2021 Hazardous Waste Scanning Project

File Form Naming Convention.

(File_Type).*(Program)*.*(Site_Number)*.*(YYYY-MM-DD)*.*(File_Name)*.pdf

Note 1: Each category is separated by a period "."
Note 2: Each word within category is separated by an underscore "_"

Specific File Naming Convention Label:

report. HW. 915020. 1990-02-01. Phase 2 _ Vol 2 _ of 2 .pdf

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PHASE II INVESTIGATION

Ferro Corporation - Electro Division Site No. 915020
City of Lackawanna Erie County

DATE: February 1990

VOLUME II - APPENDICES

Prepared for:

New York State Department of Environmental Conservation

50 Wolf Road, Albany, New York 12233
Thomas C. Jorling, *Commissioner*

Division of Hazardous Waste Remediation
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By:

Lawler, Matusky & Skelly Engineers

APPENDICES

APPENDIX A

APPENDIX A

REFERENCE DOCUMENTATION

APPENDIX A
REFERENCE DOCUMENTATION

[1] Recra Research, Inc. 1983. Ferro Corporation New York State Superfund Phase I summary report. Prepared for New York State Department of Environmental Conservation.

[2] Erie County Department of Environment and Planning correspondence. 1978. Letter to J. Marino (Ferro) from D. Tamol (ECDEP).

[3] Ferro Corporation. 21 July 1983 letter to J. Deleo (Erie County Department of Environment and Planning) from D. Parshall.

[4] Sax, N.I., and R.J. Lewis, Sr. 1987. Hawley's Condensed Chemical Dictionary. New York: Van Nostrand Reinhold Co., pp. 699-700.

[5] Erie County Department of Environment and Planning. 13 January 1984. Memo from R.D. Koczaja to D. Campbell.

[6] New York State Department of Environmental Conservation (NYSDEC). 1987. Ferro SPDES discharge permit (expires February 1991).

[7] LaSala, A.M. Jr. 1968. Erie-Niagara basin ground-water resources. New York State Water Resources Commission, Erie-Niagara Basin Regional Water Resources Planning Board. ENB-3. 114 pp.

[8] U.S. Department of Agriculture, Soil Conservation Service. 1986. Soil Survey of Erie County, NY, 384 pp.

[9] New York State Department of Environmental Conservation (NYSDEC). 7 December 1981 field sampling report and analyses.

[10] New York State Department of Environmental Conservation (NYSDEC). 25 June 1986 field sampling results.

[11] New York State Department of Environmental Conservation (NYSDEC). 15 October 1986 field sampling results.

[12] 6 NYCRR Title 6 Environmental Conservation.

[13] Coon, W.F., W.H. Johnston, D.A. Sherwood, and D.D. Deloff. 1987. Water Resources Data, New York, Water Year 1986. Vol. 3, Western New York. U.S. Geological Survey Water-Data Report NY-86-3.

APPENDIX A
REFERENCE DOCUMENTATION
(Continued)

[14] 40 CFR Part 761. Polychlorinated biphenyls spill cleanup policy: final rule.

[15] Genes, B.R., and J. Lynch. 1989. Land treatment of hydrocarbon contaminated soils. In P.T. Kostecki and E.J. Calabrese (eds.), Petroleum Contaminated Soils. Vol. I. Michigan, Lewis Publishers, Inc., pp. 163-174.

REFERENCE 1

915020

FERRO CORPORATION

NEW YORK STATE SUPERFUND
PHASE I SUMMARY REPORT

915020

September 6, 1983

Prepared By:

Recra Research, Inc.
4248 Ridge Lea Road
Amherst, New York 14226

For:

New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233-0001

FERRO CORPORATION

NEW YORK STATE SUPERFUND

PHASE I SUMMARY REPORT

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1.0 Executive Summary

Ferro Corporation - Specialty Ceramics Division is located at 661 Willet Road in the City of Lackawanna, Erie County, New York. The general area can be characterized as urban/industrial with private residences occupying property adjacent to the site on the north and west. Accessibility to the plant is limited by a chain link fence and guard.

The company produces crucible grinding wheels and refractory furniture primarily for industrial clients. Production processes reportedly use no hazardous wastes.

A small lowlying section in the southern portion of the plant property has been used for disposal of off-specification products and floor sweepings. This disposal area was reportedly filled, in preparation for the construction of additional plant facilities.

In late 1981, a tar spill occurred at the plant and subsequently entered a drainage ditch north of the plant property. This material was reportedly removed; however, recent inspection of the area verified the continued presence of the tar-like material.

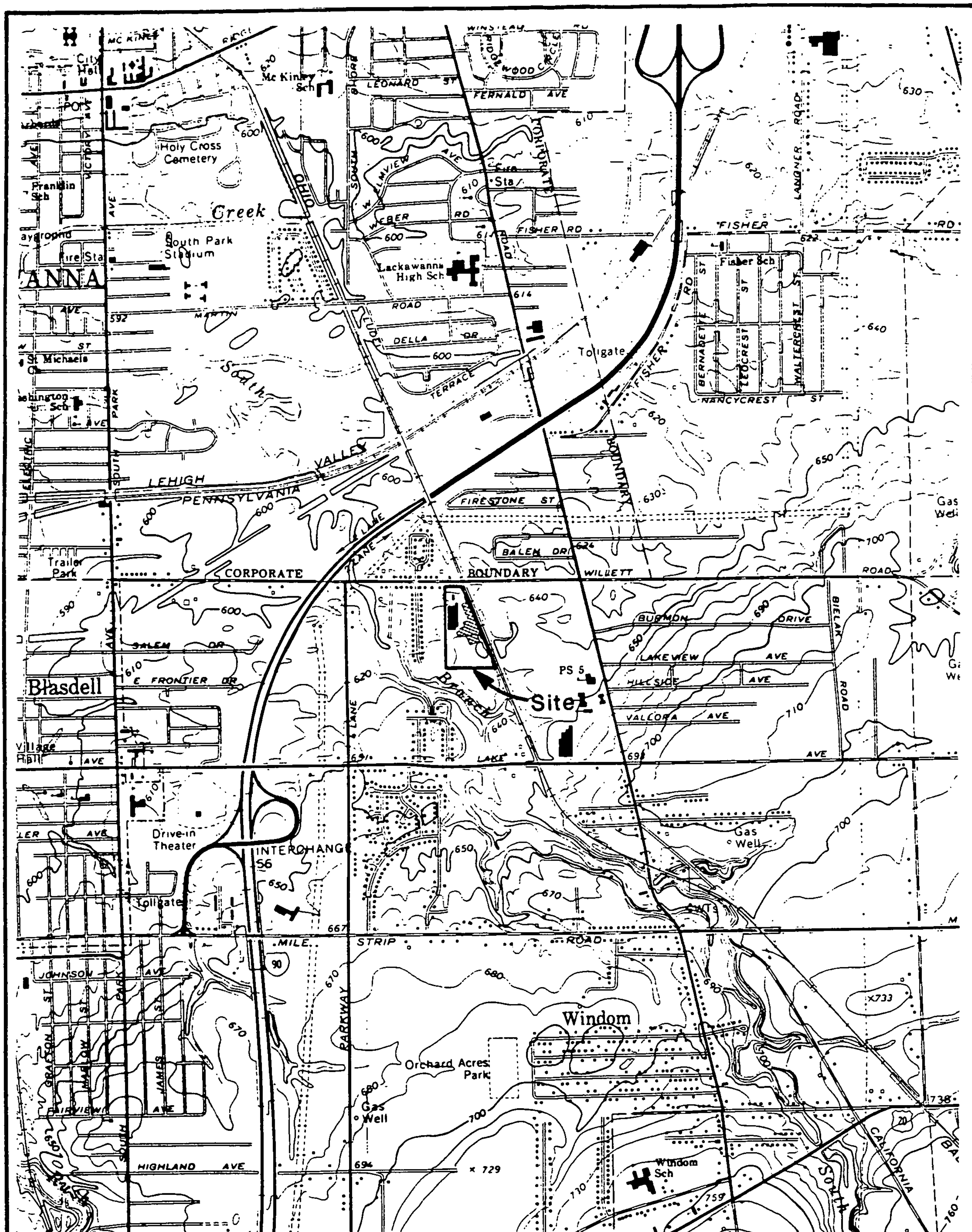
2.0 Site Description

Ferro Corporation - Specialty Ceramics Division is located on Willet Road in an urban area of Lackawanna, Erie County, New York. Plant buildings occupy approximately half of the estimated ten (10) acre total company property. Access to the plant is limited by a guard and chain link fence which surrounds the entire area.

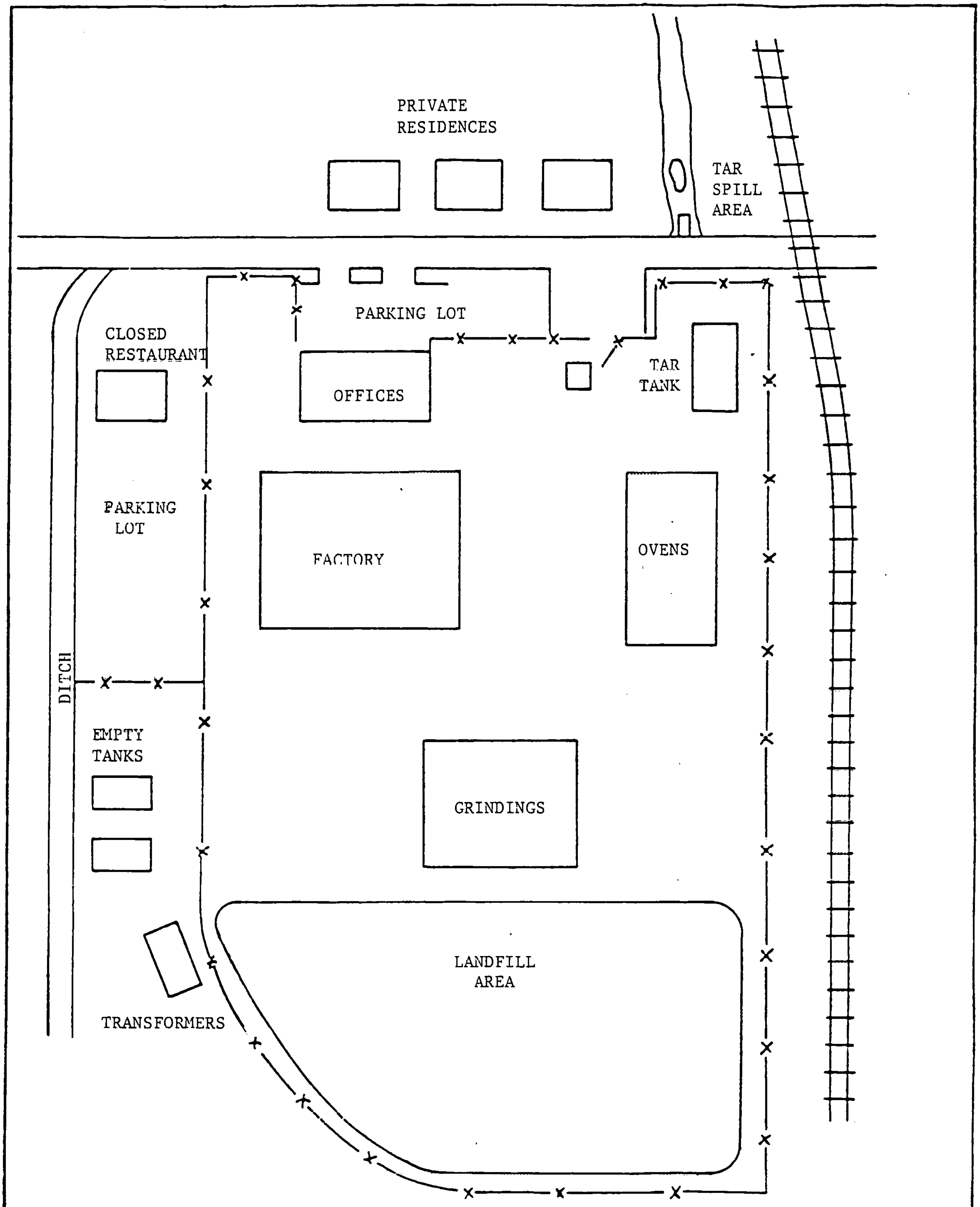
In the southern section of the property an area of approximately 0.5 acres has been used for disposal of products which failed to meet quality control standards. This area was reported to be filled in for the planned construction of an addition to one of the plant buildings. Materials such as grinding wheels, crucibles, and refractory furniture were scattered and piled in the fill area. Some of the debris had been covered with soil and graded.

The plant property is bounded on the north by Willet Road, the south by open land, the east by Baltimore and Ohio railroad tracks and on the west by private residences. A drainage ditch divides the private residences from the Ferro Corporation property. Two outfalls for plant property drainage discharge into this ditch. An additional outfall discharges north into a ditch along the railroad tracks across Willet Road. A tar-like substance was observed in this outfall and in the ditch directly below the outfall.

Topography of the area is basically flat. Surface runoff is directed east, due to the gentle slope of the area, toward the aforementioned drainage ditch. Drainage of the area ultimately discharges into the South Branch of Smoke Creek.



USGS Topographic Map Buffalo SE Quad. 1965	Vicinity Map Ferro Corporation	Figure 1



NOT TO SCALE

SITE MAP
FERRO CORPORATION

FIGURE 2

3.0 PRELIMINARY HAZARD RANKING SYSTEM SCORE

Facility name: Ferro Corporation Specialty Ceramics Division

Location: 661 Willet Rd. Lackawanna, N.Y.

EPA Region: 2

Person(s) in charge of the facility: Daniel Parshall
661 Willet Rd.
Lackawanna, N.Y.

Name of Reviewer: Recra Research, Inc. Date: 9-6-83

General description of the facility:
(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action, etc.)

Active fill area in southern section of plant property, receives off-spec products and floor sweepings. Outfall North of the plant was the site of a tar spell in 1981. Sampling of the site area has revealed some contamination.

Scores: $S_M = 1.9$ ($S_{gw} = 3.28$ $S_{sw} = 0$ $S_a = 0$)

$S_{FE} = 0$

$S_{DC} = 20.8$ Range= 2.0 to 10.0

FIGURE 1
HRS COVER SHEET

Ground Water Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
[1] Observed Release	0 45	1	0	45	3.1
If observed release is given a score of 45, proceed to line [4]. If observed release is given a score of 0, proceed to line [2]					
[2] Route Characteristics					3.2
Depth to Aquifer of Concern	0 1 2 3	2	6	6	
Net Precipitation	0 1 2 3	1	2	3	
Permeability of the Unsaturated Zone	0 1 2 3	1	2	3	
Physical State	0 1 2 3	1	1	3	
	Total Route Characteristics Score		11	15	
[3] Containment	0 1 2 3	1	3	3	3.3
[4] Waste Characteristics					3.4
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	1	8	
	Total Waste Characteristics Score		19	26	
[5] Targets					3.5
Ground Water Use	0 1 2 3	3	3	9	
Distance to Nearest Well/Population Served	0 4 6 8 10 / 12 16 18 20 / 24 30 32 35 40	1	0	40	
	Total Targets Score		3	49	
[6] If line [1] is 45, multiply [1] x [4] x [5] If line [1] is 0, multiply [2] x [3] x [4] x [5]			1881	57,330	
[7] Divide line [6] by 57,330 and multiply by 100	S_{gw} = 3.28				

FIGURE 2
GROUND WATER ROUTE WORK SHEET

Surface Water Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 45	1	45	45	4.1
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.					
2 Route Characteristics					4.2
Facility Slope and Intervening Terrain	0 1 2 3	1	0	3	
1-yr. 24-hr. Rainfall	0 1 2 3	1	2	3	
Distance to Nearest Surface Water	0 1 2 3	2	6	6	
Physical State	0 1 2 3	1	1	3	
	Total Route Characteristics Score		9	15	
3 Containment	0 1 2 3	1	3	3	4.3
4 Waste Characteristics					4.4
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	1	8	
	Total Waste Characteristics Score		19	26	
5 Targets					4.5
Surface Water Use	0 1 2 3	3	0	9	
Distance to a Sensitive Environment	0 1 2 3	2	0	6	
Population Served/Distance to Water Intake Downstream	0 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40	
	Total Targets Score		0	55	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			0	64,350	
7 Divide line 6 by 64,350 and multiply by 100	S_{sw} = 0				

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

Air Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
$\boxed{1}$ Observed Release	0 45	1	0	45	5.1
Date and Location:					
Sampling Protocol:					
If line $\boxed{1}$ is 0, the S_a = 0. Enter on line $\boxed{5}$. If line $\boxed{1}$ is 45, then proceed to line $\boxed{2}$.					
$\boxed{2}$ Waste Characteristics					5.2
Reactivity and Incompatibility	0 1 2 3	1		3	
Toxicity	0 1 2 3	3		9	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
	Total Waste Characteristics Score			20	
$\boxed{3}$ Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 21 24 27 30	1		30	
Distance to Sensitive Environment	0 1 2 3	2		6	
Land Use	0 1 2 3	1		3	
	Total Targets Score			39	
$\boxed{4}$ Multiply $\boxed{1}$ x $\boxed{2}$ x $\boxed{3}$				35,100	
$\boxed{5}$ Divide line $\boxed{4}$ by 35,100 and multiply by 100			S_a = 0		

FIGURE 9
AIR ROUTE WORK SHEET

	s	s^2
Groundwater Route Score (S_{gw})	3.28	10.76
Surface Water Route Score (S_{sw})	0	0
Air Route Score (S_a)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		10.76
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		3.28
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		1.9

FIGURE 10
WORKSHEET FOR COMPUTING S_M

Fire and Explosion Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Containment	1 3	1		3	7.1
2 Waste Characteristics					7.2
Direct Evidence	0 3	1		3	
Ignitability	0 1 2 3	1		3	
Reactivity	0 1 2 3	1		3	
Incompatibility	0 1 2 3	1		3	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
Total Waste Characteristics Score				20	
3 Targets					7.3
Distance to Nearest Population	0 1 2 3 4 5	1		5	
Distance to Nearest Building	0 1 2 3	1		3	
Distance to Sensitive Environment	0 1 2 3	1		3	
Land Use	0 1 2 3	1		3	
Population Within 2-Mile Radius	0 1 2 3 4 5	1		5	
Buildings Within 2-Mile Radius	0 1 2 3 4 5	1		5	
Total Targets Score				24	
4 Multiply 1 x 2 x 3				1,440	
5 Divide line 4 by 1,440 and multiply by 100	S_{FE} = O				

FIGURE 11
FIRE AND EXPLOSION WORK SHEET

Direct Contact Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Observed Incident	0 45	1	0	45	8.1
If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2					
2 Accessibility	0 1 2 3	1	1	3	8.2
3 Containment	0 15	1	15	15	8.3
4 Waste Characteristics Toxicity	0 1 2 3	5	15	15	8.4
5 Targets					8.5
Population Within a 1-Mile Radius	0 1 2 3 4 5	4	20	20	
Distance to a Critical Habitat	0 1 2 3	4	0	12	
Total Targets Score			20	32	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			4500	21,600	
7 Divide line 6 by 21,600 and multiply by 100			S_{DC} - 20.8		

FIGURE 12
DIRECT CONTACT WORK SHEET

3.1 DOCUMENTATION RECORDS FOR HAZARD RANKING SYSTEM

INSTRUCTIONS: The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference that will make the document used for a given data point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.

FACILITY NAME: Ferro Corporation Specialty Ceramics Division

LOCATION: 661 Willet Rd. Lackawanna, N.Y.

GROUND WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

No groundwater sampling has been conducted

Rationale for attributing the contaminants to the facility:

---

* * *

2 ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifers(s) of concern:

SHALE AQUIFER - REPORTED TO BE A HIGH YIELDING ROCK WITH GENERALLY POOR WATER QUALITY.

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern:

≈ 5 FT

Depth from the ground surface to the lowest point of waste disposal/ storage:

UNKNOWN

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

32"

Mean annual lake or seasonal evaporation (list months for seasonal):

27"

Net precipitation (subtract the above figures):

5"

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

THIN GLACIAL ~~MANTLE~~ TILL CONSISTING OF NON-SORTED ROCK MATERIAL IN A SILTY CLAY MATRIX.

Permeability associated with soil type:

$< 10^{-5} \leq 10^{-7}$ CM/SEC

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

SOLIDS

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

NO CONTAINMENT MEASURES USED

Method with highest score:

—

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Compound with highest score:

—

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

UNKNOWN- HOWEVER, THE AMOUNT OF WASTE DISPOSED CAN BE ESTIMATED TO BE AT LEAST 1-10 TONS.

Basis of estimating and/or computing waste quantity:

—

* * *

5 TARGETS

Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

INDUSTRIAL - THE AREA IS SERVICED BY MUNCIPAL SUPPLIES.

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

AN UNUSED DOMESTIC WELL WAS LOCATED APPROXIMATELY 3.0 MILES AWAY FROM THE AREA

Distance to above well or building:

< 3.0 mi.

Population Served by Ground Water Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

0

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

0

Total population served by ground water within a 3-mile radius:

0

SURFACE WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

PHENOL
PNA'S

Rationale for attributing the contaminants to the facility:

ANALYTICAL RESULTS FOR WATER SAMPLES COLLECTED ON-SITE BY NYSDEC 1/27/82

* * *

2 ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent:

2% -- U.S.G.S, BFLO SE QUAD.

Name/description of nearest downslope surface water:

DITCH TRENDING N-S ON WEST SIDE OF SITE

Average slope of terrain between facility and above-cited surface water body in percent:

0

Is the facility located either totally or partially in surface water?

NO

Is the facility completely surrounded by areas of higher elevation?

NO

1-Year 24-Hour Rainfall in Inches

2.2"

Distance to Nearest Downslope Surface Water

≈ 100 YDS

Physical State of Waste

SOLIDS

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

NO CONTAINMENT

Method with highest score:

–

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated

CHROMIUM
LEAD

Compound with highest score:

BOTH

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

UNKNOWN- ASSUME TO BE AT LEAST 1-10 TONS.

Basis of estimating and/or computing waste quantity:

—

* * *

5 TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

NIAGARA RIVER IS GREATER THAN 3 MI. FROM FACILITY.

Is there tidal influence?

NO

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

—

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

—

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

—

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

DOES NOT APPLY

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

Total population served:

Name/description of nearest of above water bodies:

Distance to above-cited intakes, measured in stream miles.

AIR ROUTE

1 OBSERVED RELEASE

Contaminants detected:

NO SAMPLING OF THIS NATURE PERFORMED.

Date and location of detection of contaminants

Methods used to detect the contaminants:

Rationale for attributing the contaminants to the site:

* * *

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

Most incompatible pair of compounds:

Toxicity

Most toxic compound:

Hazardous Waste Quantity

Total quantity of hazardous waste:

Basis of estimating and/or computing waste quantity:

* * *

3 TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how det ...ed:

0 to 4 mi 0 to 1 mi 0 to 1/2 mi 0 tc ... mi

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles ...ss:

Distance to 5-acre (minimum) fresh-water wetland, if 1 mi ... less:

Distance to critical habitat of an endangered species, if 1 mile or less:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Distance to residential area, if 2 miles or less:

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

3.2 EPA PRELIMINARY ASSESSMENT (Form 2070-12)

EPA

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

I. IDENTIFICATION
01 STATE | 02 SITE NUMBER

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site): FERRO CORPORATION - SPECIALTY CERAMICS DIVISION
02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER: 661 WILLET ROAD
03 CITY: LACKAWANNA
04 STATE: NY
05 ZIP CODE: 14218
06 COUNTY: ERIE
07 COUNTY CODE:
08 CONG DIST:
09 COORDINATES LATITUDE: 42 48 00.0 LONGITUDE: 078 48 30.0
10 DIRECTIONS TO SITE (Starting from nearest public road): SOUTH PARK TO WILLET HEAD EAST COMPANY ON SOUTH SIDE OF ROAD

III. RESPONSIBLE PARTIES

01 OWNER (If known): FERRO CORPORATION
02 STREET (Business, mailing, residential): SAME
03 CITY:
04 STATE:
05 ZIP CODE:
06 TELEPHONE NUMBER: ( )
07 OPERATOR (If known and different from owner):
08 STREET (Business, mailing, residential):
09 CITY:
10 STATE:
11 ZIP CODE:
12 TELEPHONE NUMBER: ( )

13 TYPE OF OWNERSHIP (Check one)
☒ A. PRIVATE ☐ B. FEDERAL: ______ (Agency name) ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL
☐ F. OTHER: ______ (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)
☐ A. RCRA 3001 DATE RECEIVED: / / (MONTH DAY YEAR) ☐ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: / / (MONTH DAY YEAR) ☐ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION
☒ YES DATE 12/ /81 (MONTH DAY YEAR)
☐ NO
BY (Check all that apply)
☐ A. EPA ☐ B. EPA CONTRACTOR ☒ C. STATE ☐ D. OTHER CONTRACTOR
☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: ______ (Specify)
CONTRACTOR NAME(S):

02 SITE STATUS (Check one)
☒ A. ACTIVE ☐ B. INACTIVE ☐ C. UNKNOWN

03 YEARS OF OPERATION
BEGINNING YEAR | ENDING YEAR ☐ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED
OFF-SPEC PRODUCTS AND FLOOR SWEEPINGS IN FILL
TAR MATERIAL IN DRAINAGE DITCH

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)
☐ A. HIGH (Inspection required promptly) ☒ B. MEDIUM (Inspection required) ☐ C. LOW (Inspect on time available basis) ☐ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT: RICHARD L. CROUCH
02 OF (Agency/Organization): RECRA RESEARCH INC
03 TELEPHONE NUMBER: (716) 838-6200
04 PERSON RESPONSIBLE FOR ASSESSMENT: ANDRE J. CAPRES
05 AGENCY: —
06 ORGANIZATION: RECRA
07 TELEPHONE NUMBER: (716) 838-6200
08 DATE: 7/26/83 (MONTH DAY YEAR)

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES *(Check all that apply)*

- ☒ 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

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

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. HAZARDOUS CONDITIONS AND INCIDENTS

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

01 ☒ B. SURFACE WATER CONTAMINATION — 02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☒ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

PHENOL AND POLYNUCLEAR AROMATICS FOUND IN SURFACE WATER SAMPLES

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

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

01 ☐ E. DIRECT CONTACT — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

01 ☒ F. CONTAMINATION OF SOIL — 02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: ______ (Acres) — 04 NARRATIVE DESCRIPTION

TAR SPILL MAY CONTAMINATE SOILS

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

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

01 ☐ I. POPULATION EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

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

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

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

01 ☐ M. UNSTABLE CONTAINMENT OF WASTES (Spills/runoff/standing liquids/leaking drums) — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______
04 NARRATIVE DESCRIPTION

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

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

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: ______

IV. COMMENTS

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

3.3 EPA SITE INSPECTION REPORT (Form 2070-13)

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 (Legal, common or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
FERRO CORPORATION - SPECIALTY CERAMICS DIV.	661 WILLET ROAD

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
LACKAWANNA	NY	14218	ERIE		

09 COORDINATES LATITUDE	LONGITUDE	10 TYPE OF OWNERSHIP (Check one)
42 48 00.0	078 48 30.0	☒ A. PRIVATE ☐ B. FEDERAL ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL ☐ F. OTHER ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION (MONTH DAY YEAR)	02 SITE STATUS	03 YEARS OF OPERATION
7/28/83	☒ ACTIVE ☐ INACTIVE	BEGINNING YEAR / ENDING YEAR ___ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)

☐ A. EPA ☐ B. EPA CONTRACTOR ______ (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR ______ (Name of firm)

☒ E. STATE ☒ F. STATE CONTRACTOR RECRA RESEARCH, INC. (Name of firm) ☐ G. OTHER ______ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
ANDRE J. LAPRES	GEOLOGIST	RECRA RESEARCH	(716) 838-6200

09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO.
PATRICIA M. PERRY	GEOLOGIST	RECRA	(716) 838-6200
DIANE M WERNEIWSKI	GEOLOGIST	RECRA	(716) 838-6200
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO
DANIEL PARSHALL	ENGINEERING MANA	661 WILLET ROAD	(716) 825-3900
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☒ PERMISSION ☐ WARRANT	11:00	

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
RICHARD L. CROUCH	RECRA RESEARCH INC.	(716) 838-6200

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE (MONTH DAY YEAR)
ANDRE J. LAPRES	—	RECRA	(716) 838-6200	7/28/83

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

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

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

TONS ________

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

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 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 | 02 SITE NUMBER

II. HAZARDOUS CONDITIONS AND INCIDENTS

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

01 ☒ B. SURFACE WATER CONTAMINATION
02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☒ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______
04 NARRATIVE DESCRIPTION

PHENOL AND POLYNUCLEAR AROMATICS FOUND IN SURFACE WATER SAMPLES

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

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS
02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______
04 NARRATIVE DESCRIPTION

01 ☐ E. DIRECT CONTACT
02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______
04 NARRATIVE DESCRIPTION

01 ☒ F. CONTAMINATION OF SOIL
02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: ______ (Acres)
04 NARRATIVE DESCRIPTION

Chromium and lead detected in surface sediment samples

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

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

01 ☐ I. POPULATION EXPOSURE/INJURY
02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______
04 NARRATIVE DESCRIPTION

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

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

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

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

01 ☐ M. UNSTABLE CONTAINMENT OF WASTES (Spills/Runoff/Standing liquids, Leaking drums) — 02 ☐ OBSERVED (DATE: ________) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ________ 04 NARRATIVE DESCRIPTION

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: ________) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

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

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: ________) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: ________

IV. COMMENTS

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

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
☐ A. NPDES				
☐ B. UIC				
☐ C. AIR				
☒ D. RCRA	SWPI~~0~~99842			
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
☒ I. OTHER (Specify) SPDES	003081			
☐ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☐ A. SURFACE IMPOUNDMENT		
☐ B. PILES		
☐ C. DRUMS, ABOVE GROUND		
☐ D. TANK, ABOVE GROUND		
☐ E. TANK, BELOW GROUND		
☒ F. LANDFILL	unknown	
☐ G. LANDFARM		
☐ H. OPEN DUMP		
☐ I. OTHER (Specify)		

04 TREATMENT (Check all that apply)

☐ A. INCENERATION
☐ B. UNDERGROUND INJECTION
☐ C. CHEMICAL/PHYSICAL
☐ D. BIOLOGICAL
☐ E. WASTE OIL PROCESSING
☐ F. SOLVENT RECOVERY
☐ G. OTHER RECYCLING/RECOVERY
☐ H. OTHER ______ (Specify)

05 OTHER

☒ A. BUILDINGS ON SITE

06 AREA OF SITE

~~[illegible]~~ .5 (Acres)

07 COMMENTS

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

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

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

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☐ YES ☒ NO

02 COMMENTS

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

EPA

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 applicable)

	SURFACE	WELL
COMMUNITY	A. ☒	B. ☐
NON-COMMUNITY	C. ☐	D. ☐

02 STATUS

ENDANGERED	AFFECTED	MONITORED
A. ☐	B. ☐	C. ☒
D. ☐	E. ☐	F. ☐

03 DISTANCE TO SITE

A. 10 (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)
☐ C. COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available)
☐ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER 0

03 DISTANCE TO NEAREST DRINKING WATER WELL NA (mi)

04 DEPTH TO GROUNDWATER 30 (ft)

05 DIRECTION OF GROUNDWATER FLOW ______

06 DEPTH TO AQUIFER OF CONCERN 30 (ft)

07 POTENTIAL YIELD OF AQUIFER ______ (gpd)

08 SOLE SOURCE AQUIFER ☐ YES ☒ NO

09 DESCRIPTION OF WELLS (Including useage, depth, and location relative to population and buildings)

10 RECHARGE AREA
☐ YES
☐ NO
COMMENTS

11 DISCHARGE AREA
☐ YES
☐ NO
COMMENTS

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

☐ A. RESERVOIR, RECREATION DRINKING WATER SOURCE
☐ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES
☐ C. COMMERCIAL, INDUSTRIAL
☒ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME:	AFFECTED	DISTANCE TO SITE
SMOKE CREEK SOUTH BRANCH	☐	0.5 (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. 1000 NO. OF PERSONS	B. 5400 NO. OF PERSONS	C. 80 000 NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION 0.1 (mi)

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

04 DISTANCE TO NEAREST OFF-SITE BUILDING ______ (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)

EPA FORM 2070-13 (7-81)

EPA

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

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

02 PERMEABILITY OF BEDROCK (Check one)

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

03 DEPTH TO BEDROCK: 20 (ft)

04 DEPTH OF CONTAMINATED SOIL ZONE: ______ (ft)

05 SOIL pH: ______

06 NET PRECIPITATION: 9 (in)

07 ONE YEAR 24 HOUR RAINFALL: 2 (in)

08 SLOPE — SITE SLOPE: 0.5 % — DIRECTION OF SITE SLOPE: Southwest — TERRAIN AVERAGE SLOPE: 0.5 %

09 FLOOD POTENTIAL: SITE IS IN ______ YEAR FLOODPLAIN

10 ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE A. ______ (mi) OTHER B. ______ (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species) ______ (mi)

ENDANGERED SPECIES: ______

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL A. 1.0 (mi)

RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES B. ______ (mi)

AGRICULTURAL LANDS: PRIME AG LAND C. ______ (mi) AG LAND D. ______ (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

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

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			
SURFACE WATER			
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL			
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☒ GROUND ☐ AERIAL

02 IN CUSTODY OF [illegible]
(Name of organization or individual)

03 MAPS ☒ YES ☐ NO

04 LOCATION OF MAPS
Recra Research, Inc.

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

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

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER
FERRO CORPORATION	

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

05 CITY	06 STATE	07 ZIP CODE
LACKAWANNA	NY	14218

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B 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+B NUMBER	01 NAME	02 D+B 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+B NUMBER	01 NAME	02 D+B 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+B NUMBER	01 NAME	02 D+B 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

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME: Ferro Corporation		02 D+B NUMBER:	
03 STREET ADDRESS (P O Box, RFD #, etc.): 661 Willet Rd			04 SIC CODE:
05 CITY: Lackawanna	06 STATE: NY	07 ZIP CODE: 14218	
08 YEARS OF OPERATION:	09 NAME OF OWNER:		

OPERATOR'S PARENT COMPANY (If applicable)

10 NAME:		11 D+B NUMBER:
12 STREET ADDRESS (P O Box, RFD #, etc.):		13 SIC CODE:
14 CITY:	15 STATE:	16 ZIP CODE:

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

01 NAME:		02 D+B NUMBER:	
03 STREET ADDRESS (P.O. Box, RFD #, etc.):			04 SIC CODE:
05 CITY:	06 STATE:	07 ZIP CODE:	
08 YEARS OF OPERATION:	09 NAME OF OWNER DURING THIS PERIOD:		
01 NAME:		02 D+B NUMBER:	
03 STREET ADDRESS (P.O. Box, RFD #, etc.):			04 SIC CODE:
5 CITY:	06 STATE:	07 ZIP CODE:	
YEARS OF OPERATION:	09 NAME OF OWNER DURING THIS PERIOD:		
NAME:		02 D+B NUMBER:	
STREET ADDRESS (P.O. Box, RFD #, etc.):			04 SIC CODE:
TY:	06 STATE:	07 ZIP CODE:	
ARS OF OPERATION:	09 NAME OF OWNER DURING THIS PERIOD:		

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

10 NAME:		11 D+B NUMBER:
12 STREET ADDRESS (P.O. Box, RFD #, etc.):		13 SIC CODE:
14 CITY:	15 STATE:	16 ZIP CODE:
10 NAME:		11 D+B NUMBER:
12 STREET ADDRESS (P O Box, RFD #, etc.):		13 SIC CODE:
14 CITY:	15 STATE:	16 ZIP CODE:
10 NAME:		11 D+B NUMBER:
12 STREET ADDRESS (P.O. Box, RFD #, etc.):		13 SIC CODE:
14 CITY:	15 STATE:	16 ZIP CODE:

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

EPA

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER
FERRO CORPORATION	

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

05 CITY	06 STATE	07 ZIP CODE
LACKAWANNA	NY	14218

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B 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+B NUMBER	01 NAME	02 D+B 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+B NUMBER	01 NAME	02 D+B 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+B NUMBER	01 NAME	02 D+B 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

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION

01 ☐ D. SPILLED MATERIAL REMOVED 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION

01 ☐ E. CONTAMINATED SOIL REMOVED 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION

01 ☐ F. WASTE REPACKAGED 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION

01 ☐ G. WASTE DISPOSED ELSEWHERE 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION

01 ☐ H. ON SITE BURIAL 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION

01 ☐ I. IN SITU CHEMICAL TREATMENT 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION

01 ☐ J. IN SITU BIOLOGICAL TREATMENT 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION

01 ☐ K. IN SITU PHYSICAL TREATMENT 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION

01 ☐ L. ENCAPSULATION 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION

01 ☐ M. EMERGENCY WASTE TREATMENT 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION

01 ☐ N. CUTOFF WALLS 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION

01 ☐ P. CUTOFF TRENCHES/SUMP 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION

01 ☐ Q. SUBSURFACE CUTOFF WALL 02 DATE ________ 03 AGENCY ________
04 DESCRIPTION

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER

II PAST RESPONSE ACTIVITIES *(Continued)*

01 ☐ R. BARRIER WALLS CONSTRUCTED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ S. CAPPING/COVERING — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ T. BULK TANKAGE REPAIRED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ U. GROUT CURTAIN CONSTRUCTED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ V. BOTTOM SEALED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ W. GAS CONTROL — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ X. FIRE CONTROL — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ Y. LEACHATE TREATMENT — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ Z. AREA EVACUATED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ 1. ACCESS TO SITE RESTRICTED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ 2. POPULATION RELOCATED — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

01 ☐ 3. OTHER REMEDIAL ACTIVITIES — 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION

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

EPA

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

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

EPA FORM 2070-13 (7-81)

4.0 Site History

Ferro Corporation - Electro Division has been a manufacturer of specialty ceramic products since its establishment in 1919. The company is presently changing its name to Ferro Corporation - Specialty Ceramics Division, to reflect more clearly the company's purpose.

Products manufactured by the company include crucibles for the metal industry, grinding wheels for the steel industry and refractory furniture for the ceramics industry. The primary materials employed in this production are silicon carbide clay and alumina.

Finished products which failed to meet quality control standards have been disposed of in a depressed area of the plant property. This activity was in preparation for the construction of an addition to one of the plant buildings. In addition, it is reported that the primary materials collected in floor sweeping have also been dumped in this area. Waste materials generated at the plant are hauled by Niagara Sanitation. Cooling waters employed in the manufacturing process are discharged to municipal sewers and received at the Buffalo Water Treatment Facility.

In late 1981, during a sampling program conducted by NYSDEC, a tar-like material was observed in the drainage ditch. This material reportedly entered the ditch via one of the company's drainage outfalls, after a tar spill occurred at the plant (Reference 2). Information supplied by the company indicated that this material was coal tar and that it was not classified as a hazardous material (Reference 3). Further investigation of the characteristics of the coal tar verify the company's claim; however, health hazards are associated with situations involving this material (Reference 5).

The company reportedly has since removed the tar from the drainage ditch and subsequently mixed it with sand for use on in-plant roadways (Reference 3). However, a small amount of tar was observed in the ditch during the site investigation conducted on July 28, 1983 relating to this report (Reference 9).

5.0 Site Data

5.1 Site Area Surface Features

5.1.1 Topography and Drainage - The topography in the area of Ferro Corporation can generally be characterized as flat. Surface features are typical of a glacial lake plain environment. Topography in the immediate area is mainly the result of urban development. Slope of the site area has been determined from the U.S. Geological Survey Buffalo S.E. topographic map, to be approximately 2% to the west (Reference 8). This slope directs surface runoff toward a ditch along the west side of the plant property. This ditch carries runoff southward to ultimately discharge into Smoke Creek. Drainage was also observed flowing north from the site along a ditch adjacent to the railroad tracks on the east side of the plant property. Three (3) outfalls from the plant also discharge into these drainage routes (Reference 9).

5.1.2 Environmental Setting - The area surrounding the Ferro plant is primarily residential property. There are no critical habitats of endangered species, protected wetlands or wildlife refuges in the vicinity. The previously mentioned outfalls discharging plant waters are monitored as required by the plant's SPDES permit #003081. Other permits held by the company include RCRA #SWPI0199842 and EPA #NYD043814003.

5.2 Site Hydrogeology

5.2.1 Geology - Bedrock underlying the site consists of interbedded gray limestone and fissile gray shale of the Ludlowville Formation. This unit is encountered in the area at depths ranging from 18 to 45 feet below the ground surface. Overall thickness of the Ludlowville Formation ranges from 65 to 135 feet. Regional dip of the bedrock is to the south at approximately 0.5° (Reference 7).

5.2.2 Soil - The unconsolidated material overlying bedrock in the site area is a thin mantle of glacial till composed of non-sorted rock material in a silty clay matrix (Reference 2). This material is overlain by interbedded clay, silt and fine sand sediments deposited in glacial lakes ancestral to the present Lake Erie (Reference 5). Permeabilities of these materials range from approximately 10^{-5} to 10^{-7} cm/sec. (Reference 6). Test borings completed nearby penetrated layers of silty clay to refusal at a total boring depth of 62.5 feet. Surficial soils consist of fill and disturbed or altered original soils resulting from urban development (Reference 9).

5.2.3 Groundwater - Groundwater wells are not frequently used in the area of Ferro Corporation; however, some wells are reported to be used for domestic supplies. These wells draw water from the shale bedrock aquifer at depths ranging from 27 to 65 feet.

Yields of these wells are high; however, the water in some areas is reported to contain high levels of iron and hydrogen sulfide which limits use. The first occurrence of groundwater in the area is reported to be approximately five (5) feet below the ground surface (Reference 6). Groundwater flow in this high water table is assumed to be in a southwesterly direction toward the south branch of Smoke Creek.

5.3 Previous Sampling and Analyses

5.3.1 Groundwater Quality Data - There is no groundwater quality data for the site.

5.3.2 Surface Water Quality Data - Sampling of surface waters and sediments in the site area was conducted by NYSDEC in early December 1981. Samples were taken from the ditches north and west of the plant as well as in the fill area and in Smoke Creek. Analyses of these samples has revealed contamination of the area with heavy metals such as chromium and lead. Also present in some of these samples were elevated levels of phenol and detectable levels of halogenated organics and polynuclear aromatic hydrocarbons. Analytical results are presented on the following pages.

5.3.3 Air Quality Data - There is no air quality data for the site.

5.3.4 Other Analytical Data - None.

ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
PRIORITY POLLUTANT ANALYSES - METALS

Report Date: 1/27/82
Date Received: 12/7/81

SOIL SAMPLES

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
			R-010-04 (12/7/81)	R-010-22 (12/7/81)
Total antimony	µg/g dry		<10	<4
Total arsenic	µg/g dry		<0.4	<0.4
Total beryllium	µg/g dry		0.63	0.37
Total cadmium	µg/g dry		0.51	<0.09
Total chromium	µg/g dry		73	190
Total copper	µg/g dry		60	95
Total lead	µg/g dry		59	30
Total mercury	µg/g dry		<0.3	<0.2
Total nickel	µg/g dry		27	60
Total selenium	µg/g dry		4.8	6.8
Total silver	µg/g dry		<0.5	0.22
Total thallium	µg/g dry		<[illegible]	<2
Total zinc	µg/g dry		220	130
Dry Weight	%		71	75

COMMENTS: Comments pertain to data on one or all pages of this report.

FOR RECRA RESEARCH, INC. Karen E. Marchese

DATE 1/27/82

RECRA RESEARCH, INC.

I.D. 81-1125

ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
PRIORITY POLLUTANT ANALYSES - METALS

Report Date: 1/27/82
Date Received: 12/7/81

SOIL SAMPLES

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		R-010-28 (12/7/81)	R-010-29 (12/7/81)	R-010-35 (12/7/81)
Total antimony	μg/g dry	<7	<6	<6
Total arsenic	μg/g dry	<0.3	<0.3	<0.3
Total beryllium	μg/g dry	1.1	0.58	0.63
Total cadmium	μg/g dry	0.25	<0.1	<0.2
Total chromium	μg/g dry	30	25	[illegible]
Total copper	μg/g dry	22	26	[illegible]
Total lead	μg/g dry	3.5	32	28
Total mercury	μg/g dry	<0.3	<0.3	0.57
Total nickel	μg/g dry	60	48	30
Total selenium	μg/g dry	<0.7	<0.6	<0.7
Total silver	μg/g dry	<0.3	<0.2	<0.2
Total thallium	μg/g dry	<3	<3	<3
Total zinc	μg/g dry	110	130	93
Dry Weight	%	78	67	[illegible]

COMMENTS: Samples were received at Recra on 12/7/81.

FOR RECRA RESEARCH, INC. Karen O. Marchese

DATE 1/27/82

RECRA RESEARCH, INC.
I.D. #81 1125

ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
PRIORITY POLLUTANT ANALYSES - METALS

Report Date: 1/27/82
Date Received: 12/7/81

WATER SAMPLES

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) R-010-01 (12/7/81)	R-010-07 (12/7/81)	R-010-12 (12/7/81)
Total antimony	mg/l	0.6	1.2	0.4
Total arsenic	μg/l	<5	<5	<5
Total beryllium	mg/l	0.01	0.01	<0.01
Total cadmium	mg/l	0.008	<0.005	<0.005
Total chromium	mg/l	<0.005	<0.005	<0.005
Total copper	mg/l	0.018	0.018	0.012
Total lead	mg/l	<0.03	<0.03	<0.03
Total mercury	μg/l	<3	<3	<3
Total nickel	mg/l	<0.02	<0.02	<0.02
Total selenium	μg/l	<2	<2	<2
Total silver	mg/l	<0.008	<0.008	<0.008
Total thallium	mg/l	0.2	<0.1	<0.1
Total zinc	mg/l	0.072	0.096	0.260

COMMENTS: Analyses were performed according to U.S. Environmental Protection Agency methodologies where applicable.

FOR RECRA RESEARCH, INC. Karen D. Marchese

DATE 1/27/82

RECRA RESEARCH, INC.
I.D. #81-1125

ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
PRIORITY POLLUTANT ANALYSES - METALS

Report Date: 1/27/82
Date Received: 12/7/81

WATER SAMPLES

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		R-010-17 (12/7/81)	R-010-23 (12/7/81)	R-010-30 (12/7/81)
Total antimony	mg/l	0.5	<0.2	<0.2
Total arsenic	µg/l	<5	<5	<5
Total beryllium	mg/l	0.01	<0.01	<0.01
Total cadmium	mg/l	<0.005	<0.005	<0.005
Total chromium	mg/l	<0.005	<0.005	<0.005
Total copper	mg/l	0.024	0.012	0.010
Total lead	mg/l	<0.03	<0.03	<0.03
Total mercury	µg/l	<3	<3	<3
Total nickel	mg/l	0.05	<0.02	0.02
Total selenium	µg/l	<2	<2	<2
Total silver	mg/l	<0.008	<0.008	<0.008
Total thallium	mg/l	<0.1	<0.1	<0.1
Total zinc	mg/l	0.053	0.029	0.078

COMMENTS: Values reported as "less than" (<) indicate the working detection limit for the particular sample and/or parameter.

The working detection limits vary as a function of the amount of sample used for analysis, response of standard compounds and samples, and the presence of other constituents not of interest to these analyses.

FOR RECRA RESEARCH, INC. Karen D. Marcher

DATE 1/27/82

RECRA RESEARCH, INC
I.D. #81-1125

ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Report Date: 1/27/82
Date Received: 12/7/81

SOIL SAMPLES

SAMPLE IDENTIFICATION	SAMPLE DATE	PARAMETER (UNITS OF MEASURE) TOTAL RECOVERABLE PHENOLICS (μg/g dry)
R-010-04	12/7/81	110
R-010-22	12/7/81	29
R-010-28	12/7/81	<0.3
R-010-29	12/7/81	0.43
R-010-35	12/7/81	<0.3

COMMENTS: Results of the analyses of soils are corrected for moisture content and are reported as μg/g dry (parts per million).

FOR RECRA RESEARCH, INC. Karen D. Marchese

DATE 1/27/82

RECRA RESEARCH, INC.
I.D. #81-1125

ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Report Date: 1/27/82
Date Received: 12/7/81

WATER SAMPLES

SAMPLE IDENTIFICATION	SAMPLE DATE	PARAMETER (UNITS OF MEASURE) TOTAL RECOVERABLE PHENOLICS (mg/1)
R-010-05	12/7/81	0.012
R-010-10	12/7/81	<0.01
R-010-15	12/7/81	<0.01
R-010-20	12/7/81	0.023
R-010-26	12/7/81	<0.01
R-010-33	12/7/81	<0.01

COMMENTS: Refer to pages 1 through 5.

FOR RECRA RESEARCH, INC. Karen O. Marchese

DATE 1/27/82

RECRA RESEARCH, INC.

I.D. #81-1125

ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Report Date: 1/27/82
Date Received: 12/7/81

WATER SAMPLES

SAMPLE IDENTIFICATION	SAMPLE DATE	PARAMETER (UNITS OF MEASURE) TOTAL ORGANIC CARBON (mg/1)
R-010-02	12/7/81	6.2
R-010-08	12/7/81	27
R-010-13	12/7/81	18
R-010-18	12/7/81	100
R-010-24	12/7/81	2.3
R-010-31	12/7/81	5.5

COMMENTS: Refer to pages 1 through 5.

FOR RECRA RESEARCH, INC. Karen D. Mo[illegible]

DATE 1/27/82

RECRA RESEARCH, INC.
I.D. #81-1125

ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
GAS CHROMATOGRAPHY

Report Date: 1/27/82
Date Received: 12/7/81

SOIL SAMPLES

SAMPLE IDENTIFICATION	SAMPLE DATE	PARAMETER (UNITS OF MEASURE) HALOGENATED ORGANIC SCAN (ECD) (µg/g DRY AS CHLORINE; LINDANE STANDARD)
R-010-04	12/7/81	0.81
R-010-22	12/7/81	1.8
R 010-28	12/7/81	0.41
R-010-29	12/7/81	3.6
R-010-35	12/7/81	<0.1

COMMENTS: Halogenated Organic Scan (ECD) results are used for screening purposes only and are not designed for qualification or quantification of any specific organic compound. Results are calculated based upon the response factor and chlorine content of Lindane but do not imply either the presence or absence of Lindane itself.

FOR RECRA RESEARCH, INC. Deborah J. Prario

DATE 1/27/82

I.D. #81-1125

ANALYTICAL RESULTS

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
POLYNUCLEAR AROMATIC HYDROCARBON

Report Date: 1/27/82
Date Received: 12/7/81

SOIL SAMPLES

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		R-010-04 (12/7/81)	R-010-22 (12/7/81)	R-010-28 (12/7/81)
acenaphthene	μg/g dry	780	<5	<0.7
acenaphthylene	μg/g dry	<10	<8	<1
anthracene	μg/g dry	230	1.3	0.036
benzo(a)anthracene	μg/g dry	93	1.8	0.16
benzo(a)pyrene	μg/g dry	72	0.68	0.16
benzo(b)fluoranthene	μg/g dry	81	1.2	0.20
benzo(g,h,i)perylene	μg/g dry	68	1.4	0.23
benzo(k)fluoranthene	μg/g dry	34	<0.4	0.58
chrysene	μg/g dry	120	1.6	0.29
dibenzo(a,h)anthracene	μg/g dry	<1	<0.8	0.26
fluoranthene	μg/g dry	590	12	0.68
fluorene	μg/g dry	250	5.8	0.043
indeno(1,2,3-cd)pyrene	μg/g dry	21	<0.4	0.12
naphthalene	μg/g dry	630	8.4	<0.7
phenanthrene	μg/g dry	760	16	0.22
pyrene	μg/g dry	420	8.7	0.35

COMMENTS: Polynuclear Aromatic Hydrocarbon (PAH's) analysis of soils was performed by mixing equal portions of sample (by weight) with anhydrous sodium sulfate prior to sixteen-hour extraction with 1:1 hexane:acetone in a Soxlet apparatus.

FOR RECRA RESEARCH, INC. Stephen Frost

DATE 1/27/82

RECRA RESEARCH INC
I.D. #81-1125

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
POLYNUCLEAR AROMATIC HYDROCARBON

Report Date: 1/27/82
Date Received: 12/7/81

WATER SAMPLES

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) R-010-06 (12/7/81)	R-010-11 (12/7/81)	R-010-16 (12/7/81)
acenaphthene	µg/l	25	<3	<5
acenaphthylene	µg/l	34	<5	4.5
anthracene	µg/l	0.31	0.047	0.14
benzo(a)anthracene	µg/l	<0.3	<0.3	3.5
benzo(a)pyrene	µg/l	<0.3	<0.3	<0.5
benzo(b)fluoranthene	µg/l	0.076	0.097	10
benzo(g,h,i)perylene	µg/l	0.98	0.68	<1
benzo(k)fluoranthene	µg/l	0.052	0.23	8.7
chrysene	µg/l	<0.3	0.038	8.1
dibenzo(a,h)anthracene	µg/l	1.2	1.4	<1
fluoranthene	µg/l	1.7	0.47	7.1
fluorene	µg/l	6.7	0.13	<1
indeno(1,2,3-cd)pyrene	µg/l	<0.3	<0.3	<0.5
naphthalene	µg/l	25	1.2	2.0
phenanthrene	µg/l	3.6	0.13	0.45
pyrene	µg/l	<0.3	<0.3	5.6

COMMENTS: Polynuclear Aromatic Hydrocarbon (PAH's) analyses of water were performed using Waters C_{18} Sep Pak cartridge.

FOR RECRA RESEARCH, INC. Stephen J. Frost

DATE 1/27/82

RECRA RESEARCH INC
I.D. #81-1125

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
POLYNUCLEAR AROMATIC HYDROCARBON

Report Date: 1/27/82
Date Received: 12/7/81

WATER SAMPLES

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) R-010-21 (12/7/81)	R-010-27 (12/7/81)	R-010-34 (12/7/81)
acenaphthene	µg/l	<0.6	0.37	<1
acenaphthylene	µg/l	<1	<1	0.57
anthracene	µg/l	0.40	0.051	0.019
benzo(a)anthracene	µg/l	<0.06	<0.07	<0.1
benzo(a)pyrene	µg/l	<0.06	<0.07	<0.1
benzo(b)fluoranthene	µg/l	0.20	0.034	<0.2
benzo(g,h,i)perylene	µg/l	0.16	<0.1	0.22
benzo(k)fluoranthene	µg/l	1.1	0.13	<0.1
chrysene	µg/l	0.27	0.019	<0.1
dibenzo(a,h)anthracene	µg/l	6.6	0.23	0.51
fluoranthene	µg/l	2.5	0.40	0.059
fluorene	µg/l	<0.1	0.044	<0.2
indeno(1,2,3-cd)pyrene	µg/l	<0.06	<0.07	<0.1
naphthalene	µg/l	<0.6	<0.7	1.2
phenanthrene	µg/l	0.47	0.051	0.035
pyrene	µg/l	<0.06	0.49	<0.1

COMMENTS:

FOR RECRA RESEARCH, INC. Stephen [illegible]

DATE 1/27/82

RECRA RESEARCH INC

I.D. #81-1125

6.0 Adequacy of Available Data

In compiling the Hazard Ranking Score, Ferro Corporation - Specialty Ceramics Division was found to have a score for migration potential (S_m) equal to 2.6. However, due to data inadequacies, a certain degree of subjectivity was involved in scoring and; therefore, a range for S_m was developed. For Ferro Corporation, this range was found to be 2.0 to 10.0. Data inadequacies are as follows:

- Lack of information on site-specific geology and hydrogeology.
- Lack of information on type and quantity of material in the fill area.
- There is no air quality data for the site.

7.0 PROPOSED PHASE II WORK PLAN

7.1 Objectives

As per the inadequacies of the data base that were itemized in the preceding section, a work plan has been developed which, to the extent practical, will provide the information required to address the following:

- Potential environmental effects of the landfill.
- The extent and magnitude of contamination, based on site specific hydrogeologic conditions.
- The data inputs necessary to effectuate the development and recommendation of cost effective remedial actions.

Detailed descriptions of the elements of this work plan are herein provided.

7.2 Scope of Work

The primary purpose of this work element is to fill the data gaps identified in the preliminary assessment so as to permit a complete site characterization/ranking (HRS) and engineering evaluation of remedial alternatives. The preliminary field investigation includes the following items:

- Air Monitoring
- Geophysical Exploration
- Subsurface Investigation
- Monitoring Well Installation
- Sampling and Analysis

Throughout the investigative effort, field activities will be performed in strict accordance with established safety protocol, presented in Recra Research, Inc.'s Operation Manual Field and Analytical Services (previously submitted to NYSDEC by Recra as part of a prequalifying submission).

7.2.1 Air Monitoring - Prior to implementation of the various field investigative techniques associated with this element, an initial site screening will be conducted using a Century Organic Vapor Analyzer (OVA) and/or an HNU photoionizer. Based upon described site characteristics, Recra team personnel engaged in this activity will enter the site equipped with level 3 respiratory protection. A grid pattern will be established at the site and readings taken and recorded at each grid point. This survey will determine the initial level of protection necessary for workers' safety. In addition, upgradient and downgradient air monitoring stations will be established at both sites.

If the results are indicative of air quality problems, additional testing will be initiated at specified distances away from the site.

During actual field investigative work, ambient and worker air monitoring will be conducted periodically using appropriate instrumentation, such as the photoionizer and/or OVA. When deemed necessary from actual readings, the level of respiratory protection will be adjusted to meet existing conditions. All disposable equipment necessary for worker safety will be placed daily into covered on-site drums provided by Recra, and removed from the site and disposed of either upon reaching full capacity or upon completion of all field work.

7.2.2 Geophysical Exploration - After initial assessment of the ambient air quality at the site, a geophysical program will be performed to determine the limits of the disposal area. It will also aid in determining the possibility and extent of groundwater contamination. The geophysical method proposed is the VLF-EM Terrain Conductivity survey. This method is considered sufficient to define the bedrock surface, the depth of the fill material and any possible contaminant plume on the site.

The VLF-EM Terrain Conductivity survey will be performed by recording continuous conductivity measurements on an EM-31 terrain conductivity meter equipped with a strip chart recorder. These measurements will be taken on a grid pattern established using a tape and level, in the area of the disposal site.

7.2.3 Subsurface Investigation - In order to facilitate additional information concerning possible groundwater contamination, preliminary findings indicate a need for subsurface investigations This investigation will include:

A. One (1) exploratory boring north of the fill to determine the depth of fill material and the nature of the base in-situ soil. Permeability tests will be performed on specific horizons of the soil at this time. This boring will be located in the northeast section of the site, which is assumed to be upgradient of groundwater flow, and will be extended to bedrock to determine the specific on-site geology.

B. Two (2) exploratory borings around the periphery of the site as shown in Figure 3. These borings will be located southeast of the fill area which is assumed to be downgradient of groundwater flow.

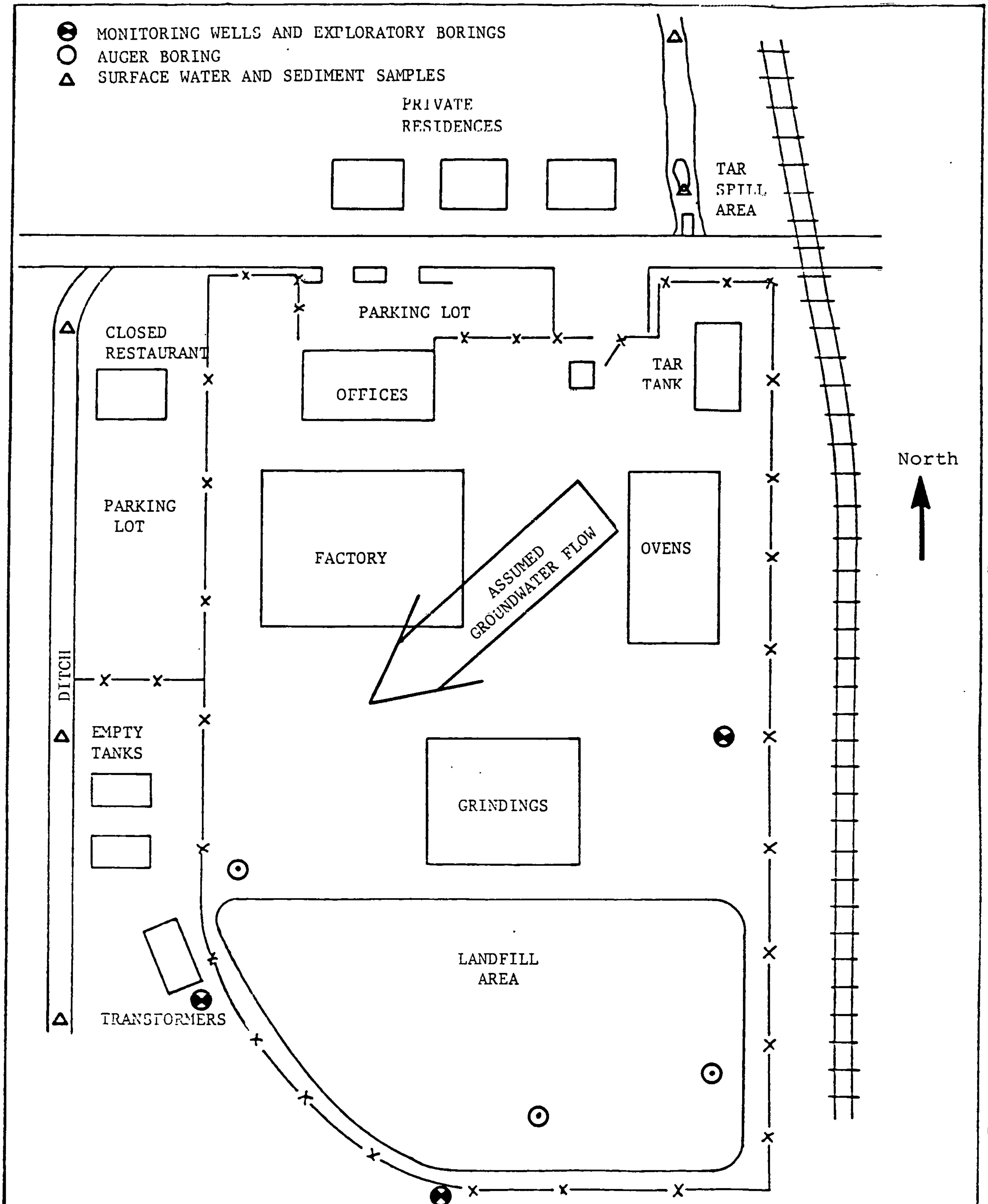
c. Three (3) auger borings in the southern section of the plant property. Two (2) of these borings will be located in the fill area and will be used to determine the nature and extent of the cover material. The final boring will be located north of the fill area and will be used to determine the nature of the original soils.

All exploratory borings will be completed as groundwater monitoring wells and will be constructed within the first encountered water bearing zone.

D. Three (3) surface water/sediment samples from the drainage ditch on the western side of the site and two (2) surface water/sediment samples from the ditch north of the site.

Well and sampling locations are illustrated in Figure 3.

All exploratory borings will be drilled with a truck, trailer, and/or all-terrain-mounted auger rig using hollow stem augers. During construction of the borings, split spoon samples will be continuously obtained in the one (1) boring extended to bedrock. In the other boring, split spoon samples will be obtained at five (5) foot intervals and/or when noticeable changes in lithology or drilling characteristics occur. If the unconsolidated material is found to be extremely heterogeneous, both borings will be continuously sampled. Also, if a confining layer is encountered, Shelby tube samples will be obtained to determine its undisturbed permeability.



NOT TO SCALE	SAMPLING AND WELL LOCATIONS FERRO CORPORATION	FIGURE 3

The acquired samples will be visually identified in the field following the procedure set forth in ASTM-D-2488, noted appropriately on the boring logs with the sample number and recorded standard penetration test results (ASTM-D-1586), and placed in pre-cleaned, teflon-lined, screw-cap glass jars for return to Recra Research, Inc.'s Tonawanda, New York laboratory.

In order to avoid possible cross-contamination during construction of the exploratory borings, the apparent upgradient boring will be completed first; then the downgradient holes will be drilled. Between each boring, the augers will be cleaned with water obtained from a known non-contaminated source. Also, between each split spoon sample, the split spoon will be cleaned with water, acetone and distilled water. All spent water/acetone liquid accumulated during this process will be disposed of in an on-site drum. Upon completion of the boring to bedrock, the boring will be backfilled with cement bentonite grout to the base of the first encountered water level. This procedure will prevent the vertical migration of possible contaminated groundwater from the first encountered water-bearing zone to bedrock. Prior to leaving the site, the drill rig will be decontaminated using high pressure water.

7.2.4 Monitoring Well Installation - The monitoring wells will be constructed of two-inch I.D. cast iron riser pipe with a five-foot long galvanized, wire-wound-wrapped steel screen. The screen will be placed just below the encountered water table. The annulus between the casing/screen and boring well will be properly sand-packed and sealed (cement/bentonite and cement) to the ground surface and the well provided with a locking cap. A typical monitoring well in unconsolidated material is illustrated in Figure 4.

Upon completion of well construction, all monitoring wells will be properly developed, and all test borings and/or top of well casings will be surveyed to determine their location and elevation above sea level. At that time, variable head tests will be performed on the wells around the site to estimate the in-situ permeability of the screened interval.

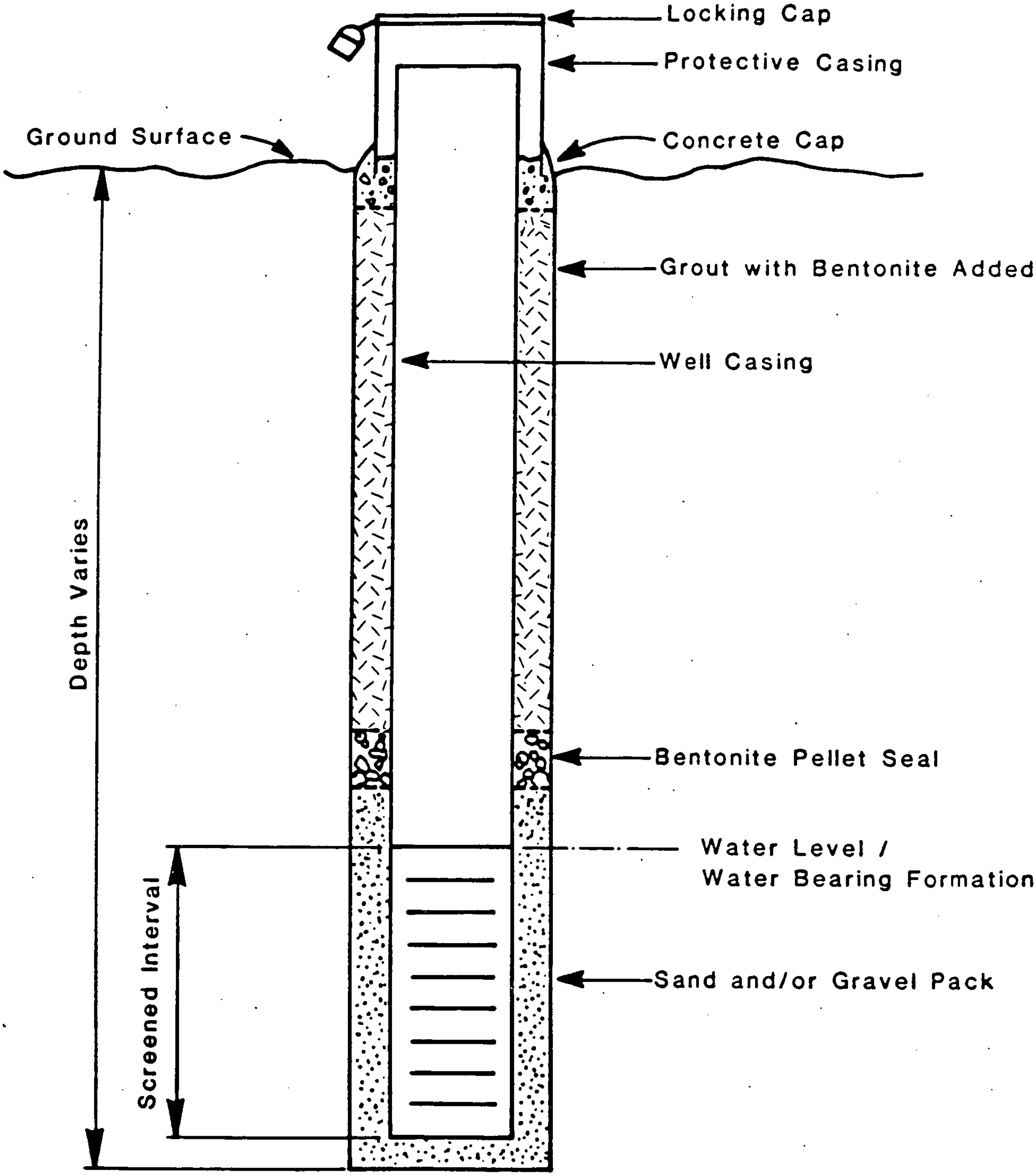
All field activity will be under the direct supervision of a qualified geologist and/or hydrogeologist.

7.2.5 Sampling and Analysis - The following procedures will encompass the sampling of groundwater from the newly installed wells, the analysis of samples obtained from these wells, the analysis of selected soil samples from the exploratory borings, as well as the sampling and analysis of surficial waters and sediments. If desired, all samples will be split with the owner of the

Figure 4

MONITORING WELL DETAIL

In Unconsolidated Formation



site. Also, upon completion of the analytical program, the owner will be notified of the results if he so requests. All samples will be analyzed for the parameters listed in Table 1.

7.2.5.1 Groundwater - Following equilibrium of water levels within the installed wells, water elevations will be measured to determine the water table surface. Representative groundwater samples will then be collected after the wells have been fully evacuated or a volume of three (3) times the well contents have been removed.

Evacuation of water from the wells and the acquisition of the samples will be accomplished with an ISCO Model 1580 peristaltic pump, using separate low-density polyethylene tubing for each well and changing the silicon rubber tubing within the ISCO between wells. An exception to this procedure will be employed when obtaining the required volume of sample for volatile organic analysis. This will be accomplished using small volume galvanized steel bailers that have been separately designated for each well.

Upon collection of the samples, field pH, temperature and conductivity measurements will be recorded. The samples will be placed in appropriate precleaned bottles/septa vials, labelled, chilled and immediately returned to

TABLE 1: ANALYTICAL PARAMETERS

Parameters	Surface Water	Groundwater
pH	.	.
Specific Conductance	.	.
Chloride	.	.
Sulfate	.	.
Total Organic Carbon	.	.
Cadmium	.	.
Chromium (Total)	*	o
Chromium (Hexavalent)	*	o
Copper	*	o
Iron	*	o
Lead	*	o
Mercury	*	o
Nickel	*	o
Silver	*	o
Zinc	*	o
Total Recoverable Phenolics	.	.
Oils & Greases	.	.
Volatile Organic Scan (VOS)	.	.
Halogenated Organic Scan (HOS)	.	.
Volatile Halogenated Organic Scan	.	.
Dry Weight		

o = Soluble Metals   * = Total Metals

VOS is a screening procedure to identify the presence or absence of volatile chlorinated organic compounds. Analyses are performed via purge and trap concentration, gas, liquid chromatography and an electrolytic conductivity detector.

HOS is a screening procedure to identify the presence or absence of halogenated organics. Analyses are performed via solvent extraction concentration gas liquid chromatography and an electron capture detector.

Recra's Tonawanda, New York laboratory for preservation and analyses of previously listed chemical parameters. If the samples cannot be returned to Recra's laboratory in a timely fashion due to the distance between the site and Recra's laboratory, field preservation will be performed prior to chilling.

7.2.5.2 Soil - Selected subsurface soil samples will undergo both physical and chemical analyses. The remaining samples will be archived by Recra Research, Inc. for a period of six (6) months after completion of the contract.

The physical analysis will aid in the characterization of the underlying unconsolidated material. The physical parameters of concern during this investigation are grain size distribution (ASTM-D-422), Atterberg limits (ASTM-D-423 and 424) and classification (ASTM-D-248). The number of samples to undergo analysis for the above parameters is dependent on the homogeneity of the subsurface conditions underlying the bottom of the uncontrolled landfill. The results from these tests, in conjunction with Standard Penetration Test results, will aid in the design and evaluation of remedial programs.

Chemical analyses of selected samples will be used to characterize attenuation by on-site soils. A sample from the unsaturated zone and a sample from the saturated zone will generally be utilized from each boring.

7.2.5.3 Surface Water - The sampling of surface water will entail collecting water and sediments from the ditches located north and west of the plant facility. Five (5) surface water and five (5) sediment samples will be taken. General locations of sampling are illustrated in Figure 3. The water samples will be obtained using a pond sampler with separate sampling bottles designated for each sampling location. Sediment samples will be taken using a two (2) foot gravity type sampler. All sediment samples will be placed in precleaned, teflon-lined, screw capped glass jars, labelled, chilled and returend to Recra for analysis. The same procedures as determined for ground water will be followed after acquisition of the surface water samples. All samples will be analyzed for the previously listed parameters.

7.2.6 Chemical Analytical Methods - The procedures to be utilized for analyses of water, sediment and soil samples during this investigation are in basic accordance with one or more of the following reference texts:

- Methods for Chemical Analysis of Water and Wastes, United States Environmental Protection Agency,
- NIOSH Manual of Analytical Methods, 2nd Edition, United States Department of Health, Education and Welfare,
- Standard Methods for the Examination of Water and Wastewater, 14th Edition, APHA, AWWA, WPCF.

7.2.7 Quality Assurance Program - An overall Quality Assurance Program is essential for the production of high-quality analytical data. Such a program requires precise control of laboratory activities. For the Quality Assurance Program in effect at the laboratories of Recra Research, Inc., the reader is referred to a document previously submitted by Recra Research, Inc. to NYSDEC, entitled "Operations Manual - Field and Analytical Services".

7.2.8 Engineering Evaluation Report/HRS Score - The purpose of this evaluation report is to compile all existing and newly-developed information concerning the sites, and utilize this information to:

- Evaluate feasible remedial alternatives at the sites and prepare budget-level cost estimates for these alternatives.

- Based upon this evaluation, recommend the most cost-effective and environmentally sound course of remedial action.

- Prepare a Hazard Ranking System (HRS) score for the sites.

It is presently anticipated that the output from this Evaluation Report will consist of a single bound report, subdivided into at least the following sections:

- <u>HRS Score</u> - Utilizing USEPA's formal method of presentation (Federal Register/Vol. 47, No. 137/Friday, July 16, 1982, the following completed work sheets will be included in this opening section: HRS Cover Sheet; Groundwater Route Work Sheet; Surface Water Route Work Sheet; Air Route Work Sheet; Fire and Explosion Work Sheet; and Direct Contact Work Sheet.

- <u>Background</u>

- <u>Summary of Project Activities</u>

- Identification and Evaluation of Remedial Alternatives
- Recommendations
- Appendix - Complete Site Data Base

7.3 Estimated Costs

The estiamted cost per individual element of the preceding scope of work are listed as follows:

o	Preliminary Field Investigation	$11,409
o	Sampling and Analysis	10,316
o	Engineering Evaluation	4,030
	Total Cost	$25,755

APPENDIX A

REFERENCES

1.) NYSDEC Hazardous Waste Disposal Sites Report, G. D. Knowles; April 15, 1982.

2.) Letter from NYSDEC Thomas R. Christoffel, to Ferro Corporation Mr. Dan Parschall; May 7, 1982.

3.) Letter from Reilly Tar & Chemical Corporation W. A. Justin to Ferro Corporation Mr. Daniel T. Parschall; May 28, 1982.

4.) Letter from Ferro Corporation Daniel T. Parschall, to NYSDEC Mr. Thomas R. Christoffel; June 2, 1982.

5.) Occupational Safety and Health Administration Material Safety Data Sheet; February 5, 1976.

6.) Erie-Niagara Basin Ground-Water Resources N.Y.S. Water Resources Commission, ENB-3; 1968.

7.) Geology of Erie County New York, Edward J. Buehler and Irving H. Tesmer, Buffalo Society of Natural Sciences Bulletin, Vol. 21, No. 3; 1963.

8.) U.S. Geological Survey topographic map, Buffalo S.E. quadrangle; 1965.

9.) Site visit and personal interview with Ferro Corporation, Daniel Parschall; July 28, 1983.

10.) Mitre, Inc. Hazard Ranking System; July 16, 1982.

11.) Codes, Rules and Regulations of the State of New York; 1966.

12.) NYSDEC Interagency Task Force on Hazardous Waste, Draft Report on Hazardous Waste Disposal in Erie and Niagara Counties, New York; March 1979.

APPENDIX B

HAZARDOUS WASTE DISPOSAL SITE REPORT

REVISED

Code: F

Site Code: 915020

Name of Site: Ferro Corporation-Specialty Ceramics Division

Region: 9

County: Erie

Town/City: Lackawanna

Street Address: 661 Willet Road, Buffalo, New York 14218

Status of Site:

- o Active fill area in southern plant property which primary relieved off-spec company products. Tar spill in Northern Plant.
- o Property entered ditch across Willet Road.
- o Urban/Industrial moderately populated area.
- o Nearest dwelling approximately 500 feet.
- o Nearest Water Body: South branch of Smoke Creek approximately .25 miles southwest.
- o Nearest Water Supply: Entire area serviced by municipal water dragon from Lake Erie.
- o High Groundwater table within 5 feet.
- o Soil type: fill.

Estimated Size: .5 acres

Type of Site: Fill in South. Spill in North

Hazardous Waste Disposed: Unknown

Type and Quality of Hazardous Wastes: Unknown

Present Owner: Ferro Corporation

Time Period Site was used: Unknown

Types of Samples: Soil and Water

Remedial Action: Removal of most of the spilled tar. None in fill area

Status of Legal Action: None

Permits Issued: SPDES #003081; RCRA SWPIO 199842; EPA NYD043814003

Assessment of Environmental Problems:

- o Spilled material entering drainage system which ultimately enter state water course.

Assessment of Health Problems: Unknown

Person completing this form: Andre J. LaPres, Recra Research, Inc.

