Report No.: 8003-180
Work Assignment No.: 019-2JZZ
Contract No.: 68-W9-0051
August 15, 1993
Volume 1 of 2

DC ✓
9/30/93

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

RE: Nash Road Landfill Site Inspection Prioritization Evaluation

Dear Ms. Foose:

The following is a summary of the Site Inspection Prioritization Evaluation of the Nash Road Landfill Site (CERCLIS ID No. NYD980534820) located on Nash Road in the Town of Wheatfield, Niagara County, New York (Ref. No.1).

General Description and Site History

The Nash Road Landfill site is an inactive landfill owned by and located in the Town of Wheatfield, Niagara County, New York, adjacent to the North Tonawanda city boundary. The 25-acre rectangular site is located in a suburban residential area, and is overgrown with trees and marsh vegetation. Fencing surrounding the property is incomplete and nearby residents use the site as a jogging area, dirt bike track, and play area (Ref. No. 13, pp. 5, 270, 278). The National Fuel Gas Corporation has a facility adjacent to the western border of the site. A gas pipeline, a salt-brine pipeline and aboveground electrical lines pass through an easement along the southern property boundary (Ref. No. 13, p. 19). The Nash Road Landfill site was operated as a landfill by Niagara Sanitation Company between 1964 and 1968. Both municipal and industrial wastes, including caustic materials and sludges, were disposed at the site. Most of the waste was mixed and subsequently covered by the upper sand unit which is found at the site. In addition, between June and July 1968, approximately 900 cubic yards of unknown waste material from a sewer excavation at the Love Canal site was disposed of in an excavated disposal trench which is located in the center of the site (Ref. No. 13, pp. 5, 6). The disposal trench (100'x 30'x 27') was excavated through the sand into a underlying clay unit (Ref. No. 13, pp. 25, 27, 28, 246). Although some wastes are covered, protruding refuse was visible from the ground surface. A site visit was conducted by the Niagara County Health Department (N.C.H.D.) in June 1981. At the time of the site visit, refuse such as tires, demolition debris, ash, wood and remnants of steel drums were found at various locations on-site (Ref.No. 13, pp. 256, 269, 270). There was evidence of some unauthorized dumping that occurred after the site was closed and numerous leachate stained areas were found in the marsh areas on the site, particularly along the northern and western borders (Ref.No. 13, pp. 256, 257, 269). Current concern centers on the possible lack of engineered containment of the waste and the offsite migration of these wastes (Ref. No. 13, pp. 10, 270). Before landfilling activities began in 1964, surface water drained to the north toward Sawyer Creek (Ref.No. 13, pp. 19, 272, 274). Landfilling of wastes and excavation of a disposal trench resulted in an irregular ground surface topography. The site is located in a flat, poorly drained area, with relief on the site greater than 10 feet (Ref.No. 13, pp. 19, 272). The volume of onsite surface water fluctuates seasonally, in the spring approximately one-third of the site is underwater; in late summer, only the disposal trench and connected ponds are filled with water. The onsite water intermittantly enters the ditch which is along the northern margin of the site (Ref. No. 13, pp. 19, 20, 26).

During July and August 1981, the N.C.H.D. collected four soil samples and one groundwater sample. Two soil samples were collected from near the two electrical powerline poles (Nos. 364

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& 365) located along the southern boundary of the site (Ref. No. 13, pp. 256, 257, 260, 262). It appears from the historical information that there were only two sample locations, but two samples were taken from each location, with one sample being analyzed for metals and the other sample being analyzed for total halogenated organics (THO) at each location (Ref. No. 13, p. 258). The groundwater sample was collected from a well located 20 feet east of powerline pole No. 363 along the southern border of the site (Ref. No. 13, p. 256-267). Inorganic metals and volatile organic contamination was detected in the groundwater samples (Ref. No. 13, p. 260). The N.C.H.D. returned in June 1982, and collected one groundwater sample and three soil samples. Inorganic metals and organic contaminants were detected in both soil and groundwater samples (Ref. No. 13, pp. 264-267). A Phase II Investigation was begun by Engineering-Science in association with Dames & Moore in June 1983 in conjunction with the ongoing Phase I Investigation. Five surface water samples were collected from around the ponds, ditch, and disposal ditch in the eastern part of the site as part of an emergency evaluation of the surface water to determine if any hazards existed at the site. No sediment samples were collected at that time (Ref. No. 13, pp. 1, 11, 12, 28, 29). Methylene chloride, a laboratory contaminant, was detected at 11 parts per billion (ppb) and 10 ppb in surface water samples SW-1 and SW-3, respectively, and THO were detected in all surface water samples ranging from 5 ppb to 10 ppb (Ref. No. 13, pp. 28, 33). Magnetometer and electrical resistivity (ER) surveys were conducted at the site in May 1984 to define the boundaries and depth of the disposal trench and identify the presence of buried metal objects and a contaminant plume (Ref. No. 13, pp. 12, 13). Five deep and two shallow groundwater monitoring wells were installed in June 1984 (Ref. No. 13, p. 13). Groundwater samples were collected in July 1984 from the seven onsite wells and from an off-site unused residential well (Osterman well). Methylene chloride was detected in two wells (Osterman well & OW-6) at a concentration of 14 ppb and 15 ppb, respectively. Butylbenzylphthalate was detected in the Osterman well (33ppb) along with cadimum (10 ppb), copper (10 ppb), zinc (50 ppb), lead (140 ppb), and mercury (0.8 ppb)(Ref. No. 13, pp. 13, 29-31, 34, 35, 36). Three sediment samples were collected in July 1984 from the "dried puddles" in the western part of the site. Analytical results indicated the presence of inorganic metals in the sediment samples, chromium (6.8 ppm), copper (10 ppm), mercury (.064 ppm), lead (18 ppm), nickel (9.4 ppm), and zinc (48 ppm) at those locations. No surface water samples were taken due to the lack of surface water at the time of the sampling (Ref. No. 13, pp. 28, 29, 34). No organic vapor contamination was detected during the on-site air survey using an HNu photoionization meter (Ref. No. 14, p. 5).

Evaluation of Existing Information

Information in the site file and the Phase II Investigation report for the Nash Road Landfill site was used to conduct the initial evaluation of the site. The Phase II Investigation report indicates the avenue of concern for contamination migration is the surface water pathway. The analytical data from the surface water and sediment samples collected during the Phase II investigation indicated the presence of inorganic metals and THO (Ref. No. 13, pp. 33, 34). Because there was no appropriate groundwater, soil, and surface water/sediment background samples collected, it can not be determined if any constituents detected onsite were detected significantly above background levels.

Hazard Assessment

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

Groundwater Pathway - Groundwater monitoring well samples collected during the 1984 Phase II Investigation indicated the presence of TOH ranging from 40 ppb (Osterman well & OW-2,OW-3) to 120 ppb (OW-6) (Ref. No. 13, pp. 30, 31, 35). The nearest residential well is the unused Osterman well which is upgradient and approximately 1000 feet west of the site (Ref. No. 13, p. 72). The aquifer of concern in the area of the site is the shallow upper sand unit which is located immediately above the clay unit in all parts of the site except in the northeast corner of the site (Ref. No. 12, pp. 23, 27, 28). This sand unit varies in thickness from greater than 8 feet in the southwest corner of the site to zero feet in the northeast section of the site. A grain size analysis of the unit indicated a fine sand with some silt. This unit probably originated as a late deposit of Lake Tonawanda (Ref. No. 13, p. 23). A deeper sand unit is located above the till/bedrock and below the clay unit (Ref. No. 13, p. 22). The clay unit above the lower sand may act as an aquitard (Ref. No. 13, p. 27). The clay unit had been partially excavated when the disposal trench was dug and there may potentially now be a connection between the upper aquifer and the lower aquifer (Ref. No. 13, pp. 27, 28). Groundwater was detected at approximately 4 feet below the ground surface and groundwater flow direction within the shallow aquifer is presumed to follow the underlying contours of the clay unit which is northeast toward Sawyer Creek (Ref. No. 13, pp. 19, 27, 28, 257). No public supply wells are within the suspected contamination boundary of the site (Ref. Nos. 8; 13, p. 9). There are no people using the groundwater as a drinking water source within four miles of the site (Ref. No. 8). No designated wellhead protection areas are within four miles of the site. (Ref. No. 7).

Surface Water Pathway - During the Phase II Investigation five on-site surface water samples (SW 1-5) and three on-site sediment samples (SD 1, 2, 3) were collected. Three surface water samples (SW 2, 3, 4) were collected from the existing pond located in the northeast section of the site (Ref. No. 13, pp. 11, 17, 28, 33, 34). One of the surface water samples (SW1) was collected from the drainage ditch northeast of the existing pond. The surface water samples collected from around the existing pond detected low levels of THO ranging from 5 ppb (SW-2) to 10 ppb in (SW-1). Sediment samples were collected in the western area of the site and they were found to contain low levels of inorganic metals. The last surface water sample (SW5) was collected from an marshy area west of the existing pond (Ref. No. 13, p. 9). There is no 15-mile surface water pathway for this site. A ditch flows along the northern border of the site and the existing onsite pond drains into this ditch (Ref. No. 13, pp. 19, 20, 38). Approximately thirty feet east of the landfill the ditch ends at an earthen embankment which forms its property boundary for an adjacent church (Ref. No. 11, p. 8). There is no overland migration from the ditch to Sawyer Creek. The nearest surface water is the onsite pond which is located in the northeast section of the site. This pond contains water year-round and is rimmed with marsh-like vegetation (Ref. No. 13, pp. 9, 26). The drainage ditch west of the existing pond was mostly dry with some water puddles. The onsite sediment samples collected were found to contain low levels of the following inorganic metals chromium (6.8 ppm), copper (10 ppm), mercury (.064 ppm), lead (18 ppm), nickel (9.4 ppm) and zinc (48 ppm) at the site. The Town of Wheatfield and Pendleton and the City of North Tonawanda and Tonawanda receive their drinking water from surface water intakes in the Niagara River. The Town of Amherst receives their drinking water from intakes on Lake Erie. There is no overland surface water migration pathway for this site, therefore these intakes are not suspected of being impacted (Ref. No. 8). There are six acres of onsite wetlands (Ref. No. 10).

Soil Exposure Pathway - The N.C.H.D. collected soil samples in June 1982 and inorganic and organic contaminants were detected (Ref. No. 13, pp. 264-267). There are no residences, schools or day care facilities within 200 feet of the site boundary (Ref. Nos. 2; 11, p. 7). The site is overgrown with vegetation and surrounded by an incomplete fence

allowing for access (Ref. No. 13, pp. 270, 278). There is evidence of unauthorized dumping consisting of tires, rubbish and remmants of steel drums visible at various onsite locations (Ref. No. 13, pp. 256, 269, 270). Nearby residents use the site as a jogging area, dirt bike track and play area (Ref. No. 13, p. 5). There are no known terrestrial sensitive environments located at the site (Ref. Nos. 4; 6).

Air Pathway - There is no analytical documentation available indicating a release of contaminants to air has occurred. An air quality survey was performed utilizing an HNu photoionization meter of the entire site during the Phase II investigation and no contamination was detected (Ref. No. 14, p. 5). The site is heavily overgrown with vegetation therefore there is a low potential for inorganics to become airborne. There are approximately 60,176 people living within a 4-mile radius of the site (0-0.25 mile, 133; 0.25-0.50 mile, 1,053; 0.50-1 mile, 3,995; 1-2 miles, 14,874; 2-3 miles, 19,224; 3-4 miles, 20,897) (Ref. No. 3). There are 23.9 miles (1,047 acres) of wetlands located within four miles of the site (Ref. No. 10).

Summary

There is no analytical documentation to indicate a release to air has occurred from this heavily overgrown site. Analytical results indicate THO were detected in onsite groundwater monitoring well samples. However, there are no people utilizing groundwater as a drinking water source within four miles of the site. Analytical results indicated organic and inorganic contaminants were detected in soil samples collected from the site. However, there are no residences, schools or day care facilities within 200 feet of the site boundary. Analytical results indicate inorganic metals were present in low concentrations in onsite sediment samples. There is no overland surface water migration pathway from this site via the drainage ditch to the nearest surface water body called Sawyer Creek. There are six acres of onsite wetlands and 1,047 acres of wetlands located within four miles of the site.

Very truly yours,

GARY BIELEN
SITE MANAGER

JOHN RIECKHOFF
PROJECT TASK LEADER

JOHN L. SPLENDORE, P.E.
WORK ASSIGNMENT MANAGER

ATTACHMENT 1

REFERENCES

1. Comprehensive Environmental Response Compensation Liability Information System (CERCLIS) List-8: Site/Event Listing, page 331, USEPA Superfund Program, March 16, 1993.

2. Four-Mile Vicinity Map for the Nash Road Landfill compiled from U.S. Geological Survey Topographic maps, 7.5 Minute Series, "Tonawanda East, NY Quadrangle", 1980; "Tonawanda West, NY Quadrangle", 1980; "Cambria Quadrangle", 1980; and "Ransomville, NY", 1980.

3. Project Note: To Nash Road Landfill file, from Gary Bielen, Malcolm Pirnie, Inc., Subject: "Four-Mile Ring Populations - Tiger Data", May, 1993.

4. Wetlands Map, compiled from U.S. Department of the Interior, Fish and Wildlife Services, National Wetlands Inventory Maps, "Tonawanda East, NY", 1978' "Tonawanda West, NY", 1978; "Niagara Falls, Ont - NY", 1978.

5. U. S. Geological Survey, "Water Resources Data, New York, Water Year 1990, Volume 3, Western New York", 1990.

6. New York State Department of Environmental Conservation, Wildlife Resources Center, National Heritage Program file information for Nash Road Landfill, April, 1993.

7. New York Department of Environmental Conservation, New York State Wellhead Protection Program, "Wellhead Protection Area Delineation Summary", September 1990.

8. Project Note: To Nash Road Landfill file, from Gary Bielen, Malcolm Pirnie, Inc., Subject: "Drinking Water Sources within Four Miles of the Site", May 1993.

9. International Great Lakes Diversions and Consumptive Uses Study Board, "Great Lake Diversions and Consumptive Uses Report", September 1981.

10. Project Note: To Nash Road landfill file, from Gary Bielen, Malcolm Pirnie, Inc., Subject: "Estimated Wetlands for Nash Road Landfill", May 1993.

11. Field Logbook for Nash Road Landfill Site Reconnaissance, May 21, 1993.

12. U.S.Environmental Protection Agency, Superfund Chemical Data Matrix (SCDM), March 1993.

13. New York State Department of Environmental Conservation, "Engineering Investigations at Inactive Hazardous Waste Sites, Phase II Investigation, Volume I", July 1985.

14. New York State Department of Environmental Conservation, "Engineering Investigation at Inactive Hazardous Waste Sites, Phase II Investigation, Volume II", July 1985.

REFERENCE NO. 1

SELECTION:
SEQUENCE: STATE, CNTY CODE, SITE NAME

EVENTS: ALL

EPA ID NO.	SITE NAME / STREET / CITY / COUNTY CODE AND NAME	STATE ZIP / CONG DIST.	UPRBLE UNIT	EVENT TYPE	EVENT QUAL	ACTUAL START DATE	ACTUAL COMPL DATE	CURRENT EVENT LEAD
NYD000512848 (CONTINUED)	MADISON WIRE WORKS CO INC		(00)	SI1	NFA	05/01/85	05/31/85	STATE(FUND)
NYD000513952	MARILLA LF EASTWOOD RD MARILLA 029 ERIE	 NY 14102	00	DS1 PA1 SI1	 NFA	 03/01/86 02/01/89	04/01/80 03/07/86 11/29/91	EPA (FUND) STATE(FUND) STATE(FUND)
NYD002107019	MOBIL OIL CORP 635 ELK ST BUFFALO 029 ERIE	 NY 14240	00	DS1 PA1 SI1		 05/01/85	06/01/81 09/01/84 05/31/85	EPA (FUND) STATE(FUND) STATE(FUND)
NYD002109961	MOLLENBER-BETZ 300 SCOTT ST BUFFALO 029 ERIE	 NY 14204	00	DS1 PA1	 NFA	 03/01/86	04/15/80 03/07/86	EPA (FUND) STATE(FUND)
NYD980534770	MORRIS & REIMANN RENSCH RD AMHERST 029 ERIE	 NY 14226	00	DS1 PA1	 NFA	 09/29/87	04/01/80 09/30/87	EPA (FUND) STATE(FUND)
NYD980534820	NASH ROAD NASH RD WHEATFIELD 029 ERIE	 NY 14150	00	DS1 PA1 SI1 SI2		 07/01/85 03/01/86	04/01/81 08/31/85 08/31/85 03/17/86	EPA (FUND) STATE(FUND) STATE(FUND) EPA (FUND)
NYD000513978	NEWSTEAD LF SAND HILL RD NEWSTEAD 029 ERIE	 NY 14001	00	DS1 PA1 SI1	 NFA	 11/01/81	04/01/80 11/01/81 11/01/81	EPA (FUND) EPA (FUND) EPA (FUND)
NYD986883367	NEWSTEAD SITE 6671 FLETCHER RD NEWSTEAD 029 ERIE	 NY 14001	00	RV1 RV2 RV3 DS1		08/29/89 09/27/89 07/01/92	09/27/89 08/22/89	EPA (FUND) RESP. PARTY RESP. PARTY EPA (FUND)

FORM 1411-3

PRINTED IN U.S.A.

REFERENCE NO. 2

TITLE:

FOUR–MILE VICINITY MAP

SITE NAME:

NASH ROAD
WHEATFIELD, NIAGARA COUNTY, NEW YORK

DATE: 5/31/93 | SCALE: 1" = 2083'

REPORT NUMBER: 8003–180

USGS TOPO NAME:

TONAWANDA EAST, NEW YORK

REFERENCE NO. 3

FROST ASSOCIATES

P.O. Box 495, Essex, Connecticut 06426
(203) 767-1254 Fax (203) 767-7069

Mar 22, 1993

To: Lilli Gonzalez
Malcolm Pirnie Inc
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Cranbury, New Jersey

Fr: Bob Frost
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Essex, Conn 06426

Tel: (203) 767-1254
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Sub: Nash Road LF
Wheatfield NY

Job: 8003-180-701

Site Longitude: 78.859390
Site Latitude : 43.069439

The CENTRACTS report below identifies the population, households, and private water wells of each Block Group that lies within, or partially within, the 4, 3, 2, 1, .5, and .25, mile "rings" of the latitude and longitude coordinates above. CENTRACTS may have up to ten radii of any length. 1000 block groups, and 15000 block group sides.

CENTRACTS uses the 1990 Block Group population and Block Group house count data found in the Census Bureau's 1990 STF-1A files. The sources of water supply data are from the Bureau's 1990 STF-3A files. The boundary line coordinates of the Block Groups were extracted from the Census Bureau's 1990 TIGER/Line Files.

CENTRACTS reports are created with programs written by Frost Associates, P.O. Box 495, Essex, Conn. The code was written using Microsoft's Quick-Basic Ver. 4.5.

Latitude and Longitude coordinates identifying a site are entered in degrees and decimal degrees. One or more county files holding Block Group boundary lines are selected for use by CENTRACTS by determining whether the site coordinates fall within the minimum and maximum Lat\Lon coordinates of each county in the state.

Each Block Group line segment has Lat\Lon coordinates representing the "From" and "To" ends of that line. All coordinates from the selected county files are read and converted from degrees, decimal degrees to X\Y miles from the site location. Each line segment is then examined whether it lies within or partially within the maximum ring from the site.

The unique Block Group ID numbers of each line segment that lie within the maximum ring are retained. All Block Group boundary lines matching the Block Group numbers are then extracted from the respective county files to obtain all sides of the in cluded Block Groups. Boundary records are then sorted in adjacent side order to determine the shape and area of each Block Group polygon.

A method to solve for the area of a polygon is to take one-half the sum of the pro

MALCOLM PIRNIE, INC. **PROJECT NOTES**

To:File	Date:June 15, 1993
From:Gary Bielen	Project #:8003-180
Subject:Four-Mile Ring Populations	Site Name:Nash Road Landfill

Population estimation within four miles of the Nash Road Landfill site was accomplished using the Topologically Integrated Geographic Encoding and Referencing (TIGER) data base. The results of the TIGER data base study for the site is summarized in the table below.

Ring (miles)	Population
0 - 0.25	133
0.25- 0.50	1,053
0.50- 1	3,995
1 - 2	14,874
2 - 3	19,224
3 - 4	20,897
Total:	60,176

ducts obtained by multiplying each X-coordinate by the difference between the adja cent Y-coordinates. For a polygon with coordinates at adjacent angles A, B, C, D, and E. The formula can be expressed:

Area = 1/2{Xa(Ye-Yb)+ Xb(Ya-Yb)+ Xc(Yb-Yd)+ Xd(Yc-Ye)+ Xe(Yd-Ya)}

For each ring, the selected Block Groups will be inside, outside, or intersected by the ring. When a polygon is intersected, the partial Block Group area within that ring is calculated using the method described below.

When a ring intersects a Block Group, the intersect points are solved and plotted at the points where the ring enters and exits the shape. The chord line, a line within the circle connecting the intersect points is determined. This chord line is used to calculate the segment area, the half moon shape between the chord line and the ring, and the sub-polygon created by the chord line and the Block Group boundaries that lie outside the ring.

The segment area is subtracted from the sub-polygon area to determine the area of the sub-polygon outside the ring. The area outside the ring is then subtracted from the area of the entire polygon to arrive at the inside area. This inside area is then divided by the tract's total area to determine the percentage of area within the ring. This process is repeated for each block group that is intersected by one of the rings. The total area, partial area, and percentage of partial area of those block groups within, or partially within a ring, are held in memory for the report.

On occasion, the algorithm described above is unable to determine the area of the partial area. Within the report program is a "Paint" routine which allows an enclosed shape to be highlighted. Another routine calculates the percentage of highlighted screen pixels to the pixels within the polygon. A manual entry is allowed. Both the "paint" method and manual entry method over ride the calculated method.

CENTRACTS lists, starting on page 4, all Block Groups in State, County, Census Tract, and Block Group ID order that lie within, or partially within, the maximum ring. Each Block Group is identified by a City or Town name and by the Block Group's State, County, Tract and Block Group ID number. Following is the Block Group's 1990 populu tion and house count extracted from the Census Bureau's 1990 STF-1A files.

The next four columns display water source data from the 1990 STF-3A files. The first column is "Units with Public system or private company source of water", followed by "Units with individual well, Drilled, source of water"; "Units with individual well, Dug, source of water" and "Units with Other source of water".

For each ring, CENTRACTS then shows the Block Groups that are within that ring, the Block Group's total area in square miles, the partial area of the Block Group within that ring, and the partial percentage within the ring. The areas of the included Block Group and the partial areas are then totaled.

The last section tallies the demographic data within each ring. The percentage of area for each Block Group is multiplied times the census data for that Block Group and totaled for all Block Group's within the ring. Ring totals are then determined by subtracting the three mile data from the four mile, the two mile from the three mile, one from the two, etc... Population on private wells is calculated using the formula: ((Drilled + Dug Wells) / Households) * Population

Nash Road LF
Wheatfield, NY

No.	City	Block Group ID	Blk Grp People	House Holds	Public Water	Drilled Wells	Dug Wells	Other
1	Tonawanda	36029 0074 1	840	313	320	7	0	0
2	Tonawanda	36029 0075 1	649	356	342	0	0	0
3	Tonawanda	36029 0075 2	1140	454	454	0	0	0
4	Tonawanda	36029 0076 1	755	296	310	0	0	0
5	Tonawanda	36029 0077 1	231	114	87	0	0	0
6	Tonawanda	36029 0077 2	324	148	160	0	0	0
7	Tonawanda	36029 0077 3	747	328	335	0	0	0
8	Tonawanda	36029 0077 4	825	339	346	0	0	0
9	Tonawanda	36029 0077 6	1116	416	419	0	0	0
10	Tonawanda	36029 0077 7	1063	469	488	0	0	0
11	Tonawanda	36029 0078 1	494	209	201	0	0	0
12	Tonawanda	36029 0078 2	577	251	267	0	0	0
13	Grand Island	36029 007304 1	1466	585	584	0	0	0
14	Grand Island	36029 007304 2	1995	713	709	0	0	5
15	Tonawanda	36029 007901 1	582	221	229	0	0	0
16	Tonawanda	36029 007901 2	996	349	329	0	0	0
17	Tonawanda	36029 007901 3	1671	596	612	0	0	0
18	Tonawanda	36029 007901 5	1137	418	406	24	0	0
19	Tonawanda	36029 007901 6	1739	844	855	0	0	0
20	Tonawanda	36029 007901 7	1103	425	412	0	0	0
21	Tonawanda	36029 007901 8	897	562	579	0	0	0
22	Amherst	36029 009106 2	2303	770	768	0	0	0
23	Amherst	36029 009106 9	1152	368	370	0	0	0
24	Amherst	36029 009107 1	3061	1085	1070	0	0	0
25	Amherst	36029 009107 2	1386	467	497	0	0	0
26	Amherst	36029 009107 9	576	245	230	0	0	0
27	Amherst	36029 009108 1	4749	2369	2371	0	0	0
28	Amherst	36029 009108 2	788	394	403	0	0	0
29	North Tonawanda	36063 0229 1	1378	530	500	0	0	0
30	North Tonawanda	36063 0229 2	1483	583	589	0	0	0
31	North Tonawanda	36063 0229 3	1240	608	611	0	0	0
32	North Tonawanda	36063 0229 4	503	234	224	0	0	0
33	North Tonawanda	36063 0229 5	816	303	321	0	0	0
34	North Tonawanda	36063 0229 6	340	142	155	0	0	0
35	North Tonawanda	36063 0230 1	629	242	235	0	0	0
36	North Tonawanda	36063 0230 2	477	174	177	0	0	0
37	North Tonawanda	36063 0230 3	639	266	274	0	0	0
38	North Tonawanda	36063 0230 4	724	308	306	0	0	0
39	North Tonawanda	36063 0230 5	1062	452	450	0	0	0
40	North Tonawanda	36063 0231 1	783	307	315	0	0	0
41	North Tonawanda	36063 0231 2	1452	593	591	0	0	0
42	North Tonawanda	36063 0231 3	636	289	283	0	0	0
43	North Tonawanda	36063 0232 1	359	119	111	0	0	0
44	North Tonawanda	36063 0232 2	1230	553	554	0	0	0
45	North Tonawanda	36063 0232 3	1286	563	573	0	0	0
46	North Tonawanda	36063 0232 4	414	364	361	0	0	0
47	North Tonawanda	36063 0233 1	662	271	281	0	0	0
48	North Tonawanda	36063 0233 2	2730	985	934	0	0	0
49	North Tonawanda	36063 0233 3	1808	876	954	0	0	0
50	North Tonawanda	36063 0233 4	455	183	178	0	0	0
51	North Tonawanda	36063 0233 5	2049	839	807	0	0	0

52	Pendleton	36063	0227029	5010	1745	1713	32	0	0
53	Wheatfield	36063	0227111	808	294	280	0	0	0
54	Wheatfield	36063	0227112	178	70	73	0	0	0
55	Wheatfield	36063	0227119	4848	1710	1716	0	0	0
56	Wheatfield	36063	0227128	5237	2143	2143	0	0	0
57	North Tonawanda	36063	0228011	2495	967	979	0	0	0
58	North Tonawanda	36063	0228013	618	238	234	0	0	0
59	North Tonawanda	36063	0228014	691	293	285	0	0	0
60	North Tonawanda	36063	0228021	1410	532	517	0	0	0
61	North Tonawanda	36063	0228022	468	189	204	0	0	0
62	North Tonawanda	36063	0228023	1801	619	613	0	0	0
63	North Tonawanda	36063	0228024	4351	1379	1385	0	0	0
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	Totals:			85432	34067	34079	63	0	5

Nash Road LF
Wheatfield, NY

City	Census Tract ID	Tract People	House Count	Public Water	Drilled Wells	Dug Wells	Other Wells
Amherst	36029 0091069	1152	368	370	0	0	0
Amherst	36029 0091071	3061	1085	1070	0	0	0
Amherst	36029 0091072	1386	467	497	0	0	0
Amherst	36029 0091079	576	245	230	0	0	0
Amherst	36029 0091081	4749	2369	2371	0	0	0
Amherst	36029 0091082	788	394	403	0	0	0
Amherst	36029 0091062	2303	770	768	0	0	0
	Sub Totals:	14015	5698	5709	0	0	0
Grand Island	36029 0073042	1995	713	709	0	0	5
Grand Island	36029 0073041	1466	585	584	0	0	0
	Sub Totals:	3461	1298	1293	0	0	5
North Tonawanda	36063 0229 6	340	142	155	0	0	0
North Tonawanda	36063 0229 4	503	234	224	0	0	0
North Tonawanda	36063 0229 5	816	303	321	0	0	0
North Tonawanda	36063 0230 3	639	266	274	0	0	0
North Tonawanda	36063 0230 1	629	242	235	0	0	0
North Tonawanda	36063 0230 2	477	174	177	0	0	0
North Tonawanda	36063 0233 1	662	271	281	0	0	0
North Tonawanda	36063 0233 2	2730	985	934	0	0	0
North Tonawanda	36063 0232 4	414	364	361	0	0	0
North Tonawanda	36063 0233 4	455	183	178	0	0	0
North Tonawanda	36063 0233 5	2049	839	807	0	0	0
North Tonawanda	36063 0233 3	1808	876	954	0	0	0
North Tonawanda	36063 0230 4	724	308	306	0	0	0
North Tonawanda	36063 0230 5	1062	452	450	0	0	0
North Tonawanda	36063 0231 1	783	307	315	0	0	0
North Tonawanda	36063 0231 2	1452	593	591	0	0	0
North Tonawanda	36063 0231 3	636	289	283	0	0	0
North Tonawanda	36063 0232 1	359	119	111	0	0	0
North Tonawanda	36063 0228011	2495	967	979	0	0	0
North Tonawanda	36063 0229 1	1378	530	500	0	0	0
North Tonawanda	36063 0229 2	1483	583	589	0	0	0
North Tonawanda	36063 0229 3	1240	608	611	0	0	0
North Tonawanda	36063 0228024	4351	1379	1385	0	0	0
North Tonawanda	36063 0228023	1801	619	613	0	0	0
North Tonawanda	36063 0232 2	1230	553	554	0	0	0
North Tonawanda	36063 0232 3	1286	563	573	0	0	0
North Tonawanda	36063 0228013	618	238	234	0	0	0
North Tonawanda	36063 0228021	1410	532	517	0	0	0
North Tonawanda	36063 0228022	468	189	204	0	0	0
North Tonawanda	36063 0228014	691	293	285	0	0	0
	Sub Totals:	34989	14001	14001	0	0	0
Pendleton	36063 0227029	5010	1745	1713	32	0	0

Nash Road LF
Wheatfield, NY

	Sub Totals:	5010	1745	1713	32	0	0
Tonawanda	36029 0075 2	1140	454	454	0	0	0
Tonawanda	36029 0077 7	1063	469	488	0	0	0
Tonawanda	36029 0075 1	649	356	342	0	0	0
Tonawanda	36029 0077 2	324	148	160	0	0	0
Tonawanda	36029 0076 1	755	296	310	0	0	0
Tonawanda	36029 0077 1	231	114	87	0	0	0
Tonawanda	36029 0077 6	1116	416	419	0	0	0
Tonawanda	36029 0079013	1671	596	612	0	0	0
Tonawanda	36029 0079015	1137	418	406	24	0	0
Tonawanda	36029 0079016	1739	844	855	0	0	0
Tonawanda	36029 0079017	1103	425	412	0	0	0
Tonawanda	36029 0077 3	747	328	335	0	0	0
Tonawanda	36029 0077 4	825	339	346	0	0	0
Tonawanda	36029 0079011	582	221	229	0	0	0
Tonawanda	36029 0079012	996	349	329	0	0	0
Tonawanda	36029 0074 1	840	313	320	7	0	0
Tonawanda	36029 0078 1	494	209	201	0	0	0
Tonawanda	36029 0078 2	577	251	267	0	0	0
Tonawanda	36029 0079018	897	562	579	0	0	0
	Sub Totals:	16886	7108	7151	31	0	0
Wheatfield	36063 0227111	808	294	280	0	0	0
Wheatfield	36063 0227112	178	70	73	0	0	0
Wheatfield	36063 0227119	4848	1710	1716	0	0	0
Wheatfield	36063 0227128	5237	2143	2143	0	0	0
	Sub Totals:	11071	4217	4212	0	0	0

Nash Road LF
Wheatfield, NY

For Radius of 4 Mi., Circle Area = 50.265482

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
1	Tonawanda	36029 741	0.675132	0.675132	100.00
2	Tonawanda	36029 751	0.087407	0.087407	100.00
3	Tonawanda	36029 752	0.122889	0.081447	66.28
4	Tonawanda	36029 761	0.265843	0.038408	14.45
5	Tonawanda	36029 771	0.164278	0.164278	100.00
6	Tonawanda	36029 772	0.050657	0.050657	100.00
7	Tonawanda	36029 773	0.079719	0.077006	96.60
8	Tonawanda	36029 774	0.121214	0.005937	4.90
9	Tonawanda	36029 776	0.142831	0.007492	5.25
10	Tonawanda	36029 777	0.087259	0.081616	93.53
11	Tonawanda	36029 781	0.266655	0.034269	12.85
12	Tonawanda	36029 782	0.061948	0.000002	0.00
13	Grand Island	36029 73041	3.683860	0.256102	6.95
14	Grand Island	36029 73042	6.143033	3.399633	55.34
15	Tonawanda	36029 79011	0.583932	0.583932	100.00
16	Tonawanda	36029 79012	0.179571	0.138427	77.09
17	Tonawanda	36029 79013	0.324094	0.032804	10.12
18	Tonawanda	36029 79015	0.148417	0.010594	7.14
19	Tonawanda	36029 79016	0.669942	0.107647	16.07
20	Tonawanda	36029 79017	0.158573	0.006367	4.02
21	Tonawanda	36029 79018	0.225432	0.225432	100.00
22	Amherst	36029 91062	1.116836	0.018017	1.61
23	Amherst	36029 91069	3.608242	1.746963	48.42
24	Amherst	36029 91071	0.867811	0.867811	100.00
25	Amherst	36029 91072	0.352859	0.352859	100.00
26	Amherst	36029 91079	1.667495	1.443109	86.54
27	Amherst	36029 91081	1.624090	0.062150	3.83
28	Amherst	36029 91082	0.120403	0.042901	35.63
29	North Tonawanda	36063 2291	0.625382	0.625382	100.00
30	North Tonawanda	36063 2292	0.209509	0.209509	100.00
31	North Tonawanda	36063 2293	0.161218	0.161218	100.00
32	North Tonawanda	36063 2294	0.235074	0.235074	100.00
33	North Tonawanda	36063 2295	0.109455	0.109455	100.00
34	North Tonawanda	36063 2296	0.979038	0.979038	100.00
35	North Tonawanda	36063 2301	0.150775	0.150775	100.00
36	North Tonawanda	36063 2302	0.074553	0.074553	100.00
37	North Tonawanda	36063 2303	0.082839	0.082839	100.00
38	North Tonawanda	36063 2304	0.078921	0.078921	100.00
39	North Tonawanda	36063 2305	0.255168	0.255168	100.00
40	North Tonawanda	36063 2311	0.155371	0.155371	100.00
41	North Tonawanda	36063 2312	0.126602	0.126602	100.00
42	North Tonawanda	36063 2313	0.207058	0.207058	100.00
43	North Tonawanda	36063 2321	0.168667	0.168667	100.00
44	North Tonawanda	36063 2322	0.120947	0.120947	100.00
45	North Tonawanda	36063 2323	0.157504	0.157504	100.00
46	North Tonawanda	36063 2324	0.550033	0.550033	100.00
47	North Tonawanda	36063 2331	0.900291	0.900291	100.00

Nash Road LF
Wheatfield, NY

48	North Tonawanda	36063 2332	1.048994	1.048994	100.00
49	North Tonawanda	36063 2333	0.248402	0.248402	100.00
50	North Tonawanda	36063 2334	0.074282	0.074282	100.00
51	North Tonawanda	36063 2335	0.383736	0.383736	100.00
52	Pendleton	36063 227029	26.726162	7.002690	26.20
53	Wheatfield	36063 227111	0.362018	0.362018	100.00
54	Wheatfield	36063 227112	0.127025	0.127025	100.00
55	Wheatfield	36063 227119	19.936838	14.751286	73.99
56	North Tonawanda	36063 228024	0.875542	0.875542	100.00
57	North Tonawanda	36063 228011	0.830716	0.830716	100.00
58	North Tonawanda	36063 228013	0.279916	0.279916	100.00
59	North Tonawanda	36063 228014	0.274143	0.274143	100.00
60	North Tonawanda	36063 228021	0.399705	0.399705	100.00
61	North Tonawanda	36063 228022	0.246161	0.246161	100.00
62	North Tonawanda	36063 228023	0.805319	0.805319	100.00
63	Wheatfield	36063 227128	7.715084	6.608740	85.66
	Totals:		89.282867	50.265484	

For Radius of 3 Mi., Circle Area = 28.274334

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
14	Grand Island	36029 73042	6.143033	0.512674	8.35
23	Amherst	36029 91069	3.608242	0.021619	0.60
24	Amherst	36029 91071	0.867811	0.488250	56.26
26	Amherst	36029 91079	1.667495	0.606669	36.38
29	North Tonawanda	36063 2291	0.625382	0.625382	100.00
30	North Tonawanda	36063 2292	0.209509	0.209509	100.00
31	North Tonawanda	36063 2293	0.161218	0.161218	100.00
32	North Tonawanda	36063 2294	0.235074	0.235074	100.00
33	North Tonawanda	36063 2295	0.109455	0.109455	100.00
34	North Tonawanda	36063 2296	0.979038	0.979038	100.00
35	North Tonawanda	36063 2301	0.150775	0.150775	100.00
36	North Tonawanda	36063 2302	0.074553	0.074553	100.00
37	North Tonawanda	36063 2303	0.082839	0.082839	100.00
38	North Tonawanda	36063 2304	0.078921	0.078921	100.00
39	North Tonawanda	36063 2305	0.255168	0.255168	100.00
40	North Tonawanda	36063 2311	0.155371	0.155371	100.00
41	North Tonawanda	36063 2312	0.126602	0.126602	100.00
42	North Tonawanda	36063 2313	0.207058	0.195770	94.55
43	North Tonawanda	36063 2321	0.168667	0.117436	69.63
44	North Tonawanda	36063 2322	0.120947	0.083584	69.11
45	North Tonawanda	36063 2323	0.157504	0.085901	54.54
46	North Tonawanda	36063 2324	0.550033	0.075572	13.74
47	North Tonawanda	36063 2331	0.900291	0.900291	100.00
48	North Tonawanda	36063 2332	1.048994	0.631851	60.23
49	North Tonawanda	36063 2333	0.248402	0.094436	38.02
50	North Tonawanda	36063 2334	0.074282	0.074282	100.00
51	North Tonawanda	36063 2335	0.383736	0.383736	100.00
52	Pendleton	36063 227029	26.726162	3.174892	11.88

54	Wheatfield	36063 227112	0.127025	0.127025	100.00
55	Wheatfield	36063 227119	19.936838	9.746081	48.88
56	North Tonawanda	36063 228024	0.875542	0.875542	100.00
57	North Tonawanda	36063 228011	0.830716	0.830716	100.00
58	North Tonawanda	36063 228013	0.279916	0.279916	100.00
59	North Tonawanda	36063 228014	0.274143	0.274143	100.00
60	North Tonawanda	36063 228021	0.399705	0.399705	100.00
61	North Tonawanda	36063 228022	0.246161	0.246161	100.00
62	North Tonawanda	36063 228023	0.805319	0.805319	100.00
63	Wheatfield	36063 227128	7.715084	3.998856	51.83
	Totals:		77.607010	28.274334	

For Radius of 2 Mi., Circle Area = 12.566371

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
26	Amherst	36029 91079	1.667495	0.004742	0.28
29	North Tonawanda	36063 2291	0.625382	0.442018	70.68
30	North Tonawanda	36063 2292	0.209509	0.209509	100.00
31	North Tonawanda	36063 2293	0.161218	0.157139	97.47
32	North Tonawanda	36063 2294	0.235074	0.064251	27.33
33	North Tonawanda	36063 2295	0.109455	0.050571	46.20
35	North Tonawanda	36063 2301	0.150775	0.124157	82.35
36	North Tonawanda	36063 2302	0.074553	0.008307	11.14
38	North Tonawanda	36063 2304	0.078921	0.007367	9.33
47	North Tonawanda	36063 2331	0.900291	0.196214	21.79
51	North Tonawanda	36063 2335	0.383736	0.162129	42.25
52	Pendleton	36063 227029	26.726162	0.176688	0.66
54	Wheatfield	36063 227112	0.127025	0.058928	46.39
55	Wheatfield	36063 227119	19.936838	5.888924	29.54
56	North Tonawanda	36063 228024	0.875542	0.875542	100.00
57	North Tonawanda	36063 228011	0.830716	0.830716	100.00
58	North Tonawanda	36063 228013	0.279916	0.279916	100.00
59	North Tonawanda	36063 228014	0.274143	0.274143	100.00
60	North Tonawanda	36063 228021	0.399705	0.399705	100.00
61	North Tonawanda	36063 228022	0.246161	0.212161	86.19
62	North Tonawanda	36063 228023	0.805319	0.805319	100.00
63	Wheatfield	36063 227128	7.715084	1.337926	17.34
	Totals:		62.813023	12.566371	

For Radius of 1 Mi., Circle Area = 3.141593

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
55	Wheatfield	36063 227119	19.936838	1.331091	6.68
56	North Tonawanda	36063 228024	0.875542	0.466151	53.24

Nash Road LF
Wheatfield, NY

57	North Tonawanda	36063 228011	0.830716	0.409641	49.31
59	North Tonawanda	36063 228014	0.274143	0.001912	0.70
62	North Tonawanda	36063 228023	0.805319	0.431879	53.63
63	Wheatfield	36063 227128	7.715084	0.500919	6.49
	Totals:		30.437643	3.141593	

For Radius of .5 Mi., Circle Area = 0.785398

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
55	Wheatfield	36063 227119	19.936838	0.150347	0.75
56	North Tonawanda	36063 228024	0.875542	0.084571	9.66
57	North Tonawanda	36063 228011	0.830716	0.030194	3.63
62	North Tonawanda	36063 228023	0.805319	0.183629	22.80
63	Wheatfield	36063 227128	7.715084	0.336657	4.36
	Totals:		30.163500	0.785398	

For Radius of .25 Mi., Circle Area = 0.196350

No.	City	Block Group ID	Total Area	Partial Area	% Within Radius
63	Wheatfield	36063 227128	7.715084	0.196350	2.55
	Totals:		7.715084	0.196350	

Nash Road LF
Wheatfield, NY

========== Site Data ==========

Population:	60177.35
Households:	23934.40
Drilled Wells:	17.10
Dug Wells:	0.00
Other Water Sources:	2.77

========== Partial (RING) data ==========

---- Within Ring: 4 Mile(s) and 3 Mile(s) ----

Population:	20897.37
Households:	8675.46
Drilled Wells:	13.30
Dug Wells:	0.00
Other Water Sources:	2.35

** Population On Private Wells: 32.03

---- Within Ring: 3 Mile(s) and 2 Mile(s) ----

Population:	19224.35
Households:	7731.49
Drilled Wells:	3.59
Dug Wells:	0.00
Other Water Sources:	0.42

** Population On Private Wells: 8.93

---- Within Ring: 2 Mile(s) and 1 Mile(s) ----

Population:	14874.40
Households:	5729.10
Drilled Wells:	0.21
Dug Wells:	0.00
Other Water Sources:	0.00

** Population On Private Wells: 0.55

---- Within Ring: 1 Mile(s) and .5 Mile(s) ----

Population:	3994.52
Households:	1382.45
Drilled Wells:	0.00
Dug Wells:	0.00
Other Water Sources:	0.00

** Population On Private Wells: 0.00

Nash Road LF
Wheatfield, NY

---- Within Ring: .5 Mile(s) and .25 Mile(s) ----

Population:	1053.43
Households:	361.36
Drilled Wells:	0.00
Dug Wells:	0.00
Other Water Sources:	0.00

** Population On Private Wells: 0.00

---- Within Ring: .25 Mile(s) and 0 Mile(s) ----

Population:	133.28
Households:	54.54
Drilled Wells:	0.00
Dug Wells:	0.00
Other Water Sources:	0.00

** Population On Private Wells: 0.00

** Total Population On Private Wells: 41.50

REFERENCE NO. 4

NATIONAL WETLANDS INVENTORY

UNITED STATES DEPARTMENT OF THE INTERIOR

NIAGARA FALLS, ONT.-NY

TONAWANDA WEST, N.Y.

TONAWANDA EAST, N.Y.

NIAGARA FALLS

NIAGARA RIVER

Navy Island

WILLOUGHBY

GRAND ISLAND

NORTH TONAWANDA

TONAWANDA

SITE LOCATION

Buffalo Park Village

TORONTO SW
NIAGARA FALLS

NIAGARA FALLS, ONT-NY

TORONTO SE
LOCKPORT

TONAWANDA WEST, N.Y.

TONAWANDA EAST, N.Y.

SCALE 1:24000

Other information concerning the wetland resources depicted on this document may be available. For information, contact:

Regional Director (R5RD) Region V
U.S. Fish and Wildlife Service
1 Gateway Center, Suite 700
Newton Corner, Massachusetts 02158

SPECIAL NOTE

This document was prepared primarily by stereoscopic analysis of high altitude aerial photographs. Wetlands were identified on the photographs based on vegetation, visible hydrology and geography in accordance with the definitions of Cowardin and Golet as modified by the Global Change Marsh Project (Version 2.0, 1991). Wetland boundaries delineated on aerial photographs typically reflect conditions during the season(s) and year(s) in which the photography was flown. Thus, there is a range of error inherent in the use of the aerial photographs. Thus, a decided on the ground and/or at a different time of year may result in a different determination of wetland boundaries established through photographic interpretation. In addition, some small wetlands and those located beneath forest cover may not be included on the document.

Federal, State and local regulatory agencies will generally require more detailed information than that provided by the wetland boundaries established through photographic interpretation. In addition, some small wetlands and those located beneath forest cover may not be included on the document.

Federal, State and local regulatory agencies will generally require more detailed information than that provided by the wetland boundaries established through photographic interpretation. In addition, some small wetlands and those located beneath forest cover may not be included on the document.

Jurisdictional determinations of the extent of Federal, State and local regulatory jurisdiction may differ from those shown on this document. Thus, a decided on the ground and/or at a different time of year may result in a different determination of the extent of Federal, State or local regulatory jurisdiction. Persons intending to engage in activities involving fill or other alterations in the waters of the United States should seek the advice of appropriate Federal, State or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

SYMBOLOGY EXAMPLE

SYSTEM
SUBSYSTEM
CLASS
SUBCLASS, WATER REGIME
(IF AND NON-WETLANDS)
PF in PAF: PARMED WETLANDS
CONTROLLED WATER REGIME

NOTES TO THE USER

This map is derived from interpreting aerial photographs. Interpretation of wetlands may be subject to error.

Boundaries depicted within wetlands or adjacent to wetlands may be more accurate than those shown on this map.

Additions or inaccuracies to the wetlands inventory may be made based on more current or more accurate information or other information the interpreter is aware of.

For information on the Wetlands Inventory, please write: Regional Director (R5RD), Region V, U.S. Fish and Wildlife Service, 1 Gateway Center, Suite 700, Newton Corner, Massachusetts 02158.

AERIAL PHOTOGRAPHY

DATE	10 / 78	
SCALE	1:80 000	
TYPE	B/W	
DATE	/ /	
SCALE		
TYPE		
DATE	/ /	
SCALE		
TYPE		

WETLAND LEGEND

Primary represents upland areas, but may include unlisted wetlands such as man-modified ponds, man-made identifiable areas and/or unidentified inclusions.

ECOLOGICAL SYSTEM

E – ESTUARINE: E1 Subtidal; E2 Intertidal
M – MARINE: M1 Subtidal; M2 Intertidal
P – PALUSTRINE: P1 Cover; P2 Emergent; P3 Shrub; P4 Forested; P5 Aquatic Bed
L – LACUSTRINE: L1 Cover; L2 Emergent
R – RIVERINE: R1 Tidal; R2 Lower Perennial; R3 Upper Perennial; R4 Intermittent; R5 Unknown Perennial

Cowardin Classification

Cover: Open Water; Aquatic Bed; Rock/Gravel; Unconsolidated Shore; Rock Bottom

Emergent: Persistent; Nonpersistent

Scrub/Shrub: Broad-Leaved Deciduous; Needle-Leaved Deciduous; Needle-Leaved Evergreen; Broad-Leaved Evergreen; Dwarf; Moss/Lichen

Forested: Broad-Leaved Deciduous; Needle-Leaved Deciduous; Needle-Leaved Evergreen; Broad-Leaved Evergreen; Dwarf; Moss/Lichen

MODIFYING TERMS

To select an item, alternately click the cursor on and off the item. Under regular, more inclusive, and or special modifiers, click the pop-up list of the item or hold down the Ctrl key. Click the Help button for a complete listing.

WATER REGIMES: Nontidal; Tidal; Regularly Flooded; Irregularly Flooded; Seasonally Flooded; Temporarily Flooded; Intermittently Exposed; Permanently Flooded; Indefinitely Flooded; Saturated; Artificially Flooded

WATER CHEMISTRY: Fresh; Mixed Fresh/Saline; Saline; Hyperhaline; Acid; Mixed Acid/Alkaline; Alkaline

SOIL: Organic; Mineral

(1) Information on the water regime modifiers is found on the legend, but not found in the classification system, may be obtained from the USFS field guide.

(2) Information on the water chemistry modifiers found on the legend, but not found in the classification system, may be obtained from the USFS field guide.

U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Regional Director (R5RD) Region V
U.S. Fish and Wildlife Service
1 Gateway Center, Suite 700
Newton Corner, Massachusetts 02158

Prepared by Office for the Northeast

TITLE:	WETLANDS MAP
SITE NAME:	NASH ROAD LANDFILL WHEATFIELD, NEW YORK
DATE: 6/30/93	SCALE: 1" = 3638'
REPORT NUMBER: 8003-180	
USGS TOPO NAME:	TONAWANDA EAST, NEW YORK

864

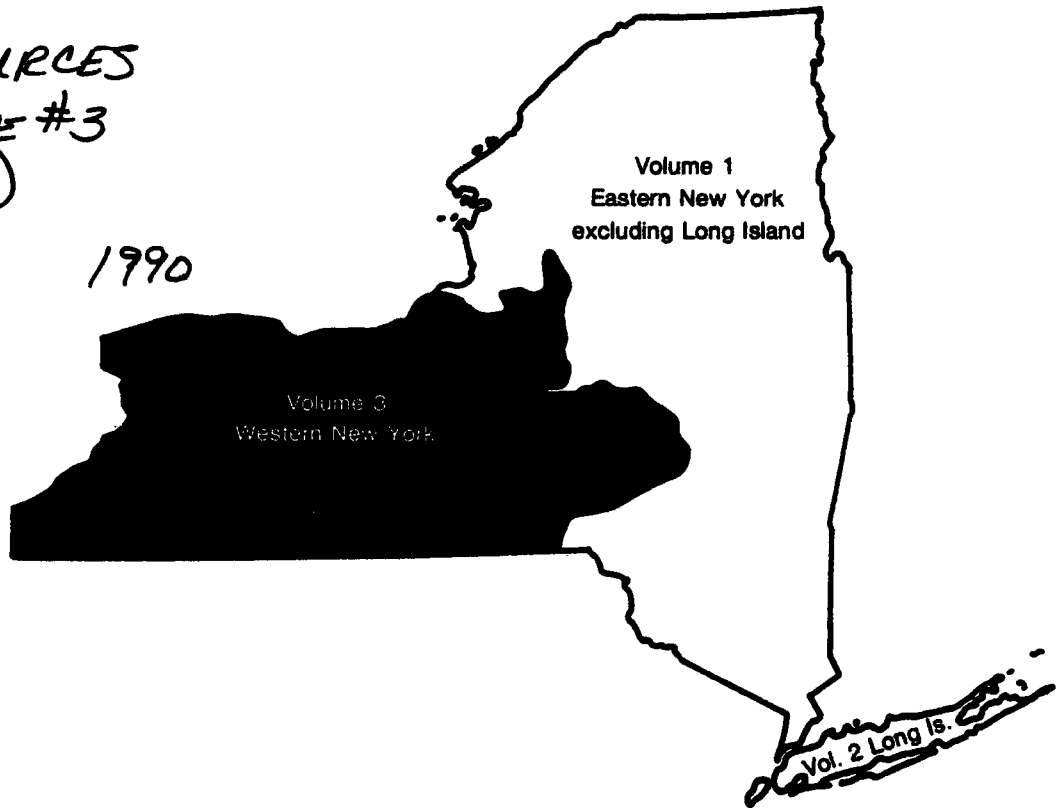
REFERENCE NO. 5

Water Resources Data
New York
Water Year 1990

Volume 3. Western New York

WATER RESOURCES
DATA - VOLUME #3
(WESTERN NY)
MANUAL 8C.

1990



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT NY-90-3
Prepared in cooperation with the State of New York
and with other agencies

04216000 NIAGARA RIVER AT BUFFALO, NY

LOCATION.--Lat 42°52'40", long 78°55'00", Erie County, Hydrologic Unit 04120104, at head of Niagara River at Buffalo, and 34.3 mi upstream from mouth.

DRAINAGE AREA.--263,700 mi^2.

PERIOD OF RECORD.--January 1860 to September 1960 (monthly discharges only published in WSP 1912), October 1960 to current year. Records of January 1926 to September 1960 daily discharges available in files of U.S. Department of Commerce and U.S. Geological Survey.

REVISED RECORDS.--WSP 1912: 1862(M), 1955 (M), 1936 (M), WDR NY-77-1: Drainage area.

GAGE.--Discharge determined from several powerplants at Niagara Falls and discharge over the falls. Discharge before 1926 determined from records of Corps of Engineers gages at Buffalo and Cleveland.

REMARKS.--Records do not include water diverted from Lake Michigan by Illinois and Michigan Canal during period of its operation prior to 1910 and by Chicago Sanitary and Ship Canal, which began operation in 1900, and from Lake Erie by Welland and New York State Canals before 1918. Records include water diverted into Lake Superior from Hudson Bay drainage by the Long Lake project, which began operation in July 1939, and by the Ogoki project, which began operation in July 1943. Figures of monthly mean discharge for 1860 to 1960 and daily discharge for 1961 to 1965, published in WSP 1912, are the official records of the U.S. Lake Survey, and have been coordinated with and concurred by the counterpart Canadian agencies, as have been the extremes for period of record through December 1976 and records October 1977 to current year.

COOPERATION.--Records of daily discharge furnished by Detroit District Corps of Engineers and Canada Department of the Environment.

AVERAGE DISCHARGE.--130 years, 205,600 ft^3/s.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 347,000 ft^3/s, Dec. 2, 1985, result of high, storm-generated Lake Erie level; minimum daily, 90,000 ft^3/s, Jan. 13, 1964, Aug. 29, 1984. Maximum monthly mean discharge, 268,400 ft^3/s, June 1986; minimum monthly mean, 116,200 ft^3/s, February 1936.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 245,000 ft^3/s, May 11; minimum daily, 162,000 ft^3/s, Dec. 22.

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

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	200000	216000	186000	202000	191000	213000	208000	219000	218000	211000	208000	212000
2	204000	200000	207000	195000	184000	216000	210000	214000	223000	212000	209000	213000
3	207000	195000	202000	185000	176000	208000	212000	210000	229000	211000	209000	204000
4	214000	195000	189000	189000	187000	205000	232000	204000	232000	222000	209000	209000
5	207000	198000	191000	189000	193000	198000	239000	216000	224000	210000	212000	213000
6	219000	206000	195000	189000	202000	187000	223000	226000	222000	204000	209000	212000
7	205000	187000	193000	192000	196000	195000	222000	225000	220000	206000	209000	217000
8	200000	190000	187000	186000	197000	201000	218000	221000	220000	206000	210000	206000
9	199000	220000	185000	187000	204000	206000	212000	217000	222000	212000	208000	212000
10	201000	207000	198000	195000	208000	209000	215000	230000	222000	206000	208000	218000
11	205000	225000	187000	201000	202000	210000	225000	245000	219000	206000	209000	213000
12	203000	201000	189000	209000	200000	215000	226000	214000	217000	192000	209000	214000
13	201000	193000	183000	196000	201000	220000	220000	215000	217000	193000	212000	213000
14	193000	198000	192000	186000	192000	216000	220000	219000	217000	201000	213000	219000
15	196000	196000	192000	188000	179000	212000	224000	219000	217000	211000	217000	227000
16	198000	236000	204000	186000	206000	213000	215000	224000	216000	214000	214000	209000
17	182000	239000	203000	190000	222000	215000	224000	238000	214000	213000	212000	211000
18	188000	228000	193000	200000	204000	222000	219000	243000	219000	212000	213000	213000
19	164000	211000	174000	197000	217000	210000	212000	229000	218000	211000	197000	215000
20	209000	226000	190000	189000	205000	212000	215000	219000	212000	213000	203000	215000
21	219000	207000	177000	198000	203000	214000	216000	219000	217000	210000	206000	212000
22	211000	191000	162000	204000	206000	211000	217000	219000	210000	203000	208000	225000
23	197000	196000	179000	191000	216000	209000	215000	223000	227000	210000	208000	231000
24	197000	208000	184000	198000	212000	210000	214000	222000	222000	211000	209000	231000
25	196000	207000	201000	192000	222000	212000	217000	219000	214000	210000	212000	225000
26	196000	199000	195000	209000	216000	211000	216000	219000	212000	210000	214000	214000
27	195000	189000	182000	194000	219000	206000	214000	221000	213000	207000	215000	209000
28	195000	214000	196000	197000	215000	207000	212000	218000	206000	208000	220000	208000
29	196000	201000	180000	183000	---	200000	214000	214000	212000	209000	217000	206000
30	196000	225000	178000	191000	---	204000	211000	220000	211000	211000	212000	213000
31	202000	---	187000	189000	---	206000	---	223000	---	209000	209000	---
TOTAL	6195000	6204000	5861000	5997000	5675000	6473000	6537000	6864000	6542000	6464000	6520000	6439000
MEAN	199800	206800	189100	193500	202700	208800	217900	221400	218100	208500	210300	214600
MAX	219000	239000	207000	209000	222000	222000	239000	245000	232000	222000	220000	231000
MIN	164000	187000	162000	183000	176000	187000	208000	204000	206000	192000	197000	204000

CAL YR 1989 TOTAL 74749000 MEAN 204800 MAX 239000 MIN 162000
WTR YR 1990 TOTAL 75771000 MEAN 207600 MAX 245000 MIN 162000

REFERENCE NO. 6

MALCOLM PIRNIE, INC.	PROJECT NOTES

To: File	**Date:** August 15, 1993
From: Gary Bielen	**Project #:** 8003-180
Subject: Threatened/Endangered Species	**Site Name:** Nash Road Landfill

The New York State Department of Environmental Conservation (NYSDEC) Wildlife Resources Center provided information concerning any New York State or Federally Listed Endangered species occupying habitats in the general vicinity of the site. The information contained in the report is confidential and may not be published without consent of the Natural Heritage Program. This data can be found in the United States Environmental Protection Agency's archive file for this site.

The report from the Wildlife Resources Center identified the presence of no New York State or Federal Endangered/Threatened species which occupy habitats contiguous to the associated water bodies along the site's surface water pathway.

New York State Department of Environmental Conservation

Wildlife Resources Center
Information Services
700 Troy-Schenectady Road
Latham, New York 12110-2400

Thomas C. Jorling
Commissioner

April 19, 1993

Dennis M. Stainken
Malcolm Pirnie, Inc.
104 Interchange Plaza
Cranbury, New Jersey 08512-9543

Dear Mr. Stainken:

We have reviewed the New York Natural Heritage Program files with respect to your recent request for biological information concerning four hazardous waste sites, as indicated on your enclosed map, two of which located in Niagara County, and one each in Orange and Dutchess Counties.

Enclosed is a computer printout covering the area you requested to be reviewed by our staff. The information contained in this report is considered sensitive and may not be released to the public without permission from the New York Natural Heritage Program.

Our files are continually growing as new habitats and occurrences of rare species and communities are discovered. In most cases, site-specific or comprehensive surveys for plant and animal occurrences have not been conducted. For these reasons, we can only provide data which have been assembled from our files. We cannot provide a definitive statement on the presence or absence of species, habitats or natural communities. This information should not be substituted for on-site surveys that may be required for environmental assessment.

This response applies only to known occurrences of rare animals, plants and natural communities and/or significant wildlife habitats. You should contact our regional office, Division of Regulatory Affairs, at the address enclosed for information regarding any regulated areas or permits that may be required (e.g., regulated wetlands) under State Law.

If this project is still active one year from now we recommend that you contact us again so that we may update this response.

Sincerely,

Burrell Buffington

Burrell Buffington
NY Natural Heritage Program

Encs.
cc: Reg. 3, Wildlife Mgr.
Reg. 3, Fisheries Mgr.
Reg. 9, Wildlife Mgr.
Reg. 9, Fisheries Mgr.

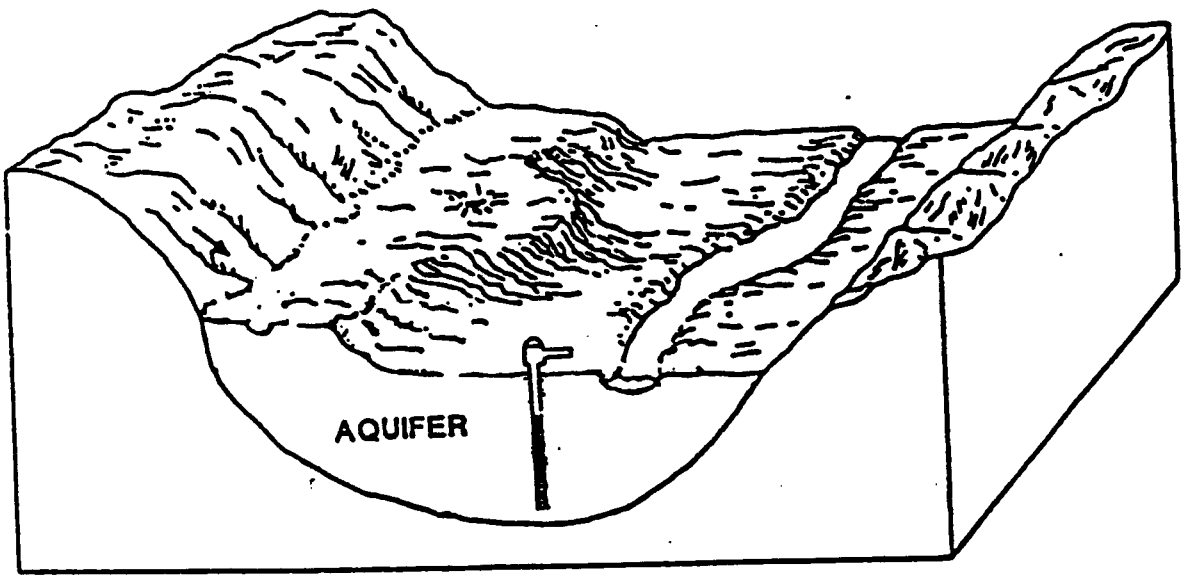
printed on recycled paper

NY Heritage Program is supported in part by The Nature Conservancy

REFERENCE NO. 7

Department of Environmental Conservation

NEW YORK STATE WELLHEAD PROTECTION PROGRAM



Submittal
to
United States Environmental Protection Agency

New York State Department of Environmental Conservation
MARIO M. CUOMO, *Governor* THOMAS C. JORLING, *Commissioner*

September 1990

TABLE 3.1.
WELLHEAD PROTECTION AREA
DELINEATION SUMMARY

Geographic Region	Aquifer Area	Wellhead Protection Area Baseline Delineation
Long Island	Magothy & Lloyd Aquifers	Deep Flow Recharge Area
	Glacial Aquifer	Simplified Variable Shape: 1,500 ft. radius upgradient 500 ft. radius downgradient
Upstate	Unconsolidated Aquifers	Aquifer Boundaries (land surface)
	Bedrock Aquifers	Fixed Radius: 1,500 ft. radius

EXPLANATION

POTENTIAL YIELD OF WATER FROM WELLS THAT TAP UNCONSOLIDATED AQUIFERS

UNCONFINED AQUIFERS, 10 TO 100 GALLONS PER MINUTE--Sand and gravel with saturated zone generally less than 10 ft thick, or thicker but with less permeable silty sand and gravel. Yields in areas adjacent to streams may exceed 100 gal/min (gallons per minute) through pumping-induced infiltration, but these areas are too small to show at this scale

UNCONFINED AQUIFERS, MORE THAN 100 GALLONS PER MINUTE--Sand and gravel of high transmissivity and with saturated thickness greater than 10 ft. Many such areas are associated with a surface-water source that can provide additional water through pumping-induced recharge

CONFINED AQUIFER UNDERLYING UNCONFINED AQUIFER, 5 TO MORE THAN 500 GALLONS PER MINUTE (from confined aquifer)--Areas where a relatively impermeable till or lacustrine, very fine sand, silt, or clay layer separates the buried sand and gravel aquifer from an overlying surficial aquifer

CONFINED AQUIFER, 5 TO MORE THAN 500 GALLONS PER MINUTE--Sand and gravel overlain by till, very fine sand, silt, or clay, but without a surficial aquifer

AQUIFERS OF UNKNOWN POTENTIAL--Areas of sand and(or) sand and gravel for which little or no well data are on file to determine yield potential. Letter symbols, explained below, indicate the type of deposit

L — Lacustrine or eolian deposits--Fine to medium sand that probably yields less than 10 gal/min

G — Kame, kame terrace, kame moraine, outwash, or alluvium--Sand and gravel of unknown thickness or saturation. Yield potential is greater where streams are present

M — Moraine--Mostly till and lacustrine deposits (very fine sand, silt, and clay) capped in some places with unsaturated sand and gravel. Thin, scattered confined aquifers of sand and gravel in some places

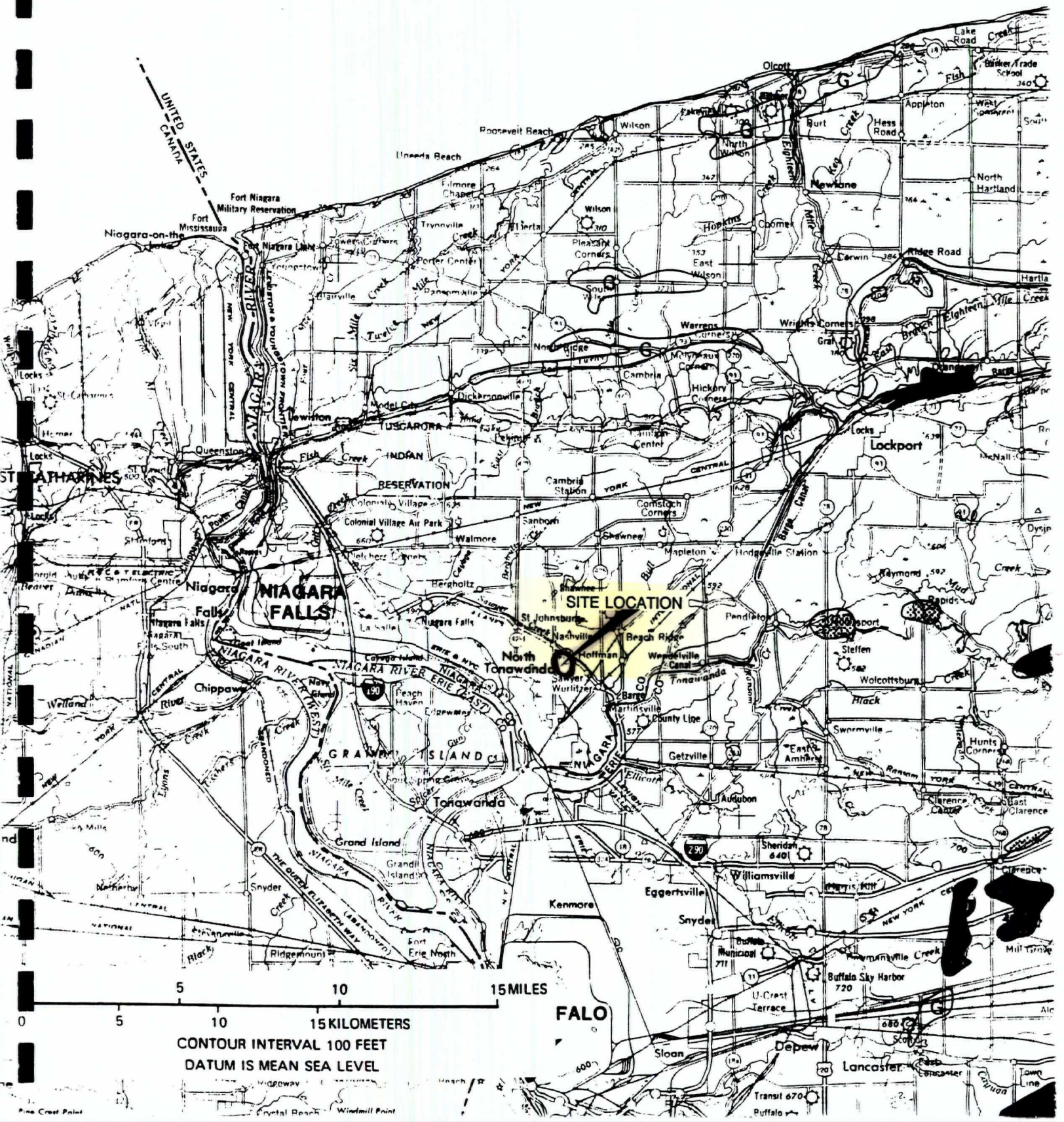
U — Confined aquifer--Areas of lacustrine deposits or till possibly underlain by sand and gravel aquifers. Depth and saturated thickness of aquifer not investigated

1 — PRIMARY WATER-SUPPLY AQUIFER--A highly productive aquifer that is being used as a source of water supply in major public-supply systems. Number indicates name of aquifer area (see key below) and report number in list of related publications. Reports and maps cited describe these aquifers in detail.

