02-8906-07-PA
REV. NO. 0

FINAL DRAFT
PRELIMINARY ASSESSMENT
AIRCO SPECIAL GASES
RIVERTON, NEW JERSEY

NJD 002 386 621

PREPARED UNDER

TECHNICAL DIRECTIVE DOCUMENT NO. 02-8906-07
CONTRACT NO. 68-01-7346

FOR THE

ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

AUGUST 25, 1989

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY:

RICHARD L. FEINBERG
PROJECT MANAGER

JAMES C. FROST
SITE MANAGER

REVIEWED/APPROVED BY:

RONALD M. NAMAN
FIT OFFICE MANAGER

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT

PART I: SITE INFORMATION

1. **Site Name/Alias** Airco Special Gases/Airco Industrial Gases

   Street Union Landing and River Roads

   City Riverton **State** New Jersey **Zip** 08077

2. **County** Burlington **County Code** 005 **Cong. Dist.** 13

3. **EPA ID No.** NJD002386621

4. **Latitude** 40° 01′ 10″N **Longitude** 74° 59′ 37″W

   USGS Quad. Beverly, PA-NJ

5. **Owner** Airco Industrial Gases **Tel. No.** (201) 464-8100

   Street 575 Mountain Avenue

   City Murray Hill **State** New Jersey **Zip** 07974

6. **Operator** Airco Industrial Gases **Tel. No.** (609) 829-7914

   Street P.O. Drawer 272 Union Landing and River Roads

   City Riverton **State** New Jersey **Zip** 08077

7. **Type of Ownership**

   ☒ Private ☐ Federal ☐ State
   ☐ County ☐ Municipal ☐ Unknown ☐ Other _____

8. **Owner/Operator Notification on File**

   ☒ RCRA 3001 Date 8/20/80 ☐ CERCLA 103c Date _____
   ☐ None ☐ Unknown

9. **Permit Information**

Permit	Permit No.	Date Issued	Expiration Date	Comments
NPDES	NJ0004545	Unknown	Unknown	

10. **Site Status**

    ☒ Active ☐ Inactive ☐ Unknown

11. **Years of Operation** 1/1/63 to Present

12. **Identify the types of waste units (e.g., 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 Management Areas

Waste Unit No.	Waste Unit Type	Facility Name for Unit
1	Containers	Gas Cylinders/Tanks
2	Drums	Drum Storage Area

(b) Other Areas of Concern

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

No known spills or dumping have been reported at the site. Airco has been cited in 2 Notices of Violation (NOVs), which resulted in an $800 fine, for failure to: inspect the storage area daily, hold semi-annual drills, and have semi-annual inspections by the local fire department. The fine was paid on May 28, 1989 and Airco is apparently now in compliance.

During inspections conducted by NJDEP on January 29 and February 2, 1987, it was noted that Airco exceeded the 90-day maximum storage requirement for generators. This violation was included in the January 29, 1987 NOV issued to Airco and this violation was included in the Notice of Civil Administrative Penalty Assessment dated May 4, 1987. However, it should be noted, that an inspection also by NJDEP on March 3, 1987 indicated that Airco "has come into compliance by correcting all the violations noted during the RCRA inspection on 2-20-87."

13. **Information available from**

Contact Amy Brochu **Agency** U.S. EPA **Tel. No.** (201) 906-6802

Preparer James C. Frost **Agency** NUS Corp. Region 2 FIT **Date** August 21, 1989

PART II: WASTE SOURCE INFORMATION

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

Waste Unit 1 - Containers, Gas Cylinders/Tanks

1. Identify the RCRA status and permit history, if applicable, and the age of the waste unit.

On August 20, 1980, Airco filed a Notification of Hazardous Waste Activity with U.S. EPA. This filing was verified by U.S. EPA on October 9, 1980. On November 17, 1980, Airco filed a Part A permit application ,EPA Form 3510-1(6-80) and EPA Form 3510-3(6-80). The facility began operation January 1, 1963.

On November 6, 1981, Airco, through its membership in the Compressed Gas Association, received a letter of clarification concerning its status under RCRA requirements from Christopher J. Capper, Acting Assistant Administrator for Solid Waste and Emergency Response. In this letter U.S. EPA asserts that gas cylinder handling facilities are not normally subject to the then-current RCRA regulations. Residues contained in the cylinder are not hazardous until the cylinders are being discarded, according to the letter. On February 5, 1982, Airco requested to be delisted to generator only status. On January 28 and February 2, 1987, Airco was inspected by the New Jersey Department of Environmental Protection (NJDEP) and identified as a generator. There is no record currently available to indicate that Airco has been formally designated as a generator rather than a Treatment, Storage, and Disposal Facility (TSDF).

As a result of the January 29 and February 2, 1987 inspections, Airco was sent 2 Notices of Violation (NOVs) on January 29, 1987 and on February 2, 1987. The violations listed in these NOV's include: holding wastes for greater than 90 days, failure to inspect the storage area daily, failure to hold semi-annual drills, and failure to have at least semi-annual inspections by the local fire department. On March 3, 1987, the NJDEP inspection personnel believed that Airco had come into compliance and all violations were resolved. On May 4, 1987, NJDEP filed a Notice of Civil Administrative Penalty Assessment and fined Airco $800 for the violations cited above. Payment of the penalty was received on May 28, 1987 by NJDEP.

2. Describe the location of the waste unit and identify clearly on the site map.

The facility is located on a property of about 500 by 1500 feet or about 17 acres. Only about half of the property is used for cylinder storage and filling; the other half is mowed lawn. Cylinders are stored all over the production half of the property. Cylinders of only two sizes were seen during the NUS Corp. off-site reconnaissance. Cylinders about 5 feet long and cylinders which were truck-mounted and about 30 feet long were observed. It is not known which of these cylinders were awaiting disposal, and thus contained hazardous waste by definition from U.S. EPA, and which were merely awaiting refilling.

3. Identify the size or quantity of the waste unit (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.

In its Notification of Hazardous Wastes Activity, Airco identified spent halogenated solvents (F001), methyl chloroform (U226), and 1,1,2-trichloroethane as hazardous wastes. In its permit application, Airco indicated that it had a process design capacity of 550 gallons in storage container(s) and 150,000 liters per day in treatment tank(s). In the same permit application Airco estimated its annual quantity of wastes as 200 pounds of arsenic (D004), 100 pounds of hydrogen phosphide (P096), 50 pounds of hydrogen sulfide (U135), 2500 pounds of corrosives, 50 pounds of nitric oxide, and 25 pounds of nitrogen dioxide.

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

   From correspondence contained in the files, the hazardous wastes appear to be sludges and residues in the compressed gas cylinders.

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

   Hazardous substances known or suspected to be present are: spent halogenated solvents, methyl chloroform, 1,1,2-trichloroethane, arsenic, hydrogen phosphide, hydrogen sulfide, corrosives, nitric oxide, nitrogen dioxide, and trichloroethylene. Cylinders are cleaned after each use at an off-site TSD cleaning facility.

6. **Describe the containment of the waste unit as it relates to contaminant migration via groundwater, surface water, and air.**

   The ground on which the cylinders were placed was paved with macadam. Due to the size and nature of the facility, it could not be determined if the plant grounds were sloped to collect surface runoff for treatment prior to discharge; however, no units could be seen that would likely be used for wastewater treatment of stormwater runoff, thus providing an additional containment level for any contaminated runoff.

Ref. Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 28

PART II: WASTE SOURCE INFORMATION

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

Waste Unit 2 - Drums, Drum Storage Area

1. Identify the RCRA status and permit history, if applicable, and the age of the waste unit.

On August 20, 1980, Airco filed a Notification of Hazardous Waste Activity with U.S. EPA. This filing was verified by U.S. EPA on October 9, 1980. On November 17, 1980, Airco filed a Part A permit application ,EPA Form 3510-1(6-80) and EPA Form 3510-3(6-80). The facility began operation January 1, 1963.

On November 6, 1981, Airco, through its membership in the Compressed Gas Association, received a letter of clarification concerning its status under RCRA requirements from Christopher J. Capper, Acting Assistant Administrator for Solid Waste and Emergency Response. In this letter U.S. EPA asserts that gas cylinder handling facilities are not normally subject to the then-current RCRA regulations. Residues contained in the cylinder are not hazardous until the cylinders are being discarded, according to the letter. On February 5, 1982, Airco requested to be delisted to generator only status. On January 28 and February 2, 1987, Airco was inspected by the New Jersey Department of Environmental Protection (NJDEP) and identified as a generator. There is no record currently available to indicate that Airco has been formally designated as a generator rather than a Treatment, Storage, and Disposal Facility (TSDF).

As a result of the January 29 and February 2, 1987 inspections, Airco was sent 2 Notices of Violation (NOVs) on January 29, 1987 and on February 2, 1987. The violations listed in these NOV's include: holding wastes for greater than 90 days, failure to inspect the storage area daily, failure to hold semi-annual drills, and failure to have at least semi-annual inspections by the local fire department. On March 3, 1987, the NJDEP inspection personnel believed that Airco had come into compliance and all violations were resolved. On May 4, 1987, NJDEP filed a Notice of Civil Administrative Penalty Assessment and fined Airco $800 for the violations cited above. Payment of the penalty was received on May 28, 1987 by NJDEP.

2. Describe the location of the waste unit and identify clearly on the site map.

The facility is located on a property of about 500 by 1,500 feet or about 17 acres. In its permit application, Airco identified a drum storage area. However, by this area could not be verified during the NUS Corp. off-site inspection conducted on July 6, 1989. No drums were observed during the inspection.

3. Identify the size or quantity of the waste unit (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.

In its Notification of Hazardous Wastes Activity, Airco identified spent halogenated solvents (F001), methyl chloroform (U226), and 1,1,2-trichloroethane as hazardous wastes. In its permit application, Airco indicated that it had a process design capacity of 550 gallons in storage container(s) and 150,000 liters per day in treatment tank(s). In the same permit application Airco estimated its annual quantity of wastes as 200 pounds of arsenic (D004), 100 pounds of hydrogen phosphide (P096), 50 pounds of hydrogen sulfide (U135), 2500 pounds of corrosives, 50 pounds of nitric oxide, and 25 pounds of nitrogen dioxide. NJDEP personnel have observed one drum of trichloroethylene at the facility.

During a February 9, 1987 inspection, NJDEP personnel identified 134 drums of waste liquid corrosive (Not Otherwise Specified (NOS), 19 drums of waste liquid corrosive NaOH, 5 drums of waste corrosive sludge (NOS), $SiCl_4$, 2 drums of trichloroethylene, and 1 drum of waste liquid arsenic

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

   From correspondence contained in the files, the hazardous wastes appear to be liquids and sludges.

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

   Hazardous substances known or suspected to be present are: spent halogenated solvents, methyl chloroform, liquid arsenic, corrosives, nitric oxide, nitrogen dioxide, and trichloroethylene.

6. **Describe the containment of the waste unit as it relates to contaminant migration via groundwater, surface water, and air.**

   Because no drums were observed, containment could not be observed and it is, therefore, unknown.

Ref. Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

PART III: HAZARD ASSESSMENT

GROUNDWATER ROUTE

1. **Describe the likelihood of a release of contaminant(s) to the groundwater as follows: observed, alleged, potential, or none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminant(s) to the facility.**

   The likelihood for release of contaminants to groundwater is rated as none. The production area is paved or indoors. Empty gas cylinders are stored outside; however, due to their construction and anticipated use, it is doubtful whether they would rust through prior to disposal. The cylinders are capped, further reducing chances of release. Since the location of drums is unknown and they were not observed during a NUS Corp. off-site reconnaissance, the potential of a release could not be assessed.

   Ref. Nos. 3, 5, 14

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

   The site lies on the Magothy and Raritan Formations which are Late Cretaceous in age and are composed of unconsolidated sand, clay, silt, and small amounts of gravel. In the outcrop area, on which the site is located, the Raritan is about 200 feet thick and the Magothy ranges in thickness from 0 to 45 feet. In the Delaware Valley, the outcrop area of both formations is almost completely covered by permeable sand and gravel, and semi-permeable silt and clay deposits of Pleistocene age.

   Northeast of Trenton, the outcrop area of the Magothy and Raritan Formations typically attains altitudes greater than 100 feet and this area is considered the major recharge area for the aquifer system. Groundwater has historically flowed radially away from this area from northeast to southwest, discharging into Raritan Bay to the northeast and the Delaware River to the southwest. In response to pumpage, some induced recharge from the Delaware River enters the aquifer system through silt and clay in the river bed. Lowered water levels have undoubtedly induced additional recharge from surface waters in the outcrop area. These sources of recharge have not altered the long-term regional trend of declining water levels.

   Ref. Nos. 15, 17

3. **Is a designated sole source aquifer within 3 miles of the site?**

   There are no designated sole source aquifers within 3 miles of the site.

   Ref. No. 25

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

   The static water level in the Hoeganaes Company well is reported as 16 feet below land surface. Since the cylinders are stored on the ground, the depth to the aquifer of concern is 16 feet. The Hoeganaes Company is a manufacturing plant located about 1,000 feet northeast of Airco.

   Ref. Nos. 15, 17

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

   The permeability value of the least permeable continuous intervening stratum is greater than 10^{-3} cm/sec.

   Ref. No. 26

6. **What is the net precipitation for the area?**

The net precipitation is estimated to be 9.75 inches.

Ref. No. 26

7. **Identify uses of groundwater within 3 miles of the site (i.e., private drinking source, municipal source, commercial, industrial, irrigation, unusable).**

Groundwater within 3 miles of the site is used for public water supply sources, commercial and industrial purposes. The nearest well is at the Hoeganaes Company about 1,000 feet northeast of Airco.

Ref. Nos. 15, 17, 18

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

Distance 1,000 feet **Depth** 136 feet

Ref. Nos. 14, 15, 17, 27

9. **Identify the population served by the aquifer of concern within a 3-mile radius of the site.**

Many public wells are known to exist in the area. These wells are interconnected, as can be seen on the NJDEP Water Supply Overlay sheet Nos. 27 and 31. It also appears that this entire area is served only by wells. Surface water is not used by communities within 3 miles of the site, except for Philadelphia which is across the Delaware River (see discussion under surface water route). While the exact population served by these wells is not known, the State of New Jersey has estimated the population of Cinnaminson, Delanco, and Delran Townships; and the Boroughs of Palmyra and Riverton at about 45,000. These areas are within 3 miles of the site and, therefore, it is safe to assume that more than 10,000 people live within 3 miles of the site and use this groundwater for drinking purposes.

Ref. Nos. 14, 15, 17, 18, 30

SURFACE WATER ROUTE

10. **Describe the likelihood of a release of contaminant(s) to surface water as follows: observed, alleged, potential, or none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminants to the facility.**

The likelihood for release to surface waters is rated as none. The production area is paved or indoors. Empty gas cylinders are stored outside; however, due to their construction and anticipated use it is doubtful whether they would rust through prior to disposal. The cylinders are capped, further reducing chances of release. The site is located in a Zone B floodplain which means it may lie in the 100- to 500-year floodplain or be flooded by less than one foot during the 100-year flood. Actual flooding of the site is unknown. The likelihood of a release from the drums is unknown since they were not observed during the NUS Corp. off-site reconnaissance.

Ref. Nos. 3, 5, 14

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

The nearest surface water is an unnamed tributary of the Delaware River. This tributary flows about 1,500 feet prior to its confluence with the Delaware River.

Ref. Nos. 14, 27

12. What is the facility slope in percent? (Facility slope is measured from the highest point of deposited hazardous waste to the most downhill point of the waste area or to where contamination is detected.)

The facility slope is estimated to be less than 1 percent.

Ref. Nos. 14, 27

13. What is the slope of the intervening terrain in percent? (Intervening terrain slope is measured from the most downhill point of the waste area to the probable point of entry to surface water.)

The slope of the intervening terrain is estimated to be less than 1 percent.

Ref. Nos. 14, 27

14. What is the 1-year 24-hour rainfall?

The 1-year 24-hour rainfall is estimated to be 2.75 inches.

Ref. No. 26

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

The nearest surface water is an unnamed tributary which discharges into the Delaware River. This ditch is less than 100 feet from the site.

Ref. No. 27

16. Identify uses of surface waters within 3 miles downstream of the site (i.e., drinking, irrigation, recreation, commercial, industrial, not used).

The Delaware River downstream of Trenton is tidally influenced and therefore, consideration of the uses of the river both "upstream" and "downstream" of the site must be assessed. The Delaware River Basin Commission (DRBC) has segmented the river into zones. This site lies within 3 miles of the division between Zones 2 and 3. Zone 2 is used for municipal water supply use, commercial and industrial water intakes and extensively for recreation. The City of Philadelphia operates a water treatment plant within 3 miles "upstream" of the site and it withdraws over 200 mgd for domestic and industrial use. Assuming 50 to 100 gallons per capita per day, an industry design standard, this plant serves 2 to 4 million persons per day. The river is also used for commercial navigation and effluent disposal.

The State of New Jersey, in accordance with its agreements regarding the Delaware River Basin Commission, has designated the following uses in Zone 2: agricultural, industrial and public water supply after reasonable treatment; wildlife; maintenance and propagation of resident game fish and other aquatic biota; passage of anadromous fish; primary contact recreation from river mile 133.4 to river mile 117.81; secondary contact recreation from river mile 133.4 to river mile 108.4; and navigation. The designated uses for Zone 3 are: agricultural, industrial and public water supply after reasonable treatment; wildlife; maintenance of resident fish and other aquatic biota; migration of anadromous fish; secondary contact recreation; and navigation.

Ref. No. 23

17. Describe any wetlands, greater than 5 acres in area, within 2 miles downstream of the site. Include whether it is a freshwater or coastal wetland.

Several areas along the Delaware River are designated as wetlands. The Department of the Interior has designated these as Palustrine, open water; and tidal, riverine regularly-flooded flats. The closest areas are about 1500 feet from the site along the Delaware River.

Ref. No. 21

18. Describe any critical habitats of federally listed endangered species within 2 miles of the site along the migration path.

The Delaware River Basin Commission 1988 305(b) report indicates that the short-nosed sturgeon, a federally-listed endangered species, is found in Zone 2 in relatively large numbers.

Ref. No. 23

19. What is the distance to the nearest sensitive environment along or contiguous to the migration path (if any exist within 2 miles)?

The distance to the nearest sensitive environment, the coastal wetlands along the river, is estimated to be about 1,500 feet.

Ref. No. 27

20. Identify the population served or acres of food crops irrigated by surface water intakes within 3 miles downstream of the site and the distance to the intake(s).

The population served by surface water treatment plants is in excess of 2 million. The intake for the Philadelphia Water Plant in Torresdale is 6,000 feet "upstream" from the facility. Since the river in this reach is tidal, thus reversing the flow of the river, intakes upstream and downstream from the site have been identified.

Ref. Nos. 23, 27

21. What is the state water quality classification of the water body of concern?

The Delaware River in this reach is classified by the State of New Jersey, in accordance with regulations promulgated by the Delaware River Basin Commission, as Zone 2.

Ref. No. 16

22. Describe any apparent biota contamination that is attributable to the site.

No biota contamination has been observed or reported.

Ref. No. 14

AIR ROUTE

23. Describe the likelihood of a release of contaminant(s) to the air as follows: observed, alleged, potential, none. Identify the contaminant(s) detected or suspected, and provide a rationale for attributing the contaminant(s) to the facility.

Due to the nature of the business, filling gas cylinders, a release could occur from product materials. However, the present potential of an air release from the sediments in the cylinders is rated very low. The potential of a release from the drums is unknown.

Ref. No. 14

24. What is the population within a 4-mile radius of the site?

The population is a 4-mile radius is estimated to be 210,900.

Ref. No. 22

FIRE AND EXPLOSION

25. Describe the potential for a fire or explosion to occur with respect to the hazardous substance(s) known or suspected to be present on site. Identify the hazardous substance(s) and the method of storage or containment associated with each.

Due to the products made here, there is a present potential for fire since some of these products are flammable and/or explosive. The potential of a release from the drums is unknown.

Ref. Nos. 1, 3, 14

26. What is the population within a 2-mile radius of the hazardous substance(s) at the facility?

The population within a 2-mile radius is estimated to be 30,300.

Ref. No. 22

DIRECT CONTACT/ON-SITE EXPOSURE

27. Describe the potential for direct contact with hazardous substance(s) stored in any of the waste units on site or deposited in on-site soils. Identify the hazardous substance(s) and the accessibility of the waste unit.

The site is well fenced and contact by unauthorized personnel is negligible. Several employees were observed on the facility's grounds; therefore, there is a potential for direct contact by employees.

Ref. No. 14

28. How many residents live on a property whose boundaries encompass any part of an area contaminated by the site?

Since there does not appear to be any contamination by the facility, there are no adjoining properties which have been contaminated. There are no residential properties which abut the facility.

Ref. Nos. 14, 19, 27

29. What is the population within a 1-mile radius of the site?

The population within a 1-mile radius is estimated to be 2,800.

Ref. No. 22

PART IV: SITE SUMMARY AND RECOMMENDATIONS

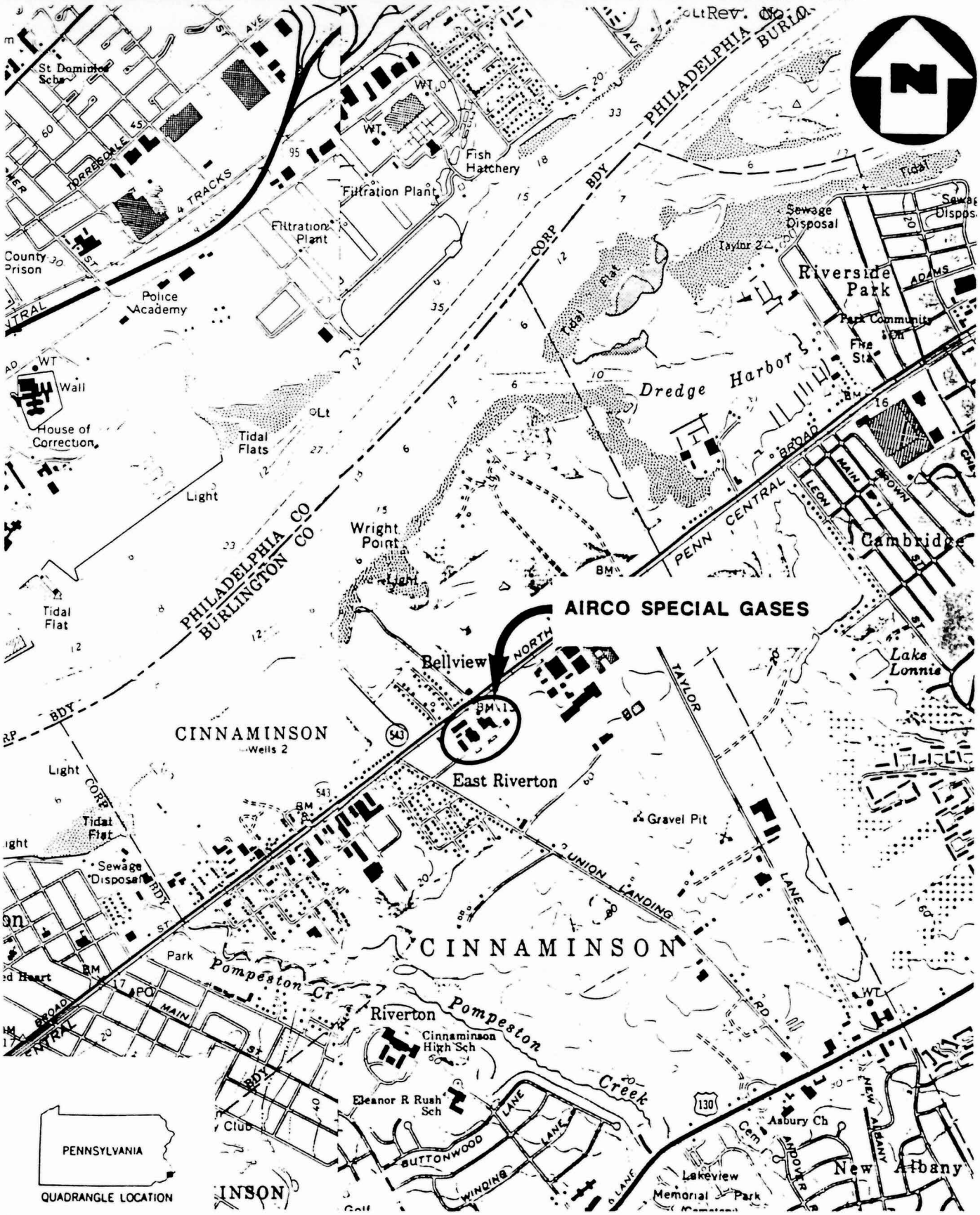
Airco Special Gases, alias Airco Industrial Gases, Airco, and Airco Industrial and Specialty Gases, is a privately owned company and is located at the intersection of River Road and Union Landing Road near East Riverton, New Jersey. The facility prepares gases for industrial purposes and uses cylinders to transport these gases to its customers. The facility is located in an industrial area but there are small residential areas to the north and south of it. Groundwater in the area is extensively used by various water companies. Surface water, particularly the Delaware River, is used for recreation and as a source of water supply for the City of Philadelphia. The property is about 17 acres in size, of which about one half is used for gas production and cylinder storage.

According to the Notification of Hazardous Waste Activity on file, Airco identified spent halogenated solvents (F001), methyl chloroform (U226), and 1,1,2-trichloroethane in its wastes. It also identified in its Part A permit application that it had a process design capacity of 550 gallons in storage capacity and 150,000 liters per day in treatment tanks. Airco estimated its annual quantity of wastes as 200 pounds of arsenic (D004), 100 pounds of hydrogen phosphide (P096), 50 pounds of hydrogen sulfide (U135), 2,500 pounds of corrosives, 50 pounds of nitric oxide and 25 pounds of nitrogen dioxide. Two drums of trichloroethylene, 134 drums of waste corrosive NOS, 19 drums of waste corrosive NaOH, 1 drum of waste liquid arsenic, and 5 drums of waste corrosive sludge have been observed by NJDEP.

Airco has been given two Notices of Violation (NOVs) for holding wastes beyond 90 days, failure to inspect the storage area daily, failure to hold semi-annual drills and failure to have semi-annual inspections by the local fire department. A March 3, 1987 NJDEP inspection found Airco to have corrected all of its violations. On May 4, 1987, Airco was issued a Notice of Administrative Penalty Assessment and was fined $800 for the violations cited above. The penalty was paid on May 28, 1987. There is no record to indicate that Airco has had any spills or releases to the environment.

Potential for direct contact is rated none for unauthorized personnel and low for employees. The site is well fenced to keep unauthorized personnel out. No cleanup actions or enforcement actions, other than the one cited above, are known.

Although there are many users of ground and surface waters in the area, there is no record that indicates that Airco has had any environmental problems. There is no record of any dumps or spills or any other release. The contents of the cylinders appear to be adequately managed and contained. Based upon this, it is assumed that the drums are also adequately managed. Therefore, a recommendation of **NO FURTHER REMEDIAL ACTION PLANNED (NFRAP)** is made.



(QUAD) BEVERLY PA.-N.J.

FIGURE 1

SITE LOCATION MAP

AIRCO SPECIAL GASES, RIVERTON, N.J.

SCALE: 1" = 2000'

NUS CORPORATION

ATTACHMENT 1

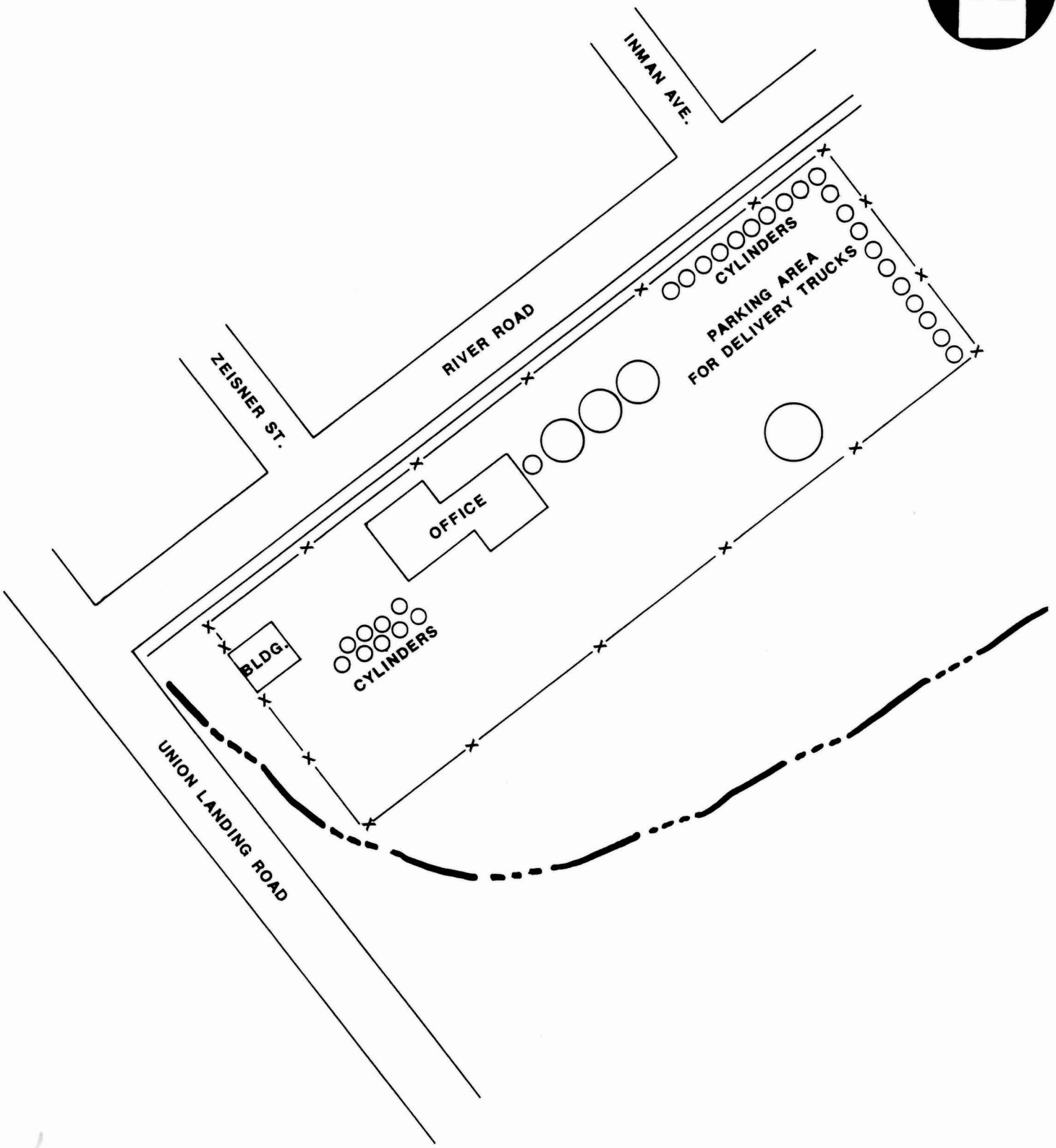


FIGURE 2

SITE MAP

AIRCO SPECIAL GASES, RIVERTON, N.J.

(NOT TO SCALE)

NUS CORPORATION

EXHIBIT A

PHOTOGRAPH LOG

AIRCO SPECIAL GASES
RIVERTON, NEW JERSEY

OFF-SITE RECONNAISSANCE: JULY 6, 1989

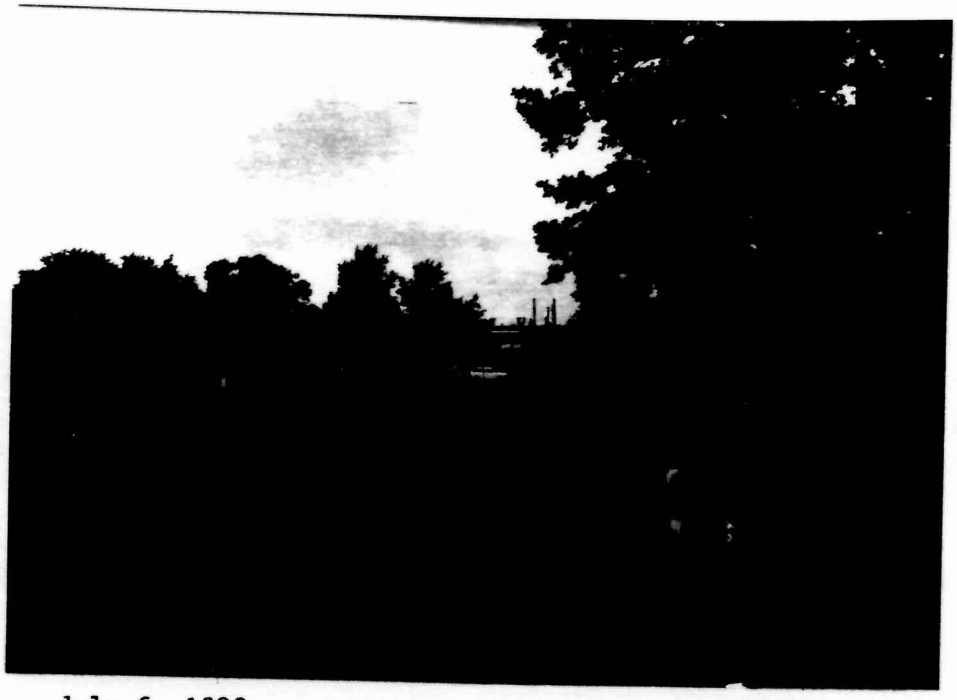
AIRCO SPECIAL GASES
RIVERTON, NEW JERSEY
JULY 6, 1989

PHOTOGRAPH INDEX

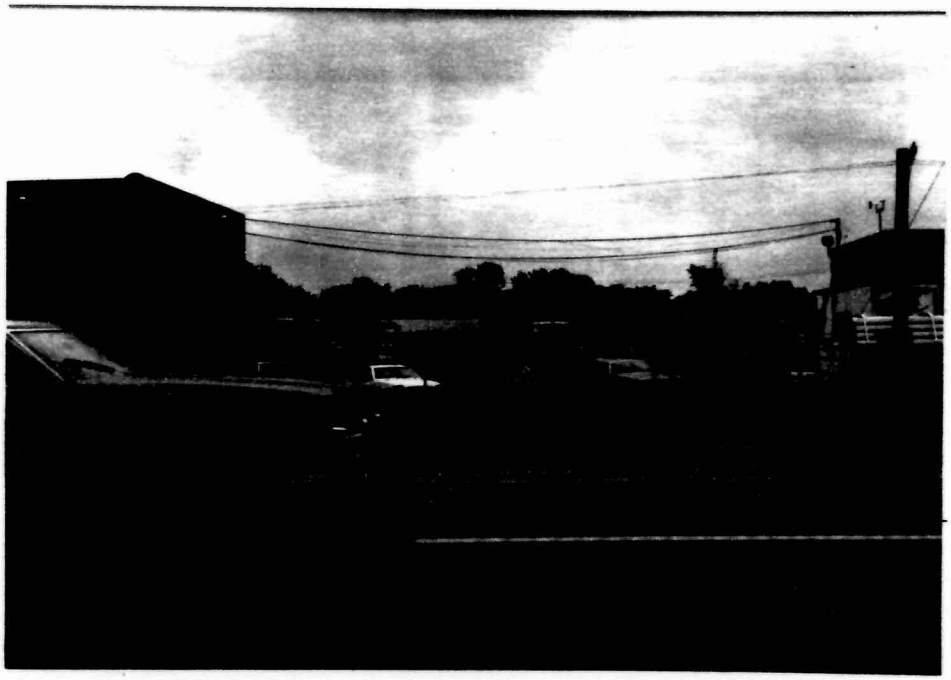
Photo Number	Description	Time
P6S6	Looking northeast at cylinders through front gate.	1409
P7S7	Looking southeast at cylinders from Zeisner Street.	1416
P8S8	Looking southeast at liquid gas tanks from Kern Street.	1424
P9S9	Looking south at what may be cylinder holders from Inman Ave.	1427
P10S10	Looking east at cylinders at north end of facility from Inman Ave.	1429

ALL PHOTOGRAPHS TAKEN BY J. FROST.

AIRCO SPECIAL GASES
RIVERTON, NEW JERSEY



R6S6 July 6, 1989 1409
Looking northeast at cylinders through front gate.



R7S7 July 6, 1989 1416
Looking southeast at cylinders from Zeisner St.

AIRCO SPECIAL GASES
RIVERTON, NEW JERSEY

R8S8 July 6, 1989 1424
Looking southeast at liquid gas tanks from Kern Street.

R9S9 July 6, 1989 1427
Looking south at what may be cylinder holders from Inman Ave.

AIRCO SPECIAL GASES
RIVERTON, NEW JERSEY

R10S10 July 6, 1989 1429
Looking east at cylinders at north end of facility from Inman Ave.

ATTACHMENT 2

REFERENCES

1. U.S. Environmental Protection Agency, Notification of Hazardous Waste Activity, EPA Form 8700-12 (6-80), August 20, 1980.

2. U.S. Environmental Protection Agency, Acknowledgement of Notification of Hazardous Waste Activity, EPA Form 8700-12B (4-80), October 9, 1980.

3. U.S. Environmental Protection Agency, General Information, Consolidated Permits Program, EPA Form 3510-1 (6-80), November 18, 1980.

4. Letter from Christopher J. Capper, Acting Assistant Administrator for Solid Waste and Emergency Response, U.S. EPA, to Lawrence W. Bierlein, Esq., Compressed Gas Association. November 6, 1981.

5. Letter from Frank J. Dux, Regulatory Compliance Coordinator, Airco Industrial Gases, to U.S. EPA and State of New Jersey. February 5, 1982.

6. NJDEP Inspection Form, Prepared by Douglas Greenfield of NJDEP. January 29 and February 2, 1987.

7. NJDEP Notice of Violation: Airco, January 29, 1987.

8. NJDEP Notice of Violation: Airco, February 2, 1987.

9. NJDEP Enforcement Referral: Airco, February 9, 1987.

10. Letter from Brian Massimi, Airco Distributor Gases, to Douglas Greenfield, NJDEP. February 9, 1987.

11. NJDEP memorandum from Doug Greenfield through Linda Jordan to Vince Krisak (all of NJDEP), Subject: Airco Riverton, Burlington NJD002386621. Reinspection for Compliance. March 3, 1987.

12. NJDEP Notice of Administrative Penalty Assessment: Airco Special Gases. May 4, 1987.

13. NJDEP Compliance Tracking Form, Prepared by JMC of NJDEP. May 28, 1987.

14. Preliminary Assessment Off-Site Reconnaissance Information Reporting Form, Airco Special Gases, TDD No. 02-8906-07, NUS Corp., Region 2 FIT, Edison, New Jersey. July 6, 1987.

15. Rush, F. Eugene. Records of wells and Ground-Water Quality in Burlington County New Jersey. Water Resources Circular No. 7, U.S. Geological Survey in cooperation with the State of New Jersey, 1962.

16. Surface Water Classification, Surface Water Quality Standards, N.J.A.C. 7:8-4, NJDEP/Division of Water Resources. May, 1985.

17. Langmuir, Donald. Iron in Ground Waters of the Magothy and Raritan Formations in Camden and Burlington Counties, New Jersey. Water Resources Circular No. 10. State of New Jersey, Department of Conservation and Economic Development, Division of Water Policy and Supply in cooperation with the U.S. Department of the Interior Geological Survey, 1969.

REFERENCES (CONT'D)

18. N.J. Department of Environmental Protection, Bureau of Geology and Topography, Land Use Overlay, Sheets 27 and 31. August, 1975.

19. N.J. Department of Environmental Protection, Bureau of Geology and Topography, Land Use Overlay, Sheet 27. 1975.

20. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Rate Map (FIRM), "Township of Cinnaminson, New Jersey, Burlington County, Page 1 of 1." May 15, 1978.

21. U.S. Department of the Interior, Fish and Wildlife Service, Atlas of National Wetlands Inventory Maps for New Jersey. 1984.

22. General Services Corporation, Graphical Exposure Modeling System (GEMS). Landover, Maryland. 1986.

23. Delaware River Basin Commission, Delaware River Water Quality Assessment, 1986-87 305(b) Report. March, 1988.

24. Wagner, Travis. The Complete Handbook of Hazardous Waste Regulations. Brunswick, Maine and Washington D.C., Perry-Wagner Publishing Co., Inc. Date Unknown.

25. Federal Register, Vol. 49, No. 16, Brunswick Shale and Sandstone Aquifer of the Ridgewood Area, New Jersey; Final Determination.

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

27. Three Mile Vicinity Map: U.S. Geological Survey Topographic Maps, 7.5 minute series: "Frankford, PA-NJ" Quadrangle, 1967, photorevised, 1973; "Beverly, PA-NJ" Quadrangle, 1966, photorevised, 1973; "Camden, NJ-PA" Quadrangle, 1967, photorevised, 1984; "Moorestown, NJ" Quadrangle, 1966, photorevised, 1981.

28. U.S. Department of Agriculture, Soil Conservation Service in cooperation with New Jersey Agricultural Experiment Station, Soil Survey, Burlington County New Jersey. October, 1971.

29. Project Note: Map of area showing wells observed during off-site reconnaissance, by J. Frost, NUS Corp., July 6, 1989.

30. New Jersey Office of Demographic and Economic Analysis, Population Estimates for New Jersey. September, 1983.

REFERENCE NO. 1

Please print or type with ELITE type *(12 characters/inch)* in the unshaded areas only. GSA No. 0246-EPA-OT

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

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

INSTALLATION'S EPA I.D. NUMBER	APPROVED	DATE RECEIVED (yr., mo., & day)
S F NJD002366211 T/A 21 C		800820

I. NAME OF INSTALLATION

AIRCO INDUSTRIAL GASES

II. INSTALLATION MAILING ADDRESS

STREET OR P.O. BOX: 3 P.O. DRAWER 272

CITY OR TOWN: 4 RIVERTON ST.: NJ ZIP CODE: 08077

III. LOCATION OF INSTALLATION

STREET OR ROUTE NUMBER: 5 UNION LANDING & RIVER ROADS

CITY OR TOWN: 6 RIVERTON ST.: NJ ZIP CODE: 08077

IV. INSTALLATION CONTACT

NAME AND TITLE *(last, first, & job title)*: 2 BORZIO J OPERATIONS MANAGER

PHONE NO. *(area code & no.)*: 609-829-7914

V. OWNERSHIP

A. NAME OF INSTALLATION'S LEGAL OWNER: 8 AIRCO INCORPORATED

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)*
- [X] C. TREAT/STORE/DISPOSE
- [ ] D. UNDERGROUND INJECTION

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

- [ ] A. AIR
- [ ] B. RAIL
- [ ] 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.

