SITE INSPECTION REPORT
ORBIS PRODUCTS CORPORATION
55 VIRGINIA STREET
NEWARK, ESSEX COUNTY, NEW JERSEY

CERCLIS ID No.: NJD010910099

VOLUME I OF VIII

EPA Contract No.: 68-W-00-121
W.O. No.: 20103.001.001.1061.00
Document Control No.: SAT.20103.1061.353

August 2003

Prepared for:
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Prepared by:
Region II Site Assessment Team
Weston Solutions, Inc.
Edison, New Jersey 08837

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SUBMITTED BY:

Scott T. Snyder
SAT Project Manager

Date 8/5/03

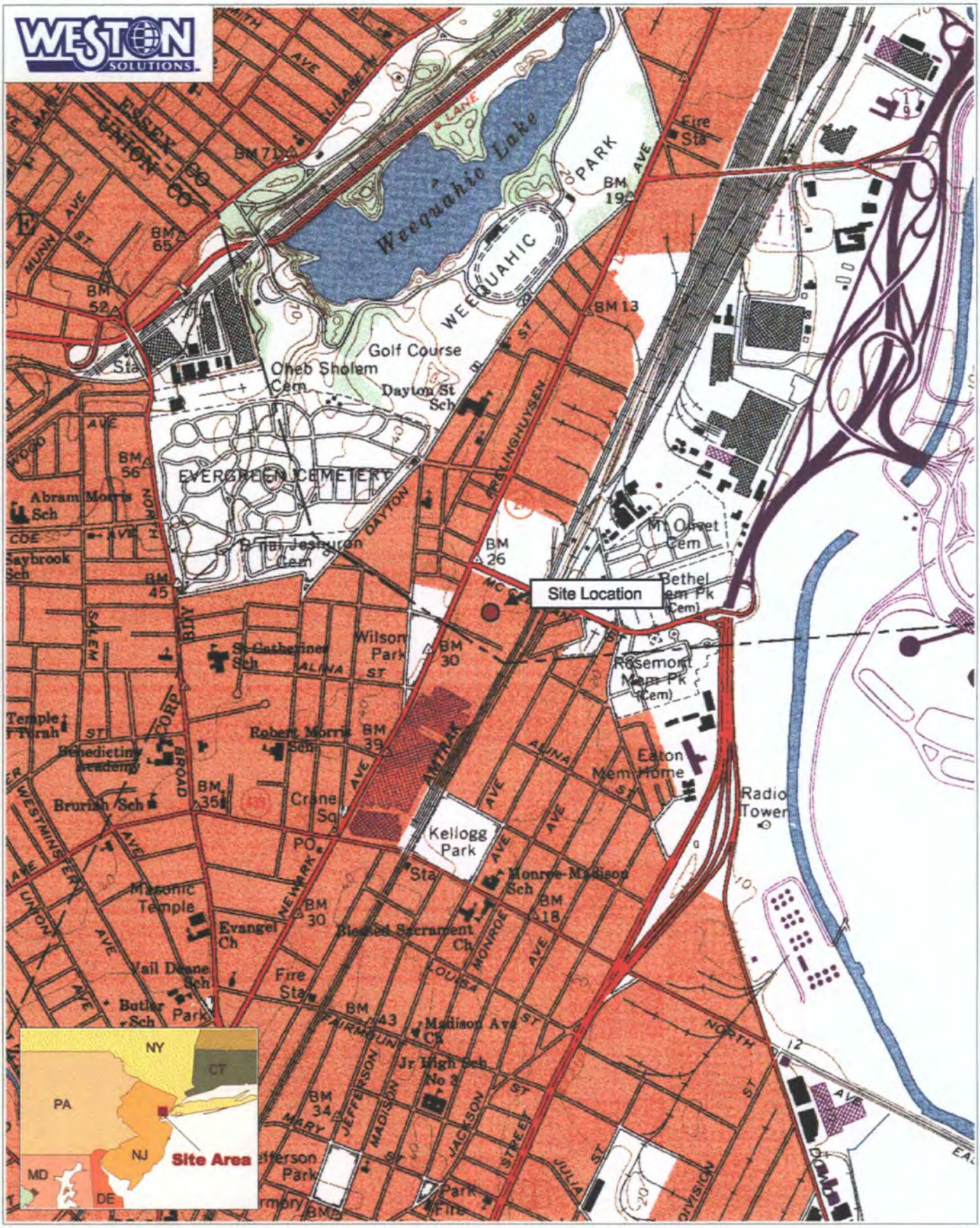
W. Scott Butterfield, CHMM
SAT Program Manager

Date 8/5/03

SITE SUMMARY

The Orbis Products Corporation (Orbis) site (CERCLIS ID No. NJD010910099) is an inactive former aromatic chemical, pharmaceutical, organic intermediate, fragrance, and flavor manufacturing facility located at 55 Virginia Street, Newark, Essex County, New Jersey (Ref. 1; 15, p. 9). The site is situated in an urban, mixed residential, commercial, and industrial area and is identified as Block 3773, Lot Nos. 15, 41, 43, and 53 on City of Newark Tax Maps (Ref. 15, pp. 7, 69; 19, p. 9). The site is bound to the north by the Dry Ice Corporation, McClellan Street, and a commercial area; to the east by railroad property and rail lines and a residential area; to the south by Virginia Street and Magruder Color Company; and to the west by the Magruder Color Company, a junk yard, Frelinghuysen Avenue, and a residential area (Ref. 14, p. 7; 19, pp. 4, 5, 7 through 9). The Orbis site consists of six major structures as well as several smaller secondary buildings formerly used to house offices, laboratories, storage, and manufacturing facilities. Portions of the site are covered with asphalt and concrete foundations of demolished buildings, as well as asphalt and concrete pads formerly used to support aboveground storage tanks (ASTs). The remainder of the site is vegetated with scattered areas of exposed soil. The site is completely fenced; however, sections of the fence are relatively low in height and would likely allow access to trespassers (Ref. 14, pp. 94, 269G; 15, pp. 7 through 9; 19, pp. 7, 8, 13). The nearest residence is located approximately 400 feet east of the site on the east side of the railroad right-of-way (Ref. 19, p. 4). A Site Location Map and a Site Map are presented in Figures 1 and 2, respectively. The City of Newark is the current owner of the property, which was acquired through a foreclosure due to failure to pay taxes (Ref. 15, p. 7).

Orbis began operations at the site in 1922 (Lot No. 15) and acquired surrounding properties in 1943 (additional portions of Lot No. 15), 1946 (Lot Nos. 41 and 53), and 1978 (Lot No. 43) (Ref. 15, pp. 11, 12). Original operations at the site included manufacturing of gums and powdered plant derivatives. In the late 1940s, Orbis became a subsidiary of Norda, Inc. (Ref. 15, p. 9). Manufacturing at the site then consisted mainly of aromatic chemicals, pharmaceuticals, organic intermediates, fragrances, and flavors. The final products were produced through custom blending, distillation, and fractionation of batch-sized quantities of raw materials and intermediates (Ref. 15, p. 9). Available background information indicates that Orbis was also a subsidiary of Adron Corporation (Ref. 6, pp. 18, 356). Operations at the site became limited during 1983 with four employees present at the facility; as of 1995, there were two employees (Ref. 15, p. 9). Operations as of 1995 consisted of the decommissioning of the site and small batch operations. All operations at the facility ceased sometime after 1995 (Ref. 15, pp. 9, 10). Other companies have also operated at portions of the site prior to those portions being acquired by Orbis. REO Chemical Company utilized Building 6 on the northern portion of the property as a warehouse in the 1930s, and R. Conte Casket Manufacturing operated at the site from the 1940s through the 1960s. Derris, Inc., Supreme Art Co. & Kiddie's Gym Corp., and Air Reduction Chemical Manufacturers, Co., have also operated on portions of the site prior to being acquired by Orbis. Nu-Soils Inc., was identified in the Solid Waste Facility Directory as a recycling center located at 55 Virginia Street. The facility was identified as inactive (Ref. 15, pp. 10, 14, 15). A Notice of Lease was signed by Orbis and Solid Waste Transfer and Recycling, Inc., (SWTR) on 27 February 1987, in which Orbis agreed to lease a portion of the site to SWTR for use as a solid waste transfer station and recycling center.



SOURCE: USGS 7.5 Minute Series (Topographic) Quadrangles: Elizabeth, NJ/NY, 1967, photorevised 1981.

DATE: 10/14/02

Scale in Feet

0 500 1000

N W E S

Figure 1
Site Location Map
Orbis Products Corporation
Newark, Essex County, New Jersey

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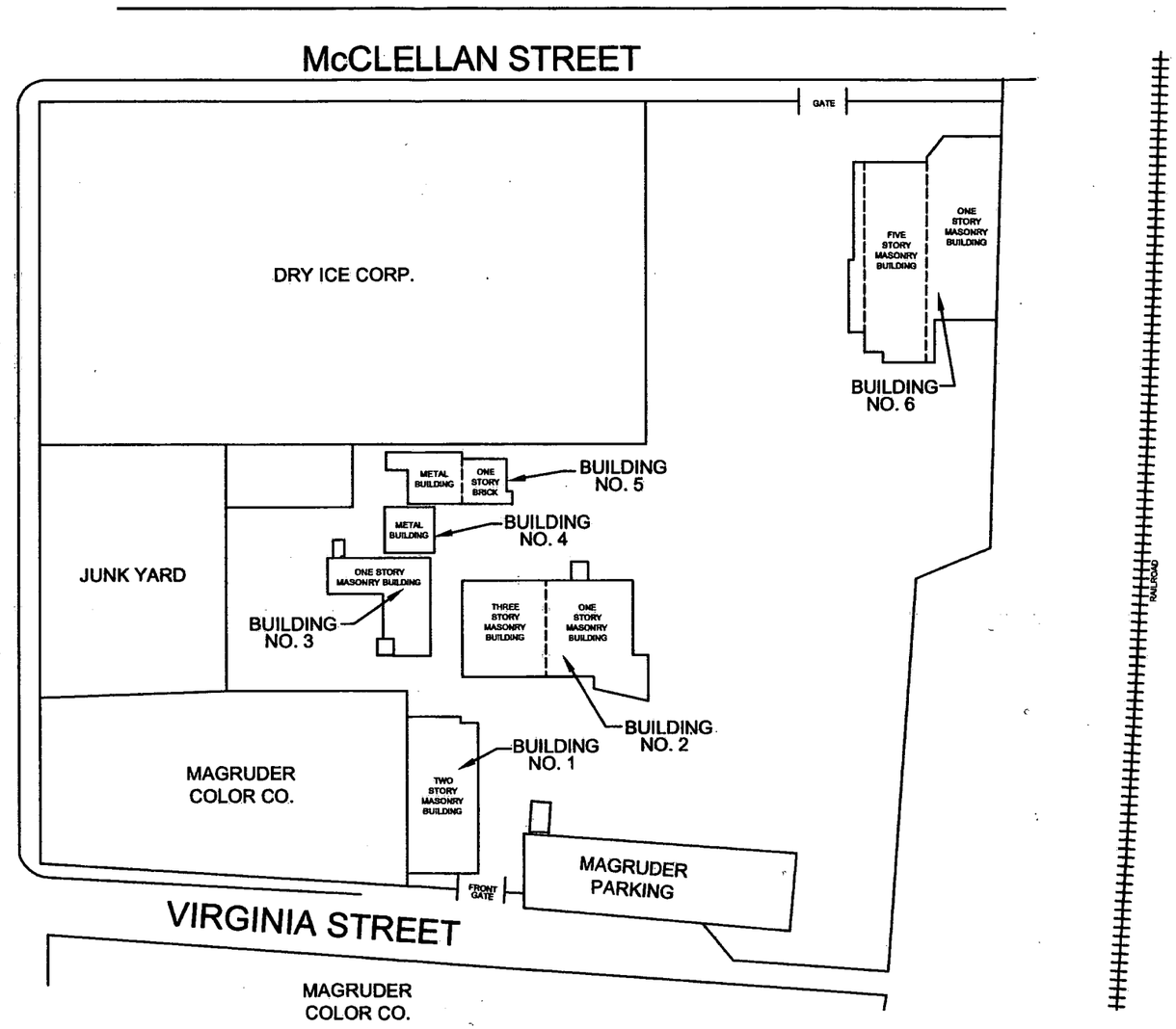

LEGEND:

APPROXIMATE SCALE

60 0 60 120

1 inch = 120 ft.

TITLE: SITE MAP

PROJECT: ORBIS PRODUCTS CORPORATION
NEWARK, ESSEX COUNTY, NEW JERSEY

CLIENT NAME: U.S. EPA

WESTON SOLUTIONS

DATE: NOVEMBER 2002

FIGURE #: 2

00625SiteMap

SITE SUMMARY (continued)

However, it is unknown if SWTR actually conducted waste transfer and recycling activities at the site (Ref. 6, pp. 346, 347).

Throughout the 1980s Orbis was cited several times by the New Jersey Department of Environmental Protection (NJDEP) for waste storage violations including poor housekeeping, failure to submit a Treatment Storage and Disposal (TSD) facility annual report, storage of hazardous waste on site for more than 90 days without a permit, disposing of oil in the site's wastewater treatment plant holding tank, improper labeling of drums, and failure to classify and dispose of approximately 37,000 gallons of sludge in the holding tank (Ref. 6, pp. 50 through 53, 55 through 58, 60, 358; 7). Orbis also received an NJDEP Notice of Violation (NOV) for the following conditions: inadequate contingency plan including no written waste analysis plan; inadequate inspection schedule; inadequate inspection records; no documentation of annual training; failure to keep training records; failure to hold semi-annual drills; inadequate aisle space; no documentation of arrangements with local agencies; failure to request semi-annual fire inspection; incomplete listing in contingency plan; failure to submit contingency plan to local authorities; no closure plan; and failure to date hazardous waste containers (Ref. 10). On 27 August 1985, an Administrative Order was issued by the NJDEP to Orbis concerning a violation of the Solid Waste Management Act (Ref. 8).

A site inspection was conducted by the NJDEP on 26 July 1984 to substantiate the findings of a previous inspection which indicated that a hazardous situation existed on the site. Observations made during the inspection indicated the presence of stained soil, oil-saturated concrete below ASTs, a storm water holding tank containing sludge, drums containing residual liquid, and a dilapidated warehouse containing approximately 1,200 drums stacked three high. Many of the drums were leaking, corroded, and sitting in pools of liquid. Based upon the inspection, the NJDEP made the following recommendations: remove drums and place on pallets; sample, remove, and properly dispose of on-site contaminated soil; remove, label, and properly dispose of drums in the warehouse; install fire control equipment; make respirators and other safety equipment available; install water control measures; and that oil and sludge be removed from the storm water holding tank, analyzed for hazardous characteristics, and properly disposed (Ref. 6, pp. 45 through 48). A follow-up inspection was performed by the NJDEP on 1 August 1984 to determine if any corrective action had been taken since the previous inspection. Observations made during the inspection indicated that some progress had been made toward site cleanup. Ninety percent of the drums that had been placed directly on the ground surface were placed on pallets and rearranged so there could be no water-enhancing chemical reactions; those not on pallets were on plastic. Stained soil had not been removed but covered with sand to absorb the oil. The exterior of the drum storage warehouse had been cleaned, although interior conditions remained the same. Conditions in the holding tank were not addressed. As a result of the inspection, the NJDEP informed Orbis that it would issue an NOV for storing hazardous waste on site without a permit beyond the 90-day limit; disposing of oil in the holding tank, which in turn is burned in the plant's furnace without a permit; and improper labeling of drums (Ref. 6, pp. 50 through 53).

SITE SUMMARY (continued)

A 1989 Preliminary Assessment (PA) report prepared by NUS Corporation under the Region II Field Investigation Team (FIT) contract gave the Orbis site a medium priority for further action recommendation based upon previous waste disposal activities and the results of existing analytical data that indicated soil contamination (Ref. 6).

Envirotactics, Inc., Manasquan, New Jersey was retained by the City of Newark to perform a PA, Site Investigation, Remedial Investigation (RI), and to develop a Remedial Action Work Plan (RAW) at the Orbis site (Ref. 14, 15). Analytical results of surface soil, subsurface soil and groundwater samples collected from on-site monitoring wells and 21 areas of concern (AOCs) identified throughout the site from October 2000 through February 2002 , indicated elevated levels [i.e., above the NJDEP Non-Residential Direct Contact Soil Cleanup Criteria (NRDCSCC), Impact to Groundwater Soil Cleanup Criteria (IGWSCC), and Groundwater Quality Standards (GWQS)] of volatile organic compounds (VOCs) in both the on-site soil and groundwater. VOC compounds detected in on-site soil and groundwater include benzene, toluene, trichloroethylene (TCE), tetrachloroethylene (PCE), chlorobenzene, and carbon tetrachloride. Elevated levels of semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and metals were also detected in on-site soil samples (Ref. 14, pp. 11 through 84, 167 through 269, 269C through 269G; 15, pp. 24 through 63, 71 through 82, 95 through 130, 142 through 4,927). The RAW recommended soil capping at AOCs that did not appear to pose a threat to groundwater. Soil excavation and tank removal were proposed for the remaining AOCs where the concentrations and types of contaminants present (i.e., VOCs) posed a threat to groundwater (Ref. 14, pp. 53 through 73). Soil excavation, disposal of contaminated groundwater, and natural remediation, including the addition of Oxygen Release Compound (ORC) and bacteria to soil excavation areas were proposed as groundwater remediation measures (Ref. 14, pp. 85, 86).

On 20 September 2002, a redevelopment firm known as McClellan Street Urban Renewal signed a Memorandum of Agreement (MOA) with the NJDEP, and submitted an approved RAW to remediate and redevelop the Orbis site for commercial use. According to a McClellan Street Urban Renewal official, remediation at the site is scheduled to begin sometime in early 2004 (Ref. 25; 26).

On 24 October 2002, the Region II Site Assessment Team (SAT) conducted an off-site reconnaissance of the Orbis site. Due to a locked front gate, Region II SAT could not access the interior of the site. Observations made by Region II SAT indicate that the site is inactive. There are no residences, schools, or day care centers within 200 feet of the site boundaries. On-site structures appear to be dilapidated, with a large portion of the windows broken. Observations made by Region II SAT confirm available background information that indicates that there is no overland path to surface water. Runoff from the site is likely to be intercepted by storm drains on adjacent streets. Storm water from this area is treated by the Passaic Valley Sewerage Commission (PVSC) and discharged to Upper New York Bay. Therefore, the likelihood of establishing a site-attributable impact to surface water and associated sensitive environments is low (Ref. 6, p. 362; 11; 19, pp. 4 through 15).

Potential receptors of contamination include approximately 22,508 people who are served by public supply wells (PSWs) located between 3 and 4 miles west of the site. However, the Orbis site is situated within an urban industrial area; other potential sources of contamination are located in the vicinity. Therefore, establishing site-attributable actual contamination of these receptors is unlikely (Ref. 5; 12; 15, pp. 50, 51; 19, p. 9).

SITE ASSESSMENT REPORT: SITE INSPECTION

PART I: SITE INFORMATION

1. Site Name/Alias Orbis Products Corporation

   Street 55 Virginia Street

   City Newark State New Jersey Zip 07114

2. County Essex County Code 13 Cong. Dist. 10

3. CERCLIS ID NO. NJD010910099

4. Block No. 3373 Lot Nos. 15, 41, 43, 53

5. Latitude 40° 41′ 17.3″ N Longitude 74° 12′ 09.5″ W

   USGS Quad(s). Elizabeth, NJ

6. Approximate size of site 6.1 acres

7. Owner City of Newark Telephone No. (973) 733-6566

   Street 920 Broad Street

   City Newark State New Jersey Zip 07102

8. Operator City of Newark Telephone No. (973) 733-6566

   Street 920 Broad Street

   City Newark State New Jersey Zip 07102

9. Type of Ownership

   __ Private __ Federal __ State

   __ County X Municipal __ Unknown __ Other _____

10. Owner/Operator Notification on File

X RCRA 3001 10/09/80 Date __ CERCLA 103c Date _____

__ None __ Unknown

11. Permit Information

Permit	Permit No.	Date Issued	Expiration Date	Comments
PVSC	21401032	Unknown	Unknown	Wastewater treatment
NJPDES*	NJ0021016	Unknown	Unknown	Discharge to the PVSC
NJDEP-Air	C-7507	Unknown	Unknown	Air permit

*New Jersey Pollution Discharge Elimination System

12. Site Status

__ Active X Inactive __ Unknown

13. Years of Operation: 1922 through 1996

14. Identify the types of waste sources (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 Sources

Waste Unit No.	**Waste Source Type**	**Facility Name for Unit**
1	Contaminated Soil	Contaminated Soil
2	Tank/Container	Former Concrete Holding Tank For Wastewater Treatment System (AOC -2)

b) Other Areas of Concern

Envirotactics identified five underground storage tanks (USTs) that are still present on the site. Observations indicate that one is empty and four are filled with water. Two of the USTs were formerly used for the storage of No. 6 Fuel Oil. ASTs have been removed from the site. Remaining AOCs consist of contaminated soil/sediment. Leaking drums and reactor vessels may still be located in on-site buildings.

Ref. 1; 3; 4; 6, p. 3; 14, pp. 53 through 73, 270 through 2,486; 15, pp. 6, 7, 9 through 11, 69; 17.

15. Describe the regulatory history of the site, including the scope and objectives of any previous response actions, investigations and litigation by State, Local and Federal agencies (indicate type, affiliation, date of investigations).
    - **Notification of Hazardous Waste Activity (Acknowledgment)** - Issued by the U.S. Environmental Protection Agency (EPA) to Orbis Products to acknowledge that Orbis filed a Notification of Hazardous Waste Activity to comply with Section 3010 of the Resource Conservation and Recovery Act (RCRA), 9 October 1980 (Ref. 6, pp. 33 through 43).
    - **Notice of Violation** - Issued by the NJDEP to Orbis Products for failure to submit a TSD Facility Annual Report, 7 January 1983 (Ref. 7).
    - **Site Inspection** - Performed by the NJDEP to substantiate the findings of a previous inspection which indicated that a hazardous situation existed on the site. Observations made during the inspection indicated the presence of stained soil, oil-saturated concrete below ASTs, a storm water holding tank containing sludge, drums containing residual liquid, and a dilapidated warehouse containing approximately 1,200 drums stacked three high. Many of the drums were leaking, corroded, and sitting in pools of liquid. Based upon the inspection, the NJDEP made the following recommendations: remove drums and place on pallets; sample, remove, properly dispose of on-site contaminated soil; remove, label and properly dispose of drums in the warehouse; install fire control equipment; make respirators and other safety equipment available; install water control measures; and that oil and sludge be removed from the storm water holding tank, analyzed for hazardous characteristics, and properly disposed, 26 July 1984 (Ref. 6, pp. 45 through 48).
    - **Site Inspection** - Performed by the NJDEP to determine if any corrective action had been taken since the previous inspection. Observations made during the inspection indicated that some progress had been made toward site cleanup. Ninety percent of the drums that had been placed directly on the ground surface were placed on pallets and rearranged so there could be no water-enhancing chemical reactions; those not on pallets were on plastic. Stained soil had not been removed, but covered with sand to absorb the oil. The exterior of the drum storage warehouse had been cleaned, although interior conditions remained the same. Conditions in the holding tank were not addressed. As a result of the inspection the NJDEP informed Orbis that it would issue an NOV for: storing hazardous waste on site without a permit beyond the 90-day limit; disposing of oil in the holding tank, which in turn is burned in the plant's furnace without a permit; and improper labeling of drums, 1 August 1984 (Ref. 6, pp. 50 through 53).
    - **Site Inspection** - Performed by the NJDEP and the Essex County Department of Health. Observations indicated that the entire facility was inoperative and there was some improvement in housekeeping including the tidying of drums and dismantled equipment. The inactive wastewater treatment plant concrete tank contained approximately 37,000 gallons of sludge. Conditions in the warehouse remained the same as observed during previous inspections. The laboratory section was 95 percent closed, with lab packs being prepared. A 6,500-gallon tank wagon was being loaded with waste fuel oil. Drums of raw material and intermediates were properly labeled. As a result of the inspection, the NJDEP indicated it would issue a Notice of Violation for failing to classify and dispose of the sludge in the wastewater tank, 20 August 1984 (Ref. 6, pp. 50, 55 through 58).

- **Notice of Violation** - Issued by the NJDEP to Orbis Products for containment of hazardous waste sludge for more than 90 days, 20 August 1984 (Ref. 6, p. 358).
- **Notice of Violation** - Issued by the NJDEP to Orbis Products for an accumulation of 44 hazardous waste drums for more than 90 days, 9 October 1984 (Ref. 6, p. 60).
- **Administrative Order** - Issued by the NJDEP to Orbis Products concerning a violation of the Solid Waste Management Act (i.e., failure to submit a TSD Annual Report), 27 August 1985 (Ref. 8).
- **Referral to NJDEP Bureau of Compliance and Technical Services** - A memorandum from NJDEP's Bureau of Hazardous Waste Engineering to the Bureau of Compliance and Technical Services requesting the Orbis site be referred to the latter for: unauthorized activity; failure to submit financial assurance for the closure of the facility; and failure to demonstrate financial responsibility for bodily injury and property damage to third parties arising from site operations, 14 October 1986 (Ref. 9).
- **Designated CERCLIS** Hazardous Waste Site by EPA; Site Discovery, March 1989 (Ref. 1, p. 2).
- **Preliminary Assessment** - Performed by NUS Corporation under the Region II FIT contract. Region II FIT issued a medium priority for further action recommendation for the site based upon past waste disposal practices, 30 June 1989 (Ref. 6).
- **Notice of Violation** - Issued by the NJDEP to Orbis Products Company for: no written waste analysis plan; inadequate inspection schedule; inadequate inspection records; no documentation of annual training; failure to keep training records; failure to hold semi-annual drills; inadequate aisle space; no documentation of arrangements with local agencies; failure to request semi-annual fire inspection; incomplete listing in contingency plan; failure to submit contingency plan to local authorities; no closure plan; and failure to date hazardous waste containers, 4 October 1989 (Ref. 10).
- **PA/Site Investigation** - Performed by Envirotactics, Manasquan, New Jersey for the City of Newark to obtain sufficient information regarding site soil and groundwater conditions to select remedial options to be implemented at the site. Sample analytical results indicated VOC, SVOC, and metal contamination of on-site soil and VOC contamination of on-site groundwater, October 2000 through May 2001 (Ref. 15).
- **Remedial Investigation** - Performed by Envirotactics, Manasquan, New Jersey for the City of Newark to obtain sufficient information regarding site soil and groundwater conditions to select remedial options to be implemented at the site. Sample analytical results indicated VOC, SVOC, and metal contamination of on-site soil and VOC contamination of on-site groundwater, June 2001 through February 2002 (Ref. 14).
- **Memorandum of Agreement (MOA)** - On 20 September 2002, a redevelopment firm known as McClellan Street Urban Renewal signed a MOA with the NJDEP, and submitted an approved RAW to remediate and redevelop the Orbis site for commercial use. According to a McClellan Street Urban Renewal official, remediation at the site is scheduled to begin sometime in early 2004 (Ref. 25; 26).

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

Neither the site nor any waste source is subject to Petroleum Exclusion provisions. However, total petroleum hydrocarbons (TPHs) were detected in on-site soils throughout the site. The maximum detected concentration was 30,500 parts per million (ppm) in surface soil sample S-19, collected from AOC-4: Aboveground Storage Tank Area - South of the Wastewater Treatment System (WWT).

Ref. 14, pp. 12 through 34, 208 through 221; 15, pp. 24 through 37, 142 through 161.

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

Based on available background information, the site is not known to have been used for agricultural purposes. Therefore, pesticides regulated under FIFRA are not known to have been applied to the site. However, available background information indicates that insecticides may have been produced at the site. Analytical results of soil samples collected by Envirotactics in October 2000 and April 2001 indicate the presence of alpha-Chlordane, gamma-Chlordane, Dieldrin, 4,4′-DDT, 4-4′-DDD, 4,4′-DDE, Endosulfan I, Endosulfan II, and heptachlor epoxide.

Ref. 15, pp. 8, 13, 135 through 140, 145, 147, 150, 152, 156, 160, 165, 169, 249 through 260, 618 through 623, 1,138 through 1,151, 2,154 through 2,158, 2,664 through 2,669.

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

During operation, Orbis was classified as a Small Quantity Generator (SQG) and a TSD facility under RCRA. However, Orbis determined that TSD status was unnecessary and petitioned the EPA on 16 June 1981 and 8 February 1983 to delist the facility. A response from the EPA was not received. A RCRA Site Closure Plan was prepared for Orbis in January 1988. The plan described the closure of one 10,000-gallon AST that was used to store non-commercial grade fuel and waste solvents. The NJDEP approved the closure plan on 15 September 1988. The site is currently inactive with no hazardous waste generation being conducted. Therefore, neither the site nor any waste source is subject to RCRA Subtitle C.

Ref. 6, pp. 7, 18, 71; 15, pp. 9, 16, 19.

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

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

Ref. 14; 15.

16. Do any conditions exist on site which would warrant immediate or emergency action?

During the off-site reconnaissance conducted by Region II SAT on 24 October 2002, no conditions were noted which would warrant immediate or emergency action.

Ref. 19.

17. Information available from:

Contact Ildefonso Acosta Agency U.S. EPA Telephone No.: (212) 637-4344
Preparer Scott Snyder Agency Region II SAT Date: August 2003

PART II: WASTE SOURCE INFORMATION

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

Waste Unit 1 - Contaminated Soil

Source Type

_____Landfill	X Contaminated Soil
_____Surface Impoundment	_____ Pile
_____Drums	_____ Land Treatment
_____Tanks/Containers	_____Other

Description:

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

   An RI conducted by Envirotactics confirmed the presence of contamination in 21 AOCs previously identified throughout the site. Analytical data of surface and subsurface soil sampling indicated the presence of elevated levels (i.e., above both the NJDEP NRDCSCC and 3 times background concentrations) of VOCs throughout the site. Validated analytical results of soil samples collected during June through August 2001 indicated the presence of the following contaminants at concentrations exceeding the NJDEP NRDCSCC (maximum concentrations): benzene [577,000 D (sample dilution) micrograms per kilogram (µg/kg)] in subsurface soil sample S-124A, collected from AOC-12: 1,000 Gallon UST; toluene (1,660,000 D µg/kg) in subsurface soil sample S-143A, collected from AOC-11: Unidentified Pipe; PCE (357,000 µg/kg) in subsurface soil sample S-87, collected from AOC-17: Aboveground Storage Tank Area North of Building #2; chloroform (121,000 D µg/kg) in subsurface soil sample S-120, collected from AOC-11: Unidentified Pipe; and carbon tetrachloride [7,470 J (estimated) µg/kg] in subsurface soil sample S-71, collected from AOC-5: Diked Tank Area. Other VOCs detected in on-site soil include chlorobenzene, ethylbenzene, TCE, xylene, 1,2-dichlorobenzene, and 1,4-dichlorobenzene. Four surface soil samples (T1 through T4) were collected from AOC-20: Former Transformers. Analyses for PCBs indicated concentrations ranging from 2,310 to 41,000 D µg/kg. VOCs, BNAs, pesticides, and metals were also detected in on-site surface soil samples.

   Envirotactics did not designate a background soil sample; therefore, subsurface soil sample S-106 will be considered the background soil sample for the purposes of this report. Sample S-106 was collected from AOC-15: Former Building #2 Aboveground Storage Tank at a depth of 4 feet below grade. Analytical results of subsurface sample S-106 indicated non-detect values for the above-mentioned VOCs. PCBs were detected at a concentration of 2,030 µg/kg.

Ref. 14, pp. 12 through 34, 198, 200 through 221, 269G through 2,486; 20; 21, pp. 2 through 27.

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

   The Orbis site includes six major structures, as well as several smaller secondary buildings, formerly used to house offices, laboratories, storage, and manufacturing facilities. Portions of the site are covered with asphalt and concrete foundations of demolished buildings, as well as asphalt and concrete pads formerly used to support ASTs. The remainder of the site is vegetated with scattered areas of exposed soil.

   Ref. 14, pp. 94, 269G; 15, pp. 7 through 9; 19, pp. 7, 8.

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

   There is no secondary containment associated with on-site contaminated soil.

   Ref. 14, pp. 270 through 2,486; 19, p. 9; 20.

Hazardous Waste Quantity

The quantity of contaminated soil present at the Orbis site is estimated to be approximately 216,990 square feet (ft^2).

Ref. 14, p. 269G; 15, pp. 8, 9; 20.

Hazardous Substances/Physical State

VOCs (benzene, toluene, PCE, TCE, chloroform, carbon tetrachloride, chlorobenzene, ethylbenzene, xylene, 1,2-dichlorobenzne, and 1,4-dichlorobenzene), pesticides, and PCBs detected in on-site soil were likely deposited in liquid form. The physical state of on-site contaminated soil is solid.

Ref. 14, pp. 269G through 2,486; 20.

PART II: WASTE SOURCE INFORMATION

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

Waste Unit 2 - Former Concrete Holding Tank For Wastewater Treatment System (AOC -2)

Source Type

_____Landfill	_____Contaminated Soil
_____Surface Impoundment	_____ Pile
_____Drums	_____ Land Treatment
X Tanks/Containers	_____Other

Description:

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

   The Former Concrete Holding Tank for the Wastewater Treatment System consists of a concrete neutralization basin located in the northwest corner of the site. The basin is reportedly constructed of concrete and divided into two sections that allowed for neutralization of wastewater prior to discharge to a publically-owned treatment works (POTW). Observations made by Envirotactics indicate that the basin has been bulldozed and covered with soil. An inspection conducted by the NJDEP on 26 June 1984 indicated that the holding tank contained approximately 37,000 gallons of sludge. A test pit advanced into the basin by Envirotactics encountered concrete debris and sludge up to a depth of approximately six feet below ground surface (bgs), at which point a concrete base was encountered. Analyses of a sludge sample collected from the basin at a depth of three feet indicated the presence of polycyclic aromatic hydrocarbons (PAHs) including benzo(a)anthracene (18,000 µg/kg), chrysene (17,000 µg/kg), benzo(b)flouranthene (20,000 µg/kg), benzo(k)flouranthene (11,000 µg/kg), benzo(a)pyrene (15,000 µg/kg), indeno(1,2,3-cd)pyrene (3,800 µg/kg), dibenzo(a,h)anthracene (2,100 µg/kg), as well as, TPH [832 parts per million (ppm)], bis(2-ethylhexyl)phthalate (140,000 µg/kg), and lead [587 milligrams per kilogram (mg/kg)]. Subsequent sampling conducted by Envirotactics confirmed the presence of the above-mentioned compounds; benzene (23,000 µg/kg) and chlorobenzene (4,000 µg/kg) were detected in one subsurface soil sample collected at the perimeter of the basin at a depth of 6 feet.

   Ref. 6, pp. 9, 57; 14, pp. 13, 14; 15, pp. 17, 20 through 22, 25, 26, 231, 233, 262, 2,107.

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

   The Former Concrete Holding Tank for Wastewater Treatment System consists of a concrete neutralization basin located in the northwest corner of the site. The basin, which measures approximately 20 feet by 40 feet by 8 feet deep, is reportedly constructed of concrete and divided into two sections that allowed for neutralization of wastewater prior to discharge to a POTW. The capacity of the holding tank is approximately 40,000 gallons. Observations made by Envirotactics indicate that the basin has been bulldozed and covered with soil. An inspection conducted by the NJDEP on 26 June 1984 indicated that the holding tank contained approximately 37,000 gallons of sludge.

   Ref. 6, pp. 9, 57; 14, pp. 13, 14; 15, pp. 17, 20 through 22, 25, 26.

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

   There is no secondary containment associated with the concrete holding tank.

   Ref. 6, pp. 9, 57; 14, pp. 13, 14; 15, pp. 17, 20 through 22, 25, 26.

Hazardous Waste Quantity

The former concrete holding tank has an estimated capacity of approximately 40,000 gallons. During an inspection conducted by the NJDEP on 26 June 1984, the concrete holding tank was observed to contain approximately 37,000 gallons of sludge. Subsurface sampling conducted by Envirotactics in 2000 and 2001 indicated that sludge was still present in the holding tank at the time of sampling.

Ref. 6, pp. 9, 57; 14, pp. 13, 14; 15, pp. 17, 20 through 22, 25, 26.

Hazardous Substances/Physical State

PAHs (benzo(a)anthracene, chrysene, benzo(b)flouranthene, benzo(k)flouranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenzo(a,h)anthracene), as well as TPH, bis(2-ethylhexyl)phthalate, and lead detected in the holding tank sludge were likely deposited in liquid form. The physical state of the sludge is assumed to be solid.

Ref. 15, p. 26.

PART III. SAMPLING RESULTS

EXISTING ANALYTICAL DATA

August 1987 - Subsurface soil sampling and analyses conducted by Elson T. Killam Associates, Inc., Millburn, New Jersey. It is unknown for whom the sampling was conducted. Four subsurface soil samples were collected from an area where six USTs had been removed without prior approval of the NJDEP Bureau of Hazardous Waste Engineering. The sample locations on site are unknown. Three of the tanks were observed to have holes. A trip blank sample, field blank sample and a Matrix Spike/Matrix Spike Duplicate (MS/MSD) sample were collected for Quality Assurance/Quality Control (QA/QC) purposes. Samples were analyzed for VOCs using EPA Method 624 and petroleum hydrocarbons (PHCs) using EPA Method 418.1 (modified for soil). Analytical results indicated the presence of acetone, benzene, toluene, ethylbenzene, total xylenes, and chlorobenzene at maximum concentrations of 1,900 µg/kg, 9,200 µg/kg, 4,900 µg/kg, 1,200 µg/kg, 2,600 µg/kg, and 220 µg/kg, respectively. PHCs were detected at a maximum concentration of 3,630 milligrams per kilogram (mg/kg) (Ref. 6, pp. 4, 8, 13, 66, 187 through 344).

October 2000 and April 2001 - Surface and subsurface soil sampling conducted by Envirotactics, Manasquan, New Jersey, in association with the PA/Site Investigation conducted for the City of Newark. Soil sampling consisted of the collection of 17 surface (≤2 feet) and 57 subsurface (> 2 feet) samples from 21 AOCs throughout the site, identified during the PA stage of the investigation. Soil sample locations were chosen based on field screening using an Organic Vapor Meter (OVM). QA/QC samples included 6 trip blank samples. Batch MS/MSDs, not necessarily containing source material from the site, were prepared by the laboratories. Samples collected in October 2000 (S-1 through S-8) were analyzed by Accredited Laboratories, Carteret, New Jersey, for VOCs (EPA Method 8260), BNAs (EPA Method 8270), pesticides (EPA Method 3550), PCBs (EPA Method 8080), metals including cyanide (EPA Method 9010), and TPHs (EPA Method 418.1, modified for soil).

Samples collected during April 2001 were analyzed by Integrated Analytical Laboratories, LLC., Randolph, New Jersey, for VOCs (EPA Method 8260B), BNAs (EPA Method 8270C), PCBs (EPA Method 8082), pesticides (EPA Method 8081A), priority pollutant (PP) metals (EPA Method 6020), mercury (EPA Method 7471A), silver (EPA Method 7760A), total cyanide (EPA Method 9012A), phenols (EPA Method 9066), and TPH (EPA Method 418.1, modified for soil).

Sample analytical results indicated that VOCs including benzene, toluene, 1,2-dichlorobenzene, TCE, and PCE are the primary contaminants of concern at the site. PCBs were detected in the surface soil at concentrations ranging from 1,370 µg/kg to 41,000 µg/kg. Summary tables of soil analytical results and a comparison to the NJDEP RDCSCC (Residential Direct Contact Soil Cleanup Criteria), NRDCSCC, and IGWSCC are presented in Reference 15, pages 142 through 162. Soil sample location maps are presented in Reference 15, pages 95 through 107. Data reporting forms and associated laboratory QA/QC documentation are presented in Reference 15, pages 170 through 3,167 (Ref. 15, pp. 24 through 37, 95 through 107, 142 through 162, 170 through 3,167).

EXISTING ANALYTICAL DATA (continued)

October 2000 - Preliminary sampling of temporary monitoring wells (MWs) conducted by Envirotactics in association with the PA/SI conducted for the City of Newark. Seven temporary wells were installed using Geoprobe® direct push technology throughout the site with several well locations biased toward known AOCs. Samples GW-1 through GW-6 were analyzed for VOCs (EPA Method 624), BNAs (EPA Method 625), PCBs (EPA Method 8082), pesticides (EPA Method 8081A), PP metals (EPA Method 200.8), mercury (EPA Method 245.2), total cyanide (EPA Method 335.2), and phenols (EPA Method 420.2) by Integrated Laboratories, LLC., Randolph, New Jersey. Sample GW-7 was analyzed by Accredited Laboratories, Carteret, New Jersey for VOCs (EPA Method 624) and BNAs (EPA Method 625). A trip blank sample was collected for QA/QC purposes. Batch MS/MSDs, not necessarily containing source material from the site, were prepared by the laboratories.

Analytical results indicated elevated levels (i.e., above the NJDEP GWQS) of benzene in samples GW-1 through GW-5 and GW-7 at concentrations ranging from 7.43 micrograms per liter (µg/L) in GW-3 to 9,990 µg/L in sample GW-4. Additional VOCs detected above the NJDEP GWQS include toluene (130,000 µg/L), ethylbenzene (760 µg/L), methylene chloride (780 µg/L), total xylenes (1,400 µg/L), and chlorobenzene (863 µg/L). PCBs were detected in GW-2 at a concentration of 0.253 µg/L. Metals detected above the NJDEP GWQS include arsenic (10.1 µg/L-12.8 µg/L), cadmium (5.18 µg/L), lead (12.1 µg/L and 42.2 µg/L), and nickel (365 µg/L). Elevated levels of metals may be attributed to turbid samples that are inherent during sampling temporary wells installed with a Geoprobe®. Summary tables of temporary well groundwater sampling results are presented in Reference 15, pages 38 through 40, 164, and 165. Temporary well sample location maps are presented in Reference 15, pages 107 through 118. Data reporting forms and associated laboratory QA/QC documentation are presented in Reference 15, pages 4,408 through 4,927 (Ref. 15, pp. 38 through 40, 164, 165, 107 through 118, 4,408 through 4,927).

April 2001 - Groundwater sampling of MWs (MW-1 through MW-8) installed at the site in March 2001 by Wilson Drilling Company, Inc., Phillipsburg, New Jersey. The MWs, with the exception of MW-4, were installed to a depth of 18 to 20 feet with a screening interval of 15 feet. Groundwater encountered in MW-4 was determined to be perched within the foundation of a former AST dike area. Wells were sampled two weeks after development by Envirotactics, subsequent to collecting geochemistry parameters including dissolved oxygen (DO), specific conductance, temperature, and pH. Collection of the groundwater samples was performed using a disposable bailer to minimize turbidity after each well was purged three well volumes. Due to the presence of free product, MW-8 was not purged. Samples were analyzed for VOCs (EPA Method 624), BNAs (EPA Method 625), PCBs (EPA Method 8082), pesticides (EPA Method 8081A), PP metals (EPA Method 200.8), mercury (EPA Method 245.2), total cyanide (EPA Method 335.2), and phenols (EPA Method 420.2) by Integrated Analytical Laboratories, Randolph, New Jersey. QA/QC samples included one field blank sample and one trip blank sample. Batch MS/MSDs, not necessarily containing source material from the site, were prepared by the laboratories.

EXISTING ANALYTICAL DATA (continued)

Sample analytical results indicated the presence of elevated levels (i.e., above the NJDEP GWQSs) of VOCs; maximum concentrations include benzene (340,000 µg/L) in MW-8, toluene (254,000 µg/L) in MW-8, PCE (2,420 µg/L) in MW-5, and chlorobenzene (1,180 µg/L) in MW-3. PCB analyses indicated non-detect values for samples collected from all MWs. Arsenic and nickel were detected at maximum concentrations of 30.5 µg/L and 166 µg/L, respectively. Summary tables of groundwater sampling results are presented in Reference 15, pages 42, 43, 166, and 167. A groundwater sample location map is presented in Reference 14, page 269D. Data reporting forms and associated laboratory QA/QC documentation are presented in Reference 15 pages 3,665 through 4,256 (Ref. 15, pp. 41 through 44, 107 through 118, 166, 167, 3,665 through 4,256).

May 2001 - A second, confirmatory round of groundwater sampling conducted by Envirotactics. Prior to sampling, three well volumes were purged from each well. Collection of the groundwater samples was performed using a disposable bailer in order to minimize turbidity. MW-8 was not purged due to the presence of free product; MW-4 was not sampled because it was monitoring groundwater perched in the foundation of a former AST dike area and was, therefore, not representative of true groundwater conditions at the site. Since MW-4 was not sampled, a temporary well (TW-1) was installed 20 feet north of MW-4 to provide groundwater data for this area. After sampling, the temporary well was removed and the boring backfilled. Samples were analyzed for VOCs (EPA Method 624), BNAs (EPA Method 625), PCBs (EPA Method 8082), pesticides (EPA Method 8081A), PP metals (EPA Method 200.8), mercury (EPA Method 245.2), total cyanide (EPA Method 335.2), and phenols (EPA Method 420.2) by Integrated Analytical Laboratories, LLC., Randolph, New Jersey. QA/QC samples included one field blank sample and one trip blank sample. Batch MS/MSDs, not necessarily containing source material from the site, were prepared by the laboratories.

Sample analytical results indicated elevated levels (i.e., above the NJDEP GWQS) of VOCs; maximum concentrations include benzene (249,000 µg/L) in MW-8, toluene (250,000 µg/L) in MW-8, PCE (2,110 µg/L) in MW-5, 1,1,2-trichloroethane (7.51 µg/L) in MW-7, chlorobenzene (119 D µg/L) in MW-1, chloroform (649 µg/L) in MW-5, and vinyl chloride (558 µg/L) in MW-2. BNAs detected at elevated concentrations include phenol (5,450 D µg/L) and 4-methylphenol (28,300 D µg/L). PCB analyses indicated non-detect values for samples collected from all MWs. Arsenic, lead, and nickel were detected at maximum concentrations of 28.2 µg/L, 13.8 µg/L, and 144 µg/L, respectively. Summary tables of groundwater analytical results are presented in Reference 15, pages 45, 46, 168, and 169. A groundwater sample location map is presented in Reference 14, page 269E. Data reporting forms and associated laboratory QA/QC documentation are presented in Reference 15, pages 3,168 through 3,664 and 4,257 through 4,407 (Ref. 14, p. 269E; 15, pp. 44 through 47, 168, 169, 3,168 through 3,664, 4,257 through 4,407).

June through August 2001 - Surface and subsurface soil sampling conducted by Envirotactics in association with the RI conducted for the City of Newark. Sampling was conducted to obtain sufficient information regarding the site soil conditions to select remedial options to be implemented. Soil sampling consisted of the collection of six surface and 89 subsurface samples in 21 AOCs

EXISTING ANALYTICAL DATA (continued)

previously identified throughout the site. QA/QC samples included three trip blank samples. Batch MS/MSDs, not necessarily containing source material from the site, were prepared by the laboratories. Soil samples were analyzed for VOCs (EPA Method 8260B), BNAs (EPA Method 8270C), pesticides (EPA Method 8081A), phenols (EPA Method 9066), PCBs (EPA Method 8082), PP Metals (EPA Method 6020), silver (EPA Method 7760A), total cyanide (EPA Method 9012A), mercury (EPA Method 7471A), and TPHs (EPA Method 418.1) by Integrated Analytical Laboratories, Randolph, New Jersey. Not all samples were analyzed for all parameters. Analyses were based upon historical information and previous sampling results.

Analytical results indicated elevated levels (i.e., above the NJDEP NRDCSCC) of VOCs throughout the site in the surface and subsurface soil; maximum concentrations include benzene (577,000 µg/kg), toluene (10,800,000 µg/kg), PCE (36,800 µg/kg), and carbon tetrachloride (7,470 µg/kg). Summary tables of soil sample analytical results and a comparison to the NJDEP RDCSCC, NRDCSCC, and IGWSCC are presented in Reference 14, pages 200 through 221. A soil sample location map is presented in Reference 14, page 269G. Data reporting forms and associated laboratory QA/QC documentation are presented in Reference 14, pages 270 through 2,486 (Ref. 14, pp. 12 through 34, 200 through 221, 269G through 2,486; 21, pp. 2 through 27). Analytical data of the above-mentioned soil samples were validated by a Region II data validation specialist (Ref. 21, pp. 2 through 27). A summary of maximum VOC concentrations in soil and a comparison to NJDEP IGWSCCs and EPA Soil Screening Levels (SSLs) are presented in Table 1.

August 2001 - Groundwater sampling conducted by Envirotactics in association with the RI performed for the City of Newark. MWs 1 through 3, 5 through 7, and 9 through 17 were sampled on 1 August 2001. All samples were analyzed for VOCs (EPA Method 624), BNAs (EPA Method 625), PP Metals (EPA Method 200.7), pesticides (EPA Method 8081A), and phenols (EPA Method 420.2). Organic analyses were performed by Integrated Analytical Laboratories, LLC., Randolph, New Jersey. Inorganic analyses were performed by VAL Associates Laboratory, Cherry Hill, NJ. QA/QC samples included one trip blank sample and one field blank sample. Batch MS/MSDs, not necessarily containing source material from the site, were prepared by the laboratories.

Analyses indicated the presence of elevated levels (i.e., above the NJDEP GWQS) of VOCs in all MWs except MW-1 and MW-13; maximum concentrations include benzene (208,000 µg/kg) in MW-16, toluene (37,400 µg/kg) in MW-5, PCE (1,810 µg/kg) in MW-5, TCE (2,970 µg/kg) in MW-14, and chlorobenzene (1,690 µg/kg) in MW-3. Summary tables for groundwater analytical results and a comparison to the NJDEP GWQSs are presented in Reference 14, pages 37, 38, 230 through 233. A MW (i.e., groundwater sample results) location map is presented in Reference 14, page 173. Data reporting forms and associated laboratory QA/QC documentation are presented in Reference 14, pages 2,486A through 3,436 (Ref. 14, pp. 36 through 39, 230 through 233, 2,486A through 3,436).

February 2002 - Groundwater sampling conducted by Envirotactics in association with the RI performed for the City of Newark. MWs 1 through 3, 5 through 7, and 9 through 17 were sampled

EXISTING ANALYTICAL DATA (continued)

on 4 and 5 February 2002. Sample analyses were chosen based upon previous analytical results. Those parameters not detected above the NJDEP GWQS in August 2001 were not included. QA/QC samples included one field blank sample and one trip blank sample. Batch MS/MSDs, not necessarily containing source material from the site, were prepared by the laboratories. All samples were analyzed for VOCs (EPA Method 624); samples collected from MWs 3, 5 through 7, 9 through 12, 16, and 17 were also analyzed for BNAs (EPA Method 625); samples from MWs 1, 5, 7, 11 through 13 were also analyzed for PP Metals (EPA Method 200.7); the sample from MW16 was also analyzed for pesticides (EPA Method 8081A); and samples from MWs 5 and 16 were also analyzed for phenols (EPA Method 420.2). Organic analyses were performed by Integrated Analytical Laboratories, LLC., Randolph, New Jersey. Inorganic analyses were performed by VAL Associates Laboratory, Inc., Cherry Hill, New Jersey.

Sample analytical results indicated elevated levels (i.e., above NJDEP GWQSs) of VOCs in every well except MW-13; maximum concentrations include benzene (298,000 µg/kg) in MW-16, toluene (32,000 µg/kg) in MW-5, PCE (1,370 µg/kg) in MW-5, TCE (1,680 µg/kg) in MW-14, and chlorobenzene (1,040 µg/kg) in MW-3. A summary of analyses is presented in Reference 14, page 40. Summary tables of groundwater analytical results are presented in Reference 14, pages 41, 42, 234 through 237. A MW (i.e., groundwater sample results) location map is presented in Reference 14, page 174. Data reporting forms and associated laboratory QA/QC documentation are presented in Reference 14, pages 3,437 through 4,140 (Ref. 14, pp. 39 through 43, 234 through 237, 3,437 through 4,140; 21, pp. 22 through 35). Analytical data of the above-mentioned groundwater samples were validated by a Region II data validation specialist (Ref. 21, pp. 29 through 35). A summary of maximum VOC concentrations in groundwater and a comparison to NJDEP GWQSs and EPA Maximum Contaminant Levels (MCLs) are presented in Table 2.

In addition to the above-mentioned analyses, samples collected from MWs 1, 3, 5 through 7, and 15 were analyzed for natural attenuation parameters. These parameters included total and dissolved iron; nitrogen, ammonia; nitrogen, nitrate-nitrite; sulfide; sulfate; methane; ethene; ethane; chloride; and total phosphorous. Analytical results indicated that conditions at the site are conducive to natural attenuation of contaminants present at the site (Ref. 14, pp. 43 through 46).

SITE INSPECTION SAMPLING RESULTS

No samples were collected by Region II SAT during the Site Inspection (SI) evaluation of the Orbis site. Based on a review of available background information and analytical data, and the additional Hazard Ranking System (HRS)-relevant information collected during the SI evaluation, it was determined that further sampling was not necessary to characterize the site.

TABLE 1
Maximum VOC Concentrations In Soil - June through August 2001

AOC No.	1	4	7	11	11	12	17	17	17	NJDEP	EPA
Sample ID	S-71	S-129	S-140B	S-120	S-143A	S-124A	S-87	S-84A	S-85	IGWSCC	SSL
Sample Depth (feet)	2.5	4	12.5	7	7	4	12.5	2.5	4.5		*Migration To Groundwater
Volatile Organics											
Benzene						**577 D**				1	0.03
Toluene					**1,660 D**					500	12
Trichloroethylene					**3.67**					1	0.06
Tetrachloroethylene							**357 D**			1	0.06
Chlorobenzene			**50.4**							1	1
Carbon Tetrachloride	**7.47 J**									1	0.07
Ethylbenzene		12.6								100	13
Total Xylenes								130 D		67	210
1,2-Dichlorobenzene				**428 D**						50	17
1,3-Dichlorobenzene				10.7						100	-
1,4-Dichlorobenzene	**45.8**									100	2
1,2-Dichloroethane									**2.04**	1	0.02
Methylene Chloride				**0.488 J**						1	0.02
Chloroform				**121 D**						1	0.6

All concentrations in milligrams per kilogram (mg/kg) = parts per million (ppm)
J - estimated concentration
D - sample transferred from dilution analysis
Bold - concentration exceeds EPA Soil Screening Level (SSL) - Migration to Groundwater 20 DAF (dilution-attenuation factor)
* 20 DAF utilized due to the presence of natural attenuation parameters in subsurface soil
IGWSCC - Impact to Groundwater Soil Cleanup Criteria
Ref. 14, pp. 12 through 34; 200 through 221, 281, 666, 671, 679, 1,963, 1,975, 1,990, 2,375, 2,387; 23.

TABLE 2
Maximum VOC Concentrations In Groundwater - February 2002

Monitoring Well No.	2	3	5	6	10	11	12	14	15 Background	16	17	NJDEP GWQS	EPA MCL
Volatile Organics													
Benzene									ND	**298,000**		1	5
Toluene			**32,000**						ND			1,000	1,000
Trichloroethylene								**1,680**	ND			1	5
Tetrachloroethylene			**1,370**						ND			1	5
Chlorobenzene		1,040							ND			50	-
Carbon Tetrachloride					1.82				ND			2	-
Ethylbenzene				268					ND			700	700
Total Xylenes				241					ND			1,000	10,000
1,2-Dichlorobenzene			**1,100**						ND			600	600
1,3-Dichlorobenzene						1.34			ND			600	-
1,4-Dichlorobenzene							9.26		ND			75	75
1,2-Dichloroethane									ND		**1,110 D**	2	5
Vinyl Chloride	2.91								ND			5	2
Dibromochloromethane									1.57			10	80
Bromodichloromethane									8.17			1	80
1,1-Dichloroethane					0.488				ND			50	-
trans-1,2-Dichloroethene					10.9				ND			100	100
Chloroform			**293**						19.6			6	80

All concentrations in micrograms per liter (µg/L) = parts per billion (ppb)
D - sample transferred from dilution analysis; ND - compound not detected
Bold - concentration exceeds EPA Maximum Contaminant Level (MCL)
GWQS - Groundwater Quality Standard

Ref. 14, pp. 234, 236, 3,447, 3,449, 3,451, 3,453, 3,459, 3,461, 3,463, 3,467, 3,469, 3,471, 3,473; 24.

PART IV: HAZARD ASSESSMENT

GROUNDWATER ROUTE

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

A release to groundwater is observed through chemical analysis. Validated groundwater analytical data of groundwater samples collected by Envirotactics in February 2002 indicate a release of site-attributable VOCs including benzene, toluene, chlorobenzene, TCE, PCE, and 1,2,-dichlorobenzene. Validated analytical data of surface and subsurface soil samples collected by Envirotactics in June through August 2001 indicate the presence of these substances at elevated levels in both the surface and subsurface soils in eight of the AOCs identified as posing a threat to groundwater.

On 4 and 5 February 2002, groundwater samples were collected from on-site MWs 1 through 17. MWs 1 through 16 are all shallow wells screened in the surficial deposits, ranging in depth from 14 to 20 feet below grade; MW17 is a deep well installed into the underlying bedrock to a depth of 40 feet. In accordance with NJDEP regulations, the MWs were surveyed by a licensed surveyor to assist in determining groundwater elevations. Depths to groundwater were measured prior to sampling on 4 February 2002. Based upon groundwater elevation maps generated using this data, MW-15 will be considered the background, upgradient well for the purposes of this report.

Analyses of the sample collected from MW-15 indicate non-detect values for all VOCs except for chloroform (19.6 µg/L), bromodichloromethane (1.57 µg/L), and bromodichloromethane (8.17 µg/L). The Method Detection Limit (MDLs) for the contaminants of concern are as follows: 0.13 µg/L (benzene), 0.22 µg/L (toluene), 0.16 µg/L (chlorobenzene), 0.19 µg/L (TCE), 0.22 µg/L (PCE), and 0.15 µg/L (1,2-dichlorobenzene). These substances were detected in samples collected from downgradient MWs at the following maximum concentrations: 298,000 µg/L of benzene in MW-16; 32,000 µg/L of toluene in MW-5; 1,040 µg/L of chlorobenzene in MW3; 1,680 µg/L of TCE in MW14; 1,370 µg/L of PCE in MW-5, and 1,100 µg/L of 1,2,-dichlorobenzene in MW-5.

Past site activities included the manufacturing of aromatic chemicals and organic intermediates. Orbis was cited by the NJDEP for poor housekeeping and waste storage violations observed during several site inspections. Observations included stained soil; saturated concrete; drums with residual liquids being stored directly on the ground surface; and a warehouse containing approximately 1,200 drums, many were observed to be corroded, leaking, and sitting in pools of liquid. Orbis was also cited for failure to dispose of approximately 37,000 gallons of sludge being stored in the concrete wastewater treatment tank.

Potential receptors of contamination include approximately 22,508 people who are served by PSWs between 3 and 4 miles west of the site. However, the Orbis site is situated within an urban industrial area. Other potential sources of contamination are located in the vicinity. Therefore, establishing site-attributable actual contamination of these receptors is unlikely.

Ref. 5; 6, pp. 45 through 48, 50, 55 through 58; 14, pp. 11 through 36, 39 through 43, 46 through 49, 53 through 78, 80 through 84, 155 through 172, 174, 176, 200 through 221, 234 through 237, 239 through 2,486, 3,437, through 3,472; 15, pp. 7, 9, 51, 53 through 73; 19, p. 9; 21.

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

The overburden in the Newark area is composed of Pleistocene glacial deposits. A buried valley exists under the Newark and Elizabeth area which is filled with 50 to 100 feet of stratified and unstratified glacial drift which is underlain with as much as 200 feet of lacusterine clay and sandy clay. Site-specific geological information obtained from well logs and a deep boring log indicate that surficial deposits at the site are composed of fill material from 0 to 5 feet bgs. The fill material is composed of silts and sands mixed with cinders and ash. Permeability of the fill material ranges from 10^{-4} to 10^{-6} centimeters per second (cm/s). Underlying the fill material is a mixture of brown and reddish brown sands, silts, and clays that occur from a depth of approximately 15 to 20 feet bgs. Below is a layer of fine- to medium-grained sand extending to bedrock, which occurs at a depth of approximately 35 feet. Depth to groundwater at the site ranges from approximately 6.5 to 17.5 feet bgs. Based upon measurements taken during a survey of on-site monitoring wells, groundwater at the site is believed to exhibit a mounding effect near the central portion of the site. Groundwater was shown to be flowing in a northeasterly and southeasterly direction away from the center of the site. The permeability of the glacial deposits ranges from 10^{-4} to 10^{-6} cm/s.

The aquifer of concern in the Newark area is the Passaic Formation (a.k.a. Brunswick Formation) which forms the bedrock. The Passaic formation is described as being composed of shale and sandstone with local occurrences of sandy and pebbly consolidated beds (conglomerate). Groundwater flow is through joints and fractures of the consolidated rock and due to drawdown, is greatest in the direction of the strike of the formation which is to the northeast. The thickness of the Passaic Formation is unknown but is believed to exceed 6,000 feet. The permeability of the bedrock ranges from 10^{-4} to 10^{-6} cm/s. Due to the similarity in permeability and the absence of a confining unit below the site, the surficial deposits and the bedrock will be evaluated together as the aquifer of concern for HRS purposes.

Geologic Unit	Depth (Approximate)	Thickness (Approximate)
Fill Material	0 Feet	5 Feet
Glacial Deposits	5 Feet	35 Feet
Passiac Formation	35 Feet	> 6,000 Feet

Ref. 2, p. 4; 6, pp. 13, 131 through 137; 14, pp. 9, 10, 35, 46 through 48, 175, 176, 239 through 252.

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

The depth from the lowest point of waste disposal/storage to the highest seasonal level of the aquifer of concern is 0 feet. This measurement is based upon site-attributable contamination detected in shallow on-site monitoring wells.

Ref. 14, pp. 11 through 36, 39 through 43, 46 through 49, 53 through 78, 80 through 84, 155 through 172, 174, 176, 200 through 221, 234 through 237, 239 through 2,486, 3,437 through 3,472; 21.

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

The permeability value of the least permeable continuous intervening stratum (i.e., mixture of brown and reddish brown sands, silts, and clays) between the ground surface and the top of the aquifer of concern ranges from 10^{-4} to 10^{-6} cm/s.

Ref. 2, p. 4; 14, pp. 9, 10, 35, 46 through 48, 175, 176, 239 through 252.

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

The net precipitation at the site ranges from 15 to 30 inches.

Ref. 2, pp. 2, 3.

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

Available background information indicates that the nearest well currently used for drinking purposes is a domestic well located approximately 2.38 miles south of the site. The depth of the well is 150 feet.

Ref. 5, p. 32; 12.

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

Approximately 22,508 people are served by PSWs between three and four miles west of the site. However, the Orbis site is situated within an urban industrial area. Other potential sources of contamination are located in the vicinity. Therefore, establishing site-attributable actual contamination of these receptors is unlikely.

Ref. 5; 12; 15, pp. 7, 51; 19, p. 9.

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

Distance	Population
0 - ¼ mile	0
>¼ - ½ mile	0
>½ - 1 mile	0
>1 - 2 miles	0
>2 - 3 miles	8
>3 - 4 miles	22,508

A total of 22,516 persons obtain drinking water from the aquifer of concern within a 4-mile radius of the site.

Ref. 5; 12.

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

Groundwater is blended with other groundwater and surface water prior to distribution.

Ref. 5, p. 29.

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

Designated wellhead protection areas (WHPAs) are located between two and three miles west and southwest of the site.

Ref. 13.

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

A waste source does not overlie a designated or proposed WHPA. A WHPA does not lie within the contaminant boundary of the observed release.

Ref. 13.

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

Available background information indicates that there is no resource use of groundwater within 4 miles of the Orbis site.

Ref. 5, pp. 7 through 22.

SURFACE WATER ROUTE

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

A release of site-attributable contaminants to surface water is not observed or suspected. The nearest downslope surface water bodies are Weequahic Lake and Newark Bay which are located approximately 0.7 mile north and 3 miles east, respectively, of the Orbis site. An overland path to surface water does not exist, as runoff from the site is likely to be intercepted by storm sewer drains located on McClellan Street and Virginia Street. Storm water discharge is to the Upper New York Bay, after secondary treatment by the PVSC. Therefore, the likelihood of establishing a site-attributable impact to surface water and associated sensitive environments is low. No surface water sampling data associated with the Orbis site are known to exist.

Ref. 6, p. 362; 11; 12; 19, pp. 4, 5, 9, 14.

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

An overland path to surface water does not exist, as runoff from the site is likely to be intercepted by storm sewer drains on McClellan Street and Virginia Street; see Question No. 10 for a description of the likelihood of a release.

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

An overland path to surface water does not exist, as runoff from the site is likely to be intercepted by storm sewer drains on McClellan Street and Virginia Street; see Question No. 10 for a description of the likelihood of a release.

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

An overland path to surface water does not exist, as runoff from the site is likely to be intercepted by storm sewer drains on McClellan Street and Virginia Street; see Question No. 10 for a description of the likelihood of a release.

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

An overland path to surface water does not exist, as runoff from the site is likely to be intercepted by storm sewer drains on McClellan Street and Virginia Street; see Question No. 10 for a description of the likelihood of a release.

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

An overland path to surface water does not exist, as runoff from the site is likely to be intercepted by storm sewer drains on McClellan Street and Virginia Street; see Question No. 10 for a description of the likelihood of a release.

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

An overland path to surface water does not exist, as runoff from the site is likely to be intercepted by storm sewer drains on McClellan Street and Virginia Street; see Question No. 10 for a description of the likelihood of a release.

17. Determine the type of floodplain that the site is located within.

An overland path to surface water does not exist, as runoff from the site is likely to be intercepted by storm sewer drains on McClellan Street and Virginia Street; see Question No. 10 for a description of the likelihood of a release.

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

An overland path to surface water does not exist, as runoff from the site is likely to be intercepted by storm sewer drains on McClellan Street and Virginia Street; see Question No. 10 for a description of the likelihood of a release.

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

An overland path to surface water does not exist, as runoff from the site is likely to be intercepted by storm sewer drains on McClellan Street and Virginia Street; see Question No. 10 for a description of the likelihood of a release.

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

An overland path to surface water does not exist, as runoff from the site is likely to be intercepted by storm sewer drains on McClellan Street and Virginia Street; see Question No. 10 for a description of the likelihood of a release.

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

An overland path to surface water does not exist, as runoff from the site is likely to be intercepted by storm sewer drains on McClellan Street and Virginia Street; see Question No. 10 for a description of the likelihood of a release.

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

An overland path to surface water does not exist, as runoff from the site is likely to be intercepted by storm sewer drains on McClellan Street and Virginia Street; see Question No. 10 for a description of the likelihood of a release.

SOIL EXPOSURE PATHWAY

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

There are no residences, schools, or day care centers on or within 200 feet of observed soil contamination. The nearest residence is located approximately 400 feet east of the site.

Ref. 14, pp. 12 through 34, 269G through 2,486; 19, pp. 4 through 6, 9, 12; 20; 21, pp. 2 through 27.

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

The Orbis site is inactive and there are no employees currently on site. Approximately 166 people work on adjacent properties that are within 200 feet of observed soil contamination.

Ref. 14, pp. 12 through 34, 269G through 2,486; 19, pp. 5, 7, 8, 14; 20; 21, pp. 2 through 27.

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

There are no terrestrial sensitive environments on or within 200 feet of observed soil contamination.

Ref. 14, pp. 12 through 34, 269G through 2,486; 19, p. 5; 20; 21, pp. 2 through 27.

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

There are no resource uses of soil on or within 200 feet of observed soil contamination.

Ref. 14, pp. 12 through 34, 269G through 2,486; 19, p. 5; 20; 21, pp. 2 through 27.

AIR PATHWAY

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

A release to air is not observed or suspected for the Orbis site. Air monitoring conducted by Envirotactics during the RI soil sampling event, using an OVM, indicated elevated readings in some soil borings. It is unknown if elevated organic vapor concentrations were detected in the ambient air. Air monitoring conducted along the site boundary by Region II SAT during the 25 October 2002 off-site reconnaissance using a photoionization detector (PID) indicated no readings above background.

On 24 May 1984 the Newark Health Department received a neighborhood complaint of odors emanating from an accumulation of drums in a warehouse. A subsequent inspection conducted by the NJDEP and the Newark Health Department indicated leaking drums and an acidic odor was noted. On 17 November 1986 the NJDEP received a complaint of chemical odors emanating from an on-site building. Upon arrival at the site the NJDEP inspector noted faint aromatic vapors from the street. The Orbis site is currently inactive and waste generation is not currently being conducted. No air sampling analytical data are known to exist with regard to the Orbis site.

Ref. 6, pp. 16, 46, 66; 14, pp. 13, 15, 18, 24, 30; 19, pp. 3, 4, 8.

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

Distance	Population
On-site	0
>0 - ¼ mi	1,117
>¼ - ½ mi	7,414
>½ - 1 mi	15,962
>1 - 2 mi	76,484
>2 - 3 mi	147,931
>3 - 4 mi	173,834

Approximately 422,742 people reside within a 4-mile radius of the Orbis site.

Ref. 22.

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

Distance	Wetlands Acreage	Sensitive Environments
On-site	0	None identified.
0 - ¼ mi	0	None identified.
>¼ - ½ mi	0	None identified.
>½ - 1 mi	2	None identified.
>1 - 2 mi	47	None identified.
>2 - 3 mi	75	None identified.
>3 - 4 mi	296	1 Federally-listed endangered species habitat.*
		3 State-listed threatened species habitats.*
		2 State-listed endangered species habitats.*
		1 Unique Biotic Community.*

There are approximately 420 acres of wetlands within a 4-mile radius of the Orbis ste.

* The exact locations of the above-listed sensitive environments are unknown; therefore, a maximum distance of 3.9 miles will be utilized for the purposes of this report.

Ref. 16; 18, p. 3.

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

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

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

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

ATTACHMENT A

REFERENCES

REFERENCES

1. Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), List-4: Site Alias Location Listing, p. 57; and List-8I: Site/Action Listing, p. 274, U.S. EPA Superfund Program, Region II, 25 April 2000 and 20 July 2000, respectively.

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

3. Congressional District Atlas, 103rd Congress of the United States, Volume 2, U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, February 1993.

4. Snyder, Scott, Region II SAT, Latitude and Longitude Calculation Worksheet, Orbis Products Corporation, based on U.S. EPA Standard Operating Procedure to Determine Site Latitude and Longitude Coordinates, 1 October 2002.

5. Project Note from Scott Snyder, Region II SAT, to Orbis Products File, Subject: Groundwater Population, 3 March 2003; with attachments.

6. Final Draft Preliminary Assessment Report for Orbis Products Corporation, prepared by Region II FIT, 30 June 1989.

7. Letter from David J. Shotwell, NJDEP, to Clifford Kuchenmeister, Orbis Products Corporation, 7 January 1983.

8. Letter from Joseph A. Rogalski, NJDEP, to Clifford Kuchenmeister, Orbis Products Corporation, 27 August 1985; with attachment.

9. NJDEP Memorandum from Ernest J. Kuhlwein, Bureau of Hazardous Waste Engineering, to Karl Delaney, Bureau of Compliance and Technical Services, Subject: Orbis Products Company, 14 October 1986.

10. Notice of Violation from NJDEP, to Orbis Products Company, 4 October 1989.

11. Overview Tour of the Passaic Valley Sewerage Commissioners 330 Million Gallon Per Day Secondary Wastewater Treatment Plant, Newark, New Jersey; accessed from the PVSC Web Site: www.pvsc.com/tour.asp, accessed on 4 October 2002.

12. Four Mile Radius Map for the Orbis Products site, compiled from USGS 7.5-Minute Series (Topographic) Quadrangles for: "Elizabeth, NJ-NY," 1967, photorevised 1981; and "Roselle, NJ," 1967, photorevised 1981.

13. Project Note: From Scott Snyder, Region II SAT, to Orbis Products File, Subject: Wellhead Protection Areas, 7 October 2002; with attachment.

REFERENCES (continued)

14. Remedial Investigation Report (RIR) and Remedial Action Workplan (RAW), Orbis Products Corporation, prepared for the City of Newark, prepared by Envirotactics, Inc., April 2002; with attached analytical data. [Volume Nos. II through V]

15. Preliminary Assessment Report (PAR), Site Investigation Report (SIR), and Remedial Investigation Workplan (RIW), Orbis Products Corporation, prepared for the City of Newark, prepared by Envirotactics, Inc., January 2001; with attached analytical data. [Volume Nos. V through VIII]

16. Project Note: From Scott Snyder, Region II SAT, to Orbis Products File, Subject: Wetland Acreage, 14 October 2002; with attachment.

17. Telecon Note: Conversation between Scott Snyder, Region II SAT, and EJ Horne, Newark Tax Assessment Office, Subject: Tax Assessment Office Address, 17 October 2002.

18. Letter from Herbert A. Lord, NJDEP, to Scott Snyder, Region II SAT, 21 October 2002; with attachments.

19. Region II SAT, Field Logbook No. SAT.061.001, Orbis Products, Off-site Reconnaissance, with attached Photo Documentation, 24 October 2002.

20. Project Note: From Scott Snyder, Region II SAT, to Orbis Products File, Subject: Quantity of Contaminated Soil, 23 October 2002; with attachment.

21. Project Note: From Scott Snyder, Region II SAT, to Orbis Products File, Subject: Soil and Groundwater Data Validation, 30 October 2002; with attachments.

22. Project Note: From Scott Snyder, Region II SAT, to Orbis Products File, Subject: Population Within 4 Miles, 7 March 2003; with attachments.

23. Soil Screening Guidance: Technical Background Document, U.S. EPA, Document No. EPA/540/R95/128, May 1996.

24. Drinking Water Standards and Health Advisories, U.S. EPA, Office of Water, Document No. EPA 822-B-00-001, Summer 2000; with attachment.

25. Telecon Note: Conversation between Scott Snyder, Region II SAT, and Dave Oster, NJDEP, Subject: Status of the Orbis site, 8 September 2003.

26. Telecon Note: Conversation between Scott Snyder, Region II SAT, and John Zidziunas, McClellan Street Urban Renewal, Subject: Status of the Orbis site, 8 September 2003.

REFERENCE 1

List-4 Site Alias Location Listing

State: NJ

Site Name EPA ID	Alias Name/ID Alias Street Alias City/ County Name	Alias ID	County Code	Zip Code	Federal Facility Flag	Cong. Dist.
OAKITE PRODUCTS INC. NJD002458776	OAKITE PRODUCTS INC. MIDDLESEX MIDDLESEX	101	023		N	06
OCCIDENTAL CHEMICALS & PLA NJD043973122	HOOKER CHEMICAL BURLINGTON	101	005		N	04
	HOOKER CHEMICALS & PLASTIC BURLINGTON	301				
OCEAN CITY COAL GAS SITE NJD982187411	JCPL - FORMER GAS PLANT CAPE MAY	101	009		N	02
OCEAN COUNTY MOSQUITO CO NJD070414081	OCEAN CITY MOSQUITO COMMI OCEAN	101	029		N	02
OCEAN LANDFILL CORP NJD980771810	MANCHESTER LF RTE 571 MANCHESTER TW OCEAN	101	029	08733	N	02
O-I BROCKWAY GLASS, INC NJD002194314	OWENS -BROCKWAY GLASS CO MONMOUTH MONMOUTH	101	025		N	03
[illegible] RECOVERY CO INC NJD000560094	OIL RECOVERY CO INC GLOUCESTER GLOUCESTER	101	015		N	01
OKONITE CO NJD002152205	OKONITE CABLE CO (NJD980770 RTE 1 NORTH BRUNSWI MIDDLESEX	201	023	08902	N	06
	OKONITE CABLE CO (NJD980770 MIDDLESEX	202			N	06
	THE OKONITE CO PLANT #3(NJD 1600 US RTE 1 NORTH BRUNSWI MIDDLESEX	101		08902	N	06
OLD GAF ASBESTOS NJD986607646	GAF CORP (NJD980207930) SOMERSET	101	035		N	07
→ ORBIS PRODUCTS CORPORATI NJD010910099	ORBIS PRODUCTS CORPORATIO ESSEX ESSEX	101	013		N	10
OWENS ILLINOIS INC.-LILY DIVIS NJD002164176	OWENS ILLINOIS INC.-LILY DIVISI MONMOUTH MONMOUTH	101	025		N	13
OWENS-CORNING FIBERGLASS NJD980532972	OWENS-CORNING FIBERGLAS C SOMERDALE RD CHEWS LANDING CAMDEN	101	007	08012	N	01
[illegible]ENS-CORNING FIBERGLASS NJD002350015	OWENS-CORNING FIBERGLASS CAMDEN	101	007		N	01

EPA ID	Site Name Address City County Name	Zip Code	Cong Dist	NFRAP Flag	Oprble Unit	Action Type	Action Lead	Action Qualif	Actual Start Date	Actual Compl Date
NJD980530919	OLDMANS TWP SANITARY LF WOODSTOWN - PEDRICKTOWN RO PEDRICKTOWN SALEM	08067 03	02							
					00	DS 001	F			06/01/81
						PA 001	S	L	09/01/84	09/01/84
						SH 001	F	H	02/02/95	01/22/96
						SI 001	F	H	04/01/90	04/01/90
NJD043622562	OMNI CHEMICAL CORPORATION MEADOW RD & RUTHERFORD AVE LYNDHURST BERGEN	07071 00	09	NFA						
					00	DS 001	S			04/10/84
						PA 001	F	L		11/01/84
						SI 001	F	N	08/01/85	09/01/85
NJD010910099	ORBIS PRODUCTS CORPORATION 55 VIRGINIA ST. NEWARK ESSEX	07114 01	10							
					00	DS 001	F			03/13/89
						PA 001	F	D	03/31/89	06/30/89
NJD980505606	OVERPECK PARK LF FORT LEE RD RIDGEFIELD PA BERGEN	07660 00	07	NFA						
					00	DS 001	F			10/01/78
						PA 001	F	L		11/01/83
						SH 001	F	N		09/30/95
						SI 001	F	N	01/01/89	03/17/89
NJD002164176	OWENS ILLINOIS INC.-LILY DI ROUTE 35 & LAUREL AVENUE HOLMDEL MONMOUTH	07733 02	13	NFA						
					00	DS 001	F			06/28/89
						PA 001	F	N		12/31/89

REFERENCE 2

federal register

Friday
December 14, 1990

Part II

Environmental Protection Agency

40 CFR Part 300
Hazard Ranking System; Final Rule

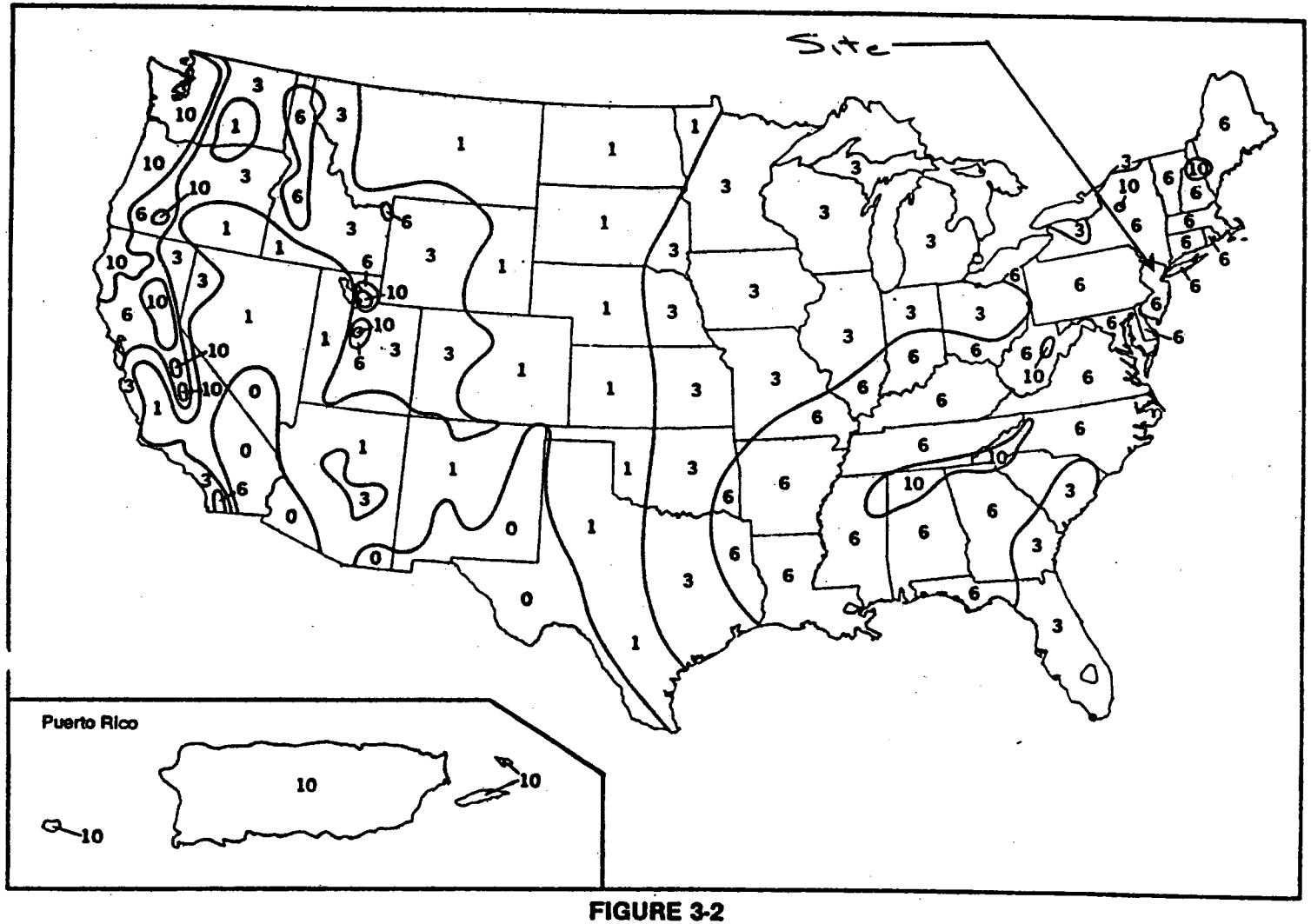

FIGURE 3-2
NET PRECIPITATION FACTOR VALUES

–When measured monthly evapotranspiration is not available, calculate monthly potential evapotranspiration (E_i) as follows:

$E_i = 0.6\, F_i\, (10\, T_i/I)^a$

where:

E_i = Monthly potential evapotranspiration (inches) for month i.

F_i = Monthly latitude adjusting value for month i.

T_i = Mean monthly temperature (°C) for month i.

$$I = \sum_{i=1}^{12} (T_i/5)^{1.514}$$

$$a = 6.75\times10^{-7} I^3 - 7.71\times10^{-5} I^2 + 1.79\times10^{-2} I + 0.49239$$

Select the latitude adjusting value for each month from Table 3–3. For latitudes lower than 50° North or 20° South, determine the monthly latitude adjusting value by interpolation.

• Calculate monthly net precipitation by subtracting monthly evapotranspiration (or monthly potential evapotranspiration) from monthly precipitation. If evapotranspiration (or potential evapotranspiration) exceeds precipitation for a month, assign that month a net precipitation value of 0.

• Calculate the annual net precipitation by summing the monthly net precipitation values.

• Based on the annual net precipitation, assign a net precipitation factor value from Table 3–4.

Enter the value assigned from Figure 3–2 or from Table 3–4, as appropriate, in Table 3–1.

TABLE 3–3.—MONTHLY LATITUDE ADJUSTING VALUES[a]

Latitude[b] (degrees)	Month											
	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
≥50 N	0.74	0.78	1.02	1.15	1.33	1.36	1.37	1.25	1.06	0.92	0.76	0.70
45 N	0.80	0.81	1.02	1.13	1.28	1.29	1.31	1.21	1.04	0.94	0.79	0.75
40 N	0.84	0.83	1.03	1.11	1.24	1.25	1.27	1.18	1.04	0.96	0.83	0.81
35 N	0.87	0.85	1.03	1.09	1.21	1.21	1.23	1.16	1.03	0.97	0.89	0.85
30 N	0.90	0.87	1.03	1.08	1.18	1.17	1.20	1.14	1.03	0.98	0.89	0.88
20 N	0.95	0.90	1.03	1.05	1.13	1.11	1.14	1.11	1.02	1.00	0.93	0.94
10 N	1.00	0.91	1.03	1.03	1.08	1.06	1.08	1.07	1.02	1.02	0.98	0.99
0	1.04	0.94	1.04	1.01	1.04	1.01	1.04	1.04	1.01	1.04	1.01	1.04
10 S	1.06	0.97	1.05	0.99	1.00	0.96	1.00	1.02	1.00	1.06	1.05	1.09
20 S	1.14	0.99	1.05	0.97	0.96	0.91	0.95	0.99	1.00	1.08	1.09	1.15

[a] Do not round to nearest integer.
[b] For unlisted latitudes lower than 50° North or 20° South, determine the latitude adjusting value by interpolation.

TABLE 3–4.—NET PRECIPITATION FACTOR VALUES

Net precipitation (inches)	Assigned value
0	0
Greater than 0 to 5	1
Greater than 5 to 15	3
Greater than 15 to 30	6
Greater than 30	10

3.1.2.3 *Depth to aquifer.* Evaluate depth to aquifer by determining the depth from the lowest known point of hazardous substances at a site to the top of the aquifer being evaluated, considering all layers in that interval. Measure the depth to an aquifer as the distance from the surface to the top of the aquifer minus the distance from the surface to the lowest known point of hazardous substances eligible to be evaluated for that aquifer. In evaluating depth to aquifer in karst terrain, assign a thickness of 0 feet to a karst aquifer that underlies any portion of the sources at the site. Based on the calculated depth, assign a value from Table 3–5 to the depth to aquifer factor.

Determine the depth to aquifer only at locations within 2 miles of the sources at the site, except: if observed ground water contamination attributable to sources at the site extends more than 2 miles beyond these sources, use any location within the limits of this observed ground water contamination when evaluating the depth to aquifer factor for any aquifer that does not have an observed release. If the necessary geologic information is available at multiple locations, calculate the depth to aquifer at each location. Use the location having the smallest depth to assign the factor value. Enter this value in Table 3–1.

TABLE 3–5.—DEPTH TO AQUIFER FACTOR VALUES

Depth to aquifer[a] (feet)	Assigned value
Less than or equal to 25	5
Greater than 25 to 250	3
Greater than 250	1

[a] Use depth of all layers between the hazardous substances and aquifer. Assign a thickness of 0 feet to any karst aquifer that underlies any portion of the sources at the site.

3.1.2.4 *Travel time.* Evaluate the travel time factor based on the geologic materials in the interval between the lowest known point of hazardous substances at the site and the top of the aquifer being evaluated. Assign a value to the travel time factor as follows:

• If the depth to aquifer (see section 3.1.2.3) is 10 feet or less, assign a value of 35.

• If, for the interval being evaluated, all layers that underlie a portion of the sources at the site are karst, assign a value of 35.

• Otherwise:

–Select the lowest hydraulic conductivity layer(s) from within the above interval. Consider only layers at least 3 feet thick. However, do not consider layers or portions of layers within the first 10 feet of the depth to the aquifer.

–Determine hydraulic conductivities for individual layers from Table 3–6 or from in-situ or laboratory tests. Use representative, measured, hydraulic conductivity values whenever available.

–If more than one layer has the same lowest hydraulic conductivity, include all such layers and sum their thicknesses. Assign a thickness of 0 feet to a karst layer that underlies any portion of the sources at the site.

–Assign a value from Table 3–7 to the travel time factor, based on the thickness and hydraulic conductivity of the lowest hydraulic conductivity layer(s).

TABLE 3-6.—HYDRAULIC CONDUCTIVITY OF GEOLOGIC MATERIALS

Type of material	Assigned hydraulic conductivity [a] (cm/sec)
Clay; low permeability till (compact unfractured till); shale; unfractured metamorphic and igneous rocks	10^{-8} 10^{-8}
Silt; loesses; silty clays; sediments that are predominantly silts; moderately permeable till (fine-grained, unconsolidated till, or compact till with some fractures); low permeability limestones and dolomites (no karst); low permeability sandstone; low permeability fractured igneous and metamorphic rocks	10^{-6} 10^{-6}
Sands; sandy silts; sediments that are predominantly sand; highly permeable till (coarse-grained, unconsolidated or compact and highly fractured); peat; moderately permeable limestones and dolomites (no karst); moderately permeable sandstone; moderately permeable fractured igneous and metamorphic rocks	10^{-4} 10^{-4}
Gravel; clean sand; highly permeable fractured igneous and metamorphic rocks; permeable basalt; karst limestones and dolomites	10^{-2} 10^{-2}

[a] Do not round to nearest integer.

TABLE 3-7.—TRAVEL TIME FACTOR VALUES [a]

Hydraulic conductivity (cm/sec)	Thickness of lowest hydraulic conductivity layer(s)[b] (feet)			
	Greater than 3 to 5	Greater than 5 to 100	Greater than 100 to 500	Greater than 500
Greater than or equal to 10^{-3} 10^{-3}	35	35	35	25
Less than 10^{-3} to 10^{-5} $10^{-3} \to 10^{-5}$	35	25	15	15
Less than 10^{-5} to 10^{-7} 10^{-5} to 10^{-7}	15	15	5	5
Less than 10^{-7} 10^{-7}	5	5	1	1

[a] If depth to aquifer is 10 feet or less or if, for the interval being evaluated, all layers that underlie a portion of the sources at the site are karst, assign a value of 35.

[b] Consider only layers at least 3 feet thick. Do not consider layers or portions of layers within the first 10 feet of the depth to the aquifer.

Determine travel time only at locations within 2 miles of the sources at the site, except: if observed ground water contamination attributable to sources at the site extends more than 2 miles beyond these sources, use any location within the limits of this observed ground water contamination when evaluating the travel time factor for any aquifer that does not have an observed release. If the necessary subsurface geologic information is available at multiple locations, evaluate the travel time factor at each location. Use the location having the highest travel time factor value to assign the factor value for the aquifer. Enter this value in Table 3-1.

3.1.2.5 *Calculation of potential to release factor value.* Sum the factor values for net precipitation, depth to aquifer, and travel time, and multiply this sum by the factor value for containment. Assign this product as the potential to release factor value for the aquifer. Enter this value in Table 3-1.

3.1.3 *Calculation of likelihood of release factor category value.* If an observed release is established for an aquifer, assign the observed release factor value of 550 as the likelihood of release factor category value for that aquifer. Otherwise, assign the potential to release factor value for that aquifer as the likelihood of release value. Enter the value assigned in Table 3-1.

3.2 *Waste characteristics.* Evaluate the waste characteristics factor category for an aquifer based on two factors: toxicity/mobility and hazardous waste quantity. Evaluate only those hazardous substances available to migrate from the sources at the site to ground water. Such hazardous substances include:

- Hazardous substances that meet the criteria for an observed release to ground water.
- All hazardous substances associated with a source that has a ground water containment factor value greater than 0 (see sections 2.2.2, 2.2.3, and 3.1.2.1).

3.2.1 *Toxicity/mobility.* For each hazardous substance, assign a toxicity factor value, a mobility factor value, and a combined toxicity/mobility factor value as specified in the following sections. Select the toxicity/mobility factor value for the aquifer being evaluated as specified in section 3.2.1.3.

3.2.1.1 *Toxicity.* Assign a toxicity factor value to each hazardous substance as specified in Section 2.4.1.1.

3.2.1.2 *Mobility.* Assign a mobility factor value to each hazardous substance for the aquifer being evaluated as follows:

- For any hazardous substance that meets the criteria for an observed release by chemical analysis to one or more aquifers underlying the sources at the site, regardless of the aquifer being evaluated, assign a mobility factor value of 1.
- For any hazardous substance that does not meet the criteria for an observed release by chemical analysis to at least one of the aquifers, assign that hazardous substance a mobility factor value from Table 3-8 for the aquifer being evaluated, based on its water solubility and distribution coefficient (K_d).
- If the hazardous substance cannot be assigned a mobility factor value because data on its water solubility or distribution coefficient are not available, use other hazardous substances for which information is available in evaluating the pathway.

TABLE 3-8.—GROUND WATER MOBILITY FACTOR VALUES [a]

Water solubility (mg/l)	Distribution coefficient (K_d) (ml/g)			
	Karst [c]	≤ 10	> 10 to 1,000	> 1,000
Present as liquid [b]	1	1	0.01	0.0001
Greater than 100	1	1	0.01	0.0001
Greater than 1 to 100	0.2	0.2	0.002	2×10^{-5}
Greater than 0.01 to 1	0.002	0.002	2×10^{-6}	2×10^{-7}
Less than or equal to 0.01	2×10^{-5}	2×10^{-6}	2×10^{-7}	2×10^{-8}

[a] Do not round to nearest integer.
[b] Use if the hazardous substance is present or deposited as a liquid.
[c] Use if the entire interval from the source to the aquifer being evaluated is karst.

Drainage area. Determine the drainage area for the sources at the site. Include in this drainage area both the source areas and the area upgradient of the sources, but exclude any portion of this drainage area for which runoff is diverted from entering the sources by storm sewers or run-on control and/or runoff management systems. Assign a drainage area value for the watershed from Table 4–3.

Soil group. Based on the predominant soil group within the drainage area described above, assign a soil group designation for the watershed from Table 4–4 as follows:

• Select the predominant soil group as that type which comprises the largest total area within the applicable drainage area.

• If a predominant soil group cannot be delineated, select that soil group in the drainage area that yields the highest value for the runoff factor.

Calculation of runoff factor value. Assign a combined rainfall/runoff value for the watershed from Table 4–5, based on the 2-year, 24-hour rainfall and the soil group designation. Determine the runoff factor value for the watershed from Table 4–6, based on the rainfall/runoff and drainage area values. Enter the runoff factor value in Table 4–1.

TABLE 4–3.—DRAINAGE AREA VALUES

Drainage area (acres)	Assigned value
Less than 50	1
50 to 250	2
Greater than 250 to 1,000	3
Greater than 1,000	4

TABLE 4–4.—SOIL GROUP DESIGNATIONS

Surface soil description	Soil group designation
Coarse-textured soils with high infiltration rates (for example, sands, loamy sands).	A
Medium-textured soils with moderate infiltration rates (for example, sandy loams, loams).	B
Moderately fine-textured soils with low infiltration rates (for example, silty loams, silts, sandy clay loams).	C
Fine-textured soils with very low infiltration rates (for example, clays, sandy clays, silty clay loams, clay loams, silty clays); or impermeable surfaces (for example, pavement).	D

TABLE 4–5.—RAINFALL/RUNOFF VALUES

2-Year, 24-hour rainfall (inches)	Soil group designation			
	A	B	C	D
Less than 1.0	0	0	2	3
1.0 to less than 1.5	0	1	2	3
1.5 to less than 2.0	0	2	3	4
2.0 to less than 2.5	1	2	3	4
2.5 to less than 3.0	2	3	4	4
3.0 to less than 3.5	2	3	4	5
3.5 or greater	3	4	5	6

TABLE 4–6.—RUNOFF FACTOR VALUES

Drainage area value	Rainfall/runoff value						
	0	1	2	3	4	5	6
1	0	0	0	1	1	1	1
2	0	0	1	1	2	3	4
3	0	0	1	3	7	11	15
4	0	1	2	7	17	25	25

4.1.2.1.2.1.3 *Distance to surface water.* Evaluate the distance to surface water as the shortest distance, along the overland segment, from any source with a surface water containment factor value greater than 0 to either the mean high water level for tidal waters or the mean water level for other surface waters. Based on this distance, assign a value from Table 4–7 to the distance to surface water factor for the watershed. Enter this value in Table 4–1.

4.1.2.1.2.1.4 *Calculation of factor value for potential to release by overland flow.* Sum the factor values for runoff and distance to surface water for the watershed and multiply this sum by the factor value for containment. Assign the resulting product as the factor value for potential to release by overland flow for the watershed. Enter this value in Table 4–1.

4.1.2.1.2.2 *Potential to release by flood.* Evaluate potential to release by flood for each watershed as the product of two factors: containment (flood) and flood frequency. Evaluate potential to release by flood separately for each source that is within the watershed. Furthermore, for each source, evaluate potential to release by flood separately for each category of floodplain in which the source lies. (See section 4.1.2.1.2.2.2 for the applicable floodplain categories.) Calculate the value for the potential to release by flood factor as specified in 4.1.2.1.2.2.3.

4.1.2.1.2.2.1 *Containment (flood).* For each source within the watershed, separately evaluate the containment (flood) factor for each category of floodplain in which the source is partially or wholly located. Assign a containment (flood) factor value from Table 4–8 to each floodplain category applicable to that source. Assign a containment (flood) factor value of 0 to each floodplain category in which the source does not lie.

4.1.2.1.2.2.2 *Flood frequency.* For each source within the watershed, separately evaluate the flood frequency factor for each category of floodplain in which the source is partially or wholly located. Assign a flood frequency factor value from Table 4–9 to each floodplain category in which the source is located.

4.1.2.1.2.2.3 *Calculation of factor value for potential to release by flood.* For each source within the watershed and for each category of floodplain in which the source is partially or wholly located, calculate a separate potential to release by flood factor value. Calculate this value as the product of the containment (flood) value and the flood frequency value applicable to the source for the floodplain category. Select the highest value calculated for those sources that meet the minimum size requirement specified in section 4.1.2.1.2.1.1 and assign it as the value for the potential to release by flood factor for the watershed. However, if, for this watershed, no source at the site meets the minimum size requirement, select the highest value calculated for the sources at the site eligible to be evaluated for this watershed and assign it as the value for this factor.

TABLE 4–7.—DISTANCE TO SURFACE WATER FACTOR VALUES

Distance	Assigned value
Less than 100 feet	25
100 feet to 500 feet	20
Greater than 500 feet to 1,000 feet	16
Greater than 1,000 feet to 2,500 feet	9
Greater than 2,500 feet to 1.5 miles	6
Greater than 1.5 miles to 2 miles	3

TABLE 4–8.—CONTAINMENT (FLOOD) FACTOR VALUES

Containment criteria	Assigned value
Documentation that containment at the source is designed, constructed, operated, and maintained to prevent a washout of hazardous substances by the flood being evaluated.	0
Other	10

TABLE 4–9.—FLOOD FREQUENCY FACTOR VALUES

Floodplain category	Assigned value
Source floods annually	50
Source in 10-year floodplain	50
Source in 100-year floodplain	25
Source in 500-year floodplain	7
None of above	0

Enter this highest potential to release by flood factor value for the watershed in Table 4–1, as well as the values for containment (flood) and flood frequency that yield this highest value.

4.1.2.1.2.3 *Calculation of potential to release factor value.* Sum the factor values assigned to the watershed for potential to release by overland flow and potential to release by flood. Assign this sum as the potential to release factor value for the watershed, subject to a maximum value of 500. Enter this value in Table 4–1.

4.1.2.1.3 *Calculation of drinking water threat-likelihood of release factor category value.* If an observed release is established for the watershed, assign the observed release factor value of 550 as the likelihood of release factor category value for that watershed. Otherwise, assign the potential to release factor value for that watershed as the likelihood of release factor category value for that watershed. Enter the value assigned in Table 4–1.

4.1.2.2 *Drinking water threat-waste characteristics.* Evaluate the waste characteristics factor category for each

the hazardous substance with the highest toxicity/persistence factor value for the watershed to assign the toxicity/persistence factor value for the drinking water threat for the watershed. Enter this value in Table 4–1.

4.1.2.2.2 *Hazardous waste quantity.* Assign a hazardous waste quantity factor value for the watershed as specified in section 2.4.2. Enter this value in Table 4–1.

4.1.2.2.3 *Calculation of drinking water threat-waste characteristics factor category value.* Multiply the toxicity/persistence and hazardous waste quantity factor values for the watershed, subject to a maximum product of 1×10^8. Based on this product, assign a value from Table 2–7 (section 2.4.3.1) to the drinking water threat-waste characteristics factor category for the watershed. Enter this value in Table 4–1.

TABLE 4–12.—TOXICITY/PERSISTENCE FACTOR VALUES [a]

Persistence factor value	Toxicity factor value					
	10,000	1,000	100	10	1	0
1.0	10,000	1,000	100	10	1	0
0.4	4,000	400	40	4	0.4	0
0.07	700	70	7	0.7	0.07	0
0.0007	7	0.7	0.07	0.007	0.0007	0

[a] Do not round to nearest integer.

4.1.2.3 *Drinking water threat-targets.* Evaluate the targets factor category for each watershed based on three factors: nearest intake, population, and resources.

To evaluate the nearest intake and population factors, determine whether the target surface water intakes are subject to actual or potential contamination as specified in section 4.1.1.2. Use either an observed release based on direct observation at the intake or the exposure concentrations from samples (or comparable samples) taken at or beyond the intake to make this determination (see section 4.1.2.1.1). The exposure concentrations for a sample (that is, surface water, benthic, or sediment sample) consist of the concentrations of those hazardous substances present that are significantly above background levels and attributable at least in part to the site (that is, those hazardous substance concentrations that meet the criteria for an observed release).

When an intake is subject to actual contamination, evaluate it using Level I concentrations or Level II concentrations. If the actual contamination is based on an observed release by direct observation, use Level II concentrations for that intake. However, if the actual contamination is based on an observed release from samples, determine which level applies for the intake by comparing the exposure concentrations from samples (or comparable samples) to health-based benchmarks as specified in sections 2.5.1 and 2.5.2. Use the health-based benchmarks from Table 3–10 (section 3.3.1) in determining the level of contamination from samples. For contaminated sediments with no identified source, evaluate the actual contamination using Level II concentrations (see section 4.1.1.2).

4.1.2.3.1 *Nearest intake.* Evaluate the nearest intake factor based on the drinking water intakes along the overland/flood hazardous substance migration path for the watershed. Include standby intakes in evaluating this factor only if they are used for supply at least once a year.

Assign the nearest intake factor a value as follows and enter the value in Table 4–1:

- If one or more of these drinking water intakes is subject to Level I concentrations as specified in section 4.1.2.3, assign a factor value of 50.
- If not, but if one or more of these drinking water intakes is subject to Level II concentrations, assign a factor value of 45.
- If none of these drinking water intakes is subject to Level I or Level II concentrations, determine the nearest of these drinking water intakes, as measured from the probable point of entry (or from the point where measurement begins for contaminated sediments with no identified source). Assign a dilution weight from Table 4–13 to this intake, based on the type of surface water body in which it is located. Multiply this dilution weight by 20, round the product to the nearest integer, and assign it as the factor value.

Assign the dilution weight from Table 4–13 as follows:

TABLE 4–13.—SURFACE WATER DILUTION WEIGHTS

Type of surface water body [a]		Assigned dilution weight [b]
Descriptor	Flow characteristics	
Minimal stream	Less than 10 cfs [c]	1
Small to moderate stream	10 to 100 cfs	0.1
Moderate to large stream	Greater than 100 to 1,000 cfs	0.01
Large stream to river	Greater than 1,000 to 10,000 cfs	0.001
Large river	Greater than 10,000 to 100,000 cfs	0.0001
Very large river	Greater than 100,000 cfs	0.00001
Coastal tidal waters [d]	Flow not applicable, depth not applicable	0.0001
Shallow ocean zone [e] or Great Lake	Flow not applicable, depth less than 20 feet	0.0001
Moderate depth ocean zone [e] or Great Lake	Flow not applicable, depth 20 to 200 feet	0.00001
Deep ocean zone [e] or Great Lake	Flow not applicable, depth greater than 200 feet	0.000005
3-mile mixing zone in quiet flowing river	10 cfs or greater	0.5

[a] Treat each lake as a separate type of water body and assign a dilution weight as specified in text.
[b] Do not round to nearest integer.
[c] cfs = cubic feet per second.
[d] Embayments, harbors, sounds, estuaries, back bays, lagoons, wetlands, etc., seaward from mouths of rivers and landward from baseline of Territorial Sea.
[e] Seaward from baseline of Territorial Sea. This baseline represents the generalized U.S. coastline. It is parallel to the seaward limit of the Territorial Sea and other maritime limits such as the inner boundary of the Federal fisheries jurisdiction and the limit of States jurisdiction under the Submerged Lands Act, as amended.

- For a river (that is, surface water body types specified in Table 4–13 as minimal stream through very large river), assign a dilution weight based on the average annual flow in the river at the intake. If available, use the average annual discharge as defined in the U.S. Geological Survey Water Resources Data Annual Report. Otherwise, estimate the average annual flow.
- For a lake, assign a dilution weight as follows:
  - –For a lake that has surface water flow entering the lake, assign a dilution weight based on the sum of the

4.1.4.2.2 *Hazardous waste quantity.* Assign the same factor value for hazardous waste quantity for the watershed as would be assigned in section 4.1.2.2.2 for the drinking water threat. Enter this value in Table 4–1.

