915022/915137

U.S. ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL SERVICES DIVISION
REGION 2
NEW YORK, NEW YORK 10278

FINAL DRAFT
SITE INSPECTION REPORT
Ernst Steel
Cheektowaga, Erie County
New York

EPA ID# NYD980508246

Draft report prepared by: Peter S. Morton, NUS Corporation

Final draft prepared by: Carol DiGuardia, Environmental Scientist, Superfund Support Section

Carol DiGuardia 1/12/90

Approved for the Director by: Richard D. Spear, Chief Surveillance & Monitoring Branch

2/28/90

SITE NAME: Ernst Steel
EPA ID NO.: NYD980508246
ADDRESS: 1746 Walden Avenue, Cheektowaga
Erie County, New York 14240
LATITUDE: 42° 54' 37" N.
LONGITUDE: 078° 46' 18" W.

1.0 SITE SUMMARY

The Ernst Steel Corporation ran a steel fabrication operation on a 3-acre site at 1746 Walden Avenue, Cheektowaga, Erie County, New York, from 1953 to 1983. The company operated a steel service center and a fabrication plant for the assembly of heavy industrial equipment. Waste materials from this operation included approximately 2,600 gallons per year of steel shavings, steel drillings, iron oxide dust and dirt, and approximately 250 gallons per year of dried paint sludge. Waste materials were landfilled in the northeastern part of the site. In 1983, the site was sold to U.S. Steel to be operated as a steel service center. Landfilling operations had ceased by this time.

The site has one large building currently being used by U.S. Steel Corporation on the western side of the property. A crane and a large girder structure are centrally located. The northern portion of the property is wooded, and a swampy area is located among the trees in the northern part of the property. Much of the site is low-lying, and because of the high clay content of the unconsolidated deposits underlying the site, ponding of water occurs following periods of high precipitation.

The site is located in a relatively flat area, with the site and surrounding terrain having slopes of less than 1 percent. Railroad tracks run parallel to the northern border of the site. There is a drainage ditch between the site and the railroad tracks. There is also a drainage ditch that runs parallel to the southern border of the site which turns and heads north along the eastern border of the site. Both of these ditches drain into Scajaquada Creek, which is located approximately 0.2 mile northeast of the northeast corner of the site. Delevan Industries, which neighbors U.S. Steel to the west, has been accused of illegally dumping paint residue and contaminated kerosene (possibly containing trichloroethane and toluene) onto the property bordering them to the west.

Land use within 1 mile of the site is residential, commercial, and industrial. A Niagara Mohawk substation and power lines are immediately east of the site, and the New York State Thruway lies east of the power lines. The nearest houses are approximately 0.2 mile north of the site. The areas immediately to the south and west of the site are commercial.

On May 24, 1988, NUS Corporation/Region 2 FIT conducted a site inspection. No imminent threats of fire or explosion were noted at this time. There is no record in the background files of any cleanup or enforcement actions ever having taken place at the site. During the FIT 2 site inspection conducted on May 24, 1988, six soil samples were collected from five sample locations. There is little potential for direct contact since the site is fenced and a security guard patrols at night.

Ref. Nos. 1, 2, 3, 4

2.0 SITE INSPECTION NARRATIVE

2.1 EXISTING ANALYTICAL DATA

The New York State Department of Environmental Conservation (NYSDEC) collected one ponded surface water sample from an unknown location on site on April 27, 1982. The analyses indicated a high concentration of lead (170 ppm). The NYSDEC also collected four soil samples north of the U.S. Steel plant building. Three of these samples were collected from a depth of 4.5 feet, and the fourth was a surface sample. These samples were analyzed for metals and total halogenated organics. Analyses indicated high concentrations of lead (up to 2500 ppm). Low levels of total halogenated organics were detected (0.6 to 1.1 ppm). The Quality Assurance/Quality Control (QA/QC) procedures used in analyzing the samples are unknown.

Ref. No. 2

2.2 WASTE SOURCE DESCRIPTION

Wastes that were generated by the steel service center and steel fabrication plant included steel shavings, steel drillings, iron oxide dust and dirt, and dried paint sludge. These types of wastes are categorized as metals and chlorinated organics. These wastes were landfilled in low-lying areas in the northeastern part of the site. The old landfill area covers approximately 0.5 acre. The waste was landfilled without any lining or method of containment. During the FIT 2 site inspection conducted on May 24, 1988, six soil samples were collected from five locations in the northern portion of the property to characterize any hazardous wastes which may be present in the old landfill area. Of these five, samples were collected from two areas that showed evidence of possible contamination: An area of orange-stained soil on the western edge of the disposal area, and an area adjacent to a rusted drum to the east.

Ref. Nos. 1, 2

2.3 GROUNDWATER ROUTE

No groundwater samples were collected during the site inspection on May 24, 1988, so an observed release to groundwater cannot be attributed to the site. Since groundwater is not used within a 3-mile radius of the site, there are no groundwater data available.

The soils in the unsaturated zone in the area of the site are clayey soils of the Lakemont Silt Loam. This soil typically has a surface layer of very dark brown silty loam, underlain by silty clay. These types of soils have permeability in the 10^{-5} to 10^{-7} cm/sec range. Annual net precipitation in the area is approximately 9 inches. Bedrock underlying the site consists of the Middle Devonian Onondaga Limestone. Depth to the limestone 1.5 miles west of the site is 7 feet. The only known well within 3 miles of the site, which is no longer in use, had a pumping rate of 130 gallons per minute. Depth to groundwater in the area is less than 10 feet. The limestone is approximately 110 feet thick. The Onondaga Limestone and other limestone units in the area contain water-bearing openings resulting from the solutioning of limestone by groundwater, especially along vertical joints and horizontal bedding planes. Because of the amount of clay in the unconsolidated sediments, there is a seasonal perched water table at times of high rainfall. Groundwater in the area flows northwesterly towards Lake Erie.

There is no known use of groundwater within 3 miles of the site. All of the residents within 3 miles of the site are serviced by the Erie County Water Authority municipal supply.

If hazardous substances are present in the old landfill area, there is potential for groundwater contamination to occur. However, groundwater is not used within three miles of the site. No groundwater samples were collected on May 24, 1988, because upgradient and downgradient wells do not exist.

Ref. Nos. 2, 5, 6, 7, 8, 9

2.4 SURFACE WATER ROUTE

The only surface water body potentially affected by the Ernst Steel site is Scajaquada Creek, which is located approximately 0.2 mile northeast of the site. There is no record of any samples ever being collected from this creek. The site is relatively flat, with an overall slope of less than 1 percent. There are several small mounds on site, with a relief of 5 to 10 feet and diameter of 15 to 20 feet, but the site is flat overall. As mentioned in Section 1.0, drainage in ditches along the northern and eastern edges of the site eventually flows into Scajaquada Creek. Because of the lack of site slope, and the amount of clay in the soil, water tends to pond on site after periods of high precipitation. A 1-year 24-hour rainfall for the area is approximately 2.1 inches.

Scajaquada Creek is used only for recreational purposes, if at all. There are no intakes within 3 miles of the site. There are also no critical habitats of federally endangered species or freshwater wetlands within 1 mile, or coastal wetlands within 2 miles of the site.

All of the municipal water for a 3-mile radius around the site is supplied by the Erie County Water Authority. Intakes for the municipal supply are from Lake Erie and the Niagara River, both greater than 3 miles from the site. There is no potential for drinking water contamination.

The only population potentially affected if surface water contamination has occurred is a small number of people who may use Scajaquada Creek for recreational purposes. No surface water samples were collected on May 24, 1988 because Scajaquada Creek is 0.2 mile away. Representative samples from the old landfill area on site were deemed sufficient to document whether hazardous substances are potentially migrating through surface water.

Ref. Nos. 3, 9, 10

2.5 AIR ROUTE

No readings above background were detected in the ambient air on the OVA prior to disturbance of the waste sources during the site inspection conducted on May 24, 1988.

There are no historic landmarks within view of the site.

2.6 ACTUAL HAZARDOUS CONDITIONS

No other actual hazardous conditions pertaining to human or environmental contamination have been documented. Specifically:

- *Contamination has not been documented either in organisms in a food chain leading to humans or in organisms directly consumed by humans.

- *There have been no documented observed incidents of direct physical contact with hazardous substances at the facility involving a human being (not including occupational exposure) or a domestic animal.

- *There have been no documented incidents of damage to flora (e.g., stressed vegetation) or to fauna (e.g., fish kill) that can be attributed to the hazardous material at the facility.

*There is no documented contamination of a sewer or storm drain without a point source to which the contamination can be attributed.

*There is no direct evidence of release of a substance of concern from the facility to the groundwater.

*There is no documented history of fire or explosive conditions on site.

Ref. No. 2

3.0 MAPS AND PHOTOS

ERNST STEEL
ERIE COUNTY, NEW YORK

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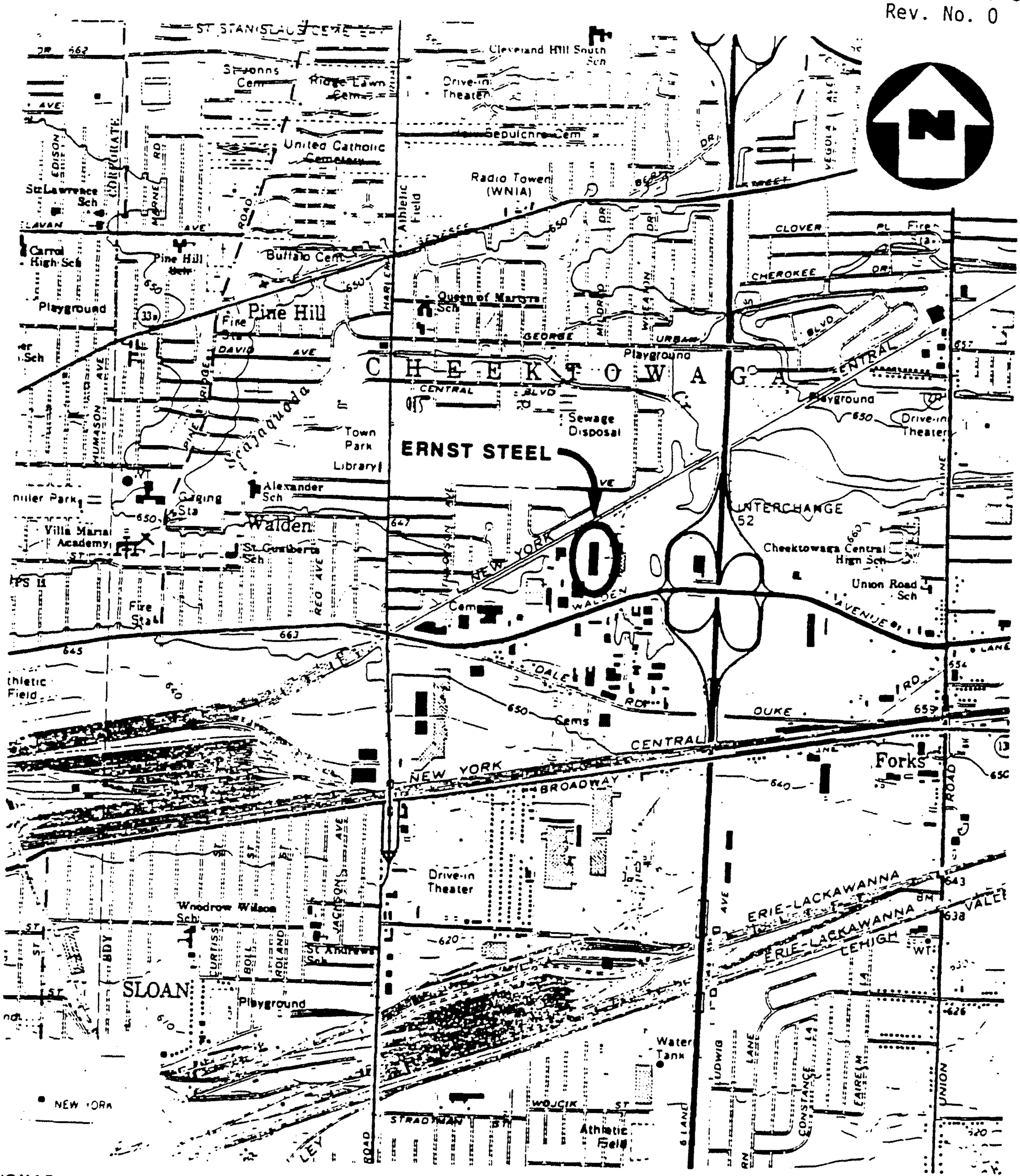

Figure 1

SITE LOCATION MAP

ERNST STEEL, CHEEKTOWAGA, N.Y.

SCALE: 1" = 2000'

FIGURE 1

NUS CORPORATION

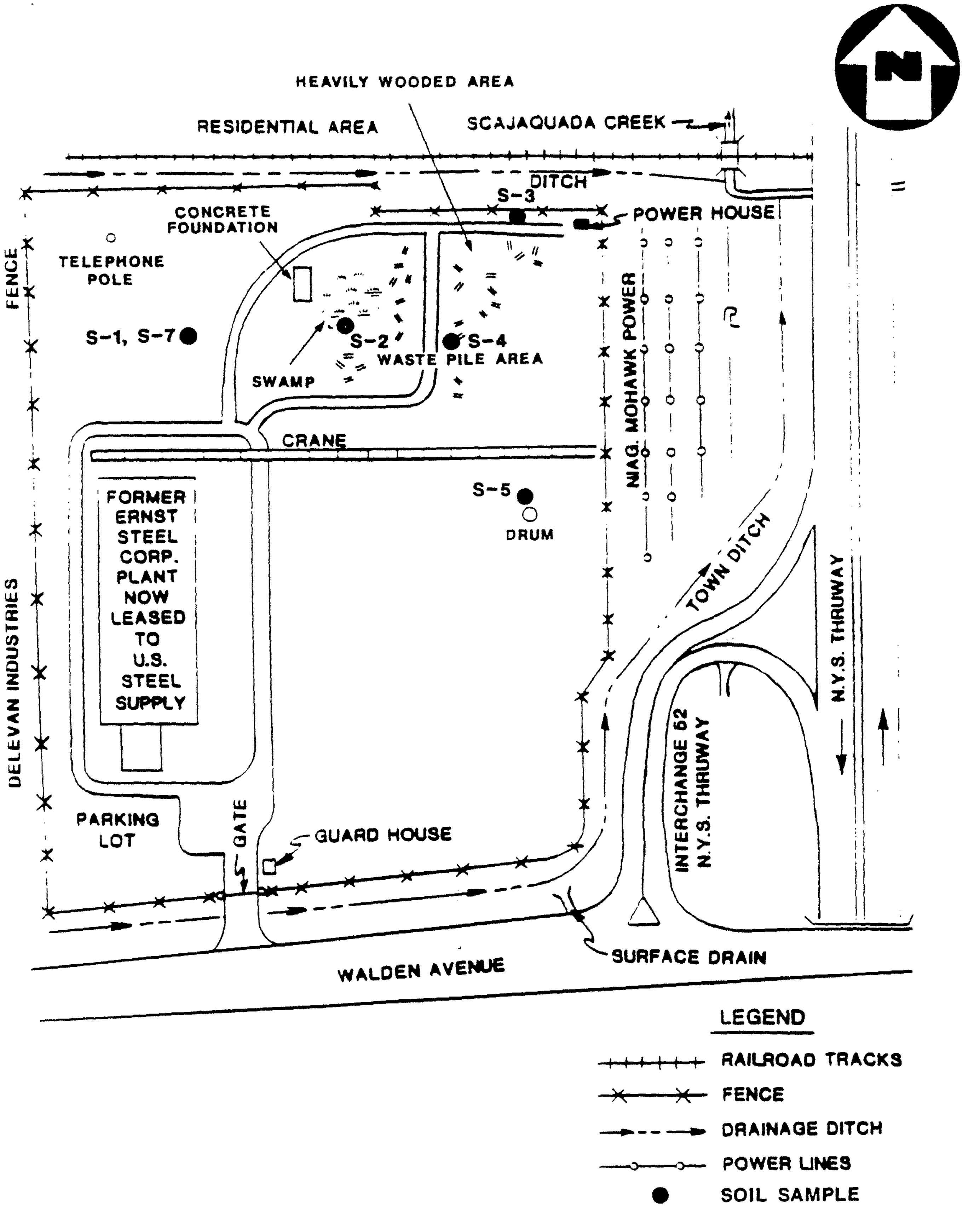

Figure 2

SAMPLE LOCATION MAP
ERNST STEEL, CHEEKTOWAGA, N.Y.

(NOT TO SCALE)

FIGURE 2

NUS CORPORATION

EXHIBIT A

PHOTOGRAPH LOG

ERNST STEEL
CHEEKTOWAGA, NEW YORK
MAY 24, 1988

ERNST STEEL
CHEEKTOWAGA, NEW YORK
MAY 24, 1988

PHOTOGRAPH INDEX

ALL PHOTOGRAPHS TAKEN BY ELIZABETH TORPEY

Photo Number	Description	Time
1P-1	Picture of soil at S-1.	1039
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1P-3	K. Fendler collecting NYFH-S2.	1050
1P-4	K. Bogdan collecting NYFH-S3.	1107
1P-5	K. Bogdan collecting NYFH-S4.	1122
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1P-7	Picture of drum located near NYFH-S5.	1133
1P-8	Picture of U.S. Steel supply building.	1135
1P-9	Picture of crane girders.	1135

ERNST STEEL, CHEEKTOWAGA, NEW YORK

1P-1 May 24, 1988 1039
Picture of soil at S-1.

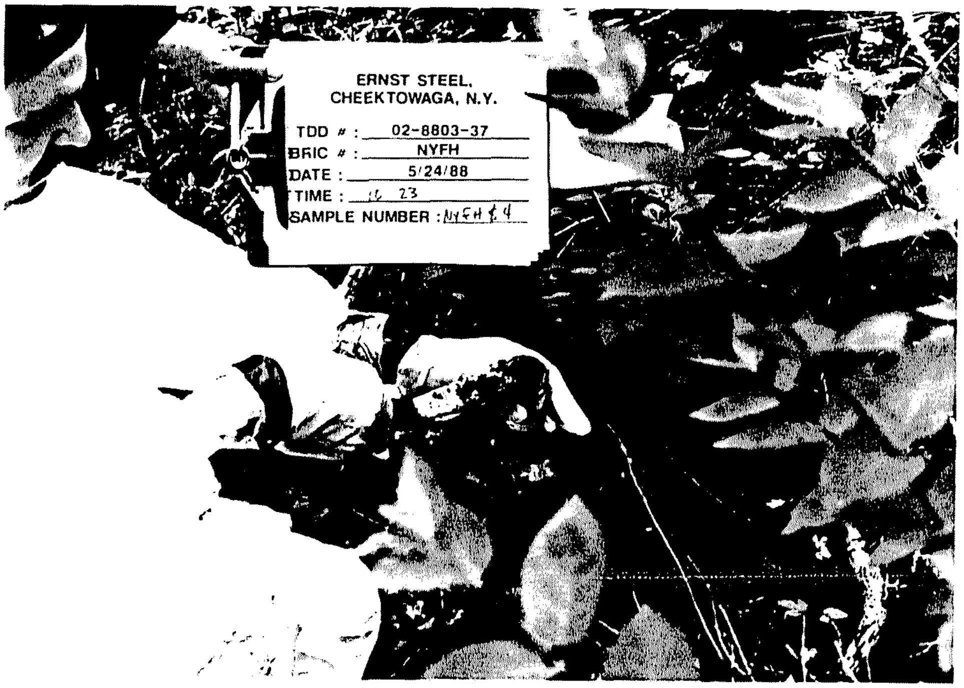
1P-2 May 24, 1988 1042
K. Bogdan collecting NYFH-S1 and NYFH-S7.

ERNST STEEL, CHEEKTOWAGA, NEW YORK

1P-3 May 24, 1988 1050
K. Fendler collecting NYFH-S2.

1P-4 May 24, 1988 1107
K. Bogdan collecting NYFH-S3.

ERNST STEEL, CHEEKTOWAGA, NEW YORK

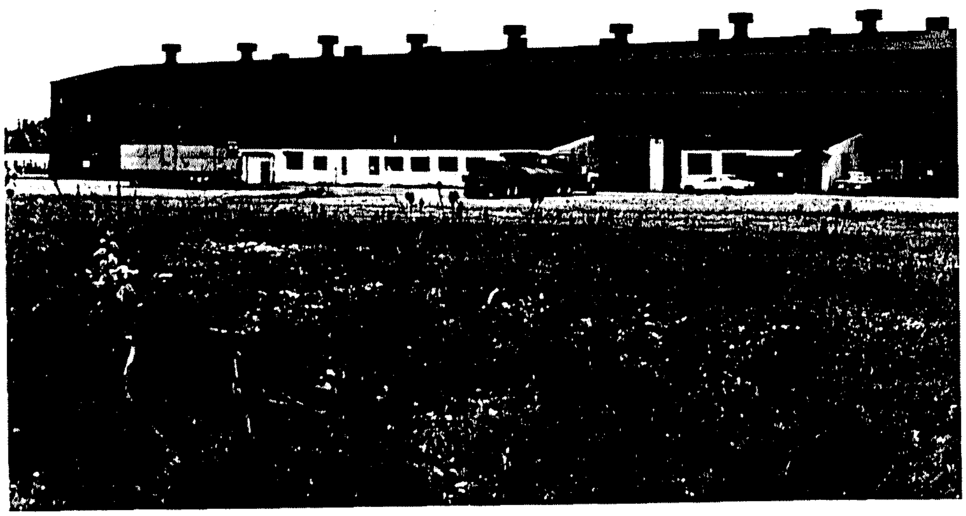


1P-5 May 24, 1988 1122
K. Bogdan collecting NYFH-S4.
Note: Time indicated on placard is incorrect.

1P-6 May 24, 1988 1130
K. Fendler collecting NYFH-S5.

ERNST STEEL, CHEEKTOWAGA, NEW YORK

1P-7 May 24, 1988 1133
Picture of drum located near NYFH-S5.



1P-8 May 24, 1988 1135
Picture of U.S. Steel supply building.

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1P-9 May 24, 1988 1135

Picture of crane girders.

4.0 SITE INSPECTION SAMPLE RESULTS

On May 24, 1988, NUS Corporation, Region 2 FIT collected samples from five locations on the Ernst Steel site. Two samples were taken from the historic landfill (waste pile) area, one near the northern boundary of the site near the landfill area, one near a drum found on the center of the property and one (and a duplicate) to the west of the landfill area (see Figure 2 for sample location data). The samples were all taken from a depth of 0-6". The samples were shipped to Contract Laboratory Program labs for TCL Inorganic and Organic analysis.

The organic analyses of the samples revealed concentrations of the following compounds:

<u>Volatile Organics</u>

* Methylene chloride was detected at 23 ppb in sample S3.

<u>Semi-volatile Organics</u>

* Phenol was detected at 680 ppb in sample S4.
* Naphthalene was detected at values ranging from 450 to 460 ppb in sample S1 and S7.
* 2-methyl naphthalene was detected at values ranging from 670 ppb to 750 ppb in samples S1, S7, and S4.
* Dibenzofuran was detected at concentrations which could not be quantified (above the instrument detection limit (IDL), but below the contractually required quantitation limit (CRQL)) in samples S1, S7, and S4.
* Phenanthrene was detected at values ranging from 450 to 1100 ppb in samples S1, S7, and S4.
* Anthracene was detected at concentrations which could not be quantified (above the IDL, but below the CRQL) in sample S4.
* Fluoranthene was detected at values ranging from 600 to 1200 ppb in samples S2, S4, and S5.
* Pyrene was detected at values ranging from 540 to 1100 ppb in samples S1, S7, S2, S4, and S5.
* Benzo(a)anthracene was detected at values ranging from 550 to 910 ppb in samples S1, S7, and S4.
* Chrysene was detected at values ranging from 680 to 1300 ppb in samples S1, S7, S2, and S4.
* Benzo(b)fluoranthene was detected at values ranging from 450 to 980 ppb in samples S7, S2, and S4.
* Benzo(k)fluoranthene was detected at values ranging from 480 to 620 ppb in samples S7 and S4.
* Benzo(a)pyrene was detected at values ranging from 550 to 800 ppb in samples S1, S7, and S4.
* Indeno(1,2,3-cd)pyrene was detected at 590 ppb in sample S4.
* Benzo(g,h,i)perylene was detected at 580 ppb in sample S4.

Pesticide/PCBs

* 4,4'-DDT was detected at 43 ppb in sample S5.
* Aroclor 1254 was detected at concentrations which could not be quantified (above IDL, below CRQL) in samples S1, S7 and S2.

The inorganics analyses of these samples revealed the following concentrations of inorganic compounds at levels exceeding the typical median concentrations found in soil:

* Arsenic was detected at values ranging from 18.1 to 30.5 ppm in samples S1, S7, and S4.
* Barium was detected at an estimated value of 637 ppm in sample S2.
* Cadmium was detected at 1.4 ppm in sample S2.
* Chromium was detected at values ranging from 698 to 711 ppm in sample S1 and S2.
* Cobalt was detected at estimated values ranging from 25.9 to 31.2 ppm in samples S1 and S7.
* Copper was detected at values ranging from 43.8 to 429 ppm in samples S1, S7, S2, S3, S4, S5.
* Iron was detected at values ranging from 45,900 to 81,000 in samples S2, S4, and S5.
* Lead was detected at values ranging from 189 to 11,800 ppm in samples S1, S7, S2, S3, S4, and S5.
* Magnesium was detected at values ranging from 6370 to 8740 ppm in samples S3 and S5.
* Manganese was detected at values ranging from 1510 to 8770 ppm in samples S1, S7, S2, and S5.
* Mercury was detected at 0.13 ppm in sample S4.
* Nickel was detected at values ranging from 110 to 120 ppm in samples S1 and S7.
* Selenium was detected at an estimated value of 1.5 in sample S4.
* Zinc was detected at estimated values ranging from 121 to 1210 ppm in samples S1, S7, S2, S3, S4, and S5.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The sampling and analysis of soil on the Ernst Steel site revealed concentrations of semi-volatile organic compounds and values higher than the typical median value of inorganic compounds found in soil. Semi-volatile organic compounds detected on the site were mostly of the polynuclear aromatic hydrocarbon class of chemicals. Levels such as these are typically found in urban soils since they are characteristic products of combustion. Of the inorganic compounds detected at the site, copper and lead were found at consistently elevated levels.

There is the potential for a release of contaminants to groundwater, although this could not be documented in the site inspection because of the lack of wells in the area. In any event, groundwater is not used as a drinking water supply in the area. There is also a potential for contaminants to be released to surface water through the drainage ditch leading to Scajaquada Creek. However, a soil sample taken on the Ernst Steel property adjacent to the drainage ditch showed lower concentrations of contaminants than locations closer to the landfill area. The Scajaquada's only use in this area is for recreation; drinking water is obtained from other sources. Direct contact with the contaminants on site is of low potential because the site is fenced and a security guard patrols at night.

Because of the above, a priority of **No Further Remedial Action Planned (NFRAP)** is the priority set for this site. This priority is based on the assumption that security will be maintained at the site. In the event that the site was abandoned, and security breached, another review of site conditions would be warranted.

REFERENCE NO. 1

6.0 REFERENCES

1. Field Notebook No. 0249, Ernst Steel, TDD No. 02-8803-37, Site Inspection, NUS Corporation Region 2 FIT, Edison, New Jersey.
2. Engineering Investigation at Inactive Hazardous Waste Sites, Phase I Investigation of Ernst Steel. Recra Environmental, Inc., March, 1986.
3. U.S. Department of the Interior, Geological Survey Topographic Maps, 7.5 minute series, "Buffalo NE, New York", 1965, and "Lancaster, New York", 1965.
4. Telecon Note: Conversation between Mr. Tom Robinson, Plant Supervisor, U.S. Steel Supply, and Beth Torpey, NUS Corporation, July 19, 1988.
5. Soil Survey of Erie County, New York. United States Department of Agriculture, Soil Conservation Service, 1978.
6. La Sala, A.M. Jr. Ground-Water Resources of the Erie-Niagara Basin, New York. United States Department of the Interior Geological Survey, in cooperation with the New York State Conservation Department Division of Water Resources, Basin Planning Report ENB-3, 1968.
7. Uncontrolled hazardous waste site ranking system, A users manual, 40 CFR, Part 300, Appendix A, 1986.
8. Groundwater Problems/Analysis. 208 Areawide Waste Treatment Management and Water Quality Improvement Program, Erie and Niagara Counties Regional Planning Board, December, 1977.
9. Telecon Note: Conversation between Mr. Ron Koczaja, Erie County Health Department, and Peter Morton, NUS Corporation, July 21, 1988.
10. New York State Department of Environmental Conservation, Significant Habitat Overlay, Buffalo Quadrangle, August, 1980, revised December 31, 1985.
11. Median Elemental Composition of Soils, Agency for Toxic Substances and Disease Registry, October 3, 1986.
12. CLP Laboratory Organic analysis from case # 9652, Industrial Corrosion Management Laboratories, Randolph, NJ.
13. CLP Laboratory Inorganic analysis from case # 9652, Columbia Analytical Services, Longview, WA.

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NUS CORPORATION

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Ernst Steel

Table of Contents

Beth Torpey 5-24-88 [illegible] 6-4-88

02-8803-37 Ernst Steel 5-24-88

B. Torpey	Site Manager
P. Morton	SSO
D. Restivo	SMO
K. Fendler	Sampler
K. Bogdan	Sampler

4.04 arrive at site
Meet with Tom Robinson plant supervisor
They don't dispose of anything on the property - The only waste is steel scrap which is shipped out - The only chemical they used is a rust-proofer which they don't have any excesses of

9.20 Setting up decon area

Tom Robinson also said that the place next door was under investigation + 2 of the foremen have been indicted for illegal disposal of hazardous waste

weather: Cloudy ~60°F
very little wind

9:28 Safety meeting held by P. Morton
attended:
P. Morton [signature]
K. Bogdan [signature]
D. Restivo [signature]
K. Fendler [signature]
B. Torpey [signature] 5-24-88

[initials]

9:33 Getting ready for recon -
only 3 escape packs (Sabre Park)

B. Torpey 192042
D. Morton 192389
K. Bogdan 192051

HNu doesn't work OVA does
Mini Rad - OK with Coleman mantle

9:42 Begin recon

9:43 Tom Robinson brings copy of newspaper article of next door (Delevan's) disposal practices - The Gate is not locked at night + they have a security service that patrols but no guard

9:50 Start recon again
D. Restivo doing RIM1 (Garter Snake)
10:00 observed Thamnophis Sirtalis Sirtalis in NW corner
Mallard in swamp area
no readings
10:15 Rabbit in NE corner normal background
no readings - Mini-Rad w/in Λ range
10:~~35~~ 32 Drum along E Side Closed no reading
BO says Penzoil-AW-Hydraulic Oil 32
Killdeer Charadrius vociferus
10:~~47~~ 27 BO Return to decon area

10:34 Setting out for S1-S4
10:36 Pheasant in area where S1 will be taken
male Phasianus colchicus

Beth Torpey 5-24-88 [initials] 5-24-88

10:39 1P-1 Soil at S-1
moist sandy orange soil with organic debris
no readings - mini Rad w/in normal background range
1-P-2 R. Bogdan sampling S1 + S7 ← Dup
10:42
Sample located 50 ft. in S-SE directed from telephone pole in west corner
no readings

1-P-3 10:50 L. Fendler sampling S-2

wet dark brown organic ooze - w/gravel
located 20 ft. S-E of the S-E corner of concrete foundation
(probably old incinerator)

11:07 1-P-4 K. Bogdan taking S-3
this is MS/MSD
located 30 ft. S. of fence + 100 ft. west of concrete building in NE corner
soil - fine wet brown organic
no readings - mini Rad w/in range normal background
11:22 1-P-5 K. Bogdan Sampling S-4
stake with yellow ribbon is at sampling place
soil - moist dark brown fine organic soil
no readings - mini Rad w/in range normal background

Beth Torpey 5-24-88 PM 6-24-88

11:30
S-S-1-P-6 K. fendler sampling S.S
soil- wet brown organic

60 ft. due S of 3rd girder
from eastern end of metal crane
no readings Mini Rad w/in range
11:33 1-P-67 drum sample was
taken by
Drum is on its side & can't tell if empty or full.

11:35 1-P-8 U.S. Steel Supply building

11:35 1-P-89 girders for crane

11:38 return to decon area

11:46 finishing SMo deconning samples

11 52 breaking down decon

Tom Robinson drops by says
11 53 Tom Ernst would have info about
history of site
He also said that a mall is
being built across the street &
the East area of the site has
been sold for an access rd. or
parking lot. He signed the
receipt for samples document.

Note: all samples taken at a depth of
0-6"

Beth Torpey 5-24-88 6-24-88

12:10 leaving site

12:20 Fed Ex P. Morton + B. Torpey

Site Overview

The disposal area is situated on the Northern border of the property. It is relatively flat with waste piles up to 7 ft high scattered in the central + eastern sections. The mid-eastern section is heavily wooded. The midsection is lightly wooded with tall grasses as is the western portion. Wildlife that one would expect to find in this type of habitat was observed. Other than those species mentioned previously in the log book we observed various bird species (Robins, red-winged blackbirds etc.) + many rabbits. The section along the eastern border where the drum was found consisted of tall grasses + light underbrush. The entire disposal area was extremely mosquito infested indicating that ponding of water occurs during rainy spells. No fire explosion potential apparent.

Beth Torpey 5-24-88

BB 6-24-88

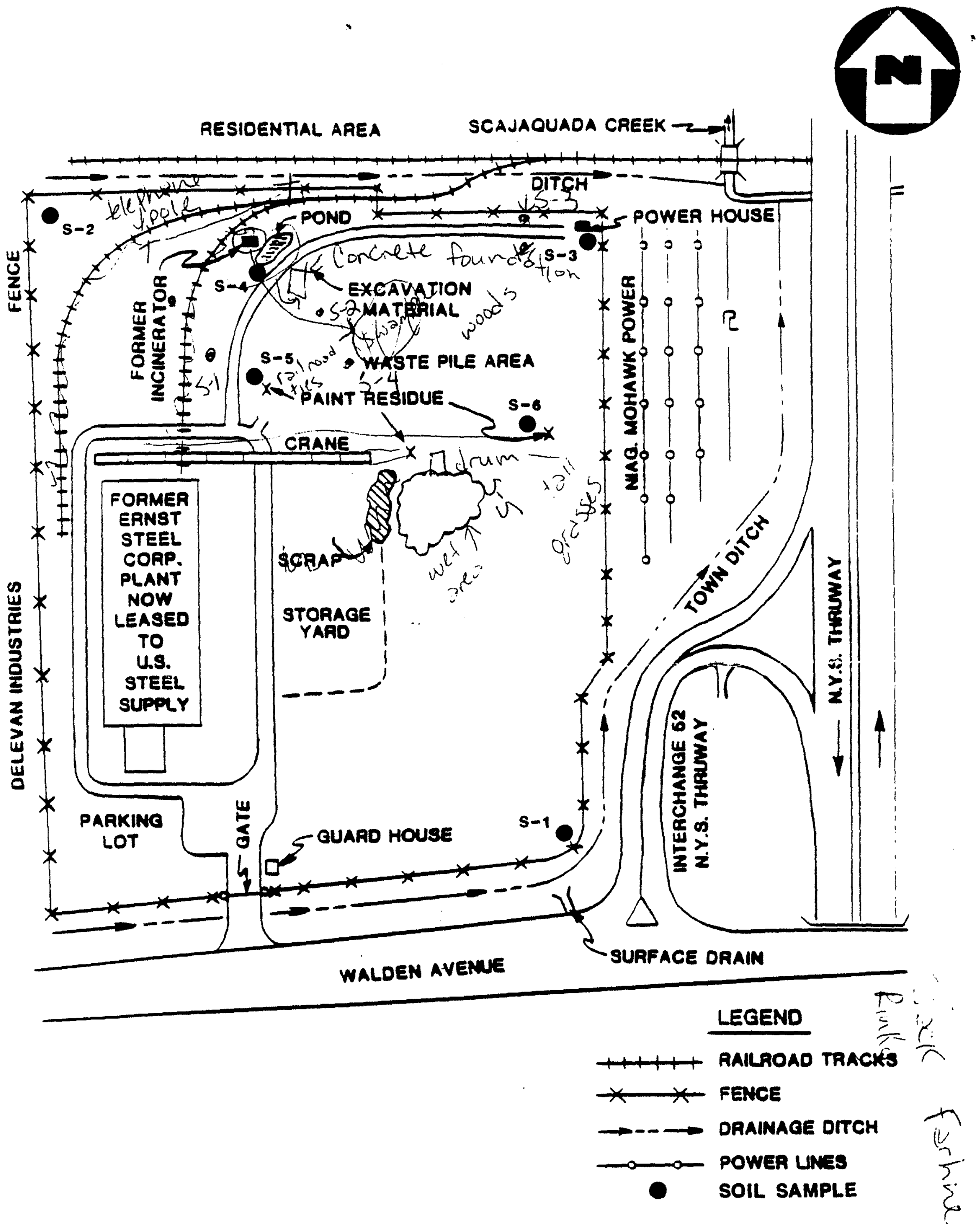

FIGURE 3

NUS CORPORATION

PRE-SAMPLE LOCATION MAP
ERNST STEEL, CHEEKTOWAGA, N.Y.

(NOT TO SCALE)

Rev. No. 0

ERNST STEEL
CHEEKTOWAGA, NEW YORK
MAY 24, 1988

PHOTOGRAPH INDEX

ALL PHOTOGRAPHS TAKEN BY ELIZABETH TORPEY

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1P-8	Picture of U.S. Steel supply building.	1135
1P-9	Picture of crane girders.	1135

Beth Torpey 5-24-88

Organic Lab . Airbill No. 7904104530
Industrial Corrosion Mgmt.
1152 Route 10
Randolph, NJ 07869

Inorganic Lab . Airbill No.
7904104526
Columbia Analytical Service
1152 Third Ave.
Longview, WA 98632

TABLE I

Sample Descriptions
Ernst Steel
Cheektowaga, New York
Case No. 9652

Sample Number	CLP Organic Traffic Report	CLP Inorganic Traffic Report	Time	Sample Type	Sample Location
NYFH-SI*	BT108	MBQ376	1042	Soil	50 ft south-southeast of the telephone pole in the northwestern corner of the site.
NYFH-S7	BT131	MBQ382	1042	Soil	Same as NYFH-S1.
NYFH-S2	BT111	MBQ377	1050	Soil	20 ft southeast of the southeast corner of the concrete foundation.
NYFH-S3**	BT112	MBQ378	1107	Soil	30 ft south of fence along northern border and 100 ft west of power house in northeast corner of the site.
NYFH-S4	BT113	MBQ379	1122	Soil	Located in waste pile in the center of the site. There is a stake with a yellow ribbon here.
NYFH-S5	BT114	MBQ380	1130	Soil	60 ft due south of the third girder from the eastern end of the metal crane.
NYFH-RIN1	BT132	MBQ383	950	Rinsate Blank	Trowel rinsate blank collected in the field.
NYFH-TBLK1	BT133	N/A	N/A	Trip Blank	Trip blank; demonstrated analyte free water.

* Indicates that a sample was designated for duplicate analysis.

** Indicates that additional volume was collected and shipped to the laboratory for matrix spike/matrix spike duplicate (MS/MSD) analysis.

Note: All soil samples were taken at a depth of 0 to 6 inches.

REFERENCE NO. 2

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

FILE COPY

PHASE I INVESTIGATION

Ernst Steel Site No. 915022
Cheektowaga Erie County

COMP

DATE: March 1986

Prepared for:

New York State Department of Environmental Conservation

50 Wolf Road, Albany, New York 12233
Henry G. Williams, *Commissioner*

Division of Solid and Hazardous Waste
Norman H. Nosenchuck, P.E., *Director*

By:

Recra Environmental, Inc.

2/3298

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES IN THE STATE OF NEW YORK PHASE I INVESTIGATIONS FOURTH ROUND

Ernst Steel Corporation
1746 Walden Avenue
Cheektowaga, Erie County, New York
Site #915022

Prepared For:

Division of Solid and Hazardous Waste
New York State Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233-0001

Prepared By:

Recra Environmental, Inc.
4248 Ridge Lea Road
Amherst, NY 14226

1.0 EXECUTIVE SUMMARY

The Ernst Steel Corporation operated a steel fabrication operation on a three acre site in Cheektowaga, Erie County, New York from 1953 to 1983 (Figure 1). Waste materials from this operation included 2600 gallons per year of steel shavings, steel drillings, iron oxide dust and dirt, and 250 gallons per year of dried paint sludge which were landfilled in the northeastern part of the site (Figure 2). During site inspections by NUS Corporation (9/28/83), Recra Environmental, Inc. (1/24/86), NYSDEC Region 9 (6/13/86), and the County (7/30/86), paint residue/red granular material was observed throughout this area. The site property was vacant from 1933 to 1953. Prior to 1933, the site was used as a railroad facility and coal cinders from this operation covered the area.

Sampling by the NYSDEC in 1982 indicated elevated levels of chromium (11 to 440 ppm), copper (4 to 280 ppm), lead (8.3 to 2500 ppm), nickel (18 to 110 ppm), zinc (31 to 64 ppm), and iron (200 to 440 ppm) in four soil samples and elevated levels of lead (170 ppm), zinc (17 ppm), and iron (3.6 ppm) in a surface water sample. No groundwater sampling has beeen conducted at the site. Groundwater is not used as a drinking water or irrigation source within three miles of the site.

The Phase I effort included a compilation of information gathered from NYSDEC Region 9, the Erie County Department of Environment and Planning, the New York State Health Department, and an interview with Frank Ernst, Vice President of the Ernst Steel Corporation. Recra Environmental, Inc., personnel conducted a site visit on January 24, 1986.

The intent of the Hazard Ranking System (HRS) is to provide a method by which uncontrolled hazardous waste sites may be systematically assessed as to the potential risk that a site may pose to human health and the environment. The HRS is designed to provide a numerical value through an assessment of technical data and information, and relating that information with respect to:

- o migration of hazardous substances from the site (S_m)
- o risk involved with direct contact (S_{dc})
- o the potential for fire and explosion (S_{fe}).

The risks involved with direct contact (S_{dc}) and the potential for fire and explosion (S_{fe}) are evaluated according to site specific information including toxicity of waste, quantity, site demographics, location with respect to sensitive habitats of wildlife, etc. Migration potential (S_m) is evaluated through the rating of factors associated with three routing modes: groundwater (S_{gw}), surface water (S_{sw}) and air (S_a). The scored value for each route is composited to determine the risk to humans and/or the environment from the migration of hazardous substances from the site (Sm).

Based on information gathered during this investigation, the Ernst Steel Corporation site was scored according to the Mitre Corporation Hazard Ranking System (HRS) and the following scores were obtained:

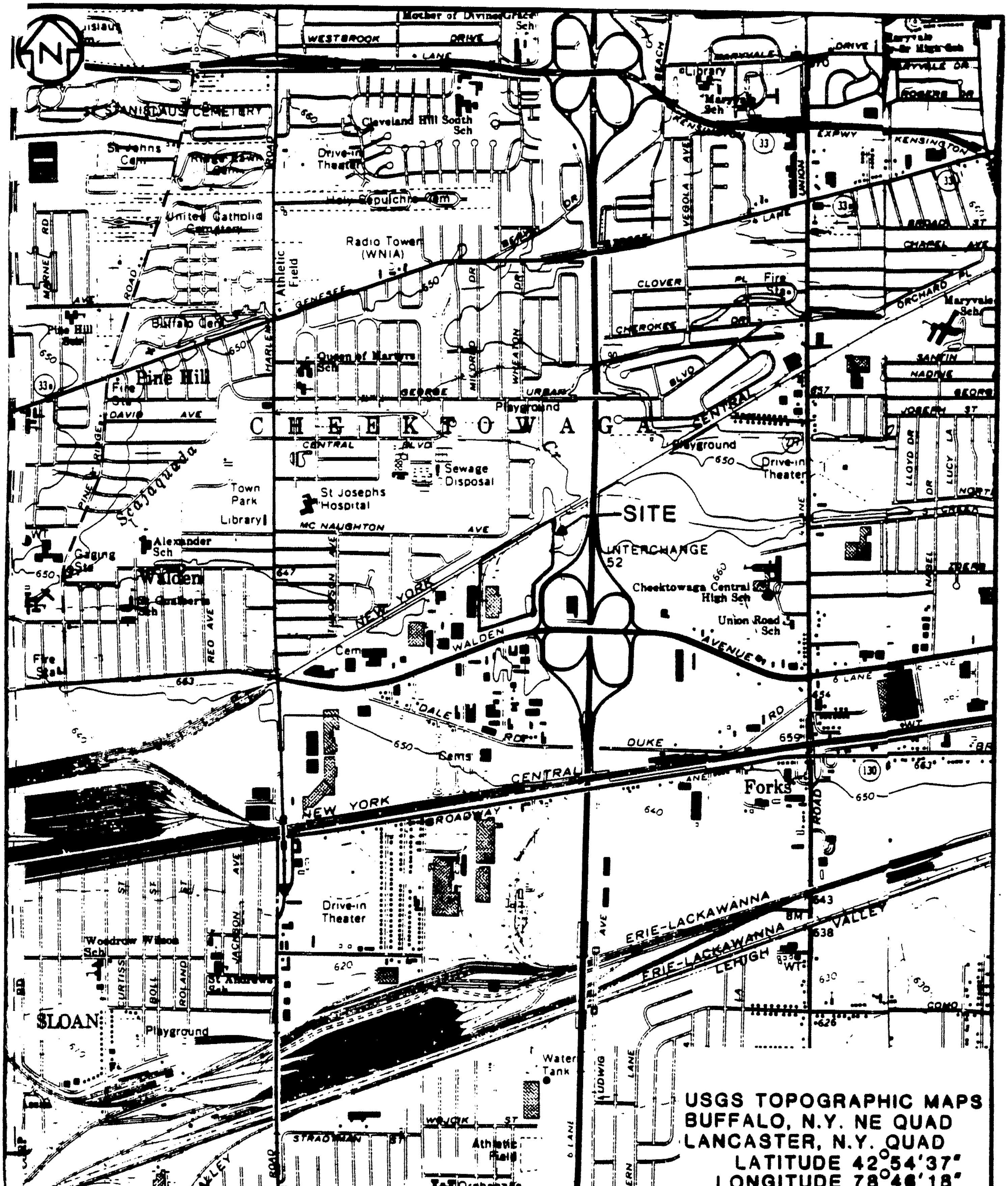
$S_m = 3.44$ ($S_{gw} = 2.68$; $S_{sw} = 5.31$; $S_a = 0$)

$S_{fe} = 0$

$S_{dc} = 0$

A Phase II investigation at the Ernst Steel site is recommended to proceed in two steps with step two contingent upon the results of step one. Step one would be a preliminary sampling and characterization of waste piles, paint residues, and incinerator ash. Composite samples from these areas should be analyzed for heavy metals and organics. In addition, a geophysical survey should be conducted to delineate the areal and vertical extent of fill areas at the site and to detect buried drums, if present.

If analytical results indicate the presence of hazardous substances at the site, step two of the Phase II work plan would be instituted. Step two would include monitoring well installation and groundwater, soil, surface water, and sediment sampling.



ECRA RESEARCH INC.
BUFFALO, NEW YORK

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Ckd.		
Ap'vd.		
Rev.		