CONTINUE ON REVERSE

I.D. – FOR OFFICIAL USE ONLY

S													T/A	C
W														1
1	2											13	14	15

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
F001					
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
U226					
37	38	39	40	41	42
U227					
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
	E. F. Szymanski Director of Safety	

EPA Form 8700-12 (6-80) REVERSE

Determinations made in this filing are preliminary in nature, and thus are subject to reevaluation upon completion of our scientific and legal review.

REFERENCE NO. 2

EPA

ACKNOWLEDGEMENT OF NOTIFICATION OF HAZARDOUS WASTE ACTIVITY
(VERIFICATION)

This is to acknowledge that you have filed a Notification of Hazardous Waste Activity for the installation located at the address shown in the box below to comply with Section 3010 of the Resource Conservation and Recovery Act *(RCRA)*. Your EPA Identification Number for that installation appears in the box below. The EPA Identification Number must be included on all shipping manifests for transporting hazardous wastes; on all Annual Reports that generators of hazardous waste, and owners and operators of hazardous waste treatment, storage and disposal facilities must file with EPA; on all applications for a Federal Hazardous Waste Permit; and other hazardous waste management reports and documents required under Subtitle C of RCRA.

EPA I.D. NUMBER → •NJD002386621

AIRCO INDUSTRIAL GASES
PO DRAWER 272
RIVERTON NJ 08077

INSTALLATION ADDRESS → UNION LANDING & RIVER ROADS
RIVERTON NJ 08077

EPA Form 8700-12B (4-80) 10/09/80

REFERENCE NO. 3

Industrial Gases

575 MOUNTAIN AVENUE MURRAY HILL, NEW JERSEY 07974 • TELEPHONE 201 464 8100

November 17, 1980

Permit Contact
Permits Administration Branch
Room 432
U.S. Environmental Protection Agency
26 Federal Plaza
New York, NY 10007

Dear Sirs:

Attached are EPA forms 1 and 3 for processing.

A topographical map is not included in the application as we have experienced a delay in obtaining this. We will forward it once it is received.

If I can be of any assistance, please contact me.

Frank J. Dux
Safety Administrator

FJD:db

Attachments

Please print or type in the unshaded areas only
(fill-in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. 158-R0175

FORM 1 GENERAL

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER

S													F/A	C
F	N	J	D	0	0	2	3	8	6	6	2	1	2	D

1 2 - 13 14 15

LABEL ITEMS

I. EPA I.D. NUMBER

III. FACILITY NAME

V. 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	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	
	16	17	18		19	20	21
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	
	22	23	24		25	26	27
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	
	28	29	30		31	32	33
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	
	34	35	36		37	38	39
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	
	40	41	42		43	44	45

III. NAME OF FACILITY

C 1 SKIP AIRCO INDUSTRIAL GASES

15 16 - 29 30 - 69

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*
C 2 BORZIO J PLANT MANAGER	609 829 7914
15 16 - 45	46 - 48 49 - 51 52 - 55

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

C 3 PO BOX 272

15 16 - 45

B. CITY OR TOWN	C. STATE	D. ZIP CODE
C 4 RIVERTON	NJ	08077
15 16 - 40	41 42	47 - 51

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

C 5 UNION LANDING & RIVER ROADS

15 16 - 45

B. COUNTY NAME

BURLINGTON

46 - 70

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE *(if known)*
C 6 RIVERTON	NJ	08077	
15 16 - 40	41 42	47 - 51	52 - 54

CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

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

A. FIRST	B. SECOND
7 2813 (specify) INDUSTRIAL GASES	7 2819 (specify) INDUSTRIAL INORGANIC CHEMICALS

C. THIRD	D. FOURTH
7 (specify)	7 (specify)

VIII. OPERATOR INFORMATION

A. NAME: 8 AIRCO INDUSTRIAL GASES

B. Is the name listed in Item VIII-A also the owner? ☒ 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)
P (specify)

D. PHONE (area code & no.): A 201 464 8100

E. STREET OR P.O. BOX: 575 MOUNTAIN AVENUE

F. CITY OR TOWN: B MURRAY HILL

G. STATE: NJ

H. ZIP CODE: 07974

IX. INDIAN LAND

Is the facility located on Indian lands? ☐ YES ☒ NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water): 9 N NJ0004545	D. PSD (Air Emissions from Proposed Sources): 9 P
B. UIC (Underground Injection of Fluids): 9 U	E. OTHER (specify): 9 (specify)
C. RCRA (Hazardous Wastes): 9 R	E. OTHER (specify): 9 (specify)

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property bounderies. 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. F9: N/50

XII. NATURE OF BUSINESS (provide a brief description)

BLENDING OF VARIOUS INDUSTRIAL GASES TO CUSTOMER SPECIFICATIONS.

F9: 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
T. E. PARKER - VICE PRESIDENT BUSINESS MANAGER	T E Parker	11/18/80

COMMENTS FOR OFFICIAL USE ONLY

C

Please print or type in the unshaded areas only
(areas are spaced for elite type, i.e., 12 characters/inch)

Form Approved OMB No. 158-S80004

FORM 3 RCRA

EPA

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

S													T/A	C
F	N	J	D	0	0	2	3	8	6	6	2	1	3	1

1 2 - 13 14 15

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS
71	73 - 29	

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

C 15 | YR. 73 74: 6 3 | MO. 75 76: 0 1 | DAY 77 78: 0 1 — FOR EXISTING FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

___ 71 2. NEW FACILITY *(Complete item below.)*

YR. 73 74 | MO. 75 76 | DAY 77 78 — FOR NEW FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR IS EXPECTED TO BEGIN

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

___ 72 1. FACILITY HAS INTERIM STATUS

___ 72 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.

S		T/A	C
C	DUP		1

1 2 - 13 14 15

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. PROCESS DESIGN CAPACITY 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. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
	16 - 18	19 - 27	28	29 - 32		16 - 18	19 - 27	28	29 - 32
X-1	S 0 2	600	G		5				
X-2	T 0 3	20	E		6				
1	S 0 1	550	G		7				
2	T 0 1	150,000	V		8				
3					9				
4					10				

CONTINUE ON REVERSE

III. PROCESSES *(continued)*

C. SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESSES *(code "T04")*. FOR EACH PROCESS ENTERED HERE 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	
X-2	D002	400	P	T03 D80	
X-3	D001	100	P	T03 D80	
X-4	D002				*included with above*

CONTINUE ON PAGE 3

Continued from page 2.

NOTE: Photocopy this page before completing if you have more than 26 wastes to list.

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EPA I.D. NUMBER *(enter from page 1)*	FOR OFFICIAL USE ONLY
S W N J D 0 0 2 3 8 6 6 2 1 T/A 3 C 1 (1–13, 14, 15)	S W DUP T/A 3 C 2 DUP (1–13, 14, 15, 23–26)

IV. DESCRIPTION OF HAZARDOUS WASTES *(continued)*

LINE NO.	A. EPA HAZARD. WASTE NO. *(enter code)* (23–26)	B. ESTIMATED ANNUAL QUANTITY OF WASTE (27–35)	C. UNIT OF MEASURE *(enter code)* (36)	D. PROCESSES 1. PROCESS CODES *(enter)* (27–29, 27–29, 27–29, 27–29)	D. PROCESSES 2. PROCESS DESCRIPTION *(if a code is not entered in D(1))*
1	D004	200	P	T01 S01	
2	P096	100	P	T01	
3	U135	50	P	T01	
4	D002	2500	P	T01 S01	
5	P076	50	P	T01	
6	P078	25	P	T01	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					

CONTINUE ON REVERSE

Continued from the front

IV. DESCRIPTION OF HAZARDOUS WASTES *(continued)*

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

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

S												T/A	C
F	N	J	D	0	0	2	3	8	6	6	2	1	3	6

F6: A/55 F6: A/56

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 01 000	074 59 300

VIII. FACILITY OWNER

X 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
T. E. PARKER	T. E. Parker	11/18/80

X. OPERATOR CERTIFICATION

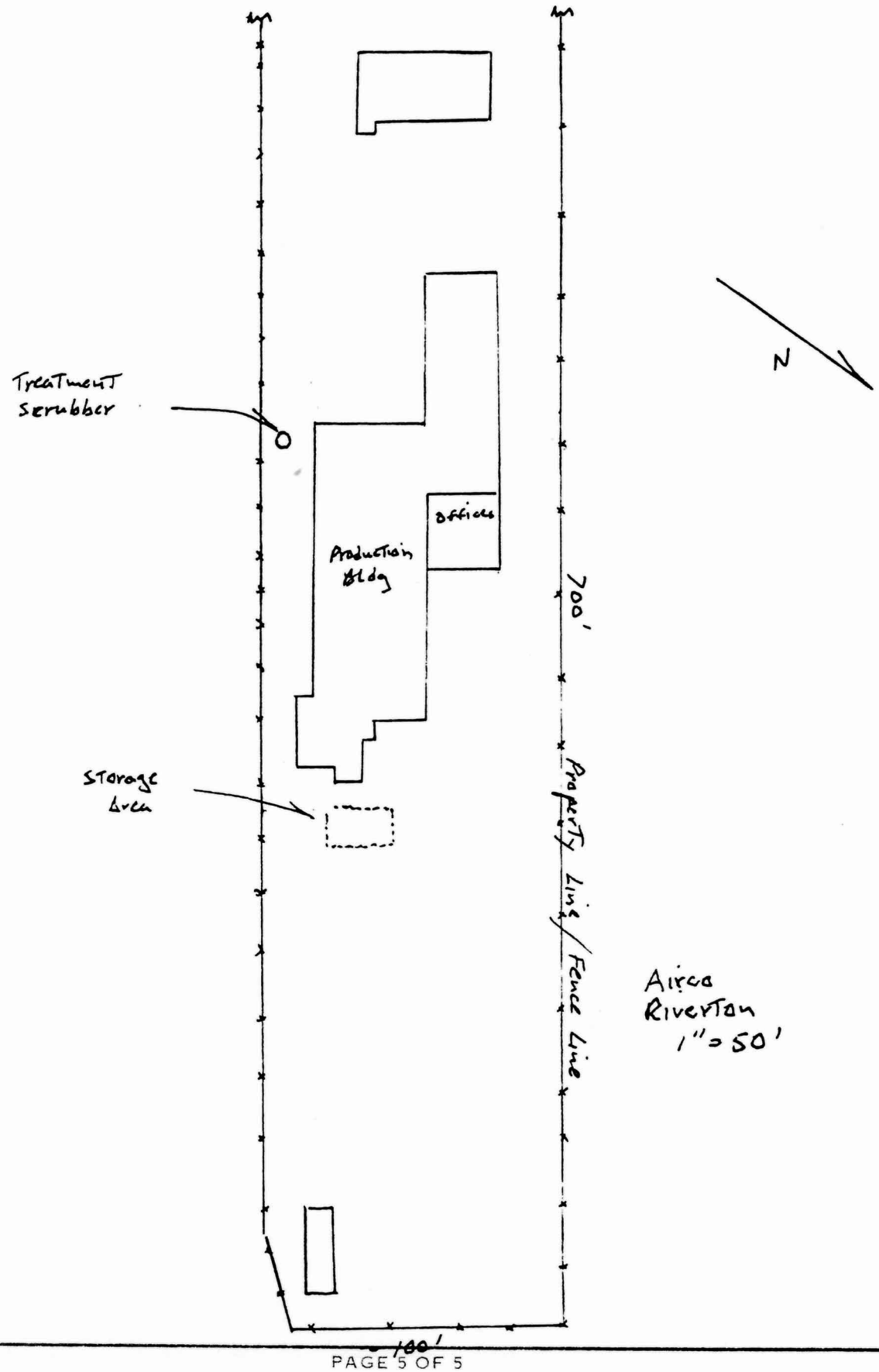
I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true,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

A. NAME	B. SIGNATURE	C. DATE SIGNED
T. E. PARKER	T. E. Parker	11/18/80

CONTINUE ON PAGE 5

Continued from page 4. Form Approved OMB No. 158-S80004

V. FACILITY DRAWING (see page 4)



REFERENCE NO. 4

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

NOV 6 1981

Lawrence W. Bierlein, Esq.
Compressed Gas Association
910 Seventeenth Street, N.W.
Washington, D.C. 20006

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

Dear Mr. Bierlein:

This is in response to your inquiry on the Resource Conservation and Recovery Act (RCRA) requirements to handle residues removed from compressed gas cylinders.

We understand that cylinders (defined generally under Department of Transportation regulations, 49 CFR 171.8, as pressure vessels having a water capacity not exceeding 1000 pounds and constructed in accordance with DOT requirements) are typically returned to gas suppliers containing gaseous residues. We further understand that these returned cylinders often are "topped off" without discard of the residues, and with reclamation of the residues by the gas supplier. In these situations, the residues are not solid wastes under §261.2, and thus, do not entail consideration of compliance with the hazardous waste regulations. (See letter from John P. Lehman to you dated November 3, 1980.)

If the gas supplier, however, decides to discard cylinders containing gaseous, liquid, or physically solid residues (i.e., non-empty containers) that meet the definitions in 40 CFR Part 261, the residues in the cylinders become hazardous wastes because they are being discarded, and these residues (and the cylinders) must be handled in compliance with the regulations. Any shipment of these contained gaseous or other wastes off-site must be in compliance with all generator and transporter requirements under 40 CFR Parts 262 and 263. Additionally, any such gas cylinders which are discarded or intended to be discarded must be managed in accordance with the requirements under 40 CFR Parts 264 to 267. Furthermore, any liquid or physically solid wastes removed from the cylinders or derived from the treatment of the contained gases, such as scrubber residues or waste neutralizing solutions, that are hazardous must be managed in accordance with the Subtitle C waste regulations.

The primary question raised by the Compressed Gas Association relates to the handling of gaseous residues removed from cylinders and neutralized, scrubbed, flared, or vented to the atmosphere, and specifically whether this activity constitutes the management of hazardous waste under the RCRA regulations. EPA does not construe the present regulations as applying to these practices. EPA has prioritized its regulatory efforts regarding hazardous wastes, and concluded that the flaring and venting of hazardous compressed gases or gases that are neutralized or scrubbed prior to their release to the environment does not demand immediate regulatory attention under the hazardous waste regulations. Accordingly, it is the position of the Agency that any gas cylinder handling facility is not subject presently to regulations promulgated under the Resource Conservation and Recovery Act, in the handling, neutralization, scrubbing, flaring or venting of gaseous residues removed from compressed gas cylinders.

The Compressed Gas Association has contended that the Agency lacks jurisdiction under RCRA to regulate the neutralization, scrubbing, flaring or venting of gases removed from cylinders, based on the definition of "solid waste" in section 1004 of RCRA and the legislative history of the statute. In light of the Agency's determination expressed in this letter, that such activities are not covered by today's RCRA regulations, we see no need to resolve the jurisdictional issue at this time. The Compressed Gas Association possesses the right to petition the Court of Appeals for review if and when the Agency asserts jurisdiction under RCRA over these activities in the future.

Sincerely yours,

Christopher J. Capper

Christopher J. Capper
Acting Assistant Administrator
for Solid Waste and Emergency Response

Full text of the changes between proposal and adoption follows (additions to proposal shown in boldface with asterisks ***thus***).

SUBCHAPTER 1. OYSTER DREDGING LICENSES
(No change from proposal.)

SUBCHAPTER 2. OYSTER MANAGEMENT IN DELAWARE BAY

7:25A-2.1 Division of Section E

(a) The Division of Fish, Game and Wildlife will divide Section E, as defined in [R.S.] **N.J.S.A.** 50:1-23 and consisting of approximately 7,877.7 acres, into 12 acre lots and designate each either an "A" or "B" lot, an "A" lot being in the judgment of the division more suitable for the planting and cultivation of oysters.

1. The coordinates of each corner of each lot shall be determined by the division. All the remaining parcels will be "B" lots.

2.* The division may further subdivide a 12 acre "B" lot at the request of an applicant. The subdivided lot must be contiguous to the applicant's existing leasehold.

7:25A-2.3 Leasing of "B" Lots

(a) The owner of an operable vessel which was licensed to dredge oysters pursuant to [R.S.] **N.J.S.A.** 50:3-1 in either 1978, 1979, or 1980 may lease one "B" lot of his choice for each vessel licensed **in any calendar year**.

1. However, no owner may lease more than two "B" lots per vessel, ***unless he chooses to vacate his "A" lot and lease an additional "B" lot in its place***.

2. The initial fee for each "B" lot will be $1,000 and thereafter shall be the regular lease fee per acre.

(a)

DIVISION OF WASTE MANAGEMENT

Hazardous Waste Management
Gas Cylinder Facility Exemption

Adopted Amendments: N.J.A.C. 7:26-1.4, 9.1 and 12.1

Proposed: March 21, 1983 at 15 N.J.R. 390(a).
Adopted: August 9, 1983 by Robert E. Hughey, Commissioner, Department of Environmental Protection.
Filed: August 11, 1983 as R.1983 d.350, **with substantive changes** not requiring additional public notice and comment (see N.J.A.C. 1:30-3.5).

Authority: N.J.S.A. 13:1E-6a(2).

Effective Date: September 6, 1983.
Expiration Dates pursuant to Executive Order No. 66(1978): Subchapter 1, June 30, 1983; Subchapter 9, October 8, 1986; Subchapter 12, October 8, 1986.

Summary of Public Comments and Agency Response:

The Department held a public hearing on April 28, 1983, concerning the proposed amendments. In addition to the verbal testimony at the hearing, the Department received one written comment.

One commentor suggested that condition No. 2 of the proposed definition of "gas cylinder facility" be revised to read: "2. Is a gas supplier and only accepts cylinders owned by or under the equivalent control of the gas supplier." This change was suggested because on occasion legal title to the gas cylinder may not, in fact, be held by the gas supplier but rather by a bank or other lending institution, holding company, lessor or other similar party. The Department has amended the definition of "gas cylinder facility" by including the suggested language.

Full text of the changes between proposal and adoption follows (additions to proposal shown in boldface with asterisks ***thus***; deletions from proposal shown in brackets with asterisks ***[thus]***).

7:26-1.4 Definitions

"Authorized facility" means a hazardous waste [treatment, storage or disposal] facility which [has]:

1.–6. (No change from proposal.)

[7. Is exempt from the New Jersey hazardous waste facility operating and permitting requirements by operation of N.J.A.C. 7:26-9.1(c)11 and 7:26-12.1(b)10.]

. . .

"Gas cylinder facility" means a *[hazardous waste]* facility that *meets all of the following criteria*:

1. *[Dispose of only hazardous waste residue from gas cylinders]*. *The only hazardous waste it disposes of is hazardous waste residue from gas cylinders*; and

2. Is a gas supplier and only accepts gas cylinders *which* it owns, * or which are under its equivalent control,* back from its own customers; and

3. (No change from proposal.)

. . .

7:26-9.1 Scope of applicability

(a)–(b) (No change.)

(c) The standards and requirements of this subchapter do not apply to:

1.–10. (No change.)

11. The owner or operator of a gas cylinder facility *[that disposes of all hazardous waste within 90 days of its receipt (the standards and requirements of this subchapter do apply to storage at other than a gas cylinder facility),]* provided the following conditions are satisfied:

i.–iii. (No change from proposal.)

7:26-12.1 Scope of applicability

(a) No change.)

(b) The following persons are not required to obtain a permit pursuant to this subchapter to conduct the following activities or construct or operate the following hazardous waste facilities:

1.–9. (No change.)

10. The owner or operator of a gas cylinder facility *[that disposes of all hazardous waste within 90 days of its receipt (the standards and requirements of this subchapter do apply to storage at other than a gas cylinder facility),]* provided the following conditions are satisfied:

i.–iii. (No change.)

REFERENCE NO. 5

AIRCO Industrial Gases

575 MOUNTAIN AVENUE, MURRAY HILL, NEW JERSEY 07974 • TELEPHONE 201-464-8100

February 5, 1982

U.S. Environmental Protection Agency
Region II
Solid Waste Branch
26 Federal Plaza
New York, NY 10007

State of New Jersey
Solid Waste Administration
Division of Environmental Quality
P. O. Box CN027
Trenton, NJ 08625

Dear Sirs:

On November 19, 1980, an application for interim status as a treatment/storage facility was submitted for our operation located at:

Airco Industrial Gases
Union Landing & River Roads
Riverton, NJ 08077

U.S. EPA #NJD002386621

When this application for interim status was submitted, it was unclear to us whether the type of operations at this plant were regulated under 40CFR Parts 264 to 267.

Through the Compressed Gas Association, we and the other member companies solicited an interpretation from the U.S. EPA on operations of this type. Mr. Christopher J. Capper, Acting Assistant Administrator for Solid Waste and Emergency Response, U.S. EPA responded in a letter dated November 6, 1981, a copy is attached.

Based on Mr. Capper's interpretation, we would like to withdraw the application of our ~~Phoenix~~ plant as a treatment/storage facility since our operations are exactly as Mr. Capper describes.

This plant will continue to act as a generator of hazardous wastes and will continue to comply with the requirements 40CFR262.

Should you have any questions, please contact me at 201-464-8100.

Thank you!

Very truly yours,

Frank J. Dux
Regulatory Compliance Coordinator

FJD:mp

FD/02058279

REFERENCE NO. 6

Form DWM-029
3/84

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT

INSPECTION REPORT (RFA)

REPORT PREPARED FOR:

- [x] Generator
- [ ] Transporter
- [ ] HWM (TSD) Facility

FACILITY INFORMATION

Name: AIRCO

Address: UNION LANDING & RIVER ROAD (RIVERTON) CINNAMINSON TWP.

Lot: 2.1 Block: 610

County: BURLINGTON

Phone: (609) 829-7914

EPA ID#: NJD002386621

Date of Inspection: JANUARY 29 & FEBRUARY 2, 1987

PARTICIPATING PERSONNEL

State or EPA Personnel: DOUGLAS GREENFIELD

Facility Personnel: JACK WERT
BRIAN MASSIMI

Report Prepared by Name: DOUGLAS GREENFIELD

Region: CENTRAL

Telephone#: (609) 426-0700

Reviewed by: Linda Z. Yida

Date of Review: 2-11-89

FACILITY NAME: AIRCO

ADDRESS: UNION LANDING & RIVER RD
RIVERTON

TIME IN: _____ COUNTY: BURLINGTON

TIME OUT: _____ EPA ID : NJD 002386621

DATE OF INSPECTION: FEBRUARY 2, 1987

PHOTOS TAKEN ☐ YES ☑ NO

If yes, how many? _____

SAMPLE TAKEN ☐ YES ☑ NO NO. OF SAMPLES _____

NJDEP ID # _____

MANIFESTS REVIEWED ☑ YES ☐ NO

Number of manifests in compliance ALL

Number of manifests not in compliance _____

List manifest document numbers of those manifests not in compliance.

SUMMARY OF FINDINGS

FACILITY DESCRIPTION AND OPERATIONS

Airco at this location fills gas cylinders with many types of gasses for industrial use. Most of the gasses are purchased and some are blended to the specific specification ordered by customer. These gasses are then compressed and put in cylinders for shipment to their customers.

All empty cylinders are returned to Airco. Some are refilled and others are shipped to a TSDF for cleaning. These clean cylinders are then returned to Airco and filled with other type gasses.

Describe the activities that result in the generation of hazardous waste.

Waste liquid of both NaOH and $SiCl_4$ is generated from the neutralization, scrubbing of gaseous residues removed from compressed gas cylinders before flaring or venting.
Trichloroethylene - used as a degreaser.

Identify the hazardous waste located on site, and estimate the approximate quantities of each. (Identify Waste Codes)

134	fifty-five	gal	drums	Waste	Corrosive	Liquid	NOS.				D002
19	"	"	"	"	"	"	"	"		NaOH	D002
5	"	"	"	"	"	"	Sludge	NOS.		$SiCl_4$	D002
2	"	"	"	"	"	Trichloroethylene					F001
1	"	"	"	"	"	Liquid	NOS	(Arsenic)			D004

GENERATOR INSPECTION CHECKLIST

		YES	NO	N/A
7:26-8.5	Hazardous waste determination			
	(a) Did the generator test its waste to determine whether it is hazardous?	✓		
	Is the waste hazardous?	✓		
7:26-8.5(b)2	Is the generator determining that its waste exhibits a hazardous waste characteristic(s) based on its knowledge of the material(s) or processes used?	✓		
	Has hazardous waste been shipped off site since November 19, 1980?	✓		
	If yes, how many shipments, off site, have been made and describe the approximate size of an average shipment made on a monthly basis. If facility is a small quantity generator, please explain. 79-1 80-0 81-2 82-2 83-3 84-3 85-1 86-6 87-1 500 gal/month			
7:26-7.4(a)1	Does the generator have an EPA ID #?	✓		
7:26-7.4(a)4	Does each manifest have the following information? Please circle the elements missing and obtain a copy of the incomplete manifests. (List those manifests that are deficient)	✓		
7:26-7.4(a)4i	The generator's name, address and phone number?	✓		
7:26-7.4(a)4ii	The generator's EPA ID number?	✓		
7:26-7.4(a)4iii	The transporter(s) name, address and phone number?	✓		
7:26-7.4(a)4iv	The transporter(s) EPA ID number?	✓		
7:26-7.4(a)4v	The name, address and phone number of the designated TSD facility?	✓		
7:26-7.4(a)4vi	The TSDF's EPA ID number?	✓		
7:26-7.4(a)4vii	The name, type and quantity of hazardous waste being shipped, including such particulars as may be required regarding same?	✓		

		YES	NO	N/A
7:26-7.4(a)4viii	Special handling instructions and any other information required on the form to be shipped by the generator?	✓		
7:26-7.4(a)5	Before allowing the manifested waste to leave the generator's property, did the generator:			
7:26-7.4(a)5i	Sign the manifest certification by hand?	✓		
7:26-7.4(a)5ii	Obtain the handwritten signature of the initial transporter and date of acceptance on the manifest?	✓		
7:26-7.4(a)5iii	Retain one copy and forward one copy to the state of origin and one copy to the state of destination?	✓		
7:26-7.4(a)5iv	Give remaining copies of the manifest form to the transporter?	✓		
7:26-7.4(f)1	Has the generator maintained facility records for three (3) years? (Manifest(s), exception report(s) and waste analysis)	✓		
7:26-7.4(h)1	Has the generator received signed copies of portion B (from the TSD facility) of all manifests for waste shipped off site more than 35 days ago?	✓		
7:26-7.4(h)2	If not:			
	1. Did the generator contact the hauler and/or the owner or operator of the TSDF and the NJDEP at 609-292-9877 to inform the NJDEP of the situation, and			✓
	2. Have exception reports been submitted to the Department covering any of these shipments made more than 45 days ago?			✓
	Before transporting or offering hazardous waste for transportation off site, does the generator?			
7:26-7.2(a)	Conspicuously lable appropriate manifest numbers on all hazardous waste containers that are intended for shipment?	✓		
7:26-7.2(b)	Insure that all containers used to transport hazardous waste off site are in conformance with applicable DOT regulations (i.e., 49 CFR 171 - 49 CFR 179)?	✓		

		YES	NO	N/A
7:26-9.3	Accumulation time			
	How is waste accumulated on site?			
	/✓/ Containers			
	/__/ Tanks (complete HWMF checklist)			
	/__/ Aboveground /__/ Below ground			
	/__/ Surface impoundments (complete HWMF checklist			
	/__/ Piles (complete HWMF checklist)			
7:26-9.3(a)3	Is each container clearly dated with each period of accumulation so as to be visible for inspection?	✓		
7:26-9.3(a)1	Is waste accumulated for more than 90 days?	✓		
	If yes, complete HWMF checklist.			

STOP HERE IF THE HAZARDOUS WASTE MANAGEMENT FACILITY (TSD) CHECKLIST IS FILLED OUT.

SHORT TERM ACCUMULATION STANDARDS (FOR GENERATORS WHO ACCUMULATE WASTE IN CONTAINERS FOR 90 DAYS OR LESS)

		YES	NO	N/A
7:26-9.4	Containers			
	What type of containers are used for storage. Describe the size, type and quantity and nature of waste (e.g., 12 fifty five gallon drums of waste acetone).			
7:26-9.4(d)1i	Do the containers appear to be in good condition, not in danger of leaking?	✓		
	If no, please describe the type, condition and number of leaking or corroded containers. Be detailed and specific.			
7:26-9.4(d)4i	Are all containers securely closed except those in use?	✓		
7:26-9.4(d)4iii	Do containers appear to be properly handled or stored in a manner which will minimize the risk of the container rupturing or leaking?	✓		
7:26-9.4(d)4iv	Are containerized hazardous waste segregated in storage by waste type?	✓		
7:26-9.4(d)4v	Is every container arranged so that its identification label is visible?	✓		
7:26-9.4(d)5	Is the storage area inspected at least daily?		✓	
7:26-9.4(d)6	Are containers holding ignitible and reactive wastes located at least 50 feet (15 meters) from the facility's property line?	✓		
7:26-11.2	Tanks			
7:26-12.1(a)	Does the generator store hazardous waste in tanks?		✓	
	If yes, what are the approximate number and size of tanks containing hazardous waste?			
	Identify the waste treated/stored in each tank.			

		YES	NO	N/A
	General Operating Requirements			
7:26-11.2(a)2	Are the tanks maintained so that there is no evidence of past, present, or risk of future leaks?			✓
	If no, please explain.			
	Are there leaking tanks?			✓
7:26-11.2(a)2	Are all hazardous wastes or treatment reagents being placed in tanks compatible with the tank material so that there is no danger or ruptures, corrosion, leaks or other failures?			✓
7:26-11.2(3)	Do uncovered tanks have at least 2 feet of freeboard or an adequate containment structure?			✓
7:26-11.2(a)4	If waste is continuously fed into a tank, is the tank equipped with a means to stop the inflow from the tank, e.g., bypass system to a standby tank?			✓
7:26-11.2(d)	Inspections			
	Is the tank(s) inspected each operating day for:			
	1. Discharge control equipment			✓
	2. Monitoring equipment			✓
	3. Level of waste in tank			✓
	4. Construction of materials of the tank			✓
	5. Are the tanks and surrounding areas (e.g., dike) inspected weekly for leaks, corrosion or other failures?			✓
7:26-9.2(b)	Are there underground tanks used to store hazardous waste?			✓
	If yes, how many and can they be entered for inspection?			✓
7:26-11.2(e)	Are ignitible or reactive wastes stored in a manner which protects them from a source of ignition or reaction?			✓
	If no, please explain.			

		YES	NO	N/A
7:26-11.2(f)	Does it appear that incompatible wastes are being stored separate from each other?			✓
7:26-9.4(g)4	Personnel training			
	Have facility personnel successfully completed a program of classroom instruction or on-the-job training since six months after the date of their employment or assignment to the facility or to a new position at the facility?	✓		
7:26-9.4(g)2	Is the program directed by a person trained in hazardous waste management procedures and does it include instruction which teaches facility personnel hazardous waste management procedures (including contingency plan implementation) relevant to the positions in which they are employed?	✓		
7:26-9.4(g)5	If yes, have facility personnel taken part in an annual review of the initial training?	✓		
	Is there written documentation of the following:			
7:26-9.4(g)6i	Job title for each position at the facility related to hazardous waste management, and the name of the employee filling each job?	✓		
7:26-9.4(g)6ii	A written job description for each position related to hazardous waste management?	✓		
7:26-9.4(g)6iii	A written description of the type and amount of both introductory and continuing training that has been and will be given to personnel in jobs related to hazardous waste management?	✓		
7:26-9.4(g)6iv	Documentation of actual training or experience received by personnel?	✓		
7:26-9.4(g)7	Are training records kept on all current employees until closure of the facility and training records kept on former employees for three years from their last date of employment?	✓		
7:26-9.4(g)8	Are semi-annual drills conducted involving all employees and appropriate local authorities to test emergency response capabilities at the facility in accordance with the contingency plan and emergency procedures development pursuant to NJAC 7:26-9.7?		✓	

		YES	NO	N/A
7:26-9.6	Preparedness and prevention Does the facility comply with preparedness and prevention requirements including maintaining:			

		YES	NO	N/A
7:26-9.6(b)1	An internal communications or alarm system?	✓		
7:26-9.6(b)2	A telephone or other device to summon emergency assistance from local authorities?	✓		
7:26-9.6(b)3	Portable fire equipment, spill control equipment, and decontamination equipment?	✓		
7:26-9.6(b)4	Water at adequate volume and pressure to supply water hose streams, or foam producing equipment, or automatic sprinklers, or water spray systems?	✓		
7:26-9.6(c)	Is equipment tested and maintained?	✓		
7:26-9.6(d)1	Is there immediate access to communications or alarm systems during handling of hazardous waste?	✓		
7:26-9.6(e)	Adequate aisle space to allow unobstructed movement of personnel fire protection equipment, spill control equipment and decontamination equipment?	✓		
	If no, please explain.			
	In your opinion, do the types of waste on site require all of the above procedures, or are some not required?	✓		
	Explain.			
7:26-9.6(f)	Has the facility made the following arrangements, as appropriate for the type of waste handled on site:			
7:26-9.6(f)1	Familiarize police, fire departments and emergency response teams with the layout of the facility and hazardous waste handled?	✓		
7:26-9.6(f)2	Where more than one police and fire department might respond to an emergency, is there an agreement designating primary emergency authority to a specific police or fire department, and agreements with any others to provide support to the primary emergency authority?	✓		

		YES	NO	N/A
7:26-9.6(f)3	Agreements with emergency response contractors, and equipment suppliers?	✓		
7:26-9.6(f)4	Arrangements to familiarize local hospitals with the properties of hazardous waste handled at the facility and the types of injuries or illnesses which could result from fires, explosions, or discharges at the facility?	✓		
7:26-9.6(f)5	Arrangements with local fire departments to inspect the facility on a regular basis with at least two (2) inspections annually?		✓	
7:26-9.7	Contingency plan and emergency procedures			
7:26-9.7(a)	Does the facility have a written contingency plan for emergency procedures designed to deal with fires, explosions, hazards to human health or environment, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil or surface water?	✓		
7:26-9.7(b)	Are provisions of the plan carried out immediately whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents which could threaten human health or the environment?	✓		
7:26-9.7(c)	Does the contingency plan describe the actions facility personnel shall take in response to fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water at the facility?	✓		
7:26-9.7(d)	Did the owner or operator prepare a Spill Prevention, Control, and Countermeasures (SPCC) Plan in accordance with 40 CFR 112 or 151 or a Discharge Prevention, Containment and Countermeasure (DPCC) Plan in accordance with N.J.A.C. 7:1E-4.1 *et seq*.?			✓
	If yes, did the owner or operator amend that plan to incorporate hazardous waste management provisions that are sufficient to comply with the requirements of this section?			✓
7:26-9.7(e)	Does the plan describe arrangements agreed to by local police departments, fire departments, hospitals, contractors, and State and local emergency response teams to coordinate emergency services?	✓		

		YES	NO	N/A
7:26-9.7(f)	Does the plan list names, addresses, and phone numbers (office and home) of all persons qualified to act as emergency coordinator and is this list kept up to date? Where more than one person is listed, one shall be named as primary emergency coordinator and others shall be listed in the order in which they will assume responsibility as alternates.	✓		
7:26-9.7(g)	Does the plan include a list of all emergency equipment at the facility (such as fire extinguishing systems, spill control equipment, communications and alarm systems (internal and external), and decontamination equipment), where this equipment is required? Is the list kept up-to-date? In addition, does the plan include the location and a physical description of each item on the list, and a brief outline of its capabilities?	✓		
7:26-9.7(h)	Does the plan include an evacuation procedure for facility personnel where there is a possibility that evaucation could be necessary? Does this plan describe signal(s) to be used to begin evacuation, evacuation routes, and alternative evaucation routes (in cases where the primary routes could be blocked by releases of hazardous waste or fires)?	✓		
7:26-9.7(i)	Is a copy of the contingency plan and all revisions to the plan:			
	1. Maintained at the facility; and	✓		
	2. Has the contingency plan been submitted to local authorities (police fire departments, emergency response teams)?	✓		

REFERENCE NO. 7

rm DWM-002 B
84

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
120 ROUTE 156, YARDVILLE, N.J. 08620

NOTICE OF VIOLATION

ID NO. NJD000768036 DATE JANUARY 29, 1987

NAME OF FACILITY AIRCO

LOCATION OF FACILITY UNION LANDING RD, RIVERTON, BURLINGTON

NAME OF OPERATOR JACK WERTH

You are hereby NOTIFIED that during my inspection of your facility on the above date, the following violation(s) of the Solid Waste Management Act, (N.J.S.A. 13:1E-1 et seq.) and Regulations (N.J.A.C. 7:26-1 et seq.) promulgated thereunder and/or the Spill Compensation and Control Act, (N.J.S.A. 58:10-23.11 et seq.) and Regulations (N.J.A.C. 7:1E-1 et seq.) promulgated thereunder were observed. These violation(s) have been recorded as part of the permanent enforcement history of your facility.

DESCRIPTION OF VIOLATION

NJAC 7:26-12.1(a) ILLEGAL TSD

NJAC 7:26-9.3 ACCUMULATION OF HAZARDOUS WASTE FOR 90 DAYS.

Remedial action to correct these violations must be initiated immediately and be completed by FEBRUARY 28, 1987. Within fifteen (15) days of receipt of this Notice of Violation, you shall submit in writing, to the investigator issuing this notice at the above address, the corrective measures you have taken to attain compliance. The issuance of this document serves as notice to you that a violation has occurred and does not preclude the State of New Jersey, or any of its agencies from initiating further administrative or legal action, or from assessing penalties, with respect to this or other violations. Violations of these regulations are punishable by penalties of $25,000 per violation.

Douglas Greenfield
Investigator, Division of Waste Management
Department of Environmental Protection

REFERENCE NO. 8

Form DWM-002 B
2/84

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
120 ROUTE 156, YARDVILLE, N.J. 08620

NOTICE OF VIOLATION

ID NO. NJD002386621 DATE FEBRUARY 2, 1987

NAME OF FACILITY AIRCO

LOCATION OF FACILITY UNION LANDING RD., RIVERTON, BURLINGTON

NAME OF OPERATOR JACK WERT

You are hereby NOTIFIED that during my inspection of your facility on the above date, the following violation(s) of the Solid Waste Management Act, (N.J.S.A. 13:1E-1 et seq.) and Regulations (N.J.A.C. 7:26-1 et seq.) promulgated thereunder and/or the Spill Compensation and Control Act, (N.J.S.A. 58:10-23.11 et seq.) and Regulations (N.J.A.C. 7:1E-1 et seq.) promulgated thereunder were observed. These violation(s) have been recorded as part of the permanent enforcement history of your facility.

DESCRIPTION OF VIOLATION

NJAC 7:26-9.4(d)5 STORAGE AREA INSPECTED AT LEAST DAILY

NJAC 7:26-9.4(g)8 SEMI-ANNUAL DRILLS

NJAC 7:26-9.6(f)5 AT LEAST TWO (2) INSPECTION ANNUALLY BY FIRE DEPARTMENT

Remedial action to correct these violations must be initiated immediately and be completed by MARCH 2, 1987. Within fifteen (15) days of receipt of this Notice of Violation, you shall submit in writing, to the investigator issuing this notice at the above address, the corrective measures you have taken to attain compliance. The issuance of this document serves as notice to you that a violation has occurred and does not preclude the State of New Jersey, or any of its agencies from initiating further administrative or legal action, or from assessing penalties, with respect to this or other violations. Violations of these regulations are punishable by penalties of $25,000 per violation.

Douglas Greenfield
Investigator, Division of Waste Management
Department of Environmental Protection

REFERENCE NO. 9

13-31-05

Form DWM-005
2/83

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
BUREAU OF FIELD OPERATIONS

ENFORCEMENT REFERRAL

TO: VINCE KRISAK DATE: 2-9-87

FROM: DOUG GEGENFIELD THRU LINDA JORDAN REGION: CENTRAL

RE: AIRCO (Name of Facility) NJD 002386621 (ID Number) UNION LANDING & RIVER RD. (Location Address)

2.1 610 (Lot and Block) CINNAMINSON (Township) BURLINGTON (County)

UNION LANDING & RIVER RD. RIVERTON NJ. 08077 (Mailing Address) JACK WERT. (Responsible Party)

The attached inspection/investigation report(s) dated 1-29-87 & 2-2-87 is being referred and it is recommended a NOCAPA be issued for violations of:

NJAC 7:26–	12.1(a)	Illegal TSD
	9.3(a)3	Accumulation of hazardous waste for 90 days
	9.4(d)5	Storage area inspected at least daily
	9.4(g)8	Semi-annual drills
	9.6(f)5	At least two (2) inspections annually by Fire Dept.
NJSA 58:10–		

Suggested penalty: PER SCHEDULE

ADDITIONAL COMMENTS:

REVIEWED AND APPROVED BY:

[signature] 2-11-87

White – Enforcement and Compliance Copy
Yellow – Region Copy

REFERENCE NO. 10

AIRCO Special Gases
An operating unit of The BOC Group, Inc.

Union Landing & River Roads
P.O. Drawer No. 272
Riverton
New Jersey 08077
Telephones: Marketing; 609-829-7878
Prod. & Admin.; 609-829-7914
International; 609-829-7917

03-31-05

2-9-87

Mr. Douglas Greenfield
NJDEP
Division of Waste Management
Twin Rivers Proffesional Bldg.
East Windsor, N.J. 08520

Mr. Greenfiield:

Enclosed is a letter from the Cinnaminson Fire Department in response to my request for semi-annual inspections and fire drills.

As stated, fire inspections will be conducted three times each year as required by the New Jersey Uniform Fire Code. The fire department has also expressed their desire to conduct fire drills with our facility, but have put off such activities until "warmer weather".

We will stay in contact will the fire department to insure that these drills take place, and we will document their occurance for your review in the future.

If I can answer any questions on these matters, please feel free to contact me.

Sincerely yours,

Brian Massimi

Brian Massimi
Airco Distributor Gases

Cinnaminson Bureau of Fire Prevention

Airco Industrial Gases.
Febuary 7, 1987

Brian Massimi

Dear Brian, the Bureau is in receipt of your, Hazardous waste management plan, and also, your emergency action plan. Your facility annually will recieve at least three fire prevention inspections, as set forth in the State Fire Code, They will occur probable every, 4 months.

In regards to Fire Department drills, the schedule is now being set for the warmer weather. This request has been turned over to Assist Chief William Covert, Station 202. The Bureau is also willing to conduct drills, for your employees, on your property, upon written request, for such things as use of hand extinguishers, operating proceduces you can expect from the Fire Department, upon their arrival at your facility etc; The Fire Department is now involved, heavily in Hazardous Materials, training, amd expect delivery within the next year of A Hazardous Materials Unit.
Thanks for your continued cooperation in your, efforts to maintain Fire Safety at your facility.