4.1.4.2.3 *Calculation of environmental threat-waste characteristics factor category value.* For the hazardous substance selected for the watershed in section 4.1.4.2.1.4, use its ecosystem toxicity/persistence factor value and ecosystem bioaccumulation potential factor value as follows to assign a value to the waste characteristics factor category. First, multiply the ecosystem toxicity/persistence factor value and the hazardous waste quantity factor value for the watershed, subject to a maximum product of 1×10^8. Then multiply this product by the ecosystem bioaccumulation potential factor value for this hazardous substance, subject to a maximum product of 1×10^{12}. Based on this second product, assign a value from Table 2–7 (section 2.4.3.1) to the environmental threat-waste characteristics factor category for the watershed. Enter this value in Table 4–1.

TABLE 4–22.—ECOLOGICAL-BASED BENCHMARKS FOR HAZARDOUS SUBSTANCES IN SURFACE WATER

- Concentration corresponding to EPA Ambient Water Quality Criteria (AWQC) for protection of aquatic life (fresh water or marine).
- Concentration corresponding to EPA Ambient Aquatic Life Advisory Concentrations (AALAC).
- Select the appropriate AWQC and AALAC as follows:
  - –Use chronic value, if available; otherwise use acute value.
  - –If the sensitive environment being evaluated is in fresh water, use fresh water value, except: if no fresh water value is available, use marine value if available.
  - –If the sensitive environment being evaluated is in salt water, use marine value, except: if no marine value is available, use fresh water value if available.
  - –If the sensitive environment being evaluated is in both fresh water and salt water, or is in brackish water, use lower of fresh water or marine values.

TABLE 4–23.—SENSITIVE ENVIRONMENTS RATING VALUES

Sensitive environment	Assigned value
Critical habitat [a] for Federal designated endangered or threatened species Marine Sanctuary National Park Designated Federal Wilderness Area Areas identified under Coastal Zone Management Act [b] Sensitive areas identified under National Estuary Program [c] or Near Coastal Waters Program [d] Critical areas identified under the Clean Lakes Program [e] National Monument [f] National Seashore Recreational Area National Lakeshore Recreational Area	100
Habitat known to be used by Federal designated or proposed endangered or threatened species National Preserve National or State Wildlife Refuge Unit of Coastal Barrier Resources System Coastal Barrier (undeveloped) Federal land designated for protection of natural ecosystems Administratively Proposed Federal Wilderness Area Spawning areas critical [g] for the maintenance of fish/shellfish species within river, lake, or coastal tidal waters Migratory pathways and feeding areas critical for maintenance of anadromous fish species within river reaches or areas in lakes or coastal tidal waters in which the fish spend extended periods of time Terrestrial areas utilized for breeding by large or dense aggregations of animals [h] National river reach designated as Recreational	75
Habitat known to be used by State designated endangered or threatened species Habitat known to be used by species under review as to its Federal endangered or threatened status Coastal Barrier (partially developed) Federal designated Scenic or Wild River	50
State land designated for wildlife or game management State designated Scenic or Wild River State designated Natural Areas Particular areas, relatively small in size, important to maintenance of unique biotic communities	25
State designated areas for protection or maintenance of aquatic life [i]	5

[a] Critical habitat as defined in 50 CFR 424.02.
[b] Areas identified in State Coastal Zone Management plans as requiring protection because of ecological value.
[c] National Estuary Program study areas (subareas within estuaries) identified in Comprehensive Conservation and Management Plans as requiring protection because they support critical life stages of key estuarine species (Section 320 of Clean Water Act, as amended).
[d] Near Coastal Waters as defined in Sections 104(b)(3), 304(1), 319, and 320 of Clean Water Act, as amended.
[e] Clean Lakes Program critical areas (subareas within lakes, or in some cases entire small lakes) identified by State Clean Lake Plans as critical habitat (Section 314 of Clean Water Act, as amended).
[f] Use only for air migration pathway.
[g] Limit to areas described as being used for intense or concentrated spawning by a given species.
[h] For the air migration pathway, limit to terrestrial vertebrate species. For the surface water migration pathway, limit to terrestrial vertebrate species with aquatic or semiaquatic foraging habits.
[i] Areas designated under Section 305(a) of Clean Water Act, as amended.

REFERENCE 3

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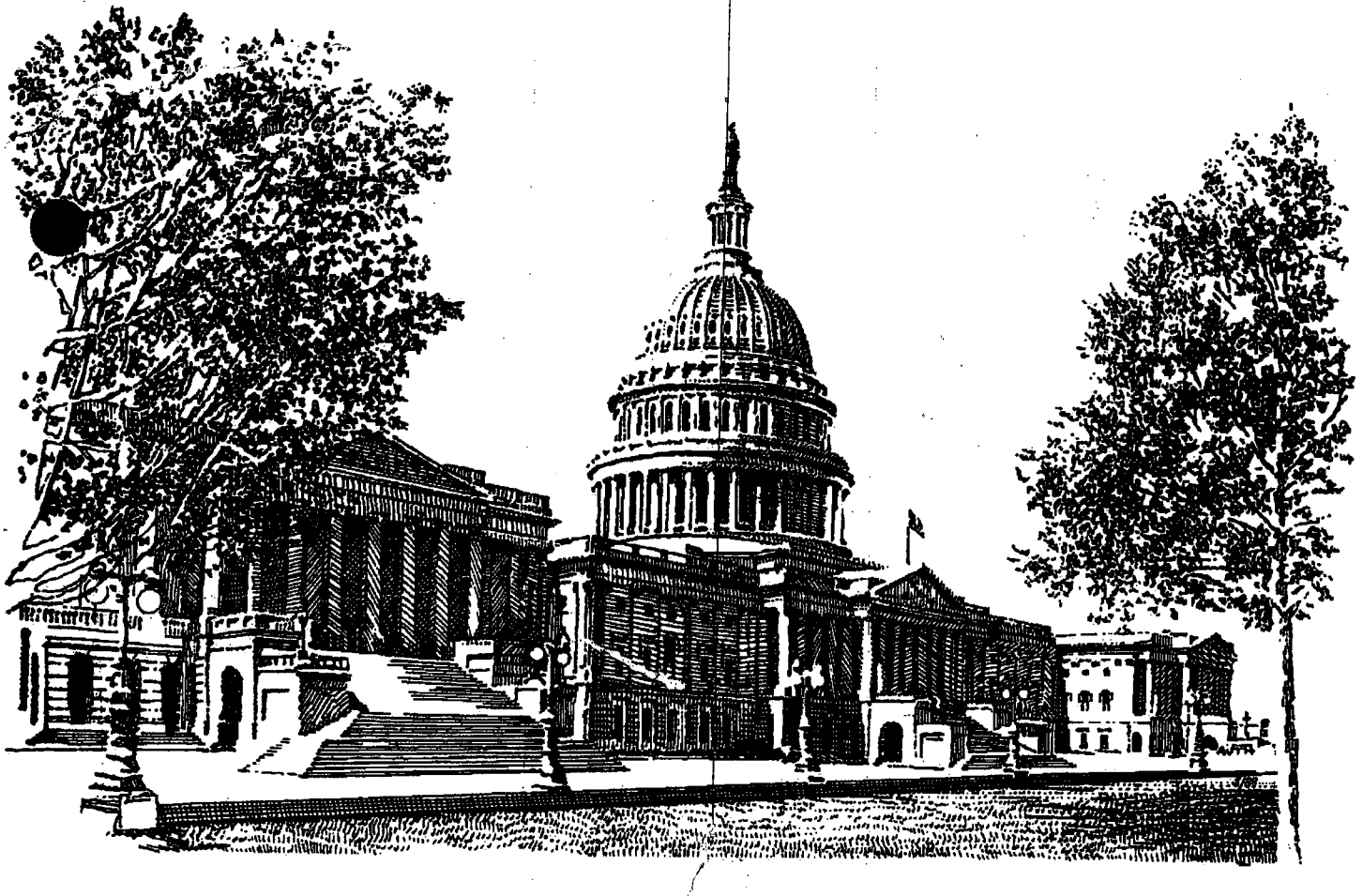

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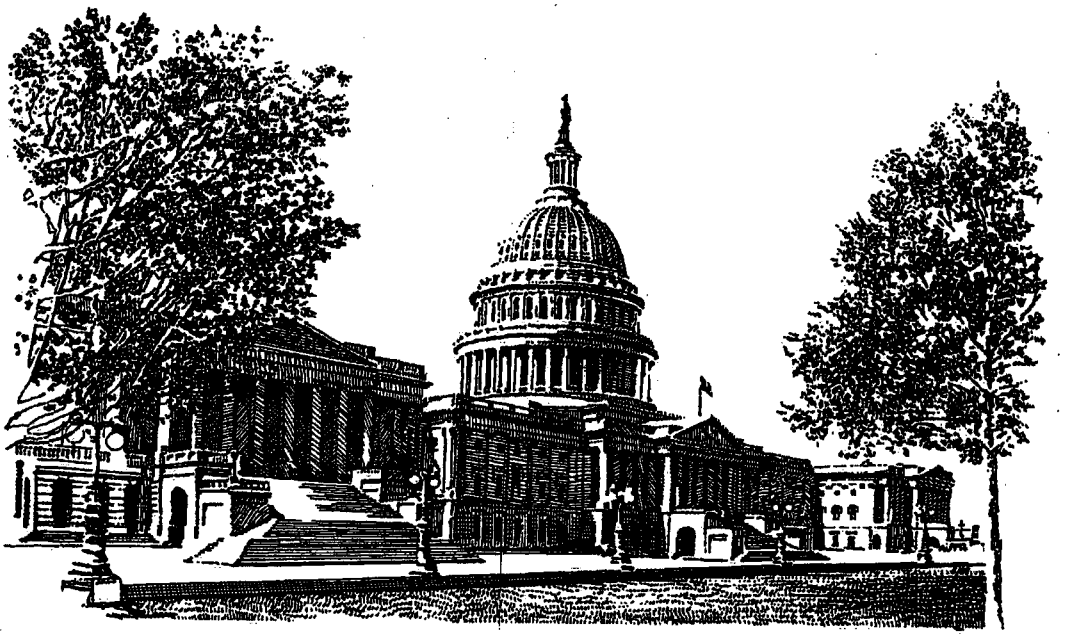

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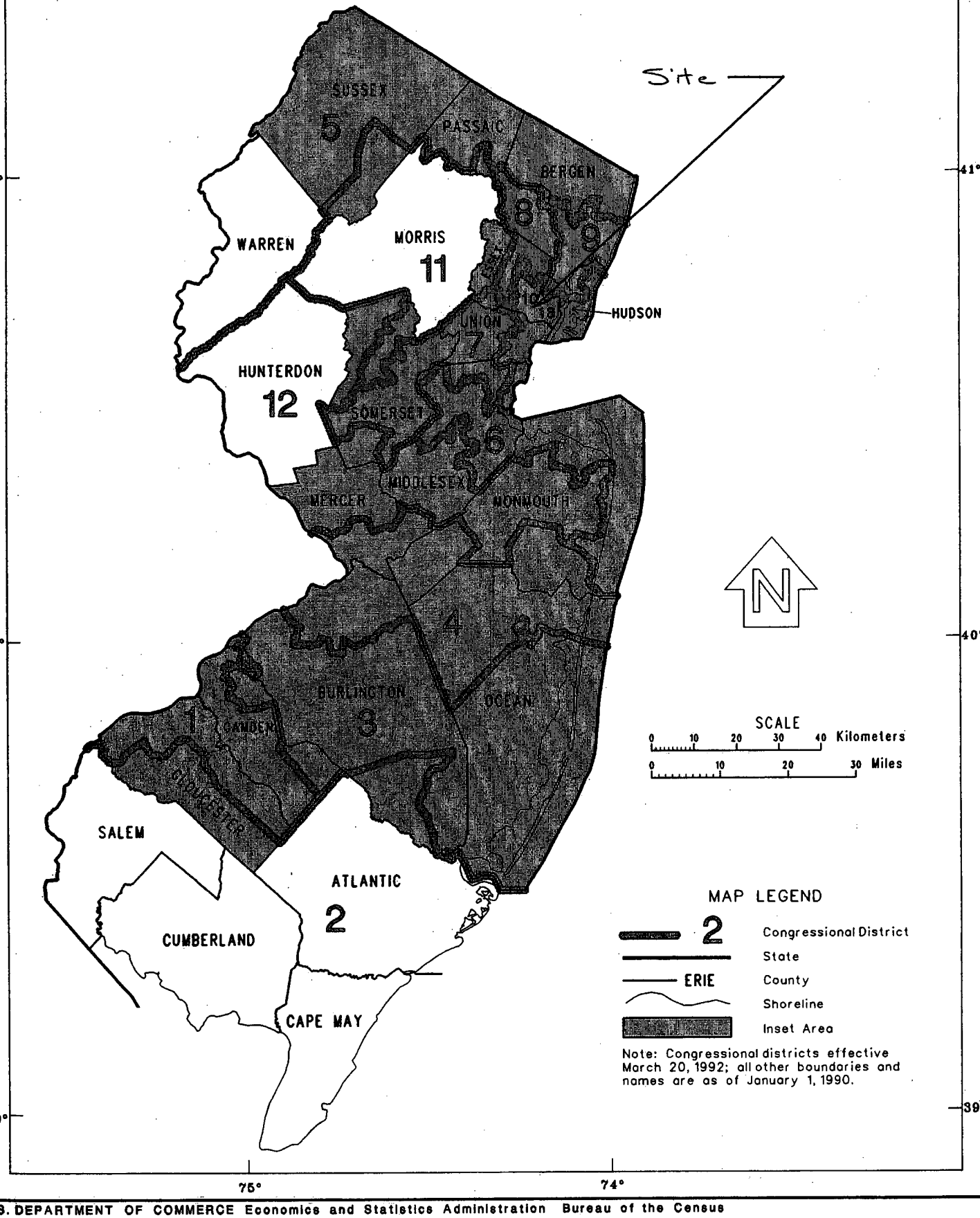


Table 1. **Places**—Con.

Place	County	Congressional district
Kenilworth borough	Union	7
Keyport borough	Monmouth	6
Kingston CDP	Middlesex	12
Kinnelon borough	Morris	11
Lakehurst borough	Ocean	4
Lake Mohawk CDP	Sussex	11
Lake Telemark CDP	Morris	11
Lakewood CDP	Ocean	4
Lambertville city	Hunterdon	12
Laurel Springs borough	Camden	1
Laurence Harbor CDP	Middlesex	6
Lavallette borough	Ocean	3
Lawnside borough	Camden	1
Lawrenceville CDP	Mercer	12
Lebanon borough	Hunterdon	12
Leisure Knoll CDP	Ocean	4
Leisuretowne CDP	Burlington	3
Leisure Village CDP	Ocean	4
Leisure Village East CDP	Ocean	4
Leisure Village West-Pine Lake Park CDP	Ocean	4
Leonardo CDP	Monmouth	6
Leonia borough	Bergen	9
Lincoln Park borough	Morris	11
Lincroft CDP	Monmouth	12
Linden city	Union	7,10,13
Lindenwold borough	Camden	1
Linwood city	Atlantic	2
Little Falls CDP	Passaic	8
Little Ferry borough	Bergen	9
Little Silver borough	Monmouth	12
Livingston CDP	Essex	7,11
Loch Arbour village	Monmouth	6
Lodi borough	Bergen	9
Long Branch city	Monmouth	6
Longport borough	Atlantic	2
Long Valley CDP	Morris	11
Lyndhurst CDP	Bergen	9
McGuire AFB CDP	Burlington	3,4
Madison borough	Morris	11
Madison Park CDP	Middlesex	6
Magnolia borough	Camden	1
Manahawkin CDP	Ocean	3
Manasquan borough	Monmouth	4
Mantoloking borough	Ocean	4
Manville borough	Somerset	7
Maple Shade CDP	Burlington	1
Maplewood CDP	Essex	7,8,10
Margate City city	Atlantic	2
Marlton CDP	Burlington	3
Matawan borough	Monmouth	6
Mays Landing CDP	Atlantic	2
Maywood borough	Bergen	9
Medford Lakes borough	Burlington	3
Mendham borough	Morris	11
Mercerville-Hamilton Square CDP	Mercer	4
Merchantville borough	Camden	3
Metuchen borough	Middlesex	6
Middlesex borough	Middlesex	7
Midland Park borough	Bergen	5
Milford borough	Hunterdon	12
Millburn CDP	Essex	7,11
Millstone borough	Somerset	7
Milltown borough	Middlesex	6
Millville city	Cumberland	2
Monmouth Beach borough	Monmouth	6
Monmouth Junction CDP	Middlesex	12
Montclair CDP	Essex	8,10
Montvale borough	Bergen	5
Moonachie borough	Bergen	9
Moorestown-Lenola CDP	Burlington	3
Morris Plains borough	Morris	11
Morristown town	Morris	11
Mountain Lakes borough	Morris	11
Mountainside borough	Union	7
Mount Arlington borough	Morris	11
Mount Ephraim borough	Camden	1
Mount Holly CDP	Burlington	3
Mullica Hill CDP	Gloucester	2
Mystic Island CDP	Ocean	3
National Park borough	Gloucester	1
Neptune City borough	Monmouth	6
Netcong borough	Morris	11
Newark city	Essex	10,13
New Brunswick city	Middlesex	6
New Egypt CDP	Ocean	4
Newfield borough	Gloucester	2
New Milford borough	Bergen	9
New Providence borough	Union	7
Newton town	Sussex	5
North Arlington borough	Bergen	9
North Beach Haven CDP	Ocean	3
North Bergen CDP	Hudson	9,13
North Brunswick Township CDP	Middlesex	6
North Caldwell CDP	Essex	11
North Cape May CDP	Cape May	2
Northfield city	Atlantic	2
North Haledon borough	Passaic	5,8
North Middletown CDP	Monmouth	6
North Plainfield borough	Somerset	7
Northvale borough	Bergen	5
North Wildwood city	Cape May	2
Norwood borough	Bergen	5
Nutley CDP	Essex	8
Oakhurst CDP	Monmouth	12
Oakland borough	Bergen	5
Oaklyn borough	Camden	1
Oak Valley CDP	Gloucester	1
Ocean Acres CDP	Ocean	3
Ocean City city	Cape May	2
Ocean Gate borough	Ocean	3
Ocean Grove CDP	Monmouth	6
Oceanport borough	Monmouth	12
Ogdensburg borough	Sussex	11
Old Bridge CDP	Middlesex	6
Old Tappan borough	Bergen	5
Olivet CDP	Salem	2
Oradell borough	Bergen	5
Orange CDP	Essex	10
Oxford CDP	Warren	5
Palisades Park borough	Bergen	9
Palmyra borough	Burlington	1
Paramus borough	Bergen	5
Park Ridge borough	Bergen	5
Parsippany-Troy Hills Township CDP	Morris	11
Passaic city	Passaic	8
Paterson city	Passaic	8
Paulsboro borough	Gloucester	1
Peapack and Gladstone borough	Somerset	12
Pemberton borough	Burlington	3
Pemberton Heights CDP	Burlington	3
Pennington borough	Mercer	12
Pennsauken CDP	Camden	1
Penns Grove borough	Salem	2
Pennsville CDP	Salem	2
Pequannock Township CDP	Morris	11
Perth Amboy city	Middlesex	13
Phillipsburg town	Warren	5
Pine Beach borough	Ocean	3
Pine Hill borough	Camden	1
Pine Ridge at Crestwood CDP	Ocean	4
Pine Valley borough	Camden	1
Pitman borough	Gloucester	2
Plainfield city	Union	7
Pleasant Plains CDP	Ocean	3,4
Pleasantville city	Atlantic	2
Point Pleasant borough	Ocean	4
Point Pleasant Beach borough	Ocean	4
Pomona CDP	Atlantic	2
Pompton Lakes borough	Passaic	6
Port Monmouth CDP	Monmouth	6
Port Norris CDP	Cumberland	2
Port Reading CDP	Middlesex	7,13
Port Republic city	Atlantic	2
Presidential Lakes Estates CDP	Burlington	3
Princeton borough	Mercer	12
Princeton Junction CDP	Mercer	12
Princeton North CDP	Mercer	12
Prospect Park borough	Passaic	8
Rahway city	Union	10
Ramblewood CDP	Burlington	3
Ramsey borough	Bergen	5
Raritan borough	Somerset	11
Red Bank borough	Monmouth	6
Ridgefield borough	Bergen	9
Ridgefield Park village	Bergen	9
Ridgewood village	Bergen	5
Ringwood borough	Passaic	5
Rio Grande CDP	Cape May	2
Riverdale borough	Morris	11
River Edge borough	Bergen	9
Riverside CDP	Burlington	3
Riverton borough	Burlington	1
River Vale CDP	Bergen	5
Robertsville CDP	Monmouth	12
Rochelle Park CDP	Bergen	5,9
Rockaway borough	Morris	11
Rockleigh borough	Bergen	5
Rocky Hill borough	Somerset	12
Roosevelt borough	Monmouth	4
Roseland borough	Essex	11
Roselle borough	Union	10
Roselle Park borough	Union	7
Rosenhayn CDP	Cumberland	2
Rossmoor CDP	Middlesex	12
Rumson borough	Monmouth	12
Runnemede borough	Camden	1
Rutherford borough	Bergen	9
Saddle Brook CDP	Bergen	9
Saddle River borough	Bergen	5
Salem city	Salem	2
Sayreville borough	Middlesex	6
Scotch Plains CDP	Union	7
Sea Bright borough	Monmouth	6
Seabrook Farms CDP	Cumberland	2
Sea Girt borough	Monmouth	6
Sea Isle City city	Cape May	2
Seaside Heights borough	Ocean	3
Seaside Park borough	Ocean	3
Secaucus town	Hudson	9
Sewaren CDP	Middlesex	13

REFERENCE 4

APPENDIX E

STANDARD OPERATING PROCEDURE TO DETERMINE SITE LATITUDE AND LONGITUDE COORDINATES

HAZARDOUS SITE EVALUATION DIVISION
SITE ASSESSMENT BRANCH
U.S ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C.

September 1991

1. STATEMENT OF PROBLEM

Location information is critical to the site investigation process. This Standard Operating Procedure (SOP) describes the minimum standard to which latitudinal and longitudinal measurements should be recorded and how to obtain measurements from topographic maps. The investigator should complete a worksheet and attach supporting documentation, which record measurements and provide computations for review.

The purpose of this SOP is to provide a method to measure latitude and longitude which is accurate and practical. The procedure uses linear measurement and interpolation, referred to as Linear Interpolation (LI) to measure latitude and longitude. Compared to other techniques, LI:

- Requires only a single ruler or scale
- Requires no extrapolation of tangents or perpendiculars
- Requires no conversions or calculations, when using a scale graduated in seconds
- Is easy to learn
- Can be easily reviewed
- Is accurate to 1 second (± 0.5)

2. SITE REFERENCE POINT

The investigator should determine the site's geographic coordinates of a specified reference point. EPA's June 1989 draft policy simply requires describing the reference point for a site (e.g., northeast corner of site, entrance to facility, point of discharge). The January 1990 revision states: "...latitude and longitude coordinates may be made in reference to <u>any convenient aspect of a site</u>..." The language was intentionally vague due to the potentially infinite range of site spatial characteristics.

Latitude and longitude determination relies on 7.5-minute topographic maps published by the U.S. Geological Survey (USGS). At the scale of these maps (1:24,000), the small black square used to identify a single family dwelling is a little less in width than 1 second of latitude; the latitude and longitude of a house can be accurately determined to 1 second. When the building, facility, site, etc., is larger in width than 1 second, the question becomes, "From where should I take the measurement?" In some cases, the site could encompass hundreds of square miles, and several degrees or minutes of latitude. To specify a pair of geographic coordinates for the site location, a reference point must be determined for each site on a map for the official record.

To specify a single point location, remember that both natural and man-made features can change with time, and contamination can be documented outside a facility boundary. Property lines, water bodies, and buildings are particularly vulnerable to change. Give priority to the following situations when determining site reference points:

- Point representing the approximate center of the area of greatest concern or a major source as chosen by the project officer in the Region most familiar with the site; or
- Location of largest permanent structure, identified to the corner being measured.

On a 7.5-minute topographic map, mark the boundaries of the site, the area encompassing waste sources, with a very sharp pencil. If the site is a single point or building, use that point. If the building is large, select a corner and describe it for later worksheets. If the site is larger than a single building, draw a center line along the long axis (longest part) of the site (curving or segmenting the line so the line is always centered within the site), and designate the midpoint of the line as the center of the site. Mark this spot in pencil keeping the dot or cross-hair as fine as possible.

Choose a permanent site reference point that is accessible to field verification. During the site reconnaissance, verify the point location relative to topographic and physical structures on the map. Coordinates of known point locations (e.g., landfills, impoundments, wells) can also be calculated and recorded.

3. EQUIPMENT

The only equipment required for LI is an original version of the scale template, the Coordinator™ (see attached page), a fine mechanical pencil (0.3 or 0.5 mm), a large flat work surface, and the topographic map(s) containing the site. Mylar films of maps are preferable. Do not use folded or wrinkled field maps.

The accuracy of LI depends on several factors, specifically the accuracy of the map and measuring device, the width of the pencil, and the cartographic ability of the person making the measurements.

The accuracy of maps printed on paper is approximately 50 feet (1 millimeter map distance) due to paper shrinking or swelling in varying humidity, or by creases in the map. This error can be considerable at the 1:24,000 scale, but these problems can be overcome by using Mylar film versions of the USGS maps. Similarly, measuring tools can have different levels of precision. Do not use the Topo-Aid™, a map aid used in the past, which does not provide the 1-second precision now required by EPA.

A second area where precision can be lost is the pencil used to mark reference lines. The smaller the width of the scribe (or line drawn by the pencil), the greater the ability to align measurements to the ruler. If the width of the scribe is broader than the graduation marks on the ruler, precision cannot be greater than the width of the scribe or ruler calibration.

A third critical factor of accuracy is the cartographic ability of the measurer. There are basically two ways to measure latitude and longitude on maps. The first requires extrapolating data from the site reference point out to the map boundaries. This method requires moderate cartographic skill and accurate drafting supplies, and can magnify resulting errors in proportion to the map edge distance from the reference point. The second requires measuring data interpolated within known map reference points, thereby reducing drafting errors.

Methodologies that required drawing tangents from an unknown point on a map to the map boundary using straight-edges or right-triangles are no longer supported by EPA. The ability to align edges parallel to the map boundaries while extrapolating the tangent line is critical to the accuracy of the calculation. A difference of only a few millimeters will create coordinate errors of 1 or more seconds. Error will result from aligning the straight edge directly over the unknown point and not allowing for the width of the scribe while drawing the tangent line. Another way that locational error is introduced is by relying on other features inside the map -- such as straight roads, apparently straight survey lines, and section lines -- to extrapolate tangents.

4. PROCEDURE

4.1 DEFINING THE GRID

Nine 2.5-minute map grid cells make up a USGS 7.5-minute topographic map (scale 1:24,000). These nine grid cells are defined by 2.5-minute tic marks at the edges of the map and 2.5-minute cross-hairs within the map. Determine which of the nine 2.5-minute grid cells contains the site center or reference point. Depending on the location of the grid, you will be required to draw two, three, or four framing lines. All measurements will be made within this grid. To draw the lines, align a straight edge so the point of the pencil will intersect two of the 2.5-minute cross-hairs. Be sure that the edge is not directly over the cross-hairs or the width of the pencil will be offset and the framing line will not exactly intersect the two cross-hairs (see Figure 4-1).

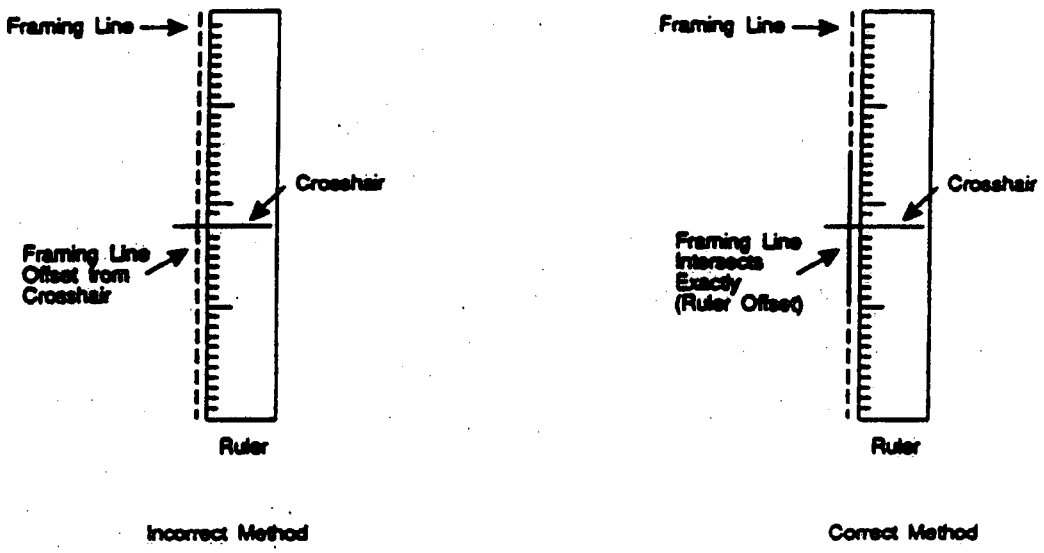


Figure 4-1. Aligning Framing Lines

Lightly draw the framing line, being careful to keep the pencil at an angle less than vertical, between 60 and 80 degrees. Strive to keep the pencil point against the straight edge at all times (see Figure 4-2).

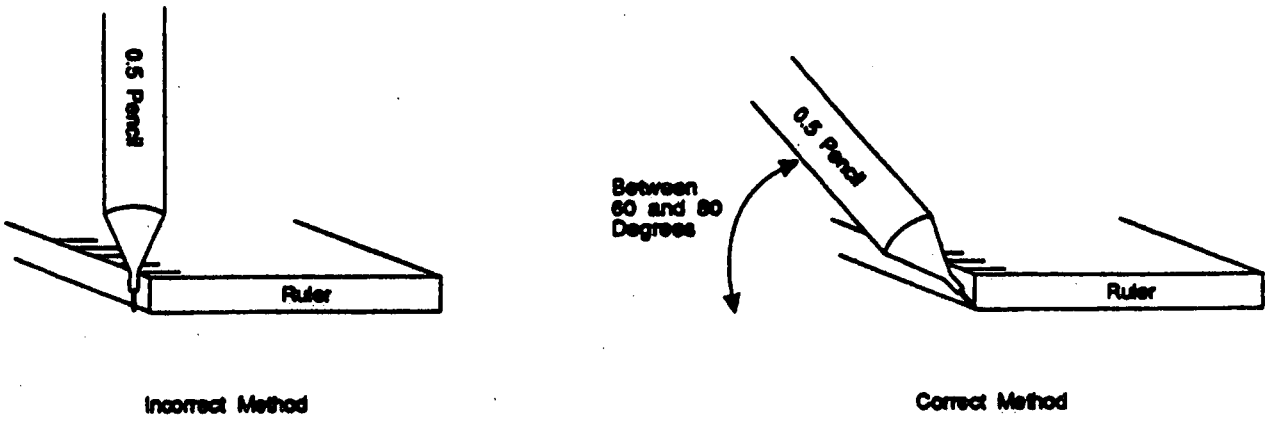


Figure 4-2. Scribing Framing Lines

After completing one of the lines, remove the straight edge and examine the line. If it does not intersect the center of the cross-hairs exactly on each end, erase the line completely and repeat the process.

NOTE: The corners of more recent 7.5 minute topographic maps may have dashed cross-hairs that differ slightly from the corners of the map. Measure from the corners of the map and not the dashed corner cross-hairs, a USGS correction for the 1983 datum. Most maps still rely on the 1927 datum. Consult the lower left legend of the map for more information on geodetic datum.

Disregard this section

4.2 LI USING RULER GRADUATED IN SECONDS

The Coordinator™ is a clear template that is essentially eight custom rulers corresponding to the most common map scales. (The Coordinator™ can be obtained from drafting supply stores or 145 Cedar Hill Road, Bedford, NY 10506.) Other custom rulers can be used if the 1-second (or better) level of precision is maintained and documented.

Custom rulers are directly graduated in seconds of latitude. This is possible because map representations of latitude are essentially constant. One scale on the Coordinator™ fits precisely within a 2.5 minute arc of latitude on a 7.5 minute quadrangle map. By laying the scale over the site location precisely between the scribed latitude lines, latitude is read directly off the scale and added to the latitude of the lower line. With scale graduations in seconds, the accuracy of latitude to 1.0 second is ensured through direct measurement and interpolation. Directly measuring seconds prevents errors caused by conversion and ratio calculations.

<u>Measuring Latitude Using a Custom Ruler (Coordinator™)</u>

1. Set out Coordinator™ 1:24,000 scale and map with the site center or reference point identified.

2. Draw 2.5-minute framing lines around the grid with the site center or reference point (see Section 4.1).

3. Fill out background information on latitude/longitude worksheet.

4. Lay the scale on the map so that the bottom of the scale coincides with the bottom framing line and the top of the scale coincides with the top framing line (see Figure 4-3).

5. Move the scale laterally until it intersects the point to be measured. Be very careful to keep the top and bottom edges of the scale on the framing lines.

6. The scale has two sets of incremental designations; the left set begins at 30 seconds and the right set begins at 0 seconds. Use the scale that corresponds to the latitude number of the lower framing line. If it ends in 30 seconds, read along the left side. If it ends in 0 seconds, read along the right side.

7. Read up the scale from the lower framing line to the point to be measured. Note at each 00 second reading on the Coordinator Scale, add 1 minute to the beginning latitude number of the lower framing line. Record that number on the worksheet.

<u>Measuring Longitude Using a Custom Ruler (Coordinator™)</u>

Longitude is calculated using the same principle and scale as for latitude. The difference is that the ground distances of 2.5 minutes of latitude and longitude are not the same. If, however, you use the same scale and align your

divisions to those of the known longitude lines, the ratios and conversions become a linear measurement. Since the scale is exactly 2.5 minutes long, place each end of the scale on one of the longitude lines. Next, slide the scale up or down until it intersects the reference point. When the edges of the scale are precisely touching the longitude lines and the scale intersects the unknown point, read up the scale from right to left to measure the longitude.

1. Set up longitude framing lines as described in Section 4.1.

2. Lay the 1:24,000 scale on the map so that the bottom of the scale coincides with the right framing line and the top of the scale coincides with the left framing line (see Figure 4-3).

3. Move the scale up or down until it intersects the point to be measured. Be very careful to keep the top and bottom edges of the scale on the framing lines.

4. The scale has two sets of increments: the left set begins at 30 seconds and the right set begins at 0 seconds. Use the scale that corresponds to the longitude number of the right framing line. If it ends in 30 seconds, read along the left side. If it ends in 0 seconds, read along the right side.

5. Read the scale up from the right framing line to the point to be measured. Note at each 00" on the Coordinator™ scale, add 1 minute to the beginning longitude number of the lower framing line. Record that number on the worksheet.

Note: Be sure to identify starting latitude and longitude from the lower right-hand corner of the 2.5 minute grid. If it ends in 30 seconds (30"), read off the 30-second side on the scale; if it ends in 00 seconds (00"), read off the 00 side.

4.3 LI USING AN ENGINEER'S SCALE

Alternative equipment to determine latitude and longitude coordinates is an "engineer's scale." An engineer's scale is a multi-sided ruler containing series of graduations per inch corresponding to map scales. For the 1:24,000 topographic maps, use the 60 divisions per inch scale; on this scale 454 divisions equal to 2.5 minutes. Use the 0 as 00" and 454 as 2'30" and follow the alignment process of Section 4.2. Record the number of divisions on the ruler, divide by 454 and multiply the resultant by 150. The number is now in seconds and can be added to the starting latitude or longitude to get the coordinates of the site.

<u>Measuring Latitude and Longitude Using an Engineer's Scale</u>

1. Display the 1/60 engineer's scale and map with the site center or reference point site identified.

2. Draw 2.5-minute framing lines on the grid with the site center or reference point (see Section 4.1).

3. Fill out background information on the latitude/longitude worksheet.

4. For latitude: place the 1/60 scale on the map so that the bottom of the ruler coincides with the bottom framing line and 454 coincides with the top framing line (see Figure 4-3).

   For longitude: place the scale on the map so that the bottom of the ruler coincides with the right framing line and 454 coincides with the left framing line (see Figure 4-3).

5. Move the scale laterally (for latitude) or vertically (for longitude) until the scale intersects the point to be measured. Be very careful to keep the 0 and 454 edges of the scale on the framing lines.

6. Record the number on the ruler where it intersects the point to be measured on the appropriate worksheet. Divide that number by 454 and multiply the resultant by 150. OR multiply the number by 0.3304. The number is now in seconds and can be added to the starting latitude or longitude of the grid to get the latitude or longitude coordinates of the site. Complete the worksheet.

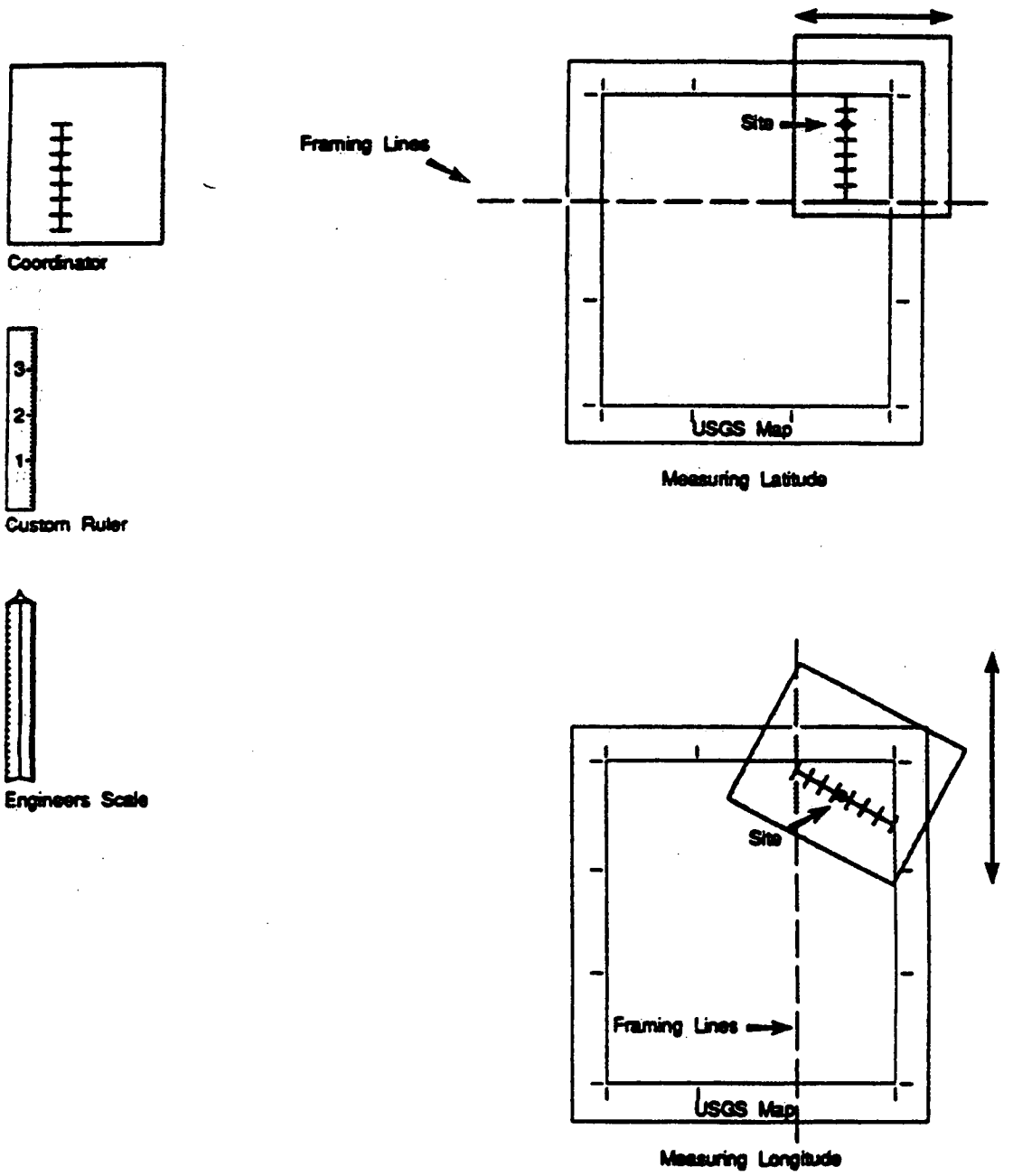


Figure 4-3. Determining Latitude and Longitude Using Linear Interpolation

5. QUALITY ASSURANCE

For QA purposes, a method must be developed to track how latitude and longitude coordinates have been verified and calculated. A datasheet (worksheet) is part of the required documentation for each PA. A completed worksheet allows a reviewer to follow the original steps and check the calculations. Completing each form is estimated to take approximately 10 minutes. Attach a complete 2.5-minute grid on a separate page with the site center or reference point clearly marked. All four corners of the grid must be clearly visible.

LATITUDE AND LONGITUDE CALCULATION WORKSHEET #2
LI USING ENGINEER'S SCALE (1/60)

SITE NAME: Orbis Products Corp. CERCLIS #: NJD010910099

AKA: _____ SSID: _____

ADDRESS: 55 Virginia Street

CITY: Newark STATE: NJ ZIP CODE: 07114

SITE REFERENCE POINT: Approx Center

USGS QUAD MAP NAME: Elizabeth, NJ TOWNSHIP: ___ N/S RANGE: ___ E/W

SCALE: 1:24,000 MAP DATE: 1967/1981 SECTION: ___1/4 ___1/4 ___1/4

MAP DATUM: 1927 1983 (CIRCLE ONE) MERIDIAN: _____

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 7.5' MAP (attach photocopy):

LONGITUDE: 74° 07' 30" LATITUDE: 40° 37' 30"

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 2.5' GRID CELL:

LONGITUDE: 74° 10' 00" LATITUDE: 40° 40' 00"

CALCULATIONS: LATITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM LATITUDE GRID LINE TO SITE REF POINT: 234

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 77.31"

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): 1' 17.31"

D) ADD TO STARTING LATITUDE: 40° 40' 00.0" + 1' 17.31 =

SITE LATITUDE: 40° 41' 17.3"

CALCULATIONS: LONGITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM RIGHT LONGITUDE LINE TO SITE REF POINT: 392

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A x 0.3304 = 129.5"

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): 2' 09.5"

D) ADD TO STARTING LONGITUDE: 74° 10' 00.0" + 2' 09.5 =

SITE LONGITUDE: 74° 12' 09.5"

INVESTIGATOR: [signature] DATE: 10/1/02

LATITUDE AND LONGITUDE CALCULATION WORKSHEET #1
LI USING CUSTOM RULER OR COORDINATOR™

SITE NAME: _____ CERCLIS #: _____

AKA: _____ SSID: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP CODE: _____

SITE REFERENCE POINT: _____

USGS QUAD MAP NAME: _____ TOWNSHIP: ____ N/S RANGE: ____ E/W

SCALE: 1:24,000 MAP DATE: _____ SECTION: ____1/4 ____1/4 ____1/4

MAP DATUM: 1927 1983 (CIRCLE ONE) MERIDIAN: _____

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 7.5' MAP (attach photocopy):

LONGITUDE: ____° ____' ____" LATITUDE: ____° ____' ____"

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 2.5' GRID CELL:

LONGITUDE: ____° ____' ____" LATITUDE: ____° ____' ____"

CALCULATIONS: LATITUDE (7.5' QUADRANGLE MAP)

A) ALIGN THE BOTTOM OF THE SCALE WITH BOTTOM OF GRID. ALIGN THE TOP OF THE SCALE WITH THE TOP OF GRID. POSITION EDGE OF RULER OVER SITE REFERENCE POINT WHILE KEEPING TOP AND BOTTOM ALIGNED.

B) READ TICS ON RULER AT 1- OR 0.5-SECOND INTERVALS (INTERPOLATE).

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): ____'____.____"

D) ADD TO STARTING LATITUDE: ____°____'____.____" + ____'____.____ =

SITE LATITUDE: ____°____'____.____"

CALCULATIONS: LONGITUDE (7.5' QUADRANGLE MAP)

A) ALIGN THE BOTTOM OF THE SCALE WITH RIGHT SIDE OF GRID. ALIGN THE TOP OF THE SCALE WITH THE LEFT SIDE OF GRID. POSITION EDGE OF RULER OVER SITE REFERENCE POINT WHILE KEEPING TOP AND BOTTOM ALIGNED.

B) READ TICS ON RULER AT 1- or 0.5-SECOND INTERVALS. (INTERPOLATE)

C) EXPRESS IN MINUTES AND SECONDS (1'= 60"): ____'____.____"

D) ADD TO STARTING LONGITUDE: ____°____'____.____" + ____'____.____ =

SITE LONGITUDE: ____°____'____.____"

INVESTIGATOR: _____ DATE: _____

SITE NAME: Orbis Products Corp. NUMBER: NJD010910099

SEE ATTACHED MAP

AFFIX MAP GRID CELL HERE

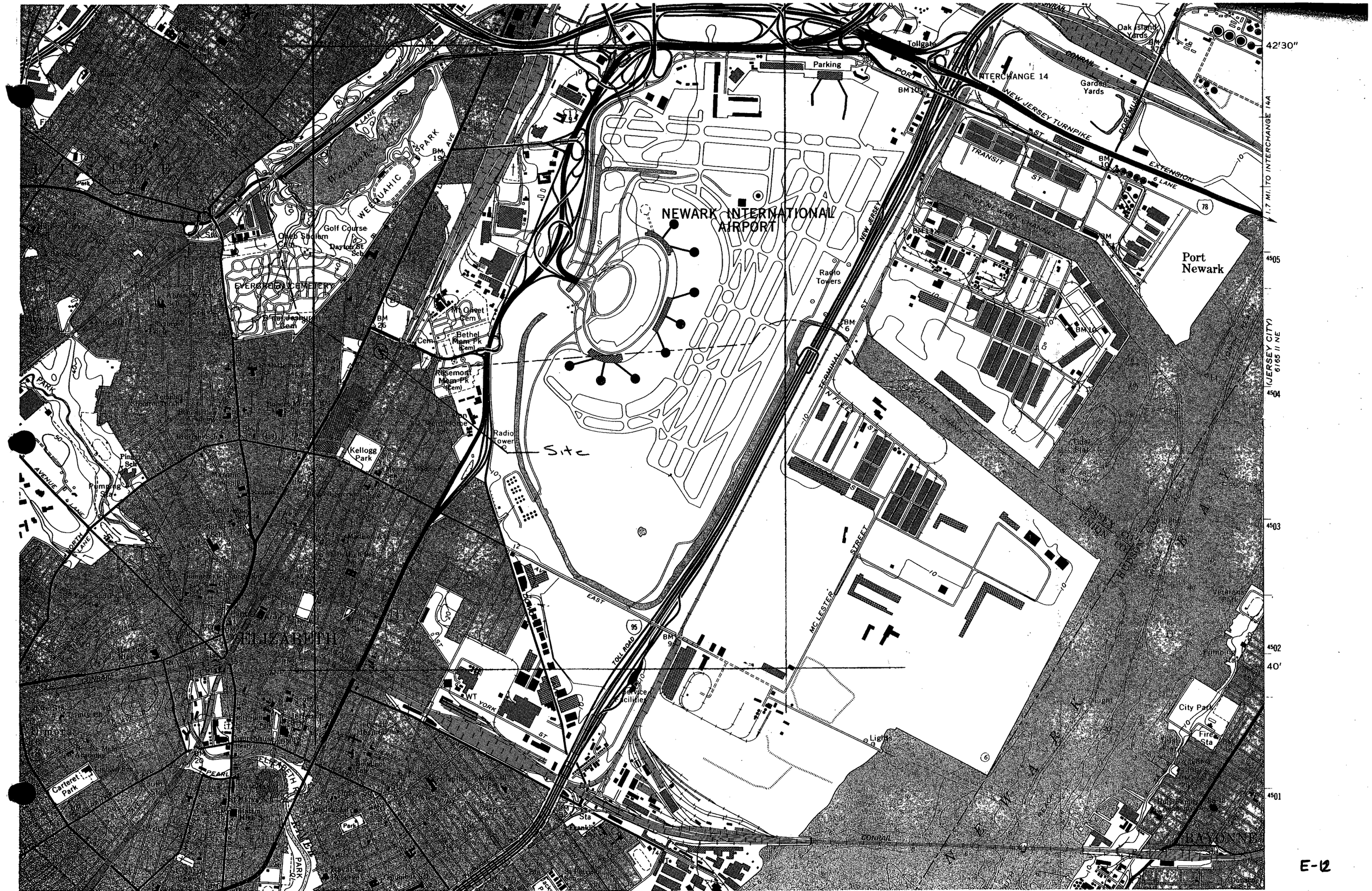
Map must have a minimum of ¼ inch
around the 2.5′ grid cell and show all four grid tic marks.

- Indicate permanent site reference point
- Indicate boundary of site/sources

TOPOGRAPHIC MAP QUADRANGLE NAME: Elizabeth, NJ SCALE: 1:24,000

COORDINATES OF LOWER RIGHT-HAND CORNER OF 2.5-MINUTE GRID:

LATITUDE: 40° 40′ 00″ LONGITUDE: 74° 10′ 00″



NEWARK INTERNATIONAL AIRPORT
Site
Port Newark
ELIZABETH
BAYONNE
WEEQUAHIC
EVERGREEN CEMETERY
Golf Course
Oheb Sholem Cem
Dayton St Sch
Mt Olivet Cem
Bethel Mem Pk (Cem)
Rosemont Mem Pk (Cem)
Kellogg Park
Radio Tower
Radio Towers
Parking
Tollgate
INTERCHANGE 14
Garden Yards
Oak Island Yards
NEW JERSEY TURNPIKE EXTENSION
6 LANE
TRANSIT ST
PORT NEWARK CHANNEL
NEW JERSEY TERMINAL
N FLEET ST
MC LESTER STREET
EAST
TOLL ROAD
YORK ST
Service Facilities
Lights
City Park
Fire Sta
Carteret Park
PEARL
ELIZABETH
PARK
AVENUE
NORTH
CONRAIL
42'30"
40'
1.7 MI. TO INTERCHANGE 14A
(JERSEY CITY) 6165 II NE
4505
4504
4503
4502
4501

E-12

REFERENCE 5

PROJECT NOTE **REGION II SITE ASSESSMENT TEAM**

To: Orbis Products File **Date:** 3 March 2003 **Page:** 1 of 2

W.O. No.: 20103.001.001.1061.00

From: Scott Snyder, Region II SAT

Subject: Groundwater Population

References:
Attachment A - New Jersey Geological Survey (NJGS) PSW 2000 Well Inventory, Search Radius 21,120 feet for Latitude: 40° 41′ 17.3″, Longitude: 74° 12′ 9.5″.
Attachment B - U.S. Geological Survey (USGS) Four-Mile Radius Well Inventory for Latitude: 40° 41′ 17.3″, Longitude: 74° 12′ 9.5″.
Attachment C - New Jersey Department of Labor, New Jersey State Data Center, Housing Units, Households and Families, New Jersey, Counties and Selected Municipalities: 1990 and 2000, August 2001.
Attachment D - Facimile Transmittal from Rich Sadowski, Elizabethtown Water Company, to Scott Snyder, Region II SAT, Re: Public Supply Well Information, 3 March 2003; with attached correspondence.
Attachment E - Snyder, Scott, Summary Table of Public and Domestic Groundwater Supply Within 4 Miles - Orbis Products Corporation.

Based upon information provided in the attached references, S. Snyder, Region II SAT, determined the approximate population served by private and public wells within 4 miles of the Orbis Products site. The USGS Well Inventory (Attachment B) indicates that there are no private wells used for domestic purposes within 2 miles of the site. The USGS Well Inventory indicates that there are 3 private wells used for domestic purposes within the 2 to 3 mile distance ring and 3 private wells used for domestic purposes within the 3 to 4 mile distance ring. To determine the approximate population served by these domestic wells, the average number of people per household in Union County (2.77) was apportioned to each well (Attachment C).

The NJGS PSW 2000 Well Inventory (Attachment A) indicates several public supply wells operated by the Elizabethtown Water Company that are located within the 3 to 4 mile distance ring. Information obtained from Elizabethtown Water (Attachment D) was used to apportion the populations served by these wells. Information provided by Elizabethtown Water indicates that groundwater is blended with surface water prior to distribution. The Raritan River intake contributes greater than 40 percent of the total system production; therefore, the population of each well will be apportioned based on that well's relative contribution to the total system production. The calculations are outlined below.

Total Population Served = 600,000
Total System Production = 144 million gallons per day (MGD)

PROJECT NOTE **REGION II SITE ASSESSMENT TEAM**

To: Orbis Products File **Date:** 3 March 2003 **Page:** 2 of 2

W.O. No.: 20103.001.001.1061.00

From: Scott Snyder, Region II SAT

Subject: Groundwater Population

Calculations -

Well Name	Pump Rate	Percent of Total Production
Hummocks H2	150 GPM = 0.22 MGD	0.22 MGD/144 MGD = 0.002
Hummocks Ranney 1	2,500 GPM = 3.6 MGD	3.6 MGD/144 MGD = 0.025
Hummocks 4A	70 GPM = 0.10 MGD	0.10 MGD/144 MGD = 0.0007
Hummocks 5A	100 GPM = 0.14 MGD	0.14 MGD/144MGD = 0.001
Hummocks 6AR	300 GPM = 0.43 MGD	0.43 MGD/144 MGD = 0.003
Hummocks 7	85 GPM = 0.12 MGD	0.12 MGD/144 MGD = 0.0008
Hummocks 8A	200 GPM = 0.29 MGD	0.29 MGD/144 MGD = 0.002
Hummocks 17	250 GPM = 0.36 MGD	0.36 MGD/144 MGD = 0.003

Well Name	Population
Hummocks H2	600,000 x 0.002 = **1,200**
Hummocks Ranney 1	600,000 x 0.025 = **15,000**
Hummocks 4A	600,000 x 0.0007 = **420**
Hummocks 5A	600,000 x 0.001 = **600**
Hummocks 6AR	600,000 x 0.003 = **1,800**
Hummocks 7	600,000 x 0.0008 = **480**
Hummocks 8A	600,000 x 0.002 = **1,200**
Hummocks 17	600,000 x 0.003 = **1,800**

GPM = gallons per minute

Signature_____

Scott Snyder

REFERENCE NO. 5

ATTACHMENT A

PSW.DAT revision: 643984 04/21/99 4:52P
Search conducted: 10-02-2002 08:04:03 Search radius: 21120 feet
Chosen search parameters were NAD27 geographic coordinates
Location entered: Latitude: 40°41'17.3" Longitude: 74°12'9.5"
Easting: 574697.830 Northing: 675761.653

Distance: 19220 ft
Permit #: 26-02393
Owner: Elizabethtown Water Co
Well Name: Chandler Ave Well
Address: Chandler Ave & E 10th St
Operational status: Inactive
Latitude: 40°39'2.505" Longitude: 74°15'5.246"
Easting: 561198.720 ft Northing: 662079.520 ft
Confinement Status: Unconfined

Distance: 16151 ft
Permit #: 26-04830
Owner: Elizabethtown Water Co
Well Name: Hummocks Well H2
Address: Rte 82 & Garden State Parkway
Operational status: Operational
Latitude: 40°41'36.141" Longitude: 74°15'37.711"
Easting: 558653.970 ft Northing: 677619.050 ft
Confinement Status: Unconfined

Distance: 17142 ft
Permit #: 26-12730
Owner: Elizabethtown Water Co
Well Name: Hummocks Ranney Well 1
Address: Rte 82 & Garden State Parkway
Operational status: Operational
Latitude: 40°41'28.847" Longitude: 74°15'51.523"
Easting: 557592.060 ft Northing: 676878.070 ft
Confinement Status: Unconfined

Distance: 16540 ft
Permit #: 46-00021
Owner: Elizabethtown Water Co
Well Name: Hummocks Well 4A
Address: Rte 82 & Garden State Parkway
Operational status: Operational
Latitude: 40°41'35.663" Longitude: 74°15'42.862"
Easting: 558257.340 ft Northing: 677569.600 ft
Confinement Status: Unconfined

Distance: 16633 ft
Permit #: 46-00023
Owner: Elizabethtown Water Co
Well Name: Hummocks Well 5A
Address: Rte 82 & Garden State Parkway
Operational status: Operational
Latitude: 40°41'34.179" Longitude: 74°15'44.289"
Easting: 558147.850 ft Northing: 677419.160 ft
Confinement Status: Unconfined

Distance: 16750 ft
Permit #: 46-00024
Owner: Elizabethtown Water Co
Well Name: Hummocks Well 6AR
Address: Rte 82 & Garden State Parkway
Operational status: Operational
Latitude: 40°41'32.91" Longitude: 74°15'45.977"
Easting: 558018.190 ft Northing: 677290.320 ft
Confinement Status: Unconfined

Distance: 16430 ft
Permit #: 46-00025
Owner: Elizabethtown Water Co
Well Name: Hummocks Well 7
Address: Rte 82 & Garden State Parkway
Operational status: Operational
Latitude: 40°41'35.683" Longitude: 74°15'41.432"
Easting: 558367.510 ft Northing: 677571.890 ft
Confinement Status: Unconfined

Distance: 17008 ft
Permit #: 46-00026
Owner: Elizabethtown Water Co
Well Name: Hummocks Well 8A
Address: Rte 82 & Garden State Parkway
Operational status: Operational
Latitude: 40°41'31.63" Longitude: 74°15'49.5"
Easting: 557747.160 ft Northing: 677160.110 ft
Confinement Status: Unconfined

Distance: 16081 ft
Permit #: 46-00032
Owner: Elizabethtown Water Co
Well Name: Hummocks Well 17

Address: Rte 82 & Garden State Parkway
Operational status: Operational
Latitude: 40°41'37.846" Longitude: 74°15'36.522"
Easting: 558745.050 ft Northing: 677791.870 ft
Confinement Status: Unconfined

End of search; 9 wells found.

REFERENCE NO. 5

ATTACHMENT B

FORM NO. 9-1904-A
Revised February 1987

Coded by _____

Checked by _____

Entered by _____

File Code _____

Date _____

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

GROUND-WATER SITE SCHEDULE
General Site Data

AGENCY CODE (C4) USGS

SITE ID (C1)

PROJECT NO. (C5)

STATION NAME (C12)

LATITUDE (C9)

LONGITUDE (C10)

LAT-LONG ACCURACY (C11) S F T M
sec. 5 sec. 10 sec. min

DISTRICT (C6)

STATE (C7)

COUNTY or TOWN (C8) _____ County code

LAND NET (C13) x x x S section T township R range mend

LOCATION MAP (C14)

MAP SCALE (C15)

ALTITUDE (C16) .

METHOD OF MEASUREMENT (C17) A L M
altimeter, level, map

ACCURACY (C18)

HYDROLOGIC UNIT CODE (C20)

DRAINAGE BASIN CODE (C801)

TOPOGRAPHIC SETTING (C19)

A	B	C	D	E	F	G	H	K	L	M	O	P	S	T	U	V	W
alluvial fan,	playa,	stream channel,	depression,	dunes,	flat,	flood plain,	hilltop,	sinkhole,	lake or swamp,	mangrove swamp,	offshore,	pediment,	hillside,	terrace,	undulating,	valley flat,	upland draw

AGENCY USE (C803) A I O
active, inactive, inventory only

DATE INVENTORIED (C711) month - day - 19 year

STATION TYPE (C802) (Place a 'Y' in the appropriate box) W Y
well

DATA TYPE (C804) (Place an 'A' (active), an 'I' (inactive), or an 'O' (inventory) in the appropriate box)
WL cont., WL int., QW cont., QW int., State water use

INSTRUMENTS (C805) (Place a 'Y' in the appropriate box):
digital recorder, graphic recorder, telemetry land line, telemetry radio, telemetry satellite, AHDAS, deflection meter, bubble gage, CR type recorder, weighing rain gage, tipping bucket rain gage

REMARKS (C806)

GROUND-WATER SITE DATA

DATA RELIABILITY (C3): C field checked, L poor location, M minimal data, U unchecked

SITE TYPE (C2): C collector, D drain, E excavation, H sink-hole, I injector well, M multiple wells, O outcrop, P pond, T tunnel, W well, X test hole

DATE OF CONSTRUCTION (C21): month – day – 19 year

USE OF SITE (C23): A anode, C standby, emer. supply, D drain, E geothermal, G seismic, H heat reservoir, M mine, O observation, P oil or gas, R recharge, S represurize, T test, U unused, W withdrawal, X waste, Z destroyed

SECONDARY USE OF SITE (C301) (SEE USE OF SITE)

TERTIARY USE OF SITE (C302) (SEE USE OF SITE)

USE OF WATER (C24): A air cond., B bottling, C commercial, D dewater, E power, F fire, H domestic, I irrigation, J industrial (cooling), K mining, M medicinal, N industrial, P public supply, Q aquaculture, R recreation, S stock, T institutional, U unused, Y desalination, Z other

SECONDARY USE OF WATER (C25) (SEE USE OF WATER)

TERTIARY USE OF WATER (C26) (SEE USE OF WATER)

AQUIFER TYPE (C713): U unconfined, single; N unconfined, multiple; C confined, single; M confined, multiple; X mixed

PRIMARY AQUIFER (C714)

HOLE DEPTH (C27) .

WELL DEPTH (C28) .

SOURCE OF DEPTH DATA (C29): A other gov't., D driller, G geologist, L logs, M memory, O owner, R other reported, S reporting agency, Z other

WATER LEVEL (C30) .

DATE WATER LEVEL MEASURED (C31) (Mandatory if C30, water level, has a value): month – day – 19 year

METHOD OF WATER-LEVEL MEASUREMENT (C34): A airline, B analog, C calibrated airline, E estimated, G pressure gage, H calibrated press. gage, L geophysical logs, M manometer, N non-rec. gage, R reported, S steel tape, T electric tape, V calibrated elec. tape, Z other

STATUS FOR WATER LEVEL (C37): D dry, E recently flowing, F flowing, G nearby flowing, H nearby recently flowing, I injector site, J injector site monitor, N measurement discon., O obstruction, P pumping, R recently pumped, S nearby pumping, T nearby recently pumped, V foreign substance, W well destroyed, X surface water effects, Z other

SOURCE OF WATER-LEVEL DATA (C33): A other gov't., D driller, G geologist, L logs, M memory, O owner, R other reported, S reporting agency, Z other

CONSTRUCTION DATA

RECORD TYPE (C754): C C O N S

RECORD SEQUENCE NO. (C723)

DATE OF CONSTRUCTION (C60): month – day – 19 year

NAME OF CONTRACTOR (C63)

SOURCE OF DATA (C64): A other gov't., D driller, G geologist, L logs, M memory, O owner, R other reported, S reporting agency, Z other

METHOD OF CONSTRUCTION (C65): A air-rotary, B bored or augered, C cable tool, D dug, H hydraulic rotary, J jetted, P air percussion, R reverse rotary, T trenching, V driven, W drive wash, Z other

TYPE OF FINISH (C66): C porous concrete, F gravel w/perf., G gravel screen, H horiz. gallery, O open end, P perf. or slotted, S screen, T sand point, W walled, X open hole, Z other

TYPE OF SEAL (C67): B bentonite, C clay, G cement grout, N none, Z other

BOTTOM OF SEAL (C68)

METHOD OF DEVELOPMENT (C69): A air-lift pump, B bailed, C compressed air, J jetted, N none, P pumped, S surged, Z other

HOURS OF DEVELOPMENT (C70)

SPECIAL TREATMENT (C71): C chemicals, D dry ice, E explosives, F deflocculant, H hydrofracturing, M mechanical, Z other

RECORD TYPE (C758) HOLE RECORD SEQUENCE NO. (C724) SEQUENCE NO. OF PARENT RECORD (C59)

DEPTH TO TOP OF INTERVAL (C73) . DEPTH TO BOTTOM OF INTERVAL (C74) . DIAMETER OF INTERVAL (C75) .

RECORD SEQUENCE NO. (C724)

DEPTH TO TOP OF INTERVAL (C73) . DEPTH TO BOTTOM OF INTERVAL (C74) . DIAMETER OF INTERVAL (C75) .

RECORD SEQUENCE NO. (C724)

DEPTH TO TOP OF INTERVAL (C73) . DEPTH TO BOTTOM OF INTERVAL (C74) . DIAMETER OF INTERVAL (C75) .

CONSTRUCTION CASING DATA (3 sets shown)

RECORD TYPE (C758) CSNG RECORD SEQUENCE NO. (C725) SEQUENCE NO. OF PARENT RECORD (C59)

DEPTH TO TOP OF CASING (C77) . DEPTH TO BOTTOM OF CASING (C78) . DIAMETER OF CASING (C79) .

[1] CASING MATERIAL (C80) CASING THICKNESS (C81) .

RECORD SEQUENCE NO. (C725)

DEPTH TO TOP OF CASING (C77) . DEPTH TO BOTTOM OF CASING (C78) . DIAMETER OF CASING (C79) .

[1] CASING MATERIAL (C80) CASING THICKNESS (C81) .

RECORD SEQUENCE NO. (C725)

DEPTH TO TOP OF CASING (C77) . DEPTH TO BOTTOM OF CASING (C78) . DIAMETER OF CASING (C79) .

[1] CASING MATERIAL (C80) CASING THICKNESS (C81) .

FOOTNOTE:

[1] CASING MATERIAL CODES:

B	C	D	G	I	M	P	R	S	T	U	W	Z
brick,	concrete,	copper,	galv. iron,	wrought iron,	other metal,	PVC or plastic,	rock or stone,	steel,	tile,	coated steel,	wood,	other material

CONSTRUCTION OPENINGS DATA (3 sets shown)

RECORD TYPE (C760) OPEN

RECORD SEQUENCE NO. (C726)

SEQUENCE NO. OF PARENT RECORD (C59)

DEPTH TO TOP OF INTERVAL (C83) .

DEPTH TO BOTTOM OF INTERVAL (C84) .

DIAMETER OF INTERVAL (C87) .

2 MATERIAL TYPE (C86)

3 TYPE OF OPENING (C85)

LENGTH OF OPENING (C89) .

WIDTH OF OPENING (C88) .

RECORD SEQUENCE NO. (C726)

DEPTH TO TOP OF INTERVAL (C83) .

DEPTH TO BOTTOM OF INTERVAL (C84) .

DIAMETER OF INTERVAL (C87) .

2 MATERIAL TYPE (C86)

3 TYPE OF OPENING (C85)

LENGTH OF OPENING (C89) .

WIDTH OF OPENING (C88) .

RECORD SEQUENCE NO. (C726)

DEPTH TO TOP OF INTERVAL (C83) .

DEPTH TO BOTTOM OF INTERVAL (C84) .

DIAMETER OF INTERVAL (C87) .

MATERIAL TYPE (C86)

3 TYPE OF OPENING (C85)

LENGTH OF OPENING (C89) .

WIDTH OF OPENING (C88) .

FOOTNOTES:

2 TYPE OF MATERIAL CODES FOR OPEN SECTIONS:

B	C	G	I	M	P	R	S	T	Z
brass or bronze,	concrete,	galv. iron,	wrought iron,	other metal,	PVC or plastic,	stainless steel,	steel,	tile,	other

3 TYPE OF OPENINGS CODES:

F	L	M	P	R	S	T	W	X	Z
fractured rock,	louvered shuttered,	mesh,	perf. or slotted,	wire-wound,	screen, (unk.)	sand point,	welled,	open hole,	other

CONSTRUCTION MEASURE POINT DATA

RECORD TYPE (C766) MPNT

RECORD SEQUENCE NO. (C728)

BEGINNING DATE (C321) - - 19 (month, day, year)

ENDING DATE (C322) - - 19 (month, day, year)

M.P. HEIGHT (C323) .

M.P. REMARKS (C324)

RECORD TYPE (C752) LIFT

RECORD SEQUENCE NO. (C254)

TYPE OF LIFT (C43) A B C J P R S T U Z
air, bucket, centrifugal, jet, piston, rotary, submersible, turbine, unknown, other

DATE RECORDED (C38) __ - __ - 19__
month day year

PUMP INTAKE DEPTH (C44)

TYPE OF POWER (C45) D E G H L N W Z
diesel, electric, gasoline, hand, LP gas, natural gas, windmill, other

HORSE-POWER RATING (C46) ___ . __

MANUFACTURER (C48)

SERIAL NO. (C49)

POWER COMPANY (C50)

POWER COMPANY ACCOUNT NUMBER (C51)

POWER METER NUMBER (C52)

PUMP RATING (C53) (million gallons/unit of fuel) ___ . ____

ADDITIONAL LIFT (C255)

PERSON OR COMPANY MAINTAINING PUMP (C54)

RATED PUMP CAPACITY (gpm) (C268)

STANDBY POWER (C56) (see TYPE OF POWER)

HORSEPOWER OF STANDBY POWER SOURCE (C57) ___ . __

MISCELLANEOUS OWNER DATA

RECORD TYPE (C768) OWNR

RECORD SEQUENCE NO.(C718) 1

DATE OF OWNERSHIP (C159) __ - __ - 19__
month day year

NAME (C161)

EXAMPLES: JONES, RALPH A.
JONES CONSTRUCTION COMPANY

MISCELLANEOUS OTHER ID DATA

RECORD TYPE (C770) OTID

RECORD SEQUENCE NUMBER (C736)

OTHER ID (C190)

ASSIGNER (C191)

MISCELLANEOUS OTHER DATA

RECORD TYPE (C772) OTDT

RECORD SEQUENCE NUMBER (C312)

OTHER DATA TYPE (C181)

OTHER DATA LOCATION (C182) C D R Z
Cooperator's Office, District Office, Reporting Agency, other

DATA FORMAT (C261) F M P Z
files, machine readable, published, other

MISCELLANEOUS VISIT DATA

RECORD TYPE (C774) VIST

RECORD SEQUENCE NO.(C737) 1

DATE OF VISIT (C187) __ - __ - 19__
month day year

NAME OF PERSON (C188)

MISCELLANEOUS QW DATA (3 sets shown)

RECORD TYPE (C776) QUAL RECORD SEQUENCE NO. (C738) DATE OF QW MEASUREMENT (C193) month – day – year

AQUIFER SAMPLED (C195) PARAMETER CODE (C196) VALUE (C197)

RECORD TYPE (C776) QUAL RECORD SEQUENCE NO. (C738) DATE OF QW MEASUREMENT (C193) month – day – year

AQUIFER SAMPLED (C195) PARAMETER CODE (C196) VALUE (C197)

RECORD TYPE (C776) QUAL RECORD SEQUENCE NO. (C738) DATE OF QW MEASUREMENT (C193) month – day – year

AQUIFER SAMPLED (C195) PARAMETER CODE (C196) VALUE (C197)

MISCELLANEOUS LOGS DATA (3 sets shown)

RECORD TYPE (C776) LOGS RECORD SEQUENCE NO. (C739)

TYPE OF LOG (C199) A B C D E F G H I J K L M N O P Q S T U V X Z

time, collar, caliper, driller's, elec., fluid conduct, geologist, magnetic, induction, gamma ray, dip meter, lateral log, micro-log, neutron, micro-lateral, log, photo video, radioactive, sonic, temp., gamma-gamma, fluid velocity, core, other

BEGINNING DEPTH (C200) . ENDING DEPTH (C201) . SOURCE OF DATA (C202) A D G L M O R S Z

other gov't, driller, geologist, logs, memory, owner, other reported, reporting agency, other

RECORD SEQUENCE NO. (C739)

TYPE OF LOG (C199) A B C D E F G H I J K L M N O P Q S T U V X Z

time, collar, caliper, driller's, elec., fluid conduct, geologist, magnetic, induction, gamma ray, dip meter, lateral log, micro-log, neutron, micro-lateral, log, photo video, radioactive, sonic, temp., gamma-gamma, fluid velocity, core, other

BEGINNING DEPTH (C200) . ENDING DEPTH (C201) . SOURCE OF DATA (C202) A D G L M O R S Z

other gov't, driller, geologist, logs, memory, owner, other reported, reporting agency, other

RECORD SEQUENCE NO. (C739)

TYPE OF LOG (C199) A B C D E F G H I J K L M N O P Q S T U V X Z

time, collar, caliper, driller's, elec., fluid conduct, geologist, magnetic, induction, gamma ray, dip meter, lateral log, micro-log, neutron, micro-lateral, log, photo video, radioactive, sonic, temp., gamma-gamma, fluid velocity, core, other

BEGINNING DEPTH (C200) . ENDING DEPTH (C201) . SOURCE OF DATA (C202) A D G L M O R S Z

other gov't, driller, geologist, logs, memory, owner, other reported, reporting agency, other

MISCELLANEOUS NETWORK DATA (3 types shown)

RECORD TYPE (C780): NETW | RECORD SEQUENCE NO. (C730): 01 | TYPE OF NETWORK (C706): QW (water quality) | BEGINNING YEAR (C115): 19 | ENDING YEAR (C116): 19

TYPE OF ANALYSES (C120): A (physical properties), B (common ions), C (trace elements), D (pesticides), E (nutrients), F (sanitary elements), G (codes B&D), H (codes B&E), I (codes B&C), J (codes B&F), K (codes D&E), L (codes C,D&E), M (all or most), N (codes B&C& radio active), P (codes B,C&A), Z (other)

SOURCE AGENCY (C117): | [4] FREQUENCY OF COLLECTION (C118): | ANALYZING AGENCY (C307): | [5] PRIMARY NETWORK SITE (C257): | [5] SECONDARY NETWORK SITE (C708):

RECORD TYPE (C780): NETW | RECORD SEQUENCE NO. (C730): 01 | TYPE OF NETWORK (C706): WL (water level) | BEGINNING YEAR (C115): 19 | ENDING YEAR (C116): 19

SOURCE AGENCY (C117): | [4] FREQUENCY OF COLLECTION (C118): | [5] PRIMARY NETWORK SITE (C257): | [5] SECONDARY NETWORK SITE (C708):

RECORD TYPE (C780): NETW | RECORD SEQUENCE NO. (C730): 01 | TYPE OF NETWORK (C706): WD (pumpage or withdrawals) | BEGINNING YEAR (C115): 19 | ENDING YEAR (C116): 19

SOURCE AGENCY (C117): | [4] FREQUENCY OF COLLECTION (C118): | METHOD OF COLLECTION (C133): C (calculated), E (estimated), M (metered), U (unknown), Z (other) | [5] PRIMARY NETWORK SITE (C257): | [5] SECONDARY NETWORK SITE (C708):

FOOTNOTES:

[4] FREQUENCY OF COLLECTION CODES: A (annually), B (bi monthly), C (continuously), D (daily), F (semi monthly), I (intermittent), M (monthly), O (one-time only), Q (quarterly), S (semi annually), W (weekly), Z (other), 2 (bi annually), 3 (every 3 years), 4 (every 4 years), 5 (every 5 years), X (every 10 years)

[5] NETWORK SITE CODES: 1 (national), 2 (district), 3 (project), 4 (co-operator)

MISCELLANEOUS REMARKS DATA

RECORD TYPE (C788): RMKS | RECORD SEQUENCE NO. (C311): | DATE OF REMARK (C184): month – day – 19 year

REMARKS (C185):

DISCHARGE DATA

RECORD SEQUENCE NO. (C147)

DATE DISCHARGE MEASURED (C148) [ ] - [ ] - 19[ ] (month, day, year)

TYPE OF DISCHARGE (C703) P F (pumped, flow)

DISCHARGE (gpm) (C150) [ ] . [ ]

SOURCE OF DATA (C151): A (other government), D (driller), G (geologist), L (logs), M (memory), O (owner), R (other reported), S (reporting agency), Z (other)

METHOD OF DISCHARGE MEASUREMENT (C152): A (accoustic meter), B (bailer), C (current meter), D (Doppler meter), E (estimated), F (flume), M (totaling meter), O (orifice), P (pitot-tube meter), R (reported), T (trajectory), U (venturi meter), V (volumetric meas.), W (weir), Z (other)

PRODUCTION WATER LEVEL (C153) [ ] . [ ]

STATIC WATER LEVEL (C154) [ ] . [ ]

SOURCE OF DATA (C155): A (other government), D (driller), G (geologist), L (logs), M (memory), O (owner), R (other reported), S (reporting agency), Z (other)

METHOD OF WATER LEVEL MEASUREMENT (C156): A (airline), B (analog), C (calib. airline), E (estimated), G (pressure gage), H (calib. pressure gage), L (geophysical logs), M (manometer), N (non-rec. gage), R (reported), S (steel tape), T (electric tape), V (calib., elec. tape), Z (other)

PUMPING PERIOD (C157) [ ] . [ ]

SPECIFIC CAPACITY (C272) [ ] . [ ]

DRAWDOWN (C309) [ ] . [ ]

GEOHYDROLOGIC DATA

RECORD TYPE (C748) GEOH

RECORD SEQUENCE NO. (C721)

DEPTH TO TOP OF UNIT (C91) [ ] . [ ]

DEPTH TO BOTTOM OF UNIT (C92) [ ] . [ ]

UNIT IDENTIFIER (C93)

LITHOLOGY (C96)

CONTRIBUTING UNIT (C304): P (principal aquifer), S (secondary aquifer), N (no contribution), U (unknown)

LITHOLOGIC MODIFIER (C97)

GEOHYDROLOGIC AQUIFER DATA

RECORD TYPE (C750) AQFR

RECORD SEQUENCE NO. (C742)

SEQUENCE NO. OF PARENT RECORD (C256)

DATE (C95) [ ] - [ ] - 19[ ] (month, day, year)

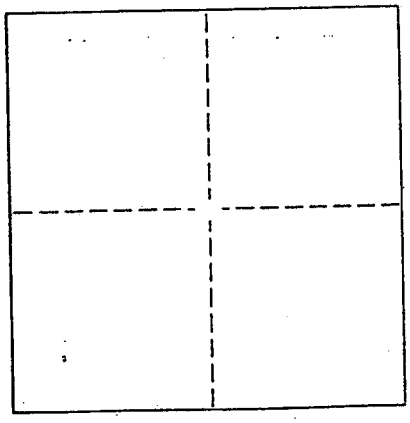
STATIC WATER LEVEL (C126) [ ] . [ ]

CONTRIBUTION (C132)

SITE LOCATION SKETCH AND DIRECTIONS

Township _____ Range _____

Section# _____



☆ U.S. GOVERNMENT PRINTING OFFICE: 1987 - 174-608 - [illegible]

NJ UID	STATION NUMBER	LOCAL ID	COUNTY	MUNICIPALITY	AQUIFER	WELL DEPTH	TOP OF OPEN INTERVAL	BOTTOM OF OPEN INTERVAL
130166	404300074132101	J PLASTICS 2	013	IRVINGTON TOWN	227PSSC	330	64	330
130170	404255074103001	NEWARK WAREHOUSE 1	013	NEWARK CITY	227PSSC	800		
130171	404434074122801	FAIRMOUNT CEMETARY 1	013	NEWARK CITY	227PSSC	635		
130182	404335074150901	PSCT 1	013	MAPLEWOOD TWP	227PSSC	600	38	600
390043	403814074121601	REICH	039	ELIZABETH CITY	227BRCKS	400	40	400
390044	403836074113701	PERK CHEM	039	ELIZABETH CITY	227BRCKS	285	41	285
390045	403848074112601	EXACT	039	ELIZABETH CITY	227BRCKS	467	75	467
390046	403858074132701	VOLUPTE 2	039	ELIZABETH CITY	227BRCKS	400	29	400
390047	403901074125501	MARCUS 1	039	ELIZABETH CITY	227BRCKS	600	20	600
390048	403904074113701	THOM-BETTS	039	ELIZABETH CITY	227BRCKS	500		
390048	403904074113701	THOM-BETTS	039	ELIZABETH CITY	227BRCKS	500	61	500
→ 390049	403927074134201	BRYAN 1	039	ELIZABETH CITY	227BRCKS	255	35	255
→ 390050	403934074134001	WALDO 1	039	ELIZABETH CITY	227BRCKS	150	33	150
390051	403949074142701	LELAND	039	ELIZABETH CITY	227BRCKS	500	33	500
390052	403951074101101	GEN CHEM	039	ELIZABETH CITY	227BRCKS	500	106	500
→ 390053	404007074150001	EINHORN	039	ELIZABETH CITY	227BRCKS	110	20	110
390054	404026074115501	LONDAT 2	039	ELIZABETH CITY	227BRCKS	300	40	300
390055	404052074122101	N ELIZ 2 OBS	039	ELIZABETH CITY	227BRCKS	203	94	203
390056	404053074112501	DIAMOND	039	ELIZABETH CITY	227BRCKS	265	92	265
390057	404055074130201	GRASSMAN	039	ELIZABETH CITY	227BRCKS	202	31	202
390058	404111074121701	SCHWEITZER OBS	039	ELIZABETH CITY	227PSSC	660		
390065	404102074134401	HILLSIDE 5	039	HILLSIDE TWP	227BRCKS	300	25	300
390066	404106074135301	HILLSIDE 4	039	HILLSIDE TWP	227BRCKS	400	21	400
390067	404109074135601	HILLSIDE 3	039	HILLSIDE TWP	227BRCKS	400	25	400
390068	404113074135501	HILLSIDE 2	039	HILLSIDE TWP	227BRCKS	600	32	600
390069	404116074141401	HILLSIDE 1	039	HILLSIDE TWP	227BRCKS	400	21	400
390070	404128074133601	DILLEN 1	039	HILLSIDE TWP	227BRCKS	379	80	379
390071	404131074133201	EMELOID 2	039	HILLSIDE TWP	227BRCKS	461	89	461
390072	404132074133801	EMELOID 1	039	HILLSIDE TWP	227BRCKS	352	92	352
390073	404140074142301	MUNDET 2	039	HILLSIDE TWP	227BRCKS	365		
390074	404148074132901	BRISTOL D	039	HILLSIDE TWP	227BRCKS	400		
390075	404148074134501	BRISTOL A1/SEALED	039	HILLSIDE TWP	227BRCKS	186		
390076	404149074133801	SUN TUBE/SEALED	039	HILLSIDE TWP	227BRCKS	275		
390077	404150074132801	BRISTOL C	039	HILLSIDE TWP	227BRCKS	404		

390078	404150074135201	BRISTOL B2/SEALED	039	HILLSIDE TWP	227BRCKS	400		
390079	404155074135801	BRISTOL E	039	HILLSIDE TWP	227BRCKS	500	49	500
390080	404203074140701	ATLAS 1	039	HILLSIDE TWP	227BRCKS	300	51	300
390081	404205074142901	INTER MILK	039	HILLSIDE TWP	227BRCKS	299	68	299
390082	404208074143001	BENNET OIL	039	HILLSIDE TWP	227BRCKS	298	78	298
390083	404209074141801	HATFIELD 1 - 1949	039	HILLSIDE TWP	227BRCKS	621	47	621
390084	404209074141802	HATFIELD 3 - 1951	039	HILLSIDE TWP	227BRCKS	605	66	605
390085	404210074141501	HATFIELD 2 - 1949	039	HILLSIDE TWP	227BRCKS	380	45	380
390086	404211074141801	SCHACT	039	HILLSIDE TWP	227BRCKS	372	72	372
390087	404211074143601	COOPER 2	039	HILLSIDE TWP	227BRCKS	503	39	503
390088	404213074142001	LINDE	039	HILLSIDE TWP	227BRCKS	322	84	322
390089	404213074143801	COOPER ALLOY 1	039	HILLSIDE TWP	227BRCKS	350		
390090	404214074143601	COOPER 3	039	HILLSIDE TWP	227BRCKS	482	38	482
390091	404215074143201	COOPER 4	039	HILLSIDE TWP	227BRCKS	536	55	536
390092	404218074140601	GILBERT 1	039	HILLSIDE TWP	227BRCKS	200	97	200
390093	404223074141701	LIONEL 1	039	HILLSIDE TWP	227BRCKS	903	55	903
390094	404223074141702	LIONEL 2	039	HILLSIDE TWP	227BRCKS	720		
390095	404223074141703	LIONEL 3	039	HILLSIDE TWP	227BRCKS	700		
390106	404033074161001	LAB 2	039	KENILWORTH BORO	227BRCKS	400	55	400
390107	404034074161801	WHITE LABS 2	039	KENILWORTH BORO	227BRCKS	250	31	250
390109	404036074163101	SERVICE 4	039	KENILWORTH BORO	227BRCKS	403	41	403
390110	404038074162701	WHITE LABS SERVICE 3	039	KENILWORTH BORO	227BRCKS	405	49	405
390113	404040074163101	SERVICE 1	039	KENILWORTH BORO	227BRCKS	470	47	470
390115	404044074162101	WHITE LAB 4 OBS	039	KENILWORTH BORO	227PSSC	251	47	251
390144	403802074133101	STAND OIL 5	039	LINDEN CITY	227BRCKS	303		
390146	403803074132601	STAND OIL 9	039	LINDEN CITY	227BRCKS	256		
390147	403803074134001	STAND OIL 13	039	LINDEN CITY	227BRCKS	305		
390148	403804074133001	STAND OIL 10	039	LINDEN CITY	227BRCKS	252		
390150	403808074133101	STAND OIL 12	039	LINDEN CITY	227BRCKS	327		
390151	403810074132201	STAND OIL 7	039	LINDEN CITY	227BRCKS	327		
390152	403812074131401	STAND OIL 4	039	LINDEN CITY	227BRCKS	230		
390153	403813074133001	STAND OIL 14	039	LINDEN CITY	227BRCKS	305		
390154	403815074131001	STAND OIL 1	039	LINDEN CITY	227BRCKS	400		
390156	403819074131201	STAND OIL 2	039	LINDEN CITY	227BRCKS	224		
390157	403820074125901	STAND OIL 3	039	LINDEN CITY	227BRCKS	228		
390159	403821074142101	EAST PACK	039	LINDEN CITY	227BRCKS	400		
390160	403832074140801	UNITED LABS 1	039	LINDEN CITY	227BRCKS	202	47	202

390161	403837074132301	PARK PLASTIC 1	039	LINDEN CITY	227BRCKS	255	33	255
390162	403855074143401	LAMPERT 1	039	LINDEN CITY	227BRCKS	803	63	803
390163	403855074143402	LAMPERT 2	039	LINDEN CITY	227BRCKS	263	123	263
390253	403903074150501	CHANDLER AVE	039	ROSELLE BORO	227BRCKS	350	45	350
390254	403910074140701	CUTTER	039	ROSELLE BORO	227BRCKS	251		
390262	403935074160301	SECOND AVE/SEALED	039	ROSELLE BORO	227BRCKS	404	35	404
→ 390263	403942074154101	LAVIN 1	039	ROSELLE PARK BORO	227BRCKS	107	21	107
390317	404007074151601	VILLAGE 1	039	UNION TWP	227BRCKS	420	33	420
390318	404017074150901	SUCAD 1	039	UNION TWP	227BRCKS	215	27	215
390319	404017074150902	SUCAD 2	039	UNION TWP	227BRCKS	235	20	235
390320	404026074131701	ZIMMERMAN 1	039	UNION TWP	227BRCKS	151	28	151
→ 390321	404038074160601	KROUSE 1	039	UNION TWP	227BRCKS	80		
390322	404049074144701	SECRETARY 1	039	UNION TWP	227BRCKS	150	27	150
390323	404058074153801	LEHNBAUER 1	039	UNION TWP	227BRCKS	155	25	155
390324	404101074141201	SCHERING 3	039	UNION TWP	227BRCKS	475	50	475
390325	404103074141301	SCHERING 2	039	UNION TWP	227BRCKS	676		
390325	404103074141301	SCHERING 2	039	UNION TWP	227BRCKS	676	80	676
390326	404104074141101	SCHERING IND 1	039	UNION TWP	227BRCKS	600		
390326	404104074141101	SCHERING IND 1	039	UNION TWP	227BRCKS	600	50	600
390332	404120074151701	BOWLING 1	039	UNION TWP	227BRCKS	425	41	425
390335	404128074151401	SUBURBAN GC IRR	039	UNION TWP	227BRCKS	586	26	586
390336	404129074143701	FORSTNER	039	UNION TWP	227BRCKS	356	57	356
390338	404143074160201	MEARS 1	039	UNION TWP	227BRCKS	400	32	400
390339	404144074162301	KRATT 1	039	UNION TWP	227BRCKS	345	60	345
390341	404153074160001	FOOD FAIR 1 - UNION CO	039	UNION TWP	227BRCKS	485	28	485
390343	404158074163001	KNIGHTS	039	UNION TWP	227BRCKS	200	41	200
390381	404205074160501	H-5/SEALED	039	UNION TWP	112SFDF	117	86.5	117
390383	404132074154401	HUMMOCKS 6AR	039	UNION TWP	227BRCKS	130	85	130
390384	404148074132601	WELL 2-1952	039	HILLSIDE TWP	227BRCKS	630	112	630
390400	404121074154601	HUMMOCKS 4A	039	UNION TWP	227PSSC	125	44	125
390401	404121074154602	HUMMOCKS 7	039	UNION TWP	227PSSC	326.7	65	326.7
390402	404133074152801	HUMMOCKS W-H2	039	UNION TWP	112SFDF	100	80	100
390422	404121074154603	HUMMOCKS 1/SEALED	039	UNION TWP	227PSSC	326.7	65	326.7
390423	404121074154604	HUMMOCKS 1A/SEALED	039	UNION TWP	227PSSC	143	78.2	143
390424	404121074154605	HUMMOCKS 2A/SEALED	039	UNION TWP	227PSSC	120.7	89.5	120.7
390425	404121074154606	HUMMOCKS 3/SEALED	039	UNION TWP	227PSSC	90.5	80.5	90.5
390426	404121074154607	HUMMOCKS 3A/SEALED	039	UNION TWP	227PSSC	129.2	97.7	129.2

390427	404121074154608	HUMMOCKS 5/SEALED	039	UNION TWP	227PSSC	91		
390428	404121074154609	HUMMOCKS 5A	039	UNION TWP	227PSSC	128	49.5	128
390429	404121074154610	HUMMOCKS 8A	039	UNION TWP	227PSSC	125.5	68.2	125.2
390430	404121074154611	HUMMOCKS 9A/SEALED	039	UNION TWP	227PSSC	125	50.9	125
390431	404121074154612	HUMMOCKS 10/SEALED	039	UNION TWP	227PSSC	83		
390432	404121074154613	HUMMOCKS 10A/SEALED	039	UNION TWP	227PSSC	118.4	86.5	118.4
390433	404121074154614	HUMMOCKS 11A/SEALED	039	UNION TWP	227PSSC	125	44	125
390434	404121074154615	HUMMOCKS 12A/SEALED	039	UNION TWP	227PSSC	122	90.2	122
390435	404121074154616	HUMMOCKS 17	039	UNION TWP	227PSSC	111.4	101.4	111.4
390436	404121074154617	HUMMOCKS 19/SEALED	039	UNION TWP	227PSSC	512	65	512
390437	404121074154618	HUMMOCKS 23/SEALED	039	UNION TWP	227PSSC	117	107	117
390438	404121074154619	HUMMOCKS 26/SEALED	039	UNION TWP	227PSSC	440.4	65	440.4
390439	404121074154620	HUMMOCKS 28/SEALED	039	UNION TWP	227PSSC	96	85	96
390440	404121074154621	HUMMOCKS 29/SEALED	039	UNION TWP	227PSSC	106	85	106
390441	404121074154622	HUMMOCKS 41/SEALED	039	UNION TWP	227PSSC	83		
390454	404130074155001	HUMMOCKS COLLECTOR	039	UNION TWP	112SFDF	98	89.375	98
390455	404131074154501	HUMMOCKS TP-1	039	UNION TWP	227PSSC	100	76	100
390457	404140074132701	CPC 1	039	HILLSIDE TWP	227PSSC	202		
390461	404220074150001	TDF 1	039	UNION TWP	227PSSC	300		
390470	404146074152601	EWC WT 2BA/SEALED	039	UNION TWP	112SFDF	107		
390470	404146074152601	EWC WT 2BA/SEALED	039	UNION TWP	112SFDF	107	87	107
390471	404148074153001	EWC TB-2/SEALED	039	UNION TWP	112SFDF	78	54	78
390479	403951074140601	DEC PLASTICS	039	ELIZABETH CITY	227PSSC	570	53	570
390480	404019074115401	HAYWARD 1	039	ELIZABETH CITY	227PSSC	274	64	274
390481	404030074162001	SCHERING 5	039	KENILWORTH BORO	227PSSC	500	50	500
390482	404030074162601	SCHERING 4A	039	KENILWORTH BORO	227PSSC	550	52	550
390483	404226074153801	MADISON 2-1980	039	UNION TWP	227PSSC	620	60	620
390495	404125074162101	UNION CNTY 1	039	UNION TWP	227PSSC	82.08	49.08	64.75
390495	404125074162101	UNION CNTY 1	039	UNION TWP	227PSSC	82.08	64.75	80.67

CASING MATERIAL	LATITUDE	LONGITUDE	DATUM	USE OF WATER	USE OF SITE	NJ PERMIT NUMBER
S	404300	741321	NAD27	W	N	26-04728
	404255	741030	NAD27	W	N	46-38537
	404434	741228	NAD27	W	I	46-37060
S	404335	741509	NAD27	W	N	26-01258
	403814	741216	NAD27	W	N	26-04096
	403836	741137	NAD27	W	N	26-03500
	403848	741126	NAD27	W	N	26-03156
	403858	741327	NAD27	W		26-00562
	403901	741255	NAD27	W	N	
	403904	741137	NAD27	W	Z	
	403904	741137	NAD27	W	Z	26-00181
	403927	741342	NAD27	W	H	
	403934	741340	NAD27	W	H	26-00651
	403949	741427	NAD27	W	N	
	403951	741011	NAD27	U	U	26-03554
	404007	741500	NAD27	W	H	26-00893
	404026	741155	NAD27	T	U	26-03056
	404052	741221	NAD27	W		26-00696
	404053	741125	NAD27	W	N	26-02301
	404055	741302	NAD27	O	U	
	404113	741216	NAD27	O	U	
	404102	741344	NAD27	U	U	26-00247
	404106	741353	NAD27	O	U	26-00246
	404109	741356	NAD27	U	U	26-00221
	404113	741355	NAD27	T	U	26-00201
	404116	741414	NAD27	T	U	
	404128	741336	NAD27	W	N	26-00237
	404131	741332	NAD27	W	N	26-03615
	404132	741338	NAD27	W	N	26-00055
	404140	741423	NAD27	W	C	
	404148	741329	NAD27	W		26-00418
	404148	741345	NAD27	Z	U	
	404149	741338	NAD27	Z	U	
	404150	741328	NAD27	W	N	

404150	741352	NAD27	Z	U	
404155	741358	NAD27	W	N	26-04018
404203	741407	NAD27	W	N	26-02070
404205	741429	NAD27	W	N	
404208	741430	NAD27	W	N	
404209	741418	NAD27	W		26-00104
404209	741418	NAD27	W	N	26-00273
404210	741415	NAD27	W	N	26-00108
404211	741418	NAD27	W	N	
404211	741436	NAD27	W	N	26-00052
404213	741420	NAD27	W		26-00057
404213	741438	NAD27	W	N	
404214	741436	NAD27	W	N	26-00053
404215	741432	NAD27	W	N	26-00392
404218	741406	NAD27	W	N	26-00081
404223	741417	NAD27	W	N	26-00453
404223	741417	NAD27	W	N	
404223	741417	NAD27	W	N	
404033	741610	NAD27	W		26-00073
404034	741618	NAD27	W	N	26-00434
404036	741631	NAD27	W	N	26-00437
404038	741627	NAD27	W	N	26-00438
404040	741631	NAD27	W	N	46-00076
404043	741618	NAD27	O	U	
403802	741331	NAD27	W	N	
403803	741326	NAD27	W	N	
403803	741340	NAD27	W	N	
403804	741330	NAD27	W		
403808	741331	NAD27	W	N	
403810	741322	NAD27	W	N	
403812	741314	NAD27	W	N	
403813	741330	NAD27	W		
403815	741310	NAD27	W		
403819	741312	NAD27	W	N	
403820	741259	NAD27	W	N	
403821	741421	NAD27	W	C	26-00202
403832	741408	NAD27	W	C	26-01282

	403837	741323	NAD27	W	N	
	403855	741434	NAD27	W	C	26-02029
	403855	741434	NAD27	W	C	26-01154
	403903	741505	NAD27	W	P	26-02393
	403910	741407	NAD27	W		
	403935	741603	NAD27	Z	U	
	403942	741541	NAD27	W	H	36-00692
	404007	741516	NAD27	W	H	26-01782
	404017	741509	NAD27	W		26-01271
	404017	741509	NAD27	W	A	26-01272
	404026	741317	NAD27	W	A	26-00045
	404038	741606	NAD27	W	H	
	404049	741447	NAD27	W	C	26-00095
	404058	741538	NAD27	W	H	26-00728
	404101	741412	NAD27	W	N	26-00281
	404103	741413	NAD27	W	N	
	404103	741413	NAD27	W	N	46-00145
	404104	741411	NAD27	W	N	
	404104	741411	NAD27	W	N	
	404120	741517	NAD27	W		
	404128	741514	NAD27	W	I	26-01741
	404129	741437	NAD27	W	N	26-00059
	404143	741602	NAD27	W	A	26-00009
	404144	741623	NAD27	W	N	
	404153	741600	NAD27	W	A	26-01176
	404158	741630	NAD27	W	A	26-03877
S	404205	741605	NAD27	Z	P	26-04926
S	404132	741544	NAD27	W	P	46-00024
S	404148	741326	NAD27	W	N	26-00265
	404121	741546	NAD27	W	P	46-00021
	404121	741546	NAD27	W	P	46-00025
S	404133	741528	NAD27	W	P	26-04830
	404121	741546	NAD27	Z	P	46-00016
	404121	741546	NAD27	Z	P	46-00017
	404121	741546	NAD27	Z	P	46-00018
	404121	741546	NAD27	Z	P	46-00019
	404121	741546	NAD27	Z	P	46-00020

	404121	741546	NAD27	Z	P	46-00022
	404121	741546	NAD27	W	P	46-00023
	404121	741546	NAD27	W	P	46-00026
	404121	741546	NAD27	Z	P	46-00027
	404121	741546	NAD27	Z	P	46-00028
	404121	741546	NAD27	Z	P	46-00029
	404121	741546	NAD27	Z	P	46-00030
	404121	741546	NAD27	Z	P	46-00031
	404121	741546	NAD27	W	P	46-00032
	404121	741546	NAD27	Z	P	46-00033
	404121	741546	NAD27	Z	P	46-00034
	404121	741546	NAD27	Z	P	46-00035
	404121	741546	NAD27	Z	P	46-00036
	404121	741546	NAD27	Z	P	46-00037
	404121	741546	NAD27	Z	P	46-00038
C	404130	741550	NAD27	W	P	26-12730
S	404131	741545	NAD27	W	P	26-04807
	404140	741327	NAD27	W	J	46-00094
	404220	741500	NAD27	W	N	46-00102
S	404146	741526	NAD27	Z	P	
S	404146	741526	NAD27	Z	P	26-04829
S	404148	741530	NAD27	Z	P	26-04808
S	403951	741406	NAD27	W	N	26-04727
S	404019	741154	NAD27	W	N	26-04712
S	404030	741620	NAD27	W	N	26-05849
S	404030	741626	NAD27	W	N	26-05532
S	404226	741538	NAD27	W	N	26-04886
S	404125	741621	NAD27	W	I	46-40935
S	404125	741621	NAD27	W	I	

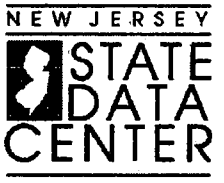
REFERENCE NO. 5

ATTACHMENT C

NJSDC-PH2000-1

NJSDC 2000 CENSUS PUBLICATION

HOUSING UNITS, HOUSEHOLDS AND FAMILIES NEW JERSEY, COUNTIES AND SELECTED MUNICIPALITIES: 1990 AND 2000



State of New Jersey
Donald T. DiFrancesco, Acting Governor

New Jersey Department of Labor
Mark Boyd, Commissioner

Division of Labor Market and Demographic Research
New Jersey State Data Center
PO Box 388
Trenton, NJ 08625-0388
(609) 292-0076

August 2001

$5.00

Table 1. Characteristics of Housing Units, Households and Families: New Jersey and Counties, 2000

County	Housing Units: Total Units	Housing Units: Vacant Units	Occupies Housing Units: Owner Occupied	Occupies Housing Units: Renter Occupied	Total Households	Family Households	Married-Couple Families	Nonfamily Households	Population in Households	Population in Group Quarters	Average Household Size	Average Family Size
New Jersey	3,310,275	245,630	2,011,473	1,053,172	3,064,645	2,154,539	1,638,322	910,106	8,219,529	194,821	2.68	3.21
Atlantic	114,090	19,066	63,054	31,970	95,024	63,151	44,148	31,873	246,058	6,494	2.59	3.16
Bergen	339,820	9,003	222,273	108,544	330,817	235,070	191,678	95,747	872,769	11,349	2.64	3.17
Burlington	161,311	6,940	119,501	34,870	154,371	111,581	89,052	42,790	409,222	14,172	2.65	3.14
Camden	199,679	13,935	130,043	55,701	185,744	129,844	92,536	55,900	498,526	10,406	2.68	3.23
Cape May	91,047	48,899	31,294	10,854	42,148	27,372	21,296	14,776	99,670	2,656	2.36	2.94
Cumberland	52,863	3,720	33,389	15,754	49,143	35,185	23,917	13,958	134,173	12,265	2.73	3.19
Essex	301,011	17,275	129,447	154,289	283,736	193,498	120,031	90,238	770,844	22,789	2.72	3.30
Gloucester	95,054	4,337	72,516	18,201	90,717	67,197	52,918	23,520	249,472	5,201	2.75	3.22
Hudson	240,618	10,072	70,682	159,864	230,546	143,532	91,772	87,014	599,525	9,450	2.60	3.27
Hunterdon	45,032	1,354	36,533	7,145	43,678	32,837	28,953	10,841	117,643	4,346	2.69	3.14
Mercer	133,280	7,473	84,338	41,469	125,807	86,288	63,604	39,519	329,669	21,092	2.62	3.16
Middlesex	273,637	7,822	177,381	88,434	265,815	190,930	151,461	74,885	729,342	20,820	2.74	3.23
Monmouth	240,884	16,648	167,311	56,925	224,236	160,233	130,550	64,003	605,265	10,036	2.70	3.24
Morris	174,379	4,668	129,039	40,672	169,711	124,907	106,544	44,804	461,026	9,186	2.72	3.18
Ocean	248,711	48,309	166,826	33,576	200,402	137,803	112,966	62,599	503,025	7,891	2.51	3.06
Passaic	170,048	6,192	91,169	72,687	163,856	119,689	84,401	44,167	479,073	9,976	2.92	3.42
Salem	26,158	1,863	17,724	6,571	24,295	17,371	13,070	6,924	63,063	1,222	2.60	3.08
Somerset	112,023	3,039	84,167	24,817	108,984	78,409	66,004	30,575	292,981	4,509	2.69	3.19
Sussex	56,528	5,697	42,039	8,792	50,831	38,805	33,024	12,026	142,479	1,687	2.80	3.24
Union	192,945	6,821	114,638	71,486	186,124	133,352	97,916	52,772	514,733	7,808	2.77	3.28
Warren	41,157	2,497	28,109	10,551	38,660	27,485	22,481	11,175	100,971	1,466	2.61	3.12

REFERENCE NO. 5

ATTACHMENT D

Elizabethtown Water Company
1341 North Avenue
Plainfield, N.J. 07062
Tel: (908) 654-1234
Fax: (908) 756-0753

Facsimile Transmittal

To: Scott Snyder Fax: 732-417-5801

From: Rich Sadowski Date: 5/3/03

Re: Public Supply Well Inf. Pages: 4

CC:

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

Notes:

RWE GROUP

Weston Solutions, Inc.
205 Campus Drive
Edison, New Jersey 08837
732-417-5800 • Fax 732-417-5801
www.westonsolutions.com

19 February 2003

Mr. Rich Sadowski
Elizabethtown Water Co.
1341 North Ave.
Plainfield, NJ 07062

RE: PUBLIC SUPPLY WELL INFORMATION
Orbis Products Site
W.O. NO.: 20103.001.001.1061.00

Dear Mr. Sadowski:

The United States Environmental Protection Agency (EPA) has tasked Weston Solutions, Inc.(WESTON®), with a site investigation at a property located in Newark, Essex County, New Jersey. The work is being conducted under WESTON's Region II Site Assessment Team (SAT) contract. The site is listed in the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) as EPA ID No. NJD010910099.

As part of our assessment, we need to determine the number of people who obtain drinking water from groundwater sources both public and private within a 4-mile radius of the site. A list of public supply wells (PSWs) provided by the New Jersey Geological Survey (NJGS) indicates several wells within 4 miles of the site that are operated by Elizabethtown Water Co. Please use the attached questionnaire and table to provide specifics regarding each of these wells and your system. If possible, please provide the most recent VOC analytical data and associated QA/QC documentation available with regard to the below-mentioned wells; as this will assist us in documenting that the site has not impacted them. In addition, any information regarding a breakdown of connections to residences, schools, day care centers, and businesses would be helpful.