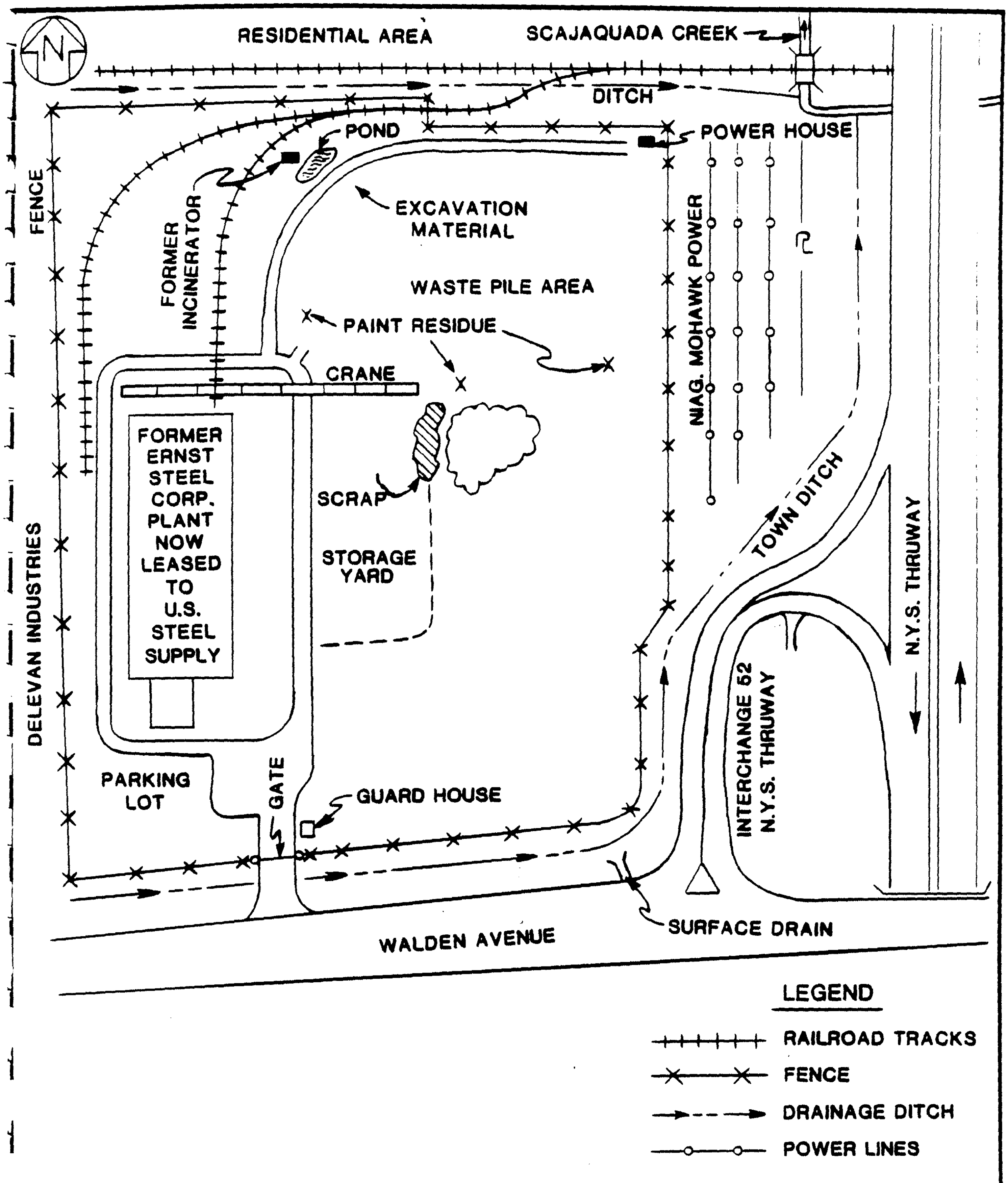
ERNST STEEL CO.
CHEEKTOWAGA, N.Y.
N.Y.S. SUPERFUND
PHASE I

VICINITY MAP

Project No. 5C280398

A

FIGURE 1



Scale: NTS			ERNST STEEL CORPORATION CHEEKTOWAGA, N.Y. N.Y.S. SUPERFUND PHASE II	SITE MAP
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Rev.			Project No. 5C280398	

2.0 PURPOSE

The objective of this Phase I investigation is to prepare a report for the Ernst Steel Corporation site that provides a history and preliminary assessment of the site based on a review of available data, assigns a numerical value to the site through the use of the Hazard Ranking System (HRS) and develops a proposed Phase II work plan designed to address the data inadequacies identified during report preparation. The purpose of developing a Phase I report in this manner is to provide an objective assessment of the site and the potential impact it may pose to human health and the environment.

The Phase I objective was met through the following activities:

- site inspection.
- collection and review of available data for report preparation and preliminary scoring of the HRS.
- evaluation of data for completeness and identification of data inadequacies.
- development of a proposed Phase II work plan to address the data inadequacies identified.

The site inspection is an integral part of the Phase I report preparation and is conducted to confirm actual site conditions. Typically, the site visit is designed to note the general topography and geology of the site, evidence of waste disposal, form of waste disposal, visible signs of contaminant release to the environment (e.g. leachate), access to the site, and location of water resources, population centers, and sensitive environments such as wetlands.

3.0 PHASE I SCOPE OF WORK

In order to provide an accurate and thorough preliminary assessment of the Ernst Steel Corporation site, Recra personnel conducted a search of state and county office files, a review of available general information concerning regional geography, geology and hydrogeology, and a site visit that included an interview with personnel associated with site operations.

The majority of the data comprising this report was obtained from NYSDEC Region 9 located at 600 Delaware Avenue, Buffalo, New York (716-847-4600) and the Erie County Department of Environment and Planning located at 95 Franklin Street, Buffalo, New York (716-846-8390). NYSDEC Region 9 also provided floodplain information and the location of wetlands and critical habitats of endangered species in the vicinity of the site.

Recra personnel conducted an inspection of the site on January 24, 1986 to identify the present condition of the site. Weather during the site visit was cloudy and 28°F with no snow cover on the ground. No air monitoring was conducted during the inspection due to the low air temperature.

4.0 SITE ASSESSMENT

4.1 Site History

The Ernst Steel Corporation is located on a three acre site at 1746 Walden Avenue, Cheektowaga, Erie County, New York (Ref. 2 and 17). From 1953 to 1983, the company operated a steel service center and a fabrication plant for the assembly of heavy industrial equipment (Ref. 2, 4, 15, 17, 20, 21). Waste materials from this operation included approximately 2600 gallons per year of steel shavings, steel drillings, iron oxide dust and dirt, and approximately 250 gallons per year of dried paint sludge (Ref. 2, 4, 15, 17, 18, 20, 21). Waste materials were landfilled in low lying areas in the northeastern part of the plant property (Ref. 4, 15, 17, 20, 21, and 23). During site inspections by NUS Corporation (9/28/83), Recra Environmental, Inc. (1/24/86), NYSDEC Region 9 (6/13/86), and the County DEP (7/30/86), waste piles and paint residue/red granular material was observed throughout this area (Ref. 3, 17, 22, and 23).

From 1933 to 1953, the site was vacant (Ref. 15). Prior to 1933, the property was a railroad facility (Ref. 15, 16). During this period, coal cinders from the railroad operation were reportedly disposed of on site (Ref. 15, 19).

In 1982, the NYSDEC collected three soil samples and a surface water sample in an area of the site around a small incinerator used to burn office paper waste and employee refuse (Ref. 2, 4, 15). The exact sampling locations are not known.

In 1983, the site was sold to U.S. Steel to be operated as a steel service center. Landfilling operations had ceased by this time (Ref. 2, 15, 17).

During site inspections in 1983 by NUS Corporation, and in 1986 by Recra Research, Inc., empty, rusted 55 gallon drums were observed on site (Ref. 3, 17).

4.2 Site Area Surface Features

4.2.1 Topography and Drainage

Topography in the area of the site is generally flat (Ref. 1). Most of the northeastern section of plant property where disposal activities took place formerly consisted of freshwater wetlands (Ref. 2). A ditch runs between the site and the railroad track bed near the northern boundary of the site (Figure 2). Run-off from the northern portion of the site can enter this ditch, which eventually drains to Scajaquada Creek. A ditch runs parallel with the southern boundary of the site and is directed along a portion of the eastern boundary before being diverted east of the Niagara Mohawk power lines and north to Scajaquada Creek (Ref. 22). Some surface drainage may leave the site through a break in a dike on the southeast corner of the site (Ref. 22). Railroad tracks separate the site from a residential area lying north of the plant property (Ref. 1).

Much of the site is low lying and because of the high clay content of the unconsolidated deposits underlying the site, some ponding of water occurs following periods of high precipitation (Ref. 7). Most surface water remains on site (Ref. 22).

4.2.2 Environmental Setting

Land use within one mile of the site is residential, commercial and industrial (Ref. 1, 2). Railroad tracks separate the site from a residential area to the north. New York State Thruway Exit 52W, a Niagara Mohawk substation, and power lines lie immediately east of the site. The entire property is surrounded by a fence with the site entrance and guardhouse located off Walden Avenue. Scajaquada Creek flows within 1000 feet of the northeastern section of the site (Ref. 1). Scajaquada Creek is a Class D waterway, suitable for secondary contact recreation such as boating or fishing (Ref. 11, 12). Portions of the northeastern section of the site lie within the 100-year floodplain of Scajaquada Creek (Ref. 14). There are no New York State regulated wetlands or critical habitats of endangered species found within one mile of the site (Ref. 13).

Approximately 5000 people live within one mile of the site and 40,000 people within three miles of the site (Ref. 17). All residents in the vicinity of the site are serviced by municipal water supply (Ref. 2, 6, 17). Surface water intakes for Cheektowaga municipal water are located in the Niagara River and operated by the Erie County Water Authority (Ref. 6).

4.3 Site Hydrogeology

4.3.1 Geology

The first encountered bedrock underlying the site is the Onondaga Limestone (Ref. 8). This formation consists of three members. The lowest member is a gray coarse-grained limestone, generally only a few

HRS WORKSHEETS

feet in thickness (Ref. 5). This lithology occasionally grades laterally into reef deposits which increases its thickness (Ref. 8). The middle member of the Onondaga Limestone is a cherty limestone, approximately 40 to 45 feet thick. The upper unit is a dark-gray to tan limestone with a thickness ranging from 50 to 60 feet (Ref. 5).

Depth to bedrock beneath the site has been estimated to range between 10 and 25 feet below ground surface (Ref. 2, 17).

4.3.2 Soils

Soils in the area including the site have been classified as Urban Land-Odessa, Nearly Level (Ref. 7). The urban land portion of this unit is characterized by disturbed or removed soils and is found in residential, commercial and industrial areas. The undisturbed portion is dominated by Odessa soils that formed in gravel and stone-free, lake-laid sediments having a high clay content. These soils are often poorly drained and have a seasonal high water table perched in the upper part of the subsoil during wet periods (Ref. 7).

On July 30, 1986, county personnel inspected the site and six soil borings were taken using a Veihmeyer Soil Sampler. Subsurface soils were collected to a depth of four feet and were found to consist mainly of orange silty clay (Ref. 23).

Large quantities of coal cinders have been reportedly landfilled on site from past operations (Ref. 15, 19).

4.3.3 Groundwater

There is no known groundwater information for the immediate area including the site. The Onondaga Limestone and other limestone units in the area contain waterbearing openings resulting from the solutioning of limestone by groundwater (Ref. 5). Solutioning occurs especially along vertical joints and horizontal bedding planes. The coefficient of transmissivity of the limestone units is estimated to range between 300 and 25,000 gallons per day per foot depending on the extent and magnitude of solutioning of the rock (Ref. 5).

As mentioned in Section 4.3.2, undisturbed site soils can support a seasonal high perched water table during periods of high precipitation. The depth of the perched water table has been reported to be 0.5 to 2 feet below ground surface (Ref. 2).

4.4 Previous Sampling and Analysis

4.4.1 Groundwater Quality Data

There is no available groundwater data for the site.

4.4.2 Surface Water Quality Data

The NYSDEC collected a surface water sample from an unknown location on the site on April 27, 1982 (Ref. 2, 4). According to the NYSDEC, the analyses indicated high concentrations of zinc (17 ppm) and iron (3.6 ppm) and a very high concentration of lead (170 mg/l)(Ref. 4).

4.4.3 Air Quality Data

There is no available air quality data for the site. During the NUS Corporation site investigation on September 28, 1983, air monitoring was conducted using an HNU photoionizer. No readings were obtained that exceeded background levels (Ref. 17).

4.4.4 Other Analytical Data

The NYSDEC collected four soil samples north of the plant building on April 27, 1982 (Ref. 2, 4). Three soil samples were taken at a depth of 4.5 feet and the fourth from the ground surface. These samples were analyzed for metals and total halogenated organics. The soil analyses from the four samples indicated high concentrations of chromium (11 to 440 ppm), copper (41 to 280 ppm), lead (8.3 to 2500 ppm), nickel (18 to 110 ppm), zinc (31 to 64 ppm), and iron (200 to 440 ppm) (Ref. 4). Low levels of total halogenated organics were detected (0.6 to 1.1 ppm).

5.0 PRELIMINARY APPLICATION OF THE HAZARD RANKING SYSTEM

5.1 Narrative Summary

The Ernst Steel Corporation operated a steel fabrication operation at 1746 Walden Avenue, Cheektowaga, Erie County, New York from 1953 to 1983 (Ref. 2, 4, 17). Waste materials from this operation that included 2600 gallons per year of steel shavings, steel drillings, iron oxide dust and dirt, and 250 gallons per year of dried paint sludge were landfilled on a four acre section in the northeastern part of the site (Ref. 2, 4, 17, 20, 21, and 23). During site inspections by NUS Corporation (9/28/83), Recra Environmental, Inc. (1/24/86), NYSDEC Region 9 (6/13/86), and the County DEP (7/30/86) waste piles and paint residue/red granular material were observed throughout this area (Ref. 3, 17, 22, and 23). From 1933 to 1953 the site property was vacant (Ref. 15). Prior to 1933, the site was used as a railroad car facility and the area was reportedly covered with coal cinders that came from railroad operations (Ref. 15, 16, 19). The site is presently owned by U.S. Steel and is used as a steel service center (Ref. 2, 15, 17).

Sampling by the NYSDEC in 1982 indicated elevated levels of lead (8.3 to 2500 ppm), chromium (11 to 440 ppm), copper (41 to 280 ppm), nickel (18 to 110 ppm), zinc (31 to 64 ppm), and iron (200 to 440 ppm) in four soil samples from the site and elevated levels of lead (170 ppm), zinc (17 ppm), and iron (3.6 ppm) in a surface water sample (Ref. 2, 4). The soil samples were collected north of the plant building, but it is not known where the surface water samples were taken (Ref. 2, 4). No groundwater sampling has been conducted at the site. Land use within one mile of the site is residential, commercial and industrial (Ref. 1, 2). All residents within three miles of the site are serviced by municipal water supply (Ref. 2, 6, 17). Surface water intakes for municipal water are located in the Niagara River ten miles downstream of the site (Ref. 6).

Scajaquada Creek lies within 1000 feet of the northeastern section of the site (Ref. 1). Ditches are located along the northern, southern, and eastern boundaries of the site and are directed to Scajaquada Creek. Most surface water, however, apparently remains on site although some surface drainage may leave the site through a break in a dike on the southeast corner of the property (Ref. 22). Portions of the northeastern section of the site are located in the 100-year floodplain of Scajaquada Creek (Ref. 14). There are no regulated wetlands or critical habitats of endangered species within a mile of the site (Ref. 13).

5.2 HRS WORKSHEET

Facility name: Ernst Steel Corporation

Location: 1746 Walden Ave., Buffalo, Erie County, New York

EPA Region: 2

Person(s) in charge of the facility: Frank Ernst, Vice President

P.O. Box 987

Buffalo, New York 14240

Name of Reviewer: Recra Research, Inc. Date: February 18, 1986

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.)

From 1953 to 1983, approximately 2600 gallons per year of steel shavings, steel drillings and iron oxide dust, and 250 gallons per year of dried paint sludge were landfilled in low lying areas in a 4 acre section of Ernst Steel Corporation property. Elevated levels of heavy metals have been detected in site soils and surface water.

Scores: S_M = 3.44(S_{gw} =2.68 S_{sw} =5.31 S_a = 0)

S_{FE} = 0

S_{DC} = 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	4	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 1 (2) 3	1	2	3	
	Total Route Characteristics Score		9	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]			1539	57,330	
[7] Divide line [6] by 57,330 and multiply by 100		S_{gw} = 2.68			

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	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	2	3	
Total Route Characteristics Score			10	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	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			3420	64,350	
7 Divide line 6 by 64,350 and multiply by 100	S_{sw} = 5.31				

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, the 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	0	3	
Toxicity	0 1 2 (3)	3	9	9	
Hazardous Waste Quantity	0 (1) 2 3 4 5 6 7 8	1	1	8	
Total Waste Characteristics Score			10	20	
3 Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 (21) 24 27 30	1	21	30	
Distance to Sensitive Environment	(0) 1 2 3	2	0	6	
Land Use	0 1 2 (3)	1	3	3	
Total Targets Score			24	39	
4 Multiply 1 x 2 x 3			0	35,100	
5 Divide line 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})	2.68	7.18
Surface Water Route Score (S_{sw})	5.31	28.20
Air Route Score (S_a)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		35.38
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		5.95
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		3.44

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) 1 2 3 4 5 6 7 8	1	0	8	
	Total Waste Characteristics Score		0	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	3	3	
Distance to Sensitive Environment	(0) 1 2 3	1	0	3	
Land Use	0 1 2 (3)	1	3	3	
Population Within 2-Mile Radius	0 1 2 3 4 (5)	1	5	5	
Buildings Within 2-Mile Radius	0 1 2 (3) 4 5	1	3	5	
	Total Targets Score		17	24	
4 Multiply 1 x 2 x 3			0	1,440	
5 Divide line 4 by 1,440 and multiply by 100		S_{FE} =	0		

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	0	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	16	20	
Distance to a Critical Habitat	(0) 1 2 3	4	0	12	
Total Targets Score			16	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]			0	21,600	
[7] Divide line [6] by 21,600 and multiply by 100		S_{DC} = 0			

FIGURE 12
DIRECT CONTACT WORK SHEET

HRS DOCUMENTATION RECORDS

June 23, 1982

5.3 HRS DOCUMENTATION RECORDS

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: Ernst Steel Corporation

LOCATION: 1746 Walden Ave., Buffalo, Erie County, New York

GROUND WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

No analytical data

Rationale for attributing the contaminants to the facility:

N/A

* * *

2 ROUTE CHARACTERISTICS

<u>Depth to Aquifer of Concern</u>

Name/description of aquifers(s) of concern:

1. Seasonal perched water table in unconsolidated deposits.
2. Onondaga Limestone (Ref. 2,5,8,10)

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

1. Perched water table - estimated at 0.5 to 2 feet.
2. Onondaga Limestone - between 10 and 60 feet

(Ref. 2, 10)

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

≤4.5 feet

(Ref. 2, 17, 23)

Net Precipitation

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

36 inches (Ref. 9)

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

27 inches (Ref. 9)

Net precipitation (subtract the above figures):

9 inches

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

Urban land - Odessa, nearly level (Ref. 7)

Permeability associated with soil type:

$<10^{-5}$ $\geq 10^{-7}$ cm/sec (Ref. 9)

Physical State

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

Solid, fine material and dried sludge (Ref. 2,4,15,17,18,20,21)

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Piles - uncovered, no liner (Ref. 2, 4, 16, 17, 22, 23)

Method with highest score:

Piles - uncovered, no liner (Ref. 9)

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Heavy metals: Cr, Cu, Pb, Zn, Fe, Ni (Ref. 2, 4)

Compound with highest score:

Heavy metals

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):

Sampling and analysis document the presence of hazardous substances at the site; exact quantity unknown. (Ref. 2, 4)

Basis of estimating and/or computing waste quantity:

N/A

5 TARGETS

Ground Water Use

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

Industrial (Ref. 5,17)

Distance to Nearest Well

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

Unknown

Distance to above well or building:

Unknown

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:

All residents within 3 miles of the site use municipal water

(Ref. 2,6,17)

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):

N/A

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):

Insufficient data for HRS scoring

(Ref. 2, 4, 23)

Rationale for attributing the contaminants to the facility:

N/A

* * *

2 ROUTE CHARACTERISTICS

<u>Facility Slope and Intervening Terrain</u>

Average slope of facility in percent:

Less than 1%

(Ref. 1)

Name/description of nearest downslope surface water:

Ditch tributary to Scajaquada Creek

(Ref. 1, 22)

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

Less than 1%

(Ref. 1)

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

No

(Ref. 1, 22)

Is the facility completely surrounded by areas of higher elevation?

No (Ref. 1)

1-Year 24-Hour Rainfall in Inches

2.1

(Ref. 9)

Distance to Nearest Downslope Surface Water

Ditch adjacent to site runs 800 feet to Scajaquada Creek

(Ref. 1, 22)

Physical State of Waste

Solid, fine material and dried sludge

(Ref. 2,14,15,17,18,20,21)

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Waste piles - not covered; no diversion system

(Ref. 2,4,16,17,22,23)

Method with highest score:

Waste piles - not covered; no diversion system

(Ref. 9)

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated

Heavy metals: Cr, Cu, Pb, Zn, Fe, Ni

(Ref. 2, 4)

Compound with highest score:

Heavy metals

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):

Sampling and analysis document the presence of hazardous substances at the site; exact quantity unknown.

(Ref. 2,4)

Basis of estimating and/or computing waste quantity:

N/A

* * *

5 TARGETS

Surface Water Use

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

Secondary contact recreation including some fishing

(Ref. Recra Site Visit, 1/24/86)

Is there tidal influence?

No

Distance to a Sensitive Environment

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

N/A

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

N/A

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

N/A

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:

N/A; surface water intakes located in the Niagara River greater than 3 miles from site.

(Ref. 6, 17)

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

N/A

Total population served:

N/A

Name/description of nearest of above water bodies:

N/A

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

N/A

AIR ROUTE

1 OBSERVED RELEASE

Contaminants detected:

No analytical data

Date and location of detection of contaminants

N/A

Methods used to detect the contaminants:

N/A

Rationale for attributing the contaminants to the site:

N/A

* * *

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

N/A

Most incompatible pair of compounds:

N/A

Toxicity

Most toxic compound:

Heavy metals (Ref. 2, 4)

Hazardous Waste Quantity

Total quantity of hazardous waste:

Sampling and analysis document the presence of hazardous substances at the site; exact quantity unknown.

(Ref. 2, 4)

Basis of estimating and/or computing waste quantity:

N/A

3 TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

0 to 4 mi   0 to 1 mi   0 to 1/2 mi   0 to 1/4 mi

5000 (Ref. 17)

Distance to a Sensitive Environment

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

N/A

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

N/A

(Ref. 13)

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

N/A

(Ref. 13)

Land Use

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

.1 mile (Ref. 17)

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

N/A

Distance to residential area, if 2 miles or less:

.1 mile (Ref. 1,17)

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

N/A (Ref. 17)

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

N/A (Ref. 17)

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

NO

FIRE AND EXPLOSION

1 CONTAINMENT

Hazardous substances present:

N/A

Type of containment, if applicable:

N/A

* * *

2 WASTE CHARACTERISTICS

Direct Evidence

Type of instrument and measurements:

N/A

Ignitability

Compound used:

N/A

Reactivity

Most reactive compound:

N/A

Incompatibility

Most incompatible pair of compounds:

N/A

* * *

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility:

Sampling and analysis document the presence of hazardous substances at the site; exact quantity unknown.

(Ref. 2, 4)

Basis of estimating and/or computing waste quantity:

N/A

* * *

3 TARGETS

Distance to Nearest Population

500 feet (Ref. 1, 17)

Distance to Nearest Building

On Site

Distance to Sensitive Environment

Distance to wetlands:

>2 miles

(Ref. 13)

Distance to critical habitat:

>1 mile

(Ref. 13)

Land Use

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

500 feet

(Ref. 1, 17)

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

N/A

Distance to residential area, if 2 miles or less:

500 feet

(Ref. 1, 17)

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

N/A

(Ref. 17)

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

N/A

(Ref. 17)

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

No

Population Within 2-Mile Radius

20,000

(Ref. 17)

Buildings Within 2-Mile Radius

+700

(Ref. 17)

DIRECT CONTACT

1 OBSERVED INCIDENT

Date, location, and pertinent details of incident:

N/A

* * *

2 ACCESSIBILITY

Describe type of barrier(s):

Site is completely fenced in.

(Ref. 17)

* * *

3 CONTAINMENT

Type of containment, if applicable:

Waste is inaccessible to direct contact by the public.

(Ref. 17)

* * *

4 WASTE CHARACTERISTICS

Toxicity

Compounds evaluated:

Heavy metals: Cr, Cu, Pb, Zn, Fe, Ni

(Ref. 2, 4)

Compound with highest score:

Heavy metals

* * *

5 TARGETS

Population within one-mile radius

5000

(Ref. 17)

Distance to critical habitat (of endangered species)

>1 mile

(Ref. 13)

5.4 EPA PRELIMINARY ASSESSMENT
(FORM 2070-12)

EPA

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

I. IDENTIFICATION
01 STATE: NY | 02 SITE NUMBER: 915022

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER				
ERNST STEEL	1746 WALDEN AVE				
03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
BUFFALO	NY	14240	ERIE		

COORDINATES LATITUDE: 42°54'37". LONGITUDE: 078 46' 18".

DIRECTIONS TO SITE (Starting from nearest public road)
WALDEN AVENUE EAST FROM BUFFALO APPROXIMATELY .5 MILE EAST OF INTERSECTION WITH HARLEM, ON LEFT

III. RESPONSIBLE PARTIES

01 OWNER (if known)	02 STREET (Business, mailing, residential)		
ERNST STEEL CORPORATION	P.O. BOX 987		
03 CITY	04 STATE	05 ZIP CODE	06 TELEPHONE NUMBER
BUFFALO	NY	14209	(716) 895-5000
07 OPERATOR (If known and different from owner)	08 STREET (Business, mailing, residential)		
SAME AS ABOVE			
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 9 / 28 / 83 (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): NUS CORPORATION

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

03 YEARS OF OPERATION
1953 (BEGINNING YEAR) | 19[illegible] (ENDING YEAR) ☐ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED
STEEL SCRAP, IRON [illegible] DUST, PAINT SLUDGE, METAL SHA[illegible]

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION
[illegible] METALS IN METAL [illegible] AND PAINT [illegible]
AMOUNTS UNKNOWN

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	02 OF (Agency/Organization)			03 TELEPHONE NUMBER
PEDRO FIERRO	RECRA ENVIRONMENTAL INC			(716) 833-8203
04 PERSON RESPONSIBLE FOR ASSESSMENT	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NUMBER	08 DATE
[illegible]		RECRA	(716) 833-8203	2 / 17 / 86 (MONTH DAY YEAR)

EPA FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	915022

WASTE STATES, QUANTITIES, AND CHARACTERISTICS

PHYSICAL STATES (Check all that apply)
- A SOLID
- [X] B POWDER, FINES
- C SLUDGE
- E SLURRY
- F LIQUID
- G GAS
- OTHER ______ (Specify)

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)
- TONS ______
- CUBIC YARDS UNKNOWN
- NO OF DRUMS ______

03 WASTE CHARACTERISTICS (Check all that apply)
- [X] A TOXIC
- B CORROSIVE
- C RADIOACTIVE
- [X] D PERSISTENT
- E SOLUBLE
- F INFECTIOUS
- G FLAMMABLE
- H IGNITABLE
- I HIGHLY VOLATILE
- J EXPLOSIVE
- K REACTIVE
- L INCOMPATIBLE
- M NOT APPLICABLE

WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE	UNKNOWN		DRIED PAINT SLUDGE
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS	UNKNOWN		METAL SHAVINGS, IRON OXIDE DUST

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
	UNKNOWN				

FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS	N/A		FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

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

NUS SITE REPORT, 1983
NYSDEC SITE PROFILE [illegible]
E DEN SITE PROFILE, 1983
NYS [illegible] PERMIT APPLICATION 1978
NYS INDUSTRIAL WASTE SURVEY 1976

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT

PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE: NY | 02 SITE NUMBER: 915022

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☒ A. GROUNDWATER CONTAMINATION — 02 ☐ OBSERVED (DATE:) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION
POTENTIAL EXISTS BECAUSE OF ELEVATED HEAVY METALS IN SITE SOILS AND SURFACE WATER (Cr, Cu, Pb, Zn, Fe, Ni)

01 ☒ B. SURFACE WATER CONTAMINATION — 02 ☒ OBSERVED (DATE: 4/27/82) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION
NYSDEC FIND ELEVATED HEAVY METALS IN SITE SOILS AND SURFACE WATER (Cr, Cu, Pb Fe, Ni Zn)

01 ☐ C. CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION
NONE LIKELY

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS — 02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION
NONE LIKELY

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

01 ☒ F. CONTAMINATION OF SOIL — 02 ☒ OBSERVED (DATE: 4/27/82) ☐ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: UNKNOWN (Acres)
04 NARRATIVE DESCRIPTION
NYSDEC FOUND ELEVATED HEAVY METALS IN SITE SOILS (Cr, Cu, Pb, Fe, Ni, Zn

01 ☐ G. DRINKING WATER CONTAMINATION — 02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION
NONE LIKELY

01 ☐ H. WORKER EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION
NONE LIKELY

01 ☐ I. POPULATION EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED:
04 NARRATIVE DESCRIPTION
NONE LIKELY

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	7-5022

II. HAZARDOUS CONDITIONS AND INCIDENTS *(Continued)*

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

NONE OBSERVED

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

NONE OBSERVED

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

UNKNOWN

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES *(Spills/runoff/standing liquids/leaking drums)* — 02 ☒ OBSERVED (DATE: 9/28/83) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______
04 NARRATIVE DESCRIPTION

NO CONTAINMENT

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

UNKNOWN

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

UNKNOWN

01 ☒ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☒ OBSERVED (DATE: 9/28/83) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

NUS SITE INVESTIGATORS OBSERVED "A LARGE NUMBER" OF DRUMS IN THE WOODED AREA OF THE SITE. MOST APPEARED EMPTY

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

UNKNOWN

III. TOTAL POPULATION POTENTIALLY AFFECTED: UNKNOWN

IV. COMMENTS

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

NUS SITE INSPECTION, 9/28/83
NUS SITE PROFILE, 1982
DEC SITE PROFILE, 1983

5.5 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
NY	[illegible]

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
ERNST STEEL CORPORATION	1746 WALDEN AVE

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

09 COORDINATES: LATITUDE 42° 54' 37" — LONGITUDE 078° 46' 18"

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

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
1, 24, 86 (MONTH DAY YEAR)	☐ ACTIVE ☒ INACTIVE	1953 (BEGINNING YEAR) / 1983 (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.
SHELDON S. NOZIK	ENVIRONMENTAL SCIENTIST	RECRA	(716)833-8203
09 OTHER INSPECTORS	**10 TITLE**	**11 ORGANIZATION**	**12 TELEPHONE NO.**
ANDRE J LAPRES	STAFF GEOLOGIST	RECRA	(716)833-8203
			( )
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO
FRANK ERNST	VICE PRESIDENT	1280 MAIN STREET BUFFALO, NEW YORK [illegible]	(716) 895 [illegible]
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☒ PERMISSION ☐ WARRANT	9:30 AM	PARTLY CLOUDY 22° F

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
PEDRO F[illegible]	RECRA ENVIRONMENTAL INC	(716)833-8203

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
THOMAS P [illegible]		RECRA	833-8203	2, 17, 86 (MONTH DAY YEAR)

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

EPA

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	915022

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES *(Check all that apply)*

- [x] A. SOLID
- [x] B. POWDER, FINES
- [x] 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 UNKNOWN

NO. OF DRUMS ________

03 WASTE CHARACTERISTICS *(Check all that apply)*

- [x] A. TOXIC
- [ ] B. CORROSIVE
- [ ] C. RADIOACTIVE
- [x] 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	UNKNOWN		DRIED PAINT SLUDGE
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS	UNKNOWN		METAL SHAVINGS, IRON OXIDE DUST

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
	UNKNOWN				

V. FEEDSTOCKS *(See Appendix for CAS Numbers)*

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS	N/A		FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

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

NUS SITE REPORT 1983

NYSDEC SITE PROFILE [illegible]

ECDEP SITE PROFILE 1983

NYS PART [illegible] PERMIT APPLICATION [illegible]

NYS INDUSTRIAL WASTE SURVEY [illegible]

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	915022

II. HAZARDOUS CONDITIONS AND INCIDENTS

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

POTENTIAL EXISTS BECAUSE OF ELEVATED HEAVY METALS IN SITE SOILS AND SURFACE WATER (Cr, Cu, Pb, Ni, Zn, Fe)

01 ☒ B. SURFACE WATER CONTAMINATION — 02 ☒ OBSERVED (DATE: 4/27/82) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______ 04 NARRATIVE DESCRIPTION

NYSDEC FOUND ELEVATED HEAVY METALS IN SITE SOILS AND SURFACE WATER (Cr, Cu, Pb, Ni, Zn, Fe)

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

NONE LIKELY

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

NONE LIKELY

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

UNKNOWN

01 ☒ F. CONTAMINATION OF SOIL — 02 ☒ OBSERVED (DATE: 4/27/82) ☐ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: UNKNOWN (Acres) 04 NARRATIVE DESCRIPTION

NYSDEC FOUND ELEVATED HEAVY METALS (Cr, Cu, Pb, Ni, Fe, Zn) IN SITE SOILS AND SURFACE WATER

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

NONE LIKELY

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

NONE LIKELY

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

NONE LIKELY

EPA

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	915022

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				
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
☐ I. OTHER (Specify)				
☒ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☐ A. SURFACE IMPOUNDMENT		
☒ B. PILES	UNKNOWN	
☐ 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
1

06 AREA OF SITE

3-4 (Acres)

07 COMMENTS

ON-SITE DISPOSAL OF STEEL SHAVINGS, STEEL DRILLINGS, IRON OXIDE DUST, DRIED PAINT SLUDGE AND PLANT WASH

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.

RUSTED DRUMS SCATTERED AROUND SITE

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☐ YES ☒ NO

02 COMMENTS

SITE IS COMPLETELY FENCED WITH LOCKED GATE

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

NUS SITE REPORT 9/28/83
RECRA RESEARCH, INC. SITE VISIT 1/24/86
NYSDEC SITE PROFILE 1982

EPA

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	915022

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
INTAKES
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 N/A (mi)

04 DEPTH TO GROUNDWATER 0.5 - 2 (ft)

05 DIRECTION OF GROUNDWATER FLOW UNKNOWN

06 DEPTH TO AQUIFER OF CONCERN N/A (ft)

07 POTENTIAL YIELD OF AQUIFER N/A (gpd)

08 SOLE SOURCE AQUIFER ☐ YES ☒ NO

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

NO WELLS IN USE IDENTIFIED

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
SCAJAQUADA CREEK	☐	800 FEET ~~(mi)~~
	☐	(mi)
	☐	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. 5,000 NO. OF PERSONS	B. 20,000 NO. OF PERSONS	C. 40000 NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION < 0.1 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE > 700

04 DISTANCE TO NEAREST OFF-SITE BUILDING <0.1 (mi)

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

SITE IS LOCATED IN MEDIUM DENSITY URBAN AREA WITH A RESIDENTIAL, COMMERCIAL AND INDUSTRIAL MIX

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	915022

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	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH
10-25 (ft)	UNKNOWN (ft)	<6.5

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
9 (in)	2.1 (in)	<1 %	SOUTH	<1 %

09 FLOOD POTENTIAL SITE IS IN 100 YEAR FLOODPLAIN

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

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE A. N/A (mi) OTHER B. >1 (mi)

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

ENDANGERED SPECIES: NONE

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AG LAND
A. 0.1 (mi)	B. 0.1 (mi)	C. >20 (mi)	D. >10 (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

THE SITE IS LOCATED IN AN AREA WITH RELATIVELY FLAT TERRAIN. SCAJAQUADA CREEK FLOWS THROUGH NORTHEASTERN PORTION OF THE SITE. RAILROAD TRACKS SEPARATE SITE FROM HOUSING COMPLEX TO THE NORTH

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

NUS SITE REPORT 9/28/83
ECDEP SITE PROFILE 1983
USGS TOPOGRAPHIC MAP BUFFALO NE QUADRANGLE 1965

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	915022

II. HAZARDOUS CONDITIONS AND INCIDENTS

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

POTENTIAL EXISTS BECAUSE OF ELEVATED HEAVY METALS IN SITE SOILS AND SURFACE WATER (Cr, Cu, Pb, Ni, Zn, Fe)

01 ☒ B. SURFACE WATER CONTAMINATION — 02 ☒ OBSERVED (DATE: 4/27/82) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ______ 04 NARRATIVE DESCRIPTION

NYSDEC FOUND ELEVATED HEAVY METALS IN SITE SOILS AND SURFACE WATER (Cr, Cu, Pb, Ni, Zn, Fe)

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

NONE LIKELY

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

NONE LIKELY

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

UNKNOWN

01 ☒ F. CONTAMINATION OF SOIL — 02 ☒ OBSERVED (DATE: 4/27/82) ☐ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: UNKNOWN (Acres) 04 NARRATIVE DESCRIPTION

NYSDEC FOUND ELEVATED HEAVY METALS (Cr, Cu, Pb, Ni, Fe, Zn) IN SITE SOILS AND SURFACE WATER

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

NONE LIKELY

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

NONE LIKELY

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

NONE LIKELY

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	915022

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER		NO SAMPLES TAKEN	
SURFACE WATER			
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL			
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
	NO FIELD MEASUREMENTS TAKEN

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☐ GROUND ☐ AERIAL

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

03 MAPS ☐ YES ☒ NO

04 LOCATION OF MAPS ______________________

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

FIELD NOTES

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

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	915022

II. CURRENT OWNER(S) / PARENT COMPANY (If applicable)

01 NAME	02 D+B NUMBER	08 NAME	09 D+B NUMBER
ERNST STEEL CORPORATION		N/A	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE
P.O. BOX 987			

05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE
BUFFALO	NY	142[illegible]			

01 NAME	02 D+B NUMBER	08 NAME	09 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE

01 NAME	02 D+B NUMBER	08 NAME	09 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE

01 NAME	02 D+B NUMBER	08 NAME	09 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE

III. PREVIOUS OWNER(S) (List most recent first) / IV. REALTY OWNER(S) (If applicable, list most recent first)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
UNKNOWN		N/A	

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

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
NY	915022

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME	02 D+B NUMBER
U.S. STEEL SUPPLY	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
13535 S. TORRANCE AVE	

05 CITY	06 STATE	07 ZIP CODE
CHICAGO	ILL	60633

08 YEARS OF OPERATION	09 NAME OF OWNER

OPERATOR'S PARENT COMPANY (If applicable)

10 NAME	11 D+B NUMBER
N/A	

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

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

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

10 NAME	11 D+B NUMBER
N/A	

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

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

NUS SITE REPORT 4/28/83

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	915022

II. ON-SITE GENERATOR

01 NAME: ERNST STEEL CORPORATION		02 D+B NUMBER:	
03 STREET ADDRESS (P.O. Box, RFD #, etc.): 1746 WALDEN AVENUE		04 SIC CODE:	
05 CITY: CHEEKTOWAGA	06 STATE: NY	07 ZIP CODE: 14240	

III. OFF-SITE GENERATOR(S)

01 NAME: NONE		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: N/A		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)

RECRA RESEARCH, INC. SITE INVESTIGATION. 1/24/86

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	915022

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
N/A

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
N/A

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
N/A

01 ☐ D. SPILLED MATERIAL REMOVED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
N/A

01 ☐ E. CONTAMINATED SOIL REMOVED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
N/A

01 ☐ F. WASTE REPACKAGED 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
N/A

01 ☐ G. WASTE DISPOSED ELSEWHERE 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
N/A

01 ☐ H. ON SITE BURIAL 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
N/A

01 ☐ I. IN SITU CHEMICAL TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
N/A

01 ☐ J. IN SITU BIOLOGICAL TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
N/A

01 ☐ K. IN SITU PHYSICAL TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
N/A

01 ☐ L. ENCAPSULATION 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
N/A

01 ☐ M. EMERGENCY WASTE TREATMENT 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
N/A

01 ☐ N. CUTOFF WALLS 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
N/A

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

01 ☐ P. CUTOFF TRENCHES/SUMP 02 DATE ______ 03 AGENCY ______
04 DESCRIPTION
N/A

EPA

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	9[illegible]022

II PAST RESPONSE ACTIVITIES *(Continued)*

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

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

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

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

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

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

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

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

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

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

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

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

NONE

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

RECRA RESEARCH, INC. SITE INVESTIGATION. 1/24/86

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	717022

I. 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)*

6.0 ADEQUACY OF AVAILABLE DATA

In completing the Hazard Ranking Score (HRS), the Ernst Steel Corporation site was found to have a migration potential (S_m) score of 3.44. This S_m score was based on the information acquired through a review of available literature. During the completion of the HRS, several data inadequacies were encountered. Information needed to address these inadequacies would include the following:

- o subsurface information including depth to the water table and/or aquifer of concern, permeability of unconsolidated deposits, groundwater quality and groundwater flow direction.
- o site soil quality including background undisturbed soil levels.
- o sediment and surface water quality in the ditch leading to Scajaquada Creek and in Scajaquada Creek upstream and downstream of the ditch confluence.
- o site drainage pattern.

REFERENCES

1. U.S. Geological Survey Topographic Map, 7.5 Minute Series: Buffalo, NY NE Quadrangle, 1965.

2. Site Profile: Ernst Steel (#915022). Erie County Department of Environment and Planning, Division of Environmental Control. December 1983.

3. Field Report: Site Investigation at Ernst Steel By Recra Research, Inc. Personnel. January 24, 1986.

4. Site Profile: Ernst Steel. New York State Department of Environmental Conservation. April 27, 1982.

5. LaSalla, Jr., A. M. Ground-Water Resources of the Erie-Niagara Basin, New York; Prepared for the Erie-Niagara Basin Regional Water Resources Planning Board. 1968.

6. New York State Atlas of Community Water System Sources. NYS Department of Health. 1982.

7. General Soil Map and Interpretations, Erie County, New York. U.S. Department of Agriculture, Soil Conservation Service. May 1979.

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

9. Uncontrolled Hazardous Waste Site Ranking System - a Users Manual. EPA. June 10, 1982.

10. Preliminary Evaluation of Chemical Migration to Groundwater and the Niagara River from Selected Waste Disposal Sites. EPA (905/4-85-001). March 1985.

11. State of New York Official Compilation of Codes, Rules and Regulations. Department of State. Title 6 Conservation, Volume C, Article 8, Part 837.

12. New York State Water Laws. Bureau of National Affairs, Inc. Washington, D.C. November 29, 1985.

13. Letter from Gordon R. Batcheller, NYSDEC Region 9, Senior Wildlife Biologist to Sheldon S. Nozik, Recra Research, Inc. December 18, 1985.

14. Flood Hazard Boundary Map Panel 5 of 10, Town of Cheektowaga, Erie County, New York. Department of Housing and Urban Development, Federal Insurance Administration. April 8, 1983.

15. Letter of Documentation to Frank Ernst, Vice President of Ernst Steel Corporation from Sheldon S. Nozik, Recra Research, Inc. February 11, 1986.

REFERENCES

1. U.S. Geological Survey Topographic Map, 7.5 Minute Series: Buffalo, NY NE Quadrangle, 1965.

2. Site Profile: Ernst Steel (#915022). Erie County Department of Environment and Planning, Division of Environmental Control. December 1983.

3. Field Report: Site Investigation at Ernst Steel By Recra Research, Inc. Personnel. January 24, 1986.

4. Site Profile: Ernst Steel. New York State Department of Environmental Conservation. April 27, 1982.

5. LaSalla, Jr., A. M. Ground-Water Resources of the Erie-Niagara Basin, New York; Prepared for the Erie-Niagara Basin Regional Water Resources Planning Board. 1968.

6. New York State Atlas of Community Water System Sources. NYS Department of Health. 1982.

7. General Soil Map and Interpretations, Erie County, New York. U.S. Department of Agriculture, Soil Conservation Service. May 1979.

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

9. Uncontrolled Hazardous Waste Site Ranking System - a Users Manual. EPA. June 10, 1982.

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11. State of New York Official Compilation of Codes, Rules and Regulations. Department of State. Title 6 Conservation, Volume C, Article 8, Part 837.

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13. Letter from Gordon R. Batcheller, NYSDEC Region 9, Senior Wildlife Biologist to Sheldon S. Nozik, Recra Research, Inc. December 18, 1985.

14. Flood Hazard Boundary Map Panel 5 of 10, Town of Cheektowaga, Erie County, New York. Department of Housing and Urban Development, Federal Insurance Administration. April 8, 1983.

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16. Interoffice Memorandum to Peter Buechi from Lawrence Clare, NYSDEC Region 9. June 10, 1985.

17. Potential Hazardous Waste Site Assessment: Ernst Steel Corporation. NUS Corporation. October 17, 1983.

18. Letter to John Banaszak, NYSDEC Region 9, from Elmer L. Ernst, President Ernst Steel Corporation. May 1, 1979.

19. Memorandum to File from Lawrence Clare, NYSDEC Department of Solid and Hazardous Waste, Region 9. May 24, 1985.

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21. NYSDEC Application for Approval to Operate a Solid Waste Management Facility. October 5, 1978.

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23. Letter and Field Report to Frank H. Ernst, Ernst Steel Corporation, from Cameron O'Connor, Erie County Department of Environment and Planning. August 11, 1986.

REFERENCE 2

ERNST STEEL

1746 WALDEN AVENUE

CHEEKTOWAGA, NEW YORK

SITE #915022

Prepared by Erie County
Dept. of Environment and
Planning, December 1983

ERNST STEEL
1746 WALDEN AVENUE
CHEEKTOWAGA, NEW YORK

The Interagency Task Force (IATF), in Volume III of Hazardous Waste Sites in New York State, reports that this company disposed of industrial wastes at the rear of their property. The IATF has assigned a B code to this site indicating that detailed chemical analysis and/or a hydrogeological potential for health and/or environmental impact is recommended.

BACKGROUND INFORMATION

Ernst Steel is a fabrication plant, responsible for the assembly of heavy industrial equipment. Waste materials produced in fabrication of steel equipment were landfilled on site in the past.

The IATF reports that plant waste from steel planning, drilling, welding fabrication and cleaning were generted. Ernst Steel reports that metal shavings, wood debris and iron dust (approximately 2600 lbs (sic)/year) and dried paint sludge (250 gallons/year) were landfilled at the site.

In 1979, Ernst steel changed to a steel service center and landfilling operations ceased. The painting operation was discontinued at that time. It is now reported that the Town of Cheektowaga picks up refuse generated at the facility. Drill turnings are picked up by INS Scrap Processors for recycling. It is reported that no degreasers are used at the firm.

LOCATION

The site is located at 1746 Walden Avenue in Town of Cheektowaga. Railroad property lies north and west of the site, the New York State Thruway lies to the east (Exhibit 1).

AERIAL PHOTOGRAPHY

In 1951, Ernst Steel did not exist at this location. The area was essentially undeveloped with the exception of the railroad line and Thruway construction.

In 1959, the main building, storage areas and parking areas were complete. Railroad spurs ran from the plant to the mainline tracks.

Access roads ran from the back of the plant in a northeast direction. The main access road terminated in an area that appeared to be receiving fill (Exhibit 2). The fill areas were a uniform texture and light tone indicating either recent clean fill or fill materials less than a year old. It is probable that the filling activity is for property improvements as most of the northeast consists of freshwater wetlands.

In 1960, continued disturbance in the northeast portion was apparent. There was also disturbance as noted on Exhibit 2. A second building has been constructed on the west side of the original facility.

By 1965, it appears that much of the wetland areas located on the northeast portion of the property have been filled. Actual disturbance in this area has ceased. The configuration of the topography does not change in the 1969 or 1972 photos. Minor disturbance between the tracks located in back of the facility are apparent; however, due to the poor quality of the 1965, 1969, 1972 photos, the exact nature of the disposal could not be determined.

No large scale disposal, change in topography or lagoons were observed from the aerial photographs.

FIELD INSPECTIONS

No visual problems are associated with the site. No odors or leachate are noted.

SAMPLING

The New York State DEC took water and soil samples on April 27, 1982.

Three soil sample borings were taken as indicated on Exhibit 2. The soil borings were taken at a depth of 4.5 feet and analyzed for metals and Total Halogenic Organics. At sampling point 1 a surface soil sample and a water sample were also taken and analyzed.

The results (Exhbit 3) indicate elevated levels of cadmium, chromium, zinc in all four soil samples and lead in one sample. The surface water analyses indicated high concentration of zinc, lead and cadmium.

ENVIRONMENTAL PROFILE

SOILS AND BEDROCK

A report prepared by URS describes the soil in the area as silty and clayey soil with a pH of <6.5. Soil permeability is very slow.

The General Soil Map and Interpretation for Eri County prepared by the USDA Soil Conservation Service (1979) identifies the area as Urban land -Odessa soils. The Urban Land classification implies areas disturbed by development such as buildings, parking lots and roads. This soil would vary in degree of texture, structure and permeability. Undisturbed soil soils are formed in gravel and stone free lake laid sediments having a high clay content. The seasonal high water table is perched in the upper part of the subsoil.

There are soils in this series that are formed by end moraine development. These soils include both ablation and lodgement till, silty clay to sandy fill. The permeability is variable but generally greater than for associated ground moraine.

The formation generally occurs near waterways. The Quadernary Geology of New York (Niagara Sheet) indicates that an end moraine formation occurs adjacent to Scajaquada Creek. Consequently filling appears to have occurred in both the lake laid and moraine sediments.

Bedrock is limestone and reported to be at a depth of greater than 10 feet.

GROUNDWATER

URS reports that the depth of the natural watertable is perched to 0.5 to 2 feet below the suface.

The drinking water supply for this area is municipal with the source being Lake Erie. There are no known private groundwater drinking supplies.

SURFACE WATER

There are minor freshwater wetlands in the vicinity of the siie. The majority of these wetlands have been filled in. The site is drained by the surface water courses. Scajaquada Creek flows through the northeastern corner of the area and a tributary stream flows through the southwestern corner (See Exhibit 2).

GEOGRAPHIC DATA

Land use within a one (1) mile radius of the site is residential, commercial and industrial.

DIRECT CONTACT

Only employees of Ernst Steel would have direct contact with the former landfill site.

FIRE OR EXPLOSION POTENTIAL

None

HEALTH RISK

There is no evidence that the site represents an immediate threat to health.

DISCUSSION OF SITE

The high values for the various metals, cadmium, zinc and lead confirm the landfilling of paint sludges and metal filings.

