Report No.: 8003-05-5
Rev. No.: 0
Work Assignment No.: 019-2JZZ
Contract No.: 68-W9-0051
September 30, 1992

Reviewed: 12/2/92
Recommend: SEA
by G. Ferreira

141973

Ms. Sandra Foose
Pre - Remedial Assistant WAM
Environmental Services Division
U.S. Environmental Protection Agency
Region II
Edison, NJ 08837

RE: Bayonne Drum & Barrel Company Site Inspection Prioritization Evaluation

Dear Ms. Foose:

The following is a summary of the Site Inspection Prioritization Evaluation for the Bayonne Drum & Barrel Company, (CERCLIS ID No. NJD009871401) located at 150 Raymond Boulevard, Newark, New Jersey.

General Description and Site History

The Bayonne Drum & Barrel Company is an inactive drum reconditioning facility. The property is bounded by Routes 1 and 9 on the west and north, the New Jersey Turnpike on the east, and the former Newark Drive-In Movie Theater on the South (Ref. No. 19, p. 2). The site covers approximately 15 acres and most of the site (9.3 acres) is owned by Bayonne Drum & Barrel Company while the remaining area (5.5 acres) is owned by Bayonne Drum & Barrel Company's principal owner Frank Langella. A small portion to the south of the site is owned by the New Jersey Turnpike Authority (Ref. No. 19, p. 2). The site contains a number of buildings, an incinerator, above-ground ahd underground storage tanks, tire piles, and a large empty drum storage area (Ref. No. 19, p. 3). The site is relatively flat with a slight slope to the northeast (Ref. No. 19, p. 75). Drainage follows this topography and empties into stormwater drains along the site's eastern border which eventually enters the Passaic River (Ref. No. 19, p. 5). The drum cleaning operations formerly involved both closed head and open head drums. In closed head cleaning, chains and a caustic solution were used to wash out previous material in the drums. Open head cleaning of the drums consisted of placing them on a conveyor belt which passed the drums through the incinerator where the inside residues were burned off. This residue was collected in two on-site subsurface holding/settling tanks (Ref. No. 19, p. 3). The facility was in operation from 1931 to 1982 (Ref. No. 19, p. 2). Bayonne Drum & Barrel Company is currently in bankruptcy and a portion of the property has been leased to a company that repairs and maintains trailers and cargo containers. During June 1988, waste ash and aqueous samples were collected by Dan Raviv Associates for the U. S. Environmental Protection Agency (EPA) from various locations on-site. The sample analytical results which were analyzed by the EPA laboratory and a sample location map is provided in the Site Inspection Review (Ref. No. 19, pp. 49-55, 56). The samples were analyzed for EP Toxicity (metals only), volatile and non-volatile organic analysis and polychlorinated biphenyls (PCBs). Analytical results of these samples indicate the presence of various volatiles, inorganic metals, polynuclear aromatic hydrocarbons (PAHs), and PCBs (Ref. No. 19, pp. 49-55).

Evaluation of Existing Information

Information in the site file for Bayonne Drum & Barrel Company was used to conduct the initial evaluation of the site. In February 1984, a Resource Conservation and Recovery Act (RCRA) sampling survey was conducted by the EPA. Sampling was conducted to determine compliance with a May 1982 complaint and compliance order. EPA took soil and aqueous samples from the area around the underground settling tank, the subsurface tank near the incinerator, and the oil/water separator trench. Ash samples were taken from the ash sludge pile at the rear of the property. Analytical results indicated inorganic metals, and total volatiles in the soil and ash samples. The soil samples also contained elevated levels of PCB's (Aroclors 1248 and 1254). There were elevated levels of semi-volatile organics detected in the aqueous waste samples

(Ref. Nos. 8; 19, pp. 171-180). These samples were analyzed by the EPA Laboratory in Edison, NJ but the sampling report contained no information as to whether the data was subject to a Quality Assurance/Quality Control (QA/QC) review. From January 1985 to January 1986, Dan Raviv Associates conducted soil, surface water/sediment and groundwater sampling at the site. Analytical results indicated the presence of PCBs, total petroleum hydrocarbons and volatile organics (Ref. Nos. 18; 19, pp. 9, 10). The samples were analyzed by Gollob Analytical Laboratory in Berkeley Heights, NJ. The data was not subject to a formal QA/QC review. During April and May 1988, Louis Berger Associates conducted soil and groundwater sampling at the site. Analytical results indicated organic and inorganic contaminants in the soils and volatile and semi-volatile organics in the groundwater samples. The analytical data was not subject to a QA/QC review by NJDEP but was reviewed by a QA coordinator for Louis Berger Associates (Ref. No. 19, pp. 9, 122-170). The analytical data from the waste ash and waste aqueous samples collected by EPA during the 1988 RCRA sampling was interpreted as indicating the presence of PCBs (Aroclors 1248 and 1254) and volatile and semi-volatile organics in various ash piles located around the property. Analytical results indicated elevated levels of various on-site contaminants but no adequate background samples were obtained during the sampling. The samples were analyzed by the EPA laboratory in Edison, NJ. The analytical data was subject to a QA review by EPA Region II personnel (Ref. No. 19, pp. 10-11, 43-66).

Hazard Assessment

Updated and additional information and data collected to further evaluate the site included groundwater population data, sensitive environment information, surface water flow rate, and 4-mile radius populations.

Groundwater Pathway - During the Dan Raviv Associates investigations, groundwater samples were obtained from the five on-site wells. During the 1988 RCRA sampling event there were no samples taken from the groundwater monitoring wells. The aquifer of concern in the area of the site is the Brunswick Formation (Ref. No. 15, p. 15). The depth to groundwater is three to four feet and groundwater flow direction is toward the east (Ref. No. 19, p. 4). The Brunswick formation is composed primarily of the soft red shale and red sandstone (Ref. No. 15, p. 13). In the Newark Area the aquifer is recharged by precipitation infiltration. There are no known potable supply wells within the suspected contamination boundary of the site. Groundwater within a four-mile radius of the site is not used as a drinking water source, as people receive their water from several reservoirs which are not located along the surface water pathway (Ref. Nos. 6, 7, 8, 9, 10, 11). The proximity of the site to a wellhead protection area cannot be determined, pending promulgation by the NJDEPE of protected areas which are not yet defined (Ref. No. 13).

Surface Water Pathway - During the 1988 RCRA sampling, no surface water/sediment samples were collected from the nearby surface water bodies. The nearest downslope surface water is the Passaic River (777 cfs) which is approximately 2,000 feet to the east. The Passaic River empties into Newark Bay (Ref. Nos. 5; 19, pp. 4, 5). The Passaic River is tidally influenced up to the Dundee Dam in Paterson (Ref. No. 14). In addition the river is used for industrial purposes and occasional recreational boating (Ref. No. 19, p. 5). There is a prohibition on the sale and consumption of all fish, shellfish or crustaceans from the Passaic River (Ref. No. 14). In addition, there is a prohibition on the sale or consumption of striped bass, blue crabs and the sale of American eels from the entire Newark Bay Complex (Ref. No. 14). Due to the tidal influence of the Passaic River, there are approximately 11 miles of wetland frontage found upstream and downstream of the site (Ref. No. 4). The nearest wetlands upstream is two miles and downstream is three-quarters of a mile, respectively, from the nearest probable point of entry. No analytical data are available to indicate that any fisheries or sensitive environments referred to above have been actually contaminated.

Soil Exposure Pathway - During the 1988 RCRA sampling event no on-site soil samples were obtained but during the 1985 to 1986 Raviv soil sampling volatile organic, total petroleum hydrocarbons and Inorganic metals were detected at various locations on-site (Ref. Nos. 18; 19, pp. 76-78). Analytical results of the ash samples from the ash pile on-site were obtained during this sampling event. Those ash samples from the waste ash pile at the rear of the property indicated elevated levels of volatile organics, inorganic metals and PCBs (Aroclors 1248 and 1254) (Ref. Nos. 18; 19, pp. 49-55). The facility is inactive, completely fenced, and there is only one security guard present on the property as a worker (Ref. Nos. 17; 19, pp. 5, 6). There are no residences, day care facilities or schools within 200 feet of the suspected soil contamination boundary (Ref. No. 2). There are no known terrestrial sensitive environments located on areas of documented soil contamination.

Air Pathway - There are no analytical results available to determine if a release to air has occurred. Since PCB's and metals are of concern at the site in the waste ash pile and dry and dusty conditions may occur, a potential for a release to air via contaminated particulates may potentially exist. The facility is inactive with one security guard on-site (Ref. No. 17). There are approximately 431,504 people living within a 4-mile radius of the site (0 - 0.25 mile, 1; 0.25 - 0.5 mile, 1,206; 0.5 - 1 mile, 4,199; 1 - 2 miles, 37,400; 2 - 3 miles, 146,043; 3 - 4 miles, 242,655) (Ref. No. 3). There are no sensitive environments located within 0.5 miles of the site (Ref. Nos. 2, 4.).

Summary

There are no analytical results to indicate a release to air has occurred from this site. Analytical results indicate the presence of volatile organics, Inorganic metals and PCB's in the on-site waste ash pile. There were no analytical samples collected from the on-site groundwater monitoring wells nor were surface water/sediment samples collected from any nearby surface water bodies during the 1988 EPA RCRA sampling. There are no sensitive environments located within a half mile from the site. The nearest wetlands are two miles upstream and three-quarters of a mile downstream from the probable point of entry. There is a closed fishery for the Passaic River and a limited fishery in the Newark Bay Complex.

Very truly yours,

GARY BIELEN
SITE MANAGER

JOHN D. RIECKHOFF
PRE-REMEDIAL PROGRAM MANAGER

DENNIS STAINKEN, Ph.D.
WORK ASSIGNMENT MANAGER

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This Report was conducted
under the following
USEPA Documentation Procedure

Guidance for Performing Site
Inspections Under CERCLA
Draft Publication 9345.1-0

ATTACHMENT 1

REFERENCES

1. Comprehensive Environmental Response Compensation Liability Information System (CERCLIS) List 8, Site/Event Listing, U.S. EPA Superfund Program, 1992.

2. Four-Mile Vicinity Map for Bayonne Drum & Barrel Company compiled from U.S. Geological Survey Topographic Maps, 7.5 minute series, "Elizabeth, N.J. Quadrangle", 1967, photorevised 1981; "Jersey City, NJ Quadrangle," 1967, photorevised 1981; "Orange, NJ Quadrangle," 1955, photorevised 1981; and "Weehauken, NJ Quadrangle," 1967, photorevised 1981.

3. General Sciences Corporation, Person Computer Version of the Graphical Exposure Modeling System (PCGEMS) 1980.

4. U.S. Department of the Interior, Fish and Wildlife Services, "Atlas of National Wetlands Inventory Maps for New Jersey - Elizabeth, Jersey City, Arthur Kill, The Narrows, Orange and Weehauken Maps", 1984.

5. U.S. Department of the Interior, U. S. Geological Survey, "Water Resources Data, New Jersey, Water Year 1990."

6. Telecon Note: Conversation between Anthony Debarros, Newark Water Department and Lisa Szegedi, Malcolm Pirnie, Inc. (MPI), February 24, 1992.

7. Telecon Note: Conversation between Sharon Sterople, Kearny Water Department and Gary Bielen, Malcolm Pirnie, Inc., July 16, 1992.

8. Telecon Note: Conversation between Tom Cifelli, Harrison Water Department and Gary Bielen, Malcolm Pirnie, Inc., February 24, 1992.

9. Telecon Note: Conversation between Whitey Coughlin, Jersey City Water Department and Gary Bielen, Malcolm Pirnie, Inc.

10. Telecon Note: Conversation between Bob Noe, North Ariington Water Department and Gary Bielen, Malcolm Pirnie, Inc., February 2, 1992.

11. Telecon Note: Conversation between M. Tender, Bayonne Water Department and Gary Bielen, Malcolm Pirnie, Inc., February 21, 1992.

12. Project Note: To Bayonne Drum & Barrel Company file from Gary Bielen, Subject: Wetlands Along the Surface Water Pathway, August 11, 1992.

13. Telecon Note: Conversation between Dan Van Abs, New Jersey Department of Environmental Protection and Energy (NJDEPE), Bureau of Water Supply Planning and Kathy Campbell, NUS Corporation, February 14, 1992.

14. New Jersey Department of Environmental Protection and Energy, Division of Fish, Game and Wildlife, "New Jersey Fish & Wildlife Digest", April 1992.

15. N. J. Department of Conservation and Economic Development, Division of Water Policy and Supply, "Prellminary Report on the Geology and Ground-Water Supply of the Newark, New Jersey Area", 1951.

16. Superfund Chemical Data Matrix Data Sources (SCDM), November 1, 1991.

17. Telecon Note: Conversation between Mario Crawford, Bayonne Drum & Barrel and Gary Bielen, Malcolm Pirnie, Inc., August 26, 1992.

18. Project Note: To Bayonne Drum & Barrel Company file from Gary Bielen, Malcolm Pirnie, Inc., Subject: Analytical Results for Dan Raviv Sampling, August 31, 1992.

19. New Jersey Department of Environmental Protection (NJDEP), Bureau of Planning and Assessment, "Site Inspection Review of Bayonne Drum and Barrel Company", December 2, 1988.

REFERENCE NO. 1

SELECTION:
SEQUENCE: REGION, STATE, SITE NAME

EVENTS: ALL

EPA ID NO.	SITE NAME / STREET / CITY / COUNTY CODE AND NAME	STATE	ZIP / CONG DIST.	OPRBLE UNIT	EVENT TYPE	EVENT QUAL	ACTUAL START DATE	ACTUAL COMPL DATE	CURRENT EVENT LEAD
NJOOD0606814	BAY CITY OIL SERVICE			00	DS1			04/10/84	STATE(FUND)
	JULIA AND SPRING STS.				PAI	NO FURTHER REMDL ACT PLND	03/29/87	03/31/87	STATE(FUND)
	ELIZABETH	NJ	07201						
	039 UNION		NJ-12						
NJ0930504849	BAYONNE CITY DUMP			00	DS1			08/01/80	EPA (FUND)
	NORTH HOOK ROAD				PAI	HIGHER PRIORITY		09/01/84	STATE(FUND)
	BAYONNE	NJ	07002		S11	DEFERRED TO RCRA OR NRC	06/30/89	09/29/89	STATE(FUND)
	017 HUDSON		NJ-14						
NJD930769962	BAYONNE D.P.W.			00	DS1			04/10/84	STATE(FUND)
	HOOK RD				PAI	NO FURTHER REMDL ACT PLND		05/31/85	STATE(FUND)
	BAYONNE	NJ	07002						
	017 HUDSON		NJ-14						
NJD009871401	BAYONNE DRUM & BARREL CO			00	DS1			11/01/79	EPA (FUND)
	PULASKI SKYWAY				PAI	NO FURTHER REMDL ACT PLND		03/01/80	EPA (FUND)
	NEWARK	NJ	07101		S11	NO FURTHER REMDL ACT PLND	02/20/89	03/31/89	EPA (FUND)
	013 ESSEX		NJ-10						
NJD981082860	BAYONNE GAS WORKS			00	DS1			04/01/85	STATE(FUND)
	OAK ST				PAI	LOWER PRIORITY		04/30/85	STATE(FUND)
	BAYONNE	NJ	07020		S11	NO FURTHER REMDL ACT PLND	06/08/88	06/15/88	EPA (FUND)
	003 BERGEN		NJ-09						
NJD054288855	BAYONNE INDUSTRIES			00	DS1			06/01/81	EPA (FUND)
	FOOT OF E 22ND ST				PAI	LOWER PRIORITY		06/01/84	EPA (FUND)
	BAYONNE	NJ	07002		S11	NO FURTHER REMUL ACT PLND	05/01/85	05/31/85	EPA (FUND)
	017 HUDSON		NJ-14						
NJD986579480	BCS ASSOCIATES			00	DS1			05/10/90	STATE(FUND)
	1218 WALNUT STREET				PAI	LOWER PRIORITY		06/21/90	STATE(FUND)
	HAMILTON TOWNSHIP	NJ	08610		S11	HIGHER PRIORITY	01/01/91	03/28/91	STATE(FUND)
	021 MERCER		NJ-04						

REFERENCE NO. 2

TITLE:

FOUR–MILE VICINITY MAP

SITE NAME:

BAYONNE DRUM & BARREL
NEWARK , HUDSON COUNTY, N.J.

DATE: SEPTEMBER 30, 1992 | SCALE: 1" = 2000'

REPORT NUMBER: 8003–05–5

USGS TOPO NAME:

ELIZABETH ,NEW JERSEY

REFERENCE NO. 3

GSC-TR-32-90-008

DRAFT

PCGEMS USER'S GUIDE RELEASE 1.0

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF PESTICIDES AND TOXIC SUBSTANCES
EXPOSURE EVALUATION DIVISION

Under
Contract No. 68024281
Task No. 2-28
Project Officer: Lynn Delpire
Task Manager: Patricia Harrigan

Prepared by

GENERAL SCIENCES CORPORATION
6100 Chevy Chase Drive
Laurel, Maryland 20707

April 1990

BAYONNE DRUM & BARREL CO

LATITUDE 40:43:56 LONGITUDE 74:07:35 1980 POPULATION

KM	0.00- 0.4	0.4- 0.8	0.8- 1.6	1.6- 3.2	3.2- 4.8	4.8- 6.4	SECTOR TOTALS
S 1	1	1206	4199	37400	146043	242655	431504
RING TOTALS	1	1206	4199	37400	146043	242655	431504

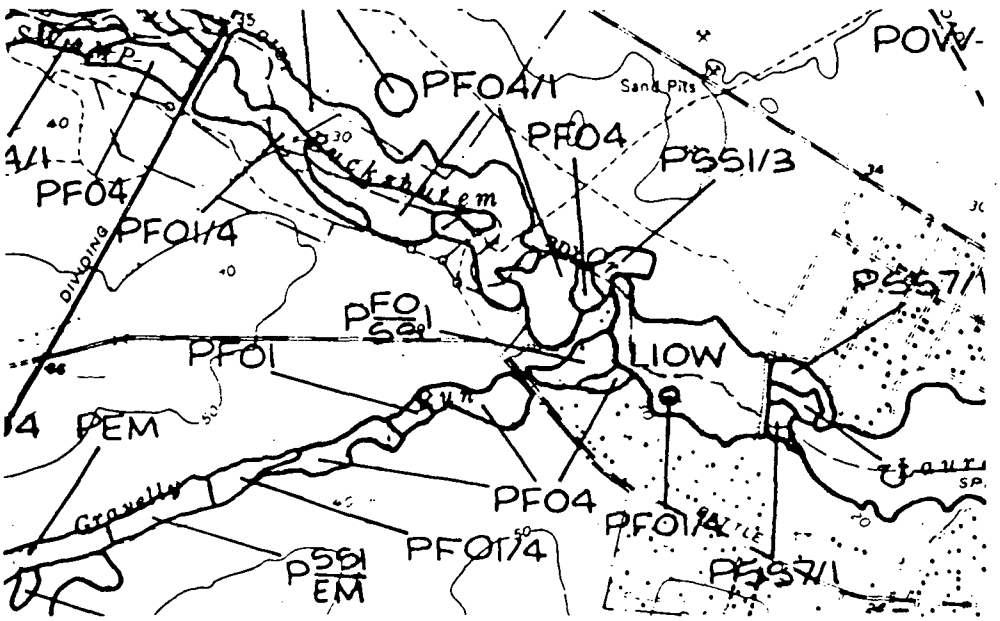
REFERENCE NO. 4

NATIONAL WETLANDS INVENTORY
UNITED STATES DEPARTMENT OF THE INTERIOR

NATIONAL WETLANDS INVENTORY
UNITED STATES DEPARTMENT OF THE INTERIOR

TITLE: FIFTEEN–MILE SURFACE WATER PATHWAY MAP	
SITE NAME: BAYONNE DRUM & BARREL CO. NEWARK, ESSEX COUNTY, N.J.	
DATE: SEPTEMBER 30, 1992	SCALE: 1" = 3638'
REPORT NUMBER: 8003–05–5	
USGS TOPO NAME: ELIZABETH , NEW JERSEY	

ATLAS
OF
NATIONAL WETLANDS INVENTORY MAPS
FOR
NEW JERSEY



PORTION OF DIVIDING CREEK MAP SCALE: 1:24,000

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

1984

HOW TO USE THIS ATLAS

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

WETLAND LEGEND

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

Examples of Alpha-numerics:

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

SYMBOLOGY

Systems and Subsystems:

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

Classes (subclasses and modifers designated where appropriate):

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

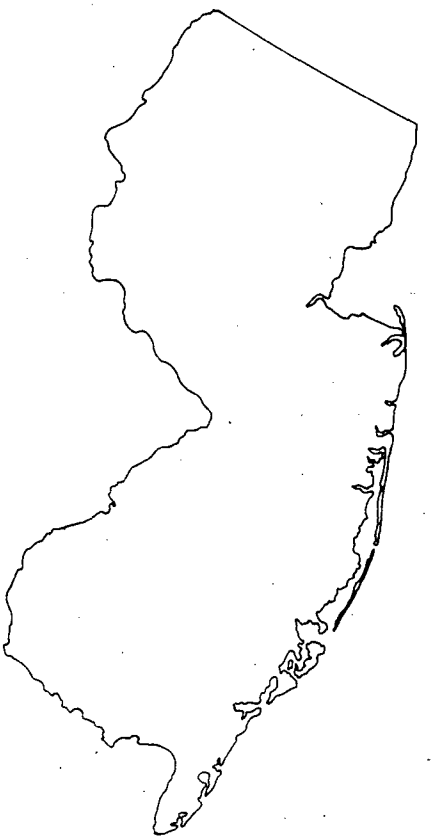
REFERENCE NO. 5

Water Resources Data
New Jersey
Water Year 1990

Volume 1. Surface-Water Data

WATER RESOURCES DATA
BOOK 1 1990

MANUAL 4



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT NJ-90-1
Prepared in cooperation with the New Jersey Department of Environmental Protection and with other agencies

01381900 PASSAIC RIVER AT PINE BROOK, NJ

LOCATION.--Lat 40°51'45", long 74°19'18", Morris County, Hydrologic Unit 02030103, on downstream left wingwall of bridge on U.S. Route 46, 0.5 mi east of Pine Brook, and 1.3 mi downstream from Rockaway River.

DRAINAGE AREA.--349 mi^2.

PERIOD OF RECORD.--Occasional low-flow measurements, water years 1963-69, 1973, and annual maximum, water years 1966-75, 1978-79. October 1979 to current year. Feb. 19 to Aug. 24, 1939 in files of U.S. Army Corps of Engineers, New York District.

REVISED RECORDS.--WDR NJ-77-1: 1967(M).

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 149.26 ft above National Geodetic Vertical Datum of 1929. December 1965 to September 1979, crest-stage gage at same site at datum 10.00 ft higher. Feb. 19 to Aug. 24, 1939, water-stage recorder at present State Route 506 bridge, 1,600 ft upstream from gage, operated by U.S. Army Corps of Engineers, New York District at datum 13.05 ft higher.

REMARKS.--Records fair except those above 1,000 ft^3/s, which are poor. Flow regulated by Boonton and Splitrock Reservoirs (see Passaic River basin, reservoirs in) and many small lakes. Water diverted from Boonton Reservoir for municipal supply of Jersey City (see Passaic River basin, diversions). Several measurements of water temperature were made during the year. Satellite telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage since at least 1810, according to State Geologist's report for 1904, 23.2 ft, Oct. 10, 1903, present datum, from King Survey of highwater marks at present State Route 506 bridge, 1,600 ft upstream from gage. Floods of Mar. 13, 1936 and Sept. 24, 1938 reached stages of 20.8 ft and 19.4 ft respectively, at present State Route 506 bridge and present datum. Flood of July 23, 1945 reached a stage of 22.3 ft at present site and datum according to U.S. Army Corps of Engineers; minimum observed, 41.1 ft^3/s, Sept. 22, 1964.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990, DAILY-MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	867	1130	591	387	2660	532	705	467	2150	398	257	515
2	759	1230	525	433	2450	489	671	412	1930	496	232	413
3	901	1180	478	355	2210	452	826	347	1680	437	185	360
4	925	1040	406	318	2000	437	1220	317	1430	339	162	308
5	778	880	361	304	1860	407	1260	588	1190	267	150	265
6	599	753	356	300	1690	379	1120	765	936	219	650	240
7	469	668	353	301	1470	371	984	712	756	196	1280	226
8	394	633	332	287	1280	363	924	574	655	180	1690	211
9	348	833	306	319	1100	354	822	477	606	185	1760	195
10	312	1110	283	414	974	365	711	528	655	237	1610	191
11	347	1230	279	541	988	385	697	1160	639	219	1940	188
12	341	1230	277	554	989	397	714	1690	538	231	2400	189
13	309	1110	272	496	909	388	653	1800	438	510	2480	187
14	276	999	259	407	807	368	567	1820	382	665	2350	201
15	257	1170	242	366	721	344	697	1800	485	624	2120	325
16	256	1060	241	345	684	332	920	1830	650	687	1850	306
17	357	931	223	327	668	333	972	3010	594	588	1520	347
18	774	838	215	364	623	562	905	4080	481	448	1210	354
19	966	743	205	439	561	670	795	3930	637	345	903	287
20	1570	656	201	443	513	754	684	3410	734	278	642	291
21	2820	602	e190	570	481	1110	595	2930	726	235	460	267
22	3510	534	e185	760	446	1290	590	2510	722	281	372	309
23	3430	491	e185	788	533	1230	564	2120	667	305	337	490
24	3120	476	e180	719	719	1050	508	1750	543	481	560	427
25	2760	452	e165	712	838	873	464	1420	430	555	796	340
26	2420	455	e160	1060	807	729	453	1170	357	426	844	278
27	2080	493	e160	1440	706	623	425	965	311	349	715	247
28	1750	601	e160	1630	610	561	394	796	279	256	578	225
29	1440	681	e160	1610	---	522	362	755	255	209	535	206
30	1190	651	e160	2090	---	557	476	1460	284	189	572	195
31	1030	---	e180	2640	---	689	---	2100	---	183	575	---
MEAN	1205	889	267	701	1002	578	723	1538	738	355	1024	286
MAX	3510	1230	591	2640	2660	1290	1260	4080	2150	687	2480	515
MIN	256	452	160	287	446	332	362	317	255	180	150	187
IN.	3.98	2.65	.88	2.32	3.23	1.91	2.31	5.08	2.36	1.17	3.38	.91

STATISTICS OF MONTHLY FLOW DATA FOR PERIOD OF RECORD, BY WATER YEAR (WY)

MEAN	353	553	700	522	795	886	1277	965	571	407	299	282
MAX	1205	922	2286	797	1221	2067	2842	2537	1482	1485	1024	849
(WY)	1990	1986	1984	1987	1984	1983	1983	1989	1984	1984	1990	1989
MIN	134	161	107	105	211	272	161	380	188	168	117	91.0
(WY)	1981	1981	1981	1981	1980	1981	1985	1986	1981	1980	1981	1980

REFERENCE NO. 6

ARCS II CONTRACT 68-W9-0051
MALCOLM PIRNIE, INC.
RECORD OF TELEPHONE CONVERSATION/AGREEMENT

File No. 8002-092 Scientific Glass

Date: 2/24/92 Time: 10:45 [X] AM [ ] PM

[ ] Incoming Call From: _____ Telephone No.

Affillation: _____

[X] Outgoing Call To: Anthony Deboccos (201)-239-4493 Telephone No.

Affiliation: Newark Water Dept

Malcolm Pirnie Staff: Lisa Szegedi (609)-860-0100
(Receiving or Calling) Name Telephone No.

Summary of [X] Conversation [ ] Agreement:

Bloomfield receives their water from Newark. They receive from Wanaque and Pequannock Reservoirs but Bloomfield only receives from Pequannock - intake in West Milford - the source is the Charlotteburg Reservoir located in West Milford

f:\rectele.jan(1)

REFERENCE NO. 7

ARCS II CONTRACT 68-W9-0051
MALCOLM PIRNIE, INC.
RECORD OF TELEPHONE CONVERSATION/AGREEMENT

File No. 0003-055 Bayonne Barrel & Drum Co.

Date: 7/16/92 Time: 10:00 [X] AM [ ] PM

[ ] Incoming Cali From: _____ Telephone No.

Affiliation: _____

[X] Outgoing Call To: Sharon Steraple (201) 991-2700 Telephone No.

Affiliation: Kearny Water Dept.

Malcolm Pirnie Staff: Gary Bielen (609) 860-0100
(Receiving or Calling) Name Telephone No.

Summary of [X] Conversation [ ] Agreement:

The Town of Kearny receives its water from the Wanague Reservoir.

Kearny currently has 38,000 people receiving their drinking water from this source.

f:\rectele.jan(1)

REFERENCE NO. 8

ARCS II CONTRACT 68-W9-0051
MALCOLM PIRNIE, INC.
RECORD OF TELEPHONE CONVERSATION/AGREEMENT

File No. 8002-052 Scientific Glass

Date: 2/24/92 Time: 1:52 [ ] AM [X] PM

[ ] Incoming Call From: _____ Telephone No.

Affiliation: _____

[X] Outgoing Call To: Tom Cifelli, supt (201)-268-2431 Telephone No.

Affiliation: Harrison water dept

Malcolm Pimie Staff: Lisa Szegedi (609)-800-0100
(Receiving or Calling) Name Telephone No.

Summary of [ ] Conversation [ ] Agreement:

Harrison receives from Passaic Valley Water Commission - Upper Passaic River and Wanaque Reservoir
No municipally owned wells

f:\rectele.jan(1)

REFERENCE NO. 9

BOONTON ELECTRONICS

ARCS II CONTRACT 68-W9-0051
MALCOLM PIRNIE, INC.
RECORD OF TELEPHONE CONVERSATION/AGREEMENT

File No._____
Date:_____ Time:_____ [] AM; [] PM

[] Incoming Call From:_____
Telephono No.
Affiliation:_____

[X] Outgoing Call To: WHITEY COUGHLIN 201-547-4456
Telephone No.
Affiliation: JERSEY CITY WATER DEPARTMENT

Malcolm Pirnie Staff: R. KAMPFER
(Receiving or Calling) Name Telephone No.

SUMMARY OF [X] CONVERSATION [] AGREEMENT:

MR. COUGHLIN RELATED TO ME THAT THE "BOONTON RESERVOIR" ~~[illegible]~~ PTIC IS THE PRIMARY WATER SUPPLY FOR PUBLIC DRINKING WATERS SERVING JERSEY CITY, HOBOKEN, AND NORTH ARLINGTON - NEW JERSEY. APPROXIMATELY 50,000 CUSTOMERS ARE BEING SERVED. ADDITIONALY, THIS SUPPLY IS THE ONLY SUPPLY FOR THE CITIES, THERE IS NO BACK-UP GROUNDWATER WELLS.

Follow-up Action: N/A
(Specify)

Action By: —
Name Action Due Date

Copy to: —

[] Continued

REFERENCE NO. 10

ARCS II CONTRACT 68-W9-0051
MALCOLM PIRNIE, INC.
RECORD OF TELEPHONE CONVERSATION/AGREEMENT

File No. S002-092 Scientific Glass

Date: 2/24/92 Time: 1:34 [ ] AM [X] PM

[ ] Incoming Call From: _____ Telephone No.

Affiliation: _____

[X] Outgoing Call To: Bob Noe (201)-955-5665 Telephone No.

Affiliation: North Arlington water dept

Malcohn Pirnie Staff: Lisa Szegedi (609)-866-0100
(Receiving or Calling) Name Telephone No.

Summary of [ ] Conversation [ ] Agreement:

North Arlington buys water from Passaic Valley Water Co - Reservoir Water - no municipality owned wells
phone # for Passaic Valley Water Co 201-340-4300

f:\rectele.jan(1)

REFERENCE NO. 11

ARCS II CONTRACT 68-W9-0051
MALCOLM PIRNIE, INC.
RECORD OF TELEPHONE CONVERSATION/AGREEMENT
SOUTHERN CALIFORNIA CHEMICAL

File No. 8002-93-1

Date: 21 FEBRUARY 1992 Time: 1050 [X] AM [ ] PM

[ ] Incoming Call From: _____
Telephone No.
Affiliation: _____

[ ] Outgoing Call To: M. TENDER 201-858-6172
Telephone No.
Affiliation: BAYONNE WATER DEPT.

Malcohn Pirnie Staff: RICKEY KAMPFER
(Receiving or Calling) Name Telephone No.

Summary of [X] Conversation [ ] Agreement:

- M. TENDER INFORMED ME THAT THE TOTAL PUPLIC WATER SOPRY FOR BAYONNE, NEW JERSEY COMES FROM THE WANAQUE RESERVOIR IN WANAQUE NEW JERSEY.
- A TOTAL OF 62,000 PERSONS ARE CURRENTLY IN BAYONNE RECIEVING WATER.

f:\rectele.jan(1)

REFERENCE NO. 12

MALCOLM PIRNIE, INC. PROJECT NOTES

To: Bayonne Drum & Barrel Co. file
Date: 8/11/92
From: Gary Bielen
Project Number: 8003-055
Subject: Wetlands along the Surface Water Pathway
Site Name:

Using the 15-mile surface water pathway map (scale 1" = 3638 feet)

I measured 16 inches of wetland frontage along the Passaic River upstream and downstream of the site. South of the site the fifteen miles goes into the Arthur Kill.

16 inches x 3638 feet = 58208 feet

1 mile = 5,280 feet

$$\frac{58,208 \text{ feet}}{5280 \text{ feet}} = 11.0 \text{ miles}$$

REFERENCE NO. 13

NUS CORPORATION AND SUBSIDIARIES — **TELECON NOTE**

CONTROL NO.:	DATE:	TIME:
9061	02/14/92	11:30

DISTRIBUTION:
- Tooley's Garage
- Staff

BETWEEN:	OF:	PHONE:
Dan Van Abs	NJDEPE, Bureau of Water Supply Planning	(609) 633-1179

AND: K. Campbell (NUS)

DISCUSSION:

Mr. Van Abs returned my call of 02/13/92, and provided the following information on Wellhead Protection Area (WHPA) delineation for the State of New Jersey:

- WHPAs are not yet delineated for the state. The Bureau of Water Supply Planning is working on a draft delineation (a multi-year process).

Mr. Van Abs will put HNEC on their mailing list to receive updates on WHPA regulations.

ACTION ITEMS:

K. Campbell 02/14/92

REFERENCE NO. 14

New Jersey
Fish & Wildlife DIGEST

1892-1992
100 Years of Conservation

FREE

A Summary of Rules and Management Information

New Jersey Department of Environmental Protection & Energy ■ Division of Fish, Game & Wildlife

Vol. 5 No. 4, April 1992

★ ★ DIVISION CELEBRATES CENTENNIAL ★ ★

Weakfish, Fluke & Other Rule Changes

by Thomas McCloy, Chief
Bureau of Marine Fisheries

During 1991, there have been a number of regulatory changes concerning marine species sought by New Jersey anglers, and 1992 promises to be an active year for implementation of various management measures. Those species highlighted here include weakfish, summer flounder (fluke) and striped bass.

Marine fisheries management can be a complex issue, because of the migratory nature of most species. As a result, regional and coastwide councils and commissions have been established to develop comprehensive management plans throughout the range of a particular species. Although

weakfish harvested by otter trawls over time to be uniform for all fisheries in New Jersey. In addition, the commercial harvest of weakfish is prohibited during the periods from June 7 through June 30 and October 20 through December 31 with the exception of the otter trawl fishery during the latter closure period. It is also illegal to possess any weakfish or weakfish parts unless than the [illegible]-inch minimum size. If weakfish are filleted at sea, the resultant fillets must have the skin attached and be at least [illegible] inches in length.

Several things are happening regarding regulations on summer flounder

One Hundred Years of Conservation

by Bob McDowell, Director
Division of Fish, Game and Wildlife

This year marks the 100th anniversary of the Division of Fish, Game and Wildlife. As early as 1892, professionals in the field of wildlife management were working toward securing the future of fish and wildlife in our state.

Though concerns of citizens back then may have been a little different than today's issues, the underlying commitment to conservation—viewing our fish and wildlife as a valuable com[illegible] resource that could, if [illegible] properly, survive and flourish [illegible] generations to come while adding [illegible] economic, aesthetic and [illegible] value to our state has remained unchanged.

Though at times, a difficult bid ob-

of each and every one of us to travel it together; to obey and enforce the management measures in effect.

Here within the division, our focus is forever on the future and like those wise early conservationists, we too, are taking advantage of and acting upon foresight and knowledge.

To commemorate those first steps toward conservation, we have planned a list of activities to help celebrate our 100th anniversary. I want to invite each and every one of you to take part in and enjoy this celebration.

Watch for an historical documentary currently being produced by the division and New Jersey Network. You'll be able to see how far we've come and where we're going as fish and wild-

HOW TO REDUCE CONSUMER EXPOSURE TO FISH CONTAMINATED WITH TOXIC CHEMICALS (PCB's, DIOXINS, CHLORDANE, ETC.)

STATEWIDE AOVISORT and/or PROHIBITION:

Striped Bass—all sales prohibited.

American Eels—advised limited consumption (especially the Northeast region).

Bluefish—advised limited consumption of large bluefish (over six pounds or 24 inches).

A. NEWARK BAT COMPLEX

Prohibited—sale or consiunption of all fish, shellfish, or crustaceans from the Tidal Passaic River; sale or consimiption of striped bass and blue crabs and sale of American eels from the entire complex. Advised—limited consmnption of bluefish, white catfish, white perch.

Newark Bay Complex includes Newark Bay, Passaic River (up to Dundee Dam), Haekensack lUver (up to Oradell Dam), Arthur Kill and Kill van Kull and tidal portions of all tributaries.*

B. HUDSON RIVER (NJ waters)

Advised—very limited consumption of striped bass and limited consumption of white perch, white catfish and bluefish. Prohibited—sale of American eels.

Hudson River includes the River up to the NJ-NY border, approximately four miles above Alpine, N.J., and Upper New York Bay.*

C. LOWER NEW TORK BAT

Lower New York Bay is not in New Jersey State waters. While New Jersey's guidelines may be helpfiil, fishermen in NY waters, including Lower New York Bay and the NY part of the Upper New York Bay and Hudson River shouid also consult New York State's advisories, which are similiar to New Jersey's.* For information on NY's advisories contact NY DEC, Bldg. 40, SUNY, Stony Brook, NY 11794; 516-751-7900.

D. RARITAN BAT COMPLEX

Advised—limited consiunpdon of bluefish, striped bass, white catfish and wliite perch.

Raritan Bay Complex includes the NJ portion of Sandy Hook and Raritan Bays and the tidal portion of the Raritan River upstream to the Rt. 1 bridge and New Brunswick and the tidal portions of all tributaries.*

E. NORTHERN COASTAL WATERS

Advised—limited consimipdon of striped bass.

Northern Coastal Waters includes all coastal waters from Raritan Bay south to Barnegat inlet.

F. CAMDEN AREA

Prohihited—sale and consimiption of all fish, crustaceans and shellfish.

Camden Area includes Strawbridge Lake, Pennsauken Creek (N and S Branches), Cooper River and its drainage, Cooper River Lake, Stewart Lake, and Newton Lake.*

G. SOUTHERN DELAWARE RIVER

Advised—against consumption of channel catfish.

Prohibited—sale of channel catfish.

Southern Delaware River refers to that area of the River between interstate 276 bridge, Burlington Township, Burlington County, and Birch Creek, Logan Townslip, Gloucester Coimty, approxunately at the PA-DE border across the River (approx. 2 miles below the Commodore Barry Bridge).*

*Detailed delineations of areas are for purposes of these guidelines only (under N.J.A.C. 7:25-18A, etc.).

DEFINITIONS

Limited Consumptioii means any person shoudd consume not more tban one meal per week of such fish and persons of high risk such as pregnant women, nursing mothers, wamen of child bearing age and young children, should not eat *any* such fish taken from the designated regiona.

Very Limited Consimiptian is tbe same as above except to fiirtlier restrict consumption to no more than one meal per month.

PREPARATION SUGOBSTIOIfS TO REDUCE EXPOSURE TO CONTAMINANTS

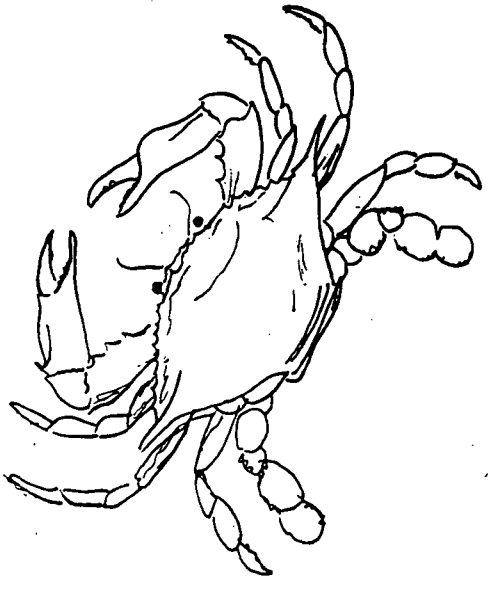
1) Remove belly flaps, backstrap and lateral-line tissue prior to cooldng.

2) Broil on elevated rack; boil in water; can fish without skins.

3) Never use the liquid which contains oils and fats as a food item.

4) Avoid coatings which hold in oils or fats.

This article draws from previously pidilished information developed by the Diviston of Science and Research. For more detailed data on history, health effects, etc. write to Paul Hauge, NJ DEPE, Div. Science & Research, CN409, Trenton, NJ 08625.



REFERENCE NO. 15

State of New Jersey

DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT

Division of Water Policy and Supply

SPECIAL REPORT 10

PRELIMINARY REPORT ON THE GEOLOGY AND GROUND-WATER SUPPLY OF THE NEWARK, NEW JERSEY, AREA

1951

STATE OF NEW JERSEY

DEPAHTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT

CHARLES R. ERDMAN, JR., COMMISSIONER

DIVISION OF WATER POLICY AND SUPPLY

HOWARD T. CRITCHLOW, DIRECTOR AND CHIEF ENGINEER

SPECIAL REPORT 10

PRELIMINARY REPORT ON THE GEOLOGY AND GROUND-WATER SUPPLY OF THE NEWARK, NEW JERSEY, AREA

By

Henry Herpers

and

Henry C. Barksdale

1951

Prepared in cooperation with the
United States Department of the Interior
Geological Survey

2

LETTER OF TRANSMITTAL

Honorable Charles R. Erdman, Jr., Commissioner
Dept. of Conservation & Economic Development

Dear Sir:

I am transmitting herewith a report on the ground-water supplies of the Newark, New Jersey, area prepared by Henry Herpers of the State Geologic & Topographic Survey, and Henry C. Barksdale, District Engineer of the United States Geological Survey. This report has been prepared in cooperation with the United States Geological Survey as a part of the cooperative investigation of the ground water resources of the State.

The report describes the geology and ground-water conditions In the City of Newark and its vicinity. It defines the limits of a gravel-filled preglacial channel, the existence of which has only been inferred heretofore. It describes the critical lowering of the water levels in the eastern part of Newark, and the rather general Intrusion of salt water into the water-bearing formations in that area. The report points out that the safe yield of the water-bearing formations in parts of the area may have been exceeded, and that further large developments in other parts of the area should be made with great caution, if at all.

I, therefore, recommend that this report be published as a Special Report of the Division of Water Policy & Supply, in order that the informatipn contained therein may be made available to the people of the State.

Respectfully submitted,

H. T. CRITCHLOW
Director & Chief Engineer

Encl.

October 22, 1951

DEPARTMENT OF CONSERVATION AND ECONOMIC DEVELOPMENT
DIVISION OF WATER POLICY AND SUPPLY
520 EAST STATE STREET, TRENTON 9, N. J.

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Max Grossman.....Atlantic City

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John Wyack, *Secretary*

Howard T. Critchlow, *Director and Chief Engineer*

Charles R. Erdman, Jr., *Commissioner of Conservation and Economic Development*

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PRELIMINARY REPORT ON THE GEOLOGY AND GROUND-WATER SUPPLY OF THE NEWARK, NEW JERSEY, AREA

By Henry Herpers and Henry C. Barksdale

ABSTRACT

In the Newark area, ground water is used chiefly for industrial cooling, air-conditioning, general processing, and for sanitary purposes. A small amount is used in the manufacture of beverages. Total ground-water pumpage in Newark is estimated at not less than 20,000,000 gallons daily.

The Newark area is underlain by formations of Recent, Pleistocene and Triassic age, and the geology and hydrologic properties of these formations are discussed. Attention is called to the important influence of a buried valley in the rock floor beneath the Newark area on the yield of wells located within it. Data on the fluctuation of the water levels and the variation in pumpage are presented, and their significance discussed. The results of a pumping test made during the investigation were inconclusive. The beneficial results of artificially recharging the aquifers in one part of the area are described.

The intrusion of salt water into certain parts of the ground-water body is described and graphically portrayed by a map showing the chloride concentration of the ground water in various parts of the City. Insofar as available data permit, the chemical quality of the ground water is discussed and records are given of the ground-water temperatures in various parts of the City.

There has been marked lowering of the water table in the eastern part of the area, accompanied by salt water intrusion, indicating that the safe yield of the formations in this part of Newark has probably been exceeded. It is recommended that the study of the ground-water resources of this area be continued, and that artificial recharging of the aquifers be increased over as wide an area as possible.

INTRODUCTION

Purpose and scope of investigation

In the Newark area, the chief uses of ground water are for cooling by industries, for air-conditioning, and for general processing and sanitary purposes. Several beverage manufacturers use ground water as an ingredient in their products, and the water from a few wells is used for drinking. As one result of a recently completed survey of all known wells, it is estimated that not less than 20 million gallons of ground water is used in this area per day. In summer an estimated one to one and a half million gallons of ground water is used for air-conditioning alone.

Records kept by various well owners and by State and Federal agencies have shown a marked lowering of the water level in many Newark wells, as well as a diminution in the yield of some. They have also shown that the ground water in certain parts of the area has become brackish because of heavy pumpage and the infiltration of salt water from surface sources. These conditions are particularly severe in the eastern part of Newark, in what is known locally as the "ironbound District." In order to give some conception of the seriousness of these conditions, it may be mentioned that in the year 1879 the water level in wells in eastern Newark ranged from a few feet above to 25 feet below the surface of the ground, and several 8-inch wells yielded as much as 500 gallons per minute when pumped by direct suction. Analyses of the water from these wells showed that it contained only 10 to 25 parts per million of chloride.[1]

1/Annual report of the State Geologist, p. 126 ff., 1879.

Analyses made by the City Chemist of Newark showed chloride contents ranging from 250 to 2,500 parts per million in water taken trom wells in 1942, in this same area. Moreover, in 1947 the general water level ranged from 125 to 200 feet beneath the land surface, and pumping levels in wells ranged from 135 to 290 feet, depending upon the amount of water pumped and the season of the year. in view of these facts, it was decided to make an intensive study of the geology and ground water of the Newark area, and to publish a report on the findings. in order to summarize and make generally available our knowledge of the quantity and quality of ground-water resources of the area, and to facilitate the planning of ground-water pumpage in the future.

The area included in the present study and referred to herein as the Newark area is shown on figure 1. it lies principally in Essex County, but includes small parts of Hudson and Union Counties. it includes all of the city of Newark, except the extreme western part; the greater part of Harrison; and parts of Kearny, irvlngton, East Orange, Bloomfield, and Elizabeth.

The Newark area lies wholly within the physiographic province known as the Piedmont Plain. The southeastern part of the area is a lowland with considerable tidal marsh, and the balance of the area is characterized chiefly by low ridges trending in a northeasterly direction. The average annual rainfall at Newark is approximately 47 inches, and the mean annual temperature is about 53°F.

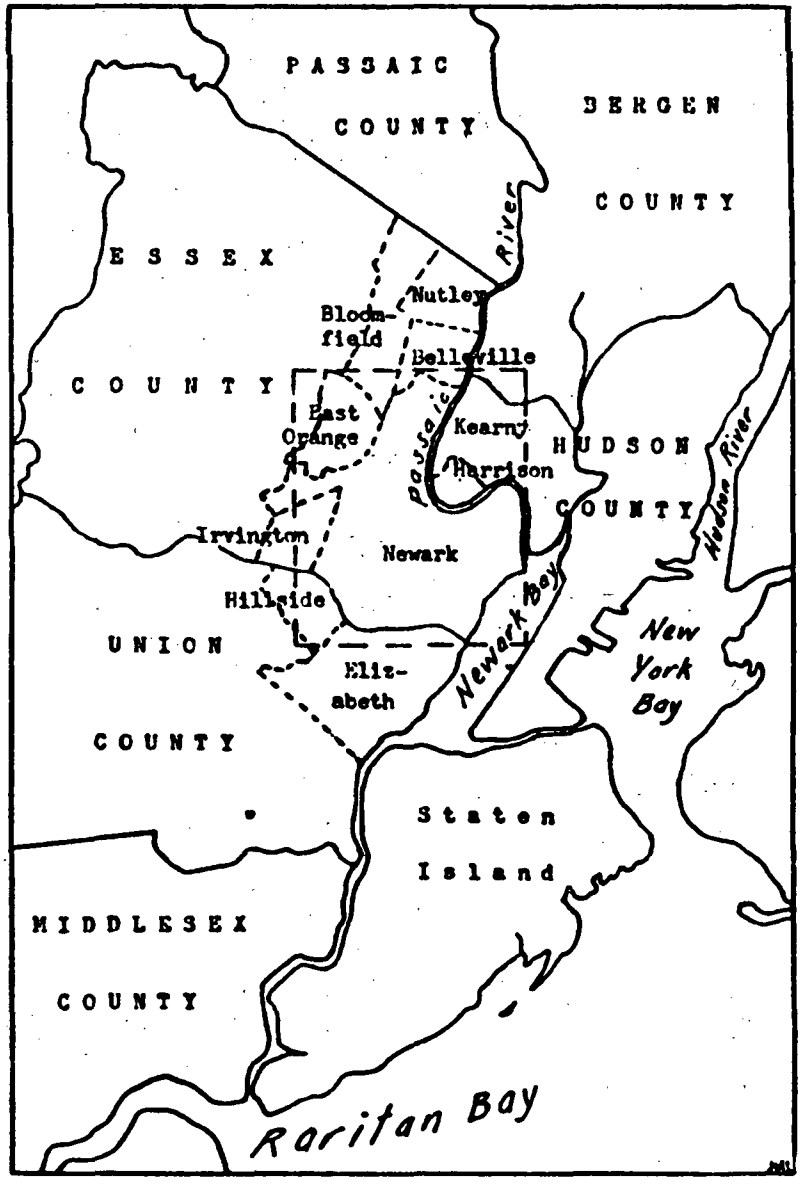

Figure 1.-Map of northeastern New Jersey, showing location of the Newark area.

Acknowledgments

This report is the result of cooperative work by the Geologic and Topographic Survey and the Division of Water Policy and Supply, both of the New Jersey Department of Conservation and Economic Development, and by the United States Geological Survey. M. E. Johnson, State Geologist, H. T. Critchlow, Director of the Division of Water Policy and Supply, and A. N. Sayre, Geologist in Charge, Ground Water Branch, U. S. Geological Survey, have exercised general supervision over the work since its beginning. Mr. Johnson and Henry C. Barksdale, District Engineer of the Ground Water Branch, U. S. Geological Survey, have shared local responsibility for the progress and details of the work. The gathering of the data necessary for the preparation of this report has been largely in the hands of Henry Herpers of the Geologic and Topographic Survey and Jerome M. Ludlow bf the U. S. Geological Survey. The greater part of this report was written by Mr. Herpers. The sections on the hydrology of the various formations were written by Mr. Barksdale.

Needing the help of the citizens and industries of Newark, and believing that they would gladly cooperate if they knew the facts, the Newark Chamber of Commerce was advised of the proposed survey and report, and a story giving the reasons for the work and indicating its importance was given the press early 1947. it is now the authors' pleasure to express their sincere appreciation of the help given the project by almost everyone approached. The work of gathering data was materially facilitated by the assistance of the following well contractors: Artesian Well and Equipment Co., C. W. Lauman & Co., Layne-New York Co., Parkhurst Well and Pump Co., Rinbrand Well Drilling Co., Samuel Stothoff Co., and William Stothoff Co. Especially valuable data on the operating characteristics of their wells, and other aid, were freely given by Mr. B. H. Bishop and other engineering personnel of P. Ballantine & Sons and by Mr. Wm. E. Heimstaedter, Mechanical Engineer, and others of the Celanese Corporation of America. Particular acknowledgment is made of the assistance

rendered by P. Ballantine & Sons in making their well field available for pumping tests and altering their plant routine to meet the requirements of the test. The Division of Water and the Department of Health of the City of Newark have assisted materially in locating wells and in furnishing records of analyses of well water.

OUTLINE OF GEOLOGY

The Newark area lies wholly within the section of New Jersey underlain by the Newark group of rocks of Triassic age. These rocks form a belt extending from the Hudson River across central New Jersey, Pennsylvania, and Maryland, and into Virginia. They consist of shale, sandstone, argillite, and conglomerate with included sheets, sills, and dikes of trap rock (basalt and diabase).

in New Jersey, the sedimentary rocks of the Newark group have been divided on the basis of their lithology into three units. The lowest is chiefly red, buff, or gray arkosic sandstone and is called the Stockton formation; the middle unit, called the Lockatong formation, is composed largely of gray, purplish-gray, or dull-red argillite; and the uppermost unit, the Brunswick formation; consists chiefly of soft red shale and red sandstone. The Brunswick formation is the bedrock throughout the Newark area. in general, the strata have been tilted northwestward and locally they have been warped into gentle flexures with occasional faulting. The harder beds form ridges, most of which trend northeastward.

The northern part of the belt of Triassic rocks was glaciated in late geologic time, so that much of the surface is covered with a mantle of glacial drift, which in many places is thick enough to conceal the bedrock surface. Although the bedrock crops out in only a few places, it accounts for the relief in the western part of the Newark area. There the covering of glacial drift is thin. in the eastern section the bedrock is concealed by thick deposits of silt and clay with

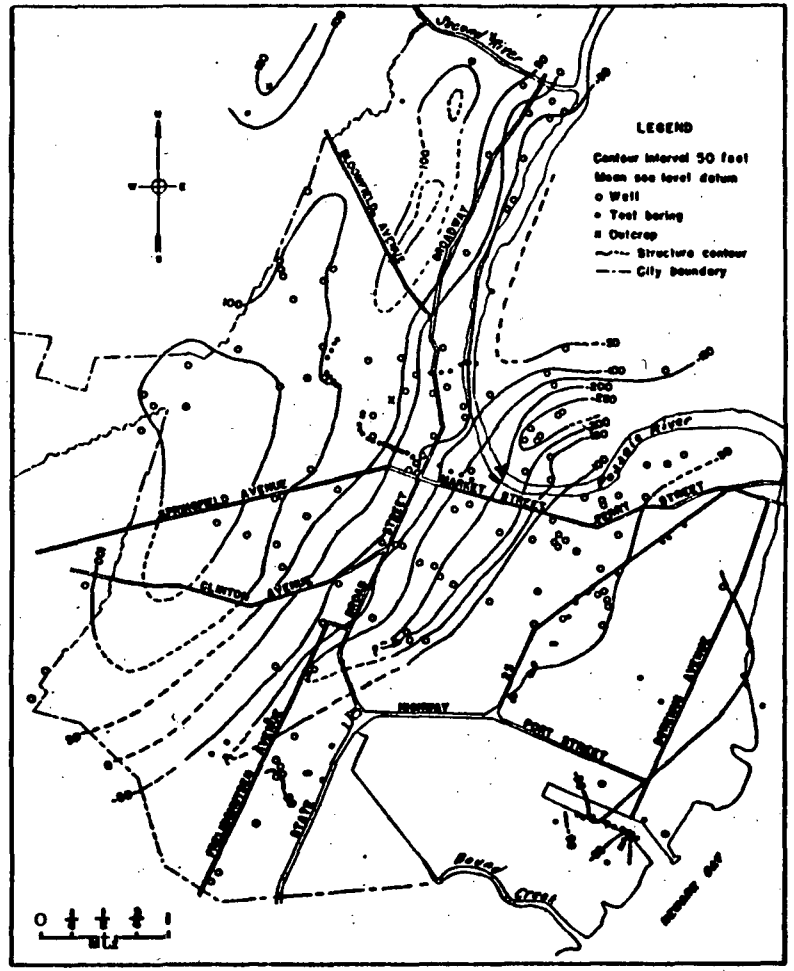

Figure 8.-*Map showing elevation and configuration of bedrock beneath Newark, N. J., and vicinity.*

thinner beds of sand and gravel, and, although topographically this region is a plain, borings have shown that the surface of the underlying bedrock does not conform with the ground surface. (See figure 2). The valleys of many of the streams in the glaciated area contain terraces of sand and gravel of glacial origin.

The geologic history of the area since the beginning of Triassic time is relatively simple. During Triassic time, sands and muds were deposited in an arid basin. Near the end of Triassic time the beds were faulted and tilted toward the northwest. Later erosion reduced the surface to a plain, over which the sea then advanced an indeterminate distance to the northwest. Sands and clays, such as those found in the coastal platn, were deposited in this sea. Still later, the sea withdrew and the forces of erosion removed the sediments of the coastal plain and then etched out the larger topographic features that we see today. During the Pleistocene epoch the details of the topography were altered by the ice. Hills were smoothed somewhat and much drift was deposited. The drift in some places fliled valleys existing prior to glaciation and effected important changes in drainage. A general rise of sea level at the close of the Pleistocene epoch flooded low areas adjacent to the coast, forming Newark Bay at the junction of the Haekensack and Passaic Rivers. Since then the meadows have been formed by stream deposits, and very, very recently -- in terms of the geologic calendar -- much meadowland has been reclaimed by suitable drainage and by filling. A typical example of such "made" land is the area upon which Newark Airport has been built.

The succession of formations in the Newark area, arranged in normal sequence (i.e., youngest formation at top) is shown in the following table:

Table 1.--Stratigraphic table in the Newark area

Cenozoic era
- Quaternary system
  - Recent series
    - Alluvium and meadow muck
  - Pleistocene series
    - Glacial till and stratified deposits of glacial origin

UNCONFORMITY

Mesozoic era
- Triassic system
  - Newark group
    - Brunswick formation

UNCONFORMITY

Older rocks[2]

2/The deepest well drilled in Newark failed to pass through the red shale and sandstone at 2,228 feet. It cannot, therefore, be stated with certainty what sort of rock lies below the city at great depths. From the general geology of the Triassic rocks, presumably the Palisade diabase would be found at great depth, and more rocks of the Newark group below the diabase. Below the Triassic rocks lie crystalline rocks of very great age which extend to an undetermined depth.

HYDROLOGY AND GEOLOGY OF THE ROCK FORMATIONS

Recent deposits

Recent deposits are found mainly in the eastern part of the Newark area where they occur in the tidal marshes or meadow lands along Passaic River and bordering Newark Bay. They consist largely of unconsolidated mud and silt with inclusions of peat and other organic materials and occasional lenses of sand and gravel. They have been deposited on top of the Pleistocene sediments, or perhaps in places directly on the Triassic rocks, by the Passaic and Hackensack Rivers and by smaller streams flowing across the area and discharging into those rivers, or into Newark Bay. The Recent deposits range in thickness from a feather edge to 35 feet.

Hydrologically, the Recent deposits are of relatively little importance except as they may transmit water to the underlying rocks or exclude it from them. Their permeability is relatively low and they occur in the parts of the area that are exposed to salt water. Therefore their action as a barrier in retarding the percolation of salt water into the underlying rocks is perhaps their most important function. In this respect they perform imperfectly because there probably are breaks in the cover that they provide at critical points, such as the ship channels in the river and in the bay.

Pleistocene deposits

The Pleistocene deposits in the Newark area are all of glacial origin. They consist of till--an unconsolidated, unstratified, heterogeneous mixture of clay, boulders, and sand--and stratified glacial drift, which is composed of sand and gravel that have been more or less sorted and stratified by the action of glacial waters. The deposits of glacial origin overlie the bedrock throughout practically all the Newark area, the bedrock cropping out only in a few more or less isolated spots. The thickness of the Pleistocene deposits varies greatly. In the western part of the area they are only a few feet thick, forming a thin veneer over the underlying bedrock, but in the eastern part of the area they

are so thick that they mask entirely the topography of the underlying rock. The map of the elevation and configuration of the bedrock beneath Newark, N. J., and vicinity (figure 2) shows that, in the area east of Broad Street, there is a large deep valley cut in the bedrock, which is entirely covered by glacial drift. At the surface this area presents the aspect of a plain. The depth to rock in the buried valley ranges from 125 feet to more than 190 feet in Newark, and to as much as 300 feet in Harrison. Farther east in the Newark area, bedrock lies at lesser depths. The buried valley extends northeastward across the city from its southwestern boundary, crossing Frelinghuysen Avenue near its northern end, and then extends east of and roughly parallel to Broad Street, finally crossing over into Harrison, where it bends eastward. It has not yet become possible to show the extension of the valley to the southwest or to the east because of the lack of sufficient reliable boring data, but its course and shape across the city of Newark is fairly accurately known. From its shape as shown on plate 1, it is apparent that the valley slopes toward the northeast, and this direction is therefore the probable direction of flow of the river that cut the valley prior to the Pleistocene epoch.

The character of the Pleistocene deposits varies throughout the Newark area. In general, these deposits consist chiefly of till in that part of the area lying west of Broad Street, whereas the cuttings taken from many test borings and wells in the eastern part of the area show that the Pleistocene deposits there consist largely of stratified materials with interbedded lenses of till. (See logs 1 to 4 in appendix.)