Thank you for your time and cooperation. If you have any questions please contact me at (732) 417-5812. Questions concerning the SAT contract should be directed to Ms. Cathy Moyik, U.S. EPA 290 Broadway, 18th Floor, New York, NY 10007-1866 (212) 637-4339.

Very truly yours,
WESTON SOLUTIONS, INC.

Scott Snyder
Project Manager

cc site file

1. Are these wells part of a blended system?

   yes

2. What is the total production of the system?

   144 MGD

3. What is the total number of wells in the system?

   150

4. Is groundwater blended with surface water prior to distribution (if yes, where are the intakes located and what is their contribution to the total system production)?

   Yes, Confluence of Raritan & Millstone Rivers

5. What is the total population served or the number of service connections in the system (if not a blended system, what is the total population of service connections for each ell in the system)?

   Over 600,000

6. Does any well or intake provide more than 40 percent of the system's water (if yes, what is the pumpage capacity for each well in the system [see table])?

   Raritan River Intake

7. What is the location of each of the wells in the system (see table)?

Well Name	State Well No.	Screening Interval	Aquifer	Location (nearest cross street)	Latitude / Longitude	Pump Rate or percentage of total production
Chandler Ave.	34	NA	Passaic		403903 / 741505	----------
Hammocks H2	45	NA	Glacial Drift	Morris Avenue	404143 / 741538	150 GPM
Hammocks Ranney 1	45	NA	Glacial Drift	Morris Avenue	404134 / 741552	2500 GPM
Hammocks 4A	45	NA	Glacial Drift	Morris Avenue	404142 / 741539	70 GPM
Hammocks 5A	45	NA	Glacial Drift	Morris Avenue	404136 / 741550	100 GPM
Hammocks 6AR	45	NA	Glacial Drift	Morris Avenue	404139 / 741544	300 GPM
Hammocks 7	45	NA	Passaic	Morris Avenue	404140 / 741542	85 GPM
Hammocks 8A	45	NA	Glacial Drift	Morris Avenue	404138 / 741546	200 GPM
Hammocks 17	45	NA	Glacial Drift	Morris Avenue	404144 / 741537	250 GPM

30

REFERENCE NO. 5

ATTACHMENT E

Public and Domestic Groundwater Supply Within 4-Miles - Orbis Products Corporation

Site Latitude:	**40 41 17.3**	**Lat. Dec. Degrees(y):**	**40.6881388888889**
Site Longitude:	**74 12 9.5**	**Long. Dec. Degrees(x):**	**74.2026388888889**

Owner	Well Name	Latitude	Longitude	Water Use	Population	Depth (ft)	Distance (mi)
Private	Waldo 1	403934	741340	Domestic	2.77	150	2.38
Private	Bryan 1	403927	741342	Domestic	2.77	255	2.51
Private	Einhorn	404007	741500	Domestic	2.77	110	2.83
Elizabethtown Water Co.	Hummocks 17	404137.8	741536.5	Public	1,800	unknown	3.05
Elizabethtown Water Co.	Hummocks H2	404136.1	741537.7	Public	1,200	unknown	3.06
Private	Lehnbauer	404058	741538	Domestic	2.77	155	3.07
Elizabethtown Water Co.	Hummocks 7	404135.7	741541.4	Public	480	unknown	3.12
Elizabethtown Water Co.	Hummocks 4A	404135.7	741542.9	Public	420	unknown	3.14
Elizabethtown Water Co.	Hummocks 5A	404134.2	741544.3	Public	600	unknown	3.16
Elizabethtown Water Co.	Hummocks 6AR	404132.9	741546	Public	1,800	unknown	3.18
Elizabethtown Water Co.	Hummocks 8A	404131.7	741549.5	Public	1,200	unknown	3.23
Elizabethtown Water Co.	Hummocks Ranney 1	404128.8	741551.5	Public	15,000	unknown	3.25
Private	Krouse 1	404038	741606	Domestic	2.77	80	3.54
Private	Lavin 1	403942	741541	Domestic	2.77	107	3.59
Elizabethtown Water Co.	Chandler Ave.	40392.5	74155.2	Public	0	unknown	3.64

Population served based on the distance of wells from the site (miles):

0-1/4	0
1/4-1/2	0
1/2-1	0
1-2	0
2-3	8.31
3-4	22,508

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REFERENCE 6

NUS CORPORATION
A Halliburton Company

FINAL DRAFT
PRELIMINARY ASSESSMENT
ORBIS PRODUCTS CORPORATION
NEWARK, NEW JERSEY

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

NUS CORPORATION
SUPERFUND DIVISION

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POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT

PART I: SITE INFORMATION

1. Site Name/Alias Orbis Products Corporation

   Street 55 Virginia Street

   City Newark State New Jersey Zip 07114

2. County Essex County Code 13 Cong. Dist. 10

3. EPA ID No. NJD010910099

4. Latitude 41° 41′ 18″N Longitude 74° 12′ 10″W

   USGS Quad. Elizabeth, New Jersey

5. Owner Adron Tel. No. Unknown

   Street Unknown

   City Unknown State Unknown Zip Unknown

6. Operator Orbis Products Corporation Tel. No. (201) 824-3144

   Street 55 Virginia Street

   City Newark State New Jersey Zip 07114

7. Type of Ownership

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

8. Owner/Operator Notification on File

   ☒ RCRA 3001 Date 10/09/80 ☐ CERCLA 103c Date _____
   ☐ None ☐ Unknown

9. Permit Information

Permit	Permit No.	Date Issued	Expiration Date	Comments
PVSC	21401032	Unknown	Unknown	Wastewater treatment
NJDEP Air	C-7507	Unknown	Unknown	
NJPDES	NJ0021016	Unknown	Unknown	

10. Site Status

    ☒ Active ☐ Inactive ☐ Unknown

11. Years of Operation August 1, 1976 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	Drums	Drum Storage Area
2	Drum Storage Warehouse	Drum Storage Warehouse
3	Holding Tank No. 19 A Area	Tank No. OT-100
4	Excavation Site of Six Underground Tanks	Unknown
5	Concrete Holding Tank	Concrete Holding Tank for Waste-Water Treatment System
6	Three Aboveground Waste Fuel Tanks	Unknown
7	Former Location of Two 25,000-Gallon Aboveground Tanks	Unknown

(b) **Other Areas of Concern**

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

During an inspection conducted on June 26, 1984, an area of contaminated soil was observed along a fence at the rear of the property. Apparently, rainwater runoff contaminated with oil was entering the site from an adjacent junkyard. In the same area oil-saturated concrete was observed around several aboveground holding tanks. A followup inspection conducted on August 20, 1984, indicated that the contaminated soil near the fence area was "cleaned and spread." No further information is available regarding this situation.

During the inspection conducted on August 20, 1984, inspectors expressed concern about the laboratory area where they found a large container of chlorinated phenols as well as numerous other chemicals scattered about the laboratory. The laboratory appeared to be about 95 percent closed with Lab Packs being prepared in fibre drums for disposal.

Some time between 1983 and November 1986, Orbis products excavated six underground tanks which had been reported to contain hexane, isopropyl alcohol, methanol, and toluol. An inspection conducted on November 18, 1986, revealed holes in three of the tanks. The excavation of the tanks had not been approved by the Bureau of Hazardous Waste Engineering. In August of 1987 subsurface soil samples were collected in the area of the removed tanks. Analysis of the samples indicated the presence of the following chemicals: benzene, toluene, 2-butanone, ethylbenzene, acetone, 2-hexanone, xylenes, chlorobenzene, and petroleum hydrocarbons. Numerous other tentatively identified compounds were also detected. Further sampling is scheduled to occur.

The facility operates a wastewater treatment system which separates waste oils from the effluent. The waste oils were stored and used as supplemental fuel for the facility's three boilers. The facility did not have a permit for this activity. The boilers are now dismantled.

13. **Information available from**

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

Preparer Paul Bauer **Agency** NUS Corp. Region 2 FIT **Date** June 30, 1989

PART II: WASTE SOURCE INFORMATION

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

Waste Unit 1 - Drums, Drum Storage Area

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

   The facility originally filed a Notification of Hazardous Waste Activity on August 14, 1980, identifying itself as a treatment, storage or disposal facility (TSDF). On October 9, 1984, Orbis Products was issued a Notice of Violation for storing drums of hazardous waste for more than 90 days. On September 15, 1988, the Bureau of Hazardous Waste Engineering approved a closure plan for an aboveground hazardous waste storage tank, and delisted the drum storage area. The age of the waste unit is unknown, but the plant has been in existence for over 40 years.

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

   The drum storage area is located adjacent to the southeast side of the wastewater treatment area.

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.**

   The drum storage area measures 20 feet by 65 feet and has a capacity of 5,500 gallons.

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.**

   The physical states of the wastes are liquid and sludge.

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

   The drum storage area is believed to have contained p-chlorobenzoyl, sodium hypochloride, allyl isothiocyanate, anisic aldehyde, allyl chloride, manganese salts, and sludge removed from the wastewater treatment tanks.

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

   The containment of the drum storage area is unknown, but it appears that the area has no containment system. An inspection conducted on August 20, 1984 indicated that 90 percent of the drums which formerly rested directly on the ground were placed on wooden pallets. The 10 percent that were not on wooden pallets were either plastic drums or "beyond retainability".

Ref. Nos. 1, 2, 3, 4, 5, 9

PART II: WASTE SOURCE INFORMATION

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

Waste Unit 2 - Drum Storage Warehouse, Drum Storage Warehouse

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

   The facility originally filed a Notification of Hazardous Waste Activity on August 14, 1980, identifying itself as a treatment, storage, or disposal facility (TSDF). On October 9, 1984, Orbis Products was issued a Notice of Violation for storing hazardous waste in drums for more than 90 days. On September 15, 1988, the Bureau of Hazardous Waste Engineering approved a closure plan for an aboveground hazardous waste storage tank, and delisted the drum storage area. The age of the waste unit is unknown, but the plant has been in existence for over 40 years.

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

   The drum storage warehouse is located in the west corner of the property adjacent to the railroad tracks.

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.**

   The warehouse measures 130 feet by 120 feet. During an inspection conducted on June 26, 1984, approximately 1200 drums were observed in the building. The building has several levels (possibly five). Apparently drums have also been stored immediately outside the warehouse. A more recent inspection conducted on November 17, 1986, indicated that there were 60 to 100 drums stored in the warehouse.

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.**

   The physical states of the waste are liquid and sludge.

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

   The warehouse is used to store still bottom residues consisting of p-chlorobenzoyl, sodium hypochloride, allyl isothiocyanate, anisic aldehyde, and sludge removed from the wastewater treatment system.

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

   During inspections conducted on June 26, 1984, the warehouse was reported to be in a general state of dilapidation. All windows had been broken; doors remained open; and leaking drums stacked three high, with no aisle space and little or no identification, were sitting in pools of liquid. The drums were exposed to the elements via overhead leaks. The inspections were originally conducted in response to a complaint of chemical odors emanating from the warehouse. A followup inspection conducted on August 20, 1984, indicated that the area outside the warehouse had been cleaned up. Inside the warehouse Orbis had begun to use overpack drums apparently to contain the leaking drums.

Ref. Nos. 1, 2, 3, 4, 5, 9

PART II: WASTE SOURCE INFORMATION

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

Waste Unit 3 - Holding Tank No. 19A Area, Tank No. OT-100

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

   The facility originally filed a Notification of Hazardous Waste Activity on August 14, 1980, identifying itself as a treatment, storage, or disposal, facility (TSDF). On September 15, 1988, the Bureau of Hazardous Waste Engineering approved a closure plan for an aboveground hazardous waste storage tank. The age of the waste unit is unknown, but the plant has been in existence for over 40 years. Although it is not clearly stated in any of the available information, it appears that holding tank No. 19 A and tank No. OT-100 are the same tank.

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

   The exact location of the tank is unknown; however, it is apparently located near a fence at the rear of the property that separates Orbis Products from a junkyard.

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.**

   The capacity of the tank is apparently 10,000 gallons. The quantity of material in the tank is unknown. The quantity of contaminated soil reported to be around the tank is also unknown.

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.**

   The physical states of the waste are liquid and solid (contaminated soil).

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

   The specific hazardous substance located in Holding Tank No. 19A is unknown. During an inspection conducted on August 20, 1984, it was indicated that a submersible pump associated with the tank was covered with a very heavy oil-type substance. The plant manager identified the substance as spent solvents. Apparently the soil around the tank had become saturated with the material. The soil was covered over with clean sand.

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

   The containment of the holding tank is unknown; however, the tank is apparently constructed of steel.

Ref. Nos. 1, 2, 3, 4, 9

PART II: WASTE SOURCE INFORMATION

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

Waste Unit 4 - Excavation Site of Six Underground Tanks, Unknown

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

   The facility originally filed a Notification of Hazardous Waste Activity on August 14, 1980, identifying itself as a treatment, storage, or disposal facility (TSDF). The age of the waste unit is unknown, but the plant has been in existence for over 40 years. During an inspection conducted on November 18, 1986, it was discovered that six underground tanks had been excavated without the prior knowledge or approval of the Bureau of Hazardous Waste Engineering. Since the discovery, sampling has been conducted and apparently some remediation has occurred. Further sampling is scheduled, and it is anticipated by the Division of Hazardous Waste Management that the installation of monitoring wells will be required.

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

   It appears that the site is located south of the main building and west of the cooling tower.

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.**

   The quantity of contaminated soil located at the excavation site is unknown. The capacity of the excavated tanks is also unknown.

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.**

   The physical state of the waste is solid (soil).

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

   The hazardous substances that the company had indicated were stored in tanks are hexane, isopropyl alcohol, methanol, and toluol. Analysis of four subsurface soil samples collected from the area where the tanks had been removed indicated the presence of the following chemicals: benzene, chlorobenzene, ethylbenzene, toluene, acetone, 2-hexanone, xylenes, and 2-butanone. Numerous other compounds have been tentatively identified.

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

   Three of the six excavated tanks were observed to have holes in them. The three tanks released contaminants to the surrounding soil; therefore, there is no containment.

Ref. Nos. 1; 7; 9; 25, pp.7, 8, 37, 38, 94, 95, 154

PART II: WASTE SOURCE INFORMATION

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

Waste Unit 5 - Concrete Holding Tank — Concrete Holding Tank for Wastewater Treatment System

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

   The facility originally filed a Notification of Hazardous Waste Activity on August 14, 1980, identifying itself as a treatment, storage, or disposal facility (TSDF). On May 16, 1986, the facility's wastewater treatment system was approved as an Industrial Waste Management Facility (IWMF), and a permit for the facility was issued by the Division of Water Resources. The age of the waste unit is unknown; however, the plant has been in existence for over 40 years.

   During an inspection conducted on June 26, 1984 facility personnel indicated that sludge had never been removed from the waste unit. Available information indicates that the waste unit is no longer operable. A sodium hydroxide solution was metered to the waste unit to neutralize the acidic waste stream. During an inspection conducted on August 20, 1984, facility personnel indicated that the contents of the sodium hydroxide tank had been sold and that removal of the contents had been scheduled to occur on August 28, 1984. Therefore, it appears that the wastewater treatment system is no longer in use. The current status of the waste unit is unknown.

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

   The wastewater treatment facility is located at the rear of the facility, north of the warehouse and the drum storage area.

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.**

   The wastewater treatment system consists of two aboveground 10,000-gallon steel tanks and a ground-level concrete tank.. The concrete tank measures approximately 20 feet by 40 feet and is 8 feet deep. The unit is divided into two sections: the first section is used as a skimmer, and the second section has central agitation. An inspection conducted on June 26, 1984 indicated the capacity of the concrete structure as 20,000 gallons; however, simple calculations of the tank's volume indicates that the tank's actual capacity would be approximately 40,000 gallons. This corresponds with the inspector's estimation of the quantity of sludge in the unit of 37,000 gallons.

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.**

   The physical state of the wastes are sludge and possibly liquid.

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

   The hazardous substance present in the waste unit is sludge and an oil film on the surface of the water.

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

The tank is constructed of concrete and reportedly contains no liner. However, the tank may possess a natural clay barrier at the bottom.

Ref. Nos. 1, 2, 3, 4, 6, 7

PART II: WASTE SOURCE INFORMATION

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

Waste Unit 6 -Three Aboveground Waste Fuel Tanks Unknown

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

   The facility filed a Notification of Hazardous Waste Activity on August 14, 1980, identifying itself as a treatment, storage, or disposal facility (TSDF). The age of the waste unit is unknown; however, the plant has been in existance for over 40 years.

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

   Unknown

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.**

   The waste unit consists of three 10,000-gallon aboveground waste fuel oil tanks. The current quantity of waste fuel in the tanks is unknown.

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.**

   The physical state of the waste is liquid.

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

   The hazardous substance present in the tanks is waste fuel oil.

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

   The three tanks are diked with concrete walls to a height of 4 feet.

   Ref. Nos. 1, 4

PART II: WASTE SOURCE INFORMATION

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

Waste Unit 7 - Former Location of Two 25,000-Gallon Aboveground Tanks Unknown

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

   The facility filed a Notification of Hazardous Waste Activity on August 14, 1980, identifying itself as a treatment, storage, or disposal facility (TSDF). During an inspection conducted on November 17, 1986, it was discovered that Orbis Products had removed two 25,000-gallon aboveground waste tanks, apparently without the prior knowledge or approval of the Bureau of Hazardous Waste Engineering.

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

   The location of the waste unit is unknown.

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.**

   The size and quantity of the waste unit is unknown.

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.**

   The physical state of the waste is unknown.

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

   The tanks had been used to store waste solvents.

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

   Unknown.

   Ref. Nos. 1, 7

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.**

   There is a potential for a release of contaminants to the groundwater. There has been an observed release of contaminants to subsurface soils, and there is no containment of the contaminated soil. The chemical compounds detected in subsurface soils are benzene, chlorobenzene, ethylbenzene, toluene, acetone, 2-hexanone, xylenes, 2-butanone, and petroleum hydrocarbons.

   Ref. Nos. 2, 3, 4, 7

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.**

   In the Newark and Elizabeth area the Brunswick Formation serves as the aquifer of concern. The Brunswick Formation, which forms the bedrock, may exceed 6000 feet in thickness and is composed of shale and sandstone with local occurrences of sandy and pebbly consolidated beds. The Brunswick Formation is overlain by and hydraulically connected to the Pleistocene glacial deposits. The depth of the deposits varies and is largely controlled by the underlying bedrock topography. A buried valley exists under the Newark and Elizabeth area which is filled with stratified drift and interbedded lenses of till. In the southern part of Newark, the main valley is filled with as much as 200 feet of lacustrine clay and sandy clay which is overlain by 50 to 100 feet of other stratified and unstratified glacial drift. The thickness of the Pleistocene glacial deposits in the vicinity of the site is approximately 70 feet. However, the overall thickness of unconsolidated material in the area of the site ranges from approximately 40 to 160 feet. The depth to bedrock in the vicinity of the site ranges from approximately 40 to 160 feet. Confined and semiconfined groundwater exist in lowland areas of Newark. Because of heavy pumping, parts of the confined aquifer have become dewatered and are no longer confined. The confined condition is a result of variations in fracturing or weathering within the Brunswick Formation. The water table in the Newark area is greatly affected by local pumping and seasonal recharge. The water table in the vicinity of the site is approximately 35-40 feet below ground surface. Saltwater intrusion has made the water unsuitable for drinking or irrigation purposes. The direction of groundwater flow is influenced by local pumping and tends to move in either a southwest or northeast direction, parallel to the strike of the bedrock.

   Ref. Nos. 10, pp. 5-11, 15, 19, 20, Table 2, Figures 2, 4; 11

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

   There is no designated sole source aquifer within 3 miles of the site.

   Ref. Nos. 12, 13

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 lowest point of waste storage is in the vicinity of the six excavated underground storage tanks. The depth is assumed to be 6 feet below ground surface. The depth from the waste area to the aquifer of concern is approximately 29 to 34 feet.

   Ref. No. 7; 10, p. 19

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

The least permeable continuous intervening stratum between the ground surface and the aquifer of concern is the Pleistocene glacial deposits which have permeability of approximately 10^{-5} to 10^{-7} cm/sec.

Ref. Nos. 10, pp. 9-11; 14, p. 15

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

The net precipitation for the area is approximately 13 inches annually.

Ref. Nos. 14, pp. 13-14

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 industrial purposes.

Ref. Nos. 15, 16, 17

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

Distance N/A **Depth** N/A

Ref. Nos. 15, 16, 17

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

There is no population served by the aquifer of concern within a 3-mile radius of the site.

Ref. Nos. 15, 16, 17

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.**

There is little likelihood of a release of contaminants to surface water, because there are no apparent migration pathways to surface water. Rainwater runoff at the site drains into the storm sewer system which is connected to a permitted IWMF wastewater treatment system. Effluent from the treatment system is discharged to the Passaic Valley Sewage Treatment Plant. Storm sewers on McClellen and Virginia Streets also discharge to the Passaic Valley Sewage Treatment Plant.

Ref. Nos. 2, 18, 19, 30

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

Weequahic Lake is located approximately 3,800 feet north of the site. However, there are no apparent migration pathways from the site to the lake. Storm sewers discharge to the Passaic Valley Sewage Treatment Plant and then Newark Bay both of which are over 3 miles downstream from the site.
Ref. No. 18

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 less than 3 percent.

Ref. Nos. 18, 19

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 less than 3 percent.

Ref. No. 18

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

The 1-year 24-hour rainfall is approximately 2.75 inches.

Ref. Nos. 14, p. 33

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 distance to the nearest surface water, Weequahic Lake, is approximately 3,800 feet; however, there is no apparent migration pathway that leads to it. The runoff from the site would be expected to discharge to the Passaic Valley Sewage Treatment Plant and then to the Newark Bay both of which are over 3 miles downstream from the site.

Ref. No. 18

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

Newark Bay is used for commercial and industrial purposes. Secondary recreational contact may also occur.

Ref. Nos. 18, 21, 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.**

There are no wetland areas within 2 miles of the site.

Ref. Nos. 18, 23

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

There are no critical habitats of federally listed endangered species within 2 miles of the site.

Ref. No. 22

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

Not applicable. There is no sensitive environment within 2 miles.

Ref. No. 22

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).**

There are no surface water intakes within 3 miles downstream.

Ref. Nos. 16, 17, 18, 20

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

The state water quality classification for Newark is SE-3.

Ref. No. 23

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

There have been no reported incidents of biota contamination attributable to the site.

Ref. Nos. 2, 3, 4, 7, 19

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.

At the present time the potential for a release of contaminants to the air is unknown; however, the New Jersey Department of Environmental Protection has twice had to respond to complaints of chemical odors emanating from the site. On May 24, 1984, the Newark Health Department received a neighborhood complaint of odors emanating from an accumulation of drums in a warehouse. Subsequently, the NJDEP and the Newark Health Department conducted several joint inspections of the site. The inspections revealed the presence of 1,200 drums of chemicals improperly stored in the warehouse. An unknown number of drums were leaking, and an acidic odor was noted. On November 17, 1986, the NJDEP received a complaint of chemical odors emanating from Orbis Products warehouse. Upon arrival at the site the inspector noted faint aromatic vapors from the street. The inspector was not given access to the warehouse. Contaminants potentially present on the site include hexane, isopropyl alcohol, methanol, toluol, p-chlorobenzoyl, sodium hypochloride, allyl isothiocyanate, anisic aldehyde, allyl chloride, benzene, toluene, 2-butanone, ethyl benzene, acetone, 2-hexanone, xylene, chlorobenzene, and petroleum hydrocarbons.

Ref. Nos. 2, 4, 7, 25, pp.7, 37, 65, 94

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

Approximately 457,900 people live within 4 miles of the site.

Ref. No. 24

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.

The present potential for a fire or explosion to occur with respect to the hazardous substances stored on site is unknown. Initial inspections indicated that a dangerous situation existed in the warehouse; however, most, if not all, of the drums have since been removed from the warehouse. Formerly the warehouse contained leaking drums of flammable and reactive materials. The facility was issued Notices of Violation (NOVs) for storing containers less than 50 feet from the property line, for not protecting wastes from ignition or reaction, failure to follow requirements for ignitable or reactive waste storage, failure to post no smoking signs, failure to close containers, failure to segregate hazardous waste, and numerous other violations. It is not known whether the warehouse has been cleaned.

Ref. Nos. 2, 3, 4, 7

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

Approximately 100,400 people live within 2 miles of the site.

Ref. No. 24

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.

There is some potential for direct contact with hazardous substances on site. Although the area is fenced, the fence is in poor condition and the general housekeeping at the site has been poor. There are also two potential areas of surface soil contamination. One area is around the steel tank (OT-100) for which Orbis received approval of its closure plan. The second area is along the fence that separates Orbis Products from a junkyard. Other potential areas for direct contact are the warehouse, the drum storage area, and the area of the excavated underground tanks.

Ref. Nos. 2, 3, 4, 7, 19

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

No residents live on a property whose boundaries encompass any part of an area contaminated by the site.

Ref. Nos. 18, 19

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

Approximately 26,700 people live within 1 mile of the site.

Ref. No. 24

PART IV: SITE SUMMARY AND RECOMMENDATIONS

Orbis Products Corp. is located in Essex County at 55 Virginia Street, Newark, New Jersey, and covers approximately 5.5 acres. The facility is situated in a narrow commercial strip that extends to the north and south. The strip is bounded by a residential area to the west and railroad tracks to the east. Orbis Products, a subsidiary of the Adron Corporation, has been in operation since 1976; however, the plant has been in existence for over 40 years. The facility has been a manufacturer of aromatic chemicals, pharmaceuticals, organic intermediates, fragrances, and flavors. Some time between 1983 and November of 1986 the facility ceased the manufacture of all products except non-hazardous flavorings for food.

The facility is classified as a treatment, storage, or disposal facility and is currently working toward being reclassified as a generator only. The company originally listed two waste units in its Hazardous Waste Permit Application. One waste unit is a wastewater treatment system which became classified as an Industrial Waste Management Facility (IWMF) on June 11, 1986, and is now permitted and regulated by the New Jersey Department of Environmental Protection (NJDEP), Division of Water Resources. The system discharges its effluent to the Passaic Valley Sewage Treatment Plant. During an inspection conducted on June 26, 1984, facility personnel indicated that sludge has never been removed from the waste unit. Inspectors estimated the quantity of sludge in the tank to be approximately 37,000 gallons. The tank's capacity is estimated to be approximately 40,000 gallons. During a followup inspection conducted on August 20, 1984, facility personnel indicated that they had sold the contents of a tank containing sodium hydroxide which is used to adjust the pH level of the waste stream. It appears that the waste unit is no longer in use.

The second waste unit listed is a drum storage area with a capacity of 5,500 gallons (110, 55-gallon drums). The area is adjacent to the southeast side of the wastewater treatment system. The containment of the outside drum storage area is unknown. On September 15, 1988, the Bureau of Hazardous Waste Engineering (BHWE) delisted the outside drum storage area based on an affidavit made by the facility supervisor, which stated that the facility had never stored hazardous waste in containers for greater than 90 days. However, the facility was issued a Notice of Violation (NOV) on October 9, 1984, by the Division of Hazardous Waste Management (DHWM) for storing 44 drums containing hazardous waste for approximately 4 years.

A 10,000-gallon aboveground steel tank that had been used to store hazardous waste had originally been considered part of the wastewater treatment system; however, this tank did not qualify as an IWMF, and the facility decided to remove the tank. The BHWE approved a closure plan for the removal of the tank on September 15, 1988. The tank was identified in the closure plan as tank No. OT-100. It appears that this is the same one identified in the available information as holding tank No. 19A. The current status of the tank is unknown.

The facility has been using a warehouse on site to store hazardous waste. The warehouse was used to store still bottom residues consisting of p-chlorobenzoyl, sodium hypochloride, allyl isothiocyanate, anisic aldehyde, and sludge removed from the wastewater treatment system. Inspections conducted in July and August of 1984 indicated that conditions in the warehouse were very poor. The building was reported to be in a general state of dilapidation. Approximately 1200 drums were stored inside the warehouse in an unsafe manner. Unlabeled and improperly labeled drums were stacked three high without adequate aisle space. The drums were exposed to the elements via overhead leaks. An unknown quantity of drums was reported to be corroded and leaking. The drums were sitting in pools of liquid that gave off an acidic odor. The inspections were originally conducted in response to neighborhood complaints to the Health Department of chemical odors emanating from the warehouse. During an inspection conducted on November 17, 1986, facility personnel indicated that the drum storage warehouse contained 61 drums of sludge; however, NJDEP inspectors were not given access to the warehouse to confirm this. Inspectors did look through some broken windows and observed approximately 100 drums in the warehouse.

An inspection on November 18, 1986 revealed that some time between 1983 and November 1986, Orbis Products had excavated six underground tanks without the prior approval of the BHWE. Inspectors observed holes in three of the six tanks excavated and required Orbis Products to conduct sampling of the excavation site. In August of 1987, subsurface soil samples were collected in the area of the removed tanks. Analysis of the samples revealed the presence of benzene, toluene, 2-butanone, ethyl benzene, chloroform, acetone, 2-hexanone, xylenes, and chlorobenzene, as well as numerous other tentatively identified compounds. Some soils have been removed and further sampling is expected to occur. The DHWM anticipates that the installation of monitoring wells will be required. Orbis Products also removed two 25,000-gallon aboveground tanks, apparently without the approval of the DHWE. No further information is available concerning these tanks.

There are three 10,000-gallon aboveground waste fuel oil tanks located on the site. During an inspection conducted on November 17, 1986, a 6,500-gallon tank wagon was observed removing waste fuel oil from these tanks. No other information is available concerning these tanks.

The inspection conducted on June 26, 1984, also indicated two areas of obvious soil contamination. One area along the back fence, appears to be the result of oil-contaminated rainwater entering the site from an adjacent junkyard. A second area of soil contamination is apparently located around the 10,000-gallon steel tank for which the facility has received closure approval (Holding Tank No. 19A / Tank No. OT-100).

Other areas of concern noted in the available information are two 10,000-gallon underground fuel tanks, two process buildings that were labeled on the plot plan included in the sample analysis report as "Two Story Asbestos Buildings", and several piles of soil and material identified as kiln dust located along one side of the warehouse.

The DHWM has indicated that conditions at the site have improved since the inspections conducted in 1984; however, the site still has problems to address. The DHWM indicated that the site will be referred to Planning Reassessment and probably be assigned to Case Management, a department that supervises sites that will require long-term remediation or monitoring. There are apparently enforcement actions pending against Orbis Products for minor paperwork violations

The environmental media of greatest concern are the underlying soils and groundwater since there is quantitative evidence that the soils have already been contaminated. There is also a possibility that the site has released contaminants to the air. There is some potential for direct contact with hazardous substance stored on site. Most, if not all, of the drums on site have been removed, and the facility now manufactures only nonhazardous food flavorings. However, the fence surrounding the facility in poor condition, and there are several areas of possible contamination on site.

A **MEDIUM PRIORITY** for further action is recommended for this site. The extent of the NJDEP cleanup operations should be determined, and all available data should be collected. If it is deemed necessary that a site inspection be conducted, there are several areas that should be addressed. Several inspections indicated that spills had occurred in the warehouse; however, there is no indication that the warehouse has been cleaned or tested. Appropriate samples should be taken in and around the warehouse, including the piles of kiln dust located beside the warehouse. Soil samples should be collected in the two areas where inspectors observed obvious soil contamination: along the rear fence and around tank No. 19A (Tank OT-100). Water samples should be collected from any monitoring wells that may be installed. Although the BHWE has delisted the drum storage area, soil samples should still be collected since inspectors reported drums that were "beyond retainability". Soil samples should be collected around the concrete holding tank of the wastewater treatment system. Because of the age of the facility and the poor housekeeping practices at the site, the integrity of all tanks on site should be verified.

ATTACHMENT 1

ORBIS PRODUCTS CORP.
NEWARK, NEW JERSEY

CONTENTS

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

EXHIBIT A

PHOTOGRAPH LOG

ORBIS PRODUCTS CORP.
NEWARK, NEW JERSEY

OFF-SITE RECONNAISSANCE: MAY 11, 1989

ORBIS PRODUCTS CORP.
NEWARK, NEW JERSEY
MAY 11,1989

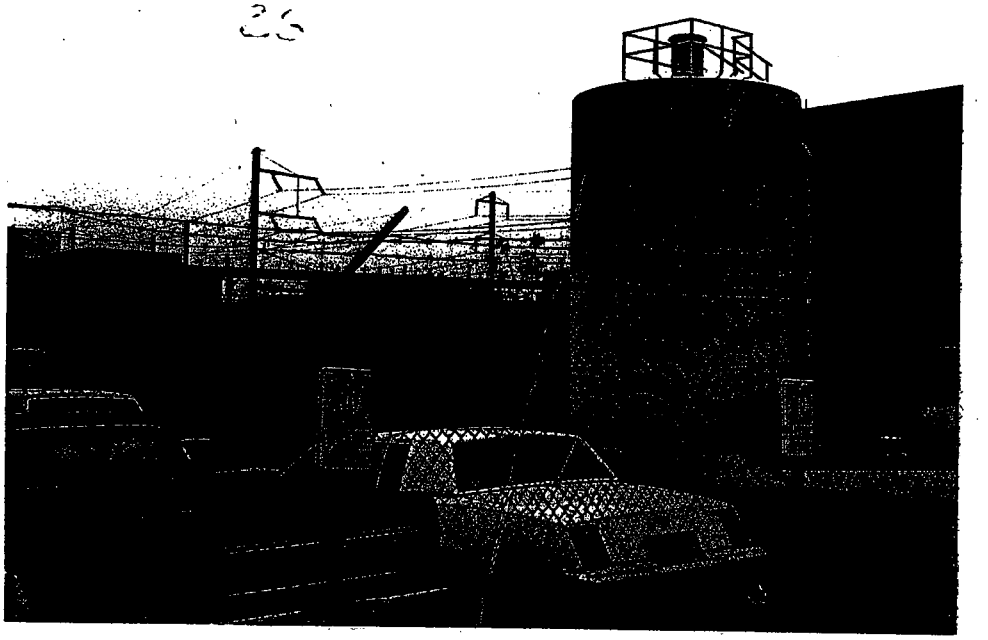
PHOTOGRAPH INDEX

Photo Number	Description	Time
1S,P	Edge of building by railroad track.	1007
2S,P	Building by tracks looking east.	1011
3S,P	Main building with tanks and trailers.	1011

All photographs taken by Dennis Foerter.

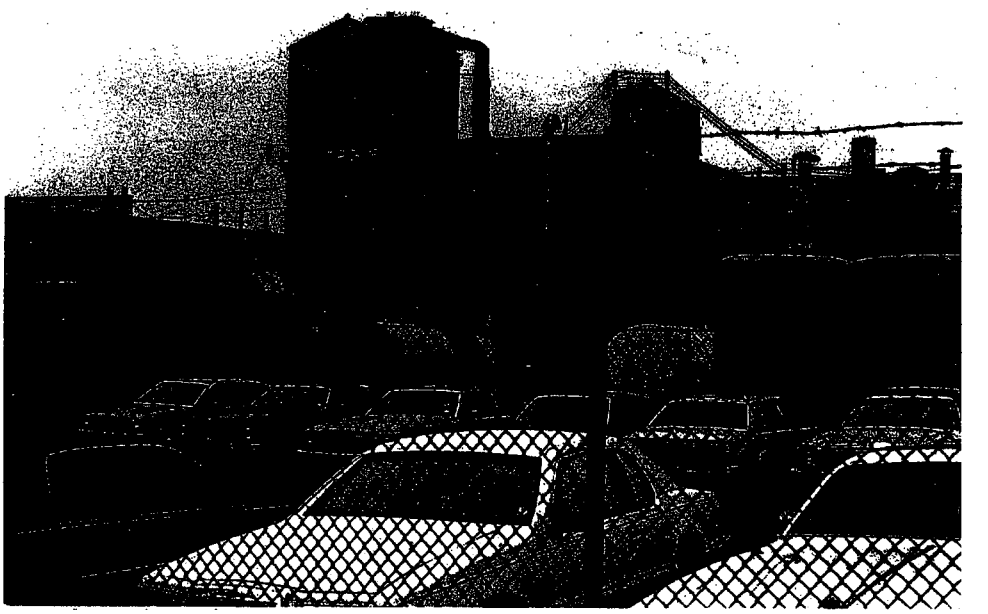
ORBIS PRODUCTS CORP.
NEWARK, NEW JERSEY

1S,P May 11, 1989 1007
Edge of building by railroad track.



2S,P May 11, 1989 1011
Building by tracks looking east.

ORBIS PRODUCTS CORP.
NEWARK, NEW JERSEY



3S,P May 11, 1989 1011
Main building with tanks and trailers.

ATTACHMENT 2

REFERENCES

1. United States Environmental Protection Agency Forms, 8700-12(6-80), 3510-1(6-80), 3510-3 (6-80).

2. NJDEP Memorandum from Joseph Hoyle to file, Subject: Orbis Products Corp., July 26, 1984.

3. NJDEP Memorandum from Joseph Hoyle to file, Subject: Orbis Products Corp., August 26, 1984.

4. NJDEP Memorandum from Red Rutkowski to file, Subject: Orbis Products Corp., August 28, 1984.

5. Notice of Violation issued by NJDEP, Division of Waste Management, to Orbis Products Corp., Newark, New Jersey, October 9, 1984.

6. Letter from Kenneth Goldstein, P.E., Chief, Industrial Pretreatment Section, Bureau of Industrial Waste Managemnet, to Bill Amaduci, Orbis Products Corp., Newark, New Jersey, June 11, 1986.

7. NJDEP Memorandum from Jeffery Hill to Spill File, Subject: Orbis Products Corp., November 18, 1986.

8. Letter from Lawrence Diamond, Hannoch Weisman Corp., Roseland, New Jersey, to Robert Zoller, New Jersey Department of Environmental Protection, Division of Hazardous Waste Management, West Orange, New Jersey, December 29, 1986.

9. Letter from Frank Coolick, Assistant Director, Hazardous Waste Regulation Element, New Jersey Department of Environmental Protection, to William Amaducci, Manager, Orbis Products Corp., Newark, New Jersey, September 15, 1988.

10. United States Department of the Interior, Geological Survey, State of New Jersey Department of Conservation and Economic Development, Division of Water Policy and Supply, Special Report No. 28, Groundwater Resources of Essex County, New Jersey, 1968.

11. Bedrock Topography and Thickness of Pleistocene Deposits in Union County and Adjacent Areas, New Jersey, Bronius Nemickas, U.S. Geological Survey, 1974.

12. Telecon Note: Conversation between Drew Baris, U.S. Environmental Protection Agency, Region 2, Office of Groundwater Management, and Paul Bauer, NUS Corp., June 12, 1989.

13. Telecon Note: Conversation between Drew Baris, U.S. Environmental Protection Agency, Region 2, Office of Groundwater Management, and Edmund Knyfd Jr., NUS Corp., May 15, 1989.

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

15. Telecon Note: Conversation between Ms. James, Newark City Water Department, and John Harrison, NUS Corp., April 17, 1989.

16. Telecon Note: Conversation between Mr. Melito, Engineer, Essex County Department of Public Works, and Richard Pagano, NUS Corp., January 20, 1988.

17. Telecon Note: Conversation between the Engineering Department, Elizabeth Water Company, and John Harrison, NUS Corp., April 19, 1989.

18. Three-Mile Vicinity Map, based on U.S. Department of the Interior, Geological Survey Topographic Maps, 7.5 minute series, "Elizabeth, NJ-NY", 1967, photorevised 1981; "Roselle, NJ", 1955, photorevised 1981.

19. Off-Site Reconnaissance Information Reporting Form, Orbis Products Corp.,TDD No. 02-8905-06 , NUS Corporation Region 2 FIT, Edison, New Jersey, May 11, 1989.

REFERENCES (Cont'd)

20. Telecon Note: Conversation between Mr. Peoples, Newark Water Department, and John Harrison, NUS Corp., May 18, 1989.

21. New Jersey Department of Environmental Protection, Land Use Overlay Sheet 26, Kemble Widmer, State Geologist, 1976.

22. U.S. Department of the Interior, U.S. Fish and Wildlife Service, Atlantic Coast Ecological Inventory, Newark, NJ-NY-PA, 1980.

23. State of New Jersey Department of Environmental Protection, Division of Water Resources, Surface Water Quality Standards, N.J.A.C. 7:9-4, Index D-Surface Water Classifications of the Passaic, Hackensack and N.Y. Harbor Complex Basin, July 1985.

24. General Sciences Corporation, Graphical Exposure Modeling Systems (GEMS). Landover, Maryland, 1986.

25. Analytical Data Report, Project Number P87-304, Elson T. Killam Associates, Inc., September 24, 1987.

26. Proposal to Develop a Comprehensive Waste Transfer Program, James C. Anderson Associates, Inc., Mt. Holly, New Jersey, February 27, 1987.

27. Telecon Note: Conversation between Dave Osterman, Division of Hazardous Waste Management, and Paul Bauer, NUS Corp., June 15, 1989.

28. Notice of Violation issued by New Jersey Department of Environmental Protection, Division of Waste Management, to Orbis Products Corp., Newark, New Jersey, November 20, 1984.

29. Letter from New Jersey Department of Environmental Protection, Division of Hazardous Waste Management, to Bill Amaducci, Manager, Orbis Products, Newark, New Jersey, May 16, 1986.

30. Telecon Note: Conversation between Mr. Tivillyes, Engineer, Newark City Water Department, and Paul Bauer, NUS Corp., June 27, 1989.

REFERENCE NO. 1

33

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 ➤ NJD010910099

ORBIS PRODUCTS CORP
55 VIRGINIA ST
NEWARK, NJ 07114

INSTALLATION ADDRESS ➤ 55 VIRGINIA ST
NEWARK, NJ 07114

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

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

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

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

NOTIFICATION OF HAZARDOUS WASTE ACTIVITY

INSTALLATION'S EPA I.D. NO.	
I. NAME OF INSTALLATION	NJD010910099
II. INSTALLATION MAILING ADDRESS	ORBIS PRODUCTS CORP 55 VIRGINIA ST NEWARK, NJ 07114
III. LOCATION OF INSTALLATION	55 VIRGINIA ST NEWARK, NJ 07114

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 [illegible] through it and supply the correct informa[illegible] 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).*

DETACH

FOR OFFICIAL USE ONLY

COMMENTS

C

INSTALLATION'S EPA I.D. NUMBER	APPROVED	DATE RECEIVED (yr., mo., & day)
F NJD010910099 3 1		800814

I. NAME OF INSTALLATION

II. INSTALLATION MAILING ADDRESS

STREET OR P.O. BOX

3

CITY OR TOWN | ST. | ZIP CODE

4

III. LOCATION OF INSTALLATION

STREET OR ROUTE NUMBER

5

CITY OR TOWN | ST. | ZIP CODE

6

IV. INSTALLATION CONTACT

NAME AND TITLE *(last, first, & job title)*: 2 LAUFER ROBERT VP GENERAL MGR

PHONE NO. *(area code & no.)*: 201-887-5600

V. OWNERSHIP

A. NAME OF INSTALLATION'S LEGAL OWNER

8 NORDA INC.

DETACH

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 notificat[illegible] 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.

I.D. – FOR OFFICIAL USE ONLY														
S	W	N	J	D	0	1	0	9	1	0	0	9	9	T/A 2	C 1

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

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

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

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

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

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

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

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

49	50	51	52	53	54

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

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

X. CERTIFICATION

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

SIGNATURE	NAME & OFFICIAL TITLE *(type or print)*	DATE SIGNED
Robert J. Laufer	Robert J. Laufer, V.P./General Mgr.	8/13/80

EPA Form 8700-12 (6-80) REVERSE

Form Approved OMB No. 158-S80004

FORM 3 RCRA

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
F	N	J	D	0	1	0	9	1	0	0	9	9			

FOR OFFICIAL USE ONLY

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

II. FIRST OR REVISED APPLICATION

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

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

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

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

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

C	YR.	MO.	DAY
8	76	08	01

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

YR.	MO.	DAY

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

1. FACILITY HAS INTERIM STATUS

2. FACILITY HAS A RCRA PERMIT

III. PROCESSES – CODES AND DESIGN CAPACITIES

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

B. PROCESS DESIGN CAPACITY – For each code entered in column A enter the capacity of the process.

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

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

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR OR 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

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
X-1	S02	600	G		5				
X-2	T03	20	E		6				
1	S01	5,500 G.C.	G		7				
2	T01	500,000 G.C.	G		8				
3					9				
4					10				

III. PROCESSES *continued*

C. SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESSES *(code "T01")* 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	K 0 5 4	900	P	T 0 3 D 8 0	
X-2	D 0 0 2	400	P	T 0 3 D 8 0	
X-3	D 0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2				*included with above*

CONTINUE ON PAGE 3

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

Form Approved. OMB No. 158-S80004

EPA I.D. NUMBER (enter from page 1)	FOR OFFICIAL USE ONLY
W N J D 0 1 0 9 1 0 0 9 9 T/A 1 C 1	W DUP T/A 2 C 2 DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	D002	775,625	T	T01	
2	D009				included with above
3	D001	45,000	P	S01	
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

EPA Form 3510-3 (6-80)

CONTINUE ON REVERSE

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

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	0	0	1	0	9	1	0	0	9	9	56

F6-55 - F6-56

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 41 [illegible]	074 12 [illegible]0

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
Robert J. Laufer Vice President & General Manager	Robert J. Laufer	11/18/80

X. OPERATOR CERTIFICATION

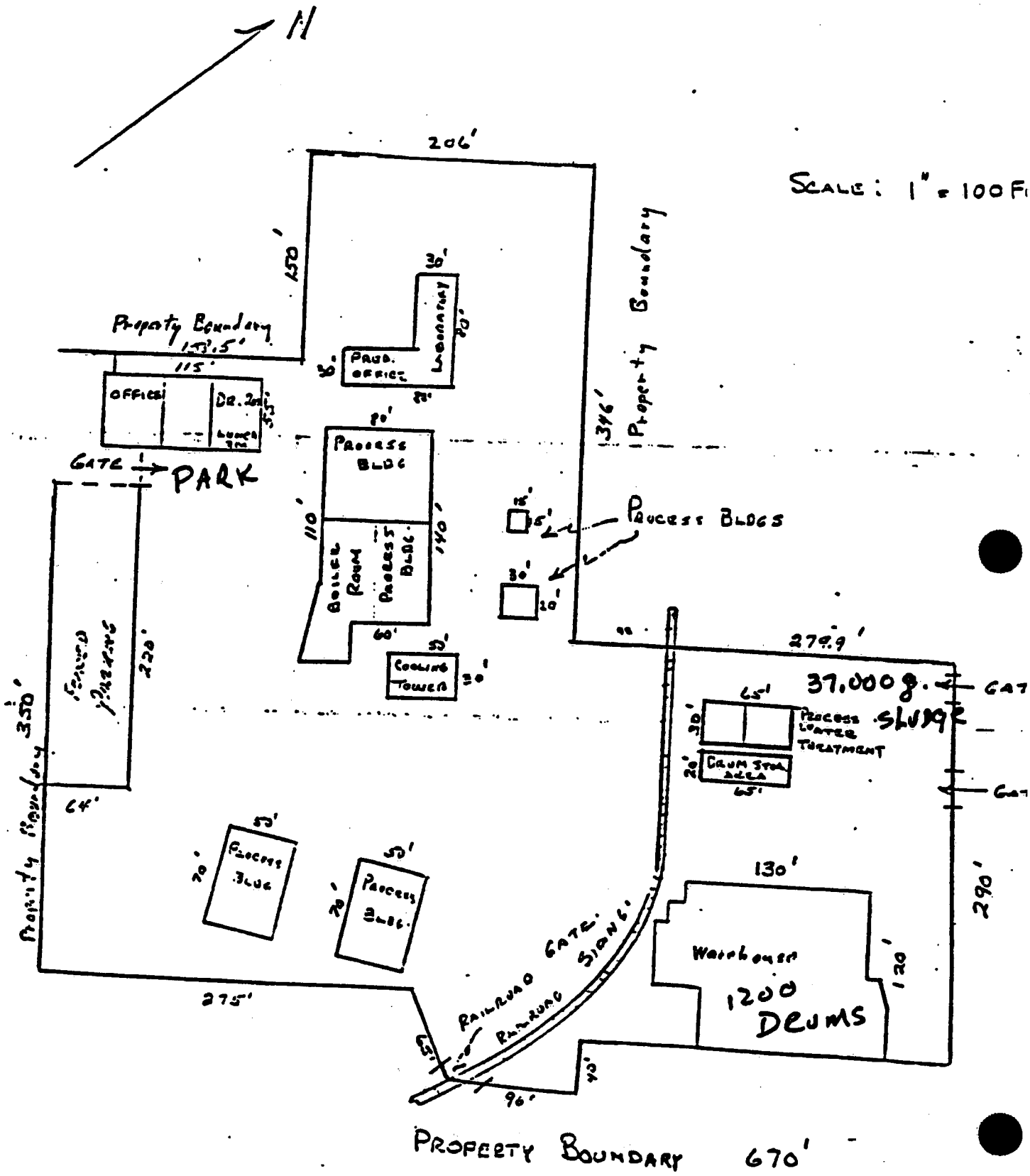
I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true,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

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED

CONTINUE ON PAGE 5

V. FACILITY DRAWING (see page 4)

Form Approved OMB No. 158-S8



8/20/84

RA Form 3510-3 (6-80)

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

F NJD010910099 3 D

LABEL ITEMS

I. EPA I.D. NUMBER	NJD010910099
III. FACILITY NAME	ORBIS PRODUCTS CORP
V. FACILITY MAILING ADDRESS	55 VIRGINIA ST NEWARK NJ 07114
VI. FACILITY LOCATION	55 VIRGINIA ST NEWARK NJ 07114

GENERAL INSTRUCTIONS

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

II. POLLUTANT CHARACTERISTICS

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

SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED
A. Is this facility a **publicly owned treatment works** which results in a **discharge to waters of the U.S.**? (FORM 2A)		X	
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	
E. Does or will this facility treat, store, or dispose of **hazardous wastes**? (FORM 3)	X		
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	
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	

SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED
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	
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	
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	
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	
J. Is this facility a proposed **stationary source** which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	

III. NAME OF FACILITY

1 SKIP ORBIS PRODUCTS CORPORATION

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*
2 KUCHENMEISTER CLIFFORD MANAGER	201 824 3144

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX	B. CITY OR TOWN	C. STATE	D. ZIP CODE
3 140 ROUTE 10	4 EAST HANOVER	NJ	07936

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER	B. COUNTY NAME
5 55 VIRGINIA STREET	ESSEX

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE *(if known)*
6 NEWARK	NJ	07114	

CONTINUED FROM THE FRONT

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

A. FIRST		B. SECOND	
2869	(specify) Industrial Organic Chemicals,n.e.c.	2899	(specify) Chemicals & Chemical Preparations,n.e
C. THIRD		D. FOURTH	
	(specify)		(specify)

VIII. OPERATOR INFORMATION

A. NAME

ORBIS PRODUCTS CORPORATION

P	(specify)	201 887 5600

140 ROUTE 10

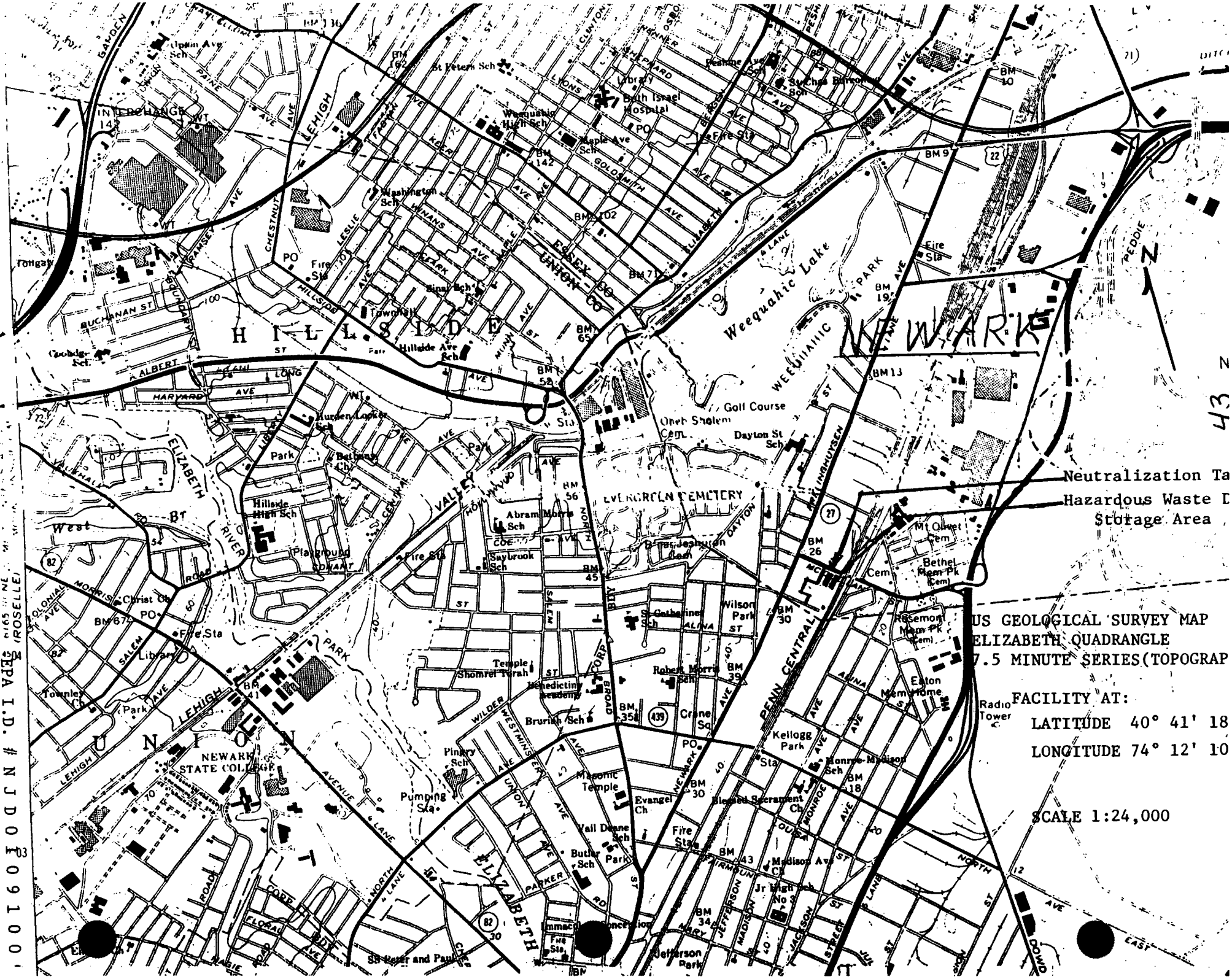
EAST HANOVER	NJ	07936

	~~NEW JERSEY~~	(specify) See attached list
	C-7507	(specify) NJDEP AIR

Basic manufacturer of aroma chemicals used by producers of flavors and fragrances; also basic manufacturer of fine organic chemical intermediates used by pharmaceutical producers and other industries.

F9: A/51

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
Robert J. Laufer Vice President & General Manager	Robert J. Laufer 42	11/18/80



Neutralization Ta
Hazardous Waste D
Storage Area
US GEOLOGICAL SURVEY MAP
ELIZABETH QUADRANGLE
7.5 MINUTE SERIES(TOPOGRAP
FACILITY AT:
LATITUDE 40° 41' 18
LONGITUDE 74° 12' 10
SCALE 1:24,000
EPA I.D. # NJD0109100
43
HILLSIDE
NEWARK
UNION
Weequahic Lake
EVERGREEN CEMETERY
NEWARK STATE COLLEGE
ELIZABETH RIVER
PENN CENTRAL
LEHIGH
ESSEX CO
UNION CO
Golf Course
Radio Tower

REFERENCE NO. 2

Form ADM-012

MEMO

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

TO File DATE July 26, 1984

FROM Joseph Hoyle

SUBJECT Orbis Products Corporation

June 26, 1984

On this date I made an initial site inspection, along with Robert J. Friedman from the Essex County Health Department of Orbis Products Corp., 55 Virginia Avenue, Newark. The reason for this inspection is a followup of a previous inspection done by Andrew S. Barais. During Mr. Barais' inspection it was indicated that a hazardous situation existed. This is also to substantiate the findings.

The site in question sits on a tract of land, .8282 acres, lot 15, block 37.73. Also lots 41 - 45, 47 - 63 McClellen Street, 980 - 990 Frelinghysen 1.3140 acres. The plant itself has been at this location for over 40 years. Bordering the facility is McClellen Street, Frelinghysen Avenue, Virginia Street and the Amtrack/Conrail lines. The Orbis plant is a subsidiary of Norda Corporation. Orbis Products Corp. has been operating with a skeleton crew since July, 1983, under the auspices of expanding at a later date. The plant manufactures products used in the cosmetic agriculture, medical industries. It incorporates chemicals that are extremely hazardous to both the environment and to employees. The process in which products are manufactured, uses glass lined vessels, glass tubing, and most of all stainless steel fittings.

I, the writer and Robert Friedman, met with Mr. William Amaducci, Plant Manager, and also with Mr. Albert Devigile, Plant Superintendent, about why we were there. During the conversations it became apparent that both Amaducci and Devigile were uneasy. (Note: Prior to making inspection, an appointment had been set up). I indicated that on the previous inspection several items of interest needed to be addressed and that if in fact these items had been complied with. After a few moments to contemplate on what was expected, an inspection party consisting of Robert Friedman, Joseph Hoyle, William Amaducci, Albert Devigile, proceeded toward the main complex. Upon reaching the outer door way of the office we made contact with Mr. Max Williamson, Plant Foreman. Mr. Williamson along with Devigile have been with the Orbis Company for over three decades. Mr. Williamson is the union shop steward. In speaking with both men, Mr. Friedman advised them of the serious nature of not being safety conscious when working with hazardous materials.

As the inspection entourage left the main office it proceeded to the rear of the site. There is a fence that separates Orbis from a junk yard. In this particular area it is evident that soil contamination exists. This contamination coming in the form as rain run off, but a closer evaluation show that this was in fact oil leaching from the junk yard. I spoke to Mr. Amaducci about it, and he indicated "what can I do". In this particular area, holding tanks (aboveground) showed evidence of oil saturated concrete, also the appearance that drums have been in this location for quite some time. When asked about the housekeeping

requirements, I was informed that due to shortage of personnel and other high priority commitments certain areas of the facility were left alone. We then traveled toward the other parts of the facility. Upon entering an open area I asked Mr. Amaducci where did all the water (rain) run off go to and then he indicated that through the storm sewer system which is connected to a 20 thousand gallon holding tank, (partially sunken) also that the plant has a permit with the Passaic Valley Sewage Commission #21401032. I asked Mr. Amaducci did he have any analytical data on the effluent, he said he did, but not at the Newark office. We observed the tank in question. Concrete in construction, no liner on bottom, but Amaducci claimed that a natural clay barrier was at bottom. When looking into this vessel it was noted that a thin film of oil at the surface. When asked, the reply was that this layer was skimmed off and burned in the plant's furnace. What about the sludge at the bottom of the tank, reply "that the sludge has never been removed". Asked did he know that the stuff was hazardous, it was if no concern necessary. We then left this area and made our way toward a warehouse. Before reaching this area, off to the left side of the court yard there are drums stacked and lined. When inquired, indicated that these drums were empty and being staged there for drum reclamation. Drum reclaimers name not furnished at time of inspection. Stenciled on the side of many of the drums were these chemical names:

1 - P-chlorobenzoyl
2 - Sodium hypochloride
3 - Allyl isothiocyanate
4 - Anisic aldehyde
5 - Allyl chloride

Asked if these drums were completely empty when sent to reclaimer, the reply was "yes", but upon inspection it proved that most of drums had the one inch residual liquids in them. I informed Mr. Amaducci that he could be liable for shipping residual hazardous waste illegally and that should two dissimilar materials make contact under adverse conditions it could prove costly not only in material, but also to the human environment. With this the inspection group moved toward the warehouse.

The outward appearance of the warehouse is one of abandonment, broken windows, open doors, and drums of chemicals, permeate the area. Both Robert Friedman and myself entered the warehouse very cautiously, followed by Mr. Amaducci, Devigile and Williamson. Once inside the warehouse, it was apparent that no work had been accomplished since the previous inspection. Leaking drums stacked three high, drums sitting in pools and pools of liquid. The liquid that was observed has a bit of odor to it. Not of a petroleum product but of an acidic compound. First floor - approximately 1200 drums stacked three high, sitting in an haphazard way, leaking, corroded bottoms.

Stenciled on drums:

1 - P-chlorobenzoyl
2 - Sodium hypochloride
3 - Allyl isothiocyanate
4 - Anisic aldehyde

There were no other questions to ask, but to indicate to Mr. Amaducci the internal cleanup must begin immediately. I have been informed by Mr. Amaducci that the plant will be shut down for two weeks and will reopen during the week of the 27th of July. I indicated to Mr. Amaducci that it was imperative that steps be taken prior to closure to have the areas in question corrected. "I'll do my best", was the reply. The upper floors of the warehouse, were littered with debris and trash. The extreme lower levels have the same cosmetic appearance as all of the other sections of the building. When asked about the disposition of the building, it was indicated by Mr. Amaducci that the building itself was part of the refurbishing program of the plant and that at present no work was being accomplished.

At this point we left the warehouse type structure and proceeded toward the laboratory/office area. In this region I inquired about the overall working schematic. Mr. Amaducci again made it clear that only chemist/technicians were allowed to handle any of the material there. Robert Friedman noted that a rather large container contained chlorinated phenols (this was on the label), and informed Mr. Amaducci that things of this nature should not be left laying around. Mr. Amaducci indicated that all potentially hazardous materials would be removed and segregated by compatibility. Mr. Friedman at this time asked both Mr. Devigile and Mr. Williamson about the safety aspects of their proposed operation. Both men replied with a positive response that protective clothing would be used.

The inspection group returned back to the main office where a prescheduled date was set for reinspection, tentatively the week of 7/23 to 7/27, this would give the company time to clear up any discrepancies that were noted.

RECOMMENDATIONS:

These are the things that require immediate attention -

1) That all drums regardless of nature will be off ground, and placed on pallets.

2) All contaminated soil be removed and sampled and disposed of in accordance with Hazardous Waste regulations.

Soil contamination is located in area where fence separates, Orbis from junk yard.

Soil contamination in and around aboveground tank to the rear of site.

Warehouse:

1) Removal, proper labeling, and disposition of drums and products within the warehouse.

   A) Concerning Safety -

      1) A fire control system to be installed, eg. sprinkler system,

foam, etc.

2) Respirator and pertinent individual safety equipment available.

3) Water control - prevention rain water from entering building.

2) Appropriate drainage system (water) either installed or upgraded. This will eliminate the ponding effect on the floor of the warehouse.

Holding Tank:

1) The oil and water be drained plus what residual sludge that is on bottom be removed, sampled and disposed of properly. This will greatly reduce the habitation of the dipterous insect.

(The skimmed surface of holding pond (tank) should be analyzed for hazardous material). This will help regulate the amount of volatiles released into the environment.

The scheduled time when all of the above recommendations should be complied with is on or before 8/1. Should none of the items be corrected or disregarded a Notice of Violation will be issued.

FOC20:dg

REFERENCE NO. 3

Form ADM-012

MEMO

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

TO File DATE 8/27/84

FROM Joseph E. Hoyle JEH

SUBJECT Orbie Products Corp.

On August 20, 1984, I the writer of this report along with Robert Friedmann, Essex County Health Department, and Irwin Rutkowski Engineering Bureau, made our third field inspection to the above mentioned facility. This inspection entails a more indepth synopis of what the final disposition of the facility. So far the plant has been operating in a general atmosphere that has left both the employees and the state in situation of discontent. This is due to economic set-backs that have taken its toll.

August 1, 1984, an inspection was made at Orbis to determine if any corrections have been made since the previous inspection. At this inspection it was evident that some progress toward clean up have taken place. The areas that were to be addressed:

1. Drums sitting on ground.
2. Contaminated soil.
3. Warehouse
4. Holding tanks

As in previous reports these areas needed immediate attention. Here are the findings from that inspection:

Item #1 (A) Drums - 90% of the drums that were sitting on the ground were placed on pallets and rearranged so that there could be no water enhancing chemical activity. The 10% that were not on wooden pallets were either plastic or beyond retainability.

(B) The contaminated soil in question had not been removed but covered over with sand to soak up the oil that has saturated the soil. I questioned Mr. William Amaducci about it and he indicated that when his people at Norda made preparations to drain, sample and dispose of the contents from tank #19A then will the contaminated soil be removed. The contaminated soil near the fence area was cleaned and spread, pallets and other debris were removed and stored properly.

Item #2. Warehouse: The warehouse, (outside) where drums were being stored, was cleaned. This indicated that a positive effort was instituted to aleviate prior

discrepancies. Still inside the warehouse there were no accurate labeling of the drums and most were still three high in some places. No sprinkler system available or were there adequate firefighting apparatii available. This I informed Mr. Amaducci was not acceptable and that should any major incident come out of it, that his company could be and will be charged with:

1. safety code violations
2. fire violations
3. Spill Compensation and Control Act - 28:10-23.11.

This made Mr. Amaducci aware of the extreme seriousness of the situation.

Item #3 -Holding tank - this area had not been addressed, reasoning, that he could not begin until parent company (Norda) has made some arrangements towards sampling and disposal of contents. I indicated to Mr. Amaducci that due to the nature of the inspection an "Notice of Violation" would be issued for:

(1) Storing hazardous waste on site without a permit beyond the 90 day limit.

(2) Disposing of the oil inside of the tank, which in turn is used to burn in the plants furness without permit.

(3) Improper labeling of chemical drums - (ref. to item #1) this is not only unsafe practice but also a hazardous one as well. Mr. Amaducci informed me that the proper labeling process would begin as soon as possible. I indicated to Mr. Amaducci that this should have been taken care of after the previous inspection. And that in effect is a direct violation of OSHA regulations and 29CFR part 1501, 1502, 1503 liable to penalties. This proved very advantageous, in that both state and company were aware of descrepancies. During the inspection dated 20 Aug. 8 the following was noted:

The area where holding tank #19A is located a submerable pump. This pump is saturated with a very heavy oil type substance. The contents of the tank as per information received from Amaducci is "spent solvents". This I am told is to be pumped out and removed by 8/24.

The laboratory area where the following chemicals were found:

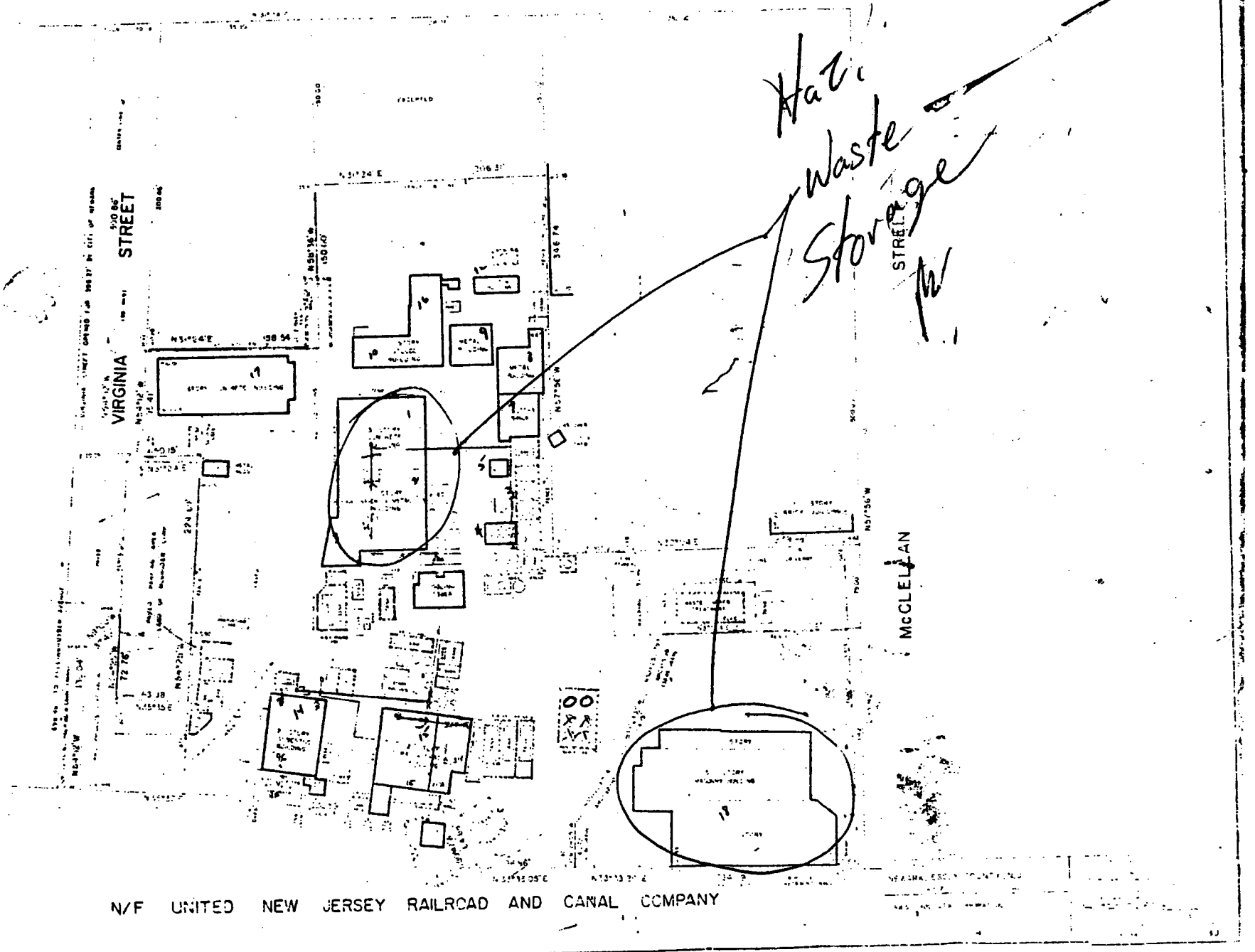
cyclotenate - 26646 (7-19-83/9-8-83)
allyl isotheocyanate (4 each)
isobutyric acid
nitric acid
toluol
sodium hydroxide waste
thymol crystals
throxyls chloride
methy pentadiene
chlorinated phenols
aubepine

These chemicals were scattered about in the laboratory. All were in glass bottles, with screw caps and cork plugs. I asked Mr. Amaducci about when will these things be "packed" up and was informed that CECOS, and Norda Chemist were supposed to set a date of 8/24 to have these things manifested, lab packed and shipped. There is also another lab pack partially filled mainly with salts but when I inquired about what the actual contents were and where would I get a copy of the inventory listing the reply that was recieved, is that the inventory sheet is at the main office in Boonton, N.J., and this office would be forwarded the sheet as the analytical data concerning the manifests. Outside the laboratory toward the McClellon side of the site is a 20,000 gallon storage tank, this tank contains sodium hydroxide solution. The approximate volumn is unknown. I asked Amaducci about the disposition and he indicated that the contents had been sold, but he didn't have the buyers name or number. I understand that the removal of the contents should take place 8/24.

Both Mr. Rutkowski, Mr. Friedmann and myself informed Mr. Amaducci that should these violations go uncorrected very heavy penalties could be levied against his company. I also inquired as to the total disposition of the site and again I was informed that he still has no idea as to the disposition.

After reviewing what was found and the process of remedy, this inspection party left the site.

FOC20:efw


FRELINGHUYSEN
AVENUE
VIRGINIA
STREET
McCLELLAN
STREET
Haz. Waste Storage
N/F UNITED NEW JERSEY RAILROAD AND CANAL COMPANY

53

REFERENCE NO. 4

ADM-012

MEMO

NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

TO File

FROM Red Rutkowski RR DATE 8/28/84

SUBJECT ORBIS Products Corp. Subsidiary of Norda Inc. Newark, NJ, EPA ID NO. NJD 010 910 099

On Monday, August 20, 1984, from 1000 to 1330 hrs., a site visit and inspection was conducted at the above referenced facility. The following named persons were involved:

Bill Amaducci - Manager, ORBIS Products
Al Devagelli - Prod. Supv., ORBIS Products
Bob Friedman - Ind. Hygienist, Essex Co. Dept. of Health
Joe Hoyle - DWM, BFO, CFO
Red Rutkowski - DWM, BHWE

A RCRA inspection was completed by BFO and a site inspection taking approximately two (2) hours was conducted.

Background:

Orbis Products Corp., Newark, is a subsidiary of Norda, Inc. Norda has facilities in Boonton and East Hanover, NJ. All three facilities are listed as being involved in Aromatic Chemicals, Pharmaceuticals, organic intermediates, fragrances and flavors.

At the time of the 8/20/84 visit, the Newark facility was staffed by four people and it was reported that operations had ceased in late 1983 due to foreign competition. It was also reported that Norda had similar operations in Mexico City.

The current activity was described as selling off existing inventory, limited blending of inventory items, and the cleaning up of the site. It was stressed by Orbis that the cleanup was not to be construed as a closure as the facility was reported as capable of resuming operation either by Orbis or a new owner.

The facility has been listed by the NJDEP as a TSDF (category 3) and is shown in the RCRA-HWDMS read out as a generator only. The design capacities are listed in the 11/19/80 Part A notification as T01 (tank treatment) of 500,000 gallons per day and S01 (container storage) of 5,500 gallons.

BHWE files reveal that the facility requested delisting in a June 16, 1981 letter to EPA on the basis of (a) operating a simple waste water neutralization tank exi.ting to a POTW (Passaic Valley Authority) and (b) the ninety (90) day drum storage exemption. No record of a reply can be found.

Additionally, reported on 8/20/84 was that when the plant was operating, the oils separated (skimmed) during the waste water treatment were stored and fed as supplemental fuel to the plant's three boilers.

As an added point, Orbis indicated a total tank capacity at the site of approximately 400,000 gallons.

Prior involvement from Field Operations and the Newark Health Department began apparently when a neighborhood complaint was received relative to an accumulation of drums in a warehouse on the edge of the site (5/24/84 odor complaint response from Newark Health Dept.).

Site Discussion:

Prior to the site tour and inspection, a meeting and paperwork review was conducted. It appeared that many of the records associated with the plant operation had been transferred to the Norda operations. Preparedness and prevention, contingency plans, and emergency procedures, and personnel training documents were not available.

Several manifests were reviewed by BFO. These did not appear to be a complete manifest file. The facility requested blank manifests and thirty-five (35) were mailed by the writer on 8/21/84 with instructions and listed contacts in the manifest section for future activity.

The facility was questioned as to the future status of the site and the Orbis personnel indicated they were uncertain and stated that a decision was to be made at a management meeting scheduled for August 21, 1984. The options indicated were that the operation would either close, remain open and again commence operation, or be purchased by another owner who would probably commence operations as previously performed. No immediate potential buyer was mentioned.

Orbis maintained that the cleanup operation was not a closure mechanism and contended that most of the residual wastes were not hazardous. Orbis was advised that the contention must be substantiated by analysis and classification procedures and that all wastes would be considered hazardous until nonhazardous verification was provided by Orbis. On 8/20/84, the writer mailed a list of State certified laboratories to Orbis to select for use in the analytical process.

As closely as could be ascertained, the primary wastes generated are the still bottoms from batch processes. These wastes are viscous, dark colored and tend to gelatinize upon standing. They were reported as containing various aldehydes and manganese salts.

Site Inspection:

The entire facility was inoperative including the three boilers. These are blue seal operated units, two of which were estimated at 25,000,000 BTU per hour capacity. The various process areas were visited and there was evident a fair degree of dismantlement. Piping and equipment appurtenances were on skids and pallets. Orbis reported that some equipment had been sold. The general housekeeping appearance was considered as average with evidence of tidying the various areas by stacking in orderly rows the various blend tanks, containers and bins.

There were three tanks cited as being involved in the storage of waste fuels approximately 10,000 gallons each. These were concrete diked to about four foot height.

Several areas were noted with drums stored neatly on their sides and appearing empty (metal drums and large plastic carboys).

Two main areas of concern were as follows:

The waste water treatment unit consisted of a ground level concrete structure about 8 feet deep, 20' x 40' with sectionalized covers which could be moved easily. It consisted of two sections with the first used as a skimmer and the second having central agitation. This unit fed to the sewer line outfall. It was reported by Orbis that the unit consisted of a pH control operation. The waste stream is acidic in nature and sodium hydroxide solution is metered to the unit to neutralize same. The facility reported the generation of very small quantities of sludge.

At the time of the site visit, the unit was not operating and it appeared that it had not been in operation for some time. It was filled to a depth of approximately six (6) feet with a brown colored sludge. The composition of the sludge was not available from Orbis records. The estimated quantity was 37,000 gallons. Orbis was advised to classify and dispose of the sludge and a notice of violation was issued to that effect.

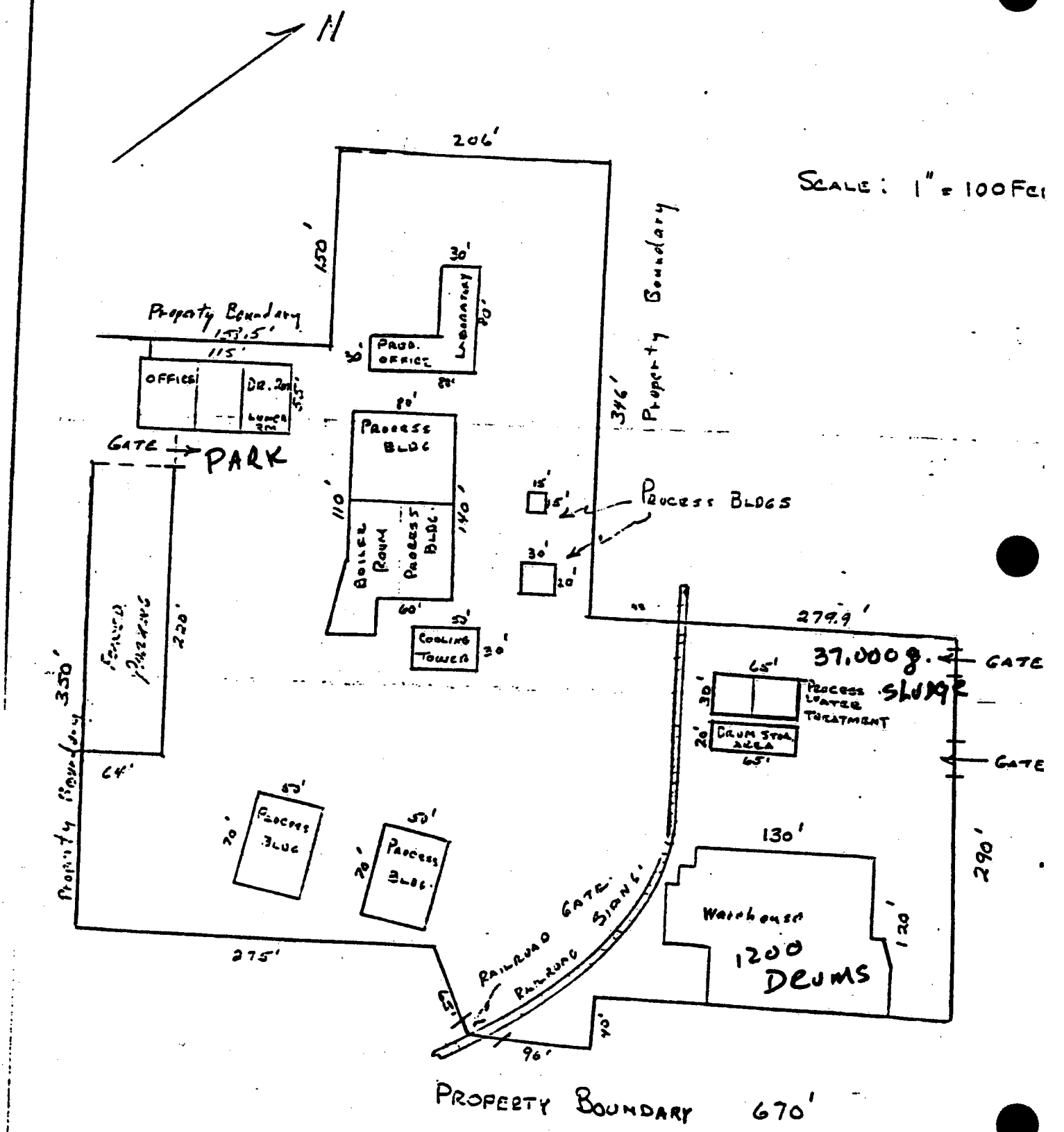
The second area of concern consisted of the warehouse in which were stored approximately 1,200 drums of the previously described still bottom residues. The warehouse had been badly vandalized (all windows broken) and the drums were exposed to the elements and overhead leaks. They were stored three high on palets with little or no identification with no regard for aisle space to identify drums in the center of the storage area. Several areas of leaking drums were found and brought to Orbis' attention. As a portion of this area, Orbis had begun to use over pack drums apparently to contain the leakers. These also did not exhibit identification of contents. Two notices of violation were issued. The first to provide identification plus aisle space and the second to provide preparedness and prevention to minimize the possibility of fire or unplanned releases of hazardous waste to air, soil, and surface waters.

The laboratory section was viewed and there was evidence of lab packs being prepared in fibre drums for disposal of these items. The labs had been stripped of equipment and appeared about 95% closed with only lab chemicals being packed (2-3 drums).

Additionally observed was a 6,500 gallon tank wagon being loaded with waste fuel oil previously described in this memo. The facility reported that this would be manifested to an approved disposal site.

There was not too much evidence of bulk (tank storage) of product or raw materials. One area, next to the powerhouse contained drum raw materials, intermediates, and product which appeared properly labeled.

Form Approved OMB No. 158-S800



8/20/84
SITE CONDITIONS

REFERENCE NO. 5

orm DWM-902 C
./84

NEW J[illegible]EY DEPARTMENT OF ENVIRONMENTAL PROT[illegible]ION
DIVISION OF WASTE MANAGEMENT
~~1259 ROUTE 46~~
~~PARSIPPANY, N.J. 07054~~
120 Rt 126 YARDVILLE

NOTICE OF VIOLATION

ID NO. _____ DATE Oct 9, 1984

NAME OF FACILITY Orbis Products

LOCATION OF FACILITY 55 Virginia Ave Newark

NAME OF OPERATOR Robert Amaducci

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 7:26-9.3b- An Accumulation of 44 Hazardous Waste Drums more than 90 Days - Drums Labeled - Waste Combustible Nos - #127 (X910 - X726) Date on Drums (Start Date Accumulation 1980) (As per Instructions Waste Conversion)

Remedial action to correct these violations must be initiated immediately and be completed by Oct 24, 1984. 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.

Joseph E Hayle Jr (EC02175)
Investigator, Division of Waste Management
Department of Environmental Protection

REFERENCE NO. 6

F. Codlin

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
CN 029
TRENTON, NEW JERSEY 08625

George G. McCann, P.E.
Acting Director

Water Quality Management

DIRK C. HOFMAN, P.E.
DEPUTY DIRECTOR

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Bill Amaduci
Orbis Products Co.
55 Virginia Street
Newark, N.J. 07114

RE: Determination of Non RCRA/IWMF Status
EPA ID No. NJD 010 910 099

JUN 11 1986

Dear Mr. Amaduci:

This is in response to a memo to Mr. Paul Kurisko, Chief of the Bureau of Industrial Waste Management, received on December 11, 1985, from the Bureau of Hazardous Waste Engineering, concerning the classification of Orbis Products Co. as an Industrial Waste Management Facility (IWMF).

The "wastewater treatment unit", for which your company filed a RCRA Part A application as a treatment facility, has been determined to be under the scope of the New Jersey Water Pollution Control Act, N.J.S.A. 58:10A-1.1 et seq. The company is subject to the Industrial Waste Management Facility (IWMF) requirements of Subchapter 4 of the New Jersey Pollutant Discharge Elimination System (NJPDES) Regulations, N.J.A.C. 7:14A-1.1 et seq. Enclosed is an IWMF worksheet which shows the basis of our determination.

This action does not relieve Orbis Products Co. of the responsibility for complying with the hazardous waste generation and accumulation requirements of the New Jersey Hazardous Waste Regulations, N.J.A.C. 7:26-1 et seq. Hazardous waste sludges generated from the unit may accumulate on-site for 90 days or less provided that:

(1) All such waste is, within 90 days or less, shipped off-site to an authorized facility;

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

(3) The date upon which each period of accumulation begins is clearly marked and visible for inspection on each container;

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

Any accumulation of such sludges for any period longer than 90 days would constitute a hazardous waste TSD storage facility, and would be subject to regulation under N.J.A.C. 7:26-1 et seq.

Since your facility has been determined to be an IWMF, pursuant to N.J.A.C. 7:14A-10.5(a)(1)(ii), your facility is considered to be a Significant Indirect User (SIU) requiring an individual NJPDES/SIU permit for your discharge to the sanitary sewer. Enclosed please find the application forms that should be completed in accordance with the guidance material within 90 days of receipt of this letter. If you have any questions on the SIU requirements or desire a pre-application conference, please contact Mr. Muhammad Shaikh at (609) 292-4860.

If there are any questions concerning this letter, please contact Valentin Kouame of my staff at (609) 292-4860.

Sincerely,

Kenneth Goldstein

Kenneth Goldstein, P.E., Chief
Industrial Pretreatment Section
Bureau of Industrial Waste Management

WQM216:vk

Enclosures

cc: Frank Coolick - DWM
Shirlee Schiffman - DWM
Joel Golumbek - EPA

INDUSTRIAL WASTE MANAGEMENT FACILITY (IWMF) WORKSHEET

1. Name: ORBIS PRODUCTS CO.
   Mailing Address: 55 VIRGINIA STREET, NEWARK, NEW JERSEY 07114
   Location Address: 55 VIRGINIA STREET NEWARK, NEW JERSEY 07114
   Facility Contact: BILL AMADUCI
   Telephone No.: (201) 824-3144 RCRA ID No.: NJD 010910099
   Facility NJPDES No.: _____ Type: ___ DSW ___ DGW ___ SIU X None
   Receiving POTW, if any: PVSC POTW NJPDES No. NJ0021016

2. Description of Waste Source(s): GENERATING FROM PHARMACEUTICALS FRAGRANCES, FLAVORS AND AROMATIC COMPOUNDS MANUFACTURING

3. The Waste Source is:

   X Intracompany/Intrastate ___ Intercompany/Intrastate

4. Operational Units comprising the treatment works (describe):

   Unit #1: FIRST STEEL TANK: FEED COLLECTION
   Unit #2: SECOND STEEL TANK: PHASE SEPARATION OF ORGANIC MIXTURES
   Unit #3: FIRST CONCRETE TANK: NEUTRALIZATION
   Unit #4: SECOND CONCRETE TANK: " " "
   Unit #5:
   Unit #6:
   Unit #7:
   Unit #8:

5. Criteria (For each item indicate Yes, No, N/A, etc.):

   a. Is there an influent wastewater? YES
      Is it hazardous? YES
      If yes, list waste type. D001

   b. Does the treatment works generate (G), store (S), or treat (T) a wastewater treatment sludge or residue? YES
      If yes, which units are involved, and what function do they perform? 2(G,S)
      Is it hazardous? YES
      If yes, list waste type(s): D001

   c. Is the unit a "tank" as per NJAC 7:14A-4.3? YES

6. Conclusions: Is the facility an IWMF? YES

7. Comments: THE FACILITY IS NOT A HAZARDOUS WASTE FACILITY (HWF) because it will STORE CONTAINERIZED HAZARDOUS WASTE FOR 90 DAYS OR LESS.

REFERENCE NO. 7

7-14-132

MEMO NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION

TO Spill file

FROM Jeffrey Hill JH. DATE November 18, 1986

SUBJECT Orbis, 55 Virginia St., Newark - Response to DWM 86-11-17-1M ~~and Pre RCRA inspection~~

Background:

On November 17, 1986 I received an anonymous complaint about a warehouse in Newark that was being used to store drums on McCellan Avenue in Newark. The complainant stated that chemical odors were emanating from the building he described as an old white story warehouse with broken windows. The company whose property it belonged to he identified as Orbis, 55 Virginia Street, Newark.

A file review revealed Orbis as a defunct T.S.D. which also ran a IWMF under a water resources permit. Numerous site visits were performed by Joe Hoyle and Red Rutkowski of this Division. In Mr. Rutkowski's report, he mentioned 1200 drums in old warehouse.

Recent correspondence from our Engineering section to Orbis stated that Orbis had been in violation of NJSA: 7:26-9.3(a) and a.3(b). On August 11, 1986 Orbis was given 10 days to make a response to our department.

At the conclusion of my file review it was questionable of the fate of the hazardous wastes generated at the facility; specifically their process generated still bottoms from large capacity stainless steel tanks.

Inspection:

After noting the buildings presence and faint aromatic vapors from the street, we contacted Mr. Al DiVigli, the plant manager.

Mr. DiVigli stated the plants operation at present only consisted of blending non-hazardous flavorings for the food industry. A visit of their laboratory and raw products confirmed that statement.

The fragrance operation he continued ceased in 1983 of which site remediation had been performed. This remediation included:

1) Removal of six underground tanks that contained hazardous substances. He identified them as Hexane, Isopropyl Alcohol, Methanol and Toluol. A visual inspection revealed holes in three of these tanks. Mr. DiVigli could not identify which tank held which substance.

2) Two 25,000 gallon above ground tanks which contained hazardous wastes (solvents) had also been removed.

3) The drums left behind he stated were taken away by Waste Conversions.

During the inspection we found 2 concrete tanks that were described in the file to contain sludges as part of the operation. They still had a large volume of water in them. When the warehouse was approached we asked Mr. DiVigli if we could look inside. He told us that he did not have the key and that there weren't any drums inside.

A large pile of soil and material identified as Kiln dust by DiVigli existed in several adjoining piles along the length of one side of the warehouse. While I was speaking to Mr. DiVigli, Mr. Zollner climbed on top of these piles which are approximately six feet high to determine if any drums existed inside. Mr. DiVigli did not expect us to verify his claim about the warehouse being empty.

After Mr. Zollner peered through the many broken windows he noted the presence of at least one hundred drums. Mr. DiVigli then told us there were 61 drums inside which contained sludge from the bottom of the tanks. He added they had permits for their storage.

Other items of interest noted were the presence of two underground 10,000 gallon fuel oil tanks still in use which are used for the buildings heat.

At the conclusion of inspecting the plant Mr. Zollner asked Mr. DiVigli for any paperwork he had in regard to the hazardous waste operations. He stated that any paperwork would be at their Boonton Operation. Paperwork specifically asked for were manifests and contingency plans.

Mr. Zollner then requested Mr. DiVigli to telephone the facilities owners that he named were Bill and Bob Amaducci to gain additional information. Mr. DiVigli agreed. After Mr. DiVigli informed Bill Amaducci about our presence and inspection at the facility, he appeared disturbed by Amaducci's return statements.

After Mr. Zollner and I left Mr. Zollner told me Mr. Amaducci was agitated by our inquiry about the facility and Mr. Zollner's request they meet as soon as possible. He then told me a meeting was arranged on Friday November twenty first at 0900. This was the date that Mr. Amaducci said he was first available.

Conclusions:

The next day I spoke to Al Navibi with our Bureau of Hazardous Waste Engineering. Mr. Navibi stated he had sent a enforcement request to Karl Delaney in order that the Orbis facility receive our attention. Mr. Navibi visited the site last year when they were still in operation. He is aware of the conditions in the warehouse and familiar with their operation. When I told him we found 3 excavated tanks with holes in them, he stated it was illegal. Orbis never made application nor informed engineering of their removal!

Mr. Navibi also mentioned we should expect minimal cooperation from the Amaducci brothers. He also recommended we maximize all penalties.

REFERENCE NO. 8

HERBERT J. HANNOCH
(1911-1983)

MILTON H. STERN
ALBERT G. BESSER
BERNARD S. BERKOWITZ
JAMES P. DUGAN
RONALD M. STURTZ
CARL G. WEISENFELD
ROBERT J. DEL TUFO
JAMES J. SHRAGER
ASHLEY STEINHART
DEAN A. GAVER
JOSEPH J. FLEISCHMAN
ELLEN B. KULKA
BERNARD J. D'AVELLA, JR
SANDERS M. CHATTMAN
STEVEN C. LEVITT
STEPHEN P. LICHTSTEIN
IRA B. MARCUS
ANTHONY J. MARCHETTA
WILLIAM W. ROBERTSON
TODD M. SAHNER
IRVIN M. FREILICH
ROBERT C. EPSTEIN
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HOWARD A. GUTMAN
ANDREW J. STAMELMAN
ANTHONY J. SYLVESTER
A. PATRICK NUCCIARONE
KEVIN J. BRUNO
DAVID N. NARCISO
JANET L. RAMUSACK
NANCY LEM
FRANKLIN K. WYMAN
MIRIAM E. CAHN
MARK MATTIA
JACK GILLMAN
MARY ELLEN SCHEUER
THOMAS L. WEISENBECK
DAVID OWEN
PETER B. BENNETT
KEVIN F. MURPHY
LEONARD A. DAVID
RICHARD M. SLOTKIN
PATRICK E. HOBBS
MICHAEL G. KEATING
JOHN M. SIMON
JEFFREY B. LEHRER
DAVID C. BERMAN
JEFFREY W. POMPEO
MICHAEL KURAK
NANCY B. ROHN
MARY ANN WALKER COLLINS
BRIAN ARRINGTON BOYD*
GERALYN G. HUMPHREY
LAWRENCE W. DIAMOND**
AMY R. WEISSBROD***
DOUGLAS W. WAMSLEY
SUSAN N. MILCH
JEFFREY A. COHEN

*N.Y., D.C. BAR ONLY
**N.Y. BAR ONLY
***N.Y., CA BAR ONLY

December 29, 1986

Our File No.
40345-5

BY HAND

Mr. Robert D. Zollner
New Jersey Department of
Environmental Protection
Division of Waste Management
2 Babcock Plaza
West Orange, New Jersey 07072

Re: Orbis Products Corporation
55 Virginia Street
Newark, New Jersey

Dear Mr. Zollner:

As you know, this firm represents Orbis Products Corporation ("Orbis") concerning the above-captioned plant. This letter transmits individual responses to the various Notices of Violation ("NOVs") issued to Orbis under the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., and the Spill Compensation and Control Act (the "Spill Act"), N.J.S.A. 58:10-23-11 et seq., on November 21, 1986. This letter also provides information essential to an understanding of operations and conditions at the plant and Orbis' position regarding the legal and factual sufficiency of the NOVs. Consequently, this letter is intended and should be construed to constitute an integral part of each of Orbis' responses to the NOVs, which responses are set forth in the Attachment hereto.

I. BACKGROUND

Orbis operates a chemical manufacturing and blending facility at 55 Virginia Street, Newark, New Jersey. As you observed during your recent inspections, this facility is involved in custom blending, distillation and fractionation of batch-sized quantities of various products. The plant manufactures aromatic chemicals for use in the flavors and fragrances industry, as well as fine organic chemical intermediates.

In November 1980, Orbis submitted a Part A Application to the U.S. Environmental Protection Agency ("USEPA") pursuant to §3005(c) of the Resource Conservation and Recovery Act ("RCRA") in order to obtain interim status for material generated at the site and accumulated there in a wastewater treatment (neutralization) system and drums. At the time of that submission Orbis was uncertain whether it would be considered subject to RCRA regulation as a treatment, storage or disposal facility (TSDF). Nevertheless, Orbis, as did hundreds if not thousands of other generators nationwide, sought the protection afforded by interim status as insurance against any conceivable subsequent contention that the facility was operating without proper authorization.

Indeed, shortly thereafter Orbis determined that interim status was unnecessary and inapplicable to its operations, which did not encompass any TSDF activities since both the wastewater treatment system and the drums were exempt: the former as an Industrial Waste Management Facility ("IWMF") and the latter because waste was not stored there for more than 90 days. Consequently, on June 16, 1981 and again on February 8, 1983 Orbis petitioned the USEPA to delist the facility. The USEPA never responded to either of those requests.

By counsel's letter dated October 8, 1985, Orbis petitioned the NJDEP for delisting. NJDEP responded by letter dated December 10, 1985 from Mr. Frank Coolick to Mr. William Amaducci. In that letter Mr. Coolick stated

that the wastewater treatment facility may be an IWMF, and suggested that Orbis both conduct soil sampling in the area where drums had been maintained and apply for an exemption for an above-ground steel tank at the plant.

Since 1983 Orbis has undertaken a coordinated program to scale down operations at the facility and to remove containers of intermediates, products and waste materials.* Some of this work has been undertaken based on input from the NJDEP. As part of this program, Orbis has cleaned out the wastewater treatment system and has removed numerous containers from the facility. Some of those containers have been determined to contain hazardous waste and have been properly manifested and disposed of in secure, permitted facilities. Others have been subjected to further processing and sold in the ordinary course of business.

II. DELISTING

As set forth in a letter dated June 11, 1986 from Mr. Kenneth Goldstein, Chief, Industrial Pretreatment Section, Bureau of Industrial Waste Management, to Mr. William Amaducci of Orbis, NJDEP has determined that the wastewater treatment system is an IWMF subject to regulations at N.J.A.C. 7:A-144.1 et seq., and does not require a hazardous waste facility permit. Mr. Goldstein indicated that as an IWMF, the facility is considered to be a Significant Indirect User ("SIU") and, accordingly, should apply for a NJPDES/SIU permit. Orbis expects to submit that application shortly.

---

*The statement in the NJDEP Inspection Report (regarding the inspections of November 17 and 21) that "The facility is not currently operating" is erroneous. Also untrue is the entry at page B of the Inspection Report indicating that hazardous wastes are "brought from off-site for reworking/reprocessing/storage pending disposal." Without going into further detail here, we also take issue with several other observations set forth in that Inspection Report, including some statements attributed to Mr. William Amaducci.

NJDEP also has requested Orbis to perform soil sampling to eliminate concern regarding possible contamination in the area where the drums had been located. Our consultant, Dames & Moore, already has been working on this project.

Further, as mentioned above, with respect to the steel tank, which Orbis refers to as "OT-100" and which has been used to bulk waste in preparation for offsite disposal, NJDEP has recommended that Orbis submit a request for exemption as a tank used for storage of hazardous waste for 90 days or less. Orbis has requested appropriate application information from NJDEP.

Orbis is pursuing all of these activities so that the delisting process can be concluded expeditiously.

III. NOTICES OF VIOLATION

On November 21, 1986 the New Jersey Department of Environmental Protection ("NJDEP") issued thirty-three (33) separate NOVs to Orbis. Those NOVs were signed and served by Robert D. Zollner, Investigator, Division of Waste Management. Initially, as to all of the NOVs we are forced to assert the objection that they are conclusory and so lacking in specific findings that they are deficient as a matter of law. Moreover, the lack of specific findings of fact in the NOVs makes it difficult if not impossible to provide adequate responses. In effect, Orbis has not been provided information necessary to understand the violations charged.

In an effort to obtain more specific information from the NJDEP, by letter dated December 2, 1986 Orbis, through its counsel, has requested Department records, including records relating to the inspections that apparently formed the basis of the NOVs. One "Inspection Report" and one "Trenton Dispatch Notification Report" were disclosed to counsel on December 17, 1986. Unfortunately, while these documents provide some additional information, they also are conclusory and lacking in precise and adequate description. Moreover, NJDEP personnel have

been unwilling to verbally divulge much additional information regarding their observations that formed the basis of the NOVs. Despite these infirmities, Orbis hereby makes its best effort to respond to the NOVs.

As to seventeen (17) of the NOVs, Orbis asserts the general legal objection that they are inapplicable to Orbis and are of no legal force and effect because they relate to alleged violations of provisions which specifically and solely regulate those entities which treat, dispose or store hazardous wastes. As set forth above, Orbis is not a TSDF and has consistently maintained that position since 1981. Rather, Orbis is a generator only, since hazardous waste does not remain on the premises for more than 90 days. Orbis responds to these 17 NOVs in Section I of the Attachment to this letter.

Orbis concedes that the regulations cited in twelve (12) of the NOVs arguably apply to generators such as Orbis. Those regulations are: N.J.A.C. 7:26-9.4(g); N.J.A.C. 7:26-9.6; N.J.A.C. 7:26-9.7; N.J.A.C. 7:26-7.2; and N.J.A.C. 7:26-9.4(d). Orbis responds to these 12 NOVs in Section II of the Attachment hereto.

Four (4) of the NOVs allege violations of the Spill Act. Orbis responds to those allegations in Section III of the Attachment hereto.

IV. PLANNED ACTIONS

Orbis is continuing and expediting the ongoing procedures dating from 1983 whereby containers are inspected and decisions made as to their disposition. Orbis has set a target date of February 19, 1987 for completing this process. If Orbis determines that the contents of any container no longer can be considered to be usable product, and if any such materials are determined to be hazardous waste, they will be handled and disposed of as required by the Solid Waste Management Act. In no event would any such hazardous waste remain at the plant for longer than 90 days.

Orbis also will perform the two investigations that NJDEP has requested. Toward that end, Orbis has been consulting with its environmental consultant, Dames & Moore, regarding preparation and implementation of sampling plans with respect to the areas where drums once were accumulated and from which the underground tanks were excavated. These actions are not and should not be construed as an acknowledgement of any closure activity by Orbis since Orbis never has operated as a TSDF. Rather, these actions constitute accommodations to NJDEP in the interest of alleviating any environmental concerns that may exist.

Furthermore, while Orbis holds that it has been in substantial compliance with the requirements of N.J.A.C. 7:26-9.6 (Preparedness and Prevention), N.J.A.C. 7:26-9.7 (Contingency Plan and Emergency Procedures), N.J.A.C. 7:26-9.4(g) (Personnel Training), and N.J.A.C. 7:26-9.4(d)5 (Daily Inspection Requirements), Orbis is proceeding to make arrangements to formalize these efforts. We will inform NJDEP of our schedule for completing these procedures as soon as it is finalized.

Moreover, as indicated in the Attachment hereto, Orbis already has alleviated many of the concerns registered in the NOVs by such actions as overpacking and repacking several drums, securing the lids on others and posting "No Smoking" signs in additional areas.

We believe that these actions clearly evidence Orbis' continued cooperation with the NJDEP as well as our intention to operate the plant in full compliance with all applicable laws and regulations.

If you have any questions concerning the above or the Attachment hereto, please do not hesitate to contact me. We look forward to a prompt resolution of this matter,

and, indeed, hope that this submittal will go a long way toward bringing the matter to a close. We will keep you informed of our progress.

Very truly yours,

HANNOCH WEISMAN

By _____
Lawrence W. Diamond

LWD/hl
Attachment
cc: Robert M. Amaducci
Michael Schuit, Esq.

ATTACHMENT

SECTION I

N.J.A.C. 7:26-9.10

Failure to meet financial requirements for facility closure

It is alleged that Orbis failed to meet the financial requirements for facility closure as required by N.J.A.C. 7:26-9.10, which provides that owners and operators of all hazardous waste facilities, except as provided in N.J.A.C. 7:26-9.1, must have a written estimate of the cost of closing a facility. Expressly excepted from these financial requirements are generators, such as Orbis, that accumulate waste on site for ninety (90) days or less.

Therefore, this regulation does not apply to Orbis, which has never been a treatment, storage or disposal facility in fact. Orbis respectfully requests that this NOV be withdrawn.

N.J.A.C. 7:26-9.13 **Failure to meet liability requirements**

It is alleged that Orbis failed to meet the liability requirements of N.J.A.C. 7:26-9.13, which provide that an owner or operator of a hazardous waste treatment, storage or disposal facility must demonstrate financial responsibility and maintain liability coverage for sudden and accidental occurrences resulting in bodily injury or property damage to third parties. This regulation, by its terms, does not apply to a generator, such as Orbis, that accumulates waste on site for ninety (90) days or less.

Therefore, this regulation does not apply to Orbis, which has never been a treatment, storage or disposal facility in fact. Orbis respectfully requests that this NOV be withdrawn.

N.J.A.C. 7:26-9.8(g) Failure to notify Department of closure activity

It is alleged that Orbis failed to notify the NJDEP of closure activity, as required by N.J.A.C. 7:26-9.8(g), which expressly provides that an owner or operator shall notify the Department at least one hundred eighty days prior to the date the owner or operator expects to begin closure, except in cases where the facility's permit is terminated or the facility is otherwise ordered by official decree or compliance order to cease receiving wastes or to close. The dates when the owner or operator "expects to begin closure" should be within thirty days after which the owner or operator expects to receive the final volume of wastes.

Generally, N.J.A.C. 7:26-9.8 applies to owners or operators of all hazardous waste facilities except as provided in N.J.A.C. 7:26-9.1. N.J.A.C. 7:26-9.1(c)4 specifically excludes from the requirements of this regulation hazardous waste generators, such as Orbis, that accumulate waste on site for ninety (90) days or less. Thus, generators like Orbis need not notify the Department of closure activity pursuant to N.J.A.C. 7:26-9.8(g). Furthermore, closure activity has not and cannot have taken place at the Orbis site since Orbis is not a treatment, storage or disposal facility. Finally, Orbis operations have not terminated; Orbis merely has undertaken a program to scale down its operations at the Newark facility.