Primary aquifer number	Aquifer area
6	Batavia
1	Jamestown
8	Olean
7	Salamanca

POTENTIAL YIELDS OF WELLS IN UNCONSOLIDATED AQUIFERS IN UPSTATE NEW YORK -- NIAGARA SHEET

BY
TODD S. MILLER



REFERENCE NO. 8

MALCOLM PIRNIE, INC. **PROJECT NOTES**

To: File	**Date:**5/7/93
From: Gary Bielen	**Project #:**8003-180
Subject: Drinking Water Sources within Four Miles	**Site Name:**Nash Road Landfill

The following telecons describe drinking water sources for people within four miles of the site. There are no people currently using groundwater as a drinking water source, surface water intakes supply drinking water to those people within four miles of the site. The following are those cities using intakes within four miles of the site.

City	Population
North Tonawanda	11,000
Tonawanda	18,000
Lockport	25,000

The Town's of Wheatfield, Grand Island, and Pendleton receive their water from surface water intakes in the Niagara River which are greater than four miles from the site. The Town of Amherst receives its water from intakes in Lake Erie, which is greater than four miles from the site.

Table 6. Household, Family, and Group Quarters Characteristics: 1990

(For definitions of terms and meanings of symbols, see text)

State County Place and [In Selected States] County Subdivision	Persons in households	All households	Family households: Total	Family households: Married-couple family	Family households: Female householder, no husband present	Nonfamily households: Total	Nonfamily households: Householder living alone: Total	Nonfamily households: Householder living alone: 65 years and over: Total	Nonfamily households: Householder living alone: 65 years and over: Female	Persons per— Household	Persons per— Family	Persons in group quarters: Total	Persons in group quarters: Institutionalized persons	Persons in group quarters: Other persons in group quarters
The State	**17 445 190**	**6 639 322**	**4 489 312**	**3 315 845**	**919 266**	**2 150 010**	**1 806 263**	**700 016**	**544 755**	**2.63**	**3.22**	**545 265**	**267 122**	**278 143**
COUNTY														
Albany County	278 399	115 824	71 455	54 534	13 355	44 369	35 050	13 559	10 777	2.40	3.04	14 195	4 286	9 909
Allegany County	45 639	17 011	12 318	10 231	1 466	4 693	3 943	1 927	1 478	2.68	3.15	4 831	398	4 433
Bronx County	1 163 368	424 112	288 609	146 234	118 610	135 503	119 218	46 431	35 780	2.74	3.35	40 421	28 534	11 887
Broome County	204 344	81 843	54 819	44 163	8 183	27 024	22 037	9 065	7 203	2.50	3.05	7 816	3 420	4 396
Cattaraugus County	80 833	30 456	21 657	17 395	3 228	8 799	7 543	3 651	2 789	2.65	3.18	3 401	1 035	2 366
Cayuga County	77 968	29 075	20 927	16 660	3 127	8 148	6 874	3 418	2 680	2.68	3.19	4 345	3 955	390
Chautauqua County	136 558	53 696	37 203	29 942	5 506	16 493	14 035	6 849	5 459	2.54	3.07	5 337	2 557	2 780
Chemung County	90 460	35 275	24 808	19 646	4 058	10 467	8 992	4 387	3 505	2.56	3.08	4 735	3 788	947
Chenango County	50 896	19 141	13 821	11 438	1 670	5 320	4 451	2 085	1 602	2.66	3.14	872	840	32
Clinton County	77 971	29 123	20 839	17 279	2 594	8 284	6 429	2 626	2 111	2.68	3.14	7 998	4 282	3 716
Columbia County	60 884	23 696	16 882	13 658	2 339	6 814	5 689	2 759	2 078	2.57	3.04	2 098	1 825	273
Cortland County	45 664	17 247	11 799	9 461	1 681	5 448	4 070	1 860	1 513	2.65	3.13	3 299	510	2 789
Delaware County	45 233	17 646	12 374	10 224	1 552	5 272	4 458	2 308	1 746	2.56	3.07	1 992	660	1 332
Dutchess County	240 984	89 567	64 757	53 635	8 353	24 810	19 884	7 705	6 051	2.69	3.18	18 478	11 475	7 003
Erie County	944 115	376 994	254 472	192 646	49 968	122 522	105 083	45 370	35 665	2.50	3.09	24 417	13 138	11 279
Essex County	34 824	13 721	9 498	7 805	1 204	4 223	3 520	1 682	1 280	2.54	3.07	2 328	2 223	105
Franklin County	42 549	16 284	11 265	8 976	1 677	5 019	4 197	2 064	1 612	2.61	3.16	3 991	3 012	979
Fulton County	53 276	20 995	14 602	11 601	2 242	6 393	5 412	2 894	2 281	2.54	3.05	915	700	215
Genesee County	58 858	21 614	16 050	13 269	2 054	5 564	4 671	2 312	1 840	2.72	3.19	1 202	800	402
Greene County	42 080	16 596	11 642	9 465	1 612	4 954	4 245	2 033	1 488	2.54	3.05	2 659	2 474	185
Hamilton County	5 197	2 153	1 508	1 266	170	645	550	241	172	2.41	2.89	82	82	–
Herkimer County	64 636	24 936	17 576	14 347	2 369	7 360	6 246	3 402	2 594	2.59	3.11	1 161	840	321
Jefferson County	103 614	37 851	28 163	23 155	3 680	9 688	8 005	3 772	2 996	2.74	3.19	7 329	2 589	4 740
Kings County	2 266 401	828 199	555 284	335 295	177 871	272 915	236 977	92 972	71 504	2.74	3.40	34 263	16 651	17 612
Lewis County	26 475	9 253	7 056	5 985	744	2 197	1 889	964	728	2.86	3.32	321	307	14
Livingston County	56 777	21 197	15 178	12 558	1 896	6 019	4 643	2 043	1 610	2.68	3.14	5 595	2 212	3 383
Madison County	64 006	23 567	17 162	14 137	2 176	6 405	5 050	2 326	1 808	2.72	3.17	5 114	776	4 338
Monroe County	691 387	271 944	182 813	140 622	34 008	89 131	71 166	25 702	20 400	2.54	3.11	22 581	8 405	14 176
Montgomery County	50 956	20 185	14 028	11 058	2 202	6 157	5 432	3 081	2 408	2.52	3.06	1 025	960	65
Nassau County	1 266 740	431 515	344 502	286 638	43 950	87 013	73 804	35 544	28 221	2.94	3.30	20 608	9 799	10 809
New York County	1 428 973	716 422	301 041	187 016	92 055	415 381	348 134	87 139	64 439	1.99	2.99	58 563	13 988	44 575
Niagara County	216 912	84 809	59 732	47 221	9 822	25 077	22 119	10 080	7 797	2.56	3.10	3 844	2 358	1 486
Oneida County	236 328	92 562	63 735	50 430	10 385	28 827	24 950	11 640	9 110	2.55	3.12	14 508	9 522	4 986
Onondaga County	453 012	177 898	118 575	91 978	21 081	59 323	47 047	18 082	14 374	2.55	3.12	15 961	5 859	10 102
Ontario County	92 094	34 929	25 143	20 792	3 210	9 786	7 716	3 414	2 675	2.64	3.10	3 007	1 497	1 510
Orange County	293 491	101 506	77 111	63 207	10 401	24 395	19 975	8 404	6 611	2.89	3.35	14 156	6 211	7 945
Orleans County	39 588	14 428	10 685	8 608	1 484	3 743	3 119	1 482	1 146	2.74	3.20	2 258	2 053	205
Oswego County	116 928	42 434	30 905	25 013	4 231	11 529	9 150	4 027	3 158	2.76	3.22	4 843	899	3 94
Otsego County	55 592	21 725	14 768	12 258	1 795	6 957	5 414	2 679	2 056	2.56	3.06	4 925	746	4 17
Putnam County	82 838	28 094	22 549	19 675	2 028	5 545	4 410	1 594	1 202	2.95	3.32	1 103	299	80
Queens County	1 924 375	720 149	490 915	351 675	102 674	229 234	196 008	82 433	65 305	2.67	3.25	27 223	18 938	8 28
Rensselaer County	148 564	57 612	39 356	30 925	6 446	18 256	14 715	6 211	4 881	2.58	3.13	5 865	1 538	4 32
Richmond County	371 574	130 519	99 059	78 198	16 249	31 460	27 314	10 516	8 305	2.85	3.33	7 403	5 222	2 18
Rockland County	257 325	84 874	66 583	55 520	8 357	18 291	15 067	6 038	4 838	3.03	3.46	8 150	4 994	3 15
St. Lawrence County	101 384	37 964	26 784	21 809	3 663	11 180	8 924	4 223	3 303	2.67	3.16	10 590	3 232	7 35
Saratoga County	177 151	66 425	48 363	40 835	5 597	18 062	14 204	5 263	4 073	2.67	3.14	4 125	2 224	1 90
Schenectady County	144 981	59 181	39 702	31 284	6 556	19 479	16 611	7 649	6 063	2.45	3.01	4 304	2 201	2 10
Schoharie County	29 759	11 257	8 127	6 705	1 016	3 130	2 522	1 249	916	2.64	3.10	2 100	450	1 65
Schuyler County	18 176	6 818	5 025	4 140	618	1 793	1 471	753	571	2.67	3.11	486	474	
Seneca County	32 452	12 285	8 998	7 421	1 156	3 287	2 708	1 296	981	2.64	3.09	1 231	670	5
Steuben County	97 128	37 299	26 447	21 446	3 615	10 852	9 194	4 286	3 374	2.60	3.11	1 960	1 690	2
Suffolk County	1 292 470	424 719	340 593	282 081	44 113	84 126	67 834	29 961	23 450	3.04	3.40	29 394	16 882	12 5
Sullivan County	63 858	24 576	17 090	13 848	2 344	7 486	6 216	2 916	2 095	2.60	3.13	5 419	2 829	2 5
Tioga County	51 974	18 838	14 470	12 192	1 640	4 368	3 670	1 594	1 252	2.76	3.17	363	318	
Tompkins County	82 093	33 338	19 049	15 488	2 661	14 289	9 066	2 608	2 105	2.46	2.98	12 004	848	11 1
Ulster County	156 774	60 807	42 213	33 839	6 186	18 594	14 799	5 988	4 628	2.58	3.09	8 530	3 653	4 8
Warren County	58 122	22 559	15 788	12 740	2 254	6 771	5 519	2 591	2 070	2.58	3.09	1 087	513	5
Washington County	55 682	20 256	15 023	12 218	2 032	5 233	4 295	2 160	1 649	2.75	3.21	3 648	3 519	1
Wayne County	87 841	31 977	23 961	19 787	3 046	8 016	6 443	2 948	2 354	2.75	3.17	1 282	962	3
Westchester County	845 770	320 030	227 827	180 205	37 133	92 203	79 330	33 373	26 725	2.64	3.16	29 096	16 022	13 0
Wyoming County	38 731	13 897	10 528	8 857	1 175	3 369	2 847	1 391	1 088	2.79	3.23	3 776	3 709	
Yates County	22 158	8 419	6 100	5 111	698	2 319	1 909	996	782	2.63	3.09	652	269	3
PLACE AND COUNTY SUBDIVISION														
Adams village, Jefferson County	1 742	726	469	379	78	257	231	131	112	2.40	3.04	11	11	
Adams town, Jefferson County	4 966	1 839	1 335	1 115	177	504	424	220	183	2.70	3.20	11	11	
Adams Center CDP, Jefferson County	1 675	591	455	378	64	136	102	45	36	2.83	3.22	–	–	
Addison village, Steuben County	1 842	711	505	378	94	206	171	106	87	2.59	3.05	–	–	
Addison town, Steuben County	2 645	995	730	556	127	265	215	118	97	2.66	3.08	–	–	
Afton village, Chenango County	838	337	238	207	26	99	86	52	38	2.49	3.01	–	–	
Afton town, Chenango County	2 972	1 092	814	670	98	278	219	108	81	2.72	3.13	–	–	
Airmont CDP, Rockland County	7 540	2 282	2 042	1 817	169	240	196	97	77	3.30	3.51	295	216	
Akron village, Erie County	2 895	1 185	790	621	137	395	350	224	176	2.44	3.04	11	–	
Alabama town, Genesee County	1 998	678	545	468	48	133	118	59	42	2.95	3.30	–	–	
Albany city, Albany County	91 458	42 121	20 308	12 695	6 193	21 813	16 239	5 659	4 481	2.17	2.94	9 624	2 338	7
Albertson CDP, Nassau County	5 166	1 808	1 484	1 261	153	324	291	177	150	2.86	3.21	–	–	
Albion village, Orleans County	5 710	2 317	1 504	1 061	347	813	704	350	284	2.46	3.06	153	121	
Albion town, Orleans County	6 259	2 394	1 625	1 211	316	769	659	319	249	2.61	3.19	1 919	1 887	
Albion town, Oswego County	2 028	638	528	442	54	110	81	26	12	3.18	3.45	15	15	
Alden village, Erie County	2 443	955	667	558	77	288	251	134	103	2.56	3.13	14	–	
Alden town, Erie County	8 587	2 991	2 411	2 100	226	580	491	259	200	2.87	3.25	1 785	1 771	
Alexander village, Genesee County	445	150	123	102	12	27	23	14	13	2.97	3.28	–	–	
Alexander town, Genesee County	2 233	742	621	543	47	121	99	41	33	3.01	3.28	–	–	
Alexandria town, Jefferson County	3 899	1 505	1 091	878	133	414	345	186	139	2.59	3.05	50	21	
Alexandria Bay village, Jefferson County	1 154	504	309	222	64	195	171	95	76	2.29	2.94	40	21	
Alfred village, Allegany County	1 055	487	191	177	12	296	197	59	52	2.17	2.81	3 504	–	3
Alfred town, Allegany County	2 287	958	517	460	36	441	308	87	76	2.39	3.02	3 504	–	3
Allegany village, Cattaraugus County	1 944	754	459	383	57	295	193	114	91	2.58	3.06	36	36	
Allegany town, Cattaraugus County	6 410	2 399	1 720	1 464	196	679	520	266	209	2.67	3.12	1 917	36	1
Allegany Reservation, Cattaraugus County	1 139	419	289	187	82	130	107	44	31	2.72	3.30	4	–	
Allen town, Allegany County	406	137	109	99	6	28	26	14	8	2.96	3.40	–	–	
Alma town, Allegany County	838	293	240	210	17	53	45	28	15	2.86	3.16	8	8	
Almond village	458	185	133	108	22	52	47	27	21	2.48	3.00	–	–	
Allegany County	442	175	128	103	22	47	43	25	20	2.53	3.04	–	–	
Steuben County	16	10	5	5	–	5	4	2	1	1.60	2.00	–	–	

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

File No. 8003-180

Date: 4/8/93 Time: 11:30 AM [x] PM []

Outgoing Call

To: Margaret Marr 716-693-4262
Telephone No.

Affiliation: Wheatfield Water Dept. - Clerk

Malcolm Pirnie Staff: Gary Bielen (609) 860-0100
Telephone No.

Summary of Conversation:

The Town of Wheatfield receives its drinking water from a surface water intake in the East Channel, on the west side of Grand Island in the Niagara River, which is greater than four miles from the site. There are no public or private groundwater wells used as a drinking water source. There are 4,100 homes serviced by the Town of Wheatfield's water system.

Niagara County's Estimated Population as derived by the US Census Bureau is 2.56 people per household.

4,100 homes x 2.56 people per household = 10,496 people

There are 10,496 people who are serviced by the Town of Wheatfield's water system.

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

File No. 8003-180

Date: 4/8/93 Time: 11:00 AM [x] PM []

Outgoing Call

To: Dianne 716-695-8531
Telephone No.

Affiliation: North Tonawanda Water Dept.- Clerk

Malcolm Pirnie Staff: Gary Bielen (609) 860-0100
Telephone No.

Summary of Conversation:

The City of North Tonawanda receives its drinking water from one of the three surface water intakes located on the west side of Tonawanda Island in the Niagara River. There are 11,000 people who get their water from this source.

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

File No. 8003-180

Date: 4/13/93 Time: 3:00 AM [] PM [x]

Outgoing Call

To: John Cadwader 716-695-1800
Telephone No.

Affiliation: Tonawanda Water Dept.-Superintendant

Malcolm Pirnie Staff: Gary Bielen (609) 860-0100
Telephone No.

Summary of Conversation:

The City of Tonawanda receives its drinking water from a surface water intake located in the east branch of the Niagara River. This intake is one of the three intakes which is on the west side of Tonawanda Island and within four miles of the site. There are approximately 18,000 people in the city who receive their water from this intake.

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

File No. 8003-135

Date: November 16, 1992 Time: 3:50 AM [ ] PM [X]

Call

To: Mary Ann (716) 773-9600 Telephone No.

Affiliation: Grand Island Water Department

Malcolm Pirnie Staff: David Kahlenberg (609) 860-0100 Telephone No.

Summary of Conversation:

I spoke with Mary Ann to determine how the people obtain their drinking water on Grand Island. She told me that they service approximately 18,000 people from a surface water intake located at the head of the island along the west river (Niagara River). I also asked if there were any groundwater wells and she said that there are no public supply wells and some private wells. However, these private wells are not used for drinking water purposes, rather, they are used for miscellaneous purposes like sprinkling their lawns.

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

File No. 8003-180

Date: 5/2/93 Time: 2:00 AM [] PM [x]

Outgoing Call

To: Angela Smith 716-439-6678
Telephone No.

Affiliation: City of Lockport Water Dept.

Malcolm Pirnie Staff: Gary Bielen (609) 860-0100
Telephone No.

Summary of Conversation:

The City of Lockport receives its drinking water from one of the three surface water intakes which is west of Tonawanda Island in the Niagara River, which is within four miles of the site. There are approximately 25,000 people who use this as a drinking water source.

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

File No. 8003-180

Date: 4/24/93 Time: 2:50 AM [] PM [x]

Outgoing Call

To: Carol 716-625-8033
Telephone No.

Affiliation: Town of Pendelton Water Dept.

Malcolm Pirnie Staff: Gary Bielen (609) 860-0100
Telephone No.

Summary of Conversation:

The Town of Pendleton purchases its drinking water from the Niagara County Water District which gets its water from a surface water intake in the Niagara River. This intake is north of Grand Island toward the Niagara Falls and is greater than four miles from the site. There are 1,494 homes who are receiving their water from this source.

Niagara County's Estimated Population as derived by the US Census Bureau is 2.56 people per household.

1,494 homes x 2.56 people per household = 3,285 people

There are 3,285 people who receive their drinking water from this drinking water source.

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

File No. 8003-180

Date: 4/8/93 Time: 11:50 AM [x] PM []

Outgoing Call

To: Laura Sieckmann 716-849-8484
Telephone No.

Affiliation: Erie County Water Authority

Malcolm Pirnie Staff: Gary Bielen (609) 860-0100
Telephone No.

Summary of Conversation:

The Town of Amherst purchases their drinking water from the Erie County Water Authority which gets their water from surface water intakes in Lake Erie, which is greater than four miles from the site. There are 111,711 people in the town who receive their drinking water from this source.

REFERENCE NO. 9

Great Lakes Diversions and Consumptive Uses

REPORT

to the

International Joint Commission

by the

International Great Lakes Diversions and Consumptive Uses Study Board

(Under the Reference of February 21, 1977)

September 1981

Diversion Report

41 percent of all users observed. Relaxing, pleasure boating, hiking, bicycling and swimming, in descending order of importance, were the other activities observed. More intensive studies of this type are needed if the recreational resources of the project area are to be adequately assessed.

Barge canal begins at Tonawanda

4.5.5 Amount of Diversion and Limitations

The amount of water diverted through the canal from the Niagara River varies seasonally and averages about 700 cfs with a maximum flow during the navigation season (April to November) of 1,100 cfs, which is the limiting flow. A control gate near Pendleton, New York, permits the canal to be de-watered during the non-navigation months.

The International Joint Commission has not exercised control over flows in the canal. The Board has not attempted to interpret the Commission's authority to exercise such control. However, the amounts of water diverted are reported to the two governments by the International Niagara Committee.

4.5.6 Hydrologic Effects of Existing Diversion

The New York State Barge Canal has a very limited capacity and draws its water from the Niagara River at Tonawanda, New York. Tonawanda is located downstream of the natural hydraulic control section of the Niagara River. Hence, any water withdrawn below the hydraulic control section has no effect on Lake Erie or the lakes upstream. However, the diversion results in a reduction of flow of the Niagara River below Tonawanda.

4.6 Other Minor Diversions

During the course of the study, the existence of a number of small diversions came to the Board's attention. Two minor diversions, the Detroit domestic water system and the Simcoe Diversion, are briefly described below as examples of small, and often undocumented, diversion projects in the Great Lakes basin.

Since 1975, the Detroit, Michigan domestic water system has withdrawn approximately 145 cfs from Lake Huron, the bulk of which is returned to the system. However, this diversion has no effect on Lake Erie levels and non-measurable impacts on Lake Huron levels. The Detroit domestic diversion was investigated further under the consumptive uses portion of the study.

The Simcoe Diversion is a municipal sewage disposal project which is still in the development stage. Municipal sewage flow from several municipalities in the Lake Simcoe (Georgian Bay) drainage basin will be pumped to the Lake Ontario drainage basin via the York-Durham sewer system for treatment at Pickering, Ontario. The flow is estimated to reach 25 cfs by the year 2000 and constitutes a diversion from Lake Huron to Lake Ontario.

REFERENCE NO. 10

MALCOLM PIRNIE, INC. **PROJECT NOTES**

To: File	**Date:**5/7/93
From: Gary Bielen	**Project #:**8003-180
Subject: Wetlands Estimation	**Site Name:**Nash Road Landfill

An estimation for the amount of wetlands that occurs within four miles of the site was conducted using US Department of the Interior, National Wetlands Inventory Maps. There are six acres of onsite wetlands.

Rings (miles)	Wetlands (miles/acres)
0 - 0.25	.76/15
0.25- 0.50	.38/7
0.50- 1	1.5 /45
1 - 2	6.25/320
2 - 3	6.00/250
3 - 4	9.00/410
Total:	**23.9/1,047**

REFERENCE NO. 11

Nash Road
Landfill

8003-180

Site Recon
May 21, 1993

Malcolm Pirnie Inc.
104 Interchange Pl.
Cranbury, NJ 08512

The paper in this book is
made of 50% high grade rag stock with
a WATER RESISTING surface sizing.

Town Engineer

Wendel Engineers

Orest Ciolko - 716-688-0767
FAX 716-625-6825

195 John Muir Drive
Suite 100
Buffalo, NY 14228

OFFICE: 716-694-6620
FAX: 716-694-5419
HOME: 716-692-7706

Jerry W. Kuehn
SUPERVISOR
TOWN OF WHEATFIELD

2800 CHURCH ROAD
NORTH TONAWANDA, N.Y. 14120-1099

CB

1

3

Jerry Kuehn 8/21/93

5/21/93 GB

845 Arrive at Wheatfield Town
Hall to meet Terry Kuehn -
Town Supervisor
He will bring us to
Nash Road Landfill
Sunny 65-70 °F 0-5mph=wind
Joe Guerriero
Fred Loneper } malcolm
Gary Bieler } Pirnie personnel
Inc.
900 meet mr. Kuehn and he
drives us to Nash Rd LF
He doesn't have keys to wells, maybe the
Using HNu EPA # 729627 NYDEC
A01379
Camera EPA # 734742
EPA # 734748 unknown well 1
Found a another well No.? 2" stickup
910 Located existing pond
Found OW-3? Unlocked, no lock
2" well stick up
Picture No. 1 batteries, paints
5x10' area
Picture No. 2 existing pond
near NE section of LF

4

Gary Bieler 5/21/93

5/21/93 GB

920 Arrive at OW-1 and OW-1B
both have locks, both stickups

930 In NE section
flow of ditch is east
toward Sawyer Creek
Picture No. 3 ditch to Sawyer Creek

931 Picture No. 4 wells OW1 and
OW1-B

932 Picture No. 4 yellow "sulphur"
staining ten feet from OW1-B
5'x10' area
Along east border farmland
and dry ditch appears to run
along east border
Zero on HNu
Picture No 5 farm along east
border, runs along the entire
east side of Landfill
Landfill is heavily overgrown
several wet low lying areas

935 OW-2 well 2" stickup near
existing pond
168' from OW-1 to OW-2
due west of OW-1 & OW-1B

5

[signature]
5/21/93

5/21/93 GB

956 Picture No. 6 drainage from
existing pond goes to ditch
looks to be the connection shown on map
1000 Find going back to get compass
we will locate the two
unknown wells to OW-2

300° from north 59.9' from OW2 to Unknown well 2

290° from north 75.8' from OW2 to unknown well 3

Unknown wells 2", both
stickups no locks

Picture No. 7 looking south
at unk wells 2 & 3 adjacent
to existing pond

1010 Drum lid ten feet from UNK well No 2
cat tails surround existing pond

ditch no flow before
church bldg.
Picture No. 8

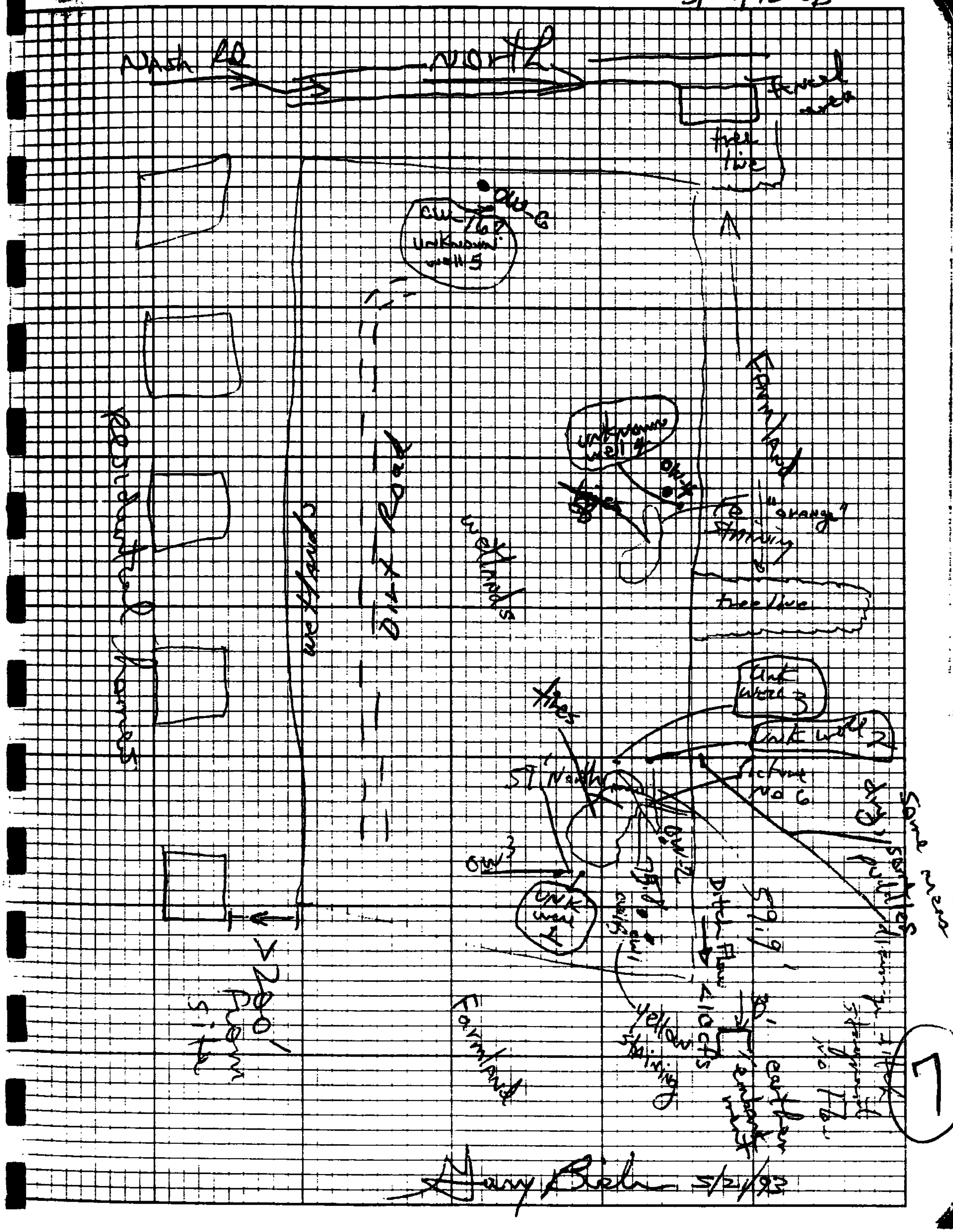
Picture No. 9 30 frogs in
existing pond north end &
south end

1040 Picture No. 10 orange "iron"
staining 50 x 100'
going into ditch
Several iron stain
areas near OW-4

6

[illegible] 5/21/93

5/21/93 GB


Nash Rd
North
fenced area
tree line
OW-6
Unknown well 5
Residential Homes
wetlands
Dirt Road
wetlands
Farmland
Unknown well 4
tires
Fe "orange" staining
tree line
Unk well 3
Unk well 2
tires
57' North
Picture No 6
OW-3
Unk well 1
Ditch flow
yellow staining
Farmland
some puddles
some more area
earthen embankment
7
5/21/93

5/21/93 GB

Picture No. 11 OW-4 4" stick up
ditch dry in this
area to treeline located
on map. A second unknown well located 10'
from OW-4, casing above stick up, no lid or cap lock
Picture No 12 Start of ditch
across from treeline

Iron staining 50x25' area
ditch stops 250' from start
back of church

Picture No 13 ~~55 gal drum~~
near barbeque ~~[illegible]~~ ditch begins
again
75' from end of previous
ditch

Picture No. 14 treeline
and farmland

1125 OW-6 & OW-16? on west side

Picture No 15 end of ditch
along NE side of site
Picture No. 16 two drums empty near
end of ditch.

There appears to be no connection
between on-site ditch and
Sawyer Creek.

[signature] 5/21/93

5/21/93 GB

1210 Went to west side of landfill
to see if drainage from
site follows ditch.
Ditch dry in this area
No connection from ditch
to Nash Road and then
possible to Sawyer Creek
Residential areas and
small businesses breakup
any surface water pathway
on either side of landfill.

9

Gary Bailey 5/21/93

REFERENCE NO. 12

Handout #8

SUPERFUND CHEMICAL DATA MATRIX

March 1993

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(329 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Hydrazine	000302-01-2	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	0.5	0.5	0.5	0.5	1000*	100	17	1.0000	Yes	No
Hydrochloric acid	007647-01-0	1000	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	1	1	NA	NA	No	Yes
Hydrogen cyanide	000074-90-8	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000*	0.0700	0.5	0.5	0.5	0.5	1000*	1000*	17	1.0000	Yes	No
Hydrogen sulfide	007783-06-4	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	0.5	0.5	0.5	0.5	1000	1000	17	1.0000	Yes	No
Indeno(1,2,3-CD)pyrene	000193-39-5	...*	1.0E+00*	1.0E-04*	2.0E-05*	2.0E-09*	1.0000*	1.0000*	50000.0*	50000.0*	50000.0*	50000.0*	...*	...*	NA*	NA *	No	Yes*
Ioxynil	001689-83-4	1000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	0.0700	500.0	500.0	500.0	500.0	1000*	1000*	NA	NA	No	Yes
Iron	015438-31-0	...	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	0.5	0.5	0.5	0.5	10	10	NA	NA	No	Yes
Isobutanol	000078-83-1	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.0700	0.5	0.5	0.5	0.5	10	1	17	1.0000	Yes	No
Isophorone	000078-59-1	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	5.0	5.0	5.0	5.0	1	1	11	1.0000	Yes	No
Kepone	000143-50-0	10000	1.0E+00*	1.0E-04*	2.0E-01*	2.0E-05*	0.4000	0.4000*	50000.0	5000.0*	50000.0	50000.0	10000*	10000*	0	0.0020	Yes	Yes
Lead	007439-92-1	10000	1.0E+00	1.0E-02	2.0E-03	2.0E-05	1.0000	1.0000	50.0	5000.0	5000.0	5000.0	1000	1000	NA	NA	No	Yes
Lindane	000058-89-9	10000	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	500.0	500.0	500.0	500.0	10000	10000	11	0.0200	Yes	Yes
Magnesium	007439-95-4	...*	1.0E+00*	1.0E+00*	... *	... *	1.0000*	1.0000*	0.5*	0.5*	0.5*	0.5*	...*	...*	NA*	NA *	No	Yes*
Malathion	000121-75-5	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50.0*	50.0*	50.0*	50.0*	10000	10000	0	0.0020	Yes	Yes
Maleic anhydride	000108-31-6	10	1.0E+00	...	...	...	0.0007*	0.0007*	0.5	0.5	0.5	0.5	1	1	11	1.0000	Yes	No
Maleic hydrazide	000123-33-1	1	1.0E+00*	1.0E+00*	1.0E+00*	1.0E+00*	0.4000	1.0000	0.5	0.5	0.5	0.5	10*	10*	17	0.2000*	Yes	Yes*
Manganese	007439-96-5	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	0.5*	0.5*	50000.0	50000.0	...	...	NA	NA	No	Yes
Mercury	007439-97-6	10000	1.0E+00	1.0E+00	2.0E-05	2.0E-05	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	10000	10000	11	0.2000	Yes	Yes
Methacrylonitrile	000126-98-7	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No

* Indicates difference between previous version of chemical data (DEC91) and current version of chemical data.

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(329 Substances)

SCDM Version: MAR93

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility: Gas	Air Gas Mobility: Part
Benzo(k)fluoranthene	000207-08-9	...	1.0E+00*	1.0E-04*	2.0E-05*	2.0E-09*	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	...	...	6	0.0002	Yes Yes
Benzofluoranthene, 3,4-	000205-99-2	10000	1.0E+00	1.0E-04	2.0E-05	2.0E-09	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	...	...	6	0.0020	Yes Yes
Benzoic acid	000065-85-0	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	5.0	5.0	5.0*	5.0*	1	1	11	0.2000	Yes Yes
Benzonitrile	000100-47-0	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000*	1.0000*	5.0	5.0	5.0	5.0	10*	10*	11	0.2000	Yes Yes
Benzothiazole, 1,2,-	000095-16-9	100*	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000*	1.0000*	50.0	50.0	50.0	50.0	10*	10*	11	0.2000	Yes Yes
Benzyl chloride	000100-44-7	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.0700	0.0700	50.0	50.0	50.0	50.0	100	100	11	1.0000	Yes No
Beryllium	007440-41-7	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50.0	50.0	50.0	50.0	...	...	NA	NA	No Yes
Biphenyl, 1,1-	000092-52-4	10	1.0E+00*	1.0E-02*	2.0E-01*	2.0E-03*	0.4000	0.4000	500.0	500.0	500.0	500.0	1000*	100	11	0.2000	Yes Yes
Bis (2-ethylhexyl) phthalate	000117-81-7	100	1.0E+00	1.0E-04	2.0E-03	2.0E-07	1.0000	1.0000	500.0*	500.0*	50000.0	50000.0	1000	1000	6	0.0020	Yes Yes
Bis(2-chloroethoxy)methane	000111-91-1	100	1.0E+00*	1.0E+00*	1.0E+00*	1.0E+00*	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	6*	0.0200*	Yes Yes*
Bis(2-chloroethyl)ether	000111-44-4	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50.0	50.0	50.0	50.0	1	1	11	1.0000	Yes No
Bis(chloromethyl)ether	000542-88-1	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.0007	0.0007	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes No
Boron	007440-42-8	100*	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	1.0000	0.5	0.5	0.5	0.5	...	...	NA	NA	No Yes
Bromodichloromethane	000075-27-4	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	...	...	17	1.0000	Yes No
Bromomethane	000074-83-9	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	5.0	5.0	5.0	5.0	10000*	10	17	1.0000	Yes No
Bromoxynil	001689-84-5	100	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	0.0700	50.0	50.0	50.0	50.0	10*	10*	0	0.0002	Yes Yes
Butadiene, 1,3-	000106-99-0	1000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.0007	0.0700	5.0	5.0	5.0	5.0	...	...	17	1.0000	Yes No
Butanol	000071-36-3	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5.0	5.0	5.0	5.0	1	1	11	1.0000	Yes No
Butylbenzyl phthalate	000085-68-7	10	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	500.0	500.0	500.0	500.0	100	1000	6	0.0020	Yes Yes

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SCDM Version: MAR93

HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(329 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Butyric acid, 4-(2,4-dichlorophenoxy)	000094-82-6	100	1.0E+00*	1.0E-02*	2.0E-01*	2.0E-03*	0.4000	0.0700	50.0	50.0	50.0	50.0	100	100	0	0.0020	Yes	Yes
Cadmium	007440-43-9	10000	1.0E+00*	1.0E+00*	2.0E-01*	2.0E-01*	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	1000	1000	NA	NA	No	Yes
Captan	000133-06-2	10	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.0007	0.0700	50.0	50.0	50.0	50.0	10000	10000	6	0.0200	Yes	Yes
Carbaryl	000063-25-2	10	1.0E+00	1.0E+00	2.0E-01	2.0E-01	1.0000*	0.4000*	50.0	50.0	50.0*	50.0*	10000	10000	0	0.0020	Yes	Yes
Carbofuran	001563-66-2	100	1.0E+00*	1.0E-02*	1.0E+00*	1.0E-02*	1.0000	1.0000	50.0	50.0	50.0	50.0	10000*	1000*	11	1.0000	Yes	No
Carbon disulfide	000075-15-0	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.4000*	50.0*	50.0*	50.0*	50.0*	100	100	17	1.0000	Yes	No
Carbon Tetrachloride	000056-23-5	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	100*	100	17	1.0000	Yes	No
Carbophenothion	000786-19-6	100	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	5000.0	5000.0	5000.0	5000.0	10000	10000	NA	NA	No	Yes
Chloral	000075-87-6	1000	1.0E+00*	1.0E+00*	1.0E+00*	1.0E+00*	1.0000*	1.0000*	5.0*	5.0*	5.0*	5.0*	...	...	11*	1.0000*	Yes*	No *
Chlordane	000057-74-9	10000	1.0E+00	1.0E-04	2.0E-03	2.0E-07	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	10000	10000	6	0.0020	Yes	Yes
Chlorine cyanide	000506-77-4	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	10000	10000	17	1.0000	Yes	No
Chloro-3-methylphenol, 4-	000059-50-7	1	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50.0	50.0	50.0	50.0	100*	100*	11	0.2000	Yes	Yes
Chloroaniline, p-	000106-47-8	1000	1.0E+00*	1.0E+00*	1.0E+00*	1.0E+00*	1.0000	1.0000*	5.0	5.0	5.0	5.0	10000*	10*	11	0.2000	Yes	Yes
Chlorobenzene	000108-90-7	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.0007*	0.0700*	50.0	50.0	50.0*	50.0*	1000	1000	17	1.0000	Yes	No
Chloroform	000067-66-3	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	10	10	17	1.0000	Yes	No
Chloromethane	000074-87-3	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.0007	0.0700	5.0	5.0	5.0	5.0	1	1	17	1.0000	Yes	No
Chloromethyl methyl ether	000107-30-2	1000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.0007	0.0007	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Chloromethyloxirane, 2-	000106-89-8	10000	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000*	0.4000*	0.5	0.5	0.5	0.5	10	10	17	1.0000	Yes	No
Chloronaphthalene, 2-	000091-58-7	10	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	500.0	500.0	500.0	500.0	...	...	11	0.2000	Yes	Yes

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HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(329 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Chlorophenol, 2-	000095-57-8	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000*	500.0	500.0	500.0	500.0	100	100	17*	1.0000	Yes	No
Chlorpyrifos	002921-88-2	1000	1.0E+00	1.0E-04	2.0E-01	2.0E-05	1.0000	1.0000	500.0*	5000.0	5000.0	5000.0	10000	10000	NA	NA	No	Yes
Chromium	007440-47-3	10000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5.0	500.0	5.0	500.0	10000	10000*	NA	NA	No	Yes
Chromium(III)	016065-83-1	1*	1.0E+00*	1.0E+00*	2.0E-05*	2.0E-05*	0.4000*	0.0700*	50000.0*	50000.0*	50000.0*	50000.0*	10	10	NA	NA	No	Yes
Chromium(VI)	018540-29-9	10000	1.0E+00*	1.0E-02*	... *	... *	1.0000	1.0000	5.0	500.0	5.0	500.0	100	100	NA	NA	No	Yes
Chrysene	000218-01-9	...	1.0E+00	1.0E-04	2.0E-05	2.0E-09	1.0000	1.0000	500.0	500.0	5000.0*	500.0	1000*	1000*	6	0.0002	Yes	Yes
Cobalt	007440-48-4	1*	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	0.5*	0.5*	5000.0	5000.0	...	...	NA	NA	No	Yes
Copper	007440-50-8	...*	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	100	1000	NA	NA	No	Yes
Copper cyanide	000544-92-3	100	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	500.0	500.0	500.0	500.0	...	...	NA	NA	No	Yes
Coumaphos	000056-72-4	100	1.0E+00	1.0E-04	2.0E-01	2.0E-05	0.4000	0.4000	500.0	500.0	500.0	500.0	10000	1000	NA	NA	No	Yes
Creosote	008001-58-9	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...*	...*	NA	NA	No	Yes
Cresol, m-	000108-39-4	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5.0	5.0	5.0	5.0	100	100	11	1.0000	Yes	No
Cresol, p-	000106-44-5	10	1.0E+00*	1.0E-02*	1.0E+00*	1.0E-02*	0.0007*	0.4000	5.0*	5.0*	5.0*	5.0*	100	100	11	1.0000	Yes	No
Cumene	000098-82-8	1000	1.0E+00*	1.0E-02*	2.0E-01*	2.0E-03*	0.4000	1.0000	500.0	500.0	500.0	500.0	100	1	17	1.0000	Yes	No
Cyanazine	021725-46-2	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	0.0700	50.0	50.0	50000.0*	50000.0*	10000*	10000*	0	0.0020	Yes	Yes
Cyanide	000057-12-5	100	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	1000	1000	NA	NA	No	Yes
Cyanogen	000460-19-5	100	1.0E+00	...	1.0E+00	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	17	1.0000	Yes	No
Cyanogen bromide	000506-68-3	10	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	1000	1000	NA	NA	No	Yes
Cyclohexane	000110-82-7	1	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	1.0000	500.0	500.0	500.0	500.0	100*	100	17	1.0000	Yes	No

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HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(329 Substances)

SCDM Version: MAR93

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility: Gas	Air Gas Mobility: Part
Xylene, o-	000095-47-6	1*	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	100	100	17	1.0000	Yes	No
Xylene, p-	000106-42-3	10	1.0E+00	1.0E-02	1.0E+00	1.0E-02	0.4000	1.0000	50.0	50.0	50.0	50.0	100	1*	17	1.0000	Yes	No
Zinc	007440-66-6	10	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	500.0	50000.0	500.0	50000.0	10	100	NA	NA	No	Yes
Zinc cyanide	000557-21-1	10	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	...	...	NA	NA	No	Yes
Zinc phosphide	001314-84-7	10000	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	50000.0	50000.0	50000.0	50000.0	...	...	NA	NA	No	Yes
Zinc sulfate	007733-02-0	10*	1.0E+00	1.0E-02	2.0E-01	2.0E-03	1.0000	1.0000	5.0	50.0*	50.0*	50000.0*	10000	1000	NA	NA	No	Yes

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HAZARD RANKING SYSTEM
Hazardous Substance Factor Values
(329 Substances)

Substance Name	CAS Number	Toxicity	Ground Water Mobility: Liquid: Karst	Ground Water Mobility: Liquid: Non-Karst	Ground Water Mobility: Non-Liquid: Karst	Ground Water Mobility: Non-Liquid: Non-Karst	Persistence: River	Persistence: Lake	Bioaccumulation: Food Chain: Fresh	Bioaccumulation: Food Chain: Salt	Bioaccumulation: Environmental: Fresh	Bioaccumulation: Environmental: Salt	Ecotoxicity: Fresh	Ecotoxicity: Salt	Air Gas Migration	Air Gas Mobility	Gas	Part
Methanol	000067-56-1	1	1.0E+00	1.0E+00	1.0E+00	1.0E+00	1.0000	0.4000	0.5	0.5	0.5	0.5	1	1	11	1.0000	Yes	No
Methomyl	016752-77-5	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	0.5	0.5	50.0*	50.0*	10000*	10000*	17	1.0000	Yes	No
Methoxychlor	000072-43-5	100	1.0E+00	1.0E-04	2.0E-03	2.0E-07	1.0000	1.0000	50000.0	5000.0	50000.0	5000.0*	10000	10000	6	0.0020	Yes	Yes
Methyl chlorocarbonate	000079-22-1	100	1.0E+00	...	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	17*	1.0000*	Yes*	No *
Methyl ethyl ketone	000078-93-3	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	0.4000	0.5	0.5	0.5	0.5	1	1	17	1.0000	Yes	No
Methyl isobutyl ketone	000108-10-1	10*	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	1	1	17	1.0000	Yes	No
Methyl methacrylate	000080-62-6	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	1	1	17	1.0000	Yes	No
Methyl napthalene, 2-	000091-57-6	...*	1.0E+00*	1.0E+00*	2.0E-01*	2.0E-01*	0.4000*	0.0700*	5000.0*	5000.0*	5000.0*	5000.0*	1000*	1000*	NA*	NA *	No	Yes*
Methylene bis (2-chloroaniline), 4,4-	000101-14-4	1000	1.0E+00	1.0E-04	2.0E-01	2.0E-05	0.4000	0.0700	500.0	500.0	500.0	500.0	...	...	0	0.0002	Yes	Yes
Methylene chloride	000075-09-2	10	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	1	10*	17	1.0000	Yes	No
Methylenediphenyl diisocyanate, 4,4-	000101-68-8	10000	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	0	0.0020	Yes	Yes
Metribuzin	021087-64-9	100	1.0E+00	1.0E+00	1.0E+00	1.0E+00	0.4000	1.0000	5.0	5.0	5.0	5.0	...	...	17	1.0000	Yes	No
Mirex	002385-85-5	10000	1.0E+00	...	...	...	0.4000	0.0700	5000.0	50000.0	50000.0	50000.0	10000	10000	NA	NA	No	Yes
Naphthalene	000091-20-3	100*	1.0E+00	1.0E-02	2.0E-01	2.0E-03	0.4000	0.4000	500.0	5.0	500.0	5000.0	1000	1000	11	0.2000	Yes	Yes
Nickel	007440-02-0	10000	1.0E+00	1.0E-02	2.0E-03	2.0E-05	1.0000	1.0000	0.5	500.0	500.0	500.0	10	1000	NA	NA	No	Yes
Nitric acid	007697-37-2	100*	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Nitric oxide	010102-43-9	10	1.0E+00	1.0E+00	...	...	0.4000	0.0700	0.5	0.5	0.5	0.5	...	...	NA	NA	No	Yes
Nitroaniline, p-	000100-01-6	1*	1.0E+00*	1.0E+00*	1.0E+00*	1.0E+00*	0.4000	0.0700	5.0*	5.0*	5.0*	5.0*	1*	1*	0	0.0020*	Yes*	Yes
Nitrobenzene	000098-95-3	1000	1.0E+00	1.0E-02	1.0E+00	1.0E-02	1.0000	1.0000	5.0	5.0	5.0	5.0	100*	100*	11	1.0000	Yes	No

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REFERENCE NO. 13

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PHASE II INVESTIGATION

VOLUME I

Nash Road Landfill **Site No. 932054**

Town of Wheatfield **Niagara County**

Date: July 1985

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:
ENGINEERING-SCIENCE
In Association With
DAMES & MOORE

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SECTION I

EXECUTIVE SUMMARY

The Nash Road site is an inactive landfill located in the Town of Wheatfield, Niagara County (NYS), adjacent to the North Tonawanda City boundary (Figure I.1). The site is rectangular, totaling approximately 25 acres. The Nash Road site is located in a suburban residential area, and is partly overgrown with trees and marsh vegetation. Nearby residents use the site as a jogging area, dirt bike track, and play area.

The Nash Road site was operated as a landfill by Niagara Sanitation Company between 1964 and 1968. Both municipal and industrial wastes, including caustic materials and sludges, are disposed at the site. In addition, between 6/6/68 and 7/15/68, approximately 900 cubic yards of waste material from a sewer excavation at the Love Canal site was disposed in an excavated trench on this site (memo of 8/9/78 to Hennessey, NYSDOT).

Although some wastes are covered, protruding refuse is visible from the ground surface. Current concern centers on the possible lack of containment of the waste and the migration of these wastes offsite.

The Phase II investigation included surface water, sediment, and groundwater sampling and analyses in order to identify the occurrence and location of contaminants and to assess the potential hazard associated with the landfill site (Figure I.2).

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Seven onsite groundwater wells were installed and aquifer testing was performed. Water samples were tested for the 15 Love Canal indicator parameters (methylene chloride, chloroform, carbon tetrachloride, benzene, toluene, chlorobenzene, 1,1,2-trichloroethane, tetrachloroethene, 1,1,2,2-tetrachloroethane, trichloroethene, trichlorobenzene (and isomers), dichlorobenzene (and isomers), hexachlorobutadiene, total organic halogens and pH). Sediment samples were tested for the 15 indicator parameters and for Pb, Cr, Cd, Cu, CN, Hg, Ni, and Zn. Geophysical surveys and downhole geophysics were used to help delineate the details of subsurface hydrogeology.

Site stratigraphy can be summarized as follows:

mixed sand/waste fill
silt (MC)
upper sand (SP)
clay (CH and CL with sand seams)
lower sand (SP)
till (GM)
dolomite bedrock

Most waste was mixed with and covered by the upper sand. The disposal trench for Love Canal waste was excavated through the sand into the clay unit.

The monitoring well screens were placed in the till and the silt/upper sand units. The piezometric surface within the fill shows a groundwater high beneath the north-center part of the site.

Surface water samples were found to contain low levels of methylene chloride and total organic halogens; no other contaminants were detected. Sediment taken from dried shallow puddles showed low levels of metals.

Limited analyses of ground water samples from new on-site monitoring wells indicated no organic contamination. One offsite residential well, approximately 80 feet deep, was analyzed for all priority pollutants; the analyses show metal contamination. An earlier USGS study showed metal contamination in the shallow aquifer.

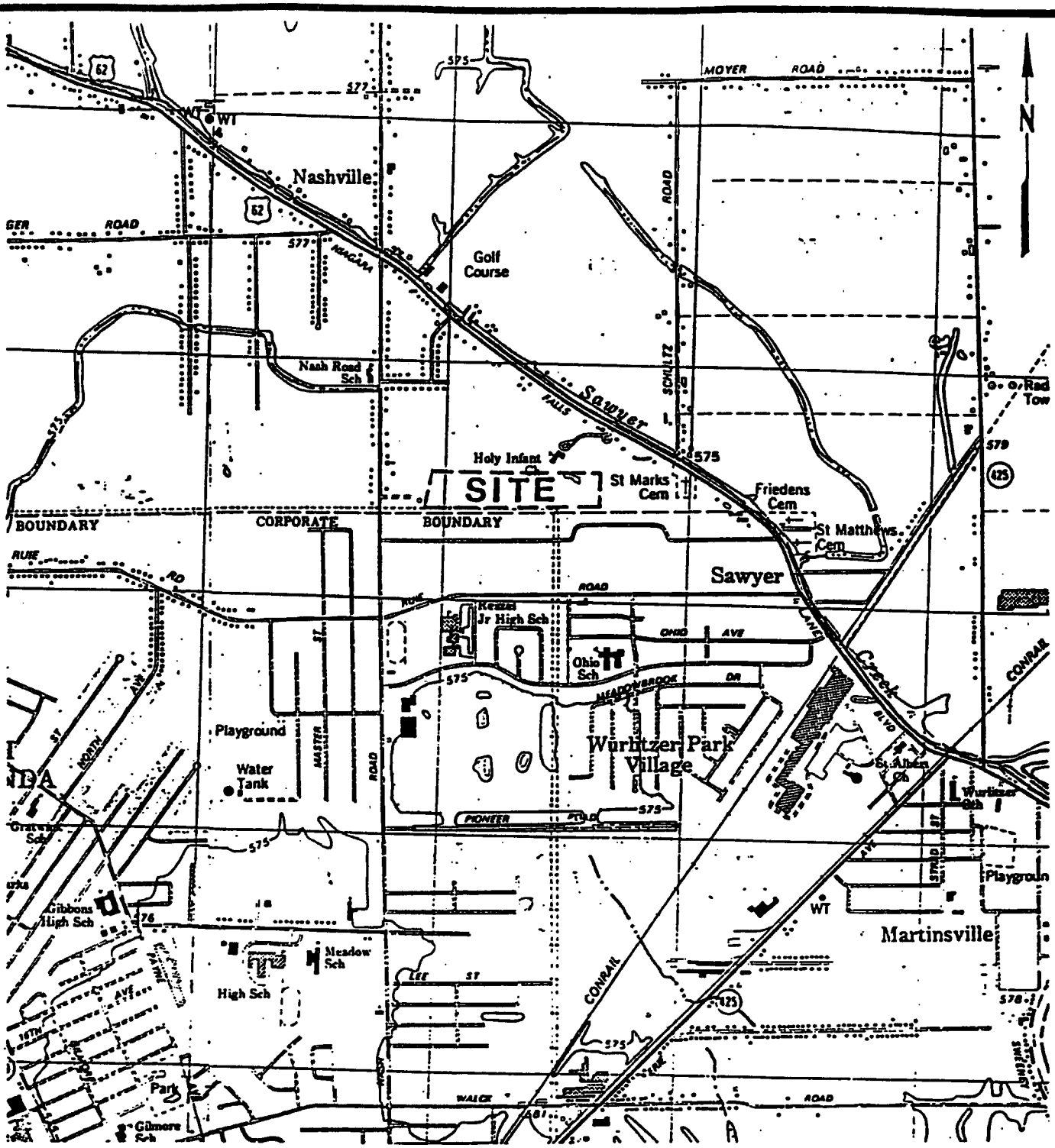
Based upon the results of this study and previous studies, the HRS scores for the Nash Road site have been calculated as follows:

$S_M = 5.37$

$S_{FE} = 26.25$

$S_{DC} = 37.50$

7



SCALE

0 1000 2000 3000 4000 FEET

SITE COORDINATES: 43°04' 10.0" N. LAT
78°51' 33.8" W. LONG

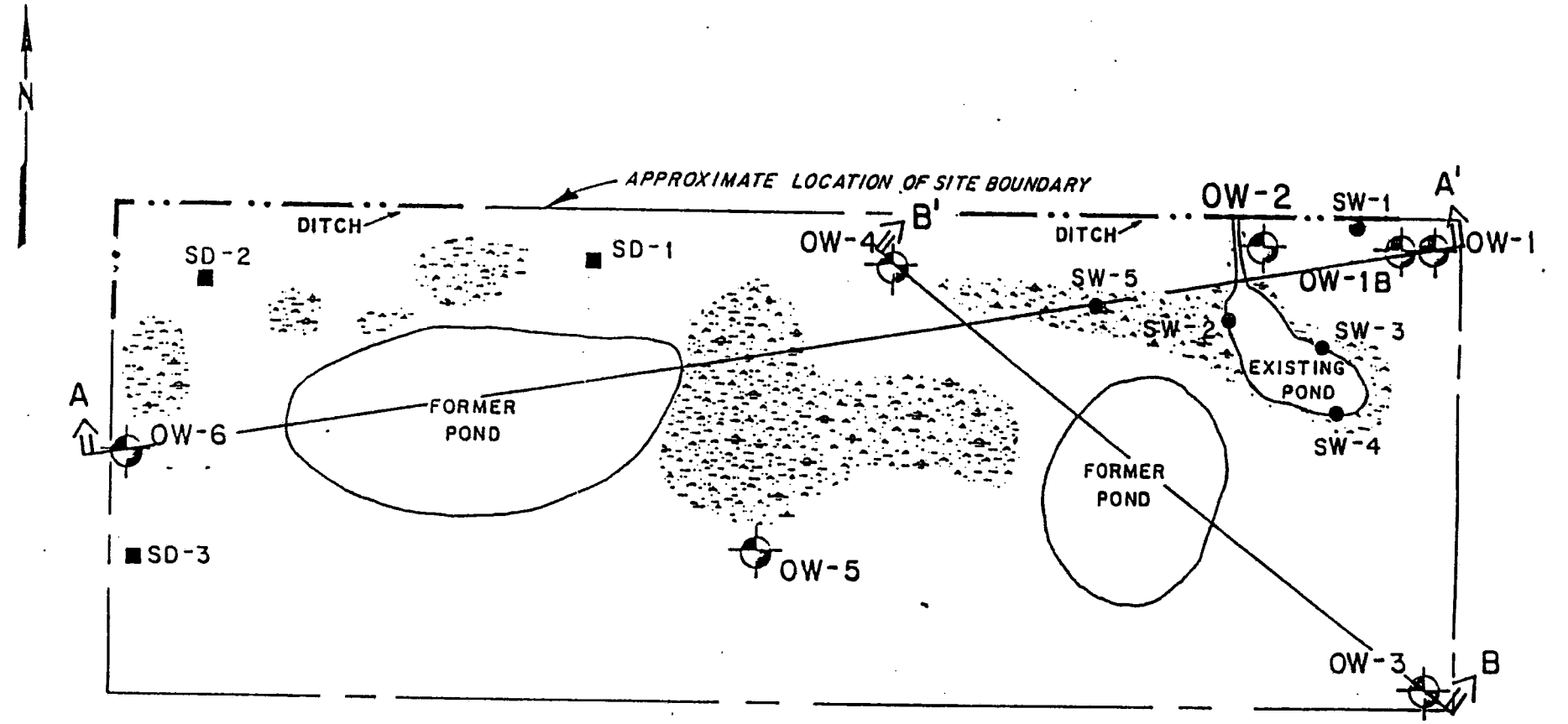
REFERENCE: U.S.G.S. 7.5' TOPOGRAPHIC MAP
TONAWANDA EAST, NY (1980) AND
TONAWANDA WEST, NY (1980) QUADRANGLES

SITE LOCATION MAP
NASH ROAD SITE

DAMES & MOORE

FIGURE I.1

BY D. Tomes DATE 8/3/89



EXPLANATION:

- ■ SEDIMENT SAMPLE
- ● SURFACE WATER SAMPLE
- ⊕ SAMPLING WELL (OW-1)

0 200 400 FEET
SCALE

NOTE 1 OSTERMAN WELL IS LOCATED APPROXIMATELY 1000 FEET WEST OF SITE.

PLOT PLAN
SHOWING CROSS SECTION LOCATIONS
NASH ROAD SITE

DAMES & MOORE

FIGURE 1.2

SECTION II

PURPOSE

Purposes

The Nash Road site is an inactive disposal area containing municipal wastes and industrial wastes, including waste materials from a sewer excavation at the Love Canal site. Disposal has occurred in and above lacustrine sands and clays; there are no engineered containment facilities on the site.

The purposes of the Nash Road Phase II Site investigation were 1) to identify the presence and location of any hazardous substance migrating from the site, 2) to determine if any imminent hazard exists, 3) to gather necessary information and to complete the HRS scoring, and 4) to prepare a site investigation report.

SECTION III

SCOPE OF WORK

Scope of Work

Phase II investigations at the Nash Road site were begun in June, 1983 in conjunction with Phase I investigation and are ongoing as of the date of this report. The scope of the investigation was originally presented in the Phase I report (June, 1983) and later in the Quality Assurance Project Plan for Nash Road and Solvent Chemical Sites (March, 1984). During the performance of the field investigation, the scope of the work was expanded at the request of the NYSDEC, in order to obtain a more comprehensive understanding of the entire Nash Road landfill.

The scope of our investigation is summarized in tabular form on Table III.1 and is summarized below.

Step 1 - Emergency Evaluation Surface Water

A surface water monitoring program was implemented in June 1983 to determine if any imminent hazard exists at the site and to evaluate the movement of surface contaminants in a northerly and northeasterly direction. Five surface water samples were collected around the ponds (including trench) and ditch in the eastern part of the site (see Figure III.1). These samples were analyzed for the 15 indicator parameters (methylene chloride, chloroform, carbon tetrachloride, benzene, toluene, chlorobenzene, 1,1,2-trichloroethane, tetrachloroethene, 1,1,2,2-tetrachloroethane, trichloroethylene, trichlorobenzene (and isomers), dichlorobenzene (and isomers), hexachlorobutadiene,

total organic halogens, and pH). The procedure for collecting the samples is discussed in Appendix A. The results of these analyses are presented in Appendix D and are discussed in Section IV.

Step 2 - Site Investigation

Geophysical Survey (east end) - Resistivity and magnetometer surveys were performed in late May 1984 to define the boundaries and depth of the disposal trench, to identify the presence of buried metal objects, to provide stratigraphic information, and to evaluate the presence of a contaminant plume. Prior to the survey, standing water was drained from the site in order to provide access for the field team.

The magnetic survey of the Nash Road site was conducted using a 40-foot grid pattern over the entire site. A north-south orientation was used on the traverses across the site. The magnetic base station was located offsite in a wooded area west of the site.

The electrical resistivity (ER) survey of the Nash Road site was conducted using both soundings and profiles. Soundings were conducted first to a depth of 100 feet in order to interpret geologic and stratigraphic features. Other soundings were conducted to a depth of 30 feet and others only as deep as necessary to distinguish lenses of interest. Profiles were conducted at electrode spacings of 10, 20, 30, 50, and 70 feet.

Figure III.2 shows the location of the ER sounding and profile stations. Field procedures are outlined in Appendix A. Magnetometer, sounding, and profile field data are included in Appendix C.

Groundwater Monitoring - A network of five deep and two shallow groundwater sampling wells was installed in June 1984. The locations of the wells were chosen to provide information about the geology of the subsurface and the groundwater flow regime at the entire Nash Road Landfill (see Figure III.1). Soil was drilled and sampled from the ground surface to the top of the bedrock. Stainless steel wells were installed with filter sand packs, and primary and secondary bentonite seals.

Each well was logged visually during drilling and later with a downhole gamma logging unit. Additionally, aquifer characteristics were evaluated by means of in-situ falling head permeability tests and routine water level measurements. To further characterize the lithology of the site soils, a grain size analysis of each soil unit was performed in the laboratory, according to ASTM D-422-63.

Groundwater samples were taken in July 1984 from the seven sampling wells and from a nearby unused residential well. Groundwater samples were analyzed for the 15 indicator parameters; the chemical analytical results are discussed in Section IV and listed in Appendix D. All field procedures are detailed in Appendix A. Boring logs and well schematics and

grain size analyses are included in Appendix B. Gamma logs are shown on Figures IV.16 and IV.17.

Sediment Sampling - Sediment samples were collected in July 1984 at three locations in the western part of the site, as shown on Figure III.1. It was originally planned that surface water would also be collected at these locations, but no surface water was present on this end of the site at the time of sampling. Locations of the sampling points are along the western and northern margins of the site and were chosen to complement the earlier surface water sampling network and to provide information about offsite surface movement of contaminants in a westerly and northerly direction. Sediments are being analyzed for Pb, Cr, Cu, Cd, CN, Hg, Ni, Zn, and organic priority pollutants. Results are discussed in Section IV and listed in Appendix D.