Date: September 6, 1983

GROUND WATER ROUTE WORK SHEET

	Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1	OBSERVED RELEASE	0 45	1	0	45	3.1
	If observed release is given a score of 45, proceed to line 4. If observed release is given a score of 0, proceed to line 2.					
2	ROUTE CHARACTERISTICS					3.2
	Depth to Aquifer of Concern	0 1 2 3	2	6	6	
	Net Precipitation	0 1 2 3	1	2	3	
	Permeability of the Unsaturated Zone	0 1 2 3	1	1	3	
	Physical State	0 $\boxed{1}$ 2 3	1	1	3	
		Total Route Characteristics Score		10	15	
3	CONTAINMENT	0 1 2 3	1	3	3	3.3
4	WASTE CHARACTERISTICS					3.4
	Toxicity/Persistence	0 $\boxed{3}$ 6 9 12 15 18	1	3	18	
	Hazardous Waste Quantity	0 $\boxed{1}$ 2 3 4 5 6 7 8	1	1	8	
		Total Waste Characteristics Score		4	26	
5	TARGETS					3.5
	Ground Water Use	0 $\boxed{1}$ 2 3	3	3	9	
	Distance to Nearest Well/Population Served	$\boxed{0}$ 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40	
		Total Targets Score		3	49	
6	If line 1 is 45, multiply 1 x 4 x 5. If line 1 is 0, multiply 2 x 3 x 4 x 5				57,330	360
7	Divide line 6 by 57,330 and multiply by 100			S_{gw} = 0.6		

GROUNDWATER ROUTE WORK SHEET

Surface Water Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 45	1	0	45	4.1
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2					
2 Route Characteristics					4.2
Facility Slope and Intervening Terrain	0 1 2 3	1	0	3	
1-yr. 24-hr. Rainfall	0 1 2 3	1	2	3	
Distance to Nearest Surface Water	0 1 2 3	2	6	6	
Physical State	0 1 2 3	1	1	3	
	Total Route Characteristics Score		9	15	
3 Containment	0 1 2 3	1	3	3	4.3
4 Waste Characteristics					4.4
Toxicity/Persistence	0 3 6 9 12 15 18	1	3	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	1	8	
	Total Waste Characteristics Score		4	26	
5 Targets					4.5
Surface Water Use	0 1 2 3	3	6	9	
Distance to a Sensitive Environment	0 1 2 3	2	0	6	
Population Served/Distance to Water Intake Downstream	0 4 6 8 10 / 12 16 18 20 / 24 30 32 35 40	1	0	40	
	Total Targets Score		6	55	
6 If line 1 is 45, multiply 1 x 4 x 5. If line 1 is 0, multiply 2 x 3 x 4 x 5			648	64,350	
7 Divide line 6 by 64,350 and multiply by 100		S_{sw} =	1.0		

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

AIR ROUTE WORK SHEET					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 OBSERVED RELEASE	0 45	1	0	45	5.1
Date and Location:					
Sampling Protocol:					
If line 1 is 0, then S_a = 0. Enter on line 5. If line 1 is 45, then proceed to line 2.					
2 WASTE CHARACTERISTICS					5.2
Reactivity and Incompatibility	0 1 2 3	1		3	
Toxicity	0 1 2 3	3		9	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
Total Waste Characteristics Score				20	
3 TARGETS					5.3
Population Within 4-Mile Radius	0 9 12 15 18 21 24 27 30	1		30	
Distance to Sensitive Environment	0 1 2 3	2		6	
Land Use	0 1 2 3	1		3	
Total Targets Score				39	
4 Multiply 1 x 2 x 3				35,100	
5 Divide line 4 by 35,100 and multiply by 100			S_a = 0		

AIR ROUTE WORK SHEET

	s	s^2
Groundwater Route Score (S_{gw})	0.6	0.4
Surface Water Route Score (S_{sw})	1.066993	1.014
Air Route Score (S_a)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		0
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		1.414
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		.82

FIGURE 10
WORKSHEET FOR COMPUTING S_M

FIRE AND EXPLOSION WORK SHEET					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Containment	1 3	1	1	3	7.1
2 Waste Characteristics					7.2
Direct Evidence	0 3	1	0	3	
Ignitability	0 1 2 3	1	0	3	
Reactivity	0 1 2 3	1	0	3	
Incompatibility	0 1 2 3	1	0	3	
Hazardous Waste Quantity	0 $\boxed{1}$ 2 3 4 5 6 7 8	1	1	8	
	Total Waste Characteristics Score		1	20	
3 Targets					7.3
Distance to Nearest Population	0 1 2 3 4 5	1	3	5	
Distance to Nearest Building	0 1 2 3	1	2	3	
Distance to Sensitive Environment	0 1 2 3	1	0	3	
Land Use	0 1 2 3	1	1	3	
Population Within 2-Mile Radius	0 1 2 3 4 5	1	3	5	
Buildings Within 2-Mile Radius	0 1 2 3 4 5	1	4	5	
	Total Target Score		13	24	
4 Multiply $\boxed{1}$ x $\boxed{2}$ x $\boxed{3}$			13	1,440	
5 Divide line $\boxed{5}$ by 1,440 and multiply by 100			S_{FE} = 0.9		

FIRE AND EXPLOSION WORK SHEET

DIRECT CONTACT WORK SHEET					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Incident	0 45	1	0	45	8.1
If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2					
2 Accessibility	0 1 2 3	1	3	3	8.2
3 Containment	0 15	1	0	15	8.3
4 Waste Characteristics Toxicity	0 1 2 3	5	0	15	8.4
5 Targets					8.5
Population within a 1-mile radius	0 1 2 3 4 5	4	8	20	
Distance to a critical habitat	0 1 2 3	4	0	12	
	Total Targets Score		11	32	
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			14	21,600	
7 Divide line 6 by 21,600 and multiply by 100			S_{DC} = 0.1		

DIRECT CONTACT WORK SHEET

REFERENCE 2

N   l. l.

COUNTY OF ERIE

EDWARD V. REGAN
COUNTY EXECUTIVE

DEPARTMENT OF ENVIRONMENT AND PLANNING

95 Franklin Street - Buffalo, New York 14202

JOAN E. LORING
COMMISSIONER
(716) 846-6725

DIVISION OF ENVIRONMENTAL CONTROL
I. ARTHUR HOEKSTRA, P.E.
DEPUTY COMMISSIONER
(716) 846-6370

November 28, 1978

Ferro Corporation
Electro Division
661 Willet Road
Hamburg, New York

Attention: James J. Marino

Dear Sir:

As you may recall a meeting and site inspection was conducted on October 27, 1978.

Visual inspection of the site indicated areas of exposed material (grinding wheels & some demolition debris) mainly due to stream bank erosion.

Even though the material observed is relatively innocuous, adequate cover & seeding is required under D.E.C. Part 360.

Our Department is requesting that this be accomplished within three weeks from the date of this letter.

Should you have any questions, please contact our department at 846-7444.

The Town of Hamburg building inspector and the U.S. Corps of Engineers should be contacted to determine if any additional permits are required by your company.

Very truly yours,

Donald Tamol, P.E.
Senior Engineer

cc: J. Banazak

DT/maa

J. Miller 8-#

To File
From D. Parrot
Subj Ferro Corp 611 Willet Rd
Landfill Complaint Follow-Up Oct 30, 1978

Inspected Deposition site on October 27, 1978 with Mr James J. Marino of Ferro Corp.

The dumped material according to visual observations & Mr Marino's comments consists of mainly old or rejected grinding wheels.

According to Mr Marino the site has not been in use for at least 4 years.

Some exposed material was noted along slope of Smokes Creek bank.

Grinding wheels were also lying in creek bottom most likely due to children trying to dam up the creek.

The wheels themselves probably do not constitute a water pollution hazard because the material used is primarily aluminum oxide.

Deterioration of the wheels into sand particles is most likely caused by water & frost intrusion.

Further information is expected from Mr Marino as to plant personnel pollution until then a reply to the company will be withelt.

Options include

1) Remove material from creekbank (say > 50 feet)

2) Cover with gravel or fill to cover up the dumped material
; THEN ~~TOPSOIL~~ ~~& BANK~~ STABILIZE BANK - TOPSOIL & SEED RIP-RAP

3) Cover with Soil to prevent leaching

4) Leave Alone

Conclusion: Wait for more info.

Check Steve Dulaski Stream Protection

FERRO

ELECTRO DIVISION

FERRO CORPORATION / ELECTRO DIVISION / 661 WILLET ROAD / BUFFALO, NEW YORK 14218 / (716) 825-7900/TELEX 91313

October 30, 1978

Mr. Donald Tamul
Erie County Dept. of Environmental Planning
95 Franklin Street
Buffalo, New York 14202

Dear Don:

The following is the information requested per our meeting on October 27, 1978.

According to a long time employee, we had stopped dumping at the site in question about 1967. This area was used to dump scrap grinding wheel, scrap brick and some refractory products.

The products scrapped are not soluable, and deteriorate only by weathering, and are not harmful.

If you have any questions, do not hesitate to call.

Sincerely,

James J. Marino

James J. Marino
Manager
Plant Engineering

JJM:gmw

REFERENCE 3

Jerome Miller
8-4

K

FERRO

ELECTRO PLANT
FERRO CORPORATION
661 WILLET ROAD
BUFFALO, NEW YORK 14218
TELEPHONE (716) 825-7900

July 21, 1983

Mr. John V. Deleo
County Of Erie
Department of Environment & Planning
95 Franklin Street
Buffalo, N.Y. 14202

Dear Mr. Deleo:

In reference to your letter of June 23, 1983, we submit the following:

a) Ferro installed a Ball Mill wash station in late 1982 which became operational last December. Its function is to reclaim green product scrap for reuse in our product line.

b) The green product scrap is of three types:

1. SiC, Hanover Clay, Goulac & water, of scrap.
2. SiC, Goulac and water, of scrap.
3. SiC, Silicon metal, Lignosol and water, of scrap.

c) The operation consists of loading the 6' dia. x 8' long ball mill with 2000 lbs. of green scrap, adding 250 gallons of water and running for a number of hours. The mill is stopped, the water drained off and then rinsed twice again with 175 gallons each rise. The water is directed into a 12' x 60' x 4' deep, tapered concrete pit which holds approximately 11000 gallons of water. The washed green scrap is discharged from the ball mill through screens and is dried prior to use.

d) To date, we have reclaimed 85,000 lbs. of green scrap and have used approximately 16,000 gallons of wash water. The first 50,000 lbs. we used only a single wash. Since January 1983, we have generated an average of 5100 lbs. of green scrap a month and correspondingly generates approximately 1530 gallons of wash water.

e) We have had to decant off our concrete settling pit four (4) times since we began the operation to a depressed land area as indicated during your inspection of June 20th, where the water leaches into the ground and/or evaporates. We have cleaned the pit one (1) time during the same period and land-filled approximately three (3) cubic yards of SiC/clay fines and water on our property.

f) It is our intention to use Niagara Sanitation to dispose of our semi-solid waste from the concrete settling pit in the future to their certified Depew, N.Y. landfill site. We will continue to decant off small amounts of water as required to maintain the water balance of our operation.

g. I have enclosed copies of (1) Niagara Sanitation's NYSDEC Form w/Permit No., (2) Material Safety Data Sheets on our Silicon metal, SiC, clay and Goulac raw materials which make up our green scrap. The data sheet on Lignosol will be forwarded upon receipt from the manufacturer.

h) We ask that you keep this information confidential.

Should you have any further questions, please call me at 825-7900, Ext. 305 or Bob Mesanovic at Ext. 263.

Sincerely,

Daniel Parshall

Dan Parshall
Engineering Manager

DP/sms
Enc.

MATERIAL SAFE HANDLING DATA SHEET

UNION CARBIDE CORPORATION - FERROALLOYS DIVISION

e purpose of this sheet is to set out pertinent information which may be necessary to uate health, safety and environmental hazards when handling the material; and to deter-ine what precautions may be necessary. The handling practices outlined are recommended but t limited thereto.

Date: April 30, 1973

SECTION I

roduct Family or Name Silicon Metal & Alloys Formula Si, Fe-Si

oducts Covered if Sheet deals with Product Family:

Silicon Metal	Ferrosilicon (50%-90%)	Silvery Iron
	"Superseed" Inoculant	"Vaxon"

SECTION II - TLV DATA ON PRINCIPAL ALLOY INGREDIENTS *

gnificant Ingredients	Quantity	TLV (mg/M^3) As published by ACGIH
Silicon	14-99%	10.0 for elemental Si

* Source: American Conference of Governmental Industrial Hygienists - 1972

SECTION III - PHYSICAL DATA

ppearance and Odor Metallic Silver. No odor.

ing Point Range (Approx.) 2570° F. Si Metal.

er 2205-2520° F. Ferrosilicon.

Specific Gravity (Approx.) 2.0 to 7.0

Solubility Nil

Reactivity in Water Small amounts of Hydrogen may evolve if moisture is present.

vaporation rate etc. not applicable to Ferroalloys)

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

nbustibility: Lump Material None

Fine Material Using a Combustibility Test, combustibility of minus 325 mesh material is weak. Dust can be ignited when suspended in air; will propagate flame but is not expected to generate sufficient pressure to explode.

inguishing Media & Special Fire Fighting Procedures Dry powder, sand, water fog.

SECTION V - HEALTH HAZARD DATA

y of Product Not known for alloys of silicon and iron. Refer to Section II for silicon.

fect of Overexposure Alloy is non-toxic in Lump form and no residual injury is expected. gh concentrations of dust will cause some irritation to eyes, nose and throat.

ergency Procedures None.

st Aid Procedures If necessary, flush eyes with water.

SECTION VI - REACTIVITY DATA

Stability Unstable ______ Stable X

Conditions to Avoid when finely divided, avo contact with moisture during prolonged storage.

Incompatibility - Materials to Avoid Caution should be observed when using with oxidizers and acids such as Hydrofluoric Acid. Avoid associated or resulting fumes.

Hazardous Decomposition Products Small amounts of hydrogen may evolve if moisture is present; also very small amounts of AsH_3 or PH_3 may evolve on rare occasions in the presence of moisture.

SECTION VII - SPILL OR LEAK INFORMATION

Expected Results under Certain Conditions None

Waste Disposal or Repack Information Avoid repacking material which is wet in closed or sealed containers.

SECTION VIII - EMPLOYEE PROTECTION INFORMATION

Respiratory Protection - Lump None

Dust or Fine Dust respirator in excessive dust (USBM Approved Schedule 21-B)

Eye Protection Standard.

Other Clothing & Equipment Standard hand protection required as metal may have sharp edges.

As with other metal dusts, avoid contamination of clothing.

Ventilation When necessary to achieve dust control and to achieve air change in confined space situations.

SECTION IX - ADDITIONAL INFORMATION

Re-milling, Handling, Storing, etc. No problems expected when sizing to minus 8 mesh. Precautions such as the use of inert atmosphere are advisable when sizing to 200 mesh with more than 50% minus 325 mesh.

Grinding wet material may be hazardous due to the possibility of hydrogen evolution.

Cyprus Industrial Minerals Company
555 South Flower Street
Los Angeles, California 90071
Telephone 213) 489-3700
TWX 910) 321-5753

THIS FORM SIMILAR TO FORM OSHA-20

MATERIAL SAFETY DATA SHEET

SECTION I

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
Hydrous Aluminum Silicate, Ball Clay	Hanover
CHEMICAL FAMILY: Silicates	FORMULA: $Al_2O_3 : 2SiO_2 \cdot 2H_2O$ + Impurities

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H_2O=1)	2.0 – 2.5
VAPOR PRESSURE (mm Hg.)		PERCENT, VOLATILE BY VOLUME (%) Water only	15%
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (______ =1)	
SOLUBILITY IN WATER Negligible			
APPEARANCE AND ODOR Cream, tan or gray colored with earthy odor.			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS			

AMERICAN CAN COMPANY

MATERIAL SAFETY DATA SHEET

GOULAC

MSDS:
DATE:

I. PRODUCT IDENTIFICATION

COMMON NAME:	Calcium Lignosulfonate	CHEMICAL FORMULA:	Lignosulfonate
SYNONYMS:	See Above		
TRADE NAMES:	See Above		
MANUFACTURER:	American Can Company		
SHIPPING NAME:	DOT	IATA	

II. HAZARDOUS INGREDIENTS

MATERIAL OR COMPONENT	%	TLV	(REMARKS)
None Known			

III. PHYSICAL DATA

BOILING POINT, 760mm Hg	Not Applicable	MELTING POINT	Not Applicable
SPECIFIC GRAVITY(H_2O=1)	Not Applicable	BULK DENSITY	35 Lb./Ft.^{3}
pH (1% Soln.)	7.0	SOLUBILITY IN WATER	100%
% VOLATILES BY WEIGHT	6.0%		
APPEARANCE & ODOR	Brown powder with slight odor		

Goulac

FIRE AND EXPLOSION DATA

FLASH POINT (Test Method)	Not Applicable	AUTOIGNITION TEMPERATURE	Approximately 400° for Dust
FLAMMABLE LIMITS IN AIR,% BY VOLUME		LOWER: 0.2 Oz./$Ft.^3$	UPPER:
EXTINGUISHING MEDIA	Water		
SPECIAL FIRE FIGHTING PRECEDURES	None Needed		
UNUSUAL FIRE AND EXPLOSION HAZARD	Flammable solids may provide conditions for a dust explosion.		

V. HEALTH HAZARD INFORMATION

(REMARKS) Not a public health hazard.

PRIMARY ROUTES OF EXPOSURE: ( ) SKIN CONTACT ( ) EYE CONTACT

( ) INHALATION ( ) SKIN ABSORPTION ( ) INGESTION

EFFECTS OF OVEREXPOSURE:

ACUTE EFFECTS: Studies to determine acute oral toxicity of lignosulfonates to rats produced no deaths from which an LD_{50} could be determined.

No effects of overexposure to lignosulfonates are known.

CHRONIC EFFECTS:

Overexposure may result in the aggravation of existing conditions of the following:

( ) Liver ( ) Skin ( ) Respiratory System

( ) Kidneys ( ) Eyes ( ) Central Nervous System

VI. EMERGENCY AND FIRST AID PROCEDURES

EYES:

Eyes should be irrigated with potable water.

SKIN:

Skin should be flushed with clean water.

INHALATION:

Remove from dusty area.

INGESTION:

Induce vomiting.

NOTES TO PHYSICIAN:

FERRO

ELECTRO DIVISION

FERRO CORPORATION · ELECTRO DIVISION

MATERIAL SAFETY DATA SHEET

SECTION I PRODUCT IDENTIFICATION

TRADE NAME AND SYNONYMS	Kellogg - 3AD
CHEMICAL NAME AND SYNONYMS	Silicon Carbide Refractory
TSCA INVENTORY CAS #	
CHEMICAL FAMILY	FORMULA SiC

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III PHYSICAL DATA

BOILING POINT not applicable	VAPOR PRESSURE not applicable
MELTING POINT	VAPOR DENSITY not applicable
SPECIFIC GRAVITY (H_2O=1) 3.1	EVAPORATION not applicable
SOLUBILITY IN WATER negligible Insol	VOLATILE not applicable
APPEARANCE AND ODOR Gray - Black Color No Odor	

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT METHOD USED not applicable	EXTINGUISHING MEDIA Water Fog, Foam Carbon Dioxide, Dry Chemical not flammable	FLAMMABLE (EXPLOSIVE) LIMITS not applicable
SPECIAL FIRE FIGHTING PROCEDURES	none required	
UNUSUAL FIRE AND EXPLOSION HAZARDS	none	

PRODUCT DESIGNATION	

SECTION V HEALTH HAZARD DATA

HEALTH HAZARD DATA			
PRINCIPAL ROUTES OF ABSORPTION		SKIN AND EYE IRRITATION	as nuisance dust
RELEVANT SYMPTOMS OF EXPOSURE	Dust from product may cause irritation of the respiratory system.		
EFFECTS OF EXPOSURE	Prolonged exposure of dust may lead to pulmonary problems		
EMERGENCY AND FIRST AID PROCEDURES	Skin—wash off with soap and water Eyes—flush immediately with clean water and call ophthalmologist		

SECTION VI REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY		CONDITIONS CONTRIBUTING TO HAZARDOUS POLYMERIZATION	
INCOMPATIBILITY (Materials to Avoid)			
HAZARDOUS DECOMPOSITION PRODUCTS	Hazardous Dust (silica) may be produced if cut or ground.		

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	Uncontaminated material may be scooped up for use If contaminated scoop or vacuum into a receptacle for disposal
WASTE DISPOSAL METHOD	Use as sanitary landfill in accordance with local, state and federal regulation

SECTION VIII SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS		PROTECTIVE EQUIPMENT EYE	Recommended when cutting
MECHANICAL (General)		GLOVES	
SPECIAL		RESPIRATOR	Approved Dust respirator is recommended
OTHER PROTECTIVE EQUIPMENT			when cutting (NIOSH)

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE	
OTHER PRECAUTIONS	

"The information herein is given in good faith but no warranty, express or implied, is made"

"ESSENTIALLY SIMILAR" TO FORM OSHA-20

REFERENCE 4

Hawley's Condensed Chemical Dictionary

ELEVENTH EDITION

Revised by

N. Irving Sax
and
Richard J. Lewis, Sr.

VNR VAN NOSTRAND REINHOLD COMPANY
New York

(CCD)

Lieben iodoform reaction. Cleavage of methyl ketones with halogens (mostly iodine) and base to carboxylic acids and haloform.

Liebig, Justus Von. (1803–1873) A German chemist who founded the *Annalen*, a world-famous chemical journal. He was a great teacher of chemistry, training such men as Hofmann, who did basic work on organic dyes. Liebig contributed original research in the fields of human physiology, plant life, soil chemistry and was the discoverer of chloroform, chloral, and cyanogen compounds. He was the first to recommend addition of nutrients to soils and thus may be considered the originator of the fertilizer industry.

life, origin. (biogenesis). The succession of chemical events that led up to the appearance of living organisms on earth about 3.3 billion years ago. According to one theory, substantiated by experimental evidence, this occurred as follows. The inorganic compounds originally present were carbides, water, ammonia, and carbon dioxide. The carbides reacted with water to form methane, which in turn reacted with ammonia and water vapor as a result of an electric impulse to form amino acids, porphyrins, and nucleotides (or their precursors). All these compounds have been created artificially in the laboratory. It has further been shown that amino acids and nucleotides can be concentrated into proteins (and probably nucleic acids) by the action of zinc-bearing clays, which were present along the shores of the primeval oceans. Little or no free oxygen existed in the primordial atmosphere, which consisted chiefly of reducing gases. The complex chemical reactions which eventually resulted in the formation of DNA took place in an anaerobic aqueous environment and the earliest living organisms developed in a nutrient solution in which free oxygen finally appeared by the photosynthesis of algae. Another theory advances the idea that essential life chemicals such as purines and amino acids were formed under primitive conditions from aqueous solutions of hydrogen cyanide. Both these theories are based on research carried out by highly competent biochemists.

ligand. A molecule, ion or atom that is attached to the central atom of a coordination compound, a chelate, or other complex. Thus, the ammonia molecules in $[Co(NH3)_6]^{+++}$ and the chlorine atoms in $[PtCl_6]^{--}$ are ligands. Ligands are also called complexing agents, for example EDTA, ammonia, etc.

See also chelate, coordination compound.

light hydrocarbon. One of a group of hydrocarbon products derived from natural gas or petroleum; ethane, propane, iso- and normal butane and natural gasoline (C_5 and heavier). Produced largely in southwest Texas and Louisiana, these are used as feedstocks for a wide vareity of organics.

See also liquefied petroleum gas.

light metal. In engineering terminology, a metal of specific gravity less than three that is strong enough for construction use (aluminum, magnesium, beryllium).

light microscope. See optical microscope.

light oil. (coal tar light oil). A fractional distillate from coal-tar with bp range from 110–210C, consisting of a mixture of benzene, pyridine, toluene, phenol, and cresols. The term is also sometimes used for oils of about the same bp range, but from other sources.

Grade: Technical.

Hazard: Highly flammable, dangerous fire risk.

Use: Source of benzene, solvent naphthas, toluene, phenol, and cresols.

light water. (1) A fire-fighting agent consisting of a water solution of perfluorocarbon compounds mixed with a water-soluble thickener of the polyoxyethylene compound type. It can be used simultaneously with dry chemical to smother gasoline or similar fires. (2) Ordinary water (as distinct from heavy water) used to both cool and moderate nuclear reactors.

lignin. A phenylpropane polymer of amorphous structure comprising 17–30% of wood. It is so closely associated with the holocellulose which makes up the balance of woody material that it can be separated from it only by chemical reaction at high temperature. It is believed to function as a plastic binder for the holocellulose fibers. It is recovered from wood-processing wastes in limited amounts.

Use: Stabilization of asphalt emulsions, ceramic binder and deflocculant, dye leveler and dispersant, drilling fluid additive, precipitation of proteins, extender for phenolic plastics, special molded products, source of vanillin, phenol, and of a component of battery expanders.

lignin sulfonate. (lignosulfonate). A metallic sulfonate salt made from the lignin of sulfite pulp-mill liquors, mw range 1000–20,000.

Properties: Light-tan to dark-brown powder, no pronounced odor, stable in dry form and relatively stable in aqueous solution, nonhygroscopic, no definite mp, decomposes above 200C,

d about 1.5, forms colloidal solutions or dispersions in water, practically insoluble in all organic solvents.
Use: Dispersing agent in concrete and carbon black-rubber mixes, extender for tanning agents, oil-well drilling mud additives, ore flotation agents, production of vanillin, industrial cleaners, gypsum slurried, dyestuffs, pesticide formulations. Commercially available as the salts of most metals and of ammonium.

lignite. (brown coal). A low rank of coal between peat and sub-bituminous, it contains 35–40% water. It occurs in the continental US, Alaska, Germany and the Netherlands. Its Btu value is low. Drying, crushing and pelletizing lignite with an asphaltic binder for direct use as fuel has been successfully demonstrated. Polymer resins (polyesters and polyamides) can be derived from lignite by oxidation with nitric acid, followed by extraction of the nitro-coal acids, which are the basis of the polymer molecules. Peat can also be used. A process for gasification of lignite to produce methanol is approaching commercial development in Sweden.
See also peat, gasification.

lignoceric acid. (n-tetracosanoic acid).
CAS: 557-59-5. $CH_3(CH_2)_{22}COOH$.
A long-chain saturated fatty acid found in minor quantities in most natural fats.
Properties: Crystals, mp 84.2C, bp 272C (10 mm), d 0.8207 (100/rC), refr index 1.4287 (100C), nearly insoluble in ethanol.
Source: Lignite and beechwood tar, peanut oil, sphingomyelin.
Grade: Technical, 99%.
Use: Biochemical research.

"Lignosol."[476] TM for a series of calcium, sodium, and ammonium lignosulfonates. These compounds are mixtures of lignosulfonates and wood sugars. Special grades are available which have low wood sugar content.
Use: Binders, dispersing agents and tanning agents.

lignosulfonate. See lignin sulfonate.

"Lignox."[236] TM for a soluble calcium lignosulfonate in dry powder form.
Use: Treatment of drilling mud containing calcium ions and in brine emulsion muds.

ligroin. A saturated volatile fraction of petroleum boiling in the range 60–110C. There is a special grade of ligroin known as petroleum benzin.
Hazard: Highly flammable, dangerous fire risk. Toxic by ingestion and inhalation.
Use: Solvent for resins, paints, varnishes, etc.

"Lilial."[227] TM for p-tert-butyl-α-methylhydrocinnamaldehyde. $C_{14}H_{20}O$.

lime. Fourth highest-volume chemical produced in US (1985). Specifically, calcium oxide (CaO), more generally, any of the various chemical and physical forms of quicklime, hydrated lime, and hydraulic lime (adapted from ASTM definition C41-47). Noncombustible. For further information, see National Lime Association, 925 16th St. N.W., Washington, D.C.
Hazard: Unslaked lime (quicklime) yields heat on mixing with water and is a caustic irritant.
Use: See calcium oxide, calcium hydroxide.
See also following entries and note under calcium oxide.

lime acetate. See calcium acetate.

lime, agricultural. Lime slaked with a minimum amount of water to form calcium hydroxide.

lime, air-slaked. Lime which has absorbed carbon dioxide and moisture from the atmosphere. It consists of a powder composed of calcium carbonate and calcium hydroxide.

lime citrate. See calcium citrate.

lime, chlorinated. (chloride of lime; bleaching powder). $CaCl(ClO)\cdot 4H_2O$
Properties: White powder, chlorine odor, mp (decomposes), decomposes in water, acids.
Derivation: By conducting chlorine into a box-like structure containing slaked lime spread upon perforated shelves.
Grade: 35–37% active chlorine, technical.
Hazard: Evolves chlorine and at higher temperatures oxygen. With acids or moisture evolves chlorine freely at ordinary temperatures.
Use: Textile and other bleaching applications, organic synthesis, deodorizer, disinfectant.
See also calcium hypochlorite, bleach.

lime, fat. A pure lime which combines readily with water to form a fine white powder, free from grit, and makes a smooth stiff paste with excess of water. Must not be loaded hot.
See also lime, lean.

lime, hydrated. See calcium hydroxide.

lime, hydraulic. A variety of calcined limestone which when pulverized absorbs water without swelling or heating and gives a cement that hardens under water. The limestone burned for this purpose usually contains 10–17% silica, alumina,

REFERENCE 5

COUNTY OF ERIE
DEPARTMENT OF ENVIRONMENT AND PLANNING
DIVISION OF ENVIRONMENTAL CONTROL

6

* * * MEMORANDUM * * *

FROM: Ronald D. Koczaja DATE: 1/13/84

TO: Donald Campbell

SUBJECT: N.Y.S. Superfund-Consultants Report Ferro Corp., 661 Willet Road, Lackawanna.

The company produces grinding wheels and refractory goods for industrial purposes. Processes employed at the facility reportedly do not produce any hazardous waste. A low lying area on plant property was used as a landfill for off-spec product and floor sweepings. The area landfilled was targeted as an expansion site for production facilities.

A preliminary hazard ranking score of 2.6 was determined for the site following the evaluation of existing data. The consultant has recommended a Phase II follow up study of the site. This evaluation will cost an estimated $25,755. The Phase II study will obtain data to allow completion of a final hazard ranking score via the Mitre Model, evaluate remedial measures and recommend the most cost effective remedial action.

For reasons listed below, it is not believed that a Phase II evaluation of the site is necessary.

Late in 1981 the DEC conducted a sampling program at the Ferro Corp., Willet Road facility. The program included surface water and sediment samples taken from five points. Sampling points were located in drainage ways to the North and West of the landfilled area. The data generated as a result of the sampling indicated that the sediment was contaminated by phenolics, chromium, and lead. Levels of chromium and lead found are within the reported range of these elements as commonly occurs in mineral soils. Three of the five sediment samples contained phenolics above the limits of detection (110 ppm, 29 ppm, 0.43 ppm). The concentrations of chromium, lead, and phenolics in the ditch sediment did not result in a contravention of surface water quality standards. The consultants expressed their concern over the level of PNAs found in the sediment and water sampled. Based on Ferro's production processes, it would not be expected to be a major source of PNAs such as coke producers or coal fired power generators.

Available geologic data suggests the site is on a layer, approximately 60 feet thick, of glacial till. These soils are estimated to have a permeability of 10^{-5}-10^{-7} cm/sec. Bedrock below the unconsolidated layer is grey limestone and fissile grey shale.

DEC Albany 8-17-88

The Phase II study proposal contains provisions for air monitoring, geophysical exploration, subsurface investigation, monitoring well installation, and sampling and analysis.

There is no evidence to indicate that substantial quantities of volatile materials were placed within the firm's landfill area. We therefore question the need for air monitoring to chacterize the potential air hazards associated with the site. This could result in the Ferro Corp. undertaking a program which would provide background air quality data not related to the landfill.

Enough information exists to determine the location of the fill area. The accurate description of the site boundaries seems to preclude the need for a geophysical study of the area. The general geology of the area, soil types, and depth to bedrock has been fairly well established in the vicinity. Data generated to refine existing geologic information does not seem necessary to characterize any potential hazard associated with this site. The type of waste disposed and its location has already been established. Ferro Corp. has not changed its processes or product line appreciably over the years. A representative composite sample of current waste should approximate the mix contained in the landfill. The composite could then be used to estimate the effect the waste could have on groundwater. The groundwater is not used as a source of potable water. Water is supplied from Lake Erie and distributed through a public supply. Very little benefit would be obtained from a groundwater sampling program. The firm's raw materials consist primarily of alumina and silicon carbide clay. Off-spec finished product and floor sweepings of the raw materials were disposed of in the landfill. Leachate produced from these materials would not be expected to render the groundwaters unsuitable as a potential source of drinking water. The effect that this site would have on a potential groundwater source of potable water is considered negligible based on the type and volume of waste, nature of the soils, and current value of groundwater as a drinking water supply.

The value of PNAs reported during the 1981 DEC study fell within the range of PNA levels found in other industrial areas of Erie County. PNAs in the soil may be a regional characteristic associated with the past and current economy of the area. A study of PNAs in the soil, with the cost borne by Ferro Corp., cannot be justified. They are not believed to be a major producer of PNAs and the levels found in the soils cannot be directly associated with the landfill operation or their waste.

Approximately 40% of the Phase II cost will result from sampling and analysis. Based on information already available, it is not believed that the site poses a problem worthy of such an expenditure by the State or Ferro Corp. We do not believe that the site poses any hazard that will require remedial action and therefore feel that any costs associated with the evaluation of remedial alternatives are not justified.

RONALD D.KOCZAJA
Asst. Env. Quality Engineer
Division of Environmental Control

RDK:rb

RDK

cc: P. Buechi, NYSDEC

REFERENCE 6

New York State Department of Environmental Conservation
Division of Regulatory Affairs-Region 9
600 Delaware Avenue, Buffalo, New York 14202-1073
716/847-4551

MJS
BDW
Permit file
B. Wager 1/16/87

Henry G. Williams
Commissioner

PERMIT TRANSMITTAL LETTER

Dear Permittee:

Enclosed is your permit which was issued in accordance with applicable provisions of the Environmental Conservation Law. The permit is valid for only that project, activity or operation expressly authorized. If modifications are desired after permit issuance, you must submit the proposed revisions and receive written approval from the Permit Administrator prior to initiating any change. If the Department determines that the modification represents a material change in the scope of the authorized project, activity, operation or permit conditions, you will be required to submit a new application for permit.

PLEASE REVIEW ALL PERMIT CONDITIONS CAREFULLY, INCLUDING ANY MONITORING REQUIREMENTS AND/OR COMPLIANCE SCHEDULE THAT MAY BE REQUIRED. IN PARTICULAR, IDENTIFY YOUR INITIAL RESPONSIBILITIES UNDER THIS PERMIT IN ORDER TO ASSURE TIMELY ACTION AND AVOID LATE REPORTING IF REQUIRED. SINCE FAILURE TO COMPLY PRECISELY WITH PERMIT CONDITIONS MAY BE TREATED AS A VIOLATION OF THE ENVIRONMENTAL CONSERVATION LAW, YOU ARE REQUESTED TO PROVIDE A COPY OF THE PERMIT TO THE PROJECT CONTRACTOR, FACILITY OPERATOR, AND OTHER PERSONS DIRECTLY RESPONSIBLE FOR PERMIT IMPLEMENTATION (IF ANY).

If you have any questions regarding the administrative processing of this permit or request for modification, please contact this office at the above address. Technical questions relating to specific permit conditions should be directed to Bruce Wager.

Respectfully,

Steven J. Doleski
Regional Permit Administrator

cc: Reg. 9, Div. of Water

Attachment(s) SPDES NY 0030881

91-20-2 (7/84)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

State Pollutant Discharge Elimination System (SPDES)
DISCHARGE PERMIT
Special Conditions (Part 1)

Industrial Code 3225, 3297
Discharge Class (CL) 01
Toxic Class (TX) 01
Major D.B. 01
Sub D.B. 01

Facility IDNumber: NY- 0030881
UPA Tracking Number: 90-86-0923
Effective Date (EDP): 2/1/87
Expiration Date (ExDP): 2/1/92
Modification Date(s):
Attachment(s): General Conditions (Part II, 2/85

This SPDES permit is issued in compliance with Title 8 of Article 17 of the Environmental Conservation Law of New York State and in compliance with the Clean Water Act, as amended, (33 U.S.C. §1251 et. seq.) (hereinafter referred to as "the Act").

Attn: Mr. Bruce Tarquino

Permittee Name: Ferro Corporation

Street: One Erieview Plaza

City: Cleveland State: Ohio Zip Code: 44114

is authorized to discharge from the facility described below:

Facility Name: Ferro Corporation

Location (C,T,V): Lackawanna County: Erie

Mailing Address (Street): 661 Willett Road

Mailing Address (City) Buffalo (C) State: New York Zip Code: 14218

from Outfall No. 004 at: Latitude 42° 48' 15" & Longitude 78° 48' 18"

into receiving waters known as: unnamed tributary of Smoke Creek, Class D

and: (list other Outfalls, Receiving Waters & Water Classification)

in accordance with the effluent limitations, monitoring requirements and other conditions set forth in this permit.

This permit and the authorization to discharge shall expire on midnight of the expiration date shown above and the permittee shall not discharge after the expiration date unless this permit has been renewed, or extended pursuant to law. To be authorized to discharge beyond the expiration date, the permittee shall apply for permit renewal as prescribed by Sections 17-0803 and 17-0804 of the Environmental Conservation Law and Parts 621, 752, and 755 of the Departments' rules and regulations.

PERMIT ADMINISTRATOR	DATE ISSUED	ADDRESS
Steven J. Doleski	1/14/87	600 Delaware Avenue Buffalo, New York 14202-1073

Distribution: Region 9 Div. Water; Albany, BWFD, TSS: Dr. Baker, EPA Reg. II; ECDEP; Great Lakes Commission

Steven J. Doleski

FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the Period Beginning EDP 2/1/87

and lasting until EDP + 5 years 2/1/92

the discharges from the permitted facility shall be limited and monitored by the permittee as specified below:

Outfall Number & Effluent Parameter	Discharge Limitations Daily Avg.	Discharge Limitations Daily Max.	Units	Minimum Monitoring Requirements Measurement Frequency	Minimum Monitoring Requirements Sample Type
001 No monitoring required, sanitary wastes only, no industrial wastes or wash water shall be allowed.					
002 No monitoring required, stormwater only					
004 Boiler Blow-down, Cooling Water and Stormwater					
Flow	Monitoring Only		gpd	Monthly	Instantaneous
Total Suspended Solids	20	40	mg/l	Monthly	Grab
pH (range) 6.0-9.0			SU	Monthly	Grab

Prohibition

The permit application must list all the corrosion/scale inhibitors or biocidal-type compounds used by the permittee. If use of new boiler/cooling water additives is intended, application must be made prior to use.

Boiler chemical additives currently in use: Nalco Transport 7202, Nalco 780

Definition of Daily Average and Daily Maximum

The daily average discharge is the total discharge by weight or in other appropriate units as specified herein, during a calendar month divided by the number of days in the month that the production or commercial facility was operating. Where less than daily sampling is required by this permit, the daily average discharge shall be determined by the summation of all the measured daily discharges in appropriate units as specified herein divided by the number of days during the calendar month when the measurements were made.

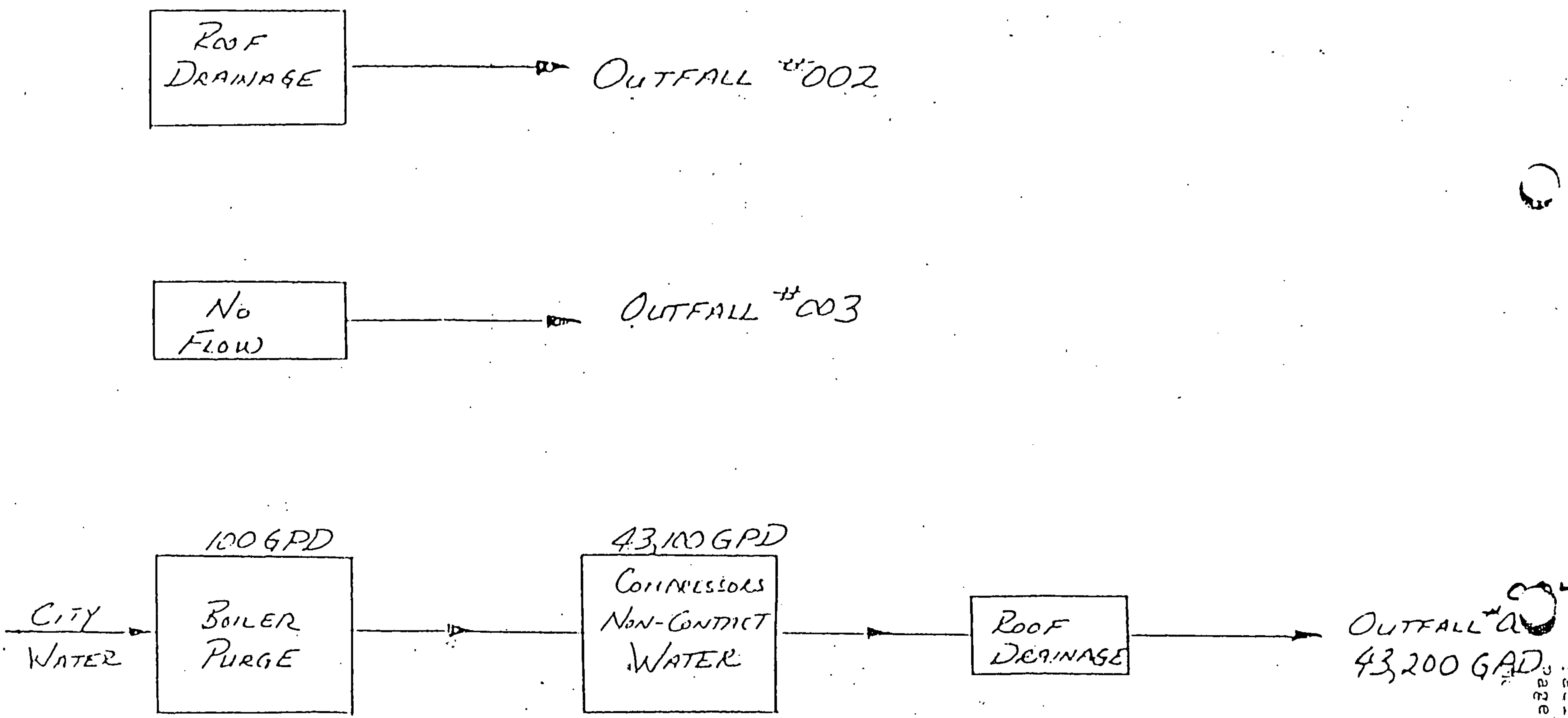
The daily maximum discharge means the total discharge by weight or in other appropriate units as specified herein, during any calendar day.

Monitoring Locations

Permittee shall take samples and measurements to meet the monitoring requirements at the location(s) indicated below: (Show locations of outfalls with sketch or flow diagram as appropriate).

See next page

FERRO CORP. - SPECIALITY CERAMICS GROUP



R MESANOVIC
12-7-87

91-20-2f (7/84)

MONITORING, RECORDING AND REPORTING

a) The permittee shall also refer to the General Conditions (Part II) of this permit for additional information concerning monitoring and reporting requirements and conditions.

b) The monitoring information required by this permit shall be:

☐ Summarized, signed and retained for a period of three years from the date of sampling for subsequent inspection by the Department or its designated agent.

☒ Summarized and reported by submitting completed and signed Discharge Monitoring Report forms once every 6 month(s) to the locations specified below. Blank forms available at department offices listed below.

The first report will be due no later than August 28.

Thereafter, reports shall be submitted no later than the 28th of the following month(s): February & August

Department of Environmental Conservation
Regional Water Enginer
600 Delaware Avenue
Buffalo, New York 14202-1073

Department of Environmental Conservation
Water Division
50 Wolf Road,
Albany, New York 12233

☐ (applicable only if checked)

______________________, Chief
Permit Administration Branch
Planning & Management Division
USEPA Region II, 26 Federal Plaza
New York, New York 10278

c) If so directed, Monthly Wastewater Treatment Plant Operator's Reports should be submitted to the Regional Engineer and County Health Department or County Environmental Control Agency specified above.

d) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

e) If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under 40 CFR 136 or as specified in the permit, the results of this monitoring shall be included in the calculations and recording of the data on the Discharge Monitoring Reports.

f) Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this permit.

g) Unless otherwise specified, all information recorded on the Discharge Monitoring Report shall be based upon measurements and sampling carried out during the most recently completed reporting period.

h) On or after April 1, 1984, any laboratory test or sample analysis required by this permit for which the State Commissioner of Health issues certificates of approval pursuant to section five hundred two of the Public Health Law shall be conducted by a laboratory which has been issued a certificate of approval. Inquires regarding laboratory certification should be sent to the Laboratory Certification/Quality Assurance Group [illegible] Department Center for Laboratories and Research, Division of Environmental Sciences, The Nelson A. Rockefeller Empire State Plaza, Albany, New York 12201

REFERENCE 7

E

Recra 8-10

Erie-Niagara Basin

Ground-Water Resources

ERIE-NIAGARA BASIN REGIONAL WATER RESOURCES PLANNING BOARD

THE NEW YORK STATE WATER RESOURCES COMMISSION

CONSERVATION DEPARTMENT • DIVISION OF WATER RESOURCES

ENB-3

GEOLOGY AND TOPOGRAPHY

The Erie-Niagara basin is underlain by layers of sedimentary bedrock which are largely covered with unconsolidated deposits. Descriptions of the various bedrock units are given in figure 2. The bedrock consists mainly of shale, limestone, and dolomite; the Camillus Shale contains a large amount of interbedded gypsum. All the bedrock units were built up by fine-grained sediments deposited in ancient seas during the Silurian and Devonian Periods and, therefore, are bedded or layered. The dip of the rocks (inclination of the bedding planes) is gently southward at from 20 to 60 feet per mile, but the average dip is between 30 and 40 feet per mile. The dip is so gentle that it is hardly perceptible in outcrops.

The unconsolidated deposits are mostly glacial deposits formed during Pleistocene time about 10,000-15,000 years ago when an ice sheet covered the area. The glacial deposits consist of: (1) till, which is a nonsorted mixture of clay, silt, sand, and stones deposited directly from the ice sheet; (2) lake deposits, which are bedded clay, silt, and sand that settled out in lakes fed by the melting ice; and (3) sand and gravel deposits, which were laid down in glacial streams. The glacial sand and gravel deposits are of both the ice-contact and outwash types, as will be explained later in the report. The glacial deposits generally are less than 50 feet thick in the northern part of the basin. They are considerably thicker in some valleys in the southern part and reach a maximum known thickness of 600 feet near Chaffee. Other unconsolidated deposits are alluvium formed by streams in Recent times and swamp deposits formed by accumulation of decayed plant matter in poorly drained areas.

Relief of the present land surface is due to preglacial erosion of the bedrock and subsequent topographic modification by glaciation. In contrast to the southward dip of the rocks, the land surface rises to the south largely because preglacial erosion was more vigorous in the northern part of the basin. The shale in the southern part of the basin is somewhat more resistant to erosion than the rocks in the northern part of the basin but not significantly so. Figure 3 shows the relationship of the topography and rock structure and delineates the two topographic provinces of the basin: the Erie-Ontario Lowlands and the Appalachian Uplands. The rocks crop out in belts which trend generally east-west. The bedrock geologic map, plate 2, shows that the outcrop belts bend around to the southwest near Lake Erie. They assume this direction mainly because relatively intense erosion in the Erie-Ontario Lowland near Lake Erie has exposed the rock at lower elevations than farther east. The Lockport Dolomite and the Onondaga Limestone, because they are relatively resistant to erosion, form low ridges in the northern part of the basin. Tonawanda, Murder, and Ellicott Creeks descend the escarpment of the Onondaga at falls and cataracts.

In the hilly southern half of the basin (the Appalachian Uplands), preglacial valleys, deepened by glacial erosion, are cut into the shale. The valleys are partly filled with glacial deposits so that some of the present streams flow 200 to 600 feet above the bedrock floors of the valleys as shown in figure 3.

System	Series	Group	Formation	Thickness in feet	Section	
Devonian	Upper	Conneaut Group of Chadwick (1934)		500		Shale, siltstone, and fine-grained sandstone. Top is missing in area.
		Canadaway Group of Chadwick (1933)	Undivided	600		Gray shale and siltstone, interbedded. (Section broken to save space)
			Perrysburg	400-450		Gray to black shale and gray siltstone containing many zones of calcareous concretions. Lower 100 feet of formation is olive-gray to black shale and interbedded gray shale containing shaly concretions and pyrite.
			Java	90-115		Greenish-gray to black shale and some interbedded limestone and zones of calcareous nodules. Small masses of pyrite occur in the lower part.
			West Falls	400-520		Black and gray shale and light-gray siltstone and sandstone. The lower part is petroliferous. Throughout the formation are numerous zones of calcareous concretions, some of which contain pyrite and marcasite.
			Sonyea	45-85		Olive-gray to black shale.
			Genesee	10-20		Dark-gray to black shale and dark-gray limestone. Beds of nodular pyrite are at base.
	Middle	Hamilton	Moscow Shale	12-55		Gray, soft shale.
			Ludlowville Shale	65-130		Gray, soft, fissile shale and limestone beds at top and bottom.
			Skaneateles Shale	60-90		Olive-gray, gray and black, fissile shale and some calcareous beds and pyrite. Gray limestone, about 10 feet thick is at the base.
			Marcellus Shale	30-55		Black, dense fissile shale.
		Unconformity	Onondaga Limestone	108		Gray limestone and cherty limestone.
Silurian	Cayuga		Akron Dolomite	8		Greenish-gray and buff fine-grained dolomite.
		Salina	Bertie Limestone	50-60		Gray and brown dolomite and some interbedded shale.
			Camillus Shale	400		Gray, red, and green thin-bedded shale and massive mudstone. Gypsum occurs in beds and lenses as much as 5 feet thick. Subsurface information indicates dolomite (or perhaps, more correctly, magnesian-lime mudrock) is interbedded with the shale (shown schematically in section). South of the outcrop area, at depth, the formation contains thick salt beds.
	Niagara		Lockport Dolomite	150		Dark-gray to brown, massive to thin-bedded dolomite, locally containing algal reef and gypsum nodules. At the base are light-gray limestone (Gasport Limestone Member) and gray shaly dolomite (DeCew Limestone Member).
		Clinton	Rochester Shale	60		Dark-gray calcareous shale.

Figure 2.--Bedrock units of the Erie-Niagara basin.

Table 6.--Records of selected wells in the Erie-Niagara basin (Continued)

Well number	County	Owner	Year completed	Type of well	Depth of well (feet)	Diameter (inches)	Depth to bedrock (feet)	Water-bearing material	Altitude above sea level (feet)	Water level: Below land surface (feet)	Water level: Date	Method of lift	Estimated pumpage or flow (gallons per day)	Use	Remarks
243-849-1	Erie	C. Lockwood	1964	Drl	--	6	a24	Shale	810	--	--	--	--	Ir	Yield 25 gpm (r); casing 27 ft in depth and is slotted to admit water from a zone of fractured shale.
243-853-1	do.	R. Filler	1954	Drl	51.7	6	2	do.	760	24.7	7-22-63	Jet	100	D	Anal; iron; yield 10 gpm (r).
243-854-1	do.	Acme Shale Brick Co., Inc.	1926	Drl	28.2	108	7	do.	660	19.3	7-22-63	Sw	--	U, I	Anal; temp 49.5.
243-855-1	do.	do.	1956	Drl	r50	6	--	do.	655	r18	--	Sw	--	I	Anal; temp 51.5, 7-22-63.
244-814-1	Wyoming	L. Lee	1953	Drl	r150	6	a120	do.	1,695	37.1	8-10-63	Jet	300	D	Iron.
244-824-1	do.	R. Daniel	1958	Drl	28.3	6	26	do.	1,615	6.7	7-20-63	Sw	150	D	Anal; iron; H_2S; yield 10 gpm (r).
244-826-1	do.	A. Almeter	1956	Dug	13.3	30	--	Sand and gravel	1,270	6.3	7-20-63	Sw	250	D	Anal; 12 ft of clay overlies sand and gravel (r).
244-829-1	Erie	J. McLaughlin	1960	Drl	r147.5	6	--	do.	930	r15	7-62	Jet	500	D	Anal; gas.
244-830-1	do.	K. Ulrich	1960	Drl	46.5	8	8	Shale	1,110	10.5	7-18-63	Jet	150	D	Anal; yield 15 gpm (r).
244-835-1	do.	R. Plugh	1958	Drl	92.8	6	--	Sand and gravel	895	11.4	8-14-63	Jet	150	D	Anal; iron; gas.
244-836-1	do.	D. Heitman	1956	Drl	r128	7	a60	Shale	895	27.4	8-14-63	Jet	300	D	Anal; iron; gas; yield 13 gpm (r).
244-844-1	do.	R. Baun	1955	Drl	50.5	6	a20	do.	900	13.1	7-25-63	Jet	250	D	Anal; iron; yield 2 gpm (r).
244-846-1	do.	R. Bieger	1957	Drl	65.3	6	15	do.	875	6.4	7-23-63	Jet	450	D	Anal; iron.
244-848-1	do.	F. Martino	1959	Drl	65.1	6	18	do.	725	4.6	7-22-63	Jet	--	U, D	Anal; H_2S.
245-817-1	Wyoming	R. Schwedt	1956	Drl	43.9	6	--	do.	1,410	17.8	8-10-63	Sw	200	D	Anal; yield 6 gpm (r).
245-818-1	do.	Varysburg Water District	1947	Drl	r118	6	--	Sand and gravel	1,125	6	2-12-63	Tur	20,000	PS	Anal; temp 50, 7-26-63; open-end casing; test pumped at 125 gpm; pumping test 60 gpm, dd 6 ft (r).
245-830-1	Erie	R. Wilson	1963	Drl	r43	8	a40	Sand and gravel; shale	950	30.7	7-18-63	Sub	200	D	Anal; bailed 20-25 gpm (r).
245-846-1	do.	B. Calelacovo	1960	Drl	57.7	6	a45	Shale	785	8.3	7-25-63	Jet	250	D	Anal; iron; yield 3 gpm (r).
246-818-1	Wyoming	G. Zwetsch	1941	Drl	132	6	a110	do.	1,090	Flow	--	--	100	D	Anal, iron; flowed 20 gpm, 15 ft above LS when drilled (r); no pump; two-story house is supplied by artesian pressure.
246-824-1	do.	C. George	1949	Drl	24.1	6	a18	do.	1,525	6.7	8-10-63	Sw	100	D	Anal; yield 2 gpm (r).
246-830-1	Erie	C. Reed	1960	Drl	76	12	a45	do.	1,150	p22.9	8- 2-63	Jet	300	D	Anal; gas; yield 2 gpm (r); a dynamite charge was fired in the well in an unsuccessful attempt to improve the yield; a well drilled 80 ft away, 50 ft deep is "dry."
246-833-1	do.	O. Peterson	1962	Drl	r140	6	75	Shale	1,015	p68.5	8- 1-63	Jet	100	D	Anal; iron; gas; yield 2 gpm.
246-836-1	do.	Village of East Aurora	1934	Drl	r105	12	--	Sand and gravel	895	r9.5	10-14-43	Tur	250,000	PS	Iron; screen, 12-inch diameter, 6-gage slot, 75-105 ft; gravel packed; pumping rate 500 gpm; pumping test 690 gpm, swl 9.5 ft, dd 46.5 ft (r).
-2	do.	do.	1941	Drl	r130.5	16	--	do.	895	r5	5-13-42	Tur	260,000	PS	Iron; screen, 16-inch diameter, 6-gage slot, 120.5-130.5 ft; gravel packed; pumping rate 430 gpm; pumping test 700 gpm, swl 5 ft, dd 102 ft.
-3	do.	do.	1950	Drl	r123	12	--	do.	895	r13	10-11-51	Tur	--	U, PS	Screen, 18-inch diameter, 107.5-122.5 ft; gravel packed; pumping test 420 gpm, swl 13 ft, dd 16.4 ft.

Table 6.--Records of selected wells in the Erie-Niagara basin (Continued)

Year com- Type Depth Depth Altitude above Water level Below Method Estimated pumpage

Table 6.--Records of selected wells in the Erie-Niagara basin (Continued)

Well number	County	Owner	Year com-ple-ted	Type of well	Depth of well (feet)	Diameter (inches)	Depth to bedrock (feet)	Water-bearing material	Altitude above sea level (feet)	Water level: Below land surface (feet)	Water level: Date	Method of lift	Estimated pumpage or flow (gallons per day)	Use	Remarks
246-836-4	Erie	Village of East Aurora	1961	Drl	r122	12	--	Sand and gravel	895	r7	5-16-61	Tur	250,000	PS	Iron; screen, 12-inch diameter, 6-gage slot, 107-122 ft; gravel packed; pumping rate 490 gpm.
246-843-1	do.	L. Godfrey	1950	Drl	45.3	6	a40	do.	830	17.9	7-26-63	Jet	100	D	H_2S; gas; clay overlies water-bearing gravel (r).
246-848-1	do.	C. Stocking	1953	Drl	27.8	6	a7	Shale	715	5.3	7-27-63	Jet	--	Ir	H_2S; used for lawn sprinkling only.
246-849-1	do.	G. Bapst	1955	Drl	39.1	7	a5	do.	685	9.2	7-27-63	Jet	250	D	Anal.
247-823-1	Wyoming	P. Heeter	1957	Drl	36.6	6	--	Sand and gravel	1,160	15.6	8- 9-63	Jet	300	D	Do.
247-833-1	Erie	T. Siciliari	1958	Drl	28.0	6	a16	Shale	945	6.5	8- 1-63	Sw	--	U	Iron; H_2S; unused because water quality is poor.
247-836-1	do.	A. Schuster	1961	Drl	46.1	6	a30	do.	860	15.8	7-30-63	Sw	250	D	Iron; H_2S; yield 10 gpm (r).
247-838-1	do.	D. Engel	1956	Drl	33.4	6	a12	do.	960	6.6	7-30-63	Sw	150	D	Anal; H_2S.
247-840-1	do.	A. Malovich	1959	Drl	40.4	8	a30	do.	890	21.1	7-26-63	Sw	200	D	Anal; Iron; blasting charge fired in well to improve yield.
247-842-1	do.	J. Smith	1959	Drl	51.5	7	--	Sand	830	9.4	7-26-63	Jet	250	D	Anal; Iron; H_2S.
248-818-1	Wyoming	O. Block	a1940	Drl	r140	6	--	Shale	1,045	Flow	--	Sw	1,400	D	Anal; gas; Iron; temp 51.2, 8-12-63; flows about 1 gpm, 2.6 ft below LS; occasionally water level has fallen below end of drop pipe, 25 ft below surface while pumping.
248-825-1	do.	N. Fox	1963	Drl	r112	8	12	do.	1,115	28.8	8- 2-63	Sub	150	D	Anal; yield 1 gpm (r); water-bearing zone at 34 ft; no lower water-bearing zones.
248-828-1	do.	W. Deazley	1957	Drl	r112	8	8	do.	1,210	20.3	8- 2-63	Jet	300	D	Anal; yield 1 gpm (r); water-bearing zone at 30 ft; attempted to increase yield by blasting at three different depths; occasionally is pumped dry.
248-829-1	Erie	O. Whitman	1958	Drl	36.4	6	a28	do.	1,150	12.5	8- 2-63	Jet	50	D	Anal; H_2S; yield 2.5 gpm (r).
248-833-1	do.	R. Gilbert	1957	Drl	35.9	6	33	Sand and gravel; shale	970	11.4	8- 1-63	Sw	400	D	Anal; Iron; H_2S.
248-838-1	do.	H. Gaczewski	1954	Drl	58.9	6	2	Shale	925	21.5	7-30-63	Jet	500	D	Anal; gas.
248-839-1	do.	Moog Servocontrols, Inc.	1957	Drl	85.7	8	--	do.	905	p40.4	9-23-63	Sub	--	I	Anal; H_2S.
-2	do.	do.	1957	Drl	24.7	12	--	do.	905	p14.4	9-23-63	Sub	--	I	Do.
-3	do.	do.	1958	Drl	76.8	10	--	do.	910	p26.9	9-23-63	Sub	--	I	H_2S.
-4	do.	do.	1962	Drl	r225	18	a10	do.	910	--	--	--	--	T	Yield 10 gpm (r).
248-841-1	do.	R. Struck	1960	Drl	43.8	6	a40	do.	770	17.9	7-26-63	Sw	200	D	Anal; Iron; H_2S; gas; yield 3 gpm (r).
248-844-1	do.	O. Eaton	1959	Drl	19.7	6	a15	do.	740	8.5	7-26-63	Sw	250	D	Anal; H_2S; yield 5 gpm (r); blasting charge was fired in well to increase yield.
248-850-1	do.	Spring Perch Co., Inc.	1936	Drl	r40	5	--	do.	580	p21.0	3-20-63	Jet	10,000	I	Anal; H_2S; yield 29 gpm; another similar well is also in use.
249-809-1	Wyoming	H. Meader	--	Dug	13.8	24	--	Sand and gravel	1,205	9.1	6- 9-64	Sw	150	D	
249-810-1	do.	C. Bailey	1963	Drl	54.4	6	--	do.	1,190	21.6	6-10-64	Jet	100	D	
-2	do.	W. Dersam	--	Dug	10.5	36	--	Till	1,180	4.6	6-10-64	Sw	--	A	
249-818-1	do.	G. Knobloch	--	Drl	58.6	4	a10	Shale	1,075	23.5	8-12-63	Jet	100	D	Anal; yield 3 gpm (est).
249-823-1	do.	L. Green	1963	Drl	81.5	8	19	do.	1,260	13.3	8- 9-63	Jet	400	D	Anal; yield 1.5 gpm (r).

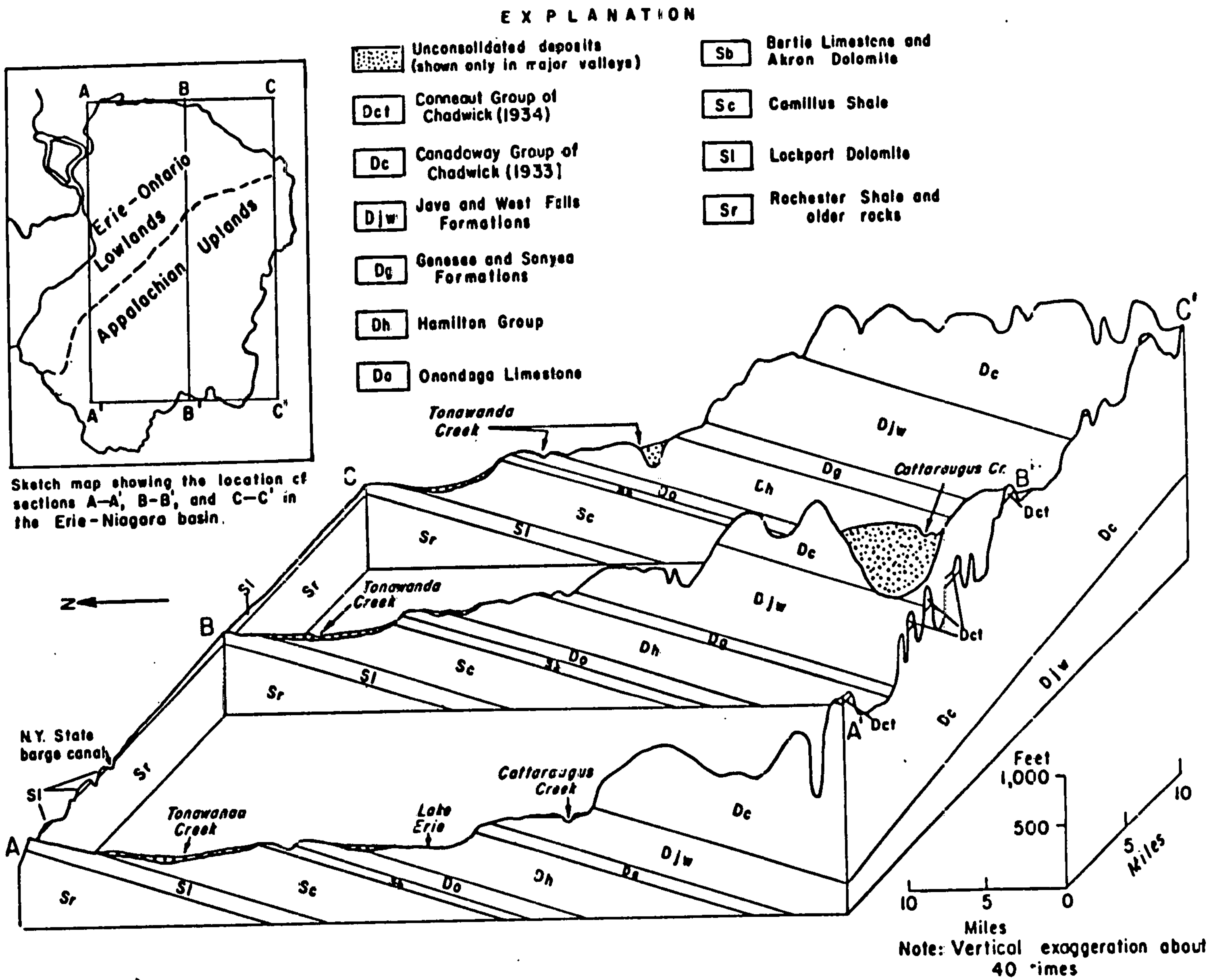


Figure 3.--Fence diagram of part of the Erie-Niagara basin.

OCCURRENCE OF GROUND WATER

Ground water is commonly thought of as water that comes from wells and springs. This definition makes the essential point and distinguishes ground water from other subsurface water. Water wells provide the most easily obtainable information on ground-water resources, but the information can be misleading. A casual inspection of a body of random data on wells in the area may lead to the notion that ground water occurs in a haphazard fashion. For example, it is apparent from the data in table 6 that wells vary greatly in depth and yield. Depths range from about 10 to 500 feet, and yields from a few gallons per day to more than 1,000 gpm. What is more, wells of large yield are interspersed with wells of low yield. A more careful study of the data shows that some of the variations in well characteristics reflect differences in well construction rather than in the availability of ground water. A carefully planned and constructed public-supply well gives a more complete picture of water availability than does a driven well constructed for lawn watering. But after accounting for variations in well construction, profound differences in the availability of ground water are still apparent. These differences arise mainly from the geologic and topographic features of the basin.

Ground water occurs in the saturated zone of the earth's crust. The water in the saturated zone (ground water) fills the interconnected openings in the rocks and is under hydrostatic pressure. As shown in figure 4, ground water will flow through the zone of saturation following a course that takes it from a point of higher head to a point of lower head. In this way water entering the ground on a hill may discharge through a spring on the side of the hill, into a nearby stream, or into a river many miles away. When the water standing in a well is pumped out, the head (water level) in the well is lowered. Water from the saturated zone can then move toward the well in the same manner it moves toward points of natural discharge. Where the saturated zone is not overlain by impermeable materials, its upper surface is the water table. The depth to the saturated zone in the area varies from 0 feet in some swamps to possibly more than 75 feet along the edges of some glacial terraces.

The unsaturated materials over the saturated zone make up the zone of aeration, the zone in which the openings are partly filled with air (fig. 4). Water in the zone of aeration is held to the walls of the openings by molecular forces. This prevents the free movement of water in the zone of aeration; water in this zone drains slowly downward but not laterally. Wells and springs, therefore, cannot obtain water from the zone of aeration. The zone is important, however, because water must pass through it to reach the saturated zone.

The unconsolidated deposits and the bedrock differ markedly in the types of water-bearing openings they contain (fig. 4). The unconsolidated deposits are composed of grains packed together with open spaces, or pore spaces, between the grains. Water truly permeates the unconsolidated deposits because it can fill the myriad of tiny pore spaces between the grains.

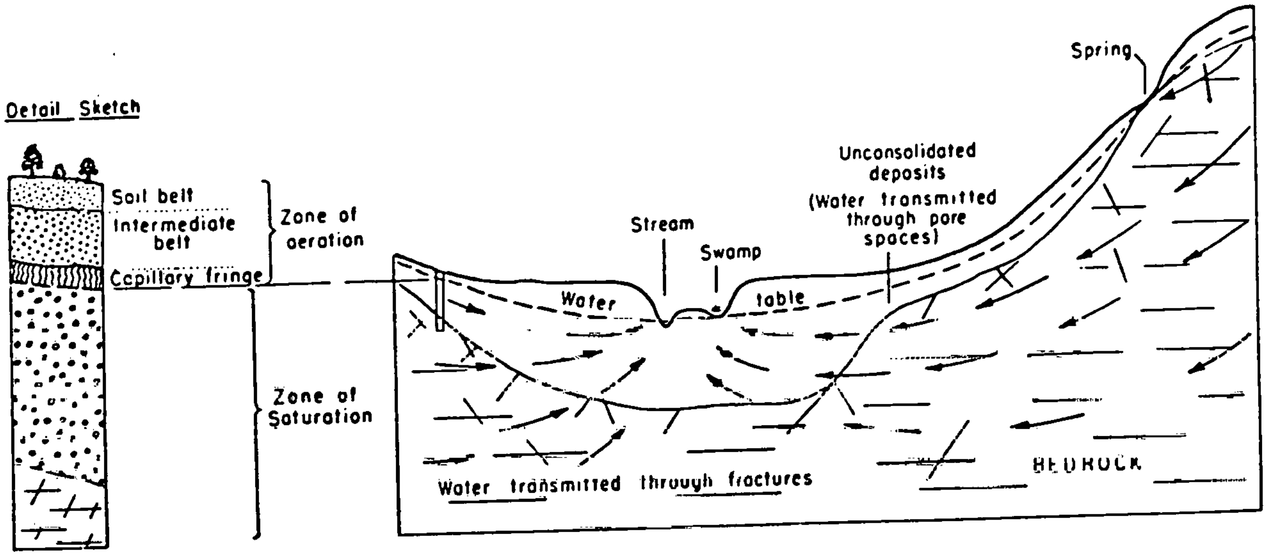


Figure 4.--Occurrence of ground water. Arrows show direction of ground-water movement.

The sediments composing the bedrock initially also contained pore spaces, but these pores were closed when the sediments were compacted and cemented. A solid piece of rock from any of the bedrock units in the area is nearly or completely impermeable. But in each of the units, masses of rock have separated along fractures. These fractures transmit ground water through the bedrock.

OCCURRENCE OF WATER IN BEDROCK

The principal water-bearing fractures in the bedrock are joints which are regularly arranged. They are caused by geologic forces acting through broad areas and occur in sets, all the joints of which are roughly parallel. In the Erie-Niagara basin, the rocks are cut typically by two sets of vertical joints. One set trends northeast and the other northwest, forming diamond-shaped patterns at the surface. These vertical joints are spaced from a few feet to perhaps 30 feet apart and may be 50 feet to a few hundred feet long at the surface. More important joints, however, are the horizontal ones that are parallel to the bedding planes of the rocks. These joints develop along planes of weakness between adjacent layers of rocks. The evidence suggests that bedding-plane joints are the principal water-bearing openings in the bedrock.

Faults, which are fractures along which adjacent masses of rock have been offset, may also provide openings for ground-water circulation. A fault trending south through Batavia is the only major one known in the area (pl. 2). However, other faults may exist but are not recognized because they are covered by the glacial deposits.

The water-bearing properties of the soluble rocks developed to a large degree in response to the composition of the rocks (lithology) and the primary sedimentary structures (bedding). The soluble rocks are composed of dense materials that are innately not water bearing. These rocks transmit water only through fractures and solution openings. The nature of the water-bearing openings can be studied both from exposures of the rocks and from data on wells. How good any unit is as a source of water can be judged from records of wells. All of these hydrologic properties and characteristics for each rock unit will be discussed in the following sections.

LOCKPORT DOLOMITE

Bedding and lithology

The lowest aquifer, the Lockport Dolomite, consists mainly of gray, fine- to coarse-grained dolomite. The Gasport Limestone Member near the base of the formation is a light-gray limestone. The thickness of the Lockport is approximately 150 feet. A general summary of the lithology and thickness of the lithologic units is given in figure 5.

The rock units within the Lockport are bedded and dip southward in the study area at 35 to 40 feet per mile. In the extensive exposures Johnston (1964, p. 22) observed in excavations for the Niagara Power Project at Niagara Falls, the beds ranged generally from 1 inch to 3 feet in thickness. In some zones, beds were only 1/4 inch thick. On the other hand, a few massive beds are as much as 8 feet thick at places. The beds thicken and thin laterally. Approximate positions of some fairly persistent zones of massive and thin beds are shown in figure 5 by the widths of the bands of lithologic symbols. The bedding planes are flat except at the few places where they curve over ancient reefs in the upper part of the formation. These reefs are massive (nonbedded) structures as much as 50 feet across and 20 feet thick. Nodules of gypsum 1/2 to 5 inches across are common in the dolomite. Particles composed of the sulfide minerals of zinc, lead, and iron are disseminated through the rock.

Water-bearing openings

With respect to water-bearing openings in the Lockport Dolomite near Niagara Falls, Johnston's (1964) report may be considered a type study for rocks of this sort. Johnston found that bedding-plane joints are the principal water-bearing openings in the Lockport. Vertical joints and voids from which gypsum nodules were dissolved are minor water-bearing openings.

Water-bearing bedding-plane joints can occur at any stratigraphic horizon in the Lockport Dolomite. However, those that are persistent commonly occur in zones of thin beds overlain by thick or massive beds. Johnston identified seven persistent water-bearing joints or zones (several closely spaced joints) in the Niagara Falls area. (His findings are summarized in figure 5.) These joints are continuous for some miles, but they are not water bearing everywhere. Where the joints are water bearing, they have been widened to some degree by the solution of rock by ground water. Some of the joints are open as much as 1/8 inch. Locally, solution along bedding joints has been great enough to cause the rock overlying the solution opening to settle.

The stratigraphic and hydrologic data for the Erie-Niagara basin are not sufficient to prove if Johnston's water-bearing bedding-plane joints extend beyond the Niagara Falls area. Well data and the examination of outcrops do indicate that at least similar sets of such joints transmit ground water in the Lockport Dolomite within the Erie-Niagara basin.

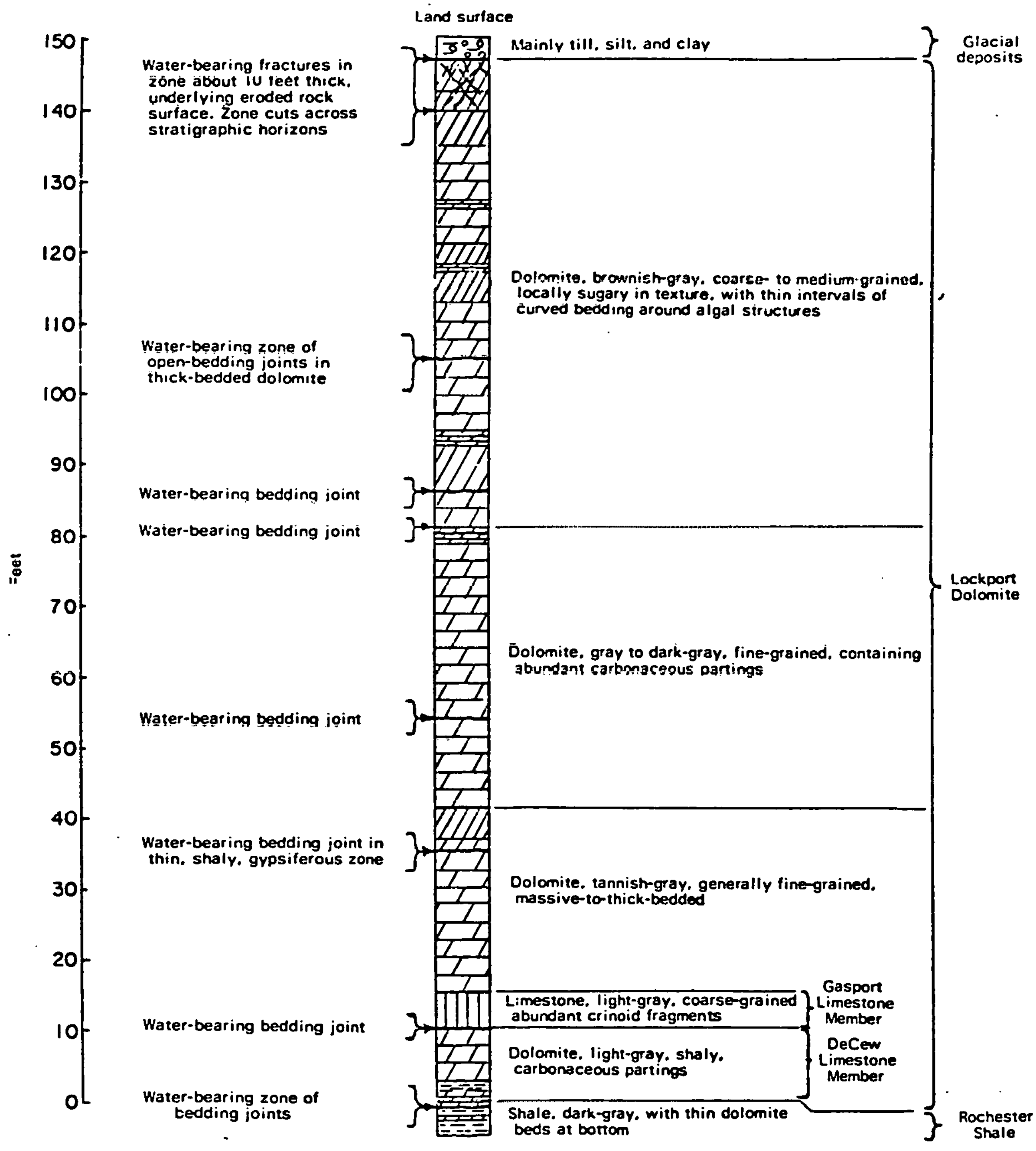


Figure 5.--Water-bearing zones in the Lockport Dolomite (adapted from Johnston, 1964).

In addition to the bedding-plane joints, a widespread water-bearing zone of highly fractured rock, perhaps 10 feet thick, lies at the top of the Lockport. This zone follows the upper surface of the rock in the outcrop area rather than a stratigraphic horizon and is hydraulically connected to the overlying glacial deposits.

A third zone of water-bearing openings is found where gypsum has been dissolved out of the Lockport Dolomite. The gypsum occur as nodules that are locally concentrated along bedding planes. Although gypsum forms a dense, impermeable rock, it is far more soluble than the enclosing rocks, whether shale, dolomite, or limestone. Only those gypsum zones actually exposed to circulating ground water can be widened by solution. The gypsum must be in contact with open fractures through which the water can move. If no open fractures exist, the gypsum is safe from being dissolved. Johnston (1964, fig. 8) observed a thin gypsum zone in the Lockport Dolomite which illustrates this fact. His water-bearing zone 3, a horizontal joint in a gypsiferous zone, was not open everywhere. (This is the zone about 35 feet above the base of the Lockport shown in figure 5.) Where the zone was closed to circulating water, the gypsum was intact.

Hydrologic characteristics

Although ground water moves through the soluble rocks toward Tonawanda Creek and its tributaries, the path of ground-water movement in each of the rock units is somewhat different. The water-bearing zones in the Lockport Dolomite receive water along the traces of their intersections with the surface or the overlying deposits. The water is discharged to small streams and swamps on the dip slope or flows into the Camillus Shale through the subsurface.