The Pleistocene deposits in the bottom of the buried valley are worthy of special attention. In the southwestern part of the Newark area they consist for the most part of fine sand and clayey sand, but in the northeastern part the bottom of the valley contains deposits of coarse sand and gravel which in many places contain much water. (See logs 1 and 2 in appendix.) In fact, some of the best wells in the Newark area pump from these deposits.

Other coarse deposits of glacial origin are found in the valley of the Passaic River north of the point where

the river makes its great eastward bend.

The Pleistocene deposits are one of the two major aquifers in the area. Their hydrologic function is twofold. In the first place, under favorable circumstances they yield water in substantial quantities directly to wells. In the second place, they absorb and store water from precipitation and from surface sources and transmit it to the underlying rocks.

Where the deposits contain beds of sand and gravel that are thick enough and extensive enough, they yield large quantities of water to wells finished in them. Insofar as is known, these conditions are limited almost entirely to the buried valley, where several wells yielding from 175 to more than 600 gallons per minute have been developed. For example, a well drilled for the Driver Harris Co. in Harrison near the locality where the buried valley crosses the Passaic River yielded 600 g.p.m. with a draw down of approximately 60 feet.

Detailed and extended records of water levels in and of pumpage from wells in this aquifer are not available. It is therefore impossible to say at this time whether water is being withdrawn from this aquifer at a rate less than, equal to, or greater than the rate at which recharge is available. The fact that two or three million gallons of water have been withdrawn daily for a number of years from the sand and gravel in the buried valley suggests that a large quantity of recharge occurs. On the other hand, the fact that the static water levels in some wells tapping this aquifer are now substantially below sea level suggests caution before further developments are made.

A more definite and immediate threat to the safe yield of the gravels of Pleistocene age is the apparent intrusion of salt water from surface sources. Wells near the point where the buried valley crosses the Passaic River are yielding water that contains 200 to 500 parts per million of chloride and is already unsuitable for some uses. Inasmuch as there is hydraulic continuity between the gravels and the underlying rocks, the problem of salt-water intrusion will be discussed in more detail in a section of this report that deals primarily with the water supply from the rocks.

The second function of the Pleistocene deposits, that of absorbing, storing, and transmitting water to the underlying rocks, is, in the aggregate, more important than their yielding water directly to wells. As already indicated, they overlie the rocks to varying thicknesses throughout most of the area. In general, there appears to be some correlation between the thickness and nature of the Pleistocene deposits and the yield of wells tapping the underlying rocks. This in to be expected because the storage capacity of the rocks is relatively low and sustained large yields can be obtained from them only if some adequate source of recharge is available. Where the overlying deposits are thick and moderately porous and permeable, they supply the necessary recharge. On the other hand, where they are thin or relatively impermeable, they may fall to supply recharge to the rocks or may even retard the movement of water into them.

Newark group

Brunswick formation

Geology

As mentioned previously in the outline of the geology of the Newark area, the sedimentary rocks of the Newark group of Triassic age in New Jersey have been divided upon the basis of their lithology into three units--the lower, or Stockton formation, the middle, or Lockatong formation, and the upper, or Brunswick formation. It should now be pointed out that whereas these lithologic distinctions can be made in central New Jersey, they are not apparent in the northern part of the belt of Triassic rocks. The Lockatong formation does not continue farther northeastward than Franklin Park, Middlesex County, and the distinction between the Stockton and Brunswick formations is no longer obvious, as it is farther southwestward, because the whole Newark group becomes, in general, coarser-grained. In the northern part of the State, particularly in Bergen County, these sediments become predominantly sandy and even conglomeratic. In the Newark area, the tendency of the rocks to increase in coarseness toward the northeast is shown by the fact that wells drilled in the southern part,

near the Elizabeth line, have penetrated rock that is chiefly soft red shale, whereas in north Newark, especially near the Belleville line, the rocks are principally sandstone with interbedded shale. In fact, during the latter part of the last century several sandstone quarries were operated in north Newark, especially along Bloomfield Avenue and in the southern part of Branch Brook Park. The change from soft shale to hard sandstone is reflected in the change in topography from a rather flat, low-lying plain with few rock hills in southern Newark to hills with rather pronounced relief in the northern part of the city. In the Newark area, therefore, the bedrock is all designated as Brunswick formation. A representative section showing the variations in the rock under Newark is shown in log 3. (See appendix 1.)

The bedrock originated as sand, silt, and mud which were derived from the erosion of older rocks northwest and southeast of the great basin in which the sediments were laid down during the Triassic period. Three times during the period of deposition great sheets of basaltic lava were poured out on the sufface and were then buried by sediments later in the Triassic. The remnants of the flows now form the Watchung Mountains, but it is impossible to state whether or not the flows ever extended as far east as the Newark area, for there are no igneous rocks of this type in that area, so far as is known. Toward the end of the Triassic period, the sediments were intruded by similar magma which apparently did not have enough force to push through to the surface but spread out beneath the surface in a great sill some 900 feet or more thick, usually following the bedding planes of the sediments but frequently cutting across them. Because of erosion, the sill is exposed today in the Palisades in eastern Hudson and Bergen Counties and also in certain mountains in central New Jersey. At the close of Triassic time, the entire Newark group of rocks were tilted toward the northwest, which is their attitude today and in the process they were faulted and greatly fractured.

The total thickness of the rocks of Triassic age in the Newark area is unknown but is estimated at about 6,000 to 7,000 feet.

The deepest well drilled in Newark reached a depth of 2,538 feet and failed to pass through the normal red shales and sandstones. it is therefore impossible to state with accuracy what lies below that depth, but presumably a well drilled to great depth in Newark would eventually strike the Palisade diabase, and below that would strike more sedimentary rocks of Triassic age before entering the crystalline basement rocks upon which the Triassic sediments were deposited.

Hydrology

GENERAL. --

The Brunswick formation yields water primarily and almost exclusively from the cracks in the rocks of which it is composed. The primary pore spaces in the rocks are generally so small that water moves through them very slowly, if at all, under the hydraulic gradients that are established by pumping. Were it not for the fact that the formation has been extensively cracked and fractured, and has thus acquired a kind of secondary permeability, it would yield very little water.

There is in the Brunswick formation a kind of modified water-table condition wherein the water is generally free to move in any direction and seek the level determined by the factors affecting recharge and discharge. The various systems of cracks intersect so that water can move more or less freely in all directions. However, the cracks are not of uniform size and capacity in all directions, and water is likely to move more freely in some directions than in others. For the area as a whole, there may be no one direction that is generally more favorable to flow than others. it probably differs from place to place.

The capacity of the formation to store and transmit water decreases with depth. As greater depths are reached, the weight of the overlying materials increases and tends to close the cracks. Thus less and less space is available to store water and the resistance to its movement is increased. it is probable that the cracks that are horizontal, or nearly so, are first affected

and most affected in this way. The horizontal cracks tend to distribute water uniformly in all directions, so that the tendency of the water to flow in the direction of the prevailing vertical cracks is probably accentuated with depth. The cracks along the bedding planes, which appear to be very numerous near the surface and are more nearly horizontal than vertical, probably are less and less important with depth.

There is, therefore, little foundation for the common belief that water is transmitted for long distances underground through the Brunswick formation, particularly along the bedding planes of the rocks. it is unlikely that the bedding planes, or rather the horizontal cracks along them, provide the path of least resistance to the flow of water. Actually, water probably flows through the formation most readily in vertical or nearly vertical cracks. Except along major faults, individual vertical cracks are not likely to extend very far without interruption, and are not likely to transmit water for distances greater than 2 or 3 miles. Furthermore, as the vertical cracks necessarily intersect the rock surface locally, they will receive recharge or discharge water locally depending upon the hydraulic gradient.

Certain characteristics of individual wells in the area may be better understood in the light pf the foregoing general description of the rocks from which they draw their water. The yield of a well tapping tbe Brunswick formation depends primarily upon the number and size of the cracks that it encounters below the water table, or more specifically upon their capacity to transmit water. Thus, two adjacent wells may pass through almost identical layers of rock, and one may yield a substantial quantity of water whereas the other may yield very little, depending upon the character of the cracks encountered in each. it is therefore impossible to predict the yield of a proposed well except in general terms based upon the average yield of other wells in the vicinity. Furthermore, all predictions of yield of wells in the Brunswick formation should be qualified by a statement that the final proof must be the actual yield of the finished well, because the number and capacity of the cracks encountered cannot be determined in advance.

There is usually little or nothing to be gained by deepening an unsuccessful well below the average depth of the productive wells in the area, because the cracks become smaller and probably less numerous with increased depth. it is almost always wiser to move to another site, even if only a short distance away, and to drill another well, rather than tp double the depth of a poor well in the hope of improving its yield. it is obviously impossible to determine the nature and pattern of the deeply burled cracks at any site from observations at the surface. There are, of course, rare exceptions to this general rule, but it holds well enough to make its observance sound economic policy. For example, it has already been mentioned that one well in Newark was drilled to a depth of more then 2,500 feet. That well, though very expensive, was unproductive.

As a general rule, in the Brunswick formation most of the productive cracks occur within the first 200 or 300 feet of the rock. in some parts of the Newark area, however, most of the productive wells penetrate the rock 400 or even 500 feet. Sufficient data are not available to indicate whether the rock there is unusually productive at great depths or whether many of these wells are unnecessarily deep, because most of them were pot tested before they had been drilled to their full depth. it is possible that the bottom parts of many of these holes are not very productive.

An interesting though probably extreme example of a well that was unproductive at depth is one about 800 feet deep that was observed in the course of the studies preceding this report. When the regional water level declined, the yield of this well dropped sharply. With the thought that some of the productive cracks might have been clogged either in the drilling or suosequently, the owner employed a driller to clean out and redevelop the well. A thorough job was done and it is unlikely that there remained any cracks that were sealed with mud or otherwise clogged. Nevertheless, the yield of the well did not improve substantially. it was therefore abandoned and made available as an observation well. During the spring and early summer of 1947 the water level in the well declined normally to a level of 161 feet below mean sea level, where it stopped abruptly. While the water levels in other

observation wells in the vicinity continued to decline to about 230 feet below mean sea level and the pumping levels in some adjacent wells were still lower, the water level in this well remained at 101 feet. in the late fall and winter, after the regional water level had recovered to 161 feet, this well again became responsive to variation in pumpage and fluctuated normally. The same performance was repeated in the summer of 1948 and again took place in 1949. Apparently the only explanation for the peculiar behavior of the water level is that no cracks were encountered below 161 feet and that therefore the well is water-tight at greater depths. This is, no doubt, an unusual case, but it does serve to emphasize the dependence of the yield of rock wells upon cracks, as well as the relative unimportance of horizontal cracks at depth and the decreased chance of hitting good cracks at increased depth.

The character of the Brunswick formation as an aquifer also explains another peculiarity of the wells that tap it. Ordinarily, in a relatively uniform aquifer, the interference between two or more wells is dependent mainly upon the distance between them. in the Brunswick formation, as in similar aquifers, a pumping well often affects the water level in a second well substantially more than that in a third well at the same distance but in a different direction. The explanation of this peculiarity, of course, lies in the fact that the different systems of cracks differ in their capacity to transmit water.

The Brunswick formation does not yield water as freely as some of the other important water-bearing formations in the State, especially those that yield water from the pore spaces in well-sorted medium-to coarse-grained sand and gravel. This is due primarily to the fact that its capacity to store and transmit water is smaller. The deficiency is most marked in regard to its capacity to store water. The specific yield (the storage capacity expressed as a percentage of the volume of the aquifer) of a coarse, well-sorted sand is frequently as much as 25 percent. The specific yield of the upper 300 feet of the Brunswick formation, based upon the volume of cracks, is probably more nearly in the order of 1 or 2 percent. Therefore, it is easy to understand the hy-

drologic importance of sources of ready recharge such as bodies of surface water or of relatively permeable sand and gravel in areas where large quantities of ground water are withdrawn from the formation. The capacity of individual cracks to transmit water is probably larger than that of a comparable volume of pore spaces in a sand. It is not surprising, therefore, to find that the capacity of the Brunswick formation to transmit water is about one-fourth of that of some of our important sand aquifers in spite of the relatively limited volume of cracks.

Pumping Tests – In January 1949, through the cooperation of the officials of P. Ballantine & Sons, two pumping tests were run on wells tapping the Brunswick formation. For several days all the company's wells were operated to suit the requirements of the test. At each of their two plants two wells were run continuously until conditions approaching equilibrium were established. This involved wasting water at some times of the day in order to have an adequate supply available at others, but it seemed to be the only practical way of reaching an approximate state of equilibrium. After about 24 hours, the effects of changing the rates of pumping at the plant appeared to have been eliminated, and, with one exception which will be discussed later, the effects of pumping at other plants in the area seemed to be of little importance.

The wells pumped during the two tests are shown on figure 8. They were selected to provide the best possible spread of observation wells in as many directions as possible. The first test was made by pumping well 1 at plant 1. This well is centrally located, and water levels were observed in seven other wells at various distances and directions from it. In the second test, well 9 at plant 2 was pumped and water levels were observed in the same group of observation wells. In this test, however, the pumping well was in one corner of the well field so that the distances to the observation wells were greater and their directions were less varied.

During the pumping tests, water-stage recorders were maintained on well 5 at plant 1 and on wells 8 and 10 at plant 2. The water levels in well 7 at plant 1 were measured by air pressure, using an 8-inch pressure gage on which it was possible to note changes of water level of one- or two-tenths of a foot. The water levels in the other wells were measured by air pressure, using ordinary pressure gages that would probably not indicate changes of water level of less than one foot. There were only four wells, therefore, in which water levels could be observed accurately; of these wells 5 and 7 at plant 1 appear to have been drawn down below the most productive cracks encountered in them. The best observations were therefore obtained in wells 8 and 10 at plant 2. Two of the wells observed, wells 4 and 8 at plant 1, were operated continuously during both tests to supply water for manufacturing purposes.

During the first test a prompt and distinct effect was observed in well 8, plant 2, when well 1, plant 1, was started and again when it was shut down. This seemed to indicate that these two wells tapped the same system of cracks. No distinct effect was observed in any of the other wells during this first test, even though it was continued for several hours. Well 7 at plant 1 is almost in a straight line with well 8, plant 2, and well 1, plant 1. It is in the opposite direction from well 1 and only about half as far away, yet no effect was observed in it. No definite effects of pumping or shut-down were observed in any of the other wells.

During the second test, when well 9, plant 2, was pumped a prompt and distinct effect was observed in well 10, plant 2, both at the beginning and at the end of pumping. None of the other wells being observed showed any distinct effect. It is interesting to note, however, that the recorder on well 10 showed a small but definite effect whenever well 27 at the plant of the Celanese Corporation of America was started or stopped. This well is approximately southwest of well 10 and about 2,400 feet from it, a distance substantially greater than that between any of the wells at the Ballantine plants.

It is believed to be significant that all the wells that were observed to affect one another during the

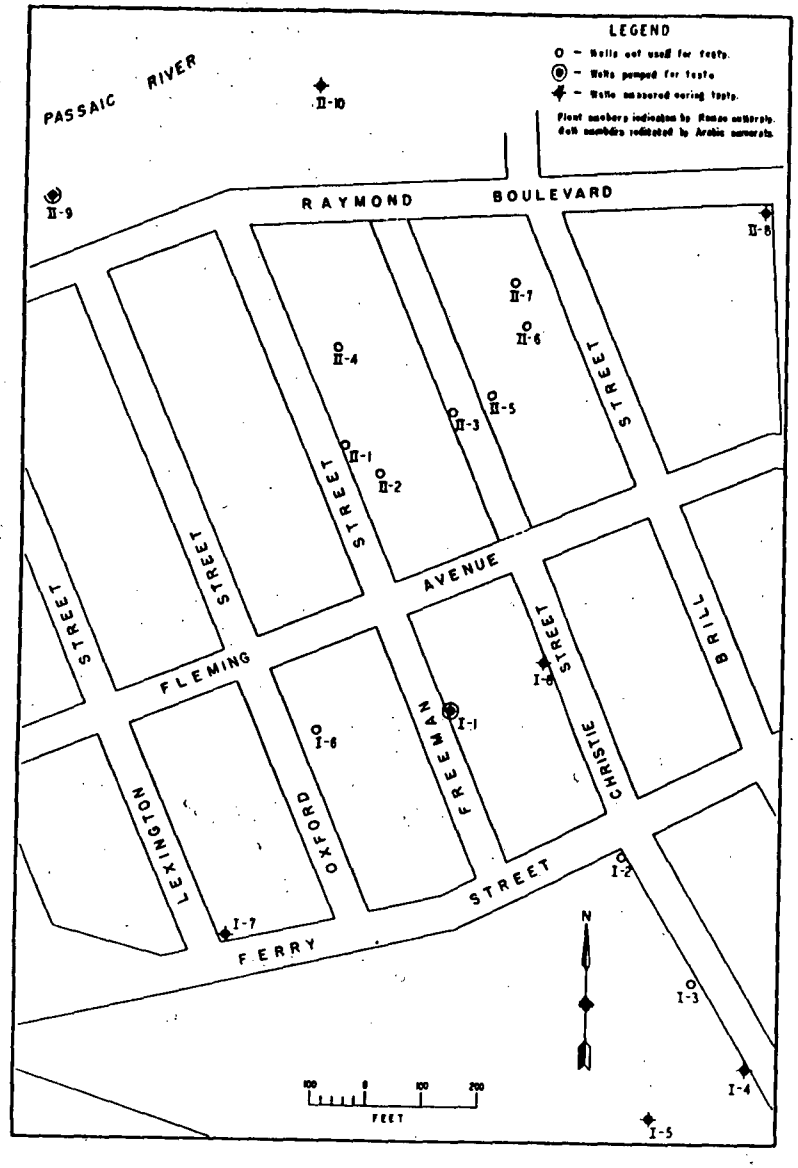

Figure 3.-Map of a part of Newark, N. J., showing the location of wells at the plants of F. Ballantine & Sons and indicating the wells used for pumped tests in January 1949.

two tests at the Ballantine plants lay along lines trending in a general northeasterly direction. This seems to indicate that in the vicinity of the Ballantine and Celanese plants there is a dominant system of cracks in that direction. No doubt there are cracks in transverse directions, but their capacity to transmit water appears to be much smaller. Consequently, water moves through the cracks that trend northeast much more easily than it does in other directions and the primary interference between wells is to the northeast or southwest.

One result of this distribution of cracks is that the formulae used to compute coefficients of transmissibility and storage are not applicable to this area. These formulae are based upon the assumption, among others, that water can move freely through the aquifer in all directions. In some other localities where the distribution and character of the cracks are more nearly equal in transverse directions, it is believed that these formulae can be applied significantly to wells in the Brunswick formation. In this part of Newark, however, they do not apply.

The tests were not without significant results, however, merely because it was impossible to compute the usual coefficients from them. For example, in planning the locations of future wells, it should be useful to know the direction in which they will interfere most with each other or with existing wells. Similarly, it might be possible to plan an operating schedule that would minimize interference between wells and thus decrease somewhat the pumping lift. Artificial recharge will be most effective if it is distributed in a direction transverse to the major cracks, thus supplying more of them without depending upon the poorer cracks to distribute the water. The movement of contaminating materials such as salt water from the river or bay is probably most easily accomplished in a northeasterly or southwesterly direction after it reaches the rock. The structure of the rock does not, of course, affect appreciably the movement of such contaminants through the materials above the rock.

Long-term fluctuations of water levels and pumpage - in the investigation that preceded this report, it was found that relatively few well owners had kept accurate and continuous records of pumpage and that still fewer

had more than an occasional record of the water levels in their wells. Fortunately, important exceptions to this general rule were some of the larger users of ground water. in only one part of the area, however - the so-called "ironbound District" in eastern Newark - was it possible to obtain sufficient data to justify a long-time estimate of pumpage rates and to compare it with similar records of water levels. in this area tho two largest users of ground water are P. Ballantine & Sons and the Celanese Corporation of America. These companies are keeping excellent records of pumpage and water levels and have dene so for some time.

When the records that these two companies furnished were combined with other data available in the area, it was possible to prepare a diagram (figure 4) that shows some significiant trends of water levels and pumpage.

Probably the most striking features of figure 4 are the long-term trends toward greater pumpage and lower water levels. These two trends go together, of course, and from the studies made thus far it is not possible to say whether the lowering of water levels indicates a pumping rate in excess of natural recharge or merely the lowering necessary to induce flow into the area at the increasing rates. The apparent reversal of the downward trend of water levels in 1948 and 1949 is due to unusually good natural recharge coupled with artificial recharge that will be discussed later.

Almost equally striking are the seasonal fluctuations of water level and pumpage, which are related to each other and are due primarily to seasonal demands for water. Much of the water taken from the ground in the area is used for cooling and the demand is naturally greater in the summer. Furthermore, there is a seasonal demand, which is greatest in summer, for the products of some of the users of ground waters. This tends to accentuate the seasonal use of water. There is, of course, a greater recharge from precipitation during the winter when the demands of vegetation are at a minimum, but this probably accounts for only a few feet of the total fluctuation of water levels.

There is a notable similarity between the fluctuations of water level in the different wells shown in the diagram. This indicates that there is an over-all

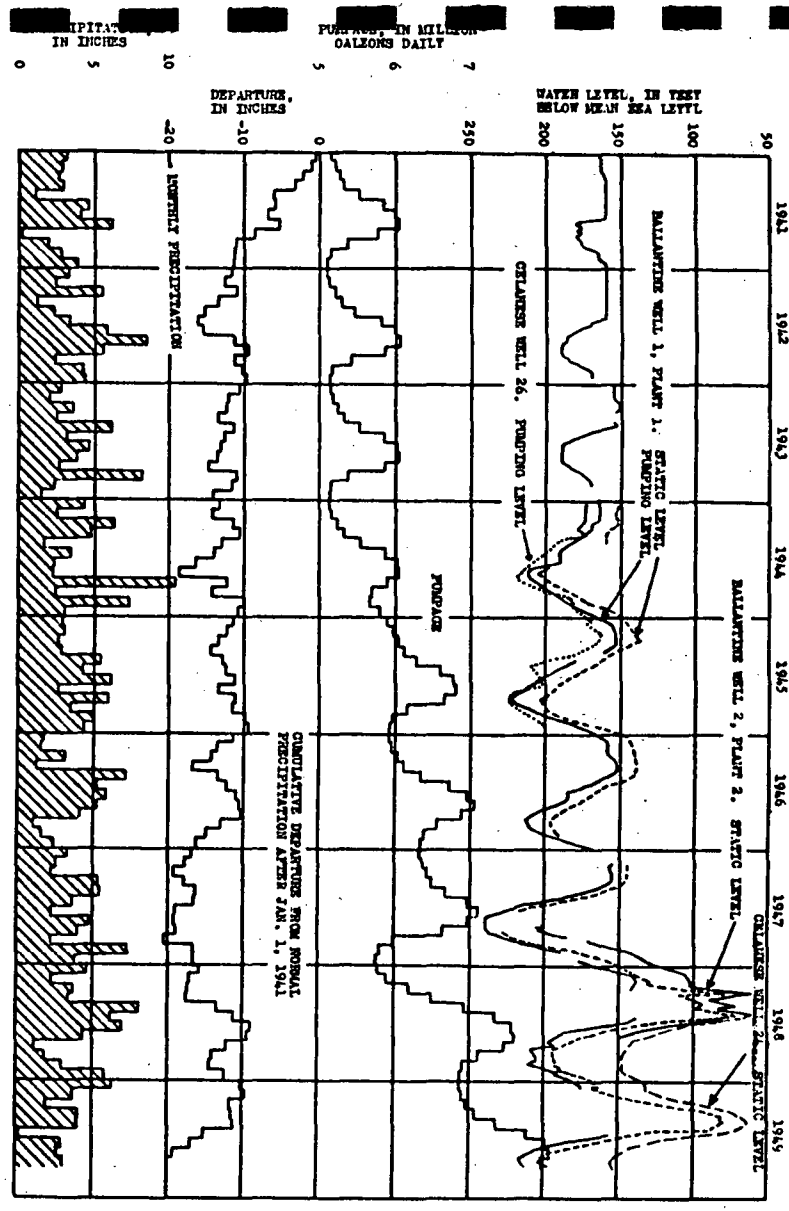

Figure 4.-Diagram showing fluctuations of pumpage and water levels in the eastern part of Newark, the monthly precipitation, and the cumulative departure from normal precipitation, 1941 to 1949.

[redacted]nect[redacted] bet[redacted] th[redacted]rlo[redacted]ells[redacted] the[redacted]a a[redacted] that the regional pumpage is of primary significance in determining the major fluctuations of water level. Minor differences are due, ofcourse, to local conditions.

The wide range of seasonal fluctuations of water levels and the great depths to which they have been drawn are noteworthy. During recent years a change of one million gallons daily in the rate of pumping in this area has resulted in water-level fluctuations in the order of 60 to 75 feet. Furthermore, with a total pumpage of about seven million gallons daily the water levels have been lowered to 200 feet or more below mean sea level. in view of the fact that an early well in this vicinity flowed at an altitude of perhaps 10 feet above sea level, the current water levels represent actual drawdowns of more than 210 feet. The rate of lowering per million gallons pumped seems to be increasing and, indeed, this would be expected because of the decreasing capacity of the cracks with increasing depth. The figures strongly suggest that the rate of pumping in this vicinity cannot safely be increased very much mbre without serious consequences, unless the increase is accompanied by some measure of conservation such as artificial recharge.

The precipitation at Newark varies considerably from month to month, as indicated at the bottom of the diagram. The trend of the accumulated departure from normal precipitation is perhaps more useful in the study of ground-water trends because it indicates periods when increasing or decreasing amounts of water are available for underground storage or withdrawal. After the very dry period of 1941. the accumulated departure shows an essentially horizontal trend. This indicates that the long-term downward trend of water levels is not due to changes in precipitation. Some of the shorter trends may, however, have had some influence on the water levels. For example, the less severe drawdown in the summer of 1946 than in 1945 is probably due to the above-normal precipitation during the summer of 1946, as indicated by the rising trend of the departure line. Similarly, the sharp decline in the summer of 1947 is probably related to the declining trend of precipitation during that summer. it isobvlous from a study of the diagram, however, that the fluctuations of pumpage rather than those of precipitation are the principal causes of the water-level fluctuations.

Artificial recharge.- The graphs of water levels in figure 3 show a sharp and abrupt rise in March 1948 and again in February 1949, both without any corresponding decrease in pumpage. These apparent anomalies are caused by artificial recharging through wells, conducted experimentally by F. Ballantine & Sons with the cooperation of the Newark Water Department. On occasions during the winter when the temperature of the city water was as low as or lower than that of the ground water and when the city's reservoirs were overflowing, conditions were ideal for recharging. Water that would otherwise have gone to waste was stored underground and conserved for future use. Recharge was accomplished through several wells. in 1948 about 168 million gallons was stored in the ground in this way and in 1949 about 236 million gallons.

it had been hoped that the results of the pumping tests discussed earlier in this report would furnish accurate data for evaluating the effects of recharging. Unfortunately, it developed that conditions in this vicinity were unsulted to analysis in this way. However, the evaluation of the artificial recharge is not wholly dependent upon pumping tests.

As a result of the recharging, the water levels in the area as a whole were higher at the beginning of the season of heavy demand than they would otherwise have been. The greatest benefit occurred in the immediate area of the recharging, that is, in the Ballantine well field, but there were substantial gains at considerable distances. For example, during the recharging in 1949 a recorder was maintained on a well of the Celanese Corporation of America approximately half a mile from the center of recharging and water levels there rose sharply and promptly when the recharging was begun.

The water used for recharging probably did not drift very far away from the area in which it was introduced into the aquifer. Previous pumping had established a deep depression in the water table there and the effect of the recharging was to fill the depression partly. The improved water levels observed elsewhere occurred before water could possibly have moved through the aquifer from the point of recharge to the point of

observation. They represented a backing up of water that had previously been flowing into the Ballantine well field and that became available for withdrawal elsewhere when recharging began. The effect outside the Ballantine well field was exactly the same as if the rate of pumping at Ballantine's had been decreased by the amount that was recharged. And indeed the demand upon natural recharge was decreased by exactly that much. Much of the recharge water probably circulated directly to other wells in the Ballantine well field during the recharging. The remainder was almost certainly drawn into them soon after recharging ceased. Whatever benefits were derived from the higher quality and lower temperature of the recharge water were probably restricted entirely to the Ballantine well field. The gain in head and therefore in water stored in the ground extended to other nearby parts of the area.

Observations made during the recharging experiments indicated that the water levels in parts of the Ballantine well field may have risen above the top of the rock. This is not surprising in view of the limited capacity of the cracks in the rock. As soon as the water levels rose into the overlying glacial material the storage capacity was much greater. At no time did the head rise far enough to cause any loss of recharge water out of the system of aquifers. The highest water levels during the recharging were still more than 50 feet below mean sea level.

Chemical quality of the ground water

The chemical quality of the ground water from rock wells in the Newark area is shown hy the analyses in table 1, on page 49. Analyses A and B are of water taken from wells in the western part of the area farthest removed from the Passaic River and Newark Bay. The water is hard, principally because of its calcium and magnesium content. it is too hard for boiler use, but is suitable for most other uses, particularly for cooling. Several tanneries using ground water in their operations report that the quality of the water has a "favorable" effect on their processes. One producer of carbonated water reported that the ground water

imparted a pleasing taste to his product. Where not contaminated by bacterial or other harmful impurities, the water is potable.

The general quality of water pumped from wells in the areas nearer the river and bay is shown in analyses C and D. This water is generally reported to be far more corrosive than the ground water in the areas farther from the river and bay, and where the chloride content is high the necessity of frequent replacement of ordinary bronze impellers on pumps has been reported. One user has apparently solved this problem by the use of impellers and pump bowls constructed of a high-nickcl-content alloy. The highly mineralized water, of course, is generally not potable.

The high sulfate content of waters from some rock wells may be a function of the depth of the well. This may be explained by tha fact that gypsum (calcium sulfate) has been observed in the cuttings taken from very deep wells. (See log of well 3, in appendix.) Gypsum has also been observed by the senior author in the cuttings from another deep well in Newark, and Meredith E. Johnson, New Jersey State Geologist, has observed gypsum in cuttings taken at 580 feet from a well drilled in the Brunswick formation near Westfield, New Jersey. in the cuttings from the bottom of the Celanese Corporation well, the gypsum occurred as large plates (1 1/2 by 1/2 by 1/8 inches) which had every appearance of having been the fillings of cracks. Presumably, therefore, gypsum, originally deposited in the cracks in the rock, has remained in the deeper cracks because it was not exposed to the circulation of meteoric waters.

Occasionally, wells drilled into the rocks of the Brunswick formation have yielded water of high mineral content upon completion. in such wells, it has sometimes been possible to lower the mineral content of the water by pumping the well heavily for a prolonged period. High mineral concentrations of this sort are probably caused by the ground water having been more or less stationary long enough to dissolve the mineral matter from the rock. Heavy pumping permits circulation of ground water and may induce a flow of water of lower mineral content toward the well. So far as is known, no instances of this sort have been reported in the Newark area.

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Table 2.--Analyses of water from rock wells in the Newark area
(Results in parts per million)

Well	A	B	C	D	E	F
Color	0	0	0	0		
Total hardness as $CaCO_3$	300	232	360	2,370		
Dissolved solids	431	373	749	4,730		
Specific conductance, micromhos at 25^0 C.	669	614	1,220	6,960		
pH	7.2	7.6	7.5	7.3		
Silica (SiO_2)	22	20	18	31	34	
Iron (Fe)	.17	.13	1.1	.15		
Calcium (Ca)	105	67	111	365	340	420
Magnesium (Mg)	9.3	23	25	173	60	51
Sodium (Na)	19	16	37	447	13	43
Potassium (K)	1.3	2.7	2.3	7.0		
Carbonate (CO_3)	0	0	0	0		
Bicarbonate (HCO_3)	202	213	150	210	76	19
Sulfate (SO_4)	33	66	91	011	903	1,330
Chloride (Cl)	25	23	230	1,900	6.2	20
Fluoride (F)	.1	.1	.1	.0		
Nitrate (NO_3)	45	29	31	6.2		

Table 2.--Analyses of water from rock wells in the Newark area (continued)

A) From 310-foot well. Frick Bros. Creamery, Irvington, N. J.
Analysis by U.S.G.S., January 1948.

B) From 300-foot well, Hooton Chocolate Co., Newark, N. J.
Analysis by U.S.G.S., January 1948.

C) From 558-foot well, Kresge Dept. Store, Newark, N. J.
Analysis by U.S.G.S., January 1948.

D) From 805-foot well, F. Ballantine & Sons, well 1, plant 1, Newark, N. J.
Analysis by the U.S.G.S., January 1948.

E*) From 250-foot well. Celluloid Works, Newark, N. J. Analysis by F. Ballantine & Sons, 1079. (See Ann. Rept. New Jersey State Geologist for 1879. p. 127.)

F*) From 615-foot well. Lister Bros., Newark, N. J. Analysis by F. Ballantine & Sons, 1879. (See Ann. Rept. New Jersey State Geologist for 1879, p. 127.)

* Recalculated to F.p.m. by H. Herpers.

Reliable and detailed analyses of waters from wells pumping from the sand and gravel in the buried valley are not available at the present writing.

Salt-water intrusion

The infiltration of salt water into the body of fresh ground water is referred to as salt-water intrusion. In the Newark area it is believed to be caused principally by heavy pumping in areas adjacent to Newark Bay and the Passaic River. Heavy pumping lowers the general ground-water levels, creating a difference in head between the ground-water body and the nearby bay and river, inducing a flow of salt water into the water-bearing formations. Another factor that probably contributes to salt-water intrusion is the dredging of ship channels in the Passaic River and Newark Bay. As mentioned previously in the discussion of the hydrology of the Recent deposits, those deposits act as an imperfect barrier to the infiltration of salt water into the underlying materials. It is not improbable, therefore, that the deepening of ship channels in the river and bay has contributed to the breaking of the imperfect seal formed by the Recent (and, in some places, Pleistocene) deposits. In the areas of salt-water intrusion, the water in both the unconsolidated materials and the rocks is affected.

The attached map (figure 5) shows the distribution of the chloride content of the ground water in the area. Most of the data upon which the map was based were provided by the Newark City Chemist, through the courtesy of Dr. Charles V. Craster, Health Officer of the City of Newark. As almost all the analyses were made in 1942, when the City of Newark made a survey of certain qualities of the waters from wells in the city, the map presents a picture of the chloride content of the ground water at that time. Recent check analyses made in the investigation preceding this report, confirm generally the distribution of chloride shown. The curved lines represent points of equal chloride concentration.

Several areas of ground water with high chloride concentrations are shown, and all are in areas of relatively heavy pumpage. The first of these is along the Passaic River near the northern boundary of Newark, where there are several industries that use well water in processing.

The pumpage here is not as heavy as in the other areas, and great amounts of river water have not been drawn into the ground-water body. Mention might here be made of the single well near the bank of the Passaic River. Just south of the area, marked A on figure 5, the water from which contained 1,710 parts of chloride per million. This well pumps from a gravel bed about 45 feet below the surface which is probably in direct hydraulic connection with the river.

The second area of high chloride concentration is near the intersection of Harrison Avenue and McCarter Highway. Here, fairly heavy pumpage has induced an inflow of water from the river.

The third area, near the intersection of Raymond Boulevard and Broad Street, contains several wells that pump large amounts of water, principally for air-conditioning.

The fourth and largest area with high concentrations of chloride in well waters is in the eastern part of the Newark area and is bounded roughly by Harrison Avenue on the north; by Fourth Street, extended to Port Street on the west; by Port Street on the south; and by the Passaic River and Newark Bay on the east. The area contains many industries that require large amounts of ground water for cooling and processing. Heavy pumping, continued over a period of many years, has caused the depression of the upper surface of the ground-water body, which has, in turn, led to river-water intrusion on a large scale. That the present character of the water in this area is materially different from its original character can be seen by comparison of analyses D, E, and P (See table 2 on p. 38) Analysis D was made of water taken from a well of P. Ballantine & Sons in January 1948, whereas analyses E and P, made in 1079, are of water taken from wells not far from the Ballantine plant. Analyses E and P show that the ground water in this section originally had a chloride content comparable to that of water taken from wells in areas away from the river and bay.

About 4,000 feet northeast of the intersection of State Highway 25 and Port Street a great concentration of chloride was found in three wells belonging to a single company. Some of the differences in chloride content in this area may be due to differences in depth. The

highest concentration (2,700 p.p.m.) was encountered in a well 535 feet deep, whereas lower concentrations were found in nearby shallower wells. At the time the deep well was drilled, it was thought that the highly saline water might be caused by a pocket of stationary ground water, which had acquired its high salt content from the formation because of a lack of normal ground-water movement in the vicinity. On the basis of this assumption, the well was pumped steadily at a high rate of discharge for a few weeks with the idea of pumping out the pocket of highly mineralized water and inducing a flow of fresh water into the well. The results were inconclusive and the well was finally abandoned because of the unsatisfactory quality of the water.

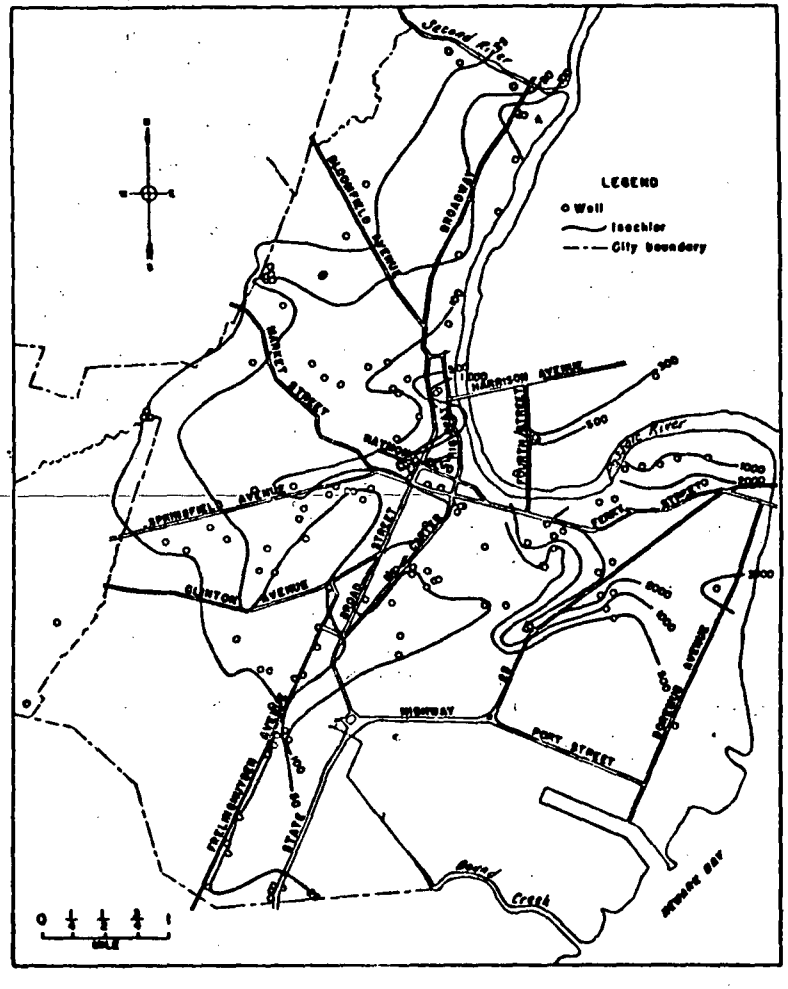

Figure 5.-Map showing chloride content of the ground water beneath Newark, N. J., and vicinity.

Temperature of the ground water

The average temperature of the ground water in the Newark area is approximately 55° F. The temperature of ground water, except as explained below, is largely a function of the depth of the aquifer from which it is drawn, and of the mean annual temperature of the air, which at Newark is 52.3° P. Water from very shallow wells will usually vary in temperature over the year. Water from somewhat deeper wells, however, has a temperature that, for all practical purposes, is equal to the mean annual temperature. The effect of the mean annual temperature on the temperature of ground water does not extend to great depths. it is known from numerous deep wells, mines, and test borings that the temperature of the earth's crust increases with depth. The rate at which the ground temperature increases with depth, known as the geothermal gradient, varies, depending upbn many conditions, but generally an increase of 50 to 150 feet in depth will raise the temperature 1° P. Of course, in regions of active volcanlsm this rate of increase does not apply. in the Newark area the normal geothermal gradient is not known as all temperature measurements have been made at the point of discharge of the pumps. Each measurement, therefore, represents merely the temperature of the water issuing from the well, which is probably an average of the temperatures of water at all producine levels.

CONCLUSIONS

The studies that preceded this report were not detailed or prolonged enough to arrive at definite answers to important questions that arise with regard to the safe yield of the aquifers in the Newark area. Only very tentative conclusions can be made at this time. Observations and studies should be continued over a period of years in order that the safe yield may be defined.

Continuing observations should be made of the pumping rates in every well in the area apd of the water levels in an adequate number of observation wells so that the rate and direction of flow in the aquifers and the

amount of recharge to them may be defined. Periodic analyses of the water from representative wells throughout the area should be made in order to detect changes in its quality and especially to define the intrusion of salt water. Geologic information should be sought to extend our knowledge of the burled channel that passes through the area and of the materials that fill it. Whenever wells or other deep excavations are made, particular attention should be given to the nature of the material overlying the rock in order to establish its geologic and hydrologic characteristics more fully, and ultimately to define the best areas of recharge.

in many parts of the area conclusive data are not available, but it seems probable that there are localities where additional quantities of ground water may be obtained. it also seems probable that in some heavily pumped parts of the area the safe yield is being approached or has already been exceeded. For example, in the area around the plants of P. Ballantine & Sons and the Celanese Corporation of America, the water levels have been lowered to such an extent that it seems unlikely that any substantial additional quantity of water can be withdrawn from the ground safely or economically. The quality of the ground water in this area is already unfit for some uses.

The experiments with artificial recharge at the Ballantine plant during the last two years offer promise of great improvement in the ground-water conditions in some parts of the area if water is available for continuing such recharge. This is certainly sound conservation practice and should be expanded as much as possible. Whenever recharging is undertaken in the future, careful observations should be made of water levels and of the quality and quantity of water recharged and withdrawn, in order to evaluate the effects more closely and to trace the movement of the water.

APPENDIX I - SELECTED WELL LOGS

1. Log of well 2, drilled for Driver Harris Co., Harrison, N. J., by C. W. Lauman & Co. Log furnished by C. W. Lauman & Co.

Depth	Thickness	Description	Correlation
0' - 21'6"	21'6"	Fill	Fill
21'6" - 30'0"	8'4"	Sand and gravel	Glacial drift
30'10" - 39'0"	8'2"	Coarse sand and gravel	"
39'0" - 41'0"	2'10"	Streaks of hard red clay and gravel	"
41'0" - 58'2"	18'4"	Red clay, fine sand and gravel	"
58'2" - 62'2"	4'0"	Clay and gravel	"
62'2" - 71'6"	9'7"	Hard red clay and broken rock	"
71'6" - 82'0"	10'3"	Red clay and fine sand	"
82'0" - 112'11"	30'11"	Red clay and rock	"
112'11" - 135'0"	22'1"	Red clay	"
135'0" - 141'0"	6'0"	Hard packed sand	"
141'0" - 155'0"	14'0"	Red clay	"
155'0" - 166'0"	11'0"	Clay, sand, and gravel	"
166'0" - 173'3"	7'3"	Hardpan	"
173'3" - 176'0"	3'0"	Clay, fine sand, and gravel	"
176'3" - 187'0"	11'0"	Cemented sand and gravel	"
187'3" - 192'0"	5'0"	Fine brown sand and clay	"
192'3" - 212'10"	20'7"	Red clay	"
212'10" - 222'6"	9'8"	Sand, gravel, and red clay	"
222'6" - 225'0"	3'0"	Coarse vend and gravel	"
225'6" - 231'6"	6'0"	Clay and gravel	"
231'0" - 234'6"	3'0"	Coarse sayd and small gravel	"
234'6" - 240'0"	5'6"	Clay and sand	"
240'6" - 243'0"	3'0"	Coarse brown sand, gravel, and some clay	"
243'0" - 253'0"	10'0"	Medium coarse red sand and grit	"
253'6" - 270'0"	17'0"	Red clay and gravel	"
270'6" - 291'0"	21'0"	Hard clay, sand, and large gravel	"
291'0" - 292'0"	1'0"	Medium coarse sand and large gravel	"
292'0" - 337'0"	45'0"	and Shale	Triassic

2. Log of well 2 drilled for John Nieder. 247 Emmet Street, Newark, N. J., by Layne-New York Co. Log furnished by Mr. W. A. North of Layne-New York Co.

Depth	Thickness	Description	Correlation
0' - 3'	3'	Concrete	Recent
3' - 5'	2'	Cinders	Fill
5' - 15'	10'	Yellow clay	Recent ?
15' - 27'	12'	Fine red sand	Glacial drift
27' - 55'	28'	Red quicksand	"
55' - 80'	25'	Tough red clay	"
80' - 125'	45'	Soft red clay	"
125' - 190'	65'	Red sandy clay	"
190' - 210'	20'	Soft red clay	"
210' - 215'	5'	Hardpan	"
215' - 225'	10'	Sand and clay	"
225' - 408'	163'	Red rock	Triassic

3. Log of well 27 drilled for Celanese Corporation of America by Layne-New York Co. Compiled by H. Herpers from samples furnished by Wm. E. Helmstaedter, Mechanical Engineer, Celanese Corporation of America.

Depth	Thickness	Description	Correlation
2' - 27'	25'	Fine-grained red-brown sand	Glacial drift
27' - 32'	5'	Coarse gravel composed of red shale (to 1/2 in.)	"
32' - 71'	30'	Fine-grained red sandy clay	"
71' - 354'	283'	Red shale	Triassic
354' - 365'	11'	Red shale (softer than last)	"
365' - 377'	12'	Soft red shale (similar to last)	"
377' - 419'	42'	Fine-grained red sandstone	"
419' - 537'	113'	Red shale	"
537' - 580'	43'	Red shale (softer than last)	"
580' - 650'	70'	Very soft red shale	"
650' - 695'	45'	Soft red shale with some gypsum grains	"
695' - 725'	30'	Red shale. A few gypsum grains	"
725' - 730'	5'	Fine-grained red sandstone	"
730' - 787'	57'	Red shale with some gypsum grains	"
787' - 796'	9'	Fine-grained red shaly sandstone with gypsum grains	"
796' - 840'	44'	Red shale	"
840' - 856'	16'	Red sandy shale with large (1-1/2 in. x 1 in. x 1/8 in.) plates of gypsum, which appear to have been deposited in fractures in rock	"

4. Log of test boring No. 19, made at crossing of Route 25 addition and Lehigh Valley R. R. yards by Giles Drilling Co. for State Highway Department. Compiled by H. Herpers from Inspection of samples.

Depth	Description	Correlation
0' - 3'	Cinders	Fill
3' - 5'	Cinders and meadow muck	Fill and Recent
5' - 11'	Cinders, gray clay, and meadow muck	"
11' - 17'	Gray, slightly sandy-clay	Recent
17' - 21'	Red and gray clay and medium sand	Recent (reworked glacial drift)
21' - 31'	Fine red silty sand	Glacial drift
31' - 41'	Red clay	"
41' - 51'	Red sandy clay	"
51' - 61'	Red sandy clay and red shale (top of rock)	Triassic
61' - 71'	Red shale (core)	"

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REFERENCE NO. 16

SUPERFUND CHEMICAL DATA MATRIX

1 November 1991

Appendix A

Chemical Data, Factor Values, and Benchmarks for Chemical Substances

Appendix B-1

Tables for Non-radioactive Hazardous Substances

NA24MI R68K168 SYSTEM
Hazardous Substance Factor Values
(305 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Ammonium sulfamate	007773-06-0	10	1.0E+00	1.0E+00	2.0E-05	2.0E-05	0.4000	0.0700	0.5	0.5	0.5	0.5	1	1	NA	NA	No	Yes
Aniline	000062-55-5	10000	1.0E+00	1.0E+00	2.0E-05	2.0E-05	0.4000	0.0700	5.0	5.0	5.0	5.0	1000	10	NA	NA	No	Yes
Anthracene	000120-12-7	10	1.0E+00	1.0E-06	2.0E-05	2.0E-07	0.4000	0.4000	5000.0	5000.0	5000.0	5000.0	10000	10000	6	0.0020	Yes	Yes
Antimony	007440-36-0	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	0.5	500.0	0.5	500.0	...	...	NA*	NA *	No	Yes
Arsenic	007440-38-2	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5.0	500.0	50.0	500.0	10	100	NA	NA	No	Yes
Asbestos	001332-21-9	10000	1.0E+00	1.0E-04	2.0E-05	2.0E-09	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Atrazine	001912-24-9	100	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.6800	0.0700	50.0	50.0	50.0	50.0	...	...	6	0.0020	Yes	Yes
Azinphos- ethyl	002642-71-9	100	1.0E+00	1.0E-02	1.9E+00	1.0E-02	0.4000	0.0700	500.0	500.0	500.0	500.0	...	...	na	NA	No	Yes
Azinphos- methyl	00000A-68-0	100	1.0E+00	1.0E+00	2.0E-05	2.0E-05	0.4000	0.0700	0.5	0.5	0.5	0.5	30000	10000	NA	NA	No	Yes
Aziridine	000133-56-4	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	11	1.0000	Yes	No
Barium	007440-39-3	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	0.5	0.5	0.5	0.5*	1	1	NA	NA	No	Yes
Barium cyanide	000542-62-1	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	0.5	0.5	0.5	0.5*	...	...	NA	NA	No	Yes
Benz(a)anthracene	000056-55-3	1000	1.0E+00	1.0E-06	2.0E-05	2.0E-09	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	10000	10000	6	0.0002	Yes	Yes
Benzene	000071-43-2	100	1.0E+00	1.0E+00	1.0E+00	3.0E400	0.4000	0.4000	5000.0	5000.0	500.0	50000.0	10000	10000	17	1.0000	Yes	No
Benzene carbonyl chloride	000098-88-7	...	1.0E+00	1.0E+00	2.5E-05	2.0E-05	0.4000	1.0000	0.5	0.5	0.5	0.5	10	1	11	1.0000	Yes	No
Benzidine	000092-87-5	10000	1.0E+00	1.0E-04	1.0E+00	1.0E-04	0.4000	0.0700	50.0	50.0	50.0	50.0	...	...	0	0.0002	Yes	Yes
Benzo(a)pyrene	000050-32-8	10000	1.0E+00	1.0E-06	2.0E-05	2.0E-09	1.0000	1.0000	50000.0	500.0	50000.0	500.0	10000	1000	6	0.0002	Yes	Yes
Benzo[b,k]fluoranene	000205-99-2	100	1.0E+00	1.0E+00	2.0E-05	2.0E-05	1.0000	0.4000	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Benzo[k]fluoranthene	000207-08-9	...	1.0E+00	1.0E+00	2.0E-05	2.0E-05	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	...	...	6	0.0000	Yes	Yes

* Indicates difference between previous version of chemical data (OCT93) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(505 substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Sea	Port
Cadmium	007440-43-9	10000	3.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	1000	1000	NA	NA	No	Yes
Captan	000133-06-2	10	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.0007	0.0700	50.0	50.0	50.0	50.0	10000	10000	6	0.0200	Yes	Yes
Carbaryl	000063-25-2	10	1.0E+00	1.0E+00	2.0E-01	2.0E-01	0.4000	0.0700	50.0	50.0	5.0	5.0	10000	10000	0	0.0000	Yes	Yes
Carbofuran	001563-66-2	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50.0	50.0	50.0	55.0	...	...	11	1.0000	Yes	No
Carbon disulfide	000075-15-0	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	0.5	0.5	0.5	0.5	100	100	17	1.0000	Yes	No
Carbon Tetrachloride	000056-23-5	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	10	100	17	1.0000	Yes	No
Carbophenothion	000786-19-6	100	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	10000	10000	NA	NA	No	Yes
Chloral	000075-87-6	1000	1.0E+00	1.0E+00	2.0E-05	2.0E-05	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Chlordane	000057-74-9	10000	1.0E+00	1.0E-04	2.0E-03	2.0E-07	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	10000	10000	6	0.0020	Yes	Yes
Chlorine cyanide	000506-77-4	10	1.0E+00	1.0E+00	2.0E-05	2.0E-05	0.4000	0.0700	0.5	0.5	0.5	0.5	10000	10000	17	1.0000	Yes	No
Chloro-5-methylphenol, 4-	000059-50-7	1	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50.0	50.0	50.0	50.0	1000	1000	11	0.2000	Yes	Yes
Chloroaniline, p-	000106-47-8	1000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	5.0	5.0	5.0	5.0	...	...	11	0.2000	Yes	Yes
Chlorobenzene	000108-90-7	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	5000.0	5000.0	1000	1000	17	1.0000	Yes	No
Chloroform	000067-66-5	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	10	10	17	1.0000	Yes	No
Chloroethane	000074-87-5	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.0007	0.0700	5.0	5.0	5.0	5.0	1	1	17	1.0000	Yes	No
Chloroethyl methyl ether	000107-86-2	1000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.0007	0.0007	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Chloroethylacrylate, 2-	000106-89-8	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	0.5	0.5	0.5	0.5	10	10	17	1.0000	Yes	No
Chloronaphthalene, 2-	000091-58-7	10	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	500.0	500.0	500.0	500.0	...	...	11	0.2000	Yes	Yes
Chlorophenol, 2-	000095-57-8	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.4000	500.0	500.0	500.0	500.0	100	100	11	1.0000	Yes	No

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* Indicates difference between previous version of chemical data (PCY91) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Value*
(505 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Sa*	Part
Hexachlorocyclohexane, alpha-	000319-04-6	10000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	500.0	500.0	5000.0	500.0	1000	1000	11	0.0200	Yes	Yes
Hexachlorocyclohexane, beta-	000319-05-7	100	1.0E+00	1.0E-02	2.0E-03	2.0E-05	1.0000	1.0000	500.0	500.0	5000.0	5000.0	...	...	6	0.0020	Yes	Yes
Hexachlorocyclohexane, delta-	000319-06-0	1000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	5.0	500.0	5000.0	500.0	...	...	6	0.0200	Yes	Yes
Hexachlorocyclopentadiene	000077-47-4	10000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	5000.0	5000.0	50.0	50.0	10000	10000	17	0.2000	Yes	Yes
Hexachloroethane	000067-72-1	1000	1.0E+00	1.0E-02	2.0E-01	2.0E-05	0.4000	1.0000	500.0	500.0	500.0	500.0	1000	1000	17	1.0000	Yes	No
Hexachlorophene	000070-30-4	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	10000	10000	NA	NA	No	Yes
Hexane	000110-54-5	10	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	1.0000	500.0	500.0	500.0	500.0	...	...	17	1.0000	Yes	No
Hydrazine	000302-01-2	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	0.5	0.5	0.5	0.5	10000	100	17	1.0000	Yes	No
Hydrochloric acid	007647-01-0	1000	1.0E+00	1.0E+00	2.0E-05	2.0E-05	0.4000	0.0700	0.5	0.5	0.5	0.5	1	1	NA	NA	No	Yes
Hydrogen cyanide	000074-90-0	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.0700	0.0700	0.5	0.5	0.5	0.5	10000	10000	17	1.0000	Yes	No
Hydrogen sulfide	007783-06-4	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	0.5	0.5	0.5	0.5	1000	1000	17	1.0000	Yes	No
Hexynil	001609-03-4	1000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	0.0700	500.0	500.0	500.0	500.0	...	...	NA	NA	No	Yes
Iron	013430-31-0	...	1.0E+00	1.00-02	1.0E+00	1.0E-02	1.0000	1.0000	0.5	0.5	0.5	0.5*	10	10	NA	NA	No	Yes
Isobutanol	000070-03-1	10	1.0E+00	1.0E+00	1.00+00	1.0E+00	0.4000	0.0700	0.5	0.5	0.5	0.5	10	1	17	1.0000	Yes	No
Isophorone	000070-39-1	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	5.0	5.0	5.0	5.0	1	1	11	1.0000	Yes	No
Kepone	000145-50-0	10000	1.0E+00	1.0E+00	2.0E-01	2.0E-01	0.4000	0.0700	50000.0	50000.0	50000.0	50000.0	...	...	0	0.0020	Yes	Yes
Lead	007439-92-1	10000	1.0E+00	1.0E-02	2.0E-03	2.0E-05	1.0000	1.0000	50.0	5000.0	5000.0	5000.0	1000	1000	NA	NA	No	Yes
Lindane	000050-09-9	10000	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	500.0	500.0	500.0	500.0	10000	10000	11	0.0200	Yes	Yes
Malathion	000121-75-5	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	10000	10000	0	0.0020	Yes	Yes

* Indicates difference between previous version of chemical data (OCT01) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(505 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Quinoline	000091-22-5	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	0.5	0.5	5.0	5.0	1000	1000	11	0.2000	Yes	Yes
Resorcinol	000108-46-3	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	5.0	5.0	5.0	5.0	...	...	6	0.0200	Yes	Yes
Ronnel	000299-84-5	10	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	1000	1000	NA	NA	No	Yes
Selenium	007782-49-2	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5000.0	50.0	5000.0	50.0	100	100	NA	NA	No	Yes
Selenourea	000630-10-4	100	1.0E+00	1.0E+00	2.0E-05	2.0E-05	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Silver	007440-22-4	1000	1.0E+00	1.0E-02	2.0E-05	2.0E-07	1.0000	1.0000	50.0	50.0	50.0	50.0	10000	10000	NA	NA	No	Yes
Silver Cyanide	000506-64-9	10	1.0E+00	1.0E-02	2.0E-05	2.0E-07	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0*	...	...	Ga	NA	No	Yes
Sodium	007440-23-3	...	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	0.5	0.5	0.5	0.5*	...	...	NA	NA	No	Yes
Strychnine	000057-24-9	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	5.0	5.0	5.0	5.0	1000	1000	NA	NA	No	Yes
Styrene	000100-42-5	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	10	10	17	1.0000	Yes	No
Sulfuric acid	007664-93-9	1000	1.0E+00	1.0E+00	2.0E-05	2.0E-05	0.4000	0.0700	0.5	0.5	0.5	0.5	10	10	NA	NA	No	Yes
TCB, 2,4,5-	000095-08-1	...	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.0700	500.0	500.0	500.0	500.0	...	...	0	0.0020	Yes	Yes
TCDD	001746-01-6	10000	1.0E+00	1.0E-04	2.0E-05	2.0E-09	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	...	...	6	0.0002	Yes	Yes
Tetrachlorobenzene, 1,2,4,5-	000095-94-3	10000	1.0E+00	1.0E-04	2.0E-03	2.0E-07	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	100	100	17	0.2000	Yes	Yes
Tetrachloroethane, 1,1,1,2-	000630-20-6	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.4000	50.0	50.0	50.0	30.0	10	10	17	1.0000	Yes	No
Tetrachloroethene, 1,1,2,2-	000079-34-5	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	5.0	5.0	5.0	3.0	100	100	11	1.0000	Yes	No
Tetrachloroethene	000127-18-4	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	100	100	17	1.0000	Yes	No
Tetrachlorophenol, 2,3,4,6-	000058-90-2	100	1.0E+00	1.0E-04	1.0E+00	1.0E-04	1.0000	1.0000	500.0	500.0	500.0	500.0	1000	100	11	0.2000	Yes	Yes
Tetraethyl Lead	000078-00-2	10000	1.0E+00	1.0E+00	2.0E-03	2.0E-03	0.0700	0.0700	500.0	500.0	500.0	500.0	100	10000	17	1.0000	Yes	No

* Indicates difference between previous version of chemical data (OCT91) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(305 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Tetraethyldithiopyrophosphate	003689-24-5	1000	1.0E+00	1.0E+00	2.0E-05	2.0E-05	0.4000	0.0700	0.5	0.5	0.5	0.3	10000	10000	NA	NA	No	Yes
Tetrahydrofuran	000109-99-9	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Thallium	007440-28-0	10000	1.0E+00	1.0E-04	1.0E+00	1.0E-04	1.0000	1.0000	500.0	50.0	500.0	30.0	...	...	NA	NA	No	Yes
Thiourea	000062-56-6	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	6	0.0200	Yes	Yes
Thiram	000137-26-8	100	1.0E+00	1.0E+00	2.0E-01	2.0E-01	0.4000	0.0700	5000.0	5000.0	5000.0	5000.0	...	...	NA	NA	No	Yes
Toluene	000108-88-3	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.4000	50.0	50.0	50.0	50.0	100	100	17	1.0000	Yes	No
Toluene diisocyanate	000584-84-9	1000	1.0E+00	1.0E+00	2.0E-05	2.0E-05	0.4000	0.0700	0.5	0.5	0.5	0.5	1	1	11	0.2000	Yes	Yes
Toxaphene	008001-35-2	1000	1.0E+00	1.0E-02	2.0E-03	2.0E-05	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	10000	10000	6	0.0020	Yes	Yes
TP, 2,4,5-	000093-72-1	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.0700	500.0	500.0	500.0	500.0	1000	1000	0	0.0020	Yes	Yes
Tribromomethane	000075-25-2	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	50.0	50.0	50.0	50.0	10	10	11	1.0000	Yes	No
Trichloro-1,2,2-Trifluoroethane, 1,1,2-	000076-13-1	1	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	...	...	17	1.0000	Yes	No
Trichlorobenzene, 1,2,4-	000120-82-1	1000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	1.0000	500.0	500.0	500.0	500.0	1000	100	17	1.0000	Yes	No
Trichloroethane, 1,1,1-	000071-55-6	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	5.0	5.0	5.0	5.0	10	10	17	1.0000	Yes	No
Trichloroethane, 1,1,2-	000079-00-5	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	10	10	17	1.0000	Yes	No
Trichloroethylene	000079-01-6	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	10	10	17	1.0000	Yes	No
Trichlorofluoromethane	000075-69-4	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	...	...	17	1.0000	Yes	No
Trichlorophenol, 2,3,5-	000933-78-8	...	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	...	...	6	0.0200	Yes	Yes
Trichlorophenol, 2,3,6-	000933-75-5	...	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	500.0	500.0	500.0	500.0	...	...	6	0.0200	Yes	Yes
Trichlorophenol, 2,4,5-	000095-95-4	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	0.4000	500.0	500.0	5000.0	5000.0	1000	1000	11	0.2000	Yes	Yes

* Indicates difference between previous version of chemical data (OCT91) and current version of chemical data.