Air Survey - An HNU meter survey was performed during July 1984 to evaluate the presence of organic vapor contaminants. No contamination was detected. The procedure for this survey is described in Appendix A. Field data is presented in Appendix D.

TABLE III.1

WORK PLAN - TASK DESCRIPTION
(as implemented)
NIAGARA SANITATION, NASH ROAD

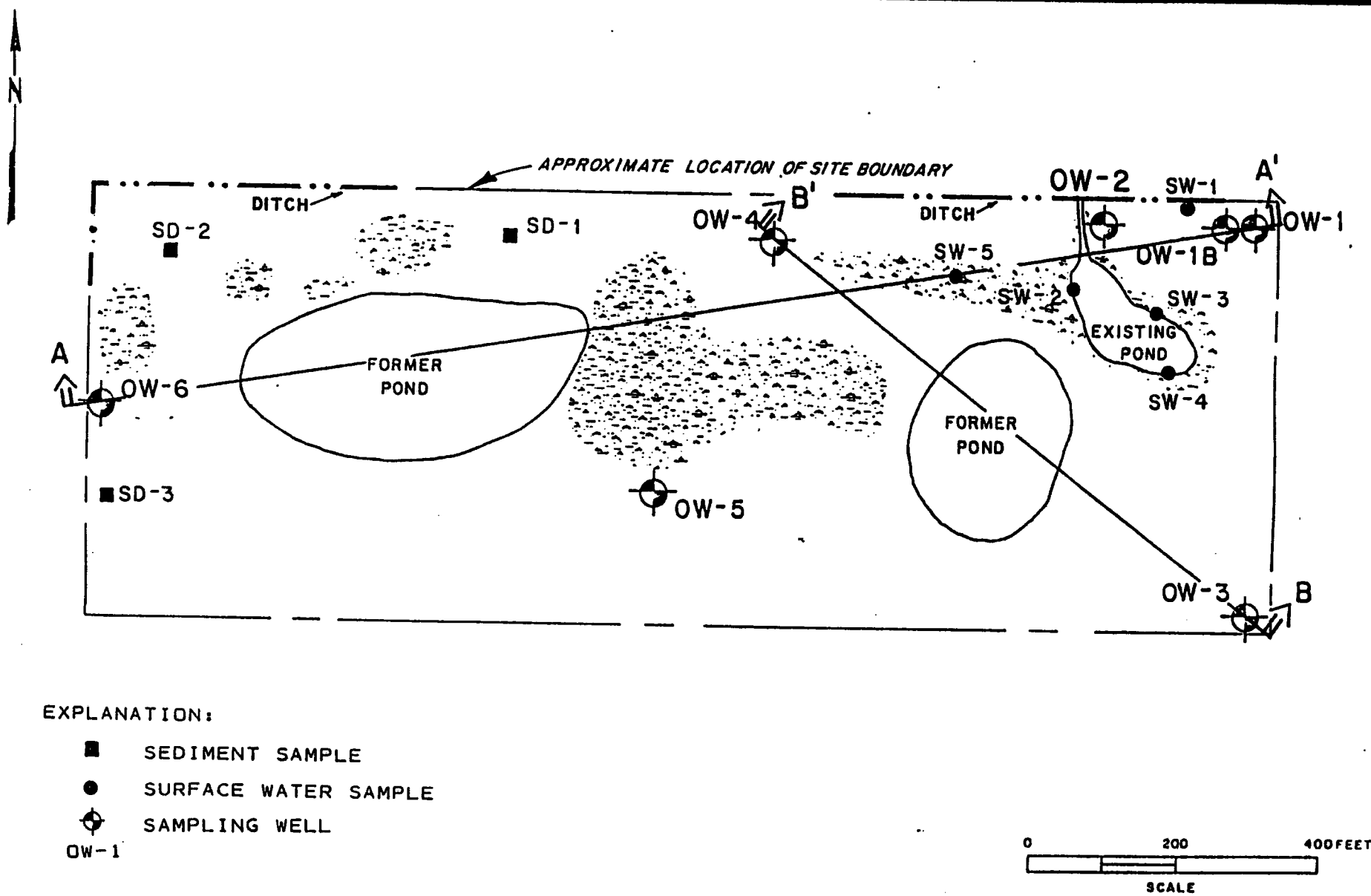
TASKS	DESCRIPTION OF TASK
Step 1 - Emergency Evaluation	
Perform Surface Water Sampling and Analyses	Inspect the site and collect 5 water samples around the disposal trench. Analyze the samples for methylene chloride, chloroform, carbon tetrachloride, benzene, toluene, chlorobenzene, 1,1,2-trichloroethane, tetrachloroethene, 1,1,2,2-tetrachloroethane, trichloroethene, trichlorobenzene (and isomers), dichlorobenzene (and isomers), hexachlorobutadiene, total organic halogens and pH.
Step 2 - Site Investigation	
II-A Update Work Plan	Review the information in the Phase I report, and Step 1 evaluation, and revise the Phase II work plan.
II-B Conduct Geophysical Studies	Conduct EM and resistivity to define the boundary and depth of the disposal trench and to provide hydrogeological information.
II-C Conduct Boring/Install Monitoring Wells	Install 7 stainless steel sampling wells.
II-D Construct Test Pits/ Auger Holes	No further construction of test auger holes necessary.
II-E Perform Sampling and Analysis	
Soil samples from borings	Collect samples during drilling at 5-foot intervals or at changes in subsurface lithology. Perform grain size analysis of each lithologic unit on site.
Soil samples from surface soils	No further sampling necessary.
Soil samples from test pits and auger holes	No further sampling necessary.

TABLE III.1 (cont.)

TASKS	DESCRIPTION OF TASK
Sediment samples from surface water	Collect 3 sediment samples at the west end and analyze samples for Pb, Cr, Cd, Cu, CN, Hg, Ni, Zn, and a GC/MS organic priority pollutant scan.
Groundwater samples	Collect samples from the 7 new monitoring wells and analyze for the parameter listed in Step 1.
Surface water samples	No water at west end of site at time of investigation.
	Air samples Using the HNU meter, determine if organic vapors are present.
Waste samples	No further sampling necessary.
II-F Calculate Final HRS	Revise HRS based on the field data collected in Tasks IIB-IIE, complete the HRS form.
II-G Conduct Site Assessment	Prepare final report containing Phase I report, additional field data, final HRS and HRS documentation records, and site assessments. The site assessment will consist of a conceptual evaluation of alternatives and a preliminary cost estimate of the most probable alternative.
II-H Project Management	Project coordination, administration and reporting.

FIL[redacted]133[redacted]03/1[redacted]

BY D. Tomsa DATE 8/3/84



NOTE 1 OSTERMAN WELL IS LOCATED APPROXIMATELY 1000 FEET WEST OF SITE.

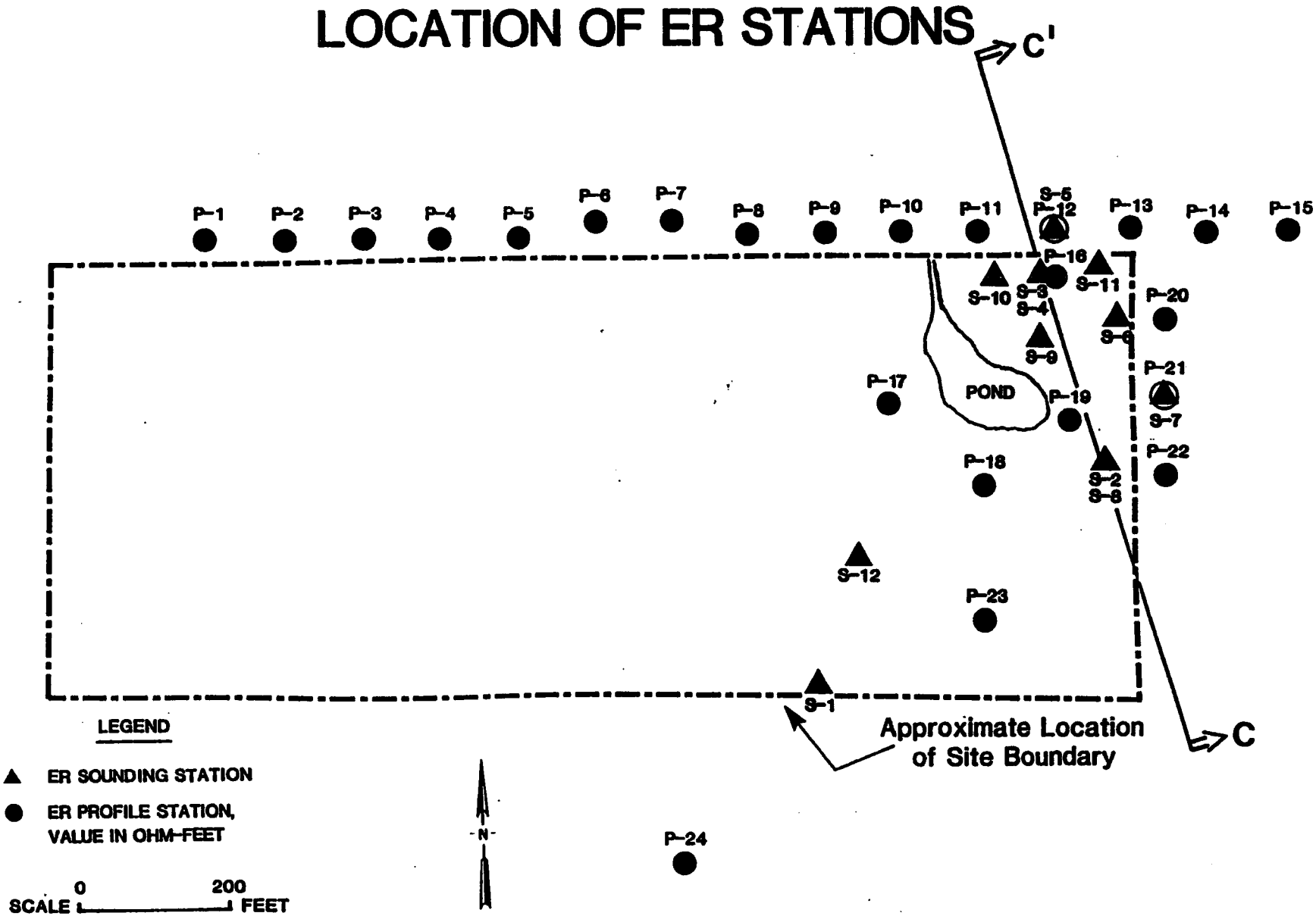
PLOT PLAN
SHOWING CROSS SECTION LOCATIONS
NASH ROAD SITE

DAMES & MOORE

FIGURE III.1

NIAGARA SANITATION – NASH ROAD SITE

LOCATION OF ER STATIONS



ES ENGINEERING-SCIENCE

FIGURE III.2

SECTION IV

SITE ASSESSMENT

Site Topography

The site is an inactive landfill located in the Town of Wheatfield, Niagara County, adjacent to the North Tonawanda City boundary. The site is a rectangular area, twenty five acres in size. It is surrounded by a suburban residential area, and is partially overgrown with trees and marsh vegetation. Dirt roads provide access to and within the site.

The landfill is visible to many of the residential neighbors south of the site. It is used by nearby residents as a jogging area, dirt bike track, and general play area.

Access to the site is open and unguarded. National Fuel Gas Corporation has a facility adjacent to the western border of the site. A gas pipeline, a salt-brine pipeline, and above-ground electrical lines also pass through the site along the southern boundary.

Before landfilling began, the site was a swamp area with surface water drainage to the north toward Sawyer Creek. General surface features are shown on Figures IV.1 and IV.2. Landfilling of wastes and excavation of a disposal trench (labelled "existing pond") has resulted in irregular ground surface topography. Relief on the site is greater than 10 feet.

The volume of onsite surface water fluctuates seasonally. In the

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spring, approximately one-third of the site is underwater; in late summer, only the disposal trench and connected ponds are filled with water. The northern margin of the site is bounded in most parts by a ditch, which, in the spring, contains surface water. The large ponds and the disposal trench drain into this ditch.

During the field activities in May through July, 1984, abundant wildlife was observed on the site, including birds, rabbits, frogs, turtles. No human use of surface water was observed. Groundwater is similarly unused, although an older home adjacent to the site has a (unused) residential water well. It is possible that other older homes in the vicinity of the landfill have residential wells. (Niagara Co. Dept. of Health is unaware of any other existing wells.) All nearby residents presently are supplied with municipal drinking water.

Site Hydrogeology

Regional Geology

The Nash Road Site is located in the Erie-Ontario Lowlands physiographic province. The bedrock of this region is predominantly limestone, dolostone, and shale.

In the recent past, most of New York State, including the site, has been repeatedly covered by a series of continental ice sheets. The activity of the glacier widened preexisting valleys and deposited widespread accumulations of till. The melting of ice, ending approximately 12,000 years ago, produced large

volumes of meltwater; this water subsequently shaped channels and deposited thick accumulations of stratified, granular sediments.

As glacial ice retreated from the region, meltwater formed lakes in front of the ice margin. This region is covered by lake sediments, the most recent being from Lake Tonawanda, an elongate lake which occupied an east-west valley and drained north into Lake Iroquois. The sediments consist of blanket sands and beach ridges which are occasionally interlayered with lacustrine silts and clays.

Granular deposits in this region frequently act as shallow aquifers, whereas lacustrine clays, as well as tills, often inhibit groundwater movement. However, fine-grained, water-lain sediments, such as silts and clays, frequently contain horizontal laminations and sand seams. These internal features facilitate lateral groundwater movement through otherwise low permeability materials.

Site Geology

This analysis is based on subsurface information from the drilling program, downhole gamma logging and geophysical surveys and sounding of the site. Also used in this analysis were the USGS shallow borings made in 1982.

Bedrock is Lockport Dolostone, occurring at depths varying from 65 feet to 71 feet below the ground surface. The surface of the bedrock slopes generally northward (Figure IV.3) and forms a

north-trending channel in the center of the site. An ER profile of the 70-foot deep surface (Figure IV.4) resulted in electrical values indicative of bedrock. Values south of the disposal trench, as seen on Figure IV.4 and all ER profiles are numerically lower and suggest a wet area.

A till unit is located immediately above the bedrock surface. The till is a pink, very dense, silt and gravel with some sand. Grain size analyses show silt contents as great as 65%. Gravel size increases to the west. The till blankets the site with an average thickness of 25 feet. The 50-foot deep surface, which occurs within the till, has been mapped with ER profiling (Figure IV.5). The values are relatively consistent, except again for the low values south of the disposal trench. The top surface of the till, as shown on Figure IV.6, forms a channel trending generally northwest, with a maximum relief across the study area of 17 feet.

Overlying the till is a lower sand unit. A grain size analysis of the unit indicates that it is a fine sand with approximately 35% silt. This sand unit does not blanket the site, but rather occurs as a wedge-shaped unit, thickening to the north-center part of the site (Figure IV.7). At the western and eastern margin of the site, the sand unit has a thickness of less than one foot. An ER profile map of the 30-foot deep surface (Figure IV.8), which corresponds approximately with the depth of the lower sand, shows lower values south of the trench. Again, these can be interpreted as an increased water content of the soils in

this area. Based on its lithology and stratigraphic position, this sand unit is interpreted to be an early deposit of Lake Tonawanda.

Above the lower sand and blanketing the site is a layered "fat" clay unit which grades vertically into a layered silty "lean" clay. Both of these units contain numerous sand seams. Hydrometer analyses of these fat and lean clays confirm the vertically increasing silt content. These clay units are classic examples of Lake Tonawanda deposits, as mapped by Muller (1977). The most likely mineralogy for the clay minerals is illite. Two ER profile maps of the 20-foot deep and 10-foot deep surfaces (both of which are within this clay unit) show, again, an area south of the trench with distinctly low resistivity values. This again is interpreted as the result of increased water content. Contours on the top surface of the upper clay unit, as shown on Figure IV.11, show a surface sloping gently north and west; maximum relief is 3 feet.

An upper sand unit is located immediately above the clay unit, in all parts of the site except in the northeast corner. This sand unit varies in thickness from greater than 8 feet in the southwest to 0 feet in the northeast (Figure IV.12). A grain size analysis of this unit indicates a fine sand with approximately 20% silt. This unit probably originated as a late deposit of Lake Tonawanda.

In the eastern part of this site, the upper sand is overlain by a

layered silt. A grain size analysis of this silt shows that it contains approximately 20% sand and little clay. During testing, a suspension of this silt was extremely frothy and had a soapy odor. The occurrence of this fine-grained unit suggests a possible deepening of the Lake Tonawanda water.

The uppermost unit on the site is a mixed sand/waste fill. This unit is defined best from the results of the magnetometer survey. Readings on the site were highly variable due to the disturbed soil, landfill type debris and buried metallic objects. On Figure IV.13, the areas of very high magnetic readings (greater than 58,000 gammas) are interpreted as buried ferromagnetic metal objects. The magnetic readings of 57,500 gammas are interpreted as disturbed soil areas and possibly buried ferromagnetic metal objects.

The magnetic data indicates that there are five areas on the landfill that may be underlain by buried ferromagnetic metal objects. The data also suggest that the landfill has several distinct areas of disturbed soil, i.e., pits and/or trenches, and mixed soil/waste fill. Samples taken during drilling support this interpretation.

The stratigraphic relationship between the units can be seen on the cross sections prepared from boring logs (Figures IV.14 and IV.15). The locations of these lines are shown on the Plot Plan (Figure III.1). The sand/waste mixed fill covers part of the ground surface and is underlain by the upper sand or the clayey

silt. In virgin areas, the ground surface is either silt or sand. Excavation of the disposal trench, not shown on the cross section, would have exposed the fat clay in the base of the trench.

Cross sections have also been prepared based on gamma log records (Figures IV.16 and IV.17). These cross sections show the same stratigraphy as those based on boring logs, as well as some finer detail and time lines. For example, peaks A and B are on approximately horizontal lines suggesting site-wide thin sand seams within the lacustrine clay. Similarly, peak C corresponds to the occurrence of the lower sand unit and peak E to the upper sand and sand/waste fill units. It should be noted that the gamma log responses of the upper sand unit and the fill/sand unit are the same due to the presence of the sand. These units are plotted together on the gamma log cross sections.

A cross section based on ER sounding values has been prepared and is shown on Figure IV.18. The location of this cross section line is shown on Figure IV.19. On the cross section, all lithologic units are discernable. In addition, a "wet zone" is indicated between depths of 16 feet and 26 feet, sloping to the north. This ER peak corresponds roughly with the depths of peak B on the gamma log cross sections and therefore may indicate a silt or other low gamma count density material. Boring logs (OW-1 and OW-3) show this depth range to be a very soft wet clay. This anomaly is of particular interest to the study because it coincides with the approximate depth of the disposal trench.

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Hydrology

To date, the hydrology of the Nash Road site is known from in-situ permeability tests, groundwater elevation measurements, surface and groundwater chemical information, and interpretations from the subsurface geology.

Surface Water Hydrology:

The occurrence and location of surface water on the Nash Road site is variable and seasonal. Most surface water bodies occur in small enclosed depressions, less than 3 feet deep. They are formed by either snow meltwater or rainwater and generally disappear, due to evaporation, during the summer months. Water in these ponds was observed to be either clear or rust-colored. Most of these ponds are rimmed with marsh-type vegetation. Due to their temporal and enclosed nature, no water samples were taken in these ponds.

In contrast to the small ponds, several large connected ponds, including one which was a disposal trench, are located in the northeast section of the site and contain water year-round. The color of this water is clear, with occasional patches of green floating algae and weeds. The edges of these ponds are rimmed with marsh-like vegetation. Rusty barrels and other debris can be seen floating in these ponds. Nearby residents reported to our field team that these ponds do not freeze in the winter. In the spring and early summer, these ponds drain into a ditch along the northern margin of the site.

Groundwater Hydrology:

Permeabilities for the various screened units are shown in Table IV.1. The magnitudes of the values are typical of the corresponding soil lithologies. The till/bedrock interface permeability is variable, depending upon the degree of fracture of the bedrock and the sand and gravel content of the till.

The piezometric surface within the till is mapped on Figure IV.20. The configuration of the contours suggests a groundwater mound beneath the center of the site. Thismound may be attributable to the occurrence of the lower sand unit, immediately above the till, acting as a source of recharge for the till.

The thick, soft clay unit above the lower sand may act as an aquitard, thus allowing only lateral recharge of the lower sand unit. Alternately, the clay may be permeable due to its soft (low density) consistency and layered fabric with numerous sand seams (see gamma logs). Additionally, the excavation of the disposal trench removed part of the clay unit and possibly disturbed the clay floor of the trench during the drag-line excavation procedure. This activity may have opened a new flow path by which surface water now may be connected with sand seams in the clay and possibly with the lower sand unit.

The upper sand unit probably forms a shallow aquifer, although no wells were placed in this unit. Based on our interpretation of the upper clay unit surface geometry (Figure IV.11), we expect

that flow direction within the shallow aquifer to follow the contours of the underlying clay unit. Again, this clay unit has been partially excavated in the trench, thereby providing a connection between the upper aquifer and trench water, and, by extension, possibly into the lower aquifer.

Contamination

Contamination of the environment within the site boundaries has been evaluated by chemical analyses of surface water, sediment, and groundwater samples and an HNU air quality survey. Migration of contamination away from the site is assessed by chemical analyses of surface water and one nearby (unused) residential well, as well as our interpretation of groundwater and surface water flow characteristics.

Surface Water Contamination

Water samples from ponds and from the ditch were analyzed in July 1983, as an emergency measure to assess the migration of contamination off-site via a surface water pathway. The results of these analyses are shown on Table IV.2. The samples were analyzed for the indicator parameters. Only very low levels of total organic halogens and methylene chloride were found. The ditch water sample had slightly greater levels than any of the pond and trench samples. This may indicate another subsurface or surface water source to the ditch, either west or north of the site. The TOX values (10 ppb and less) could be indicative of background levels. Alternately, the low levels of methylene chloride could be due to the laboratory contamination. These

chemical analyses were performed without complete quality assurance procedures due to the emergency response nature of this part of the study.

A sample of ponded water was collected by Region 9 DEC on July 11, 1983 and analyzed for GC/MS organics. Two compounds were identified at low concentrations including: Diethylphthalate (identified) and Toluene (42.7 ug/l).

From these analyses, no significant surface water contamination from organic indicator pollutants is believed to exist at the eastern end of the site.

Sediment Contamination

In the summer of 1984, three sediment samples were taken from "dried puddles" in the western end of the site (see Figure III.1 for sampling locations). These samples were analyzed for organic priority pollutants and metals. The results of these analyses are presented in Table IV.3. Also presented in this table are ranges of concentrations of metals in non-contaminated soils. The values for cadmium, chromium, copper, lead, nickel and zinc are all within the range of "typical" soils. Also there is no significant variation between the values for different sampling locations. Values for mercury and cyanide were not presented in Friberg, Nordberg and Vouk (1979); however, the values of cyanide are less than the detection limit. Mercury was detected at very low levels. Based on the results of the analysis of these

samples, no sediment contamination is believed to exist at the site.

Groundwater Contamination

Seven on-site monitoring wells and one nearby off-site unused residential well (Osterman well) were sampled in the summer of 1984. The on-site wells were analyzed for volatile organics, base/neutral extractable organics, total organic halogens and pH. The results of compounds that were detected are presented on Table IV.4. Based on the results of these analyses, no significant organic contamination is believed to exist at the site.

The Osterman well sample was analyzed for priority pollutants (volatiles, acid extractables, base/neutral extractables, pesticides/PCBs, metals, cyanides and phenolics). The results of the analyses for organics that were detected are presented in Table IV.4. The results of analysis of two samples for metal are presented in Table IV.5. Only metals that were detected in at least one of the ground water samples are presented in this table.

Lead was found in one of these two Osterman well samples at levels in excess of the New York State Class GA water quality standard (25 ug/l). However, in the other sample the concentration of lead was less than the detection limit. Cadmium was detected in both samples. The concentration in one of the samples was at the water quality limit (10 ug/l) and the

concentration in the other sample was less than the water quality limit. The concentrations of other metals were below water quality limits. It should be noted that the analytical results presented in Table IV.5 are total metals on unfiltered samples and that the monitoring well samples were not analyzed for metals. Additional sampling is required to determine if metals contamination exists at the site and to determine whether or not the contamination is migrating from the site.

Air Contamination

An HNU air quality survey was performed in the summer of 1984 and nor airborne organic contaminants were detected.

TABLE IV.1

Summary
In-Situ Permeability

Well	Permeability cm/sec	
OW-1	4.37×10^{-4}	silt
OW-2	6.75×10^{-4}	silt and sand
OW-1B	8.43×10^{-7}	till/bedrock
OW-3	1.43×10^{-6}	wet zone in till
OW-4	7.88×10^{-7}	till/bedrock
OW-5	7.5×10^{-4}	till/bedrock
OW-6	6.8×10^{-4}	till/bedrock

TABLE IV.2

Analytical Results for Surface Water Samples

Parameter (ug/l)	SW-1	SW-2	SW-3	SW-4	SW-5
Methylene Chloride	11	<10	10	<10	<10
Chloroform	<10	<10	<10	<10	<10
Carbon Tetrachloride	<10	<10	<10	<10	<10
Benzene	<10	<10	<10	<10	<10
Toluene	<10	<10	<10	<10	<10
Chlorobenzene	<10	<10	<10	<10	<10
1,1,2,2,-trichloroethane	<10	<10	<10	<10	<10
Tetrachloroethane	<10	<10	<10	<10	<10
1,1,2,2,-tetrachloro-ethene	<10	<10	<10	<10	<10
Trichloroethene	<10	<10	<10	<10	<10
Trichlorobenzene (isomers)	<10	<10	<10	<10	<10
Dichlorobenzene (isomer)	<10	<10	<10	<10	<10
Hexchlorobutadiene	<10	<10	<10	<10	<10
pH	6.9	8.1	7.1	7.4	7.4
Total organic halogens	10.	5.	7.	7.	8.

(See Figure III.1 for location of sampling points)

TABLE IV.3
Analytical Results[1] for Sediment Samples

Parameter (ug/g)	Sample No. SD-1	SD-2	SD-3	Range of Concentration in non-contaminated soils[2]
Cadmium	0.30	< .2	< .2	<1
Chromium	6.8	6.3	5.6	trace to 250
Copper	5.7	8.2	10.0	2 to 100
Lead	18.	7.0	14.	2 to 200
Mercury	0.0084	0.064	0.010	(3)
Nickel	6.5	8.5	9.4	3 to 1,000
Zinc	40.	34.	48.	10 to 300
Cyanide	<1	<1	<1	(3)

(1) Samples were analyzed for volatile organics, acid and base/neutral extractable organics and pesticides/PCB's. All results for organics analysis were less than detection limits

(2) Source: Handbook on the Toxicology of Metals, Edited by L. Friberg, G. F. Nordberg and V. Vouck, 1979.

(3) No information for this parameter available in Friberg, Nordberg, and Vouk (1979)

(See Figure III.1 for location of sampling points)

TABLE IV.4

ANALYTICAL RESULTS (ORGANICS AND pH) FOR GROUND WATER SAMPLES

SAMPLE IDENTIFICATION

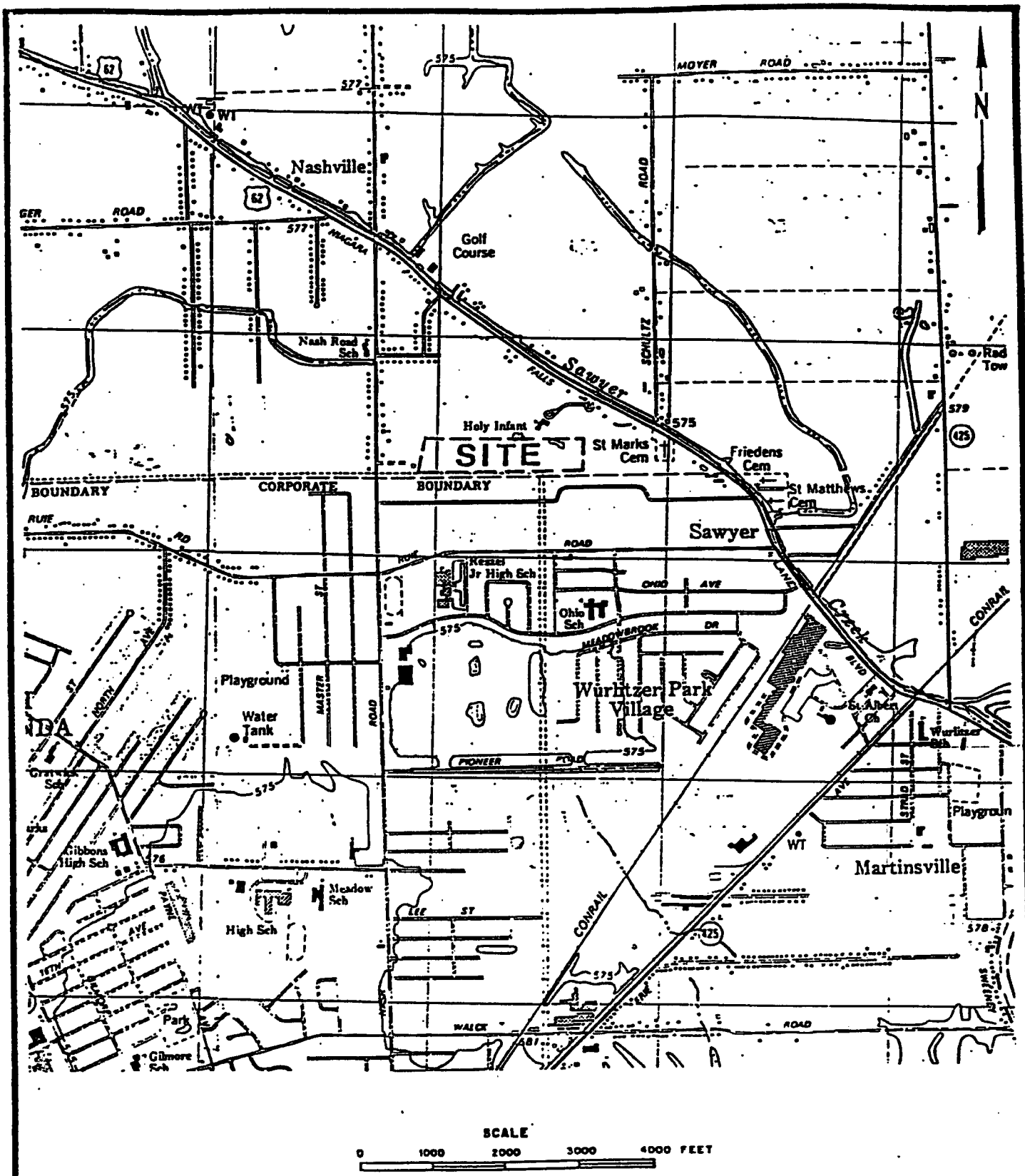
Parameter	OW-1	OW-1B	OW-2	OW-3	OW-4	OW-5	OW-6	FT-1	Osterman Well	Osterman Property	OST-1
Methylene Chloride (ug/l)	ND	ND	ND	ND	ND	ND	15	ND	ND	ND	14
Toluene (ug/l)	ND	ND	ND	ND	ND	ND	ND	ND	<6.0	ND	ND
1,1,1,-trichloroethane (ug/l)	ND	<3.8	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butylbenzylphthalate (ug/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	33
Total Organic Halides (mg/l)	<0.02	<0.02	0.04	0.04	0.09	<0.02	0.12	--	0.04	--	--
pH	8.05	8.14	8.12	8.11	8.14	8.16	8.07	6.45	8.20	--	--

ND = Not Detected

TABLE IV.5

Results of Metals Analysis
For Osterman Well

Parameter	Sample Identification: Osterman Property	Sample Identification: OST-1	Class GA Water Quality Standards
Total Cadmium (ug/l)	6	10	10
Total Copper (ug/l)	13	10	1,000
Total Zinc (ug/l)	258	50	5,000
Total Lead (ug/l)	<5	140	25
Total Mercury (ug/l)	<0.5	0.8	2



SITE COORDINATES: 43°04' 10.0" N. LAT
78°51' 33.8" W. LONG

REFERENCE: U.S.G.S. 7.5' TOPOGRAPHIC MAP
TONAWANDA EAST, NY (1980) AND
TONAWANDA WEST, NY (1980) QUADRANGLES

SITE LOCATION MAP
NASH ROAD SITE

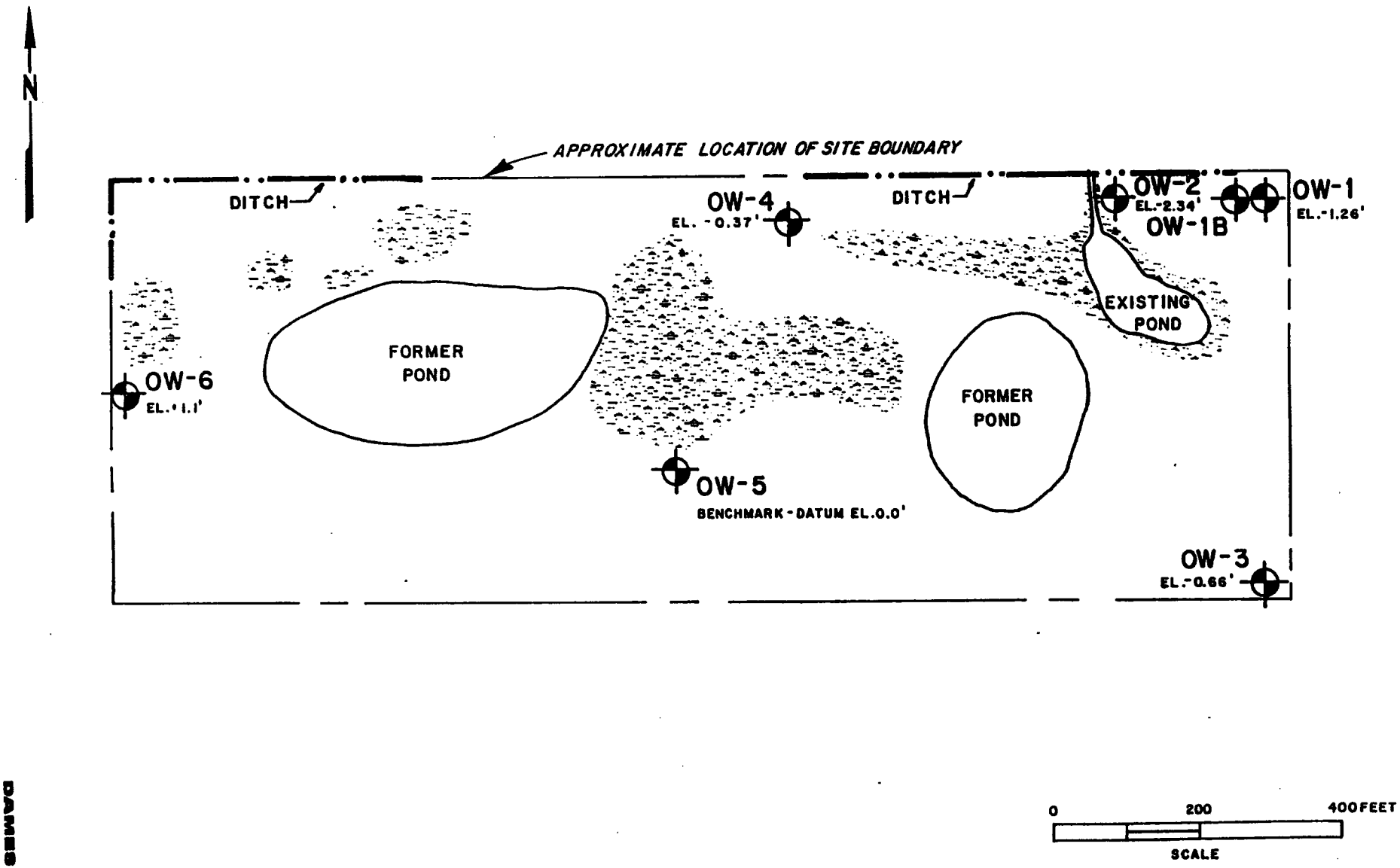
37

DAMES & MOORE

FIGURE IV.1

FILE 13305 603/11

BY D. Dmar DATE 7/25/84



SURFACE TOPOGRAPHY
NASH ROAD SITE

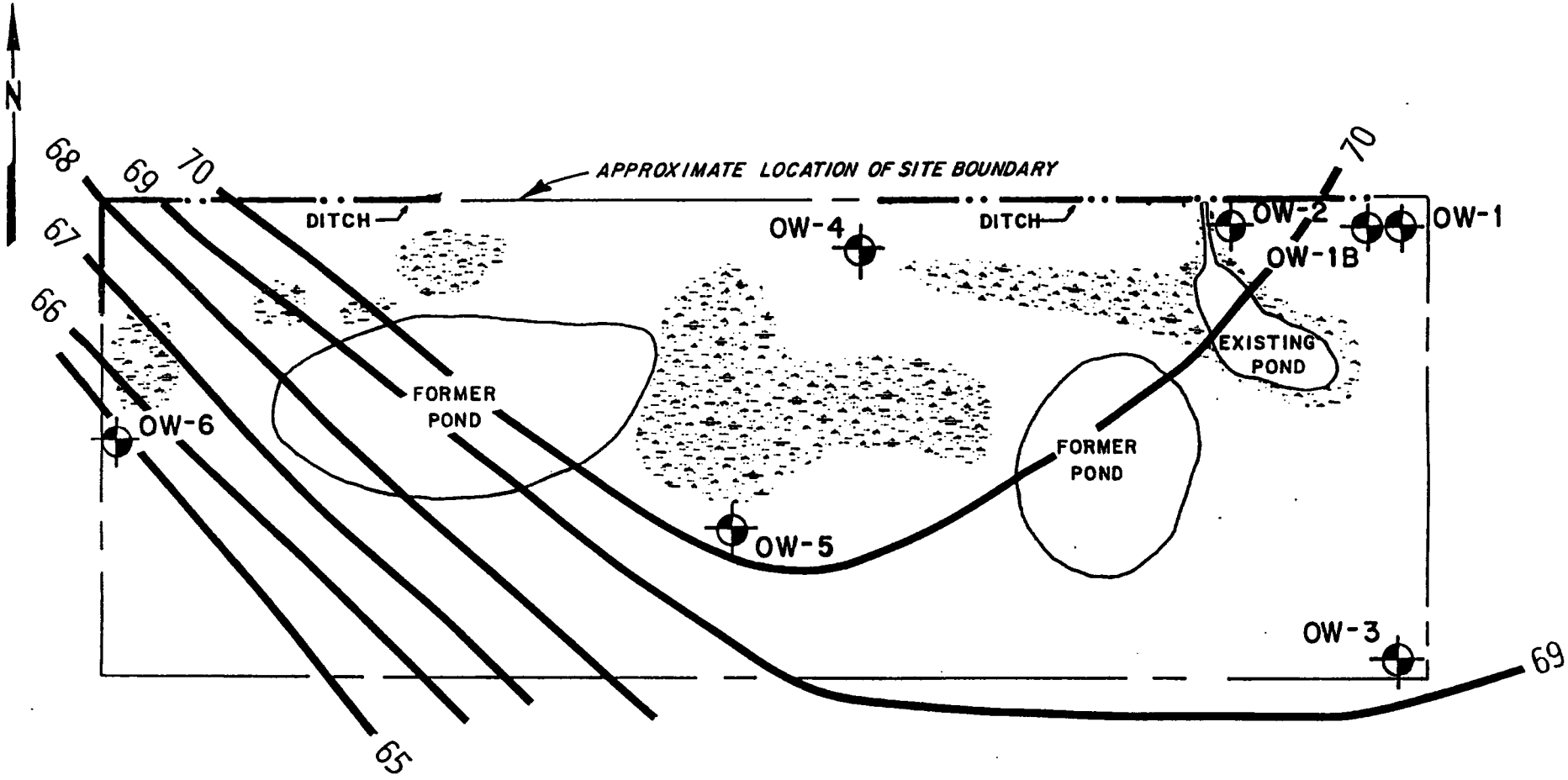
Note: Elevation values in feet relative to arbitrary datum

DAMES & MOORE

FIGURE IV.2

FILE 13305-003/19

BY D. James DATE 7/05/84



0 200 400 FEET
SCALE

DAMES & MOORE

FIGURE IV.3

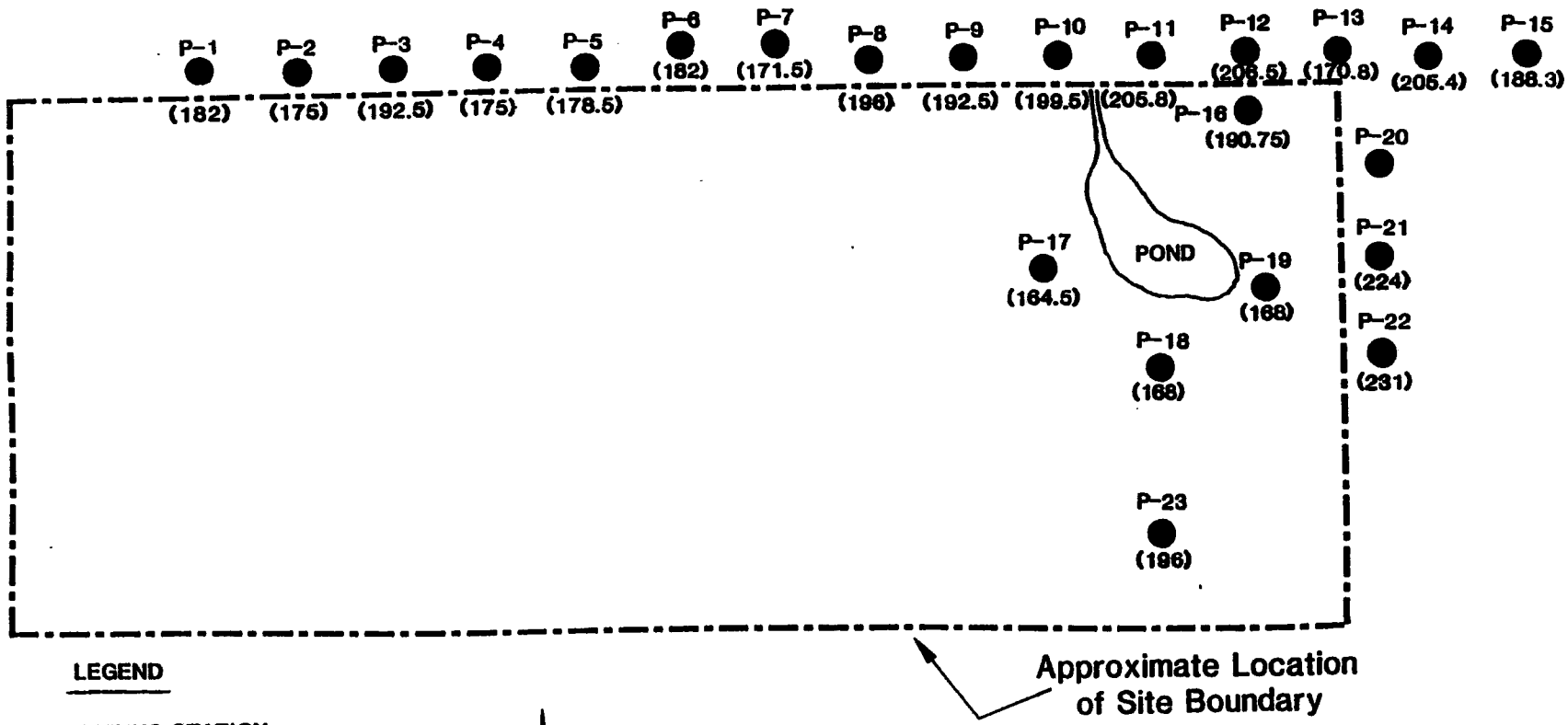
DEPTH TO BEDROCK SURFACE
NASH ROAD SITE

Note: Values in feet below arbitrary datum.

NIAGARA SANITATION -NASH ROAD SITE

ER PROFILE MAP

(Electrode Spacing =70 feet)



LEGEND

▲ ER SOUNDING STATION

● ER PROFILE STATION, VALUE IN OHM-FEET

SCALE 0 200 FEET

N

P-24
(186.2)

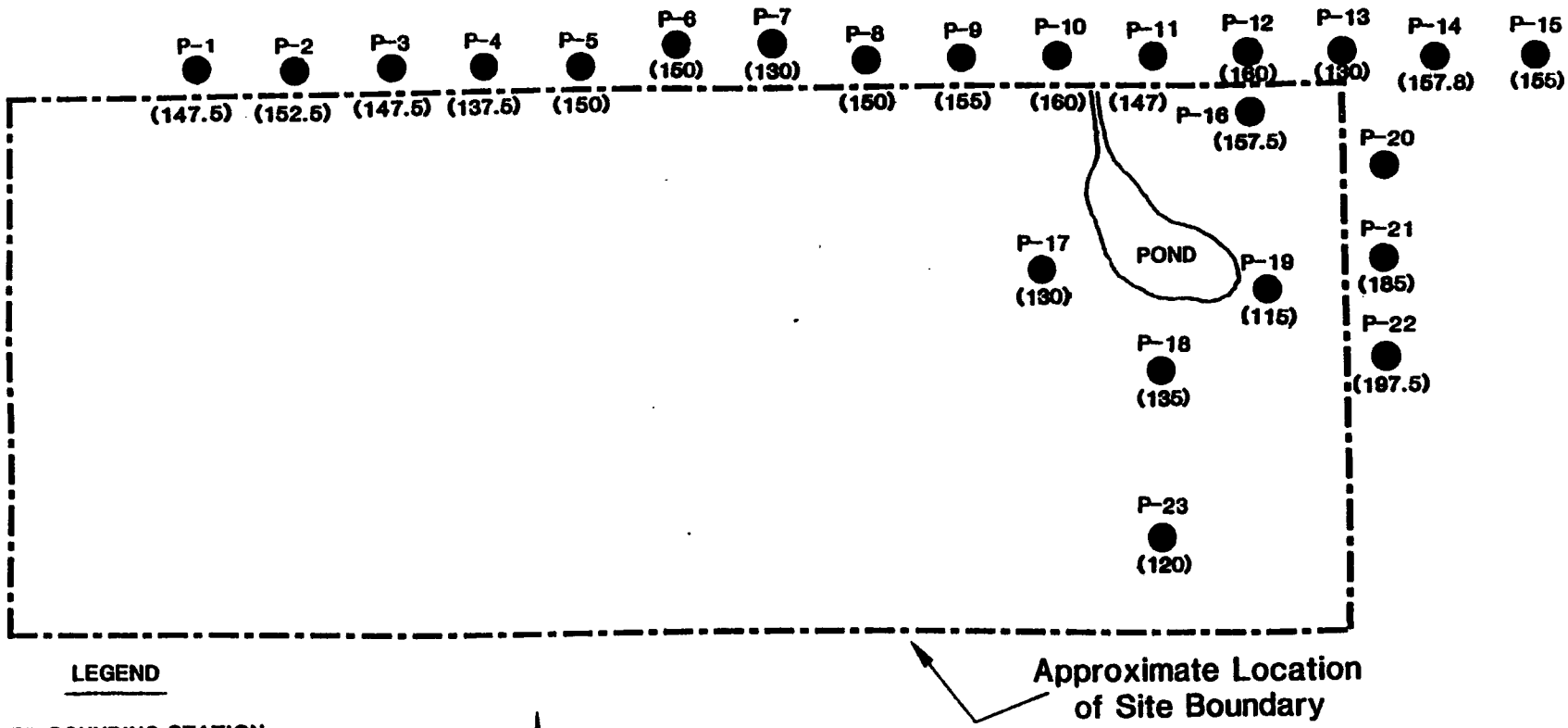
ES ENGINEERING-SCIENCE

FIGURE IV.4

NIAGARA SANITATION -NASH ROAD SITE

ER PROFILE MAP

(Electrode Spacing =50 feet)



LEGEND

▲ ER SOUNDING STATION

● ER PROFILE STATION, VALUE IN OHM-FEET

SCALE 0 200 FEET

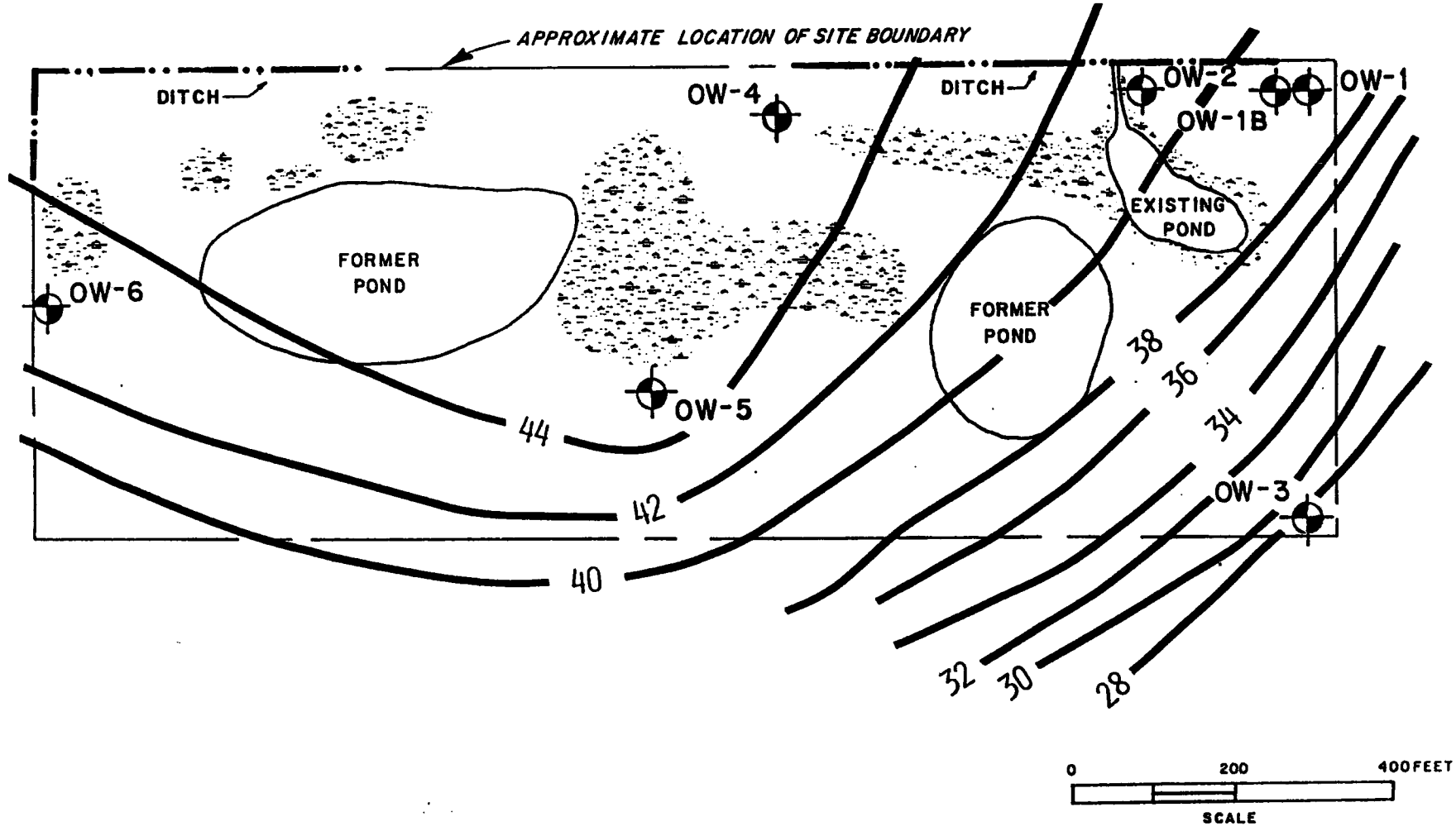
N

ES ENGINEERING-SCIENCE

FIGURE IV.5

FILE 13305-003/14

BY D. Doman DATE 7/25/84



Note: Values in feet below arbitrary datum.

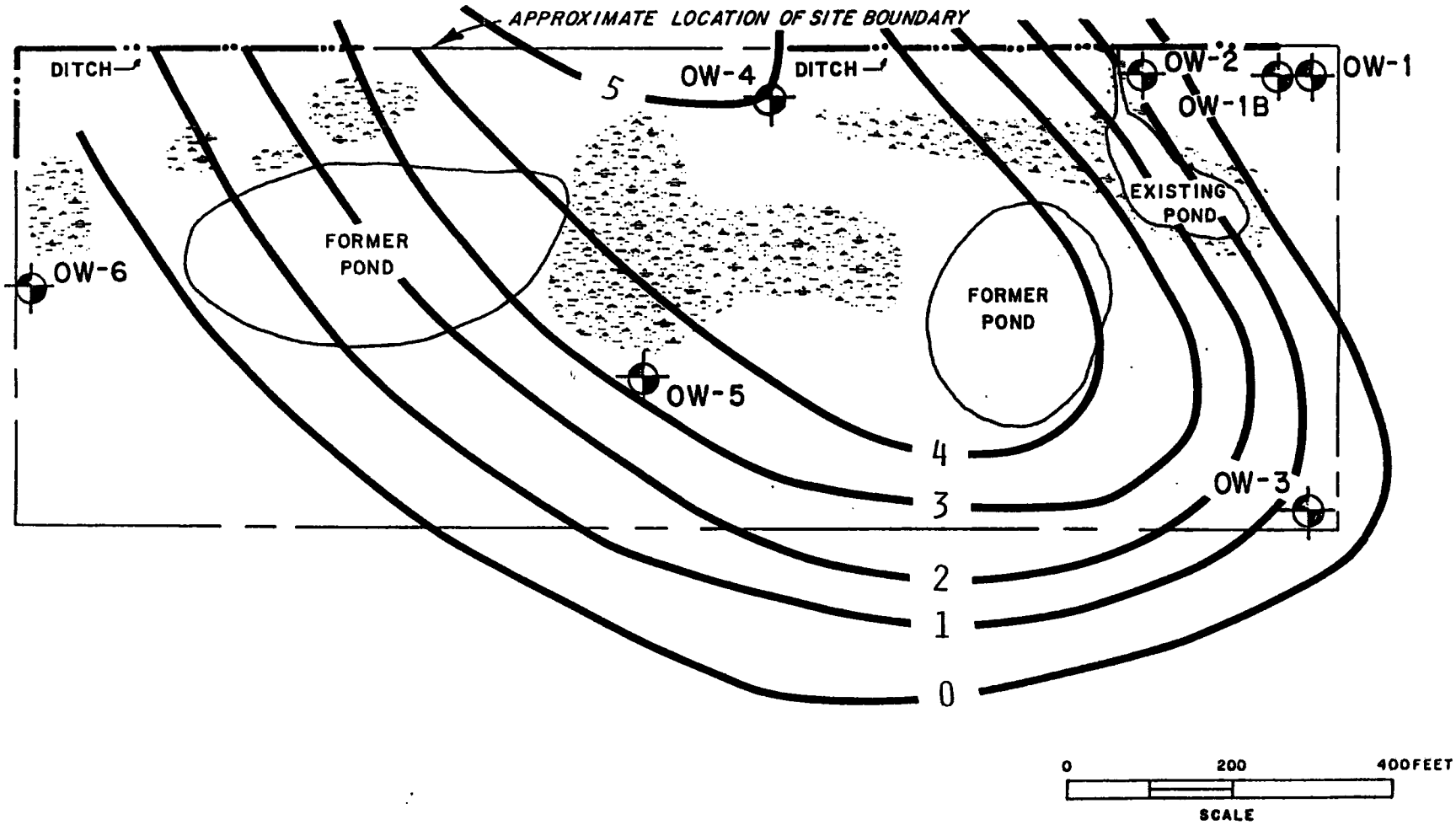
DEPTH TO TOP OF TILL
NASH ROAD SITE

DAMES & MOORE

FIGURE IV.6

FILE 13305-003/19

BY D. Wagner DATE 7/25/84



LOWER SAND ISOPACHS
NASH ROAD SITE

Note: Values in feet

DAMES & MOORE

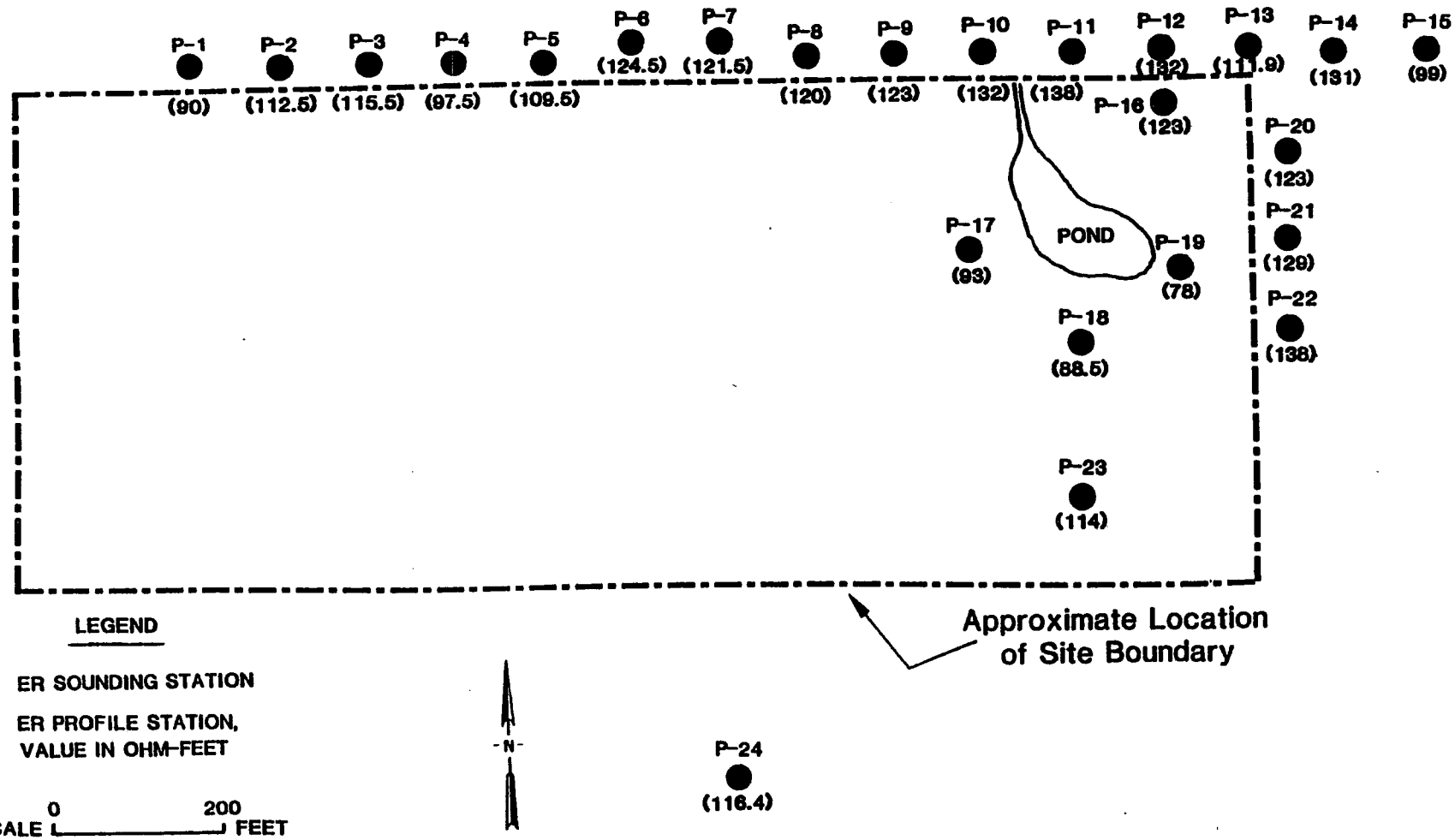
FIGURE IV.7

53

NIAGARA SANITATION -NASH ROAD SITE

ER PROFILE MAP

(Electrode Spacing = 30 feet)



LEGEND

▲ ER SOUNDING STATION

● ER PROFILE STATION, VALUE IN OHM-FEET

SCALE 0 200 FEET

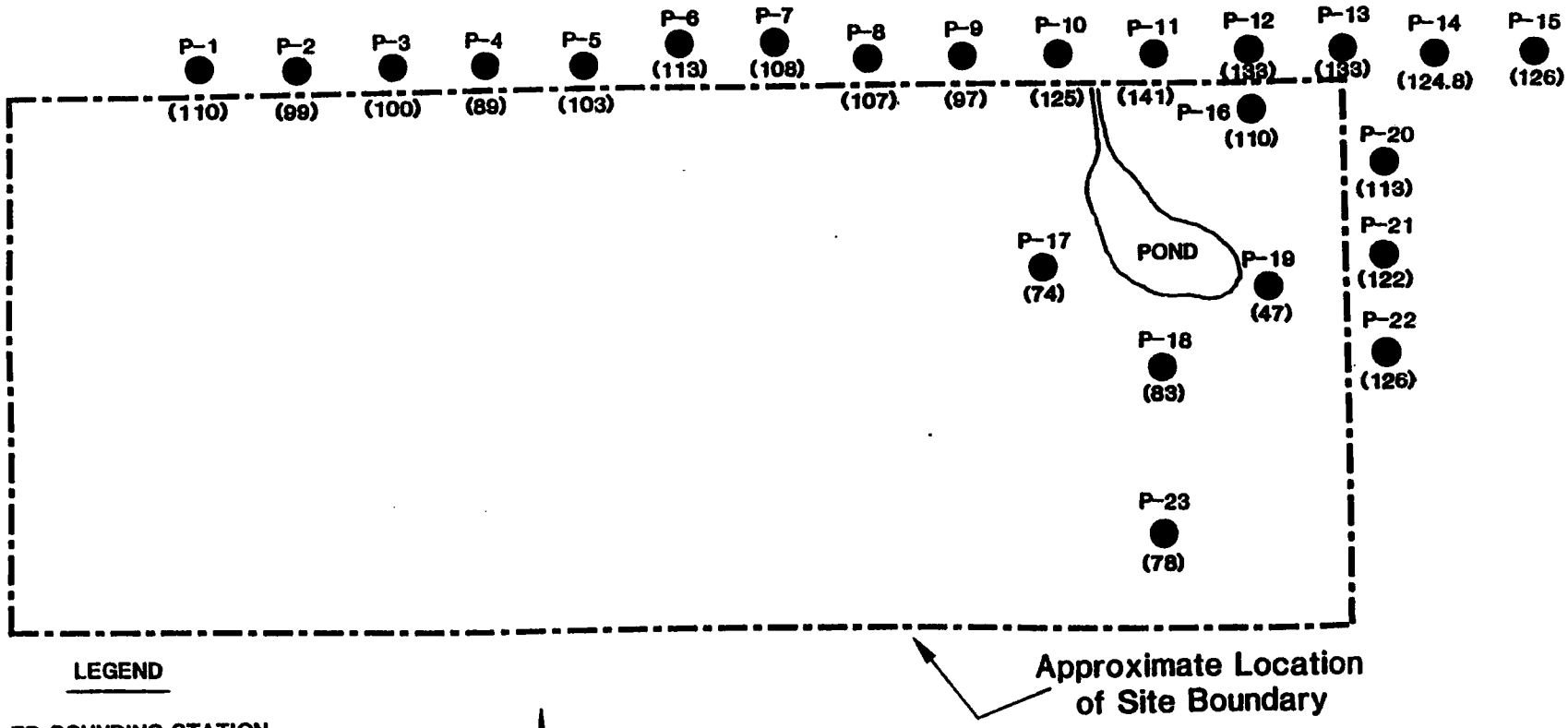
ES ENGINEERING-SCIENCE

FIGURE IV.8

NIAGARA SANITATION -NASH ROAD SITE

ER PROFILE MAP

(Electrode Spacing = 20 feet)



LEGEND

▲ ER SOUNDING STATION

● ER PROFILE STATION, VALUE IN OHM-FEET

SCALE 0 200 FEET

N

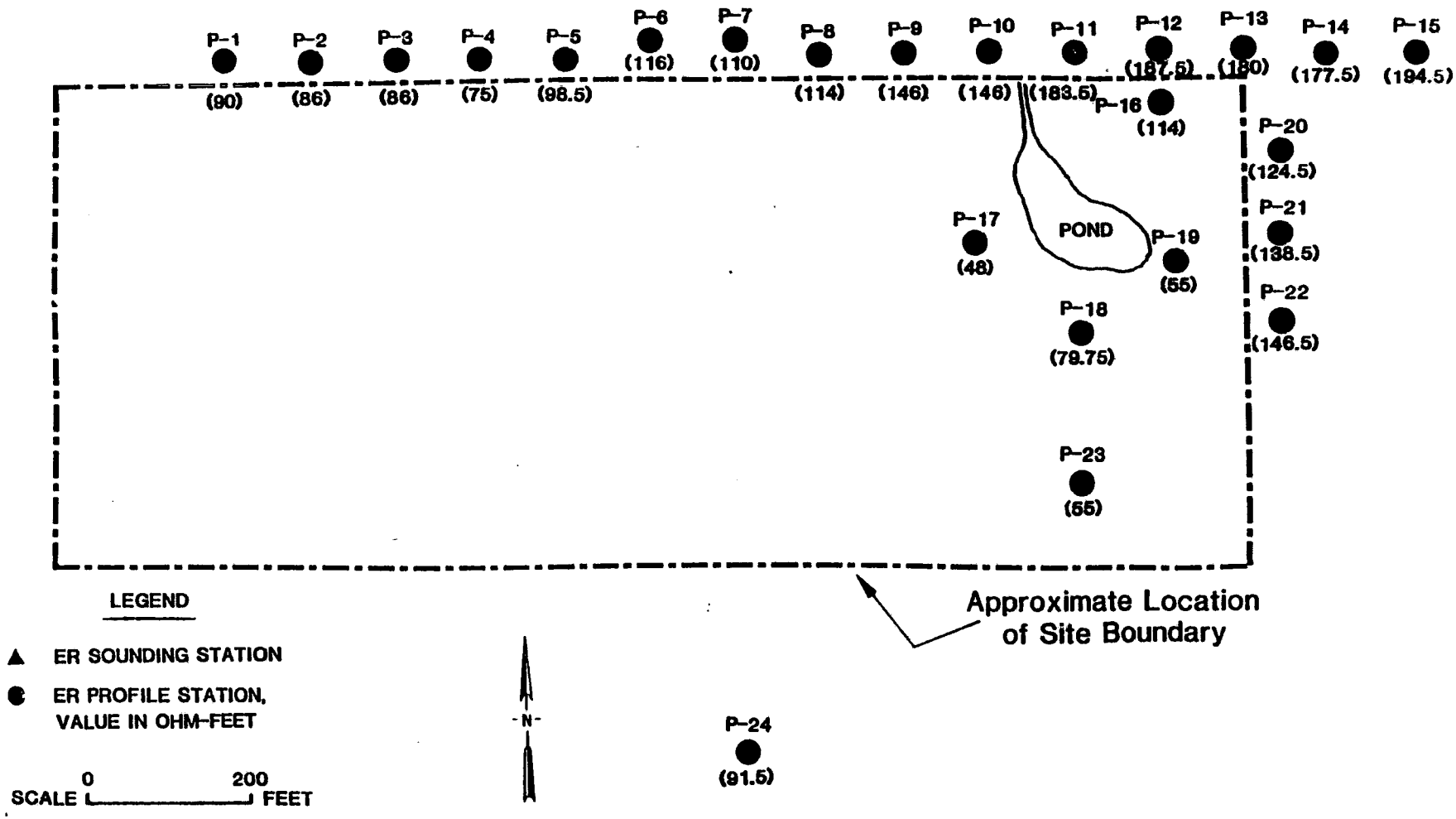
ES ENGINEERING-SCIENCE

FIGURE IV.9

NIAGARA SANITATION -NASH ROAD SITE

ER PROFILE MAP

(Electrode Spacing = 10 feet)

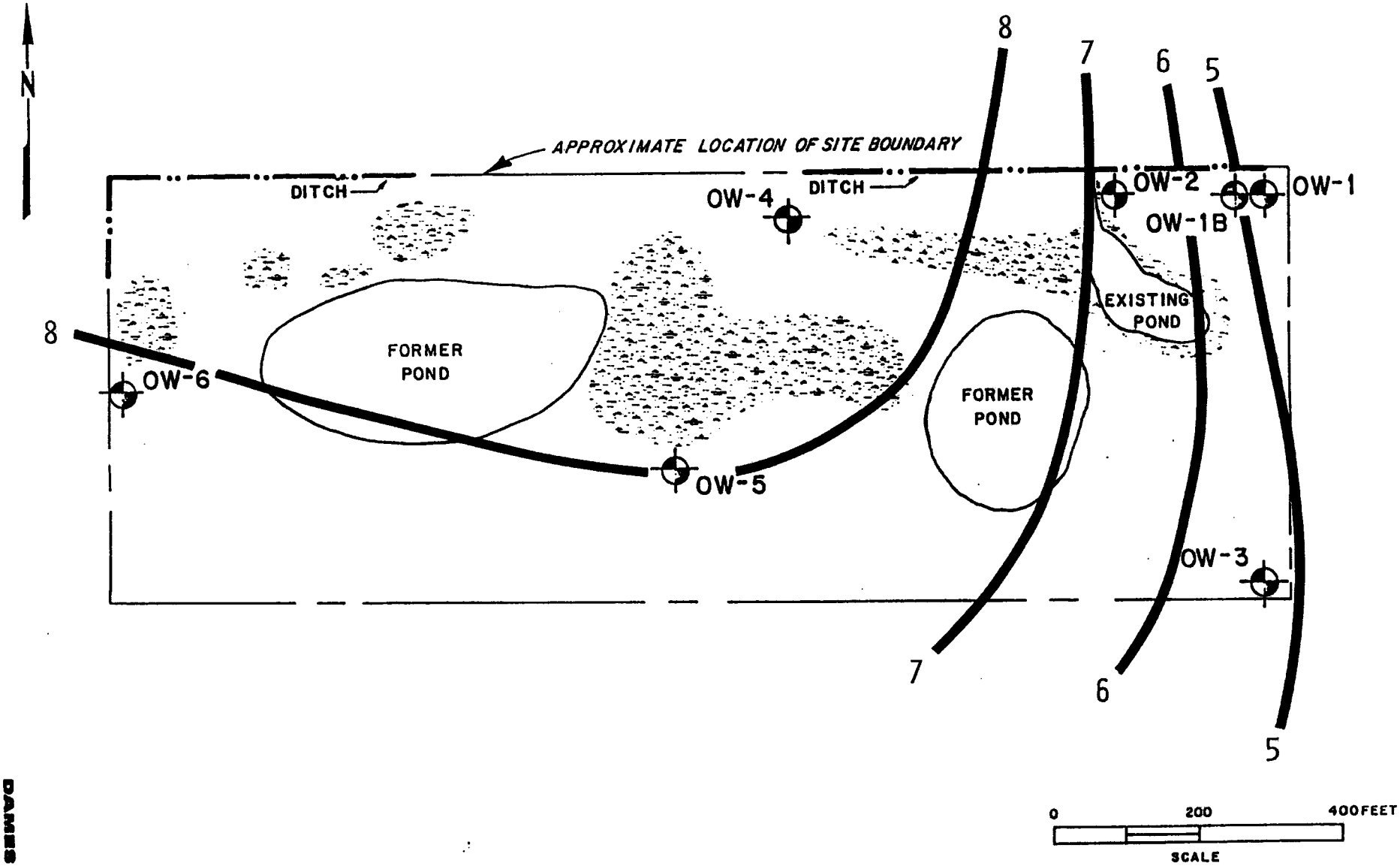


ES ENGINEERING-SCIENCE

FIGURE IV.10

FILE 1230S.003/17

BY D. Toma DATE 7/25/84



DEPTH TO TOP OF UPPER CLAY UNIT
NASH ROAD SITE

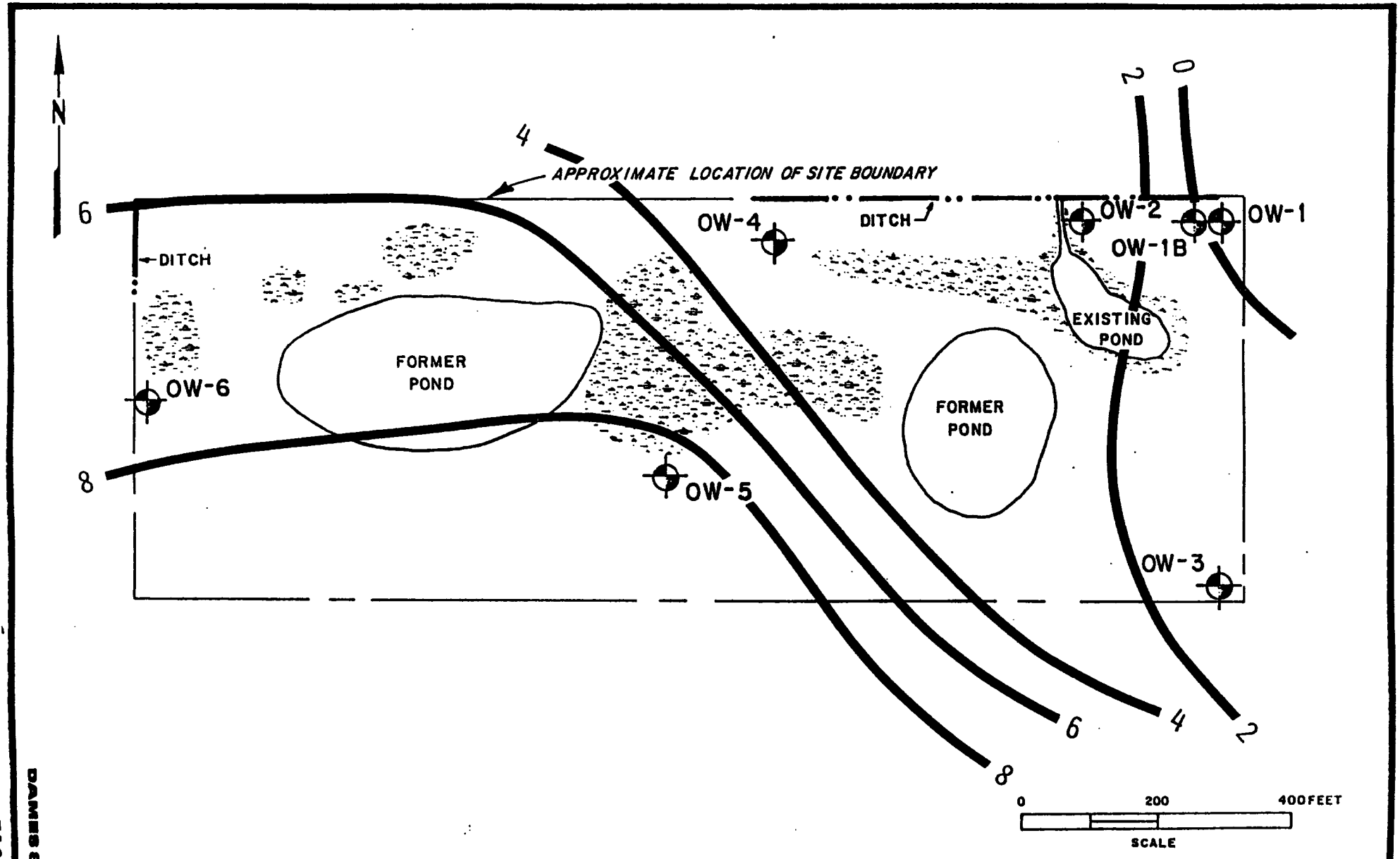
Note: Values in feet below arbitrary datum.