The zone of fracturing and solution that follows the upper surface of the soluble rocks is in hydraulic continuity with the glacial deposits. Water moves between this zone and the glacial deposits. Water enters the bedding joints where the joints come to the surface or where they intersect the glacial deposits or water-bearing fracture zone at the rock surface. Vertical joints also transmit some water but, at most places, they are not open to a significant degree. The occurrence of water at the gypsum mine portrayed in figure 6 indicates very restricted vertical circulation. Vertical joints are not present in the mine. Water finds its way through the roof of the mine only where roof bolts and cracks have intersected horizontal openings. Evidence was also presented by Johnston (1964, p. 29) to prove that horizontal joints in the Lockport Dolomite are not interconnected by vertical joints to any significant degree. Johnston was able to measure the head of water in various bedding joints in the Lockport. He found that the head declines in successively lower joints. The head differences are explained by the position of the joints and topography. The successively lower joints crop out at successively lower altitudes.

Hydraulic properties

The hydraulic properties of an aquifer are described by its coefficient of trasmissibility (T) and its coefficient of storage (S). The coefficient of transmissibility is a quantitative description of the rate at which an aquifer will transmit ground water. It is defined as the rate of flow, in gallons per day, through a vertical strip of the aquifer 1 foot wide and extending the full saturated thickness, under a hydraulic gradient of 1 foot per foot at the prevailing temperature of the water. The coefficient of storage of an aquifer describes the properties of an aquifer in releasing water from storage. It is defined as the volume of water the aquifer releases or takes into storage per unit surface area per unit change in the head normal to the surface. The storage coefficients of the bedrock units vary mainly with the volume of the openings in the rocks, which, in turn, vary mainly with the solubility of the rocks. The aquifer constants (T and S) are necessary to compute the quantities of water that can be obtained from an aquifer, the effect of pumping on ground-water levels, and the most favorable spacing of wells.

Pumping tests should be performed to determine the constants where-ever ground water is to be intensively developed. The constants already determined in the Erie-Niagara basin show that the soluble rocks generally have moderate to high coefficients of transmissibility and low coefficients of storage. This means that wells in these formations will produce moder-ate to large yields but that the cones of depression around the wells will develop rapidly and extensively. (Cone of depression is defined as the depression in a water table or piezometric surface caused by pumping.) However, in large-yield wells in north Buffalo and the Tonawandas that are pumped either continuously or for prolonged periods, the water levels are generally stable. The stable pumping levels indicate that the rocks receive recharge from streams. Temperature data for wells near the Niagara River also indicate that recharge is received from the river, as will be explained later.

For the Lockport Dolomite, Johnston (1964, p. 33) calculated a coefficient of transmissibility of 2,300 gpd (gallons per day) per foot from data collected during dewatering of an 18,000-foot long conduit near Niagara Falls. This probably is a representative figure for the Lockport because of the extent of rock involved. Pumping tests on four wells in the Niagara Falls area gave transmissibilities of 300 to 1,000 gpd per foot and coefficients of storage of 0.00001 to 0.0003. The small transmissibility of 300 gpd per foot and small coefficient of storage of 0.00001 apply to the lower part of the Lockport.

Yields of wells

The data on yields of wells in the soluble rocks should be inter-preted from the standpoint of hydrology and geology. They are not suit-able for statistical treatment.

Many domestic-supply wells penetrate from 1 foot to a few feet into the soluble rocks and produce small but adequate yields. On the other hand, industrial wells that were intended to produce large supplies of water give a truer picture of the water-supply potential of the rocks. Data on industrial wells show that the Camillus Shale will yield as much as 1,200 gpm and the limestone unit as much as 300 gpm and probably more. But the data also show that the rocks produce low yields at places. This is shown by such wells as 301-848-1 which was drilled to obtain a large supply for an industry but which yielded only 30 gpm. The water-bearing zones obviously are unevenly distributed through the rocks. Factors that control the occurrence of the water-bearing zones cannot be evaluated at the present time to the extent necessary to predict exactly where the zones occur.

The Lockport Dolomite is the least productive unit of the soluble rocks. Within the Erie-Niagara basin yields of wells in the Lockport range from about 4 to 90 gpm. Depth of the wells range from 20 to 70 feet. Most of the deeper wells were drilled where the depth to bedrock is greatest. Domestic-supply wells generally are finished in the fracture zone at the rock surface or in a bedding joint within the uppermost 30 feet of the rock. It is usually not necessary to drill deeper into the Lockport if only a small supply is needed.

Drilling deeper in an attempt to intersect additional bedding-plane openings at depth would provide higher yields but, generally, at the expense of lower water levels and therefore higher pump lifts. Johnston (1964) collected data on a much larger number of wells along the outcrop belt of the Lockport Dolomite than were inventoried in the Erie-Niagara basin. He found that wells drawing water from the lower 40 feet of the Lockport (the northern part of the outcrop area) yield from 1/2 to 20 gpm and have an average yield of 7 gpm. Wells finished in the upper part of the Lockport (the southern part of the outcrop area) yield from 2 to 110 gpm and have an average yield of 31 gpm. Yields of as much as 50 or 100 gpm are possible from the Lockport in the Erie-Niagara basin but would be exceptional.

CAMILLUS SHALE

Bedding and lithology

The Camillus Shale lies above the Lockport Dolomite and crops out to the south of where the dolomite is exposed. Exposures of the Camillus Shale are rare in the Erie-Niagara basin because of the low relief of the outcrop area and the cover of glacial deposits. Geologists who have studied the Camillus in the study basin agree that it consists mostly of gray shale. (For example, see Buehler and Tesmer, 1963, p. 29-30.) Subsurface data, on the other hand, indicate that a considerable amount of gray limestone and dolomite is interbedded with the shale. Along with these carbonates, gypsum comprises a significant part of the Camillus Shale. Some of the gypsum beds are as much as 5 feet thick. Gypsum also occurs in the Camillus as thin lenses and veins. Table 1,

Table 1.--Log of a gypsum-mine slope near Clarence Center

(Site 300-839-A)

Log	Depth below land surface (feet)
Topsoil, subsoil, gravel and clay	0-25.5
Soft gray limestone mixed with clay	25.5-27.5
Soft dark-gray limestone	27.5-29.5
Soft shaly limestone, thin bedded	29.5-38.0
Crushed dark-gray limestone interbedded with 2-inch seams of brown limestone	38.0-40.8
Dark-gray limestone interbedded with seams of gypsum 1 1/2 to 3 inches thick	40.8-43.6
Hard gray limestone interbedded with thin streaks of gypsum 1/8 to 1/2 inch thick	43.6-45.1
Soft gray limestone	45.1-49.1
Hard gray limestone interbedded with thin streaks of gypsum	49.1-52.1
Hard gray limestone	52.1-57.6
Gypsum	57.6-58.3
Brown limestone	58.3-59.3
Gray limestone	59.3-61.3
Soft, crumbly green-gray material (shale)	61.3-64.3
Mottled rock rich in gypsum	64.3-65.1
Soft brown limestone	65.1-65.7
Cap rock -- hard dark-gray limestone	65.7-66.8
Soft shaly material	66.8-66.9
Gypsum	66.9-71.4

which is a log compiled during construction of a mine slope, illustrates the occurrence of gypsum and the predominance of carbonate rocks in some parts of the Camillus.

Though the Camillus dips southward at approximately 40 feet to the mile, the dip is not uniform. Gypsum miners say the formation "rolls," to describe the gentle folding of its beds. The formation is marked by broad, low folds with amplitudes of a few feet and spacings of a few hundred feet between crests. The fold axes generally are east-west.

Water-bearing openings

The extensive beds of gypsum make the Camillus Shale unique among the shale formations of the basin. The importance of the gypsum lies in its solubility; gypsum is far more soluble than the enclosing rocks, whether shale, dolomite, or limestone. Where gypsum has been dissolved, openings exist for the passage and storage of water.

The effect of the solution of gypsum on the water-bearing properties of the Camillus Shale (and other rocks) can be readily appreciated. Where the topmost beds of the Camillus crop out at the base of the falls of Murder Creek at Akron, the Camillus seems to be an impermeable shale. If one judged the water-bearing properties of the Camillus on the basis of this outcrop alone, he would be wrong. Yields of water wells and drainage into gypsum mines prove that large volumes of water do move through the Camillus.

Clues to the nature of the water-bearing openings in the Camillus can be obtained by considering some of the circumstances where large volumes of water were obtained. About 1885, the Buffalo Cement Company located a 4-foot thick bed of gypsum only 43 feet below land surface by test drilling in Buffalo on Main Street near Williamsville. A shaft was sunk with the intention of beginning a subsurface mining operation, but when the gypsum was struck the shaft was flooded with ground water. The report is that "..... a pump with a capacity of 2,000 gallons per minute failed to make any impression upon it [the water] and the attempt was abandoned" (Newland and Leighton, 1920, 209-210).

In 1964, a gypsum mine near Clarence Center received an unexpected inflow of ground water. Several hundred gallons of water per minute continuously enters the mine at a place about midway down the entry slope. This water is pumped out by a drainage system diagrammatically shown in figure 6. Ordinarily, only small seeps occur in the remainder of the mine from roof bolts and small cracks in the roof. At a distance of more than a mile from the entry slope, the working face intersected an unplugged drill hole. Water poured into the mine at an alarming rate until the hole was plugged with much effort.

Large-yield wells, such as those at Tonawanda and North Tonawanda, obtain water from thin intervals of gypsum-bearing rock. The gypsum in the Camillus Shale obviously is related to the occurrence of large quantities of water. Gypsum is a highly soluble mineral and is

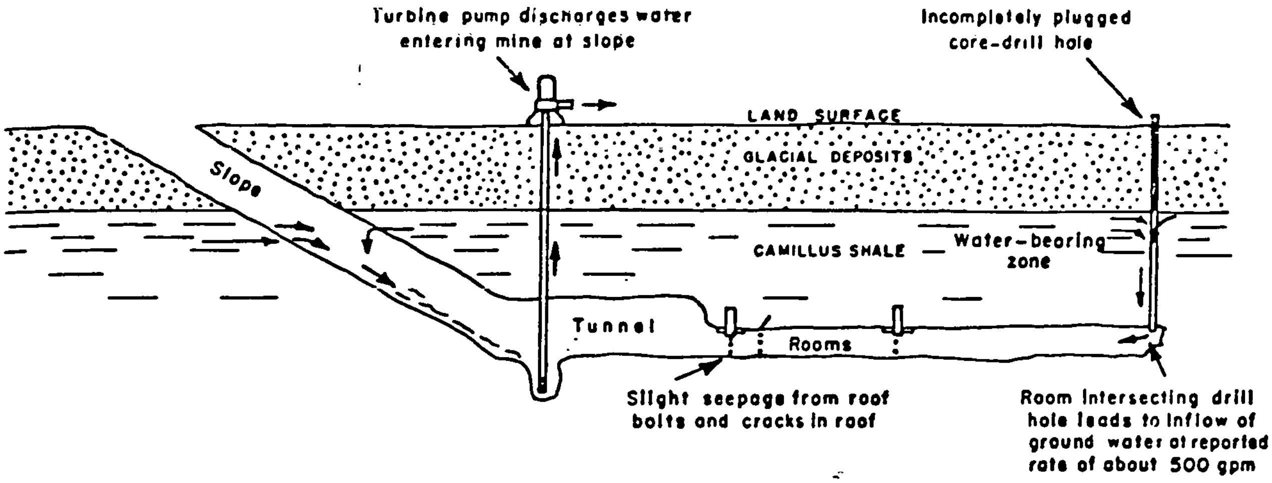


Figure 6.--Occurrence of ground water in the Camillus Shale at a gypsum mine near Clarence Center.

dissolved by circulating ground water faster than are the enclosing rocks. Very likely the openings in the Camillus that yield copious amounts of water were formed by the solution of gypsum by ground water. The water-bearing zones are mainly horizontal because most of the gypsum occurs in horizontal beds and thin zones of gypsiferous shale and dolomite. Only those gypsum zones actually exposed to circulating ground water can be widened by solution. The gypsum must be in contact with an open fracture through which the water can move. If no open fracture exists, the gypsum cannot be dissolved. The occurrence of ground water at the gypsum mine shown in figure 6 is a further illustration. The 4 1/2-foot thick bed that is mined at a depth of 66.9 feet (table 1) is dry because of the lack of vertical fractures to transmit water to it.

The solution-widened water-bearing zones occur at various depths and stratigraphic horizons in the Camillus. The existence of such zones is borne out by well data. For instance, wells 303-850-1 and -2 are 90 feet apart and obtain water from the same 2- to 3-foot thick zone at a depth of 67 to 68 feet. Such zones may be continuous for as much as 1 or 2 miles but information is not available on the extent of individual zones. The gypsum occurs principally in lenticular beds. The thicker beds may be 3 or 4 miles in lateral extent. The thinner beds can be expected to be much smaller in extent.

A zone of fracturing and solution extending several feet below the rock surface yields relatively small but sufficient water supplies for domestic use. This zone appears to be present throughout the area and is unrelated to stratigraphic position.

Hydrologic and hydraulic characteristics

The Camillus Shale forms a low topographic trough split down the axis by Tonawanda Creek. Ground water that enters the formation discharges mainly to the creek. Little water is discharged to the small, barely incised streams on the Camillus. These streams are dry much of the year.

Coefficients of transmissibility given in table 2 were computed for the Camillus Shale on the basis of specific capacities of wells penetrating a considerable thickness of the aquifer, by the method described by Walton (1962, p. 12-13).

Table 2.--Specific-capacity tests of wells finished in the Camillus Shale

Well number	Pumping rate (gpm)	Duration of pumping (hours) e: estimated	Drawdown (feet)	Specific capacity (gpm/ft)	Coefficient of transmissibility (gpd/ft)
a/ 258-853-1	1,090	e8	53	21	40,000
-2	90	--	22	4	7,000
258-855-1	500	e8	17	29	55,000
-2	1,000	e8	26	38	70,000
-3	1,500	e8	38	39	70,000
303-850-1	700	24	10	70	--
-2	660	e8	8	83	--

a/ Well also penetrates water-bearing zone in Lockport Dolomite.

The large specific capacities of wells 303-850-1 and -2 probably result in part from recharge induced from Sawyer Creek. Measurements of recovery of water levels in well 303-850-1 were made when well 303-850-2 was shut down after a year of continuous pumping. From these data, a coefficient of transmissibility of about 80,000 per foot and a coefficient of storage of 0.025 were computed. The computed transmissibility is about half the transmissibility that would have been indicated from specific capacity if recharge were not induced from Sawyer Creek.

Yields of wells

The Camillus Shale is by far the most productive bedrock aquifer in the area. Except in the vicinity of Buffalo and Tonawanda, where industrial wells produce from 300 to 1,200 gpm, no attempt has been made to obtain large supplies from the formation. However, the inflow of water to gypsum mines near Clarence Center and Akron indicate that large supplies are not necessarily restricted to the Buffalo and the Tonawanda area. Two examples of large flows of water encountered in gypsum mining have already been mentioned. Pumpage from gypsum mines near Clarence Center (including the mine mentioned previously) is substantial. The water pumped is discharged to Got Creek. On July 2, 1963, the creek had a flow of 2.1 mgd (million gallons per day) about half a mile downstream from the mines, that was due almost entirely to the pumpage. Water for industrial use is pumped from a flooded, abandoned gypsum mine at Akron. This pumpage, at a rate of 500 to 700 gpm, has had no appreciable effect on the water level in the mine.

Probably the larger solution openings are most common in discharge areas near Tonawanda Creek and its tributaries and near the Niagara River; the flow of ground water becomes concentrated as it approaches the streams to which it discharges. Other discharge areas, such as low-lying swampy areas and headwaters of small streams that have perennial flow, are likely places to drill wells.

LIMESTONE UNIT

Bedding and lithology

The term "limestone unit" in this report is applied to a sequence of limestone and dolomite overlying the Camillus Shale. The limestone unit includes the Bertie Limestone at the base, the Akron Dolomite, and the Onondaga Limestone at the top. The lithology and thickness of these units are shown in figure 7. The Bertie Limestone and the Akron Dolomite are Silurian in age and are separated from the overlying Onondaga Limestone of Devonian age by an unconformity or erosional contact.

The Bertie Limestone is mainly dolomite and dolomitic limestone but contains interbedded shale particularly in the thin-bedded lower part of the formation. The middle part is brown, massive dolomite, and the upper part is gray dolomite and shale whose beds are of variable thickness. The total thickness of the formation is about 55 feet (Buehler and Tesmer, 1963, p. 30-31).

The Akron Dolomite is composed of greenish-gray and buff dolomite beds varying from a few inches to about a foot in thickness. The upper contact of the Akron is erosional and is often marked by remnants of shallow stream channels. Thin lenses of sandy sediments lie in the bottoms of some channels. The thickness of the formation is generally between 7 and 9 feet (Buehler and Tesmer, 1963, p. 33-34).

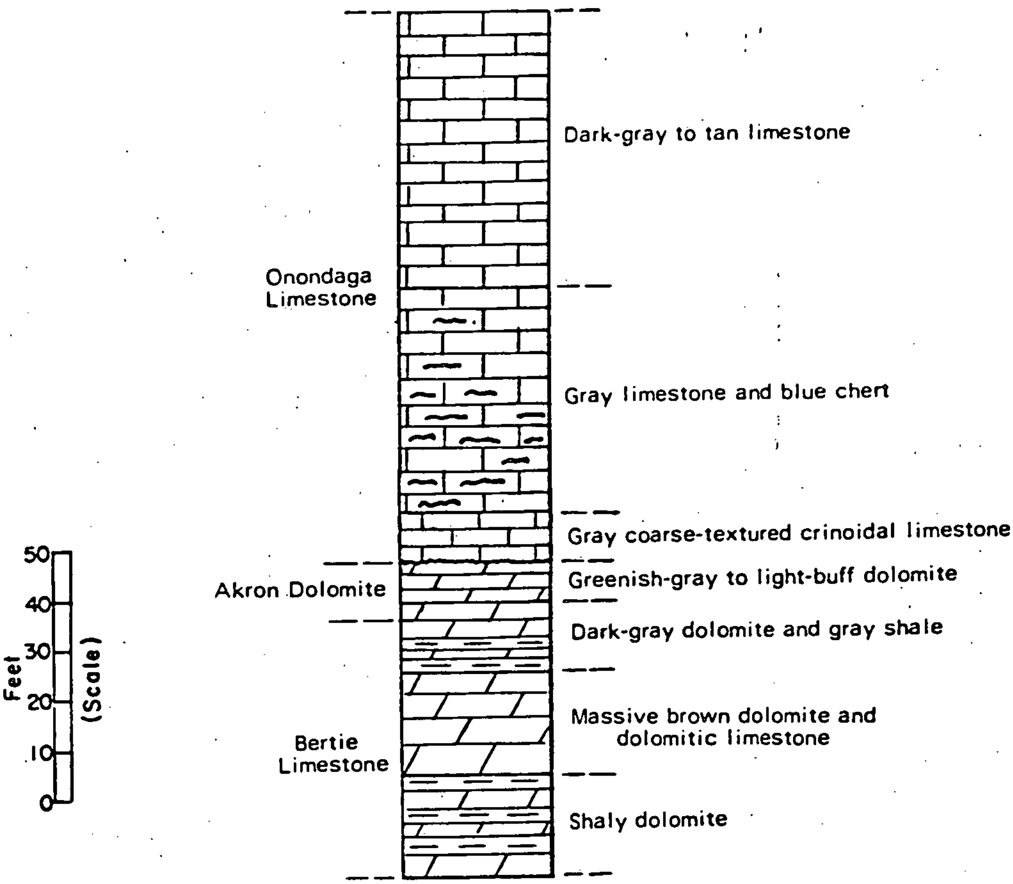


Figure 7.--Lithology of the limestone unit.

The Onondaga Limestone, about 110 feet thick, makes up the greatest thickness of the limestone unit. The formation consists of three members. The lowest member is a gray coarse-grained limestone, generally only a few feet thick. At places this member grades laterally into reef deposits which increases its thickness (Buehler and Tesmer, 1963, p. 35-36).

The middle member of the Onondaga is a cherty limestone. In some zones the chert exceeds the amount of limestone. The unit is probably 40-45 feet thick.

The upper unit is a dark-gray to tan limestone of varying texture and is probably about 50-60 feet thick.

Water-bearing openings

The limestone unit contains water-bearing openings that are similar to those of the Lockport Dolomite. Because the limestone unit is more soluble, however, solution widening of the openings appears to be more

Table 3.--Specific-capacity tests of wells finished in the limestone unit

Well number	Pumping rate (gpm)	Duration of pumping (hours)	Drawdown (feet)	Specific capacity (gpm/ft)	Coefficient of transmissibility (gpd/ft)
252-852-1	85	34	7	12.1	25,000
-2	30	--	17	2	4,000
255-848-1	130	--	10	13	25,000
255-850-1	180	6	45	4	8,000
259-824-1	100	8	30	3.3	6,000
-2	100	8	12	8.3	15,000
300-824-1	104	8	28	3.7	7,000

The coefficient of storage of the limestone unit is probably between those of the Lockport Dolomite and the Camillus Shale. The storage coefficients of these three units vary mainly with the volume of the openings in the rocks which, in turn, vary with the solubility of the rocks. Limestone is more soluble than dolomite but less soluble than gypsum. Storage coefficients in the limestone unit should, therefore, be somewhat higher than those of the Lockport Dolomite but somewhat lower than those of the Camillus Shale.

Yields of wells

The limestone unit is more productive than the Lockport. A number of large-yield wells in Buffalo, Cheektowaga, Williamsville, Pembroke, and Batavia are finished in the limestone unit and indicate that yields of 300 gpm and possibly more can be obtained. Like the Lockport Dolomite, the yields of wells in the limestone unit range through a broad spectrum. However, the more productive wells in the limestone unit are relatively abundant when compared to those in the Lockport. Of significance also is that three wells half a mile apart drilled for an industrial firm near Pembroke, each sustained a discharge of about 100 gpm (table 6, wells 259-824-1, -2, and 300-824-1). These three wells indicate that such yields are available in some areas.

SHALE

Bedding and lithology

The Marcellus Shale and all overlying formations are distributed through the southern half of the Erie-Niagara basin. They are predominantly shale but include a few thin limestone members at various stratigraphic positions (fig. 2). Thin beds of fine-grained sandstone are also interbedded with the shale in the upper part of the section. The rocks dip southward at about 40 feet per mile. They underlie the upland part of the basin and also a broad plain along Lake Erie in the southern part of the basin. Streams eroded deep valleys in the uplands prior to glaciation. The rocks were further eroded during glaciation and later these valleys were partly filled with stratified glacial deposits and the hills were veneered with till. The rocks on the lake plain are thinly covered with till and clay. In postglacial time Cattaraugus and Eighteenmile Creeks, where they cross the lake plain, cut spectacular gorges in the shale.

Water-bearing openings

The shale formations are cut by both vertical and bedding-plane joints along which are hairline openings. Locally, openings along thin limestone beds may be widened by solution. An important feature of the shale is a discontinuous zone of fracturing that follows the upper surface of the rock. In places, this zone consists only of shallow tension cracks caused by the movement of glacial ice over the rock. At other places, the zone is as much as 10 feet thick and consists of crumpled and broken rock. Some exposures show convoluted beds interfolded with glacial deposits.

Hydrologic characteristics

Water enters the shale almost exclusively by percolation from the overlying glacial deposits in interstream areas. Generally, the water table or top of the saturated zone lies in the glacial deposits above the shale. The water table lies within the shale only where the glacial deposits are absent or thin. The fracture zone at the top of the rock is directly connected to the glacial deposits and, therefore, is most advantageously positioned to receive water. At places, the fracture zone is overlain by a thin section of coarse-grained till which is, in turn, overlain by clayey till of much lower permeability. The coarse-grained till and fracture zone then act as a single water-bearing zone. The vertical and bedding joints, which extend into the shale at depth, receive water where they intersect the fracture zone along the top of the rock or intersect the overlying glacial deposits. The joints are thin and widely spaced. The shale at depth, therefore, has a much lower permeability than the fracture zone at the top of the shale.

Yields of wells

The shale formations generally yield only small supplies of water to wells. Individual wells provide adequate and dependable supplies for numerous homes and farms in the area. Yields of as much as 40 gpm are obtained from the Hamilton Group, probably because it contains limestone with openings that have been enlarged by solution. Elsewhere, the maximum yields of wells are generally 10 to 15 gpm from the fracture zone. If the fracture zone is absent, water is obtained from joints deeper in the rock and the yields of wells are much smaller. The small number of applicable data in table 6 indicate that the yields of wells drawing from the deeper fractures range from 1 to 7 gpm. However, dry holes or wells with inadequate yields are not uncommon and are not restricted to any stratigraphic unit or geographic area. The data are sparse by which to study the relationship of topography to yields. It does appear that the wells drilled in valleys, particularly if the shale is overlain by thick unconsolidated deposits, have somewhat larger yields than those wells on hills.

OCCURRENCE OF WATER IN UNCONSOLIDATED DEPOSITS

The unconsolidated deposits overlie the bedrock units previously discussed and consist of a variety of granular material. The bulk of the unconsolidated deposits are glacial in origin and include till, lake deposits, and sand and gravel deposits. The materials laid down since glaciation are thin and consist of alluvium and swamp deposits.

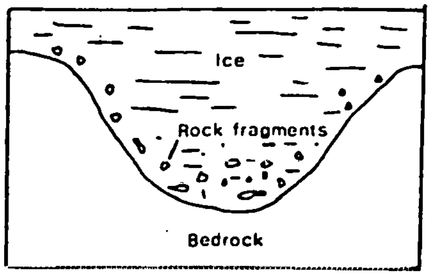
The deposits vary in their hydrologic characteristics because of differences in their lithology and thickness and because of their distribution and spatial relationships to one another. Plate 3 is a geologic map showing the division of the unconsolidated deposits into several groups on the basis of their origin. The distribution of these groups at the surface is readily apparent from the map. An understanding of the geologic processes that formed the deposits allows their subsurface distribution to be inferred. The map, therefore, can be read in three dimensions through proper interpretation.

An explanation of the origin and general features of the several types of deposits is given in figure 8. When the ice sheet advanced over the area, the ice tore and abraded the bedrock surface. The hills were somewhat reduced and rounded and the valleys were deepened. Some of the rock material eroded from the bedrock was redeposited by the ice and forms the poorly sorted mantle material that is called till (fig. 8A). Eventually, the ice began to wane with a change in climate. As the amount of snow nourishing it decreased, the ice sheet thinned. It had difficulty maintaining flow over rough topography along its marginal zone. The margin became scalloped, and some marginal zones grew so thin that they stagnated. These zones separated from the ice sheet and wasted away in place.

The sequence of deposition in an upland valley during retreat generally followed a particular order. A temporary valley was formed between the wasting ice and the rock wall of the valley. Melt water from the ice sheet, which at times of rapid melting was released in enormous quantities, flowed through the valley away from the retreating ice sheet. The melt water carried a heavy load of sediment washed out of the ice. It deposited sediment, mainly sand and gravel, and began to fill up the valley. This type of sand and gravel deposit is an ice-contact deposit (fig. 8B). In southward drained valleys, ice-contact deposits could form at low levels, even in the valley bottoms. In northward drained valleys, because of the divide to the south, the ice-contact deposits could form only high on the sides of the valley above the level of melt-water lakes impounded to the level of the spillway over the divides.

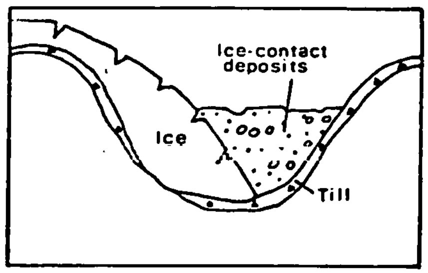
As the ice sheet melted back, a lower outlet for the melt water was uncovered. The melt-water stream was diverted from the ice-contact deposit. As the stagnant ice mass bordering the ice-contact deposits continued to melt away, the sand and gravel held up by the ice mass subsided toward the center of the valley. A lake formed in the open area left by the ice as it melted (fig. 8C). In a southward drained valley, the lake would be caused by a dam of earlier glacial deposits across the valley, perhaps part of the ice-contact deposits. In a northward drained valley, the lake would be formed between the divide to the south and the ice sheet to the north. Fine-grained sediments (clay, silt, and fine sand) settled out

A



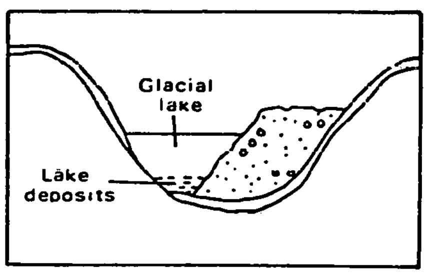
Ice advances over area and gathers load by eroding bedrock. Later, at the base of the ice, rock fragments are deposited to form till. (See B)

B



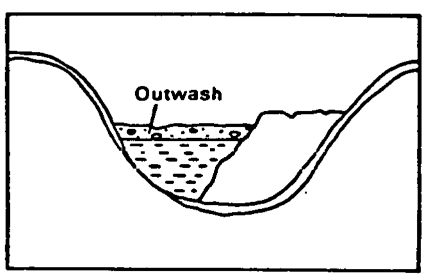
Ice begins to melt. Sand and gravel (ice-contact) deposits are laid down in a temporary valley between ice and valley wall.

C



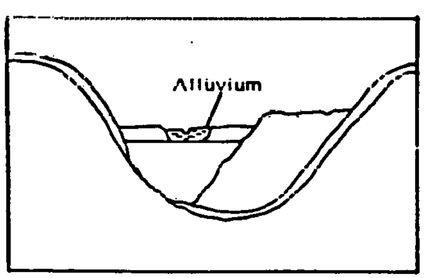
Stagnant ice melts. Ice-contact deposits slope toward center of valley. A glacial lake forms in which clay and silt accumulate.

D



Glacial lake is filled with sediment or is drained. Glacial streams flow over surface of lake deposits and lay down sand and gravel deposits.

E



Recent stream cuts into glacial deposits and lays down alluvium consisting of silt, sand and gravel.

Figure 8.--Origin of unconsolidated deposits.

in the lake and gradually filled it (fig. 8D).

Eventually the lake deposits built up to the threshold of the dam, or the dam was cut away by the water spilling over it, or the ice sheet retreated northward opening up the valley. Streams could then flow over the surface of the lake deposits and lay down a second sand and gravel deposit, an outwash deposit (fig. 8D). The sources of the stream waters were the wasting ice sheet (particularly so in southward drained valleys), small masses of wasting ice remaining in tributary valleys, and precipitation. The thickest and most extensive outwash deposits were formed in southward drained valleys and in zones peripheral to the ice sheet. With time, the ice sheet retreated still farther northward, the glacial streams ceased to flow, and glacial deposition came to an end.

As the ice sheet retreated farther north, the climate more nearly approached that of the present. A drainage system developed in response to precipitation. Streams began to incise channels into the deposits. Vegetation took hold as the weather warmed and helped stabilize the slopes. In time, with a change in regimen, the streams began to lay down alluvium (fig. 8E).

The sequence of events discussed above and shown in figure 8 is generalized. Nevertheless, it is useful in understanding the occurrence of the unconsolidated deposits, particularly in valley areas where they constitute an important source of ground water. In the following sections the lithology and water-bearing characteristics of each of the major types of deposits in the Erie-Niagara basin will be discussed.

TILL

As shown in plate 3, till is the most widespread of all the unconsolidated deposits in the Erie-Niagara basin. Till is essentially a nonsorted material whose character depends principally upon the types of rocks over which the ice passed and the vigor with which the ice crushed and abraded the rock. Till overlying the shale is dark gray and clayey or silty. In some areas, mainly on hillsides and terraces south of Cattaraugus Creek, part of the till is stony material. Till on the soluble rocks is light red and silty; in some morainic ridges it is mostly fine sand.

Thickness of the till varies considerably from a thin cover of 2 or 3 feet to more than 200 feet along the divides between Cattaraugus Creek and the northwestward flowing streams, such as Tonawanda, Buffalo, and Eighteenmile Creeks. On flat terraces mapped as till in Buttermilk Creek valley, the stony till is as much as 30 feet thick.

Only small supplies of water are available from till. The permeability of till is so small that wells with large wall areas are required to obtain even small supplies. This requirement for a large wall area is met by digging large-diameter wells.

LAKE DEPOSITS

Lake deposits consist of horizontally bedded clay, silt, and sand. They form a thin skin over till and bedrock in the Erie-Ontario Lowlands, but reach thicknesses of 300 feet or more in some valleys in the uplands. Thick sequences of clay (such as penetrated by well 229-842-1 near Springville) are so impermeable as to yield no water to wells. The lake deposits also contain thick sections of water-bearing fine sand in the major valleys of the Appalachian Uplands. This fine sand is called quicksand because it moves into wells. Small supplies can be developed from the fine sand by careful well construction, but usually these deposits are not utilized as sources of water.

GLACIAL SAND AND GRAVEL DEPOSITS

Glacial sand and gravel deposits include the ice-contact and outwash deposits shown in plate 3. In addition, deltaic deposits are present within the area. A prominent delta (lat 42°30', long 78°56') west of Collins, composed of sand and gravel, was built out from Clear Creek into a lake that occupied the Erie-Ontario Lowlands. Another delta (lat 42°50', long 78°34') was formed by Little Buffalo Creek, northeast of Marilla. These deltas are shown arbitrarily in plate 3 as ice-contact deposits. Deltaic deposits, presently concealed, probably interfinger with glacial lake deposits in the major valleys of the Appalachian Uplands where tributary streams deposited coarse-grained sediments in lakes. Subsurface data indicate deltaic deposits interfinger with lake deposits near the junction of Crow and Tonawanda Creeks south of the Attica State Prison. The sand and gravel deposits occur principally in the valleys of the Appalachian Uplands with only scattered, minor occurrences elsewhere. The relationship of the sand and gravel to the other unconsolidated deposits and to the bedrock is shown in figure 8. Where the deposits are thick and water bearing, they constitute the best aquifers found in the Erie-Niagara basin.

Lithology and thickness

The glacial sand and gravel deposits exhibit a variety of textures and sedimentary structures but they all are marked by stratification and a high degree of sorting. Characteristic of the deposits are horizontal beds of well-sorted sand, lenticular beds of cobble and boulder gravel, and scattered beds and lenses of open-work gravel. These various materials are interbedded in varying proportions, though boulder gravel is not present in most outwash deposits.

The deposits form thick fills in valleys of the upland section. In the valley bottoms the saturated thickness of the deposits exceeds 100 feet at many places. Thick deposits underlying terraces along the valley walls are to a large extent above the saturated zone. Buried sand and gravel deposits 10 to 40 feet thick underlie lake deposits in some valleys.

The thickness of the sand and gravel deposits can be inferred from the surficial geologic map (pl. 3) and the data on wells (table 6). The sand and gravel mapped as ice-contact deposits extends downward to till or bedrock. Till forms only a thin cover on the bedrock in most valleys, so the depth to bedrock can be assumed to be the thickness of the ice-contact deposits. The sand and gravel deposits mapped as outwash, on the other hand, are generally thin and overlie lake deposits in most valleys. The outwash deposits are thinnest wherever lake deposits are mapped in narrow bands along the edge of outwash terraces or as small areas within larger areas of outwash.

A thick outwash deposit of high permeability lies in the Tonawanda Creek valley south of Batavia. This outwash deposit contains open-work gravel which enhances its permeability. In addition its saturated thickness exceeds 70 feet. This is the most permeable large deposit known in the study basin.

The sand and gravel deposits that underlie lake deposits in the major valleys are not mapped. The location and thickness of these deposits are known only from subsurface data. The only such deposit developed for large ground-water supplies is at Gowanda. Small to moderate capacity public-supply wells are also developed from buried sand and gravel deposits at Holland, Varysburg, and at Hamburg for the Biehler Meadows development.

Hydraulic properties

Coefficients of transmissibility of the sand and gravel deposits given in table 4 were estimated on the basis of reported specific capacities of larger yield wells using graphs given by Walton (1962, p. 12-13). If the screened interval is small in relation to the thickness of the aquifer, the computed transmissibility applies mainly to the materials opposite the screen. The position of the aquifer and the depth of the screened interval are given to allow evaluation of these factors. The transmissibilities computed for some wells may be misleading because the drawdowns may have been affected by infiltration from streams. The transmissibility of the aquifer at well 259-809-1 is phenomenally high. Various wells drilled for the city of Batavia also had specific capacities that indicated similarly high transmissibilities. Yet, the transmissibilities computed from the specific capacities of wells 258-809-1 and 259-809-7 are an order of magnitude less. Irregularly distributed zones of open-work gravel in these deposits may account for this disparity.

Yields of wells

The yields of wells in the sand and gravel deposits vary greatly depending on the permeability and saturated thickness of the deposits and on well construction. Most wells for domestic supply are 6-inch diameter drilled wells with open-end casings. Such wells have low yields because they are necessarily inefficient; this type of construction is cheap and is adequate for household supplies. Wells drilled for public supplies are constructed for high efficiency and give a representative picture of the availability of water in the sand and gravel deposits. Efficient

Table 4.--Specific-capacity tests of wells finished in sand and gravel deposits

Well number	Pumping rate (gpm)	Drawdown (feet)	Specific capacity (gpm/ft)	Position of aquifer (feet below land surface) Top	Bottom	Screened interval (feet below land surface)	Coefficient of transmissibility (gpd/ft)
227-856-1	545	92	5.9	332	377	336-376	12,000
-4	517	81.3	6.4	301	347	303-333	12,000
229-822-1	425	30.5	13.9	1/ 24	75	64-74	17,000
229-856-1	150	9.5	15.8	1/ 19	35	30-35	18,000
230-840-1	830	25	33	100	157	119-138	40,000
231-825-1	150	3	50	1/ 16	48	38-48	55,000
-2	502	7.1	71	1/ 17	49	39-49	100,000
232-825-1	305	6.9	44.2	1/ 7	>53	44-49	60,000
234-856-3	254	19.3	13.1	1/ 11	>35	25-35	15,000
238-832-1	300	33	9.1	--	--	--	20,000
238-855-1	130	42.7	3.0	43	58	47-57	4,500
-2	137	12.6	10.9	1/ 9	24	19-24	13,000
239-853-1	115	42.4	2.7	47	54	49-54	3,500
246-836-1	690	46.5	14.8	40	>112	75-105	20,000
-2	700	102	6.9	72	>132	121-131	10,000
254-829-1	220	11.1	19.8	1/ 9	>34	29-34	25,000
258-809-1	456	12.8	35.6	1/ 26	>49	41-49	40,000
259-809-1	600	1.5	400	1/ 15	>64	40-60	600,000
-7	200	4.4	45.6	1/ 14	>60	50-60	60,000

1/ For a water-table aquifer, the depth to the water table is given.

wells yield 500 to 600 gpm from sand and gravel deposits in most valleys in the Uplands. The highly permeable outwash deposits in Tonawanda Creek valley provide yields of 1,000 to 1,400 gpm. Wells with these yields cannot be developed everywhere in the sand and gravel deposits. It is necessary to locate a sufficient thickness of water-saturated coarse-grained material (generally 10 to 20 feet), in which a screen can be set. Several test holes may be needed to locate the required aquifer materials. The success of communities and industries in developing large-yield supplies from sand and gravel deposits indicates that the relatively thick zones of permeable materials needed for well development are abundant.

ALLUVIUM AND SWAMP DEPOSITS

Some alluvium lies along all streams. Larger streams have built flood plains or terraces of alluvium consisting of silt, sand, and gravel. In most of the smaller streams with steep gradients, the alluvium is a bed deposit of gravel. The gravelly alluvium along Cattaraugus Creek is tapped for small supplies at places by means of driven and dug wells. Alluvial deposits otherwise are not significant sources of water.

Swamp deposits of muck and sediments lie in poorly drained areas. They generally mark areas of ground-water discharge. Because of their generally low permeability, they are not a significant source of water.

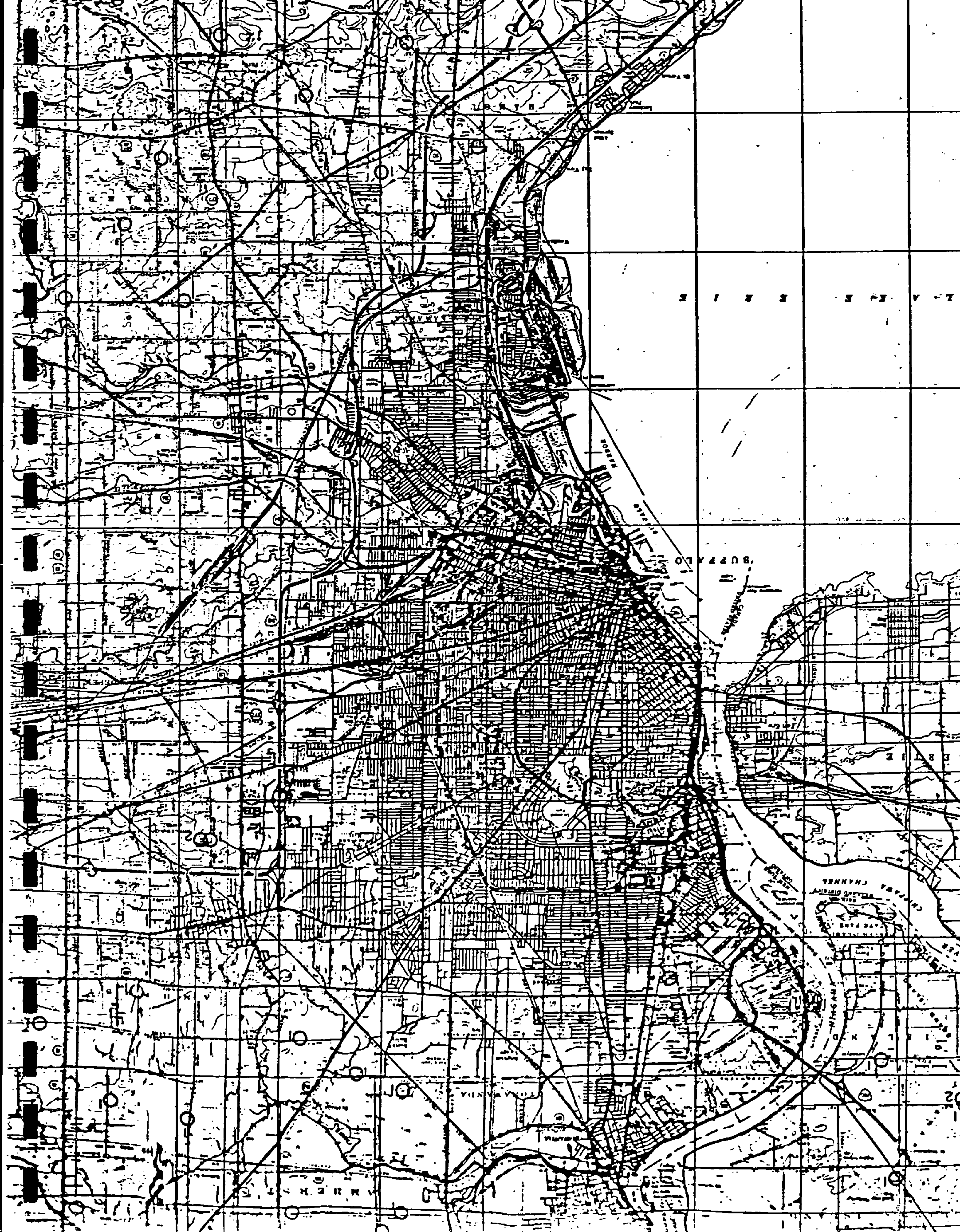

BUFFALO

Table 6.--Records of selected wells in the Erie-Niagara basin

Well number: See "Well-Numbering and Location System" in text for explanation.

Year completed: a - about
b - before

Type of well: Drl - drilled
Drv - driven

Depth of well: All depths below land surface.
a - about
r - reported
all others measured

Diameter of well: Diameters of dug wells are approximate.
Where two or more sizes of casings were used, they are shown in descending order.

Depth to bedrock: All depths below land surface
a - about
m - measured
all others reported

Water-bearing material: Gravel, sand, silt, and till - glacial deposits of Pleistocene age.
Camillus Shale - Camillus Shale of Silurian age.
Limestone - limestone unit consisting of the Onondaga Limestone of Devonian age and the Bertie Limestone and Akron Dolomite of Silurian age.
Lockport Dolomite - Lockport Dolomite of Silurian age.
Shale - Hamilton Group and Conneaut Group of Chadwick (1934) and intervening units, all of Devonian age.

Altitude above sea level: Estimated from topographic maps to nearest 5 feet.

Water level: All water levels are below land surface except those preceded by a (+) sign, which are above land surface.
a - about
p - pumping effect is probable
flow - water flows above land surface but static head could not be measured.
r - reported
all others measured by U.S.G.S. personnel

Method of lift: AL - air lift
Dw - deep well cylinder pump
Jet - deep well jet pump
Sub - submersible pump
Sw - shallow-well pump
Tur - turbine pump

Type of power is indicated as -- I - internal combustion engine
M - manual
all others are electrically powered

Estimated pumpage: Average daily pumpage supplied by owner, tenant, or operator, or computed on basis of per capita consumption of 50 gpd per person or 20 gpd per milk cow.

Use: A - abandoned
Ag - agricultural
C - commercial
D - domestic
F - dairy farm
GT - gas test
I - industrial
In - institutional
Ir - irrigation only
PS - public supply
T - test
U - unused
X - destroyed

Remarks: anal - chemical analysis in this report
dd - drawdown
est - estimated
gas - flammable gas issues from well
gpd - gallons per day
gpm - gallons per minute
H_2S - hydrogen sulfide gas present in ground water
iron - water has noticeable iron content
LS - land surface
OW - observation well, series of water-level measurements available
r - reported
swl - static water level
temp - temperature, in degrees Fahrenheit, measured by U.S.G.S. on same day water level was measured unless otherwise noted

REFERENCE 8

United States
Department of
Agriculture

Soil
Conservation
Service

In Cooperation with
the Cornell University
Agricultural
Experiment Station

Soil Survey of Erie County, New York

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
PhA, PhB----------- Phelps	0-10	Gravelly loam---	ML, SM, GM, CL-ML	A-2, A-4, A-1	0-25	50-80	45-75	25-75	15-70	20-35	2-10
	10-15	Gravelly loam, gravelly clay loam, silt loam.	ML, SM, GM, CL-ML	A-2, A-4, A-1	0-25	50-95	45-90	35-90	25-70	20-35	2-10
	15-32	Gravelly sandy loam, clay loam, gravelly silt loam.	ML, SM, GM, CL-ML	A-1, A-2, A-4	0-25	50-95	45-90	35-90	15-70	20-35	2-10
	32-60	Stratified very gravelly sand to very gravelly loamy sand.	GW, GP, GM, GW-GM	A-1	5-30	15-55	10-50	5-40	0-15	<20	NP-2
Pt*, Pu*. Pits											
Qu*. Quarries											
RaA, RaB----------- Raynham	0-8	Silt loam--------	ML	A-4	0	100	95-100	80 100	55-95	20-35	NP-10
	8-26	Silt loam, silt, very fine sandy loam.	ML	A-4	0	100	95-100	80-100	55-95	20-35	NP-10
	26-60	Silt loam, very fine sandy loam loam, fine sand	ML, SM	A-4, A-2	0	100	95-100	65-100	20-95	<35	NP-10
Re----------------- Red Hook	0-10	Silt loam--------	ML, SM, SM-SC, CL-ML	A-4, A-2	0-5	80-100	75-95	50-95	30-80	15-40	1-15
	10-23	Silt loam, loam, very gravelly sandy loam.	ML, SM, GM, SM-SC	A-1, A-2, A-4	0-5	30-90	25-85	15-80	10-70	15-30	1-15
	23-60	Gravelly loam, gravelly silt loam, very gravelly sandy loam.	GM, SM, SM-SC, ML	A-1, A-2, A-4	5-10	30-80	25-75	15-75	10-70	15-30	1-15
RfA, RfB, RfC------ Remsen	0-9	Silty clay loam	CL, CH	A-7	0-10	90-100	85-100	75-100	60-100	45-55	20-30
	9-36	Silty clay, clay	CL, CH	A-7	0-10	90-100	85-100	75-100	65-100	45-55	20-30
	36-60	Clay, silty clay	CL, ML, SC	A-6, A-7	0-10	60-100	55-100	50-100	45-95	35-45	10-20
RgA, RgB----------- Rhinebeck	0-9	Silt loam--------	ML, MH, CL, CH	A-6, A-7	0	80-100	75-100	70-100	60-90	30-55	10-25
	9-37	Silty clay loam, silty clay.	CH, CL	A-7, A-6	0	90-100	85-100	80-100	70-95	30-55	15-30
	37-70	Silty clay loam, silty clay, clay.	CH, CL	A-7, A-6	0	90-100	85-100	80-100	70-95	30-55	15-30
RhC3--------------- Rhinebeck	0-9	Silty clay loam	ML, MH, CL, CH	A-6, A-7	0	80-100	75-100	70-100	60-90	30-55	10-25
	9-37	Silty clay loam, silty clay.	CH, CL	A-7, A-6	0	90-100	85-100	80-100	70-95	30-55	15-30
	37-70	Silty clay loam, silty clay, clay.	CH, CL	A-7, A-6	0	90-100	85-100	80-100	70-95	30-55	15-30

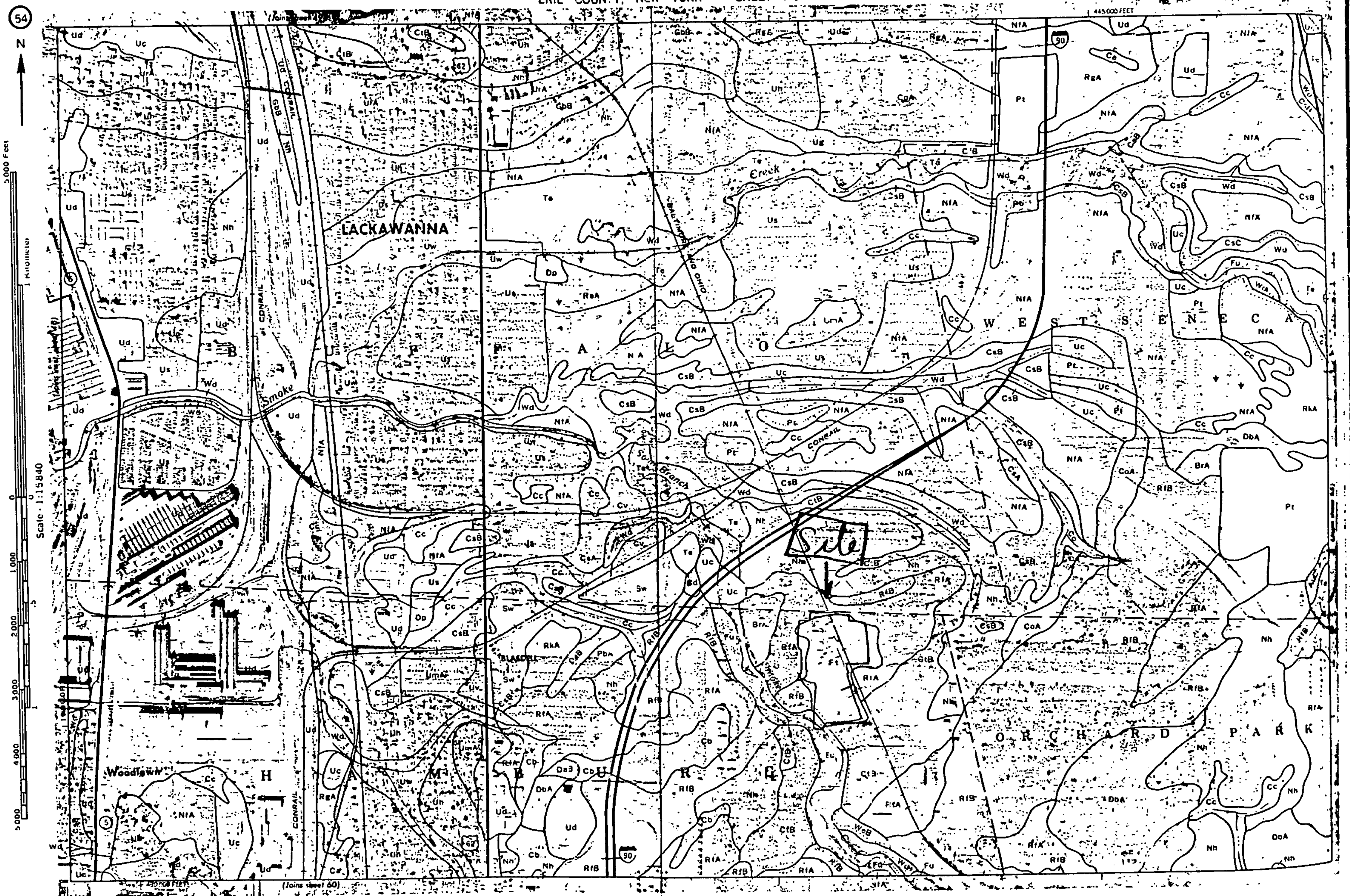
See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay <0.002mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH				Pct
Nh---------------- Niagara	0-14	15-25	1.20-1.50	0.6-2.0	0.17-0.22	5.1-7.3	Low-----------	0.49	3	2-6
	14-40	18-35	1.20-1.50	0.2-0.6	0.16-0.20	5.6-7.8	Low-----------	0.43		
	40-60	8-35	1.7-1.95	0.06-0.6	0.08-0.13	6.6-8.4	Low-----------	0.28		
Od---------------- Odessa	0-9	20-40	1.00-1.25	0.2-0.6	0.17-0.21	5.6-7.3	Moderate-----	0.49	3	3-9
	9-22	35-60	1.20-1.40	<0.2	0.12-0.17	5.6-7.8	Moderate-----	0.28		
	22-60	35-60	1.15-1.40	<0.2	0.12-0.14	7.4-8.4	Moderate-----	0.28		
Oe*:										
Odessa-----------	0-9	20-40	1.00-1.25	0.2-0.6	0.17-0.21	5.6-7.3	Moderate-----	0.49	3	3-9
	9-22	35-60	1.20-1.40	<0.2	0.12-0.17	5.6-7.8	Moderate-----	0.28		
	22-60	35-60	1.15-1.40	<0.2	0.12-0.14	7.4-8.4	Moderate-----	0.28		
Lakemont---------	0-9	20-40	1.00-1.25	0.2-0.6	0.17-0.21	6.1-7.3	Moderate-----	0.49	3	3-10
	9-29	35-60	1.20-1.40	<0.06	0.12-0.17	6.1-7.3	Moderate-----	0.28		
	29-60	35-60	1.15-1.40	<0.06	0.12-0.14	7.4-8.4	Moderate-----	0.28		
OrA, OrB, OrC---- Orpark	0-9	18-35	1.10-1.40	0.6-2.0	0.14-0.21	4.5-5.5	Low-----------	0.37	3	3-7
	9-27	18-35	1.20-1.60	0.06-0.6	0.14-0.20	4.5-5.5	Low-----------	0.37		
	27	---	---	---	---	---	-------------	----		
OvA, OvB--------- Ovid	0-10	15-35	1.00-1.25	0.6-2.0	0.13-0.21	5.6-6.5	Low-----------	0.37	3	2-7
	10-20	28-35	1.20-1.40	0.2-0.6	0.09-0.16	5.6-7.3	Moderate-----	0.37		
	20-60	28-35	1.60-1.80	0.06-0.2	0.11-0.17	7.4-8.4	Low-----------	0.28		
Pa---------------- Palms	0-38	---	0.25-0.45	0.2-6.0	0.35-0.45	5.1-8.4	-------------	----	---	>75
	38-60	7-35	1.46-2.00	0.2-2.0	0.14-0.22	6.1-8.4	Low-----------	----		
PbA, PbB--------- Palmyra	0-9	10-27	1.10-1.40	0.6-2.0	0.10-0.16	5.6-7.3	Low-----------	0.24	3	3-7
	9-28	10-35	1.25-1.55	0.6-2.0	0.07-0.15	6.1-7.8	Low-----------	0.28		
	28-60	0-5	1.45-1.65	>20	0.01-0.02	7.4-8.4	Low-----------	0.17		
Pc---------------- Patchin	0-10	18-35	1.20-1.50	0.2-0.6	0.15-0.21	4.5-5.5	Low-----------	0.37	3	3-8
	10-23	18-35	1.40-1.70	0.06-0.2	0.14-0.20	4.5-5.5	Low-----------	0.37		
	23	---	---	---	---	---	-------------	----		
PhA, PhB--------- Phelps	0-10	10-28	1.10-1.40	0.6-2.0	0.10-0.16	5.6-7.3	Low-----------	0.24	3	3-6
	10-15	18-35	1.25-1.55	0.6-2.0	0.08-0.13	5.6-7.3	Low-----------	0.28		
	15-32	18-35	1.25-1.55	0.6-2.0	0.09-0.18	5.6-7.3	Low-----------	0.28		
	32-60	1-5	1.45-1.65	2.0-20	0.01-0.04	7.4-8.4	Low-----------	0.17		
Pt*, Pu*. Pits										
Qu*. Quarries										
RaA, RaB--------- Raynham	0-8	3-16	1.2-1.5	0.6-2.0	0.20-0.25	5.1-7.3	Low-----------	0.49	3	---
	8-26	3-16	1.2-1.5	0.2-2.0	0.18-0.22	5.1-7.3	Low-----------	0.64		
	26-60	3-16	1.2-1.5	0.06-0.2	0.18-0.22	5.6-8.4	Low-----------	0.64		
Re---------------- Red Hook	0-10	8-18	1.10-1.40	0.6-2.0	0.14-0.19	5.1-6.5	Low-----------	0.49	3	3-12
	10-23	5-18	1.25-1.55	0.6-2.0	0.04-0.17	5.6-7.8	Low-----------	0.43		
	23-60	5-18	1.45-1.65	0.6-2.0	0.04-0.11	6.1-8.4	Low-----------	0.20		
RfA, RfB, RfC---- Rensen	0-9	20-40	1.10-1.40	0.6-2.0	0.16-0.21	5.1-6.5	Moderate-----	0.43	3	3-6
	9-36	40-60	1.60-1.85	<0.06	0.12-0.14	5.6-7.8	Moderate-----	0.28		
	36-60	40-60	1.60-1.85	<0.06	0.10-0.14	7.4-8.4	Moderate-----	0.28		
RgA, RgB, RhC3--- Rhinebeck	0-9	15-40	1.00-1.25	0.2-0.6	0.16-0.21	5.1-7.3	Moderate-----	0.49	3	3-7
	9-37	35-60	1.20-1.40	0.06-0.2	0.12-0.14	5.1-7.8	Moderate-----	0.28		
	37-70	35-60	1.15-1.40	0.06-0.2	0.12-0.14	6.1-8.4	Moderate-----	0.28		
RkA, RkB--------- Rhinebeck	0-9	15-40	1.00-1.25	0.2-0.6	0.11-0.15	5.1-7.3	Moderate-----	0.37	3	3-7
	9-37	35-60	1.20-1.40	0.06-0.2	0.12-0.14	5.1-7.8	Moderate-----	0.28		
	37-70	35-60	1.15-1.40	0.06-0.2	0.12-0.14	6.1-8.4	Moderate-----	0.28		

See footnote at end of table.

ERIE COUNTY, NEW YORK — SHEET NUMBER 54



REFERENCE 9

A

NAME OF LANDFILL: Ferro Corporation - Electro Division

LOCATION: Willet Road, Lackawanna, Erie County

CURRENT OWNER: Ferro Corporation

HISTORY

Off spec castings from this plant were used to fill the parking area on site.

INVESTIGATION

On December 7, 1981, an investigation was conducted at this site by Messrs. Tygert, Christoffel and Wozniak of DEC-Region 9. Samples were taken from six locations in and around the plant site. The first station was a drainage ditch across the street from the plant, adjacent to a railroad track. The second and third stations were located in a drainage ditch adjacent to the parking lot. The fourth station was at a groundwater breakout in the south center face of the filled area. The fifth station was from Smokes Creek, 100 feet downstream of the plant property. The last station was from a surface water ditch draining the south end of the plant property.

SOILS AND GEOLOGICAL INFORMATION

This site is located on a Remsen-Darien Soil Association. It is a heavy textured, somewhat poorly to poorly drained soils on predominantly moderately rolling topography. Remsen soils are deep, fine textured developed in clayey glacial till, derived from dark shales or reworked lacustrine material. Darien series consits of deep, moderately fine textured soils not quite as heavy as Remsen but drained from similar dark colored shales or reworked lacustrine material.

The heavy, rather dense and compact material of the soil, substratum and underlying shale bedrock do not make good aquifers. This dense material lacks open joint plains or solution chambers necessary to provide storage for water.

This site is located on a Marcellus formation type bedrock. In Western New York the Marcellus formation consists of black fissile shale. The approximate depth to bedrock is 20 feet.

SAMPLE ANALYSES

The soil and water samples from Station #1 generally had higher concentrations of polynuclear aromatic hydrocarbon compounds. There was also a high concentration of phenolics in the soil sample from Station #1. All of the soil samples contained fairly high concentrations of chromium and zinc. Halogenated organics were detected in every soil sample except from Station #6. The samples from Stations #1 and #3 generally contained higher concentrations of the polynuclear aromatic hydrocarbon compounds. The sample from Station #4, the groundwater breakout, contained high concentration of total organic carbon, indicating a high organic concentration. Halogenated organics were detected in all six water samples.

DISCUSSION OF RESULTS

On the day of this inspection a black, tarlike substance was observed on the banks and the bottom of the ditch at Station #1. Ferro Corporation has a discharge pipe into this ditch. It is reasonable to assume that the substance was discharged by Ferro.

This facility manufactures grinding wheels. Many of these off-spec wheels were scattered near the parking lot, particularly on the hill leading from the facility site to Smokes Creek.

This site is above the 100 year flood plain of Smokes Creek (South Branch). It is less than 1 acre in size. The site has been classified code "F" meaning no further action is required; subsequent investigation has shown that no in-place toxics are present in dangerous amounts, and the site does not present a toxics hazard.

RECOMMENDATIONS

It is recommended that the tarlike substance at Station #1 be cleaned up immediately. The high PNA concentrations could pose a potential health hazard if it were to percolate into the groundwater or runoff into surface water. Because phenolic binders are used in the grinding wheels, the off-spec grinding wheels scattered behind the parking lot should be cleaned up to prevent surface runoff from possibly washing phenolic compounds into Smokes Creek.

FERRO CORPORATION - Soil Analyses

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (Station #) (1)	(4)	(5)	(3)	(6)
Antimony	ug/g dry	< 10	< 4	< 7	< 6	< 6
Arsenic	ug/g dry	< 0.4	< 0.4	< 0.3	< 0.3	< 0.3
Beryllium	ug/g dry	0.63	0.37	1.1	0.58	0.63
Cadmium	ug/g dry	0.51	< 0.09	0.25	< 0.1	< 0.2
Chromium	ug/g dry	73	190	30	25	25
Copper	ug/g dry	60	95	22	26	27
Lead	ug/g dry	59	30	3.5	32	28
Mercury	ug/g dry	< 0.3	< 0.2	< 0.3	< 0.3	0.57
Nickel	ug/g dry	27	60	60	48	30
Selenium	ug/g dry	4.8	6.8	< 0.7	< 0.6	< 0.7
Silver	ug/g dry	< 0.5	0.22	< 0.3	< 0.2	< 0.2
Thallium	ug/g dry	< 6	< 2	< 3	< 3	< 3
Zinc	ug/g dry	220	130	110	130	93
Dry Weight	%	71	75	78	67	74
Phenolics	ug/g dry	110	29	0.3	0.43	< 0.3
Halogenated Organic Scan	ug/g dry as Cl_2 Lindane Standard	0.81	1.8	0.41	3.6	< 0.1

Polynuclear Aromatic Hydrocarbon

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (Station #) (1)	(4)	(5)	(3)	(6)
Acenaphthene	ug/g dry	780	< 5	< 0.7	< 0.5	< 0.2
Acenaphthylene	ug/g dry	< 10	< 8	< 1	< 1	< 0.4
Anthracene	ug/g dry	230	1.3	0.036	0.019	0.20
Benzo(a) anthracene	ug/g dry	93	1.8	0.16	0.079	0.15
Benzo(a) pyrene	ug/g dry	72	0.68	0.16	0.85	0.040
Benzo(b) fluoranthene	ug/g dry	81	1.2	0.20	0.12	0.15
Benzo(g,h,i) perylene	ug/g dry	68	1.4	0.23	0.37	0.21
Benzo(k) fluoranthene	ug/g dry	34	0.4	0.58	0.05	0.036
Chrysene	ug/g dry	120	1.6	0.29	0.20	0.31
Dibenzo(a,h)-anthracene	ug/g dry	< 1	< 0.8	0.26	0.37	0.089
Fluoranthene	ug/g dry	500	12	0.68	0.58	0.81
Fluorene	ug/g dry	250	5.8	0.043	0.11	0.14
Indeno(1,2,3,cd) pyrene	ug/g dry	21	< 0.4	0.12	0.064	0.071
Naphthalene	ug/g dry	630	8.4	< 0.7	0.38	0.11
Phenanthrene	ug/g dry	760	16	0.22	0.29	0.65
Pyrene	ug/g dry	420	8.7	0.35	0.38	0.54

FERRO CORPORATION - Water Analyses

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (Station #) (1)	(2)	(3)	(4)	(5)	(6)
Antimony	mg/l	0.6	1.2	0.4	0.5	<0.2	<0.2
Arsenic	ug/l	< 5	< 5	< 5	< 5	< 5	< 5
Beryllium	mg/l	0.01	0.01	<0.01	0.01	<0.01	<0.01
Cadmium	mg/l	0.008	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium	mg/l	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Copper	mg/l	0.018	0.018	0.012	0.024	0.012	0.010
Lead	mg/l	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Mercury	ug/l	< 3	< 3	< 3	< 3	< 3	< 3
Nickel	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Selenium	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
Silver	mg/l	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Thallium	mg/l	0.2	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	mg/l	0.072	0.096	0.260	0.053	0.029	0.078
Phenolics	mg/l	0.012	<0.01	<0.01	0.023	<0.01	<0.01
TOC	mg/l	6.2	27	18	100	2.3	5.5
THO	ug/l as Cl_2 Lindane Standard	0.14	0.85	1.3	0.11	0.44	0.10

Polynuclear Aromatic Hydrocarbon

COMPOUND	UNITS	SAMPLE IDENTIFICATION (Station #) (1)	(2)	(3)	(4)	(5)	(6)
Acenaphthene	ug/l	25	< 3	< 5	< 0.6	0.37	< 1
Acenaphthylene	ug/l	34	< 5	4.5	< 1	< 1	0.57
Anthracene	ug/l	0.31	0.047	0.14	0.40	0.051	0.019
Benzo(a)anthracene	ug/l	< 0.3	< 0.3	3.5	< 0.06	< 0.07	< 0.1
Benzo(a)pyrene	ug/l	< 0.3	< 0.3	< 0.5	< 0.06	< 0.07	< 0.1
Benzo(b)fluoranthene	ug/l	0.076	0.097	10	0.20	0.034	0.2
Benzo(g,h,i)perylene	ug/l	0.98	0.68	< 1	0.16	< 0.1	0.22
Benzo(k)fluoranthene	ug/l	0.052	0.23	8.7	1.1	0.13	< 0.1
Chrysene	ug/l	< 0.3	0.038	8.1	0.27	0.019	< 0.1
Dibenzo(a,h)anthracene	ug/l	1.2	1.4	< 1	6.6	0.23	0.51
Fluoranthene	ug/l	1.7	0.47	7.1	2.5	0.40	0.059
Fluorene	ug/l	6.7	0.13	< 1	< 0.1	0.044	< 0.2
Indeno(1,2,3cd)pyrene	ug/l	< 0.3	< 0.3	< 0.5	< 0.06	< 0.07	< 0.1
Naphthalene	ug/l	25	1.2	2.0	< 0.6	< 0.7	1.2
Phenanthrene	ug/l	3.6	0.13	0.45	0.47	0.051	0.035
Pyrene	ug/l	< 0.3	< 0.3	5.6	< 0.06	0.49	< 0.1

FERRO CORP.
12/7/81

N.

STATION #1 Water & silt sample from discharge pipe NORTH SIDE OF WILLETT Rd.

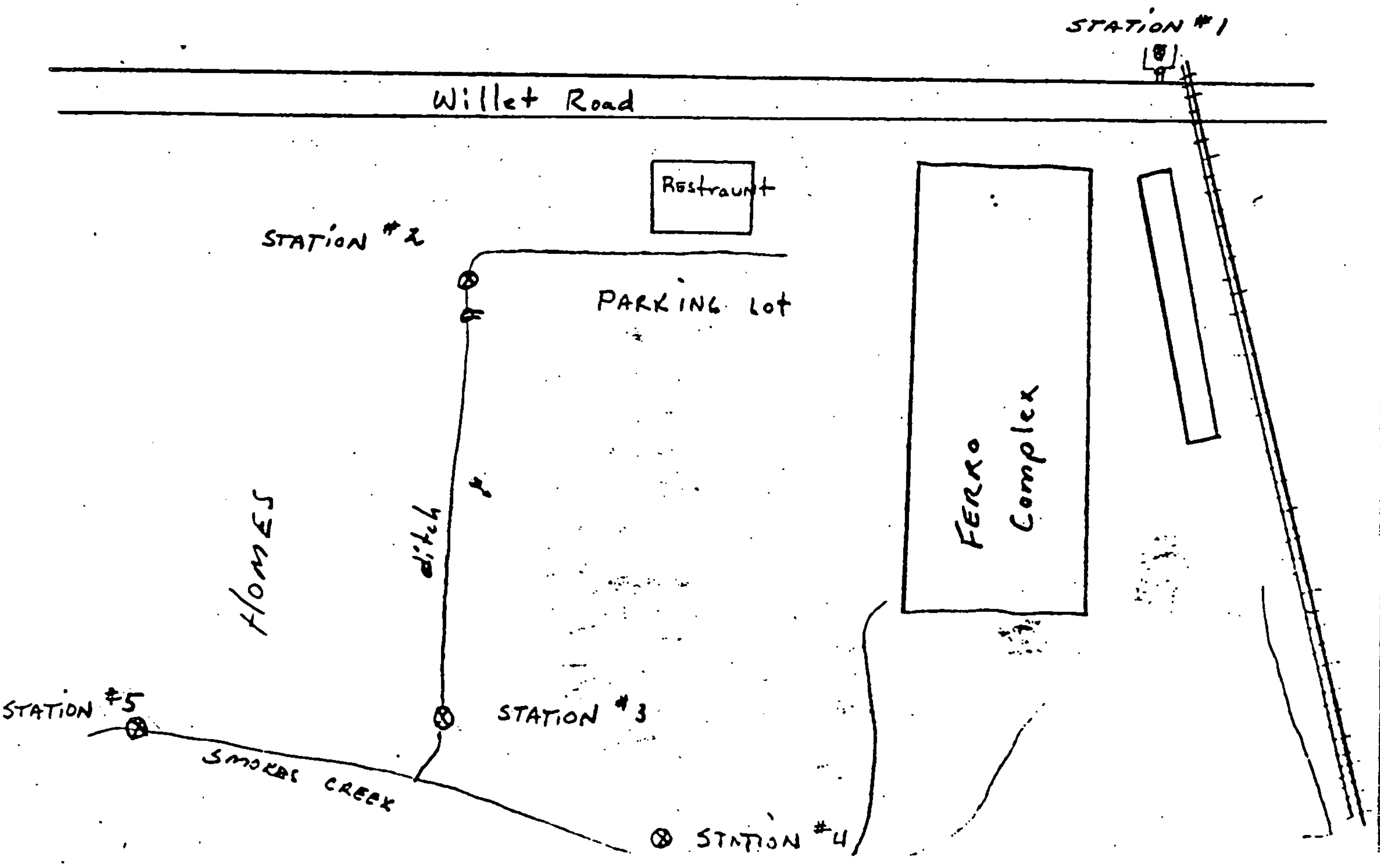
STATION #2 WATER & silt sample from surface WATER DITCH NORTH WEST CORNER OF PARKING LOT

STATION #3 WATER & silt sample from surface WATER DITCH 40 ft. upstream from confluence with smokes creek

STATION #4 WATER & silt sample from ground water breakout south center face of filled AREA

STATION #5 WATER & silt sample from smokes creek 100 ft down stream of plant prop.

STATION #6 - WATER & silt sample from surface WATER ditch draining south end of Plant property



REFERENCE 10

3

DIVISION OF SOLID AND HAZARDOUS WASTE

QUALITY ASSURANCE WORK PLAN

(#915020)

FERRO CORPORATION
(Project Name)

1883
(T&A Code)

Submitted By: CARL HOFFMAN

Agency: N.Y.S.D.E.C., BUREAU of HAZARDOUS SITE CONTROL

Phone Number: 518-457-9538

Date: ____________________

Sampling 6/25/86

DEC Albany 8-17-88

1. Project Description:

→ OFF SPECIFICATION CERAMIC CASTINGS WERE USED TO FILL AREAS ON SITE. THE PHASE I REPORT did NOT MENTION the MORE APPARENT FILL AREA bordering SMOKE CREEK ON the Southern Edge of SITE.

→ THE FILL AREA IDENTIFIED IN the PHASE I IS located within the fenced IN plant proper, Adjacent to A TRANSFORMER BANK.

→ A PAIR of ditches ACROSS WILLET ROAD, draining the RAILROAD TRACKS ON the NORTH, show waste material. The ditch on the west shows OIL, while the EAST DITCH Shows A yellowish Substance on bottom.

→ A large ditch following the western Edge of property intercepts significant surface run off AND directs it to the SOUTH BRANCH OF SMOKE CREEK.

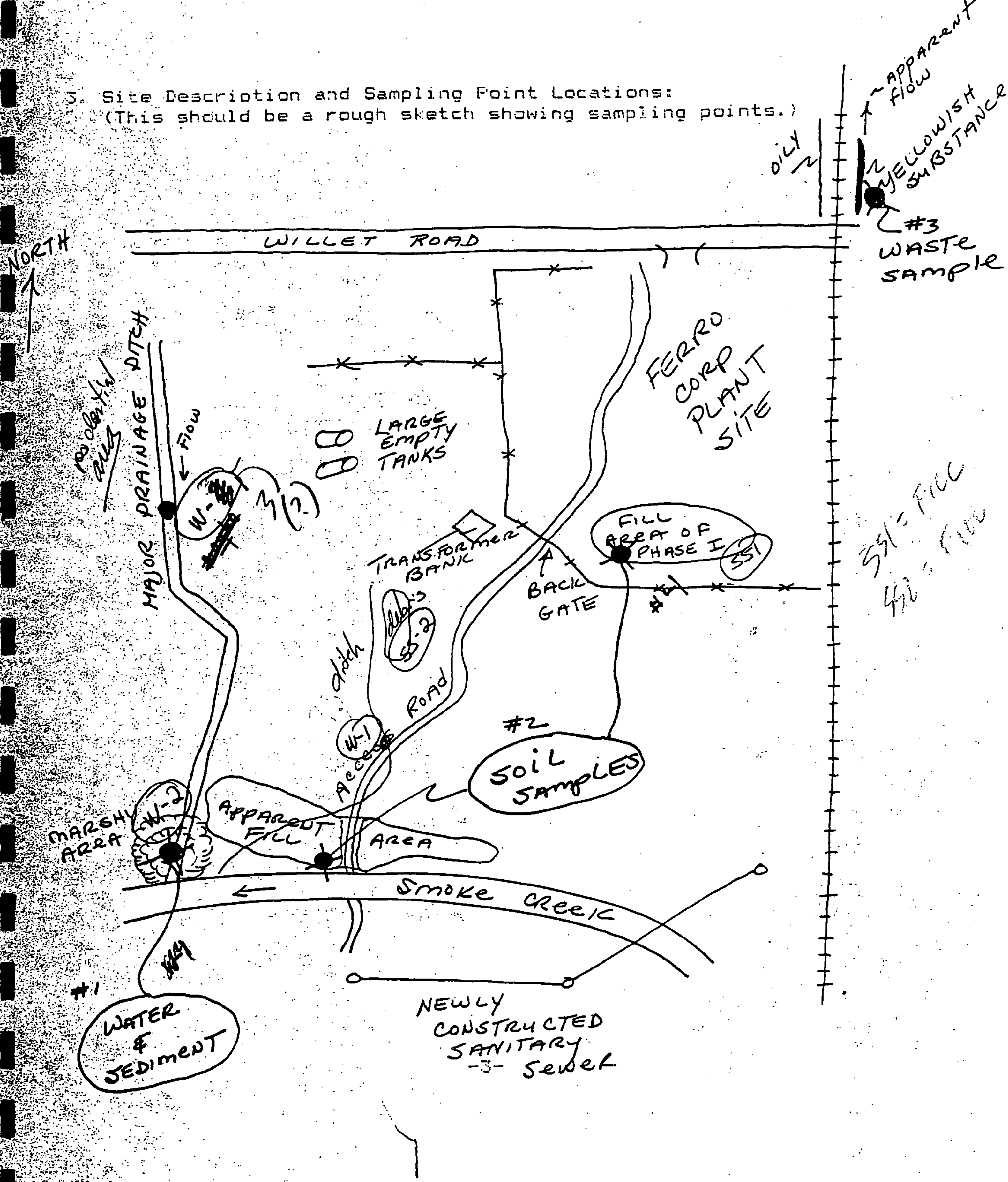
2. Project Objective:

→ THE LARGE DITCH INTERCEPTING DRAINAGE ON THE WESTERN BORDER OF SITE IS TO BE SAMPLED IN the MARSHY AREA WHERE IT DELIVERS TO SMOKE CREEK.

→ A composite soil sample of the Apparent FILL AREA. (Previous sampling detected chrome, copper, lead & ZINC above soil background levels.)

→ The EASTERN DITCH BORDERING THE R.R. TRACKS, ON THE NORTHERN SIDE OF ~~the~~ WILLET ROAD has A yellowish substance on its bottom. It could be Attributed to the R.R. OR WILLET ROAD Activity.

3. Site Description and Sampling Point Locations:
(This should be a rough sketch showing sampling points.)



-3-

4. Sampling Methods: (describe equipment, sampling procedures and cleaning procedures)

#1 – A water and sediment sample will be collected at the marshy area where the large ditch enters Smoke Creek. The sample is not to be collected where the dilution effect of Smoke Creek would reduce contaminate concentration. This sample would represent the most significant migration pathway to Smoke Creek.

#2 – The apparent fill area and the Phase I identified fill area will be sampled for organics and metals. The Registry identified elevated chrome, copper, lead + zinc levels from prior sampling.