REFERENCE NO. 17

ARCS II CONTRACT 68-W9-0051
MALCOLM PIRNIE, INC.
RECORD OF TELEPHONE CONVERSATION/AGREEMENT

File No. 8403-055

Date: 8/26/92 Time: 10:50 [X] AM [ ] PM

[ ] Incoming Call From: _____ Telephone No.

Affiliation: _____

[X] Outgoing Call To: Mario Crawford 201-589-5569 Telephone No.

Affiliation: Bayonne Drum & Barrel Security Guard

Malcolm Pirnie Staff: Gary Bielen 609-860-0100
(Receiving or Calling) Name Telephone No.

Summary of [X] Conversation [ ] Agreement:

Mr. Crawford is the security guard for Bayonne Drum & Barrel Company.
He is the only person onsite

f:\rectele.jan(1)

REFERENCE NO. 18

MALCOLM PIRNIE, INC. PROJECT NOTES

To: File
Date: 9/2/92
From: GARY BIELEN
Project Number: 8003 - 055
Subject: Analytical Results for DAN RAVIV Sampling
Site Name: Bayonne Drum & Barrel

Attached is the analytical results for the sampling events conducted by DAN RAVIV Associates from 1985 to 1986.

SITE NAME: BAYONNE BARREL & DRUM CO.
SAMPLING DATES: 10/15/85-10/31/85

Sample ID No.	BBD-1	BBD-2	BBD-4	BBD-8	BBD-10	BBD-11	BBD-12	BBD-13	BBD-13	BBD-14	BBD-15	BBD-15	BBD-15	BBD-16	BBD-16
	0-1	0-1	0-1	0-1		0-1	0-1	0-1	4 (FBLANK)	0-1	0-1	S-7	15 (FBLANK)	1-2	S-8
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Vinyl Chloride (ppb)															
Chloroethane (ppb)															
Methylene Chloride (ppb)															
1,1-Dichloroethylene (ppb)															
1,1-Dichloroethane (ppb)															
1,2-Dichloroethylene (ppb)															
Chloroform (ppb)															
1,2-Dichloroethane (ppb)															
1,1,1-Trichloroethane (ppb)															
Bromodichloromethane (ppb)															
1,2-Dichloropropane (ppb)															
Trichloroethylene (ppb)															
Benzene (ppb)			55					29				60		57	30
1,1,2-Trichloroethane (ppb)															
1,1,2,2-Tetrachloroethylene (ppb)															
Toluene (ppb)			360					210						630	
Chlorobenzene (ppb)															
Ethylbenzene (ppb)			8600				52	810				87		830	
1,2 & 1,4-Dichlorobenzene (ppb)															
1-Butanol (ppb)			50												
Isopropylcyclopropane (ppb)															
Xylenes (ppb)			28000												
m-Xylenes (ppb)			28000				38	1500						1400	43
o,p-Xylenes (ppb)							47	1200						1200	23
Cyclopropane (ppb)															
Acetone (ppb)															
Dimethyl Sulfide (ppb)															
Isopropanol (ppb)															
Carbon Disulfide (ppb)															
Methyl Ethyl Ketone (ppb)															
Freon 113 (ppb)															
Cyclohexane (ppb)															
Hexane (ppb)															
Methyl Isobutyl Ketone (ppb)															
4-Methyl-2-Pentanol (ppb)															
Benzyl Butyl Phthalate (ppm)															
Di-N-Butylphthalate (ppm)															
2-Methyl Naphthalene (ppm)							0.68	1.5							
Anthracene (ppm)								0.65			1				
Benzo(b)fluoranthene (ppm)								0.51			1.9				
Benzo(a)pyrene (ppm)								1.3			2.3				
Bis(2-Ethylhexyl)phthalate (ppm)							7.25	6.3		410	2.8				
Chrysene (ppm)								2.3			2.9				
2,4-Dinitrotoluene (ppm)								1.9							
Fluoranthene (ppm)								2.5			5.2				
Fluorene (ppm)								0.63							
Naphthalene (ppm)							1.2	1.7		120					
Phenanthrene (ppm)								2.8			4.7				
Pyrene (ppm)								4			5.8				
1,2-Diphenylhydrazene (ppm)								0.52							
Benzo(a)anthracene (ppm)											2.9				
Benzo(g,h,i)perylene (ppm)											0.87				
Indeno(1,2,3-cd)pyrene (ppm)											0.87				
Chlorofluoromethane (ppb)															
Dichlorofluoromethane (ppb)															
Di-Isopropylether (ppb)															
Diethylether (ppb)															

SITE NAME: BAYONNE BARREL S. DRUM CO.
SAMPLING DATES: 10/15/8S–10/31/8S

Sample ID No.	BBD–1	BBD–2	BBD–4	BBD–8	BBD–10	BBD–11	BBD–12	BBD–13	BBD–13	BBD–14	BBD–15	BBD–1S	BBD–1S	BBD–16	BBD–16
	0–1	0–1	0–1	0–1		0–1	0–1	0–1	4 (FBLANK)	0–1	0–1	5–7	15 (FBLANK)	1–2	S–8
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2,1,4–Trimethylpentane (ppb)															
Xylene Isomers (ppb)															
Methylcyclopentane (ppb)															
Cycloheplane (ppb)															
Isoprapylbenzena (ppb)															
n–Propylbenzene (ppb)															
Antimony (ppm)			13							8.4					4
Arsenic (ppm)			17	390	0.002	51				8.4	55				2.9
Barium (ppm)				22		10					10				
Beryllium (ppm)			0.64							0.28					0.32
Cadmium (ppm)			1300	34	0.21	4.72				0.S2	S.08				0.2
Chromium (ppm)			3400	1900		43.2				27	S2				7
Copper (ppm)			ISS00							15.6					4.64
Lead (ppm)			8400	8400	2.6	380				92	6400				15
Mercury (ppm)			2.2	13.6	0.0004	1.3				1.6	4.1				0.62
Nbkel (ppm)			62.4							25					5.28
Silver (ppm)			0.92	3.1		0.48				0.3	0.84				0.2
Selenium (ppm)			0.03	0.048	0.001	0.004				0.019	0.042				
Zinc (ppm)			4520							71.2					15.4
Phenol (ppm)			15												2.8
Cyanide (ppm)			2												

SITE NAME: BAYONNE BARREL & DRUM CO.
SAMPLING DATES: 10/15/85-10/31/85

Sample ID No.	BBD-17 0-1	BBD-17 0-1 (DUP)	BBD-17 S	BBD-19 0-1	BBD-20 FBLANK	BBD C1	BBD-C1 0-2	BBD-C1 5-7	BBD-C2	BBD-C2 5-7	BBD-C2 S-7 (DUP)	BBD-C2 10-12	BBD-C3	BBD-C3 5-7	BBD-C3 15-17
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS
Vinyl Chloride (ppb)	89	170	170												
Chloroethane (ppb)			33												
Methylene Chloride (ppb)	130	91	740												
1,1-Dichloroethylene (ppb)			28												
1,1-Dichloroethane (ppb)	250	210	1000												
1,2-Dichloroethylene (ppb)	150	120	1100												
Chloroform (ppb)	41	21	100										25		
1,2-Dichloroethane (ppb)	36	32	78												
1,1,1-Trichloroethane (ppb)	510	211	850												
Bromodichloromethane (ppb)													5		
1,2-Dichloropropane (ppb)			52												
Trichloroethylene (ppb)	240	210	630												
Benzene (ppb)	130	87	220					410		50	51			265	
1,1,2-Trichloroethane (ppb)	100	92	220												
1,1,2,2-Tetrachloroethylene (ppb)	94	71	290												
Toluene (ppb)	7500	6400	14000							71	84			1700	
Chlorobenzene (ppb)	30	22	49											330	
Ethylbenzene (ppb)	2200	1600	2700					2300						3700	
1,2 & 1,4-Dichlorobenzene (ppb)	61	79	93											320	
1-Butanol (ppb)															
Isopropylcyclopropane (ppb)															
Xylenes (ppb)								800		130	140			9600	
m-Xylenes (ppb)			3900												
o,p-Xylenes (ppb)			3400												
Cyclopropane (ppb)			30												
Acetone (ppb)	130	130	70												
Dimethyl Sulfide (ppb)			30												
Isopropanol (ppb)			50												
Carbon Disulfide (ppb)	30	15	50								20	36			
Methyl Ethyl Ketone (ppb)	170	140	110												
Freon 113 (ppb)			20												
Cyclohexane (ppb)	40	20	50												
Hexane (ppb)	25	15	25												
Methyl Isobutyl Ketone (ppb)	730	500	550							120	120				
4-Methyl-2-Pentanol (ppb)	160	85	140												
Benzyl Butyl Phthalate (ppm)	19.3														
Di-N-Butylphthalate (ppm)	17														
2-Methyl Naphthalene (ppm)	15.5														
Anthracene (ppm)															
Benzo(b)fluoranthene (ppm)															
Benzo(a)pyrene (ppm)															
Bis(2-Ethylhexyl)phthalate (ppm)															
Chrysene (ppm)															
2,4-Dinitrotoluene (ppm)															
Fluoranthene (ppm)															
Fluorene (ppm)															
Naphthalene (ppm)															
Phenanthrene (ppm)															
Pyrene (ppm)															
1,2-Diphenylhydrazene (ppm)															
Benzo(a)anthracene (ppm)															
Benzo(g,h,i)perylene (ppm)															
Indeno(1,2,3-cd)pyrene (ppm)															
Chlorofluoromethane (ppb)						10									
Dichlorofluoromethane (ppb)						70									
Di-Isopropylether (ppb)						15									
Diethylether (ppb)									10						

SITE NAME: BAYONNE BARREL & DRUM CO.
SAMPUNG DATES: 10/1S/8S–10/31/8S

Sample ID No.	BBD–17 0–1	BBD–17 0–1 (DUP)	BBD–17 S	BBD–19 0–1	BBD–20 FBLANK	BBD C1	BBD–C1 0–2	BBD–C1 5–7	BBD–C2	BBD–D2 5–7	BBD–C2 5–7 (DUP)	BBD–C2 10–12	BBD–C3	BBD–C3 5–7	BBD–C3 15–17
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	AQUEOUS	AQUEOUS	AOUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS
2,1,4–Trimethylpentane (ppb)									10						
Xylene Isomers (ppb)															
Methybyclopentane (ppb)															
Cycloheptane (ppb)															
Isopropylbenzene (ppb)															
n–Propylbenzene (ppb)															
Antimony (ppm)	6														
Arsenic (ppm)	56														
Barium (ppm)															
Beryllium (ppm)	0.S														
Cadmium (ppm)	6 56														
Chromium (ppm)	2300														
Copper (ppm)	128														
Lead (ppm)	370														
Mercury (ppm)	1.6														
Nickel (ppm)	56.8														
Silver (ppm)	1.7														
Selenium (ppm)	0.023														
Zinc (ppm)	5040														
Phenol (ppm)	20														
Cyanide (ppm)	0.5														

SITE NAME: BAYONNE BARREL & DRUM CO.
SAMPLING DATES: 10/15/85-10/31/85

Sample ID No.	BBD-C3 20-22	BBD-C4	BBD-C4 S-7	BBD-C4 15-17	BBD-CS	BBD-C6	BBD S1	BBD S2	BBD S3	BBD S4	BBD W1
Matrix	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS
Vinyl Chloride (ppb)											
Chloroethane (ppb)											
Methylene Chloride (ppb)											
1,1-Dichloroethylene (ppb)											
1,1-Dichloroethane (ppb)											
1,2-Dichloroethylene (ppb)											
Chloroform (ppb)											
1,2-Dichloroethane (ppb)											
1,1,1-Trichloroethane (ppb)											
Bromodichloromethane (ppb)											
1,2-Dichloropropane (ppb)											
Trichloroethylene (ppb)											
Benzene (ppb)		28	90	26							
1,1,2-Trichloroethane (ppb)											
1,1,2,2-Tetrachloroethylene (ppb)											
Toluene (ppb)		S	2200	20	150					39	
Chlorobenzene (ppb)			650		67						
Ethylbenzene (ppb)			790	10	1060						
1,2 & 1,4-Dichlorobenzene (ppb)			87		76						
1-Butanol (ppb)											
Isopropylcyclopropane (ppb)			70								
Xylenes (ppb)			1300								
m-Xylenes (ppb)											
o,p-Xylenes (ppb)											
Cyclopropane (ppb)											
Acetone (ppb)										25	
Dimethyl Sulfide (ppb)											
Isopropanol (ppb)											
Carbon Disulfide (ppb)			10								
Methyl Ethyl Ketone (ppb)											
Freon 113 (ppb)											
Cyclohexane (ppb)			50		60						
Hexane (ppb)											
Methyl Isobutyl Ketone (ppb)											
4-Methyl-2-Pentanol (ppb)										20	
Benzyl Butyl Phthalate (ppm)											
Di-N-Butylphthalate (ppm)		28									
2-Methyl Naphthalene (ppm)											
Anthracene (ppm)											
Benzo(b)fluoranthene (ppm)											
Benzo(a)pyrene (ppm)											
Bis(2-Ethylhexyl)phthalate (ppm)											
Chrysene (ppm)											
2,4-Dinitrotoluene (ppm)											
Fluoranthene (ppm)											
Fluorene (ppm)											
Naphthalene (ppm)		14									
Phenanthrene (ppm)											
Pyrene (ppm)											
1,2-Diphenylhydrazene (ppm)											
Benzo(a)anthracene (ppm)											
Benxo(g,h,i)perylene (ppm)											
Indeno(1,2,3-cd)pyrene (ppm)											
Chlorofluoromethane (ppb)											
Dichlorofluoromethane (ppb)											
Di-Isopropylether (ppb)											
Diethylether (ppb)		30									

SITE NAME: BAYONNE BARREL & DRUM CO.
SAMPLING DATES: 10/15/85–10/31/85

Sample ID No.	BBD–C3 20–22	BBD–C4	BBD–C4 5–7	BBD–C4 15–17	BBD–C5	BBD–C6	BBDS1	BBDS2	BBDS3	BBDS4	BBDW1
Matrix	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS	AQUEOUS
2,1,4–Trimethylpentane (ppb)											
Xylene Isomers (ppb)											
Methylcyclopentane (ppb)					30						
Cycloheplane (ppb)					100						
Isopropylbenzene (ppb)					90						
n–Propylbenzene (ppb)					150						
Antimony (ppm)											
Arsenic (ppm)		0.01									
Barium (ppm)											
Beryllium (ppm)											
Cadmium (ppm)											
Chromium (ppm)											
Copper (ppm)		0.04									
Lead (ppm)											
Mercury (ppm)											
Nbkel (ppm)											
Silver (ppm)		0.03									
Selenium (ppm)											
Zinc (ppm)		0.03									
Phenol (ppm)											
Cyanide (ppm)											

REFERENCE NO. 19

SI REVIEW SHEET

SITE: Bayonne Barrel & Drum Co. AKA:

CITY: Newark COUNTY: Essex

DATE SAMPLED: FROM 1984 TO 1988 EPA ID #: NJD009371401

SITE LEAD: EPA Surveillence & Monitoring Branch SITE CONTACT Mike Ferriola

SAMPLE MATRIX (# SAMPLES)			BACKGROUND SAMPLE (Y,N)	* SAMPLE PARAMETERS	QA/QC REVIEW (Y,N)
SOIL	> 75	OFF SITE	No	PP+40, VO+15, PCB's, PHC, metals	No
GW	5	UPGRADIENT	Yes	PP+40, PCB's, PHC, ~~[illegible]~~	No
SW		UPSTREAM			

COMMENTS:

REVIEWER: Ed Maven DATE:

* SPECIFY SAMPLE PARAMETERS: PP+40, VO SCAN, METALS, ETC.

SITE INSPECTION REVIEW

BAYONNE BARREL AND DRUM CO.
154 RAYMOND BLVD.
NEWARK, ESSEX COUNTY, N.J.
EPA ID # NJD009871401

GENERAL INFORMATION AND SITE HISTORY

Bayonne Barrel and Drum Co. is an inactive facility located in an industrial area of Newark, bordered by Route 1 and 9 to the west, the New Jersey Turnpike to the east, and an empty lot previously occupied by the Newark drive-in movie theater to the south. The site covers approximately 15 acres and consists of three main buildings and a large yard area. Most of the site is in Block 5002 Lot 3 (9.3 acres) and is owned by Bayonne Barrel and Drum Co. Block 5002 Lot 14 (5.5 acres) is owned by Frank Langella, principal owner of BBD, and is used as part of the facility for drum storage.

Bayonne Barrel and Drum Co. operated a drum reconditioning facility at the site from the early 1940's until about 1982 when the company filed for bankruptcy. According to NJ Department of State records, Bayonne Barrel and Drum Co. incorporated in 1937 under the name of Export Barrel Co. The name was changed to Bayonne Barrel and Drum Co. in 1942. Property deed records for Essex County indicate a history of site ownership as follows:

Bayonne Barrel and Drum Co.	1945 - present
Colville Bros. Inc.	1933 - 1945
Barbara and Henry Smith	1931 - 1933
B & F Co. Inc.	Prior to 1931

N.J. Department of State records indicate that B & F Co. incorporated in 1931 and dissolved in 1935; Colville Bros. incorporated in 1933 and dissolved in 1945.

Sanborn fire insurance maps show a drum reconditioning facility at the site as early as 1931, owned by B & F Co. Inc. The buildings present at the site were labeled as "tenant occupied" and included crate and drum storage, and drum cleaning areas. A review of aerial photography was conducted in 1986 by Louis Berger and Associates, a consultant for the N.J. Turnpike Authority which is proposing to construct a right-of-way over a portion of the BBD property. The following areas of potential environmental concern were noted:

1947 - landfill activity in the southern portion of the site.
- lagoon near eastern site boundary.
- drainage channels connecting lagoon to Passaic River.
- large open storage area containing several thousand drums.

1959 - N.J. Turnpike construction near eastern site boundary.
- liquid filled trench near old lagoon location.
- small waste disposal area in northeast corner of site.

1985 - dark ground staining along eastern site boundary.
- large mound of dark material (ash) near western edge of site.
- lagoon and waste disposal areas no longer evident.

Currently, the site contains several buildings, an incinerator, above-ground and underground storage tanks, an ash/sludge pile and an empty drum storage area (30,000 drums estimated). Since BBD filed for bankruptcy a portion of the site has been leased and used to repair and maintain trailers and cargo containers. A one-acre parcel near the northern boundary is reportedly leased to Nationwide Tire and contains a pile of used automobile tires.

SITE OPERATIONS OF CONCERN

Operations at the BBD facility involved both closed head and open head drums. The closed head system employed chains and caustic solution to remove residues in the drums. Spent solution from the process drained through an oil/water separator trench into a 5,000-gallon underground tank, and then was pumped into a 60,000-gallon above-ground holding/settling tank prior to being discharged to the sewer under a permit with the Passaic Valley Sewage Commission. Open head drums were placed on a conveyer and processed through the incinerator with residue from the process collected in two subsurface holding/settling tanks, and then placed into a dumpster/trailer prior to being manifested off-site.

Past inspections by NJDEP representatives during 1982 and 1984 reported the following items:

- 40,000 pounds per month of incinerator ash and sludge generated at the facility, most of which was being sent to S & W Waste in Kearny, N.J.; a lesser amount was disposed of at GROWS Landfill in Morrisville, Pa.

- wastewater overflow from the 5,000-gallon tank was observed entering a storm sewer as a result of a frozen pump and broken lines to the tank; the storm sewer reportedly flows to a small creek leading to the Passaic River.

- oil staining on ground surface near the above-ground tank.

- ash/sludge material on ground surface around incinerator.

- ash/sludge pile (220' x 50' x 4') on ground in rear of property, uncovered with no containment or runoff control.

- approximately 30,000 drums stacked on ground in rear of property; a random survey indicated about half of the drums contained some amount of material.

The ash pile and rows of drums (30,000 estimated) still remain in the rear of the property. The plastic cover over the ash pile is in poor condition , leaving the pile partially uncovered. In addition, a RCRA enforcement inspection conducted by EPA during June 1988 noted a large ash pile and 100-150 drums containing ash and aqueous materials in a building near the incinerator. There is also an ash pile in the courtyard between the incinerator and furnace room building.

A NJPDES-DGW permit (NJ 0064068) was issued to Bayonne Barrel and Drum Co. and several adjacent property owners in order to monitor groundwater in the vicinity of an old landfill area which was reportedly active prior to 1947, known as the 15E sanitary landfill. The landfill covers approximately 45

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acres and received construction and demolition debris. It is located in the area between Foundry Street and Raymond Blvd. and encompassed the southern portion of the BBD site and the former drive-in movie theater to the south. The permit was issued 2/15/88 and includes 13 groundwater monitoring wells.

GROUNDWATER ROUTE

A soil and groundwater characterization report for the BBD site was submitted by Dan Raviv Associates in July 1986. The report contains soil and groundwater sampling data and information on site geology and groundwater conditions. Soil and well boring data indicate that the site is underlain by the following materials:

- black coal-cinder fill material:	0-10 feet
- medium to coarse grained sand:	10-40 feet
- dark red-brown coarse silt:	40-50 feet
- dark red shale (Brunswick Formation):	below 50 feet

Field investigations by Dan Raviv Associates included the installation of four monitoring wells (20-50 feet deep) and one well point (10 feet deep). The monitoring wells included two background locations, one near the ash pile, and one near the oil storage tanks the northeast portion of the site. Groundwater samples were analyzed for volatile organics, petroleum hydrocarbons, and PCB's. The monitoring well near the above-ground tank (downgradient location) was also analyzed for priority pollutants. Depth to groundwater is 3-4 feet and the direction of flow is toward the east.

Sampling data indicate that groundwater beneath the site is contaminated with volatile organics, petroleum hydrocarbons, and PCB's at concentrations significantly above background. The monitoring well near the ash pile showed low level contamination with benzene (28 ppb), napthalene (14 ppb), and di-n-butylphthalate (28 ppb). Groundwater in the northeast portion of the site near the oil storage tanks was found to be contaminated with PCB's (53 ppb), petroleum hydrocarbons (2,000 ppm), toluene (150 ppb), chlorobenzene (67 ppb), ethylbenzene (1,060 ppb), dichlorobenzenes (76 ppb), and various non-priority pollutant organics including cyclohexane (60 ppb), cycloheptane (100 ppb), isopropylbenzene (90 ppb), n-propylbenzene (150 ppb), ethyl toluene isomers (550 ppb), trimethylbenzene isomers (1400 ppb), and xylene isomers (2000 ppb).

A soil and groundwater study was also completed by Louis Berger Associates in 1986 in order to characterize contamination in the proposed NJ Turnpike right-of-way adjacent to the eastern site boundary. Two additional monitoring wells were installed in this area and the results showed contamination with volatile organics (up to 98 ppb), polynuclear aromatic hydrocarbons (34 ppb), phenol (877 ppb), and 2,4-dimethylphenol (860 ppb).

NJDEP water supply overlay and water allocation maps show no major public supply wells within a 3 mile radius of the site. Groundwater in the area is not used for drinking, however there are a number of industrial supply wells on the order of 200-700 feet deep which draw from the Brunswick Formation. Downward migration of contaminants at the BBD site could have an adverse impact on water quality of the Brunswick Formation.

SURFACE WATER ROUTE

The nearest downslope surface water is the Passaic River about 2000 feet to

the east, which empties into the Newark Bay roughly one mile south of the site. Storm sewers at the site reportedly lead to Harrison's Creek and the Passaic River. A NJDEP inspection in 1982 reported wastewater flowing into a storm sewer as a result of equipment malfunctions at the facility. Sample of the wastewater discharge to the storm sewer showed contamination with benzene, toluene, xylene, ethylbenzene, methylene chloride, and 1,1,1-trichloroethane. The Passaic River is used for industrial purposes and occasional recreational boating.

AIR ROUTE

There are no records of air sampling conducted at the site. The facility had 12 air pollution control permits during its operation (plant ID #05103) that included drum cleaning units, paint spray booths and ovens, drum incinerator, baghouses, and a deisel fuel and gasoline tank.

During 1978 the facility was cited for opacity violations which resulted from drums not being emptied properly prior to incineration. Hydrogen sulfide type odors and other strong odors were noted by Louis Berger Associates during work along the eastern portion of the site, and by road workers during construction along Route 1 and 9. The potential for air contamination exists due to the documented volatile organic contamination at the site, however there are other sources of air pollution in the area from adjacent highways and the Newark Airport located about three miles to the south.

SOIL

Field work completed by Dan Raviv Associates included soil samples from 19 soil borings (up to 15 feet deep) and five well borings (up to 42 feet deep). A total of 71 soil samples were analyzed at depths ranging from 0-22 feet for a variety of parameters including total petroleum hydrocarbons, volatile organics, PCB's, and priority pollutant scan. One sample was analyzed for dioxin. The highest levels of soil contamination detected at the site are listed as follows:

total priority volatile organics -	22,553 ppb
total non-priority volatile organics -	66,035 ppb
total petroleum hydrocarbons -	173,000 ppm
PCB's	320 ppm
arsenic	390 ppm
cadmium	1300 ppm
chromium	3400 ppm
copper	15,500 ppm
lead	8,400 ppm
mercury	13.0 ppm
zinc	5040 ppm

Petroleum hydrocarbon concentrations above 100 ppm were detected throughout the site at depths up to ten feet. Volatile organic and PCB contamination was detected in the oil storage tanks area, drum storage area, and ash pile area. The highest metal contamination was found near the ash pile and drum storage areas in the rear of the property.

DIRECT CONTACT

No reported incidents of direct contact were noted in Department files. The potential for direct contact is low since the facility is inactive and surrounded by a fence. The nearest residential area is about 1/2 mile to

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to the west. There is a potential for exposure by highway construction workers next to the site and the few security and maintenance staff at the facility. Past BBD employees may have been exposed to hazardous materials due to sloppy housekeeping and waste handling practices and contamination which has been documented throughout the site.

FIRE AND EXPLOSION

NJDEP Enforcement files contain two reports of fires at the site, however these did not directly involve hazardous substances or wastes present at the facility. A brush fire in 1985 encompassed the portion of the site containing the automobile tire pile, but did not spread to the rows of drums in the rear of the property. A smaller brush fire also occurred at the site in 1986. Most of the drums stacked in the rear of the property (30,000 estimated) are reported to be empty, however there may be volatile or flammable residues present in some of the drums. EPA inspectors noted 100-150 drums containing ash residues and aqueous materials in a building near the incinerator area during a recent inspection and sampling episode. Samples collected from an ash pile inside the building and an aqueous drum sample showed volatile organic contamination, representing a potential fire or explosion hazard.

ADDITIONAL CONSIDERATIONS

The potential for damage to flora and fauna is low due to the urban location of the site and apparent lack of plant and animal life. Potential migration of contaminants from the site via surface runoff and storm sewers could have an adverse impact on Passaic River biota. The potential for damage to offsite property exists through migration of contaminants in groundwater and surface runoff. Contamination was found in the proposed N.J. Turnpike right-of-way adjacent to the eastern site boundary.

EPA RCRA ENFORCEMENT INSPECTION

A RCRA sampling inspection was conducted at Bayonne Barrel and Drum on June 2, 1988 by EPA Region II personnel. The facility was found to be in violation of RCRA and TSCA violations based upon sampling results and a visual inspection of the site. Analytical data showed that several waste ash piles present at the site are considered a hazardous waste due to levels of cadmium above RCRA criteria limits for EP Toxicity. The ash pile in the rear of the property showed PCB contamination of 115 ppm and 293 ppm for arochlor 1248 and 1252, respectively. Approximately 100-150 drums were observed in the drum and ash storage room which were not labeled as a hazardous waste and apparently stored for greater than 90 days.

ENFORCEMENT ACTIONS

An EPA Consent Agreement and Order issued in 1984 cited Bayonne Barrel and Drum Co. for operation of a hazardous waste facility and storage of hazardous wastes without a hazardous waste permit. The order required the facility to implement a soil sampling program and to remove hazardous waste piles present at the site, liquid and sludge from the oil storage tanks, and areas of contaminated soil identified on the property. The facility was also required to submit a closure plan. A soil and groundwater characterization study was completed in 1986, however BBD has not complied with the remaining terms of the consent agreement.

The U.S. Justice Department has filed a suit against the company and its president, Frank Langella, for various violations of RCRA and failure to comply with the terms of the EPA consent agreement. The case is currently

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in litigation. An attorney for the U.S. Justice Department has indicated that the facility may be sold to a third party which may be willing to conduct the cleanup, in which case the site would be subject to ECRA regulations. As previously mentioned, BBD filed for bankruptcy in 1982 and has reportedly defaulted on a back loan, thus the bank (First National State Bank) could foreclose and take title to the property but has apparently not done so because they would be considered a responsible party under CERCLA as owner of the site. Both the EPA and U.S. Justice Department have expressed interest in having the NJDEP involved in reviewing any sampling/cleanup plans which may be developed for the site following litigation.

RECOMMENDATIONS

Nd additional sampling is recommended at this time by the Bureau of Planning and Assessment since adequate data is available which documents the presence of soil and groundwater contamination at the site. A summary of sampling data is attached. At this time the case should be transferred to the Responsible Party Cleanup Element Bureau of Case Management - State Program for overall case management responsibilities. Any future site investigation/remediation efforts should be consistent with ECRA requirements since there is a strong possibility that the facility may be sold following the bankruptcy litigation, thereby necessitating case transfer to the Industrial Site Evaluation Element.

Submitted by:

Edward Gaven

Edward Gaven, HSMS III
NJDEP Bureau of Planning and Assessment
December 2, 1988

SUMMARY OF SAMPLING DATA

I. EPA RCRA INSPECTION AND SAMPLING EPISODE REPORT

Sampling Date:	May 16, 1984
Sampled By:	EPA Surveillance and Monitoring Branch
Samples:	soil - 3 waste (aqueous) - 3 waste (ash/sludge) - 3
Laboratory:	EPA Region II Laboratory, Edison, N.J.
Parameters:	Soil and ash samples were analyzed for volatile and non-volatile organics, metals, PCB's, and EP Toxicity. Aqueous samples were analyzed for volatile and non-volatile organics, and RCRA characteristics (ignitability, corrosivity).
Sample Description:	Soil samples included one each from the area around the underground settling tank, the subsurface tank near the incinerator, and the oil/water separator trench. Ash samples were collected from the ash sludge pile in the rear of the property. Aqueous samples were collected from the underground settling tank, the subsurface tank near the incinerator, and the oil/water separator trench.
Results:	Contaminants detected in soil samples included the following substances along with highest concentrations shown in parenthesis: cadmium (59 ppm), chromium (1,200 ppm), copper (1,100 ppm), mercury (27 ppm), lead (4,500 ppm), arochlor 1248 (67.2 ppm), and arochlor 1254 (117.5 ppm). Total volatile organic and base neutral organic concentrations were on the order of 4.1 ppm and 1,950 ppm, respectively. Ash samples showed contamination with cadmium (160 ppm), chromium (3,300 ppm), copper (3,300 ppm), and mercury (21 ppm), while total volatile organic and base neutral organic concentrations were on the order of 400 ppm and 2,000 ppm, respectively. The ash pile in the rear of the property was determined to be EP toxic for cadmium and lead. Contaminants detected in the aqueous waste samples included toluene (4.9 ppm), bis (2-ethylhexyl) phthailate (13 ppm), butyl benzl phthailate (1.1 ppm), and di-n-butyl phthailate (1.8 ppm).
QA/QC Information:	The sampling report contained no information regarding any blank or duplicate samples, or whether the data were subject to a QA/QC review. Sampling was conducted in accord with EPA standard procedures.

File Location:	NJDEP/DHWM Metro Field Office, West Orange, N.J.

II. LOUIS BERGER ASSOCIATES REPORT - SAMPLING IN PROPOSED NJ TURNPIKE RIGHT OF WAY.

Sampling Dates:	April 25, 26, 28, 1988 and May 5, 6, 27, 1988
Sampled By:	Louis Berger Associates, East Orange, N.J.
Samples:	soil - 21 groundwater - 2
Laboratory:	ETC Laboratory, Edison, N.J.
Parameters:	Priority pollutants plus forty
Sample Description:	Soil samples included fourteen discrete samples and seven composite samples at depths up to three feet. Groundwater samples were collected from two monitoring wells (15 feet deep) installed along the eastern site boundary.
Results:	Soil contaminants included arsenic (73 ppm), cadmium (71 ppm), chromium (590 ppm), copper (870 ppm), lead (8,520 ppm), benzene (31 ppm), ethylbenzene (408 ppm), toluene (321 ppm), 2,4-dimethylphenol (188 ppm), phenol (58.9 ppm), and PAH compounds (up to 861 ppm). Groundwater samples showed contamination with toluene (76.6 ppb), ethylbenzene (15.9 ppb), benzene (5.6 ppb), 2,4-dimethylphenol (860 ppb), phenol (877 ppb), acenaphthene (9.2 ppb), fluorene (3.15 ppb), naphthalene (16.3 ppb), and phenanthrene (4.9 ppb).
QA/QC Information:	The sampling report indicated that chain of custody procedures were carried out in accord with EPA and NJDEP procedures. The analytical data were not subject to a QA/QC review by NJDEP, however the lab reports (NJDEP Tier II format) were reviewed by a QA Coordinator from the consulting firm, Louis Berger Associates.
File Location:	EPA Surveillance and Monitoring Branch Edison, N.J.

III. DAN RAVIV ASSOCIATES REPORT - SOIL AND GROUNDWATER CHARACTERIZATION

Sampling Dates:	January 18, 1985; October 25-31, 1985; November 27 to December 17, 1985; January 7, 1986.
Sampled By:	Dan Raviv Associates, West Orange, N.J.
Samples:	soil - 75 (approx.) sediment - 4 surface water - 1 groundwater - 5
Laboratory:	Gollob Analytical Laboratory, Berkeley Heights, N.J.

Parameters: Sample parameters included priority pollutants plus forty, volatile organics plus fifteen, PCB's, metals, petroleum hydrocarbons, and dioxin.

Sample Description: Soil samples were collected from nineteen soil borings (up to 15 feet deep) and five well borings (up to 42 feet deep). Approximately 75 soil samples were analyzed at depths up to 22 feet. Sediment samples were collected from the oil separator trench and from drainage canals and floor pits inside three of the buildings surrounding the incinerator area. The surface water sample was collected from the oil separator trench.

Results: The highest levels of contamination are listed as follows:

soil:	total priority volatile organics	22.5 ppm
	total non-priority volatile organics	66.0 ppm
	total petroleum hydrocarbons	173,000 ppm
	PCB's	320 ppm
	arsenic	390 ppm
	cadmium	1,300 ppm
	chromium	3,400 ppm
	copper	15,500 ppm
	lead	8,400 ppm
	mercury	13 ppm
	zinc	5,040 ppm
sediment:	petroleum hydrocarbons	39,400 ppm
	toluene	39 ppb
	PCB's	130 ppm
surface water:	petroleum hydrocarbons	670 ppm
groundwater:	petroleum hydrocarbons	2,000 ppm
	PCB's	53 ppb
	chlorobenzene	67 ppb
	ethylbenzene	1,060 ppb
	toluene	150 ppb
	dichlorobenzene(s)	76 ppb

QA/QC Information: Analytical data included four field blanks, two lab duplicates, and chain of custody records. The data were not subject to a formal QA/QC review by NJDEP.

File Location: EPA Surveillance and Monitoring Branch Edison, N.J.

IV. EPA RCRA INSPECTION AND SAMPLING REPORT

Sampling Date: June 2, 1988

Sampled By: EPA Surveillance and Monitoring Branch, Edison, N.J.

Samples: waste (ash piles) - 5
waste (aqueous samples) - 5

Laboratory: EPA Region II Laboratory, Edison, N.J.

Parameters: Volatile organics, non-volatile organics, PCB's, EP Toxicity metals.

Description: Samples were collected from waste ash piles in the furnace room building, the drum and ash storage room, the courtyard area near the incinerator, and from the large ash pile in the rear of the property. Aqueous samples were collected from the oil separator trench, the pump house, the underground holding/settling tank, a drum inside the drum and ash storage room, and from ponded water in the courtyard area.

Results: The highest levels of contamination are listed as follows:

Ash samples:

furnace room ash pile - low levels of volatile organic and PAH compounds.
courtyard ash pile - ethylbenzene (570 ppb), toluene (1,300 ppb), xylene (1,200 ppm), PAH compounds.
drum and ash storage room ash pile - ethylbenzene (1,500 ppb), tetrachloroethylene (1,200 ppb), toluene (2,700 ppb), trichloroethylene (550 ppb), xylene (3,200 ppb), PAH compounds.
ash pile in rear of property - ethylbenzene (5,200 ppb), tetrachloroethylene (1,300 ppb), toluene (12,000 ppb), trichloroethylene (490 ppb), xylene (4,600 ppb), styrene (2,500 ppb), arochlor 1248 (293 ppm), arochlor 1254 (115 ppm), EP Tox cadmium (2.84 ppm), PAH compounds.

Aqueous samples:

oil separator trench - low level volatile organics and PAH compounds.
pump house - ethylbenzene (130 ppb), toluene (660 ppb), vinyl chloride (18 ppb), PAH compounds.
underground tank - low level volatile organics and PAH compounds.
courtyard area - low level volatile organics and PAH compounds.
drum sample - benzene (92 ppm), chlorobenzene (78 ppm), ethylbenzene (1,200 ppm), tetrachloroethylene (62 ppm), toluene (2,400 ppm), xylene (10,000 ppm), dichlorobenzene(s) (200 ppm), dibenzofuran (567 ppb), 2,4-dinitrotoluene (597 ppb).

QA/QC Information: Samples were collected in accord with EPA standard sampling protocol and chain of custody procedures. Analytical data were subject to a QA review by EPA Region II personnel. Samples were split with Interwaste Services Company (ISCO), which was contracted by BBD to collect split samples and observe EPA sampling procedures.

File Location: EPA Surveillance and Monitoring Branch Edison, N.J.

Site Inspection Report

BAYONNE BARREL AND DRUM CCMPANY
154 RAYMOND BLVD.
NEWARK, ESSEX COUNTY, N.J.

EPA ID# NJD 009871401

Hours: 25

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER

II. SITE NAME AND LOCATION

01 SITE NAME	02 STREET, ROUTE NO. OR SPECIFIC LOCATION IDENTIFIER
Bayonne Barrel and Drum Co.	154 Raymond Blvd

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 [illegible]
Newark	NJ	07105	Essex		

09 COORDINATES LATITUDE	LONGITUDE	10 TYPE OF OWNERSHIP (Check one)
40° 43' 56"	74° 07' 30"	☐ A PRIVATE ☐ B FEDERAL ☐ C STATE ☐ D COUNTY ☐ E MUNICIPAL ☐ F OTHER ☐ G UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
6-2-88 (MONTH DAY YEAR)	☐ ACTIVE ☒ INACTIVE	1945 (BEGINNING YEAR) 1982 (ENDING YEAR) ☐ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)

☒ A. EPA ☐ B. EPA CONTRACTOR _____ ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR _____
☐ E. STATE ☐ F. STATE CONTRACTOR _____ ☐ G. OTHER Dan Raviv Associates (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
Site Inspection Review			( )

09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO.
			( )
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO.
Frank Langella	President-BBD	154 Raymond Blvd. Newark, NJ	( )
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☐ PERMISSION ☐ WARRANT		

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
Mike Ferriola	EPA Surveillence and Monitoring Branch	( ) 201 321-

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
Ed Gaven	NJDEP	DHWM/BPA	609/292-4320	12-07 (MONTH DAY)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D009871401

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- XX A SOLID
- ☐ B POWDER, FINES
- XX C. SLUDGE
- XX E SLURRY
- ☐ F LIQUID
- ☐ G GAS
- ☐ O OTHER _____ (Specify)

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

TONS _____
CUBIC YARDS 1500
NO OF DRUMS 100 - 150

03 WASTE CHARACTERISTICS (Check all that apply)

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

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE	1,500	cubic yards	ash/sludge pile
OLW	OILY WASTE	70,000	gallons	oil and sludge storage tanks
SOL	SOLVENTS	unknown		
PSO	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS	unknown		
IOC	INORGANIC CHEMICALS			
ACO	ACIDS			
BAS	BASES			
MES	HEAVY METALS	unknown		

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

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
SOL	benzene	71-43-2	Groundwater Samples	28	ppb
SOL	chlorobenzene	108-90-7	* Concentration	67	ppb
SOL	ethylbenzene	100-41-4	shown are the	1,060	ppb
SOL	toluene	108-88-3	highest levels	150	ppb
SOL	xylene	1330-20-7	detected in	2,000	ppb
SOL	diethyl ether		grounawater	30	ppb
SOL	isopropyl benzene		samples.	90	ppb
OCC	n-propylbenzene			150	ppb
OCC	di-n-butylphthallate	84-74-2		28	ppb
OCC	napthalene	91-20-3		14	ppb
OCC	cyclohexane	110-82-7		60	ppb
OCC	cycloheptane			100	ppb
OCC	2,4-dimethylphenol	105-67-9		860	ppb
OCC	phenol	108-95-2		877	ppb

V. FEEDSTOCKS (See Appendix for CAS Numbers)

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

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

Soil and Groundwater charaterization Report- Dan Raviv Associates (Ref. B)

Sampling in Proposed NJ Turnpike Right-of-Way- Louis Berger Associates (Ref. C)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D009871401

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

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

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

TONS _____
CUBIC YARDS _____
NO. OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

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

III. WASTE TYPE

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

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

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
SOL	benzene	71-43-2		265	ppb
SOL	chlorobenzene	108-90-7	Soil Samples	650	ppb
SOL	ethylbenzene	100-41-4		8,000	ppb
SOL	1,1-dichloroethane	75-34-3		1,000	ppb
SOL	1,2-dichloroethylene	25323-30-2	* Concentrations	1,100	ppb
SOL	methylene chloride	75-09-2	shown are the	740	ppb
SOL	1,1,1-trichloroethane	71-55-06	highest levels	850	ppb
SOL	trichloroethylene	79-01-6	detected in soil	830	ppb
SOL	toluene	108-88-3	samples.	14,000	ppb
SOL	xylene	1330-20-7		9,600	ppb
SOL	methyl ethyl ketone	78-93-3		170	ppb
SOL	methyl isobutyl ketone	105-44-2		730	ppb
SOL	styrene	100-42-5		450	ppb
OCC	acenaphthene	83-32-9		19,600	ppb
OCC	anthracene	120-12-7		15,300	ppb
OCC	benzo (a) anthracene	56-55-3		22,000	ppb

V. FEEDSTOCKS (See Appendix for CAS Numbers)

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

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

Soil and Groundwater Charaterization Report-Dan Raviv Associates (Ref. B)
Sampling in Proposed N.J. Turnpike Right-of-Way---Louis Berger Associates (Ref. C)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D009871401

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

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

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

TONS _____

CUBIC YARDS _____

NO. OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

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

III. WASTE TYPE

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

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
OCC	benzo(a) pyrene	50-32-8		18,000	ppb
OCC	benzo (b) fluoranthene	207-08-9	Soil Samples	23,000	ppb
OCC	benzo (g,h,i) perylene	191-24-2		4,000	ppb
OCC	bis(2-ethylhexyl)phthalate	117-81-7	* Concentrations	290,000	ppb
OCC	butyl benzyl phthalate	85-68-7	shown are the	30,100	ppb
OCC	chrysene	218-01-9	highest levels	24,400	ppb
OCC	1,4-dichlorobenzene	25321-22-6	detected in soil	11,800	ppb
OCC	diethyl phthalate	84-66-2	samples	11,500	ppb
OCC	dimethyl phthalate	131-11-3		22,000	ppb
OCC	di-n-butyl phthalate	84-74-2		87,900	ppb
OCC	fluoranthene	206-44-0		35,900	ppb
OCC	fluorene	86-73-7		29,300	ppb
OCC	napthalene	91-20-3		191,000	ppb
OCC	phenanthrene	85-01-8		80,800	ppb
OCC	pyrene	129-00-0		56,200	ppb
OCC	1,2,4-trichlorobenzene	120-82-1		24,700	ppb

V. FEEDSTOCKS (See Appendix for CAS Numbers)

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

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

Soil and Groundwater Charaterization Report - Dan Raviv Associates (Ref. B)
Sampling in Proposed N.J. Turnpike Right-of-Way - Louis Berger Associates (Ref. C)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NJ	D009871401

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

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

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

TONS _____

CUBIC YARDS _____

NO. OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

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

III. WASTE TYPE

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

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

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
MES	arsenic	7440-38-2		390	ppm
MES	cadmium	7440-43-9	Soil Samples	1,300	ppm
MES	chromium	7440-47-3		3,400	ppm
MES	copper	7440-50-8	* Concentrations	15,000	ppm
MES	lead	7439-92-1	shown are the highest	8,400	ppm
MES	mercury	7439-97-6	levels detected in	13.6	ppm
MES	zinc	7440-66-6	soil samples.	5,040	ppm
SOL	ethylbenzene	100-41-4	waste ash pile	5,200	ppb
SOL	trichloroethylene	79-01-6	samples	490	ppb
SOL	tetrachloroethylene	127-18-4		1,300	ppb
SOL	toluene	108-88-3		12,000	ppb
SOL	xylene	1330-20-7		4,600	ppb
SOL	styrene	100-42-5		2,500	ppb
OCC	arochlor 1248	12672-29-6		293,970	ppb
OCC	arochlor 1254	11097-69-1		115,400	ppb

V. FEEDSTOCKS (See Appendix for CAS Numbers)

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

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

EPA Investigation and Sampling Episode (Ref. A)
Soil and Groundwater Charaterization Report-Dan Raviv Associates (Ref. B)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NJ	D009871401

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- [X] 1 SOLID
- [ ] 2 POWDER, FINES
- [ ] C SLUDGE
- [ ] D OTHER _____ (Specify)
- [ ] E SLURRY
- [ ] F LIQUID
- [ ] G GAS

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

TONS _____

CUBIC YARDS _____

NO. OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

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

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			
SOL	SOLVENTS			
PSO	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
CC	INORGANIC CHEMICALS			
ACO	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
~~SOL~~	~~benzene~~	~~71-43-2~~	~~aqueous drum sample~~	~~92,000~~	~~ppb~~
SOL	chlorobenzene	108-90-7		78,000	ppb
SOL	ethylbenzene	100-41-4		1,200,000	ppb
SOL	tetrachloroethylene	127-18-4		62,000	ppb
SOL	xylene	108-88-3		10,000,000	ppb
SOL	toluene	1330-20-7		2,400,000	ppb
SOL					
OCC	1,3-dichlorobenzene	25321-22-6		2,610	ppb
OCC	1,4-dichlorobenzene	25321-22-6		34,200	ppb
OCC	1,2-dichlorobenzene	25321-22-6		167,140	ppb
OCC	napthalene	91-20-3		28,380	ppb
OCC	dibenzofuran	132-64-9		567	ppb
OCC	~~2,4-dinitrotoluene~~	121-14-2		597	ppb

V. FEEDSTOCKS (See Appendix for CAS numbers)

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

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

EPA Investigation and Sampling Episode (Ref. A)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE: NJ | 02 SITE NUMBER: D009571401

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [X] A. GROUNDWATER CONTAMINATION — 02 [X] OBSERVED (DATE July 1986) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Groundwater beneath the site is contaminated with volatile organics, petroleum hydrocarbons and PCB's.

Ref. B

01 [X] B. SURFACE WATER CONTAMINATION — 02 [ ] OBSERVED (DATE _____) — [X] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

There is a potential for migration of surface run-off from site into the Passaic River via storm sewers. Samples of a wastewater discharge into a storm sewer at the facility in 1982 showed contamination with violatile organic compounds. Ref. E,S

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

Potential exists due to documented volatile organic contamination throughout the site. Strong odors have been noted by highway construction workers adjacent to the site. Ref. B,L

01 [X] D. FIRE EXPLOSIVE CONDITIONS — 02 [ ] OBSERVED (DATE _____) — [X] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

An EPA site inspection/sampling episode in 1988 reported 100-150 drums stored in a building near the incinerator. Drum and ash samples showed volatile organic contamination, representing a potential fire or explosive hazard. Brush fires were reported at the site in 1985 and 1986. Ref. A,N,M

01 [X] E. DIRECT CONTACT — 02 [ ] OBSERVED (DATE _____) — [X] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

The potential for direct contact is low since the facility is inactive and surrounded by a fence. The nearest residential area is about ½ mile away, however there is a potential for exposure of highway construction workers along Route 1 and 9 and the N.J. Turnpike. Ref. A,L

01 [X] P. CONTAMINATION OF SOIL — 02 [X] OBSERVED (DATE July 1986) — [ ] POTENTIAL — [ ] ALLEGED
03 AREA POTENTIALLY AFFECTED: _____ (Acres) 04 NARRATIVE DESCRIPTION

Soil samples show high levels of contamination with volatile organics, petroleum hydrocarbons, PCB's and metals.

Ref. B

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

no potential exists since groundwater in the area is not used for drinking Downward migration of contaminants could affect the Brunswick formation, which is used for industrial purposes in the Newark area. Ref. B Maps 5 & 7

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

Past employees may have been exposed to hazardous substances due to sloppy housekeeping and waste handling practices and documented contamination on-site. Currently, there are a few security and maintenance personnel present at the facility. Ref. A,B

01 [X] I. POPULATION EXPOSURE/INJURY — 02 [ ] OBSERVED (DATE _____) — [X] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Potential for population exposure is low since the nearest residential area is about ½ mile away. The facility is fenced in, however there is a potential for off-s contamination and population exposure due to urban location.

Ref.

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE: NJ | 02 SITE NUMBER: D009871401

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 [X] J. DAMAGE TO FLORA — 02 [ ] OBSERVED (DATE _____) — [X] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION
Potential migration of contaminants via surface run-off and storm sewers may have adverse impact on Passaic River biota.
Ref. S

01 [X] K. DAMAGE TO FAUNA — 02 [ ] OBSERVED (DATE _____) — [X] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION (Include names(s) of species)
Potential migration of contaminants via surface run-off and storm sewers may have adverse impact in Passaic River Biota.
Ref. S

01 [X] L. CONTAMINATION OF FOOD CHAIN — 02 [ ] OSSERVED (DATE _____) — [X] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION
Potential exists due to documented PCB and metal contamination at site.
Ref. B

01 [X] M. UNSTABLE CONTAINMENT OF WASTES (Spills, Runoff, Standing liquids, Leaking drums) — 02 [X] OBSERVED (DATE June 1988) — [ ] POTENTIAL — [ ] ALLEGED
03 POPULATION POTENTIALLY AFFECTED _____ 04 NARRATIVE DESCRIPTION
Ash piles in the rear of the property do not have adequate containment or runoff control.
Ref. A

01 [X] N. DAMAGE TO OFFSITE PROPERTY — 02 [X] OBSERVED (DATE July 1986) — [ ] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION
Contamination related to past operations at the facility has been detected in the proposed N.J. Turnpike Right-of-Way adjacent to the eastern site boundry.
Ref. C

01 [X] O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 [X] OBSERVED (DATE 2-22-82) — [ ] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION
Samples of a wastewater discharge into a storm sewer at the facility in 1982 showed volatile organic contamination. The storm sewer reportedly leads to the Passaic River.
Ref. E, S

01 [X] P. ILLEGAL UNAUTHORIZED DUMPING — 02 [ ] OBSERVED (DATE June 1988) — [ ] POTENTIAL — [ ] ALLEGED
04 NARRATIVE DESCRIPTION
Ash piles are stored on open ground in the rear of the property. Sampling data indicate that the material is EP toxic for cadmium in violation of RCRA regulations.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS
An estimated 30,000 drums are stacked in rows in the rear of the property. The drums are reported to be empty, however some may contain waste residues.
Ref. A,R

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

IV. COMMENTS
EPA Inspection and Sampling Episode (Ref.A)
Soil and Groundwater Characterization Report-Dan Raviv Associates (Ref. B)
Sampling in Proposed N.J. Turnpike Right-of-Way -Louis Berger Associates (Ref.C)

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)
Sludge and Liquid Sampling Results-1982 (Ref. E)
NJDEP Incident NOtification Reports (Ref.L,M)
EPA Pollution Report on Fire Incident (Ref. N)
~~NJDEP Site Inspection Memo (Ref. R)~~
NJDEP Hazardous Waste INvestigation Reports (Ref. S)

EPA FORM 2070-13 (7-81)

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D009871401

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
X A. NPDES	NJ0064068	2-15-88	2-28-90	inactive 15E sanitary lan
☐ B. UIC				
X C. AIR	plant ID#05103		expired	
☐ D. RCRA				
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
☐ I. OTHER (Specify)				
☐ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☐ A. SURFACE IMPOUNDMENT		
X B. PILES	1,500	cubic yards
X C. DRUMS, ABOVE GROUND	100-150	drums
X D. TANK, ABOVE GROUND	65,000	gallons
X E. TANK, BELOW GROUND	5,000	gallons
☐ F. LANDFILL		
☐ G. LANDFARM		
☐ H. OPEN DUMP		
☐ I. OTHER (Specify)		

04 TREATMENT (Check all that apply)
- X A. INCINERATION
- ☐ B. UNDERGROUND INJECTION
- ☐ C. CHEMICAL/PHYSICAL
- ☐ D. BIOLOGICAL
- XX E. WASTE OIL PROCESSING
- ☐ F. SOLVENT RECOVERY
- ☐ G. OTHER RECYCLING/RECOVERY
- ☐ H. OTHER (Specify)

05 OTHER
- X A. BUILDINGS ON SITE

06 AREA OF SITE: 15 Acres

07 COMMENTS

01B- Ash pile in rear of property is approximately 225' x 50' x 4'.
01C- Drums located inside building near incinerator area;an estimated 30,00 drums ar stacked in rear of property, reportedly empty.
01D- Oil and sludge storage tank.
01E- Wastewater holding/settling tank.
04A and E: Incinerator and oil separator trench no longer active.

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

☐ A. ADEQUATE, SECURE ☐ B. MODERATE X C. INADEQUATE, POOR ☐ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

Ash piles are stored in rear of property on open ground without proper containment or runoff control. Documented soil and groundwater contamination indicates inadequate containment of wastes.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: XX YES ☐ NO

02 COMMENTS

Facility is surrounded by a fence to prevent access and is also inactive.

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

EPA Inspection and Sampling Episode (Ref. A)
Soil and Groundwater Characterization-Dan Raviv Associates (Ref. B)
NJPDES Permit and Fact Sheet (Ref. J)
NJDEP/BAPC Stack Log Listing (Ref. V)

EPA FORM 2070-13 (7-81)

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as appropriate)

	SURFACE	WELL
COMMUNITY	A [X]	B [ ]
NON-COMMUNITY	C [ ]	D [ ]

02 STATUS

ENDANGERED	AFFECTED	MONITORED
A [ ]	B [ ]	C [X]
D [ ]	E [ ]	F [ ]

03 DISTANCE TO SITE

A 20-25 (mi)
B _____ (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

[ ] A ONLY SOURCE FOR DRINKING
[ ] B DRINKING (Other sources available)
COMMERCIAL INDUSTRIAL IRRIGATION (No other water sources available)
[X] C COMMERCIAL INDUSTRIAL IRRIGATION (Limited other sources available)
[ ] D NOT USED UNUSEABLE

02 POPULATION SERVED BY GROUND WATER N/A

03 DISTANCE TO NEAREST DRINKING WATER WELL >4.0 (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
3-4 (ft)	east	50 (ft)	500gpm (gpd)	[ ] YES [X] NO

09 DESCRIPTION OF WELLS (Including usage, depth, and relative to population and aquifers)

Industrial supply wells within 1-2 miles of the site are on the order of 200-700 feet deep and draw from the Brunswick formation

10 RECHARGE AREA		11 DISCHARGE AREA	
[ ] YES	COMMENTS	[ ] YES	COMMENTS
[ ] NO		[ ] NO	

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

[ ] A RESERVOIR RECREATION DRINKING WATER SOURCE
[ ] B IRRIGATION ECONOMICALLY IMPORTANT RESOURCES
[X] C COMMERCIAL INDUSTRIAL
[ ] D NOT CURRENTLY USED

02 AFFECTED POTENTIALLY AFFECTED BODIES OF WATER

NAME	AFFECTED	DISTANCE TO SITE
Passaic River	[ ]	2000 feet (mi)
	[ ]	(mi)
	[ ]	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. 32,000 (NO OF PERSONS)	B 100,000 (NO OF PERSONS)	C. 225,000 (NO OF PERSONS)

02 DISTANCE TO NEAREST POPULATION 0.25 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE numerous

04 DISTANCE TO NEAREST OFF-SITE BUILDING 0.10 (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

Site is in an urban industrial area bordered by the NJ Turnpike and Route 1 and 9. The nearest residential area is located about ½ mile to the west. Population within 3 miles of the site includes roughly half of Newark and Jersey City, and most of Harrison.

EPA FORM 2070-13 (7-81)

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NJ	D009871401

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one) fill material and sand

☐ A. 10^{-6} – 10^{-8} cm/sec ☐ B. 10^{-4} – 10^{-6} cm/sec XX C. 10^{-4} – 10^{-1} cm/sec ☐ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one) fractured shale and sandstone

☐ A. IMPERMEABLE (Less than 10^{-6} cm/sec) ☐ B. RELATIVELY IMPERMEABLE (10^{-4} – 10^{-6} cm/sec) X C. RELATIVELY PERMEABLE (10^{-2} – 10^{-4} cm/sec) ☐ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH
50 (ft)	10 (ft)	

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
12 (in)	2.5 (in)	1-2 %	North st	0-1 %

09 FLOOD POTENTIAL	10
SITE IS IN N/A YEAR FLOODPLAIN	☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY N/A

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE	OTHER
A. N/A (mi)	B. N/A (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species) N/A (mi)

ENDANGERED SPECIES

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL INDUSTRIAL	RESIDENTIAL AREAS, NATIONAL STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AG LAND
A. 0.10 (mi)	B. 0.50 (mi)	C. N/A (mi)	D. N.A (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

The ground surface at the site is about 10 feet above MSL and slopes toward the northeast. The site is underlain by approximately 10 feet of fill material, 30-40 feet of sand and salt, and fractured shale bedrock of the Brunswick formation Depth to groundwater is 3-4 feet and the direction of flow is toward the east.

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

Soil and Groundwater Characterization Report -Dan Raviv Associates (Ref.A)
USGS Quad Map- Elizabeth Quad (Map 1)
NJDEP Water Supply Overlay map (Map 5)
NJDEP Water Allocation Map (Map 7)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	5 2	Gollob Analytical, Berkeley Heights, NJ ETC Laboratory, Edison, NJ	available
SURFACE WATER			
WASTE	10	EPA Edison, Edison, NJ	available
AIR			
RUNOFF			
SPILL			
SOIL	70 18	Gollob Analytical, Berkeley Heights, NJ ETC Laboratory, Edison, NJ	available
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☐ GROUND ☐ AERIAL

02 IN CUSTODY OF _____ (Name of organization or individual)

03 MAPS ☐ YES ☐ NO

04 LOCATION OF MAPS _____

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

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

EPA inspection and sampling episode (ref. A)

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POTENTIAL HAZAROOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NJ	D009871401

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER
Bayonne Barrel & Drum Co.	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
154 Raymond Blvd.	3412

05 CITY	06 STATE	07 ZIP CODE
Newark	NJ	07105

01 NAME	02 D+B NUMBER
Frank Langella	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
154 Raymond Blvd.	

05 CITY	06 STATE	07 ZIP CODE
Newark	NJ	07105

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

PARENT COMPANY (If applicable)

08 NAME	09 D+B NUMBER

10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

12 CITY	13 STATE	14 ZIP CODE

08 NAME	09 D+B NUMBER

10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

12 CITY	13 STATE	14 ZIP CODE

08 NAME	09 D+B NUMBER

10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

12 CITY	13 STATE	14 ZIP CODE

08 NAME	09 D+B NUMBER

10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

12 CITY	13 STATE	14 ZIP CODE

III. PREVIOUS OWNER(S) (List most recent first)

01 NAME	02 D+B NUMBER
Colville Bros., Inc.	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER
B & F Co. Inc.	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

IV. REALTY OWNER(S) (If applicable; list most recent first)

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sampling results, photos)

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EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NJ	D009871401

II. CURRENT OPERATOR (Provide if different from owner)			OPERATOR'S PARENT COMPANY (If applicable)		
01 NAME: Site inactive		02 D+B NUMBER	10 NAME		11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER				

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)			PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)		
31 NAME: Bayonne Barrel & Drum Co.		02 D+B NUMBER	10 NAME		11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.): 154 Raymond Blvd.		04 SIC CODE: 3412	12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE
05 CITY: Newark	06 STATE: NJ	07 ZIP CODE: 07105	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION: 1945-1982	09 NAME OF OWNER DURING THIS PERIOD: Frank Langella				
31 NAME		02 D+B NUMBER	10 NAME		11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD				
01 NAME		02 D+B NUMBER	10 NAME		11 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD				

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

EPA FORM 2070-13 (7-81)

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POTENTIAL HAZAROOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NJ	D009871401

II. ON-SITE GENERATOR

01 NAME	02 D+3 NUMBER
Bayonne Barrel & Drum, Co.	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
154 Raymond Blvd.	3412

05 CITY	06 STATE	07 ZIP CODE
Newark	NJ	07105

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+8 NUMBER	01 NAME	02 D+8 NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+8 NUMBER	01 NAME	02 D+8 NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME	02 D+3 NUMBER	01 NAME	02 D+3 NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+3 NUMBER	01 NAME	02 D+3 NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

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

EPA FORM 2070-13 (7-81)

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY ENFORCEMENT ACTION ☒ YES ☐ NO

02 DESCRIPTION OF FEDERAL STATE LOCAL REGULATORY ENFORCEMENT ACTION

An EPA Consent Agreement issued in 1984 cited Bayonne Barrel and Drum Company, for operation of a hazardous waste facility and storage of hazardous wastes without a hazardous waste permit, in violation of RCRA regulation. The facility was required to conduct an investigation of contamination and submit a closure plan for the facility. The US Justice Department has filed a suit against the company and its president, Frank Langella, for RCRA violations and failure to comply with the terms of the Consent Agreement signed with EPA. The case is presently in litigation.

