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ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES IN THE STATE OF NEW YORK

PHASE II INVESTIGATIONS

LaSalle Reservoir Site
Site Number 915033
City of Buffalo, Erie County

April 1991

Prepared for:

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233
Thomas C. Jorling, Commissioner

Division of Hazardous Waste Remediation
Michael J. O'Toole, Jr., P.E., Director

Prepared by:

Ecology and Environment Engineering, P.C.

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STATE OF NEW YORK
GERALD A. STROBEL
LICENSE NO. 044479-1
LICENSED PROFESSIONAL ENGINEER

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1. EXECUTIVE SUMMARY

1.1 SITE DESCRIPTION AND BACKGROUND

The LaSalle Reservoir site is a former limestone quarry approximately 50 acres in size located in the City of Buffalo, Erie County, New York (see Figures 1-1 and 1-2).

The site was originally owned by the Buffalo Cement Company and was used as a limestone quarry beginning sometime prior to 1927, according to aerial photos. In 1947, the Buffalo Crushed Stone Company (successor in title to the Buffalo Cement Company) conveyed the area of the present retention basin to the City of Buffalo. Subsequently, the City of Buffalo acquired an adjacent 0.6-acre parcel from the Buffalo Crushed Stone Company. By 1951, filling of the quarry was well underway, especially in the northern section. Aerial photos from 1958 and 1960 show continued filling activity. In 1960, the city acquired an adjoining 24.75 acres from Houdaille Industries, Inc. (successor in title to Buffalo Crushed Stone Company) on the condition that the area would be filled and used as a public park. By 1972, the entire original quarry area had been filled.

The fill allegedly consists of municipal refuse, incinerator ash, construction and demolition debris, household appliances, and tree parts. The site also received paint waste mixed with sawdust, floor sweepings, and refuse from Buffalo Forge Company. Additionally, the Erie County Department of Environment and Planning (DEP) has indicated the possibility of industrial waste having been disposed on site. The site now consists of a housing development and a playground and borders a remaining portion of the quarry which is utilized as a stormwater retention basin by the Buffalo Sewer Authority. The depth of this basin and the former quarry is approximately 45 feet below the natural ground surface. A Phase I investigation was completed for this site by Recra Environmental, Inc., in November 1985. No previous analytical data is known to exist for the site.

In 1989, a geotechnical report was prepared for the Buffalo Sewer Authority concerning the Hertel Avenue/North Buffalo Tunnel project proposed to traverse the southwest portion of the site. This study included the installation of an observation well, which is located on the west side of the site. A groundwater sample was collected from this observation well (boring location HA-4) and tested for corrosive properties and water quality. Analyses included bicarbonate (alkalinity), sulfate, carbonate (alkalinity), chloride, free CO_2, and total hardness. Test results indicated that the sulfate content exceeded the "corrosive threshold" (2 to 3 ppm) and that free CO_2 existed at elevated levels. (Jenny Engineering Corporation 1989).

1.2 PHASE II INVESTIGATION

The Phase II field investigation conducted by Ecology and Environment Engineering, P.C. (E & E) in the spring of 1989 included an initial site reconnaissance, electromagnetic terrain conductivity (EM31) survey, and portable proton magnetometer survey to define the site geological conditions, locate any buried materials, and determine the presence of contaminant plumes. Three bedrock groundwater monitoring wells were installed. Groundwater, subsurface soil, surficial soil, and waste samples were collected and analyzed.

1.3 SITE ASSESSMENT

The geophysical surveys indicated that the proposed monitoring well locations did not contain buried metallic objects. Geologic logs from the on-site drilling indicate the overburden ranges from 7.5 to 22 feet thick above an underlying bedrock of fractured limestone.

Three groundwater monitoring wells were installed into the bedrock. The August 1989 depth to water in these wells ranged from 33.2 to 44.5 feet below ground surface. Local groundwater flow based on the three bedrock wells is apparently to the northwest.

Groundwater, waste, and subsurface soil samples from borings were analyzed for Target Compound List (TCL) organics, including volatile organics, base/neutral and acid extractables (BNAs), and pesticides/ polychlorinated biphenyls (PCBs). These samples along with six additional surface soil samples were analyzed for inorganics and cyanide.

Three groundwater samples were collected and analyzed. Five TCL organic compounds were found above the quantifiable detection limit in samples from one of the three bedrock wells, with the level of 1,1,1-trichloroethene exceeding proposed United States Environmental Protection Agency (EPA) Maximum Contaminant Level (MCL) groundwater guidelines. Nine metals were detected, with concentrations of iron exceeding New York State Class GA standards in wells GW-2 and GW-3.

Waste samples were collected at eight locations over the landfilled area at depths of 2 to 4 feet where possible. Organic compounds detected include polynuclear aromatic hydrocarbons (PAHs), dibenzofuran, 4,4′-DDT, and 4,4′-DDD. Sixteen metals were detected in waste samples. Concentrations of lead exceeded average soil concentrations for soils of the eastern United States in two of the eight waste sample locations.

Subsurface soil samples were collected during the drilling of two of the three well borings. Organic compounds, including PAHs, were detected in soil samples collected from GW-3. Sixteen inorganic elements were detected in both GW-1 and GW-3. None of these exceeded published naturally occurring ranges.

Six surficial soil samples were collected and analyzed for inorganic analysis only. No metals were detected in concentrations exceeding average soil concentrations for soils of the eastern United States.

The on-site air monitoring surveys, using a portable HNu photoionization detector, revealed no responses above background levels. In summary, the types and concentrations of organic and inorganic compounds detected are consistent with the LaSalle Reservoir site's former use as a municipal solid waste landfill. Analytical results have revealed the potential for encountering contamination problems during the site's present use as a playground and housing complex.

1.4 HAZARD RANKING SYSTEM SCORE

The Hazard Ranking System (HRS) score was compiled to quantify risks associated with the site. The HRS score is applied to inactive hazardous waste sites in New York State to prioritize those needing additional investigation and remediation. The system evaluates site characteristics, containment measures, waste types, and potential contaminant receptors.

Under the HRS, three numerical scores are computed to express the site's relative risk of damage to the population and the environment. The three scores are described below:

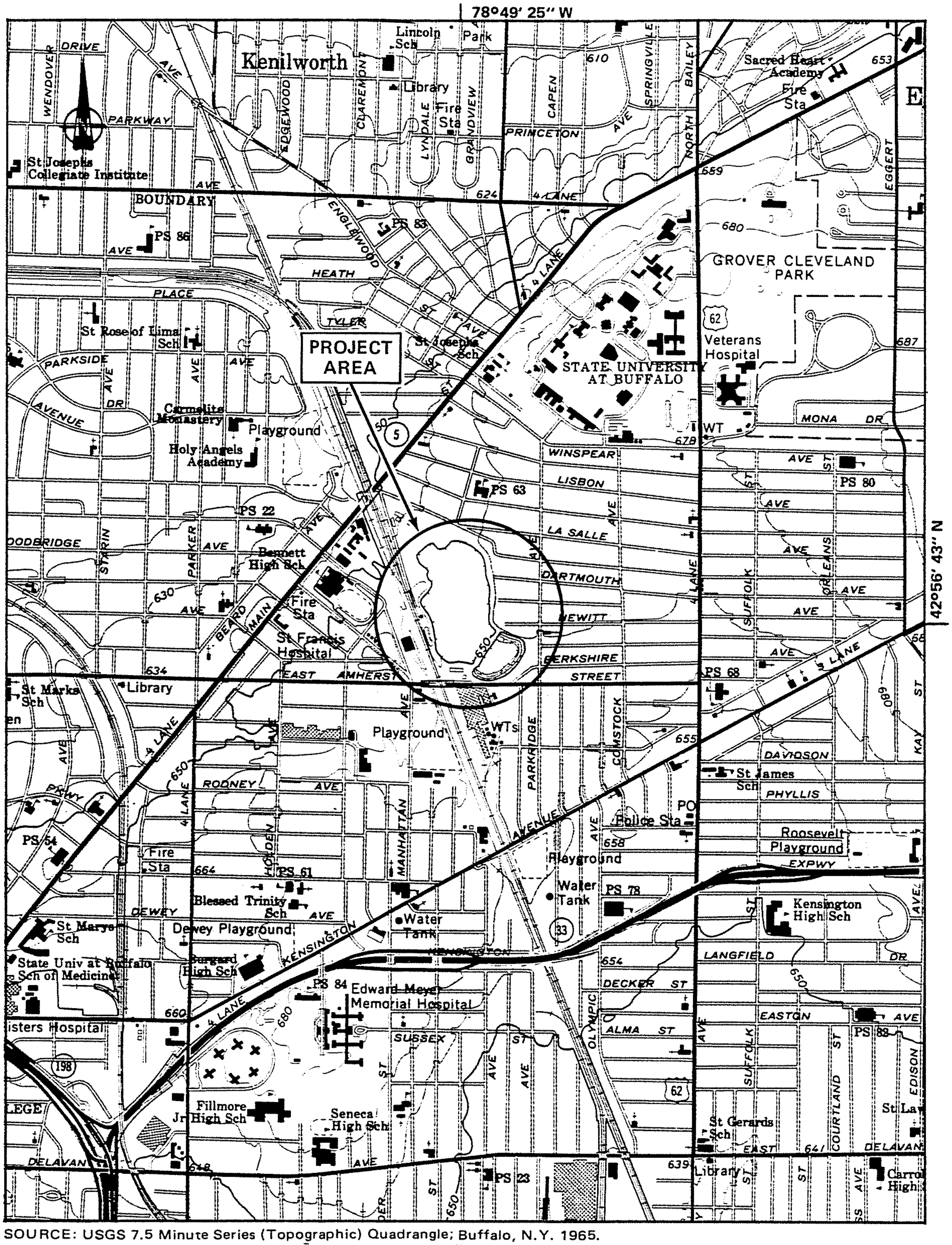
- S_M reflects the potential for harm to humans or the environment from migration of a hazardous substance away from the facility via groundwater, surface water, or air. It is a composite of separate scores for each of the three routes (S_{gw} = groundwater route score, S_{sw} = surface water route score, and S_a = air route score).
- S_{FE} reflects the potential for harm from substances that can explode or cause fires.
- S_{DC} reflects the potential for harm from direct contact with hazardous substances at the facility (i.e., no migration need be involved).

Based on the results of this and previous studies, the HRS scores for the LaSalle Reservoir site have been calculated as follows:

S_M = 2.58 (S_{gw} = 4.47; S_{sw} = 0; S_a = 0)

S_{FE} = 0

S_{DC} = 62.5



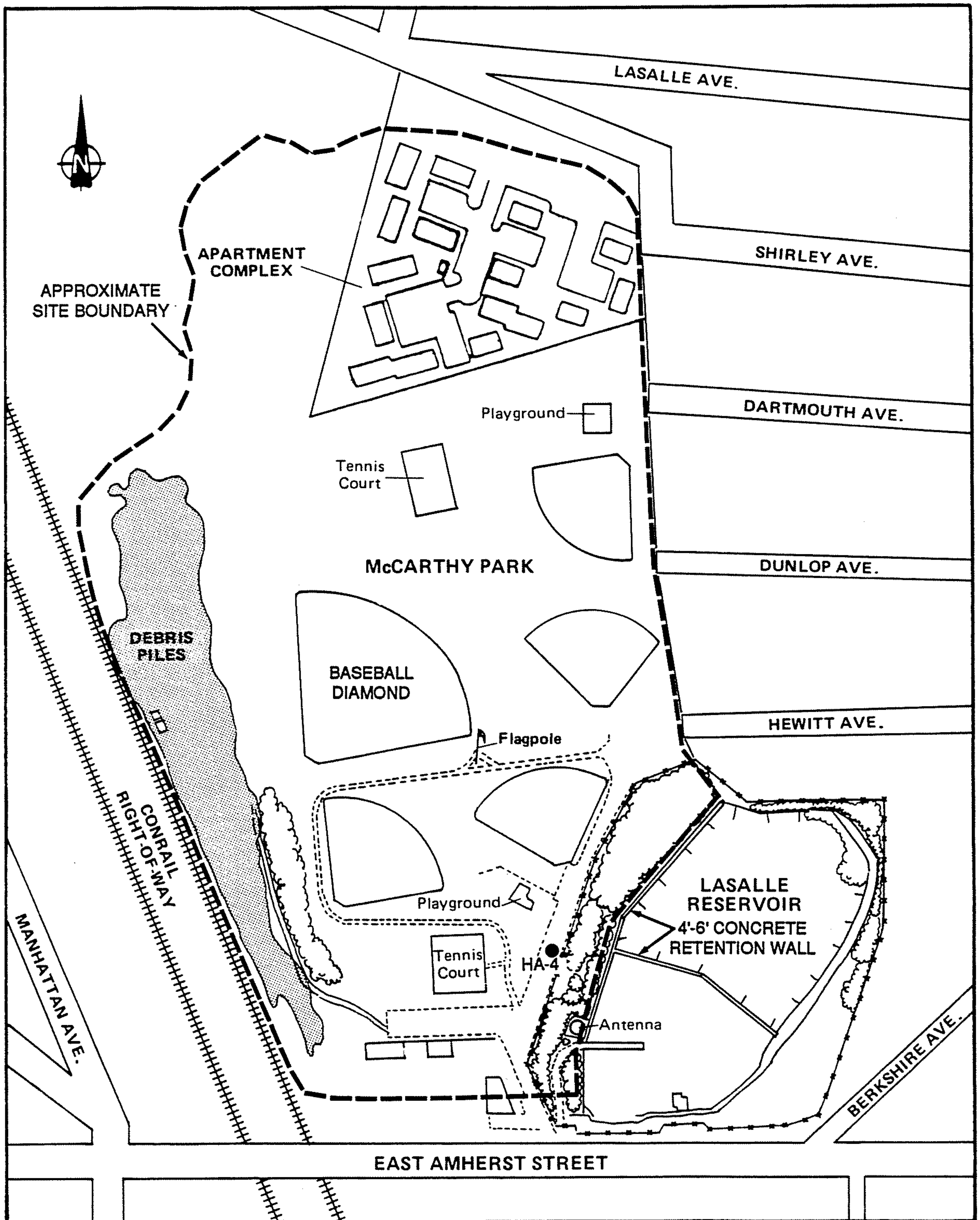
SOURCE: USGS 7.5 Minute Series (Topographic) Quadrangle; Buffalo, N.Y. 1965.

SCALE 1:24,000

0 .5 1 Mile

0 .5 1 Kilometer

Figure 1–1
LOCATION MAP: LASALLE RESERVOIR SITE



SOURCE: Ecology and Environment Engineering, P.C.

NOT TO SCALE

KEY:

— — Approximate Site Boundary

● Buffalo Sewer Authority Well

Figure 1–2
SITE SKETCH: LASALLE RESERVOIR SITE

47-15-25 (11/90)-9d

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS WASTE REMEDIATION

Original-BHSC
Copy-REGION
Copy-DEE
Copy-DOH
Copy-PREPARER

ADDITIONS/CHANGES TO REGISTRY OF INACTIVE HAZARDOUS WASTE DISPOSAL SITES

1. Site Name	2. Site Number	3. Town	4. County
LaSalle Reservoir Site	915033	Buffalo	Erie

5. Region 9

6. Classification Current 2a /Proposed D1

7. Activity [ ] Add [ ] Reclassify [X] Delist [ ] Modify

8a. Describe location of site (attach USGS topographic map showing site location).
The site is located on the north side of East Amherst Street, south of Main Street, east of abandoned railroad tracks in the City of Buffalo. Figure 1-1 of the Phase II report shows the actual location of the site.

b. Quadrangle Buffalo c. Site latitude 42°56'43"N Longitude 78°49'25"W d. Tax Map Number 90.23-7-10 90.23-7-1

9a. Briefly describe the site (attach site plan showing disposal/sampling locations)
The site consists of an open quarry now used by the Buffalo Sewer Authority for storm water retention, and a recreational park (McCarthy Park). The park was built on the former portion of the quarry that was filled. Figure 3-2 shows well and soil sample locations.

b. Area 50 acres c. EPA ID number NYD980534606 d. PA/SI [ ] Yes [X] No

e. Completed: [X] Phase I [X] Phase II [ ] PSA [X] Sampling

10. Briefly list the type and quantity of the hazardous waste and the dates that it was disposed of at this site.
Fill material allegedly consisted of unknown quantities of municipal refuse, incinerator ash, construction and demolition debris, household appliances, tree limbs and paint waste mixed with sawdust, floor sweepings, and refuse from Buffalo Forge Company.

11a. Summarized sampling data attached

[ ] Air [X] Groundwater [ ] Surface Water [X] Soil [X] Waste [ ] EP Tox [ ] TCLP

b. List contravened parameters and values
Groundwater: 1,1-DCE (13 μg/L); 1,1-DCA (140 μg/L); total-1,2-DCE (21 μg/L); 1,1,1-TCA (280 μg/L); Fe (574-2,800 μg/L); Mg (43,000 - 103,000 μg/L).

12. Site impact data

a. Nearest surface water: Distance 10,500 ft. Direction Southwest Classification D

b. Nearest groundwater: Depth 30.4 ft. Flow direction NW [ ] Sole source [ ] Primary [ ] Principal

c. Nearest water supply: Distance >15,000 ft. Direction West Active [X] Yes [ ] No

d. Nearest building: Distance <25 ft. Direction South Use Commercial

e. Crops/livestock on site? [ ] Yes [X] No

f. Exposed hazardous waste? [ ] Yes [X] No

g. Controlled site access? [ ] Yes [X] No

h. Documented fish or wildlife mortality? [ ] Yes [X] No

i. Impact on special status fish or wildlife resource? [ ] Yes [X] No

j. Within a State Economic Development Zone? [ ] Yes [X] No

k. For Class 2A: Code ______ Health model score ______

l. For Class 2: Priority category ______

m. HRS Score SM = 2.58

n. Significant threat [ ] Yes ______ [X] No [ ] Unknown

13. Site owner's name	14. Address	15. Telephone Number
City of Buffalo	Buffalo, NY	(716) 851-4200

16. Preparer
Barbara Topor, Geologist, Ecology and Environment Engineering, P.C.
Name, title, and organization

4-5-91
Date

Barbara Topor
Signature

17. Approved

Name, title, and organization

Date

Signature

02[UZ]YO1080:D2826/4333

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2. PURPOSE

This Phase II investigation was conducted under contract to the NYSDEC Division of Hazardous Waste Remediation, Bureau of Hazardous Site Control. The purpose of the Phase II investigation was to determine if hazardous waste has been disposed of at this site, if contaminants exist in the various site media, if contaminants are migrating from the site, and whether or not threats to human health or the environment exist. Information gathered relative to the LaSalle Reservoir Site will allow NYSDEC to reclassify the site or, if warranted, delist it.

The Phase II investigation was designed to supplement existing data for the site and update the HRS score. No previous environmental investigations that included sampling were conducted on the site prior to the Phase II study.

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3. SCOPE OF WORK

3.1 INTRODUCTION

Field work for the Phase II investigation at the LaSalle Reservoir site began in May 1989 and was completed by December 1989. A quality assurance project plan (QAPP) was submitted to NYSDEC for approval prior to the start of field work. In addition, a site-specific health and safety plan (HSP) was submitted to NYSDEC prior to the start of field work. NYSDEC prepared the scope of work for the Phase II field investigation at the LaSalle Reservoir site. With minor exceptions, all field activities were performed in accordance with this scope of work. Variations from the plan occurred as a result of judgments made in the field, with the concurrence of NYSDEC representatives.

3.2 PHASE II SITE INVESTIGATION

3.2.1 Records Search/Data Compilation

Available information from state, county, municipal, and private files was collected and reviewed prior to the initiation of field work. Records from local and state agency files were reviewed to supplement the Phase I report prepared by Recra Environmental, Inc. in 1985. The data review allowed for the proper completion of the field investigation, site assessment, and calculation of the final HRS score. Specific contacts are listed in Table 3-1.

3.2.2 Site Reconnaissance

On May 5, 1989, E & E personnel conducted a site reconnaissance. The purposes of the site visit was to:

- o Identify access problems;
- o Identify tentative locations for wells and soil samples;

- Determine if underground utilities may impact drilling by visually inspecting well locations, using a portable magnetometer, and contacting utilities;
- Identify a nearby water supply for drilling; and
- Conduct a limited air monitoring study using a photoionization detector.

A site safety plan was developed which included pertinent emergency phone numbers, a map showing the route to the nearest hospital, and a list of dangers to human health potentially posed by the contaminants at the site (see Appendix A).

At the beginning of each day of field activities, a site safety meeting was conducted by the site safety officer or the team leader. Discussions included the contaminants found on site, the routes of exposure, the route to the hospital, location of the nearest phone, and the use of the air monitoring instruments. Also, a general plan of the on-site activities for the day was made. Each person on site was requested to sign the attendance sheet from these meetings. A site safety plan was available to all personnel on site at all times.