Therefore, Orbis respectfully requests that this NOV be withdrawn.

N.J.A.C. 7:26-9.4(b) **No Waste Analysis Plan**

It is alleged that Orbis does not have a waste analysis plan as required by N.J.A.C. 7:26-9.4(b):

> (b) Before an owner or operator treats, stores, or disposes of any hazardous waste, the owner or operator shall obtain a detailed chemical and physical analysis of a representative sample of the waste.

This Notice of Violation clearly applies only to an owner or operator that treats, stores or disposes of hazardous waste. Orbis, however, is only a generator of hazardous waste, which is not accumulated on site for more than ninety (90) days.

While the necessity for a waste analysis plan applies to TSD facilities, there is no equivalent requirement for generators. See N.J.A.C. 7:26-9.3.

Although not required by N.J.A.C. 7:26-9.3 to maintain a waste analysis plan, Orbis continues the process of reviewing and analyzing the materials at the plant.

Orbis respectfully requests that this NOV be withdrawn.

N.J.A.C. 7:26-9.8 **No Closure Plan**

It is asserted that Orbis does not have a closure plan as required by N.J.A.C. 7:26-9.8, which sets forth general requirements for the closure of any hazardous waste facility. Specifically excluded from this regulation are those handlers of hazardous waste identified in N.J.A.C. 7:26-9.1, which include generators, such as Orbis, that accumulate hazardous wastes on site for ninety (90) days or less.

Accordingly, this NOV does not apply to Orbis. Orbis respectfully requests that this NOV be withdrawn.

N.J.A.C. 7:26-9.4(m) **Failure to allow inspection by authorized Department representative**

It is alleged that Orbis failed to allow an inspection by an authorized Department representative. N.J.A.C. 7:26-9.4(m) expressly provides that:

> (m) The Department and its authorized representatives shall have the right to enter and inspect any building or other portion of the facility for the purpose of:
>
> 1. Investigating an actual or suspected source of pollution of the environment; and
>
> 2. Ascertaining compliance or noncompliance with statutes of the State of New Jersey or any rules or regulations of the Department.

The NOV is so unspecific that it is legally deficient: it does not specifically allege what a Department representative could not inspect, or when he could not inspect it. However, if Mr. Zollner is referring to the events of November 17, 1986, Orbis responds as follows.

As recited in the attached affidavits of Mr. William Amaducci and Mr. Albert DeVigili (Exhibits A and B), on November 17, 1986 as well as on subsequent occasions Orbis allowed NJDEP representatives to inspect all portions of the plant to which they sought access. While the NJDEP inspectors may not have completed their inspection on November 17, they did not insist on

doing so and, as was communicated to them on that day, would not have been barred from doing so. The inspectors agreed to return on November 21 to continue their inspection.

On Friday, November 21, 1986, and again on Wednesday, November 26, 1986, the NJDEP representatives were provided access to any and all parts of the facility and to available records at their request. At no time has Orbis prevented or impeded NJDEP inspection of plant premises or records. We further note that the NJDEP Inspection Report purportedly prepared by Mr. Zollner makes no reference to any problems regarding access.

Therefore, no corrective action has been necessary with respect to the allegations set forth in this NOV. If NJDEP were to assert that corrective action was required, such corrective action certainly has been taken by facilitating the inspections on November 21 and November 26. Consequently, Orbis has been and remains in full compliance with N.J.A.C. 7:26-9.4(m).

Accordingly, this NOV is unfounded, and Orbis respectfully requests that this NOV be withdrawn.

N.J.A.C. 7:26-9.4(k)1 **Records not available as required**

It is alleged that Orbis records were not available as required by N.J.A.C. 7:26-9.4(k)1, which expressly provides that:

> (k) Records shall be available according to the following requirements:
>
> > 1. All records shall be furnished upon the request, and made available at all reasonable times for inspection, by any officer, employee, or representative of the Department who is duly designated by the Department.

The NOV is legally deficient in that it does not specify which records allegedly were not available, and when they allegedly were not available. For the purpose of this response, Orbis will assume that the NOV is referring to records, i.e. manifests, originally requested on November 17, 1986.

As stated in the response to the NOV issued for the alleged violation of N.J.A.C. 7:26-9.4(m), which response is incorporated herein by reference, on November 17 manifests were not available at the Newark plant because they were in the possession of the plant Manager, William Amaducci, at the Orbis office in Boonton, New Jersey. Had the inspector insisted that Mr. Amaducci produce the records at the time (which, we believe, would have been unreasonable), Mr. Amaducci would have done so. However, Messrs. Zollner and Amaducci agreed that the records could be made available on November 21. In fact, the records

were available for inspection at the Newark plant on November 21 and November 26, 1986.

Therefore, reasonable access to records was afforded NJDEP. Orbis asserts that in fact it has not violated N.J.A.C. 7:26-9.4(k)1, and that no corrective action was necessary with regard to the allegations set forth in this NOV. If NJDEP were to assert that corrective action was required, such corrective action certainly has been taken by facilitating the inspections and records review described above. Furthermore, Orbis is taking the step of making photocopies of its records so that they will be available at both its Boonton and Newark offices.

Accordingly, Orbis has been and remains in full compliance with N.J.A.C. 7:26-9.4(k)1. Orbis respectfully requests that this NOV be withdrawn.

N.J.A.C.	7:26-9.12(a)9i	Failure to yield authorized Department representative access to container storage area for inspection on 11/17/86

It is alleged that Orbis Products failed to provide authorized Department representatives access to a container storage area for inspection on November 17, 1986, as required by N.J.A.C. 7:26-12.4(a)9i, which provides:

> 9. The permittee shall allow an authorized representative of the Department upon presentation of credentials to:
>
> > 1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where the records should be kept under the conditions of this permit.

This NOV is legally deficient in that it fails to identify the container storage area from which the Department representative allegedly was barred.

The narrative and accompanying affidavits comprising the Orbis response to the NOV issued for an alleged violation of N.J.A.C. 7:26-9.4(m) are incorporated by reference herein. As noted in that response, any requested inspection did take place at a reasonable time as determined by the mutual agreement of NJDEP and Orbis.

Therefore, this NOV is unfounded, and Orbis respectfully requests that it be withdrawn.

N.J.A.C. 7:26-12.4(a)9ii **Failure to give access to records required by permit**

It is alleged that Orbis failed to provide access to records as required by its permit. N.J.A.C. 7:26-12.4(a)9ii provides that:

> 9. The permittee shall allow the authorized representative of the Department upon presentation of credentials to:
>
> > ii. Have access to and copy any records that shall be kept under the conditions of this permit.

This NOV is legally deficient in that it fails to identify the records to which access allegedly was denied, and when such access allegedly was not given.

As discussed in the Orbis response to the NOVs issued for the alleged violations of N.J.A.C. 7:26-9.4(m) and N.J.A.C. 7:26-9.4(k)1, which responses are incorporated herein by reference, access to Orbis records was provided NJDEP.

Therefore, this NOV is unfounded, and Orbis respectfully requests that it be withdrawn.

N.J.A.C. 7:26-12.4(a)9iii **Failure to allow inspection of logs and control facilities of container storage area**

It is alleged that Orbis failed to allow an inspection as required by permit and N.J.A.C. 7:26-12.4(a)9iii, which provides:

> 9. The permittee shall allow an authorized representative of the Department upon presentation of credentials to:
>
> > iii. Inspect any facilities, equipment (including monitoring equipment), practices, or operations regulated or required under this permit.

This NOV is legally deficient in that it fails to identify the container storage area which allegedly could not be inspected or when such inspection allegedly could not take place. If the NOV refers to the events of November 17, 1986, Orbis responds as follows: any inspection not conducted on November 17, 1986 was rescheduled per the mutual agreement of Mr. Zollner and Mr. Amaducci, as described in the Orbis responses to the NOVs issued for the alleged violations of N.J.A.C. 7:26-9.4(m) and N.J.A.C. 7:26-9.4(k)1, which responses are incorporated herein by reference.

Therefore, this NOV is unfounded, Orbis respectfully requests that it be withdrawn.

N.J.A.C. 7:26-12.4(a)9iv — Failure to give access to container storage area for sampling substances

It is alleged that Orbis failed to provide access as required by permit and N.J.A.C. 7:26-12.4(a)9iv, which provides:

> 9. The permittee shall allow an authorized representative of the Department upon the presentation of credentials to:
>
> > iv. Sample or monitor for the purpose of assuring permit compliance as otherwise authorized by the Solid Waste Management Act (N.J.S.A. 13:1E-1 et seq.), any substances or parameters at any location.

This NOV is legally deficient in that it fails to identify the container storage area from which the Department representative allegedly was barred, and when such access allegedly was not given.

As discussed in the Orbis response to the NOV issued for the alleged violation of N.J.A.C. 7:26-9.4(m), which response is incorporated herein by reference, access to the container storage area was provided, for sampling and any other legitimate purpose. Further, the NJDEP representatives did not indicate any desire to conduct sampling on November 17 or 21, except that on November 21 Mr. W. Amaducci assisted Mr. Zollner to take a sample from tank OT-100. On November 25, counsel was informed by a NJDEP representative that the Department intended to conduct sampling on November 26. Orbis mobilized its consultant, Dames &

Moore, to attend the November 26 inspection to take splits of any samples extracted. In fact, however, NJDEP did not take any samples on November 26.

Therefore, this NOV is unfounded, and Orbis respectfully requests that it be withdrawn.

N.J.A.C. 7:26-12.4(a)8 **Failure to formally correspond with BHWE/DEP**

It is alleged that Orbis failed to formally correspond with the Bureau of Hazardous Waste Engineering of the NJDEP with respect to Bureau letters of December 10, 1985, May 16, 1986, and August 1, 1986 regarding permit information, as required by N.J.A.C. 7:26-12.4(a)8.

These letters, however, did not refer to required permit information, but, rather, to information regarding Orbis' delisting and exemption requests for the facility. In fact, Orbis initiated this correspondence.

As noted, Orbis is in the process of gathering the required information for the delisting and exemption requests for the facility, and will forward this information to the Department as soon as it becomes available. Further, Orbis has been consulting with its environmental consultant, Dames & Moore, with respect to the requested soil sampling. It must be further noted that the NJDEP has not been prejudiced. Rather, only Orbis has suffered any negative consequences of failing to promptly respond to the NJDEP's request for information concerning Orbis' delisting.

Therefore, Orbis asserts that the aforementioned NOV is an inappropriate exercise of NJDEP's prosecutorial discretion. Orbis respectfully requests that this NOV be withdrawn.

N.J.A.C. 7:26-9.4(f) **Failure to meet general inspection requirements**

It is alleged that Orbis failed to meet the general inspection requirements set forth in N.J.A.C. 7:26-9.4(f).

Orbis, however, is not a hazardous waste facility, and thus is not required to adhere to the general inspection requirements in N.J.A.C. 7:26-9.4(f). Orbis maintains that it is a generator accumulating hazardous waste on site for ninety (90) days or less.

Nevertheless, Orbis does conduct daily inspections of the plant and takes necessary and appropriate actions to prevent leaks or discharges of any kind.

Therefore, this NOV is unfounded, and Orbis respectfully requests that it be withdrawn.

N.J.A.C. 7:26-12.3(b)2 **Unauthorized operation of SO2 activity**

It is alleged that Orbis conducted an SO2 (tank storage) activity without authorization. The NOV asserts that Orbis should have included this activity in its Part A application as required by N.J.A.C. 7:26-12.3(b)2.

However, Orbis maintains that at the time it filed the Part A application the activity complained of was exempt under the Federal regulations which exempt generators who accumulate hazardous waste on site for ninety (90) days or less. See 40 CFR 262.34. Further, the Federal regulation did not require the filing of an application.

Subsequently, the NJDEP promulgated its regulations whereby a short-term storage activity continued to be exempted, but for which an application was required. Orbis presently is in the process of complying with that regulation, and expects that the exemption will be granted.

Considering the existence of the EPA regulation, which applied to the tank in question, and the fact that the tank has not been used for almost one year (although it is being maintained for use and may be used again in the near future), Orbis maintains that the NOV for the unauthorized operation of SO2 tank storage activity was an inappropriate exercise of NJDEP's prosecutorial discretion, and Orbis respectfully requests that it be withdrawn.

N.J.A.C. 7:26-9.4(e)1 Wastes not protected from ignition or reaction

It is alleged that Orbis failed to protect wastes from ignition or reaction as stipulated by N.J.A.C. 7:26-9.4(e)1, which provides that the owner or operator shall take precautions to prevent ignition or reaction of ignitable or reactive waste.

This NOV is legally deficient in that it does not specify which containers allegedly were not protected from ignition or reaction, or what protection allegedly was not afforded.

As a generator that stores waste on site for ninety (90) days or less, Orbis is not subject to this regulation. Nevertheless, Orbis asserts that it is and has been in full compliance with the requirements of N.J.A.C. 7:26-9.4(e)1. Any materials kept at the facility are adequately protected from open flames, smoking, cutting, hot surfaces, frictional heat, sparks and other activities that may result in an accidental ignition or reaction.

Therefore, this NOV is unfounded, and Orbis respectfully requests that it be withdrawn.

N.J.A.C. 7:26-9.4(e)2 — **Failure to follow requirements for ignitable or reactive waste storage**

It is alleged that Orbis failed to follow the requirements for ignitable or reactive waste storage as required by N.J.A.C. 7:26-9.4(e)2, which provides that the treatment, storage, or disposal of ignitable or reactive waste, and the mixture of incompatible waste, or incompatible waste and materials, shall be conducted so that it does not generate extreme heat or pressure, produce uncontrolled toxic mists, produce uncontrolled flammable fumes, damage the structural integrity of the device or facility containing the waste, or threaten human health or the environment.

This NOV is legally deficient for failing to specify what requirements for which waste storage activities allegedly were not being followed. Moreover, Orbis contends that the cited violation is inappropriate and unfounded because Orbis does not treat, store or dispose of ignitable or reactive waste at the plant, although at times it may accumulate such waste for ninety (90) days or less.

Therefore, Orbis maintains that this NOV is unfounded, and respectfully requests that it be withdrawn.

N.J.A.C. 7:26-9.4(e)liii **Failure to confine smoking by posting signs**

It is alleged that Orbis failed to confine smoking by posting signs as required by N.J.A.C. 7:26-9.4(e)liii, which provides that the owner or operator shall take precautions to prevent accidental ignition or reaction of ignitable or reactive waste by conspicuously placing "No Smoking" signs wherever there is a hazard from ignitable or reactive waste.

This NOV is legally deficient for failing to identify the area or areas where such signs are alleged not to have been posted. Also, Orbis does not store ignitable or reactive waste, although at times it may accumulate such waste for ninety (90) days or less. However, it is company policy not to allow smoking in any area where such wastes are accumulated. In fact, smoking is allowed only in designated smoking areas, such as the lunch room, locker rooms and offices. Smoking is not even permitted in any outdoor area of the plant.

Further, in response to receipt of this NOV Orbis has conspicuously placed "No Smoking" signs where ignitable or reactive waste accumulation may occur.

Therefore, this NOV is unfounded as applied to Orbis, and Orbis respectfully requests that it be withdrawn. However, if corrective action had been necessary, such action certainly has been taken as described above.

SECTION II

N.J.A.C. 7:26-9.4(d)2 **Containers in very poor condition**

It is alleged that Orbis containers are in very poor condition in violation of N.J.A.C. 7:26-9.4(d)2, which sets forth the requirements for the use and management of containers. Subsection 2 provides that:

> 2. If a container holding hazardous waste is not in good condition, or if it begins to leak, the owner or operator should transfer the hazardous waste from the container to a container that is in good condition, or manage the waste in some other way that complies with the requirements of the section.

This NOV is legally deficient in that it does not provide sufficient information identifying which containers are alleged to be in "very poor condition". However, Orbis maintains that company policy provides that containers at the plant found to be in poor condition during daily inspections are to be overpacked or repacked to prevent loss or discharge of materials. In any case, Orbis is expediting its ongoing container and materials review procedure to ensure the adequacy of all containers. Thus, at the present time, Orbis is taking all necessary precautions to conform to the requirements for use and management of containers as set forth in N.J.A.C. 7:26-9.4(d)2.

Therefore, Orbis respectfully requests that this NOV be withdrawn.

N.J.A.C. 7:26-9.4(d)4i Failure to close containers

It is alleged that Orbis failed to close containers as required by N.J.A.C. 7:26-9.4(d)4i, which provides that, except during filling or emptying, containers of hazardous waste shall be securely closed so that there is no escape of hazardous waste or vapors.

This NOV is legally deficient for failing to identify allegedly unclosed containers. Further, Orbis contends that none of the containers found not to be closed are known to contain hazardous waste.

Nevertheless, any containers that may not have been thoroughly closed during the NJDEP inspection on November 21, 1986 were closed immediately following that inspection. Orbis conducts daily inspections of the containers to ensure that the containers have remained closed and that there are no discharges or leaks of materials or vapors.

Therefore, Orbis respectfully requests that this NOV be withdrawn.

N.J.A.C. 7:26-9.4(d)4iii **Containers not properly handled**

It is alleged that Orbis did not handle containers properly as stipulated by N.J.A.C. 7:26-9.4(d)4iii. N.J.A.C. 7:26-9.4(d)4iii expressly provides that a container holding hazardous waste shall not be opened, handled, or stored in a manner which may rupture the container or cause it to leak.

This NOV is legally deficient for failing to adequately identify the containers or the manner in which they were alleged to have been improperly handled. However, when counsel questioned NJDEP about this NOV, one of the Department inspectors mentioned that some drums were observed to have been lying on their sides.

The usual method for handling drums is to maintain them in an upright position. However, it is not necessarily improper to store drums on their sides. In fact, there are circumstances under which it is necessary and appropriate to turn drums on their side, e.g., while filling side-bunged drums, or to avoid accumulation of water on the head to alleviate external corrosion.

Orbis asserts that all containers handled on the property are handled properly, and when hazardous waste is identified any containers of such waste are handled in accordance with the requirements of N.J.A.C. 7:26-9.4(d) and will continue to be so

handled. Orbis inspects the containers on a daily basis to ensure compliance.

Orbis maintains that it has complied and will continue to comply with the requirements of N.J.A.C. 7:26-9.4(d). Therefore, Orbis respectfully requests that this NOV be withdrawn.

N.J.A.C. 7:26-9.4(d)4iv **Containerized hazardous waste not segregated**

It is alleged that containerized hazardous wastes were not segregated as required by N.J.A.C. 7:26-9.4(d)4iv, which stipulates that containerized hazardous waste shall be segregated in storage by waste type.

This NOV is legally deficient for failing to identify the allegedly hazardous waste that was not segregated. However, Orbis is in the process of reviewing the materials in the containers and will appropriately segregate any deemed to contain hazardous waste. Orbis' consultant is assisting the company in making these determinations and in any necessary segregation of hazardous waste.

Accordingly, Orbis respectfully requests that this NOV be withdrawn.

N.J.A.C. 7:26-9.4(d)4v **Container identification label not visible**

It is alleged that a container identification label was not visible in accordance with N.J.A.C. 7:26-9.4(d)4v, which stipulates that every container of hazardous waste shall be arranged so that its identification label is visible.

This NOV is legally deficient for failing to adequately identify the container alleged not to have had a visible label.

Most containers have a batch tag which sufficiently identifies the material contained therein. Nonetheless, during the continuing and expedited container review process Orbis will take appropriate action to ensure that all container identification labels are clearly visible, whether the container holds product or hazardous waste. Note that item (10) of the excerpt from the Orbis "Workers Manual", annexed hereto and labelled Exhibit C, states the company policy that workers shall "[i]nclude all information when stencilling drums."

Therefore, Orbis respectfully requests that this NOV be withdrawn.

N.J.A.C. 7:26-9.4(d)5 **No container inspection**

It is alleged that Orbis does not conduct container inspections as required by N.J.A.C. 7:26-9.4(d)5, which expressly provides that the owner or operator shall inspect areas where containers of hazardous waste are stored, at least daily, looking for leaks and for deterioration caused by corrosion or other factors.

Orbis maintains that a daily inspection of the containers is conducted. In fact, Orbis has a 24-hour guard service and time clock mechanisms which ensure that container areas are inspected on a daily basis. The guard has instructions, and the necessary information, to contact Orbis officials to report any irregularities. During this daily inspection, the containers are checked for leaks and other evidence of deterioration and corrosion. Further, Orbis plant personnel inspect container areas each working day. In addition, Orbis is in the process of instituting a daily log so that the daily inspections and results thereof can be appropriately recorded. Finally, item (8) of Exhibit C hereto sets forth the Orbis company policy instructing workers to "[g]et in the habit of looking for leakers anywhere in the plant."

Nevertheless, a formalized inspection procedure will be prepared.

Orbis contends that this NOV is unfounded, and respectfully requests that it be withdrawn.

N.J.A.C. 7:26-9.4(d)6 **Containers less than 50 feet from property line**

It is alleged that containers are less than 50 feet from the property line in violation of N.J.A.C. 7:26-9.4(d)6, which expressly provides that containers holding ignitable or reactive waste shall be located at least 50 feet (15 meters) from the facility's property line.

This NOV is legally deficient because it fails to adequately identify those container alleged to contain ignitable or reactive waste and to be within 50 feet of the property line.

Orbis' ongoing and expedited process of reviewing and analyzing materials at the plant will ensure that if any ignitable or reactive wastes are determined to exist at the plant, they will not be maintained within 50 feet of the property line.

Therefore, Orbis respectfully requests that this NOV be withdrawn.

N.J.A.C. 7:26-9.4(d)7iii **Failure to physically separate incompatible wastes**

It is alleged that Orbis failed to physically separate incompatible wastes as required by N.J.A.C. 7:26-9.4(d)7iii, which provides that a storage container holding a hazardous waste that is incompatible with any waste or other materials stored nearby in other containers, open tanks, or surface impoundments shall be separated from the other materials or protected from them by means of a dike, berm, wall or other device.

This NOV is legally deficient for failing to adequately identify the wastes or containers thereof alleged not to have been physically separated.

Nevertheless, Orbis is in the process of reviewing the materials stored in the containers and will physically separate any deemed to contain hazardous wastes that are incompatible with any waste or other material stored nearby in other containers.

Therefore, this NOV is unfounded, and Orbis respectfully requests that it be withdrawn.

N.J.A.C. 7:26-9.4(g) **No personnel training records**

It is alleged that Orbis does not have personnel training records as required by N.J.A.C. 7:26-9.4(g), which provides that facility personnel should successfully complete a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that insures the facility's compliance with the requirements of the regulation.

Orbis maintains that all personnel employed at the Newark site have been adequately trained to respond appropriately and effectively to emergency situations. However, as stated in the accompanying letter from Mr. Diamond to Mr. Zollner, Orbis will develop a more formal personnel training procedure.

Orbis respectfully requests that this NOV be withdrawn.

N.J.A.C. 7:26-9.7 **No Contingency Plan**

It is alleged that Orbis does not have a contingency plan as required by N.J.A.C. 7:26-9.7, which sets forth the elements to be addressed by contingency plans and the procedures to be followed in the case of an emergency.

Orbis maintains that the company presently has a contingency plan and procedures to be followed in case of an emergency. However, as stated in the accompanying letter from Mr. Diamond to Mr. Zollner, a more formal contingency plan will be developed in the near future.

N.J.A.C. 7:26-9.6(f) **Necessary arrangements not made**

It is alleged that Orbis failed to make the necessary emergency preparedness and prevention arrangements with local organizations, such as local police, fire and emergency response teams, pursuant to N.J.A.C. 7:26-9.6(f).

As a generator, Orbis has made all arrangements deemed appropriate in appreciation of the types of substances handled at the site. For example, the Newark Fire Department visits the plant periodically, and Orbis presently possesses and has posted Fire Safety Permit No. 805. Also, Orbis has ongoing arrangements with St. Elizabeth Hospital in Elizabeth to handle any injuries that may occur at the plant. However, as stated in the accompanying letter from Mr. Diamond to Mr. Zollner, Orbis is in the process of formalizing these relationships.

N.J.A.C. 7:26-7.4(a)4vii **Improper manifest form for quantity and type**

It is alleged that Orbis violated N.J.A.C. 7:26-7.4(a)4viii, which provides that a generator must provide the following information on a manifest form:

> vii. The name, type and quantity of hazardous waste being shipped, including such particulars as may be required regarding same.

The NOV is legally deficient in that it does not specify which information in the manifest allegedly was incorrect. Based on discussions with the inspectors, however, Orbis admits that even though the material was correctly handled and transported, several manifests appear to have been improperly coded. As explained to the inspectors on November 21, the error was an inadvertent oversight, in that the individual filling out the manifest forms used the container code "DM" (for drums) rather than "DT" (for trailers). Apparently, these particular manifests had been pretyped with the expectation that they would be used for a load of drums, and the oversight was in not changing the letter "M" to "T".

Orbis will correct manifests and include the corrected forms in the Annual Report to be submitted to the NJDEP in March 1987. Orbis is, therefore, taking all necessary action in order to comply with the requirements of N.J.A.C. 7:26-7.4(a)4vii.

SECTION III

N.J.S.A. 58:10-23.11(c) and (e)	**Hazardous substances... continually discharge in container storage**

These NOVs alleging discharge of hazardous substances and failure to notify thereof are legally deficient for failing to adequately identify the subject matter of the alleged violations. Furthermore, the inspectors have been reluctant or unable to reveal sufficient details about this alleged discharge. However, suffice it to note that under the statutory authority cited, the threshold jurisdictional requirement for any discharge is the entry of a hazardous substance "into the waters or onto the lands of the State...". The NOV fails to set forth any facts to support a finding that a hazardous substance has entered into waters or onto land.

The allegation of the "seriousness" of the threat to the environment and/or human health is difficult to understand since fire fighting equipment, spill control equipment, and round-the-clock security services are provided. Furthermore, despite the alleged "seriousness" of the condition, at no time during three separate facility inspections did the inspector specifically indicate the need for any immediate remedial action. Finally, again, the NJDEP has not been forthcoming with detailed information about the basis of this allegation, despite multiple requests.

Orbis makes no assumptions about the alleged discharge, including where it is alleged to have occurred. However, if NJDEP were to allege that the discharge occurred in Building 18, there would be no basis in fact or in law for such an assertion. Building 18 is a closed, secure structure. The containers are housed therein on a concrete floor in which there are no drains or other conduits to the outside.

Nevertheless, as indicated in item (8) of Exhibit C annexed hereto, any drums that may be found to be leaking will continue to be addressed immediately upon discovery. Orbis presently is not aware of any leaking containers at the plant.

With respect to the allegation of non-notification, since there was no discharge there could not be a failure to notify.

Therefore, these NOVs are unfounded, and Orbis respectfully requests that they be withdrawn.

N.J.S.A. 58:10-23.11(c) and (e)	**Hazardous substance discharge as evidenced by corrosion holes in excavated underground tanks...**

This NOV appears to be based on the presumption that visual evidence of tank corrosion is sufficient to support a finding of discharge under N.J.S.A. 58:10-23.11(c). Although there are several factual circumstances under which this presumption would clearly be rebutted (i.e., tank empty during corrosion; positive hydraulic pressure causing tank to fill rather than leak, etc.), Orbis has begun working with its environmental consultant, Dames & Moore, toward implementation of the requested subsurface investigation at the former location of the tanks. Such investigation should not be construed as an acknowledgment of any closure liability or an agreement to proceed with remediation. Rather, it will be conducted as an accommodation to the NJDEP.

The parallel violation of N.J.S.A. 58:10-23.11(e) appears to further presume knowledge of or liability for a discharge, which presumption is erroneous.

Therefore, this NOV is unfounded, and Orbis respectfully requests that it be withdrawn.

EXHIBIT A

AFFIDAVIT

STATE OF NEW JERSEY)
SS.:
COUNTY OF ESSEX)

WILLIAM R. AMADUCCI, being of full age and duly sworn according to law, says to the best of his knowledge and belief:

1. I am Manager of the Orbis Products Corporation ("Orbis") Plant at 55 Virginia Street, Newark, New Jersey (the "plant").

2. In this capacity, I am present at the plant on a regular basis and I am familiar with the operations of Orbis at the plant. Orbis also maintains an office at 94 Fanny Road, Boonton, New Jersey, where I frequently do paperwork related to the Orbis business.

3. At approximately 3:00 p.m. on Monday, November 17, 1986, while at the Boonton office, I received a telephone call from Mr. Albert DeVigili, the plant Supervisor. Mr. DeVigili almost immediately gave the phone to an individual who identified himself as Mr. Robert D. Zollner, an inspector with the New Jersey Department of Environmental Protection ("NJDEP"), Division of Waste Management. Mr. Zollner informed me that he was conducting an inspection of the plant, and he requested access to

hazardous waste manifests for materials that Orbis had sent off-site for disposal. At that time, those manifests were in my custody in the Boonton office.

4. I explained to Mr. Zollner that since it was approaching 3:30, the regular shift at the plant was over. I further informed him that leaving the Boonton office at that time would have been very inconvenient, and a hardship, because no one was available at that particular time to substitute for me. Nevertheless, I volunteered to drive from Boonton to Newark at that time if he deemed it necessary.

Mr. Zollner clearly informed me that his inspection authority was not contingent on matters of convenience. However, he then asked me when it would be convenient for me to meet him at the plant, and we agreed on Friday, November 21, 1986. Mr. Zollner did not request that I provide access to Building 18 or any other area of the plant, nor did he indicate that he wished to continue his inspection on November 17. Had Mr. Zollner stated that he had to see the manifests or continue his inspection on that day, I would have travelled to the plant to accommodate him. Mr. Zollner did not indicate that NJDEP might issue any Notice of Violation ("NOV") to Orbis.

5. On Friday, November 21, 1986, I met Mr. Zollner at the plant and he continued his inspection. On that date he was given complete access to the plant, including Building 18, and to

EXHIBIT B

AFFIDAVIT

STATE OF NEW JERSEY)
SS.:
COUNTY OF ESSEX)

ALBERT D. DeVIGILI, being of full age and duly sworn according to law, says to the best of his knowledge and belief:

1. I am a Supervisor at the Orbis Products Corporation ("Orbis") plant at 55 Virginia Street, Newark, New Jersey ("the plant").

2. In this capacity, I am responsible for daily operations at the plaint.

3. In the early afternoon on Monday November 17, 1986, while working behind the plant laboratory, I was approached by two men who identified themselves as inspectors with the New Jersey Department of Environmental Protection ("NJDEP"), Division of Waste Management. One of the men introduced himself as Robert D. Zollner. Mr. Zollner indicated that he wanted to inspect the plant.

4. I accompanied the inspectors through the plant grounds and provided them with access as requested, including specifically Buildings 1, 2 and 3. I also explained the location and operation of various equipment and materials.

5. During the inspection Mr. Zollner asked to see hazardous waste manifest forms. I told him that those records were in the Orbis office in Boonton, New Jersey. Mr. Zollner also requested access to Building 18, which was locked. It was necessary to return to the office in order to retrieve the key. While at the office, I phoned Mr. William R. Amaducci, the Manager of the plant, who was at the Boonton office. Mr. Amaducci spoke directly with Mr. Zollner.

6. After speaking with Mr. Amaducci, Mr. Zollner indicated that he would return on November 21, 1986.

Both inspectors then left the plant. Since it was the end of the shift, I also left.

7. Mr. Zollner returned to inspect the plant on November 21. No NJDEP representative requested samples or indicated a desire to take samples on either November 17 or November 21, except that on November 21 Mr. Zollner took a sample from tank OT-100.

8. I make this affidavit in support of Orbis' responses to the Notices of Violation concerning the plant that were issued on Friday, November 21, 1986.

Albert D. DeVigili

Albert D. DeVigili, Supervisor
Orbis Products Corporation

Sworn to and Subscribed to
before me this 19th day of
December, 1986.

Janis DiMarco
Notary Public

JANIS DiMARCO
A NOTARY PUBLIC OF NEW JERSEY
My Commission Expires Oct. 24, 1990

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EXHIBIT C

ORBIS PRODUCTS CORPORATION

SAFETY IN DRUM HANDLING:

Almost all of our material is put in drums or taken out of drums. Here are some safety rules on handling drums:

(1) When filling or emptying drums, be sure drums are blocked so they will not roll.

(2) Do NOT fill drums to the top. Leave about four (4) inches for expansion.

(3) Use NEW gaskets for sealing a bung.

(4) Make an after check on filled drums for leaks.

(5) Above all, be sure that the drum you are using is the right one for the job. Check yourself to make sure it is clean, dry and odorless. When in doubt, have your foreman check.

(6) Tighten bungs on all empty drums.

(7) Be sure that the drums you are using have bungs of the same material. For instance, never use a stainless-steel drum with a galvanized bung, etc.

(8) Mark leaking drums plainly as leakers, and transfer material to a sound drum. Get in the habit of looking for leakers anywhere in the plant.

(9) Never put caustic or acid material in a galvanized or aluminum drum. Never put chlorinated material in aluminum drums.

(10) Include all information when stencilling drums. Check tare weight of drum before filling. Re-weigh all drums before emptying into any equipment.

(11) Never lift a full drum by yourself. Use a drum upender or get help.

REFERENCE NO. 9

Let's protect our earth

FAF

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF HAZARDOUS WASTE MANAGEMENT

Michele M. Putnam
Deputy Director
Hazardous Waste Operations

John J. Trela, Ph.D., Director
401 East State St.
CN 028
Trenton, N.J. 08625-0028
(609)633-1408

Lance R. Miller
Deputy Director
Responsible Party Remedial Action

SEP 15 1988

Mr. William Amaducci, Manager
Orbis Products Company
55 Virginia Street
Newark, NJ 07114

Dear Mr. Amaducci:

RE: Closure Plan Approval for Storage Tank OT-100 and Delisting Approval for Container Storage Activity for Orbis Products Company, Newark, EPA ID No. NJD 010 910 099, CP-88-8

The Bureau of Hazardous Waste Engineering acknowledges receipt of a closure plan and revision dated February 1, 1988 and April 22, 1988 from Deborah Kinburn of Hannoch Weisman for the referenced facility's aboveground hazardous waste storage tank OT-100. The closure plan was submitted in order to delist the tank and take it out of service. A public notice of the closure plan was issued and a public comment period of thirty (30) days was provided. However, no comments were received from the public concerning closure.

Based upon its review, the Department hereby approves the closure plan for tank OT-100. Closure of the subject storage area shall be conducted in accordance with N.J.A.C. 7:26-9.8, the February 1, 1988 and April 22, 1988 submittals, and also the following conditions:

1. Removal of all hazardous waste inventory from the tank for manifested disposal to an authorized facility must be done within 90 days of this approval.

2. Tank OT-100 and its associated piping shall be dismantled and disposed of off-site to an authorized hazardous waste disposal facility.

3. All hazardous waste generated during closure activities shall be manifested off-site to an authorized facility.

4. Soil sampling shall be completed within 90 days from the date of this approval, however, sampling shall not be conducted prior to the removal of all hazardous waste from the tank. The Department shall be notified at least two weeks prior to initiation of sampling so an auditor from the Department can be present during the sampling episode.

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Soil sampling activities shall be conducted in accordance with the approved plans dated February 1, 1988 and April 22, 1988 and the following conditions:

a. Soil samples shall be collected from locations specified in the plan. S-1, S-2 and S-3 shall be analyzed for total petroleum hydrocarbons at a depth of 0-6 inches and Target Compound List (TCL) +30 at a depth of 6-12 inches. S-3 shall also be analyzed for TCL VOA plus 10 fraction and total petroleum hydrocarbons at a depth of 18-24 inches. Any obviously stained soils shall be sampled independently of an in addition to other samples proposed. These samples shall be collected at a depth of 0-6 inches and be analyzed for TCL +30 and total petroleum hydrocarbons.

b. In addition, one trip blank to be analyzed for volatile organic parameters and one field blank to be analyzed for the same parameters as samples collected that day shall also be conducted.

c. The laboratory conducting the analysis must utilize CLP SOW for Organic and Inorganic Analysis or 3rd Edition SW-846 methodologies.

5. Soil sampling analytical results shall be submitted to the Department within 60 days from the date of sampling. The Department shall review the results and notify the facility of its findings regarding soil sample contamination. If the soil samples are found to be contaminated, Orbis shall be required to submit for the Department's approval a detailed delineation and cleanup plan for the contaminated areas within 60 days from notification. Upon approval of the plan, the facility shall have 30 days to begin implementation of delineation and cleanup procedures.

6. Closure activities shall be completed within 180 days from the date of this approval.

7. Written certification by the operator and an independent professional engineer registered in New Jersey shall be provided to the Department within 210 days from the date of this approval. The certification shall document that all closure activities have been carried out in accordance with the approved plan and conditions of this letter.

Be advised, a complete delisting of the facility can only occur after the aforementioned closure certification has been received and approved by the Department.

Orbis requested delistment of its container storage activity in letters to the EPA dated June 16, 1981 and February 8, 1983, and in letters to the Bureau of Hazardous Waste Engineering dated January 18, 1983, October 8, 1985 and November 6, 1987. Orbis based these requests on the fact that the facility never stored hazardous waste in containers for greater than 90 days, and only filed its Part A application as a protective filer. Based upon these requests and an affidavit dated April 27, 1988 attesting to these facts made by Albert Devigili, supervisor at the facility, Orbis' container storage activity is hereby delisted from "TSD" status and assigned

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"generator" status per compliance with N.J.A.C. 7:26-9.3(a) which is as follows:

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

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

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

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

If you have any questions concerning these matters, please contact Anthony Fontana at (609) 292-9880.

Very truly yours,

Frank Coolick

Frank Coolick, Assistant Director
Hazardous Waste Regulation Element

EP63/abl
c: Barry Tornick, USEPA, Region II
Kathleen Miller, BEMQA
Deborah Kinburn, Hannoch Weisman
Anthony Cavalier, MFO

DOCUMENT: ORBIS1
FOLDER: LXRMCB

SPECIAL CONDITIONS FOR NJPDES/SIU PERMITS-BY-RULE

(a) All indirect dischargers which are not SIUs or which are not required by N.J.A.C. 7:14A-10.5(a) to obtain an individual NJPDES permit and which are authorized by the DTW pursuant to N.J.A.C. 7:14A-13.4(a) shall be deemed to possess a NJPDES permit-by-rule and must comply with the standards specified in (c) below.

(b) Termination of eligibility for a permit-by-rule.

1. Based upon non-compliance with (c) below, the Department may terminate the eligibility of any indirect discharger for a permit-by-rule. Where eligibility for a permit-by-rule has been terminated by the Department, the indirect discharger shall apply for and is required to obtain a NJPDES/SIU permit in accordance with N.J.A.C. 7:14A-10.5(c).

2. Whenever a DTW's-Pretreatment Program approval has been withdrawn based upon the criteria set forth in N.J.A.C. 7:14A-13.8, all SIUs discharging to the DTW will lose their eligibility for a permit-by-rule and will be required to obtain an individual NJPDES/SIU permit in accordance with N.J.A.C. 7:14A-10.1(h).

(c) Standards for NJPDES/SIU Permit-by-Rule. All indirect dischargers shall comply with the following:

1. Standards for prohibited discharges, see N.J.A.C. 7:14A-13.3(a)1;

2. Categorical pretreatment standards, see N.J.A.C. 7:14A-13.3(a)2;

3. DTW ordinances, rules and regulations which have been approved by the Department, see N.J.A.C. 7:14A-13.3(a)4;

4. Water quality violations, see N.J.A.C. 7:14A-13.6;

5. Sludge quality violations, see N.J.A.C. 7:14A-13.7; and

6. Any other standards promulgated by the Department under the Pretreatment Act or State Act.

WQM216:vk

REFERENCE NO. 10

STATE OF NEW JERSEY
DEPARTMENT OF CONSERVATION
AND ECONOMIC DEVELOPMENT

DIVISION OF WATER POLICY
AND SUPPLY

SPECIAL REPORT NO. 28

GROUND-WATER RESOURCES OF ESSEX COUNTY, NEW JERSEY

Prepared in cooperation with
United States Department of the Interior
Geological Survey

1968

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GROUND-WATER RESOURCES OF ESSEX COUNTY, NEW JERSEY

By William D. Nichols

ABSTRACT

Ground water in Essex County occurs in joints and fractures in consolidated rocks and in the voids of unconsolidated statified drift deposits. Wells in sandstone and shale of the Brunswick Formation of Triassic age yield from 35 to 820 gpm; the most productive water-bearing zones are commonly between depths of 300 to 400 feet. Drawdown due to pumping is greatest in the direction of strike of the formation (about N 30° E in Essex County) and least in the direction perpendicular to strike. Wells in the Watchung basalt, which is intercalated with rocks of the Brunswick Formation commonly yield small to moderate supplies but may occasionally yield up to 400 gpm. Large yields, ranging from 410 to 1,593 gpm, are common from wells tapping the stratified drift deposits in the western part of the county.

Quality of ground water is acceptable for most uses throughout the county. However, heavy pumpage in the Newark area has lowered water levels to more than 100 feet below sea level. The low water levels have reversed the natural gradient and induced the flow of salt water into the bedrock aquifer, seriously impairing ground-water quality there. Recent analyses of ground-water samples from Newark indicate that the chloride concentration in the aquifer has increased since the preliminary study of the problem by Herpers and Barksdale in 1951.

Highly productive stratified drift deposits are found primarily in that part of the county west of Second Watchung Mountain. They occur as valley-fill material in stream valleys cut into the underlying bedrock before the last glaciation. These deposits in Essex County are part of an extensive valley-fill aquifer system underlying the eastern Morris-western Essex County area. Water levels in these deposits in western Millburn Township have declined 36 feet since 1950, probably as a result of below normal rainfall for most of the period 1953 to 1966 together with constantly increasing pumpage throughout the area.

Withdrawals of ground water from all aquifers in Essex County for public supply averaged about 26 mgd (million gallons per day) in 1966. Pumpage for public supply from aquifers in unconsolidated sediments averaged 20.9 mgd, about 81 percent of the total from all aquifers.

Most of the productive aquifers in Essex County are currently being developed. Although the optimum potential of the stratified drift aquifers

Population of Essex County 1900-60

1900	359,053
1910	512,886
1920	652,089
1930	833,513
1940	837,340
1950	905,949
1960	923,545

Nearly 90 percent of the county's population is located in the 71.5 square miles (55.6 percent of total area) east of the Watchung Mountains.

The economy of Essex County is primarily industrial. The principal manufactured products include food products, electrical goods and machinery, chemicals, machinery (excluding electrical machinery), fabricated metal products, and apparel. In 1960, only about 5 percent of the total land area of the county was utilized as farmland.

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GEOLOGY

INTRODUCTION

The Brunswick Formation and Watchung Basalt of the Newark Group of Late Triassic age underlie all of Essex County. The Brunswick Formation is dominantly shale and sandstone, but also includes minor amounts of conglomerate. The Watchung Basalt consists of three extensive sequences of lava flows intercalated with the shale and sandstone of the Brunswick Formation. The generalized bedrock geologic map (fig. 2) shows the areal extent of the rocks of Triassic age underlying Essex County. Overlying the rocks of the Newark Group are unconsolidated clay, sand, and gravel deposited during the Pleistocene and Recent Epochs. Pleistocene deposits are the most widespread and are found throughout the county. Deposits of Recent age are confined to the present-day stream valleys. Figure 3 shows the general distribution of the unconsolidated Pleistocene deposits.

Parts of Fairfield and Millburn Townships and Newark are underlain by valleys cut (fig. 3) in bedrock by streams that drained the area before the last glaciation. The valley were subsequently filled in and buried by glacial debris and have little present-day surface expression.

DISTRIBUTION AND LITHOLOGY OF ROCK UNITS

Consolidated Rocks

Rocks of the Brunswick Formation, the uppermost unit of the Newark Group, underlie most of Essex County. The formation consists dominantly of interbedded brown, reddish-brown, and gray shale, sandy shale, sandstone, and some conglomerate. Three sheets of gray to black basalt are intercalated with sandstone and shale beds of the Brunswick Formation. The total thickness of the Brunswick Formation is not known, but probably exceeds 6,000 feet (Kümmel 1940, p. 102).

In the southern part of the county east of the Watchung Mountains, the Brunswick Formation is predominantly a soft red shale. These rocks become coarser grained toward the north. In the northern part of the county the rocks are mostly sandstone and some interbedded shale; conglomerate is found in the extreme northern part of the county. This change from soft, easily weathered, shale to more resistant sandstone is reflected in the change of topography from the rather flat low-lying plain with few hills in southern Newark to hills of low relief in the northern part of the county.

Between First and Second Watchung Mountains, the Brunswick Formation is dominantly sandstone. West of Second Watchung Mountain, the formation is covered with thick deposits of unconsolidated sediments

of glacial origin and few outcrops can be found. As indicated from records of wells drilled in this area, the rocks are mainly shale and some interbedded sandstone.

Two prominent ridges, First and Second Watchung Mountains, extend from northeast to southwest across the county (fig. 2). These are the two lowest sequences of basalt flows of the Watchung Basalt. The third, uppermost, sequence of flows is represented by Ricker Hill in Livingston Township. These basalt sheets were formed by lava which was extruded at three different times during the accumulation of the sedimentary rocks of the formation. Each of these sheets is made up of several lava flows. Scoriaceous zones occur at the top of many of the individual flows. In some places, thin beds of shale occur between successive flows. The lower part of the Watchung Basalt, which comprises First Watchung Mountain, is from 600 to 650 feet thick; the Watchung Basalt in Second Watchung Mountain varies from 750 to 900 feet in thickness; the uppermost Watchung Basalt ranges from 225 to 350 feet in thickness (Darton and others, 1908, p. 10).

First and Second Watchung Mountains are parallel, and in places have double-crested ridges reflecting the presence of interbedded sedimentary rocks; the ridges generally rise between 300 and 400 feet above the adjacent country. The trend of the ridges reflect the general strike of the sedimentary rocks of the Brunswick Formation. The beds dip about 10 degrees toward the northwest.

Pleistocene and Recent Deposits

Unconsolidated sediments deposited by glaciers or by glacial meltwater during the Pleistocene Epoch cover most areas of Essex County. These deposits can be divided roughly into several types. Unstratified drift called till or ground moraine is a heterogeneous mixture of clay, silt, sand, gravel, cobbles, and boulders which was deposited by the ice. Unstratified drift that has accumulated in a ridgelike deposit along the margin of a glacier is called an end moraine. Stratified drift is deposited by glacial meltwater in streams (glaciofluvial deposits) and lakes (glaciolacustrine deposits). Glaciofluvial deposits are generally stratified sand, and sand and gravel, and glaciolacustrine deposits are usually bedded or laminated silt and clay. Figure 3 is a map showing the generalized distribution of the Pleistocene deposits in Essex County.

Streams and rivers draining the Essex County area before the last glaciation cut deep valleys into the Triassic rocks (fig. 3). These valleys were subsequently buried by glacial debris, and the thickness of the glacial deposits is largely controlled by the underlying bedrock topography. The

altitude of the floor of the buried bedrock valley under the Newark area is as much as 280 feet below sea level (fig. 4), and the glacial drift is as much as 300 feet thick. In the southwestern corner of Essex County in Millburn Township, the altitude of the valley floor is 17 feet above sea level and the drift averages 150 feet in thickness. In the northwestern part of the county in Fairfield Township, the floor of the valley is as much as 35 feet below sea level and the drift has a maximum thickness of about 200 feet. In the areas between the valleys, where the bedrock surface is high, the drift ranges from 0 to 70 feet thick.

East of the Watchung Mountains and west of the buried valley under the Newark area, the glacial deposits consist dominantly of till. The valley under the Newark area, however, is filled largely with stratified drift and interbedded lenses of till. In the central and southern part of Newark the main valley (fig. 4) is filled with as much as 200 feet of lacustrine clay and sandy clay, which is overlain by 50 to 100 feet of other stratified or unstratified glacial drift. In the northern part of Newark, where the valley (fig. 4) parallels the Passaic River, the valley contains several deposits of sand and gravel interbedded with clay and till. The sand and gravel ranges from 1 to 19 feet in thickness and is encountered mostly at depths of less than 50 feet and depths of more than 220 feet below land surface.

The present-day valley between First and Second Watchung Mountains is underlain by approximately 100 feet of stratified drift in both Cedar Grove in the north and Millburn Township in the south. These deposits consist mostly of stratified sand and gravel. Their maximum thickness appears to occur under that part of the valley west of the Rahway and Peckman Rivers; east of the rivers, the bedrock surface is shallow (30 to 50 feet below the valley floor), and the unconsolidated deposits are thin. There are not enough data to define the thickness and character of the subsurface glacial deposits in the valley in Verona and most of West Orange.

West of Second Watchung Mountain, the stratigraphy of the glacial deposits is moderately complex, especially in the buried valleys. The drift in the main buried valley in Livingston and Millburn Townships (fig. 3) has a maximum thickness of about 170 feet and consists of interbedded sand, sand and gravel, clay and till. Thicknesses of sand and gravel outwash range from 20 to 80 feet. Farther north, in north-western Fairfield, the main buried valley (fig. 3) is filled with as much as 200 feet of drift consisting almost exclusively of 140 to 170 feet of laminated silt and clay underlain by 10 to 30 feet of till. Deposits of fine- to medium-grained sand ranging in thickness from 0 to 20 feet occur on the surface.

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The tributary buried valleys in Fairfield Township (fig. 3) contain from 30 to 50 feet of silty sand, sand, and gravel overlain by clay and till near the confluence with the main buried valley. Where the bedrock surface is high, between buried valleys, the glacial deposits consist dominantly of till. However, some stratified sand and gravel are found in the subsurface in eastern Roseland and Essex Fells which do not occur as valley-fill deposits.

Unconsolidated sediments of Recent age are confined to areas adjacent to present-day streams. These deposits consist of clay, silt, and fine sand with gravel. (Rogers and others, 1957, p. 7).

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GROUND-WATER HYDROLOGY

INTRODUCTION

Ground water is derived from that part of precipitation that does not run off the surface of the land to streams or return to the atmosphere through evaporation and transpiration. Factors which determine the amount of water that infiltrates to the ground-water reservoir include (1) the porosity and permeability of the surficial material, (2) the slope of the land, (3) the amount and kind of natural and artificial cover, and (4) the intensity and amount of precipitation.

The permeability of a rock, or its ability to transmit water, depends on its porosity, that is, on the number and size of the interstices and on the extent to which the interstices are interconnected. The porosity of a rock, in turn, depends largely on: "the shape and arrangement of its constituent particles, the degree of assortment of its particles, the cementation and compacting to which it has been subjected since its deposition, the removal of mineral matter through solution by percolating waters, and the fracturing of the rock, resulting in joints and other openings" (Meinzer, 1923, p. 3). Porosity is expressed quantitatively as the ratio between the volume of void to the total volume of the rock, that is, as the percentage of the total volume of rock occupied by interstices.

On the basis of the type of openings in which ground water may occur, the geologic formations in Essex County may be divided into two groups: (1) consolidated rocks of Triassic age, and (2) unconsolidated sediments of Pleistocene age.

The primary pore spaces in consolidated rocks of the Brunswick Formation in Essex County are commonly so small that an insignificant quantity of water, if any, moves through them under the natural hydraulic gradients or those established by pumping. However, a joint and fracture system that has developed in the consolidated rocks provides secondary porosity and it is largely in and through these openings that the storage and movement of ground water takes place. In addition, vesicles and scoriaceous zones in the basalt add to the porosity in these rocks. Limited interconnected void space occurs in sandstone beds where cementing material is lacking. The volume of all of these openings constitute only a very small percentage of the total volume of the Brunswick Formation and, consequently, their capacity to store and transmit water is limited.

In unconsolidated sediments, water occurs in the pore spaces between the constituent grains. The capacity of unconsolidated sand and gravel deposits to store and transmit water is commonly much g[illegible] than that of the consolidated rocks. The reason for this is that t[illegible]atio of the

volume of void to the total volume of unconsolidated sediment is considerably greater than the ratio of the volume of fracture openings to the total volume of rock. The interstitial openings in clays and silts are so small, however, that they restrict the movement of water, even though the percentage of void space may be great.

WATER-BEARING PROPERTIES OF MAJOR GEOLOGIC UNITS

Consolidated Rocks

Rocks of the Brunswick Formation are the main source of ground water in Essex County. The shales and sandstones are generally capable of sustaining moderate to large yields to wells. The Watchung basalt commonly is capable of yielding only small to moderate quantities of water.

Water in these rocks occurs under both unconfined and confined conditions. Unconfined ground water occurs mainly in the upland areas where overlying unconsolidated deposits are thin or absent. Confined and semiconfined ground water conditions exist in lowland areas in Newark, parts of Fairfield, and along the Passaic River where clay beds in the unconsolidated Quaternary deposits mantle the underlying rocks. Wherever such confinement occurs, water beneath the relatively impermeable confining layers is commonly under artesian pressure. In many areas, such as parts of Fairfield and in the northern part of the county, water in wells tapping the confined aquifers will rise above the top of the aquifer and sometimes near or above land surface. In areas subjected to heavy pumping, such as the Newark area and western Millburn Township, the artesian pressure may be considerably reduced. Parts of the confined aquifer may even become dewatered as has happened in part of Newark, in which case the water remaining in the aquifer is no longer confined.

Confined ground water is also encountered in the shales and sandstone directly beneath the basalt flows in the western part of the county downdip from the outcrop area. Confined or semiconfined ground-water conditions may occur in some areas because of differences in permeability within the rock layers resulting from variations in fracturing or weathering or a combination of both.

Some of the various systems of joints and fractures in the consolidated rocks intersect so that water can move vertically as well as horizontally and zones of high secondary porosity are then interconnected. Most wells tapping these rocks draw water from more than one water-bearing zone. However, these zones in the Brunswick Formation have not yet been accurately defined. They are certainly within the first 600 feet below land surface, and for most practical purposes are probably within the

Essex County are for the most part between 300 and 400 feet deep. Nevertheless, the lack of any precise known boundaries makes it difficult to determine the optimum depth to which a well should be drilled in any given location. Also it is impossible to predict the yield of a proposed well except in very general terms based on the average yield of other wells in the area.

Two pumping tests, both at the same locality, were conducted by the U. S. Geological Survey in January 1949 on wells tapping the Brunswick Formation in Essex County. The wells (owned by P. Ballantine and Sons, Newark), shown on figure 5, were selected to provide the best possible spread of observation wells in as many directions as possible. As the results of the tests have been reported by Herpers and Barksdale (1951, p. 28-31) they will be only summarized here.

In the first test, the centrally located well I-1 was pumped and water levels were observed in the seven surrounding wells indicated on figure 5. Well II-9 was pumped during the second test and the same wells were used to observe water levels. In both tests, observation wells lying along the strike of the Brunswick Formation with respect to the pumping well showed the greatest drawdown. When well I-1 was pumped, there was a prompt and distinct decline of the water level in observation well II-8. When well II-9 was pumped, the water level in observation well II-10 responded promptly and distinctly. No significant response was seen in observation wells aligned in directions other than along the strike during either test.

In these tests, as well as in several others conducted, it is invariably noted that aquifers in the sedimentary rocks of Triassic age of northern New Jersey are anisotropic, that is, they do not transmit water equally in all directions (Vecchioli, 1967). The greatest drawdowns are observed in those wells aligned along the strike of the sedimentary layers with respect to the pumping well. The least amount of drawdown is observed in observation wells that are located transverse to the strike. These observations have been interpreted to indicate that water moves more readily along joints and fractures which strike parallel to the strike of the bedding than along joints and fractures which strike in other directions. It is useful, when planning future well locations, to know the direction in which wells will interfere most with each other and with existing wells. In general, wells should be spaced far apart along the direction of strike (approximately N 30° E for most of Essex County) because it is in this direction that the greatest interference occurs. They may be placed closer together perpendicular to the strike since interference is less in that direction.

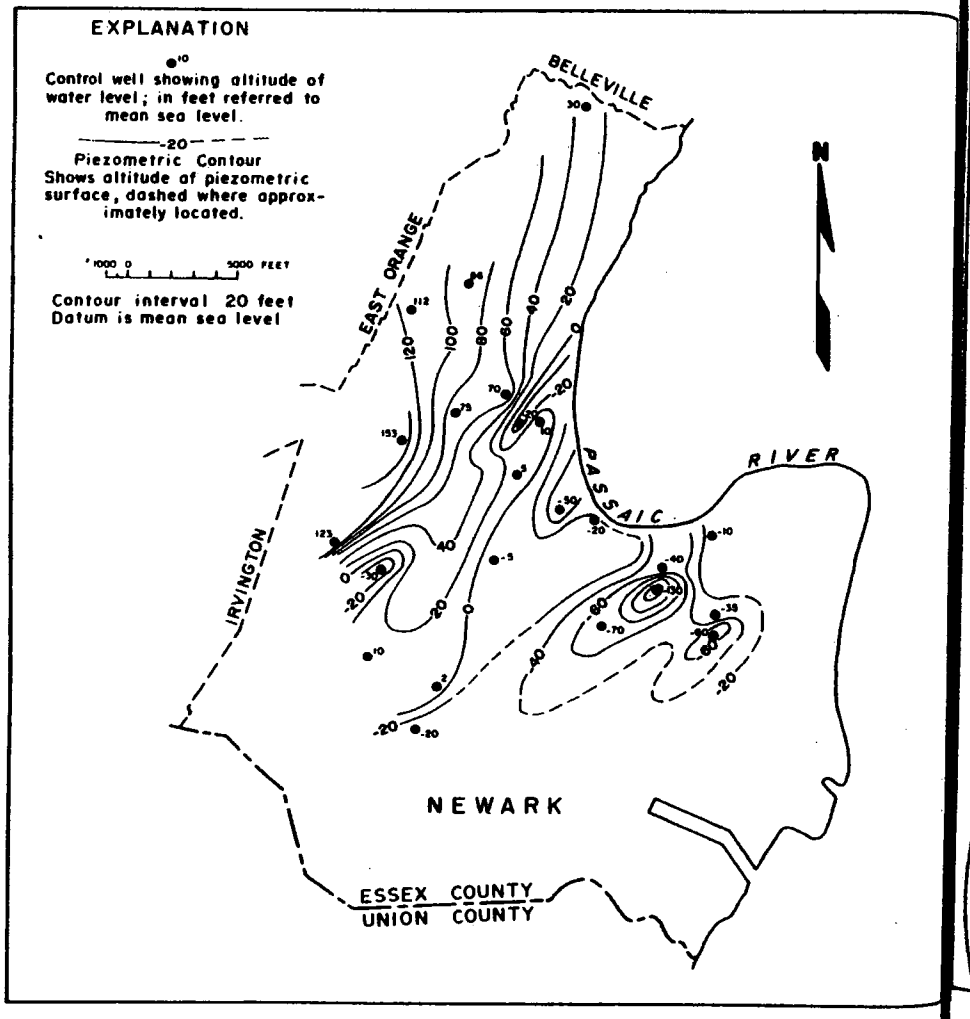

Figure 9.—Generalized piezometric contours for the Brunswick Formation in the Newark area based on water levels in wells drilled between 1890 and 1900.

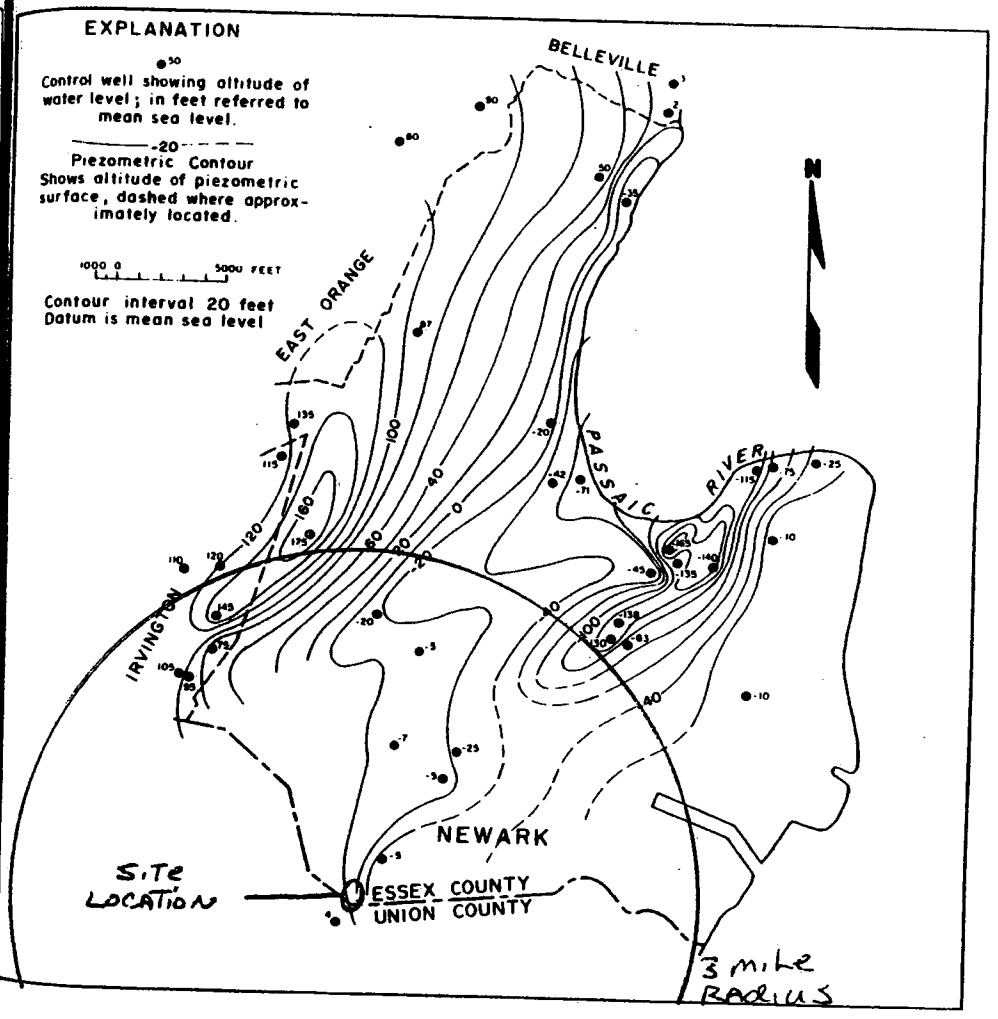

Figure 10.—Generalized piezometric contours for the Brunswick Formation in the Newark area based on water levels in wells drilled between 1950 and 1960

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Salt-water contamination of the Brunswick Formation in the Newark area has been investigated by Herpers and Barksdale (1951). Their study was based on analyses of water samples collected in 1942 by the city of Newark. More recent analyses suggest there has been additional encroachment of saline water since 1942 throughout the problem area. In 1942, water from the Wilbur Driver Company's well No. 2 along the Passaic River in northern Newark contained 72 ppm chloride. In 1961, water from this same well contained 330 ppm chloride. Water from a well drilled by Mutual Benefit Life Insurance Company, 520 Broad Street, in 1965 contained 1,145 ppm chloride. Samples collected from other wells in this area contained less than 500 ppm chloride in 1942.

Pleistocene Deposits

Unconsolidated sediments of Pleistocene age mantle the bedrock throughout much of Essex County (fig. 3). They consist of clay, silt, sand, gravel, and boulders and can be divided into two general categories—stratified drift and unstratified drift. Only sand and gravel aquifers in stratified drift deposits contain sufficient quantities of water to warrant discussion of their water-bearing properties.

Water in the stratified drift occurs under both unconfined (water table) and confined (artesian) conditions. Unconfined ground water occurs where sand and gravel deposits are not covered by clay, silt, or glacial till and are exposed at the surface. The distribution of these deposits is shown on figure 3. For the most part however, these sand and gravel deposits do not yield large quantities of water as they are commonly less than 20 feet thick and are not areally extensive. The unconfined aquifers are recharged directly from precipitation on the outcrop area. Confined and semiconfined ground water occurs where sand and gravel deposits have been covered by lake clay or silt, or by glacial till. These deposits are largely confined to the buried valley so they are not visible on the surface and their regional extent and distribution are therefore not readily apparent. The confined and semiconfined aquifers are recharged by leakage through overlying confining beds and by precipitation falling on outcrop areas outside Essex County. Some recharge may also be derived from the underlying and adjacent Brunswick Formation.

The most productive artesian and semi-artesian aquifers in the stratified drift in Essex County occur as valley fill in stream valleys that were cut in the bedrock before the last glaciation. Consequently the size, shape, and distribution of the aquifers conform to the size, shape, and distribution of the bedrock valleys. The bedrock valley underlying the Newark area (shown on fig. 4) is filled with till and clay, and contains only minor amounts of water-bearing sand. Extensive subsurface exploration in western

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Aquifer name:
Qsd, Stratified drift
TRb, Brunswick Formation
TRwb, Watchung Basalt

TABLE 2.—RECORDS OF SELECTED WELLS IN ESSEX COUNTY, N. J.—Continued

Remarks:
O.W., Owners well number

Well	Owner or Tenant	Driller	Date Drilled	Altitude above mean sea level (ft)	Total depth drilled below land surface (ft)	Diameter of well (inches)	Depth to which well is cased (ft)	Screen setting (ft)	Aquifer	Static level below land surface (feet)	Yield (gpm)	Drawdown (ft)	Specific capacity (gpm/ft)	Remarks
					FAIRFIELD BOROUGH									
1	Fairfield Borough	W. Beatty	1962	---	90	8	79	79-90	Qsd	---	350	---	--	
2	Republic Tool & Mfg. Co.	Algeier Bros.	7-30-52	170	53	6	53	---	Qsd	2	40	8	5.00	
3	Curtiss Wright Corp.	Artesian Well & Equip. Co.	1941	170	560	10	---	none	TRwb	11	155	136	1.14	O.W.1
4	Fairfield Borough	H. A. Kieffer	12-26-53	170	185	6	83	none	TRb	20	36	20	1.80	O.W.1
5	Fairfield Borough	Burrows Well Drilling Co.	7- 9-64	167	350	10	85	none	TRb	--4	500	64	7.35	
6	De Witt Rubber Mfg. Co.	Algeier Bros.	7-16-54	170	142	6	86	none	TRb	2	25	13	1.92	
7	Curtiss Wright Corp.	Artesian Well & Equip. Co.	4- 5-43	175	490	10	---	none	TRwb	32	275	85	3.24	O.W.6
8	Industry Publications	Algeier Bros.	9-15-54	180	100	6	57	none	TRwb	15	15	10	1.5	
9	Williamson & Co., Inc.	H. A. Kieffer	5-15-53	190	510	6	74	none	TRwb	13	25	55	.45	
10	Green Brook Country Club	H. A. Kieffer	1958	---	300	8	53	none	TRb & TRwb	20	335	28	11.96	O.W.4
					GLEN RIDGE BOROUGH									
1	S. Mendelsohn	Wm. Stothoff Co., Inc.	1-12-51	240	166	6	22	none	TRb	45	30	3	10.00	
2	Chicle Products Co.	----------	1920	---	757	6	110	none	TRb	18	50	52	.96	
					IRVINGTON (TOWN)									
1	Fezem Memorial Home	Wm. Stothoff Co., Inc.	5-19-52	185	304	8	66	none	TRb	75	78	25	3.1	
2	Kles Diner, Inc.	Parkhurst Well & Pump Co.	3-10-55	---	250	8	47	none	TRb	31	65	69	.94	
3	American Stores	Parkhurst Well & Pump Co.	7-17-51	160	402	8	45	none	TRb	40	126	80	1.57	O.W.1
4	Olympic Park	A. J. Connally, Inc.	1928	158	300	10	---	none	TRb	52	420	78	5.38	
5	Irvington Smelting & Refining Works	Wm. Stothoff Co., Inc.	3-25-53	---	304	10	62	none	TRb	40	300	22	13.6	
6	Jersey Plastic & Die Casting Co.	Wm. Stothoff Co., Inc.	3-26-54	155	400	10	38	none	TRb	94	183	106	1.74	
7	Gallo Asphalt Co.	F. J. Bott	6- 9-61	150	201	6	107	none	TRb	46	200	24	8.4	
8	Palnut Co.	Parkhurst Well & Pump Co.	1-27-50	170	229	8	[illegible]	none	TRb	45	60	6	10.0	

Aquifer name:
Qsd, Stratified drift
TRb, Brunswick Formation
TRwb, Watchung Basalt

TABLE 2.—RECORDS OF SELECTED WELLS IN ESSEX COUNTY, N. J.—Continued

Remarks:
O.W., Owners well number

Well	Owner or Tenant	Driller	Date Drilled	Altitude above mean sea level (ft)	Total depth drilled below land surface (ft)	Diameter of well (inches)	Depth to which well is cased (ft)	Screen setting (ft)	Aquifer	Static level below land surface (feet)	Yield (gpm)	Drawdown (ft)	Specific capacity (gpm/ft)	Remarks
					MONTCLAIR (TOWN)									
1	Rapt & Ruden	Parkhurst Well & Pump Co.	4-29-48	360	250	10	23	none	TRb	5	145	180	.81	
2	Bond's Ice Cream, Inc.	Parkhurst Well & Pump Co.	3-10-50	510	157	8	21	none	TRb	15	150	55	2.73	
3	Town of Montclair	----------	1966	---	300	10	41	none	TRb	24	950	51	18.62	
4	Hahne & Co.	Parkhurst Well & Pump Co.	8- 9-49	280	350	8	31	none	TRb	18	350	182	1.92	O.W. 2
5	M. Quadrel	Burrows Well Drilling Co.	June, 1955	260	151	6	18	none	TRb	33	75	---	----	
6	Montclair Auto Minit Man	Rinbrand Well Drilling Co.	1-10-50	---	200	6	16	none	TRb	40	60	---	----	
					NEWARK (CITY)									
1	Aluminum Finishing Co.	J. Foster	7-20-53	50	150	6	55	none	TRb	30	100	30	3.33	
2	Wilbur B. Driver Co.	Rinbrand Well Drilling Co.	7- 2-53	15	400	10	93	none	TRb	45	240	155	1.55	O.W. 5
3	Pittsburgh Plate Glass Co.	Lauman & Co.	1940	12	---	12	90	none	TRb	9	390	---	----	
4	McEvoy Court Apartments	Parkhurst Well & Pump Co.	Oct. 1939	200	206	6	35	none	TRb	84	60	106	.57	
5	Columbia Theaters, Inc.	Wm. Stothoff Co., Inc.	6- 9-53	---	312	8	26	none	TRb	20	140	32	4.38	
6	Pabst Brewing Co., Inc.	Artesian Well & Equip. Co.	3-14-49	190	685	14	39	none	TRb	59	557	67	8.31	O.W. 4
7	Pabst Brewing Co., Inc.	Artesian Well & Equip. Co.	7-17-50	185	687	14	55	none	TRb	108	240	120	2.00	O.W. 5
8	Newark Milk & Cream Co.	Rinbrand Well Drilling Co.	Feb. 1949	25	700	10	80	none	TRb	60	75	190	.39	
9	Continental Ins. Co.	S. P. D'Alessio	July 1965	---	300	8	58	none	TRb	77	85	72	1.18	
10	Newark Center Corp.	Garden State Artesian Well & Pump Co.	2-18-55	---	700	10-6	150	none	TRb	81	89	144	.62	O.W. 1
11	Kolker Chemical Works	Wm. Stothoff Co., Inc.	12-11-51	12	802	12	127	none	TRb	117	600	43	13.95	O.W. 2
12	Kolker Chemical Works	Wm. Stothoff Co., Inc.	4-27-49	8	359	10	98	none	TRb	76	300	22	13.63	O.W. 1
13	Eureka Construction Co.	Rinbrand Well Drilling Co.	1-23-59	10	500	8	90	none	TRb	25	75	225	.33	
14	P. Ballentine & Sons	----------	1937	12	875	16	95	none	TRb	227	375	153	1.79	O.W. 8, Plant #2

Aquifer name:
Qsd, Stratified drift
TRb, Brunswick Formation
TRwb, Watchung Basalt

TABLE 2.—RECORDS OF SELECTED WELLS IN ESSEX COUNTY, N. J.—Continued

Remarks:
O.W., Owners well number

Well	Owner or Tenant	Driller	Date Drilled	Altitude above mean sea level (ft)	Total depth drilled below land surface (ft)	Diameter of well (inches)	Depth to which well is cased (ft)	Screen setting (ft)	Aquifer	Static level below land surface (feet)	Yield (gpm)	Drawdown (ft)	Specific capacity (gpm/ft)	Remarks
					NEWARK (CITY) - Continued									
15	Celanese Corp. of Amer.	P. H. & J. Colan	1924	12	805	16-10	95	none	TRb	176	400	28	14.29	O.W. 26
16	Celanese Corp. of Amer.	Layne-New York Co.	5-16-47	14	856	16-10	75	none	TRb	147	778	40	19.45	O.W. 27
17	J. Hemler Brewing Co.	P. Chaffitelli	12-14-49	12	700	10-8	57	none	TRb	60	450	240	1.79	O.W. 4
18	Synthetic Plastics Co.	Industrial Well & Pump Co.	1-15-63	14	600	8	145	none	TRb	150	300	110	2.73	O.W. 1
19	Ablon Finishes, Inc.	Frank Bott	7-12-60	15	500	8	86	none	TRb	30	360	70	5.14	
20	Cotan Corporation	-------	1930	10	290	8	---	none	TRb	140	160	95	1.59	
21	Universal Grain Co.	Wm. Stothoff Co., Inc.	10-18-51	10	303	8	79	none	TRb	143	200	53	3.77	
22	Mother's Food Products, Inc.	---------	1959	11	400	8	107	none	TRb	94	125	8	15.62	
23	Kar Auto Service Co.	P. Chaffitelli	2- 8-50	208	300	6	35	none	TRb	23	60	104	.58	
24	Food Fair Stores	Burrows Well Drilling Co.	April, 1955	100	298	8	35	none	TRb	105	250	45	5.56	
25	S. & S. Super Service Corp.	Rinbrand Well Drilling Co.	2-18-50	50	190	6	94	none	TRb	45	20	---	----	
26	Rutherford & Delaney Holding Co.	Garden State Artesian Well & Pump Co.	7-31-56	---	220	8-6	42	none	TRb	22	100	73	1.37	O.W. 1
27	Linde Air Products Co.	Artesian Well & Equip. Co.	July, 1954	10	500	12	44	none	TRb	17	124	190	.65	
28	C-O Two Fire Equipment Co.	Parkhurst Well & Pump Co.	4-27-50	10	603	10	127	none	TRb	35	89	215	.41	
29	Suburban Motor Lodge, Inc.	Rinbrand Well Drilling Co.	June, 1950	10	555	8	126	none	TRb	15	20	235	.08	
30	S. B. Penick & Co.	Wm. Stothoff Co., Inc.	6- 7-61	---	400	10	75	none	TRb	60	644	23	28.00	O.W. 2
					NORTH CALDWELL BOROUGH									
1	Green Brook Country Club	H. A. Kieffer	July, 1951	310	300	8	33	none	TRwb	2	25	81	.31	O.W. 3
2	Green Brook Country Club	H. A. Kieffer	March, 1925	290	301	8	---	none	TRb & TRwb	flowing 25 gpm	60	---	----	O.W. 1. Redrilled 1962
3	A. Struss	H. A. Kieffer	8-16-55	---	182	6	42	none	TRwb	65	25	5	5.00	
4	A. F. Leitner	Algeier Bros.	5-24-58	---	195	6	25	none	TRwb	25	7	125	.05	

Aquifer name:
Qsd, Stratified drift
TRb, Brunswick Formation
TRwb, Watchung Basalt

TABLE 3.—CHEMICAL ANALYSES OF WATER FROM SELECTED WELLS IN ESSEX COUNTY

(Results in parts per million except as indicated)

(1) I, industrial
P.S., public supply

Location no. on map	Owner and well number	Water-bearing formation	Date of collection	Temperature (°F)	Silica (SiO_2)	Iron (Fe)	Manganese (Mn)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Specific conductance (micromhos at 25°C)	pH	Color	Source of analysis	Use
	ESSEX FELLS BOROUGH																							
1	Boro. of Essex Fells, No. 8	TRwb	9- 1-66	53	25	.09	.00	32	6.9	14	.3	84	36	19	.0	6.3	192	109	40	281	7.6	2	U.S.G.S.	P.S.
4	Boro. of Essex Fells, No. 1	Qsd	9- 1-66	52	27	.02	.00	42	16	7.2	.5	122	40	28	.0	6.4	265	171	71	358	8.1	3	U.S.G.S.	P.S.
	LIVINGSTON TOWNSHIP																							
5	Livingston Twp. No. 1	TRb	2-25-59	---	---	---	---	---	---	6.7	---	127	26	8.5	---	9.6	---	104	32	299	7.8	2	U.S.G.S.	P.S.
5	Livingston Twp. No. 4	TRb	8-31-66	55	23	.00	.00	32	14	8.7	.7	124	31	13	.0	8.4	220	138	36	306	7.8	2	U.S.G.S.	P.S.
1	City of East Orange	Qsd	8-18-66	---	19	.14	.00	52	20	13	.8	166	7.8	9.4	.1	6.1	309	212	76	433	7.5	2	U.S.G.S.	P.S.
2	City of East Orange	TRb	8-18-66	---	24	.10	.00	34	13	8.7	.7	140	25	6.7	.0	3.8	191	139	24	288	7.3	--	U.S.G.S.	P.S.
	MILLBURN TOWNSHIP																							
1	Commonwealth Wu. Co. No. 49	Qsd	8-19-66	53	20	.00	.00	53	14	13	.8	155	67	13	.0	6.1	298	190	63	407	8.1	2	U.S.G.S	P.S.
1	Commonwealth Wu. Co. No. 5	Qsd	8-19-66	54	21	.10	.00	44	15	12	.8	164	40	10	.0	4.1	240	172	37	368	7.6	2	U.S.G.S.	P.S.
	Commonwealth Wu. Co., E	Qsd	2-24-59	53	22	.00	.00	40	13	19	.8	124	77	7.7	.0	1.2	256	104	52	242	7.9	3	U.S.G.S.	P.S.
	Commonwealth Wu. Co. No. 46	Qsd	8-19-66	53	20	.04	.10	40	10	23	.4	158	47	11	.1	0.6	240	141	12	368	7.6	3	U.S.G.S.	P.S.
	City of East Orange	Qsd	8-18-66	---	25	.03	.00	50	13	3.6	1.8	158	32	15	.0	2.5	256	179	49	347	8.0	2	U.S.G.S.	P.S
	City of Orange, No. 1	Qsd	2-24-58	---	---	---	---	--	---	5.2		55	33	11	---	1.1	---	45	39	203	7.3	2	U.S.G.S.	P.S.
	NEWARK (CITY)																							
	P. Ballentine & Sons	TRb	1- 9-48	59	31	.15	---	865	173	447	7.0	210	911	1900	.0	6.2	4780	-		6960	7.3	0	U.S.G.S.	I
	Heusler Brewing Co.	TRb	10-18-37	---	--	---	---	152	31	---	---	162	240	12	---	---	---	-	--	--		-	U.S.G.S.	I
	SOUTH ORANGE (VILLAGE)																							
	City of South Orange, No. 2	TRb	2-24-59	---	19	.06	.00	80	7.4	23	2.0	198	76	35	.0	8.6	343	162	58	486	7.9	1	U.S.G.S.	P
	City of South Orange, No. 3	TRb	9- 2-66	54	17	.08	.00	93	10	40	2.6	204	51	92	.0	4.9	469	271	106	705	7.9	2	U.S.G.S.	P.S.

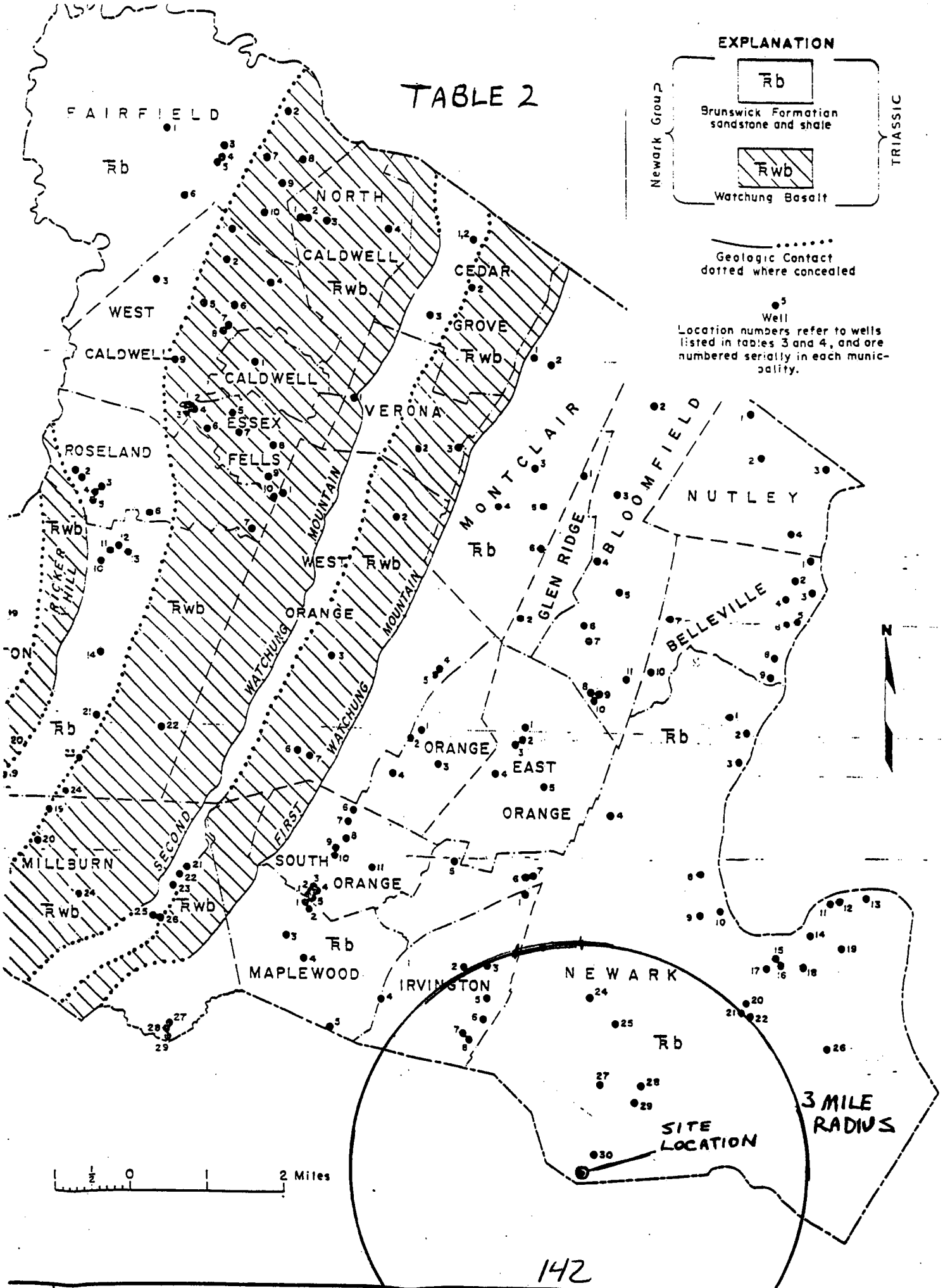


Figure 2.—Generalized bedrock geologic map of Essex County, N. J. showing locations of selected wells.

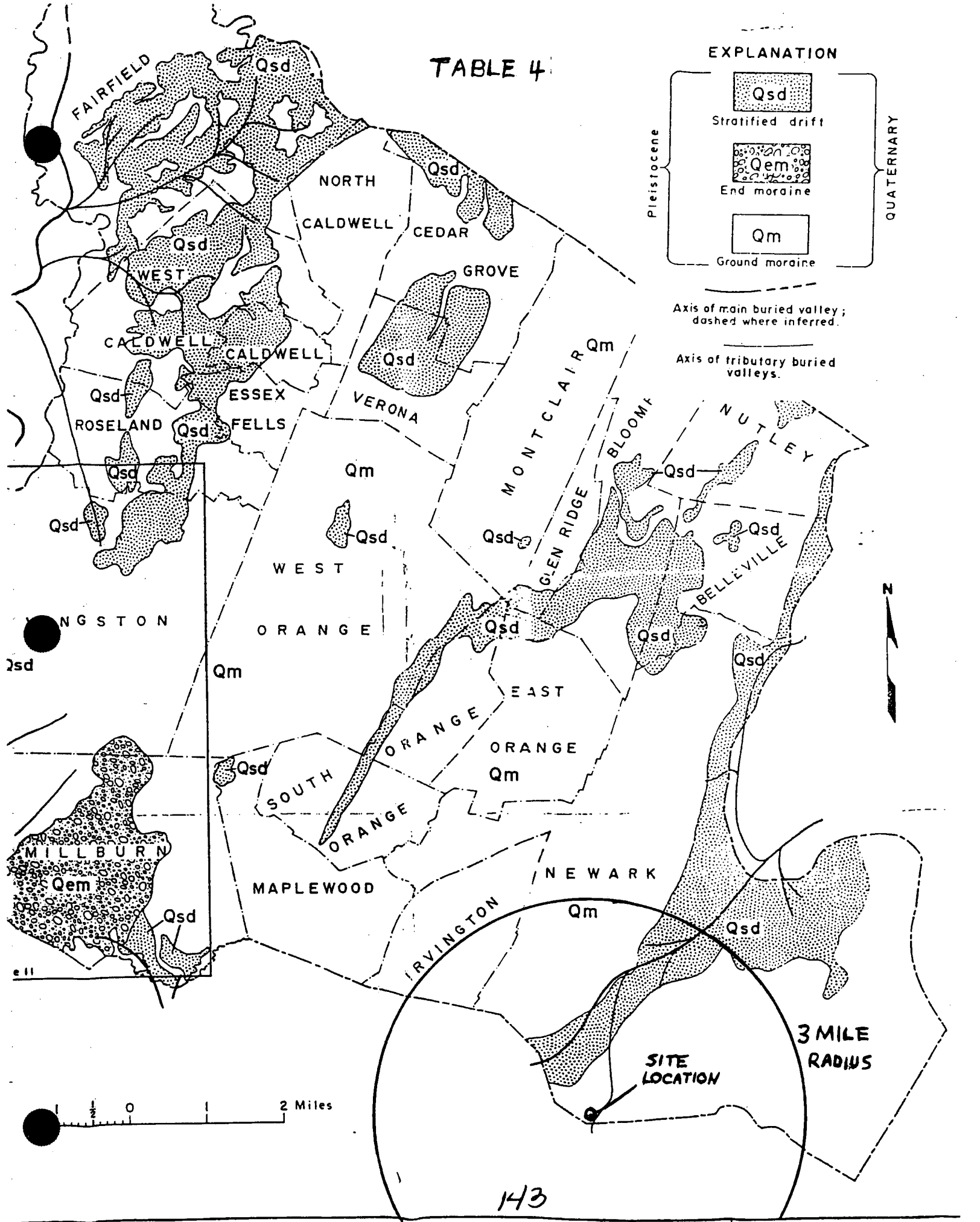


Figure 3.—Generalized surficial geologic map of Essex County, N. J. showing axes of buried valleys.

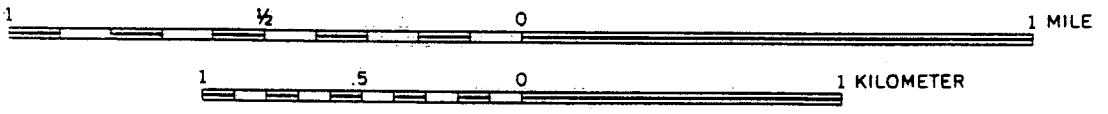
REFERENCE NO. 11

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

BEDROCK TOPOGRAPHY AND THICKNESS OF PLEISTOCENE DEPOSITS IN UNION COUNTY AND ADJACENT AREAS, NEW JERSEY

By Bronius Nemickas

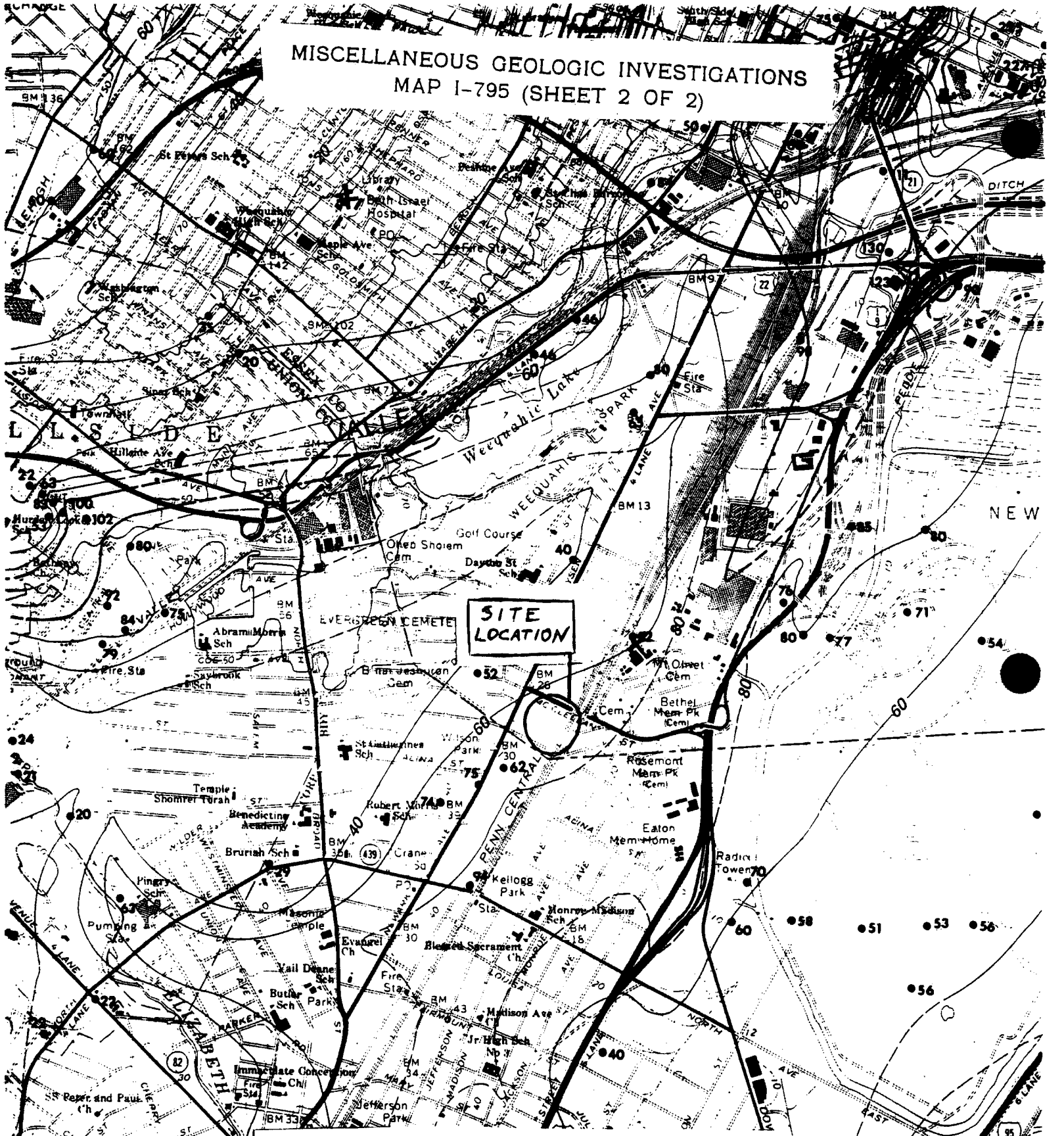
SCALE 1:24 000



CONTOUR INTERVALS 10 AND 20 FEET
DEPTH CURVE AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS APPROXIMATELY 5.3 FEET

MISCELLANEOUS GEOLOGIC INVESTIGATIONS MAP
Published by the U.S. Geological Survey, 1974
Washington, D.C. 20244

MISCELLANEOUS GEOLOGIC INVESTIGATIONS
MAP I-795 (SHEET 2 OF 2)



EXPLANATION

• 27 WELL OR BORING – Number indicates thickness of Pleistocene deposits, in feet

—100— LINE OF EQUAL THICKNESS – Dashed where approximately located. Interval 20 feet

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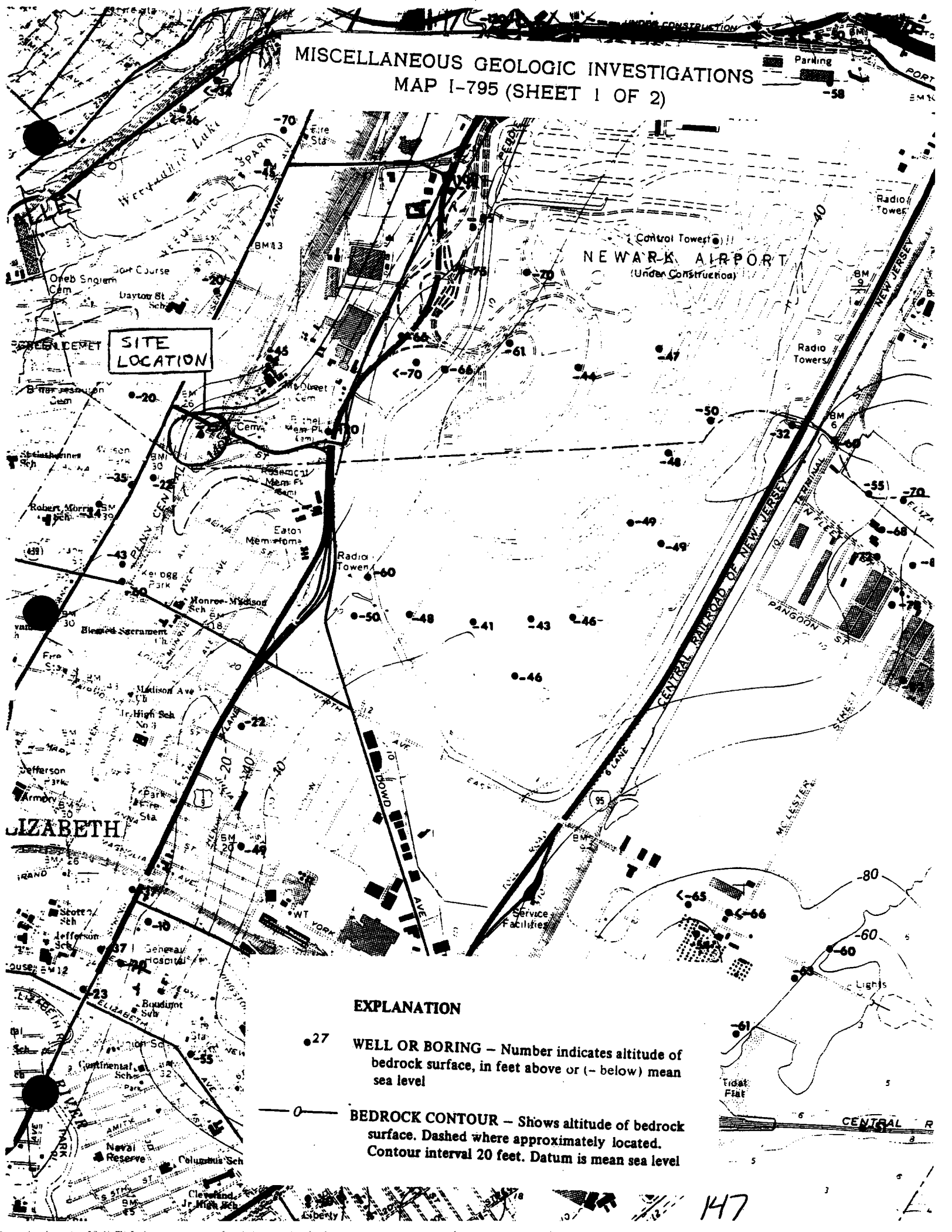

MISCELLANEOUS GEOLOGIC INVESTIGATIONS
MAP I-795 (SHEET 1 OF 2)
SITE LOCATION
NEWARK AIRPORT
(Under Construction)
Control Tower
Radio Towers
Radio Tower
Parking
Service Facilities
CENTRAL RAILROAD OF NEW JERSEY
NEW JERSEY
DOWD AVE
PANGOON ST
Eaton Mem Home
Monroe-Madison Sch
Blessed Sacrament
Madison Ave
Jr High Sch
Jefferson Park
Armory
Park Fire Sta
Scott Sch
Jefferson Sch
General Hospital
Boudinot Sch
Continental Sch
Naval Reserve
Columbus Sch
Cleveland Jr High Sch
Liberty
Tidal Flat
Lights
Oneb Snolem Cem
Dayton St Sch
Robert Morris Sch
Fire Sta
Wequahic Lake
Wilson Park
Kellogg Park
Rosemont Mem Pk
Mt Olivet Cem
Bethel Mem Pk
Cem
Fire Sta
Jefferson Park
Armory
Park Fire Sta
LIZABETH
EXPLANATION
27 WELL OR BORING – Number indicates altitude of bedrock surface, in feet above or (– below) mean sea level
0 BEDROCK CONTOUR – Shows altitude of bedrock surface. Dashed where approximately located. Contour interval 20 feet. Datum is mean sea level

REFERENCE NO. 12

NUS CORPORATION TELECON NOTE

CONTROL NO:	DATE:	TIME:
02-8905-06	6/12/89	1102

DISTRIBUTION:

ORBIS PRODUCTS

BETWEEN:	OF:	PHONE:
DREW BARIS	EPA REGION 2 - OFFICE OF GROUNDWATER MANAGEMENT	(212) 264 5635

AND: PAUL BAUER (NUS)

DISCUSSION:

MR. BARIS TOLD ME THERE IS NO ~~A~~ PE SOLE SOURCE AQUIFERS WITHIN 3 miles OF THE TOWN OF ELIZABETH, N.J., OR THE NEWARK AIRPORT.

Paul Bauer

ACTION ITEMS:

NUS 087 REVISED 0581

REFERENCE NO. 13

NUS CORPORATION TELECON NOTE

CONTROL NO:	DATE:	TIME:
02-8904-27	5-15-89	1126

DISTRIBUTION: TO FILE - CELLOFILM CORPORATION

BETWEEN:	OF:	PHONE:
DREW BARIS	EPA REGION 2 - OFFICE OF GROUNDWATER MGMT.	(212) 264-5635

AND: EDMUND KNYFD JR. (NUS)

DISCUSSION:

I asked Drew if there is a current or pending sole source aquifer designation for Newark. He said there is no current or pending sole source aquifer designation for Newark.

Edmund Knyfd Jr. 5-15-89

ACTION ITEMS:

NUS 087 REVISED 0581

REFERENCE NO. 14

Uncontrolled Hazardous Waste Site Ranking System

A Users Manual

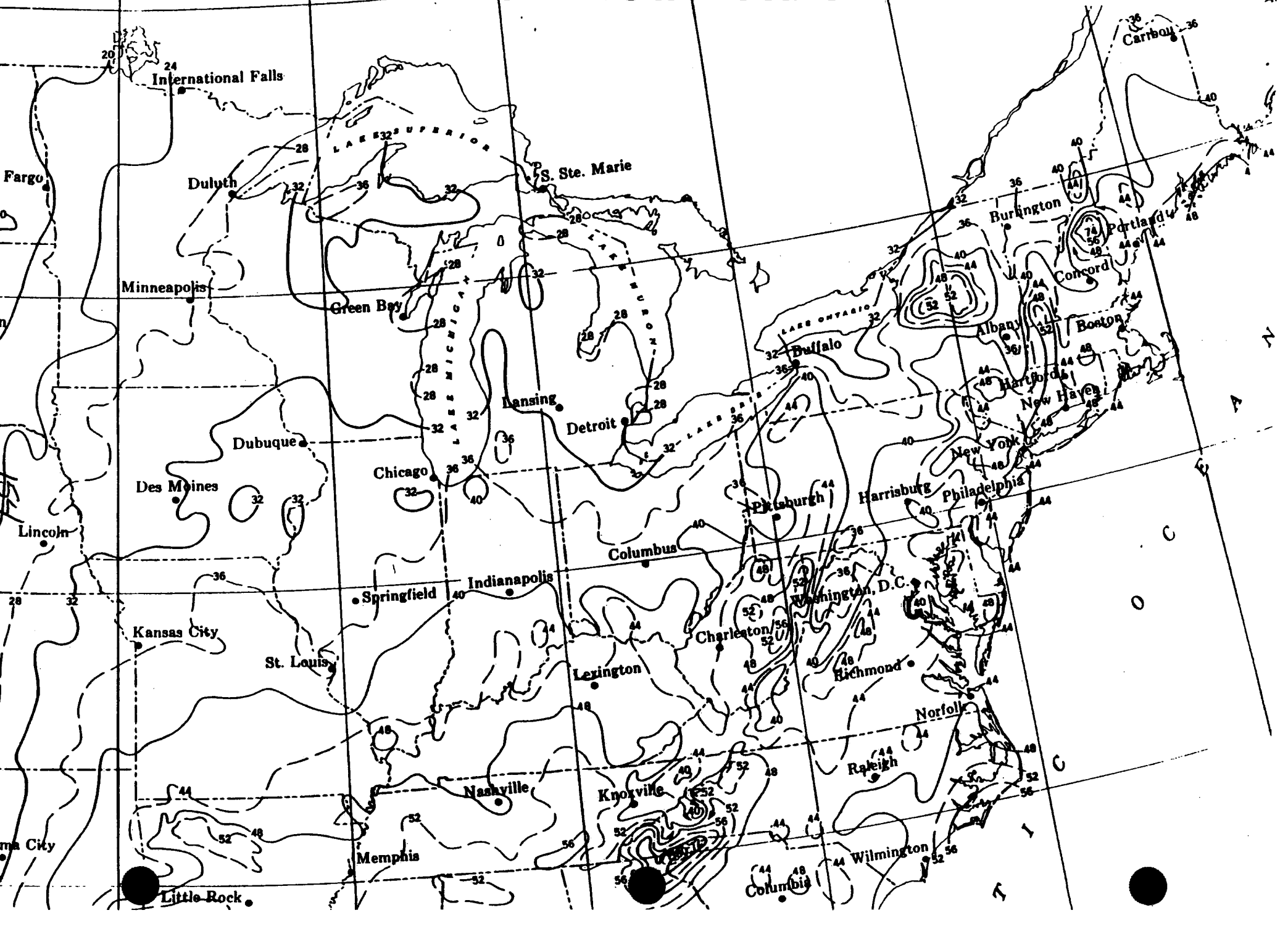
(HW-10)

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

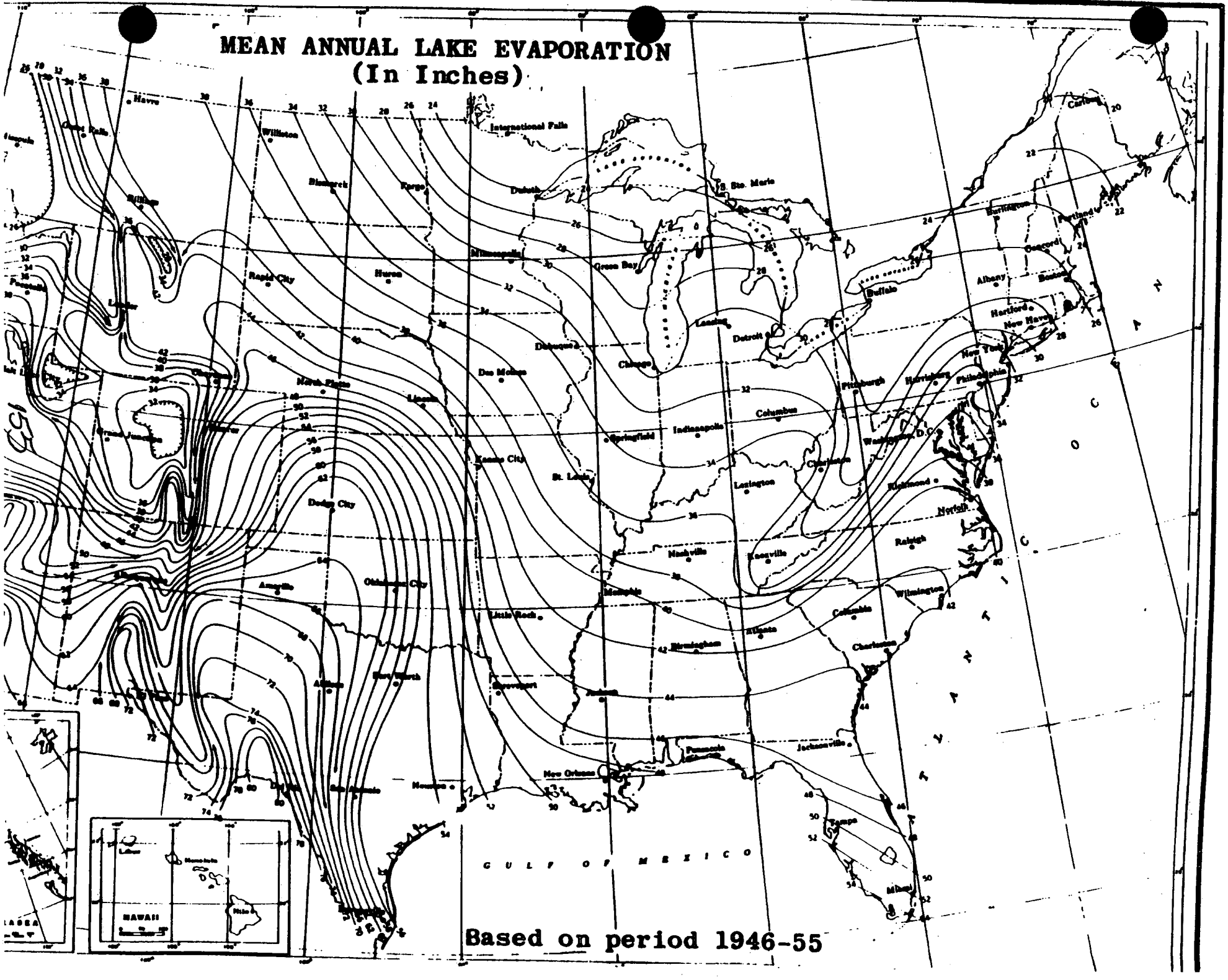
United States
Environmental Protection
Agency

1984

NORMAL ANNUAL TOTAL PRECIPITATION (Inches)



MEAN ANNUAL LAKE EVAPORATION
(In Inches)



Based on period 1946-55

1 YEAR 24-HOUR RAINFALL (inches)

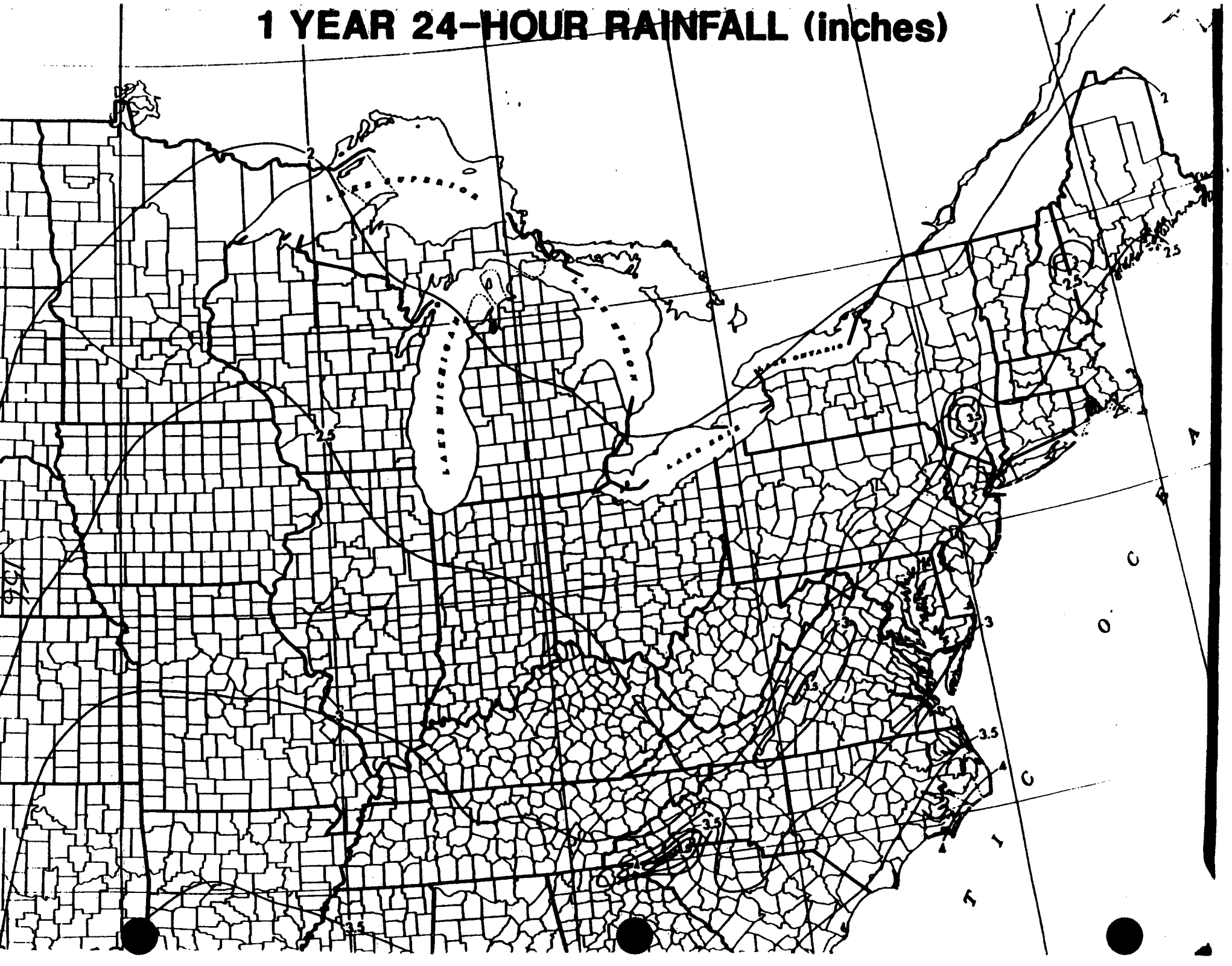


TABLE 2

PERMEABILITY OF GEOLOGIC MATERIALS*

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

*Derived from:

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

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

REFERENCE NO. 15

NUS CORPORATION AND SUBSIDIARIES — **TELECON NOTE**

CONTROL NO:	DATE:	TIME:
02-8904-24	4-17-89	1435

DISTRIBUTION:
Groundwater usage in the City of Newark
Anheuser-Busch Inc.