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

EPA Consent Order (ref. Q)

EPA FORM 2070-13 (7-81)

BAYONNE BARREL AND DRUM CO.
REFERENCES

MAPS

1. USGS QUAD MAP: ELIZABETH AND JERSEY CITY QUADS
2. SITE MAP: LOUIS BERGER & ASSOCIATES
3. CITY OF NEWARK TAX MAP
4. NJ ATLAS BASE MAP
5. NJDEP WATER SUPPLY OVERLAY MAP #26
6. NJDEP GEOLOGIC OVERLAY MAP AND WELL INFORMATION
7. NJDEP/DWR WATER ALLOCATION RADIUS MAP

ATTACHMENTS

A.	EPA RCRA ENFORCEMENT INSPECTION AND SAMPLING	6/2/88
B.	SOIL AND GROUND WATER CHARACTERIZATION - DAN RAVIV	7/86
C.	PRELIMINARY INVESTIGATION AND SAMPLING IN PROPOSED N.J. TURNPIKE RIGHT-OF-WAY - LOUIS BERGER ASSOCIATES.	12/86
D.	EPA RCRA INSPECTION AND SAMPLING EPISODE	5/16/84

Note: The Preliminary Assessment Report and Documentation Package were also referenced in this report.

ELIZABETH QUADRANGLE
NEW JERSEY–NEW YORK
7.5 MINUTE SERIES (TOPOGRAPHIC)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

USGS Quad Map: Elizabeth & Jersey City Quads
Scale: 1 inch = 2000 feet
Bayonne Barrel and Drum Co.
154 Raymond Blvd.
Newark, Essex County

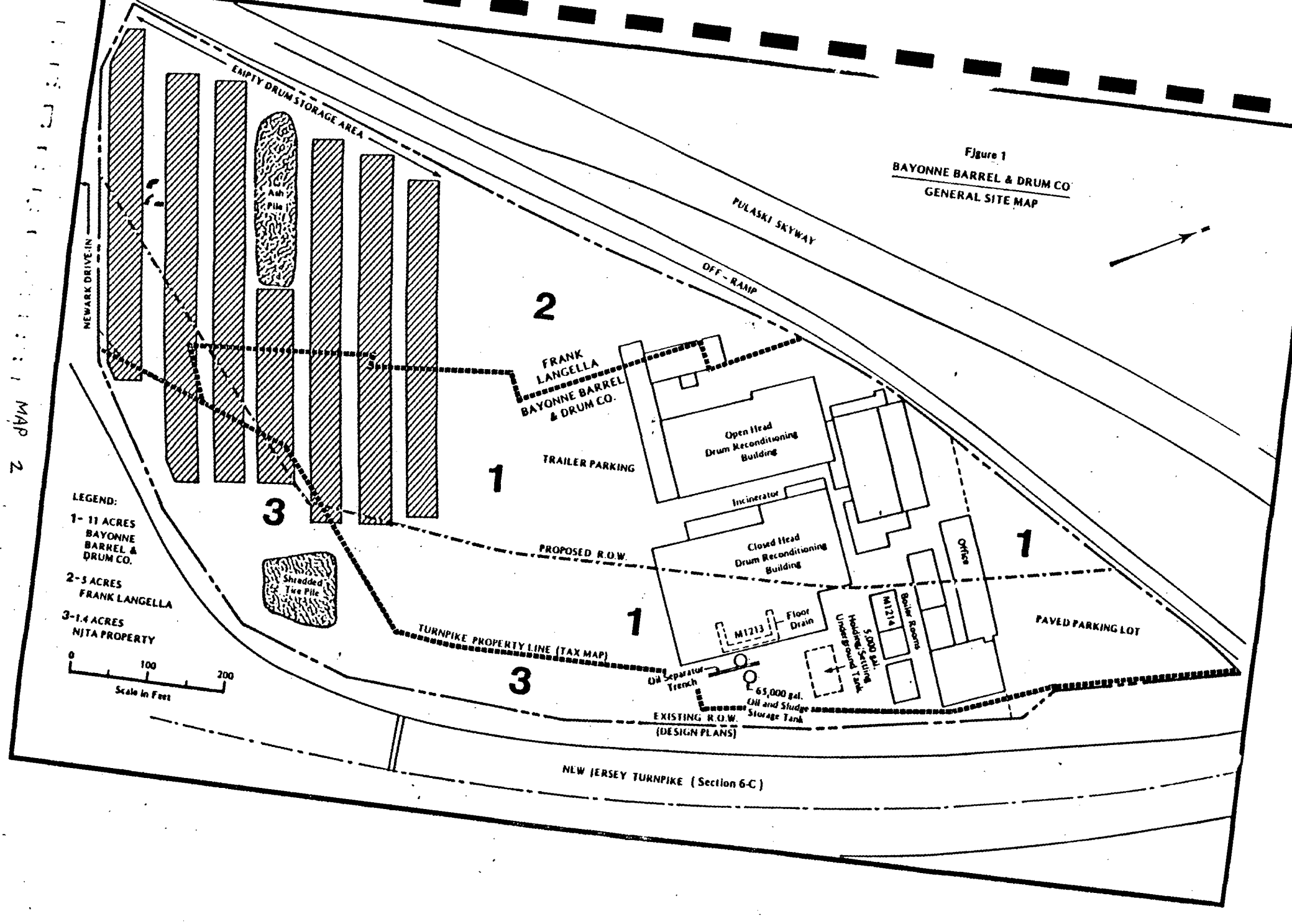
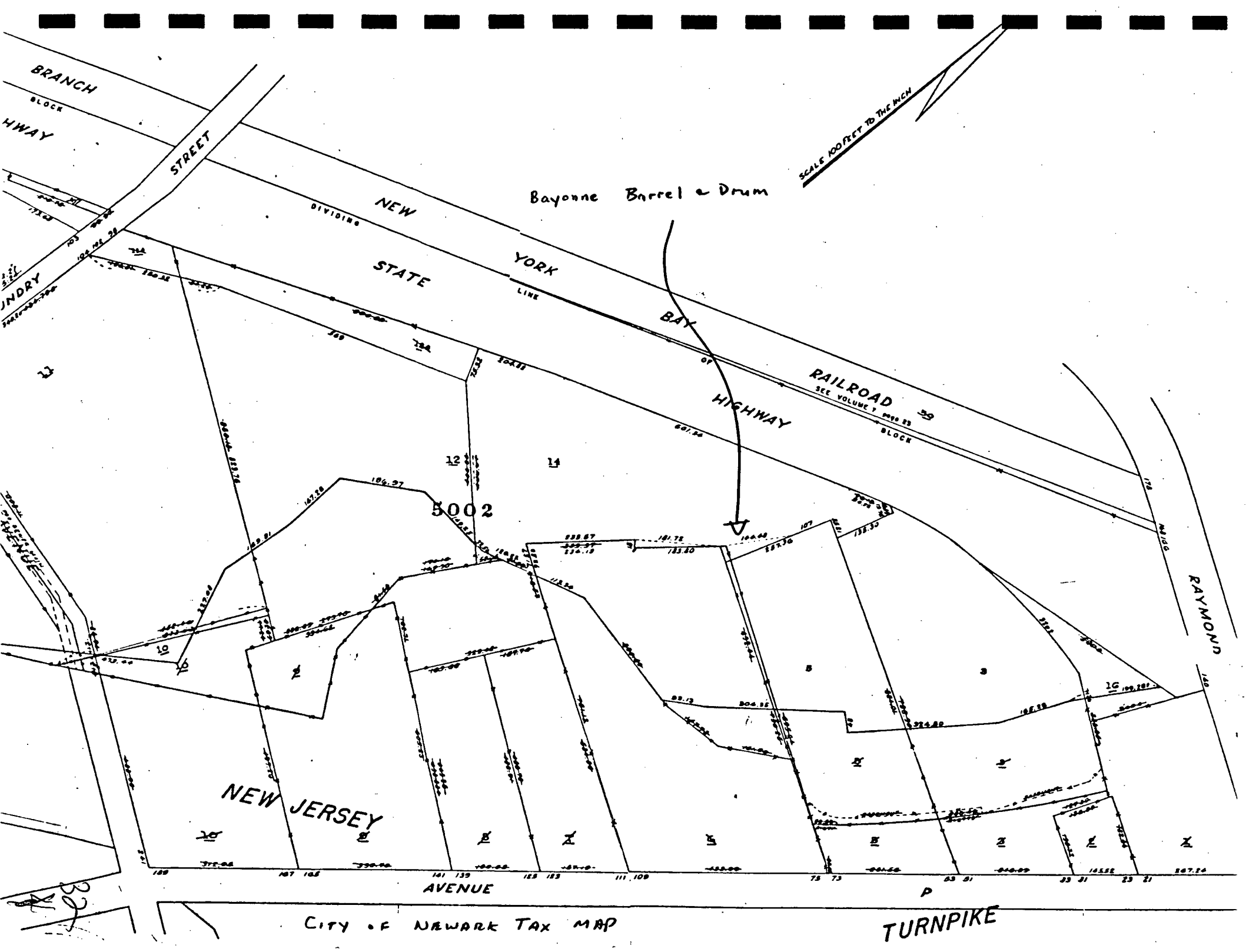
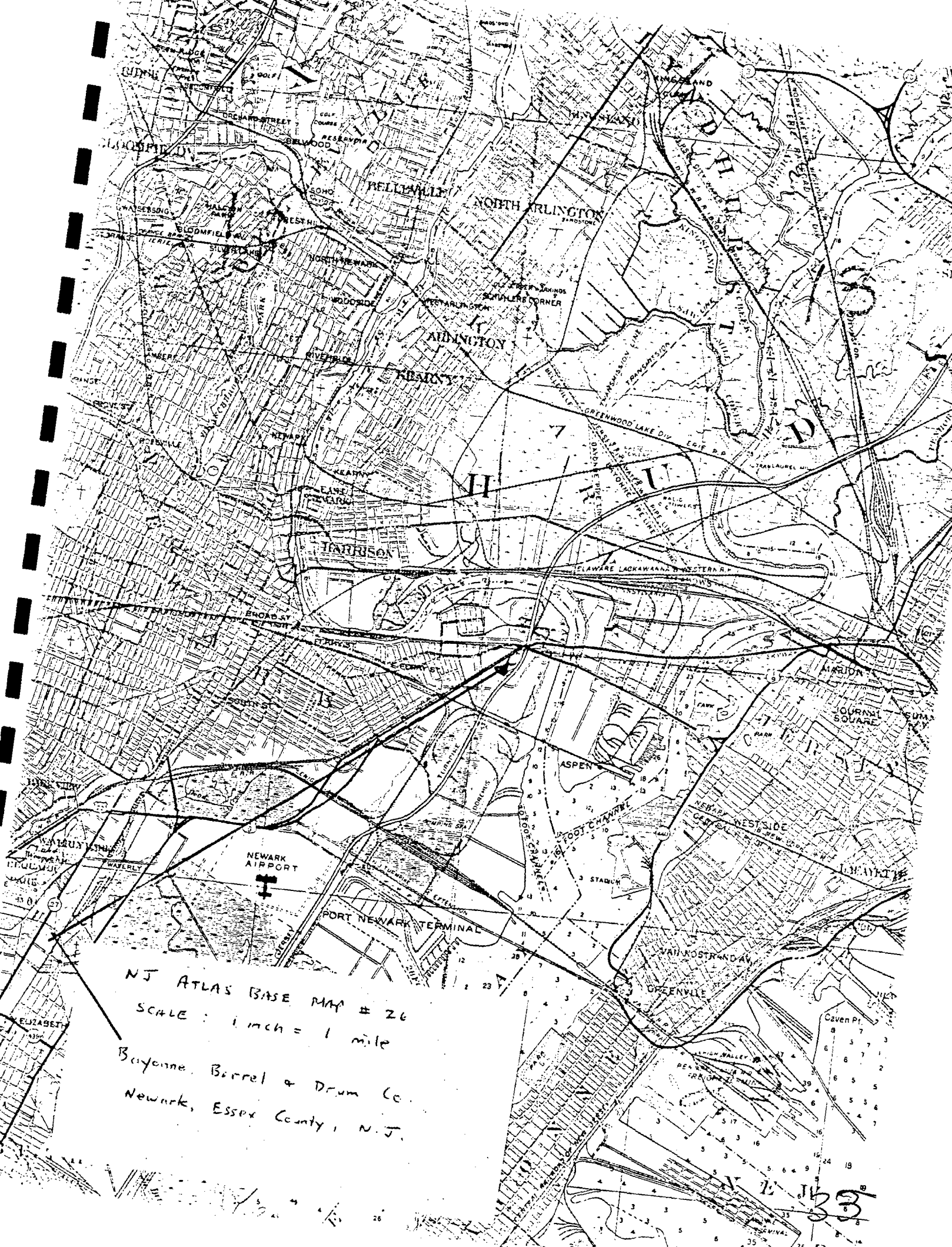


Figure 1
BAYONNE BARREL & DRUM CO
GENERAL SITE MAP
EMPTY DRUM STORAGE AREA
PULASKI SKYWAY
OFF - RAMP
NEWARK DRIVE-IN
Ash Pile
2
FRANK LANGELLA BAYONNE BARREL & DRUM CO.
TRAILER PARKING
1
3
Open Head Drum Reconditioning Building
Incinerator
Closed Head Drum Reconditioning Building
PROPOSED R.O.W.
Office
1
Shredded Tire Pile
M1213
Floor Drain
M1214
Boiler Rooms
5,000 gal. Holding/Settling Underground Tank
PAVED PARKING LOT
TURNPIKE PROPERTY LINE (TAX MAP)
Oil Separator Trench
65,000 gal. Oil and Sludge Storage Tank
3
EXISTING R.O.W. (DESIGN PLANS)
NEW JERSEY TURNPIKE (Section 6-C)
LEGEND:
1- 11 ACRES BAYONNE BARREL & DRUM CO.
2- 5 ACRES FRANK LANGELLA
3- 1.4 ACRES NJTA PROPERTY
0
100
200
Scale in Feet

MAP 2



BRANCH
BLOCK
HWAY
STREET
UNDRY
NEW
DIVIDING
STATE
YORK
LINE
BAY
OF
HIGHWAY
RAILROAD
SEE VOLUME 7 PAGE 23
BLOCK
Bayonne Barrel & Drum
SCALE 100 FEET TO THE INCH
5002
12
14
10
16
RAYMOND
NEW JERSEY
AVENUE
P
TURNPIKE
CITY OF NEWARK TAX MAP



NJ ATLAS BASE MAP # 26
SCALE : 1 inch = 1 mile
Bayonne Barrel & Drum Co.
Newark, Essex County, N.J.

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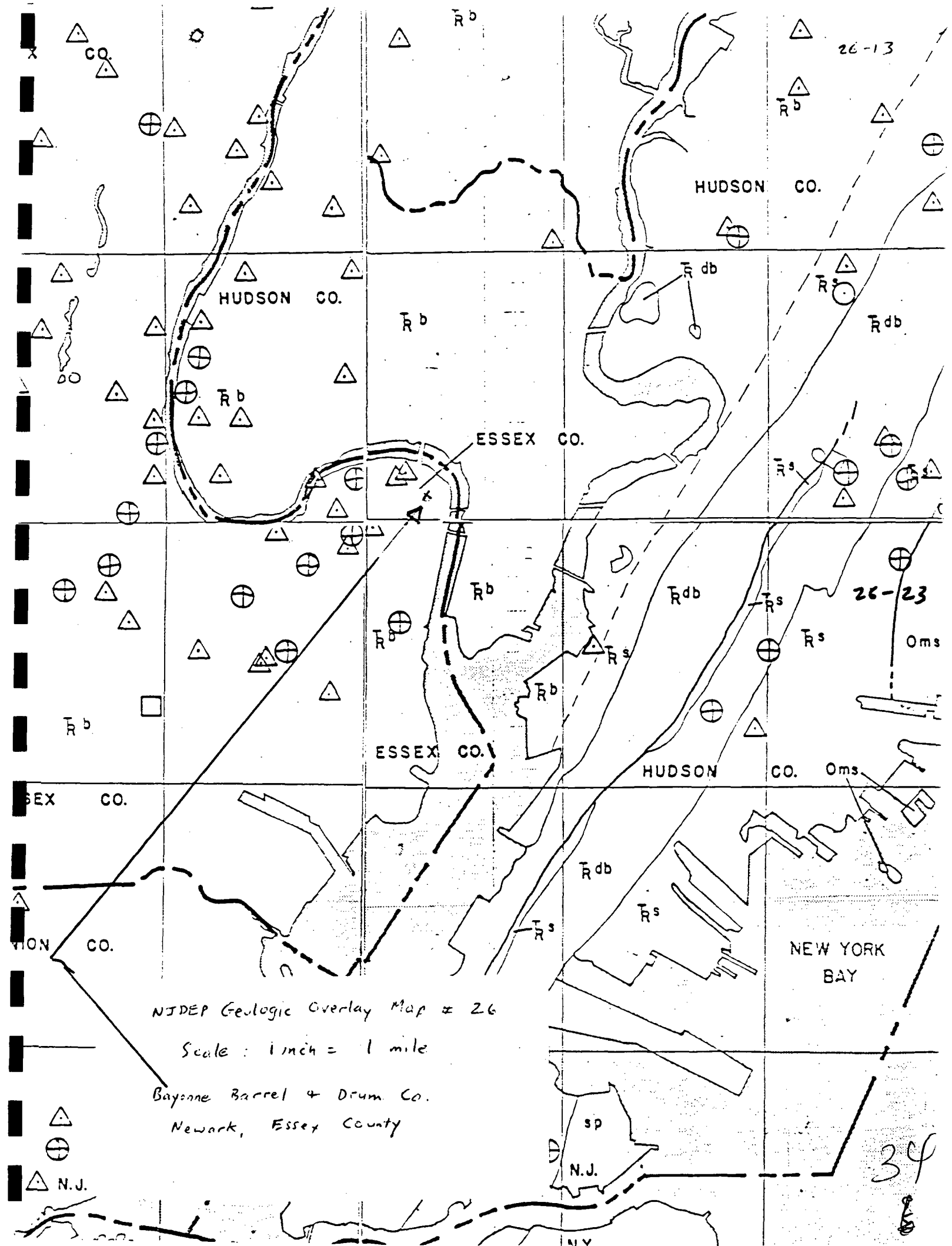
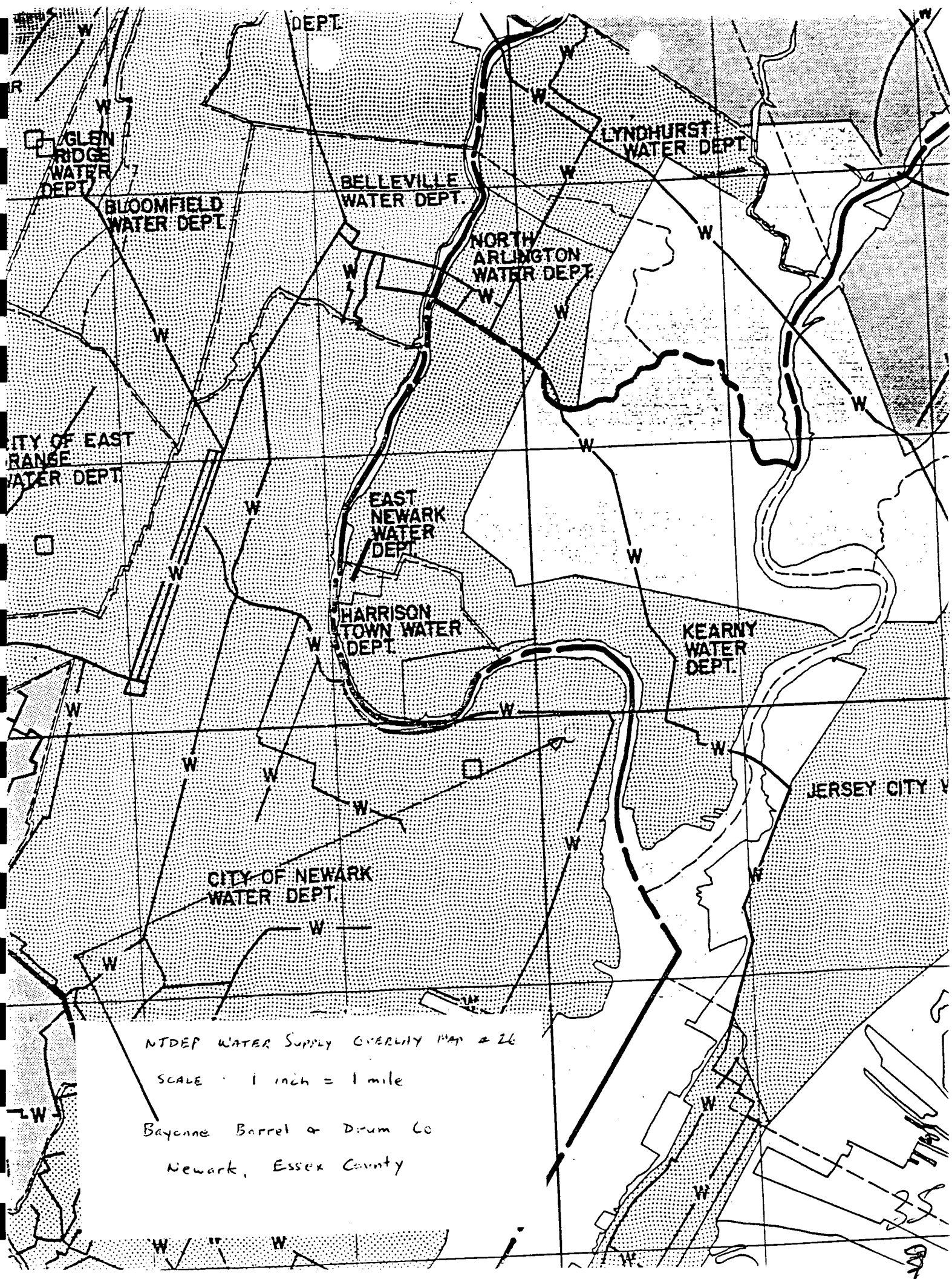

26-13
26-23
HUDSON CO.
HUDSON CO.
ESSEX CO.
ESSEX CO.
HUDSON CO.
SEX CO.
ION CO.
NEW YORK BAY
N.J.
N.J.
N.Y.
sp
Oms
Oms
NJDEP Geologic Overlay Map # 26
Scale : 1 inch = 1 mile
Bayonne Barrel & Drum Co.
Newark, Essex County
34


DEPT.
GLEN RIDGE WATER DEPT.
BLOOMFIELD WATER DEPT.
BELLEVILLE WATER DEPT.
LYNDHURST WATER DEPT.
NORTH ARLINGTON WATER DEPT.
ITY OF EAST RANGE ATER DEPT.
EAST NEWARK WATER DEPT.
HARRISON TOWN WATER DEPT.
KEARNY WATER DEPT.
JERSEY CITY
CITY OF NEWARK WATER DEPT.
NJDEP WATER SUPPLY OVERLAY MAP # 26
SCALE 1 inch = 1 mile
Bayonne Barrel & Drum Co
Newark, Essex County

I. Water Well Records

Location	Owner	Year Drilled	Screen Setting or Depth of Casing	Total Depth	g/n Yield	Formatio
26-22-143	Irvington Smelting & Ref.Wks.	1953	71	209	192	Trb
26-22-143	"	1953	62'4"	304	300	"
26-22-145	Associated Mech.Devices	1960	33	250	80	"
26-22-149	Gallo Asphalt Co.	1961	107	201	200	"
26-22-213	Krueger Brewing Co.			656	435	"
26-22-223	Smith & Smith Funeral Parlor			776	25	"
26-22-234	U.S. Navy			565	39	"
26-22-237	Conmar Corp.			300	450	"
26-22-262	National Lock Washer Co.			800	100	"
26-22-275	Linde Air Products Co.	1954	44'5"	500	124	"
26-22-293	New York Port Authority	1963	60	370	260	"
26-22-322	Standard Bitulithic Co.	1964	89'11"	406	360	"
26-22-327	Pfeiffer, H.			505	12	"
26-22-333	Arkansas Co., Inc.	1965	72'9"	400	65	"
26-22-323	Ronson Metals Corp.	1965	30	300	220	"
26-22-334	Wilson, H.A. Co.			773	3	"
26-22-345	Chem-Fleur	1965	97	306	200	"
26-22-355	Englehard Ind., Inc.	1966	54/79'3"	423	167	"
26-22-355	"	1965	80'7"	400	401	"
26-22-356	"	1966	78.5/92	495	4	"
26-22-363	Rutherford & Delaney Hidg.Co.	1956	42	220	100	"
26-22-411	Bristol Meyers	1967	49	500	159	"
26-22-413	Dilloc-Beck Mfg. Co.			379	100	"
26-22-449	Elizabethtown Water Co.			400	550	"
26-22-463	Orbis Products Corp.	1953	157	350	12	"
26-22-517	Pennick, S.B. Co.	1961	64'10"	535	24	"
26-22-513	Purs Carbonic			600	30	"
26-22-546	Black Diamond Grit Co.	1960	92	265	150	"
26-22-574	Londat Aetz Fabric Co.	1965	50	600	30	"
26-22-574	Elizabeth Abbatoir			641	75	"
26-22-744	Morey LaRue Laundry			700	15	"
26-22-745	"			600	14	"
26-22-735	Stevenson Car Co.			300	95	"
26-22-736	Feldnan Brothers			305	54	"
26-22-795	Reichold Chemical Co.	1967	39'6"	400	415	"
26-22-328	Siager Mfg. Co.			1200	90	"
26-22-833	General Chemical Co.	1965	106	500	70	"
26-22-342	Clauss Bottling Works			500	50	"
26-22-347	Elizabethtown Gas & Light			300	0	"
26-22-352	Riker Motor Co.			500	0	"
26-22-354	Thomas & Betts Co., Inc.			500	264	"

J. Geodetic Control Survey monuments described
Index Map 26; adjacent Index Map 31

BLOCK #26-22

A. Elizabeth

3. Arthur Kill-Elizabeth, Elizabeth Channel, Morses Creek; Passaic-Lower Passaic

C. 1. Newark WSO AP - Detailed meteorologic data

2.

Map No.	Location	Period of Record
67	Elizabeth River at Irvington	1931-1938
68	Elizabeth River at Nye Ave., Irvington	7/23/38
72	Elizabeth River at Elizabeth	1921-

3.

262	Passaic River at Harrison	1967-1971
272	Elizabeth River at Morris Ave., Elizabeth	1964-

Water Quality Standards: (explained in Atlas Sheet description)
FW3, TW2 except where classified TW3

D. Brunswick Formation (Trb), Stockton Formation (Trs), Diabase (Trdb)

E. 1. Physiographic Province: Piedmont
Subdivision: Triassic Lowlands
Major Topographic Features: Wisconsin Terminal Moraine, Red Sandstone Plain, Hackensack Meadows, Newark Bay, Palisades Ridge
Elevations (ft.above sea level): ridges 300, valleys 0
Relief (ft.): 200

2. a. Normal Year: 44"
Dry Year: 36"
Wet Year: 53"

b. January: 32°F
July: 74°F

c. 243 days. Last killing frost: 4/15; first killing frost 10/20

F. Essex County:
Weequahic Park
Union County:
Elizabeth River Park
Warinaaco Park

H. Boxwood Hall/Boudinot Mansion, Elizabeth (State Owned)

26-13-598	Erie Railroad			184	200	Trs
25-13-598	"			182	4	Trb
26-13-615	Keystone Metal Finishers	1968	20	200	312	"
26-13-642	"	1950	18	200	76	"
26-13-655/6	"	1960	21	150	150	Trs
26-13-663	Kiesewettar			380	0	Trdb-Tr
26-13-695	North Bergen Realty Co.			72	90	Q
26-13-775	Fairmount Chemical Co.	1965	114	300	300	Trb
26-13-775	United Shellac Co.			475	200	"
26-13-921	Miller & Co.			135	925	Q
26-13-924	DeAngelis Packing Co.	1943		45	0	"
26-13-983	Mehl, John & Co.	1913		1020	150	Trdb
26-13-983	"	1923		1050	40	"
26-13-984	Mountain Ice Co.			950	0	Trdb-PG
26-13-987	Steel Laundry Co.			1028	130	" "
26-13-994	General Refrigerator			1350	0	Trs-PG
26-13-995	Columbia Amusement Park			200	100	Trs

J. Geodetic Control Survey monuments described
Index Maps 21,25; adjacent Index Map 16

SUBJECT TO REVISION

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

LATITUDE 404356
LONGITUDE 740730

DRAFT

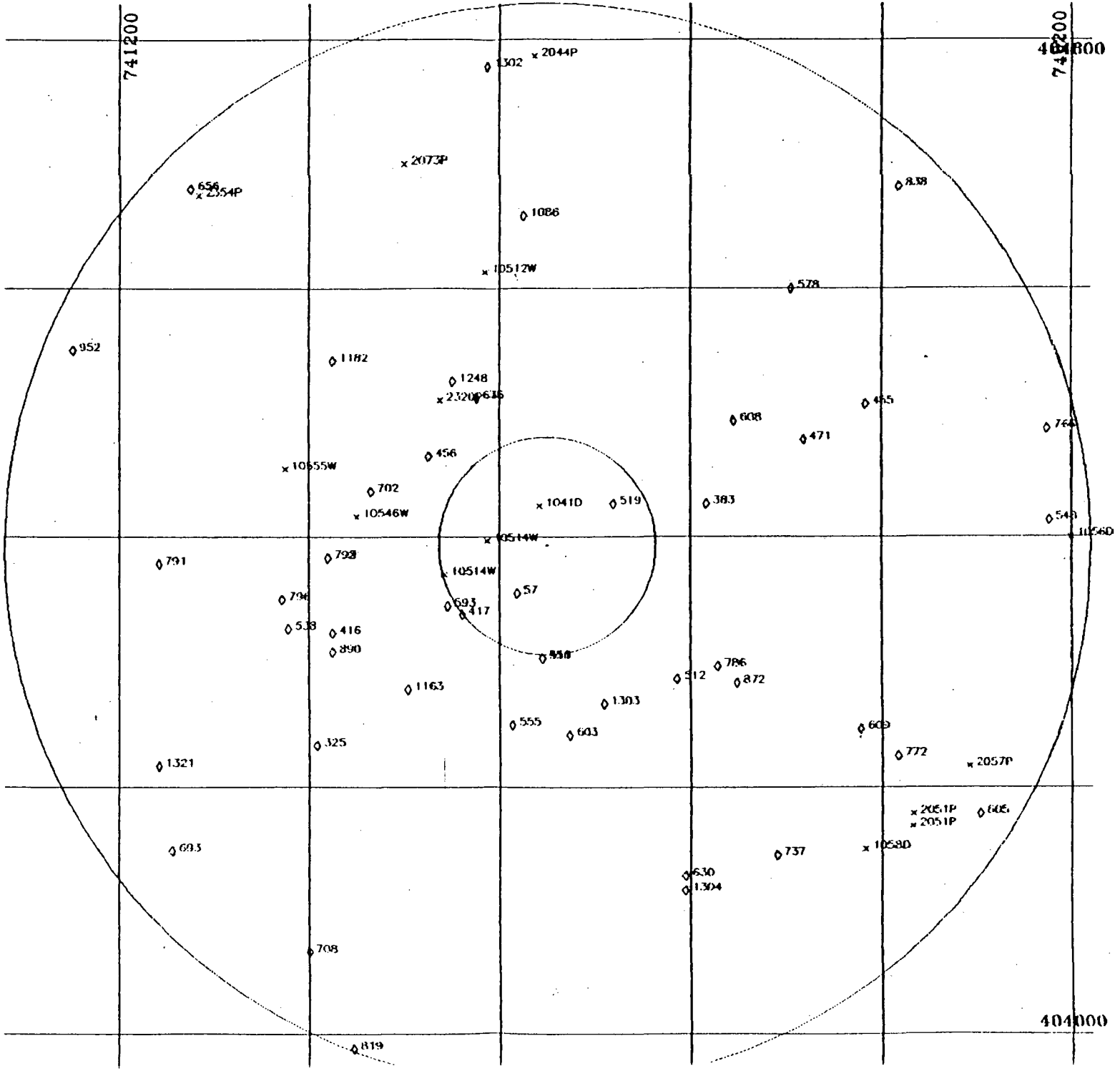
SCALE: 1:63,360
(1 Inch = 1 Mile)

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

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

PLOT PRODUCED BY:
NJDEP
DIVISION OF WATER RESOURCES
BUREAU OF WATER ALLOCATION
CN-029
TRENTON, NJ 08625

DATE: 10/08/88



Page 1 of PRELIMINARY SURVEY OF WATER WITHDRAWAL POINTS WITHIN 5.0 MILES OF 404356 LAT. 740730 LON. (IN ORDER BY PERMIT NUMBER) - 10/08/98

PERMIT NUMBER	NAME	SOURCEID	LOCID	LAT	LON	LLACC	DISTANCE	COUNTY	MUN	DEPTH	GEO1	GEO2	CAPACITY
1041D	AMERICAN REF-FUEL COMPANY	175 WELL	POINTS	404415	740735	F	0.4	13	14	35	GRSD		250
1051W	V.H. SWENSON CO., INC.	2602717	1	404309	740309	F	2.6	17	07	400	GTRB		150
1054W	RONSON METALS CORP.	2603495	1	404358	740608	T	0.6	13	14	300	GTRB		150
	RONSON METALS CORP.	2604993	3	404342	740635	T	1.0	13	14	165			100
1054W	PUBLIC SERVICE ELECTRIC & GAS	4600103	1	404410	740930	F	1.8	17	04	216	GTRB		250
1055W	NEW JERSEY BELL TELEPHONE	2603173	1	404433	741015		2.5	13	14	215	GTRB		60
1060D	NEWPORT CITY DEV. CO.			404400	740000	F	4.8	17	06				1000
1060D	PORT LIBERTE PARTNERS			404130	740410	F	4.0	17	06				200
2044P	GRAND UNION CO.	4600002		404752	740772	S	4.5	03	39	300	GTRB		60
2051P	LIBERTY HILLSIDE ASSOC.	4600077	STANDBY	404147	740341		4.2	39	07	275	GTRB		250
	LIBERTY HILLSIDE ASSOC.	4600078	STANDBY A	404141	740341		4.2	39	07	186	GTRB		250
	LIBERTY HILLSIDE ASSOC.	4600079	MAIN B	404141	740341		4.2	39	07	400	GTRB		465
	LIBERTY HILLSIDE ASSOC.	2600418	MAIN D	404141	740341		4.2	39	07	400	GTRB		350
2057P	SPINNERIN YARN CO., INC.	4600174	1	404210	740335	F	4.4	03	59	230	GTRB		120
2077P	INTERNATIONAL MINERALS & CHEM.	4600092	1	404700	740700	T	3.8	13	01	352	GTRB		100
	INTERNATIONAL MINERALS & CHEM.	4600093	2	404700	740900	T	3.8	13	01	400	GTRB		150
	INTERNATIONAL MINERALS & CHEM.	2605113	3	404700	740900	F	3.8	13	01	400	GTRB		150
2080P	HONEYCOMB PLASTICS CORP.	4600182	1	404506	740835	S	1.7	17	07	500	GTRB		210
	HONEYCOMB PLASTICS CORP.	2602284	2	404506	740835	S	1.7	17	07	701	GTRB		500
2094P	ESSEX COUNTY DEPT. OF PARKS	2604574	2	404645	741110	T	4.6	13	14	450	GTRB		180

Number of Observations: 20

Page 1 of NJDS CASE INDEX SITES WITHIN 5.0 MILES OF 404[illegible] LAT. 740[illegible] LON. AS OF 12[illegible]/87 (IN ORDER BY SITE NUMBER) - 10/[illegible]/88

SITEMLN	NAME	LAT	LON	DISTANCE	CONTAM	RMCODE1	RMCODE2	STATUS1	STATUS2
57	ASHLAND CHEM., NEWARK, ESSEX CO.	404333	740719	0.5	53	130	3070	1	
325	FRONTAGE ROAD DRUM DUMP, NEWARK, ESSEX CO.	404330	740755	2.8	1	0130	0	1	B
393	FORGE, KEARNY, HUDSON CO.	404116	740530	1.5	38	130	3070	0	
410	ASHLAND CHEM., NEWARK, ESSEX CO.	404302	740733	1.0	00	3070	0	9	
416	ALBERT STEEL TRUV PRENTISS DRUG, NEWARK, ESSEX CO. (DIOXIN)	404314	740745	2.1	72	103	130	1	E
417	TROY CHEM., NEWARK, ESSEX CO.	404323	740824	1.0	38	130	3070	1	
455	DIAMOND SHAMROCK, S. KEARNY, HUDSON CO.	404504	740410	3.2	35	103	101	1	
465	CONRAIL-MEADOWS YARD, KEARNY, HUDSON CO.	404439	740545	1.4	52	101	130	1	
471	KOPPERS, KEARNY, HUDSON CO.	404447	740449	2.5	1	103	130	9	
512	ROOSEVELT DRIVE-IN (DAYLIN/GRACE), JERSEY CITY, HUDSON CO.	404252	740603	1.7	39	103	101	5	B
519	SILICON RESINS, KEARNY, HUDSON CO.	404416	740548	0.7	00	100	3070	1	G
528	J.L. HARRITAGE + CO., NEWARK, ESSEX CO.	404316	741013	2.5	0	130	3070	1	
548	CONRAIL YARD, HOBOKEN, HUDSON CO.	404405	740214	4.6	52	103	110	1	
551	SUNMARK IND., NEWARK, ESSEX CO.	404302	740733	1.0	63	130	3070	9	
555	CENTRAL STEEL DRUM, NEWARK, ESSEX CO.	404250	740752	1.7	1	130	3070	0	
570	CONRAIL DECAUDIS, HUDSON CO.	404600	740157	3.3	1	103	102	1	
577	FEDERATED METALS, NEWARK, ESSEX CO.	404327	740833	1.1	0	130	3070	9	
603	TEXACO TERMINAL, NEWARK, ESSEX CO.	404215	740716	1.8	53	130	3070	9	
605	PITTSTON PETROLEUM, JERSEY CITY, HUDSON CO.	404147	740258	4.7	53	103	101	8	
608	STANDARD CHLORINE, KEARNY, HUDSON CO.	404456	740533	2.1	39	103	101	0	
609	SHEFFIELD AVE., 880, JERSEY CITY, HUDSON CO.	404328	740413	3.3	39	103	102	1	
670	MCKAY CHEMICAL CORP., BAYONNE CITY, HUDSON CO.	404117	740403	3.3	00	103	0	9	
675	80-LISTER AVENUE, NEWARK, (DIOXIN CASE), ESSEX CO.	404507	740815	1.5	72	103	0130	1	G
676	100 LISTER AVE (DIOXIN), NEWARK, ESSEX CO.	404507	740915	1.5	72	0103	0130	1	G
677	J.T. BAKER, PHILLIPSBURG, WARREN CO.	404129	741126	4.4	00	130	8010	1	A
702	HARRISON COAL GAS SITE, HUDSON CO.	404422	740921	1.7	70	0110	3070	1	C
703	HACKENSACK RD. LANDFILL, ELIZABETH, UNION CO.	404040	741000	4.3	50	100	3070	0	
707	PUP LANDFILL, JERSEY CITY, HUDSON CO.	404137	740506	3.5	38	103	101	9	
708	CARNIVAL SPRAYING CO., INC, HOBOKEN, HUDSON CO.	404452	740213	4.7	63	0103	0100	1	B
712	COLUMBIA PAINT, INC., JERSEY CITY, HUDSON CO.	404215	740330	3.7	00	0103	0100	1	B
736	BOLLER INSTRUMENTS, JERSEY CITY, HUDSON CO.	404258	740543	1.5	35	0103	3030	1	B
791	GENERAL ELECTRIC CO-NEWARK LAMP PLANT	404347	741135	3.6	00	0103	3070	1	B
792	GEORGIA-PACIFIC CORP--CASTING DEPT, NEWARK, ESSEX CO.	404350	740748	2.0	00	0110	3070	1	B
793	GEORGIA-PACIFIC CORP--POWDER PLANT, NEWARK, ESSEX CO.	404350	740948	2.0	00	0110	3070	1	B
796	J & P METALLIZING CO, INC., NEWARK, ESSEX CO.	404330	741017	2.5	00	0110	3070	1	B
819	HOLDEN, INC - ELIZABETH PLANT, UNION CO.	403957	740932	5.0	00	0103	0100	1	B
830	SQUARE D CO, SECAUCUS, BERGEN CO.	404649	740350	4.6	00	0110	3070	1	B
873	TEXTILE PROCESS, JERSEY CITY, HUDSON CO.	404250	740521	2.1	63	0103	3030	1	B
890	CHEM-FLEUR, NEWARK, ESSEX CO.	404305	740945	2.2	00	0110		1	B
991	PASSAIC WATER DEPT., ORANGE, ESSEX CO.	404520	741330	4.7	00	0170	3070	1	C
1036	S M I CONCRETE, NORTH ARLINGTON, BERGEN CO.	404635	740745	3.0	53	0103	0	1	B
1063	NEW ISLAND-CONRAIL TERMINAL, NEWARK, ESSEX CO.	404347	741338	1.8	52			3	
1082	FRANKLIN PLASTICS, KEARNY, HUDSON CO.	404525	740745	2.6	34	0100	3070	1	G
1098	BRIGHTON & GREEN, KEARNY, HUDSON CO.	404515	740630	1.7	53	0130	0101	1	C
1102	RESEARCH ORGANIC INORGANIC CHEM CORP, BELLEVILLE, ESSEX CO.	404747	740038	4.5	00	0130	3070	1	E
1103	BROWERS POINT, JERSEY CITY, HUDSON CO.	404240	740651	1.5	39	0101	0130	1	A
1104	ROUTE 185, JERSEY CITY, HUDSON CO.	404110	740600	3.4	39	0130	0101	1	B
1121	J.F.HENRY CHEMICAL CO., NEWARK, ESSEX CO.	404310	741135	4.1	63	0110	3070	1	B

Number of Observations: 49

RCRA Enforcement Inspection

Bayonne Barrel and Drum
Newark, New Jersey

NJD009871401

June 2, 1988

Participating Personnel:

U.S. Environmental Protection Agency

M. Ferriola, Environmencal Scientist
R. Coleates, Environmental Scientist
R. Morrell, Geologist
D. Dugan, Environmencal Scientist
J. Wilk, Environmental Scientisc

Bayonne Barrel and Drum

Frank Langella, Company owner

Report Prepared by:

Michael Ferriola, Environmental Scientist
Source Monitoring Seccion

Approved for the Director by:

Richard D. Spear, Chief
Surveillance and Monitoring Branch

ATTACHMENT A-1

42

Bayonne Barrel and Dr
Newark, New Jersey

June 2, 1988

RCRA ENFORCEMENT INSPECTION

Objective

A RCRA sampling lospectlon was conducted at Bayonne Barrel and Drum (BBD) on June 2, 1988, by members of EPA's Region II, Environmental Services Division. This investigation was requested by the Hazardous Waste Compliance Branch (HWCB) in New York. The scope of this Inspection was to determine if BBD is actively scoring hazardous wasces on site and establish present site conditions as compared to the original sampling Investigation performed by EPA in 1984. A general site map (Figure 1) is attached which illustrates the approximate sampling locations.

Survey Participants

Frank Langella, Company owner - Bayonne Barrel and Drum

Tom Colligan, Operations Manager - Interwaste Services Company (ISCO)
James Wilson, Field Engineer - ISCO
Andy Kondracki, Environmental Controls Manager - ISCO
Mike Young, ISCO

Mike Ferriola, Environmental Scientist - U.S. EPA
Rithard Coleates, Environmental Scientist - U.S. EPA
Robert Morrell, Geologist - U.S. EPA
David Dugan, Environmental Stientist - U.S. EPA
John Wilk, Environmental Scientist - U.S. EPA

* Personnel from Interwaste Services Co. (ISCO) were contracted by BBD to collect split samples and observe EPA sampling activities.

Discussion

On June 2, 1988, a RCRA sampling inspection was conducted at Bayonne Barrel and Drum, located at 150 Raymond Boulevard in Newark, New Jersey. Two previous sampling inspections were attempted. However, due to an access denial on May 12 and inclement weather on May 19, those inspections were not completed. Access was denied on May 12 by BBD's attorney, Damon Sadlta, after being on site for approximately one hour and actively engaged in sampling. EPA was Informed by their attorney that Investigative personnel (EPA) should not be on site. This arrangement was made as per an agreement with the Department of Justice in Washington, D.C., since the site was already in litigation. A second sampling visit was scheduled, after consent by EPA and BBD attorneys, exactly one week later on May 19, 1988, Due to extessive rain the previous 36 hours, sampling had to be postponed once again.

ATTACHMENT A-2

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Site Description

Currently, BBD is an inactive drum reconditioning facility which has filed for bankruptcy under Chapter 11 and is only staffed by a few maintenance/security people. The plant has undergone some surficial cleaning/housekeeping which Includes the arrangement of empty drums in orderly rows, grading of empty lots on the south side of the buildings, and reaoval of most equipaent from the balldlng interiors. In addition, the ash pile on the southwest corner of the property has been covered with a sheet of clear plastic. During EPA's initial attempt to sample, the ash pile was found uncovered. However, on a setond saapling attempt, the contractor representing BBD had covered the ash pile with several rolls of clear sheet plastic. During the third and attual sampling inspettion, the pile remained covered.

Even though the plant "appears aesthetically tleaner", there remain a few areas which appear grossly contaminated. The drum and ash storage room contains a large ash pile from incineration activities. Also, approximately 150 drums remain which contain ash or aqueous materials. A few drums had holes punched in their sides which allowed the contents to stain the surrounding floor space. A couple of drums had been Inverted to prevent their contents from leaking and others were severely dented and/or crushed. Most drums contained ash whith looked similar in nature to the ash pile in the middle of the room. See the attached photographs for illustrations. Approximate building locations and sampling sites are depitted in Figure 1. In addition, an ash pile remains in the courtyard between the inclnerator and the furnace room building. The ash residue was multicolored, as shown in the attached photographs.

Sampling locations and methodology

In order to fulfill the objectives of this investigation, a total of seven predetermined locations were selected. The sampling network and rationale was based upon a previous sampling inspettion by EPA (2/64) and new lotations proposed by the HWCB during a presurvey walk-through condutted on April 15, 1988. Based upon this information, the foliowing poiots were selected:

1 - Furnace room building
2 - Courtyard area
3 - Drum and ash storage room (near incinerator)
4 - Waste ash pile (near rows of drums)
5 - Oil separator trench
6 - Pump House (near oil separator trench)
7 - Underground tank (near toluene pump)

Approximate sample locations are depicted in Figure 1 which correspond to the sample numbering system above. The analyses requested included EP Toxicity (metals only), volatile organic analysis (VOA), non-volatile organic analysis (NVOA), PCB's, and also pH for aqueous samples. In addition, Ignitability was analyzed on the drum sample containing an aqueous solution (sample # 112213),

ATTACHMENT A-3

The following is a list of sample identification numbers, corresponding sample locations, and descriptions of collection techniques:

Sample #112201 - This sample was collected from the floor of the furnace room building as depicted in picture #10. The ash sample was collected at random from several locations using a dedicated poiypropyleoe scoop. lhe sample was then mixed in a stainless steel tray to form a composite sample, which was subsequently split for EPA personnel and the BBD contractor. The stainless steel tray was lined with new "Whatman Benchcoat" paper each cime a sample for ash was collected to prevent cross contamination among different sampling locations.

Sample #112202 - Courtyard area ash sample collected at random using the same techniques as listed in sample #112201. Photographs #5 - 9 illustrate the sample location and collection techniques. Make special notice of the various colors encountered in the ash pile and sample collected.

Sample #112203 - Drum and Ash storage room ash sample collected in a manner identical to chat listed in sample #112201. Level B personal protective equipment (PPE) was worn in this area due to the presence of hazardous organic vapors, as indicated by air aonitoring equipment. Pictures #15-16 illustrate sampling technique and level of protective equipment required.

Sample #112204 - This sample number represents the "WEST" half of the waste ash pile near the drum storage area. An imaginary line was drawn through the ash pile to delineate an "EAST" and "WEST" half, for the purpose of sampling only. Figure 1 shows the relative locacion of che ash pile and illuscraces the approximace boundary drawn to delineate the two halves. Photographs #17 and 19 illustrate the entire waste ash pile snd sample collection in the "WEST" half, respectively. Level C PPE was worn during sample collection and compositing. Since the ash pile was covered with polyethylene plastic sheeting, holes were cut at random to enable sample collection. Samples were collected using a dedicated polypropylene scoop and throughly mixed in a stainless steel tray to form a composite sample.

Sample #112205 - Aqueous samples were collected from the oil separator trench using an i-Chem Series 300, one quart glass jar attached to an aluminum rod and clamp. Samples were poured directly from the glass jar into the respective sample containers.

Sample #112206 - Aqueous samples were collected from the pump house using the same techniques mentioned in sample #112205, Picture #1 illustrates the pump house and rod/clamp used for sample collection. A duplicate sample, #112211, was also collected at this location.

Sample #112207 - Aqueous samples were collected from an underground tank near the toluene pump. The sample was collected by taping an i-Chem Series 300 glass jar to an aluminum rod. The sample was collected in this manner due to the size of the access standpipe. in addition, the aluminum rod was shaped to fit the angled opening of the tank. See picture #3, which illustrates sampling of the underground tank.

Sample #112208 - In addition to collecting ash samples from the courtyard, aqueous samples were also collected as depicted in photgraph #4. Ponded water samples were collecced in a low lying area adjacent to the courtyard ash pile and incinerator. Sample collection technique was by direct filling an I-Chem Series 300 glass jar and pouring into the appropriate sample containers.

Sample #112212 - This sanple number represents the "EAST" half of the waste ash pile near the drum storage area. Photograph #18 depicts sampling the "EAST" half of the ash pile while wearing Level C PPE. Sample collection techniques were che same as in sample #112204. A series of random grab samples were collecced using a dedicaced polypropylene scoop and then composiced in a stainless steel tray. After the sample was throughly mixed, the respective sample containers were filled.

Sample #112213 - An aqueous sample was collected from a "RED" drum in the drum and ash storage room as depicted in photographs #11 - 12. Level B PPE was worn due to che presence of high concencracions of unknown organic concaminants. The drum was sampled using a precleaned, dedicated teflon bailer. Pictures #13 - 14 indicate the particular red drum which was sampled and other drums in the imaediate area. Note the condition of the drums in all four photographs. Mosc of che drums contalned ash which looked similar in nature co che ash pile in che center of the room. However, some of che drums contained liquids of unknown concenc. Many of the containers were in very poor condition, some with holes and a few inverted to prevent their contents from leaking onto the floor.

All samples were collected in accordance with established EPA, Region II protocols. Standard EPA Chain of Custody procedures were employed throughout this inspection and a receipt for samples was signed by the facility representative (ISCO), as required under section 3007 (a) of RCRA, All samples collected by EPA were split with ISCO during this investigation (containers for BBD samples were provided by ISCO), EPA samples were analyzed at the Region II laboratory in Edison, New Jersey,

ATTACHMENT A-5

Results of Analyses

The results obtained from the samples collected during this investigation are presented in the following tables: Volatile Organics GC/MS scan (Table 1), Non-volatile Organics GC/MS scan (Table 2), and EP TOX Metals (Table 3).

Table 1 presents che wolatile organic compouads aod concentrations that were detected. The results indicate the presence of volatile organics in all samples collected. Exceptionally high concentrations of volatile organic compounds were found in samples #112212 and #112213, Concentrations ranged from 490 ug/l of trichloroethylene to 10,000,000 ug/l of xylene in those samples.

Table 2 presents the non-volatile organics/PCB compounds and concentrations that were detected. Very high concentrations of non-volatile organics were found in the ash samples, as presented in the attacbed tables, pages 2a - 2b. In addition, PCB's were found in sample #112212 at 115,400 and 293,970 ug/l for Aroclor 1248 and 1254, respectively. High concentrations of non-volatile organics were also found in the drum sample, #112213.

Table 3 presents the results of analyses for the hazardous waste characteristic of EP Toxicity (metals). The maximum concentration allowed for cadmium (1.0 mg/l) was exceeded in three of the samples collected (#112201, 112203, and 112204). All other EP Toxicity metals contaminants were below the maximum limit allowed, as presented in Table 3.

Aqueous samples were analyzed for pH, and in addition, ignitability analysis was performed on the drum sample. Results of these analyses show that none of the samples analyzed met the criteria of corrosivity or ignitability, as per 261.21 and 261.22. Results are presented below:

Characteristic of Corrosivity

Sample #	ph (SH)
112205	7.37
112206	6.59
112207	6.28
112208	6.70
112213 (drum)	10.9

Characteristic of Ignitability

Sample #	Flash point
112213	> 145°F

ATTACHMENT A-6

Findings and Conclusions

Based upon the sampling results of this investigation and a visual inspection of the site, Bayonne Barrel and Drum is in violation of existing RCRA ana TSCA regulations. Analytical results indicate that the waste ash pile, drum and ash storage rooa ash, aod furnace room ash are a RCRA hazardous waste in accordance with 40 CFR Part 261.24. The ash exhibits the characteristic of EP Toxicity for cadmiua (D006).

Results of PCB analyses show concentrations for Aroclor 1248 and 1252 to be 115 and 293 mg/l, respectively. This is a violation of TSCA regulations 40 CFR Part 761.60.

The waste ash pile was still in vlolatioo of 40 CFR Part 265, Subpart L (waste piles) during che initial site visit on May 12, 1988. The pile was subsequently covered by sheet plastic on May 19, 1988. However, a containment system to prevent and collect run-off or eliminate a discharge to groundwater does not exist.

The drum and ash storage room contained many drums, approximately 100-150, which were not marked as a hazardous waste and were apparently stored in excess of 90 days.

in addition, numerous organic compounds were found throughout the site in varying concentrations. All results are listed in Tables 1-3.

ATTACHMENT A-7

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TABLE 1

BAYO BARREL AND DRUM, NEWARK, NEW .SEY

VOLATILE ORGANICS GC/MS SCAN

JUNE 2, 1988

Ash samples

PARAMETER/SAMPLE#	ash from floor of furnace room #112201	ash - (courtyard) #112202	ash (drum/ash storage room) #112203	ash pile #112204	ash pile #112212
Benzene					
Carbon Tetrachloride			28 M		
Chlorobenzene			540 M		
1,2-dichloroethane					
1,1,1-trichloroethane	96 M		340 M		64 M
1,1-dichloroethane					
1,1,2-trichloroethane					680 M
1,1,2,2-tetrachloroethane					
Chloroethane					
Chloroform		28 J	60 M		24 M
1,1-dichloroethylene					
1,2-trans dichloroethylene					
1,2-dichloropropane					
1,3-dichloropropylene					
Ethylbenzene	140 M	570	1500	100 M	5200
Methylene chloride					
Methyl chloride					
Methyl bromide					
Bromoform					
Dichlorobromomethane					
Chlorodibromomethane					
Tetrachloroethylene		80 M	1200	140 M	1300
Toluene	310 M	1300	2700	200 M	12,000
Trichloroethylene	82 M	46 M	550	110 M	490
Vinyl chloride					
Xylene		1200	3200		4600
Styrene					2500

All concentrations in ug/kg,

M = above the detection limit, but below the level of quantification

J = estimated value

ATTACHMENT 4-1

TABLE 1
BARREL AND DRUM, NEWARK, NEW JERSEY
VOLATILE ORGANICS GC/MS SCAN
JUNE 2, 1988

Aqueous samples

PARAMETER/SAMPLE#	aqueous (oil sep. trench) #112205	aqueous (pump house) 112206	Dup. 112211	aqueous (UIG tank) #112207	aqueous (ponded water) #112208	aqueous (drum) #112213
Benzene			4.4			92,000
Carbon Tetrachloride						
Chlorobenzene		9.4	7.3			78,000
1,2-dichloroethane						
1,1,1-trichloroethane		5.2	4.3			
1,1-dichloroethane		11	8.8			
1,1,2-trichloroethane		1.3M	1.0M			
1,1,2,2-tetrachloroethane						
Chloroethane						
Chloroform	2,6 M	1.6	5.5	10		
1,1-dichloroethylene						
1,2-Trans dichloroethylene	3,7 M	55	41	2.3		
1,2-dichloropropane						
1,3-dichloropropylene						
Ethylbenzene		130	110	1.8 M	14 M	1,200,000
Methylene chloride						
Methyl chloride						
Methyl bromide						
Bromoform						
Dichlorobromomethane						
Chiorodibromomethane						
Tetrachloroethylene		2.2M	1.6M			62,000
Toluene	2.6 M	660	540	0.4 M	600 J	2,400,000 J
Trichloroethylene		4.5	3.4	0.5 M		
Vinyl chloride		18	12			
Xylene	5.0 M	140	220	4.1 J	60 J	10,000,000
4-methyl-2-pentanone		21	17			
Styrene			38			

All concentrations In ug/l.
M = above the detection limit, but below the level of quantification
J = estimated value

ATTACHMENT 4-9

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BAYONNE [illegible], NEWARK, NEW JERSEY

NON-VOLATILE ORGANICS GC/MS SCAN

JUNE 2, 1988

Ash samples

PARAMETER/SAMPLE #	ash (furnace room) 112201	ash (courtyard) 112202	ash (drum/ash storage room) 112203	ash pile 112204	ash pile 112212
2-chlorophenol					
2-nitrophenol					
phenol		2350 J	104,400 J		
2,4-dimethylphenol			2,350 M		
2,4-dichlorophenol					
2,4,6-trichlorophenol					
p-chloro-m-cresol					
2,4-dinltrophenol					
4,6-dinitro-o-cresol					
pentachlorophenol					
4-nitrophenol					
1,3-dichlorobenzene					
1,4-dichlorobenzene				140 M	
1,2-dichlorobenzene		330 M	5,780 M	400 M	
hexachloroethane					
hexachlorobutadiene					
1,2,4-trichlorobenzene	490 M	620 M	49,200 J	2820 J	
napthalene	2600 J	9910 J	15,050 J	6430 J	1210 M
bis(2-chloroechyl) ether					
bis(2-chloroethoxy) methane			5,080 M		
isophorone		6730 J	5,060 M	1060 M	
nitrobenzene					
acenaphthylene		1250 M	700 M	2850 M	
acenapthene		130 M	3,700 M	450 M	
fluorene		1520 M	7,375 J	490 M	
hexachlorobenzene					
phenanthrene	1140 M	1880 J	37,380 J	3080 M	220 M
anthracene	230 M	1850 M	3,550 M	1240 M	
fluoranthene	650 M	2490 M		1970 J	140 M
aniline	160 M				
2-methyl napthalene	1090 M	3370 J	17,180 J	4490 J	460 M
2-methyl phenol			9,600 J		
4-methyl phenol			20,000 J	1140 J	
biphenyl			20,000 J		
dimethyl diphenyl urea			37,200 J	7200 J	
n-nitrosodiphenylamlne				770 M	180 M
3,3-dlchlorobenzidene				520 M	
benzoic acid				5710 J	
hexane diisocyanate				12,100 J	

All concentrations in ug/kg.
M = above the detection limit, but below the level of quantification
J = estimated value

ATTACHMENT 9-10

TABLE 2
BAYONNE BARREL AND DRUM NEWARK, NEW JERSEY
NON-VOLATILE ORGANIC GC/MS SCAN
JUNE 2, 1988

Ash samples

PARAMETER/SAMPLE#	ash (furnace room) #112201	ash (courtyard) #112202	ash (drum/ash storage room) #112203	ash pile #112204	ash pile #112212
dimethyl phthalate		230 M	1750 M	170 M	
diethyl phthalate	380 M	890 M	102,930 J	1100 M	
di-n-butyl phthlate	5200 J	35,920 J	90,150 J	6830 J	1980 M
butyl benzyl phthalate	2500 M	8,070 J	67,530 J	1290 M	1780 M
di-n-octyl phthalate	340 M		5850 M		50 M
bis(2-ethylhexyl) phthalate		51,060 J	259,230 J	39,960 J	
pyrene	660 M	480 M	7500 J	3610 J	200 M
chrysene	160 M	630 M	1950 M	2070 M	
1,2-benzanthracene	110 M	400 M	1055 M	1850 M	
4-chlorophenyl phenyl ether					
benzo(a) pyrene		2450 M			
1,12-benzoperylene					
benzyl alcohol		710 M	24,730 J	2570 J	
2-methyl alcohol					
dibenzofuran	250 M	750 M	3450 M	360 M	
toluene diisocyanate		340,000 J			
phthalic anhydride		56,000 J			1500 J
naphthalene isocyanate		67,000 J			
2,6 dinitrotoluene					
2,4-dinitrotoluene				120 M	
1,2-diphenylhydrazine		1560 M			110 M
3,4-benzofluoranthene	280 M	2950 M			
11,12-benzofluoranthene					
dihydrotrimethylphenyl ind.				33,000 J	
phenol,2,4-bis(1,1-dimethyl)				4590 J	
ylangene			12,500 J		
homosolate			123,000 J	5700 J	
cholestanol					
PCB-1016					
PCB-1221					
PCB-1232					
PCB-1242					
PCB-1248					293,970
PCB-1254					115,400
PCB-1260					

All concentrations in ug/kg.
J = Estimated value.
M = Above the detection limit, but below the level of quantification.