During the site reconnaissance and subsequent surface soil sampling, a continuous air monitoring survey using an HNu photoionization detector was performed at various areas throughout the site. No readings above background were recorded at any of the areas tested. All field activities were recorded in the site log books (see Appendix I).

3.2.3 Geophysical Survey

Two geophysical surveys were performed at the LaSalle Reservoir site on June 19 and July 5, 1989, utilizing an EM31 and a portable proton magnetometer. The first set of survey grids was set up at the monitoring well locations proposed by NYSDEC in the Phase II investigation work plan (see Figure 3-1). After reviewing the geophysical results and a 1927 aerial photograph of the site (see Appendix F), it was concluded that proposed well locations GW-1 and GW-3 were over the former quarry and therefore deemed unsuitable. Proposed location GW-2 also was determined to be unsuitable due to geomagnetic anomalies over the survey area possibly caused by buried metallic objects and surface debris. The proposed well locations were moved (see Figure 3-1) and the second geophysical survey concluded that these new locations were acceptable sites for drilling.

The results of these geophysical surveys, in addition of verifying proposed monitoring well locations, were used to determine site geologic conditions, locate buried metallic materials, and identify any conductive subsurface plumes. The geophysical survey methods and results are presented in Appendix B.

3.2.4 Monitoring Well Installation

Three bedrock monitoring wells were installed in the vicinity of the LaSalle Reservoir site between July 19, 1989 and July 26, 1989 by American Auger and Ditching Company. Monitoring wells GW-1, GW-2, and GW-3 were all moved from their proposed locations to areas clear of surface debris and outside the former quarry boundaries (see Section 3.2.3).

The drilling program was designed to obtain quality soil and water samples for environmental analysis while providing the maximum level of safety for personnel working on site. Prior to commencement of drilling activities, a decontamination pad was constructed between the debris piles and the Conrail right-of-way at the western edge of the site. All drilling equipment, including augers, rods, bits, rigs, casings, and tools, were steam cleaned at this decontamination pad in agreement with the NYSDEC work plan and QAPP. This location was used for steam cleaning throughout the project.

The three bedrock wells were drilled and constructed in accordance with NYSDEC guidelines. Split-spoon samples were taken continuously through the overburden during construction of all the wells. Based on the review of the soil boring logs, three soil samples from GW-1 were analyzed for grain-size characteristics. Boring logs are included in Appendix C and the geotechnical analyses are included in Appendix D.

Drilling of the three bedrock wells (GW-1 through GW-3) involved the advancement of a 4 1/2-inch inside diameter (ID) hollow-stem auger through the overburden, then the coring of a rock socket using a 3 7/8-inch (HQ) outside diameter (OD) coring bit. Three-inch polyvinyl chloride (PVC) casing was placed in the socket and pressure-grouted into position using a tremie line. After allowing a minimum of 24 hours for the grout to set, the hole was cored into a water-bearing zone using a 2 7/8-inch OD (NQ) core barrel. The well was pumped and surged to verify that a sufficient quantity of water could be produced.

Once the well was determined to be at a satisfactory depth, a locking protective surface casing was grouted into place. Each well was later developed using a centrifugal pump or was hand-bailed using precleaned dedicated bailers. The wells were developed for one to two hours. Low-turbidity was reached relatively quickly. All field activities were recorded in the field logbooks included in Appendix I.

3.2.5 Groundwater Sampling and Analysis

After waiting a minimum of 7 days after development, groundwater samples were collected from all three monitoring wells installed as part of the Phase II investigation of the LaSalle Reservoir site. These samples were analyzed for TCL organic compounds, metals, and cyanide by E & E's Analytical Services Center (ASC). Quality assurance/quality control (QA/QC) samples consisting of a duplicate sample from GW-3 for matrix spike and matrix spike duplicate analyses (MS/MSD) also were analyzed for the same parameters. As a check on the quality of the water used in drilling, a sample of drill water was obtained from the subcontractor's water tank truck that had been filled at the fire hydrant located at LaSalle and Cordova avenues. The drill water was analyzed for TCL organics and inorganics. Analyses and reporting were performed following the NYSDEC Contract Laboratory Protocol (CLP).

Samples were collected using dedicated PVC bailers and polypropylene line. Analytical results are discussed in Section 4.5.1, and raw data are included in Appendix E. Actual well locations are shown on the site survey map in Appendix H. Copies of the field logbooks are included in Appendix I.

3.2.6 Surface Soil Sampling and Analysis

Six surface soil samples, designated SS-1 through SS-6, were collected from the top 6 inches of soil in the vicinity of the playground and baseball diamonds of the LaSalle Reservoir site (see Figure 3-2).

These samples were analyzed only for metals by E & E's ASC. Analyses and reporting were performed following the NYSDEC CLP. Actual sample locations are shown on the site survey map in Appendix H. Copies of the field logbooks are included in Appendix I.

3.2.7 Waste Sampling and Analysis

Eight waste samples, designated WS-7 through WS-14, were collected from the subsurface in the vicinity of the playground and baseball diamonds of the LaSalle Reservoir site. Waste samples were collected from various areas of the landfill by hand augering. Observation of the materials collected indicated that the cap is very poor and insufficient to prevent both near-surface waste from protruding to the surface and surface water infiltration. All samples were composited from the 2 to 4-foot interval, with the exception of two samples taken at shallower depths due to subsurface obstructions. WS-11 and WS-12 were collected from 0.5 to 1 and 1 to 1.5 feet, respectively. The samples were analyzed for TCL organics and inorganics by E & E's ASC. For QA/QC purposes, one duplicate sample and one MS/MSD sample were collected. Analyses and reporting were performed following NYSDEC CLP. Actual sample locations are shown on the site survey map in Appendix H. Copies of the site logbooks are included in Appendix I.

3.2.8 Soil Samples from Borings and Analysis

Two subsurface soil samples were taken during drilling at the site. A sample was taken from the 4- to 6-foot interval of well boring GW-1 and from the 0- to 2-foot interval in GW-3 and analyzed for TCL organic compounds based on HNu readings in excess of 5 ppm.

Table 3-1

SOURCES CONTACTED FOR THE NYSDEC PHASE II INVESTIGATION AT THE LASALLE RESERVOIR SITE

Agencies Contacted

Erie County Department of Health
5444 Camp Road
Hamburg, New York 14075
Contact: John Kociella
Telephone Number: (716) 858-7677
Date: May 10, 1989
Information Gathered: Information about files pertaining to NYSDEC sites

Erie County Water Authority
3030 Union Road
Cheektowaga, New York 14226
Contact: Dana Cosselt
Telephone: (716) 849-8484
Date: April 28, 1989
Information Gathered: Erie County DEC Phase II sites within Erie County's Water Service

New York State Department of Environmental Conservation
Information Services/Significant Habitat Unit
Wildlife Resources Center
Delmar, New York 12054-9767
Contact: John Ozard
Telephone Number: (518) 439-7488
Date: May 2, 1989
Information Gathered: Information on designated critical habitats with respect to NYSDEC Phase II sites

United States Department of Agriculture
Soil Conservation Service
Erie County District
21 S. Grove Street
East Aurora, New York 14052
Contact: John R. Whitney
Telephone: (716) 652-8480
Date: March 29-30, 1989
Information Gathered: File search for Erie County DEC Phase II site report preparation

New York State Department of Environmental Conservation
584 Delaware Avenue
Buffalo, New York 14202
Contact: Jaspal Singh Walia/Jim Feron
Telephone: (716) 847-4585
Date: March 27-28, 1989
Information Gathered: File search for NYSDEC Phase II report preparation

New York State Department of Environmental Conservation
Bureau of Hazardous Site Control
50 Wolf Road
Albany, New York 12233
Contact: Mike Ryan and Jane Thapa
Telephone: (518) 457-9538
Date: April 3-4, 1989
Information Gathered: File search for additional data and NYSDEC Phase I reports

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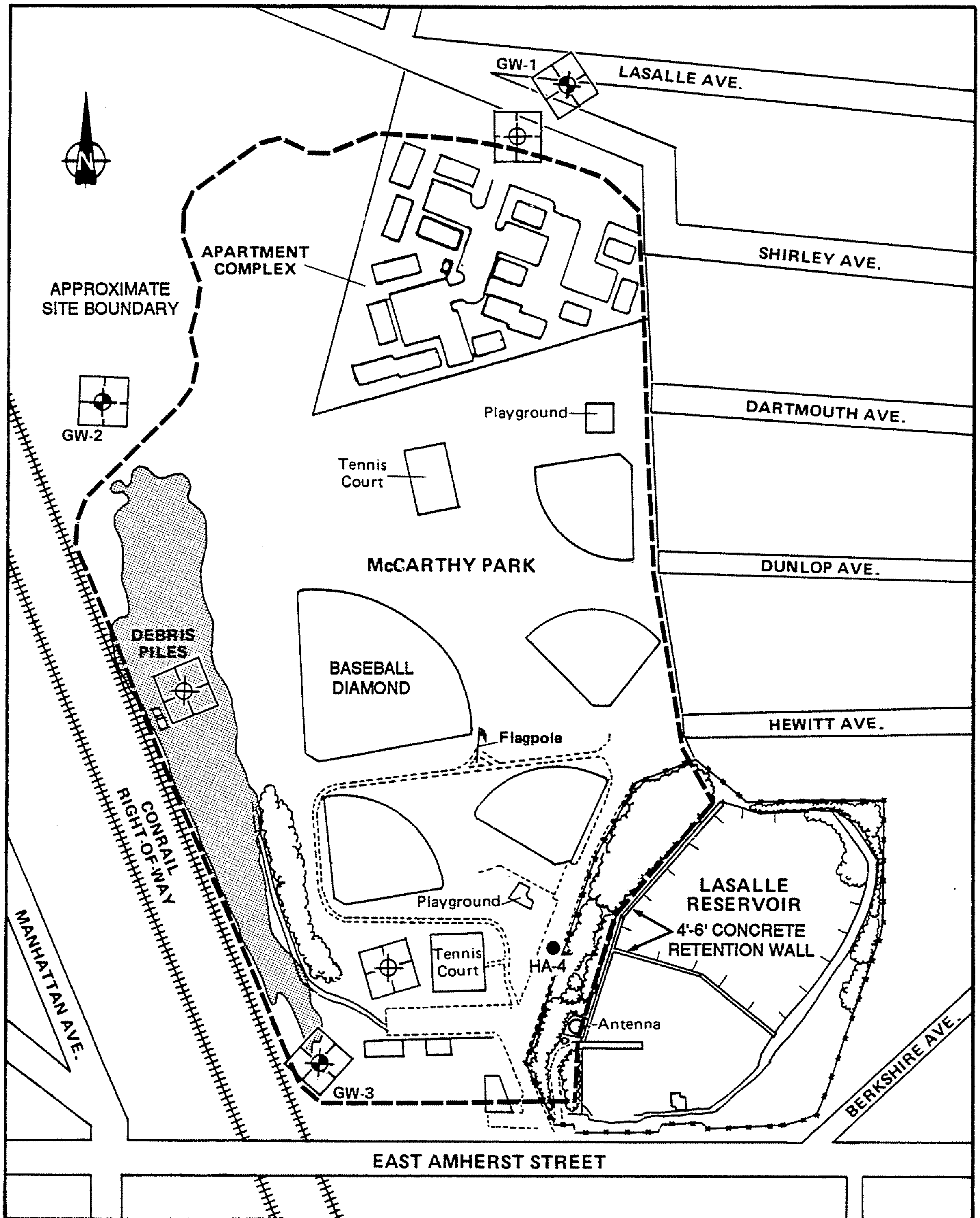
New York State Department of Environmental Conservation
Division of Regulatory Affairs
600 Delaware Avenue
Buffalo, New York 14202
Contact: Mary Ketter
Telephone: (716) 847-4551
Date: April 6, 1989
Information Gathered: File search

New York State Department of Health
Regional Toxic Program Office
584 Delaware Avenue
Buffalo, New York 14202
Contact: Cameron O'Conner
Telephone: (716) 847-4365
Date: March 24, 1989
Information Gathered: File search for NYSDEC Phase II report preparation

New York State Department of Health
Bureau of Environmental Exposure
11 University Plaza - Room 205
Albany, New York 12203
Contact: Lani D. Rafferty
Telephone: (518) 458-6306
Date: April 3-4, 1989
Information Gathered: Viewed site inspection reports for NYSDEC Phase II sites

County of Erie Department of Environment and Planning
95 Franklin Street
Buffalo, New York 14202
Contact: Jerome L. Miller
Telephone: (716) 846-7583
Dates: March 28, 1989 and April 6, 1989
Information Gathered: Copied pertinent site files

Buffalo Sewer Authority
1038 City Hall
Buffalo, New York 14202
Contact: Franklin J. DiMascio, P.E.
Telephone: (716) 855-4664
Dates: June 1, 1989
Information: Maps; Geotechnical Report



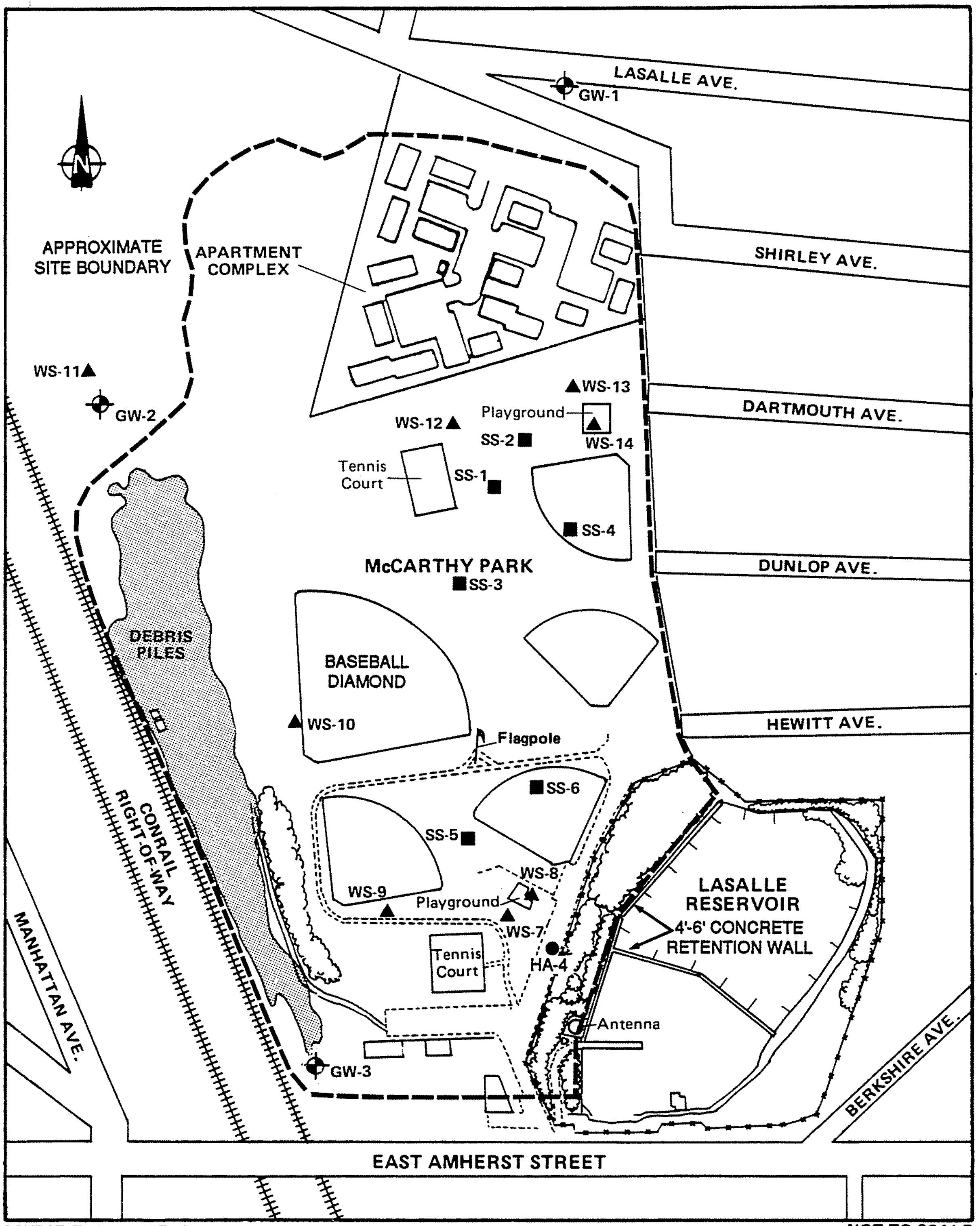
SOURCE: Ecology and Environment Engineering, P.C.

NOT TO SCALE

KEY:

- Groundwater Monitoring Well
- Buffalo Sewer Authority Well
- Geophysical Survey Grid
- Proposed Monitoring Well

Figure 3-1
MONITORING WELL LOCATIONS AND GEOPHYSICAL SURVEY GRIDS AT LASALLE RESERVOIR



SOURCE: Ecology and Environment Engineering, P.C.

NOT TO SCALE

KEY:

- Groundwater Monitoring Well
- Surficial Soil Sample
- Waste Sample
- Buffalo Sewer Authority Well

Figure 3–2
MONITORING WELL, SURFACE SOIL, AND WASTE SAMPLING LOCATIONS

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4. SITE ASSESSMENT

4.1 SITE HISTORY

The LaSalle Reservoir site occupies approximately 50 acres in the City of Buffalo, New York and is bounded on the north by LaSalle Avenue, on the south by East Amherst Street, on the east by a residential development, and on the west by a railroad right-of-way (see Figure 1-2). The site is a former quarry which has been utilized by the City of Buffalo as a landfill for municipal refuse, incinerator ash, construction and demolition debris, household appliances, and tree parts. The New York State Right-to-Know Document (RTK) confirms the presence of paint wastes mixed with sawdust floor sweepings and refuse from the Buffalo Forge Company. Also, the Erie County DEP has indicated that other industrial wastes may have been disposed of on site.

The northern portion of the site is now a housing development, and the southern portion is a playground. To the southeast is an unfilled part of the quarry which is used by the Buffalo Sewer Authority as a stormwater retention basin. The only retention wall that presently exists between the fill area and the LaSalle Reservoir is a 4- to 6-foot high concrete wall (see Figure 1-2).

The site was originally owned by the Buffalo Cement Company and was used as a limestone quarry beginning sometime prior to 1927, according to aerial photos. In 1947, the Buffalo Crushed Stone Company (successor in title to the Buffalo Cement Company) conveyed the area of the present retention basin to the City of Buffalo. Subsequently, the City of Buffalo acquired an adjacent 0.6-acre parcel from the Buffalo Crushed Stone Company. By 1951, filling of the quarry was well underway, especially in the northern section. Aerial photos from 1958 and 1960 show continued filling activity. In 1960, the city acquired an adjoining 24.75 acres from Houdaille Industries, Inc. (successor in title to Buffalo Crushed Stone Company) on the condition that the area would be filled and used as a public park. By 1972, the entire original quarry area had been filled.

4.2 REGIONAL GEOLOGY AND HYDROGEOLOGY

The site lies within the Erie-Niagara basin and the Erie-Ontario lowland physiographic province. The overburden in the vicinity of the site consists mainly of glacial till, an unconsolidated, poorly sorted mix of clay, silt, sand, and/or gravel with occasional boulders. It forms a thin mantle over the bedrock and exhibits low permeability. The region also received lacustrine clay and silt deposits during late Pleistocene time from Glacial Lake Warren, one of the ancestral stages of Lake Erie. These deposits exhibit very low permeabilities. As the glacial lake retreated, sandy beach sediments were also deposited in this region. These deposits have relatively high permeabilities.

The bedrock in the region is exclusively sedimentary. The shale, limestone, and dolomite units dip gently southward approximately 40 feet per mile. Although the bedrock dips southward, the land surface is flat or actually increases in elevation to the south. Therefore, the further south the location, the younger the underlying bedrock.

Up to 32 distinct bedrock members have been identified in Erie County (see Figure 4-1). The oldest unit, Silurian in age, underlying the northern part of the county is the Camillus Shale. This member, which is 30 to 100 feet thick, contains significant reserves of groundwater in cavities formed by the dissolution of gypsum.

Several limestone members also of Silurian age overlie the Camillus Shale. The Bertie Limestone, approximately 50 feet thick, overlies the Camillus Shale and is in turn overlain by the Akron Dolomite, which is about 8 feet thick. Little record of latest Silurian or early Devonian history is preserved in western New York. However, the Middle and Late Devonian record is well preserved beginning with the Onondaga Limestone unconformably overlying the Akron Dolomite. The unit comprises three distinct members that cumulatively are approximately 140 feet thick.

The Marcellus Shale member overlies the limestone units. This dense, black, fissile shale is approximately 30 to 55 feet thick. This shale, unlike the Camillus Shale, is relatively impermeable. It confines the limestone and Camillus Shale aquifers below.