Bruce J Adams
Bruce J Adams
Fire Official

cc S 201&202 File

1621 Riverton Road ● Cinnaminson, N.J. 08077 ● 829-5220

REFERENCE NO. 11

Form ADM-012

MEMO

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

TO Vince Krisak **DATE** 3-03-87

FROM Doug Greenfield thru Linda Jordan LJ

SUBJECT Airco Riverton, Burlington NJD 002386621 Reinspection for compliance

3-02-87 Arrived at 1405 and met Jack Wert, Plant Manger, and Brian Massimi I explained to them that my visit was to check to see if they were in compliance as per their letter dated 2-06-87.

The storage area is inspected and recorded daily by the supervisor whose department generates 80% of the waste. they have correspondence from the Cinnaminson Bureau of Fire Prevention which states that the facility will be inspected at least three times annually. The letter states that drills will be conducted with the plant personnel.

Toured the storage area and observed all the old drums had been removed. This was also noted by the manifests generated the last month. There were only 10 drums of recently generated waste. Mr Massimi stated that no hazardous waste will remain on site for more than 90 days.

Left site at 1450.

RECOMMENDATION:

I feel this facility has come in compliance by correcting all the violations noted during the RCRA inspection on 2-02-87. This facility should be listed only as a generator.

REFERENCE NO. 12

HC-021.87

C/F/O

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

MAY 4 1987

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Airco Special Gases
Union Landing and River Roads
P.O. Drawer No. 272
Riverton, New Jersey 08077
Attention: Jack Wert

Re: Notice of Civil Administrative Penalty Assessment

Dear Mr. Wert:

There is enclosed for service upon you, a Notice of Civil Administrative Penalty Assessment issued by the New Jersey Department of Environmental Protection pursuant to the provisions of the Solid Waste Management Act, N.J.S.A. 13-1E-1 et seq.

If you have any questions concerning this Notice of Civil Administrative Penalty Assessment, please contact Jennifer Meyer at (609) 426-0700.

Very truly yours,

Ronald T. Corcory
Assistant Director - Enforcement
Division of Hazardous Waste Mgt.

Enclosure
cc Bureau of Compliance and Technical Services
Division of Water Resources Enforcement
Region Field Office
Bureau of Hazardous Waste Engineering
Bureau of Manifest & Information Systems
Mayor
Health Department
County Solid Waste Coordinator
Central File

HC-021-87

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

MAY 4 1987

IN THE MATTER OF AIRCO SPECIAL GASES UNION LANDING AND RIVER ROADS P.O. DRAWER NO. 272 RIVERTON, NEW JERSEY 08077 ATTENTION: JACK WERT	: : : : : :	NOTICE OF CIVIL ADMINISTRATIVE PENALTY ASSESSMENT

This Notice of Civil Administrative Penalty Assessment is issued pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (hereinafter "NJDEP" or the "Department") by N.J.S.A. 13:1D-1 et seq. and the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., and duly delegated to the Assistant Director for Enforcement of the Division of Hazardous Waste Management pursuant to N.J.S.A. 13:1B-4.

FINDINGS

1) The Department has determined that Airco Special Gases is a generator of hazardous waste (EPA ID #NJD002386621) as defined by N.J.A.C. 7:26-1.4, and is located at Block 610, Lot 2.1, Union Landing and River Roads, Cinnaminson Township, Burlington County, State of New Jersey.

2) During inspections conducted by Departmental personnel on January 29, 1987 and February 2, 1987, Airco Special Gases was observed to be accumulating hazardous waste in containers on site in excess of ninety (90) days. Pursuant to N.J.A.C. 7:26-9.3(a), a generator may accumulate hazardous waste on site without a permit for ninety (90) days or less. A generator who accumulates hazardous waste in excess of ninety (90) days is an operator of a hazardous waste storage facility and must comply with N.J.A.C. 7:26-9.1 et seq., and with the permit requirements of N.J.A.C. 7:26-12.1 et seq.

3) Based on the facts cited in paragraph 2, the Department has determined that Airco Special Gases is operating a hazardous waste facility as defined by N.J.A.C. 7:26-1.4. Consequently, Airco Special Gases is in violation of N.J.A.C. 7:26-12.1(a) et seq., by failing to submit a Part A and Part B hazardous waste

permit application and without having received a final and effective permit prior to operating a hazardous waste facility.

4) During inspections on January 29, 1987 and February 2, 1987, it was also noted that:

   a) Airco Special Gases failed to inspect areas where containers are stored, at least daily, looking for leaks and for deterioration caused by corrosion or other factors, in violation of N.J.A.C. 7:26-9.4(d)5.

   b) Airco Special Gases failed to conduct semi-annual drills involving all employees and appropriate local authorities to test emergency response capabilities at the facility in accordance with the contingency plan and emergency procedures development pursuant to N.J.A.C. 7:26-9.7, in violation of N.J.A.C. 7:26-9.4(g)8.

   c) Airco Special Gases failed to make arrangements to have the local fire department inspect the facility on a regular basis with at least two (2) inspections annually, in violation of N.J.A.C. 7:26-9.6(f)5.

5) By a letter dated February 6, 1987, Airco Special Gases notified the Department that they had attained compliance with all above mentioned violations.

6) Based on the facts set forth in these FINDINGS, the Department has determined that Airco Special Gases has violated the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq. and the regulations promulgated pursuant thereto, N.J.A.C. 7:26-1 et seq., specifically N.J.A.C. 7:26-9.4(d)5 and 12.1(a).

NOTICE OF CIVIL ADMINISTRATIVE PENALTY ASSESSMENT

7) Pursuant to N.J.S.A. 13:1E-9e and based upon the above FINDINGS, the Department has determined that a civil administrative penalty should be assessed against Airco Special Gases in the amount of $800.

8) Payment of the penalty is due when a final order is issued by the Commissioner subsequent to a hearing, if any, or when this Notice of Civil Administrative Penalty Assessment becomes a final order (see following paragraph). Payment shall be made by certified check payable to "Treasurer, State of New Jersey" and shall be submitted to:

   Assistant Director for Enforcement
   Division of Hazardous Waste Management
   CN 028
   Trenton, NJ 08625

9) If no request for a hearing is received within twenty (20) calendar days from receipt of this Notice of Civil Administrative

Penalty Assessment, it shall become a final order upon the twenty-first calendar day following its receipt and the penalty shall be due and payable.

NOTICE OF RIGHT TO A HEARING

10) Pursuant to N.J.S.A 52:14B-1 et seq. and N.J.S.A. 13:1E-9, Airco Special Gases is entitled to an administrative hearing. Any hearing request shall be delivered to the address referenced in paragraph 8 within twenty (20) calendar days from receipt of this Notice of Civil Administrative Penalty Assessment.

11) Pursuant to N.J.S.A. 52:14B-9(b) and N.J.A.C. 1:1-6.1(b), Airco Special Gases shall, in its request for a hearing, furnish NJDEP with the following:

a. A statement of the legal authority and jurisdiction under which the hearing or action to be taken is to be held;

b. A reference to the particular sections of the statutes and rules involved;

c. A short and plain statement of the matters of fact and law asserted; and

d. The provisions of this Notice of Civil Administrative Penalty Assessment to which Airco Special Gases objects, the reasons for such objections, and any alternative provisions proposed.

GENERAL PROVISIONS

12) This Notice of Civil Administrative Penalty Assessment is binding on Airco Special Gases, its principals, directors, officers, agents, successors, assigns, any trustee in bankruptcy or other trustee, and any receiver appointed pursuant to a proceeding in law or equity.

13) Notice is given that violations of any statutes, rules or permits other than those herein cited may be cause for additional enforcement actions, either administrative or judicial. By issuing this Notice of Civil Administrative Penalty Assessment the Department does not waive its rights to initiate additional enforcement actions.

14) No obligations imposed by this Notice of Civil Administrative Penalty Assessment (with the exception of paragraph 7, above) are intended to constitute a debt, damage claim, penalty or other civil action which should be limited or discharged in a bankruptcy proceeding. All obligations are imposed pursuant to the police powers of the State of New Jersey, intended to protect the public health, safety, welfare and environment.

15) Notice is given that pursuant to N.J.S.A. 13:1E-9e, the Department is authorized to assess a civil administrative penalty of not more than $25,000.00 for each violation and additional penalties of not more than $2,500.00 for each day during which the violation continues after receipt of an administrative order from the Department.

16) Notice is further given that pursuant to N.J.S.A. 13:1E-9f, any person who violates N.J.S.A. 13:1E-1 et seq. or any code, rule or regulation promulgated thereunder shall be liable to a penalty of not more than $25,000.00 per day of such violation, and each day's continuance of the violation shall constitute a separate violation.

17) Notice is further given that pursuant to N.J.S.A. 13:1E-9f, any person who violates an administrative order issued pursuant to N.J.S.A. 13:1E-9c, or a court order issued pursuant to N.J.S.A. 13:1E-9d, or who fails to pay a civil administrative penalty in full after it is due shall be subject upon order of a court to a civil penalty not to exceed $50,000.00 per day of such violation and each day's continuance of the violation shall constitute a separate violation.

18) Except as provided above in the Notice of a Right to a Hearing Section, this Notice of Civil Administrative Penalty Assessment shall be effective upon receipt.

Ronald T. Corcory
Assistant Director - Enforcement
Division of Hazardous Waste Management

df

REFERENCE NO. 13

DIVISION OF WASTE MANAGEMENT - BUREAU OF COMPLIANCE & ENFORCEMENT 05-31-85

NJ ID _____ EPA ID N J D 0 0 2 3 8 6 6 2 1

VIOLATOR INFORMATION

NAME Airco Special

ADDRESS Union Landing - River Roads Riverton

VIOLATION DATE 02/02/87

LOCATION OF VIOLATION

BLOCK 610 LOT 2.1

OTHER _____ C/M 0308

DATE (FOLLOW UP EVAL.) __/__/__

ALL TYPE EVAL.

- [x] EVAL. INSP.
- [ ] SAMP. INSP.
- [ ] SPEC. INSP.
- [ ] FOLLOW-UP
- [ ] RECORD REV

HAZ. WASTE ONLY

TYPE INSP.

- [x] GEN
- [ ] TRANS
- [ ] TSD
- [ ] GWM

TYPE RECORD REV.

- [ ] CLOSURE PLAN
- [ ] FINAN. DOC.
- [ ] GWM REPORT
- [ ] ANNUAL REPORT
- [ ] OTHER: _____

REQUESTING AGENCY

- [x] BFO
- [ ] SWE
- [ ] HWE
- [ ] C&M
- [ ] ECRA
- [ ] EPA
- [ ] R&P
- [ ] DWR
- [ ] HSMA
- [ ] _____

ENFORCEMENT ACTION (DWM ACTION NO. HC-021-87)

- [ ] SOLID WASTE
- [x] HAZ. WASTE
- [ ] SPILL FUND

- [x] NEW
- [ ] AMEND
- [ ] RESCIND

- [ ] DL
- [ ] NOV
- [ ] AO
- [ ] ACO
- [x] CIV A VOCAPA-Inc
- [ ] PSO
- [x] _____

ACTION DATE: 05/04/87

COMP. DATE:

SCHED: __/__/__

ACTUAL: 05/26/87

PENALTY: $ 800

ASSESSED: $ _____

COLLECTED: $ $800

VIOLATIONS (ALL)

REG	CLASS	REG	CLAS
9.4(d)5	I		
9.4(g)8	II		
9.6(f)5	II		
12.1(a)	I		

REFERRALS

- [x] ORS
- [ ] LAW (AG)
- [x] CJ
- [x] DWR
- [x] HWE
- [x] HSMA
- [ ] _____

REQUESTED ACTION

- [x] REVIEW
- [ ] INJ. RELIEF
- [ ] PENALTY COLL.
- [ ] _____

DATE OF REQUEST 4/18/87

REFERRAL RESPONSE

- [ ] ORS
- [ ] LAW (AG)
- [ ] CJ
- [ ] DWR
- [ ] HWE
- [ ] HSMA
- [ ] _____

- [ ] HOLD
- [ ] RELEASE
- [ ] _____
- [ ] _____
- [ ] _____

DATE OF RESP. __/__/__

5/28/87 Ck sent to Coll. Lec

VIOL. SUM. (HW ONLY)

CLASS	HP	I	II
GWM			
C/PL			
FR			
Pt.B			
CS			
MAN			
OTHER		2	0

COMMENTS: _____

REFERENCE NO. 14

PRELIMINARY ASSESSMENT
OFF SITE RECONNAISSANCE
INFORMATION REPORTING FORM

Date: 7/6/89

Site Name: AIRCO SPECIAL GAS TDD: 02-8906-07

Site Address: UNION LANDING & RIVER ROAD
Street, Box, etc.

RIVERTON
Town

BURLINGTON
County

NEW JERSEY
State

NUS Personnel:

Name	Discipline
J. FROST	ENVIRONMENTAL SCIENCE
R. SCERBO	ENVIRONMENTAL SCIENCE

Weather Conditions (clear, cloudy, rain, snow, etc.):
RAINY, CLOUDY, HUMID

Estimated wind direction and wind speed: NONE

Estimated temperature: 75°

Signature: James G. Frost Date: 7/6/89

Countersigned: Robert H. Scerbo Date: 7/6/89

PRELIMINARY ASSESSMENT

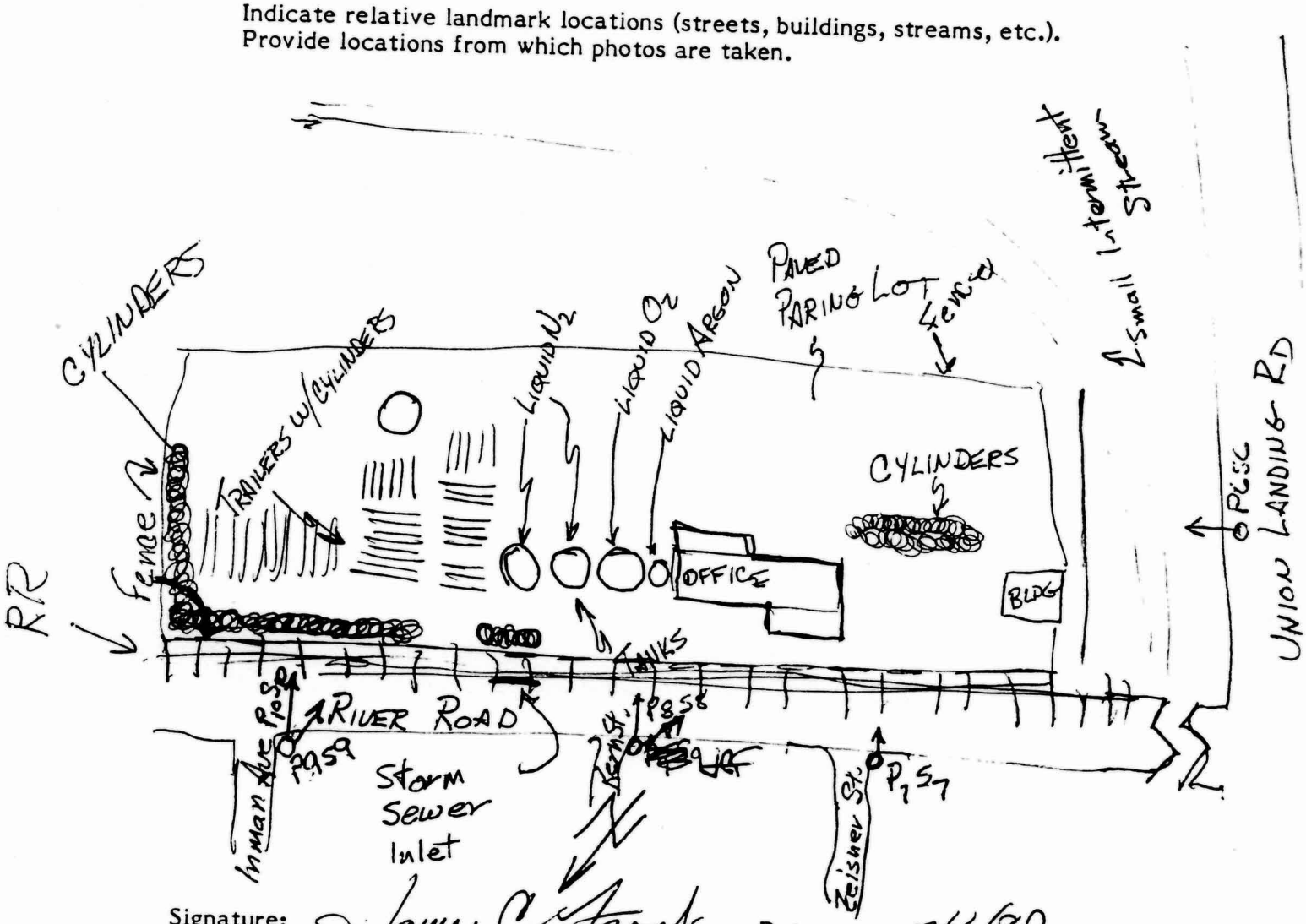
INFORMATION REPORTING FORM

Date: 7/6/89

Site Name: AIRCO SPECIAL GAS TDD: 02-8906-07

Site Sketch:

Indicate relative landmark locations (streets, buildings, streams, etc.). Provide locations from which photos are taken.



Signature: James C. Frost Date: 7/6/89

Countersigned: Robert A. Harper Date: 7/6/89

PRELIMINARY ASSESSMENT

INFORMATION REPORTING FORM

Date: 7/6/89

Site Name: AIRCO SPECIAL GAS TDD: 02-8906-07

Notes (Periodically indicate time of entries in military time):

Arrived at site at 1400. Site is well-maintained large active industrial complex. Site is fenced with guards stationed at the gates. The site is very flat and slope is estimated at <1%. Several hundred cylinders could be seen on the site. Difficult to ascertain wastes on site due to the size of the facility. No drums or tanks could be seen other than the cylinders. No odors were noted. Some homes are located across River Road from facility. Hard to tell which cylinders are good ones waiting to be filled and which are ~~waiting~~ waiting to be disposed of. No storm sewers were seen but a little ditch starts to the southeast of the facility and curves around the southend of the facility eventually flowing in NW direction towards Delaware River. The river is

Signature: James C. Frost Date: 7/6/89

Countersignature: Robert H. Scerbo Date: 7/6/89

PRELIMINARY ASSESSMENT

INFORMATION REPORTING FORM

Date: 7/6/89

Site Name: AIRCO SPECIAL GAS TDD: 02-8906-07

Notes (Cont'd):

< half mile away. Directly next door to NE is AGC and just beyond that is Hogannes Corp. In driving around the area well houses were observed at Taylor Ave and Rte 130 and Taylor Ave. and River Road. Also, Dredge Harbor is an active marina about ½ mile NE of facility. It has wells, too. Abandoned landfill is to the east that is undergoing closure.

None of the cylinders, of which there are hundreds, maybe thousands, seemed to be leaking. Some were rusted as is normal for gas cylinders. No stressed vegetation or animals were seen. Left area at 1600. Cylinders are on paved parking lot but no other containment appeared to be provided. JC 7/7/89

Attach additional sheets if necessary. Provide site name, TDD number, signature, and countersignature on each.

Signature: James C. Frost Date: 7/6/89

Countersignature: Robert A. Scerbo Date: 7/6/89

PRELIMINARY ASSESSMENT

INFORMATION REPORTING FORM

Date: 7/6/89

Site Name: Airco Special Gas TDD: 02-8903-0037

Photolog:

Frame/Photo Number	Date	Time	Photographer	Description
P6 S6	7/6/89	1409	J. Frost	Looking N.E. at cylinders
P7 S7	7/6/89	1416	J. Frost	Looking SE at cylinders.
P8 S8	7/6/89	1424	J. Frost	Looking SE at liquid gas tanks
P9 S9	7/6/89	1427	J. Frost	Looking South at what may be cylinder holders
P10 S10	7/6/89	1429	J. Frost	Looking east at cylinders.

Attach additional sheets if necessary. Provide site name, TDD number, signature, and countersignature on each.

Signature: James C. Frost Date: 7/6/89

Countersignature: Robert A. Jerbo Date: 7/6/89

REFERENCE NO. 15

RECORDS OF WELLS AND GROUND-WATER QUALITY IN BURLINGTON COUNTY, NEW JERSEY

A Preliminary Report

By

F. Eugene Rush

Geologist

U. S. Geological Survey

Prepared by the U. S. Geological Survey

in cooperation with the

State of New Jersey

LIBRARY
DEPT. OF THE INTERIOR, FWPCA
METUCHEN, N. J. 08840

RECORDS OF WELLS AND GROUND-WATER QUALITY IN BURLINGTON COUNTY, NEW JERSEY

by

F. Eugene Rush

ABSTRACT

This basic-data report is limited to the presentation of selected drillers' logs and their geologic correlations, well data, and chemical analyses of water from wells in Burlington County, N. J. The county lies within the Coastal Plain province; it is underlain by unconsolidated sediments of Quaternary, Tertiary, and Cretaceous age and at greater depth by much older consolidated rocks.

INTRODUCTION

Purpose and Scope

The investigation of the ground-water resources of Burlington County, New Jersey is part of a state-wide program of water-resources studies being carried out by the U. S. Geological Survey in cooperation with the New Jersey Department of Conservation and Economic Development, Division of Water Policy and Supply. The investigation has been under the general supervision of Allen Sinnott, District Geologist.

This basic-data report is limited to the presentation of selected drillers' logs, well data, and chemical analyses of water from wells in Burlington County. Most of the drillers' logs and the well data were obtained from the files of the New Jersey Geological Survey, Bureau of Topography and Geology, Division of Research and Development, Department of Conservation and Economic Development. The information is released at this time in advance of an interpretive report because of its value to prospective ground-water users in Burlington County. The data in this report form, in part, the basis for a comprehensive, interpretive report on the ground-water resources of Burlington County, now in preparation.

Location and Extent

Burlington County is in the southcentral part of New Jersey, extending from the Delaware River on the northwest to Great Bay, an arm of the Atlantic Ocean, on the southeast. The county is bounded by Camden and Atlantic Counties on the southwest and by Mercer, Monmouth, and Ocean Counties on the northeast. (See fig. 1.) Burlington County is the largest county in New Jersey in area, covering 827 square miles. It has a population of 224,499 in the 1960 Federal Census. While the county is principally known for its agriculture, there is considerable manufacturing, particularly along the Delaware River.

GENERAL GEOLOGY AND HYDROLOGY

Burlington County lies within the Coastal Plain province; it is underlain by layers of sand, silt, and clay of Quaternary, Tertiary, and Cretaceous age. The formation names given to these deposits and the basement crystalline rocks are listed in table 1, which gives their age, thickness, and water-bearing character. The important water-bearing formations in the county are the Raritan and Magothy Formations, the Englishtown Formation, the Wenonah Formation and Mount Laurel Sand, and the Kirkwood Formation and Cohansey Sand.

WELL DATA

Descriptions of selected wells are given in table 2. The locations of these wells are shown on figure 1. The drillers' logs in this report have been modified, where necessary, to present a more uniform terminology. The drillers' logs and the author's tentative geologic correlations are given in table 3.

Table 1. – Age, thickness, water-bearing character, and lithology of stratigraphic units in Burlington County, N. J.

System	Series	Formation	Thickness (feet)	Water-bearing character	Description
Quaternary	Pleistocene	Cape May Formation	0-40	Variable	Sand and gravel, local clay
		Pensauken Formation	0-40	Variable	Sand and gravel
Tertiary	Pliocene (?)	Cohansey Sand	0-300	Excellent to fair	Sand, medium to coarse, with local ironstone
	Miocene	Kirkwood Formation	0-200	Excellent to fair	Sand, fine, some clay seams
	Eocene	Manasquan Formation	0-100	Poor	Sand, glauconite, clayey
	Paleocene	Vincentown Formation	0-100	Good to poor	Sand, limy, clayey; glauconite
		Hornerstown Sand	0-60	Poor	Glauconite sand, with green clay matrix
Cretaceous		Red Bank Sand	0-40	Fair	Sand and clay with glauconite sand
		Navesink Formation	0-40	Poor	Glauconite sand, with dark gray clay matrix
		Mount Laurel Sand and Wenonah Formation	0-100	Good to poor	Sand, clayey, some glauconite; silt
		Marshalltown Formation	0-100	Poor	Clay, sandy; glauconite sand
		Englishtown Formation	0-100	Good to poor	Sand and clay
		Woodbury Clay	0-120	Poor	Clay, black, micaceous
		Merchantville Formation	0-80	Poor	Clay, dark gray, glauconite sand
		Magothy Raritan Formations	30-800	Excellent to good	Clay and sand, alternating
Early Paleozoic (?)		Wissahickon Formation		Poor	Schist or gneiss, commonly weathered

Table 2.--Records of selected wells in Burlington County, N. J.

Well no.: Numbers correspond to those in figure 2 and tables 3 and 4; A. indicates chemical analysis given in table 4, L. indicates driller's log given in table 3.
Water-bearing formations: Psw, Wissahickon Formation; Kmr, Magothy and Raritan Formation; Ket, Englishtown Formation; Kmw, Mount Laurel Sand and Wenonah Formation; Tvt, Vincentown Formation; Tkw, Kirkwood Formation; Tch, Cohansey Sand; Qcm, Cape May Formation.
Uses: CI, commercial and institutional; D, domestic; Ind, industrial; Irr, irrigation; O, observation; PS, public supply; U, unused.

Well no.	Location	Owner or name and number	Driller	Year completed	Altitude of land surface (feet)	Total depth drilled (feet)	Well diameter (inches)	Casing length (feet)	Screen setting (feet)	Water-bearing formation	Static water level below land surface (feet)	Yield (gpm)	Drawdown (feet)	Use	Remarks	Well no.
1	Bordentown	Bordentown Water Dept. No. 1	Layne-New York Co., Inc.	1955	89	441	16 & 8	355	355-385	Kmr	86	572	17	PS		1
2	1/2 mi. E of U.S. Highway 206, at Crosswicks Creek	Bordentown Water Dept. White Horse well field No. A 40		1941	9	80	3	75	(none)	do.	(flowing)	25		PS	Approximately 43 flowing wells in field, all with similar construction, 2", 3" or 4" in diam., with total depths of 75'-80'.	2
3	Burlington	Burlington Water Dept. No. 3	Layne-New York Co., Inc.	1949	9	90	16	64	64-85	Kmr	10	517	48	PS	A., L.	3
4	1 mi. NE of Burlington on Burlington Island	Burlington Water Dept. Test Well No. 2 - Island	Artesian Well Drilling Co.	1952	19	49	6	40	10	Qcm	14	75	8	O	L.	4
5	1 mi. N of Burlington on Burlington Island	Burlington Water Dept. No. 2 - Island	do.	1952	20	49	17	33	33-49	Qcm	18	760	13	PS	Concrete casing and screen. A.	5
6	Columbus	Columbus Water Co. No. 2	William Stothoff Co.	1943	73	260	8	240	240-260	Kmr	60	125	40	PS	A.	6
7	1 mi. N. of Crosswicks	Crosswicks Water Co. No. 1	do.	1959	30	299	8	269	269-299	Kmr	15	500	44	PS	A.	7
8	Beverly	Delaware River Water Co. No.15	A. C. Schultes & Sons	1951	12	59	12	49	47-57	Kmr	18	1200	14	PS	Drilled to bedrock. A.	8
9	Riverside	do. No.17	do.	1955	21	140	12	97	97-118	Kmr	23	483	70	PS	do. L.	9
10	1 mi. SW of Riverside, at Cambridge	do. No.19	do.	1959	25	143	12	91	89-130	Kmr	14	974	59	PS	do L.	10
11	Marlton	Evesham Tp. Water Dept. No. 1	A. G. Dumphey	1897	115	212	6	—	———	Ket	42	100	36	PS	A., L.	11
12	Marlton	do. No. 3	Layne-New York Co., Inc.	1956	85	512	12 & 8	369	369-389	Kmr	91	517	168	PS	L.	12
13	Florence	Florence Tp. Water Dept. No.3	do.	1949	25	162	16	123	123-138	Kmr	24	620	34	PS	Drilled to bedrock. A., L.	13
14	2 mi. S of Wrightstown	Fort Dix No. 1	Artesian Well Drilling Co.	1941	138	980	20,16,& 10	920	916-960	Kmr	132	800	96	PS	A.	14
15	1 mi. S of Wrightstown	do. No. 2	do.	1941	131	1051	do.	1030	1030-1051	Kmr	123	900	61	PS	A., L.	15
16	3 mi. S of Wrightstown	do. No. 4	Layne-New York Co., Inc.	1943	148	1096	do.	1056	1056-1086	Kmr	140	700	70	PS	A., L.	16
17	3 mi. NE of Browns Mills at Hanover Lake	do. No. 11	William Stothoff Co.	1943	85	485	6	470	470-980	Ket	20	45	193	PS	L.	17
18	1 mi. E of Wrightstown	McGuire Air Force Base - A	A. C. Schultes & Sons	1953	128	1100	24,16,& 10	992	992-1055	Kmr	120	913	63	PS	Drilled to weathered bedrock. A., L.	18
19	2 mi. E of Wrightstown	do. - C	do.	1953	102	1123	do.	1036	1036-1089	Kmr	110	900	45	PS	Drilled to weathered bedrock. A., L.	19
20	2 mi. SE of Wrightstown	do. - D	do.	1953	112	1120	do.	1012	1012-1075	Kmr	110	925	34	PS	Drilled to weathered bedrock. A.	20
21	3 mi. SW of Medford, at Lake Pine	Lakes Water Co. No. 2	J. Henry Robbins	1950	52	200	6	180	(none)	Kmr	20	100	—	PS	A., L.	21
22	Levittown	Levitt and Sons, Inc. No. 2	A. C. Schultes & Sons	1955	29	363	20,16,& 12	225	225-354	Kmr	22	1404	65	U	Screen blanks 246-292 and 315-344. L.	22
	do.	do. No. 3	C. W. Lemmon Co., Inc.	1959	28	383	do.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 2.--Records of selected wells in Burlington County, N. J.--Continued

Well no.	Location	Owner or name and number	Driller	Year completed	Altitude of land surface (feet)	Total depth drilled (feet)	Well diameter (inches)	Casing length (feet)	Screen setting (feet)	Water-bearing formation	Static water level below land surface (feet)	Yield (gpm)	Drawdown (feet)	Use	Remarks	Well no.
56	1 mi. SW of Florence	National Gypsum Co. No. 2	Layne-New York Co., Inc.	1955	22	157	12 & 8	113	113-123	Kmr	21	183	21	Ind	Drilled to bedrock. L.	56
57	2 mi. SW of Burlington on U.S. Hwy. 130	Mechanics National Bank No. 2	Charles L. Mollitor, Inc.	1958	35	209	4	189	189-209	Kmr	30	180	27	CI	Air conditioning recharge well.	57
58	1 mi. S of Burlington	Charles Heal, Jr.	do.	1955	50	80	8	59	59-80	Kmr	36	400	50	Irr	Water pumped into irrigation pond. L.	58
59	2 mi. SW of Burlington	Anthony Cannuli	Edward Robbins	1950	66	173	6	153	153-173	Kmr	55	200	30	Irr	Water pumped into irrigation pond.	59
60	2 mi. SW of Burlington on U.S. Hwy. 130	Albert Heisler	do.	1950	46	252	8	212	212-252	Kmr	41	500	42	Irr	Pump capacity is 500 gpm.	60
61	11 mi. S of Chatsworth, at Harrisville	Harrisville well	--	1866	15	375	8	---	---	Trw	(flowing)	---	---	U	Well is still flowing. A., L.	61
62	2 mi. NE of Bordentown	N.J. State Reformatory No. 4	Layne-New York Co., Inc.	1951	97	454	12 & 8	357	357-387	Kmr	86	503	36	U	A., L.	62
63	4 mi. SE of Bordentown, at Chesterfield	H. W. Eriel	Howard Farmer	1959	93	272	4	266	266-272	Kmr	72	50	10	D		63
64	1 mi. SW of Chesterfield, on Whitepine Rd.	Ralph J. DeMarco	Louis Bainbridge	1958	82	393	4	388	388-392	Kmr	75	4	45	D		64
65	3 mi. SE of Bordentown, on Old York Rd.	Ernest Liptak	Greenhalgh & Kaye	1957	114	214	4	208	208-214	Kmr	100	10	20	D		65
66	2 mi. N of Wrightstown	Jacob Dana Packing Co. No. 3	do.	1958	208	276	6	255	255-276	Ket	100	60	80	CI	L.	66
67	7 mi. N of Wrightstown, on Ellisdale Rd.	Francis D. Gray	Louis Bainbridge	1960	92	329	6	319	319-325	Kmr	75	40	5	D	Used for swimming pool also. A., L.	67
68	8 mi. N of Wrightstown, on Ellisdale Rd.	John Marinoas	Greenhalgh & Kaye	1954	97	208	6	204	204-208	Kmr	80	25	69	D	L.	68
69	4 mi. N of Wrightstown	Joseph S. Kucowski	do.	1957	104	149	6	143	143-149	Ket	38	10	7	D		69
70	2 mi. NE of Riverton	Hoeganaes Sponge Iron Co.	Layne-New York Co., Inc.	1951	35	136	8	119	119-134	Kmr	16	326	68	CI	Pump capacity is 50 gpm. L.	70
71	3 mi. NE of Mount Holly, on State Route 537	Eastampton School	Charles L. Mollitor, Inc.	1957	73	417	--	407	407-417	Kmr	70	75	30	U	L.	71
72	1 mi. NE of Mount Holly, on North Pemberton Rd.	J. A. Methvin	do.	1953	39	364	6	352	352-363	Kmr	63	30	15	D	L.	72
73	1 mi. NW of Marlton, on Cropwell Rd.	Byron T. Roberts Farms Inc. No. 2	A. C. Schultes & Sons	1957	93	406	18 & 8	322	322-375	Kmr	100	750	80	Irr	Screen blank 348-359. A., L.	73
74	1 mi. W of Marlton, on Old Marlton Pike	David D. Grissom	J. Henry Robbins	1952	98	340	4	320	320-340	Kmr	100	40	---	D	L.	74
75	2 mi. SE of Marlton	U.S. Army Nike Base, control area well	Edward Robbins, Sr.	1954	84	158	8	138	138-158	Kmr	41	200	43	U		75
76	1 mi. SE of Beverly, on U.S. Highway 130	Earl R. Blyler	Charles L. Mollitor, Inc.	1950	39	117	10	90	90-114	Kmr	14	575	19	Irr	L.	76
77	1 mi. SE of Beverly, on Cooper St.	John W. Heal	do.	1951	36	135	10	107	107-135	Kmr	18	500	89	Irr	A.	77
78	1 mi. SW of Beverly, at Cambridge	Amico Sand and Gravel Co.	do.	1957	15	75	6	27	27-37	Kmr	7	120	11	CI	L.	78
79	1 mi. S of Riverside, on U.S. Hwy 130	Hillside Farms No. 3	A. C. Schultes & Sons	1956	20	112	12	90	90-106	Kmr	6	444	68	CI		79
80	1 mi. SE of Riverside, on U.S. Hwy 130	Holy Cross High School	Charles L. Mollitor, Inc.	1958	82	174	10	154	154-174	Kmr	55	185	[illegible]	[illegible]	[illegible]	80

Table 2.--Records of selected wells in Burlington County, [illegible]--Continued

Well no.	Location	Owner or name and number	Driller	Year completed	Altitude of land surface (feet)	Total depth drilled (feet)	Well diameter (inches)	Casing length (feet)	Screen setting (feet)	Water-bearing formation	Static water level below land surface (feet)	Yield (gpm)	Drawdown (feet)	Use	Remarks	Well no.
131	4 mi. NE of Wrightstown, at Ocean Co. line.	Jersey Central Power & Light Co.	Greenhalgh & Kaye	1956	88	121	6	110	110-121	Kmw	3	30	105	CI	A., L.	131
132	5 mi. N of Wrightstown	Edward H. Gemsers	do.	1954	121	157	4	148	148-152	Ket	35	10	17	D	L.	132
133	6 mi. N of Wrightstown	Stanley Mormer, Jr.	do.	1958	118	154	4	151	151-154	Ket	40	15	25	D		133
134	Wrightstown	Spartan Village, Inc.	Louis Bainbridge and Charles L. Mollitor, Inc.	1955	154	395	6	128	128-150	Kmw	26	40	19	U	L.	134
135	5 mi. N of Wrightstown	John Giberson	Greenhalgh & Kaye	1956	140	135	4	---	(none)	Kmw	42	10	13	D		135
136	Riverside	B. F. Goodrich Co. No. 2	Artesian Well Drilling Co.	1951	34	162	10	95	95-120	Kmr	24	458	19	Ind	A., L.	136
137	1 mi. SW of Riverside, at Cambridge	Dredge Harbor Yacht Basin	Charles L. Mollitor, Inc.	1947	10	80	--	76	(none)	Pzw	—	25	--	CI		137
138	Riverside	Riverside-Alloy Metal Co.	Ridpath & Potter	1938	18	800	6	120	(none)	Pzw	--	—	--	Ind	L.	138
139	do.	Riverside Industrial Center	Charles L. Mollitor, Inc.	1952	18	80	8	54	54-67	Kmr	12	250	28	Ind	Water temperature reported as 49°F(?)	139
140	1 mi. NW of Browns Mills	Jane Tabone	do.	1954	130	140	4	134	134-140	Tvt	38	10	8	CI	L.	140
141	2 mi. S of Pemberton	A. F. Brunt	do.	1955	83	210	4	204	204-210	Kmw	45	15	--	D	L.	141
142	1 mi. S of Pemberton	Clarence Adams	J. Henry Robbins	1949	72	195	4	175	(none)	Kmw	25	6	--	D	Farm use also.	142
143	Browns Mills	Mr. Reilley	Ridpath & Potter	before 1910	70-80	430	6	---	---	Ket	(flowing)	48	--	-	Pumped at a rate of 225 gpm also. L.	143
144	2 mi. E of Browns Mills, on Ridge Rd.	Joseph O'Neill	A. C. Schultes and Sons	1949	91	337	6	322	322-337	Kmw	29	110	27	D	L.	144
145	2 mi. SE of Browns Mills, at Country Lakes	Country Lakes, Inc.	Charles L. Mollitor, Inc.	1959	82	345	4	329	329-345	Kmw	23	80	10	PS	L.	145
146	2 mi. SE of Pemberton	Harvey Gower	Edward Robbins, Sr.	1949	68	250	6	250	(none)	Kmw	14	150	86	Irr		146
147	1 mi. E of Pemberton, on State Rte 530	John W. Goodman	Harvey Beebe, Sr.	1951	73	231	2	140	(none)	Kmw	15	30	—	D		147
148	4 mi. W of Wrightstown	Helis Stock Farm	Wm. Elsiedell & Orcutt Bros.	before 1893	approx. 70	715	-	---	---	Kmr	--	--	--	U	Abandoned. Formerly called Lorillard well. L.	148
149	4 mi. W of Wrightstown, at Jobstown	Kauffman & Minteer, Inc.	Charles L. Mollitor, Inc.	1960	74	107	6	95	95-105	Ket	14	60	4	CI	A., L.	149
150	3 mi. SW of Wrightstown, at Juliustown	Milton L. Havens, Sr.	Gus Hauser	1953	115	137	4	117	(none)	Kmw	20	110	2	D	Water temperature is 56°F.	150
151	3 mi. SW of Wrightstown	Helis Stock Farm	Ridpath & Potter	1928	96	988	12 & 8	757	757-800	Kmr	—	120	4	O	Water contains iron. Formerly called Walker-Gordon Dairy well. L.	151
152	3 mi. N of Mount Holly	Ridge Stables	Charles L. Mollitor, Inc.	1957	41	230	6	220	220-230	Kmr	45	100	65	D	Farm use also. L.	152
153	2 mi. NW of Wrightstown	Frank J. Ondrushek, Sr.	Greenhalgh & Kaye	1958	182	256	4	253	253-256	Ket	96	15	30	D		153
154	5 mi. NE of Mount Holly, on U.S. Highway 206	Tallman Brothers, Inc.	J. Henry Robbins	1956	42	260	8 & 6	240	240-260	Kmr	60	40	—	CI		154
155	do.	do.	W. R. Clair	1952	42	52	2	47	47-52	Ket	6	10	4	CI	L.	155

Table 2.- Records of selected wells in Burlington County, N. J.--Continued

Well no.	Location	Owner or name and number	Driller	Year completed	Altitude of land surface (feet)	Total depth drilled (feet)	Well diameter (inches)	Casing length (feet)	Screen setting (feet)	Water-bearing formation	Static water level below land surface (feet)	Yield (gpm)	Drawdown (feet)	Use	Remarks	Well no.
182	1 mi. W of Wrightstown	John L. Bond	Greenhalgh & Kaye	1953	143	123	-	--	------	Kmw	13	15	7	D		182
183	2 mi. NW of Wrightstown	Charles B. Hutchinson	Charles L. Mollitor, Inc.	1960	180	134	4	124	124-134	Kmw	54	25	5	D	L.	183
184	2 mi. NE of Browns Mills	Fort Dix No. 10	William Stothoff Co., Inc.	1943	100	449	6	--	------	Ket	26	60	102	PS	A.	184
185	4 mi. SE of Browns Mills, at Whitesbog	Joseph J. White, Inc.	Ridpath & Potter	1914	95	801	10 & 8	498	(none)	Ket	5	45	--	U	L.	185
186	do.	do.	J. W. Jenkins	1959	95	388	6 & 4	376	376-388	Kmw	--	150	--	CI	Pumping level is 90 feet. L.	186
187	4 mi. SE of Pemberton	Francis Bush	Edward Robbins, Sr.	1954	65	273	6	250	250-256	Kmw	28	400	38	Irr		187
188	Chatsworth	Anthony DeMarco Cranberry Plant	Bernard A. Leek	----	99	67	3	--	------	Tch	6	--	--	D	A.	188
189	3 mi. NE of New Gretna, at Lake Absegami	Bass River State Forest		----	20	31	1¼	27	(none)	Tch	3	--	--	PS	A.	189
190	6 mi. NW of New Gretna	Green Bank State Forest Nursery			13	73	8 & 6	53	53-73	Tch	-	150	--	Irr	A.	190
191	New Gretna	Chester Allen			9	232	3	--	------	Tkw	(flowing)	10	4	CI	Static water level is 4 feet above land surface. A.	191
192	Atsion	Lesson Small			51	88	1¼	--	------	Tch	6	--	--	D	A.	192
193	3 mi. N of Atsion, at Indian Mills	Leah Prickett		----	77	60	--	--	------	Tch	-	--	--	D	A.	193
194	4 mi. SW of Pemberton, near Vincentown	Vincentown Water Co.		1923	40	153	8	--	------	Kmw	(flowing)	175	--	PS	Flows 28 gpm at land surface in the spring season. A.	194
195	2 mi. S of Mount Holly, at Lumberton	Electronic Parts Specialty Co.	J. Henry Robbins	1953	33	121	6 & 4	101	101-121	Ket	30	50	--	Ind	A.	195
196	2 mi. W of Medford Lakes, at Taunton Lakes	Taunton Lakes Water Co. No. 1	do.	1950	57	252	6	230	(none)	Kmw	25	300	--	U	Abandoned. A., L.	196
197	Beverly	National Waterproof Papers, Inc.	Charles L. Mollitor, Inc.	1955	38	61	16	41	41-6	Kmr	22	---	--	Ind	Used for cooling.	197
198	2 mi. SE of Riverton	Riverton-Palmyra Water Co. No. 10	A. C. Schultes & Sons	1961	79	308	12	243	243-281	Kmr	75	1051	95	PS	Drilled to weathered bedrock. A., L.	198
199	2 mi NE of Moorestown, on Hartford Rd.	Moorestown Tp. Water Dept. No. 4	Layne-New York Co., Inc.	1959	59	360	12	298	298-338	Kmr	58	715	52	PS	L.	199
200	2 mi NE of Chatsworth	The Superior Zinc Corp.	Artesian Well Drilling Co.	1941	140	153	12	121	121-146	Tch	36	300	50	Ind		200
201	6 mi. E of Chatsworth on State Hwy 72	Cedar Bridge Fire Tower	J. Henry Robbins	1938	200	110	6	---	------	Tch	61	---	--	O	L.	201
202	3 mi. W of Mount Holly	Inductotherm Corp.	Charles L. Mollitor, Inc.	1961	65	444	6	411	411-443	Kmr	80	300	16	Ind	L.	202
203	6 mi. S of Chatsworth, on State Route 563	Arthur Sooy	(Owner)	----	45	30	2	---	------	Tch	-	---	--	D	Driven well. A.	203
204	1 mi. SW of Bordentown at Fieldsboro	Baura Chemical Co., Inc.	A. J. Connelly, Inc.	1960	9	79	---	---	-----	Kmr	-	---	--	Ind	A.	204
205	3 mi. NE of Pemberton	Pemberton Tp. High School	Layne-New York Co., Inc.	1959	75	220	6	140	140-150	Kmw	-	---	--	CI	A.	205
206	3 mi. E of Moorestown on Marne Hwy	William Haines, Jr.	Artesian Well Drilling Co.	1958	55	238	8	200	200-238	Ket	-	400	--	Irr	A.	206
207	5 mi. NE of Mount Holly on U.S. Hwy 206	Harry Rupp		----	62	52	4	---	------	Ket	-	---	--	CI	A.	207
208	2 mi. S of Moorestown	Mount Laurel Water Co.	A. C. Schultes & Sons	1961	30	595	12, 8	558	558-589	Kmr	32	518	77	PS		

Table 3. – Selected drillers' logs of wells in Burlington County, N. J. – Continued

Well no. 9, Delaware River Water Co.
(Log by A. C. Schultes & Sons)

	Altitude 21 feet	
	Thickness (feet)	Depth (feet)
Quaternary:		
Cape May Formation:		
Fine, brown sand	23	23
Sand, gravel, and clay	3	26
Cretaceous(?):		
Magothy (?) and Raritan (?) Formations:		
Gray clay	13	39
Stones	2	41
Interbedded brown sand, gravel, and clay	8	49
Coarse, brown sand	5	54
Cretaceous:		
Magothy and Raritan Formations:		
Coarse, brown sand and white clay, some gravel	21	75
Gravel and yellow clay	7	82
Red, white and yellow clay	8	90
Red and brown clay	6	96
Yellow and white clay	2	98
Stones, gravel, and clay	7	105
Fine sand and gravel	4	109
Fine sand and gravel, some white clay	10	119
Brown and white sand, clay	7	126
Coarse, brown sand and clay	6	132
Yellow and white clay	3	135
Early Paleozoic (?):		
Wissahickon Formation:		
Weathered rock	5	140

Table 3. – Selected drillers' logs of wells in Burlington County, N. J. – Continued

Well no. 10, Delaware River Water Co.
(Log by A. C. Schultes and Sons)

	Altitude 25 feet	
	Thickness (feet)	Depth (feet)
Quaternary:		
Cape May Formation:		
No sample	20	20
Cretaceous (?):		
Magothy (?) and Raritan (?) Formations:		
Hard clay	15	35
Cretaceous:		
Magothy and Raritan Formations:		
White and red clay	2	37
Soft, gray clay	3	40
Yellow sandy clay	14	54
Coarse, white sand	5	59
Medium to coarse sand, some ironstone	5	64
Yellow clay and fine sand	10	74
Pebbles, fine sand, and yellow clay - water-bearing	7	81
Medium to coarse sandy clay, ironstone	5	85
Coarse sand and gravel	5	91
Medium to coarse sand	5	96
Medium to coarse sand, clay, and stones	18	114
Fine sand, stones, and yellow clay	5	119
Medium to coarse sand	10	129
Brown clay	7	136
Red clay	6	142
Early Paleozoic (?):		
Wissahickon Formation:		
Weathered rock	1	143

Table 3. – Selected drillers' logs of wells in Burlington County, N. J. – Continued

Well no. 68, John Marincas
(Log by Greenhalgh and Kaye)

	Altitude 97 feet Thickness (feet)	Depth (feet)
Quaternary and Cretaceous:		
Pensauken and Englishtown Formations (undifferentiated):		
Yellow gravel and clay	38	38
Cretaceous:		
Woodbury Clay and Merchantville Formation (undifferentiated):		
Dense, black clay	12	50
Gray and black clay	70	120
Dark green marl with shells	45	165
Black clay	15	180
Magothy and Raritan Formations:		
Clay and sand	5	185
Coarse sand and sandstone with wood	23	208

Well no. 70, Hoeganaes Sponge Iron Co.
(Log by Layne-New York Co., Inc.)