#3 – The ditch on the northern side of Willet Road shows evidence of a yellowish substance present on the bottom. The materials appear paint-like and might be attributable to R.R. or Willet Road activity, as well as Ferro Corp.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DIVISION OF SOLID AND HAZARDOUS WASTE

Sample Chain of Custody Form*

Sample Descriptions:

Sample ID	Matrix	Sampling Point	Analytical Requirements	
W-2	WATER SEDIMENT	confluence of ditch & Smoke Creek marsh	VOA ORGANICS, METALS	A986176-01 Haz " -02 Soil
SS-1	SOIL	APPARENT FILL within fence	ORGANICS, METALS	A986176-07
SS-2	SOIL	phase I fill area, outside fence debris pile	ORGANICS, METALS	A986176-08
oil spill not sampled	WASTE	WEBB DITCH NORTH of WILLET ROAD	ORGANICS, METALS (PAINT-like)	A986176-09
W-3	Water & Sediment	up gradient of marsh sample W-2	VOA, organics 625, metals	A986176-05 H A986176-06 Soil
W-1	Water & Sediment	smaller ditch through middle of site, from piles of debris	VOA, 625, metals	A986176-03 Haz A986176-04 Soil

	Name	Date	Affiliation
Collected by:	[illegible]	6/25/86	DEC
Relinquished by:	[illegible]	6/25/86	"
Received by:	[illegible]	6/25/86	DEC
Relinquished by:	[illegible]	6/26/86	"
Received by:	[illegible]	6/26/86	"
Relinquisged by:			
Received by:			
Relinquished by:			
Accessioned by:	[illegible]		
Analyzed by:			
Reported by:			

Organics

*·This form will be returned when the data is reported.

5. Parameter Table:

Sampling Point	Matrix[1]	Parameters

[1] Groundwater = GW
Surface Water = SW
Soil = S
Sediment = Sed
Drummed Waste = DW
Drummed Liquid = DL
Waste Material = WM

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE
Mobile Analytical Laboratory

Region:	9
Site Name:	Ferro Corporation
Lab Number:	A98617601
Date Collected:	June 25, 1986
Collected By:	C. Hoffman
Sampling Point:	W-2
Date Reported:	September 8, 1986

Metals	Conc. (ppm)
Sb	NA
As	40.5ppb
Ba	NA
Be	NA
Cd	<0.05
Cr	<0.10
Cu	0.03
Pb	<0.2
Hg	<0.5ppb
Ni	<0.50
Os	NA
Se	NA
Ag	<0.5ppb
Tl	NA
V	NA
Zn	0.23
Fe	11.0
Mg	34.0
Mn	0.6
Al	NA
Ca	NA
K	NA
Na	NA
Sn	NA
Co	NA

NA = Not Analyzed

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE
Mobile Analytical Laboratory

Region: 9
Site Name: Ferro Corporation
Lab Number: A98617602
Date Collected: June 25, 1986
Collected By: C. Hoffman
Sampling Point: W-2, sediment
Date Reported: September 8, 1986

Metals	Conc. (ppm)
Sb	NA
As	30.2
Ba	NA
Be	NA
Cd	3.0
Cr	45.2
Cu	57.2
Pb	90.4
Hg	301.2ppb
Ni	45.2
Mo	NA
Se	NA
Ag	90.4ppb
Tl	NA
V	NA
Zn	277.1
Fe	36897.6
Mg	7831.3
Mn	337.3
Al	NA
Ca	NA
K	NA
Na	NA
Sn	NA
Co	NA

NA = Not Analyzed.

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE
Mobile Analytical Laboratory

Region:	9
Site Name:	Ferro Corporation
Lab Number:	A98617603
Date Collected:	June 25, 1986
Collected By:	C. Hoffman
Sampling Point:	W-1
Date Reported:	September 8, 1986

Metals	Conc. (ppm)
Sb	NA
As	2.6ppb
Ba	NA
Be	NA
Cd	<0.05
Cr	<0.10
Cu	<0.01
Pb	<0.20
Hg	1.0ppb
Ni	,0.50
Os	NA
Se	NA
Ag	<0.5ppb
Tl	NA
V	NA
Zn	0.08
Fe	3.44
Mg	19.0
Mn	0.57
Al	NA
Ca	NA
K	NA
Na	NA
Sn	NA
Co	NA

NA = Not Analyzed

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE
Mobile Analytical Laboratory

Region:	9
Site Name:	Ferro Corporation
Lab Number:	A98617604
Date Collected:	June 25, 1986
Collected By:	C. Hoffman
Sampling Point:	W-1, Sediment
Date Reported:	September 8, 1986

Metals	Conc. (ppm)
Sb	NA
As	6.7
Ba	NA
Be	NA
Cd	<0.05
Cr	23.9
Cu	23.9
Pb	22.2
Hg	2.1
Ni	23.9
Os	NA
Se	NA
Ag	119.7ppb
Tl	NA
V	NA
Zn	186.3
Fe	15470.1
Mg	3333.3
Mn	177.8
Al	NA
Ca	NA
K	NA
Na	NA
Sn	NA
Co	NA

NA = Not Analyzed

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE
Mobile Analytical Laboratory

Region:	9
Site Name:	Ferro Corporation
Lab Number:	A98617605
Date Collected:	June 25, 1986
Collected By:	C. Hoffman
Sampling Point:	W-3
Date Reported:	September 8, 1986

Metals	Conc. (ppm)
Sb	NA
As	7.7ppb
Ba	NA
Be	NA
Cd	<0.05
Cr	<0.1
Cu	<0.01
Pb	<0.2
Hg	<0.5ppb
Ni	<0.5
Os	NA
Se	NA
Ag	<0.5ppb
Tl	NA
V	NA
Zn	<0.05
Fe	<0.2
Mg	21.5
Mn	<0.2
Al	NA
Ca	NA
K	NA
Na	NA
Sn	NA
Co	NA

NA = Not Analyzed

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE
Mobile Analytical Laboratory

Region:	9
Site Name:	Ferro Corporation
Lab Number:	A90617606
Date Collected:	June 25, 1986
Collected By:	C. Hoffman
Sampling Point:	W-3, Soil
Date Reported:	September 8, 1986

Metals	Conc. (ppm)
Sb	NA
As	23.8
Ba	NA
Be	NA
Cd	<0.05
Cr	27.6
Cu	31.9
Pb	NA
Hg	145.1ppb
Ni	55.2
Os	NA
Se	NA
Ag	29.0ppb
Tl	NA
V	NA
Zn	116.1
Fe	35994.2
Mg	7474.6
Mn	355.6
Al	NA
Ca	NA
K	NA
Na	NA
Sn	NA
Co	NA

NA = Not Analyzed

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE
Mobile Analytical Laboratory

Region:	9
Site Name:	Ferro Corporation
Lab Number:	A98617607
Date Collected:	June 25, 1986
Collected By:	C. Hoffman
Sampling Point:	SS-1
Date Reported:	September 8, 1986

Metals	Conc. (ppm)
Sb	NA
As	11.9
Ba	NA
Be	NA
Cd	1.2
Cr	79.3
Cu	51.7
Pb	NA
Hg	240.4ppb
Ni	102.2
Os	NA
Se	NA
Ag	24.0ppb
Tl	NA
V	NA
Zn	161.1
Fe	32992.8
Mg	4387.0
Mn	462.7
Al	NA
Ca	NA
K	NA
Na	NA
Sn	NA
Co	NA

NA = Not Analyzed

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE
Mobile Analytical Laboratory

Region:	9
Site Name:	Ferro Corporation
Lab Number:	A98617608
Date Collected:	June 25, 1986
Collected By:	C. Hoffman
Sampling Point:	SS-2
Date Reported:	September 8, 1986

Metals	Conc. (ppm)
Sb	NA
As	198.1ppb
Ba	NA
Be	NA
Cd	6.0
Cr	99.0
Cu	87.0
Pb	NA
Hg	483.1ppb
Ni	60.4
Os	NA
Se	NA
Ag	36.2ppb
Tl	NA
V	NA
Zn	930.0
Fe	48430.0
Mg	3140.1
Mn	397.3
Al	NA
Ca	NA
K	NA
Na	NA
Sn	NA
Co	NA

NA = Not Analyzed

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE
Mobile Analytical Laboratory

Region:	9
Site Name:	Ferro Corporation
Lab Number:	198617609
Date Collected:	June 25, 1986
Collected By:	C. Hoffman
Sampling Point:	Waste
Date Reported:	September 8, 1986

Metals	Conc. (ppm)
Sb	NA
As	10.3ppb
Ba	NA
Be	NA
Cd	2.1
Cr	11.4
Cu	23.9
Pb	NA
Hg	104.2ppb
Ni	42.7
Os	NA
Se	NA
Ag	31.2ppb
Tl	NA
V	NA
Zn	35.5
Fe	6197.9
Mg	<0.01
Mn	78.1
Al	NA
Ca	NA
K	NA
Na	NA
Sn	NA
Co	NA

NA = Not Analyzed

REFERENCE 11

CURVE FORMULAS

$T = R \tan \frac{1}{2} I$	$R = T \cot. \frac{1}{2} I$	Chord def. $= \frac{\text{chord}^2}{R}$
$T = \frac{50 \tan \frac{1}{2} I}{\text{Sin.} \frac{1}{2} D}$	$R = \frac{50}{\text{Sin.} \frac{1}{2} D}$	No. chords $= \frac{I}{D}$
$\text{Sin.} \frac{1}{2} D = \frac{50}{R}$	$E = R \text{ ex. sec } \frac{1}{2} I$	Tan. def. $= \frac{1}{2}$ chord def.
$\text{Sin.} \frac{1}{2} D = \frac{50 \tan \frac{1}{2} I}{T}$	$E = T \tan \frac{1}{4} I$	

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.) and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance. Multiply the angle by .01745, and the product by the distance.

GENERAL DATA

Right Angle Triangles. Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt. 10. $10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. 25. $25^2 \div 200 = 3.125$; $100 - 3.125 = 96.875 =$ Base.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

Leveling. The correction for curvature and refraction, in feet and decimals of feet is equal to $0.574 d^2$, where d is the distance in miles. The correction for curvature alone is closely, $\frac{2}{3} d^2$. The combined correction is negative.

Probable Error. If d_1, d_2, d_3, etc. are the discrepancies of various results from the mean, and if Σd^2 = the sum of the squares of these differences and n = the number of observations, then the probable error of the mean $= \pm 0.6745 \sqrt{\frac{\Sigma d^2}{n(n-1)}}$

MINUTES IN DECIMALS OF A DEGREE

1'	.0167	11'	.1833	21'	.3500	31'	.5167	41'	.6833	51'	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

INCHES IN DECIMALS OF A FOOT

1-16	3-32	⅛	3-16	¼	5-16	⅜	½	⅝	¾	⅞
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729
1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

4

·1·

Ferro Corporation
Willett road
Lackawanna
Erie County. 915020

inorg
VOA
BNA

1 water / leachate sample
& 5 soil / sediment samples.

same point of sampling
1 SH915020 0101 - water
2 SH915020 0102 - sediment
3 SH915020 0201 - sediment
4 SH915020 0301 - " " "
5 SH915020 0401 - " " "
6 SH915020 0501 - " " "

Samples are to be analysed for:
metals
VOAs
BNAs

Sample bottles picked up from RECRA labs on 10/14/86
Labels prepped on 10/15
@ the site.

DEC Smith 8-17-

Sampling started @ about 9:45

Sampling done by:
Dennis Farrar

Weather conditions:
partly to mostly cloudy.
Cold - low 40's
Windy & "raw"

Site ~~was~~ very wet due to the heavy rains of the previous day.

Samples were taken @ approximately the same locations as last July.

Sample 9150200101 - water
9150200102 - sediment

Refer to photo. - Soil was ~~to~~ very soft & muddy - Some cattails in the drainage ditch

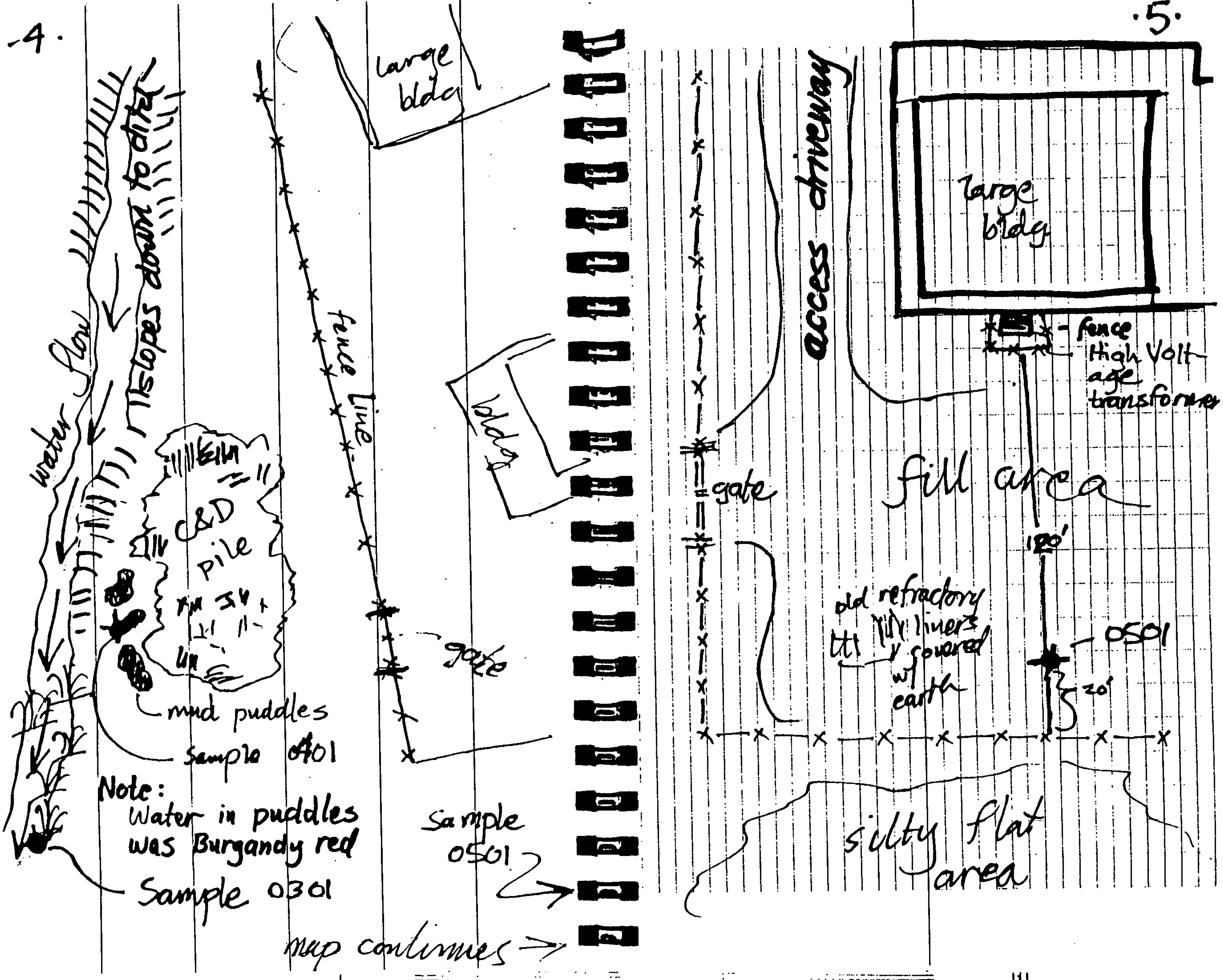
No odors noted on site w/ the exception of a mild swampy odor down by the cattails

Sample SH9150200201 - Sediment taken from a drainage swale about 100 feet from Willett Creek - water was running in the swale. - Muddy dark sediment

Sample SH9150300301 - taken ~~dow~~ from a shallow drainage ditch filled w/ cattails - Water was flowing in the ditch - ~~Soil~~ Sediment was coarse shale chips mixed w/ mud.

This sampling spot was w/in 75 feet of a dumping area of old refractory rubble & what appeared to C.&D waste

Sample SH9150200401 - taken w/in 15 feet of the edge of the C&D rubble disposal area. Sediment sample was taken from an ~~a~~ shallow puddle. The water in the puddle was burgandy red in color.


-4-
large bldg
slopes down to ditch
water flow
C&D pile
fence line
bldg
gate
mud puddles
Sample 0401
Note:
Water in puddles
was Burgandy red
Sample 0301
Sample
0501
map continues
-5-
access driveway
gate
large bldg
fence
High Voltage transformer
fill area
120'
old refractory
liners covered
w/ earth
0501
20'
silty flat
area

Sample SH 915 020 0501 - sediment
Taken on the other side of the fence (see map on previous page) directly behind a large "pre-fab" panel bldg. We dug down about 1 ft. thru the refractory cover into the clay soil below to get the sample ~ clay was yellowish - brown.

Sampling completed about 11:20 AM ~ Clean up completed around 11:35 AM.
The weather improved toward the end of the sampling ~ turned sunny & clear & slightly warmer.

Left site just before noon. Checked out w/ Doug Dohn the Safety Supervisor for the Ferro Corp.

We got ice for the samples @ a 7-11 store approx. 1½ miles away from the site.
Samples were delivered to RCRA on 10/15 @ about 6:30 P.M.

·Photographs·

Sampling @ Site 9150200101
9150200102
drainage ditch @ edge of property

The "soil" along the edge of the drainage ditch was finely fractured shale. Numerous brachiopod fossils mixed in.

Sample 9150200201
Sediment taken from a small stream that runs into Willett Creek

Sediment from a small stream running thru a swampy area. Mild odor from the swamp. Heavy vegatation (cattails) growing thru here.

Sample SH9150200401
Sample taken of sediment in the small puddle near C&D pile.

Note: large C&D pile filled w/ construction debris & refractory liners, etc.
Samples were taken from the sediment @ the bottom of small puddles on site. The water in the puddles was burgandy red in color.

SITE NAME Ferro Corp.
SITE ID # 915020

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DIVISION OF SOLID AND HAZARDOUS WASTE

Sample Chain of Custody Form* B986288-01 → 06

Sample Descriptions:

Sample ID	Matrix	Sampling Point	Analytical Requirements	
			INORGANICS	
SH91502000101	water	0101		B986288-01
SH91502000102	Sediment	0102	" "	-02
SH91502000201	" "	0201	" "	-03
SH91502000301	" "	0301	" "	-04
SH91502000401	" "	0401	" "	-05
SH91502000501	" "	0501	" "	-06

	Name	Date	Affiliation
Collected by:	D. Farrar	10-15-86	NYSDEC
Relinquished by:	TM Koch	10-20-86	" " "
Received by:	MG.	10/20/86	" " "
Relinquished by:			
Received by:			
Relinquisged by:			
Received by:			
Relinquished by:			
Accessioned by:			
Analyzed by:			
Reported by:			

* This form will be returned when the data is reported.

15 (12-, 5)

7/1 Cur

New York State Department of Environmental Conservation

5

MEMORANDUM

TO: Walter Demick
FROM: John Rankin, Division of Solid and Hazardous Waste QA/QC Officer JMR
SUBJECT: Analysis of Phase II and Onondaga Lake Samples

DATE: August 25, 1987

Martha McEwen and Maureen Hogan, of my staff, have reviewed the data produced by RECRA Research concerning the Phase II investigations and the Onondaga Lake samples.

1 copy to each site file
MK - 1 copy

The Phase II sites included the following:

1. Ferro Corporation:

    SH9150200101 - water
    SH9150200102 - sediment
    SH9150200201 - sediment
    SH9150200301 - sediment
    SH9150200401 - sediment
    SH9150200501 - sediment

2. Lehigh Valley R.R.:

    SH9150710101 - sediment
    SH9150710201 - sediment
    SH9150710301 - sediment
    SH9150710401 - water

3. Roblin Steel:

    SH9150560101 - water
    SH9150560102 - sediment
    SH9150560201 - water
    SH9150560202 - sediment

4. Lynch Park:

    SH9320060101 - water
    SH9320060102 - sediment
    SH9320060201 - sediment
    SH9320060301 - sediment

5. McKenna Landfill:

    SH8370030101 - leachate
    SH8370030201 - leachate
    SH8370030301 - leachate
    SH8370030401 - sediment

8-17
Acc. M Memorandum
All QA/QC
denied -
not for phase II
use

DEC Albany
8-17-88

All samples collected for the Phase II investigation are out of control for the QA/QC aspect under the deliverables package of the CLP. RECRA has been provided with a critique of these data packages.

The Onondaga Lake samples included analysis of 25 sediment and 13 water samples. The sample numbers are:

Sediment	Sediment	Water
S-50-00-00	S-29-48-54	W-02-04-04
S-49-00-00	S-29-36-42	W-02-13-13
S-48-00-00	S-29-24-30	W-02-16-16
S-47-00-00	S-29-12-18	W-08-01-01
S-46-00-00	S-29-03-06	W-08-04-04
S-45-00-00	S-29-00-03	W-04-00-00
S-44-00-00	S-14-48-50	W-05-00-00
S-38-48-50	S-14-36-42	W-06-00-00
S-38-36-42	S-14-24-30	W-07-00-00
S-38-24-30	S-14-12-18	W-09-00-00
S-38-12-18	S-14-03-06	W-10-00-00
S-38-03-06	S-14-00-03	W-11-00-00
S-38-00-03		W-12-00-00

The data from the sediment samples has been reviewed and summarized. The data has been declared unusable. Holding times and analysis times were exceeded, the laboratory reported all the metals data as being unusable, tuning criteria were not nor had ever been met for the analysis of the VOA and 625 parameters. Considering the review of the sediment samples divulged such disasterous results, the data of the water samples was not reviewed.

Since the initial intention was to produce CLP quality data, I recommend this data not be used and the sites be resampled. Needless to say, RECRA should not be paid for the analysis, in part or whole, for the aforementioned sample numbers.

cc: L. Bailey
C. Goddard
M. Chen
M. Hogan

SITE NAME Ferro Corp.
SITE ID # 915020

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DIVISION OF SOLID AND HAZARDOUS WASTE

Sample Chain of Custody Form* B986288-01→06

Sample Descriptions:

Sample ID	Matrix	Sampling Point	Analytical Requirements	
SH9150200101	water	0101	INORGANICS	B986288-01
SH9150200102	Sediment	0102	" "	-02
SH9150200201	" "	0201	" "	-03
SH9150200301	" "	0301	" "	-04
SH9150200401	" "	0401	" "	-05
SH9150200501	" "	0501	" "	-06

	Name	Date	Affiliation
Collected by:	D. Farrar	10-15-86	NYSDEC
Relinquished by:	TMKoch	10-20-86	" " "
Received by:	MG.	10/20/86	" " "
Relinquished by:			
Received by:			
Relinquisged by:			
Received by:			
Relinquished by:			
Accessioned by:			
Analyzed by:			
Reported by:			

* This form will be returned when the data is reported.

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HSL Metals Report

Site Name: FERRO CORP
Site Code: 915020
Date Collected: 15OCT86
Matrix: SEDIMENT
Concentration Units: MG/KG

Lab.Number: 98628806
Sample I.D.: SH915020050I
Date Reported: 20MAR87
Percent Solids: 75.16
Archival File: M0119

Metal	Concentration
Aluminum	ND
Antimony	ND
Arsenic *	30194.5
Barium	ND
Beryllium	ND
Cadmium	7.7
Calcium	ND
Chromium	55.0
Cobalt	ND
Copper	39.7
Iron	49130.0
Lead	<0.2
Magnesium	ND
Manganese	1253.8
Mercury *	127.9
Nickel	129.9
Potassium	ND
Selenium *	ND
Silver *	63.9
Sodium	ND
Thallium	ND
Tin	ND
Vanadium	ND
Zinc	281.5

* Concentration in UG/L or UG/KG

ND = Not Determined

Sampling 10-15-86
see last sheet

DEC Albany 8-17-88

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HSL Metals Report

Site Name: FERRO CORP
Site Code: 915020
Date Collected: 15OCT86
Matrix: SEDIMENT
Concentration Units: MG/KG

Lab.Number: 98628805
Sample I.D.: SH9150200401
Date Reported: 20MAR87
Percent Solids: 74.71
Archival File: M0118

Metal	Concentration
Aluminum	ND
Antimony	ND
Arsenic *	35872.0
Barium	ND
Beryllium	ND
Cadmium	12.1
Calcium	ND
Chromium	112.4
Cobalt	ND
Copper	275.7
Iron	65854.6
Lead	65.6
Magnesium	ND
Manganese	1338.5
Mercury *	133.8
Nickel	139.9
Potassium	ND
Selenium *	ND
Silver *	80.3
Sodium	ND
Thallium	ND
Tin	ND
Vanadium	ND
Zinc	1258.2

* Concentration in UG/L or UG/KG

ND = Not Determined

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HSL Metals Report

Site Name: FERRO CORP
Site Code: 915020
Date Collected: 15OCT86
Matrix: SEDIMENT
Concentration Units: MG/KG

Lab.Number: 98628804
Sample I.D.: SH9150200301
Date Reported: 20MAR87
Percent Solids: 81.07
Archival File: M0157

Metal	Concentration
Aluminum	ND
Antimony	ND
Arsenic *	22696.4
Barium	ND
Beryllium	ND
Cadmium	7.3
Calcium	ND
Chromium	64.0
Cobalt	ND
Copper	50.6
Iron	52793.9
Lead	<0.2
Magnesium	ND
Manganese	2861.7
Mercury *	<0.5
Nickel	94.6
Potassium	ND
Selenium *	ND
Silver *	37.0
Sodium	ND
Thallium	ND
Tin	ND
Vanadium	ND
Zinc	222.0

Concentration in UG/L or UG/KG

ND = Not Determined

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HSL Metals Report

Site Name: FERRO CORP
Site Code: 915020
Date Collected: 15OCT86
Matrix: SEDIMENT
Concentration Units: MG/KG

Lab.Number: 98628803
Sample I.D.: SH9150200201
Date Reported: 20MAR87
Percent Solids: 40.99
Archival File: M0116

Metal	Concentration
Aluminum	ND
Antimony	ND
Arsenic *	49280.3
Barium	ND
Beryllium	ND
Cadmium	14.6
Calcium	ND
Chromium	100.0
Cobalt	ND
Copper	61.0
Iron	53183.7
Lead	146.4
Magnesium	ND
Manganese	1463.8
Mercury *	243.9
Nickel	132.2
Potassium	ND
Selenium *	ND
Silver *	463.5
Sodium	ND
Thallium	ND
Tin	ND
Vanadium	ND
Zinc	487.9

* Concentration in UG/L or UG/KG

ND = Not Determined

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HSL Metals Report

Site Name: FERRO CORP
Site Code: 915020
Date Collected: 15OCT86
Matrix: SEDIMENT
Concentration Units: MG/KG

Lab.Number: 98628802
Sample I.D.: SH9150200102
Date Reported: 20MAR87
Percent Solids: 74.46
Archival File: M0165

Metal	Concentration
Aluminum	ND
Antimony	ND
Arsenic *	20682.3
Barium	ND
Beryllium	ND
Cadmium	2.7
Calcium	ND
Chromium	45.7
Cobalt	ND
Copper	26.9
Iron	51299.2
Lead	10.2
Magnesium	ND
Manganese	1155.0
Mercury *	53.7
Nickel	108.0
Potassium	ND
Selenium *	ND
Silver *	13.4
Sodium	ND
Thallium	ND
Tin	ND
Vanadium	ND
Zinc	161.2

* Concentration in UG/L or UG/KG

ND = Not Determined

IS = Insufficient Sample

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE

HSL Metals Report

Site Name: FERRO CORP
Site Code: 915020
Date Collected: 15OCT86
Matrix: WATER
Concentration Units: MG/L

Lab.Number: 98628801
Sample I.D.: SH9150200101
Date Reported: 20MAR87
Percent Solids: ....
Archival File: M0114

Metal	Concentration
Aluminum	ND
Antimony	ND
Arsenic *	2.8
Barium	ND
Beryllium	ND
Cadmium	<0.1
Calcium	ND
Chromium	<0.1
Cobalt	ND
Copper	<0.01
Iron	2.0
Lead	<0.2
Magnesium	ND
Manganese	<0.2
Mercury *	<0.5
Nickel	<0.3
Potassium	ND
Selenium *	ND
Silver *	<0.05
Sodium	ND
Thallium	ND
Tin	ND
Vanadium	ND
Zinc	<0.05

* Concentration in UG/L or UG/KG

ND = Not Determined

REFERENCE 12

STATE OF NEW YORK

OFFICIAL COMPILATION

OF

CODES, RULES AND REGULATIONS

MARIO M. CUOMO
Governor

GAIL S. SHAFFER
Secretary of State

Published by
DEPARTMENT OF STATE
162 Washington Avenue

PART 701

CLASSIFICATIONS AND STANDARDS OF QUALITY AND PURITY

(Statutory authority: Environmental Conservation Law, §§ 3-0301[2][m], 15-0313, 17-0301)

Historical Note

Part repealed, new filed: April 28, 1972; Feb. 25, 1974 eff. 30 days after filing.

Section 701.1 Definitions. The terms, words or phrases used in Parts 700, 701, 702 and 704 of this Title shall have the following meanings:

(a) *Commissioner* shall mean the Commissioner of the Department of Environmental Conservation.

(b) *Administrator* shall mean the administrator of the United States Environmental Protection Agency.

(c) *Best usage of waters* as specified for each class shall be those used as determined by the commissioner and the administrator in accordance with the considerations prescribed by the Environmental Conservation Law and the Federal Water Pollution Control Act of 1972 (see section 705.1 of this Title).

(d) *Approved treatment* as applied to water supplies shall mean treatment accepted as satisfactory by the authorities responsible for exercising supervision over the sanitary quality of water supplies.

(e) *Source of water supply for drinking, culinary or food processing purposes* shall mean any source, either public or private, the waters from which are used for domestic consumption or used in connection with the processing of milk, beverages or foods. (When water is taken for public drinking, culinary or food processing purposes, refer to New York State Department of Health regulations—10 NYCRR Part 170.)

(f) *Primary contact recreation* shall mean recreational activities where the human body may come in direct contact with raw water to the point of complete body submergence. Such uses include swimming, diving, water skiing, skin diving and surfing.

CLASS "B"

Best usage of waters. Primary contact recreation and any other uses except as a source of water supply for drinking, culinary or food processing purposes.

Quality Standards for Class "B" Waters

Items	*Specifications*
1. Coliform.	The monthly median coliform value for 100 ml of sample shall not exceed 2,400 from a minimum of five examinations, and provided that not more than 20 percent of the samples shall exceed a coliform value of 5,000 for 100 ml of sample and the monthly geometric mean fecal coliform value for 100 ml of sample shall not exceed 200 from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.
2. pH	Shall be between 6.5 and 8.5.
3. Total dissolved solids.	None at concentrations which will be detrimental to the growth and propagation of aquatic life. Waters having present levels less than 500 milligrams per liter shall be kept below this limit.
4. Dissolved oxygen.	For cold waters suitable for trout spawning, the DO concentration shall not be less than 7.0 mg/l from other than natural conditions. For trout waters, the minimum daily average shall not be less than 6.0 mg/l. At no time shall the DO concentration be less than 5.0 mg/l. For non-trout waters, the minimum daily average shall not be less than 5.0 mg/l. At no time shall the DO concentration be less than 4.0 mg/l.

CLASS "C"

Best usage of waters. The waters are suitable for fishing and fish propagation. The water quality shall be suitable for primary and secondary contact recreation even though other factors may limit the use for that purpose.

Quality Standards for Class "C" Waters

Items	*Specifications*
1. Coliform.	The monthly median coliform value for 100 ml of sample shall not exceed 2,400 from a minimum of five examinations, and provided that not more than 20 percent of the samples shall exceed a coliform value of 5,000 for 100 ml of sample and the monthly geometric mean fecal coliform value for 100 ml of sample shall not exceed 200 from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.
2. pH	Shall be between 6.5 and 8.5.

3. Total dissolved solids.	None at concentrations which will be detrimental to the growth and propagation of aquatic life. Waters having present levels less than 500 milligrams per liter shall be kept below this limit.
4. Dissolved oxygen.	For cold waters suitable for trout spawning, the DO concentration shall not be less than 7.0 mg/l from other than natural conditions. For trout waters, the minimum daily average shall not be less than 6.0 mg/l. At no time shall the DO concentration be less than 5.0 mg/l. For non-trout waters, the minimum daily average shall not be less than 5.0 mg/l. At no time shall the DO concentration be less than 4.0 mg/l.

CLASS "D"

Best usage of waters. The waters are suitable for fishing. The water quality shall be suitable for primary and secondary contact recreation even though other factors may limit the use for that purpose. Due to such natural conditions as intermittency of flow, water conditions not conducive to propagation of game fishery or stream bed conditions, the waters will not support fish propagation.

Conditions related to best usage of waters. The waters must be suitable for fish survival.

Quality Standards for Class "D" Waters

Items	*Specifications*
1. pH	Shall be between 6.0 and 9.5.
2. Dissolved oxygen.	Shall not be less than 3 milligrams per liter at any time.
3. Coliform.	The monthly median coliform value for 100 ml of sample shall not exceed 2,400 from a minimum of five examinations and provided that not more than 20 percent of the samples shall exceed a coliform value of 5,000 for 100 ml of sample and the monthly geometric mean fecal coliform value for 100 ml of sample shall not exceed 200 from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.

Historical Note

Sec. added by renum. and amd. 701.4, filed July 3, 1985; amd. filed Sept. 20, 1985 eff. 30 days after filing.

701.20 Classes and standards for saline surface waters. The following items and specifications shall be the standards applicable to all New York saline surface waters which are assigned the classification of SA, SB, SC or SD, in addition to the specific standards which are found in this section under the heading of each such classification.

PART 837

LAKE ERIE (EAST END)—NIAGARA RIVER DRAINAGE BASIN

(Statutory authority: Public Health Law, art. 12)

Section 837.1 Adopting order. Pursuant to the authority contained in article 12 of the Public Heatlh Law, the Water Pollution Control Board having made proper studies and having held public hearings on due notice with reference thereto, hereby adopts and assigns the following classifications and standards of quality and purity to the various waters as specifically designated and described below and subject to the definitions and conditions as stated.

837.2 Definitions and conditions. The several terms, words or phrases hereinafter mentioned shall be construed as follows:

(a) *Class* as appearing in table I, as the letters A, A-special (International boundary waters), B, C, D or E opposite each specifically designated waters means Class A, A-special (International boundary waters), B, C, D or E, as the case may be, as set forth in Part 701 and 702, *supra.*

(b) *Standards* as appearing in table I, as the letters A, A-special (International boundary waters), B, C, D or E opposite each specifically designated waters shall mean the standards of quality and purity estabilshed for class A, A-special (International boundary waters), B, C, D or E, as the case may be, as set forth in Part 701 and 702, *supra.* The symbol (T) after any class designation shall mean that the designated waters are trout waters and that the dissolved oxygen specification for trout waters shall apply thereto.

(c) *Waters index number* as appearing in table I shall mean that number which has been applied to any specifically designated waters as appearing on the maps set forth in section 837.7, *infra.*

(d) *Name* as appearing in table I shall mean the name, if any, by which the specifically designated waters are generally known and which name, if any, appears on the reference maps. In cases of specifically designated waters which have no name, the named tributary to which the unnamed waters are tributary is indicated so far as possible. In the table, an item number is assigned consecutively to each specifically designated waters.

(e) *Description* as appearing in table I shall mean a brief indication as to the location of the specifically designated waters so that by reference to reference maps such waters may be located without reference to their waters index numbers. Entries under column headed "Description" also include designations of sections of a stream to which a particular assignment of a class and standards shall apply.

(f) *Map ref. no.* The numbers appearing in the table under the heading designate the following maps which have been partially reproduced as maps 1 to 13, inclusive, with superimposed tracing in black of streams and other waters and waters index numbers in section 837.7, *infra.*

1640 CN 10-15-66

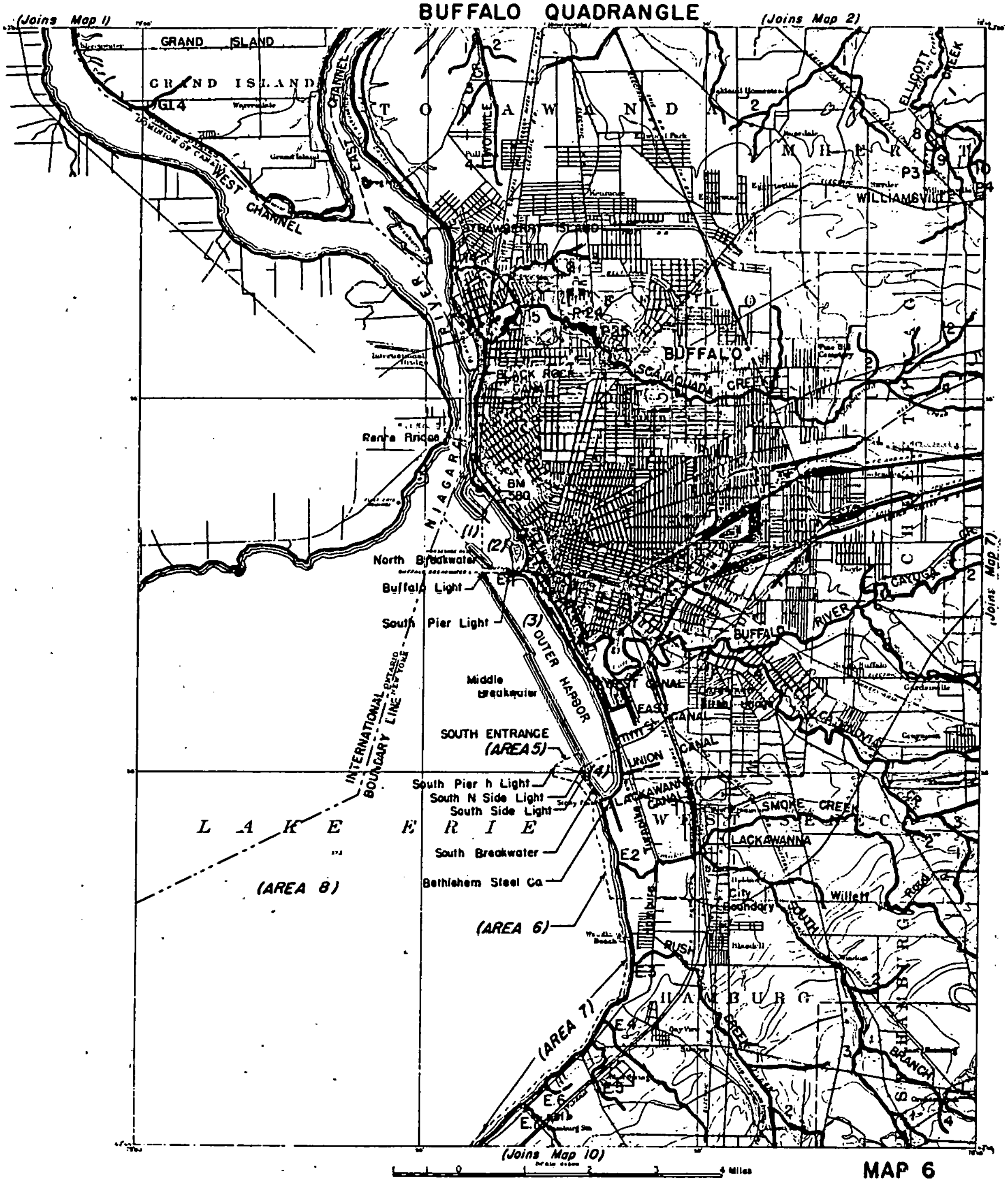
TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standa
219	E-1-55-2	Tributary of Beaver Meadow Creek	Enters Beaver Meadow Creek from south approximately 4.6 miles above mouth.	12	C	C(T
220	E-1-56,57 and 58 and tribs. as shown on reference map	Tributaries of Buffalo River	Enter Buffalo River from east and west between Beaver Meadow Creek, item no. 219, and Plato Creek, item no. 221.	12	D	D
221	E-1-59 and tribs. as shown on reference map	Plato Creek	Enters Buffalo River from south approximately 0.9 mile above Java Village.	12	D	D
222	E-1-60,61,62,63, 64,65,66,67 and 68 and tribs. as shown on reference map	Tributaries of Buffalo River	Enter Buffalo River from east and west between Plato Creek, item no. 221, and trib. 69, item no. 223.	12	D	D
223	E-1-69 and tribs. as shown on reference map	Tributary of Buffalo River	Enters Buffalo River from east approximately 0.2 mile below Sardinia-Holland town line.	12	C	C(T
224	E-1-70	Tributary of Buffalo River	Enters Buffalo River from east approximately 1.0 mile above Erie-Wyoming county line.	12	D	D
225	E-2	Smoke Creek	Enters Lake Erie from east approximately 0.6 mile north of City of Lakawanna-Hamburg town line.	6,7,11	D	D

TABLE I *(cont'd)*

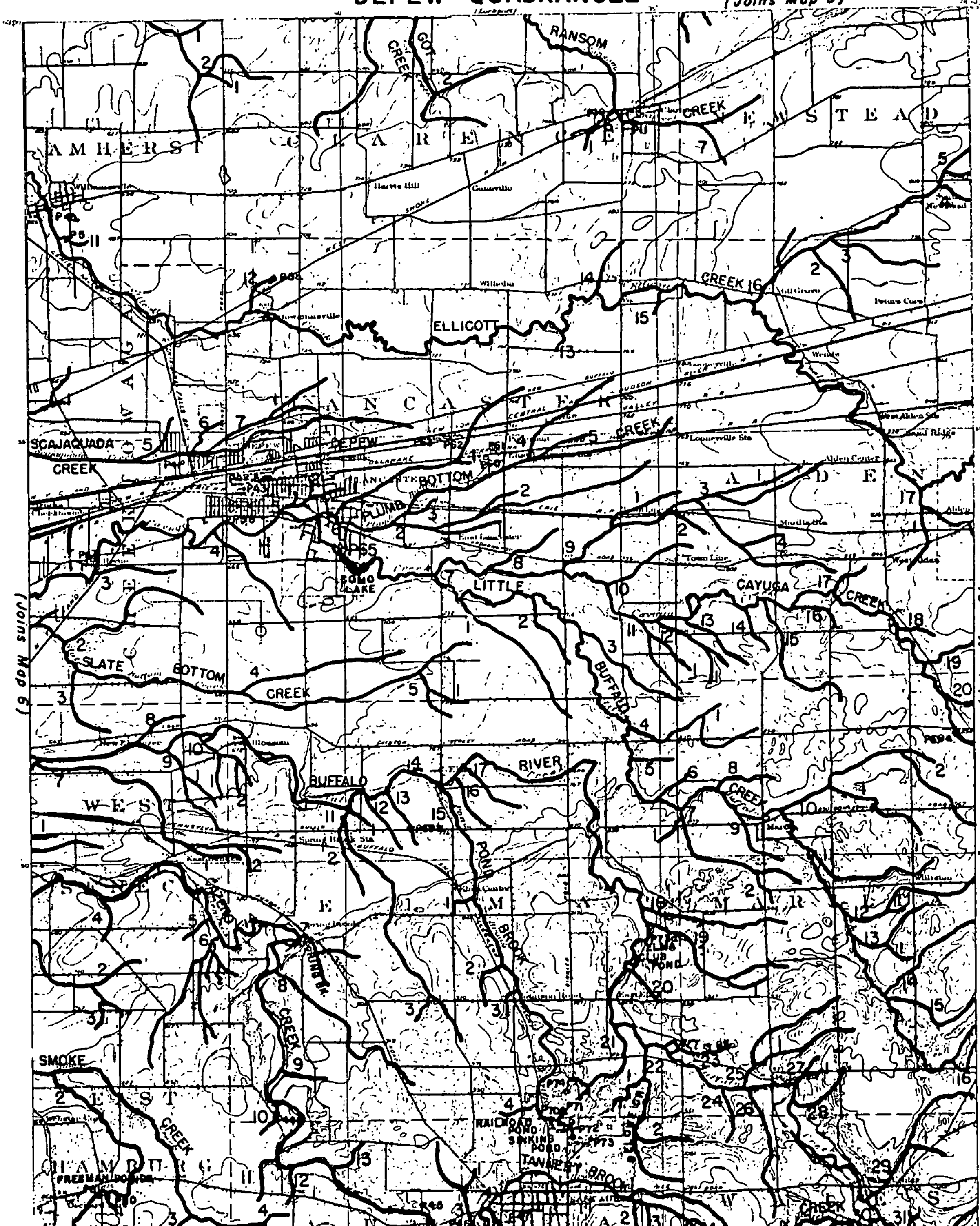
Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
226	E-2-1 portion as described	South Branch	Enters Smoke Creek from south-east 1.5 miles above mouth. Mouth to Green Lake, item no. 227.	6,7	C	C
227		Green Lake	Located on South Branch just west of S. Buffalo Street, Orchard Park.	7	B	B
228	E-2-1 portion as described	South Branch	From Green Lake, item no. 227, to source.	7,11	B	B
229	E-2-1-1,2,4	Tributaries of South Branch	Enter South Branch between mouth and Green Lake, item No. 227	6,10	D	D
229.1	E-2-1-3	Trib. of South Branch	Mouth to source	6,10, 11	C	C
229.2	E-2-1-3-1,2,3	Subtribs. of South Branch		6,10	D	D
230	E-2-1-5	Tributary of South Branch	Enters South Branch from south approximately 0.5 mile above Ellicott.	11	B	B
231	E-2-2 portion as described	Tributary of Smoke Creek	Enters Smoke Creek from south approximately 0.7 mile due north of Webster Corner. Mouth to outlet of P 80 easterly of Freeman Ponds. Near junction of S. Freeman Road and E. Quaker Street, Orchard Park.	7	D	D

BUFFALO QUADRANGLE



MAP 6

DEPEW QUADRANGLE



MAP 7

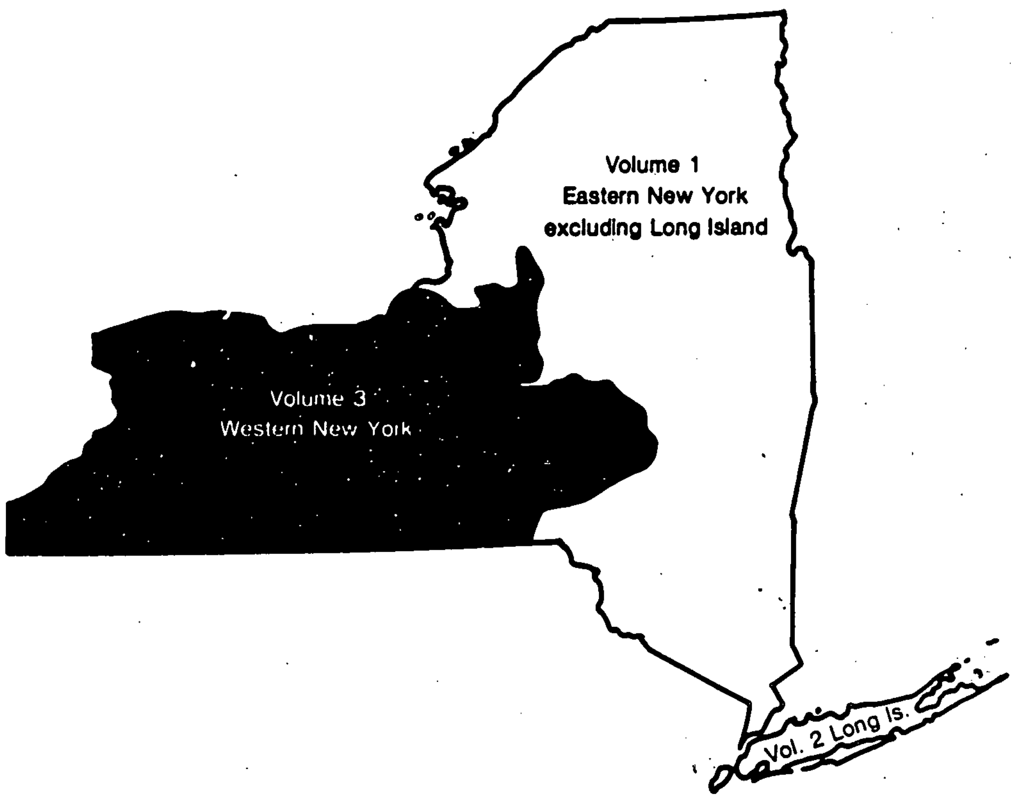
REFERENCE 13

Ref. 13 Appendix A

Water Resources Data New York Water Year 1986

Volume 3. Western New York

by W.F. Coon, W.H. Johnston, D.A. Sherwood, and D.D. Deloff



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT NY-86-3
Prepared in cooperation with the State of New York
and with other agencies

PB88-174404

Water Resources Data
New York, Water Year 1986
Volume 3. Western New York

(U.S.) Geological Survey, Albany, NY

Aug 87

U.S. Department of Commerce
National Technical Information Service
NTIS

04213500 CATTARAUGUS CREEK AT GOWANDA, NY--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1959, 1963-64, 1972 to current year.
CHEMICAL DATA: 1959 (e), 1963 (b), 1972 (a), 1975 (b), 1976-78 (c), 1979-80 (d), 1981-82 (c), 1983-86 (b).
MINOR ELEMENTS DATA: 1972-74 (a), 1975 (b), 1976-77 (c), 1978-86 (b).
ORGANIC DATA: OC--1975 (b), 1976-77 (c), 1978-80 (d), 1981 (c).
NUTRIENT DATA: 1975 (b), 1976-77 (c), 1978-80 (d), 1981-82 (c), 1983-86 (b).
BIOLOGICAL DATA:
Bacterial--1978-80 (d), 1981-82 (c), 1983-86 (b).
Phytoplankton--1978 (b), 1979-80 (c), 1981 (b).
SEDIMENT DATA: 1964 (b), 1978-82 (c), 1983-86 (b).

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1958 to September 1959, unpublished; January 1978 to September 1981.
pH: October 1958 to September 1959, unpublished.
WATER TEMPERATURES: October 1958 to September 1959, January 1978 to September 1981.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum daily, 952 microsiemens Oct. 7, 1958; minimum daily, 150 microsiemens Feb. 19, 1981.
WATER TEMPERATURES: Maximum daily, 29.0°C Aug. 19, 1978; minimum daily, 0.0°C on many days during winter periods.

WATER QUALITY DATA, WATER YEAR OCTOBER 1985 to SEPTEMBER 1986

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE (DEG C)	TUR-BID-ITY (NTU)	BARO-METRIC PRES-SURE (MM OF HG)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML)
OCT 29...	1600	188	396	8.20	8.0	4.0	750	12.4	106	42
MAR 19...	1100	1610	235	8.06	7.5	93	728	9.4	82	630
JUN 17...	1115	1370	250	8.11	19.0	180	749	8.2	90	--
AUG 19...	1145	319	359	8.24	21.5	4.6	748	8.7	101	82

DATE	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS (MG/L AS CACO3)	HARD-NESS NONCARB WH WAT TOT FLD MG/L AS CACO3	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY WH WAT TOTAL FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
OCT 29...	K12	180	46	56	10	13	1.9	135	41	20
MAR 19...	170	120	34	36	6.2	6.4	1.1	82	17	15
JUN 17...	7600	120	37	38	5.9	6.4	1.7	81	21	10
AUG 19...	K18	170	42	54	9.1	9.2	1.9	129	30	13

K results based on colony count outside the ideal range (non-ideal colony count).

Avg. = 40

REFERENCE 14

federal register

Thursday
April 2, 1987

Part III

Environmental Protection Agency

40 CFR Part 761

Polychlorinated Biphenyls Spill Cleanup Policy; Final Rule discovery, but in no case later than 24 hours after discovery. For purposes of the notification requirement, the 10 pounds are measured by the weight of the PCB-containing material spilled rather than by the weight of only the PCBs spilled.

(iv) Spills of 10 pounds or less, which are not addressed in paragraph (a)(1) (i) or (ii) of this section, must be cleaned up in accordance with this policy (in order to avoid EPA enforcement liability), but notification of EPA is not required.

(2) *Disposal of cleanup debris and materials.* All concentrated soils, solvents, rags, and other materials resulting from the cleanup of PCBs under this policy shall be properly stored, labeled, and disposed of in accordance with the provisions of § 761.60.

(3) *Determination of spill boundaries in the absence of visible traces.* For spills where there are insufficient visible traces yet there is evidence of a leak or spill, the boundaries of the spill are to be determined by using a statistically based sampling scheme.

(b) *Requirements for cleanup of low-concentration spills which involve less than 1 pound of PCBs by weight (less than 270 gallons of untested mineral oil)*—(1) *Decontamination requirements.* Spills of less than 270 gallons of untested mineral oil, low-concentration PCBs, as defined under § 761.123, which involve less than 1 pound of PCBs by weight (e.g., less than 270 gallons of untested mineral oil containing less than 500 ppm PCBs) shall be cleaned in the following manner:

(i) Solid surfaces must be double washed/rinsed (as defined under § 761.123); except that all indoor, residential surfaces other than vault areas must be cleaned to 10 micrograms per 100 square centimeters (10 $\mu g/100\ cm^2$) by standard commercial wipe tests.

(ii) All soil within the spill area (i.e., visible traces of soil and a buffer of 1 lateral foot around the visible traces) must be excavated, and the ground be restored to its original configuration by back-filling with clean soil (i.e., containing less than 1 ppm PCBs).

(iii) Requirements of paragraph (b)(1) (i) and (ii) of this section must be completed within 48 hours after the responsible party was notified or became aware of the spill.

(2) *Effect of emergency or adverse weather.* Completion of cleanup may be delayed beyond 48 hours in case of circumstances including but not limited to, civil emergency, adverse weather conditions, lack of access to the site, and emergency operating conditions. The occurrence of a spill on a weekend or overtime costs are not acceptable reasons to delay response. Completion of cleanup may be delayed only for the duration of the adverse conditions. If the adverse weather conditions, or time lapse due to other emergency, has left insufficient visible traces, the responsible party must use a statistically based sampling scheme to determine the spill boundaries as required under paragraph (a)(3) of this section.

(3) *Records and certification.* At the completion of cleanup, the responsible party shall document the cleanup with records and certification of decontamination. The records and certification must be maintained for a period of 5 years. The records and certification shall consist of the following:

(i) Identification of the source of the spill (e.g., type of equipment).

(ii) Estimated or actual date and time of the spill occurrence.

(iii) The date and time cleanup was completed or terminated (if cleanup was delayed by emergency or adverse weather: the nature and duration of the delay).

(iv) A brief description of the spill location.

(v) Precleanup sampling data used to establish the spill boundaries if required because of insufficient visible traces, and a brief description of the sampling methodology used to establish the spill boundaries.

(vi) A brief description of the solid surfaces cleaned and of the double wash/rinse method used.

(vii) Approximate depth of soil excavation and the amount of soil removed.

(viii) A certification statement signed by the responsible party stating that the cleanup requirements have been met and that the information contained in the record is true to the best of his/her knowledge.

(ix) While not required for compliance with this policy, the following information would be useful if maintained in the records:

(A) Additional pre- or post-cleanup sampling.

(B) The estimated cost of the cleanup by man-hours, dollars, or both.

(C) *Requirements for cleanup of high-concentration spills and low-concentration spills involving 1 pound or more PCBs by weight (270 gallons or more of untested mineral oil).* Cleanup of low-concentration spills involving 1 lb or more PCBs by weight and of all spills of materials other than low-concentration materials shall be considered complete if all of the immediate requirements, cleanup standards, sampling, and recordkeeping requirements of paragraphs (c) (1) through (5) of this section are met.

(1) *Immediate requirements.* The four actions in paragraphs (c)(1) (i) through (iv) of this section must be taken as quickly as possible and within no more than 24 hours (or within 48 hours for PCB Transformers) after the responsible party was notified or became aware of the spill, except that actions described in paragraphs (c)(1) (ii) through (iv) of this section can be delayed beyond 24 hours if circumstances (e.g., civil emergency, hurricane, tornado, or other similar adverse weather conditions, lack of access due to physical impossibility, or emergency operating conditions) so require for the duration of the adverse conditions. The occurrence of a spill on a weekend or overtime costs are not acceptable reasons to delay response. Owners of spilled PCBs who have delayed cleanup because of these types of circumstances must keep records documenting the fact that circumstances precluded rapid response.

(i) The responsible party shall notify the EPA regional office and the NRC as required by § 761.125(a)(1) or by other applicable statutes.

(ii) The responsible party shall effectively cordon off or otherwise delineate and restrict an area encompassing any visible traces plus a 3-foot buffer and place clearly visible signs advising persons to avoid the area to minimize the spread of contamination as well as the potential for human exposure.

(iii) The responsible party shall record and document the area of visible contamination, noting the extent of the visible trace areas and the center of the visible trace area. If there are no visible traces, the responsible party shall record this fact and contact the regional office of the EPA for guidance in completing statistical sampling of the spill area to establish spill boundaries.

(iv) The responsible party shall initiate cleanup of all visible traces of the fluid on hard surfaces and initiate removal of all visible traces of the spill on soil and other media, such as gravel, sand, oyster shells, etc.

(v) If there has been a delay in reaching the site and there are insufficient visible traces of PCBs remaining at the spill site, the responsible party must estimate (based on the amount of material missing from the equipment or container) the area of the spill and immediately cordon off the area of suspect contaimination. The responsible party must then utilize a statistically based sampling scheme to identify the boundaries of the spill area as soon as practicable.

(vi) Although this policy requires certain immediate actions, as described in paragraphs (c)(1)(i) through (iv) of this section, EPA is not placing a time limit on completion of the cleanup effort since the time required for completion will vary from case to case. However, EPA expects that decontamination will be achieved promptly in all cases and will consider promptness of completion in determining whether the responsible party made good faith efforts to clean up in accordance with this policy.

(2) *Requirements for decontaminating spills in outdoor electrical substations.* Spills which occur in outdoor electrical substations, as defined under § 761.123, shall be decontaminated in accordance with paragraphs (c)(2)(i) and (ii) of this section. Conformance to the cleanup standards under paragraphs (c)(2)(i) and (ii) of this section shall be verified by post-cleanup sampling as specified under § 761.130. At such times as outdoor electrical substations are converted to another use, the spill site shall be cleaned up to the nonrestricted access requirements under paragraph (c)(4) of this section.

(i) Contaminated solid surfaces (both impervious and non-impervious) shall be cleaned to a PCB concentration of 100 micrograms (μg)/100 square centimeters (cm^2) (as measured by standard wipe tests).

(ii) At the option of the responsible party, soil contaminated by the spill will be cleaned either to 25 ppm PCBs by weight, or to 50 ppm PCBs by weight provided that a label or notice is visibly placed in the area. Upon demonstration by the responsible party that cleanup to 25 ppm or 50 ppm will jeopardize the integrity of the electrical equipment at the substation, the EPA regional office may establish an alternative cleanup method or level and place the responsible party on a reasonably timely schedule for completion of cleanup.

(3) *Requirements for decontaminating spills in other restricted access areas.* Spills which occur in restricted access locations other than outdoor electrical substations, as defined under § 761.123, shall be decontaminated in accordance with paragraph (c)(3)(i) through (v) of this section. Conformance to the cleanup standards in paragraph (c)(3)(i) through (v) of this section shall be verified by postcleanup sampling as specified under § 761.130. At such times as restricted access areas other than outdoor electrical substations are converted to another use, the spill site shall be cleaned up to the nonrestricted access area requirements of paragraph (c)(4) of this section.

(i) High-contact solid surfaces, as defined under § 761.163 shall be cleaned to 10 μg/100 cm^2 (as measured by standard wipe tests).

(ii) Low-contact, indoor, impervious solid surfaces will be decontaminated to 10 μg/100 cm^2.

(iii) At the option of the responsible party, low-contact, indoor, nonimpervious surfaces will be cleaned either to 10 μg/100 cm^2 or to 100 μg/100 cm^2 and encapsulated. The Regional Administrator, however, retains the authority to disallow the encapsulation option for a particular spill situation upon finding that the uncertainties associated with that option pose special concerns at that site. That is, the Regional Administrator would not permit encapsulation if he/she determined that if the encapsulation failed the failure would create an imminent hazard at the site.

(iv) Low-contact, outdoor surfaces (both impervious and nonimpervious) shall be cleaned to 100 μg/100 cm^2.

(v) Soil contaminated by the spill will be cleaned to 25 ppm PCBs by weight.

(4) *Requirements for decontaminating spills in nonrestricted access areas.* Spills which occur in nonrestricted access locations, as defined under § 761.123, shall be decontaminated in accordance with paragraphs (c)(4)(i) through (v) of this section. Conformance to the cleanup standards at paragraphs (c)(4)(i) through (v) of this section shall be verified by postcleanup sampling as specified under § 761.130.

(i) Furnishings, toys, and other easily replaceable household items shall be disposed of in accordance with the provisions of § 761.60 and replaced by the responsible party.

(ii) Indoor solid surfaces and high-contact outdoor solid surfaces, defined as high contact residential/commercial surfaces under § 761.123, shall be cleaned to 10 μg/100 cm^2 (as measured by standard wipe tests).

(iii) Indoor vault areas and low-contact, outdoor, impervious solid surfaces shall be decontaminated to 10 μg/100 cm^2.

(iv) At the option of the responsible party, low-contact, outdoor, nonimpervious solid surfaces shall be either cleaned to 10 μg/100 cm^2 or cleaned to 100 μg/100 cm^2 and encapsulated. The Regional Administrator, however, retains the authority to disallow the encapsulation option for a particular spill situation upon finding that the uncertainties associated with that option pose special concerns at that site. That is, the Regional Administrator would not permit encapsulation if he/she determined that if the encapsulation failed the failure would create an imminent hazard at the site.

(v) Soil contaminated by the spill will be decontaminated to 10 ppm PCBs by weight provided that soil is excavated to a minimum depth of 10 inches. The excavated soil will be replaced with clean soil, i.e., containing less than 1 ppm PCBs, and the spill site will be restored (e.g., replacement of turf).

(5) *Records.* The responsible party shall document the cleanup with records of decontamination. The records must be maintained for a period of 5 years. The records and certification shall consist of the following:

(i) Identification of the source of the spill, e.g., type of equipment.

(ii) Estimated or actual date and time of the spill occurrence.

(iii) The date and time cleanup was completed or terminated (if cleanup was delayed by emergency or adverse weather: the nature and duration of the delay).

(iv) A brief description of the spill location and the nature of the materials contaminated. This information should include whether the spill occurred in an outdoor electrical substation, other restricted access location, or in a nonrestricted access area.

(v) Precleanup sampling data used to establish the spill boundaries if required because of insufficient visible traces and a brief description of the sampling methodology used to establish the spill boundaries.

(vi) A brief description of the solid surfaces cleaned.

(vii) Approximate depth of soil excavation and the amount of soil removed.

(viii) Postcleanup verification sampling data and, if not otherwise apparent from the documentation, a brief description of the sampling methodology and analytical technique used.

(ix) While not required for compliance with this policy, information on the estimated cost of cleanup (by man-hours, dollars, or both) would be useful if maintained in the records.

§ 761.130 Sampling requirements.

Postcleanup sampling is required to verify the level of cleanup under § 761.125(c) (2) through (4). The responsible party may use any statistically valid, reproducible sampling scheme (either random samples or grid samples) provided that the requirements of paragraphs (a) and (b) of this section are satisfied.

(a) The sampling area is the greater of (1) an area equal to the area cleaned

REFERENCE 15

PETROLEUM CONTAMINATED SOILS

Volume I

REMEDIATION TECHNIQUES
ENVIRONMENTAL FATE
RISK ASSESSMENT

PAUL T. KOSTECKI
EDWARD J. CALABRESE

LEWIS PUBLISHERS

CHAPTER 14

Land Treatment of Hydrocarbon Contaminated Soils

John Lynch and Benjamin R. Genes

Land treatment has been used as a waste treatment and disposal technology by U.S. petroleum refineries for more than 25 years. In addition, the technology is being applied by the exploration and production sector of the petroleum industry as a cost-competitive alternative in Superfund cleanup studies. This chapter presents information and operational data for a specific Superfund site involving land treatment as the final cleanup option. The waste material consists of contaminated soils from a wood-treating plant. The constituents of concern are hydrocarbons found in petroleum industry waste. Operational data and removal rates are quantified for gross hydrocarbons and specific polynuclear aromatic hydrocarbons.

Land treatment uses the assimilative capacity of the soil to decompose and contain the applied waste in the surface soil layer (usually the top 15–30 cm or 6–12 in.). The upper soil layer is the *zone of incorporation* (ZOI). The incorporation zone, in conjunction with the underlying soils where additional treatment and immobilization of the applied waste constituents occur, is referred to as the *treatment zone*. The *treatment zone* in the soil may be as much as 1.5 m or 5 ft. Soil conditions below this depth generally are not conducive to oxidation of the applied waste constituents. The transformations, biological oxidations, and immobilization will occur primarily in the zone of incorporation.

BACKGROUND

Wastewaters from a creosote wood-preserving operation have been sent to a shallow, unlined surface impoundment for disposal since the 1930s. The discharge of wastewater to the disposal pond generated a sludge which is a listed hazardous waste under the Resource Conservation and Recovery Act (RCRA). Due to groundwater contamination of the shallow aquifer at the site by polynuclear aromatic hydrocarbons (PNAs), the State of Minnesota nominated the site for listing on the Superfund National Priorities List in 1982. Since 1982, numerous remedial investigation activities have been undertaken to determine the nature and extent of contamination at the site. Based on the results of these studies and extensive negotiations, the Minnesota Pollution Control Agency (MPCA), the U.S. Environmental Protection Agency (EPA), and the owner of the facility signed a Consent Order in March 1985 specifying actions to be taken at the site.

In general terms, the remedial actions selected by the MPCA and EPA involve a combination of offsite control measures and source control measures. The offsite controls involve a series of gradient control wells to capture contaminated groundwater. The source control measures include onsite biological treatment of the sludges and contaminated soils, and capping of residual contaminants located at depths greater than 5 ft. Costs for onsite treatment and capping were estimated to be $59/ton.

PILOT-SCALE STUDIES

Before the onsite treatment alternative was implemented, bench-scale and pilot-scale studies were conducted to define operating and design parameters for the full-scale facility. Several performance, operating, and design parameters were evaluated in the land treatment studies. These included:

- soil characteristics
- climate
- treatment supplements
- reduction of gross organics and PAH compounds
- toxicity reduction
- effect of initial loading rate
- effect of reapplication

Three different loading rates were evaluated in the test plot studies: 2%, 5%, and 10% benzene extractable (BE) hydrocarbons. The soils used in the pilot study consisted of a fine sand which was collected from the upper 2 ft of the RCRA impoundment. The soil was contaminated with creosote constituents consisting primarily of PNA compounds. Total PNAs in the soil ranged from 1000 to 10,000

ppm, and BE hydrocarbons in the contaminated soil ranged from approxima
2% to 10% by weight.

Because the natural soils are fine sands and extremely permeable, it was de
ed that the full-scale system would include a liner and leachate collection sys
to prevent possible leachate breakthrough. To simulate the proposed full-s
conditions, the pilot studies consisted of five lined, 50-ft square test plots
leachate collection. The studies were designed to maintain soil conditions w
promote the degradation of hydrocarbons. These conditions included:

- maintain a pH of 6.0 to 7.0 in the soil treatment zone
- maintain soil carbon-to-nitrogen ratios between 50:1 and 25:1
- maintain soil moisture near field capacity

Hydrocarbon losses in the test plots were measured using benzene as th
traction solvent. The analysis of BE hydrocarbons provides a general paran
which is well suited to wastes containing high molecular weight aromatics
as creosote wastes. Reductions of BE hydrocarbons were fairly similar bet
all the field plots. Average removals for all field plots over four months
approximately 40%, with a corresponding first-order kinetic constant (
0.004/day.

The reduction of PNA constituents was monitored by measuring decreas
16 PNA compounds. The following compounds were monitored in the test

2 Rings	3 Rings	4, 5, and 6 Rings
Naphthalene	Fluorene	Fluoranthene
Acenaphthylene	Phenanthrene	Pyrene
Acenaphthene	Anthracene	Benzo(a)anthracene
		Chrysene
		Benzo(j)fluoranth
		Benzo(k)fluorant
		Benzo(a)pyrene
Dibenzo(a,h)anthracene		
		Benzo(g,h,i)pery
Indeno(1,2,3,c,d)pyrene		

Greater than 62% removals of PNAs were achieved in all the test plo
laboratory reactors over a four-month period. PNA removals for each rin
are shown below:

- 2-ring PNA: 80–90%
- 3-ring PNA: 82–93%
- 4+-ring PNA: 21–60%
- Total PNA: 62–80%

APPENDIX B

APPENDIX B

APPENDIX B

SITE INSPECTION/AIR MONITORING DATA

Ferro-Corp.

DAILY HEALTH AND SAFETY REPORT

Date: 8/8/88

Background HNU Reading (Measured at Emergency Staging Area): .2

Background OVA Reading (Measured at Emergency Staging Area): -

Background EXP Reading (Measured at Emergency Staging Area): -

Background OXY Reading (Measured at Emergency Staging Area): -

Work Area and Task: Site / Recon

Level of Protection Required: Level D.

Work Area and Task:

Level of Protection Required:

Comments: -85°F-90°F 45-50% Humidity wind coming from the NW.

- No mishaps

On-Site Health and Safety Officer: [signature]

576-013

Note: Readings at work site are recorded on separate table.

Facility: Ferro. (Field)
Date: 8/8/88
Calib. By: EMH, RC
Calib. Gas: Isobutylene

LAWLER, MATUSKY & SKELLY ENGINEERS
H.NU METER FIELD CALIBRATION
DATA SHEET

Job No: 576-013
Site: Ferro Corp.
Crew: EMH, RC
Oper: RECON

DATE/TIME	METER No.	BATT. CHECK	EXPECTED ZERO	EXPECTED CALIB. GAS (ppm)	OBSERVED ZERO	OBSERVED CALIB. GAS (ppm)	SPAN ADJ. (from -- -- to)	COMMENTS
8/8 1200	NYSDEC #801439	O.K.	0	54 PPM	0	54 ppm	9.8 no Adj.	Did not Vent.

On-Site Health & Safety Officer and/or Crew Chief:

(Signature): [signature]

(Date): 8/8/88

Job No: 576-013
Site: Ferro Corp. (Buffalo)
Oper: RECON
Crew: EMH, RC

LAWLER, MATUSKY & SKELLY ENGINEERS
DAILY HEALTH & SAFETY REPORT
DATA SHEET

H.Nu Meter: NYSDEC #801434
OVA Meter: —
Explosimeter: —
Date: 8/8/88

TIME	SAMPLE LOCATION	H.NU READING	EXPLOSIMETER READING	OVA READING	COMMENTS
1202	Parking Lot In front of building	.2			85°F / ~45% Humidity
1220	GW-1 site	.2			SSE wind 0-2 knots
1230	East Perimeter of Plant	.2			
1240	GW-3 Site	.2			
1250	GW-2 side	.2			
1255	South of Plant	.2			Perimeter
1300	Side for SS-3	.2			
1335	Side for SS-2	.2			
1448	SS-1	.2			
1450	west Perimeter of Plant	.2			

On-Site Health & Safety Officer and/or Crew Chief:

(Signature) [signature]

(Date) 8/8/88

B
APPENDIX C

APPENDIX C

HEALTH AND SAFETY PLAN

LAWLER, MATUSKY & SKELLY ENGINEERS

SITE-SPECIFIC

HEALTH AND SAFETY PLAN FORM

Site Name: Ferro Corporation Location: 661 Willet Rd. Lackawanna, NY

HASP Preparer: Karen A. Wright

APPROVALS
Project Manager: [illegible]

Safety Officer: Karen A. Wright Karen A Wright

PROJECT PERSONNEL:

On-Site Coordinator:
On-Site Health and Safety Officer:

Phone: (914) 735-8300

DATE OF PLAN PREPARATION: 6 October 1988

HAZARDOUS/SUBSTANCES (known or suspected, contaminated media or in storage container, etc.):

Tar like spill occurred late 1981-discharged to drainage ditch north of property. Analyses:

	soil, ppm	water, ppb
Acenaphthene	<0.2-780	<0.6-25
Anthracene	0.019-230	0.019-0.40
Chrysene	0.20-120	0.019-8.1
Fluoranthene	0.58-590	0.059-7.1
Fluorene	0.043-250	0.044-6.7
Naphthalene	0.11-630	<0.6-25
Phenanthrene	0.22-760	0.035-3.6
Pyrene	0.35-420	<0.06-5.6
Benzo(a)anthracene	0.079-93	<0.06-3.5
Benzo(a)pyrene	0.04-72	<0.06-<0.5
Benzo(b)fluoranthene	0.12-81	<0.06-0.097
Benzo(g,h,i)perylene	0.21-68	0.034-0.98
Dibenzo(a,h)anthracene	0.089-0.37	0.019-1.4
Indeno(1,2,3c,d)pyrene	0.064-21	<0.06-<0.3
Acenaphthylene	<0.4-<10	<.57-34
Benzo(k)fluoranthene	<0.036-34	0.038-8.1

also various metals

HAZARD ASSESSMENT (toxic effects, including TLVs, IDLHs, reactivity, stability, flammability, and operational hazards with sampling, decontaminating, etc):

See attached Table 1

SITE WORK ZONES: (designate exclusion zone, contamination reduction zone and support zone)

See attached Figure 1

SITE ACCESS: (describe procedures to control site access)

Sign in/sign out at guard house.

HSO also to keep log book of personnel on-site.

MONITORING PROCEDURES (If required by the Safety Officer)

Monitoring the site for identity and concentration of contamination in all media:

Continuous monitoring with HNU.

Background readings to be taken at guard booth.

Medical monitoring procedures for evidence of personnel exposure i.e. analyses specific to site not covered in general LMS physical:

N/A

Personnel monitoring procedures:

N/A

DECONTAMINATION AND DISPOSAL

Decontamination Procedures (contaminated personnel, surfaces, materials, instruments, equipment, etc.):

Drill rigs, augers, split spoons to be steam cleaned before leaving site. Split spoons to be detergent washed, potable water rinsed between uses. Split spoons to be steam cleaned or hot washed between boreholes. If chemical analyses to be done, use decon procedures described in workscope. Stainless steel spoons and trowels used to collect soil samples and bailers used to collect water samples are to be cleaned in laboratory as described in LMS FSP. Use water from hydrant.

Disposal Procedures (contaminated equipment, supplies, disposables, washwater.

Cuttings to be left at borehole. Decon water, development water, purge water to be poured on ground. Above done unless HNU >5 ppm, then will drum everything. Disposables to be bagged.

EMERGENCY PROCEDURES

In event of personnel exposure (skin contact, inhalation, ingestion, specific procedures for specific chemicals):

Immediately wash exposed area with clean water. Remove person to clean air if inhalation problem.

In event of personnel injury:

Follow standard first aid procedures.

In event of potential or actual fire or explosion:

Evacuate to support zone (guard house) and leave site. HSO to check that everyone is accounted for before leaving site.

In event of potential or actual ionizing radiation exposure:

N/A

In event of environmental accident (spread of contamination outside sites):

Stop spread as best as possible and call LMS.

EMERGENCY SERVICES (complete here or have separate list available on-site)

Location	Telephone
Emergency Medical Facility	
Mercy Hospital	(716) 826-7000
Abbott Road	
Ambulance Service	
Newton-Abbott	(716) 825-3663
Fire Department	
Newton-Abbott Fire Department	(716) 825-3663

Location	Telephone
Police Department	
Hamburgh Town Police	(716) 648-5111
Poison Control Center	

PERSONNEL POTENTIALLY EXPOSED TO HAZARDOUS SUBSTANCES (As Applicable)

Personnel Authorized to Enter Site (specific conditions of site would preclude most LMS trained persons from entering site and would allow only certain personnel, list here)

1. N/A
2.
3.
4.
5.

ALTERNATIVE WORK PRACTICES

(Describe alternative work practices or instruments not specified in this form. Indicate work practices specified in the chapter for which proposed alternative work practices will serve as substitute.)

N/A

TASK-SPECIFIC LEVEL OF PROTECTION (attach table including specific description of protective gear)

See attached Table 2

SITE MAP

(Attach a site map. Map should be properly scaled and keyed to local landmarks.)

See attached Figure 1

TRAINING

(Provide description of minimum training, reference OSHA Sections).

One person 29 CFR 1910. 120 e(2)

AFFIDAVIT

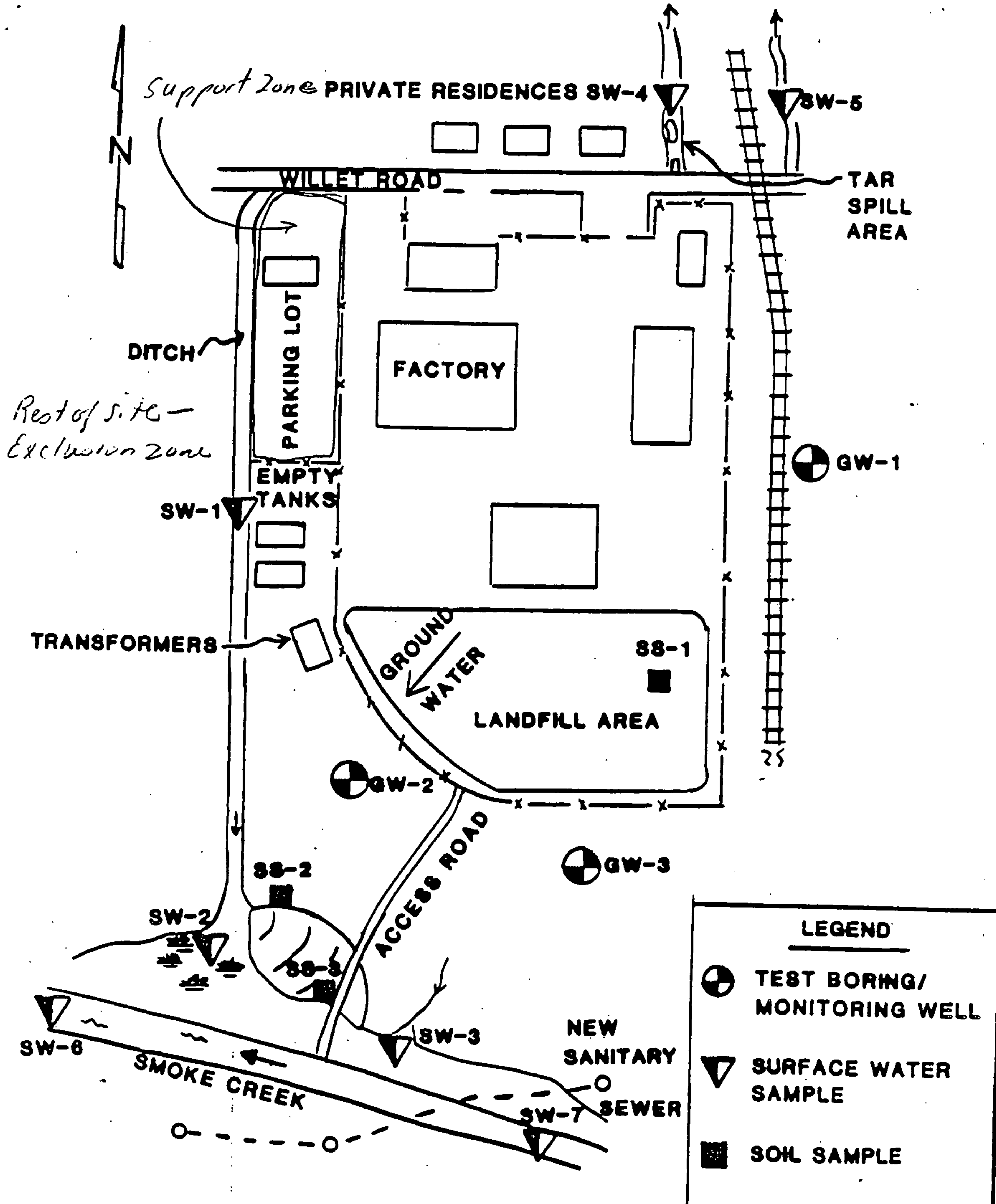
All personnel who enter site must sign attached affidavit. LMS personnel must also read and comply with LMS' generic HASP.