The Skaneateles Formation overlies the Marcellus Shale. This 60- to 90-foot-thick formation is represented by the Stafford Limestone and Levanna Shale. The black, fissile shale is expected to be relatively impermeable and will therefore confine groundwater found in the lower limestone units.

Overlying the Skaneateles is the Ludlowville Formation represented by the Centerfield Limestone, Ledyard Shale, Wanakah Shale, and Tichenor Limestone members. The shale members contain numerous limestone beds. The Ludlowville Formation is followed by the Moscow Formation represented by the Kashong Shale and Windom Shale. The Moscow Formation is followed by 2,500 feet of upper Devonian rocks in southwestern New York State consisting of the Genesee, Sauna, West Falls, Java, Canadaway, Chodakoin, and Cattaraugus formations. These consist almost exclusively of shale members. The Canadaway Formation is by far the thickest (up to 1,000 feet) and underlies the southern third of Erie County.

Significant amounts of groundwater occur only in the overburden and in the lower bedrock units. The Camillus Shale contains numerous cavities formed by the dissolution of gypsum and is thus a very productive aquifer. The Onondaga, Akron, and Bertie dolomites and limestones contain water in bedding joints widened by dissolution. Vertical fractures in the limestone provide hydraulic connections among the many bedding planes.

Very little groundwater is found in the formations above the limestone unit. These formations, principally shale, are relatively impermeable. Some water transmission occurs in small fractures in the bedrock, but no wells of significant yield are found in these units. Groundwater in these regions is obtained mainly from glacial overburden deposits (LaSala 1968).

4.3 SITE GEOGRAPHY

4.3.1 Topography

The LaSalle Reservoir site is located within the Erie-Ontario lowland topographic province in The City of Buffalo, Erie County, New York. The lowlands are characterized by a low, flat-lying topography resulting from pre-glacial erosion of the bedrock and subsequent topographic modification by glaciation. The ground surface of the site is flat due to the filling of the quarried area.

The natural ground surface over the site slopes gently to the northwest. Most of the site is approximately 650 feet above mean sea level. The debris piles at the western edge of the site are estimated to be 680 feet above mean sea level.

4.3.2 Soils

Mixed soil types have been identified within the LaSalle Reservoir site. These include landfill rubbish and construction and demolition debris covered with soil and fill of unknown origin. Borings on and around the site revealed soil consisting of silt and clay with varying amounts of sand, gravel, and fill material.

4.4 SITE HYDROGEOLOGY

The information used to develop the discussion in this subsection includes the Phase II geophysical survey, three monitoring well borings and installations, United States Geological Survey (USGS) topographic maps, geological survey maps, and regional groundwater reports.

The geophysical survey results are presented in Appendix B, and the geotechnical analysis results are presented in Appendix D.

4.4.1 Geology

The LaSalle Reservoir site is underlain by the Middle Devonian Onondaga Limestone. This unit consists of gray, coarse to fine-grained limestone containing chert as irregular beds and as nodules. The Onondaga is micritic, massively bedded, and shows horizontal fractures in the site area.

Drilling during monitoring well installation showed the Onondaga Limestone ranging from approximately 9 to 23 feet thick and occurring from approximately 7 to 22 feet below grade. The rock quality designation (RQD) for this unit ranged from 73 to 96% throughout.

The Onondaga rests unconformably on the Akron Dolostone. This Upper Silurian unit consists of mottled light gray or tan dolostone with horizontal fractures and open or filled vugs. It contains trace amounts of pyrite and dolomite resulting from secondary mineralization. During drilling surrounding the LaSalle Reservoir site, the Akron Dolostone ranged from approximately 5 to 10 feet thick with RQD values from 79 to 99.9%. Beneath the Akron Dolostone near the site is the Upper Silurian Bertie Formation. This unit is a gray to buff-colored dolostone interbedded with shale layers that has horizontal fractures, traces of pyrite, and occasional brecciated zones. The Bertie Formation was encountered between 35 and 41 feet below ground surface in the vicinity of the site and had RQD values ranging from 33 to 100%.

4.4.2 Hydrology

Three groundwater monitoring wells were installed at the LaSalle Reservoir site to determine groundwater flow direction and assess the quality of the groundwater at the site. Well summary data are presented in Table 4-1. Well locations and water level elevations and contours are shown in Figure 4-2 and water level data are summarized in Table 4-2. The three wells penetrate and monitor the bedrock aquifer at approximately 65 feet beneath the ground surface.

Based on water-level data taken before sampling on August 14, 1989, groundwater appears to flow to the north-northwest across the site. Well GW-3 is considered the most upgradient well based on groundwater data; however, it is also located closest to the landfill area, and natural soil conditions were not encountered during drilling. For this reason, it should be noted that while GW-3 is thought to be hydrologically upgradient, none of the wells should be considered a background or clean well for analytical or comparison purposes. Well GW-2 is considered the most downgradient well.

Due to the distance of the three bedrock wells from one another and the geologic material (i.e., fractured bedrock) these wells penetrate, it is not known whether these three wells are hydraulically connected with one another. Based upon regional data, groundwater occurs in bedding planes and vertical joints and fractures in the Onondaga Limestone. The upper 5 to 15 feet contain the most joints fractures. The downward migration of water is inhibited by massive beds within the Onondaga, and the relatively impermeable underlying Akron and Bertie Dolomites. Groundwater flow in the Onondaga is from areas of recharge to areas of discharge through the network of joints and bedding planes. In general, regional groundwater flow follows the east-to-west slope of the Erie-Niagara basin. Flow paths in the underlying Akron and Bertie Dolomites are similar to the Onondaga aquifer (Staubitz and Miller 1987). Since the wells installed at the site are along the perimeter of the former quarry, and the quarry rock was excavated and replaced with fill material, it is unknown as to whether or not a hydraulic connection exists.

The groundwater in the landfill area may be mounded and flowing outward in all directions. The open quarry to the southeast is an area of discharge causing local groundwater flow to move in a south-southeasterly direction. This was noted by seeps in the walls of the retention basin. In addition, a flow to the northwest as depicted in Figure 4-2 through the fill material is interrupted and probably redirected downward and/or to the north along the former quarry wall beneath the railroad tracks. Consequently, local groundwater flow direction cannot be accurately determined based on the limited available information.

Surface Water

No evidence of surface water or leachate was found on the landfill area itself, but a drainage ditch lies to the west of the site, adjacent to the railroad tracks. Surface run-off from the landfilled portion of the site enters the Buffalo sewer system via storm sewers. The nearest surface water is Scajaquada Creek, located approximately 2 miles southwest of the site.

4.5 SITE CONTAMINATION ASSESSMENT

Analytical data for the site contamination assessment are presented in Appendix E. For TCL organic compounds, all positive reported values and qualifiers for samples, field QC samples, and laboratory MS/MSD samples are presented on data summary forms. For inorganics, CLP Form 1's are included for all samples and field QC samples.

All CLP data packages were reviewed to determine whether qualified data were acceptable for the intended use. In general, common laboratory contaminants, including methylene chloride, acetone, and phthalate compounds, are considered background contamination and not evaluated if the values are qualified with a "B" and levels are less than five times the detection limit. TCL organic compound values reported below the quantifiable detection limit are presented in Appendix E.

For organic contaminants, general classes of compounds such as PAHs were identified on tables in the text, and the concentrations were reported as totals. Individual compounds and their concentrations are included on the data summary forms in Appendix E.

4.5.1 Groundwater Contamination Assessment

A total of four groundwater samples were collected from the three wells (an MS/MSD sample was collected from GW-3). All samples were analyzed for TCL organic compounds, including volatile organics, BNAs, PCBs/ pesticides, metals, and cyanide.

As detailed in Table 4-3, 1,1-dichloroethene, 1,1-dichloroethane, total-1,2,-dichloroethene, and 1,1,1-trichloroethane were detected above the quantitation limits in GW-3, and all were found to exceed NYSDEC Class GA standards. In addition, several other organic compounds were detected in GW-3 below the quantitation limits, with estimated values as follows: trichloroethene (5 µg/L), tetrachloroethene (5 µg/L), and total xylenes (3 µg/L). The concentrations of organic compounds detected in GW-3 were found to be similar in GW-3MS and GW-3MSD. Furthermore, 2-chlorophenol was detected in GW-2 below the quantitation limit at an estimated concentration of 1 µg/L. Due to the proximity of the site to various commercial facilities, as well as the size of the landfill and the variable direction of groundwater flow, the origin of the compounds detected in GW-3 cannot be determined based upon the information gathered in this investigation.

Nine metals were detected in each of the groundwater samples. Filtering was not required due to the low turbidity. One metal (iron) was detected in GW-2 and GW-3 at concentrations exceeding NYSDEC Class GA standards for groundwater. In addition, magnesium was found to exceed the NYSDEC Class GA guidance value in GW-1 and GW-2. However, magnesium is a common constituent in limestone and dolostone, and may or may not be derived from the bedrock. Table 4-4 details the metals detected in the groundwater samples.

The drill water contains trihalomethanes, which are products of the chlorination process, and the presence of these compounds is not considered significant because of the trace amounts present.

4.5.2 Surface Soil Samples

Six surface soil samples were collected and analyzed for metals and cyanide. Surface soil samples consisted of a composite of the top 6 inches of soil. These samples were numbered SS-1 through SS-6. Approximate locations of the surface soil samples in the vicinity of the playground and baseball diamonds are shown in Figure 3-2.

A total of 15 metals were detected in the surface soil samples. Of these, none were found in concentrations that exceeded common ranges (see Table 4-5).

4.5.3 Waste Samples

Eight waste samples were collected, in addition to one duplicate and one MS/MSD. All samples were analyzed for TCL organic compounds, including volatiles, semi-volatiles, pesticides/PCBs, metals, and cyanide. These samples were numbered WS-7 through WS-15, with WS-15 being a duplicate of WS-10. Waste samples were composited from the 2-foot to 4-foot interval, with the exception of WS-11 and WS-12 which were composited over the intervals 0.5 to 1 and 1 to 1.5 feet, respectively, due to subsurface obstructions. Approximate locations of samples are shown in Figure 3-2. Table 4-6 compares selected PAHs in the waste samples to common ranges in urban soils. Table 4-7 summarizes the organic compounds detected in the waste samples.

Waste samples contained total PAHs to an estimated maximum concentration of 374,000 μg/kg. Specifically, benzo(a)pyrene and chrysene exceeded proposed urban ranges at WS-9, WS-10, and WS-11 (see Table 4-6). These waste sample locations are in the western half of the LaSalle Reservoir site. PAHs were found in waste samples WS-7 through WS-14. WS-10, located in the western portion of the site, had the highest concentration of PAHs. The levels of PAHs at WS-7 and WS-13 were below quantifiable detection limits. Several tentatively identified compounds (TICs) were present and are considered related to the PAH contamination at the site.

Several other organic compounds were detected, including xylenes, dibenzofuran, 4,4′-DDD, and 4,4′-DDT. Dibenzofuran was found in samples from locations WS-9, WS-10, WS-11, WS-12, and WS-13. These locations are along the western half and middle section of the site. The highest concentration was found at WS-10. At WS-11, WS-12, and WS-13, dibenzofuran values were recorded as being present but below the quantifiable detection limit.

The pesticide 4,4′-DDD was found at WS-8, WS-10, WS-13, and WS-14, all of which are located both in the southern and northern sections of the site. The highest concentration (290 µg/kg) was found in WS-8, which is in close proximity to the southernmost playground area. At WS-10, WS-13, and WS-14, 4,4′-DDD was present below the quantifiable detection limit. 4,4′-DDT was found only in sample WS-13 at a concentration of 25 µg/kg.

Other pesticides, such as dieldrin, heptachlor epoxide, 4,4′-DDE, alpha-chlordane, and gamma-chlordane, were also found to be present but below quantifiable detection limits in waste from WS-8, WS-13, and WS-14. These three waste sample locations are also in close proximity to both the northern and southern playground areas. A summary of organic compounds detected and their concentrations can be found in Table 4-7.

A total of 17 inorganic elements were detected in these waste samples. Of these, only lead was found in concentrations that exceeded common ranges in samples WS-8 and WS-9 (see Table 4-8).

4.5.4 Soil Samples From Borings

Subsurface soil samples were retained for chemical analyses due to the elevated HNu readings from the 4- to 6-foot interval and 0- to 2-foot interval during drilling of wells GW-1 and GW-3, respectively. The samples from GW-1 and GW-3 were analyzed for the same parameters as the waste samples.

Total PAHs with concentrations ranging from 2,891 to 5,602 µg/kg were detected in the samples from GW-3. 4,4′-DDT was also detected in the samples from GW-3. 4,4′-DDE was found below quantitation limits in GW-3. Table 4-9 is a summary of organic compounds and their detected concentrations. A total of 16 inorganic elements were detected in these subsurface soil samples. None of the inorganic compounds detected exceeded common ranges (see Table 4-10).

4.5.5 Site Assessment Summary

Several organic compounds including 1,1-dichloroethene, 1,1-dichloroethane, total-1,2-dichloroethene, and 1,1,1-trichloroethane were found in groundwater from the presumed upgradient monitoring well GW-3, which is located in the southwest portion of the site. No organic compounds were found in significant concentrations in groundwater from monitoring wells GW-1 and GW-2, which are located to the northwest and north of the site, respectively.

Several PAHs were found in soil samples from boring GW-3 and in all waste samples collected throughout the site (WS-7 through WS-14). The highest concentrations of PAHs were found at WS-10, which is located on the western portion of the site. Dibenzofuran, a contaminant of concern, was found in waste samples WS-9 and WS-10, which are located in the southwest portion of the site.

Several pesticides were also found in the waste and soil boring samples. Specifically, the pesticide 4,4'-DDT was found in soil from boring GW-3 and in waste sample WS-13. The pesticide 4,4'-DDD was found at WS-8, which is located near the southernmost playground area. There are no standards regulating the maximum contaminant levels for concentrations of these compounds. 4,4'-DDD and 4,4'-DDE are degradation products of 4,4'-DDT. Considering the former wide-spread usage of 4,4'-DDT, it is quite possible that the presence of these compounds is attributable to this common usage in the past and that atmospheric dispersion has resulted in the presence of these compounds in the soil of the landfill area.

Several metals were detected in the groundwater, surface soils, soil samples from borings, and waste samples. In groundwater, iron concentrations exceeded New York State Class GA groundwater standards in monitoring wells GW-2 and GW-3. Magnesium was found to exceed the Class GA guidance value in wells GW-1 and GW-2. There are no regulatory standards for the other metals detected in the groundwater, including aluminum, calcium, potassium, and sodium. No metals were detected in concentrations exceeding the range typically found in soils of the eastern United States in the surficial soil samples or in the soil samples from borings.

Lead is the only metal in the waste samples that exceeded the common range for metals concentrations in soils of the eastern United States. The inorganics detected in the soil samples that were collected during the installation of monitoring wells GW-1 and GW-3 did not exceed the published naturally occurring ranges.

In summary, the types and concentrations of organic and inorganic compounds detected are consistent with the site's former use as a municipal solid waste landfill. Analytical results have revealed the potential for encountering contamination problems during the site's present use as a playground and housing complex. This potential for contamination is primarily due to improper cover and the presence of waste protruding from the ground surface. Also, since incinerator ash is known to have been disposed of at the LaSalle Reservoir site, polychlorinated dibenzofurans (PCDFs), which were not analyzed for as part of this investigation, and heavy metals may be of concern because they are commonly detected in fly ash and flue gas from municipal and industrial incinerators. Other sources of PCDFs included fungicides, herbicides, wood preservatives, and PCBs. PCBs are mixtures of chlorinated biphenyls and have been widely used in a number of industrial products such as heat exchangers, hydraulic and lubricating fluids, printing inks, and flame retardants. The Erie County DEP has indicated the possibility of industrial waste having been disposed of at the site.

4.6. RECOMMENDATIONS

Hazardous waste disposal has been documented at this site. An unknown quantity of paint waste mixed with saw dust, floor sweepings, and refuse from the Buffalo Forge Company was reportedly disposed of at the landfill. No evidence of this disposal was apparent during this investigation. Notable concentrations of PAHs were detected in the waste samples and may be attributable to the incinerator ash and/or municipal waste known to have been disposed of at the site. Concentrations of 1,1-dichloroethene, 1,1-dichloroethane, total-1,2-dichloroethene, and 1,1,1-trichloroethane were found to exceed

NYSDEC Class GA groundwater standards in what is presumed to be the upgradient well. It should be noted, however, that the groundwater flow direction in the area is variable due to the anthropogenic interferences imposed on the area (i.e., quarry rock removed and replaced with fill). Therefore, the source(s) of contamination in GW-3 is unknown; however, it should be noted that various commercial facilities are located in proximity to this well.

At the LaSalle Reservoir Site, the types and concentrations of compounds detected are consistent with the site's former usage as a municipal solid waste landfill. The following recommendations are offered as supplemental steps based on the findings of this investigation as well as the site's current usage as a public recreational area:

- Further characterize the nature and occurrence of waste disposed of beneath the playground and the areas to the west and southwest of the site in order to determine the feasibility of removing large protruding debris and solid waste piles, thereby preventing possible injury to authorized city workers and those visitors who use the site for recreational purposes;

- Examine the need for capping with relatively impermeable material, such as natural clay or asphalt, to eliminate possible direct exposure to contaminated soils, leachate (if present), organic vapors and physical hazards. Proper capping and venting would also reduce infiltration of rainwater into the fill material and thereby reduce any leachate flow from the landfill into the groundwater;

- Additional groundwater flow data should be compiled in order to determine a possible source or sources of the organic contamination in monitoring well GW-3, located in the southwest corner of the site; and

- Determine the feasibility of constructing a retaining wall between the site and the LaSalle Reservoir retention basin to prevent overflow of storm and sewer water and subsequent migration into the landfill.

These measures, if implemented, should reduce and/or eliminate the physical hazards and chemical hazards posed by direct contact at the site, and alleviate potential migration of contaminants from the landfill to the groundwater. Further consideration for a more complete site characterization should be made prior to changes in current usage of the site, e.g., the Buffalo Sewer Authority tunnel project or potential additional housing development. Reclassification of this site is appropriate so that the Division of Solid Waste can carry out the above recommendations. To this end, NYSDEC should work toward delisting this site from the Registry of Inactive Hazardous Waste Disposal Sites.

Table 4-1

MONITORING WELL SUMMARY

Well Number	Ground Elevation (feet)	Date Drilled	PVC Casing Diameter (inches)	PVC Casing Depth (feet)	Depth to Bedrock (feet)	Depth Drilled (feet)	Depth to Groundwater From Top of Casing (feet)	Comments
GW-1	647.6	7/21/89 - 7/26/89	3	12.5	7.5	65	35.35	Open hole construction
GW-2	645.5	7/19/89 - 7/25/89	3	14.25	9.25	65	44.45	Open hole construction
GW-3	647.3	7/19/89- 7/24/89	3	27	22	65.3	33.2	Open hole construction

[UZ]YO1080:D2826, #2548, PM = 10

Note: All elevations are referenced from an assumed elevation of 650 feet at the base of the flagpole.

Table 4-2

MONITORING WELL AND GROUNDWATER ELEVATIONS

Well Number	Ground Elevation (feet)	Top of Casing (feet)	Depth to Groundwater From Top of Casing (feet)	Groundwater Elevation (feet)
GW-1	647.6	649.6	35.35	614.25
GW-2	645.5	647.5	44.45	603.05
GW-3	647.3	650.09	33.2	616.89

[UZ]YO1080:D2826, #2549, PM = 31

Note: All elevations are referenced from an assumed elevation of 650 feet above mean sea level at the base of the flagpole.

Table 4-3

ORGANIC COMPOUNDS DETECTED ABOVE QUANTITATION LIMITS IN GROUNDWATER SAMPLES

Compound	Range (μg/L)	NYSDEC Class GA Groundwater Standards (μg/L)	Samples Exceeding Standard	
			Sample Number	Concentration (μg/L)
1,1-Dichloroethene	ND - 13	5	GW-3	13
1,1-Dichloroethane	ND - 140	5	GW-3	140
Total-1,2-Dichloroethene	ND - 21	5*	GW-3	21
1,1,1-Trichloroethane	ND - 280	5	GW-3	280

02[UZ]YO1080:D2826/2550/19

Note: Volatile organic compounds were detected only in GW-3.

ND = Not detected.

*Standard for trans isomer only. Reported concentration is for sum of all isomers.

Table 4-4

INORGANIC ELEMENTS FOUND IN GROUNDWATER SAMPLES

Element	Range (µg/L)	NYSDEC Class GA Groundwater Standard (µg/L)	Sample Exceeding Standard	
			Sample Number	Concentration (µg/L)
Aluminum	ND - 1,240	NA	--	--
Calcium	94,300 - 159,000	NA	--	--
Iron	ND - 2,800	300	GW-2 GW-3	574 2,800
Lead	ND - 5.4	25	--	--
Magnesium	24,100 - 103,000	35,000 G	GW-1 GW-2	43,600 103,000
Manganese	ND - 114	300	--	--
Potassium	ND - 16,500	NA	--	--
Sodium	21,100 - 67,200	NA	--	--
Zinc	ND - 31	300	--	--

02[UZ]YO1080:D2826/2551/20

Key:

G = Guidance value.
NA = No applicable New York State standard or guidance value.
ND = Not detected.