ATTACHMENT 4-11

TABLE 2
BAYONNE BARREL AND DRUM, NEWARK, NEW JERSEY
NON-VOLATILE ORGANICS GC/MS SCAN
JUNE 2, 1988

Aqueous samples

PARAMETER/SAMPLE #	aqueous (oil sep trench) #112205	aqueous (pump house) 112206	Dup. 112211	aqueous (w/6 tank) #112207	aqueous (ponded water) #112208	aqueous (drum) #112213
2-chlorophenol						
2-nitrophenol						
phenol	1.3 M		3.2 M		1.4 M	
2,4-dimethylphenol		7.3	11.2 M	0.2 M	6.2	
2,4-dichlorophenol				1.1 M		
2,4,6-trichlorophenol						
p-chloro-m-cresol						
2,4-dinitrophenol						
4,6-dinitro-o-cresol						
pentachlorophenol						
4-nitrophenol						
1,3-dichlorobenzene	1.1 M	0.4 M				2610
1,4-dichlorobenzene	4.2 M	1.5 M		1.6 M		34,200
1,2-dichlorobenzene	1.2 M	1.6 M		0.2 M		167,140
hexachloroethane						
hexachlorobutadiene						
1,2,4-trichlorobenzene	0.8 M	0.5 M			0.2 M	393
napthalene		11.7	14.7 M			28,380
bis(2-chloroethyl) ether						
bis(2-chloroethoxy) methane						
isophorone		2.4			2.8	109
nitrobenzene						
acenaphthylene					2.5 M	
acenapthene						137
fluorene		1.3 M	7.8 M		0.5 M	
hexachlorobenzene						
phenanthrene	0.3 M	2.7 M	18.7 M	0.2 M	2.8 M	115 M
anthracene					1.6 M	
fluoranthene		0.8 M		2.2 M	4.2	
aniline						
2-methyl napthalene			11.7 M			61,080 J
2-methyl phenol	0.8 M	20.1 J	18.5 M			
4-methyl phenol		11.3 J	8.0 M		1.9 M	
benzoic aald			54.3 M		6.2	
methylbenzene salfonamide	179 J				75 J	
methyl ethylbenzene		25.3 J				

All concentrations in ug/l.
M = above the detection limit, but below the level of quantification
J = estimated value

ATTACHMENT A-12

TABLE 2
BAYONNE BARREL AND DRUM, NEW[illegible]
NON-VOLATILE ORGANIC GC/MS SCAN
JUNE 2, 1988

Aqueous samples

PARAMETER/SAMPLE#	aqueous (oil sep. trench) #112205	aqueous (pump house) 112206	Dup. 112211	aqueous (oil tank) #112207	aqueous (penned water) #112208	aqueous (drum) #112213
dimethyl phthalate		0.4 M				
diethyl phthalate						
di-n-butyl phthlate		7.2				
butyl benzyl phthalate	1.1 M	10.6 J	46.3J		7.1 M	
di-n-octyl phthalate		1.6 M	3.7M		0.7 M	
bis(2-ethylhexyl) phthalate	1.4 M	13.5 J	106.8J	4.7 J	21.7 J	
pyrene		1.3 M	7.9M	0.1 M	6.5	
chrysene	0.1 M	0.2 M	1.1M		1.8 M	
1,2-benzanthracene		0.1 M	0.5M		0.7 M	
4-calorophenyl phenyl ether						
benzo(a) pyrene	0.2 M	0.2 M			2.8	
1,12-benzoperylene		0.5 M			4.3	
benzyl alcohol		5.3 J	3.1M			
2-methyl alcohol						
dibenzofuran		0.8 M	2.0M		0.4 M	567
2,6 dialtrotoluene						
2,4-dialtrotoluene		0.6 M				597
1,2-diphenylhydrazine	1.7 M	2.0 M		0.1 M		26.8 M
3,4-benzofluoranthene		0.1 M			2.3 M	
11,12-benzofluoranthene		0.2 M			2.5 M	
n,n-dimethyl n,n-diphenyl urea	52 J					
trimethylbenzene isomers		58.4 J				
trimethyl-1,3 pentanediol		26.3 J				
n-ethyl-4-methylbenzene salf.		39.3 J				
tetramethyl butylphenol					27 J	
methyl napthalene isomers		5.5 M			1.4 M	
ylangene						
homosolate						
cholestanol		96.6 J	712 J	71 J		
PCB-1016						
PCB-1221						
PCB-1232						
PCB-1242						
PCB-1248						
PCB-1254	0.403					
PCB-1260						

All concentrations in ug/l.
J = Estimated value.
M = Above the detection limit, but below the leval of quantification.

ATTACHMENT A-13

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TABLE 3
BAYON. BARREL AND DRUM, NEWARK, NEW J EY
EP TOX METALS UATA
JUNE 2, 1988

SAMPLE #/PARAMETER	Ag	As	Ba	Cd	Cr	Mg	Pb	Se
#112201 (ash)	—	.01 M	2.84	1.16	—	—	4.72	.03 M
#112202 (ash)	.048M	.02 M	1.86	0.257	--	—	1.06	.02 M
#112203 (ash)	—	.04 M	3.53	2.84	.36 M	.15	1.69	.53
#112204 (ash)	—	.04 M	5.02	2.72	--	.0007 M	1.67	.04 M
#112205 (liq)	—	.01 M	0.22M	.027M	—	.0002 M	.1 M	—
#112206 (liq)	.012 M	.02 M	0.45M	—	—	.0003 M	—	.02 M
#112207 (liq)	.013 M	.01 M	—	--	--	—	--	.01 M
#112208 (liq)	--	.01 M	0.48M	—	--	—	--	.02 M
#112211 (liq)	—	.01 M	0.28M	—	—	.0003 M	--	.01 M
#112212 (ash)	—	.01 M	0.846M	.243	—	--	.57	.01 M
#112213 (liq)	—	1.0 M	.62M	—	1.6 M	.004 M	--	2.0 M
Maximum concentration allowed for EP TOX	5.0	5.0	100	1.0	5.0	0.2	5.0	1.0

Sample #112211 was a duplicate to sample #112206.
All concentrations expressed in mg/l.
M = above the detection limit, but below the level of quantification.

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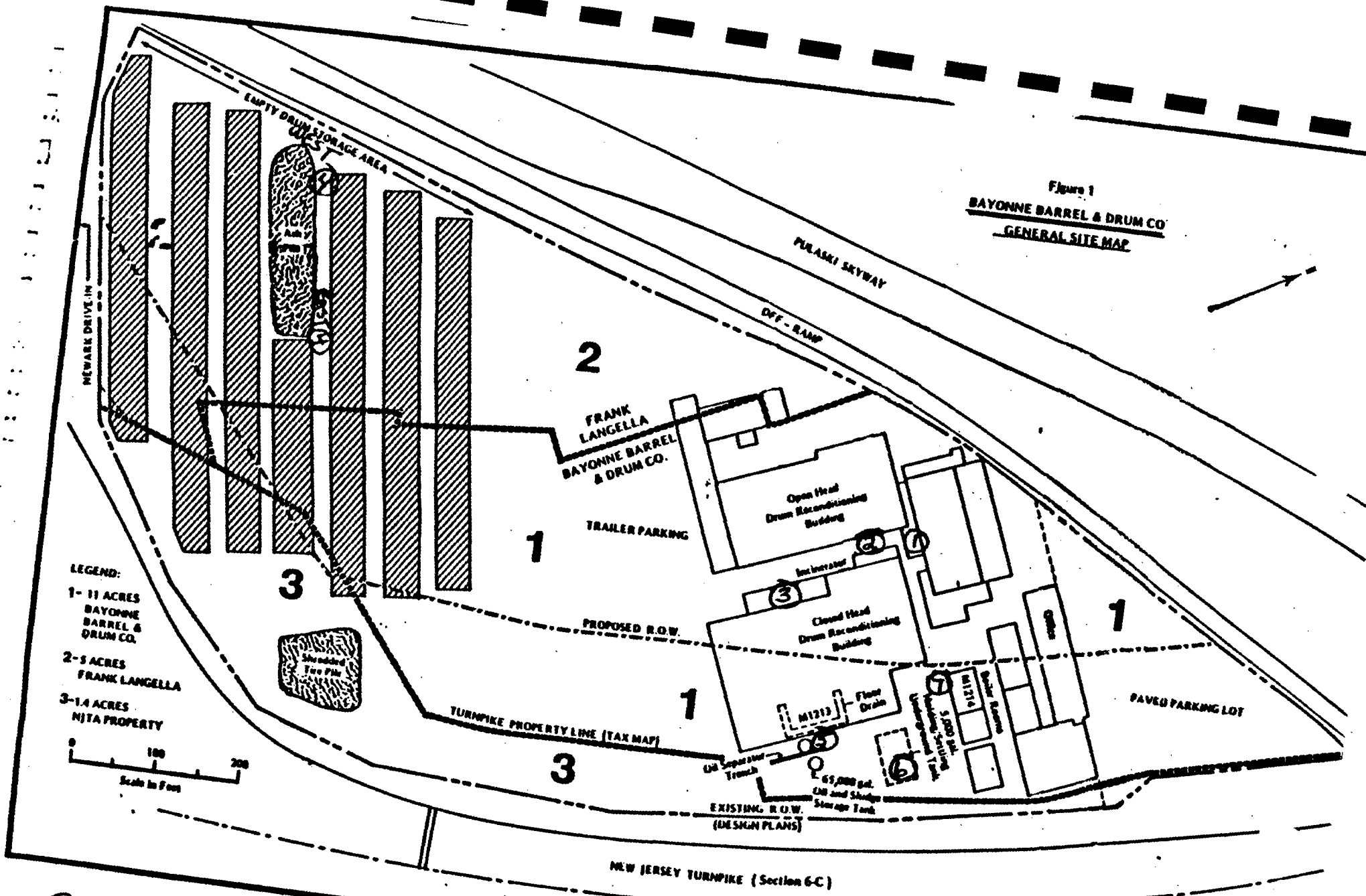
ATTACHMENT 4-14



ATTACHMENT

Sampling locations are approximate, as indicated by numbers in colored areas.

Map taken from Lou... and Assoc. report dated ... for NJ Tu...

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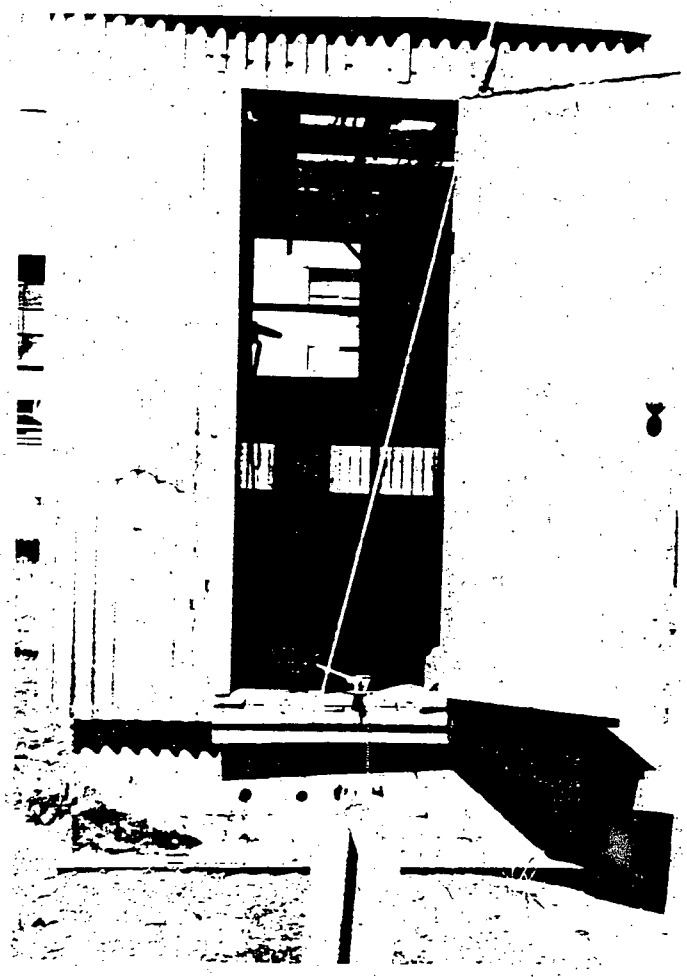
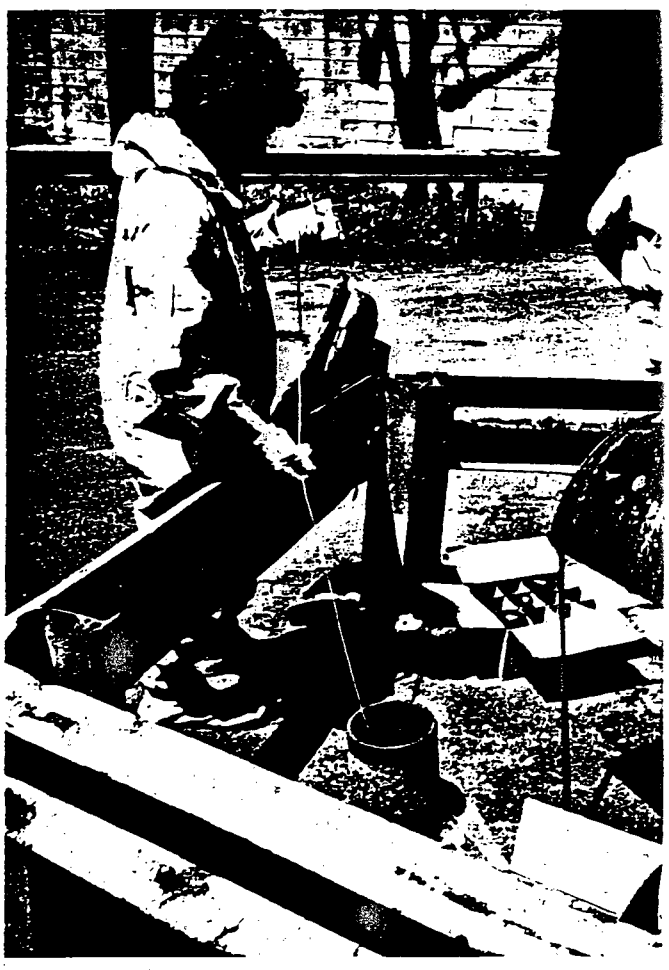


#1. Pump house sampling location. Liquid samples collected at this location. See item #6 on attached site map.



#2. Underground tank, item #7 on attached site map. Measuring total depth of tank.

BAYONNE BARREL AND DRUM
Newark, N.J. June 2, 1988
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#3. Sampling underground tank.

#4. Collection of aqueous samples from courtyard area. Item #2 on attached site map.

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#5. Collection of random, grab composite ash sample from courtyard area.

#6. Close-up of ash pile in courtyard, similar to photo #5.

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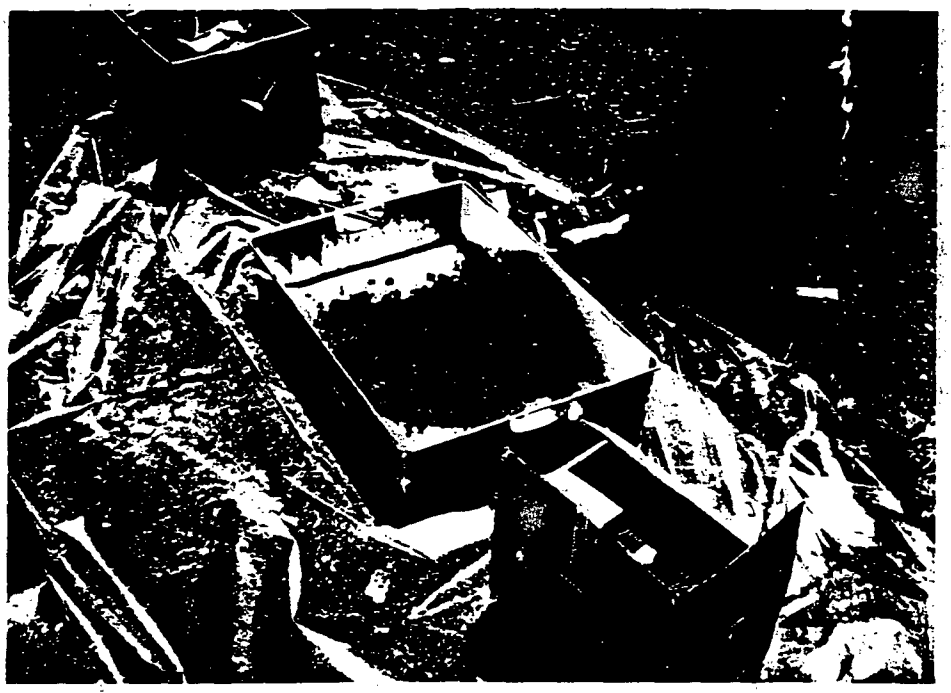
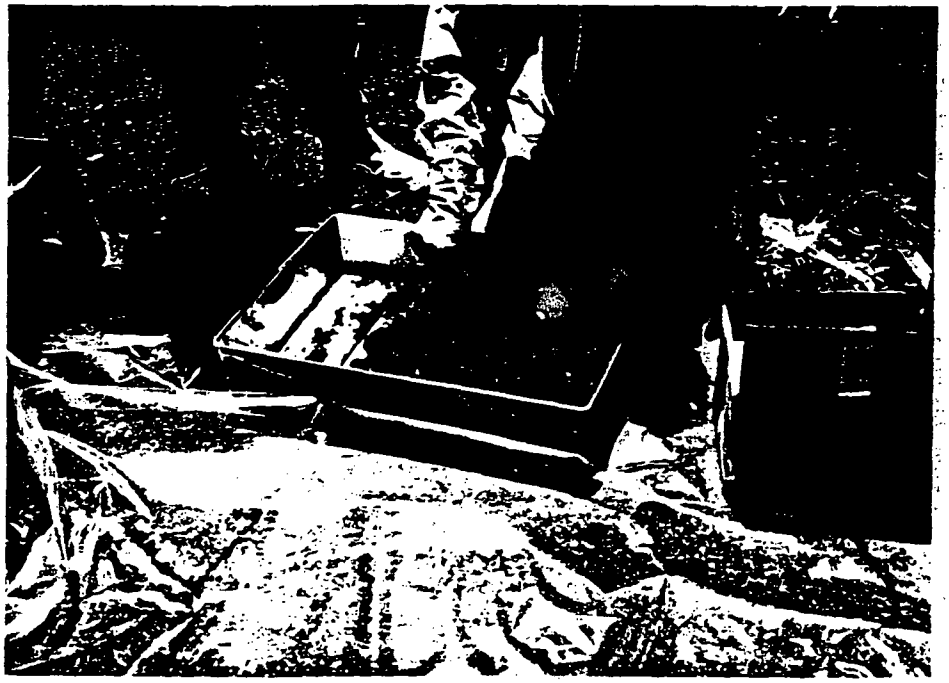


#7. Ash from courtyard area ash pile, ready for compositing.



#8. Compositing ash sample from courtyard area, prior to filling sample containers.

BAYONNE BARREL AND DRUM
Newark, N.J. June 2, 1988
NJD009871401

#9. Filling POA vial with ash from courtyard area, item #2 on the attached site map.

#10. Furnace room building, item #1 on the attached site map. Combination ash/soil samples were collected at random from this

BAYONNE BARREL AND DRUM
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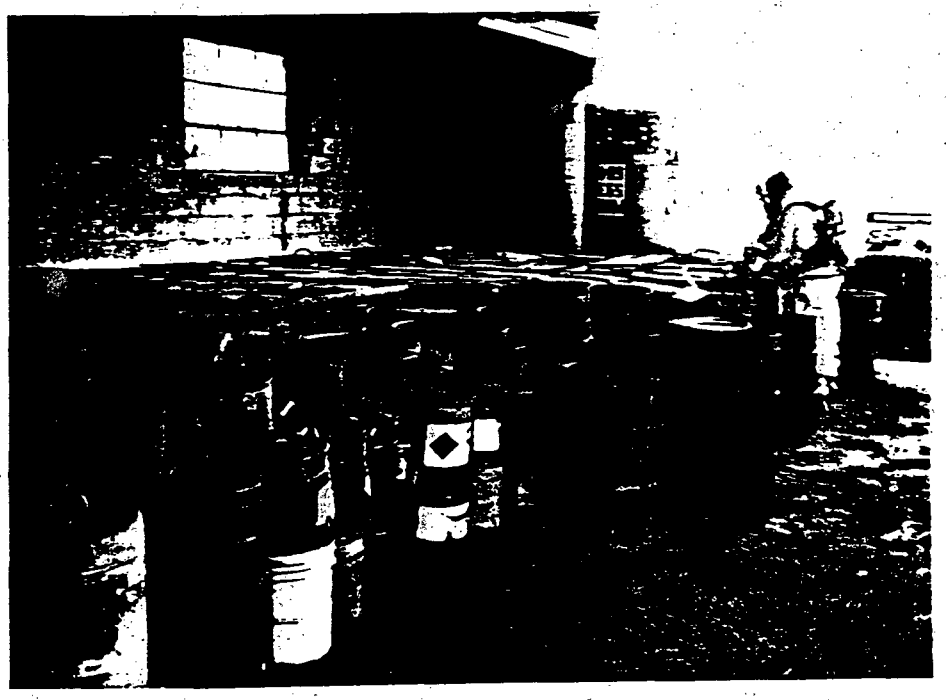
#11. Sampling "red" drum in the drum and ash storage room; item #3 on the attached site map.



#12. Overview of some of the many drums in the drum and ash storage room. Note condition of drums and old labels.

BAYONNE BARREL AND DRUM
Newark, N.J. June 2, 1988
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#13. "Red" drum which was sampled in the drum and ash storage room.

#14. Another view of drums in the drum and ash storage room.

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#15. Sampling the ash pile in the drum and ash storage room. Note presence of drums in background.

#16. Opposite view of ash pile in drum and ash storage room.

BAYONNE BARREL AND DRUM
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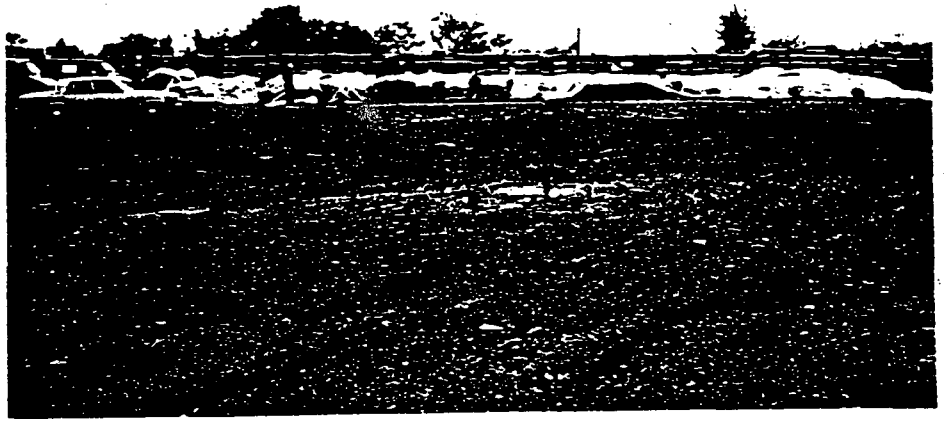
NJD009871401

EAST



WEST

#17. Waste ash pile, item #4 on the attached site map. An imaginary line was drawn through the ash pile to delineate an EAST and WEST half.

#18. Sampling East half of the ash pile. Samples were collected at random and manually composited in a stainless steel tray.

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BAYONNE BARREL AND DRUM
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#19. Sampling West half of ash pile; item #4 on the attached site map.

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Soil + Groundwater Characterization

Dan Raviv. Assoc July 1986

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ATTACHMENT B-1

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6Y

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LIST OF APPENDICES

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A	Well Construction Diagrams
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1.0 Summary of Field Investigations

Four field investigations have been performed by DRAI at Bayonne Barrel and Drum Co., located at 150 Raymond Boulevard in Newark, New Jersey. During these investigations, undisturbed split spoon soil samples, surface sediment samples, and a surface water sample were collected from various locations around the site. Ground water monitoring wells were installed, developed and sampled, and several additional split spoon soil samples were collected from the well borings before the wells were installed. This work was done to establish the quality of soils and ground water at the site. All sample locations are displayed on Figure 2.

The field investigations, discussed below as Field Investigation I, II, III and IV, were performed on: January 18, 1985; October 25-31, 1985; November 27 - December 17, 1985; and January 7, 1986, respectively. All boring and drilling work done at the site was performed by Jersey Boring and Drilling Co., Inc. of Newark, New Jersey. All samples were collected using methods outlined in DRAI Field Procedure Protocols which were submitted with the DRAI Work Plan. Finally, samples were transported for analysis, via a chain of custody, to Gollob Analytical Service Laboratory in Berkeley Heights, New Jersey.

1.1 Field Investigation I - January 18, 1985

On January 18, 1985, DRAI personnel were at Bayonne Barrel and Drum Co. to sample the furnace residue pile. A total of nine split spoon soil samples, BBD1-BBD9, were collected from nine borings (Figure 2). Borings were located at the nodes of an imaginary grid laid out across the residue pile. In addition, four surface soil samples, one from the residue pile (BBD14) and three from the furnace area (BBD11-13), were collected. All samples, except for BBD 10, were analyzed for Polychlorinated Biphenyls (PCB) (Table I.1).

For the purpose of waste classification, a composite sample, BBDIO, was created by mixing an equal volume of soil from each of three samples, BBD 2,5 and 8. BBDIO was then analyzed for EP-Toxicity parameters:

(1) Metals:
- (a) Arsenic (As)
- (b) Barium (Ba)
- (c) Cadmium (Cd)
- (d) Chromium (Cr)
- (e) Lead (Pb)
- (f) Mercury (Hg)
- (g) Silver (Ag)
- (h) Selenium (Se)

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(2) Herbicides and Pesticides:
   (a) Endrine
   (b) Lindane
   (c) Methoxychlor
   (d) Toxaphene
   (e) 2,4-D (2,4-Dichlorophenoxyacetic acid)
   (d) 2,4,5-TP Silvex (2,4,5-Trichlorophenoxypropionic acid)

(These were the required parameters at the time this analysis was requested).

1.2 Field Investigation II - October 25-31, 1985
Just prior to Field Investigation II, the utility locator service associated with Public Service Electric & Gas Company, was contacted for the purpose of marking out the location of any utility lines that may run underneath the property. They, in turn, contacted several other major utilities. DRAI was informed that two lines exist (Figure 1).

During the second field investigation, soil borings were completed by the auger method, in various areas around the site (Figure 2). Boring locations were chosen to provide general information on conditions around the site, as well as specific target areas, such as the furnace residue pile, the furnace area, and the oil storage tanks area.

In order to examine general site conditions, seventy-six samples, composed of seventy-one split spoon soil samples, four surface sediment samples, and one surface water sample, were collected. Nineteen borings were advanced to various depths between one and fifteen feet, and undisturbed split spoon samples were collected at one foot intervals down to a depth of three feet, and at two feet intervals at depths of five, nine and thirteen feet. Analysis was requested on fifty-two of the seventy-one soil samples and all five of the surface samples (Table 1.2).

One of the four surface sediment samples (BBDS1) was collected from sediment accumulation adjacent to the oil separator trench. The remaining three sediment samples (BBDS2-BBDS4) were collected, one from each of the three buildings surrounding the furnace area. All three buildings had contained drum reconditioning equipment. The floor in Building 1 contains 12 drainage canals, with an east-west orientation, along the east wall of the building. All canals were filled with cinder blocks and dry sediment, which appeared to have been swept into the canals. Sample BBDS2 was collected from the west end of the eighth canal (counting north to south). Sample BBDS3 vas collected in Building 2 from within a small area enclosed by concrete curbing. Finally, sample BBDS4 was a composite collected from three small floor pits located in Building 3. Again, it appears that sediment accumulation in the building had been swept into these pits. It is from these sediments that the sample was collected.

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The surface water sample (BBDW1) was collected at several locations, directly from the oil separator trench.

The list of parameters for which these samples were analyzed includes:

(1) Polychlorinated Biphenyls (PCB)
(2) Total Petroleum hydrocarbons (TPHC)
(3) Volatile Organic Compounds (VOC) plus 15 unidentified peaks
(4) Metals: As, Ba, Cd, Cr, Pb, Hg, Ag, Se
(5) 129 Priority Pollutants plus 40 unidentified peaks including:
    (a) VOC
    (b) Base Neutral and Acid Extractable Compounds (BN/AE)
    (c) Metals:
        (1) Antimony (Sb)
        (2) Arsenic (As)
        (3) Beryllium (Be)
        (4) Cadmium (Cd)
        (5) Chromium (Cr)
        (6) Copper (Cu)
        (7) Lead (Pb)
        (S) Mercury (Hg)
        (9) Nickel (Ni)
        (10) Silver (Ag)
        (11) Selenium (Se)
        (12) Thallium (Tl)
        (13) Zinc (Zn)
    (d) Phenol
    (e) Cyanide
(6) Dioxin

To verify that Dioxin is not present in soils, one sample, BBD17/0-1', collected in the furnace area, has been analyzed. This sample was chosen for Dioxin analysis because materials still remaining in the drums when received for processing, were removed in this area during the reconditioning process.

1.3 Field Investigation III - November 27 - December 17, 1985
During the third field investigation, four monitoring wells (BBDC1-4) and one monitoring well point (BBDC5) were installed at various locations on site (Figure 2). Wells BBDC1 and BBDC2 were installed as background locations. Well BBDC4 was so located to determine water quality conditions near the furnace residue pile, and well BBDC5 was so located to determine water quality conditions near the oil storage storage tanks. In addition, a deep well, BBDC3, was completed near the oil storage tanks area for the purpose of examining the quality of ground water at depth.

Additional split spoon soil samples were collected from well borings B3DC1-4, during the augering phase of well installation. A total of

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twenty-one soil samples were collected, and analyses were requested on fourteen of the samples (Table 1.3). Finally, after installation, the wells were developed using compressed air. Generally speaking, construction of the four monitoring wells is similar. After the initial boring was completed, four inch diameter PVC screen and casing was installed. The anulus was backfilled by pouring sandpack until it filled to a level approximately two feet above the screen. The anulus was then sealed with bentonite. A protective, locking, steel casing was set with cement in the portion of anulus still open. Construction of the deep well (BBDC3) required installation of an eight inch diameter steel casing down to a depth of thirteen feet. This was done to seal off an upper zone of contamination (discussed in more detail later). The well point (Well BBDC5) was constructed using 2½ inch diameter steel screen and casing. Well construction diagrams are presented in Appendix A.

1.4 Field Investigation IV - January 7, 1986

The last field investigation was completed on January 7, 1986. At that time, the four monitoring wells and one well point were redeveloped using a suction pump. A minimum of three well volumes was removed from each well, which was then sampled with a pre-cleaned teflon bailer. All samples were analyzed for VOC's, except for BBDC4, which was analyzed for priority pollutants (Table 1.4).

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2.0 Site Description and Geologic Conditions

As stated in the DRAI Work Plan, the site covers approximately 20 acres of land located in an industrial area of Newark. The area is characterized by storage tank facilities, rail yards, trucking facilities and used car yards.

Ground surface of the site is approximately ten feet above sea level and slopes downward slightly to the northeast. It is underlain by Pleistocene drift, which fills a buried valley cut into the Brunswick Formation. The Passaic River runs a loop, north of the site, and eventually joins the Haekensack River where it opens into Newark Bay. The River is within a one mile radius of the site.

The property has an elongate shape that trends northeast-southwest (Figure 1). The northeru edge of the property is bounded by the Pulaski Skyway, and the southern edge is bounded by the New Jersey Turupike. The property consists of three main buildings, formerly used in the the drum reconditioning process, and several smaller buildings, used for offices. These facilities are located at the northeast end of the property. The central and southwest portions of the property are characterized, in general, by a black coal-cinder type fill. Approximately one-third of the southwest corner of the property is used for empty drum storage.

Boring log data, accumulated during DRAI field investigations, indicate a slight difference in the type and thickness of the lithologic sequence than was originally stated in the DRAI Work Plan. Lithologic data from borings around the site indicate that there is a black coal-cinder type fill found from surface down to an average depth of ten feet. The location of hydrogeologic cross-sections are displayed on Figure 3. The fill is underlain by a medium to a coarse grained, well sorted sand that ranges in color from brown to red-brown to dark maroon-brown. Observations of the lithology at depth were made while drilling well boring BBDC3 (Figures 4 and 5). As stated above, the fill is underlain by a medium to coarse sand that lies within a depth interval of ten to forty feet. The material observed from forty to fifty feet below surface consists of a dark red-brown, uniform, coarse silt. Below fifty feet, observations of cuttings indicated a gradational zone downward into more consolidated material. Once drilling proceeded beyond fifty feet, small fragments of dark red shale were observed. Drilling continued to a depth of fifty-three feet to confirm these observations. These findings are interpreted as a vertical gradation into the upper zone of weathered Brunswick Shale Formation. Boring logs are presented in Appendix B.

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3.0 Results of Analyses

Due to the volume of data, samples are not always discussed individually. Instead, the data is presented in tables using two formats. The data presented in the first format (Table II) has been categorized numerically by areas, as they are defined in Figure 6.

The concentration listed for a particular parameter (e.g., metals) represents a total of the individual constituents (e.g., Antimony, Arsenic, Barium, etc.) of that parameter. The data presented in Tables III through IX follow the second format. These data are listed chronologically and numerically. In addition, for those parameters having more than one constituent, each constituent and its concentration are listed. Chain of Custody Forms and laboratory data sheets are presented in Appendices C and D, respectively.
In summary, the list of parameters for which soil, surface sediment, surface water, and ground water samples were analyzed includes PCB's, TPHC's, VOC's, Priority Pollutants, Metals, EP-Toxicity, and Dioxin. These parameters were chosen to characterize the site and to establish base line conditions. The results of these analyses were also used to more thoroughly delineate suspected areas of environmental concern. Results, for analyses performed on samples, are discussed below.

3.1 Furnace Residue Pile Area

Forty-two soil samples were collected from the Furnace Residue Pile Area (Figure 2). Thirty-one of these forty-two samples were collected in the immediate vicinity of the furnace residue pile itself. The other eleven samples were collected from other locations within the area. One or more types of analyses, including PCB's, TPHC's, VOC's, a single priority pollutant scan and a single EP-Toxicity, were performed on thirty-four of the forty-two samples collected, and results were reported on all samples (Table II - Furnace Residue Pile Area). Eleven samples, consisting of nine split spoon soil samples (BBD1-9), one surface soil sample (BBD14) and one composite sample (BBDI0), were collected during field investigation I. The nine soil samples and Sample BBD14 were analyzed for PCB's. Sample BBDI0 is a composite sample which was produced on-site. An equal volume of material was taken from samples BBD2, 5 and 8, mixed on plastic, then containerized. This sample was analyzed for EP-Toxicity.

During Field Investigation II, an additional twenty-one split spoon soil samples were collected from five borings (BBD2, 4, 5, 6 and 7). Sixteen of these twenty-one samples were analyzed for parameters, including PCB's TPHC's, VOC's, and a single sample for priority pollutants. (Note: Some samples collected during Field Investigations I & II possess the same sample number; they are differentiated in the tables, by sampling date.)

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The final ten of the forty-two samples are split spoon soil samples collected during field investigation III from well borings BBDC1 and 4, before installation of the wells. Seven of these samples were analyzed for PCB's, TPHC's and VOC's.

Of the eighteen samples analyzed for PCB's, laboratory results indicate that PCB's are present in six of them (Figure 7). Of the twenty-three soil samples analyzed for total petroleum hydrocarbons (TPHC's), TPHC's are present in twenty-two (Figure 8). A volatile organic compound analysis was run on six samples. Results show that four of the samples are contaminated (Figure 9). A priority pollutant scan performed on one sample (BBD4/0-1') revealed the presence of a variety of pollutants, including VOC's, metals, Phenol and Cyanide (Table 10).

3.2 Incoming Drum Storage Area

Eighteen split spoon soil samples were collected from four borings (BBD 9, 12, 13 & 15) during Field Investigation II. These borings are located in an area defined as the Incoming Drum Storage Area (Figure 6). Analyses were requested on fourteen of the eighteen samples. Analyses for PCB's, TPHC's, VOC's, and Metals were performed on thirteen samples. Results indicate that several of these contaminants are present in soils. A PCB analysis was performed on six samples. Four samples, one from each boring location, were found to be contaminated (Table II - Incoming Drum Storage Area). Three samples were analyzed for VOC's, and results show that all are contaminated. Finally, one sample (BBD15/0-1') was analyzed for metals and several constituents were detected.

3.3 Furnace Area

Fourteen samples, consisting of three surface soil, and eleven split spoon soil samples, were collected from the Furnace Area (Figure 2). One or more analyses were requested on thirteen of the fourteen samples collected, and results were reported for ten. Three surface soil samples (BBD 11, 12 and 15) collected during Field Investigation I were analyzed for PCB's. Eleven split spoon samples were collected from three borings (BBD 17, 18 and 19) during Field Investigation II. Results for seven of the eleven soil samples were reported fdt one or more contaminants including PCB's, TPHC's and VOC's. One sample (BBD17/0-1') was also analyzed for priority pollutants and Dioxin. Laboratory results indicate that PCB's were not present in the three surface soil samples (Table II - Furnace Area). PCB results were reported on the eight samples for which that analysis was requested and was detected in four of the samples. TPHC analysis, performed on seven soil samples, indicated that petroleum hydrocarbons are present in soils. Finally, a priority pollutant scan and an analysis for Dioxin were performed on one sample (BBD17/0-1'). Results indicate that VOC's, base neutral extractables (including Pesticide extractables) compounds, metals, Phenol and Cyanide compounds are also present in soils. Dioxin was not detected.

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3.4 Oil Storage Tank Area

Thirteen samples, consisting of one surface water sample, one surface sediment sample and eleven split spoon soil samples, were collected from the oil storage tank area (Figure 2). Analyses were requested and reported for nine of the samples. Two surface samples (BBDS1 and BBDW1) and two soil samples from Boring BBD16 were collected during Field Investigation II. The remaining seven soil samples, all taken during the augering of well boring BBDC3, were collected during Field Investigation III. Analyses requested for these samples include: PCB's, TPHC's, VOC's, and a Priority Pollutant scan.

Results for these samples indicate that many of the contaminants are present in soils (Table II - Oil Storage Tanks Area). Eight samples were analyzed for PCB's and nine were analyzed for TPHC's. Four samples contain PCB's, while all nine samples contain petroleum hydrocarbons. A volatile organic analysis was performed on five of the nine samples, three of which contained VOC's. Finally, a priority pollutant scan was requested on sample BBD16/5-8' and 8-10'. PCB's and VOC's, reperted as part of the priority pollutant scan, have been discussed above. The remaining types of analyses, which complete the priority pollutant analysis, are metals, Phenol and Cyanide. Several metals and Phenol were detected in relatively minor concentrations. Cyanide was not detected.

3.5 Drum Storage and Background Areas

The Drum Storage and Background Areas consist of those sections, betweem the process buildings and the southern plant boundary, which have not yet been discussed. A total of twenty-one samples, all split spoon soil samples, were collected from seven borings. Nineteen of the twenty-one samples were collected from six borings (BBDI, 3, 8, 10, 11, and 14) during Field Investigation II. The remaining two samples were collected from well boring BBDC2 during Field Investigation III.

Analyses were requested on eighteen samples and reported for seventeen of them. Samples were analyzed for one or more parameters, including PCB's, TPHC's and VOC's (Table II - Drum Storage and Background Areas). A priority pollutant analysis was performed on one sample (BBD14/0-1'). Results indicate that VOC's are not present. However, a total concentration of 250 ppm was reported for metals and a total concentration of 830 ppm was reported for base neutral compounds. Acid extractable compounds, Phenols and Cyanide were not detected. Five samples were analyzed for PCB's. Four of the five samples contain PCB's at a detectable concentration. All twenty-one samples were analyzed for TPHC's. Results indicate that all samples contained a detectable concentration of petroleum hydrocarbons.

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3.6 Buildings

Three sediment samples (BBDS2-4) were collected, one each, from the three reconditioning buildings. Sample BBDS2 was analyzed for PCB's and VOC's, sample BBDS3 was analyzed for TPHC's and sample BBDS4 was analyzed for PCB's, TPHC's and VOC's. PCB's were detected in samples BBDS2 and BBDS4 at 80 and 11.1 ppm, respectively. Petroleum hydrocarbons were detected in samples BBDS3 and BBDS4 at 850 and 39,400 ppm, respectively, and concentrations of 84 parts per billion (ppb) was reported for sample BBDS4. Finally, volatile organics were detected in sample BBDS4 at 84 ppb.

3.7 Ground Water

A total of six samples, five ground water samples and one field blank, were analyzed (Table VIII). The field blank was made up of store-bought spring water. The types of analyses performed on the samples, with the exception of BBDC4, included PCB's, TPHC's and VOC's. Sample BBDC4 was analyzed for priority pollutants.

PCB's were detected, in a concentration of 53 ppb, in sample BBDC5. In addition, the laboratory filtered the sediment out of the sample and analyzed the sediment. A concentration of 80 ppm was reported. PCB's were not detected in any other samples. All of the ground water samples, except BBDC4, were analyzed for TPHC's. Concentrations found in samples BBDC1, 2, 3 and 6 are 2.8, 3.7, 4.8 and 1.8 ppm, respectively. The concentration in sample BBDC5, taken in the old storage tank area, was reported at 2,000 ppm. The remaining analyses were performed on sample BBDC4 as part of the priority pollutant scan. No metals were found in any significant concentrations. Although several metals were detected, all were, at, or just above, the threshold detection limit. A total concentration of 42 ppb was reported for base neutral compounds, and acid extractable compounds, Phenol and Cyanide, were not detected.

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4.0 Areas of Environmental Concern

For the purpose of defining areas of environmental concern, the property has been geographically subdivided into six major areas, based on usage, land ownership, and future potential land utilization (Figure 6). These areas are:

I. Furnace Residue Pile Area
II. Incoming Drum Storage Area
III. Furnace Area
IV. Oil Storage Tank Area
V. Drum Storage and Background Area
VI. Drum Storage and Background Area (BBD3 & 8)
VII. Buildings

Activities performed in each area are discussed below in detail.

4.1 Furnace Residue Pile Area - Area I

The furnace residue pile area has been defined by two features. First, the waste residues generated during the drum cleaning process were disposed of on the furnace residue pile, which is located in this area (Figure 6); and, second, this portion of the property is owned by the principal of Bayonne Barrel & Drum Company. In addition, the remaining portion of this area is used for empty drum storage. Results of laboratory analyses indicate that a wide variety of contaminants, including PCB's, TPHC's, VOC's and metals, are present in significant concentrations in the furnace residue pile area.

4.2 Incoming Drum Storage Area - Area II

The incoming drum storage area is defined as the area which extends from the plant buildings to immediately south of the furnace area (Figure 6). This area was utilized as the first stage in reconditioning for the drums about to enter the furnace. Significant concentrations of each of four types of contaminants, PCB's, TPHC's, VOC's and metals, were found within this area.

4.3 Furnace Area - Area III

The furnace area is an enclosure created by the three main plant buildings (Figure 6). The furnace, itself, is situated here with a conveyor that passed from the incoming drum storage area, through the furnace, into a drum reconditioning building (Bldg. 2), where the process was completed. A recovery pit, rectangular in shape and perpendicular to the conveyor, was situated beneath the exit port of the furnace. Furnace residue type materials were observed on the ground, adjacent to the northwest side of the furnace. Analytical results revealed the presence of many contaminants. Constituents found included PCB's, TPHC's, VOC's, metals, base neutral compounds and Phenols.

4.4 Oil Storage Tank Area Area TV

The oil storage tank area is located east of the main plant buildings,

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on the side closest to the New Jersey Turnpike (Figure 6). One tank (Figure 2) was used for storage of oil which had been liberated during the firing of incoming drums in the furnace area. Oniy one was observed by DRAI to be directly associated with the oil recovery system. Prior use of tbe renaining two tanks is unknown. There is also a trench which carried fluids, generated in the furnace area, to the oil separator area and a single underground tank located at the northern terminus of the trench. The exact volume of the tank is unknown. (Several inquiries, combined with information on file, have yielded several different answers.) However, using surface measurements, DRAI has estimated the volume to be 1,000 gallons.

Observations of the subsurface conditions, during the augering phase of borings BBD16, BBD3 & BBD5, revealed a zone of material, between three and nine feet, which appeared to be saturated with oil. Soils in this zone were very soft and fluid-like and offered little resistance when split spoons were actually driven.

The analytical results for samples collected in this area indicated that nany contaminants are present in soils. PCB's and TPHC's were found at relatively high concentrations (Table II - Oil Storage Tanks Area). VOC's were detected, as were minor concentrations of metals and Phenol.

4.5 Drmm Storage and Background Areas - Areas V & VI

The drum storage area encompasses those areas, between the furnace residue pile area and the main plant buildings, which have not been previously categorized (Figure 6). This area is actually divided into a northern and southerm half. The division has been based on a knowledge of the prospects for land use in the future. Specifically, the Department of Transportation wishes to acquire the southerm half of the property (Area V - south) to be used for transportation purposes.

These areas are characterized by a black, coal-cinder type of surface fill to a depth of approximately ten feet below surface (Figures 4 and 5). The areas are used primarily for storage of empty drums, and as lanes for vehicular traffic. Three types of pollutants, petroleum hydrocarbons, VOC's, and metals, were detected in soils within Area V. Petroleum hydrocarbons were found in all of the samples. Metals were detected in three samples, BBD8, 11 and 14. Volatile organics were detected in two of five samples analyzed for VOC's (both from well boring BBDC2).

4.6 Buildings

Three surface sediment samples (BBDS2, 3 and 4) were collected, one each, from the three main buildings surrounding the furnace area (Figure 6). Three types of analyses, PCB's, TPHC's and VOC's, were performed for the purpose of detecting contaminants in the interiors of the buildings. Results indicate that all three parameters are present in significant concentrations.

ATTACHMENT B-15

5.0 Summary of Findings

5.1 Soil and Sediment Quality

Soil samples, sediment samples, one surface water sample and five ground water samples were analyzed for a variety of parameters including PCB's, TPHC's, and VOC's. Four samples, each from a different area, were submitted for analysis of 129 Priority Pollutants plus 40 largest peaks (PP+40). A PP+40 scan includes VOC's, PCB's, Metals, Acid Extractables and Base/Neutrals Extractable Compounds, and four pesticides and two herbicides. One soil sample was submitted for analysis of Dioxin.

Analytical results for all parameters, except metals, are presented chronologically by area in Table II. This table was included to facilitate the review of results by area. Results of analyses for PCB's and total petroleum hydrocarbons (TPHC) are listed in Table III. Virtually all soil samples collected were analyzed for TPHC's. Only one sample was analyzed for Dioxin (Table III). Volatile organic compound (VOC) analyses results for both "priority" and non-priority" compounds are found on Table IV. Concentrations for inorganic parameters (metals, phenol, cyanide and pesticides) are presented in Table V. Concentrations for Base/Neutral - Pesticide extractable and acid extractable compounds are included on Table VI. Finally, results of analyses for PCB, TPHC, and VOC concentrations in surface sediment and water samples are presented on Table VII.

An unusual occurance appears to be present in the Oil Storage Tank area, which is unique to this location of the facility. During drilling operations an anomalously high water table was encountered. In addition, at the time of drilling, soils in this area possessed more fluid-like characteristics due to an abnormally high liquid content. This was observed in soils down to a depth of approximately 5 to 8 feet below surface. Concentrations for a variety of parameters reported for one ground water sample (BBDCS) and several soil samples collected in this area were consistantly higher than concentrations found in other areas. The furnace area is the only area which exhibits higher concentrations for several contaminants; specifically, concentrations of PCB's and VOC's are slightly higher. This is most likely a result of the fact that the furnace area is, in essence, the source area since the furnace area is the first location in which materials brought on site are liberated from drums. The liquid materials are then transferred to the Oil Storage Tank area for storage in above and below ground tanks, via a channel which connects both areas. The concentration for TPHC's is highest in the Oil Storage area. Although the initial source of these liquids may be the furnace area, the oils captured during drum firing are stored, in volume, in the Oil Storage Tank area thus creating a new primary source.

ATTACHMENT B-16

Polychlorinated Biphenyls. In general, results fcr PCB analyses indicate that this contaminant is distributed throughout the site. Concentrations reported, range from "not detected" at 1 part per million (ppm), to 320 ppm. The highest concentrations are found in the furnance and oil storage tank areas. Fluids, generated as a result of drum firing operations in the furnace area were pumped via a drainage channel into the storage tanks. Therefore, the relatively high concentration found in the storage tank area is substantiated by the fact that these materials have been readily transferred into the tanks area. PCB's were also detected in soils located in the incoming drum storage area, the furnace residue pile, and the drum storage and background areas.

A comparison of results obtained from duplicate analyses of samples performed by the laboratory, indicates a high degree of correlation in both compound identification and concentrations. The correlation between one sample (BBD17/1') a field duplicate of it (BBD17/S), collected in the furmace area, does indicate some disparity. However, in our opinion, this is a result of the method used to collect the duplicate. The two samples, the original and the duplicate, were collected by driving two separate split spoon samplers into the ground. The spoon sample locations were within a one to two foot distance of each other, but the soil samples can not be considered as typical duplicates since they were not from the same sample. Instead, each sample was collected separately, one from each spoon sample recovered.

Total Petroleum Hydrocarbons. With respect to total petroleum hydrocarbons, all soil samples collected during the field investigations of October and November 1985, and submitted to the laboratory, were analyzed for TPHC's. Concentrations found in samples collected from the surface to a depth of ten feet, all exceed the maximum permissible concentration allowed in soils. With the exception of one sample, BBDC1/10-12' (410 ppm), the concentration of TPHC's in all samples collected below a depth of ten feet were below the maximum permissible concentration for TPHC's in soil.

When reviewing these results, it should be noted that this property was used as a disposal area for coal and ash. These materials were an end product of a coal-burning, electric power generating station operating in the area. A review of Figures 4 and 5 reveals that the depth of this coal-ash fill is approximately ten feet and exists as the uppermost layer, from the surface down to a depth of ten feet.

For reasons as explained in the discussion of PCB's, TPHC results for sample BBD17/1' and its duplicate BBD17/S display some disparity; however, results for duplicate analyses performed by the laboratory exhibit a high degree of correlation.

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Volatile Organic Compounds. In general, volatile organic compounds in soils for priority and non-priority constituents were limited to specific areas only. VOC concentrations are significant in soils found in the incoming drum storage, furnace, oil storage tank and furnace residue pile areas, whereas results for soils analyzed outside the specified boundaries of these areas indicate that VOC's were not even present in detectable concentrations. Priority VOC's were detected in a range from "not detected" at 20 ppb to 22,553 ppb, and non-priority VOC's were detected in a range from "not detected" at 20 ppb to 66,035 ppb. The appearance of VOC's in soils is, in general, restricted to those areas in which materials handled and liberated in the process of reconditioning drums are most likely to be found. Thus, a noticeable distinction is present between contaminated and uncontaminated soils. Only one sample, (BBDC1/5-7'), collected outside any of the above named areas, contain significant concentrations of VOC's with reported values of 27.0 ppb and 2,160 ppb for priority and non-priority VOC's, respectively. VOC concentrations were found mostly within two depth intervals, 0-1' and 5-7', and where present in depths below seven feet, did not exceed the maximum permissible concentration allowed in soils.

One surface water and two surface sediment samples were analyzed for VOC's. VOC's were detected in one of the samples; however, concentrations do not exceed the maximum pernissible concentration allowed in soils.

Inorganic Parameters. With respect to inorganic parameters, including metals, phenol and cyanide, some contaminants are present. Results for these parameters were generated as part of a PP+40 scan requested on four soil samples (BBD4/1', BBD14/1', BBD16/5-8 & 8-10' and BBD17/1'), one each from four different areas of the facility. Metals were found in a range of concentrations from "Not detected" for Thallium, to 15,500 ppm for Copper. The highest concentrations were found in the furnace and furnace residue pile areas. Metals showing the highest concentrations include Cadmium, Chromium, Copper, Lead and Zinc. Concentrations for these metals in the remaining two areas, in which the analyses were requested (Oil Storage Tank and Background), are substantially less. The remaining metals for which soils were analyzed were either not present, or present in relatively lower concentrations.

Phenol was detected in three of the four areas. Concentrations range between ND0.5 to 20 ppm. Phenol was detected in the furnace, furnace residue pile and oil storage tank areas. Phenol was not detected in a Background area.

Finally, Cyanide was reported in a range of concentrations from ND0.1 to 2 ppm in the furnace and furnace residue pile areas.

ATTACHMENT B-18

Base/Neutral and Acid Extractable Compounds. B/N, AE analysis was requested on four samples (as listed "Inorganic parameters). The soils are generally clean with respect to these compounds. Concentrations for base neutrals were reported in a range from ND9.5 to 350 ppm. Acid Extractable compounds were not detected.

5.2 Ground Water

Polychlorinated Biphenyls. A PCB analysis was requested for four of the five ground water samples including BBDC1, 2, 3 and 5. Contamination was detected in Well BBDC5 only, in the oil storage tank area, at a concentration of 53 ppb. Results of an analysis performed on sediments which were separated, from the water sample, by the laboratory, indicate that they also contain PCB's at a concentration of 80 ppm.

Total Petroleum Hydrocarbons. A TPHC analysis was requested on four (same as listed above) of the five ground water samples. The range of concentrations reported extends from 2.8 to 2,000 ppm. Concentrations for samples BBDC1, BBDC2, BBDC3 and BBDC5 were 2.8, 3.7, 4.8 and 2,000, respectively. A detectable concentration for TPHC's was reported (1.8) ppm) in the trip blank. As a result, the values reported for BBDC1-3, (2.8, 3.7 and 4.8 ppm) that are of the same magnitude, are questionable. However, since the results reported for sample BBDC5 are three times greater in magnitude, this is a positive indication that contamination is present in the sample.

Volatile Organic Compounds. VOC's were detected in all five ground water samples. However, there is a distinct difference between the total priority and non-priority concentrations reported for water sample BBDC5 when compared to the values reported for the remaining four ground water samples. For the priority VOC's, values were reported between "not detected" and 1,353 ppb. The range of values reported for non-priority VOC's falls between "none-detected" and 4,620 ppb. The total concentration reported in well BBDC5 for each set of parameters, priority and non-priority VOC's, exceeds the maximum allowable concentration for VOC's in grmund water. For concentrations reported in the remaining four wells, BBDC1, 2, 3 and 4, the combined sum of priority and non-priority VOC's concentrations found in each does not exceed the maximum allowable concentration for VOC's in ground water.

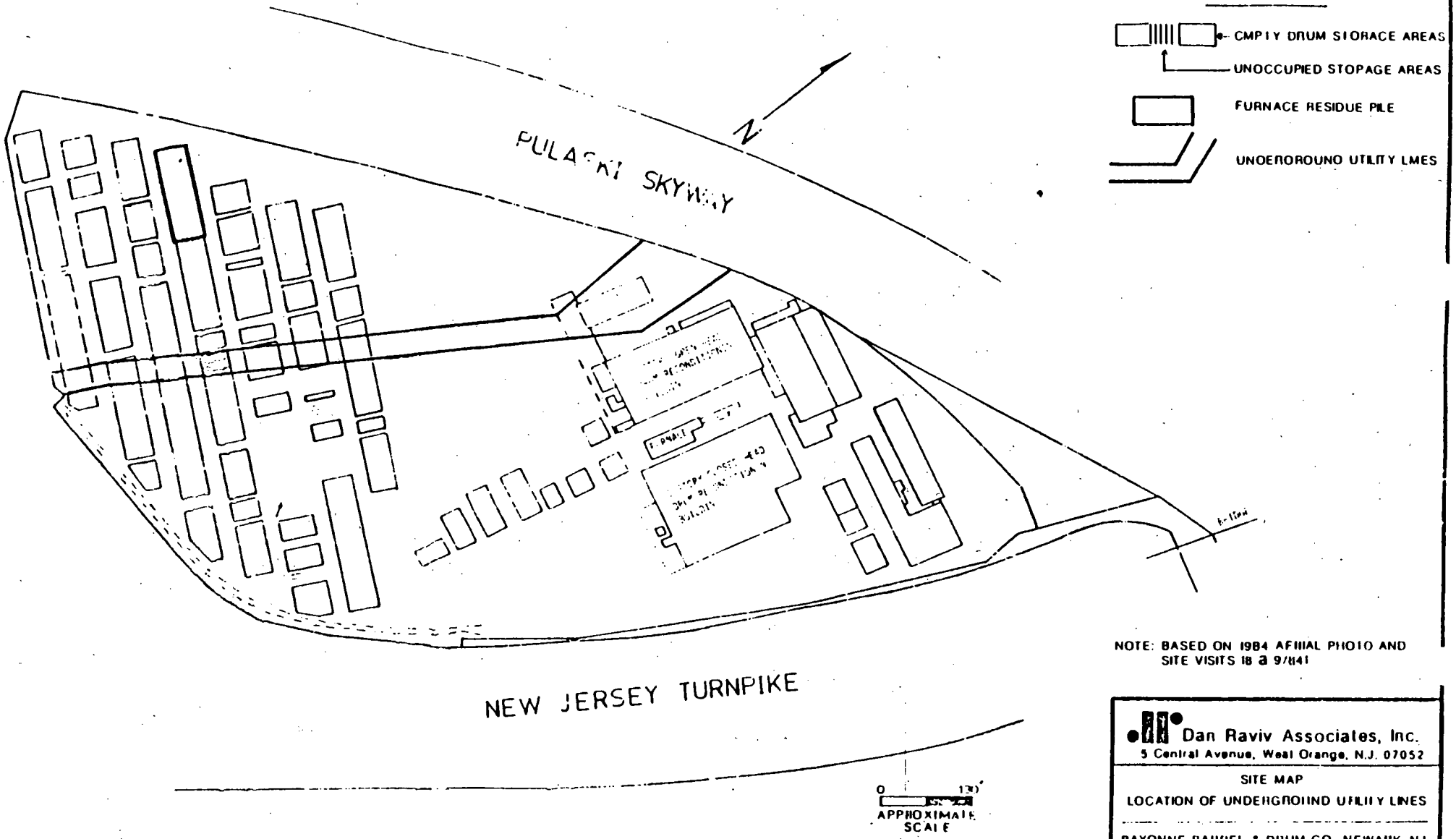
Inorganic Parameters. The inorganic parameters including metals, phenol and cyanide were requested as part of a PP+40 analysis requested on ground water sample BBDC4. With respect to these parameters, ground water was clean. Concentrations reported for all metals were reported as "not detected" or at or very close to the method detection limit, for each metal, in ground water. Both phenol and cyanide were "not detected".

ATTACHMENT B-19

Base/Neutral and Acid Extractable Compounds. B/N and AE compound analyses were also reported as part of the PP+40 scan requested on water sample BBDC4. The sum total concentraticn of B/N compounds reported is 42 ppb while AE compounds were "not detected".

Dioxin. One sacple BBD17/1', taken from the furnace area, was submitted for aaalysis of Dioxin. A concentration of "not-detected" at a method detection limit of 0.320 ppb was reported.