The water sample, which was secured from a ponded (puddle) area on the former landfill, indicate high elevated levels of zinc, lead, and cadmium. Although no leachate was observed on site, materials from the site appear to be contaminating rain water that falls on the site. During periods of heavy rains, it is possible that this water could leave the site as runoff and contaminate surface drainage ways. There is, however, no analytical data to support such an assumption.

In the same vein, aerial photographs indicate disposal into freshwater wetlands. As wetlands do generally indicate a high (or seasonally high) water table, it is possible that contamination of groundwater in the unconsolidated strata could occur.

As the soils on the site area have a high percentage of clay and do not exhibit low pH (high reactivity) it is unlikely that contamination would flow vertically to the limestone bedrock and cause contamination of the deeper water bearing zones.

It has been confirmed that this site has received industrial wastes that might have a deletorious effect on the environment, however, it appears that, the landfill in itself, was a minor operation.

RECOMMENDATION

This site should be given low priority for further study.

A costly or generic sampling program should not be proposed in the near future.

Additional sampling may be warranted to determine if contamination runoff from the disposal reas is still occurring. If so, capping the three (3) acre site with clay cover may resolve potential surface or groundwater problems.

As there is no environmentally sensitive area in the vicinity of the landfill, the groundwater is not used as a drinking water source, there are no health hazardous indicated and due to minor nature of the filling operation, environment degradation is minimal.

For subsequent transaction, the deed of the property should reflect past filling activities.

-LING DATE
)EC 4/27/82

;t Steel-Water Analyses

OUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION STATION #1
c	ug/l	<5
llium	mg/l	<0.01
im	mg/l	0.175
)mium	mg/l	0.054
) r	mg/l	0.358
l	mg/l	170
ry	ug/l	4.4
kel	mg/l	0.30
e ium	ug/l	<5
ver	mg/l	<0.01
l'ium	mg/l	<0.1
i.)ny	mg/l	<0.2
c	mg/l	17
n	mg/l	3.6

s+ Steel- Soil Analyses

		SAMPLE IDENTIFICATION (Station #)			
RAMETER	UNITS OF MEASURE	(SURFACE SOIL (1))	(1)	(2)	(3)
senic	ug/g dry	12	9.3	25	5.1
ry'llium	ug/g dry	<0.4	<0.5	<0.2	<0.3
dr_um	ug/g dry	3.0	2.3	1.6	0.91
romium	ug/g dry	440	220	200	11
?I r	ug/g dry	41	49	280	59
ad	ug/g dry	8.3	270	2,500	13
rc ry	ug/g dry	<0.03	<0.03	0.04	<0.03
:kel	ug/g dry	18	35	110	21
le ium	ug/g dry	<0.07	0.64	0.30	0.41
lver	ug/g dry	<0.4	<0.5	<0.2	<0.3
al ium	ug/g dry	3.6	1.0	<0.2	<3
timony	ug/g dry	11	10	<0.4	<6
nc	ug/g dry	46	64	31	40
/ Weight	%	68	73	79	71
)n	ug/g dry	300	440	200	300
!o,enated 'anic Scan	ug/g dry as Cl_2 Lindane Standard	0.59	0.94	1.1	0.99

GROUND-WATER RESOURCES OF THE ERIE-NIAGARA BASIN, NEW YORK

Prepared for the
Erie-Niagara Basin Regional Water Resources
Planning Board

by

A. M. La Sala, Jr.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
in cooperation with
THE NEW YORK STATE CONSERVATION DEPARTMENT
DIVISION OF WATER RESOURCES

STATE OF NEW YORK
CONSERVATION DEPARTMENT
WATER RESOURCES COMMISSION

Basin Planning Report ENB-3
1968

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).

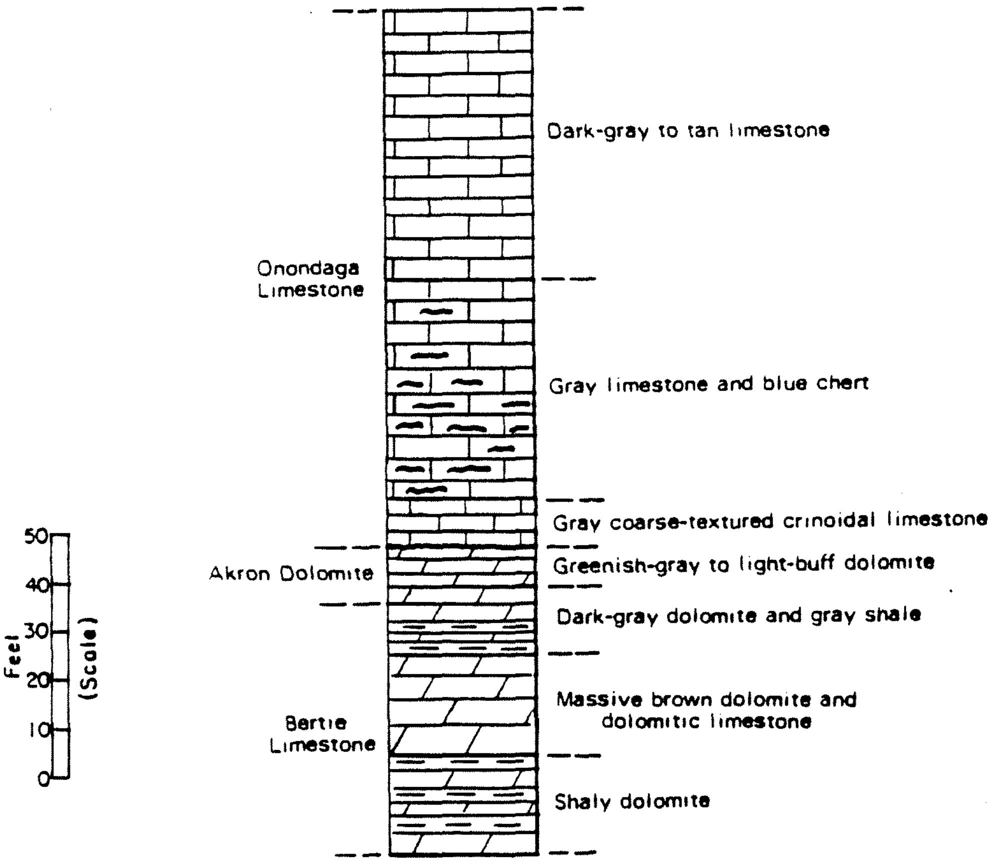


Figure 7.--Lithology of the limestone unit.

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 ronounced. The types of water-bearing joints in the limestone can be seen at the falls of Murder Creek at Akron. Not all of the flow of Murder Creek plunges over the falls. A considerable part of the flow ercolates into the limestone unit upstream from the falls and discharges from bedding joints both at the face and along the sides of the falls. The principal zones of discharge are at the base of the Bertie, and at a ontact of a shaly zone and overlying thick-bedded dolomite 20 feet above he base.

The falls at Akron also illustrate in an exaggerated way the role of ertical joints. Water from Murder Creek percolates into the rock through solution-widened vertical joints before reaching the bedding-plane joints. The continuous and concentrated flow of water in the creek has widened he vertical joints to an unusual degree. Vertical joints are ordinarily very narrow. They probably are most effective in aiding the movement of water to the bedding joints where the bedding joints are close to the ock surface.

Locally, solution along bedding joints in the limestone unit has been reat enough to cause the rock overlying the solution opening to settle. ettling of this type probably accounts for at least some of the small depressions in the outcrop belt of the Onondaga Limestone. A collapsed solution zone in the Onondaga Limestone discharges a large volume of water nto a quarry (257-840-A) near Harris Hill. About 3,000 gpm is pumped from the quarry, and most of the water is reported to come from the solution zone.

The limestone unit is cut by a fault on the east side of Batavia. Faults cutting limestone are likely to cause shattering along the fault nd, thus, create a permeable water-bearing zone.

Hydrologic and hydraulic characteristics

The limestone unit is similar to the Lockport Dolomite in structure. However, its hydrology is different. The limestone unit is cut trans- ersely by Tonawanda Creek and its major tributaries. Small tributaries low across it in northerly and westerly directions. The limestone unit receives water in the interstream areas by percolation into joints. The ater is discharged laterally to the streams and at places along the orth-facing scarp or enters the Camillus Shale at depth.

The coefficient of transmissibility of the limestone unit probably anges from about 300 to 25,000 gpd per foot. Specific capacity data are given in table 3. Drillers' reports indicate high transmissibilities for the limestone unit in Williamsville which probably arise from relatively ntense circulation of ground water near Ellicott Creek. The coefficients f transmissibility given in table 3 were computed from specific capacity data by the method described by Walton (1962, p. 12-13).

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

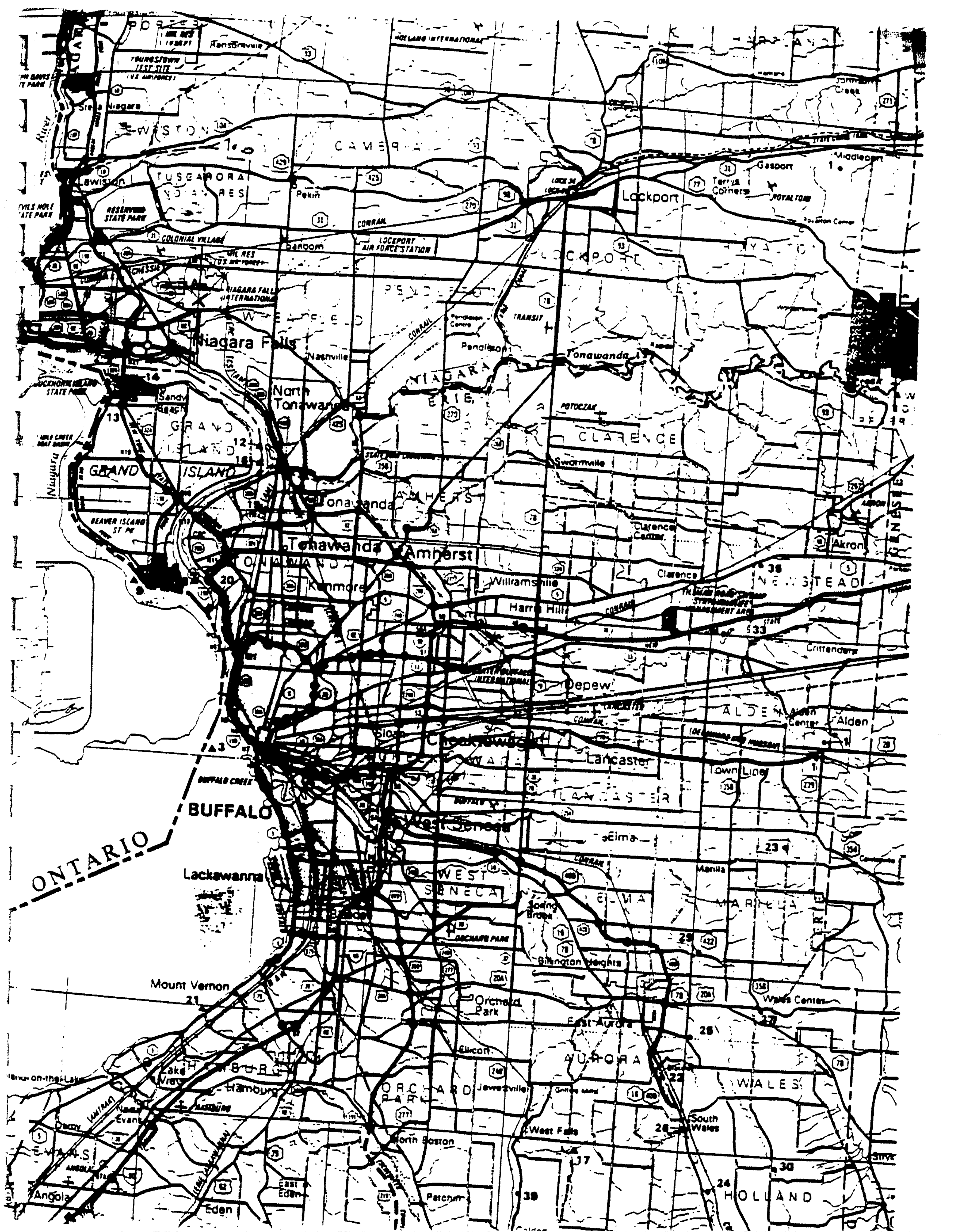
The limestone unit is more productive than the Lockport. A number of large-yield wells in Buffalo, Cheektowaga, Williamsville, Pembroke, and Batavia are finished in the limestone unit and indicate that yields of 300 gpm and possibly more can be obtained. Like the Lockport Dolomite, the yields of wells 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.

REFERENCE 6

DEC - 5

New York State Atlas of Community Water System Sources 1982

NEW YORK STATE DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL PROTECTION
BUREAU OF PUBLIC WATER SUPPLY PROTECTION

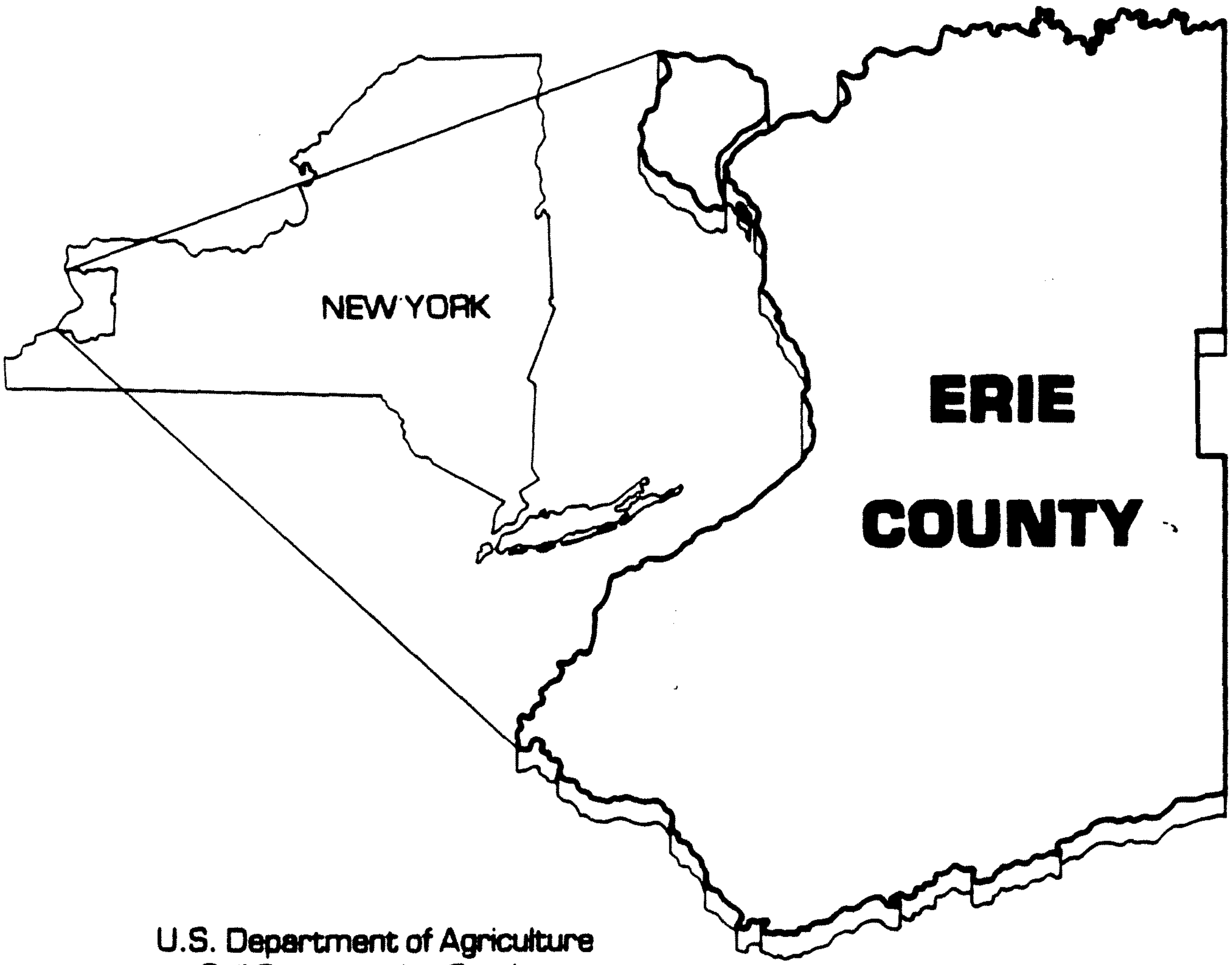


Lewiston
Lockport
Niagara Falls
North Tonawanda
Grand Island
Tonawanda
Amherst
Kenmore
Williamsville
Clarence
Akron
Newstead
Depew
Cheektowaga
Lancaster
Alden
BUFFALO
West Seneca
ONTARIO
Lackawanna
Elma
Orchard Park
East Aurora
Aurora
Wales
Hamburg
Mount Vernon
Angola
Eden
Holland
South Wales
North Boston
Jewettville
Ellicott
Pendleton
Sanborn
Pekin
Cambria
Wheatfield
Sloan
Billington Heights

ERIE COUNTY

ID NO	COMMUNITY WATER SYSTEM	POPULATION	SOURCE
Municipal Community			
	Akron Village (See No 1 Wyoming Co, Page 10)	3640	
1	Alden Village	3460	Wells
2	Angola Village	8500	Lake Erie
3	Buffalo City Division of Water	357870	Lake Erie
4	Caffee Water Company	210	Wells
5	Collins Water District #3	704	Wells
6	Collins Water Districts #1 and #2	1384	Wells
7	Erie County Water Authority (Sturgeon Point Intake)	375000	Lake Erie
8	Erie County Water Authority (Van DeWater Intake)	NA	Niagara River - East Branch
9	Grand Island Water District #2	9390	Niagara River
10	Holland Water District	1670	Wells
11	Lawtons Water Company	138	Wells
12	Lockport City (Niagara Co)		Niagara River - East Branch
13	Niagara County Water District (Niagara Co)		Niagara River - West Branch
14	Niagara Falls City (Niagara Co)		Niagara River - West Branch
15	North Collins Village	1500	Wells
16	North Tonawanda City (Niagara Co)		Niagara River - West Branch
17	Orchard Park Village	3671	Pipe Creek Reservoir
18	Springville Village	4169	Wells
19	Tonawanda City	18538	Niagara River - East Branch
20	Tonawanda Water District #1	91269	Niagara River
21	Wanakah Water Company	10750	Lake Erie
Non-Municipal Community			
22	Aurora Mobile Park	125	Wells
23	Bush Gardens Mobile Home Park	270	Wells
24	Circle B Trailer Court	50	Wells
25	Circle Court Mobile Park	125	Wells
26	Creekside Mobile Home Park	120	Wells
27	Donnelly's Mobile Home Court	99	Wells
28	Gowanda State Hospital	NA	Clear Lake
29	Hillside Estates	160	Wells
30	Hunters Creek Mobile Home Park	150	Wells
31	Knox Apartments	NA	Wells
32	Maple Grove Trailer Court	72	Wells
33	Millgrove Mobile Park	100	Wells
34	Perkins Trailer Park	75	Wells
35	Quarry Hill Estates	400	Wells
36	Springville Mobile Park	114	Wells
37	Springwood Mobile Village	132	Wells
38	Taylors Grove Trailer Park	39	Wells
39	Valley View Mobile Court	42	Wells
40	Villager Apartments	NA	Wells

GENERAL SOIL MAP and INTERPRETATIONS



U.S. Department of Agriculture
Soil Conservation Service

in cooperation with

Cornell University Agricultural Experiment Station and
Erie County Soil and Water Conservation District

43. URBAN LAND-ODESSA, NEARLY LEVEL

Nonsoil areas, and deep, somewhat poorly drained, clayey soils, on lowland plains.

This unit is in areas of residential developments interspersed with undisturbed soils dominated by clayey sediments. Most areas extend eastward and northward from Buffalo into the suburbs. Slope ranges from 0 to 3 percent.

This unit covers about 11,100 acres or 1.6 percent of the county. Urban land makes up 65 percent of the unit, Odessa soils about 25 percent and soils of minor extent the remaining 10 percent.

The urban land portion of this unit is covered by streets, sidewalks, driveways, house foundations, and parking lots. A few areas also include shopping centers, institutional facilities and light industrial parks. All of these areas have the upper layers of soil disturbed or removed. The undisturbed soil portion of this unit is dominated by Odessa soils that formed in gravel and stone-free, lake-laid sediments having a high clay content. These soils are somethwat poorly drained and have a seasonal high water table perched in the upper part of the subsoil during spring and other wet periods. Rate of water movement through the soil is slow or very slow. Most areas of the undisturbed Odessa soils are in lawns, gardens, parks, or vacant lots.

Soils that are of minor extent are primarily those of the Cosad and Lakemont series. Cosad soils are in areas that have a surficial layer of sand overlying clayey sediments. Poorly drained and very poorly drained Lakemont soils occur in depressions and along drainageways in this unit.

Most of this unit is in residential housing. Seasonal wetness, slow water movement through the soil, clayey textures, and poor stability of the soil layers are concerns for further development of areas of this unit. In the town of Amherst, some areas are subject to ponding or slow removal of water when nearby streams are near flood stage.

REFERENCE 8

Camillus

GEOLOGY

OF

ERIE COUNTY

New York

By

EDWARD J. BUEHLER
Professor of Geology
State University of New York at Buffalo

AND

IRVING H. TESMER
Professor of Geology
State University College at Buffalo

BUFFALO SOCIETY OF NATURAL SCIENCES
BULLETIN

Vol. 21. No. 3 Buffalo. 1963

ARTHROPODS

Eurypterus remipes lacustris Harlan
Leperditia scalaris Jones
Pterygotus sp.

GRAPTOLITES

Inocaulis akronensis Ruedemann
Medusaegraptus graminiformis (Pohlmann)

Devonian System

Lower Devonian (Ulsterian) Series

ORISKANY SANDSTONE

The Oriskany Sandstone is not exposed as such in western New York but sand grains at the Silurian-Devonian contact have been termed Oriskany by Clarke (1900, pp. 79, 96-98).

Middle Devonian (Erian) Series

ONONDAGA LIMESTONE

TYPE REFERENCE: Hall (1839, pp. 293-309).

TYPE LOCALITY: Onondaga County, New York. A more exact type locality has not been designated.

TERMINOLOGY: Eaton (1828, p. 153) called the Onondaga Limestone "Corniferous limerock." Oliver (1954) conducted the most recent and thorough study. He recognized four members: the Edgecliff (oldest), Nedrow, Moorehouse, and Seneca (see fig. 5).

AGE AND CORRELATION: The Onondaga Limestone is generally dated as early Middle Devonian but comparison with the European standard section suggests a late Early Devonian age to some (Cooper *et al.* 1942). This formation has been traced eastward across New York State and southward into the Appalachian Mountains. To the west, the Onondaga correlates in part with the Detroit River Group of Michigan.

THICKNESS: Complete measured sections of the Onondaga Limestone in Erie County have not been published. Luther (1906, p. 13) mentions 162 feet. Bishop (1897, p. 390) gives a more probable figure of 108 feet. The Edgecliff Member, normally only a few feet in thickness, swells to about 35 feet in the bioherm at Williamsville (filled quarry at Main Street and Kensington Avenue). This produces a local dome with dips as great as 10 degrees.

LITHOLOGY: The *Edgecliff Member* is a gray, coarse-textured, crinoidal limestone with abundant corals. In the Williamsville bioherm and vicinity, there are beds of green tinted shale and some disseminated bituminous matter.

The *Nedrow Member* is a rough-weathering, cherty limestone. The chert is generally blue-black in color and in some beds so greatly exceeds the limestone in amount that the term bedded chert is applicable. Fossils are not as common as in the other members.

The *Moorehouse Limestone Member* bears a coral-brachiopod-bryozoan fauna. The texture varies from coarse to very finely crystalline and the color from dark gray to tan. Chert, some light buff in color, and disseminated bituminous matter are present.

Oliver (1954, pp. 637-641) suggests that the *Seneca*, the uppermost member of the Onondaga, cannot be recognized in Erie County. The upper part of the Moorehouse may be of Seneca age. A thin layer which may represent the Tioga Bentonite occurs near the top of the Onondaga Limestone in western New York and is said to crop out in the Federal Crushed Stone quarry in Cheektowaga.

The north-facing cliff of the Onondaga escarpment consists chiefly of the Edgecliff and Nedrow Members.

PROMINENT OUTCROPS: East Amherst Street storm sewer; Buffalo Crushed Stone quarry at Wehrle and Harris Hill roads; Louisville Cement Company quarry on New York route 5 near Clarence; Murder Creek near Akron Falls Park (pl. 6, lower). There are numerous exposures along the Onondaga escarpment. The exposure at Greiner Road is especially prominent. The upper part of the Onondaga can be observed in the quarry of the Federal Crushed Stone Company on Como Park Road in Cheektowaga, and in the Lancaster Crushed Stone quarry at Clarence (pl. 7, upper).

CONTACTS: The Onondaga Limestone rests disconformably on the Upper Silurian Akron Dolostone. The contact with the overlying Marcellus Formation cannot be seen in Erie County.

ECONOMIC GEOLOGY: The Onondaga Limestone is an important source of crushed stone in Erie County and is quarried for that purpose by several companies. In the past, the Nedrow Member has been used for building stone.

PALEONTOLOGY: Oliver (1954, pp. 638-639; 1958, p. S22) lists the following species from the Edgecliff Member in Erie County:

COELENTERATES

Bethanyphyllum robustum
Billingsastraea cf. *verneuili* (Edwards and Haime)
Blothrophyllum decorticatum Billings
B. promissum
Breviphrentis vandelli
Caunopora sp.
Chonophyllum magnificum (Billings)
Coenites sp.
Cystiphylloides robustum
C. sulcatum
C. cf. *conifollis*
C. sp. A
Eridophyllum gigas
Favosites basalticus
F. canadensis (Billings)
F. emmonsi
F. epidermatus
F. tuberosa
F. turbinatus Billings
Heliophylloides corniculum
Heliophyllum gemmatum
H. halli (?) Edwards and Haime
H. sp. C

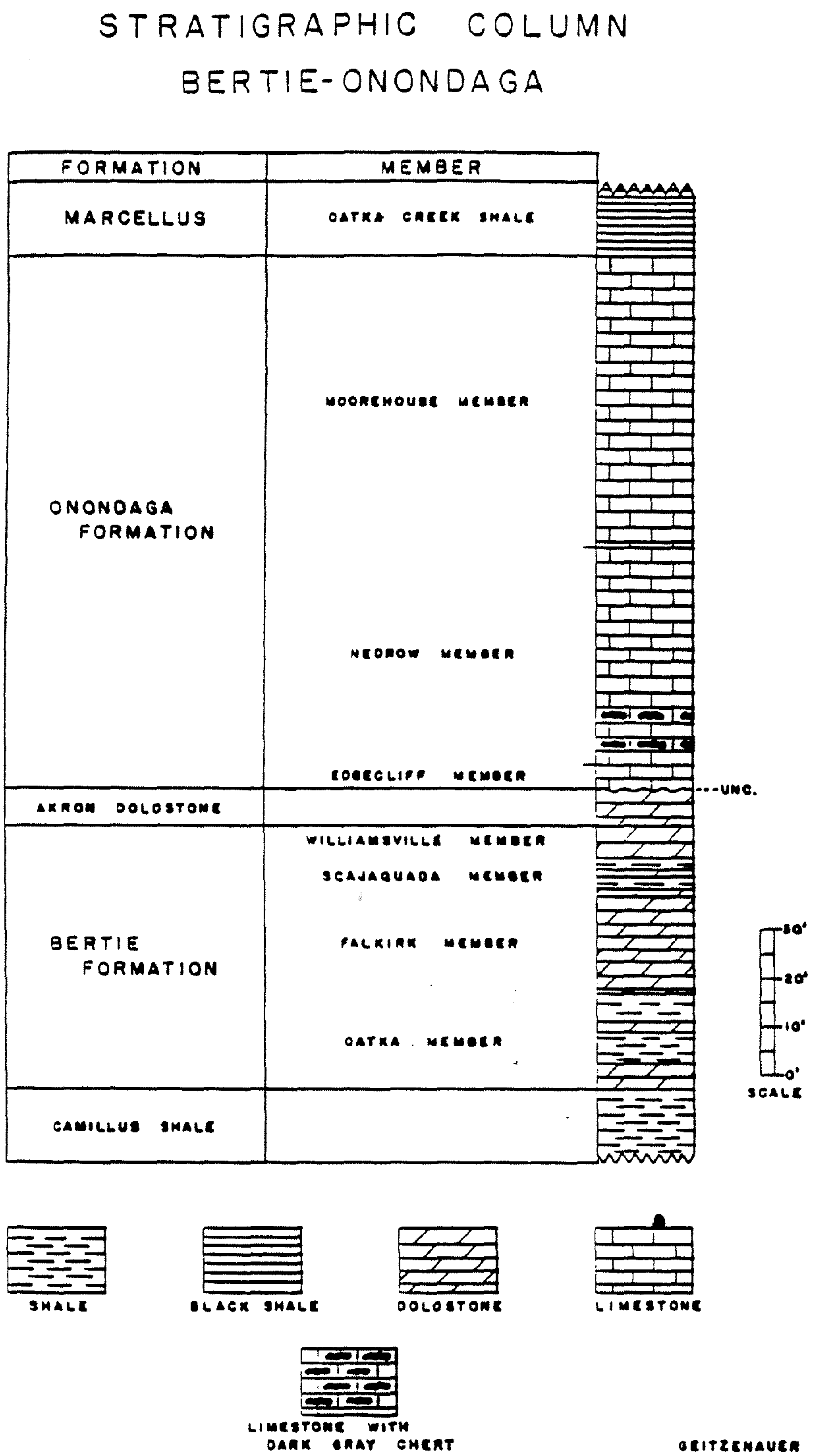

STRATIGRAPHIC COLUMN
BERTIE-ONONDAGA
FORMATION
MEMBER
MARCELLUS
OATKA CREEK SHALE
ONONDAGA FORMATION
MOOREHOUSE MEMBER
NEDROW MEMBER
EDGECLIFF MEMBER
UNC.
AKRON DOLOSTONE
WILLIAMSVILLE MEMBER
SCAJAQUADA MEMBER
BERTIE FORMATION
FALKIRK MEMBER
OATKA MEMBER
CAMILLUS SHALE
30'
20'
10'
0'
SCALE
SHALE
BLACK SHALE
DOLOSTONE
LIMESTONE
LIMESTONE WITH DARK GRAY CHERT
GEITZENAUER

Fig. 5

REFERENCE 9

REFERENCE 10

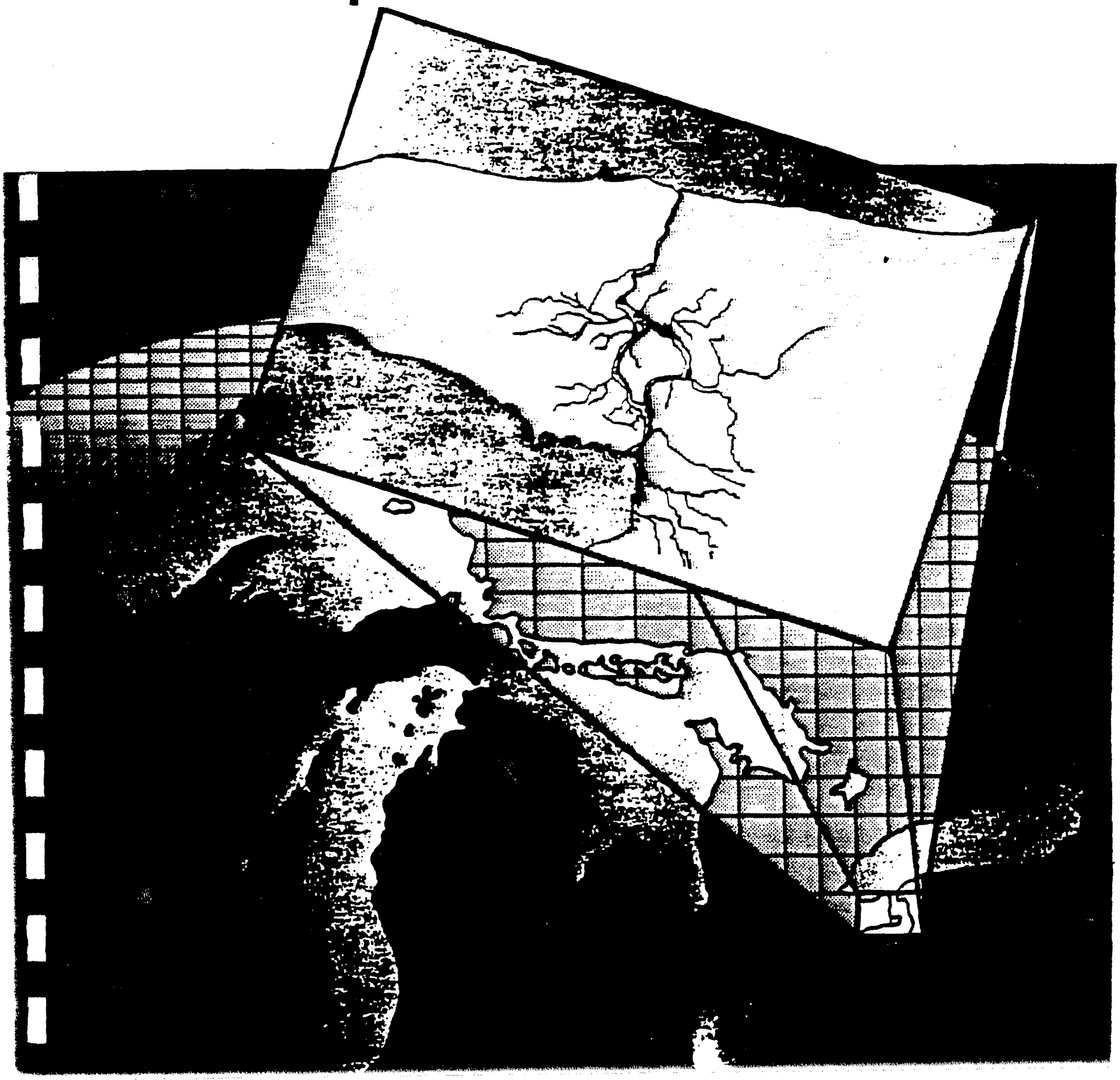
United States
Environmental Protection
Agency

Great Lakes National
Program Office
536 South Clark Street
Chicago, Illinois 60605

EPA-905/4-85-001
March 1985

EPA

Preliminary Evaluation Of Chemical Migration To Groundwater and The Niagara River from Selected Waste-Disposal Sites



BUFFALO AREA

Geology

The Buffalo study area (pl. 1) consists of units of sedimentary bedrock composed of shale, limestone, and dolomite overlain by unconsolidated deposits of clay, sand, and till. The bedrock units are of Silurian and Devonian age; the unconsolidated deposits are primarily of Pleistocene age. The extent of the sedimentary bedrock units is shown in figure 3; the distribution of the unconsolidated units is shown in figure 4.

The bedrock units of concern in this study are: Camillus Shale, Bertie Limestone, and Akron Dolomite (described as one unit); Onondaga Limestone; Marcellus Shale, and the Skaneateles Formation. The unconsolidated deposits of interest are of glacial origin and consist of a glaciolacustrine clay-sand deposit, end-moraine deposits, and an outwash-terrace-delta gravel deposit.

Bedrock Units.--The oldest sedimentary bedrock unit encountered in this study is the Camillus Shale of Silurian age (fig. 3), which occurs only in the northern part of the Buffalo area. This unit has been described by LaSala (1968) as a gray, red, and green thin-bedded shale containing massive mudstone; the unit also contains beds and lenses of gypsum approaching 5 ft in thickness. Subsurface information indicates a dolomitic mudrock to be interbedded within the unit also. The Camillus Shale, estimated to be about 400 ft in thickness, dips southward throughout the area at approximately 40 ft/mi. Information from gypsum miners indicates that the dip of the formation is undulatory within a range of a few feet.

Two other units of Silurian age overlie the Camillus Shale--the Bertie Limestone and the overlying Akron Dolomite. The Bertie Limestone is a gray and brown dolomite with some interbedded shale; the Akron Dolomite is a greenish-gray and buff fine-grained dolomite (LaSala, 1968). The Bertie Limestone, the thicker of the two units, ranges from 50 to 60 ft thick, whereas the Akron Dolomite is estimated to be 8 ft thick. Both formations dip southward, as does the underlying Camillus Shale.

The Onondaga Limestone of middle Devonian age overlies this limestone-dolomite unit; the two units are separated by an unconformity or an erosional contact. The Onondaga Limestone consists of three members. The lowest, which overlies the Akron Dolomite, is a gray, coarse-grained limestone generally a few feet thick. This member, according to Buehlor and Tesmer (1963), grades laterally into reef deposits, thereby increasing its thickness. The middle member consists of a gray limestone and blue chert and reaches a thickness of [illegible] to 45 ft. The upper member is a dark gray to tan limestone ranging in thickness from 50 to 60 ft. The overall thickness of the Onondaga Limestone is approximately 110 ft.

The Marcellus Shale overlies this limestone unit; the formation is described by LaSala (1968) as being black and fissile. The unit ranges in thickness from 30 to 55 ft and dips generally southward at 40 ft/mi. The uppermost unit within the study area is the Skaneateles Formation. It is olive-gray to dark-gray and black, fissile shale with calcareous beds. The lower 10 feet of the unit is gray limestone. Total thickness is 60 to 90 feet. This unit is found in the southernmost part of the study area.

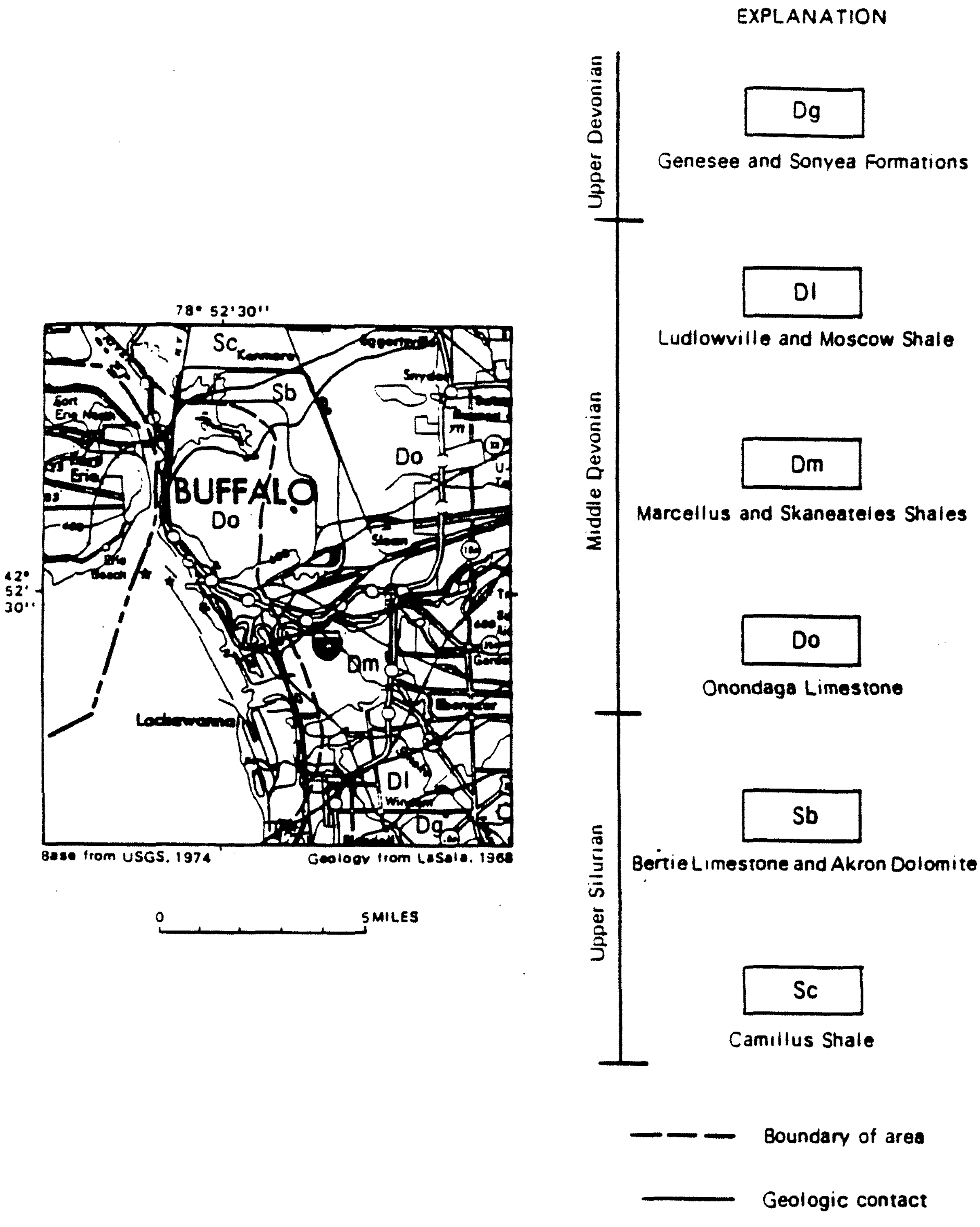


Figure 3. Bedrock geology of the Buffalo area. (Modified from La Sala, 1968.)

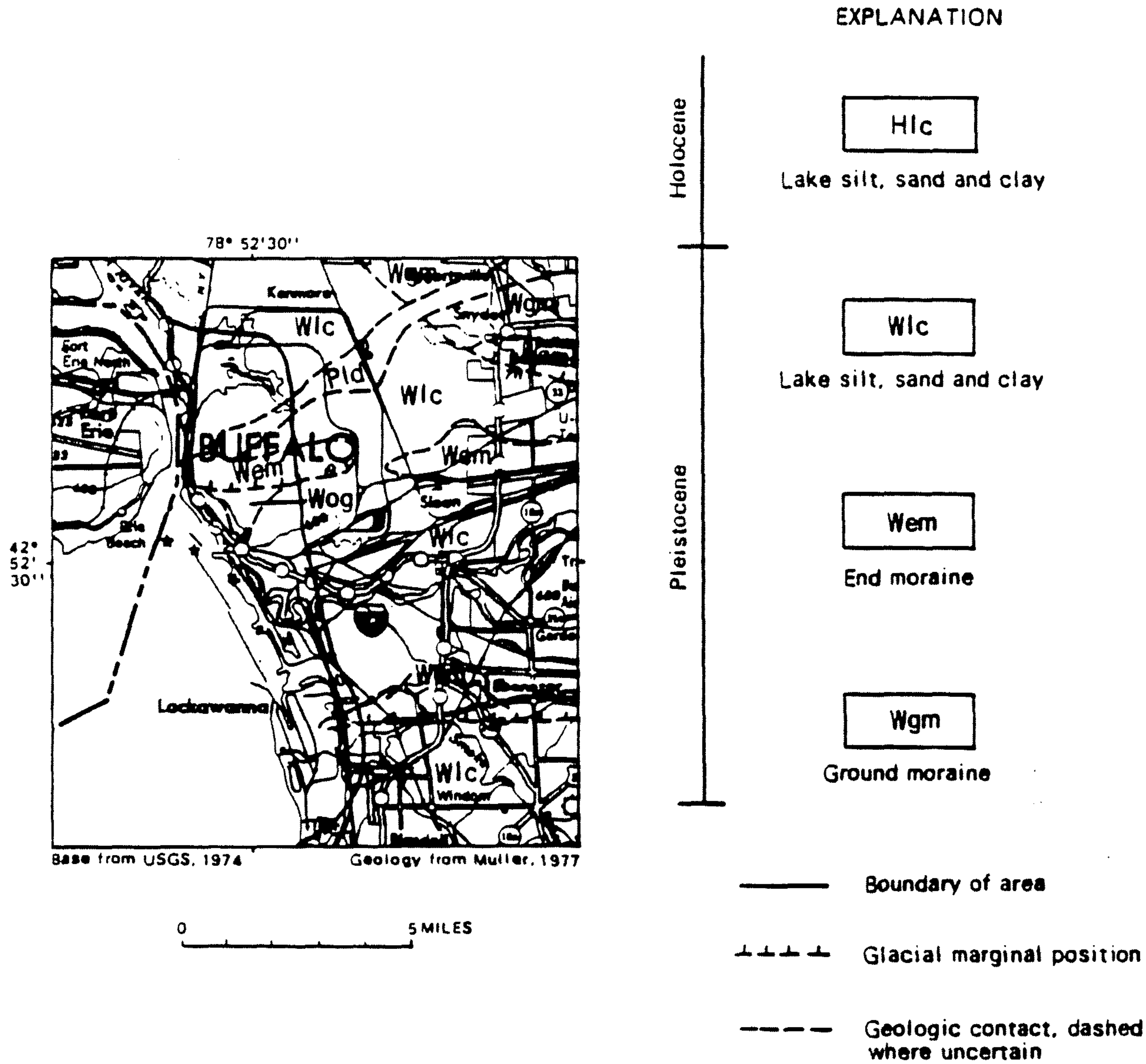


Figure 4. Surficial geology of the Buffalo area. (Modified from Muller, 1977.)

No additional data on the bedrock units within the Buffalo area were obtained. The geology of the units is summarized by La Sala (1968) in his report about ground-water resources of the Erie-Niagara basin.

Unconsolidated Deposits.--The unconsolidated units (fig. 4) consist of glacial material deposited during the latter part of the Pleistocene epoch. The main unconsolidated unit in the Buffalo area is a glaciolacustrine clay-sand deposit consisting of silt, fine to medium sand, and clay and containing laminae of alternating sand and clay.

Two other unconsolidated deposits of lesser extent are present in the area--an end-moraine deposit and a small area of outwash, terrace, and delta gravel. The end-moraine material, which consists of ablation and lodgment tills or poorly sorted gravel that contain more than 20 percent carbonate and crystalline clasts, was deposited at the edge of an ice sheet by meltwater either at the end of an advance or during a stillstand of glacial retreat. The outwash, terrace, and delta gravels, which consist of well-sorted pebbles and cobbles with sand, contain more than 30 percent carbonate and crystalline clasts. The material was deposited by meltwater streams forming coalescent aprons near the ice sheet or as stream terraces or terrace remnants.

Three test holes were drilled to bedrock in the Buffalo area to help define the subsurface geology; their locations are shown in plate 1. The geologic descriptions are as follows:

Boring no.	Depth (ft)	Description
SA-9	0 - 1.5	Topsoil
	1.5 - 6.5	Sand, brown
	6.5 - 11.5	Clay, sandy, with gravel, dark brown
	11.5 - 25.5	Clay, sand with clay, gray, wet at 11.5 ft
	25.5	Bedrock
SA-10	0 - 1.5	Topsoil
	1.5 - 6.5	Clay, sandy, red
	6.5 - 11.0	Clay, some gravel, red
	11.0	Bedrock, material was dry throughout
SA-11	0 - 16.5	Fill, black, ground water at 10 ft
	16.5 - 21.5	Clay, silty, green
	21.5 - 36.5	Clay, silty, gray-green
	36.5 - 60.0	Clay, silty, pinkish-gray
	60.0	Bedrock

The geologic information from these test holes, combined with the data from the waste-disposal sites, enables a general characterization of the area.

The unconsolidated deposits, primarily the glaciolacustrine clay, tend to decrease in thickness toward the east and north, where bedrock rises to less than 5 ft below land surface. Also, the clay unit is generally less than 2 ft below land surface except where it has been removed by landfilling and waste-disposal operations or urbanization.

Aquifer Lithology and Water-Bearing Characteristics

The ground-water system within the Buffalo area consists of a fractured bedrock aquifer and an overlying aquifer of unconsolidated deposits.

Bedrock aquifer.--The bedrock aquifer consists of all the bedrock units discussed previously. The main sources of water are the fractures and solution cavities. The specific-capacity and transmissivity values of selected bedrock aquifer units are shown below.

Bedrock unit[1]	Specific capacity[2] (gal/min)/ft		Transmissivity[2] (gal/d)/ft	
	Min	Max	Min	Max
Akron Dolomite	2	13	4,000	25,000
Camillus Shale	4	83	7,000	70,000

[1] Position of units is shown in figure 3.
[2] Data from LaSala (1968)

The specific capacity of a well is the rate of discharge of water from the well divided by the drawdown of the water level within the well. If the specific capacity is constant except for the time variation, it is roughly proportional to the transmissivity of the aquifer. Transmissivity is the rate at which water is transmitted through a unit width of the aquifer under a unit hydraulic gradient.

The data above indicate that these two properties differ considerably within and among the units. This variation reflects the amount and size of the fractures and solution cavities.

Unconsolidated aquifer.--The unconsolidated aquifer consists of a glaciolacustrine clay and sand and gravel deposits. The thicker unit is the glaciolacustrine clay. The test drilling during the summer of 1982 encountered the water table at various depths within the clay, and saturated sand stringers up to 3 inches thick were common. These stringers were not large, however, and generally thinned out within a few feet.