DAMES & MOORE

FIGURE IV.11

FILE 13303-001/17

BY Q. Jones DATE 7/25/84



Note: Values in feet

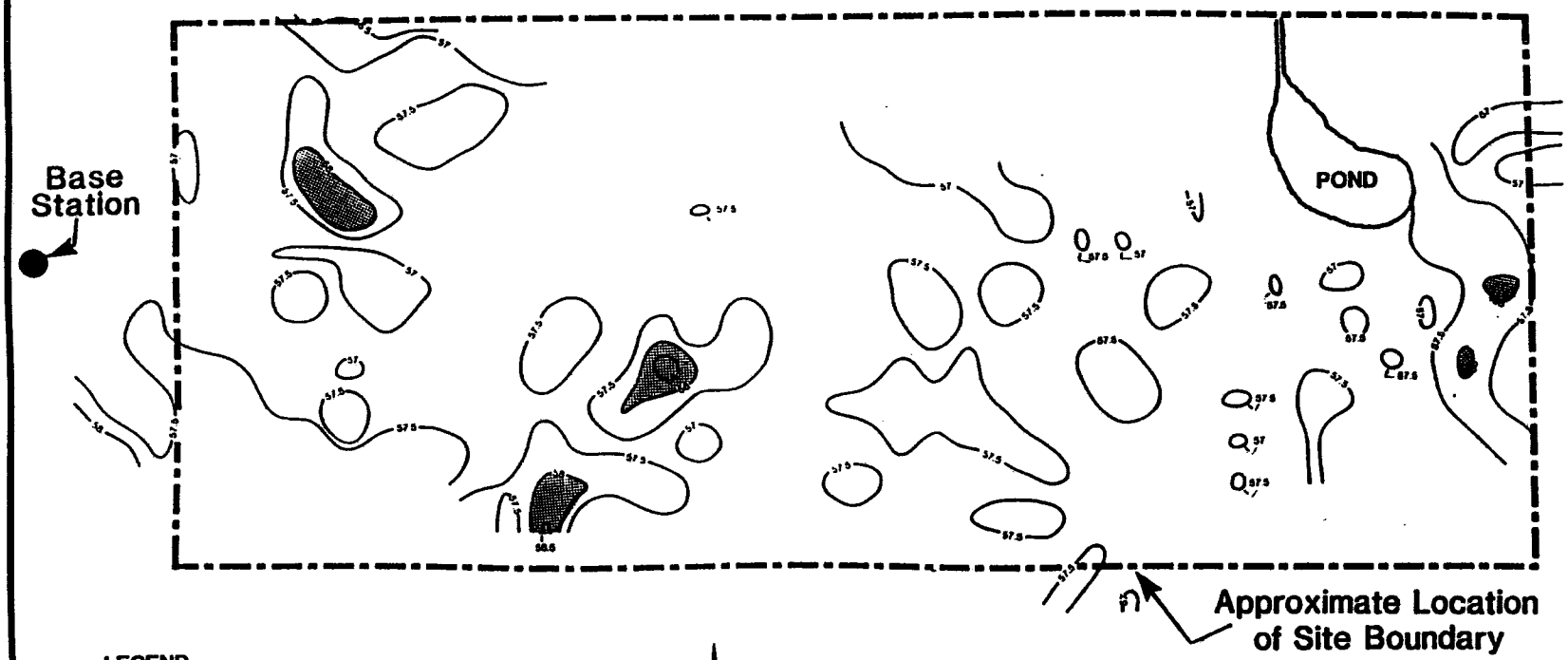
DAMES & MOORE

UPPER SAND ISOPACHS
NASH ROAD SITE

FIGURE IX.12

NIAGARA SANITATION - NASH ROAD SITE

MAGNETIC CONTOUR MAP



LEGEND

—57— MAGNETIC CONTOUR VALUE X 1000 GAMMAS

SCALE 0 200

NOTE: Shading indicates area of very high magenetic reading (>58,000 gammas)

ES ENGINEERING-SCIENCE

FIGURE IV.13

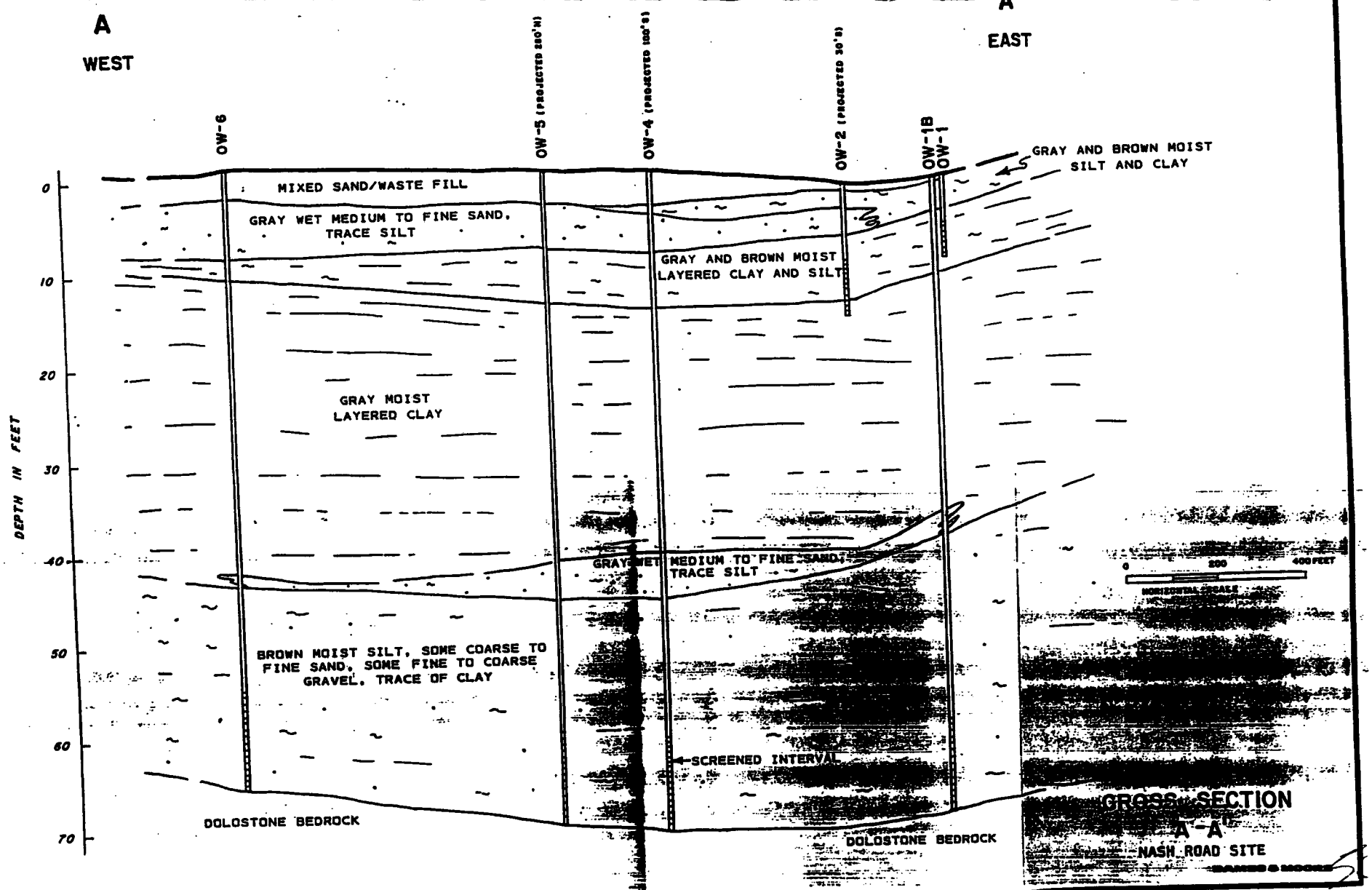
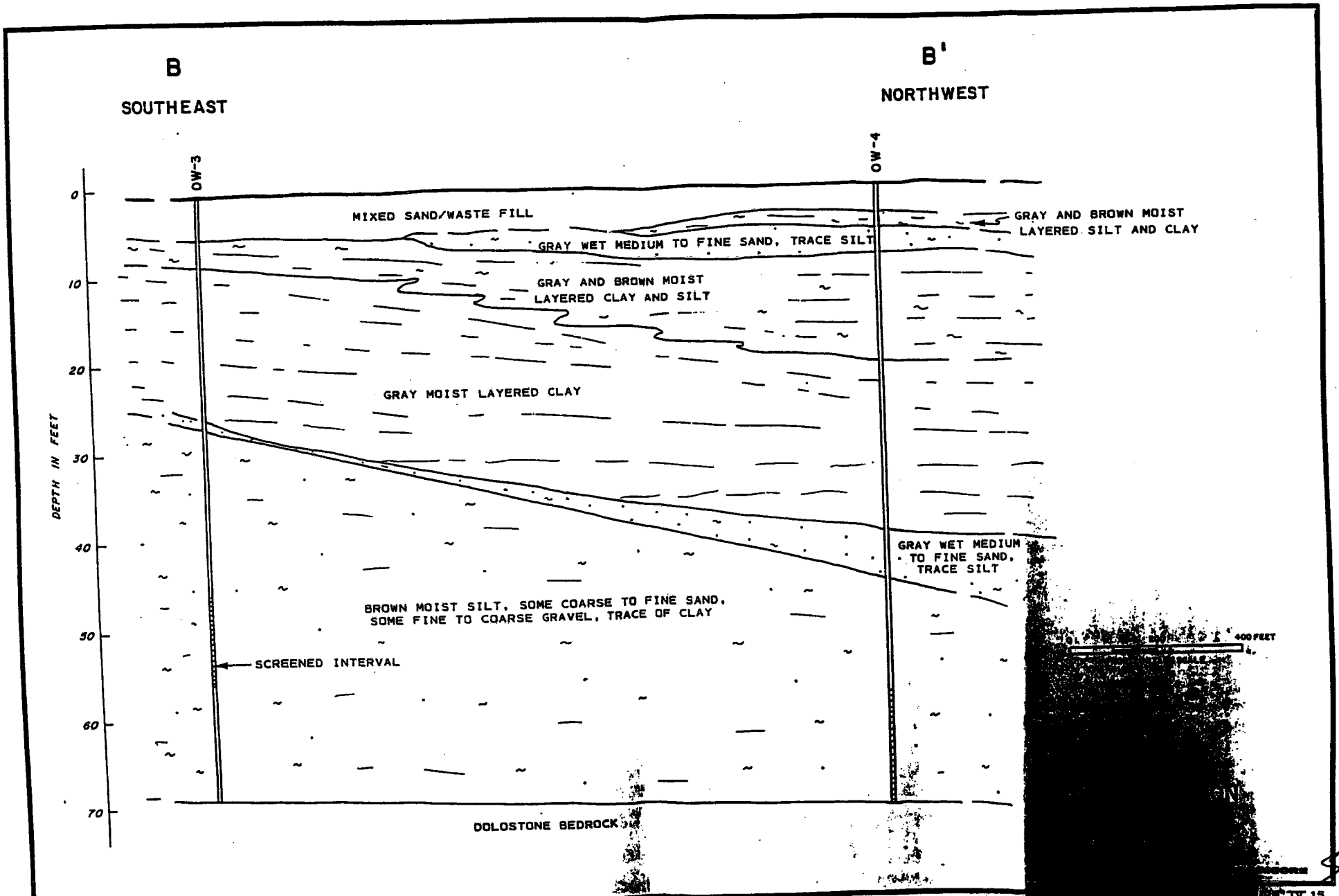
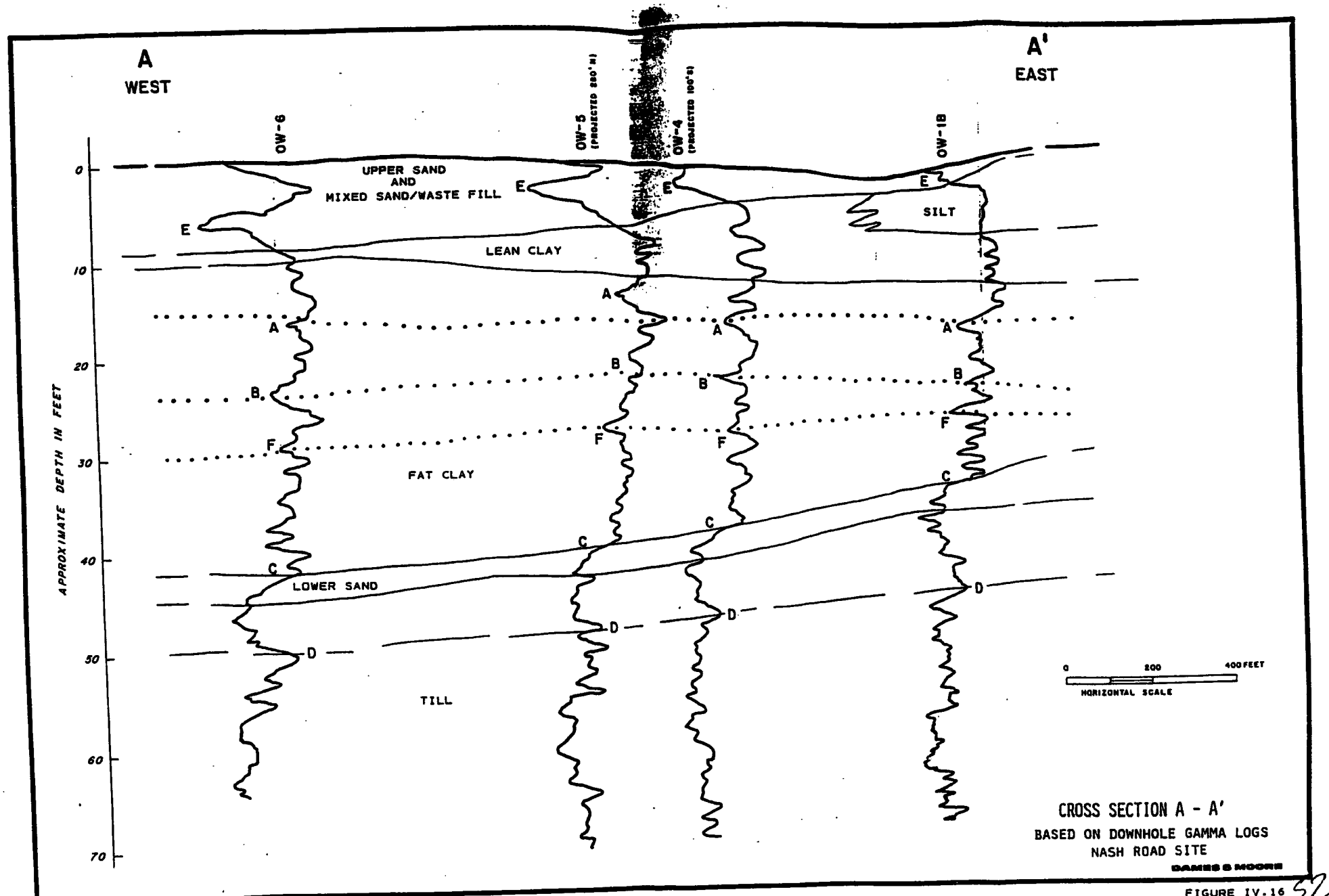


FIGURE IV.14

FILE 13205-803-17
BY D. Tomas DATE 8/6/84



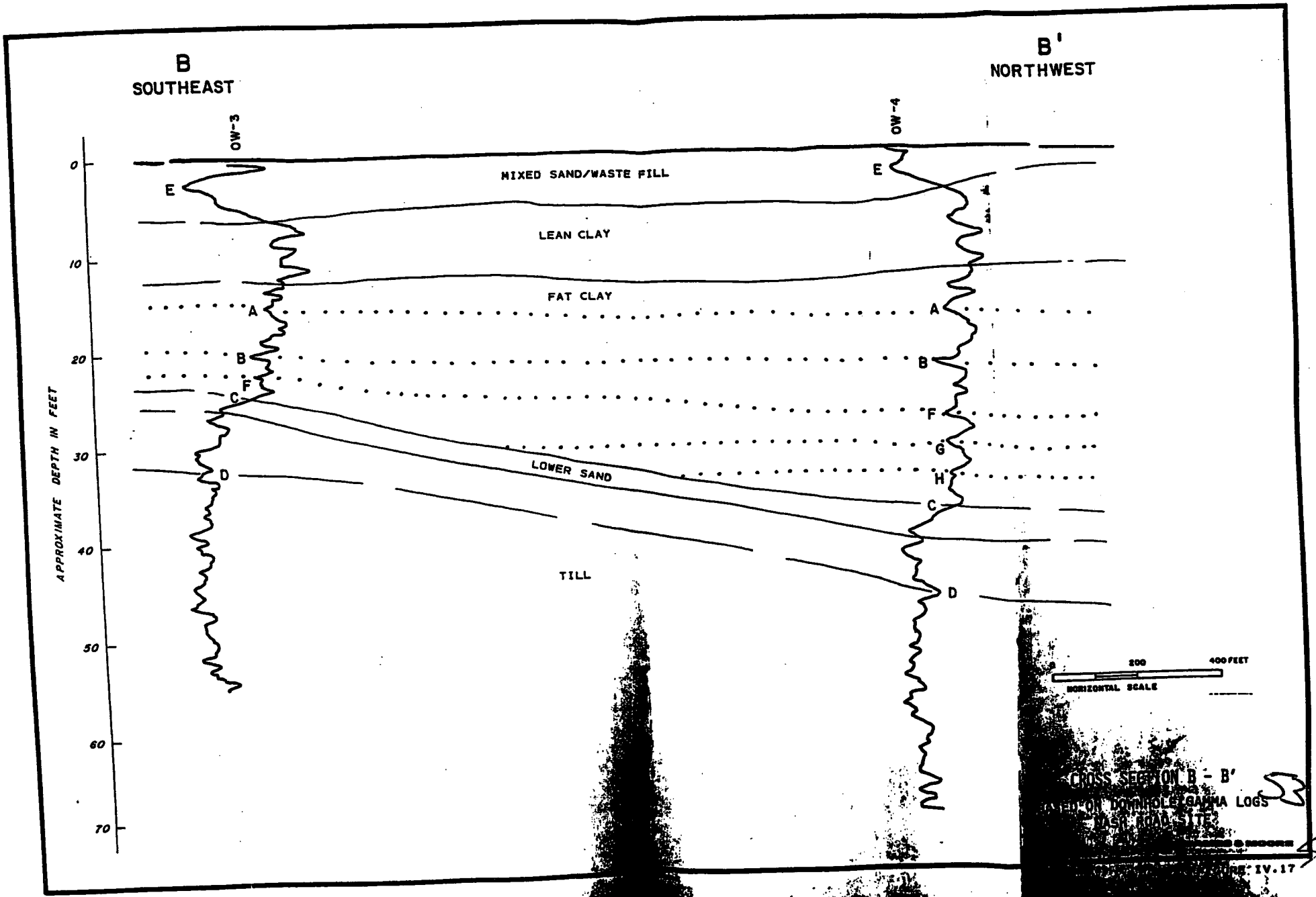
FILE 13305-005-19
BY D. Tomac DATE 8/6/84



CROSS SECTION A - A'
BASED ON DOWNHOLE GAMMA LOGS
NASH ROAD SITE

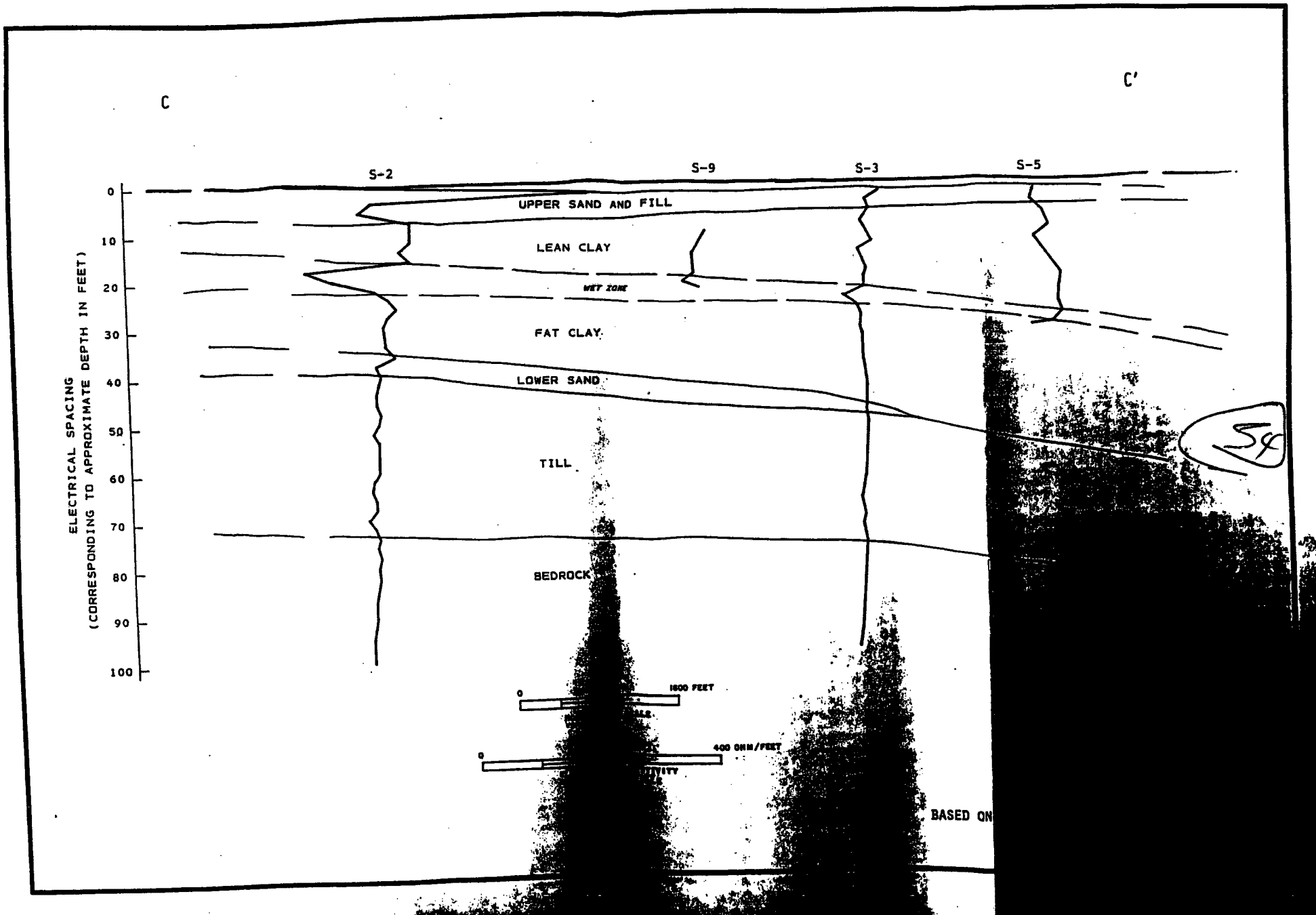
DAMES & MOORE

FIGURE IV.16



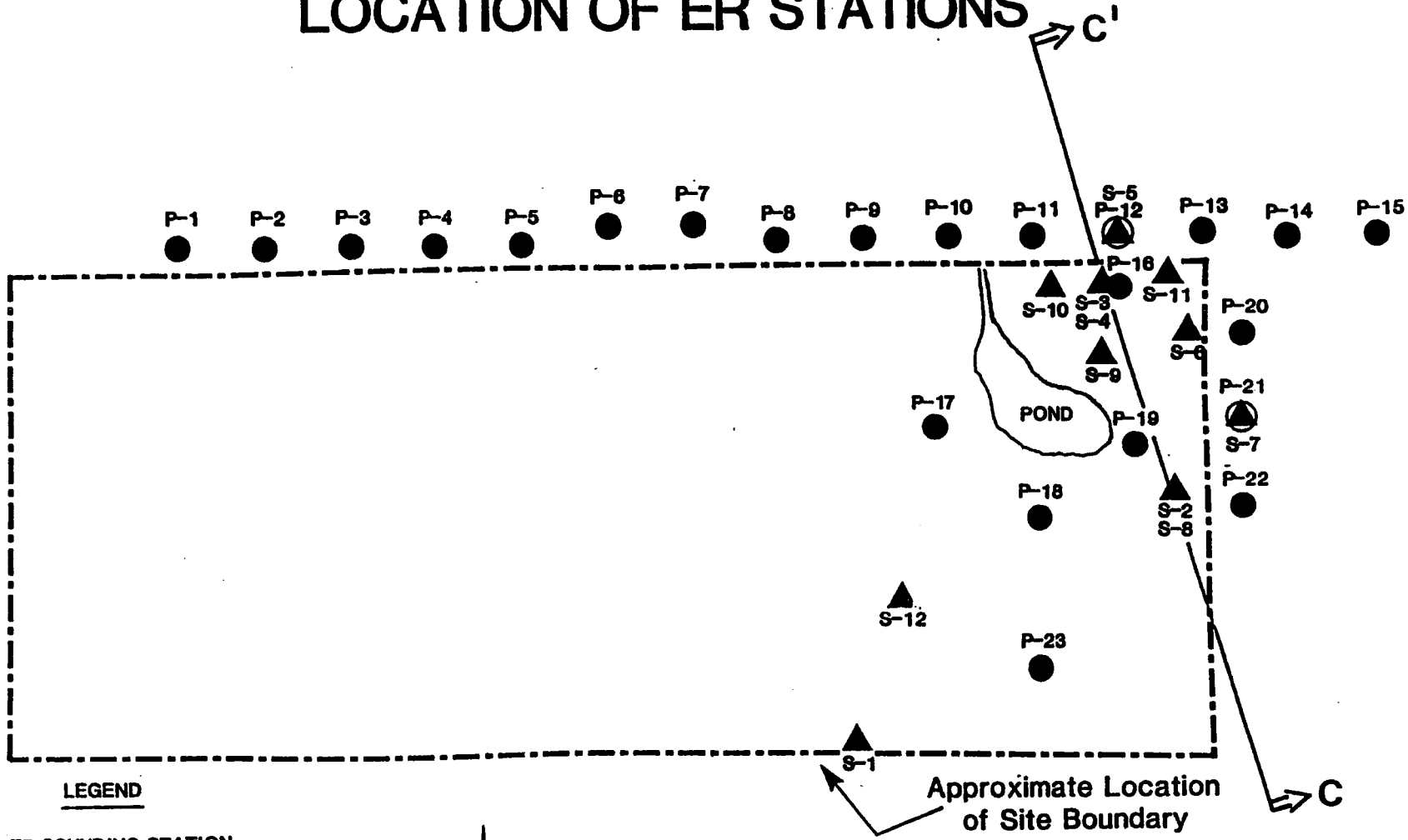
CROSS SECTION B - B'
BASED ON DOWNHOLE GAMMA LOGS
NASH ROAD SITE

FIGURE IV.17


C
C'
S-2
S-9
S-3
S-5
ELECTRICAL SPACING
(CORRESPONDING TO APPROXIMATE DEPTH IN FEET)
0
10
20
30
40
50
60
70
80
90
100
UPPER SAND AND FILL
LEAN CLAY
WET ZONE
FAT CLAY
LOWER SAND
TILL
BEDROCK
1600 FEET
400 OHM/FEET
BASED ON
54

NIAGARA SANITATION – NASH ROAD SITE

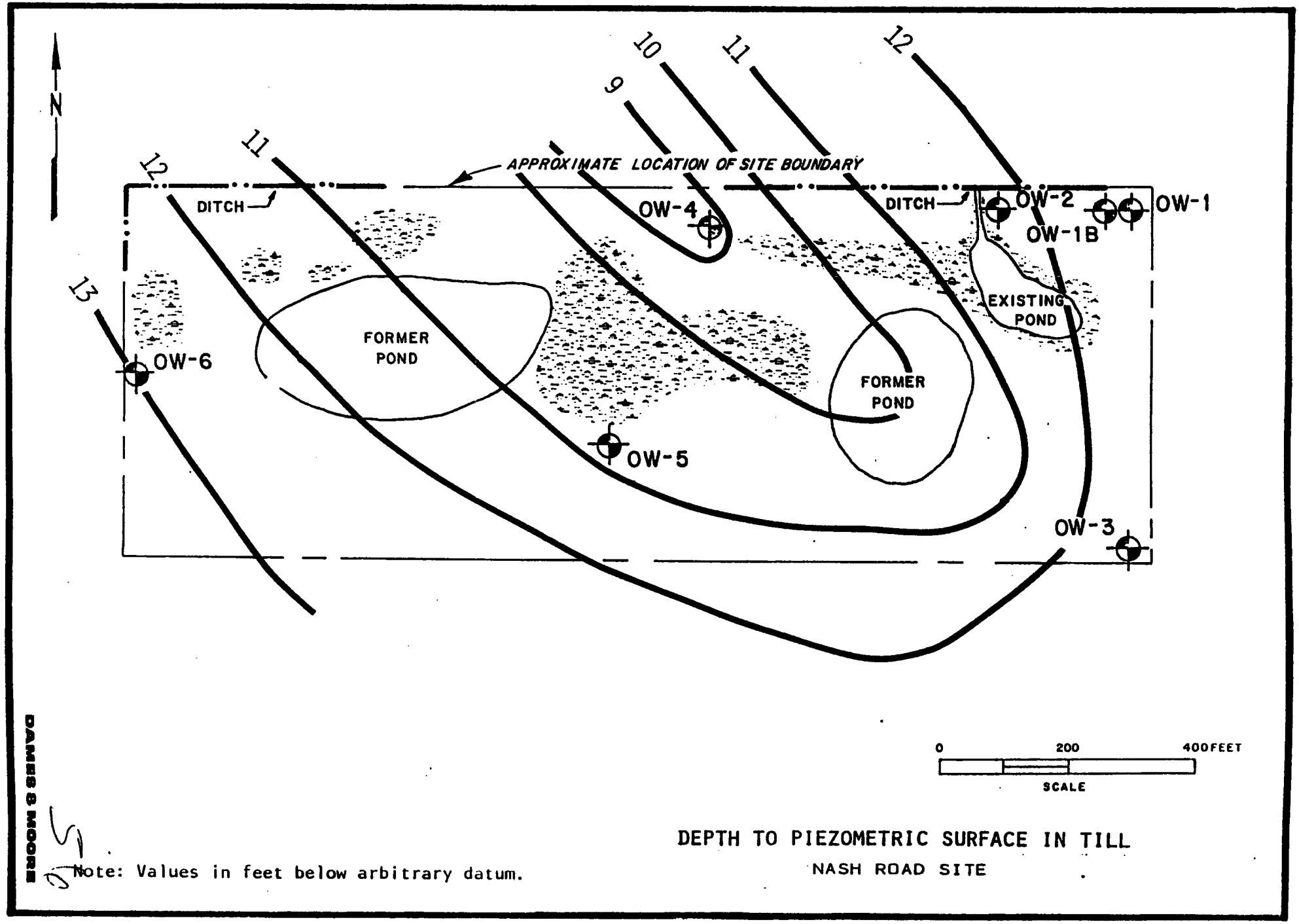
LOCATION OF ER STATIONS



ES ENGINEERING-SCIENCE

FIGURE IV.19

BY D. Donnan DATE 2/25/84



DAMES & MOORE

Note: Values in feet below arbitrary datum.

DEPTH TO PIEZOMETRIC SURFACE IN TILL

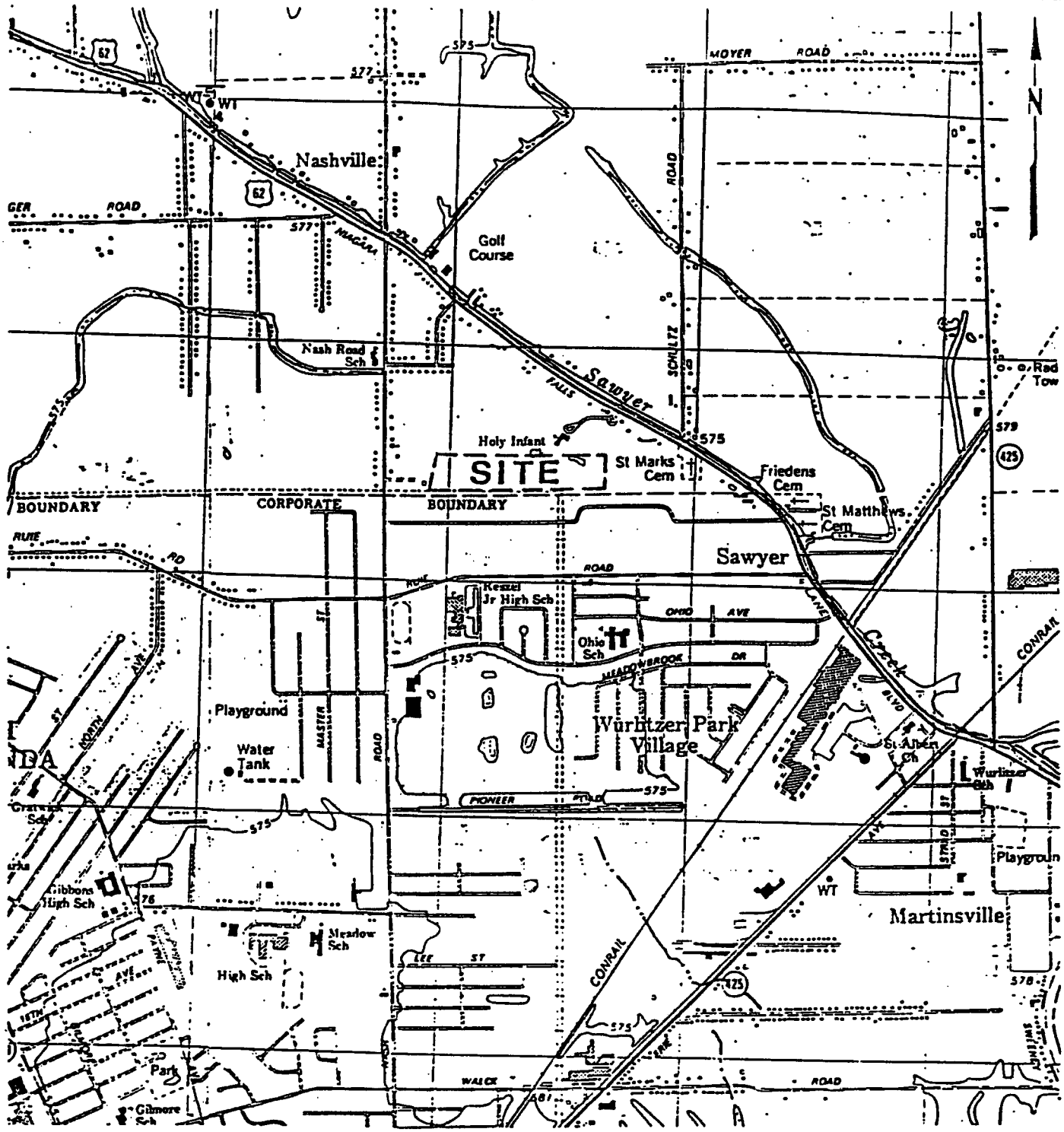
NASH ROAD SITE

FIGURE IV.20

FINAL HAZARD RANKING SYSTEM
for
Niagara Sanitation Landfill
Nash Road
Town of Wheatfield
Niagara County, New York State

The 25-acre site is an inactive landfill in the Town of Wheatfield, Niagara County (NYS) adjacent to the North Tonawanda City boundary. It is located in a suburban residential area, and is partly overgrown with trees and marsh vegetation. Nearby residents use the site as a jogging area, dirt bike track, and play area. The landfill was operated by Niagara Sanitation Company between 1964 and 1968. Both municipal and industrial wastes, including caustic materials and sludges, are disposed at the site. In addition, between 6/6/68 and 7/15/68, approximately 900 cubic yards of waste materials from the excavation of a sewer line at the Love Canal site were disposed in an excavated trench on this site (memo of 8/9/78 to Hennessy, NYSDOT).

Although some wastes are covered, protruding refuse is visible on the ground surface. For the Phase II study, several surface water, sediment and groundwater samples were chemically analyzed for a limited number of contaminants. Sediment was found to contain low levels of metals. No organic contaminants were found in the groundwater or surface water. A USGS (1982) investigation identified metal contamination in the shallow aquifer; current concern centers on the possible lack of containment of the waste and the migration of contaminants off-site. At the present time, no cleanup or enforcement actions are ongoing.



SCALE

0 1000 2000 3000 4000 FEET

SITE COORDINATES: 43°04' 10.0" N. LAT
78°51' 33.8" W. LONG

REFERENCE: U.S.G.S. 7.5' TOPOGRAPHIC MAP
TONAWANDA EAST, NY (1980) AND
TONAWANDA WEST, NY (1980) QUADRANGLES

SITE LOCATION MAP
NASH ROAD SITE

DAMES & MOORE

FIGURE V.ii.1

HRS COVER SHEET

Facility name: NASH ROAD LANDFILL

Location: TOWN OF WHEATFIELD

EPA Region: II

Person(s) in charge of the facility: Ed Greinert
Town Supervisor
Town of Wheatfield, N.Y.

Name of Reviewer: Eileen Gilligan Date: 11/8/84

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.)

Landfill used by Niagara Sanitation 1964-1968 for both municipal and industrial wastes. Waste materials from the excavation of a sewer at the Love Canal site disposed on the site in 1968. Improperly closed, rubbish visible. Phenols, lead, and organics found in soil and groundwater samples.

Scores: S_M = 5.37 (S_{gw} = 5.65 S_{sw} = 7.38 S_a = 0.0)

S_{FE} = 26.25

S_{DC} = 37.50

HRS COVER SHEET

Facility Name: Nash Road Landfill Date: 11/8/84

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	3	3	
Total Route Characteristics Score			11	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	6	8	
Total Waste Characteristics Score			24	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			4752	64,350	
7 Divide line 6 by 64,350 and multiply by 100			S_{sw} = 7.38		

SURFACE WATER ROUTE WORK SHEET

60

Facility Name: Nash Road Landfill Date: 11/8/84

Ground Water Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 45	1	45	45	3.1
If observed release is given a score of 45, proceed to line 4. ✓					
If observed release is given a score of 0, proceed to line 2.					
2 Route Characteristics					3.2
Depth to Aquifer of Concern	0 1 2 3	2		6	
Net Precipitation	0 1 2 3	1		3	
Permeability of the Unsaturated Zone	0 1 2 3	1		3	
Physical State	0 1 2 3	1		3	
Total Route Characteristics Score				15	
3 Containment	0 1 2 3	1		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	6	8	
Total Waste Characteristics Score			24	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			3240	57,330	
7 Divide line 6 by 57,330 and multiply by 100			S_{gw} = 5.65		

GROUND WATER ROUTE WORK SHEET

61

Facility Name: Nash Road Landfill Date: 8/13/84

Air Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Release	(0) 45	1	0	45	5.1
Date and Location: July 1984 Air Quality Survey					
Sampling Protocol: HNU survey					
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	0 1 2 3 4 5 6 7 8	1		8	
	Total Waste Characteristics Score			20	
3 Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 21 24 27 30	1		30	
Distance to Sensitive Environment	0 1 2 3	2		6	
Land Use	0 1 2 3	1		3	
	Total Targets Score			39	
4 Multiply 1 x 2 x 3				35,100	
5 Divide line 4 by 35,100 and multiply by 100			S_a = 0		

AIR ROUTE WORK SHEET

acility Name: Nash Road Landfill Date: 8/13/84

Direct Contact Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Incident	(0) 45	1	0	45	8.1
If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2 ✓					
2 Accessibility	0 1 2 (3)	1	3	3	8.2
3 Containment	0 (15)	1	15		8.3
4 Waste Characteristics Toxicity	0 1 2 (3)	5	15	15	8.4
5 Targets					8.5
Population Within 1-Mile Radius	0 1 2 (3) 4 5	4	12	20	
Distance to a Critical Habitat	(0) 1 2 3	4	0	12	
Total Targets Score			12	32	
6 If line 1 is 45, multiply 1 × 4 × 5 If line 1 is 0, multiply 2 × 3 × 4 × 5			8100	21,600	
7 Divide line 6 by 21,600 and multiply by 100			S_{DC} = 37.50		

DIRECT CONTACT WORK SHEET

Facility Name: Nash Road Landfill Date: 8/13/84

Fire and Explosion Work Sheet

Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Containment	1 (3)	1	3	3	7.1
2 Waste Characteristics					7.2
Direct Evidence	(0) 3	1	0	3	
Ignitability	0 1 2 (3)	1	3	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	6	8	
Total Waste Characteristics Score			9	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	1	3	
Distance to Sensitive Environment	(0) 1 2 3	1	0	3	
Land Use	0 1 (2) 3	1	2	3	
Population Within 2-Mile Radius	0 1 2 3 (4) 5	1	4	5	
Buildings Within 2-Mile Radius	0 1 2 3 (4) 5	1	4	5	
Total Targets Score			14	24	
4 Multiply 1 x 2 x 3			378	1,440	
5 Divide line 4 by 1,440 and multiply by 100			S_{FE} =	26.25	

FIRE AND EXPLOSION WORK SHEET

Facility Name: Nash Road Landfill Date: 11/8/84

Worksheet for Computing S_M

	S	S^2
Groundwater Route Score (S_{gw})	5.65	31.92
Surface Water Route Score (S_{sw})	7.38	54.53
Air Route Score (S_a)	0.0	0.0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		86.45
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		9.30
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		5.37

WORK SHEET FOR COMPUTING S_M

HRS DOCUMENTATION RECORDS

1) HAZARD RANKING SYSTEM
2) HNU PHOTO-IONIZER READING
3) OSTERMAN WELL
4) TRIP BLANKS
5) SEDIMENT DATA
6) GROUNDWATER DATA
7) SURFACE WATER DATA
8) BORING LOGS
9) SAMPLING LOCATION MAP
10) PERMEABILITY TEST DATA
11) BACKGROUND INFORMATION

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1) HAZARD RANKING SYSTEM

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: Nash Road Landfill

LOCATION: Nash Road, Town of Wheatfield, Niagara Co., New York

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GROUND WATER ROUTE

1. OBSERVED RELEASE

Contaminants detected (5 maximum):

lead	total halogenated organics
nickel	arsenic
phenol	

Rationale for attributing the contaminants to the facility:

groundwater sample from USGS study (1982)

* * *

2. ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifer(s) in concern:

1) shallow aquifer in upper (surface)sand unit
2) low aquifer at till/bedrock interface
(Engineering Science/Dames & Moore soil borings)

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

1) approximately 0 feet
2) approximately 8 feet
(ES/D&M soil borings and field investigations)

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

27 feet in disposal trench

(New York State Department of Transportation memorandum of August 9, 1978)

(Niagara County Department of Health memorandum from M. Hopkins, January 27, 1984)

67

Net Precipitation

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

40"

(Federal Register, Volume 47 no. 137, Friday, July 16, 1982)

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

27"

(Federal Register, Volume 47 no. 137, Friday, July 16, 1982)

Net precipitation (subtract the above figures):

40" - 27" = 13"

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

In western part of site, surface soil is a fine to medium sand. In eastern part of site, surface soil is clayey silt with trace of fine sand.

Permeability associated with soil type:

1) western part: 10^{-3} cm/sec (Lambe & Whitman)

2) eastern part: 5×10^{-4} cm/sec (in-situ test)

Physical State

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

solids
liquids in drums

(Dames & Moore site visit)
(Memo of August 9, 1978)

* * *

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3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

drums and uncontained wastes

Method with highest score:

drums

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

phenol
lead
nickel
arsenic (USGS study of 1982)
chlorotoluenes
benzoyl chloride
benzoic acid
(Hooker letter of May 9, 1968)

Compound with highest score:

lead
(3,3) → 18

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):

900 cubic yards of chemical waste from Love Canal plus unknown quantity of other industrial waste

Basis of estimating and/or computing waste quantity:

DOT memo of August 9, 1978

* * *

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5 TARGETS

Ground Water Use

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

Available for industrial use

(Discussion with M. Hopkins, Niagara Co. Dept. of Health, 1983)

Distance to Nearest Well

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

Osterman residential well at 7403 Nash Road (presently unused but useable)

Distance to above well or building:

1,000 feet west of site

(USGS Topographic map; Tonawanda East, NY quadrangle)

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:

None.

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):

Not applicable.

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):

TOX
methylene chloride
(Very low levels (11 ppb) may be indicative of background levels)

Rationale for attributing the contaminants to the facility:

Analysis of surface water samples in June, 1983 by Engineering Science/ Dames & Moore

* * *

2 ROUTE CHARACTERISTICS

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

Average slope of facility in percent:

0%
(USGS topographic map; Tonawanda East, NY)

Name/description of nearest downslope surface water:

Sawyer Creek
(USGS topographic mapl Tonawanda East, NY)

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

<1%
(USGS topographic map; Tonawanda East, NY)

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

Yes. Wastes in swamp areas and in water-filled disposal trenches.

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Is the facility completely surrounded by areas of higher elevation?

No.
(USGS topographic map; Tonawanda East, NY)

1-Year 24-Hour Rainfall in Inches

2.1"
(Federal Register vol. 47, no. 137, Friday, July 16, 1982)

Distance to Nearest Downslope Surface Water

0.25 miles
(USGS topographic map; Tonawanda East, NY)

Physical State of Wastes

liquid and solid
(Dames & Moore site visit memo of 8/9/78)

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

drums and uncontained
(NYSDEC memo of August 9, 1978)

Method with the highest score:

drums

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

phenol
lead
iron
nickel
(USGS study - 1982)

chlorotoluenes
benzoyl chloride
benzoic acid
(Hooker letter of May 9, 1968)

Compound with the highest score:

lead
(3,3) → 18

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):

900 cubic yards of chemical waste from Love Canal and unknown quantity of other industrial waste

Basis of estimating and/or computing waste quantity:

NYSDOT memo of August 9, 1978

* * *

5 TARGETS

Surface Water Use

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

recreation
transportation
(numerous ES/D&M site visits)

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Is there tidal influence?

No.

Distance to a Sensitive Environment (Ref: USGS topographic map)

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

none within 2 miles.

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

None within 1 mile.

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

None within 1 mile.
(Conversation with G. Batcheller, NYSDEC, Region 9)

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:

None.
(USGS topographic map; Tonawanda East, NY)

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AIR ROUTE

1 OBSERVED RELEASE

Contaminants detected:

None detected with HNU meter during air survey of site by Dames & Moore in July, 1984.

Date and location of detection of contaminants

Not applicable.

Methods used to detect the contaminants:

Not applicable.

Rationale for attributing the contaminants to the site:

Not applicable.

* * *

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

Not applicable.

Most incompatible pair of compounds:

Not applicable.

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Toxicity

Most toxic compound:

Not applicable.

Hazardous Waste Quantity

Total quantity of hazardous waste:

Not applicable.

Basis of estimating and/or computing waste quantity:

Not applicable.

* * *

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

Approximately 1,800 people
(estimate from USGS topographic map)

Distance to a Sensitive Environment

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

None within 2 miles.
(USGS topographic map)

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

None within 1 mile.
(USGS topographic map)

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

None within 1 mile.
(Conversation with G. Batcheller of NYSDEC, Region 9)

Land Use (Ref: Numberous site visits by ES/D&M personnel)

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

0.01 mile (adjacent to National Fuel Gas installation)

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

None within 2 miles.

Distance to residential area, if 2 miles or less:

0.01 mile (adjacent to suburban area)

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

0.01 mile (adjacent to corn field)

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

None within 2 miles.

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

No.

2) HNU PHOTO-IONIZER READING

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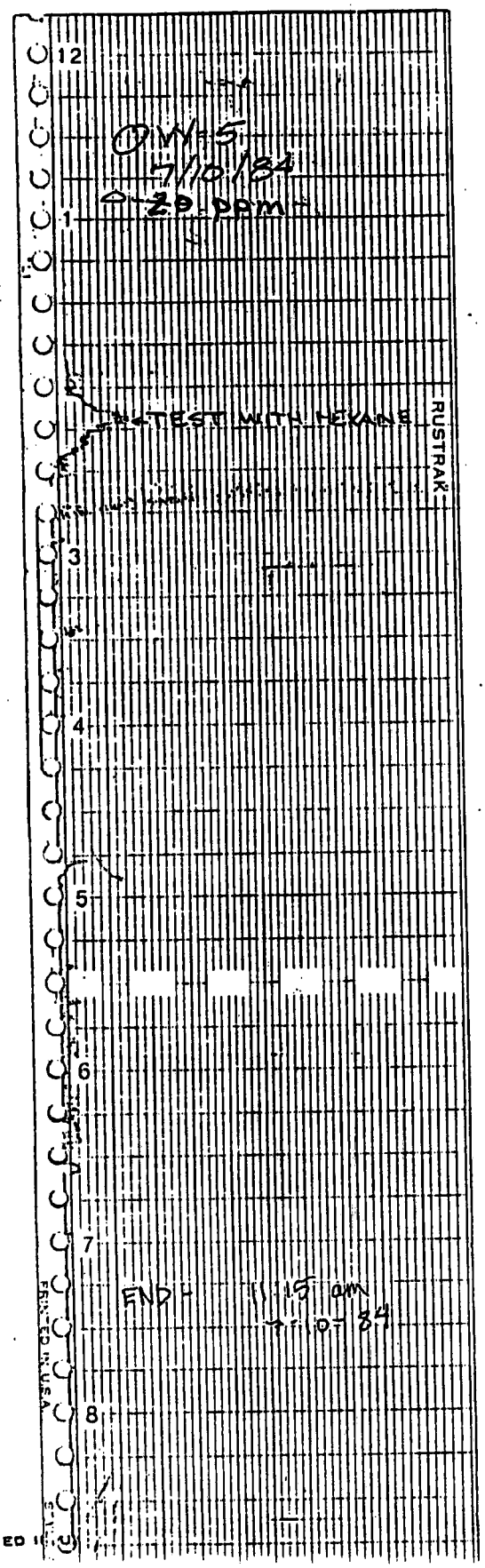
FILE 13305-003-19

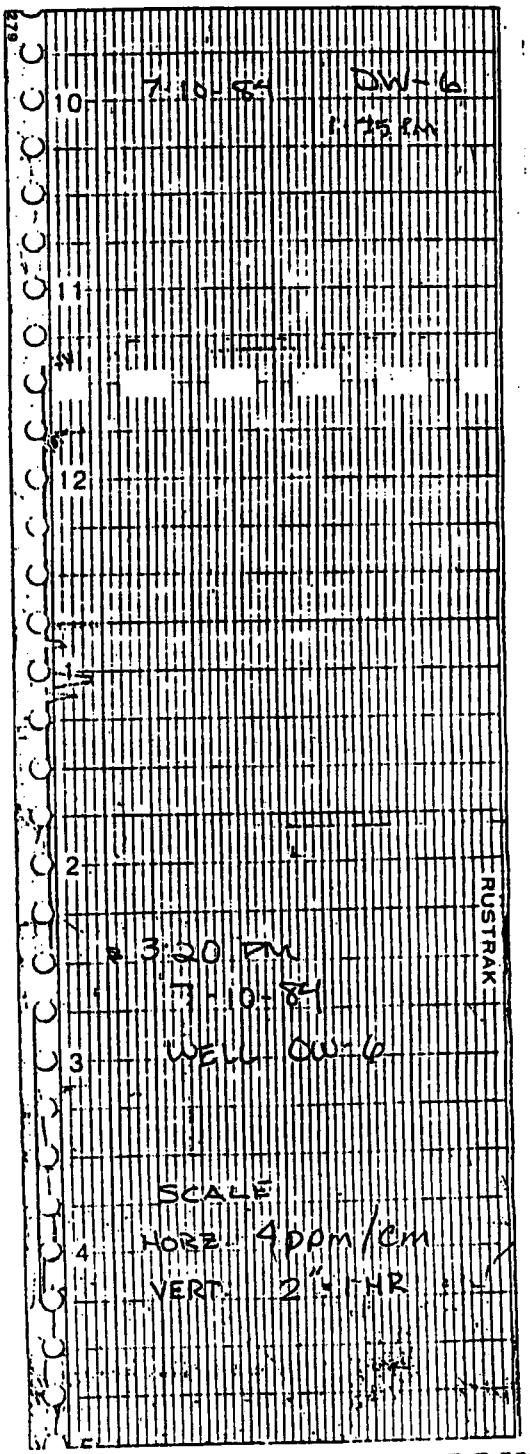
SUBJECT

HNU PHOTO-IONIZER READING SHEET 1 OF 1

7/10/84

SCALE HORZ 4 ppm/cm
VERT 2" = 1 HR





DAMES & MOORE

BY ____ DATE ____ TO EO ____
BY ____ DATE ____ TO EO ____
BY ____ DAT ____
CHECKED BY ____
COPY TO EO ____

PRINTED IN U.S.A.

3) OSTERMAN WELL

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SEP 07 1984

COMPUCHEM LABORATORIES

August 30, 1984

Mr. Ernie Schroder
Engineering Science, Inc.
57 Executive Park South
Suite 590
Atlanta, GA 30329

Dear Mr. Schroder:

Thank you for selecting CompuChem® Laboratories for your recent sample analysis. We have completed the analysis that you requested and have enclosed a summary of the CompuChem® data for your review. Additional data details are available for purchase if you require them.

As you know, EPA has proposed detection limits for the priority pollutants in the December 3, 1979, Federal Register, and we have reported all priority pollutant concentrations which have exceeded these limits (or their equivalent for solid matrices). In addition, we have permanently stored a complete record of your data on magnetic tape. This includes chromatograms, mass spectra, calibration and quality control data for the organics. Therefore, your original data is readily available for future reference. Should you require additional information from your data base, please contact us at 1/800-334-8525.

In order to expedite data to you, we have forwarded the results for all completed analyses. If you submitted more samples than are included in the enclosed results, the data will be forthcoming upon completion of our final review.

Your confidence in our CompuChem® service is appreciated. We look forward to a continuing association.

Sincerely,

Customer Service Dept.
CompuChem®

Enclosure:

Report: OST-1 - 32303

DATA REPORT NOTICE

CompuChem employs Methods 624 and 625 for GC/MS analysis of organics in liquid matrices. These methods were proposed on December 3, 1979 by the U.S.E.P.A. in Volume 44 of the Federal Register. These methods were subsequently revised and reissued in July, 1982 as publication EPA-600/4-82-057. The EPA Environmental Monitoring and Support Laboratory (EMSL-Cincinnati) has subsequently issued method modifications which provide for the analysis of solid matrices. These modifications specify changes in the sample preparation procedures.

Additionally, for solid samples detection limits and any analytical results reported are based on processing the method specified sample size of as-received material.

The referenced methods are no longer appropriate for several of the original priority pollutant compounds. This is due to either the deletion from the toxic pollutant list (40 CFR Part 401) by EPA or the determination by EPA that the referenced methods may not be optimized for certain compounds (EPA-600/4-82-057) originally incorporated by the methods.

CompuChem® presents these compounds in its sample data report for completeness as many of the government compound list forms continue to display the affected compounds. For consistency, these compounds are reported as "BDL" or "Below Detection Limit" as they are either not likely to exist in the sample or are not likely to be detected by the method. Those compounds which have actually been deleted are listed below with the Federal Register deletion reference.

Compound Name	GC/MS Fraction	Federal Register	Date
Dichlorodifluoromethane	Volatile	46FR2264	1/8/81
*Trichlorofluoromethane	Volatile	46FR2264	1/8/81
Bis(Chloromethyl)Ether	Volatile	46FR10723	2/4/81

*While this compound has been deleted, CompuChem® continues to identify and quantitate for it.

COMPUCHEM LABORATORIES

REPORT OF DATA

SAMPLE IDENTIFIER: OST-1

COMPUCHEM SAMPLE NUMBER: 32303

SUBMITTED TO:

Mr. Ernie Schroder
Engineering Science, Inc.
57 Executive Park South
Suite 590
Atlanta, GA 30329

Diana A. Scammell

DIANA A. SCAMMELL
TECHNICAL SPECIALIST, OPERATIONS

R. L. MYERS, PH.D., PRESIDENT

ROBERT E. MEIERER
DIRECTOR OF QUALITY ASSURANCE

LABORATORY CHRONICLE

SAMPLE IDENTIFIER: OST-1
COMPUCHEM SAMPLE NUMBER: 32303

	Date
Received/Refrigerated	7-27-84
Organics	
Extracted	7-30-84
Analyzed	
1. Volatiles	7-31-84
2. Acid	8-8-84
3. Base/Neutrals	8-7-84
4. Pesticides/PCBS	8-7-84
Inorganics	
1. Metals	8-14-84
2. Cyanide	8-9-84
3. Phenols	Not Requested

COMPOUND LIST - VOLATILES ORGANICS

SAMPLE IDENTIFIER: OST-1
COMPUCHEM SAMPLE NUMBER: 32303

		CONCENTRATION (UG/L)	DETECTION† LIMIT (UG/L)
1V.	CHLOROMETHANE	BDL	10
2V.	VINYL CHLORIDE	BDL	10
3V.	CHLOROETHANE	BDL	10
4V.	BROMOMETHANE	BDL	10
5V.	ACROLEIN	BDL	100
6V.	ACRYLONITRILE	BDL	100
7V.	METHYLENE CHLORIDE	14(BG)*	10
8V.	TRICHLOROFLUOROMETHANE	BDL	10
9V.	1,1-DICHLOROETHYLENE	BDL	10
10V.	1,1-DICHLOROETHANE	BDL	10
11V.	TRANS-1,2-DICHLOROETHYLENE	BDL	10
12V.	CHLOROFORM	BDL	10
13V.	1,2-DICHLOROETHANE	BDL	10
14V.	1,1,1-TRICHLOROETHANE	BDL	10
15V.	CARBON TETRACHLORIDE	BDL	10
16V.	BROMODICHLOROMETHANE	BDL	10
17V.	1,2-DICHLOROPROPANE	BDL	10
18V.	TRANS-1,3-DICHLOROPROPENE	BDL	10
19V.	TRICHLOROETHYLENE	BDL	10
20V.	BENZENE	BDL	10
21V.	CIS-1,3-DICHLOROPROPENE	BDL	10
22V.	1,1,2-TRICHLOROETHANE	BDL	10
23V.	DIBROMOCHLOROMETHANE	BDL	10
24V.	BROMOFORM	BDL	10
25V.	1,1,2,2-TETRACHLOROETHYLENE	BDL	10
26V.	1,1,2,2-TETRACHLOROETHANE	BDL	10
27V.	TOLUENE	BDL	10
28V.	CHLOROBENZENE	BDL	10
29V.	ETHYLBENZENE	BDL	10
30V.	2-CHLOROETHYL VINYL ETHER	BDL	10
31V.	DICHLORODIFLUOROMETHANE†	BDL	
32V.	BIS(CHLOROMETHYL)ETHER†	BDL	

BDL=BELOW DETECTION LIMIT

†See Data Report Notice

*See Quality Control Notice

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QUALITY ASSURANCE NOTICE

CompuChem Sample No. 32303

Although not required by the Federal Register, December 3, 1979 (modified July, 1982) Volatile Method 624 procedure, the laboratory prepares VOA blanks when compositing water samples and preparing low and medium level hazardous waste VOA samples. This is to insure that the glassware used is free from contamination, and to monitor the possibility of cross-contamination from high levels of volatile organic compounds in some samples and the laboratory atmosphere.