BETWEEN:	OF:	PHONE:
Ms. James	Newark City Water Dept	(201) 256-4965

AND:
John Harrison (NUS Corp)

DISCUSSION:

City of Newark draws its drinking water from the Pequannock watershed, which is a system of five reservoirs. Where Anheuser-Busch Inc is located, it is served by the Wanaque Reservoir. All of these reservoirs are located in Northern Passaic County. All water usage in the city of Newark is strictly industrial. JH 4-17-89

ACTION ITEMS:

NUS 067 REVISED 0685

REFERENCE NO. 16

NUS CORPORATION AND SUBSIDIARIES

TELECON NOTE

CONTROL NO:	DATE:	TIME:
02-8801-01	01-20-88	1400

DISTRIBUTION:

SCP

BETWEEN:	OF:	PHONE:
Mr Melito	Essex Co Dept of Public Work - Engineer	(201) 2268500

AND:

Richard Pagano

DISCUSSION:

Mr Melito informed me that to his knowledge there are no drinking water wells in the whole city of Newark

ACTION ITEMS:

NUS 067 REVISED 0688

REFERENCE NO. 17

NUS CORPORATION AND SUBSIDIARIES — **TELECON NOTE**

CONTROL NO:	DATE:	TIME:
02-8904-24	4-18-89	1130

DISTRIBUTION: Anheuser-Busch Inc.

BETWEEN:	OF:	PHONE:
Engineering Dept.	Elizabeth Water Company	(201) 272-0610

AND: John Harrison (NUS Corp)

DISCUSSION:

I spoke with a ~~Eng~~ Company Engineer, and he informed me that there are no public supply wells in the area of the Newark/Union Co. border. Elizabethtown Water Company's service extends from Northwestern Newark to Southwestern Elizabeth. A large portion of Union County is serviced by them. Anheuser-Busch Inc. is located approx 1 mile from Elizabethtown's Water Company's service.

JH 4-18-89

ACTION ITEMS:

NUS 067 REVISED 0685

REFERENCE NO. 18

NUS CORPORATION
SUPERFUND DIVISION

PROJECT NOTES

TO: ORBIS PRODUCTS

DATE: 6/19/89

FROM: PAUL BAUER

COPIES:

SUBJECT: LOCATION of Ref. 18

REFERENCE: REPORT No 02-8905-06-PA

Reference 18, The 3 mile Vicinity map, is LOCATED in THE BACK of THIS REPORT

P. Bauer

NUS 443A 58 1182

REFERENCE NO. 19

PRELIMINARY ASSESSMENT
OFF SITE RECONNAISSANCE
INFORMATION REPORTING FORM

Date: May 11, 1989

Site Name: Orbis Products Corp TDD: 02-8905-06

Site Address: 55 Virginia Street
Street, Box, etc.

Newark, ~~NJ~~
Town

Essex
County

New Jersey
State

NUS Personnel:

Name	Discipline
Dennis Foerter	Environmental Analyst
Richard Hubner	Biologist

Weather Conditions (clear, cloudy, rain, snow, etc.):
Rainy. 45° to 50° wind ~~0-5~~

Estimated wind direction and wind speed: 0-5 mph

Estimated temperature: 45 to 50°

Signature: Dennis J. Foerter Date: 5/11/89

Countersigned: [illegible] Date: 5/11/89

PRELIMINARY ASSESSMENT

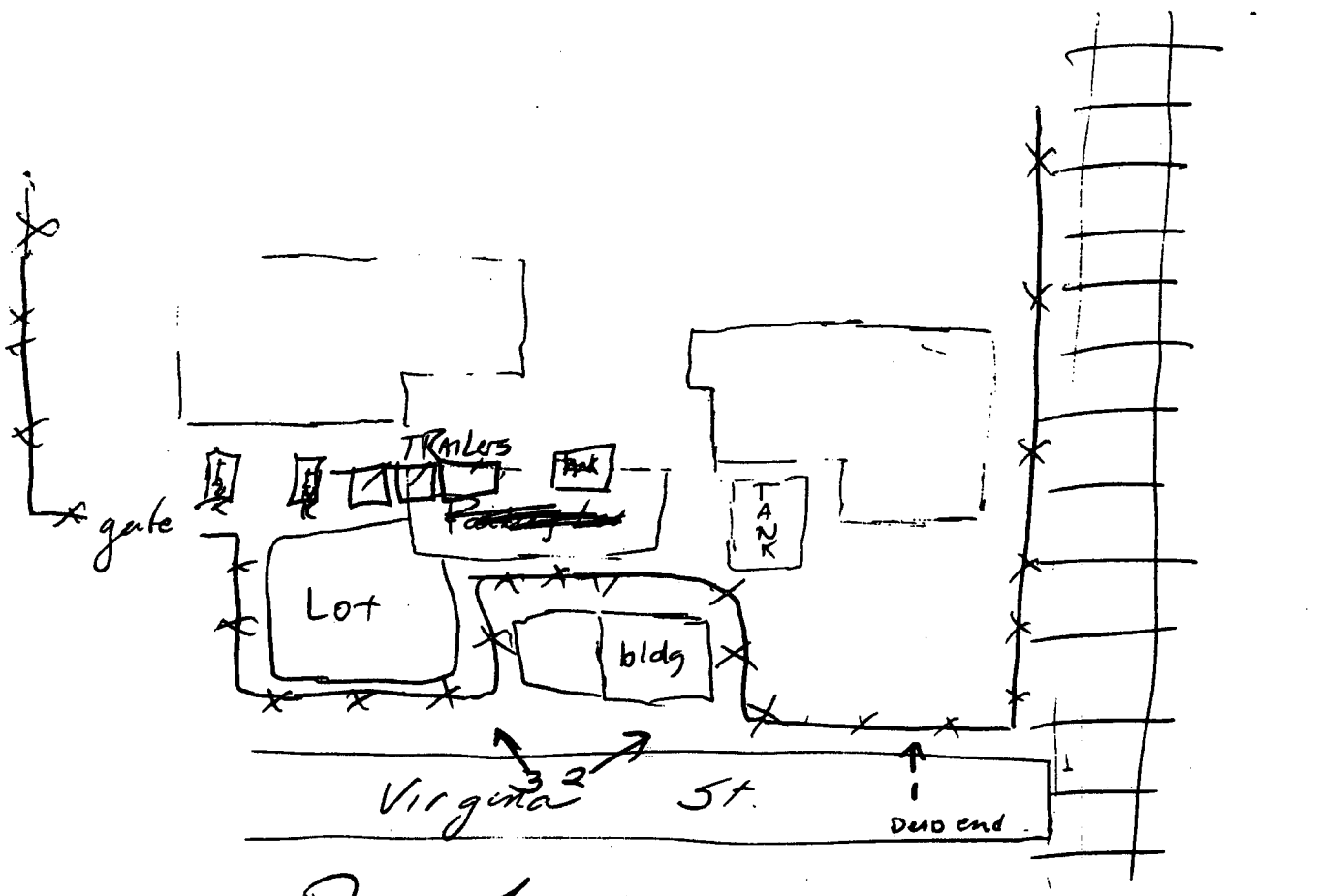
INFORMATION REPORTING FORM

Date: May 11, 1984

Site Name: Orbis Products Corp TDD: 02-8905-06

Site Sketch:

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



Signature: Dennis [illegible] Date: 5/11/84

Countersigned: [illegible] Date: 5/11/84

PRELIMINARY ASSESSMENT

INFORMATION REPORTING FORM

Date: May 11, 1989

Site Name: Orbis Products Corp TDD: 02-8905-06

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

10:02 arrived on site
Site is run-down and enclosed with a falling fence and bordered by Virginia Ave and a Railroad track. Site is fairly level and site looks active. Numerous tanks visible and also some trailers w/ may be for storage.
limited site access so visibility is poor.

10:15 left site.

Signature: Dennis J Trentel Date: 5/11/89
Countersignature: [illegible] Date: 5/11/89

PRELIMINARY ASSESSMENT

INFORMATION REPORTING FORM

Date: _____

Site Name: Orbis Products Corp TDD: 02-8905-06

Notes (Cont'd):

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

Signature: _____ Date: _____

Countersignature: _____ Date: _____

PRELIMINARY ASSESSMENT

INFORMATION REPORTING FORM

Date: May 11, 1989

Site Name: Orbis Products Corp TDD: 02-8905-06

Photolog:

Frame/Photo Number	Date	Time	Photographer	Description
1 S,P	5/11/89	10:07	D. Foerter	edge of bldg by Railroad Track
2 S,P	5/11/89	10:11	↓	bldg by Tanks looking east
3 S,P	5/11/89	10:11	↓	Main bldg w/ tanks and trailers

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

Signature: Dennis [illegible] Date: 5/11/89

Countersignature: [illegible] Date: 5/11/89

REFERENCE NO. 20

NUS CORPORATION AND SUBSIDIARIES — **TELECON NOTE**

CONTROL NO:	DATE:	TIME:
02-8904-24-PA	5/15/89	1000

DISTRIBUTION: Weequahic Lake (uses)

BETWEEN:	OF:	PHONE:
Mr Peoples	Newark Water Dept (Engineering Dept)	(201) 733-3654

AND: John Harrison

DISCUSSION:

Mr Peoples informed me that Weequahic Lake has no apparent uses, However in the event of a drought emergency water is drawn from other water depts and reservoirs not the Weequahic Lake, the lake would only be used for industrial purposes during a drought situation. DJB 5/15/89

ACTION ITEMS:

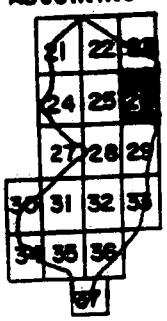
NUS 067 REVISED 0685

REFERENCE NO. 21

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DAVID J. BARDIN, COMMISSIONER

KEY TO ADJOINING SHEETS



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

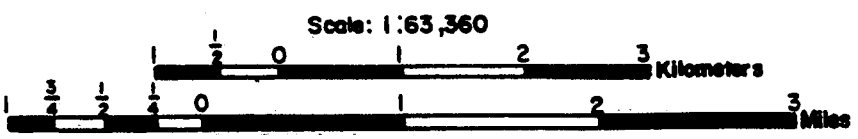
BARREN LAND

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

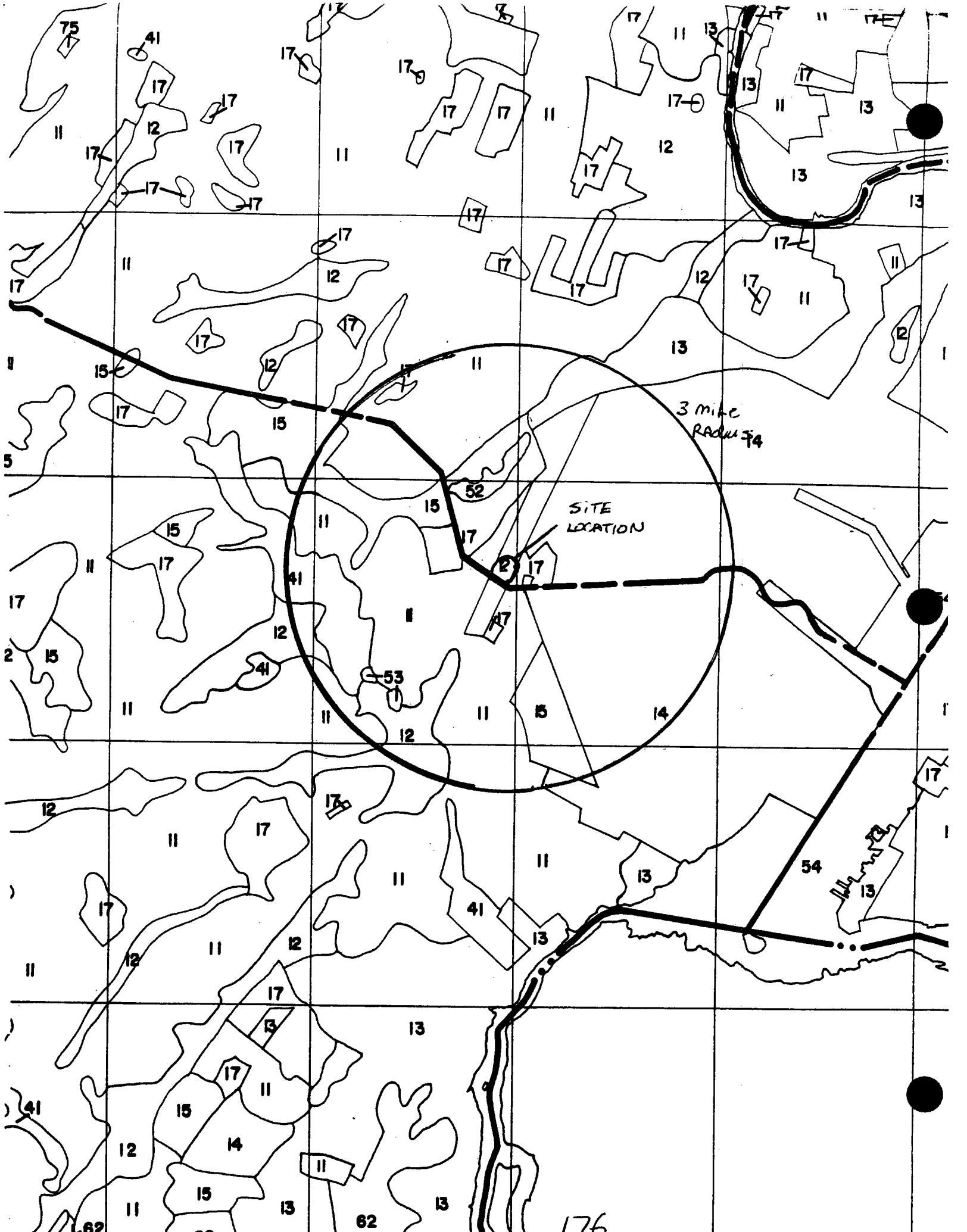
LAND USE OVERLAY SHEET 26

BUREAU OF GEOLOGY AND TOPOGRAPHY
KEMBLE WIDMER, STATE GEOLOGIST
1976

Scale: 1:63,360



SUPERVISED BY GEORGE J. HALASI-KUN, TOPOGRAPHIC ENGINEER
DRAFTED BY JOHN E OLSCHEWSKI


3 mile
RADIUS
SITE
LOCATION

REFERENCE NO. 22

40074-A1-EI-250

Newark

N. J.–N. Y.–PA.

1:250 000-scale map of

Atlantic Coast Ecological Inventory

LAND USE–LAND COVER SYMBOLS

Study area (coastal zone boundary to three-mile limit) .....

Special land use areas, including refuges and wildlife management areas, parks and seashores, may be used in lieu of habitat boundary .....

Subdivision of a special land use area into more than one designation .....

Swamp .....

Marsh .....

Beach/Dunes .....

Seagrass .....

Reef .....

POINT AND AREA FEATURE SYMBOLS

(shown in RED for species with special status; shown in BLUE for aquatic organisms; and shown in BROWN for terrestrial organisms)

Localized concentration of species 500n

General habitat boundary for indicated species; may be superceded by special land use boundary 100d

Produced by
U. S. FISH AND WILDLIFE SERVICE
1980

Scale 1:250,000

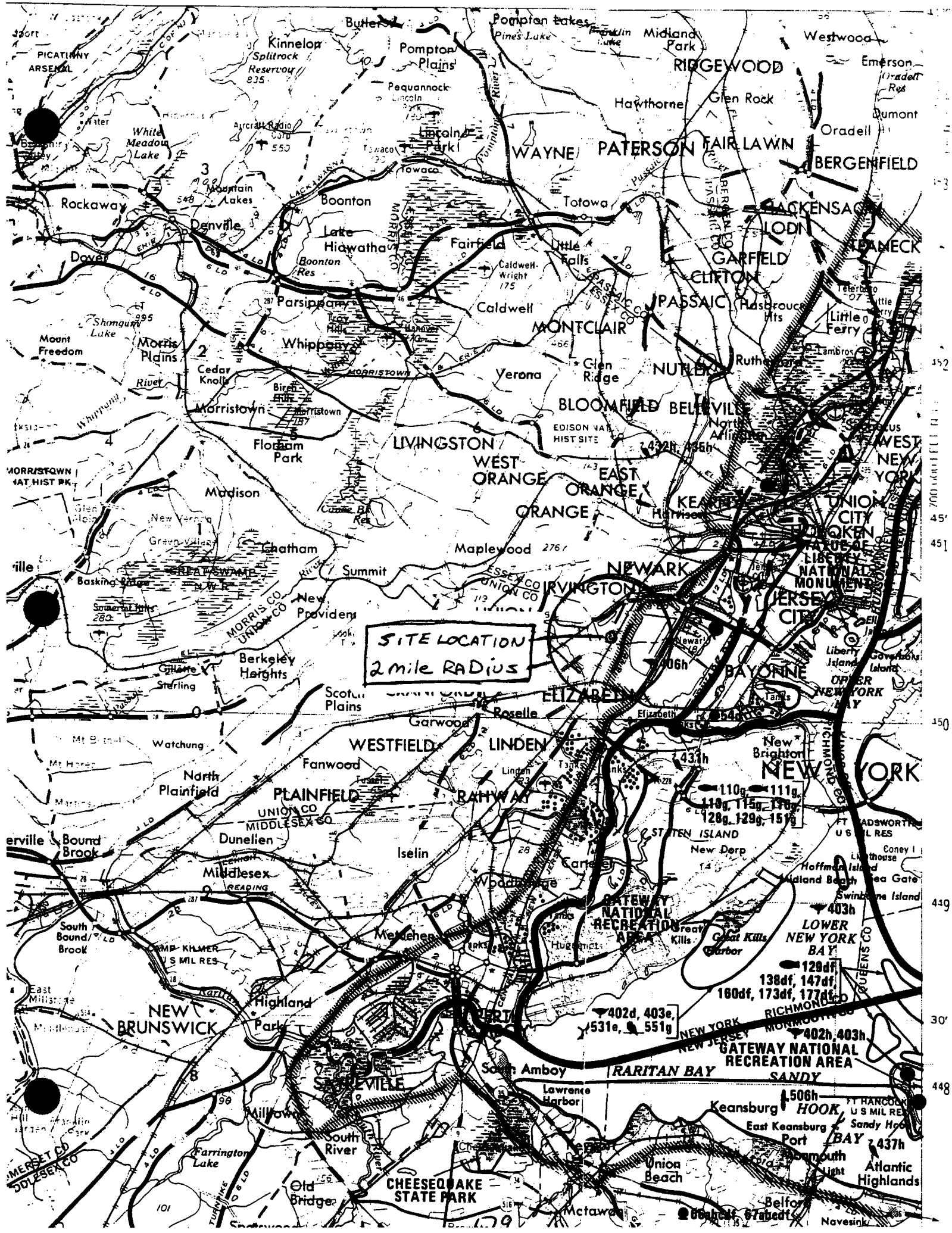
5 0 5 10 15 20 Statute Miles

5 0 5 10 15 20 25 30 Kilometers

5 0 5 10 15 Nautical Miles

TRANSVERSE MERCATOR PROJECTION

178


SITE LOCATION
2 mile RADIUS
PICATINNY ARSENAL
Kinnelon
Splitrock Reservoir
Butler
Pompton Lakes
Pompton Plains
Midland Park
Westwood
RIDGEWOOD
Emerson
Hawthorne
Glen Rock
Dumont
Oradell
White Meadow Lake
Lincoln Park
WAYNE
PATERSON
FAIR LAWN
BERGENFIELD
Rockaway
Mountain Lakes
Boonton
Totowa
HACKENSACK
LODI
TEANECK
Denville
Lake Hiawatha
Fairfield
Little Falls
GARFIELD
Dover
Boonton Res
Caldwell-Wright
CLIFTON
Parsippany
Caldwell
PASSAIC
Hasbrouck Hts
Little Ferry
Shongum Lake
MONTCLAIR
Mount Freedom
Morris Plains
Whippany
Glen Ridge
NUTLEY
Cedar Knolls
Verona
BLOOMFIELD
BELLEVILLE
Morristown
EDISON NAT HIST SITE
Florham Park
LIVINGSTON
WEST ORANGE
EAST ORANGE
WEST NEW YORK
MORRISTOWN NAT HIST PK
Madison
ORANGE
KEARNY
UNION CITY
HOBOKEN
Chatham
Maplewood
STATUE OF LIBERTY NATIONAL MONUMENT
Summit
NEWARK
IRVINGTON
Basking Ridge
New Providence
JERSEY CITY
Berkeley Heights
BAYONNE
Sterling
Scotch Plains
ELIZABETH
UPPER NEW YORK BAY
Roselle
Garwood
Watchung
WESTFIELD
LINDEN
New Brighton
NEW YORK
North Plainfield
Fanwood
PLAINFIELD
RAHWAY
Bound Brook
Dunellen
STATEN ISLAND
New Dorp
Iselin
Middlesex
Woodbridge
GATEWAY NATIONAL RECREATION AREA
South Bound Brook
Metuchen
Great Kills
Great Kills Harbor
LOWER NEW YORK BAY
CAMP KILMER U S MIL RES
NEW BRUNSWICK
Highland Park
South Amboy
RARITAN BAY
SANDY HOOK BAY
GATEWAY NATIONAL RECREATION AREA
Lawrence Harbor
Keansburg
East Keansburg
Port Monmouth
Atlantic Highlands
Millstone
South River
Farrington Lake
Old Bridge
CHEESEQUAKE STATE PARK
Union Beach
Belford
Navesink
110g, 111g, 118g, 115g, 116g, 128g, 129g, 151g
431h
406h
54h
403h
129df, 138df, 147df, 160df, 173df, 177df
402d, 403e, 531e, 551g
402h, 403h
506h
437h
66abcdf, 67abcdf
MORRIS CO
UNION CO
MIDDLESEX CO
ESSEX CO
BERGEN CO
PASSAIC CO
HUDSON CO
RICHMOND CO
QUEENS CO
MONMOUTH CO
SOMERSET CO
NEW YORK
NEW JERSEY

REFERENCE NO. 23

Surface Water Classifications

Surface Water Quality Standards
N.J.A.C. 7:9-4

Index D-
Surface Water Classifications of the Passaic, Hackensack and N.Y. Harbor Complex Basin

July 1985

181

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

(Stockholm) - Brook between Hamburg Turnpike and Williamsville-Stockholm Rd. to its confluence with Lake Stockholm Brook, north of Rt. 23	FW1 [tm]
LITTLE POND BROOK (Oakland) - Entire length	FW2-TP(C1)
LOANTAKA BROOK	
(Green Village) - Entire length, except segment described below	FW2-NT
(Great Swamp) - Brook and all tributaries within the boundaries of Great Swamp National Wildlife Refuge	FW2-NT(C1)
LUD-DAY BROOK	
(Camp Garfield) - Source to confluence with a tributary from Camp Garfield	FW1
MACOPIN RIVER	
(Newfoundland) - Source to Echo Lake dam	FW2-NT
(Newfoundland) - Echo Lake dam to Pequannock River	FW2-TM
MEADOW BROOK (Wanaque) - Skyline Lake to Wanaque River	FW2-NT
MILL BROOK	
(Randolph) - Source to Rt. 10 bridge	FW2-TP(C1)
(Randolph) - Rt. 10 bridge to Rockaway River	FW2-NT
MORSES CREEK - Entire length	FW2-NT/SE3
MOSSMAN'S BROOK - See CLINTON BROOK	
MT. TABOR BROOK (Morris Plains) - Entire length	FW2-NT
NEWARK BAY (Newark) - North of an east-west line connecting Elizabethport with Bergen Pt., Bayonne up to the mouths of the Passaic and Hackensack Rivers	SE3
NOSENZO POND (Upper Macopin)	FW2-NT(C1)
OAK RIDGE RESERVOIR (Oak Ridge)	FW2-TM
OAK RIDGE RESERVOIR (Oak Ridge) - Northwestern tributary to Reservoir	FW1 [tm]
OVERPECK CREEK (Palisades Park) - Entire length	FW2-NT/SE2
PECKMAN RIVER (Verona) - Entire length	FW2-NT
PACACK BROOK	
(Stockholm) - Source to Pequannock River, excluding Canistear Reservoir, except segments described separately below	FW2-NT
(Canistear) - Brook and tributaries upstream of Canistear Reservoir located entirely within the boundaries of the Newark Watershed	FW1
PASSAIC RIVER	
(Mendham) - Source to Rt. 202 bridge (Van Doren's Mill), except tributaries described separately below	FW2-TM
(Paterson) - Rt. 202 bridge to Dundee Lake dam	FW2-NT
(Little Falls) - Dundee Lake dam to confluence with Second River	FW2-NT/SE2
(Newark) - Confluence with Second River to mouth	SE3

WANAQUE RIVER	
MAIN STEM	
(Hewitt) - Greenwood Lake outlet, through Wanaque Wildlife Management Area to the boundary of the State Park and Forest land at Monks, except tributary described separately below	FW2-TM(C1)
(Hewitt) - Entire length of tributary south of Jennings Creek	FW2-TP(C1)
(Monks) - Parkland boundary to Wanaque Reservoir	FW2-TM
(Pompton Lakes) - Wanaque Reservoir dam to Pompton River	FW2-NT
WEST BROOK (W. Milford) - Entire length	FW2-TP(C1)
WEST POND (Hewitt)	FW1
WEYBLE POND (Ringwood)	FW2-NT(C1)
WHIPPANY RIVER	
(Brookside) - Source to Whitehead Rd. bridge	FW2-TP(C1)
(Morristown) - Whitehead Rd. bridge to Passaic River	FW2-NT
WONDER LAKE (West Milford)	FW2-NT(C1)
WOODBRIDGE RIVER - Entire length	FW2-NT/SE3

REFERENCE NO. 24

GSC-TR8645

GRAPHICAL EXPOSURE MODELING SYSTEM

(GEMS)

USER'S GUIDE

VOLUME 2. MODELING

Prepared for:

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF PESTICIDES AND TOXIC SUBSTANCES
EXPOSURE EVALUATION DIVISION
Task No. 3-2
Contract No. 68023970
Project Officer: Russell Kinerson
Task Manager: Loren Hall

Prepared by:

GENERAL SCIENCES CORPORATION
8401 Corporate Drive
Landover, Maryland 20785

Submitted: December 1, 1986

GEMS> I

ORBIS PRODUCTS
LATITUDE 40:41:18 LONGITUDE 74:12:10 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	5305	3028	18345	73734	163139	194323	457874
RING TOTALS	5305	3028	18345	73734	163139	194323	457874

GEMS> I

ORBIS PRODUCTS
LATITUDE 40:41:18 LONGITUDE 74:12:10 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	2207	1079	7629	24984	57047	69535	162481
RING TOTALS	2207	1079	7629	24984	57047	69535	162481

Distance	Population	Housing
1/4	5305	2207
1/2	8333	3286
1	26,678	10,915
2	100,412	35,899
3	263,551	92,946
4	457,874	162,481

REFERENCE NO. 25

Elson T. Killam Associates, Inc.

27 Bleeker Street, P.O. Box 1008, Millburn, NJ 07041
Tel. 201/379-3400 Telex 642-057 Telecopier 201/376-1072

Environmental and Hydraulic Engineers

ANALYTICAL DATA REPORT

ORBIS PRODUCTS CORP.

NEWARK, NEW JERSEY

U.G. STORAGE TANK AREA

PROJECT NUMBER: P87-304

LABORATORY REFERENCE NUMBER: 2033-6007

DATE AND TIME COLLECTED: 8/7/87 11:20

Nancy J. Potak
LABORATORY DIRECTOR

SEPTEMBER 24, 1987

N.J. LABORATORY CERTIFICATION NO.: 07059

1/88

Elson T. Killam Associates, Inc.

LABORATORY CHRONICLE

LABORATORY SAMPLE NO.: 2033-6007

RECEIVED: 8/7/87

ORGANICS:

EXTRACTION:

ANALYSES:

1. **VOLATILE COMPOUNDS:** 8/20/87
2. **ACID EXTRACTABLES:**
3. **BASE/NEUTRALS:**
4. **PESTICIDES/PCBs:**

METALS:

DIGESTION:

ANALYSES:

OTHER ANALYSES:	EXTRACTED:	ANALYSES:
PHC	8/13/87	8/14/87

QUALITY CONTROL SUPERVISOR REVIEW AND APPROVAL: [illegible]

METHODOLOGY SUMMARY

Purgeable Organics

USEPA METHOD 624

Acid Extractables

Base/Neutral Extractables

PESTICIDE EXTRACTABLES

Metals

Total Cyanide

Total Phenol

Other PHC - USEPA METHOD 418.1 (Modified for soil)

PETROLEUM HYDROCARBONS DATA

LABORATORY SAMPLE NO.: 2033-6007

	CONCENTRATION DRY WEIGHT (mg/Kg)	DETECTION LIMIT (mg/Kg)
PETROLEUM HYDROCARBONS	3,630	156

BDL = BELOW DETECTION LIMIT

PETROLEUM HYDROCARBONS
MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

LAB REFERENCE ID NO.: 2033-6007 **QUALITY ASSURANCE SAMPLE:** 2033-6006

LAB SAMPLE NO.	CONC. SPIKE ADDED	SAMPLE CONC.	CONC. MS	% REC	CONC. MSD	% REC	RPD
2033-6006.....	610	<30	612	100	632	104	4

Concentration - mg/kg
RPD - relative percent difference

DATA QUALIFIERS

The following four qualifiers are used in the analytical report package. They are equivalent to those issued by EPA - Contract Laboratory Program:

U - Indicates that the compound was analyzed for but not detected. All sample detection limits reported have been corrected for dilution and per cent moisture. No adjustements for blank contamination have been made.

J - Refers to an estimated value. This is used when the mass spectral data indicates the presence of a compound that meets the identification criteria, yet has a concentration less than the contract required detection limit. All estimated values reported have been adjusted for both dilution and per cent moisture, but no corrections have been made for possible blank contamination.

B - This flag is used to note that the compound was found to be present in the laboratory blank as well as in the sample. It indicates that the possibility of laboratory contamination exists.

The EPA has issued certain quidelines to aid in the evaluation of data when common laboratory artifacts occur. Blank contribution is considered to be negligable if it is ten times less than the concentration present in the sample. If the concentrations of the compounds found in both the sample and the blank are comparable (i.e. sample concentration is less than twice that of the blank), the occurance of the compound in the sample is considered to be suspect.

Up to 25 ppb of methylene chloride is permitted to be present in the blanks of volatile organic analyses.

C - Applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >10 ng/ul in the final extract are confirmed by GC/MS.

The next qualifier is also used in referencing the analytical results:

X - This flag indicates the presence of a compound which is often found as a common laboratory or field contaminant.

VOLATILE COMPOUNDS DATA

LABORATORY SAMPLE NO.: 2033-6007(1/10 DIL) **DATA FILE NO.:** VOA5802

% SOLIDS: 76.7

	CONCENTRATION (ug/Kg)		SCAN	DETECTION LIMIT (ug/Kg)
ACROLEIN		U		1300.
ACRYLONITRILE		U		1300.
BENZENE	9200		606	65.
BROMOFORM		U		65.
BROMOMETHANE		U		130.
CARBON TETRACHLORIDE		U		65.
CHLOROBENZENE	220		830	65.
DIBROMOCHLOROMETHANE		U		65.
CHLOROETHANE		U		130.
2-CHLORO ETHYL VINYL ETHER		U		130.
CHLOROFORM	22	J	441	65.
CHLOROMETHANE		U		65.
BROMODICHLOROMETHANE		U		65.
1,1-DICHLOROETHANE		U		65.
1,2-DICHLOROETHANE		U		65.
1,1-DICHLOROETHENE		U		65.
TRANS-1,2-DICHLOROETHENE		U		65.
1,2-DICHLOROPROPANE		U		65.
CIS-1,3-DICHLOROPROPENE		U		65.
TRANS-1,3-DICHLOROPROPENE		U		65.
ETHYLBENZENE	290		893	65.
METHYLENE CHLORIDE	61	JB	282	65.
1,1,2,2-TETRACHLOROETHANE		U		65.
TETRACHLOROETHENE		U		65.
TOLUENE	4300		796	65.
1,1,1-TRICHLOROETHANE		U		65.
1,1,2-TRICHLOROETHANE		U		65.
TRICHLOROETHENE		U		65.
VINYL CHLORIDE		U		130.
ACETONE - HSL	1500		299	130.
CARBON DISULFIDE - HSL		U		65.
2-HEXANONE - HSL	240		754	130.
2-BUTANONE		U		130.
4-METHYL-2-PENTANONE -HSL	88	J	704	130.
STYRENE - HSL		U		65.
TOTAL XYLENES - HSL	714		1018,1050	65.

Laboratory Name E.T. Killam Assoc.

Case No _____

Sample Number
2033-6007

Organics Analysis Data Sheet
(Page 4)

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/kg)
1. 110-82-7	Cyclo Hexane < DOT	VOA	516	1,100
2. 96-37-7	Cyclo Pentane, Methyl	VOA	535	1,700
3. 79-29-8	Butane, 2,3-Dimethyl	VOA	570	180
4. 628-16-0	1,5-Hexadiyne	VOA	594	4,500
5. 96-14-0	Pentane, 3-Methyl	VOA	648	4,100
6. 589-34-4	Hexane, 3-Methyl	VOA	741	84
7. 586-63-0	Cyclo Hexene, 3-Methyl-6-			
8.	(Methylethylidene)	VOA	877	380
9. 18172-67-3	Bicyclo [3.1.1] Heptane, 6,6-			
10.	Dimethyl-2-Methylene-, (1S)	VOA	903	380
11. 470-82-6	2 Oxabicyclo [2.2.2] Octane 1,3,3-			
12.	Trimethyl	VOA	955	660
13. 2867-05-2	Bicyclo [3.1.0] Hex-2-ene, 2-Methyl-			
14.	5-(1-Methylethyl)	VOA	987	180
15. 76-22-2	Bicyclo [2.2.1] Heptan-2-one,			
16.	1,7,7-Trimethyl	VOA	1029	459
17. 106-43-4	Benzene, 1-Chloro-4-Methyl	VOA	1097	960
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

METHOD PERFORMANCE DATA

SOILS SURROGATE PERCENT RECOVERY

LABORATORY SAMPLE NO.: 2033-6007

COMPOUND	RECOVERY	EPA CONTROL LIMITS	SCAN #
VOLATILE FRACTION			
TOLUENE - D8	36*	81-117	781
BROMOFLUOROBENZENE	84	74-121	970
1,2-DICHLOROETHANE	104	70-121	459
SEMI-VOLATILE FRACTION			
NITROBENZENE-D5	-	23-120	-
2-FLUOROBIPHENYL	-	30-116	-
TERPHENYL-D14	-	18-137	-
PHENOL-D5	-	24-113	-
2-FLUOROPHENOL	-	26-121	-
2,4,6-TRIBROMOPHENOL	-	19-122	-
PESTICIDE			
DIBUTYL CHLORENDATE	-	20-150**	-

*LOW SURROGATE RECOVERY DUE TO MATRIX EFFECT OF HIGH CONCENTRATION OF TOLUENE IN THE SAMPLE.
**ADVISORY LIMITS ONLY

INTERNAL STANDARD SCAN LIST
(RETENTION TIME)

LABORATORY SAMPLE NO.: 2033-6007

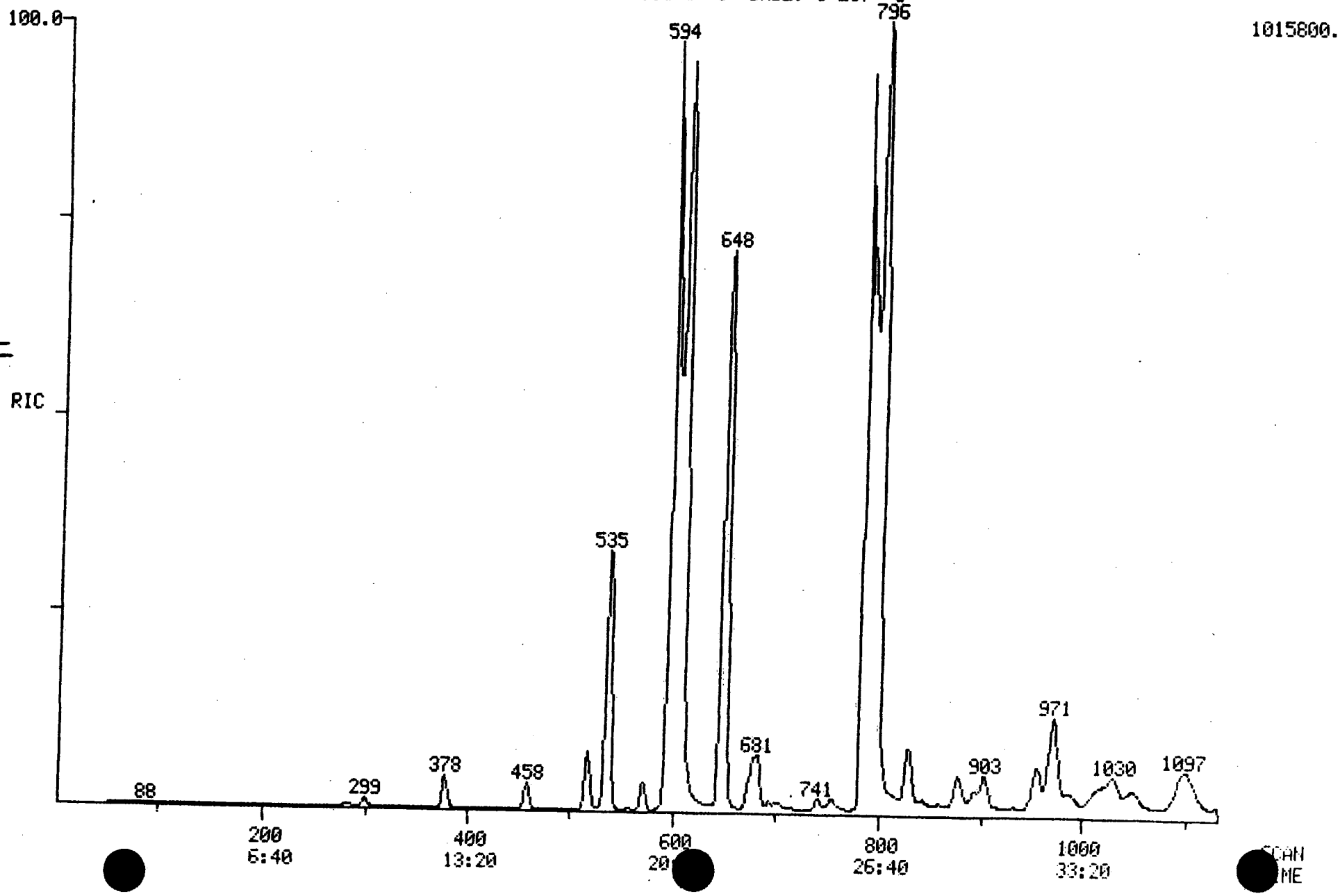
INTERNAL STANDARD	SCAN #
VOLATILE FRACTION	
BROMOCHLOROMETHANE	378
1,4-DIFLUOROBENZENE	677
CHLOROBENZENE-D5	827

SEMI-VOLATILE FRACTION	SCAN #
1,4-DICHLOROBENZENE-D4	-
NAPTHALENE-D8	-
ACENAPTHENE-D10	-
PHENANTHRENE-D10	-
CHRYSENE-D12	-
PERYLENE-D12	-

MIDRIC
08/20/87 6:09:00
SAMPLE: GC/MS#1, 2033-6007 (1/10 DILUTION)
CONDS.: 624
RANGE: G 1,1130 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: VOA5802 #1
CALI: VOA5802 #2

SCANS 1 TO 1130



11

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SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. _____ Contractor E.T. Killam Assoc. Contract No. _____

Low Level X Medium Level _____

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/Kg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS * RPD	QC LIMITS * RECOVERY
VOA SMO SAMPLE NO. 2033 6004	1,1-Dicholorethene	50	0	38	76	47	94	10	22	59-172
	Trichloroethene	50	0	40	80	46	92	7	24	62-137
	Chlorobenzene	50	0	46	92	53	106	7	21	60-133
	Toluene	50	7	43	86	54	108	11	21	59-139
	Benzene	50	3	47	94	53	106	6	21	66-142
B/N SMO SAMPLE NO.	1,2,4-Trichlorobenzene								23	38-107
	Acenaphthene								19	31-137
	2,4 Dinitrotoluene								47	28-89
	Di-n-Butylphthalate								47	29-135
	Pyrene								36	35-142
	N-Nitrosodi-n-Propylamine								38	41-126
	1,4-Dichlorobenzene								27	28-104
ACID SMO SAMPLE NO.	Pentachlorophenol								47	17-109
	Phenol								35	26-90
	2-Chlorophenol								50	25-102
	4-Chloro-3-Methylphenol								33	26-103
	4-Nitrophenol								50	11-114
PEST SMO SAMPLE NO.	Lindane								50	46-127
	Heptachlor								31	35-130
	Aldrin								43	34-132
	Dieldrin								38	31-134
	Endrin								45	42-139
	4,4'-DDT								50	23-134

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs 0 out of 5 ; outside QC limits
B/N _____ out of _____ ; outside QC limits
ACID _____ out of _____ ; outside QC limits
PEST _____ out of _____ ; outside QC limits

RECOVERY: VOAs 0 out of 10 : outside QC limits
B/N _____ out of _____ : outside QC limits
ACID _____ out of _____ : outside QC limits
PEST _____ out of _____ : outside QC limits

Comments: _____

GC/MS TUNING AND MASS CALIBRATION

Bromofluorobenzene (BFB)

Case No. _____ Contractor E.T. Killam Assoc. Contract No. _____

Instrument ID 5100 Date 8/20/87 Time 5:21 + 32:20

Lab ID VOA 5801 Data Release Authorized By: JEF

m/e	ION ABUNDANCE CRITERIA	%RELATIVE ABUNDANCE
50	15.0 - 40.0% of the base peak	18.11
75	30.0 - 60.0% of the base peak	40.94
95	Base peak, 100% relative abundance	100.00
96	5.0 - 9.0% of the base peak	5.76
173	Less than 1.0% of the base peak	<1
174	Greater than 50.0% of the base peak	72.58
175	5.0 - 9.0% of mass 174	5.20 (7.16)[1]
176	Greater than 95.0%, but less than 101.0% of mass 174	70.66 (97.4)[1]
177	5.0 - 9.0% of mass 176	4.48 (6.34)[2]

[1]Value in parenthesis is % mass 174.
[2]Value in parenthesis is % mass 176.

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

SAMPLE ID	LAB ID	DATE OF ANALYSIS	TIME OF ANALYSIS
50 ug/L VOA HSL STD	VOA 5801	8/20/87	5:21
2033-6007 (1/10 Dil)	VOA 5802	"	6:09
BLANK	VOA 5803	"	6:56
2033-6010 (1/10 Dil)	VOA 5804	"	7:44
BLANK	VOA 5805	"	8:32
2033-6009 (1/10 Dil)	VOA 5806	"	9:20
BLANK	VOA 5807	"	10:07
2033-6008 (1/10 Dil)	VOA 5808	"	10:55
N/A	VOA 5809	"	N/A
BLANK	VOA 5810	"	12:30

4/84

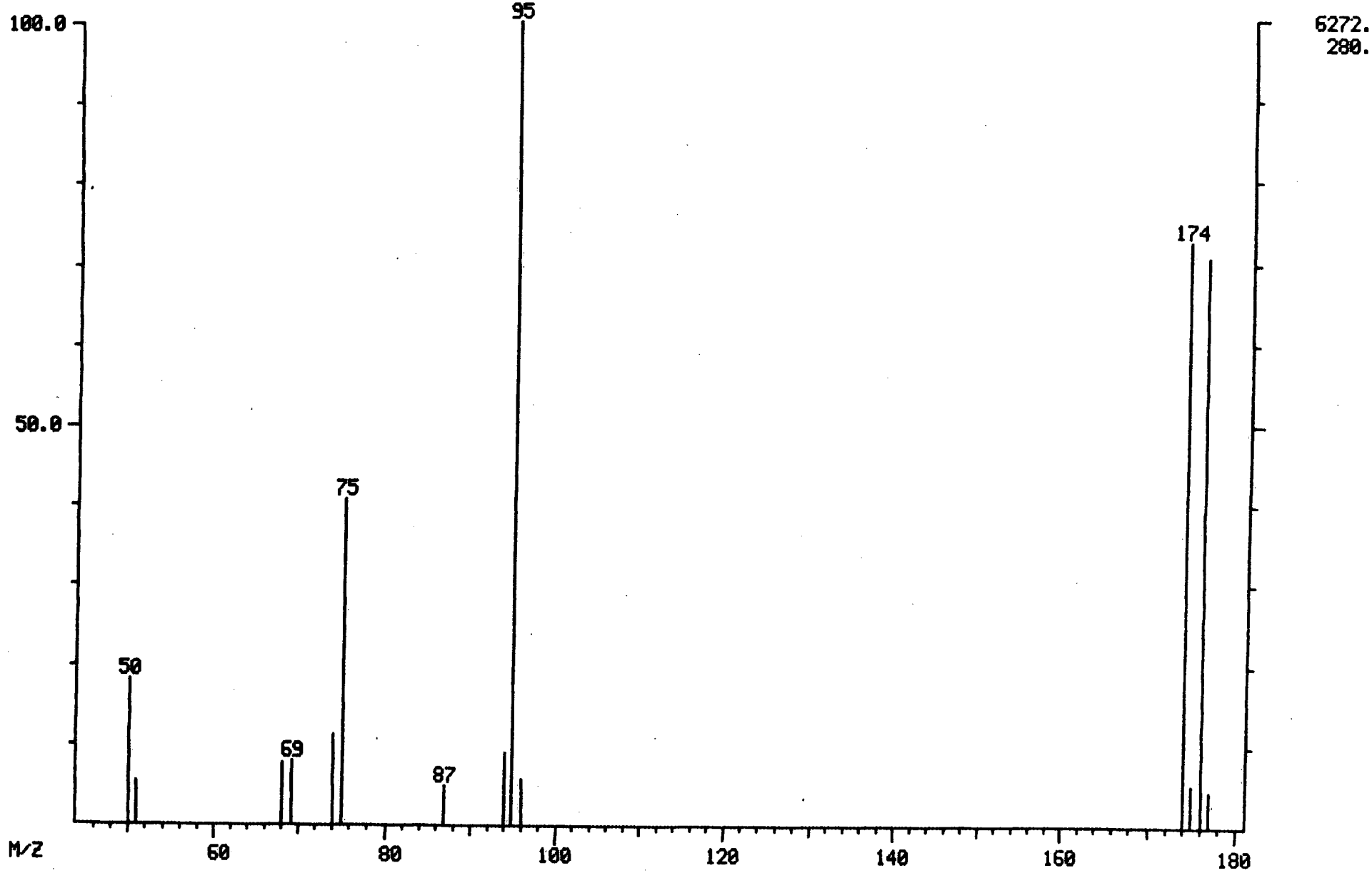
FORM V

200

MID MASS SPECTRUM
08/20/87 5:21:00 + 32:20
SAMPLE: GC/MS#1, @ 50 UG/L VOAHSL STD.
CONDS.: 624
GC TEMP: 239 DEG. C
ENHANCED (S 15B 2N 0T)

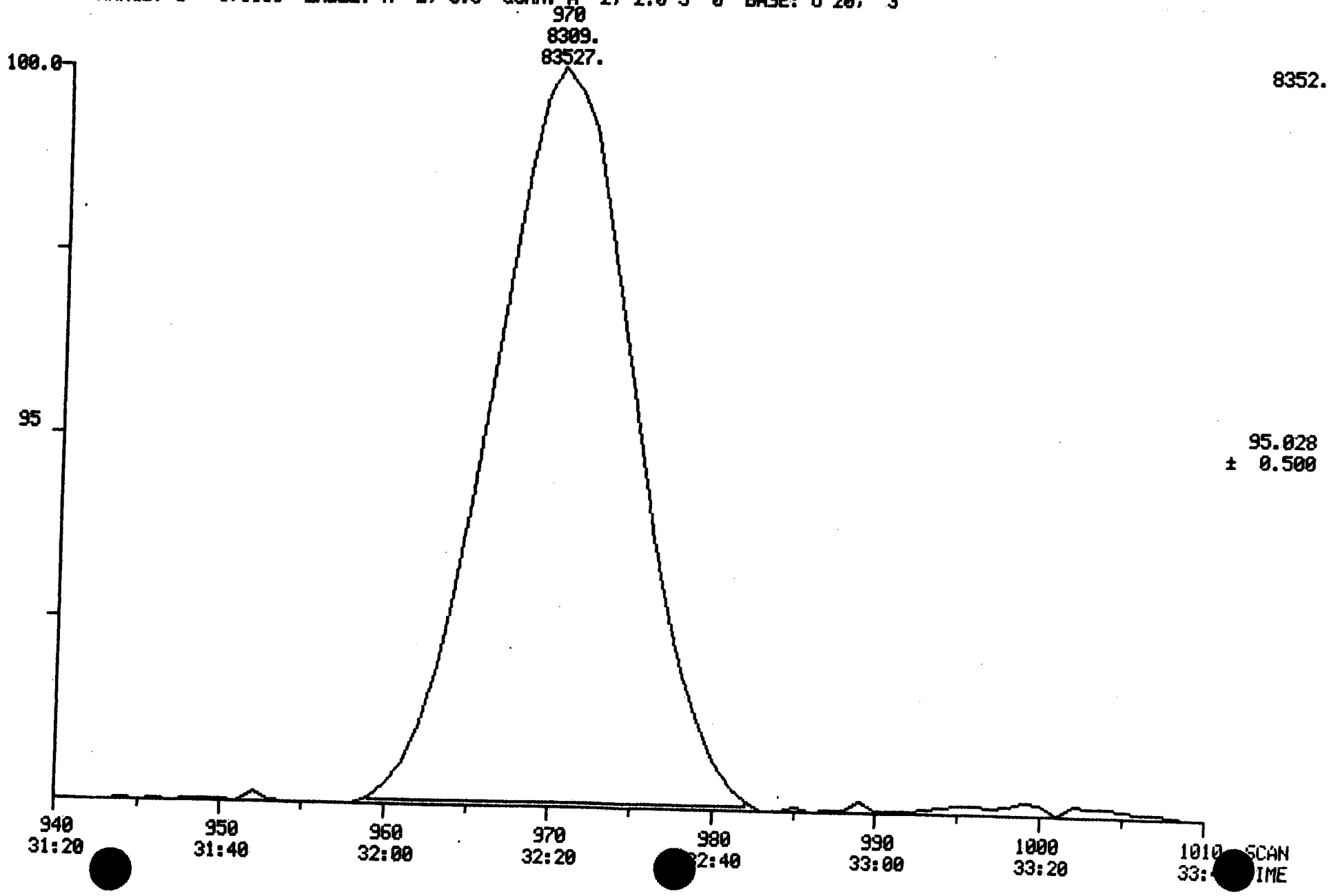
DATA: VOA5801 #970
CALI: VOA5801 #2

BASE M/Z: 95
RIC: 27424.



14 of 1

MIDMASS CHROMATOGRAM DATA: VOA5801 #970 SCANS 940 TO 1010
08/20/87 5:21:00 CALI: VOA5801 #2
SAMPLE: GC/MS#1, @ 50 UG/L VOAHSL STD.
CONDS.: 624
RANGE: G 1,1130 LABEL: N 2, 3.0 QUAN: A 2, 2.0 J 0 BASE: U 20, 3



MASS SPECTRAL DATA

FOR

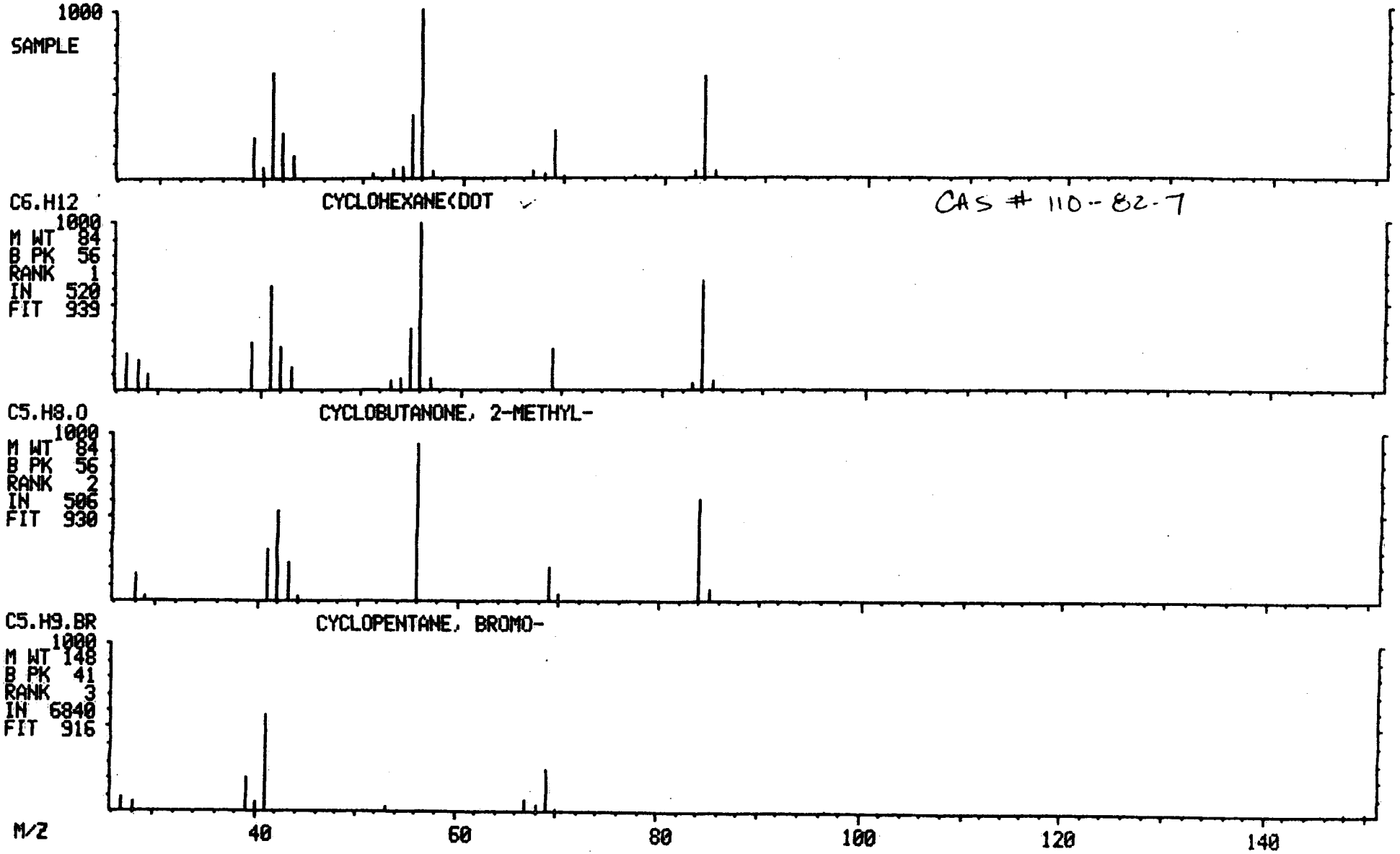
TENTATIVELY IDENTIFIED COMPOUNDS

For each tentatively identified compound, a mass spectrum of the detected compound is provided with the mass spectrums of the three best matches from the NBS Library search. When the library search does not produce an adequate match, the detected compound is labelled as "unknown".

MID LIBRARY SEARCH
08/20/87 6:09:00 + 17:12
SAMPLE: GC/MS31, 2033-6007 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5802 # 516
CALI: VOA5802 # 2

BASE M/Z: 56
RIC: 68607.

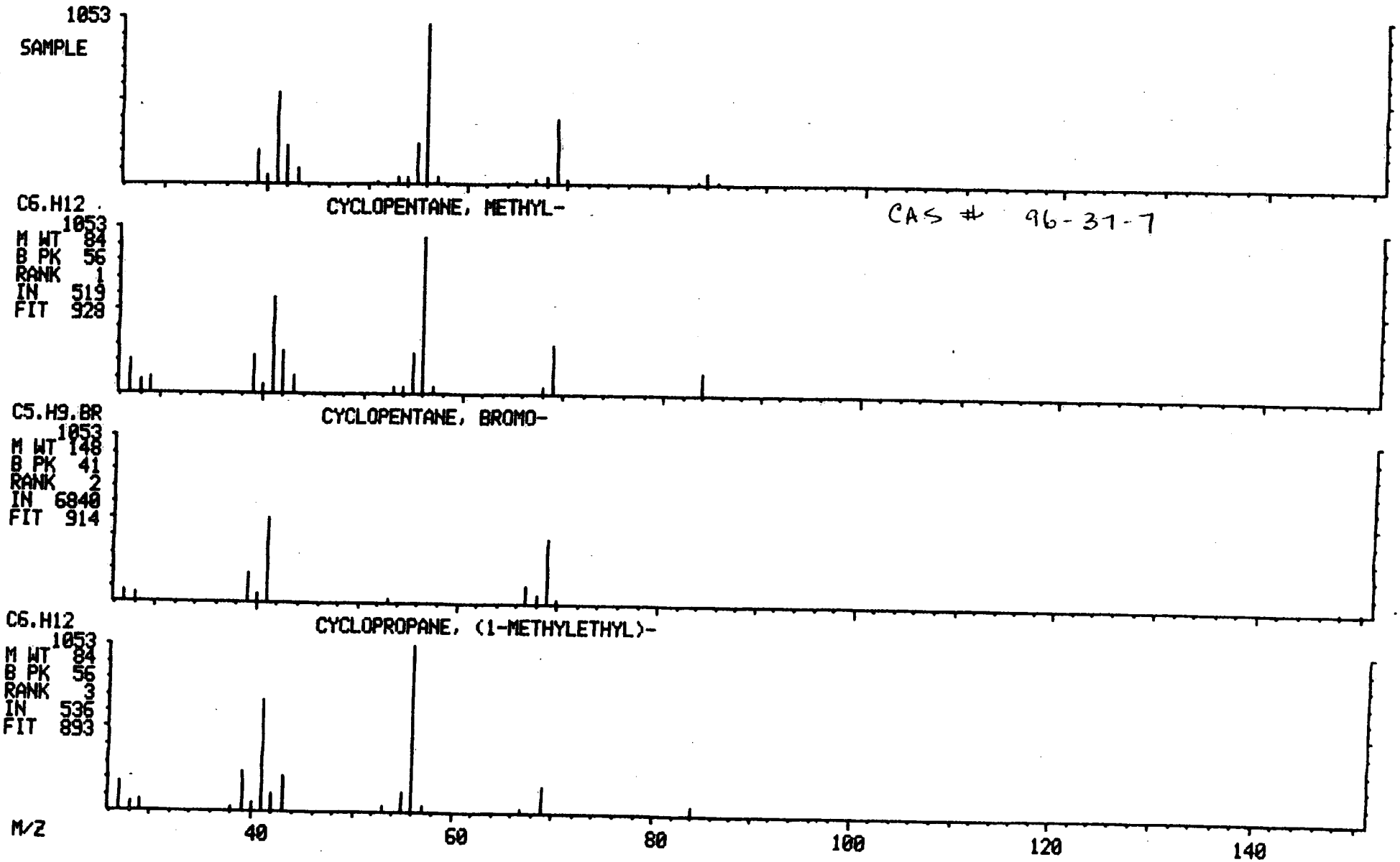


17 of 24

MID LIBRARY SEARCH
08/20/87 6:09:00 + 17:50
SAMPLE: GC/MS31, 2033-6007 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5802 # 535
CALI: VOA5802 # 2

BASE M/Z: 56
RIC: 316927.

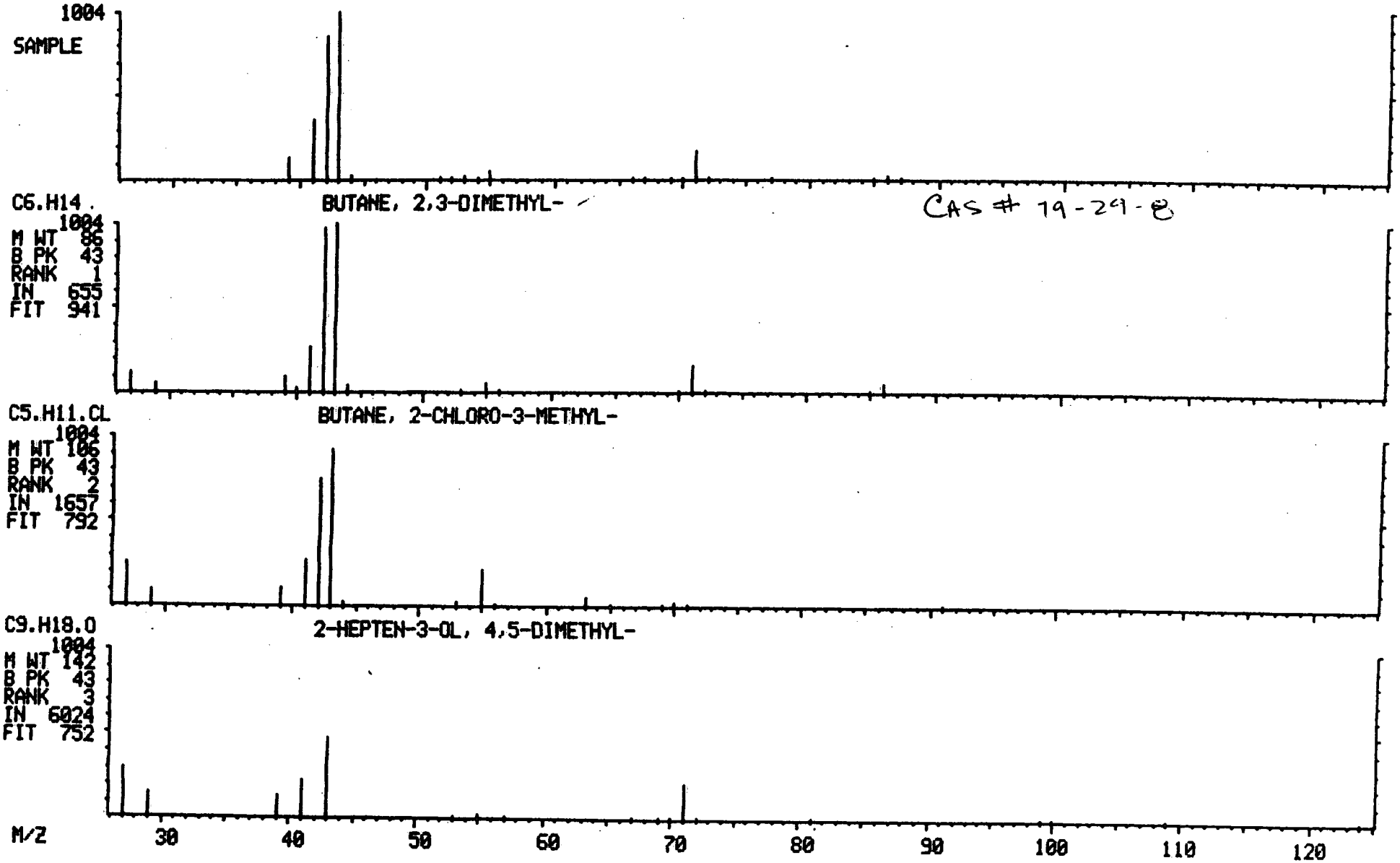


18 of 25

MID LIBRARY SEARCH
08/20/87 6:09:00 + 19:00
SAMPLE: GC/MS31, 2033-6007 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5802 # 570
CALI: VOA5802 # 2

BASE M/Z: 43
RIC: 33215.

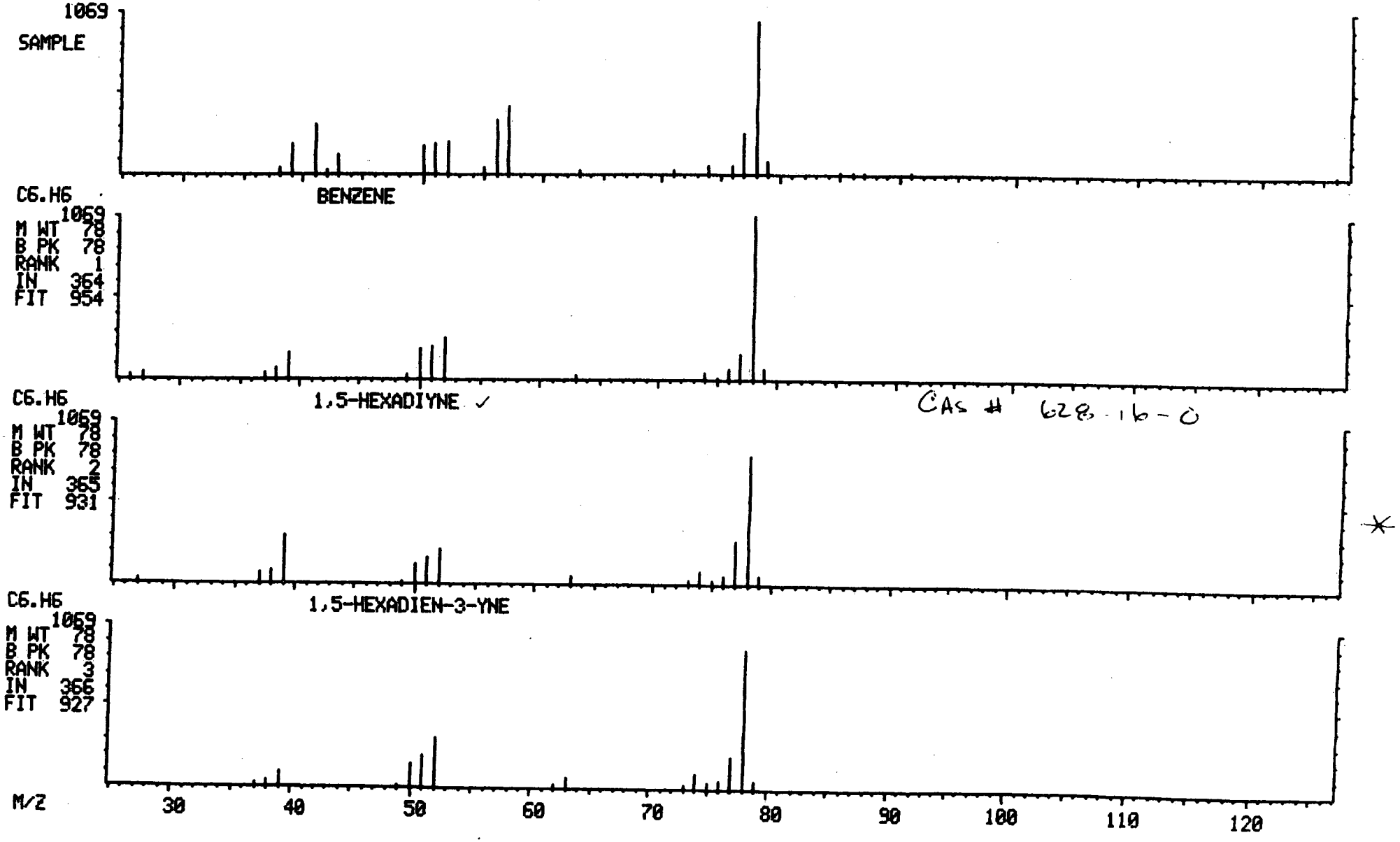


19 of 26

MID LIBRARY SEARCH
08/20/87 6:09:00 + 19:48
SAMPLE: GC/M531, 2033-6007 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5802 # 594
CALI: VOA5802 # 2

BASE M/Z: 78
RIC: 505855.

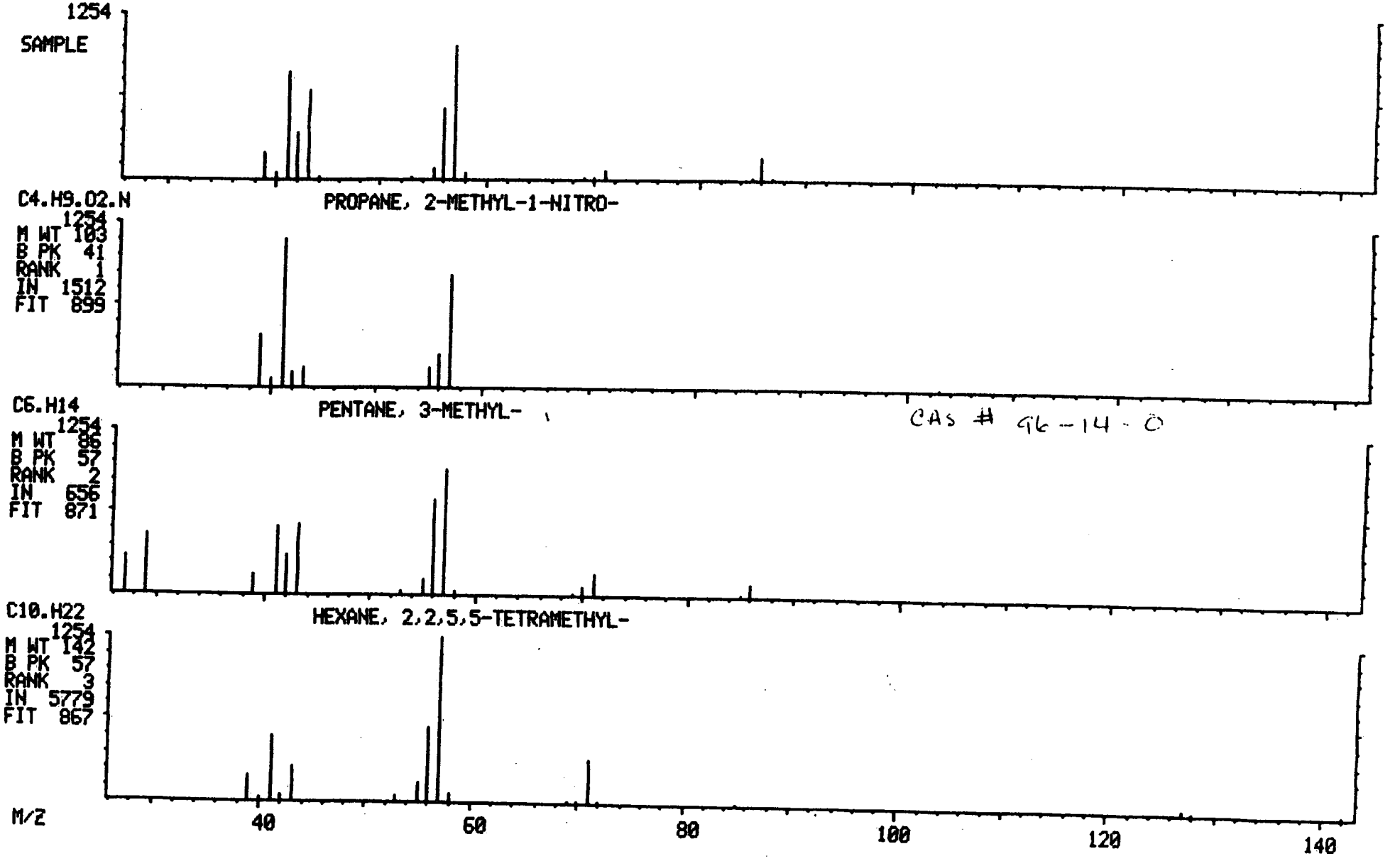


20 of 70

MID LIBRARY SEARCH
08/20/87 6:09:00 + 21:36
SAMPLE: GC/MS31, 2033-6007 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5802 # 648
CALI: VOA5802 # 2

BASE M/Z: 57
RIC: 688127.

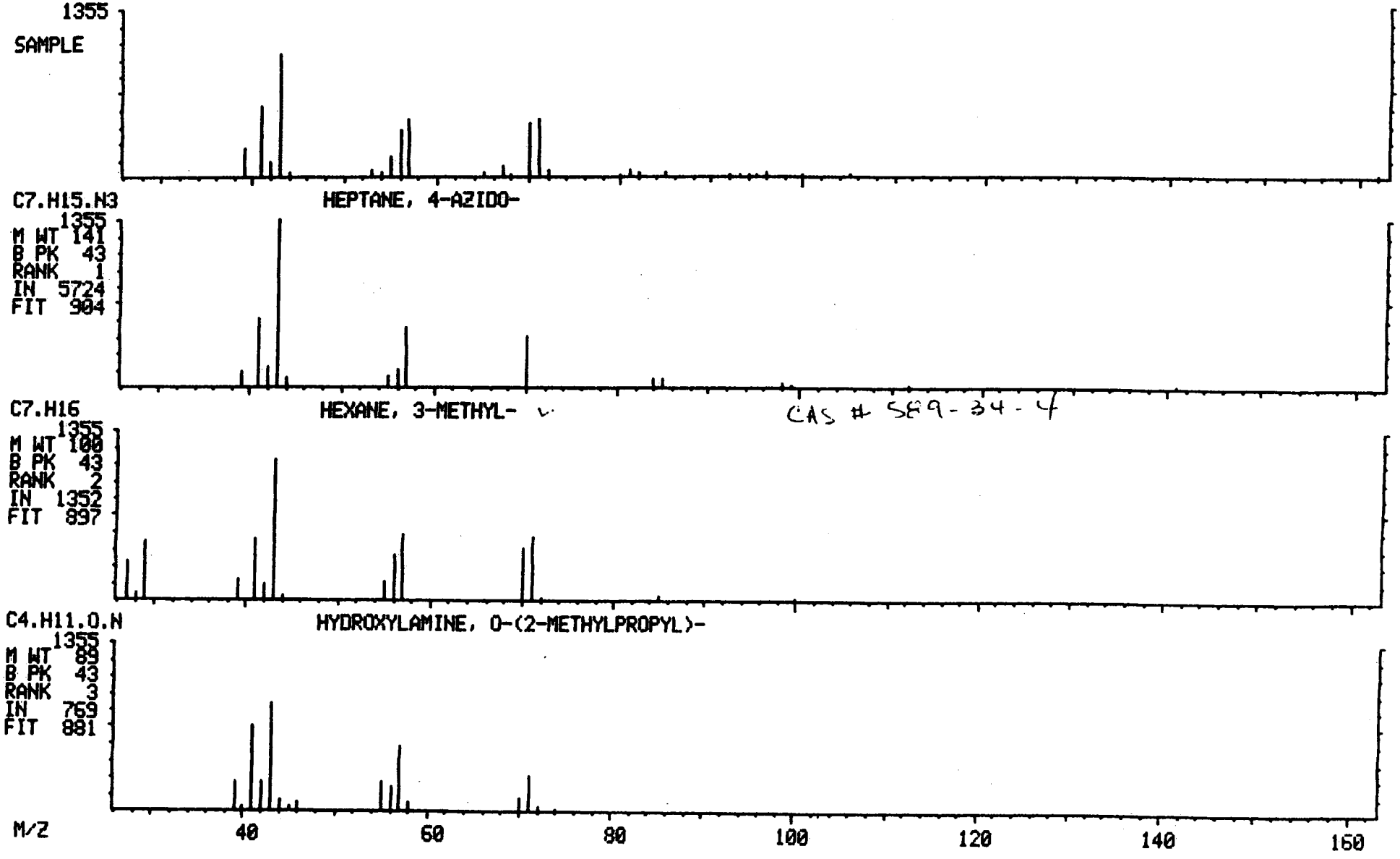


21

MID LIBRARY SEARCH
08/20/87 6:09:00 + 24:42
SAMPLE: GC/MS31, 2033-6007 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5802 # 741
CALI: VOA5802 # 2

BASE M/Z: 43
RIC: 11423.



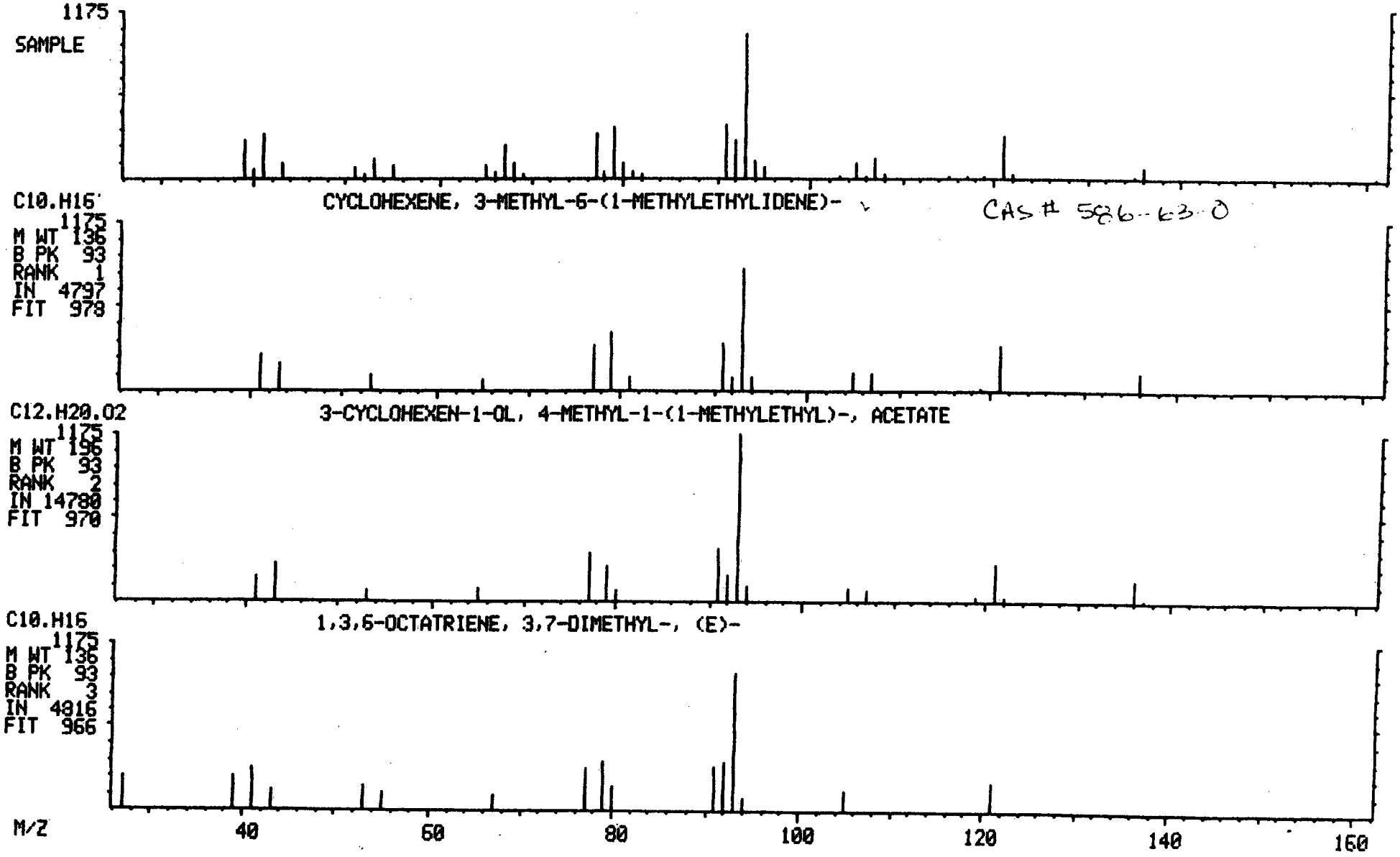
22

209

MID LIBRARY SEARCH
08/20/87 6:09:00 + 29:14
SAMPLE: GC/MS31, 2033-6007 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5802 # 877
CALI: VOA5802 # 2

BASE M/Z: 93
RIC: 31167.

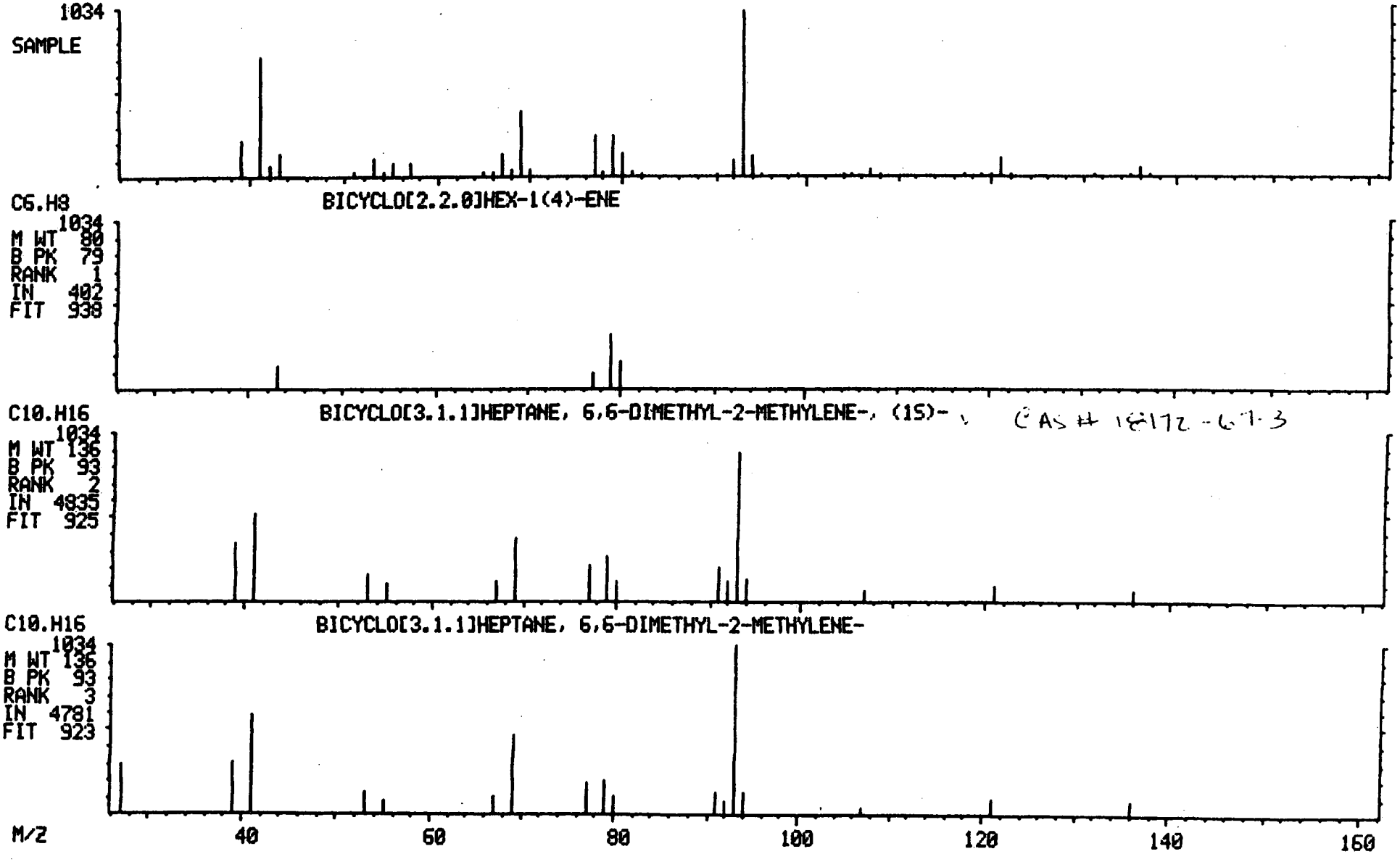


23
210

MID LIBRARY SEARCH
08/20/87 6:09:00 + 30:06
SAMPLE: GC/MS31, 2033-6007 (1/10 DILUTION)
CONDS.: 624
ENHANCED (5 15B 2N 0T)

DATA: VOA5802 # 903
CALI: VOA5802 # 2

BASE M/Z: 93
RIC: 29759.



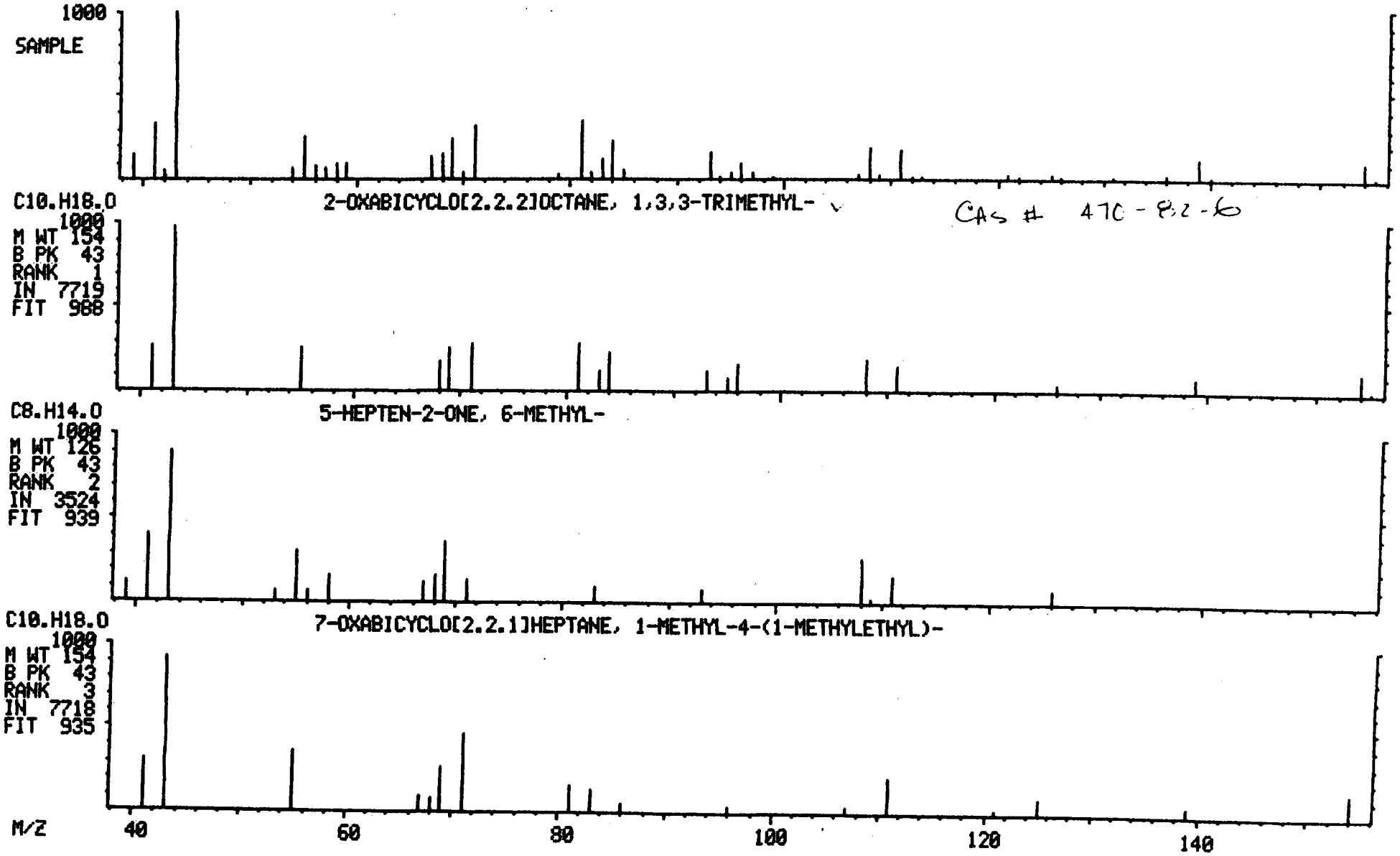
CAS # 18172-67-3

24 211

MID LIBRARY SEARCH
08/20/87 6:09:00 + 31:50
SAMPLE: GC/MS31, 2033-6007 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5802 # 955
CALI: VOA5802 # 2

BASE M/Z: 43
RIC: 36543.

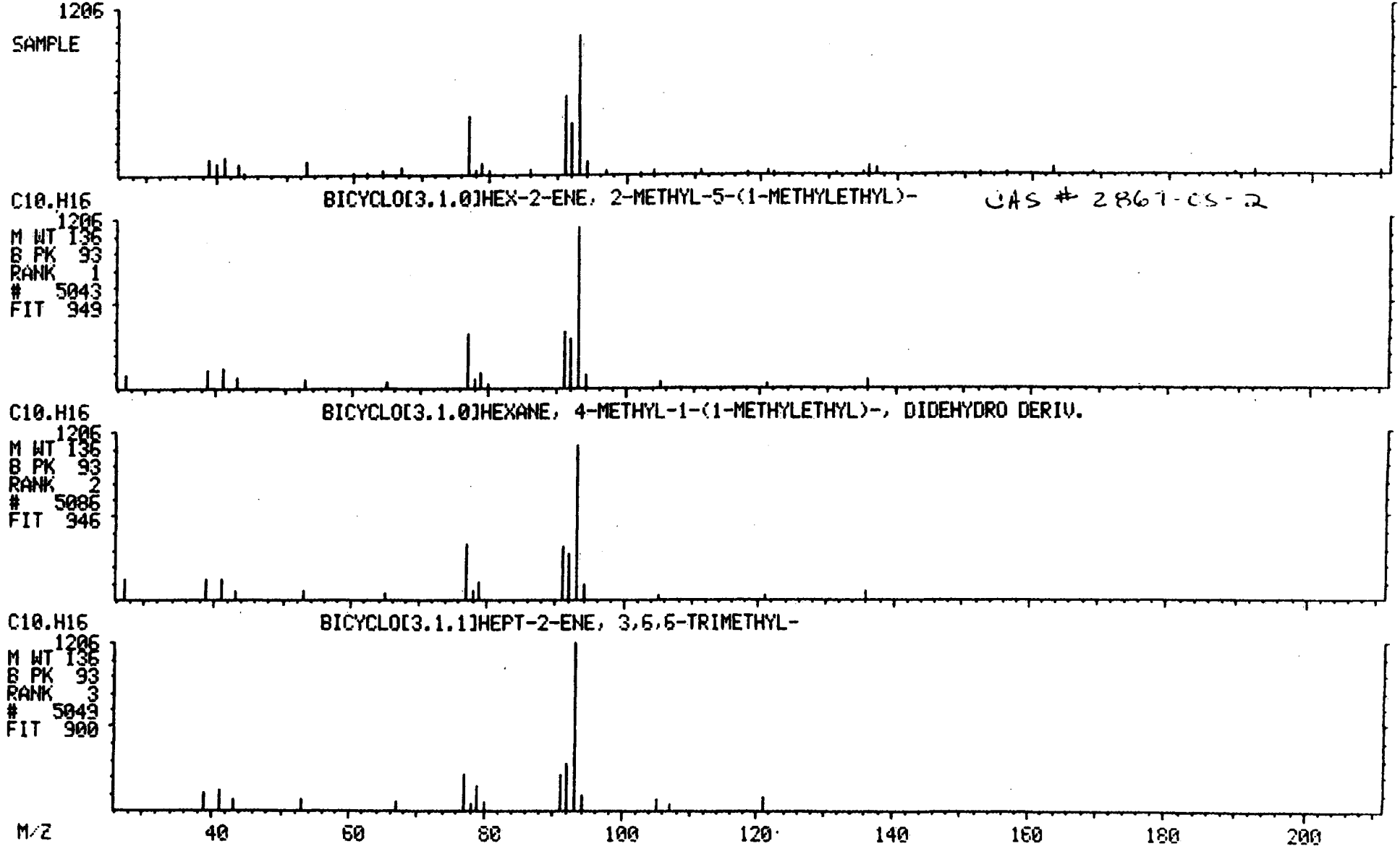


25 212

MID LIBRARY SEARCH
08/20/87 6:09:00 + 32:54
SAMPLE: GC/MS31, 2033-6007 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5802 # 987
CALI: VOA5802 # 2

BASE M/Z: 93
RIC: 8119.



26
713

MID LIBRARY SEARCH
08/20/87 6:09:00 + 34:18
SAMPLE: GC/MS31, 2033-6007 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5802 #1029
CALI: VOA5802 # 2

BASE M/Z: 95
RIC: 18015.

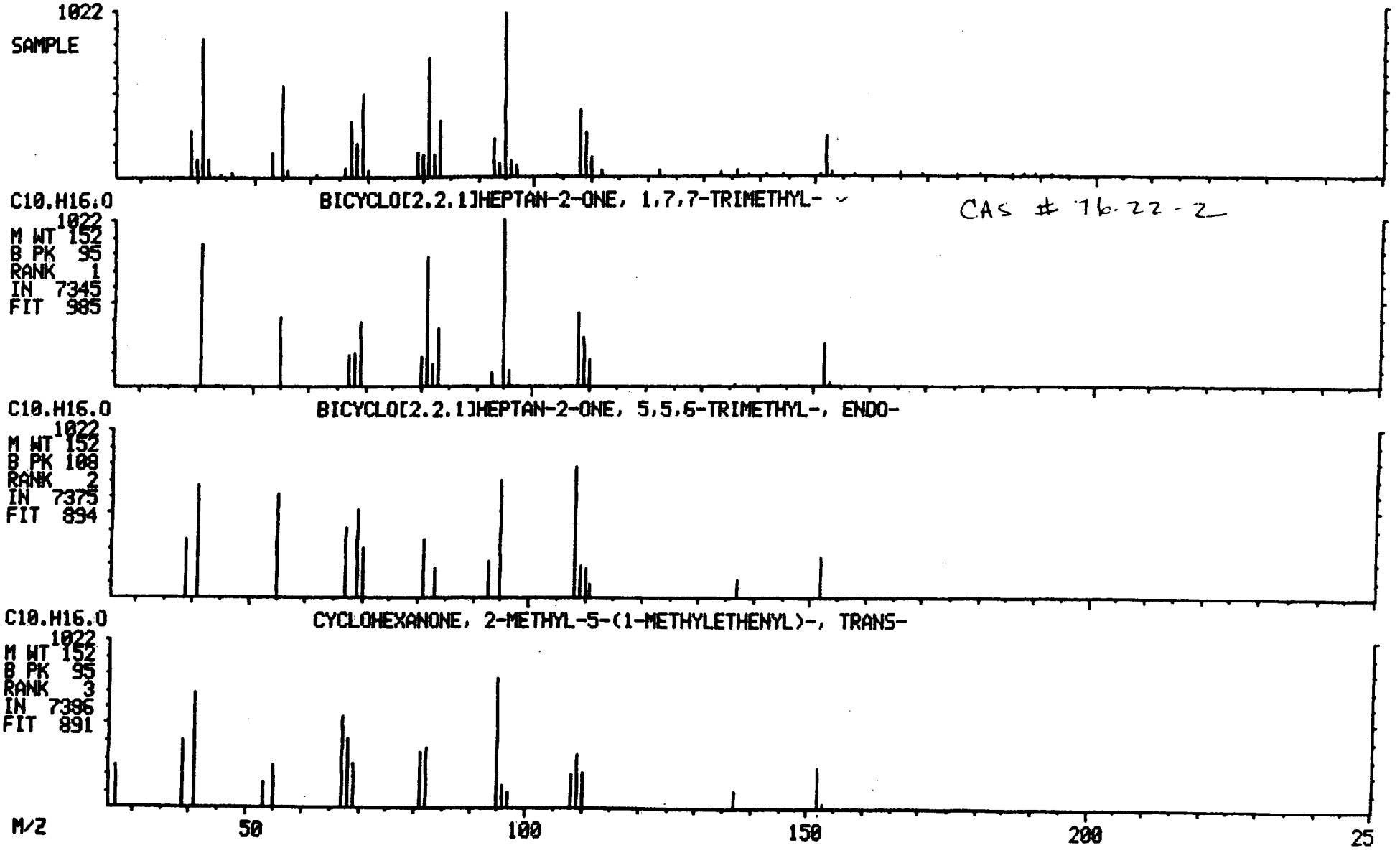
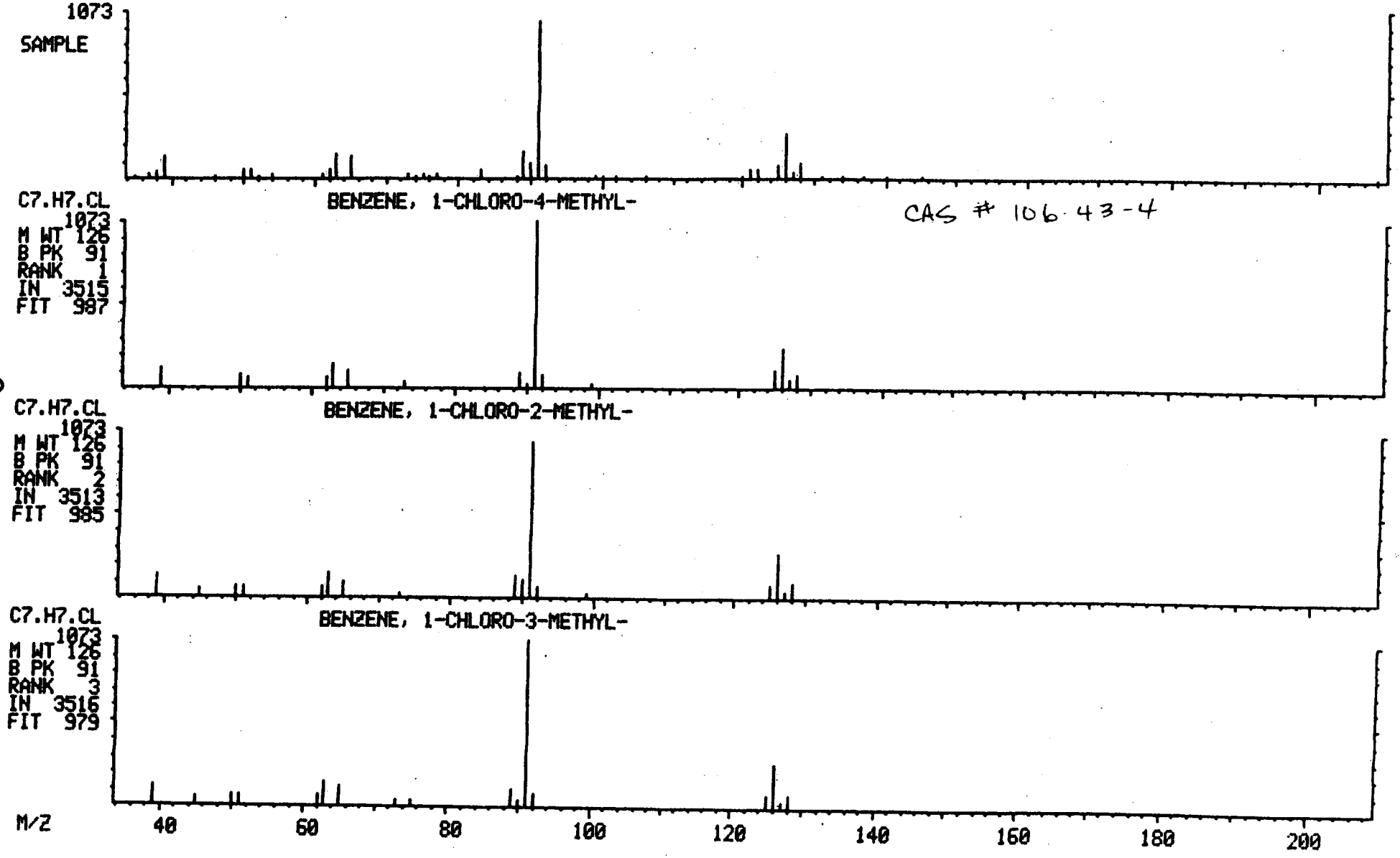


FIG 2

MID LIBRARY SEARCH
08/20/87 6:09:00 + 36:34
SAMPLE: GC/MS31, 2033-6007 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5802 #1097
CALI: VOA5802 # 2

BASE M/Z: 91
RIC: 15359.