	Altitude 35 feet	
Quaternary:		
Cape May (?) Formation:		
Sand	10	10
Cretaceous:		
Magothy and Raritan Formations:		
Sand and sandy clay	6	16
Muddy sand	5	21
Sand, gravel, and clay	5	26
Sand	8	34
Clay	11	45
Sand, gravel, and clay	14	59
Yellow sand, gravel, and clay	13	72
Gray sand and white clay	10	82
Gravel, sand, and clay	16	98
Muddy gravel and sand	4	102
Gravel with streaks of clay	7	109
Coarse sand and gravel	26	135

Table 3. – Selected drillers' logs of wells in Burlington County, N. J. – Continued

Well no. 78, Amico Sand and Gravel Co.
(Log by Paul Steffens)

	Altitude 15 feet Thickness (feet)	Depth (feet)
Quaternary:		
Cape May Formation:		
Sand	3	3
Coarse gravel	3	6
Cretaceous:		
Magothy (?) and Raritan (?) Formations:		
Black clay	9	15
Dirty sand	3	18
Sand and gravel	12	30
Gravel	6	36
Clay	13	49
Early Paleozoic (?):		
Wissahickon Formation:		
Soft rock	26	75

Well no. 80, Holy Cross High School
(Log by Charles L. Mollitor Inc.)

	Altitude 82 feet	
Topsoil	2	2
Cretaceous:		
Magothy and Raritan Formations:		
Yellow sand	4	6
Brown sand	20	26
White clay	6	32
Red clay	11	43
Gray and white clay	6	49
Gray clay	22	71
Dirty, gray sand	48	119
White clay	19	138
White sand	7	145
White clay	8	153
Sand and gravel	21	174

Table 3. – Selected drillers' logs of wells in Burlington County, N. J. – Continued

Well no. 138, Riverside-Alloy Metal Co.
(Log by Ridpath and Potter)

	Altitude 18 feet	
	Thickness (feet)	Depth (feet)
Quaternary and Cretaceous:		
Cape May, Magothy and Raritan Formations (undifferentiated):		
Fine to coarse sand, clay, and some gravel	120	120
Early Paleozoic (?):		
Wissahickon Formation:		
Mica gneiss	680	800

Well no. 140, Jane Tabone
(Log by Charles L. Mollitor Inc.)

	Altitude 130 feet	
Quaternary and Tertiary:		
Bridgeton and Kirkwood Formations (undifferentiated):		
Yellow sand and gravel	22	22
Red sand and gravel	26	48
Tertiary:		
Kirkwood Formation:		
Yellow sand	22	70
Black mud	5	75
Muddy sand	30	105
Manasquan Formation:		
Green marl	25	130
Vincentown Formation:		
Green and black sand	10	140

Table 3. – Selected drillers' logs of wells in Burlington County, N. J. – Continued

Well no. 198, Riverton-Palmyra Water Company
(Log by A. C. Schultes and Sons)

	Altitude 79 feet Thickness (feet)	Depth (feet)
Quaternary:		
Cape May Formation:		
Fine, brown sand	4	4
Fine, brown clayey sand	2	6
Fine, brown sand	6	12
Cretaceous:		
Merchantville Formation:		
Clay	7	19
Magothy and Raritan Formations:		
Fine to medium, brown sand	6	25
Medium to coarse, brown sand	5	30
Sand, clay, and stones	7	37
Sand and clay	2	39
Gravel and clay	1	40
Medium to coarse sand	4	44
Gravel	2	46
Fine to coarse sand	4	50
Gravel and clay	4	54
Sandy clay	5	59
Fine sand	4	63
Coarse sand and gravel	2	65
Clay and sand	11	76
Medium sand	1	77
Clay and sand	8	85
Coarse gravel and sand	3	88
Sandy clay	10	98
Clay and gravel	4	102
Clay and sand	4	106
Brown sand	12	118
Coarse gravel	5	123
Clay	1	124
Brown sand and gravel	25	149
Sand and clay	6	155
Gravel and sand	5	160
Sandy clay	5	165
Sand and gravel	14	179
Gravel and sand	9	188
Gravel and clay	2	190
White clay	4	194
Sand and gravel	6	200

(Continued)

Table 3. – Selected drillers' logs of wells in Burlington County, N. J. – Continued

Well no. 198, Riverton-Palmyra Water Company
(Log by A. C. Schultes and Sons)
(Continued)

	Thickness (feet)	Depth (feet)
Cretaceous – Continued:		
Magothy and Raritan Formations – Continued:		
Clay and sand	11	211
White clay	6	217
Sandy clay	1	218
Sand and clay	14	232
Sand	5	237
Sand and clay	12	249
Sand and gravel	9	258
Clay and gravel	1	259
Sand and gravel	6	265
Medium to coarse, brown sand with some gravel	6	271
Medium to coarse, brown sand and gravel	11	282
Red clay	5	287
Very hard, brown and white clay	2	289
Coarse gravel	13	302
Early Paleozoic (?):		
Wissahickon Formation:		
Stones, gravel, and weathered, micaceous rock	2	304
Rock with some sand	2	306
Weathered rock		308

REFERENCE NO. 16

Surface Water Classifications

Surface Water Quality Standards

State of New Jersey Department of Environmental Protection/Division of Water Resources

(Allamuchy) - All tributaries to the Pond and to its outlet stream that are located entirely with the boundaries of Allamuchy State Park	FW1
DELAWANNA CREEK (Delaware) - Entire length	FW2-TM
DELAWARE RIVER	
MAIN STEM (Interstate Waters - Classifications from Delaware River Basin Commission (DRBC))	
(State Line) - That portion of DRBC's Zone 1C from the New York-New Jersey state line to the proposed axis of the Tocks Island Dam at River Mile 217.0	Zone 1C
(Tocks Island) - Proposed axis of Tocks Island Dam at River Mile 217.0 to the mouth of the Lehigh River at Easton, Pennsylvania, at River Mile 183.66	Zone 1D
(Easton, Pa.) - Mouth of the Lehigh River at River Mile 183.66, to the head of tide at the Trenton-Morrisville Toll Bridge, Trenton at River Mile 133.4	Zone 1E
(Trenton) - Head of tide at the Trenton-Morrisville Bridge, Trenton, River Mile 133.4 to below the mouth of Pennypack Creek, Pennsylvania at River Mile 108.4	Zone 2
(Philadelphia) - River Mile 108.4 to below the mouth of Big Timber Creek, New Jersey, at River Mile 95.0	Zone 3
(Gloucester) - River Mile 95.0 to the Pennsylvania-Delaware state line at River Mile 78.8	Zone 4
(Marcus Hook) - Pennsylvania-Delaware state line at River Mile 78.8 to Liston Pt., Delaware at River Mile 48.2	Zone 5
(Liston Point) - Delaware Bay from Liston Point, Delaware at River Mile 48.2 to River Mile 0.0 at the intersection of the centerline of the navigation channel and a line between Cape May Light and the tip of Cape Henlopen, Delaware	Zone 6 (C1)
TRIBUTARIES, DELAWARE RIVER	
(Holland) - Entire length	FW2-TP(C1)
(Port Jervis) - Unnamed or unlisted direct tributaries that are north of Big Timber Creek, are outside of the Pinelands Protection and Preservation Areas, and are not mapped as C1 waters by the Department	FW2-NT
(Titusville) - Unnamed tributaries through Washington Crossing State Park	FW2-NT(C1)
(Brooklawn) - Unnamed or unlisted direct tributaries, south of Big Timber Creek and north of Oldman's	FW2-NT/SE2

REFERENCE NO. 17

STATE OF NEW JERSEY

DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT

DIVISION OF WATER POLICY AND SUPPLY

IRON IN GROUND WATERS OF THE MAGOTHY AND RARITAN FORMATIONS IN CAMDEN AND BURLINGTON COUNTIES, NEW JERSEY

WATER RESOURCES CIRCULAR NO. 19

Prepared in Cooperation with

United States Department of the Interior

Geological Survey

1969

IRON IN GROUND WATERS OF THE MAGOTHY AND RARITAN FORMATIONS IN CAMDEN AND BURLINGTON COUNTIES, NEW JERSEY

By

Donald Langmuir, Hydrologist

U. S. Geological Survey

Prepared by the U. S. Geological Survey

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the State of New Jersey

IRON IN GROUND WATERS OF THE MAGOTHY AND RARITAN FORMATIONS IN CAMDEN AND BURLINGTON COUNTIES, NEW JERSEY

ABSTRACT

Iron is the major water-quality problem in potable ground waters of the Magothy and Raritan aquifer system in Camden and Burlington Counties, New Jersey. Most wells tapping the aquifer system in this area yield total iron concentrations in excess of 0.3 mg/l (milligram per liter). The iron is present primarily as dissolved ferrous iron (Fe^{+2}), and as colloidal-sized ferric hydroxide [$Fe(OH)_3$].

Four water-quality zones are defined in terms of dissolved solids, pH, prevalent chemical character, and iron content as analyzed from ground-water samples from 185 wells. The ground water in zones 1 to 3 is primarily of the calcium-bicarbonate type, whereas in zone 4 it is of the sodium-bicarbonate type.

Zone 1 includes ground waters in outcrop areas having dissolved solids less than 100 mg/l. These waters are oxygenated and uncontaminated, with pH values from 5.0 to 6.0, and both ferrous and total iron concentrations less than 0.5 mg/l.

Ground waters are polluted or vulnerable to pollution in zone 2. This zone is almost entirely within the outcrop area, and includes areas adjacent to the Delaware River opposite Philadelphia, Pa. Dissolved solids in zone 2 range from 100 mg/l to generally less than 400 mg/l; pH values range from 6.0 to 7.0. Ferrous iron and total iron concentrations usually exceed 0.5 mg/l, and are occasionally as high as 5 mg/l and 20 mg/l, respectively.

Zone 3 corresponds largely to confined parts of the aquifer system downdip from zones 1 and 2, where the ground water contains less than 200 mg/l dissolved solids. In zone 3, pH values range from 6.0 to 8.0. Ferrous iron and total iron concentrations are as high as 6.6 mg/l and 16 mg/l, respectively, in shallow ground waters, due to solution of ferrous iron minerals in the sediments coupled with partial oxidation of the ferrous iron. Both ferrous iron and total iron concentrations decrease progressively in the downdip direction as the pH rises above 6.5. Concentrations of both forms of iron are generally less than 0.05 mg/l at a pH of 8.0. The decrease may be due to ion exchange removal of the ferrous iron coupled with reduction of the colloidal ferric hydroxide to ferrous iron, or sorption of the ferrous iron by the colloidal ferric hydroxide followed by coagulation and coprecipitation.

Zone 4, downdip and south of zone 3, is characterized by ground waters with dissolved solids in excess of 200 mg/l, pH values of 8.0 or above, and both total iron and ferrous iron concentrations of less than 0.3 mg/l. The low iron values may be due to the same reaction or reactions responsible for the decrease in iron in zone 3.

The water-quality and geohydrologic data suggest that heavy, long-term pumpage in the vicinity of Philadelphia and adjacent parts of New Jersey, has induced the flow of zone 3 ground waters up to seven miles in a northerly direction towards this area since 1900. A reduction in pumpage in the Philadelphia area, coupled with increased pumpage in adjacent New Jersey during the period from 1958 to 1966, has brought about movement of zone 2 of up to one mile toward the southeast in Camden County.

In northern Camden County, changes in specific conductance, and in ferrous iron, total iron, and bicarbonate-ion concentrations in the ground water, indicate that heavy

summer pumpage by shallow wells in zone 3 induces ground-water flow downdip towards these wells from the outcrop area and zone 1. Similarly, deeper zone 3 wells in the same area probably induce significant amounts of vertical leakage through the overlying Woodbury Clay and Merchantville Formations. Adjustment of the ground water within the aquifer system to marked seasonal changes in pumpage may cause local ground-water movement of up to one mile with corresponding changes in iron content.

INTRODUCTION

Most of the potable water used by public and private interests in the Coastal Plain of New Jersey is ground water, and most of this ground water is pumped from the aquifer system in the Magothy and Raritan Formations. The outcrop area of the aquifer system embraces some of the more populous and intensively developed parts of New Jersey. (See Fig. 1). These areas depend heavily on ground water for public, private and industrial water supply.

The outcrop of the Magothy and Raritan Formations in southern New Jersey is vulnerable to salt-water encroachment from the Delaware estuary below Philadelphia, and to man-made pollution in the vicinity of Philadelphia and adjacent New Jersey. Approximately south of a line connecting the city of Salem and Island Beach State Park, potable fresh waters in the aquifer system give way to highly saline residual waters. Within the area north of this line, the ground water is generally of good quality, except for the common occurrence of total iron in amounts greater than the maximum of 0.3 mg 1 (milligram per liter) recommended by the New Jersey State Department of Health (1964) for potable supplies.

Millions of dollars have been spent on the construction of treatment plants for iron removal in Camden and Burlington Counties. Wells have been drilled and subsequently abandoned due to objectionably high iron content in the water, or clogging of the well screen with ferric hydroxide sediments. Because of the lack of detailed information on iron distribution in the ground water, a number of these wells have been drilled in areas of high iron, even though ground water low in iron was available nearby.

It has generally been assumed that the iron in deep well waters is entirely in solution and in the form of ferrous iron (Fe^{+2}). Such a belief is casually supported by the absence of visible turbidity in freshly collected ground-water samples. However, this study indicates that large amounts of iron may also be present in deep well waters as particulate ferric hydroxide [$Fe(OH)_3$]. This material is uniformly dispersed, and colloidal or near-colloidal in size and therefore not visible to the naked eye.

Traditional water-treatment practices are geared to the total iron analysis, which represents the combined concentrations of particulate ferric hydroxide and dissolved ferrous iron. However, except when ion-exchange methods are used, iron is removed from solution during treatment as ferric hydroxide. Because of this, only the ferrous iron in a raw water requires treatment.

Most ground waters in the study area which contain more than 0.3 mg 1 total iron are of the calcium-bicarbonate type having pH values ranging from about 6.0-8.0. Iron removal commonly involves aeration, followed by settling and filtration. If no chemicals are added to the raw water, the reactions taking place during aeration are

$$2Fe^{+2} + 5H_2O + \tfrac{1}{2}O_2 = 2Fe(OH)_3 + 4H^+ \qquad (1)$$

and

$$H^+ + HCO_3^- = H_2O + CO_2 \qquad (2)$$

Reaction (1) is prohibitively slow at pH values below 7.0. Only when sufficient natural alkalinity (i.e. bicarbonate) is present in the water for reaction (2) to operate and eliminate hydrogen ions as they form will the pH remain above 7.0 during aeration. Where the alkalinity or bicarbonate content of the water is low, or the pH is below 7.0, it is often necessary to add lime to raise the pH for effective iron removal. The iron present in raw water as particulate ferric hydroxides does not enter into these reactions and need not be considered in the estimation of lime dosage or alkalinity demand for pH control. Thus, if appreciable quantities of particulate ferric hydroxide

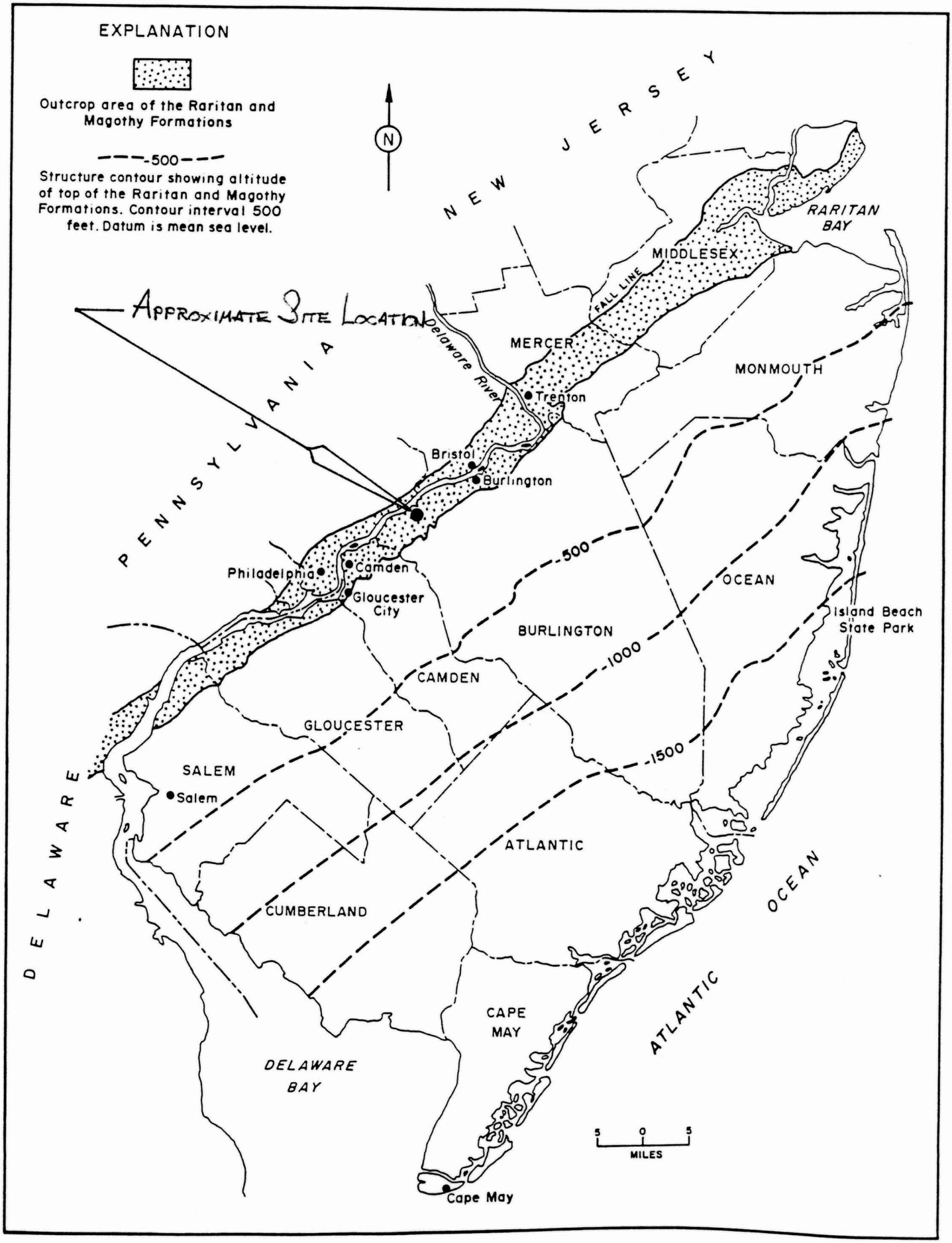


Fig. 1. Map showing outcrop area and generalized altitude of the top of the

are present in the raw water, a total iron analysis by itself is likely to be misleading to the water-treatment plant operator.

The breakdown of ferrous and total iron in a ground water is also important if the iron is to be removed by the sodium ion exchange process, for this process only removes ferrous iron, and any colloidal ferric hydroxide present will tend to clog the exchanger.

In short, it is probable than an awareness of the ferrous iron and particulate ferric hydroxide content in raw ground water (or treated water for that matter) would help to explain many of the perplexing difficulties encountered by water-works personnel engaged in treatment for iron removal.

With a view in part to remedying some of these problems, this report describes the distribution and behavior of ferrous iron, total iron, and several related chemical constituents in ground waters of the Magothy and Raritan aquifer system in Camden and Burlington Counties. The water-quality discussion is preceded by introductory sections dealing with the geologic and hydrologic framework of the aquifer system. It is hoped that the information presented herein will be of interest to owners of existent wells, water-works personnel, and individuals or groups faced with deciding where to drill new wells which are likely to yield ground waters low in iron. Additionally, this study attempts to explain the geochemical behavior of ferrous iron and particulate ferric hydroxides in the ground water. Although a few references will be made to iron geochemistry, a detailed discussion of this subject is considered beyond the scope of this report.

Acknowledgments

This investigation was conducted by the U. S. Geological Survey in cooperation with the Division of Water Policy and Supply, New Jersey State Department of Conservation and Economic Development. The helpful cooperation and assistance of well owners who permitted sampling of their wells are gratefully acknowledged.

GEOLOGY

Coastal Plain geology in New Jersey is characterized by a wedge of unconsolidated and semiconsolidated sediments exposed southeast of the Fall Line, of Cretaceous through Quaternary age, that thicken downdip towards the Atlantic Ocean. The oldest of these sediments, known in New Jersey as the Raritan and Magothy Formations, rest unconformably upon an early Paleozoic and Precambrian crystalline basement, which crops out at the surface northwest of the Fall Line (fig. 1). In New Jersey, the erosion surface on the buried pre-Cretaceous basement dips from 60-100 feet per mile toward the southeast (Parker and others, 1964, p. 42), is about 3,800 feet deep at Island Beach State Park and 6,000 feet deep at Cape May (Richards and others, 1962, p. 13). South of Trenton the surface is characterized by a number of easterly to southerly trending channels which were carved by the ancient Schuylkill and Delaware Rivers and their tributaries (Greenman and others, 1961). The buried upper surface of the crystalline basement has been weathered into a micaceous residual clay. The clay is widespread, and probably serves as a confining bed where it occurs below the overlying unconsolidated sediments.

The Magothy and Raritan Formations, which make up approximately the lower half of the Coastal Plain sequence in New Jersey, are Late Cretaceous in age, and are composed of unconsolidated sand, clay, and silt, and small amounts of gravel. In the outcrop area south of Trenton, the Raritan is about 200 feet thick and the Magothy ranges in thickness from 0-45 feet (H. E. Gill, oral communication). The formations dip from 40-100 feet per mile toward the southeast, with the lower dips assigned to the overlying Magothy formation (Johnson and Richards, 1952, p. 2, 152). At Island Beach State Park, the Raritan attains a thickness of 1,730 feet and the Magothy about 260 feet. The contours in figure 1 show the altitude of the top of the Magothy Formation. In the Delaware Valley, south of Trenton, the outcrop area of both formations is almost completely covered by permeable sand and gravel, and semi-permeable silt and clay deposits of Pleistocene age.

Although a number of distinct sand and clay members within the Raritan Formation have been identified in Middlesex County, several tens of miles northeast of the study area, it has not been possible to trace these beds for great distances away from the type locality. Magothy and Raritan sediments in Camden and Burlington Counties are highly variable in nature both vertically and horizontally because of their predominantly fluvial character. Because of this variability, it has traditionally been assumed that the major sand and gravel aquifers within the two formations are interconnected over relatively short distances around the clay layers. Although this assumption is open to question in some areas, the interconnection is certainly most effective in sediments filling several major stream channels which have been carved into the crystalline basement. These ancient valleys contain thick accumulations of highly permeable coarse-grained sediments which are the most reliable and productive sources of ground water in the area. A thickness map of the uppermost water-bearing zone in Magothy and Raritan sediments, based largely on an interpretation of geophysical logs by Gill (written communication) is shown in figure 2. The map shows two major channels south and east of Philadelphia, respectively, which are characterized by a thickening of sands and gravels to over 100 feet. The channel in Gloucester County may represent an ancient course of the Schuylkill River. Also of hydrologic significance are the 100-120 foot thick sands southeast of Bristol. Considerable movement of ground water has taken place in sediments filling the channel south of Philadelphia. The channel opposite Bristol has also had an important influence on ground-water movement in that area.

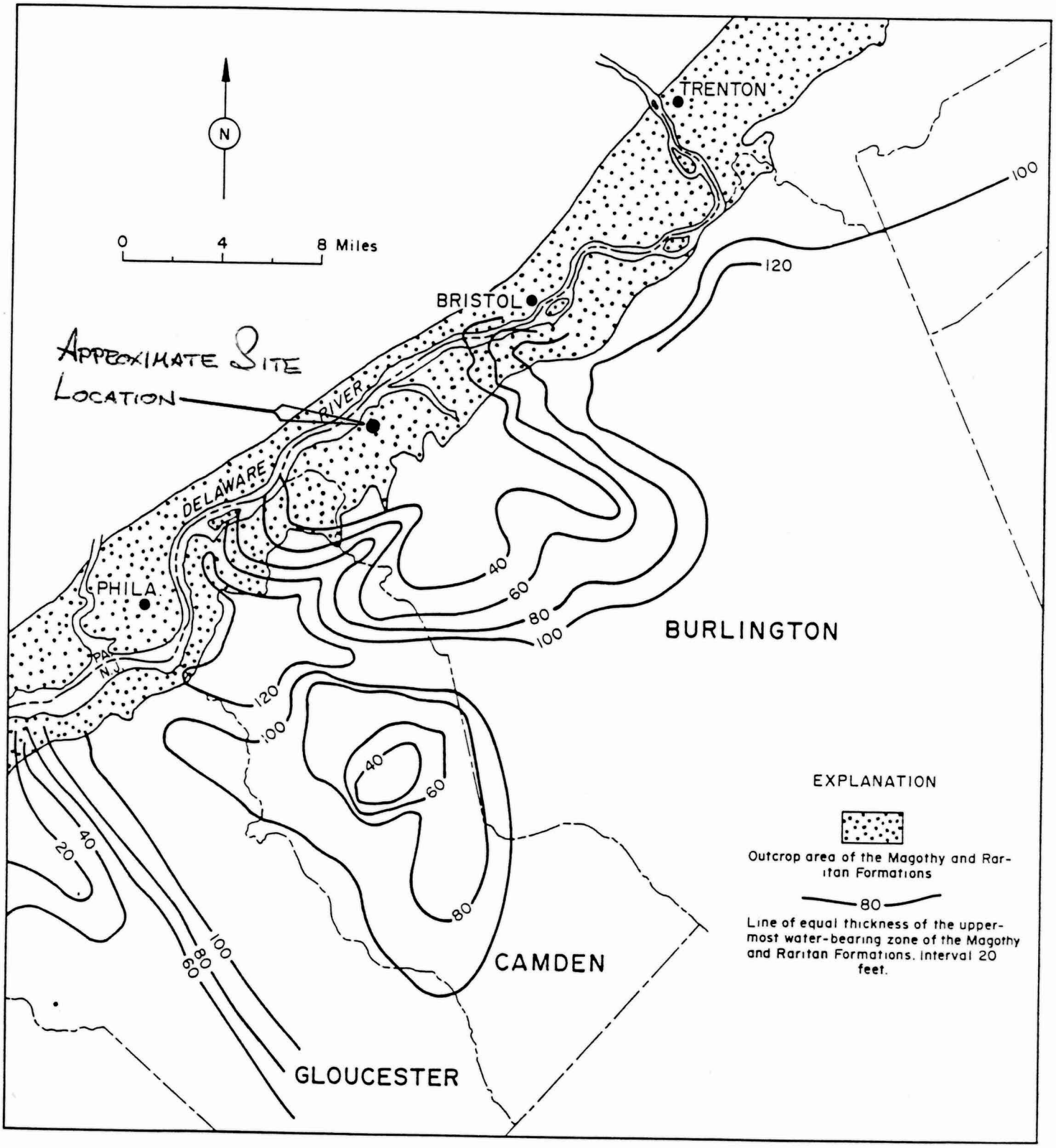


Figure 2.—Thickness of the uppermost water-bearing zone of the Magothy and Raritan Formations.

The aquifers within the Magothy and Raritan Formations are effectively confined below by the crystalline basement and its residual clay, and above by the silts and clays of the Merchantville Formation and Woodbury Clay of Late Cretaceous age, which collectively are about 100 feet thick or more. The Merchantville Formation is a sequence of horizontally stratified thin-to-thick bedded silts and sands which are slightly to very clayey. The Woodbury Clay is a massive bedded, and somewhat silty clay (Owens and Minard, 1964). These two formations, of marine origin are areally extensive, and function primarily as a confining bed in the study area.

GEOHYDROLOGY

A generalized map of static water levels in the aquifer system measured before significant pumpage had occurred, is shown in figure 3. The map is based upon the earliest records for each well shown, and is probably representative of conditions in the study area around 1900. Northeast of Trenton, the outcrop area of the Magothy and Raritan Formations typically attains altitudes greater than 100 feet. This has historically been considered the major recharge area for the aquifer system, with water levels in excess of 60 to 80 feet. Ground water flows away from this region radially from northeast to southwest, discharging into Raritan Bay to the northeast (fig. 1), and southwest into the Delaware River between Bristol and Trenton. The pre-pumpage water-level data indicate a two-way flow pattern in most of Camden County and adjacent parts of Burlington County, with flow from highs of between 10 and 20 feet above mean sea level northwest towards the outcrop area, and flow also in the opposite direction downdip towards the southeast.

Maps of chemical constituents in the ground water, which will be discussed later, suggest that the two-way flow pattern just described is a relatively recent development, and that ground waters now present in Burlington and Camden Counties southeast and south of Bristol were emplaced by flow primarily towards the southeast from the Delaware River and the outcrop area. Emplacement may have taken place during the later stages of Pleistocene glaciation when the ocean stood several hundred feet lower than present levels. The flow pattern shown in figure 3 has subsequently caused this older ground water to move updip towards the northwest and the outcrop area in the vicinity of Bristol. Movement has taken place principally along the axis of the major buried stream channel in Magothy and Raritan sediments opposite Bristol.

Measurements during the fall of 1966, indicate that static water levels in the area north and east of Burlington County have not dropped appreciably since pumpage began. This is primarily a consequence of induced recharge from the high-level intake area northeast of Trenton. However, sources of natural or induced recharge have not kept pace with rapidly increasing rates of withdrawal in Burlington and Camden Counties and adjacent Pennsylvania. As a result, water levels in the vicinity of Bristol and southeast and south of Bristol are now generally below sea level. At the same time, static water levels in almost all of Camden County are deeper than 20 feet below mean sea level and in the northern part of the county are typically deeper than 40 feet and occasionally 50 feet below mean sea level.

In response to pumpage, some induced recharge from the Delaware River enters the aquifer system through silt and clay in the river bed, where wells are located within a few hundred feet of the river channel. Lowered water levels have undoubtedly also induced additional recharge from surface waters in the outcrop area, and small amounts of vertical leakage into the aquifer system through the overlying Woodbury Clay and Merchantville Formation southeast of the outcrop area. Nevertheless, these sources of recharge have not altered the long-term regional trend of declining water levels.

A notable effect of the heavy withdrawals has been the regional migration of artesian ground waters updip towards centers of pumpage. Chemical maps, some of which will be discussed in this report, indicate that the migration has taken place for the most part within the highly porous and permeable sands and gravels which fill and buried stream channels downdip from Philadelphia and Bristol (fig. 2). In addition, the heavy pumpage in parts of Cmaden County adjacent to Philadelphia, coupled with a reduction in ground-water use in the Philadelphia area, has led to a substantial migration of polluted ground waters from beneath Philadelphia towards the east and southeast into adjacent parts of Camden County.

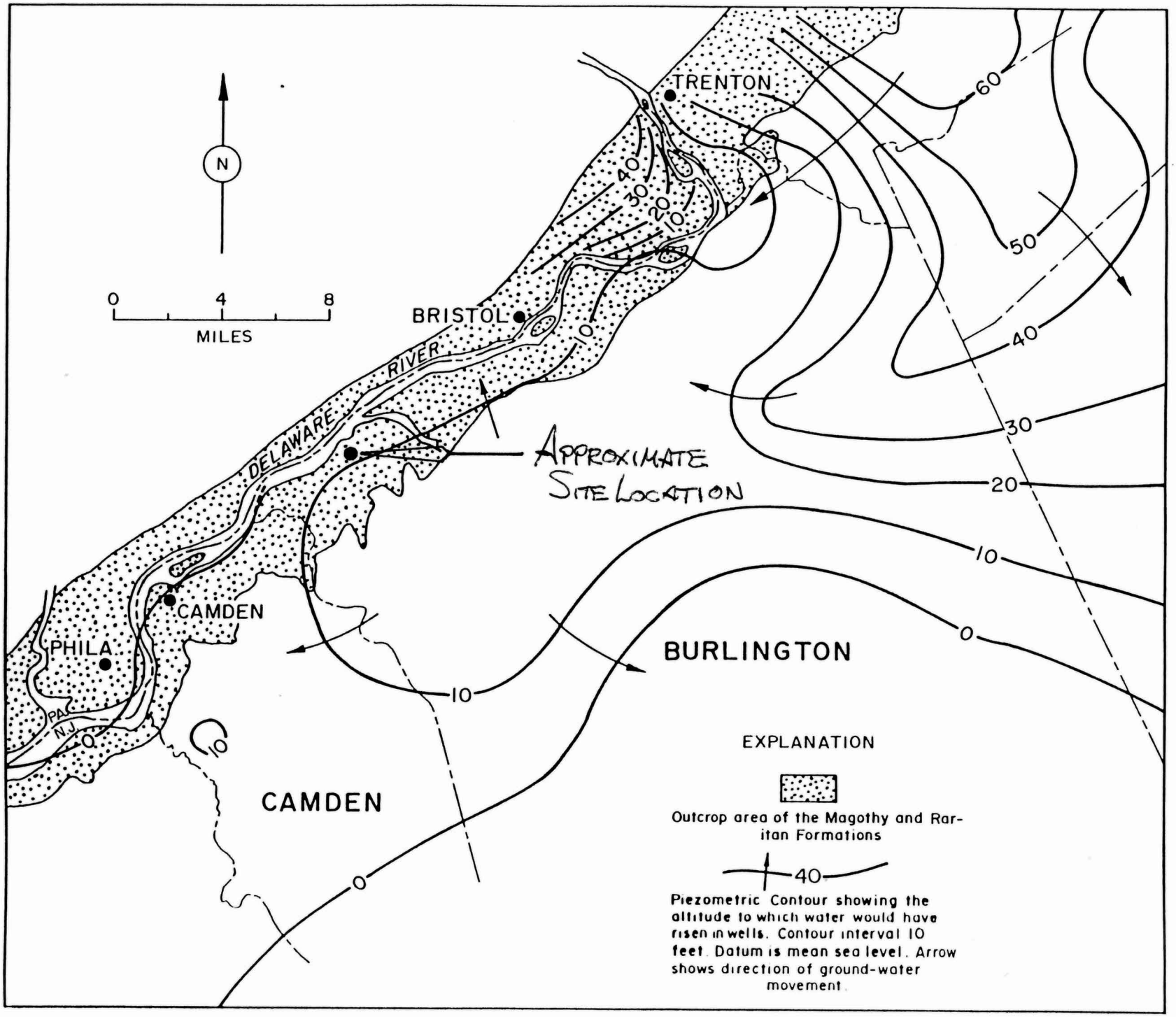


Figure 3.—Map showing probable general configuration of the piezometric surface of the aquifer system around 1900.

Superimposed on these long-term regional trends is short-term local movement in response to seasonal changes in pumpage. Ground-water use in the Coastal Plain of New Jersey is substantially greater in summer months than during the rest of the year. This is primarily a consequence of irrigation practices and the use of ground water for industrial cooling. Marked seasonal changes in water chemistry in parts of northern Camden and Burlington Counties indicate that the steep hydraulic gradients established by heavy local pumpage can induce appreciable ground-water movement within the aquifer system and also vertical leakage through the overlying Woodbury Clay and Merchantville Formations.

The chemical maps in this report (figures 5-9) represent a generalized picture of water quality in the Magothy and Raritan Formations regardless of individual aquifer or depth. This generalization is possible in most of the study area probably because of: (1) a similar history and evolution of ground-water quality in each aquifer regardless of depth; and (2) hydrologic interconnection vertically around beds or lenses of silt and clay separating the various sand and gravel aquifers.

In some areas, water quality changes markedly with depth. This is true in the area of transition between fresh and residual saline water in southern Camden and Burlington Counties (fig. 5). Along this gradational boundary, the saline water is commonly present several miles further updip in the deeper sands than it is in relatively shallow overlying parts of the aquifer system. Elsewhere in the two-county area, marked changes in ground-water quality with depth are probably due principally to differential pumpage of individual sands. In areas downdip from the outcrop of the formations where, before pumpage, the water quality was apparently similar regardless of depth, differential pumpage of poorly inter-connected sands and gravels, coupled with differences in permeability and transmissibility within individual aquifers, has led to moderate differences in water quality with depth. The most pronounced quality differences with depth are found in the outcrop area adjacent to the Delaware River opposite Philadelphia. In this area, shallow wells obtain most of their yield by recharge from the Delaware River. Deep wells, on the other hand, receive highly mineralized ground water that originates in the area of South Philadelphia. Heavy pumpage in adjacent parts of Gloucester, Camden, and Burlington Counties has drawn these highly mineralized ground waters into New Jersey, where they are separated from the river by overlying silt and clay.