AFFIDAVIT

I, ______________________________, (name) of ______________________ (company name) have read the Health and Safety Plan (HASP) for the _______________________ (site description and project description). I have also read the LMS generic HASP. I agree to conduct all on-site work in conformity with the requirements of both HASPs. In addition, I acknowledge that failure to comply with the designated procedures in the Health and Safety Plans may lead to my removal from the site.

Signed _____________________________

Date _______________________________



Scale: NTS	By	Date
Dwn.	SSN	10/86
Ckd.		
Ap'vd.		
Rev.		

FERRO CORPORATION
NYS SUPERFUND
PHASE II
SITE NO. 915020

Project No. 5C280497

PROPOSED SAMPLING LOCATION MAP

A FIGURE 1

TABLE 1

HAZARD ASSESSMENT

COMPOUND	TWA, ppm	STEL, ppm	IDLH, ppm	LEL, %	UEL, %	FLASH pt °F	VAPOR PRESSURE, mm	IONIZATION POTENTIAL, eV
Benzo(a)pyrene				suspected carcinogen				
Chrysene				suspended carcinogen				
Naphthalene	10	15	500	0.9	5.9	174	0.05	8.14
Anthracene	-	-		0.6	-	250		-
Coal Tar Pitch Volatiles mg/m^3 (includes all cpds listed on page 1 of HASP)	0.2	-	Ca	-	-	405	-	-

TABLE 2

TASK SPECIFIC LEVEL OF PROTECTION

TASK	LEVEL	DESCRIPTION
1. Monitoring Well Drilling and Installation	D	Hard hat, safety glasses, safety shoes, coated tyvek (optional in case of splash or contact), latex gloves
2. Surface Water/ Sediment Sampling	D	Same as above
3. Surface Water/ Sediment Sampling at SW-4 (location of coal tar spill)	D	Hard hat, safety glasses, safety shoes, coated tyvek, nitrile gloves
4. Soil Sampling	D	Same as monitoring well

Action Levels - If HNU reads greater than 0.5 ppm above background in breathing zone, must upgrade to Level C respiratory. While doing SW-4 if see evidence of coal tar, call LMS before sampling.

APPENDIX D

APPENDIX D

APPENDIX D

GEOPHYSICAL RESULTS

8/31/88

FERRO CORPORATION

BUFFALO, NEW YORK

1.0 INTRODUCTION

A terrain conductivity survey was completed around the perimeter of the Ferro Corporation Site in the City of Buffalo, New York on August 24, 1988. The method of investigation utilized a Geonics Model EM-31 DL terrain conductivity meter (TC) to measure the subsurface conductivity characteristics. A terrain conductivity survey is a fast, environmentally non-invasive technique for determining subsurface conditions. This method is indirect and interpretive and should be verified by more direct methods of investigation.

A total of 11 terrain conductivity profiles were completed for a total of approximately 4460 lineal feet (Figure 1).

2.0 PURPOSE

The purpose of this investigation was to help define limits of fill material to better characterize the site and to help assess the presence of contaminants.

3.0 METHODS

3.1 Survey Control

Base stations and turning points were established with a 300 foot tape measure and tied into permanent landmarks where possible. Base stations and turning points wers staked, flagged and the coordinates recorded on them. Traverses through thick vegetation were marked by attaching red surveyors tape to reeds and brush at approximately 100 foot intervals. While traversing through open fields a Brunton compass was used to help maintain an accurate survey trend.

3.2 Terrain Conductivity Survey

Prior to data collection with the EM-31 DL TC meter, the instrument was calibrated. After calibration processes were completed, a 300 foot tape measure was extended along the path of the traverse to establish accurate station location with the instrument. Readings were taken with the EM-31 DL TC at 20 foot centers unless otherwise noted. All readings were taken with the instrument in the routine "operational" mode which measures the quadrature-phase component of the induced magnetic field. This component is linearly related to actual ground conductivity. Readings were taken with the instrument both parallel and perpendicular to the direction of travel unless otherwise noted. This method was incorporated to test the lateral variation in conductivity at each station. Parallel and perpendicular values were plotted on each profile.

A terrain conductivity profile was not completed along Willet Road due to the presence of a chain link fence, overhead power lines buried utilities and sewers located within the immediate vicinity. It was concluded that these potential sources of interference would mask any contaminants present within the ground water of the site.

The EM-31 DL TC meter is equipped with a transmitter coil and a receiver coil spaced 12 feet apart. The theory of operation is as follows: the transmitter coil is energized with an alternating current at an audio frequency producing a time varying primary magnetic field (McNeill, 1980). The magnetic field induces small currents in the ground which produces a secondary magnetic field. The ratio of the primary field to the secondary field is linearly proportional to the ground conductivity. The effective depth of investigation of the instrument is 20 feet.

Ground water contamination can be detected by the EM-31 provided that the contaminants produce a measurable anomaly. Typically, this can occur if sufficient amounts of electrolytic contaminants are present in the ground water. Generally the electrolytes that cause the instrument to respond are not of primary concern. Electrolytes are generally common travelers with contaminants that are of concern such as organic chemicals, of which few are conductive. If relatively non-electrolytic contaminants are present in the soil and ground water of the Ferro Corp. site such contaminants may go undetected by terrain conductivity surveying.

4.0 RESULTS

4.1 Background conductivity values were approximately 30-35 millimhos/meter. Terrain conductivity profiles and the raw data is included in Appendix I and II respectively.

4.1.1 Profile 1

Profile 1 was located along the eastern property boundary approximately 19 feet east of a chain link fence that marked the property boundary. Background values observed were approximately 40 millimhos/meter and may represent the presence of the fence, silty clay in the subsurface or the presence of fill. An anomolous value was observed at location 0N of this profile. This station (the base station 0N, 0W) was approximately 20 feet south of Willet Road and overhead power lines as well as buried utilities and sewers were observed and/or anticipated within the vicinity of this station.

Values increased between station -20N and -120N and may represent the presence of fill material and/or the presence of the chain link fences in this vicinity.

4.1.2 Profile 2

Profile 2 trended east approximately 29 feet north of a chain link fence. Values observed across this profile decreased as the survey advanced in an easterly direction. This may be representative of a deepening water table or the grading of subsurface soils from fine to coarser.

4.1.3 Profile 3

Profile 3 was located along the eastern boundary of the site trending south. Surface observations revealed that the area may have received some fill. Background values were approximately 31-34 mmhos/meter. An anomaly was observed between location -120N and -260N. A mound of fill material was traversed over in this vicinity and is probably responsible for this anomaly.

Anomalies were observed at locations -400N and -840N. These anomalies may represent buried metallic debris.

4.1.4 Profile 4

Profile 4 was located on top of a suspected fill area. This area appeared to be approximately eight feet above grade. This profile trended west towards the railroad tracks.

Background values observed were approximately 30-35 millimhos/meter. Anomalous readings were observed at stations 60W and 80W. Location 60W was at the top edge of the suspected fill area and location 80W was at the toe of the fill in the vicinity of the railroad tracks. Their placement may be responsible for the anomalies.

4.1.5 Profile 5

Profile 5 was located approximately 22 feet east of the railroad tracks and trended south. Background values observed were approximately 40 millimhos/meter.

An anomaly was observed between location -860N and -980N. Metallic railroad debris was observed on the surface in this vicinity and may also be present in the subsurface.

Anomalous readings were observed between locations -1340N and -1520N. It should be noted that the suspected fill area mentioned in section 4.1.4 ended at station -1320N. These anomalous values may represent buried debris containing metal within the vicinity of the railroad tracks.

4.1.6 Profile 6

Profile 6 was located along the southern property boundary of the site. Background values observed were 30-35 millimhos/meter. Readings were not recorded at locations 100W or 140W due to the presence of railroad tracks. A reading was not recorded at location 160W due to a steep embankment.

An anomaly was observed between locations 560W and 700W. This anomaly may be present within the subsurface.

4.1.7 Profile 7

Profile 7 was located along the southwestern property boundary trending north. Background values observed were approximately 30-35 millimhos/meter. Bedrock, a gray thin fissile shale, was observed at the surface in the vicinity of this profile and appeared to have a conductivity of 27-31 mmhos/meter. An anomaly was observed between locations -1520N and -1420N and may represent fill material containing ceramic, brick and concrete debris. An anomaly was observed at location -1040N and may represent the presence of buried metal within the vicinity of the station.

A reading was omitted at location -920N due to the presence of a chain link fence.

An anomaly was observed between location -860N and -760N. A large steel filter approximately 5' x 5' and overhead power lines were observed within this vicinity.

4.1.8 Profile 8

Profile 8 was located on the west side of the property and trended east to west. Background readings observed were 45-55 mmhos/meter and may reflect the presence of fill material, or a silty clay.

An anomalous value was observed at location 900W and may reflect the presence of coarser material within the subsurface and/or construction/demolition type fill material.

4.1.9 Profile 9

Profile 9 was located along the western boundary of the site trending south to north. Background values observed across this profile were approximately 30-35 millimhos/meter and may reflect the presence of a silt and clay or the shale bedrock near the surface.

Readings were not taken at station -520N due to the presence of a chain link fence. An abandoned parking lot was located approximately between -480N and -200N. Rust colored material and staining was observed on the surface at locations -400N and -300N.

An anomaly was observed between location -500N and -440N. This anomaly may be due to the presence of fill material or increased clay content in the soil. An anomaly was observed between location -360N and 240N. This anomaly may be due to the presence of the rust colored material noted on the surface at location -300N also being present in the subsurface or the presence of fill material.

An anomaly was observed at location -200N and may be due to the presence of several cars in the vicinity.

4.1.10 Profile 10

Profile 10 was located in a used parking area located in the northwest corner of the plant property. Background values observed were approximately 30-35 millimhos/meter.

Readings observed at locations 900W to 840W may represent the presence of the cars in the parking lot, fill material or a soil boundary condition.

Profile 4.1.11 Profile 11

Profile 11 was located along the center line of Alered Road trending south to north. Background values were approximately 30-40 millimhos/meter.

An anomaly was observed at location 20N and may represent a buried utility. An anomaly was observed at location 80N in the vicinity of a sewer. This anomaly is probably due to the presence of the sewer.

Differences between parallel and perpendicular readings across this profile is probably due to the presence of a chain link fence on the east side of Alered Road.

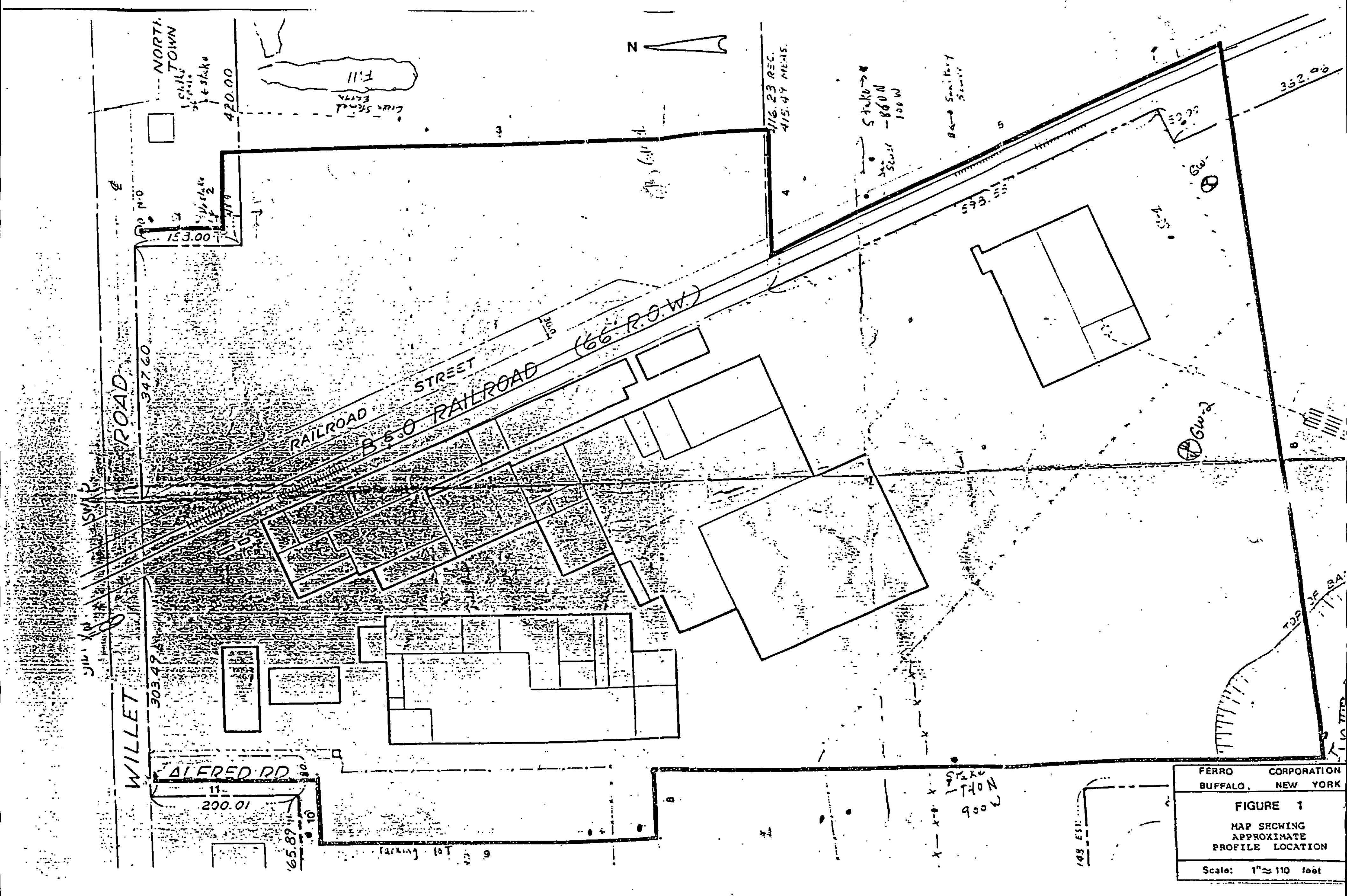
5.0 CONCLUSIONS

- Suspected fill material was located along Profiles 1,3,4,6,7,8,9 and 10.
- Suspected buried debris containing metals was observed along Profiles 3,5 and 7.
- Suspected buried debris containing ceramic material was located along Profiles 6,7 and possibly 8.

- Filling activity may have taken place in the vicinity of the intersection of Profiles 6 and 7 since the construction of the property boundary map dated December 12, 1986. Ceramic debris was noted within the near surface soil material of this area.
- Rust colored material and staining of the surface soils was noted two locations along Profile 9. This material may also be present within the subsurface.

6.0 LIMITATIONS

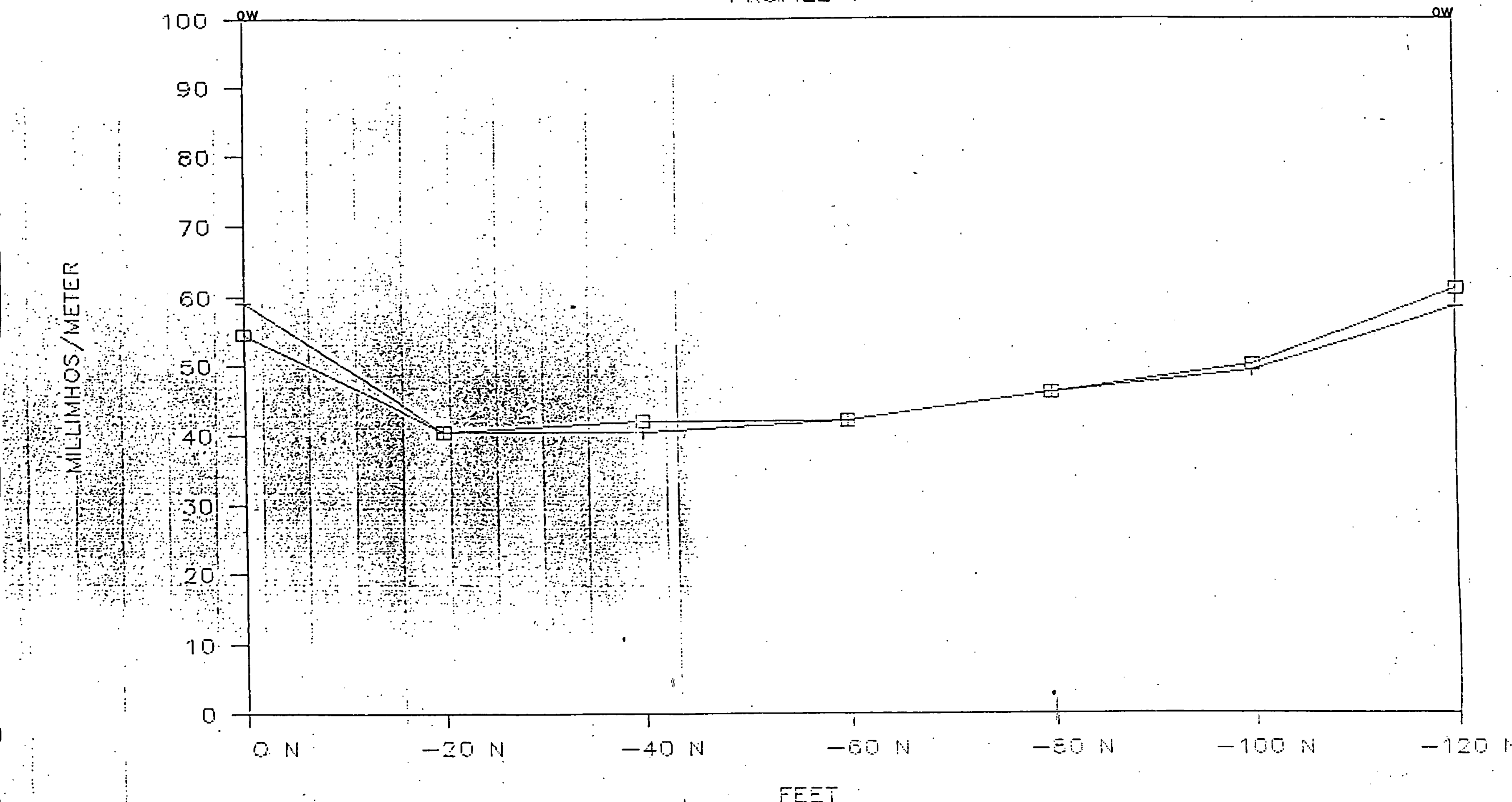
Geophysical exploration is an established method for nondestructively investigating the subsurface. However, because it is an indirect method of subsurface investigation it is subject to inherent limitations and ambiguities. Search targets such as stratigraphy, the water table, disturbed areas, soil or ground water contamination, buried tanks, drums, transformers, and conduits are detectable only if they produce recognizable anomalies or patterns against the background geophysical data. Natural and cultural features such as major soil changes, topography, site boundaries, pavement, fences, buildings, surface and buried extraneous debris, vehicles, and heterogeneous fill, may exhibit significant anomalies depending upon the geophysical technique being used.

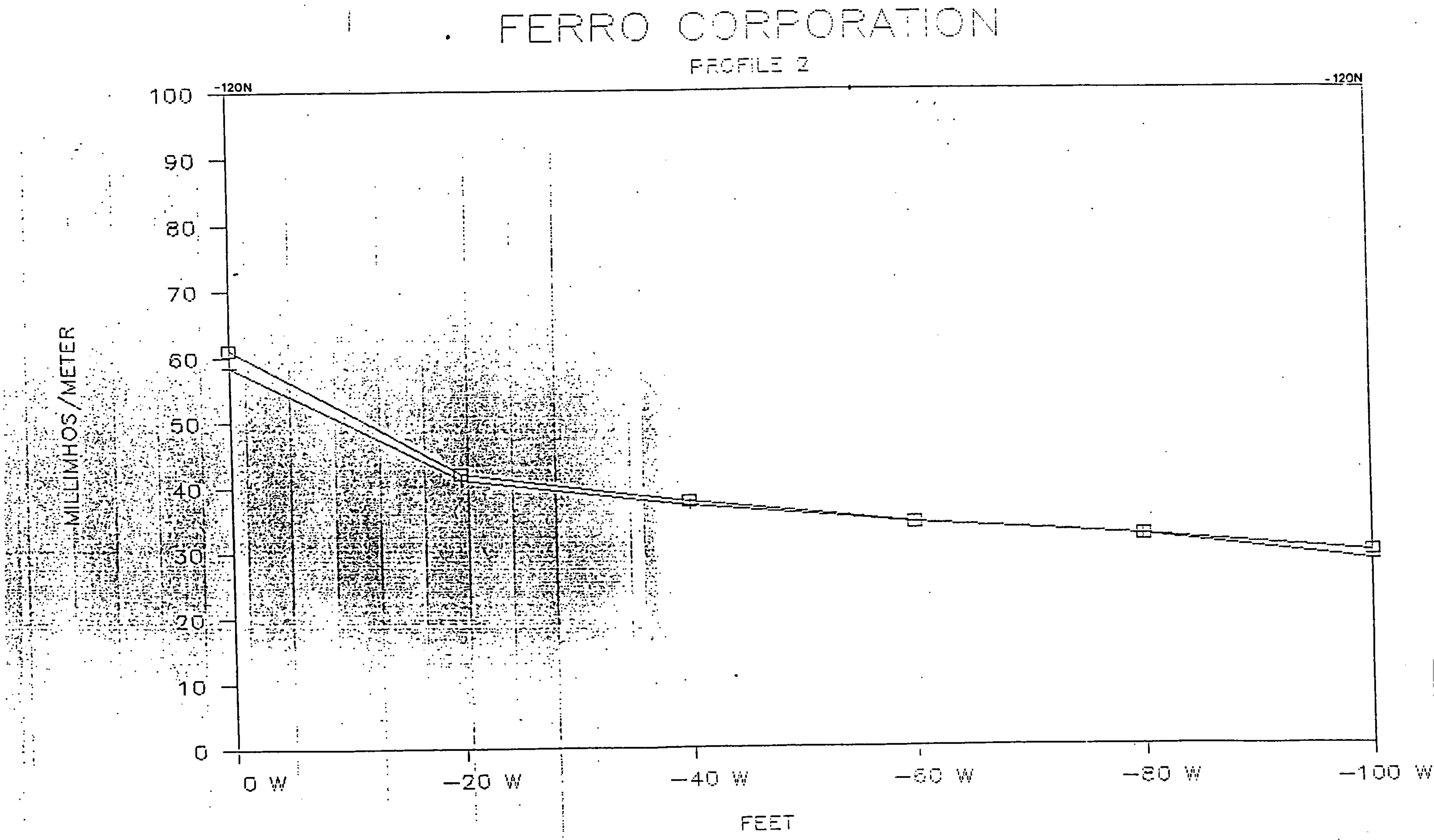

FERRO CORPORATION
BUFFALO, NEW YORK
FIGURE 1
MAP SHOWING APPROXIMATE PROFILE LOCATION
Scale: 1" ≈ 110 feet
WILLET ROAD
ALFRED RD
B & O RAILROAD (66' R.O.W.)
RAILROAD STREET
NORTH TOWN
N
420.00
153.00
347.60
303.49
200.01
65.89
416.23 REC.
415.47 MEAS.
593.35
362.06
52.00
Fill
GW-2
Parking lot

APPENDIX I

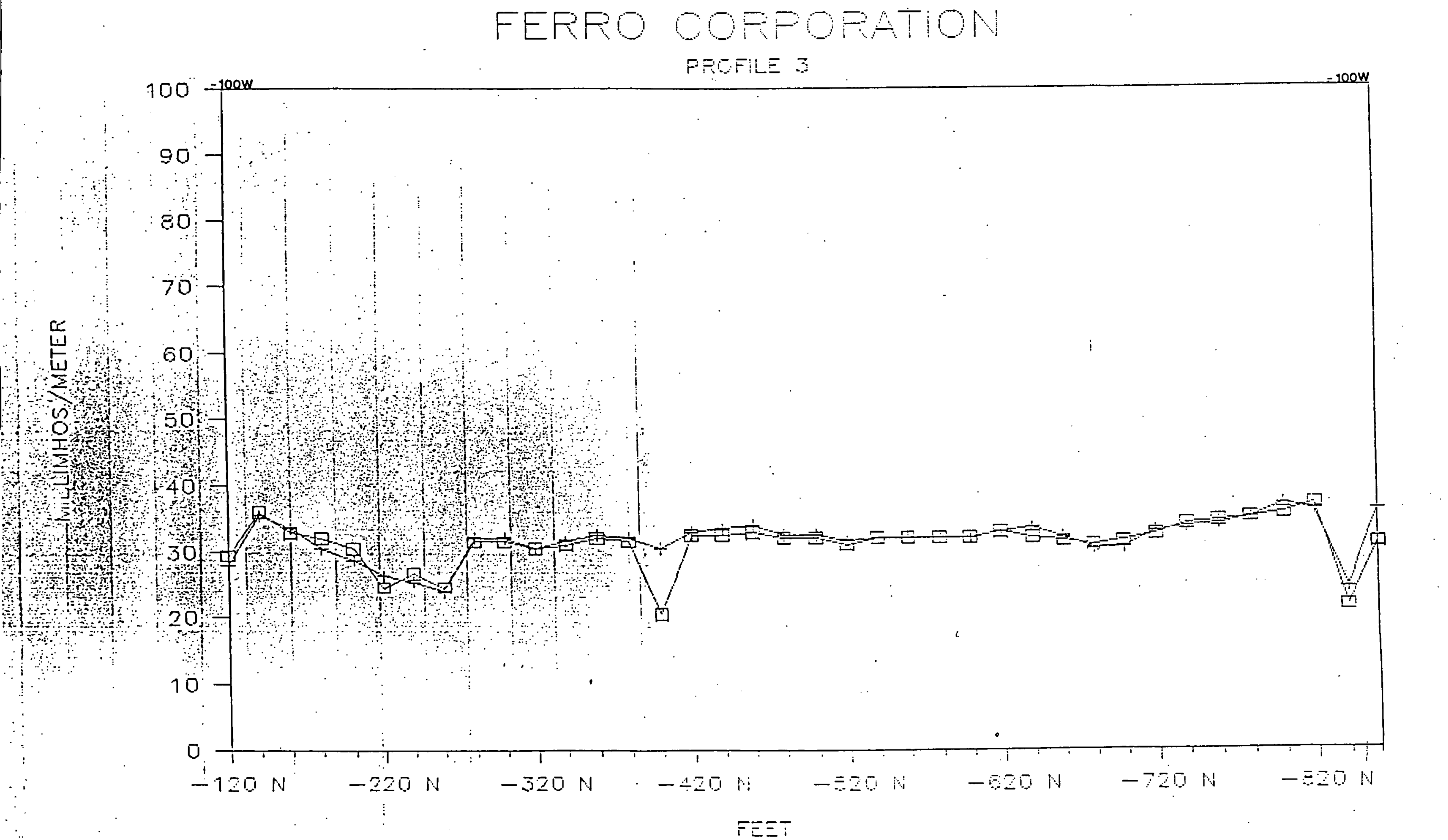
FERRO CORPORATION

PROFILE 1



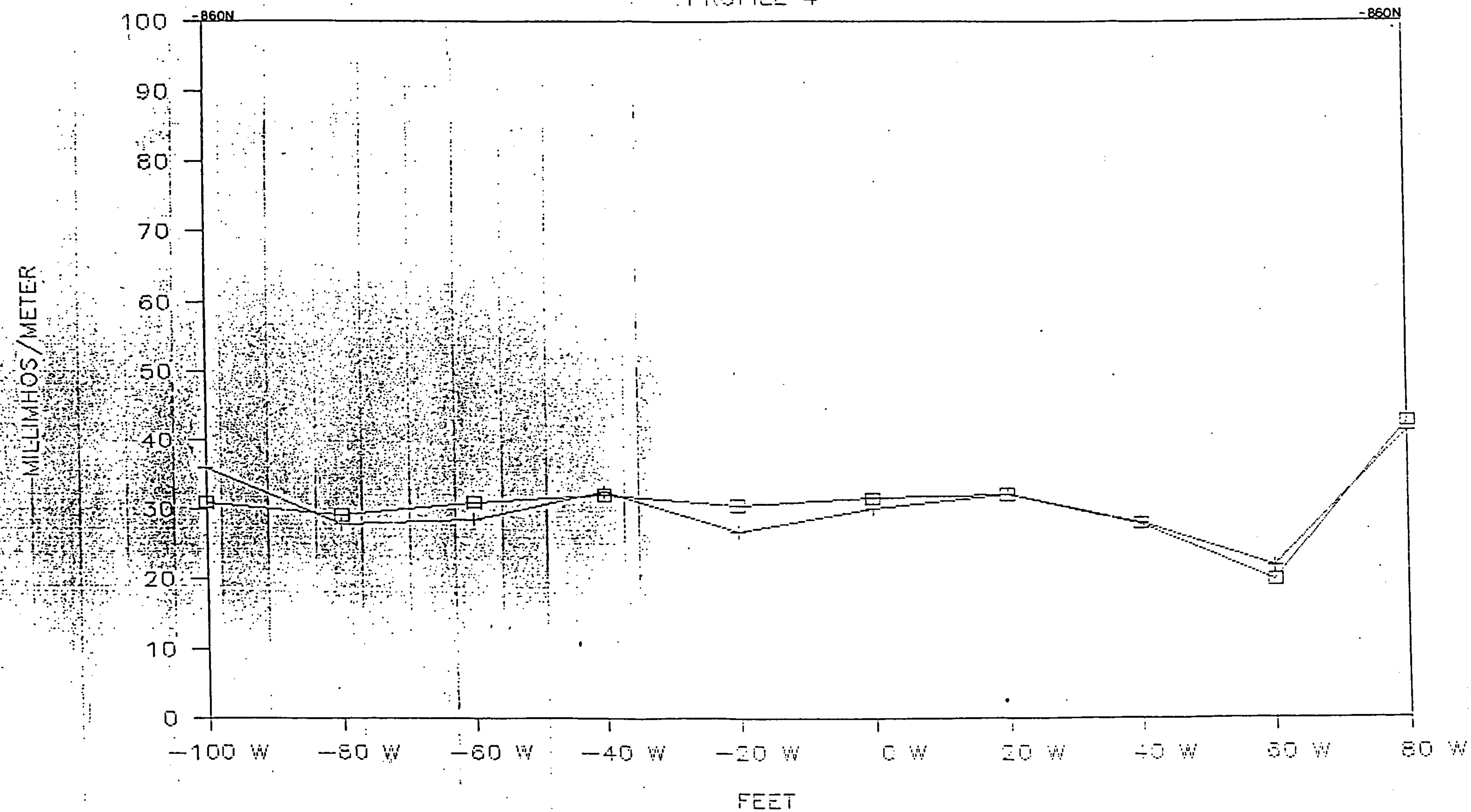


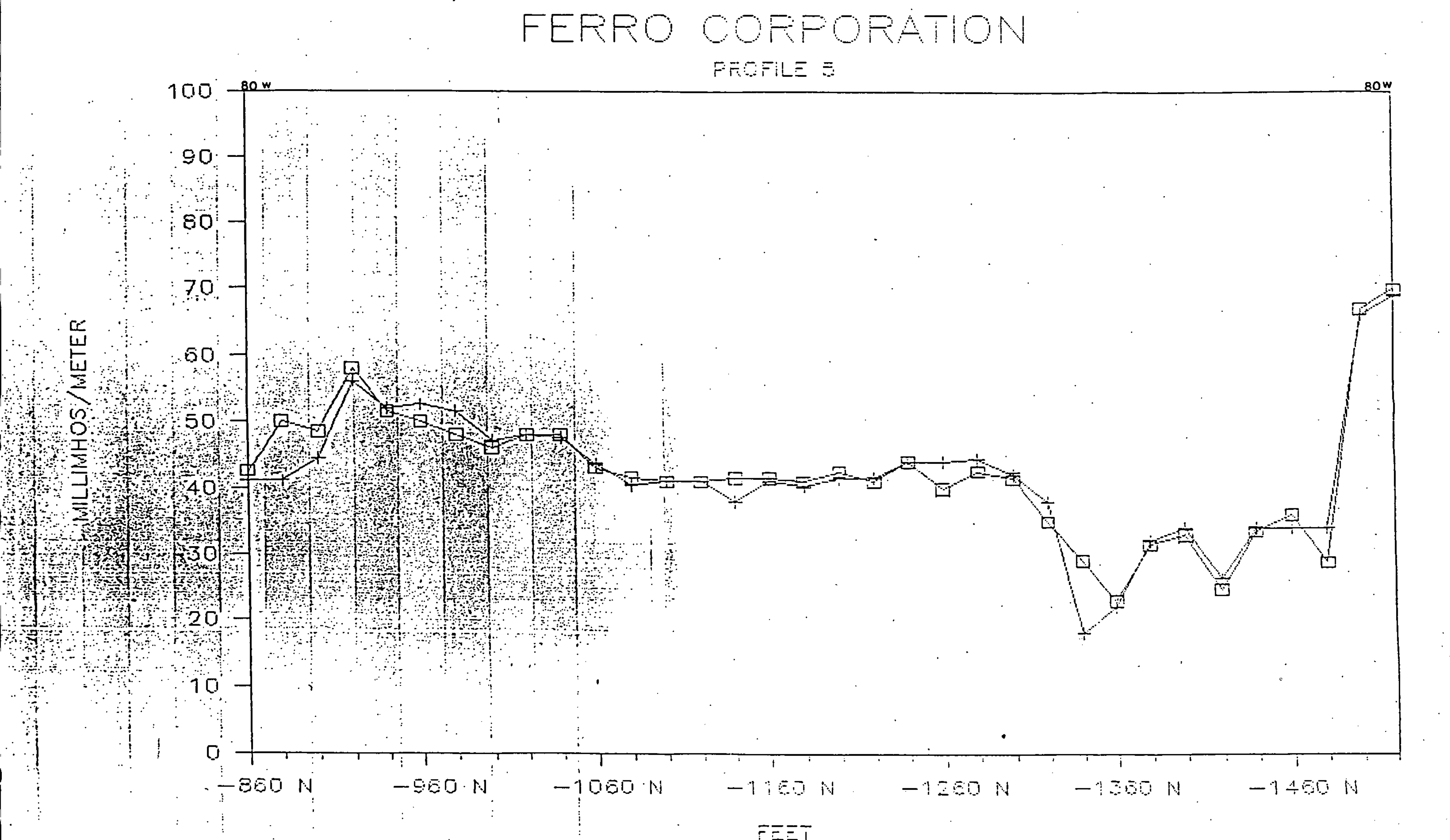
FERRO CORPORATION
PROFILE 2
-120N
-120N
MILLIMHOS/METER
100
90
80
70
60
50
40
30
20
10
0
0 W
-20 W
-40 W
-60 W
-80 W
-100 W
FEET


FERRO CORPORATION
PROFILE 3
-100W
-100W
MILLIMHOS/METER
100
90
80
70
60
50
40
30
20
10
0
-120 N
-220 N
-320 N
-420 N
-520 N
-620 N
-720 N
-820 N
FEET

FERRO CORPORATION

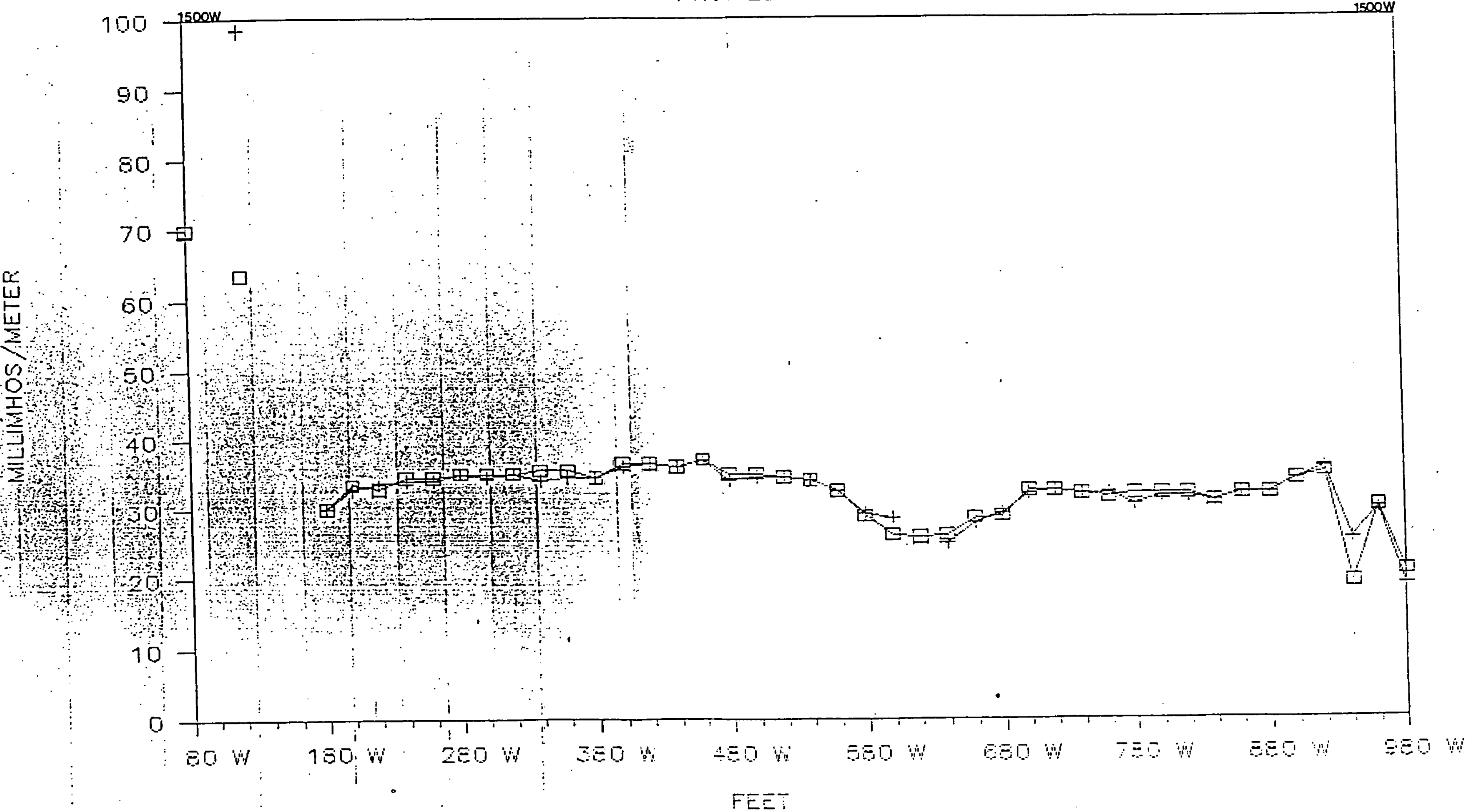
PROFILE 4

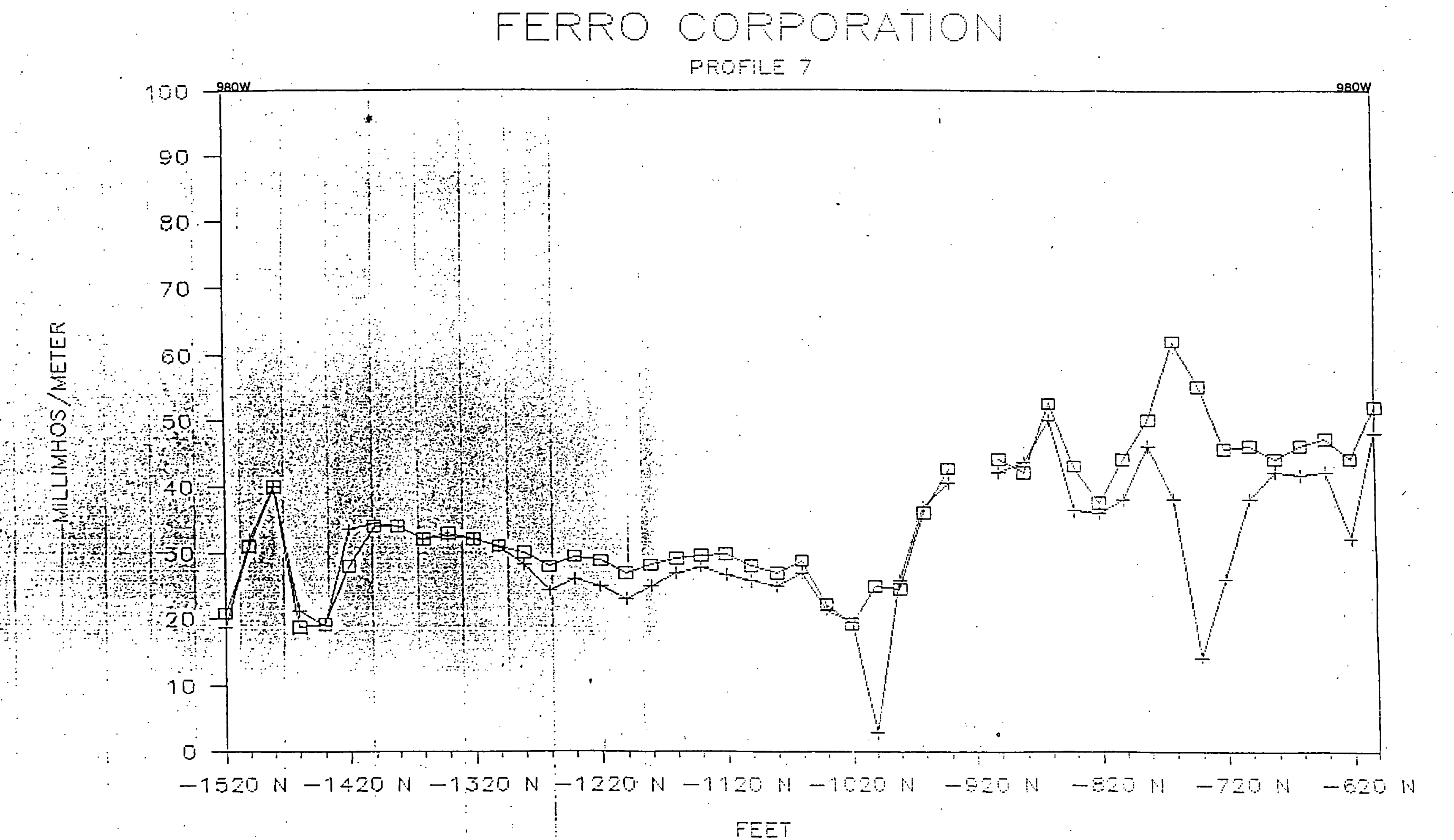



FERRO CORPORATION
PROFILE 5
80 W
80 W
MILLIMHOS/METER
100
90
80
70
60
50
40
30
20
10
0
-860 N
-960 N
-1060 N
-1160 N
-1260 N
-1360 N
-1460 N
FEET

FERRO CORPORATION

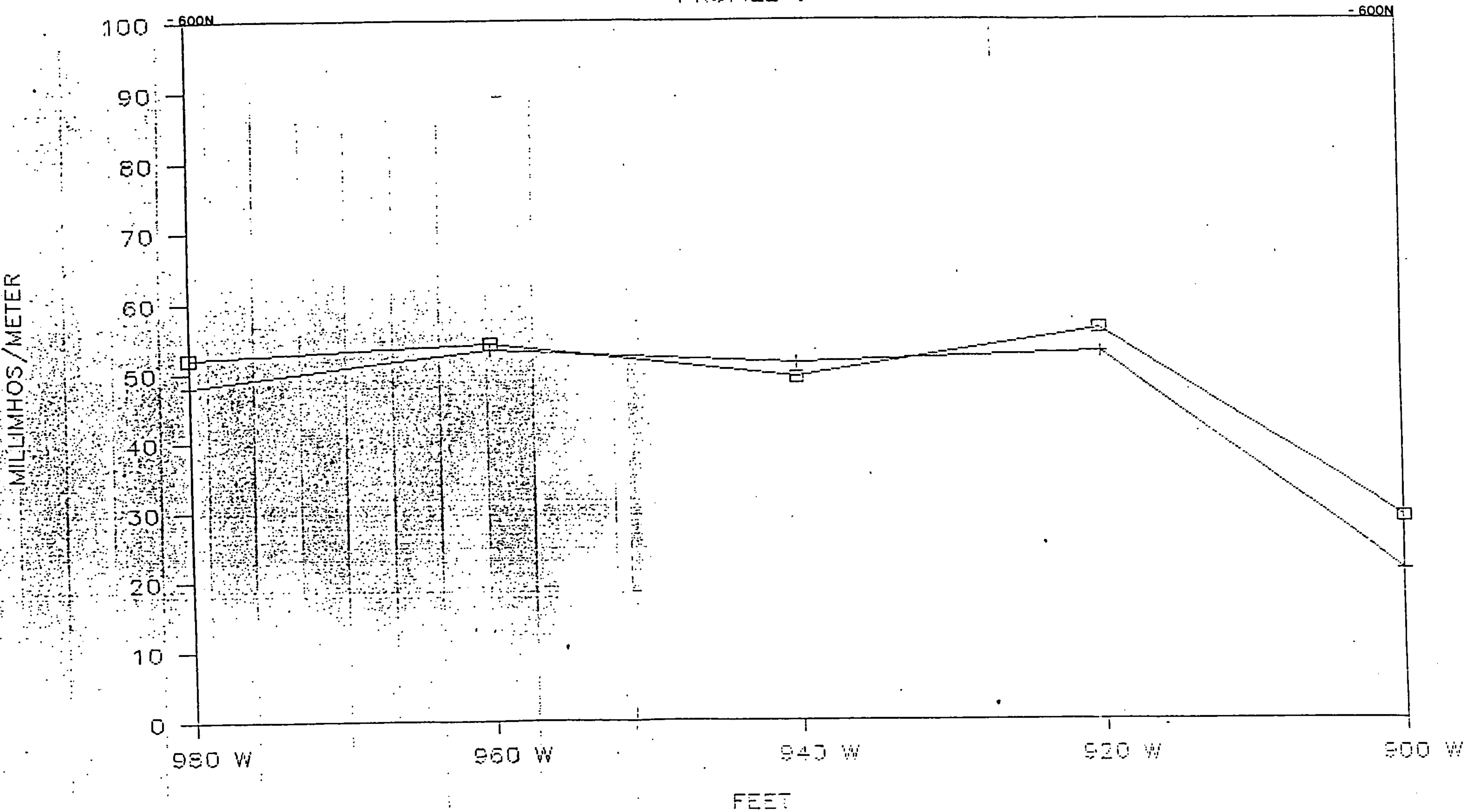
PROFILE 6




FERRO CORPORATION
PROFILE 7
980W
980W
100
90
80
70
60
50
40
30
20
10
0
MILLIMHOS/METER
-1520 N
-1420 N
-1320 N
-1220 N
-1120 N
-1020 N
-920 N
-820 N
-720 N
-620 N
FEET

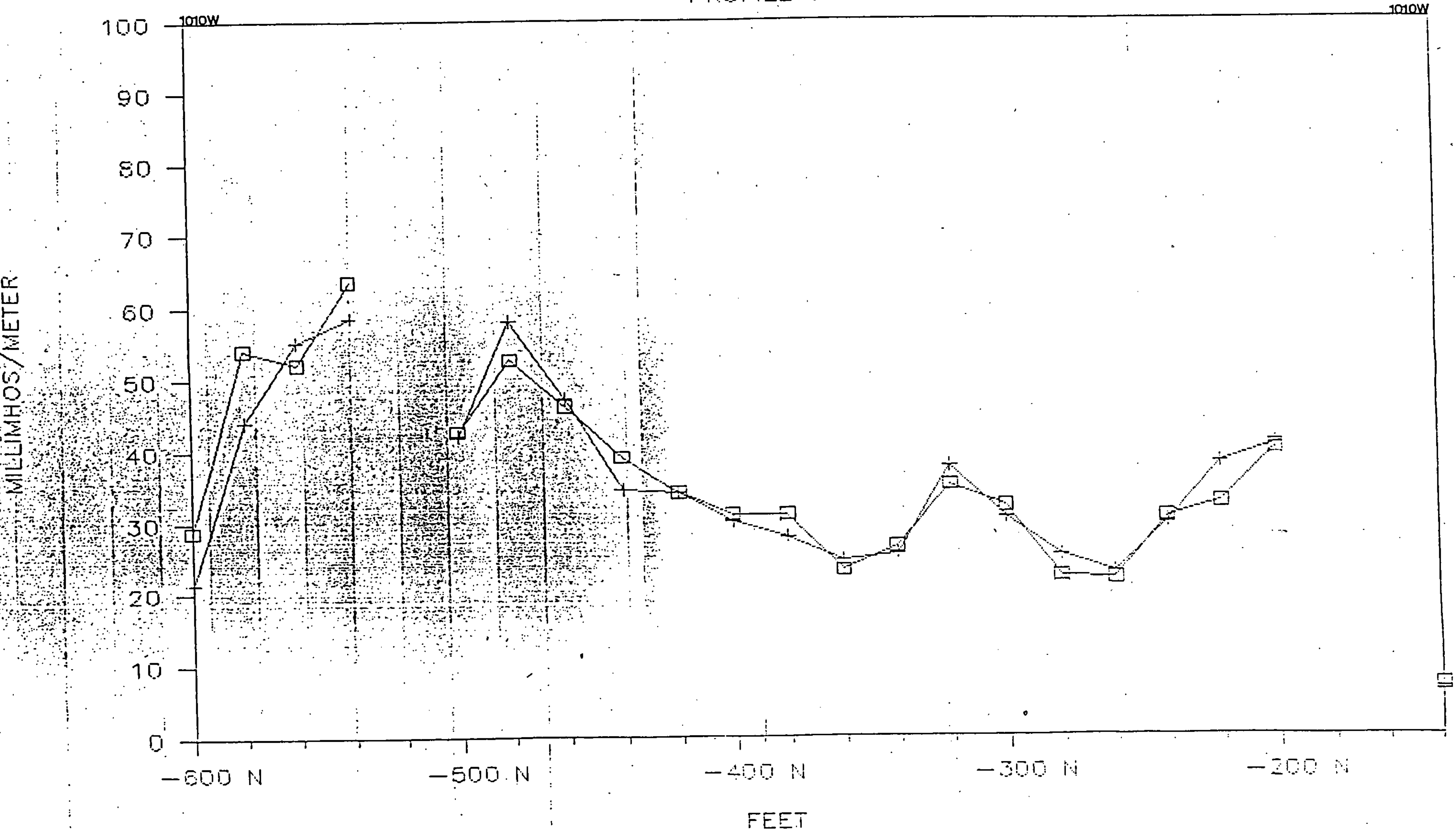
FERRO CORPORATION

PROFILE 8



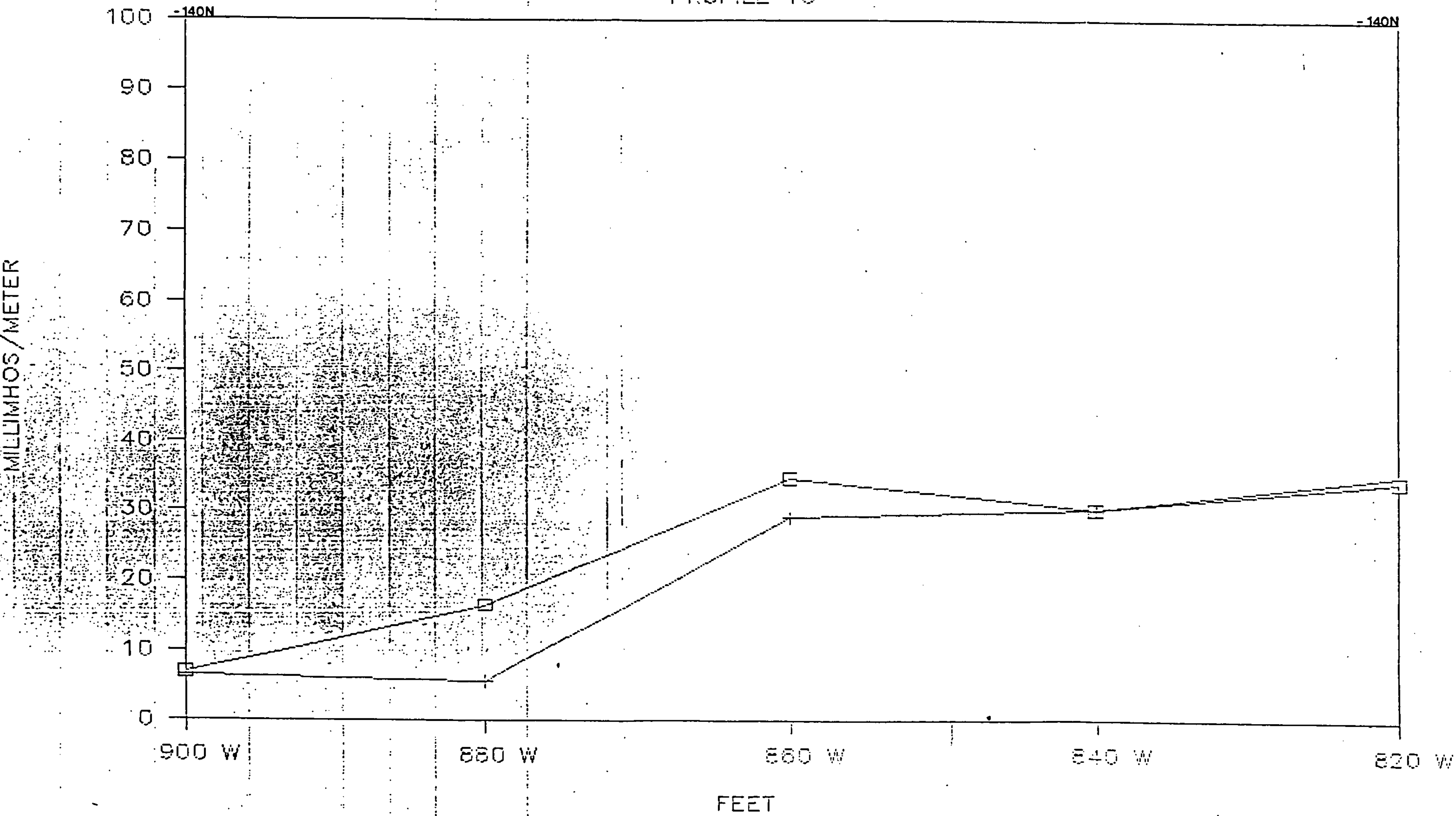
FERRO CORPORATION

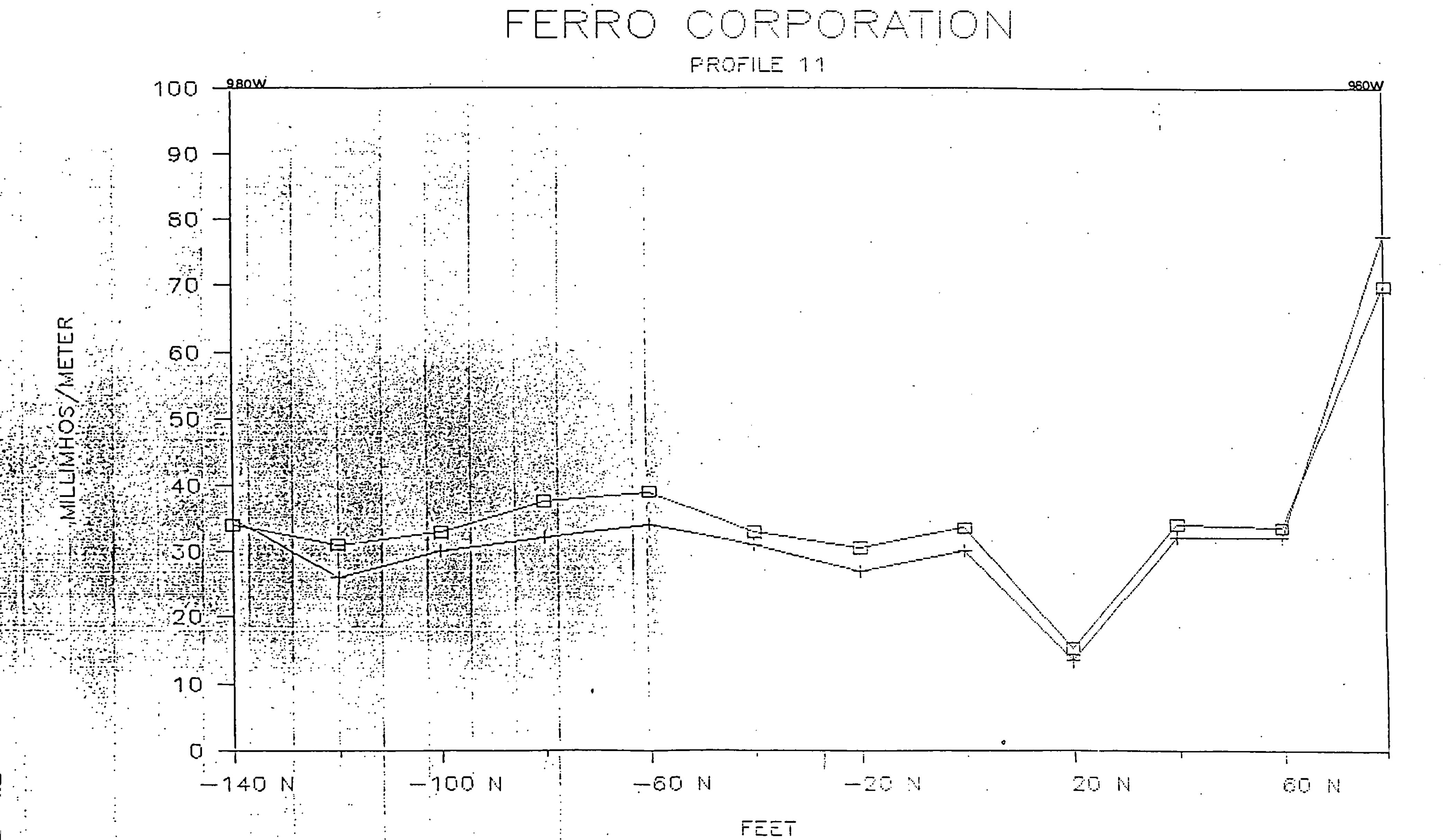
PROFILE 9



FERRO CORPORATION

PROFILE 10




FERRO CORPORATION
PROFILE 11
980W
960W
MILLIMHOS/METER
100
90
80
70
60
50
40
30
20
10
0
-140 N
-100 N
-60 N
-20 N
20 N
60 N
FEET

APPENDIX II

FERRO CORPORATION
BUFFALO, NEW YORK

PROFILE 1

LOCATION		PARALLEL	PERPENDICULAR	AVERAGE
0 N	0 W	54.5	59	56.75
-20 N	0 W	40.5	40.5	40.5
-40 N	0 W	42	40.5	41.25
-60 N	0 W	42	42	42
-80 N	0 W	46	46	46
-100 N	0 W	50	49	49.5
-120 N	0 W	61	58.5	59.75

PROFILE 2

LOCATION		PARALLEL	PERPENDICULAR	AVERAGE
-120 N	0 W	61	58.5	59.75
-120 N	-20 W	42	41	41.5
-120 N	-40 W	37.5	37	37.25
-120 N	-60 W	34	34	34
-120 N	-80 W	32	32	32
-120 N	-100 W	29.5	28.1	28.8

PROFILE 3

LOCATION		PARALLEL	PERPENDICULAR	AVERAGE
-120 N	-100 W	29.5	28.1	28.8
-140 N	-100 W	36	35.5	35.75
-160 N	-100 W	33	33.5	33.25
-180 N	-100 W	32	30.5	31.25
-200 N	-100 W	30.5	28.8	29.65
-220 N	-100 W	24.6	26.4	25.5
-240 N	-100 W	26.8	25.5	26.15
-260 N	-100 W	24.6	24	24.3
-280 N	-100 W	31.5	32	31.75
-300 N	-100 W	31.5	32	31.75
-320 N	-100 W	30.5	30.5	30.5
-340 N	-100 W	31	31.5	31.25
-360 N	-100 W	32	32.5	32.25
-380 N	-100 W	31.5	32	31.75
-400 N	-100 W	20.5	30.5	25.5
-420 N	-100 W	32.5	33	32.75
-440 N	-100 W	32.5	33.5	33
-460 N	-100 W	33	34	33.5
-480 N	-100 W	32	32.5	32.25
-500 N	-100 W	32	32.5	32.25
-520 N	-100 W	31	31.5	31.25
-540 N	-100 W	32	32	32
-560 N	-100 W	32	32	32
-580 N	-100 W	32	32	32
-600 N	-100 W	32	32	32
-620 N	-100 W	33	33	33

-640	N	-100	W	32	33.5	32.75
-660	N	-100	W	31.5	32	31.75
-680	N	-100	W	31	30.5	30.75
-700	N	-100	W	31.5	30.5	31
-720	N	-100	W	32.5	33	32.75
-740	N	-100	W	34	33.5	33.75
-760	N	-100	W	34.5	34	34.25
-780	N	-100	W	35	35	35
-800	N	-100	W	35.5	37	36.25
-820	N	-100	W	37	36	36.5
-840	N	-100	W	21.6	24.2	22.9
-860	N	-100	W	31	36	33.5

PROFILE 4

LOCATION				PARALLEL	PERPENDICULAR	AVERAGE
-860	N	-100	W	31	36	33.5
-860	N	-80	W	29.2	27.8	28.5
-860	N	-60	W	31	28.6	29.8
-860	N	-40	W	32	32.5	32.25
-860	N	-20	W	30.5	26.8	28.65
-860	N	0	W	31.5	30	30.75
-860	N	20	W	32	32	32
-860	N	40	W	27.9	28.1	28
-860	N	60	W	19.9	21.9	20.9
-860	N	80	W	42.5	41	41.75

PROFILE 5

LOCATION				PARALLEL	PERPENDICULAR	AVERAGE
-860	N	80	W	42.5	41	41.75
-880	N	80	W	50	41	45.5
-900	N	80	W	48.5	44.5	46.5
-920	N	80	W	58	56	57
-940	N	80	W	51.5	52	51.75
-960	N	80	W	50	52.5	51.25
-980	N	80	W	48	51.5	49.75
-1000	N	80	W	46	47	46.5
-1020	N	80	W	48	48	48
-1040	N	80	W	48	47.5	47.75
-1060	N	80	W	43	43.5	43.25
-1080	N	80	W	41.5	40.5	41
-1100	N	80	W	41	41	41
-1120	N	80	W	41	41	41
-1140	N	80	W	41.5	38	39.75
-1160	N	80	W	41.5	41	41.25
-1180	N	80	W	41	40.5	40.75
-1200	N	80	W	42.5	41.5	42
-1220	N	80	W	41	41.5	41.25
-1240	N	80	W	44	44	44
-1260	N	80	W	40	44	42
-1280	N	80	W	42.5	44.5	43.5
-1300	N	80	W	41.5	42	41.75
-1320	N	80	W	35	38	36.5
-1340	N	80	W	29.1	18.1	23.6

-1360 N	80 W	22.9	22.1	22.5
-1380 N	80 W	31.5	32	31.75
-1400 N	80 W	33	34	33.5
-1420 N	80 W	24.8	26.4	25.6
-1440 N	80 W	33.5	34	33.75
-1460 N	80 W	36	34	35
-1480 N	80 W	28.9	34	31.45
-1500 N	80 W	67	66	66.5
-1520 N	80 W	70	69	69.5

PROFILE 6

LOCATION		PARALLEL	PERPENDICULAR	AVERAGE
-1520 N	80 W	70	69	69.5
-1520 N	100 W			ERR
-1520 N	120 W	63.5	98.5	81
-1520 N	140 W			ERR
-1520 N	160 W			ERR
-1520 N	180 W	30	30	30
-1520 N	200 W	33.5	33	33.25
-1520 N	220 W	33	33.5	33.25
-1520 N	240 W	34.5	34	34.25
-1520 N	260 W	34.5	34	34.25
-1520 N	280 W	35	35	35
-1520 N	300 W	35	34.5	34.75
-1520 N	320 W	35	35	35
-1520 N	340 W	35.5	34	34.75
-1520 N	360 W	35.5	34.5	35
-1520 N	380 W	34.5	34.5	34.5
-1520 N	400 W	36.5	36	36.25
-1520 N	420 W	36.5	36.5	36.5
-1520 N	440 W	36	36	36
-1520 N	460 W	37	37	37
-1520 N	480 W	35	34	34.5
-1520 N	500 W	35	34.5	34.75
-1520 N	520 W	34.5	34.5	34.5
-1520 N	540 W	34	34	34
-1520 N	560 W	32.5	32.5	32.5
-1520 N	580 W	28.9	29.1	29
-1520 N	600 W	26.2	28.6	27.4
-1520 N	620 W	25.9		25.9
-1520 N	640 W	26.2	25	25.6
-1520 N	660 W	28.6	27.8	28.2
-1520 N	680 W	28.8	29.1	28.95
-1520 N	700 W	32.5	32	32.25
-1520 N	720 W	32.5	32.5	32.5
-1520 N	740 W	32	32	32
-1520 N	760 W	31.5	32	31.75
-1520 N	780 W	32	30.5	31.25
-1520 N	800 W	32	31.5	31.75
-1520 N	820 W	32	31.5	31.75
-1520 N	840 W	31	31	31
-1520 N	860 W	32	32	32
-1520 N	880 W	32	32	32
-1520 N	900 W	34	34	34
-1520 N	920 W	35	35.5	35.25

-1520	N	940	W	19.2	25.5	22.35
-1520	N	960	W	30	29.9	29.95
-1520	N	980	W	20.9	18.9	19.9

PROFILE 7

LOCATION				PARALLEL	PERPENDICULAR	AVERAGE
-1520	N	980	W	20.9	18.9	19.9
-1500	N	980	W	31	32	31.5
-1480	N	980	W	40	40	40
-1460	N	980	W	18.8	21.2	20
-1440	N	980	W	19.2	19	19.1
-1420	N	980	W	28.1	33.5	30.8
-1400	N	980	W	34	34.5	34.25
-1380	N	980	W	34	34	34
-1360	N	980	W	32	32	32
-1340	N	980	W	33	32.5	32.75
-1320	N	980	W	32	32	32
-1300	N	980	W	31	31	31
-1280	N	980	W	30	28.2	29.1
-1260	N	980	W	28	24.2	26.1
-1240	N	980	W	29.5	26.1	27.8
-1220	N	980	W	28.9	24.9	26.9
-1200	N	980	W	27	22.9	24.95
-1180	N	980	W	28.2	25	26.6
-1160	N	980	W	29.2	27	28.1
-1140	N	980	W	29.6	27.9	28.75
-1120	N	980	W	29.9	26.8	28.35
-1100	N	980	W	28.1	25.8	26.95
-1080	N	980	W	27	24.9	25.95
-1060	N	980	W	28.8	27	27.9
-1040	N	980	W	22.2	21.3	21.75
-1020	N	980	W	19.2	19.5	19.35
-1000	N	980	W	25	2.8	13.9
-980	N	980	W	24.5	25.9	25.2
-960	N	980	W	36	37	36.5
-940	N	980	W	42.5	40.5	41.5
-920	N	980	W			ERR
-900	N	980	W	44	42	43
-880	N	980	W	42	43.5	42.75
-860	N	980	W	52.5	50	51.25
-840	N	980	W	43	36.5	39.75
-820	N	980	W	37.5	36	36.75
-800	N	980	W	44	38	41
-780	N	980	W	50	46	48
-760	N	980	W	62	38	50
-740	N	980	W	55	14.2	34.6
-720	N	980	W	45.5	26.2	35.85
-700	N	980	W	46	38	42
-680	N	980	W	44	42	43
-660	N	980	W	46	41.5	43.75
-640	N	980	W	47	42	44.5
-620	N	980	W	44	32	38
-600	N	980	W	52	48	50

PROFILE 8

LOCATION				PARALLEL	PERPENDICULAR	AVERAGE
-600	N	980	W	52	48	50
-600	N	1000	W	54	53	53.5
-600	N	1020	W	49	51	50
-600	N	1040	W	56	52.5	54.25
-600	N	1060	W	28.9	21.4	25.15

PROFILE 9

LOCATION				PARALLEL	PERPENDICULAR	AVERAGE
-600	N	1060	W	28.9	21.4	25.15
-580	N	1060	W	54	44	49
-560	N	1060	W	52	55	53.5
-540	N	1060	W	63.5	58.5	61
-520	N	1060	W			
-500	N	1060	W	42.5	42	42.25
-480	N	1060	W	52.5	58	55.25
-460	N	1060	W	46	47	46.5
-440	N	1060	W	39	34.5	36.75
-420	N	1060	W	34	34	34
-400	N	1060	W	31	30	30.5
-380	N	1060	W	31	27.9	29.45
-360	N	1060	W	23.1	24.6	23.85
-340	N	1060	W	26.5	25.5	26
-320	N	1060	W	35	37.5	36.25
-300	N	1060	W	32	30.5	31.25
-280	N	1060	W	22.2	25.2	23.7
-260	N	1060	W	21.9	22.8	22.35
-240	N	1060	W	30.5	29.9	30.2
-220	N	1060	W	32.5	38	35.25
-200	N	1060	W	40	40.5	40.25
-180	N	1060	W			
-160	N	1060	W			
-140	N	1060	W	6.8	6.4	6.6

PROFILE 10

LOCATION				PARALLEL	PERPENDICULAR	AVERAGE
-140	N	1060	W	6.8	6.4	6.6
-140	N	1040	W	16.4	5.5	10.95
-140	N	1020	W	34.5	28.9	31.7
-140	N	1000	W	30	30	30
-140	N	980	W	34	35	34.5

PROFILE 11

LOCATION				PARALLEL	PERPENDICULAR	AVERAGE
-140	N	980	W	34	35	34.5
-120	N	980	W	31	26	28.5
-100	N	980	W	33	30	31.5

-30 N	980 W	37.5	32	34.75
-60 N	980 W	39	34	36.5
-40 N	980 W	33	31	32
-20 N	980 W	30.5	27	28.75
0 N	980 W	33.5	30	31.75
20 N	980 W	15.2	13.5	14.35
40 N	980 W	34	32	33
60 N	980 W	33.5	32	32.75
80 N	980 W	70	77.5	73.75

APPENDIX E

APPENDIX E

APPENDIX E

BORING LOGS

Data by Kevin McGuinness + Anthony Magliocchino | Sheet 1 of 1

SUBSURFACE EXPLORATION - TEST BORING LOG

Boring No. GW-3
Project No. 576-013

Project Name Ferro Corp.

Date 10/24/88 (start) 10/25/88 (finish)

Client NYSDEC

Boring Location

Driller American Auger + Ditching Co., Inc.

Total Depth 14.5 FT.

Monitoring Instrument(s) HNu

Depth to Water 11 FT 10/24/88

SAMPLE HAMMER

Hole Diameter 8 inches

Weight 140 lb

Ground Surface Elevation

Fall 30 in.

Depth	Blows on Sampler 0" to 6"	6" to 12"	12" to 18"	18" to 24"	Retained Sample	Recovery (feet)	Sample No.	Instrument Reading	Moisture Content	Stratigraphic Column	CLASSIFICATION OF MATERIAL (f - fine, m - medium, c - coarse; and - 35-50%, some - 20-35%, little - 10-20%, trace - 0-10%)	Remarks
0	2							1=BKGD	DAMP		0-0.4 - Damp gray CLAY, trace silt, trace shale chips	
		23										
			42						DRY		0.4-2.0 - Gray fissle SHALE - Dry, fossiliferous	
2				50/35	X	2.0	1	1				
									DRY		Refused at 21.5 inches - Augering to 4 ft. Cuttings dry gray powder with some rounded stones	
4	10										0-1.4 - Gray fissle shale - Some cohesive sections, lots of powdered shale - Dry	Meter deflected when sample was stirred
		47							DRY			
			50/1		X	1.4	2	1.2-2.4				
6												
8	15										0-1.1 - Gray shale - limestone - still fissile, but with more blocky pieces, lots of dry powder	Slight petroleum odor
		24							DRY			
			100/4									
9.5					X	1.1	3	0.4-17				
									DRY		9.5-14.5 - Rock core sample. First 0.5 ft is broken - probably due to wobbling of sample barrel. Rest is solid (4.5 ft) with some fractures.	Competent bedrock at 9.5-10 ft. Water table at 11 ft.
									WET			
14.5											14.5 FT TOTAL DEPTH	No well installed

Facility:
Date: 10-13-88
Calib. By: KM & G
Calib. Gas:

LAWLER, MATUSKY & SKELLY ENGINEERS
H.NU METER FIELD CALIBRATION
DATA SHEET

Job No: 575-3[illegible]
Site: [illegible]
Crew: [illegible]
Oper:
Ferro Corp

DATE/TIME	METER No.	BATT. CHECK	EXPECTED ZERO	EXPECTED CALIB. GAS (ppm)	OBSERVED ZERO	OBSERVED CALIB. GAS (ppm)	SPAN ADJ. (from -- -- to)	COMMENTS
10-13 0930	NYSDEC 801446	✓	0	55	0	55	—	NO Adjust
10-17 10:10	NYDEC 801446	✓	0	55	0	57	—	NO ADJUST
10-18 1410	NYSDEC 801446	✓	0	55	0	51	—	no adjust
10-24 1445	NYSDEC 801439	✓	0	55	0	54	-	NO Adjust

On-Site Health & Safety Officer and/or Crew Chief:

(Signature):

(Date):

APPENDIX F

APPENDIX F

SAMPLING LOGS

Date: 11-2-88
Crew: JMG CS
Site: Ferro

LAWLER, MATUSKY & SKELLY ENGINEERS
FIELD DATA SHEET FOR SOIL/SEDIMENT SAMPLES
Job No: 576-013

Oper: Sediment Samples
Thermometer No: —

STA. NO.	TIME	SMPL DPTH	METHOD	TEXT.	CLR.	ODOR	SAMPLE BOTTLES: SAMPLE PARAMETERS	BOT. Nos.	SAMPLE PARAMETERS	BOT. Nos.	COMMENTS
SW-4	0850	0-4"	s/s Spoon			strong Petroleum	HSL +30 Organics & Metals				Water has a sheen on the surface, some sheening on sediment
SW-5	0930	0-1"	"				HSL +30 Organics + Metals				Tan-Yellow material settling out on stream bed. Tried to take a sample of just this material
SW-1	1030	0-3"	"				HSL +30 Organics + Metals				Material taken from area near northern most pipe discharge
SW-6*	—	—	—	—	—	—	—				* None Taken. No sediment
SW-7*	—	—	—	—	—	—	—				* None Taken No sediment
SW-3*	—	—	—	—	—	—	—				* None Taken as per workplan
SW-8	1510	0-6"	s/s Spoon	Silty Clay w/ org matter	Brn	No noticeable odor	HSL +30 Organics + Metals				Hit water at approx 5" down below surf.
SW-2	1610	0-4"	"	*	Brn, Gray		HSL +30 Organics + Metals				* alot of org matter (decayed cattails) in the sample

Date: 11-2-88
Crew: JMG CS
Site: Ferro
Oper: Surf H_2O

LAWLER, MATUSKY & SKELLY ENGINEERS
FIELD DATA SHEET FOR SURFACE WATER
Job No: 576-013

pH No: DEC orion #4776
Thermometer No: 568
SCT No: DEC TLC #560
Velocity Meter No: —

STA. NO.	SAMPLE DEPTH (ft/in)	TIME (HHMM)	TEMP. (°C)	pH	SP. COND. (µmhos/cm)	FLOW MEAS.	CRK. DPTH ft INT. (Rt-Lft) (ft/in)	CRK. WDTH (ft)	SAMPLE BOTTLES: SAMPLE PARAMETERS	BOT. Nos.	SAMPLE PARAMETERS	BOT. Nos.	COMMENTS
SW-4	Surf	0830	20.7°	8.6	378	—	1.3' in middle	7'	HSL+30, Organics, Metals, Pest/PCBs		Cyanide		Dipped bottles in directly, strong petroleum odor, sheen on surf.
SW-5	Surf	0915	8.2°	11.7	2180	—	0.3 in middle	2'	HSL+30, Organics, Metals, Pest/PCBs		Cyanide		Dipped bottles directly Tan-yellow material settling out on stream bed
SW-1	Surf.	1030	5.7°	9.5	511	—	—	—	HSL+30, Organics, Metals, Pest/PCBs		Cyanide		Dipped Bottles Directly from area below pipe
SW-1-MS	"	"	"	"	"	—	—	—	↓		↓		" Matrix Spike
SW-1 MSD	"	"	"	"	"	—	—	—	↓		↓		" Matrix spike Duplicate
SW-6	"	1305	6.7°	8.2	712	—	1.1' in sample area (middle)	22'	HSL+30, Organics, Metals, Pest/PCBs		Cyanide		Dipped bottles directly into stream
SW-7	"	1320	6.5°	8.3	723	—	1.0' in sample area (~ middle)	24'	HSL+30, Organics, Metals, Pest/PCBs		Cyanide		"
SW-3	from* weir	1340	9.9°	7.4	2010	~2gpm	—	—	HSL+30, Organics, Metals, Pest/PCBs		Cyanide		* made a weir so water would flow into sample jars

Date: 11-2-88
Crew: JMG CS
Site: Ferro Corp
Oper: Surf H_2O

LAWLER, MATUSKY & SKELLY ENGINEERS
FIELD DATA SHEET FOR SURFACE WATER
Job No: 576-013

pH No: DEC Orion #4776
Thermometer No: 568
SCT No: DEC TLC #560
Velocity Meter No: —

STA. NO.	SAMPLE DEPTH (ft/in)	TIME (HHMM)	TEMP. (°C)	pH	COND. (µmhos/cm)	FLOW MEAS.	CRK. DPTH ___ft INT. (Rt-Lft) (ft/in)	CRK. WDTH (ft)	SAMPLE BOTTLES: SAMPLE PARAMETERS	BOT. Nos.	SAMPLE PARAMETERS	BOT. Nos.	COMMENTS
SW-9	Surf.	1410	9.9	7.2	362	—	—	—	HSL +30 Organics Metals Pest/PCBs		Cyanides		Taken in area before ditch splits up + cascades down the hill (samples at the bottom may have lost some volatiles)
SW-8*	—	—	—	—	—	—	—	—					No sample! As per workplan
SW-2	Surf	1555	12.5° / 12.5°	7.7	299 / 294	—	—	—	HSL +30 Organics Metals Pest/PCB's		Cyanide		Filled Bottles directly from area just after pipe that runs under the road by the fence
Field Blank	—	1620	—	—	—	—	—	—	HSL +30 Organics Metals Pest/PCBs		Cyanide		Poured samples directly from bottle to bottle because we did not use any type of sampling device to collect the water samples
Trip Blank	—	—	—	—	—	—	—	—	HSL +10 VOCs				

Date: 11-2-88
Crew: JMG CS
Site: Ferro

LAWLER, MATUSKY & SKELLY ENGINEERS
FIELD DATA SHEET FOR SOIL/SEDIMENT SAMPLES
Job No: 576-013

Oper: Soil Samples
Thermometer No: —

STA. NO.	TIME	SMPL DPTH	METHOD	TEXT.	CLR.	ODOR	SAMPLE BOTTLES: SAMPLE PARAMETERS	BOT. Nos.	SAMPLE PARAMETERS	BOT. Nos.	COMMENTS
SS-3	1445	0-1"	S/S Spoon		Red + Brown		HSL +30 Organics + Metals + EP Tox Metals				Brown Sand/Waste area on bank of fill
SS-3-MS	"	"	"		"		"				" Matrix Spike
SS-3 MSD	"	"	"		"						" Matrix Spike Dup
SS-2	1540	0-2'	Shovel / S/S spoon		Brn	—	HSL +30 Organics + Metals + EP Tox Metals				
SS-4	1640	0-1"	S/S Spoon				HSL +30 Organics + Metals + EP Tox Metals				Composite of stained looking areas around lg black above ground tank & yellow upright + ½ submerged tanks nearby
SS-1	1705	0-1.5'	Shovel / S/S spoon				HSL +30 Organics + Metals + EP Tox Metals				Not able to dig any deeper than 1.5 ft (lots of rubble) Hit perched water at ~1.3' deep

Crew: JMG CS
Date: 11-2-88
Job No: 576-013

LAWLER, MATUSKY & SKELLY ENGINEERS
FIELD METER CALIBRATION AND/OR CHECK
DATA SHEET

Site: Ferro Corp
Oper: Surf H_2O
Calib. By: JMG

METER No./	PROBE No.	TIME	THERM No./	TEMP. (°C)	EXPECTED VALUE		OBSERVED VALUE		ADJ TO[a]		% DIFF.[b]	COMMENTS
DEC Orion	#4776	1000	Thermistor	8.5°	7.00	–	7.10	–	7.00	–		
pH		↓		↓	4.00	10.00	3.90	10.02	4.00	–		
		1345		7.3°	7.00	–	7.09	–	7.00	–		
		↓		↓	10.00	4.00	9.92	3.70	10.00	–		
		1740		6.2°	7.00	–	7.09	–	7.00	–		
↓		↓	↓	↓	10.00	4.00	10.03	3.85	10.00	–		

[a] For dissolved oxygen and pH meter calibrations, record adjustments (include % and ppm readings for dissolved oxygen meter calibration).