The compositing or method blank (# 32333) prepared with this sample contained the compound(s) listed below. The concentration in the associated sample has been adjusted and the data flagged with a qualifier.

Compound(s)	Adjusted Sample Concentration (ug/l)	Applicable Qualifier
Methylene Chloride	14	BG

The following data qualifiers are used by EPA and adopted by CompuChem® for reporting purposes:

BG = The concentration in the blank is greater than 1/2 of the method detection limit and is less than or equal to 1/2 the concentration detected in a sample; the concentration in the blank is subtracted from the sample.

COMPOUND LIST -- ACID EXTRACTABLE ORGANICS

SAMPLE IDENTIFIER: OST-1
COMPUCHEM SAMPLE NUMBER: 32303

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1A.	PHENOL	BDL	25
2A.	2-CHLOROPHENOL	BDL	25
3A.	2-NITROPHENOL	BDL	25
4A.	2,4-DIMETHYLPHENOL	BDL	25
5A.	2,4-DICHLOROPHENOL	BDL	25
6A.	P-CHLORO-M-CRESOL	BDL	25
7A.	2,4,6-TRICHLOROPHENOL	BDL	25
8A.	2,4-DINITROPHENOL	BDL	250
9A.	4-NITROPHENOL	BDL	25
10A.	4,6-DINITRO-O-CRESOL	BDL	250
11A.	PENTACHLOROPHENOL	BDL	25

BDL=BELOW DETECTION LIMIT

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLE ORGANICS

SAMPLE IDENTIFIER: OST-1
COMPUCHEM SAMPLE NUMBER: 32303

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1B.	N-NITROSODIMETHYLAMINE	BDL	10
2B.	BIS (2-CHLOROETHYL) ETHER	BDL	10
3B.	1,3-DICHLOROBENZENE	BDL	10
4B.	1,4-DICHLOROBENZENE	BDL	10
5B.	1,2-DICHLOROBENZENE	BDL	10
6B.	BIS (2-CHLOROISOPROPYL) ETHER	BDL	10
7B.	HEXACHLOROETHANE	BDL	10
8B.	N-NITROSODI-N-PROPYLAMINE	BDL	10
9B.	NITROBENZENE	BDL	10
10B.	ISOPHORONE	BDL	10
11B.	BIS(2-CHLOROETHOXY) METHANE	BDL	10
12B.	1,2,4-TRICHLOROBENZENE	BDL	10
13B.	NAPHTHALENE	BDL	10
14B.	HEXACHLOROBUTADIENE	BDL	10
15B.	HEXACHLOROCYCLOPENTADIENE	BDL	10
16B.	2-CHLORONAPHTHALENE	BDL	10
17B.	DIMETHYLPHTHALATE	BDL	10
18B.	ACENAPHTHYLENE	BDL	10
19B.	2,6-DINITROTOLUENE	BDL	10
20B.	ACENAPHTHENE	BDL	10
21B.	2,4-DINITROTOLUENE	BDL	10
22B.	DIETHYLPHTHALATE	BDL	10
23B.	FLUORENE	BDL	10
24B.	4-CHLOROPHENYL PHENYL ETHER	BDL	10
25B.	DIPHENYLAMINE (N-NITROSO)	BDL	10
26B.	1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	BDL	10
27B.	4-BROMOPHENYL PHENYL ETHER	BDL	10
28B.	HEXACHLOROBENZENE	BDL	10

(Continued)

BDL=BELOW DETECTION LIMIT

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLE ORGANICS (Page Two)

SAMPLE IDENTIFIER: OST-1
COMPUCHEM SAMPLE NUMBER: 32303

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
29B.	PHENANTHRENE	BDL	10
30B.	ANTHRACENE	BDL	10
31B.	DI-N-BUTYLPHTHALATE	BDL	10
32B.	FLUORANTHENE	BDL	10
33B.	BENZIDINE	BDL	10
34B.	PYRENE	BDL	10
35B.	BUTYLBENZYLPHTHALATE	33	10
36B.	BENZO(A)ANTHRACENE	BDL	10
37B.	3,3'-DICHLOROBENZIDINE	BDL	10
38B.	CHRYSENE	BDL	10
39B.	BIS(2-ETHYLHEXYL)PHTHALATE	BDL	10
40B.	DI-N-OCTYLPHTHALATE	BDL	10
41B.	BENZO(B)FLUORANTHENE	BDL	10
42B.	BENZO(K)FLUORANTHENE	BDL	10
43B.	BENZO(A)PYRENE	BDL	10
44B.	INDENO(1,2,3-C,D)PYRENE	BDL	25
45B.	DIBENZO(A,H)ANTHRACENE	BDL	25
46B.	BENZO(G,H,I)PERYLENE	BDL	25

BDL=BELOW DETECTION LIMIT

COMPOUND LIST -- PESTICIDES/PCB'S

SAMPLE IDENTIFIER: OST-1
COMPUCHEM SAMPLE NUMBER: 32303

		CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)
1P.	ALDRIN	BDL	10
2P.	ALPHA-BHC	BDL	10
3P.	BETA-BHC	BDL	10
4P.	GAMMA-BHC	BDL	10
5P.	DELTA-BHC	BDL	10
6P.	CHLORDANE	BDL	10
7P.	4,4'-DDT	BDL	10
8P.	4,4'-DDE	BDL	10
9P.	4,4'-DDD	BDL	10
10P.	DIELDRIN	BDL	10
11P.	ALPHA-ENDOSULFAN	BDL	10
12P.	BETA-ENDOSULFAN	BDL	10
13P.	ENDOSULFAN SULFATE	BDL	10
14P.	ENDRIN	BDL	10
15P.	ENDRIN ALDEHYDE	BDL	10
16P.	HEPTACHLOR	BDL	10
17P.	HEPTACHLOR EPOXIDE	BDL	10
18P.	PCB-1242	BDL	10
19P.	PCB-1254	BDL	10
20P.	PCB-1221	BDL	10
21P.	PCB-1232	BDL	10
22P.	PCB-1248	BDL	10
23P.	PCB-1260	BDL	10
24P.	PCB-1016	BDL	10
25P.	TOXAPHENE	BDL	10

BDL=BELOW DETECTION LIMIT

COMPOUND LIST -- INORGANICS PRIORITY POLLUTANTS

SAMPLE IDENTIFIER: OST-1
COMPUCHEM SAMPLE NUMBER: 32303

	CONCENTRATION (MG/L)	DETECTION LIMIT (MG/L)
1. CADMIUM, TOTAL	BDL	0.010
2. CHROMIUM, TOTAL	BDL	0.050
3. COPPER, TOTAL	BDL	0.10
4. LEAD, TOTAL *	0.14 ?	0.50 RMP ?
5. MERCURY, TOTAL	0.0008	0.0002
6. ZINC, TOTAL	0.05	0.020
7. NICKEL, TOTAL	BDL	0.10
8. CYANIDE	BDL	0.01

0.05

BDL=BELOW DETECTION LIMIT

*Lead analyzed by flame AAS because of concentration level found.

Send copy to
Gilligan, DEM
File
Rocco

COMPUCHEM
LABORATORIES

NOV 19 1984

November 8, 1984

Mr. Rocco Palazzolo
Engineering Science, Inc.
57 Executive Park South
Suite 590
Atlanta, GA 30329

RE: Data Inquiry for sample OST-1/32303

Dear Mr. Palazzolo:

Enclosed is an amended compound list for sample number 32303 that reflects the correct detection limit for lead.

We apologize for any inconvenience you may have experienced. If you have further questions please feel free to call me at 1/800-334-8525.

Sincerely,

Diana A. Scammell

Diana A. Scammell
Technical Specialist, Operations

cc: Robert Meierer
Mickey Cartagena
File #32303

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COMPOUND LIST -- INORGANICS PRIORITY POLLUTANTS

SAMPLE IDENTIFIER: OST-1
COMPUCHEM SAMPLE NUMBER: 32303

	CONCENTRATION (MG/L)	DETECTION LIMIT (MG/L)
1. CADMIUM, TOTAL	BDL	0.010
2. CHROMIUM, TOTAL	BDL	0.050
3. COPPER, TOTAL	BDL	0.10
4. LEAD, TOTAL*	0.14	0.050
5. MERCURY, TOTAL	0.0008	0.00020
6. ZINC,TOTAL	0.05	0.020
7. NICKEL, TOTAL	BDL	0.10
8. CYANIDE	BDL	0.010

BDL=BELOW DETECTION LIMIT
*Lead analyzed by flame AAS because of concentration level found.

RECRA ENVIRONMENTAL LABORATORIES
Division of Recra Research, Inc.

1st sample of Gill Creek - Solv. Chem
1st sample of Osterman Well - Nach Rd

ANALYTICAL RESULTS

H2M
PRIORITY POLLUTANT ANALYSES

Prepared For:

H2M
575 Broadhallow Road
Melville, NY 11747

Prepared By:

Recra Environmental Laboratories
4248 Ridge Lea Road
Amherst, NY 14226

Report Date: October 3, 1984

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4248 Ridge Lea Road, Amherst, New York 14226
Telephone Sales (716) 838-6200
Laboratory (716) 692-7620

ANALYTICAL RESULTS

H2M
PRIORITY POLLUTANT ANALYSES

Report Date: 10/3/84

INTRODUCTION:

On September 5, 1984 samples were received at Recra Environmental Laboratories. A request was made by H2M to have the samples analyzed for selected fractions of the Environmental Protection Agency decreed priority pollutants.

This report will address the results of those analyses.

METHODS:

Priority pollutant analyses were conducted according to Environmental Protection Agency (EPA) methodologies.

Organic priority pollutants were analyzed by Gas Chromatography/Mass Spectrometry (GC/MS). Pesticide priority pollutants were analyzed by Gas Chromatography.

RESULTS AND DISCUSSION:

No Volatile field blank was received.

Analyses for specific Pesticides/PCB's are based upon the matching of retention times between samples and standards on a single gas chromatographic column. Gas chromatographic values reported as "less than" (<) indicate the working detection limit for the given sample and/or parameter.

Pesticides identified by Gas Chromatography are at concentrations too low for confirmation via Gas Chromatography/Mass Spectrometry.

Compounds reported as ND are "not detected".

Respectfully Submitted,

RECRA ENVIRONMENTAL LABORATORIES

Barbara J Krajewski

ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 10/3/84

ACID/PHENOLICS

COMPOUND	DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION	
		GILL CREEK	OSTERMAN PROPERTY
2-chlorophenol	3.3	ND	ND
2,4-dichlorophenol	2.7	ND	ND
2,4-dimethylphenol	2.7	ND	ND
4,6-dinitro-o-cresol	24	ND	ND
2,4-dinitrophenol	42	ND	ND
2-nitrophenol	3.6	ND	ND
4-nitrophenol	2.4	ND	ND
p-chloro-m-cresol	3.0	ND	ND
pentachlorophenol	3.6	ND	ND
phenol	1.5	ND	ND
2,4,6-trichlorophenol	2.7	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	7/11/84	7/11/84
Extraction Date	9/7/84	9/7/84
Analysis Date	9/19/84	9/19/84
Internal Standard (IS) - Level	20 µg/l	20 µg/l
deuterated phenanthrene - Recovery	100%	110%
Surrogate Standard (SS1) - Level	120 µg/l	120 µg/l
2-fluorophenol - Recovery	55%	30%
Surrogate Standard (SS2) - Level	120 µg/l	120 µg/l
pentafluorophenol - Recovery	43%	27%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 10/3/84

ENVIRONMENTAL LABORATORIES

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ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 10/3/84

BASE/NEUTRALS

COMPOUND	DETECTION LIMIT (ug/l)	SAMPLE IDENTIFICATION	
		GILL CREEK	OSTERMAN PROPERTY
acenaphthene	1.9	ND	ND
acenaphthylene	3.5	ND	ND
anthracene	1.9	ND	ND
benzidine	44	ND	ND
benzo(a)anthracene	7.8	ND	ND
benzo(a)pyrene	2.5	ND	ND
benzo(b)fluoranthene	4.8	ND	ND
benzo(g,h,i)perylene	4.1	ND	ND
benzo(k)fluoranthene	2.5	ND	ND
bis(2-chloroethoxy)methane	5.3	ND	ND
bis(2-chloroethyl)ether	5.7	ND	ND
bis(2-chloroisopropyl)ether	5.7	ND	ND
bis(2-ethylhexyl)phthalate	2.5	ND	ND
4-bromophenylphenylether	1.9	ND	ND
butylbenzylphthalate	2.5	ND	ND
2-chloronaphthalene	1.9	ND	ND
4-chlorophenylphenylether	4.2	ND	ND
chrysene	2.5	ND	ND
dibenzo(a,h)anthracene	2.5	ND	ND
1,2-dichlorobenzene	1.9	ND	ND
1,3-dichlorobenzene	1.9	ND	ND
1,4-dichlorobenzene	4.4	ND	ND
3,3'-dichlorobenzidine	16.5	ND	ND
diethylphthalate	22	ND	ND
dimethylphthalate	1.6	ND	ND
di-n-butylphthalate	2.5	ND	ND

(Continued)

CRA ENVIRONMENTAL LABORATORIES
I.D. #84-898

ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 10/3/84

BASE/NEUTRALS

COMPOUND	DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION	
		GILL CREEK	OSTERMAN PROPERTY
2,6-dinitrotoluene	1.9	ND	ND
2,4-dinitrotoluene	5.7	ND	ND
di-n-octylphthalate	2.5	ND	ND
1,2-diphenylhydrazine	25	ND	ND
fluoranthene	2.2	ND	ND
fluorene	1.9	ND	ND
hexachlorobenzene	1.9	ND	ND
hexachlorobutadiene	0.9	ND	ND
hexachlorocyclopentadiene	25	ND	ND
hexachloroethane	1.6	ND	ND
indeno(1,2,3-cd)pyrene	3.7	ND	ND
isophorone	2.2	ND	ND
naphthalene	1.6	ND	ND
nitrobenzene	1.9	ND	ND
N-nitrosodimethylamine	25	ND	ND
N-nitrosodi-n-propylamine	25	ND	ND
N-nitrosodiphenylamine	1.9	ND	ND
phenanthrene	5.4	ND	ND
pyrene	1.9	ND	ND
1,2,4-trichlorobenzene	1.9	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	7/11/84	7/11/84
Extraction Date	9/7/84	9/7/84
Analysis Date	9/19/84	9/19/84
Internal Standard - Level	20 µg/l	20 µg/l
deuterated phenanthrene - Recovery	100%	110%
Surrogate Standard (SS3) - Level	120 µg/l	120 µg/l
decafluorobiphenyl - Recovery	55%	45%
Surrogate Standard (SS4) - Level	100 µg/l	100 µg/l
2-fluorobiphenyl - Recovery	60%	47%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 10/3/84

RECRA ENVIRONMENTAL LABORATORIES

ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 10/3/84

VOLATILES

COMPOUND	DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION	
		GILL CREEK	OSTERMAN PROPERTY
acrolein	400	ND	ND
acrylonitrile	400	ND	ND
benzene	4.4	ND	ND
bromodichloromethane	2.2	ND	ND
bromoform	4.7	ND	ND
bromomethane	10	ND	ND
carbon tetrachloride	2.8	ND	ND
chlorobenzene	6.0	ND	ND
chloroethane	10	ND	ND
2-chloroethylvinyl ether	10	ND	ND
chloroform	1.6	ND	ND
chloromethane	10	ND	ND
dibromochloromethane	3.1	ND	ND
1,1-dichloroethane	4.7	ND	ND
1,2-dichloroethane	2.8	ND	ND
1,1-dichloroethylene	2.8	ND	ND
trans-1,2-dichloroethylene	1.6	ND	ND
1,2-dichloropropane	6.0	ND	ND
1,3-dichloropropene	5.0	ND	ND
ethylbenzene	7.2	ND	ND
methylene chloride	2.8	ND	ND
1,1,2,2-tetrachloroethane	6.9	ND	ND
tetrachloroethylene	4.1	ND	ND

(Continued)

ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 10/3/84

VOLATILES

COMPOUND	DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION	
		GILL CREEK	OSTERMAN PROPERTY
toluene	6.0	ND	ND
1,1,1-trichloroethane	3.8	ND	ND
1,1,2-trichloroethane	5.0	ND	ND
trichloroethylene	1.9	ND	ND
vinyl chloride	10	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	7/11/84	7/11/84
Analysis Date	9/17/84	9/17/84
Internal Standard - Level	40 µg/l	40 µg/l
bromochloromethane - Recovery	73%	80%
Internal Standard - Level	40 µg/l	40 µg/l
2-bromo-1-chloropropane - Recovery	70%	73%
Internal Standard - Level	40 µg/l	40 µg/l
1,4-dichlorobutane - Recovery	76%	76%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 10/3/84

RA ENVIRONMENTAL LABORATORIES
T.D. #84-898

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ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY
PRIORITY POLLUTANT ANALYSES

Report Date: 10/3/84

PESTICIDES/PCB'S

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		GILL CREEK (7/11/84)	OSTERMAN PROPERTY (7/11/84)
aldrin	µg/l	0.10	<0.01
α-BHC	µg/l	0.36	<0.01
β-BHC	µg/l	0.26	<0.01
δ-BHC	µg/l	0.05	<0.01
γ-BHC	µg/l	0.04	<0.01
chlordane	µg/l	<0.2	<0.1
4,4'-DDD	µg/l	<0.02	<0.01
4,4'-DDE	µg/l	<0.02	<0.01
4,4'-DDT	µg/l	<0.02	<0.01
dieldrin	µg/l	<0.02	<0.01
α-endosulfan	µg/l	<0.02	<0.01
β-endosulfan	µg/l	<0.02	<0.01
endosulfan sulfate	µg/l	<0.02	<0.01
endrin	µg/l	<0.02	<0.01
endrin aldehyde	µg/l	<0.02	<0.01
heptachlor	µg/l	<0.02	<0.01
heptachlor epoxide	µg/l	<0.02	<0.01
PCB-1016	µg/l	<0.2	<0.1
PCB-1221	µg/l	<0.4	<0.2
PCB-1232	µg/l	<0.4	<0.2
PCB-1242	µg/l	<0.2	<0.1
PCB-1248	µg/l	<0.2	<0.1
PCB-1254	µg/l	<0.2	<0.1
PCB-1260	µg/l	<0.2	<0.1
toxaphene	µg/l	<0.2	<0.1

FOR RECRA ENVIRONMENTAL LABORATORIES F. Bogek

DATE 10/3/84

RECRA ENVIRONMENTAL LABORATORIES

T.D. 184-898

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ANALYTICAL RESULTS

H2M
PRIORITY POLLUTANT ANALYSES

Report Date: 10/3/84

METALS

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		GILLCREEK (7/11/84)	OSTERMAN PROPERTY (7/11/84)
Total antimony	mg/l	<0.005	<0.005
Total arsenic	mg/l	<0.005	<0.005
Total beryllium	mg/l	<0.005	<0.005
Total cadmium	mg/l	0.007	0.006
Total chromium	mg/l	<0.005	<0.005
Total copper	mg/l	0.010	0.013
Total lead	mg/l	<0.005	<0.005
Total mercury	mg/l	0.003	<0.0005
Total nickel	mg/l	<0.005	<0.005
Total selenium	mg/l	<0.005	<0.005
Total silver	mg/l	<0.02	<0.02
Total thallium	mg/l	<0.005	<0.005
Total zinc	mg/l	0.061	0.258

FOR RECRA ENVIRONMENTAL LABORATORIES D. U. Zimm

DATE 10/3/84

ANALYTICAL RESULTS

H2M
PRIORITY POLLUTANT ANALYSES

Report Date: 10/3/84

MISCELLANEOUS

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		GILL CREEK (7/11/84)	OSTERMAN PROPERTY (7/11/84)
Total cyanide	mg/l	<0.010	<0.01
Total recoverable phenolics	mg/l	<0.01	<0.01

FOR RECRA ENVIRONMENTAL LABORATORIES D. V. Zinn

DATE 10/3/84

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ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES
QUALITY CONTROL

Report Date: 10/3/84

EXTRACTABLE RECOVERY ANALYSIS OF
SAMPLE GILL CREEK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
2-chlorophenol	50	43	86
1,3-dichlorobenzene	50	29	58
2,4-dichlorophenol	50	46	92
di-n-octylphthalate	50	29	58
fluoranthene	50	50	100
naphthalene	50	34	68
nitrobenzene	50	36	72
2,4,6-trichlorophenol	50	29	58

ADDITIONAL SAMPLE INFORMATION

Sample Date	7/11/84
Extraction Date	9/7/84
Analysis Date	9/19/84
Internal Standard (IS) - Level	20 ug/l
deuterated phenanthrene - Recovery	120%
Surrogate Standard (SS1) - Level	120 ug/l
2-fluorophenol - Recovery	36%
Surrogate Standard (SS2) - Level	120 ug/l
pentafluorophenol - Recovery	27%
Surrogate Standard (SS3) - Level	120 ug/l
decafluorobiphenyl - Recovery	46%
Surrogate Standard (SS4) - Level	100 ug/l
2-fluorobiphenyl - Recovery	52%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kazeanski

DATE 10/3/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #84-898

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ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY
PRIORITY POLLUTANT ANALYSES
QUALITY CONTROL

Report Date: 10/3/84

PESTICIDE RECOVERY ANALYSIS OF
SAMPLE GILL CREEK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
aldrin	0.26	0.20	77
γ-BHC	0.24	0.19	79
4,4'-DDE	0.25	0.20	80
β-endosulfan	0.66	0.61	92
endrin	0.23	0.29	126
heptachlor	0.24	0.18	75

FOR RECRA ENVIRONMENTAL LABORATORIES F. Bogek

DATE 10/3/84

4) TRIP BLANKS

EXHIBIT II - COMPOUND LIST

SAMPLE IDENTIFIER: SD-1 Trip Blank
COMPUCHEM SAMPLE NUMBER: 32302

	VOLATILE ORGANICS	CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)	SCAN NUMBER
1V.	CHLOROMETHANE	BDL	10	
2V.	VINYL CHLORIDE	BDL	10	
3V.	CHLOROETHANE	BDL	10	
4V.	BROMOMETHANE	BDL	10	
5V.	ACROLEIN	BDL	100	
6V.	ACRYLONITRILE	BDL	100	
7V.	METHYLENE CHLORIDE	BDL	10	
8V.	TRICHLOROFLUOROMETHANE	BDL	10	
9V.	1,1-DICHLOROETHYLENE	BDL	10	
10V.	1,1-DICHLOROETHANE	BDL	10	
11V.	TRANS-1,2-DICHLOROETHYLENE	BDL	10	
12V.	CHLOROFORM	BDL	10	
13V.	1,2-DICHLOROETHANE	BDL	10	
14V.	1,1,1-TRICHLOROETHANE	BDL	10	
15V.	CARBON TETRACHLORIDE	BDL	10	
16V.	BROMODICHLOROMETHANE	BDL	10	
17V.	1,2-DICHLOROPROPANE	BDL	10	
18V.	TRANS-1,3-DICHLOROPROPENE	BDL	10	
19V.	TRICHLOROETHYLENE	BDL	10	
20V.	BENZENE	BDL	10	
21V.	CIS-1,3-DICHLOROPROPENE	BDL	10	
22V.	1,1,2-TRICHLOROETHANE	BDL	10	
23V.	DIBROMOCHLOROMETHANE	BDL	10	
24V.	BROMOFORM	BDL	10	
25V.	1,1,2,2-TETRACHLOROETHYLENE	BDL	10	
26V.	1,1,2,2-TETRACHLOROETHANE	BDL	10	
27V.	TOLUENE	BDL	10	
28V.	CHLOROBENZENE	BDL	10	
29V.	ETHYLBENZENE	BDL	10	
30V.	2-CHLOROETHYL VINYL ETHER	BDL	10	
31V.	DICHLORODIFLUOROMETHANE†	BDL		
32V.	BIS(CHLOROMETHYL)ETHER†	BDL		

BDL=BELOW DETECTION LIMIT

†See Data Report Notice

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LABORATORY CHRONICLE

SAMPLE IDENTIFIER: SD-1 Trip Blank
COMPUCHEM SAMPLE NUMBER: 32302

	Date
Received/Refrigerated	07/27/84
Organics	
Extracted	Not Required
Analyzed	
1. Volatiles	07/30/84
2. Acid	Not Requested
3. Base/Neutrals	Not Requested
4. Pesticides/PCBS	Not Requested
Inorganics	
1. Metals	Not Requested
2. Cyanide	Not Requested
3. Phenols	Not Requested

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EXHIBIT II - COMPOUND LIST

SAMPLE IDENTIFIER: SD-2 Trip Blank
COMPUCHEM SAMPLE NUMBER: 32300

	VOLATILE ORGANICS	CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)	SCAN NUMBER
1V.	CHLOROMETHANE	BDL	10	
2V.	VINYL CHLORIDE	BDL	10	
3V.	CHLOROETHANE	BDL	10	
4V.	BROMOMETHANE	BDL	10	
5V.	ACROLEIN	BDL	100	
6V.	ACRYLONITRILE	BDL	100	
7V.	METHYLENE CHLORIDE	BDL	10	
8V.	TRICHLOROFLUOROMETHANE	BDL	10	
9V.	1,1-DICHLOROETHYLENE	BDL	10	
10V.	1,1-DICHLOROETHANE	BDL	10	
11V.	TRANS-1,2-DICHLOROETHYLENE	BDL	10	
12V.	CHLOROFORM	BDL	10	
13V.	1,2-DICHLOROETHANE	BDL	10	
14V.	1,1,1-TRICHLOROETHANE	BDL	10	
15V.	CARBON TETRACHLORIDE	BDL	10	
16V.	BROMODICHLOROMETHANE	BDL	10	
17V.	1,2-DICHLOROPROPANE	BDL	10	
18V.	TRANS-1,3-DICHLOROPROPENE	BDL	10	
19V.	TRICHLOROETHYLENE	BDL	10	
20V.	BENZENE	BDL	10	
21V.	CIS-1,3-DICHLOROPROPENE	BDL	10	
22V.	1,1,2-TRICHLOROETHANE	BDL	10	
23V.	DIBROMOCHLOROMETHANE	BDL	10	
24V.	BROMOFORM	BDL	10	
25V.	1,1,2,2-TETRACHLOROETHYLENE	BDL	10	
26V.	1,1,2,2-TETRACHLOROETHANE	BDL	10	
27V.	TOLUENE	BDL	10	
28V.	CHLOROBENZENE	BDL	10	
29V.	ETHYLBENZENE	BDL	10	
30V.	2-CHLOROETHYL VINYL ETHER	BDL	10	
31V.	DICHLORODIFLUOROMETHANE†	BDL		
32V.	BIS(CHLOROMETHYL)ETHER†	BDL		

BDL=BELOW DETECTION LIMIT

†See Data Report Notice

LABORATORY CHRONICLE

SAMPLE IDENTIFIER: SD-2 Trip Blank
COMPUCHEM SAMPLE NUMBER: 32300

	Date
Received/Refrigerated	07/27/84
Organics	
Extracted	Not Required
Analyzed	
1. Volatiles	07/30/84
2. Acid	Not Requested
3. Base/Neutrals	Not Requested
4. Pesticides/PCBS	Not Requested
Inorganics	
1. Metals	Not Requested
2. Cyanide	Not Requested
3. Phenols	Not Requested

EXHIBIT II - COMPOUND LIST

SAMPLE IDENTIFIER: SD-3 Trip Blank
COMPUCHEM SAMPLE NUMBER: 32298

	VOLATILE ORGANICS	CONCENTRATION (UG/L)	DETECTION LIMIT (UG/L)	SCAN NUMBER
1V.	CHLOROMETHANE	BDL	10	
2V.	VINYL CHLORIDE	BDL	10	
3V.	CHLOROETHANE	BDL	10	
4V.	BROMOMETHANE	BDL	10	
5V.	ACROLEIN	BDL	100	
6V.	ACRYLONITRILE	BDL	100	
7V.	METHYLENE CHLORIDE	BDL	10	
8V.	TRICHLOROFLUOROMETHANE	BDL	10	
9V.	1,1-DICHLOROETHYLENE	BDL	10	
10V.	1,1-DICHLOROETHANE	BDL	10	
11V.	TRANS-1,2-DICHLOROETHYLENE	BDL	10	
12V.	CHLOROFORM	BDL	10	
13V.	1,2-DICHLOROETHANE	BDL	10	
14V.	1,1,1-TRICHLOROETHANE	BDL	10	
15V.	CARBON TETRACHLORIDE	BDL	10	
16V.	BROMODICHLOROMETHANE	BDL	10	
17V.	1,2-DICHLOROPROPANE	BDL	10	
18V.	TRANS-1,3-DICHLOROPROPENE	BDL	10	
19V.	TRICHLOROETHYLENE	BDL	10	
20V.	BENZENE	BDL	10	
21V.	CIS-1,3-DICHLOROPROPENE	BDL	10	
22V.	1,1,2-TRICHLOROETHANE	BDL	10	
23V.	DIBROMOCHLOROMETHANE	BDL	10	
24V.	BROMOFORM	BDL	10	
25V.	1,1,2,2-TETRACHLOROETHYLENE	BDL	10	
26V.	1,1,2,2-TETRACHLOROETHANE	BDL	10	
27V.	TOLUENE	BDL	10	
28V.	CHLOROBENZENE	BDL	10	
29V.	ETHYLBENZENE	BDL	10	
30V.	2-CHLOROETHYL VINYL ETHER	BDL	10	
31V.	DICHLORODIFLUOROMETHANE†	BDL		
32V.	BIS(CHLOROMETHYL)ETHER†	BDL		

BDL=BELOW DETECTION LIMIT

†See Data Report Notice

LABORATORY CHRONICLE

SAMPLE IDENTIFIER: SD-3 Trip Blank
COMPUCHEM SAMPLE NUMBER: 32298

	Date
Received/Refrigerated	07/27/84
Organics	
Extracted	Not Required
Analyzed	
1. Volatiles	07/30/84
2. Acid	Not Requested
3. Base/Neutrals	Not Requested
4. Pesticides/PCBS	Not Requested
Inorganics	
1. Metals	Not Requested
2. Cyanide	Not Requested
3. Phenols	Not Requested

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CompuChem LABORATORIES

REPORT OF DATA

SAMPLE IDENTIFIER:		COMPUCHEM SAMPLE NUMBER:
SD-3	Trip Blank	32298
SD-2	Trip Blank	32300
SD-1	Trip Blank	32302

SUBMITTED TO:

Mr. Ernie Schroder
Engineering Science, Inc.
57 Executive Park South
Suite 590
Atlanta, GA 30329

Diana A. Scammell
DIANA A. SCAMMELL
TECHNICAL SPECIALIST, OPERATIONS

R. L. MYERS, PH.D., PRESIDENT

ROBERT E. MEIERER
DIRECTOR OF QUALITY ASSURANCE

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DATA REPORT NOTICE

CompuChem employs Methods 624 and 625 for GC/MS analysis of organics in liquid matrices. These methods were proposed on December 3, 1979 by the U.S.E.P.A. in Volume 44 of the Federal Register. These methods were subsequently revised and reissued in July, 1982 as publication EPA-600/4-82-057. The EPA Environmental Monitoring and Support Laboratory (EMSL-Cincinnati) has subsequently issued method modifications which provide for the analysis of solid matrices. These modifications specify changes in the sample preparation procedures.

Additionally, for solid samples detection limits and any analytical results reported are based on processing the method specified sample size of as-received material.

The referenced methods are no longer appropriate for several of the original priority pollutant compounds. This is due to either the deletion from the toxic polluant list (40 CFR Part 401) by EPA or the determination by EPA that the referenced methods may not be optimized for certain compounds (EPA-600/4-82-057) originally incorporated by the methods.

CompuChem® presents these compounds in its sample data report for completeness as many of the government compound list forms continue to display the affected compounds. For consistency, these compounds are reported as "BDL" or "Below Detection Limit" as they are either not likely to exist in the sample or are not likely to be detected by the method. Those compounds which have actually been deleted are listed below with the Federal Register deletion reference.

Compound Name	GC/MS Fraction	Federal Register	Date
Dichlorodifluoromethane	Volatile	46FR2264	1/8/81
*Trichlorofluoromethane	Volatile	46FR2264	1/8/81
Bis(Chloromethyl)Ether	Volatile	46FR10723	2/4/81

*While this compound has been deleted, CompuChem® continues to identify and quantitate for it.

COMPUCHEM LABORATORIES IS NO LONGER AFFILIATED WITH MEAD CORPORATION.

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analyses of trip blanks [illegible]
Washing for sediment & GW

3308 East Chapel Hill/Nelson Highway
P.O. Box 12652
Research Triangle Park, NC 27709

CompuChem LABORATORIES

Telephone: 919-549-8263
800-334-8525

August 7, 1984

Mr. Ernie Schroder
Engineering Science, Inc.
57 Executive Park South
Suite 590
Atlanta, GA 30329

Dear Mr. Schroder:

Thank you for selecting CompuChem® Laboratories for your recent sample analysis. We have completed the analysis that you requested and have enclosed a summary of the CompuChem® data for your review. Additional data details are available for purchase if you require them.

As you know, EPA has proposed detection limits for the priority pollutants in the December 3, 1979, Federal Register, and we have reported all priority pollutant concentrations which have exceeded these limits (or their equivalent for solid matrices). In addition, we have permanently stored a complete record of your data on magnetic tape. This includes chromatograms, mass spectra, calibration and quality control data for the organics. Therefore, your original data is readily available for future reference. Should you require additional information from your data base, please contact us at 1/800-334-8525.

In order to expedite data to you, we have forwarded the results for all completed analyses. If you submitted more samples than are included in the enclosed results, the data will be forthcoming upon completion of our final review.

Your confidence in our CompuChem® service is appreciated. We look forward to a continuing association.

Sincerely,

Customer Service Dept.
CompuChem®

Enclosure:

Report:	SD-3	Trip Blank	-	32298
	SD-2	Trip Blank	-	32300
	SD-1	Trip Blank	-	32302

RECEIVED
AUG 09 1984
Engineering - Science
Atlanta

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5) SEDIMENT DATA

COMPUCHEM
LABORATORIES

August 29, 1984

Mr. Ernie Schroder
Engineering Science, Inc.
57 Executive Park South
Suite 590
Atlanta, GA 30329

SEP 04 1984

Dear Mr. Schroder:

Thank you for selecting CompuChem® Laboratories for your recent sample analysis. We have completed the analysis that you requested and have enclosed a summary of the CompuChem® data for your review. Additional data details are available for purchase if you require them.

As you know, EPA has proposed detection limits for the priority pollutants in the December 3, 1979, Federal Register, and we have reported all priority pollutant concentrations which have exceeded these limits (or their equivalent for solid matrices). In addition, we have permanently stored a complete record of your data on magnetic tape. This includes chromatograms, mass spectra, calibration and quality control data for the organics. Therefore, your original data is readily available for future reference. Should you require additional information from your data base, please contact us at 1/800-334-8525.

In order to expedite data to you, we have forwarded the results for all completed analyses. If you submitted more samples than are included in the enclosed results, the data will be forthcoming upon completion of our final review.

Your confidence in our CompuChem® service is appreciated. We look forward to a continuing association.

Sincerely,

Customer Service Dept.
CompuChem®

Enclosure:

Report:	SD-3	-	32411
	SD-2	-	32412
	SD-1	-	32413

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DATA REPORT NOTICE

CompuChem employs Methods 624 and 625 for GC/MS analysis of organics in liquid matrices. These methods were proposed on December 3, 1979 by the U.S.E.P.A. in Volume 44 of the Federal Register. These methods were subsequently revised and reissued in July, 1982 as publication EPA-600/4-82-057. The EPA Environmental Monitoring and Support Laboratory (EMSL-Cincinnati) has subsequently issued method modifications which provide for the analysis of solid matrices. These modifications specify changes in the sample preparation procedures.

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Compound Name	GC/MS Fraction	Federal Register	Date
Dichlorodifluoromethane	Volatile	46FR2264	1/8/81
*Trichlorofluoromethane	Volatile	46FR2264	1/8/81
Bis(Chloromethyl)Ether	Volatile	46FR10723	2/4/81

*While this compound has been deleted, CompuChem® continues to identify and quantitate for it.

COMPUCHEM LABORATORIES

LABORATORY CHRONICLE

SAMPLE IDENTIFIER: SD-3
COMPUCHEM SAMPLE NUMBER: 32411

Samples:
Received - 7-26-84
Analyzed - 8-02-84

SAMPLE IDENTIFIER:	COMPUCHEM SAMPLE NUMBER:
SD-3	32411
SD-2	32412
SD-1	32413

SUBMITTED TO:

Mr. Ernie Schroder
Engineering Science, Inc.
57 Executive Park South
Suite 590
Atlanta, GA 30329

Diana A Scammell

DIANA A. SCAMMELL
TECHNICAL SPECIALIST, OPERATIONS

R. L. MYERS, PH.D., PRESIDENT

ROBERT E. MEIERER
DIRECTOR OF QUALITY ASSURANCE

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EXHIBIT II - COMPOUND LIST

SAMPLE IDENTIFIER: SD-3
COMPUCHEM SAMPLE NUMBER: 32411

INORGANICS PRIORITY POLLUTANTS	CONCENTRATION (MG/KG)	DETECTION LIMIT (MG/KG)
14M. CYANIDE, TOTAL	BDL	1.0

EXHIBIT II - COMPOUND LIST

SAMPLE IDENTIFIER: SD-2
COMPUCHEM SAMPLE NUMBER: 32412

INORGANICS PRIORITY POLLUTANTS	CONCENTRATION (MG/KG)	DETECTION LIMIT (MG/KG)
14M. CYANIDE, TOTAL	BDL	1.0

EXHIBIT II - COMPOUND LIST

SAMPLE IDENTIFIER: SD-1
COMPUCHEM SAMPLE NUMBER: 32413

INORGANICS PRIORITY POLLUTANTS	CONCENTRATION (MG/KG)	DETECTION LIMIT (MG/KG)
14M. CYANIDE, TOTAL	BDL	1.0

SEP 10 1984

COMPUCHEM
LABORATORIES

August 31, 1984

SEP 06 1984

Engineering Science
Atlanta

Mr. Ernie Schroder
Engineering Science, Inc.
57 Executive Park South
Suite 590
Atlanta, GA 30329

Dear Mr. Schroder:

Thank you for selecting CompuChem® Laboratories for your recent sample analysis. We have completed the analysis that you requested and have enclosed a summary of the CompuChem® data for your review. Additional data details are available for purchase if you require them.

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Sincerely,

Customer Service Dept.
CompuChem®

Enclosure:

Report: SD-2 - 32299

126

DATA REPORT NOTICE

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*Trichlorofluoromethane	Volatile	46FR2264	1/8/81
Bis(Chloromethyl)Ether	Volatile	46FR10723	2/4/81

*While this compound has been deleted, CompuChem® continues to identify and quantitate for it.

COMPUCHEM LABORATORIES

REPORT OF DATA

SAMPLE IDENTIFIER: SD-2

COMPUCHEM SAMPLE NUMBER: 32299

SUBMITTED TO:

Mr. Ernie Schroder
Engineering Science, Inc.
57 Executive Park South
Suite 590
Atlanta, GA 30329

Diana A. Scammell

DIANA A. SCAMMELL
TECHNICAL SPECIALIST, OPERATIONS

R. L. MYERS, PH.D., PRESIDENT

ROBERT E. MEIERER
DIRECTOR OF QUALITY ASSURANCE

128

LABORATORY CHRONICLE

SAMPLE IDENTIFIER: SD-2
COMPUCHEM SAMPLE NUMBER: 32299

	Date
Received/Refrigerated	07/27/84
Organics	
Extracted	08/01/84
Analyzed	
1. Volatiles	07/03/84
2. Acid	08/08/84
3. Base/Neutrals	08/06/84
4. Pesticides/PCBS	08/06/84
Inorganics	
1. Metals	08/14/84
2. Cyanide	Not Requested
3. Phenols	Not Requested

COMPOUND LIST - VOLATILES ORGANICS

SAMPLE IDENTIFIER: SD-2
COMPUCHEM SAMPLE NUMBER: 32299

		CONCENTRATION (UG/KG)	DETECTION LIMIT (UG/KG)
1V.	CHLOROMETHANE	BDL	10
2V.	VINYL CHLORIDE	BDL	10
3V.	CHLOROETHANE	BDL	10
4V.	BROMOMETHANE	BDL	10
5V.	ACROLEIN	BDL	100
6V.	ACRYLONITRILE	BDL	100
7V.	METHYLENE CHLORIDE	NDB*	10
8V.	TRICHLOROFLUOROMETHANE	BDL	10
9V.	1,1-DICHLOROETHYLENE	BDL	10
10V.	1,1-DICHLOROETHANE	BDL	10
11V.	TRANS-1,2-DICHLOROETHYLENE	BDL	10
12V.	CHLOROFORM	BDL	10
13V.	1,2-DICHLOROETHANE	BDL	10
14V.	1,1,1-TRICHLOROETHANE	BDL	10
15V.	CARBON TETRACHLORIDE	BDL	10
16V.	BROMODICHLOROMETHANE	BDL	10
17V.	1,2-DICHLOROPROPANE	BDL	10
18V.	TRANS-1,3-DICHLOROPROPENE	BDL	10
19V.	TRICHLOROETHYLENE	BDL	10
20V.	BENZENE	BDL	10
21V.	CIS-1,3-DICHLOROPROPENE	BDL	10
22V.	1,1,2-TRICHLOROETHANE	BDL	10
23V.	DIBROMOCHLOROMETHANE	BDL	10
24V.	BROMOFORM	BDL	10
25V.	1,1,2,2-TETRACHLOROETHYLENE	BDL	10
26V.	1,1,2,2-TETRACHLOROETHANE	BDL	10
27V.	TOLUENE	BDL	10
28V.	CHLOROBENZENE	BDL	10
29V.	ETHYLBENZENE	BDL	10
30V.	2-CHLOROETHYL VINYL ETHER	BDL	10
31V.	DICHLORODIFLUOROMETHANE†	BDL	
32V.	BIS(CHLOROMETHYL)ETHER†	BDL	

BDL=BELOW DETECTION LIMIT
*See Quality Assurance Notice

†See Data Report Notice

QUALITY ASSURANCE NOTICE

CompuChem Sample No. 32299

Although not required by the Federal Register, December 3, 1979 (modified July, 1982) Volatile Method 624 procedure, the laboratory prepares VOA blanks when compositing water samples and preparing low and medium level hazardous waste VOA samples. This is to insure that the glassware used is free from contamination, and to monitor the possibility of cross-contamination from high levels of volatile organic compounds in some samples and the laboratory atmosphere.

The compositing or method blank (# 32330) prepared with this sample contained the compound(s) listed below. Sample data associated with this blank have been adjusted and/or flagged according to the EPA-recommended methods.

Compound(s)	Concentration Found In Sample (ug/kg)	Applicable Qualifier*
Methylene Chloride	44	NDB

The following data qualifiers are used by EPA and adopted by CompuChem® for reporting purposes:

NDB = The concentration of a priority pollutant in the blank is greater than 1/2 the detection limit and is greater than 1/2 the concentration in the sample.

*No adjusted sample concentration is reported.

COMPOUND LIST -- ACID EXTRACTABLE ORGANICS

SAMPLE IDENTIFIER: SD-2
COMPUCHEM SAMPLE NUMBER: 32299

		CONCENTRATION (UG/KG)	DETECTION† LIMIT (UG/KG)
1A.	PHENOL	BDL	500
2A.	2-CHLOROPHENOL	BDL	500
3A.	2-NITROPHENOL	BDL	500
4A.	2,4-DIMETHYLPHENOL	BDL	500
5A.	2,4-DICHLOROPHENOL	BDL	500
6A.	P-CHLORO-M-CRESOL	BDL	500
7A.	2,4,6-TRICHLOROPHENOL	BDL	500
8A.	2,4-DINITROPHENOL	BDL	5000
9A.	4-NITROPHENOL	BDL	500
10A.	4,6-DINITRO-O-CRESOL	BDL	5000
11A.	PENTACHLOROPHENOL	BDL	500

BDL=BELOW DETECTION LIMIT
†See Data Report Notice

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLE ORGANICS

SAMPLE IDENTIFIER: SD-2
COMPUCHEM SAMPLE NUMBER: 32299

		CONCENTRATION (UG/KG)	DETECTION† LIMIT (UG/KG)
1B.	N-NITROSODIMETHYLAMINE	BDL	200
2B.	BIS (2-CHLOROETHYL) ETHER	BDL	200
3B.	1,3-DICHLOROBENZENE	BDL	200
4B.	1,4-DICHLOROBENZENE	BDL	200
5B.	1,2-DICHLOROBENZENE	BDL	200
6B.	BIS (2-CHLOROISOPROPYL) ETHER	BDL	200
7B.	HEXACHLOROETHANE	BDL	200
8B.	N-NITROSODI-N-PROPYLAMINE	BDL	200
9B.	NITROBENZENE	BDL	200
10B.	ISOPHORONE	BDL	200
11B.	BIS(2-CHLOROETHOXY) METHANE	BDL	200
12B.	1,2,4-TRICHLOROBENZENE	BDL	200
13B.	NAPHTHALENE	BDL	200
14B.	HEXACHLOROBUTADIENE	BDL	200
15B.	HEXACHLOROCYCLOPENTADIENE	BDL	200
16B.	2-CHLORONAPHTHALENE	BDL	200
17B.	DIMETHYLPHTHALATE	BDL	200
18B.	ACENAPHTHYLENE	BDL	200
19B.	2,6-DINITROTOLUENE	BDL	200
20B.	ACENAPHTHENE	BDL	200
21B.	2,4-DINITROTOLUENE	BDL	200
22B.	DIETHYLPHTHALATE	BDL	200
23B.	FLUORENE	BDL	200
24B.	4-CHLOROPHENYL PHENYL ETHER	BDL	200
25B.	DIPHENYLAMINE (N-NITROSO)	BDL	200
26B.	1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	BDL	200
27B.	4-BROMOPHENYL PHENYL ETHER	BDL	200
28B.	HEXACHLOROBENZENE	BDL	200

BDL=BELOW DETECTION LIMIT
†See Data Report Notice

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLE ORGANICS (Page Two)

SAMPLE IDENTIFIER: SD-2
COMPUCHEM SAMPLE NUMBER: 32299

		CONCENTRATION (UG/KG)	DETECTION† LIMIT (UG/KG)
29B.	PHENANTHRENE	BDL	200
30B.	ANTHRACENE	BDL	200
31B.	DI-N-BUTYLPHTHALATE	BDL	200
32B.	FLUORANTHENE	BDL	200
33B.	BENZIDINE	BDL	200
34B.	PYRENE	BDL	200
35B.	BUTYLBENZYLPHTHALATE	BDL	200
36B.	BENZO(A)ANTHRACENE	BDL	200
37B.	3,3'-DICHLOROBENZIDINE	BDL	200
38B.	CHRYSENE	BDL	200
39B.	BIS(2-ETHYLHEXYL)PHTHALATE	BDL	200
40B.	DI-N-OCTYLPHTHALATE	BDL	200
41B.	BENZO(B)FLUORANTHENE	BDL	200
42B.	BENZO(K)FLUORANTHENE	BDL	200
43B.	BENZO(A)PYRENE	BDL	200
44B.	INDENO(1,2,3-C,D)PYRENE	BDL	500
45B.	DIBENZO(A,H)ANTHRACENE	BDL	500
46B.	BENZO(G,H,I)PERYLENE	BDL	500

BDL=BELOW DETECTION LIMIT
†See Date Report Notice

COMPOUND LIST -- PESTICIDES/PCB'S

SAMPLE IDENTIFIER: SD-2
COMPUCHEM SAMPLE NUMBER: 32299

		CONCENTRATION (UG/KG)	DETECTION† LIMIT (UG/KG)
1P.	ALDRIN	BDL	200
2P.	ALPHA-BHC	BDL	200
3P.	BETA-BHC	BDL	200
4P.	GAMMA-BHC	BDL	200
5P.	DELTA-BHC	BDL	200
6P.	CHLORDANE	BDL	200
7P.	4,4'-DDT	BDL	200
8P.	4,4'-DDE	BDL	200
9P.	4,4'-DDD	BDL	200
10P.	DIELDRIN	BDL	200
11P.	ALPHA-ENDOSULFAN	BDL	200
12P.	BETA-ENDOSULFAN	BDL	200
13P.	ENDOSULFAN SULFATE	BDL	200
14P.	ENDRIN	BDL	200
15P.	ENDRIN ALDEHYDE	BDL	200
16P.	HEPTACHLOR	BDL	200
17P.	HEPTACHLOR EPOXIDE	BDL	200
18P.	PCB-1242	BDL	200
19P.	PCB-1254	BDL	200
20P.	PCB-1221	BDL	200
21P.	PCB-1232	BDL	200
22P.	PCB-1248	BDL	200
23P.	PCB-1260	BDL	200
24P.	PCB-1016	BDL	200
25P.	TOXAPHENE	BDL	200

BDL=BELOW DETECTION LIMIT
†See Data Report Notice

COMPOUND LIST - INORGANICS (METALS)

SAMPLE IDENTIFIER: SD-2
COMPUCHEM SAMPLE NUMBER: 32299

INORGANICS PRIORITY POLLUTANTS	CONCENTRATION (UG/G)	DETECTION LIMIT† (UG/G)
1. CADMIUM, TOTAL	BDL	0.20
2. CHROMIUM, TOTAL	6.3	0.50
3. COPPER, TOTAL	8.2	1.0
4. LEAD, TOTAL*	7.0	0.50
5. MERCURY, TOTAL	0.064	0.0020
6. NICKEL, TOTAL	8.5	1.0
7. ZINC, TOTAL	34	0.20

BDL=BELOW DETECTION LIMIT
†See Data Report Notice

*Lead analyzed by Flame AAS because of concentration level found.

3308 East Chapel Hill/Nelson Highway
P.O. Box 12652
Research Triangle Park, NC 27709

Telephone: 919-549-8263
800-334-8525

CompuChem LABORATORIES

August 27, 1984

Mr. Ernie Schroder
Engineering Science, Inc.
57 Executive Park South
Suite 590
Atlanta, GA 30329

SEP 04 1984

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Sincerely,

Customer Service Dept.
CompuChem®

Enclosure:

Report:	SD-3	-	32297
	SD-1	-	32301

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DATA REPORT NOTICE

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CompuChem LABORATORIES

REPORT OF DATA

SAMPLE IDENTIFIER	COMPUCHEM SAMPLE NUMEBER
SD-3	32297
SD-1	32301

SUBMITTED TO:

Mr. Ernie Schroder
Engineering Science, Inc.
57 Executive Park South
Suite 590
Atlanta, GA 30329

Diana A. Scammell
DIANA A. SCAMMELL
TECHNICAL SPECIALIST, OPERATIONS

R. L. MYERS, PH.D., PRESIDENT

ROBERT E. MEIERER
DIRECTOR OF QUALITY ASSURANCE

139

LABORATORY CHRONICLE

SAMPLE IDENTIFIER: SD-3
COMPUCHEM SAMPLE NUMBER: 32297

	Date
Received/Refrigerated	7-27-84
Organics	
Extracted	8-1-84
Analyzed	
1. Volatiles	7-30-84
2. Acid	8-8-84
3. Base/Neutrals	8-4-84
4. Pesticides/PCBS	8-4-84
Inorganics	
1. Metals	8-14-84
2. Cyanide	Not Requested
3. Phenols	Not Requested

COMPOUND LIST - VOLATILES ORGANICS

SAMPLE IDENTIFIER: SD-3
COMPUCHEM SAMPLE NUMBER: 32297

		CONCENTRATION (UG/KG)	DETECTION LIMIT (UG/KG)
1V.	CHLOROMETHANE	BDL	10
2V.	VINYL CHLORIDE	BDL	10
3V.	CHLOROETHANE	BDL	10
4V.	BROMOMETHANE	BDL	10
5V.	ACROLEIN	BDL	100
6V.	ACRYLONITRILE	BDL	100
7V.	METHYLENE CHLORIDE	BDL	10
8V.	TRICHLOROFLUOROMETHANE	BDL	10
9V.	1,1-DICHLOROETHYLENE	BDL	10
10V.	1,1-DICHLOROETHANE	BDL	10
11V.	TRANS-1,2-DICHLOROETHYLENE	BDL	10
12V.	CHLOROFORM	BDL	10
13V.	1,2-DICHLOROETHANE	BDL	10
14V.	1,1,1-TRICHLOROETHANE	BDL	10
15V.	CARBON TETRACHLORIDE	BDL	10
16V.	BROMODICHLOROMETHANE	BDL	10
17V.	1,2-DICHLOROPROPANE	BDL	10
18V.	TRANS-1,3-DICHLOROPROPENE	BDL	10
19V.	TRICHLOROETHYLENE	BDL	10
20V.	BENZENE	BDL	10
21V.	CIS-1,3-DICHLOROPROPENE	BDL	10
22V.	1,1,2-TRICHLOROETHANE	BDL	10
23V.	DIBROMOCHLOROMETHANE	BDL	10
24V.	BROMOFORM	BDL	10
25V.	1,1,2,2-TETRACHLOROETHYLENE	BDL	10
26V.	1,1,2,2-TETRACHLOROETHANE	BDL	10
27V.	TOLUENE	BDL	10
28V.	CHLOROBENZENE	BDL	10
29V.	ETHYLBENZENE	BDL	10
30V.	2-CHLOROETHYL VINYL ETHER	BDL	10
31V.	DICHLORODIFLUOROMETHANE†	BDL	
32V.	BIS(CHLOROMETHYL)ETHER†	BDL	

BDL=BELOW DETECTION LIMIT

†See Data Report Notice

COMPOUND LIST -- ACID EXTRACTABLE ORGANICS

SAMPLE IDENTIFIER: SD-3
COMPUCHEM SAMPLE NUMBER: 32297

		CONCENTRATION (UG/KG)	DETECTION* LIMIT (UG/KG)
1A.	PHENOL	BDL	500
2A.	2-CHLOROPHENOL	BDL	500
3A.	2-NITROPHENOL	BDL	500
4A.	2,4-DIMETHYLPHENOL	BDL	500
5A.	2,4-DICHLOROPHENOL	BDL	500
6A.	P-CHLORO-M-CRESOL	BDL	500
7A.	2,4,6-TRICHLOROPHENOL	BDL	500
8A.	2,4-DINITROPHENOL	BDL	5000
9A.	4-NITROPHENOL	BDL	500
10A.	4,6-DINITRO-O-CRESOL	BDL	5000
11A.	PENTACHLOROPHENOL	BDL	500

BDL=BELOW DETECTION LIMIT
*Detection limits based on processing 50g of as-received sample.

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLE ORGANICS

SAMPLE IDENTIFIER: SD-3
COMPUCHEM SAMPLE NUMBER: 32297

		CONCENTRATION (UG/KG)	DETECTION* LIMIT (UG/KG)
1B.	N-NITROSODIMETHYLAMINE	BDL	200
2B.	BIS (2-CHLOROETHYL) ETHER	BDL	200
3B.	1,3-DICHLOROBENZENE	BDL	200
4B.	1,4-DICHLOROBENZENE	BDL	200
5B.	1,2-DICHLOROBENZENE	BDL	200
6B.	BIS (2-CHLOROISOPROPYL) ETHER	BDL	200
7B.	HEXACHLOROETHANE	BDL	200
8B.	N-NITROSODI-N-PROPYLAMINE	BDL	200
9B.	NITROBENZENE	BDL	200
10B.	ISOPHORONE	BDL	200
11B.	BIS(2-CHLOROETHOXY) METHANE	BDL	200
12B.	1,2,4-TRICHLOROBENZENE	BDL	200
13B.	NAPHTHALENE	BDL	200
14B.	HEXACHLOROBUTADIENE	BDL	200
15B.	HEXACHLOROCYCLOPENTADIENE	BDL	200
16B.	2-CHLORONAPHTHALENE	BDL	200
17B.	DIMETHYLPHTHALATE	BDL	200
18B.	ACENAPHTHYLENE	BDL	200
19B.	2,6-DINITROTOLUENE	BDL	200
20B.	ACENAPHTHENE	BDL	200
21B.	2,4-DINITROTOLUENE	BDL	200
22B.	DIETHYLPHTHALATE	BDL	200
23B.	FLUORENE	BDL	200
24B.	4-CHLOROPHENYL PHENYL ETHER	BDL	200
25B.	DIPHENYLAMINE (N-NITROSO)	BDL	200
26B.	1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	BDL	200
27B.	4-BROMOPHENYL PHENYL ETHER	BDL	200
28B.	HEXACHLOROBENZENE	BDL	200

BDL=BELOW DETECTION LIMIT
*Detection limits based on processing 50g of as-received sample.

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLE ORGANICS (Page Two)

SAMPLE IDENTIFIER: SD-3
COMPUCHEM SAMPLE NUMBER: 32297

		CONCENTRATION (UG/KG)	DETECTION* LIMIT (UG/KG)
29B.	PHENANTHRENE	BDL	200
30B.	ANTHRACENE	BDL	200
31B.	DI-N-BUTYLPHTHALATE	BDL	200
32B.	FLUORANTHENE	BDL	200
33B.	BENZIDINE	BDL	200
34B.	PYRENE	BDL	200
35B.	BUTYLBENZYLPHTHALATE	BDL	200
36B.	BENZO(A)ANTHRACENE	BDL	200
37B.	3,3'-DICHLOROBENZIDINE	BDL	200
38B.	CHRYSENE	BDL	200
39B.	BIS(2-ETHYLHEXYL)PHTHALATE	BDL	200
40B.	DI-N-OCTYLPHTHALATE	BDL	200
41B.	BENZO(B)FLUORANTHENE	BDL	200
42B.	BENZO(K)FLUORANTHENE	BDL	200
43B.	BENZO(A)PYRENE	BDL	200
44B.	INDENO(1,2,3-C,D)PYRENE	BDL	500
45B.	DIBENZO(A,H)ANTHRACENE	BDL	500
46B.	BENZO(G,H,I)PERYLENE	BDL	500

BDL=BELOW DETECTION LIMIT
*Detection limits based on processing 50g of as-received sample.

COMPOUND LIST -- PESTICIDES/PCB'S

SAMPLE IDENTIFIER: SD-3
COMPUCHEM SAMPLE NUMBER: 32297

		CONCENTRATION (UG/KG)	DETECTION* LIMIT (UG/KG)
1P.	ALDRIN	BDL	200
2P.	ALPHA-BHC	BDL	200
3P.	BETA-BHC	BDL	200
4P.	GAMMA-BHC	BDL	200
5P.	DELTA-BHC	BDL	200
6P.	CHLORDANE	BDL	200
7P.	4,4'-DDT	BDL	200
8P.	4,4'-DDE	BDL	200
9P.	4,4'-DDD	BDL	200
10P.	DIELDRIN	BDL	200
11P.	ALPHA-ENDOSULFAN	BDL	200
12P.	BETA-ENDOSULFAN	BDL	200
13P.	ENDOSULFAN SULFATE	BDL	200
14P.	ENDRIN	BDL	200
15P.	ENDRIN ALDEHYDE	BDL	200
16P.	HEPTACHLOR	BDL	200
17P.	HEPTACHLOR EPOXIDE	BDL	200
18P.	PCB-1242	BDL	200
19P.	PCB-1254	BDL	200
20P.	PCB-1221	BDL	200
21P.	PCB-1232	BDL	200
22P.	PCB-1248	BDL	200
23P.	PCB-1260	BDL	200
24P.	PCB-1016	BDL	200
25P.	TOXAPHENE	BDL	200

BDL=BELOW DETECTION LIMIT
*Detection limit based on processing 50g of as-received sample.

COMPOUND LIST -- INORGANICS PRIORITY POLLUTANTS

SAMPLE IDENTIFIER: SD-3
COMPUCHEM SAMPLE NUMBER: 32297

	CONCENTRATION (UG/G)	DETECTION LIMIT (UG/G)
1. CADMIUM	BDL	0.20
2. CHROMIUM	5.6	0.50
3. COPPER	10.0	1.0
4. LEAD *	14	0.50
5. MERCURY	0.010	0.0020
6. NICKEL	9.4	1.0
7. ZINC	48	0.20

BDL=BELOW DETECTION LIMIT

*Lead analyzed by Flame AAS because of concentration level found.

LABORATORY CHRONICLE

SAMPLE IDENTIFIER: SD-1
COMPUCHEM SAMPLE NUMBER: 32301

	Date
Received/Refrigerated	7-27-84
Organics	
Extracted	8-1-84
Analyzed	
1. Volatiles	7-31-84
2. Acid	8-8-84
3. Base/Neutrals	8-6-84
4. Pesticides/PCBS	8-6-84
Inorganics	
1. Metals	8-14-84
2. Cyanide	Not Requested
3. Phenols	Not Requested

COMPOUND LIST - VOLATILES ORGANICS

SAMPLE IDENTIFIER: SD-1
COMPUCHEM SAMPLE NUMBER: 32301

		CONCENTRATION (UG/KG)	DETECTION LIMIT (UG/KG)
1V.	CHLOROMETHANE	BDL	10
2V.	VINYL CHLORIDE	BDL	10
3V.	CHLOROETHANE	BDL	10
4V.	BROMOMETHANE	BDL	10
5V.	ACROLEIN	BDL	100
6V.	ACRYLONITRILE	BDL	100
7V.	METHYLENE CHLORIDE	BDL	10
8V.	TRICHLOROFLUOROMETHANE	BDL	10
9V.	1,1-DICHLOROETHYLENE	BDL	10
10V.	1,1-DICHLOROETHANE	BDL	10
11V.	TRANS-1,2-DICHLOROETHYLENE	BDL	10
12V.	CHLOROFORM	BDL	10
13V.	1,2-DICHLOROETHANE	BDL	10
14V.	1,1,1-TRICHLOROETHANE	BDL	10
15V.	CARBON TETRACHLORIDE	BDL	10
16V.	BROMODICHLOROMETHANE	BDL	10
17V.	1,2-DICHLOROPROPANE	BDL	10
18V.	TRANS-1,3-DICHLOROPROPENE	BDL	10
19V.	TRICHLOROETHYLENE	BDL	10
20V.	BENZENE	BDL	10
21V.	CIS-1,3-DICHLOROPROPENE	BDL	10
22V.	1,1,2-TRICHLOROETHANE	BDL	10
23V.	DIBROMOCHLOROMETHANE	BDL	10
24V.	BROMOFORM	BDL	10
25V.	1,1,2,2-TETRACHLOROETHYLENE	BDL	10
26V.	1,1,2,2-TETRACHLOROETHANE	BDL	10
27V.	TOLUENE	BDL	10
28V.	CHLOROBENZENE	BDL	10
29V.	ETHYLBENZENE	BDL	10
30V.	2-CHLOROETHYL VINYL ETHER	BDL	10
31V.	DICHLORODIFLUOROMETHANE†	BDL	
32V.	BIS(CHLOROMETHYL)ETHER†	BDL	

BDL=BELOW DETECTION LIMIT

†See Data Report Notice

COMPOUND LIST -- ACID EXTRACTABLE ORGANICS

SAMPLE IDENTIFIER: SD-1
COMPUCHEM SAMPLE NUMBER: 32301

		CONCENTRATION (UG/KG)	DETECTION* LIMIT (UG/KG)
1A.	PHENOL	BDL	500
2A.	2-CHLOROPHENOL	BDL	500
3A.	2-NITROPHENOL	BDL	500
4A.	2,4-DIMETHYLPHENOL	BDL	500
5A.	2,4-DICHLOROPHENOL	BDL	500
6A.	P-CHLORO-M-CRESOL	BDL	500
7A.	2,4,6-TRICHLOROPHENOL	BDL	500
8A.	2,4-DINITROPHENOL	BDL	5000
9A.	4-NITROPHENOL	BDL	500
10A.	4,6-DINITRO-O-CRESOL	BDL	5000
11A.	PENTACHLOROPHENOL	BDL	500

BDL=BELOW DETECTION LIMIT
*Detection limits based on processing 50g of as-received sample.

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLE ORGANICS

SAMPLE IDENTIFIER: SD-1
COMPUCHEM SAMPLE NUMBER: 32301

		CONCENTRATION (UG/KG)	DETECTION* LIMIT (UG/KG)
1B.	N-NITROSODIMETHYLAMINE	BDL	200
2B.	BIS (2-CHLOROETHYL) ETHER	BDL	200
3B.	1,3-DICHLOROBENZENE	BDL	200
4B.	1,4-DICHLOROBENZENE	BDL	200
5B.	1,2-DICHLOROBENZENE	BDL	200
6B.	BIS (2-CHLOROISOPROPYL) ETHER	BDL	200
7B.	HEXACHLOROETHANE	BDL	200
8B.	N-NITROSODI-N-PROPYLAMINE	BDL	200
9B.	NITROBENZENE	BDL	200
10B.	ISOPHORONE	BDL	200
11B.	BIS(2-CHLOROETHOXY) METHANE	BDL	200
12B.	1,2,4-TRICHLOROBENZENE	BDL	200
13B.	NAPHTHALENE	BDL	200
14B.	HEXACHLOROBUTADIENE	BDL	200
15B.	HEXACHLOROCYCLOPENTADIENE	BDL	200
16B.	2-CHLORONAPHTHALENE	BDL	200
17B.	DIMETHYLPHTHALATE	BDL	200
18B.	ACENAPHTHYLENE	BDL	200
19B.	2,6-DINITROTOLUENE	BDL	200
20B.	ACENAPHTHENE	BDL	200
21B.	2,4-DINITROTOLUENE	BDL	200
22B.	DIETHYLPHTHALATE	BDL	200
23B.	FLUORENE	BDL	200
24B.	4-CHLOROPHENYL PHENYL ETHER	BDL	200
25B.	DIPHENYLAMINE (N-NITROSO)	BDL	200
26B.	1,2-DIPHENYLHYDRAZINE (AZOBENZENE)	BDL	200
27B.	4-BROMOPHENYL PHENYL ETHER	BDL	200
28B.	HEXACHLOROBENZENE	BDL	200

BDL=BELOW DETECTION LIMIT
*Detection limit based on processing 50g of as-received sample.