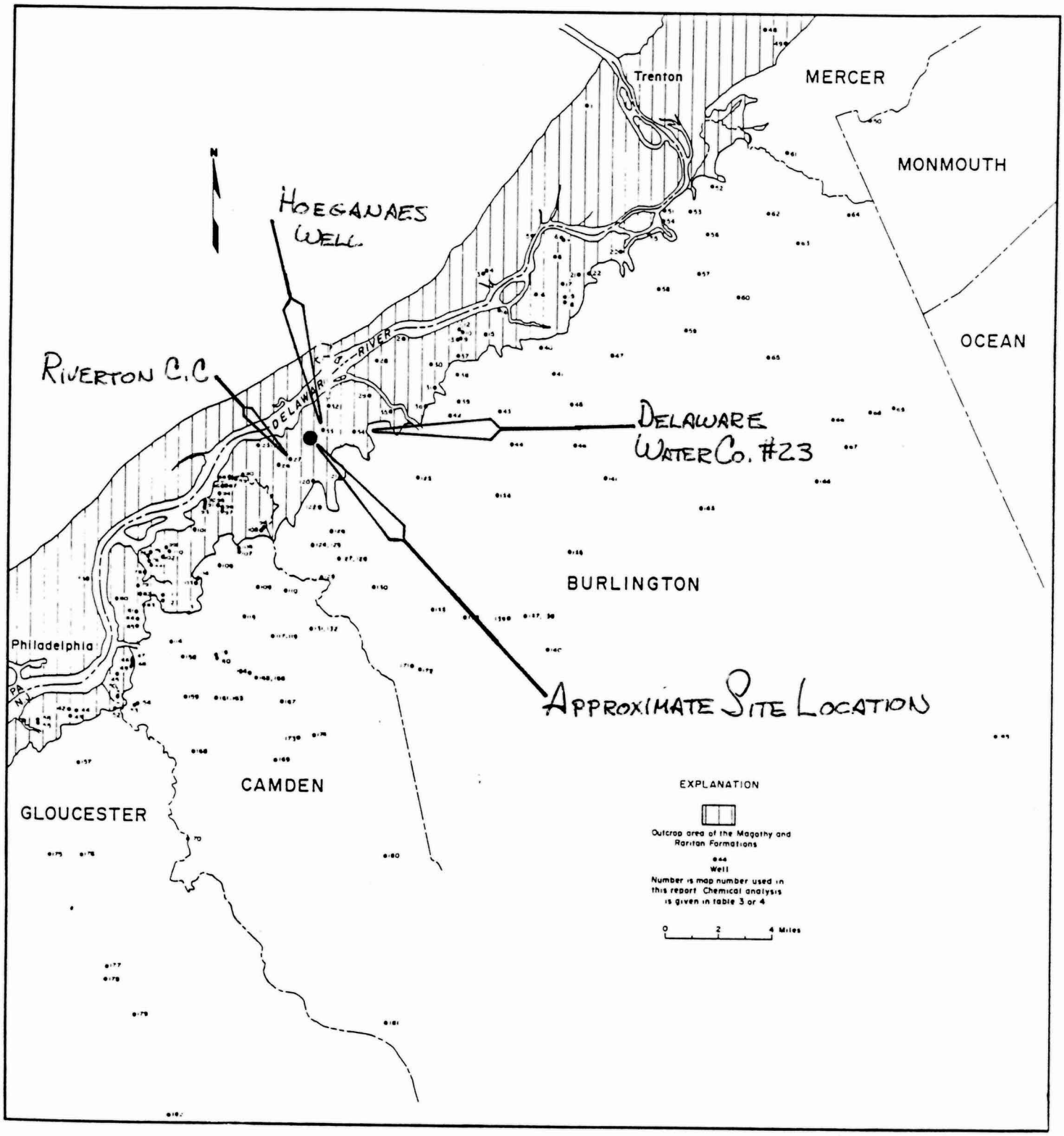


Figure 4.—Map showing location of wells for which chemical analyses are presented in this report.

SUMMARY AND CONCLUSIONS

Most of the ground water used by public and private interests in Coastal Plain New Jersey is pumped from the Magothy and Raritan aquifer system. In northern Camden and Burlington Counties, ground water in the aquifer system is primarily of the calcium bicarbonate type. In this area dissolved solids are generally less than 200 mg 1, except adjacent to the Delaware River in northernmost Camden County where they may be as high as 400 mg/1 as a result of pollution. In southern parts of the two-county region, calcium in the ground water has been replaced by sodium through ion-exchange reactions with clay minerals in the sediments, and the ground water is consequently of the sodium-bicarbonate type. Dissolved solids increases towards the south in this area from 200 mg 1 to values in excess of 500 mg 1.

The New Jersey State Department of Health (1964) recommends a maximum concentration of 0.3 mg 1 of total iron for potable-water supplies. Most wells tapping the Magothy and Raritan Formations in Camden and Burlington Counties, New Jersey, yield ground waters containing iron concentrations in excess of this amount, and therefore treatment for iron removal is necessary. The normal pH range of these ground waters is from 5.0 to 8.0. In this range the iron is present as dissolved ferrous iron and colloidal ferric hydroxide. A total iron analysis thus represents the sum of these two forms. Under reducing conditions in the pH range from 5.0 to 7.0, iron is brought into the ground water in the ferrous state. The colloidal ferric hydroxide is formed by partial oxidation of the ferrous iron already in solution.

Four ground water-quality zones have been defined within the study area based on dissolved-solids content, pH, prevalent chemical character, and ferrous and total iron content. Zone 1 includes ground waters in outcrop areas with dissolved solids less than 100 mg 1, pH values from 5.0 to 6.0, and both ferrous and total iron concentrations less than 0.5 mg 1. Ferrous-iron concentrations in zone 1 are low due to the absence of appreciable contamination, and as a consequence of mixing of the ground water with oxygen-rich surface recharge. The concentration of colloidal ferric hydroxide in this zone is also low consistent with the absence of ferrous iron in the ground water.

Ground waters are polluted or vulnerable to pollution in zone 2. This zone is almost entirely within the outcrop area, and includes parts of Camden and northwest Burlington Counties adjacent to the Delaware River opposite Philadelphia. Dissolved solids in zone 2 range from 100 mg 1 to generally less than 400 mg 1, and pH values from 6.0 to 7.0. Total iron and ferrous iron concentrations usually exceed 0.5 mg 1, and are occasionally as high as 5 mg 1 and 20 mg 1 respectively. The presence of organic-waste materials and associated decay processes in zone 2, and the existence of locally confining conditions facilitates the buildup of dissolved ferrous iron by acid leaching and reduction of ferric iron minerals in the sediments. Zone 2 ground waters are susceptible to mixing with oxygenated surface waters derived from precipitation, or from streams such as the Delaware River flowing across the outcrop area. Much of this oxygen-rich recharge is induced by pumping wells. Ferrous iron concentrations are greatest where such recharge does not reach or mix effectively with the ground water. Substantial concentrations of colloidal ferric hydroxide are built up in zone 2 by repeated leaching and reduction of ferric iron minerals in the sediments, followed by partial oxidation of the ferrous iron.

Zone 3 corresponds largely to confined parts of the aquifer system downdip from zones 1 and 2, where the ground water contains less than 200 mg/1 dissolved solids. The range of pH values in zone 3 is from 6.0 to 8.0. Total iron and ferrous-iron concentrations are as high as 16 mg/1 and 6.6 mg 1, respectively in shallow ground waters in the northwestern part of Burlington County, a few miles southeast of the

outcrop area. Ferrous iron minerals such as siderite, pyrite, and marcasite in the sediments react with shallow ground waters depleting their oxygen content and causing the buildup in ferrous iron. Colloidal ferric-hydroxide concentrations increase in the same area by partial oxidation of the ferrous iron. The oxidation is accomplished by surface recharge, much of which is probably induced by pumping wells. Locally, the recharge flows downdip from the outcrop area and zone 1, and in some instances through the overlying Woodbury Clay and Merchantville Formations. Both ferrous iron and total iron concentrations decrease progressively in the downdip direction as the pH continues to rise above 6.5. Thus at a pH of 8.0, concentrations of both forms of iron are negligible (less than 0.05 mg/1). The decrease may be due to ion exchange removal of the ferrous iron coupled with reduction of the colloidal ferric hydroxide to ferrous iron, or sorption of the ferrous iron by the colloidal ferric hydroxide followed by coagulation and coprecipitation.

Zone 4, downdip and south of zone 3, is characterized by ground waters with dissolved solids in excess of 200 mg/1, pH values of 8.0 or above, and both total iron and ferrous iron concentrations less than 0.3 mg 1 throughout. The low iron values may be due to the same reaction or reactions responsible for the decrease in ferrous iron and colloidal ferric hydroxide in zone 3.

An appraisal of the water-quality and geohydrologic data suggests that heavy, long-term pumpage in the vicinity of Philadelphia and adjacent parts of New Jersey, has caused substantial migration of ground water within the aquifer system. Pumpage in this area since 1900 has induced the flow of zone 3 ground waters up to seven miles in a northerly direction in northeast Gloucester County and adjacent Camden County. A reduction in pumpage in the Philadelphia area, coupled with increased pumpage in adjacent New Jersey, has brought about an enlargement of zone 2 up to one mile towards the southeast in Camden County during the period from 1958 to 1966.

In Camden County, just downdip from the outcrop area in zone 3, heavy summer pumpage apparently causes induced ground-water recharge by oxygen-rich surface waters. This recharge moves downdip from zone 1 and the outcrop area. Similarly, pumpage by a number of wells further downdip in zone 3 in the vicinity of Haddon, probably induces significant amounts of vertical leakage of surface waters through the overlying Woodbury Clay and Merchantville Formations. Such induced ground-water movement can cause partial oxidation of dissolved ferrous iron and in some instances a significant change in the dissolved-solids and bicarbonate content of the ground water. Adjustment of the ground water within the aquifer system to marked seasonal changes in pumpage may cause local ground water movement of up to one mile with corresponding changes in iron content.

TABLE 2.—Selected wells tapping the Magothy and Raritan Formations for which chemical analyses of ground water are presented in this report.

Map No.	*Owner or name and number*	*Altitude of land surface (feet)*	*Screen setting (feet)*
1	Falls Twp., No. 3	—	—
2	Delaware Valley Water Co., No. 26	12	47-57
3	Bristol Water Dept., Bath Rd., No. 1	16	42-64
4	Bristol Water Dept., Bath Rd., No. 11	10	48-69
5	Bristol Water Dept., Edgely Rd., No. 1	1	13-21
6	Florence Twp. Water Dept., No. 3	25	123-138
7	Florence Twp. Water Dept., No. 1	25	110-125
8	National Gypsum Co., No. 2	22	113-123
9	Tenneco Plastics, Division of Tenneco Manufacturing Co., No. 5	10	102-132
10	Tenneco Plastics, Division of Tenneco Manufacturing Co., No. 7	10	88-118
11	Tenneco Plastics, Division of Tenneco Manufacturing Co., No. 9	8	121-131
12	Tenneco Plastics, Division of Tenneco Manufacturing Co., No. 11	7	111-121
13	Beverly Rd. School	20	—
14	Burlington City Water Dept., No. 3	9	64-85
15	Industrial Valley Industries	15	—
16	Hercules Powder Co., No. 1	22	105-135
17	Columbus Metal Products, Inc.	40	—
18	William A. Donald	42	72-106
19	James Workman	41	170-194
20	Stephen Bogdany	50	55-60
21	Edgar Harris Nursery	35	—
22	Hunt Brothers Circus	40	—
23	Delaware Valley Water Co., No. 1	15	57
24	Delaware Valley Water Co., No. 9	10	49-70
25	Delaware Valley Water Co., No. 11	15	72-98
26	Delaware Valley Water Co., No. 13	65	167-198
27	Riverton Country Club	30	—
28	Ed Price	20	—
29	Delaware Valley Water Co., No. 17	21	98-118
30	Delaware Valley Water Co., No. 22	40	103-123
31	Willingboro Municipal Utility Authority, No. 1	12	147-199
32	Amico Sand & Gravel Co.	15	27-37
33	Hoeganaes Sponge Iron Co.	35	119-134
34	Delaware Valley Water Co., No. 23	36	120-130 148-156 164-170
35	Atlantic Refining Co.	10	146-156
36	Willingboro Municipal Utility Authority, No. 4	28	196-279

TABLE 2.—Selected wells tapping the Magothy and Raritan Formations for which chemical analyses of ground water are presented in this report. (Continued)

Map No.	*Owner or name and number*	*Altitude of land surface (feet)*	*Screen setting (feet)*
37	Howard Johnsons Restaurant	35	—
38	Willingboro Municipal Utility Authority, No. 5	39	230-256
39	Willingboro Municipal Utility Authority, No. 7	19	179-255
40	Masonic Home	79	174-194
41	Russell H. Deacon	62	203-208
42	Willingboro Municipal Utility Authority, No. 3	28	203-238 283-303
43	Eugene D. Buzzeli	45	204-210
44	Inductotherm Corp.	65	411-443
45	Burlington County Country Club	102	269-309
46	Mt. Holly Water Co., No. 5	55	—
47	Interstate Storage and Pipeline Corp.	90	—
48	Hamilton Square Water Co., No. 4	100	187-202
49	Hamilton Square Water Co., No. 10	100	194-243
50	Allentown Water Co., No. 1	80	263-273
51	Stephens Chemical Co., No. 1	9	—
52	Bordentown Water Dept., No. 1	89	355-385
53	National Guard Ordinance & Maintenance Shops	83	—
54	North American Marine Salvage	5	—
55	River Front Rest Motel	60	98-100
56	Sandman Motor Lodge	85	170-180
57	Turnpike Junction Industrial Park, No. 1	60	293-329
58	Ed Kelley	60	—
59	Columbus Water Co., No. 2	73	240-260
60	North Burlington Co. Regional Jr.-Sr. High School	83	290-310
61	Crosswicks Water Co., No. 1	30	269-299
62	Ernest A. Liptack	114	208-214
63	Chesterfield School	92	247-253
64	Francis D. Gray	92	319-326
65	Irving W. Tallman	105	—
66	Fort Dix, No. 2	131	1030-1051
67	Fort Dix, No. 1	138	916-960
68	McGuire Air Force Base, D	112	1012-1075
69	McGuire Air Force Base, C	102	1036-1089
70	Paulsboro Water Dept., No. 4	16	286-313
71	Swedesboro Water Dept., No. 2	30	216-240
72	East Greenwich Twp. Water Dept., No. 1	65	185-205
73	Abbotts Dairies	30	—
74	Camden City Water Dept., No. 14	8	105-145
75	Camden City Water Dept., No. 15	8	116-136

TABLE 2.—Selected wells tapping the Magothy and Raritan Formations for which chemical analyses of ground water are presented in this report. (Continued)

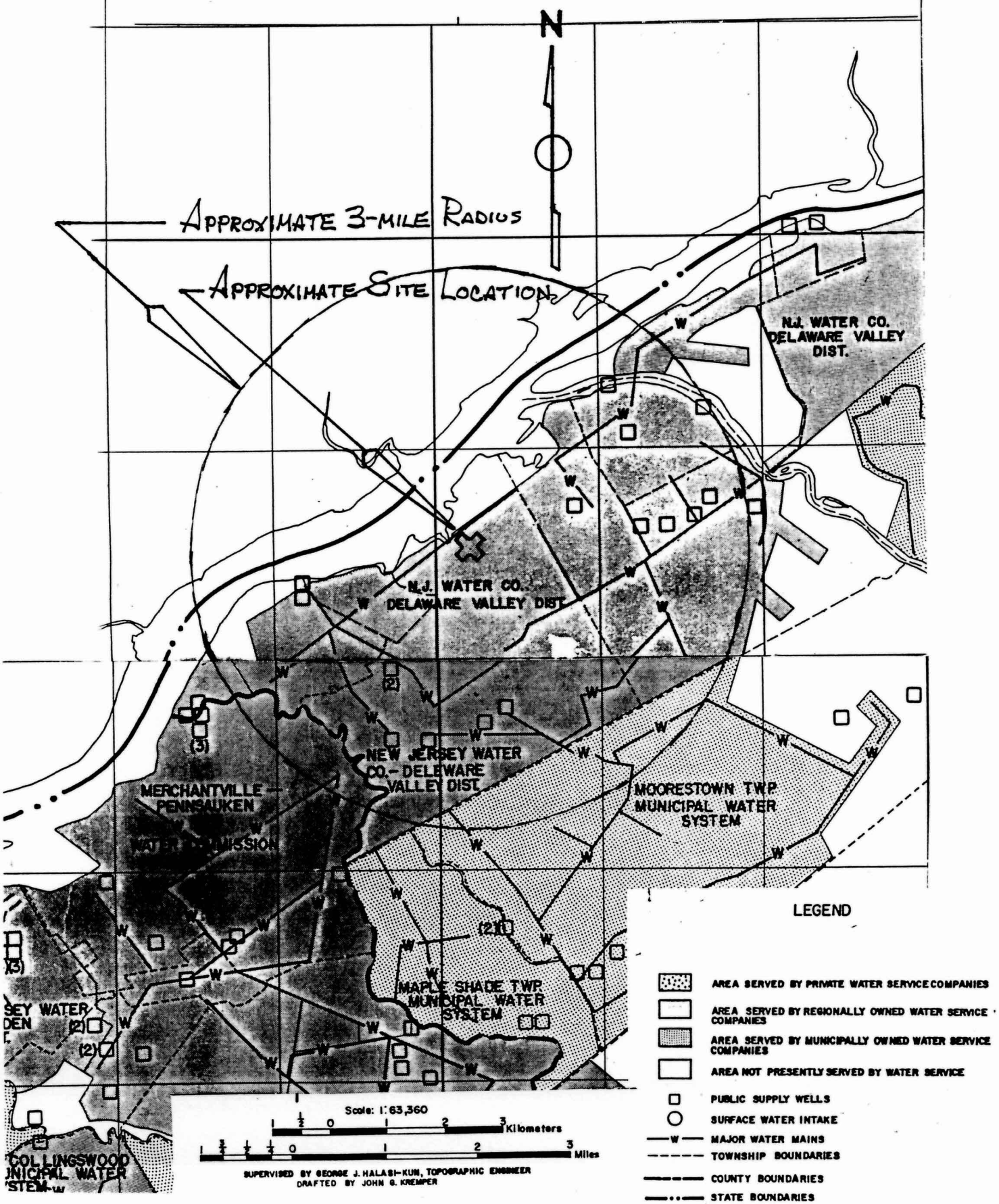
Map No.	*Owner or name and number*	*Altitude of land surface (feet)*	*Screen setting (feet)*
77	Camden City Water Dept., No. 10	10	126-156
78	Camden City Water Dept., No. 1A	10	135-170
76	Camden City Water Dept., No. 9	9	116-146
79	Camden City Water Dept., No. 5	22	142-172
80	Camden City Water Dept., No. 2B	8	111-136
81	Camden City Water Dept., No. 6	14	111-136
82	Camden City Water Dept., No. 3A	15	91-116
83	Camden City Water Dept., No. 4	41	131-156
84	Camden City Water Dept., No. 11	13	124-154
85	Camden City Water Dept., No. 7	21	120-160
86	Camden City Water Dept., Morris Station, No. 6	8	99-134
87	Camden City Water Dept., Morris Station, No. 10	8	75-115
88	Camden City Water Dept., Morris Station, No. 4	8	95-130
89	Camden City Water Dept., Morris Station, No. 3	12	30-104
90	Camden City Water Dept., Morris Station, No. 1	5	—
91	Camden City Water Dept., Delair, No. 1	10	103-138
92	Camden City Water Dept., Delair, No. 2	10	—
93	Camden City Water Dept., Delair, No. 3	10	97-127
94	Camden City Water Dept., Morris Station, No. 8	10	89-124
95	Camden City Water Dept., Puchack, No. 1	10	127-162
96	Camden City Water Dept., Puchack, No. 4	10	127-186
97	Camden City Water Dept., Puchack, No. 3	10	137-177
98	Merchantville-Pennsauken Water Commission, Park Ave., No. 2	39	115-145
99	N. J. Water Co., Camden Division, No. 49	9	137-169
100	N. J. Water Co., Camden Division, No. 51	10	141-192
101	Merchantville-Pennsauken Water Commission, Delaware Gardens, No. 1	50	97-123
102	Camden City Water Dept., No. 16	23	149-179
103	Merchantville-Pennsauken Water Commission, Browning Rd., No. 1	19	118-148
104	Merchantville-Pennsauken Water Commission, Browning Rd., No. 2A	19	204-224
105	Merchantville-Pennsauken Water Commission, Marion Ave., No. 1	61	243-278
106	Merchantville-Pennsauken Water Commission, Woodbine	75	245-285
107	Merchantville-Pennsauken Water Commission, Marion Ave., No. 2	61	243-278
108	Merchantville-Pennsauken Water Commission, Park Ave., No. 5	20	248-288

REFERENCE NO. 18

REV. No. 0

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DAVID J. BARDIN, COMMISSIONER



REFERENCE NO. 19

REV. NO. 0

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

LAND USE OVERLAY
SHEET 27

LEGEND

URBAN AND BUILT-UP LAND

11 RESIDENTIAL
12 COMMERCIAL & SERVICES
13 INDUSTRIAL
14 TRANSPORTATION, COMMUNICATION & UTILITIES
15 INDUSTRIAL & COMMERCIAL COMPLEXES
16 MIXED URBAN & BUILT-UP LAND
17 OTHER URBAN OR BUILT-UP LAND

AGRICULTURAL LAND

21 CROPLAND & PASTURE
22 ORCHARDS & HORTICULTURAL AREAS

FOREST LAND

41 DECIDUOUS
42 EVERGREEN
43 MIXED

WATER

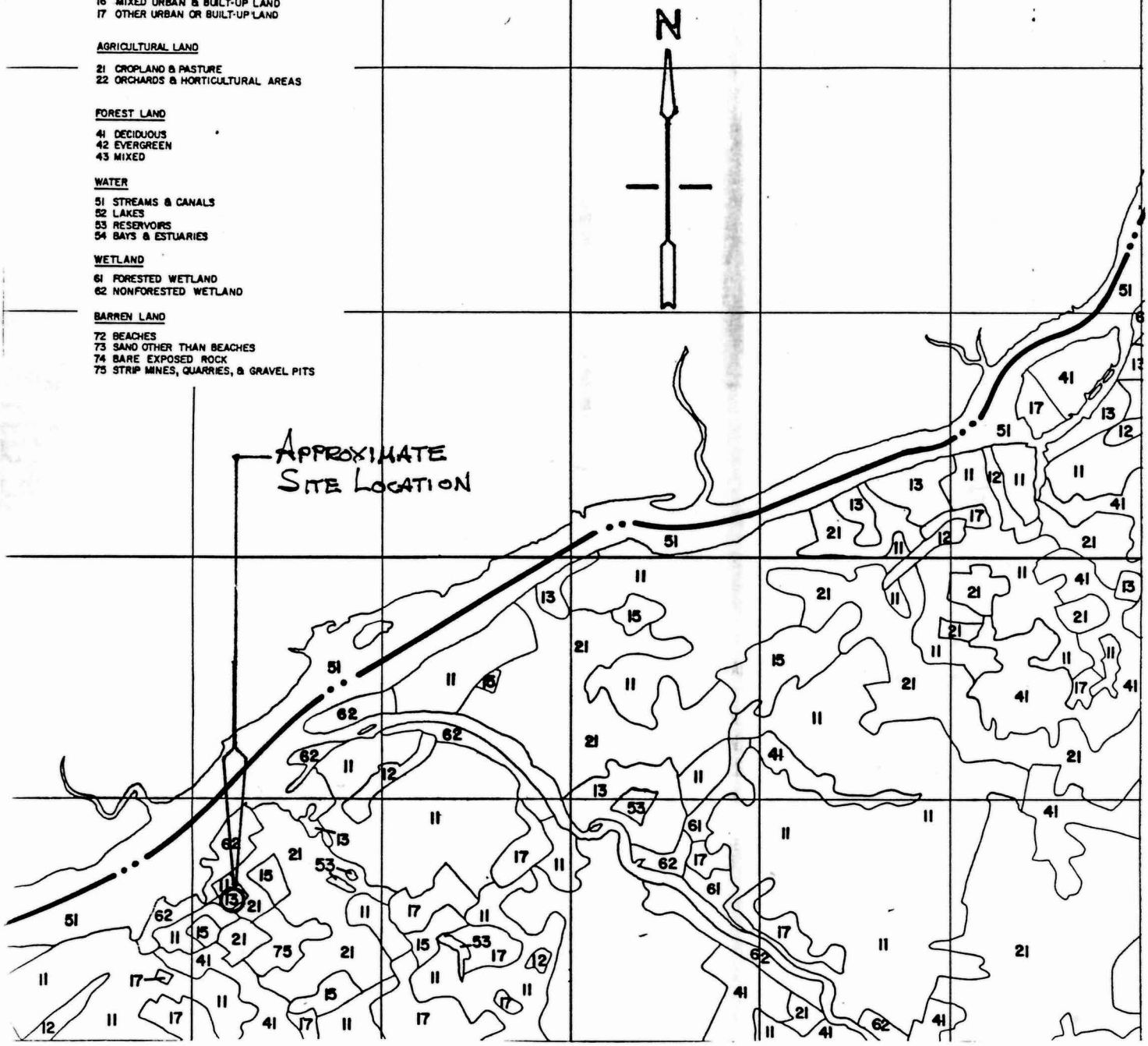
51 STREAMS & CANALS
52 LAKES
53 RESERVOIRS
54 BAYS & ESTUARIES

WETLAND

61 FORESTED WETLAND
62 NONFORESTED WETLAND

BARREN LAND

72 BEACHES
73 SAND OTHER THAN BEACHES
74 BARE EXPOSED ROCK
75 STRIP MINES, QUARRIES, & GRAVEL PITS



Scale: 1:63,360

1 ½ 0 1 2 3 Kilometers

1 ¾ ½ ¼ 0 1 2 3 Miles

SUPERVISED BY GEORGE J. HALASI-KUN, TOPOGRAPHIC ENGINEER
DRAFTED BY JOHN G. KREMPER

REFERENCE NO. 20

REV. No. 0

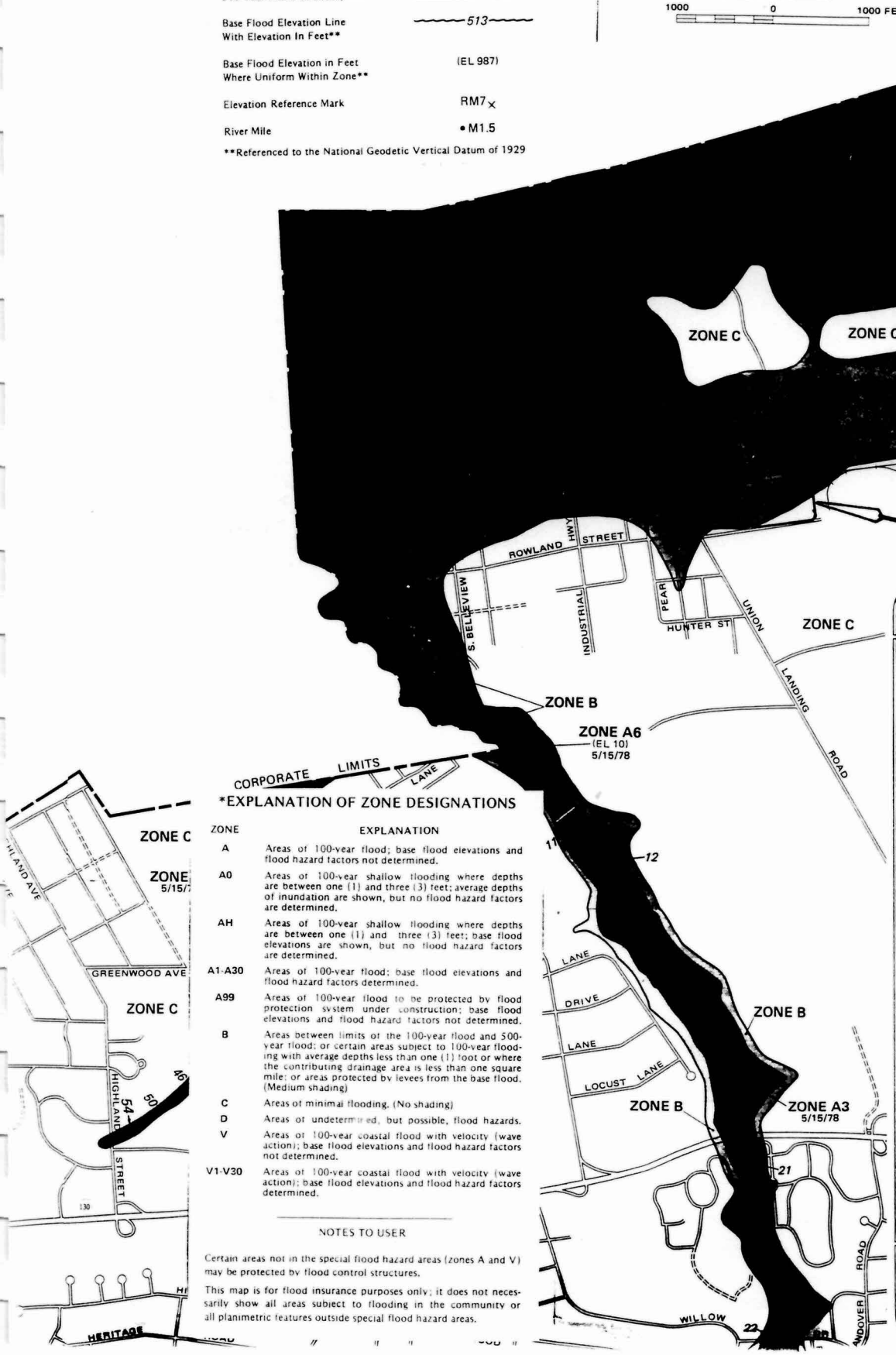
KEY TO MAP

500-Year Flood Boundary	ZONE B
100-Year Flood Boundary	
Zone Designations* With Date of Identification e.g., 12/2/74	
100-Year Flood Boundary	
500-Year Flood Boundary	ZONE B
Base Flood Elevation Line With Elevation In Feet**	513
Base Flood Elevation in Feet Where Uniform Within Zone**	(EL 987)
Elevation Reference Mark	RM7 ×
River Mile	• M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

APPROXIMATE SCALE

1000 0 1000 FEET



*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

TOWNSHIP OF CINNAMINSON, NEW JERSEY BURLINGTON COUNTY

COMMUNITY-PANEL NUMBER
340092 0005 A

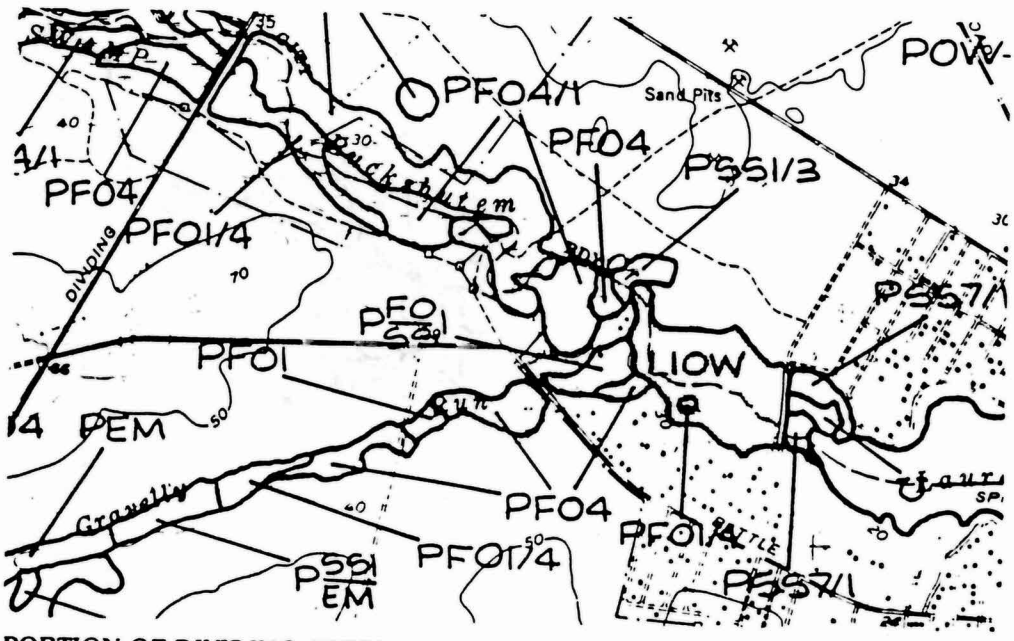
PAGE 1 OF 1

EFFECTIVE
MAY 15, 1978

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

REFERENCE NO. 21

ATLAS
OF
NATIONAL WETLANDS INVENTORY MAPS
FOR
NEW JERSEY



PORTION OF DIVIDING CREEK MAP

SCALE: 1:24,000

UNITED STATES
DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Region Five
Habitat Resources
One Gateway Center, Suite 700
Newton Corner, Massachusetts

1984

HOW TO USE THIS ATLAS

The Atlas contains reductions of all 1:24,000 National Wetlands Inventory maps. Maps appear in alphabetical order. Map names can be located on the index map (Figure 2). Each map shows the configuration, location and type of wetlands and deepwater habitats found within a given area.

WETLAND LEGEND

Wetland data are displayed on maps by a series of letters and numbers (alpha-numerics). Mixing of classes and subclasses are represented by a diagonal line. The more common symbols are shown below; less common symbols have been omitted for simplicity. For identifying these latter symbols, the reader should refer to an actual NWI map legend.

Examples of Alpha-numerics:

E2EMN6	=	Estuarine (E), Intertidal(2), Emergent Wetland(EM), Regularly Flooded(N), Oligohaline(6)
E2FL	=	Estuarine(E), Intertidal(2), Flat(FL)
PF01	=	Palustrine(P), Forested Wetland(FO), Broad-leaved Deciduous(1)
PEM/OW	=	Palustrine(P), Emergent Wetland/Open Water(EM/OW)
PFO/SS1	=	Palustrine(P), Forested Wetland/Scrub-Shrub Wetland(FO/SS), Broad-leaved Deceduous(1)

SYMBOLOGY

Systems and Subsystems:

M 1	=	Marine Subtidal	R 3	=	Riverine Upper Perennial
M 2	=	Marine Intertidal	R 4	=	Riverine Intermittent
E 1	=	Estuarine Subtidal	L 1	=	Lacustrine Limnetic
E 2	=	Estuarine Intertidal	L 2	=	Lacustrine Littoral
R 1	=	Riverine Tidal	P	=	Palustrine
R 2	=	Riverine Lower Perennial	U	=	Upland

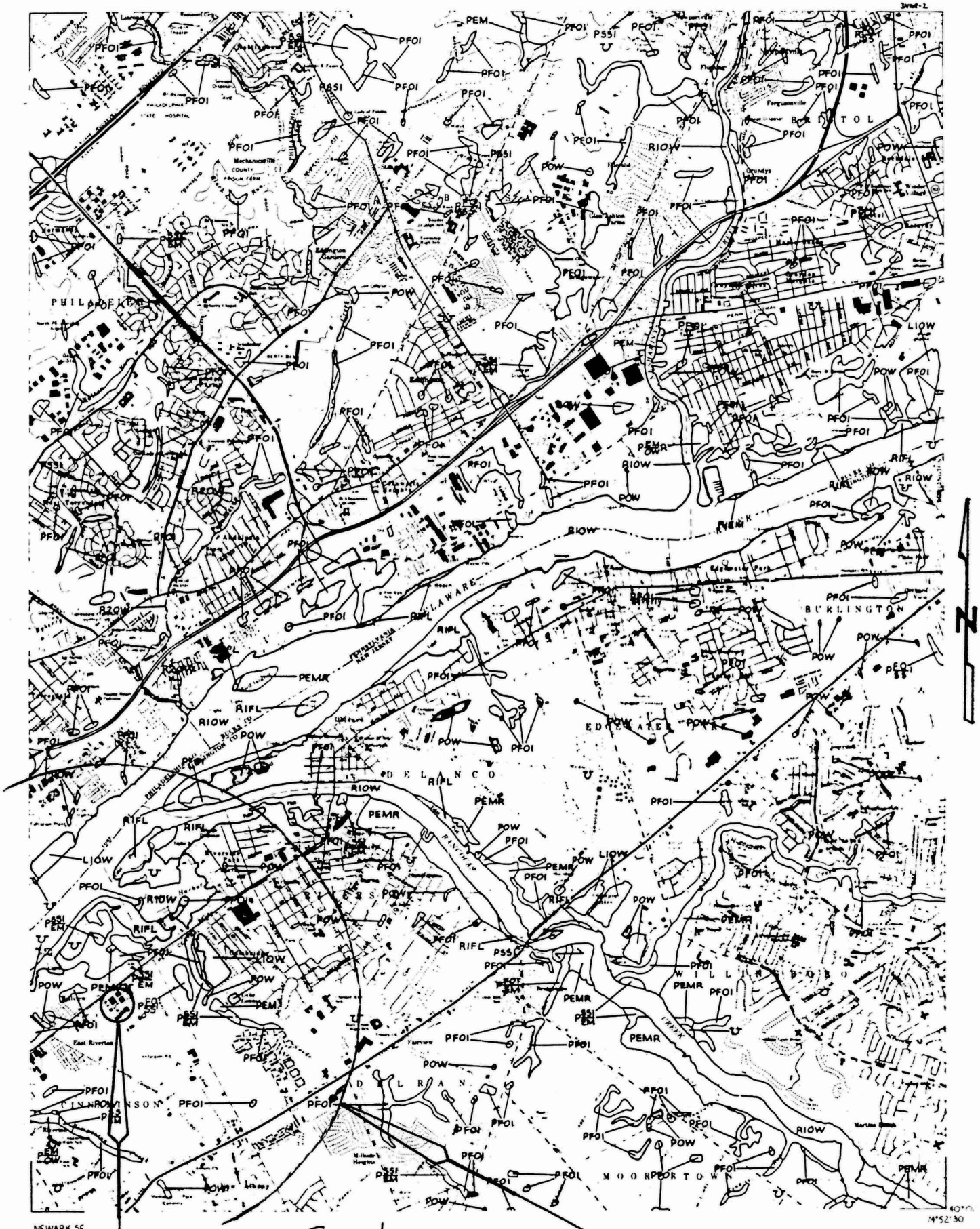
Classes (subclasses and modifers designated where appropriate):

AB	=	Aquatic Bed
BB	=	Beach/Bar
EM	=	Emergent Wetland
EMN6	=	Emergent Wetland, Regularly Flooded, Oligohaline
EMP6	=	Emergent Wetland, Irregularly Flooded, Oligohaline
EMR	=	Emergent Wetland, Seasonally Flooded-Tidal
FL	=	Flat
FO1	=	Forested Wetland, Broad-leaved Deciduous
FO2	=	Forested Wetland, Needle-leaved Deciduous
FO4	=	Forested Wetland, Needle-leaved Evergreen
OW	=	Open Water/Unknown Bottom
SS1	=	Scrub=Shrub Wetland, Broad-leaved Deciduous
SS3	=	Scrub-Shrub Wetland, Broad-leaved Evergreen
SS4	=	Scrub-Shrub Wetland, Needle-leaved Evergreen
SS5	=	Scrub-Shrub Wetland, Dead
SS7	=	Scrub-Shrub Wetland, Evergreen

02-8106-07-PA
REV. NO. 0

NATIONAL WETLANDS INVENTORY

UNITED STATES DEPARTMENT OF THE INTERIOR



SITE LOCATION

APPROXIMATE 2-MILE RADIUS

REV. NO. 0

NATIONAL WETLANDS INVENTORY

UNITED STATES DEPARTMENT OF THE INTERIOR

APPROXIMATE 2-MILE RADIUS

FOR SITE LOCATION SEE BEVERLY PA-NJ MAP.

02-8906-07 PA
REV. No. 0

NATIONAL WETLANDS INVENTORY

UNITED STATES DEPARTMENT OF THE INTERIOR

FRANKFORD PA — N J

NEWARK SW
READING

40°00
75°00

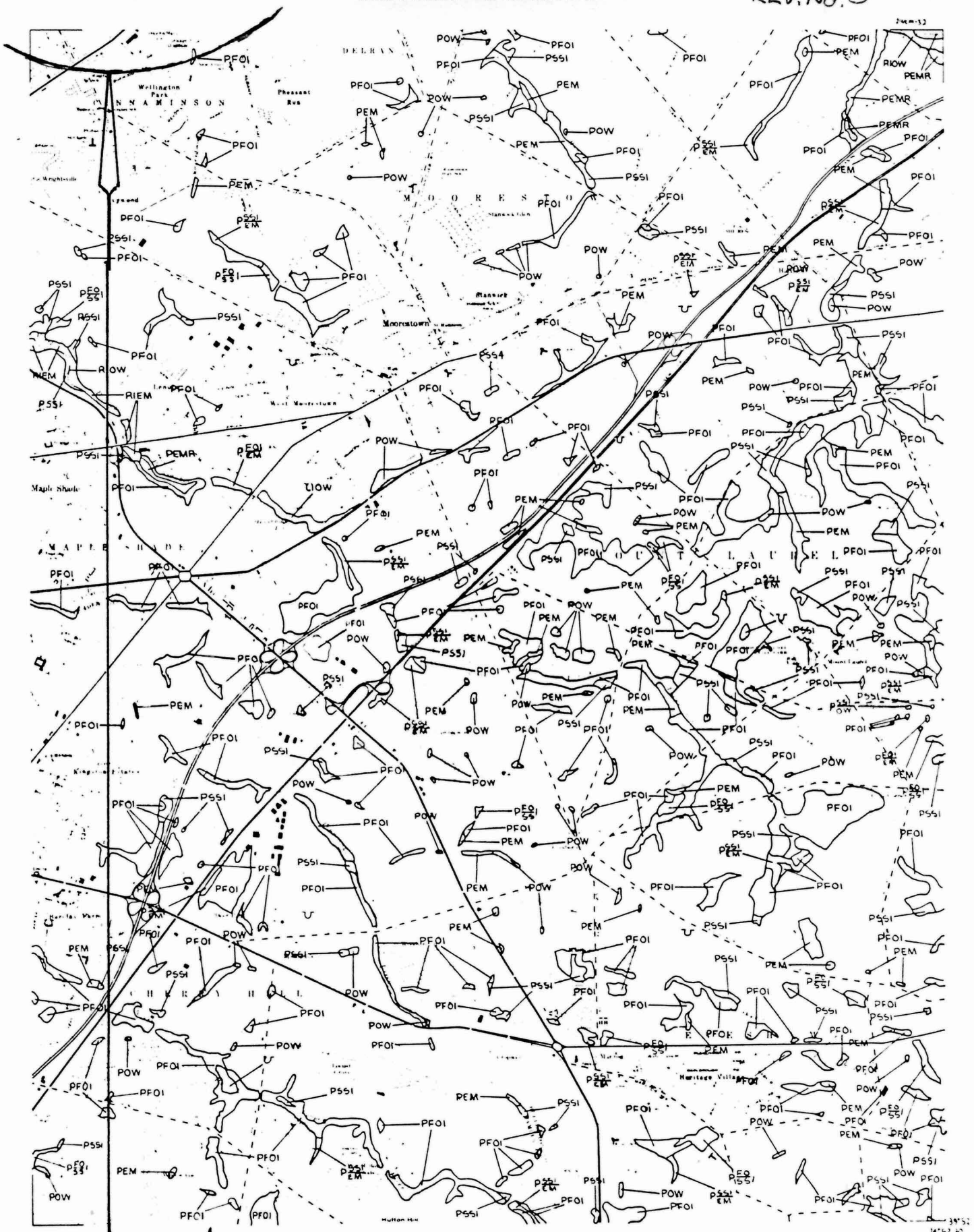
FRANKFORD PA — N J

APPROXIMATE 2-MILE RADIUS

FOR SITE LOCATION SEE BEVERLY PA-NJ MAP.