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REAGENT BLANK SUMMARY

Case No. _____ Contractor E.T. Killam Assoc Contract No. _____

FILE ID	DATE OF ANALYSIS	FRACTION	MATRIX	CONC. LEVEL	INST. ID	CAS NUMBER	COMPOUND (HSL, TIC OR UNKNOWN)	CONC.	UNITS	CRDL
VOA 5810	8/20/87	VOA	WATER	Low	5100	N/A	Methylene Chloride	4J	ug/L	5

Comments:

FORM IV

29 211

CHAIN OF CUSTODY RECORD

Log Book Pg. No. 10/11

Project Name/Number ORBIS P87-304 | Sample Date: 8-7-87

— See options below

ETK Lab # Sample #	Sub	Field Sample No. A	B	Time	Sample Location	Sample Depth	Sample Type	No. of Containers	Section / Option: Metals A B C D	GC/MS Organics A B C D	Other Organics A B C D	Nutrients A B C D	S.D.W.A.	Solids	Bacty	TC/FC	Remarks
		P304	6007	11:20	OB-4 "TANK	6.5	SOIL	1		C	A						ALL SAMPLES
		P304	6008	11:35	OB-7 "TANK	6.5	SOIL	1		C	A						OBTAINED FROM
		P304	6009	11:50	OB-8 "TANK	6.5	SOIL	1		C	A						TEST PITS IN
		P304	6010	12:00	OB-5 "TANK	6.5	SOIL	1		C	A						U.G. STORAGE
																	TANK (REMOVED) AREA

Metals -M-	GC/MS Organics -G-	Organics (Other) -Q-	Nutrients - Minerals -N-	S.D.W.A. Conven. Analysis -S-	Solid Series / pH Conductivity
"A" Priority Metals As Sb Be Cd Cr Cu Pb Hg Ni Se Ag Tl Zn	"A" P.P. + 40 VOAs + 15 A/BNs + 25 Pesticides & PCBs	"A" PHC Petroleum Hydrocarbons	"A" Nutrients Ammonia Nitrate Nitrite Total Phosphorus TKN	Primary: Fl^- Turb. NO_3-N Secondary: pH TDS Alk. Hardness L.I. SO_4 Cl^- F^- M.B.A.S.	TS TDS TSS TVDS pH TVSS Conductivity
"B" S.D.W.A. Primary: As Ba Cd Cr Pb Na Hg Se Ag Secondary: Cu Fe Mn Zn	"B" P.P. — No Searches VOAs A/BNs Pesticides & PCBs	"B" O & G Oil & Grease	"B" Minerals Alk. Cl^- pH F^- Hard. SO_4 L.I. Turb.		
"C" Misc. Metals Cr+6 Fe Mn Na Ba K Ca Mg	"C" VOAs only A. Searches B. No Searches C. Specific: _____	"C" Total Phenols Total Phenols	"C" Oxygen Demand B.O.D. C.O.D. A. Total B. Soluable		
"D" List (others)	"D" A-280 A-280 Parameters S.D.W.A.	"D" Cyanide Cyanide	"D" Misc. List		

Bottles/Samplers Prepared by:	Date	Time
KAA	8/6/87	1000
Sampled by:	**Date**	**Time**
KE Kaul	8/7/87	see Above
Received by:	**Date**	**Time**
1		
2		
3		
4		
Lab. Received by:	**Date**	**Time**
J. Sanderson	8/7/87	1345

30 717

2033

2 of 3

Elson T. Killam Associates, Inc.

27 Bleeker Street, P.O. Box 1008, Millburn, NJ 07041
Tel. 201/379-3400 Telex 642-057 Telecopier 201/376-1072

Environmental and Hydraulic Engineers

ANALYTICAL DATA REPORT

ORBIS PRODUCTS CORP.

NEWARK, NEW JERSEY

U.G. STORAGE TANK AREA

PROJECT NUMBER: P87-304

LABORATORY REFERENCE NUMBER: 2033-6008

DATE AND TIME COLLECTED: 8/7/87 11:35

Nancy J. Potak
LABORATORY DIRECTOR

SEPTEMBER 24, 1987

N.J. LABORATORY
CERTIFICATION NO.: 07059

31 218

Elson T. Killam Associates, Inc.

LABORATORY CHRONICLE

LABORATORY SAMPLE NO.: 2033-6008

RECEIVED: 8/7/87

ORGANICS:

EXTRACTION:

ANALYSES:

1. **VOLATILE COMPOUNDS:** 8/20/87
2. **ACID EXTRACTABLES:**
3. **BASE/NEUTRALS:**
4. **PESTICIDES/PCBs:**

METALS:

DIGESTION:

ANALYSES:

OTHER ANALYSES:	EXTRACTED:	ANALYSES:
PHC	8/13/87	8/14/87

QUALITY CONTROL SUPERVISOR REVIEW AND APPROVAL: [illegible]

METHODOLOGY SUMMARY

Purgeable Organics

USEPA METHOD 624

Acid Extractables

Base/Neutral Extractables

PESTICIDE EXTRACTABLES

Metals

Total Cyanide

Total Phenol

Other PHC - USEPA METHOD 418.1 (Modified for soil)

PETROLEUM HYDROCARBONS DATA

LABORATORY SAMPLE NO.: 2033-6008

	CONCENTRATION DRY WEIGHT (mg/Kg)	DETECTION LIMIT (mg/Kg)
PETROLEUM HYDROCARBONS	3,070	130

BDL = BELOW DETECTION LIMIT

LEFT BLANK

PETROLEUM HYDROCARBONS
MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

LAB REFERENCE ID NO.: 2033-6008 QUALITY ASSURANCE SAMPLE: 2033-6006

LAB SAMPLE NO.	CONC. SPIKE ADDED	SAMPLE CONC.	CONC. MS	% REC	CONC. MSD	% REC	RPD
2033-6006.....	610	<30	612	100	632	104	4

Concentration - mg/kg
RPD - relative percent difference

DATA QUALIFIERS

The following four qualifiers are used in the analytical report package. They are equivalent to those issued by EPA - Contract Laboratory Program:

U - Indicates that the compound was analyzed for but not detected. All sample detection limits reported have been corrected for dilution and per cent moisture. No adjustements for blank contamination have been made.

J - Refers to an estimated value. This is used when the mass spectral data indicates the presence of a compound that meets the identification criteria, yet has a concentration less than the contract required detection limit. All estimated values reported have been adjusted for both dilution and per cent moisture, but no corrections have been made for possible blank contamination.

B - This flag is used to note that the compound was found to be present in the laboratory blank as well as in the sample. It indicates that the possibility of laboratory contamination exists.

The EPA has issued certain guidelines to aid in the evaluation of data when common laboratory artifacts occur. Blank contribution is considered to be negligable if it is ten times less than the concentration present in the sample. If the concentrations of the compounds found in both the sample and the blank are comparable (i.e. sample concentration is less than twice that of the blank), the occurance of the compound in the sample is considered to be suspect.

Up to 25 ppb of methylene chloride is permitted to be present in the blanks of volatile organic analyses.

C - Applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >10 ng/ul in the final extract are confirmed by GC/MS.

The next qualifier is also used in referencing the analytical results:

X - This flag indicates the presence of a compound which is often found as a common laboratory or field contaminant.

VOLATILE COMPOUNDS DATA

LABORATORY SAMPLE NO.: 2033-6008(1/10 DIL) DATA FILE NO.: VOA5808

% SOLIDS: 77.6

	CONCENTRATION (ug/Kg)		SCAN	DETECTION LIMIT (ug/Kg)
ACROLEIN		U		1300.
ACRYLONITRILE		U		1300.
BENZENE	4900		605	64.
BROMOFORM		U		64.
BROMOMETHANE		U		130.
CARBON TETRACHLORIDE		U		64.
CHLOROBENZENE		U		64.
DIBROMOCHLOROMETHANE		U		64.
CHLOROETHANE		U		130.
2-CHLORO ETHYL VINYL ETHER		U		130.
CHLOROFORM		U		64.
CHLOROMETHANE		U		64.
BROMODICHLOROMETHANE		U		64.
1,1-DICHLOROETHANE		U		64.
1,2-DICHLOROETHANE		U		64.
1,1-DICHLOROETHENE		U		64.
TRANS-1,2-DICHLOROETHENE		U		64.
1,2-DICHLOROPROPANE		U		64.
CIS-1,3-DICHLOROPROPENE		U		64.
TRANS-1,3-DICHLOROPROPENE		U		64.
ETHYLBENZENE	78	J	893	64.
METHYLENE CHLORIDE	44	JB	281	64.
1,1,2,2-TETRACHLOROETHANE		U		64.
TETRACHLOROETHENE		U		64.
TOLUENE	4000		797	64.
1,1,1-TRICHLOROETHANE		U		64.
1,1,2-TRICHLOROETHANE		U		64.
TRICHLOROETHENE		U		64.
VINYL CHLORIDE		U		130.
ACETONE - HSL	1500		299	130.
CARBON DISULFIDE - HSL		U		64.
2-HEXANONE - HSL		U		130.
2-BUTANONE		U		130.
4-METHYL-2-PENTANONE -HSL		U		130.
STYRENE - HSL		U		64.
TOTAL XYLENES - HSL	213		1017,1048	64.

Laboratory Name: E.T. Killam Assoc.

Case No: _____

Sample Number
2033-6008

Organics Analysis Data Sheet
(Page 4)

Tentatively Identified Compounds

	CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/kg)
1.	110-82-7	CYCLOHEXANE (DOT	VOA	516	300
2.	96-37-7	CYCLOPENTANE, METHYL	VOA	535	660
3.	79-29-8	BUTANE, 2,3-DIMETHYL	VOA	569	76
4.	16747-25-4	HEXANE, 2,2,3-TRIMETHYL	VOA	593	600
5.	628-16-0	1,5-HEXADIYNE	VOA	599	5,100
6.	96-14-0	PENTANE, 3-METHYL-	VOA	647	1,800
7.	4889-83-2	BICYCLO [3.1.1] HEPT-2-ENE,			
8.		3,6,6-TRIMETHYL	VOA	877	95
9.	470-82-6	2-OXABICYCLO [2.2.2] OCTANE,			
10.		1,3,3 TRIMETHYL	VOA	954	280
11.	76-22-2	BICYCLO [2.2.1] HEPTAN-2-ONE,			
12.		1,7,7 TRIMETHYL	VOA	1030	370
13.	108-41-8	BENZENE, 1-CHLORO-3-METHYL	VOA	1096	620
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

METHOD PERFORMANCE DATA

SOILS SURROGATE PERCENT RECOVERY

LABORATORY SAMPLE NO.: 2033-6008

COMPOUND	RECOVERY	EPA CONTROL LIMITS	SCAN #
VOLATILE FRACTION			
TOLUENE - D8	60*	81-117	786
BROMOFLUOROBENZENE	90	74-121	970
1,2-DICHLOROETHANE	88	70-121	458
SEMI-VOLATILE FRACTION			
NITROBENZENE-D5	-	23-120	-
2-FLUOROBIPHENYL	-	30-116	-
TERPHENYL-D14	-	18-137	-
PHENOL-D5	-	24-113	-
2-FLUOROPHENOL	-	26-121	-
2,4,6-TRIBROMOPHENOL	-	19-122	-
PESTICIDE			
DIBUTYL CHLORENDATE	-	20-150**	-

*LOW SURROGATE RECOVERY DUE TO MATRIX EFFECT OF HIGH CONCENTRATION OF TOLUENE IN THE SAMPLE.
**ADVISORY LIMITS ONLY

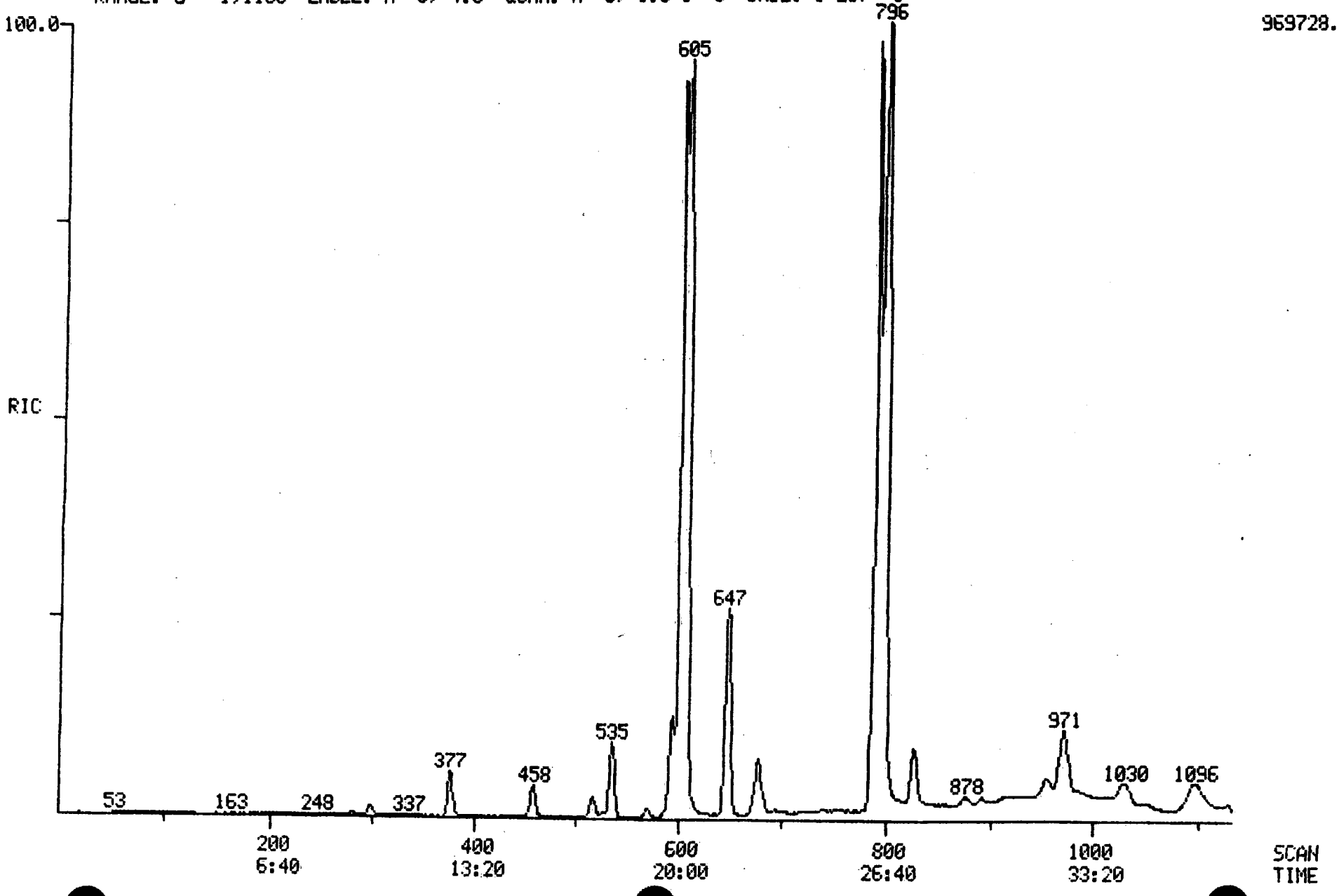
INTERNAL STANDARD SCAN LIST
(RETENTION TIME)

LABORATORY SAMPLE NO.: 2033-6008

INTERNAL STANDARD	SCAN #
VOLATILE FRACTION	
BROMOCHLOROMETHANE	377
1,4-DIFLUOROBENZENE	677
CHLOROBENZENE-D5	827

SEMI-VOLATILE FRACTION	SCAN #
1,4-DICHLOROBENZENE-D4	-
NAPTHALENE-D8	-
ACENAPTHENE-D10	-
PHENANTHRENE-D10	-
CHRYSENE-D12	-
PERYLENE-D12	-

MIDRIC DATA: VOA5808 #1 SCANS 1 TO 1130
08/20/87 10:55:00 CALI: VOA5808 #2
SAMPLE: GC/MS#1, 2033-6008 (1/10 DILUTION)
CONDS.: 624
RANGE: G 1,1130 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3



41 229

SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. _____ Contractor E.T. Killam Assoc. Contract No. _____

Low Level X Medium Level _____

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/Kg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS * RPD	QC LIMITS * RECOVERY
VOA SMO SAMPLE NO. 2033 6004	1,1-Dicholorethene	50	0	38	76	47	94	10	22	59-172
	Trichloroethene	50	0	40	80	46	92	7	24	62-137
	Chlorobenzene	50	0	46	92	53	106	7	21	60-133
	Toluene	50	7	43	86	54	108	11	21	59-139
	Benzene	50	3	47	94	53	106	6	21	66-142
B/N SMO SAMPLE NO.	1,2,4-Trichlorobenzene								23	38-107
	Acenaphthene								19	31-137
	2,4 Dinitrotoluene								47	28-89
	Di-n-Butylphthalate								47	29-135
	Pyrene								36	35-142
	N-Nitrosodi-n-Propylamine								38	41-126
	1,4-Dichlorobenzene								27	28-104
ACID SMO SAMPLE NO.	Pentachlorophenol								47	17-109
	Phenol								35	26-90
	2-Chlorophenol								50	25-102
	4-Chloro-3-Methylphenol								33	26-103
	4-Nitrophenol								50	11-114
PEST SMO SAMPLE NO.	Lindane								50	46-127
	Heptachlor								31	35-130
	Aldrin								43	34-132
	Dieldrin								38	31-134
	Endrin								45	42-139
	4,4'-DDT								50	23-134

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs 0 out of 5 ; outside QC limits
B/N _____ out of _____ ; outside QC limits
ACID _____ out of _____ ; outside QC limits
PEST _____ out of _____ ; outside QC limits

RECOVERY: VOAs 0 out of 10 : outside QC limits
B/N _____ out of _____ : outside QC limits
ACID _____ out of _____ : outside QC limits
PEST _____ out of _____ : outside QC limits

Comments: _____

GC/MS TUNING AND MASS CALIBRATION

Bromofluorobenzene (BFB)

Case No. _____ Contractor E.T. Killam Assoc. Contract No. _____

Instrument ID 5100 Date 8/20/87 Time 5:21 + 32:20

Lab ID VOA 5801 Data Release Authorized By: JEF

m/e	ION ABUNDANCE CRITERIA	%RELATIVE ABUNDANCE
50	15.0 - 40.0% of the base peak	18.11
75	30.0 - 60.0% of the base peak	40.94
95	Base peak, 100% relative abundance	100.00
96	5.0 - 9.0% of the base peak	5.76
173	Less than 1.0% of the base peak	<1
174	Greater than 50.0% of the base peak	72.58
175	5.0 - 9.0% of mass 174	5.20 (7.16)[1]
176	Greater than 95.0%, but less than 101.0% of mass 174	70.66 (97.4)[1]
177	5.0 - 9.0% of mass 176	4.48 (6.34)[2]

[1] Value in parenthesis is % mass 174.
[2] Value in parenthesis is % mass 176.

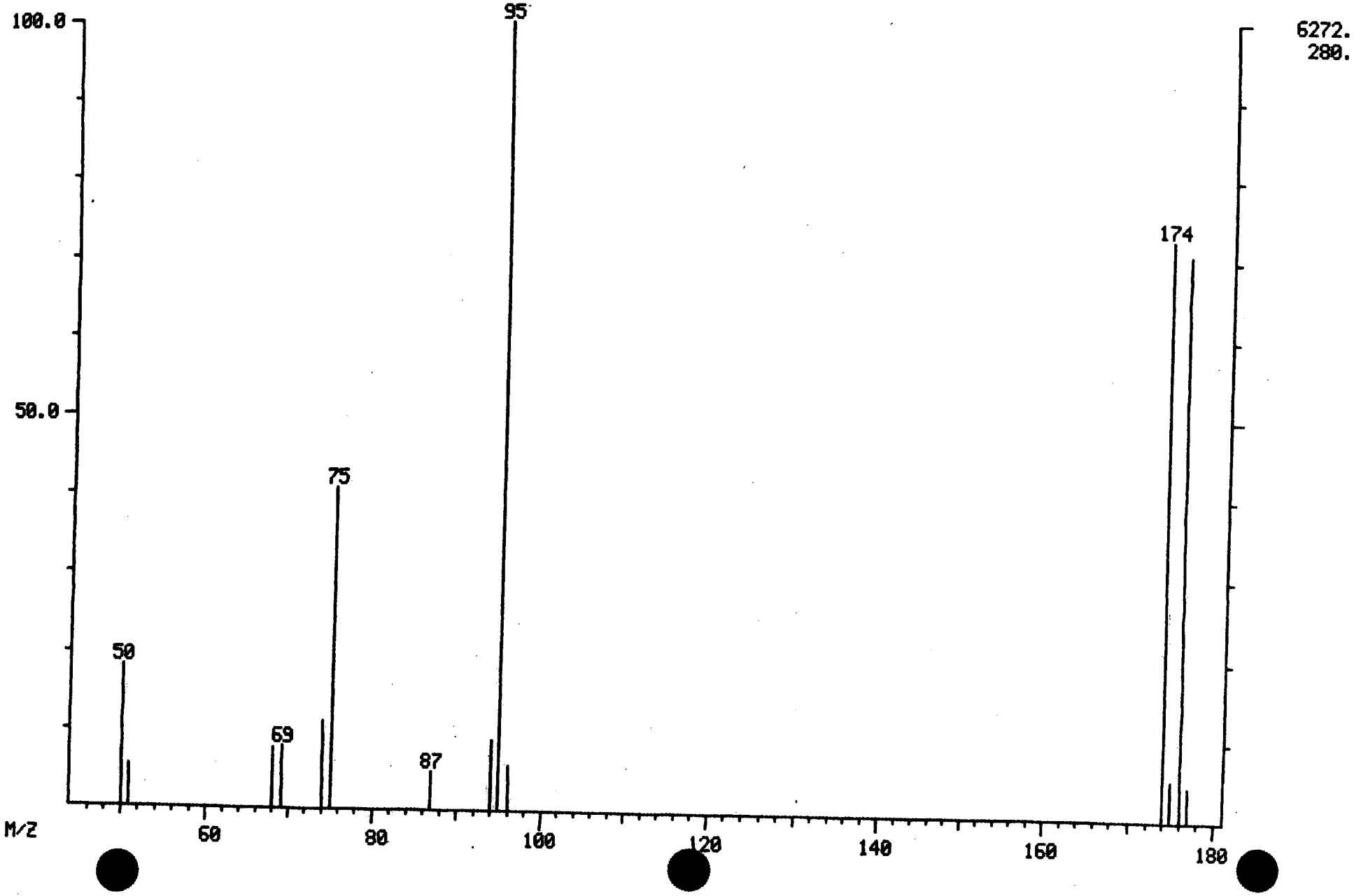
THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

SAMPLE ID	LAB ID	DATE OF ANALYSIS	TIME OF ANALYSIS
50 ug/L VOA HSL STD	VOA 5801	8/20/87	5:21
2033-6007 (1/10 D.L.)	VOA 5802	"	6:09
BLANK	VOA 5803	"	6:56
2033-6010 (1/10 D.L.)	VOA 5804	"	7:44
BLANK	VOA 5805	"	8:32
2033-6009 (1/10 D.L.)	VOA 5806	"	9:20
BLANK	VOA 5807	"	10:07
2033-6008 (1/10 D.L.)	VOA 5808	"	10:55
N/A	VOA 5809	"	N/A
BLANK	VOA 5810	"	12:30

MID MASS SPECTRUM
08/20/87 5:21:00 + 32:20
SAMPLE: GC/MS#1, @ 50 UG/L VOAHSL STD.
CONDS.: 624
GC TEMP: 239 DEG. C
ENHANCED (S 15B 2N 0T)

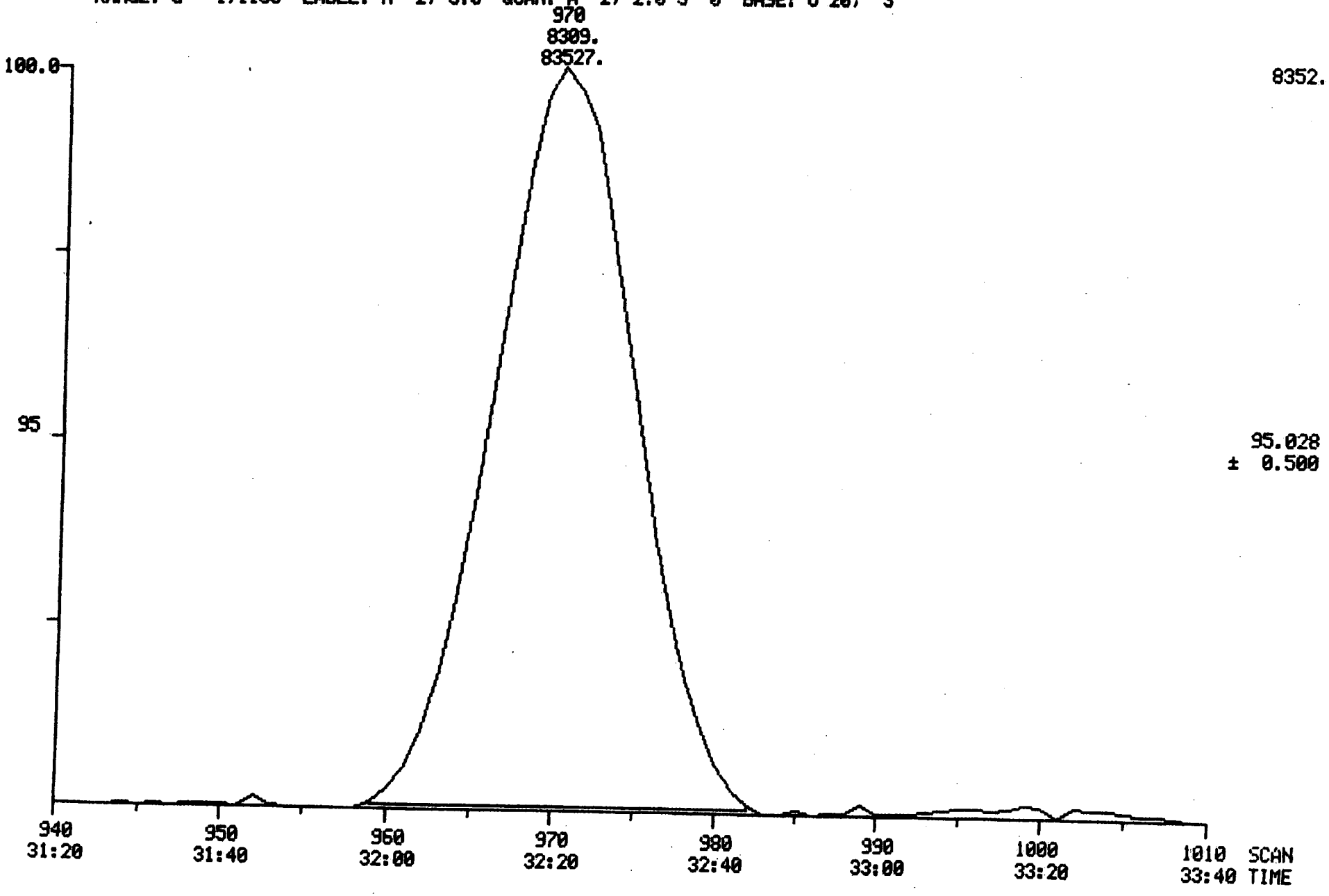
DATA: VOA5801 #970
CALI: VOA5801 #2

BASE M/Z: 95
RIC: 27424.



44 232

MIDMASS CHROMATOGRAM DATA: VOA5801 #970 SCANS 940 TO 1010
08/20/87 5:21:00 CALI: VOA5801 #2
SAMPLE: GC/MS#1, @ 50 UG/L VOAHSL STD.
CONDS.: 624
RANGE: G 1,1130 LABEL: N 2, 3.0 QUAN: A 2, 2.0 J 0 BASE: U 20, 3



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MASS SPECTRAL DATA

FOR

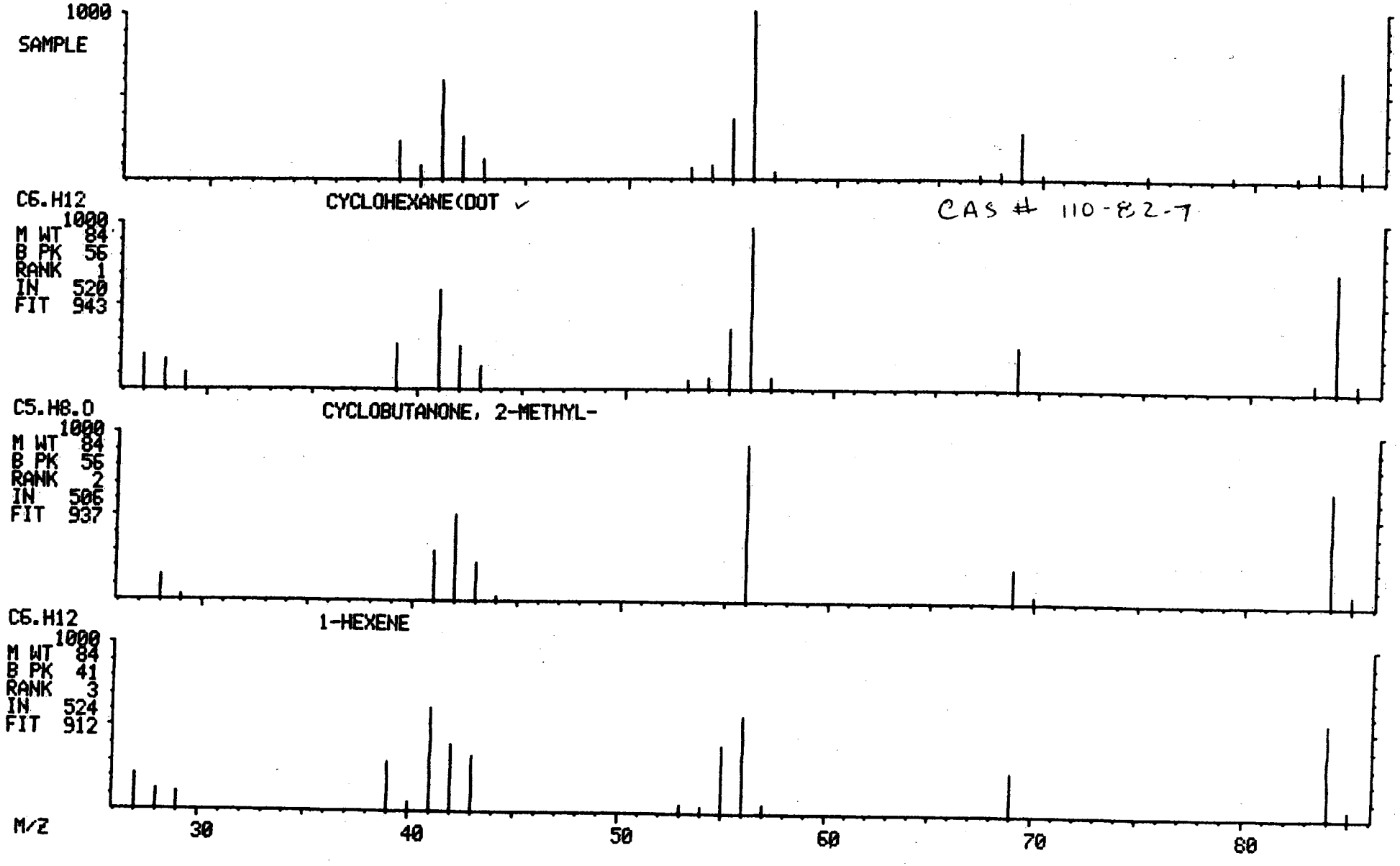
TENTATIVELY IDENTIFIED COMPOUNDS

For each tentatively identified compound, a mass spectrum of the detected compound is provided with the mass spectrums of the three best matches from the NBS Library search. When the library search does not produce an adequate match, the detected compound is labelled as "unknown".

MID LIBRARY SEARCH
08/20/87 10:55:00 + 17:12
SAMPLE: GC/MS#1, 2033-6008 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5808 # 516
CALI: VOA5808 # 2

BASE M/Z: 56
RIC: 19839.



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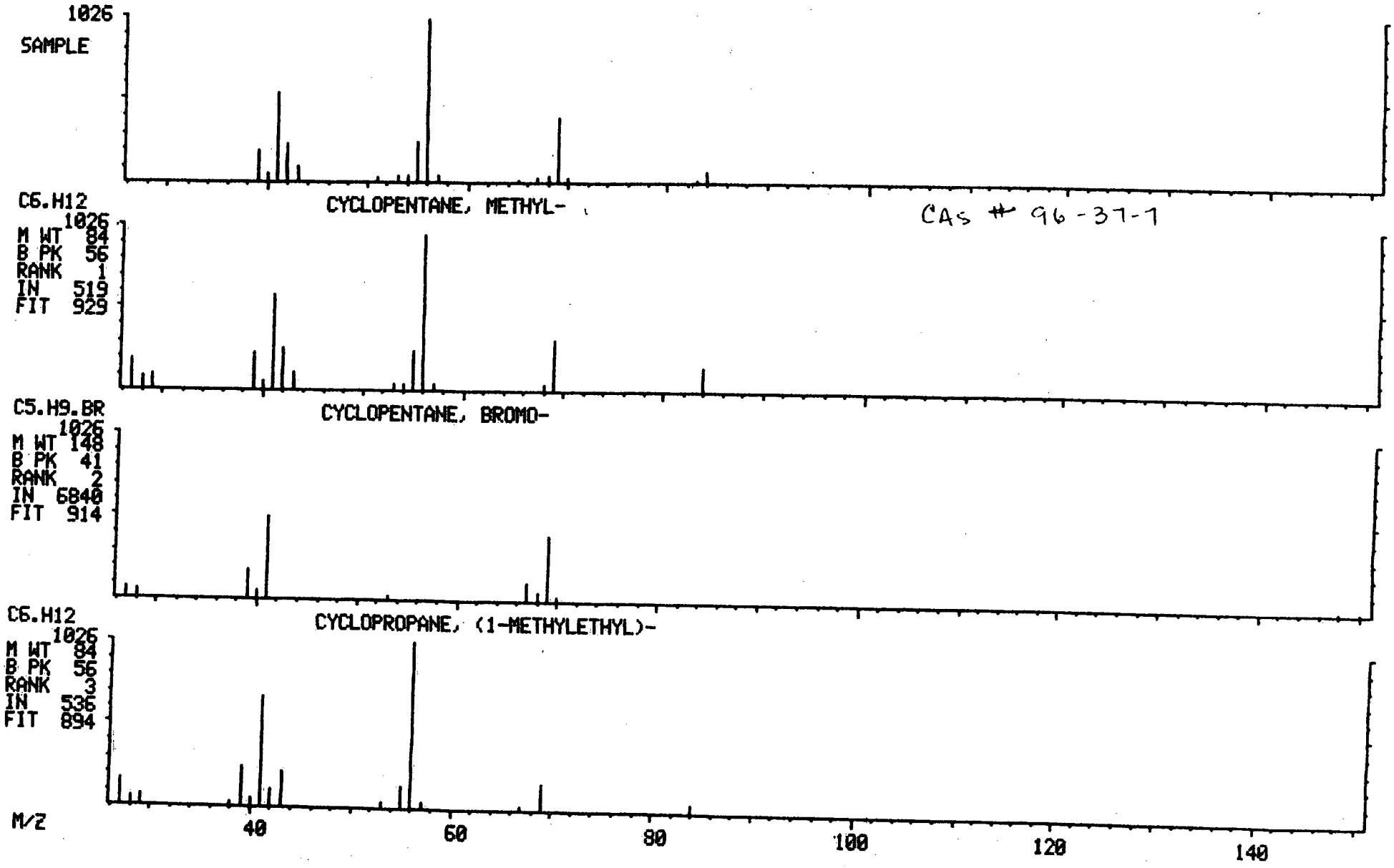
MID LIBRARY SEARCH
08/20/87 10:55:00 + 17:50
SAMPLE: GC/MS#1, 2033-6008 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5808 # 535
CALI: VOA5808 # 2

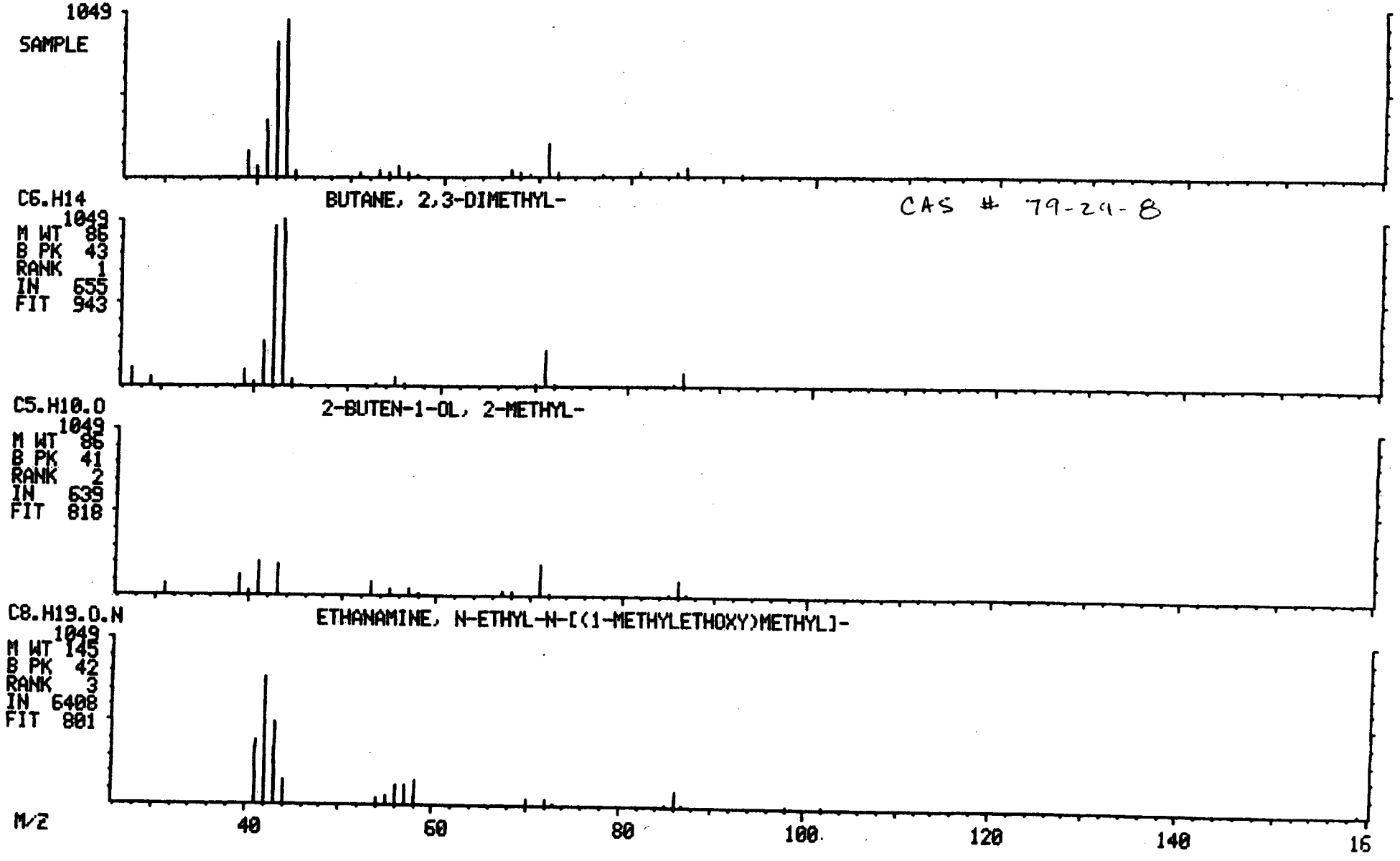
BASE M/Z: 56
RIC: 84479.



MID LIBRARY SEARCH
08/20/87 10:55:00 + 18:58
SAMPLE: GC/MS#1, 2033-6008 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5808 # 569
CALI: VOA5808 # 2

BASE M/Z: 43
RIC: 10207.



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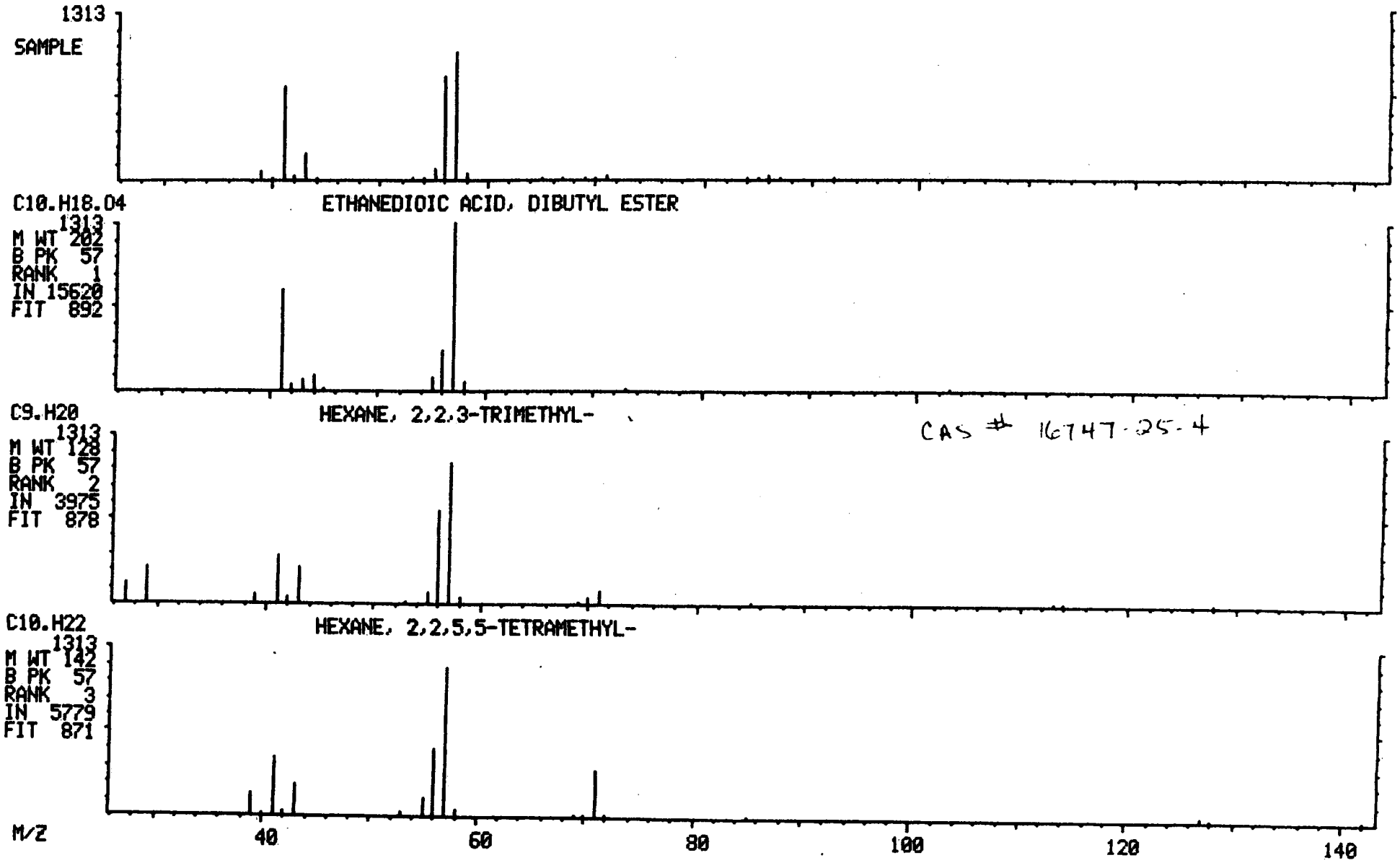
MID LIBRARY SEARCH
08/20/87 10:55:00 + 19:46
SAMPLE: GC/MS#1, 2033-6008 (1/10 DILUTION)
CONDS.: 624
ENHANCED (5 15B 2N 0T)

DATA: VOA5808 # 593
CALI: VOA5808 # 2

BASE M/Z: 57
RIC: 102527.



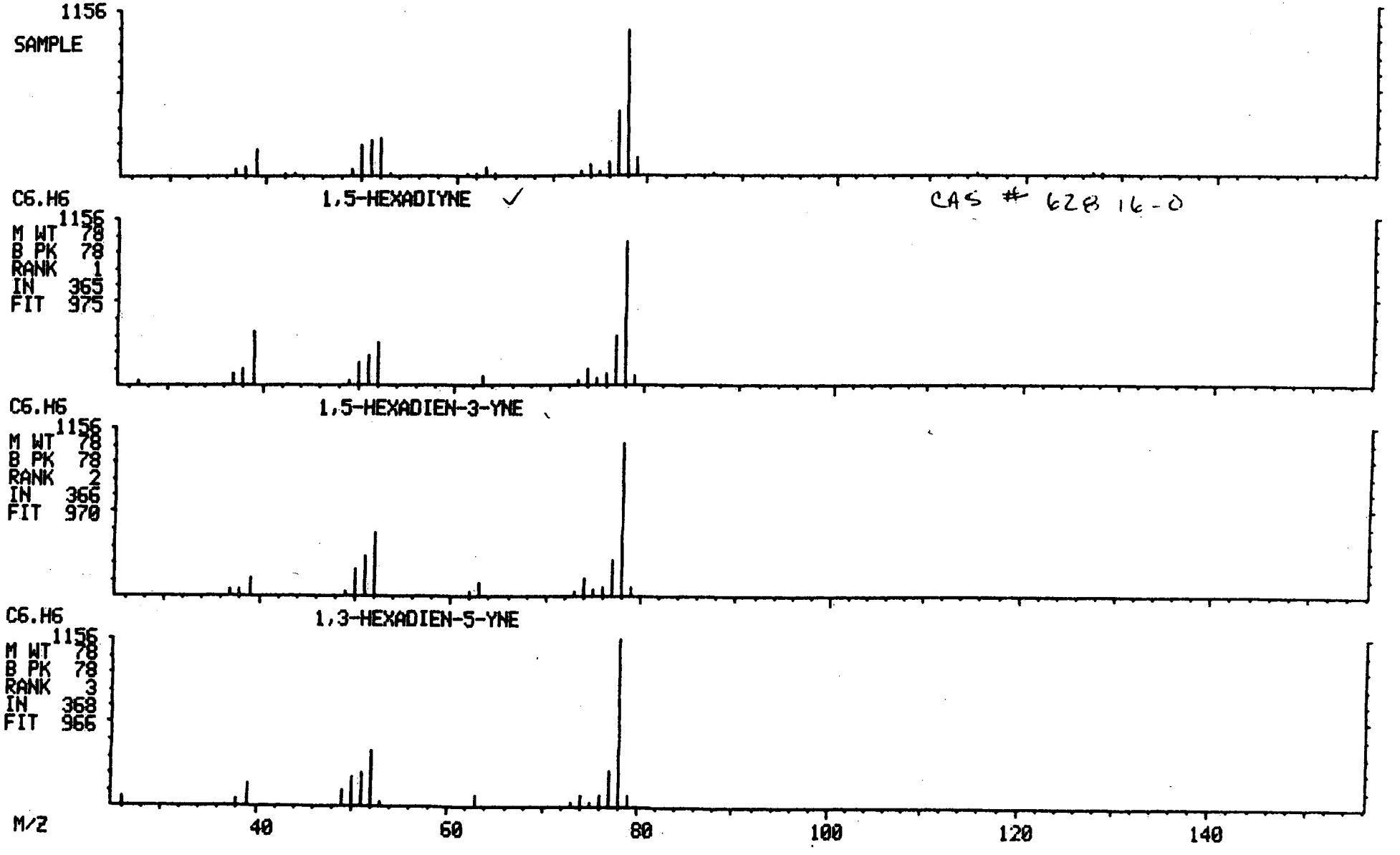
CAS # 16747-25-4

50 238

MID LIBRARY SEARCH
08/20/87 10:55:00 + 19:58
SAMPLE: GC/MS#1, 2033-6008 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5808 # 599
CALI: VOA5808 # 2

BASE M/Z: 78
RIC: 317951.



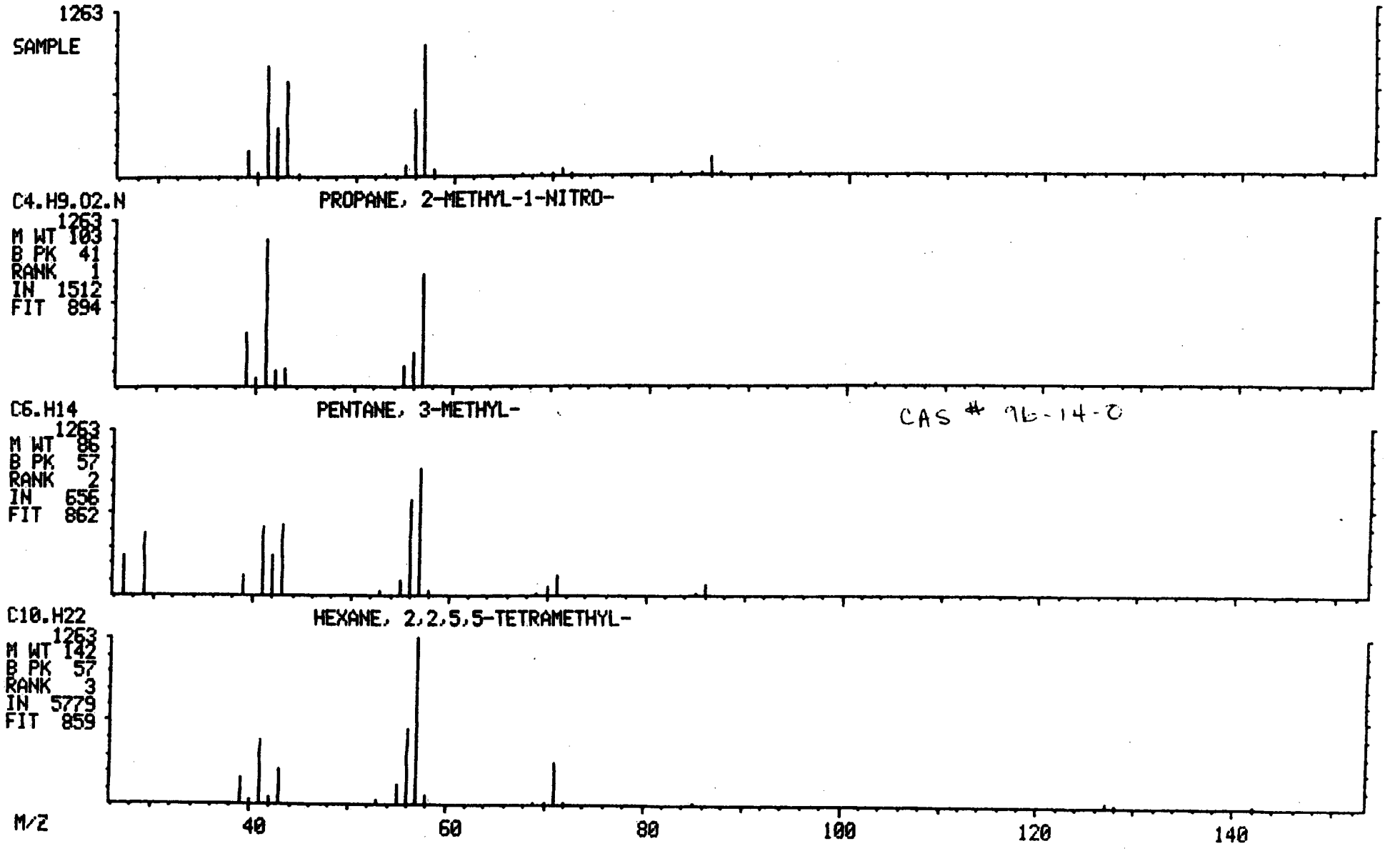
51

239

MID LIBRARY SEARCH
08/20/87 10:55:00 + 21:34
SAMPLE: GC/MS#1, 2033-6008 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5808 # 647
CALI: VOA5808 # 2

BASE M/Z: 57
RIC: 239359.



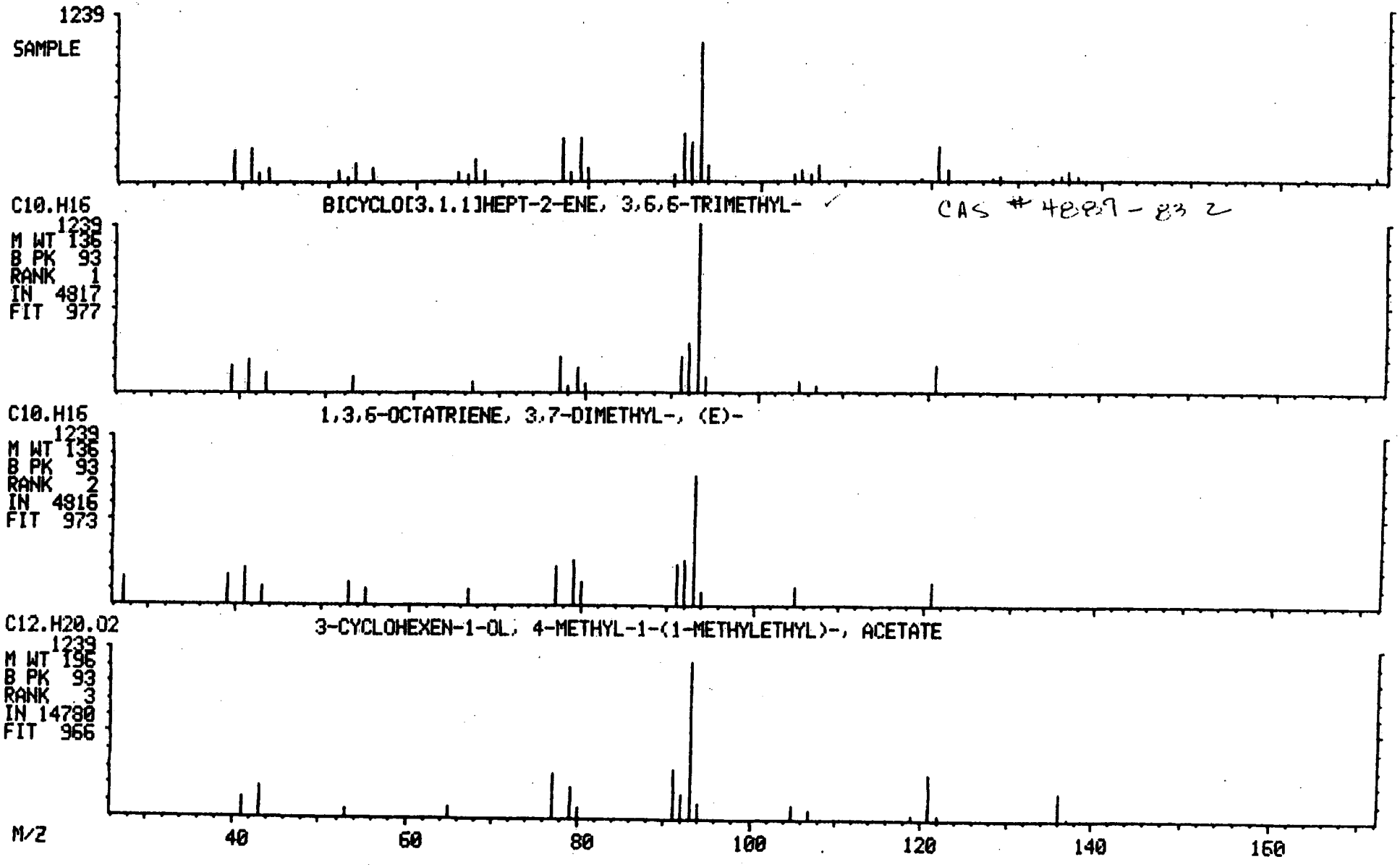
CAS # 96-14-0

5 of 240

MID LIBRARY SEARCH
08/20/87 10:55:00 + 29:14
SAMPLE: GC/MS#1, 2033-6008 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5808 # 877
CALI: VOA5808 # 2

BASE M/Z: 93
RIC: 7479.

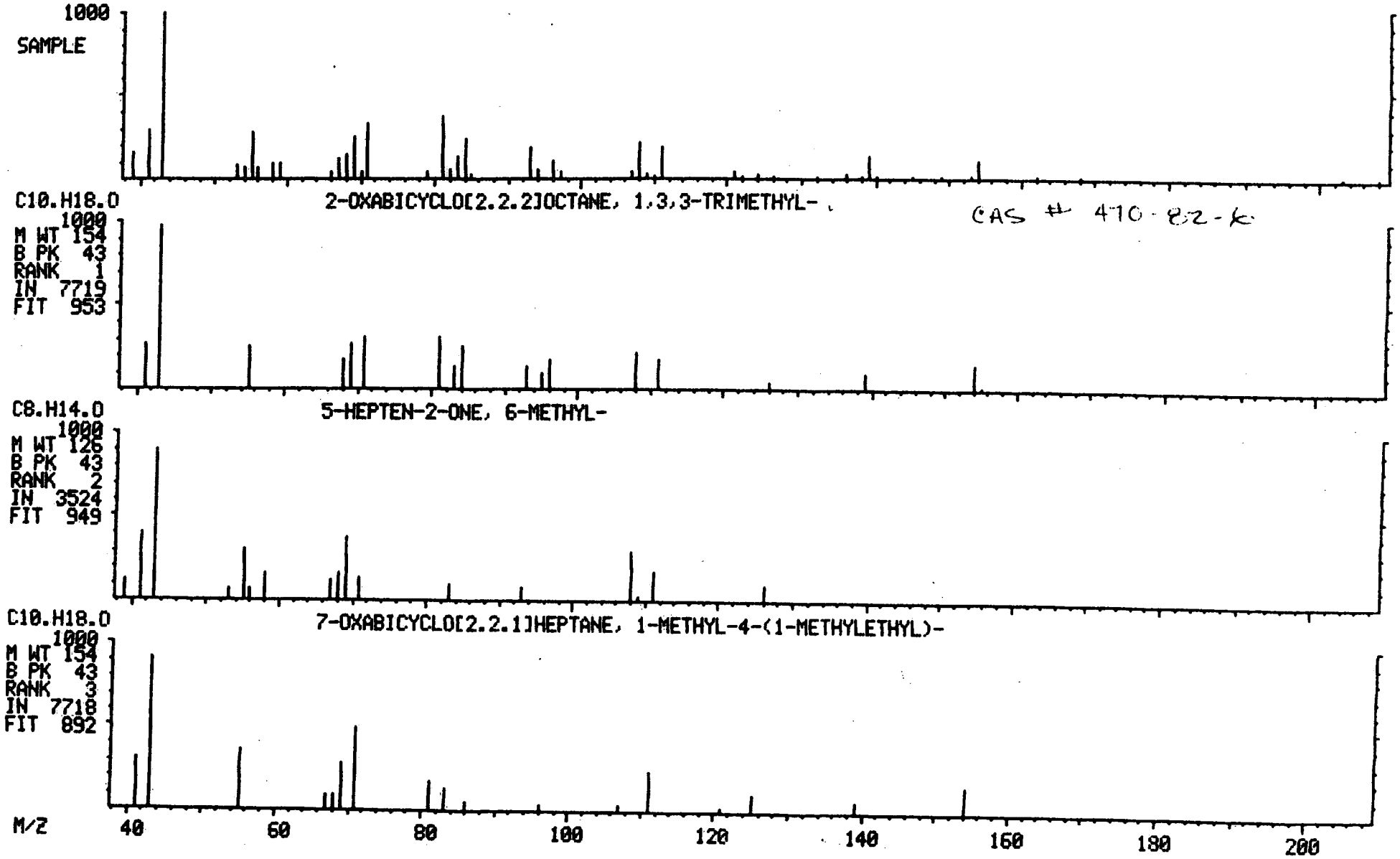


53 241

MID LIBRARY SEARCH
08/20/87 10:55:00 + 31:48
SAMPLE: GC/MS#1, 2033-6008 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5808 # 954
CALI: VOA5808 # 2

BASE M/Z: 43
RIC: 17247.



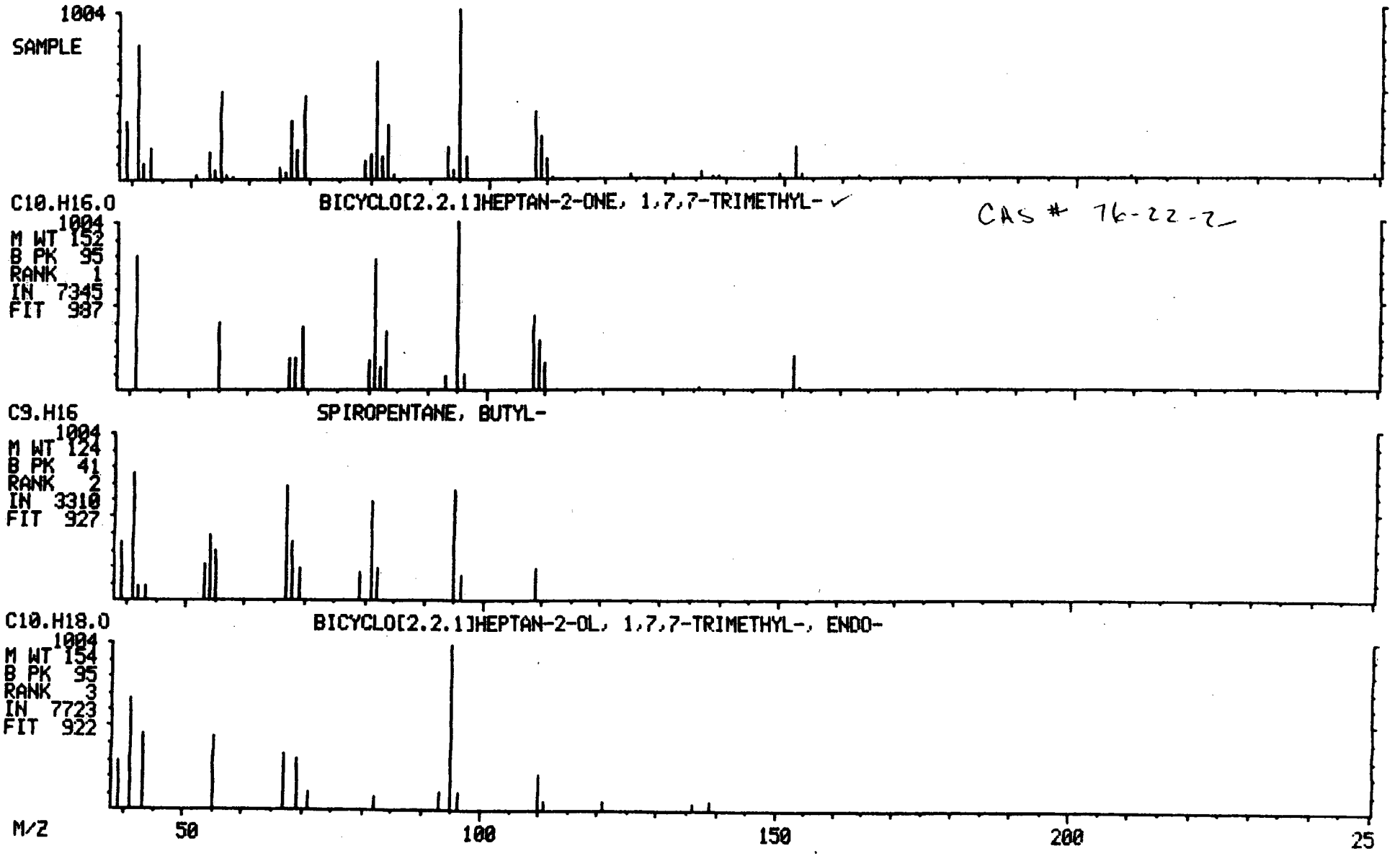
CAS # 470-82-6

54 242

MID LIBRARY SEARCH
08/20/87 10:55:00 + 34:20
SAMPLE: GC/MS#1, 2033-6008 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5808 #1030
CALI: VOA5808 # 2

BASE M/Z: 95
RIC: 15791.



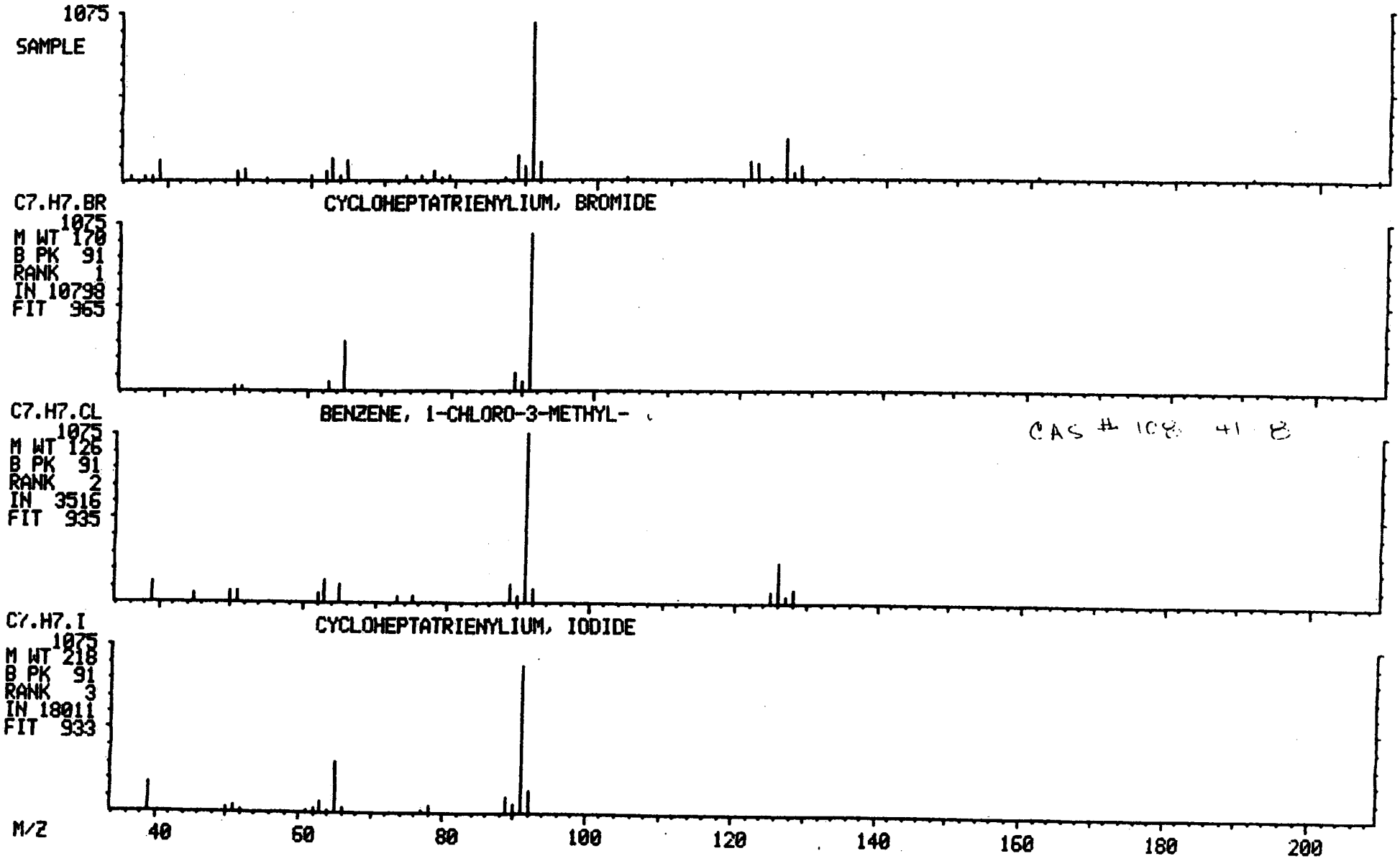
CAS # 76-22-2

55 743

MID LIBRARY SEARCH
08/20/87 10:55:00 + 36:32
SAMPLE: GC/MS#1, 2033-6008 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5808 #1096
CALI: VOA5808 # 2

BASE M/Z: 91
RIC: 11247.



CAS # 108 41 8

56 744

REAGENT BLANK SUMMARY

Case No. _____ Contractor E.T. Killam Assoc. Contract No. _____

FILE ID	DATE OF ANALYSIS	FRACTION	MATRIX	CONC. LEVEL	INST. ID	CAS NUMBER	COMPOUND (MDL, TIC OR UNKNOWN)	CONC.	UNITS	CRQL
VOA 5810	8/20/87	VOA	WATER	LOW	5700	N/A	Methylene Chloride	4.5	ug/L	5

Comments:

FORM IV

4/84

57 245

CHAIN OF CUSTODY RECORD

Log Book Pg. No. 10/11

— See options below

Project Name/Number ORBIS P87-304 | Sample Date: 8-7-87

ETK Lab # Sample #	Sub	Field Sample No. A	B	Time	Sample Location	Sample Depth	Sample Type	No. of Containers	Section / Option: Metals (A B C D)	GC/MS Organics (A B C D)	Other Organics (A B C D)	Nutrients (A B C D)	S.D.W.A.	Solids	Bacty	TC/FC	Remarks
		P304	6007	11:20	OB-4 "TANK	6.5	SOIL	1		C	A						ALL SAMPLES
		P304	6008	11:35	OB-7 "TANK	6.5	SOIL	1		C	A						OBTAINED FROM
		P304	6009	11:50	OB-8 "TANK	6.5	SOIL	1		C	A						TEST PITS IN
		P304	6010	12:00	OB-5 "TANK	6.5	SOIL	1		C	A						U.G. STORAGE
																	TANK (REMOVED) AREA

Metals -M-	GC/MS Organics -G-	Organics (Other) -Q-	Nutrients - Minerals -N-	S.D.W.A. Conven. Analysis -S-	Solid Series / pH Conductivity
"A" Priority Metals As Sb Be Cd Cr Cu Pb Hg Ni Se Ag Tl Zn	**"A" P.P. + 40** VOAs + 15 A/BNs + 25 Pesticides & PCBs	**"A" PHC** Petroleum Hydrocarbons	**"A" Nutrients** Ammonia Nitrate Nitrite Total Phosphorus TKN	**Primary:** Fl^- Turb. NO_3-N **Secondary:** pH TDS Alk. Hardness L.I. SO_4 Cl^- F^- M.B.A.S.	TS TDS TSS TVDS pH TVSS Conductivity
"B" S.D.W.A. **Primary:** As Ba Cd Cr Pb Na Hg Se Ag **Secondary:** Cu Fe Mn Zn	**"B" P.P. — No Searches** VOAs A/BNs Pesticides & PCBs	**"B" O & G** Oil & Grease	**"B" Minerals** Alk. Cl^- pH F^- Hard. SO_4 L.I. Turb.		
"C" Misc. Metals Cr+6 Fe Mn Na Ba K Ca Mg	**"C" VOAs only** A. Searches B. No Searches C. Specific: _____	**"C" Total Phenols** Total Phenols	**"C" Oxygen Demand** B.O.D. C.O.D. A. Total B. Soluable		
"D" List (others)	**"D" A-280** A-280 Parameters S.D.W.A.	**"D" Cyanide** Cyanide	**"D" Misc. List**		

Bottles/Samplers Prepared by:	Date	Time
KAA	8/6/87	1000
Sampled by:	**Date**	**Time**
KE Kah	8/7/87	see Above
Received by:	**Date**	**Time**
1		
2		
3		
4		
Lab. Received by:	**Date**	**Time**
J. Sanderson	8/7/87	1315

2033

2 of 3

58 246

Elson T. Killam Associates, Inc.

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Tel. 201/379-3400 Telex 642-057 Telecopier 201/376-1072

Environmental and Hydraulic Engineers

ANALYTICAL DATA REPORT

ORBIS PRODUCTS CORP.

NEWARK, NEW JERSEY

U.G. STORAGE TANK AREA

PROJECT NUMBER: P87-304

LABORATORY REFERENCE NUMBER: 2033-6009

DATE AND TIME COLLECTED: 8/7/87 11:50

Nancy J. Potak
LABORATORY DIRECTOR

SEPTEMBER 24, 1987

N.J. LABORATORY
CERTIFICATION NO.: 07059

59 247

Elson T. Killam Associates, Inc.

LABORATORY CHRONICLE

LABORATORY SAMPLE NO.: 2033-6009

RECEIVED: 8/7/87

ORGANICS:

EXTRACTION:

ANALYSES:

1. **VOLATILE COMPOUNDS:** 8/20/87
2. **ACID EXTRACTABLES:**
3. **BASE/NEUTRALS:**
4. **PESTICIDES/PCBs:**

METALS:

DIGESTION:

ANALYSES:

OTHER ANALYSES:	**EXTRACTED:**	**ANALYSES:**
PHC	8/13/87	8/14/87

QUALITY CONTROL SUPERVISOR REVIEW AND APPROVAL: [illegible]

60

246

METHODOLOGY SUMMARY

Purgeable Organics

USEPA METHOD 624

Acid Extractables

Base/Neutral Extractables

PESTICIDE EXTRACTABLES

Metals

Total Cyanide

Total Phenol

Other PHC - USEPA METHOD 418.1 (Modified for soil)

PETROLEUM HYDROCARBONS DATA

LABORATORY SAMPLE NO.: 2033-6009

	CONCENTRATION DRY WEIGHT (mg/Kg)	DETECTION LIMIT (mg/Kg)
PETROLEUM HYDROCARBONS	3,530	132

BDL = BELOW DETECTION LIMIT

PETROLEUM HYDROCARBONS
MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

LAB REFERENCE ID NO.: 2033-6009 **QUALITY ASSURANCE SAMPLE:** 2033-6006

LAB SAMPLE NO.	CONC. SPIKE ADDED	SAMPLE CONC.	CONC. MS	% REC	CONC. MSD	% REC	RPD
2033-6006.....	610	<30	612	100	632	104	4

Concentration - mg/kg
RPD - relative percent difference

DATA QUALIFIERS

The following four qualifiers are used in the analytical report package. They are equivalent to those issued by EPA - Contract Laboratory Program:

U - Indicates that the compound was analyzed for but not detected. All sample detection limits reported have been corrected for dilution and per cent moisture. No adjustements for blank contamination have been made.

J - Refers to an estimated value. This is used when the mass spectral data indicates the presence of a compound that meets the identification criteria, yet has a concentration less than the contract required detection limit. All estimated values reported have been adjusted for both dilution and per cent moisture, but no corrections have been made for possible blank contamination.

B - This flag is used to note that the compound was found to be present in the laboratory blank as well as in the sample. It indicates that the possibility of laboratory contamination exists.

The EPA has issued certain quidelines to aid in the evaluation of data when common laboratory artifacts occur. Blank contribution is considered to be negligable if it is ten times less than the concentration present in the sample. If the concentrations of the compounds found in both the sample and the blank are comparable (i.e. sample concentration is less than twice that of the blank), the occurance of the compound in the sample is considered to be suspect.

Up to 25 ppb of methylene chloride is permitted to be present in the blanks of volatile organic analyses.

C - Applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >10 ng/ul in the final extract are confirmed by GC/MS.

The next qualifier is also used in referencing the analytical results:

X - This flag indicates the presence of a compound which is often found as a common laboratory or field contaminant.

VOLATILE COMPOUNDS DATA

LABORATORY SAMPLE NO.: 2033-6009(1/10 DIL) DATA FILE NO.: VOA5806

% SOLIDS: 75.6

	CONCENTRATION (ug/Kg)		SCAN	DETECTION LIMIT (ug/Kg)
ACROLEIN		U		1300.
ACRYLONITRILE		U		1300.
BENZENE	9800		605	66.
BROMOFORM		U		66.
BROMOMETHANE		U		130.
CARBON TETRACHLORIDE		U		66.
CHLOROBENZENE		U		66.
DIBROMOCHLOROMETHANE		U		66.
CHLOROETHANE		U		130.
2-CHLORO ETHYL VINYL ETHER		U		130.
CHLOROFORM		U		66.
CHLOROMETHANE		U		66.
BROMODICHLOROMETHANE		U		66.
1,1-DICHLOROETHANE		U		66.
1,2-DICHLOROETHANE		U		66.
1,1-DICHLOROETHENE		U		66.
TRANS-1,2-DICHLOROETHENE		U		66.
1,2-DICHLOROPROPANE		U		66.
CIS-1,3-DICHLOROPROPENE		U		66.
TRANS-1,3-DICHLOROPROPENE		U		66.
ETHYLBENZENE	1200		893	66.
METHYLENE CHLORIDE	68	JB	282	66.
1,1,2,2-TETRACHLOROETHANE		U		66.
TETRACHLOROETHENE		U		66.
TOLUENE	4900		798	66.
1,1,1-TRICHLOROETHANE		U		66.
1,1,2-TRICHLOROETHANE		U		66.
TRICHLOROETHENE		U		66.
VINYL CHLORIDE		U		130.
ACETONE - HSL	1900		298	130.
CARBON DISULFIDE - HSL		U		66.
2-HEXANONE - HSL	310		747	130.
2-BUTANONE		U		130.
4-METHYL-2-PENTANONE -HSL		U		130.
STYRENE - HSL		U		66.
TOTAL XYLENES - HSL	2600		1018,1050	66.

Laboratory Name E.T. Killam Assoc.

Case No

Sample Number
2033-6009

Organics Analysis Data Sheet
(Page 4)

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/kg)
1.	UNKNOWN	VOA	337	140
2. 110-82-7	CYCLOHEXANE (DOT	VOA	516	3,000
3. 96-37-7	CYCLOPENTANE, METHYL	VOA	535	3,600
4. 79-29-8	BUTANE, 2,3-DIMETHYL	VOA	569	360
5.	UNKNOWN	VOA	591	6,200
6. 96-14-0	PENTANE, 3-METHYL	VOA	645	6,700
7. 108-08-7	PENTANE, 2,4-DIMETHYL	VOA	691	200
8. 488-97-1	TRICYCLO[2.2.1.02,6]HEPTANE,	VOA	877	140
9.	1,3,3-TRIMETHYL			
10. 100-66-3	BENZENE, METHOXY	VOA	932	120
11. 470-82-6	2-OXABICYCLO[2.2.2]OCTANE,			
12.	1,3,3 TRIMETHYL	VOA	955	840
13. 108-41-8	BENZENE, 1-CHLORO-3-METHYL	VOA	1098	992
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

METHOD PERFORMANCE DATA

SOILS SURROGATE PERCENT RECOVERY

LABORATORY SAMPLE NO.: 2033-6009

COMPOUND	RECOVERY	EPA CONTROL LIMITS	SCAN #
VOLATILE FRACTION			
TOLUENE - D8	8*	81-117	761
BROMOFLUOROBENZENE	102	74-121	971
1,2-DICHLOROETHANE	100	70-121	458
SEMI-VOLATILE FRACTION			
NITROBENZENE-D5	-	23-120	-
2-FLUOROBIPHENYL	-	30-116	-
TERPHENYL-D14	-	18-137	-
PHENOL-D5	-	24-113	-
2-FLUOROPHENOL	-	26-121	-
2,4,6-TRIBROMOPHENOL	-	19-122	-
PESTICIDE			
DIBUTYL CHLORENDATE	-	20-150**	-

*LOW SURROGATE RECOVERY DUE TO MATRIX EFFECT OF HIGH CONCENTRATION OF TOLUENE IN THE SAMPLE.
**ADVISORY LIMITS ONLY

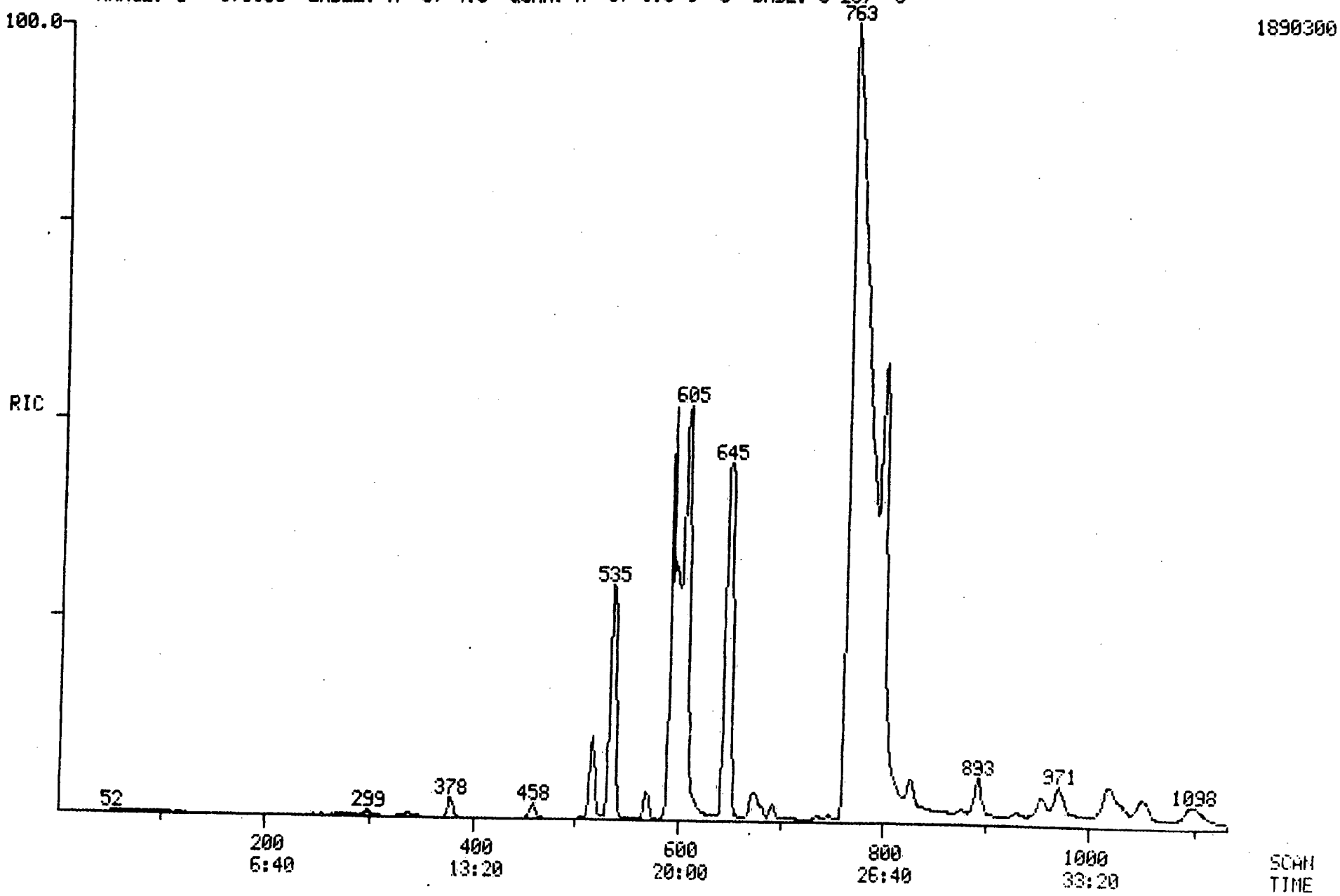
INTERNAL STANDARD SCAN LIST
(RETENTION TIME)

LABORATORY SAMPLE NO.: 2033-6009

INTERNAL STANDARD	SCAN #
VOLATILE FRACTION	
BROMOCHLOROMETHANE	378
1,4-DIFLUOROBENZENE	675
CHLOROBENZENE-D5	827

SEMI-VOLATILE FRACTION	SCAN #
1,4-DICHLOROBENZENE-D4	-
NAPTHALENE-D8	-
ACENAPTHENE-D10	-
PHENANTHRENE-D10	-
CHRYSENE-D12	-
PERYLENE-D12	-

MIDRIC DATA: VOA5806 #1 SCANS 1 TO 1130
08/20/87 9:20:00 CALI: VOA5806 #2
SAMPLE: GC/MS#1, 2033-6009 (1/10 DILUTION)
CONDS.: 624
RANGE: G 1,1130 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3



69 257

SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. _____ Contractor E.T. Killam Assoc. Contract No. _____

Low Level X Medium Level _____

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/Kg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS * RPD	QC LIMITS * RECOVERY
VOA SMO SAMPLE NO. 2033-6004	1,1-Dichloroethene	50	0	38	76	47	94	10	22	59-172
	Trichloroethene	50	0	40	80	46	92	7	24	62-137
	Chlorobenzene	50	0	46	92	53	106	7	21	60-133
	Toluene	50	7	43	86	54	108	11	21	59-139
	Benzene	50	3	47	94	53	106	6	21	66-142
B/N SMO SAMPLE NO.	1,2,4-Trichlorobenzene								23	38-107
	Acenaphthene								19	31-137
	2,4 Dinitrotoluene								47	28-89
	Di-n-Butylphthalate								47	29-135
	Pyrene								36	35-142
	N-Nitrosodi-n-Propylamine								38	41-126
	1,4-Dichlorobenzene								27	28-104
ACID SMO SAMPLE NO.	Pentachlorophenol								47	17-109
	Phenol								35	26-90
	2-Chlorophenol								50	25-102
	4-Chloro-3-Methylphenol								33	26-103
	4-Nitrophenol								50	11-114
PEST SMO SAMPLE NO.	Lindane								50	46-127
	Heptachlor								31	35-130
	Aldrin								43	34-132
	Dieldrin								38	31-134
	Endrin								45	42-139
	4,4'-DDT								50	23-134

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs 0 out of 5 ; outside QC limits
B/N _____ out of _____ ; outside QC limits
ACID _____ out of _____ ; outside QC limits
PEST _____ out of _____ ; outside QC limits

RECOVERY: VOAs 0 out of 10 : outside QC limits
B/N _____ out of _____ : outside QC limits
ACID _____ out of _____ : outside QC limits
PEST _____ out of _____ : outside QC limits

Comments: _____

70 254

GC/MS TUNING AND MASS CALIBRATION

Bromofluorobenzene (BFB)

Case No. _____ Contractor E.T. Killam Assoc. Contract No. _____

Instrument ID 5100 Date 8/20/87 Time 5:21 + 32:20

Lab ID VOA 5801 Data Release Authorized By: JEF

m/e	ION ABUNDANCE CRITERIA	%RELATIVE ABUNDANCE
50	15.0 - 40.0% of the base peak	18.11
75	30.0 - 60.0% of the base peak	40.94
95	Base peak, 100% relative abundance	100.00
96	5.0 - 9.0% of the base peak	5.76
173	Less than 1.0% of the base peak	<1
174	Greater than 50.0% of the base peak	72.58
175	5.0 - 9.0% of mass 174	5.20 (7.16)[1]
176	Greater than 95.0%, but less than 101.0% of mass 174	70.66 (97.4)[1]
177	5.0 - 9.0% of mass 176	4.48 (6.34)[2]

[1] Value in parenthesis is % mass 174.
[2] Value in parenthesis is % mass 176.

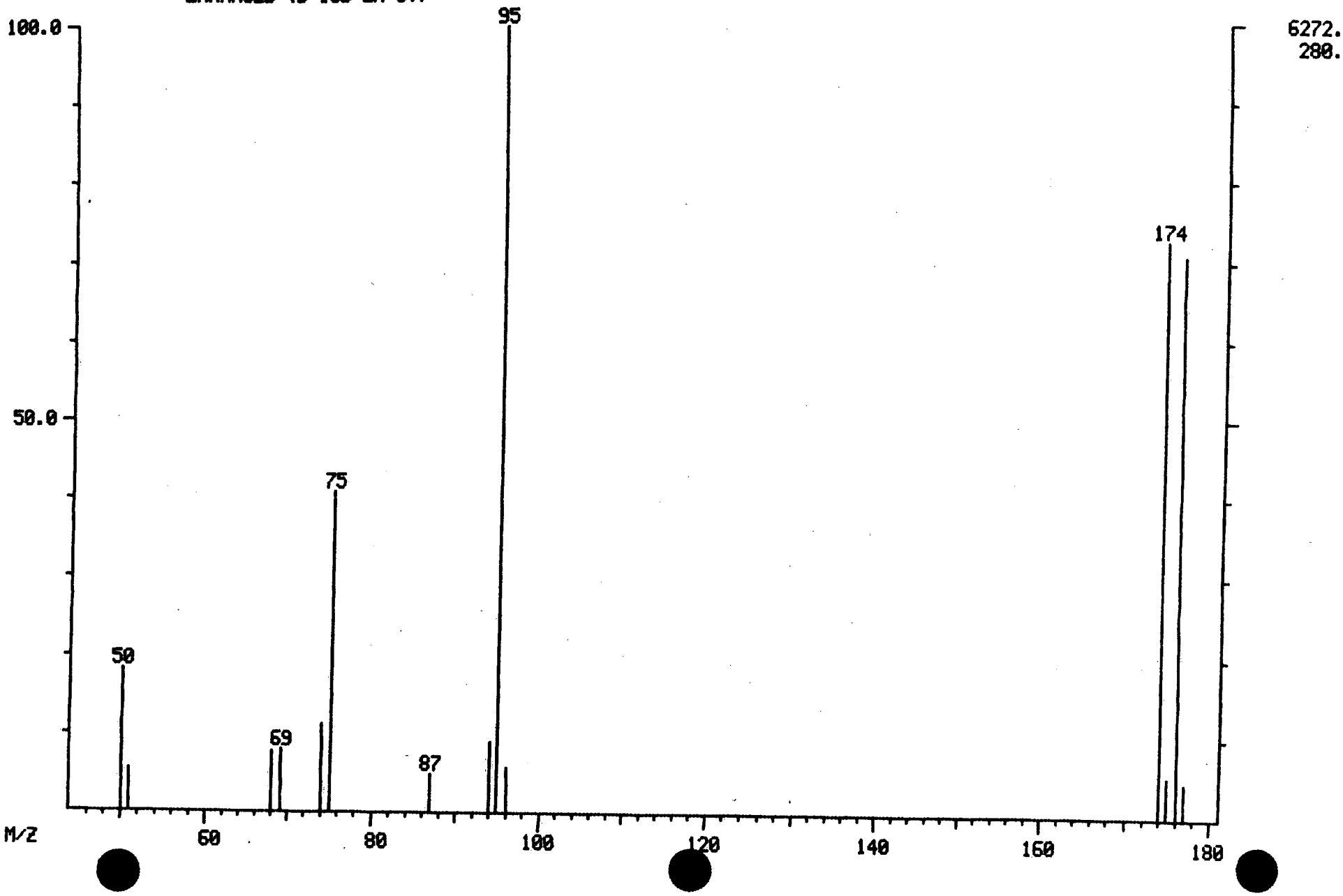
THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

SAMPLE ID		LAB ID	DATE OF ANALYSIS	TIME OF ANALYSIS
50 ug/L VOA HSL	STD	VOA 5801	8/20/87	5:21
2033-6007 (1/10 Dil)		VOA 5802	"	6:09
BLANK		VOA 5803	"	6:56
2033-6010 (1/10 Dil)		VOA 5804	"	7:44
BLANK		VOA 5805	"	8:32
2033-6009 (1/10 Dil)		VOA 5806	"	9:20
BLANK		VOA 5807	"	10:07
2033-6008 (1/10 Dil)		VOA 5808	"	10:55
N/A		VOA 5809	"	N/A
BLANK		VOA 5810	"	12:30

MID MASS SPECTRUM
08/20/87 5:21:00 + 32:20
SAMPLE: GC/MS#1, @ 50 UG/L VOAHSL STD.
CONDS.: 624
GC TEMP: 239 DEG. C
ENHANCED (S 15B 2N 0T)

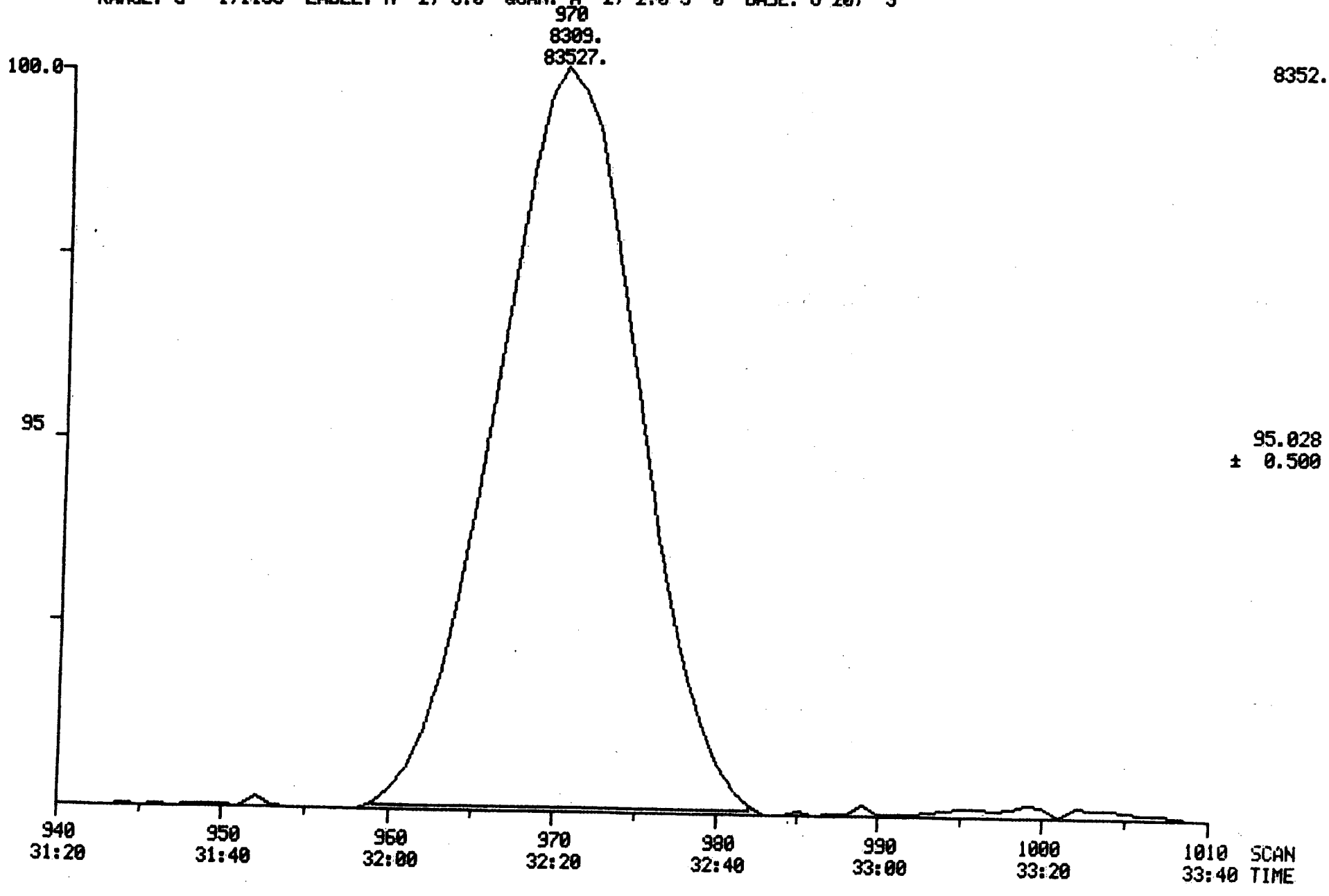
DATA: VOA5801 #970
CALI: VOA5801 #2

BASE M/Z: 95
RIC: 27424.



78-760

MIDMASS CHROMATOGRAM DATA: VOA5801 #970 SCANS 940 TO 1010
08/20/87 5:21:00 CALI: VOA5801 #2
SAMPLE: GC/MS#1, @ 50 UG/L VOAHSL STD.
CONDS.: 624
RANGE: G 1,1130 LABEL: N 2, 3.0 QUAN: A 2, 2.0 J 0 BASE: U 20, 3



73 761

MASS SPECTRAL DATA

FOR

TENTATIVELY IDENTIFIED COMPOUNDS

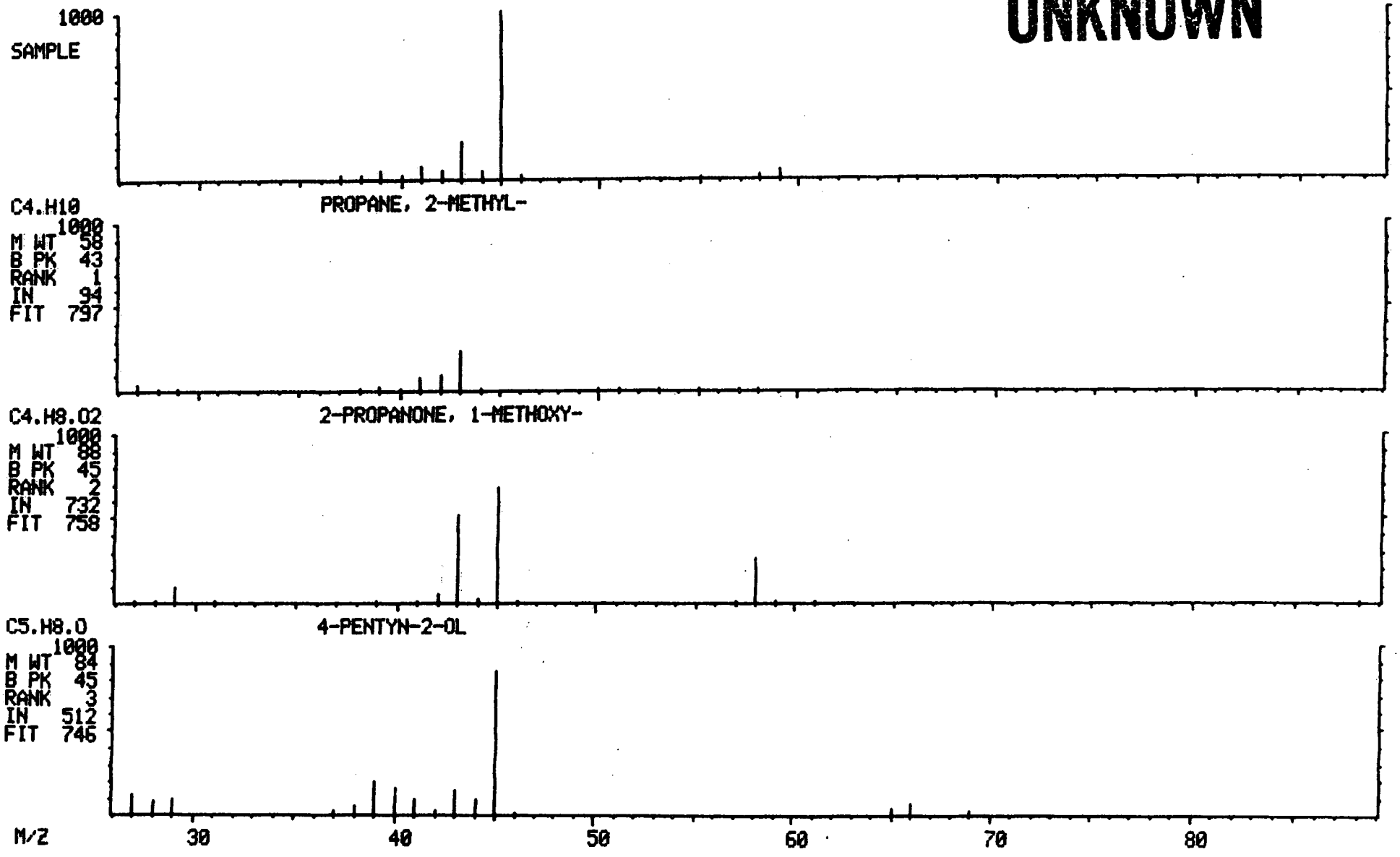
For each tentatively identified compound, a mass spectrum of the detected compound is provided with the mass spectrums of the three best matches from the NBS Library search. When the library search does not produce an adequate match, the detected compound is labelled as "unknown".

MID LIBRARY SEARCH
08/20/87 9:20:00 + 11:14
SAMPLE: GC/MS#1, 2033-6009 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5806 # 337
CALI: VOA5806 # 2

BASE M/Z: 45
RIC: 6871.

UNKNOWN

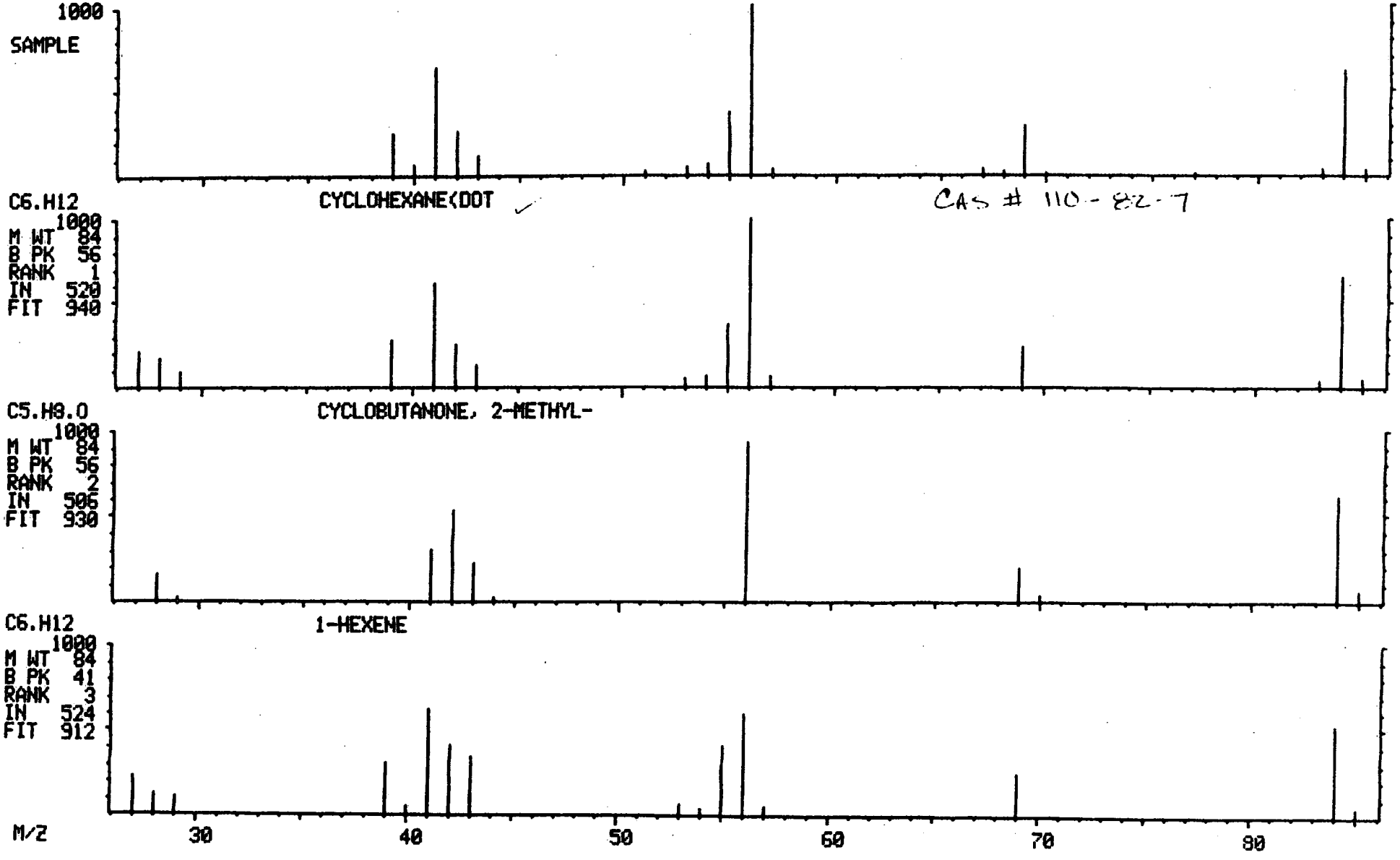


75 763

MID LIBRARY SEARCH
08/20/87 9:20:00 + 17:12
SAMPLE: GC/MS#1, 2033-6009 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5806 # 516
CALI: VOA5806 # 2

BASE M/Z: 56
RIC: 181247.