COMPOUND LIST -- BASE-NEUTRAL EXTRACTABLE ORGANICS (Page Two)

SAMPLE IDENTIFIER: SD-1
COMPUCHEM SAMPLE NUMBER: 32301

		CONCENTRATION (UG/KG)	DETECTION* LIMIT (UG/KG)
29B.	PHENANTHRENE	BDL	200
30B.	ANTHRACENE	BDL	200
31B.	DI-N-BUTYLPHTHALATE	BDL	200
32B.	FLUORANTHENE	BDL	200
33B.	BENZIDINE	BDL	200
34B.	PYRENE	BDL	200
35B.	BUTYLBENZYLPHTHALATE	BDL	200
36B.	BENZO(A)ANTHRACENE	BDL	200
37B.	3,3'-DICHLOROBENZIDINE	BDL	200
38B.	CHRYSENE	BDL	200
39B.	BIS(2-ETHYLHEXYL)PHTHALATE	BDL	200
40B.	DI-N-OCTYLPHTHALATE	BDL	200
41B.	BENZO(B)FLUORANTHENE	BDL	200
42B.	BENZO(K)FLUORANTHENE	BDL	200
43B.	BENZO(A)PYRENE	BDL	200
44B.	INDENO(1,2,3-C,D)PYRENE	BDL	500
45B.	DIBENZO(A,H)ANTHRACENE	BDL	500
46B.	BENZO(G,H,I)PERYLENE	BDL	500

BDL=BELOW DETECTION LIMIT
*Detection limit based on processing 50g of as-received sample.

COMPOUND LIST -- PESTICIDES/PCB'S

SAMPLE IDENTIFIER: SD-1
COMPUCHEM SAMPLE NUMBER: 32301

		CONCENTRATION (UG/KG)	DETECTION* LIMIT (UG/KG)
1P.	ALDRIN	BDL	200
2P.	ALPHA-BHC	BDL	200
3P.	BETA-BHC	BDL	200
4P.	GAMMA-BHC	BDL	200
5P.	DELTA-BHC	BDL	200
6P.	CHLORDANE	BDL	200
7P.	4,4'-DDT	BDL	200
8P.	4,4'-DDE	BDL	200
9P.	4,4'-DDD	BDL	200
10P.	DIELDRIN	BDL	200
11P.	ALPHA-ENDOSULFAN	BDL	200
12P.	BETA-ENDOSULFAN	BDL	200
13P.	ENDOSULFAN SULFATE	BDL	200
14P.	ENDRIN	BDL	200
15P.	ENDRIN ALDEHYDE	BDL	200
16P.	HEPTACHLOR	BDL	200
17P.	HEPTACHLOR EPOXIDE	BDL	200
18P.	PCB-1242	BDL	200
19P.	PCB-1254	BDL	200
20P.	PCB-1221	BDL	200
21P.	PCB-1232	BDL	200
22P.	PCB-1248	BDL	200
23P.	PCB-1260	BDL	200
24P.	PCB-1016	BDL	200
25P.	TOXAPHENE	BDL	200

BDL=BELOW DETECTION LIMIT
*Detection limit based on processing 50g of as-received sample.

COMPOUND LIST -- INORGANICS PRIORITY POLLUTANTS

SAMPLE IDENTIFIER: SD-1
COMPUCHEM SAMPLE NUMBER: 32301

	CONCENTRATION (UG/G)	DETECTION LIMIT (UG/G)
1. CADMIUM, TOTAL	0.30	0.020
2. CHROMIUM, TOTAL	6.8	0.50
3. COPPER, TOTAL	5.7	1.0
4. LEAD, TOTAL *	18	0.50
5. MERCURY, TOTAL	0.0084	0.0020
6. NICKEL, TOTAL	6.5	1.0
7. ZINC, TOTAL	40	0.20

BDL=BELOW DETECTION LIMIT

*Lead analyzed by flame AAS because of concentration level found.

6) GROUNDWATER DATA

Nash Rd

H2M LABORATORY

ENVIRONMENTAL and INDUSTRIAL ANALYTICAL SERVICES

November 1, 1984

Mr. Rocco Palazolo
Engineering Sciences
57 Executive Park S.
Atlanta, Georgia 30329

Re: Sample results for OW-1A, OW-1B, OW-2, OW-3, OW-4, OW-5, & OW-6.

Dear Rocco:

Enclosed please find additional copies of the reports for the above referenced samples. As we discussed, they were shipped to RECRA Environmental Laboratories for analysis, since we were unable to meet your turnaround time needs at the time.

Should you have any questions or comments, please do not hesitate to contact me at anytime.

Very truly yours,

H2M CORPORATION

Stanley C. Lewis
Operations Manager - Laboratory

SCL/jes
Enclosure

575 BROAD HOLLOW ROAD, MELVILLE, N.Y. 11747 • 516-694-3040

Established in 1956

Member ACIL

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RECRA ENVIRONMENTAL LABORATORIES

Division of Recra Research, Inc.

August 24, 1984

Mr. Stan Lewis
H2M
575 Broadhallow Road
Melville, NY 11747

Re: Analytical Results

Dear Mr. Lewis:

Please find enclosed results of the analyses of the samples received at our laboratories on July 30 and August 1, 1984.

If you have any questions concerning these data, do not hesitate to contact our Customer Service Representative at (716) 692-7620.

Sincerely,

RECRA ENVIRONMENTAL LABORATORIES

James A. Ploscyca
Laboratory Manager

BJK/JAP/mdc/jhs
Enclosure

I.D. #84-746
84-746 A
84-746 B

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4248 Ridge Lea Road, Amherst, New York 14226

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Laboratory (716) 692-7620

RECRA ENVIRONMENTAL LABORATORIES
Division of Recra Research, Inc.

ANALYTICAL

REPORT

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RECRA ENVIRONMENTAL LABORATORIES

Division of Recra Research, Inc.

ANALYTICAL RESULTS

H2M
PRIORITY POLLUTANT ANALYSES

Prepared For:

H2M
575 Broadhallow Road
Melville, NY 11747

Prepared By:

Recra Environmental Laboratories
4248 Ridge Lea Road
Amherst, NY 14226

Report Date:

August 24, 1984

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4248 Ridge Lea Road, Amherst, New York 14226

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ANALYTICAL RESULTS

H2M
PRIORITY POLLUTANT ANALYSES

Report Date: 8/24/84

INTRODUCTION:

On July 30, and August 1, 1984 samples were received at Recra Environmental Laboratories. A request was made by H2M to have the samples analyzed for selected fractions of the Environmental Protection Agency decreed priority pollutants, total organic halide, and to determine the pH.

This report will address the results of those analyses.

METHODS:

Priority pollutant analyses were conducted according to Environmental Protection Agency (EPA) methodologies.

Organic priority pollutants were analyzed by Gas Chromatography/Mass Spectrometry (GC/MS).

RESULTS AND DISCUSSION:

Analysis for total organic halide was subcontracted. Sample FT-1 for total organic halide was not received.

Total organic halide values reported as "less than" (<) indicate the working detection limit for the given sample and/or parameter.

Sample OW-2 was analyzed in duplicate for the base neutral compounds but no positive values resulted.

Compounds reported as ND are "not detected". Compounds reported as BDL are confirmed as being present in the sample at a level "below detection limit", and are not subject to reliable quantitation.

Respectfully Submitted,

RECRA ENVIRONMENTAL LABORATORIES

Barbara J Krajewski

ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 8/24/84

BASE/NEUTRALS

COMPOUND	DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION		
		OW-1	OW-1B	OW-2
acenaphthene	1.9	ND	ND	ND
acenaphthylene	3.5	ND	ND	ND
anthracene	1.9	ND	ND	ND
benzidine	44	ND	ND	ND
benzo(a)anthracene	7.8	ND	ND	ND
benzo(a)pyrene	2.5	ND	ND	ND
benzo(b)fluoranthene	4.8	ND	ND	ND
benzo(g,h,i)perylene	4.1	ND	ND	ND
benzo(k)fluoranthene	2.5	ND	ND	ND
bis(2-chloroethoxy)methane	5.3	ND	ND	ND
bis(2-chloroethyl)ether	5.7	ND	ND	ND
bis(2-chloroisopropyl)ether	5.7	ND	ND	ND
bis(2-ethylhexyl)phthalate	2.5	ND	ND	ND
4-bromophenylphenylether	1.9	ND	ND	ND
butylbenzylphthalate	2.5	ND	ND	ND
2-chloronaphthalene	1.9	ND	ND	ND
4-chlorophenylphenylether	4.2	ND	ND	ND
chrysene	2.5	ND	ND	ND
dibenzo(a,h)anthracene	2.5	ND	ND	ND
1,2-dichlorobenzene	1.9	ND	ND	ND
1,3-dichlorobenzene	1.9	ND	ND	ND
1,4-dichlorobenzene	4.4	ND	ND	ND
3,3'-dichlorobenzidine	16.5	ND	ND	ND
diethylphthalate	22	ND	ND	ND
dimethylphthalate	1.6	ND	ND	ND
di-n-butylphthalate	2.5	ND	ND	ND

(Continued)

RECRA ENVIRONMENTAL LABORATORIES

ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 8/24/84

BASE/NEUTRALS

COMPOUND	DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION OW-1	OW-1B	OW-2
2,6-dinitrotoluene	1.9	ND	ND	ND
2,4-dinitrotoluene	5.7	ND	ND	ND
di-n-octylphthalate	2.5	ND	ND	ND
1,2-diphenylhydrazine	25	ND	ND	ND
fluoranthene	2.2	ND	ND	ND
fluorene	1.9	ND	ND	ND
hexachlorobenzene	1.9	ND	ND	ND
hexachlorobutadiene	0.9	ND	ND	ND
hexachlorocyclopentadiene	25	ND	ND	ND
hexachloroethane	1.6	ND	ND	ND
indeno(1,2,3-cd)pyrene	3.7	ND	ND	ND
isophorone	2.2	ND	ND	ND
naphthalene	1.6	ND	ND	ND
nitrobenzene	1.9	ND	ND	ND
N-nitrosodimethylamine	25	ND	ND	ND
N-nitrosodi-n-propylamine	25	ND	ND	ND
N-nitrosodiphenylamine	1.9	ND	ND	ND
phenanthrene	5.4	ND	ND	ND
pyrene	1.9	ND	ND	ND
1,2,4-trichlorobenzene	1.9	ND	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	7/2/84	7/3/84	7/3/84
Extraction Date	7/31/84	8/22/84	7/31/84
Analysis Date	8/14/84	8/23/84	8/15/84
Internal Standard - Level	20 µg/l	20 µg/l	20 µg/l
deuterated phenanthrene - Recovery	102%	82%	130%
Surrogate Standard (SS3) - Level	120 µg/l	120 µg/l	120 µg/l
Decafluorobiphenyl - Recovery	54%	62%	65%
Surrogate Standard (SS4) - Level	100 µg/l	100 µg/l	100 µg/l
2-fluorobiphenyl - Recovery	61%	70%	63%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski /6/

DATE 8/24/84

RECRA ENVIRONMENTAL LABORATORIES

ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 8/24/84

BASE/NEUTRALS

COMPOUND	DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION		
		OW-3	OW-4	OW-5
cenaphthene	1.9	ND	ND	ND
acenaphthylene	3.5	ND	ND	ND
nthracene	1.9	ND	ND	ND
benzidine	44	ND	ND	ND
enzo(a)anthracene	7.8	ND	ND	ND
benzo(a)pyrene	2.5	ND	ND	ND
enzo(b)fluoranthene	4.8	ND	ND	ND
enzo(g,h,i)perylene	4.1	ND	ND	ND
enzo(k)fluoranthene	2.5	ND	ND	ND
is(2-chloroethoxy)methane	5.3	ND	ND	ND
bis(2-chloroethyl)ether	5.7	ND	ND	ND
is(2-chloroisopropyl)ether	5.7	ND	ND	ND
bis(2-ethylhexyl)phthalate	2.5	ND	ND	ND
-bromophenylphenylether	1.9	ND	ND	ND
butylbenzylphthalate	2.5	ND	ND	ND
-chloronaphthalene	1.9	ND	ND	ND
4-chlorophenylphenylether	4.2	ND	ND	ND
hrysene	2.5	ND	ND	ND
ibenzo(a,h)anthracene	2.5	ND	ND	ND
1,2-dichlorobenzene	1.9	ND	ND	ND
,3-dichlorobenzene	1.9	ND	ND	ND
1,4-dichlorobenzene	4.4	ND	ND	ND
3'-dichlorobenzidine	16.5	ND	ND	ND
diethylphthalate	22	ND	ND	ND
imethylphthalate	1.6	ND	ND	ND
di-n-butylphthalate	2.5	ND	ND	ND

(Continued)

ECRA ENVIRONMENTAL LABORATORIES

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ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 8/24/84

BASE/NEUTRALS

COMPOUND	DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION		
		OW-3	OW-4	OW-5
2,6-dinitrotoluene	1.9	ND	ND	ND
2,4-dinitrotoluene	5.7	ND	ND	ND
di-n-octylphthalate	2.5	ND	ND	ND
1,2-diphenylhydrazine	25	ND	ND	ND
fluoranthene	2.2	ND	ND	ND
fluorene	1.9	ND	ND	ND
hexachlorobenzene	1.9	ND	ND	ND
hexachlorobutadiene	0.9	ND	ND	ND
hexachlorocyclopentadiene	25	ND	ND	ND
hexachloroethane	1.6	ND	ND	ND
indeno(1,2,3-cd)pyrene	3.7	ND	ND	ND
isophorone	2.2	ND	ND	ND
naphthalene	1.6	ND	ND	ND
nitrobenzene	1.9	ND	ND	ND
N-nitrosodimethylamine	25	ND	ND	ND
N-nitrosodi-n-propylamine	25	ND	ND	ND
N-nitrosodiphenylamine	1.9	ND	ND	ND
phenanthrene	5.4	ND	ND	ND
pyrene	1.9	ND	ND	ND
1,2,4-trichlorobenzene	1.9	ND	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	7/2/84	7/3/84	7/10/84
Extraction Date	7/31/84	7/31/84	7/31/84
Analysis Date	8/15/84	8/15/84	8/15/84
Internal Standard - Level	20 µg/l	20 µg/l	20 µg/l
deuterated phenanthrene - Recovery	110%	130%	135%
Surrogate Standard (SS3) - Level	120 µg/l	120 µg/l	120 µg/l
decafluorobiphenyl - Recovery	65%	58%	59%
Surrogate Standard (SS4) - Level	100 µg/l	100 µg/l	100 µg/l
2-fluorobiphenyl - Recovery	56%	47%	45%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski 163

DATE 8/24/84

RECRA ENVIRONMENTAL LABORATORIES

ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 8/24/84

BASE/NEUTRALS

COMPOUND	DETECTION LIMIT (ug/l)	SAMPLE IDENTIFICATION		
		OW-6	OSTERMAN WELL	FT-1
acenaphthene	1.9	ND	ND	ND
acenaphthylene	3.5	ND	ND	ND
anthracene	1.9	ND	ND	ND
benzidine	44	ND	ND	ND
benzo(a)anthracene	7.8	ND	ND	ND
benzo(a)pyrene	2.5	ND	ND	ND
benzo(b)fluoranthene	4.8	ND	ND	ND
benzo(g,h,i)perylene	4.1	ND	ND	ND
benzo(k)fluoranthene	2.5	ND	ND	ND
bis(2-chloroethoxy)methane	5.3	ND	ND	ND
bis(2-chloroethyl)ether	5.7	ND	ND	ND
bis(2-chloroisopropyl)ether	5.7	ND	ND	ND
bis(2-ethylhexyl)phthalate	2.5	ND	ND	ND
4-bromophenylphenylether	1.9	ND	ND	ND
butylbenzylphthalate	2.5	ND	ND	ND
2-chloronaphthalene	1.9	ND	ND	ND
4-chlorophenylphenylether	4.2	ND	ND	ND
chrysene	2.5	ND	ND	ND
dibenzo(a,h)anthracene	2.5	ND	ND	ND
1,2-dichlorobenzene	1.9	ND	ND	ND
1,3-dichlorobenzene	1.9	ND	ND	ND
1,4-dichlorobenzene	4.4	ND	ND	ND
3,3'-dichlorobenzidine	16.5	ND	ND	ND
diethylphthalate	22	ND	ND	ND
dimethylphthalate	1.6	ND	ND	ND
di-n-butylphthalate	2.5	ND	ND	ND

(Continued)

ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 8/24/84

BASE/NEUTRALS

COMPOUND	DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION		
		OW-6	OSTERMAN WELL	FT-1
2,6-dinitrotoluene	1.9	ND	ND	ND
2,4-dinitrotoluene	5.7	ND	ND	ND
di-n-octylphthalate	2.5	ND	ND	ND
1,2-diphenylhydrazine	25	ND	ND	ND
fluoranthene	2.2	ND	ND	ND
fluorene	1.9	ND	ND	ND
hexachlorobenzene	1.9	ND	ND	ND
hexachlorobutadiene	0.9	ND	ND	ND
hexachlorocyclopentadiene	25	ND	ND	ND
hexachloroethane	1.6	ND	ND	ND
indeno(1,2,3-cd)pyrene	3.7	ND	ND	ND
isophorone	2.2	ND	ND	ND
naphthalene	1.6	ND	ND	ND
nitrobenzene	1.9	ND	ND	ND
N-nitrosodimethylamine	25	ND	ND	ND
N-nitrosodi-n-propylamine	25	ND	ND	ND
N-nitrosodiphenylamine	1.9	ND	ND	ND
phenanthrene	5.4	ND	ND	ND
pyrene	1.9	ND	ND	ND
1,2,4-trichlorobenzene	1.9	ND	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	7/10/84	7/11/84	7/3/84
Extraction Date	7/31/84	7/31/84	7/31/84
Analysis Date	8/15/84	8/15/84	8/15/84
Internal Standard - Level	20 µg/l	20 µg/l	20 µg/l
deuterated phenanthrene - Recovery	130%	78%	135%
Surrogate Standard (SS3) - Level	120 µg/l	120 µg/l	120 µg/l
decafluorobiphenyl - Recovery	71%	50%	64%
Surrogate Standard (SS4) - Level	100 µg/l	100 µg/l	100 µg/l
2-fluorobiphenyl - Recovery	63%	52%	55%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kazenski 165

DATE 8/24/84

RECRA ENVIRONMENTAL LABORATORIES

ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 8/24/84

VOLATILES

COMPOUND	DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION		
		OW-1	OW-1B	OW-2
acrolein	400	ND	ND	ND
acrylonitrile	400	ND	ND	ND
benzene	4.4	ND	ND	ND
bromodichloromethane	2.2	ND	ND	ND
bromoform	4.7	ND	ND	ND
bromomethane	10	ND	ND	ND
carbon tetrachloride	2.8	ND	ND	ND
chlorobenzene	6.0	ND	ND	ND
chloroethane	10	ND	ND	ND
2-chloroethylvinyl ether	10	ND	ND	ND
chloroform	1.6	ND	ND	ND
chloromethane	10	ND	ND	ND
dibromochloromethane	3.1	ND	ND	ND
1,1-dichloroethane	4.7	ND	ND	ND
1,2-dichloroethane	2.8	ND	ND	ND
1,1-dichloroethylene	2.8	ND	ND	ND
trans-1,2-dichloroethylene	1.6	ND	ND	ND
1,2-dichloropropane	6.0	ND	ND	ND
1,3-dichloropropene	5.0	ND	ND	ND
ethylbenzene	7.2	ND	ND	ND
methylene chloride	2.8	ND	ND	ND
1,1,2,2-tetrachloroethane	6.9	ND	ND	ND
tetrachloroethylene	4.1	ND	ND	ND

(Continued)

ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 8/24/84

VOLATILES

COMPOUND	DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION		
		OW-1	OW-1B	OW-2
toluene	6.0	ND	ND	ND
1,1,1-trichloroethane	3.8	ND	BDL	ND
1,1,2-trichloroethane	5.0	ND	ND	ND
trichloroethylene	1.9	ND	ND	ND
vinyl chloride	10	ND	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	7/2/84	7/3/84	7/3/84
Analysis Date	8/13/84	8/13/84	8/13/84
Internal Standard - Level	40 µg/l	40 µg/l	40 µg/l
bromochloromethane - Recovery	99%	120%	96%
Internal Standard - Level	40 µg/l	40 µg/l	40 µg/l
2-bromo-1-chloropropane - Recovery	99%	110%	96%
Internal Standard - Level	40 µg/l	40 µg/l	40 µg/l
1,4-dichlorobutane - Recovery	99%	120%	100%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 8/24/84

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RA ENVIRONMENTAL LABORATORIES
I.D. #84-746

ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 8/24/84

VOLATILES

COMPOUND	DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION		
		OW-3	OW-4	OW-5
acrolein	400	ND	ND	ND
acrylonitrile	400	ND	ND	ND
benzene	4.4	ND	ND	ND
bromodichloromethane	2.2	ND	ND	ND
bromoform	4.7	ND	ND	ND
bromomethane	10	ND	ND	ND
carbon tetrachloride	2.8	ND	ND	ND
chlorobenzene	6.0	ND	ND	ND
chloroethane	10	ND	ND	ND
2-chloroethylvinyl ether	10	ND	ND	ND
chloroform	1.6	ND	ND	ND
chloromethane	10	ND	ND	ND
dibromochloromethane	3.1	ND	ND	ND
1,1-dichloroethane	4.7	ND	ND	ND
1,2-dichloroethane	2.8	ND	ND	ND
1,1-dichloroethylene	2.8	ND	ND	ND
trans-1,2-dichloroethylene	1.6	ND	ND	ND
1,2-dichloropropane	6.0	ND	ND	ND
1,3-dichloropropene	5.0	ND	ND	ND
ethylbenzene	7.2	ND	ND	ND
methylene chloride	2.8	ND	ND	ND
1,1,2,2-tetrachloroethane	6.9	ND	ND	ND
tetrachloroethylene	4.1	ND	ND	ND

(Continued)

RA ENVIRONMENTAL LABORATORIES

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ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 8/24/84

VOLATILES

COMPOUND	DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION OW-3	OW-4	OW-5
toluene	6.0	ND	ND	ND
1,1,1-trichloroethane	3.8	ND	ND	ND
1,1,2-trichloroethane	5.0	ND	ND	ND
trichloroethylene	1.9	ND	ND	ND
vinyl chloride	10	ND	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	7/2/84	7/3/84	7/10/84
Analysis Date	8/13/84	8/13/84	8/10/84
Internal Standard - Level	40 µg/l	40 µg/l	40 µg/l
bromochloromethane - Recovery	120%	97%	99%
Internal Standard - Level	40 µg/l	40 µg/l	40 µg/l
2-bromo-1-chloropropane - Recovery	130%	97%	90%
Internal Standard - Level	40 µg/l	40 µg/l	40 µg/l
1,4-dichlorobutane - Recovery	130%	100%	85%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 8/24/84

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ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 8/24/84

VOLATILES

COMPOUND	DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION		
		OW-6	OSTERMAN WELL	FT-1
acrolein	400	ND	ND	ND
acrylonitrile	400	ND	ND	ND
benzene	4.4	ND	ND	ND
bromodichloromethane	2.2	ND	ND	ND
bromoform	4.7	ND	ND	ND
bromomethane	10	ND	ND	ND
carbon tetrachloride	2.8	ND	ND	ND
chlorobenzene	6.0	ND	ND	ND
chloroethane	10	ND	ND	ND
2-chloroethylvinyl ether	10	ND	ND	ND
chloroform	1.6	ND	ND	ND
chloromethane	10	ND	ND	ND
dibromochloromethane	3.1	ND	ND	ND
1,1-dichloroethane	4.7	ND	ND	ND
1,2-dichloroethane	2.8	ND	ND	ND
1,1-dichloroethylene	2.8	ND	ND	ND
trans-1,2-dichloroethylene	1.6	ND	ND	ND
1,2-dichloropropane	6.0	ND	ND	ND
1,3-dichloropropene	5.0	ND	ND	ND
ethylbenzene	7.2	ND	ND	ND
methylene chloride	2.8	15 µg/l	ND	ND
1,1,2,2-tetrachloroethane	6.9	ND	ND	ND
tetrachloroethylene	4.1	ND	ND	ND

(Continued)

ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 8/24/84

VOLATILES

COMPOUND	DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION		
		OW-6	OSTERMAN WELL	FT-1
toluene	6.0	ND	BDL	ND
1,1,1-trichloroethane	3.8	ND	ND	ND
1,1,2-trichloroethane	5.0	ND	ND	ND
trichloroethylene	1.9	ND	ND	ND
vinyl chloride	10	ND	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	7/10/84	7/11/84	7/3/84
Analysis Date	8/10/84	8/10/84	8/10/84
Internal Standard - Level	40 µg/l	40 µg/l	40 µg/l
bromochloromethane - Recovery	94%	98%	89%
Internal Standard - Level	40 µg/l	40 µg/l	40 µg/l
2-bromo-1-chloropropane - Recovery	99%	95%	77%
Internal Standard - Level	40 µg/l	40 µg/l	40 µg/l
1,4-dichlorobutane - Recovery	97%	96%	84%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 8/24/84

RA ENVIRONMENTAL LABORATORIES

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ANALYTICAL RESULTS

H2M

Report Date: 8/24/84

SAMPLE IDENTIFICATION	SAMPLE DATE	PARAMETER (UNITS OF MEASURE) TOTAL ORGANIC HALIDE (mg/l)
OW-1	7/2/84	<0.02
OW-1B	7/3/84	<0.02
OW-2	7/3/84	0.04
OW-3	7/2/84	0.04
OW-4	7/3/84	0.09
OW-5	7/10/84	<0.02
OW-6	7/10/84	0.12
Osterman Well	7/11/84	0.04

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 8/24/84

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RECRA ENVIRONMENTAL LABORATORIES

ANALYTICAL RESULTS

H2M

Report Date: 8/24/84

SAMPLE IDENTIFICATION	SAMPLE DATE	PARAMETER (UNITS OF MEASURE) pH (STANDARD UNITS)
OW-1	7/2/84	8.05
OW-1B	7/3/84	8.14
OW-2	7/3/84	8.12
OW-3	7/2/84	8.11
OW-4	7/3/84	8.14
OW-5	7/10/84	8.16
OW-6	7/10/84	8.07
FT-1	7/3/84	6.45
Osterman Well	7/11/84	8.20

FOR RECRA ENVIRONMENTAL LABORATORIES RRS for Richard V Finn

DATE 8/24/84

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ENVIRONMENTAL LABORATORIES

ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES
QUALITY CONTROL

Report Date: 8/24/84

BASE NEUTRAL RECOVERY ANALYSIS OF
METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
1,3-dichlorobenzene	50	25	50
di-n-octylphthalate	50	36	72
fluoranthene	50	20	40
naphthalene	50	31	62
nitrobenzene	50	31	62

ADDITIONAL SAMPLE INFORMATION

Extraction Date	7/31/84
Analysis Date	8/14/84
Internal Standard (IS) - Level	20 µg/l
deuterated phenanthrene - Recovery	140%
Surrogate Standard (SS3) - Level	120 µg/l
Decafluorobiphenyl - Recovery	61%
Surrogate Standard (SS4) - Level	100 µg/l
2-fluorobiphenyl - Recovery	50%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 8/24/84

RECRA ENVIRONMENTAL LABORATORIES

ANALYTICAL RESULTS

H2M
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES
QUALITY CONTROL

Report Date: 8/24/84

VOLATILE RECOVERY ANALYSIS OF
SAMPLE OW-3

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
carbon tetrachloride	200	120	60
chlorobenzene	200	160	80
chloroethyl vinyl ether	200	180	90
chloroform	200	160	80
dibromochloromethane	200	110	55
1,1-dichloroethane	200	180	90
1,1-dichloroethylene	200	170	85
1,2-dichloropropane	200	170	85
methylene chloride	200	140	70
tetrachloroethylene	200	180	80
1,1,2-trichloroethane	200	170	85
trichloroethylene	200	160	80

ADDITIONAL SAMPLE INFORMATION

Sample Date	7/2/84
Analysis Date	8/13/84
Internal Standard - Level	40 µg/l
Bromochloromethane - Recovery	120%
Internal Standard - Level	40 µg/l
2-bromo-1-chloropropane - Recovery	130%
Internal Standard - Level	40 µg/l
1,4-dichlrobutane - Recovery	130%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 8/24/84

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RA ENVIRONMENTAL LABORATORIES

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
13305-003	Nash Road Site (Niagara Sanitation)

SAMPLERS: (Signature) Lynne M. Baumgras

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	1-liter glass EXTRACTABLES	1-liter glass TOX	40 ml vials VOLATILES	plastic bottle pH			REMARKS
OW-1	7/2/84	6:00 pm		X	Nash Rd, Wheatfield, NY	8	3	1	3	1			In cooler I
	7/2/84	6:00 pm											Do not test if Dames & Moore label seal is not intact (label is broken) before opening.

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Lynne M. Baumgras	7/3/84 12pm	[signature] 7-5	Steve Murrell	7-27-84 2:00 PM	[signature]
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
13305-003	Nash Road Site (Niagara Sanitation)

SAMPLERS: (Signature) Lynne M. Baumgrass

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	1-liter glass EXTRACTABLES	1-liter glass TOX	40-ml vials VOLATILES	plastic bottle pH			REMARKS
OW-2	7/27/84	10:00 am		X	Nash Rd, Wheatfield, NY	8	3	1	3	1			In cooler III

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Lynne Baumgrass	7/27/84 12 pm	[signature] 7-5	Sam Hurrell	7-27-84 2:00 PM	John A. [signature]
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
13305-003	Nash Rd Site, Wheatfield, NY

SAMPLERS: (Signature) Lynne M. Baumgarten

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	1-liter glass EXTRACTABLES	1-liter glass TOX	40ml vials VOLATILES	plastic bottle pH			REMARKS
OW-3	7/2/84	5:00 pm		X	Nash Rd, Wheatfield, NY	8	3	1	3	1			In cooler IV
													Do not test unless
													Dames & Moore Stickers
													are intact (not broken.)

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Lynne M. Baumgarten	7/3/84 12pm	[signature] 7-5	Stan Murrell	7-27-84 2:00 pm	John A. [signature]
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

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CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
13305-003	Nash Road Site (Niagara Sanitation)

SAMPLERS: (Signature) Lynne M. Baumgras

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	1-liter glass: EXTRACTABLES	1-liter glass: TOX	40 ml vials: VOLATILES	plastic bottle: pH			REMARKS
ON-4	7/3/81	5:00 pm		X	Nash Rd., Wheatfield, NY	8	3	1	3	1			In cooler V
													Do not test if Dames & Moore seal is broken upon arrival (~~seal~~ label is broken)

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
L Baumgras	6 pm 7/3/81	[illegible] 7-5	Steve Murrell	7-27-81 2:00	John A. [illegible]
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

CHAIN OF CUSTODY RECORD

PROJ. NO. 13305-003

PROJECT NAME: Nash Road Site (Niagara Sanitation)

SAMPLERS: (Signature) Lynnette Baumgardner

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	1-liter glass: EXTRACTABLES	1-liter glass: TOX	40 ml vials: VOLATILES	plastic bottle: pH			REMARKS
OW-5	7/10/84	10:00 am		X	Nash Rd, Wheatfield, NY	8	3	1	3	1			In cooler VI DO NOT TEST UNLESS DAMES + MOORE SEAL IS INTACT (LABEL NOT BROKEN)

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Lynnette Baumgardner	9:00 am 7/11/84	Stuart Murrell 7/16/84	Stu Murrell	7-27-84 2:00 pm	[illegible]
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

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CHAIN OF CUSTODY RECORD

PROJ. NO. 18305-003

PROJECT NAME: Nash Road Site (Niagara Sanitation)

SAMPLERS: (Signature) Lynne M. Baumgartner

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	1-liter glass EXTRACTABLES	1-liter glass: TOX	40ml vials: VOLATILES	plastic bottle: pH			REMARKS
OW-6	7/10/84	4:00 pm		X	Nash Rd., Wheatfield, NY	8	3	1	3	1			In cooler VII
													DO NOT TEST UNLESS
													DAMES & MOORE SEAL IS
													INTACT (LABEL NOT
													BROKEN)

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Lynne M. Baumgartner	7/11/84 9:00 am	Steve Murrell 7/16/84	Steve Murrell	7-27-84 2:00 PM	John A. [illegible]
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

CHAIN OF CUSTODY RECORD

PROJECT NAME	
PROJ. NO. 13305-003	Nash Road Site (Niagara Sanitation)

SAMPLERS: (Signature) Lynne M. Baumgras

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	1-liter glass EXTRACTABLES	1-liter glass TOX	40 ml vials VOLATILES	plastic bottle: pH			REMARKS
OSTERMAN WELL	7/11/87	2:00 PM		X	Osterman property Nash Rd, Wheatfield, NY	8	3	1	3	1			OSTERMAN WELL (AFTER 1 EXCHANGE)
													In cooler VIII
													DO NOT TEST IF UNIQUE SEAL IS NOT INTACT (DAMES + MOORE LABEL BROKEN)

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Lynne M. Baumgras	7/12/87 5:00 PM	Stuart Murrell 7/16/87	Stu Murrell	7-27-87 2:00 pm	John A. [illegible]
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
13305-003	Nash Road Site (Niagara Sanitation)

SAMPLERS: (Signature) Lynne M. Baumgrao

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	1 liter glass EXTRACTABLE	1 liter glass - TOX	40 ml - vials VOLATILES	plastic bottle pH			REMARKS
~~OW-1B~~	~~7/3/81~~	~~8:00 am~~		~~X~~	~~Nash Rd, Wheatfield, NY~~	~~8~~	~~3~~	~~1~~	~~3~~	~~1~~			~~In cooler II~~
~~OW-1B~~	~~7/3/81~~	~~8:00 am~~		~~X~~	~~Nash Rd, Wheatfield, NY~~	~~8~~	~~3~~	~~1~~	~~3~~	~~1~~			~~" "~~
OW-1B	7/3/81	8:00 am		X	Nash Rd, Wheatfield, NY	5	1	1	2	1			In cooler II
FT-1	7/3/81	9:00 am		X	Nash Rd, Wheatfield, NY	3	2		1				
													Do not lost unless Dames & Moore stickers are intact - seal not broken

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Lynne M. Baumgrao	7/3/81 12pm	[signature] 7-5	Steve Murrell	7-27-81 2:00 PM	John A. [signature]
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

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7) SURFACE WATER DATA

ENGINEERING-SCIENCE LABORATORY ANALYSIS REPORT

te: 7/15/83
JOB: NASH ROAD - PHASE I
3 NUMBER: 36330

mple ID: Five samples received 7/1/83 for volatile organics, base-neutral organics, total organic halogens and pH analy

Parameter / Sample ID	SW-1	SW-2	SW-3	SW-4	SW
Methylene Chloride (ug/L)	11	<10	10	<10	<1
Chloroform (ug/L)	<10	<10	<10	<10	<1
Carbon tetrachloride (ug/L)	<10	<10	<10	<10	<1
Benzene (ug/L)	<10	<10	<10	<10	<1
Toluene (ug/L)	<10	<10	<10	<10	<1
Chlorobenzene (ug/L)	<10	<10	<10	<10	<1
1,1,2-Trichloroethane (ug/L)	<10	<10	<10	<10	<1
Tetrachloroethene (ug/L)	<10	<10	<10	<10	<10
1,1,2,2-Tetrachloroethane (ug/L)	<10	<10	<10	<10	<10
Trichloroethene (ug/L)	<10	<10	<10	<10	<10
Trichlorobenzene Isomers (ug/L)	<10	<10	<10	<10	<10
Dichlorobenzene Isomers (ug/L)	<10	<10	<10	<10	<10
Hexachlorobutadiene (ug/L)	<10	<10	<10	<10	<10
pH (S.U.)	6.9	8.1	7.1	7.4	7.2
Total Organic halogens (ppm)	0.010	0.005	0.007	0.007	0.0

B.L. Thorpe
Laboratory Supervisor

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mes W. Andrews, Ph.D.
resident
lanette M. Davis
hief Chemist, VP

SAVANNAH LABORATORIES AND ENVIRONMENTAL SERVICES, INC.

P.O. Box 13842 • Savannah, Ga. 31406
912/354-7858

REPORT OF ANALYSIS

):
B. L. Thorpe
Engineering-Science
57 Executive Park South, NE
Suite 590
Atlanta,GA. 30329

REPORT NO. 5239
DATE RECEIVED 7/7/83
SAMPLED BY Client

ENTIFICATION: Samples submitted to laboratory

ETHODS: EPA Methods of Analysis (Model 610/O.I. Corp.)

SAMPLE ID.#	TOX CONTENT (ppm)
07-1000-01	0.010
07-1001-01	0.005
07-1002-01	0.007
07-1003-01	0.007
07-1004-01	0.008

Janette M. Davis

Janette M. Davis

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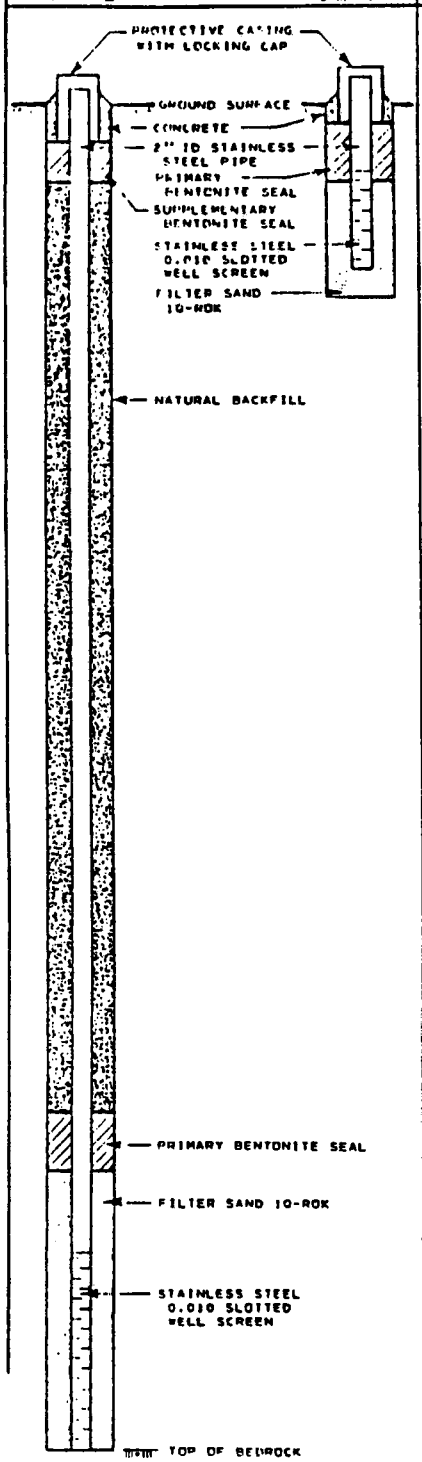
8) BORING LOGS

BORING OW-1
NASH ROAD SITE

WELL SCHEMATICS

OW-1B OW-1



BLOW COUNT	SAMPLE NO. & TYPE	RUN NO.	CORE REC.	CORE RQD	FRACTURES	DEPTH IN FEET	GRAPHIC LOG	DESCRIPTIVE GEOLOGIC NOTES
								SURFACE CONDITIONS: GRASSY, WET.
5	1 S					0	ML	LIGHT BROWN MOIST MEDIUM SILT AND CLAY, TRACE OF SAND, OCCASIONAL BLACK ORGANIC STAINS
15	2 S							
15	3 S					5	CL	GRAY MOIST STIFF LAYERED CLAY AND SILT WITH OCCASIONAL SEAMS OF FINE TO MEDIUM SAND, 1/8" IN THICKNESS
35	4 S							
15	5 S							GRADES TO LESS STIFF
9	6 S					10		GRAY MOIST MEDIUM LAYERED CLAY, RED CLAY LAYERS APPROXIMATELY 1/10" THICKNESS AT IRREGULAR INTERVALS
10	7 S							
7	8 S							GRADES TO VERY SOFT CLAY
2	9 S					15		
	10 S							
	11 S					20		
9	18:11 S					25	CH	GRADES TO SOFT
4	18:12 S					30		GRADES TO VERY SOFT
						35		
38/6"	18:13 S							BROWN, MOIST SILT AND COARSE TO FINE GRAVEL, LITTLE CLAY, LITTLE FINE SAND (TILL)
55/6"	18:14 S					40		
16/6"	18:15 S							GRADES TO WET
20/6"	18:16 S							
						45		
98	18:17 S					50	GM	GRADES TO MOIST, DENSE SILT, SOME FINE TO COARSE SAND, LITTLE FINE GRAVEL
55/6"	18:18 S					55		
45/6"	18:19 S					60		GRADES TO WET
76/6"	18:10 S					65		

SOIL SAMPLING INFORMATION

- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- DISTURBED SAMPLE
- NO SAMPLE RECOVERED

ROCK CORE INFORMATION

- RQD — CORE LOSS ZONE; PERCENT CORE RECOVERY
- RQD — CORE RQD

FRACTURES

- Zone of core loss
- Breccia zone
- Dipslip slickensides
- Fractures shown at approximate angle to core axis
- Mineralized fracture c = calcite s = sulfide
- Fractured zone
- Void

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

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DAMES & MOORE

BORING OW-1
NASH ROAD SITE

WELL SCHEMATICS	SAMPLING: BLOW COUNT	SAMPLE NO & TYPE	PUMP NO	CORE PEC	CORE ROD	FRACTURES	DEPTH IN FEET	GRAPHIC LOG	DESCRIPTIVE GEOLOGIC NOTES
							65		
		1R-11					70		TOP OF BEDROCK AT 68.6'. BEDROCK IS DOLOSTONE. BORING TERMINATED AT A DEPTH OF 68.6' ON JUNE 11, 1984.

SOIL SAMPLING INFORMATION

- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- DISTURBED SAMPLE
- NO SAMPLE RECOVERED

ROCK CORE INFORMATION

- RD — CORE LOSS ZONE
- PERCENT CORE RECOVERY
- R2 — CORE ROD

FRACTURES

- Zone of core loss
- Breccia zone
- Dip-slip slickensides
- Fractures shown at approximate angle to core axis
- Mineralized fracture c = calcite s = sulfide
- Fractured zone
- Void

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

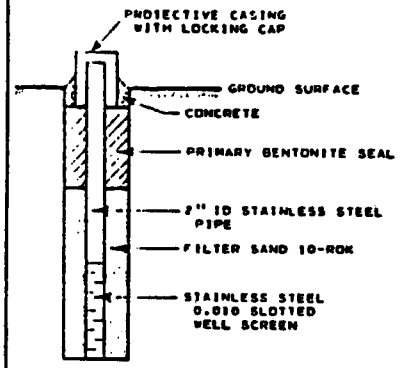
DAMES & MOORE

FIGURE B-

BORING OW-2
NASH ROAD SITE

WELL SCHEMATICS

OW-2



SAMPLING					FRACTURES	DEPTH IN FEET	GRAPHIC LOG	DESCRIPTIVE GEOLOGIC NOTES
BLOW COUNT	SAMPLE NO & TYPE	RUN NO	CORE REC	CORE RQD				SURFACE CONDITIONS: GRASSY, MUDDY
10	1 S					0	ML	LIGHT BROWN MOIST STIFF SILT, LITTLE FINE SAND
11	2 S						SW	GRAY WET MEDIUM DENSE FINE SAND, TRACE SILT
13	3 S					5	CL	GRAY AND BROWN MOIST STIFF LAYERED CLAY AND SILT; SILT LAYERS ABOUT 1/2" THICK
36	4 S							GRADES TO MEDIUM
18	5 S							GRADES TO SOFT
5	6 S					10	CH	GRAY MOIST, VERY SOFT LAYERED CLAY; RED CLAY LAYERS ARE APPROXIMATELY 1/8" THICK AT 3/4" INTERVALS
3	7 S							BORING TERMINATED AT A DEPTH OF 14.0' ON JUNE 6, 1984.
						15		

SOIL SAMPLING INFORMATION

- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- DISTURBED SAMPLE
- NO SAMPLE RECOVERED

ROCK CORE INFORMATION

RQD — CORE LOSS ZONE
PERCENT CORE RECOVERY

R2 — CORE RUN

FRACTURES

- Zone of core loss
- Breccia zone
- Dip-slip slickensides
- Fractures-shown at approximate angle to core axis
- Mineralizing fracture c - calcite s - sulfide
- Fractured zone
- Void

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

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DAMES & MOORE

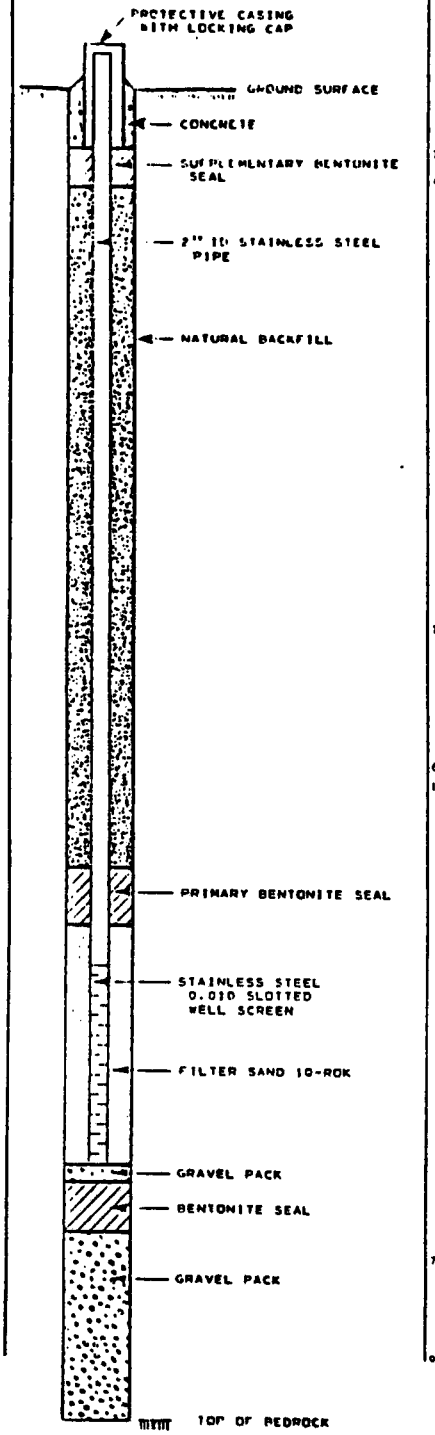
FIGURE B

BORING OW-3

NASH ROAD SITE

WELL SCHEMATICS

OW-3



SAMPLING: Blows/Count	Sample No. & Type	Blows/Ad	Core Rec	Core Acc	FRACTURES
6	1				
11	2				
7/.5'	3A				
9/.5'	3B				
32	4				
20	5				
7	6				
6	7				
4	8				
2	9				
2	10				
2	11				
3	12A				
3	12B				
72/5'	13				
	14				
65/5'	15				
100/6"	16				
29	17				
21	18				
23	19				
17	20				
75/5'	21				
96/5"	22				

DEPTH IN FEET: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65

GRAPHIC LOG: CL, CH, CL, GM

DESCRIPTIVE GEOLOGIC NOTES

SURFACE CONDITIONS: GRASSY, TALL BRUSH

MIXED SAND/WASTE FILL

GRAY AND BROWN MOIST MEDIUM LAYERED CLAY AND SILT, TRACE FINE SAND, BROWN SILT LAYERS APPROXIMATELY 1/2" -1" IN THICKNESS AT 1 1/2" INTERVALS

GRADES TO STIFF AT 6.0'

GRAY MOIST MEDIUM LAYERED CLAY

RED CLAY LAYERS APPROXIMATELY 1/10" THICK AT 1/2" INTERVALS

GRADES TO SOFT WITH OCCASIONAL SILT LAYERS APPROXIMATELY 1/2" THICK AT 10

CLAY LAYERS BECOME LESS DISTINCT AT 12.0

GRADES TO VERY SOFT AT 16.0'

GRAY AND BROWN/RED MOIST MEDIUM STIFF LAYERED CLAY AND SILT AT 26.0'

SEAM OF MOIST MEDIUM TO FINE SAND AT 26.

BROWN MOIST MEDIUM SILT AND COARSE TO FINE GRAVEL, TRACE FINE SAND, TRACE CLAY (TILL)

GRADES TO DRY AND VERY STIFF SILT AT 28.5'

GRADES TO MOIST AND HARD SILT

GRADES TO MOIST AND MEDIUM

GRADES TO WET

GRADES TO COARSE TO FINE GRAVEL AND BROWN DRY HARD SILT, SOME WEATHERED ROCK FRAGMENTS, TRACE FINE SAND

SOIL SAMPLING INFORMATION

- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- DISTURBED SAMPLE
- NO SAMPLE RECOVERED

2-01-80 PIEZOMETRIC SURFACE & DATE TESTED

ROCK CORE INFORMATION

RQD CORE LOSS ZONE

PERCENT CORE RECOVERY

RQD CORE ROD

FRACTURES

- Zone of core loss
- Breccia zone
- Dip-slip slickensides
- Fractures shown at approximate angle to core axis
- Mineralized fracture c - calcite s - sulfide
- Fractured zone
- Void

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

DAMES & MOORE

FIGURE B.3

BORING OW-3

NASH ROAD SITE

WELL SCHEMATICS	SAMPLING: BLOW COUNT	SAMPLE NO. & TYPE	RUN NO.	CORE REC.	CORE RQD	FRACTURES	DEPTH IN FEET	GRAPHIC LOG	DESCRIPTIVE GEOLOGIC NOTES
							65		
							70		TOP OF BEDROCK 68.7' BEDROCK IS DOLOSTONE BORING TERMINATED AT A DEPTH OF 68.7' ON JUNE 7, 1984.

SOIL SAMPLING INFORMATION

- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- DISTURBED SAMPLE
- NO SAMPLE RECOVERED

ROCK CORE INFORMATION

- CORE LOSS ZONE
- PERCENT CORE RECOVERY
- CORE RUN

FRACTURES

- Zone of core loss
- Breccia zone
- Dipping slickensides
- Fractures-shown at approximate angle to core axis
- Mineralized fracture c = calcite s = sulfide
- Fractured zone
- Void

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

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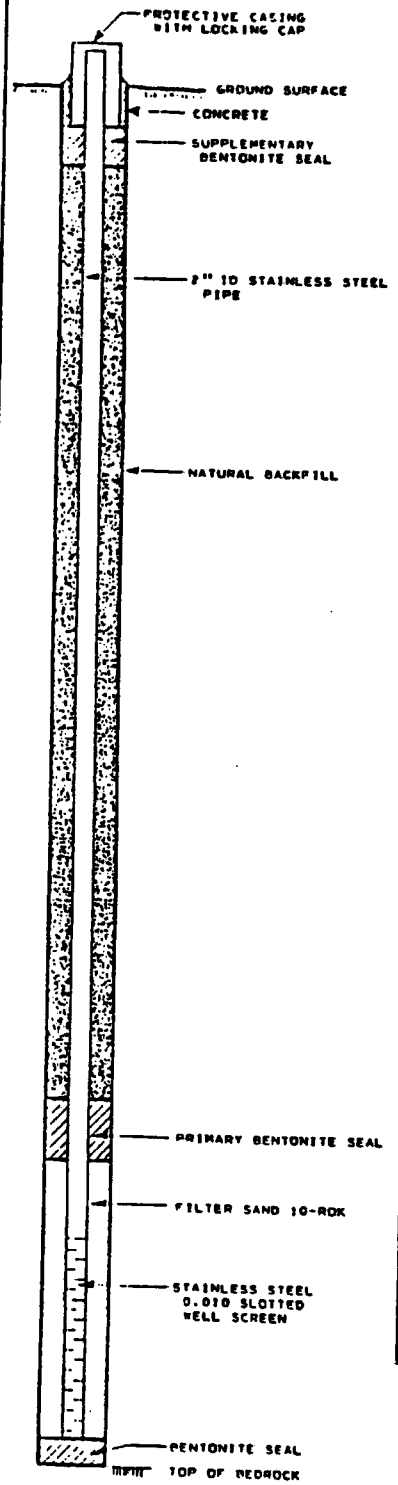
DAMES & MOORE

BORING OW-4
NASH ROAD SITE

WELL SCHEMATICS

OW-4



SAMPLING: BLOW COUNT	SAMPLE NO & TYPE	RUN NO	CORE REC	CORE ROD	FRACTURES
22	1 ▣				
15	2 ▣				
17	3 ▣				
33	4 ▣				
10	5 ▣				
18	6 ▣				
16					
8	7 ▣				
6	8 ▣				
5	9 ▣				
2	10 ▣				
3					
2	11 ▣				
2					
2	12 ▣				
2					
2	13 ▣				
2					
2	14 ▣				
2					
26	15 ▣				
46	16				
50/.2'	17 ▣				
	18				
50/.5'	19 ▣				
50/.5'	20 ▣				
50/.4'	21 ▣				
50/.5'	22 ▣				

DEPTH IN FEET: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65

GRAPHIC LOG: ML, SW, CL, CH, SW, SP, GM

DESCRIPTIVE GEOLOGIC NOTES

SURFACE CONDITIONS: GRASSY, SOME SURFACE TRASH

MIXED SAND/WASTE FILL

GRAY MOIST SILT AND CLAY

GRAY WET MEDIUM TO FINE SAND, TRACE SILT, ORGANIC ODOR, SOME BLACK STAIN

GRAY AND BROWN MOIST LAYERED SILT AND CLAY, TRACE FINE SAND

LAYERS APPROX. 1/2" THICK

GRADES TO WET BROWN SILT AND CLAY

GRADES TO CLAY, TRACE SILT

BROWN WET SILT AND FINE TO COARSE SAND, LITTLE MEDIUM TO FINE GRAVEL

BROWN WET MEDIUM TO FINE SAND

BROWN MOIST SILT, AND COARSE TO FINE SAND, LITTLE FINE TO COARSE SAND (TILL)

GRADES TO WET

GRADES TO MOIST

SOIL SAMPLING INFORMATION

- ▣ STANDARD PENETRATION TEST
- ■ UNDISTURBED SAMPLE
- ▨ DISTURBED SAMPLE
- ▢ NO SAMPLE RECOVERED

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

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DAMES & MOORE

BORING OW-4
NASH ROAD SITE

WELL SCHEMATICS	SAMPLING: BLOW COUNT	SAMPLE NO. & TYPE	RUN NO.	CORE REC.	CORE RQD	FRACTURES	DEPTH IN FEET	GRAPHIC LOG	DESCRIPTIVE GEOLOGIC NOTES
							65	GM	
							70		TOP OF BEDROCK 70.3' BEDROCK IS DOLOSTONE BORING TERMINATED AT A DEPTH OF 70.3' ON JUNE 13, 1986.

SOIL SAMPLING INFORMATION

- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- DISTURBED SAMPLE
- NO SAMPLE RECOVERED

ROCK CORE INFORMATION

RQD — CORE LOSS ZONE; PERCENT CORE RECOVERY

RQ — CORE RQD

FRACTURES

- Zone of core loss
- Breccia zone
- Dip-slip slickensides
- Fractures shown at approximate angle to core axis
- Mineralized fracture c - calcite s - sulfide
- Fractured zone
- Void

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

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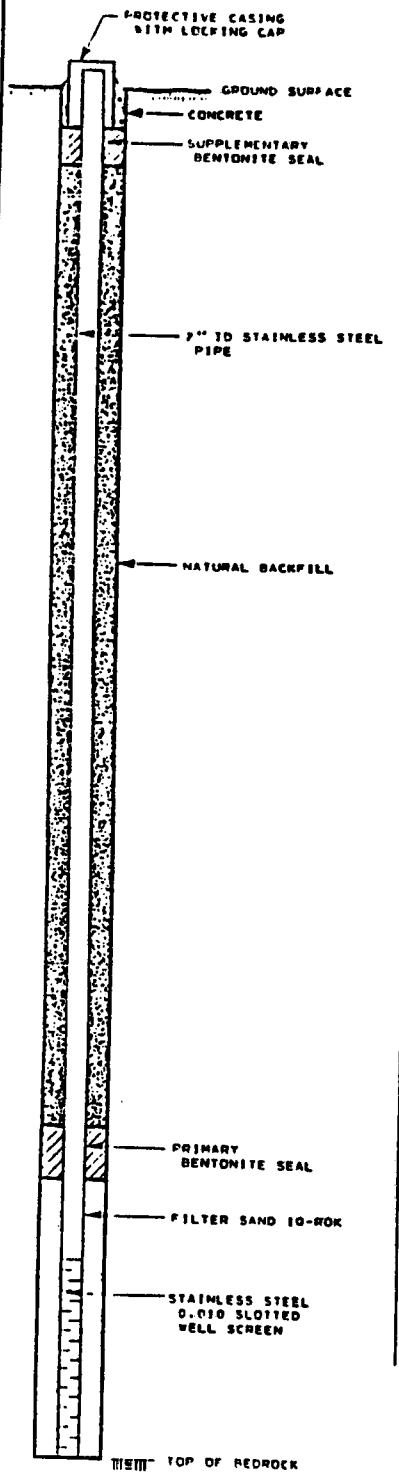
DAMES & MOORE

BORING OW-5
NASH ROAD SITE

WELL SCHEMATICS

OW-5



BLOW COUNT	SAMPLE NO & TYPE	RUN NO	CORE REC	CORE RQD	FRACTURES
17	1 ▣				
11/6"	2 ▣				
9/6"	3 ▣				
12	4				
29	5 ▣				
5	6 ▣				
6	7 ▣				
2	8 ▣				
2	9 ▣				
2	10 ▣				
2	11 ▣				
2	12 ▣				
39/5"	13 ▣				
50/4"	14 ▣				
50/2"	15 ▣				
50/4"	16 ▣				
65/5"	17 ▣				
	18 ▣				

DEPTH IN FEET: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65

GRAPHIC LOG: SW, CL, CH, SP, GM

DESCRIPTIVE GEOLOGIC NOTES

SURFACE CONDITIONS: GRASSY, ATOP FILL

GRAY, WET MEDIUM TO FINE SAND, TRACE SILT

GRADES TO FINE SAND

GRAY AND BROWN MOIST LAYERED CLAY AND SILT, TRACE FINE SAND

SILT LAYERS APPROXIMATELY 1/2" THICK, OCCASIONAL SEAMS OF WET FINE TO MEDIUM SAND APPROXIMATELY 1/8" THICKNESS

GRAY WET SOFT LAYERED CLAY

RED CLAY LAYERS APPROXIMATELY 1/10" THICKNESS AT IRREGULAR INTERVALS

GRADES TO VERY SOFT

RED CLAY LAYERS APPROXIMATELY 1/10" THICKNESS AT 3/4" INTERVALS

BROWN WET LAYERED SILT AND COARSE TO FINE SAND

BROWN WET SILT AND FINE TO COARSE GRAVEL, SOME COARSE TO FINE SAND, TRACE CLAY (TILL)

GRADES TO MOIST

GRADES TO MORE GRAVEL, LESS SILT, DRY

GRADES TO WET SILT, SOME MEDIUM TO FINE GRAVEL, LITTLE WEATHERED BEDROCK FRAGMENTS AT 65.0'

SOIL SAMPLING INFORMATION

- ▣ STANDARD PENETRATION TEST
- ■ UNDISTURBED SAMPLE
- ▣ DISTURBED SAMPLE
- □ NO SAMPLE RECOVERED

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

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DAMES & MOORE

BORING OW-5
NASH ROAD SITE

WELL SCHEMATICS	SAMPLING: BLOW COUNT	SAMPLE NO & TYPE	RUN NO	CORE REC	CORE ROD	FRACTURES	DEPTH IN FEET	GRAPHIC LOG	DESCRIPTIVE GEOLOGIC NOTES
							65		
							70		TOP OF DOLOSTONE BEDROCK AT 69.8' BORING TERMINATED AT A DEPTH OF 70.0' ON JUNE 14, 1986.

SOIL SAMPLING INFORMATION

- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- DISTURBED SAMPLE
- NO SAMPLE RECOVERED

ROCK CORE INFORMATION

- CORE LOSS ZONE
- LOWEST CORE RECOVERY
- CORE RUN

FRACTURES

- Zone of core loss
- Breccia zone
- Dip-slip slickensides
- Fractures shown at approximate angle to core axis
- Mineralized fracture c - calcite s - sulfide
- Fractured zone
- Void

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

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DAMES & MOORE

BORING OW-6
NASH ROAD SITE

WELL SCHEMATICS

OW-6

SAMPLING					FRACTURES
BLOW COUNT	SAMPLE NO & TYPE	RUN NO	CORE REC.	CORE ROD	
12	1 ▣				
31	2 ▣				
17	3 ▣				
41	4 ▣				
15	5 ▣				
4	6 ▣				
2	7 ▣				
2	8 ▣				
2	9 ▣				
2	10 ▣				
2	11 ▣				
39	12 ▣				
39	13 ▣				
61/6"	14 ▣				
55/5"	15 ▣				

DEPTH IN FEET: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65

GRAPHIC LOG

DESCRIPTIVE GEOLOGIC NOTES

SURFACE CONDITIONS: VERY MUDDY WITH STANDING WATER; MARSHY GRASS

MIXED SAND/WASTE FILL

GRAY WET MEDIUM TO FINE SAND, LITTLE SILT, SOME BLACK STAINS

GRAY AND BROWN MOIST STIFF LAYERED CLAY AND SILT,
SILT LAYERS APPROXIMATELY 1/4" THICK AT 1" INTERVALS

GRAY MOIST STIFF CLAY
GRADES TO MEDIUM CLAY AT 13.0'
GRADES TO SOFT AT 18.0'

GRADES TO WET
RED CLAY LAYERS APPROXIMATELY 1/2" THICK AT 1 1/2 TO 2" INTERVALS (DETECTABLE ORGANIC ODOR)

RED CLAY LAYERS APPROXIMATELY 2" THICK AT 1" INTERVALS AT 35.0'
TRACE SMALL BLACK MOTTLES OF ORGANIC MATERIAL IN RED LAYERS

BROWN DRY MEDIUM SILT, AND MEDIUM TO FINE GRAVEL, TRACE CLAY, TRACE FINE TO COARSE SAND (TILL)

GRADES TO MOIST

GRADES TO WET, MORE GRAVEL, LESS SILT

SOIL SAMPLING INFORMATION

- ▣ STANDARD PENETRATION TEST
- ■ UNDISTURBED SAMPLE
- ▣ DISTURBED SAMPLE
- □ NO SAMPLE RECOVERED

ROCK CORE INFORMATION

80 — CORE LOSS ZONE
PERCENT CORE RECOVERY

82 — CORE ROD

FRACTURES

- Zone of core loss
- Breccia zone
- Dip-slip slickensides
- Fractures shown at approximate angle to core axis
- Mineralized fracture c - calcite s - sulfide
- Fractured zone
- Void

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

DAMES & MOORE

BORING OW-6
NASH ROAD SITE

WELL SCHEMATICS	SAMPLING: BLOW COUNT	SAMPLE NO & TYPE	RUN NO	CORE REC	CORE RQD	FRACTURES	DEPTH IN FEET	GRAPHIC LOG	DESCRIPTIVE GEOLOGIC NOTES
							65		TOP OF BEDROCK 66.0' BEDROCK IS DOLOSTONE BORING TERMINATED AT A DEPTH OF 66.0' ON JUNE 19, 1984.
							70		

SOIL SAMPLING INFORMATION

- STANDARD PENETRATION TEST
- UNDISTURBED SAMPLE
- DISTURBED SAMPLE
- NO SAMPLE RECOVERED

ROCK CORE INFORMATION

80 — CORE LOSS ZONE

PERCENT CORE RECOVERY

87 — CORE RUN

FRACTURES

- Zone of core loss
- Breccia zone
- Dip-slip slickensides
- Fractures-shown at approximate angle to core axis
- Mineralized fracture c - calcite s - sulfide
- Fractured zone
- Void

KEY TO WELL SCHEMATIC

- Grout
- Bentonite Seal
- Sand Filter
- Well Screen

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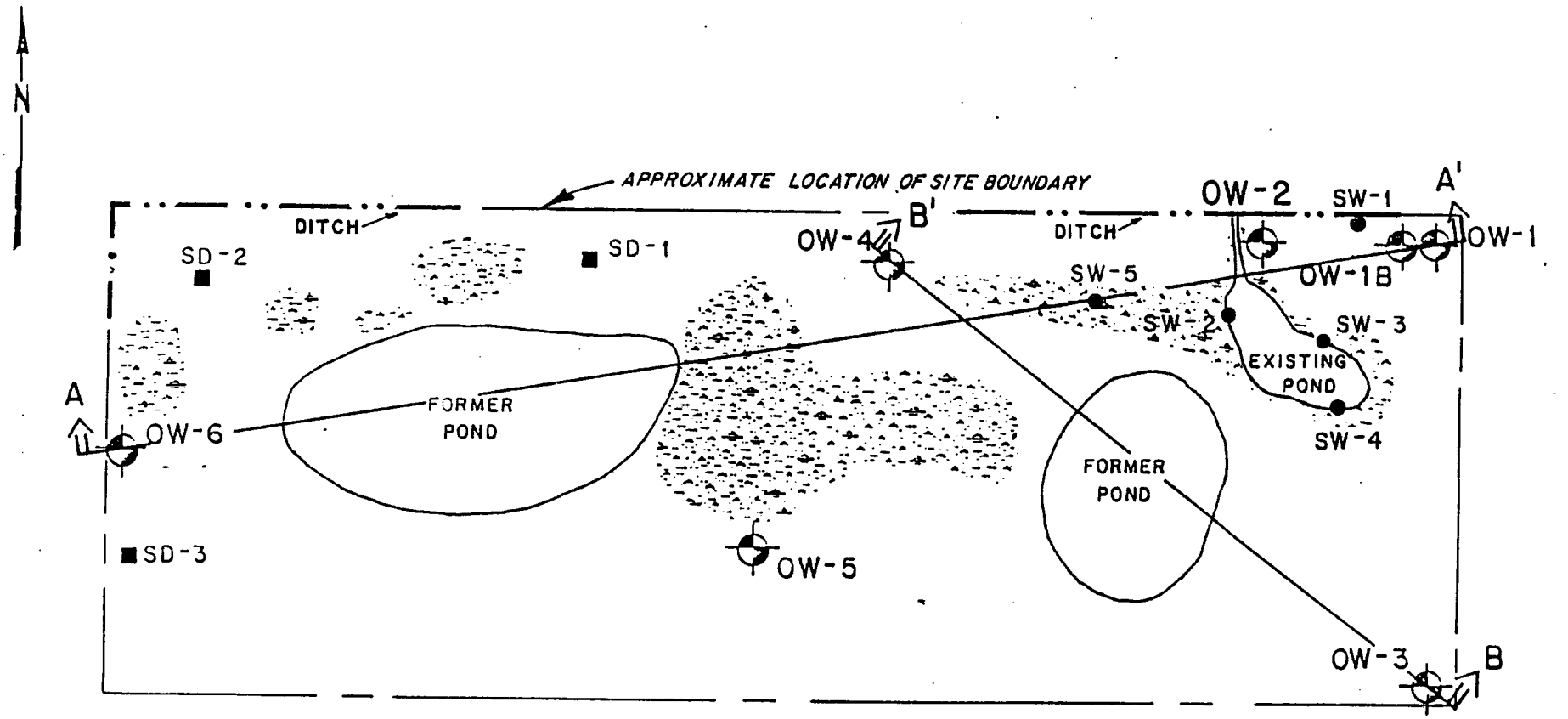
DAMES & MOORE

9) SAMPLING LOCATION MAP

FILE 133 203

BY D. Tomas DATE 8/3/89



EXPLANATION:

■ SEDIMENT SAMPLE

● SURFACE WATER SAMPLE

⊕ SAMPLING WELL

OW-1

0 200 400 FEET

SCALE

NOTE: OSTERMAN WELL IS LOCATED APPROXIMATELY 1000 FEET WEST OF SITE.