A seasonal water table above the clay unit was observed during wet periods but not during the summer. This water table is formed by the ponding of infiltrated precipitation above the relatively impermeable clay. As the water mounds upward, gradients toward natural or manmade topographic lows develop and eventually discharge to nearby surface-water bodies. As the season becomes drier and warmer, vegetation increases and takes up the remaining ground water through transpiration.

The hydrologic properties of the unconsolidated aquifer within the Buffalo area are also described in consultants' reports for Buffalo Color Corporation (sites 120-122), Bethlehem Steel Corporation (site 118), and the Alltift Landfill (site 162).

The general range of hydraulic conductivity was 0.0328 to 155.8 ft/d. The larger value can be attributed to slag fill material, which would have a considerably greater permeability than the glaciolacustrine clay. A permeability test was performed on a clay sample from the Alltift landfill; the permeability ranged from 1.6×10^{-4} to 1.8×10^{-4} ft/d.

The rate of ground-water movement within the unconsolidated aquifer at the Buffalo Color Corporation (sites 120-122) was calculated and ranges from 0.02 to 0.06 ft/yr.

The direction of ground-water movement in the unconsolidated aquifer is generally toward the major surface-water bodies--Lake Erie, Niagara River, and Buffalo River (fig. 4). The ground-water flow pattern is dissected in the northern part of the area, where impermeable bedrock is less than 5 ft below land surface, as indicated in figure 4. This unsaturated zone diverts the flow northward and southward.

Ground-Water Quality

The quality of ground water in the bedrock aquifer in the Buffalo area has been documented by LaSala (1968), who included maps showing the concentration ranges for sulfate, hardness, and chloride. Sulfate concentrations given in that report ranges from 100 to 500 ppm and hardness (as $CaCO_3$) from 150 to 1,000 ppm; chloride concentrations range from 100 to 1,500 ppm, and specific conductance ranges from 1,000 to 9,000 μmho/cm.

To estimate background water quality in the Buffalo area, a water sample was collected from the unconsolidated deposits in the fall of 1982 and analyzed for priority pollutants. The observation well was on Seneca Street (well SA-9, pl. 1), in the eastern part of the area just east of the Buffalo city line, and was screened above the bedrock contact. The results are given in table 14. Cadmium, lead, and zinc exceeded USEPA drinking-water criteria; minor amounts of some organic compounds were also detected. Additional sampling of the ground water in the unconsolidated aquifer would be needed to define the quality of water in this aquifer in the Buffalo area.

Three substrate samples were collected in the Buffalo area at localities not affected by waste-disposal sites to compare their concentrations of heavy metals with those in substrate samples from waste-disposal sites. Results are given in table 13.

Table 13.--Heavy-metal concentrations in samples from undisturbed soils in Buffalo, N.Y., June 1, 1983
[Locations shown in pl. 1. Concentrations in μg/kg.]

Location	Sample number	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Forest Lawn Cemetery	SB-1	5,000	8,000	7,000	20,000	100	10,000	31,000
Martin Luther King Park	SB-2	5,000	8,000	10,000	40,000	90	20,000	42,000
Holy Cross Cemetery[1]	SB-3	9,000	30,000	40,000	290,000	280	40,000	160,000

[1] This location is downwind from a major industrial area.

Table 14.--Analyses of a ground-water sample from well SA-9 in the unconsolidated deposits along Seneca Street, West Seneca, N.Y., November 13, 1982.

[Location shown in pl. 1. Concentrations are in μg/L. Dashes indicate that constituent or compound was not found, LT indicates it was found but below the quantifiable detection limit.]

Inorganic constituents

Antimony	2	Lead	490†
Arsenic	17	Mercury	--
Beryllium	--	Nickel	210
Cadmium	22†	Selenium	1
Chromium	1	Zinc	53,000†
Copper	160		

Organic compounds

Priority pollutants

Methylene chloride	3.2	Phenol	LT
Toluene	3.9	Naphthalene	LT
Ethylbenzene	LT	Dimethyl phthalate	LT
DDT	0.17†	Diethyl phthalate	19
		Dibutyl phthalate	LT

Nonpriority pollutants

Chlordene	0.19	1,3-Dimethylbenzene[1]	LT
1-Methyl-3-phenoxybenzene[1]	LT	2-Butoxyethanol[1]	LT
1-(2-butoxyethoxy)ethanol[1]	490	1-(1-isobutyl-3-methyl-1-butenyl)-pyrrolidine[1]	LT
2-Ethylhexanoic acid[1]	15.7	2,3,3,4-Tetramethylpentane[1]	LT
Exo-2-chloro-1-methyl-bicyclo[2.2.1]heptane[1]	LT	Methyl-3,5-di-O-methyl-alpha-D-xylofuranoside[1]	550
Cis-1-bromo-2-chlorocyclohexane[1]	LT	N-Ethylbutanamide[1]	100
Benzenepropanoic acid[1]	67		

[1] Tentative identification based on comparison with the National Bureau of Standards (NBS) library. No external standard was available. Concentration reported is semiquantitative and is based only on an internal standard. GC/MS spectra were examined and interpreted by GC/MS analysts.

† Exceeds USEPA criterion for maximum permissible concentration in drinking water.

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
Albany, New York 12231

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
117	0-158-15 portion as described	Scajaquada Creek	From crossing of Main Street, City of Buffalo to trib. 4 which is in line with continuation of Frederick Drive, Town of Cheektowaga.	6	D	D
118	0-158-15 portion as described	Scajaquada Creek	From trib. 4 which is in line with continuation of Frederick Drive, Town of Cheektowaga to source.	6,7	B	B
119	0-158-15-1,2,3, 4,5,6, and 7 and tribs. as shown on reference map	Tribs. of Scajaquada Creek	Enter Scajaquada Creek from north and northeast between mouth and source.	6,7	D	D
120	Big Burnt Ship Creek	Big Burnt Ship Creek	Seperates Grand Island from Buckhorn Island.	2	B	B
121	G.I. 1	Trib. of Big Burnt Ship Creek	Enters Big Burnt Ship Creek from east opposite eastern end of Buckhorn Island.	2	B	B
122	G.I. 2 and trib. as shown on reference map	Gun Creek	Enters Niagara (East Channel) from Grand Island at Edgewater.	2	B	B
123	G.I. 3 and trib. as shown on reference map	Spicer Creek	Enters Niagara (East Channel) from Grand Island opposite North Tonawanda water intake light.	2	B	B

APPENDIX B

REFERENCE 12

Note 1: [Repealed]

CLASS D

Best usage of waters. These waters are suitable for secondary contact recreation, but 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 the propagation of fish.

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

Quality Standards for Class D Waters

Item: 1. pH.

Specifications: Shall be between 6.0 and 9.5.

Item: 2. Dissolved oxygen.

Specifications: Shall not be less than three milligrams per liter at any time.

Note 1: [Repealed]

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

Quality Standards for Saline Surface Waters

Items: 1. Garbage, cinders, ashes, oils, sludge or other refuse.

Specifications: None in any waters of the marine district as defined by Environmental Conservatiòn Law (§17-0105).

Item: 2. pH.

Specifications: The normal range shall not be extended by more than 0.1 pH unit.

Item: 3. Turbidity.

Specifications: No increase except from natural sources that will cause a substantial visible contrast to natural conditions. In cases of naturally turbid waters, the contrast will be due to increased turbidity.

Item: 4. Color.

Specifications: None from man-made sources that will be detrimental to anticipated best usage of waters.

Item: 5. Suspended, colloidal or settleable solids

Specifications: None from sewage, industrial wastes or other wastes which will cause deposition or be deleterious for any best usage determined for the specific waters which are assigned to each class.

Items: 6. Oil and floating substances.

Specifications: No residue attributable to sewage, industrial wastes or other wastes, nor visible oil film nor globules of grease.

Item: 7. Thermal discharges.

Specifications: (See Part 704 of this Title.)

CLASS SA

Best usage of waters. The waters shall be suitable for shellfishing for market purposes and primary and secondary contact recreation.

Quality Standards for Class SA Waters

Item: 1. Coliform.

Specifications: The median MPN value in any series of samples representative of waters in the shellfish growing area shall not be in excess of 70 per 100 ml.

Item: 2. Dissolved oxygen.

Specifications: Shall not be less than 5.0 mg/l at any time.

Items: 3. Toxic wastes and deleterious substances.

Specifications: None in amounts that will interfere with use for primary contact recreation or that will be injurous to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary condition thereof or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

CLASS SB

Best usage of waters. The waters shall be suitable for primary and secondary contact recreation and any other use except for the taking of shellfish for market purposes.

Quality Standards for Class SB Waters

Item: 1. Coliform

Specifications: 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.

REFERENCE 13

New York State Department of Environmental Conservation
600 Delaware Avenue, Buffalo, NY 14202-1073 716/847-4550

Henry G. Williams
Commissioner

December 18, 1985

Mr. Sheldon S. Nozik
RECRA Research, Inc.
4248 Ridge Lea Road
Amherst, NY 14226

Dear Mr. Nozik:

Tentative Erie County and final Niagara County freshwater wetlands are shown directly on your site maps for the Superfund sites you are studying. Please be sure to examine all the maps since I did not copy all wetland boundaries if a given area was shown on another map.

Also, our maps show only those wetlands which exceed 5 ha in size. We have no information compiled for wetlands less than 5 acres in size.

To my knowledge, we have no "critical habitats" within one mile of the sites in question. Further, I am not aware of endangered or threatened species occupying these sites.

If you need some specific information on the wetlands within your study area, you will need to come to Regional Headquarters to compile those data.

Sincerely,

Gordon Batcheller

Gordon R. Batcheller
Senior Wildlife Biologist
Region 9

GRB:ls

Enc.

cc: Mr. Pomeroy

REFERENCE 15

RECRA RESEARCH, INC.
Hazardous Waste And Toxic Substance Control

February 11, 1986

Mr. Frank Ernst, Vice President
Ernst Steel Corporation
P.O. Box 987
Buffalo, NY 14240

Dear Mr. Ernst:

Thank you for your assistance in the Phase I Superfund investigation we are currently conducting at the Ernst Steel site for the NYSDEC.

As part of the background search requirements for the NYSDEC Superfund sites, we the consultants, are required to have all of our interviews in person or by telephone, documented. Below is an account of our conversation on February 11, 1986. Would you please read the account and check the information for errors, sign at the bottom, and return the original to me. This is only to serve as documentation that the conversation took place.

° The site was a railroad car facility until 1933, when it went bankrupt. The area was covered by coal cinders believed to be from these operations.

° The site was left vacant until 1953, when your company began operations.

° Ernst Steel Corp. fabricated and erected steel bridges, etc.

° The company installed a wheel abrator blast cleaning machine which collected steel/iron dust, and the NYSDEC required a permit to dispose of this material on your property.

° Also disposed of in a low area behind the plant was floor sweepings consisting of fine steel drill shavings and old paint which had solidified into chunks called "Red Lead". Slag was also piled in this area.

° An incinerator was used to dispose of office paper waste and employee refuse.

° The site was leased to U.S. Steel in 1983.

° In 1982 the NYSDEC took soil samples in the area around the incinerator approximately 4 feet deep.

° In 1985 the area around the incinerator was excavated to about 2 feet and the soil was piled up around this area.

4248 Ridge Lea Road, Amherst, New York 14226 Telephone (716) 838-6200

° To your knowledge no other material was ever landfilled or disposed of on site.

Thank you for your cooperation.

Sincerely,

RECRA RESEARCH, INC.

Sheldon S. Nozik

Sheldon S. Nozik
Environmental Scientist

SSN/jlo

____
Mr. Frank Ernst

REFERENCE 22

Mr. Tygert
Mr. Clare
Ernst Steel - Site No. 915022
June 13, 1986

On Thursday, May 29, 1986, a site inspection of the Ernst Steel site was made with Mr. Frank Ernst, Vice President of Ernst Steel Corporation at his request. Mr. Ernst requested this on-site meeting since he feels that no hazardous wastes were ever disposed of on this site as a result of Ernst Steel Operations.

The attached site sketch was prepared as a result of this inspection. The following points are relevant:

1. US Steel - owns the structure and western half of the property.

2. Waste Disposal - During operation, floor drain contents including lead paint overspray, dust and grindings were disposed of on site.

   Piles of red granular material is exposed throughout the northeast wooded area.

   Large numbers of timbers are also exposed on the entire eastern half of the site. These are mainly untreated construction timbers -- used for crane outrigger pads, etc.

   Three drums of oil were found during one previous inspection. Mr. Ernst is having this oil picked up for disposal.

3. Pond - The pond adjacent to the abandoned incinerator was dug by Mr Ernst. Following DEC's 1982 sampling, the top three feet of earth was removed to look for any wastes which might have been buried in the area. None was found.

4. US Steel - The current fabricating operations (similar to Ernst's previous operation) were briefly inspected. The plant is clean -- no oil on floors or obvious sources of waste liquids.

5. **Surface Drainage**

   There is no natural surface drainage to the ditch along the railroad on the north

   Floor drains from the plant are piped to a storm sewer on the west side of the plant

   Roof drains are piped to the drainage ditch on Walden Avenue

   Some surface drainage may leave the site through a break in the Town dike on the southeast corner of the site.

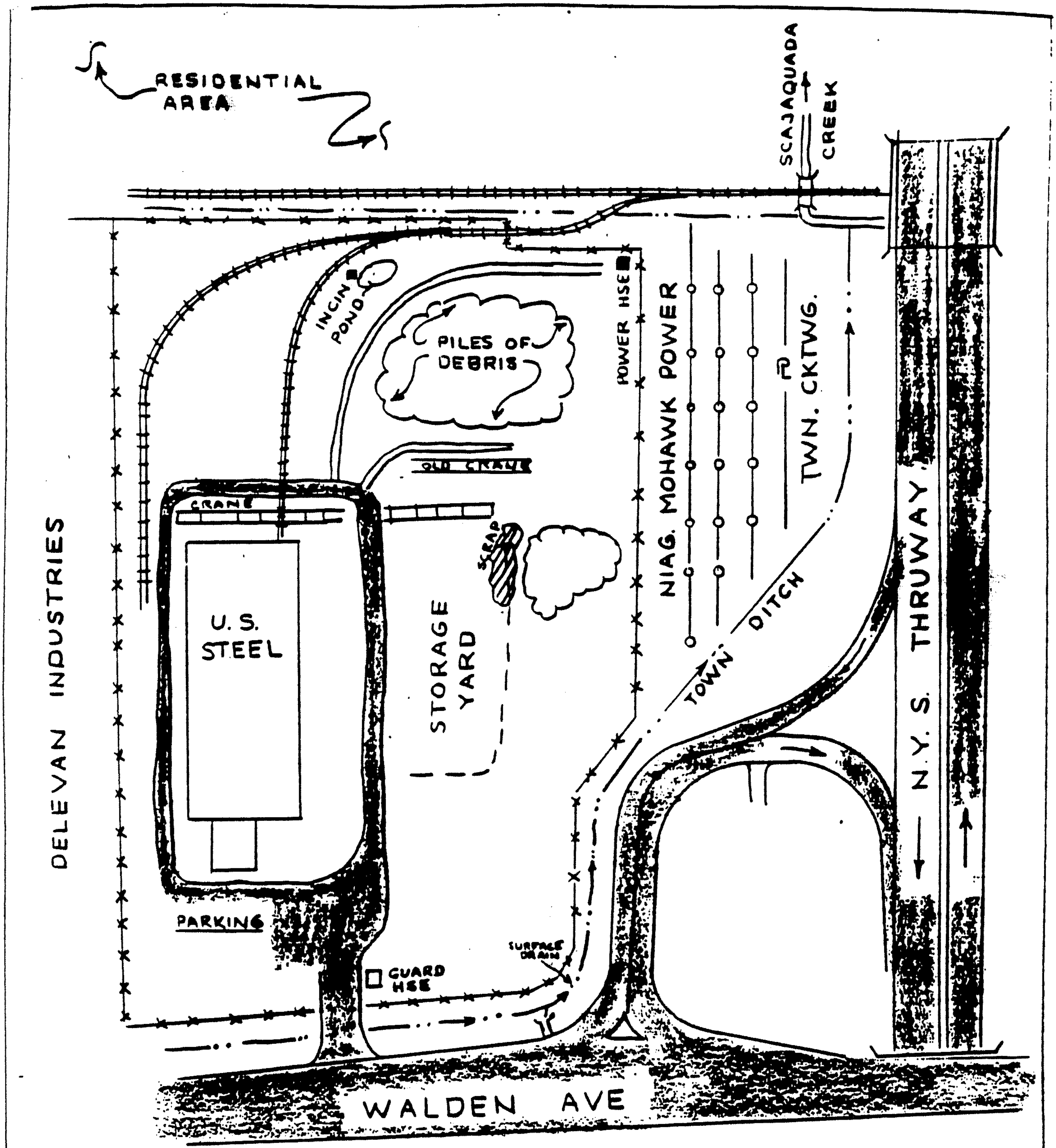
   MOST surface water remains on site.

6. Ernst Steel Corporation - Is no longer in the steel business. All fabricating operations in New York and Titusville, PA have been terminated. Assets are being disposed of.

Mr. Ernst is anxious to resolve the listing of this site as an Inactive Hazardous Waste Site so that the property can be sold. Since there is no record of hazardous waste being disposed of on site, there does not seem to be a sound basis for believing this site is of major significance.

It is my recommendation that an EP Toxicity test be performed on two separate composite samples of the on-site wastes to determine whether or not a Phase II Investigation is even needed.

TGC:ec
cc: Mr. Demick



POND – CIRCA 1984

ERNST STEEL
SITE 915022

L. CLARE 6/12/86

NUS CORPORATION	TITLE: THREE MILE VICINITY MAP
DATE: 12/15/89	SITE: ERNST STEEL, CHEEKTOWAGA, N.Y.
TDD: 02-8803-37	
QUAD: BUFFALO NE, N.Y.	FIGURE NUMBER: / SCALE: 1"=2000'

REFERENCE NO. 3

REFERENCE NO. 4

02-8803-37

NUS CORPORATION AND SUBSIDIARIES 02-8803-37 **TELECON NOTE**

CONTROL NO:	DATE:	TIME:
02-8803-37	7-19-88	15:00

DISTRIBUTION:

Ernst Steel

BETWEEN:	OF:	PHONE:
Tom Robinson	US Steel Supply	(716) 891-7500

AND:

Beth Torpey

DISCUSSION:

Called to find out what the adjacent property had been accused of dumping. Delevan Ind. (next door) makes the trailers used to carry new cars. They were caught dumping paint residue + contaminated Kerosene (possibly with Trichloroethane + toluene) onto the property adjacent to their western border.

ACTION ITEMS:

NUS 067 REVISED 0685

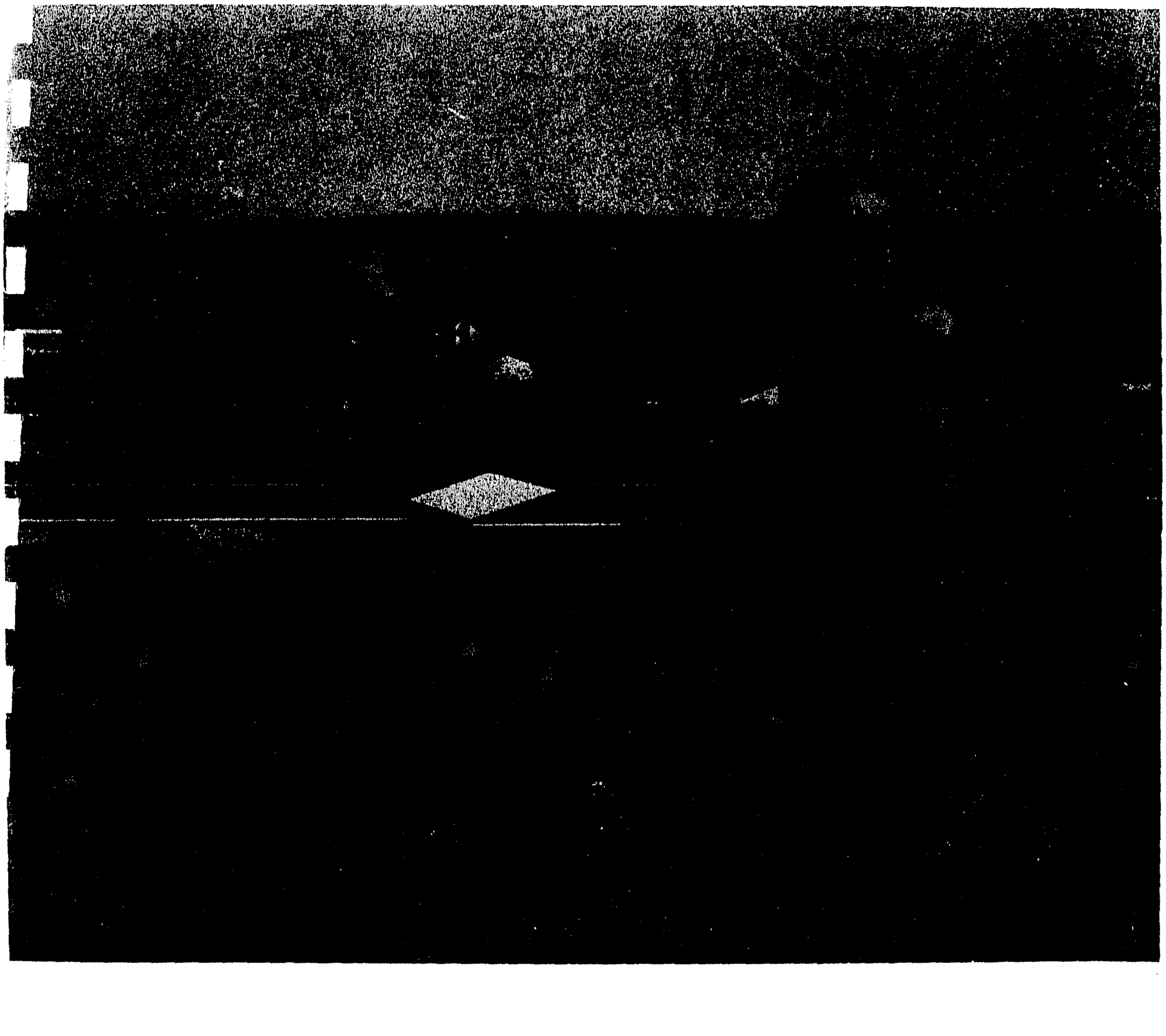
REFERENCE NO. 5

United States
Department of
Agriculture

Soil
Conservation
Service

In Cooperation with
the Cornell University
Agricultural
Experiment Station

Soil Survey of Erie County, New York



Kendaia series

The Kendaia series consists of somewhat poorly drained soils in areas of glacial till plains where runoff is received from higher adjacent soils. These soils formed in firm glacial till deposits. Slope ranges from 0 to 3 percent.

The Kendaia, Honeoye, Lima, and Lyons soils formed in similar parent material, but the Kendaia soils are more poorly drained than the Honeoye and Lima soils and are better drained than the Lyons soils. The Kendaia soils are also associated with the Cazenovia and Ovid soils but have a lower clay content in the subsoil and are not as red. The Kendaia soils are similar to Appleton soils, but do not have the clay accumulation in the subsoil.

Typical pedon of Kendaia silt loam, in the town of Alden, 0.2 mile north of railroad crossing on Town Line Road, 0.25 mile east of the road:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak medium subangular blocky structure parting to moderate fine granular; very friable; many fine and common medium roots; many medium pores; 5 percent coarse fragments; slightly acid; abrupt smooth boundary.

B21—8 to 13 inches; brown (10YR 5/3) heavy silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure; firm; common medium and fine roots; common medium pores; grayish brown (10YR 5/2) ped faces; 5 percent coarse fragments; neutral; abrupt wavy boundary.

B22—13 to 20 inches; brown (10YR 4/3) heavy silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; very firm; common fine roots; 10 percent coarse fragments; neutral; abrupt wavy boundary.

B3—20 to 32 inches; dark reddish brown (5YR 4/2) heavy silt loam; common fine distinct yellowish brown (10YR 5/4) mottles; medium coarse subangular blocky structure; very firm; few fine roots, 10 percent coarse fragments; mildly alkaline; clear wavy boundary.

C—32 to 60 inches; dark reddish brown (5YR 4/2) gravelly silt loam; moderate medium platy structure; very firm; 20 percent coarse fragments; calcareous; moderately alkaline.

The thickness of the solum ranges from 18 to 36 inches. Depth to carbonates ranges from 15 to 36 inches. Bedrock is more than 5 feet below the soil surface. Coarse fragments range from 5 to 15 percent by volume in the A horizon, from 5 to 30 percent in the B horizon, and from 15 to 30 percent in the C horizon.

The Ap horizon has hue of 7.5YR or 10YR and value of 3 or 4. Texture is silt loam, loam, or fine sandy loam. Reaction ranges from medium acid to neutral.

The B horizon has hue of 10YR through 5YR, value of 4 or 5, and chroma of 2 through 4. Chroma is 2 or less in the matrix or on ped faces at a depth of less than 20 inches. The B horizon has common to many, fine to coarse mottles. It is fine sandy loam, loam, or silt loam or the gravelly analogs of those textures. Reaction ranges from slightly acid to mildly alkaline.

The C horizon ranges in hue from 10YR through 5YR and in value from 4 to 5. It is fine sandy loam, loam, silt loam, or the gravelly analogs of these textures. It is massive or has platy structure and is firm or very firm in consistence. Reaction is mildly alkaline or moderately alkaline.

Lakemont series

The Lakemont series consists of deep, poorly drained or very poorly drained soils in nearly level areas or in depressional areas of the lowland lake plain in the northern part of the county. These soils formed in reddish lacustrine deposits dominated by clay and silt. Slope ranges from 0 to 3 percent but is dominantly 0 to 1 percent.

The Lakemont soils formed in the same kind of parent material as the well drained and moderately well drained Schoharie soils and the somewhat poorly drained Odessa soils. They are associated with the Canandaigua, Getzville, Wayland, and Cheektowaga soils. The Lakemont soils have a higher clay content than the Canandaigua soils, are not underlain by sandy deposits as are the Getzville soils, are not subject to flooding as are the silty Wayland soils, and do not have the sandy mantle of the similarly drained Cheektowaga soils.

Typical pedon of Lakemont silt loam, in the town of Clarence, 0.6 mile south of the intersection of Keller and Strickler Roads:

Ap—0 to 9 inches; very dark brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine and medium granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A2g—9 to 13 inches; gray (10YR 6/1) silty clay loam; common fine distinct brown (7.5YR 5/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; common fine pores; neutral; clear wavy boundary.

B21tg—13 to 18 inches; brown (7.5YR 5/2) silty clay; many medium distinct light gray (10YR 7/1) and strong brown (7.5YR 5/6) mottles; strong medium prismatic structure parting to moderate medium angular blocky; firm, plastic and sticky; few very fine pores; abundant gray (10YR 5/1) clay films on ped faces and lining all pores; neutral; clear wavy boundary.

B22tg—18 to 29 inches; dark reddish gray (5YR 4/2) silty clay; common medium distinct gray (N 6/1) and common medium faint reddish brown (5YR 4/4) mottles; strong medium angular blocky structure within strong coarse prisms; firm, very plastic and sticky; very few fine pores; continuous dark gray (5YR 4/1) clay films on ped faces; mildly alkaline; clear smooth boundary.

C—29 to 60 inches; reddish brown (5YR 4/3) silty clay loam; few medium faint reddish gray (5YR 5/2) mottles; moderate medium platy structure; firm; strongly calcareous, with white (10YR 8/1) lime segregated in streaks on ped (plate) surfaces; moderately alkaline.

The thickness of the solum ranges from 24 to 42 inches. Depth to carbonates ranges from 20 to 40 inches. Bedrock is more than 60 inches below the soil surface. There are generally no coarse fragments, but they range up to 5 percent of coarse fragments.

The Ap horizon is 10YR or 7.5YR in hue and 1 or 2 in chroma. Color value is 1 to 3 when moist and 5 or less when dry. Texture is mainly silt loam but also includes loam and silty clay loam, and in many areas it is mucky. Reaction is slightly acid or neutral. There is no A2 horizon in some deeply plowed areas, but when there is one it has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 1 or 2. Texture ranges from loam to silty clay loam. Reaction is slightly acid or neutral.

The B horizon has hue of 2.5YR to 7.5YR, value of 3 to 6, and chroma of 1 to 4. Ped faces have chroma of 2 or less, and mottles in the interior of peds are common to many and have chroma that is both higher and lower than that of the matrix. Texture ranges from silty clay loam to clay. The clay content of the Bt horizon ranges from 35 to 55 percent. Reaction is slightly acid or neutral, except it can be mildly alkaline in the lower part of the B horizon.

The C horizon has hue of 2.5YR to 7.5YR. It ranges from bedded clay and silt, giving the appearance of platy structure, to massive silty clay. Reaction is mildly alkaline or moderately alkaline.

Lamson series

The Lamson series consists of deep, poorly drained, and very poorly drained soils in depressions on glacial lake plains. These soils formed in sandy lake-laid deposits. Slope ranges from 0 to 3 percent.

The Lamson soils are associated with the Arkport, Galen, Minoa, Colonie, Elnora, and Canandaigua soils. The Lamson soils are wetter than the well drained Arkport soils, the moderately well drained Galen soils, and the somewhat poorly drained Minoa soils. They have a higher silt and clay content than the sandy Colonie and Elnora soils and are not as well drained. They are more sandy than the silty Canandaigua soils.

Typical pedon of Lamson very fine sandy loam, in the town of Amherst, near Hopkins Road and 0.6 mile north of New York Highway 263:

Ap—0 to 9 inches; very dark brown (10YR 3/1) very fine sandy loam, gray (10YR 5/1) dry; weak fine granular structure; very friable; many fine roots; slightly acid; abupt smooth boundary.

A2G—9 to 14 inches; light gray (10YR 6/1) loamy very fine sand; few fine distinct brown (7.5YR 4/4) mottles; single grain; loose; common fine roots; neutral; clear wavy boundary.

B21g—14 to 24 inches; brown (7.5YR 4/2) fine sandy loam; many fine and medium distinct yellowish brown (10YR 5/6) and faint brown (7.5YR 4/4) mottles; weak coarse subangular blocky structure; friable; very few fine roots; neutral; clear wavy boundary.

B22g—24 to 40 inches; grayish brown (10YR 5/2) fine sandy loam varved with light gray (10YR 7/2) loamy fine sand and very fine sandy loam; common medium distinct strong brown (7.5YR 5/6) mottles, varves have few medium faint yellowish brown (10YR 5/4) mottles; weak medium and thick platy structure; friable; mildly alkaline; gradual smooth boundary.

C—40 to 50 inches; light brownish gray (10YR 6/2) loamy very fine sand; few fine faint brown (10YR 5/3) mottles; massive; very friable, compact in place; calcareous; moderately alkaline.

The thickness of the solum and depth to carbonates range from 30 to 50 inches. Depth to bedrock or contrasting material is more than 60 inches. From the base of the Ap horizon to a depth of 40 inches, the average clay content is less than 18 percent. There are commonly no coarse fragments, but some subhorizons have up to 10 percent gravel.

The Ap horizon has hue of 10YR to 7.5YR, value of 2 or 3, and chroma of 1 or 2. The value dry is 5 or less. Texture is mainly very fine sandy loam or mucky very fine sandy loam, but some pedons have fine sandy loam or silt loam textures in the surface layer. Reaction ranges from medium acid to mildly alkaline. The A2g horizon has hue of 2.5Y or 10YR, value of 5 or 6, and chroma of 1 or 2 with few to common mottles. Structure ranges from weak, coarse subangular blocky to weak, medium granular to single grain. Consistence is loose,

REFERENCE NO. 6

GROUND-WATER RESOURCES OF THE ERIE-NIAGARA BASIN, NEW YORK

Prepared for the
Erie-Niagara Basin Regional Water Resources
Planning Board

by

A. M. La Sala, Jr.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
in cooperation with
THE NEW YORK STATE CONSERVATION DEPARTMENT
DIVISION OF WATER RESOURCES

STATE OF NEW YORK
CONSERVATION DEPARTMENT
WATER RESOURCES COMMISSION

Basin Planning Report ENB-3
1968

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).

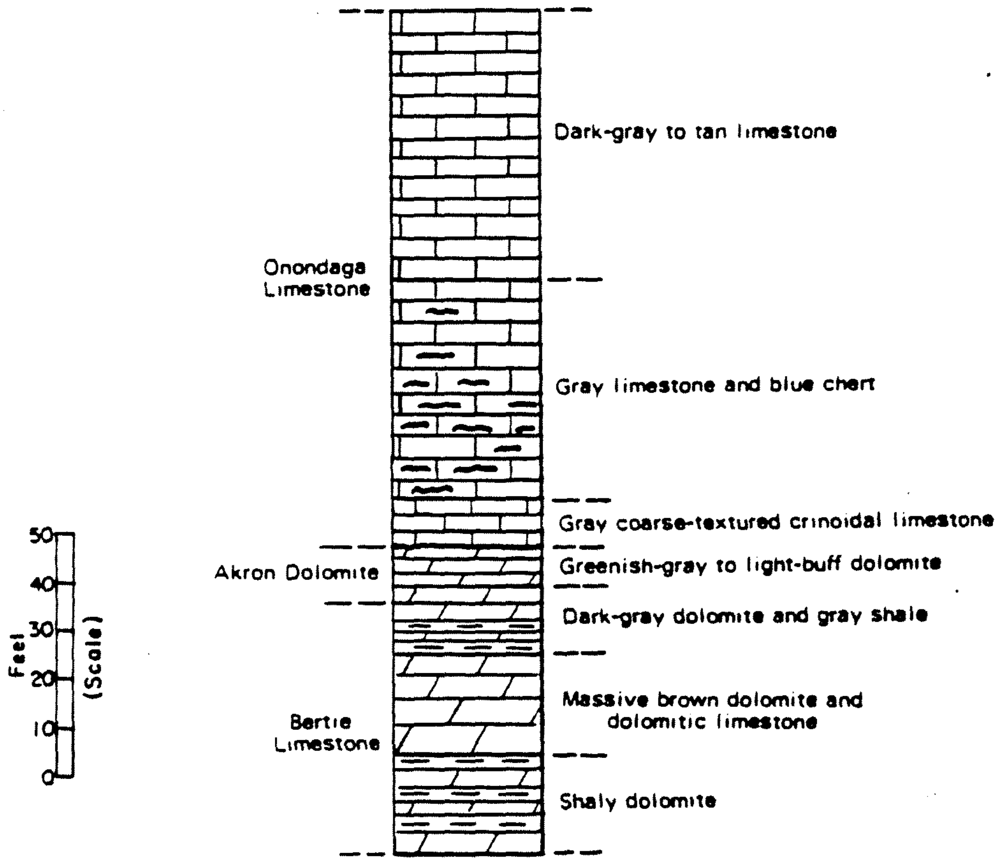


Figure 7.--Lithology of the limestone unit.

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 pronounced. The types of water-bearing joints in the limestone can be seen at the falls of Murder Creek at Akron. Not all of the flow of Murder Creek plunges over the falls. A considerable part of the flow percolates into the limestone unit upstream from the falls and discharges from bedding joints both at the face and along the sides of the falls. The principal zones of discharge are at the base of the Bertie, and at a contact of a shaly zone and overlying thick-bedded dolomite 20 feet above the base.

The falls at Akron also illustrate in an exaggerated way the role of vertical joints. Water from Murder Creek percolates into the rock through solution-widened vertical joints before reaching the bedding-plane joints. The continuous and concentrated flow of water in the creek has widened the vertical joints to an unusual degree. Vertical joints are ordinarily very narrow. They probably are most effective in aiding the movement of water to the bedding joints where the bedding joints are close to the rock surface.

Locally, solution along bedding joints in the limestone unit has been great enough to cause the rock overlying the solution opening to settle. Settling of this type probably accounts for at least some of the small depressions in the outcrop belt of the Onondaga Limestone. A collapsed solution zone in the Onondaga Limestone discharges a large volume of water into a quarry (257-840-A) near Harris Hill. About 3,000 gpm is pumped from the quarry, and most of the water is reported to come from the solution zone.

The limestone unit is cut by a fault on the east side of Batavia. Faults cutting limestone are likely to cause shattering along the fault and, thus, create a permeable water-bearing zone.

Hydrologic and hydraulic characteristics

The limestone unit is similar to the Lockport Dolomite in structure. However, its hydrology is different. The limestone unit is cut transversely by Tonawanda Creek and its major tributaries. Small tributaries flow across it in northerly and westerly directions. The limestone unit receives water in the interstream areas by percolation into joints. The water is discharged laterally to the streams and at places along the north-facing scarp or enters the Camillus Shale at depth.

The coefficient of transmissibility of the limestone unit probably ranges from about 300 to 25,000 gpd per foot. Specific capacity data are given in table 3. Drillers' reports indicate high transmissibilities for the limestone unit in Williamsville which probably arise from relatively intense circulation of ground water near Ellicott Creek. The coefficients of transmissibility given in table 3 were computed from specific capacity data by the method described by Walton (1962, p. 12-13).

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 transmissi-bility (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.

REFERENCE NO. 7

Uncontrolled Hazardous Waste Site Ranking System

A Users Manual
(HW-10)

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

United States
Environmental Protection
Agency

1984

REFERENCE NO. 8

208 WATER QUALITY MANAGEMENT PROGRAM

Report 13

GROUND WATER PROBLEMS / ANALYSIS

ERIE AND NIAGARA COUNTIES REGIONAL PLANNING BOARD

OCTOBER 1978

208 AREAWIDE WASTE TREATMENT MANAGEMENT STUDY REPORT INDEX SYSTEM

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The preparation of this report was financially aided through a Federal grant from the United States Environmental Protection Agency authorized by Section 208 of the Federal Water Pollution Control Act Amendment of 1972 (PL92-500).

Federal Grant No. P002111

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INTRODUCTION

SCOPE AND PURPOSE

This report represents work conducted by the 208 staff of the Erie and Niagara Counties Regional Planning Board on the Ground-Water Resources of the bi-county region. The location of the study area is shown on the accompanying location map.

The Erie-Niagara Region is an area which has both heavily industrialized areas and rural agricultural expanses. The range in life styles present in the area, coupled with imbalanced population distribution, result in localized differences in ground water use and type of demand (Industrial, domestic, etc.), and in types of ground water problems.

Ground-water resources in the bi-county area represent an important environmental issue. The use of this resource could be lost if the ground water becomes contaminated as the result of man's activities on the surface, or below the surface, of the land. Such activities include the disposal of residual wastes in landfills, pits, ponds, and lagoons; storage of chemicals and petroleum products; and improper design and use of individual sewage systems such as spetic tanks. Many other activities can, and do, affect the quality of the ground water and will be presented within the text of the report.

The purpose of this report (Task 13) is to examine and relate the geology and hydrology of the bi-county area to existing and potential threats to ground-water quality. Guidelines and surveillance programs will be recommended to remedy existing ground water quality problems and to prevent future problems.

An attempt has been made to bring together the available information on ground-water resources of the region from existing material, both published and unpublished. Due to economic and time restraints, and the regional scale of the 208 project, it was not possible to conduct detailed field work as part of this report. As such, some data gaps are present for specific areas of the region. Where this is the case, the general conditions have been presented, and a methodology suggested for on-site analysis of ground-water resources. It is hoped that this report will serve as a springboard for those who wish to conduct research on a smaller scale within the bi-county area.

SOURCES OF INFORMATION

Most of the available material on ground-water resources pertaining to the area is contained in three reports (Johnston, 1962; Johnston, 1963; and LaSala, 1968). In addition, useful geologic information was contained in reports by Buehler and Tesmer (1963), and Reck (1952). Information concerning design of landfill sites and monitoring networks is contained in other numerous reports.

SUMMARY

A. PURPOSE

The Erie-Niagara Region has both heavily industrialized areas and rural agricultural expanses. The range in life styles present in the area, coupled with imbalanced population distribution, result in localized differences in ground-water use and type of demand, and in the character of ground water problems.

Ground-water resources in the bi-county area represent an important environmental issue. The use of the resource could be lost if the ground water becomes contaminated due to the activities of man. Such activities include the disposal of residual wastes inland fills, pits, ponds, and lagoons; storage of chemicals and petroleum products, and imporper design and use of septic systems for domestic waste disposal.

The purpose of this report is to relate the geology and hydrology of the bi-county area to existing and potential threats to ground-water quality. It is hoped that this report will serve as a springboard for those who wish to conduct detailed research on a smaller scale.

B. GEOLOGY OF THE REGION

Fundamental to any discussion on the ground water resources of an area, is a knowledge of the geologic conditions present. By definition, ground water is water which is contained within the subsurface materials in the saturated zone, be they bedrock or unconsolidated deposits. The characteristics of the groundwater system are dependent upon the nature of the geology, thus the need for reliable geologic data.

The bi-county area is underlain by nearly horizontal sedimentary rocks which dip slightly to the south at 30-40 feet per mile. Rock types consist of limestone, dolomite, shale, and sandstone. These rock types are distributed among the approximately 16 different formations (rock units) present in the area. The predominant rock type is shale which completely underlies the area north of the Niagara Escarpment, and makes up most of the bedrock from Buffalo, south to Cattaraugus Creek. A major outcrop of shale is also present in Southern Niagara and Northern Erie Counties.

Both the altitude and relief of the land tend to increase from north to south within the region. Conspicuous escarpments run roughly east-west and divide the region into four parts. These parts include three glacial "plains" which are generally flat, and the Allegheny Plateau which has been deeply dissected by streams, in the southern part of the region.

Large supplies of ground water, 500 to 1,000 gpm from individual wells, can be obtained from the Camillus Shale. Still larger supplies probably could be pumped from abandoned gypsum mines near akron and operating mines near Clarence Center. The quality of water from the Camillus is poor and the water would be useful mainly for industrial uses, such as cooling.

The Onondaga Limestone will provide supplies of 100 gpm in many parts of its outcrop belt and occasional supplies of as much as 300 gpm. The quarries near Williamsville will provide a supply of about 3,000 gpm from inflowing ground water.

The Lockport Dolomite is the most important aquifer in the Niagara Falls area. This aquifer will yield and average of 31 gpm from the upper portion and 7 gpm from the lower portion. Yields of 2000 gpm have been reported by industrial users as the result of induced infiltration from the Niagara River. Water quality is acceptable with treatment. The water is hard and high concentrations of chloride have been reported.

D. GROUND-WATER RECHARGE

Ground-water recharge is generally defined as the addition of water by any means, to the ground water system. In this area, most of the ground-water recharge is due to infiltration of precipitation at the land surface. Small amounts, however, infiltrate from ponds and reservoirs which lie above the water table.

The upper aquifer (overburden) is, in effect, the source of recharge for the bedrock aquifers. Water must first infiltrate into the overburden before it can enter the bedrock units. The ability of a bedrock unit to accept water in a given area is dependent on: 1) open fractures at the bedrock surface, and 2) the infiltration capacity of the overlying material. Where sand and gravel overlie the bedrock, precipitation may be readily admitted to the system with little runoff. Conversely, where clay and silt overly the bedrock, the infiltration will be slow and runoff will be high.

Recharge to sand and gravel deposits, along with infiltration induced from streams by pumping, sets the upper limit of pumpage from them. If more water is removed from storage by pumping than is added by recharge, water supplies will dwindle and new sources of supply may have to be found.

Landfills (both municipal and industrial) represent a definite hazard to the quality of the ground water in this region. Based on general geologic knowledge and constraints, areas where landfills are suspected of contaminating ground waters, or are known to be doing so are: 1) Village of Akron, 2) Town of Amherst, 3) Village of Angola, 4) Prochnal and Katra Disposal Area, 5) Town of Eden, 6) Village of Gowanda, 7) Town of Lancaster, 8) Town of Sardinia, 9) City of Tonawanda, 10) Town of Hartland, 11) Town of Niagara, 12) City of Lockport, 13) Town of Porter, 14) City of Niagara Falls.

Other sources of ground-water contamination in the region are, insecticides and fertilizers, road salting, and sludge pits, ponds, and lagoons.

G. GUIDELINES FOR PREVENTION OF GROUND-WATER CONTAMINATION

Ideally, ground-water should be protected from contamination by limiting disposal of wastes on, or in, the ground. Obviously, this is not practical in this area due to the termendous volumes of waste generated, and the lack of suitable alternatives for disposal. Ground-water contamination must, therefore, be prevented by the operational method used for waste disposal on the land.

The proper development of a waste disposal site should begin with a detailed analysis of the geology and the ground-water system in the vicinity of the site. These are the limiting factors in site development as they will dictate to a large degree, the potential for contaminants reaching the ground water. Important considerations in the selection of a site are: 1) depth and type of overburden, 2) location, 3) depth to the high ground water table, and 4) topography of the area.

Overburden should be thick and impermeable beneath residual waste disposal sites. Clay is ideal for this purpose. Areas having steep slopes, or no slope, should be avoided; there is a happy medium where water will run off but will not cause large amounts of erosion. Flood plains, wetlands, and aquifer recharge areas should also be avoided.

The design of a residual waste disposal site is important in determining if leachate will enter the ground water system at all. Isolation of the waste material from the environment is the best way to prevent contamination. Combined with a leachate collection system and treatment facility, the probability of leachate contaminating ground waters is substantially reduced by this method. Isolation is best accomplished through the use of an impermeable liner.

In addition to the actual site design, provisions should also be made for a network of monitoring wells. Samples taken from these wells prior to initiation of waste disposal can then be compared to samples taken periodically after operation begins. This will allow the early detection of contamination from the site, if it should occur.

CHAPTER I
GENERAL GEOLOGY
(Task 13.1)

A. BEDROCK GEOLOGY

The bedrock Geology of the two county area consists of nearly flat lying sedimentary rocks of Lower Paleozoic age which dip southward at about 30-40 feet/mile (.3-.4 degrees).

These rocks range in age from 350 million years old to 450 million years old with the oldest rocks exposed in the northern most part of the region and the youngest rocks making up the highlands in the southern portion of the region.

As an aid in visualizing the distribution and configuration of rock layers in the region, both in plan view and in cross section, a generalized geologic map (Figure 13-1), and a geologic cross section (Figure 13-2) have been provided. The irregular nature of the map pattern is a result of topographic effects on the outcrop pattern and not the result of irregularities in the formations themselves.

Rock types present in the area are given as follows, with the oldest formations at the bottom of the column and youngest at the top.

FORMATION (Name and Symbol)	ROCK TYPES
Deg, Dcsw, Ded - Canadaway Formation	Shale and siltstone
Dj - Java Formation	Black and grey shales
Dwn, Dwa, Dwr - West Falls Formation	Sandstones, silts
Dso - Sonyea Formation	Shale w/ calcareous nodules
Dg - Genesee Formation	Shale w/ interbedded limestone
Dmo - Moscow Formation	Shale, calcareous shale
Dl - Ludlowville Formation	Shale and limestone
Dsk - Skaneateles Formation	Shale w/ L. s. interbeds
Dma - Marcellus Formation	Shale
Do - Onodaga Limestone	Limestone
Da - Akron Dolestone	Dolostone
Sb - Bertie Formation	Argillaceous limestone, dolostone, shale
Sc - Camillus Shale	Shale w/ large amounts of sypsum
Sl - Lockport Dolomite	Dolomite, limestone, thin shale partings
Sal - Clinton and Albion Groups	Sandstone, shale, some thin Limestone unity (Irondequoit and Renales Formations)

2. TILL - Till is composed of a mixture of partical sizes ranging from clay-sized to boulders. Much of the ground cover south of the Niagara Escarpment is till. In addition, thin deposits of very dense till (40-50% clay) underlies much of the lake deposits in the region. As is the case with lake deposits, abnormally thick deposits are found in the upland areas.

Till, by virtue of its heterogeneous nature and high clay content compacts very well, resulting in low permeability. Consequently, till does not yield large amounts of water to wells, but locally may provide adequate supplies for domestic use.

3. ALLUVIUM - These deposits consist of recently deposited sand and gravel along stream channels and their adjacent flood plains. Partical sizes range from silt/fine sane to course sand, depending upon the energy (the "swiftness") of a particular stream.

Alluvium generally has moderate permeabilities and may yield adequate amounts of water to domestic wells, but because of their limited extent, they are significant only locally for water supplies. These deposits are differentiated from (4) below by their limited extent.

4. SAND AND GRAVEL DEPOSITS - The sand and gravel deposits consist of outwash, and ice contact materials laid down at the margin of the glacier during the last ice age about 12,000 to 15,000 years ago. These deposits are found extensively in the uplands of southern Erie County, and are scattered throughout the remainder of the bi-county area. They exist both as thick deposits in the upland valleys, and as isolated hills and ridges in other areas. All such deposits are underlain by till or lake clay in this area.

The permeability of sand and gravel generally makes it an excellent aquifer, capable of yielding large amounts of water to wells, especially where deposits are thick. The isolated hills and ridges, which are primarily located in Niagara County, tend to drain rapidly, making them less productive as aquifers.

The above discussion presents the picture of a basically two-component ground-water system. The first component consists of the bedrock units which are each effective in limited areas. The second consists of the overlying material and the upper, fractured bedrock, which completely overlies and crosscuts all bedrock units. These two systems can be considered as separate water-bearing components, each with its own characteristics.