[b] Include % Diff. calculation for conductivity calibration checks: % Diff = $\frac{Ex - Ob}{Ex}$ X 100

APPENDIX G

APPENDIX G

ANALYTICAL DATA SUMMARY SHEETS

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISS-2

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-2

Sample wt/vol: 5.1 (g/mL) G Lab File ID: 27830HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 16 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	6	U
67-64-1	Acetone	6	BJ
75-15-0	Carbon Disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	6	BJ
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-dichloropropene	6	U
75-25-2	Bromoform	6	U
591-78-6	2-Hexanone	12	U
108-10-1	4-Methyl-2-Pentanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	1	BJ
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	6	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISS-2

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1675 SAS No.: - SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-2

Sample wt/vol: 5.1 (g/mL) G Lab File ID: 27830HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 16 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	NO TIC'S DETECTED			
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
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15.				
16.				
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29.				
30.				

FORM I VOA-TIC

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISS-3

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-3

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 27834HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 7 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	11	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	11	U
108-10-1	4-Methyl-2-Pentanone	11	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	0.4	BJ
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISS-3

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1675 SAS No.: - SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-3

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 27834HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 7 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	ALKYL HYDROCARBON	17:12	11	J
2.				
3.				
4.				
5.				
6.				
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29.				
30.				

FORM I VOA-TIC

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISS-3MS

Lab Name: RECRA ENVIRON   Contract: 001918

Lab Code: RECNY   Case No.: 1675   SAS No.: ______   SDG No.: LS02

Matrix: (soil/water) SOIL   Lab Sample ID: ISS-3MS

Sample wt/vol: 5.1 (g/mL) G   Lab File ID: 27832HP

Level: (low/med) LOW   Date Received: 11/03/88

% Moisture: not dec. 7   Date Analyzed: 11/04/88

Column: (pack/cap) PACK   Dilution Factor: 1.000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	11	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	6	BJ
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	11	U
108-10-1	4-Methyl-2-Pentanone	11	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

EPA SAMPLE NO.

ISS-3MSD

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-3MSD

Sample wt/vol: 5.1 (g/mL) G Lab File ID: 27833HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 7 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl Chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene Chloride	4	J
67-64-1	Acetone	11	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	6	BJ
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	11	U
108-10-1	4-Methyl-2-Pentanone	11	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISS-4

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-4

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 27835HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 16 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl Chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene Chloride	6	U
67-64-1	Acetone	4	BJ
75-15-0	Carbon Disulfide	2	J
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon Tetrachloride	6	U
108-05-4	Vinyl Acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	trans-1,3-dichloropropene	6	U
75-25-2	Bromoform	6	U
591-78-6	2-Hexanone	12	U
108-10-1	4-Methyl-2-Pentanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	0.3	BJ
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total Xylenes	6	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISS-4

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1675 SAS No.: - SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-4

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 27835HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 16 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	-	ALKYL HYDROCARBON	17:21	10	J
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3.					
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FORM I VOA-TIC

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-1

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ____ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-1

Sample wt/vol: 5.1 (g/mL) G Lab File ID: 27837HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 54 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	21	U
74-83-9	Bromomethane	21	U
75-01-4	Vinyl Chloride	21	U
75-00-3	Chloroethane	21	U
75-09-2	Methylene Chloride	11	U
67-64-1	Acetone	15	BJ
75-15-0	Carbon Disulfide	5	J
75-35-4	1,1-Dichloroethene	11	U
75-34-3	1,1-Dichloroethane	11	U
540-59-0	1,2-Dichloroethene (total)	7	J
67-66-3	Chloroform	11	U
107-06-2	1,2-Dichloroethane	11	U
78-93-3	2-Butanone	11	BJ
71-55-6	1,1,1-Trichloroethane	11	U
56-23-5	Carbon Tetrachloride	11	U
108-05-4	Vinyl Acetate	21	U
75-27-4	Bromodichloromethane	11	U
78-87-5	1,2-Dichloropropane	11	U
10061-01-5	cis-1,3-dichloropropene	11	U
79-01-6	Trichloroethene	3	J
124-48-1	Dibromochloromethane	11	U
79-00-5	1,1,2-Trichloroethane	11	U
71-43-2	Benzene	11	U
10061-02-6	trans-1,3-dichloropropene	11	U
75-25-2	Bromoform	11	U
591-78-6	2-Hexanone	21	U
108-10-1	4-Methyl-2-Pentanone	21	U
127-18-4	Tetrachloroethene	6	J
79-34-5	1,1,2,2-Tetrachloroethane	11	U
108-88-3	Toluene	1	BJ
108-90-7	Chlorobenzene	11	U
100-41-4	Ethylbenzene	11	
100-42-5	Styrene	11	U
1330-20-7	Total Xylenes	34	

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISW-1

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1675 SAS No.: - SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-1

Sample wt/vol: 5.1 (g/mL) G Lab File ID: 27837HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 54 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	ALKYL HYDROCARBON	17:26	15	J
2.				
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FORM I VOA-TIC

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-2

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-2

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 27838HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 55 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	22	U
74-83-9	Bromomethane	22	U
75-01-4	Vinyl Chloride	22	U
75-00-3	Chloroethane	22	U
75-09-2	Methylene Chloride	11	U
67-64-1	Acetone	8	BJ
75-15-0	Carbon Disulfide	14	
75-35-4	1,1-Dichloroethene	11	U
75-34-3	1,1-Dichloroethane	11	U
540-59-0	1,2-Dichloroethene (total)	11	U
67-66-3	Chloroform	3	J
107-06-2	1,2-Dichloroethane	11	U
78-93-3	2-Butanone	22	U
71-55-6	1,1,1-Trichloroethane	11	U
56-23-5	Carbon Tetrachloride	11	U
108-05-4	Vinyl Acetate	22	U
75-27-4	Bromodichloromethane	11	U
78-87-5	1,2-Dichloropropane	11	U
10061-01-5	cis-1,3-dichloropropene	11	U
79-01-6	Trichloroethene	11	U
124-48-1	Dibromochloromethane	11	U
79-00-5	1,1,2-Trichloroethane	11	U
71-43-2	Benzene	11	U
10061-02-6	trans-1,3-dichloropropene	11	U
75-25-2	Bromoform	11	U
591-78-6	2-Hexanone	22	U
108-10-1	4-Methyl-2-Pentanone	22	U
127-18-4	Tetrachloroethene	4	J
79-34-5	1,1,2,2-Tetrachloroethane	11	U
108-88-3	Toluene	2	BJ
108-90-7	Chlorobenzene	11	U
100-41-4	Ethylbenzene	11	U
100-42-5	Styrene	11	U
1330-20-7	Total Xylenes	7	J

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISW-2

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1675 SAS No.: - SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-2

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 27838HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 55 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

Number TICs found: 4

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	OXYGENATED COMPOUND	23:46	60	J
2. -	UNKNOWN	25:09	12	J
3. -	ALKYL HYDROCARBON	26:06	34	J
4. -	UNKNOWN	30:22	20	J
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FORM I VOA-TIC

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-4

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-4

Sample wt/vol: 1.2 (g/mL) G Lab File ID: 27841HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 50 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 5.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	83	U
74-83-9	Bromomethane	83	U
75-01-4	Vinyl Chloride	83	U
75-00-3	Chloroethane	83	U
75-09-2	Methylene Chloride	64	
67-64-1	Acetone	130	B
75-15-0	Carbon Disulfide	33	J
75-35-4	1,1-Dichloroethene	42	U
75-34-3	1,1-Dichloroethane	42	U
540-59-0	1,2-Dichloroethene (total)	42	U
67-66-3	Chloroform	42	U
107-06-2	1,2-Dichloroethane	42	U
78-93-3	2-Butanone	50	BJ
71-55-6	1,1,1-Trichloroethane	42	U
56-23-5	Carbon Tetrachloride	42	U
108-05-4	Vinyl Acetate	83	U
75-27-4	Bromodichloromethane	42	U
78-87-5	1,2-Dichloropropane	42	U
10061-01-5	cis-1,3-dichloropropene	42	U
79-01-6	Trichloroethene	42	U
124-48-1	Dibromochloromethane	42	U
79-00-5	1,1,2-Trichloroethane	42	U
71-43-2	Benzene	42	U
10061-02-6	trans-1,3-dichloropropene	42	U
75-25-2	Bromoform	42	U
591-78-6	2-Hexanone	83	U
108-10-1	4-Methyl-2-Pentanone	83	U
127-18-4	Tetrachloroethene	42	U
79-34-5	1,1,2,2-Tetrachloroethane	42	U
108-88-3	Toluene	29	BJ
108-90-7	Chlorobenzene	42	U
100-41-4	Ethylbenzene	3	J
100-42-5	Styrene	42	U
1330-20-7	Total Xylenes	25	J

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISW-4

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1675 SAS No.: - SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-4

Sample wt/vol: 1.2 (g/mL) G Lab File ID: 27841HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 50 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 5.0

Number TICs found: 4

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	ALKYL HYDROCARBON	17:23	150	J
2. -	ALKYL HYDROCARBON	21:35	43	J
3. -	UNKNOWN	24:50	110	J
4. -	UNKNOWN	29:50	220	J
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FORM I VOA-TIC

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-5

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-5

Sample wt/vol: 5.1 (g/mL) G Lab File ID: 27839HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 42 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	17	U
74-83-9	Bromomethane	17	U
75-01-4	Vinyl Chloride	17	U
75-00-3	Chloroethane	17	U
75-09-2	Methylene Chloride	8	U
67-64-1	Acetone	10	BJ
75-15-0	Carbon Disulfide	8	U
75-35-4	1,1-Dichloroethene	8	U
75-34-3	1,1-Dichloroethane	8	U
540-59-0	1,2-Dichloroethene (total)	8	U
67-66-3	Chloroform	8	U
107-06-2	1,2-Dichloroethane	8	U
78-93-3	2-Butanone	6	BJ
71-55-6	1,1,1-Trichloroethane	8	U
56-23-5	Carbon Tetrachloride	8	U
108-05-4	Vinyl Acetate	17	U
75-27-4	Bromodichloromethane	8	U
78-87-5	1,2-Dichloropropane	8	U
10061-01-5	cis-1,3-dichloropropene	8	U
79-01-6	Trichloroethene	8	U
124-48-1	Dibromochloromethane	8	U
79-00-5	1,1,2-Trichloroethane	8	U
71-43-2	Benzene	1	BJ
10061-02-6	trans-1,3-dichloropropene	8	U
75-25-2	Bromoform	8	U
591-78-6	2-Hexanone	17	U
108-10-1	4-Methyl-2-Pentanone	17	U
127-18-4	Tetrachloroethene	8	U
79-34-5	1,1,2,2-Tetrachloroethane	8	U
108-88-3	Toluene	1	BJ
108-90-7	Chlorobenzene	8	U
100-41-4	Ethylbenzene	8	U
100-42-5	Styrene	8	U
1330-20-7	Total Xylenes	8	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISW-5

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1675 SAS No.: - SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-5

Sample wt/vol: 5.1 (g/mL) G Lab File ID: 27839HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 42 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	-	ALKYL SUBSTITUTED COMPOUND	29:38	11	J
2.					
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FORM I VOA-TIC

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-8

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-8

Sample wt/vol: 5.1 (g/mL) G Lab File ID: 27842HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 55 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	22	U
74-83-9	Bromomethane	22	U
75-01-4	Vinyl Chloride	22	U
75-00-3	Chloroethane	22	U
75-09-2	Methylene Chloride	10	J
67-64-1	Acetone	6	BJ
75-15-0	Carbon Disulfide	5	J
75-35-4	1,1-Dichloroethene	11	U
75-34-3	1,1-Dichloroethane	11	U
540-59-0	1,2-Dichloroethene (total)	11	U
67-66-3	Chloroform	11	U
107-06-2	1,2-Dichloroethane	11	U
78-93-3	2-Butanone	22	U
71-55-6	1,1,1-Trichloroethane	11	U
56-23-5	Carbon Tetrachloride	11	U
108-05-4	Vinyl Acetate	22	U
75-27-4	Bromodichloromethane	11	U
78-87-5	1,2-Dichloropropane	11	U
10061-01-5	cis-1,3-dichloropropene	11	U
79-01-6	Trichloroethene	11	U
124-48-1	Dibromochloromethane	11	U
79-00-5	1,1,2-Trichloroethane	11	U
71-43-2	Benzene	11	U
10061-02-6	trans-1,3-dichloropropene	11	U
75-25-2	Bromoform	11	U
591-78-6	2-Hexanone	22	U
108-10-1	4-Methyl-2-Pentanone	22	U
127-18-4	Tetrachloroethene	7	J
79-34-5	1,1,2,2-Tetrachloroethane	11	U
108-88-3	Toluene	1	BJ
108-90-7	Chlorobenzene	11	U
100-41-4	Ethylbenzene	11	U
100-42-5	Styrene	11	U
1330-20-7	Total Xylenes	5	J

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO. 028

ISW-8

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1675 SAS No.: - SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-8

Sample wt/vol: 5.1 (g/mL) G Lab File ID: 27842HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 55 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

Number TICs found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	ALKYL HYDROCARBON	17:23	24	J
2. -	ALKYL HYDROCARBON	24:24	69	J
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISS-1

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ____ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-1

Sample wt/vol: 30.5 (g/mL) G Lab File ID: 510Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 24 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) Y pH: 8.8 Dilution Factor: 10.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	8600	U
111-44-4	bis(2-Chloroethyl)Ether	8600	U
95-57-8	2-Chlorophenol	8600	U
541-73-1	1,3-Dichlorobenzene	8600	U
106-46-7	1,4-Dichlorobenzene	8600	U
100-51-6	Benzyl Alcohol	8600	U
95-50-1	1,2-Dichlorobenzene	8600	U
95-48-7	2-Methylphenol	8600	U
108-60-1	bis(2-Chloroisopropyl)Ether	8600	U
106-44-5	4-Methylphenol	8600	U
621-64-7	N-Nitroso-Di-n-Propylamine	8600	U
67-72-1	Hexachloroethane	8600	U
98-95-3	Nitrobenzene	8600	U
78-59-1	Isophorone	8600	U
88-75-5	2-Nitrophenol	8600	U
105-67-9	2,4-Dimethylphenol	8600	U
65-85-0	Benzoic Acid	41000	U
111-91-1	bis(2-Chloroethoxy)Methane	8600	U
120-83-2	2,4-Dichlorophenol	8600	U
120-82-1	1,2,4-Trichlorobenzene	8600	U
91-20-3	Naphthalene	8600	U
106-47-8	4-Chloroaniline	8600	U
87-68-3	Hexachlorobutadiene	8600	U
59-50-7	4-Chloro-3-Methylphenol	8600	U
91-57-6	2-Methylnaphthalene	8600	U
77-47-4	Hexachlorocyclopentadiene	8600	U
88-06-2	2,4,6-Trichlorophenol	8600	U
95-95-4	2,4,5-Trichlorophenol	41000	U
91-58-7	2-Chloronaphthalene	8600	U
88-74-4	2-Nitroaniline	41000	U
131-11-3	Dimethyl Phthalate	8600	U
208-96-8	Acenaphthylene	1100	J

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISS-1

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-1

Sample wt/vol: 30.5 (g/mL) G Lab File ID: 510Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 24 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) Y pH: 8.8 Dilution Factor: 10.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	41000	U
83-32-9	Acenaphthene	1400	J
51-28-5	2,4-Dinitrophenol	41000	U
100-02-7	4-Nitrophenol	41000	U
132-64-9	Dibenzofuran	1300	J
121-14-2	2,4-Dinitrotoluene	8600	U
606-20-2	2,6-Dinitrotoluene	8600	U
84-66-2	Diethylphthalate	8600	U
7005-72-3	4-Chlorophenyl-phenylether	8600	U
86-73-7	Fluorene	8600	U
100-01-6	4-Nitroaniline	41000	U
534-52-1	4,6-Dinitro-2-Methylphenol	41000	U
86-30-6	N-Nitrosodiphenylamine (1)	8600	U
101-55-3	4-Bromophenyl-phenylether	8600	U
118-74-1	Hexachlorobenzene	8600	U
87-86-5	Pentachlorophenol	41000	U
85-01-8	Phenanthrene	32000	
120-12-7	Anthracene	9800	
84-74-2	Di-n-Butylphthalate	8600	U
206-44-0	Fluoranthene	79000	
129-00-0	Pyrene	72000	
85-68-7	Butylbenzylphthalate	8600	U
91-94-1	3,3'-Dichlorobenzidine	17000	U
56-55-3	Benzo(a)Anthracene	31000	
117-81-7	bis(2-Ethylhexyl)Phthalate	8600	U
218-01-9	Chrysene	30000	
117-84-0	Di-n-Octyl Phthalate	8600	U
205-99-2	Benzo(b)Fluoranthene	59000	
207-08-9	Benzo(k)Fluoranthene	5300	J
50-32-8	Benzo(a)Pyrene	25000	
193-39-5	Indeno(1,2,3-cd)Pyrene	16000	
53-70-3	Dibenz(a,h)Anthracene	3600	J
191-24-2	Benzo(g,h,i)Perylene	13000	

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISS-1

Lab Name: RECRA ENVIRONMENTAL, INC.   Contract: 001918

Lab Code: RECNY   Case No.: 1675   SAS No.: ____   SDG No.: LS02

Matrix: (soil/water) SOIL   Lab Sample ID: ISS-1

Sample wt/vol: 30.5 (g/mL) G   Lab File ID: 510Z

Level: (low/med) LOW   Date Received: 11/03/88

% Moisture: not dec. 24   dec. -   Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC   Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) Y   pH: 8.8   Dilution Factor: 10.0

Number TIC's found: 8

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	PHENANTHRENE DERIVATIVE	25:07	4,400	J
2. -	PHENANTHRENE DERIVATIVE	25:22	11,000	J
3. -	NAPHTHALENE DERIVATIVE	26:01	4,000	J
4. -	PYRENE DERIVATIVE	29:02	8,700	J
5. -	PYRENE DERIVATIVE	29:14	4,800	J
6. -	PYRENE DERIVATIVE	31:05	6,500	J
7. -	ALKYL PHENOL COMPOUND	32:06	24,000	BJ
8. -	UNKNOWN	37:15	8,800	J
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISS-2

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-2

Sample wt/vol: 31.7 (g/mL) G Lab File ID: 508Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 16 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/06/88

GPC Cleanup: (Y/N) Y pH: 8.8 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	870	
111-44-4	bis(2-Chloroethyl)Ether	740	U
95-57-8	2-Chlorophenol	740	U
541-73-1	1,3-Dichlorobenzene	740	U
106-46-7	1,4-Dichlorobenzene	740	U
100-51-6	Benzyl Alcohol	740	U
95-50-1	1,2-Dichlorobenzene	740	U
95-48-7	2-Methylphenol	740	U
108-60-1	bis(2-Chloroisopropyl)Ether	740	U
106-44-5	4-Methylphenol	740	U
621-64-7	N-Nitroso-Di-n-Propylamine	740	U
67-72-1	Hexachloroethane	740	U
98-95-3	Nitrobenzene	740	U
78-59-1	Isophorone	740	U
88-75-5	2-Nitrophenol	740	U
105-67-9	2,4-Dimethylphenol	740	U
65-85-0	Benzoic Acid	3600	U
111-91-1	bis(2-Chloroethoxy)Methane	740	U
120-83-2	2,4-Dichlorophenol	740	U
120-82-1	1,2,4-Trichlorobenzene	740	U
91-20-3	Naphthalene	800	
106-47-8	4-Chloroaniline	740	U
87-68-3	Hexachlorobutadiene	740	U
59-50-7	4-Chloro-3-Methylphenol	740	U
91-57-6	2-Methylnaphthalene	1300	
77-47-4	Hexachlorocyclopentadiene	740	U
88-06-2	2,4,6-Trichlorophenol	740	U
95-95-4	2,4,5-Trichlorophenol	3600	U
91-58-7	2-Chloronaphthalene	740	U
88-74-4	2-Nitroaniline	3600	U
131-11-3	Dimethyl Phthalate	740	U
208-96-8	Acenaphthylene	59	J

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISS-2

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-2

Sample wt/vol: 31.7 (g/mL) G Lab File ID: 5032

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 16 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/06/88

GPC Cleanup: (Y/N) Y pH: 8.8 Dilution Factor: 1.00

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION (UG/KG)	Q
99-09-2	3-Nitroaniline	3600	U
83-32-9	Acenaphthene	1800	
51-28-5	2,4-Dinitrophenol	3600	U
100-02-7	4-Nitrophenol	3600	U
132-64-9	Dibenzofuran	1600	
121-14-2	2,4-Dinitrotoluene	740	U
606-20-2	2,6-Dinitrotoluene	740	U
84-66-2	Diethylphthalate	740	U
7005-72-3	4-Chlorophenyl-phenylether	740	U
86-73-7	Fluorene	740	U
100-01-6	4-Nitroaniline	3600	U
534-52-1	4,6-Dinitro-2-Methylphenol	3600	U
86-30-6	N-Nitrosodiphenylamine (1)	740	U
101-55-3	4-Bromophenyl-phenylether	740	U
118-74-1	Hexachlorobenzene	740	U
87-86-5	Pentachlorophenol	3600	U
85-01-8	Phenanthrene	6800	
120-12-7	Anthracene	410	J
84-74-2	Di-n-Butylphthalate	46	BJ
206-44-0	Fluoranthene	5000	
129-00-0	Pyrene	4800	
85-68-7	Butylbenzylphthalate	740	U
91-94-1	3,3'-Dichlorobenzidine	1500	U
56-55-3	Benzo(a)Anthracene	1400	
117-81-7	bis(2-Ethylhexyl)Phthalate	77	BJ
218-01-9	Chrysene	1400	
117-84-0	Di-n-Octyl Phthalate	740	U
205-99-2	Benzo(b)Fluoranthene	1200	
207-08-9	Benzo(k)Fluoranthene	1300	
50-32-8	Benzo(a)Pyrene	950	
193-39-5	Indeno(1,2,3-cd)Pyrene	550	J
53-70-3	Dibenz(a,h)Anthracene	130	J
191-24-2	Benzo(g,h,i)Perylene	470	J

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISS-2

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ____ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-2

Sample wt/vol: 31.7 (g/mL) G Lab File ID: 508Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 16 dec. - Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/06/88

GPC Cleanup: (Y/N) Y pH: 8.8 Dilution Factor: 1.0

Number TIC's found: 15

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER		COMPOUND NAME	RT	EST. CONC.	Q
1.	-	ALKYL SUBSTITUTED COMPOUND	07:32	1,300	J
2.	-	NAPHTHALENE DERIVATIVE	15:56	1,100	J
3.	-	ALKYL HYDROCARBON	22:08	470	J
4.	-	PHENALEN DERIVATIVE	22:54	590	J
5.	-	BENZOTHIOPHENE DERIVATIVE	23:07	690	J
6.	-	ALKYL HYDROCARBON	24:53	440	J
7.	-	ALKYL PHENOL DERIVATIVE	26:25	3,600	J
8.	-	ALKYL PHENOL DERIVATIVE	27:15	7,300	J
9.	-	ALKYL SUBSTITUTED COMPOUND	28:35	630	J
10.	-	UNKNOWN	30:31	2,900	J
11.	-	LONGCHAIN COMPOUND	32:51	370	J
12.	-	UNKNOWN	34:41	3,400	BJ
13.	-	UNKNOWN	35:42	1,400	J
14.	-	UNKNOWN	37:07	550	J
15.	-	UNKNOWN	40:14	870	J
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
ISS-3

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-3

Sample wt/vol: 30.9 (g/mL) G Lab File ID: 505Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 7 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/06/88

GPC Cleanup: (Y/N) Y pH: 8.2 Dilution Factor: 10.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION (UG/KG)	Q
108-95-2	Phenol	2300	J
111-44-4	bis(2-Chloroethyl)Ether	6900	U
95-57-8	2-Chlorophenol	6900	U
541-73-1	1,3-Dichlorobenzene	6900	U
106-46-7	1,4-Dichlorobenzene	6900	U
100-51-6	Benzyl Alcohol	6900	U
95-50-1	1,2-Dichlorobenzene	6900	U
95-48-7	2-Methylphenol	6900	U
108-60-1	bis(2-Chloroisopropyl)Ether	6900	U
106-44-5	4-Methylphenol	6900	U
621-64-7	N-Nitroso-Di-n-Propylamine	6900	U
67-72-1	Hexachloroethane	6900	U
98-95-3	Nitrobenzene	6900	U
78-59-1	Isophorone	6900	U
88-75-5	2-Nitrophenol	6900	U
105-67-9	2,4-Dimethylphenol	6900	U
65-85-0	Benzoic Acid	33000	U
111-91-1	bis(2-Chloroethoxy)Methane	6900	U
120-83-2	2,4-Dichlorophenol	6900	U
120-82-1	1,2,4-Trichlorobenzene	6900	U
91-20-3	Naphthalene	1700	J
106-47-8	4-Chloroaniline	6900	U
87-68-3	Hexachlorobutadiene	6900	U
59-50-7	4-Chloro-3-Methylphenol	6900	U
91-57-6	2-Methylnaphthalene	2200	J
77-47-4	Hexachlorocyclopentadiene	6900	U
88-06-2	2,4,6-Trichlorophenol	6900	U
95-95-4	2,4,5-Trichlorophenol	33000	U
91-58-7	2-Chloronaphthalene	6900	U
88-74-4	2-Nitroaniline	33000	U
131-11-3	Dimethyl Phthalate	6900	U
208-96-8	Acenaphthylene	6900	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISS-3

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-3

Sample wt/vol: 30.9 (g/mL) G Lab File ID: 505Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 7 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/06/88

GPC Cleanup: (Y/N) Y pH: 8.2 Dilution Factor: 10.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION (UG/KG)	Q
99-09-2	3-Nitroaniline	33000	U
83-32-9	Acenaphthene	1900	J
51-28-5	2,4-Dinitrophenol	33000	U
100-02-7	4-Nitrophenol	33000	U
132-64-9	Dibenzofuran	1600	J
121-14-2	2,4-Dinitrotoluene	6900	U
606-20-2	2,6-Dinitrotoluene	6900	U
84-66-2	Diethylphthalate	6900	U
7005-72-3	4-Chlorophenyl-phenylether	6900	U
86-73-7	Fluorene	1400	J
100-01-6	4-Nitroaniline	33000	U
534-52-1	4,6-Dinitro-2-Methylphenol	33000	U
86-30-6	N-Nitrosodiphenylamine (1)	6900	U
101-55-3	4-Bromophenyl-phenylether	6900	U
118-74-1	Hexachlorobenzene	6900	U
87-86-5	Pentachlorophenol	33000	U
85-01-8	Phenanthrene	6300	J
120-12-7	Anthracene	6900	U
84-74-2	Di-n-Butylphthalate	6900	U
206-44-0	Fluoranthene	4400	J
129-00-0	Pyrene	3700	J
85-68-7	Butylbenzylphthalate	6900	U
91-94-1	3,3'-Dichlorobenzidine	14000	U
56-55-3	Benzo(a)Anthracene	1200	J
117-81-7	bis(2-Ethylhexyl)Phthalate	190	BJ
218-01-9	Chrysene	1300	J
117-84-0	Di-n-Octyl Phthalate	6900	U
205-99-2	Benzo(b)Fluoranthene	6900	U
207-08-9	Benzo(k)Fluoranthene	190	J
50-32-8	Benzo(a)Pyrene	870	J
193-39-5	Indeno(1,2,3-cd)Pyrene	490	J
53-70-3	Dibenz(a,h)Anthracene	6900	U
191-24-2	Benzo(g,h,i)Perylene	470	J

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISS-3

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ____ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-3

Sample wt/vol: 30.9 (g/mL) G Lab File ID: 505Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 7 dec. - Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/06/88

GPC Cleanup: (Y/N) Y pH: 8.2 Dilution Factor: 10.0

Number TIC's found: 8

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	-	SULFUR COMPOUND	21:29	4,600	J
2.	-	ALKYL PHENOL COMPOUND	26:20	9,300	J
3.	-	ALKYL PHENOL DERIVATIVE	32:05	4,100	BJ
4.	-	SILICON COMPOUND	33:49	4,300	J
5.	-	LONGCHAIN COMPOUND	34:43	3,700	BJ
6.	-	ALKYL SUBSTITUTED COMPOUND	35:40	3,300	J
7.	-	SILICON COMPOUND	37:49	7,600	J
8.	-	SILICON COMPOUND	39:40	4,100	J
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISS-3MS

P99

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-3MS

Sample wt/vol: 30.7 (g/mL) G Lab File ID: 519Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 7 dec. Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/08/88

GPC Cleanup: (Y/N) Y pH: 8.2 Dilution Factor: 10.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	6900	U
111-44-4	bis(2-Chloroethyl)Ether	6900	U
95-57-8	2-Chlorophenol	6900	U
541-73-1	1,3-Dichlorobenzene	6900	U
106-46-7	1,4-Dichlorobenzene	6900	U
100-51-6	Benzyl Alcohol	6900	U
95-50-1	1,2-Dichlorobenzene	6900	U
95-48-7	2-Methylphenol	6900	U
108-60-1	bis(2-Chloroisopropyl)Ether	6900	U
106-44-5	4-Methylphenol	6900	U
621-64-7	N-Nitroso-Di-n-Propylamine	6900	U
67-72-1	Hexachloroethane	6900	U
98-95-3	Nitrobenzene	6900	U
78-59-1	Isophorone	6900	U
88-75-5	2-Nitrophenol	6900	U
105-67-9	2,4-Dimethylphenol	6900	U
65-85-0	Benzoic Acid	34000	U
111-91-1	bis(2-Chloroethoxy)Methane	6900	U
120-83-2	2,4-Dichlorophenol	6900	U
120-82-1	1,2,4-Trichlorobenzene	6900	U
91-20-3	Naphthalene	1300	J
106-47-8	4-Chloroaniline	6900	U
87-68-3	Hexachlorobutadiene	6900	U
59-50-7	4-Chloro-3-Methylphenol	6900	U
91-57-6	2-Methylnaphthalene	2400	J
77-47-4	Hexachlorocyclopentadiene	6900	U
88-06-2	2,4,6-Trichlorophenol	6900	U
95-95-4	2,4,5-Trichlorophenol	34000	U
91-58-7	2-Chloronaphthalene	6900	U
88-74-4	2-Nitroaniline	34000	U
131-11-3	Dimethyl Phthalate	6900	U
208-96-8	Acenaphthylene	6900	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISS-3MS

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-3MS

Sample wt/vol: 30.7 (g/mL) G Lab File ID: 519Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 7 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/08/88

GPC Cleanup: (Y/N) Y pH: 8.2 Dilution Factor: 10.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION	Q
99-09-2	3-Nitroaniline	34000	U
83-32-9	Acenaphthene	6900	U
51-28-5	2,4-Dinitrophenol	34000	U
100-02-7	4-Nitrophenol	34000	U
132-64-9	Dibenzofuran	1800	J
121-14-2	2,4-Dinitrotoluene	6900	U
606-20-2	2,6-Dinitrotoluene	6900	U
84-66-2	Diethylphthalate	6900	U
7005-72-3	4-Chlorophenyl-phenylether	6900	U
86-73-7	Fluorene	1400	J
100-01-6	4-Nitroaniline	34000	U
534-52-1	4,6-Dinitro-2-Methylphenol	34000	U
86-30-6	N-Nitrosodiphenylamine (1)	6900	U
101-55-3	4-Bromophenyl-phenylether	6900	U
118-74-1	Hexachlorobenzene	6900	U
87-86-5	Pentachlorophenol	34000	U
85-01-8	Phenanthrene	7700	
120-12-7	Anthracene	6900	U
84-74-2	Di-n-Butylphthalate	6900	U
206-44-0	Fluoranthene	4700	J
129-00-0	Pyrene	6900	U
85-68-7	Butylbenzylphthalate	6900	U
91-94-1	3,3'-Dichlorobenzidine	14000	U
56-55-3	Benzo(a)Anthracene	1200	J
117-81-7	bis(2-Ethylhexyl)Phthalate	6900	U
218-01-9	Chrysene	1300	J
117-84-0	Di-n-Octyl Phthalate	6900	U
205-99-2	Benzo(b)Fluoranthene	6900	U
207-08-9	Benzo(k)Fluoranthene	1800	J
50-32-8	Benzo(a)Pyrene	830	J
193-39-5	Indeno(1,2,3-cd)Pyrene	6900	U
53-70-3	Dibenz(a,h)Anthracene	6900	U
191-24-2	Benzo(g,h,i)Perylene	6900	U

(1) - Cannot be separated from Diphenylamine

2000

EPA SAMPLE NO.

ISS-3MSD

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-3MSD

Sample wt/vol: 30.8 (g/mL) G Lab File ID: 507Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 7 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/06/88

GPC Cleanup: (Y/N) Y pH: 8.2 Dilution Factor: 10.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	6900	U
111-44-4	bis(2-Chloroethyl)Ether	6900	U
95-57-8	2-Chlorophenol	6900	U
541-73-1	1,3-Dichlorobenzene	6900	U
106-46-7	1,4-Dichlorobenzene	6900	U
100-51-6	Benzyl Alcohol	6900	U
95-50-1	1,2-Dichlorobenzene	6900	U
95-48-7	2-Methylphenol	6900	U
108-60-1	bis(2-Chloroisopropyl)Ether	6900	U
106-44-5	4-Methylphenol	6900	U
621-64-7	N-Nitroso-Di-n-Propylamine	6900	U
67-72-1	Hexachloroethane	6900	U
98-95-3	Nitrobenzene	6900	U
78-59-1	Isophorone	6900	U
88-75-5	2-Nitrophenol	6900	U
105-67-9	2,4-Dimethylphenol	6900	U
65-85-0	Benzoic Acid	34000	U
111-91-1	bis(2-Chloroethoxy)Methane	6900	U
120-83-2	2,4-Dichlorophenol	6900	U
120-82-1	1,2,4-Trichlorobenzene	6900	U
91-20-3	Naphthalene	1400	J
106-47-8	4-Chloroaniline	6900	U
87-68-3	Hexachlorobutadiene	6900	U
59-50-7	4-Chloro-3-Methylphenol	6900	U
91-57-6	2-Methylnaphthalene	3100	J
77-47-4	Hexachlorocyclopentadiene	6900	U
88-06-2	2,4,6-Trichlorophenol	6900	U
95-95-4	2,4,5-Trichlorophenol	34000	U
91-58-7	2-Chloronaphthalene	6900	U
88-74-4	2-Nitroaniline	34000	U
131-11-3	Dimethyl Phthalate	6900	U
208-96-8	Acenaphthylene	6900	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISS-3MSD

Lab Name: RECRA ENVIRON   Contract: 001918

Lab Code: RECNY   Case No.: 1675   SAS No.: ______   SDG No.: LS02

Matrix: (soil/water) SOIL   Lab Sample ID: ISS-3MSD

Sample wt/vol: 30.8 (g/mL) G   Lab File ID: 507Z

Level: (low/med) LOW   Date Received: 11/03/88

% Moisture: not dec. 7 dec. ____   Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC   Date Analyzed: 12/06/88

GPC Cleanup: (Y/N) Y   pH: 8.2   Dilution Factor: 10.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	34000	U
83-32-9	Acenaphthene	6900	U
51-28-5	2,4-Dinitrophenol	34000	U
100-02-7	4-Nitrophenol	34000	U
132-64-9	Dibenzofuran	2100	J
121-14-2	2,4-Dinitrotoluene	6900	U
606-20-2	2,6-Dinitrotoluene	6900	U
84-66-2	Diethylphthalate	6900	U
7005-72-3	4-Chlorophenyl-phenylether	6900	U
86-73-7	Fluorene	1700	J
100-01-6	4-Nitroaniline	34000	U
534-52-1	4,6-Dinitro-2-Methylphenol	34000	U
86-30-6	N-Nitrosodiphenylamine (1)	6900	U
101-55-3	4-Bromophenyl-phenylether	6900	U
118-74-1	Hexachlorobenzene	6900	U
87-86-5	Pentachlorophenol	34000	U
85-01-8	Phenanthrene	7600	
120-12-7	Anthracene	6900	U
84-74-2	Di-n-Butylphthalate	6900	U
206-44-0	Fluoranthene	5100	J
129-00-0	Pyrene	6900	U
85-68-7	Butylbenzylphthalate	6900	U
91-94-1	3,3'-Dichlorobenzidine	14000	U
56-55-3	Benzo(a)Anthracene	1500	J
117-81-7	bis(2-Ethylhexyl)Phthalate	200	BJ
218-01-9	Chrysene	1500	J
117-84-0	Di-n-Octyl Phthalate	6900	U
205-99-2	Benzo(b)Fluoranthene	6900	U
207-08-9	Benzo(k)Fluoranthene	6900	U
50-32-8	Benzo(a)Pyrene	1100	J
193-39-5	Indeno(1,2,3-cd)Pyrene	680	J
53-70-3	Dibenz(a,h)Anthracene	6900	U
191-24-2	Benzo(g,h,i)Perylene	520	J

(1) - Cannot be separated from Diphenylamine

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISS-4

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-4

Sample wt/vol: 30.9 (g/mL) G Lab File ID: 509Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 16 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/06/88

GPC Cleanup: (Y/N) Y pH: 8.3 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	760	U
111-44-4	bis(2-Chloroethyl)Ether	760	U
95-57-8	2-Chlorophenol	760	U
541-73-1	1,3-Dichlorobenzene	760	U
106-46-7	1,4-Dichlorobenzene	760	U
100-51-6	Benzyl Alcohol	760	U
95-50-1	1,2-Dichlorobenzene	760	U
95-48-7	2-Methylphenol	760	U
108-60-1	bis(2-Chloroisopropyl)Ether	760	U
106-44-5	4-Methylphenol	760	U
621-64-7	N-Nitroso-Di-n-Propylamine	760	U
67-72-1	Hexachloroethane	760	U
98-95-3	Nitrobenzene	760	U
78-59-1	Isophorone	760	U
88-75-5	2-Nitrophenol	760	U
105-67-9	2,4-Dimethylphenol	760	U
65-85-0	Benzoic Acid	3700	U
111-91-1	bis(2-Chloroethoxy)Methane	760	U
120-83-2	2,4-Dichlorophenol	760	U
120-82-1	1,2,4-Trichlorobenzene	760	U
91-20-3	Naphthalene	170	J
106-47-8	4-Chloroaniline	760	U
87-68-3	Hexachlorobutadiene	760	U
59-50-7	4-Chloro-3-Methylphenol	760	U
91-57-6	2-Methylnaphthalene	130	J
77-47-4	Hexachlorocyclopentadiene	760	U
88-06-2	2,4,6-Trichlorophenol	760	U
95-95-4	2,4,5-Trichlorophenol	3700	U
91-58-7	2-Chloronaphthalene	760	U
88-74-4	2-Nitroaniline	3700	U
131-11-3	Dimethyl Phthalate	760	U
208-96-8	Acenaphthylene	37	J

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISS-4

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-4

Sample wt/vol: 30.9 (g/mL) G Lab File ID: 509Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 16 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/06/88

GPC Cleanup: (Y/N) Y pH: 8.3 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	3700	U
83-32-9	Acenaphthene	87	J
51-28-5	2,4-Dinitrophenol	3700	U
100-02-7	4-Nitrophenol	3700	U
132-64-9	Dibenzofuran	76	J
121-14-2	2,4-Dinitrotoluene	760	U
606-20-2	2,6-Dinitrotoluene	760	U
84-66-2	Diethylphthalate	760	U
7005-72-3	4-Chlorophenyl-phenylether	760	U
86-73-7	Fluorene	110	J
100-01-6	4-Nitroaniline	3700	U
534-52-1	4,6-Dinitro-2-Methylphenol	3700	U
86-30-6	N-Nitrosodiphenylamine (1)	760	U
101-55-3	4-Bromophenyl-phenylether	760	U
118-74-1	Hexachlorobenzene	760	U
87-86-5	Pentachlorophenol	3700	U
85-01-8	Phenanthrene	730	J
120-12-7	Anthracene	130	J
84-74-2	Di-n-Butylphthalate	27	BJ
206-44-0	Fluoranthene	980	
129-00-0	Pyrene	930	
85-68-7	Butylbenzylphthalate	760	U
91-94-1	3,3'-Dichlorobenzidine	1500	U
56-55-3	Benzo(a)Anthracene	370	J
117-81-7	bis(2-Ethylhexyl)Phthalate	110	BJ
218-01-9	Chrysene	440	J
117-84-0	Di-n-Octyl Phthalate	760	U
205-99-2	Benzo(b)Fluoranthene	350	J
207-08-9	Benzo(k)Fluoranthene	77	J
50-32-8	Benzo(a)Pyrene	320	J
193-39-5	Indeno(1,2,3-cd)Pyrene	200	J
53-70-3	Dibenz(a,h)Anthracene	760	U
191-24-2	Benzo(g,h,i)Perylene	180	J

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISS-4

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ____ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-4

Sample wt/vol: 30.9 (g/mL) G Lab File ID: 509Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 16 dec. - Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/06/88

GPC Cleanup: (Y/N) Y pH: 8.3 Dilution Factor: 1.0

Number TIC's found: 7

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER		COMPOUND NAME	RT	EST. CONC.	Q
1.	-	ALKYL SUBSTITUTED COMPOUND	07:31	1,400	J
2.	-	LONGCHAIN COMPOUND	27:02	940	J
3.	-	UNKNOWN	30:29	4,600	J
4.	-	UNKNOWN	34:40	7,200	J
5.	-	LONGCHAIN COMPOUND	35:37	1,600	J
6.	-	UNKNOWN	37:14	1,500	J
7.	-	UNKNOWN	41:14	1,000	J
8.					
9.					
10.					
11.					
12.					
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-1

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-1

Sample wt/vol: 30.8 (g/mL) G Lab File ID: 513Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 53 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) Y pH: 9.0 Dilution Factor: 10.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	14000	U
111-44-4	bis(2-Chloroethyl)Ether	14000	U
95-57-8	2-Chlorophenol	14000	U
541-73-1	1,3-Dichlorobenzene	14000	U
106-46-7	1,4-Dichlorobenzene	14000	U
100-51-6	Benzyl Alcohol	14000	U
95-50-1	1,2-Dichlorobenzene	14000	U
95-48-7	2-Methylphenol	14000	U
108-60-1	bis(2-Chloroisopropyl)Ether	14000	U
106-44-5	4-Methylphenol	14000	U
621-64-7	N-Nitroso-Di-n-Propylamine	14000	U
67-72-1	Hexachloroethane	14000	U
98-95-3	Nitrobenzene	14000	U
78-59-1	Isophorone	14000	U
88-75-5	2-Nitrophenol	14000	U
105-67-9	2,4-Dimethylphenol	14000	U
65-85-0	Benzoic Acid	66000	U
111-91-1	bis(2-Chloroethoxy)Methane	14000	U
120-83-2	2,4-Dichlorophenol	14000	U
120-82-1	1,2,4-Trichlorobenzene	14000	U
91-20-3	Naphthalene	14000	U
106-47-8	4-Chloroaniline	14000	U
87-68-3	Hexachlorobutadiene	14000	U
59-50-7	4-Chloro-3-Methylphenol	14000	U
91-57-6	2-Methylnaphthalene	14000	U
77-47-4	Hexachlorocyclopentadiene	14000	U
88-06-2	2,4,6-Trichlorophenol	14000	U
95-95-4	2,4,5-Trichlorophenol	66000	U
91-58-7	2-Chloronaphthalene	14000	U
88-74-4	2-Nitroaniline	66000	U
131-11-3	Dimethyl Phthalate	14000	U
208-96-8	Acenaphthylene	14000	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
ISW-1

Lab Name: RECRA ENVIRON   Contract: 001918

Lab Code: RECNY   Case No.: 1675   SAS No.: ______   SDG No.: LS02

Matrix: (soil/water) SOIL   Lab Sample ID: ISW-1

Sample wt/vol: 30.8 (g/mL) G   Lab File ID: 513Z

Level: (low/med) LOW   Date Received: 11/03/88

% Moisture: not dec. 53   dec. ____   Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC   Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) Y   pH: 9.0   Dilution Factor: 10.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	66000	U
83-32-9	Acenaphthene	14000	U
51-28-5	2,4-Dinitrophenol	66000	U
100-02-7	4-Nitrophenol	66000	U
132-64-9	Dibenzofuran	14000	U
121-14-2	2,4-Dinitrotoluene	14000	U
606-20-2	2,6-Dinitrotoluene	14000	U
84-66-2	Diethylphthalate	14000	U
7005-72-3	4-Chlorophenyl-phenylether	14000	U
86-73-7	Fluorene	14000	U
100-01-6	4-Nitroaniline	66000	U
534-52-1	4,6-Dinitro-2-Methylphenol	66000	U
86-30-6	N-Nitrosodiphenylamine (1)	14000	U
101-55-3	4-Bromophenyl-phenylether	14000	U
118-74-1	Hexachlorobenzene	14000	U
87-86-5	Pentachlorophenol	66000	U
85-01-8	Phenanthrene	6300	J
120-12-7	Anthracene	14000	U
84-74-2	Di-n-Butylphthalate	14000	U
206-44-0	Fluoranthene	8900	J
129-00-0	Pyrene	8500	J
85-68-7	Butylbenzylphthalate	14000	U
91-94-1	3,3'-Dichlorobenzidine	27000	U
56-55-3	Benzo(a)Anthracene	3700	J
117-81-7	bis(2-Ethylhexyl)Phthalate	14000	U
218-01-9	Chrysene	14000	U
117-84-0	Di-n-Octyl Phthalate	14000	U
205-99-2	Benzo(b)Fluoranthene	14000	U
207-08-9	Benzo(k)Fluoranthene	14000	U
50-32-8	Benzo(a)Pyrene	3300	J
193-39-5	Indeno(1,2,3-cd)Pyrene	14000	U
53-70-3	Dibenz(a,h)Anthracene	14000	U
191-24-2	Benzo(g,h,i)Perylene	14000	U

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISW-1

051

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ____ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-1

Sample wt/vol: 30.8 (g/mL) G Lab File ID: 513Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 53 dec. - Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) Y pH: 9.0 Dilution Factor: 10.0

Number TIC's found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	ALKYL SUBSTITUTED COMPOUND	35:37	16,000	J
2.				
3.				
4.				
5.				
6.				
7.				
8.				
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-2

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-2

Sample wt/vol: 30.7 (g/mL) G Lab File ID: 553Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 55 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/10/88

GPC Cleanup: (Y/N) Y pH: 7.6 Dilution Factor: 1.00

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION (UG/KG)	Q
108-95-2	Phenol	1400	U
111-44-4	bis(2-Chloroethyl)Ether	1400	U
95-57-8	2-Chlorophenol	1400	U
541-73-1	1,3-Dichlorobenzene	1400	U
106-46-7	1,4-Dichlorobenzene	1400	U
100-51-6	Benzyl Alcohol	1400	U
95-50-1	1,2-Dichlorobenzene	1400	U
95-48-7	2-Methylphenol	1400	U
108-60-1	bis(2-Chloroisopropyl)Ether	1400	U
106-44-5	4-Methylphenol	1400	U
621-64-7	N-Nitroso-Di-n-Propylamine	1400	U
67-72-1	Hexachloroethane	1400	U
98-95-3	Nitrobenzene	1400	U
78-59-1	Isophorone	1400	U
88-75-5	2-Nitrophenol	1400	U
105-67-9	2,4-Dimethylphenol	1400	U
65-85-0	Benzoic Acid	6900	U
111-91-1	bis(2-Chloroethoxy)Methane	1400	U
120-83-2	2,4-Dichlorophenol	1400	U
120-82-1	1,2,4-Trichlorobenzene	1400	U
91-20-3	Naphthalene	1400	U
106-47-8	4-Chloroaniline	1400	U
87-68-3	Hexachlorobutadiene	1400	U
59-50-7	4-Chloro-3-Methylphenol	1400	U
91-57-6	2-Methylnaphthalene	13	J
77-47-4	Hexachlorocyclopentadiene	1400	U
88-06-2	2,4,6-Trichlorophenol	1400	U
95-95-4	2,4,5-Trichlorophenol	6900	U
91-58-7	2-Chloronaphthalene	1400	U
88-74-4	2-Nitroaniline	6900	U
131-11-3	Dimethyl Phthalate	1400	U
208-96-8	Acenaphthylene	1400	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-2

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-2

Sample wt/vol: 30.7 (g/mL) G Lab File ID: 553Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 55 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/10/88

GPC Cleanup: (Y/N) Y pH: 7.6 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	6900	U
83-32-9	Acenaphthene	1400	U
51-28-5	2,4-Dinitrophenol	6900	U
100-02-7	4-Nitrophenol	6900	U
132-64-9	Dibenzofuran	1400	U
121-14-2	2,4-Dinitrotoluene	1400	U
606-20-2	2,6-Dinitrotoluene	1400	U
84-66-2	Diethylphthalate	1400	U
7005-72-3	4-Chlorophenyl-phenylether	1400	U
86-73-7	Fluorene	1400	U
100-01-6	4-Nitroaniline	6900	U
534-52-1	4,6-Dinitro-2-Methylphenol	6900	U
86-30-6	N-Nitrosodiphenylamine (1)	1400	U
101-55-3	4-Bromophenyl-phenylether	1400	U
118-74-1	Hexachlorobenzene	1400	U
87-86-5	Pentachlorophenol	6900	U
85-01-8	Phenanthrene	250	J
120-12-7	Anthracene	1400	U
84-74-2	Di-n-Butylphthalate	1400	U
206-44-0	Fluoranthene	540	J
129-00-0	Pyrene	820	J
85-68-7	Butylbenzylphthalate	130	J
91-94-1	3,3'-Dichlorobenzidine	2900	U
56-55-3	Benzo(a)Anthracene	210	J
117-81-7	bis(2-Ethylhexyl)Phthalate	1200	BJ
218-01-9	Chrysene	1400	U
117-84-0	Di-n-Octyl Phthalate	1400	U
205-99-2	Benzo(b)Fluoranthene	1400	U
207-08-9	Benzo(k)Fluoranthene	1400	U
50-32-8	Benzo(a)Pyrene	1400	U
193-39-5	Indeno(1,2,3-cd)Pyrene	1400	U
53-70-3	Dibenz(a,h)Anthracene	1400	U
191-24-2	Benzo(g,h,i)Perylene	1400	U

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO. ISW-2

054

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ____ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-2

Sample wt/vol: 30.7 (g/mL) G Lab File ID: 553Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 55 dec. - Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/10/88

GPC Cleanup: (Y/N) Y pH: 7.6 Dilution Factor: 1.0

Number TIC's found: 17

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	ALKYL HYDROCARBON	09:55	2,900	J
2. -	ALKYL HYDROCARBON	10:22	6,600	J
3. -	ALKYL HYDROCARBON	10:34	3,600	J
4. -	ALKYL SUBSTITUTED COMPOUND	10:50	1,400	J
5. -	ALKYL SUBSTITUTED COMPOUND	11:51	1,200	J
6. -	ALKYL SUBSTITUTED COMPOUND	12:46	1,400	J
7. -	UNKNOWN	21:48	1,400	J
8. -	UNKNOWN	25:00	700	J
9. -	UNKNOWN	28:00	2,200	BJ
10. -	ALKYL HYDROCARBON	29:17	1,100	J
11. -	ALKYL HYDROCARBON	31:25	2,300	J
12. -	UNKNOWN	34:14	3,100	J
13. -	UNKNOWN	34:46	5,100	BJ
14. -	UNKNOWN	37:10	3,900	J
15. -	UNKNOWN	38:10	1,400	J
16. -	LONGCHAIN COMPOUND	39:01	3,500	J
17. -	UNKNOWN	40:51	2,600	J
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-4

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-4

Sample wt/vol: 30.6 (g/mL) G Lab File ID: 549Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 50 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/10/88

GPC Cleanup: (Y/N) Y pH: 7.2 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	1300	U
111-44-4	bis(2-Chloroethyl)Ether	1300	U
95-57-8	2-Chlorophenol	1300	U
541-73-1	1,3-Dichlorobenzene	1300	U
106-46-7	1,4-Dichlorobenzene	1300	U
100-51-6	Benzyl Alcohol	1300	U
95-50-1	1,2-Dichlorobenzene	1300	U
95-48-7	2-Methylphenol	1300	U
108-60-1	bis(2-Chloroisopropyl)Ether	1300	U
106-44-5	4-Methylphenol	1300	U
621-64-7	N-Nitroso-Di-n-Propylamine	1300	U
67-72-1	Hexachloroethane	1300	U
98-95-3	Nitrobenzene	1300	U
78-59-1	Isophorone	1300	U
88-75-5	2-Nitrophenol	1300	U
105-67-9	2,4-Dimethylphenol	1300	U
65-85-0	Benzoic Acid	6300	U
111-91-1	bis(2-Chloroethoxy)Methane	1300	U
120-83-2	2,4-Dichlorophenol	1300	U
120-82-1	1,2,4-Trichlorobenzene	1300	U
91-20-3	Naphthalene	590	J
106-47-8	4-Chloroaniline	1300	U
87-68-3	Hexachlorobutadiene	1300	U
59-50-7	4-Chloro-3-Methylphenol	1300	U
91-57-6	2-Methylnaphthalene	640	J
77-47-4	Hexachlorocyclopentadiene	1300	U
88-06-2	2,4,6-Trichlorophenol	1300	U
95-95-4	2,4,5-Trichlorophenol	6300	U
91-58-7	2-Chloronaphthalene	1300	U
88-74-4	2-Nitroaniline	6300	U
131-11-3	Dimethyl Phthalate	1300	U
208-96-8	Acenaphthylene	150	J

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-4

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-4

Sample wt/vol: 30.6 (g/mL) G Lab File ID: 549Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 50 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/10/88

GPC Cleanup: (Y/N) Y pH: 7.2 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	6300	U
83-32-9	Acenaphthene	3200	
51-28-5	2,4-Dinitrophenol	6300	U
100-02-7	4-Nitrophenol	6300	U
132-64-9	Dibenzofuran	2300	
121-14-2	2,4-Dinitrotoluene	1300	U
606-20-2	2,6-Dinitrotoluene	1300	U
84-66-2	Diethylphthalate	1300	U
7005-72-3	4-Chlorophenyl-phenylether	1300	U
86-73-7	Fluorene	5000	
100-01-6	4-Nitroaniline	6300	U
534-52-1	4,6-Dinitro-2-Methylphenol	6300	U
86-30-6	N-Nitrosodiphenylamine (1)	1300	U
101-55-3	4-Bromophenyl-phenylether	1300	U
118-74-1	Hexachlorobenzene	1300	U
87-86-5	Pentachlorophenol	6300	U
85-01-8	Phenanthrene	24000	E
120-12-7	Anthracene	8100	
84-74-2	Di-n-Butylphthalate	1300	U
206-44-0	Fluoranthene	23000	E
129-00-0	Pyrene	35000	E
85-68-7	Butylbenzylphthalate	1300	U
91-94-1	3,3'-Dichlorobenzidine	2600	U
56-55-3	Benzo(a)Anthracene	11000	
117-81-7	bis(2-Ethylhexyl)Phthalate	560	BJ
218-01-9	Chrysene	9200	
117-84-0	Di-n-Octyl Phthalate	1300	U
205-99-2	Benzo(b)Fluoranthene	5900	
207-08-9	Benzo(k)Fluoranthene	4700	
50-32-8	Benzo(a)Pyrene	5200	
193-39-5	Indeno(1,2,3-cd)Pyrene	13000	
53-70-3	Dibenz(a,h)Anthracene	470	J
191-24-2	Benzo(g,h,i)Perylene	1900	

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISW-4

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ____ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-4

Sample wt/vol: 30.6 (g/mL) G Lab File ID: 549Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 50 dec. - Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/10/88

GPC Cleanup: (Y/N) Y pH: 7.2 Dilution Factor: 1.0

Number TIC's found: 15

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	ALKYL HYDROCARBON	09:56	18,000	J
2. -	ALKYL SUBSTITUTED COMPOUND	10:22	26,000	BJ
3. -	ALKYL SUBSTITUTED COMPOUND	10:35	9,700	J
4. -	ALKYL HYDROCARBON	10:51	9,300	J
5. -	ALKYL SUBSTITUTED COMPOUND	11:52	3,300	J
6. -	ALKYL SUBSTITUTED COMPOUND	12:42	3,400	J
7. -	ALKYL SUBSTITUTED COMPOUND	12:47	3,500	J
8. -	ALKYL HYDROCARBON	14:45	2,500	J
9. -	ALKYL SUBSTITUTED COMPOUND	15:15	2,500	J
10. -	ALKYL HYDROCARBON	16:37	3,000	J
11. -	ALKYL SUBSTITUTED COMPOUND	17:01	3,400	J
12. -	ALKYL HYDROCARBON	18:04	3,700	J
13. -	ALKYL HYDROCARBON	21:49	4,500	J
14. -	PHENANTHRENE DERIVATIVE	24:39	2,900	J
15. -	PHENANTHRENE DERIVATIVE	24:59	6,100	J
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-4DL

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-4DL

Sample wt/vol: 30.6 (g/mL) G Lab File ID: 7217

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 50 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/18/89

GPC Cleanup: (Y/N) Y pH: 7.2 Dilution Factor: 10.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION	Q
108-95-2	Phenol	13000	U
111-44-4	bis(2-Chloroethyl)Ether	13000	U
95-57-8	2-Chlorophenol	13000	U
541-73-1	1,3-Dichlorobenzene	13000	U
106-46-7	1,4-Dichlorobenzene	13000	U
100-51-6	Benzyl Alcohol	13000	U
95-50-1	1,2-Dichlorobenzene	13000	U
95-48-7	2-Methylphenol	13000	U
108-60-1	bis(2-Chloroisopropyl)Ether	13000	U
106-44-5	4-Methylphenol	13000	U
621-64-7	N-Nitroso-Di-n-Propylamine	13000	U
67-72-1	Hexachloroethane	13000	U
98-95-3	Nitrobenzene	13000	U
78-59-1	Isophorone	13000	U
88-75-5	2-Nitrophenol	13000	U
105-67-9	2,4-Dimethylphenol	13000	U
65-85-0	Benzoic Acid	63000	U
111-91-1	bis(2-Chloroethoxy)Methane	13000	U
120-83-2	2,4-Dichlorophenol	13000	U
120-82-1	1,2,4-Trichlorobenzene	13000	U
91-20-3	Naphthalene	1300	DJ
106-47-8	4-Chloroaniline	13000	U
87-68-3	Hexachlorobutadiene	13000	U
59-50-7	4-Chloro-3-Methylphenol	13000	U
91-57-6	2-Methylnaphthalene	1400	DJ
77-47-4	Hexachlorocyclopentadiene	13000	U
88-06-2	2,4,6-Trichlorophenol	13000	U
95-95-4	2,4,5-Trichlorophenol	63000	U
91-58-7	2-Chloronaphthalene	13000	U
88-74-4	2-Nitroaniline	63000	U
131-11-3	Dimethyl Phthalate	13000	U
208-96-8	Acenaphthylene	260	DJ

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-4DL

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-4DL

Sample wt/vol: 30.6 (g/mL) G Lab File ID: 721Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 50 dec. Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 01/18/89

GPC Cleanup: (Y/N) Y pH: 7.2 Dilution Factor: 10.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	63000	U
83-32-9	Acenaphthene	5500	DJ
51-28-5	2,4-Dinitrophenol	63000	U
100-02-7	4-Nitrophenol	63000	U
132-64-9	Dibenzofuran	4900	DJ
121-14-2	2,4-Dinitrotoluene	13000	U
606-20-2	2,6-Dinitrotoluene	13000	U
84-66-2	Diethylphthalate	13000	U
7005-72-3	4-Chlorophenyl-phenylether	13000	U
86-73-7	Fluorene	8900	DJ
100-01-6	4-Nitroaniline	63000	U
534-52-1	4,6-Dinitro-2-Methylphenol	63000	U
86-30-6	N-Nitrosodiphenylamine (1)	13000	U
101-55-3	4-Bromophenyl-phenylether	13000	U
118-74-1	Hexachlorobenzene	13000	U
87-86-5	Pentachlorophenol	63000	U
85-01-8	Phenanthrene	49000	D
120-12-7	Anthracene	14000	D
84-74-2	Di-n-Butylphthalate	13000	U
206-44-0	Fluoranthene	49000	D
129-00-0	Pyrene	40000	D
85-68-7	Butylbenzylphthalate	13000	U
91-94-1	3,3'-Dichlorobenzidine	26000	U
56-55-3	Benzo(a)Anthracene	19000	D
117-81-7	bis(2-Ethylhexyl)Phthalate	13000	U
218-01-9	Chrysene	19000	D
117-84-0	Di-n-Octyl Phthalate	13000	U
205-99-2	Benzo(b)Fluoranthene	17000	D
207-08-9	Benzo(k)Fluoranthene	15000	D
50-32-8	Benzo(a)Pyrene	16000	D
193-39-5	Indeno(1,2,3-cd)Pyrene	9700	DJ
53-70-3	Dibenz(a,h)Anthracene	2100	DJ
191-24-2	Benzo(g,h,i)Perylene	9100	DJ

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISW-4 DL

06

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ____ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-4 DL

Sample wt/vol: 30.6 (g/mL) G Lab File ID: 7212

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 50 dec. - Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 01/18/89

GPC Cleanup: (Y/N) Y pH: 7.2 Dilution Factor: 10.0

Number TIC's found: 20

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	-	ALKYL SUBSTITUTED COMPOUND	08:27	12,000	J
2.	-	ALKYL SUBSTITUTED COMPOUND	09:55	13,000	J
3.	-	ALKYL SUBSTITUTED COMPOUND	10:09	18,000	J
4.	-	ALKYL SUBSTITUTED COMPOUND	10:35	26,000	J
5.	-	ALKYL SUBSTITUTED COMPOUND	10:48	15,000	J
6.	-	ALKYL HYDROCARBON	11:34	11,000	J
7.	-	ALKYL HYDROCARBON	13:36	7,500	J
8.	-	ALKYL PHENOL DERIVATIVE	19:12	6,800	J
9.	-	ALKYL SUBSTITUTED COMPOUND	22:05	10,000	J
10.	-	PHENANTHRENE DERIVATIVE	25:12	12,000	J
11.	-	UNKNOWN	25:52	10,000	J
12.	-	PYRENE DERIVATIVE	28:53	16,000	J
13.	-	LONGCHAIN COMPOUND	29:50	10,000	J
14.	-	UNKNOWN	30:48	9,100	J
15.	-	ALKYL PHENOL DERIVATIVE	32:01	18,000	BJ
16.	-	LONGCHAIN COMPOUND	33:22	15,000	J
17.	-	BENZOPYRENE DERIVATIVE	35:31	18,000	J
18.	-	UNKNOWN	37:41	13,000	J
19.	-	UNKNOWN	38:46	14,000	J
20.	-	UNKNOWN	40:52	52,000	J
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-5

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-5

Sample wt/vol: 31.9 (g/mL) G Lab File ID: 512Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 42 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) Y pH: 9.4 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	1100	U
111-44-4	bis(2-Chloroethyl)Ether	1100	U
95-57-8	2-Chlorophenol	1100	U
541-73-1	1,3-Dichlorobenzene	1100	U
106-46-7	1,4-Dichlorobenzene	1100	U
100-51-6	Benzyl Alcohol	1100	U
95-50-1	1,2-Dichlorobenzene	1100	U
95-48-7	2-Methylphenol	1100	U
108-60-1	bis(2-Chloroisopropyl)Ether	1100	U
106-44-5	4-Methylphenol	1100	U
621-64-7	N-Nitroso-Di-n-Propylamine	1100	U
67-72-1	Hexachloroethane	1100	U
98-95-3	Nitrobenzene	1100	U
78-59-1	Isophorone	1100	U
88-75-5	2-Nitrophenol	1100	U
105-67-9	2,4-Dimethylphenol	1100	U
65-85-0	Benzoic Acid	5200	U
111-91-1	bis(2-Chloroethoxy)Methane	1100	U
120-83-2	2,4-Dichlorophenol	1100	U
120-82-1	1,2,4-Trichlorobenzene	1100	U
91-20-3	Naphthalene	1100	U
106-47-8	4-Chloroaniline	1100	U
87-68-3	Hexachlorobutadiene	1100	U
59-50-7	4-Chloro-3-Methylphenol	1100	U
91-57-6	2-Methylnaphthalene	1100	U
77-47-4	Hexachlorocyclopentadiene	1100	U
88-06-2	2,4,6-Trichlorophenol	1100	U
95-95-4	2,4,5-Trichlorophenol	5200	U
91-58-7	2-Chloronaphthalene	1100	U
88-74-4	2-Nitroaniline	5200	U
131-11-3	Dimethyl Phthalate	1100	U
208-96-8	Acenaphthylene	1100	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-5

Lab Name: RECRA ENVIRON   Contract: 001918

Lab Code: RECNY   Case No.: 1675   SAS No.: ______   SDG No.: LS02

Matrix: (soil/water) SOIL   Lab Sample ID: ISW-5

Sample wt/vol: 31.9 (g/mL) G   Lab File ID: 512Z

Level: (low/med) LOW   Date Received: 11/03/88

% Moisture: not dec. 42   dec. ____   Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC   Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) Y   pH: 9.4   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	5200	U
83-32-9	Acenaphthene	1100	U
51-28-5	2,4-Dinitrophenol	5200	U
100-02-7	4-Nitrophenol	5200	U
132-64-9	Dibenzofuran	1100	U
121-14-2	2,4-Dinitrotoluene	1100	U
606-20-2	2,6-Dinitrotoluene	1100	U
84-66-2	Diethylphthalate	1100	U
7005-72-3	4-Chlorophenyl-phenylether	1100	U
86-73-7	Fluorene	1100	U
100-01-6	4-Nitroaniline	5200	U
534-52-1	4,6-Dinitro-2-Methylphenol	5200	U
86-30-6	N-Nitrosodiphenylamine (1)	1100	U
101-55-3	4-Bromophenyl-phenylether	1100	U
118-74-1	Hexachlorobenzene	1100	U
87-86-5	Pentachlorophenol	5200	U
85-01-8	Phenanthrene	180	J
120-12-7	Anthracene	1100	U
84-74-2	Di-n-Butylphthalate	1100	U
206-44-0	Fluoranthene	320	J
129-00-0	Pyrene	300	J
85-68-7	Butylbenzylphthalate	1100	U
91-94-1	3,3'-Dichlorobenzidine	2100	U
56-55-3	Benzo(a)Anthracene	100	J
117-81-7	bis(2-Ethylhexyl)Phthalate	360	BJ
218-01-9	Chrysene	1100	U
117-84-0	Di-n-Octyl Phthalate	54	J
205-99-2	Benzo(b)Fluoranthene	1100	U
207-08-9	Benzo(k)Fluoranthene	1100	U
50-32-8	Benzo(a)Pyrene	85	J
193-39-5	Indeno(1,2,3-cd)Pyrene	1100	U
53-70-3	Dibenz(a,h)Anthracene	1100	U
191-24-2	Benzo(g,h,i)Perylene	1100	U

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISW-5

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ____ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-5

Sample wt/vol: 31.9 (g/mL) G Lab File ID: 512Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 42 dec. - Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) Y pH: 9.4 Dilution Factor: 1.0

Number TIC's found: 7

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	ALKYL SUBSTITUTED COMPOUND	07:31	2,200	J
2. -	UNKNOWN	30:28	7,300	J
3. -	ALKYL HYDROCARBON	33:47	700	J
4. -	ALKYL SUBSTITUTED COMPOUND	34:08	930	J
5. -	UNKNOWN	34:38	5,600	BJ
6. -	UNKNOWN	35:06	960	J
7. -	ALKYL HYDROCARBON	35:39	2,800	J
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-8

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-8

Sample wt/vol: 30.9 (g/mL) G Lab File ID: 514Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 55 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) Y pH: 7.3 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	64	J
111-44-4	bis(2-Chloroethyl)Ether	1400	U
95-57-8	2-Chlorophenol	1400	U
541-73-1	1,3-Dichlorobenzene	1400	U
106-46-7	1,4-Dichlorobenzene	1400	U
100-51-6	Benzyl Alcohol	1400	U
95-50-1	1,2-Dichlorobenzene	1400	U
95-48-7	2-Methylphenol	1400	U
108-60-1	bis(2-Chloroisopropyl)Ether	1400	U
106-44-5	4-Methylphenol	1400	U
621-64-7	N-Nitroso-Di-n-Propylamine	1400	U
67-72-1	Hexachloroethane	1400	U
98-95-3	Nitrobenzene	1400	U
78-59-1	Isophorone	1400	U
88-75-5	2-Nitrophenol	1400	U
105-67-9	2,4-Dimethylphenol	1400	U
65-85-0	Benzoic Acid	6900	U
111-91-1	bis(2-Chloroethoxy)Methane	1400	U
120-83-2	2,4-Dichlorophenol	1400	U
120-82-1	1,2,4-Trichlorobenzene	1400	U
91-20-3	Naphthalene	1400	U
106-47-8	4-Chloroaniline	1400	U
87-68-3	Hexachlorobutadiene	1400	U
59-50-7	4-Chloro-3-Methylphenol	1400	U
91-57-6	2-Methylnaphthalene	55	J
77-47-4	Hexachlorocyclopentadiene	1400	U
88-06-2	2,4,6-Trichlorophenol	1400	U
95-95-4	2,4,5-Trichlorophenol	6900	U
91-58-7	2-Chloronaphthalene	1400	U
88-74-4	2-Nitroaniline	6900	U
131-11-3	Dimethyl Phthalate	1400	U
208-96-8	Acenaphthylene	1400	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-8

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-8

Sample wt/vol: 30.9 (g/mL) G Lab File ID: 5142

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 55 dec. ____ Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) Y pH: 7.3 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	6900	U
83-32-9	Acenaphthene	1400	U
51-28-5	2,4-Dinitrophenol	6900	U
100-02-7	4-Nitrophenol	6900	U
132-64-9	Dibenzofuran	1400	U
121-14-2	2,4-Dinitrotoluene	1400	U
606-20-2	2,6-Dinitrotoluene	1400	U
84-66-2	Diethylphthalate	1400	U
7005-72-3	4-Chlorophenyl-phenylether	1400	U
86-73-7	Fluorene	1400	U
100-01-6	4-Nitroaniline	6900	U
534-52-1	4,6-Dinitro-2-Methylphenol	6900	U
86-30-6	N-Nitrosodiphenylamine (1)	1400	U
101-55-3	4-Bromophenyl-phenylether	1400	U
118-74-1	Hexachlorobenzene	1400	U
87-86-5	Pentachlorophenol	6900	U
85-01-8	Phenanthrene	1400	U
120-12-7	Anthracene	1400	U
84-74-2	Di-n-Butylphthalate	1400	U
206-44-0	Fluoranthene	630	J
129-00-0	Pyrene	900	J
85-68-7	Butylbenzylphthalate	1400	U
91-94-1	3,3'-Dichlorobenzidine	2800	U
56-55-3	Benzo(a)Anthracene	250	J
117-81-7	bis(2-Ethylhexyl)Phthalate	530	BJ
218-01-9	Chrysene	1400	U
117-84-0	Di-n-Octyl Phthalate	1400	U
205-99-2	Benzo(b)Fluoranthene	1400	U
207-08-9	Benzo(k)Fluoranthene	1400	U
50-32-8	Benzo(a)Pyrene	230	J
193-39-5	Indeno(1,2,3-cd)Pyrene	250	J
53-70-3	Dibenz(a,h)Anthracene	1400	U
191-24-2	Benzo(g,h,i)Perylene	1400	U

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISW-8

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ____ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISW-8

Sample wt/vol: 30.9 (g/mL) G Lab File ID: 514Z

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 55 dec. - Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) Y pH: 7.3 Dilution Factor: 1.0

Number TIC's found: 18

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	-	OXYGENATED COMPOUND	25:43	1,500	BJ
2.	-	LONGCHAIN COMPOUND	27:07	1,800	J
3.	-	UNKNOWN	28:53	1,500	J
4.	-	UNKNOWN	30:30	8,900	J
5.	-	UNKNOWN	31:08	3,300	J
6.	-	UNKNOWN	32:46	740	J
7.	-	UNKNOWN	34:42	3,200	BJ
8.	-	UNKNOWN	35:04	14,000	J
9.	-	LONGCHAIN COMPOUND	35:16	1,900	J
10.	-	UNKNOWN	35:38	830	J
11.	-	LONGCHAIN COMPOUND	35:42	1,100	J
12.	-	UNKNOWN	36:58	7,900	J
13.	-	UNKNOWN	37:07	13,000	J
14.	-	UNKNOWN	37:52	3,000	J
15.	-	UNKNOWN	38:55	4,600	J
16.	-	LONGCHAIN COMPOUND	39:06	9,500	J
17.	-	UNKNOWN	40:33	990	J
18.	-	LONGCHAIN COMPOUND	41:09	11,000	J
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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
ISS-1

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675A SAS No.: NA SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: SS1380

Sample wt/vol: 30.5 (g/mL) G Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 24 dec. - Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/08/88

GPC Cleanup: (Y/N) Y pH: 8.8 Dilution Factor: 5

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	100	U
319-85-7	beta-BHC	100	U
319-86-8	delta-BHC	100	U
58-89-9	gamma-BHC (Lindane)	100	U
76-44-8	Heptachlor	100	U
309-00-2	Aldrin	100	U
1024-57-3	Heptachlor epoxide	100	U
959-98-8	Endosulfan I	100	U
60-57-1	Dieldrin	200	U
72-55-9	4,4'-DDE	200	U
72-20-8	Endrin	200	U
33213-65-9	Endosulfan II	200	U
72-54-8	4,4'-DDD	200	U
1031-07-8	Endosulfan sulfate	200	U
50-29-3	4,4'-DDT	200	U
72-43-5	Methoxychlor	1,000	U
53494-70-5	Endrin ketone	200	U
5103-71-9	alpha-Chlordane	1,000	U
5103-74-2	gamma-Chlordane	1,000	U
8001-35-2	Toxaphene	2,000	U
12674-11-2	Aroclor-1016	1,000	U
11104-28-2	Aroclor-1221	1,000	U
11141-16-5	Aroclor-1232	1,000	U
53469-21-9	Aroclor-1242	1,000	U
12672-29-6	Aroclor-1248	1,000	U
11097-69-1	Aroclor-1254	2,000	U
11096-82-5	Aroclor-1260	2,000	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.: ISS-2

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675A SAS No.: NA SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: SS1378

Sample wt/vol: 31.7 (g/mL) G Lab File ID: -

Level: (low/med) LOW Date Received: 11 03/88

% Moisture: not dec. 16 dec. - Date Extracted: 11 04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12 08/88

GPC Cleanup: (Y/N) Y pH: 8.8 Dilution Factor: 2

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION	Q
319-84-6	alpha-BHC	40	U
319-85-7	beta-BHC	40	U
319-86-8	delta-BHC	40	U
58-89-9	gamma-BHC (Lindane)	40	U
76-44-8	Heptachlor	40	U
309-00-2	Aldrin	40	U
1024-57-3	Heptachlor epoxide	40	U
959-98-8	Endosulfan I	40	U
60-57-1	Dieldrin	80	U
72-55-9	4,4'-DDE	80	U
72-20-8	Endrin	80	U
33213-65-9	Endosulfan II	80	U
72-54-8	4,4'-DDD	80	U
1031-07-8	Endosulfan sulfate	80	U
50-29-3	4,4'-DDT	80	U
72-43-5	Methoxychlor	400	U
53494-70-5	Endrin ketone	80	U
5103-71-9	alpha-Chlordane	400	U
5103-74-2	gamma-Chlordane	400	U
8001-35-2	Toxaphene	800	U
12674-11-2	Aroclor-1016	400	U
11104-28-2	Aroclor-1221	400	U
11141-16-5	Aroclor-1232	400	U
53469-21-9	Aroclor-1242	400	U
12672-29-6	Aroclor-1248	400	U
11097-69-1	Aroclor-1254	800	U
11096-82-5	Aroclor-1260	800	U

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
ISS-3

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675A SAS No.: NA SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: SS1375

Sample wt/vol: 30.9 (g/mL) G Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 7 dec. - Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/08/88