PLOT PLAN

SHOWING CROSS SECTION LOCATIONS

NASH ROAD SITE

DAMES & MOORE

FIGURE V.iv.

10) PERMEABILITY TEST DATA

Summary
In-Situ Permeability

Well	Permeability cm/sec	
OW-1	4.37×10^{-4}	silt
OW-2	6.75×10^{-4}	silt + sand
OW-1B	8.43×10^{-7}	till/bedrock
OW-3	1.43×10^{-6}	wet zone in ti
OW-4	7.88×10^{-7}	till/bedrock
OW-5	7.5×10^{-4}	till/bedrock
OW-6	4.8×10^{-4}	till/[illegible]

CALIBRATION DATA
Well 1 OW1
A=-5.6258E 01
B= 6.4516E-02
D= 0.0000E 00
J0= 272
T0= 81493

ET(sec)= 30
WELL DRAWDOWN
OW1 -2.96

ET(sec)= 61
WELL DRAWDOWN
OW1 -3.63

ET(sec)= 90
WELL DRAWDOWN
OW1 -4.27

ET(sec)= 121
WELL DRAWDOWN
OW1 -4.88

ET(sec)= 151
WELL DRAWDOWN
OW1 -5.22

ET(sec)= 180
WELL DRAWDOWN
OW1 -5.46

ET(sec)= 211
WELL DRAWDOWN
OW1 -5.61

ET(sec)= 241
WELL DRAWDOWN
OW1 -5.76

ET(sec)= 271
WELL DRAWDOWN
OW1 -5.87

ET(sec)= 301
WELL DRAWDOWN
OW1 -5.93

ET(sec)= 330
WELL DRAWDOWN
OW1 -6.00

ET(sec)= 361
WELL DRAWDOWN
OW1 -6.06

ET(sec)= 390
WELL DRAWDOWN
OW1 -6.12

ET(sec)= 421
WELL DRAWDOWN
OW1 -6.19

ET(sec)= 421
WELL DRAWDOWN

OW1 -6.19

ET(sec)= 451
WELL DRAWDOWN

OW1 -6.19

ET(sec)= 481
WELL DRAWDOWN

OW1 -6.25

ET(sec)= 511
WELL DRAWDOWN

OW1 -6.32

ET(sec)= 540
WELL DRAWDOWN

OW1 -6.32

ET(sec)= 571
WELL DRAWDOWN

OW1 -6.32

ET(sec)= 600
WELL DRAWDOWN

OW1 -6.38

ET(sec)= 631
WELL DRAWDOWN

OW1 -6.38

ET(sec)= 661
WELL DRAWDOWN

OW1 -6.38

ET(sec)= 690
WELL DRAWDOWN

OW1 -6.38

ET(sec)= 721
WELL DRAWDOWN

OW1 -6.45

ET(sec)= 751
WELL DRAWDOWN

OW1 -6.45

ET(sec)= 781
WELL DRAWDOWN

OW1 -6.45

ET(sec)= 811
WELL DRAWDOWN

OW1 -6.45

ET(sec)= 841
WELL DRAWDOWN

OW1 -6.45

ET(sec)= 871
WELL DRAWDOWN

OW1 -6.45

ET(sec)= 901
WELL DRAWDOWN

OW1 6.49

ET(sec)= 930

204

ET(sec)= 930
WELL DRAWDOWN

OW1 -6.51

ET(sec)= 961
WELL DRAWDOWN

OW1 -6.51

ET(sec)= 990
WELL DRAWDOWN

OW1 -6.51

ET(sec)= 1021
WELL DRAWDOWN

OW1 -6.51

ET(sec)= 1051
WELL DRAWDOWN

OW1 -6.51

ET(sec)= 1080
WELL DRAWDOWN

OW1 -6.51

ET(sec)= 1110
WELL DRAWDOWN

OW1 -6.51

ET(sec)= 1141
WELL DRAWDOWN

OW1 -6.51

ET(sec)= 1171
WELL DRAWDOWN

OW1 -6.58

ET(sec)= 1200
WELL DRAWDOWN

OW1 -6.58

ET(sec)= 1231
WELL DRAWDOWN

OW1 -6.58

ET(sec)= 1261
WELL DRAWDOWN

OW1 -6.58

ET(sec)= 1291
WELL DRAWDOWN

OW1 -6.58

ET(sec)= 1320
WELL DRAWDOWN

OW1 -6.58

ET(sec)= 1350
WELL DRAWDOWN

OW1 -6.58

ET(sec)= 1380
WELL DRAWDOWN

OW1 -6.58

ET(sec)= 1410
WELL DRAWDOWN

OW1 -6.58

ET(sec)= 1441

205

ET(sec)= 1290
WELL DRAWDOWN

OW1 -6.58

ET(sec)= 1410
WELL DRAWDOWN

OW1 -6.58

ET(sec)= 1441
WELL DRAWDOWN

OW1 -6.58

ET(sec)= 1471
WELL DRAWDOWN

OW1 -6.58

ET(sec)= 1500
WELL DRAWDOWN

OW1 -6.58

ET(sec)= 1530
WELL DRAWDOWN

OW1 -6.58

ET(sec)= 1561
WELL DRAWDOWN

OW1 -6.58

ET(sec)= 1591
WELL DRAWDOWN

OW1 -6.58

ET(sec)= 1621
WELL DRAWDOWN

OW1 -6.62

ET(sec)= 1651
WELL DRAWDOWN

OW1 -6.62

ET(sec)= 1681
WELL DRAWDOWN

OW1 -6.64

ET(sec)= 1711
WELL DRAWDOWN

OW1 -6.64

ET(sec)= 1741
WELL DRAWDOWN

OW1 -6.64

ET(sec)= 1771
WELL DRAWDOWN

OW1 -6.64

ET(sec)= 1800
WELL DRAWDOWN

OW1 -6.64

ET(sec)= 1830
WELL DRAWDOWN

CALIBRATION DATA
Well 1 OW1B
A=-5.6923E 01
B= 6.5279E-02
D= 0.0000E 00

J0= 273
T0= 62293

ET(sec)= 61
WELL DRAWDOWN
OW1B -1.58

ET(sec)= 121
WELL DRAWDOWN
OW1B -1.76

ET(sec)= 180
WELL DRAWDOWN
OW1B -1.89

ET(sec)= 241
WELL DRAWDOWN
OW1B -1.95

ET(sec)= 301
WELL DRAWDOWN
OW1B -2.08

ET(sec)= 361
WELL DRAWDOWN
OW1B -2.19

ET(sec)= 420
WELL DRAWDOWN
OW1B -2.28

ET(sec)= 481
WELL DRAWDOWN
OW1B -2.35

ET(sec)= 541
WELL DRAWDOWN
OW1B -2.48

ET(sec)= 601
WELL DRAWDOWN
OW1B -2.54

ET(sec)= 661
WELL DRAWDOWN
OW1B -2.61

ET(sec)= 721
WELL DRAWDOWN
OW1B -2.74

ET(sec)= 780
WELL DRAWDOWN
OW1B -2.80

ET(sec)= 840
WELL DRAWDOWN
OW1B -2.87

ET(sec)= 900
WELL DRAWDOWN

207

OW1B -2.87

ET(sec)= 900
WELL DRAWDOWN

OW1B -2.93

ET(sec)= 960
WELL DRAWDOWN

OW1B -3.00

ET(sec)= 1021
WELL DRAWDOWN

OW1B -3.06

ET(sec)= 1081
WELL DRAWDOWN

OW1B -3.17

ET(sec)= 1141
WELL DRAWDOWN

OW1B -3.26

ET(sec)= 1200
WELL DRAWDOWN

OW1B -3.32

ET(sec)= 1261
WELL DRAWDOWN

OW1B -3.39

ET(sec)= 1321
WELL DRAWDOWN

OW1B -3.45

ET(sec)= 1381
WELL DRAWDOWN

OW1B -3.52

ET(sec)= 1440
WELL DRAWDOWN

OW1B -3.59

ET(sec)= 1500
WELL DRAWDOWN

OW1B -3.65

ET(sec)= 1561
WELL DRAWDOWN

OW1B -3.72

ET(sec)= 1621
WELL DRAWDOWN

OW1B -3.78

ET(sec)= 1681
WELL DRAWDOWN

OW1B -3.85

ET(sec)= 1741
WELL DRAWDOWN

OW1B -3.91

ET(sec)= 1800
WELL DRAWDOWN

OW1B -3.98

ET(sec)= 1861
WELL DRAWDOWN

OW1B -4.04

WELL DRAWDOWN

OW1B -4.17

ET(sec)= 2041
WELL DRAWDOWN

OW1B -4.24

ET(sec)= 2101
WELL DRAWDOWN

OW1B -4.33

ET(sec)= 2161
WELL DRAWDOWN

OW1B -4.43

ET(sec)= 2220
WELL DRAWDOWN

OW1B -4.46

ET(sec)= 2280
WELL DRAWDOWN

OW1B -4.56

ET(sec)= 2340
WELL DRAWDOWN

OW1B -4.56

ET(sec)= 2400
WELL DRAWDOWN

OW1B -4.65

ET(sec)= 2461
WELL DRAWDOWN

OW1B -4.70

ET(sec)= 2520
WELL DRAWDOWN

OW1B -4.76

ET(sec)= 2580
WELL DRAWDOWN

OW1B -4.83

ET(sec)= 2640
WELL DRAWDOWN

OW1B -4.89

ET(sec)= 2701
WELL DRAWDOWN

OW1B -4.96

ET(sec)= 2761
WELL DRAWDOWN

OW1B -5.02

ET(sec)= 2821
WELL DRAWDOWN

OW1B -5.09

ET(sec)= 2880
WELL DRAWDOWN

ET(sec)= [illegible]
WELL DRAWDOWN

OW1B -5.02

ET(sec)= 2821
WELL DRAWDOWN

OW1B -5.09

ET(sec)= 2880
WELL DRAWDOWN

OW1B -5.15

ET(sec)= 2941
WELL DRAWDOWN

OW1B -5.22

ET(sec)= 3001
WELL DRAWDOWN

OW1B -5.28

ET(sec)= 3061
WELL DRAWDOWN

OW1B -5.35

ET(sec)= 3121
WELL DRAWDOWN

OW1B -5.41

ET(sec)= 3181
WELL DRAWDOWN

OW1B -5.46

ET(sec)= 3240
WELL DRAWDOWN

OW1B -5.48

ET(sec)= 3300
WELL DRAWDOWN

OW1B -5.54

ET(sec)= 3361
WELL DRAWDOWN

OW1B -5.61

210

ET(sec)= 1370
WELL DRAWDOWN

OW2 -3.05

ET(sec)= 1396
WELL DRAWDOWN

OW2 -2.85

ET(sec)= 1422
WELL DRAWDOWN

OW2 -2.69

ET(sec)= 1449
WELL DRAWDOWN

OW2 -2.51

ET(sec)= 1475
WELL DRAWDOWN

OW2 -2.31

ET(sec)= 1501
WELL DRAWDOWN

OW2 -2.11

ET(sec)= 1527
WELL DRAWDOWN

OW2 -1.96

ET(sec)= 1554
WELL DRAWDOWN

OW2 -1.78

ET(sec)= 1580
WELL DRAWDOWN

OW2 -1.58

ET(sec)= 1606
WELL DRAWDOWN

OW2 -1.42

ET(sec)= 1633
WELL DRAWDOWN

OW2 -1.24
J0= 273
T0= 59355

ET(sec)= 16
WELL DRAWDOWN

OW2 -0.57

ET(sec)= 42
WELL DRAWDOWN

OW2 -0.57

ET(sec)= 68
WELL DRAWDOWN

OW2 -0.57

ET(sec)= 94
WELL DRAWDOWN

OW2 -1.15

211

WELL DRAWDOWN

OW2 -1.15

ET(sec)= 119
WELL DRAWDOWN

OW2 -1.73

ET(sec)= 145
WELL DRAWDOWN

OW2 -2.33

ET(sec)= 171
WELL DRAWDOWN

OW2 -2.91

ET(sec)= 196
WELL DRAWDOWN

OW2 -3.51

ET(sec)= 222
WELL DRAWDOWN

OW2 -4.12

ET(sec)= 248
WELL DRAWDOWN

OW2 -4.72

ET(sec)= 273
WELL DRAWDOWN

OW2 -5.25

ET(sec)= 299
WELL DRAWDOWN

OW2 -5.65

ET(sec)= 325
WELL DRAWDOWN

OW2 -5.99

ET(sec)= 351
WELL DRAWDOWN

OW2 -6.28

ET(sec)= 377
WELL DRAWDOWN

OW2 -6.52

ET(sec)= 403
WELL DRAWDOWN

OW2 -6.72

ET(sec)= 429
WELL DRAWDOWN

OW2 -6.86

ET(sec)= 455
WELL DRAWDOWN

OW2 -7.01

ET(sec)= 481
WELL DRAWDOWN

OW2 -7.12

ET(sec)= 507
WELL DRAWDOWN

OW2 -7.26

ET(sec)= 533
WELL DRAWDOWN

2/2

WELL DRAWDOWN

OW2 -7.26

ET(sec)= 533
WELL DRAWDOWN

OW2 -7.32

ET(sec)= 560
WELL DRAWDOWN

OW2 -7.39

ET(sec)= 586
WELL DRAWDOWN

OW2 -7.46

ET(sec)= 612
WELL DRAWDOWN

OW2 -7.50

ET(sec)= 638
WELL DRAWDOWN

OW2 -7.52

ET(sec)= 665
WELL DRAWDOWN

OW2 -7.59

ET(sec)= 691
WELL DRAWDOWN

OW2 -7.59

ET(sec)= 717
WELL DRAWDOWN

OW2 -7.66

ET(sec)= 743
WELL DRAWDOWN

OW2 -7.66

ET(sec)= 769
WELL DRAWDOWN

OW2 -7.66

ET(sec)= 796
WELL DRAWDOWN

OW2 -7.70

ET(sec)= 822
WELL DRAWDOWN

OW2 -7.72

ET(sec)= 848
WELL DRAWDOWN

OW2 -7.72

ET(sec)= 874
WELL DRAWDOWN

OW2 -7.72

ET(sec)= 900
WELL DRAWDOWN

OW2 -7.72

ET(sec)= 926
WELL DRAWDOWN

OW2 -7.79

ET(sec)= 952
WELL DRAWDOWN

OW2 -7.79

2/3

OW2 -7.70

ET(sec)= 822
WELL DRAWDOWN

OW2 -7.72

ET(sec)= 848
WELL DRAWDOWN

OW2 -7.72

ET(sec)= 874
WELL DRAWDOWN

OW2 -7.72

ET(sec)= 900
WELL DRAWDOWN

OW2 -7.72

ET(sec)= 926
WELL DRAWDOWN

OW2 -7.79

ET(sec)= 952
WELL DRAWDOWN

OW2 -7.79

ET(sec)= 979
WELL DRAWDOWN

OW2 -7.79

CALIBRATION DATA
Well 1 OW3
A=-6.7066E 01
B= 8.2614E-02
D= 1.5000E 01
J0= 272
T0= 71820

ET(sec)= 60
WELL DRAWDOWN
OW3 8.09

ET(sec)= 121
WELL DRAWDOWN
OW3 7.93

ET(sec)= 180
WELL DRAWDOWN
OW3 7.85

ET(sec)= 241
WELL DRAWDOWN
OW3 7.76

ET(sec)= 301
WELL DRAWDOWN
OW3 7.60

ET(sec)= 360
WELL DRAWDOWN
OW3 7.52

ET(sec)= 421
WELL DRAWDOWN
OW3 7.43

ET(sec)= 481
WELL DRAWDOWN
OW3 7.30

ET(sec)= 541
WELL DRAWDOWN
OW3 7.19

ET(sec)= 600
WELL DRAWDOWN
OW3 7.10

ET(sec)= 661
WELL DRAWDOWN
OW3 7.02

ET(sec)= 721
WELL DRAWDOWN
OW3 6.94

ET(sec)= 781
WELL DRAWDOWN
OW3 6.77

ET(sec)= 841
WELL DRAWDOWN
OW3 6.69

ET(sec)= 900
WELL DRAWDOWN
OW3 6.61

ET(sec)= 961
WELL DRAWDOWN
OW3 6.44

ET(sec)= 1021
WELL DRAWDOWN
OW3 6.36

ET(sec)= 1081
WELL DRAWDOWN
OW3 6.28

ET(sec)= 1141
WELL DRAWDOWN
OW3 6.19

ET(sec)= 1200
WELL DRAWDOWN
OW3 6.11

ET(sec)= 1261
WELL DRAWDOWN
OW3 6.36

ET(sec)= 1321
WELL DRAWDOWN
OW3 6.28

ET(sec)= 1381
WELL DRAWDOWN
OW3 6.19

ET(sec)= 1441
WELL DRAWDOWN
OW3 6.11

ET(sec)= 1501
WELL DRAWDOWN
OW3 6.03

ET(sec)= 1561
WELL DRAWDOWN
OW3 5.95

ET(sec)= 1621
WELL DRAWDOWN
OW3 5.86

ET(sec)= 1681
WELL DRAWDOWN
OW3 5.78

ET(sec)= 1741
WELL DRAWDOWN
OW3 5.61

ET(sec)= 1800
WELL DRAWDOWN
OW3 5.61

ET(sec)= 1861
WELL DRAWDOWN
OW3 5.50

ET(sec)= 1921
WELL DRAWDOWN
OW3 5.37

ET(sec)= 1981
WELL DRAWDOWN
OW3 5.37

ET(sec)=
WELL DRAWDOWN

OW3 5.37

ET(sec)= 1981
WELL DRAWDOWN

OW3 5.37

ET(sec)= 2041
WELL DRAWDOWN

OW3 5.28

ET(sec)= 2101
WELL DRAWDOWN

OW3 5.15

ET(sec)= 2160
WELL DRAWDOWN

OW3 5.04

ET(sec)= 2220
WELL DRAWDOWN

OW3 4.95

ET(sec)= 2280
WELL DRAWDOWN

OW3 4.87

ET(sec)= 2340
WELL DRAWDOWN

OW3 4.79

ET(sec)= 2400
WELL DRAWDOWN

OW3 4.71

ET(sec)= 2461
WELL DRAWDOWN

OW3 4.62

ET(sec)= 2521
WELL DRAWDOWN

OW3 4.54

ET(sec)= 2581
WELL DRAWDOWN

OW3 4.46

ET(sec)= 2641
WELL DRAWDOWN

OW3 4.38

ET(sec)= 2700
WELL DRAWDOWN

OW3 4.29

ET(sec)= 2760
WELL DRAWDOWN

OW3 4.21

ET(sec)= 2821
WELL DRAWDOWN

OW3 4.13

ET(sec)= 2881
WELL DRAWDOWN

OW3 4.04

ET(sec)= 2941
WELL DRAWDOWN

ET(sec)= [illegible]
WELL DRAWDOWN

OW3 4.29

ET(sec)= 2760
WELL DRAWDOWN

OW3 4.21

ET(sec)= 2821
WELL DRAWDOWN

OW3 4.13

ET(sec)= 2881
WELL DRAWDOWN

OW3 4.04

ET(sec)= 2941
WELL DRAWDOWN

OW3 3.96

ET(sec)= 3001
WELL DRAWDOWN

OW3 3.88

ET(sec)= 3061
WELL DRAWDOWN

OW3 3.80

ET(sec)= 3121
WELL DRAWDOWN

OW3 3.71

ET(sec)= 3181
WELL DRAWDOWN

OW3 3.63

ET(sec)= 3241
WELL DRAWDOWN

OW3 3.55

ET(sec)= 3301
WELL DRAWDOWN

OW3 3.47

ET(sec)= 3360
WELL DRAWDOWN

OW3 3.38

ET(sec)= 3421
WELL DRAWDOWN

OW3 3.30

ET(sec)= 3481
WELL DRAWDOWN

OW3 3.22

ET(sec)= 3541
WELL DRAWDOWN

OW3 3.14

ET(sec)= 3601
WELL DRAWDOWN

OW3 3.08

ET(sec)= 3660
WELL DRAWDOWN

CALIBRATION DATA
Well 1 OW4
A=-6.1285E 01
B= 2.1428E-02
D= 0.0000E 00
J0= 273
T0= 81079

ET(sec)= 60
WELL DRAWDOWN

OW4 -14.00

ET(sec)= 121
WELL DRAWDOWN

OW4 -14.21

ET(sec)= 180
WELL DRAWDOWN

OW4 -14.35

ET(sec)= 241
WELL DRAWDOWN

OW4 -14.50

ET(sec)= 300
WELL DRAWDOWN

OW4 -14.64

ET(sec)= 361
WELL DRAWDOWN

OW4 -14.78

ET(sec)= 420
WELL DRAWDOWN

OW4 -14.85

ET(sec)= 481
WELL DRAWDOWN

OW4 -15.00

ET(sec)= 541
WELL DRAWDOWN

OW4 -15.07

ET(sec)= 600
WELL DRAWDOWN

OW4 -15.14

ET(sec)= 661
WELL DRAWDOWN

OW4 -15.21

ET(sec)= 720
WELL DRAWDOWN

OW4 -15.28

ET(sec)= 781
WELL DRAWDOWN

OW4 -15.35

ET(sec)= 841
WELL DRAWDOWN

OW4 -15.42

ET(sec)= 900
WELL DRAWDOWN

OW4 -15.50

ET(sec)= 960
WELL DRAWDOWN

OW4

OW4 -15.50

ET(sec)= 960
WELL DRAWDOWN

OW4 -15.57

ET(sec)= 1021
WELL DRAWDOWN

OW4 -15.64

ET(sec)= 1081
WELL DRAWDOWN

OW4 -15.64

ET(sec)= 1141
WELL DRAWDOWN

OW4 -15.71

ET(sec)= 1201
WELL DRAWDOWN

OW4 -15.78

ET(sec)= 1261
WELL DRAWDOWN

OW4 -15.85

ET(sec)= 1321
WELL DRAWDOWN

OW4 -15.85

ET(sec)= 1380
WELL DRAWDOWN

OW4 -15.92

ET(sec)= 1440
WELL DRAWDOWN

OW4 -16.00

ET(sec)= 1501
WELL DRAWDOWN

OW4 -16.07

ET(sec)= 1561
WELL DRAWDOWN

OW4 -16.07

ET(sec)= 1621
WELL DRAWDOWN

OW4 -16.14

ET(sec)= 1680
WELL DRAWDOWN

OW4 -16.21

ET(sec)= 1740
WELL DRAWDOWN

OW4 -16.21

ET(sec)= 1801
WELL DRAWDOWN

OW4 -16.28

ET(sec)= 1861
WELL DRAWDOWN

OW4 -16.35

ET(sec)= 1920
WELL DRAWDOWN

OW4 -16.42

ET(sec)= 1801
WELL DRAWDOWN

OW4 -16.28

ET(sec)= 1861
WELL DRAWDOWN

OW4 -16.35

ET(sec)= 1920
WELL DRAWDOWN

OW4 -16.42

ET(sec)= 1980
WELL DRAWDOWN

OW4 -16.50

ET(sec)= 2040
WELL DRAWDOWN

OW4 -16.50

ET(sec)= 2100
WELL DRAWDOWN

OW4 -16.57

ET(sec)= 2161
WELL DRAWDOWN

OW4 -16.57

ET(sec)= 2221
WELL DRAWDOWN

OW4 -1.49

ET(sec)= 2280
WELL DRAWDOWN

OW4 -1.35

ET(sec)= 2341
WELL DRAWDOWN

OW4 -1.21

ET(sec)= 2401
WELL DRAWDOWN

OW4 -0.99

ET(sec)= 2461
WELL DRAWDOWN

W4 -0.92

RECOVERY TEST
7/11/84

WATER LEVEL
IS WATER
ABOVE XDUCER
TRANSDUCER AT
DEPTH OF 30'

OW-5

TIME	WATER LEVEL
17.0556	16.7000
17.0611	16.7000
17.0625	16.7000
START	
17.0933	15.7967
17.0933	16.7645
17.0933	15.2161
17.0933	15.4096
17.0933	15.5387
17.0933	15.6032
17.0933	15.8612
1	15.5387
17.0933	15.6677
17.0933	15.2806
17.0933	14.9580
17.0933	15.1516
17.1122	15.3451
17.1122	15.4741
17.1122	15.6032
17.1122	15.7322
17.1122	15.7967
17.1122	15.9258
17.1247	16.3129
17.1318	16.5709
START	
17.1512	15.6032
17.1542	16.1838
17.1613	16.5064
17.1642	16.6354
17.1712	16.7645
17.1743	16.7645
17.1812	16.7645
17.1842	16.8290
17.1913	16.8290
17.1942	16.8290
17.2012	16.8290
17.2043	16.8290
17.2112	16.7645
17.2142	16.8290

static 14.3' below
top of casing
S.U. 1.3'

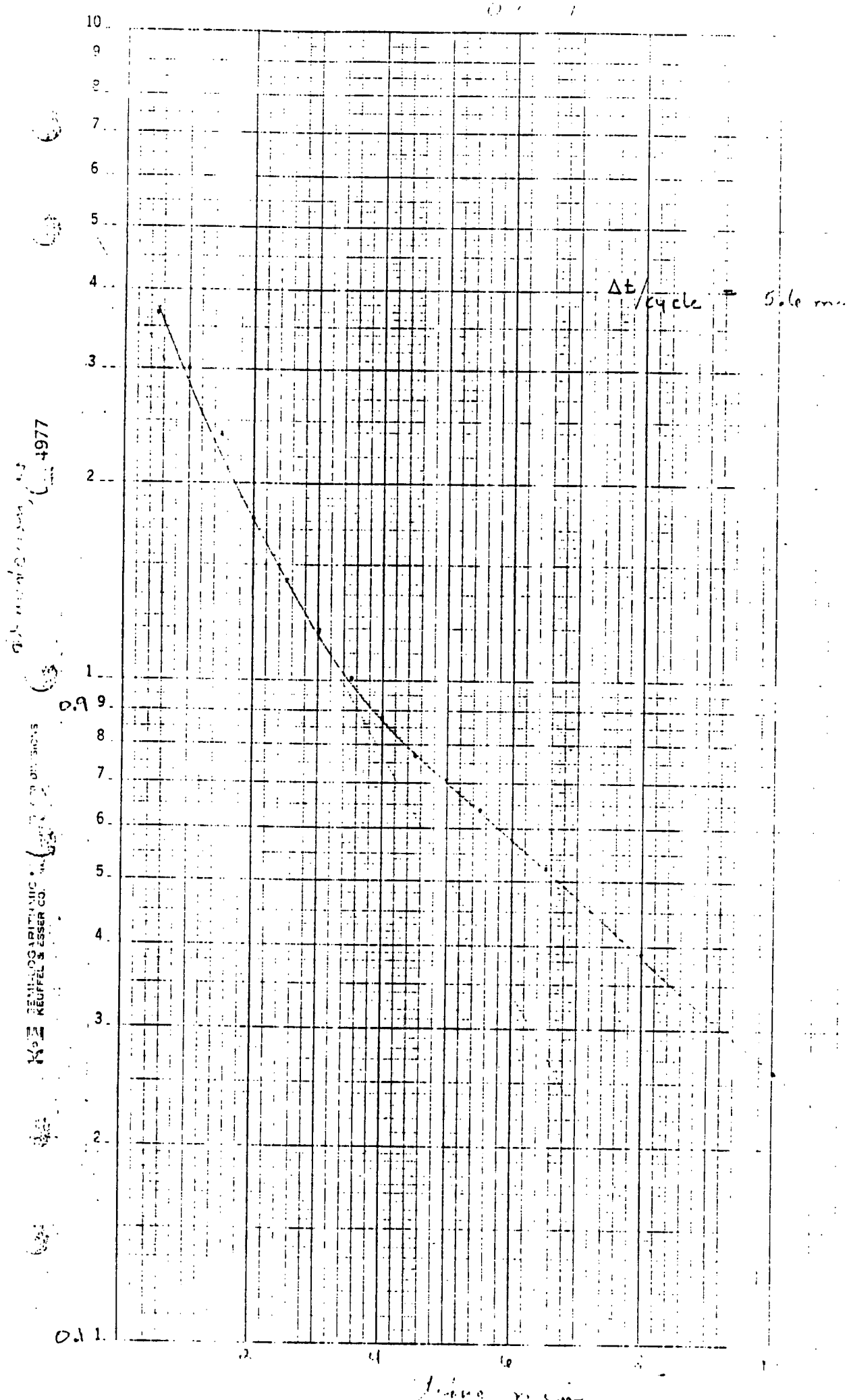
XDUCER AT
35.0 Down
HERE

OW-6

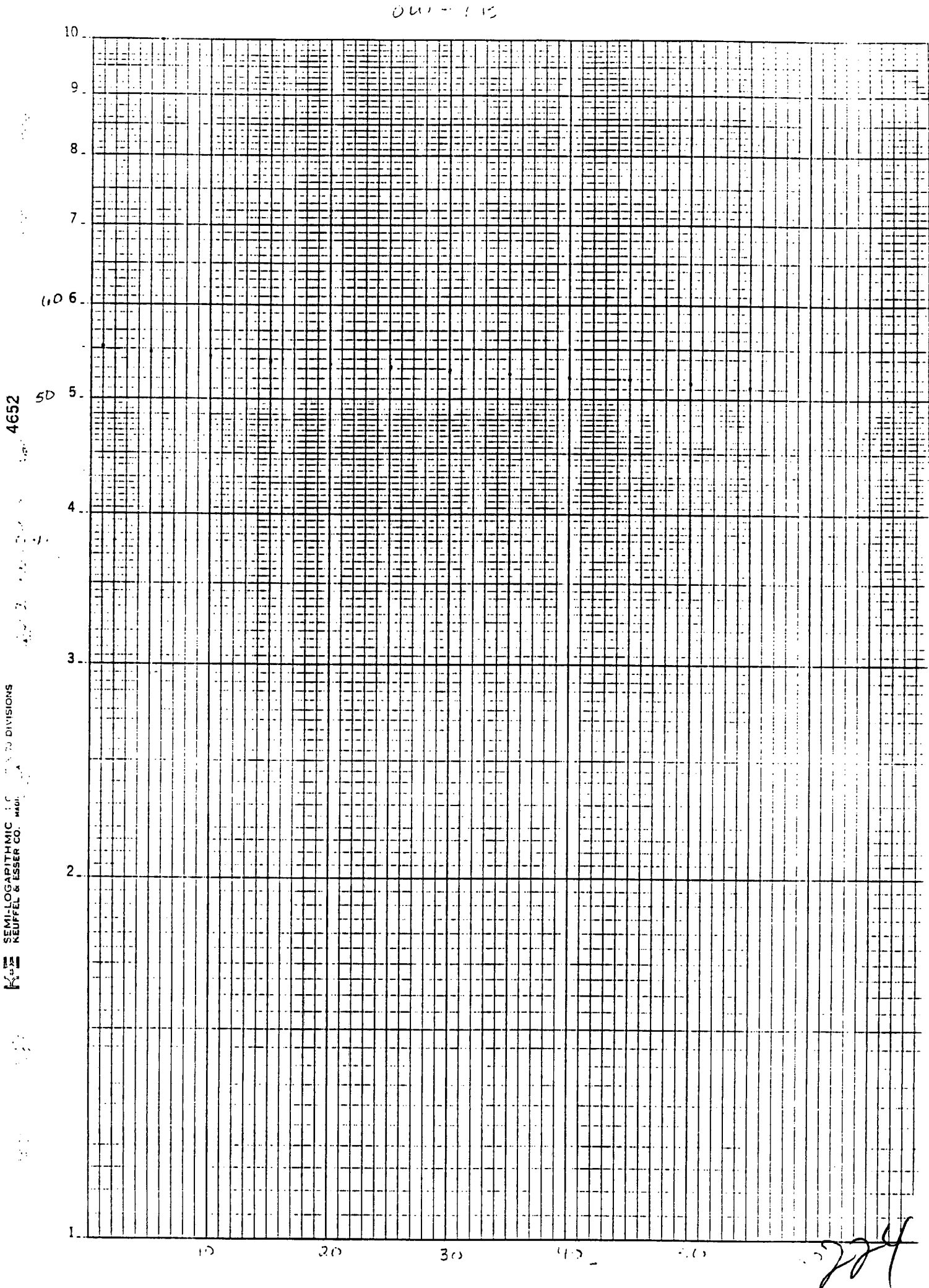
TIME	WATER LEVEL
17.4344	17.7653
17.4354	17.7653
17.4404	17.7653
17.4923	15.0202
17.4933	15.8045
17.4944	16.0006
17.5021	15.8045
17.5036	16.0006
17.5051	16.2620
17.5106	16.4581
17.5121	16.5888
17.5136	16.7196
17.5205	17.5432*

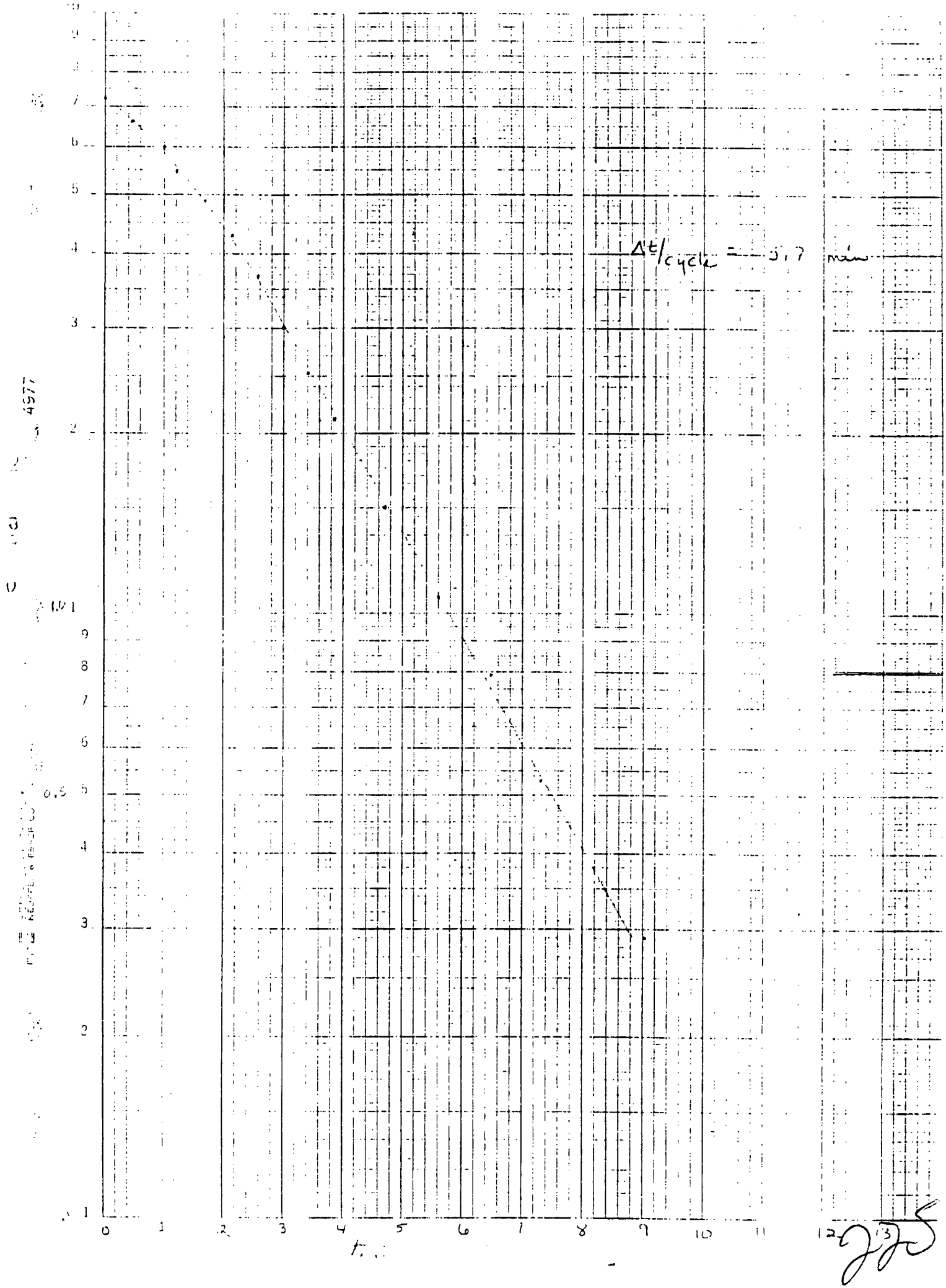
* SUSPECT DATA
static = 17.25' stick up 2.9'

222

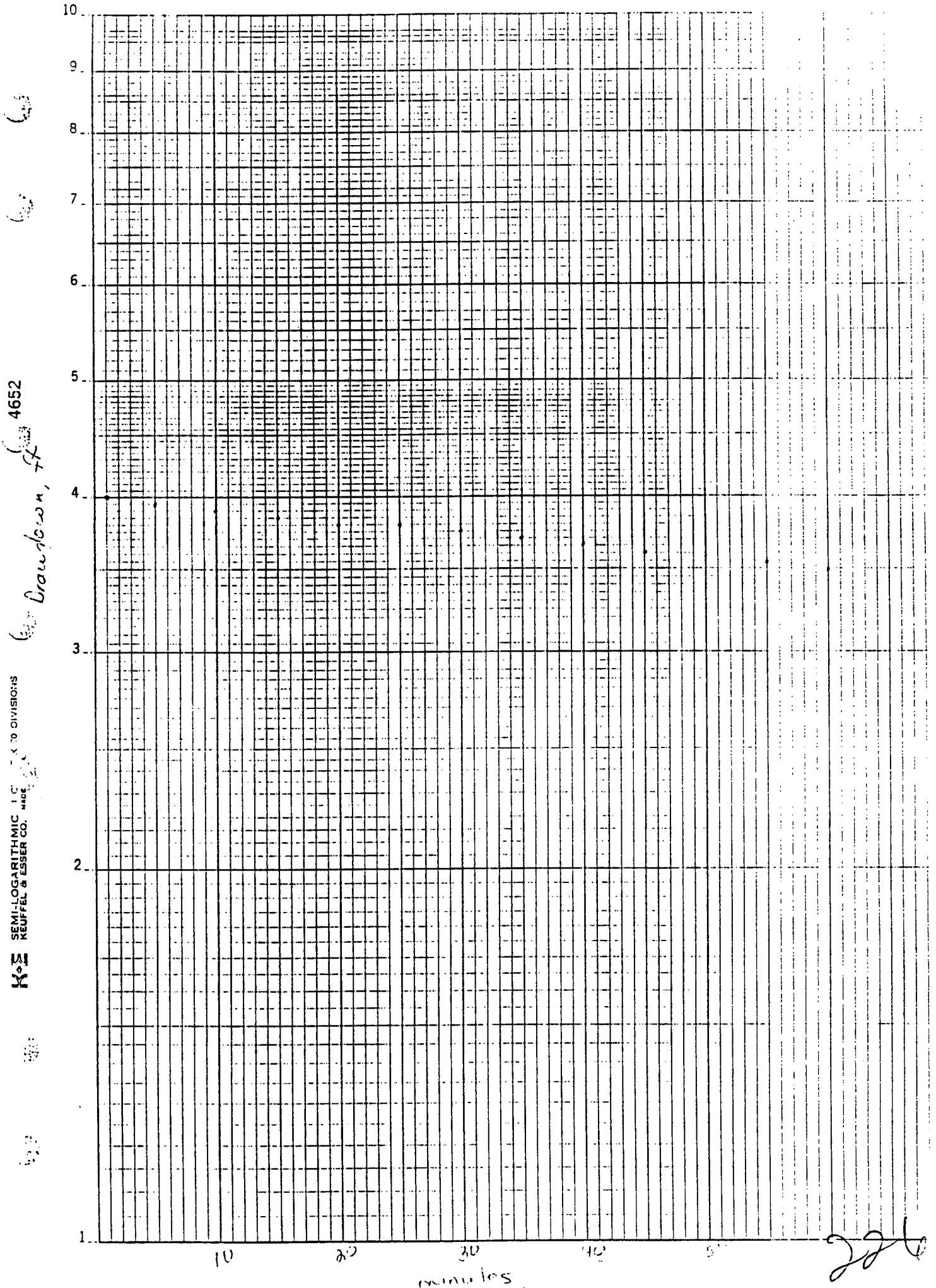


223


10
9
8
7
6
5
4
3
2
1
10
20
30
4652
SEMI-LOGARITHMIC
KEUFFEL & ESSER CO.

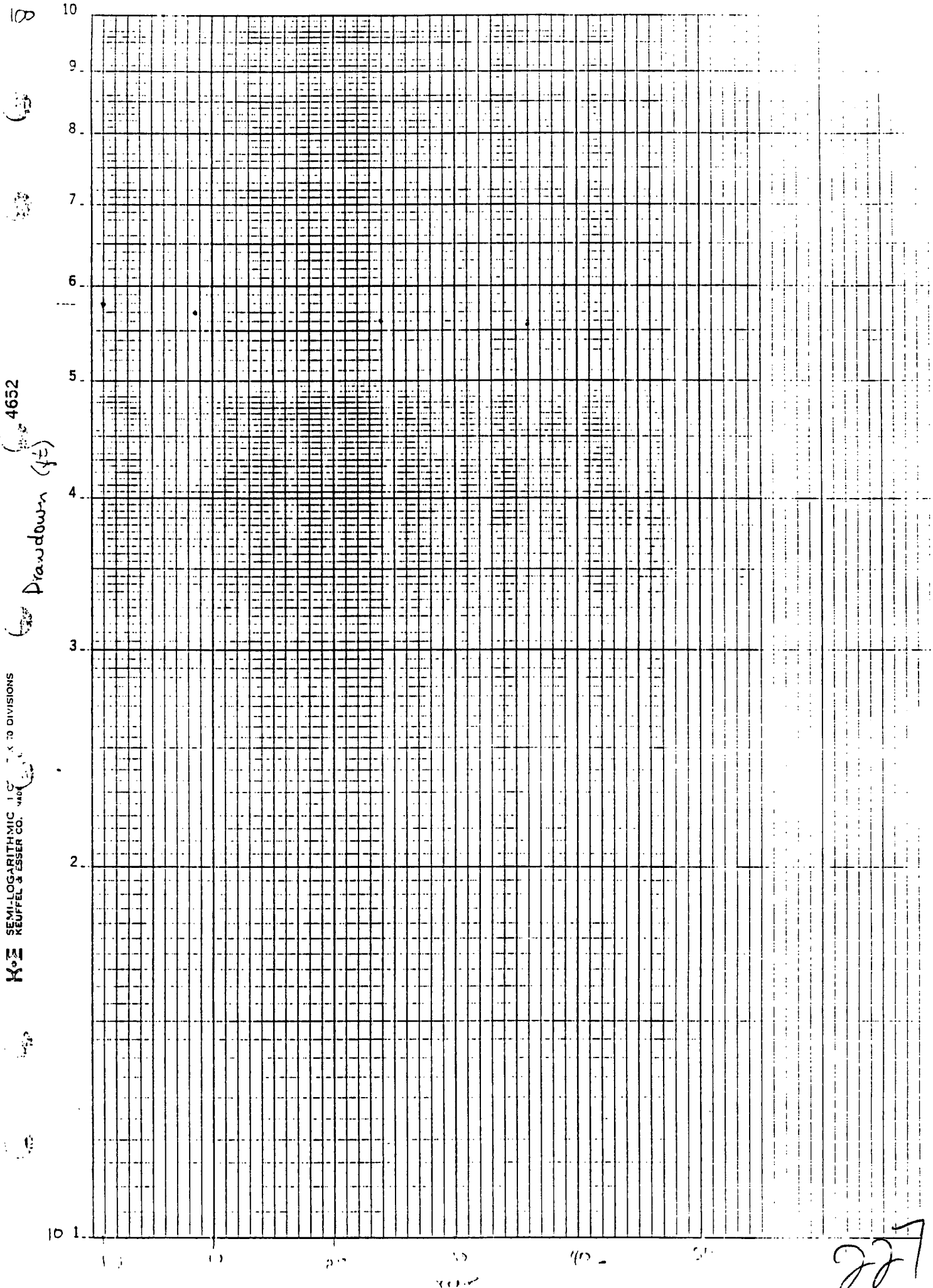


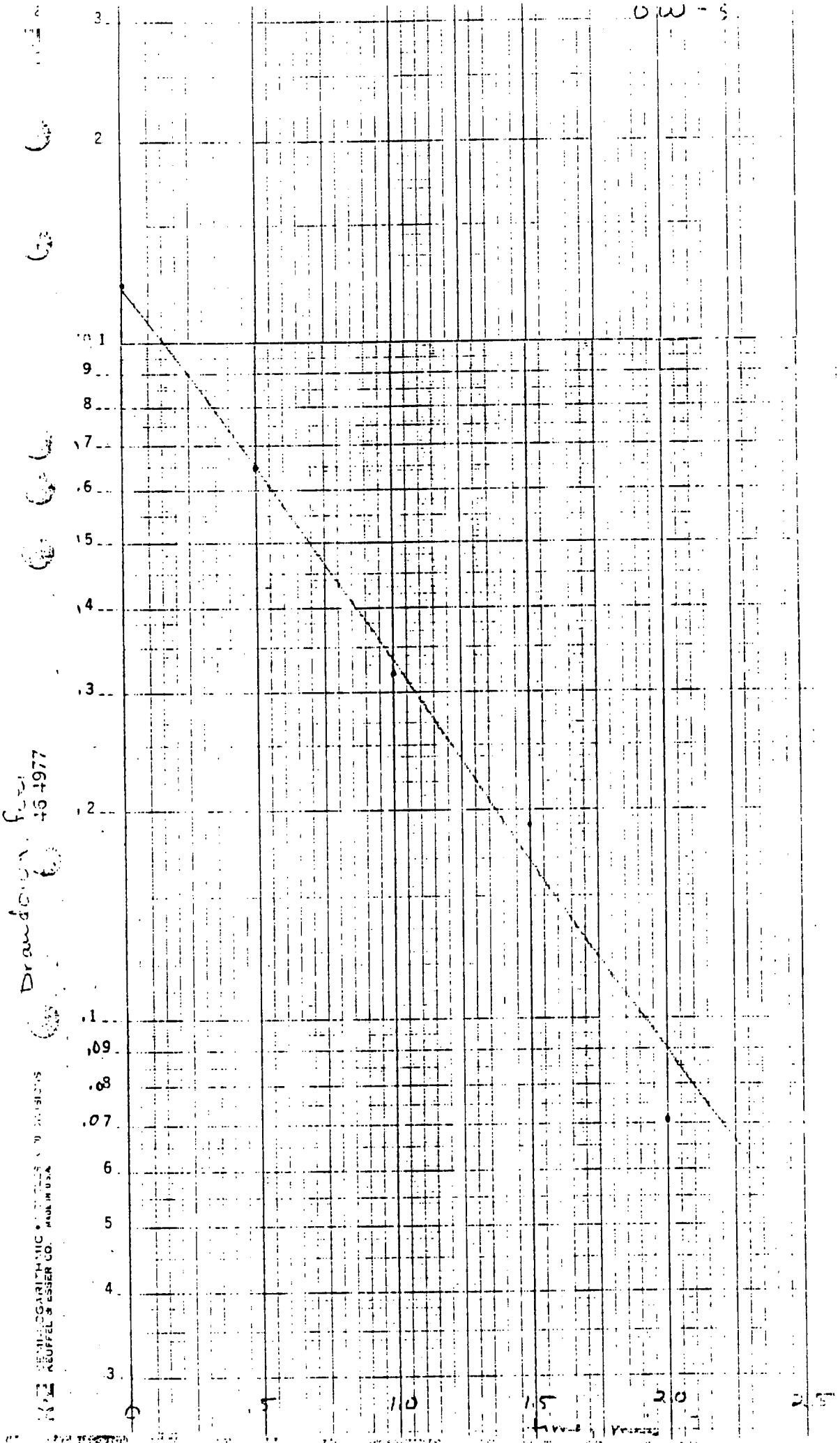
Δt/cycle = 5.7 min
4977
0.5
0
1
2
3
4
5
6
7
8
9
10
11
12
13



10
9
8
7
6
5
4
3
2
1
10
20
30
40
minutes
Drawdown, ft
4652
K+E SEMI-LOGARITHMIC 1 C 70 DIVISIONS
KEUFFEL & ESSER CO. MADE

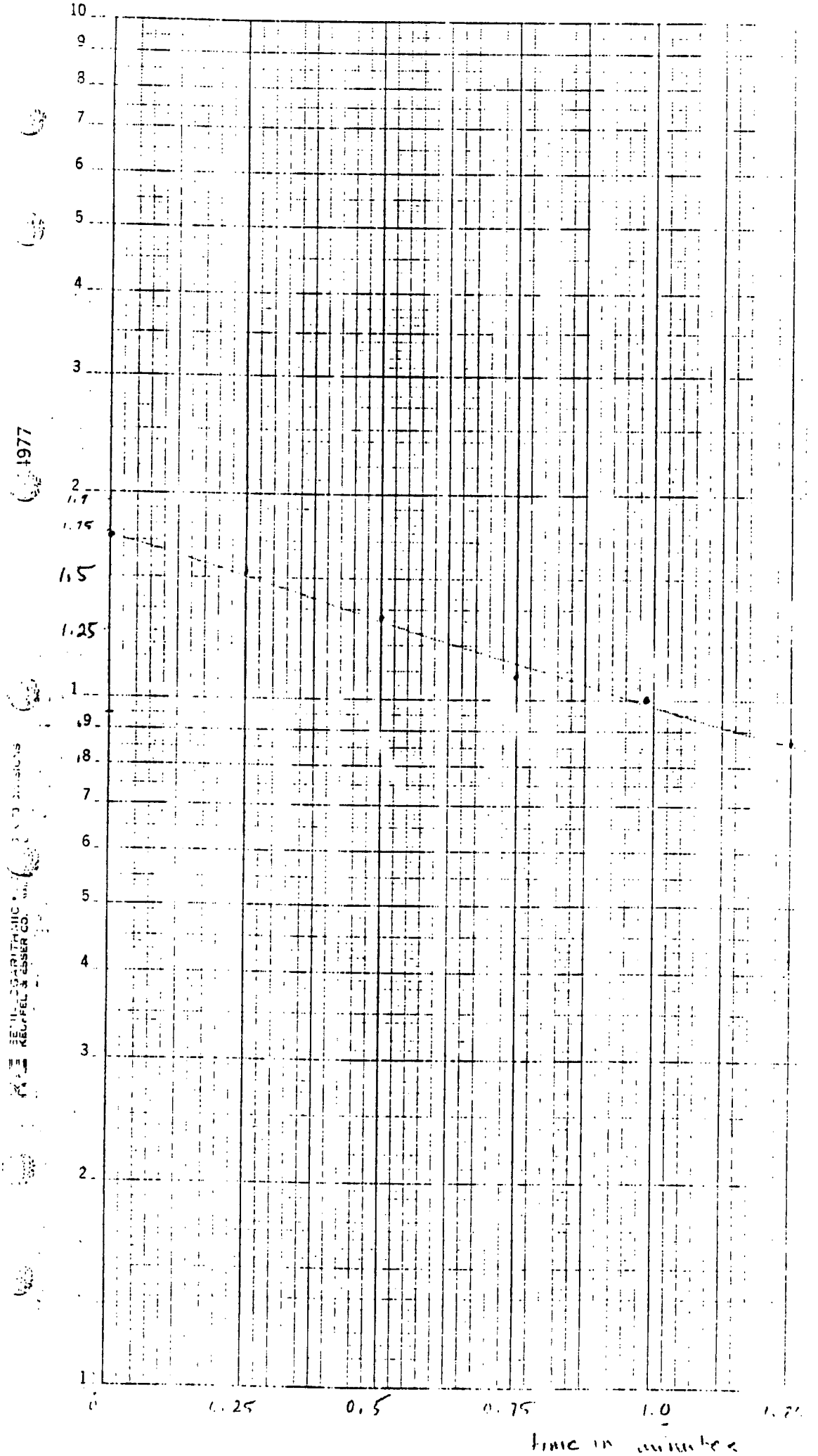
226


10
9
8
7
6
5
4
3
2
10 1
4652
Drawdown (ft)
K+E SEMI-LOGARITHMIC
KEUFFEL & ESSER CO.



OW-5
3
2
1
.9
.8
.7
.6
.5
.4
.3
.2
.1
.09
.08
.07
.6
.5
.4
.3
0
.5
1.0
1.5
2.0
2.5
Drawdown, feet
46 4977
KEUFFEL & ESSER CO. MADE IN U.S.A.

228


10
9
8
7
6
5
4
3
2
1
1.75
1.5
1.25
1
.9
.8
.7
.6
.5
.4
.3
.2
0
0.25
0.5
0.75
1.0
time in minutes
1977
KEUFFEL & ESSER CO.

229

Case F

OW-1

from straight line

assume $m = 1$ $H_1 = 2.63$ ft $= 80.2$ c

$L = 6$ ft $= 183$ cm $t_1 = 60$ sec

$D = 17$ cm $H_2 = 0.34$ ft $= 10.4$ c

$d = 5$ cm $t_2 = 360$ sec

$$\frac{2mL}{D} = \frac{2(182.9)}{17} > 4$$

$$k_h = \frac{d^2 \ln\left(\frac{4mL}{D}\right)}{8L(t_2 - t_1)} \ln \frac{H_1}{H_2}$$

$$k_h = \frac{5^2 \ln\left(\frac{4(1)(183)}{17}\right)}{8(183)(300)} \ln\left(\frac{80.2}{10.4}\right)$$

$$k_h = \frac{25(3.763)}{439200}(2.04)$$

$$k_h = 4.37 \times 10^{-4} \text{ cm/sec}$$

230

assume $m = 1$ $H_1 = 55.3$ ft $= 1685.5$ cm

$L = 14$ ft $= 426.7$ cm $t_1 = 60$ sec

$D = 17$ cm $H_2 = 51.$ ft $= 1554.5$ cm

$d = 5$ cm $t_2 = 3300$ sec

$$k_h = \frac{d^2 \ln\left(\frac{4mL}{D}\right)}{8L(t_2 - t_1)} \ln \frac{H_1}{H_2}$$

$$k_h = \frac{(5^2) \ln\left(\frac{4(1)(426.7)}{17}\right)}{8(426.7)(3300-60)} \ln\left(\frac{1686}{1555}\right)$$

$$k_h = \frac{25\ (4.609)}{11060064} \quad 0.08088$$

$$k_h = 8.43 \times 10^{-7} \text{ cm/sec}$$

assume $m = 1$

$L = 9\,ft = 274.3\ cm$

$D = 17\ cm$

$d = 5\ cm$

$H_1 = 4.4' = 670.6$

$t_1 = 120\ sec$

$H_2 = 0.42' = 12.8\ cm$

$t_2 = 480\ sec$

$$k_h = \frac{d^2 \ln\left(\frac{4mL}{D}\right)}{8L(t_2 - t_1)} \ln \frac{H_1}{H_2}$$

$$k_h = \frac{5^2 \ln\left(\frac{4(1)(274.3)}{5}\right)}{8(274.3)(480-120)} \ln\left(\frac{670.6}{12.8}\right)$$

$$\frac{(25)\ 5.3911}{789984} \quad 3.9587$$

$$k_h = 6.75 \times 10^{-4}\ cm/sec$$

Case F

OW-3

assume $m = 1$

$L = 12\ ft = 366\ cm$

$D = 12\ cm$

$d = 5\ cm$

$H_1 = 4\ ft = 121.9\ cm$

$t_1 = 60\ sec$

$H_2 = 3.5\ ft = 106.7\ cm$

$t_2 = 3600\ sec$

$$k_h = \frac{d^2 \ln\left(\frac{4mL}{D}\right)}{8L(t_2 - t_1)} \ln \frac{H_1}{H_2}$$

$$k_h = \frac{(5^2) \ln\left(\frac{4(1)(366)}{12}\right)}{8(366)(3600-60)} \ln\left(\frac{121.9}{106.7}\right)$$

$$k_h = \frac{25\ (4.4557)}{10365120}\ (0.1332)$$

$$k_h = 1.43 \times 10^{-6}\ cm/sec$$

Case F

OW-4

assume $m = 1$

$L = 13\ ft = 396\ cm$

$D = 6.75\ in = 17\ cm$

$d = 2\ in = 5\ cm$

$$\frac{2mL}{D} = \frac{2(1)(396)}{17} =$$

pt 2 $H_1 = 5.8\ ft =$

$t_1 = 60\ sec$

$H_2 = 5.56\ ft =$

$t_2 = 2160\ sec$

$$k_h = \frac{d^2 \ln\left(\frac{4mL}{D}\right)}{8L(t_2 - t_1)} \ln \frac{H_1}{H_2}$$

$$k_h = \frac{(5)^2 \ln\left(\frac{4(1)(396)}{17}\right)}{8(396)(2160-60)} \ln \frac{1770}{1640}$$

$$\frac{25(4.53)}{6652800} \quad (.04625)$$

113.4

$k_h = 7.88 \times 10^{-7}\ cm/sec$

234

Case F OW-5

assume $m = 1$

$L = 14\ ft = 426.7\ cm$

$D = 17\ cm$

$d = 5\ cm$

$$k_h = \frac{d^2 \ln\left(\frac{4mL}{D}\right)}{8L(t_2 - t_1)} \ln\left(\frac{H_1}{H_2}\right)$$

$H_1 = 0.65' =$

$t_1 = 0.5\ min =$

$H_2 = 0.09'$

$t_2 = 2\ min =$

$$k_h = \frac{\sqrt{115.2}\,(5^2)\ \cancel{\ln}\left(\frac{\overset{4.6}{\cancel{4(1)}}(427)}{\cancel{17}}\right)}{8(427)(120-30)} \ln\left(\frac{19.8}{2.7}\right)$$

307440 (1.99

$$\boxed{7.5 \times 10^{-4}}$$

235

Case 1 OW-6

H_1 - 1.5 = 45
t_1 - 0.25 = 4
H_2 - .87 = 26
t_2 - 1.25 =

M = 1
L = 12.1 = ~~38~~ 368.8 cm
D = 17 cm
d = 5 cm

$$k_h = \frac{(25)\ \ln\left(\frac{4 \cdot 368.8}{17}\right)}{8 \cdot (368.8)(30)} \left[\ln \frac{45.7}{26.5}\right]$$

$$\frac{(111.5)}{88512} \cdot (.54)$$

$$\boxed{6.8 \times 10^{-4}}$$

5
66
53
1

236

11) BACKGROUND INFORMATION

OFFICE MEMORANDUM SYRACUSE

ACTION	INFO	
To:		File: 13305-001
		X-Ref:
		Date: 5/2/83

From: Eileen Gillipaw Reply Required By:

Subject: Conversation with Niagara Co DOH - Mike Hopkins

Reference(s):

Met with Mike Hopkins of Niagara Co DOH to discuss Phase I sites in Niagara Co.

Re: Nash Rd site

He is unaware of any use for the shallow or deep aquifers, although believes it could be used for industrial purposes, if so desired.

Eileen

ROUTING

114.7 SR

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DAMES & MOORE

OFFICE MEMORANDUM

ACTION	INFO	
To:		File: 13305-001
		X-Ref:
		Date: 5/2/83

From: Eileen Gillipaw

Reply Required By:

Subject: Endangered Species / Critical Habitat

Reference(s):

On 5/2/83 I met with Gordon Batcheller of Fish + Wildlife NYSDEC Region 9 (Buffalo). He showed me maps outlining wetland + critical habitat for the Buffalo + Niagara Falls area. The area is in the migratory pathway of falcons + eagles, but there are not critical habitats for these birds within 1 mile.

Eileen

ROUTING

239

114.7 SR

HAINES & MOORE

Peter Buechi, Senior Sanitary Engineer, Region 9
Martin S. Ferguson, Environmental Chemist, Hazardous Site Contr
Sample Testing from the Nash Road Site

August 29, 1983

Enclosed is a Laboratory Test Report for the sampling of ponded water taken July 11, 1983 at the Nash Road Site. Diethyl phthalate, Terbutol and Toluene were identified in the extracted sample. The former and latter are hazardous wastes (priority pollutants).

MSF:cl
Enclosure

cc: J. Rankin
C. Goddard

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NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Solid Waste

Mobile Laboratory

Facility: Nash Rd.

Sample Type: Ponded H_2O.

Date Sampled: 7/11/83

Sampling Site		Ponded H_2O.					
Lab. Number		83-191-01					
Parameter	Units						
pH	SU						
Conductivity	ohms						
Cd	mg/l						
Fe	mg/l						
Zn	mg/l						
Cr	mg/l						
Pb	mg/l						
Ni	mg/l						
Cu	mg/l						
GC/MS	indent	Tarbutol					
	ident	diethyl phthalate					
Toluene	µg/l.	42.7					

NIAGARA COUNTY HEALTH DEPARTMENT

MEMORANDUM

DATE: January 27, 1984

TO: Peter Buechi

FROM: Michael Hopkins M. Hopkins

SUBJECT: INFORMATION REGARDING NIAGARA SANITATION NASH ROAD LANDFILL (REQUESTED IN DECEMBER 1983 TELEPHONE CONVERSATION)

Attached are copies of various documents from our files regarding the Niagara Sanitation - Nash Road Site. These documents are provided for your information and may be provided to your consultants for Phase II State Superfund investigation provided this department is properly credited for any information used in the Phase II report or subsequent reports.

This department has various other information regarding this site which is not attached but is available for inspection if desired. This information includes drawings of the Hooker "Brine Line", City of North Tonawanda Sewer maps for nearby areas, original drawings by Krehbiel Engineers showing the proposed location and dimensions of the disposal trench for Love Canal wastes, original letters between DOT and NCHD (1968) and original boring logs and locator drawings for test borings made on site in 1968 prior to digging the disposal trench.

The investigation conducted by this department in June, July and August of 1983 came to the following conclusions:

1. There is reasonable evidence in the form of plans, correspondence, etc., which indicates that wastes from the Love Canal were disposed of at this site. It is suspected that disposal occurred in a trench dug specifically for this purpose.

2. This department was unable to locate any person who claims to have been present when Love Canal wastes were disposed of or who could provide first-hand information on such disposal.

3. Various area residents, former residents, City of North Tonawanda officials and a former equipment operator have reported that industrial wastes were observed in areas of landfill used for municipal disposal. Those wastes are said to include caustics in drums, battery cases, graphite, pallets and laminating compounds, but not the wastes from Love Canal.

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4. It is believed that much of the municipal waste and the industrial wastes listed above were buried in former ponds and borrow pits. Most of the disposal area was always wet and swampy prior to disposal activity. At least one large trench was dug specifically for municipal waste disposal.

5. There is no specific evidence indicating that off site migration of contaminants has occurred or that a direct contact hazard is present; however, the available data is not conclusive in this respect.

This department considers follow-up investigation at this site to be necessary. Additional sampling and analysis of soil and groundwater are considered necessary to confirm whether or not residential areas adjacent to the site have been impacted by contaminants from the site. This department is also concerned that adequate data is not available to assess the potential of exposure to persons who may be on site, regardless of whether such persons are on site legally or illegally.

This department requests that we be kept informed of any activities of DEC with respect to this site and that we be kept informed of any additional information your department may have or obtain in the future.

Please feel free to contact me with any questions.

MEH:cs
Attachments

cc: M. N. Vaughan

August 9, 1978

Disposal of Chemical Waste
Contract FAC 67-15; FALSE 67-1
LaSalle Arterial, Niagara Falls, Niagara County

ORIGINAL SIGNED BY
D. H. KETCHUM

D. H. Ketchum, Regional Director - Region 5

W. C. Hennessy, Commissioner of Transportation, Bldg. 5, Room 507

cc ~~[illegible]~~ M. J. Cuddy

During the course of construction of the LaSalle Arterial in the City of Niagara Falls, buried chemical waste was encountered during excavation for a storm sewer line along Frontier Avenue between 97th and 99th Streets. Further exploration revealed that the chemical waste material extended under the proposed location of relocated Frontier Avenue north of the existing street. The total quantity of chemicals in the proposed roadway was estimated to be 1100 CY. No chemicals were found under, or south of, existing Frontier Avenue.

When the sewer line excavation first began, the chemicals were piled to one side along with the other excavated material. This prompted several complaints from adjacent property owners about the offensive odor of the material.

After consulting with Hooker Chemical and the Niagara County Health Department, some of the chemicals were trucked to an existing dump owned by Hooker off Hyde Park Blvd. near the north city line of Niagara Falls. After approximately 200 CY were disposed of at this location, the contractor was advised by Hooker officials that no more would be accepted at their dump.

After negotiation with the Town of Wheatfield, and with the approval of the Niagara County Health Department, the remainder of the chemical waste was trucked to a Town dump area off Nash Road in the Town of Wheatfield.

The following is a chronological summary of events from March 15, 1968, when the chemicals were first encountered to July 15, 1968, when the disposal of the chemicals was completed.