Bedrock aquifers do not have water tables, as such, in this area. The water is contained within the unit(s) and this water does not appear at the surface. The water table encountered in the region, represents the water table of the "upper aquifer" only and does not directly reflect the water level in the bedrock aquifers.

Regional ground water flow in the bedrock can be described as generally southwest-ward and northwestward. This assumes that the flow is essentially down-dip and toward the Niagara River, Lake Ontario and Lake Erie and toward two major discharge streams, Tonawanda Creek and Cattaraugus Creek. Local flow variations undoubtedly occur but the regional flow can be depicted as in Figure 13-4.

Ground water flow in the upper aquifer is dependent on surface topography, stream location, and configuration of the water table. Generally, water will discharge to surface water bodies and streams, and flow will approximate a path perpendicular to elevation contours.

A. UPPER AQUIFER

The character of the upper aquifer changes from location to location, as we have seen earlier. There are basically four types of material: 1) Sand, sand and gravel, 2) Till, 3) Clay and Silt, and 4) Alluvium. The characteristics of these materials have been discussed earlier, and each type has different water-bearing capabilities. The result is that the upper aquifer is actually discontinuous, yielding large amounts of water in some areas and none in others. Generally the different types can be arranged according to their water-yielding capabilities.

Those unconsolidated materials which are characterized by high permeabilities are the best aquifers. Deposits can be classified based on their grain size distribution and permeability from worst to best:

Deposit Type	Composition	Classification
Lake deposits	Clay, silt, fine sand	Very poor-cannot be considered an aquifer.
Till	Clay, sand, boulder mixture. Up to 50% clay in north, up to 30% clay in other parts of region.	Poor, permeabilities are low, sufficient water for domestic use if well taps sand lenses or "washed zones"

portions (thick-bedded) of the aquifer. These layers are characterized by single fractures, which do not produce as much water as the zones.

Vertical fractures are unimportant except in the few top feet of the rock. They do aid in transfer of water from one zone to another although this effect would tend to decrease with depth due to the pressure closing of the vertical fractures.

Because the water-bearing zones in the Lockport Dolomite are more or less confined within the rock unit, the system may be regarded as artesian. As such, a water table does not really exist for this aquifer.

Yields of wells tapping the upper and middle parts of the Lockport average 31 gpm (gallons per minute). Wells tapping the lower 40 feet of the unit average 7 gpm. Yields are greatest near the Niagara River above Niagara Falls. This is due to induced infiltration from the river which is evidenced from water quality data. Yields from these wells may be as high as 2000 gpm. It appears that vertical fractures form avenues through which river water can readily infiltrate. As such, high yield wells tend to cluster around these fracture zones.

Because the aquifer is not water-bearing throughout its thickness, permeability values serve little useful purpose. It is better instead, to present the ease with which water moves through the aquifer as a function of the total thickness of the unit. This is accomplished by the use of the coefficient of transmissibility (T) and is simply the product of the permeability and the saturated thickness of the aquifer. Transmissibility values can be found directly from well tests in this type of system whereas permeability cannot. Units for T are given as gallons per day per foot of thickness of the aquifer (gpd/ft). T-values for the Lockport Dolomite range from 330 gpd/ft to 68,000 gpd/ft. The latter represents the optimum value for the aquifer. A T-value of 2,300 gpd/ft is probably most representative of the upper part of the aquifer and 330 gpd/ft is probably characteristic of the lower part.

The natural quality of the water can be described as highly mineralized. Hardness is a major problem; a result of high concentrations of $CaSO_4$ and Ca HCO_3. The uppermost water-bearing zone has been known to yield salt brines in local areas. The origin of these brines is not considered to be man-induced but is rather a result of conditions present at the time the rock was deposited.

C. CAMILLUS SHALE -

The Camillus Shale consists of approximately 400 feet of thin-bedded to massive mudstone. Large amounts of gypsum are present in beds up to five feet thick and also in the lenses and veins.

Information for the yield to wells of this aquifer is limited, but generally they can be expected to be larger than the Lockport Dolomite. Yields of 300 gpm and more have been reported.

Transmissibility values (t) may be as low as 300 gpd/ft in areas where water-bearing joints are few. More commonly, however, T-values range from 4,000 gpd/ft to 25,000 gpd/ft.

Camillus Shale into the Lockport Dolomite, and from the Limestone Unit into the Camullis Shale. The amount of leakage from the shale units overlying the Limestone Unit will be relatively small because of the impermeable nature of the shale The permeability of these rocks is less than 0.01 gpd/ft^2 compared with approximately 1,500 gpd/ft^2 for sand.

Recharge to the upper aquifer is primarily through the glacial deposits in interstream areas. The most infiltration will occur in areas underlain by sand, sand and gravel, and to some extent, sandy till where slopes are gentle, and adequate vegetation allows water to remain long enough to soak in without running off to streams and ponds.

Assuming topographic conditions suitable for infiltration, the various types of surface materials can be listed from best to worst, based on their capacity to accept water:

Sand and Gravel
Alluvium (sand)
Sandy Till
Till
Clayey Till
Silt
Clay

Figure 13-3 shows the distribution of the surface materials in the region. Small, isolated bodies of material may not be shown.

Recharge to the bedrock aquifers may occur significant distances from the point of extraction. The nature of the water transport system, i.e., fractures, allows ground water to travel long distances fairly rapidly. Recharge to the upper aquifer is a local condition. Water does not travel long distances from the point of recharge due to the variability of hydraulic conditions and the discontinuous nature of the significant water-bearing materials.

3. ALDEN VILLAGE - Alden Village obtains its water from four ground water wells. The combined yield of the four wells is 625 gpm, and the distribution system is fed at 173 gpm. All four wells are less than 50 feet deep and terminate in the upper, fractured part of the bedrock (shale). Water is obtained from this fractured unit and sand and gravel deposits. The treatment given the water is limited to aeration and chlorination. Recharge to this water source is through sand and gravel deposits in the vicinity of Alden.

4. NORTH COLLINS VILLAGE - The Village of North Collins has four wells averaging 40 feet in depth. All are pumping from sand and gravel deposits. Till overlies the sand and gravel at one site. The combined yield of the wells is 800 gpm, but only 175 gpm is pumped for distribution. Two storage tanks with a total capacity of 0.42 million gallons are located on the distribution system.

5. GOWANDA VILLAGE - A portion of Gowanda Village's water supply comes from two wells in the central part of the village. The combined output from the water plant is 52 gpm (75,000 gpd). The wells are both 380 feet deep and pump from a sand and gravel body which is overlain by clay and silt deposits. These deposits inhibit recharge and yield from the wells are steadily declining. Proper management may aid in preservation of the aquifer.

Major recharge to the wells field occurs latterally through the sand and gravel which is exposed at the surface southeast of the village.

6. TOWN OF COLLINS - The Town of Collins has four wells, all of which obtain water from sand, or sand and gravel. Only two wells are used regularly, the other two are near the Cattaraugus Indian Reservation boundary and are used for backup purposes.

The sand and gravel which is exploited for the principal water source is covered by till at one site and clay at another. Major recharge points can be considered as the sand and gravel deposits exposed at the surface near the wells. Some recharge occurs through the till. Combined pumpage from the two regularly used wells averages 150,000 gpd. Chlorination is the only treatment.

7. HAMLET OF CHAFFEE - The Hamlet of Chaffee and its immediate environs are served by a drilled well in sand and gravel. Estimated pumpage from the well is approximately 20,000 gpd.

8. LAWTON'S WATER COMPANY - This is a private company which serves the Hamlet of Lawtons. The system utilizes springs, and the distribution system puts out an average of 13,000 gpd. The water is of good quality, and issues from sand and gravel deposits.

CHAPTER V
RECHARGE, RUNOFF, AND POTENTIAL CONTAMINATION
(Task 13.3)

A. RECHARGE

The absorptive charcteristics of the various types of overburden have been discussed in general terms earlier in this report, but a more in-depth look at existing conditions must be presented. The relative ability, or inability, of various deposits to accept water (herein referred to as infiltration capacity) directly affects the rate at which water can reach the water table, and also has direct bearing on the potential of surface contaminants reaching ground water supplies.

Task 13.3 calls for a review of existing soil data as an input for this task. More pertinent information, however, has been presented in the section on surficial geology. These deposits, be they sand and gravel, clay or a mixture of the two, dictate to a large degree, the types of soil that will develop on them. For this reason, the existing information on surficial geology is considered more important for the purposes of this study.

Different types of overburden have previously been listed according to their relative infiltration capacities. Of these materials, the sand and gravel deposits are the significant sites of infiltration. It is important to know the actual rate of recharge to the sand and gravel as these deposits represent sources for development of large supplies of good quality water.

In addition to recharge from precipitation, infiltration occurs alons stream reaches where the water table lies below the level of the stream. In this area, this condition normally results from the lowering of the water table by pumping (induced infiltration). As soon as the water table drops below stream level, water flows out of the stream into the ground. The normal condition is just the opposite, Figure 13-7 shows this effect in the Niagara Falls industrial area, where large amounts of water are pumped from wells for cooling purposes and other industrial uses.

In addition to the Niagara Falls industrial area, induced infiltration probably occurs in the vicinity of the public-supply wells of North Collins and East Aurora. The potential is large for increasing ground water recharge by induced infiltration wherever perennial streams cross sand and gravel deposits.

Recharge to sand and gravel deposits, along with induced stream infiltration, sets the upper limit of pumpage from them. If more is removed from storage by pumping than is added by recharge, water supplies will dwindle and new sources of supply may have to be found.

of the different materials. Clays will accept water if they are dry and the precipitation is light. As they become soaked, the clay particals swell up, effectively sealing off the material to further infiltration.

Till in this area varies in clay content from about 50 percent in the lowlands to about 30 percent in the southern uplands. The permeability (and the infiltration capacity) is very low (less than 2.0 gpd per square foot) resulting in a high degree of runoff.

Sand and gravel deposits, because of their high permeability, are capable of accepting water readily. Surface runoff from these deposits is very low.

2. EFFECTS OF RELIEF - Surface relief dictates to a large extent how fast water will run off, the slower the runoff rate, the more time is available for recharge. For example, runoff will be much higher for an area with a 30 percent slope than it will be for one with a 2 percent slope. Flatter areas allow water to remain in one area longer, giving the soil a longer time to accept it.

3. EFFECT OF VEGETAL COVER - The amount and type of vegetal cover is important in the retention of water. Natural vegetation such as grassland and woodland are much more effective in retaining water for infiltration than is cropland. However, it is well known that certain types of planting such as contour plowing and strip cropping, may increase the ability of cropland to hold water and reduce surface runoff. Generally, sparse or absent vegetation will result in a very high percentage of surface runoff.

4. EFFECTS OF SURFACE STORAGE - A sharply defined drainage system with few surface depressions, ponds, or swamps facilitates rapid removal of water via surface runoff. Conversely, an area with a poor drainage system and many surface storage depressions will have a relatively high rate of infiltration.

Obviously, the above factors do not operate independently. A given area must be assessed as to its runoff characteristics based on the combined effects of all four factors. For example, a 30 percent slope underlain by sand and gravel will probably produce less runoff than a 10 percent slope underlain by clay. As an aid in arriving at an estimation of the amount of runoff that can be expected in a given area, a table has been provided (Table 13-3). This table may be used by utilizing the map of surficial deposits, topographic maps, the land use map from tasks 6.3 and 6.4, and a map of Significant Areas of Recharge and Runoff. It is intended as an initial approach to be followed by a more quantitative assessment in the field in those areas where potential problems are apparent. In the two-county area, a high percentage of runoff can be expected in those areas underlain to the surface (swamps, ponds, flood plains, areas characterized by springs or seeps), (3) areas where the overburden cover is thin (see drift thickness map of Erie County), and (4) areas where the prime source of water is bedrock.

Sand and gravel does not have a high adsorptive capacity as does clay. That is to say that clay and clay rich materials are much more efficient in removing contaminants from the water than is sand and gravel. This is partly a function of partical size and soil chemistry. Bedrock aquifers, do not filter contaminants from water to any great degree.

In areas where surface runoff is typically high, the potential for ground water pollution is low. A source of contamination at the surface, such as a landfill, will leak pollutants in amounts directly related to the amounts of water which pass through them. If permeability is low, less water will pass through them, more adsorption will occur, and lower contaminant levels will reach the ground water. Highly permeable areas then, are areas most likely to transmit contaminants to the ground water. Conversely, impermeable areas (underlain by clay) will not be likely to transmit contaminants in large concentrations.

Use of the surface materials map, topographic maps and land use maps will be useful in preliminary investigations. However, on-site evaluation should proceed development in any area.

Lockport water. This water seems to occur in two zones near the base of the unit. Brines have been located in two wells near the northern edge of the Power Project reservoir. Chloride concentrations at these wells are 123,000 mg/l and 11,200 mg/l respectively. As there is no source of chloride in the area, this assumed to represent a localized, natural condition of the ground water in the area. A high chloride content is also present in two industrial wells near the Niagara River in Niagara Falls.

The Camillus Shale produces the poorest quality natural waters in the region. Large amounts of gypsum (highly soluble) produce high sulfate concentrations in the ground water.

The limestone unit produces natural waters with much the same characteristics shown by the Lockport Dolomite. Dissolved Solid concentrations are somewhat less than the Lockport however.

Ground water in Shale is generally of better quality than water from the carbonate units but for the most part yields so little water to wells that it is not exploited for large supplies of water.

Ground water with the lowest concentration of dissolved solids in the region occurs in the surficial sand and gravel deposits (see map of surficial deposits). Dissolved solids range from about 175 to 300 mg/l. The chemical quality of ground water in unconsolidated deposits is not easily portrayed on maps because of its variability, particularly with depth. In general, ground water at shallow depth is lower in dissolved solids than the underlying bedrock.

Figures 13-8, 13-9, 13-10, 13-11 indicate the concentrations of various chemical constituants in ground water from bedrock units. These figures are from the Erie-Niagara Basin Report on ground-water resources. As such, only Erie County and the southern portion of Niagara County are shown. Little data of this type is available for most of Niagara County.

B. GROUND WATER CONTAMINATION

1. WELL MONITORING RECORDS - One way in which ground water contamination can be detected is through the use of monitoring wells. Briefly defined, a monitoring well is one which is drilled into an aquifer for the specific purpose of monitoring the quality of ground water. Water samples taken from the ground water system are periodically analyzed for contaminants and changes in the concentrations of these contaminations. Results are recorded and used as indicators of what is happening to the subsurface water. Exactly what contaminants are analyzed for depends upon the specific purpose of the well. For example, water from a well drilled to monitor ground water quality in the vicinity of a municipal landfill would be analyzed for constituants indicative of contaminants from that

Municipal water systems which utilize ground water as their source of supply are required by their respective county health departments to periodically submit water samples for analysis. None of the municipal ground water supplies currently show contamination of the ground water in the vicinity of the well or wells.

2. <u>AREAS OF EXISTING GROUND WATER CONTAMINATION</u> - Potential sources of ground water contamination in this region, in order of importance, from the standpoint of extent are: septic tanks, landfill sites (both industrial and municipal), industrial sludge pits, wastewater and water treatment plant lagoons, waste stockpiles, road salting and use of fertilizers and insecticides. Deep well disposal of wastes, although not presently practiced in the region, can be a definite source of groundwater pollution. Two test wells were drilled to test the feasibility of this type of disposal, one by Bethlehem Steel in Lackawanna, and one by Hooker in Niagara Falls. DEC never issued permits for their use and, to the best of their knowledge, these wells have never been used.

a. <u>Septic Tank Effluent</u> - Sewage released from septic tanks and leachfields is by far the most widespread cause of ground water contamination, as a large portion of the region is not sewered (LaSala, U. S. G. S., 1968; see map of present sewered areas). Contamination by septic tanks is usually of a local nature, with contamination appearing only on the lot containing the source or an adjacent lot. The reason for this is that ground water which is contaminated by septic tank effluent is a problem only if the effluent reaches the well within a few hundred feet of the point of its release. The bacteria count is reduced by travel through the ground and the chemical concentration of the effluent is further reduced by dilution and dispersion. According to the Erie County and Niagara County Health Departments, wells showing contamination by sewage are at scattered locations throughout the area. Most are in rural or suburban settings and are affected by purely local sources; usually within 150 feet of the septic tank causing the problem. General ground water contamination by septic tank effluent is evidenced in a strip of land in Williamsville, east to Harris Hill Road as reported by LaSala, 1968. Reasons for general contamination of this sort are probably due to the lack of sufficient thicknesses of overburden. Effluent enters the bedrock (shale) soon after its release from the leach field and is subject to very little filtration from that point on. Moreover, fractured bedrock allows rapid migration of ground water, and hence contaminants, so that a significantly large area may be affected. In addition, because of the density of septic tanks in some areas, general pollution of shallow ground water can be assumed to be occurring in all unsewered communities (LaSala, 1968). This does not mean that all well produce bad water. In most cases, the water is sufficiently cleansed before reaching the wells. Fortunately, wells contaminated in this manner are, at best, isolated in the bi-county area (see appendix E).

The Niagara Falls area, in the vicinity of Niagara Recycling and Newco, as well as along the Buffalo Avenue industrial district is suspected of having large scale ground water contamination. Recent findings by the Niagara County Health Department indicate that much of the contimination associated with closed Hooker Chemical disposal sites is of the toxic-chemical variety. The contaminated ground water eventually discharges to the Niagara River above the Falls.

Similar contamination is suspected along certain portions of the Lake Erie shoreline south of Buffalo where industrialization is prevalent. No information is available to bear out this suspicion however.

The Village of Lewiston has experienced leachate problems at an old landfill at the present "Artpark" location. The ground-water problem here is more of a local one as the groundwater in this vicinity discharges almost immediately to the Niagara River. The nature of the contamination is assumed to be consistent with that produced by industrial/commercial landfills in general. High BOD, sulfates, chloride, and other so-called "nutrients" characterize this type of contamination. High concentrations of many metals are probably also present.

The Niagara County Refuse Disposal District Landfill in Lockport is also a suspected area of contamination as this site utilized parts of a dolomite quarry. Sealing of the bottom is carried out but the sides remain in contact with the refuse. The highly fractured nature of the dolomite permits rapid transport of leachate to the saturated zone.

In addition to the sites located on the map, contamination of ground water can be expected to be occurring on a local scale in the vicinity of all landfills in the two-county region. This suspecion is presented without the aid of supportive data (none exists) in hopes that those directly impacted individuals will initiate technical studies (monitoring, etc.) at these sites. In the future, new landfill sites will be required to have monitoring wells, but most of the existing facilities have none.

c. Industrial Sludge Pits - Those areas having industries which dispose of sludges in pits, are probably experiencing ground water contamination. This is a known fact in the Niagara Falls area, and is likely to be occurring in other portions of Niagara County and in areas south of Buffalo.

d. Road Salting - This is a general ground water contamination problem which becomes very pronounced during the early summer. Infiltrating water following spring rains carries chloride ions into the ground. Natural travel time of the water in the ground usually results in excess chloride showing up in wells during late June and early July. Concentrations rarely exceed the U.S. Public Health Service recommended limit of 250 taminants than more clay-rich soils. Chemical fertilizers and insecticides are used most heavily in the Towns of Eden, Collins, and Batavia, where intensive farming is practiced. They are also used in most other agriculturally-oriented towns to varying degrees.

Those residual waste disposal sites which are potentially most dangerous, are in areas which utilize abandoned sand and gravel pits located in major aquifers, and in no longer used stone quarries. Both conditions allow rapid percolation of leachate to the water table. Equally as dangerous, although harder to detect, are landfills which intersect the water table. Effects resulting from the use of stone quarries may be reduced by sealing the site with two or more feet of clay. However, sealing the sides of these excavations is nearly impossible due to their vertical nature. Therefore, latteral migration of leachate may still occur.

The extent of contamination from residual waste disposal sites may be diminished by its geologic location. Clay and till will tend to deep leachate migration to a minimum, whereas sand and gravel will allow more rapid transmittal of these contaminates. To avoid extensive text, the reader is invited to review Task 14.3 (Residual Waste Disposal Practices) and the accompanying map which locates all residual waste disposal sites. On the map, the site number refers to the sites as described in the text of 14.3.

Those landfills which may pose the largest potential problems are (not in order of significance):

1. Village of Akron (site 8). This site utilizes a depleated gravel pit.

2. Town of Amherst Municipal Disposal Area (now closed, site 9). A high ground water table exists here, and refuse is deposited directly in standing water. Even through this, any many other sites are closed, leachate generation still occurs.

3. Village of Angola and Town of Evans - William Fox Disposal Area (site 10). There is a possibility of shallow bedrock (less than 20 feet of overburden) in this area. The overburden is till - normally good for landfills but if insufficient thicknesses are present contamination of ground water may occur if excavation is within five feet of the bedrock surface.

4. Prochnal and Katra Disposal Area (site 11). Possibility of the high ground water table within five feet of the base of the landfill make this site a potential threat to ground-water quality.

5. Town of Eden (site 22). There is a possibility of a high ground water table.

6. Village of Gowanda (site 26). Utilizes abandoned gravel pit. High permeability soils and cover material allow rapid percalation of leachate to the water table. Its isolation from major aquifers by discontinuous clay deposits may limit large scale contamination.

C. DEEP WELL DISPOSAL

Bethlehem Steel and Hooker Chemical have each constructed a well for the purpose of deep well disposal of wastes. Permits have not been issued by DEC for their use, and there is no indication that the wells have actually ever-been used for their designed purpose.

2. not located on a flood plain or near a stream of any sort. Flood plains are typically sand and gravel and have a high permeability. Flooding may introduce large amounts of water to the site, generating abnormally large volumes of leachate. The natural direction of ground-water flow near streams causes it to discharge to the stream. Therefore, contaminated ground water may, in turn, contaminate the stream by the natural process of ground-water discharge.

3. not be within five (5) feet of the high ground water table. This measure will insure that the saturated zone will not interact directly with the waste material in unlined facilities.

4. not be located in recharge areas of major aquifers. In these areas the principal flow of water is downward. Contaminated waters would readily enter the aquifer and become available to wells.

5. never be located in bedrock excavations. The fractured nature of the bedrock in the area allows rapid transport of leachate with little filtering effect. Moreover, the bottoms of all reported excavations are below the water table and are in the saturated zone. Sealing of the excavation for use as a disposal site is a common method of preparing a bedrock excavation. This practice does little good as the clay in this area contains large amounts of carbonate minerals which are readily dissolved away.

6. have a low, continuous slope to keep water from ponding and infiltrating on the surface of the landfill. Excessive slopes should be avoided to lessen erosion potential of the cover material. Slopes of 1-3% should be sufficient for these purposes.

7. have an availability of cover material well suited to the purpose. It should be of low permeability and be easily compacted.

Obviously, finding a site which satisfies all of the above requirements is difficult. Moreover, the percent of available land that meets these requirements is very small in this area.

Less suitable sites may be used for the purpose of disposal of wastes, provided the engineering design of a site is such that possible effects on ground water systems by the site are eliminated.

B. SITE DESIGN

The present state-of-the-art in landfill design for the purposes of ground-water protection is best described in a technical paper by Giddings, 1977. This paper covers the development of a landfill site in Pennsylvania, and treats all phases of construction.

The above measures will insure that leachate will not enter the ground water system.

2. Monitoring System - A monitoring system composed of a number of wells should also be a part of the overall design. This aspect of design is treated in detail in Chapter IX and will therefore will not be presented here.

3. Cover Material and General Operation of Disposal Site - This aspect of land disposal operations is probably the easiest to control. By issuing permits and conducting periodic site inspections, it is not difficult to control the operation of a waste disposal site. This is not as true when dealing with private operations on private land (e.g., industries). In this instance, much of the control becomes voluntary on the part of the operator. All solid waste disposal sites are required to add cover material daily, amounting to at least 6 inches of low permeability soil (such as clay).

Adding of cover material is inapplicalbe in the case of sludge pits, ponds, and lagoons. These sites can eliminate direct rainfall into the site be coverage with some sort of camopy. Evaporation pits would require, in addition, some mechanism by which sunlight could still reach the pond surface.

The reader is invited to review the interim report for Task 14 (Residual Wastes) for a more detailed description of the sludge disposal problem.

C. CLOSING OF EXISTING LAND DISPOSAL SITES

Those disposal sites which are known to be causing ground-water contamination should be closed. Simply closing these sites, however, does not remove their contaminating effects. Rainfall will continue to intercept the site, and percolating ground waters may still intercept the bottom of the site. The result is continued production of leachate.

Possible solutions to this problem would be to grade the surface of the site and install drainage systems to remove water before it can infiltrate, and in extreme cases where contamination has already occurred, the installation of interception wells around the site. The use of interception wells, which are pumped continuously to remove contaminated water from around the site before it can migrate, is extremely expensive. These wells set up a ground-water gradient toward the site from all directions.

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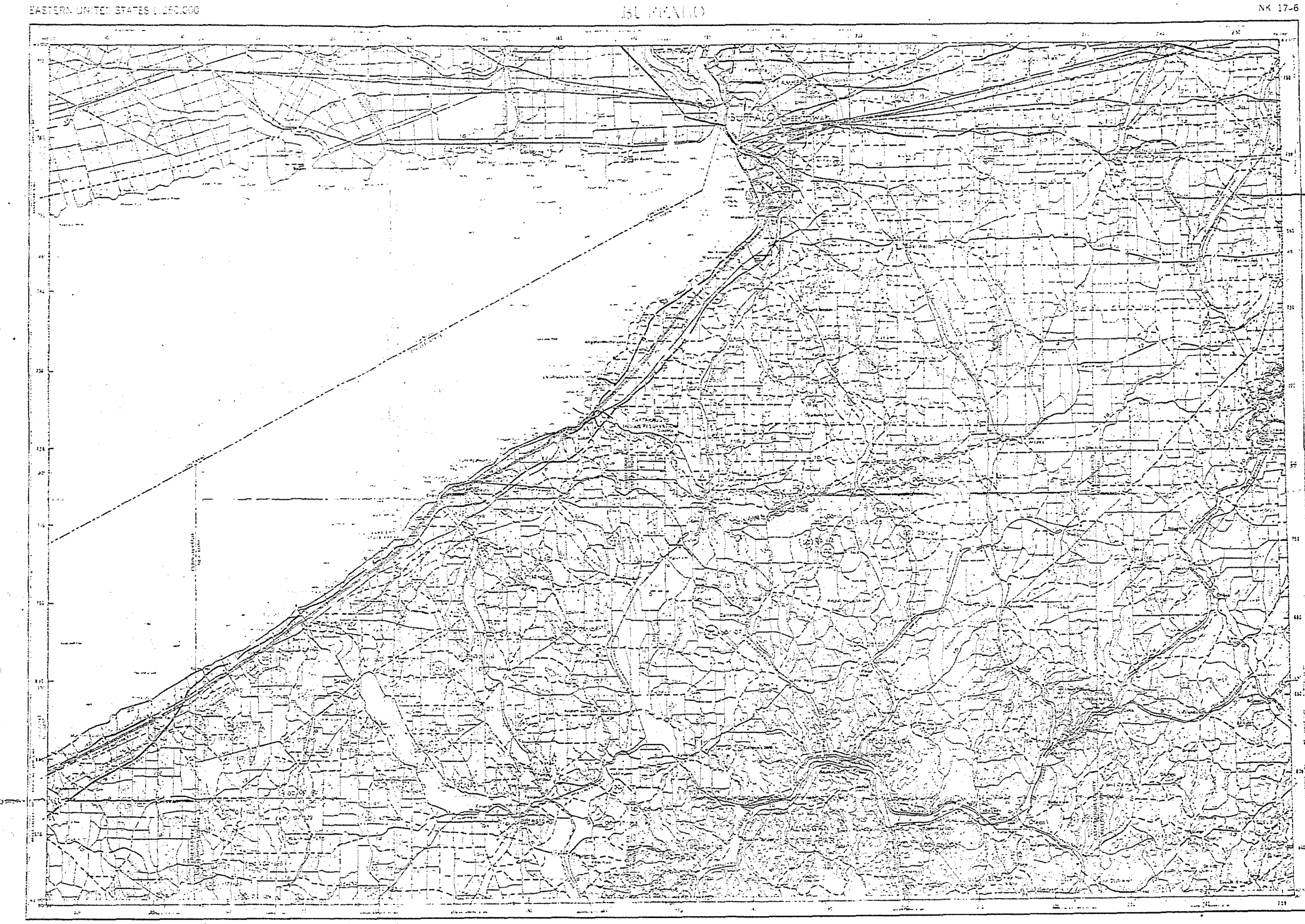

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KEY

SIGNIFICANT HABITAT OVERLAY NO.____ OF 2

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DIVISION OF FISH AND WILDLIFE

PREPARED BY: HABITAT INVENTORY UNIT

BUFFALO N.Y.; PA.; U.S.; ONT.; CAN.

AUGUST 1980

REVISED: 12/31/85

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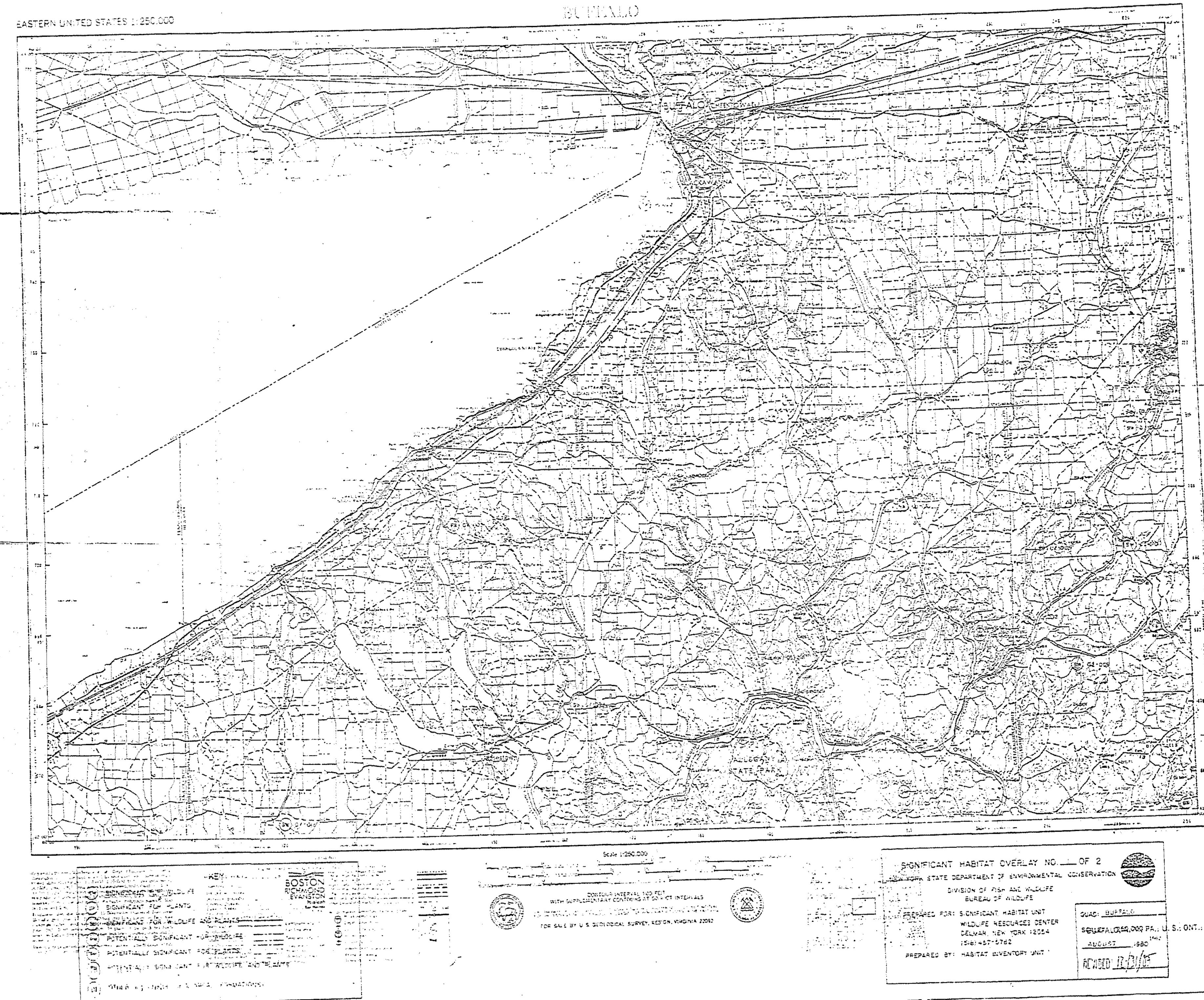

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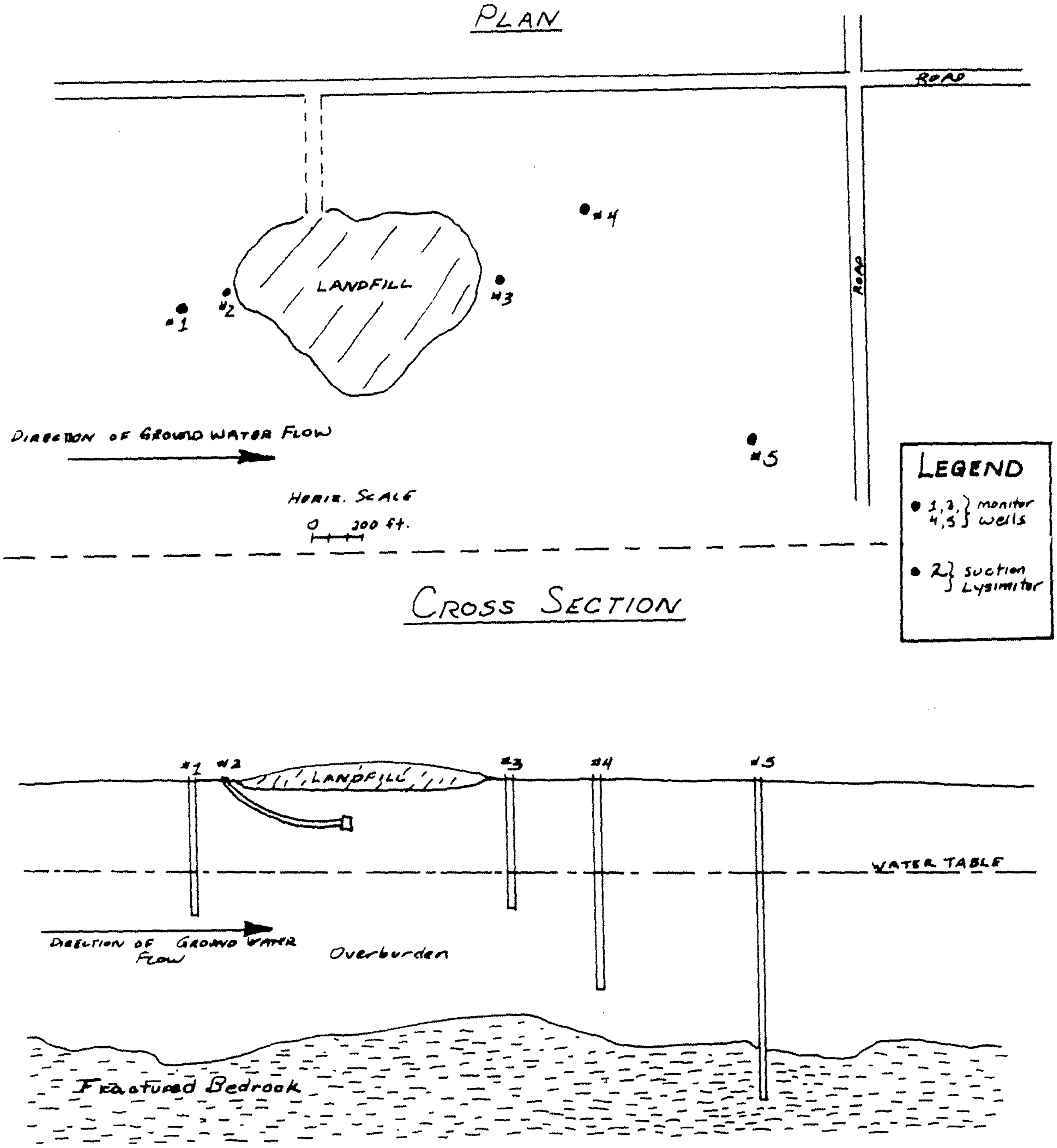

Figure 13-14: Typical configuration of a monitoring network in the vicinity of a residual waste disposal site. Note that not all wells are of equal depth. This allows both shallow and deep ground water to be sampled. The suction lysimeter allows water samples to be be obtained from the unsaturated zone.

APPENDIX C

Common Misconceptions Concerning Ground Water

MISCONCEPTIONS CONCERNING GROUND WATER

Misconception:	Ground water often occures in underground lakes and rivers.
Fact:	Bodies of ground water generally bear little resemblance to surface water bodies.
Misconception:	Ground water is mysterious and occult.
Fact:	Natural Laws control the occurrence and movement of ground water and therefore its behavior is predictable.
Misconception:	Water rushes so rapidly underground that its presence can be detected by listening.
Fact:	In most cases ground water flows only a few feet per year.
Misconception:	Ground water removed from the earth is never returned.
Fact:	Ground water is a renewable resource.
Misconception:	Ground water migrates thousands of miles through the earth.
Fact:	Most ground water is replaced in the near vicinity of its withdrawal.
Misconception:	Ground water is not a significant source of supply.
Fact:	The amount of ground water in storage dwarfs our present surface supply.
Misconception:	There is no relationship between ground water and surface water.
Fact:	Ground water provides much of the flow of streams; lakes and swamps are merely windows in the water table.

Misconception: The water table is falling throughout the country.

Fact: Although in a few areas the water table has declined significantly, in most places the water table rises and falls with climatic variations.

Misconception: The water level in a well remains constant.

Fact: The water level must decline in the vicinity of a pumping well.

Misconception: Spring water is synonymous with exceptional quality.

Fact: Springs are points where ground water is discharging, but they are easily polluted.

Misconception: All well water is naturally of drinkable quality.

Fact: The natural mineralization of ground water generally increases with depth; eventually a point is reached where it is no longer potable because of naturally-occurring minerals dissolved from the rocks through which the water flows.

Misconception: Since ground water can't be seen, nothing is happening to it.

Fact: We do not know the extent of ground water pollution, but from available information we know that the threat of its widespread pollution is substantial.

Source: A Manual of Laws, Regulations, and Institutions for Control of Ground Water Pollution

APPENDIX D

Glossary of Hydrogeologic Terms

GLOSSARY OF GROUND-WATER TERMS AND ABBREVIATIONS USED IN THE TEXT OF THIS REPORT

SOURCE: LaSala, 1968, Ground-Water Resources of the Erie-Niagara Basin, New York.

Term or abbreviation	Definition
Altitude	Distance, in feet, above mean sea level.
Aquifer	A formation, group of formations, or part of a formation that is water bearing.
cfs	Cubic feet per second.
Cone of depression	The depression, roughly conical in shape, produced in a water table by pumping from a well.
Confining bed	One which, because of its position, and its impermeability or low permeability relative to that of the aquifer, prevents or retards the natural discharge of water from the aquifer into adjacent formations.
Dip	The angle between the bedding plane and the horizontal plane.
Drawdown	The vertical distance through which the water level in a well is lowered by pumping from the well at a given rate.
gpd	Gallons per day.
gpm	Gallons per minute.
Ground-water discharge	Discharge of water from the zone of saturation, usually to streams or other surface-water bodies, but may include the discharge from wells.
Ground-water recharge	Water that is added to the zone of saturation.
Ground-water runoff	That part of the runoff which has passed into the ground, has become ground water, and has been discharged into a stream channel as spring or seepage water.
Head	Amount of water pressure at a certain point. The amount of pressure is determined by the height of the water over that point.
Hydraulic gradient	Pressure gradient. As applied to an aquifer it is the rate of change of pressure head per unit of distance of flow at a given point and in a given direction.
Hydrograph	A graph showing level, flow, velocity, or other property of water with respect to time.
Impermeable	Having a texture that does not permit water to move through it perceptibly under the head difference usually found in subsurface water.
Infiltration	The flow or movement of water through the soil surface into the ground.
Infiltration capacity	The maximum rate at which the soil, when in a given condition, can absorb falling rain or melting snow.
Joint	Fracture planes or surfaces that divide rocks but over which there has been no visible movement.
mgd	Million gallons per day.
Permeability (P) (coefficient of)	The rate of flow of water in gallons a day (gpd) through a cross section of 1 square foot under a hydraulic gradient of 100 percent at a temperature of 60°F.
Porosity	The ratio of the aggregate volume of pore spaces in a rock or soil to its total volume. It is usually stated as a percentage. (Porosity is equal to the sum of the specific yield and the specific retention.)
Safe yield	The rate at which water can be withdrawn from an aquifer without depleting the supply to such an extent that continued withdrawal at this rate is harmful to the aquifer itself, or to the quality of the water, or is not economically feasible. In practice, the safe yield is equal to or less than the mean annual recharge to the aquifer.
Screen loss (of a well)	That part of the drawdown in a pumping well that may be attributed to the restriction to free flow of water through the screen and the material immediately surrounding the screen.
Soil (zone)	A layer of loose earthy material, approximately parallel to the land surface, which has been so modified and acted upon by physical, chemical, and biological agents that it will support plant growth.
Specific capacity (of a well)	The ratio of the yield of a well to the drawdown of water level in the well at a given pumping rate; generally expressed in gallons per minute per foot of drawdown.
Static level (Hydrostatic level)	That level which, for a given point in an aquifer, passes through the top of a column of water that can be supported by the hydrostatic pressure of the water at that point. Corresponds to the water table or piezometric surface under static conditions.
Storage (S) (coefficient of)	The volume of water in cubic feet released from storage in each vertical column of an aquifer having a base 1 foot square when the water table or other piezometric surface declines 1 foot. (This is approximately equal to the specific yield for non-artesian aquifers.)
Stream infiltration	The flow or movement of water through the bed of a stream into the underlying material
Transmissibility (T) (coefficient of)	The rate of flow of water in gallons per day through a section of aquifer 1 foot wide and having a height equal to the saturated thickness of the aquifer, under a hydraulic gradient of 100 percent, and at a temperature of 60°F. The coefficient of transmissibility is equal to the coefficient of permeability times the saturated thickness of the aquifer.
Water table	The upper surface of a zone of saturation.
Zone of aeration	The zone between the water table and the land surface in which the pore spaces of the rocks are not all filled (except temporarily) with water.
Zone of saturation	The zone in which the pore spaces of rocks are saturated with water under hydrostatic pressure.

APPENDIX E

Summary of Areas Reporting Community Sewage Problems

Summary of the Areas Reporting Community Sewage Problems*

SOURCE: Erie County Department of Environmental Quality

* In unsewered communities, these problems are assumed to be due to faulty septic system operation.

---

1. Highland Acres area on South Park Avenue - Town of Hamburg
2. Clifton Heights area along Lake Shore Road - Town of Hamburg
3. Pinehurst area along the Lake Shore Road - Town of Hamburg
4. Lakeview area - Town of Hamburg
5. Village of Farnham - Town of Brant
6. Eden Valley area - Town of Eden
7. Hamlet of Eden on Route 62 - Town of Eden
8. Hamlet of East Eden on the East Eden Road - Town of Eden
9. Grandview area along McKinley Parkway - Town of Hamburg
10. Hamlet of North Boston
11. Hamlet of Patchin
12. Hamlet of Boston
13. Hamlet of New Oregon - Town of North Collins
14. Hamlet of Lawtons - Town of North Collins
15. Hamlet of Collins - Town of Collins
16. Hamlet of Collins Center - Town of Collins
17. Hamlet of Colden - Town of Colden
18. Hamlet of Glenwood - Town of Colden
19. Hamlet of Holland - Town of Holland
20. Hamlet of South Wales - Town of Wales
21. Castle Hill - Glenridge area - Town of Aurora
22. Hamlet of Wales Center - Town of Wales

23. Hamlet of Porterville - Town of Aurora

24. Hamlet of Marilla - Town of Marilla

25. Hamlet of Springbrook - Town of Elma

26. Hamlet of Elma - Town of Elma

27. Hamlet of Bowmansville - Town of Lancaster

28. Hamlet of Millgrove - Town of Alden

29. Hamlet of Clarence - Town of Clarence

30. Hamlet of Clarence Center - Town of Clarence

31. Harris Hill area - Town of Clarence

32. Draudt Subdivision - Town of Hamburg

33. Windover Heights - Town of Hamburg

34. Baseline and Whitehaven Roads - Grand Island

35. Mill Street - Town of Amherst

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ADDENDUM

ADDENDUM TO REPORT NO. 13
GROUNDWATER PROBLEMS/ANALYSIS

Review of Report 13, by the Environmental Protection Agency, New York State Department of Environmental Conservation and interested public has produced various comments. This addendum makes changes in the text to reflect these comments.

Page 13-5, paragraph 1, second sentence. This sentence should be removed and replaced by:

> "Still larger supplies probably could be pumped from abandoned gypsum mines near Akron and Clarence Center."

Page 13-7, paragraph 3, third line. The word "termendous" should read "tremendous".

Page 13-26, paragraph 4, last line. The first word in this line should read "capital".

Page 13-27, paragraph 2, fourth line. The word "partical" should read "particle".

Page 13-30, paragraph 2, third sentence. This sentence should read:

> "When this information is limited or not available, the identification of areas with contaminated groundwater becomes difficult."

Page 13-30, paragraph 3, third line. It should be noted that Chem-trol Pollution Services, Inc., maintains four monitoring wells in the vicinity of their hazardous waste disposal facility, not three as reported in the text.

Page 13-30, paragraph 4, the last line. This line should be removed and replaced by the following:

> "A variety of parameters have been required by New York State Department of Environmental Conservation for groundwater monitoring, including heavy metals and toxic substances such as Chlorinated Hydrocarbons."

Page 13-31, paragraph 3, line eight. Change the second "the" in this sentence to "a".

Page 13-31, paragraph 3, sixth line from the bottom. The third and fourth last sentences in this paragraph should be replaced by:

> "In addition, because of the density of septic tanks in some areas, general pollution of shallow groundwater can be assumed to be occurring in all of these unsewered communities (LaSala, 1968). This does not mean that all wells produce bad water."

Page 13-32, paragraph 1, second sentence. This sentence should be deleted and replaced by the following text:

> "Properly designed and maintained septic systems and wells will significantly reduce the potential for contamination of water supplies if the material in which the septic systems are constructed is suitable."

Page 13-32, paragraph 2. Replace the last sentence with the following text:

> "The nitrogen compounds contained in septic tank effluent oxidize to nitrate in the ground. Due to the lack of groundwater monitoring data, it is not possible to determine the impact of nitrate on groundwater quality or its suitability for drinking water use."

Page 13-32, the last line on the page. The last line should be changed to read:

> "supplies if contamination is occurring."

Page 13-33, paragraph 4, the second line. Change "utilized" to read "utilizes".

Page 13-37, paragraph 2, the second line. Change the second last word to read "keep".

Page 13-38, item 12, fourth line. Change the word "if" to read "in".

Page 13-40, paragraph 3, fifth line. Change the word "choozing" to read "choosing".

Page 13-42, paragraph 1, third line. Insert the word "of" before the word "contaminating".

Page 13-43, paragraph 4, third line. Change the word "camopy" to read "canopy".

Page 13-43, paragraph 5. This paragraph should be deleted and the following inserted in its place:

> "The reader is invited to review Report 14 (Residual Waste Problems/Analysis) for a more detailed description of the sludge disposal problem."

Page 13-48, paragraph 4, first sentence. That part of the sentence enclosed in parenthesis should be deleted.

Page 13-49, item 2, fourth line. The word "larger" should replace the word "layer".

BIBLIOGRAPHIC DATA SHEET	1. Report No. 13	2.	3. Recipient's Accession No.

4. Title and Subtitle

Ground-Water Analysis

5. Report Date: October, 1978

6.

7. Author(s)

Erie and Niagara Counties Regional Planning Board

8. Performing Organization Rept. No.

9. Performing Organization Name and Address

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10. Project/Task/Work Unit No.: Task 13.11

11. Contract/Grant No.: P002111010

12. Sponsoring Organization Name and Address

United States Environmental Protection Agency
Washington, D.C.

13. Type of Report & Period Covered: Final 1/19/76-10/31/78

14.

15. Supplementary Notes

None

16. Abstracts

Ground Water Resources in Erie and Niagara Counties are relied on by approximately 10% of the population for water supply. For this reason, it is important to characterize its flow patterns, its availability, and its quality, for it represents an important environmental issue. The use of the resource could be lost, if the ground water quality have been identified and recommendations have been made for protecting the ground-water quality in the bi-county area, and for establishing monitoring systems.

17. Key Words and Document Analysis. 17a. Descriptors

Ground Water Problems
Water Quality/Ground Water
Ground Water Users
Pollution/Ground Water
Ground-Water Pollution
Ground-Water Analysis

17b. Identifiers/Open-Ended Terms

17c. COSATI Field/Group

18. Availability Statement

United States Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

19. Security Class (This Report): UNCLASSIFIED

20. Security Class (This Page): UNCLASSIFIED

21. No. of Pages: 67

22. Price

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** Resigned as of November 18, 1977.
* This report was prepared by these individuals with assistance of other staff members.