Table 4-5

INORGANIC ELEMENTS FOUND IN SURFACE SOIL SAMPLES

Element	Range (mg/kg)	Common* Range (mg/kg)	Samples Above Range, With Concentration in mg/kg
Aluminum	1,820 - 13,900	7,000 ->100,000	--
Arsenic	2 - 4.5	<0.1 - 73	--
Barium	0 - 118	10 - 1,500	--
Cadmium	0 - 1.9	NA	--
Calcium	6,680 - 76,400	10 - 280,000	--
Chromium	3 - 19.4	1 - 1,000	--
Copper	0 - 49.3	<1 - 700	--
Iron	4,970 - 24,400	10 - 100,000	--
Lead	7 - 215	<10 - 300	--
Magnesium	4,380 - 36,300	50 - 50,000	--
Manganese	174 - 639	<2 - 7,000	--
Nickel	0 - 20.1	<5 - 700	--
Potassium	0 - 2,680	50 - 3,700	--
Vanadium	0 - 26.5	<7 - 300	--
Zinc	36.1 - 222	<5 - 2,900	--

02[UZ]YO1080:D2826/2552/24

*Range source: USGS professional paper 1270, "Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States"

NA = No range listed.

Table 4-6

SELECTED PAHs FOUND IN WASTE AND SOIL BORING SAMPLES

Compound	Range (µg/kg)	Range for Urban Soils (µg/kg)*	Samples Above Urban Range With Concentration in µg/kg	
Anthracene	ND - 23,000	NA	--	
Benzo(a)anthracene	ND - 31,000	169 - 59,000	--	
Benzo(a)pyrene	ND - 21,000	165 - 220	WS-9	6,400
			WS-10	21,000
			WS-15	19,000
			WS-11	6,900
			WS-12	2,100
Benzo(g,h,i)perylene	ND - 8,900	900 - 47,000	--	
Benzo(b)fluoranthene	ND*** - 32,000	15,000 - 62,000	--	
Chrysene	ND*** - 30,000	251 - 640	WS-8	950
			WS-9	8,100
			WS-10	30,000
			WS-15	30,000
			WS-11	4,600
			WS-12	2,700
Fluoranthene	ND*** - 53,000	200 - 166,000	--	
Fluorene	ND - 16,000	NA	--	
Indeno(1,2,3-cd)pyrene	ND - 11,000	8,000 - 61,000	--	
Phenanthrene	ND*** - 73,000	NA	--	
Pyrene	ND - 48,000	145 - 147,000	--	

02[UZ]YO1080:D2826/2714/20

*Proposed ranges.
**WS-15 is a duplicate of WS-10.
***Compound present in all samples, but below quantifiable detection limits for one or more samples.

Source: Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, "Toxicological Profile for Polycyclic Aromatic Hydrocarbons."

Table 4-7

ORGANIC COMPOUNDS FOUND IN WASTE SAMPLES

Organic Compound	Range µg/kg	Concentration in Affected Samples (µg/kg)													
		WS-7	WS-7RE*	WS-8	WS-9	WS-9 MS***	WS-9 MSD	WS-10	WS-10 MS***	WS-10 MSD	WS-11	WS-12	WS-13	WS-14	WS-15 (Dup of WS-10)
Total xylenes	0 - 8	--	--	--	--	NA	NA	6J	6J	8	--	--	--	--	8
Total PAHs+	729J - 373,970	729J	NA	9,755	91,420	54,820	66,730	373,970	NA	NA	51,988	25,280	4,288J	4,375	354,690
Dibenzofuran	0 - 12,000	--	NA	--	2,200	1,300	1,200	12,000	NA	NA	84J	220J	45J	--	11,000
4,4'-DDD	0 - 290	--	NA	290	--	--	--	140J	NA	NA	--	--	6J	2.8J	220J
4,4'-DDT	0 - 25	--	NA	--	--	--	--	--	NA	NA	--	--	25	--	--
Other pesticides++	0 - 80J	--	NA	80J	--	--	--	--	NA	NA	--	--	--	44.8J	--

02[UZ]YO1080:D2826/2572/1

Note: No standards for organics in soil.

*Reanalyzed for volatile organics only.
**MS/MSD of WS-9 taken for BNA and Pesticide/PCB analyses.
***MS/MSD of WS-10 taken for volatile organic analysis.

-- = Not detected.
J = Compound present. Reported value may not be accurate or precise.
+ = Including compounds detected below quantitation limits.
++ = Including heptachlor epoxide, dieldrin, 4,4'-DDE, alpha-chlordane, gamma-chlordane. All were detected below quantitation limits.
NA = Not analyzed for compound listed.

Table 4-8

INORGANIC ELEMENTS FOUND IN WASTE SAMPLES

Element	Range (mg/kg)	Common* Range (mg/kg)	Samples Above Range, With Concentration in mg/kg
Aluminum	5,670 - 11,000	7,000 - >100,000	--
Arsenic	1.8 - 7.8	<0.1 - 73	--
Barium	56.3 - 559	10 - 1,500	--
Cadmium	1.4 - 8.2	NA	--
Calcium	11,000 - 87,000	10 - 280,000	--
Chromium	12.2 - 45.1	1 - 1,000	--
Copper	14.3 - 158	<1 - 700	--
Iron	14,100 - 47,500	10 - >100,000	--
Lead	49.4 - 576	<10 - 300	WS-8 436 WS-9 576
Magnesium	3,850 - 19,500	50 - 50,000	--
Manganese	235 - 684	<2 - 7,000	--
Mercury	0 - 0.23	<0.01 - 3.4	--
Nickel	0 - 31.3	<5 - 700	--
Potassium	0 - 1,440	50 - 37,000	--
Vanadium	14.7 - 24.4	<7 - 300	--
Zinc	68.9 - 459	<5 - 2,900	--
Cyanide	0 - 1.3	NA	--

02[UZ]YO1080:D2826/2553/25

*Range source: USGS professional paper 1270, "Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States"

NA = No range listed.

Table 4-9

ORGANIC COMPOUNDS FOUND IN SOIL SAMPLES FROM BORINGS

Organic Compound	Range µg/kg	Concentration in Affected Samples (µg/kg)			
		GW-1-SS-01 4-6′	GW-3 0-2′	GW-3MS 0-2′	GW-3MSD 0-2′
Total PAHs*	2,891 - 5,602	--	2,891	5,602	5,560
4,4′-DDT	0 - 28	--	28	--	--
4,4′-DDE	0 - 10J	--	10J	--	--

02[UZ]YO1080:D2826/2575/21

Note: No standards for organics in soil.

-- Not detected

*Including J values

Table 4-10

INORGANIC ELEMENTS FOUND IN SOIL SAMPLES FROM BORINGS

Element	Range (mg/kg)	Common* Range (mg/kg)	Samples Above Range, With Concentration in mg/kg
Aluminum	12,000 – 16,600	7,000 – >100,000	--
Arsenic	0 – 5.4	<0.1 – 73	--
Barium	104 – 246	10 – 1,500	--
Beryllium	0 – 0.51	<1 – 7	--
Calcium	40,300 – 134,000	10 – 280,000	--
Chromium	16.9 – 23.3	1 – 1,000	--
Copper	19.8 – 72.4	<1 – 700	--
Iron	22,000 – 29,000	10 – >100,000	--
Lead	10.1 – 165	<10 – 300	--
Magnesium	17,900 – 27,800	50 – 50,000	--
Manganese	456 – 1,220	<2 – 7,000	--
Mercury	0 – 0.27	<0.01 – 3.4	--
Nickel	14.9 – 23.2	<5 – 700	--
Potassium	1,660 – 2,390	50 – 37,000	--
Vanadium	21.1 – 33.3	<7 – 300	--
Zinc	104 – 644	<5 – 2,900	--

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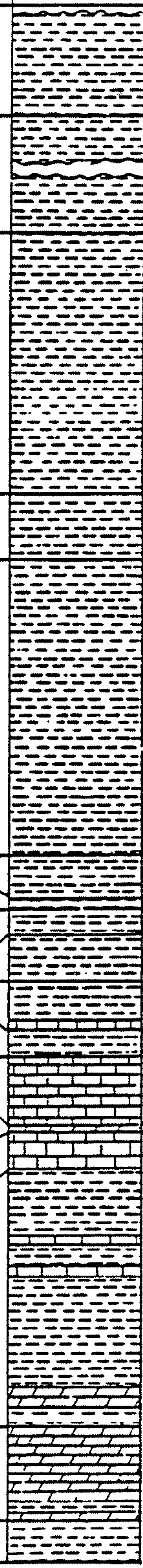
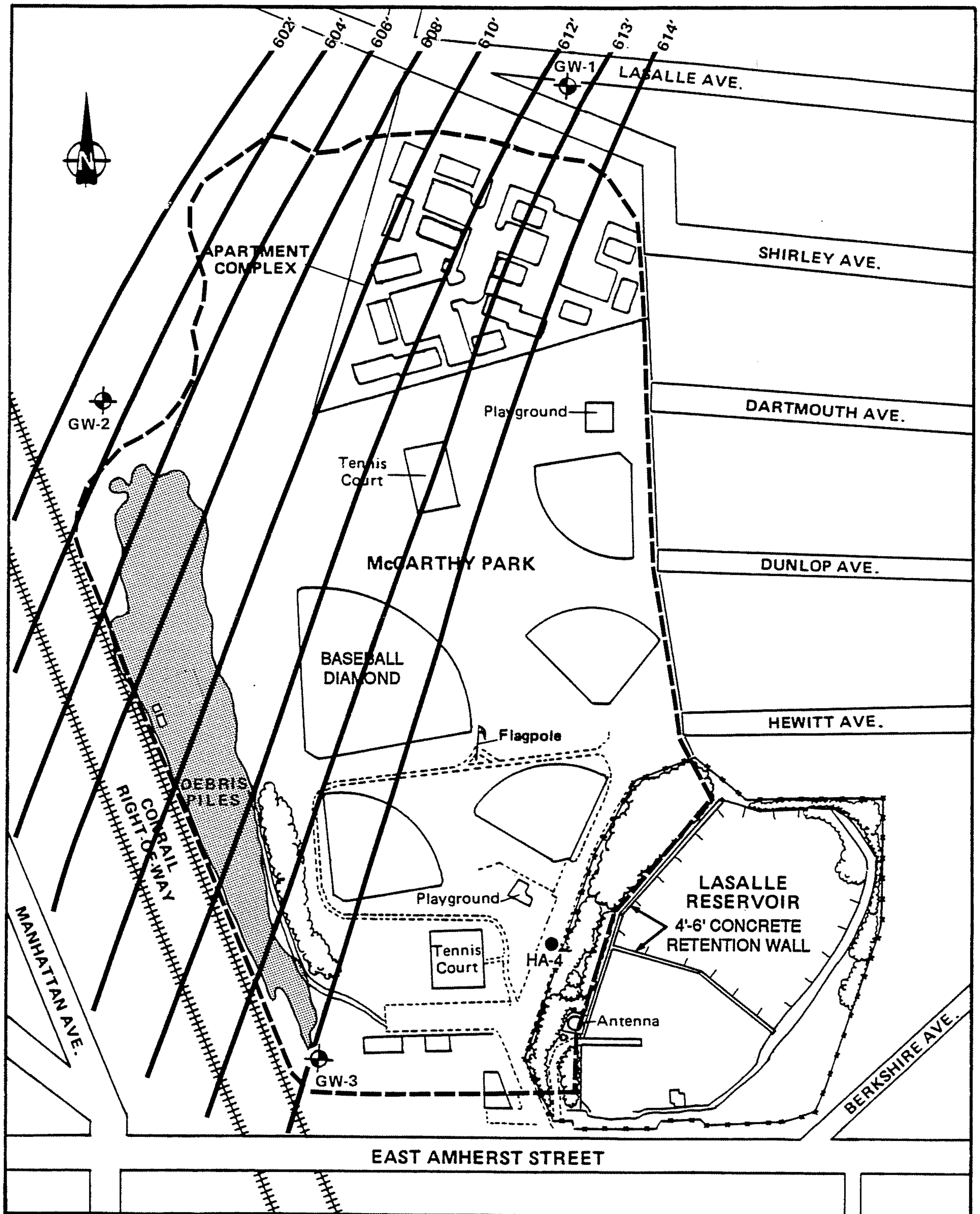
*Range source: USGS professional paper 1270, "Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States"

NA = No range listed.

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

SOURCE: LaSala 1968

Figure 4—1
BEDROCK UNITS OF THE ERIE-NIAGARA BASIN



SOURCE: Ecology and Environment Engineering, P.C.

KEY:

Groundwater Monitoring Well

Groundwater Contour

Buffalo Sewer Authority Well

Figure 4-2
GROUNDWATER CONTOUR MAP FOR LASALLE RESERVOIR SITE

5

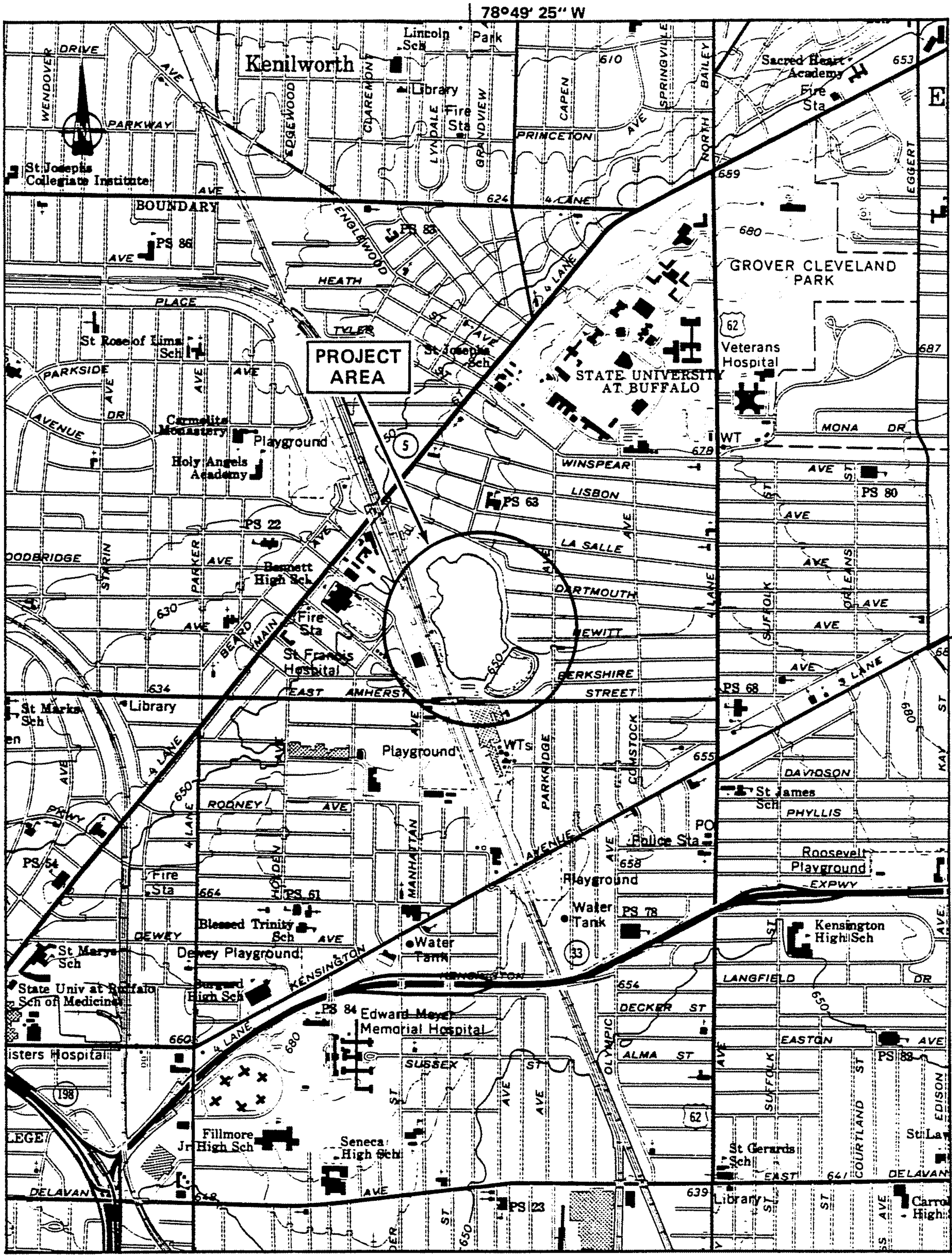
5. FINAL APPLICATION OF HAZARD RANKING SYSTEM

5.1 NARRATIVE SUMMARY

The LaSalle Reservoir site encompasses a former limestone quarry approximately 50 acres in size and 45 feet deep located in the City of Buffalo, Erie County, New York (see Figure 5-1). The site is currently owned by the City of Buffalo under the jurisdiction of the Buffalo Sewer Authority. The site was formerly a limestone quarry that was used by the City of Buffalo as a landfill for municipal waste, incinerator ash, construction and demolition debris, household appliances, and tree parts. Also, industrial wastes have allegedly been disposed of at the site.

According to tests conducted by Ecology and Environment Engineering, P.C., groundwater, surface soil, and waste samples contain hazardous organic compounds (e.g., 1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, and total-1,2-dichloroethene, PAHs) and inorganic compounds (e.g., iron and lead).

Although the HRS migration score for this site is low (2.58), the contamination present is still significant, as can be seen in the direct contact score (62.5). This is due to the high population density in the vicinity of the site and the use of the site as a recreation and residential area.



SOURCE: USGS 7.5 Minute Series (Topographic) Quadrangle; Buffalo, N.Y. 1965.

SCALE 1:24,000

0 .5 1 Mile

0 .5 1 Kilometer

Figure 5—1
LOCATION MAP: LASALLE RESERVOIR SITE

5.3 HRS Worksheets

FIGURE 1

H R S   C O V E R   S H E E T

Facility Name: LaSalle Reservoir

Location: Parkridge Avenue and East Amherst Street, Buffalo, New York

EPA Region: II

Person(s) in Charge of Facility: City of Buffalo/Buffalo Sewer Authority

Franklin Dimascio

201 City Hall, Buffalo, NY 14202

Name of Reviewer: Ralinda Leichner   Date: 2/90

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.)

The site is a former limestone quarry approximately 50 acres in area and 45 feet deep. Most of the quarry was landfilled with municipal wastes from the City of Buffalo. The site also received paint waste mixed with sawdust floor sweepings from Buffalo Forge Company. No waste disposal records are available for the site. An unfilled portion of the quarry in the southeastern section is currently used as a stormwater retention basin by the Buffalo Sewer Authority.

According to tests conducted by Ecology and Environment Engineerng, P.C., groundwater, surface soil, and waste samples contained organic compounds (e.g., 1,1,1-trichloroethane and PAHs) and inorganic compounds (e.g., iron and lead). The site poses a potential direct contact hazard since the northern portion is now a housing development and the southern portion is a playground. The groundwater is not used for drinking.

Scores: $S_M = 2.58$ ($S_{gw} = 4.47$ $S_{sw} = 0$ $S_a = 0$)

$S_{FE} = 0$

$S_{DC} = 62.5$

[UZ]YO1080:D2826/2577/10

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	6	
Net Precipitation	0 1 2 3	1	2	3	
Permeability of the Unsaturated Zone	0 1 2 3	1	2	3	
Physical State	0 1 2 3	1	2	3	
	Total Route Characteristics Score		12	15	
3 Containment	0 1 2 3	1	3	3	3.3
4 Waste Characteristics					3.4
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	1	8	
	Total Waste Characteristics Score		19	26	
5 Targets					3.5
Ground Water Use	0 1 2 3	3	3	9	
Distance to Nearest Well/Population Served	0 4 6 8 10 / 12 16 18 20 / 24 30 32 35 40	1	0	40	
	Total Targets Score		3	49	
6 If line 1 is 45, multiply 1 x 4 x 5 / If line 1 is 0, multiply 2 x 3 x 4 x 5			2,565	57,330	
7 Divide line 6 by 57,330 and multiply by 100	S_{gw} = 4.47				

FIGURE 2
GROUND WATER ROUTE WORK SHEET

Surface Water Route Work Sheet					
Rating Factor	**Assigned Value (Circle One)**	**Multiplier**	**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	0	6	
Physical State	0 1 2 3	1	2	3	
	Total Route Characteristics Score		4	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	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
	Total Waste Characteristics Score			26	
[5] Targets					4.5
Surface Water Use	0 1 2 3	3	0	9	
Distance to a Sensitive Environment	0 1 2 3	2	0	6	
Population Served/Distance to Water Intake Downstream	0 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40	
	Total Targets Score		0	55	
[6] If line [1] is 45, multiply [1] x [4] x [5] If line [1] is 0, multiply [2] x [3] x [4] x [5]			0	64,350	
[7] Divide line [6] by 64,350 and multiply by 100	S_{sw} = 0				

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

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

FIGURE 9
AIR ROUTE WORK SHEET

	S	S^2
Groundwater Route Score (S_{gw})	4.47	19.98
Surface Water Route Score (S_{sw})	0	0
Air Route Score (S_a)	0	0
$S^2_{gw} + S^2_{sw} + S^2_a$		19.98
$\sqrt{S^2_{gw} + S^2_{sw} + S^2_a}$		4.47
$\sqrt{S^2_{gw} + S^2_{sw} + S^2_a} / 1.73 = S_M =$		2.58

FIGURE 10
WORKSHEET FOR COMPUTING S_M

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

FIGURE 11
FIRE AND EXPLOSION WORK SHEET

Note: Mode not scored since no fire or explosion threat has been documented.