GPC Cleanup: (Y/N) Y pH: 8.2 Dilution Factor: 2

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	30	U
319-85-7	beta-BHC	30	U
319-86-8	delta-BHC	30	U
58-89-9	gamma-BHC (Lindane)	30	U
76-44-8	Heptachlor	30	U
309-00-2	Aldrin	30	U
1024-57-3	Heptachlor epoxide	30	U
959-98-8	Endosulfan I	30	U
60-57-1	Dieldrin	60	U
72-55-9	4,4'-DDE	60	U
72-20-8	Endrin	60	U
33213-65-9	Endosulfan II	60	U
72-54-8	4,4'-DDD	60	U
1031-07-8	Endosulfan sulfate	60	U
50-29-3	4,4'-DDT	60	U
72-43-5	Methoxychlor	300	U
53494-70-5	Endrin ketone	60	U
5103-71-9	alpha-Chlordane	300	U
5103-74-2	gamma-Chlordane	300	U
8001-35-2	Toxaphene	600	U
12674-11-2	Aroclor-1016	300	U
11104-28-2	Aroclor-1221	300	U
11141-16-5	Aroclor-1232	300	U
53469-21-9	Aroclor-1242	300	U
12672-29-6	Aroclor-1248	300	U
11097-69-1	Aroclor-1254	600	U
11096-82-5	Aroclor-1260	790	

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.: ISS-3 MS

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675A SAS No.: NA SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: SS1376

Sample wt/vol: 30.7 (g/mL) G Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 7 dec. - Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/08/88

GPC Cleanup: (Y/N) Y pH: 8.2 Dilution Factor: 2

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	30	U
319-85-7	beta-BHC	30	U
319-86-8	delta-BHC	30	U
58-89-9	gamma-BHC (Lindane)	-	
76-44-8	Heptachlor	-	
309-00-2	Aldrin	-	
1024-57-3	Heptachlor epoxide	30	U
959-98-8	Endosulfan I	30	U
60-57-1	Dieldrin	-	
72-55-9	4,4'-DDE	60	U
72-20-8	Endrin	-	
33213-65-9	Endosulfan II	60	U
72-54-8	4,4'-DDD	60	U
1031-07-8	Endosulfan sulfate	60	U
50-29-3	4,4'-DDT	-	
72-43-5	Methoxychlor	300	U
53494-70-5	Endrin ketone	60	U
5103-71-9	alpha-Chlordane	300	U
5103-74-2	gamma-Chlordane	300	U
8001-35-2	Toxaphene	600	U
12674-11-2	Aroclor-1016	300	U
11104-28-2	Aroclor-1221	300	U
11141-16-5	Aroclor-1232	300	U
53469-21-9	Aroclor-1242	300	U
12672-29-6	Aroclor-1248	300	U
11097-69-1	Aroclor-1254	600	U
11096-82-5	Aroclor-1260	360	J

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.: ISS-3 MSD

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675A SAS No.: NA SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: SS1377

Sample wt/vol: 30.8 (g/mL) G Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 7 dec. - Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/08/88

GPC Cleanup: (Y/N) Y pH: 8.2 Dilution Factor: 2

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	30	U
319-85-7	beta-BHC	30	U
319-86-8	delta-BHC	30	U
58-89-9	gamma-BHC (Lindane)	-	
76-44-8	Heptachlor	-	
309-00-2	Aldrin	-	
1024-57-3	Heptachlor epoxide	30	U
959-98-8	Endosulfan I	30	U
60-57-1	Dieldrin	-	
72-55-9	4,4'-DDE	60	U
72-20-8	Endrin	-	
33213-65-9	Endosulfan II	60	U
72-54-8	4,4'-DDD	60	U
1031-07-8	Endosulfan sulfate	60	U
50-29-3	4,4'-DDT	-	
72-43-5	Methoxychlor	300	U
53494-70-5	Endrin ketone	60	U
5103-71-9	alpha-Chlordane	300	U
5103-74-2	gamma-Chlordane	300	U
8001-35-2	Toxaphene	600	U
12674-11-2	Aroclor-1016	300	U
11104-28-2	Aroclor-1221	300	U
11141-16-5	Aroclor-1232	300	U
53469-21-9	Aroclor-1242	300	U
12672-29-6	Aroclor-1248	300	U
11097-69-1	Aroclor-1254	600	U
11096-82-5	Aroclor-1260	1,900	

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO. ISS-4

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675A SAS No.: NA SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: SS1379

Sample wt/vol: 30.9 (g/mL) G Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 16 dec. - Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/08/88

GPC Cleanup: (Y/N) Y pH: 8.3 Dilution Factor: 1

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION (UG/KG)	Q
319-84-6	alpha-BHC	20	U
319-85-7	beta-BHC	20	U
319-86-8	delta-BHC	20	U
58-89-9	gamma-BHC (Lindane)	20	U
76-44-8	Heptachlor	20	U
309-00-2	Aldrin	20	U
1024-57-3	Heptachlor epoxide	20	U
959-98-8	Endosulfan I	20	U
60-57-1	Dieldrin	40	U
72-55-9	4,4'-DDE	40	U
72-20-8	Endrin	40	U
33213-65-9	Endosulfan II	40	U
72-54-8	4,4'-DDD	40	U
1031-07-8	Endosulfan sulfate	40	U
50-29-3	4,4'-DDT	40	U
72-43-5	Methoxychlor	200	U
53494-70-5	Endrin ketone	40	U
5103-71-9	alpha-Chlordane	200	U
5103-74-2	gamma-Chlordane	200	U
8001-35-2	Toxaphene	400	U
12674-11-2	Aroclor-1016	200	U
11104-28-2	Aroclor-1221	200	U
11141-16-5	Aroclor-1232	200	U
53469-21-9	Aroclor-1242	200	U
12672-29-6	Aroclor-1248	200	U
11097-69-1	Aroclor-1254	400	U
11096-82-5	Aroclor-1260	570	

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
ISW-1

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675A SAS No.: NA SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: SS1383

Sample wt/vol: 30.8 (g/mL) G Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 54 dec. - Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/08/88

GPC Cleanup: (Y/N) Y pH: 9.0 Dilution Factor: 2

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	70	U
319-85-7	beta-BHC	70	U
319-86-8	delta-BHC	70	U
58-89-9	gamma-BHC (Lindane)	70	U
76-44-8	Heptachlor	70	U
309-00-2	Aldrin	70	U
1024-57-3	Heptachlor epoxide	70	U
959-98-8	Endosulfan I	70	U
60-57-1	Dieldrin	140	U
72-55-9	4,4'-DDE	140	U
72-20-8	Endrin	140	U
33213-65-9	Endosulfan II	140	U
72-54-8	4,4'-DDD	140	U
1031-07-8	Endosulfan sulfate	140	U
50-29-3	4,4'-DDT	140	U
72-43-5	Methoxychlor	700	U
53494-70-5	Endrin ketone	140	U
5103-71-9	alpha-Chlordane	700	U
5103-74-2	gamma-Chlordane	700	U
8001-35-2	Toxaphene	1,400	U
12674-11-2	Aroclor-1016	700	U
11104-28-2	Aroclor-1221	700	U
11141-16-5	Aroclor-1232	700	U
53469-21-9	Aroclor-1242	700	U
12672-29-6	Aroclor-1248	700	U
11097-69-1	Aroclor-1254	1,400	U
11096-82-5	Aroclor-1260	1,500	

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.: ISW-2

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675A SAS No.: NA SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: SS1385

Sample wt/vol: 30.7 (g/mL) G Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 55 dec. - Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/08/88

GPC Cleanup: (Y/N) Y pH: 7.6 Dilution Factor: 1

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION	Q
319-84-6	alpha-BHC	35	U
319-85-7	beta-BHC	35	U
319-86-8	delta-BHC	35	U
58-89-9	gamma-BHC (Lindane)	35	U
76-44-8	Heptachlor	35	U
309-00-2	Aldrin	35	U
1024-57-3	Heptachlor epoxide	35	U
959-98-8	Endosulfan I	35	U
60-57-1	Dieldrin	70	U
72-55-9	4,4'-DDE	70	U
72-20-8	Endrin	70	U
33213-65-9	Endosulfan II	70	U
72-54-8	4,4'-DDD	70	U
1031-07-8	Endosulfan sulfate	70	U
50-29-3	4,4'-DDT	70	U
72-43-5	Methoxychlor	350	U
53494-70-5	Endrin ketone	70	U
5103-71-9	alpha-Chlordane	350	U
5103-74-2	gamma-Chlordane	350	U
8001-35-2	Toxaphene	700	U
12674-11-2	Aroclor-1016	350	U
11104-28-2	Aroclor-1221	350	U
11141-16-5	Aroclor-1232	350	U
53469-21-9	Aroclor-1242	350	U
12672-29-6	Aroclor-1248	350	U
11097-69-1	Aroclor-1254	700	U
11096-82-5	Aroclor-1260	700	U

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
ISW-4

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675A SAS No.: NA SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: SS1381

Sample wt/vol: 30.7 (g/mL) G Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 50 dec. - Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/08/88

GPC Cleanup: (Y/N) Y pH: 7.2 Dilution Factor: 4

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	130	U
319-85-7	beta-BHC	130	U
319-86-8	delta-BHC	130	U
58-89-9	gamma-BHC (Lindane)	130	U
76-44-8	Heptachlor	130	U
309-00-2	Aldrin	130	U
1024-57-3	Heptachlor epoxide	130	U
959-98-8	Endosulfan I	130	U
60-57-1	Dieldrin	260	U
72-55-9	4,4'-DDE	260	U
72-20-8	Endrin	260	U
33213-65-9	Endosulfan II	260	U
72-54-8	4,4'-DDD	260	U
1031-07-8	Endosulfan sulfate	260	U
50-29-3	4,4'-DDT	260	U
72-43-5	Methoxychlor	1,300	U
53494-70-5	Endrin ketone	260	U
5103-71-9	alpha-Chlordane	1,300	U
5103-74-2	gamma-Chlordane	1,300	U
8001-35-2	Toxaphene	2,600	U
12674-11-2	Aroclor-1016	1,300	U
11104-28-2	Aroclor-1221	1,300	U
11141-16-5	Aroclor-1232	1,300	U
53469-21-9	Aroclor-1242	1,300	U
12672-29-6	Aroclor-1248	1,300	U
11097-69-1	Aroclor-1254	2,600	U
11096-82-5	Aroclor-1260	2,600	U

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
ISW-5

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675A SAS No.: NA SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: SS1382

Sample wt/vol: 31.9 (g/mL) G Lab File ID: -

Level: (low/med) LOW Date Received: 11/03 88

% Moisture: not dec. 42 dec. - Date Extracted: 11/04 88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/08 88

GPC Cleanup: (Y/N) Y pH: 9.4 Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	30	U
319-85-7	beta-BHC	30	U
319-86-8	delta-BHC	30	U
58-89-9	gamma-BHC (Lindane)	30	U
76-44-8	Heptachlor	30	U
309-00-2	Aldrin	30	U
1024-57-3	Heptachlor epoxide	30	U
959-98-8	Endosulfan I	30	U
60-57-1	Dieldrin	60	U
72-55-9	4,4'-DDE	60	U
72-20-8	Endrin	60	U
33213-65-9	Endosulfan II	60	U
72-54-8	4,4'-DDD	60	U
1031-07-8	Endosulfan sulfate	60	U
50-29-3	4,4'-DDT	60	U
72-43-5	Methoxychlor	300	U
53494-70-5	Endrin ketone	60	U
5103-71-9	alpha-Chlordane	300	U
5103-74-2	gamma-Chlordane	300	U
8001-35-2	Toxaphene	600	U
12674-11-2	Aroclor-1016	300	U
11104-28-2	Aroclor-1221	300	U
11141-16-5	Aroclor-1232	300	U
53469-21-9	Aroclor-1242	300	U
12672-29-6	Aroclor-1248	300	U
11097-69-1	Aroclor-1254	600	U
11096-82-5	Aroclor-1260	600	U

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
ISW-8

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1675A SAS No.: NA SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: SS1384

Sample wt/vol: 30.9 (g/mL) G Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 55 dec. - Date Extracted: 11/04/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 12/08/88

GPC Cleanup: (Y/N) Y pH: 7.3 Dilution Factor: 2

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	70	U
319-85-7	beta-BHC	70	U
319-86-8	delta-BHC	70	U
58-89-9	gamma-BHC (Lindane)	70	U
76-44-8	Heptachlor	70	U
309-00-2	Aldrin	70	U
1024-57-3	Heptachlor epoxide	70	U
959-98-8	Endosulfan I	70	U
60-57-1	Dieldrin	140	U
72-55-9	4,4'-DDE	140	U
72-20-8	Endrin	140	U
33213-65-9	Endosulfan II	140	U
72-54-8	4,4'-DDD	140	U
1031-07-8	Endosulfan sulfate	140	U
50-29-3	4,4'-DDT	140	U
72-43-5	Methoxychlor	700	U
53494-70-5	Endrin ketone	140	U
5103-71-9	alpha-Chlordane	700	U
5103-74-2	gamma-Chlordane	700	U
8001-35-2	Toxaphene	1,400	U
12674-11-2	Aroclor-1016	700	U
11104-28-2	Aroclor-1221	700	U
11141-16-5	Aroclor-1232	700	U
53469-21-9	Aroclor-1242	700	U
12672-29-6	Aroclor-1248	700	U
11097-69-1	Aroclor-1254	1,400	U
11096-82-5	Aroclor-1260	1,700	

FORM I PEST

Form I

022

Sample No.
ISW-7

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1709

CONTRACT NO. 001918 LAB RECEIPT DATE 11.3.88

LAB SAMPLE ID. NO. 6423 QC REPORT NO. 88-1709

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water X Soil ______ Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	[110]		A
2.	Antimony	10U		F
3.	Arsenic	5.0U		F
4.	Barium	60U		A
5.	Beryllium	5.0U		A
6.	Cadmium	5.0U		A
7.	Calcium	88,500		A
8.	Chromium	5.0U		A
9.	Cobalt	30U		A
10.	Copper	[12]		A
11.	Iron	530		A
12.	Lead	26	*	A
	Cyanide	10U		

13.	Magnesium	13,400	A
14.	Manganese	22	A
15.	Mercury	0.2U	CV
16.	Nickel	20U	A
17.	Potassium	[4,420]	A
18.	Selenium	5.0U	F
19.	Silver	5.0U	A
20.	Sodium	36,000	NA
21.	Thallium	5.0U	NF
22.	Vanadium	30U	A
23.	Zinc	5.0U	A
	Percent Solids (%)	NR	

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

Form I

Sample No.

ISW-9

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1709

CONTRACT NO. 001918 LAB RECEIPT DATE 11 3 88

LAB SAMPLE ID. NO. 6425 QC REPORT NO. 88-1709

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water X Soil ______ Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	[150]	A	13.	Magnesium	10,200	A
2.	Antimony	10U	F	14.	Manganese	10U	A
3.	Arsenic	5.0U	F	15.	Mercury	0.2U	CV
4.	Barium	60U	A	16.	Nickel	20U	A
5.	Beryllium	5.0U	A	17.	Potassium	[1,340]	A
6.	Cadmium	5.0U	A	18.	Selenium	5.0U	F
7.	Calcium	46,400	A	19.	Silver	5.0U	A
8.	Chromium	5.0U	A	20.	Sodium	12,000	N A
9.	Cobalt	30U	A	21.	Thallium	5.0U	N F
10.	Copper	[18]	A	22.	Vanadium	30U	A
11.	Iron	190	A	23.	Zinc	5.0U	A
12.	Lead	5.0U	* F		Percent Solids (%)	NR	
Cyanide		10U					

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

Form I

024

Sample No.
I FIELD BLANK

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1709

CONTRACT NO. 001918 LAB RECEIPT DATE 11 3 88

LAB SAMPLE ID. NO. 6427 QC REPORT NO. 88-1709

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water X Soil ______ Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	50U	A	13.	Magnesium	100U	A
2.	Antimony	10U	F	14.	Manganese	10U	A
3.	Arsenic	5.0U	F	15.	Mercury	0.2U	CV
4.	Barium	60U	A	16.	Nickel	[20]	A
5.	Beryllium	5.0U	A	17.	Potassium	200U	A
6.	Cadmium	5.0U	A	18.	Selenium	5.0	F
7.	Calcium	[280]	A	19.	Silver	5.0U	A
8.	Chromium	5.0U	A	20.	Sodium	[1,000]	N A
9.	Cobalt	30U	A	21.	Thallium	5.0U	N F
10.	Copper	[11]	A	22.	Vanadium	30U	A
11.	Iron	[90]	A	23.	Zinc	5.0U	A
12.	Lead	5.0U	* F		Percent Solids (%)	NR	
	Cyanide	10U					

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

Form I

014

Sample No.
ISS-1

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1675A

CONTRACT NO. 001918 LAB RECEIPT DATE 11/3/88

LAB SAMPLE ID. NO. 5383 QC REPORT NO. 88-1675A

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water ______ Soil X Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	10,600	P	13.	Magnesium	22,500 *	P
2.	Antimony	1.3	F	14.	Manganese	10,020 *	P
3.	Arsenic	10.9 + *	F	15.	Mercury	0.03 U	CV
4.	Barium	65.5 *	A	16.	Nickel	70.7 * N	P
5.	Beryllium	0.79	A	17.	Potassium	1,250	A
6.	Cadmium	0.65	A	18.	Selenium	0.65 U N	F
7.	Calcium	103,000 *	P	19.	Silver	0.65U * N	A
8.	Chromium	348	A	20.	Sodium	3,740	P
9.	Cobalt	6.7 *	P	21.	Thallium	0.65 U	F
10.	Copper	51.4 *	P	22.	Vanadium	147	P
11.	Iron	63,080	P	23.	Zinc	107 *	P
12.	Lead	95.6 *	A		Percent Solids (%)	76.2	
	Cyanide	0.66U					

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

IFB Amend. One

Form I

Sample No.
ISS-2

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC.   CASE NO. 88-1675A

CONTRACT NO. 001918   LAB RECEIPT DATE 11/3/88

LAB SAMPLE ID. NO. 5381   QC REPORT NO. 88-1675A

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water ______ Soil X Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	20,100		P	13.	Magnesium	6,310	*	P
2.	Antimony	1.2U		F	14.	Manganese	570	*	P
3.	Arsenic	25.6	S*	F	15.	Mercury	0.02U		CV
4.	Barium	50.0	*	A	16.	Nickel	112	* N	P
5.	Beryllium	0.71		A	17.	Potassium	2,480		A
6.	Cadmium	0.59U		A	18.	Selenium	0.59	UN	F
7.	Calcium	30,720	*	P	19.	Silver	1.1	*N	A
8.	Chromium	139		A	20.	Sodium	3,308		P
9.	Cobalt	12.8	*	P	21.	Thallium	0.59U		F
10.	Copper	153	*	P	22.	Vanadium	43.6		P
11.	Iron	64,800		P	23.	Zinc	162	*	P
12.	Lead	781	*	A		Percent Solids (%)	83.7		
	Cyanide	0.60U							

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

Form I

Sample No.
ISS-3

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1675A

CONTRACT NO. 001918 LAB RECEIPT DATE 11/3/88

LAB SAMPLE ID. NO. 5379 QC REPORT NO. 88-1675A

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water ______ Soil X ______ Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	8,340			P
2.	Antimony	1.1U			F
3.	Arsenic	12.6	*		F
4.	Barium	46.4	*		A
5.	Beryllium	0.54U			A
6.	Cadmium	0.54U			A
7.	Calcium	16,400	*		P
8.	Chromium	147			A
9.	Cobalt	14.5	*		P
10.	Copper	180	*		P
11.	Iron	70,560			P
12.	Lead	507	*		A
	Cyanide	0.58			
13.	Magnesium	3,670	*		P
14.	Manganese	552	*		P
15.	Mercury	0.02U			CV
16.	Nickel	83.1	*	N	P
17.	Potassium	1,740			A
18.	Selenium	0.54U		N	F
19.	Silver	3.4	*	N	A
20.	Sodium	2,330			P
21.	Thallium	0.54			F
22.	Vanadium	23.6			P
23.	Zinc	237	*		P
	Percent Solids (%)	92.6			

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

Form I

Sample No.
ISS-3
DUPLICATE

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC.   CASE NO. 88-1675A

CONTRACT NO. 001918   LAB RECEIPT DATE 11/3/88

LAB SAMPLE ID. NO. 5380   QC REPORT NO. 88-1675A

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water ______ Soil X Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	7,301		P	13.	Magnesium	2,580		*	P
2.	Antimony	1.1U		F	14.	Manganese	793		*	P
3.	Arsenic	8.6	*	F	15.	Mercury	0.02U			CV
4.	Barium	60.0	*	A	16.	Nickel	64.6		*N	P
5.	Beryllium	0.54U		A	17.	Potassium	1760			A
6.	Cadmium	0.54U		A	18.	Selenium	0.54	UN		F
7.	Calcium	20,600	*	P	19.	Silver	1.7	*N		A
8.	Chromium	129		A	20.	Sodium	1,970			P
9.	Cobalt	8.4	*	P	21.	Thallium	0.54U			F
10.	Copper	142	*	P	22.	Vanadium	27.9			P
11.	Iron	63,500		P	23.	Zinc	180		*	P
12.	Lead	5,680	*	A		Percent Solids (%)	92.6			
	Cyanide	0.54U								

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

Form I

Sample No.
ISS-4

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1675A

CONTRACT NO. 001918 LAB RECEIPT DATE 11/3/88

LAB SAMPLE ID. NO. 5382 QC REPORT NO. 88-1675A

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water ______ Soil X Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	12,000	P	13.	Magnesium	597 *	P
2.	Antimony	1.2U	F	14.	Manganese	680 *	P
3.	Arsenic	18.9 S*	F	15.	Mercury	0.02U	CV
4.	Barium	20.3 *	A	16.	Nickel	36.9 *N	P
5.	Beryllium	1.1	A	17.	Potassium	2,880	A
6.	Cadmium	0.60U	A	18.	Selenium	0.60UN	F
7.	Calcium	110,500 *	P	19.	Silver	0.60U *N	A
8.	Chromium	24.8	A	20.	Sodium	771	P
9.	Cobalt	6.1 *	P	21.	Thallium	0.60U	F
10.	Copper	32.9 *	P	22.	Vanadium	18.7	P
11.	Iron	30,800	P	23.	Zinc	78.4 *	P
12.	Lead	27.4 *	A		Percent Solids (%)	83.8	
	Cyanide	0.60U					

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

Form I

Sample No.
ISW-1

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1675A

CONTRACT NO. 001918 LAB RECEIPT DATE 11/3/88

LAB SAMPLE ID. NO. 5386 QC REPORT NO. 88-1675A

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water ______ Soil X Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	15,020			P
2.	Antimony	2.2U			F
3.	Arsenic	15.2	+	*	F
4.	Barium	114		*	A
5.	Beryllium	1.3			A
6.	Cadmium	1.1U			A
7.	Calcium	150,000		*	P
8.	Chromium	113			A
9.	Cobalt	14.6		*	P
10.	Copper	10.1		*	P
11.	Iron	42,700			P
12.	Lead	189		*	A
	Cyanide	1.1U			

13.	Magnesium	9,680	*		P
14.	Manganese	2,520	*		P
15.	Mercury	0.3			CV
16.	Nickel	55.9	*N		P
17.	Potassium	2,730			A
18.	Selenium	1.1U		N	F
19.	Silver	1.1U		*N	A
20.	Sodium	1,550			P
21.	Thallium	1.1U			F
22.	Vanadium	69.4			P
23.	Zinc	464		*	P
	Percent Solids (%)	46.5			

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

Form I

Sample No.
ISW-2

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1675A

CONTRACT NO. 001918 LAB RECEIPT DATE 11/3/88

LAB SAMPLE ID. NO. 5388 QC REPORT NO. 88-1675A

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water ______ Soil X Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	7,760		P	13.	Magnesium	4,706	*	P
2.	Antimony	2.2		F	14.	Manganese	605	*	P
3.	Arsenic	5.5	S*	F	15.	Mercury	13.3		CV
4.	Barium	40.3	*	A	16.	Nickel	40.3	*N	P
5.	Beryllium	1.1U		A	17.	Potassium	739		A
6.	Cadmium	2.5		A	18.	Selenium	1.1U	N	F
7.	Calcium	86,300	*	P	19.	Silver	1.1U	*N	A
8.	Chromium	72.4		A	20.	Sodium	623		P
9.	Cobalt	17.7	*	P	21.	Thallium	1.1U		F
10.	Copper	84.9	*	P	22.	Vanadium	69.2		P
11.	Iron	17,000		P	23.	Zinc	1,720	*	P
12.	Lead	73.9	*	A		Percent Solids (%)	44.6		
	Cyanide	1.2							

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

Form I

Sample No.
ISW-4

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC.   CASE NO. 88-1675A

CONTRACT NO. 001918   LAB RECEIPT DATE 11/3/88

LAB SAMPLE ID. NO. 5384   QC REPORT NO. 88-1675A

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water ______ Soil X Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	13,400		P	13.	Magnesium	5,590	*		P
2.	Antimony	2.0U		F	14.	Manganese	707	*		P
3.	Arsenic	5.2	*	F	15.	Mercury	1.0			CV
4.	Barium	73.8	*	A	16.	Nickel	8.0		*N	P
5.	Beryllium	1.0U		A	17.	Potassium	1,750			A
6.	Cadmium	1.2		A	18.	Selenium	1.0U		N	F
7.	Calcium	23,300	*	P	19.	Silver	1.0U	*N		A
8.	Chromium	49.9		A	20.	Sodium	964			P
9.	Cobalt	11.2	*	P	21.	Thallium	1.0U			F
10.	Copper	79.4	*	P	22.	Vanadium	39.9			P
11.	Iron	24,100		P	23.	Zinc	307	*		P
12.	Lead	97.8	*	A		Percent Solids (%)	50.1			
	Cyanide	2.0								

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

FORM I

Sample No.
ISW-5

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1675A

CONTRACT NO. 001918 LAB RECEIPT DATE 11/3/88

LAB SAMPLE ID. NO. 5385 QC REPORT NO. 88-1675A

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water ______ Soil X Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	1,990		P
2.	Antimony	1.7U		F
3.	Arsenic	3.2	*	F
4.	Barium	13.8	*	A
5.	Beryllium	0.86U		A
6.	Cadmium	0.86U		A
7.	Calcium	297,000	*	P
8.	Chromium	5.0		A
9.	Cobalt	11.8	*	P
10.	Copper	8.1	*	P
11.	Iron	3,160		P
12.	Lead	24.2	*	A
13.	Magnesium	3120	*	P
14.	Manganese	8,640	*	P
15.	Mercury	0.03U		CV
16.	Nickel	6.9	*N	P
17.	Potassium	746		A
18.	Selenium	0.86U	N	F
19.	Silver	0.86U	*N	A
20.	Sodium	391		P
21.	Thallium	0.86		F
22.	Vanadium	4.7		P
23.	Zinc	59.6	*	P
Cyanide		0.86U		
Percent Solids (%)		57.9		

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

Form I

Sample No.
ISW-8

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1675A

CONTRACT NO. 001918 LAB RECEIPT DATE 11/3/88

LAB SAMPLE ID. NO. 5387 QC REPORT NO. 88-1675A

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water ______ Soil X Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	254		P		13.	Magnesium	8,540	*	P
2.	Antimony	2.2		F		14.	Manganese	591	*	P
3.	Arsenic	26.5	+ *	F		15.	Mercury	0.04U		CV
4.	Barium	59.1	*	A		16.	Nickel	39.4	*N	P
5.	Beryllium	1.1		A		17.	Potassium	3086		A
6.	Cadmium	1.1U		A		18.	Selenium	1.1U	N	F
7.	Calcium	8,300	*	P		19.	Silver	1.1U	*N	A
8.	Chromium	40.1		A		20.	Sodium	766		P
9.	Cobalt	15.3	*	P		21.	Thallium	1.1U		F
10.	Copper	39.6	*	P		22.	Vanadium	38.7		P
11.	Iron	28,000		P		23.	Zinc	235	*	P
12.	Lead	87.6	*	A			Percent Solids (%)	45.4		
	Cyanide	1.1U								

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

EP TOXICITY TEST EXTRACT - METALS

PARAMETER (Units of Measure = mg/l)	ANALYSIS DATE	EPA MAX. CONC.	SAMPLE IDENTIFICATION ISS-1	ISS-2
Total Arsenic	11/30/88	5.0	<0.005	0.005
Total Barium	11/15/88	100.0	0.16	0.06
Total Cadmium	11/15/88	1.0	<0.006	<0.006
Total Chromium	11/15/88	5.0	<0.010	0.012
Total Lead	11/28/88	5.0	<0.05	0.39
Total Mercury	11/22/88	0.2	<0.0008	0.0019
Total Selenium	11/30/88	1.0	<0.005	<0.005
Total Silver	11/15/88	5.0	<0.010	<0.010

___ Standard Addition
X Non-Standard Addition

EP TOXICITY TEST EXTRACT - METALS

PARAMETER (Units of Measure = mg/l)	ANALYSIS DATE	EPA MAX. CONC.	SAMPLE IDENTIFICATION ISS-3	ISS-4
Total Arsenic	11/30/88	5.0	0.010	<0.005
Total Barium	11/15/88	100.0	0.28	0.11
Total Cadmium	11/15/88	1.0	0.008	<0.006
Total Chromium	11/15/88	5.0	<0.010	<0.010
Total Lead	11/28/88	5.0	1.6	0.06
Total Mercury	11/22/88	0.2	<0.0005	<0.0005
Total Selenium	11/30/88	1.0	<0.005	<0.005
Total Silver	11/15/88	5.0	<0.010	<0.010

___ Standard Addition
X Non-Standard Addition

I.D. #88-1675

QUALITY CONTROL INFORMATION - PRECISION
EP TOXICITY TEST EXTRACT - METALS

SAMPLE IDENTIFICATION ISS-1

PARAMETER (Units of Measure = mg/l)	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION
Total Arsenic	<0.005	<0.005	<0.005	-
Total Barium	0.16	0.16	0.16	0
Total Cadmium	<0.006	<0.006	<0.006	-
Total Chromium	<0.010	<0.010	<0.010	-
Total Lead	<0.05	<0.05	<0.05	-
Total Mercury	<0.0008	<0.0008	<0.0008	-
Total Selenium	<0.005	<0.005	<0.005	-
Total Silver	<0.010	<0.010	<0.010	-

___ Standard Addition
X Non-Standard Addition

I.D. #88-1675

1A

VOLATILE ORG ...CS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-1

Lab Name: RE...A ENVIRON Contract: 001018

Lab Code: RECHY Ca... .: 1709 SAS No.: SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-1

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6889

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISW-1

01

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-1

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6889

Level: (low/med) LOW Date Received: 11 03 88

% Moisture: not dec. ____ Date Analyzed: 11 04 88

Column: (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	NO TIC'S DETECTED			
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

FORM I VOA-TIC

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-1MS

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-1MS

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6890

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-1MSD

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-1MSD

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6891

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-2

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-2

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6892

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	2	J
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	17	
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	9	
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISW-2

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-2

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6892

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	NO TIC'S DETECTED			
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FORM I VOA-TIC

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-3

Lab Name: RECRA ENVIRON Contract: 00[illegible]18

Lab Code: RECNY Case No.: 1709 SAS No.: SDG No.: LW02

Matrix: (soil/water) WATER Sample ID: ISW-3

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6893

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	2	J
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

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1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.: ISW-3

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-3

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6893

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ___ Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	NO TIC'S DETECTED			
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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-4

Lab Name: RECRA ENVIRON   Contract: 001918

Lab Code: RECNY   Case No.: 1709   SAS No.: ______   SDG No.: LW02

Matrix: (soil/water) WATER   Lab Sample ID: ISW-4

Sample wt/vol: 5.0 (g/mL) ML   Lab File ID: 6894

Level: (low/med) LOW   Date Received: 11/03/88

% Moisture: not dec. ____   Date Analyzed: 11/04/88

Column: (pack/cap) PACK   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	2	J
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	15	
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	0.07	J
10061-02-6	trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISW-4

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-4

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6894

Level: (low/med) LOW Date Received: 11 03/88

% Moisture: not dec. ____ Date Analyzed: 11 04/88

Column: (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	NO TIC'S DETECTED			
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FORM I VOA-TIC

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-5

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-5

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6895

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.

ISW-5

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-5

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6895

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	NO TIC'S DETECTED			
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FORM I VOA-TIC

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-6

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-6

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6896

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	2	J
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.

ISW-6

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-6

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6896

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	NO TIC'S DETECTED			
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FORM I VOA-TIC

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-7

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-7

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6897

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	1	J
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO. 022

ISW-7

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-7

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6897

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	NO TIC'S DETECTED			
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FORM I VOA-TIC

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-9

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-9

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6398

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	9	
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	3	J
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISW-9

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-9

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6898

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	NO TIC'S DETECTED			
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FORM I VOA-TIC

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

IFIELDBLK

Lab Name: RECRA ENVIRON   Contract: 001918

Lab Code: RECNY   Case No.: 1709   SAS No.: ______   SDG No.: LW02

Matrix: (soil/water) WATER   Lab Sample ID: IFIELDBLK

Sample wt/vol: 5.0 (g/mL) ML   Lab File ID: 6887

Level: (low/med) LOW   Date Received: 11/03/88

% Moisture: not dec. ____   Date Analyzed: 11/04/88

Column: (pack/cap) PACK   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	5	
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

SAMPLE NO. 032

IFIELD BLANK

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: IFIELD BLANK

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 5887

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	NO TIC'S DETECTED			
2.				
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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ITRIPBLK

Lab Name: RECRA ENVIR[illegible] Contract: 001918

Lab Code: RECNY C[illegible] No.: 1709 SAS No.: SDG No.: LW02

Matrix: (soil/water) [illegible]ER Lab Sample ID: ITRIPBLK

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6888

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	CONCENTRATION	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	3	J
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
108-05-4	Vinyl Acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total Xylenes	5	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ITRIPBLK

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ITRIPBLK

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 6888

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	NO TIC'S DETECTED			
2.				
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FORM I VOA-TIC

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-1

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-1

Sample wt/vol: 910 (g/mL) ML Lab File ID: 341Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	11	U
111-44-4	bis(2-Chloroethyl)Ether	11	U
95-57-8	2-Chlorophenol	11	U
541-73-1	1,3-Dichlorobenzene	11	U
106-46-7	1,4-Dichlorobenzene	11	U
100-51-6	Benzyl Alcohol	11	U
95-50-1	1,2-Dichlorobenzene	11	U
95-48-7	2-Methylphenol	11	U
108-60-1	bis(2-Chloroisopropyl)Ether	11	U
106-44-5	4-Methylphenol	11	U
621-64-7	N-Nitroso-Di-n-Propylamine	11	U
67-72-1	Hexachloroethane	11	U
98-95-3	Nitrobenzene	11	U
78-59-1	Isophorone	11	U
88-75-5	2-Nitrophenol	11	U
105-67-9	2,4-Dimethylphenol	11	U
65-85-0	Benzoic Acid	55	U
111-91-1	bis(2-Chloroethoxy)Methane	11	U
120-83-2	2,4-Dichlorophenol	11	U
120-82-1	1,2,4-Trichlorobenzene	11	U
91-20-3	Naphthalene	11	U
106-47-8	4-Chloroaniline	11	U
87-68-3	Hexachlorobutadiene	11	U
59-50-7	4-Chloro-3-Methylphenol	11	U
91-57-6	2-Methylnaphthalene	11	U
77-47-4	Hexachlorocyclopentadiene	11	U
88-06-2	2,4,6-Trichlorophenol	11	U
95-95-4	2,4,5-Trichlorophenol	55	U
91-58-7	2-Chloronaphthalene	11	U
88-74-4	2-Nitroaniline	55	U
131-11-3	Dimethyl Phthalate	11	U
208-96-8	Acenaphthylene	11	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-1

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-1

Sample wt/vol: 910 (g/mL) ML Lab File ID: 341Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	55	U
83-32-9	Acenaphthene	11	U
51-28-5	2,4-Dinitrophenol	55	U
100-02-7	4-Nitrophenol	55	U
132-64-9	Dibenzofuran	11	U
121-14-2	2,4-Dinitrotoluene	11	U
606-20-2	2,6-Dinitrotoluene	11	U
84-66-2	Diethylphthalate	11	U
7005-72-3	4-Chlorophenyl-phenylether	11	U
86-73-7	Fluorene	11	U
100-01-6	4-Nitroaniline	55	U
534-52-1	4,6-Dinitro-2-Methylphenol	55	U
86-30-6	N-Nitrosodiphenylamine (1)	11	U
101-55-3	4-Bromophenyl-phenylether	11	U
118-74-1	Hexachlorobenzene	11	U
87-86-5	Pentachlorophenol	55	U
85-01-8	Phenanthrene	11	U
120-12-7	Anthracene	11	U
84-74-2	Di-n-Butylphthalate	11	U
206-44-0	Fluoranthene	11	U
129-00-0	Pyrene	11	U
85-68-7	Butylbenzylphthalate	11	U
91-94-1	3,3'-Dichlorobenzidine	22	U
56-55-3	Benzo(a)Anthracene	11	U
117-81-7	bis(2-Ethylhexyl)Phthalate	2	J
218-01-9	Chrysene	11	U
117-84-0	Di-n-Octyl Phthalate	11	U
205-99-2	Benzo(b)Fluoranthene	11	U
207-08-9	Benzo(k)Fluoranthene	11	U
50-32-8	Benzo(a)Pyrene	11	U
193-39-5	Indeno(1,2,3-cd)Pyrene	11	U
53-70-3	Dibenz(a,h)Anthracene	11	U
191-24-2	Benzo(g,h,i)Perylene	11	U

(1) - Cannot be separated from Diphenylamine

041

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.: ISW-1

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-1

Sample wt/vol: 910 (g/mL) ML Lab File ID: 341Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.0

Number TIC's found: 8

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	-	UNKNOWN	24:58	11	J
2.	-	LONGCHAIN COMPOUND	26:14	480	J
3.	-	LONGCHAIN COMPOUND	26:34	16	J
4.	-	UNKNOWN	26:49	12	J
5.	-	UNKNOWN	27:07	20	J
6.	-	UNKNOWN	29:27	10	J
7.	-	UNKNOWN	32:17	10	J
8.	-	UNKNOWN	33:48	81	J
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
ISW-1MS

Lab Name: RECRA ENVIRON   Contract: 001918

Lab Code: RECNY   Case No.: 1709   SAS No.: ______   SDG No.: LW02

Matrix: (soil/water) WATER   Lab Sample ID: ISW-1MS

Sample wt/vol: 910 (g/mL) ML   Lab File ID: 342Y

Level: (low/med) LOW   Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____   Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF   Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N   pH: 7.0   Dilution Factor: 1.00

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	Concentration	Q
108-95-2	Phenol	11	U
111-44-4	bis(2-Chloroethyl)Ether	11	U
95-57-8	2-Chlorophenol	11	U
541-73-1	1,3-Dichlorobenzene	11	U
106-46-7	1,4-Dichlorobenzene	11	U
100-51-6	Benzyl Alcohol	11	U
95-50-1	1,2-Dichlorobenzene	11	U
95-48-7	2-Methylphenol	11	U
108-60-1	bis(2-Chloroisopropyl)Ether	11	U
106-44-5	4-Methylphenol	11	U
621-64-7	N-Nitroso-Di-n-Propylamine	11	U
67-72-1	Hexachloroethane	11	U
98-95-3	Nitrobenzene	11	U
78-59-1	Isophorone	11	U
88-75-5	2-Nitrophenol	11	U
105-67-9	2,4-Dimethylphenol	11	U
65-85-0	Benzoic Acid	55	U
111-91-1	bis(2-Chloroethoxy)Methane	11	U
120-83-2	2,4-Dichlorophenol	11	U
120-82-1	1,2,4-Trichlorobenzene	11	U
91-20-3	Naphthalene	11	U
106-47-8	4-Chloroaniline	11	U
87-68-3	Hexachlorobutadiene	11	U
59-50-7	4-Chloro-3-Methylphenol	11	U
91-57-6	2-Methylnaphthalene	11	U
77-47-4	Hexachlorocyclopentadiene	11	U
88-06-2	2,4,6-Trichlorophenol	11	U
95-95-4	2,4,5-Trichlorophenol	55	U
91-58-7	2-Chloronaphthalene	11	U
88-74-4	2-Nitroaniline	55	U
131-11-3	Dimethyl Phthalate	11	U
208-96-8	Acenaphthylene	11	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-1MS

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-1MS

Sample wt/vol: 910 (g/mL) ML Lab File ID: 342Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	55	U
83-32-9	Acenaphthene	11	U
51-28-5	2,4-Dinitrophenol	55	U
100-02-7	4-Nitrophenol	55	U
132-64-9	Dibenzofuran	11	U
121-14-2	2,4-Dinitrotoluene	11	U
606-20-2	2,6-Dinitrotoluene	11	U
84-66-2	Diethylphthalate	11	U
7005-72-3	4-Chlorophenyl-phenylether	11	U
86-73-7	Fluorene	11	U
100-01-6	4-Nitroaniline	55	U
534-52-1	4,6-Dinitro-2-Methylphenol	55	U
86-30-6	N-Nitrosodiphenylamine (1)	11	U
101-55-3	4-Bromophenyl-phenylether	11	U
118-74-1	Hexachlorobenzene	11	U
87-86-5	Pentachlorophenol	55	U
85-01-8	Phenanthrene	11	U
120-12-7	Anthracene	11	U
84-74-2	Di-n-Butylphthalate	11	U
206-44-0	Fluoranthene	11	U
129-00-0	Pyrene	11	U
85-68-7	Butylbenzylphthalate	11	U
91-94-1	3,3'-Dichlorobenzidine	22	U
56-55-3	Benzo(a)Anthracene	11	U
117-81-7	bis(2-Ethylhexyl)Phthalate	3	J
218-01-9	Chrysene	11	U
117-84-0	Di-n-Octyl Phthalate	11	U
205-99-2	Benzo(b)Fluoranthene	11	U
207-08-9	Benzo(k)Fluoranthene	11	U
50-32-8	Benzo(a)Pyrene	11	U
193-39-5	Indeno(1,2,3-cd)Pyrene	11	U
53-70-3	Dibenz(a,h)Anthracene	11	U
191-24-2	Benzo(g,h,i)Perylene	11	U

(1) - Cannot be separated from Diphenylamine

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-1MSD

Lab Name: RECRA ENVIRON   Contract: 001918

Lab Code: RECNY   Case No.: 1709   SAS No.: ______   SDG No.: LW02

Matrix: (soil/water) WATER   Lab Sample ID: ISW-1MSD

Sample wt/vol: 910 (g/mL) ML   Lab File ID: 343Y

Level: (low/med) LOW   Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____   Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF   Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N   pH: 7.0   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	11	U
111-44-4	bis(2-Chloroethyl)Ether	11	U
95-57-8	2-Chlorophenol	11	U
541-73-1	1,3-Dichlorobenzene	11	U
106-46-7	1,4-Dichlorobenzene	11	U
100-51-6	Benzyl Alcohol	11	U
95-50-1	1,2-Dichlorobenzene	11	U
95-48-7	2-Methylphenol	11	U
108-60-1	bis(2-Chloroisopropyl)Ether	11	U
106-44-5	4-Methylphenol	11	U
621-64-7	N-Nitroso-Di-n-Propylamine	11	U
67-72-1	Hexachloroethane	11	U
98-95-3	Nitrobenzene	11	U
78-59-1	Isophorone	11	U
88-75-5	2-Nitrophenol	11	U
105-67-9	2,4-Dimethylphenol	11	U
65-85-0	Benzoic Acid	55	U
111-91-1	bis(2-Chloroethoxy)Methane	11	U
120-83-2	2,4-Dichlorophenol	11	U
120-82-1	1,2,4-Trichlorobenzene	11	U
91-20-3	Naphthalene	11	U
106-47-8	4-Chloroaniline	11	U
87-68-3	Hexachlorobutadiene	11	U
59-50-7	4-Chloro-3-Methylphenol	11	U
91-57-6	2-Methylnaphthalene	11	U
77-47-4	Hexachlorocyclopentadiene	11	U
88-06-2	2,4,6-Trichlorophenol	11	U
95-95-4	2,4,5-Trichlorophenol	55	U
91-58-7	2-Chloronaphthalene	11	U
88-74-4	2-Nitroaniline	55	U
131-11-3	Dimethyl Phthalate	11	U
208-96-8	Acenaphthylene	11	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-1MSD

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-1MSD

Sample wt/vol: 910 (g/mL) ML Lab File ID: 343Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	55	U
83-32-9	Acenaphthene	11	U
51-28-5	2,4-Dinitrophenol	55	U
100-02-7	4-Nitrophenol	55	U
132-64-9	Dibenzofuran	11	U
121-14-2	2,4-Dinitrotoluene	11	U
606-20-2	2,6-Dinitrotoluene	11	U
84-66-2	Diethylphthalate	11	U
7005-72-3	4-Chlorophenyl-phenylether	11	U
86-73-7	Fluorene	11	U
100-01-6	4-Nitroaniline	55	U
534-52-1	4,6-Dinitro-2-Methylphenol	55	U
86-30-6	N-Nitrosodiphenylamine (1)	11	U
101-55-3	4-Bromophenyl-phenylether	11	U
118-74-1	Hexachlorobenzene	11	U
87-86-5	Pentachlorophenol	55	U
85-01-8	Phenanthrene	11	U
120-12-7	Anthracene	11	U
84-74-2	Di-n-Butylphthalate	11	U
206-44-0	Fluoranthene	11	U
129-00-0	Pyrene	11	U
85-68-7	Butylbenzylphthalate	11	U
91-94-1	3,3'-Dichlorobenzidine	22	U
56-55-3	Benzo(a)Anthracene	11	U
117-81-7	bis(2-Ethylhexyl)Phthalate	3	J
218-01-9	Chrysene	11	U
117-84-0	Di-n-Octyl Phthalate	11	U
205-99-2	Benzo(b)Fluoranthene	11	U
207-08-9	Benzo(k)Fluoranthene	11	U
50-32-8	Benzo(a)Pyrene	11	U
193-39-5	Indeno(1,2,3-cd)Pyrene	11	U
53-70-3	Dibenz(a,h)Anthracene	11	U
191-24-2	Benzo(g,h,i)Perylene	11	U

(1) - Cannot be separated from Diphenylamine

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-2

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-2

Sample wt/vol: 980 (g/mL) ML Lab File ID: 221Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/11/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	51	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	51	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	51	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-2

Lab Name: RECRA ENVIRON   Contract: 001918

Lab Code: RECNY   Case No.: 1709   SAS No.: ______   SDG No.: LW02

Matrix: (soil/water) WATER   Lab Sample ID: ISW-2

Sample wt/vol: 980 (g/mL) ML   Lab File ID: 221Y

Level: (low/med) LOW   Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____   Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF   Date Analyzed: 11/11/88

GPC Cleanup: (Y/N) N   pH: 7.0   Dilution Factor: 1.000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	51	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	51	U
100-02-7	4-Nitrophenol	51	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	51	U
534-52-1	4,6-Dinitro-2-Methylphenol	51	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	51	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	0.5	BJ
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	0.7	J
218-01-9	Chrysene	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISW-2

044

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-2

Sample wt/vol: 980 (g/mL) ML Lab File ID: 221Y

Level: (low/med) LOW Date Received: 11 03/88

% Moisture: not dec. _____ dec. _____ Date Extracted: 11 07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/11/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.0

Number TIC's found: 5

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	UNKNOWN	08:31	42	J
2. -	UNKNOWN	10:03	30	J
3. -	UNKNOWN	10:08	11	J
4. -	UNKNOWN	13:02	16	J
5. -	UNKNOWN ALCOHOL	26:18	37	J
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EPA SAMPLE NO.

ISW-3

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: RECRA ENVIRON   Contract: 001918

Lab Code: RECNY   Case No.: 1709   SAS No.: ______   SDG No.: LW02

Matrix: (soil/water) WATER   Lab Sample ID: ISW-3

Sample wt/vol: 930 (g/mL) ML   Lab File ID: 219Y

Level: (low/med) LOW   Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____   Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF   Date Analyzed: 11/11/88

GPC Cleanup: (Y/N) N   pH: 7.0   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	11	U
111-44-4	bis(2-Chloroethyl)Ether	11	U
95-57-8	2-Chlorophenol	11	U
541-73-1	1,3-Dichlorobenzene	11	U
106-46-7	1,4-Dichlorobenzene	11	U
100-51-6	Benzyl Alcohol	11	U
95-50-1	1,2-Dichlorobenzene	11	U
95-48-7	2-Methylphenol	11	U
108-60-1	bis(2-Chloroisopropyl)Ether	11	U
106-44-5	4-Methylphenol	11	U
621-64-7	N-Nitroso-Di-n-Propylamine	11	U
67-72-1	Hexachloroethane	11	U
98-95-3	Nitrobenzene	11	U
78-59-1	Isophorone	11	U
88-75-5	2-Nitrophenol	11	U
105-67-9	2,4-Dimethylphenol	11	U
65-85-0	Benzoic Acid	54	U
111-91-1	bis(2-Chloroethoxy)Methane	11	U
120-83-2	2,4-Dichlorophenol	11	U
120-82-1	1,2,4-Trichlorobenzene	11	U
91-20-3	Naphthalene	11	U
106-47-8	4-Chloroaniline	11	U
87-68-3	Hexachlorobutadiene	11	U
59-50-7	4-Chloro-3-Methylphenol	11	U
91-57-6	2-Methylnaphthalene	11	U
77-47-4	Hexachlorocyclopentadiene	11	U
88-06-2	2,4,6-Trichlorophenol	11	U
95-95-4	2,4,5-Trichlorophenol	54	U
91-58-7	2-Chloronaphthalene	11	U
88-74-4	2-Nitroaniline	54	U
131-11-3	Dimethyl Phthalate	11	U
208-96-8	Acenaphthylene	11	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-3

Lab Name: RECRA ENVIRON   Contract: 001918

Lab Code: RECNY   Case No.: 1709   SAS No.: ______   SDG No.: LW02

Matrix: (soil/water) WATER   Lab Sample ID: ISW-3

Sample wt/vol: 930 (g/mL) ML   Lab File ID: 219Y

Level: (low/med) LOW   Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____   Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF   Date Analyzed: 11/11/88

GPC Cleanup: (Y/N) N   pH: 7.0   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	54	U
83-32-9	Acenaphthene	11	U
51-28-5	2,4-Dinitrophenol	54	U
100-02-7	4-Nitrophenol	54	U
132-64-9	Dibenzofuran	11	U
121-14-2	2,4-Dinitrotoluene	11	U
606-20-2	2,6-Dinitrotoluene	11	U
84-66-2	Diethylphthalate	11	U
7005-72-3	4-Chlorophenyl-phenylether	11	U
86-73-7	Fluorene	11	U
100-01-6	4-Nitroaniline	54	U
534-52-1	4,6-Dinitro-2-Methylphenol	54	U
86-30-6	N-Nitrosodiphenylamine (1)	11	U
101-55-3	4-Bromophenyl-phenylether	11	U
118-74-1	Hexachlorobenzene	11	U
87-86-5	Pentachlorophenol	54	U
85-01-8	Phenanthrene	11	U
120-12-7	Anthracene	11	U
84-74-2	Di-n-Butylphthalate	1	BJ
206-44-0	Fluoranthene	11	U
129-00-0	Pyrene	11	U
85-68-7	Butylbenzylphthalate	11	U
91-94-1	3,3'-Dichlorobenzidine	22	U
56-55-3	Benzo(a)Anthracene	11	U
117-81-7	bis(2-Ethylhexyl)Phthalate	1	J
218-01-9	Chrysene	11	U
117-84-0	Di-n-Octyl Phthalate	11	U
205-99-2	Benzo(b)Fluoranthene	11	U
207-08-9	Benzo(k)Fluoranthene	11	U
50-32-8	Benzo(a)Pyrene	11	U
193-39-5	Indeno(1,2,3-cd)Pyrene	11	U
53-70-3	Dibenz(a,h)Anthracene	11	U
191-24-2	Benzo(g,h,i)Perylene	11	U

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISW-3

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-3

Sample wt/vol: 930 (g/mL) ML Lab File ID: 219Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/11/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.0

Number TIC's found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	LONGCHAIN COMPOUND	26:19	130	J
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-4

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-4

Sample wt/vol: 950 (g/mL) ML Lab File ID: 339Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	11	U
111-44-4	bis(2-Chloroethyl)Ether	11	U
95-57-8	2-Chlorophenol	11	U
541-73-1	1,3-Dichlorobenzene	11	U
106-46-7	1,4-Dichlorobenzene	11	U
100-51-6	Benzyl Alcohol	11	U
95-50-1	1,2-Dichlorobenzene	11	U
95-48-7	2-Methylphenol	11	U
108-60-1	bis(2-Chloroisopropyl)Ether	11	U
106-44-5	4-Methylphenol	11	U
621-64-7	N-Nitroso-Di-n-Propylamine	11	U
67-72-1	Hexachloroethane	11	U
98-95-3	Nitrobenzene	11	U
78-59-1	Isophorone	11	U
88-75-5	2-Nitrophenol	11	U
105-67-9	2,4-Dimethylphenol	11	U
65-85-0	Benzoic Acid	53	U
111-91-1	bis(2-Chloroethoxy)Methane	11	U
120-83-2	2,4-Dichlorophenol	11	U
120-82-1	1,2,4-Trichlorobenzene	11	U
91-20-3	Naphthalene	11	U
106-47-8	4-Chloroaniline	11	U
87-68-3	Hexachlorobutadiene	11	U
59-50-7	4-Chloro-3-Methylphenol	11	U
91-57-6	2-Methylnaphthalene	0.5	J
77-47-4	Hexachlorocyclopentadiene	11	U
88-06-2	2,4,6-Trichlorophenol	11	U
95-95-4	2,4,5-Trichlorophenol	53	U
91-58-7	2-Chloronaphthalene	11	U
88-74-4	2-Nitroaniline	53	U
131-11-3	Dimethyl Phthalate	11	U
208-96-8	Acenaphthylene	11	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-4

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-4

Sample wt/vol: 950 (g/mL) ML Lab File ID: 339Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	53	U
83-32-9	Acenaphthene	2	J
51-28-5	2,4-Dinitrophenol	53	U
100-02-7	4-Nitrophenol	53	U
132-64-9	Dibenzofuran	11	U
121-14-2	2,4-Dinitrotoluene	11	U
606-20-2	2,6-Dinitrotoluene	11	U
84-66-2	Diethylphthalate	11	U
7005-72-3	4-Chlorophenyl-phenylether	11	U
86-73-7	Fluorene	11	U
100-01-6	4-Nitroaniline	53	U
534-52-1	4,6-Dinitro-2-Methylphenol	53	U
86-30-6	N-Nitrosodiphenylamine (1)	11	U
101-55-3	4-Bromophenyl-phenylether	11	U
118-74-1	Hexachlorobenzene	11	U
87-86-5	Pentachlorophenol	53	U
85-01-8	Phenanthrene	26	
120-12-7	Anthracene	7	J
84-74-2	Di-n-Butylphthalate	11	U
206-44-0	Fluoranthene	36	
129-00-0	Pyrene	32	
85-68-7	Butylbenzylphthalate	11	U
91-94-1	3,3'-Dichlorobenzidine	21	U
56-55-3	Benzo(a)Anthracene	10	J
117-81-7	bis(2-Ethylhexyl)Phthalate	8	J
218-01-9	Chrysene	14	
117-84-0	Di-n-Octyl Phthalate	11	U
205-99-2	Benzo(b)Fluoranthene	14	
207-08-9	Benzo(k)Fluoranthene	11	
50-32-8	Benzo(a)Pyrene	11	U
193-39-5	Indeno(1,2,3-cd)Pyrene	4	J
53-70-3	Dibenz(a,h)Anthracene	11	U
191-24-2	Benzo(g,h,i)Perylene	11	U

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO. ISW-4

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-4

Sample wt/vol: 950 (g/mL) ML Lab File ID: 339Y

Level: (low/med) LOW Date Received: 11 03 88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11 07 88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12 07 88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.0

Number TIC's found: 20

CONCENTRATION UNITS: (ug/L or ug/Kg) ug L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	ALKYL HYDROCARBON	09:42	20	J
2. -	ALKYL SUBSTITUTED COMPOUND	10:08	24	J
3. -	ALKYL HYDROCARBON	21:31	20	J
4. -	ALKYL HYDROCARBON	22:58	31	J
5. -	UNKNOWN	24:59	22	J
6. -	ALKYL HYDROCARBON	25:15	25	J
7. -	ALKYL SUBSTITUTED COMPOUND	25:27	14	J
8. -	UNKNOWN	26:15	87	J
9. -	UNKNOWN	27:07	53	J
10. -	ALKYL SUBSTITUTED COMPOUND	28:19	51	J
11. -	ALKYL SUBSTITUTED COMPOUND	29:13	41	J
12. -	UNKNOWN	30:13	37	J
13. -	ALKYL SUBSTITUTED COMPOUND	30:21	30	J
14. -	ALKYL HYDROCARBON	31:10	54	J
15. -	ALKYL SUBSTITUTED COMPOUND	31:46	74	J
16. -	ALKYL SUBSTITUTED COMPOUND	32:31	58	J
17. -	ALKYL SUBSTITUTED COMPOUND	32:47	79	J
18. -	ALKYL HYDROCARBON	33:32	140	J
19. -	UNKNOWN	36:45	57	J
20. -	UNKNOWN	37:38	50	J
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-5

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-5

Sample wt/vol: 970 (g/mL) ML Lab File ID: 340Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	52	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	52	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	52	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-5

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ____ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-5

Sample wt/vol: 970 (g/mL) ML Lab File ID: 340Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	CONCENTRATION	Q
99-09-2	3-Nitroaniline	52	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	52	U
100-02-7	4-Nitrophenol	52	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	52	U
534-52-1	4,6-Dinitro-2-Methylphenol	52	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	52	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	21	U
56-55-3	Benzo(a)Anthracene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	2	J
218-01-9	Chrysene	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISW-5

053

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-5

Sample wt/vol: 970 (g/mL) ML Lab File ID: 640Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 12.0 Dilution Factor: 1.0

Number TIC's found: 4

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	UNKNOWN	24:58	10	J
2. -	LONGCHAIN COMPOUND	26:13	340	J
3. -	LONGCHAIN COMPOUND	27:03	9	J
4. -	UNKNOWN	33:46	31	J
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-6

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-6

Sample wt/vol: 980 (g/mL) ML Lab File ID: 217Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/11/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	51	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	51	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	51	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-6

Lab Name: RECRA ENVIRON   Contract: 001918

Lab Code: RECNY   Case No.: 1709   SAS No.: ______   SDG No.: LW02

Matrix: (soil/water) WATER   Lab Sample ID: ISW-6

Sample wt/vol: 980 (g/mL) ML   Lab File ID: 217Y

Level: (low/med) LOW   Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____   Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF   Date Analyzed: 11/11/88

GPC Cleanup: (Y/N) N   pH: 7.0   Dilution Factor: 1.000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	51	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	51	U
100-02-7	4-Nitrophenol	51	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	51	U
534-52-1	4,6-Dinitro-2-Methylphenol	51	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	51	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	3	J
218-01-9	Chrysene	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISW-6

056

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-6

Sample wt vol: 980 (g/mL) ML Lab File ID: 217Y

Level: (low/med) LOW Date Received: 11 03.88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07.88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11 11 88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.0

Number TIC's found: 2

CONCENTRATION UNITS:
(ug L or ug/Kg) ug L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	LONGCHAIN COMPOUND	26:10	63	J
2. -	UNKNOWN	33:45	9	J
3.				
4.				
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-7

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-7

Sample wt/vol: 960 (g/mL) ML Lab File ID: 252Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/16/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	Concentration	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	0.1	J
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	52	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	52	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	52	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-7

Lab Name: RECRA ENVIRON   Contract: 001918

Lab Code: RECNY   Case No.: 1709   SAS No.: ______   SDG No.: LW02

Matrix: (soil/water) WATER   Lab Sample ID: ISW-7

Sample wt/vol: 960 (g/mL) ML   Lab File ID: 252Y

Level: (low/med) LOW   Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____   Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF   Date Analyzed: 11/16/88

GPC Cleanup: (Y/N) N   pH: 7.0   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	52	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	52	U
100-02-7	4-Nitrophenol	52	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	52	U
534-52-1	4,6-Dinitro-2-Methylphenol	52	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	52	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	0.4	BJ
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	21	U
56-55-3	Benzo(a)Anthracene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	2	J
218-01-9	Chrysene	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISW-7

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-7

Sample wt/vol: 960 (g/mL) ML Lab File ID: 252Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/16/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.0

Number TIC's found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	-	LONGCHAIN COMPOUND	25:08	49	J
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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-9

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-9

Sample wt/vol: 950 (g/mL) ML Lab File ID: 220Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/11/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	11	U
111-44-4	bis(2-Chloroethyl)Ether	11	U
95-57-8	2-Chlorophenol	11	U
541-73-1	1,3-Dichlorobenzene	11	U
106-46-7	1,4-Dichlorobenzene	11	U
100-51-6	Benzyl Alcohol	11	U
95-50-1	1,2-Dichlorobenzene	11	U
95-48-7	2-Methylphenol	11	U
108-60-1	bis(2-Chloroisopropyl)Ether	11	U
106-44-5	4-Methylphenol	11	U
621-64-7	N-Nitroso-Di-n-Propylamine	11	U
67-72-1	Hexachloroethane	11	U
98-95-3	Nitrobenzene	11	U
78-59-1	Isophorone	11	U
88-75-5	2-Nitrophenol	11	U
105-67-9	2,4-Dimethylphenol	11	U
65-85-0	Benzoic Acid	53	U
111-91-1	bis(2-Chloroethoxy)Methane	11	U
120-83-2	2,4-Dichlorophenol	11	U
120-82-1	1,2,4-Trichlorobenzene	11	U
91-20-3	Naphthalene	11	U
106-47-8	4-Chloroaniline	11	U
87-68-3	Hexachlorobutadiene	11	U
59-50-7	4-Chloro-3-Methylphenol	11	U
91-57-6	2-Methylnaphthalene	11	U
77-47-4	Hexachlorocyclopentadiene	11	U
88-06-2	2,4,6-Trichlorophenol	11	U
95-95-4	2,4,5-Trichlorophenol	53	U
91-58-7	2-Chloronaphthalene	11	U
88-74-4	2-Nitroaniline	53	U
131-11-3	Dimethyl Phthalate	11	U
208-96-8	Acenaphthylene	11	U

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISW-9

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-9

Sample wt/vol: 950 (g/mL) ML Lab File ID: 220Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/11/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	53	U
83-32-9	Acenaphthene	11	U
51-28-5	2,4-Dinitrophenol	53	U
100-02-7	4-Nitrophenol	53	U
132-64-9	Dibenzofuran	11	U
121-14-2	2,4-Dinitrotoluene	11	U
606-20-2	2,6-Dinitrotoluene	11	U
84-66-2	Diethylphthalate	11	U
7005-72-3	4-Chlorophenyl-phenylether	11	U
86-73-7	Fluorene	11	U
100-01-6	4-Nitroaniline	53	U
534-52-1	4,6-Dinitro-2-Methylphenol	53	U
86-30-6	N-Nitrosodiphenylamine (1)	11	U
101-55-3	4-Bromophenyl-phenylether	11	U
118-74-1	Hexachlorobenzene	11	U
87-86-5	Pentachlorophenol	53	U
85-01-8	Phenanthrene	11	U
120-12-7	Anthracene	11	U
84-74-2	Di-n-Butylphthalate	0.7	BJ
206-44-0	Fluoranthene	11	U
129-00-0	Pyrene	11	U
85-68-7	Butylbenzylphthalate	11	U
91-94-1	3,3'-Dichlorobenzidine	21	U
56-55-3	Benzo(a)Anthracene	11	U
117-81-7	bis(2-Ethylhexyl)Phthalate	2	J
218-01-9	Chrysene	11	U
117-84-0	Di-n-Octyl Phthalate	11	U
205-99-2	Benzo(b)Fluoranthene	11	U
207-08-9	Benzo(k)Fluoranthene	11	U
50-32-8	Benzo(a)Pyrene	11	U
193-39-5	Indeno(1,2,3-cd)Pyrene	11	U
53-70-3	Dibenz(a,h)Anthracene	11	U
191-24-2	Benzo(g,h,i)Perylene	11	U

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.: ISW-9

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: ISW-9

Sample wt/vol: 950 (g/mL) ML Lab File ID: 220Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/11/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.0

Number TIC's found: 1

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	-	UNKNOWN	26:22	35	J
2.					
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EPA SAMPLE NO.

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SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: ______ SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: IFIELDBLANK

Sample wt/vol: 980 (g/mL) ML Lab File ID: 222Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/11/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.000

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)Ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl Alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)Ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-Di-n-Propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	51	U
111-91-1	bis(2-Chloroethoxy)Methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	51	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	51	U
131-11-3	Dimethyl Phthalate	10	U
208-96-8	Acenaphthylene	10	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

IFIELDBLANK

Lab Name: RECRA ENVIRON   Contract: 001918

Lab Code: RECNY   Case No.: 1709   SAS No.: ______   SDG No.: LW02

Matrix: (soil/water) WATER   Lab Sample ID: IFIELDBLANK

Sample wt/vol: 980 (g/mL) ML   Lab File ID: 222Y

Level: (low/med) LOW   Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____   Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF   Date Analyzed: 11/11/88

GPC Cleanup: (Y/N) N   pH: 7.0   Dilution Factor: 1.000

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	CONCENTRATION	Q
99-09-2	3-Nitroaniline	51	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	51	U
100-02-7	4-Nitrophenol	51	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	51	U
534-52-1	4,6-Dinitro-2-Methylphenol	51	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	51	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-Butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	20	U
56-55-3	Benzo(a)Anthracene	10	U
117-81-7	bis(2-Ethylhexyl)Phthalate	1	J
218-01-9	Chrysene	10	U
117-84-0	Di-n-Octyl Phthalate	10	U
205-99-2	Benzo(b)Fluoranthene	10	U
207-08-9	Benzo(k)Fluoranthene	10	U
50-32-8	Benzo(a)Pyrene	10	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10	U
53-70-3	Dibenz(a,h)Anthracene	10	U
191-24-2	Benzo(g,h,i)Perylene	10	U

(1) - Cannot be separated from Diphenylamine

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

IFIELD BLANK

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: - SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: IFIELD BLANK

Sample wt/vol: 980 (g/mL) ML Lab File ID: 222Y

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. ____ dec. ____ Date Extracted: 11/07/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 11/11/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.0

Number TIC's found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	UNKNOWN	26:18	50	J
2. -	UNKNOWN	33:44	9	J
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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
ISW-1

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: NA SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: SW2877

Sample wt/vol: 900 (g/mL) ML Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. - dec. - Date Extracted: 11/08/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.05	U
319-85-7	beta-BHC	0.05	U
319-86-8	delta-BHC	0.05	U
58-89-9	gamma-BHC (Lindane)	0.05	U
76-44-8	Heptachlor	0.05	U
309-00-2	Aldrin	0.05	U
1024-57-3	Heptachlor epoxide	0.05	U
959-98-8	Endosulfan I	0.05	U
60-57-1	Dieldrin	0.1	U
72-55-9	4,4'-DDE	0.1	U
72-20-8	Endrin	0.1	U
33213-65-9	Endosulfan II	0.1	U
72-54-8	4,4'-DDD	0.1	U
1031-07-8	Endosulfan sulfate	0.1	U
50-29-3	4,4'-DDT	0.1	U
72-43-5	Methoxychlor	0.5	U
53494-70-5	Endrin ketone	0.1	U
5103-71-9	alpha-Chlordane	0.5	U
5103-74-2	gamma-Chlordane	0.5	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.5	U
11104-28-2	Aroclor-1221	0.5	U
11141-16-5	Aroclor-1232	0.5	U
53469-21-9	Aroclor-1242	0.5	U
12672-29-6	Aroclor-1248	0.5	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

1402

SAMPLE NO.

ISW-1 MS

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: NA SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: SW2878

Sample wt/vol: 850 (g/mL) ML Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. - dec. - Date Extracted: 11/08/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.05	U
319-85-7	beta-BHC	0.05	U
319-86-8	delta-BHC	0.05	U
58-89-9	gamma-BHC (Lindane)	-	
76-44-8	Heptachlor	-	
309-00-2	Aldrin	-	
1024-57-3	Heptachlor epoxide	0.05	U
959-98-8	Endosulfan I	0.05	U
60-57-1	Dieldrin	-	
72-55-9	4,4'-DDE	0.1	U
72-20-8	Endrin	-	
33213-65-9	Endosulfan II	0.1	U
72-54-8	4,4'-DDD	0.1	U
1031-07-8	Endosulfan sulfate	0.1	U
50-29-3	4,4'-DDT	-	
72-43-5	Methoxychlor	0.5	U
53494-70-5	Endrin ketone	0.1	U
5103-71-9	alpha-Chlordane	0.5	U
5103-74-2	gamma-Chlordane	0.5	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.5	U
11104-28-2	Aroclor-1221	0.5	U
11141-16-5	Aroclor-1232	0.5	U
53469-21-9	Aroclor-1242	0.5	U
12672-29-6	Aroclor-1248	0.5	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

FORM I PEST

RECRA ENVIRONMENTAL, INC.