02-8406-01-PA
REV. No. 0

NATIONAL WETLANDS INVENTORY
UNITED STATES DEPARTMENT OF THE INTERIOR



APPROXIMATE 2-MILE RADIUS
FOR SITE LOCATION SEE BEVERLY PA-NJ MAP

REFERENCE NO. 22

GEMS> I

AIRCO SPECIAL GASES
LATITUDE 40: 1:10 LONGITUDE 74:59:37 1980 POPULATION

KM	0.00-.400	.400-.810	.810-1.60	1.60-3.20	3.20-4.80	4.80-6.40	SECTOR TOTALS
S 1	309	629	1856	27529	79538	101027	210888
RING TOTALS	309	629	1856	27529	79538	101027	210888

GEMS> I

AIRCO SPECIAL GASES
LATITUDE 40: 1:10 LONGITUDE 74:59:37 1980 HOUSING

KM	0.00-.400	.400-.810	.810-1.60	1.60-3.20	3.20-4.80	4.80-6.40	SECTOR TOTALS
S 1	115	205	884	8156	28137	36146	73643
RING TOTALS	115	205	884	8156	28137	36146	73643

DISTANCE IN MILES	POPULATION	HOUSING
0.25	309	115
0.50	938	320
1.00	2,794	1,204
2.00	30,323	9,360
3.00	109,861	37,497
4.00	210,888	73,643

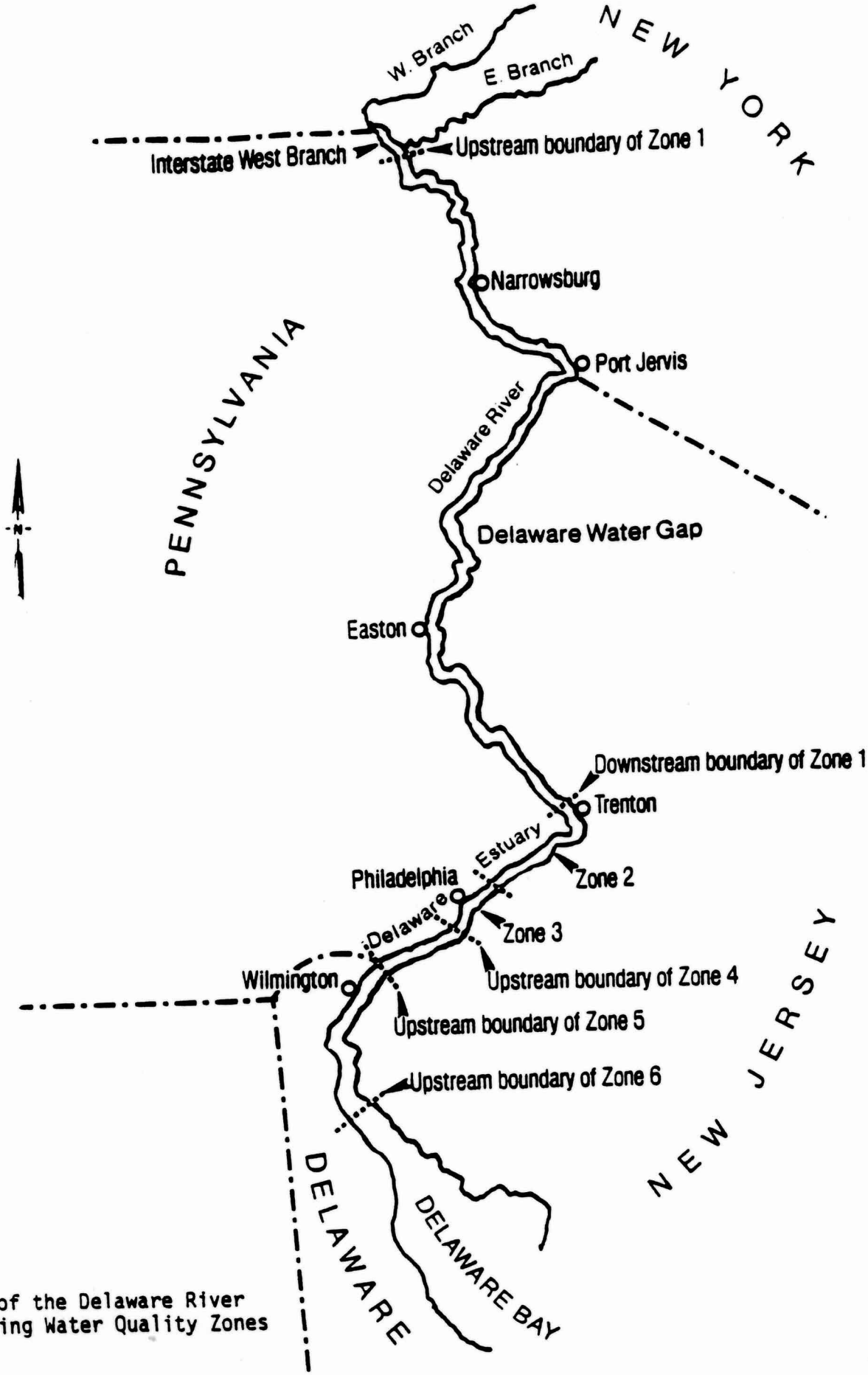
REFERENCE NO. 23

DELAWARE RIVER
WATER QUALITY ASSESSMENT

1986-87 305(b) Report

Delaware River Basin Commission
West Trenton, New Jersey

March 1988



Map of the Delaware River
Showing Water Quality Zones

the most important spawning grounds of the American Shad, an anadromous fish. Shad populations were drastically reduced in the past due to pollution in the Delaware Estuary that prevented passage of migrating shad in the spring and fall months. A resurgence of shad has been noted as the Delaware Estuary became cleaner and in recent years spawning has been documented throughout the non-tidal section of river. Other fish migrating to the non-tidal river for spawning are herring, the American eel and others. Small commercial fisheries are centered around the shad and eel migrations and sport fishing is of economic significance. A recent study of shad fishing, for example, placed a $3.2 million annual value on this fishery alone.

For water quality management purposes, the non-tidal river has been designated Zone 1. This zone is divided into 5 sub-zones which reflect minor changes in the water quality standards adopted by the Delaware River Basin Commission and the States of New Jersey, New York and Pennsylvania.

DELAWARE ESTUARY (ZONES 2, 3, 4 AND 5) - NEW JERSEY, PENNSYLVANIA AND DELAWARE

The Delaware River becomes tidal at Trenton, New Jersey, the head of tide. The upper 85 miles of tidally-influenced river is called the Delaware Estuary although it is a freshwater river in its upper half and, thus not entirely a true estuary in an oceanographic sense. The Delaware Estuary flows by Trenton, New Jersey; Philadelphia, Pennsylvania; Camden, New Jersey; and Wilmington, Delaware. This area is one of the world's greatest concentrations of heavy industry and the nation's second largest complex of oil refining and petrochemical plants.

Manufacturing, although declining in importance, is still a major factor affecting water quality in the estuary. Major industries include paper-making, chemicals, oil-refining, shipbuilding, food processing, and others. The estuary's ports form the largest freshwater port in the world, the largest U.S. port in terms of international tonnage and the second largest U.S. port in total tonnage. A navigation channel running from the Atlantic Ocean to Trenton is maintained by dredging. The depth of the channel varies from 40 feet in most reaches to 25 feet deep near Trenton, with a channel width of 300 to 400 feet.

The estuary region has a population exceeding 5.7 million people - a population greater than in 40 states. Zones 3 and 4 flow through the fifth largest U.S. urban area, the Philadelphia-Camden metropolitan area. The majority of residents in the estuary region use the Delaware as their source of water - either directly through intakes on the river or indirectly via the recharge of ground water aquifers. For water quality management purposes, the estuary has been divided into four zones:

Zone 2, the uppermost of these zones, begins at the head of tide at Trenton, N.J. (R.M. 133) and extends down river twenty-five miles to a point midway between the mouth of Pennypack Creek, a small tributary that runs through the northeast portion of the City of Philadelphia near the Tacony-Palmyra Bridge. Although tidal, Zone 2 contains freshwater. In the Torresdale section of Philadelphia, the city withdraws over 200 million gallons of water per day for domestic and industrial use. Smaller water supply intakes and many industrial intakes are also located in this zone.

Zone 2 is characterized by diversity. In the upstream portion of the zone are Trenton, New Jersey (pop. 92,000) and Morrisville, Pennsylvania (pop. 10,000). Major land uses include various industries and urban/suburban development. The largest tributary is the Delaware River itself at the head of tide, having an average annual flow of 11,671 cfs and a 6780 square mile drainage area. Freshwater flow into the tidal Delaware River, however, varies seasonally and annually causing (along with other factors) changes in water quality.

Below Trenton, Zone 2 is characterized by small towns such as Bordentown (pop. 4,500), Fieldsboro (pop. 600), Florence (pop. 9,000), and Burlington (pop. 10,000) in New Jersey and Bristol, (pop. 11,000) in Pennsylvania. Also present are freshwater wetlands, and industrial plants, highway complexes and increasing suburbanization of the remaining open space. On the Pennsylvania side of Zone 2 is the U.S. Steel Fairless Works, a large integrated steel-making facility. In the lower reach of Zone 2 urbanization increases dramatically, with the last three miles of Zone 2 within the city limits of Philadelphia. Large suburban developments include Levittown in Bucks County, Pennsylvania and Willingboro in Burlington County, New Jersey.

Major tributaries include Crosswicks Creek, Assiscunk Creek and Rancocas Creek in New Jersey and Neshaminy Creek, Poquessing Creek and Pennypack Creek in Pennsylvania. Water quality in each is highly influenced by wastewater discharges and urban-suburban development. Tributaries are tidal in their lowest reaches and, thus, affected by inflow of Delaware River water.

Zone 2 is used extensively for recreation. Power boating, sailing and fishing are the predominant recreational uses. River sight-seeing boats operate out of Philadelphia; at least two dozen marinas, boat yards and public boat ramps are operated; and parks have been developed adjacent to the river. Swimming occurs in undesignated areas.

Fishing in Zone 2 is for a variety of fish species, both migratory and resident. Studies in 1984 identified 43 species of fish in the zone. Fish species using Zone 2 waters for spawning, nursery or passage include largemouth bass, walleye, alewife, herring, shad, yellow and white perch, striped bass, catfish, smallmouth bass and others. The short-nosed sturgeon, a federally-designated endangered species, is found in Zone 2 in relatively large numbers. In 1987 shad spawning was documented in Zone 2, a recent response to the cleanup of the estuary.

Zones 3 and 4 begin in Northeast Philadelphia and extend downstream to the Delaware-Pennsylvania-New Jersey state line at Marcus Hook. The thirty mile reach has historically been one of the most polluted rivers in the United States (see Chapter 2). In years past, massive amounts of untreated wastes entered the river in Zones 3 and 4 causing widespread septic conditions and noxious gases emissions. Due to the cleanup of these wastes, major improvements in water quality and fisheries have been documented in recent years, making the Delaware Estuary one of the premier water pollution control success stories in the U.S.

Zones 3 and 4 flow through the Philadelphia-Camden metropolitan area and adjacent urban and suburban areas. In Philadelphia, Camden, Gloucester City

and Chester are found extensive networks of combined sewers that discharge untreated wastewater during rain and dry periods. Industrial development is extensive and a major influence on water quality as well. In Zones 3 and 4, 14 major industries including oil-refineries, paper manufacturing and others discharge directly into the river after treatment. Many others send their wastewater to regional (municipal) treatment plants for treatment.

Major tributaries to Zones 3 and 4 are Pennsauken Creek, Cooper River, Big Timber Creek, Mantua Creek and Raccoon Creek in New Jersey; and Frankford Creek, Schuylkill River and Darby Creek in Pennsylvania. The Schuylkill is the largest Delaware River tributary, draining 15% of the Delaware River Basin. The lower 8 miles of the Schuylkill is tidal, with a dredged navigation channel and large oil refining and terminal facilities.

The intensive industrial and port development along Zones 3 and 4 preclude much recreational access to the river. Minor amounts of swimming occur although pollution and safety considerations make such activity dangerous. Boating is the primary recreational activity during the warmer months. At least a dozen marinas are found in Zones 3 and 4 and tour boats are operated out of Philadelphia. In recent years Philadelphia, Camden and adjoining counties have developed recreation areas along the river. Several waterfront restaurants have opened in recent years, and this portion of the estuary appears to be on the threshold of intense commercial, residential and recreational development. This new interest in the old urban waterfronts is a testimony to cleaner water and represents significant economic benefits accrued from investments made in water pollution control facilities.

Fishing occurs in Zones 3 and 4 although diminished by pollution and lack of river access. A variety of fish can be found in Zones 3 and 4, but their numbers at any one location or time are uncertain. Studies in 1985 and 1986 found 36 species of fish including herring, white perch, American shad, various catfish species, blue crab, alewife and many others. Important sport fishes migrate through the zones or reside temporarily in the zones, but do not use them for spawning or as a nursery area. Recent increases in the size and distribution of American shad runs in the non-tidal Delaware River and the establishment of a viable year-round (albeit marginal) fish population in

REFERENCE NO. 24

The Complete Handbook of Hazardous Waste Regulation

A Comprehensive, Step-by-Step Guide to the Regulation of Hazardous Wastes Under RCRA, TSCA, and Superfund

Travis Wagner

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model which is a ground-water transport model. The VHS model assumes reasonable worst-case conditions to model the transport of toxicants from disposal sites to nearby receptors. More specifically, the model estimates the ability of an aquifer to dilute the toxicants from a specific volume of waste and predicts toxicant levels at a receptor well. The predicted levels of toxicants are then compared to health-based standards for those compounds in an effort to evaluate the hazard potential. The VHS model is discussed in detail in *50 FR* 48886 and *51 FR* 41084.

Characteristics of Hazardous Waste

Section 3001 of RCRA requires EPA to develop and promulgate criteria for identifying characteristics of hazardous waste that are separate from the listed wastes. The primary responsibility for determining whether a waste exhibits a characteristic rests with the generator. Characteristics were selected that were measurable by standard available testing protocols. Thus, EPA established that ignitability, corrosiveness, reactivity, and extraction procedure toxicity (collectively known as ICRE) are the characteristics of a hazardous waste.

Ignitability (D001)

A waste is an ignitable waste if it meets any of the following conditions:

1. A liquid that has a flash point of less than 140°F as determined by either a Pensky-Martens or a Setaflash closed-cup test.

   Liquids are determined by using the paint filter test (PFT), EPA test method No. 9095. A sample of the waste is placed onto a paint filter (400 micron or No. 60 mesh). If any liquid seeps through the filter within 5 minutes, it is considered a liquid.
   There is an exclusion from the ignitable characteristic for aqueous solutions that fail the flash point test and contain less than 24 percent alcohol. Originally, this exclusion was intended for alcoholic beverages such as wine (45 FR 33108). However, the regulatory language is ambiguous regarding the extent of this exclusion. OSWER Directive No. 9443.02 states, "while the Agency's intent was that this exemption apply to potable beverages only, because the term alcohol was used instead of ethanol, all aqueous wastes which are ignitable only because they contain alcohols (here using the term alcohol to mean any chemical containing the hydroxl [-OH] functional group) are excluded from regulation." The directive also defines the term "aqueous solution" by stating, "With respect to what constitutes an aqueous solution, such a solution is one in which water is the primary component. This means that water constitutes at least 50 percent by weight of the sample."

2. Solids that can spontaneously combust through friction, absorption, or loss of moisture. At this time, there is no standardized test to determine this; however, EPA is developing such a test.
3. It is an ignitable compressed gas as defined by the Department of Transportation (DOT) in 49 CFR 173.300.

   An ignitable compressed gas must first meet the definition of a compressed gas, which is "any material or mixture having in the container an absolute pressure exceeding 40 p.s.i. at 70°F or, regardless of the pressure at 70°F, having an absolute pressure exceeding 104 p.s.i. at 130°F; or any liquid flammable mixture having a vapor pressure exceeding 40 p.s.i. absolute at 100°F." A material meeting the definition of a compressed gas is ignitable if it is either a mixture of 13 percent or less (by volume) with air, forms a flammable mixture, or the flammable range with air is wider than 12 percent regardless of the lower limit; the flame projects more than 18 inches beyond the ignition source with valve opened fully, or, the flame flashes back and burns at the valve with any degree of valve opening; or there is any significant propagation of flame away from the ignition source.
4. It is an oxidizer as defined by DOT in 49 CFR 173.151.

   An oxidizer is a substance that yields oxygen readily when involved in a fire, thereby accelerating and intensifying the combustion of organic material. There is no prescribed test for determining this classification. DOT does give examples of oxidizers such as chlorate, permanganate, inorganic peroxide, or a nitrate.

Corrosivity (D002)

A waste is a corrosive waste if it meets any of the following criteria:

1. It is aqueous and has a pH of 2 or less or 12.5 or more
2. It is a liquid and corrodes steel at a rate of 6.35 mm or more per year as determined by the National Association of Corrosion Engineers (NACE).
   Wastes in a solid phase, as determined by the paint filter test, are not considered corrosive wastes (45 FR 33108).

Reactivity (D003)

The reactivity characteristic requires a determination based more on judgement than a standardized quantitative determination except for explosives (class A or B) and toxic (sulfide and cyanide) gas generation.

If a material can cause the generation of harmful vapors or fumes that can present a danger to human health or the environment, reacts violently with water, or has the ability to explode without detonation, it is considered a reactive hazardous waste.

For sulfide and cyanide gas generation, using the prescribed test method, if free (not total) cyanide is generated at 250 mg/kg of waste or more, or free sulfide is generated at 500 mg/kg of waste, it is considered a reactive hazardous waste.

Toxicity (D004–17)

EPA has determined that one of the most significant dangers posed by hazardous waste stems from the leaching of toxic constituents of land-disposed wastes into ground water. Consequently, the toxicity characteristic is designed to identify wastes that are likely to leach hazardous constituents into ground water under improper management conditions. EPA established a testing procedure that extracts constituents from a solid waste in a manner which simulates the leaching action that can occur in a landfill. EPA has made the assumption that industrial waste would be co-disposed of with nonindustrial waste in an actively decomposing municipal landfill situated over an aquifer. It is important to note that for the purposes of determining whether a waste is hazardous using the toxicity test, it is irrelevant that a person does not, in fact, co-dispose of their hazardous waste in a municipal landfill or in any type of landfill.

The toxicity test, also known as the extraction procedure toxicity test (EP Tox), requires a representative sample of the waste to be subjected to an acidic solution (e.g., acetic acid at a pH of 5.0). After 24 hours, the resulting extract is then tested to determine if it contains any of the contaminants identified in the National Primary Drinking Water Standards promulgated under the Safe Drinking Water Act as depicted in table 1. If the waste is a liquid, it does not need to be subjected to the acidic solution. The liquid will be considered the extract and analyzed for the contaminants accordingly.

Extraction Procedure for Oily Wastes (EPOW) If a waste being analyzed with the EP toxicity test contains one percent or more of grease or oil, the waste is subject to the EPOW, EPA test method No. 1330. The EPOW method requires the sample to be separated into liquid and solid components by filtration. The solid phase is treated with specified solvents. The

TABLE 1 EP toxicity levels.

Hazardous Waste No.	Contaminant	Maximum concentration (mg/l)
D004	Arsenic	5.00
D005	Barium	100.0
D006	Cadmium	1.0
D007	Chromium*	5.0
D008	Lead	5.0
D009	Mercury	0.2
D010	Selenium	1.0
D011	Silver	5.0
D012	Endrin	0.02
D013	Lindane	0.4
D014	Methoxychlor	10.0
D015	Toxaphene	0.5
D016	2,4-D	10.0
D017	2,4,5-TP Silvex	1.0

**In the EP toxicity test, the term chromium means total chromium.*

resultant residue from this treatment and the original liquid component are analyzed for the contaminants in table 1. If any of the contaminants exceed the listed maximum concentration levels, the waste is considered EP toxic for the exceeded component.

Toxicity Characteristic Leaching Procedure (TCLP)—The TCLP will ultimately take the place of the EP toxicity test. The proposed TCLP will add 38 organic constituents to the current list for a total of 52. The proposed test procedure, EPA test method No. 1310, has revised the extraction procedure for easier and more consistent results. The TCLP was finalized on November 7, 1986 (51 *FR* 40572), solely for the purpose of the land disposal ban (see chapter 6). The test is expected to become final in the winter of 1988 for the purpose of hazardous waste determination.

Special Categories of Waste

The following sections outline the requirements for special categories of hazardous waste. These categories are found in different sections of the regulations but have been grouped here for easier reference.

Mixture Rule

A mixture of any amount of hazardous waste and a solid (nonhazardous) waste is considered a hazardous waste [Section 261.3(a)(2)(iii)]. (There is

Appendix II

EPA-Listed Hazardous Wastes

EPA waste number	Hazardous waste	Hazard code[1]
Hazardous Waste From Nonspecific Sources		
F001	The following spent halogenated solvents used in degreasing: tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, chlorinated fluorocarbons, all spent solvent mixture/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F002	The following spent halogenated solvents: tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, o-dichlorobenzene, and trichlorofluoromethane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F003	The following spent nonhalogenated solvents: xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, methanol; all spent solvent mixtures/blends containing, before use, one or more of the above nonhalogenated solvents, and, a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(I)
F004	The following spent nonhalogenated solvents: cresols and cresylic acid, nitrobenzene; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by	(T)

[1]Hazard codes are C = corrosive, H = acutely hazardous, I = ignitable, R = reactive, and T = toxic.

EPA waste number	Hazardous waste	Hazard code[1]
	volume) of one or more of the above nonhalogenated solvents or those solvents listed in F001, F002, and F005; and the still bottoms from the recovery of these spent solvents and spent solvent mixtures.	
F005	The following spent nonhalogenated solvents: toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above nonhalogenated solvents or those listed in F001, F002, and F004; and the still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(I,T)
F006	Wastewater treatment sludges from electroplating operations except from the following processes: (1) sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3)zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc, and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum	(T)
F019	Wastewater treatment sludges from the chemical conversion coating of aluminum	(T)
F007	Spent cyanide plating bath solutions from electroplating operations (except for precious metals electroplating spent cyanide plating bath solutions)	(R,T)
F008	Plating bath sludges from the bottom of plating baths from electroplating operations for which cyanides are used in the process (except for precious metals electroplating plating bath sludges)	(R,T)
F009	Spent stripping and cleaning bath solutions from electroplating operations for which cyanides are used in the process (except for precious metals electroplating spent stripping and cleaning bath solutions)	(R,T)
F010	Quenching bath sludges from oil baths from metal heat treating operations for which cyanides are used in the process (except for precious metals heat-treating quenching bath sludges)	(R,T)
F011	Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations (except for precious metals heat treating spent cyanide solutions from salt bath pot cleaning)	(R,T)
F012	Quenching wastewater treatment sludges from metal heat treating operations for which cyanides are used in the process	(T)

EPA waste number	Hazardous waste	Hazard code
	(except for precious metals heat treating quenching wastewater treatment sludges)	
F024	Wastes including but not limited to distillation residues, heavy ends, tars, and reactor clean-out wastes from the production of chlorinated aliphatic hydrocarbons, having carbon content from one to five, utilizing free radical catalyzed processes (Does not include light ends, spent filters and filter aids, spent dessicants, wastewater, wastewater treatment sludges, spent catalysts and wastes listed in 261.32)	(T
F020	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol or of intermediates used to produce their pesticide derivatives (Does not include wastes from the production of Hexachlorophene from highly purified 2,4,5-trichlorophenol)	(H
F021	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol or of intermediates used to produce its derivatives	(H
F022	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions	(H
F023	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols (Does not include wastes from equipment used only for the production or use of hexachlorophene from highly purified 2,4,5-trichlorophenol)	(H
F026	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions	(H
F027	Discarded unused formulations containing tri-, tetra-, or	(H

EPA waste number	Hazardous waste	Hazard code[1]
	pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols (Does not include formulations containing hexachlorophene synthesized from prepurified 2,4,5-trichlorophenol as the sole component	
F028	Residues resulting from the incineration or thermal treatment of soil contaminated with EPA hazardous wastes numbered F020, F021, F022, F023, F026, and F027	(T)

Hazardous Wastes From Specific Sources

Wood Preservatives

K001	Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol	(T)

Inorganic Pigments

K002	Wastewater treatment sludge from the production of chrome yellow and orange pigments	(T)
K003	Wastewater treatment sludge from the production of molybdate orange pigments	(T)
K004	Wastewater treatment sludge from the production of zinc yellow pigments	(T)
K005	Wastewater treatment sludge from the production of chrome green pigments	(T)
K006	Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated)	(T)
K007	Wastewater treatment sludge from the production of iron blue pigments	(T)
K008	Oven residue from the production of chrome oxide green pigments	(T)

EPA waste number	Hazardous waste	Hazard code[1]

Organic Chemicals

K009	Distillation bottoms from the production of acetaldehyde from ethylene	(T)
K010	Distillation side cuts from the production of acetaldehyde from ethylene	(T)
K011	Bottom stream from the wastewater stripper in the production of acrylonitrile	(R,T)
K013	Bottom stream from the acetonitrile column in the production of acrylonitrile	(R,T)
K014	Bottoms from the acetonitrile purification column in the production of acrylonitrile	(T)
K015	Still bottoms from the distillation of benzyl chloride	(T)
K016	Heavy ends or distillation residues from the production of carbon tetrachloride	(T)
K017	Heavy ends (still bottoms) from the purification column in the production of epichlorohydrin	(T)
K018	Heavy ends from the fractionation column in ethyl chloride production	(T)
K019	Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production	(T)
K020	Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production	(T)
K021	Aqueous spent antimony catalyst waste from fluoromethanes production	(T)
K022	Distillation bottom tars from the production of phenol/acetone from cumene	(T)
K023	Distillation light ends from the production of phthalic anhydride from naphthalene	(T)
K024	Distillation bottoms from the production of phthalic anhydride from naphthalene	(T)
K093	Distillation light ends from the production of phthalic anhydride from o-xylene	(T)
K094	Distillation bottoms from the production of phthalic anhydride from o-xylene	(T)

EPA waste number	Hazardous waste	Hazard code[1]
K025	Distillation bottoms from the production of nitrobenzene by the nitration of benzene	(T)
K026	Stripping still tails from the production of methyl ethyl pyridines	(T)
K027	Centrifuge and distillation residues from toluene diisocyanate production	(R,T)
K028	Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane	(T)
K029	Waste from the product steam stripper in the production of 1,1,1-trichloroethane	(T)
K095	Distillation bottoms from the production of 1,1,1-trichloroethane	(T)
K096	Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane	(T)
K030	Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene	(T)
K083	Distillation bottoms from aniline production	(T)
K103	Process residues from aniline extraction from the production of aniline	(T)
K104	Combined wastewater streams generated from nitrobenzene/aniline production	(T)
K085	Distillation or fractionation column bottoms from the production of chlorobenzenes	(T)
K105	Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes	(T)
K111	Product washwaters from the production of dinitrotoluene via nitration of toluene	(C,T)
K112	Reaction by-product water from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene	(T)
K113	Condensed liquid light ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene	(T)
K114	Vicinals from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene	(T)

EPA waste number	Hazardous waste	Hazard code[1]
K115	Heavy ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene	(T)
K116	Organic condensate from the solvent recovery column in the production of toluene diisocyanate via phosgenation of toluenediamine	(T)
K117	Wastewater from the reactor vent gas scrubber in the production of ethylene dibromide via bromination of ethene	(T)
K118	Spent adsorbent solids from purification of ethylene dibromide via bromination of ethene	(T)
K136	Still bottoms from the purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene	(T)
	Inorganic Chemicals	
K071	Brine purification muds from the mercury cell process in chlorine production for which separately prepurified brine is not used	(T)
K073	Chlorinated hydrocarbon waste from the purification step of the diaphragm cell process using graphite anodes in chlorine production	(T)
K106	Wastewater treatment sludge from the mercury cell process in chlorine production	(T)
	Pesticides	
K031	By-product salts generated in the production of MSMA and cacodylic acid	(T)
K032	Wastewater treatment sludge from the production of chlordane	(T)
K033	Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane	(T)
K034	Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane	(T)
K097	Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane	(T)

EPA waste number	Hazardous waste	Hazard code[1]
K035	Wastewater treatment sludges generated in the production of creosote	(T)
K036	Still bottoms from toluene reclamation distillation in the production of disulfoton	(T)
K037	Wastewater treatment sludges from the production of disulfoton	(T)
K038	Wastewater from the washing and stripping of phorate production	(T)
K039	Filter cake from the distillation of diethylphosphorodithioic acid in the production of phorate	(T)
K040	Wastewater treatment sludge from the production of phorate	(T)
K041	Wastewater treatment sludge from the production of toxaphene	(T)
K098	Untreated process wastewater from the production of toxaphene	(T)
K042	Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T	(T)
K043	2,6-Dichlorophenol waste from the production of 2,4-D	(T)
K099	Untreated wastewater from the production of 2,4-D	(T)
	Explosives	
K044	Wastewater treatment sludges from the manufacturing and processing of explosives	(R)
K045	Spent carbon from the treatment of wastewater containing explosives	(R)
K046	Wastewater treatment sludges from the manufacturing, formulation, and loading of lead-based initiating compounds	(R)
K047	Pink/red water from TNT operations	(R)
	Petroleum Refining	
K048	Dissolved air floatation (DAF) float from the petroleum refining industry	(T)
K049	Slop oil emulsion solids from the petroleum refining industry	(T)

EPA waste number	Hazardous waste	Hazard code[1]
K050	Heat exchanger bundle cleaning sludge from the petroleum refining industry	(T)
K051	API separator sludge from the petroleum refining industry	(T)
K052	Tank bottoms (leaded) from the petroleum refining industry	(T)
	Iron and Steel	
K061	Emission control dust/sludge from the primary production of steel in electric furnaces	(T)
K062	Spent pickle liquor generated by steel finishing operations of facilities within iron and steel industry SIC codes 331 and 332.	(C,T)
	Secondary Lead	
K069	Emission control dust/sludge from secondary lead smelting	(T)
K100	Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting	(T)
	Veterinary Pharmaceuticals	
K084	Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds	(T)
K101	Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds	(T)
K102	Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds	(T)
	Ink Formulation	
K086	Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment	(T)

EPA waste number	Hazardous waste	Hazard code[1]
	used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead	
	Coking	
K060	Ammonia still lime sludge from coking operations	(T)
K087	Decanter tank tar sludge from coking operations	(T)

Commercial Chemical Products

The following P code wastes are considered acutely hazardous.

P023 Acetaldehyde, chloro-
P002 Acetamide, N-(aminothioxomethyl)-
P057 Acetamide, 2-fluoro-
P058 Acetic acid, fluoro-, sodium salt
P066 Acetimidic acid, N-[(methylcarbamoyl)oxy]thio-, methyl ester
P001 3-(alpha-acetonylbenzyl)-4-hydroxycoumarin and salts, when present at concentrations greater than 0.3%
P002 1-Acetyl-2-thiourea
P003 Acrolein
P070 Aldicarb
P004 Aldrin
P005 Allyl alcohol
P006 Aluminum phosphide
P007 5-(Aminomethyl)-3-isoxazolol
P008 4-aAminopyridine
P009 Ammonium picrate (R)
P119 Ammonium vanadate
P010 Arsenic acid
P012 Arsenic(III) oxide
P011 Arsenic (V) oxide
P011 Arsenic pentoxide
P012 Arsenic trioxide
P038 Arsine, diethyl
P054 Aziridine

P013 Barium cyanide
P024 Benzenamine, 4-chloro-
P077 Benzenamine, 4-nitro-
P028 Benzene, (chloromethyl)-
P042 1,2-Benzenediol, 4-[(1-hydroxy-2-(methyl-amino)ethyl)]-
P014 Benzenethiol
P028 Benzyl chloride
P015 Beryllium dust
P016 Bis(chloromethyl) ether
P017 Bromoacetone
P018 Brucine

P021 Calcium cyanide
P123 Camphene, octachloro-
P103 Carbamimidoselenoic acid
P022 Carbon bisulfide
P022 Carbon disulfide

P095 Carbonyl chloride
P033 Chlorine cyanide
P023 Chloroacetaldehyde
P024 p-Chloroaniline
P026 1-(o-Chlorophenyl)thiourea
P027 3-Chloropropionitrile
P029 Copper cyanides
P030 Cyanides (soluble cyanide salts), not elsewhere specified
P031 Cyanogen
P033 Cyanogen chloride

P036 Dichlorophenylarsine
P037 Dieldrin
P038 Diethylarsine
P039 O,O-Diethyl S-[2-(ethylthio)ethyl] phosphorodithioate
P041 Diethyl-p-nitrophenyl phosphate
P040 O,O-Diethyl O-pyrazinyl phosphorothioate
P043 Diisopropyl fluorophosphate
P044 Dimethoate
P045 3,3-Dimethyl-1-(methylthio)-2-butanone,O-[(methylamino)carbonyl] oxime
P071 O,O-Dimethyl O-p-nitrophenyl phosphorothioate
P082 Dimethylnitrosamine
P046 alpha,alpha-Dimethylphenethylamine
P047 4,6-Dinitro-o-cresol and salts
P034 4,6-Dinitro-o-cyclohexylphenol
P048 2,4-Dinitrophenol
P020 Dinoseb
P085 Diphosphoramide, octamethyl
P039 Disulfoton
P049 2,4-Dithiobiuret
P109 Dithiopyrophosphoric acid, tetraethyl ester

P050 Endosulfan
P088 Endothall
P051 Endrin
P042 Epinephrine
P046 Ethanamine, 1,1-dimethyl-2-phenyl-
P084 Ethenamine, N-methyl-N-nitroso-
P101 Ethyl cyanide
P054 Ethylenimine

P097 Famphur
P056 Fluorine
P057 Fluoroacetamide
P058 Fluoroacetic acid, sodium salt
P065 Fulminic acid, mercury(II) salt

P059 Heptachlor
P051 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-endo,endo-1,4:5,8-dimethanonaphthalene
P037 1,2,3,4,10,10,-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-endo, exo-1,4:5,8-dimethanonaphthalene
P060 1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,8-endo, endo-dimethanonaphthalene
P004 1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,8-endo, exo-dimethanonaphthalene
P060 Hexachlorohexahydro-exo, exo-dimethanonaphthalene P062 Hexaethyl tetraphosphate
P116 Hydrazinecarbothioamide
P068 Hydrazine, methyl-
P063 Hydrocyanic acid
P063 Hydrogen cyanide
P096 Hydrogen phosphide

P064 Isocyanic acid, methyl ester
P007 3(2H)-isoxazolone, 5-(aminomethyl)-

P092 Mercury, (acetato-O)phenyl-
P065 Mercury fulminate (R,T)
P016 Methane, oxybis(chloro)-
P112 Methane, tetranitro- (R)
P118 Methanethiol, trichloro-
P059 4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-
P066 Methomyl
P067 2-Methylaziridine
P068 Methyl hydrazine
P064 Methyl isocyanate
P069 2-Methyllactonitrile
P071 Methyl parathion

P072 alpha-Naphthylthiourea
P073 Nickel carbonyl
P074 Nickle cyanide
P074 Nickle(II) cyanide
P073 Nickle tetracarbonyl
P075 Nicotine and salts
P076 Nitric oxide
P077 p-Nitroaniline
P078 Nitrogen dioxide
P076 Nitrogen(II) oxide
P078 Nitrogen(IV) oxide
P081 Nitroglycerine (R)
P082 N-Nitrosodimethylamine

P084 N-Nitrosomethylvinylamine
P050 5-Norbornene-2,3-dimethanol,1,4,5,6,7,7-hexachloro, cyclic sulfite

P085 Octamethylpyrophosphoramide
P087 Osmium oxide
P087 Osmium tetroxide
P088 7-Oxabicyclo-[2.2.1] heptane-2,3-dicarboxylic acid

P089 Parathion
P034 Phenol, 2-cyclohexyl-4,6-dinitro-
P048 Phenol, 2,4-dinitro-
P047 Phenol, 2,4-dinitro-6-methyl-
P020 Phenol, 2,4-dinitro-6-(1-methylpropyl)-
P009 Phenol, 2,4,6-trinitro-, ammonium salt (R)
P036 Phenyl dichloroarsine
P092 Phenylmercuric acetate
P093 N-Phenylthiourea
P094 Phorate
P095 Phosgene
P096 Phosphine
P041 Phosphoric acid, diethyl p-nitrophenyl ester
P044 Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxyethyl] ester
P043 Phosphorofluoric acid, bis(1-methylethyl)ester
P094 Phosphorothioic acid, O,O-diethyl S-(ethylthio) methyl ester
P089 Phosphorothioic acid, O,O-diethyl O(p-nitrophenyl) ester
P040 Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester
P097 Phosphorothioic acid, O,O-dimethyl O-[p(dimethylamino)-sulfonyl) phenyl] ester
P110 Plumbane, tetraethyl-
P098 Potassium cyanide
P099 Potassium silver cyanide
P070 Propanal, 2-methyl-2-(methylthio)-O-[(methylamino) carbonyl]oxime
P101 Propanenitrile
P027 Propanenitrile, 3-chloro
P069 Propanenitrile, 2-hydroxy-2-methyl-
P081 1,2,3-Propanetriol, trinitrate- (R)
P017 2-Propanone, 1-bromo-
P102 Propargyl alcohol
P003 2-propenal
P005 2 propen-1-ol
P067 1,2-Propylenimine
P102 2 Propyn-1-ol
P008 4 Pyridinamine
P075 Pyridine, (S)-3-(1-methyl-2-pyrrolidinyl)-, and salts
P111 Pyrophosphoric acid, tetraethyl ester

P103 Selenourea
P104 Silver cyanide
P105 Sodium azide
P106 Sodium cyanide
P107 Strontium sulfide
P108 Strychnidin-10-one, and salts
P018 Strychnidin-10-one, 2,3-dimethoxy-
P108 Strychnine and salts
P115 Sulfuric acid, thallium(I) salts

P109 Tetraethyldithiopyrophosphate
P110 Tetraethyl lead
P111 Tetraethylpyrophosphate
P112 Tetranitromethane (R)
P062 Tetraphosphoric acid, hexaethyl ester
P113 Thallic oxide
P113 Thallium(III) oxide
P114 Thallium (I) selenite
P115 Thallium (I) sulfate
P045 Thiofanax
P049 Thiomidodicarbonic diamide
P014 Thiophenol
P116 Thiosemicarbazide
P026 Thiourea, (2-chlorophenyl)-
P072 Thiourea, 1-naphthalenyl-
P093 Thiourea, phenyl
P123 Toxaphene
P118 Trichloromethanethiol

P119 Vanadic acid, ammonium salt
P120 Vanadium pentoxide
P120 Vanadium(V) oxide

P001 Warfarin, when present at concentrations greater than 0.3%

P121 Zinc cyanide
P122 Zinc phosphide, when present at concentrations greater than 10%

The following U code wastes are nonacutely hazardous.