Direct Contact Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
[1] Observed Incident	0 45	1	0	45	8.1
If line [1] is 45, proceed to line [4] If line [1] is 0, proceed to line [2]					
[2] Accessibility	0 1 2 3	1	3	3	8.2
[3] Containment	0 15	1	15	15	8.3
[4] Waste Characteristics Toxicity	0 1 2 3	5	15	15	8.4
[5] Targets					8.5
Population Within a 1-Mile Radius	0 1 2 3 4 5	4	20	20	
Distance to a Critical Habitat	0 1 2 3	4	0	12	
Total Targets Score			20	32	
[6] If line [1] is 45, multiply [1] x [4] x [5] If line [1] is 0, multiply [2] x [3] x [4] x [5]			13,500	21,600	
[7] Divide line [6] by 21,600 and multiply by 100	S_{DC} = 62.5				

FIGURE 12
DIRECT CONTACT WORK SHEET

5.4 HRS Documentation Records

DOCUMENTATION RECORDS

FOR

HAZARD RANKING SYSTEM

Instructions: As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,320 drums plus 80 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference. Include the location of the document.

Facility Name: LaSalle Reservoir

Location: Parkridge Avenue and East Amherst Street, Buffalo, New York

Date Scored: February 1990

Person Scoring: Ralinda Leichner

Primary Source(s) of Information (e.g., EPA region, state, FIT, etc.):

NYSDEC records, Ecology and Environment site-specific investigations, previous site studies, published reports

Factors Not Scored Due to Insufficient Information:

None

Comments or Qualifications:

None

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1. OBSERVED RELEASE

Contaminants detected (3 maximum):

Iron, 1,1,1-trichloroethane, 1,1-dichloroethane
Ref. 2

Rationale for attributing the contaminants to the facility:

Detected in groundwater samples at and near the site.
Ref. 10

* * *

2. ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifer(s) of concern:

Limestone unit consisting of Onondaga Limestone, Akron Dolostone, and Bertie Limestone. The Onondaga consists of limestone and cherty limestone, the Akron is a thin dolomite unit, and the Bertie consists of dolomite and dolomitic limestone with interbedded shale.
Ref. 2, 3

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

Score of 3 assigned because the depth to groundwater is 30.4 feet below ground surface and fill material (possibly hazardous) may exist to 45 feet below ground surface. Therefore, groundwater is in contact with fill material.
Ref. 1, 3

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

45 feet
Ref. 1

Net Precipitation

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

36 inches
Ref. 1

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

27 inches
Ref. 1

Net precipitation (subtract the above figures):

9 inches
Ref. 1

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

All natural soil removed during quarrying. Present soil is fill.
Ref. 1, 3

Permeability associated with soil type:

Permeability of fill assumed to be 10^{-3} to 10^{-5} cm/sec
Score = 2
Ref. 6

Physical State

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

Solid, unconsolidated municipal waste and construction and demolition debris
Score = 1
Ref. 1

Powder or fine material such as incinerator ash and paint waste mixed with sawdust sweepings from Buffalo Forge Company
Score = 2
Ref. 1

* * *

3. CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Piles uncovered, waste unstabilized, and no liner
Ref. 1

Landfill - no liner
Ref. 1

Method with highest score:

Both have maximum score = 3

4. WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Several inorganic and organic substances (e.g., iron, 1,1-dichloroethane, 1,1,1-trichloroethane) Ref. 10

Compound with highest score:

Iron
Ref. 2, 10

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.):

No statistically significant/accurate way to estimate quantity. Hazardous substances found in samples. Industrial wastes thought to be disposed of, including paint waste mixed with sawdust (an EPA D001 waste), but quantity unknown.
Ref. 1, 11

Basis of estimating and/or computing waste quantity:

Factor scored greater than 0 due to presence of hazardous substances in soil and water samples, and unknown quantity of waste as listed on the RTK.
Score = 1

* * *

5. TARGETS

Groundwater Use

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

Commercial, industrial, and another water source presently available; not used but usable
Score = 1
Ref. 2

Distance to Nearest Well

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

None currently known. Former wells at Nagel's Dairy and Commodore Theatre are no longer used.
Ref. 1

Distance to above well or building:

N/A

Population Served by Groundwater 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 known.
Ref. 1

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

N/A
Ref. 5

Total population served by groundwater within a 3-mile radius:

None known.

1. OBSERVED RELEASE

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

None known. No known analytical testing of surface water has occurred.
Ref. 1

Rationale for attributing the contaminants to the facility:

N/A

* * *

2. ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent:

1%
Ref. 1

Name/description of nearest downslope surface water:

Surface drainage from the site flows to the City of Buffalo sewers.
Ref. 1

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

N/A

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

No
Ref. 5

Is the facility completely surrounded by areas of higher elevation?

No
Ref. 5

1-Year 24-Hour Rainfall in Inches

2.1 inches
Ref. 1

Distance to Nearest Downslope Surface Water

> 2 miles
Ref. 5

Physical State of Waste

Solid, unconsolidated, or unstabilized material: Score = 1
Powder or fine material: Score = 2
Ref. 1

* * *

3. CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Piles not covered, waste unconsolidated, and no diversion or containment
Score = 3
Ref. 1

Landfill – no liner
Ref. 1

Method with highest score:

Both have maximum score = 3

4. WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

N/A No surface water samples taken.

Compound with highest score:

N/A

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.):

No statistically significant/accurate way to estimate. Hazardous substances detected in soil and water samples, but no confirmed disposal of hazardous materials. Industrial wastes thought to be disposed of, including paint waste mixed with sawdust (an EPA D001 waste), but quantity unknown.
Ref. 1, 11

Basis of estimating and/or computing waste quantity:

Factor scored greater than 0 due to hazardous substances detected in soil samples, and unknown quantity of waste as listed on the RTK.
Score = 1

* * *

5. TARGETS

Surface Water Use

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

Not used.

Ref. 5

Is there tidal influence?

No
Ref. 5

Distance to a Sensitive Environment

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

N/A
Ref. 1, 5

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

N/A
Ref. 1

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

N/A
Ref. 1

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:

VanDewater Intake, Niagara River, East Branch, Erie County Water Authority. Not applicable for this site as surface runoff enters Buffalo sewers.
Ref. 1

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

N/A
Ref. 5

Total population served:

0

Ref. 1

Name/description of nearest of above water bodies:

Niagara River, however runoff enters Buffalo Sewer System before reaching the Niagara River.

Ref. 1

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

>3 stream miles to VanDewater intake along Scajaquada Creek. Not applicable to this site as surface runoff enters sewers
Ref. 5, 7, 8

1. OBSERVED RELEASE

Contaminants detected:

None. No known air sampling has occurred, other than HNu field screening that did not indicate ambient air readings above background.

Ref. 1

Date and location of detection of contaminants:

N/A

Methods used to detect the contaminants:

N/A

Rationale for attributing the contaminants to the site:

N/A

* * *

2. WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

N/A Air samples not taken.

Most incompatible pair of compounds:

N/A Air samples not taken.

Toxicity

Most toxic compound:

N/A Air samples not taken.

Hazardous Waste Quantity

Total quantity of hazardous waste:

No statistically significant/accurate way to estimate.

Basis of estimating and/or computing waste quantity:

Factor scored greater than 0 due to hazardous substances detected in soil and water samples.
Score = 1

* * *

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
	36,909		

Ref. 10

Distance to a Sensitive Environment

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

N/A
Ref. 1, 5

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

N/A
Ref. 1

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

N/A
Ref. 1

Land Use

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

<100 feet
Ref. 1, 5

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

N/A
Ref. 1, 5

Distance to residential area, if 2 miles or less:

<50 feet
Ref. 5

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

N/A
Ref. 1, 5

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

N/A
Ref. 1, 5

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

No
Ref. 1

1. CONTAINMENT

Hazardous substances present:

Site has not been certified by a state or local fire marshall to present a significant fire or explosion threat.
Ref. 1

Type of containment, if applicable:

N/A

* * *

2. WASTE CHARACTERISTICS

Direct Evidence

Type of instrument and measurements:

N/A

Ignitability

Compound used:

N/A

Reactivity

Most reactive compound:

N/A

Incompatibility

Most incompatible pair of compounds:

N/A

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility:

No statistically significant/accurate way to estimate.

Basis of estimating and/or computing waste quantity:

Factor scored greater than 0 due to hazardous substances detected in soil and water samples and historic disposal of paint wastes.
Ref. 1

* * *

3. TARGETS

Distance to Nearest Population

<50 feet
Score = 5

Distance to Nearest Building

<50 feet
Score = 3

Distance to a Sensitive Environment

Distance to wetlands:

Coastal	>2 miles	Score = 0
Freshwater	>1 mile	Score = 0

Distance to critical habitat:

>1 mile   Score = 0

Land Use

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

<100 feet
Ref. 1, 5

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

N/A
Ref. 1

Distance to residential area, if 2 miles or less:

<50 feet
Ref. 1, 5

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

N/A
Ref. 1, 5

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

N/A
Ref. 1, 5

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

No
Ref. 1, 5

Population Within 2-Mile Radius

119,271
Ref. 10

Buildings Within 2-Mile Radius

>2,600
Ref. 5

1. OBSERVED INCIDENT

Date, location, and pertinent details of incident:

No record of observed incident of direct contact with hazardous substances at this site.
Ref. 1

* * *

2. ACCESSIBILITY

Describe type of barrier(s):

Barriers do not completely surround the site.
Score = 3
Ref. 1

* * *

3. CONTAINMENT

Type of containment, if applicable:

Landfill with no known containment. Fill encountered <2 feet below ground surface.
Ref. 1, 3

* * *

4. WASTE CHARACTERISTICS

Toxicity

Compounds evaluated:

Lead, benzo(a)pyrene, chrysene, xylenes, dibenzofuran, 4,4'-DDD, 4,4'-DDT. These contaminants were detected in waste samples from 0 - 2 feet below ground surface.

Ref. 10

Compound with highest score:

Lead.

Ref. 2, 10

* * *

5. TARGETS

Population Within 1-Mile Radius

36,909
Ref. 10

Distance to Critical Habitat (of endangered species)

N/A
Ref. 1

R E F E R E N C E S

If the entire reference is not available for public review in the EPA regional files on this site, indicate where the reference may be found.

Reference Number	Description of the Reference
1	New York State Department of Environmental Conservation, Engineering Investigations at Inactive Hazardous Waste Sites, Phase I Investigation, LaSalle Reservoir, Site No. 915033, City of Buffalo, Erie County, prepared by Recra Research, Inc. Document location: Ecology and Environment, Inc., Lancaster, New York.
2	Sax, N.I., 1984, Dangerous Properties of Industrial Materials, Sixth Edition, Van Nostrand Reinhold Company, New York, New York. Document location: Ecology and Environment, Inc., Lancaster, New York.
3	LaSala, A.M., Jr., 1968, Ground-Water Resources of the Erie-Niagara Basin, New York, prepared for the Erie-Niagara Basin Regional Water Resources Planning Board. Document location: Ecology and Environment, Inc., Lancaster, New York.
4	Ecology and Environment, Inc., February 1990, Phase II Investigation, LaSalle Reservoir, Well Logs, Appendix C (this report). Document location: Ecology and Environment, Inc., Lancaster, New York.
5	New York State Department of Transportation, 1927, 7.5-Minute Series (Planimetric), NE/4 Buffalo 15' Quadrangle. Document location: Ecology and Environment, Lancaster, New York.
6	Barrett, K.W., S.S. Chang, S.A. Haus, and A.M. Platt, 1982, Uncontrolled Hazardous Waste Site Ranking System Users' Manual, Mitre Corporation. Document location: Ecology and Environment, Inc., Lancaster, New York.
7	New York State Department of Health, New York State Atlas of Community Water System Sources, 1982. Document location: Ecology and Environment, Inc., Lancaster, New York.
8	New York State Department of Transportation, 1927, 7.5-Minute Series (Planimetric) NW/4 Buffalo 15' Quadrangle. Document location: Ecology and Environment, Inc., Lancaster, New York.
9	Ecology and Environment, Inc., February 1990, Phase II Investigation, LaSalle Reservoir, Analytical Data, Appendix C (this report). Document location: Ecology and Environment, Inc., Lancaster, New York.
10	General Sciences Corporation, 1987, Graphical Exposure Modeling System (GEMS). Document location: Ecology and Environment, Inc., Lancaster, New York.
11	NYSDEC, data unknown, Right-To-Know (RTK) Program, Reported Hazardous Waste Data Listed by Region, Site, Code, Waste Type. Document Location: Ecology and Environment, Inc., Lancaster, New York.

02[UZ]YO1080:D2826/2578/6

REFERENCE 1

Dangerous Properties of Industrial Materials

Sixth Edition

N. IRVING SAX

Assisted by:

Benjamin Feiner/Joseph J. Fitzgerald/Thomas J. Haley/Elizabeth K. Weisburger

5-24

VNR VAN NOSTRAND REINHOLD COMPANY

NEW YORK CINCINNATI TORONTO LONDON MELBOURNE

TABLE I

EPA Hazard Ranking System Waste Characteristics Values (Toxicity/Persistence Matrix)

Chemical/Compound	Ground Water and Surface Water Pathway Values	Air Pathway Values
Acenapthene	9	3
Acetaldehyde	6	6
Acetic Acid	6	6
Acetone	6	6
2-Acetylaminoflourene	18	9
Aldrin	18	9
Ammonia	9	9
Aniline	12	9
Anthracene	15	9
Arsenic	18	9
Arsenic Acid	18	9
Arsenic Trioxide	18	9
Asbestos	15	9
Barium	18	9
Benzene	12	9
Benzidine	18	9
Benzoapyrene	18	9
Benzopyrene, NOS	18	9
Beryllium & Compounds NOS	18	9
Beryllium Dust, NOS	18	9
Bis (2-Chloroethyl) Ether	15	9
Bis (2-Ethylhexyl Phthalate	12	3
Bromodichloromethane	15	6
Bromoform	15	6
Bromomethane	15	9
Cadmium	18	9
Carbon Tetrachloride	18	9
Chlordane	18	9
Chlorobenzene	12	6
Chloroform	18	6
3-Chlorophenol	12	6
4-Chlorophenol	15	9
2-Chlorophenol	12	6
Chromium	18	9
Chromium, Hexavalent (Cr^{+6})	18	9

hemical/Compound	Ground Water and Surface Water Pathway Values	Air Pathway Values
hromium, Trivalent (Cr^{+3})	15	6
opper & Compounds, NOS	18	9
reosote	15	6
resols	9	6
4-Cresol	12	9
upric chloride	18	9
yanides (soluble salts), NOS	12	9
yclohexane	12	6
DE	18	9
DT	18	9
iaminotoluene	18	6
ibromochloromethane	15	6
, 2-Dibromo, 3-chloropropane	18	9
i-N-Butyl-Phthalate	18	6
, 4-Dichlorobenzene	15	6
ichlorobenzene, NOS	18	6
1, 1-Dichloroethane	12	6
1, 2-Dichloroethane	12	9
1, 1-Dichloroethene	15	9
1, 2-cis-Dichloroethylene	12	3
1, 2-trans-Dichloroethylene	12	3
Dichloroethylene, NOS	12	3
2, 4-Dichlorophenol	18	6
2, 4-Dichlorophenoxyacetic Acid	18	9
Dicyclopentadiene	18	9
Dieldrin	18	9
2, 4-Dinitrotoluene	15	9
Dioxin	18	9
Endosulfan	18	9
Endrin	18	9
Ethylbenzene	9	6
Ethylene Dibromide	18	9
Ethylene Glycol	9	6
Ethyl Ether	15	3
Ethylmethacrylate	12	6

Chemical/Compound	Ground Water and Surface Water Pathway Values	Air Pathway Values
Fluorine	18	9
Formaldehyde	9	9
Formic Acid	9	6
Heptachlor	18	9
Hexachlorobenzene	15	6
Hexachlorobutadiene	18	9
Hexachlorocyclohexane, NOS	18	9
Hexachlorocyclopentadiene	18	9
Hydrochloric Acid	9	6
Hydrogen Sulfide	18	9
Indene	12	6
Iron & Compounds, NOS	18	9
Isophorone	12	6
Isopropyl Ether	9	3
Kelthane	15	6
Kepone	18	9
Lead	18	9
Lindane	18	9
Magnesium & Compounds, NOS	15	6
Manganese & Compounds, NOS	18	9
Mercury	18	9
Mercury Chloride	18	9
Methoxychlor	15	6
4, 4-Methylene-Bis-(2-Chloroaniline)	18	9
Methylene Chloride	12	6
Methyl Ethyl Ketone	6	6
Methyl Isobutyl Ketone	12	6
4-Methyl-2-Nitroaniline	12	9
Methyl Parathion	9	9
2-Methylpyridine	12	6
Mirex	18	9

[illegible] (cont.)

Chemical/Compound	Ground Water and Surface Water Pathway Values	Air Pathway Values
Naphthalene	9	6
Nickel & Compounds, NOS	18	9
Nitric Acid	9	9
Nitroaniline, NOS	18	9
Nitrogen Compounds, NOS	12	0
itroguanidine	12	9
itrophenol, NOS	15	9
m-Nitrophenol	15	
o-Nitrophenol	12	
p-Nitrophenol	15	
itrosodiphenylamine	12	6
arathion	9	9
entachlorophenol (PCP)	18	9
esticides, NOS	18	9
enanthrene	15	9
enol	12	9
osgene	9	9
lybrominated Biphenyl (PBB), NOS	18	9
lychlorinated Biphenyls (PCB), NOS	18	9
tassium Chromate	18	9
dium & Compounds, NOS	18	9
don & Compounds, NOS	15	9
(Cyclonite)	15	
4-D, Salts & Esters	18	9
enium	15	9
in (Carbaryl)	18	9
ium Cyanide	12	9
rene	9	6
fate	9	0
furic Acid	9	9
, 5-T	18	9
., 2, 2-Tetrachloroethane	18	9
achloroethane, NOS	18	9
, 2, 2-Tetrachlorohene	12	6

Chemical/Compound	Ground Water and Surface Water Pathway Values	Air Pathway Values
Tetraethyl Lead	18	9
Tetrahydrofuran	15	6
Thorium & Compounds, NOS	18	9
Toluene	9	6
TNT	12	
Toxaphene	18	9
Tribromomethane	18	9
1, 2, 4-Trichlorobenzene	15	6
1, 3, 5-Trichlorobenzene	15	6
1, 1, 1-Trichloroethane	12	6
1, 1, 2-Trichloroethane	15	6
Trichloroethane, NOS	15	6
Trichloroethene	12	6
1, 1, 1-Trichloropropane	12	6
1, 1, 2-Trichloropropane	12	6
1, 2, 2-Trichloropropane	12	6
1, 2, 3-Trichloropropane	15	9
Uranium & Compounds, NOS	18	9
Varsol	12	6
Vinyl Chloride	15	9
Xylene	9	6
Zinc & Compounds, NOS	18	9
Zinc Cyanide	18	9

REFERENCE 2

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

LaSalle Reservoir
Buffalo, Erie County, New York
Site #915033

Prepared For:

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

Prepared By:

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

LASALLE RESERVOIR
TABLE OF CONTENTS

REFERENCE 3

Erie-Niagara Basin

Ground-Water Resources

ERIE-NIAGARA BASIN REGIONAL WATER
RESOURCES PLANNING BOARD

THE NEW YORK STATE WATER RESOURCES COMMISSION

CONSERVATION DEPARTMENT • DIVISION OF WATER RESOURCES

ENB-3

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

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

by

A. M. La Sala, Jr.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

in cooperation with

THE NEW YORK STATE CONSERVATION DEPARTMENT
DIVISION OF WATER RESOURCES

STATE OF NEW YORK
CONSERVATION DEPARTMENT
WATER RESOURCES COMMISSION

Basin Planning Report ENB-3
1968

5-35

Yields of wells

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

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

LIMESTONE UNIT

Bedding and lithology

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

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

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

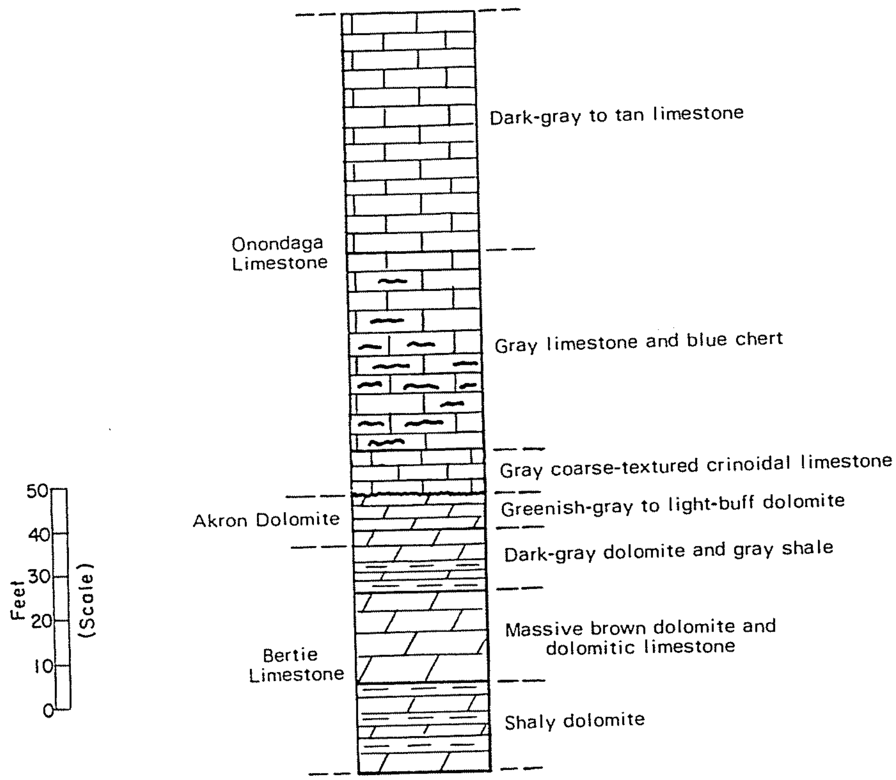


Figure 7.--Lithology of the limestone unit.