CHAIN OF CUSTODY RECORD

PROJECT NO: 576-013

SITE NAME: Ferro Corp

SAMPLERS (SIGNATURE): John M Guzewich

STATION NO	DATE	TIME	COMP	GRAB	STATION LOCATION	NO OF CONTAINERS	VOC, HSL +10	AB/N, HSL +20	Pest./PCBs HSL	Total Metals HSL	Cyanide HSL		REMARKS
SW-4	11-2-88	0830		✓	Ferro Corp Surface Waters	7	2	2	1	1	1		
SW-5	↓	0915		✓	↓	7	2	2	1	1	1		* pH ~ 11.5
SW-1		1030		✓		7	2	2	1	1	1		
SW-1 MS		1030		✓		7	2	2	1	1	1		Matrix Spike of SW-1
SW-1 MSD		1030		✓		7	2	2	1	1	1		Matrix Spike Dup of SW-1
SW-6		1305		✓		7	2	2	1	1	1		
SW-7		1320		✓		7	2	2	1	1	1		
SW-3		1340		✓		7	2	2	1	1	1		
SW-9		1410		✓		7	2	2	1	1	1		
SW-2		1555		✓		7	2	2	1	1	1		
Field Blank		1620		–		7	2	2	1	1	1		
Trip Blank		–		–		1	1						Trip Blank used for Surf. H_2O, Sediment + Soil Sampling

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)
John M Guzewich	11-3-88	0752	Craig O Jones				
RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)
RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY (SIGNATURE)	DATE	TIME	REMARKS	

Distribution: Original accompanies shipment; copy to coordinator field files

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ISS-1

Lab Name: RECRA ENVIRON Contract: 001918

Lab Code: RECNY Case No.: 1675 SAS No.: ______ SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-1

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 27836HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 24 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	13	U
74-83-9	Bromomethane	13	U
75-01-4	Vinyl Chloride	13	U
75-00-3	Chloroethane	13	U
75-09-2	Methylene Chloride	7	U
67-64-1	Acetone	4	BJ
75-15-0	Carbon Disulfide	5	J
75-35-4	1,1-Dichloroethene	7	U
75-34-3	1,1-Dichloroethane	7	U
540-59-0	1,2-Dichloroethene (total)	7	U
67-66-3	Chloroform	7	U
107-06-2	1,2-Dichloroethane	7	U
78-93-3	2-Butanone	6	BJ
71-55-6	1,1,1-Trichloroethane	7	U
56-23-5	Carbon Tetrachloride	7	U
108-05-4	Vinyl Acetate	13	U
75-27-4	Bromodichloromethane	7	U
78-87-5	1,2-Dichloropropane	7	U
10061-01-5	cis-1,3-dichloropropene	7	U
79-01-6	Trichloroethene	7	U
124-48-1	Dibromochloromethane	7	U
79-00-5	1,1,2-Trichloroethane	7	U
71-43-2	Benzene	7	U
10061-02-6	trans-1,3-dichloropropene	7	U
75-25-2	Bromoform	7	U
591-78-6	2-Hexanone	13	U
108-10-1	4-Methyl-2-Pentanone	13	U
127-18-4	Tetrachloroethene	7	
79-34-5	1,1,2,2-Tetrachloroethane	7	U
108-88-3	Toluene	0.5	BJ
108-90-7	Chlorobenzene	7	U
100-41-4	Ethylbenzene	7	U
100-42-5	Styrene	7	U
1330-20-7	Total Xylenes	7	U

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NO.
ISS-1

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY CASE NO.: 1675 SAS No.: - SDG No.: LS02

Matrix: (soil/water) SOIL Lab Sample ID: ISS-1

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 27836HP

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. 24 Date Analyzed: 11/04/88

Column: (pack/cap) PACK Dilution Factor: 1.00

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. -	ALKYL HYDROCARBON	17:23	10	J
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FORM I VOA-TIC

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO. 1414

ISW-1 MSD

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: NA SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: SW2879

Sample wt/vol: 850 (g/mL) ML Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. - dec. - Date Extracted: 11/08/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	Concentration	Q
319-84-6	alpha-BHC	0.05	U
319-85-7	beta-BHC	0.05	U
319-86-8	delta-BHC	0.05	U
58-89-9	gamma-BHC (Lindane)	-	
76-44-8	Heptachlor	-	
309-00-2	Aldrin	-	
1024-57-3	Heptachlor epoxide	0.05	U
959-98-8	Endosulfan I	0.05	U
60-57-1	Dieldrin	-	
72-55-9	4,4'-DDE	0.1	U
72-20-8	Endrin	-	
33213-65-9	Endosulfan II	0.1	U
72-54-8	4,4'-DDD	0.1	U
1031-07-8	Endosulfan sulfate	0.1	U
50-29-3	4,4'-DDT	-	
72-43-5	Methoxychlor	0.5	U
53494-70-5	Endrin ketone	0.1	U
5103-71-9	alpha-Chlordane	0.5	U
5103-74-2	gamma-Chlordane	0.5	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.5	U
11104-28-2	Aroclor-1221	0.5	U
11141-16-5	Aroclor-1232	0.5	U
53469-21-9	Aroclor-1242	0.5	U
12672-29-6	Aroclor-1248	0.5	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.: ISW-2

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: NA SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: SW2881

Sample wt/vol: 920 (g/mL) ML Lab File ID: -

Level: (low/med) LOW Date Received: 11/03 88

% Moisture: not dec. - dec. - Date Extracted: 11/08 88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07 88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.05	U
319-85-7	beta-BHC	0.05	U
319-86-8	delta-BHC	0.05	U
58-89-9	gamma-BHC (Lindane)	0.05	U
76-44-8	Heptachlor	0.05	U
309-00-2	Aldrin	0.05	U
1024-57-3	Heptachlor epoxide	0.05	U
959-98-8	Endosulfan I	0.05	U
60-57-1	Dieldrin	0.1	U
72-55-9	4,4'-DDE	0.1	U
72-20-8	Endrin	0.1	U
33213-65-9	Endosulfan II	0.1	U
72-54-8	4,4'-DDD	0.1	U
1031-07-8	Endosulfan sulfate	0.1	U
50-29-3	4,4'-DDT	0.1	U
72-43-5	Methoxychlor	0.5	U
53494-70-5	Endrin ketone	0.1	U
5103-71-9	alpha-Chlordane	0.5	U
5103-74-2	gamma-Chlordane	0.5	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.5	U
11104-28-2	Aroclor-1221	0.5	U
11141-16-5	Aroclor-1232	0.5	U
53469-21-9	Aroclor-1242	0.5	U
12672-29-6	Aroclor-1248	0.5	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
ISW-3

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: NA SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: SW2880

Sample wt/vol: 900 (g/mL) ML Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. - dec. - Date Extracted: 11/08/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.05	U
319-85-7	beta-BHC	0.05	U
319-86-8	delta-BHC	0.05	U
58-89-9	gamma-BHC (Lindane)	0.05	U
76-44-8	Heptachlor	0.05	U
309-00-2	Aldrin	0.05	U
1024-57-3	Heptachlor epoxide	0.05	U
959-98-8	Endosulfan I	0.05	U
60-57-1	Dieldrin	0.05	U
72-55-9	4,4'-DDE	0.1	U
72-20-8	Endrin	0.1	U
33213-65-9	Endosulfan II	0.1	U
72-54-8	4,4'-DDD	0.1	U
1031-07-8	Endosulfan sulfate	0.1	U
50-29-3	4,4'-DDT	0.1	U
72-43-5	Methoxychlor	0.1	U
53494-70-5	Endrin ketone	0.5	U
5103-71-9	alpha-Chlordane	0.1	U
5103-74-2	gamma-Chlordane	0.5	U
8001-35-2	Toxaphene	0.5	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	0.5	U
11141-16-5	Aroclor-1232	0.5	U
53469-21-9	Aroclor-1242	0.5	U
12672-29-6	Aroclor-1248	0.5	U
11097-69-1	Aroclor-1254	0.5	U
11096-82-5	Aroclor-1260	1.0	U
		1.0	U

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.: ISW-4

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: NA SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: SW2882

Sample wt/vol: 920 (g/mL) ML Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. - dec. - Date Extracted: 11/08/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.05	U
319-85-7	beta-BHC	0.05	U
319-86-8	delta-BHC	0.05	U
58-89-9	gamma-BHC (Lindane)	0.075	
76-44-8	Heptachlor	0.05	U
309-00-2	Aldrin	0.05	U
1024-57-3	Heptachlor epoxide	0.05	U
959-98-8	Endosulfan I	0.05	U
60-57-1	Dieldrin	0.1	U
72-55-9	4,4'-DDE	0.1	U
72-20-8	Endrin	0.1	U
33213-65-9	Endosulfan II	0.1	U
72-54-8	4,4'-DDD	0.1	U
1031-07-8	Endosulfan sulfate	0.1	U
50-29-3	4,4'-DDT	0.1	U
72-43-5	Methoxychlor	0.5	U
53494-70-5	Endrin ketone	0.1	U
5103-71-9	alpha-Chlordane	0.5	U
5103-74-2	gamma-Chlordane	0.5	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.5	U
11104-28-2	Aroclor-1221	0.5	U
11141-16-5	Aroclor-1232	0.5	U
53469-21-9	Aroclor-1242	0.5	U
12672-29-6	Aroclor-1248	0.5	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

FORM I PEST

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO. ISW-5

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: NA SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: SW2883

Sample wt/vol: 960 (g/mL) ML Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. - dec. - Date Extracted: 11/08/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 11.0 Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.05	U
319-85-7	beta-BHC	0.05	U
319-86-8	delta-BHC	0.05	U
58-89-9	gamma-BHC (Lindane)	0.05	U
76-44-8	Heptachlor	0.05	U
309-00-2	Aldrin	0.05	U
1024-57-3	Heptachlor epoxide	0.05	U
959-98-8	Endosulfan I	0.05	U
60-57-1	Dieldrin	0.1	U
72-55-9	4,4'-DDE	0.1	U
72-20-8	Endrin	0.1	U
33213-65-9	Endosulfan II	0.1	U
72-54-8	4,4'-DDD	0.1	U
1031-07-8	Endosulfan sulfate	0.1	U
50-29-3	4,4'-DDT	0.1	U
72-43-5	Methoxychlor	0.5	U
53494-70-5	Endrin ketone	0.1	U
5103-71-9	alpha-Chlordane	0.5	U
5103-74-2	gamma-Chlordane	0.5	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.5	U
11104-28-2	Aroclor-1221	0.5	U
11141-16-5	Aroclor-1232	0.5	U
53469-21-9	Aroclor-1242	0.5	U
12672-29-6	Aroclor-1248	0.5	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

FORM I PEST

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO. ISW-6

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001915

Lab Code: RECNY Case No.: 1709 SAS No.: NA SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: SW2884

Sample wt/vol: 980 (g/mL) ML Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. - dec. - Date Extracted: 11/08/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.05	U
319-85-7	beta-BHC	0.05	U
319-86-8	delta-BHC	0.05	U
58-89-9	gamma-BHC (Lindane)	0.05	U
76-44-8	Heptachlor	0.05	U
309-00-2	Aldrin	0.05	U
1024-57-3	Heptachlor epoxide	0.05	U
959-98-8	Endosulfan I	0.05	U
60-57-1	Dieldrin	0.1	U
72-55-9	4,4'-DDE	0.1	U
72-20-8	Endrin	0.1	U
33213-65-9	Endosulfan II	0.1	U
72-54-8	4,4'-DDD	0.1	U
1031-07-8	Endosulfan sulfate	0.1	U
50-29-3	4,4'-DDT	0.1	U
72-43-5	Methoxychlor	0.5	U
53494-70-5	Endrin ketone	0.1	U
5103-71-9	alpha-Chlordane	0.5	U
5103-74-2	gamma-Chlordane	0.5	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.5	U
11104-28-2	Aroclor-1221	0.5	U
11141-16-5	Aroclor-1232	0.5	U
53469-21-9	Aroclor-1242	0.5	U
12672-29-6	Aroclor-1248	0.5	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.: ISW-7

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: NA SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: SW2885

Sample wt/vol: 980 (g/mL) ML Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. - dec. - Date Extracted: 11/08/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.05	U
319-85-7	beta-BHC	0.05	U
319-86-8	delta-BHC	0.05	U
58-89-9	gamma-BHC (Lindane)	0.05	U
76-44-8	Heptachlor	0.05	U
309-00-2	Aldrin	0.05	U
1024-57-3	Heptachlor epoxide	0.05	U
959-98-8	Endosulfan I	0.05	U
60-57-1	Dieldrin	0.1	U
72-55-9	4,4'-DDE	0.1	U
72-20-8	Endrin	0.1	U
33213-65-9	Endosulfan II	0.1	U
72-54-8	4,4'-DDD	0.1	U
1031-07-8	Endosulfan sulfate	0.1	U
50-29-3	4,4'-DDT	0.1	U
72-43-5	Methoxychlor	0.5	U
53494-70-5	Endrin ketone	0.1	U
5103-71-9	alpha-Chlordane	0.5	U
5103-74-2	gamma-Chlordane	0.5	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.5	U
11104-28-2	Aroclor-1221	0.5	U
11141-16-5	Aroclor-1232	0.5	U
53469-21-9	Aroclor-1242	0.5	U
12672-29-6	Aroclor-1248	0.5	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
ISW-9

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: NA SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: SW2886

Sample wt/vol: 910 (g/mL) ML Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. - dec. - Date Extracted: 11/08/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	UG/L	Q
319-84-6	alpha-BHC	0.05	U
319-85-7	beta-BHC	0.05	U
319-86-8	delta-BHC	0.05	U
58-89-9	gamma-BHC (Lindane)	0.05	U
76-44-8	Heptachlor	0.05	U
309-00-2	Aldrin	0.05	U
1024-57-3	Heptachlor epoxide	0.05	U
959-98-8	Endosulfan I	0.05	U
60-57-1	Dieldrin	0.1	U
72-55-9	4,4'-DDE	0.1	U
72-20-8	Endrin	0.1	U
33213-65-9	Endosulfan II	0.1	U
72-54-8	4,4'-DDD	0.1	U
1031-07-8	Endosulfan sulfate	0.1	U
50-29-3	4,4'-DDT	0.1	U
72-43-5	Methoxychlor	0.5	U
53494-70-5	Endrin ketone	0.1	U
5103-71-9	alpha-Chlordane	0.5	U
5103-74-2	gamma-Chlordane	0.5	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.5	U
11104-28-2	Aroclor-1221	0.5	U
11141-16-5	Aroclor-1232	0.5	U
53469-21-9	Aroclor-1242	0.5	U
12672-29-6	Aroclor-1248	0.5	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
I FIELD BLANK

Lab Name: RECRA ENVIRONMENTAL, INC. Contract: 001918

Lab Code: RECNY Case No.: 1709 SAS No.: NA SDG No.: LW02

Matrix: (soil/water) WATER Lab Sample ID: SW2887

Sample wt/vol: 975 (g/mL) ML Lab File ID: -

Level: (low/med) LOW Date Received: 11/03/88

% Moisture: not dec. - dec. - Date Extracted: 11/08/88

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: 12/07/88

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.05	U
319-85-7	beta-BHC	0.05	U
319-86-8	delta-BHC	0.05	U
58-89-9	gamma-BHC (Lindane)	0.05	U
76-44-8	Heptachlor	0.05	U
309-00-2	Aldrin	0.05	U
1024-57-3	Heptachlor epoxide	0.05	U
959-98-8	Endosulfan I	0.05	U
60-57-1	Dieldrin	0.1	U
72-55-9	4,4'-DDE	0.1	U
72-20-8	Endrin	0.1	U
33213-65-9	Endosulfan II	0.1	U
72-54-8	4,4'-DDD	0.1	U
1031-07-8	Endosulfan sulfate	0.1	U
50-29-3	4,4'-DDT	0.1	U
72-43-5	Methoxychlor	0.5	U
53494-70-5	Endrin ketone	0.1	U
5103-71-9	alpha-Chlordane	0.5	U
5103-74-2	gamma-Chlordane	0.5	U
8001-35-2	Toxaphene	1.0	U
12674-11-2	Aroclor-1016	0.5	U
11104-28-2	Aroclor-1221	0.5	U
11141-16-5	Aroclor-1232	0.5	U
53469-21-9	Aroclor-1242	0.5	U
12672-29-6	Aroclor-1248	0.5	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

Form I

Sample No.
ISW-1

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1709

CONTRACT NO. 001918 LAB RECEIPT DATE 11 3 88

LAB SAMPLE ID. NO. 6420 QC REPORT NO. 88-1709

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water X Soil ______ Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	860	A	13.	Magnesium	8,730	A
2.	Antimony	10U	F	14.	Manganese	77	A
3.	Arsenic	5.0U	F	15.	Mercury	0.2U	CV
4.	Barium	50U	A	16.	Nickel	20U	A
5.	Beryllium	5.0U	A	17.	Potassium	8,910	A
6.	Cadmium	5.0U	A	18.	Selenium	5.0U	F
7.	Calcium	74,100	A	19.	Silver	5.0U	A
8.	Chromium	5.0U	A	20.	Sodium	35,000	NA
9.	Cobalt	30U	A	21.	Thallium	5.0U	NF
10.	Copper	[19]	A	22.	Vanadium	30U	A
11.	Iron	980	A	23.	Zinc	25	A
12.	Lead	11 *	F		Percent Solids (%)	NR	
	Cyanide	10U					

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

Form I

Sample No.
ISW-1
DUPLICATE

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1709

CONTRACT NO. 001918 LAB RECEIPT DATE 11/3/88

LAB SAMPLE ID. NO. 6421 QC REPORT NO. 88-1709

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water X Soil ______ Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	830	A	13.	Magnesium	8,680	A
2.	Antimony	10U	F	14.	Manganese	78	A
3.	Arsenic	5.0U	F	15.	Mercury	0.2U	CV
4.	Barium	60U	A	16.	Nickel	20U	A
5.	Beryllium	5.0U	A	17.	Potassium	8,930	A
6.	Cadmium	5.0U	A	18.	Selenium	5.0U	F
7.	Calcium	71,100	A	19.	Silver	5.0U	A
8.	Chromium	5.0U	A	20.	Sodium	36,000	N A
9.	Cobalt	30U	A	21.	Thallium	5.0U	N F
10.	Copper	[21]	A	22.	Vanadium	30U	A
11.	Iron	890	A	23.	Zinc	26	A
12.	Lead	15	* F		Percent Solids (%)	NR	
Cyanide		10U					

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

Form I

01

Sample No.
LSW-2

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1709

CONTRACT NO. 001918 LAB RECEIPT DATE 11/3 88

LAB SAMPLE ID. NO. 6426 QC REPORT NO. 88-1709

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water X Soil ______ Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	250	A	13.	Magnesium	120	A
2.	Antimony	10U	F	14.	Manganese	10U	A
3.	Arsenic	5.0U	F	15.	Mercury	0.2U	CV
4.	Barium	60U	A	16.	Nickel	20U	A
5.	Beryllium	5.0U	A	17.	Potassium	[1,750]	A
6.	Cadmium	5.0U	A	18.	Selenium	5.0U	F
7.	Calcium	35,200	A	19.	Silver	5.0U	A
8.	Chromium	5.0U	A	20.	Sodium	11,000	N A
9.	Cobalt	30U	A	21.	Thallium	5.0U	N F
10.	Copper	[11]	A	22.	Vanadium	30U	A
11.	Iron	110	A	23.	Zinc	[16]	A
12.	Lead	5.0U	* F		Percent Solids (%)	NR	
	Cyanide	10U					

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

Form I

Sample No.
ISW-3

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1709

CONTRACT NO. 001918 LAB RECEIPT DATE 11 3/88

LAB SAMPLE ID. NO. 6424 QC REPORT NO. 88-1709

Elements Identified and Measured

Concentration: Low ________ Medium ________

Matrix: Water X Soil ________ Sludge ________ Other ________

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	8,320	A	13.	Magnesium	116,000	A
2.	Antimony	10U	F	14.	Manganese	316	A
3.	Arsenic	[5.1]	F	15.	Mercury	0.2U	CV
4.	Barium	960	A	16.	Nickel	50	A
5.	Beryllium	5.0U	A	17.	Potassium	17,200	A
6.	Cadmium	5.0U	A	18.	Selenium	5.0U	F
7.	Calcium	154,000	A	19.	Silver	5.0U	A
8.	Chromium	32	A	20.	Sodium	130,000	NA
9.	Cobalt	30U	A	21.	Thallium	5.0U	NF
10.	Copper	39	A	22.	Vanadium	30U	A
11.	Iron	21,300	A	23.	Zinc	88	A
12.	Lead	80	* F		Percent Solids (%)	NR	
	Cyanide	10U					

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

Form I

Sample No.
ISW-4

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1709

CONTRACT NO. 001918 LAB RECEIPT DATE 11 3 88

LAB SAMPLE ID. NO. 6418 QC REPORT NO. 88-1709

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water X Soil ______ Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	660	A	13.	Magnesium	9,120	A
2	Antimony	10U	F	14.	Manganese	86	A
3.	Arsenic	5.0U	F	15.	Mercury	0.2U	CV
4	Barium	50U	A	16.	Nickel	50	A
5.	Beryllium	5.0U	A	17.	Potassium	[3,060]	A
6.	Cadmium	5.0U	A	18.	Selenium	5.0U	F
7.	Calcium	48,700	A	19.	Silver	5.0U	A
8.	Chromium	5.0U	A	20.	Sodium	26,000	N A
9.	Cobalt	30U	A	21.	Thallium	5.0U	N F
10.	Copper	49	A	22.	Vanadium	30U	A
11.	Iron	1,160	A	23.	Zinc	99	A
12.	Lead	15	F		Percent Solids (%)	NR	
	Cyanide	10U					

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

Form I

Sample No.

ISW-5

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1709

CONTRACT NO. 001918 LAB RECEIPT DATE 11/3/88

LAB SAMPLE ID. NO. 6419 QC REPORT NO. 88-1709

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water X Soil ______ Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	310	A	13.	Magnesium	9,090	A
2.	Antimony	10U	F	14.	Manganese	37	A
3.	Arsenic	5.0U	F	15.	Mercury	0.2U	CV
4.	Barium	60U	A	16.	Nickel	20U	A
5.	Beryllium	5.0U	A	17.	Potassium	17,300	A
6.	Cadmium	5.0U	A	18.	Selenium	5.0U	F
7.	Calcium	265,000	A	19.	Silver	5.0U	A
8.	Chromium	19	A	20.	Sodium	73,000	N A
9.	Cobalt	30U	A	21.	Thallium	5.0U	N F
10.	Copper	[20]	A	22.	Vanadium	30U	A
11.	Iron	980	A	23.	Zinc	24	A
12.	Lead	10	* S F		Percent Solids (%)	NR	
	Cyanide	10U					

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

Form I

Sample No.
ISW-6

INORGANIC ANALYSIS DATA SHEET

LAB NAME RECRA ENVIRONMENTAL, INC. CASE NO. 88-1709

CONTRACT NO. 001918 LAB RECEIPT DATE 11.3 88

LAB SAMPLE ID. NO. 6422 QC REPORT NO. 88-1709

Elements Identified and Measured

Concentration: Low ______ Medium ______

Matrix: Water X Soil ______ Sludge ______ Other ______

ug/L or mg/kg dry weight (Circle One)

1.	Aluminum	[110]	A	13.	Magnesium	14,300	A
2.	Antimony	10U	F	14.	Manganese	23	A
3.	Arsenic	5.0U	F	15.	Mercury	0.2U	CV
4.	Barium	60U	A	16.	Nickel	20U	A
5.	Beryllium	5.0U	A	17.	Potassium	[4,300]	A
6.	Cadmium	5.0U	A	18.	Selenium	5.0U	F
7.	Calcium	88,400	A	19.	Silver	5.0U	A
8.	Chromium	5.0U	A	20.	Sodium	35,000	N A
9.	Cobalt	30U	A	21.	Thallium	[7.9]	N F
10.	Copper	[14]	A	22.	Vanadium	30U	A
11.	Iron	480	A	23.	Zinc	[6.0U]	A
12.	Lead	12	* F		Percent Solids (%)	NR	
	Cyanide	10U					

Footnote: For reporting results to EPA, standard result qualifiers are used as defined on Cover Page. Additional flags or footnotes explaining results are encouraged. Definition of such flags must be explicit and contained on Cover Page, however.

Comments: CV - cold vapor

APPENDIX H

APPENDIX H

QA/QC REPORTS

APPENDIX H

QA/QC REPORTS

Appendix H contains the case narratives from the data packages submitted most recently by Recra Environmental. The case narratives include responses to questions by the data validator and discussions of problems encountered during data analyses.

Appendix H also contains NYtest Environmental Inc.'s final data validation reports for all the Ferro Corporation - Electro Division site data collected as part of the Phase II investigations. Also included is an LMS report on the usability determination of the data.

The validator found the pesticide samples were noncompliant, as discussed in their report. Upon further investigation by LMS, it was found that the pesticide samples were usable as submitted. The resubmitted metals data were found usable, as discussed in the LMS Usability Report.

Sample numbers beginning with the letter "I" represent samples from the Ferro site.

1/11436

RECRA ENVIRONMENTAL, INC.

Chemical Waste Analysis, Prevention and Control

April 13, 1989

RECEIVED
APR 14 1989
LAWLER, MATUSKY & SKELLY ENGINEERS

Mr. Ed Maikish
Lawler, Matusky and Skelly Engineers
One Blue Hill Plaza
P.O. 1509
Pearl River, NY 10965-8509

Re: Analytical Results

Dear Mr. Maikish:

The enclosed report represents the resubmittal of the organic portion of Case #1709, Brzezinski Landfill and Ferro Corporation. The report addresses all issues noted by Nytest Environmental, Inc. in the Data Validation Report dated March 31, 1989 and in accordance with the guidelines established at the March 21, 1989 meeting between Recra, LMS, DEC and NYtest.

Pertinent Information:	Quote #:	001918
	Site#:	Brzezinski Landfill & Ferro Corp.
	Matrix:	Aqueous
	Samples Received:	11/3/88
	Sample Dates:	11/2-8/88

If you have any questions concerning these data, do not hesitate to contact Ms. Deborah Travis, Manager, Environmental Testing Services at (716) 691-2600.

Sincerely,

RECRA ENVIRONMENTAL, INC.

AKBhattacharya/djt

Arun K. Bhattacharya, Ph.D.
Senior Vice President/
Laboratory Director

VDH/AKB/ndc
Enclosure
cc: Mr. Douglas Sheeley
NYtest Environmental, Inc.
60 Seaview Blvd., Box 1518
Port Washington, NY 11050

#88-1709, Resubmittal
#88-1709A, Resubmittal
#8C1301
#8C1301I

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1709, Resubmittal

Contract Number: 001918

SDG Number: LW02

Sample Identifications:

ISW-1
ISW-1 MS
ISW-1 MSD
ISW-2
ISW-3
ISW-4
ISW-5
ISW-6
ISW-7
ISW-9
I Field Blank
I Trip Blank
JGW-2
JGW-3
JGW-3 MS
JGW-3 MSD
J Niagara River
J Field Blank
Trip Blank

RESUBMITTAL STATEMENT

The data contained in this package is in response to the Data Validation Report by Nytest Environmental, Inc. All compliance issues have been reviewed by Recra Environmental, Inc. and are addressed in the enclosed case narrative. Only those pages from the original report which required corrections are included in this resubmittal package. Any pages considered illegible in the original report have been re-copied and are enclosed.

VOLATILE DATA

Volatile sample and standard areas are listed on the corresponding data system printouts.

Volatile data was processed utilizing Finnigan Autoquantitation and QA Formaster software. Compounds not listed on the quantitation report were deleted if contract laboratory protocol criteria were not met.

Surrogate recovery of 1,2-Dichloroethane for sample JGW-3 MSD exceeded QC limits. Re-analysis yielded the same results, indicating sample matrix effects. Data for both analyses are included.

The relative percent difference for spike compound 1,1-Dichloroethene between samples ISW-1 MS and ISW-1 MSD exceeded the quality control limits. However, the percent recoveries for the MS/MSD analyses were within required limits.

Samples I-Field Blank, J-Field Blank, I-Trip Blank and Trip Blank exhibited minor contamination by TCL constituent Methylene Chloride. In all cases, the contaminant concentrations were below the contract required detection limits. The data is compliant and usable as reported.

Quantitation of Xylene was performed utilizing a secondary ion at the time of these analyses. Although this procedure does not meet contract specifications, Xylene was not detected at a requantitation level in any of the samples, except one. Primary ion quantitation was not required and the data remains usable as reported.

Sample JGW-2 exhibited a Xylene concentration within the "CRDL-20ppb" requantitation range. Calculation sheets demonstrating our primary ion quantitation are included in the resubmittal package. The reported value of 12 ug/l by secondary ion quantitation remained the same upon primary ion quantitation.

Scan averaging was utilized in obtaining Bromofluorobenzene Tuning and Mass Calibrations 6654 and 6902.

Retention times for all tentatively identified compounds are reported as "minutes:seconds" rather than "minutes.decimal minute."

Upper and lower retention times are not required by contract laboratory protocol. The form 8's are correct as originally reported.

SEMIVOLATILE DATA

Semivolatile sample and standard areas are listed on the corresponding data system printouts.

Semivolatile data was processed utilizing Finnigan Autoquantitation and QA Formaster software. Compounds not listed on the quantitation report were deleted if contract laboratory protocol criteria were not met.

N-Nitrosodiphenylamine was detected at a low level in sample JGW-3 MSD but not in JGW-3 or JGW-3 MS.

Six samples exhibited surrogate recoveries which fell outside the quality control limits, however none of the samples had more than one recovery value out of control in either the base/neutral or acid/phenol fraction of the analyses. This condition is compliant with Contract Laboratory Protocol and the data is usable.

1/11436

Method blanks SBLK14 and SBLK24 exhibited minor contamination by TCL constituents. In both cases the contaminant concentrations were below the contract allowable limits. Method blank QC criteria were met and the data remains usable.

Samples I-Field Blank and J-Field Blank exhibited contamination by TCL constituent Bis(2-ethylhexyl)phthalate. Since there are no contract required criteria concerning field blank contamination, the data remains usable.

Scan averaging was utilized in obtaining DFTPP Tuning and Mass Calibrations 16Y, 215Y, 242Y, 305Y, 333Y and 402Y.

Upper and lower retention times for internal standards are not required by Contract Laboratory Protocol. The form 8's are correct as originally reported.

Retention times for all tentatively identified compounds are reported as "minutes:seconds" rather than "minutes.decimal minute."

SPECTRAL INTERPRETATIONS (VOA and SVOA)

Our spectral interpretations are designed to favor false positives in order that no compound remains undetected. The criteria for positive identification is as follows:

1. The presence of all ions from Table 3 (pg. VOA D-33 for volatiles) or Table 4 (pg. SV D-40 for semivolatiles) is determined. Any of these ions of greater than 10% intensity in the standard spectrum MUST be present in the sample spectrum. The relative intensities of these ions must be $\pm$ 20% of those in the standard spectrum (pg. A-3).

2. Ions greater than 10% intensity in the sample spectrum but not present in the standard spectrum must be accounted for (pg. A-3).

3. Technical judgement of the mass spectral interpretor coupled with criteria 1 and 2 is used to resolve questionable identifications (pg. A-3).

The following spectral interpretations were questioned in the Nytest Data Validation Review.

1. The identification of Toluene in sample JGW-3 was reviewed and verified. The absence of minor ions from the sample spectrum as compared to the standard spectrum, is due to the low concentration of Toluene in the sample.

2. The identification of Toluene in sample VBLK-20 was reviewed and verified. Ions which appear in the sample spectrum but not in the standard spectrum are due to background interference from the surrogate Toluene-d_8. The absence of minor ions from the sample spectrum as compared to the standard specturm, is due to the low concentration of Toluene in the sample.

002C

3. The identification of Benzene in sample ISW-4 was reviewed and verified. The absence of minor ions from the sample spectrum as compared to the standard spectrum is due to the low concentration of Benzene in the sample.

4. The identification of Methylene Chloride in sample ISW-7 was reviewed and verified. The absence of minor ions from the sample spectrum as compared to the standard spectrum is due to the low concentration of Methylene Chloride in the sample.

5. The identification of 2-Chlorophenol in sample ISW-7 was reviewed and verified. The absence of minor ions from the sample spectrum as compared to the standard spectrum is due to the low concentration of 2-Chlorophenol in the sample.

PESTICIDES/PCB DATA

Compounds confirmed by two dissimilar GC columns were not confirmed by GC/MS due to insufficient concentration in the sample extracts.

"DL" has been reported for %D on Form 8E when Dibutyl Chlorendate was diluted out of the sample extract.

The presence of 4,4'-DDT was reported in sample J-Field Blank because all retention time criteria were met. Since no Phthalate standards were analyzed the assumption that the questioned peak is phthalate can not be confirmed.

The quantitation of Endrin Ketone in Individual Standard Mix B on December 8, 1988, 11:38 was performed on the 3% OV-1 column (%D = 2.1). The 2250/2401 column was used for confirmation of Endrin Ketone (%D = 18). This condition meets Contract Laboratory Protocol since either column can be utilized as long as the quantitation column exhibits a %D of less than or equal to 15 and the confirmation column exhibits a %D of less than or equal to 20.

The %D for Endrin Ketone in Individual Standard Mix B on December 8, 1988, 14:58 slightly exceeded the 20% confirmation limit on column 2250/2401. Although contract specifications were not met, Endrin Ketone was not detected in any of the samples and the data remains usable.

The confirmation calibration factor for Aroclor 1254 has been recalculated utilizing the same four (4) peaks from the initial calibration and the continuing calibration. The amended form 9 is included in the resubmittal package.

The %D for Heptachlor in Individual Standard Mix A on December 8, 1988 at 1339 was reviewed and verified as 19.7. A demonstration of our calculation procedure is included.

$$\frac{\text{Calibration Factor (Init. Cal)} - \text{Calibration Factor (Cont. Cal.)}}{\text{Calibration Factor (Init. Cal.)}} \times 100 = \%D$$

$$\frac{140846-113077}{140846} \quad X \quad 100 \quad = \quad \%D$$

$$\frac{27769}{140846} \quad X \quad 100 \quad = \quad 19.7\%$$

The DBP reference compound coelutes with Heptachlor resulting in a decreased resolution. Since Heptachlor was not detected in any of the samples the data remains usable.

The presence of gamma-BHC was reported in sample SW-4 since the chromatographic peaks fell within the retention time windows on both the quantitation and confirmation columns. Similar peaks in other samples were not reported because contract retention time criteria were not met.

The presence of 4,4'-DDT was reported in samples JGW-3 and J-Niagara River since all contract required retention time criteria were met. No phthalate standards were analyzed so the assumption that the corresponding peaks on the confirmation column are phthalates can not be verified.

GENERAL COMMENTS

Organic analyses were performed according to the New York State DEC 1987 Protocol.

Sample prefixes I and J indicate samples taken from the Ferro Corporation and Brzezinski Landfill sites respectively.

"Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature."

A K Bhattacharya /djt
Dr. Arun K. Bhattacharya

4/13/89
Date

1/11439

RECRA ENVIRONMENTAL, INC.

Chemical Waste Analysis, Prevention and Control

April 13, 1989

RECEIVED
APR 14 1989
LAWLER, MATUSKY & SKELLY ENGINEERS

Mr. Ed Maikish
Lawler, Matusky and Skelly Engineers
One Blue Hill Plaza
P.O. 1509
Pearl River, NY 10965-8509

Re: Analytical Results

Dear Mr. Maikish:

The enclosed report represents the resubmittal of the inorganic portion of Case #1709, Brzezinski Landfill and Ferro Corporation. The report addresses all issues noted by Nytest Environmental, Inc. in the Data Validation Report dated March 31, 1989 and in accordance with the guidelines established at the March 21, 1989 meeting between Recra, LMS, DEC and NYtest.

Pertinent Information:
- Quote #: 001918
- Site#: Brzezinski Landfill & Ferro Corp.
- Matrix: Aqueous
- Samples Received: 11/3/88
- Sample Dates: 11/2-3/88

If you have any questions concerning these data, do not hesitate to contact Ms. Deborah Travis, Manager, Environmental Testing Services at (716) 691-2600.

Sincerely,

RECRA ENVIRONMENTAL, INC.

AKBhattacharya/djt

Arun K. Bhattacharya, Ph.D.
Senior Vice President/
Laboratory Director

VDH/AKB/ndc
Enclosure
cc: Mr. Douglas Sheeley
NYtest Environmental, Inc.
60 Seaview Blvd., Box 1518
Port Washington, NY 11050

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1709, Resubmittal

Contract Number: 001918

SDG Number: LW02

Sample Identifications:

ISW-1
ISW-1 MS
ISW-1 MD
ISW-2
ISW-3
ISW-4
ISW-5
ISW-6
ISW-7
ISW-9
I Field Blank
JGW-2
JGW-3
JGW-3 MS
JGW-3 MD
J Niagara River
J Field Blank

GENERAL COMMENTS

Inorganic analyses were performed according to the New York State DEC 1986 Protocol.

Sample prefixes I and J indicate samples taken from the Ferro Corporation and Brzezinski Landfill sites respectively.

Results are reported utilizing standard qualifiers as defined on the attached Inorganic Data Comment Page.

Standard addition was required on sample "Niagara River" for selenium and sample ISW-5 for lead.

DATA COMPLETENESS

The Barium value was recalculated and corrected for sample number 6419.

The Calcium value was reported correctly for sample number 6427 in the original data.

The Chromium value was recalculated and corrected for sample number 6423. The Chromium value was reported correctly for sample number 6426 in the original data.

The Magnesium value for sample number 6426 was recalculated and corrected.

The correct detection limit for Nickel is reported in the resubmittal package.

The Manganese values were recalculated and corrected for sample numbers 6420 and 6421.

The Zinc values were recalculated and corrected for sample numbers 6420 and 6421.

The method of analysis code for Lead on sample 6423 has been changed.

The MSA results for sample numbers 5402 and 6419 were reported properly according to the protocol in the original data.

The CRQL standard was not a 1986 CLP requirement and was not reported.

ICP serial dilution and ICP Interelement correction forms are not included because all ICP work was redone using flame AA.

QUALITY CONTROL PROCEDURES:

All analyses associated with the correct recalibration procedures have been rerun and the data has been reported. The reanalysis raw data is now included in the report.

Baseline corrections are not used as continuing calibration blanks.

Continuing calibration blanks and verifications are run every tenth analytical sample. In some of the cases noted in the review the analyses have been rerun and any problems associated with CCV's and CCB's have been corrected. This applies to: K, Na, Al, Co, Cu, Fe, Mn, Ni, Ag, U, Zn, Ba, Ca and Mg.

In the cases where CCB's and CCV's were not run every tenth analytical sample we feel the data is still usable due to the fact that all other associated quality control was acceptable and the baseline showed little change.

Standardization data for Mercury and Cyanide is now included.

When Cyanide analysis is performed all samples and quality control samples are determined at the same time. The data is then judged as acceptable or is rejected based upon the results of all required quality control samples.

The same digestion log numbers are used for the furnace and ICP/AA samples. The digestions are separated in the lab.

"Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature."

AK Bhattacharya /djt
Dr. Arun K. Bhattacharya

4/13/89
Date

1/11443

RECRA ENVIRONMENTAL, INC.

Chemical Waste Analysis, Prevention and Control

April 13, 1989

Mr. Ed Maikish
Lawler, Matusky & Skelly Engineers
One Blue Hill Plaza
P.O. Box 1509
Pearl River, NY 10965-8509

RECEIVED
APR 14 1989
LAWLER, MATUSKY & SKELLY ENGINEERS

Re: Analytical Results

Dear Mr. Maikish:

The enclosed report represents the resubmittal of the organic portion of Case #1675, Brzezinski Landfill and Ferro Corporation. The report addresses all issues noted by NYtest Environmental, Inc. in the Data Validation Report dated March 31, 1989 and in accordance with the guidelines established at the March 21, 1989 meeting between Recra, LMS, DEC and NYtest.

EP Toxicity data was listed as non-compliant on the summary page (0003) of the NYtest Data Validation review, however, no comments were included in the text. Mr. Douglas Sheely of NYtest was contacted to clarify the required data, but at the time of this resubmittal, he had not submitted the necessary information to Recra Environmental, Inc.

Pertinent Information:	Contract#:	001918
	Site#:	Brzezinski Landfill and Ferro Corporation
	Matrix:	Soil and Sediment
	Sample Received:	10/28,11/3/88
	Sample Date:	10/28,11/2,3/88

If you have any questions concerning these data, do not hesitate to contact our Customer Service Representative at (716) 691-2600.

Sincerely,

RECRA ENVIRONMENTAL, INC.

AKBhattacharya /djt

Arun K. Bhattacharya, Ph.D.
Senior Vice President/
Laboratory Director

VDH/AKB/jsm
Enclosure
cc: Mr. Douglas Sheely
NYtest Environmental, Inc.
60 Seaview Blvd., Box 1518
Port Washington, NY 11050

UU~

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1675, Resubmittal

Contract Number: 001918

SDG Number: LS02

Sample Identifications:

JGW-4
ISS-1
ISS-2
ISS-3
ISS-3 MS
ISS-3 MSD
ISS-4
ISW-1
ISW-2
ISW-4
ISW-5
ISW-8
JSS-2

RESUBMITTAL STATEMENT

The data contained in this package is in response to the Data Validation Report by NYtest Environmental, Inc. All compliance issues have been reviewed by Recra Environmental, Inc. and are addressed in the enclosed case narrative. Only those pages from the original report which required corrections are included in this resubmittal package. Any pages considered illegible in the original report have been re-copied and are enclosed.

GENERAL COMMENTS

Organic analyses were performed in accordance with the New York State DEC 1987 Protocol.

Sample prefixes J and I designate samples taken from the Brzezinski Landfill and Ferro Corporation sites respectively.

VOLATILE DATA

Volatile sample and standard areas are listed on the corresponding data system printouts.

Volatile data was processed utilizing Finnigan Autoquantitation and QA Formaster software. Compounds not listed on the quantitation report were deleted if contract laboratory protocol criteria were not met.

Surrogate recoveries of Bromofluorobenzene and 1,2-Dichloroethane-D_4 for sample JGW-4DL were outside of the acceptable QC limits. Re-analysis of the sample also yielded non-compliant results, indicating sample matrix effects.

Matrix spike and matrix spike duplicate analyses were not performed on a sample from Case #1675. To demonstrate the validity of our medium level soil procedure, we are enclosing the Form I's, Form III's and quantitation reports from the matrix spike and matrix spike duplicate analyses of a sample of similar matrix. These MS-MSD analyses were performed immediately prior to the medium level soil analyses of Case #1675.

Method blanks VBLK15, VBLK16 and VBLK21 exhibited minor contamination by various TCL constituents. In all cases but one, the concentrations of contaminants were below the allowable limits as stated on page E-17 of the contract laboratory protocol. The concentration of Carbon Disulfide exceeded allowable limits in VBLK15, however, Carbon Disulfide was not detected in any samples associated with this method blank. The data is usable as originally reported.

Scan averaging was utilized in obtaining Bromofluorobenzene Tuning and Mass Calibrations 27735HP, 27808HP, 27827HP and 27902HP.

Retention times for all Tentatively Identified Compounds are reported as "minutes:seconds" rather than "minutes:decimal minutes."

Upper and lower retention times for internal standards are not required by contract laboratory protocol. The Form 8's are correct as originally submitted.

Quantitation of Xylene was performed utilizing a secondary ion at the time of these analyses. Although this procedure does not meet contract specifications, Xylene was not detected in any of the samples at a level which would require primary ion re-quantitation, and the data remains usable as submitted. The quantitation procedure for Xylene has since been corrected.

The area units for the internal standards were rechecked and verified. Although low, they are correct as reported.

0023

SEMIVOLATILE DATA

Semivolatile sample and standard areas are listed on the corresponding data system printouts.

Semivolatile data was processed utilizing Finnigan Autoquantitation and QA Formaster software. Compounds not listed on the quantitation report were deleted if contract laboratory protocol criteria were not met.

The chromatographic peaks of Chrysene-D_{12} and Perylene-D_{12} are masked by sample matrix interference in sample ISW-4, making manual determination of area units, as required in performing the library search, unreliable. As a result, these internal standards were not utilized for calculation of tentatively identified compounds.

Samples ISW-8 and JSS-2 exhibited surrogate recoveries which were outside quality control limitations. Contract specifications were not met since neither sample had two or more non-compliant recoveries in either the base/neutral or acid/phenol fraction.

Percent recovery of 1,4'-Dichlorobenzene fell below quality control limitations in both ISS-3MS and ISS-3MSD indicating sample matrix effects.

Method blank SBLK36 exhibited minor contamination by Di-n-butylphthalate and Bis(2-ethyl hexyl) phthalate. The contaminant concentrations were below the allowable limits as stated on page E-34 of the Contract Laboratory Protocol. Method blank QC criteria were met and the data remains usable.

Initial analysis of sample ISW-4 was performed on December 10, 1988 and yielded elevated levels of Phenanthrene, Fluoranthrene and Pyrene. The necessity for a secondary dilution was not detected until the data processing was performed by which time the analysis holding time limitations had been exceeded. The dilution of sample ISW-4 was analyzed and exhibited levels of the elevated constituents which were similar to the original analysis. Method blank SBLK36 was analyzed in the same time frame as sample ISW-4DL. Since the data from ISW-4 and ISW-4DL have a reasonable coefficient of variation, the data remains usable even though the holding time limitations were exceeded for the diluted analysis. Both ISW-4 and ISW-4DL are included in the original submission.

The extraction of soil sample ISW-4(DL) was performed by sonication rather than separatory funnel procedures. The appropriate corrections have been made on the Form I's.

Scan averaging was utilized in obtaining DFTPP Tuning and Mass Calibrations 482Z, 500Z, 515Z, 529Z, 619Z and 719Z.

Retention times for all tentatively identified compounds are reported as "minutes:seconds" rather than "minutes:decimal minutes."

Upper and lower retention times for internal standards are not required by contract laboratory protocol. The Form 8's are correct as originally reported.

SPECIAL INTERPRETATIONS (VOA and SVOA)

Our spectral interpretations are designed to favor false positives in order that no compound remains undetected. The criteria for positive identifications is as follows:

1) The presence of all ions from Table 3 (pg. VOA D-33 for volatiles) or Table 4 (pg. SV D-40 for semivolatiles) is determined. Any of these ions of greater than 10% intensity in the standard spectrum MUST be present in the sample spectrum. The relative intensities of these ions must be ± 20 % of those in the standard spectrum (pg. A-3).

2) Ions greater than 10% intensity in the sample spectrum but not present in the standard spectrum must be accounted for (pg. A-3).

3) Technical judgement of the mass spectral interpretor coupled with criteria 1 and 2 is used to resolve questionable identifications (pg. A-3).

The following spectral interpretations were questioned in the NYtest Data Validation Report:

1) The identification of Toluene in samples ISS-1, ISS-4, ISW-1, ISW-8, JGW-4 and JGW-4DLRE was reviewed and verified. Ions which appear in the sample spectra but not in the standard spectra are due to background interference from surrogate Toluene-D_8. The absence of minor ions in the sample spectra, as compared to the standard spectra, is due to the low concentration of Toluene in the samples.

2) The identifications of Chloroform in sample ISW-2 was reviewed and verified. Ions which appear in the sample spectrum but not in the standard spectrum are due to background interference from the sample. The absence of minor ions in the sample spectrum, as compared to the standard spectrum, is due to the low concentration of Chloroform in the sample.

3) The identification of Xylene in samples ISW-4 and ISW-8 was reviewed and verified. Ions which appear in the sample spectra but not in the standard spectra are due to background interferences from the samples. The absence of minor ions in the sample spectra, as compared to the standard spectrum, is due to the low concentration of Xylene in the samples.

4) The identifications of Benzene in samples ISW-5R, VBLK15 and VBLK16 was reviewed and verified. Ions which appear in the sample spectra but not in the standard spectra are due to background interferences from the samples. The absence of minor ions in the sample spectra, as compared to the standard spectra, is due to the low concentrations of Benzene in the samples.

5) The identification of 1,2-Dichloroethene in sample JGW-4 was reviewed and verified. Additional ions in the sample spectrum which do not appear in the standard spectrum are due to background interferences of the sample. The absence of minor ions from the sample spectrum, as compared to the standard spectrum, is due to the low concentration of 1,2-Dichloroethene in the sample.

6) The identifications of Tetrachloroethene in sample JSS-2 was reviewed and verified. Additional ions in the sample spectrum which do not appear in the standard spectrum are due to background interference of the sample. The absence of minor ions from the sample spectrum, as compared to the standard spectrum, is due to the low concentration of Tetrachloroethene in the sample.

7) The identification of 2-Methyl naphthalene in sample ISW-2 was reviewed and verified. Ions which appear in the sample spectrum but not in the standard spectrum are due background interferences of the sample. The absence of minor ions in the sample spectrum, as compared to the standard spectrum, is due to the low concentration of 2-Methyl naphthalene in the sample.

8) The identification of Phenol in sample ISW-8 was reviewed and verified. Additional ions in the sample spectrum which do not appear in the standard spectrum are due to background interference from the surrogate Phenol-D5. The absence of minor ions in the sample spectrum, as compared to the standard spectrum, is due to the low concentration of Phenol in the samples.

PESTICIDES/PCB DATA

"DL" has been reported for %D on Form 8E when Dibutyl Chlorendate was diluted out of the sample extract.

Compounds confirmed by two dissimilar GC columns were not confirmed by GC/MS due to insufficient concentration in the sample extracts.

Surrogate recoveries for sample ISS-4 and ISW-2 were outside of advisory QC limits due to sample matrix interference.

PBLK 21 exhibited 269% surrogate recovery due to positive enhancement from an extraneous peak.

Spike recoveries for sample ISS-3MS and ISS-3MSD could not be calculated due to the presence of Aroclor 1260 in the sample and were not reported with the original data. Form 3F has been generated and is included in this resubmittal package.

The Aroclor 1260 confirmation times were shifted outside the established windows in samples ISS-3MS and ISS-3MSD due to the presence of spike compound Endrin.

The confirmation retention times of Aroclor 1260 are slightly outside the established windows in samples ISS-3MS ,ISS-3MSD, ISS-4 and ISW-1. Pattern recognition techniques, based on chromatograms of standards, were utilized for the confirmation of Aroclor 1260 in these samples.

The DDT degradation in Evaluation Mix B was correctly reported as 14% in the orignal data. A demonstration of our calculation is included:

DDE Area units = 569 $\quad \frac{(DDE+DDD)}{(DDE+DDD+DDT)} \times 100 = \%\text{Degradation}$

DDD Area units = 218 $\quad \frac{(569+218)}{(569+218+4840)} \times 100 = \%\text{Degradation}$

DDT Area units - 4840 $\quad \frac{(787)}{5627} \times 100 = 14\%\ \text{Degradation}$

The presence of the Dibutylchorendate surrogate could not be detected in the Toxaphene standards analyzed on December 2, 1988. Although this condition does not meet contract specifications, Toxaphene was not detected in any of the samples and the data remains usable.

The %D for Endosulfan Sulfate analyzed in the standard sequence of December 3, 1988 was reviewed and verified as 54%. Although this error does not meet contract specifications, Endolsulfan Sulfate was not detected in any of the samples and the data remains usable.

The DBP reference compound coelutes with Heptachlor in Individual Standard Mix A on the 3% OV-1 column, Since Heptachlor was not detected in any of the samples, the data remains usable.

Due to sample matrix considerations, samples ISS-1, ISS-2, ISS-3, ISW-1, ISW-4 and ISW-8 required dilution prior to analysis. Since the dilution was performed on the intial analysis, the suffix "DL" was not required. The suffix "DL" is required only if initial analysis and subsequent secondary dilution are necessary. In the above mentioned samples, none of the dilutions were greater than 10 so the dilution is considered the initial analysis. The sample identifications are correct as previously reported and the data is compliant and usable.

Dieldrin was incorrectly reported as being present in sample JGW-4. The correct compound identification is Aroclor 1260. Corrected forms and raw data are included in this resubmittal package.

EP TOXICITY DATA

Methods used for the EP Toxicity Test procedure as well as the analysis of the resulting extract are presented in U.S. Environmental Protection Agency publication, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods". July 1982, SW-846, Second Edition.

The values reported as "less than" (<) indicate the working detection limit for the particular sample and/or parameter.

"Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature."

AK Bhattacharya /clt
Dr. Arun K. Bhattacharya

Date 4/13/89

HE[illegible] ENVIRONMENTAL, INC.

1/11449

RECRA ENVIRONMENTAL, INC.

Chemical Waste Analysis, Prevention and Control

April 13, 1989

RECEIVED
APR 14 1989
LAWLER, MATUSKY & SKELLY
ENGINEERS

Mr. Ed Maikish
Lawler, Matusky and Skelly Engineers
One Blue Hill Plaza
P.O. 1509
Pearl River, NY 10965-8509

Re: Analytical Results

Dear Mr. Maikish:

The enclosed report represents the resubmittal of the inorganic portion of Case #1675, Brzezinski Landfill and Ferro Corporation. The report addresses all issues noted by Nytest Environmental, Inc. in the Data Validation Report dated Arpil 6, 1989 and in accordance with the guidelines established at the March 21, 1989 meeting between Recra, LMS, DEC and NYtest.

Pertinent Information:	Quote #:	001918
	Site#:	Brzezinski Landfill and Ferro Corp.
	Matrix:	Soil and Sediment
	Samples Received:	10/28, 11/3/88
	Sample Dates:	10/28, 11/2-3/88

If you have any questions concerning these data, do not hesitate to contact Ms. Deborah Travis, Manager, Environmental Testing Services at (716) 691-2600.

Sincerely,

RECRA ENVIRONMENTAL, INC.

AK Bhattacharya /djt

Arun K. Bhattacharya, Ph.D.
Senior Vice President/
Laboratory Director

VDH/AKB/ndc
Enclosure
cc: Mr. Douglas Sheeley
NYtest Environmental, Inc.
60 Seaview Blvd., Box 1518
Port Washington, NY 11050

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1675, Resubmittal

Contract Number: 001918

SDG Number: LS02

Sample Identifications:

ISS-1
ISS-2
ISS-3
ISS-3 MS
ISS-3 MD
ISS-4
ISW-1
ISW-2
ISW-4
ISW-5
ISW-8
JGW-4
JSS-2

INORGANIC DATA

Inorganic analyses were performed in accordance with the New York State DEC 1986 Protocol.

Sample prefixes J and I designate samples taken from the Brzezinski Landfill and Ferro Corporation sites respectively.

Standard Result qualifiers are utilized and are defined on the enclosed Inorganic Data Comment Page.

COMMENTS

CRQL form II (part 2) was not a 1986 CLP requirement and was not reported.

ICP Interelement Correction Factors Form (Form X) has been generated and is included in the resubmittal package.

Analyses performed when recalibration was improperly sequenced have been rerun and the new data is included in this report. This includes all Sodium and Potassium analysis.

Standardization data for Mercury and Cyanide are included in the resubmittal package.

When Cyanide analysis is performed all samples and quality control samples are determined at the same time. The data is then judged as acceptable or is rejected based upon the results of all required quality control samples.

The same digestion log numbers are used for the furnace and ICP/AA samples. The digestions are separated in the laboratory.

Total solids work sheets are included in the resubmittal package.

The solid lab control sample is reported with the US EPA established limits as indicated in the 1986 protocol (page E-59).

All furnace data is flagged with the required indications as defined in the 1986 protocol. (Figure 1, page E-58).

All raw data has been placed in the correct order and is included in the resubmittal package

CCV's and CCB's have been analyzed every tenth analytical sample.

"Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature."

AK Bhattacharya /djt
Dr. Arun K. Bhattacharya

4/13/89
Date

1/11822

RECRA ENVIRONMENTAL, INC.
Chemical Waste Analysis, Prevention and Control

May 24, 1989

RECEIVED
MAY 26 1989
LAWLER, MATUSKY & SKELLY ENGINEERS

Mr. Ed Maikish
Lawler, Matusky & Skelly Engineers
One Blue Hill Plaza
Pearl River, NY 10965-8509

Re: Data Validation Report - Brzezinski and Ferro Resubmittal Case 1709

Dear Mr. Maikish:

In the Data Validation Report of the Brzezinski and Ferro Resubmittal case 1709, NYtest Environmental, Inc. has cited two Pesticide/PCB Compliance issues which have already been addressed by Recra Environmental, Inc. in the detailed case narrative which accompanied this resubmittal and the usability of the data is documented. Final decisions in data usability, as per the March 21, 1989 meeting between LMS, NYtest, Recra and NYSDEC, and the presence or absence of the pesticidal constituents measured by the CLP methodology is the reponsibility of the QA officer at LMS.

All responses to the Inorganic compliance issues are documented in the enclosed amended case narrative. Additional data is included and numbered for insertion into the original report.

If you have any questions or comments, please do not hesitate to contact Ms. Deborah Travis, Manager, Environmental Testing Services at (716) 691-2600.

Sincerely,

RECRA ENVIRONMENTAL, INC.

AKBhattacharya

Arun K. Bhattacharya, Ph.D
Senior Vice President/
Laboratory Director

VDH/AKB/jsm
Enclosure
cc: Mr. Douglas Sheely

Audubon Business Centre • 10 Hazelwood Drive, Suite No. 106 • Amherst, New York 14150 • (716) 691-2600

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1709, Resubmittal

Contract Number: 001918

SDG Number: LW02

Sample Identifications:

ISW-1
ISW-1 MS
ISW-1 MD
ISW-2
ISW-3
ISW-4
ISW-5
ISW-6
ISW-7
ISW-9
I Field Blank
JGW-2
JGW-3
JGW 3 MS
JGW-3 MD
J Niagara River
J Field Blank

GENERAL COMMENTS

Inorganic analyses were performed according to the New York State DEC 1986 Protocol.

Sample prefixes I and J indicate samples taken from the Ferro Corporation and Brzezinski Landfill sites respectively.

Results are reported utilizing standard qualifiers as defined on the attached Inorganic Data Comment Page.

Standard addition was required on sample "Niagara River" for selenium and sample ISW-5 for lead.

DATA COMPLETENESS

The Barium value was recalculated and corrected for sample number 6419.

The Calcium value was reported correctly for sample number 6427 in the original data.

The Chromium value was recalculated and corrected for sample numbers 6423. The Chromium value was reported correctly for sample number 6426 in the original data.

The Magnesium value for sample number 6426 was recalculated and corrected.

The correct detection limit for Nickel is reported in the resubmittal package.

The Manganese values were recalculated and corrected for sample numbers 6420 and 6421.

The Zinc values were recalculated and corrected for sample numbers 6420 and 6421.

The method of analysis code for Lead on sample 6423 has been changed.

The MSA results for sample numbers 5402 and 6419 were reported properly according to the protocol in the original data.

The CRQL standard was not a 1986 CLP requirement and was not reported.

ICP serial dilution and ICP Interelement correction forms are not included because all ICP work was redone using flame AA.

Only that portion of the data package which was considered non-compliant due to sequencing discrepancies was reanalyzed. Since the DEC requested that 1986 and 1987 protocols not be intermingled, the reanalyses were performed in accordance with NYSDEC 1986 protocol and the entire package resubmitted.

The ICP instrument detection limits were inadvertently submitted in the data package. Since the reanalyses were performed by flame techniques, pages 43 and 45 should be removed.

On the Form VII's - Instrument Detection Limits and Laboratory Control Sample, both the ICP and Atomic Absorption instrument identifications were listed. Since the ICP was not utilized for any analyses, its identification has been deleted and amended forms are enclosed for insertion into the report.

The Cadmium raw data for sample ISW-9 was inadvertently omitted from the data package. Copies of the data are enclosed for inclusion into the original report.

The Calcium value for sample I Field Blank was re-calculated and corrected to [600].

The Chromium value for sample ISW-1 Dup was re-calculated and corrected to [8].

The instrument detection limit for Cobalt should have been reported as fifty (50). Any forms requiring corrections have been amended and are included for insertion into the original report.

The reanalysis of Iron for sample ISW-3 was performed on February 17, 1989 but the raw data was omitted from the resubmittal package. The reanalysis raw data is now included and the reported Iron value was verified as being correctly calculated from the new data.

The diluted analysis of Potassium for sample ISW-3 was performed after the final CCV and CCB, however, in comparing the diluted and undiluted analyses, the values agree and the reported data, although non-compliant, is usable.

Form II (page 30) has been amended to include two additional CCV values for Sodium which were omitted from the original report.

The reanalysis raw data for Sodium was inadvertently omitted from the resubmittal package. Copies of this data are enclosed for insertion into the report.

The Selenium value for sample JGW-3 Dup was recalculated and corrected to 5U on the Form I.

The CCV value for Thallium in case number 88-1709A was recalculated and corrected to 84.3 on the Form II (page 31).

QUALITY CONTROL PROCEDURES:

All analyses associated with the correct recalibration procedures have been rerun and the data has been reported. The reanalysis raw data is now included in the report.

Baseline corrections are not used as continuing calibration blanks.

Continuing calibration blanks and verifications are run every tenth analytical sample. In some of the cases noted in the review the analyses have been rerun and any problems associated with CCV's and CCB's have been corrected. This applies to: K, Na, Al, Co, Cu, Fe, Mn, Ni, Ag, U, Zn, Ba, Ca and Mg.

In the cases where CCB's and CCV's were not run every tenth analytical sample we feel the data is still usable due to the fact that all other associated quality control was acceptable and the baseline showed little change.

Standardization data for Mercury and Cyanide is now included.

When Cyanide analysis is performed all samples and quality control samples are determined at the same time. The data is then judged as acceptable or is rejected based upon the results of all required quality control samples.

The same digestion log numbers are used for the furnace and ICP/AA samples. The digestions are separated in the lab.

"Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature."

Dr. Arun K. Bhattacharya

5/24/89
Date

1/11820

RECRA ENVIRONMENTAL, INC.

Chemical Waste Analysis, Prevention and Control

May 24, 1989

RECEIVED
MAY 26 1989
LAWLER, MATUSKY & SKELLY ENGINEERS

Mr. Ed Maikish
Lawler, Matusky & Skelly Engineers
One Blue Hill Plaza
Pearl River, NY 10965-8509

Re: Data Validation Report - Brzezinski and Ferro Resubmittal Case 1675

Dear Mr. Maikish:

NYtest Environmental, Inc. has cited several organic compliance issues in the data validation report of the Brzezinski and Ferro Resubmittal case, which have already been addressed by Recra Environmental, Inc. The usability of this data is to be determined by the LMS QA/QC officer as resolved at the March 21, 1989 meeting between LMS, NYtest, Recra and NYSDEC. In order to clarify any usability issues, we shall reiterate our response to the data considered by NYtest to be in question.

A. Volatile Data

1. Method blank VBLK15 non-compliant:

°Method blank VBLK15 was contaminated with a level of Carbon Disulfide which exceeded the contract allowable limits. No false positives were reported since Carbon Disulfide was not detected in any of the associated samples, indicating that cross-contamination did not occur and the data is usable as submitted.

B. Semivolatile Data

1. ISW-4 re-analyzed outside holding times:

°Initial analysis of sample ISW-4 was performed on December 10, 1988 and yielded elevated levels of Phenanthrene, Fluoroanthrene and Pyrene. The necessity for a secondary dilution was not detected until the data processing was performed by which time the analysis holding time limitations had been exceeded. The dilution of sample ISW-4 was analyzed and exhibited levels of the elevated constituents which were similar to the original analysis. Since the data from ISW-4 and ISW-4DL have a reasonable coefficient of variation, the data remains usable even though the holding time limitations were exceeded for the diluted analysis.

C. Pesticide/PCB Data

1. Remains non-compliant:

°Specific issues were not stated in the data validation report of the resubmittal package. Responses to all previous issues are detailed in the case narrative and the usability of the data is documented. Final decisions in data usability, as per our meeting with the NYSDEC and the presence or absence of the pesticidal constituents measured by the CLP methodology is the responsibility of the QA officer at LMS.

D. Inorganic Data

1. All compliance issues concerning the inorganic data package are addressed in the enclosed amended case narrative. Where needed, the forms have been corrected and are numbered for insertion into the report.

2. The inorganic EP Toxicity analyses were not performed in accordance with New York State DEC CLP. As noted in the case narrative, the analyses were performed by SW-846, Second Edition methodology and the CLP CCV sequencing does not apply.

As stated previously, all organic issues have been addressed in the resubmittal package. As discussed at the March 21, 1989 meeting, the usability of the final data will be the decision of the LMS QA/QC Officer. If additional corrections are required in the inorganic package, Recra can make the necessary modifications.

If you have any questions or comments, please do not hesitate to contact Ms. Deborah Travis, Manager, Environmental Testing Services at (716) 691-2600.

Sincerely,

RECRA ENVIRONMENTAL, INC.

Arun K. Bhattacharya, Ph.D.
Senior Vice President/
Laboratory Director

VDH/AKB/jsm
Enclosure
cc: Mr. Douglas Sheely

CASE NARRATIVE

Laboratory Name: Recra Environmental, Inc.

Laboratory Code: RECNY

Case Number: 1675, Resubmittal

Contract Number: 001918

SDG Number: LS02

Sample Identifications:

ISS-1
ISS-2
ISS-3
ISS-3 MS
ISS-3 MD
ISS-4
ISW-1
ISW-2
ISW-4
ISW-5
ISW-8
JGW-4
JSS-2

INORGANIC DATA

Inorganic analyses were performed in accordance with the New York State DEC 1986 Protocol.

Sample prefixes J and I designate samples taken from the Brzezinski Landfill and Ferro Corporation sites respectively.

Standard Result qualifiers are utilized and are defined on the enclosed Inorganic Data Comment Page.

COMMENTS

CRQL form II (part 2) was not a 1986 CLP requirement and was not reported.

ICP Interelement Correction Factors Form (Form X) has been generated and is included in the resubmittal package.

Analyses performed when recalibration was improperly sequenced have been rerun and the new data is included in this report. This includes all Sodium and Potassium analysis.

Standardization data for Mercury and Cyanide are included in the resubmittal package.

When Cyanide analysis is performed all samples and quality control samples are determined at the same time. The data is then judged as acceptable or is rejected based upon the results of all required quality control samples.

The same digestion log numbers are used for the furnace and ICP/AA samples. The digestions are separated in the laboratory.

Total solids work sheets are included in the resubmittal package.

The solid lab control sample is reported with the US EPA established limits as indicated in the 1986 protocol (page E-59).

All furnace data is flagged with the required indications as defined in the 1986 protocol. (Figure 1, page E-58).

All raw data has been placed in the correct order and is included in the resubmittal package

CCV's and CCB's have been analyzed every tenth analytical sample.

Page 49 of the report package was incorrectly labeled as Form X-ICP Interelement Correction Factors. An amended page is included reflecting the correct title as Form -ICP Interelement Correction Factors.

The raw data for Beryllium pages 96-101 are duplicates and should be removed from the report package.

The instrument detection limit for Antimony was incorrectly listed as 10 on the Form VIII's. Amended forms are included to reflect the correct instrument detection limit of 5.

The correct Chromium instrument detection limit of five (5) is listed on the Form IX for flame analysis (page 48.)

The instrument detection limit for Lead was incorrectly listed as five (5) on the Form IX for flame analysis. An amended Form IX is enclosed reflecting the correct instrument detection limit of fifty (50).

The digestion log for sample JGW-4 was inadvertently omitted from the report package. A copy of the log is enclosed for insertion into the report.

The concentration for Calcium in sample JSS-2 was reviewed and verified as reported correctly in the resubmittal report.

Several samples required the analysis of dilutions to achieve optimum results for certain elements. Page 76 of this report is a compilation of raw data for several elements and some samples are listed more than once due to the dilution requirements. The values reported on the Form I's for a particular element represent the results from the sample of lowest dilution which was within the analytical range for that element.

1/11449.1

The analysis of sample ISS-3 Duplicate (5380) was performed directly after the final CCV, however, considering the good post digestion spike recovery obtained on the sample, the data is considered usable.

The results for Lead in sample JGW-4 (page 25) were incorrectly indicated as being obtained by furnace analysis. An amended Form I is included for insertion into the report package.

The results from the second Sodium CCV were inadvertently omitted from the Form II (page 28). An amended Form II is included for insertion into the report package.

"Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature."

Dr. Arun K. Bhattacharya

5/24/89

Date

RECRA ENVIRONMENTAL, INC.

TOTAL ANALYTICAL SERVICES FOR A SAFE ENVIRONMENT
nytest environmental inc.

RECEIVED
APR 05 1989
LAWLER, MATUSKY & SKELLY
ENGINEERS

March 31, 1989

Mr. Ed Maikish
Lawler, Matusky & Skelly Engineers
One Blue Hill Plaza
P.O. Box 1509
Pearl River, NY 10965-8509

Re: Data Validation Report - Brzezinski and Ferro Case #1709

89-15613

Dear Mr. Maikish:

Enclosed please find our Data Validation Report for the inorganic and organic results for the Brzezinski and Ferro sites (Case #1709). A list of the samples and their contract compliance is included.

Our review is combined because the data from the two sites was submitted together. Sample prefixes J and I designate samples taken from the Brzezinski and the Ferro Corp. sites respectively.

For the inorganics the conclusion of this data validation report is that the data on these samples are non-compliant with CLP protocol and partially incomplete. The items listed, and in particular that the instruments were frequently recalibrated prior to running a CCV would make this data non-compliant with a resubmittal.

For the organics data, some fractions for some samples may be compliant with resubmittal.

If you have any questions concerning this report, please call me at 516-625-5500.

Very truly yours,

Douglas Sheeley
Laboratory Director

cc: Mike Komoroske
NYSDEC
50 Wolf Rd.
Albany, NY 12233

Robert Wyeth/Debbie Travis
RECRA Env
10 Hazelwood Dr.
Suite No. 106
Amherst, NY 14150

nytest environmental inc.

89-15613

Additional comments on Case #1709

1. Volatiles
   a. Toluene was not a positive hit for: JGW-3 and VBLK20
   b. Methylene Chloride was not positive for ISW-7
   c. Benzene was not positive for ISW-4
   d. BFB scan averaging on 10/7; 11/08
   e. Xylene quantitated on secondary ion

2. Semivolatiles
   a. The following samples have noncompliant surrogate recoveries: JFIELD BLANK; ISW-2; ISW-6; ISW-9
   b. DFTPP scan averaging on 10/5; 11/11; 11/16; 12/7; 12/13
   c. 2-Chlorophenol not positive for ISW-7

3. Pesticide/PCB
   1. JFIELD BLANK had DDT reported, but looks like a phthalate peak on the confirm column and noise on primary column.
   2. a) On p.1310, INDB 12/08/88 11:38 Endrin Ketone 18% and called on OV1, all other compounds quant column is 2250/2401.
      b) On p.1312 INDB 12/08/88 14:58 2250/2401 Endrin Ketone 20.5%.
      c) Did not use same 4 peaks for ICAL 1254 and continuing calibration 1254 on p.1313 OV1 confirm column 12/07/88 15:39.
      d) On p.1316 INDA 12/08/88 13:39 OV1 the %D for Heptachlor calculates to be 27.3 not 19.7 as reported.
   3. Heptachlor merges with DBP and does not give 25% resolution.
   4. a) Reported g-BHC in ISW-4, but this peak appears in other samples and is not reported.
      b) DDT is reported for JGW-3 and J-Niagra River, but confirm peak appears to be a phthalate.

nytest environmental inc.

SITE: FERRO CORPORATION AND BRZEZINSKI LANDFILL
CASE #1709
89-15613

SAMPLE #	METALS	CN	VOA	BNA	PEST	RECRA-1
ISW-1	NC	R	R	OK	NC	
ISW-2	NC	R	R	OK	NC	
ISW-3	NC	R	R	OK	NC	
ISW-4	NC	R	R	OK	NC	
ISW-5	NC	R	R	OK	NC	
ISW-6	NC	R	R	OK	NC	
ISW-7	NC	R	R	OK	NC	
ISW-9	NC	R	R	OK	NC	
I-FIELD BLANK	NC	R	R	OK	NC	
I-TRIP BLANK			R			
JGW-2	NC	R	R	OK	NC	
J-NIAGRA RIVER	NC	R	R	OK	NC	
J-FIELD BLANK	NC	R	R	OK	NC	
TRIP BLANK			R			

R= RESUBMIT
NC= NON COMPLIANT WITH CLP
NOTE: RECRA-1 = EPTox complete; PCB; Corrosivity; Reactivity; Flashpoint

TOTAL ANALYTICAL SERVICES FOR A SAFE ENVIRONMENT

nytest environmental inc.

March 31, 1989

RECEIVED
APR 05 1989
LAWLER, MATUSKY & SKELLY ENGINEERS

Mr. Ed Maikish
Lawler, Matusky & Skelly Engineers
One Blue Hill Plaza
P.O. Box 1509
Pearl River, NY 10965-8509

Re: Data Validation Report - Brzezinski and Ferro Case #1675

89-15612

Dear Mr. Maikish:

Enclosed please find our Data Validation Report for the inorganic and organic results for the Brzezinski and Ferro sites (Case #1675). A list of the samples and their contract compliance is included.

Our review is combined because the data from the two sites was submitted together. Sample prefixes J and I designate samples taken from the Brzezinski and the Ferro Corp. sites respectively.

For the inorganics the conclusion of this data validation report is that the data on these samples are non-compliant with CLP protocol and partially incomplete. The items listed, and in particular that the instruments were frequently recalibrated prior to running a CCV would make this data non-compliant with a resubmittal.

For the organics data, some fractions for some samples may be compliant with resubmittal.

If you have any questions concerning this report, please call me at 516-625-5500.

Very truly yours,

Douglas Sheeley
Laboratory Director

cc: Mike Komoroske
NYSDEC
50 Wolf Rd.
Albany, NY 12233

Robert Wyeth/Debbie Travis
RECRA Env
10 Hazelwood Dr.
Suite No. 106
Amherst, NY 14150

nytest environmental inc.

89-15612

Additional comments on Case #1675

A. Volatiles
1. Possible false positive hits are listed in the text.
2. Missing MS/MSD for medium level analysis.
3. Xylene was quantitated on the secondary ion.
4. Internal standard area counts are low, although QC requirements are passed.

B. Semivolatiles
1. Holding times were exceeded for ISW-4DL and SBLK36.
2. DFTPP scan enhancement on 12/2; 12/6; 12/8; 12/9; 1/7; and 1/18/89.
3. Possible false positive hits are listed in the text.
4. TIC's should be in decimal minutes.

C. Pesticide/PCB
1. No Form III, even though MS/MSD had interference.
2. The confirmation RT's are out of the windows for PCB's in ISS-3MS, ISS-3MSD, ISS-4, ISW-1.
3. On p.2084 EVALB 12/07/88 01:06 DDT breakdown calculates be 23%, not 14%.
4. On 12/02/88 the sequence for both columns ICAL TOXAPH std appears not to have DBC.
5. Endosulfan Sulfate p.2095 12/03/88, 20:00 54% D.
6. Reference DBP merges with Heptachlor in INDA on OV1.
7. Samples ISS-1, ISS-2, ISS-3, ISW-1,ISW-4, and ISW-8 are analyzed at a dilution, but no DL suffix on ID. %
8. IGW-4 reported Dieldrin, but the pattern seems similar to samples and could be AR1260.

D. Inorganics
1. CRQL for AA and ICP Form II(part2) are present.
2. ICP interelement correction factors not reported, Form XII (part1).
3. Recalibration often performed during a run, frequently just prior to a CCV.
4. Standardization data for Hg and CN not included.
5. ICV and CCV follow one another directly in the CN run.
6. Digestion logs do not clearly distinguish separate digestion methods for furnace and ICP/AA.
7. No TS work sheets.
8. LCS %R not reported.
9. Furnace samples with spikes outside 85-115% should be flagged, even if <IDL (E-15, 7/87).

nytest environmental inc.

SITE: FERRO CORPORATION AND BRZEZINSKI LANDFILL
CASE #1675
89-15612

SAMPLE #	METALS	CN	VOA	BNA	PEST	RECRA
JGW-4	NC	R	R	OK	NC	--
ISS-1	NC	R	R	OK	NC	NC
ISS-2	NC	R	R	OK	NC	NC
ISS-3	NC	R	R	OK	NC	NC
ISS-4	NC	R	R	OK	NC	NC
ISW-1	NC	R	R	OK	NC	--
ISW-2	NC	R	R	OK	NC	--
ISW-4	NC	R	R	NC	NC	--
ISW-5	NC	R	R	OK	NC	--
ISW-8	NC	R	R	OK	NC	
JSS-2	NC	R	R	OK	NC	NC
ISS-3 MS	NC	R	R	OK	NC	--
ISS-3 MSD(MD)	NC	R	R	OK	NC	--

R= RESUBMIT
NC= NON COMPLIANT WITH CLP
NOTE: RECRA = EPTox Metals

TOTAL ANALYTICAL SERVICES FOR A SAFE ENVIRONMENT

nytest environmental inc.

RECEIVED
MAY 1 6 1989
LAWLER, MATUSKY & SKELLY ENGINEERS

May 8, 1989

Mr. Ed Maikish
Lawler, Matusky & Skelly Engineers
One Blue Hill Plaza
P.O. Box 1509
Pearl River, NY 10965-8509

Re: Data Validation Report - Resubmittal of Brzezinski and
Ferro Case #1709

89-15613

Dear Mr. Maikish:

Enclosed please find our Data Validation Report for the resubmitted inorganic and organic results for the Brzezinski and Ferro sites (Case #1709).

The data was reviewed in accorgance theh the guidelines established by NYSDEC on March 21, 1989.

If you have any questions concerning this report, please call me at 516-625-5500.

Very truly yours,

Douglas Sheeley
Laboratory Director

cc: Mike Komoroske
NYSDEC
50 Wolf Rd.
Albany, NY 12233

Robert Wyeth/Debbie Travis
RECRA Env
10 Hazelwood Dr.
Suite No. 106
Amherst, NY 14150

box 1518 □ 60 seaview blvd., port washington, ny 11050 □ (516) 625-5500

nytest environmental inc.

89-15613

Additional comments on the resubmittal of Case #1709

A. Inorganics

In general the inorganics data package is not organized properly, and is difficult to review. The EPA significant figure rules, and IDL rules are not followed throughout. If the entire data package was reanalyzed and resubmitted, why were the analyses performed by 1986 protocol?

1. IDL forms on pages 43 and 44 are listed as ICP, but flame was used.
2. LCS forms on p. 40 and 41 are not clear as to what instrument was used.
3. Cd on ISW-9 results not found in raw data.
4. Ca for IField Blank should be [600], not [280], on p.113-114 the sample was run line 80 and run again on line 88 whihout explanation.
5. Cr for ISW-1DUP should be [8], not 5U.
6. Co had inconsistant IDL reported.
7. Fe the result for sample ISW-3 should be 23,800 not 21,300.
8. K for ISW-3 was run after CCV. 5
9. Na CCV on p.29 should be 25.00 not 24.00.
10. No rew data for Na for 5 samples in group 88-1709A.
11. Se on JGW-3DUP should be 5U not 5.
12. Tl for group 88-1709A The CCV should be 84.3, not 79.6.

B. Volatile

Resubmittal is compliant.

B. Semivolatile

Resubmittal is compliant.

C. Pesticide/PCB

The pesticide/PCB fraction is still not compliant with CLP

1. The %D for Endrin Ketone in INDB 12/8/88, 14:58, on column 2250/2401 was outside limits.
2. DPB coelutes with Heptachlor.

nytest environmental inc.

SITE: Ferro and Brzezinski Resubmittal

SAMPLE #	METALS	CN	VOA	BNA	PEST	RECRA-1
ISW-1	R	OK	OK	OK	NC	
ISW-2	R	OK	OK	OK	NC	
ISW-3	R	OK	OK	OK	NC	
ISW-4	R	OK	OK	OK	NC	
ISW-5	R	OK	OK	OK	NC	
ISW-6	R	OK	OK	OK	NC	
ISW-7	R	OK	OK	OK	NC	
ISW-9	R	OK	OK	OK	NC	
I-FIELD BLANK	R	OK	OK	OK	NC	
I-TRIP BLANK			OK			
JGW-2	R	OK	OK	OK	NC	
JGW-3	R	OK	OK	OK	NC	
J-NIAGRA RIVER	R	OK	OK	OK	NC	
J-FIELD BLANK	R	OK	OK	OK	NC	
TRIP BLANK			OK			

NC= NOT COMPLIANT R= RESUBMIT

TOTAL ANALYTICAL SERVICES FOR A SAFE ENVIRONMENT

nytest environmental inc.

RECEIVED
MAY 15 1989
LAWLER, MATUSKY & SKELLY ENGINEERS

May 5, 1989

Mr. Ed Maikish
Lawler, Matusky & Skelly Engineers
One Blue Hill Plaza
P.O. Box 1509
Pearl River, NY 10965-8509

Re: Data Validation Report - Resubmittal of Brzezinski and Ferro Case #1675

89-15612

Dear Mr. Maikish:

Enclosed please find our Data Validation Report for the resubmitted inorganic and organic results for the Brzezinski and Ferro sites (Case #1675).

The data was reviewed in accorgance theh the guidelines established by NYSDEC on March 21, 1989.

I was contacted by RECRA concerning the EP Toxicity data and left a message that the original data was not compliant due to the metals analytical sequences

If you have any questions concerning this report, please call me at 516-625-5500.

Very truly yours,

Douglas Sheeley

Douglas Sheeley
Laboratory Director

cc: Mike Komoroske
NYSDEC
50 Wolf Rd.
Albany, NY 12233

Robert Wyeth/Debbie Travis
RECRA Env
10 Hazelwood Dr.
Suite No. 106
Amherst, NY 14150

nytest environmental inc.

89-15612

Additional comments on the resubmittal of Case #1675

A. Inorganics

In general the inorganics data package is not organized properly, and is difficult to review. The EPA significant figure rules are not followed throughout. The

1. Pages 90-95 and 96-101 are duplicates of the raw Be data.
2. Pages 49 and 50 are both labeled Form X.
3. Note the following inconsistent IDL's

	p41	p44	p47
Sb	IDL 10	IDL 10	IDL 5
Cr	IDL 5	IDL 5	IDL 10
PB	IDL 50	IDL 50	IDL 5

4. No digestion log for sample JGW-4.
5. Ca for JSS-2 should be 69,400 not 601.
6. Several samples on p.76 are listed more than once and there is no indication which results were used.
7. On p.145, for Pb, sample 5380 is run at a dilution after the last CCV.
8. P. 25, Pb listed as P, but there were no GFA results.
9. Na should have 2 CCV's.

B. Volatile

1. The concentration of Carbon Disulfide in VBLK15 exceeded limits, samples JGW-4, JGW-4DL, JGW-4DLRE ane not compliant.

B. Semivolatile

1. ISW-4 was reanalyzed outside holding times.

C. Pesticide/PCB

The pesticide/PCB fraction is still not compliant with CLP

nytest environmental inc.

SITE: FERRO CORPORATION AND BRZEZINSKI LANDFILL - RESUBMITTAL
CASE #1675
89-15612

SAMPLE #	METALS	CN	VOA	BNA	PEST	RECRA
JGW-4	R	OK	NC	OK	NC	--
ISS-1	R	OK	OK	OK	NC	NC
ISS-2	R	OK	OK	OK	NC	NC
ISS-3	R	OK	OK	OK	NC	NC
ISS-4	R	OK	OK	OK	NC	NC
ISW-1	R	OK	OK	OK	NC	--
ISW-2	R	OK	OK	OK	NC	--
ISW-4	R	OK	OK	NC	NC	--
ISW-5	R	OK	OK	OK	NC	--
ISW-8	R	OK	OK	OK	NC	--
JSS-2	R	OK	OK	OK	NC	--
ISS-3 MS	R	OK	OK	OK	NC	--
ISS-3 MSD(MD)	R	OK	OK	OK	NC	--

R= RESUBMIT, THE INORGANIC DATA MUST BE CORRECTED BEFORE THE REPORT IS COMPLIANT - Consult with the NYSDEC.

NC= NON COMPLIANT WITH CLP

NOTE: RECRA = EPTox Metals were never resubmitted

RECRA ENVIRONMENTAL, INC.
Chemical Waste Analysis, Prevention and Control

October 11, 1989

RECEIVED
OCT 16 1989
LAWLER, MATUSKY & SKELLY ENGINEERS

Mr. Ed Maikish
Lawler, Matusky and Skelly Engineers
One Blue Hill Plaza
P.O. Box 1509
Pearl River, New York 10965

RE: LMS Usability Determination - Ferro Corporation
Case #'s 1675 and 1709

Dear Mr. Maikish:

The following summarizes the LMS usability report dated September 13, 1989 concerning the Ferro Corporation project.

Volatile Data	-	Compliant
Semivolatile Data	-	Compliant and Usable.
Pesticide/PCB Data	-	Usable
Inorganic Data	-	Compliant and Usable

This letter documents the completion of the data validation and usability review process regarding the Ferro Corporation site. If I may be of further assistance, do not hesitate to contact me at (716) 691-2600.

Sincerely,

RECRA ENVIRONMENTAL, INC.

Verl D. Harbison

Verl D. Harbison
CLP Programs Manager

VDH/sh
cc: RKW
KCM

FERRO
USABILITY DETERMINATION FOR
FRACTIONS OTHER THAN PESTICIDES
576-013

Case 1709

Metals fraction

Potassium for sample TSW-3 was run after CCV.5 which is non-compliant with New York State Department of Environmental Conservation (NYSDEC) CLP protocol. However, since RECRA states that the results from the undiluted sample compared favorably with the diluted sample (the one run after the CCV), the results should be usable. This is also LMS' contention.

Case 1675

BNA fraction

Sample TSW-4 is considered non-compliant since the reanalyses was done outside the holding time. Since the initial analyses was done within the required holding time, the data are usable.

Metals fraction

Lead in sample TSS-3 duplicate was analyzed after the final CCV. Although non-compliant, the results should be usable.

FERRO

PESTICIDE DATA USABILITY REPORT

576-013

Case 1709

SAMPLE ID	MATRIX	NYTEST ORIG REVIEW	NYTEST REREVIEW	DATA	REASON FOR FAILURE	FINAL DETERMINATION
ISW-1	water	NC	NC	ND	a	usable
ISW-2	water	NC	NC	ND	a	usable
ISW-3	water	NC	NC	ND	a	usable
ISW-4	water	NC	NC	γBHC 0.075	a	usable[a]
ISW-5	water	NC	NC	ND	a	usable
ISW-6	water	NC	NC	ND	a	usable
ISW-7	water	NC	NC	ND	a	usable
ISW-9	water	NC	NC	ND	a	usable
IFB	water	NC	NC	ND	a	usable

Case 1675

SAMPLE ID	MATRIX	NYTEST ORIG REVIEW	NYTEST REREVIEW	DATA	REASON FOR FAILURE	FINAL DETERMINATION
ISS-1	soil	NC	NC	ND	b	usable
ISS-2	soil	NC	NC	ND	b	usable
ISS-3	soil	NC	NC	ND	b	usable
ISS-4	soil	NC	NC	ND	b	usable
ISW-1	soil	NC	NC	ND	b	usable
ISW-2	soil	NC	NC	ND	b	usable
ISW-4	soil	NC	NC	ND	b	usable
ISW-5	soil	NC	NC	ND	b	usable
ISW-8	soil	NC	NC	ND	b	usable
ISS-3MS	soil	NC	NC	ND	b	usable
ISS-3MSD	soil	NC	NC	ND	b	usable

a. % D > 15% Endrin ketone (18%) 12/8/88, 11:38 SP2250/2401 column
% D > 15% Endrin ketone (20%) 12/8/88, 14:58
% D > 20% Heptachlor (27.3%) 12/7/88, 13:39 - 3% OV-1 column

Apparently if the % D > 15% on column SP2250/2401, RECRA used column OV-1 for quantification. Column SP2250/2401 should only be used for quantification and column OV-1, should only be used for confirmation.

Since neither of these compounds was detected in any of the samples the results are usable.

- o Did not use same 4 peaks for ICAL 1254 and continuing calibration 1254, on OV-1 confirmation 12/7/88, 15:39.

- o Heptachlor merges with DBP and does not give 25% resolution.

Non detected values are usable since problems with analysis affects positive hits.

Since RECRA did not respond to question on γ BHC in ISW-4 (i.e., peak also appears in other samples and is not reported) the identification is questionable and therefore not usable.

b % D > 15% Endosulfan sulfate (54%) 12/3/88, 20:00 SP2250/2401 column

- o DBP merges with Heptachlor INDA on 3% OV-1 column.

- o RT for Aroclor 1260 outside RTWs for ISS-3-MS, ISS-3MSD, ISS-4 and ISW-1.

- o DBC not detected in Toxophene standard of 12/2/88.

Since none of the pesticides were detected in any of the samples with problems the data remains usable.

Even though Aroclor 1260 was slightly outside RTW in several samples the fact that the analyst used pattern recognition techniques based on chromatograms of standards is acceptable and the data are usable.