ATTACHMENT B-20



NOTE: BASED ON 1984 AERIAL PHOTO AND SITE VISITS 18 & 9/84

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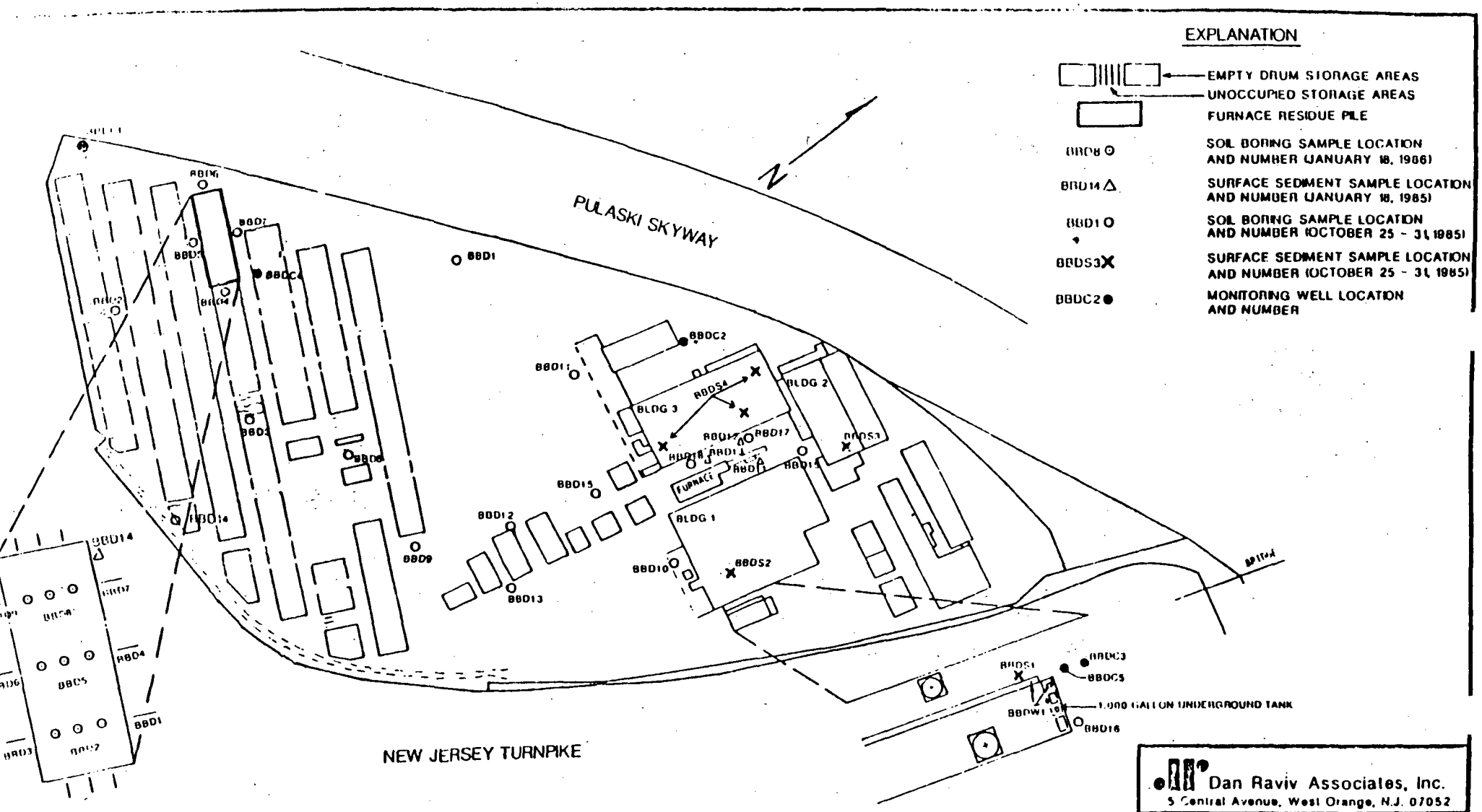
SITE MAP
LOCATION OF UNDERGROUND UTILITY LINES

BAYONNE BARREL & DRUM CO-NEWARK, NJ

Prepared By MZ/RIP	Date APRIL, 1986
Job No 84C182	Figure 1

B-21



NOTE: SURFACE WATER SAMPLE BBDW1 WAS TAKEN FROM OIL SEPARATOR TRENCH AND TANK VTNIS (AS SHOWN)

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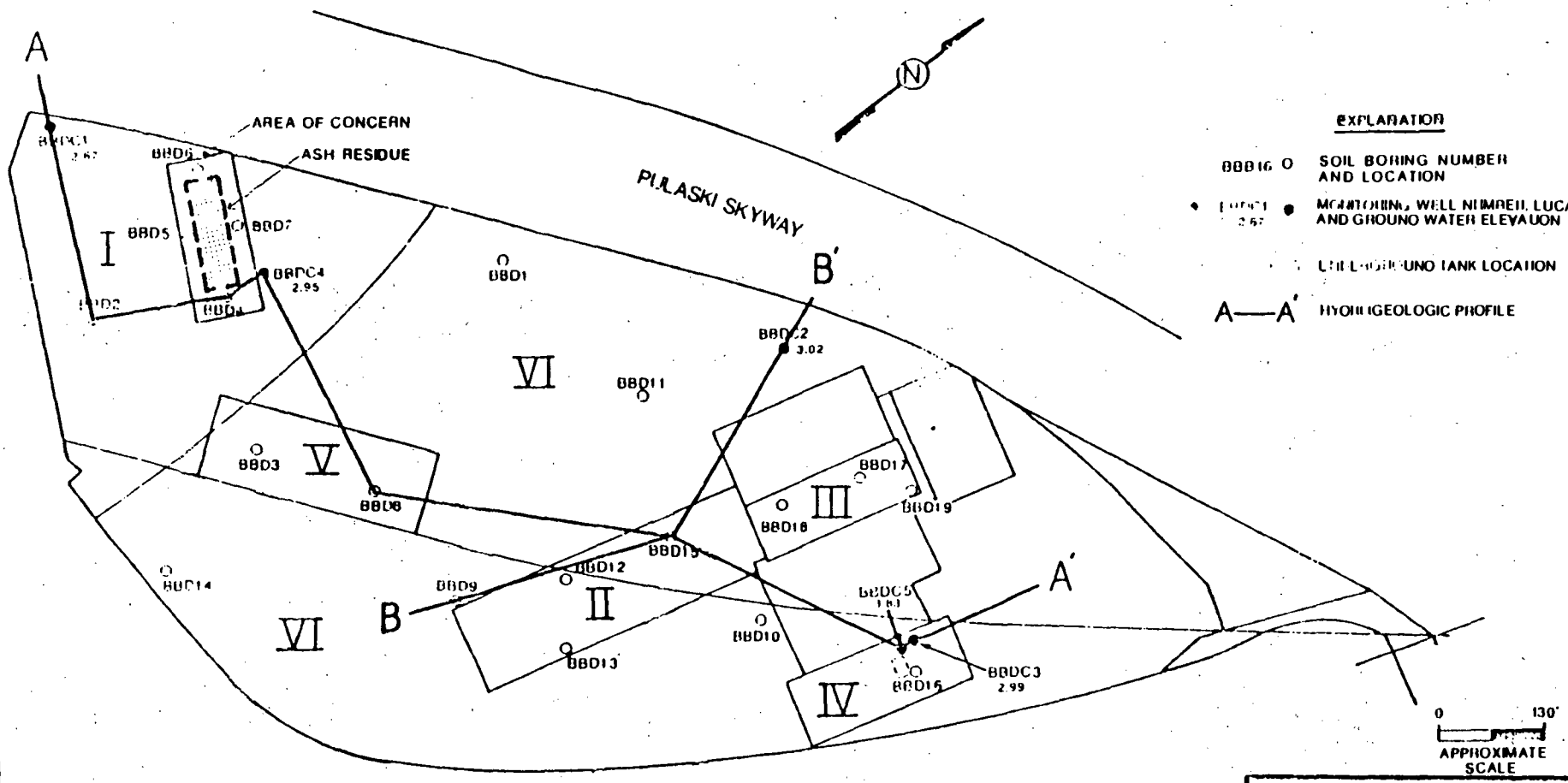
LOCATION OF SURFACE SEDIMENT/WATER, SOIL BORING AND WELL BORING SAMPLES AND MONITORING WELLS

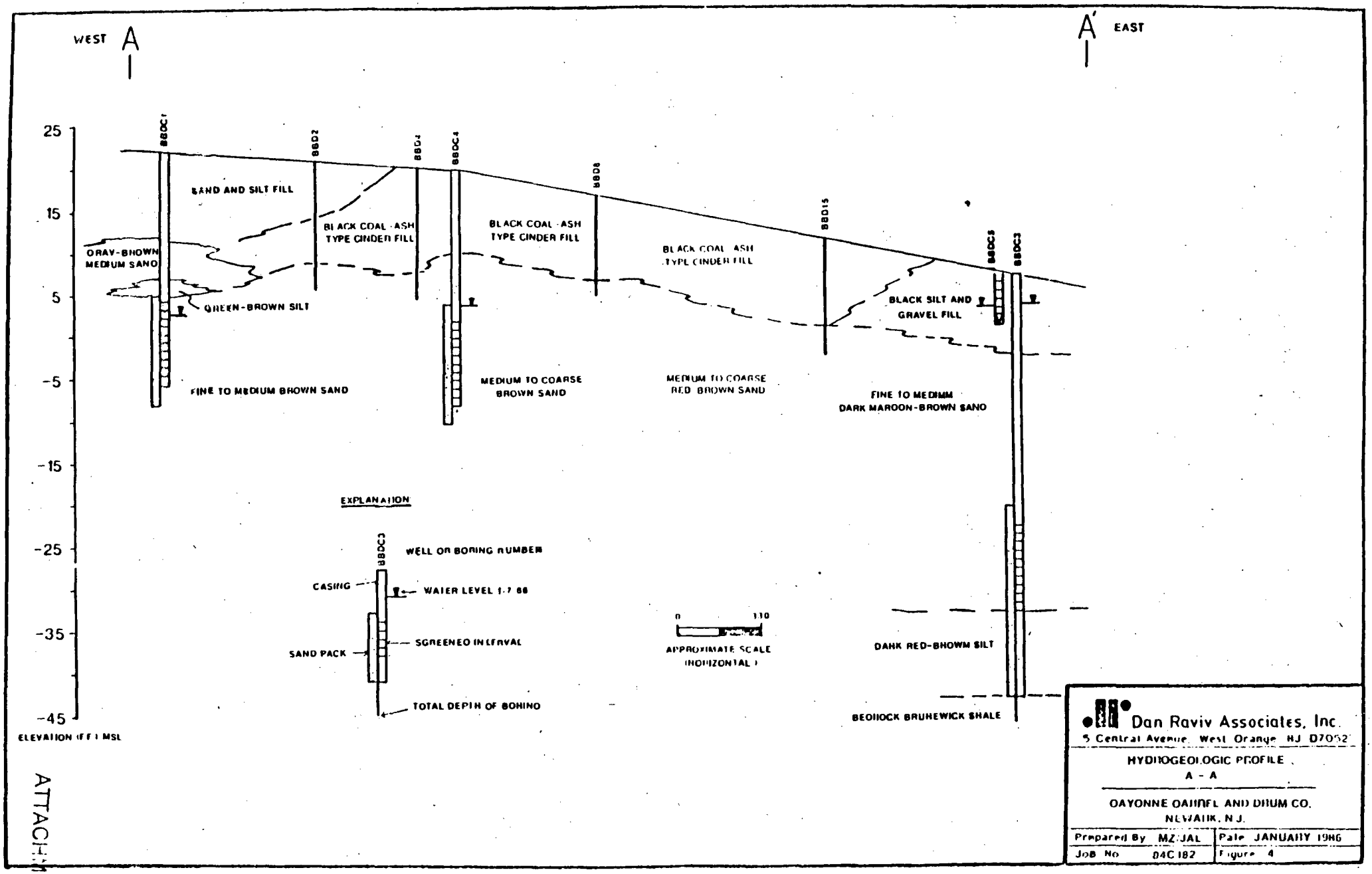
BAYONNE BARREL & DRUM CO. NEWARK, NJ

Prepared By MZ/BJR	Date APRIL, 1986
No. 84C102	Figure 2

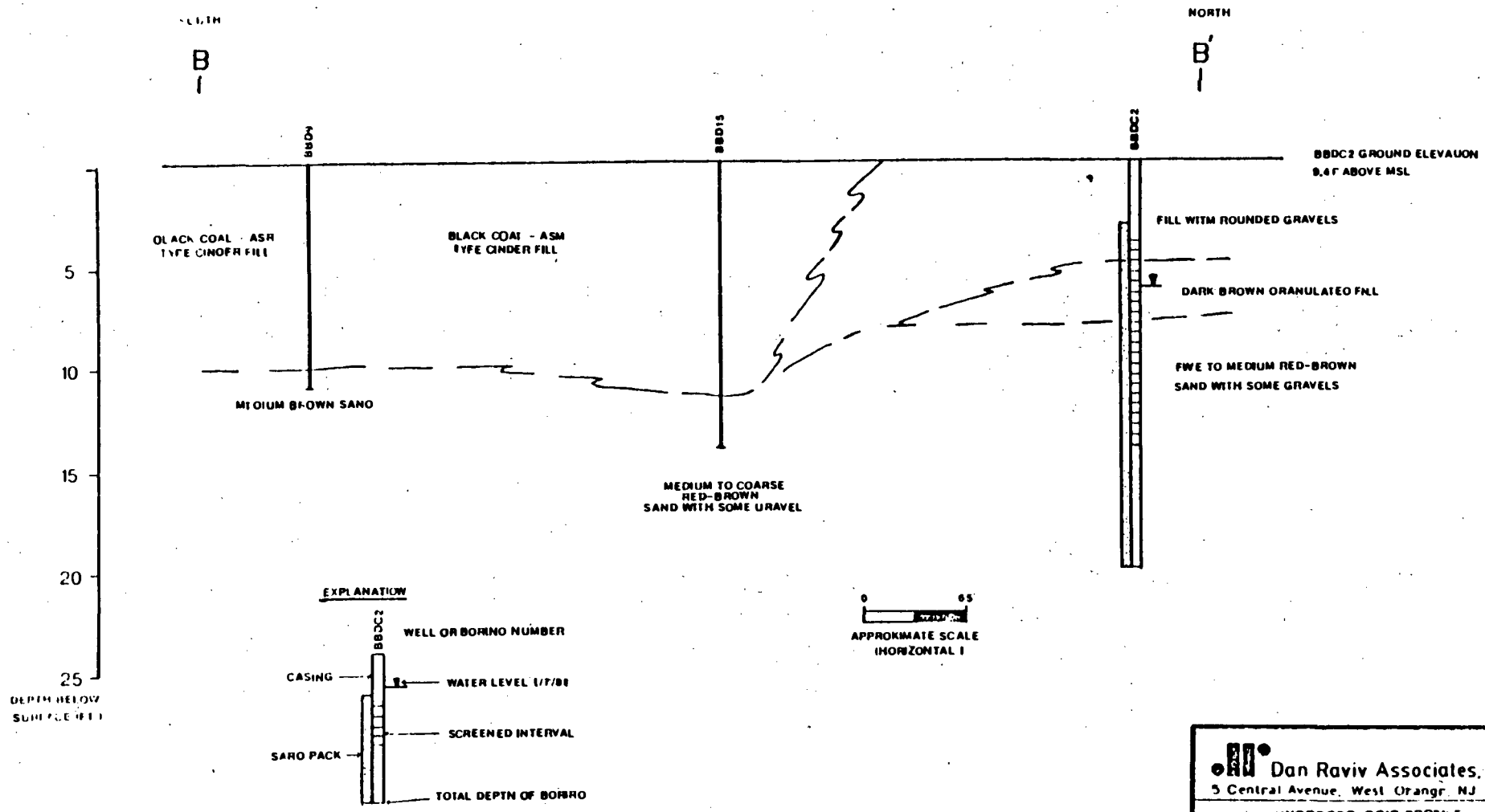
ATTACHMENT B-2



ATTACHMENT B-23



ATTACHMENT B-2



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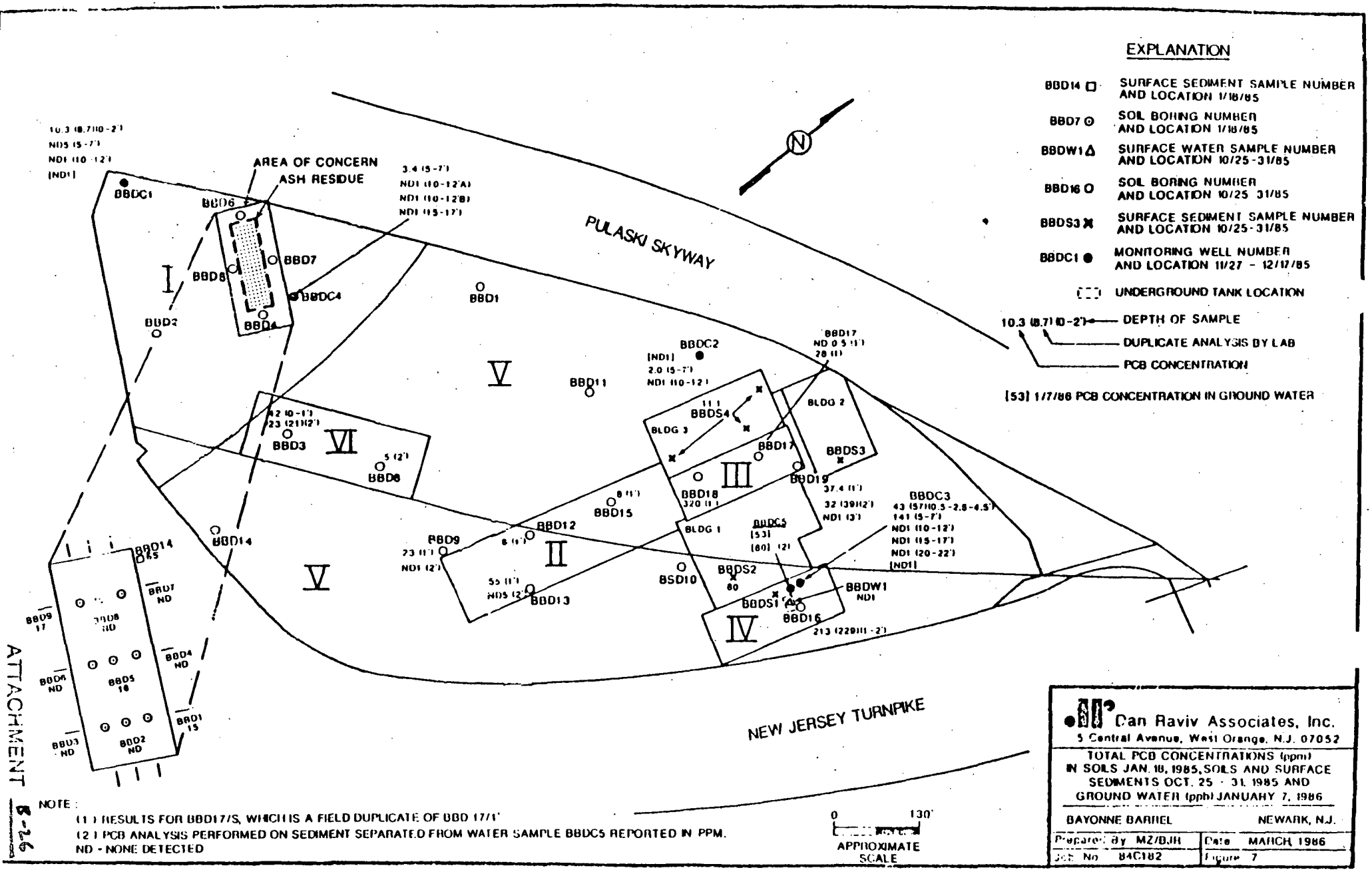
HYDROGEOLOGIC PROFILE
B - B'

BAYONNE BARREL AND DRUM CO.
NEWARK, N.J.

Prepared By MZ/JAL	Date JANUARY 1986
Job No 84C192	Figure 5

ATTACHMENT 8-25



NOTE:
(1) RESULTS FOR BBD17/S, WHICH IS A FIELD DUPLICATE OF BBD 17/1'
(2) PCB ANALYSIS PERFORMED ON SEDIMENT SEPARATED FROM WATER SAMPLE BBDC5 REPORTED IN PPM.
ND - NONE DETECTED

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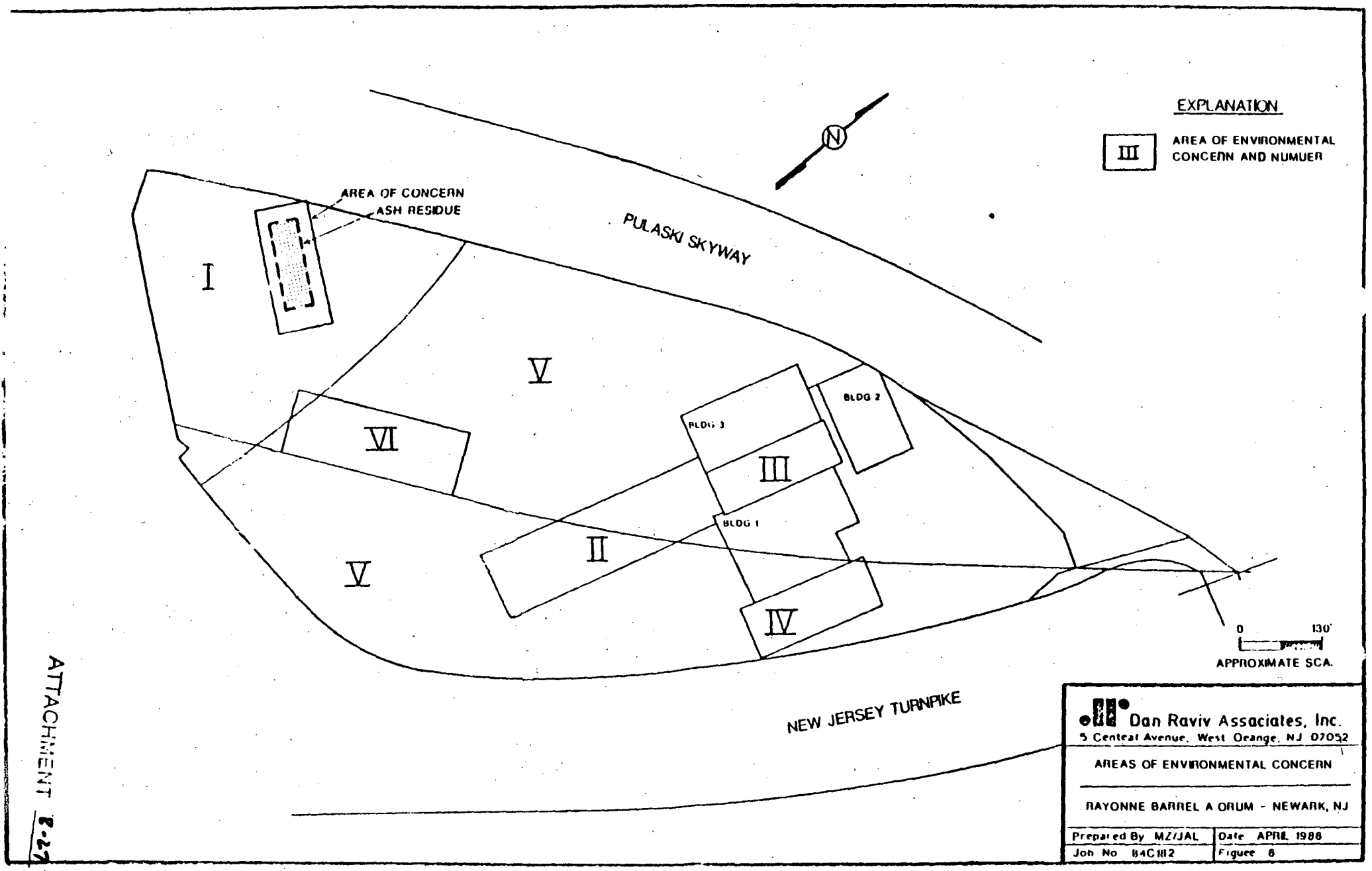
TOTAL PCB CONCENTRATIONS (ppm) IN SOILS JAN. 18, 1985, SOILS AND SURFACE SEDIMENTS OCT. 25 - 31, 1985 AND GROUND WATER (ppb) JANUARY 7, 1986

BAYONNE BARREL — NEWARK, N.J.

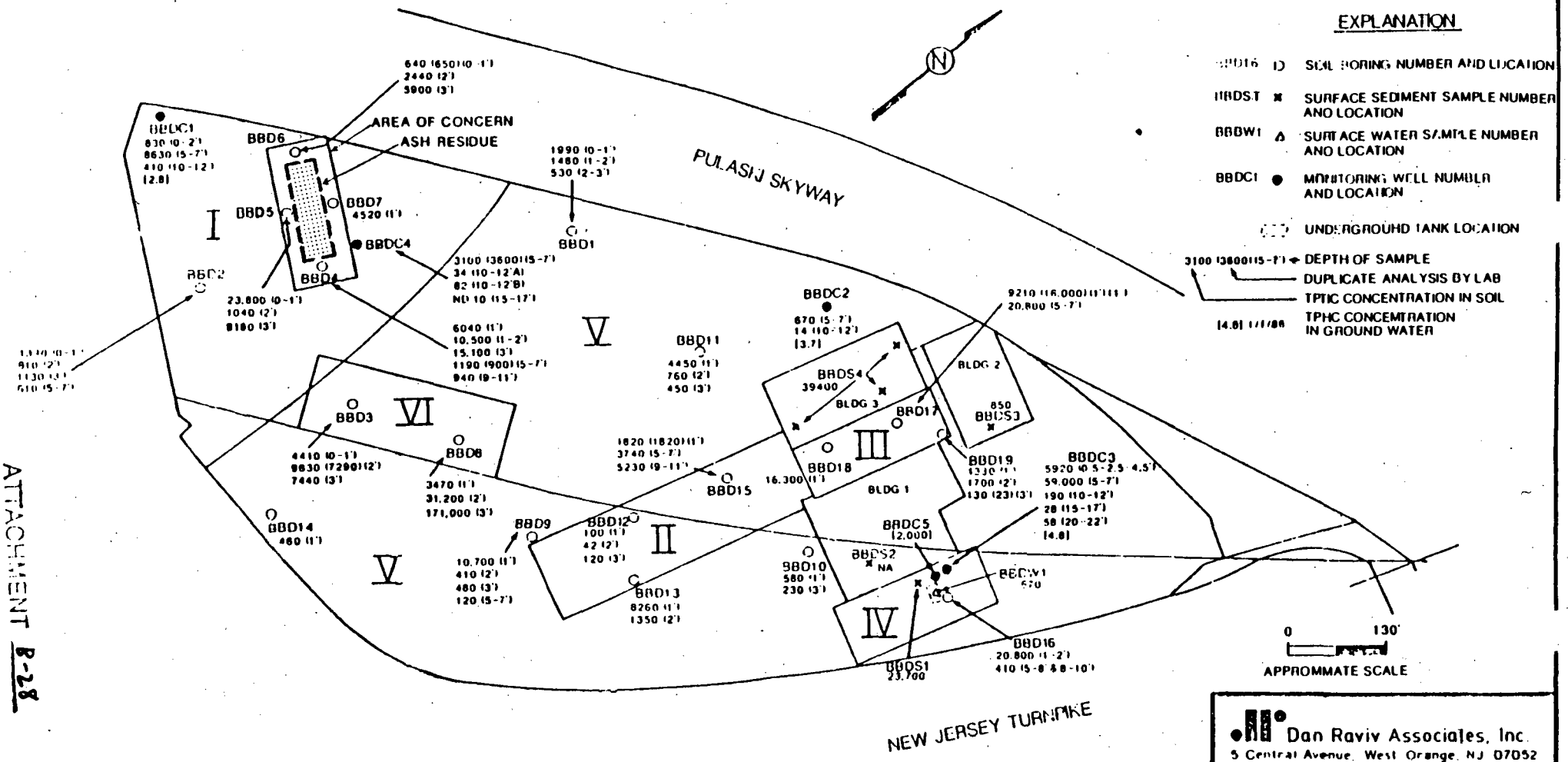
Prepared By MZ/BJH	Date MARCH 1986
Job No 84C182	Figure 7

ATTACHMENT B-26



ATTACHMENT B-27

B



NOTE:
(1) RESULTS FOR BBD17/S, WHICH IS A FIELD DUPLICATE OF BBD17/1'.
NA - NOT ANALYZED

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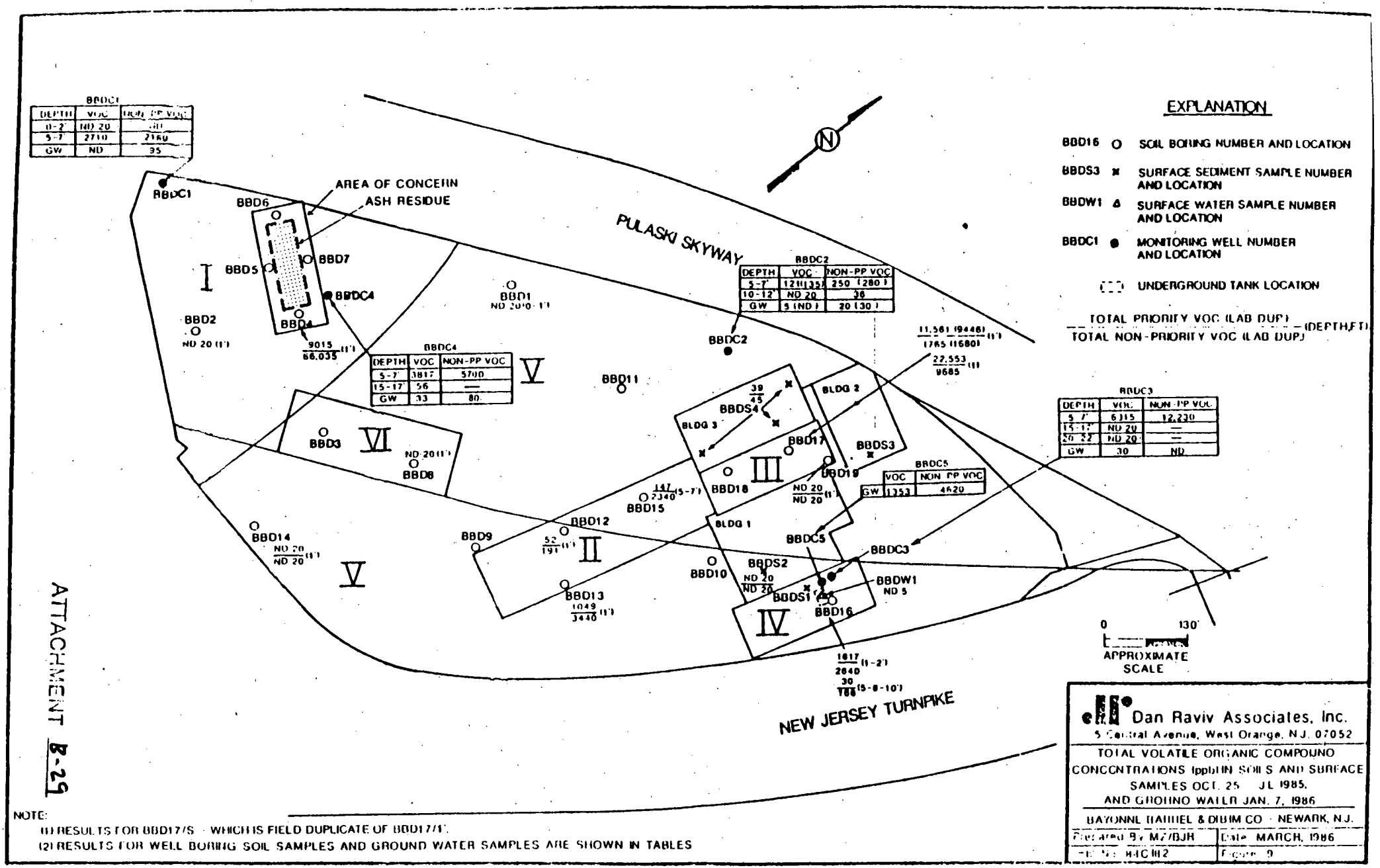
TOTAL PETROLEUM HYDROCARBON CONCENTRATIONS (ppm) IN SOILS AND SURFACE SAMPLES OCT. 25 - 31, 1985 AND GROUND WATER JAN. 7, 1986

BAYONNE BARREL & DRUM CO. - NEWARK, N.J.

Prepared By MZ/HJR	Date MARCH 1986
Job No. 114C182	Figure 8

ATTACHMENT B-28



BBDC1

DEPTH	VOC	NON-PP VOC
0-2'	ND 20	[illegible]
5-7'	2710	2160
GW	ND	95

BBDC2

DEPTH	VOC	NON-PP VOC
5-7'	121 (135)	250 (280)
10-12'	ND 20	36
GW	5 (ND)	20 (30)

BBDC4

DEPTH	VOC	NON-PP VOC
5-7'	3817	5700
15-17'	56	—
GW	33	80

BBDC3

DEPTH	VOC	NON-PP VOC
5-7'	6315	12,230
15-17'	ND 20	—
20-22'	ND 20	—
GW	30	ND

BBDC5

	VOC	NON-PP VOC
GW	1353	4620

NOTE:
(1) RESULTS FOR BBD17/S - WHICH IS FIELD DUPLICATE OF BBD17/1'.
(2) RESULTS FOR WELL BORING SOIL SAMPLES AND GROUND WATER SAMPLES ARE SHOWN IN TABLES

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TOTAL VOLATILE ORGANIC COMPOUND CONCENTRATIONS (ppb) IN SOILS AND SURFACE SAMPLES OCT. 25 - JL 1985, AND GROUND WATER JAN. 7, 1986

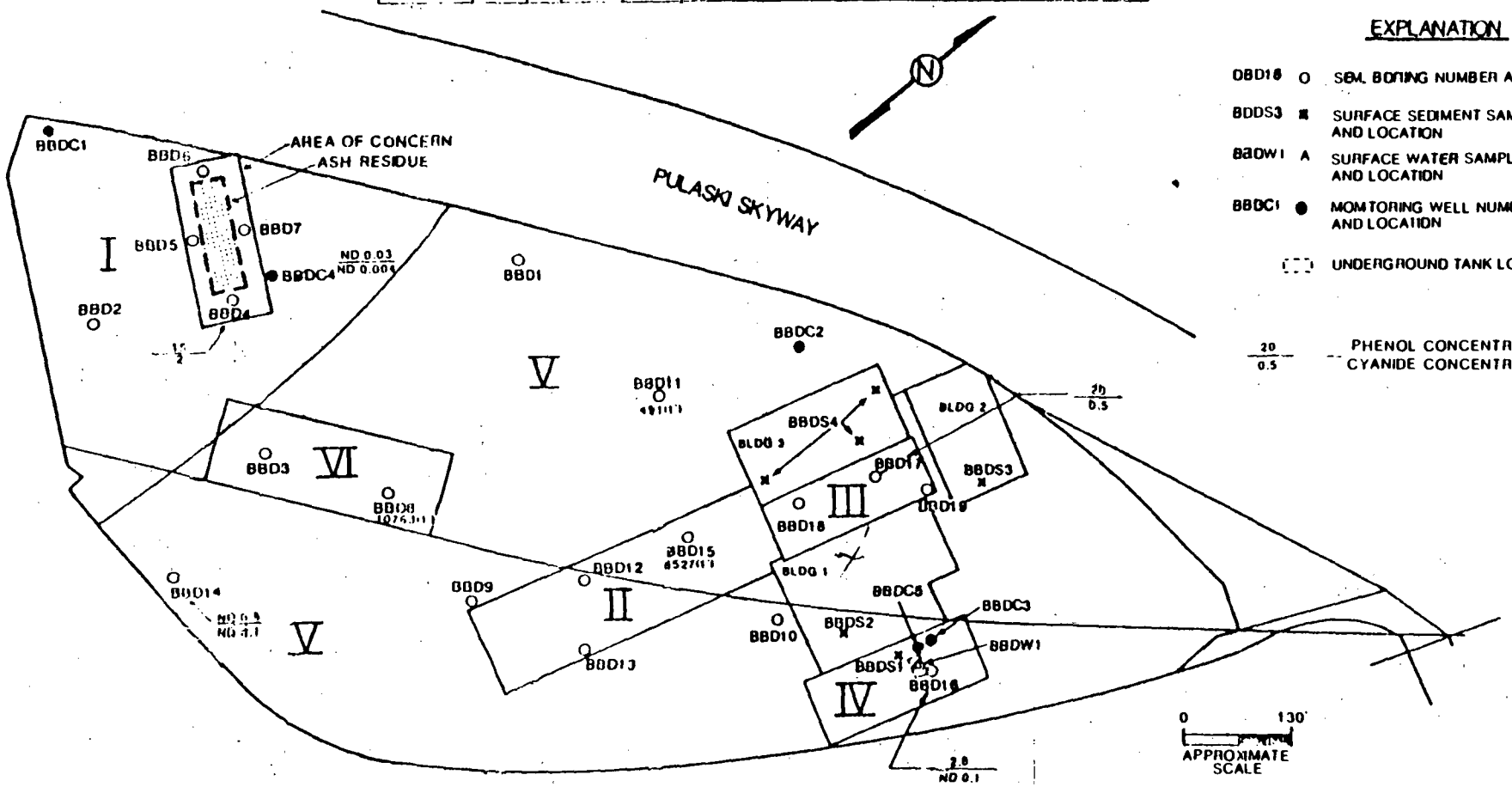
BAYONNE BARREL & DRUM CO. - NEWARK, N.J.

Prepared By MZ/BJR	Date MARCH, 1986
[illegible]	Figure 9

ATTACHMENT B-29

GROUND WATER

Metal - (ppm)	Sb	As	Be	Cd	Cr	Cu	Pb	Hg	Ni	Se	Ag	Tl	Zn
BDDW4	ND 0.5	0.01	ND 0.01	ND 0.01	ND 0.01	0.04	ND 0.1	ND 0.002	ND 0.01	ND 0.007	0.03	ND 0.1	0.03



SOILS

Metal (ppm)	Sb	As	Ba	Be	Cd	Cr	Cu	Pb	Hg	Ni	Tl	Se	Tl	Zn
BDD 4/11	13	1	ND	0.64	1300	3400	15800	8400	3.2	62.4	0.92	0.030	ND 0.4	4920
BDD 14/11	8.4	0.4	ND	0.28	0.52	27	16.6	92	1.8	25	0.3	0.019	ND 0.4	71.2
BD 16/15-18'	4.0	2.8	ND	0.32	0.6	110	4.64	15	0.62	5.28	0.2	0.004	ND 0.4	15.4
BDD 11/11	6.0	[illegible]	ND	0.50	6.56	2300	128	370	1.6 12.31	56.8	1.7	0.023	ND 0.4	5040

NOTES:
- FOR SAMPLES BBD 8, 11 & 15, METALS ANALYSIS INCLUDES: As,Ba,Cd,Cr,Pb,Hg,Ag and Se.
- FOR SAMPLES BDD4, 14, 16 & 17, METALS ANALYSIS INCLUDES: Sb,As,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl AND Zn.
- (OW) RESULTS SHOWN FOR SAMPLE BDDG4 ARE CONCENTRATIONS IN GROUND WATER.

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METALS, PHENOL, AND CYANIDE CONCENTRATIONS (ppm) IN SOILS OCTOBER 25 - 31, 1985 AND GROUND WATER JANUARY 7, 1986

BAYONNE BARREL & DRUM CO. NEWARK, NJ

Prepared By MZ/JAI	Date APRIL 1986
Job No. 84C182	Figure 10

ATTACHMENT B-30

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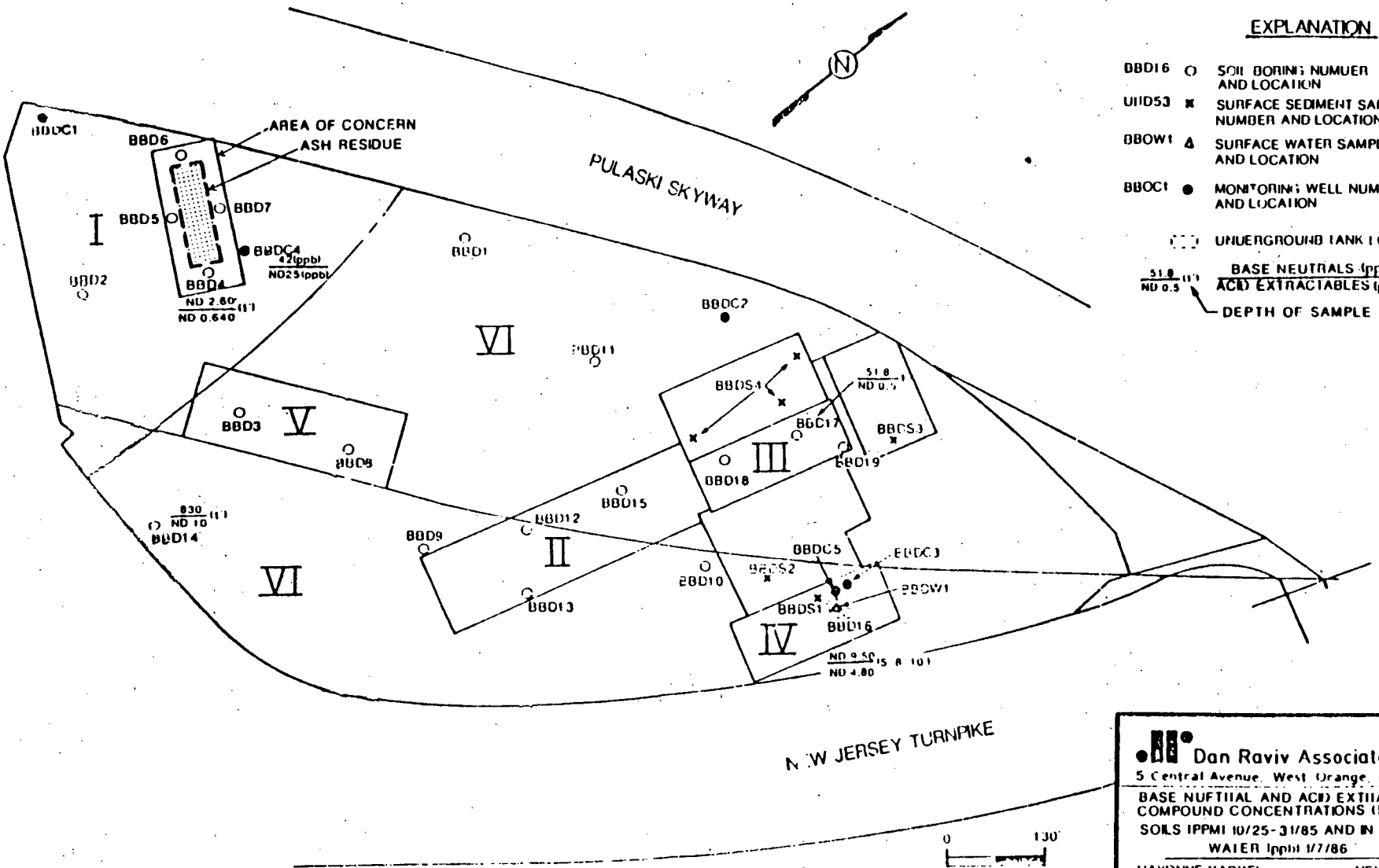
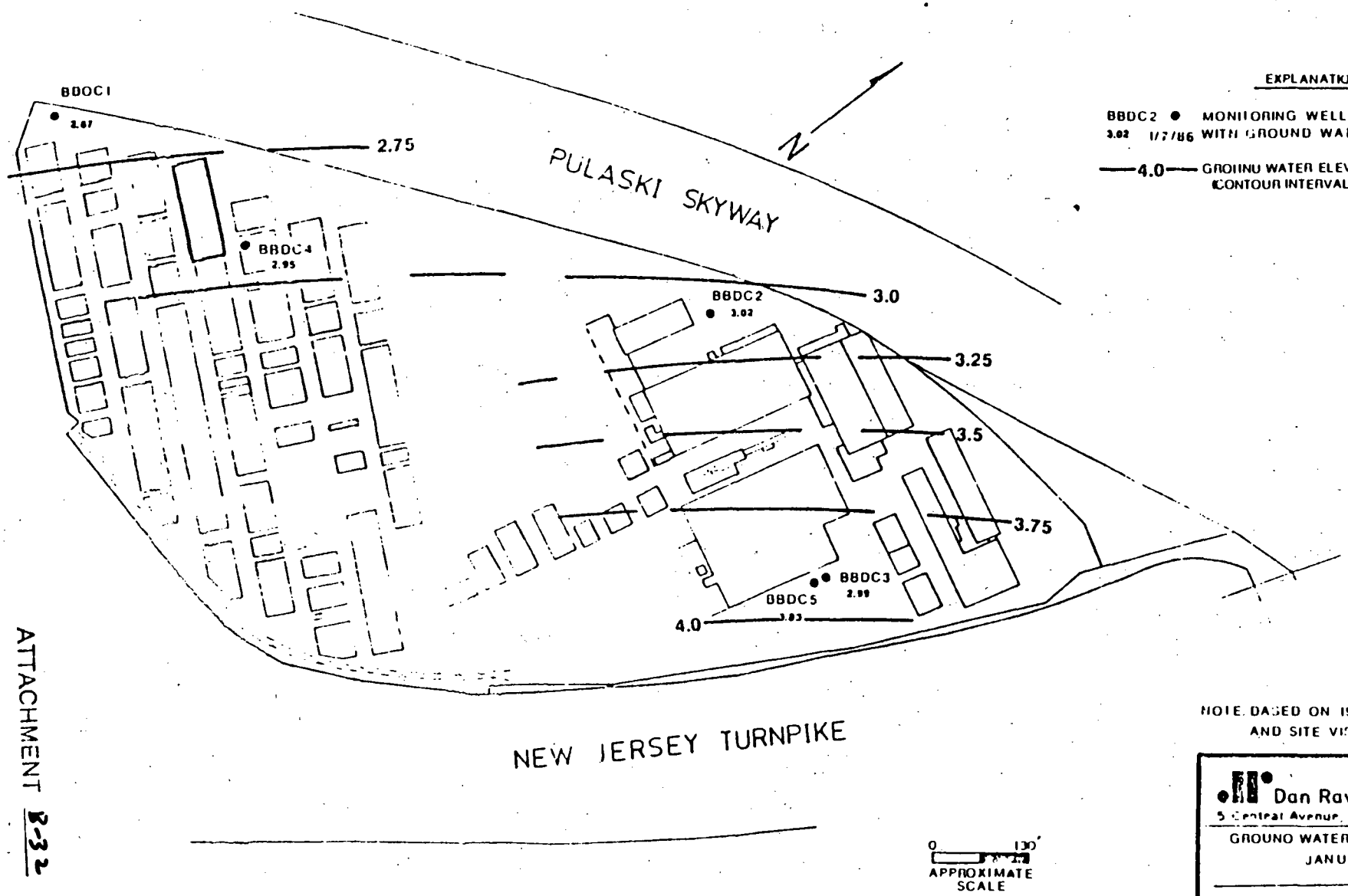


NOTE: CONCENTRATIONS REPORTED FOR BBDC4 ARE FOR GROUND WATER.

ATTACHMENT B-31



EXPLANATION

BBDC2 ● MONITORING WELL LOCATION AND NUMBER
3.02 1/7/86 WITH GROUND WATER ELEVATION (FEET msl)

—4.0— GROUND WATER ELEVATION CONTOUR
CONTOUR INTERVAL 0.25 FT

NOTE: BASED ON 1984 AERIAL PHOTO AND SITE VISITS 8/3/1984

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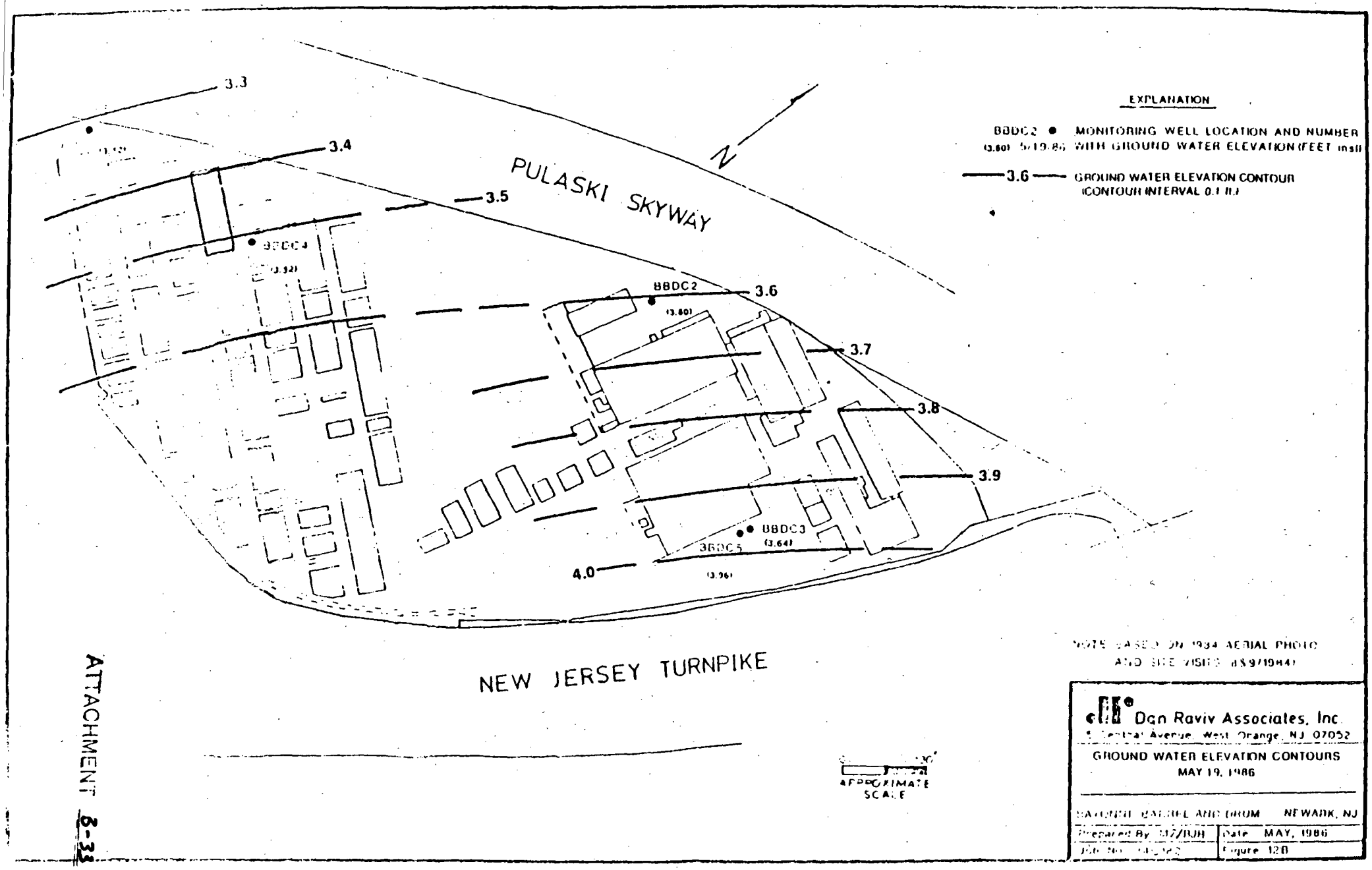
GROUND WATER ELEVATION CONTOURS
JANUARY 7, 1986

BAYONNE BARREL AND DRUM — NEWARK, NJ

Prepared By M.Z./RJH	Date MAY, 1986
Job No. 84C182	Figure 12A

ATTACHMENT B-32



ATTACHMENT 3-33

Table I.1

Summary of Soil Boring and Surface Samples and Analyses
Field Investigation I
January 18, 1985

Boring/Soil Sample No.	Sample Interval Deep (feet)	Analyses Requested
BBDI	0-2	PCB
BBD2	0-2	PCB
BBD3	0-3	PCB
BBD4	0-3	PCB
BBD5	0-3	PCB
BBD6	0-3	PCB
BBD7	0-3	PCB
BBD8	0-3	PCB
BBD9	0-3	PCB
BBD10	Composite (1)	EP-Toxicity
BBD11	Surface	PCB
BBD12	Surface	PCB
BBD13	Surface	PCB
BBD14	Surface	PCB

(1) Sample BBDI0 is a composite of samples BBD 2,5 and 8. Analysis includes metals (As,Ba,Cd,Cr,Pb,Hg,Ag and Se), Herbicides (Endrine, Lindane, Methoxychlor, and Toxaphene) and Pesticides (2,4-D and 2,4,5-TP Silvex).

Dan Raviv Associates, Inc.
Job No. 84C182

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Table 1.2

Summary of Soil Boring and Surface Samples and Analyses
Field Investigation II
October 25-31, 1965

Boring/Soil Sample No.	Sample Interval Depth (feet)	Analyses Requested
BBDI	0-1	TPHC, VOA (2)
	1-2	[TPHC]
	2-3	[TPHC]
	5-7	[TPHC]
BBD2	0-1	TPHC, VOA
	1-2	[TPHC]
	2-3	[TPHC]
	5-7	TPHC
	9-11	NR
	13-15	NR
BBD3	0-1	PCB, TPHC
	1-2	[PCB,TPHC]
	2-3	[TPHC]
BBD4	0-1	PP, TPHC
	1-2	TPHC
	2-3	[TPHC]
	5-7	[TPHC]
	9-11	[TPHC]
	13-15	NR
BBD5	0-1	TPHC
	1-2	[TPHC]
	2-3	[TPHC]
BBD6	0-1	TPHC
	1-2	[TPHC]
	2-3	[TPHC]
BBD7	0-1	TPHC
	1-2	NR
	2-3	NR
BBD8	0-1	TPHC, VOA, Metals
	1-2	[PCB, TPHC]
	2-3	[TPHC]
	5-7	TPHC
	7-9	NR
	9-11	NR

(1) NR = Analysis Not Requested.
(2) Request for analyses listed in brackets was made on 2/5/86.

Dan Raviv Associates, Inc.
Job No. 84C182

ATTACHMENT B-35

Table 1.2 (cont'd)

Summary of Soil Boring and Surface Samples and Analyses
Field Investigation II
October 25-31, 1985

Boring/Soil Sample No.	Sample Interval Depth (feet)	Analyses Requested
BBD9	0-1	PCB, TPHC
	1-2	[PCB, TPHC] (1)
	2-3	TPHC
	5-7	[TPHC]
	7-9	NR (2)
	9-11	NR
BBDIO	0-1	TPHC
	1-2	(PCB,TPHC) (3)
	2-3	[TPHC]
BBD11	0-1	TPHC, Metals
	1-2	TPHC
	2-3	[TPHC]
BBDI2	0-1	PCB,TPHC, VOA
	1-2	[TPHC]
	2-3	[TPHC]
BBD13	0-1	PCB, TPHC, VOA
	1-2	[PCB, TPHC]
	2-3	(TPHC)
	4(Field Blank)	VOA
BBD14	0-1	PP, TPHC
BBD15	0-1	PCB, TPHC, Metals
	1-2	NR
	2-3	(TPHC)
	5-7	TPHC, VOA
	9-11	[TPHC]
	12-14	NR
	15(Field Blank)	VOA
BBD16	1-2	VOA, [PCB, TPHC]
	5-8 & 8-10	PP, TPHC

(1) For parameters listed in brackets, request for analyses was made on 2/5/86.
(2) NR = Analysis not requested.
(3) For parameters listed in parenthesis, request for analyses was made 2/5/86; however, the sample was either lost or not analyzed due to insufficient volume.

Dan Raviv Associates, Inc.
Job No. 84C182

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ATTACHMENT B-36

Table 1.2 (cont'd)

Summary of Soil Boring and Surface Samples and Analyses
Field Investigation II
October 25-31, 1985

Boring/Soil Sample No.	Sample Interval Depth (feet)	Analyses Requested
BBD9	0-1	PCB, TPHC
	1-2	[PCB, TPHC] (1)
	2-3	TPHC
	5-7	[TPHC] (2)
	7-9	NR
	9-11	NR
BBDI7	0-1	PP,TPHC, Dioxin
	S (1)	PCB, TPHC, VOA
	2-3	(PCB, TPHC) (2)
	5-7	[TPHC] (3)
	9-11	NR
BBDI8	0-1	PCB,TPHC
	1-2	(PCB, TPHC)
	2-3	(PCB, TPHC)
BBD19	0-1	PCB,TPHC, VOA
	1-2	[PCB, TPHC)
	2-3	[PCB, TPHC)
BBD20	(Field Blank)	VOA
BBDW1	Surface Water	PCB, TPHC
BBDS1	Surface Sediment	PCB, TPHC
BBDS2	Surface Sediment	PCB, VOA
6BDS3	Surface Sediment	TPHC
BBDS4	Surface Sediment	PCB,TPHC, VOA

(1) BBD17/S is a field duplicate of BBD17/0-1'.
(2) For parameters listed in parentheses, request for analyses was made 2/5/86; however, the sample was either lost or not analyzed due to insufficient volume.
(3) For parameters listed io brackets, request for analysis was made 2/5/86.

Table 1.3

Summary of Well Boring Samples and Analyses
Field Investigation III
November 27 - December 17, 1985

Boring/Soil Sample No.	Sample Interval Depth (feet)	Analyses Requested
BBDC1	0-2	PCB, TPHC, VOA
	5-7	VOA, [PCB,TPHC)
	10-12	PCB, TPHC
	15-17	NR
	20-22	NR
BBDC2	5-7	PCB, TPHC, VOA
	10-12	PCB, TPHC
BBDC3	0.5-2.5 & 2.5-4.5	[PCB,TPHC] (2)
	5-7	PCB, TPHC, VOA
	10-12	(PCB, TPHC)
	15-17	PCB, TPHC, VOA
	20-22	PCB, TPHC, VOA
	25-27	NR (1)
	30-32	NR
	35-37	NR
	40-42	NR
BBDC4	0-2	NR
	5-7	PCB, TPHC, VOA
	10-12A	PCB, TPHC
	10-12B	PCB, TPHC
	15-17	PCB, TPHC, VOA
BBDC5	No Sample	PCB

(1) NR = Analysis Not Requested.
(2) For parameters listed in brackets, request for analyses was made on 2/5/86.
(3) For parameters listed in parentheses, request for analyses was made on 2/5/86; however, the sample was either lost or not analyred due to insufficient volume.

Table 1.4

Summary of Ground Water Analyses
Field Investigation IV
January 7, 1986

Well Sample No.	Analysis Requested
BBDC1	PCB, TPHC, VOA
BBDC2	PCB, TPHC, VOA
BBDC3	PCB, TPHC, VOA
BBDC4	129 Priority Pollutants +40
BBDCS	PCB, TPHC, VOA
BBDC6 (1)	PCB, TPHC, VOA

(1) Sample BBDC6 is a field blank.

Table II
Summary of Sample Results by Area:
Concentrations of PCB's, TPHC's, VOC's, Base/Neutrals,
Acid Extractables, Phenol, Cyanide & Dioxin
Bayonne Barrel & Drum Company

Sample Date	Sample No.	Sample Depth (ft)	PCB's (ppm)	TPHC's (ppm)	VOC's PRIORITY (Total) (ppb)	VOC's NON PRIORITY (ppb)	B/N (Total) (ppm)	AC (Total) (ppm)	PHENOL (ppm)	CYANIDE (ppm)
FURNACE RESIDUE PILE AREA										
January 16, 1983										
	BBD 1	0-2	13							
	BBD 2	0-2	ND 10							
	BBD 3	0-3	ND 10							
	BBD 4	0-2	ND 10							
	BBD 5	0-2	16							
	BBD 6	0-3	ND 10							
	BBD 7	0-2	ND 10							
	BBD 8	0-3	ND 15							
	BBD 9	0-3	17							
	BBD 10	C								
	BBD 14	surface	65							
October 23-31, 1983										
	BBD 2	0-1		1,390	ND 20	ND 20				
	BBD 2	1-2		810						
	BBD 2	2-3		1,130						
	BBD 2	3-7		610						
	BBD 4	0-1		6,040	9,015	66,035	ND 0.640	ND 2.60	15	2
	BBD 4	1-2		10,300						
	BBD 4	2-3		13,100						
	BBD 4	3-7		1,190 (900)						
	BBD 4	9-11		940						
	BBD 5	0-1		23,800						
	BBD 5	1-2		1,040						
	BBD 5	2-3		9,100						
	BSD 6	0-1		640 (630)						
	BBD 6	1-2		2,440						
	BBD 6	2-3		3,900						
	BBD 7	0-1		4,920						

Notes: ND = Not detected at or above minimum detection limit indicated.
C = Composite of samples BBD 3, BBD 5 & BBD 8.
Laboratory duplicates in parentheses.
If no entry, analysis was not requested.