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

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

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

Water-bearing openings

The limestone unit contains water-bearing openings that are similar to those of the Lockport Dolomite. Because the limestone unit is more soluble, however, solution widening of the openings appears to be more pronounced. The types of water-bearing joints in the limestone can be seen at the falls of Murder Creek at Akron. Not all of the flow of Murder Creek plunges over the falls. A considerable part of the flow percolates into the limestone unit upstream from the falls and discharges from bedding joints both at the face and along the sides of the falls. The principal zones of discharge are at the base of the Bertie, and at a contact of a shaly zone and overlying thick-bedded dolomite 20 feet above the base.

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

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

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

Hydrologic and hydraulic characteristics

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

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

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

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

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

Yields of wells

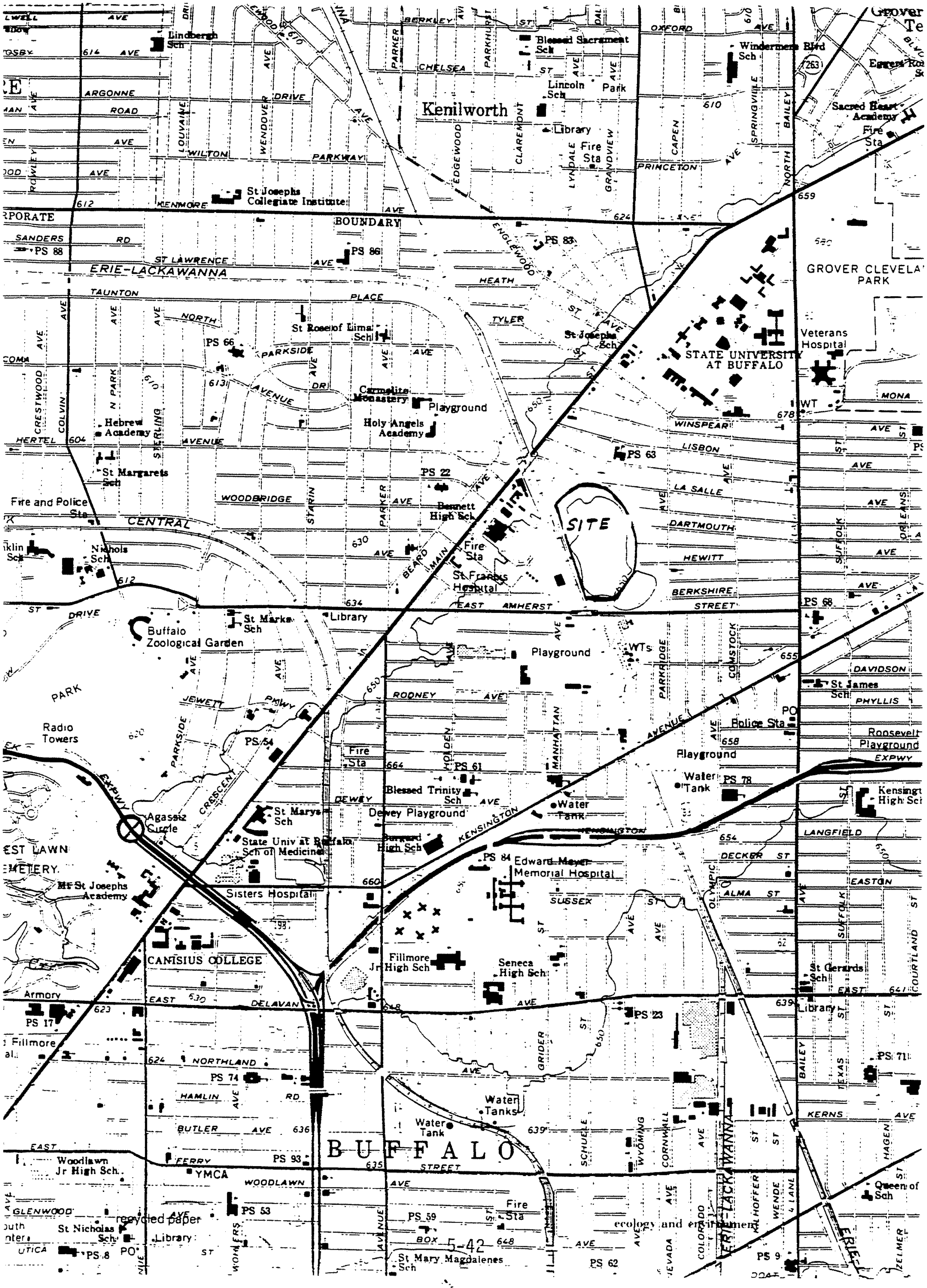
The limestone unit is more productive than the Lockport. A number of large-yield wells in Buffalo, Cheektowaga, Williamsville, Pembroke, and Batavia are finished in the limestone unit and indicate that yields of 300 gpm and possibly more can be obtained. Like the Lockport Dolomite, the yields of wells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

REFERENCE 4

DRILLING LOGS

(APPENDIX C THIS REPORT)

REFERENCE 5



recycled paper
ecology and environment
5-42

REFERENCE 6

P. FARRELL
(P.G./M.C.)

Uncontrolled Hazardous Waste Site Ranking System

A Users Manual

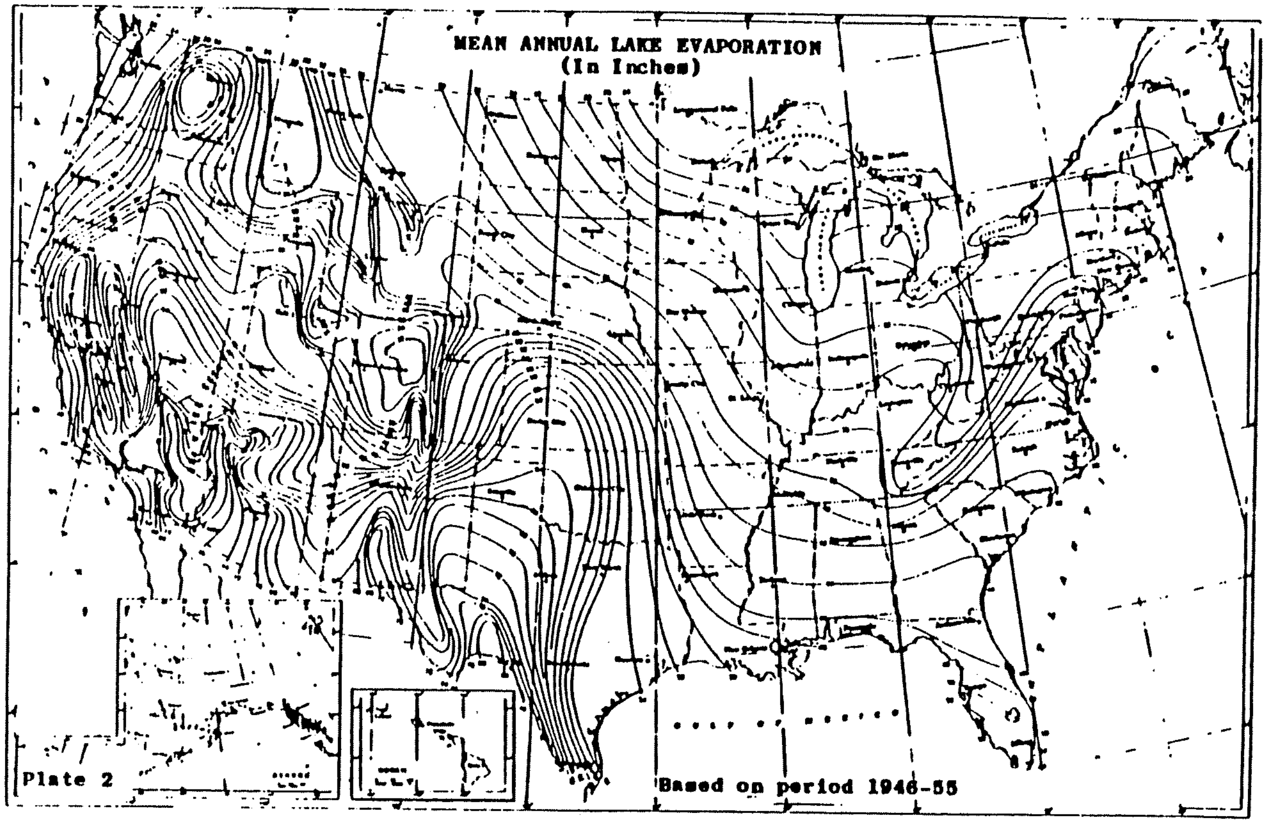
Kris W. Barrett
S. Steven Chang
Stuart A. Haus
Andrew M. Platt

August 1982

MTR-82W111

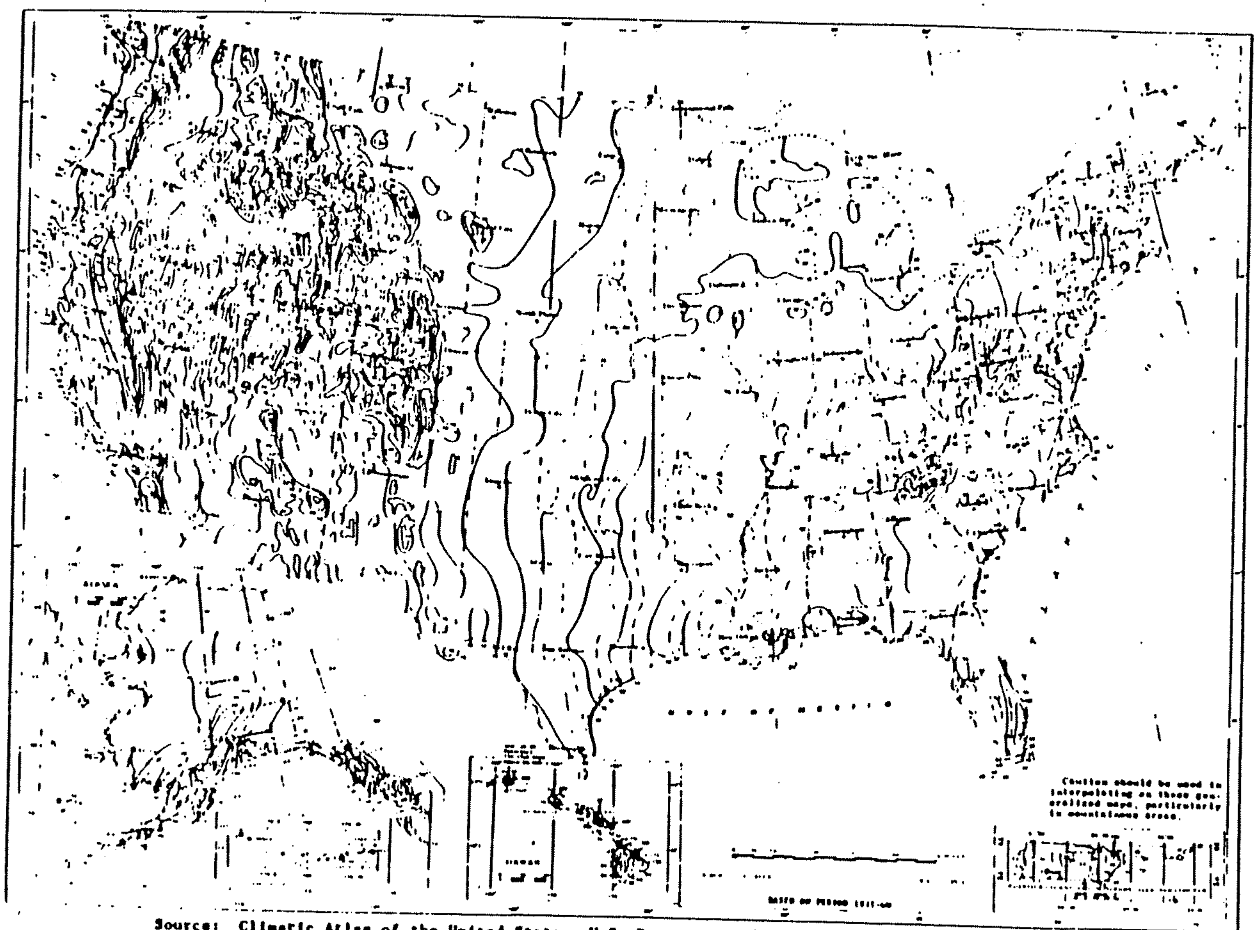
SPONSOR:
U.S. Environmental Protection Agency
CONTRACT NO.:
68-01-6278

The MITRE Corporation
Metrek Division
1820 Dolley Madison Boulevard
McLean, Virginia 22102



Source: Climatic Atlas of the United States, U.S. Department of Commerce, National Climatic Center, Ashville, N.C., 1979.

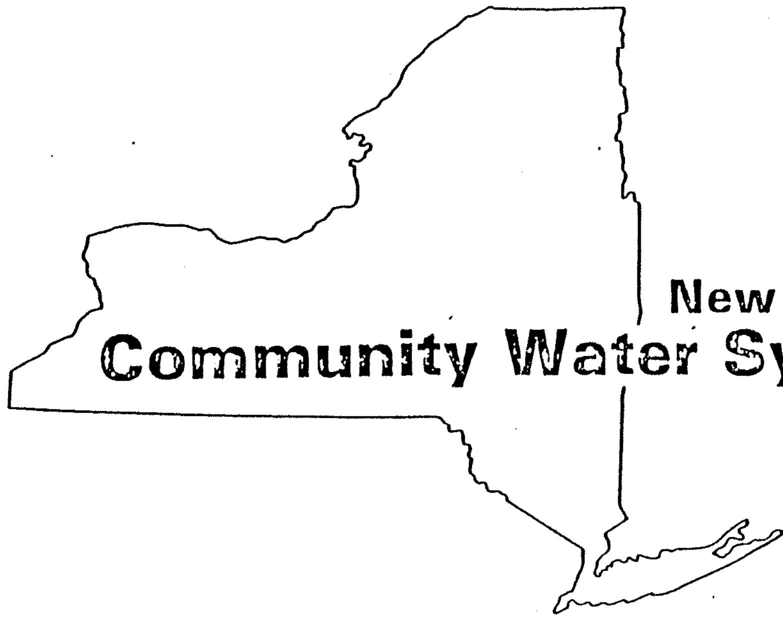
FIGURE 4
MEAN ANNUAL LAKE EVAPORATION
(IN INCHES)



Source: Climatic Atlas of the United States, U.S. Department of Commerce, National Climatic Center, Ashville, N.C., 1979.

FIGURE 5
NORMAL ANNUAL TOTAL PRECIPITATION (INCHES)

REFERENCE 7



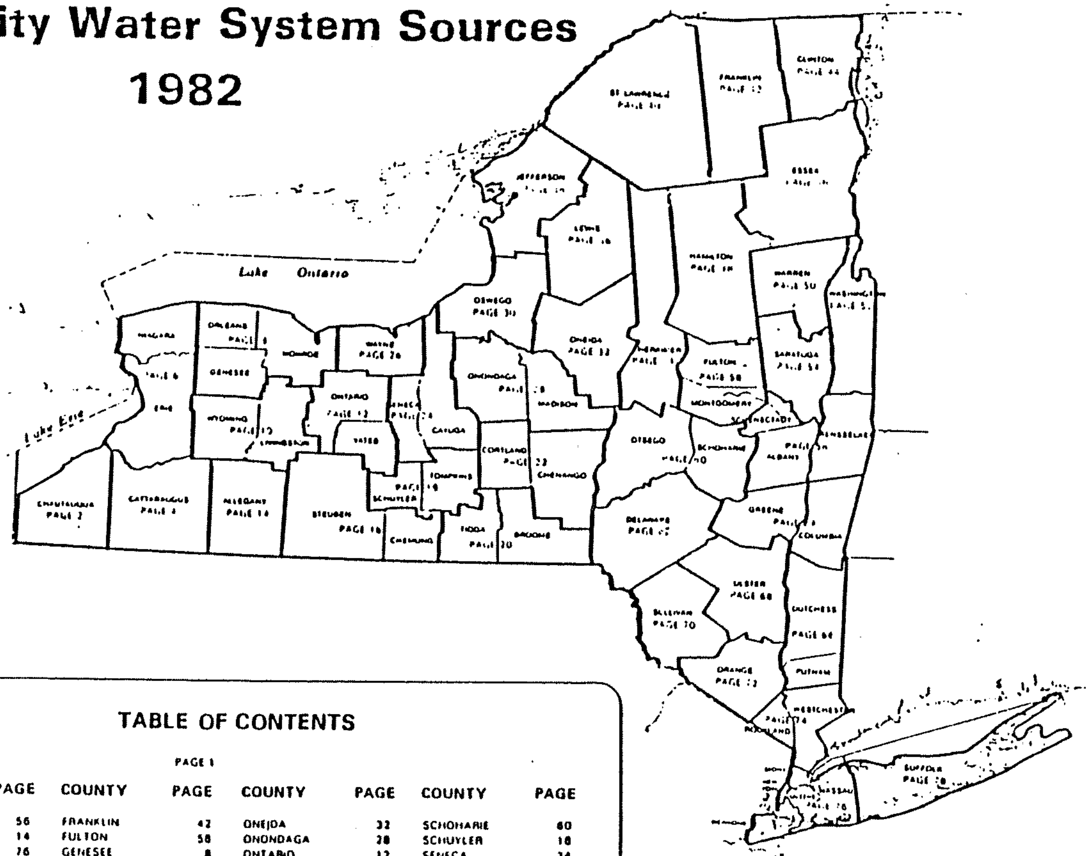
New York State Atlas of Community Water System Sources 1982

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

New York State Atlas of Community Water System Sources

1982

NEW YORK STATE
DEPARTMENT OF HEALTH



LEGEND

BOUNDARIES AND PLACES

International
State
County
Town
Indian Reservation
City — Village
Unincorporated Place — Federal Reservation
Built up Area (Over 25 000 population including any contiguous city or village)

CLASSIFICATION OF POPULATED PLACES

100 000 or more — YONKERS
50 000 to 100 000 — Levittown
12 500 to 50 000
2 500 to 12 500
250 to 2 500
250 or less

TRANSPORTATION

Highways
Divided Highways
Full Control of Access
Partial or No Control of Access
Undivided Highway
Interchange
Touring Route (State U S Interstate) or State Parkway
Touring Route Markers
State U S Interstate

Railroads
Operating Line — Service Discontinued
Operator
Owner (If Other than Operator)
Company Having Trackage Rights

Airports (Open to the Public Military)
Runway under 4000' — Runway over 4000'