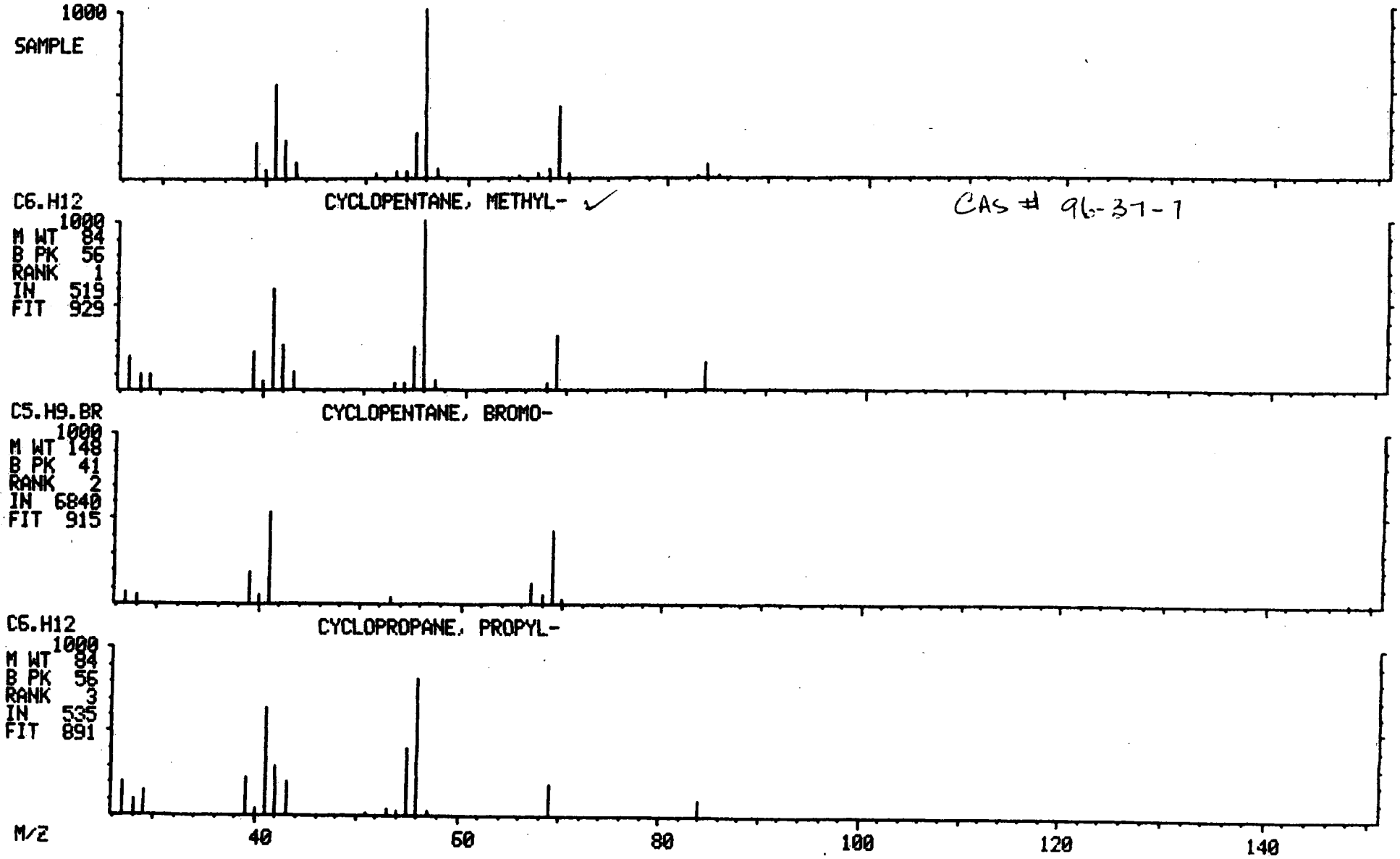


76 724

MID LIBRARY SEARCH
08/20/87 9:20:00 + 17:50
SAMPLE: GC/MS#1, 2033-6009 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5806 # 535
CALI: VOA5806 # 2

BASE M/Z: 56
RIC: 522239.

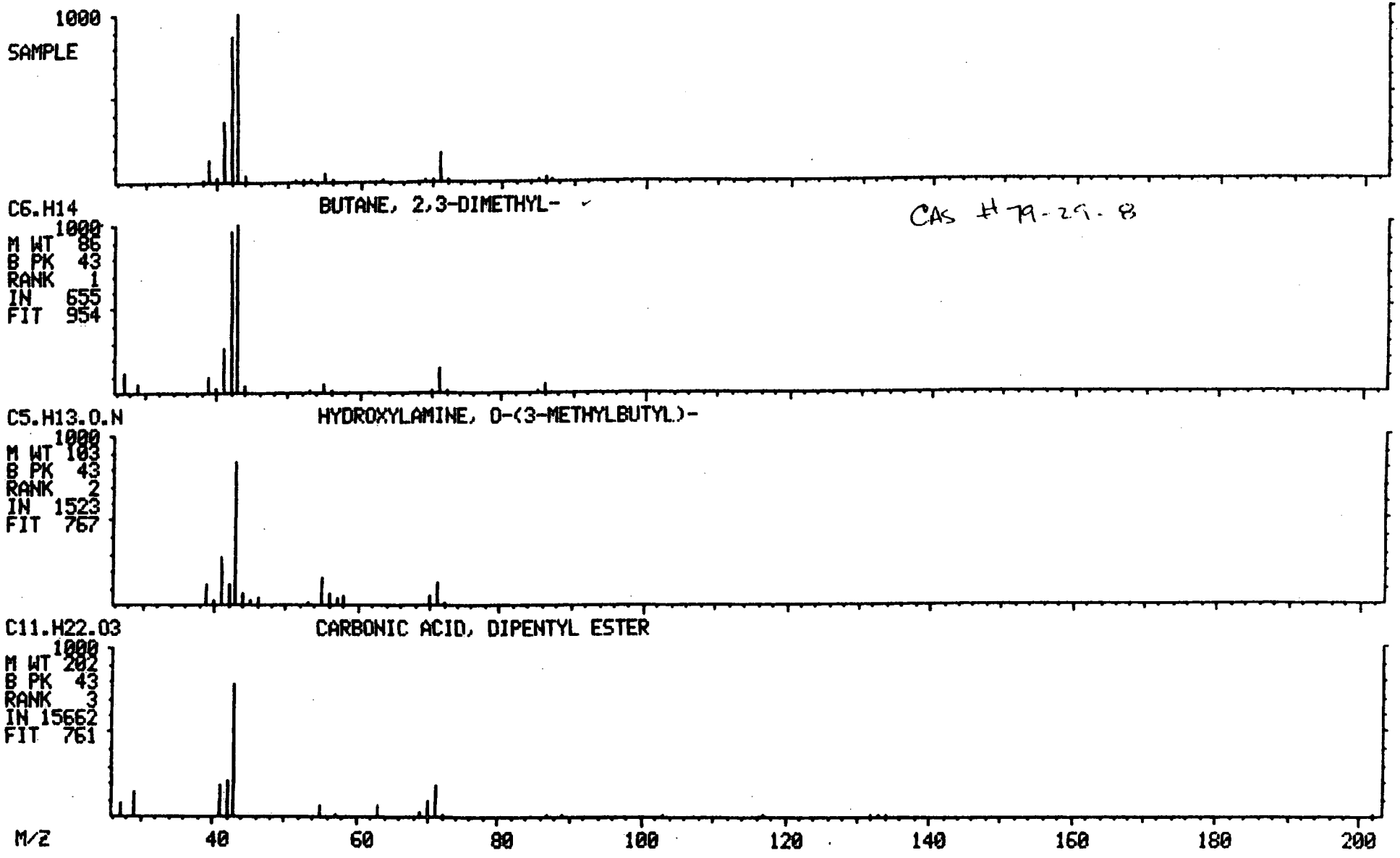


77 265

MID LIBRARY SEARCH
08/20/87 9:20:00 + 18:58
SAMPLE: GC/MS#1, 2033-6009 (1/10 DILUTION)
CONDS.: 624
ENHANCED (5 15B 2N 0T)

DATA: VOA5806 # 569
CALI: VOA5806 # 2

BASE M/Z: 43
RIC: 60415.



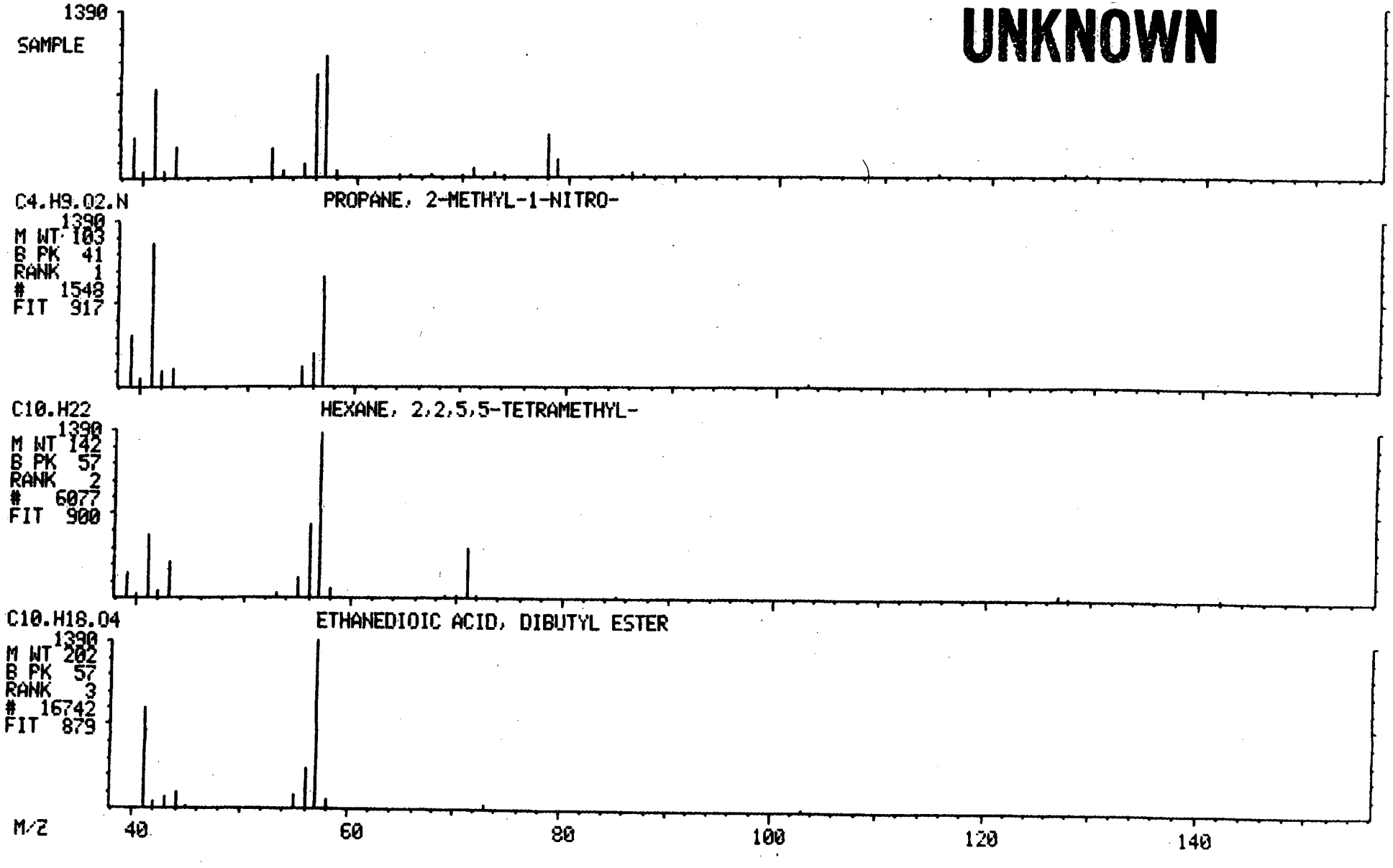
78 266

MID LIBRARY SEARCH
08/20/87 9:20:00 + 19:42
SAMPLE: GC/MS#1, 2033-6009 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5806 # 591
CALI: VOA5806 # 2

BASE M/Z: 57
RIC: 339967.

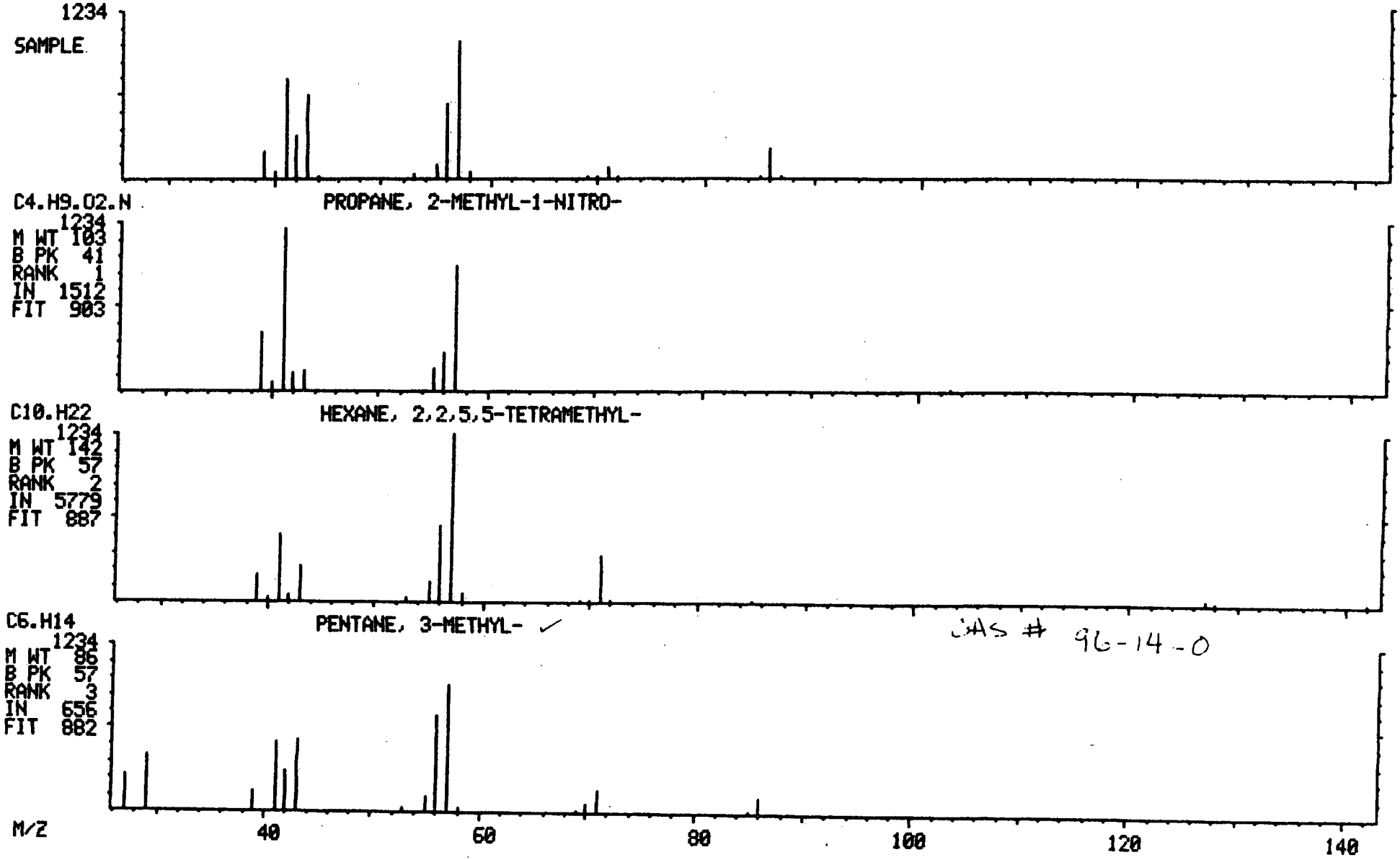
UNKNOWN



MID LIBRARY SEARCH
08/20/87 9:20:00 + 21:30
SAMPLE: GC/MS#1, 2033-6009 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5806 # 645
CALI: VOA5806 # 2

BASE M/Z: 57
RIC: 782335.



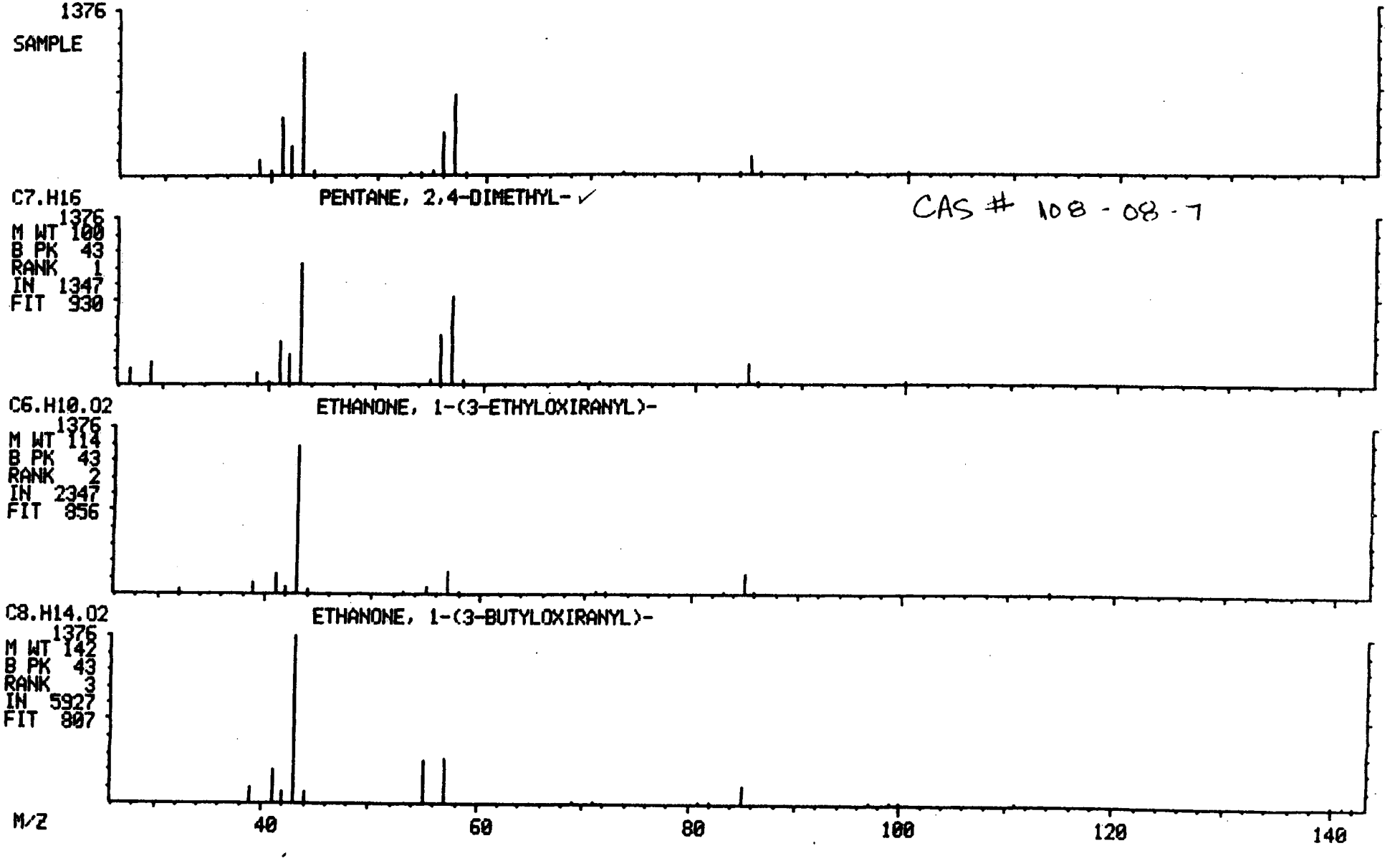
CAS # 96-14-0

80 7656

MID LIBRARY SEARCH
08/20/87 9:20:00 + 23:02
SAMPLE: GC/MS#1, 2033-6009 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5806 # 691
CALI: VOA5806 # 2

BASE M/Z: 43
RIC: 30303.



CAS # 108-08-7

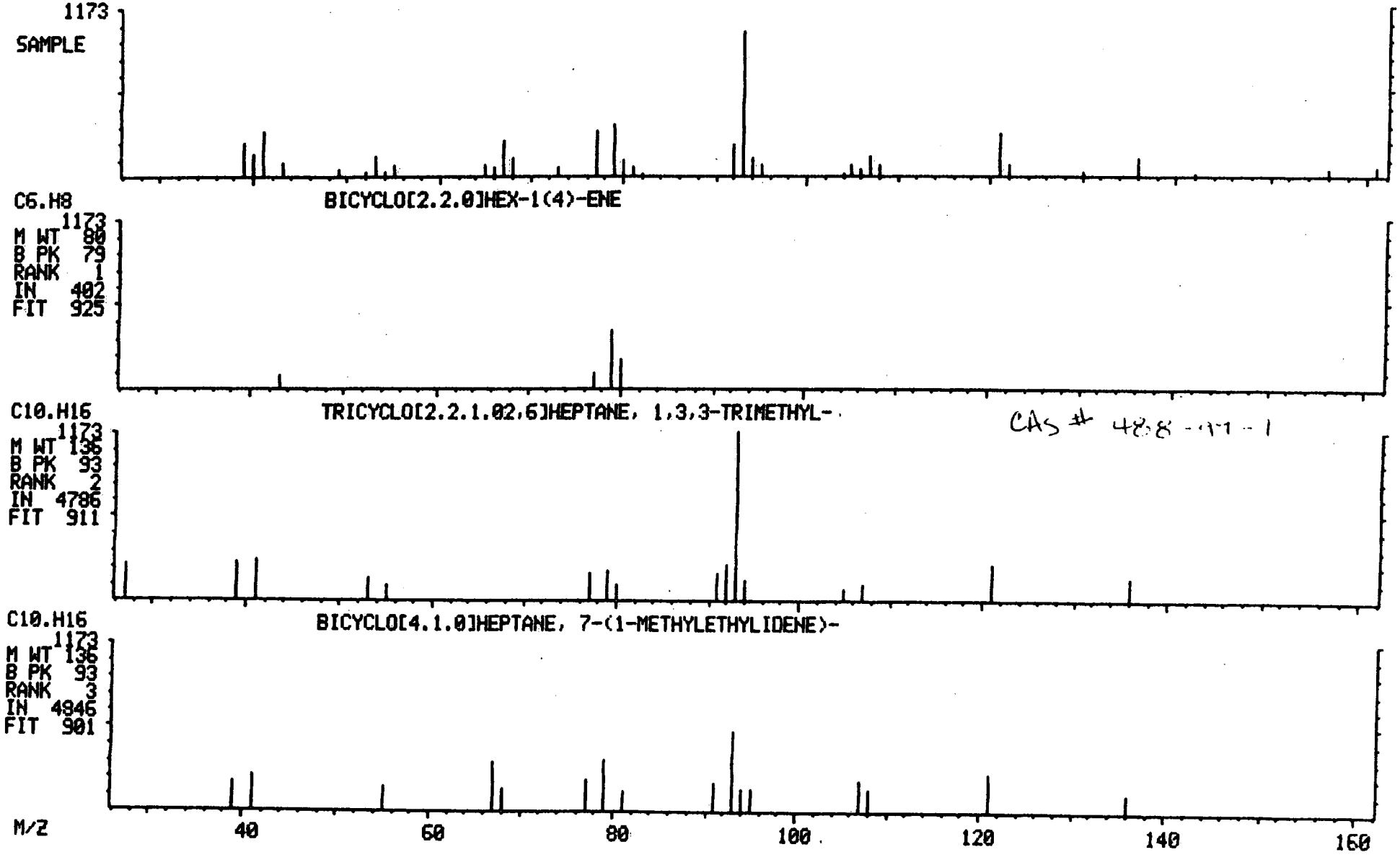
81 269

LEFT BLANK

MID LIBRARY SEARCH
08/20/87 9:20:00 + 29:14
SAMPLE: GC/MS#1, 2033-6009 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5806 # 877
CALI: VOA5806 # 2

BASE M/Z: 93
RIC: 6831.

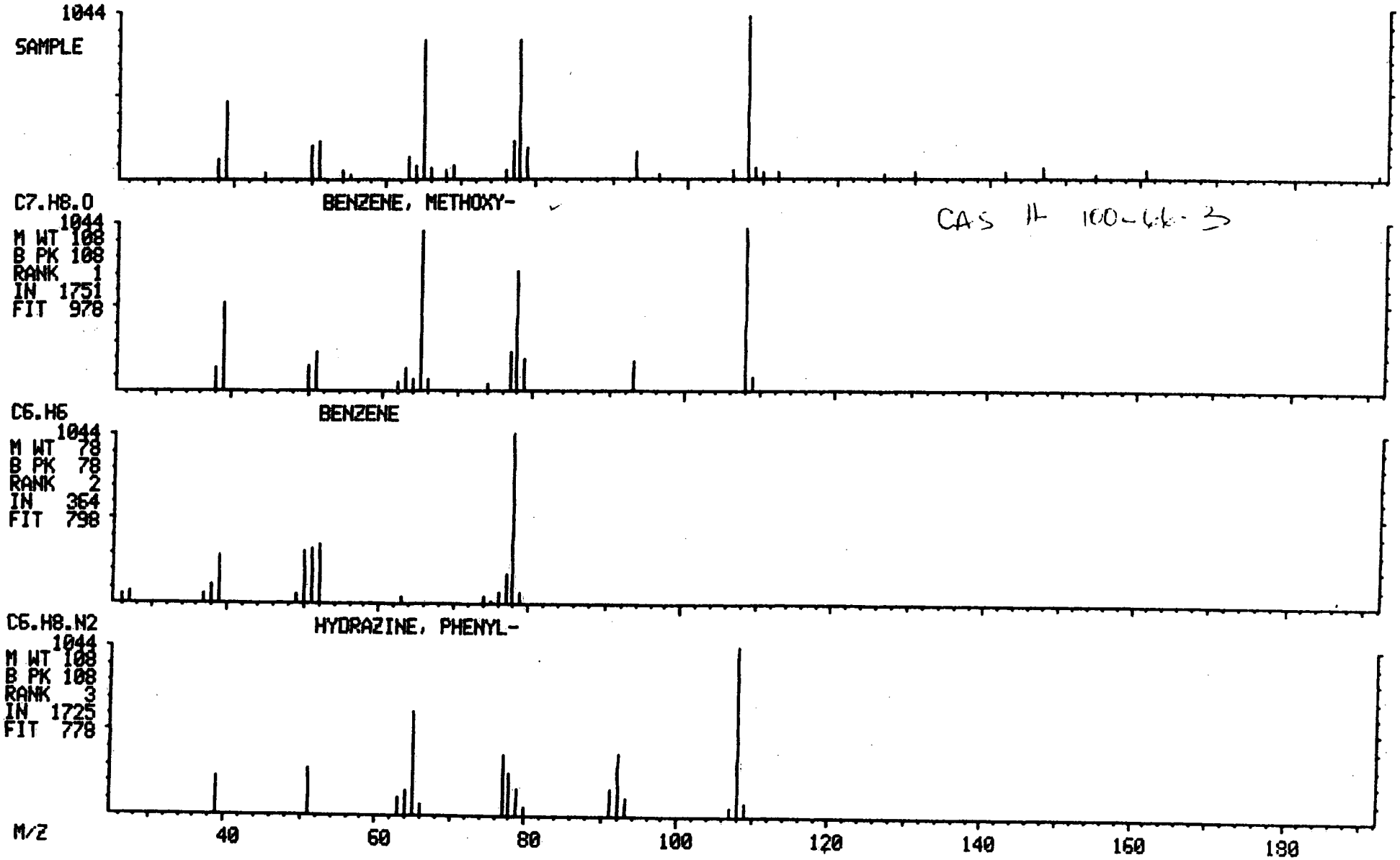


CAS # 488-99-1

MID LIBRARY SEARCH
08/20/87 9:20:00 + 31:04
SAMPLE: GC/MS#1, 2033-6009 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5806 # 932
CALI: VOA5806 # 2

BASE M/Z: 108
RIC: 6343.



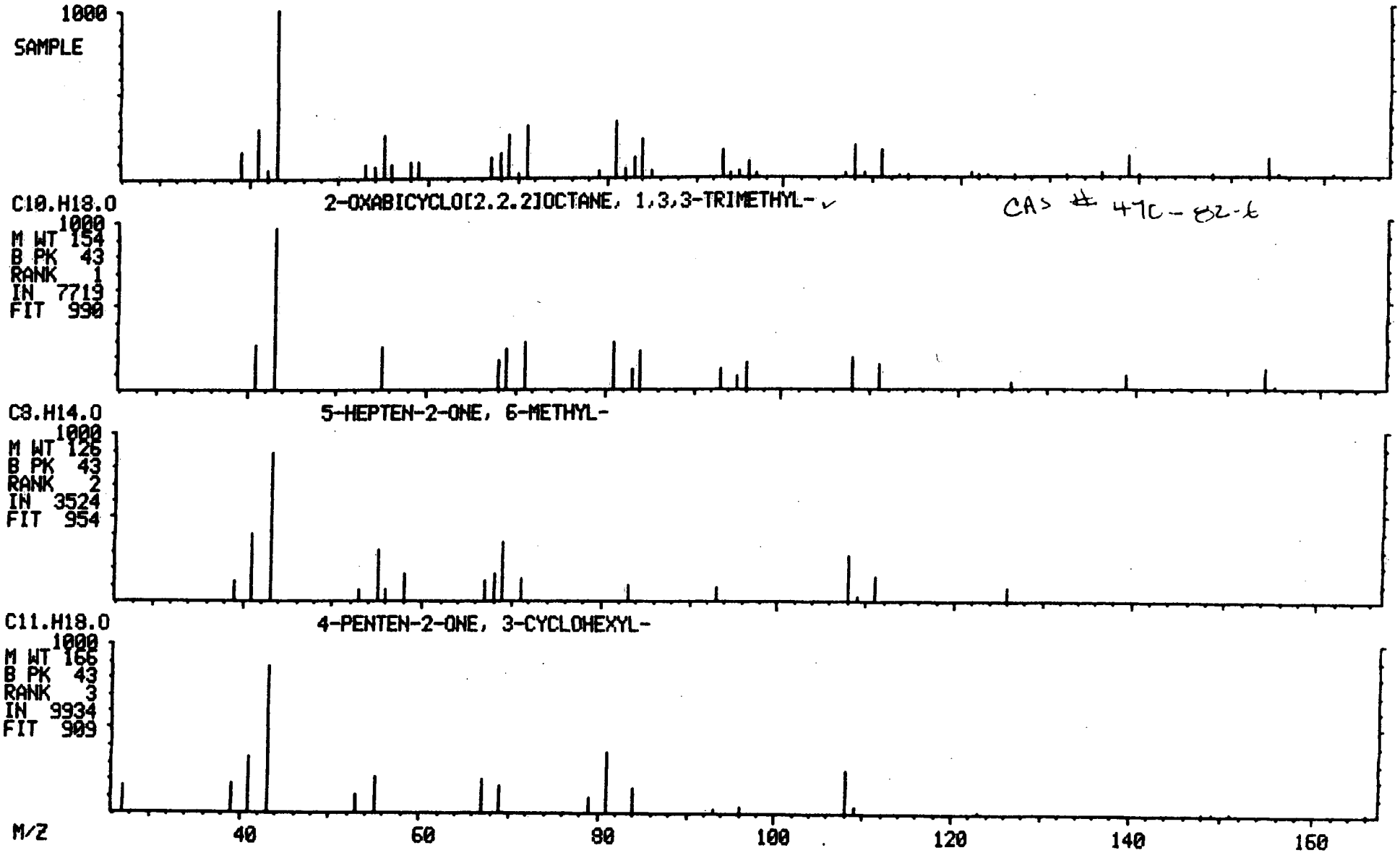
CAS # 100-66-3

83 742

MID LIBRARY SEARCH
08/20/87 9:20:00 + 31:50
SAMPLE: GC/MS#1, 2033-6009 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5806 # 955
CALI: VOA5806 # 2

BASE M/Z: 43
RIC: 33343.

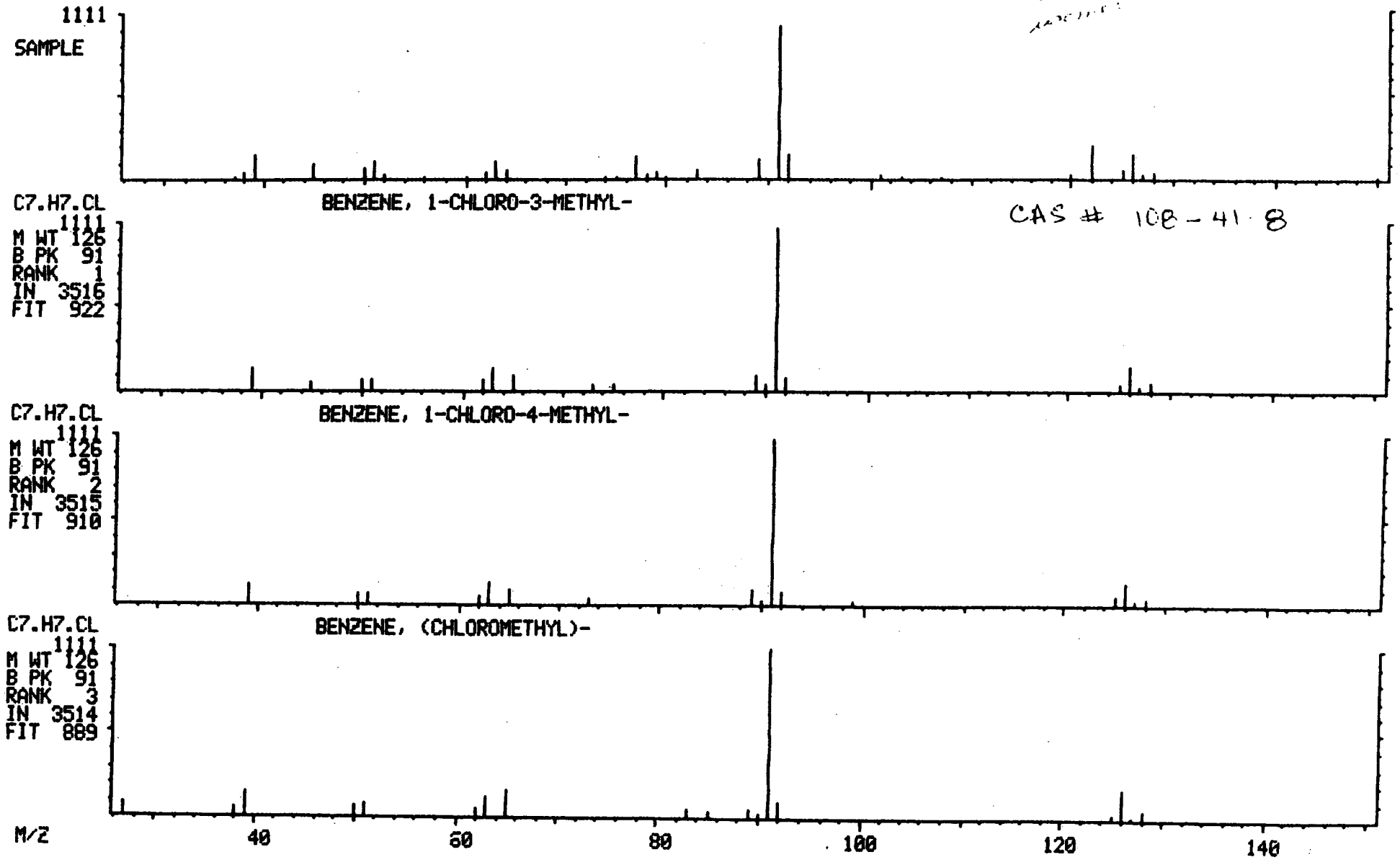


84 273

MID LIBRARY SEARCH
08/20/87 9:20:00 + 36:36
SAMPLE: GC/MS#1, 2033-6009 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5806 #1098
CALI: VOA5806 # 2

BASE M/Z: 91
RIC: 9583.



85 234

REAGENT BLANK SUMMARY

Case No. _____ Contractor E.T. Killam Assoc. Contract No. _____

FILE ID	DATE OF ANALYSIS	FRACTION	MATRIX	CONC. LEVEL	INST. ID	CAS NUMBER	COMPOUND (INCL. TIC OR UNKNOWN)	CONC.	UNITS	CRQL
VOA 5810	8/20/87	VOA	WATER	Low	5700	N/A	Methylene Chloride	4J	ug/L	5

Comments:

FORM IV

4/84

CHAIN OF CUSTODY RECORD

Log Book Pg. No. 10/11

Project Name/Number ORBIS P87-304 | Sample Date: 8-7-87

— See options below

ETK Lab # Sample #	Sub	Field Sample No. A	Field Sample No. B	Time	Sample Location	Sample Depth	Sample Type	No. of Contain-ers	Metals (Section / Option)	GC/MS Organics	Other Organics	Nutrients	S.D.W.A.	Solids	Bacty	TC/FC	Remarks
		P304	6007	11:20	OB-4 "TANK	6.5	SOIL	1		C	A						ALL SAMPLES
		P304	6008	11:35	OB-7 "TANK	6.5	SOIL	1		C	A						OBTAINED FROM
		P304	6009	11:50	OB-8 "TANK	6.5	SOIL	1		C	A						TEST PITS IN
		P304	6010	12:00	OB-5 "TANK	6.5	SOIL	1		C	A						U.G. STORAGE
																	TANK (REMOVED) AREA

Metals -M-	GC/MS Organics -G-	Organics (Other) -Q-	Nutrients - Minerals -N-	S.D.W.A. Conven. Analysis -S-	Solid Series / pH Conductivity
"A" Priority Metals As Sb Be Cd Cr Cu Pb Hg Ni Se Ag Tl Zn	**"A" P.P. + 40** VOAs + 15 A/BNs + 25 Pesticides & PCBs	**"A" PHC** Petroleum Hydrocarbons	**"A" Nutrients** Ammonia Nitrate Nitrite Total Phosphorus TKN	**Primary:** Fl⁻ Turb. NO_3-N **Secondary:** pH TDS Alk. Hardness L.I. SO_4 Cl⁻ F⁻ M.B.A.S.	TS TDS TSS TVDS pH TVSS Conductivity
"B" S.D.W.A. **Primary:** As Ba Cd Cr Pb Na Hg Se Ag **Secondary:** Cu Fe Mn Zn	**"B" P.P. — No Searches** VOAs A/BNs Pesticides & PCBs	**"B" O & G** Oil & Grease	**"B" Minerals** Alk. Cl⁻ pH F⁻ Hard. SO_4 L.I. Turb.		
"C" Misc. Metals Cr+6 Fe Mn Na Ba K Ca Mg	**"C" VOAs only** A. Searches B. No Searches C. Specific: _____	**"C" Total Phenols** Total Phenols	**"C" Oxygen Demand** B.O.D. C.O.D. A. Total B. Soluable		
"D" List (others) ___ ___ ___ ___ ___ ___ ___ ___ ___	**"D" A-280** A-280 Parameters S.D.W.A.	**"D" Cyanide** Cyanide	**"D" Misc. List** ___ ___ ___ ___ ___ ___ ___ ___ ___		

Bottles/Samplers Prepared by:	Date	Time
KAA	8/6/87	1000
Sampled by:	**Date**	**Time**
KE Kock	8/7/87	see above
Received by:	**Date**	**Time**
1		
2		
3		
4		
Lab. Received by:	**Date**	**Time**
[illegible]	8/7/87	1315

Elson T. Killam Associates, Inc.

27 Bleeker Street, P.O. Box 1008, Millburn, NJ 07041
Tel. 201/379-3400 Telex 642-057 Telecopier 201/376-1072

Environmental and Hydraulic Engineers

ANALYTICAL DATA REPORT

ORBIS PRODUCTS CORP.

NEWARK, NEW JERSEY

U.G. STORAGE TANK AREA

PROJECT NUMBER: P87-304

LABORATORY REFERENCE NUMBER: 2033-6010

DATE AND TIME COLLECTED: 8/7/87 12:00

Nancy J. Potak
LABORATORY DIRECTOR

SEPTEMBER 24, 1987

N.J. LABORATORY
CERTIFICATION NO.: 07059

88 277

Elson T. Killam Associates, Inc.

LABORATORY CHRONICLE

LABORATORY SAMPLE NO.: 2033-6010

RECEIVED: 8/7/87

ORGANICS:

EXTRACTION:

ANALYSES:

1. **VOLATILE COMPOUNDS:** 8/20/87
2. **ACID EXTRACTABLES:**
3. **BASE/NEUTRALS:**
4. **PESTICIDES/PCBs:**

METALS:

DIGESTION:

ANALYSES:

OTHER ANALYSES:	EXTRACTED:	ANALYSES:
PHC	8/13/87	8/14/87

QUALITY CONTROL SUPERVISOR REVIEW AND APPROVAL: [illegible]

89 278

METHODOLOGY SUMMARY

Purgeable Organics

USEPA METHOD 624

Acid Extractables

Base/Neutral Extractables

PESTICIDE EXTRACTABLES

Metals

Total Cyanide

Total Phenol

Other PHC - USEPA METHOD 418.1 (Modified for soil)

PETROLEUM HYDROCARBONS DATA

LABORATORY SAMPLE NO.: 2033-6010

	CONCENTRATION DRY WEIGHT (mg/Kg)	DETECTION LIMIT (mg/Kg)
PETROLEUM HYDROCARBONS	73	33

BDL = BELOW DETECTION LIMIT

PETROLEUM HYDROCARBONS
MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

LAB REFERENCE ID NO.: 2033-6010 QUALITY ASSURANCE SAMPLE: 2033-6006

LAB SAMPLE NO.	CONC. SPIKE ADDED	SAMPLE CONC.	CONC. MS	% REC	CONC. MSD	% REC	RPD
2033-6006.....	610	<30	612	100	632	104	4

Concentration - mg/kg
RPD - relative percent difference

DATA QUALIFIERS

The following four qualifiers are used in the analytical report package. They are equivalent to those issued by EPA - Contract Laboratory Program:

U - Indicates that the compound was analyzed for but not detected. All sample detection limits reported have been corrected for dilution and per cent moisture. No adjustements for blank contamination have been made.

J - Refers to an estimated value. This is used when the mass spectral data indicates the presence of a compound that meets the identification criteria, yet has a concentration less than the contract required detection limit. All estimated values reported have been adjusted for both dilution and per cent moisture, but no corrections have been made for possible blank contamination.

B - This flag is used to note that the compound was found to be present in the laboratory blank as well as in the sample. It indicates that the possibility of laboratory contamination exists.

The EPA has issued certain quidelines to aid in the evaluation of data when common laboratory artifacts occur. Blank contribution is considered to be negligable if it is ten times less than the concentration present in the sample. If the concentrations of the compounds found in both the sample and the blank are comparable (i.e. sample concentration is less than twice that of the blank), the occurance of the compound in the sample is considered to be suspect.

Up to 25 ppb of methylene chloride is permitted to be present in the blanks of volatile organic analyses.

C - Applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >10 ng/ul in the final extract are confirmed by GC/MS.

The next qualifier is also used in referencing the analytical results:

X - This flag indicates the presence of a compound which is often found as a common laboratory or field contaminant.

VOLATILE COMPOUNDS DATA

LABORATORY SAMPLE NO.: 2033-6010(1/10 DIL) **DATA FILE NO.:** VOA5804

% SOLIDS: 78.5

	CONCENTRATION (ug/Kg)		SCAN	DETECTION LIMIT (ug/Kg)
ACROLEIN		U		1300.
ACRYLONITRILE		U		1300.
BENZENE	6200		602	64.
BROMOFORM		U		64.
BROMOMETHANE		U		130.
CARBON TETRACHLORIDE		U		64.
CHLOROBENZENE		U		64.
DIBROMOCHLOROMETHANE		U		64.
CHLOROETHANE		U		130.
2-CHLORO ETHYL VINYL ETHER		U		130.
CHLOROFORM		U		64.
CHLOROMETHANE		U		64.
BROMODICHLOROMETHANE		U		64.
1,1-DICHLOROETHANE		U		64.
1,2-DICHLOROETHANE		U		64.
1,1-DICHLOROETHENE		U		64.
TRANS-1,2-DICHLOROETHENE		U		64.
1,2-DICHLOROPROPANE		U		64.
CIS-1,3-DICHLOROPROPENE		U		64.
TRANS-1,3-DICHLOROPROPENE		U		64.
ETHYLBENZENE		U		64.
METHYLENE CHLORIDE	44	JB	281	64.
1,1,2,2-TETRACHLOROETHANE		U		64.
TETRACHLOROETHENE		U		64.
TOLUENE	440		793	64.
1,1,1-TRICHLOROETHANE		U		64.
1,1,2-TRICHLOROETHANE		U		64.
TRICHLOROETHENE		U		64.
VINYL CHLORIDE		U		130.
ACETONE - HSL		U		130.
CARBON DISULFIDE - HSL		U		64.
2-HEXANONE - HSL		U		130.
2-BUTANONE	200		455	130.
4-METHYL-2-PENTANONE -HSL		U		130.
STYRENE - HSL		U		64.
TOTAL XYLENES - HSL		U		64.

Laboratory Name: E.T. Killam Assoc.

Case No _____

Sample Number
2033-6010

Organics Analysis Data Sheet
(Page 4)

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/kg)
1.	UNKNOWN	VOA	645	160
2. 470-82-6	2-OXABICYCLO[2.2.2]OCTANE,			
3.	1,3,3-TRIMETHYL	VOA	953	1500
4. 76-22-2	BICYCLO[2.2.1]HEPTAN-2-ONE,			
5.	1,7,7-TRIMETHYL	VOA	1030	220
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

METHOD PERFORMANCE DATA

SOILS SURROGATE PERCENT RECOVERY

LABORATORY SAMPLE NO.: 2033-6010

COMPOUND	RECOVERY	EPA CONTROL LIMITS	SCAN #
VOLATILE FRACTION			
TOLUENE - D8	100	81-117	788
BROMOFLUOROBENZENE	92	74-121	969
1,2-DICHLOROETHANE	100	70-121	457
SEMI-VOLATILE FRACTION			
NITROBENZENE-D5	-	23-120	-
2-FLUOROBIPHENYL	-	30-116	-
TERPHENYL-D14	-	18-137	-
PHENOL-D5	-	24-113	-
2-FLUOROPHENOL	-	26-121	-
2,4,6-TRIBROMOPHENOL	-	19-122	-
PESTICIDE			
DIBUTYL CHLORENDATE	-	20-150**	-

*VALUES ARE OUTSIDE QC LIMITS
**ADVISORY LIMITS ONLY

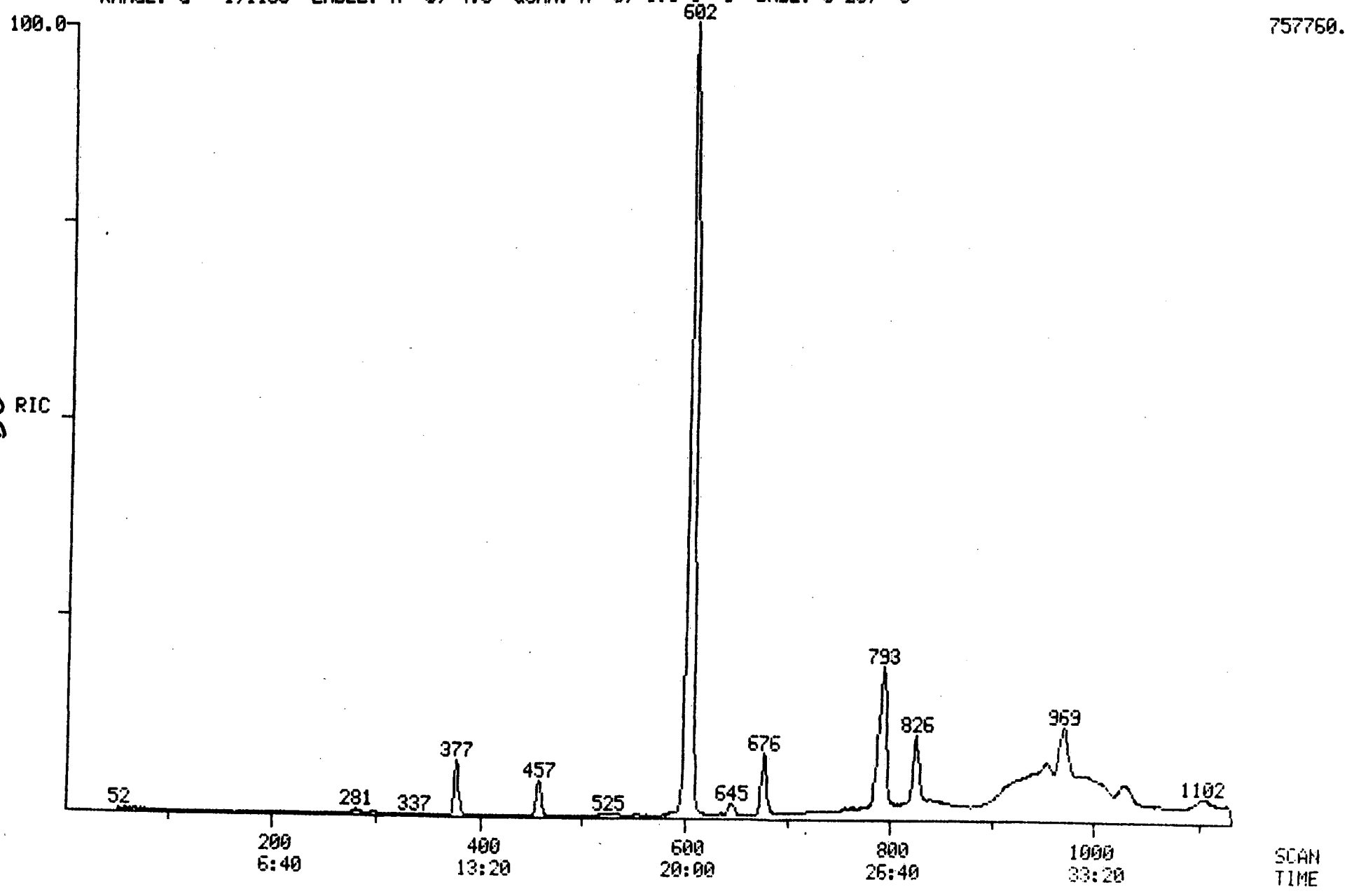
INTERNAL STANDARD SCAN LIST
(RETENTION TIME)

LABORATORY SAMPLE NO.: 2033-6010

INTERNAL STANDARD	SCAN #
VOLATILE FRACTION	
BROMOCHLOROMETHANE	377
1,4-DIFLUOROBENZENE	676
CHLOROBENZENE-D5	826

SEMI-VOLATILE FRACTION	SCAN #
1,4-DICHLOROBENZENE-D4	-
NAPTHALENE-D8	-
ACENAPTHENE-D10	-
PHENANTHRENE-D10	-
CHRYSENE-D12	-
PERYLENE-D12	-

MIDRIC DATA: VOA5804 #1 SCANS 1 TO 1130
08/20/87 7:44:00 CALI: VOA5804 #2
SAMPLE: GC/MS#1, 2033-6010 (1/10 DILUTION)
CONDS.: 624
RANGE: G 1,1130 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3



98 287

SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. _____ Contractor E.T. Killam Assoc. Contract No. _____

Low Level X Medium Level _____

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/Kg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS * RPD	QC LIMITS * RECOVERY
VOA SMO SAMPLE NO. 2033-6004	1,1-Dichloroethene	50	0	38	76	47	94	10	22	59-172
	Trichloroethene	50	0	40	80	46	92	7	24	62-137
	Chlorobenzene	50	0	46	92	53	106	7	21	60-133
	Toluene	50	7	43	86	54	108	11	21	59-139
	Benzene	50	3	47	94	53	106	6	21	66-142
B/N SMO SAMPLE NO.	1,2,4-Trichlorobenzene								23	38-107
	Acenaphthene								19	31-137
	2,4 Dinitrotoluene								47	28-89
	Di-n-Butylphthalate								47	29-135
	Pyrene								36	35-142
	N-Nitrosodi-n-Propylamine								38	41-126
	1,4-Dichlorobenzene								27	28-104
ACID SMO SAMPLE NO.	Pentachlorophenol								47	17-109
	Phenol								35	26-90
	2-Chlorophenol								50	25-102
	4-Chloro-3-Methylphenol								33	26-103
	4-Nitrophenol								50	11-114
PEST SMO SAMPLE NO.	Lindane								50	46-127
	Heptachlor								31	35-130
	Aldrin								43	34-132
	Dieldrin								38	31-134
	Endrin								45	42-139
	4,4'-DDT								50	23-134

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs 0 out of 5 ; outside QC limits
B/N _____ out of _____ ; outside QC limits
ACID _____ out of _____ ; outside QC limits
PEST _____ out of _____ ; outside QC limits

RECOVERY: VOAs 0 out of 10 : outside QC limits
B/N _____ out of _____ : outside QC limits
ACID _____ out of _____ : outside QC limits
PEST _____ out of _____ : outside QC limits

Comments: _____

GC/MS TUNING AND MASS CALIBRATION

Bromofluorobenzene (BFB)

Case No. _____ Contractor E.T. Killam Assoc. Contract No. _____

Instrument ID 5100 Date 8/20/87 Time 5:21 + 32:20

Lab ID VOA 5801 Data Release Authorized By: JEF

m/e	ION ABUNDANCE CRITERIA	%RELATIVE ABUNDANCE
50	15.0 - 40.0% of the base peak	18.11
75	30.0 - 60.0% of the base peak	40.94
95	Base peak, 100% relative abundance	100.00
96	5.0 - 9.0% of the base peak	5.76
173	Less than 1.0% of the base peak	<1
174	Greater than 50.0% of the base peak	72.58
175	5.0 - 9.0% of mass 174	5.20 (7.16)[1]
176	Greater than 95.0%, but less than 101.0% of mass 174	70.66 (97.4)[1]
177	5.0 - 9.0% of mass 176	4.48 (6.34)[2]

[1] Value in parenthesis is % mass 174.
[2] Value in parenthesis is % mass 176.

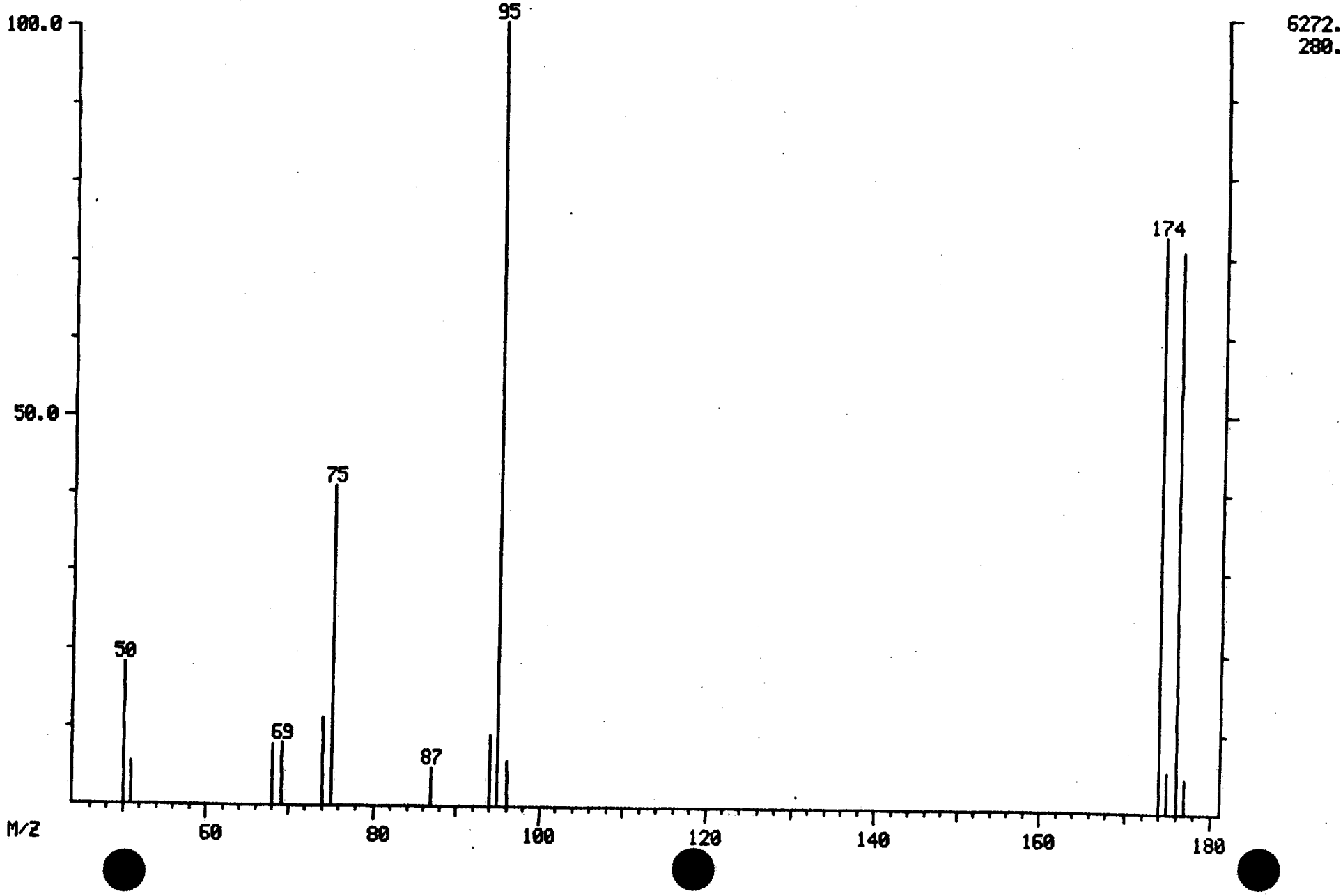
THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

SAMPLE ID	LAB ID	DATE OF ANALYSIS	TIME OF ANALYSIS
50 ug/L VOA HSL STD	VOA 5801	8/20/87	5:21
2033-6007 (1/10 D.L.)	VOA 5802	"	6:09
BLANK	VOA 5803	"	6:56
2033-6010 (1/10 D.L.)	VOA 5804	"	7:44
BLANK	VOA 5805	"	8:32
2033-6009 (1/10 D.L.)	VOA 5806	"	9:20
BLANK	VOA 5807	"	10:07
2033-6008 (1/10 D.L.)	VOA 5808	"	10:55
N/A	VOA 5809	"	N/A
BLANK	VOA 5810	"	12:30

MID MASS SPECTRUM
08/20/87 5:21:00 + 32:20
SAMPLE: GC/MS#1, @ 50 UG/L VOAHSL STD.
CONDS.: 624
GC TEMP: 239 DEG. C
ENHANCED (S 15B 2N 0T)

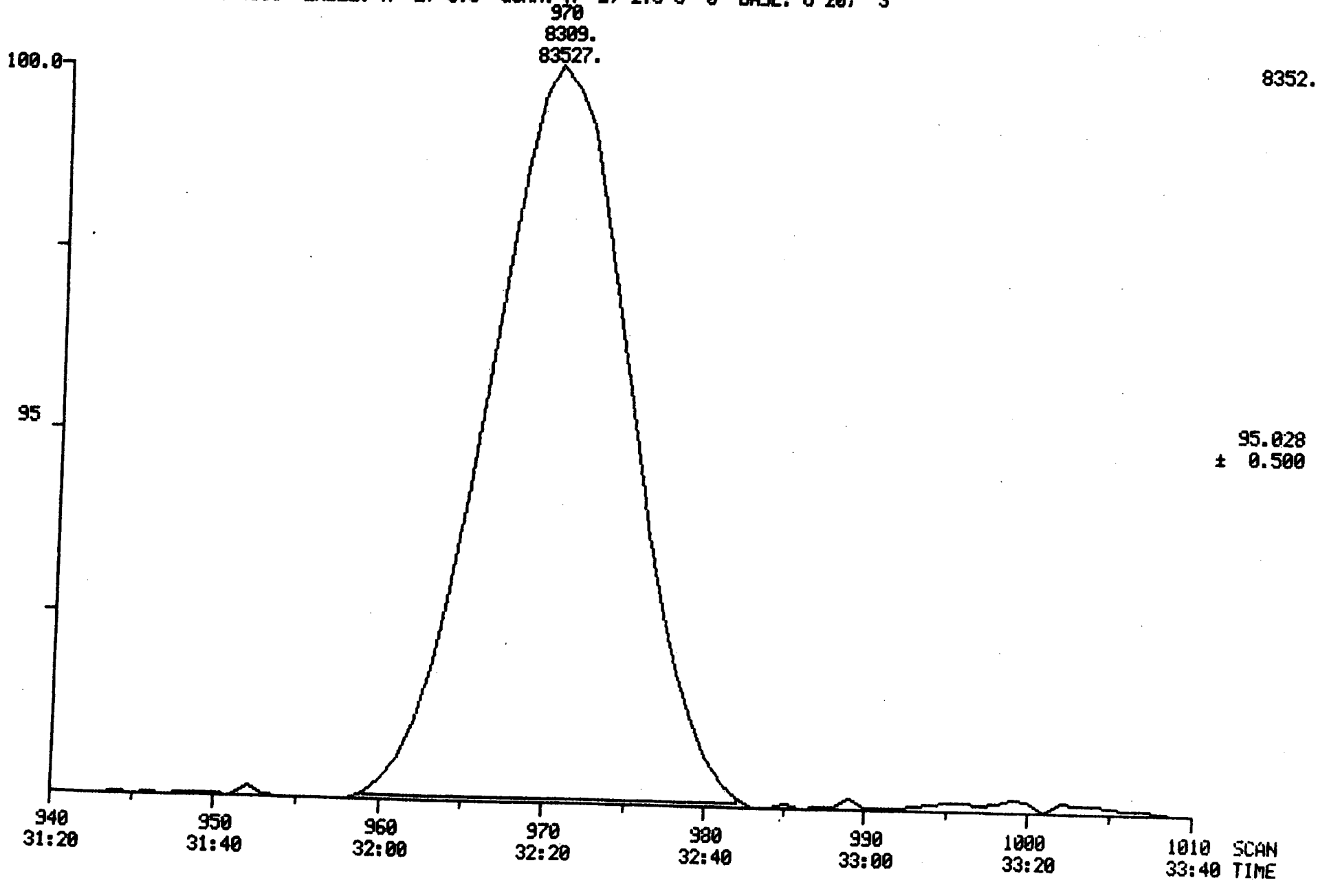
DATA: VOA5801 #970
CALI: VOA5801 #2

BASE M/Z: 95
RIC: 27424.



101 290

MIDMASS CHROMATOGRAM DATA: VOA5801 #970 SCANS 940 TO 1010
08/20/87 5:21:00 CALI: VOA5801 #2
SAMPLE: GC/MS#1, @ 50 UG/L VOAHSL STD.
CONDS.: 624
RANGE: G 1,1130 LABEL: N 2, 3.0 QUAN: A 2, 2.0 J 0 BASE: U 20, 3



108-741

MASS SPECTRAL DATA

FOR

TENTATIVELY IDENTIFIED COMPOUNDS

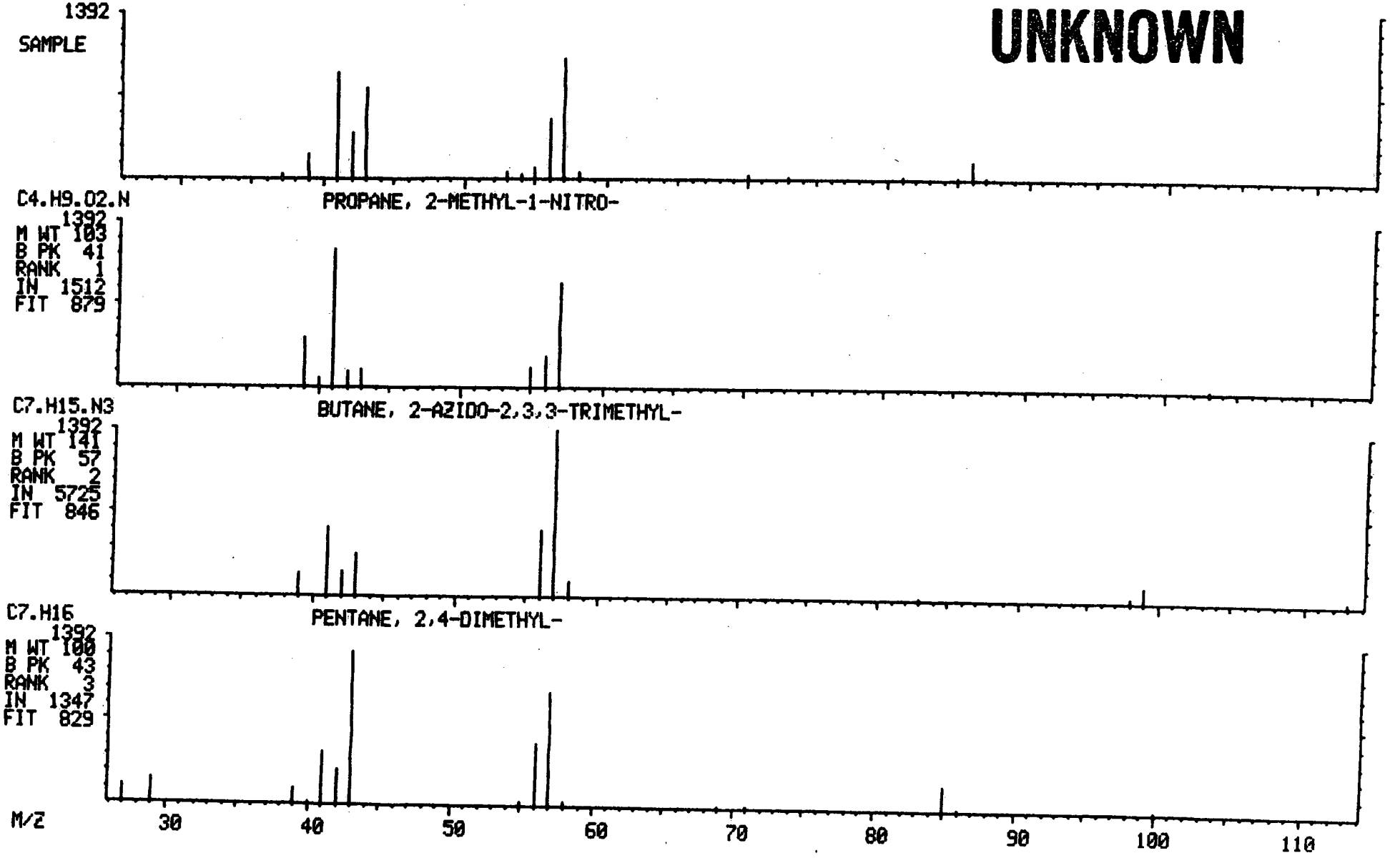
For each tentatively identified compound, a mass spectrum of the detected compound is provided with the mass spectrums of the three best matches from the NBS Library search. When the library search does not produce an adequate match, the detected compound is labelled as "unknown".

MID LIBRARY SEARCH
08/20/87 7:44:00 + 21:30
SAMPLE: GC/MS#1, 2033-6010 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5804 # 645
CALI: VOA5804 # 2

BASE M/Z: 57
RIC: 10431.

UNKNOWN

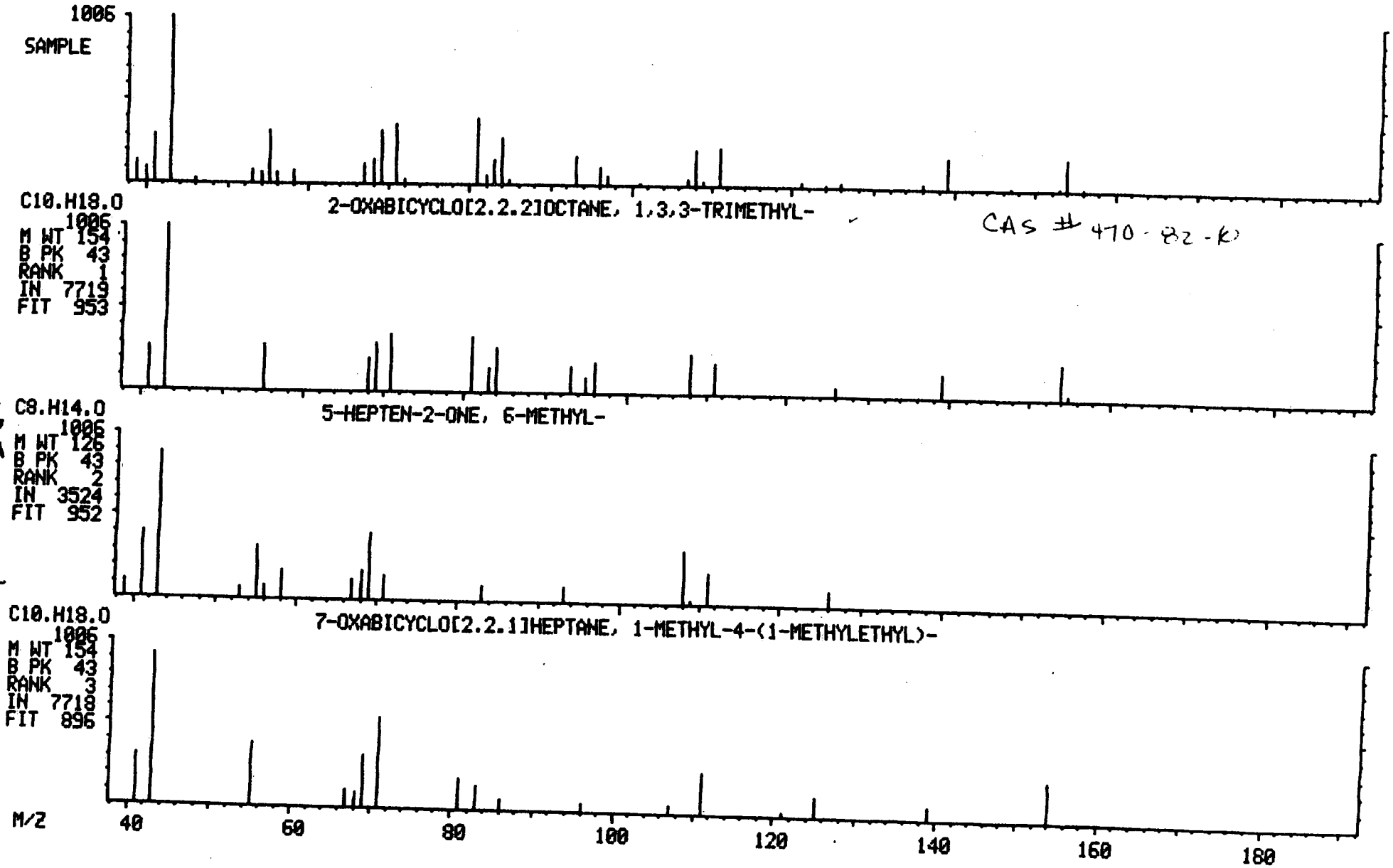


104 253

MID LIBRARY SEARCH
08/20/87 7:44:00 + 31:46
SAMPLE: GC/MS#1, 2033-6010 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5804 # 953
CALI: VOA5804 # 2

BASE M/Z: 43
RIC: 11503.



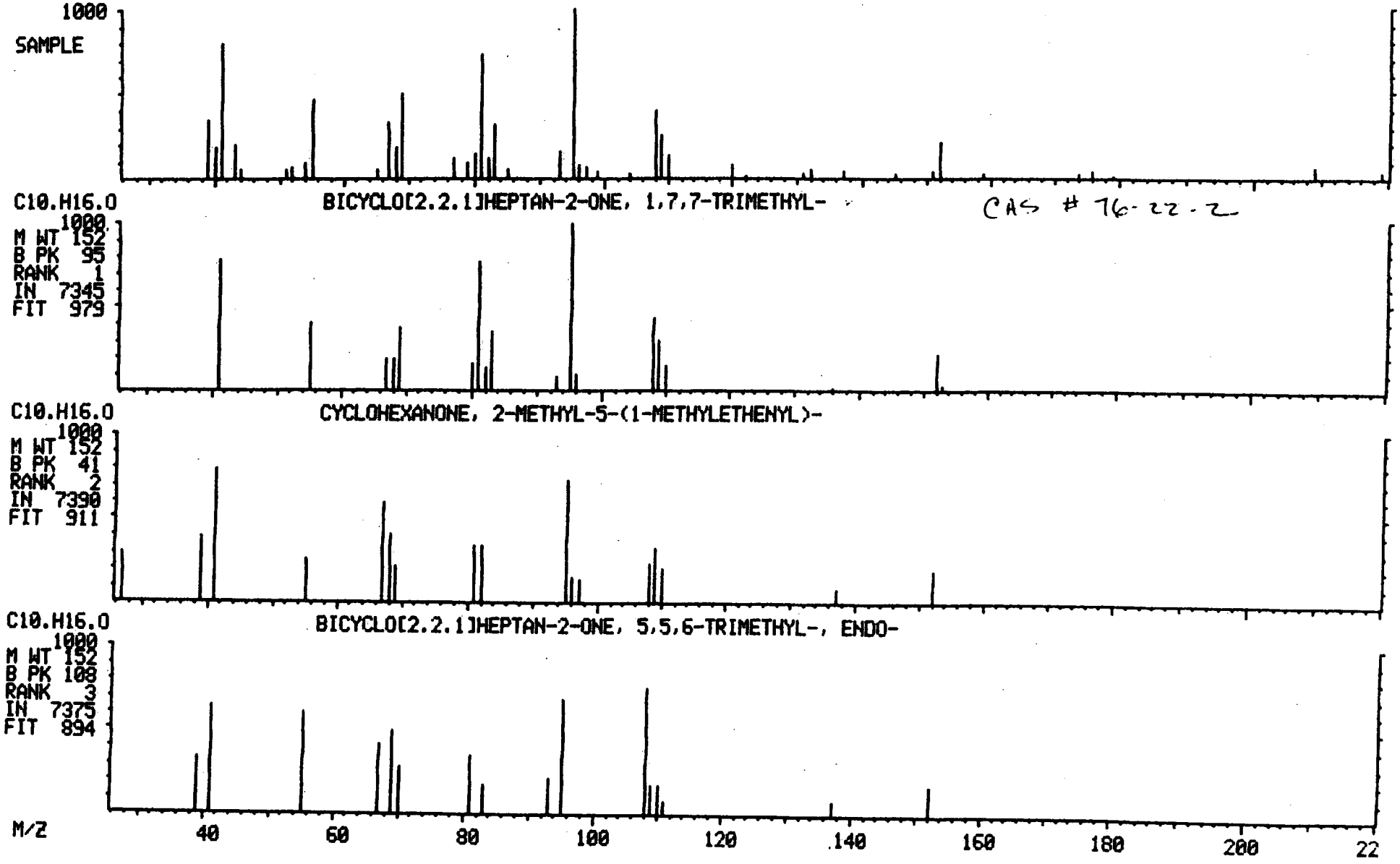
CAS # 470-82-K

105 294

MID LIBRARY SEARCH
08/20/87 7:44:00 + 34:20
SAMPLE: GC/MS#1, 2033-6010 (1/10 DILUTION)
CONDS.: 624
ENHANCED (S 15B 2N 0T)

DATA: VOA5804 #1030
CALI: VOA5804 # 2

BASE M/Z: 95
RIC: 8943.



116 295

REAGENT BLANK SUMMARY

Case No. _____ Contractor E.T. Killam Assoc. Contract No. _____

FILE ID	DATE OF ANALYSIS	FRACTION	MATRIX	CONC. LEVEL	INST. ID	CAS NUMBER	COMPOUND (HSL, TIC OR UNKNOWN)	CONC.	UNITS	CRQL
VOA 5810	8/20/87	VOA	WATER	Low	5700	N/A	Methylene Chloride	4 J	ug/L	5

Comments:

FORM IV

CHAIN OF CUSTODY RECORD

Log Book Pg. No. 10/11

Project Name/Number ORBIS P87-304 | Sample Date: 8-7-87

— See options below

ETK Lab # Sample #	Sub	Field Sample No. A	B	Time	Sample Location	Sample Depth	Sample Type	No. of Containers	Section / Option: Metals (A B C D)	GC/MS Organics (A B C D)	Other Organics (A B C D)	Nutrients (A B C D)	S.D.W.A.	Solids	Bacty	TC/FC	Remarks
		P304	6007	11:20	OB-4 "TANK	6.5	SOIL	1		C	A						ALL SAMPLES
		P304	6008	11:35	OB-7 "TANK	6.5	SOIL	1		C	A						OBTAINED FROM
		P304	6009	11:50	OB-8 "TANK	6.5	SOIL	1		C	A						TEST PITS IN
		P304	6010	12:00	OB-5 "TANK	6.5	SOIL	1		C	A						U.G. STORAGE
																	TANK (REMOVED) AREA

Metals -M-	GC/MS Organics -G-	Organics (Other) -Q-	Nutrients - Minerals -N-	S.D.W.A. Conven. Analysis -S-	Solid Series / pH Conductivity
"A" Priority Metals As Sb Be Cd Cr Cu Pb Hg Ni Se Ag Tl Zn	"A" P.P. + 40 VOAs + 15 A/BNs + 25 Pesticides & PCBs	"A" PHC Petroleum Hydrocarbons	"A" Nutrients Ammonia Nitrate Nitrite Total Phosphorus TKN	Primary: Fl^- Turb. NO_3-N Secondary: pH TDS Alk. Hardness L.I. SO_4 Cl^- F^- M.B.A.S.	TS TDS TSS TVDS pH TVSS Conductivity
"B" S.D.W.A. Primary: As Ba Cd Cr Pb Na Hg Se Ag Secondary: Cu Fe Mn Zn	"B" P.P. — No Searches VOAs A/BNs Pesticides & PCBs	"B" O & G Oil & Grease	"B" Minerals Alk. Cl^- pH F^- Hard. SO_4 L.I. Turb.		
"C" Misc. Metals Cr+6 Fe Mn Na Ba K Ca Mg	"C" VOAs only A. Searches B. No Searches C. Specific: _____	"C" Total Phenols Total Phenols	"C" Oxygen Demand B.O.D. C.O.D. A. Total B. Soluable		
"D" List (others)	"D" A-280 A-280 Parameters S.D.W.A.	"D" Cyanide Cyanide	"D" Misc. List		

Bottles/Samplers Prepared by:	Date	Time
KAA	8/6/87	1000
Sampled by:	**Date**	**Time**
KE Kaul	8/7/87	see Above
Received by:	**Date**	**Time**
1		
2		
3		
4		
Lab. Received by:	**Date**	**Time**
J Sanderson	8/7/87	1315

108 297

2033

2 of 3

Elson T. Killam Associates, Inc.

27 Bleeker Street, P.O. Box 1008, Millburn, NJ 07041
Tel. 201/379-3400 Telex 642-057 Telecopier 201/376-1072

Environmental and Hydraulic Engineers

ANALYTICAL DATA REPORT

ORBIS PRODUCTS CORP.

NEWARK, NEW JERSEY

TRIP BLANK

PROJECT NUMBER: P87-304

LABORATORY REFERENCE NUMBER: 2033-1001TB

DATE AND TIME COLLECTED: 8/7/87 8:30

Nancy J. Potak
LABORATORY DIRECTOR

SEPTEMBER 24, 1987

N.J. LABORATORY
CERTIFICATION NO.: 07059

109 296

Elson T. Killam Associates, Inc.

LABORATORY CHRONICLE

LABORATORY SAMPLE NO.: 2033-1001TB

RECEIVED: 8/7/87

ORGANICS:

EXTRACTION:

ANALYSIS:

1. VOLATILE COMPOUNDS: 8/19/87
2. ACID EXTRACTABLES:
3. BASE/NEUTRALS:
4. PESTICIDES/PCBs:

QUALITY CONTROL SUPERVISOR
REVIEW AND APPROVAL:

METALS:

DIGESTION:

ANALYSIS:

OTHER ANALYSES:

QUALITY CONTROL SUPERVISOR
REVIEW AND APPROVAL:

METHODOLOGY SUMMARY

Purgeable Organics

USEPA METHOD 624

Acid Extractables

Base/Neutral Extractables

PESTICIDE EXTRACTABLES

Metals

Total Cyanide

Total Phenol

Other

DATA QUALIFIERS

The following four qualifiers are used in the analytical report package. They are equivalent to those issued by EPA - Contract Laboratory Program:

U - Indicates that the compound was analyzed for but not detected. All sample detection limits reported have been corrected for dilution and per cent moisture. No adjustements for blank contamination have been made.

J - Refers to an estimated value. This is used when the mass spectral data indicates the presence of a compound that meets the identification criteria, yet has a concentration less than the contract required detection limit. All estimated values reported have been adjusted for both dilution and per cent moisture, but no corrections have been made for possible blank contamination.

B - This flag is used to note that the compound was found to be present in the laboratory blank as well as in the sample. It indicates that the possibility of laboratory contamination exists.

The EPA has issued certain guidelines to aid in the evaluation of data when common laboratory artifacts occur. Blank contribution is considered to be negligable if it is ten times less than the concentration present in the sample. If the concentrations of the compounds found in both the sample and the blank are comparable (i.e. sample concentration is less than twice that of the blank), the occurance of the compound in the sample is considered to be suspect.

Up to 25 ppb of methylene chloride is permitted to be present in the blanks of volatile organic analyses.

C - Applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >10 ng/ul in the final extract are confirmed by GC/MS.

The next qualifier is also used in referencing the analytical results:

X - This flag indicates the presence of a compound which is often found as a common laboratory or field contaminant.

VOLATILE COMPOUNDS DATA

LABORATORY SAMPLE NO.: 2033-1001TB

DATA FILE NO.: VOA5785

	CONCENTRATION (ug/Kg)	SCAN	DETECTION LIMIT (ug/Kg)
ACROLEIN	U		100.
ACRYLONITRILE	U		100.
BENZENE	U		5.
BROMOFORM	U		5.
BROMOMETHANE	U		10.
CARBON TETRACHLORIDE	U		5.
CHLOROBENZENE	U		5.
DIBROMOCHLOROMETHANE	U		5.
CHLOROETHANE	U		10.
2-CHLORO ETHYL VINYL ETHER	U		10.
CHLOROFORM	U		5.
CHLOROMETHANE	U		10.
BROMODICHLOROMETHANE	U		5.
1,1-DICHLOROETHANE	U		5.
1,2-DICHLOROETHANE	U		5.
1,1-DICHLOROETHENE	U		5.
TRANS-1,2-DICHLOROETHENE	U		5.
1,2-DICHLOROPROPANE	U		5.
CIS-1,3-DICHLOROPROPENE	U		5.
TRANS-1,3-DICHLOROPROPENE	U		5.
ETHYLBENZENE	U		5.
METHYLENE CHLORIDE	4 JB	296	5.
1,1,2,2-TETRACHLOROETHANE	U		5.
TETRACHLOROETHENE	U		5.
TOLUENE	U		5.
1,1,1-TRICHLOROETHANE	U		5.
1,1,2-TRICHLOROETHANE	U		5.
TRICHLOROETHENE	U		5.
VINYL CHLORIDE	U		10.
ACETONE - HSL	U		10.
CARBON DISULFIDE - HSL	U		5.
2-HEXANONE - HSL	U		10.
2-BUTANONE	U		10.
4-METHYL-2-PENTANONE -HSL	U		10.
STYRENE - HSL	U		5.
TOTAL XYLENES - HSL	U		5.

Laboratory Name: E.T. Killam Assoc.

Case No

Sample Number
2033-100TB

Organics Analysis Data Sheet
(Page 4)

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/kg)
1.	NO COMPOUNDS FOUND	VOA		
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
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25.				
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27.				
28.				
29.				
30.				

METHOD PERFORMANCE DATA

WATER SURROGATE PERCENT RECOVERY

FIELD SAMPLE ID NO.: 2033-1001TB

COMPOUND	RECOVERY	EPA CONTROL LIMITS	SCAN #
VOLATILE FRACTION			
TOLUENE - D8	96	88-110	838
BROMOFLUOROBENZENE	106	86-115	1028
1,2-DICHLOROETHANE	86	76-114	485
SEMI-VOLATILE FRACTION			
NITROBENZENE-D5	-	35-114	-
2-FLUOROBIPHENYL	-	43-110	-
TERPHENYL-D14	-	33-141	-
PHENOL-D5	-	10-94	-
2-FLUOROPHENOL	-	21-100	-
2,4,6-TRIBROMOPHENOL	-	10-123	-
PESTICIDE			
DIBUTYL CHLORENDATE	-	24-156**	-

*VALUES ARE OUTSIDE QC LIMITS
**ADVISORY LIMITS ONLY

INTERNAL STANDARD SCAN LIST
(RETENTION TIME)

LABORATORY SAMPLE NO.: 2033-1001TB

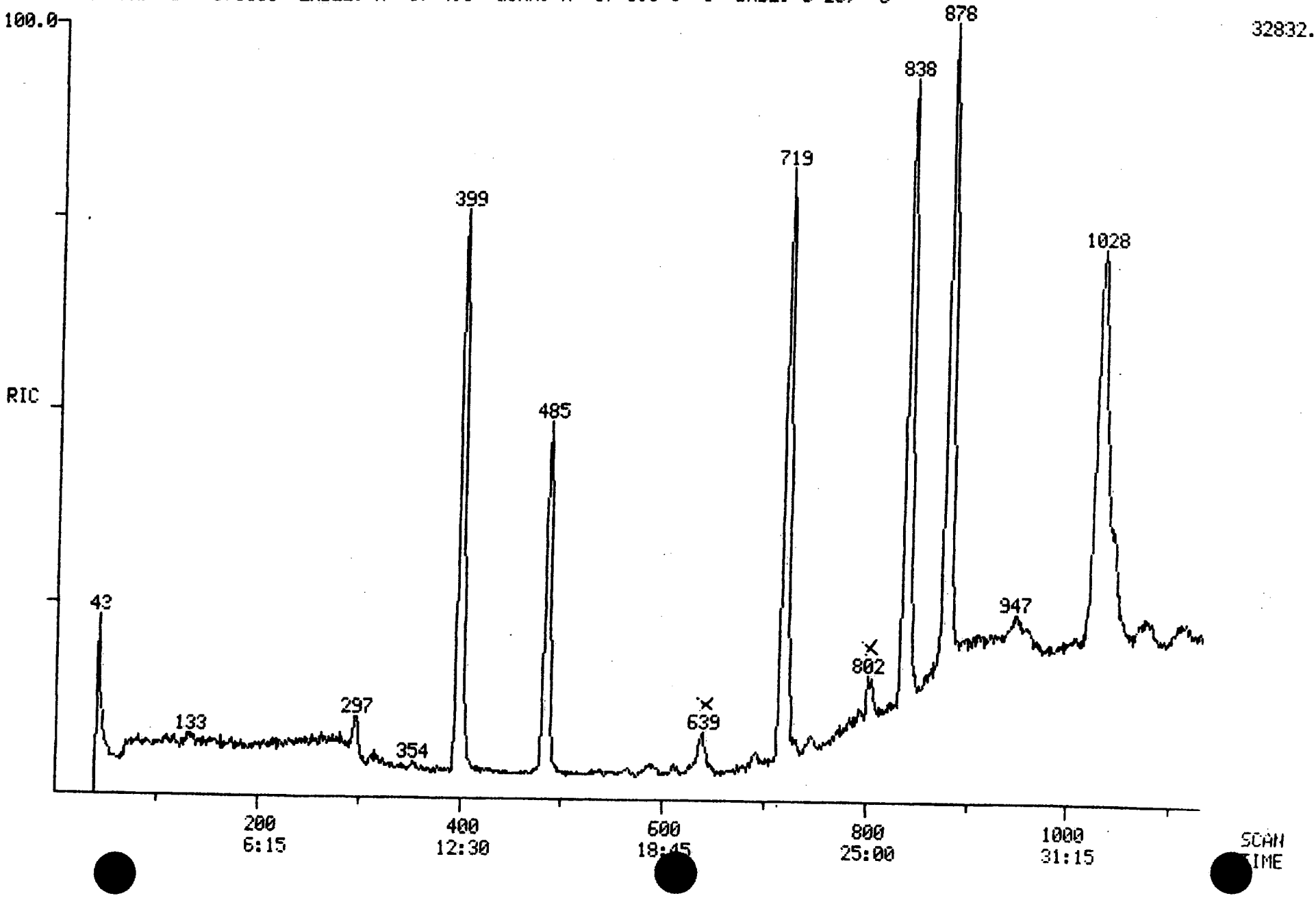
INTERNAL STANDARD	SCAN #
VOLATILE FRACTION	
BROMOCHLOROMETHANE	399
1,4-DIFLUOROBENZENE	719
CHLOROBENZENE-D5	878

SEMI-VOLATILE FRACTION	SCAN #
1,4-DICHLOROBENZENE-D4	-
NAPTHALENE-D8	-
ACENAPTHENE-D10	-
PHENANTHRENE-D10	-
CHRYSENE-D12	-
PERYLENE-D12	-

MIDRIC
08/19/87 15:00:00
SAMPLE: GC/MS#1, 2033-1001 TB
CONDS.: 624
RANGE: G 1,1130 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: VOA5785 #1
CALI: VOA5785 #2

SCANS 1 TO 1130



117 306

SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. _____ Contractor E.T. Killam Assoc. Contract No. _____

Low Level X Medium Level _____

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/Kg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS* RPD	QC LIMITS* RECOVERY
VOA SMO SAMPLE NO. 2033 6004	1,1-Dicholorethene	50	0	38	76	47	94	10	22	59-172
	Trichloroethene	50	0	40	80	46	92	7	24	62-137
	Chlorobenzene	50	0	46	92	53	106	7	21	60-133
	Toluene	50	7	43	86	54	108	11	21	59-139
	Benzene	50	3	47	94	53	106	6	21	66-142
B/N SMO SAMPLE NO.	1,2,4-Trichlorobenzene								23	38-107
	Acenaphthene								19	31-137
	2,4 Dinitrotoluene								47	28-89
	Di-n-Butylphthalate								47	29-135
	Pyrene								36	35-142
	N-Nitrosodi-n-Propylamine								38	41-126
	1,4-Dichlorobenzene								27	28-104
ACID SMO SAMPLE NO.	Pentachlorophenol								47	17-109
	Phenol								35	26-90
	2-Chlorophenol								50	25-102
	4-Chloro-3-Methylphenol								33	26-103
	4-Nitrophenol								50	11-114
PEST SMO SAMPLE NO.	Lindane								50	46-127
	Heptachlor								31	35-130
	Aldrin								43	34-132
	Dieldrin								38	31-134
	Endrin								45	42-139
	4,4'-DDT								50	23-134

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs 0 out of 5 ; outside QC limits
B/N _____ out of _____ ; outside QC limits
ACID _____ out of _____ ; outside QC limits
PEST _____ out of _____ ; outside QC limits

RECOVERY: VOAs 0 out of 10 : outside QC limits
B/N _____ out of _____ : outside QC limits
ACID _____ out of _____ : outside QC limits
PEST _____ out of _____ : outside QC limits

Comments: _____

FORM III

1/85

GC/MS TUNING AND MASS CALIBRATION

Bromofluorobenzene (BFB)

Case No. _____ Contractor E.T. Killam Assoc. Contract No. _____

Instrument ID 5100 Date 8/19/87 Time 11:07 + 32:02

Lab ID VOA 5780 Data Release Authorized By: JEF

m/e	ION ABUNDANCE CRITERIA	%RELATIVE ABUNDANCE
50	15.0 - 40.0% of the base peak	22.32
75	30.0 - 60.0% of the base peak	43.55
95	Base peak, 100% relative abundance	100.00
96	5.0 - 9.0% of the base peak	5.31
173	Less than 1.0% of the base peak	<1
174	Greater than 50.0% of the base peak	67.30
175	5.0 - 9.0% of mass 174	5.23 (7.77)[1]
176	Greater than 95.0%, but less than 101.0% of mass 174	64.24 (95.4)[1]
177	5.0 - 9.0% of mass 176	4.06 (6.3)[2]

[1] Value in parenthesis is % mass 174.
[2] Value in parenthesis is % mass 176.

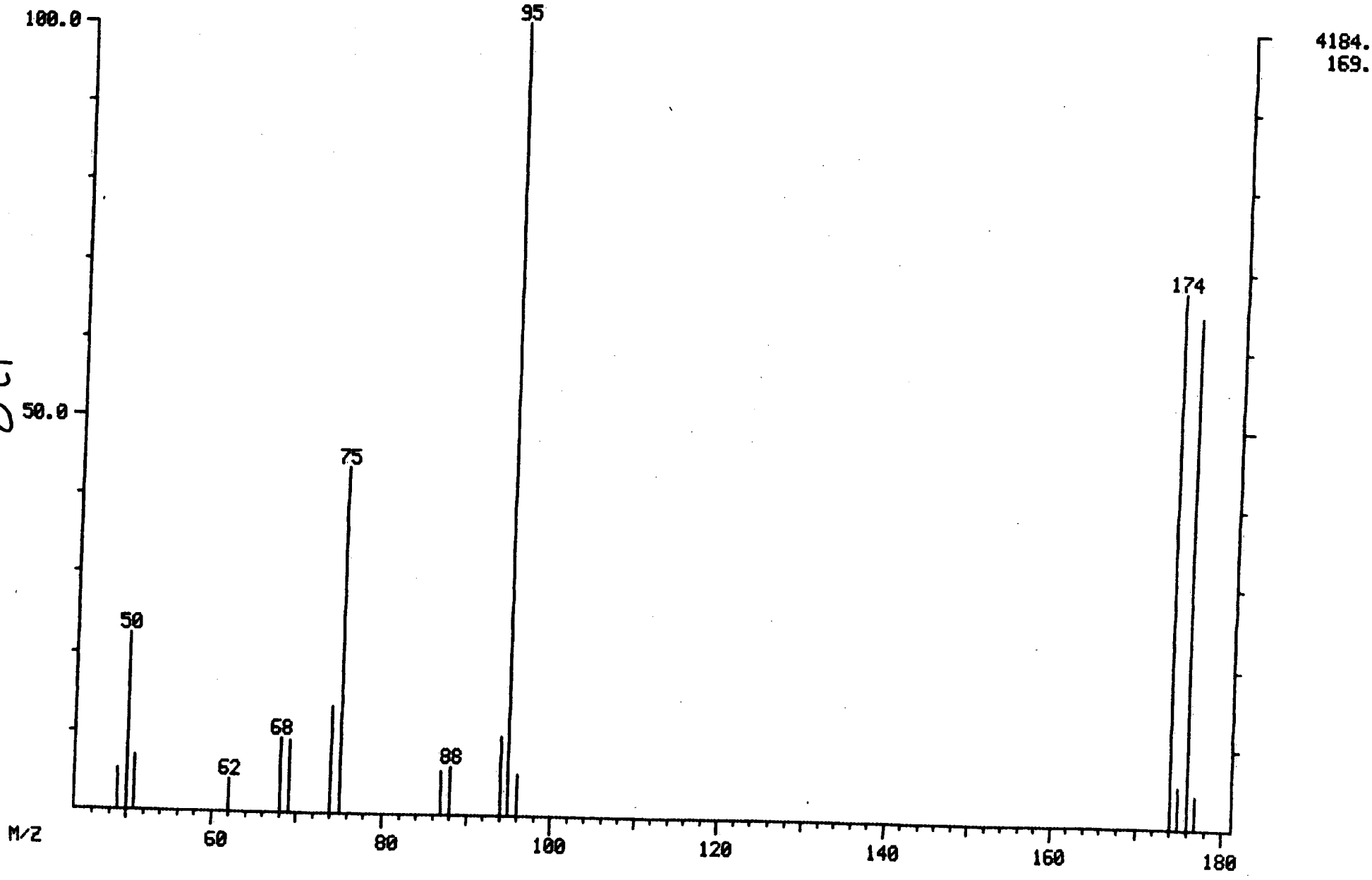
THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

SAMPLE ID		LAB ID	DATE OF ANALYSIS	TIME OF ANALYSIS
BLK BFB STD		VOA 5780	8/19/87	11:07
20 ug/L VOA HSL	STD	VOA 5781	"	11:52
100 ug/L VOA HSL	STD	VOA 5782	"	12:38
200 ug/L VOA HSL	STD	VOA 5783	"	13:24
BLANK		VOA 5784	"	14:09
2033-1001 TB		VOA 5785	"	15:00
2033-1002 FB		VOA 5786	"	15:46
2033-6001		VOA 5787	"	16:37
2033-6002		VOA 5788	"	17:22
N/A		VOA 5789	"	N/A
BLANK		VOA 5790	"	19:00

MID MASS SPECTRUM
08/19/87 11:07:00 + 32:02
SAMPLE: GC/MS#1, BLK BFR STD.
CONDS.: 624
GC TEMP: 239 DEG. C
ENHANCED (S 15B 2N 0T)

DATA: VOA5780 #1025
CALI: VOA5780 #2

BASE M/Z: 95
RIC: 19168.

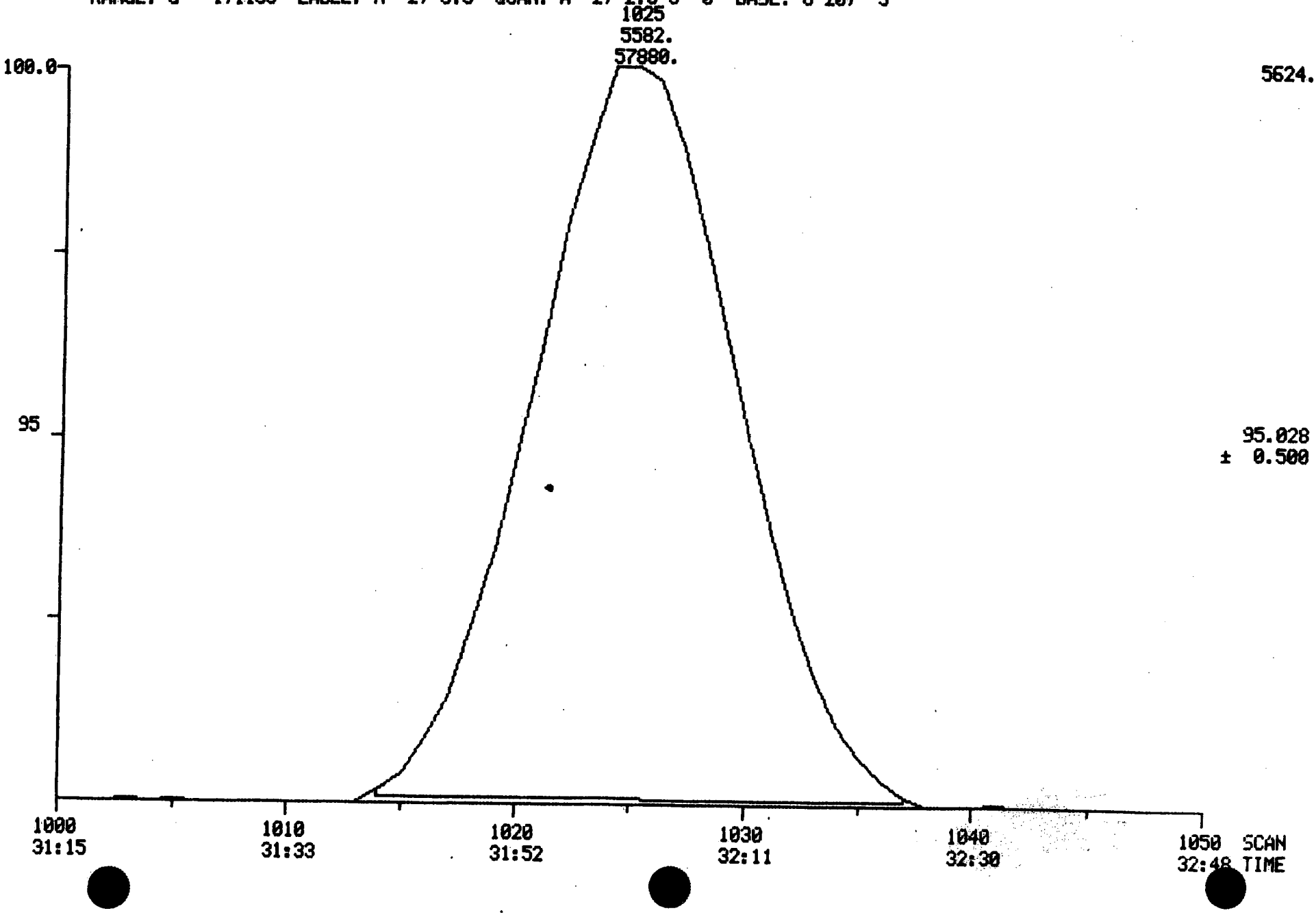


120
309

MIDMASS CHROMATOGRAM
08/19/87 11:07:00
SAMPLE: GC/MS#1, BLK BFR STD.
CONDS.: 624
RANGE: G 1,1130 LABEL: N 2, 3.0 QUAN: A 2, 2.0 J 0 BASE: U 20, 3

DATA: VOA5780 #1025
CALI: VOA5780 #2

SCANS 1000 TO 1050



121 310

REAGENT BLANK SUMMARY

Case No. _____ Contractor E.T. Killam Assoc. Contract No. _____

FILE ID	DATE OF ANALYSIS	FRACTION	MATRIX	CONC. LEVEL	INST. ID	CAS NUMBER	COMPOUND (INCL. TIC OR UNKNOWN)	CONC.	UNITS	CRQL
VOA 5790	8/19/87	VOA	WATER	Low	5100	N/A	Methylene Chloride	5	ug/L	5

Comments:

FORM IV

4/84

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CHAIN OF CUSTODY RECORD

Log Book Pg. No. 9

Project Name/Number ORBIS P87-304 | Sample Date: 8-7-87

— See options below

ETK Lab # Sample #	Sub	Field Sample No. A	B	Time	Sample Location	Sample Depth	Sample Type	No. of Containers	Section / Option: Metals A B C D	GC/MS Organics A B C D	Other Organics A B C D	Nutrients A B C D	S.D.W.A.	Solids	Bacty	TC/FC	Remarks
		P304	1001	8:30	LAB	—	WATER	1		C							
		P304	1002	10:30	FIELD	—	WATER	6	A	A	A						

Metals -M-	GC/MS Organics -G-	Organics (Other) -Q-	Nutrients - Minerals -N-	S.D.W.A. Conven. Analysis -S-	Solid Series / pH Conductivity
"A" Priority Metals As Sb Be Cd Cr Cu Pb Hg Ni Se Ag Tl Zn	"A" P.P. + 40 VOAs + 15 A/BNs + 25 Pesticides & PCBs	"A" PHC Petroleum Hydrocarbons	"A" Nutrients Ammonia Nitrate Nitrite Total Phosphorus TKN	Primary: Fl^- Turb. NO_3-N Secondary: pH TDS Alk. Hardness L.I. SO_4 Cl^- F^- M.B.A.S.	TS TDS TSS TVDS pH TVSS Conductivity
"B" S.D.W.A. Primary: As Ba Cd Cr Pb Na Hg Se Ag Secondary: Cu Fe Mn Zn	"B" P.P. — No Searches VOAs A/BNs Pesticides & PCBs	"B" O & G Oil & Grease	"B" Minerals Alk. Cl^- pH F^- Hard. SO_4 L.I. Turb.		
"C" Misc. Metals Cr+6 Fe Mn Na Ba K Ca Mg	"C" VOAs only A. Searches B. No Searches C. Specific:	"C" Total Phenols Total Phenols	"C" Oxygen Demand B.O.D. C.O.D. A. Total B. Soluable		
"D" List (others)	"D" A-280 A-280 Parameters S.D.W.A.	"D" Cyanide Cyanide	"D" Misc. List		

Bottles/Samplers Prepared by:	Date	Time
KBA	8/6/87	1000
Sampled by:	**Date**	**Time**
Kevin Hennessy	8/7/87	1030
Received by:	**Date**	**Time**
1		
2		
3		
4		
Lab. Received by:	**Date**	**Time**
J Sauerlon	8/7/87	1345

123 317

2 3

3 of 3

Elson T. Killam Associates, Inc.

27 Bleeker Street, P.O. Box 1008, Millburn, NJ 07041
Tel. 201/379-3400 Telex 642-057 Telecopier 201/376-1072

Environmental and Hydraulic Engineers

ANALYTICAL DATA REPORT

ORBIS PRODUCTS CORP.

NEWARK, NEW JERSEY

FIELD BLANK

PROJECT NUMBER: P87-304

LABORATORY REFERENCE NUMBER: 2033-1002FB

DATE AND TIME COLLECTED: 8/7/87 10:30

Nancy J. Potak
LABORATORY DIRECTOR

SEPTEMBER 24, 1987

N.J. LABORATORY
CERTIFICATION NO.: 07059

Elson T. Killam Associates, Inc.