ATTACHMENT B-40

Table 11 (cont.)
Summary of Sample Results by Area:
Concentrations for PCB's, TPHC's, VOC's, Base Neutrals,
Acid Extractables, Phenol, Cyanide & Dioxin
Baronne Terrel & Drum Company

Sample Date	Sample No.	Sample Depth (ft)	PCB's (ppm)	TPHC's (ppm)	VOC's PRIORITY (Total) (ppb)	VOC's NO1 PRIORITY (ppb)	B/N (Total) (ppm)	AC (Total) (ppm)	PHENOL (ppm)	CYANIDE (ppm)
OIL STORAGE TANK AREA										
October 25-31, 1985										
	BID 14	1-2	213 (325)	20200	1217	2640				
	BID 16	5-2 & A-10		410	30	168	ND 8.50	ND 4.20	2.2	ND 0.1
	BIDS 1	surface	130	33700						
	BBDS 1	surface	ND 1	470						
November 27 - December 17, 1985										
	BBDC 3	0.5-3.3 & 2.3-4.5	43 157)	5520						
	BIDC 3	5-7	141	58000	6315	12230				
	BBDC 5	10-13	ND 1	180						
	BBDC 3	15-17	ND 1	28	ND 20	ND 30				
	BBDC 3	20-23	ND 1	38	ND 20	ND 30				
January 7, 1986										
	BBDC 3	Ground Water	ND 1 (ppb)	4.2						
	BBDC 5	Ground Water	33 (ppb)	2000						
			ND (1)							
OHUM STORAGE AND BACKGROUND AREAS										
October 25-31, 1983										
	BBD 1	0-1		1550	20 20	ND 20				
	BBD 1	1-2		1460						
	BID 1	2-3		330						
	BBD 3	0-1	42	4410						
	BBD 3	1-2	33 1311	9898 17350)						
	BBD 3	2-3		7440						
	BBD 8	0-1		3470	ND 20	ND 30				
	BID 8	1-2	5	31200						
	BBD 8	2-3		173000						
	BID 10	0-1		520						
	BID 10	2-3		230						
	BBD 11	0-1		4430						
	BBD 11	1-2		760						
	BBD 11	2-3		430						
	BBD 14	0-1		460	ND 30	ND 30	030	ND 10	ND 0.3	ND 0.1
November 37 - December 17, 1985										
	BBDC 2	3-7	2	670	121 1133)	330 (220)				
	BBDC 3	10-12	ND 1	14	ND 20	36				
BUILDINGS										
October 33-31, 1983										
	BBDS 2	surface	50		ND 20	ND 20				
	BBDS 3	surface		830						
	BBDS 4	surface	11.1	35400	35	45				

Notes: (1) Concentration (ppm) in sediments filtered out of sample.
ND = Not detected at or above minimum detection limit indicated.
Laboratory duplicates in parentheses.

ATTACHMENT B-41

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[redacted] of [redacted] Nassau [redacted] by Ar[redacted]

Concentrations for PCB's, TPHC's, VOC's, Base/Neutrals,
Acid Extractables, Phenol, Cyanide & Dioxin
Bayonne Barrel & Drum Company

PARAMETER: (units)	Sample Date	Sample No.	Sample Depth (ft)	PCB's (ppm)	TPHC's (ppm)	VOC's PRIORITY (Total) (ppb)	VOC's NON PRIORITY (ppb)	B/N (Total) (ppm)	AC (Total) (ppm)	PHENOL (ppm)	CYANIDE (ppm)	DIOXIN (ppb)
FURNACE RESIDUE PILE AREA (cont.)												
	November 27 - December 17, 1985											
		BBDC 1	0-2	10.3 (2.7)	830	ND 20	ND 20					
		BBDC 1	5-7	ND 5	2,630	2,710	2,160					
		BBDC 1	10-12	ND 1	410							
		BBDC 4	5-7	3.4	3,100 (3,600)	3,217	5,700					
		BBDC 4	10-12	ND 1	34							
		BBDC 4	10-12	ND 1	82							
		BBDC 4	15-17	ND 1	ND 10	56	ND 30					
	January 7, 1986											
		BBDC 4	Ground Water	ND 10 (1)		33	20	42 ppb	ND 25 ppb	ND 0.03	ND 0.004	
FURNACE AREA												
	January 12, 1983											
		BBD 11	surface	ND 10								
		BBD 12	surface	ND 20								
		BBD 13	surface	ND 10								
	October 25-31, 1985											
		BBD 17	0-1	ND 0.5 (1)	5,310	11,561 (15,446)	1,765 (11,680)	51.8	ND 0.5	20	0.5	ND 0.32
		BBD 17	2	22	16,000	22,533						
		BBD 17	5-7		20,800							
		BBD 12	0-1	330	16,300							
		BBD 15	0-1	37.4	4,330	ND 20	ND 20					
		BBD 15	1-2	32 (35)	1,700							
		BID 15	2-3	ND 1.0	130 (23)							
INCOMING DRUM STORAGE AREA												
	October 25-31, 1985											
		BBD 5	0-1	33	10,700							
		BBD 5	1-2	ND 1	410							
		BBD 5	2-3		480							
		BID 5	5-7		120							
		BBD 12	0-1	6	100	53	151	5.13	ND 0.5			
		BBD 12	1-2		42							
		BBD 12	2-3		130							
		BBD 13	0-1	33	8,260	1,045	3,440	27.01	ND 0.5			
		BBD 13	1-2	ND 3	1,330							
		BBD 15	0-1	8	1,820 (1,820)			31.24	ND 0.5			
		BBD 13	5-7		3,740	147	2,340					
		BBD 13	5-11		5,230							

Notes: (1) PCB results are part of the priority pollutant-base neutral scan for the sample listed.
Sample BBD17/8 is a field duplicate of sample 28D17/0-1.
ND = Not detected at or above minimum detection limit indicated.
Laboratory duplicates in parentheses.
If no entry, analyte was not requested.

ATTACHMENT 8-42

Table III
Summary of Polychlorinated Biphenyls, Total Petroleum Hydrocarbon & Dioxin
Concentrations in Soils January 18, October 25-31, 1985 and November 27 - December 17, 1985
Bayonne Barrel & Drum Company

PARAMETER (units):	PCB's (ppm)	PCB's (ppm)	Total Petroleum Hydrocarbons (ppm)
Sample date:	1/18/85	10/25-31/85	10/25-31/85
Sample No./ Sample Depth (ft)			
BDD 1/0-1	15		1990
BDD 1/1-2			1480
1/2-3			530
BDD 2/0-1	ND 10		1390
BDD 2/1-2			810
BDD 2/2-3			1130
BDD 2/5-7			610
BDD 3/0-1	ND 10	42	1410
BDD 3/1-2		23 (21)	9630 (7290)
BDD 3/2-3			7440
BDD 1/0-1	ND 10		6040
BDD 1/1-2			10500
BDD 1/2-3			15100
BDD 1/5-7			1190 (900)
BDD 1/9-11			940
BDD 5/0-1	16		23800
BDD 5/1-2			1040
BDD 5/2-3			9180
BDD 6/0-1	ND 10		640 (650)
BDD 6/1-2			2440
BDD 6/2-3			5900
BDD 7/0-1	ND 10		1520
BDD 8/0-1	ND 15		3470
BDD 8/1-2		5	31200
BDD 8/2-3			173000
BDD 9/0-1	17	23	10700
BDD 9/1-2		ND 1	410
BDD 9/2-3			480
BDD 9/5-7			120
BDD 10/0-1			580
BDD 10/2-3			230

Notes: Samples BDD 1 - BDD 9, collected January 18, 1985, are split spoon samples taken from a depth of 0-2 feet.
ND = Not detected at or above minimum detection limit indicated.
Laboratory duplicates in parentheses.
[illegible] analysis was not requested

ATTACHMENT B-43

Summary of Polychlorinated Biphenyls, Total Petroleum Hydrocarbon & Dioxin
Concentrations in Soils January 18, October 25-31, 1985 and November 27 - December 17, 1985
Bayonne Barrel & Drum Company

PARAMETER (units): / Sample date:	PCB's (ppm) 1/18/85	PCB's (ppm) 10/25-31/85 11/27 - 12/17/85	Total Petroleum Hydrocarbons (ppm) 10/25-31/85	Dioxin (ppb) 10/25-31/85
Sample Designation/ Sample Depth (ft)				
BBD 11/0-1	ND 10 (1)		4150	
BBD 11/1-2			760	
BBD 11/2-3			450	
BBD 12/0-1	ND 20 (1)	6	100	
DDD 12/1-2			42	
BBD 12/2-3			120	
BBD 13/0-1	ND 10 (1)	55	8260	
B 13/1-2		ND 5	1350	
DBD 14/0-1	65 (1)		460	
BBD 15/0-1		8	1820 (1820)	
BBD 15/5-7			3740	
BBD 15/9-11			5230	
BBD 16/1-2		213 (229)	20800	
BBD 16/5-8,8-10			410	
BDD 17/0-1		ND 0.5	9210	ND 0.320
DBD 17/8		28	16000	
BBD 17/5-7		--	20800	
DBD 18/0-1		320	16300	
BBD 19/0-1		37.4	4330	
BBD 19/1-2		32(39)	1700	
DBD 19/2-3		ND 1	130 (23)	
DDD C1/0-2		10.3(8.7)	830	
DDD C1/5-7		ND 5	8630	
DDD C1/10-12		ND 1	410	
BDD C2/5-7		2	670	
DDD C2/10-12		ND 1	14	
DDD C3/0.5-2.5, 2.5-4.5		43(57)	8920	
BBD C3/6-7		141	59000	
DDD C3/10-12		ND 1	190	
BBD C3/15-17		ND 1	28	
DBD C3/20-22		ND 1	58	
DDD C4/5-7		3.4	3100 (3600)	
BBD C4/10-12A		ND 1	34	
DDD C4/10-12B		ND 1	82	
BBD C4/15-17		ND 1	ND 10	

Notes: (1) Samples DDD 11 - DDD 14, collected January 18, 1985, are surface soil samples.
Results for samples designated "DDD C" are for samples collected on 11/27 - 12/17/85.
ND = Not detected at or above minimum detection limit indicated.
[illegible] analysis was not requested.

ATTACHMENT B-44

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Table IV
Summary of Volatile Organic Compound
Concentrations in Soils
October 25-31, 1985
Bayonne Barrel & Drum Company

Sample No.	DHD 1	HDD 2	DDD 1	DDD 8	DHD 12	HHD 13	HDD 13	DDD 14
Sample Depth (ft):	0-1	0-1	0-1	0-1	0-1	0-1	4 (field blank)	0-1
PRIORITY POLLUTANTS (ppb)								
Acrolein (ppm)			ND 1					ND 1
Acrylonitrile (ppm)			ND 1					ND 1
Vinyl Chloride	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 5	ND 20
Chloroethane								
Methylene Chloride								
1,1-Dichloroethylene								
1,1-Dichloroethane								
1,2-Dichloroethylene								
Chloroform								
1,2-Dichloroethane								
1,1,1-Trichloroethane								
1,2-Dichloropropane								
Trichloroethylene			ND 20			ND 20		
Benzene			55			29		
1,1,2-Trichloroethane			ND 20			ND 20		
1,1,2,2-Tetrachloroethylene			ND 20			ND 20		
Toluene			360			210		
Chlorobenzene			ND 20		ND 20	ND 20		
Ethylbenzene			8600		52	810		
1,2 & 1,4-Dichlorobenzene	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 5	ND 20
Total Priority Pollutants	ND 20	ND 20	9015	ND 20	52	1049	ND 5	ND 20

Notes: ND = Not detected at or above minimum detection limit indicated.
If no entry, analysis was not requested.

ATTACHMENT 8-45

Table IV (cont.)
Summary of Volatile Organic Compound
Concentrations in Soils
October 25-31, 1985
Bayonne Barrel & Drum Company

Sample No.	BDD 15	BDD 15	DDD 16	BBD 16	BBD 17	BDD 17	BBD 17	BBD 19	DDD 20
Sample Depth (ft):	6-7	15 (Field Blank)	1-2	5-8 8-10	0-1	0-1 (Lab Dup)	S	0-1	Water (Field Blank)
PRIORITY POLLUTANTS (ppb)									
Acrolein (ppm)				ND 1	ND 1				
Acrylonitrile (ppm)				ND 1	ND 1				
Vinyl Chloride	ND 20	ND 5	ND 20	ND 20	89	170	170	ND 20	ND 5
Chloroethane					ND 20	ND 20	33		
Methylene Chloride					130	91	740		
1,1-Dichloroethylene					ND 20	ND 20	28		
1,1-Dichloroethane					250	210	1000		
1,2-Dichloroethylene					180	120	1100		
Chloroform					41	21	100		
1,2-Dichloroethane					36	32	78		
1,1,1-Trichloroethane					510	211	850		
1,2-Dichloropropane					ND 20	ND 20	52		
Trichloroethylene	ND 20		ND 20	ND 20	240	210	830		
Benzene	60		57	30	130	87	220		
1,1,2-Trichloroethane	ND 20		ND 20	ND 20	100	92	220		
1,1,2,2-Tetrachloroethylene			ND 20		94	71	290		
Toluene			930		7500	6400	14000		
Chlorobenzene	ND 20		ND 20		30	22	49		
Ethylbenzene	87		830		2200	1600	2700		
1,2 & 1,4-Dichlorobenzene	ND 20	ND 5	ND 20	ND 20	61	79	93	ND 20	ND 5
Total Priority Pollutants	147	ND 5	1817	30	11561	9446	22553	ND 20	ND 5

Notes: ND = Not detected at or above minimum detection limit indicated.
If no entry, analysis was not requested.

ATTACHMENT 8

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Table IV (cont.)
Summary of Volatile Organic Compound
Concentrations In Soils
October 25-31, 1985
Bayonne Barrel & Drum Company

Sample No.	BBD 1	BBD 2	BBD 4	DDD 8	BBD 12	BBD 13	BBD 13	BBD 14
Sample Depth (ft):	0-1	0-1	0-1	0-1	0-1	0-1	4 (field blank)	0-1
NON PRIORITY POLLUTANTS (ppb)								
1-Butanol	ND 20	ND 20	50	ND 20	ND 20	ND 20	ND 5	ND 20
Isopropylcyclopropane			ND 20		ND 20	ND 20		
Benzene			28000		ND 20	ND 20		
Xylene			28000		38	1500		
o,p-Xylene			ND 20		47	1200		
Cyclopropane					ND 20	ND 20		
Ketone								
Methyl Sulfide								
Propanal								
Carbon Disulfide								
Methyl Ethyl Ketone								
Carbon 113								
Cyclohexane								
Ketone								
Methyl Isobutyl Ketone								
Methyl-2-Pentanol								
C12 Aliphatic Hydrocarbons			ND 20			ND 20		
C8H Aliphatic Hydrocarbons			190			70		
C7H10 Aliphatic Hydrocarbons			35			ND 20		
C8H16 Aliphatic Hydrocarbons			30		ND 20	ND 20		
C6H6 Aromatic Hydrocarbons			2600		75	150		
C9H12 Aromatic Hydrocarbons			430		31	130		
C9H12 Aromatic Hydrocarbons			3400		ND 20	330		
C9H12 Aromatic Hydrocarbons			ND 20			60		
C9H12 Aromatic Hydrocarbons			3300			ND 20		
C10H14			ND 20					
C10H20			ND 20					
Styrene	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 5	ND 20
Total Non Priority Pollutants	ND 20	ND 20	66039	ND 20	191	3440	ND 5	ND 20

Notes: ND = Not detected at or above minimum detection limit indicated.
If no entry, analysis was not requested.

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Table IV (cont.)
Summary of Volatile Organic Compound
Concentrations in Soils
October 25-31, 1985
Bayonne Barrel & Drum Company

Sample No.	BBD 15	BBD 15	BBD 16	BBD 16	BBD 17	BBD 17	BBD 17	BBD 19	BBD 20
Sample Depth (ft):	5-7	15 (Field Blank)	1-2	5-8 B-10	0-1	0-1 (Lab Dup)	S	0-1	Water (Field Blank)
NON PRIORITY POLLUTANTS (ppb)									
1-butanol	ND 20	ND 5	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 5
Isopropylcyclopropane			ND 20	ND 20			ND 20		
Xylenes			ND 20	ND 20			ND 20		
m-Xylene			1400	43			3900		
o,p-Xylene			1200	23			3400		
Cyclopropane			ND 20	ND 20	ND 20	ND 20	30		
Acetone					130	130	70		
Dimethyl Solfide					ND 20	ND 20	30		
Isopropanol					ND 20	ND 20	50		
Carbon Disulfide					30	15	50		
Methyl Ethyl Ketone					170	140	110		
Freon 113					ND 20	ND 20	20		
Cyclohexane					40	20	50		
Hexane					25	15	25		
Methyl Isobutyl Ketone					730	500	550		
4-Methyl-2-Pentanol					160	85	140		
C6H12 Aliphatic Hydrocarbons				ND 20	30	35	100		
C7H14 Aliphatic Hydrocarbons				70	40	80	120		
C7H16 Aliphatic Hydrocarbons				ND 20	ND 20	ND 20	ND 20		
C8H16 Aliphatic Hydrocarbons	ND 20			30	ND 20	ND 20	ND 20		
C9H12 Aromatic Hydrocarbons	300		ND 20	ND 20	ND 20	ND 20	ND 20		
C10H12 Aromatic Hydrocarbons	910		40		40	35	60		
C10H14 Aromatic Hydrocarbons	580		ND 20		60	55	80		
Aromatic Hydrocarbons	580				190	200	300		
Aromatic Hydrocarbons	ND 20				120	90	150		
[illegible]					ND 20	ND 20	ND 20		
[illegible]					ND 20	ND 20	ND 20		
Styrene	ND 20	ND 5	ND 20	ND 20	ND 20	280	450	ND 20	ND 5
Total Non Priority Pollutants	2340	ND 5	2040	166	1765	1080	9685	ND 20	ND 5

Notes: ND = Not detected at or above minimum detection limit indicated.
If no entry, analysis was not requested.

ATTACHMENT B-4

Table IV (cont.)
Summary of Volatile Organic Compound
Concentrations In Soils
November 27 - December 17, 1983
Bayonne Barrel & Drum Company

Sample No.	BBD C1	BBD C1	BBD C2	BBD C2	BBD C2	BBD C3	BBD C3	BBD C3	BBD C4	BBD C4
Sample Depth (ft):	0-2	3-7	3-7	3-7 (lab Dup)	10-12	3-7	13-17	20-22	3-7	13-17
PRIORITY POLLUTANTS (ppb)										
Acrolein (ppm)										
Acrylonitrile (ppm)										
Vinyl Chloride	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 30
Chloroethane										
Methylene Chloride										
1,1-Dichloroethylene										
1,1-Dichloroethane										
1,2-Dichloroethylene										
Chloroform										
1,2-Dichloroethane										
1,1,1-Trichloroethane										
1,2-Dichloropropane										
Trichloroethylene		ND 20	ND 20	ND 20		ND 20			ND 20	ND 30
Benzene		410	50	31		263			90	36
1,1,2-Trichloroethane		ND 20	ND 20	ND 20		ND 20			ND 20	ND 30
1,1,2,2-Tetrachloroethylene			ND 20	ND 20		ND 20			ND 20	ND 30
Toluene			71	64		1700			2200	30
Chlorobenzene		ND 20	ND 30	ND 20		330			630	ND 30
Ethylbenzene		2300	ND 20	ND 20		3700			790	10
1,2 & 1,4-Dichlorobenzene	ND 20	ND 20	ND 20	ND 30	ND 20	320	ND 20	ND 20	87	ND 20
Total Priority Pollutants	ND 20	2710	121	133	ND 20	6313	ND 20	ND 20	3517	36

Notes: ND = Not detected at or above minimum detection limit indicated.
If no entry, analysis was not requested.

ATTACHMENT B-4

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Table IV (cont.)
Summary of Volatile Organic Compound
Concentrations (ppb) in Soils
November 27 - December 17, 1985
Bayonne Barrel & Drum Company

Sample No.	BDD C1	BBD C1	BBD C2	BDO C2	BBD C2	BBD C3	BBD C3	BBD C3	BBD C1	BBD C1
Sample Depth (ft):	0-2	5-7	5-7	5-7 (Lab Dup)	10-12	5-7	15-17	20-22	5-7	15-17
NON PRIORITY POLLUTANTS (ppb)										
1-Butanol	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20
Isopropylcyclopropane		ND 20	ND 20	ND 20		ND 20			70	
enes		800	130	140		9600			1300	
ylene		ND 20	ND 20	ND 20		ND 20			ND 20	
o,p-Xylene										
Cyclopropane										
Acetone										
Dimethyl Sulfide										
Isopropanol				ND 20	ND 20				ND 20	
Carbon Disulfide				20	36				40	
Methyl Ethyl Ketone				ND 20	ND 20				ND 20	
Freon 113									ND 20	
Cyclohexane									50	
Hexane			ND 20	ND 20					ND 20	
Methyl Isobutyl ketone			120	120						
4-Methyl-2-Pentanol			ND 20	ND 20						
C6H12 Aliphatic Hydrocarbons						ND 20			ND 20	
C7H14 Aliphatic Hydrocarbons						200			150	
C7H10 Aliphatic Hydrocarbons						ND 20			30	
C8H10 Aliphatic Hydrocarbons		ND 20				ND 20			ND 20	
H10 Aromatic Hydrocarbons		1100				330			80	
C9H12 Aromatic Hydrocarbons		ND 20				2000			800	
C9H12 Aromatic Hydrocarbons		ND 20				ND 20			ND 20	
C9H12 Aromatic Hydrocarbons		ND 20				ND 20				
C9H12 Aromatic Hydrocarbons		260				ND 20				
C10H14		ND 20				100				
C10H19						100			ND 20	
C10H20						ND 20			180	
Styrene	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20
Total Non Priority Pollutants	ND 20	2160	250	280	36	12230	ND 20	ND 20	5700	ND 20

Note: ND = Not detected at or above minimum detection limit indicated.
If no entry, analysis was not requested.

ATTACHMENT 8-52

Table V
Summary of Metals, Phenol, Cyanide & Pesticides Concentrations
In Soils January 18, 1985 and October 25-31, 1985
Bayonne Barrel & Drum Company

Sample No.	BBD10	BBD 4	BBD 0	BBD 11	BBD 14	BBD 15	BBD 16	BBD 17
Sample Depth (ft):	(notes)	0-1	0-1	0-1	0-1	0-1	5-8 8-10	0-1
		ash pile	drum storage					incinerator
METALS (ppm)								
Antimony		15			8.4		4.0	6.0
Arsenic	0.002	17	390	51	8.4	55	2.9	56
Barium	ND 1.0		22	10		10		
Beryllium		0.64			0.28		0.52	0.5
Cadmium	0.21	1500	54	4.72	0.52	5.08	0.2	6.56
Chromium	ND 0.02	5400	1900	45.2	27	52.0	7.0	2500
Copper		15500			15.6		4.64	128
Lead	2.6	8400	8400	580	92	6400	15	570
Mercury	0.0004	2.2	13.6	1.5	1.6	4.1	0.62	1.6 (2.5)
Nickel		62.4			25		5.28	56.8
Silver	ND 0.02	0.92	5.1	0.48	0.5	0.84	0.2	1.7
Selenium	0.001	0.05	0.046	0.004	0.019	0.042	ND 0.004	0.025
Thallium		ND 0.4			ND 0.4		ND 0.4	ND 0.4
Zinc		4520			71.2		15.4	5040
Phenol (ppm)		15			ND 0.5		2.8	20
Cyanide (ppm)		2			ND 0.1		ND 0.1	0.5
PESTICIDES (ppb)								
Endrine	ND 1.0							
Lindane	ND 1.0							
Methoxychlor	ND 1.0							
Toxaphene	ND 1.0							
2,4-D	ND 1.0							
2,4,5-TP Silvex	ND 1.0							

Notes: Sample BBD 10, collected January 18, 1985, from furnace residue pile, is a composite sample analyzed for EP Toxicity.
ND - Not detected at or above minimum detection limit indicated.
If no entry, analysis was not requested.

ATTACHMENT B-5

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Table VI
Summary of Base/Neutral - Pesticide Extractable
& Acid Extractable Compounds Concentrations in Soils
October 25-31, 1985

Sample No.	BBD 4	BBD 11	BBD 16	BBD 17	BBD 12	BBD 13	BBD 15
Sample Depth (ft):	0-1	0-1	5-8 8-10	0-1	0-1	0-1	0-1
BASE/NEUTRAL - PESTICIDES (ppm)							
Bu[illegible]l Butyl Phthalate	ND 2.60		ND 4.80	19.3	ND 0.5	ND 0.5	ND 0.5
D[illegible] Butylphthalate				17.0	ND 0.5	ND 0.5	ND 0.5
2-Methyl Naphthalene				15.5	0.68	1.5	ND 0.5
Anthracene				ND 0.5	ND 0.5	0.65	1.0
B[illegible]zo(b)fluoranthene					ND 0.5	0.91	1.9
[illegible]zolalpyrene					ND 0.5	1.3	2.3
[illegible] 2-Ethylhexyl)phthalate		410			7.25	6.3	2.8
[illegible]sene					ND 0.5	2.3	2.9
[illegible]Dinitrotoluene						1.9	ND 0.5
[illegible]ranthene						2.5	5.2
[illegible]rene					ND 0.5	0.63	ND 0.5
[illegible]thalene		120			1.2	1.7	ND 0.5
[illegible]anthrene					ND 0.5	2.8	4.7
Pyrene						4.0	5.8
1,2-Diphenylhydrazene						0.52	ND 0.5
Benzo(a)anthracene						ND 0.5	2.9
Benzo(ghi)perylene						ND 0.5	0.87
Indeno(1,2,3-cd)pyrene				ND 0.5	ND 0.5	ND 0.5	0.87
T[illegible] Base/Neutral & Pesticides	ND 2.60	830	ND 4.80	51.8	9.13	27.01	31.21
Total ACID EXTRACTABLES (ppm)	ND 0.640(1)		ND 9.50(1)	ND 0.5	ND 0.5	ND 0.5	ND 0.5

Notes: ND = not detected at or above minimum detection limit indicated.
if no entry, analysis was not requested.

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Table VII
Summary of Polychlorinated Diphenyls, Total Petroleum Hydrocarbons
& Volatile Organic Compound Concentrations
In Surface Sediment & Surface Water Samples
October 25-31, 1985
Bayonne Barrel & Drum Company

	Sediments				Water
Sample No.:	BBD S1	BBD S2	BBD S3	BBD S4	BBD W1
PARAMETER	Concentrations (ppm)				
PCB's	130	80		11.1	ND 1
Total Petroleum Hydrocarbons	23700		850	39400	670
PARAMETER	Concentrations (ppb)				
Volatile Organic Compounds					
Priority Pollutants		ND 20			ND 5
Toluene		ND 20		39	
Non Priority Pollutants		ND 20			
Acetone				25	
4-Methyl-2-Pentanol				20	

Notes: ND = Not detected at or above minimum detection limit indicated.
If no entry, analysis was not requested.

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Table VIII
Summary of Polychlorinated Biphenyls , Total Petroleum Hydrocarbons, Metals,
Acid Extractables, Base Neutrals, Phenol & Cyanide
Concentrations in Ground Water
January 7,1986
Bayonne Barrel & Drum Company

Sample No.:	BBD C1	BBD C2	BBD C3	BBD C4	BBD C5	BBD C6
PARAMETER (units)						
PCB's (ppb)	ND 1	ND 1	ND 1	ND 10 (1)	53 80 (2)	ND 1
Tot Petroleum Hydrocarbons (ppm)	2.8	3.7	4.8		2000	1.8
METAL CONSTITUENTS	Concentrations (ppm)					
Antimony				ND 0.5		
Arsenic				0.01		
Beryllium				ND 0.01		
Cadmium				ND 0.01		
Chromium				ND 0.01		
Copper				0.04		
Lead				ND 0.1		
Mercury				ND 0.002		
Nickel				ND 0.01		
Selenium				ND 0.007		
Silver				0.03		
Thallium				ND 0.1		
Zinc				0.03		
PARAMETER (units)						
Base/Neutrals (ppb)						
Di-N-Butylphthalate				28		
Naphthalene				14		
Acid Extractables (ppb)				ND 25		
Phenol (ppm)				ND 0.03		
Cyanide (ppm)				ND 0.004		

Notes: (1) PCB results are part of the priority pollutant - Base Neutral scan for the sample listed.
(2) Concentration (ppm) in sediments filtered out of water sample.
ND = Not detected at or above minimum detection limit indicated.
If no entry, analysis was not repeated.

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Table IX
Summary of Volatile Organic Compound Concentrations in Ground Water
January 7, 1986
Bayonne Barrel & Drum Company

Sample No.:	BDD C1	BDD C2	BDD C3	BDD C4	DBD C5	DOO C6
CONSTITUENTS	Concentrations (ppb)					
PRIORITY POLLUTANTS (ppb)						
Chloroform	ND 5	ND 5	25	ND 5	ND 5	ND 5
1,1,1-Trichloroethane		5 (ND 5)	ND 5	ND 5		
Bromodichloromethane		ND 5	5	ND 5		
Benzene			ND 5	28	ND 5	
Toluene				5	150	
Chlorobenzene				ND 5	67	
Ethylbenzene				ND 5	1060	
1,2 & 1,4-Dichlorobenzene	ND 5	ND 5	ND 5	ND 5	76	ND 5
Total Priority Pollutants	ND 5	5	30	33	1353	ND 5
NON PRIORITY POLLUTANTS (ppb)						
Chlorofluoromethane	10	ND 5	ND 5	ND 5	ND 5	ND 5
Dichlorofluoromethane	70	ND 5		ND 5		
Di-isopropylether	15	ND 5		ND 5		
Diethylether	ND 5	10 (20)		30		
2,4,4-Trimethylpentane		10 (10)		ND 5	ND 5	
Xylene Isomers		ND 5		15	2000	
Cyclohexane				ND 5	60	
Methylcyclopentane					30	
Cycloheptane					100	
Isopropylbenzene					90	
n-Propylbenzene				ND 5	150	
Ethyl-Toluene Isomers				35	550	
Trimethylbenzene Isomers				ND 5	1400	
C9H10 Isomers	ND 5	ND 5	ND 5	ND 5	240	ND 5
Total Non Priority Pollutants	95	20 (30)	ND 5	80	1620	ND 5

Notes: 1 ND = Not detected at or above minimum detection limit indicated.
Laboratory duplicates in parentheses.
If no entry, analysis was not requested.

B-55

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

Newark, New Jersey

Submitted to:

New Jersey Turnpike Authority

P.O. Box 1121

New Brunswick, New Jersey

Submitted by:

Louis Berger & Associates, Inc.

100 Halsted Street

East Orange, New Jersey

December 1986

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Appendices

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Appendix D Boring Logs and Well Permits

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1.0 INTRODUCTION

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

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

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

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

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

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2.0 SITE DESCRIPTION

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

2.1 Site Characteristics

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

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

2.2 Current Owner/Operator

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

2.3 Status of the Property

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

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

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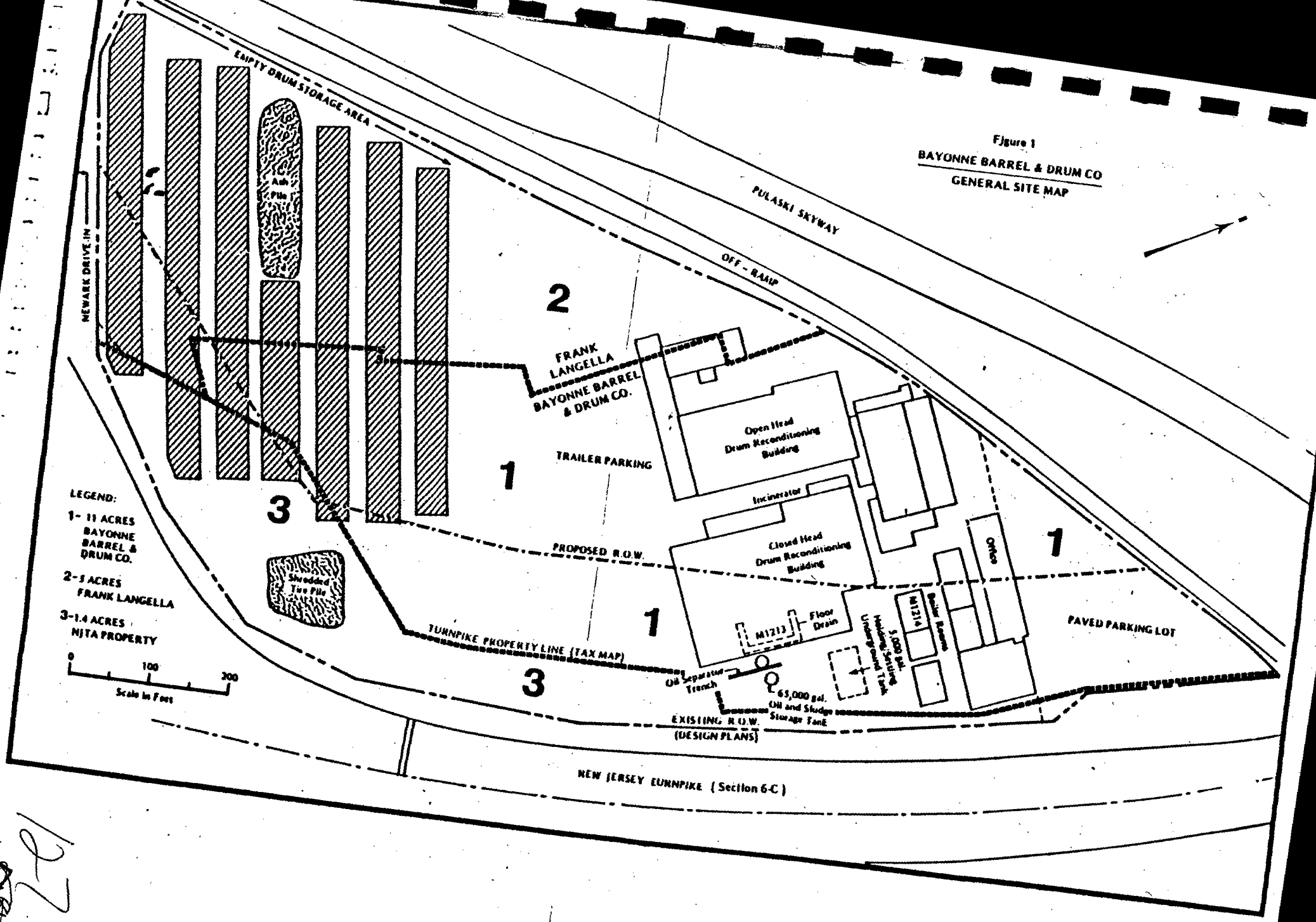
Figure 1
BAYONNE BARREL & DRUM CO
GENERAL SITE MAP
EMPTY DRUM STORAGE AREA
PULASKI SKYWAY
OFF - RAMP
NEWARK DRIVE IN
Ash Pile
2
FRANK LANGELLA BAYONNE BARREL & DRUM CO.
Open Head Drum Reconditioning Building
TRAILER PARKING
1
3
Incinerator
Closed Head Drum Reconditioning Building
PROPOSED R.O.W.
Office
1
Shredded Tire Pile
1
M1213
Floor Drain
M1214
Boiler Room
5,000 gal. Holding Settling Underground Tank
PAVED PARKING LOT
TURNPIKE PROPERTY LINE (TAX MAP)
3
Oil Separator Trench
65,000 gal. Oil and Sludge Storage Tank
EXISTING R.O.W. (DESIGN PLANS)
NEW JERSEY TURNPIKE (Section 6-C)
LEGEND:
1- 11 ACRES BAYONNE BARREL & DRUM CO.
2-5 ACRES FRANK LANGELLA
3-1.4 ACRES NJTA PROPERTY
0
100
200
Scale in Feet

As the operator of the site did not have a permit required under the authority of the Resource Conservation and Responsibility Act (RCRA) to operate a hazardous waste storage facility, a consent order was issued by the USEPA (Docket No. II RCRA-82-0115) charging BB&D with violating Sections 3004 and 3005 of the Act (see Appendix A). The consent agreement accompanying the consent order required Bayonne Barrel and Drum to take the following actions:

1. Submit a detailed soil and aqueous sampling plan.

2. Remove all hazardous waste piles and contaminated soil.

3. Submit a groundwater monitoring plan to determine if contamination of groundwater occurred and the extent and direction of movement of any contaminated plume.

4. Submit a closure plan that satisfies the requirements of RCRA under 40 CFR 265.112, 40 CFR 265.197 and 40 CFR 265.351.

After the consent order was issued, BB&D hired Dan Raviv Associates, Inc. to conduct a soil and groundwater monitoring program. The original sampling plan that Dan Raviv & Associates proposed in October, 1984 was later modified to reflect comments by USEPA and NJDEP. The modifications were agreed to in an exchange of letters during the summer of 1985. Though this program has been initiated, the extent to which it has been implemented and any results that were obtained has not been made known. Although the site is being monitored by the USEPA Region II, no actions are known to have been taken to proceed with any site cleanup.

Other than the consent order and agreement, no other violations, permits or enforcement actions are known to be in effect or pending.

2.4 Historical Use

The area encompassed by the BB&D property is believed to have been part of the tidal marshes associated with the lower reaches of the Passaic River. At some time the area appears to have been covered with fill. It is not clear to what extent this fill was dumped as waste, and what was placed there for construction purposes. Historical maps and air photos indicate that parts of the area now occupied by the Bayonne Barrel and Drum company have been used for drum storage/reconditioning since at least 1931. Additionally, substantial portions of the site have also been utilized for waste disposal.

The earliest reference to a drum recycling facility at the site is a 1931 Sanborn Atlas of Newark which shows an industrial facility operating at a site owned by the B & F Co., Inc. However, the buildings are labelled "tenant occupied". Most buildings are shown to be storage buildings. Crate and drum storages are located east of the original site buildings, outside the current site boundaries. Two of the smaller buildings are labeled as "drum cleaning" areas (Figure 2, Area A). The 1939 Newark Directory lists the Bayonne Steel Drum company with James Allen as President. The 1942

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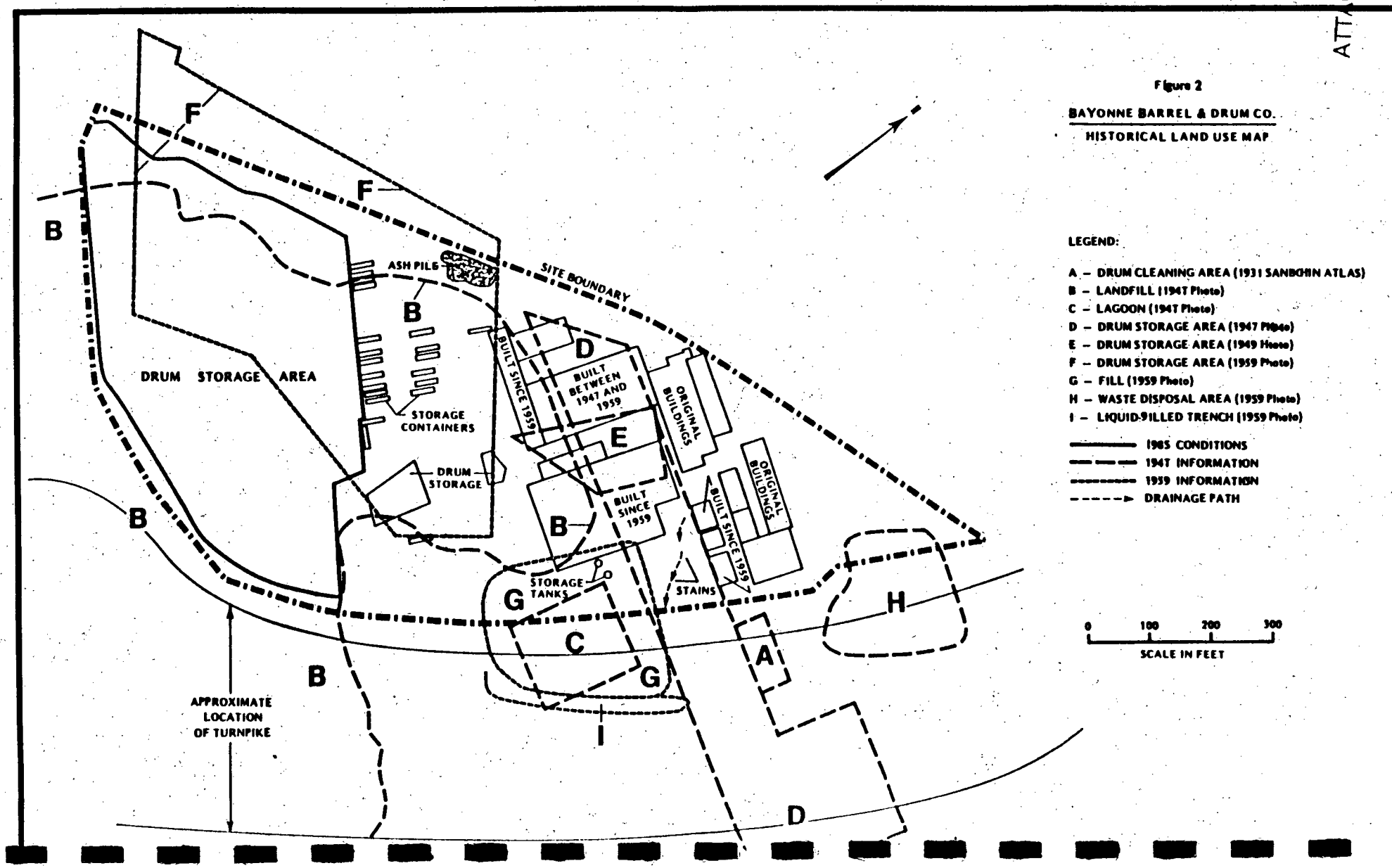

Figure 2

BAYONNE BARREL & DRUM CO.

HISTORICAL LAND USE MAP

LEGEND:

A – DRUM CLEANING AREA (1931 SANBORN ATLAS)
B – LANDFILL (1947 Photo)
C – LAGOON (1947 Photo)
D – DRUM STORAGE AREA (1947 Photo)
E – DRUM STORAGE AREA (1949 Photo)
F – DRUM STORAGE AREA (1959 Photo)
G – FILL (1959 Photo)
H – WASTE DISPOSAL AREA (1959 Photo)
I – LIQUID-FILLED TRENCH (1959 Photo)

1985 CONDITIONS
1947 INFORMATION
1959 INFORMATION
DRAINAGE PATH

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

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

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

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

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

PHOTO SOURCES:

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

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

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

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

3.1.2 Personnel Protection Equipment

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

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

3.1.3 Decontamination Procedures

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

3.2 Sampling Plan

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

3.2.1 Soils

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

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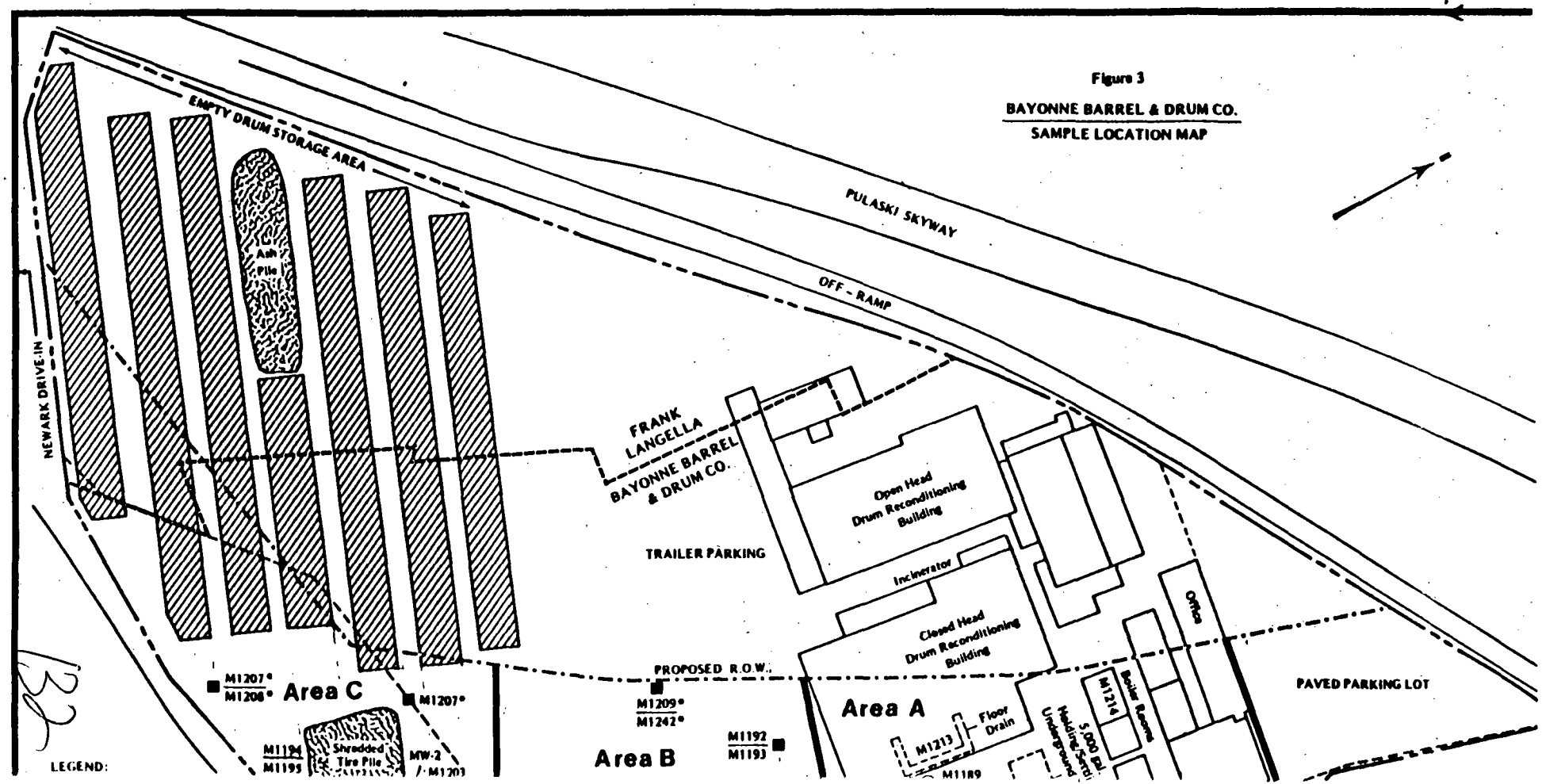
Figure 3

BAYONNE BARREL & DRUM CO.

SAMPLE LOCATION MAP



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

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

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

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

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

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

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

3.2.1.1 Sampling methods

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

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

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

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

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

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

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

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

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

3.2.1.2 Sample containers

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

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Table 1

SOIL BORING DESCRIPTIONS

A. Discrete Soil Samples

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

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Table 1 (continued)

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

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Table 1 (continued)

Boring #	Depth (Inches)	Soil Description
1209	0-4	Black sandy loam, trace small pebbles; friable
7B)	4-8	Same, some fill (Slag, brick and glass)
	8-14	Same, little rainbow colored bands; moist
	14-18	Fill (asphalt-like material); trace oily odor.
1242	18-24	Fill (same, but little wood); slight oily odor
	24-30	Fill (asphalt-like material, white coatings, spongy material, sand and other)
	30-36	Same, all black trace-white coatings. Weak oily odor.
1209	0-10	Black sandy silt and m-c gravel
7C)	10-14	Fill (asphalt-like substrate, trace slag)
	14-18	Same, little orange coated slag; distinct petroleum odor.
1242	18-24	Fill (wood fibers, asphalt-like material, glass, slag); moist; distinct petroleum odor.
	24-30	Same
	30-36	Same, some brick

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

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

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

3.2.2 Groundwater

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

3.2.2.1 Monitoring Well Installation

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

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

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

3.2.2.2 Well Development

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

Monitoring well #3 was developed with a hand bailer until the well went dry. Its discharge was extremely turbid but did not contain much sand. Monitoring well #2 was developed by pumping with a suction pump for approximately 70 minutes at a rate exceeding 10 gpm. Its discharge was relatively turbid free.

3.2.2.3 Groundwater Sampling

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

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

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

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

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

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

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

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

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Table 3

FIELD MEASUREMENTS OF PARAMETERS AT
MONITORING WELLS 2 AND 3

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

Source: Louis Berger & Associates, 1986.

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

Measurements in both monitoring wells indicated no distinct immiscible layers.

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

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

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

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

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

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

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

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

3.3 Quality Assurance

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

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

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

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

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

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

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

4.0 RESULTS OF ANALYSES AND CONCLUSIONS

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

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

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

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

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

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

4.1 Soils

Area A

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

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

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

There are no BISE criteria for cleanup levels of base/neutral extractables in soil, but polycyclic aromatic hydrocarbons are either known or suspected carcinogens and are included in the range of constituents found in sample M1188. There were no other excessive levels of contaminants in any of the soil samples in Area A, except for PCB's in sample M118B, at a concentration of 19.1 mg/kg. The BISE cleanup criteria for PCB's in soils is 1-5 mg/kg while USEPA does not regulate PCBs with a concentration of less than 50 mg/kg.

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TABLE 5
SUMMARY OF AREA A CHEMICAL ANALYSIS RESULTS

Sample #	N1188	N1189	N1198	M1213	M1214	M1215
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	25-Apr	25-Apr	05-May	26-Apr	26-Apr	27-May
Depth	0-18"	0-18"	0-2'			
Composite/Discrete	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	X	X	W
VOLATILE ORGANICS						
PRIORITY POLLUTANTS						
Benzene	ND	ND	ND	NA	NA	ND
cis-1,3-Dichloropropylene	ND	ND	ND	NA	NA	ND
Ethylbenzene	28.1D J2	ND UJ1	ND UJ1	NA	NA	ND UJ2
Methylene chloride	158	ND	ND	NA	NA	ND
Tetrachloroethylene	ND	ND	ND	NA	NA	ND
Toluene	33	2	ND	NA	NA	ND
Totals	219.1	2	0	NA	NA	0
ADDITIONAL PEAKS (SEMI-QUANTITATIVE)						
3-Methyl hexane	ND	ND	ND	NA	NA	ND
2-Pentanone, 4-Methyl	ND	ND	ND	NA	NA	ND
2-Propanones	ND	ND	ND	NA	NA	ND
3-methyl benzene	ND	ND	ND	NA	NA	ND
3-Methyl pentane	ND	ND	ND	NA	NA	ND
4-Ethyl 2-Pentanone	ND	ND	ND	NA	NA	ND
4-Methyl 2-Pentanones	ND	ND	ND	NA	NA	ND
Acetone	ND	ND	ND	NA	NA	ND
Alkanes	50	ND	ND	NA	NA	ND
Alkyl benzene	ND	ND	ND	NA	NA	ND
Benzene ethenyl-methyl	ND	ND	ND	NA	NA	ND
Benzene, 1,2,3-trimethyl	ND	50	ND	NA	NA	ND
Cycloheptane, methyl	89	ND	ND	NA	NA	ND
Cyclohexane, 1,1,3-trimethyl	ND	ND	ND	NA	NA	ND
Cyclohexane, 1,1-dimethyl	76	ND	ND	NA	NA	ND
Cyclohexane, 1,3-dimethyl	64	ND	ND	NA	NA	ND
Cyclohexane, 1,3-dimethyl, cis	ND	ND	ND	NA	NA	ND
Cyclohexane, 1,3-dimethyl, trans	3D	ND	ND	NA	NA	ND
Cyclohexane, 1,1,3-trimethyl	ND	ND	ND	NA	NA	ND
Cyclohexane, 1,2-dimethyl, cis	ND	ND	ND	NA	NA	ND
Cyclohexane, 1,2-dimethyl, trans	ND	ND	ND	NA	NA	ND
Cyclohexane, 1,3-dimethyl, trans	ND	ND	ND	NA	NA	ND
Cyclohexane, 1,4-dimethyl, cis	ND	ND	ND	NA	NA	ND
Cyclohexane, 1-ethyl-4-methyl cis	ND	ND	ND	NA	NA	ND
Cyclohexane, 1-ethyl-4-methyl trans	ND	ND	ND	NA	NA	ND
Cyclohexanone, 3,3,5-trimethyl	ND	ND	ND	NA	NA	ND
Cyclooctane, methyl	176	ND	ND	NA	NA	ND
Cyclopentane, methyl	ND	ND	ND	NA	NA	ND
Cyclopentane, 1,3-dimethyl, trans	ND	ND	ND	NA	NA	ND
Dimethyl benzenes	ND	ND	ND	NA	NA	ND

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

NA = Not analyzed for this parameter

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

	N1188	N1189	M1198	N1213	M1214	M1215
	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Submission	25-Apr	25-Apr	05-May	26-Apr	28-Apr	27-May
	0-18"	0-18"	0-2'			
te/Discrete	D	D	D	C	C	D
)/Water (W)/Sediment (X)	S	S	S	X	X	W
E OROANICS ADDITIONAL PEAKS (SIMI-QUANTITATIVE) CONTINUED						
l cyclohexane	ND	ND	ND	NA	NA	ND
l cyclopentane	ND	ND	ND	NA	NA	ND
1-3-hexene	ND	ND	ND	NA	NA	ND
1,1'-oxybis	ND	ND	ND	NA	NA	ND
ethyl benxene	ND	ND	ND	NA	NA	ND
, aethyl	ND	ND	ND	NA	NA	ND
rbons	ND	ND	ND	NA	NA	ND
cyclohexane	ND	ND	ND	NA	NA	ND
ee	ND	ND	ND	NA	NA	ND
enes	ND	ND	ND	NA	NA	ND
, 5-methyl	ND	ND	ND	NA	NA	ND
s, methyl	ND	ND	ND	NA	NA	ND
benxene	ND	ND	ND	NA	NA	ND
	ND	ND	ND	NA	NA	ND
ACID EXTRACTABLES						
PRIORITY POLLUTANTS						
ophenol	ND	ND	ND	ND	ND	ND
hlorophenol	BD	ND	ND	ND	ND	ND
ethylphenol	230	ND	ND	ND	ND	21.9
lorophenol	ND	ND	ND	ND	ND	ND
	210	ND	ND	708	360	ND
richlorophenol	BD	ND	ND	ND	ND	ND
Totals	440	0	0	708	360	21.9
BASE/NEUTRAL EXTRACTABLES						
PRIORITY POLLUTANTS						
	ND	ND	ND	ND	ND	2.3
thylene	ND	ND	BMDL	ND	ND	ND
ene	510	ND	BMDL	ND	ND	ND
)anthracene	BD	ND	BMDL	ND	ND	ND
)pyrene	1,100	ND	BMDL	ND	ND	ND
)fluoranthene	2,000	ND	733	ND	ND	ND
hi)perylene	ND	ND	ND	ND	ND	ND
thylhexyl)phthalate	55,100	44,600	12,200	206,000	114,000	ND
enxyl phthalate	1,200	ND	7,520	47,600	5,400	ND
e	ND	ND	BMDL	ND	ND	ND

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

Sample #	N11BB	M1169	M1196	M1213	M1214	M1215
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	25-Apr	25-Apr	05-May	26-Apr	26-Apr	27-May
Depth	0-18"	0-18"	0-2'			
Composite/Discrete	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	X	X	W
BASE/NEUTRAL EXTRACTABLES, PRIORITY POLLUTANTS CONTINUED						
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ND	ND	ND	19,900	ND	ND
Dimethyl phthalate	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ND	ND	420	46,000	4,600	ND
2,6-Dinitrotoluene	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ND	ND	ND	3,700	ND	ND
Fluoranthene	2,600	ND	BMDL	2,090	1,500	ND
Fluorene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND
Isophorone	ND	ND	ND	ND	ND	ND
Naphthalene	2,000	ND	BMDL	660	4,200	ND
N-Nitrosodiphenylamine	ND	ND	3,210	1,570	ND	ND
Phenanthrene	2,200	ND	BMDL	3,500	3,100	ND
Pyrene	4,100	ND	BMDL	2,130	1,200	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	8.24
Totals	111,010	44,600	24,063	335,350	134,000	10.54
BASE/NEUTRAL/ACID EXTRACTABLES, ADDITIONAL PEAKS (SEMI-QUANTITATIVE)						
1H-Indene octahydro 2,2,4,4,7,7-hexamethyl	6,560	ND	ND	ND	ND	ND
1H-Benzo(b) fluorene	ND	ND	ND	ND	ND	ND
1H-Indene,2,5-dihydro	ND	ND	ND	ND	ND	ND
1H-Inden-5-ol,2,3-dihydro	ND	ND	ND	ND	ND	ND
1,1'-Biphenyl	ND	ND	ND	ND	ND	ND
1,2,3,4-Tetramethyl benzene	3,410	ND	ND	ND	ND	ND
1,2,3-Trimethyl benzene	ND	ND	ND	ND	ND	ND
1-Methyl anthracene	ND	ND	ND	ND	ND	ND
2,6-Dimethyl nonane	ND	ND	ND	ND	9,080	ND
2-Ethyl hexanoic	ND	ND	ND	4,234	ND	ND
2-Ethyl naphthalene	ND	ND	ND	ND	ND	ND
2-hydroxy benzaldehyde	ND	ND	ND	ND	ND	ND
2-methyl 1,1'-biphenyl	ND	ND	ND	ND	ND	ND
2-Methyl anthracenes	ND	ND	ND	ND	ND	ND
2-Methyl naphthalene	ND	ND	ND	ND	ND	ND
2-Methyl phenanthrene	ND	ND	ND	ND	ND	ND
2-methyl phenol	ND	ND	ND	ND	ND	ND
2-Propenoic acid, 2-Methyl, Dodecyl ester	ND	ND	ND	3,834	ND	ND

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

Sample #	M1188	M1189	M1198	M1213	M1214	M1215
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	25-Apr	25-Apr	05-May	28-Apr	28-Apr	27-May
Depth	0-18"	0-18"	0-2'			
Composite/Discrete	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	X	X	W
BASE/NEUTRAL/ACID EXTRACTABLES, ADDITIONAL PEAKS (SEMI-QUANTITATIVE) CONTINUED						
3-Ethyl-2-Methyl heptane	ND	ND	ND	ND	ND	ND
3-Methyl phenanthrene	ND	ND	ND	ND	ND	ND
3-Methyl phenol	ND	ND	ND	ND	ND	ND
4-Methyl phenanthrene	ND	ND	ND	ND	ND	ND
4-Methyl phenols	ND	ND	ND	ND	ND	ND
Alkanes	76,390	ND	2,668	20,114	54,924	ND
Benzenesulfonamide, 4-methyl	ND	ND	ND	ND	ND	ND
Bicyclo(3,2,1)oct-2-ene,5-methyl-4-methylene	ND	ND	ND	ND	ND	ND
Cyclohexane,pentyl	ND	ND	ND	ND	ND	ND
Diethyl benzene	ND	ND	ND	ND	ND	ND
Dimethyl 2-pentenes	ND	2,120	ND	ND	ND	ND
Dimethyl ethyl phenol	ND	ND	ND	ND	ND	ND
Dimethyl heptane	ND	ND	ND	ND	ND	ND
Dimethyl naphthalenes	ND	ND	ND	ND	ND	ND
Dimethyl pentenes	ND	ND	ND	ND	ND	ND
Dimethyl phenanthrenes	ND	ND	ND	ND	ND	ND
Dimethyl phenols	ND	ND	ND	ND	ND	ND
Dimethyl-ethyl benzenes	ND	ND	398	ND	ND	ND
Dimethyl-ethyl phenol	ND	ND	ND	ND	ND	ND
Ethanone, 1-(4-ethyl phenyl)-ethyl	ND	ND	ND	ND	ND	ND
Ethyl benzenes	ND	ND	ND	ND	ND	ND
Ethyl methyl benzene	ND	ND	ND	ND	ND	ND
Ethyl naphthalene	ND	ND	ND	ND	ND	ND
Ethyl phenols	ND	ND	ND	ND	ND	ND
Ethyl- methyl benzenes	ND	ND	ND	ND	ND	ND
Ethyl-1,2,3-trimethyl benzene	ND	ND	ND	ND	ND	ND
Ethyl-1,2,4-trimethyl benzene	8,920	ND	ND	ND	ND	ND
Ethyl-dimethyl benzenes	9,640	ND	ND	ND	ND	ND
Ethyl-methyl benzenes	4,640	ND	1,096	ND	ND	ND
Ethyl-methyl phenols	ND	ND	ND	ND	ND	ND
Ethyl-propyl benzene	ND	ND	ND	ND	ND	ND
Hexadecanoic acid	ND	ND	ND	ND	16,062	ND
Hexanal	ND	ND	ND	ND	11,010	ND
Hydroxy benzaldehyde	ND	ND	ND	4,626	ND	ND
Methoxy benzaldehyde	ND	ND	ND	ND	ND	ND
Methyl benzenes	ND	ND	721	3,939	9,400	ND
Methyl ethyl benzene	ND	ND	ND	ND	ND	ND
Methyl Fluorenes	ND	ND	ND	ND	ND	ND
Methyl naphthalene	ND	ND	387	ND	ND	ND
Methyl phenanthrene	ND	ND	ND	ND	ND	ND
Methyl phenols	ND	ND	ND	ND	ND	ND
Methyl-ethyl benzene	ND	ND	ND	ND	ND	ND

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

Sample #	M1166	M1189	M1196	M1213	M1214	M1215
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	25-Apr	25-Apr	05-May	26-Apr	26-Apr	27-May
Depth	0-18"	0-18"	0-2'			
Composite/Discrete	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	X	X	W
BASE/NEUTRAL/ACID EXTRACTIBLES, ADDITIONAL PEAKS (SEMI-QUANTITATIVE) CONTINUED						
Methyl-ethyl phenols	ND	ND	ND	ND	ND	ND
Methyl-methyl ethyl phenols	ND	ND	ND	ND	ND	ND
Methyl-methyl-ethyl benzenes	8,290	ND	627	ND	ND	ND
Methyl-naphthalene	ND	ND	ND	ND	ND	ND
Methyl-propyl benzenes	ND	ND	ND	ND	ND	ND
Naphthalene,decahydro,trans	ND	ND	ND	ND	ND	ND
N-propyl benzamide	ND	ND	ND	8,490	ND	ND
Phosphoric acid, triphenyl ester	ND	ND	ND	ND	ND	ND
Propyl benzenes	ND	ND	ND	ND	ND	ND
Tetrachlorobiphenyls	ND	ND	ND	ND	ND	ND
Tetradecanoic acid	ND	ND	ND	1,229	ND	ND
Tetramethyl benzenes	ND	ND	ND	ND	ND	ND
Tetramethyl butyl phenols	5,090	2,460	335	ND	ND	ND
Trichlorethene	ND	ND	ND	ND	ND	ND
Trimethyl benzenes	ND	ND	ND	ND	ND	ND
Trimethyl naphthalenes	4,950	ND	ND	ND	ND	ND
Trimethyl phenols	ND	ND	ND	ND	ND	ND
Xylenes	5,580	ND	386	ND	ND	ND
PCB						
PRIORITY POLLUTANTS						
Aroclor 1242	4,100 J1	ND	ND	ND	ND	ND
Aroclor 1254	5,000 J1	2,200 J1	3,600 J1	ND	ND	ND
Totals	9,100 J1	2,200 J1	3,600 J1	0	0	0
METALS UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L
PRIORITY POLLUTANTS						
Antimony	13.60	0.90	1.10	3.50	4.10	3.10
Arsenic	18.20	9.20	3.60	5.60	27.00	ND
Beryllium	2.30	0.09	ND	0.46	0.32	ND
Cadmium	11	24	ND	100	16	2.50
Chromium	99	170	ND	210	120	12.00
Copper	550	233	1.10	223	830	7.80
Lead	980	790	230	970	720	ND
Mercury	1.20	5.50	0.44	52	1.00	6.85
Nickel	84	54	ND	69	76	15
Selenium	ND	ND	0.41	ND	ND	NT

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

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

Sample #	M1188	M1189	M1198	M1213	M1214	M1215
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L
Date of Submission	25-Apr	25-Apr	05-May	26-Apr	26-Apr	27-May
Depth	0-18"	0-18"	0-2'			
Composite/Discrete	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	X	X	W
METALS, PRIORITY POLLUTANTS CONTINUED						
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/L
Silver	2.80	2.70	ND	2.90	1.50	2.00
Thallium	0.46	0.76	ND	0.39	0.16	ND
Zinc	2,470	716	2.20	1,340	2,970	71.00
Totals	4,221	2,005	339	2,976	4,466	114
PESTICIDES						
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L
PRIORITY POLLUTANTS						
Beta-BHC	ND	ND	ND	24 J1	ND	ND
4,4'-DDE	ND	ND	ND	140 J1	130 J1	ND
4,4'-DDD	ND	ND	ND	ND	160 J1	ND
Endosulfan sulfate	ND	ND	ND	160 J1	34 J1	ND
Endrin aldehyde	ND	ND	ND	65 J1	ND	ND
Totals	0	0	0	389 J1	324 J1	0
PHENOLICS & CYANIDE						
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L
Phenolics, Total	1.00	1.40	0.70			0.06
Cyanide, Total	1.40	1.20	1.00			<.025

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

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Sediment

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

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

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

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

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

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

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

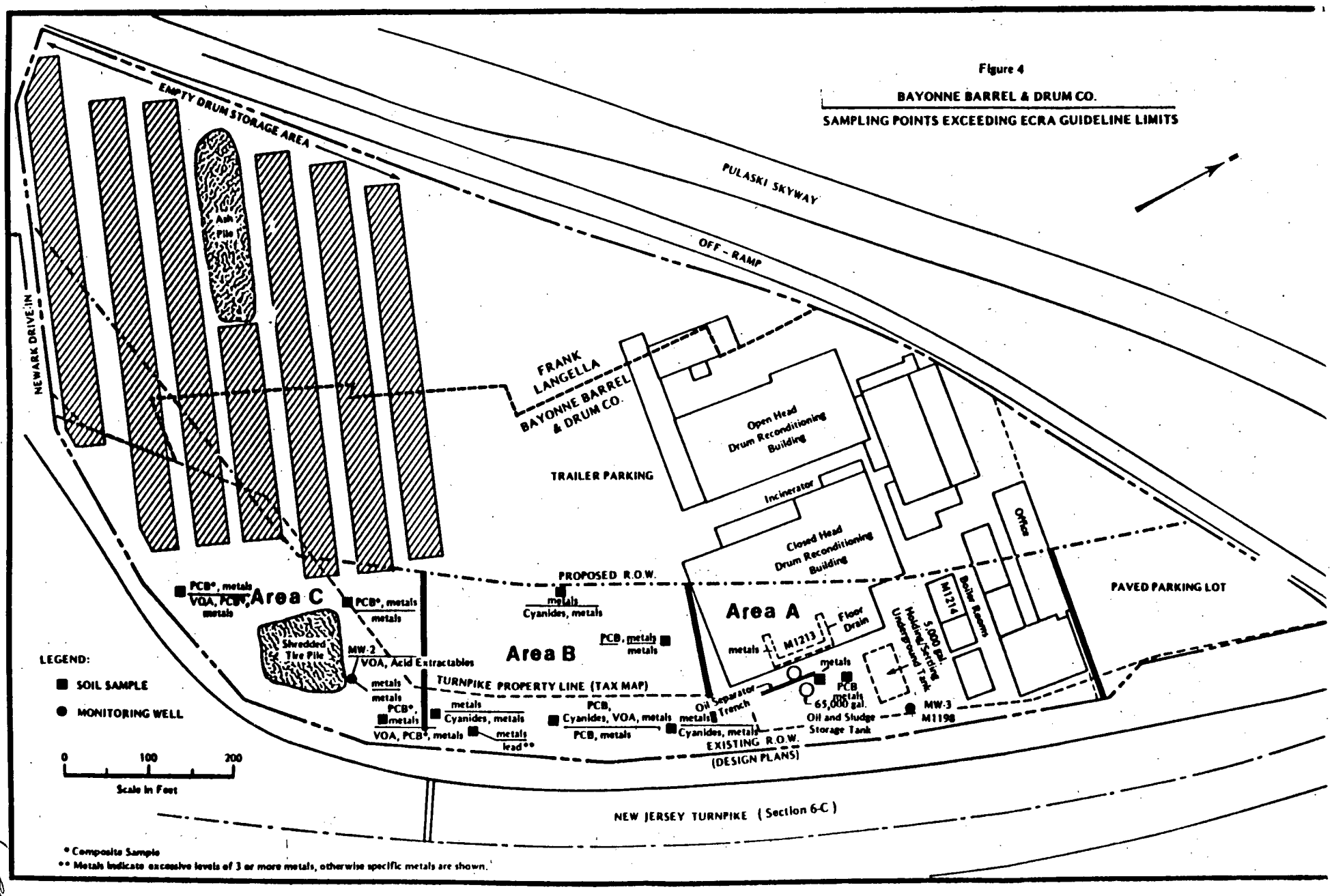
Area B

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

Figure 4

BAYONNE BARREL & DRUM CO.