Rest Areas
Food Gas Rest Rooms — Rest Rooms
Gas Rest Rooms — Parking Only

RECREATION FACILITIES

State or National Recreation Area
State Campground
State Boat Launching Site
State Canal Park
State Fish Hatchery
Other State Recreation Site

TABLE OF CONTENTS

ERIE COUNTY

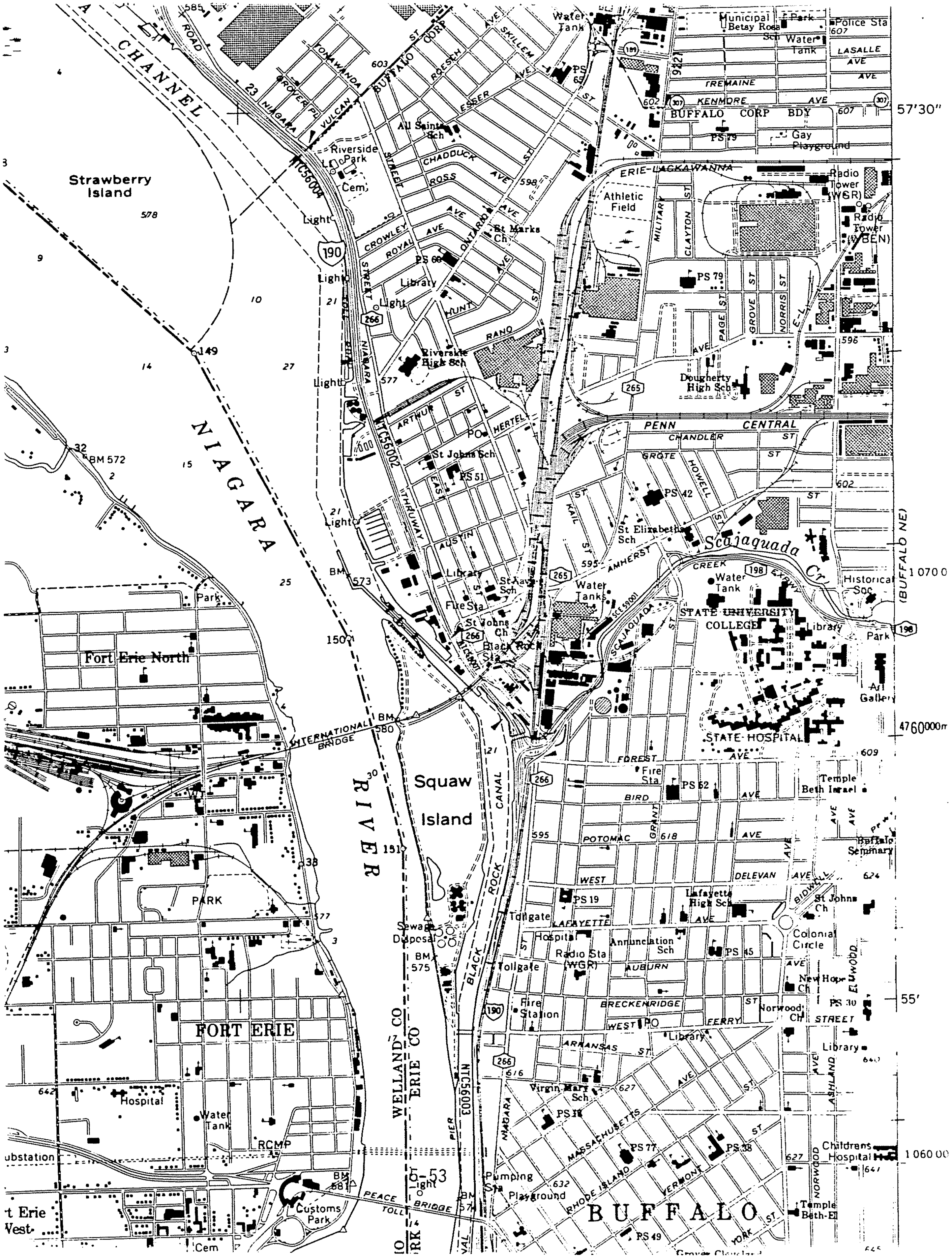
ID NO	COMMUNITY WATER SYSTEM	POPULATION	SOURCE
	Municipal Community		
[illegible]	Akron Village (See No 1 Wyoming Co, Page 10)	3600	
[illegible]	Alden Village	3460	Wells
[illegible]	Angola Village	8500	Lake Erie
[illegible]	Buffalo City Division of Water	357870	Lake Erie
[illegible]	Cattoe Water Company	210	Wells
[illegible]	Collins Water District #3	704	Wells
[illegible]	Collins Water Districts #1 and #2	1384	Wells
[illegible]	Erie County Water Authority (Sturgeon Point Intake)	375000	Lake Erie
[illegible]	Erie County Water Authority (Van DeWater Intake)	NA	Niagara River - East Branch
[illegible]	Grand Island Water District #2	9390	Niagara River
[illegible]	Holland Water District	1670	Wells
[illegible]	Lawtons Water Company	138	Wells
[illegible]	Lockport City (Niagara Co)		Niagara River - East Branch
[illegible]	Niagara County Water District (Niagara Co)		Niagara River - West Branch
[illegible]	Niagara Falls City (Niagara Co)		Niagara River - West Branch
[illegible]	North Collins Village	1500	Wells
[illegible]	North Tonawanda City (Niagara Co)		Niagara River - West Branch
[illegible]	Orchard Park Village	3671	Pipe Creek Reservoir
[illegible]	Springville Village	4169	Wells
[illegible]	Tonawanda City	18538	Niagara River - East Branch
[illegible]	Tonawanda Water District #1	91269	Niagara River
[illegible]	Wanakah Water Company	10750	Lake Erie
	Non Municipal Community		
[illegible]	Aurora Mobile Park	125	Wells
[illegible]	Bush Gardens Mobile Home Park	270	Wells
[illegible]	Circle B Trailer Court	50	Wells
[illegible]	Circle Court Mobile Park	125	Wells
[illegible]	Creekside Mobile Home Park	120	Wells
[illegible]	Donnelly's Mobile Home Court	99	Wells
[illegible]	Gowanda State Hospital	NA	Clear Lake
[illegible]	Hillside Estates	160	Wells
[illegible]	Hunters Creek Mobile Home Park	150	Wells
[illegible]	Knox Apartments	NA	Wells
[illegible]	Maple Grove Trailer Court	72	Wells
[illegible]	Millgrove Mobile Park	100	Wells
[illegible]	Perkins Trailer Park	75	Wells
[illegible]	Quarry Hill Estates	400	Wells
[illegible]	Springville Mobile Park	114	Wells
[illegible]	Springwood Mobile Village	132	Wells
[illegible]	Taylors Grove Trailer Park	39	Wells
[illegible]	Valley View Mobile Court	42	Wells
[illegible]	Villager Apartments	NA	Wells

NIAGARA COUNTY

ID NO	COMMUNITY WATER SYSTEM	POPULATION	SOURCE
	Municipal Community		
	Lockport City (See No 12, Erie Co)	25000	
1	Middleport Village	2000	Wells (Springs)
	Niagara County Water District (See No 13, Erie Co)	48	
2	Niagara Falls City (See also No 14 Erie Co)	77384	Niagara River - East Branch
	North Tonawanda City (See No 16 Erie Co)	36000	
	Non Municipal Community		
3	Country Estates Mobile Village	28	Wells

ERIE AND NIAGARA COUNTIES
PAGE 7
Niagara Falls
North Tonawanda
GRAND ISLAND
Tonawanda
Amherst
Lockport
Cheektowaga
Depew
Lancaster
BUFFALO
West Seneca
Lackawanna
ONTARIO
E
Mount Vernon
Hamburg
Orchard Park
East Aurora
Eden
Lake Erie Beach
South Wales
Colden
Springville
Cattaraugus Creek
Arcade
GENESEE
WYOMING
5L 51

REFERENCE 8


Strawberry Island
NIAGARA RIVER
CHANNEL
Squaw Island
Fort Erie North
FORT ERIE
BUFFALO
BUFFALO CORP BDY
STATE UNIVERSITY COLLEGE
STATE HOSPITAL
Riverside High Sch
Dougherty High Sch
Lafayette High Sch
INTERNATIONAL BRIDGE
PEACE BRIDGE
Customs Park
Scajaquada Cr
BLACK ROCK CANAL
WELLAND CO
ERIE CO
PENN CENTRAL
ERIE-LACKAWANNA
Athletic Field
Colonial Circle
Childrens Hospital
Sewage Disposal
Pumping Sta
Playground
Hospital
Water Tank
RCMP
Substation
57'30"
55'
4760000m
1 070 000
1 060 000
(BUFFALO NE)

REFERENCE 9

ANALYTICAL DATA
(APPENDIX C THIS REPORT)

REFERENCE 10

DRAFT

GRAPHICAL EXPOSURE MODELING SYSTEM

(GEMS)

USER'S GUIDE

VOLUME 1. CORE MANUAL

Prepared for:

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF PESTICIDES AND TOXIC SUBSTANCES
EXPOSURE EVALUATION DIVISION
Task No. 3-2
Contract No. 68023970
Project Officer: Russell Kinerson
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Prepared by:

GENERAL SCIENCES CORPORATION
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5.5 EPA 2070–13

EPA

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT

PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION	
01 State NY	02 Site Number 915033

II. SITE NAME AND LOCATION

01 Site Name (Legal, common, or descriptive name of site) LaSalle Reservoir	02 Street, Route No., or Specific Location Identifier Parkridge				
03 City Buffalo	04 State NY	05 Zip Code 14202	06 County Erie	07 County Code	08 Cong. Dist.

09 Coordinates Latitude 4 7 5 6 4 3. 2	Longitude 0 7 8 4 9 2 5. 0	10 Type of Ownership (Check One) [ ] A. Private [ ] B. Federal [ ] C. State [ ] D. County [x] E. Municipal [ ] F. Other ______ [ ] G. Unknown

III. INSPECTION INFORMATION

01 Date of Inspection 5 / 5 / 89 (Month Day Year)	02 Site Status [ ] Active [x] Inactive	03 Years of Operation Approx. 1950 (Beginning Year) | Approx. 1972 (Ending Year) [ ] Unknown

04 Agency Performing Inspection (Check all that apply)
[ ] A. EPA [ ] B. EPA Contractor ______ (Name of Firm) [ ] C. Municipal
[ ] D. Municipal Contractor ______ (Name of Firm) [ ] E. State [x] F. State Contractor Ecology and Environment Engineering, P.C. (Name of Firm)
[ ] G. Other (Specify) ______

05 Chief Inspector	06 Title	07 Organization	08 Telephone No.
Barbara Topor	Geologist	E & E	(716)684-8060
09 Other Inspectors	**10 Title**	**11 Organization**	**12 Telephone No.**
Gene Florentino	Geologist	E & E	(716)684-8060
Don Johnson	Geologist	E & E	(716)684-8060
Jim Richert	Geologist	E & E	(716)684-8060
Bob Meyers	Geologist	E & E	(716)684-8060
Chad Eich	Geologist	E & E	(716)684-8060

13 Site Representatives Interviewed	14 Title	15 Address	16 Telephone No.
NA			( )
			( )
			( )

17 Access Gained by	18 Time of Inspection	19 Weather Conditions
foot		

IV. INFORMATION AVAILABLE FROM

01 Contact	02 Agency/Organization	03 Telephone No.
Barb Topor	Ecology and Environment Engineering, P.C.	(716)684-8060

04 Person Responsible for Site Inspection Form	05 Agency	06 Organization	07 Telephone No.	08 Date
				2 / 8 / 90

02[UZ]YO1080:D2826/2582

EPA	POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 2 - WASTE INFORMATION	I. IDENTIFICATION	
		01 State NY	02 Site Number 915033

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 Physical States (Check all that apply)	02 Waste Quantity at Site (Measure of waste quantities must be independent)	03 Waste Characteristics (Check all that apply)	
[x] A. Solid [x] B. Powder, Fines [ ] C. Sludge [ ] D. Other ________ (Specify) [ ] E. Slurry [ ] F. Liquid [ ] G. Gas	Tons ________ Cubic Yards unknown No. of Drums ________	[x] A. Toxic [ ] B. Corrosive [ ] C. Radioactive [x] D. Persistent [ ] E. Soluble [ ] F. Infectious [x] G. Flammable	[ ] H. Ignitable [ ] I. Highly volatile [ ] J. Explosive [ ] K. Reactive [ ] L. Incompatible [ ] M. Not applicable

III. WASTE TYPE

Category	Substance Name	01 Gross Amount	02 Unit of Measure	03 Comments
SLU	Sludge			
OLW	Oily waste			
SOL	Solvents	Unknown		
PSD	Pesticides	Unknown		
OCC	Other organic chemicals	Unknown		
IOC	Inorganic chemicals			
ACD	Acids			
BAS	Bases			
MES	Heavy Metals	Unknown		

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

01 Category	02 Substance Name	03 CAS Number	04 Storage/Disposal Method	05 Concentration	06 Measure of Concentration
	Total PAHs			to 369,600	ppb
	Dibenzofuran			to 12,000	ppb
	1,1,1-Trichloroethane			to 330	ppb

V. FEEDSTOCKS (See Appendix for CAS Numbers)

Category	01 Feedstock Name	02 CAS Number	Category	01 Feedstock Name	02 CAS Number
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

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

NYS Phase I report; Phase II investigations including sampling of groundwater, soil, and waste

EPA	POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS	I. IDENTIFICATION 01 State: NY 02 Site Number: 915033

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [ ] A. Groundwater Contamination 02 [ ] Observed (Date ________) [x] Potential [ ] Alleged
03 Population Potentially Affected ________ 04 Narrative Description

None known, but basement flooding is a problem in the area.

01 [ ] B. Surface Water Contamination 02 [ ] Observed (Date ________) [ ] Potential [ ] Alleged
03 Population Potentially Affected ________ 04 Narrative Description:

None known.

01 [ ] C. Contamination of Air 02 [ ] Observed (Date ________) [ ] Potential [ ] Alleged
03 Population Potentially Affected ________ 04 Narrative Description:

None known.

01 [ ] D. Fire/Explosive Conditions 02 [ ] Observed (Date ________) [ ] Potential [ ] Alleged
03 Population Potentially Affected ________ 04 Narrative Description:

None known.

01 [ ] E. Direct Contact 02 [ ] Observed (Date ________) [x] Potential [ ] Alleged
03 Population Potentially Affected 36,909 04 Narrative Description:

There is no access control. There is a park and a housing development on the site.

01 [ ] F. Contamination of Soil 02 [ ] Observed (Date ________) [ ] Potential [ ] Alleged
03 Area Potentially Affected 50 acres 04 Narrative Description:

Analysis of surface soil and waste samples collected at 14 locations across the site detected 18 metals and 20 organics, including numerous PAHs, acetone, DDD, and DDT.

01 [ ] G. Drinking Water Contamination 02 [ ] Observed (Date ________) [ ] Potential [ ] Alleged
03 Population Potentially Affected ________ 04 Narrative Description:

None known; all local residences use municipal water.

01 [ ] H. Worker Exposure/Injury 02 [ ] Observed (Date ________) [ ] Potential [ ] Alleged
03 Workers Potentially Affected ________ 04 Narrative Description:

None reported.

01 [ ] I. Population Exposure/Injury 02 [ ] Observed (Date ________) [ ] Potential [ ] Alleged
03 Population Potentially Affected 36,909 04 Narrative Description:

No access control.

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT	I. IDENTIFICATION	
EPA PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS (Cont.)	01 State NY	02 Site Number 915033

II. HAZARDOUS CONDITIONS AND INCIDENTS (Cont.)

01 [ ] J. Damage to Flora 02 [ ] Observed (Date ________) [x] Potential [ ] Alleged
04 Narrative Description:

None observed.

01 [ ] K. Damage to Fauna 02 [ ] Observed (Date ________) [x] Potential [ ] Alleged
04 Narrative Description:

Potential exists.

01 [ ] L. Contamination of Food Chain 02 [ ] Observed (Date ________) [x] Potential [ ] Alleged
04 Narrative Description:

Potential exists.

01 [ ] M. Unstable Containment of Wastes (Spills/Runoff/Standing liquids, Leaking drums) 02 [X] Observed (Date 5/5/89) [ ] Potential [ ] Alleged
03 [ ] Population Potentially Affected 36,909 04 Narrative Description:

Protruding, highly decomposed drum pieces in northern portion of site near tennis court and playground area.

01 [ ] N. Damage to Offsite Property 02 [ ] Observed (Date ________) [ ] Potential [ ] Alleged
04 Narrative Description:

None known.

01 [ ] O. Contamination of Sewers, Storm/ Drains, WWTPs 02 [ ] Observed (Date ________) [x] Potential [ ] Alleged
04 Narrative Description:

Potential exists; surface runoff enters City of Buffalo sewers.

01 [ ] P. Illegal/Unauthorized Dumping 02 [x] Observed (Date 5/5/89) [ ] Potential [ ] Alleged
04 Narrative Description:

Results of unauthorized dumping observed (i.e., large debris piles on site).

05 Description of Any Other Known, Potential, or Alleged Hazards

Soil cover inadequate to prevent waste from coming to surface.

III. TOTAL POPULATION POTENTIALLY AFFECTED 36,909 (1-mile radius)

IV. COMMENTS

Site is in a commercial/industrial/residential/recreational area.

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

NYS Phase I report; field notes of E & E; Phase II investigation, including sampling of groundwater, surface soil, subsurface soil, and waste.

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT EPA PART 4 - PERMIT AND DESCRIPTIVE INFORMATION	I. IDENTIFICATION	
	01 State NY	02 Site Number 915033

II. PERMIT INFORMATION

01 Type of Permit Issued (Check all apply)	02 Permit Number	03 Date Issued	04 Expiration Date	05 Comments
[ ] A. NPDES NA				
[ ] 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	04 Treatment (Check all that apply)	05 Other
[ ] A. Surface Impoundment			[ ] A. Incineration	[x] A. Buildings On Site
[ ] B. Piles	Unknown		[ ] B. Underground Injection	Comfort station, apartment building
[ ] C. Drums, Above Ground			[ ] C. Chemical/Physical	
[ ] D. Tank, Above Ground			[ ] D. Biological	
[ ] E. Tank, Below Ground			[ ] E. Waste Oil Processing	
[ ] F. Landfill	Unknown		[ ] F. Solvent Recovery	06 Area of Site
[ ] G. Landfarm			[ ] G. Other Recycling Recovery	
[ ] H. Open dump				
[ ] I. Other ______ (Specify)			[ ] H. Other ______ (specify)	50 Acres

07 Comments
Waste types and quantities disposed of remain unknown. Protruding debris reported and observed on site.

IV. CONTAINMENT

01 Containment of Wastes (Check one)

[ ] A. Adequate, Secure [ ] B. Moderate [x] C. Inadequate, Poor [ ] D. Insecure, Unsound, Dangerous

02 Description of Drums, Diking, Liners, Barriers, etc.
Protruding decayed drum observed by E & E. No known containment structures.

V. ACCESSIBILITY

01 Waste Easily Accessible: [ ] Yes [x] No
02 Comments: Depth of cover unknown.

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

NYS Phase I report; field notes, and sample analyses from Phase II.

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT EPA PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA	I. IDENTIFICATION	
	01 State NY	02 Site Number 915033

II. DRINKING WATER SUPPLY

01 Type of Drinking Supply (Check as applicable)

	Surface	Well
Community	A. [x]	B. [ ]
Non-community	C. [ ]	D. [ ]

02 Status

Endangered	Affected	Monitored
A. [ ]	B. [ ]	C. [x]
D. [ ]	E. [ ]	F. [ ]

03 Distance to Site

A >3 (mi)

B ______ (mi)

III. GROUNDWATER

01 Groundwater Use in Vicinity (Check one)

[ ] A. Only Source for Drinking

[ ] B. Drinking (Other sources available) Commercial, industrial, irrigation (No other water sources available)

[x] C. Commercial, industrial, irrigation (Limited other sources available)

[ ] D. Not Used, Unusable

02 Population Served by Groundwater 0

03 Distance to Nearest Drinking Water Well >3 (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 Unknown
Approx. 35 (ft)	N - NW	Approx. 35 (ft)	144,000 (gpd)	[ ] Yes [x] No

09 Description of Wells (including usage, depth, and location relative to population and buildings)

Three groundwater monitoring wells were installed around the perimeter of the site during July of 1989. Approximate depths are as follows: GW-1 = 65', GW-2 = 65', GW-3 = 62'

10 Recharge Area

[ ] Yes

[x] No

Comments:

11 Discharge Area

[x] Yes

[ ] No

Comments:

IV. SURFACE WATER

01 Surface Water (Check one)

[ ] A. Reservoir, Recreation, Drinking Water Source

[ ] B. Irrigation, Economically Important Resources

[ ] C. Commercial, Industrial

[x] D. Not Currently Used

02 Affected/Potentially Affected Bodies of Water

Name:	Affected	Distance to Site
None. Surface runoff enters City of Buffalo sewers.	[ ]	(mi)
	[ ]	(mi)
	[ ]	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 Total Population Within

One (1) Mile of Site	Two (2) Miles of Site	Three (3) Miles of Site
A. 36,909	B. 119,271	C. 240,157
No. of Persons	No. of Persons	No. of Persons

02 Distance to Nearest Population 0.01 (mi)

03 Number of Buildings Within Two (2) Miles of Site >2,600

04 Distance to Nearest Off-Site Home 0.01 (mi)

05 Population Within Vicinity of Site (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

Densely populated urban area.