LABORATORY CHRONICLE

LABORATORY SAMPLE NO.:	2033-1002FB
RECEIVED:	8/7/87
ORGANICS:	
EXTRACTION:	8/14/87
ANALYSIS:	
1. **VOLATILE COMPOUNDS:**	8/19/87
2. **ACID EXTRACTABLES:**	8/26/87
3. **BASE/NEUTRALS:**	8/26/87
4. **PESTICIDES/PCBs:**	8/26/87

METALS:	CONVENTIONAL	Se	Hg	As
DIGESTION:	8/10/87	8/17/87	8/17/87	8/17/87
ANALYSES:	8/21-26/87	8/18/87	8/20/87	8/19/87

OTHER ANALYSES:	**EXTRACTED:**	**ANALYSES:**
PHC	8/10/87	8/14/87

QUALITY CONTROL SUPERVISOR
REVIEW AND APPROVAL: Nancy J. Pat

METHODOLOGY SUMMARY

Purgeable Organics

USEPA METHOD 624

Acid Extractables

USEPA METHOD 625

Base/Neutral Extractables

USEPA METHOD 625

PESTICIDE EXTRACTABLES

USEPA METHOD 625

Metals

SW 846 3050 (FLAME)
SW 846 7061 As (Hydride)
SW 846 7741 Se (Hydride)
SW 846 7471 Hg (Cold Vapor)

Total Cyanide

Total Phenol

Other PHC - USEPA 418.1 (Modified for soils)

PETROLEUM HYDROCARBONS DATA

LABORATORY SAMPLE NO.: 2033-1002FB

	CONCENTRATION DRY WEIGHT (mg/L)	DETECTION LIMIT (mg/L)
PETROLEUM HYDROCARBONS	BDL	.5

BDL = BELOW DETECTION LIMIT

PETROLEUM HYDROCARBONS
MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

LAB REFERENCE ID NO.: 2033-1002FB **QUALITY ASSURANCE SAMPLE:** 2033-6006

LAB SAMPLE NO.	CONC. SPIKE ADDED	SAMPLE CONC.	CONC. MS	% REC	CONC. MSD	% REC	RPD
2033-6006.....	610	<30	612	100	632	104	4

Concentration - mg/kg
RPD - relative percent difference

METALS AND MISCELLANEOUS DATA

LABORATORY SAMPLE NO.: 2033-1002FB

	CONCENTRATION (mg/L)	DETECTION LIMIT (mg/L)
ANTIMONY	0.03	0.02
ARSENIC	BDL	0.005
BERYLLIUM	BDL	0.005
CADMIUM	BDL	0.002
CHROMIUM	BDL	0.005
COPPER	BDL	0.02
LEAD	BDL	0.005
MERCURY	BDL	0.002
NICKEL	BDL	0.02
SELENIUM	BDL	0.005
SILVER	0.02	0.01
THALLIUM	BDL	0.01
ZINC	BDL	0.005

BDL = BELOW DETECTION LIMIT

METALS
SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

LAB SAMPLE NO.: 2033-1002FB **QUALITY ASSURANCE SAMPLE NO.:** 2033-6004

	CONC. SPIKE ADDED	SAMPLE CONC.	CONC. MS	% REC	CONC. MSD	% REC	RPD
Antimony.....	50	<10	24	48	24	48	0
Arsenic.....	0.50	6.4*	-	-	-	-	-
Beryllium.....	20	2	21	104	19	97	7
Cadmium.....	20	<1	23	117	22	111	5
Chromium.....	50	58	66	133	64	128	4
Copper.....	50	26	54	108	54	108	0
Lead.....	50	31	57	113	60	121	6
Mercury.....	0.40	0.2	0.36	90	0.38	95	5
Nickel.....	50	25	54	108	53	105	3
Selenium.....	0.50	0.6	0.34	69	0.42	83	18
Silver.....	50	<5	52	105	52	103	2
Thallium.....	50	<5	56	111	56	111	0
Zinc.....	20	213*	-	-	-	-	-

Concentration - mg/kg
RPD - relative percent difference

* Sample concentration is too high for accurate spike recovery.

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DATA QUALIFIERS

The following four qualifiers are used in the analytical report package. They are equivalent to those issued by EPA - Contract Laboratory Program:

U - Indicates that the compound was analyzed for but not detected. All sample detection limits reported have been corrected for dilution and per cent moisture. No adjustements for blank contamination have been made.

J - Refers to an estimated value. This is used when the mass spectral data indicates the presence of a compound that meets the identification criteria, yet has a concentration less than the contract required detection limit. All estimated values reported have been adjusted for both dilution and per cent moisture, but no corrections have been made for possible blank contamination.

B - This flag is used to note that the compound was found to be present in the laboratory blank as well as in the sample. It indicates that the possibility of laboratory contamination exists.

The EPA has issued certain quidelines to aid in the evaluation of data when common laboratory artifacts occur. Blank contribution is considered to be negligable if it is ten times less than the concentration present in the sample. If the concentrations of the compounds found in both the sample and the blank are comparable (i.e. sample concentration is less than twice that of the blank), the occurance of the compound in the sample is considered to be suspect.

Up to 25 ppb of methylene chloride is permitted to be present in the blanks of volatile organic analyses.

C - Applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides >10 ng/ul in the final extract are confirmed by GC/MS.

The next qualifier is also used in referencing the analytical results:

X - This flag indicates the presence of a compound which is often found as a common laboratory or field contaminant.

VOLATILE COMPOUNDS DATA

LABORATORY SAMPLE NO.: 2033-1002FB DATA FILE NO.: VOA5786

	CONCENTRATION (ug/L)		SCAN	DETECTION LIMIT (ug/L)
ACROLEIN		U		100.
ACRYLONITRILE		U		100.
BENZENE		U		5.
BROMOFORM		U		5.
BROMOMETHANE		U		10.
CARBON TETRACHLORIDE		U		5.
CHLOROBENZENE		U		5.
DIBROMOCHLOROMETHANE		U		5.
CHLOROETHANE		U		10.
2-CHLORO ETHYL VINYL ETHER		U		10.
CHLOROFORM	32		466	5.
CHLOROMETHANE		U		10.
BROMODICHLOROMETHANE	5		561	5.
1,1-DICHLOROETHANE		U		5.
1,2-DICHLOROETHANE		U		5.
1,1-DICHLOROETHENE		U		5.
TRANS-1,2-DICHLOROETHENE		U		5.
1,2-DICHLOROPROPANE		U		5.
CIS-1,3-DICHLOROPROPENE		U		5.
TRANS-1,3-DICHLOROPROPENE		U		5.
ETHYLBENZENE		U		5.
METHYLENE CHLORIDE	3	JB	298	5.
1,1,2,2-TETRACHLOROETHANE		U		5.
TETRACHLOROETHENE		U		5.
TOLUENE		U		5.
1,1,1-TRICHLOROETHANE		U		5.
1,1,2-TRICHLOROETHANE		U		5.
TRICHLOROETHENE		U		5.
VINYL CHLORIDE		U		10.
ACETONE - HSL		U		10.
CARBON DISULFIDE - HSL		U		5.
2-HEXANONE - HSL		U		10.
2-BUTANONE		U		10.
4-METHYL-2-PENTANONE -HSL		U		10.
STYRENE - HSL		U		5.
TOTAL XYLENES - HSL		U		5.

LEFT BLANK

A C I D E X T R A C T A B L E D A T A

LABORATORY SAMPLE NO.: 2033-1002FB

	CONCENTRATION dry weight (ug/L)	SCAN	DETECTION LIMIT (ug/L)
2-CHLOROPHENOL	U		10
2,4-DICHLOROPHENOL	U		10
2,4-DIMETHLYPHENOL	U		10
4,6-DINITRO-2-METHYLPHENOL	U		50
2,4-DINITROPHENOL	U		50
2-NITROPHENOL	U		10
4-NITROPHENOL	U		50
4-CHLORO-3-METHYLPHENOL	U		10
PENTACHLOROPHENOL	U		50
PHENOL	U		10
2,4,6-TRICHLOROPHENOL	U		10

Elson T. Killam Associates, Inc.

BASE NEUTRAL EXTRACTABLE DATA

LABORATORY SAMPLE NO.: 2033-1002FB **DATA FILE NO.:** ABN2652

	CONCENTRATION dry weight (ug/L)	SCAN	DETECTION LIMIT (ug/L)
ACENAPHTHENE	U		10
ACENAPPHTHYLENE	U		10
ANTHRACENE	U		10
BENZIDINE	U		50
BENZO (A) ANTHRACENE	U		10
BENZO (A) PYRENE	U		10
BENZO (B) FLUORANTHENE	U		10
BENZO (G,H,I) PERYLENE	U		10
BENZO (K) FLUORATHENE	U		10
BIS (2-CHLOROETHOXY) METHANE	U		10
BIS (2-CHLOROETHYL) ETHER	U		10
BIS (2-CHLOROISOPROPYL) ETHER	U		10
BIS (2-ETHYLHEXYL) PHTHALATE	U		10
4-BROMOPHENYL PHENYL ETHER	U		10
BUTYLBENZYL PHTHALATE	U		10
2-CHLORONAPHTHALENE	U		10
4-CHLOROPHENYL PHENLY ETHER	U		10
CHRYSENE	U		10
DIBENZO (A,H) ANTHRACENE	U		10
1,2-DICHLOROBENZENE	U		10
1,3-DICHLOROBENZENE	U		10
1,4-DICHLOROBENZENE	U		10
3,3'-DICHLOROBENZIDINE	U		20
DIETHYLPHTHALATE	U		10
DIMETHYL PHTHALATE	U		10
DI-N-BUTYL PHTHALATE	U		10
2,4-DINITROTOLUENE	U		10
2,6-DINITROTOLUENE	U		10
DI-N-OCTYL PHTHALATE	U		10
1,2-DIPHENYLHYDRAZINE	U		10
FLOURANTHENE	U		10
FLOURENE	U		10
HEXACHLOROBUTADIENE	U		10
HEXACHLOROCYCLOPENTADIENE	U		10
HEXACHLOROBENZENE	U		10
HEXCHLOROETHANE	U		10
INDENO (1,2,3-CD) PYRENE	U		10
ISOPHORONE	U		10
NAPHTHALENE	U		10
NITROBENZENE	U		10
N-NITROSODIMETHYLAMINE	U		10
N-NITROSODI-N-PROPYLAMINE	U		10
N-NITROSODIPHENYLAMINE	U		10
PHENANTHRENE	U		10
PYRENE	U		10
1,2,4-TRICHLOROBENZENE	U		10

PESTICIDES/PCBs DATA

LABORATORY SAMPLE NO.: 2033-1002FB DATA FILE NO.: ABN2652

	CONCENTRATION dry weight (ug/L)	SCAN	DETECTION LIMIT (ug/L)
ALDRIN	U		10
ALPHA-BHC	U		10
BETA-BHC	U		10
GAMMA-BHC	U		10
DELTA-BHC	U		10
CHLORDANE	U		10
4,4'-DDT	U		10
4,4'-DDE	U		10
4,4'-DDD	U		10
DIELDRIN	U		10
ALPHA-ENDOSULFAN	U		10
BETA-ENDOSULFAN	U		10
ENDOSULFAN SULFATE	U		10
ENDRIN	U		10
ENDRIN ALDEHYDE	U		10
HEPTACHLOR	U		10
HEPTACHLOR EPOXIDE	U		10
PCB-1016	U		10
PCB-1221	U		10
PCB-1232	U		10
PCB-1242	U		10
PCB-1248	U		10
PCB-1254	U		10
PCB-1260	U		10
TOXAPHENE	U		10

Laboratory Name: ET Killam Assoc.

Case No

Sample Number
2033-1002FB

Organics Analysis Data Sheet
(Page 4)

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/kg)
1.	No Compounds Found	VOA		
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
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27.				
28.				
29.				
30.				

Laboratory Name E.T. Killam Assoc.

Case No

Sample Number 2033-1002 FB

Organics Analysis Data Sheet
(Page 4)

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/kg)
1.	No Compounds Found	ABN		
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
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22.				
23.				
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25.				
26.				
27.				
28.				
29.				
30.				

METHOD PERFORMANCE DATA

WATER SURROGATE PERCENT RECOVERY

LABORATORY SAMPLE NO.: 2033-1002FB

COMPOUND	RECOVERY	EPA CONTROL LIMITS	SCAN #
VOLATILE FRACTION			
TOLUENE - D8	96	88-110	838
BROMOFLUOROBENZENE	100	86-115	1029
1,2-DICHLOROETHANE	84	76-114	486
SEMI-VOLATILE FRACTION			
NITROBENZENE-D5	70	35-114	1003
2-FLUOROBIPHENYL	87	43-110	1381
TERPHENYL-D14	105	33-141	2178
PHENOL-D5	25	10-94	845
2-FLUOROPHENOL	47	21-100	656
2,4,6-TRIBROMOPHENOL	45	10-123	1689
PESTICIDE			
DIBUTYL CHLORENDATE	86	24-156**	2454

*VALUES ARE OUTSIDE QC LIMITS
**ADVISORY LIMITS ONLY

INTERNAL STANDARD SCAN LIST
(RETENTION TIME)

LABORATORY SAMPLE NO.: 2033-1002FB

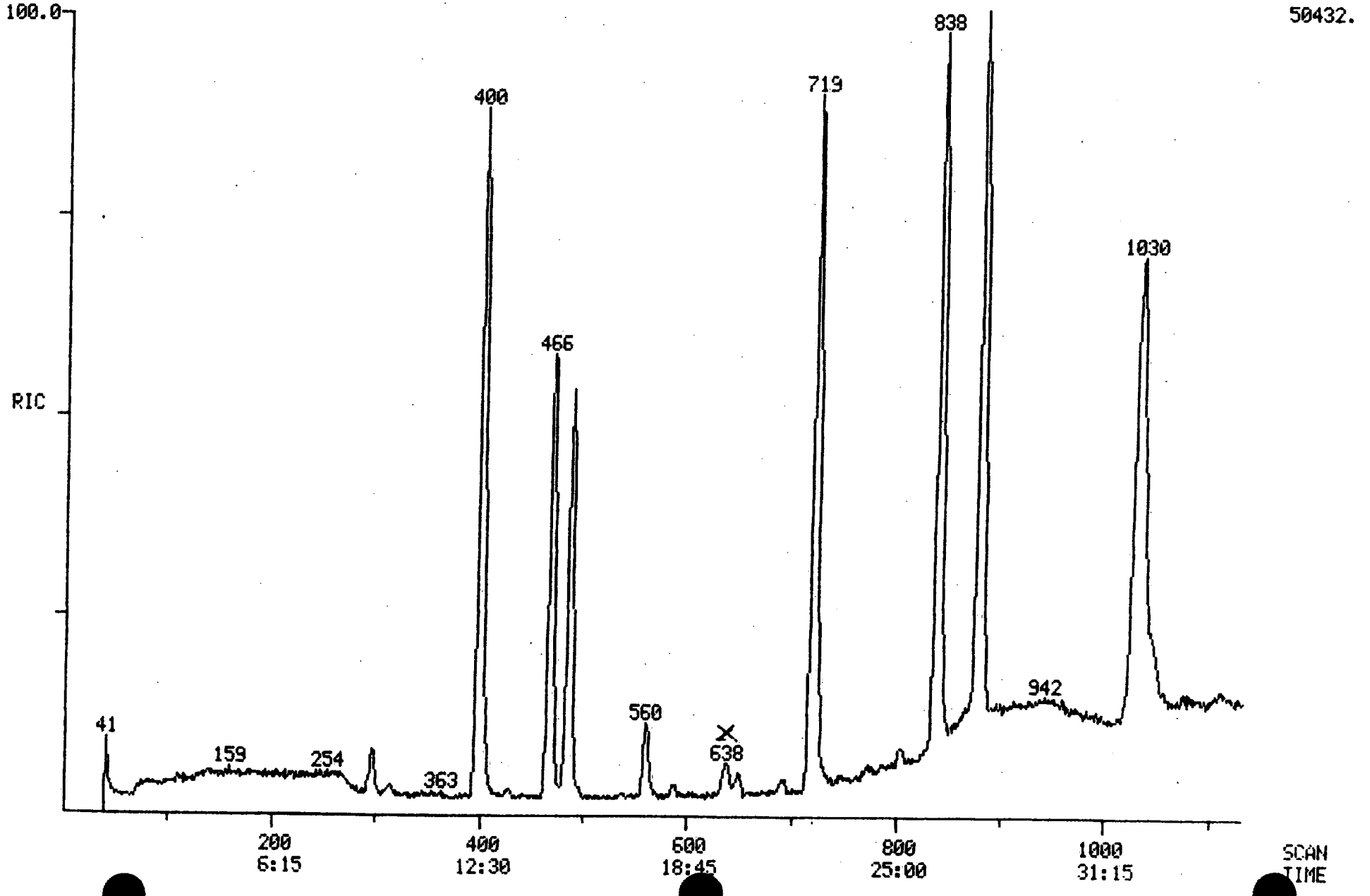
INTERNAL STANDARD	SCAN #
VOLATILE FRACTION	
BROMOCHLOROMETHANE	400
1,4-DIFLUOROBENZENE	719
CHLOROBENZENE-D5	878

SEMI-VOLATILE FRACTION	SCAN #
1,4-DICHLOROBENZENE-D4	884
NAPTHALENE-D8	1144
ACENAPTHENE-D10	1516
PHENANTHRENE-D10	1827
CHRYSENE-D12	2397
PERYLENE-D12	2806

MIDRIC
08/19/87 15:46:00
SAMPLE: GC/MS#1, 2033-1002 FB
CONDS.: 624
RANGE: G 1,1130 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: VOA5786 #1
CALI: VOA5786 #2

SCANS 1 TO 1130

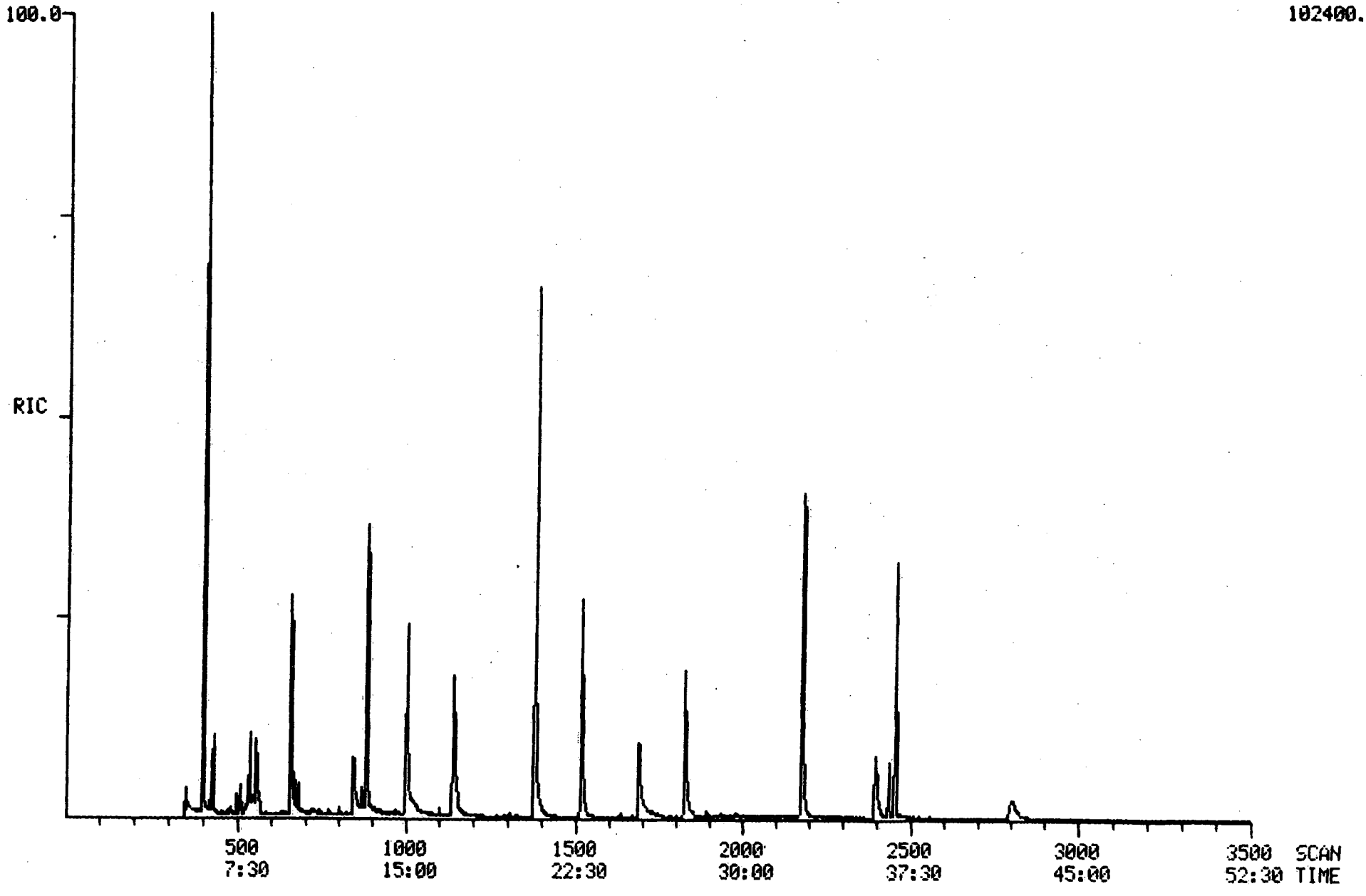


140

MIDRIC
08/26/87 20:19:00
SAMPLE: 2033-1002
CONDS.: 625
RANGE: G 1,3500 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: ABN2652 #1
CALI: ABN2652 #2

SCANS 1 TO 3500



141
221

SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. _____ Contractor E.T. Killam Assoc. Contract No. _____

Low Level X Medium Level _____

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/Kg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS* RPD	QC LIMITS* RECOVERY
VOA SMO SAMPLE NO. 2033 6004	1,1-Dicholorethene	50	0	38	76	47	94	10	22	59-172
	Trichloroethene	50	0	40	80	46	92	7	24	62-137
	Chlorobenzene	50	0	46	92	53	106	7	21	60-133
	Toluene	50	7	43	86	54	108	11	21	59-139
	Benzene	50	3	47	94	53	106	6	21	66-142
B/N SMO SAMPLE NO.	1,2,4-Trichlorobenzene								23	38-107
	Acenaphthene								19	31-137
	2,4 Dinitrotoluene								47	28-89
	Di-n-Butylphthalate								47	29-135
	Pyrene								36	35-142
	N-Nitrosodi-n-Propylamine								38	41-126
	1,4-Dichlorobenzene								27	28-104
ACID SMO SAMPLE NO.	Pentachlorophenol								47	17-109
	Phenol								35	26-90
	2-Chlorophenol								50	25-102
	4-Chloro-3-Methylphenol								33	26-103
	4-Nitrophenol								50	11-114
PEST SMO SAMPLE NO.	Lindane								50	46-127
	Heptachlor								31	35-130
	Aldrin								43	34-132
	Dieldrin								38	31-134
	Endrin								45	42-139
	4,4'-DDT								50	23-134

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs 0 out of 5 ; outside QC limits
B/N _____ out of _____ ; outside QC limits
ACID _____ out of _____ ; outside QC limits
PEST _____ out of _____ ; outside QC limits

RECOVERY: VOAs 0 out of 10 : outside QC limits
B/N _____ out of _____ : outside QC limits
ACID _____ out of _____ : outside QC limits
PEST _____ out of _____ : outside QC limits

Comments: _____

Case No. _____ Contractor E.T. Williams Assoc. Contract No. _____

Low Level _____ Medium Level _____

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/Kg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS* RPD	QC LIMITS* RECOVERY
VOA SMO SAMPLE NO.	1,1-Dicholorethene								22	59-172
	Trichloroethene								24	62-137
	Chlorobenzene								21	60-133
	Toluene								21	59-139
_____	Benzene								21	66-142
B/N SMO SAMPLE NO.	1,2,4-Trichlorobenzene	100	0	71	71	67	67	3	23	38-107
	Acenaphthene	100	0	73	73	74	74	1	19	31-137
	2,4 Dinitrotoluene	100	0	69	69	72	72	2	47	28-89
	Di-n-Butylphthalate	100	4	97	97	100	100	2	47	29-135
	Pyrene	100	1	79	79	88	88	5	36	35-142
	N-Nitrosodi-n-Propylamine	100	0	26	26*	27	27*	2	38	41-126
2033-6006	1,4-Dichlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	27	28-104
ACID SMO SAMPLE NO.	Pentachlorophenol	100	0	97	97	97	97	0	47	17-109
	Phenol	100	0	40	40	41	41	1	35	26-90
	2-Chlorophenol	100	0	27	27	26	26	2	50	25-102
	4-Chloro-3-Methylphenol	100	0	68	68	78	78	7	33	26-103
2033-6006	4-Nitrophenol	N/A	N/A	N/A	N/A	N/A	N/A	N/A	50	11-114
PEST SMO SAMPLE NO.	Lindane	100	0	78	78	88	88	6	50	46-127
	Heptachlor	100	0	82	82	90	90	5	31	35-130
	Aldrin	100	0	78	78	81	81	2	43	34-132
	Dieldrin	100	0	74	74	78	78	3	38	31-134
	Endrin	100	0	78	78	84	84	4	45	42-139
2033-6006	4,4'-DDT	100	0	51	51	56	56	5	50	23-134

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs 0 out of 16; outside QC limits
B/N _____ out of _____; outside QC limits
ACID _____ out of _____; outside QC limits
PEST _____ out of _____; outside QC limits

RECOVERY: VOAs 2 out of 32; outside QC limits
B/N _____ out of _____; outside QC limits
ACID _____ out of _____; outside QC limits
PEST _____ out of _____; outside QC limits

Comments: 4-Nitrophenol & 1,4-Dichlorobenzene not added to spike solution.

143
222

GC/MS TUNING AND MASS CALIBRATION

Bromofluorobenzene (BFB)

Case No. _____ Contractor E.T. Killam Assoc. Contract No. _____

Instrument ID 5100 Date 8/19/87 Time 11:07 + 32:02

Lab ID VOA 5780 Data Release Authorized By: JEF

m/e	ION ABUNDANCE CRITERIA	%RELATIVE ABUNDANCE
50	15.0 - 40.0% of the base peak	22.32
75	30.0 - 60.0% of the base peak	43.55
95	Base peak, 100% relative abundance	100.00
96	5.0 - 9.0% of the base peak	5.31
173	Less than 1.0% of the base peak	<1
174	Greater than 50.0% of the base peak	67.30
175	5.0 - 9.0% of mass 174	5.23 (7.77)[1]
176	Greater than 95.0%, but less than 101.0% of mass 174	64.24 (95.4)[1]
177	5.0 - 9.0% of mass 176	4.06 (6.3)[2]

[1] Value in parenthesis is % mass 174.
[2] Value in parenthesis is % mass 176.

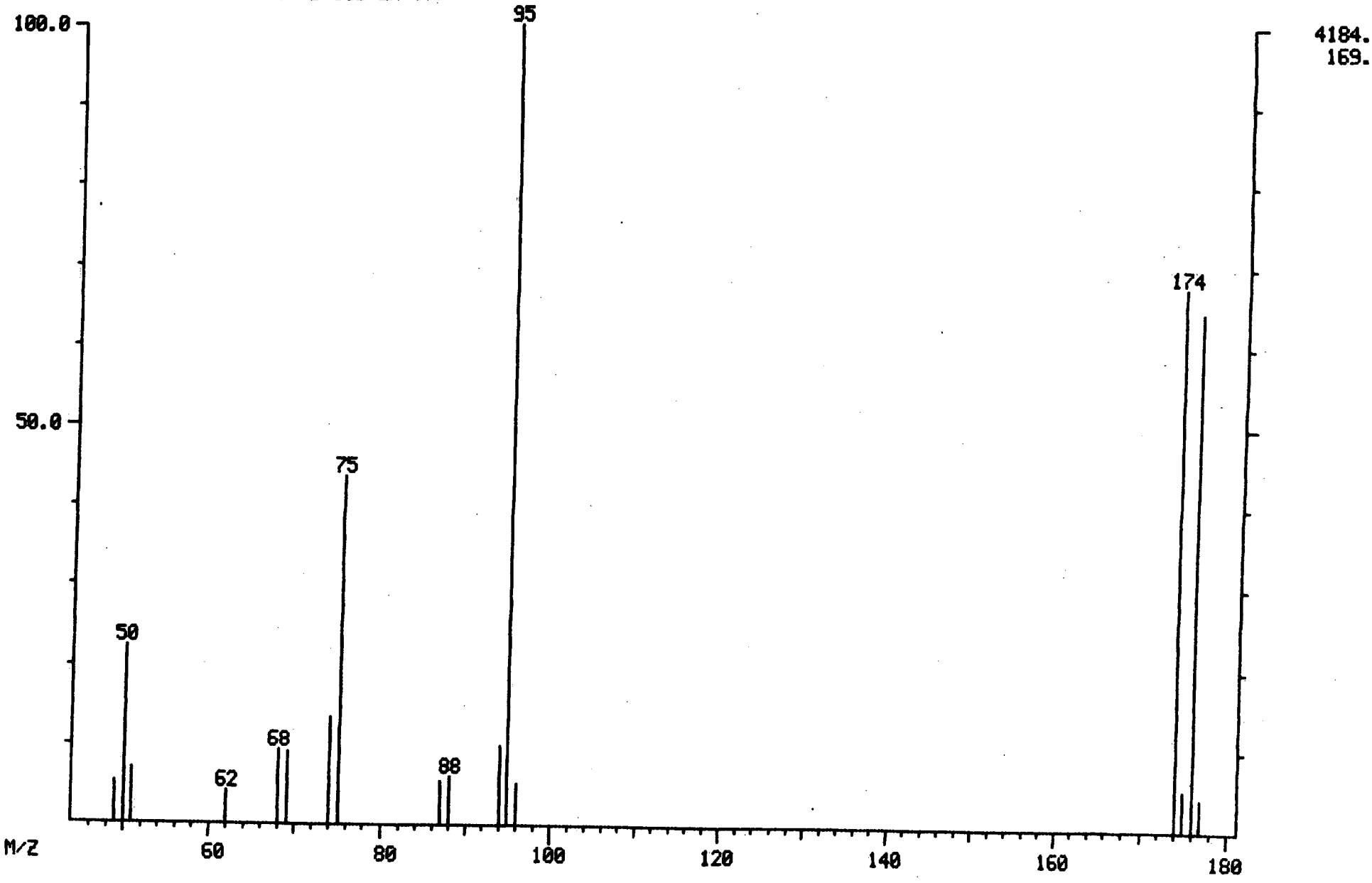
THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

SAMPLE ID	LAB ID	DATE OF ANALYSIS	TIME OF ANALYSIS
BLK BFB STD	VOA 5780	8/19/87	11:07
20 ug/L VOA HSL STD	VOA 5781	"	11:52
100 ug/L VOA HSL STD	VOA 5782	"	12:38
200 ug/L VOA HSL STD	VOA 5783	"	13:24
BLANK	VOA 5784	"	14:09
2033-1001 TB	VOA 5785	"	15:00
2033-1002 FB	VOA 5786	"	15:46
2033-6001	VOA 5787	"	16:37
2033-6002	VOA 5788	"	17:22
N/A	VOA 5789	"	N/A
BLANK	VOA 5790	"	19:00

MID MASS SPECTRUM
08/19/87 11:07:00 + 32:02
SAMPLE: GC/MS#1, BLK BFR STD.
CONDS.: 624
GC TEMP: 239 DEG. C
ENHANCED (S 15B 2N 0T)

DATA: VOA5780 #1025
CALI: VOA5780 #2

BASE M/Z: 95
RIC: 19168.

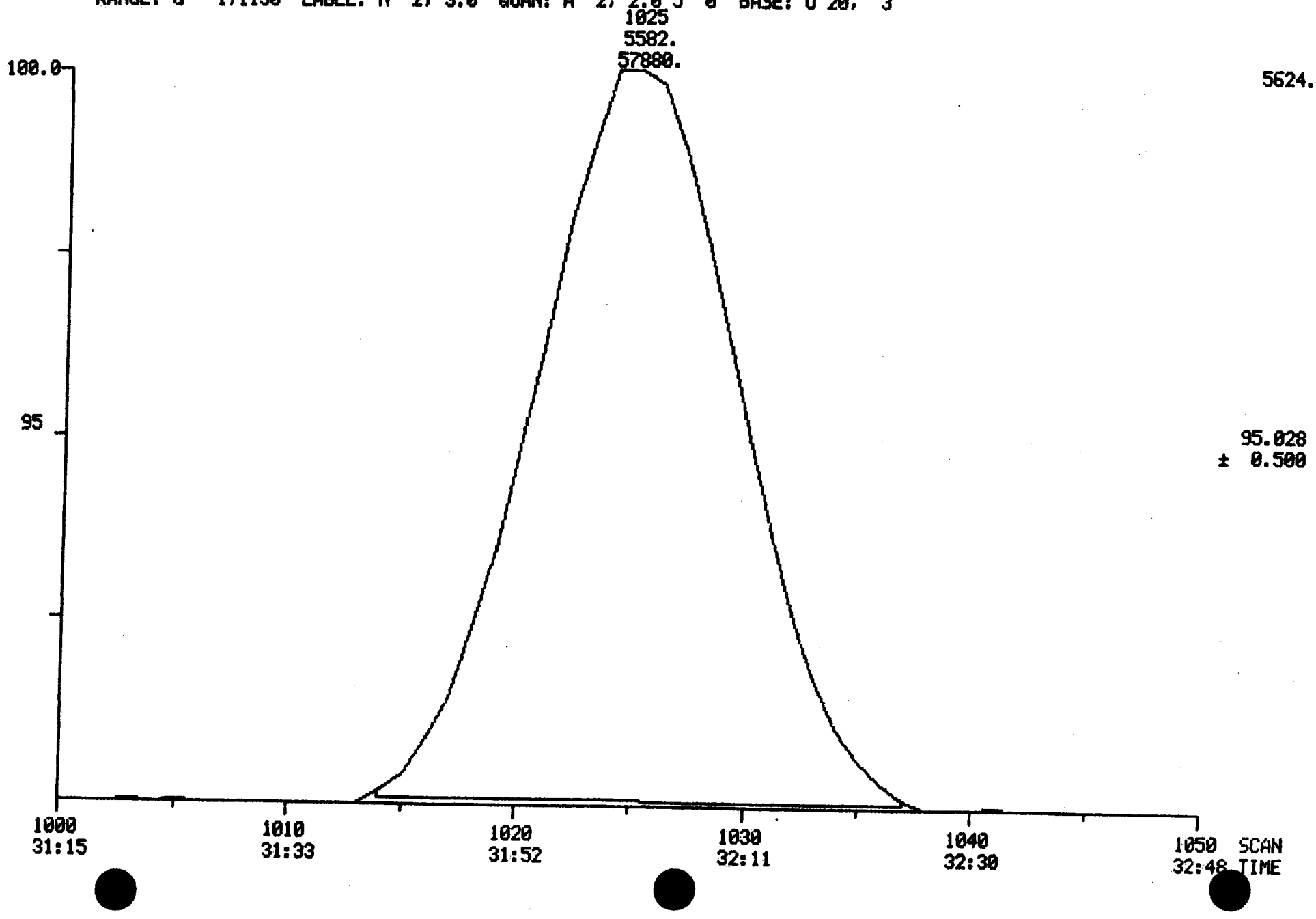


145
225

MIDMASS CHROMATOGRAM
08/19/87 11:07:00
SAMPLE: GC/MS#1, BLK BFR STD.
CONDS.: 624
RANGE: G 1,1130 LABEL: N 2, 3.0 QUAN: A 2, 2.0 J 0 BASE: U 20, 3

DATA: VOA5780 #1025
CALI: VOA5780 #2

SCANS 1000 TO 1050



146 336

REAGENT BLANK SUMMARY

Case No. _____ Contractor E.T. Killam Assoc. Contract No. _____

FILE ID	DATE OF ANALYSIS	FRACTION	MATRIX	CONC. LEVEL	INST. ID	CAS NUMBER	COMPOUND (HSL, TIC OR UNKNOWN)	CONC.	UNITS	CRQL
VOA 5790	8/19/87	VOA	WATER	Low	5100	N/A	Methylene Chloride	5	ug/L	5

Comments:

FORM IV

4/84

147 333

REAGENT BLANK SUMMARY

Case No. _____ Contractor _____ Contract No. _____

FILE ID	DATE OF ANALYSIS	FRACTION	MATRIX	CONC. LEVEL	INST. ID	CAS NUMBER	COMPOUND (HSL, TIC OR UNKNOWN)	CONC.	UNITS	CRDL
ABN 2653	8/26/87	ABN	WATER	[illegible]	5700	N/A	NONE			

Comments:

FORM IV

148

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CHAIN OF CUSTODY RECORD

Log Book Pg. No. 9

Project Name/Number ORBIS P87-304 | Sample Date: 8-7-87

— See options below

ETK Lab # Sample #	Sub	Field Sample No. A	B	Time	Sample Location	Sample Depth	Sample Type	No. of Containers	Section / Option: Metals A B C D	GC/MS Organics A B C D	Other Organics A B C D	Nutrients A B C D	S.D.W.A.	Solids	Bacty	TC/FC	Remarks
		P304	1001	8:30	LAB	—	WATER	1		C							
		P304	1002	10:50	FIELD	—	WATER	6	A	A	A						

Metals -M-	GC/MS Organics -G-	Organics (Other) -Q-	Nutrients - Minerals -N-	S.D.W.A. Conven. Analysis -S-	Solid Series / pH Conductivity
"A" Priority Metals As Sb Be Cd Cr Cu Pb Hg Ni Se Ag Tl Zn	"A" P.P. + 40 VOAs + 15 A/BNs + 25 Pesticides & PCBs	"A" PHC Petroleum Hydrocarbons	"A" Nutrients Ammonia Nitrate Nitrite Total Phosphorus TKN	Primary: Fl^- Turb. NO_3-N Secondary: pH TDS Alk. Hardness L.I. SO_4 Cl^- F^- M.B.A.S.	TS TDS TSS TVDS pH TVSS Conductivity
"B" S.D.W.A. Primary: As Ba Cd Cr Pb Na Hg Se Ag Secondary: Cu Fe Mn Zn	"B" P.P. — No Searches VOAs A/BNs Pesticides & PCBs	"B" O & G Oil & Grease	"B" Minerals Alk. Cl^- pH F^- Hard. SO_4 L.I. Turb.		
"C" Misc. Metals Cr+6 Fe Mn Na Ba K Ca Mg	"C" VOAs only A. Searches B. No Searches C. Specific:	"C" Total Phenols Total Phenols	"C" Oxygen Demand B.O.D. C.O.D. A. Total B. Soluable		
"D" List (others)	"D" A-280 A-280 Parameters S.D.W.A.	"D" Cyanide Cyanide	"D" Misc. List		

Bottles/Samplers Prepared by:	Date	Time
KBA	8/6/87	1000
Sampled by:	**Date**	**Time**
Kevin Hunt	8/7/87	1030
Received by:	**Date**	**Time**
1		
2		
3		
4		
Lab. Received by:	**Date**	**Time**
J Sanderson	8/7/87	1345

149 339

2033

3 of 3

GC/MS TUNING AND MASS CALIBRATION
Decafluorotriphenylphosphine (DFTPP)

Case No. _____ Contractor E.T. Killam Assoc. Contract No. _____

Instrument ID 5100 Date 8/26/87 Time 18:38

Lab ID DFTPP 355 Date Release Authorized By: JEC

m/e	ION ABUNDANCE CRITERIA	%RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	36.35
68	less than 2.0% of mass 69	0.47 (1.0y)[1]
69	mass 69 relative abundance	45.68
70	less than 2.0% of mass 69	0 (0)[1]
127	40.0 - 60.0% of mass 198	42.30
197	less than 1.0% of mass 198	0
198	base peak, 100% relative abundance	100.00
199	5.0 - 9.0% of mass 198	6.49
275	10.0 - 30.0% of mass 198	20.88
365	greater than 1.00% of mass 198	3.72
441	present, but less than mass 443	11.28
442	greater than 40.0% of mass 198	73.24
443	17.0 - 23.0% of mass 442	16.76 (22.88)[2]

[1] Value in parenthesis is % mass 69.
[2] Value in parenthesis is % mass 442.

THIS PERFORMANCE TUNE APPLIES TO THE FOLLOWING SAMPLES, BLANKS AND STANDARDS.

SAMPLE ID	LAB ID	DATE OF ANALYSIS	TIME OF ANALYSIS
50 µg/ml ABN HSL-PEST. STD.	ABN 2651	8/26/87	19:10
2033-1002	ABN 2652	"	20:19
BLANK-water (2033) 8/14	ABN 2653	"	21:28
2071-1202	ABN 2654	"	22:37
2071-2201	ABN 2655	"	23:46
2071-2202	ABN 2656	8/27/87	0:55
2071-2203	ABN 2657	"	2:04
2071-2204	ABN 2658	"	3:13
2071-2205	ABN 2659	"	4:22
BLANK-water (2071) 8/21	ABN 2660	"	5:30
2062-1002	ABN 2661	"	6:39
BLANK-water (2062) 8/18	ABN 2662	"	7:48

MID Mass List
08/26/87 18:38:00 + 8:10
Sample: 50 NG DFTPP
Conds.: 625
Enhanced (S 15B 2N OT)

Data: DFTPP355 # 544
Cali: DFTPP355 # 2

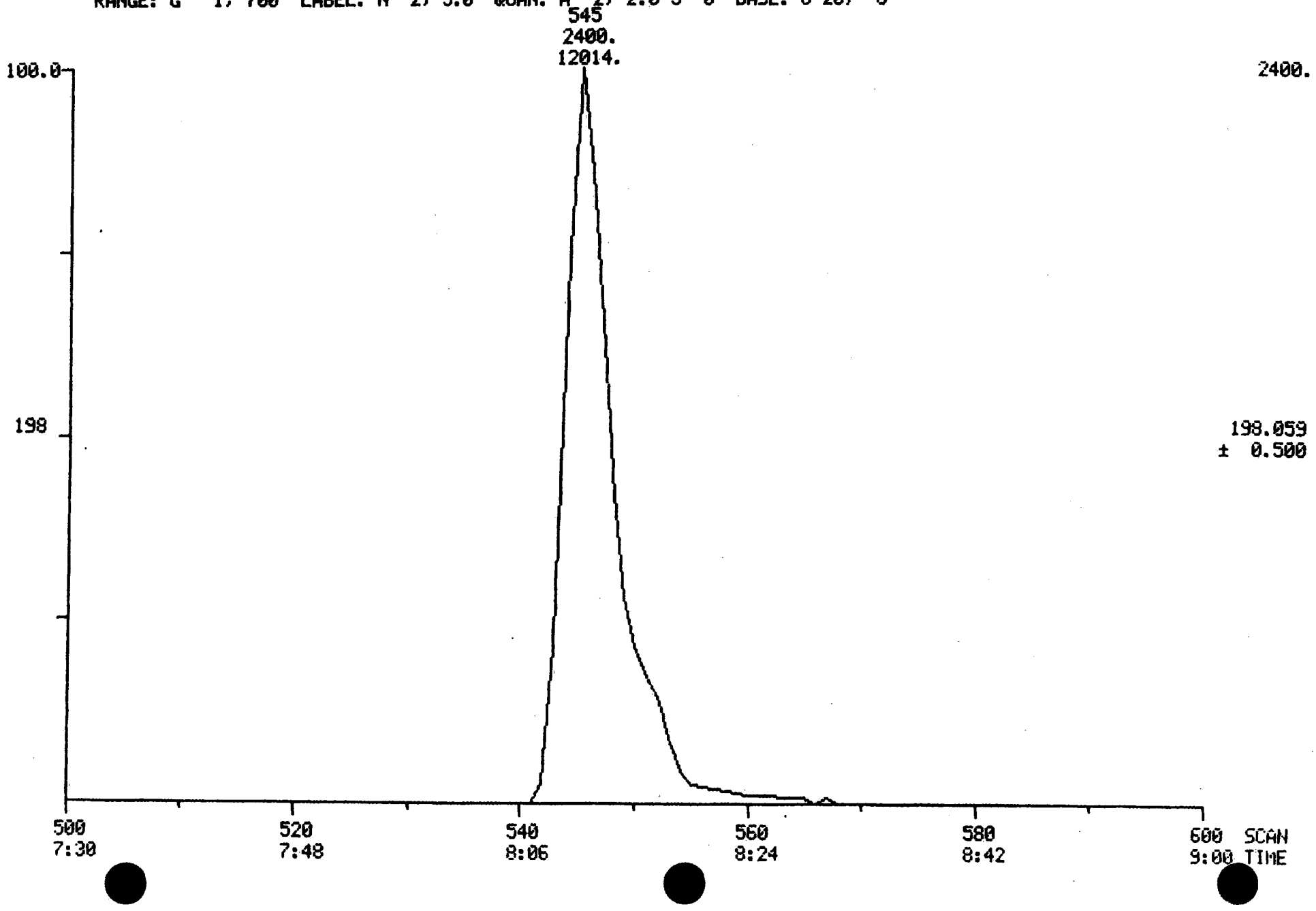
Base m/z: 198
RIC: 12480.

51 3.70 0.00 0. Minima Min inten: 55.
443 # 0 Maxima

Mass	% RA	% RIC	Inten.
51.00	36.35	4.31	538.
69.00	45.68	5.42	676.
74.00	4.05	0.48	60.
75.00	6.42	0.76	95.
77.00	37.97	4.50	562.
93.00	4.46	0.53	66.
98.00	4.05	0.48	60.
99.00	4.05	0.48	60.
107.00	14.26	1.69	211.
110.00	25.54	3.03	378.
111.00	3.99	0.47	59.
117.00	8.85	1.05	131.
127.00	42.30	5.02	626.
129.00	18.99	2.25	281.
167.00	4.59	0.54	68.
179.00	3.92	0.46	58.
186.00	14.19	1.68	210.
187.00	4.26	0.50	63.
198.00	100.00	11.86	1480.
199.00	6.49	0.77	96.
204.00	3.72	0.44	55.
205.00	5.41	0.64	80.
206.00	21.62	2.56	320.
217.00	7.50	0.89	111.
221.00	4.46	0.53	66.
224.00	11.22	1.33	166.
227.00	5.88	0.70	87.
244.00	8.51	1.01	126.
255.00	45.88	5.44	679.
256.00	6.76	0.80	100.
258.00	4.12	0.49	61.
274.00	4.26	0.50	63.
275.00	20.88	2.48	309.
296.00	5.61	0.67	83.
365.00	3.72	0.44	55.
423.00	6.15	0.73	91.
441.00	11.28	1.34	167.
442.00	73.24	8.69	1084.
443.00	16.76	1.99	248.

MIDMASS CHROMATOGRAM
08/26/87 18:38:00
SAMPLE: 50 NG DFTPP
CONDS.: 625
RANGE: G 1, 700 LABEL: N 2, 3.0 QUAN: A 2, 2.0 J 0 BASE: U 20, 3

DATA: DFTPP355 #544 SCANS 500 TO 600
CALI: DFTPP355 #2

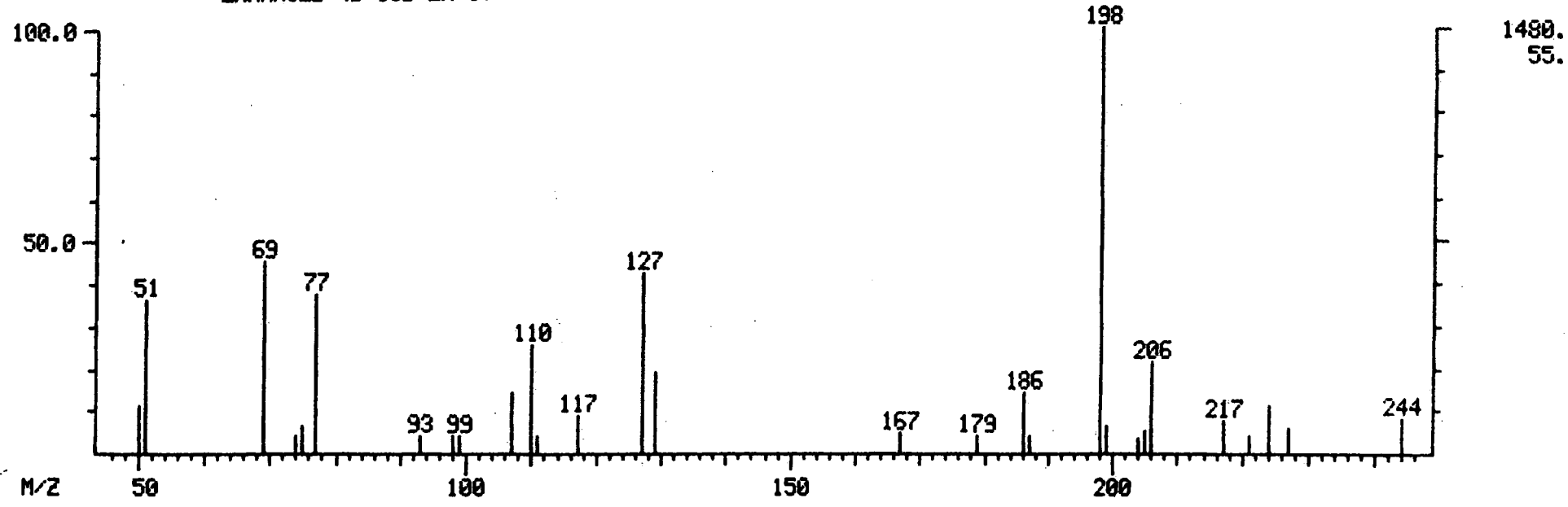


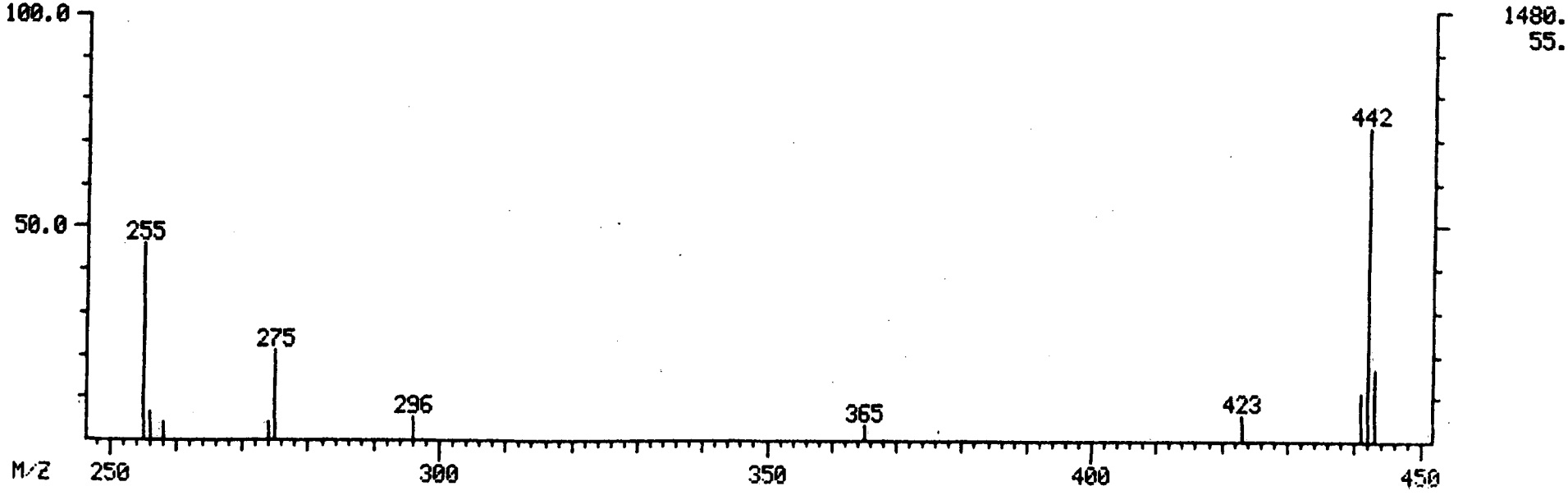
152 347

MID MASS SPECTRUM
08/26/87 18:38:00 + 8:10
SAMPLE: 50 NG DFTPP
CONDS.: 625
GC TEMP: 230 DEG. C
ENHANCED (S 15B 2N 0T)

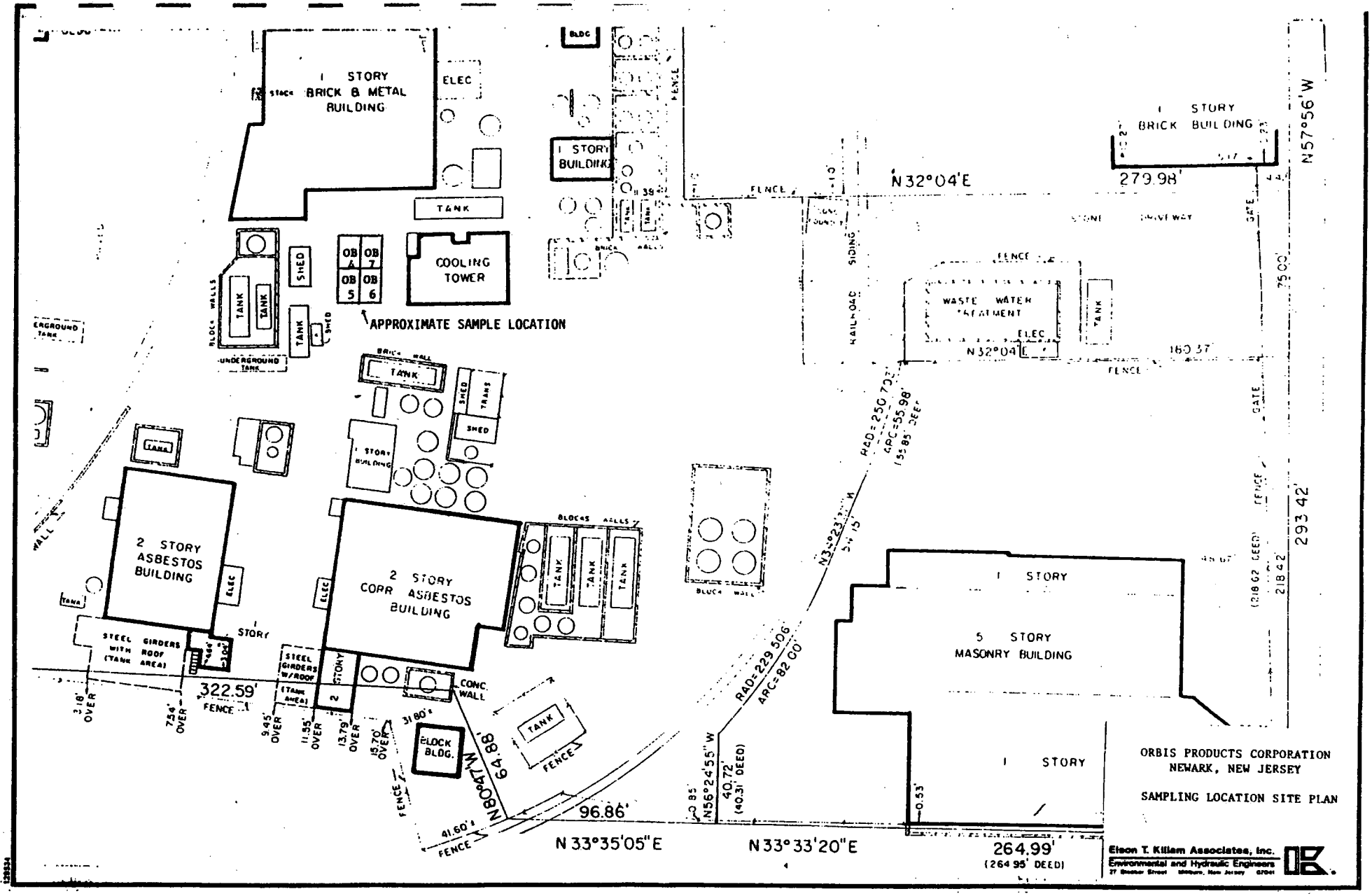
DATA: DFTPP355 #544
CALI: DFTPP355 #2

BASE M/Z: 198
RIC: 12480.





153 343



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ORBIS - Pt. 2

REFERENCE NO. 26

672-0111
MARK MACRIELLO

PROPOSAL TO DEVELOP A COMPREHENSIVE WASTE TRANSFER PROGRAM

FOR
ESSEX COUNTY, NEW JERSEY

SUBMITTED BY:

SOLID WASTE TRANSFER AND
RECYCLING, INC.

PREPARED BY:

JAMES C. ANDERSON ASSOCIATES, INC.
2615 Route 38
Mt. Holly, NJ 08060

February 27,1987

NOTICE OF LEASE

PLEASE BE ADVISED that ORBIS PRODUCTS, INC. ("Orbis") and SOLID WASTE TRANSFER AND RECYCLING, INC. ("Solid") have agreed to enter into a Lease Agreement under which Orbis, as Lessor, shall rent and Solid, as Lessee, shall hire a portion of certain premises owned by Orbis and located at 55 Virginia Street, Newark, New Jersey for use as a solid waste transfer station and recycling facility. The initial term of the Lease shall be for three (3) years with seven (7) successive options to renew for a term of one (1) year each.

In Witness Whereof, Orbis and Solid have hereunto caused these Presents to be executed by their proper corporate officers this day of February, 1987.

Orbis Products, Inc.

By: Frank J. Amadeo
Pres.

Solid Waste Transfer and Recycling, Inc.

By: Ray T. [illegible]

INTRODUCTION

Solid Waste Transfer And Recycling Incorporated (SWTR) is a new New Jersey corporation formed for the purposes of responding to the "Solicitation of interest in having transfer stations included in the Essex County Solid Waste Management Plan" issued by the Essex County Division of Solid Waste Management. The system proposed by SWTR incorporates three proposed new facilities which will satisfy all of the disposal needs of Essex County for up the three years required by the solicitation published by the County or for a longer period if the needs of the County require a longer term operation. Further, the systems proposed can serve as processing points for by-pass and non-processible waste after start-up of the County Resource Recovery facility.

SWTR will lease all three facilities under net-net leases and will contract for operation of each facility over the term of the award. The leases and operating contracts each contain options for extensions should the need for additional disposal capacity arise.

SWTR will supply all administrative functions internally. All scales will be monitored and controlled through a central computer system which can be used to collect waste flow data for use by the County. The system will also be used to monitor transportation equipment throughout its routing to disposal points. All dealings with facility users in terms of billing and collection of receipts will be through SWTR. Payment for use of the facilities will be through advance payments by users and maintenance of a user account through the computer system.

Transportation and disposal of Essex County's waste in the Commonwealth of Pennsylvania will be through an agreement with Chambers Development Company, Inc. pursuant to the letter of intent incorporated herein and under agreements to be executed consistent with an agreement in principal which has been executed between SWTR and Chambers Development Company, Inc.

The program proposes three new transfer stations to be located in Essex County. Two of the facilities will be located in the City of Newark and the third facility will be located in the City of Orange. The Evergreen Avenue, Newark, Facility will have a nominal waste loading rate of 646 tons per day, the McClellan Street, Newark, Facility will have a nominal waste loading rate of 1316 tons per day and the Orange Facility will have a nominal waste loading rate of 706 tons per day. Of the three facilities, two will have the capacity to process a maximum of 1000 tons of waste per day each and the third will have the capacity to process a maximum of 2000 tons of waste per day, for a maximum

a maximum capacity of 4000 tons of waste per day for all three stations combined. Finally, a County-wide recycling facility will be established at one of the Newark sites. This facility will have the capacity to process 80 tons of recyclable materials per day.

Included in this submission is a technical proposal, qualifications and experience, and a cost proposal. Drawings for all of the sites are submitted under separate cover. Each set of drawings contains a title sheet, site location map, plot plan and schematic of the compactor.

TECHNICAL PROPOSAL

A. Narrative Description

The municipal solid waste (MSW) transfer program presented herein provides adequate capacity for the transfer, transport and disposal of Essex County's 2,500* tons per day of MSW. SWTR proposes to serve all of Essex County through the operation of three transfer stations and the subsequent disposal at out-of-state, permitted, sanitary landfills. It is expected that these transfer stations and their out-of-state landfills will serve Essex County until resource recovery is implemented, at which time the transfer stations would serve the resource recovery facility.

The transfer station system proposed by SWTR incorporates three new facilities with a maximum design capacity of 4000 tons per day (TPD). Two facilities will be located in the City of Newark, one at McClellan St. and the other at 102-122 Evergreen Avenue. The third facility will be located in the city of Orange at 111 Hill Street adjacent Freeway Drive West between Hickory Street and Oakwood Avenue. The McClellan Street Station will have a maximum design processing capacity of 2000 TPD and an expected loading rate of 1316 TPD, while the Evergreen Avenue and Orange Stations will have maximum design processing capacities of 1000 TPD, and expected loading rates of 646 TPD and 706 TPD, respectively. All three transfer stations are assumed to be working on a 5½ day week. A County wide recycling facility would be established on the McClellan Street site.

The transfer of MSW from collection vehicles to transfer trailers will be accomplished through the use of a compactor-baler system manufactured and developed by Amfab Resources Inc. This compactor-baler, the Trans-Pak 500, pre-loads and pre-weighs a full transport load of solid waste within its own packing chamber producing a densified bale that measures 67 cubic yards (7' x 7' x 37') and weighs up to 27 tons. Compaction density of the unit is controlled by the operator to prevent overloading the transfer trailers. SWTR trailers will be loaded to a maximum of 23 tons to ensure that they do not exceed load limits. Upon reaching a predetermined weight as indicated by an electronic scale readout, the bale will be pushed by the hydaulic packing ram into a transfer

* Based on tonnage provided in Essex County RFP dated 12/10/86 Should the waste quantities of the County exceed 2,500 TPD the facilities as designed can accommodate that larger flow by expansion of the hours of operation for processing waste. SWTR estimates that the maximum capacity of its three facilities is 4,000 TPD.

trailer for transport to the final disposal site. The hydraulic ram has a twenty cubic yard packing stroke, and can build a load in approximately 10 minutes, according to the manufacturer and load a transfer trailer in approximately two minutes.

Loaded transfer trailers will be transported their waste to landfills operated by Chambers Development Co., Inc. located in western Pennsylvania. These landfills are operating under approved Pennsylvania Department of Environmental Resources (PA DER) permits and haveindicated their willingness and ability to accept transfer trailer loads delivered by SWTR for a five year period. (See Appendix A).

B. Transfer Station Information

1. Location

The three transfer stations to be operated by SWTR are located in the City of Newark (two transfer stations will be located in Newark, denoted as Evergreen Avenue and McClellan Street) and in the City of Orange.

a. Newark

1. Evergreen Avenue Transfer Station

The first transfer station will be located on Evergreen Avenue, Newark, New Jersey. The site's tax map designation is Block 3779 Lot 20 and is zoned I3, Third Industrial District. The entire site is approximately 2.87 acres in size. The site is shown on the following USGS 7.5' quadrangle and the map of Essex County, Figures 1 and 2, respectively.

A detailed site location map, has been included separately as an attachment. This map shows surrounding Land Use, Zoning and transportation access for an area encompassing 1500 feet from the property line.
An in depth review of the site reveals the following information:

1. Flood hazard area - The Evergreen Avenue site is not located within the 100-year flood hazard area. The Flood Insurance Rate Map (FIRM) designation for this site is Zone C. (Areas outside the 500 year flood).

2. Wetlands - Upon review of the applicable wetlands maps, it is our opinion that the Evergreen Avenue site is not located in a wetland as defined by the U.S. Fish and Wildlife Service.

3. Historic Sties - The Evergreen Avenue site is not located adjacent to sites listed in the New Jersey and National Register of Historic Places.

4. Recreational or Open Space - The Evergreen Avenue site is not located within areas dedicated to publicly owned recreation or open space use.

5. Critical Habitats - JCA Associates has requested, by letter, that the N.J. Division of Fish, Game and Wildlife make a determination on endangered or threatened species of animals and plants on the site. SWTR will notify the County of the results of this determination when it is made available. (See Appendix I).

6. Wild and Scenic Rivers - JCA Associates has requested, by letter, that the NJDEP's Office of Wild and Scenic Rivers make a determination of possible wild, scenic recreational, or developed recreational rivers at or near the site. SWTR will notify the County of the results of this determination when it is made available. (See Appendix I).

7. Agricultural Development Areas - To the best of our knowledge, the site is not within agricultural development areas.

2. McClellan Street Transfer Station

The second transfer station will be located at McClellan Street, Newark, New Jersey. The site's tax mapdesignation is Block 3773 Lots 15, 41, 43, 45, 53, 63, 923, 980 and is zoned I3, Third Industrial District. The entire site is approximately 6.5 acres in size as shown on the following USGS 7.5' quadrangle and the map of Essex County, Figures 3 and 4, respectively.

A detailed Site Location Map, presented separately as an attachment shows surrounding land use, zoning and transportation access for an area encompassing 1500 feet from the property line.

An in-depth review of the site reveals the following information:

1. Flood Hazard Area - The McClellan Street site is not located within the 100 year flood area. The FIRM designation for this site is Zone C. (Areas outside 500 year flood).

2. Wetlands - Upon review of the applicable wetlands maps, it is our opinion that the McClellan Street site is not located in a wetland as defined by the U.S. Fish and Wildlife Service.

3. Historic Areas - The McClellan Street site is not located adjacent to sites listed in the New Jersey and National Register of Historic Places.

4. Recreational or Open Space - The McClellan Street site is not located within areas dedicated to publicly owned recreation or open space use.

5. Critical Habitats - JCA Associates has requested, by letter, that the N.J. Department of Fish Game and Wildlife make a determination on endangered or threatened species of animals and plants on this site. SWTR will notify the County of the results of this determination when it is made available. (See Appendix I).

6. Wild and Scenic Rivers - JCA Associates has requested, by letter, that the NJDEP's Office of Wild and Scenic Rivers make a determintion of possible wild, scenic recreational or developed recreational rivers at or near the site. SWTR will notify the County of the results when it is made available. (See Appendix I).

7. Agricultural Development Areas - To the best of our knowledge, the site is not located within agricultural development areas.

b. Orange Transfer Station

The third transfer station will be located on Hill Street, just off Freeway Drive West, Orange, New Jersey. The site tax map designation is Block 94 and is zoned Industrial. The area used to house the station is approximately 1.33 acres in size and is shown on the following USGS 7.5' quadrangle and the map of Essex County, Figures 5 and 6, respectively.

A detailed Site Location Map, presented separately as an attachment shows surrounding land use, zoning and transportation access for an area encompassing 1500 feet from the property line.

An in-depth review of the site reveals the following information:

1. Flood Hazard Area - The Orange site is not located within the 100 year flood hazard area. The FIRM designation for this site is Zone C. (Areas outside the 500 year flood).

2. Wetlands - Upon review of the applicable wetlands maps, it is our opinion that the Orange site is not located in a wetland as defined by the U. S. Fish and Wildlife Service.

3. Historic Areas - The Orange site is not located adjacent to sites listed in the New Jersey and National Register of Historic Places.

4. Recreational or Open Space - The Orange site is not located within an area dedicated to publicly owned recreation or open space use.

5. Critical Habitats - JCA Associates has requested, by letter, that the N.J. Division of Fish Game and Wildlife make a determination of endangered or threatened species of plants or animals that may exist on this site. SWTR will notify the County of the results when it is made. (See Appendix I).

6. Wild and Scenic Rivers - JCA Associates has requested, by letter, that the NJDEP's Office of Wild and Scenic Rivers make a determination of possible wild, scenic recreational or developed recreational rivers at or near the site. SWTR will notify the County of the results when it is made available. (See Appendix I).

7. Agricultural Development Areas - To the best of our knowledge, the site is not located within agricultural development acres.

REFERENCE NO. 27

NUS CORPORATION TELECON NOTE

CONTROL NO:	DATE:	TIME:
02-8905-06	6/15/89	11:15

DISTRIBUTION:

ORBIS PRODUCTS FILE

BETWEEN:	OF:	PHONE:
DAVE OSTERMAN	DIVISION OF HAZARDOUS WASTE MANAGEMENT	(201) 669 3960

AND: PAUL BAUER (NUS)

DISCUSSION:

MR. OSTERMAN TOLD ME THE SITUATION AT ORBIS PRODUCTS IS MUCH IMPROVED OVER THE CONDITIONS REPORTED IN 1984. HOWEVER, THEY STILL HAVE PROBLEMS. SOME SOILS WERE REMOVED FROM FORMER UNDERGROUND TANK AREA AND MORE SAMPLING WILL OCCUR. IT LOOKS LIKE MONITORING WELLS WILL HAVE TO BE INSTALLED. THE PERSON WHO CONDUCTED THE INSPECTIONS IN 1984 LEFT THE DHWM AND THE FILE WAS NOT WORKED ON FOR A WHILE. APPARENTLY THERE WAS NEVER ANY FOLLOW-UP TO THE 33 NOV'S ISSUED AS A RESULT OF THOSE INSPECTIONS. THE COMPANY IS SLOWLY DISMANTLING AND SELLING OFF PORTIONS OF THE FACILITY. HE BELIEVES THEY CURRENTLY HAVE ENFORCEMENT ACTION PENDING AGAINST THEM FOR MINOR PAPERWORK VIOLATIONS. THE PLANT IS 50-75 YRS OLD, HE DOESN'T KNOW THE EXACT AGE OF ANY PARTICULAR WASTE UNIT. THE COMPANY IS NOW OWNED BY A CORP. CALLED ADRON (THE REVERSE SPELLING OF NORDA, IT'S PREVIOUS OWNER). IT LOOKS LIKE THE SITE WILL BE REFERRED TO PLANNING REASSESSMENT AND POSSIBLY ASSIGNED TO CASE MANAGEMENT, A DEPARTMENT THAT TAKES CARE OF LONG TERM PROBLEM SITES.

ACTION ITEMS:

THE DRUM STORAGE AREA WAS DELISTED BY BHWE - THEY DON'T ALWAYS CHECK WITH THE DHWM BEFORE TAKING ACTION ON A SITE. HE DOESN'T KNOW ABOUT CONTAINMENT OF THE DRUM STORAGE AREA OR THE CONDITION OF THE WAREHOUSE.

Paul Bauer

NUS 067 REVISED 0581

REFERENCE NO. 28

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.~~ EPA# NJDC10910099 DATE 20 Aug 84

NAME OF FACILITY Orbis Products

LOCATION OF FACILITY 55 Virginia St Newark

NAME OF OPERATOR William Amaducci

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 7:26-11.2 - Containment of Hazardous Waste Sludge more than 90 Days Tank Size 8'x20'x40' - Sludge to be Tested, Pumped, and Disposed of Law Hazardous Waste Regulation

Remedial action to correct these violations must be initiated immediately and be completed by Sept 5, 1984. 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.

Joseph E Hall Jr
Investigator, Division of Waste Management
Department of Environmental Protection
20 Aug 84

REFERENCE NO. 29

GXIa - fac

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
32 E. Hanover St., CN 028, Trenton, N.J. 08625

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

RICHARD C. SALKIE, P.E.
ASSOCIATE DIRECTOR

Mr. Bill Amaducci, Manager
Orbis Products Company
55 Virginia Street
Newark, N.J. 07114

16 MAY 1986

Dear Mr. Amaducci:

RE: Orbis Products, Status Determination
EPA ID NO. NJD 010 910 099

The Bureau of Hazardous Waste Engineering has received the Status determination of your facility's two (2) underground concrete tanks and two (2) aboveground steel tanks from the Division of Water Resources (DWR). According to DWR, these four (4) tanks are Industrial Waste Management Facilities (IWMF), they are regulated only under DWR, and do not require a hazardous waste facility permit.

However, your facility still operates a third steel tank, which stores hazardous waste. As indicated in our December 10, 1985 letter, under item 3, this tank could be exempted for storage of hazardous waste for less than 90 days. Your facility must apply for this exemption and follow guidelines submitted to you with the December 10th letter.

Item 4 of the aforementioned letter indicates that soil sampling is required for the hazardous waste drum storage area, to assure non-contamination of the soil. Guidelines for this plan were also submitted to you with the same letter.

Please submit to this Bureau documentation concerning the two (2) above mentioned requirements within thirty (30) days of the date of this letter, so the Bureau can proceed with the process of delisting.

REFERENCE NO. 30

NUS CORPORATION

TELECON NOTE

CONTROL NO:	DATE:	TIME:
02-8905-06	June 27 1989	16:13

DISTRIBUTION:

To File; ORBIS Products Corp.

BETWEEN:	OF:	PHONE:
Mr. Tivillyes Engr.	Newark City Water Dept.	(201) 733-8414

AND:

Paul Bauer (NUS)

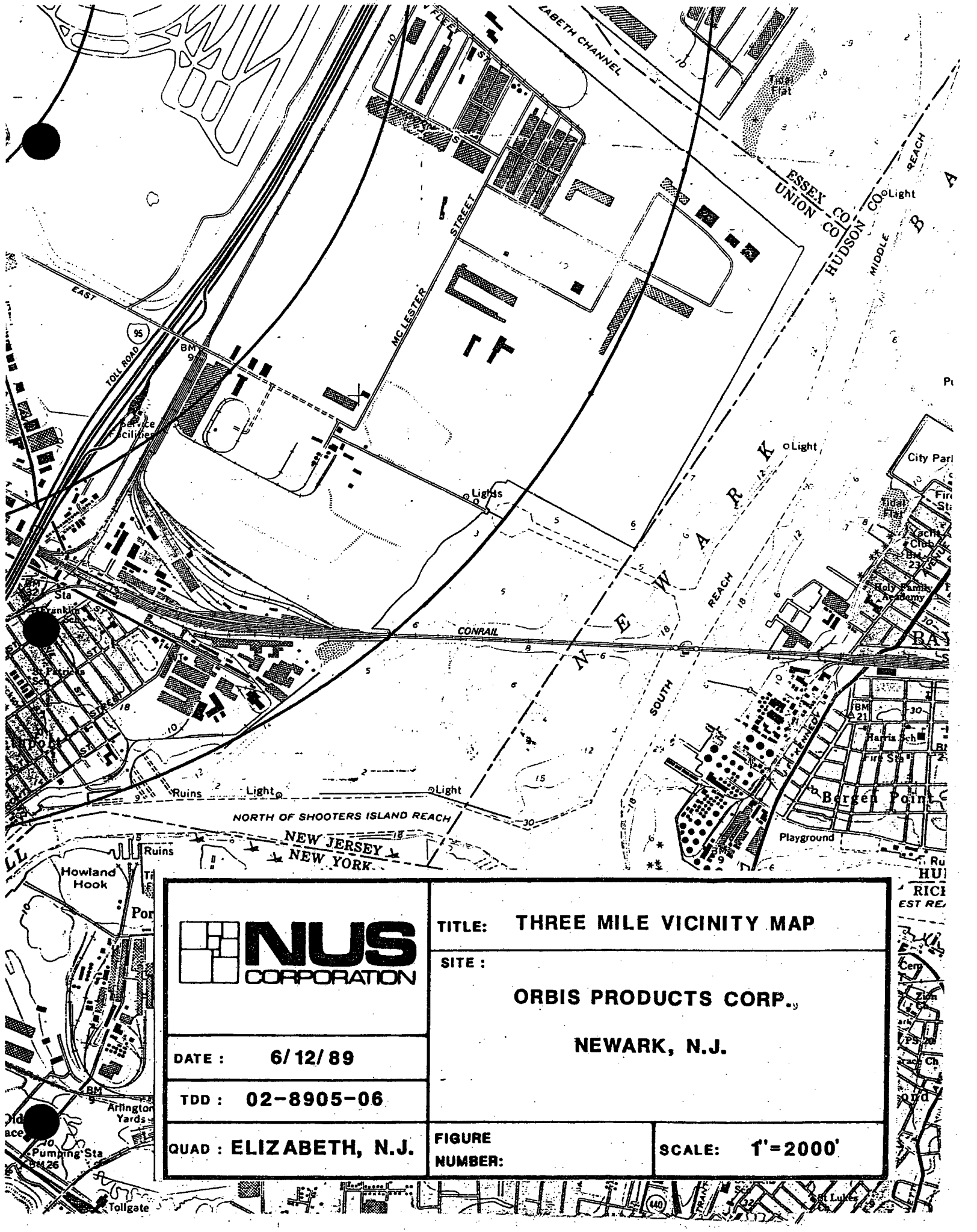
DISCUSSION:

Mr. Tivillyes said that storm sewers and sewage lines are connected in the area of the site. Specifically, along McClellan Street and Virginia Street. They travel to a pumping station near McClellen Street Bridge and then to the Passiac Valley Sewage Treatment Plant.

Paul Bauer

ACTION ITEMS:

NUS 087 REVISED 0581



NUS CORPORATION

TITLE: THREE MILE VICINITY MAP

SITE: ORBIS PRODUCTS CORP., NEWARK, N.J.

DATE: 6/12/89

TDD: 02-8905-06

QUAD: ELIZABETH, N.J.

FIGURE NUMBER:

SCALE: 1"=2000'

LEFT BLANK

REFERENCE 7

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
32 E. Hanover St., CN 027, Trenton, N.J. 08625

JACK STANTON
DIRECTOR

LINO F. PEREIRA
DEPUTY DIRECTOR

Clifford Kuchenmeister
Orbis Products Corporation
140 Route 10
East Hanover, NJ 07936

RE: NOTICE OF VIOLATION
FAILURE TO SUBMIT ANNUAL REPORT

Dear Mr. Kuchenmeister:

As a result of the information included in your company's RCRA Part A submittal to the USEPA, Region II, your hazardous waste activities were classified as a TSD (Treatment, Storage or Disposal) facility status. Pursuant to the provisions of the New Jersey Solid Waste Management Act, N.J.S.A. 13:1E-1, et seq., the Department of Environmental Protection has determined by examination of our files that you failed to submit a TSD Facility Annual Report by March 1, 1982. The requirements of this report are given on the enclosed sheet (along with instructions on how to be delisted from TSD status). Please note that this report is different and separate from the Generator's Report referred to in N.J.A.C. 7:26-7.4(g).

NOW, THEREFORE, YOU ARE HEREBY NOTIFIED that your facility shall submit the required annual report within fifteen (15) days of receipt of this Notice to: Frank Coolick, Chief, Bureau of Hazardous Waste Engineering, 32 East Hanover Street, Trenton, New Jersey 08625.

BE ON NOTICE that the Solid Waste Management Act establishes penalties of up to $25,000 per day for violation of the Department's hazardous waste management regulations. Your failure to correct the above violation, or any future violation, may result in a penalty action by this Department. Failure to submit the required report by the specified date will result in daily fines as follows:

i.	During the first week after the deadline:	$100/day
ii.	During the second week after the deadline:	$200/day
iii.	During the third week after the deadline:	$500/day
iv.	During the fourth week after the deadline and subsequently: a maximum of	$25,000/day

If you have any questions regarding this Notice, please call the Bureau of Hazardous Waste Engineering at (609) 292-9880.

DATE: JAN 07 1983

David J. Shotwell, Chief
Bureau of Compliance and Eforcement

DJS:rh
Enclosure

New Jersey Is An Equal Opportunity Employer

REFERENCE 8

3E

State of New Jersey

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

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

LINO F. PEREIRA
DEPUTY DIRECTOR

AUG 27 1985

Orbis Products Corporation
55 Virginia Street
Newark, NJ 07102

Attention: Clifford Kuchenmeister
Manager

Re: Penalty Settlement Offer

Dear Mr. Kuchenmeister:

Attached is an Administrative Order concerning a violation of the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq and regulations promulgated thereunder, specifically N.J.A.C. 7:26-7.6(f)2.

Pursuant to the terms of the Administrative Order, the violations must be corrected and the rules and regulations of this Department must be complied with by the specified date.

In addition, a penalty settlement offer of $875.00 will be held open until SEP 10 1985 to allow for an amicable resolution of this statutory claim for the referenced violation. Be advised that N.J.S.A. 13:1E-9c provides for a maximum civil penalty of $25,000 per day for violations of this nature.

In the event of non-compliance with the Administrative Order and/or non-acceptance of this penalty settlement offer, this matter will be referred to the Office of the Attorney General for the initiation of litigation to enforce the Order and seek the full penalties allowed by law.

Should you wish to discuss the specifics for acceptable compliance with these directives, contact Dina DiMarsico at (609) 292-9592.

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Be advised that such discussion will not automatically delay or otherwise extend the deadline for compliance with the Administrative Order.

Very truly yours,

Joseph A. Rogalski

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

F01:F026:lmc
Attachments

4D

State of New Jersey

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

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

LINO F. PEREIRA
DEPUTY DIRECTOR

AUG 27 1985

(IN THE MATTER OF)
(ORBIS PRODUCTS CORPORATION)

ADMINISTRATIVE ORDER

The following FINDINGS are made and ORDER is issued pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (Department) by N.J.S.A. 13:1D-1 et seq., the Solid Waste Management Act, as amended and supplemented, N.J.S.A. 13:1E-1 et seq., and duly delegated to the Assistant Director for Enforcement and Field Operations, Division of Waste Management, pursuant to N.J.S.A. 13:1B-4.

FINDINGS

1) The New Jersey Department of Environmental Protection (hereinafter "the Department") has determined that Orbis Products Corporation is operating a hazardous waste facility (EPA ID #NJD010910099) as defined by N.J.A.C. 7:26-1.4 and is located at Block 96, Lot 81, 55 Virginia Street, Newark City, Essex County, New Jersey.

2) As a result of the information included in your company's RCRA Part A submittal to the USEPA, Region II, your hazardous waste activities were classified as a TSD (Treatment, Storage or Disposal) facility status. Pursuant to the provisions of the New Jersey Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., the Department of Environmental Protection has determined by examination of our files that you failed to submit a 1984 TSD Facility Annual Report by March 1, 1985, in violation of N.J.A.C. 7:26-7.6(f)2.

3) N.J.A.C. 7:26-7.6(f)2 states: The owner or operator must prepare and submit two copies of an annual report to the Department by March 1 of each year. The report must include:

   i. The EPA identification number, name and address of the facility.

   ii. The calendar year cover by the report.

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iii. A compilation of the daily operating record kept pursuant to N.J.A.C. 7:26-9.1 et seq. for the calendar year covered by the report.

iv. A summary of all manifest numbers for all hazardous waste received, identifying those shipments which were rejected in whole or in part and identifying those shipments where a discrepancy occurred.

v. For each type of hazardous waste accepted, a report of the total quantity received and the quantities consigned to each treatment, recovery, or disposal process used. The report shall include the quantities of each waste type placed into storage and removed from storage during the reporting period.

vi. Monitoring data under N.J.A.C. 7:14A-6.1 et seq. (Rules of the Division of Water Resources), where required.

vii. The most recent closure cost estimate under N.J.A.C. 7:26-9.8 and the most recent post-closure cost estimate under N.J.A.C. 7:26-9.9, where applicable.

viii. A certification signed and dated by the owner or operator of the facility or his authorized representative stating "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 under N.J.S.A. 7:1E-1 et seq. for submitting false information, including the possibility of fine and imprisonment."

ORDER

NOW, THEREFORE, IT IS HEREBY ORDERED that Orbis Products Corporation, its principals, agents, employees, successors, assigns, tenants, and any receiver or trustee in bankruptcy appointed pursuant to a proceeding in law or equity, (should such an entity be appointed to take control of the facility which is the subject of this Order) shall:

4) Within fifteen (15) calendar days of receipt of this Order submit the required 1984 TSD annual report to:

New Jersey Department of Environmental Protection
Division of Waste Management
Bureau of Compliance & Enforcement
120 Route 156
Yardville, NJ 06820
Attention: Dina DiMarsico

BE ON NOTICE that the maximum civil penalty for violations of the Solid Waste Management Act or an ORDER issued pursuant thereto is $25,000 per day.

Joseph A. Rogalski
Assistant Director

F01:F014:F026:lmc

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Intentionally

REFERENCE 9

Navidi - fac

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
CN 028
Trenton, N.J. 08625
609 - 292 - 1250

MEMORANDUM

14 OCT 1986

TO: Karl Delaney, Acting Chief
Bureau of Compliance and Technical Services

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

SUBJECT: Orbis Products Company
55 Virginia Street
Newark, NJ 07114
EPA ID NO. NJD 010 910 099
Tel. No. (201) 334-1600

The subject facility is a manufacturer of flavors and fragrances, and is both managed and owned by the Amaducci Brothers. An inspection was conducted by this Bureau staff: Al Navidi and Ernie Kuhlwein, on November 15, 1985, which revealed that the facility operates the following activities:

1. S01 activity with a total capacity of 5,500 gallons (100-55 gallon drums).

2. T01 activity with a total capacity of 500,000 gallons/day. This activity was determined to be an IWMF by DWR on 4/18/86.

3. An unauthorized S02 activity, which includes (1) aboveground hazardous waste steel storage tank, with an undetermined total capacity. This activity was never mentioned in the facility's Part A application.

This Bureau requested Orbis, in its May 16, 1986 letter, to submit information concerning its S01 activity, which included a soil sampling plan, and also its S02 activity. No response was ever submitted to this Bureau. A second request was made on 8/11/86, which again had no result. A conversation took place between this Bureau's Al Navidi and Robert Amaducci on 9/4/86, regarding the Bureau's 8/11/86 letter.

14 OCT 1986

During this conversation, Mr. Amaducci requested a few additional days to respond verbally before submitting any information. As of 10/6/86, no response has been received from Orbis, whatsoever.

This Bureau is, therefore, referring the subject facility to your Bureau's attention, for lack of compliance with the following TSDF requirements:

1. Unauthorized operation of an SO2 activity, in violation of N.J.A.C. 7:26-12.3(a).

2. Failure to submit financial assurance for the closure of the facility as specified in N.J.A.C. 7:26-9.10.

3. Failure to demonstrate financial responsibility for bodily injury and property damage to third parties caused by sudden accidental occurrences arising from operations of the facility in the amount of at least $1 million per occurrence, with an annual aggregate of at least $2 million, exclusive of legal defense costs as specified in N.J.A.C. 7:26-9.13.

Please refer to the attached correspondence between Orbis and DEP. Take whatever steps you deem necessary to obtain compliance with the above mentioned requirements of N.J.A.C., and notify this Bureau of your actions. Any questions on this matter, can be referred to Al Navidi at 2-9880.

EP12/slw
Enc.

REFERENCE 10

Form HWM-004
3/87

1/2

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS WASTE MANAGEMENT
~~5th Fl., 401 E. State St., Trenton, N.J. 08625~~
2 BARLOCK PL, W ORANGE NJ 07052

NOTICE OF VIOLATION (201) 669-3960

ID NO. NJD 010 910 099 DATE 10/4/89

NAME OF FACILITY ORBIS PRODUCTS COMPANY

LOCATION OF FACILITY 55 VIRGINIA ST NEWARK, NJ 07114

NAME OF OPERATOR ROBERT & WILLIAM AMADUCCI

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 7:26-9.4(b)2 No written waste analysis plan; -9.4(f)3.iv Inadequate inspection schedule; -9.4(f)6 Inadequate inspection record; ~~-9.4(g)6 iii~~ -9.4(g)6 No documentation of annual training; -9.4(g)7 Failing to keep training records; -9.4(g)8 Failing to hold semi-annual drills; -9.6(e) Inadequate aisle space; -9.6(f) No documentation of arrangements with

Remedial action to correct these violations must be initiated immediately and be completed by 10/25/89. 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.

Thomas Brady
Investigator, Division of Waste Management
Department of Environmental Protection
Thomas Brady
10/10/89

Form HWM-004
3/87

2/2

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS WASTE MANAGEMENT
~~5th Fl., 401 E. State St., Trenton, N.J. 08625~~
2 BABCOCK PL, W ORANGE NJ 07052
(201) 669-3960

NOTICE OF VIOLATION

ID NO. NJD 010 910 099 DATE 10/4/89

NAME OF FACILITY ORBIS PRODUCTS COMPANY

LOCATION OF FACILITY 55 VIRGINIA ST, NEWARK NJ 07114

NAME OF OPERATOR ROBERT + WILLIAM AMADUCCI

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 local agencies (police, fire, hospital, contractor);
-9.6(f)5 Failing to request semi annual fire inspection;
-9.7(f) Incomplete listing in contingency plan (home addresses)
-9.7(i) Failing to submit contingency plan to local authorities;
-9.8(c) No closure plan; -9.3(a)3 Failing to date hazardous waste containers;

Remedial action to correct these violations must be initiated immediately and be completed by 10/25/89. 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.

Thomas Brady
Investigator, Division of Waste Management
Department of Environmental Protection
Thomas Brady
10/10/89

REFERENCE 11

Passaic Valley Sewerage Commissioners

The fifth largest wastewater treatment plant in the US. Established in 1902 by the New Jersey State Legislature for the purpose of alleviating pollution in the Passaic River and its tributaries.

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OVERVIEW TOUR OF THE PASSAIC VALLEY SEWERAGE COMMISSIONERS 330 MILLION GALLONS PER DAY SECONDARY WASTEWATER TREATMENT PLANT NEWARK, NEW JERSEY

OVERVIEW

In order to protect and preserve local streams and rivers from water pollution, the Passaic Valley Sewerage Commissioners (PVSC) operate one of the country's largest treatment plants for the wastewaters of northern New Jersey. With many expansions, and recent upgrading to secondary treatment, the facility has been striving, since its initial operation in 1924, to improve local water quality in accordance with federal and state water quality legislation.

DEVELOPMENT AND EXTENT OF THE PVSC ORGANIZATION

In 1902, by a special act of the State Legislature, the Passaic Valley Sewerage Commissioners was formed as an agency of the State to reduce pollution of the Passaic River and its tributaries. Passaic Valley's early anti-pollution activities actually predated the adoption of the New Jersey Sewerage Authority Law. The organization is one of the oldest and largest, in terms of operational capability, regional sewerage commissions in the United States and is directed by a Board of Commissioners appointed by the Governor and confirmed by the State Senate.

The heavily industrialized service area of northern New Jersey encompasses all of the land draining into the Passaic River from the Great Falls in Paterson to Newark Bay on the Atlantic Ocean. Presently, there are 47 municipalities in portions of Passaic, Bergen, Essex and Hudson Counties with a population of about 1.5 million. The influent flow is about 330 million gallons per day (MGD) (14.45 m^3/s)and is estimated to be a fourth of the total wastewater generated in all of New Jersey.

In addition to the conveyance and treatment of wastewaters, PVSC is also responsible for pollution abatement for the portion of the Passaic River within its service area. The Commission owns about 25 miles (40 km) of intercepting sewers ranging from 3.5 to 13 feet (ft) (1.07 to 3.96 m) in diameter and a 12-ft (3.66 m) diameter, 6-fingered ocean outfall terminating at Robins Reef in New York Harbor. There are several field pumping stations in the collection system along with about 2,000 miles (3,218 km) of lateral sewers owned by the various contributing towns.

DEVELOPMENT OF PVSC TREATMENT FACILITIES

The Passaic Valley Sewerage Commissioners was formed as an agency of the State of New Jersey in 1902. A report completed in 1908 provided the conceptual plan for a primary treatment plant and pumping station to be located in Newark near Newark Bay and for an intercepting sewer to be built parallel to the Passaic River between the Great Falls in the City of Paterson and the mouth of the river in Newark Bay.

Construction of the original facilities recommend in the 1908 report was completed in 1924. The original plant contained a 21-mile (34 km) long interceptor with pumping stations located at Wallington and Yantacaw, a primary treatment facility at Newark Bay containing a steam plant pumping station, and a 5-mile long outfall into New York Harbor.

Since the completion of the original treatment plant and interceptor in 1924, numerous plant expansions have been made to increase capacity. In the 1930's and 1940's, two additional sedimentation basins were constructed. In the 1950's and 1960's, the sedimentation basins were mechanized, the steam pumps in the main station were replaced with electric and diesel drives, and their capacity was increased. Sludge handling facilities were added and modifications were made to the grit chambers and screenings facility.

The facility originally provided only primary treatment for an average sewage flow of about 150 mgd (6.57 m^3/s). Additional construction was initiated in the early 1970's as an important step toward improving treatment, increasing capacity, and implementing EPA requirements concerning chlorination. Those projects consisted of a grit and screenings chamber, grit and screenings incinerator facilities, chlorination facilities, and an Administration and Control Building containing an analytical laboratory.

In order to bring the plant into full compliance with more stringent EPA requirements on water quality, an upgrading to secondary treatment levels was required. Plant design began in 1969 with a 1973 report initiating Step 2 and Step 3 Grants for construction. Field construction began in 1977 and secondary plant start-up began in October, 1981.

The new secondary facilities were constructed alongside the original existing Primary Clarifiers. The first few years of secondary plant operation did not have the benefits of the primary settling facilities. After start-up, all flows passed directly into the secondary system while the old primary basins were demolished (summer, 1982) and new ones constructed in their place. Consequently, start-up of the primary clarifiers in December, 1985 resulted in many process and operational changes.

In order to meet the March 17, 1991 NJDEP deadline to end Sludge Ocean Dumping, a new Interim Sludge Dewatering Facility was constructed. Plant design started in late 1989 and the Facility was started up on March 11, 1991.

SERVICE AREA AND WASTEWATER CHARACTERISTICS

The plant's heavily industrialized 100 square mile (259 km^2) section of northern New Jersey contains a variety of wastewater dischargers. The plant's influent flow is about 15% industrial by volume and 50% industrial by strength. In 1993 there were about 380,000 residential units, 360 large apartment buildings, 2205 large commercial institutions and 380 major industries in the service area.

Of the 380 major industrial plants 296 require pretreatment due to their chemical or heavy metal wastewaters. The dominant industries are

electroplaters, metal finishers, pharmaceutical and organic chemical manufacturers, textile dyers, hospitals, electronic products manufacturers, and newsprint recycling mills.

Operationally the treatment plant must respond to an influent wastewater whose pollutant strength is about double that of the usual domestic sewage with industrial shock loads of 50 to 100 percent above the average. During rainy weather the flow from combined sewers can result in rapid and large hydraulic surges into the plant. About 25% of the drainage basin has combined sewers which contribute 60% of the plant's flow. This combination of strength, industrial component, and system dynamics create a very difficult wastewater for treatment. The plant generates approximately 250 dry tons (227 metric tons) of thickened sludge per day.

DESCRIPTION OF THE TREATMENT FACILITY

The Passaic Valley Sewerage Commissioners wastewater facility is a specialized secondary treatment plant designed to remove approximately 93% of the biochemical oxygen demand (BOD) and 94% of the total suspended solids (TSS). The secondary treatment approach utilizes a pure oxygen-activated sludge process with wet air oxidation for sludge treatment.

The plant is capable of treating an average of 330 mgd (14.45 m^3/s) of wastewater with peak dry weather flows of 400 mgd (17.52 m^3/s) and peak wet weather flows of 550 mgd (24.09 m^3/s). Treatment capacity is in compliance with requirements through the year 2000 and the hydraulic capacity through the year 2040.

The 172 acre (0.70 km^2) plant is one of the largest modern wastewater facility in the Eastern United States and one of the half-dozen largest in the entire Country. It contains over eight miles (13 km) of access roads, over one mile (1.6 km) of 15-foot-wide (4.57 m) utility tunnels, miles of sewers and storm drains, miles of process pipes, thousands of instruments and valves, hundreds of pumps, and a 450 ft (137.16 m) long bridge over Doremus Avenue.

View the Basic Parts of a Wastewater Treatment Plant

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Passaic Valley Sewerage Commissioners

Passaic Valley's Service District

The fifth largest wastewater treatment plant in the US. Established in 1902 by the New Jersey State Legislature for the purpose of alleviating pollution in the Passaic River and its tributaries.

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View the Map

Member Municipalities

Bayonne
Belleville
Bloomfield
Clifton
East Newark
East Orange
East Rutherford
Elmwood Park
Fair Lawn
Garfield
Glen Ridge
Glen Rock
Haledon
Harrison
Hawthorne
Jersey City
Kearny
Little Falls
Lodi
Lyndhurst
Montclair
Newark
North Arlington
North Haledon
Nutley
Orange
Passaic
Paterson
Prospect Park
Rutherford
Saddle Brook
Totowa
Wallington
West Paterson

Contributing Municipalities

Cedar Grove
Elizabeth
Franklin Lakes
Hackensack
Hasbrouck Heights
Hillside
North Caldwell
Ridgewood
South Hackensack
South Orange
Union City
West Orange
Wood-Ridge
Wyckoff

Home Index

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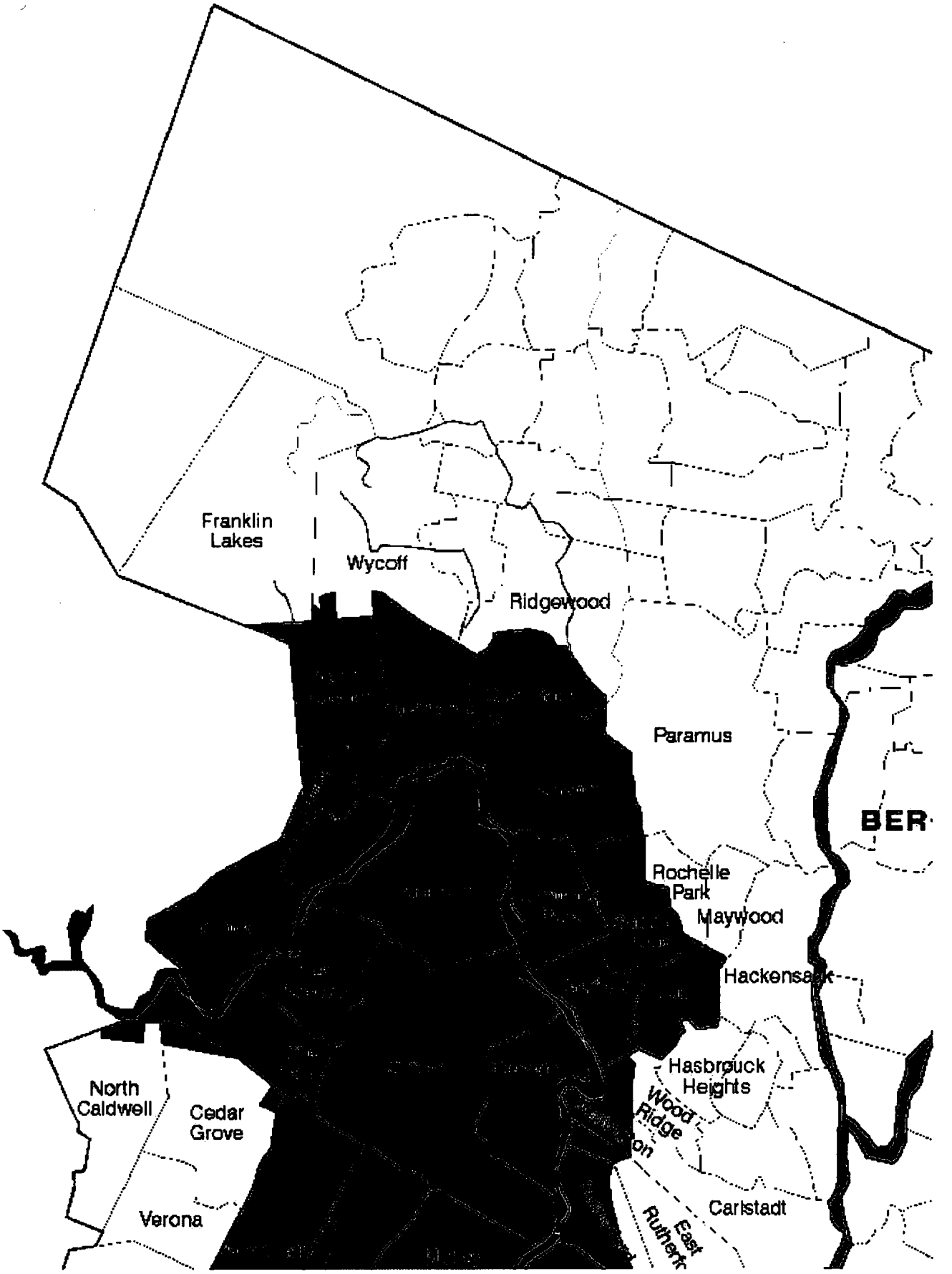
Franklin Lakes
Wycoff
Ridgewood
Paramus
BER
Rochelle Park
Maywood
Hackensack
Hasbrouck Heights
Wood Ridge
East Rutherford
Carlstadt
North Caldwell
Cedar Grove
Verona

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REFERENCE 12

Work Order Number: 20103-001-001-1061-00
Contract Number: 68-W-00-121

Figure 3
Four-Mile Radius Map
Orbis Products Corporation
Newark, Essex County, New Jersey

LEGEND

- Site Location
  - -Longitude: West 74 12 9.5
  - -Latitude: North 40 41 17.3
- Public Supply Well Location
- Ineligible Wetlands Under HRS
- HRS Eligible Wetlands

N W E S

2000 0 2000 4000 Feet

0.25 0 0.25 0.5 0.75 1 Miles

SOURCE: USGS 7.5 Minute Series (Topographic) Quadrangles: Elizabeth, NJ/NY, 1967, photorevised 1981; Roselle, NJ, 1955, photorevised 1981.

DATE: 10/14/02

WESTON SOLUTIONS

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REFERENCE 13

PROJECT NOTE — REGION II SITE ASSESSMENT TEAM

To: Orbis Products File **Date:** 7 October 2002 **Page:** 1 of 1

W.O. No.: 20103.001.001.1061.00

From: Scott Snyder, Region II SAT

Subject: Wellhead Protection Areas

Reference: Designated Wellhead Protection Area Map for the Orbis Products Corporation Site, compiled from USGS 7.5-Minute Series (Topographic) Quadrangles for: "Roselle, NJ," 1955, photorevised 1981; "Elizabeth, NJ-NY," 1967, photorevised 1981; and "Jersey City, NJ-NY," 1967, photorevised 1981.

The attached map (Figure 4) was created by Karen Sotomayor, Geographic Information Systems (GIS) Specialist, Weston Solutions, Inc. The location of designated wellhead protection areas (WHPAs) was provided by the New Jersey Department of Environmental Protection (NJDEP) on CD-ROM. This information was then overlain onto geo-referenced USGS topographic maps, using the GIS Program Arc View 3.2 a.

Signature _____

Scott Snyder

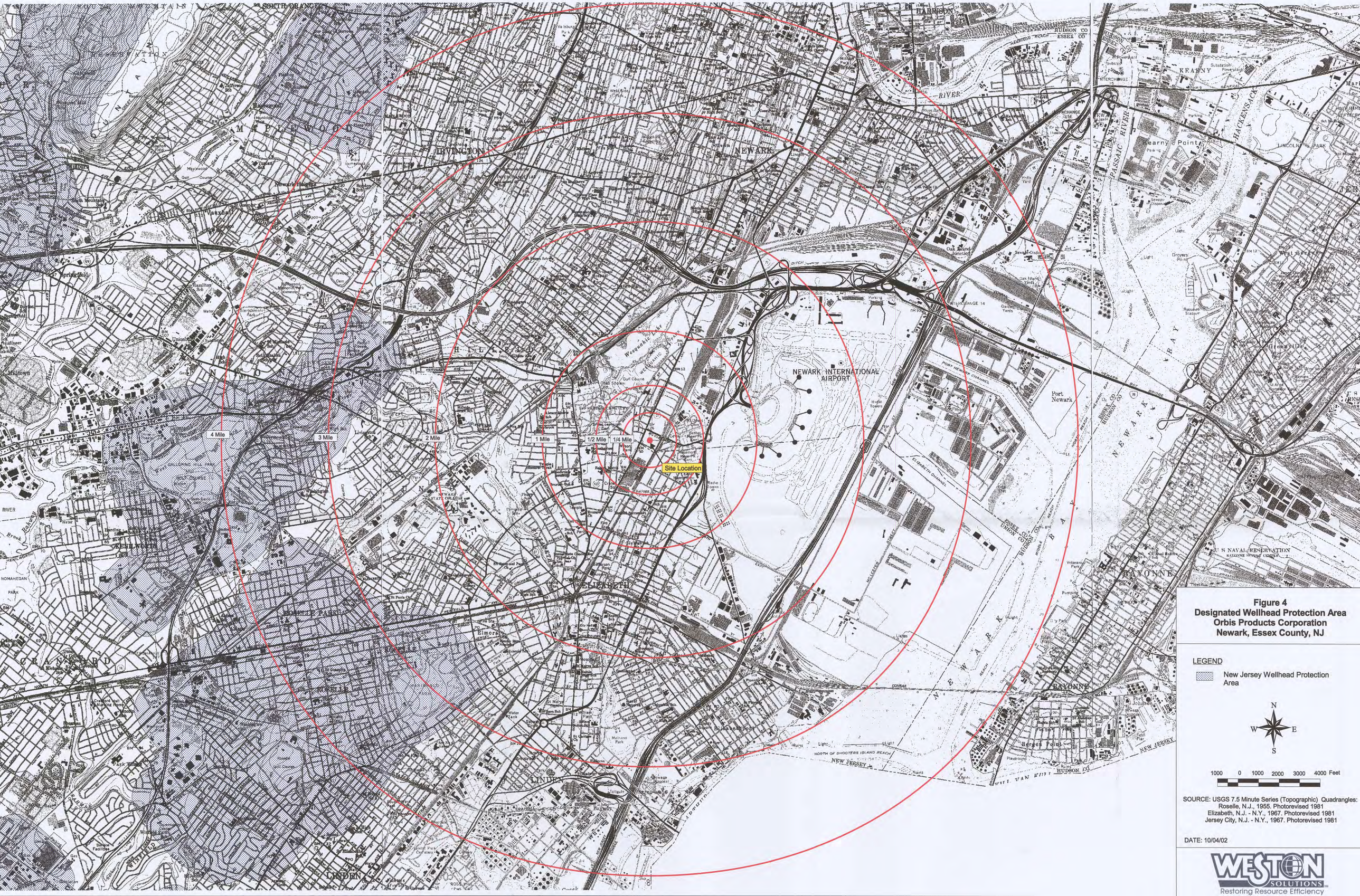

Figure 4
Designated Wellhead Protection Area
Orbis Products Corporation
Newark, Essex County, NJ

LEGEND

New Jersey Wellhead Protection Area

N
W E
S

1000 0 1000 2000 3000 4000 Feet

SOURCE: USGS 7.5 Minute Series (Topographic) Quadrangles:
Roselle, N.J., 1955. Photorevised 1981
Elizabeth, N.J. - N.Y., 1967. Photorevised 1981
Jersey City, N.J. - N.Y., 1967. Photorevised 1981

DATE: 10/04/02

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