REFERENCE NO. 9

0022-C
02-8803-37

NUS CORPORATION AND SUBSIDIARIES **TELECON NOTE**

CONTROL NO:	DATE: 7-21-88	TIME: 1415

DISTRIBUTION:
Ernst Steel Fab
TDD No. 02-8803-37

BETWEEN: Ron Koczaja	OF: Erie Co. Health	PHONE: (716) 846-7677

AND: Peter Morton - NUS Corp

DISCUSSION:

called regarding municipal water - Erie Co. Water Authority, intakes >3 miles from site

surface water - Scajaquada Creek - limited recreational uses (ie fishing) only

ACTION ITEMS:

NUS 067 REVISED 0685

REFERENCE NO. 10

REVISED, DISPOSE OF PREVIOUS COPIES

10/03/1986 McClanahan 0019S

MEDIAN ELEMENTAL COMPOSITION OF SOILS

ELEMENT		MAXIMUM CONCENTRATION REPORTED AT SITE mg/kg (ppm)	CONCENTRATION IN SOILS RANGE mg/kg (ppm)	TYPICAL MEDIAN mg/kg (ppm)	SOURCE
aluminum	Al		10,000 - 300,000	71,000	1
antimony	Sb		0.2 - 150	6	1,2,3 & 4
arsenic	As		0.1 - 194	11	5
barium	Ba		100 - 3,000	500	1
beryllium	Be		0.01 - 40	0.3	1
boron	B		2 - 270	20	1
bromine	Br		1 - 110	10	1
cadmium	Cd		0.01 - 7	0.5	6
calcium	Ca		< 150 - 500,000	24,000	1 and 7
chlorine	Cl		8 - 1,800	100	1
chromium	Cr		5 - 3,000	100	6
cobalt	Co		0.05 - 65	8	1
copper	Cu		2 - 250	30	1
flourine	F		6 - 7070	270	5
gallium	Ga		2 - 100	20	1
germanium	Ge		0.1 - 50	1	1
iron	Fe		100 - 550,000	40,000	1 and 5
lanthanum	La		2 - 180	40	1
lead	Pb		< 1 - 888	29	5
magnesium	Mg		400 - 9,000	5,000	1
manganese	Mn		20 - 18,300	1,000	1, 5 & 6
mercury	Hg		0.01 - 4.6	0.098	5
molybdenum	Mo		0.1 - 40	2	1 and 6
nickel	Ni		0.1 - 1,530	50	1 and 5
phosphorus	P		35 - 5,300	800	1
potassium	K		80 - 37,000	14,000	1
rubidium	Rb		20 - 1,000	150	1
scandium	Sc		5 - 55	7	1
selenium	Se		0.1 - 38	0.4	1 and 6
silicon	Si		250,000 - 410,000	330,000	1
silver	Ag		0.01 - 8	0.4	5
sodium	Na		150 - 25,000	5,000	1
strontium	Sr		< 3 - 3,500	278	5
sulfur	S		30 - 1,600	700	1
thallium	Tl		0.1 - 0.8	0.2	1
thorium	Th		2 - 13	9	8
tin	Sn		1 - 200	10	1 and 6
titanium	Ti		150 - 25,000	5,000	1
tungsten	W		0.5 - 83	1.5	1
vanadium	V		3 - 500	100	1, 6 & 7
yttrium	Y		< 10 - 200	40	1 and 7
zinc	Zn		1 - 2,000	90	1 and 5
zirconium	Zr		60 - 2,000	400	1

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REFERENCE NO. 11

REFERENCE NO. 12

[illegible]

TDD‾ ‾‾8803-‾‾

SAMPLING DATE: 5/24/88

EPA CASE NO.: 9652 LAB: INDUSTRIAL CORROSION MGMT.

VOLATILES								
Sample ID No.	NYFH-S1(DUP)	NYFH-S7	NYFH-S2	NYFH-S3(MS/MSD)	NYFH-S4	NYFH-S5	NYFH-RIN1	NYFH-TBLK1
Traffic Report No.	BT108	BT131	BT111	BT112	BT113	BT114	BT132	BT133
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	WATER	WATER
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L	ug/L
Dilution Factor	.96	.96	.98	.96	1	.96	1	1
Percent Moisture	17	16	31	31	29	37	--	--
Chloromethane								
Bromomethane								
Vinyl Chloride								
Chloroethane								
Methylene Chloride				23				
Acetone							5800 E	3600 E
Carbon Disulfide								
1,1-Dichloroethene								
1,1-Dichloroethane								
Trans-1,2-Dichloroethene (total)								
Chloroform								
1,2-Dichloroethane								
2-Butanone								
1,1,1-Trichloroethane								
Carbon Tetrachloride								
Vinyl Acetate								
Bromodichloromethane								
1,2-Dichloropropane								
cis-1,3-Dichloropropene								
Trichloroethene								
Dibromochloromethane								
1,1,2-Trichloroethane								
Benzene								
trans-1,3-Dichloropropene								
Bromoform								
4-Methyl-2-Pentanone								
2-Hexanone								
Tetrachloroethene								
Toluene							B	B
1,1,2,2-Tetrachloroethane								
Chlorobenzene								
Ethylbenzene								
Styrene								
Xylenes (Total)								

NOTES:

Blank space - compound analyzed for but not detected

B - compound found in lab blank as well as sample, indicates possible/probable blank contamination

E - estimated value

J - estimated value, compound present below CRQL but above IDL

R - analysis did not pass EPA QA/QC

N - Presumptive evidence of the presence of a compound, but can't be identified

NR - analysis not required

Detection limits elevated if Dilution

TDD#: 02-8803-??
SAMPLING DATE: 5/24/88
EPA CASE NO.: 9652 LAB: INDUSTRIAL CORROSION MGMT.

SEMI-VOLATILES								
Sample ID No.	NYFH-S1(DUP)	NYFH-S7	NYFH-S2	NYFH-S3(MS/MSD)	NYFH-S4	NYFH-S5	NYFH-RIN1	NYFH-TBLK1
Traffic Report No.	BT108	BT131	BT111	BT112	BT113	BT114	BT132	BT133
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	WATER	WATER
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L	ug/L
Dilution Factor	1	1	1	1	1	1	1	N/A
Percent Moisture	17	16	31	31	29	37	--	N/A
Phenol					680			NR
bis(2-Chloroethyl)ether								NR
2-Chlorophenol								NR
1,3-Dichlorobenzene								NR
1,4-Dichlorobenzene								NR
Benzyl alcohol								NR
1,2-Dichlorobenzene								NR
2-Methylphenol								NR
bis(2-Chloroisopropyl)ether								NR
4-Methylphenol								NR
N-Nitroso-di-n-dipropylamine								NR
Hexachloroethane								NR
Nitrobenzene								NR
Isophorone								NR
2-Nitrophenol								NR
2,4-Dimethylphenol								NR
Benzoic acid								NR
bis(2-Chloroethoxy)methane								NR
2,4-Dichlorophenol								NR
1,2,4-Trichlorobenzene								NR
Naphthalene	450	460	J	J	J	J		NR
4-Chloroaniline								NR
Hexachlorobutadiene								NR
4-Chloro-3-Methylphenol								NR
2-Methylnaphthalene	670	740	J	J	750			NR
Hexachlorocyclopentadiene								NR
2,4,6-Trichlorophenol								NR
2,4,5-Trichlorophenol								NR
2-Chloronaphthalene								NR
2-Nitroaniline								NR
Dimethylphthalate								NR
Acenaphthylene								NR
2,6-Dinitrotoluene								NR
3-Nitroaniline								NR
Acenaphthene								NR
2,4-Dinitrophenol								NR
4-Nitrophenol								NR
Dibenzofuran	J	J			J			NR
2,4-Dinitrotoluene								NR
Diethylphthalate								NR
4-Chlorophenyl-phenyl ether								NR
Fluorene								NR
4-Nitroaniline								NR
4,6-Dinitro-2-methylphenol								NR
N-nitrosodiphenylamine								NR
4-Bromophenyl-phenyl ether								NR
Hexachlorobenzene								NR

TDD#: 02-8803-77
SAMPLING DATE: [illegible]/88
EPA CASE NO.: 9652 LAB: INDUSTRIAL CORROSION MGMT.

SEMI-VOLATILES								
Sample ID No.	NYFH-S1(DUP)	NYFH-S7	NYFH-S2	NYFH-S3(MS/MSD)	NYFH-S4	NYFH-S5	NYFH-RIN1	NYFH-TBLK1
Traffic Report No.	BT108	BT131	BT111	BT112	BT113	BT114	BT132	BT133
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	WATER	WATER
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L	ug/L
Dilution Factor	1	1	1	1	1	1	1	N/A
Percent Moisture	17	16	31	31	29	37	—	N/A
Pentachlorophenol								NR
Phenanthrene	450	450	J	J	1100	J		NR
Anthracene					J			NR
Di-n-butylphthalate								NR
Fluoranthene	J	J	600	J	1200	750 E		NR
Pyrene	600	650	540	J	1100	680 E		NR
Butylbenzylphthalate								NR
3,3'-Dichlorobenzidine								NR
Benzo(a)anthracene	550	570	J		910			NR
Chrysene	760	740	680		1300			NR
bis(2-Ethylhexyl)phthalate								NR
Di-n-octylphthalate								NR
Benzo(b)fluoranthene		450	510		980			NR
Benzo(k)fluoranthene		480			620			NR
Benzo(a)pyrene	550	560	J		800			NR
Indeno(1,2,3-cd)pyrene	J	J	J		590	J		NR
Dibenz(a,h)anthracene								NR
Benzo(g,h,i)perylene	J	J	J		580			NR

NOTES:
Blank space - compound analyzed for but not detected
B - compound found in lab blank as well as sample, indicates possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - Presumptive evidence of the presence of a compound, but can't be identified
NR - analysis not required
Detection limits elevated if Dilution Factor >1 and/or percent moisture >0%

SITE NAME: [illegible] STEEL
TDD#: [illegible] 9803-37
SAMPLING DATE: [illegible]
EPA CASE NO.: 9652 LAB: INDUSTRIAL CORROSION MGMT.

PESTICIDES								
Sample ID No.	NYFH-S1(DUP)	NYFH-S7	NYFH-S2	NYFH-S3(MS/MSD)	NYFH-S4	NYFH-S5	NYFH-RIN1	NYFH-TBLK1
Traffic Report No.	BT108	BT131	BT111	BT112	BT113	BT114	BT132	BT133
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	WATER	WATER
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L	ug/L
Dilution Factor	1	1	5	1	1	1	1	N/A
Percent Moisture	17	16	31	31	29	37	—	N/A
alpha-BHC								NR
beta-BHC								NR
delta-BHC								NR
gamma-BHC (Lindane)								NR
Heptachlor								NR
Aldrin								NR
Heptachlor epoxide								NR
Endosulfan I								NR
Dieldrin								NR
4,4'-DDE								NR
Endrin								NR
Endosulfan II								NR
4,4'-DDD								NR
Endosulfan sulfate								NR
4,4'-DDT						43		NR
Methoxychlor								NR
Endrin ketone								NR
alpha-Chlordane								NR
gamma-Chlordane								NR
Toxaphene								NR
Aroclor-1016								NR
Aroclor-1221								NR
Aroclor-1232								NR
Aroclor-1242								NR
Aroclor-1248								NR
Aroclor-1254	J	J	J					NR
Aroclor-1260								NR

NOTES:
Blank space - compound analyzed for but not detected
B - compound found in lab blank as well as sample, indicates possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - Presumptive evidence of the presence of a compound, but can't be identified
NR - analysis not required
Detection limits elevated if Dilution Factor)1 and/or percent moisture)0%

Title: Attachment 2 - CLP Data Assessment Checklist (GC and GC/MS Analysis)
PART II: MMB Review - TOTAL REVIEW

CASE # 9652 LAB ~~Ernest Steel~~ ICM SITE Ernest Steel

19.0 Conclusions: (NOTE: Reviewers must red-line unacceptable data on sample data (FORM I) sheets; red-line data does not imply the compound is not present). Only the MMB reviewer has the authority to red-line unacceptable data. The letter J indicates an estimated value. In addition to the two definitions stated in the contract it also implies that the analyte is present but the quantitative value contains an unspecified deg.ee of error. If an accurate quantity is desired, resampling/analysis is recommended.

19.1 Data Assessment 1) Blanks are required to determine contamination not indigenous to the sample. Method blanks are analyzed along with the samples to determine contamination introduced in the lab by "impure" solvents, "dirty" glassware, etc. Trip and rinse blanks determine contamination introduced in sampling or in lab's preparation of samples. The method blanks in the VOA fraction contained acetone, toluene, methylene chloride and some TIC's. The trip and rinse blanks contained acetone, toluene and TIC's. The soil samples were flagged (u) non-detect and (R) reject (TIC's): all samples.

In the semivolatile fraction the method blank contained di-n-butylphthalate & several TIC's. The soil samples were

19.2 Contract Problems/Non-compliance

Reviewer's Signature: Pamela Greenlaw Date: 10/31/88

Verified By: Stelios Gerazounis Date: 11/9/88

II ASSESSMENT: (cont.) #9652 10/31/88 Pamela Greenlaw

gged (u) non-detect and (R) reject (TIC's): all samples.

2) Calibrations are required to ensure that the instrument is ...le of producing acceptable quantitative data. In the VOA fraction e initial calibrations showed an RSD of >30% for acetone and 2-...none. All samples were flagged (J) estimated for these analytes. One ...ntinuing calibration had a %D > 25% for chloroethane. The associated ...mples were flagged (J) estimated: BT108, 111-114 & 131.

In the semivolatile fraction the calibrations had a %D/%RSD ...eater than contract required limits for diethylphthalate; 3,3'-dichloro...nzidine; 3-nitroaniline; 2,4 dinitrophenol and 4 chlorophenylether. ...e associated samples were flagged (J) estimated: all samples.

3) Internal standards performance criteria insure that GC/MS ...nsitivity and response is stable during every run. In the semivolatile fraction two samples had internal standard recovery below contract required limits. For sample BT 114 and 114Re the recoveries were low for ...henanthrene-d10, chrysene-d12 and perylene-d12. All associated analytes were flagged (J) estimated. For sample BT 112 and 112RE the ...recoveries were low for chrysene d-12 and perylene-d-12. All associated analytes were flagged (J) estimated.

ICM
1152 Route 10
Randolph, NJ 07869
201-584-0330
FAX #201-584-0515

Contract 68-W8-0046

Case #: 9852
SDG #: BT108
Region II

Samples:

BT108	BT114
BT111	BT131
BT112	BT132
BT113	BT133

Case Narrative

Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Richard Levine — 7/1/88

Richard Levine
Laboratory Manager

Date

Extractions

The pH of water sample BT132 was 3.49. This sample was extracted for both ABN and Pesticide/PCBs on Saturday 5/28/88. Since we were unable to contact a DPO for resolution without exceeding the sample holding time, the technician adjusted the sample to a neutral pH with 10N NaOH and proceeded with the extraction. The DPO was notified on Monday 5/31/88.

Volatiles

Water sample BT132 was used as a matrix spike/matrix spike duplicate. Due to the high level of acetone (5800 ppb) this sample was reanalyzed at a 50 times dilution. The matrix spike and matrix spike duplicate were also analyzed both straight and at a 50 times dilution.

Pesticides/PCBs

1. Arochlor 1254 patterns were detected or suspected on several of the chromatograms. Therefore, after the extracts were run on the primary and confirmation columns, the extracts were subjected to an acid clean-up and run as ZZZZZ samples in the same confirmation sequence. The arochlor pattern immerged clearly on three of the samples (BT108, BT111, and BT131). Copies of these chromatograms are included for your information.

Values reported were calculated to 1254 from primary column results. Calculations based on the cleaned-up samples on the confirmatory column are somewhat lower.

	ug/kg Arochlor 1254	
	Primary	Confirm.(clean-up)
BT108	150	116
BT111	290	106
BT131	110	97

It will be noted that the arochlor pattern of the cleaned-up extracts resemble Arochlor [illegible] as well as Arochlor 1254

2. DBC retention time of BT108 is 2.2% on the confirmation run which does not meet criteria. When this extract was acid cleaned and run (sample number 28 on Form 3E) the DBC % difference was 2.0%. Although the computer flagged this value as out, it would seem that it does meet the criteria of "not to exceed 2.0%".

3. We believe that the DBC retention time shift on BT132MS and BT132MSD on the confirmation column was due to co-eluting matrix interference rather than an instrumental problem for the following reasons: a) the samples immediately before and after these showed no shift at all and analytical conditions did not change. b) DBC recoveries calculated from these runs are 300% and 340% indicating the presence of a co-eluting compound.

4. On sample BT114, DDT was called as a "hit" since a peak appeared in the windows of both columns. We do not, however, believe this compound is present in the sample since the calculated concentration levels from the two dissimilar columns are vastly different, 207PG for SP2250/2401 and 444PG for OV-1.

5. On the GC primary column SP2250/2401, Endrin Ketone coelutes with DBC.

6. On the GC confirmation column OV-1, Endrin Aldehyde coelutes with 4,4'DDD and breakdown was therefore reported on Form VIII Pest-1 as combined.

Semivolatiles

1. Di-n-butyl phthalate was detected in BT132MS, BT132MSD, BT112MS, and BT112MSD. Di-n-butyl phthalate is a compound in our spike which is purchased as a spiking mixture from Supelco (although Di-n-butyl phthalate is not a specified matrix spike compound in the SOW).

2. When samples BT112, BT112MSD, and BT114 were first analyzed the internal standard areas were not within QC limits. Corrective action was taken which included clipping the column and replacing the inlet liner. All three of the samples were then reanalyzed. The internal standard areas again did not meet QC limits, indicating a matrix interference problem. Both sets of data have been submitted.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT108

Lab Name: ICM Contract: 68-W8-0046

Lab Code: ICM Case No.: 9652 SAS No.: SDG No.: BT108

Matrix: (soil/water) SOIL Lab Sample ID:

Sample wt/vol: 5. (g/mL) G Lab File ID: B2230

Level: (low/med) LOW Date Received: 5/25/88

% Moisture: not dec. 17. Date Analyzed: 6/ 4/88

Column: (pack/cap) PACK Dilution Factor: .96

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.	UJ
75-09-2	Methylene Chloride	6.	U
67-64-1	Acetone	36.	~~[illegible]~~ UJ
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	12.	UJ
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
108-10-1	4-Methyl-2-Pentanone	12.	U
591-78-6	2-Hexanone	12.	U
127-18-4	Tetrachloroethene	6.	U
79-34-5	1,1,2,2-Tetrachloroethane	6.	U
108-88-3	Toluene	~~3.~~ 6	~~BJ~~ U
108-90-7	Chlorobenzene	6.	U
100-41-4	Ethylbenzene	6.	U
100-42-5	Styrene	6.	U
1330-20-7	Xylene (total)	6.	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT131

Lab Name: ICM   Contract: 68-W8-0046

Lab Code: ICM   Case No.: 9652   SAS No.:   SDG No.: BT108

Matrix: (soil/water) SOIL   Lab Sample ID:

Sample wt/vol: 5. (g/mL) G   Lab File ID: B2229

Level: (low/med) LOW   Date Received: 5/25/89

Moisture: not dec. 16.   Date Analyzed: 6/ 4/89

Column: (pack/cap) PACK   Dilution Factor: .96

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	(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.	UJ
75-09-2	Methylene Chloride	6.	U
67-64-1	Acetone	20.	~~B~~ UJ
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	11.	UJ
71-55-6	1,1,1-Trichloroethane	6.	U
56-23-5	Carbon Tetrachloride	6.	U
108-05-4	Vinyl Acetate	11.	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
108-10-1	4-Methyl-2-Pentanone	11.	U
591-78-6	2-Hexanone	11.	U
127-18-4	Tetrachloroethene	6.	U
79-34-5	1,1,2,2-Tetrachloroethane	6.	U
108-88-3	Toluene	6.	~~B~~ U
108-90-7	Chlorobenzene	6.	U
100-41-4	Ethylbenzene	6.	U
100-42-5	Styrene	6.	U
1330-20-7	Xylene (total)	6.	U

FORM I VOA   1/87 Rev.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT111

a Name: ICM Contract: 68-W8-0046

ab Code: ICM Case No.: 9652 SAS No.: SDG No.: BT108

atrix: (soil/water) SOIL Lab Sample ID:

a ple wt/vol: 5. (g/mL) G Lab File ID: B2227

evel: (low/med) LOW Date Received: 5/25/88

isture: not dec. 31. Date Analyzed: 6/ 4/88

olumn: (pack/cap) PACK Dilution Factor: .98

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	14.	U
74-83-9	Bromomethane	14.	U
75-01-4	Vinyl Chloride	14.	U
75-00-3	Chloroethane	14.	UJ
75-09-2	Methylene Chloride	8.	BJ
67-64-1	Acetone	14	BJ UJ
75-15-0	Carbon Disulfide	7.	U
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	14.	UJ
71-55-6	1,1,1-Trichloroethane	7.	U
56-23-5	Carbon Tetrachloride	7.	U
108-05-4	Vinyl Acetate	14.	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
108-10-1	4-Methyl-2-Pentanone	14.	U
591-78-6	2-Hexanone	14.	U
127-18-4	Tetrachloroethene	7.	U
79-34-5	1,1,2,2-Tetrachloroethane	7.	U
108-88-3	Toluene	7	BJ a)
108-90-7	Chlorobenzene	7.	U
100-41-4	Ethylbenzene	7.	U
100-42-5	Styrene	7.	U
1330-20-7	Xylene (total)	7.	U

4. Colden (on highland areas between streams)
5. Aurora (on highland areas between streams)
6. Clarence (north of the Thruway, in the vicinity of Clarence Center).

Niagara County -

Overburden thickness in Niagara County is generally adequate, but in many places, it has low permeability. It should be noted that this is the general case. Isolated areas with thin, or nonexistant, overburden probably exist in the bi-county area which have not been presented. Detailed site inspection is advised for all areas before construction is undertaken.

Thin overburden may lead to the blasting of bedrock to allow installation of septic systems. This practice is not recommended. Blasting further opens fractures, creates new ones, and increases the infiltration capacity of the bedrock, allowing easy entry of effluent. The probability of contamination is high under these conditions.

Fortunately, reported incidents of septic tank effluent contamination are few and widely spaced. As long as correct design, construction, and maintenance procedures are followed, protection of the ground water from septic tank effluent should be adequate.

1. Infiltration from a pollution source to the subsurface.
2. Percolation through the unsaturated zone.
3. Transport and dispersion of disposed substances within the ground-water flow system.

After the mechanisms have been evaluated, it is necessary to define the hydrogeologic setting. Much of this information is available from pre-existing information but, detailed, on site analysis should directly follow the review of existing information. The nature of the flow system, the depth to the water table, the permeability of the overburden, and the direction of ground-water flow are fundamental inputs to this analysis. If the preliminary investigation indicates that a given site may be a potential threat to the quality of the ground water, a monitoring system should be installed as soon as possible to verify the suspicion. It should be designed such that all the parameters necessary to interpret changes in ground water quality are measured in addition to those of public health significance. Analyses for the following parameters should be conducted:

1. Color
2. Turbidity
3. Coliform Organisms
4. Alkalinity
5. Ammonia
6. Heavy Metals (Barium, Boron, Cadmium, Zinc, Chromium, Copper, Lead, Magnesium, Arsenic)
7. Chloride
8. Sulfate
9. Nitrate
10. Sodium
11. Iron (filterable)
12. pH
13. Total Dissolved Solids
14. Flouride
15. Hardness
16. Total Organic and Inorganic Carbon
17. BOD
18. Selected Organic Compounds

It may not be necessary to analyze for all of the above parameters, depending upon what sort of material is accepted by the site under investigation. Municipal waste sites will produce leachate of somewhat different character than industrial waste sites. Differences such as this should be taken into account when deciding on an analysis plan.

to detect failure of properly designed waste disposal facilities, and to guard against not recognizing the failure of a waste disposal site to properly handle leachate. They cannot, in themselves, prevent contamination of ground-water supplies.

C. RECOMMENDATIONS FOR FUTURE MONITORING

Regulations for ground water monitoring systems are currently being reviewed and amended by the State Department of Environmental Conservation as part of the proposed Part 360 of the New York State Solid Waste Regulations.

As Part 360 reads now, all new solid waste disposal sites, and all modified sites will be required to install a minimum of three observation wells. At least two of these wells are required to be down gradient from the site. The present wording of the regulation allows the State a great degree of flexibility as to the number, and location of wells on a site by site basis.

As all new or modified sites will be required by law to install a monitoring system, very little is left to be said regarding those sites. However, Part 360 also states that existing sites may be required to install monitoring systems if the State determines it is necessary. This should also be expanded to include those closed sites that may be contaminating ground waters as indicated by reported problems with wells, or other indications of leachate migration.

Factors which should be studied when making the decision to monitor an existing waste site are:

1. PROXIMITY OF SITE TO DOMESTIC WELLS - If the landfill is close to areas which depend on ground water supplies, the site should be monitored to provide for sufficient warning if the ground water supply should become contaminated by leachate.

2. UNFAVORABLE GEOLOGIC CONDITIONS - Where closed or existing sites have been constructed in bedrock, or in highly permeable material such as sand and gravel, rapid migration of leachate is possible. Moreover, leachate will affect a layer area much quicker, due to the hydraulic characteristics of the material. A monitoring system would help to characterize this migration and would provide a warning system if contamination were to occur.

3. HIGH WATER TABLE - In areas where the seasonally high water table is close to land surface, direct contact between the saturated zone and the base of the landfill may be occurring. Under such conditions contamination of ground water supplies may be occurring at an accelerated rate.

In addition to solid waste sites, monitoring possibilities should be investigated at all sewage treatment plants and water treatment plants which utilize lagoons as part of the treatment process. Industrial waste sites should also make use of monitoring systems - although this would be a more difficult regulation to enforce. Monitoring of this type would be most effective if carried out in industrial concentration areas South of Buffalo along Lake Erie, and in the Niagara Falls Industrial Area on the Niagara River. Under these conditions, proportionately fewer wells would be needed to monitor the potential sources of contamination as one well may effectively monitor contamination from a number of sources.

/ps
2/7/77

APPENDIX A

Tables

TABLE 15-1. VARIOUS AQUIFERS IN THE ERIE-NIAGARA REGION

AQUIFER	TYPE	YIELDS	THICKNESS	PERMEABILITY OR TRANSMISSIBILITY	REMARKS
Lockport Dolomite	Bedrock	31 gpm average	150'	330 to 68,000 gpd/ft.	Dolomite
Camillus Shale	Bedrock	300-1200 gpm	400'	40,000-70,000 gpd/ft. Some values low as 7,000 gpd/ft.	Large amounts of gypsum
Limestone Unit	Bedrock	Up to 300 gpm	174'	4,000-25,000 gpd/ft.	Similar to Lockport Dolomite
Upper Aquifer	Overburden	Variable	Variable	Permeability (gpd/ft^2) Variable	
Lake Clays and Silts		0-1 gpm	Variable	Approximately .8 gpd/ft^2	Not exploitable
Till		0-5 gpm	Variable	Variable, approximately 20 gpd/ft^2	Only domestic supplies
Sand and Gravel		500-600 gpm	Variable	Variable, 1,000-3,000 gpd/ft^2	Most municipalities with ground water supplies use this
Alluvium		up to 20 gpm	Variable	Variable, approximately 300 gpd/ft^2	Limited extent

TABLE 13-2: NON-DOMESTIC USEAGE OF GROUND WATER RESOURCES
(MUNICIPAL WATER SUPPLIES)

User & Type of Useage	No. of Wells	Location	Combined Yield	Plant Capacity	Treatment	Fm. Pumped & Well Depth	Remarks
Town of Holland W26-13	1	Water St.	---	150,000 gpd 140 gpm	Coke Aerator Chlorination	12-14 feet into bedrock, 214'	Contact Gord Hessel at 537-2778
Chaffee Hamlet 31-05	1	---	---	20,000 gpd	---	Sand and Gravel	---
Village of Springville W31-17	2	Buffalo St. Central	1,130 gpm	---	Flouride Chlorination Calgon	Sand and Gravel 150' deep	Wells close together
Village of Middleport	1 Collec-	Mountain Road	75,000 gpd (52 gpm)	---	None	Limestone (Lockport Dolomite) 15' deep, 60' dia.	Contact Arthu Kraatz, Supt. at 735-3303

APPENDIX B

Figures

GENERALIZED GEOLOGIC MAP

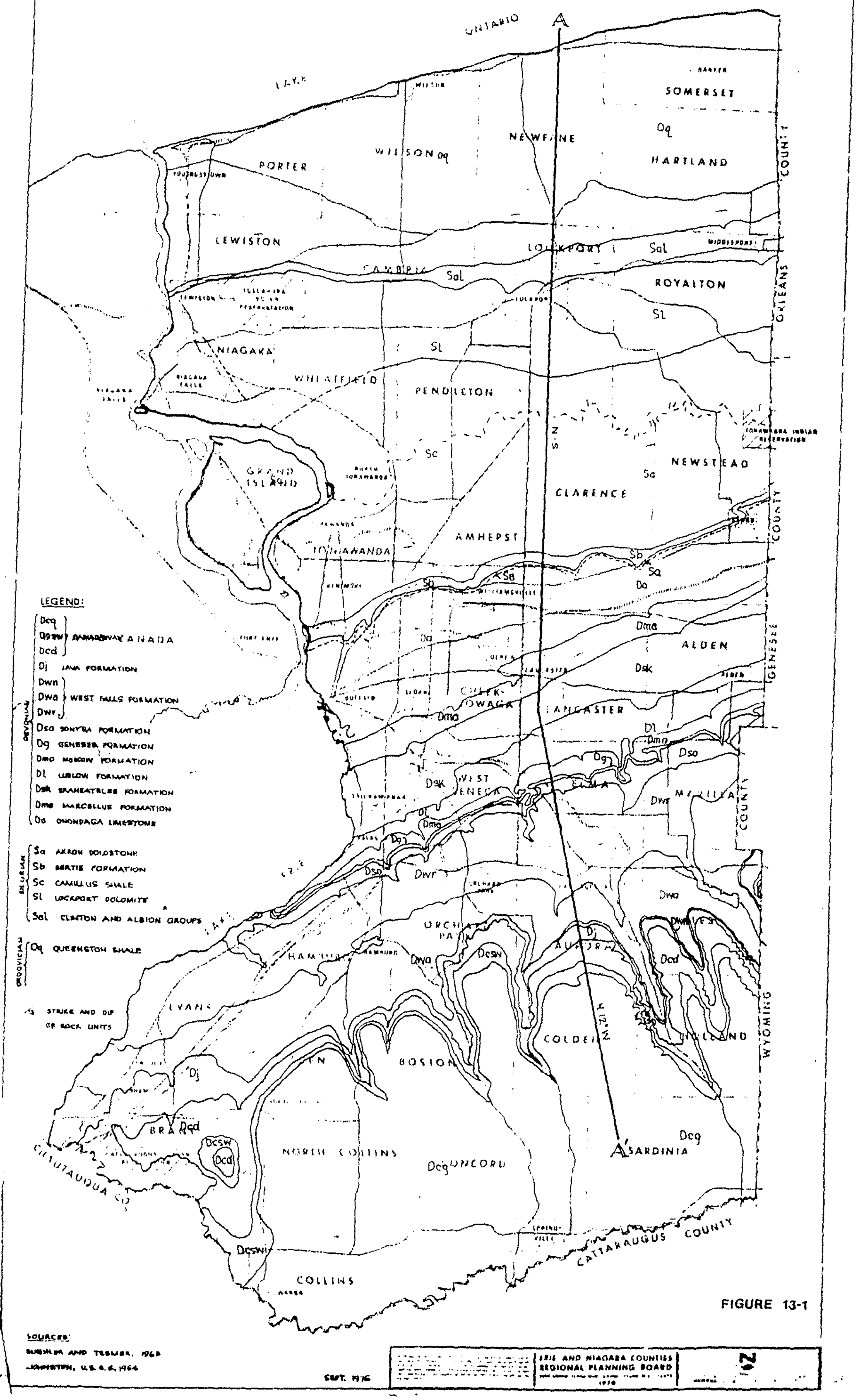


FIGURE 13-1

GENERALIZED GEOLOGIC CROSS SECTION A-A'
(TO ACCOMPANY FIGURE 13-1)

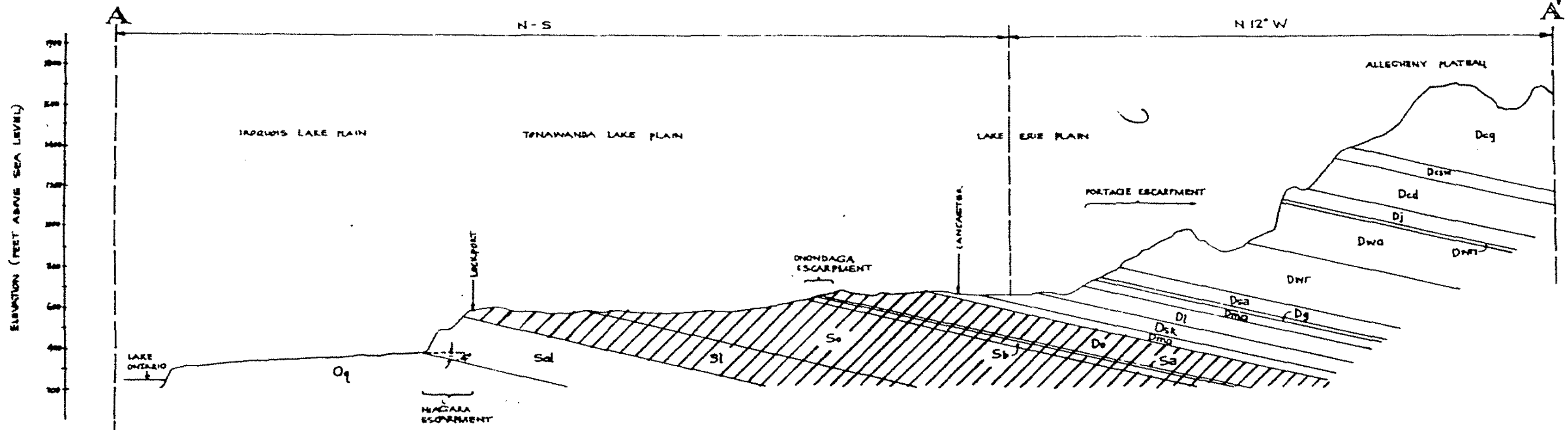


FIGURE 13-2

VERTICAL SCALE: 1"=2540'
VERTICAL EXAGGERATION: ~40X

AREAWIDE WASTE TREATMENT MANAGEMENT PLANNING STUDY

ERIE AND NIAGARA COUNTIES
REGIONAL PLANNING BOARD

SOURCE: ERIE AND NIAGARA COUNTIES REGIONAL PLANNING BOARD

SEPT. 1976

SURFACE MATERIALS

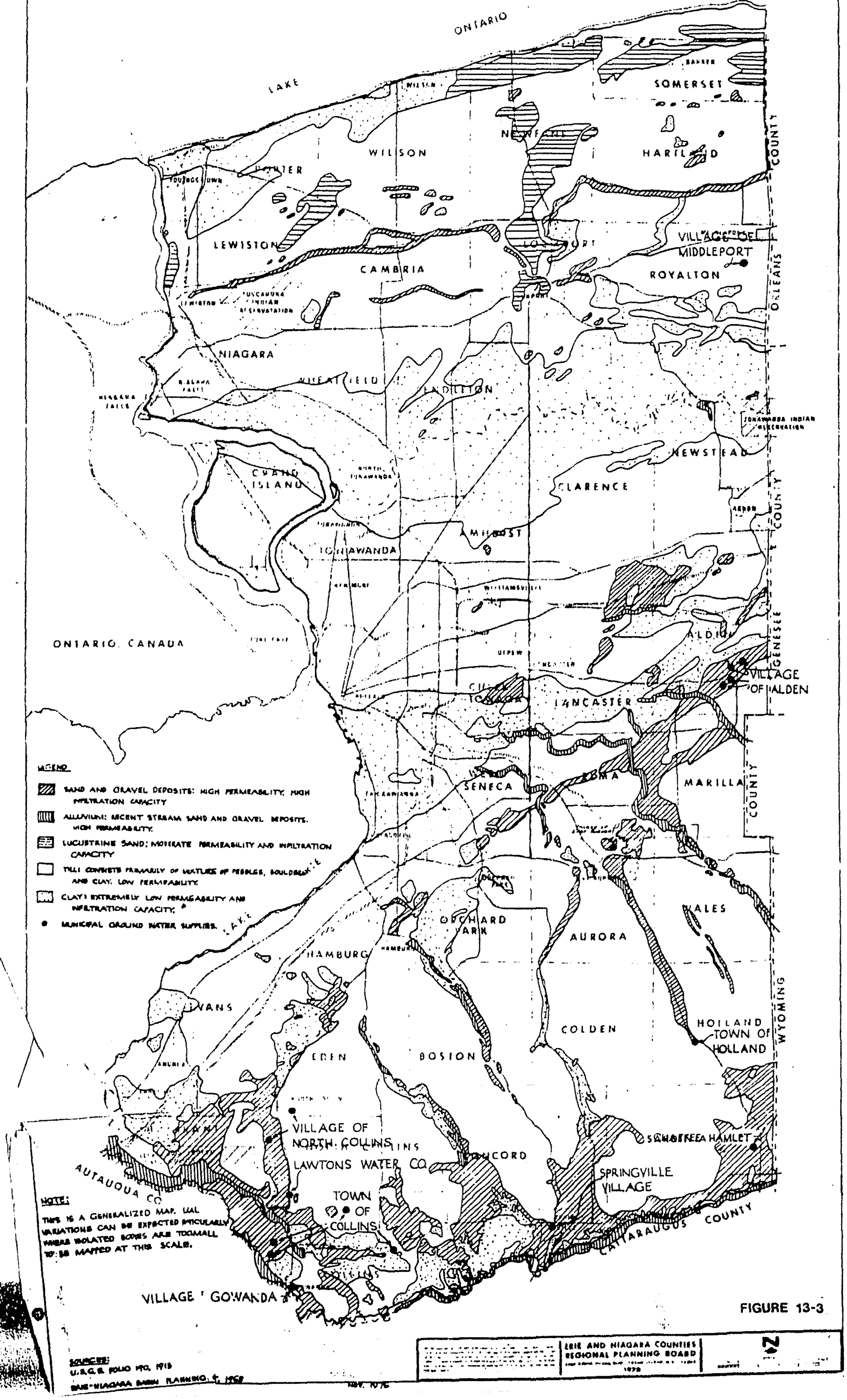


FIGURE 13-3

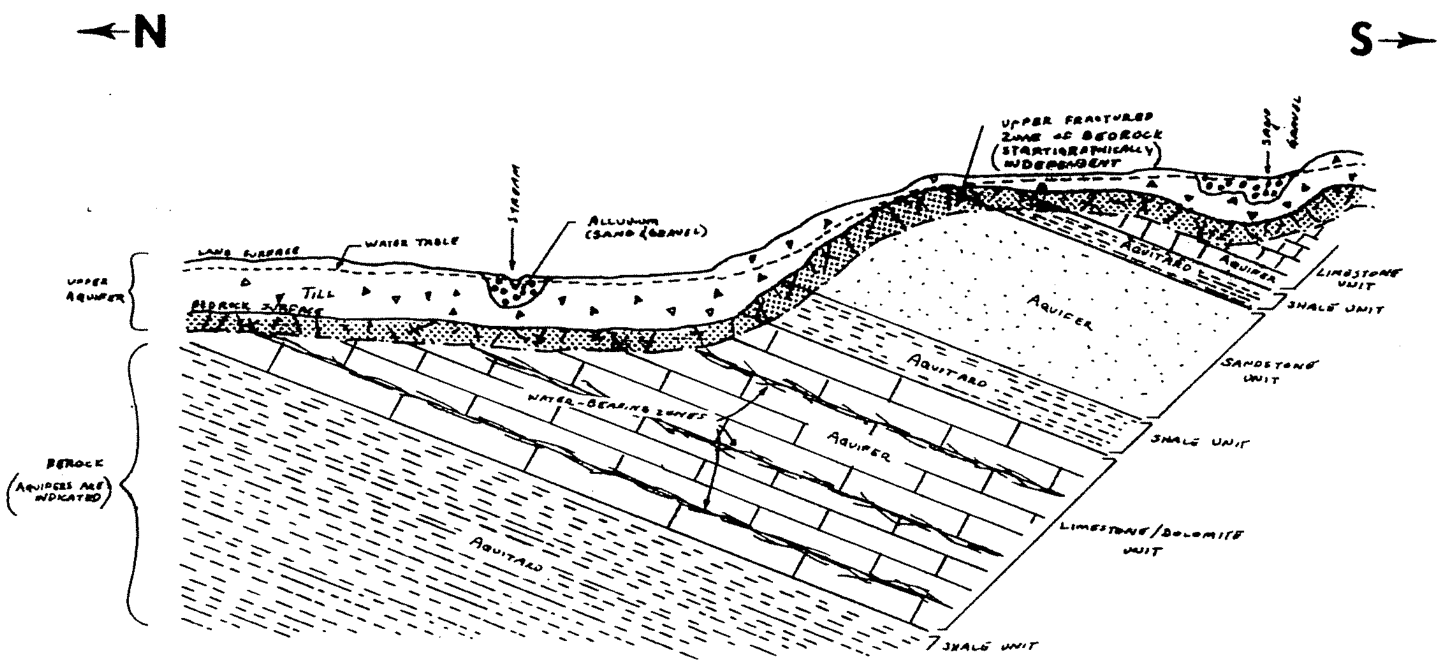
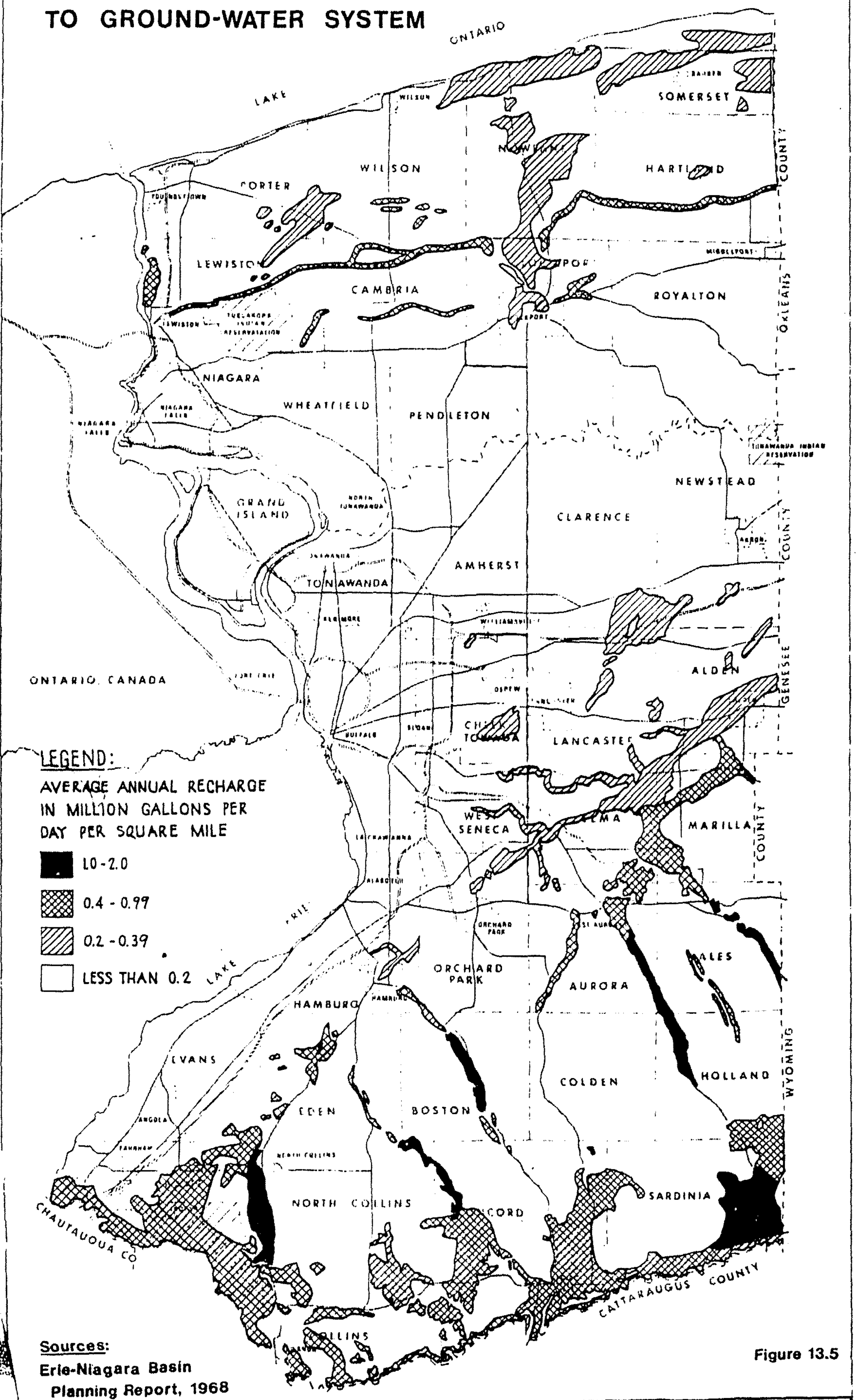


Figure 13-4: Schematic cross section of the major aquifer types found in the Erie-Niagara Region. Note that the upper aquifer which includes the overburden and the upper, fractured bedrock, is continuous over the area wher as the bedrock aquifers are effective only in limited areas. The vertical scale is exaggerated for clarity. Actual dip angle of rock layers is between 0.3 and 0.4 degrees.