U001 Acetaldehyde (I)
U034 Acetaldehyde, trichloro-
U187 Acetamide, N-(4-ethoxyphenyl)-
U005 Acetamide, N-9H-fluoren-2-yl-
U112 Acetic acid, ethyl ester (I)
U144 Acetic acid, lead salt
U214 Acetic acid, thallium(I) salt

U002 Acetone (I)
U003 Acetonitrile (I,T)
U248 3-(alpha-Acetonylbenzyl)-4-hydroxycoumarin and salts, when present at concentations of 0.3% or less
U004 Acetophenone
U005 2-Acetylaminofluorene
U006 Acetyl chloride (C,R,T,)
U007 Acrylamide
U008 Acrylic acid (I)
U009 Acrylonitrile
U150 Alanine, 3-[p-bis(2-chloroethyl)amino] phenyl-, L-
U328 2-Amino-1-methylbenzene
U353 4-Amino-1-methylbenzene
U011 Amitrole
U012 Aniline (I,T)
U014 Auramine
U015 Azaserine
U010 Azirino (2',3',3',4)pyrrolo (1,2-a)indole-4,7-dione, 6-amino-8-[((amino-carbonyl)oxy)methyl)-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-

U157 Benz(j)aceanthrylene, 1,2-dihydro-3-methyl-
U016 Benz(c)acridine
U016 3,4-Benzacridine
U017 Benzal chloride
U018 Benz(a)anthracene
U018 1,2-Benzanthracene
U094 1,2-Benzanthracene, 7,12-dimethyl-
U012 Benzenamine (I,T)
U014 Benzenamine, 4,4'-carbonimidoylbis(N,N-dimethyl)-
U049 Benzenamine, 4-chloro-2-methyl-
U093 Benzenamine, N,N'-dimethyl-4-phenylazo-
U158 Benzenamine, 4,4'-methylenebis(2-chloro)-
U222 Benzenamine, 2-methyl-,hydrochloride
U181 Benzenamine, 2-methyl-,5-nitro
U019 Benzene (I,T)
U038 Benzeneacetic acid, 4-chloro-alpha-(4-chloro-phenyl)-alpha-hydroxy, ethyl ester
U030 Benzene, 1-bromo-4-phenoxy-
U037 Benzene, chloro
U190 1,2-Benzenedicarboxylic acid anhydride
U028 1,2-Benzenedicarboxylic acid [bis(2-ethyl-hexyl)] ester
U069 1,2-Benzenedicarboxylic acid, dibutyl ester
U088 1,2-Benzenedicarboxylic acid, diethyl ester
U102 1,2-Benzenedicarboxylic acid, dimethyl ester
U107 1,2-Benzenedicarboxylic acid, di-n-octyl ester
U070 Benzene, 1,2-dichloro-

U071 Benzene, 1,3-dichloro-
U072 Benzene, 1,4-dichloro-
U017 Benzene, (dichloromethyl)-
U223 Benzene, 1,3-diisocyanatomethyl- (R,T)
U239 Benzene, dimethyl- (I,T)
U201 1,3-Benzenediol
U127 Benzene, hexachloro-
U056 Benzene, hexahydro- (I)
U188 Benzene, hydroxy-
U220 Benzene, methyl-
U105 Benzene, 1-methyl-1,2,4-dinitro-
U106 Benzene, 1-methyl-2,6-dinitro-
U203 Benzene, 1,2-methylenedioxy-4-allyl-
U141 Benzene, 1,2-methylenedioxy-4-propenyl-
U090 Benzene, 1,2-methylenedioxy-4-propyl-
U055 Benzene, (1-methylethyl) (I)
U169 Benzene, nitro- (I,T)
U183 Benzene, pentachloro-
U185 Benzene, pentachloro-nitro-
U020 Benzenesulfonic acid chloride (C,R)
U020 Benzenesulfonyl chloride (C,R)
U207 Benzene, 1,2,4,5-tetrachloro-
U023 Benzene, (trichloromethyl)- (C,R,T)
U234 Benzene, 1,3,5-trinitro (R,T)
U021 Benzidine
U202 1,2-Benzisothiazolin-3-one,1,1-dioxide
U120 Benzo(j,k)fluorene
U022 Benzo(a)pyrene
U022 3,4-Benzopyrene
U197 p-Benzoquinone
U023 Benzotrichloride (C,R,T)
U050 1,2-Benzphenanthrene
U085 2,2'-Bioxirane (I,T)
U021 (1,1'-Biphenyl)-4,4'-diamine
U073 (1,1'-Biphenyl)-4,4'-diamine, 3,3'-dichloro-
U091 (1,1'-Biphenyl)-4,4'-diamine, 3,3'-dimethoxy-
U095 (1,1'-Biphenyl)-4,4'-diamine, 3,3'-dimethyl- U024 Bis(2-chloroethoxy) methane
U027 Bis(2-chloroisopropyl) ether
U244 Bis(dimethylthiocarbamoyl) disulfide
U028 Bis(2-ethyhexyl)phthalate (DEHP)
U246 Bromine cyanide
U225 Bromoform
U030 4-Bromophenyl phenyl ether
U128 1,3-Butadiene, 1,1,2,3,4,4-hexachloro
U172 1-Butanamine, N-butyl-N-nitroso-
U035 Butanoic acid, 4-[Bis(2-chloroethyl)amino]benzene-

U031 1-Butanol (I)
U159 2-Butanone (I,T)
U160 2-Butanone peroxide (R,T)
U053 2-Butenal
U074 2-Butene, 1,4-dichloro- (I,T)
U031 n-Butyl alcohol (I)

U136 Cacodylic acid
U032 Calcium chromate
U238 Carbamic acid, ethyl ester
U178 Carbamic acid, methylnitroso-, ethyl ester
U176 Carbamide, N-ethyl-N-nitroso-
U177 Carbamide, N-methyl-N-nitroso-
U219 Carbamide, thio-
U097 Carbamoyl chloride, dimethyl-
U215 Carbonic acid, dithallium (I)salt
U156 Carbonochloridic acid, methyl ester (I,T)
U033 Carbon oxyfluoride (R,T)
U211 Carbon tetrachloride
U033 Carbonyl fluoride (R,T)
U034 Chloral
U035 Chlorambucil
U036 Chlordane, technical
U026 Chlornaphazine
U037 Chlorobenzene
U039 4-Chloro-m-cresol
U041 1-Chloro-2,3-epoxypropane
U042 2-Chloroethyl vinyl ether
U044 Chloroform
U046 Chloromethyl methyl ether
U047 beta-Chloronaphthalene
U048 o-Chlorophenol
U049 4-Chloro-o-toluidine, hydrochloride
U032 Chromic acid, calcium salt
U050 Chrysene
U051 Creosote
U052 Cresols
U052 Cresylic acid
U053 Crotonaldehyde
U055 Cumene (I)
U246 Cyanogen bromide
U197 1,4-Cyclohexadienedione
U056 Cyclohexane (I)
U057 Cyclohexanone (I)
U130 1,3-Cyclopentadiene, 1,2,3,4,5,5-hexa-chloro- U058 Cyclophosphamide

U240 2,4-D, salts and esters

U059 Daunomycin
U060 DDD
U061 DDT
U142 Decachloro octahydro-1,3,4-metheno-2H-cyclobuta(c,d) pentalen-2-one
U062 Diallate
U133 Diamine (R,T)
U221 Diaminotoluene
U063 Dibenz(a,h)anthracene
U063 1,2:5,6-Dibenzanthracene
U064 1,2:7,8-Dibenzopyrene
U064 Dibenz(a,i)pyrene
U066 1,2-Dibromo-3-chloropropane
U069 Dibutyl phthalate
U062 S-(2,3-Dichloroallyl)diisopropylthiocarbamate
U070 o-Dichlorobenzene
U071 m-Dichlorobenzene
U072 p-Dichlorobenzene
U073 3,3'-Dichlorobenzidine
U074 1,4-Dichloro-2-butene (I,T)
U075 Dichlorodifluoromethane
U192 3,5-Dichloro-N-(1,1-dimethyl-2-propynyl)benzamide
U060 Dichloro diphenyl dichloroethane
U061 Dichloro diphenyl trichloroethane
U078 1,1-Dichloroethylene
U079 1,2-Dichloroethylene
U025 Dichloroethyl ether
U081 2,4-Dichlorophenol
U082 2,6-Dichlorophenol
U240 2,4-Dichlorophenoxyacetic acid, salts and esters
U083 1,2-Dichloropropane
U084 1,3-Dichloropropene
U085 1,2:3,4-Diepoxybutane (I,T)
U108 1,4-Diethylene dioxide
U086 N,N-Diethylhydrazine
U087 O,O-Diethyl-S-methyl-dithiophosphate
U088 Diethyl phthalate
U089 Diethylstilbestrol
U148 1,2-Dihydro-3,6-pyradizinedione
U090 Dihydrosafrole
U091 3,3'-Dimethoxybenzidine
U092 Dimethylamine (I)
U093 Dimethylaminoazobenzene
U094 7,12-Dimethylbenz(a)anthracene
U095 3,3'-Dimethylbenzidine
U096 alpha,alpha-Dimethylbenzylhydroperoxide (R)
U097 Dimethylcarbamoyl chloride
U098 1,1-Dimethylhydrazine

U099 1,2-Dimethylhydrazine
U101 2,4-Dimethylphenol
U102 Dimethyl phthalate
U103 Dimethyl sulfate
U105 2,4-Dinitrotoluene
U106 2,6-Dinitrotoluene
U107 Di-n-octyl phthalate
U108 1,4-Dioxane
U109 1,2-Dipheylhydrazine
U110 Dipropylamine (I)
U111 Di-N-propylnitrosamine

U001 Ethanal (I)
U174 Ethanamine, N-ethyl-N-nitroso-
U067 Ethane, 1,2-dibromo-
U076 Ethane, 1,1-dichloro-
U077 Ethane, 1,2-dichloro-
U114 1,2-Ethanediylbiscarbamodithioic acid
U131 Ethane, 1,1,1,2,2,2-hexachloro-
U024 Ethane, 1,1'-[methylenebis(oxy)]bis(2-chloro)-
U003 Ethanenitrile (I,T)
U117 Ethane, 1,1'-oxybis- (I)
U025 Ethane, 1,1'-oxybis(2-chloro)-
U184 Ethane pentachloro-
U208 Ethane, 1,1,1,2-tetrachloro-
U209 Ethane, 1,1,2,2-tetrachloro-
U218 Ethanethioamide
U247 Ethane, 1,1,1-trichloro-2,2-bis(p-methoxyphenyl)
U227 Ethane, 1,2,1-trichloro-
U043 Ethene, chloro-
U042 Ethene, 2-chloroethoxy-
U078 Ethene, 1,1-dichloro-
U079 Ethene, trans-1,2-dicloro-
U210 Ethene, 1,1,2,2-tetrachloro-
U173 Ethanol, 2,2'-(nitrosoimino)bis-
U004 Ethanone, 1-phenyl-
U006 Ethanoyl chloride (C,R,T)
U112 Ethyl acetate (I)
U113 Ethyl acrylate (I)
U238 Ethyl carbamate (urethan)
U038 Ethyl 4,4'-dichlorobenzilate
U359 Ethylene glycol monoethyl ether
U114 Ethylenebis(dithiocarbamic acid)
U067 Ethylene dibromide
U077 Ethylene dichloride
U115 Ethylene oxide (I,T)
U116 Ethylene thiourea

U117 Ethyl ether
U076 Ethylidene dichloride
U118 Ethylmethacrylate
U119 Ethyl methanesulfonate

U139 Ferric dextran
U120 Fluoranthene
U122 Formaldehyde
U123 Formic acid (C,T)
U124 Furan (I)
U125 2-Furancarboxaldehyde (I)
U147 2,5-Furandione
U213 Furan, tetrahydro- (I)
U125 Furfural (I)
U124 Furfuran (I)

U206 D-Glucopyranose,2-deoxy-2(3-methyl-3-nitro-sourcido)-
U126 Glycidylaldehyde
U163 Guanidine, N-nitroso-N-methyl-N'nitro-

U127 Hexachlorobenzene
U128 Hexachlorobutadiene
U129 Hexachlorocyclohexane(gamma isomer)
U130 Hexachlorocyclopentadiene
U131 Hexachloroethane
U132 Hexachlorophene
U243 Hexachloropropene
U133 Hydrazine (R,T)
U086 Hydrazine, 1,2-diethyl-
U098 Hydrazine, 1,1-dimethyl-
U099 Hydrazine, 1,2-dimethyl-
U109 Hydrazine, 1,2-diphenyl-
U134 Hydrofluoric acid (C,T)
U134 Hydrogen fluoride (C,T)
U135 Hydrogen sulfide
U096 Hydroperoxide, 1-methyl-1-phenylethyl- (R)
U136 Hydroxydimethylarsine oxide

U116 2-Imidazolidinethione
U137 Indeno(1,2,3-cd)pyrene
U139 Iron dextran
U140 Isobutyl alcohol (I,T)
U141 Isosafrole

U142 Kepone

U143 Lasiocarpine
U144 Lead acetate
U145 Lead phosphate
U146 Lead subacetate
U129 Lindane

U147 Maleic anhydride
U148 Maleic hydrazide
U149 Malononitrile
U150 Melphalan
U151 Mercury
U152 Methacrylonitrile (I,T)
U092 Methanamine, N-methyl- (I)
U029 Methane, bromo-
U045 Methane, chloro- I,T)
U046 Methane, chloromethoxy-
U068 Methane, dibromo-
U080 Methane, dichloro-
U075 Methane, dichlorodifluoro-
U138 Methane, iodo-
U119 Methanesulfonic acid, ethyl ester
U211 Methane, tetrachloro-
U121 Methane, trichlorofluoro-
U153 Methanethiol (I,T)
U225 Methane, tribromo-
U044 Methane, trichloro-
U121 Methane, trichlorofluoro-
U123 Methanoic acid (C,T)
U036 4,7-Methanoindan, 1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a- tetrahydro-
U154 Methanol (I)
U155 Methapyrilene
U247 Methoxychlor
U154 Methyl alcohol (I)
U029 Methyl bromide
U186 1-Methylbutadiene (I)
U045 Methyl chloride (I,T)
U156 Methyl chlorocarbonate (I,T)
U226 Methyl chloroform
U157 3-Methylcholanthrene
U158 4,4'-Methylenebis(2-chloroaniline)
U132 2,2'-Methylenebis(3,4,6-trichlorophenol)
U068 Methylene bromide
U080 Methylene chloride
U122 Methylene oxide
U159 Methyl ethyl ketone (I,T)
U160 Methyl ethyl ketone peroxide (R,T)
U138 Methyl iodide

U161 Methyl isobutyl ketone (I)
U162 Methyl methacrylate (I,T)
U163 N-Methyl-N'-nitro-N-nitrosoguanidine
U161 4-Methyl-2-pentanone (I)
U164 Methylthiouracil
U010 Mitomycin C

U059 5,12-Naphthacenedione,(8S-cis)-8-acetyl-10-[(3-amino-2,3,6-trideoxy-alpha-L-lyxo-hexopyranosyl)oxyl)-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methyoxy-
U165 Naphthalene
U047 Naphthalene,2-chloro-
U166 1,4-Naphthalenedione
U236 2,7-Naphthalenedisulfonic acid,3,3'-[(3,3'-dimethyl-(1,1'bi-phenyl)-4,4'diyl)]-bis(azo)bis(5-amino-4-hydroxy)-, tetrasodium salt
U166 1,4,Naphthaquinone
U167 1-Naphthylamine
U168 2-Naphthylamine
U167 alpha-Naphthylamine
U168 beta-Naphthylamine
U026 2-Naphthylamine, N,N'-bis(2-chloromethyl)-
U169 Nitrobenzene (I,T)
U170 p-Nitrophenol
U171 2-Nitropropane (I)
U172 N-Nitrosodi-n-butylamine
U173 N-Nitrosodiethanolamine
U174 N-Nitrosodiethylamine
U111 N-Nitroso-N-propylamine
U176 N-Nitroso-N-ethylurea
U177 N-Nitroso-N-methylurea
U178 N-Nitroso-N-methylurethane
U179 N-Nitrosopiperidine
U180 N-Nitrosopyrrolidine
U181 5-Nitro-o-toluidine
U193 1,2-Oxathiolane,2,2-dioxide
U058 2H-1,3,2-Oxazaphosphorine,2-[bis(2-chloroethyl)amino] tetrahydro-, oxide 2-

U115 Oxirane (I,T)
U041 Oxirane, 2-(chloromethyl)-

U182 Paraldehyde
U183 Pentachlorobenzene
U184 Pentachloroethane
U185 Pentachloronitrobenzene
U186 1,3-Pentadiene (I)
U187 Phenacetin

U188 Phenol
U048 Phenol, 2-chloro-
U039 Phenol, 4-chloro-3-methyl-
U081 Phenol, 2,4-dichloro-
U082 Phenol, 2,6-dichloro-
U101 Phenol, 2,4-dimethyl-
U170 Phenol, 4-nitro-
U137 1,10-(1,2-phenylene)pyrene
U145 Phosphoric acid, Lead salt
U087 Phosphorodithioic acid O,O-diethyl-,S-methylester
U189 Phosphorous sulfide (R)
U190 Phthalic anhydride
U191 2-Picoline
U192 Pronamide
U194 1-Propanamine (I,T)
U110 1-Propanamine, N-propyl- (I)
U066 Propane, 1,2-dibromo-3-chloro-
U149 Propanedinitrile
U171 Propane, 2-nitro- (I)
U027 Propane, 2,2'-oxybis(2-chloro)-
U193 1,3-Propane sultone
U235 1-Propanol, 2,3-dibromo-,phosphate(3:1)
U126 1-Propanol, 2,3-epoxy-
U140 1-Propanol, 2-methyl- (I,T)
U002 2-Propanone (I)
U007 2-Propenamide
U084 Propene, 1,3-dichloro-
U243 1-Propene, 1,1,2,3,3,3-hexachloro-
U009 2-Propenenitrile
U152 2-Propenenitrile, 2-methyl- (I,T)
U008 2-Propenoic acid (I)
U113 2-Propenoic acid, ethyl ester (I)
U118 2-Propenoic acid, 2-methyl-, ethyl ester
U162 2-Propenoic acid, 2-methyl, methyl ester (I,T)
U194 n-Propylamine (I,T)
U083 Propylene dichloride
U196 Pyridine
U155 Pyridine, 2-[(2-(dimethylamino)-2-thenylamino)]
U179 Pyridine, hexahydro-N-nitroso-
U191 Pyridine, 2-methyl-
U164 4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-
U180 Pyrrole, tetrahydro-N-nitroso-

U200 Reserpine
U201 Resorcinol

U202 Saccharin and salts

U203 Safrole
U204 Selenious acid
U204 Selenium dioxide
U205 Selenium disulfide (R,T)
U015 L-Serine, diazoacetate (ester)
U089 4,4'-Stilbenediol,alpha,alpha'-diethyl-
U206 Streptozotocin
U135 Sulfur hydride
U103 Sulfuric acid, dimethyl ester
U189 Sulfur phosphide (R)
U205 Sulfur selenide (R,T)

U207 1,2,4,5-Tetrachlorobenzene
U208 1,1,1,2-Tetrachloroethane
U209 1,1,2,2-Tetrachloroethane
U210 Tetrachloroethylene
U213 Tetrahydrofuran (I)
U214 Thallium(I) acetate
U215 Thallium(I) carbonate
U216 Thallium(I) chloride
U217 Thallium(I) nitrate
U218 Thioacetamide
U153 Thiomethanol (I,T)
U219 Thiourea
U244 Thiram
U220 Toluene
U221 Toluenediamine
U223 Toluenediisocyanate (R,T)
U328 *o*-Toluidine
U222 o-Toluidine hydrochloride
U353 *p*-Toluidine
U011 1H-1,2,4-Triazol-3-amine
U226 1,1,1-Trichloroethane
U227 1,1,2-Trichloroethane
U228 Trichloroethene
U228 Trichloroethylene
U121 Trichloromonofluoromethane
U234 sym-Trinitrobenzene (R,T)
U182 1,3,5-Trioxane, 2,4,5-trimethyl-
U235 Tris(2,3-dibromopropyl)phosphate
U236 Trypan blue

U237 Uracil, 5[bis(2-chloromethyl)amino]-
U237 Uracil mustard

U043 Vinyl chloride

U248 Warfarin, when present at concentrationsof 0.3% or less

U239 Xylene (I)

U200 Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[(3,4,5 trimethoxy-benzoyl)oxy]-methyl ester

U249 Zinc phosphide, when present at concentrations of 10% or less

REFERENCE NO. 25

Date: _____
Company
By: _____
Date: _____
Contractor
By: _____
Date: _____

[FR Doc. 84-1452 Filed 1-23-84; 8:45 am]
BILLING CODE 6560-50-M/A%

[OW-FRL-2460-3]

Brunswick Shale and Sandstone Aquifer of the Ridgewood Area, New Jersey; Final Determination

AGENCY: U.S. Environmental Protection Agency.

ACTION: Notice.

SUMMARY: Pursuant to Section 1424(e) of the Safe Drinking Water Act, the Administrator of the U.S. Environmental Protection Agency (EPA), has determined that the Brunswick Shale and Sandstone Aquifer, underlying the Ridgewood Area, is the sole or principal source of drinking water for Ridgewood, Midland Park, Glen Rock, and Wyckoff, New Jersey, and that the aquifer, if contaminated, would create a significant hazard to public health. As a result of this action, Federal financially assisted projects constructed in the Ridgewood Area and its streamflow source zone (upstream portions of Ho Ho Kus Brook and Saddle River Run drainage basins) will be subject to EPA review to ensure that these projects are designed and constructed so that they do not create a significant hazard to public health.

ADDRESSES: The data on which these findings are based are available to the public and may be inspected during normal business hours at the U.S. Environmental Protection Agency, Water Supply Branch, 26 Federal Plaza, New York, New York 10278.

FOR FURTHER INFORMATION CONTACT: Damina J. Duda, Water Supply Branch, 26 Federal Plaza, New York, New York 10278 (212) 264-1800.

SUPPLEMENTARY INFORMATION: Notice is hereby given that pursuant to Section 1424(e) of the Safe Drinking Water Act (42 U.S.C., 300f, 300h-3(e), Pub. L. 93-523), the Administrator of the U.S. Environmental Protection Agency (EPA) has determined that the Brunswick Shale and Sandstone aquifer of the Ridgewood Area is the sole or principal source of drinking water for Ridgewood, Midland Park, Glen Rock, and Wyckoff, New Jersey. Pursuant to Section 1424(e), Federal financially assisted projects constructed in the Ridgewood Area and its streamflow source zone (upstream portions of Ho Ho Kus Brook, and

Saddle River Run drainage basins) will be subject to EPA review.

I. Background

Section 1424(e) of the Safe Drinking Water Act state:

(e) If the Administrator determines, on his own initiative or upon petition, that an area has an aquifer which is the sole or principal drinking water source for the area and which, if contaminated, would create a significant hazard to public health, he shall publish notice of that determination in the Federal Register. After the publication of any such notice, no commitment for Federal financial assistance (through a grant, contract, loan guarantee, or otherwise) may be entered into for any project which the Administrator determines may contaminate such aquifer through a recharge zone so as to create a significant hazard to public health, but a commitment for Federal financial assistance may, if authorized under another provision of law, be entered into to plan or design the project to assure that it will not so contaminate the aquifer.

On July 4, 1979, the Committee to keep Our Water Pure petitioned EPA to designate the Brunswick Shale and Sandstone Aquifer of the Ridgewood Area as sole source aquifer. On January 15, 1980, EPA published a notice in the Federal Register announcing a public comment period and setting a public hearing date. A public hearing was conducted on February 28, 1980, and the public was allowed to submit comments on the petition until March 28, 1980.

II. Basis for Determination

Among the factors to be considered by the Administrator in connection with the designation of an under Section 1424(e) are: (1) Whether the aquifer is the area's sole or principal source of drinking water, and (2) whether contamination of the aquifer would create a significant hazard to public health.

On the basis of information available to this Agency, the Administrator has made the following findings, which are the basis for the determination noted above:

1. The Brunswick Shale and Sandstone Aquifer of the Ridgewood Area is the "sole source" of drinking water for the approximately 68,820 residents of Ridgewood, Midland Park, Glen Rock, and Wyckoff, New Jersey.

2. There is no existing alternative drinking water source or combination of sources which provides fifty percent or more of the drinking water to the designated area.

3. The Brunswick formation is a soft red shale interbedded with coarse grained sandstone. The aquifer is overlain by permeable unconsolidated glacial and recent deposits. As a result of permeable soil characteristics, the Brunswick Shale and Sandstone Aquifer of the Ridgewood Area is highly susceptible to contamination through its recharge zone from a number of sources, including but not limited to, chemical spills, leachate from landfills, stormwater runoff, highway deicers, faulty septic systems, wastewater treatment systems, and waste disposal lagoons. The aquifer is also susceptible to contamination to a lesser degree from the same sources, through its streamflow source zone. Since ground water contamination can be difficult or impossible to reverse and since the aquifer in this area is solely relied upon for drinking water purposes by the population of the Ridgewood Area, contamination of the aquifer could pose a significant hazard to public health.

III. Description of the Brunswick Shale and Sandstone Aquifer of the Ridgewood Area, Its Recharge Zone and Its Streamflow Source Zone

The Brunswick Shale and Sandstone Aquifer is a soft red shale interbedded with coarse grained sandstone. The formation, located in northern New Jersey, is fairly large, extending south into Pennsylvania and north into New York. Igneous intrusions which form the Watchung Mountains and the Palisades, also form the western and eastern boundaries of the Burnswick formation, respectively. The area in which Federal financially assisted projects will be subject to review is the portion of the Brunswick Shale and Sandstone Aquifer in the Ridgewood Area, its streamflow source zone, and its recharge zone.

For the purposes of this designation, the Brunswick Shale and Sandstone Aquifer of the Ridgewood Area is considered to include the entire municipalities of Ridgewood, Midland Park, Glen Rock, and Wyckoff, New Jersey. It's recharge zone is considered to be one and the same with this area. The streamflow source zone is that portion of the drainage basins of Ho Ho Kus Brook and Saddle River Run located upstream of the Ridgewood area. This includes all or a portion of the following New Jersey municipalities: Waldwick, Allendale, Ramsey, Mahwah, Franklin Lakes, Ho Ho Kus, Saddle River, Upper Saddle River, Woodcliff Lake, Hillside, Washington, Montvale, as well as Ramapo Township, New York.

IV. Information Utilized in Determination

The information utilize in this determination includes the petition, written and verbal comments submitted by the public, and various technical publications. The above data is available to the public and may be inspected during normal business hours at the U.S. Environmental Protection Agency, Region II, Water Supply Branch, 26 Federal Plaza, New York, New York 10278.

V. Project Review

EPA Region II is working with the Federal agencies that may in the future provide financial assistance to projects in the area of concern. Interagency procedures have been developed through which EPA will be notified of proposed commitments by Federal agencies for projects which could contaminate the Brunswick Shale and Sandstone Aquifer, upon which the Ridgewood Area is dependent for its sole source water supply. EPA will evaluate such projects and, where necessary, conduct an in-depth review, including soliciting public comments where appropriate. Should the Administrator determine that a project may contaminate the aquifer through its recharge zone so as to create a significant hazard to public health, no commitment for Federal financial assistance may be entered into. However, a commitment for Federal financial assistance may, if authorized under another provision of law, be entered into to plan or design the project to assure that it will not so contaminate the aquifer.

Although the project review process cannot be delegated, the U.S. Environmental Protection Agency will rely to the maximum extent possible on any existing or future State and local control mechanisms in protecting the ground water quality of the Brunswick Shale and Sandstone Aquifer on which the Ridgewood Area is dependent for its sole source water supply. Included in the review of any Federal financially assisted project will be coordination with the State and local agencies. Their comments will be given full consideration and the Federal review process will attempt to complement and support State and local ground water protection mechanisms.

VI. Summary and Discussion of Public Comments

Most comments were generally in favor of designation. Two local governments submitted resolutions in support of designation. Only two commenters expressed any reservations regarding the designation.

One commenter expressed concern that the proposed designation would provide protection which is duplicative of State and local controls and may lead to unnecessary bureaucratic delays of

projects. Although a number of ground water protection measures are available at the Federal, State and local level, none of these, either, individually or collectively, permit EPA to act as directly as would a sole source designation in the review and approval of Federal financially assisted projects. In addition, EPA feels that the sole source project review process will foster integration rather than duplication of environmental review efforts. Memoranda of Understanding have been negotiated with various Federal agencies, with the purpose of streamlining the review process and minimizing project delays.

One commenter expressed concern that the area proposed for sole source designation could be an arbitrary political subdivision of the larger Brunswick aquifer system. The commenter questioned whether sufficient consideration had been given to the physical limits of the hydrologic system. The EPA recognizes that the aquifer does indeed cover a large area. However, a significant portion of the population in these other areas utilize other sources of water supply or have alternative sources available.

Concern was also raised that the Ridgewood Area may have alternative water supply available through adjacent water purveyors; specifically, the Passaic Valley Water Commission or the Hackensack Water Company. EPA has reviewed this matter and determined that either insufficient supply is currently available (in one case) or interconnections between the Ridgewood Area and the purveyor are currently not adequate to handle the Area's demand. Furthermore, the Brunswick Shale and Sandstone Aquifer in the Ridgewood Area is a source of water for export to adjacent purveyors during drought conditions.

The area considered for designation was determined to meet the criteria of an area which depends upon an aquifer for its sole or principal drinking water source and which, if contaminated, would pose a serious threat to the health of the Ridgewood Area residents.

VII. Economic and Regulatory Impact

Pursuant to the provisions of the Regulatory Flexibility Act (RFA), 5 U.S.C. 605(b), I hereby certify that the attached rule will not have a significant impact on a substantial number of small entities. For purposes of this Certification the "small entity" shall have the same meaning as given in Section 601 of the RFA. This action is only applicable to the Ridgewood Area.

The only affected entities will be those Area-based businesses, organizations or governmental jurisdictions that request Federal financial assistance for projects which have the potential for contaminating the aquifer so as to create a significant hazard to public health. EPA does not expect to be reviewing small isolated commitments of financial assistance on an individual basis, unless a cumulative impact on the aquifer is anticipated; accordingly, the number of affected small entities will be minimal.

For those small entities which are subject to review, the impact to today's action will not be significant. Most projects subject to this review will be proceded by a ground water impact assessment required pursuant to other Federal laws, such as the National Environmantal Policy Act, as amended (NEPA), 42 U.S.C. 4321, et seq. Integration of those related review procedures with sole source aquifer review will allow EPA and other Federal agencies to avoid delay or duplication of effort in approving financial assistance, this minimizing any adverse effect on those small entities which are affected. Finally, today's action does not prevent grants of Federal financial assistance which may be available to any affected small entity in order to pay for the redesign of the project to assure protection of the aquifer.

Under Executive Order 12291, EPA must judge whether a regulation is "major" and therefore subject to the requirement of a Regulatory Impact Analysis. This regulation is not major because it will not have an annual effect of $100 million or more on the economy, will not cause any major increase in costs or prices, and will not have significant adverse effects on competition, employment, investment, productivity, innovation, or the ability of United States enterprises to compete in domestic or export markets. Today's action only affects the Brunswick Shale and Sandstone Aquifer of the Ridgewood Area. It provides an additional review of ground-water protection measures, incorporating State and local measures whenever possible, for only those projects which request Federal financial assistance.

Dated: January 12, 1983.

William D. Ruckelshaus,
Administrator.

FR Doc. 84-1887 Filed 1-23-84; 8:45 am]
BILLING CODE 6560-50-M

REFERENCE NO. 26

Uncontrolled Hazardous Waste Site Ranking System

A Users Manual

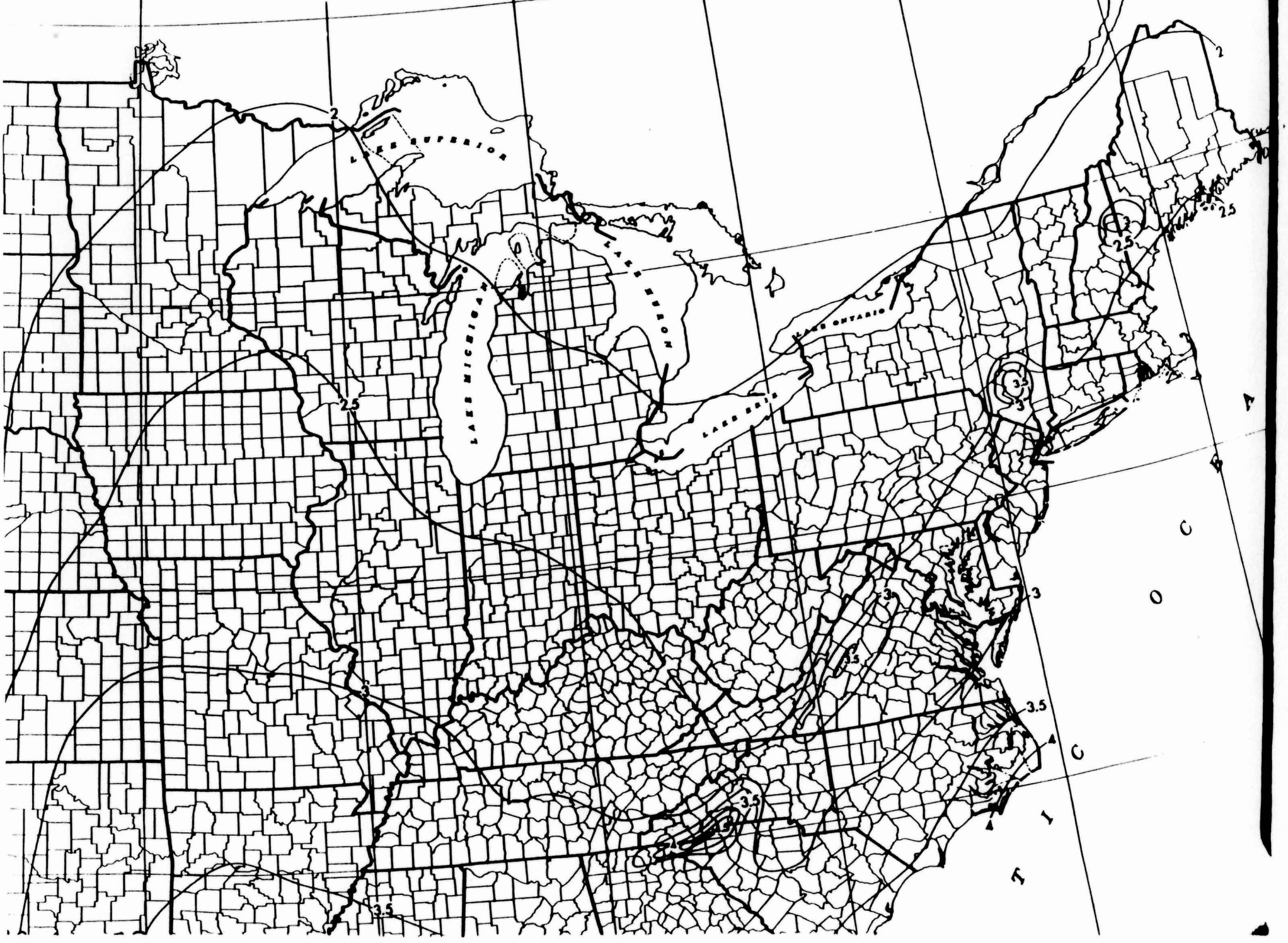
(HW-10)

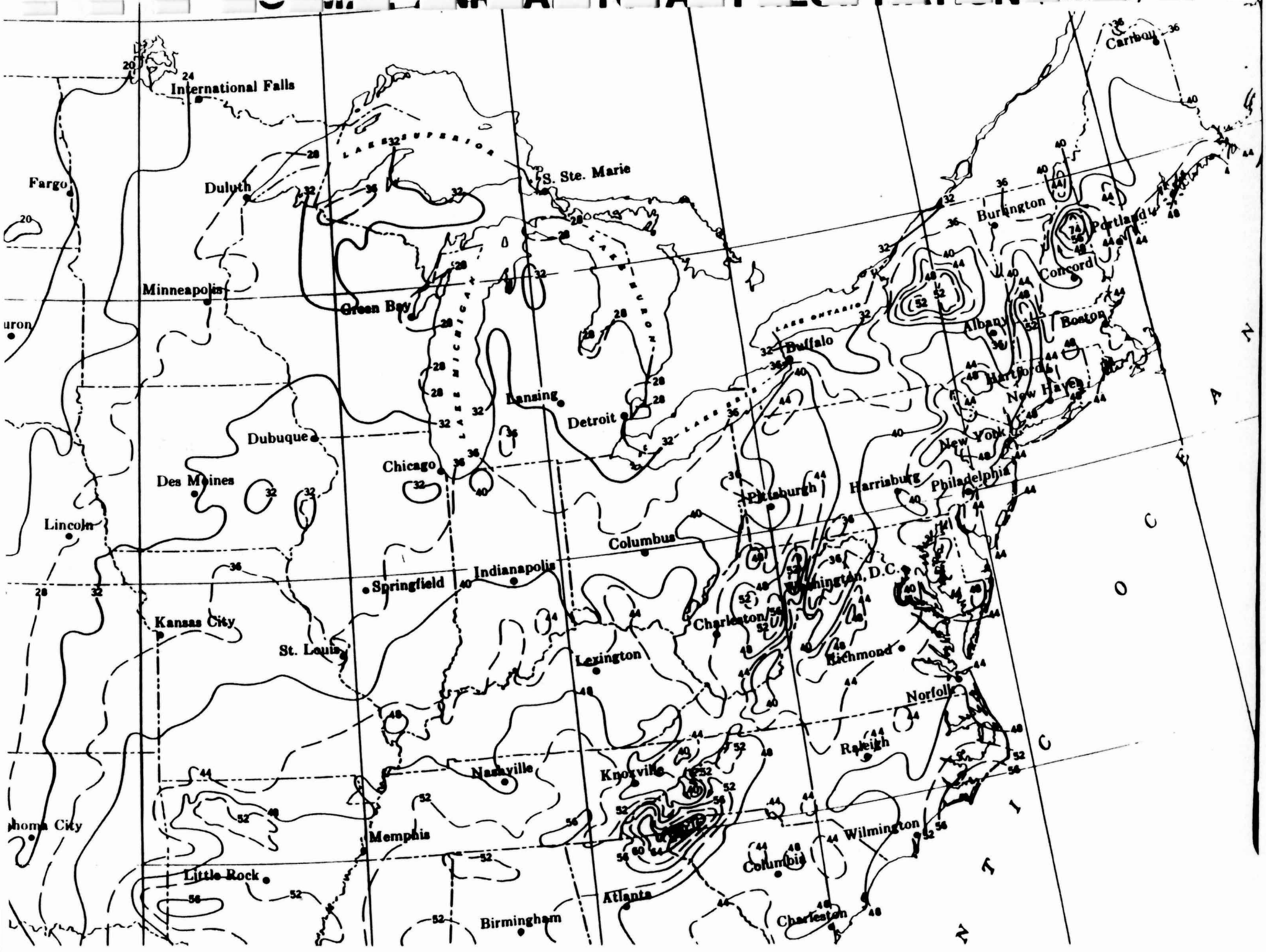
Originally Published in
the July 16, 1982, *Federal Register*

United States
Environmental Protection
Agency

1984

1 YEAR 24-HOUR RAINFALL (inches)

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Nashville
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Richmond
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Columbia
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Philadelphia
New York
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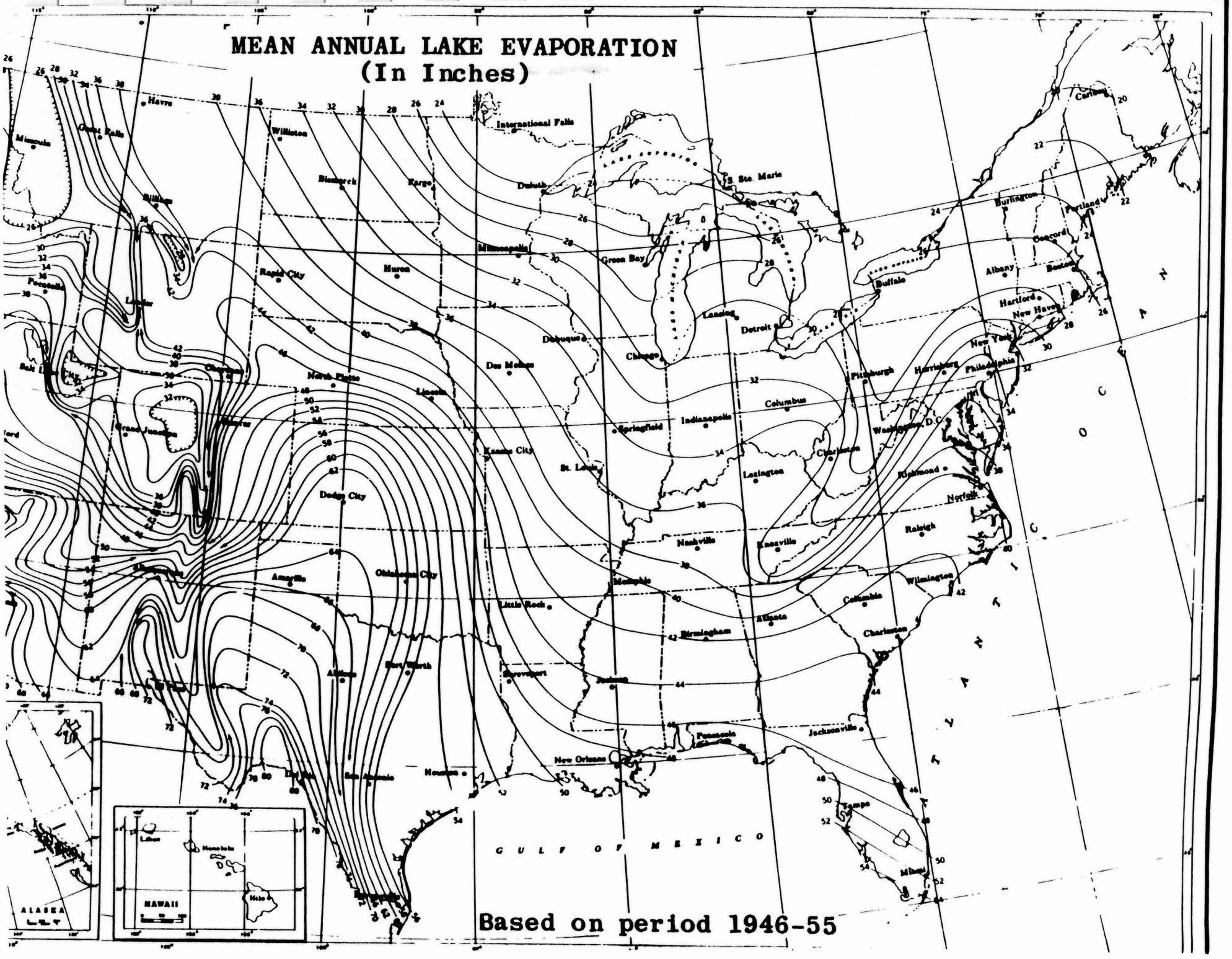
Hartford
Albany
Buffalo
Burlington
Concord
Portland
Boston
Caribou
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ERIE
LAKE ONTARIO

MEAN ANNUAL LAKE EVAPORATION
(In Inches)



Based on period 1946-55

REFERENCE NO. 27

FOR 3-MILE
RADIUS MAP
SEE FOLDER IN
BACK OF REPORT

REFERENCE NO. 28

SOIL SURVEY

Burlington County New Jersey

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
NEW JERSEY AGRICULTURAL EXPERIMENT STATION
Issued October 1971

SITE LOCATION

BURLINGTON COUNTY, NEW JERSEY — SHEET NUMBER 20

1 ¾ ½ ¼ 0 1 Mile

5000 4000 3000 2000 1000 0 5000 Feet

Scale 1:15840

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. The suitability of the soils for use as cropland is discussed in the soil descriptions. The capability classification is discussed on pages 54 through 56. For information on use of soils for woodland, see section beginning on page 56, including table 4, page 58. Other information is given in tables as follows:

Acreage and extent, table 1, page 8.
Estimated yields, table 2, page 53.
Use of soils for wildlife, table 5, page 62.
Engineering uses of soils, tables 6, 7, and 8, pages 66 through 99.
Limitations of soils for recreational and community developments, table 9, page 102.