SAMPLING POINTS EXCEEDING ECRA GUIDELINE LIMITS



* Composite Sample

** Metals indicate excessive levels of 3 or more metals, otherwise specific metals are shown.

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TABLE 6
SUMMARY OF AREA B CHEMICAL ANALYSIS RESULTS

Sample #	M1190	M1191	M1192	M1193	M1196	M1197	M1209	M1242
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Date of Submission	25-Apr	25-Apr	25-Apr	25-Apr	26-Apr	26-Apr	26-Apr	26-Apr
Depth	(-18"	16-36"	(-18"	16-36"	(-18"	16-36"	(-18"	
Composite/Discrete	D	D	D	D	D	D	C	C
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	S
VOLATILE ORGANICS								
PRIORITY POLLUTANTS								
Benzene	22,000	31,100	ND	1.6	BMDL	ND	NA	137
cis-1,3-Dichloropropylene	ND	ND	ND	ND	ND	ND	NA	ND
Ethylbenzene	243,000	80E,000	5.82	ND	4.5	33.9	NA	ND
Methylene chloride	46,800 J3	91,600 J3	ND WJ3	ND WJ4	ND WJ5	ND WJ6	NA	25.9
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	NA	ND
Toluene	265,000	321,000	ND	ND	ND	15.4	NA	ND
Totals	576,800	851,700	5.63	1.6	4.5	49.3	NA	322.9
ADDITIONAL PEAKS (SEMI-QUANTITATIVE)								
2-Methyl hexane	ND	ND	ND	ND	ND	ND	ND	ND
2-Pentanone, 4-Methyl	ND	ND	ND	ND	ND	ND	ND	ND
2-Propanames	ND	ND	6	30	6	32	ND	ND
3-methyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
3-Methyl pentane	89,000	ND	ND	ND	ND	ND	ND	ND
4-Ethyl 2-Pentanone	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl 2-Pentanones	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	ND	ND
Alkanes	ND	ND	ND	ND	ND	ND	ND	ND
Alkyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Benzene ethenyl-methyl	ND	ND	ND	ND	ND	7	ND	ND
Benzene, 1,2,3-trimethyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane, methyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane, 1,1,3-trimethyl	ND	ND	17	20	ND	ND	ND	ND
Cyclohexane, 1,1-dimethyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane, 1,3-dimethyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane, 1,3-dimethyl, cis	ND	ND	30	ND	ND	ND	ND	ND
Cyclohexane, 1,3-dimethyl, trans	ND	ND	9	ND	ND	ND	ND	ND
Cyclohexane, 1,1,3-trimethyl	ND	ND	ND	ND	ND	ND	ND	46
Cyclohexane, 1,2-dimethyl, cis	ND	ND	ND	ND	ND	ND	ND	37
Cyclohexane, 1,2-dimethyl, trans	ND	ND	ND	ND	ND	ND	ND	67
Cyclohexane, 1,3-dimethyl, trans	ND	ND	ND	ND	ND	ND	ND	26
Cyclohexane, 1,4-dimethyl, cis	ND	ND	ND	ND	ND	ND	ND	44
Cyclohexane, 1-ethyl-4-methyl cis	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane, 1-ethyl-4-methyl trans	ND	ND	ND	ND	ND	ND	ND	46
Cyclohexanone, 3,3,5-trimethyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclooctane, butyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclopentane, methyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclopentane, 1,3-dimethyl, trans	ND	ND	ND	ND	ND	ND	ND	10
Dimethyl benzenes	ND	ND	ND	ND	ND	162	ND	ND

J3 = Estimated concentrations due to greater than 25% difference between RF for initial calibration and RF for continuing calibration
ND = Not Detectable
BMDL = Below Minimum Detection Limits
WJ3 = Estimated quantitation limit 16.4ug/kg
WJ4 = Estimated quantitation limit 27.1ug/kg
WJ5 = Estimated quantitation limit 22.9ug/kg
WJ6 = Estimated quantitation limit 17.6ug/kg

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

Sample #	N1190	N1191	N1192	N1193	N1196	N1197	N1209	N1242
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Date of Submission	25-Apr	25-Apr	25-Apr	25-Apr	26-Apr	26-Apr	26-Apr	26-Apr
Depth	0-18"	18-36"	0-18"	18-36"	0-18"	18-36"	0-18"	
Composite/Discrete	D	D	D	D	D	D	C	C
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	S
VOLATILE ORGANICS ADDITIONAL PEAKS (SEMI-QUANTITATIVE) CONTINUED								
dimethyl cyclohexane	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl cyclopentane	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl-3-hexene	ND	ND	ND	ND	ND	ND	ND	ND
Ethane, 1,1'-oxybis	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl-methyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Heptane, methyl	ND	ND	ND	ND	ND	ND	ND	ND
Hydrocarbons	ND	34,000	ND	ND	ND	ND	ND	ND
Methyl cyclohexane	ND	ND	ND	ND	ND	ND	ND	ND
m-Xylenes	1,610,000	3,200,000	ND	ND	ND	ND	ND	ND
o&p-Xylenes	1,310,000	2,260,000	ND	ND	ND	ND	ND	ND
Pentane, 3-methyl	ND	ND	ND	ND	ND	ND	ND	ND
Pentanes, methyl	ND	ND	ND	ND	ND	ND	ND	15
Propyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	ND	ND	ND	ND	ND	ND	ND	ND
ACID EXTRACTABLES								
PRIORITY POLLUTANTS								
2-Chlorophenol	ND	880	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	470	3,700	ND	ND	ND	ND	ND	1760
2,4-Dimethylphenol	2,650	7,410	5,090	ND	ND	ND	890	2470
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	4,130	1,500	800	ND	NDL	ND	ND	4000
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
Totals	7,450	13,490	5,890	0	0	0	890	8,250
BASE/NEUTRAL EXTRACTABLES								
PRIORITY POLLUTANTS								
Acenaphthene	ND	15,800	ND	ND	ND	180	200	390
Acenaphthylene	ND	5,500	ND	ND	ND	ND	120	ND
Anthracene	4,700	14,600	ND	ND	250	240	230	ND
Benzo(a)anthracene	7,300	22,200	1,900	2,600	380	530	350	1,700
Benzo(a)pyrene	4,600	18,000	2,500	3,100	1,040	680	772	2,500
Benzo(b)fluoranthene	8,450	23,000	3,900	5,700	1,180	730	1,360	4,100
Benzo(ghi)perylene	2,100	4,000	2,600	2,700	1,150	ND	614	ND
bis(2-Ethylhexyl)phthalate	290,000	186,000	7,100	7,500	11,200	2,110	56,000	75,900
Butyl benzyl pthalate	35,100	4,100	ND	ND	1,310	310	1,170	9,030
Chrysene	7,910	24,400	2,200	2,700	690	600	ND	2,100

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

Sample #	N1190	N1191	N1192	N1193	N1196	N1197	N1209	N1242
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Date of Submission	25-Apr	25-Apr	25-Apr	25-Apr	28-Apr	28-Apr	28-Apr	28-Apr
Depth	0-18"	18-26"	0-18"	18-26"	0-18"	18-26"	0-18"	
Composite/Discrete	D	D	D	D	D	D	C	C
Soil (S)/Water (W)/Sediment (X)	E	E	E	E	E	S	S	S
BASE/NEUTRAL EXTRACTABLES, PRIORITY POLLUTANTS CONTINUED								
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	11,800	ND	ND	ND	ND	ND	ND
Diethyl phthalate	7,550	ND	ND	ND	ND	ND	220	ND
Dimethyl phthalate	ND	ND	ND	ND	220	ND	ND	ND
Di-n-butyl phthalate	83,200	113,000 J	1,100 J	1,200 J	700	150	3,870	13,100
2,6-Dinitrotoluene	ND	ND	ND	ND	ND	1,900	ND	ND
Di-n-octyl phthalate	4,400	ND	ND	ND	210	ND	2,060	5,400
Fluoranthene	14,900	35,900	2,100	2,900	670	1,000	490	2,400
Fluorene	7,400	29,300	ND	ND	80	120	220	1,800
Indeno(1,2,3-c,d)pyrene	1,200	3,500	2,100	2,000	877	ND	560	ND
Isophorone	ND	ND	ND	ND	400	ND	ND	ND
Naphthalene	50,800	191,000	1,200	ND	660	290	5,630	21,000
N-Nitrosodiphenylamine	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	26,200	80,800	ND	1,900	670	1,100	966	4,200
Pyrene	19,200	56,200	2,900	4,000	866	950	590	2,700
1,2,4-Trichlorobenzene	5,600	24,700	ND	ND	ND	ND	250	2,100
Totals	575,610	861,500	29,400	27,200	22,882	10,950	78,872	158,420
BASE/NEUTRAL/ACID EXTRACTABLES, ADDITIONAL PEAKS (SEMI-QUANTITATIVE) CONTINUED								
1N-Indene octahydro 2,3,4,4,7,7-hexamethyl	ND	ND	ND	ND	ND	ND	ND	ND
1N-Benzo(b) fluorene	ND	ND	ND	ND	ND	ND	ND	ND
1H-Indene,2,3-dihydro	ND	ND	ND	ND	ND	ND	ND	ND
1N-Inden-5-ol,2,3-dihydro	ND	ND	ND	ND	ND	ND	ND	ND
1,1'-Biphenyl	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,4-Tetramethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trimethyl benzene	49,800	ND	ND	ND	ND	ND	ND	ND
1-Methyl anthracene	NS	ND	ND	ND	ND	ND	ND	ND
2,6-Dimethyl nonane	ND	ND	ND	ND	ND	ND	NP	ND
2-Ethyl hexanone	ND	ND	ND	ND	NP	ND	ND	ND
2-Ethyl naphthalene	ND	ND	ND	NP	ND	ND	ND	2tr601
2-hydroxy benzaldehyde	ND	ND	2,650	ND	ND	ND	ND	ND
2-methyl 1,1'-biphenyl	ND	ND	NP	ND	ND	NP	ND	ND
2-Methyl anthracenes	ND	ND	ND	ND	ND	ND	ND	ND
2-Methyl naphthalene	ND	ND	ND	ND	ND	ND	ND	ND
2-Methyl phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND
2-methyl phenol	ND	ND	2,700	ND	ND	ND	ND	ND
2-Propenoic acid, 2-methyl, Dodecyl ester	ND	ND	ND	ND	ND	ND	ND	ND

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

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

Sample #	N1190	M1151	M1192	M1193	N1196	M1197	N1209	M1242
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Date of Submission	25-Apr	25-Apr	25-Apr	25-Apr	26-Apr	26-Apr	26-Apr	26-Apr
Depth	0-16"	16-36"	0-18"	16-36"	0-18"	16-36"	0-18"	
Composite/Discrete	D	D	D	D	D	D	C	C
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	S
BASE/NEUTRAL/ACID EXTRACTIBLES, ADDITIONAL PEAKS (SEMI-QUANTITATIVE) CONTINUED								
3-Ethyl-2-Methyl heptane	ND	21,100	ND	ND	ND	ND	ND	ND
3-Methyl phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND
3-Methyl phenol	ND	ND	ND	ND	ND	ND	ND	6,676
4-Methyl phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl phenols	ND	ND	73,500	ND	ND	ND	ND	10,771
Alkanes	196,600	243,500	17,170	ND	ND	2,341	13,350	123,250
Benzenesulfonamide, 4-methyl	ND	ND	ND	ND	376	ND	ND	ND
Bicyclo(3,2,1)oct-2-ene,3-methyl-4-methylene	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane,pentyl	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl 2-pentenes	ND	ND	7,250	ND	ND	ND	ND	ND
Dimethyl ethyl phenol	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl heptane	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl naphthalenes	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl pentenes	ND	ND	ND	ND	ND	514	ND	ND
Dimethyl phenanthrenes	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phenols	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl-ethyl benzenes	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl-ethyl phenol	ND	ND	ND	ND	ND	ND	ND	56,969
Ethanone, 1-(4-ethyl phenyl)-ethyl	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl benzenes	91,300	67,700	ND	ND	564	ND	ND	53,189
Ethyl methyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl naphthalene	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl phenols	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl- methyl benzenes	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl-1,2,3-trimethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl-1,2,4-trimethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl-dimethyl benzenes	96,300	ND	ND	ND	773	ND	31,040	114,556
Ethyl-methyl benzenes	385,900	129,900	7,870	ND	404	875	ND	275,877
Ethyl-methyl phenols	ND	ND	ND	ND	ND	ND	ND	0
Ethyl-propyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Hexadecanoic acid	ND	ND	ND	ND	ND	ND	ND	ND
Hexanal	ND	ND	ND	ND	ND	ND	ND	ND
Hydroxy benzaldehyde	ND	ND	ND	ND	ND	ND	ND	ND
Methoxy benzaldehyde	ND	ND	19,600	ND	ND	ND	ND	ND
Methyl benzenes	113,000	47,400	ND	ND	3,227	2,620	ND	63,345
Methyl ethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Fluorenes	ND	ND	ND	ND	ND	ND	ND	ND
Methyl naphthalene	ND	ND	ND	ND	ND	ND	ND	ND
Octyl phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND
Methyl phenols	ND	ND	ND	ND	ND	ND	ND	ND
Methyl-ethyl benzene	ND	45,700	ND	ND	ND	ND	ND	ND

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

Sample #	M1190	M1191	M1192	M1193	M1194	M1197	M1205	M1247
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Date of Submission	25-Apr	25-Apr	25-Apr	25-Apr	25-Apr	25-Apr	25-Apr	25-Apr
Depth	0-18"	16-36"	0-18"	16-36"	0-18"	18-56"	0-18"	
Composite/Discrete	D	D	D	D	D	D	C	C
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	S
BASE/NEUTRAL/ACID EXTRACTABLES, ADDITIONAL TEALS (SEMI-QUANTITATIVE) CONTINUED								
Methyl-ethyl phenols	ND	ND	ND	ND	ND	ND	ND	ND
Methyl-methyl ethyl phenols	ND	ND	ND	ND	ND	ND	ND	ND
Methyl-methyl-ethyl benzenes	ND	48,400	ND	3,180	ND	ND	ND	ND
Methyl-naphthalene	ND	26,300	ND	ND	ND	ND	ND	ND
Methyl-propyl benzenes	81,900	26,500	ND	ND	ND	ND	8,925	ND
Naphthalene,Decahydro,trans	ND	ND	ND	ND	ND	ND	ND	ND
N-propyl benzamide	ND	ND	ND	ND	ND	ND	ND	ND
Phosphoric acid, triphenyl ester	ND	ND	ND	ND	ND	ND	ND	ND
Propyl benzenes	27,000	17,700	ND	ND	ND	ND	ND	ND
Tetrachlorobiphenyls	ND	ND	ND	ND	ND	ND	ND	ND
Tetradecanoic acid	ND	ND	ND	ND	ND	ND	ND	ND
Tetramethyl benzenes	112,200	ND	ND	ND	1,182	ND	5,002	25,960
Tetramethyl butyl phenols	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Triethyl benzenes	ND	82,100	ND	ND	894	ND	ND	ND
Trimethyl naphthalenes	ND	ND	ND	ND	ND	ND	ND	ND
Trimethyl phenols	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	475,000	228,700	2,600	ND	1,868	759	ND	232,560
PCB								
PRIORITY POLLUTANTS								
Aroclor 1343	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1354	27,000 J1	72,000 J1	37,000 J1	1,400 J1	1,800 J1	140 J1	2,800 J1	1,100 J1
Totals	27,000 J1	72,000 J1	37,000 J1	1,400 J1	1,800 J1	140 J1	2,800 J1	1,100 J1
METALS UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
PRIORITY POLLUTANTS								
Antimony	12.00	18.00	1.70	2.20	1.00	1.30	4.70	12.00
Arsenic	98.00	72.00	24.00	28.00	5.60	1.50	18.00	62.00
Beryllium	1.20	0.18	0.52	0.59	0.38	0.34	0.25	9.70
Cadmium	62	71	6	10	7.90	0.25	27	28
Chromium	790	590	47	96	120	10.00	205	510
Copper	1,580	870	380	430	140	24	1150	2,050
Lead	8,200	5,520	1,440	ND	1,010	1,080	2,800	5,600
Mercury	9.10	1.80	1.60	1.80	1.90	0.27	1.20	3.60
Nickel	140	110	27	5.40	24.00	8.50	110	210
Selenium	ND	ND	ND	ND	ND	ND	ND	ND

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

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

Sample #	M1190	M1191	M1192	M1193	M1196	M1197	M1209	M1742
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Date of Submission	25-Apr	25-Apr	25-Apr	25-Apr	28-Apr	28-Apr	28-Apr	28-Apr
Depth	0-18"	18-36"	0-18"	16-36"	0-18"	18-36"	0-18"	
Composite/Discrete	D	D	D	D	D	D	C	C
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	S
METALS, PRIORITY POLLUTANTS CONTINUED								
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Silver	2.80	3.70	6.40	4.30	0.69	0.22	6.40	4.40
Thallium	ND	ND	0.14	ND	0.39	0.23	0.43	ND
Zinc	8,120	4,970	1,050	1,400	640	130	2,760	12,200
Totals	16,976	15,327	3,014	1,979	1,962	1,247	6,885	20,699
PESTICIDES								
PRIORITY POLLUTANTS								
Beta-BHC	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	ND	ND	ND	ND	ND	ND	ND	ND
Totals	0	0	0	0	0	0	0	0
PHENOLICS & CYANIDE								
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Phenolics, Total	13.00	0.34	0.35	0.13	0.38	0.07	1.90	5.90
Cyanide, Total	16.00	13.00	1.70	3.30	3.30	1.00	0.73	16.00

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mples M1190 and M1191 were the only samples in Area B to have excessive vels of contamination from volatile organics (see Table 6 and Figure 4). 190 (0-18") and M1191 (18-36") both exceeded the clean-up levels of mg/kg tal volatile organics (VOA) used by the BISE, with total priority pollu- t concentrations of 579 mg/kg and 852 mg/kg, respectively. There are so high concentrations of the non-priority pollutant VOA xylene (in all s isomeric forms) in samples M1190 and M1191. It is not surprising that e deeper sample had higher VOA concentrations as samples closer to the rface volatilize more easily. No other samples in Area B had concen- ations of VOAs exceeding 1 mg/kg.

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

ere was no consistency in the results with respect to depth, as some ganic parameters were higher in the 0-18" interval than in the 18-36" terval, while others were higher in the lower depth interval than in the rface interval. For example, in samples M1190 and M1191, most of the iority pollutant base/neutral organic parameters were higher in M1191 an in M1190, while for alkanes (a nonpriority pollutant), xylenes and her non-priority pollutant base/neutrals, the reverse was true. The same true for M1192, M1193 and M1196/M1197 (which is upgradient of the M1190/ 191), but with lower concentrations.

e alkane concentrations in the borings of samples M1192/M1193 and M1196/ 197 were likewise inconsistent, but to a greater degree. For M1192 -18") the alkane concentration was 17.2 mg/kg while from 18"-36" (M1193) ere was no detectable concentration. The opposite is true for samples 196 and M1197: M1196 had no detectable levels of alkane while M1197 had 2 mg/kg. Samples M1190/M1191, the boring for which is only 75 feet south that for M1196/M1197, had high concentrations in both intervals.

CB's also greatly exceeded cleanup levels of 1-5 mg/kg in samples M1190, 191 and M1192 with concentrations of 87 mg/kg, 73 wg/kg and 37 wg/kg, espectively. Samples M1190 and M1191 also exceed USEPA trigger levels 50 mg/kg.

eavy metal concentrations that exceeded BISE cleanup levels were detected all soil samples in Area B. The metals were the same as those found in ea A but with the addition of Arsenic (As), nickel (Ni), and silver (Ag). e highest levels were found in samples M1190/M1191 with Pb (8,200/8,520 g/kg), Cr (790/590 mg/kg), Cd (63/71 mg/kg), Hg (9.1/1.9 mg/kg), 2n (6,120 ,970 mg/kg), and Cu (1,580/870 mg/kg) well above other discrete soil mples concentrations. Only composite sample M1242 (18-36") had higher evels of Cu and Zn.

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

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TABLE 7
SUMMARY OF AREA C CHEMICAL ANALYSIS RESULTS

Sample #	M1194	M1195	M1203	M1205	M1206	M1207	M1208	M1217
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	26-Apr	26-Apr	06-May	06-May	06-May	26-Apr	26-Apr	27-May
Depth	0-18"	16-36"	5-5'	13-15'	17.5-19	0-18"	16-36"	
Composite/Discrete	D	D	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	W
VOLATILE ORGANICS								
PRIORITY POLLUTANTS								
Benzene	ND	ND	85.3	5.6	ND	4.53	1,100	5.56
cis-1,3-Dichloropropylene	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	333	46	111	19.9	44,300	15.9
Methylene chloride	ND UJ7	ND UJ6	34	ND	44	46.9 J2	5,280 J3	ND UJ9
Tetrachloroethylene	ND	ND	6.6	ND	ND	ND	ND	ND
Toluene	2.1	ND	316	58	85	25.2	218,000	76.6
Totals	2.1	0	777.1	109.6	240	96.53	266,680	96.06
VOLATILE ORGANICS, ADDITIONAL PEAKS (SEMI-QUANTITATIVE)								
2-Methyl hexane	ND	ND	295	ND	ND	ND	ND	ND
2-Pentanone, 4-Methyl	ND	ND	ND	ND	ND	ND	ND	323
2-Propanones	ND	ND	ND	71	ND	1,050	ND	64
3-methyl benzene	ND	ND	ND	ND	ND	ND	62,000	ND
3-Methyl pentane	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyl 2-Pentanone	ND	ND	572	ND	ND	ND	ND	ND
4-Methyl 2-Pentanones	ND	ND	ND	1,023	240	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	ND	ND
Alkanes	ND	ND	409	ND	ND	ND	ND	ND
Alkyl benzene	ND	ND	ND	ND	ND	ND	42,000	ND
Benzene ethenyl-methyl	ND	ND	ND	ND	ND	ND	ND	ND
Benzene, 1,2,3-trimethyl	ND	ND	ND	ND	ND	ND	ND	ND
Cycloheptane, methyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexanes, 1,1,3-trimethyl	ND	ND	ND	ND	ND	160	ND	ND
Cyclohexane, 1,1-dimethyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane, 1,3-dimethyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexanes, 1,3-dimethyl, cis	ND	ND	ND	ND	ND	94	ND	ND
Cyclohexanes, 1,3-dimethyl,trans	ND	ND	ND	ND	ND	53	ND	ND
Cyclohexane,1,1,3-trimethyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane,1,2-dimethyl,cis	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane,1,2-dimethyl,trans	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane,1,3-dimethyl,trans	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane,1,4-dimethyl,cis	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane,1-ethyl-4-methyl cis	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane,1-ethyl-4-methyl trans	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexanone, 3,3,5-trimethyl	ND	ND	ND	ND	ND	ND	ND	35
Cyclooctane, butyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclopentane, methyl	ND	ND	ND	ND	ND	994	ND	ND
Cyclopentane,1,3-dimethyl,trans	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl benzene	ND	ND	ND	ND	ND	647	ND	ND

J2 = Estimated concentration due to %RSD for response factor in initial calibration higher than 30%
J3 = Estimated concentration due to greater than 25% difference between RF for initial calibration and RF for continuing calibration
ND = Not Detectable
BMDL = Below Minimum Detection Limits
UJ7 = Estimated quantitation limit 18.4ug/kg
UJ6 = Estimated quantitation limit 18.5ug/kg
UJ9 = Estimated quantitation limit 11.0ug/l

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

Sample #	M1194	M1195	M1203	M1205	M1206	M1207	M1208	M1117
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	26-Apr	26-Apr	06-May	06-May	06-May	26-Apr	26-Apr	27-May
Depth	6-18"	16-36"	3-5'	13-15'	17.5-19	0-16"	16-36"	
Composite/Discrete	D	D	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	W
BASE/NEUTRAL/ACID EXTRACTIBLES, ADDITIONAL PEAKS (SEMI-QUANTITATIVE) CONTINUED								
3-Ethyl-2-Methyl heptane	ND	ND	ND	ND	ND	ND	ND	ND
3-Methyl phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND
3-Methyl phenol	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl phenols	ND	ND	ND	ND	ND	ND	ND	ND
Alkanes	2,670	ND	53,000	ND	937	ND	2,790	ND
Benzenesulfonamide, 4-methyl	ND	ND	ND	ND	ND	ND	ND	ND
Bicyclo(3,2,1)oct-2-ene,3-methyl-4-methylene	ND	ND	ND	ND	ND	ND	2,670	ND
Cyclohexane,pentyl	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl benzene	ND	ND	ND	ND	ND	ND	2,560	ND
Diethyl 2-pentanes	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl ethyl phenol	ND	ND	ND	1,400	ND	ND	ND	ND
Dimethyl heptane	1,630	ND	ND	ND	ND	ND	ND	ND
Dimethyl naphthalenes	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl pentenes	ND	165,770	ND	ND	ND	ND	ND	ND
Dimethyl phenanthrenes	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phenols	ND	ND	6,660	1,090	6,019	ND	ND	ND
Dimethyl-ethyl benzenes	ND	ND	29,000	ND	ND	ND	ND	ND
Dimethyl-ethyl phenol	ND	RD	ND	ND	ND	ND	ND	ND
Ethanone, 1-(4-ethyl phenyl)-ethyl	ND	ND	ND	21,210	ND	ND	ND	ND
Ethyl benzenes	ND	ND	ND	ND	ND	270	2,450	ND
Ethyl methyl benzene	ND	ND	ND	ND	ND	ND	16,730	ND
Ethyl naphthalene	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl phenols	ND	ND	6,890	11,410	ND	ND	ND	ND
Ethyl- methyl benzenes	ND	ND	ND	ND	ND	ND	10,770	ND
Ethyl-1,2,3-trimethyl benzene	ND	ND	ND	ND	ND	ND	1,960	ND
Ethyl-1,2,4-trimethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl-dimethyl benzenes	ND	ND	ND	ND	ND	ND	16,100	ND
Ethyl-methyl benzenes	ND	ND	299,300	ND	3,290	315	ND	ND
Ethyl-methyl phenols	ND	ND	17,880	16,280	4,210	ND	ND	ND
Ethyl-propyl benzene	ND	ND	35,100	ND	ND	ND	ND	ND
Hexadecanoic acid	ND	ND	ND	ND	ND	ND	ND	ND
Hexanal	ND	ND	ND	ND	ND	ND	ND	ND
Hydroxy benzaldehyde	ND	ND	ND	ND	ND	ND	ND	ND
Methoxy benzaldehyde	ND	ND	ND	ND	ND	ND	ND	ND
Methyl benzoes	13,280	11,920	ND	ND	ND	1,585	7,780	ND
Methyl ethyl benzene	ND	ND	ND	ND	ND	ND	1,375	ND
Methyl fluorenes	ND	ND	ND	ND	ND	ND	ND	ND
Methyl naphthalene	ND	ND	ND	ND	1,190	ND	ND	ND
Methyl phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND
Methyl phenols	ND	ND	13,100	26,070	9,870	ND	ND	ND
Methyl-ethyl hexane	ND	ND	ND	ND	ND	ND	ND	ND

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

Sample #	N1194	N1195	M1203	M1205	M1206	M1207	M1206	M1217
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	26-Apr	26-Apr	06-May	06-May	06-May	26-Apr	26-Apr	27-May
Depth	0-18"	16-36"	3-5'	13-15'	17.5-19	0-16"	18-36"	
Composite/Discrete	D	D	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	W
VOLATILE ORGANICS ADDITIONAL PEAKS (SEMI-QUANTITATIVE) CONTINUED								
dimethyl cyclohexane	ND	ND	179	ND	ND	ND	ND	ND
Dimethyl cyclopentane	ND	ND	218	ND	ND	ND	ND	ND
Dimethyl-3-hexene	ND	ND	412	ND	ND	ND	ND	ND
Ethane, 1,1'-oxybis	ND	ND	ND	ND	ND	ND	ND	13
Ethyl-methyl benzene	ND	ND	ND	ND	ND	ND	ND	21
Heptane, methyl	ND	ND	ND	ND	ND	115	ND	ND
Hydrocarbons	ND	ND	ND	ND	ND	ND	13,000	ND
Methyl cyclohexane	ND	ND	2,076	ND	ND	ND	ND	ND
m-Xylenes	ND	ND	ND	ND	ND	ND	1,010,000	ND
o&p-Xylenes	RD	ND	ND	ND	ND	ND	769,000	ND
Pentane, 3-methyl	ND	ND	ND	ND	ND	ND	ND	ND
Pentanes, methyl	ND	ND	ND	ND	ND	9,550	ND	ND
Propyl benzene	ND	ND	ND	ND	ND	ND	187,000	ND
Xylenes	ND	ND	7,105	91	1,535	ND	ND	326
ACID EXTRACTABLES								
PRIORITY POLLUTANTS								
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	188,000	79,900	11,500	ND	3,600	660
Pentachlorophenol	ND	ND	ND	ND	ND	ND	1,000	ND
Phenol	ND	ND	27,700	58,900	750	ND	17,600	677
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	650	ND
Totals	0	0	215,700	136,800	12,250	0	22,850	1,737
BASE/NEUTRAL EXTRACTABLES								
PRIORITY POLLUTANTS								
Acenaphthene	ND	ND	BMDL	19,600	ND	ND	ND	9.2
Acenaphthylene	ND	ND	ND	ND	ND	250	ND	ND
Anthracene	ND	ND	BMSL	15,300	310	140	ND	ND
Benzo(a)anthracene	ND	ND	BMDL	16,600	300	500	ND	SD
Benzo(a)pyrene	ND	ND	10,100	11,000	510	994	ND	ND
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	1,200	ND	ND
Benzo(ghi)perylene	ND	ND	BMDL	BMDL	350	895	ND	ND
bis(2-Ethylhexyl)phthalate	4,100	1,700	61,700	ND	1,500	4,620	411,000	ND
Butyl benzyl phthalate	ND	ND	BMDL	ND	RD	110	26,500	ND
Chrysene	ND	ND	BMDL	ND	330	670	ND	ND

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

Sample #	N1194	N1195	N1203	N1205	N1206	N1207	N1206	M1217
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	26-Apr	26-Apr	06-May	06-May	06-May	26-Apr	26-Apr	27-May
Depth	0-18"	16-36"	3-5'	13-15'	17.5-19	0-18"	16-36"	
Composite/Discrete	D	D	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	W
BASE/NEUTRAL EXTRACTABLES, PRIORITY POLLUTANTS CONTINUED								
Dibenzo(a,h)anthracene	ND	ND	ND	BNDL	ND	140	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ND	ND	ND	ND	ND	ND	11,500	ND
Dimethyl phthalate	ND	ND	ND	ND	ND	ND	22,000	ND
Di-n-butyl phthalate	ND	ND	11,300	45,300	480	96	87,900	ND
2,6-Dinitrotoluene	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ND	ND	ND	ND	ND	ND	15,700	ND
Fluoranthene	ND	ND	12,200	32,000	630	460	3,400	ND
Fluorene	ND	ND	BNDL	19,300	360	ND	2,800	3.15
Indeno(1,2,3-c,d)pyrene	ND	ND	BNDL	BNDL	280	640	ND	ND
Isophorone	ND	ND	ND	ND	ND	260	ND	ND
Naphthalene	ND	ND	44,700	13,700	1,660	240	179,000	16.3
N-Nitrosodiphenylamine	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ND	ND	18,900	48,400	1,150	430	8,180	4.9
Pyrene	ND	ND	11,700	25,300	530	894	4,700	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	6,200	ND
Totals	4,100	1,700	170,600	246,700	8,390	12,539	778,880	34
BASE/NEUTRAL/ACID EXTRACTABLES, ADDITIONAL PEAKS (SEMI-QUANTITATIVE)								
1H-Indene octahydro 2,2,4,4,7,7-hexamethyl	ND	ND	ND	ND	ND	ND	ND	ND
1H-Benzo(b) fluorene	ND	ND	ND	ND	ND	ND	ND	ND
1H-Indene,2,3-dihydro	ND	ND	ND	ND	ND	ND	2,250	ND
1H-Inden-5-ol,2,3-dihydro	ND	ND	19,700	ND	ND	ND	ND	ND
1,1'-Biphenyl	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,4-Tetramethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trimethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
1-Methyl anthracene	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dimethyl nonane	ND	ND	ND	ND	ND	ND	ND	ND
2-Ethyl hexanoic	ND	ND	ND	ND	ND	ND	ED	ND
2-Ethyl naphthalene	ND	ED	ND	ED	ND	ED	ED	ED
3-hydroxy benzaldehyde	ED	ND	ND	ND	ND	ND	ND	ND
4-Methyl 1,1'-biphenyl	ND	ND	ND	ND	ND	ND	ND	ND
9-Methyl anthracenes	ED	ND	ND	ND	ND	ND	ND	ND
2-Methyl naphthalene	ND	ND	ND	ND	ND	ND	ND	ND
2-Methyl phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND
3-methyl phenol	ND	ND	ED	ED	ND	ND	ED	ND
2-Propenoic acid, 2-Methyl, Dodecyl ester	ND	ED	ED	ED	ND	ND	ED	ED

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TABLE 7 (CONTINUED)
SUMMARY OF AREA 6 CHEMICAL ANALYSIS RESULTS

Sample #	M1194	M1195	M1203	M1205	M1206	M1207	M1208	M1217
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	28-Apr	28-Apr	06-May	06-May	06-May	28-Apr	28-Apr	27-May
Depth	0-18"	18-36"	3-5'	13-15'	17.5-19	0-18"	18-36"	
Composite/Discrete	D	C	D	D	C	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	W
BASE/NEUTRAL/ACID EXTRACTIBLES, ADDITIONAL GCAAS (SEMI-QUANTITATIVE) CONTINUED								
Methyl-ethyl phenols	ND	ND	1,000	ND	910	ND	ND	ND
Methyl-methyl ethyl phenols	ND	ND	ND	3,970	ND	ND	ND	ND
Methyl-methyl-ethyl benzenes	ND	ND	ND	ND	[illegible]	ND	1,750	ND
Methyl-naphthalene	ND	ND	ND	ND	ND	ND	ND	ND
Methyl-propyl benzenes	ND	ND	ND	ND	ND	ND	4,805	ND
Naphthalene,decahydro,trans	ND	ND	ND	ND	ND	ND	ND	ND
N-propyl benzamide	ND	ND	ND	ND	ND	ND	ND	ND
Phosphoric acid, tripenyl ester	ND	ND	ND	2,890	ND	ND	ND	ND
Propyl benzenes	ND	ND	ND	ND	ND	ND	4,700	ND
Tetrachlorobiphenyls	ND	ND	ND	ND	ND	612	ND	ND
Tetradecanoic acid	ND	ND	ND	ND	ND	ND	ND	ND
Tetramethyl benzenes	ND	ND	57,700	ND	ND	ND	4,960	ND
Tetramethyl butyl phenols	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethane	ND	1,530	ND	ND	ND	ND	ND	ND
Trimethyl benzenes	ND	ND	ND	ND	ND	491	28,410	ND
Trimethyl naphthalenes	ND	ND	ND	ND	ND	ND	ND	ND
Trimethyl phenols	ND	ND	2,590	2,900	3,490	ND	ND	ND
Xylenes	ND	ND	98,900	9,370	1,050	749	76,000	ND
PCB								
PRIORITY POLLUTANTS								
Aroclor 1742	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	500 J1	79 J1	ND	ND	1,100 J1	5,300 J1	50,000 J1	ND
Totals	500 J1	79 J1	0	0	1,100 J1	5,500 J1	50,000 J1	0
METALS								
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/L
PRIORITY POLLUTANTS								
Antimony	0.90	0.20	19.00	ND	ND	5.20	0.70	2.60
Arsenic	4.50	3.70	11.00	5.90	1.30	14.00	7.70	2.00
Beryllium	0.16	0.14	ND	ND	ND	0.32	0.49	ND
Cadmium	0.49	ND	0.20	ND	ND	9.90	12	ND
Chromium	19	9.00	3.30	1.10	ND	130	290	2.30
Copper	29	22	4.80	1.00	ND	250	350	8.30
Lead	43	43	2,750	350	90	1,060	1,980	ND
Mercury	0.39	0.10	1.80	1.90	0.09	2.00	1.30	ND
Nickel	7.40	5.70	ND	0.50	ND	35	57	27
Selenium	ND	ND	3.90	0.32	ND	0.40	1.00	ND

J1 = Estimated Concentration. Samples were reextracted past holding time limits as specified in [illegible]

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TABLE 7
SUMMARY OF AREA C CHEMICAL ANALYSIS RESULTS

Sample #	M1194	M1195	N1203	M1205	M1206	N1207	M1208	M1217
units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	26-Apr	28-Apr	06-May	06-May	06-May	26-Apr	28-Apr	27-May
Depth	0-18"	18-36"	3-5'	15-15'	17.5-19	0-18"	16-36"	
Composite/Discrete	D	D	D	D	D	D	C	I
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	W
METALS, PRIORITY POLLUTANTS CONTINUED								
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/L
Silver	0.18	0.11	ND	ND	ND	1.10	0.99	ND
Thallium	0.43	2.30	ND	ND	ND	0.33	0.33	ND
Zinc	67	49	18.00	3.70	ND	705	2,200	69.00
Totals	172	137	2,822	366	91	2,213	4,898	106
PESTICIDES								
PRIORITY POLLUTANTS								
Beta-BHC	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	ND	ND	ND	ND	ND	ND	ND	ND
Totals	0	0	0	0	0	0	0	0
PHENOLICS & CYANIDE								
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L
Phenolics, Total	0.11	0.12	0.40	1700	0.30	0.62	0.47	16.30
Cyanide, Total	1.80	0.69	0.90	0.50	4.05	2.60	8.80	0.08

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

Area C

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

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

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

metal concentrations in the first two soil samples from monitoring #2 exceeded BISE cleanup levels for lead and mercury. The lead con- ation was significantly less for the 13 to 15 foot sample (M1205) than 3 to 5 foot layer (M1203) and both lead and mercury totally absent 17.5 to 19 foot sample (M1206). The mercury concentrations were significantly different from sample M1203 (1.3 mg/kg) to sample M1205 g/kg).

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

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

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

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

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

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

4.2 Groundwater

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

Area A

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

Area B

There was no monitoring well located in Area B.

Area C

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

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

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

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

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

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

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

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

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

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE May 16, 1984

SUBJECT Bayonne Barrel and Drum RCRA Sampling Results (MJD009871401)

FROM Louis DiGuardia, Geologist 5/16/84
Source Monitoring Section

TO William K. Sawyer, Attorney
Waste and Toxic Substances Branch

Thru: John Ciancia, Chief
Source Monitoring Section

Richard D. Spear. Chief
Surveillance and Monitoring Branch

On February 17, 1984 a RCRA sampling survey was conducted at Bayonne Barrel and Drum by Joseph Cosentino, Karen Egnot, Steven Hale, Brian Kovak and myself. This survey was conducted at the request of the Waste and Toxic Substances Branch to determine if any actions were taken by Bayonne Barrel and Drum in order to comply with the complaint and compliance order issued May 20, 1982.

The facility located at 150 Raymond Boulevard in Newark, New Jersey was formerly in the business of cleaning and reconditioning dirty and damaged drums. The facility encompasses an area of approximately 20 acres. At the time of the inspection, operations had ceased and the company had filed for bankrupcy.

Drum cleaning operations formerly involved both closed head and open head drums. In closed head cleaning, chains and a caustic solution were used to wash out previous material in the drums. The spent solution drained through an oil-water separator into a 5,000 gallon under ground holding/settling tank and was then pumped into a 60,000 gallon above ground holding/settling tank. The liquid was decanted to the sewer under a permit to the Passaic Valley Sewage Commission. Open head drums were placed on a conveyor belt and moved through an incinerator which burned residue out of the inside. This residue material was collected in two subsurface holding/settling tanks. Approximately 40,000 lbs of incinerator ash and sludge was generated monthly.

Samples were taken from the following areas of concern:

1) Under ground 5,000 gallon holding/settling tank

Sampling #65189 - agueous sample collected from the tank.
Sampling #65190 - composite soil sample collected from the area around the tank.

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EPA Form 1320-6 (Rev. 3-76)

2) Oil/Water Separator

Sample #65188 - aqueous sample collected from oil separator trench.

3) Subsurface tank near incinerator

Sample #65191 - aqueous sample collected from the subsurface tank.
Sample #65192 - composite soil sample near subsurface tank.

4) Incinerator ash waste pile

Sample #65184 - composite sample taken from ash pile
Sample #65185 - " " " " " "
Sample #65186 - " " " " " "
Sample #65187 - composite soil sample taken around ash pile

Sampling equipment and containers were prepared according to EPA standard procedures prior to sampling. A total of nine (9) samples were taken, three (3) aqueous, three (3) soil, and three (3) from the ash pile.

Aqueous samples were analyzed for RCRA characteristics (ignitability and corrosivity) and non-volatile (NVOA) and purgeable (POA) organic priority pollutants. Soil and ash samples were analyzed for the characteristics of EP toxicity (metals, herbicides and pesticides) as defined in RCRA, as well as metal analysis, and priority pollutants (NVOA, POA). All analyses were performed in EPA's Edison, New Jersey laboratory. EPA standard procedures were followed for the collection of samples throughout the survey.

Sample results are given in Tables I thru VI. Results indicate that all samples contained a number of organic compounds. In the incinerator ash waste pile, EP toxicity limits for metals were exceeded for both cadmium and lead. Also, the metals scan showed high levels of heavy metal contamination in all ash and soil samples.

In addition to the above analysis, PCB's in measurable quantities were detected in sample #65187, soil by ash pile.

Attachments:
Figure I - Map of Facilities Grounds
Figure II - Sample Location Map
Tables I-VI - Analytical Results
Appendix I - Photographs
Appendix II - Receipt of Samples

Figure I - Map of Facility Grounds

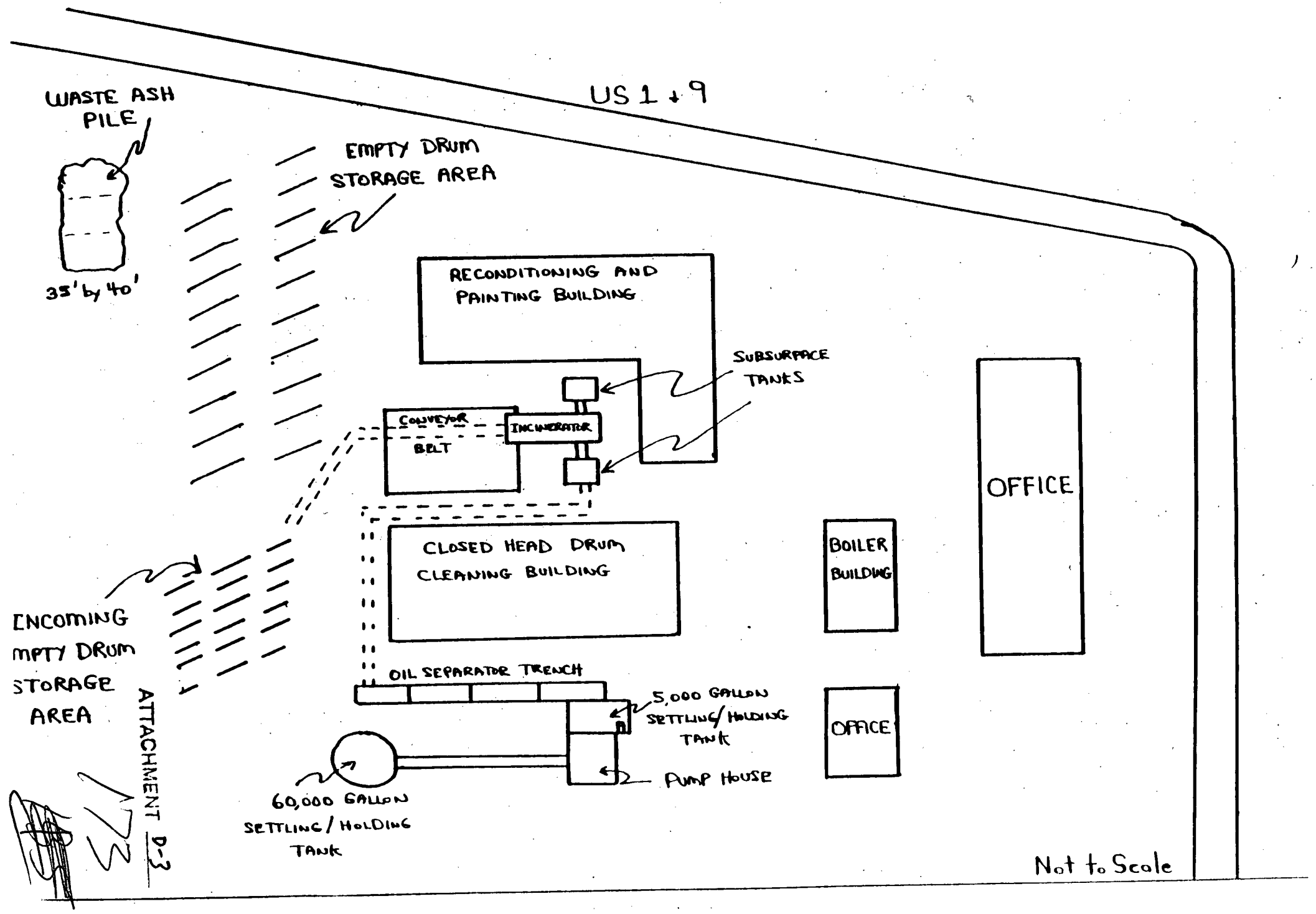

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Table I

Comparison of Waste Analysis to Characteristics of Corrosivity and Ignitability

Parameter	Maximum Allowable Limit	65188	65189	65191
Ignitability	> 140°F	> 140°F	> 140°F	> 140°F
Corrosivity	> 2.5 S.U.	*	*	6.93 S.U.

S.U. - Standard Units

65188 - Oil Separator
65189 - 5000 Gallon Tank
65191 - Subsurface Tank by Incinerator

* - No Analysis Performed

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Comparison of Sample Analysis to Characteristic of EP Toxicity

Parameter	Maximum Concentration for EP Toxicity mg/l	65184 mg/l	65185 mg/l	65186 mg/l	65187 mg/l	65191 mg/l	6519 mg/
Arsenic	5.0	.02K	.02K	.02K	.02K	.02K	.02K
Barium	100.0	4.0	5.3	1.3	1.5	.16	1.7
Cadmium	1.0	.99	1.2	.17	.08	.002K	.04
Chromium	5.0	.02J	.01J	.04	.008K	.02J	.08J
Lead	5.0	7.6	10.0	2.4	.25	.04	.10
Mercury	0.2	.0002K	.0002K	.0002K	.001	.0002K	.000
Selenium	1.0	.008K	.02J	.008K	.008K	.009J	.008
Silver	5.0	.002K	.002J	.002K	.002J	.002K	.002
Endrin	.02	.000008K	.000008K	.000008K	.000008K	.000008k	.000C
Lindane	.4	.00003	.00004	.00023	.00066	.00002	.000C
Methoxychlor	10.0	.00038	.00008K	.00328	.01100	.00054	.000
2,4,-D	10.0	.0003K	.0003K	.0073	.0080	.0003K	.000
Silvex	1.0	.00007K	.00007K	.00007K	.00007K	.00007K	.000C
Toxophene	0.5	.00035K	.00035K	.00035K	.00035K	.00035K	.000

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

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

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Table III

Results of Metals Analysis on Samples

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

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

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

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Table IV

Results of Organics Analysis on Samples

Organic Compounds	65188 ug/l	65189 ug/l	65191 ug/l
Fluoranthene		90J	
Isophoronnne	1800J		1300
Nephthalene	1500J	1400	
Bis(2-ethylhexyl) phthalate	13,000	6900	
Butyl benzly phthalate		1100	
Di-n-butyl phthalate	3800J	1800	
Fluorene		70J	
Phenanthrene	2500J	290	
Pyrene		60J	
Phenol			110J
Toluene			4900

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

65188 - Oil Separator
65189 - 5,000 Gallon Tank
65191 - Subsurface Tank [illegible]or

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Table Va

Results of Organic Analysis Samples

Organic Compounds	65184 ug/kg	65185 ug/kg	65186 ug/kg	65187 ug/kg	65190 ug/kg	6519 ug/k
Acenaphthene			4300J	2500J	1400J	
1,2,4-Trichlorobenzene			8400	1200J		
1,2-Dichlorabenzene		730				
1,4-Dichlorobenzene		240				
1,2-Diphenylhydrazine	3200J		11000	1900J	1500J	2300
Fluoranthene	2600J	280	15000	12000	12000	3700
Isophorane	92000	22000	250000	27000		2500
Naphthalene	110000	8300	180000	18000	22000	1200
N-nitrosodiphenyulamine	20000	120	1700J	2000J	4800J	780J
Bis(2-ethylhexyl)phthalatel	800000	11000	1200000	990000	1200000	2100
Butyl benzyl phthalate	370000	2100	1200000	210000	400000	2000
Di-n-butyl phthalate	450000	2100	330000	110000	280000	2800
Di-n-octyl phthalate	5700J	1200	7200	[illegible]		770J
Diethylphthalate	9700	400				
Dimethylphthalate	24000					
Acenaphthylene	[illegible]	160		1800J		3100
Anthracene	2300J	100	8000	5000J		1400
Fluorene	9400J	57K	7400	3200J	3300J	1600
Phenanthrene	12000	900	32000	17000	28000	7000
Pyrene	3600J	260	14000	15000	9000	4700
Phenol	80000	170	4600	5800J		4700

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

ATTACHMENT D-8

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Table Vb

Results of Organic Analysis on Samples

Organic Compounds	65184 ug/kg/	65185 ug/kg	65186 ug/kg	65187 ug/kg	65190 ug/kg	65[illegible] ug[illegible]
Benzene	160	130	480		15	
1,2-Dichloroethane	46		88	36		
1,1,1-Trichloroethane	58	380	7000	350	15	
1,1-Dichloroethane	320	67	500	16		
1,1,2-Trichloroethane	1300		5000	660		
Chloroform	47	120	160	23		
1,1-dichloroethylene	68		400	13		
1,2-dichloropropane		18K				
Ethylbenzene	3200	1900	65000	120	580	
Methylene Chloride	10000	4600	8700	1500		
Tetrachloroethylene	1800	1300	2600	440	100	
Toluene	28000	11[illegible]	320000	630	1700	
Trichloroethylene	2200	1[illegible]00	8100	29[illegible]	19	
Vinyl Chloride	1600		150			

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

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

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ATTACHMENT D-9

Table VI

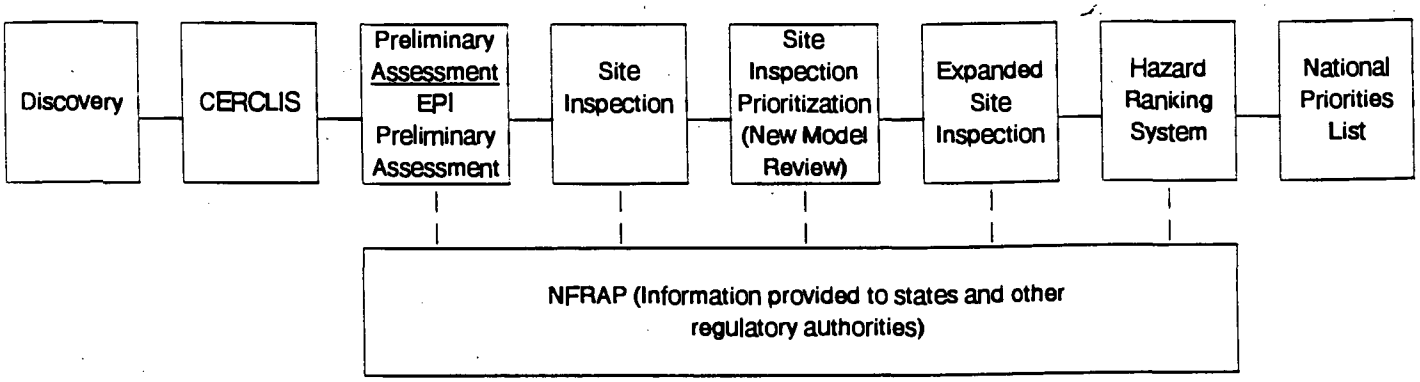
Results for PCB Analysis

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

65187 - Composite soil sample by ash pile

ATTACHMENT 2

SUPERFUND SITE ASSESSMENT PROGRAM



SITE ASSESSMENT REPORTS

1. PRELIMINARY ASSESSMENT
   - * Quick Review of Readily Accessible Records and Reports
   - * Undertaken to Determine the Existence of a Problem and the Need for Further Action at a Site by Characterizing:
     - Magnitude of the Hazard
     - Source and Nature of the Release or Potential Release
     - Identification of Targets
   - * Does Not Include Sample Collection
2. SITE INSPECTION
   - * The Purpose of the Site Inspection is to:
     - Further Define and Characterize the Problem
     - Provide Data for the Hazard Ranking System (HRS) Scoring and Compute initial Score
     - Identification of Targets
     - Determine the Necessity of Further Action
   - * The Site Inspection Involves an On-Site Visit and Sampling (10+/- Samples)
   - * A Site Inspection is not an Extent of Contamination Study
3. SITE INSPECTION PRIORITIZATION
   - * Quick Review of Readily Accessible Records and Reports
   - * Undertaken to Determine the Validity and Update Background Conditions Under the New HRS Model, and the Need for Further Action at a Site by Characterizing:
     - Magnitude of the Hazard
     - Source and Nature of the Release or Potential Release
   - * Included On-Site Visits or Sample Collection as needed
     - Analyze Samples/Limited Analytical Resources
     - Account for Significant Safety Hazards On-Site
4. EXPANDED SITE INSPECTION

   A Follow-Up Inspection May Be Recommended After the SI To:
   - * Gather Additional Data Necessary to Strengthen or Substantiate the Initial HRS Score
     - Geophysical Surveys
     - installation of Groundwater Monitoring Weils
     - Additional Sampling

Review of Analytical Data

If previous analytical data are available, they should be reviewed for information which supports the design of the sampling and analysis program, tests site hypotheses, and documents the site score. The Site Investigation (SI) investigator should review all previous analytical data. While analytical data collected for other purposes may not meet SI objectives, site-specific analytical data are generally helpful in better understanding the nature of the problem at the site, regardless of data sources or data quality. The depth of the review depends on the overall quality and quantity of data, the intended use of the data, and whether they are representative of current site conditions and comparable to SI data. Determining whether available data can be applied as SI-generated data requires the professionai judgement of an experienced reviewer. Both validated and non-validated analytical data may be available. Previous SI data will be validated and of CLP-quality. Non-validated data may contain false positive and false negatives, as well as quantitation, transcription, and calculation errors. If data of unknown or questionable quality are used for decision-making, the investigator shouid review all available information to assess the level of certainty associated with the data. If these data are used for HRS documentation, data validation wiil be necessary. The investigator should be able to determine the general quality of the data set by reviewing QC data for evaluation under the Superfund Program.