Date	Event	Source
3-15-68	First encountered chemical waste material between 97th and 99th Sts. in relocated Frontier Ave. area.	Engineer's Dir
3-15-68	Contacted Hooker Chem. Co. requesting information on material makeup.	Joe Caine Dir
3-19-68	Mr. Capong, property owner, complained of stench coming off chemical waste stockpile.	Engineer's di Joe Cain's di

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e	Event	Source
)-68	Messrs. Popovici, Maida, Niagara County Health Dept. investigating	Joe Cain's diary
3-22-68	Ken Reitmeier, Supervising Soils and Materials Engr., investigated and wrote memo this date recommending removal of chemical waste.	Memo dated 3-22-68
3-25-68	Mr. Popovici telephoned ordering chemical waste excavated to date, removed from project site and disposted of at a dump operated by Hooker Chemical Co. located off Hyde Park Blvd. near north city line.	Joe Cain's diary
3-27-68	Letter confirming the telephone conversation 3-25-68 from Ernest R. Gedeon, Niagara County Health Dept.	Letter dated 3-27-68
4-1-68	Letter from J.P. Cain, ordering contractor to remove chemical waste to the Hooker Dump on Hyde Park Blvd.,	Letter dated 4-1-68
4-1-68	Stimm sent letter disputing work to removed chemical waste material.	Letter dated 4-1-68
4-3-68	Removal of chemical waste to Hooker's dump site off Hyde Park Blvd. began.	Joe Cain's diary
4-8-68	Hooker officials (Fred T. Olotka) ordered a halt to further dumping of chemical waste at their Hyde Park Blvd. dump. Niagara County Health Dept. informed.	Joe Cain's diary.
4-15-68	Letter to Robert W. Sweet, Chief Engineer from A. J. Kopczynski recommending extra payment for work to remove approx. 1,000 CY of chemical waste.	Letter dated 4-15-68
4-23-68	Letter to J. P. Cain from Stimm requesting permission to use Town of Wheatfield dump site.	Letter dated 4-23-68
4-25-68	Maps and borings received from Krehbiel, Quay, Rugg & Hall, Engr. - Bel Air Subdivision.	Package dated 4-25-68
5-1-68	Letter to Ernest R. Gedeon, Chief Air Pollution Control, Niagara County Health Dept. from J.P. Cain outlining proposed method of disposing of chemical waste.	Letter dated 5-1-68

Date	Event	Source
5-3-68	Wm. Friedman, Jr., Asst. Comm. of Env. Health, telephoned listing information he will require before approval of Wheatfield site is given.	Memo to Files dated 5-3-68
5-6-68	Letter from Friedman confirming the above telephone conversation (5-3-68) to Brzeninski (Stimm) requesting permission to use Wheatfield dump.	Letter dated 5-6-68
5-9-68	Letter from Hooker (Fred Olotka), listing makeup of chemical waste from ground samples taken.	Letter dated 5-9-68
5-16-68	Boring taken on Frontier Ave. between 97th and 99th Sts. to determine the limits of chemical waste.	Memo dated 5-16-68, P. Nowadly to J.P.Cai
5-16-68	Borings of proposed Wheatfield dump site sent to Friedman, Niagara County Health.	Letter dated 5-16-68, P. Nowadly to Friedm
5-21-68	Verbal permission received from Friedman granting permission to use Wheatfield site. Letter ordering Stimm to excavate and remove chemical waste to Wheatfield.	J. Cain's diary. Letter dated 5-21-6 Cain to Stimm.
5-27-68	Began excavating Wheatfield dumpsite.	MURK II dated 5-27-68
6-6-68	Began hauling chemical waste to dump.	MURK II 6-6-68
7-15-68	Complete all work including regrading dump site.	MURK II 7-15-68

The disposal area off Nash Road was visited on August 8, 1978 by J. Powers, Jr., and P. Goodman of my staff. Although they were unable to pin point the exact location of the buried chemicals, the approximate area was examined and no sign of the chemicals was found. The area in which the chemicals were buried was an excavation approximately 100 ft. by 30 ft. by 27 ft. deep. The area is located in a Town of Wheatfield dump just north of the North Tonawanda City Line, approximately 1/2 mile east of Nash Road and 1/2 mile south of Niagara Falls Blvd. There has been no development in the area and no apparent hazard exists at this time.

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Our records indicate that the chemicals were placed in the 100' x 30' area to a depth of approximately 15 ft. and covered with at least 12 ft. of the excavated material. A review of Inspectors' reports indicates that the estimate of 1100 CY of chemicals was exceeded by about 50 percent for a total of 1600 CY ± placed in this excavation.

Disposal of the chemicals in the Nash Road area was done with the full knowledge and consent of the Town of Wheatfield and the Niagara County Health Dept. Soil exploration was conducted by our Soils Engineer prior to disposal of the chemicals and the area was found to be acceptable for disposal purposes.

Attached are copies of all pertinent correspondence, drawings and boring logs.

DHK:JEP:mh

Attachments

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NEW YORK STATE GEOLOGICAL ASSOCIATION

54th ANNUAL MEETING

October 8-10, 1982

Amherst, New York

GUIDEBOOK FOR FIELD TRIPS IN WESTERN NEW YORK, NORTHERN PENNSYLVANIA AND ADJACENT, SOUTHERN ONTARIO

Edward J. Buehler

and

Parker E. Calkin

Editors

Department of Geological Sciences
State University of New York at Buffalo

Held in Conjunction with
11th Annual Meeting Eastern
Section American Association
of Petroleum Geologists

Published by the New York State Geological Association. Guidebook available from the executive secretary: M.P. Wolf, Geology Department, Gittleson Hall, Hofstra University, Hempstead, New York 11550.

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NEW YORK STATE GEOLOGICAL ASSOCIATION

38th Annual Meeting

April 29 - May 1, 1966

GUIDEBOOK

Geology of Western New York

Edward J. Buehler, Editor

Department of Geological Sciences
State University of New York at Buffalo

Additional copies are available from the permanent secretary of the New York State Geological Association: Dr. Kurt E. Lowe, Department of Geology, City College of the City University of New York, 139th St. at Convent Ave., New York, N. Y.

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Soil Mechanics

T. William Lambe • *Robert V. Whitman*

Massachusetts Institute of Technology

1969

John Wiley & Sons, Inc.

New York London Sydney Toronto

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in which

k = the Darcy coefficient of permeability
D_s = some effective particle diameter
γ = unit weight of permeant
μ = viscosity of permeant
e = void ratio
C = shape factor

The following is an expression for the permeability of porous media, known as the *Kozeny-Carman equation* since it was proposed by Kozeny and improved by Carman:

$$k = \frac{1}{k_0 S^2} \frac{\gamma}{\mu} \frac{e^3}{(1 + e)} \tag{19.5}$$

in which

k_0 = factor depending on pore shape and ratio of length of actual flow path to soil bed thickness
S = specific surface area

Since D_s is defined as the diameter of particle having a specific surface of S, Eq. 19.4 can be considered a simplification of the Kozeny-Carman equation.

Table 19.1 Coefficient of Permeability of Common Natural Soil Formations

Formation	Value of k (cm/sec)
River deposits	
Rhone at Genissiat	Up to 0.40
Small streams, eastern Alps	0.02–0.16
Missouri	0.02–0.20
Mississippi	0.02–0.12
Glacial deposits	
Outwash plains	0.05–2.00
Esker, Westfield, Mass.	0.01–0.13
Delta, Chicopee, Mass.	0.0001–0.015
Till	Less than 0.0001
Wind deposits	
Dune sand	0.1–0.3
Loess	0.001 ±
Loess loam	0.0001 ±
Lacustrine and marine offshore deposits	
Very fine uniform sand, $U^a = 5$–2	0.0001–0.0064
Bull's liver, Sixth Ave., N.Y., $U = 5$–2	0.0001–0.0050
Bull's liver, Brooklyn, $U = 5$	0.00001–0.0001
Clay	Less than 0.0000001

[a] U = uniformity coefficient.
From Terzaghi and Peck, 1967.

Table 19.2 Classification of Soils According to Their Coefficients of Permeability

Degree of Permeability	Value of k (cm/sec)
High	Over 10^{-1}
Medium	10^{-1}–10^{-3}
Low	10^{-3}–10^{-5}
Very low	10^{-5}–10^{-7}
Practically impermeable	Less than 10^{-7}

From Terzaghi and Peck, 1967.

Equation 19.4 or 19.5 aids considerably in the following examination of the variables affecting permeability. In this examination those characteristics related to the permeant are considered first and then those related to the soil composition are treated.

Permeant

Equations 19.4 and 19.5 show that both the viscosity and the unit weight of the permeant influence the value of permeability. These two permeant characteristics can be eliminated as variables by defining another permeability, the *specific* or *absolute* permeability, as:

$$K = \frac{k\mu}{\gamma} \tag{19.6}$$

Since k is in units of velocity, K is in units of length^2; e.g., if k is in cm/sec, the corresponding unit for K is cm^2. K is also expressed in terms of darcys; 1 darcy = 0.987×10^{-8} cm^2. For water at 20°C, the following two equations permit one to convert k in cm/sec to K in cm^2 or in darcys:

$$K \text{ in cm}^2 = k \text{ in cm/sec} \times 1.02 \times 10^{-5} \tag{19.7}$$

$$K \text{ in darcys} = k \text{ in cm/sec} \times 1.035 \times 10^{3} \tag{19.8}$$

Figure 19.6 is a chart for the conversion of permeability values from one set of units to another. (Conversion factors are given in the appendix.)

While viscosity and unit weight are the only variables of the permeant that influence the permeability of pervious soils, other permeant characteristics can have a major influence on the permeability of relatively impervious soils. The magnitude of influence for characteristics other than viscosity and unit weight are illustrated in Fig. 19.7. In this figure values of permeability of saturated kaolinite are plotted for various permeants. The permeability is expressed in terms of the absolute permeability, thus the influences of viscosity and unit weight have been eliminated. The data in Fig. 19.7 show that the nature of the permeant can be very important, with variations of many hundred percent in absolute permeability depending on the actual permeant. The

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Protection of Environment

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PARTS 190 to 399

Revised as of July 1, 1983

CONTAINING
A CODIFICATION OF DOCUMENTS
OF GENERAL APPLICABILITY
AND FUTURE EFFECT

AS OF JULY 1, 1983

With Ancillaries

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the Office of the Federal Register
National Archives and Records Service
General Services Administration

as a Special Edition of
the Federal Register

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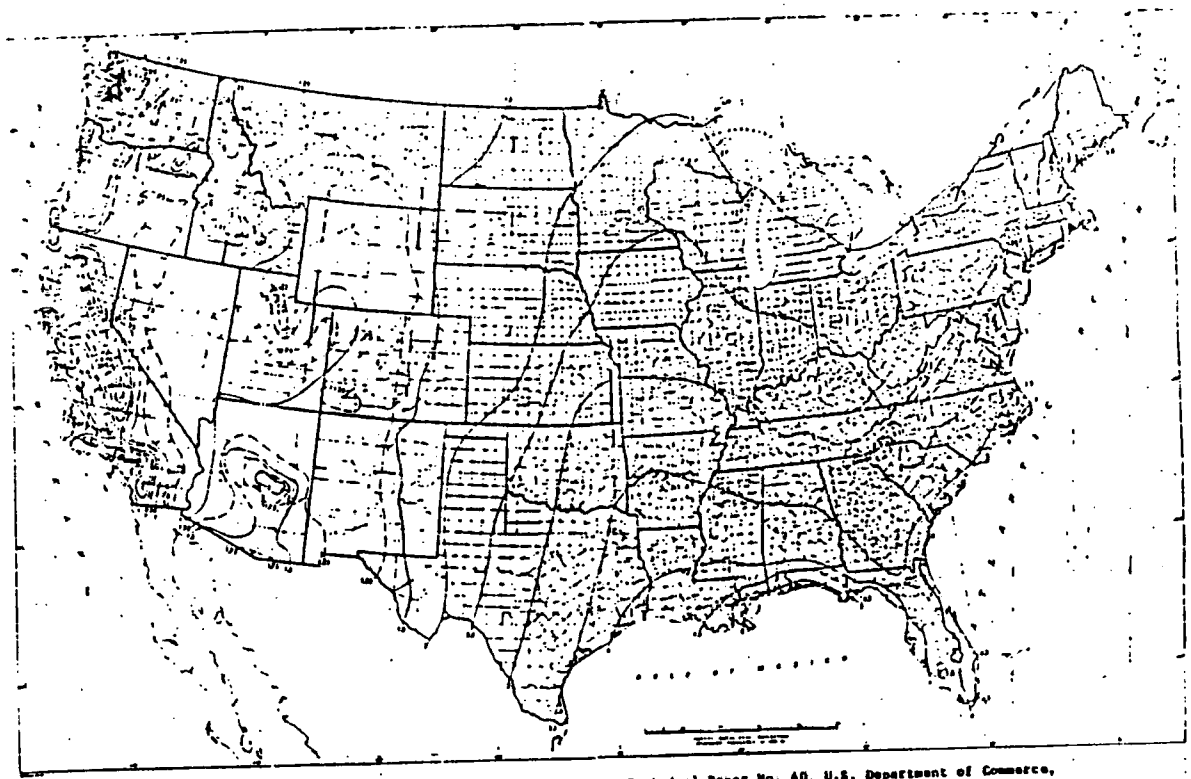
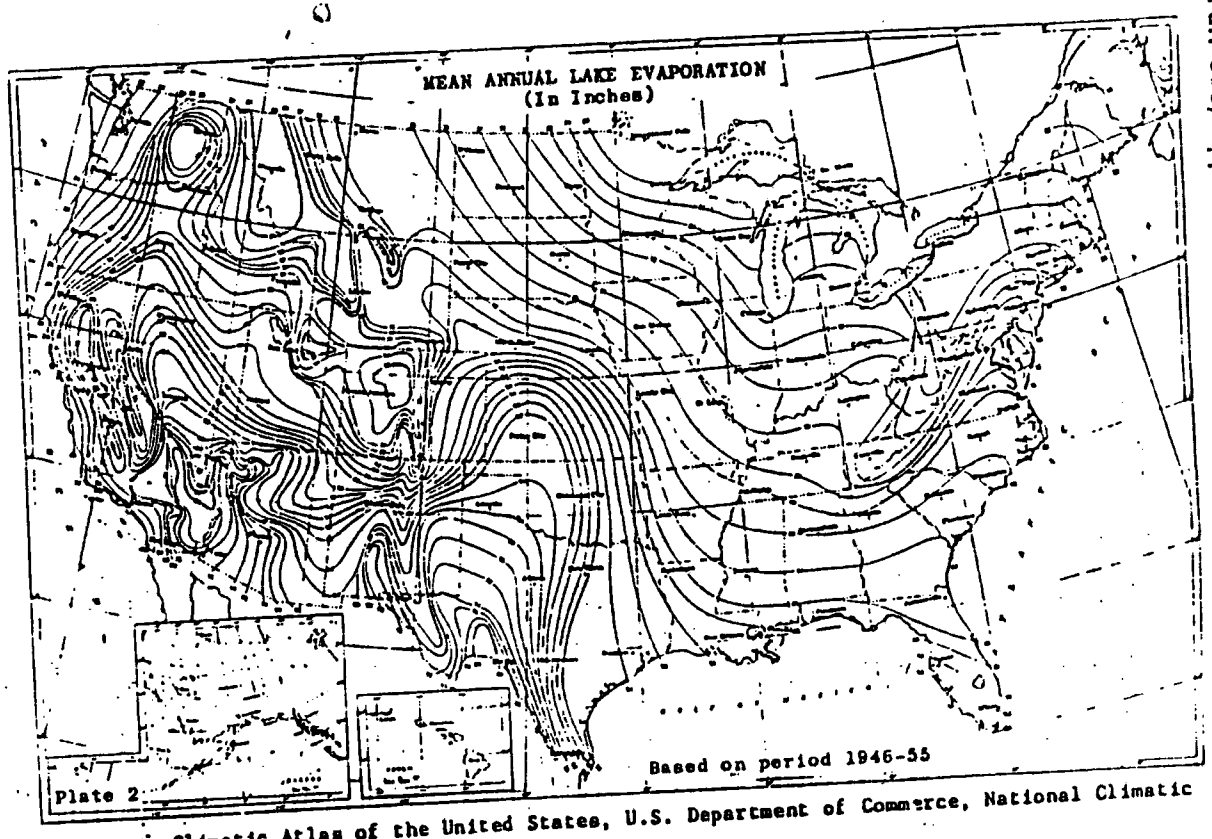


Source: Rainfall Frequency Atlas of the United States, Technical Paper No. 40, U.S. Department of Commerce, U.S. Government Printing Office, Washington, D.C., 1963.

Figure 8

1-Year 24-Hour Rainfall (Inches)

253

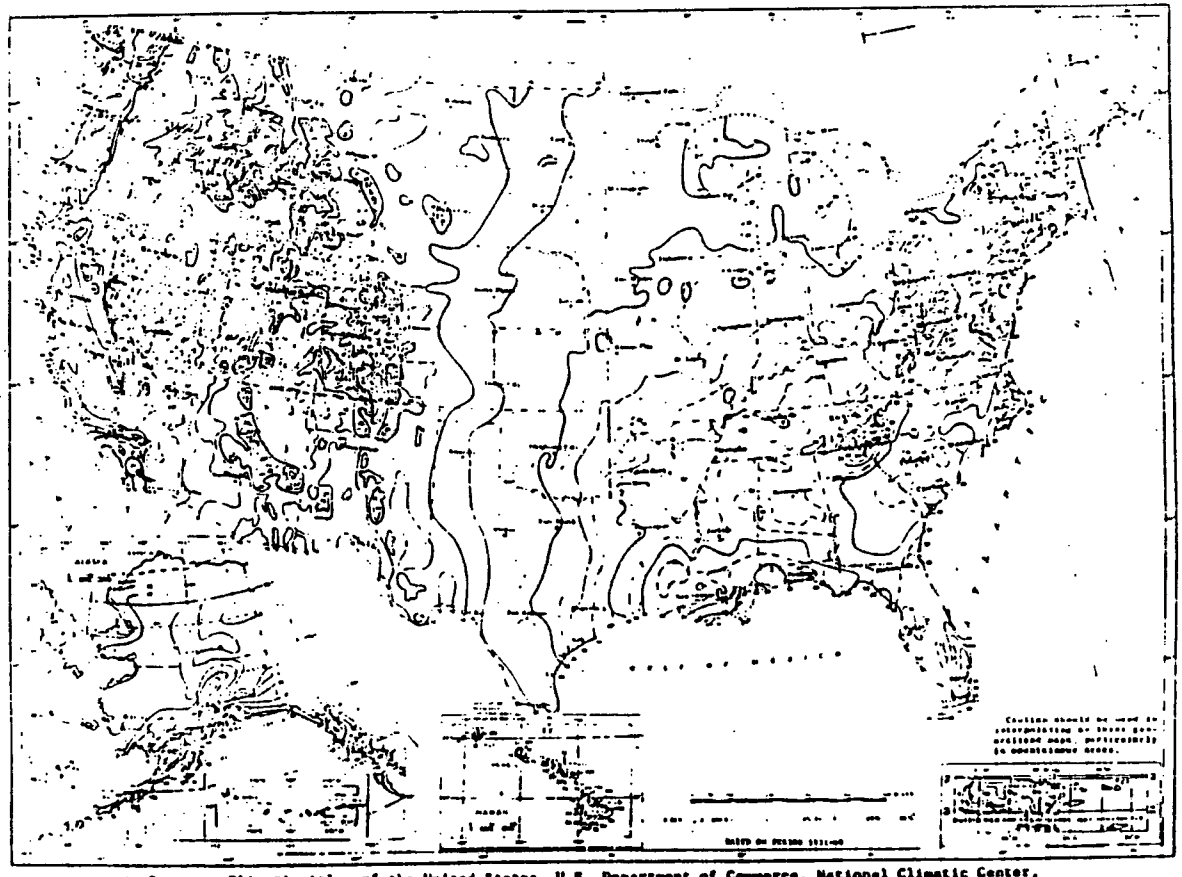


Source: Climatic Atlas of the United States, U.S. Department of Commerce, National Climatic Center, Ashville, N.C., 1979.

Figure 4

Mean Annual Lake Evaporation (In Inches)

254



Source: Climatic Atlas of the United States, U.S. Department of Commerce, National Climatic Center, Asheville, N.C., 1979.

Figure 5

Normal Annual Total Precipitation (inches)

Niagara County DOH, 1981

NAME OF LANDFILL

NIAGARA SANITATION COMPANY (DEC #932054)

LOCATION Nash Road, Town of Wheatfield

The site is estimated to be about seven acres in size and located north of the Niagara Mohawk easement which straddles the North Tonawanda - Wheatfield town line. The site extends from the eastern end of the access road running from Nash Road approximately 350 yards east to the fork in the power easement (Tower #365). The site is estimated to be 120 yards wide at the western end tapering to about 70 yards wide at the eastern end.

The landfill location and extent are shown on the attached drawing.

OWNERSHIP

The property is owned by the Town of Wheatfield.

HISTORY

This landfill was used by the Niagara Sanitation Company for waste disposal from 1964 to 1968. The refuse site was used for both industrial and municipal refuse. The site received refuse from Niagara Falls Air Force Base, Bell Aerospace, Carborundum, Frontier Chemical, Graphite Specialties, Continental Can and Grief Bros. Wastes disposed of may include caustics, plating tank sludge and municipal wastes.

Historical information was obtained from Hazardous Waste Disposal Sites in New York State, Volume 3, NYS DEC.

INVESTIGATION

A site visit was made by Mr. M.E. Hopkins of the Niagara County Health Department on June 11, 1981. The site was found to be poorly covered with protruding refuse. Visible items included rubber blocks, tubes and hoses, tires, concrete fragments and other demolition debris, broken glass, ash, wood, rusted cans and pieces of graphite rods. Also found were what appeared to be remnants of steel drums. There was evidence of some unauthorized dumping after the site was closed. Access to the site was not restricted.

Red-brown (rust-colored) stains were found on vegetation and soil in numerous locations around the perimeter of the site, particularly along the northern and western edges. Additional stained areas were found throughout the marshes and other low points within the site. Although most of these stained areas were dry, two areas were found beneath standing water. It was noted that although the ground was stained beneath the water, the water was not discolored. No flowing leachate streams were found. The sampling well was not found on the June 11th visit. A well was found on June19th on a subsequent visit. The well was located 20 feet east of Niagara Mohawk Tower #363. The location is shown on the attached drawing. The well had apparently been

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INVESTIGATION (continued)

vandalized. The upper standpipe had been broken off at ground level and the well had, therefore, been left uncovered. The well may still be useable for sampling.

No evidence of landfill activity was noted east of Niagara Mohawk Tower #365. However, USDA aerial photographs (ARE 3V-75;1966) indicate that the landfilled area may extend 300 to 400 ft. east of Tower #365.

SOILS

The soils surrounding the site are Raynham and Canandaigua series soils. The composition of the soil contained with the site itself is not known, although it is expected to be largely composed of refuse. The surface is generally a silty clay material with some sand in spots. Portions of the site are marshy while others appear well drained, indicating that the soil may not be uniform throughout the site. Boring records of the sampling well immediately south of the site, indicate a profile of silty sand and sandy silt to a depth of about 9 feet over clay to an unknown depth. The records also show the water table at 4 feet. This suggests that the water table may be perched. Fluctuations of the water table are not known.

CONCLUSIONS

The potential for the migration of contaminants off-site is present. Visible leachate stains and the odor in the well south of the landfill indicate that material may be leaching in perched groundwater. Permeable soils in some areas could allow lateral migration. The site requires proper closing. The proximity of houses along Forbes Road and potential for migration justify sampling at this site.

SAMPLING

Well and soil samples were taken for THO, heavy metals and phenol analysis. It was noted at the time of sampling, that the water drawn from the well was discolored gray and strongly odorous with an organic odor. A slight oily sheen was present on the surface of the sample. Two soil samples were taken near Towers #364 and #365. These samples were taken from the bottoms of hand augered holes roughly 4 feet deep. The boring near pole #364 indicated a gray silt over a darker gray silty clay layer at the point of sampling. The second boring showed a tan silty clay over clay at about 4 feet. The sample was taken from this interface. Groundwater was encountered slightly below the 4 foot level in both holes.

RECOMMENDATIONS

This site must be properly closed. Additional sampling wells along the Niagara Mohawk easement would be desireable to facilitate future sampling. The existing well should be maintained. Annual inspection and periodic monitoring is recommended. The Town of Wheatfield was notified to submit an abatement plan for the site..

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SUMMARY OF SAMPLES TAKEN

SAMPLE #	LOCATION	TYPE	PARAMETER	DATE	NEAREST HOUR
1	Gratwick # 13	Well	Metals	7/16/81	11:00
2	Gratwick # 10	Well	Metals	7/16/81	11:00
3	Gratwick # 11	Well	Metals	7/16/81	11:00
4	Gratwick # 12	Well	Metals	7/16/81	11:00
5	Gratwick # 13	Well	THO	7/16/81	11:00
6	Gratwick # 10	Well	THO	7/16/81	11:00
7	Gratwick # 11	Well	THO	7/16/81	11:00
8	Gratwick # 12	Well	THO	7/16/81	11:00
9	Nia. Sanitation	Well	Metals	7/16/81	1:00
10	Nia. Sanitation	Well	THO	7/16/81	1:00
11	Zimmerman	Well	THO	7/16/81	12:00
12	Holiday Old Falls	Well	THO	7/16/81	12:00
13	Artpark	Leachate	Metals	7/17/81	12:00
14	Artpark	Leachate	THO	7/17/81	12:00
15	PASNY	Soil	Metals	7/21/81	10:00
16	PASNY	Soil	THO	7/21/81	10:00
17	Nia. Sanitation	Soil	Metals	7/24/81	12:00
18	Nia. Sanitation	Soil	THO	7/24/81	12:00
19	Nia. Sanitation	Soil	Metals	7/24/81	12:00
20	Nia. Sanitation	Soil	THO	7/24/81	12:00
21	Walck Road	Soil	THO	7/24/81	12:00
22	Gratwick # 13	Well	Phenol	8/12/81	10:00
23	Gratwick # 10	Well	Phenol	8/12/81	10:00
24	Gratwick # 11	Well	Phenol	8/12/81	10:00
25	Gratwick # 12	Well	Phenol	8/12/81	10:00
26	Zimmerman	Well	Phenol	8/12/81	11:00
27	Old Falls	Well	Phenol	8/12/81	11:00
28	Nia. Sanitation	Well	Phenol	8/12/81	12:00
29	Olin-Industrial Welding	Soil	THO, TOC Lindane	9/07/81	12:00

ANALYTICAL RESULTS FOR SAMPLES TAKEN AT GRATWICK - RIVERSIDE PARK

WELL # 10

Sample # 2	Sampled 11:00	7/16/81
Cadmium, total	L.T. 0.02 MG/L	
Chromium, total	L.T. 0.1 MG/L	
Lead; total	L.T. 0.1 MG/L	
Mercury, total	L.T. 0.4 MCG/L	
Nickle, total	0.05 MG/L	
Sample # 6	Sampled 11:00	7/16/81
THO	35 MCG/L	
Sample #24	Sampled 10:00	8/12/81
Phenol	3 MG/L	

WELL # 11

Sample # 3	Sampled 11:00	7/16/81
Cadmium, total	L.T. 0.02 MG/L	
Chromium, total	L.T. 0.1 MG/L	
Lead, total	L.T. 0.1 MG/L	
Mercury, total	L.T. 0.4 MCG/L	
Nickle; total	L.T. 0.05 MG/L	
Sample # 7	Sampled 11:00	7/16/81
THO	Less than 1 MCG/L	
Sample # 25	Sampled 10:00	8/12/81
Phenol	3 MG/L	

WELL # 12

Sample # 4	Sampled 11:00	7/16/81
Cadmium, total	L.T. 0.02 MG/L	
Chromium, total	L.T. 0.1 MG/L	
Lead, total	L.T. 0.1 MG/L	
Mercury, total	L.T. 0.4 MCG/L	
Nickle, total	L.T. 0.05 MG/L	
Sample # 8	Sampled 11:00	7/16/81
THO	4 MCG/L	
Sample # 26	Sampled 10:00	8/12/81
Phenols	0.2 MG/L	

GRATWICK - RIVERSIDE PARK (continued)

WELL # 13

Sample # 1 Sampled 11:00 7/16/81

Cadmium, total	L.T.	0.02	MG/L
Chromium, total	L.T.	0.1	MG/L
Lead, total		0.1	MG/L
Mercury, total	L.T.	0.4	MCG/L
Nickle, total		0.05	MG/L

Sample # 5 Sampled 11:00 7/16/81

THO 18 MCG/L

Sample # 22 Sampled 10:00 8/12/81

Phenols 17 MG/L

RESULTS OF SAMPLES TAKEN AT NIAGARA SANITATION SITE

WELL SAMPLES

Sample # 9 Sampled 1:00 7/16/81

Cadmium, total	L.T.	0.02	MG/L
Chromium, total	L.T.	0.1	MG/L
Lead, total		0.2	MG/L
Mercury, total	L.T.	0.4	MCG/L
Nickle, total		0.12	MG/L

Sample # 10 Sampled 1:00 7/16/81

THO 4 MCG/L

Sample # 28 Sampled 12:00 8/12/81

Phenol 0.008 MG/L

well + sample locations not marked on map

SOIL SAMPLES

Samples # 17,18,19 & 20 all Sampled 10:00 7/24/81
Samples # 17 & 18 Metals - Results not yet available
Sample # 19 L.T. 10 PPB THO
Sample # 20 L.T. 10 PPB THO

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RESULTS OF SAMPLES TAKEN AT ARTPARK

LEACHATE SAMPLES

Sample # 13 Sampled 1:00 7/17/81

Cadmium, total	0.02	MG/L
Chromium, total	0.1	MG/L
Lead, total	0.5	MG/L
Nickle, total	0.73	MG/L
Mercury, total	L.T. 0.4	MCG/L

Sample # 14 Sampled 1:00 7/17/81

THO 47 MCG/L

RESULTS OF SAMPLES TAKEN AT HOLIDAY PARK

WELL SAMPLES

WELL # 4

Sample # 11(Zimmerman) Sampled 12:00 7/16/81

THO 4 MG/L

Sample # 26 Sampled 11:00 8/12/81

Phenols .008 MG/L

WELL # 8

Sample # 12 (Old Falls) Sampled 12:00 7/16/81

THO 3 MCG/L

Sample # 27 Sampled 11:00 8/12/81

Phenol .01 MG/L

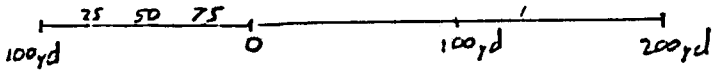
SOIL SAMPLES

Sample # 21 Walch Road Sampled 12:00 7/24/81

THO Less than 10 PPB

NIAGARA SANITATION NASH ROAD SITE (DEC # 932054)

Approx. Scale.
1: 3600
(All distances estimated)

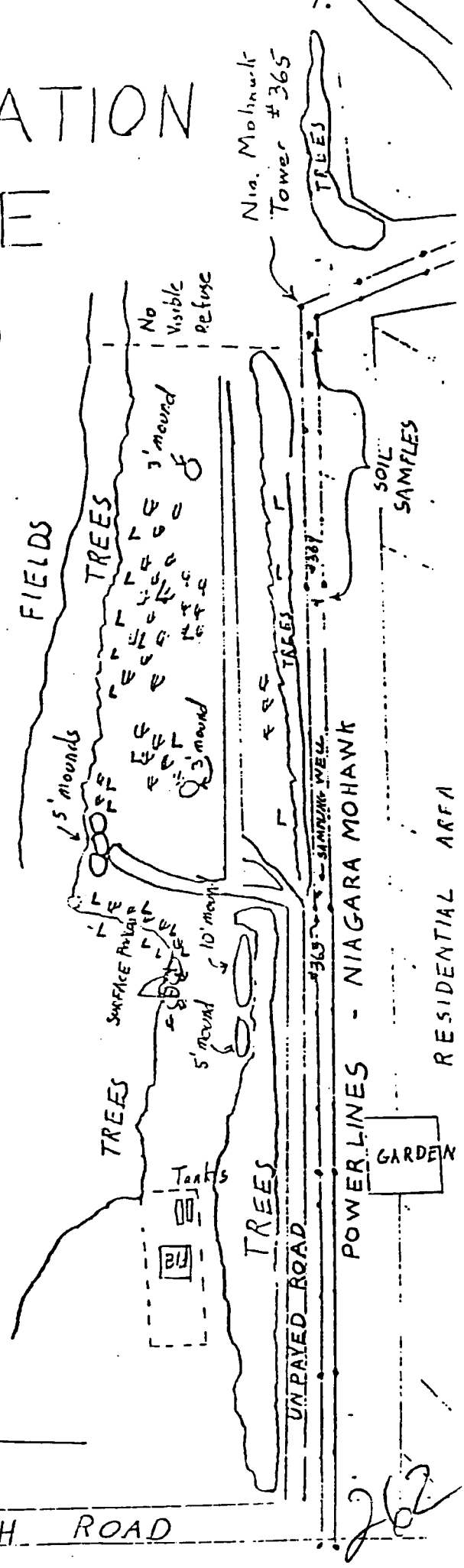


ψ - Marsh Area
{ - Treeline
|| - Powerlines
L - Red-Brown Leachate stains

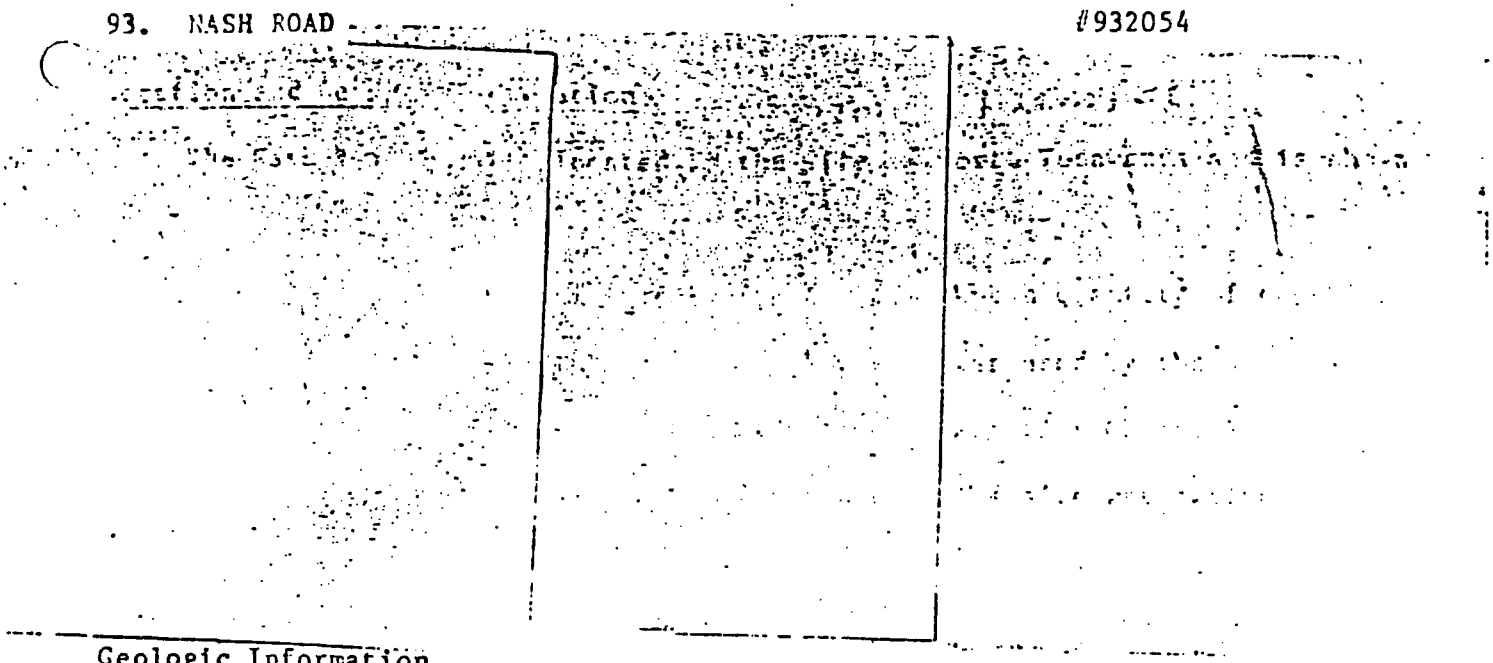
Slope - downward toward SE (<1%)

Mapped from field observation only by M. Hopkins NCHD

Michael E. Hopkins



93. NASH ROAD #932054



Geologic Information

The geology of the site consists of a Holocene lacustrine clay unit overlying a bedrock of Camillus Shale. Four test borings were drilled on the site and their locations are shown in figure 1. The geologic description of the borings is as follows:

Well No.	Depth (ft)	Description
1	0 - 5.0	Fill.
	5.0 - 6.5	Clay, pink.
		WATER SAMPLE: 6.0 ft.
2	0 - 8.0	Clay, tan to light green, sandy, dry.
	8.0 - 10.0	Clay, green.
	10.0 - 11.5	Clay, pink.
		SOIL SAMPLE: 8 - 10 ft.
3	0 - 1.5	Tan and black fill.
	1.5 - 3.5	Clay, greenish, sandy, dry.
	3.5 - 7.0	Clay, greenish, sandy, wet.
		SOIL SAMPLE: 7 ft.
4	0 - 1.0	Topsoil.
	1.0 - 3.5	Clay, sandy, dry.
	3.5 - 6.5	Clay, greenish, wet.
		SOIL SAMPLE: 6.5 ft.

Table 1.--Analyses of ground-water and substrate samples from Nash Road, Wheatfield, New York

	Sample number			
	1	2	3	4
Date collected	052482	062482	062482	062482
Depth (ft)	6.0	9.5	7.0	6.5
Sample Type[1]	gw	s	s	s
pH	6.4	-	-	-
Conductivity (uMHOS)	2650	-	-	-
Temperature (°C)	17.0	-	-	-
Inorganic Constituents[2]				
Antimony				
Arsenic	5;5	<1000;<1000	<1000	<1000
Cadmium	1;1	1000;1000	1000	1000
Chromium	<10;<10	2000;4000	2000	2000
Copper	17;21	77000;100000	71000	71000
Iron	90000;90000	2500000;5000000	2100000	2400000
Lead	67;74	20000;20000	13000	20000
Mercury	0.3;0.5	<10;<10	<10	<10
Nickel	34;34	<10000;<10000	<10000	<10000
Selenium				
Zinc				
Flouride				
Sulfide				
Cyanide				
Organic Compounds[2]				
1,2,3-trimethylbenzene[5]	6.2;-[7]	-;-	<300	-
1,2,4-trimethylbenzene[5]	18;-[7]	-;-	<300	-
1,4-dichlorobenzene[5]	7.3;-[7]	-;-	<300	-
(1-methylethyl)benzene[5]	9.3;-[7]	-;-	<300	-
1,3,3-Trimethyl-bicyclo-[2.2.1]heptan-2-one[4]	62;-[7]	-;-	<300	-
1,7,7-Trimethyl-bicyclo-[2.2.1]heptan-2-one[4]	390;17[7]	-;-	<300	-

1 Sample type: gw=ground water, sw=surface water, and s=substrate.
2 Concentrations: ug/L for water and ug/Kg for substrate. Blank spaces indicate that no analyses were performed; dashes indicate that constituents and compounds were not found.
3 Cu(D): analysis done by direct aspiration because of high iron concentration.
4 Identity determined by library match; no standard available. Concentration results are semiquantitative and are based on the response factor of the internal standard.
5 Identity based on less than library match; identification seemed reasonable. As for footnote 4, concentration results are semiquantitative.
6 Volatile found in GC/ms extractions. Concentration results probably less than actual.
7 Low surrogate recoveries.
8 Estimated value less than detection limit.

Table 1 .--Analyses of ground-water and substrate samples from Nash Road, Wheatfield, New York

	Sample Number 1	2	3	4
Organic Compounds[2] (continued)				
Iodocyclohexane [5]	-;-	10052;-	-	-
N-[2-methyl-1-(1-methylethyl) butylidiene]methanamine[5]	-;-	36569;-	-	-
N-(2 hydroethyl)-dodecanamide [5]	-;-	16342;-	-	-
1-(2-butenyl)-2,3-dimethylbenzene [5]	-;-	1301;-	-	-
2,3,5,6,7,8,9,10-octahydri-5-hydroxy-2,2,7,7,9-pentamethyl-5,9-menthano-benzocycloocten-4(1H)-one[4]	-;-	6294;-	-	-
10-methylcisosane [4]	-;-	<300;-	-	-
Hexamethylcyclotrisiloxane[5]	-;-	-;-	-	1300
Octamethylcyclotetra-siloxane [5]	-;-	-;-	-	5440
Decamethylcyclopenta-siloxane [5]	-;-	-;-	-	293[8]
Dodecamethylcyclohexa-siloxane [5]	-;-	-;-	-	90.7
5-Methyl-3-hexen-2-one[5]	-;-	-;3500	-	-
Dichloromethylbenzene[5]	-;-	-;<300	-	-
2-(1,1-Dimethyl)-4-methylfuran[5]	-;-	-;183000	-	-
2,4-Dimethyl-2-pentene		-;182000	-	-
3-Octanol[5]		-;47500	-	-
2,6-Bis(1,1-dimethylethyl) napthalene[5]	-;-	-;1650	-	-
1,1,4,5,5,8-Hexamethyl-S-hydrindacene[5]	-;-	-;5750	-	-
Flouranthene	-;-	-;538	-	-
Benz(a)anthracene	-;-	-;272[8]	-	-
Chrysene	-;-	-;274[8]	-	-
Benzo(b)flouranthene	-;-	-;223[8]	-	-
Benzo(k)flouranthene	-;-	-;249[8]	-	-
2,6-Dimethyl-2,5-hepta-dien-4-one[5]	-;-	-;-	509	-
2-Methyl-2-octen-4-one[5]	-;-	-;-	13300	-
1,2,4-Trimethyl-5-(1-methyl-ethenyl)benzene[5]	-;-	-;-	159	-

1 Sample type: gw=ground water, sw=surface water, and s=substrate.
2 Concentrations: ug/L for water and ug/Kg for substrate. Blank spaces indicate that no analyses were performed; dashes indicate that constituents and compounds were not found.
3 Cu(D): analysis done by direct aspiration because of high iron concentration.
4 Identity determined by library match; no standard available. Concentration results are semiquantitative and are based on the response factor of the internal standard.
5 Identity based on less than library match; identification seemed reasonable. As for footnote 4, concentration results are semiquantitative.
6 Volatile found in GC/ms extractions. Concentration results probably less than actual.
7 Low surrogate recoveries.
8 Estimated value less than detection limit.

Table 1.—Analyses of ground-water and substrate samples from Nash Road, Wheatfield, New York—continued

	Sample Number			
	1	2	3	4
Organic Compounds[2] (continued)				
1,7,7-Trimethyl-bicyclo-[2.2.1]heptane-2.5-dione[5]	<5;20[7]	-;-	-	-
3-(1,1-dimethylethyl) phenol[5]	20;2.0[8]	-;-	-	-
2-methylbenzochloride[5]	<5;-[7]	-;-	-	-
Diethylphthalate[5]	6.2;8.0[7]	-;-	-	-
Phosphoric acid, tributylester[5]	10;110[7]	-;-	-	-
2(3H)-benzothiazolone[5]	<5;60[7]	-;-	-	-
Di-n-butylphthalate[5]	2.5[8];5.7[7]	-;-	-	-
1,2,3,4,4a,9,10,10a-octahydro-1,4a-dimethyl-7-(1-methyethyl)-[1R-(1 alpha, 4a beta, 10a alpha)]-1-phenanthrenecarboxaldehyde[5]	<5;1.5[8]	-;-	-	-
Cyclohexlphthalate[5]	2.6[8];-[7]	-;-	-	-
3,5-Dimethyl phenol[5]	-;11[7]	-;-	-	-
2-ethyl-4-phenol-.delta. 2-1,3,4-oxadiazolin-5-one[5]	-;100[7]	-;-	-	-
n-butylbenzene sulfonamide[5]	-;9.9[7]	-;-	-	-
3-(2-phenylethyl)phenol[5]	-;2.1[8]	-;-	-	-
2H-1-benzopyran[5]	-;<5[7]	-;-	-	-
2-methylpentadecane[5]	-;<5[7]	-;-	-	-
Heptadecane[5]	-;<5[7]	-;-	-	-
Octacosane[5]	-;<5[7]	-;-	-	-
4,8,12-Trimethyl-3,7,11-tridecatriene-nitrile,4[5]	-;<5[7]	-;-	-	-
Nonadecane[5]	-;<5[7]	-;-	-	-
3,8-Dimethylundecane[5]	-;<5[7]	-;-	-	-
o-methyloxime-3,5-dimethyl-2-cyclohexen-1-one[5]	-;-	804;-	-	-

1 Sample type: gw=ground water, sw=surface water, and s=substrate.
2 Concentrations: ug/L for water and ug/Kg for substrate. Blank spaces indicate that no analyses were performed; dashes indicate that constituents and compounds were not found.
3 Cu(D): analysis done by direct aspiration because of high iron concentration.
4 Identity determined by library match; no standard available. Concentration results are semiquantitative and are based on the response factor of the internal standard.
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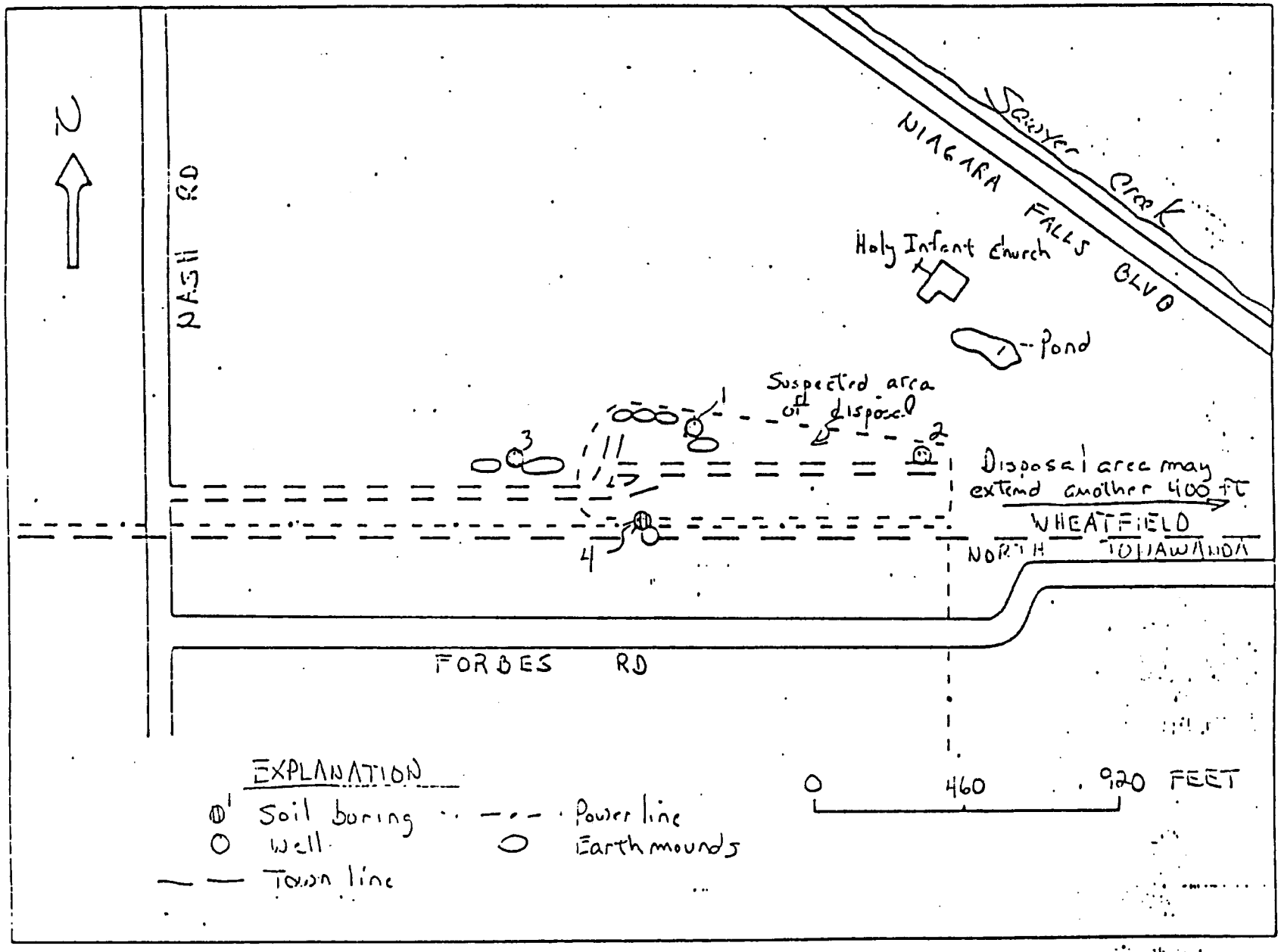

Figure 1. Location of sampling sites on the Nash Road property.

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	0000514380

TES, QUANTITIES, AND CHARACTERISTICS

TES (Check all that apply)

☐ E. SLURRY
☐ F. LIQUID
☐ G. GAS
(Specify)

C2 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS _____
CUBIC YARDS 1600
NO. OF DRUMS _____

C3 WASTE CHARACTERISTICS (Check all that apply)

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

YPE

SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLUDGE			
OILY WASTE			
SOLVENTS			
PESTICIDES			
OTHER ORGANIC CHEMICALS	900 cu. yds.		Chemical waste/ Love Canal
INORGANIC CHEMICALS			
ACIDS			
BASES			
HEAVY METALS			lead, chromium, plating sludge

ARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
lead	999	landfill	67-20,000	ppb
2,4, dimethyl 2 pentene	999	landfill	182,000	ppb
2-(1,1 dimethyl)-4-	999	landfill	183,000	ppb
methylfuran		landfill	-	-
phenol	108-95-2	landfill	1,000	mg/l
mercury	7439-97-6	landfill	0.5	ppb
benzene	71432	landfill		
toluene	108883	landfill	-	-
methylene chloride	999	landfill	-	-
dichlorobenzene	25321-226	landfill	-	-
tetrachloride	999	landfill	-	-
trichloroethane	127184	landfill	-	-
trichloroethene	999	landfill	-	-
hexachlorobutadiene	87683	landfill	-	-

EDSTOCKS (See Appendix for CAS Numbers)

ORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
	mercury	7439-97-6	FDS		
FDS			FDS		
S			FDS		
			FDS		

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

) Investigation of Selected Inactive Toxic Landfills in conjunction with the Niagara River Study," Aug. 1981, (U.S.G.S.)
) Memo to Hennesey NYSDOT, 8/9/78
Letter to Caine NYSDOT from Hooker, 5/9/68

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CATION
SITE NUMBER
00 514 380
☐ ALLEGED
☐ ALLEGED
yses show
☐ ALLEGED
☐ ALLEGED
☐ ALLEGED
ALLEGED
ALLEGED
LLEGED

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

I. IDENTIFICATION
01 STATE: NY | 02 SITE NUMBER: 0000514380

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☑ J. DAMAGE TO FLORA — 02 ☑ OBSERVED (DATE: 7/84) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None observed.

01 ☐ K. DAMAGE TO FAUNA — 02 ☑ OBSERVED (DATE: 7/84) ☑ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)

Abundant small animal wildlife on site. No damage observed.

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

Potential to aquatic microorganisms in ponds and trenches

01 ☑ M. UNSTABLE CONTAINMENT OF WASTES (Spills/Runoff/Standing liquids, Leaking drums) — 02 ☑ OBSERVED (DATE: 4/28/83) POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: — 04 NARRATIVE DESCRIPTION 7/83

Pools of orange tinted standing water observed, rubbish protruding from earth.

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

None.

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

None.

01 ☑ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☑ OBSERVED (DATE: 6/11/81) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Niagara County DOH observed "evidence of dumping" after site closed.

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

III. TOTAL POPULATION POTENTIALLY AFFECTED: unknown

IV. COMMENTS

Per NYSDEC instruction, Phase II study did not address extent of contamination. Therefore, total population potentially affected cannot be determined.

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

1.) Niagara County DOH 1981
2.) U.S.G.S. Study, 1982/83
3.) Site visits during Phase II investigations

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	0000514380

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	Not applicable			
☐ 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		
☐ 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 None (Specify)

05 OTHER

- ☐ A. BUILDINGS ON SITE

06 AREA OF SITE: 7 (Acres)

07 COMMENTS

Poorly closed; tires, metal, other rubbish visible

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.

1.) Poorly closed; tires, metal, other rubbish visible.
2.) Disposal trench for Love Canal waste excavated in soft, layered clay. No engineered barriers installed.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☑ YES ☐ NO

02 COMMENTS

Unfenced, easy access

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

1.) Site inspection, summer 1983
2.) Memo to Hennesey NYSDOT, 8/9/84

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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	0000514380

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable)

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

02 STATUS

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

03 DISTANCE TO SITE

A. _____ (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 0.2 (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
4.0 (ft)	SW,S,SE	~4.0 (ft)	_____ (gpd)	☐ YES ☑ NO

09 DESCRIPTION OF WELLS (including useable depth, and location relative to population and buildings)

Network of sampling wells varying from 10' to 70' in depth located throughout the landfill

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
small pond on site		
Sawyer Creek		0.25 (mi)
Bull Creek		1.1 (mi)
Tonawanda Creek		2.3 (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. 1.800 NO. OF PERSONS	B. 6,100 NO. OF PERSONS	C. 12,000 NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION 350 '

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE 1620

04 DISTANCE TO NEAREST OFF-SITE BUILDING 350'

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 adjacent to a suburban housing development.

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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 000514 380

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
~ 70 (ft)	unknown (ft)	5.6-7.3

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
40 - 27 = 13 (in)	2.1 (in)	~ 0 %	~ E	1.0 %

09 FLOOD POTENTIAL
SITE IS IN 7,500 YEAR FLOODPLAIN

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

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE: A. _____ (mi) OTHER: B. 3.5 (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

3.5 (mi)

ENDANGERED SPECIES: Peregrine Falcon, Golden E

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AGRICULTURAL LANDS: AG LAND
A. _____ (mi)	B. 0.01 (mi)	C. _____ (mi)	D. 0.01 (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

Site is located in a flat, poorly drained area. Prior to dumping, site was a swamp, with drainage to the North.

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

1.) U.S.G.S. Study
2.) DEC site Dossier
3.) Phase II Investigation

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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 0000514380

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	8	Compu Chem	8/84
SURFACE WATER	5	ES laboratory	presently available
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL			–
VEGETATION			
OTHER sediment	3	Compu Chem	8/84

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
Downhole gamma logging	Performed in wells to define soil stratigraphy
Geophysical survey	Performed to locate disposal trench boundaries
Permeability testing	Performed in wells to evaluate rate of contaminant movement

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☑ GROUND ☐ AERIAL

02 IN CUSTODY OF Dames & Moore office (Name of organization or individual)

03 MAPS ☑ YES ☐ NO

04 LOCATION OF MAPS Dames & Moore office

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

Soil samples were collected during the drilling of the seven sampling wells. Grain size analyses of selected samples were performed in the laboratory.

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

Phase II investigation

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	0000514380

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
Town of Wheatfield		2800 Church Road		N.Tonawanda	NY	14120

PARENT COMPANY (If applicable)

08 NAME	09 D+B NUMBER	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE	12 CITY	13 STATE	14 ZIP CODE

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

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE

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

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE

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

New York State Tax Records

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	0000514380

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
None.			

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER

OPERATOR'S PARENT COMPANY (If applicable)

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

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
Niagara Sanitation Co.			

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
N. Tonawanda	NY				

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD
1964-1968	

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

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

Niagara County Department of Health, 1981

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

I. IDENTIFICATION
01 STATE | 02 SITE NUMBER
NY 0000514380

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER
None.	

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

05 CITY	06 STATE	07 ZIP CODE

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
Hooker Chemical		Niagara Falls Air Force Base	
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
Niagara Falls / NY		Niagara Falls / NY	
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
Bell Aerospace		Canborumdum	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
		Buffalo Ave	
05 CITY / 06 STATE	07 ZIP CODE	05 CITY / 06 STATE	07 ZIP CODE
		Niagara Falls / NY	

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
Niagara Sanitation Co.			
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
N. Tonawanda / NY			?
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)

Other off-site generator: Frontier Chemical

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

I. IDENTIFICATION
01 STATE 02 SITE NUMBER
NY 0000514380

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ D. SPILLED MATERIAL REMOVED — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ E. CONTAMINATED SOIL REMOVED — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ F. WASTE REPACKAGED — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ G. WASTE DISPOSED ELSEWHERE — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ H. ON SITE BURIAL — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ I. IN SITU CHEMICAL TREATMENT — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ K. IN SITU PHYSICAL TREATMENT — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ L. ENCAPSULATION — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ M. EMERGENCY WASTE TREATMENT — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ N. CUTOFF WALLS — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ P. CUTOFF TRENCHES/SUMP — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ Q. SUBSURFACE CUTOFF WALL — 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

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

I. IDENTIFICATION
01 STATE NY 02 SITE NUMBER 0000514380

II. PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R. BARRIER WALLS CONSTRUCTED 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ S. CAPPING/COVERING 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
Incomplete cover of waste (trash)

01 ☐ T. BULK TANKAGE REPAIRED 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ U. GROUT CURTAIN CONSTRUCTED 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ V. BOTTOM SEALED. 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ W. GAS CONTROL 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ X. FIRE CONTROL 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ Y. LEACHATE TREATMENT 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ Z. AREA EVACUATED 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

01 ☐ 1. ACCESS TO SITE RESTRICTED 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No. Site is surrounded by incomplete (although locked) fence.

01 ☐ 2. POPULATION RELOCATED 02 DATE _____ 03 AGENCY _____
04 DESCRIPTION
No.

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)

Site visits during Phase II investigation

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

I. IDENTIFICATION
01 STATE | 02 SITE NUMBER
NY | 0000514380

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☐ YES ☑ NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

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

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TABLE VI.1
IDENTIFICATION OF REMEDIAL ACTION METHODS (FIRST SCREENING)

METHOD	APPLICABLE	NOT APPLICABLE	COMMENTS
Air Emissions Controls		X	No air contamination detected.
Surface Water Controls	X		No surface water detected, however, site capping would eliminate ponding and reduce leachate generation. Also reduces public health risk for exposure by direct contact and fire and explosion hazard.
Ground Water Controls	X		Ground water contamination not confirmed. Additional sampling and analysis of monitoring wells is required.
Comtaminated Water and Sewer Lines		X	No susceptible municipal sewer or water lines.
Treatment		X	No treatment of air, water, wastes, sediment or soil required. Highest concentrations of metals detected in ground water samples are low enough for discharge to public sewer systems.

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TABLE VI.2
PRELIMINARY SCREENING OF REMEDIAL ACTIONS (SECOND SCREENING)

ALTERNATIVE	APPLICABLE	NOT APPLICABLE	COMMENTS
Surface Water Controls			
Containment (capping)	X		Conventional, demonstrated relatively low cost technology for reducing leachate generation and minimizing public health risk by direct contact.
Grading	X		Site should be graded to promote surface runoff to drainage ditch north of landfill. Drainage ditch should be regraded and maintained to convey runoff away from site.
Revegetation	X		Revegetation stabilizes the surface of the site, and controls erosion of the cap.
Perimeter Fencing	X		Limits access to site to minimize public health risk and damage to the cap.
Ground Water Controls			
Monitoring	X		Ground water contamination not confirmed, additional sampling and analysis of samples for metals is required.
Impermeable Barriers			
-Slurry Walls		X	Depth to bedrock reduces technical feasibility and increases cost. Fractures in dolomite bedrock may be flow path.
-Grout Curtains		X	
-Sheet Piling		X	
Permeable Treatment Bed		X	No practical means available to divert ground water to treatment bed. Synthetic ion exchange resins for metals removal may plug. Maintenance costly and difficult. Capital cost extremely high.
Ground Water Pumping		X	Ground water pumping is not feasible due to low permeability of soils above bedrock. Bedrock may yield water from fractures, but may not contain contaminant plume.
Leachate Control			
-Subsurface Drains		X	Not practical as extensive soil excavation would be required for leachate control systems.
-Drainage Ditches		X	
-Liners		X	

TABLE VI.3
ELEVATION OF POTENTIAL REMEDIAL ALTERNATIVES (THIRD SCREENING)

ALTERNATIVE	TECHNOLOGY	ENVIRONMENTAL IMPACT	PUBLIC HEALTH RISK	REGULATORY ACCEPTANCE	ENGINEERING JUDGEMENT COMMENTS	RETAIN OPTION
Surface Water Controls						
Capping, Grading, Revegetation and Perimeter Fencing	3	3	3	3	Provides effective means for control of migration of contaminants off-site and reduces public health risk and fire and explosion hazard.	YES
Ground Water Controls						
Monitoring	3	2	3	2	Additional sampling and analysis for heavy metals would confirm or deny the existence of contamination. Present analytical results are inconclusive, however no significant contamination was found.	YES

Legend: 1 = Unfavorable (i.e., high cost, severe environmental impacts, high health risks, poor regulatory compliance, unproven or difficult technology)

2 = Fair

3 = Favorable

Table VI.4
Summary of Conceptual Remedial Cost Estimate
Nash Road Landfill

Item No.	Description	Approximate Cost (1)
I.	Site dewatering and preliminary site work prior to grading, capping, revegetation and perimeter fencing	$ 290,000
II.	Site grading and drainage	$ 327,000
III.	Surface sealing and capping (1' thick clay cap)	$ 592,000
IV.	Revegetation Topsoil (1'), seed and mulch	$ 67,000
V.	Perimeter fence (4600') with two gates (6' high)	$ 47,000
Subtotal		$1,323,000
Contigency (30%)		$ 397,000
Engineering (20%)		$ 265,000
Total Capital Cost		$1,985,000

(1) Costs are in 1984 $
(2) These costs are considered preliminary conceptual costs.

SECTION VI

PRELIMINARY REMEDIAL ALTERNATIVES AND COST

Introduction

The purpose of this conceptual remedial alternative evaluation is to identify potential remedial action technologies and prepare a conceptual cost estimate for the most likely remedial alternative for the Nash Road site. Due to the preliminary nature of the data available, any remedial alternative evaluation must be considered very preliminary and, hence, would be conservative. A more detailed remedial investigation and feasibility study would be required to better define design criteria and costs for remedial alternatives.

Identification of Remedial Methods

The conceptual remedial alternatives considered for the Nash Road site were subjected to a three-tiered screening process. First, remedial action methods were screened to determine applicability to the site. The methods were selected to conform with the on-site actions for remediation of hazardous material releases, as presented in the National Contingency Plan. Remedial action methods were eliminated if they were considered unnecessary at the Nash Road landfill. The screening process and rationale for selection of engineering methods is summarized in Table VI.1. Based on this screening only surface water and ground water controls were retained for the second screening process.

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Second Screening of Remedial Actions

In the second screening process, the engineering methods identified in the first screening process were further evaluated. The results of the second screening of remedial actions are presented in Table VI.2.

Remedial actions for surface water controls which were retained after this screening process include capping, grading, revegetation and perimeter fencing. Although no on-site surface water contamination or migration of contaminants was indicated during the Phase II investigation, these actions are considered to be applicable since they will 1) reduce the potential for future releases to surface water, 2) protect the public health by eliminating exposure to hazardous substances by direct contact and 3) minimize the risk of fires.

Actions for containment and/or pumping of ground water were eliminated during this phase of the screening process because, although some analytical results of ground water samples collected as part of the Phase II investigation indicated slight metals contamination, the migration of significantly contaminated ground water from the site was not found. Furthermore, due to the geology of the site, these remedial actions would be technically difficult and/or expensive to implement. Only continued monitoring of ground water was retained for further consideration. Collection and analysis of ground water samples from on-site wells will confirm or deny the existence of significant heavy metals contamination.

Evaluation of Remedial Alternatives

The third screening process involved a more detailed evaluation of several combinations of remedial actions that had passed the first two screening steps. Alternatives were scored in a general sense (unfavorable, fair, favorable) in each of five categories: technical feasibility, environmental impact, public health risk, and regulatory compliance. The total score for an alternative is not necessarily an indication of overall acceptability.

For example, alternatives may score high in all categories except regulatory compliance, and therefore would be eliminated. Conversely, the monitoring alternative is retained throughout, regardless of its rating, to act as the baseline (i.e., lowest) level of effort for comparison.

The basic elements of each of the five criterion are as follows:

Technical Applicability

The technical applicability of a remedial action technology refers to its ability to achieve performance standards such as: a) protection of the groundwater aquifer, and b) minimization of emissions. In addition, the ease of implementation is important. This criterion provides an effective means of reducing a very large number of alternatives to only those that are applicable from an engineering standpoint.

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Environmental Impact

The most important environmental impacts are the potentials for surface water, ground water and air emission contamination. Each alternative was screened in consideration of its ability to prevent contamination of these three media.

Public Health Risk

The key concern of the Superfund program is protection of the public health. Potential areas of risk are: contamination of ground water supplies and surface water supplies, emissions of volatile hazardous compounds to the atmosphere, spills of hazardous substances during transportation to acceptable disposal sites, exposure of the public or workers to toxic substances during cleanup operations, accidental or purposeful entry by unauthorized personnel into the sites and subsequent contact with hazardous wastes.

Regulatory Compliance/Acceptability

The involved regulatory agencies and their means of responsibility are as follows:

New York Department of Environmental Conservation (Albany)

New York Department of Environmental Conservation, Region 9 (Bufffalo)

U.S. Environmental Protection Agency, Region II (New York)

Preferred alternatives must comply with all regulatory requirements and have regulatory agency support.

The evaluation of potential remedial alternatives for surface

water controls and ground water controls is presented in Table VI.3. Capping, grading, revegetation and limiting site access by erection of a fence around the perimeter of the site is judged to be an appropriate remedial alternative for controlling migration of contaminants off-site, preventing human contact with hazardous substances and reducing the possibility of fires or explosions.

Collection and analysis of additional ground water samples is considered to be an appropriate remedial alternative, to determine whether or not significant contamination of ground water exists on the site. Although this remedial alternative scored only fair for environmental impact and regulatory compliance, since slight lead contamination (concentration in excess of state standards) was detected in one of two ground water samples; the public health risk is low since the ground water is not used for drinking water. This alternative is judged to be the appropriate level of response, based on existing data.

Conceptual Cost Estimate

A conceptual cost estimate was prepared for the alternatives which were developed for surface water controls and ground water controls. The following are assumptions which were made to generate a preliminary cost estimate for capping the landfill. The area of the landfill is estimated to be approximately 25 acres in size. The former disposal trench would have to be dewatered and filled prior to capping. Vegetation would need to be cleared and the site would have to be graded and recontoured prior to capping. The cap would consist of a one-foot layer of

compacted clay. The drainage ditch north of the site would require reconstruction after capping of the site. Revegetation would consist of a layer of topsoil, covered with grass seed and mulch. The perimeter fence will surround the 25-acre site and be six feet high. Using the above assumptions, published cost information, a contingency of 30% and engineering of 20%, the preliminary capital cost for this alternative is 2 million dollars. (Table VI.4).

The cost of the ground water monitoring alternative considers the collection of two rounds of samples from the monitoring wells and from the Osterman well. These samples would be filtered in the field to reduce variability in the analytical results. The estimated cost for collection and analysis for heavy metals of two rounds of samples is $11,100.

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