AVERAGE ANNUAL RECHARGE TO GROUND-WATER SYSTEM



Sources:
Erie-Niagara Basin Planning Report, 1968
Erie and Niagara Counties Regional Planning Board

Dec. '77

Figure 13.5

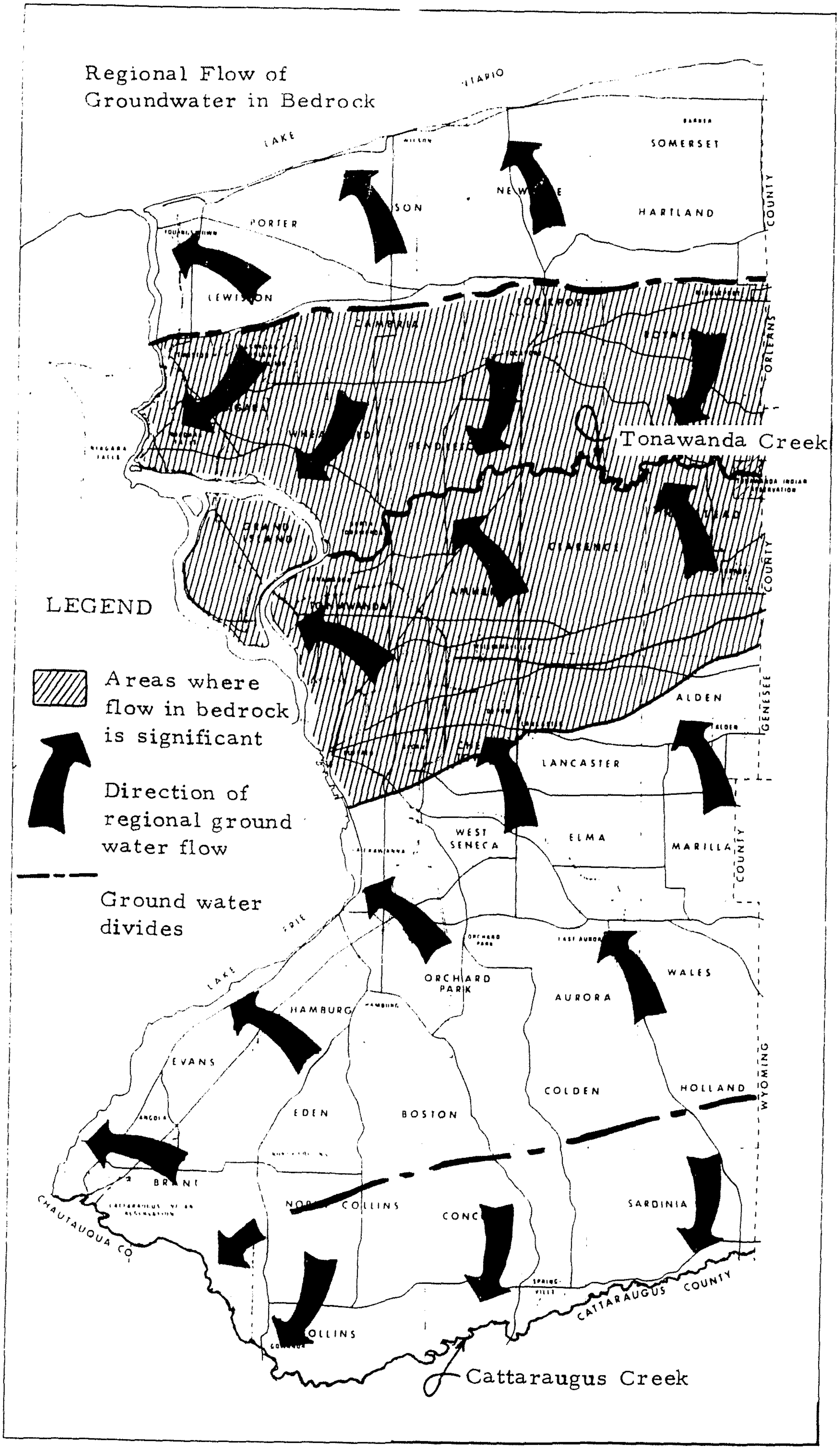
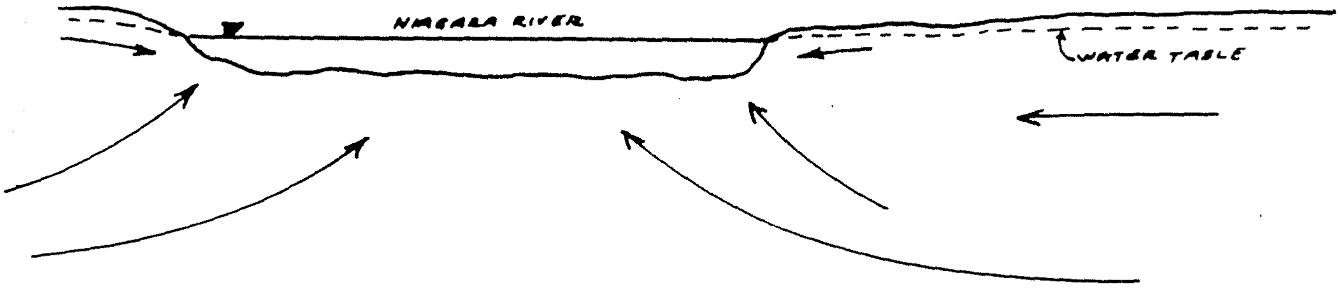
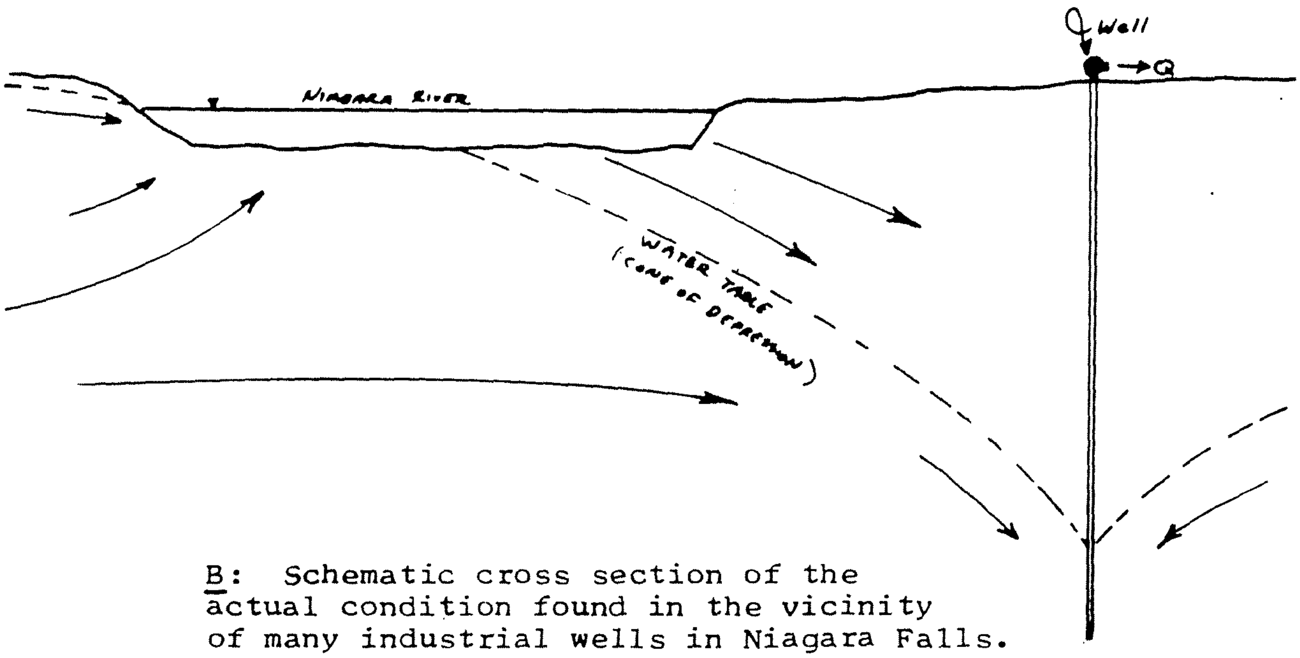

Regional Flow of Groundwater in Bedrock
LEGEND
Areas where flow in bedrock is significant
Direction of regional ground water flow
Ground water divides
Tonawanda Creek
Cattaraugus Creek
LAKE
SOMERSET
HARTLAND
PORTER
LEWISTON
LOCKPORT
CAMBRIA
ORLEANS
COUNTY
CLARENCE
ALDEN
GENESEE
LANCASTER
WEST SENECA
ELMA
MARILLA
ERIE
LAKE
ORCHARD PARK
AURORA
WALES
HAMBURG
EVANS
EDEN
BOSTON
COLDEN
HOLLAND
WYOMING
NORTH COLLINS
SARDINIA
CHAUTAUQUA CO
COLLINS
CATTARAUGUS COUNTY

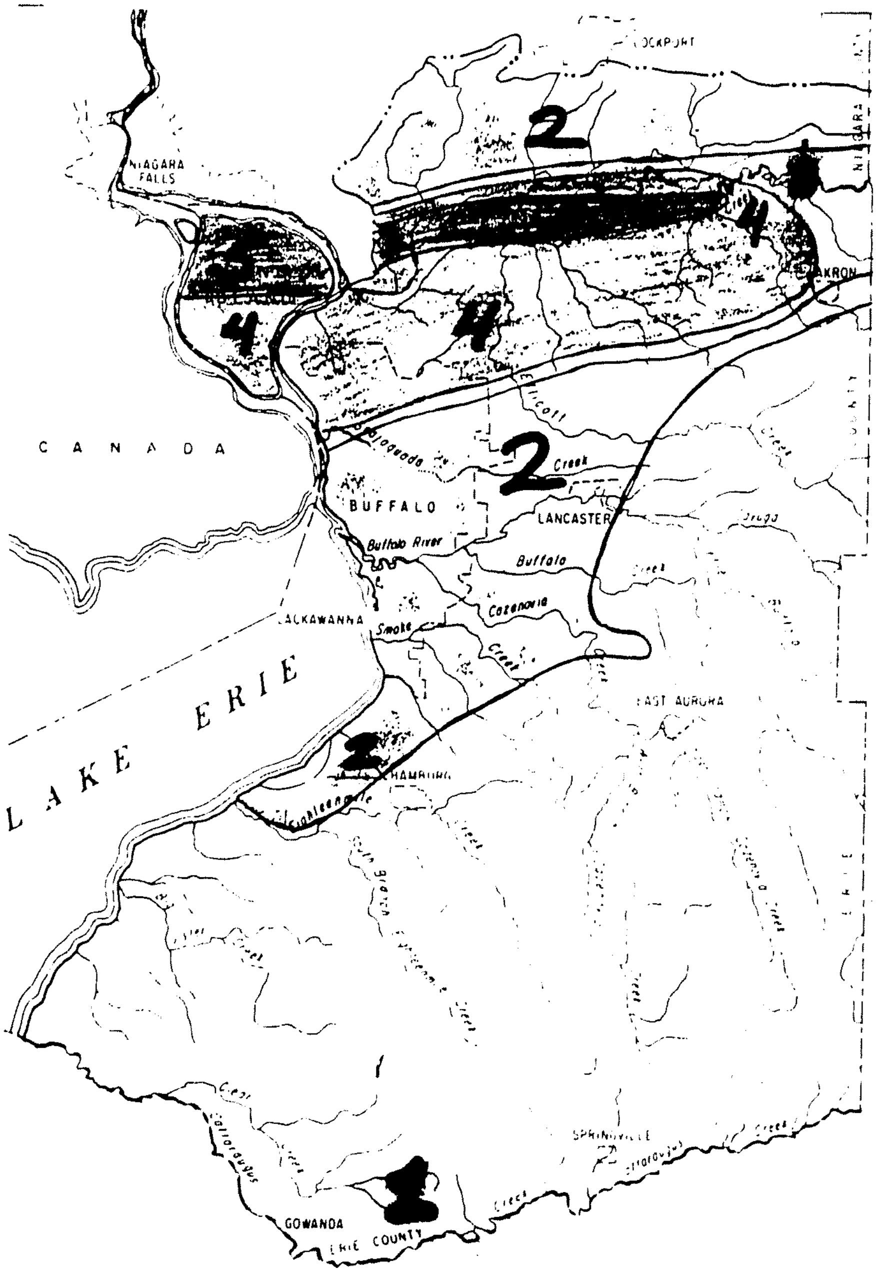
Figure 13-7: Effect of high pumping rates on the direction of ground water flow in the Niagara Falls industrial area.



A: Schematic cross section showing direction of ground-water flow in a natural environment. No pumping demands are placed on the aquifer.



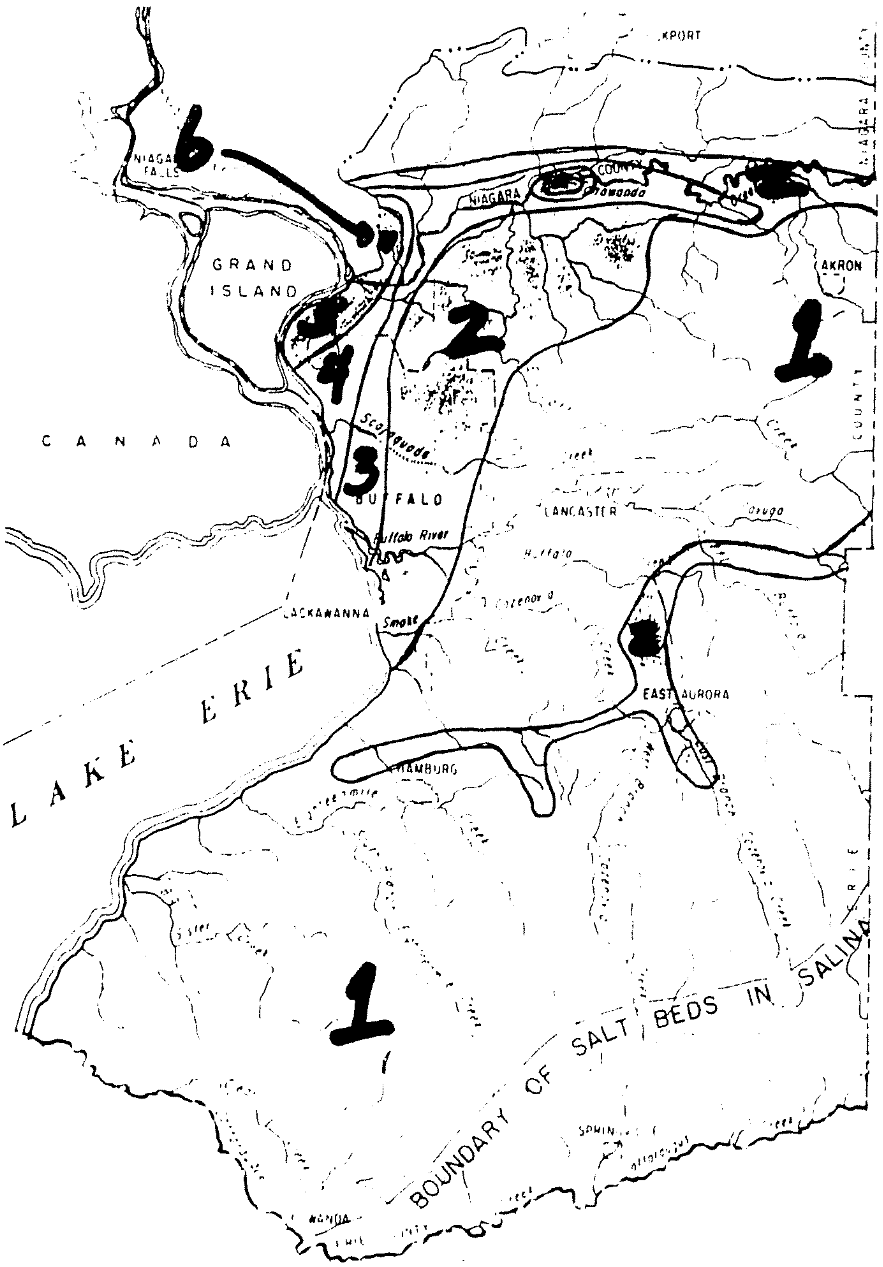
B: Schematic cross section of the actual condition found in the vicinity of many industrial wells in Niagara Falls. The cone of depression has intersected the Niagara River, causing water to move into the aquifer from the stream (induced infiltration).



LEGEND: Sulfate content, in milligrams per liter

1	2	3	4	5
0-100	100-500	500-1000	1000-1500	1500-2000

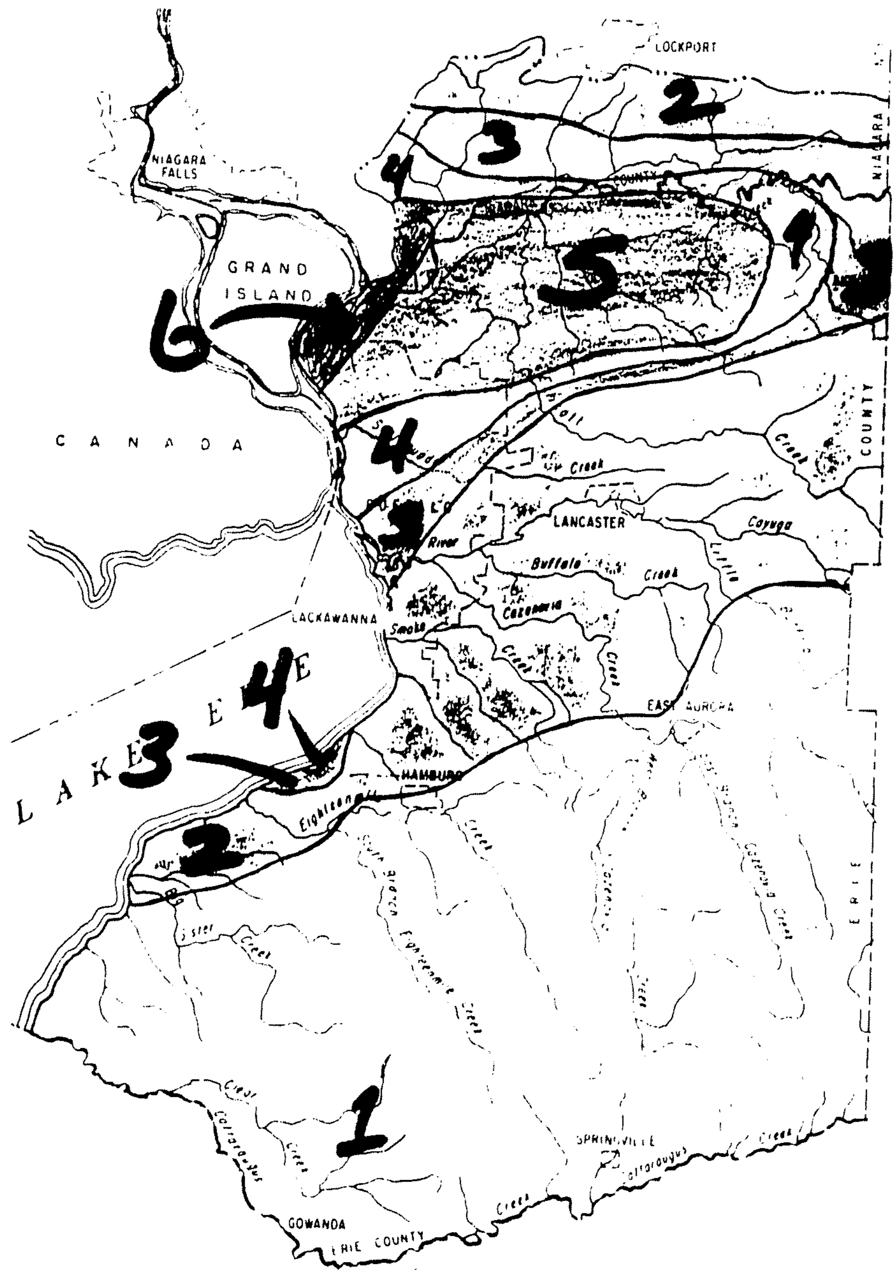
Figure 13-8: Sulfate content of water in bedrock for Erie County and the southern part of Niagara County. SOURCE: LaSala, 1968, Ground-Water Resources of the Erie-Niagara Basin, New York.



LEGEND: Chloride content, in milligrams per liter

1	2	3	4	5	6
<100	100-500	500-1000	1000-1500	1500-2000	2000-2500

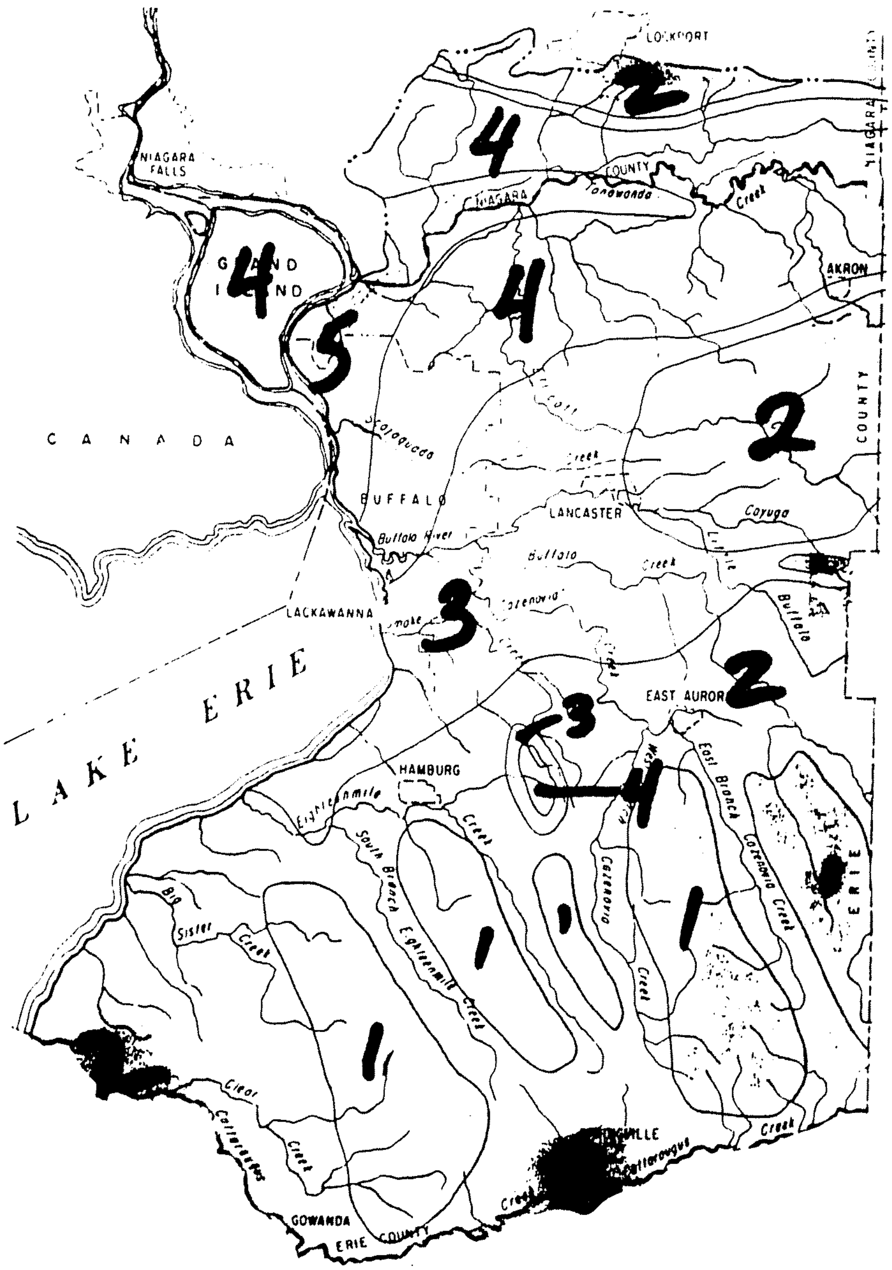
Figure 13-9: Chloride content of water in bedrock in Erie County and the southern part of Niagara County. SOURCE: LaSala, 1968, Ground-Water Resources of the Erie-Niagara Basin, New York.



LEGEND: Hardness (as $CaCO_3$), in milligrams per liter

1	2	3	4	5	6
<250	250-500	500-1000	1000-1500	1500-2000	2000-3000

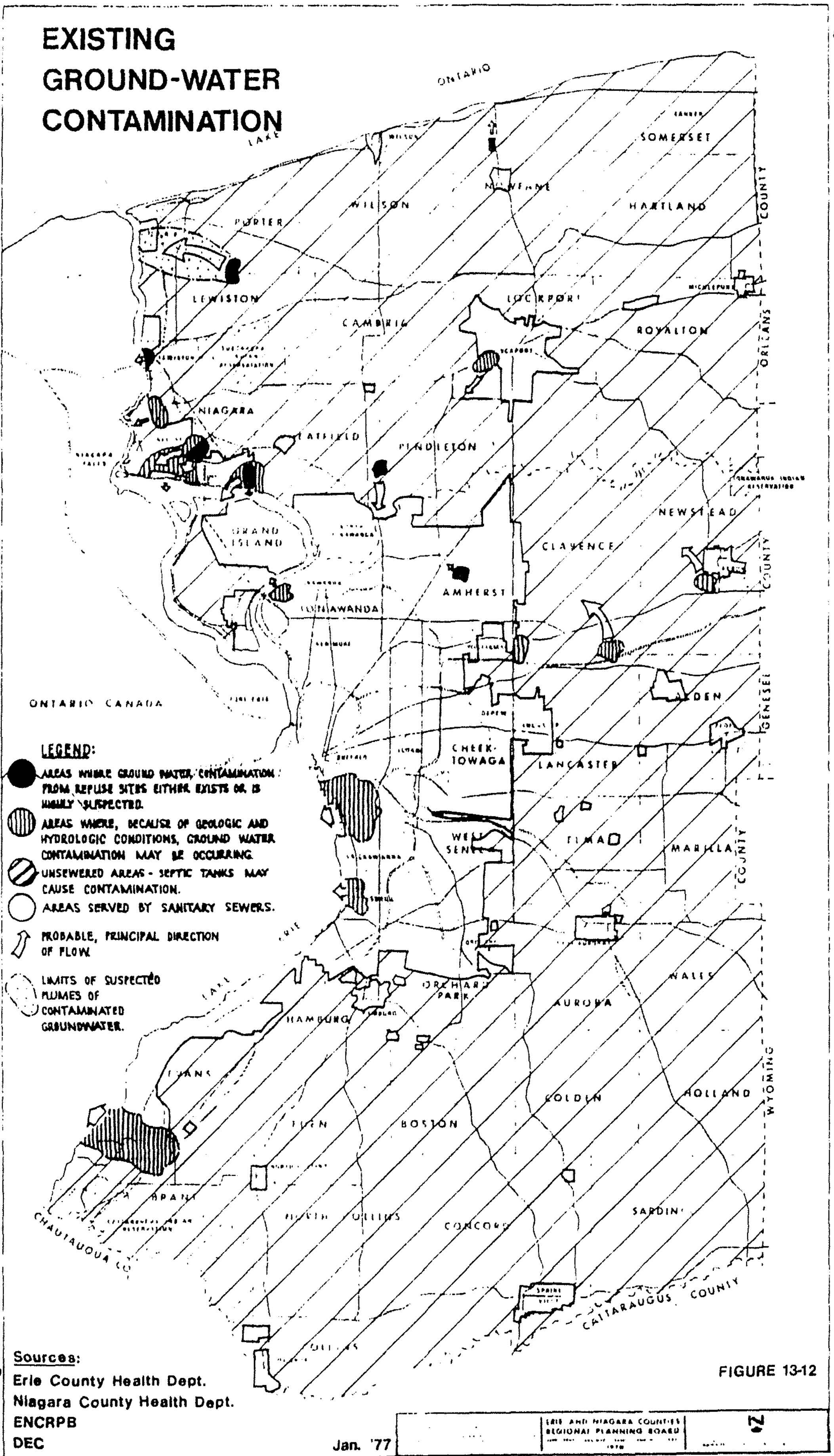
Figure 13-10: Hardness (as $CaCO_3$) of water in bedrock in Erie County and the southern part of Niagara County. SOURCE: LaSala, 1968, Ground-Water Resources of the Erie-Niagara Basin, New York.



LEGEND: Specific conductance, in micromhos per centimeter at 25°C.

1	2	3	4	5
< 500	500-1000	1000-1500	1500-3000	3000-9000

Figure 13-11: Specific conductance of water in bedrock in Erie and parts of Niagara Counties. SOURCE: LaSala, 1968, Ground-Water Resources of the Erie-Niagara Basin, New York.


EXISTING
GROUND-WATER
CONTAMINATION
ONTARIO
LAKE
SOMERSET
WILSON
HARTLAND
PORTER
LEWISTON
LOCKPORT
CAMBRIA
ROYALTON
NIAGARA
PENDLETON
GRAND ISLAND
NEWSTEAD
CLARENCE
AMHERST
TONAWANDA
ONTARIO CANADA
ALDEN
CHEEK-TOWAGA
LANCASTER
WEST SENECA
ELMA
MARILLA
ORCHARD PARK
WALES
AURORA
HAMBURG
EVANS
COLDEN
HOLLAND
BOSTON
BRANT
CONCORD
SARDINIA
CHAUTAUQUA CO.
CATTARAUGUS COUNTY
ORLEANS COUNTY
GENESEE COUNTY
WYOMING
LEGEND:
AREAS WHERE GROUND WATER CONTAMINATION FROM REFUSE SITES EITHER EXISTS OR IS HIGHLY SUSPECTED.
AREAS WHERE, BECAUSE OF GEOLOGIC AND HYDROLOGIC CONDITIONS, GROUND WATER CONTAMINATION MAY BE OCCURRING.
UNSEWERED AREAS - SEPTIC TANKS MAY CAUSE CONTAMINATION.
AREAS SERVED BY SANITARY SEWERS.
PROBABLE, PRINCIPAL DIRECTION OF FLOW.
LIMITS OF SUSPECTED PLUMES OF CONTAMINATED GROUNDWATER.
Sources:
Erie County Health Dept.
Niagara County Health Dept.
ENCRPB
DEC
Jan. '77
FIGURE 13-12
ERIE AND NIAGARA COUNTIES REGIONAL PLANNING BOARD

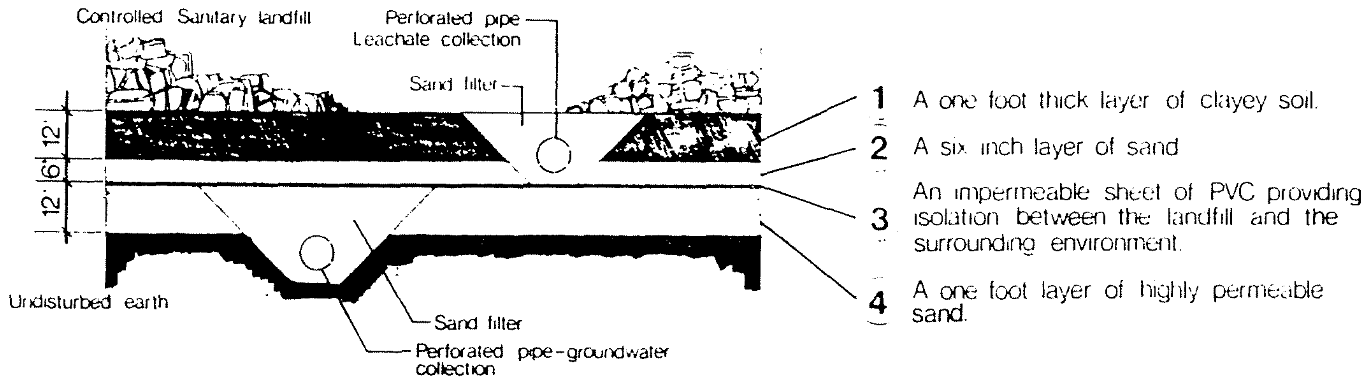


Figure 13-13: Design environmental protection measures for lining waste disposal sites. SOURCE: Giddings, T.M., 1977, The Lycoming County, Sanitary Landfill: State-of-the Art in Ground-Water Protection. Ground Water, vol. 15, no. 1, pp. 5-15.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT133

ab Name: ICM   Contract: 68-W8-0046

Lab Code: ICM   Case No.: 9652   SAS No.:   SDG No.: BT108

atrix: (soil/water) WATER   Lab Sample ID:

Sample wt/vol: 5. (g/mL) ML   Lab File ID: B2193

Level: (low/med) LOW   Date Received: 5/25/88

Moisture: not dec.100.   Date Analyzed: 6/ 3/88

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	3600 D ~~2700.~~	~~E~~ J
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.	UJ
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
108-10-1	4-Methyl-2-Pentanone	10.	U
591-78-6	2-Hexanone	10.	U
127-18-4	Tetrachloroethene	5.	U
79-34-5	1,1,2,2-Tetrachloroethane	5.	U
108-88-3	Toluene	1.	BJ
108-90-7	Chlorobenzene	5.	U
100-41-4	Ethylbenzene	5.	U
100-42-5	Styrene	5.	U
1330-20-7	Xylene (total)	5.	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT108

Lab Name: ICM Contract: 68-W8-0046

Lab Code: ICM Case No.: 9530 SAS No.: SDG No.: BT108

Matrix: (soil/water) SOIL Lab Sample ID:

Sample wt/vol: 30. (g/mL) G Lab File ID: C0298

Level: (low/med) LOW Date Received: 5/25/88

% Moisture: not dec. 17. dec. 0. Date Extracted: 6/ 2/88

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 6/22/88

GPC Cleanup: (Y/N) N pH: 7.2 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	400.	U
111-44-4	bis(2-Chloroethyl)ether	400.	U
95-57-8	2-Chlorophenol	400.	U
541-73-1	1,3-Dichlorobenzene	400.	U
106-46-7	1,4-Dichlorobenzene	400.	U
100-51-6	Benzyl alcohol	400.	U
95-50-1	1,2-Dichlorobenzene	400.	U
95-48-7	2-Methylphenol	400.	U
108-60-1	bis(2-Chloroisopropyl)ether	400.	U
106-44-5	4-Methylphenol	400.	U
621-64-7	N-Nitroso-di-n-propylamine	400.	U
67-72-1	Hexachloroethane	400.	U
98-95-3	Nitrobenzene	400.	U
78-59-1	Isophorone	400.	U
88-75-5	2-Nitrophenol	400.	U
105-67-9	2,4-Dimethylphenol	400.	U
65-85-0	Benzoic acid	2000.	U
111-91-1	bis(2-Chloroethoxy)methane	400.	U
120-83-2	2,4-Dichlorophenol	400.	U
120-82-1	1,2,4-Trichlorobenzene	400.	U
91-20-3	Naphthalene	450.	
106-47-8	4-Chloroaniline	400.	U
87-68-3	Hexachlorobutadiene	400.	U
59-50-7	4-Chloro-3-methylphenol	400.	U
91-57-6	2-Methylnaphthalene	670.	
77-47-4	Hexachlorocyclopentadiene	400.	U
88-06-2	2,4,6-Trichlorophenol	400.	U
95-95-4	2,4,5-Trichlorophenol	2000.	U
91-58-7	2-Chloronaphthalene	400.	U
88-74-4	2-Nitroaniline	2000.	U
131-11-3	Dimethylphthalate	400.	U
208-96-8	Acenaphthylene	400.	U
606-20-2	2,6-Dinitrotoluene	400.	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT109

Lab Name: ICM Contract: 68-W8-0046

Lab Code: ICM Case No.: 9652 SAS No.: SDG No.: BT109

Matrix: (soil/water) SOIL Lab Sample ID:

Sample wt/vol: 30. (g/mL) G Lab File ID: C0290

Level: (low/med) LOW Date Received: 5/25/89

% Moisture: not dec. 17. dec. Date Extracted: 6/ 3/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 6/20/89

GPC Cleanup: (Y/N) N pH: 7.5 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	2000.	U J
83-32-9	Acenaphthene	400.	U
51-28-5	2,4-Dinitrophenol	2000.	U J
100-02-7	4-Nitrophenol	2000.	U
132-64-9	Dibenzofuran	190.	J
121-14-2	2,4-Dinitrotoluene	400.	U
84-66-2	Diethylphthalate	400.	U J
7005-72-3	4-Chlorophenyl-phenylether	400.	U J
86-73-7	Fluorene	400.	U
100-01-6	4-Nitroaniline	2000.	U
534-52-1	4,6-Dinitro-2-methylphenol	2000.	U
86-30-6	N-Nitrosodiphenylamine (1)	400.	U
101-55-3	4-Bromophenyl-phenylether	400.	U
118-74-1	Hexachlorobenzene	400.	U
87-86-5	Pentachlorophenol	2000.	U
85-01-8	Phenanthrene	450.	
120-12-7	Anthracene	400.	U
84-74-2	Di-n-butylphthalate	400.	U
206-44-0	Fluoranthene	280.	J
129-00-0	Pyrene	500.	
85-68-7	Butylbenzylphthalate	400.	U
91-94-1	3,3'-Dichlorobenzidine	810.	U J
56-55-3	Benzo(a)anthracene	550.	
218-01-9	Chrysene	750.	
117-81-7	bis(2-Ethylhexyl)phthalate	400.	U
117-84-0	Di-n-octylphthalate	400.	U
205-99-2	Benzo(b)fluoranthene	400.	U
207-08-9	Benzo(k)fluoranthene	400.	U
50-32-8	Benzo(a)pyrene	550.	
193-39-5	Indeno(1,2,3-cd)pyrene	300.	J
53-70-3	Dibenz(a,h)anthracene	400.	U
191-24-2	Benzo(g,h,i)perylene	290.	J

(1) - Cannot be separated from diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT[illegible]21

Lab Name: ICM   Contract: [illegible]

Lab Code: ICM   Case No.: [illegible]   SAS No.:   SDG No.: BT109

Matrix: (soil/water) SOIL   Lab Sample ID:

Sample wt/vol: 30. (g/mL) G   Lab File ID: [illegible]

Level: (low/med) LOW   Date Received: [illegible]

% Moisture: not dec. 16. dec. 0.   Date Extracted: [illegible]

Extraction: (SepF/Cont/Sonc) SONC   Date Analyzed: [illegible]

GPC Cleanup: (Y/N) N   pH: 7.6   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	400.	U
111-44-4	bis(2-Chloroethyl)ether	400.	U
95-57-8	2-Chlorophenol	400.	U
541-73-1	1,3-Dichlorobenzene	400.	U
106-46-7	1,4-Dichlorobenzene	400.	U
100-51-6	Benzyl alcohol	400.	U
95-50-1	1,2-Dichlorobenzene	400.	U
95-48-7	2-Methylphenol	400.	U
108-60-1	bis(2-Chloroisopropyl)ether	400.	U
106-44-5	4-Methylphenol	400.	U
621-64-7	N-Nitroso-di-n-propylamine	400.	U
67-72-1	Hexachloroethane	400.	U
98-95-3	Nitrobenzene	400.	U
78-59-1	Isophorone	400.	U
88-75-5	2-Nitrophenol	400.	U
105-67-9	2,4-Dimethylphenol	400.	U
65-85-0	Benzoic acid	2000.	U
111-91-1	bis(2-Chloroethoxy)methane	400.	U
120-83-2	2,4-Dichlorophenol	400.	U
120-82-1	1,2,4-Trichlorobenzene	400.	U
91-20-3	Naphthalene	460.	
106-47-8	4-Chloroaniline	400.	U
87-68-3	Hexachlorobutadiene	400.	U
59-50-7	4-Chloro-3-methylphenol	400.	U
91-57-6	2-Methylnaphthalene	740.	
77-47-4	Hexachlorocyclopentadiene	400.	U
88-06-2	2,4,6-Trichlorophenol	400.	U
95-95-4	2,4,5-Trichlorophenol	2000.	U
91-58-7	2-Chloronaphthalene	400.	U
88-74-4	2-Nitroaniline	2000.	U
131-11-3	Dimethylphthalate	400.	U
208-96-8	Acenaphthylene	400.	U
606-20-2	2,6-Dinitrotoluene	400.	U

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1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ST131

Lab Name: ICM   Contract: 68-W0-0016

Lab Code: ICM   Case No.: 9952   SAS No.:   SDG No.: ST102

Matrix: (soil/water) SOIL   Lab Sample ID:

Sample wt/vol: 30.0 (g/mL) G   Lab File ID: [illegible]

Level: (low/med) LOW   Date Received: 5/25/90

% Moisture: not dec. 10   dec. [illegible]   Date Extracted: [illegible]/90

Extraction: (SepF/Cont/Sonc) SONC   Date Analyzed: [illegible]/90

GPC Cleanup: (Y/N) N   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	2000.	U J
83-32-9	Acenaphthene	400	U
51-28-5	2,4-Dinitrophenol	2000.	U J
100-02-7	4-Nitrophenol	2000.	U
132-64-9	Dibenzofuran	190.	J
121-14-2	2,4-Dinitrotoluene	400.	U
84-66-2	Diethylphthalate	400.	U J
7005-72-3	4-Chlorophenyl phenylether	400.	U J
86-73-7	Fluorene	400.	U
100-01-6	4-Nitroaniline	2000.	U
534-52-1	4,6-Dinitro-2-methylphenol	2000.	U
86-30-6	N-Nitrosodiphenylamine (1)	400.	U
101-55-3	4-Bromophenyl-phenylether	400.	U
118-74-1	Hexachlorobenzene	400.	U
87-86-5	Pentachlorophenol	2000.	U
85-01-8	Phenanthrene	450.	
120-12-7	Anthracene	400.	U
84-74-2	Di-n-butylphthalate	400.	U
206-44-0	Fluoranthene	270.	J
129-00-0	Pyrene	550	
85-68-7	Butylbenzylphthalate	400	U
91-94-1	3,3'-Dichlorobenzidine	790.	U J
56-55-3	Benzo(a)anthracene	570.	
218-01-9	Chrysene	740.	
117-81-7	bis(2-Ethylhexyl)phthalate	400.	U
117-84-0	Di-n-octylphthalate	400.	U
205-99-2	Benzo(b)fluoranthene	450.	
207-08-9	Benzo(k)fluoranthene	480.	
50-32-8	Benzo(a)pyrene	560.	
193-39-5	Indeno(1,2,3-cd)pyrene	320.	J
53-70-3	Dibenz(a,h)anthracene	400.	U
191-24-2	Benzo(g,h,i)perylene	260.	J

(1) - Cannot be separated from diphenylamine

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

RT111

...me: ICM Contract: 68-W9-0046

...de: ICM Case No.: 9652 SAS No.: SDG No.: RT109

... (soil/water) SOIL Lab Sample ID:

... wt/vol: 31. (g/mL) G Lab File ID: [illegible]

... (low/med) LOW Date Received: 5/25/93

...sture: not dec. 31 dec. [illegible] Date Extracted: [illegible]

...ction: (SepF/Cont/Sonc) SONC Date Analyzed: [illegible]

...eanup: (Y/N) N pH: 7.5 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	460.	U
111-44-4	bis(2-Chloroethyl)ether	460.	U
95-57-8	2-Chlorophenol	460	U
541-73-1	1,3-Dichlorobenzene	460.	U
106-46-7	1,4-Dichlorobenzene	460.	U
100-51-6	Benzyl alcohol	460.	U
95-50-1	1,2-Dichlorobenzene	460.	U
95-48-7	2-Methylphenol	460.	U
108-60-1	bis(2-Chloroisopropyl)ether	460.	U
106-44-5	4-Methylphenol	460.	U
621-64-7	N-Nitroso-di-n-propylamine	460.	U
67-72-1	Hexachloroethane	460.	U
98-95-3	Nitrobenzene	460.	U
78-59-1	Isophorone	460.	U
88-75-5	2-Nitrophenol	460.	U
105-67-9	2,4-Dimethylphenol	460.	U
65-85-0	Benzoic acid	2300.	U
111-91-1	bis(2-Chloroethoxy)methane	460.	U
120-83-2	2,4-Dichlorophenol	460.	U
120-82-1	1,2,4-Trichlorobenzene	460.	U
91-20-3	Naphthalene	71.	J
106-47-8	4-Chloroaniline	460.	U
87-68-3	Hexachlorobutadiene	460.	U
59-50-7	4-Chloro-3-methylphenol	460.	U
91-57-6	2-Methylnaphthalene	340.	J
77-47-4	Hexachlorocyclopentadiene	460.	U
88-06-2	2,4,6-Trichlorophenol	460.	U
95-95-4	2,4,5-Trichlorophenol	2300.	U
91-58-7	2-Chloronaphthalene	460.	U
88-74-4	2-Nitroaniline	2300.	U
131-11-3	Dimethylphthalate	460.	U
208-96-8	Acenaphthylene	460.	U
606-20-2	2,6-Dinitrotoluene	460.	U

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1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT111

Lab Name: ICM Contract: 68-W8-0046

Lab Code: ICM Case No.: 9650 SAS No.: SDG No.: BT108

Matrix: (soil/water) SOIL Lab Sample ID:

Sample wt/vol: 31. (g/mL) G Lab File ID: [illegible]

Level: (low/med) LOW Date Received: 5/05/98

% Moisture: not dec. 31 dec. 0 Date Extracted: 5/ /98

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 6/08/98

GPC Cleanup: (Y/N) N pH: 7.5 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
88-74-4	2-Nitroaniline	2300.	U
83-32-9	Acenaphthene	460.	U
51-28-5	2,4-Dinitrophenol	2300.	U
100-02-7	4-Nitrophenol	2300.	U
132-64-9	Dibenzofuran	460.	U
121-14-2	2,4-Dinitrotoluene	460.	U
84-66-2	Diethylphthalate	460.	U
7005-72-3	4-Chlorophenyl-phenylether	460.	U
86-73-7	Fluorene	460.	U
100-01-6	4-Nitroaniline	2300.	U
534-52-1	4,6-Dinitro-2-methylphenol	2300.	U
86-30-6	N-Nitrosodiphenylamine (1)	460.	U
101-55-3	4-Bromophenyl-phenylether	460.	U
118-74-1	Hexachlorobenzene	460.	U
87-86-5	Pentachlorophenol	2300.	U
85-01-8	Phenanthrene	380.	J
120-12-7	Anthracene	460.	U
84-74-2	Di-n-butylphthalate	460.	U
206-44-0	Fluoranthene	600.	
129-00-0	Pyrene	510.	
85-68-7	Butylbenzylphthalate	460.	U
91-94-1	3,3'-Dichlorobenzidine	930.	U
56-55-3	Benzo(a)anthracene	380.	J
218-01-9	Chrysene	520.	
117-81-7	bis(2-Ethylhexyl)phthalate	460.	U
117-84-0	Di-n-octylphthalate	460.	U
205-99-2	Benzo(b)fluoranthene	510.	
207-08-9	Benzo(k)fluoranthene	460.	U
50-32-8	Benzo(a)pyrene	380.	J
193-39-5	Indeno(1,2,3-cd)pyrene	400.	J
53-70-3	Dibenz(a,h)anthracene	460.	U
191-24-2	Benzo(g,h,i)perylene	400.	J

(1) - Cannot be separated from diphenylamine

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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.: BT11[illegible]

Lab Name: ICM   Contract: 68-W8-0046

Lab Code: ICM   Case No.: [illegible]   SAS No.:   SDG No.: BT109

Matrix: (soil/water) SOIL   Lab Sample ID:

Sample wt/vol: 30 (g/mL) G   Lab File ID: [illegible]

Level: (low/med) LOW   Date Received: [illegible]

% Moisture: not dec. 31   dec. 0   Date Extracted: [illegible]

Extraction: (SepF/Cont/Sonc) SONC   Date Analyzed: [illegible]

GPC Cleanup: (Y/N) N   pH: 7.7   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	480.	U
111-44-4	bis(2-Chloroethyl)ether	480.	U
95-57-8	2-Chlorophenol	480.	U
541-73-1	1,3-Dichlorobenzene	480.	U
106-46-7	1,4-Dichlorobenzene	480.	U
100-51-6	Benzyl alcohol	480.	U
95-50-1	1,2-Dichlorobenzene	480.	U
95-48-7	2-Methylphenol	480.	U
108-60-1	bis(2-Chloroisopropyl)ether	480.	U
106-44-5	4-Methylphenol	480.	U
621-64-7	N-Nitroso-di-n-propylamine	480.	U
67-72-1	Hexachloroethane	480.	U
98-95-3	Nitrobenzene	480.	U
78-59-1	Isophorone	480.	U
88-75-5	2-Nitrophenol	480.	U
105-67-9	2,4-Dimethylphenol	480.	U
65-85-0	Benzoic acid	2400.	U
111-91-1	bis(2-Chloroethoxy)methane	480.	U
120-83-2	2,4-Dichlorophenol	480.	U
120-82-1	1,2,4-Trichlorobenzene	480.	U
91-20-3	Naphthalene	66.	J
106-47-8	4-Chloroaniline	480.	U
87-68-3	Hexachlorobutadiene	480.	U
59-50-7	4-Chloro-3-methylphenol	480.	U
91-57-6	2-Methylnaphthalene	92.	J
77-47-4	Hexachlorocyclopentadiene	480.	U
88-06-2	2,4,6-Trichlorophenol	480.	U
95-95-4	2,4,5-Trichlorophenol	2400.	U
91-58-7	2-Chloronaphthalene	480.	U
88-74-4	2-Nitroaniline	2400.	U
131-11-3	Dimethylphthalate	480.	U
208-96-8	Acenaphthylene	480.	U
606-20-2	2,6-Dinitrotoluene	480.	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.: BT112

Lab Name: ICM   Contract: 68-W9-0045

Lab Code: ICM   Case No.: 9652   SAS No.:   SDG No.: BT102

Matrix: (soil/water) SOIL   Lab Sample ID:

Sample wt/vol: 30 (g/mL) G   Lab File ID: [illegible]

Level: (low/med) LOW   Date Received: 5/05/92

% Moisture: not dec. 21   dec.   Date Extracted: [illegible]

Extraction: (SepF/Cont/Sonc) SONC   Date Analyzed: [illegible]

GPC Cleanup: (Y/N) N   pH: 7.7   Dilution Factor: [illegible]

CONCENTRATION UNITS: (ug/L or ug/Kg) [illegible]

CAS NO.	COMPOUND	CONCENTRATION	Q
99-09-2	3-Nitroaniline	2400.	U J
83-32-9	Acenaphthene	480.	U
51-28-5	2,4-Dinitrophenol	2400.	U J
100-02-7	4-Nitrophenol	2400.	U
132-64-9	Dibenzofuran	480.	U
121-14-2	2,4-Dinitrotoluene	480.	U
84-66-2	Diethylphthalate	480.	U J
7005-72-3	4-Chlorophenyl-phenylether	480.	U J
86-73-7	Fluorene	480.	U
100-01-6	4-Nitroaniline	2400.	U
534-52-1	4,6-Dinitro-2-methylphenol	2400.	U
86-30-6	N-Nitrosodiphenylamine (1)	480.	U
101-55-3	4-Bromophenyl-phenylether	480.	U
118-74-1	Hexachlorobenzene	480.	U
87-86-5	Pentachlorophenol	2400.	U
85-01-8	Phenanthrene	220.	J
120-12-7	Anthracene	480.	U
84-74-2	Di-n-butylphthalate	~~[illegible]~~ 480	U
206-44-0	Fluoranthene	270.	J
129-00-0	Pyrene	250.	J
85-68-7	Butylbenzylphthalate	480.	U J
91-94-1	3,3'-Dichlorobenzidine	950.	U J
56-55-3	Benzo(a)anthracene	480.	U J
218-01-9	Chrysene	480.	U J
117-81-7	bis(2-Ethylhexyl)phthalate	480.	U J
117-84-0	Di-n-octylphthalate	480.	U J
205-99-2	Benzo(b)fluoranthene	480.	U J
207-08-9	Benzo(k)fluoranthene	480.	U J
50-32-8	Benzo(a)pyrene	480.	U J
193-39-5	Indeno(1,2,3-cd)pyrene	480.	U J
53-70-3	Dibenz(a,h)anthracene	480.	U J
191-24-2	Benzo(g,h,i)perylene	480.	U J

(1) - Cannot be separated from diphenylamine

..S DATA SHEET

Contract: 68-W8-

Case No.: 9650 SAS No.:

(soil/water) SOIL Lab Sample

Sample wt/vol: 29. (g/mL) G Lab File ID

Level: (low/med) LOW Date Received

Moisture: not dec. 29. dec. 0. Date Extracted

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed:

GPC Cleanup: (Y/N) N pH: 7.1 Dilution Factor

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	690.	
111-44-4	bis(2-Chloroethyl)ether	530.	U
95-57-8	2-Chlorophenol	530.	U
541-73-1	1,3-Dichlorobenzene	530.	U
106-46-7	1,4-Dichlorobenzene	530.	U
100-51-6	Benzyl alcohol	530.	U
95-50-1	1,2-Dichlorobenzene	530.	U
95-48-7	2-Methylphenol	530.	U
108-60-1	bis(2-Chloroisopropyl)ether	530.	U
106-44-5	4-Methylphenol	530	U
621-64-7	N-Nitroso-di-n-propylamine	530.	U
67-72-1	Hexachloroethane	530.	U
98-95-3	Nitrobenzene	530.	U
78-59-1	Isophorone	530.	U
88-75-5	2-Nitrophenol	530.	U
105-67-9	2,4-Dimethylphenol	530.	U
65-85-0	Benzoic acid	2700.	U
111-91-1	bis(2-Chloroethoxy)methane	530.	U
120-83-2	2,4-Dichlorophenol	530.	U
120-82-1	1,2,4-Trichlorobenzene	530.	U
91-20-3	Naphthalene	500.	J
106-47-8	4-Chloroaniline	530.	U
87-68-3	Hexachlorobutadiene	530.	U
59-50-7	4-Chloro-3-methylphenol	530.	U
91-57-6	2-Methylnaphthalene	750.	
77-47-4	Hexachlorocyclopentadiene	530.	U
88-06-2	2,4,6-Trichlorophenol	530.	U
95-95-4	2,4,5-Trichlorophenol	2700.	U
91-58-7	2-Chloronaphthalene	530.	U
88-74-4	2-Nitroaniline	2700.	U
131-11-3	Dimethylphthalate	530.	U
208-96-8	Acenaphthylene	530.	U
606-20-2	2,6-Dinitrotoluene	530.	U

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1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT112

Lab Name: ICM Contract: 68-W8-0046

Lab Code: ICM Case No.: 9657 SAS No.: SDG No.: BT102

Matrix: (soil/water) SOIL Lab Sample ID:

Sample wt/vol: 26. (g/mL) G Lab File ID: [illegible]

Level: (low/med) LOW Date Received: [illegible]

% Moisture: not dec. 39. dec. 0. Date Extracted: [illegible]

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: [illegible]

GPC Cleanup: (Y/N) N pH: [illegible] Dilution Factor: [illegible]

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	2700.	U
83-32-9	Acenaphthene	530.	U
51-28-5	2,4-Dinitrophenol	2700.	U
100-02-7	4-Nitrophenol	2700.	U
132-64-9	Dibenzofuran	260.	J
121-14-2	2,4-Dinitrotoluene	530.	U
84-66-2	Diethylphthalate	530.	U J
7005-72-3	4-Chlorophenyl-phenylether	530.	U
86-73-7	Fluorene	530.	U
100-01-6	4-Nitroaniline	2700.	U
534-52-1	4,6-Dinitro-2-methylphenol	2700.	U
86-30-6	N-Nitrosodiphenylamine (1)	530.	U
101-55-3	4-Bromophenyl-phenylether	530.	U
118-74-1	Hexachlorobenzene	530.	U
87-86-5	Pentachlorophenol	2700.	U
85-01-8	Phenanthrene	1100.	
120-12-7	Anthracene	180.	J
84-74-2	Di-n-butylphthalate	~~140~~ 530	~~B~~ UJ
206-44-0	Fluoranthene	1700.	
129-00-0	Pyrene	1100.	
85-68-7	Butylbenzylphthalate	530.	U
91-94-1	3,3'-Dichlorobenzidine	1100.	U J
56-55-3	Benzo(a)anthracene	910.	
218-01-9	Chrysene	1300.	
117-81-7	bis(2-Ethylhexyl)phthalate	530.	U
117-84-0	Di-n-octylphthalate	530.	U
205-99-2	Benzo(b)fluoranthene	980.	
207-08-9	Benzo(k)fluoranthene	620.	
50-32-8	Benzo(a)pyrene	900.	
193-39-5	Indeno(1,2,3-cd)pyrene	590.	
53-70-3	Dibenz(a,h)anthracene	530.	U
191-24-2	Benzo(g,h,i)perylene	580.	