Map symbol	Mapping unit	Described on page	Capability unit	Woodland suitability group
AaA	Adelphia fine sandy loam, 0 to 2 percent slopes	10	IIw-14	2w1
AaB	Adelphia fine sandy loam, 2 to 5 percent slopes	10	IIw-14	2w1
AcA	Adelphia fine sandy loam, clayey substratum, 0 to 2 percent slopes	10	IIw-14	2w1
AcB	Adelphia fine sandy loam, clayey substratum, 2 to 5 percent slopes	10	IIw-14	2w1
AhA	Adelphia loam, 0 to 2 percent slopes	10	IIw-13	2w1
Ak	Adelphia sandy clay loam, truncated	10	IIw-13	2w1
AnA	Adelphia fine sandy loam, glauconitic variant, 0 to 2 percent slopes	11	IIw-14	2w1
AnB	Adelphia fine sandy loam, glauconitic variant, 2 to 5 percent slopes	11	IIw-14	2w1
Ao	Alluvial land, loamy	11	VIw-28	1w1
Ap	Alluvial land, sandy	12	VIw-28	3w1
At	Atsion sand	13	Vw-22	3w1
Au	Atsion sand, loamy substratum	13	Vw-22	3w1
Av	Atsion fine sand	13	Vw-22	3w1
Aw	Atsion fine sand, loamy substratum	13	Vw-22	3w1
Bp	Berryland sand	15	Vw-26	3w1
Bt	Berryland fine sand	15	Vw-26	3w1
Bu	Berryland mucky sand	15	Vw-26	3w1
Cm	Colemantown loam	16	IIIw-20	3w2
CnA	Collington fine sandy loam, 0 to 2 percent slopes	17	I-5	1o1
CnB	Collington fine sandy loam, 2 to 5 percent slopes	17	IIe-5	1o1
CnC	Collington fine sandy loam, 5 to 10 percent slopes	17	IIIe-5	1o1
CoA	Collington loam, 0 to 2 percent slopes	17	I-4	1o1
CoB	Collington loam, 2 to 5 percent slopes	17	IIe-4	1o1
DeB	Donlonton fine sandy loam, 0 to 3 percent slopes	18	IIw-12	2w1
DlA	Donlonton loam, 0 to 3 percent slopes	18	IIw-11	2w1
DoA	Downer loamy sand, 0 to 2 percent slopes	19	IIs-6	3o1
DoB	Downer loamy sand, 2 to 5 percent slopes	19	IIs-6	3o1
DoC	Downer loamy sand, 5 to 10 percent slopes	19	IIIe-6	3o1
DpB	Downer loamy sand, gravelly substratum, 0 to 5 percent slopes	19	IIs-6	3o1
DrA	Downer loamy sand, loamy substratum, 0 to 2 percent slopes	19	IIs-6	3o1
DsB	Downer sandy loam, truncated, 0 to 5 percent slopes	20	IIIe-6	3o1
EvB	Evesboro sand, 0 to 5 percent slopes	20	VIIs-7	3s1
EvC	Evesboro sand, 5 to 10 percent slopes	20	VIIs-7	3s1
EwB	Evesboro sand, loamy substratum, 0 to 5 percent slopes	20	IVs-7	3s1
EyB	Evesboro fine sand, 0 to 5 percent slopes	20	IVs-7	3s1
Fa	Fallsington fine sandy loam	21	IIIw-21	3w2
Fc	Fallsington fine sandy loam, clayey substratum	21	IIIw-21	3w2
FfA	Freehold fine sandy loam, 0 to 2 percent slopes	22	I-5	1o1
FfB	Freehold fine sandy loam, 2 to 5 percent slopes	22	IIe-5	1o1
FfC	Freehold fine sandy loam, 5 to 10 percent slopes	23	IIIe-5	1o1
FfD	Freehold fine sandy loam, 10 to 15 percent slopes	23	IVe-5	1o1
FfE	Freehold fine sandy loam, 15 to 25 percent slopes	23	VIe-5	1r1
FgB	Freehold fine sandy loam, clayey substratum, 2 to 5 percent slopes	23	IIe-5	1o1

U. S. GOVERNMENT PRINTING OFFICE : 1971 O - 383-859

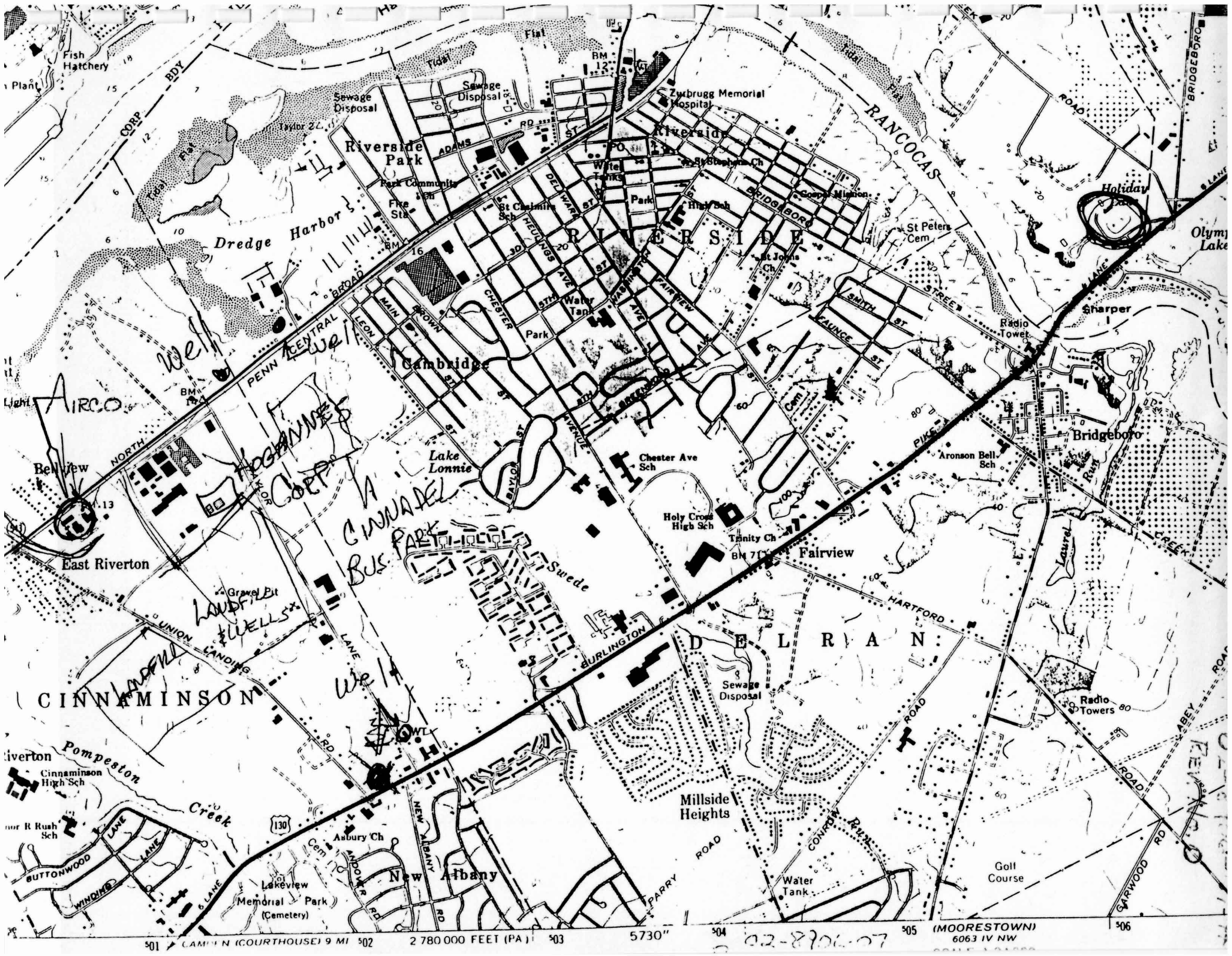
GUIDE TO MAPPING UNITS.--Continued

Map symbol	Mapping unit	Described on page	Capability unit	Woodland suitability group
FhB	Freehold loamy sand, 0 to 5 percent slopes	23	IIs-6	2o1
FhC	Freehold loamy sand, 5 to 10 percent slopes	23	IIIe-6	2o1
FoC3	Freehold sandy loam, 5 to 10 percent slopes, severely eroded	23	IVe-5	1o1
FoD3	Freehold sandy loam, 10 to 15 percent slopes, severely eroded	23	VIe-5	1o1
GaA	Galestown sand, 0 to 5 percent slopes	24	IVs-7	3s1
GcB	Galestown sand, clayey substratum, 0 to 5 percent slopes	24	IVs-7	3s1
HdA	Holmdel fine sandy loam, 0 to 2 percent slopes	25	IIw-14	2w1
HdB	Holmdel fine sandy loam, 2 to 5 percent slopes	25	IIw-14	2w1
HlB	Holmdel loamy sand, 0 to 5 percent slopes	25	IIIw-15	2w1
HmA	Holmdel fine sandy loam, clayey substratum, 0 to 2 percent slopes	26	IIw-14	2w1
HmB	Holmdel fine sandy loam, clayey substratum, 2 to 5 percent slopes	26	IIw-14	2w1
Hn	Holmdel-Urban land complex	26	-----	---
Ka	Keansburg fine sandy loam	27	IIIw-25	3w2
KeB	Keyport loamy sand, 0 to 5 percent slopes	28	IIe-3	2w1
KfB	Keyport fine sandy loam, 2 to 5 percent slopes	28	IIe-2	2w1
KlA	Keyport loam, 0 to 2 percent slopes	28	IIw-1	2w1
KlB	Keyport loam, 2 to 5 percent slopes	28	IIe-1	2w1
KlC	Keyport loam, 5 to 10 percent slopes	28	IIIe-1	2w1
KlD	Keyport loam, 10 to 15 percent slopes	28	VIe-1	2w1
KlE	Keyport loam, 15 to 25 percent slopes	28	VIIe-1	2r1
KmA	Klej sand, 0 to 4 percent slopes	29	IIIw-16	3s1
KnA	Klej sand, loamy substratum, 0 to 2 percent slopes	29	IIIw-16	3s1
KoA	Klej fine sand, 0 to 2 percent slopes	30	IIIw-16	3s1
KwA	Kresson loamy sand, 0 to 3 percent slopes	31	IIIw-12	2w1
KxA	Kresson fine sandy loam, 0 to 3 percent slopes	31	IIIw-12	2w1
KyA	Kresson loam, 0 to 3 percent slopes	31	IIIw-11	2w1
LaA	Lakehurst sand, 0 to 3 percent slopes	32	IVw-17	4s1
LlA	Lakehurst sand, thick surface, 0 to 3 percent slopes	32	IVw-17	4s1
LmA	Lakehurst sand, loamy substratum, 0 to 3 percent slopes	32	IVw-17	4s1
LnA	Lakehurst fine sand, 0 to 3 percent slopes	32	IVw-17	4s1
LoA	Lakehurst fine sand, loamy substratum, 0 to 3 percent slopes	33	IVw-17	4s1
LrA	Lakehurst-Lakewood sands, 0 to 5 percent slopes	33	IVw-17	4s1
LsA	Lakehurst-Lakewood sands, loamy substratum, 0 to 5 percent slopes	33	IVw-17	4s1
LtB	Lakewood sand, 0 to 5 percent slopes	34	VIIs-8	5s1
LtC	Lakewood sand, 5 to 10 percent slopes	34	VIIs-8	5s1
LtD	Lakewood sand, 10 to 15 percent slopes	34	VIIs-8	5s1
LuB	Lakewood sand, thick surface, 0 to 5 percent slopes	34	VIIs-8	5s1
LvB	Lakewood sand, loamy substratum, 0 to 5 percent slopes	34	VIIs-8	5s1
LwB	Lakewood fine sand, 0 to 5 percent slopes	34	VIIs-8	5s1
LyA	Lakewood fine sand, loamy substratum, 0 to 5 percent slopes	34	VIIs-8	5s1
Ma	Made land, dredged coarse material	34	-----	---
Mf	Made land, dredged fine material	35	-----	---
Mg	Made land, sanitary fill	35	-----	---
MhA	Marlton fine sandy loam, 0 to 2 percent slopes	36	IIs-2	2o1
MhB	Marlton fine sandy loam, 2 to 5 percent slopes	36	IIe-2	2o1
MrC	Marlton soils, 5 to 10 percent slopes	36	IIIe-2	2o1
Ms	Marsh, fresh water	37	VIIIw-29	---
Mt	Marsh, tidal	37	VIIIw-29	---
Mu	Muck, shallow	37	VIIw-30	3w3
NbA	Nixonton fine sandy loam, 0 to 2 percent slopes	39	IIw-14	2w1
NbB	Nixonton fine sandy loam, 2 to 5 percent slopes	39	IIw-14	2w1

GUIDE TO MAPPING UNITS.--Continued

Map symbol	Mapping unit	Described on page	Capability unit	Woodland suitability group
NcA	Nixonton loamy fine sand, 0 to 2 percent slopes	39	IIw-15	2w1
NcB	Nixonton loamy fine sand, 2 to 5 percent slopes	39	IIw-15	2w1
Pa	Pasquotank fine sandy loam	40	IIIw-20	3w2
PbA	Pemberton sand, 0 to 5 percent slopes	41	IIIw-15	3s1
PcA	Pemberton sand, thick surface, 0 to 5 percent slopes	41	IIIw-16	3s1
Pt	Pits, sand and gravel	41	-----	---
Pu	Pits, clay and marl	41	-----	---
Pv	Pocomoke fine sandy loam	42	IIIw-24	3w2
Se	Sandy land, ironstone	42	VIIs-8	3s1
SfB	Sassafras loamy sand, 0 to 5 percent slopes	43	IIs-6	2o1
SgA	Sassafras fine sandy loam, 0 to 2 percent slopes	44	I-5	2o1
SgB	Sassafras fine sandy loam, 2 to 5 percent slopes	44	IIe-5	2o1
SgC	Sassafras fine sandy loam, 5 to 10 percent slopes	44	IIIe-5	2o1
ShA	Sassafras fine sandy loam, clayey substratum, 0 to 2 percent slopes	44	I-5	2o1
ShB	Sassafras fine sandy loam, clayey substratum, 2 to 5 percent slopes	44	IIe-5	2o1
Sk	Sassafras-Urban land complex	45	-----	---
Sm	Sassafras-Urban land complex, clayey substrata	45	-----	---
Sn	Shrewsbury fine sandy loam	46	IIIw-21	3w2
So	Shrewsbury fine sandy loam, clayey substratum	46	IIIw-21	3w2
Sp	Shrewsbury loam	46	IIIw-20	3w2
Sv	Shrewsbury sandy clay loam, truncated	46	IIIw-20	3w2
Sx	Shrewsbury fine sandy loam, ironstone variant	47	IVw-21	3w2
TsB	Tinton sand, 0 to 5 percent slopes	47	IIIs-6	3s1
TsC	Tinton sand, 5 to 10 percent slopes	48	IVs-7	3s1
TtB	Tinton sand, thick surface, 0 to 5 percent slopes	48	IVs-7	3s1
Ug	Urban land, sandy	48	-----	---
Ut	Urban land, clayey	48	-----	---
Uv	Urban land, sandy over clayey	48	-----	---
WaA	Westphalia loamy fine sand, 0 to 2 percent slopes	49	IIs-6	2o1
WaB	Westphalia loamy fine sand, 2 to 5 percent slopes	49	IIs-6	2o1
WdA	Westphalia fine sandy loam, 0 to 2 percent slopes	49	I-5	2o1
WdB	Westphalia fine sandy loam, 2 to 5 percent slopes	49	IIe-5	2o1
WeB	Woodmansie sand, 0 to 5 percent slopes	50	IVs-8	4s1
WeC	Woodmansie sand, 5 to 10 percent slopes	50	IVs-8	4s1
WgB	Woodmansie sand, firm substratum, 2 to 5 percent slopes	50	IVs-8	4s1
WhB	Woodmansie sand, loamy substratum, 0 to 5 percent slopes	50	IVs-8	4s1
WkA	Woodstown loamy sand, 0 to 2 percent slopes	51	IIIw-15	2w1
WlA	Woodstown loamy sand, loamy substratum, 0 to 2 percent slopes	51	IIIw-15	2w1
WmA	Woodstown fine sandy loam, 0 to 2 percent slopes	51	IIw-14	2w1
WmB	Woodstown fine sandy loam, 2 to 5 percent slopes	52	IIw-14	2w1
WnA	Woodstown fine sandy loam, clayey substratum, 0 to 2 percent slopes	52	IIw-14	2w1
WnB	Woodstown fine sandy loam, clayey substratum, 2 to 5 percent slopes	52	IIw-14	2w1

REFERENCE NO. 29



Fish Hatchery
Sewage Disposal
Riverside Park
Park Community Ch
Fire Sta
Dredge Harbor
Tidal Flat
Zurbrugg Memorial Hospital
Riverside
St Stephens Ch
Water Tanks
Park
High Sch
Gospel Mission
St Casimirs Sch
RIVERSIDE
St Peters Cem
St Johns Ch
Holiday Lake
Olympic Lake
RANCOCAS
Sharper
Radio Tower
Cambridge
Water Tank
Park
Lake Lonnie
Chester Ave Sch
Holy Cross High Sch
Trinity Ch
Fairview
Aronson Bell Sch
Bridgeboro
Laurel Run
Bellview
East Riverton
Gravel Pit
Swede
DELRAN
Sewage Disposal
Radio Towers
CINNAMINSON
Riverton
Cinnaminson High Sch
Pompeston Creek
Asbury Ch
New Albany
Lakeview Memorial Park (Cemetery)
Millside Heights
Water Tank
Golf Course
Well
Well
Well
AIRCO
HOGANNES CORP
A CINNADEL BUS PARK
LANDFILL & WELLS
LANDFILL
Cem
CAMDEN (COURTHOUSE) 9 MI
2 780 000 FEET (PA)
5730"
(MOORESTOWN)
6063 IV NW

REFERENCE 30

Official State Estimates

Population Estimates for New Jersey

JULY 1, 1982

OFFICE OF DEMOGRAPHIC AND ECONOMIC ANALYSIS
DIVISION OF PLANNING AND RESEARCH
DEPARTMENT OF LABOR
C N 388
TRENTON, NEW JERSEY 08625 - 0388

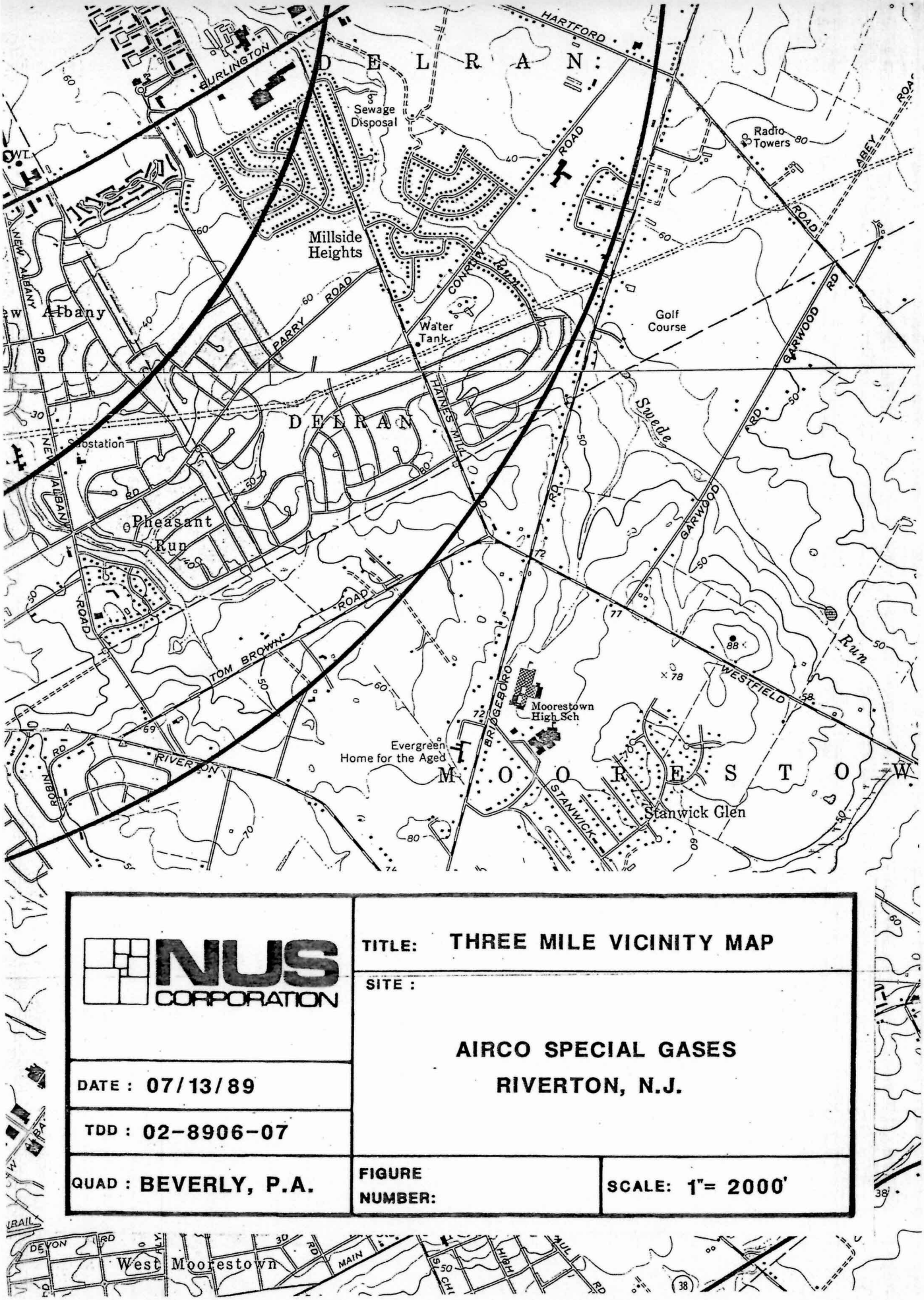
THOMAS H. KEAN
Governor

ROGER A. BODMAN
Commissioner

SEPTEMBER 1983

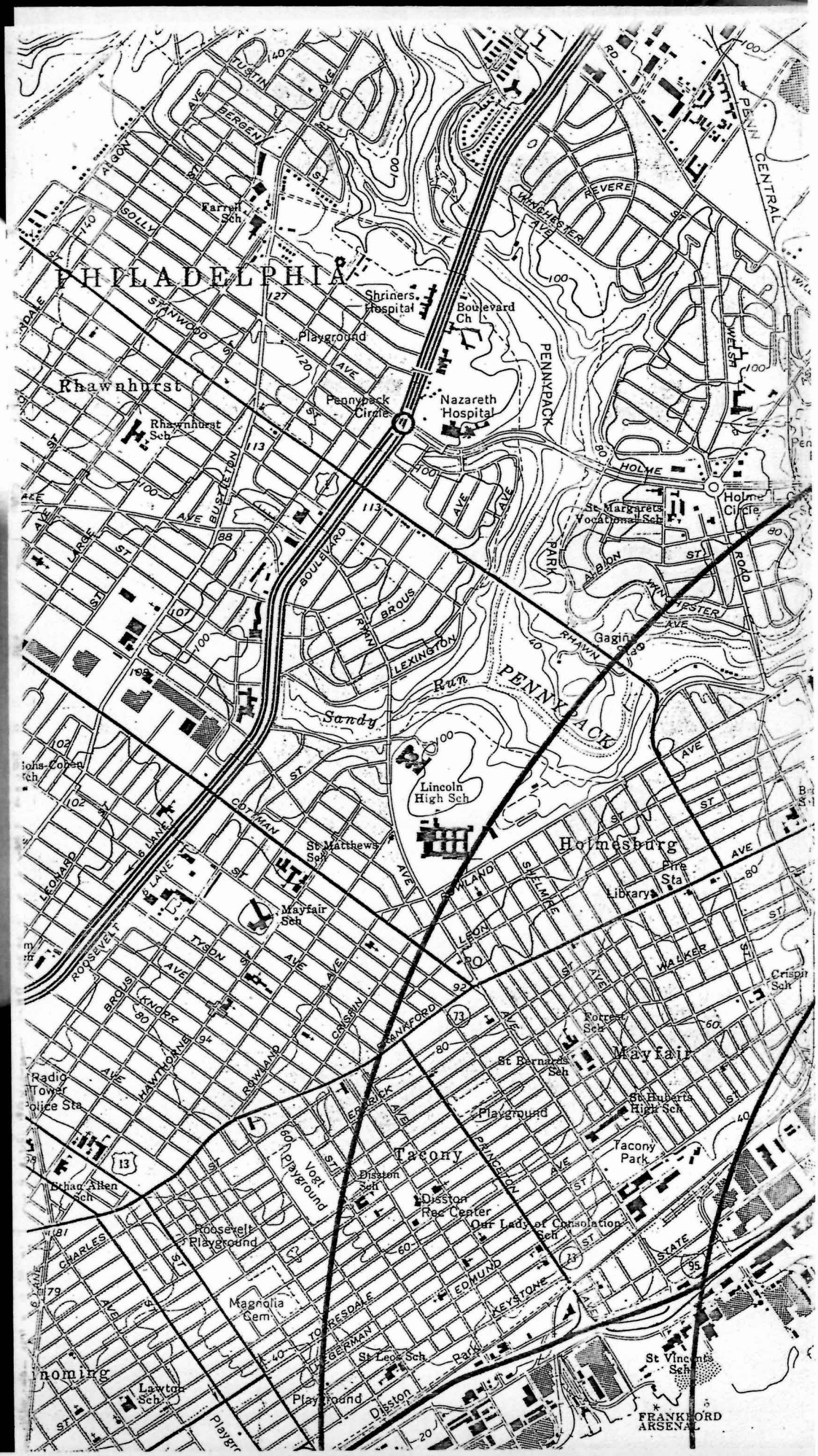
RESIDENT POPULATION

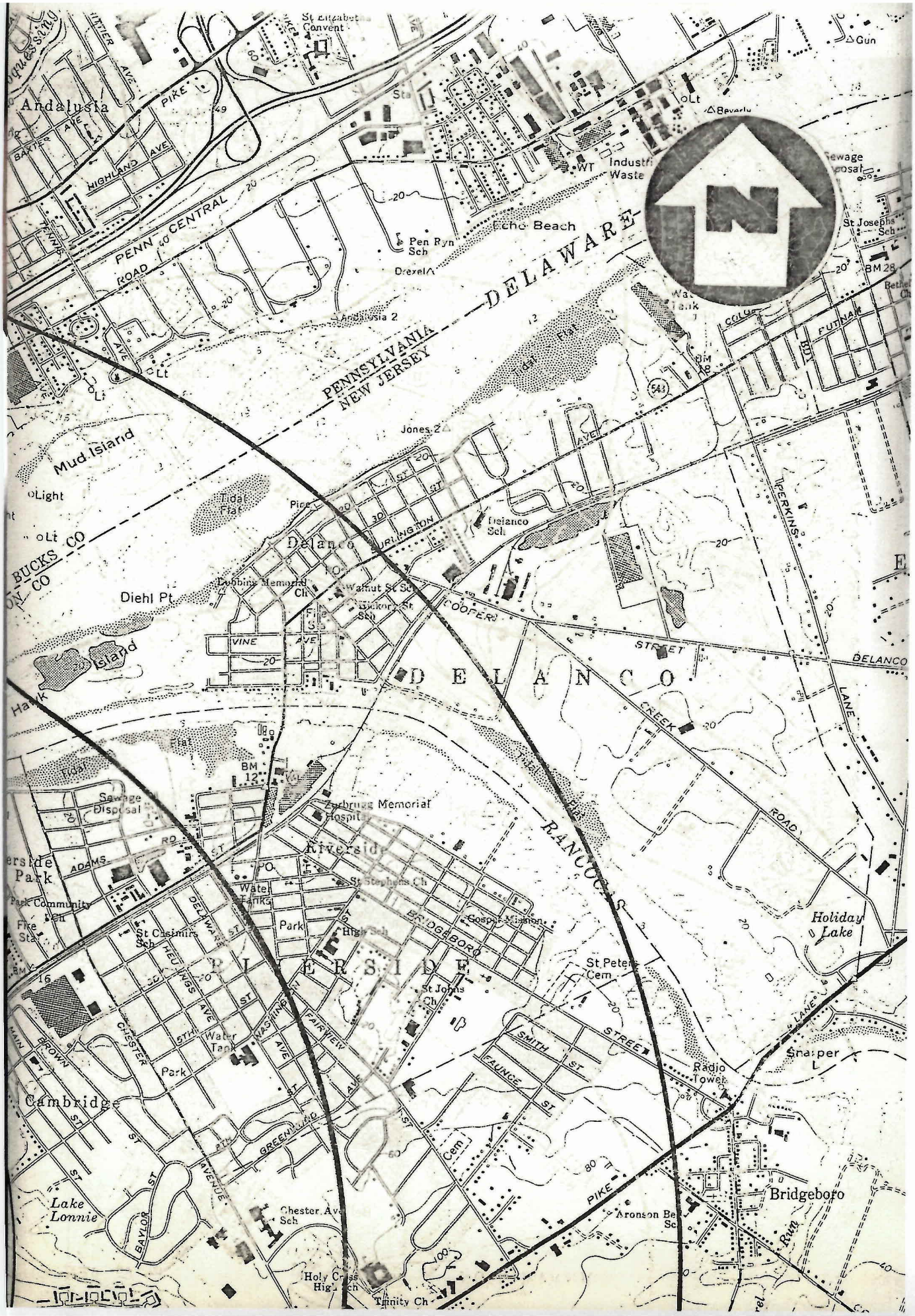
BURLINGTON COUNTY	CENSUS COUNTS, APRIL 1, 1980	REVISED ESTIMATES, JULY 1, 1981	PROVISIONAL ESTIMATES, JULY 1, 1982
Bass River township	1,344	1,355	1,354
Beverly city	2,919	2,928	2,918
Bordentown city	4,441	4,456	4,444
Bordentown township	7,170	7,221	7,215
Burlington city	10,246	10,655	10,641
Burlington township	11,527	11,616	11,616
Chesterfield township	3,867	4,029	4,177
Cinnaminson township	16,072	16,155	16,163
Delanco township	3,730	3,748	3,744
Delran township	14,811	14,873	14,863
Eastampton township	3,814	3,818	3,825
Edgewater Park township	9,273	9,314	9,308
Evesham township	21,508	22,298	22,797
Fieldsboro borough	597	599	599
Florence township	9,084	9,145	9,136
Hainesport township	3,236	3,303	3,335
Lumberton township	5,236	5,264	5,264
Mansfield township	2,523	2,561	2,560
Maple Shade township	20,525	20,608	20,578
Medford township	17,622	18,363	18,649
Medford Lakes borough	4,958	4,984	4,983
Moorestown township	15,596	15,723	15,786
Mount Holly township	10,818	10,860	10,763
Mount Laurel township	17,614	18,922	19,638
New Hanover township	14,258	15,320	16,377
North Hanover township	9,050	9,063	9,212
Palmyra borough	7,085	7,226	7,218
Pemberton borough	1,198	1,205	1,196
Pemberton township	29,720	30,092	30,026
Riverside township	7,941	7,995	7,994
Riverton borough	3,068	3,084	3,081
Shamong township	4,537	4,703	4,732
Southampton township	8,808	8,880	8,926
Springfield township	2,691	2,731	2,744
Tabernacle township	6,236	6,458	6,551
Washington township	808	815	819
Westampton township	3,383	3,493	3,533
Willingboro township	39,912	40,076	40,042
Woodland township	2,285	2,179	1,985
Wrightstown borough	3,031	3,200	3,203
TOTAL	362,542	369,318	371,995



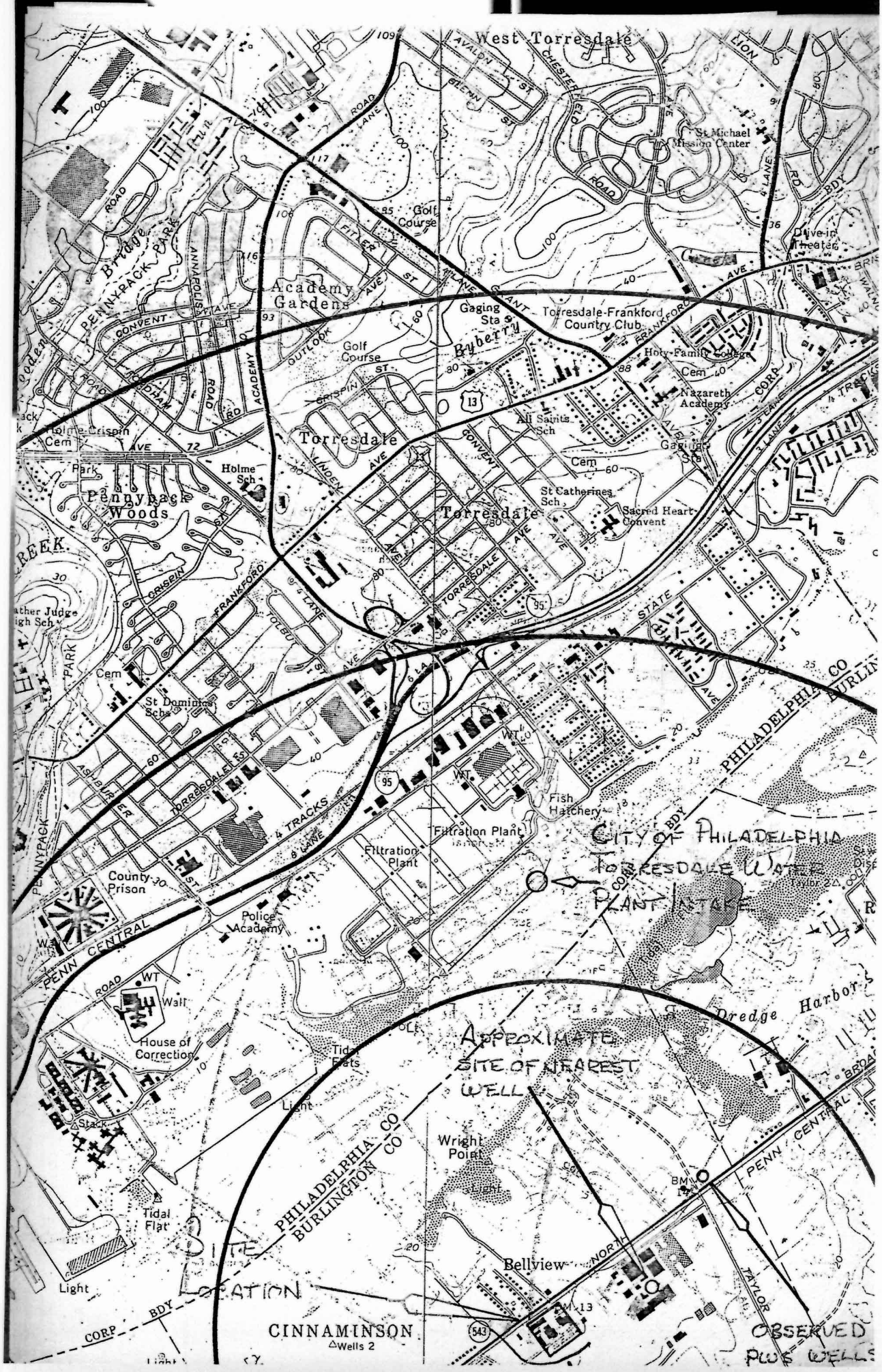
NUS CORPORATION	TITLE: THREE MILE VICINITY MAP	
	SITE : AIRCO SPECIAL GASES RIVERTON, N.J.	
DATE : 07/13/89		
TDD : 02-8906-07		
QUAD : BEVERLY, P.A.	FIGURE NUMBER:	SCALE: 1"= 2000'

OBSERVED DITCH NEAR SITE
CINNAMINSON
Riverton
Sewage Disposal
Sacred Heart Schs
Pompeston Cr
Pompeston Creek
Cinnaminson High Sch
Eleanor R Rush Sch
Riverton Country Club
Golf Course
Lakeview Memorial Park (Cemetery)
Lakeview Mem Park (Cemetery)
Asbury Ch
Morgan Cem
Westfield Sch
Wellington Park
Memorial Sch
Stimbel Sch
Parry
Wood Park
Phillips Sch
St Charles Sch
Wrightsville
Ivywood
Radio Tower (WCAU)
East Hennsauken
MOORESTOWN
Water Tank
MAPLE SHADE
SCALE 1:24000
1 MILE
7000 FEET
1 KILOMETER
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929


PHILADELPHIA
Rhawnhurst
Rhawnhurst Sch
Tarrell Sch
Shriners Hospital
Boulevard Ch
Playground
Pennypack Circle
Nazareth Hospital
PENNYPACK
PENNYPACK PARK
Holme Circle
St Margarets Vocational Sch
Gaging Station
Sandy Run
Lincoln High Sch
St Matthews Sch
Holmesburg
Fire Sta
Library
Mayfair Sch
Mayfair
Crispin Sch
Rotrem Sch
St Bernards Sch
St Huberts High Sch
Playground
Tacony
Tacony Park
Radio Tower
Police Sta
Ethan Allen Sch
Disston Sch
Disston Rec Center
Our Lady of Consolation Sch
Vogt Playground
Roosevelt Playground
Magnolia Gem
St Leos Sch
Lawton Sch
Playground
Disston
St Vincents Sch
FRANKFORD ARSENAL
PENN CENTRAL



Andalusia
PENN CENTRAL
ROAD
HIGHLAND AVE
BAXTER AVE
PIKE
Echo Beach
Pen Ryn Sch
Drexel
Andalusia 2
DELAWARE
PENNSYLVANIA
NEW JERSEY
Industrial Waste
Sewage Disposal
St Josephs Sch
BM 28
Tidal Flat
Jones 2
Mud Island
Light
Tidal Flat
Pine
Delanco
Delanco Sch
BURLINGTON
BUCKS CO
Diehl Pt
Dobbins Memorial Ch
Walnut St Sch
Hickory St Sch
COOPER
STREET
VINE
AVE
Island
DELANCO
CREEK
ROAD
PERKINS
LANE
Hawk
Tidal Flat
BM 12
Sewage Disposal
Zurbrugg Memorial Hospital
Riverside
ADAMS
RD
Park
Park Community Ch
Fire Sta
St Stephens Ch
Water Tanks
Park
High Sch
BRIDGEBORO
Gospel Mission
RANCOCAS
Holiday Lake
St Casimirs Sch
DELAWARE
HEULINGS
AVE
PIVERSIDE
St Peters Cem
St Johns Ch
FAIRVIEW
SMITH
FAUNCE
STREET
Snaiper
Radio Tower
Water Tank
Park
CHESTER
BROWN
MAIN
Cambridge
GREENWOOD
AVENUE
Cem
Bridgeboro
PIKE
Aronson Bell Sch
Lake Lonnie
BAYLOR
Chester Ave Sch
Holy Cross High Sch
Trinity Ch


West Torresdale
St Michael Mission Center
Golf Course
Drive-in Theater
Academy Gardens
Gaging Sta
Torresdale-Frankford Country Club
Ryberry
Holy Family College
Golf Course
Cem
Nazareth Academy
Holme Crispin Cem
Torresdale
All Saints Sch
Gaging Sta
Holme Sch
Pennypack Woods
Cem
St Catherines Sch
Sacred Heart Convent
Torresdale
Cem
St Dominics Sch
Fish Hatchery
Filtration Plant
Filtration Plant
County Prison
Police Academy
House of Correction
Wall
Tidal Flats
Light
Stack
Wright Point
Tidal Flat
Light
Bellview
CINNAMINSON
Wells 2
PHILADELPHIA CO
BURLINGTON CO
PENN CENTRAL
4 TRACKS
Dredge Harbor
CITY OF PHILADELPHIA
TORRESDALE WATER
PLANT INTAKE
APPROXIMATE
SITE OF NEAREST
WELL
SITE
LOCATION
OBSERVED
PLUS WELLS

PHILADELPHIA
Rhawnhurst
Rhawnhurst Sch
Farrell Sch
Shriners Hospital
Boulevard Ch
Playground
Pennypack Circle
Nazareth Hospital
PENNYPACK
PENN CENTRAL
Holme Circle
St Margarets Vocational Sch
Gaging Sta
Sandy Run
PENNYPACK
Lincoln High Sch
Holmesburg
Fire Sta
Library
St Matthews Sch
Mayfair Sch
Mayfair
St Bernards Sch
St Huberts High Sch
Tacony Park
Tacony
Vogt Playground
Disston Sch
Disston Rec Center
Our Lady of Consolation Sch
Roosevelt Playground
Magnolia Cem
St Leos Sch
Playground
Lawton Sch
St Vincents Sch
FRANKFORD ARSENAL
Gaging Sta
Ethan Allen Sch
Radio Tower
Crispin Sch
Forrest Sch
Radio Tower
Police Sta
Lincoln Park
Disston Park
Playground
Playground
Disston
Playground
Gaging Sta

THIS DOCUMENT IS CURRENTLY CLASSIFIED NON-CONFIDENTIAL BY EPA AS THE ABOVE SITE DOES NOT QUALIFY FOR FURTHER REMEDIAL ACTION AT THIS TIME

AIRGO SPECIAL GASES

CONFIDENTIAL-NOT FOR PUBLIC RELEASE 02-8906-07-PA

HRS

	S	S^2
Groundwater Route Score (S_{gw})	0	0
Surface Water Route Score (S_{sw})	0	0
Air Route Score (S_a)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		0
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		0
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		0

WORKSHEET FOR COMPUTING S_M

PRO

	S	S^2
Groundwater Route Score (S_{gw})	21.49	461.82
Surface Water Route Score (S_{sw})	17.09	292.07
Air Route Score (S_a)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		753.89
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		27.46
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		15.87

WORKSHEET FOR COMPUTING S_M

AIRCO SPECIAL GASES
02-8906-07-PA

CONFIDENTIAL-NOT FOR PUBLIC RELEASE

Ground Water Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	HRS	Max. Score	PRO
1 Observed Release	(0) 45	1	0	45	0
If observed release is given a score of 45, proceed to line 4. If observed release is given a score of 0, proceed to line 2.					
2 Route Characteristics					
Depth to Aquifer of Concern	0 1 2 (3)	2	6	6	6
Net Precipitation	0 1 (2) 3	1	2	3	2
Permeability of the Unsaturated Zone	0 1 2 (3)	1	3	3	3
Physical State	0 1 2 (3)	1	3	3	3
	Total Route Characteristics Score		14	15	14
3 Containment	(0) 1 2 3	1	0	3	1
4 Waste Characteristics					
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	18
Hazardous Waste Quantity	0 1 (2) 3 4 5 6 7 8	1	2	8	2
	Total Waste Characteristics Score		20	26	20
5 Targets					
Ground Water Use	0 1 2 (3)	3	9	9	9
Distance to Nearest Well/Population Served	0 4 6 8 10 / 12 16 18 20 / 24 30 32 (35) 40	1	35	40	35
	Total Targets Score		44	49	44
6 If line 1 is 45, multiply 1 x 4 x 5; If line 1 is 0, multiply 2 x 3 x 4 x 5			0	57,330	12,320
7 Divide line 6 by 57,330 and multiply by 100		S_{gw} =	0		21.49

O = HRS

□ = PRO

Airco Special Gas
02-8906-07-PA

CONFIDENTIAL-NOT FOR PUBLIC RELEASE

Surface Water Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multi-plier	HRS	Max. Score	PRO
1 Observed Release	(0) 45	1	0	45	0
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.					
2 Route Characteristics					
Facility Slope and Intervening Terrain	(0) 1 2 3	1	0	3	0
1-yr. 24-hr. Rainfall	0 1 (2) 3	1	2	3	2
Distance to Nearest Surface Water	0 1 2 (3)	2	6	6	6
Physical State	0 1 2 (3)	1	3	3	3
Total Route Characteristics Score			11	15	11
3 Containment	(0) 1 2 3	1	0	3	1
4 Waste Characteristics					
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	18
Hazardous Waste Quantity	0 1 (2) 3 4 5 6 7 8	1	2	8	2
Total Waste Characteristics Score			20	26	20
5 Targets					
Surface Water Use	0 1 2 (3)	3	9	9	9
Distance to a Sensitive Environment	0 1 2 (3)	2	6	6	6
Population Served/Distance to Water Intake Downstream	0 4 6 8 10 / 12 16 18 20 / 24 30 32 (35) 40	1	35	40	35
Total Targets Score			50	55	50
6 If line 1 is 45, multiply 1 x 4 x 5; If line 1 is 0, multiply 2 x 3 x 4 x 5			0	64,350	11,000
7 Divide line 6 by 64,350 and multiply by 100		S_{sw} =	0		17.09

O = HRS

□ = PRO