1) - Cannot be separated from diphenylamine

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1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT114

Lab Name: [illegible] Contract: CP-WP-0046

Lab Code: [illegible] Case No.: 0552 SAS No.: SDG No.: BT102

Matrix: (soil/water) SOIL Lab Sample ID:

Sample wt/vol: [illegible] (g/mL) G Lab File ID: [illegible]

Level: (low/med) LOW Date Received: 5/25/[illegible]

% Moisture: not dec. 37. dec. [illegible] Date Extracted: [illegible]

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: [illegible]

GPC Cleanup: (Y/N) N pH: [illegible] Dilution Factor: [illegible]

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	510.	U
111-44-4	bis(2-Chloroethyl)ether	510.	U
95-57-8	2-Chlorophenol	510.	U
541-73-1	1,3-Dichlorobenzene	510.	U
106-46-7	1,4-Dichlorobenzene	510.	U
100-51-6	Benzyl alcohol	510.	U
95-50-1	1,2-Dichlorobenzene	510.	U
95-48-7	2-Methylphenol	510.	U
108-60-1	bis(2-Chloroisopropyl)ether	510.	U
106-44-5	4-Methylphenol	510.	U
621-64-7	N-Nitroso-di-n-propylamine	510.	U
67-72-1	Hexachloroethane	510.	U
98-95-3	Nitrobenzene	510.	U
78-59-1	Isophorone	510.	U
88-75-5	2-Nitrophenol	510.	U
105-67-9	2,4-Dimethylphenol	510.	U
65-85-0	Benzoic acid	2600.	U
111-91-1	bis(2-Chloroethoxy)methane	510.	U
120-83-2	2,4-Dichlorophenol	510.	U
120-82-1	1,2,4-Trichlorobenzene	510.	U
91-20-3	Naphthalene	48.	J
106-47-8	4-Chloroaniline	510.	U
87-68-3	Hexachlorobutadiene	510.	U
59-50-7	4-Chloro-3-methylphenol	510.	U
91-57-6	2-Methylnaphthalene	510.	U
77-47-4	Hexachlorocyclopentadiene	510.	U
88-06-2	2,4,6-Trichlorophenol	510.	U
95-95-4	2,4,5-Trichlorophenol	2600.	U
91-58-7	2-Chloronaphthalene	510.	U
88-74-4	2-Nitroaniline	2600.	U
131-11-3	Dimethylphthalate	510.	U
208-96-8	Acenaphthylene	510.	U
606-20-2	2,6-Dinitrotoluene	510.	U

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Contr.

ab No.: 9882   SAS No

ter) SOIL

wt/vol: 31.   (g/mL) G   L

Level: (low/med) LOW   Dat

% Moisture: not dec. 37.   dec. 0.   Date

Extraction: (SepF/Cont/Sonc) SONC   Date

GPC Cleanup: (Y/N) N   pH: 8.0   Dilutio

CAS NO.	COMPOUND	CONCENTRATION (ug/L or ug/Kg)	
99-09-2	3-Nitroaniline		
83-32-9	Acenaphthene		
51-28-5	2,4-Dinitrophenol	1	
100-02-7	4-Nitrophenol	2	
132-64-9	Dibenzofuran	5	
121-14-2	2,4-Dinitrotoluene	51	
84-66-2	Diethylphthalate	510	
7005-72-3	4-Chlorophenyl-phenylether	510.	
86-73-7	Fluorene	510.	
100-01-6	4-Nitroaniline	2600.	
534-52-1	4,6-Dinitro-2-methylphenol	2600.	
86-30-6	N-Nitrosodiphenylamine (1)	510.	
101-55-3	4-Bromophenyl-phenylether	510.	
118-74-1	Hexachlorobenzene	510.	U
87-86-5	Pentachlorophenol	2600.	U
85-01-8	Phenanthrene	510.	J
120-12-7	Anthracene	510.	U
84-74-2	Di-n-butylphthalate	510.	U
206-44-0	Fluoranthene	750.	
129-00-0	Pyrene	380.	
85-68-7	Butylbenzylphthalate	510.	U
91-94-1	3,3'-Dichlorobenzidine	1000.	U
56-55-3	Benzo(a)anthracene	510.	U
218-01-9	Chrysene	510.	U
117-81-7	bis(2-Ethylhexyl)phthalate	510	U
117-84-0	Di-n-octylphthalate	510.	U
205-99-2	Benzo(b)fluoranthene	510.	U
207-08-9	Benzo(k)fluoranthene	510.	U
50-32-8	Benzo(a)pyrene	510.	U
193-39-5	Indeno(1,2,3-cd)pyrene	350.	J
53-70-3	Dibenz(a,h)anthracene	510.	U
191-24-2	Benzo(g,h,i)perylene	510.	U

(1) - Cannot be separated from diphenylamine

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

[illegible]

Lab Name: [illegible] Contract: [illegible]

Lab Code: [illegible] Case No.: [illegible] SAS No.: SDG No.: [illegible]

Matrix: (soil/water) WATER Lab Sample ID:

Sample wt/vol: 1000 (g/mL) ML Lab File ID: [illegible]

Level: (low/med) LOW Date Received: [illegible]

% Moisture: not dec. [illegible] dec. [illegible] Date Extracted: [illegible]

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: [illegible]

GPC Cleanup: (Y/N) N pH: [illegible] Dilution Factor: ~~[illegible]~~ 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	50.	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	50.	U
91-58-7	2-Chloronaphthalene	10.	U
88-74-4	2-Nitroaniline	50.	U
131-11-3	Dimethylphthalate	10.	U
208-96-8	Acenaphthylene	10.	U
606-20-2	2,6-Dinitrotoluene	10.	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT102

Lab Name: ICM Contract: 68-W8-0018

Lab Code: ICM Case No.: [illegible] SAS No.: SDG No.: BT102

Matrix: (soil/water) WATER Lab Sample ID:

Sample wt/vol: 1000 (g/mL) ML Lab File ID: [illegible]

Level: (low/med) LOW Date Received: [illegible]

% Moisture: not dec. 100 dec. [illegible] Date Extracted: [illegible]

Extraction: (SepF/Cont/Sonc) SEPF Date Analyzed: [illegible]

GPC Cleanup: (Y/N) N pH: [illegible] Dilution Factor: ~~1.00~~ 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	50.	U
83-32-9	Acenaphthene	10.	U
51-28-5	2,4-Dinitrophenol	50.	U
100-02-7	4-Nitrophenol	50.	U
132-64-9	Dibenzofuran	10.	U
121-14-2	2,4-Dinitrotoluene	10.	U
84-66-2	Diethylphthalate	10.	U J
7005-72-3	4-Chlorophenyl-phenylether	10.	U
86-73-7	Fluorene	10.	U
100-01-6	4-Nitroaniline	50.	U
534-52-1	4,6-Dinitro-2-methylphenol	50.	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	50.	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 J
56-55-3	Benzo(a)anthracene	10.	U
218-01-9	Chrysene	10.	U
117-81-7	bis(2-Ethylhexyl)phthalate	10.	U
117-84-0	Di-n-octylphthalate	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

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT108

ab Name: ICM Contract: 68-W8-0040

ab Code: ICM Case No.: 9650 SAS No.: SDG No.: BT102

atrix: (soil/water) SOIL Lab Sample ID:

ample wt/vol: 21. (g/mL) G Lab File ID: [illegible]

evel: (low/med) LOW Date Received: 5/[illegible]/88

Moisture: not dec. 17. dec. 0. Date Extracted: 6/ 7/88

xtraction: (SepF/Cont/Sonc) SONC Date Analyzed: 6/15/88

PC Cleanup: (Y/N) N pH: 7.6 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	9.4	U
319-85-7	beta-BHC	9.4	U
319-86-8	delta-BHC	9.4	U
58-89-9	gamma-BHC (Lindane)	9.4	U
76-44-8	Heptachlor	9.4	U
309-00-2	Aldrin	9.4	U
1024-57-3	Heptachlor epoxide	9.4	U
959-98-8	Endosulfan I	9.4	U
60-57-1	Dieldrin	19.	U
72-55-9	4,4'-DDE	19.	U
72-20-8	Endrin	19.	U
33213-65-9	Endosulfan II	19.	U
72-54-8	4,4'-DDD	19.	U
1031-07-8	Endosulfan sulfate	19.	U
50-29-3	4,4'-DDT	19.	U
72-43-5	Methoxychlor	94.	U
53494-70-5	Endrin ketone	19.	U
5103-71-9	alpha-Chlordane	94.	U
5103-74-2	gamma-Chlordane	94.	U
8001-35-2	Toxaphene	190.	U
12674-11-2	Aroclor-1016	94.	U
11104-28-2	Aroclor-1221	94.	U
11141-16-5	Aroclor-1232	94.	U
53469-21-9	Aroclor-1242	94.	U
12672-29-6	Aroclor-1248	94.	U
11097-69-1	Aroclor-1254	150.	J
11096-82-5	Aroclor-1260	190.	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT131

N me: ICM   Contract: 68-W8-0046

Code: ICM   Case No.: 9932   SAS No.:   SDG No.: BT109

: (soil/water) SOIL   Lab Sample ID:

le wt/vol: 30. (g/mL) G   Lab File ID: D0154

(low/med) LOW   Date Received: 5/03/89

isture: not dec. 15. dec. 0.   Date Extracted: 5/ 3/89

action: (SepF/Cont/Sonc) SONC   Date Analyzed: 6/13/89

C eanup: (Y/N) N   pH: 7.3   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	9.5	U
319-85-7	beta-BHC	9.5	U
319-86-8	delta-BHC	9.5	U
58-89-9	gamma-BHC (Lindane)	9.5	U
76-44-8	Heptachlor	9.5	U
309-00-2	Aldrin	9.5	U
1024-57-3	Heptachlor epoxide	9.5	U
959-98-8	Endosulfan I	9.5	U
60-57-1	Dieldrin	19.	U
72-55-9	4,4'-DDE	19.	U
72-20-8	Endrin	19.	U
33213-65-9	Endosulfan II	19.	U
72-54-8	4,4'-DDD	19.	U
1031-07-8	Endosulfan sulfate	19.	U
50-29-3	4,4'-DDT	19.	U
72-43-5	Methoxychlor	95.	U
53494-70-5	Endrin ketone	19.	U
5103-71-9	alpha-Chlordane	95.	U
5103-74-2	gamma-Chlordane	95.	U
8001-35-2	Toxaphene	190.	U
12674-11-2	Aroclor-1016	95.	U
11104-28-2	Aroclor-1221	95.	U
11141-16-5	Aroclor-1232	95.	U
53469-21-9	Aroclor-1242	95.	U
12672-29-6	Aroclor-1248	95.	U
11097-69-1	Aroclor-1254	110.	J
11096-82-5	Aroclor-1260	190.	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ST 11

Lab Name: ICM　　　Contract: 68-W8-0046

Lab Code: ICM　　Case No.: 9652　　SAS No.:　　SDG No.: ST102

Matrix: (soil/water) SOIL　　　Lab Sample ID:

Sample wt/vol: 31. (g/mL) G　　　Lab File ID: D0152

Level: (low/med) LOW　　　Date Received 5/25/89

% Moisture: not dec. 21.　　dec. 0.　　　Date Extracted: 6/ 3/89

Extraction: (SepF/Cont/Sonc) SONC　　　Date Analyzed: 6/15/89

GPC Cleanup: (Y/N) N　　pH: 7.5　　　Dilution Factor: 5.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	56.	U
319-85-7	beta-BHC	56.	U
319-86-8	delta-BHC	56.	U
58-89-9	gamma-BHC (Lindane)	56.	U
76-44-8	Heptachlor	56.	U
309-00-2	Aldrin	56.	U
1024-57-3	Heptachlor epoxide	56.	U
959-98-8	Endosulfan I	56.	U
60-57-1	Dieldrin	110.	U
72-55-9	4,4'-DDE	110.	U
72-20-8	Endrin	110.	U
33213-65-9	Endosulfan II	110.	U
72-54-8	4,4'-DDD	110.	U
1031-07-8	Endosulfan sulfate	110.	U
50-29-3	4,4'-DDT	110.	U
72-43-5	Methoxychlor	560.	U
53494-70-5	Endrin ketone	110.	U
5103-71-9	alpha-Chlordane	560.	U
5103-74-2	gamma-Chlordane	560.	U
8001-35-2	Toxaphene	1100.	U
12674-11-2	Aroclor-1016	560.	U
11104-28-2	Aroclor-1221	560.	U
11141-16-5	Aroclor-1232	560.	U
53469-21-9	Aroclor-1242	560.	U
12672-29-6	Aroclor-1248	560.	U
11097-69-1	Aroclor-1254	290.	J
11096-82-5	Aroclor-1260	1100.	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT112

b Name: ICM   Contract: 68-W8-0046

b Code: ICM   Case No.: 9652   SAS No.:   SDG No.: BT108

t ix: (soil/water) SOIL   Lab Sample ID:

mple wt/vol: 32. (g/mL) G   Lab File ID: D0143

. .: (low/med) LOW   Date Received: 5/25/88

oisture: not dec. 31.   dec. 0.   Date Extracted: 6/ 6/88

action: (SepF/Cont/Sonc) SONC   Date Analyzed: 6/15/88

Cleanup: (Y/N) N   pH: 7.7   Dilution Factor: 1.00

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
319-84-6	alpha-BHC	11.	U
319-85-7	beta-BHC	11.	U
319-86-8	delta-BHC	11.	U
58-89-9	gamma-BHC (Lindane)	11.	U
76-44-8	Heptachlor	11.	U
309-00-2	Aldrin	11.	U
1024-57-3	Heptachlor epoxide	11.	U
959-98-8	Endosulfan I	11.	U
60-57-1	Dieldrin	22.	U
72-55-9	4,4'-DDE	22.	U
72-20-8	Endrin	22.	U
33213-65-9	Endosulfan II	22.	U
72-54-8	4,4'-DDD	22.	U
1031-07-8	Endosulfan sulfate	22.	U
50-29-3	4,4'-DDT	22.	U
72-43-5	Methoxychlor	110.	U
53494-70-5	Endrin ketone	22.	U
5103-71-9	alpha-Chlordane	110.	U
5103-74-2	gamma-Chlordane	110.	U
8001-35-2	Toxaphene	220.	U
12674-11-2	Aroclor-1016	110.	U
11104-28-2	Aroclor-1221	110.	U
11141-16-5	Aroclor-1232	110.	U
53469-21-9	Aroclor-1242	110.	U
12672-29-6	Aroclor-1248	110.	U
11097-69-1	Aroclor-1254	220.	U
11096-82-5	Aroclor-1260	220.	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT112

Lab Name: ICM   Contract: 68-W8-0015

Lab Code: ICM   Case No.: 9552   SAS No.:   SDG No.: BT102

Matrix: (soil/water) SOIL   Lab Sample ID:

Sample wt/vol: 30. (g/mL) G   Lab File ID: D0148

Level: (low/med) LOW   Date Received: 5/25/88

% Moisture: not dec. 23. dec. 0.   Date Extracted: 5/ 0/88

Extraction: (SepF/Cont/Sonc) SONC   Date Analyzed: 6/15/88

GPC Cleanup: (Y/N) N   pH: 7.1   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	13.	U
319-85-7	beta-BHC	13.	U
319-86-8	delta-BHC	13.	U
58-89-9	gamma-BHC (Lindane)	13.	U
76-44-8	Heptachlor	13.	U
309-00-2	Aldrin	13.	U
1024-57-3	Heptachlor epoxide	13.	U
959-98-8	Endosulfan I	13.	U
60-57-1	Dieldrin	26.	U
72-55-9	4,4'-DDE	26.	U
72-20-8	Endrin	26.	U
33213-65-9	Endosulfan II	26.	U
72-54-8	4,4'-DDD	26.	U
1031-07-8	Endosulfan sulfate	26.	U
50-29-3	4,4'-DDT	26.	U
72-43-5	Methoxychlor	130.	U
53494-70-5	Endrin ketone	26.	U
5103-71-9	alpha-Chlordane	130.	U
5103-74-2	gamma-Chlordane	130.	U
8001-35-2	Toxaphene	260.	U
12674-11-2	Aroclor-1016	130.	U
11104-28-2	Aroclor-1221	130.	U
11141-16-5	Aroclor-1232	130.	U
53469-21-9	Aroclor-1242	130.	U
12672-29-6	Aroclor-1248	130.	U
11097-69-1	Aroclor-1254	260.	U
11096-82-5	Aroclor-1260	260.	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT111

ab Name: ICM Contract: 68-W8-0048

ab Code: ICM Case No.: 9652 SAS No.: SDG No.: BT109

trix: (soil/water) SOIL Lab Sample ID:

mple wt/vol: 31. (g/mL) G Lab File ID: D0155

vl: (low/med) LOW Date Received: 5/25/89

Moisture: not dec. 27. dec. 0. Date Extracted: 6/ 2/89

action: (SepF/Cont/Sonc) SONC Date Analyzed: 6/11/89

C Cleanup: (Y/N) N pH: 8.0 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	12.	U
319-85-7	beta-BHC	12.	U
319-86-8	delta-BHC	12.	U
58-89-9	gamma-BHC (Lindane)	12.	U
76-44-8	Heptachlor	12.	U
309-00-2	Aldrin	12.	U
1024-57-3	Heptachlor epoxide	12.	U
959-98-8	Endosulfan I	12.	U
60-57-1	Dieldrin	25.	U
72-55-9	4,4'-DDE	25.	U
72-20-8	Endrin	25.	U
33213-65-9	Endosulfan II	25.	U
72-54-8	4,4'-DDD	25.	U
1031-07-8	Endosulfan sulfate	25.	U
50-29-3	4,4'-DDT	43.	✓
72-43-5	Methoxychlor	120.	U
53494-70-5	Endrin ketone	25.	U
5103-71-9	alpha-Chlordane	120.	U
5103-74-2	gamma-Chlordane	120.	U
8001-35-2	Toxaphene	250.	U
12674-11-2	Aroclor-1016	120.	U
11104-28-2	Aroclor-1221	120.	U
11141-16-5	Aroclor-1232	120.	U
53469-21-9	Aroclor-1242	120.	U
12672-29-6	Aroclor-1248	120.	U
11097-69-1	Aroclor-1254	250.	U
11096-82-5	Aroclor-1260	250.	U

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[illegible]ES ANALYSIS DATA SHEET

EPA SAMPLE NO.

N me: ICM[illegible] Contract: 68-W8-0046

Code: ICM[illegible] No.: 9552 SAS No.: SDG No.: BT108

[illegible] : (soil/water) WATER Lab Sample ID:

[illegible]le wt/vol: 1000. (g/mL)ML Lab File ID: D0119

[illegible]el: (low/med) LOW Date Received: 5/25/88

[illegible] ture: not dec.100. dec. 0. Date Extracted: 5/28/88

[illegible]action: (SepF/Cont/Sonc) SEPF Date Analyzed: 6/14/88

C eanup: (Y/N) N pH: 8.5 Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	.050	[illegible]
319-85-7	beta-BHC	.050	[illegible]
319-86-8	delta-BHC	.050	[illegible]
58-89-9	gamma-BHC (Lindane)	.050	U
76-44-8	Heptachlor	.050	U
309-00-2	Aldrin	.050	U
1024-57-3	Heptachlor epoxide	.050	U
959-98-8	Endosulfan I	.050	U
60-57-1	Dieldrin	.10	U
72-55-9	4,4'-DDE	.10	U
72-20-8	Endrin	.10	U
33213-65-9	Endosulfan II	.10	U
72-54-8	4,4'-DDD	.10	U
1031-07-8	Endosulfan sulfate	.10	U
50-29-3	4,4'-DDT	.10	U
72-43-5	Methoxychlor	.50	U
53494-70-5	Endrin ketone	1.0	U
5103-[illegible]	[illegible]lordane	.50	U
5103-[illegible]	[illegible]lordane	.50	U
8001-[illegible]	[illegible]	1.0	U
1267[illegible]	[illegible]1016	.50	U
11104-28-[illegible]	[illegible]1221	.50	U
11141-[illegible]	[illegible]1232	.50	U
53469-21-9	Aroclor-1242	.50	U
12672-29-6	Aroclor-1248	.50	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

REFERENCE NO. 13

SITE [illegible] ERNST [illegible]
TDD#: 02-8803-37
SAMPLING DATE: 5/24/88
EPA CASE NO.: 9652
LAB NAME: COLUMBIA

INORGANICS								
Sample ID No.	NYFH-S1(DUP)	NYFH-S7	NYFH-S2	NYFH-S3(MS/MSD)	NYFH-S4	NYFH-S5	NYFH-RIN1	NYFH-TBLK1
Traffic Report No.	MBQ376	MBQ382	MBQ377	MBQ378	MBQ379	MBQ380	MBQ383	N/A
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	WATER	N/A
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/L	ug/L
Aluminum	1550	4480	11000	13400	6860	12300	J	NR
Antimony								NR
Arsenic	24.3	30.5	10.7	7.3	18.1	8.4		NR
Barium	55.5 E	101 E	637 E	88.5 E	109 E	89.6 E	J	NR
Beryllium	J	J	J	J	J	J		NR
Cadmium	R	R	1.4		J	J		NR
Calcium	R	R	R	R	R	R	J	NR
Chromium	698	711	57.6	20.7	26.1	51.9		NR
Cobalt	31.2 E	25.9 E	J	J	J	J		NR
Copper	429	393	90.7	43.8	201	53.9		NR
Iron	R	R	51400	33500	45900	81000	101	NR
Lead	9870	11800	7520	189	748	222		NR
Magnesium	J	2760	2370	8740	J	6370		NR
Manganese	7040	8770	4080	604	841	1510	J	NR
Mercury					0.13			NR
Nickel	120 E	110 E	28.9 E	26.8 E	43.1 E	42.4 E		NR
Potassium		J	1460	2330	J	1730		NR
Selenium	J		J		1.5 E	J		NR
Silver			J					NR
Sodium	J	J	J	R	J	R	J	NR
Thallium								NR
Vanadium		J	20.6	26.8	20.1	18.2		NR
Zinc	423 E	1210 E	246 E	121 E	597 E	156 E	J	NR

NOTES:
Blank space - compound analyzed for but not detected
E - estimated value
J - estimated value, compound present below CRDL but above IDL
R - analysis did not pass EPA QA/QC
NR - analysis not required

Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Acceptability Narrative

Date: Feb. 1988
Number: HW-2
Revision: 7

Case# 9652   Site ERNST STEEL   Matrix: Soil 6
Lab COLUMBIA   Water 1
Other —

I

A.2.1 Are all data of acceptable quality? Yes ____ No ✓

If no, list exceptions with reason(s) for rejection or qualification as estimated value (J).

I) The following analytes were qualified as estimated (flagged with 'J') because Spike recovery is less than 75%.
Ni, Se, Ag → All soil samples.

II) The following analyte was qualified as estimated (flagged with 'J') because Spike recovery is greater than 125% and data not flagged with a 'U'.
Zn → all soil samples.

III) The following analyte was rejected for duplicate analysis because the difference between sample and duplicate is greater than 2×CRDL where sample and/or duplicate is less than 5×CRDL but greater than CRDL.
Ca → all soil samples.

IV) The following analyte was

Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Acceptability Narrative

Date: Feb. 1988
Number: HW-2
Revision: 7

Case# 9652 Site ERNST STEEL Matrix: Soil 6

Lab COLUMBIA Water 1

II Other —

A.2.1 Are all data of acceptable quality? Yes ____ No ✓

If no, list exceptions with reason(s) for rejection or qualification as estimated value (J).

rejected for field duplicate because RPD is greater than 100 % where sample and duplicate are both greater than 5x CRDL.

Fe → MBQ-376, MBQ-382.

V) The following analytes were rejected for field duplicate because the difference between sample and duplicate is greater than 2x CRDL where sample and/or duplicate is less than 5x CRDL but greater than CRDL.

Cd, Ca → MBQ-376, MBQ-382.

(Ca is also previously rejected due to duplicate criteria)

VI) The following analyte was qualified as estimated (flagged with 'J') because LCS % recovery is between 50-79 %.

Ag → all soil samples. (Ag is also previously qualified as estimated due to other Q.C criteria)

Title: Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Acceptability Narrative

Date: Feb. 1988
Number: HW-2
Revision: 7

A.2.1 (continuation)

VII) The following analyte was qualified as estimated (flagged with 'J') because LCS % recovery is between 121-150 % and data not flagged with a "U".

Ba → all soil samples.

VIII) The following analyte was rejected because field blank was greater than 2x IDL and the sample concentration was less than 5x field blank value but not flagged with a "U".

Na → MBQ-378, MBQ-380.

A.2.2 Contract Problems/Non-compliance

* Samples are diluted beyond the contract requirements but lab failed to report dilution factor on Form I's.

* Lab failed to report Lab I.D no. in all Form I's to IX. No action taken.

MMB Reviewer: ______________________ Date: __________
Signature

Contractor Reviewer: Sunita Sumbely. Date: 09-16-88.
Signature

Verified by: Hanif Sheikh Date: 10-15-88

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COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Ernst Steel
65
1W

ab Name: COLUMBIA ANALYTICAL INC. Contract: 68-W8-0024

Lab Code: COLUMB Case No.: 9652 SAS No.: SDG No.: MBQ376

OW No.: 7/87

EPA Sample No.	Lab Sample ID.
MBQ376	
MBQ376D	
MBQ376S	
MBQ377	
MBQ378	
MBQ379	
MBQ380	
MBQ382	
MBQ383	
MBQ383D	
MBQ383S	

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES
If yes-were raw data generated before application of background corrections? Yes/No NO

Comments:
1 TO 5 SERIAL DILUTION OF SAMPLE MBQ376 YEILDED A 12.7% DIFFERENCE FOR CO AND A 10.9% DIFFERENCE FOR NI. ALL SOIL SAMPLES FLAGGED WITH 'E'.

00001

Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Lab Manager: Thomas C. Leach

Date: 8/18/88

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MBQ376

S1

Name: COLUMBIA ANALYTICAL INC. Contract: 68-W8-0024

Code: COLUMB- Case No.: 9652 SAS No.: SDG No.: MBQ376

x (soil/water): SOIL Lab Sample ID:

el (low/med): LOW Date Received: 05/25/88

ids: 85.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1550		*	P
7440-36-0	Antimony	11.6	U		P
7440-38-2	Arsenic	24.3			F
7440-39-3	Barium	55.5		J	P
7440-41-7	Beryllium	0.25	B		P
7440-43-9	Cadmium	[illegible]			P
7440-70-2	Calcium	[illegible]		*	P
7440-47-3	Chromium	698			P
7440-48-4	Cobalt	31.2		E	P
7440-50-8	Copper	429		*	P
7439-89-6	Iron	[illegible]			P
7439-92-1	Lead	9870			P
7439-95-4	Magnesium	696	B		P
7439-96-5	Manganese	7040			P
7439-97-6	Mercury	0.09	U		CV
7440-02-0	Nickel	120		EN* J	P
7440-09-7	Potassium	92.9	U		P
7782-49-2	Selenium	0.19	B	N J	F
7440-22-4	Silver	0.46	U	N J	P
7440-23-5	Sodium	372	B		P
7440-28-0	Thallium	1.1	U	W	F
7440-62-2	Vanadium	0.46	U		P
7440-66-6	Zinc	423		N* J	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

s.

00002

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MBQ377

Lab Name: COLUMBIA ANALYTICAL INC. Contract: 68-W8-0024

Lab Code: COLUMB Case No.: 9652 SAS No.: SDG No.: MBQ376

Matrix (soil/water): SOIL Lab Sample ID:

Level (low/med): LOW Date Received: 05/25/88

% Solids: 71.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11000		*	P
7440-36-0	Antimony	13.4	U		P
7440-38-2	Arsenic	10.7			F
7440-39-3	Barium	637		J	P
7440-41-7	Beryllium	0.57	B		P
7440-43-9	Cadmium	1.4			P
7440-70-2	Calcium	~~5830~~		~~*~~	P
7440-47-3	Chromium	57.6			P
7440-48-4	Cobalt	10.6	B	E	P
7440-50-8	Copper	90.7		*	P
7439-89-6	Iron	51400			P
7439-92-1	Lead	7520			P
7439-95-4	Magnesium	2370			P
7439-96-5	Manganese	4080			P
7439-97-6	Mercury	0.08	U		CV
7440-02-0	Nickel	28.9		EN* J	P
7440-09-7	Potassium	1460			P
7782-49-2	Selenium	0.42	B	NW J	F
7440-22-4	Silver	0.70	B	N J	P
7440-23-5	Sodium	341	B		P
7440-28-0	Thallium	0.25	U	W	F
7440-62-2	Vanadium	20.6			P
7440-66-6	Zinc	246		N* J	P
	Cyanide				NR

... Before: BLACK Clarity Before: Texture: MEDIUM

...lor After: BROWN Clarity After: Artifacts:

...ents:

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U.S. EPA - CLP

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

MBQ378

Lab Name: COLUMBIA ANALYTICAL INC. Contract: 68-W8-0024

Lab Code: COLUMB Case No.: 9652 SAS No.: SDG No.: MBQ376

Matrix (soil/water): SOIL Lab Sample ID:

Level (low/med): LOW Date Received: 05/25/88

% Solids: 75.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	13400		*	P
7440-36-0	Antimony	12.6	U		P
7440-38-2	Arsenic	7.3			F
7440-39-3	Barium	88.5		J	P
7440-41-7	Beryllium	0.60	B		P
7440-43-9	Cadmium	0.50	U		P
7440-70-2	Calcium	[illegible]		*	P
7440-47-3	Chromium	20.7			P
7440-48-4	Cobalt	8.2	B	E	P
7440-50-8	Copper	43.8		*	P
7439-89-6	Iron	33500			P
7439-92-1	Lead	189			P
7439-95-4	Magnesium	8740			P
7439-96-5	Manganese	604			P
7439-97-6	Mercury	0.12	U		CV
7440-02-0	Nickel	26.8		EN* J	P
7440-09-7	Potassium	2330			P
7782-49-2	Selenium	0.12	U	NW J	F
7440-22-4	Silver	0.50	U	N J	P
7440-23-5	Sodium	[illegible]	B		P
7440-28-0	Thallium	0.23	U	W	F
7440-62-2	Vanadium	26.8			P
7440-66-6	Zinc	121		N* J	P
	Cyanide				NR

c or Before: BROWN Clarity Before: Texture: MEDIUM

olor After: BROWN Clarity After: Artifacts:

o ments:

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U.S. EPA - CLP

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

MBQ379

Lab Name: COLUMBIA ANALYTICAL INC. Contract: 68-W8-0024

Lab Code: COLUMB Case No.: 9652 SAS No.: SDG No.: MBQ376

Matrix (soil/water): SOIL Lab Sample ID:

Level (low/med): LOW Date Received: 05/25/88

% Solids: 67.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6860		*	P
7440-36-0	Antimony	14.2	U		P
7440-38-2	Arsenic	18.1			F
7440-39-3	Barium	109		J	P
7440-41-7	Beryllium	0.68	B		P
7440-43-9	Cadmium	1.1	B		P
7440-70-2	Calcium	[redacted]			P
7440-47-3	Chromium	26.1			P
7440-48-4	Cobalt	8.3	B	E	P
7440-50-8	Copper	201		*	P
7439-89-6	Iron	45900			P
7439-92-1	Lead	748			P
7439-95-4	Magnesium	1300	B		P
7439-96-5	Manganese	841			P
7439-97-6	Mercury	0.13			CV
7440-02-0	Nickel	43.1		EN* J	P
7440-09-7	Potassium	1170	B		P
7782-49-2	Selenium	1.5		NS J	F
7440-22-4	Silver	0.57	U	N J	P
7440-23-5	Sodium	898	B		P
7440-28-0	Thallium	0.29	U	W	F
7440-62-2	Vanadium	20.1			P
7440-66-6	Zinc	597		N* J	P
	Cyanide				NR

1

l r Before: BLACK Clarity Before: Texture: MEDIUM

lor After: BROWN Clarity After: Artifacts: YES

m ents:

Hrtifacts include plant tissue and 1 cm pieces which look like wood but feel like stone.

00002

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One

U.S. EPA - CLP

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

MBQ380

Lab Name: COLUMBIA ANALYTICAL INC. Contract: 68-W8-0024

ab Code: COLUMB Case No.: 9652 SAS No.: SDG No.: MBQ376

"atrix (soil/water): SOIL Lab Sample ID:

Level (low/med): LOW Date Received: 05/25/88

' Solids: 70.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12300		*	P
7440-36-0	Antimony	13.3	U		P
7440-38-2	Arsenic	8.4			F
7440-39-3	Barium	89.6		J	P
7440-41-7	Beryllium	0.99	B		P
7440-43-9	Cadmium	0.63	B		P
7440-70-2	Calcium	[illegible]	-	E*	P
7440-47-3	Chromium	51.9			P
7440-48-4	Cobalt	8.7	B	E	P
7440-50-8	Copper	53.9		*	P
7439-89-6	Iron	81000			P
7439-92-1	Lead	222			P
7439-95-4	Magnesium	6370			P
7439-96-5	Manganese	1510			P
7439-97-6	Mercury	0.08	U		CV
7440-02-0	Nickel	42.4		EN* J	P
7440-09-7	Potassium	1730			P
7782-49-2	Selenium	0.30	B	NW J	F
7440-22-4	Silver	0.53	U	N J	P
7440-23-5	Sodium	[illegible]			P
7440-28-0	Thallium	0.27	U		F
7440-62-2	Vanadium	18.2			P
7440-66-6	Zinc	156		N* J	P
	Cyanide				NR

.(· Before: BROWN Clarity Before: Texture: MEDIUM

.or After: BROWN Clarity After: Artifacts:

m :nts:

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U.S. EPA - CLP

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

MBQ382

Lab Name: COLUMBIA ANALYTICAL INC. Contract: 68-W8-0024

Lab Code: COLUMB Case No.: 9652 SAS No.: SDG No.: MBQ376

Matrix (soil/water): SOIL Lab Sample ID:

Level (low/med): LOW Date Received: 05/25/88

% Solids: 83.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4480		*	P
7440-36-0	Antimony	11.6	U		P
7440-38-2	Arsenic	30.5			F
7440-39-3	Barium	101		J	P
7440-41-7	Beryllium	0.56	B		P
7440-43-9	~~Cadmium~~	~~7.1~~			P
7440-70-2	~~Calcium~~	~~[illegible]~~			P
7440-47-3	Chromium	711			P
7440-48-4	Cobalt	25.9		E	P
7440-50-8	Copper	393		*	P
7439-89-6	~~Iron~~	~~[illegible]~~			P
7439-92-1	Lead	11800			P
7439-95-4	Magnesium	2760			P
7439-96-5	Manganese	8770			P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	110		EN* J	P
7440-09-7	Potassium	341	B		P
7782-49-2	Selenium	0.11	U	N J	F
7440-22-4	Silver	0.47	U	N J	P
7440-23-5	Sodium	612	B		P
7440-28-0	Thallium	1.1	U	W	F
7440-62-2	Vanadium	7.2	B		P
7440-66-6	Zinc	1210		N* J	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

00007

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MBQ383

'.ab Name: COLUMBIA ANALYTICAL INC. Contract: 68-W8-0024

Lab Code: COLUMB Case No.: 9652 SAS No.: SDG No.: MBQ376

latrix (soil/water): WATER Lab Sample ID:

Level (low/med): LOW Date Received: 05/25/88

Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	102	B		P
7440-36-0	Antimony	50.0	U		P
7440-38-2	Arsenic	1.0	U		F
7440-39-3	Barium	0.52	B		P
7440-41-7	Beryllium	1.0	U		P
7440-43-9	Cadmium	2.0	U		P
7440-70-2	Calcium	41.2	B		P
7440-47-3	Chromium	3.0	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	101		*	P
7439-92-1	Lead	1.0	U		F
7439-95-4	Magnesium	30.0	U		P
7439-96-5	Manganese	2.8	B		P
7439-97-6	Mercury	0.20	U		CV
7440-02-0	Nickel	8.0	U		P
7440-09-7	Potassium	400	U		P
7782-49-2	Selenium	0.50	U		F
7440-22-4	Silver	2.0	U		P
7440-23-5	Sodium	322	B		P
7440-28-0	Thallium	1.0	U		F
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	4.6	B		P
	Cyanide				NR

ɔ ɔr Before: COLORLESS Clarity Before: CLEAR Texture:

ɔ' ɔr After: COLORLESS Clarity After: CLEAR Artifacts:

ɔmments:

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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT112

Lab Name: ICM Contract: 68-W8-0046

Lab Code: ICM Case No.: 9652 SAS No.: SDG No.: BT108

Matrix: (soil/water) SOIL Lab Sample ID:

Sample wt/vol: 5. (g/mL) G Lab File ID: B2219

Level: (low/med) LOW Date Received: 5/25/88

% Moisture: not dec. 31. Date Analyzed: 6/ 4/88

Column: (pack/cap) PACK Dilution Factor: .96

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION (UG/KG)	Q
74-87-3	Chloromethane	14.	U
74-83-9	Bromomethane	14.	U
75-01-4	Vinyl Chloride	14.	U
75-00-3	Chloroethane	14.	UJ
75-09-2	Methylene Chloride	23.	
67-64-1	Acetone	31.	~~B~~ UJ
75-15-0	Carbon Disulfide	7.	U
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	14.	UJ
71-55-6	1,1,1-Trichloroethane	7.	U
56-23-5	Carbon Tetrachloride	7.	U
108-05-4	Vinyl Acetate	14.	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
108-10-1	4-Methyl-2-Pentanone	14.	U
591-78-6	2-Hexanone	14.	U
127-18-4	Tetrachloroethene	7.	U
79-34-5	1,1,2,2-Tetrachloroethane	7.	U
108-88-3	Toluene	7 ~~8.~~	~~B~~ JU
108-90-7	Chlorobenzene	7.	U
100-41-4	Ethylbenzene	7.	U
100-42-5	Styrene	7.	U
1330-20-7	Xylene (total)	7.	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT113

b Name: ICM   Contract: 68-W8-0046

b Code: ICM   Case No.: 9652   SAS No.:   SDG No.: BT108

t ix: (soil/water) SOIL   Lab Sample ID:

mple wt/vol: 5. (g/mL) G   Lab File ID: B2232

v l: (low/med) LOW   Date Received: 5/25/88

Moisture: not dec. 29.   Date Analyzed: 6/ 4/88

: mn: (pack/cap) PACK   Dilution Factor: 1.00

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	14.	U
74-83-9	Bromomethane	14.	U
75-01-4	Vinyl Chloride	14.	U
75-00-3	Chloroethane	14.	UJ
75-09-2	Methylene Chloride	7.	U
67-64-1	Acetone	14.	~~B~~ UJ
75-15-0	Carbon Disulfide	7.	U
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	14.	UJ
71-55-6	1,1,1-Trichloroethane	7.	U
56-23-5	Carbon Tetrachloride	7.	U
108-05-4	Vinyl Acetate	14.	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
108-10-1	4-Methyl-2-Pentanone	14.	U
591-78-6	2-Hexanone	14.	U
127-18-4	Tetrachloroethene	7.	U
79-34-5	1,1,2,2-Tetrachloroethane	7.	U
108-88-3	Toluene	~~4.~~ 7	~~J~~ UJ
108-90-7	Chlorobenzene	7.	U
100-41-4	Ethylbenzene	7.	U
100-42-5	Styrene	7.	U
1330-20-7	Xylene (total)	7.	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT114

Lab Name: ICM Contract: 68-W8-0046

Lab Code: ICM Case No.: 9652 SAS No.: SDG No.: BT108

Matrix: (soil/water) SOIL Lab Sample ID:

Sample wt/vol: 5. (g/mL) G Lab File ID: B2228

Level: (low/med) LOW Date Received: 5/25/88

% Moisture: not dec. 37. Date Analyzed: 6/ 4/88

Column: (pack/cap) PACK Dilution Factor: .96

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	15.	U
74-83-9	Bromomethane	15.	U
75-01-4	Vinyl Chloride	15.	U
75-00-3	Chloroethane	15.	UJ
75-09-2	Methylene Chloride	2.8	U
67-64-1	Acetone	15.	UJ
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	15.	UJ
71-55-6	1,1,1-Trichloroethane	8.	U
56-23-5	Carbon Tetrachloride	8.	U
108-05-4	Vinyl Acetate	15.	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	8.	U
10061-02-6	trans-1,3-Dichloropropene	8.	U
75-25-2	Bromoform	8.	U
108-10-1	4-Methyl-2-Pentanone	15.	U
591-78-6	2-Hexanone	15.	U
127-18-4	Tetrachloroethene	8.	U
79-34-5	1,1,2,2-Tetrachloroethane	8.	U
108-88-3	Toluene	2.8	U
108-90-7	Chlorobenzene	8.	U
100-41-4	Ethylbenzene	8.	U
100-42-5	Styrene	8.	U
1330-20-7	Xylene (total)	8.	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BT132

Lab Name: ICM Contract: 68-W8-0046

Lab Code: ICM Case No.: 9652 SAS No.: SDG No.: BT108

Matrix: (soil/water) WATER Lab Sample ID:

Sample wt/vol: 5. (g/mL) ML Lab File ID: B2197

Level: (low/med) LOW Date Received: 5/25/88

% Moisture: not dec.100. Date Analyzed: 6/ 3/88

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	5800 D ~~1300.~~	EJ
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.	UJ
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
108-10-1	4-Methyl-2-Pentanone	10.	U
591-78-6	2-Hexanone	10.	U
127-18-4	Tetrachloroethene	5.	U
79-34-5	1,1,2,2-Tetrachloroethane	5.	U
108-88-3	Toluene	5.	B
108-90-7	Chlorobenzene	5.	U
100-41-4	Ethylbenzene	5.	U
100-42-5	Styrene	5.	U
1330-20-7	Xylene (total)	5.	U

Ernst Steel
NYD980508246

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HRS

	S	S^2
Groundwater Route Score (S_{gw})	4.32	18.66
Surface Water Route Score (S_{sw})	2.80	7.84
Air Route Score (S_a)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		26.5
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		5.15
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		2.98

WORKSHEET FOR COMPUTING S_M

PRO

	S	S^2
Groundwater Route Score (S_{gw})	4.32	18.66
Surface Water Route Score (S_{sw})	5.60	31.36
Air Route Score (S_a)	0	0.
$S_{gw}^2 + S_{sw}^2 + S_a^2$		50.02
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		7.07
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		4.09

WORKSHEET FOR COMPUTING S_M

Ernst Steel
NYD980508046

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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, the 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			

HRS PRC 0

FIGURE 9
AIR ROUTE WORK SHEET

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NYD980508246

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Surface Water Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	HRS	Max. Score	PRO
1 Observed Release	(0) 45	1	0	45	0
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.					
2 Route Characteristics					
Facility Slope and Intervening Terrain	(0) 1 2 3	1	0	3	0
1-yr. 24-hr. Rainfall	0 1 (2) 3	1	2	3	2
Distance to Nearest Surface Water	0 1 (2) 3	2	4	6	4
Physical State	0 1 (2) 3	1	2	3	2
Total Route Characteristics Score			8	15	8
3 Containment	0 1 2 (3)	1	3	3	3
4 Waste Characteristics					
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	18
Hazardous Waste Quantity	0 1 2 3 4 5 6 (7) 8	1	7	8	7
Total Waste Characteristics Score			25	26	25
5 Targets					
Surface Water Use	0 (1) (2) 3	3	3	9	6
Distance to a Sensitive Environment	(0) 1 2 3	2	0	6	0
Population Served/Distance to Water Intake Downstream	0 4 6 8 10 / 12 16 18 20 / 24 30 32 35 40	1	0	40	0
Total Targets Score			3	55	6
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			1800	64,350	3600
7 Divide line 6 by 64,350 and multiply by 100		S_{sw} =	2.80		5.60

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Ground Water Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	HRS	Max. Score	PRO
1 Observed Release	(0) 45	1	0	45	0
If observed release is given a score of 45, proceed to line 4. If observed release is given a score of 0, proceed to line 2.					
2 Route Characteristics					
Depth to Aquifer of Concern	0 1 2 (3)	2	6	6	6
Net Precipitation	0 1 (2) 3	1	2	3	2
Permeability of the Unsaturated Zone	0 (1) 2 3	1	1	3	1
Physical State	0 1 (2) 3	1	2	3	2
Total Route Characteristics Score			11	15	11
3 Containment	0 1 2 (3)	1	3	3	3
4 Waste Characteristics					
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	18
Hazardous Waste Quantity	0 1 2 3 4 5 6 (7) 8	1	7	8	7
Total Waste Characteristics Score			25	26	25
5 Targets					
Ground Water Use	0 (1) 2 3	3	3	9	3
Distance to Nearest Well/Population Served	(0) 4 6 8 10 / 12 16 18 20 / 24 30 32 35 40	1	0	40	0
Total Targets Score			3	49	3
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			2475	57,330	2475
7 Divide line 6 by 57,330 and multiply by 100		S_{gw} =	4.32		4.32