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT EPA PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA (Cont.)	I. IDENTIFICATION 01 State: NY 02 Site Number: 915033

VI. ENVIRONMENTAL INFORMATION

01 Permeability of Unsaturated Zone (Check one)

[ ] A. $10^{-6} - 10^{-8}$ cm/sec [ ] B. $10^{-4} - 10^{-6}$ cm/sec [x] 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) [x] C. Relatively Permeable ($10^{-2} - 10^{-4}$ cm/sec) [ ] D. Very Permeable (Greater than 10^{-2} cm/sec)

03 Depth to Bedrock	04 Depth of Contaminated Soil Zone	05 Soil pH
Approx. 7-22 (ft)	0-45 feet	8-9

06 Net Precipitation	07 One Year 24-Hour Rainfall	08 Site Slope	Direction of Site Slope	Terrain Average Slope
9 (in)	2.2 (in)	1 %	West	1 %

09 Flood Potential	10 [ ] Site is on Barrier Island, Coastal High Hazard Area, Riverine Floodway
Site is not in a floodplain	No

11 Distance to Wetlands (5 acre minimum)	12 Distance to Critical Habitat (of endangered species)
ESTUARINE NA OTHER	>1 (mi)
A. >1 (mi) B. >1 (mi)	Endangered Species:

13 Land Use in Vicinity

Distance to:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREA; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AGRICULTURAL LANDS: AG LAND
A. <0.02 (mi)	B. <0.01 (mi)	C. NA (mi)	D. NA (mi)

14 Description of Site in Relation to Surrounding Topography

Site and surrounding area is generally flat with the exception of the unfilled portion of the quarry to the east.

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

Field notes; NYSDEC Phase I Investigation; Phase II Investigation

EPA	POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 6 – SAMPLE AND FIELD INFORMATION	I. IDENTIFICATION 01 State: NY 02 Site Number: 915033

II. SAMPLES TAKEN – No samples taken during S.I.

Sample Type	01 Number of Samples Taken	02 Samples Sent to	03 Estimated Date Results Available
Groundwater	3*	All samples were sent to Ecology and Environment's	1/90
Surface Water	0	Analytical Services Center, 4285 Genesee Street,	
Waste	7*	Buffalo, New York, 14225, except two soil samples,	1/90
Air	0	which were sent to Law Environmental, Inc. of	
Runoff	0	Kennesaw, GA for engineering characteristics.	
Spill	0		
Soil	6* surface/ 2 subsurface		1/90
Vegetation	0		
Other	0	*Plus QA/QC samples	

III. FIELD MEASUREMENTS TAKEN

01 Type	02 Comments
EM31 and Magnetometer	Used to maximize well locations
Ambient air	No readings above background in the breathing zone
Temp/pH/cond/turbidity	Readings taken of groundwater during development and sampling of wells

IV. PHOTOGRAPHS AND MAPS

01 Type	02 In Custody of
[x] Ground 35 mm [ ] Aerial	Ecology and Environment, Inc. (Name of Organization or Individual)

03 Maps	04 Location of Maps
[x] Yes [ ] No	Planimetric and tax maps – Ecology and Environment, Inc.

V. OTHER FIELD DATA COLLECTED (Provide narrative description of sampling activities)

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

Ecology and Environment Engineering, P.C. field notes and files.

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

EPA

PART 7 - OWNER INFORMATION

I. IDENTIFICATION	
01 State NY	02 Site Number 915033

II. CURRENT OWNER(S)			PARENT COMPANY (if applicable)		
01 Name City of Buffalo		02 D+B Number	08 Name		09 D+B Number
03 Street Address (P.O. Box, RFD #, etc.) 201 City Hall		04 SIC Code	10 Street Address (P.O. Box, RFD #, etc.)		11 SIC Code
05 City Buffalo	06 State NY	07 Zip Code 14202	12 City	13 State	14 Zip Code
01 Name		02 D+B Number	08 Name		09 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	10 Street Address (P.O. Box, RFD #, etc.)		11 SIC Code
05 City	06 State	07 Zip Code	12 City	13 State	14 Zip Code
01 Name		02 D+B Number	08 Name		09 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	10 Street Address (P.O. Box, RFD #, etc.)		11 SIC Code
05 City	06 State	07 Zip Code	12 City	13 State	14 Zip Code
01 Name		02 D+B Number	08 Name		09 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	10 Street Address (P.O. Box, RFD #, etc.)		11 SIC Code
05 City	06 State	07 Zip Code	12 City	13 State	14 Zip Code

III. PREVIOUS OWNER(S) (List most recent first)			IV. REALTY OWNER(S) (if applicable, most recent first)		
01 Name Houdaille Industries, Inc.		02 D+B Number	01 Name		02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.) unknown		04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code
05 City	06 State	07 Zip Code	05 City	06 State	07 Zip Code
01 Name Buffalo Crushed Stone Co.		02 D+B Number	01 Name		02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.) unknown		04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code
05 City	06 State	07 Zip Code	05 City	06 State	07 Zip Code
01 Name Buffalo Cement Co.		02 D+B Number	01 Name		02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.) unknown		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)

NYS Phase I report

EPA P O T E N T I A L H A Z A R D O U S W A S T E S I T E S I T E I N S P E C T I O N R E P O R T PART 8 – OPERATOR INFORMATION – NA	I. IDENTIFICATION 01 State NY	02 Site Number 915033

II. CURRENT OPERATOR (if different from Owner)			OPERATOR'S PARENT COMPANY (if applicable)		
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				
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	
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				
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)					

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT EPA PART 9 - GENERATOR/TRANSPORTER INFORMATION	I. IDENTIFICATION 01 State: NY 02 Site Number: 915033

II. ON-SITE GENERATOR - NA

01 Name	02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)	04 SIC Code
05 City	06 State / 07 Zip Code

III. OFF-SITE GENERATOR(S) - NA

01 Name		02 D+B Number	01 Name		02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code
05 City	06 State	07 Zip Code	05 City	06 State	07 Zip Code
01 Name		02 D+B Number	01 Name		02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code
05 City	06 State	07 Zip Code	05 City	06 State	07 Zip Code

IV. TRANSPORTER(S) - NA

01 Name		02 D+B Number	01 Name		02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code
05 City	06 State	07 Zip Code	05 City	06 State	07 Zip Code
01 Name		02 D+B Number	01 Name		02 D+B Number
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code
05 City	06 State	07 Zip Code	05 City	06 State	07 Zip Code

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

EPA	POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 10 - PAST RESPONSE ACTIVITIES	I. IDENTIFICATION 01 State: NY 02 Site Number: 915033

II. PAST RESPONSE ACTIVITIES

01 [ ] A. Water Supply Closed 02 Date ________ 03 Agency ________
04 Description:

01 [ ] B. Temporary Water Supply Provided 02 Date ________ 03 Agency ________
04 Description:

01 [ ] C. Permanent Water Supply Provided 02 Date ________ 03 Agency ________
04 Description:

01 [ ] D. Spilled Material Removed 02 Date ________ 03 Agency ________
04 Description:

01 [ ] E. Contaminated Soil Removed 02 Date ________ 03 Agency ________
04 Description:

01 [ ] F. Waste Repackaged 02 Date ________ 03 Agency ________
04 Description:

01 [ ] G. Waste Disposed Elsewhere 02 Date ________ 03 Agency ________
04 Description:

01 [ ] H. On-Site Burial 02 Date ________ 03 Agency ________
04 Description:

01 [ ] I. In Situ Chemical Treatment 02 Date ________ 03 Agency ________
04 Description:

01 [ ] J. In Situ Biological Treatment 02 Date ________ 03 Agency ________
04 Description:

01 [ ] K. In Situ Physical Treament 02 Date ________ 03 Agency ________
04 Description:

01 [ ] L. Encapsulation 02 Date ________ 03 Agency ________
04 Description:

01 [ ] M. Emergency Waste Treatment 02 Date ________ 03 Agency ________
04 Description:

01 [ ] N. Cutoff Walls 02 Date ________ 03 Agency ________
04 Description:

01 [ ] O. Emergency Diking/Surface Water Diversion 02 Date ________ 03 Agency ________
04 Description:

01 [ ] P. Cutoff Trenches/Sump 02 Date ________ 03 Agency ________
04 Description:

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT EPA PART 10 - PAST RESPONSE ACTIVITIES (Cont.)	I. IDENTIFICATION 01 State: NY 02 Site Number: 915033

II. PAST RESPONSE ACTIVITIES (Cont.)

01 [ ] Q. Subsurface Cutoff Wall 02 Date ________ 03 Agency ________
04 Description:

01 [ ] R. Barrier Walls Constructed 02 Date ________ 03 Agency ________
04 Description:

01 [ ] S. Capping/Covering 02 Date ________ 03 Agency ________
04 Description:

01 [ ] T. Bulk Tankage Repaired 02 Date ________ 03 Agency ________
04 Description:

01 [ ] U. Grout Curtain Constructed 02 Date ________ 03 Agency ________
04 Description:

01 [ ] V. Bottom Sealed 02 Date ________ 03 Agency ________
04 Description:

01 [ ] W. Gas Control 02 Date ________ 03 Agency ________
04 Description:

01 [ ] X. Fire Control 02 Date ________ 03 Agency ________
04 Description:

01 [ ] Y. Leachate Treatment 02 Date ________ 03 Agency ________
04 Description:

01 [ ] Z. Area Evacuated 02 Date ________ 03 Agency ________
04 Description:

01 [ ] 1. Access to Site Restricted 02 Date ________ 03 Agency ________
04 Description:

01 [ ] 2. Population Relocated 02 Date ________ 03 Agency ________
04 Description:

01 [ ] 3. Other Remedial Activities 02 Date ________ 03 Agency ________
04 Description:

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

POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT EPA PART 11 - ENFORCEMENT INFORMATION	I. IDENTIFICATION 01 State: NY 02 Site Number: 915033

II. ENFORCEMENT INFORMATION

01 Past Regulatory/Enforcement Action [ ] Yes [x] No

02 Description of Federal, State, Local Regulatory/Enforcement Action

Note: This report represents not only a one-day site inspection but several day of fieldwork (i.e., geophysics, drilling, and sampling) which took place over a several-month period from 5-89 to 12-89.

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

6

6. REFERENCES

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Appendix

APPENDIX A

SITE-SPECIFIC SAFETY PLAN AND DRILLING SAFETY CHECKLIST

ecology and environment, inc.

S I T E   S A F E T Y   P L A N

Version 988

A. GENERAL INFORMATION

ject Title: LaSalle Reservoir   Project No.: YO1020

TDD/Pan No.:

ject Manager: B. Topor   Project Dir.: P. Farrell

ation(s): Central Park section of Buffalo - East Amherst Street

pared by: C. Eich   Date Prepared: 4-13-89

roval by: Date Approved:

e Safety Officer Review: Date Reviewed:

pe/Objective of Work: Site reconnaissance, geophysical survey, and environmental sampling.

posed Date of Field Activities: May 1989

‹ground Info: Complete: [ ]   Preliminary (No analytical data available) [X]

ımentation/Summary:

Overall Chemical Hazard:	Serious [ ] Low [X]	Moderate [ ] Unknown [X]
Overall Physical Hazard	Serious [ ] Low [X]	Moderate [ ] Unknown [ ]

B. SITE/WASTE CHARACTERISTICS

:e Type(s):

Liquid	[ ]	Solid	[X]	Sludge	[ ]	Gas/Vapor	[ ]

racteristic(s):

Flammable/ Ignitable	[X]	Volatile	[X]	Corrosive	[ ]	Acutely Toxic	[ ]
Explosive	[ ]	Reactive	[ ]	Carcinogen	[ ]	Radioactive*	[ ]

Other:

ical Hazards:

Overhead	[ ]	Confined* Space	[ ]	Below Grade	[ ]	Trip/Fall	[ ]
Puncture	[X]	Burn	[ ]	Cut	[X]	Splash	[ ]
Noise	[ ]	Other: To be determined.					

uires completion of additional form and special approval from the Corporate Health/Safety group. Contact or HQ.

D. SITE SAFETY WORK PLAN

Site Control: Attach map, use back of this page, or sketch of site showing hot zone, contamination reduction, zone, etc.

Perimeter identified? [Y] Site secured? [N]

Work Areas Designated? [N] Zone(s) of Contamination Identified? [N]

Personnel Protection (TLD badges required for all field personnel):

Anticipated Level of Protection (Cross-reference task numbers to Section C):

	A	B	C	D
Task 1				X
Task 2				X
Task 3			(X)	X
Task 4				

(Expand if necessary)

Modifications: Leachate sampling in Level C; may downgrade depending on Hnu readings.

Action Levels for Evacuation of Work Zone Pending Reassessment of Conditions:

- Level D: O_2 <19.5% or >25%, explosive atmosphere >10% LEL, organic vapors above background levels, particulates >_____ mg/m^3, other _______________.
- Level C: O_2 <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapor (in breathing zone) >5 ppm, particulates >_____ mg/m^3, other ___________.
- Level B: O_2 <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapors (in breathing zone) >500 ppm, particulates >_____ mg/m^3, other _____________.
- Level A: O_2 <19.5% or >25%, explosive atmosphere >25% LEL (California-20%), unknown organic vapors >500 ppm, particulates >_____ mg/m^3, other _________.

Air Monitoring (daily calibration unless otherwise noted):

Contaminant of Interest	Type of Sample (area, personal)	Monitoring Equipment	Frequency of Sampling
Volatile organics	Area	Hnu	Continuous
Radiation	Area	Mini-Rad	Continuous
Flammables	Area	Explosimeter	Continuous

(Expand if necessary)

Decontamination Solutions and Procedures for Equipment, Sampling Gear, etc.:

1) Scrub with brushes in trisodium phosphate solution, 2) Rinse with deionized water, 3) 10% Nitric acid rinse, 4) Rinse with hexane, 5) Rinse with acetone, 6) Rinse with deionized water, 7) Air dry.

*NOTE: Decon activities requiring solvent use necessitate wearing APR with GMC-H cartridges, as well as impermeable gloves.

Personnel Decon Protocol: Following disposal of expendables, crew will wash hands/face ASAP; water, pump soap and paper towels to be available at hotline.

Decon Solution Monitoring Procedures, if Applicable: N/A.

Special Site Equipment, Facilities, or Procedures (Sanitary Facilities and Lighting Must Meet 29 CFR 1910.120):

ite Entry Procedures and Special Considerations: Steep slope at southeast end of site leading to retention basin. Sampling of surface water and leachate may require use of waders or lifelines, if leaning out over water is necessary.

ork Limitations (time of day, weather conditions, etc.) and Heat/Cold Stress Requirements:

Daylight, no work during thunderstorms.

neral Spill Control, if applicable: N/A.

vestigation-Derived Material Disposal (i.e., expendables, decon waste, cuttings):

o be determined; solid materials to be double bagged; liquids to be containerized. Written authorization ust be obtained to leave IDMs on-site after to beginning of fieldwork, or provide plans for off-site isposal.

mple Handling Procedures Including Protective Wear:

ibber booties and gloves; Tyvek coveralls, safety shoes, face shield to be worn when sampling liquids. ırgical gloves for handling samples during documentation, labeling, and packing.

Team Member*	Responsibility
be determined.	Team Leader
	Site Safety Officer

entries into exclusion zone require Buddy System use. All E & E field staff participate in medical iitoring program and have completed applicable training per 29 CFR 1910.120. Respiratory protection program ets requirements of 29 CFR 1910.134, and ANSI Z88.2 (1980).

Site History/Description and Unusual Features (see Sampling Plan for detailed description): Former limestone quarry turned municipal landfill for municipal refuse, incinerator ash, construction/demolition debris, paint aste mixed with sawdust refuse from Buffalo Forge.

Locations of Chemicals/Wastes: Buried wastes; site now occupied by apartment complex and playground. Leachate was observed along a retaining wall.

Estimated Volume of Chemicals/Wastes:

Site Currently in Operation Yes: [ ] No: [X]

C. HAZARD EVALUATION

List Hazards by Task (i.e., drum sampling, drilling, etc.) and number them. (Task numbers are cross-referenced in Section D)

Physical Hazard Evaluation: 1) Site reconnaissance, 2) Geophysical survey, 3) Environmental sampling - surface soil, surface water, leachate.

Chemical Hazard Evaluation:

Compound	PEL/TWA	Route of Exposure	Acute Symptoms	Odor Threshold	Odor Description
Lead	0.05 mg/m cu	Inhalation, oral	Lassitude, pallor, loss of appetite	--	--
Benzene	10 ppm	Inhalalation	Dizziness, eye, nose and throat irritation	4-12 ppm	Gasoline
Toluene	100 ppm	Inhalation, dermal	Fatigue, nausea, dizziness	2-3 ppm	Benzene-like
Xylene	100 ppm	Inhalalation	Dizziness, irri-tion to eyes and respiratory system	0.5 ppm	Aromatic
Chromium	0.1 mg/m cu	Inhalation, dermal, oral	Dizziness, vom-iting, skin and irritation	--	--
Vinyl chloride	1 ppm	Inhalation, oral	CNS depression, nausea, skin irritation	3,000 ppm	Odorless gas

te: Complete and attach a Hazard Evaluation Sheet for major known contaminant.

E. EMERGENCY INFORMATION

(Use supplemental sheets, if necessary)

LOCAL RESOURCES

(Obtain a local telephone book from your hotel, if possible)

Ambulance Dial 911

Hospital Emergency Room St. Francis Hospital, 2787 Main Street, Buffalo, NY (716) 837-4200

Poison Control Center (716) 878-7654

Police (include local, county sheriff, state) Erie County Sheriffs Department, Phone 662-5554 or (dial 911)

Fire Department Dial 911 or (716) 856-6600

Airport Buffalo Airport, Genesee Street, Cheektowaga, NY

Agency Contact (EPA, State, Local USCG, etc.) ______

Local Laboratory E & E ASC

UPS/Fed. Express ______

Client/EPA Contact ______

Site Contact ______

SITE RESOURCES

Site Emergency Evacuation Alarm Method ______

Water Supply Source ______

Telephone Location, Number ______

Cellular Phone, if available ______

Radio ______

Other ______

EMERGENCY CONTACTS

. Dr. Raymond Harbison (Univ. of Florida) .... (501) 221-0465 or (904) 462-3277, 3281
Alachua, Florida (501) 370-8263 (24 hours)

. Ecology and Environment, Inc., Safety Director
Paul Jonmaire .... (716) 684-8060 (office)
(716) 655-1260 (home)

. Regional Office Contact .... ______ (home)
______ (office)

. FITOM, TATOM, or Office Manager .... ______ (home)

MEDTOX HOTLINE

1. Twenty-four hour answering service: (501) 370-8263

   What to report:

   - State: "this is an emergency."
   - Your name, region, and site.
   - Telephone number to reach you.
   - Your location.
   - Name of person injured or exposed.
   - Nature of emergency.
   - Action taken.

2. A toxicologist, (Drs. Raymond Harbison or associate) will contact you. Repeat the information given to the answering service.

3. If a toxicologist does not return your call within 15 minutes, call the following persons in order until contact is made:

   a. **24 hour hotline - (716) 684-8940**
   b. Corporate Safety Director - Paul Jonmaire - home # (716) 655-1260
   c. Assistant Corp. Safety Officer - Steven Sherman - home # (716) 688-0084

EMERGENCY ROUTES

(NOTE: Field Team must Know Route(s) Prior to Start of Work)

Directions to hospital (include map) LaSalle Street west to Main Street, left on Main, approximately 4 blocks St. Francis Hospital, at 2787 Main Street.

Emergency Egress Routes to Get Off-Site To be determined and discussed at on-site safety meeting.

ecology and environment, inc.

HAZARD EVALUATION OF CHEMICALS

Chemical Name XYLENE Date 4-13-89

DOT Name/U.N. No. 1307 Job No. Y01000

CAS Number

References Consulted (circle):

NIOSH/OSHA Pocket Guide Verschueren Merck Index Hazardline Chris (Vol. II)

Toxic and Hazardous Safety Manual ACGIH Other:

Chemical Properties: (Synonyms: DIMETHYLBENZENE, XYLOL)

Chemical Formula C_8H_{10} Molecular Weight 106

Physical State COLORLESS LIQUID Solubility (H_2O) 0.00003% Boiling Point 292°F

Flash Point 77°F Vapor Pressure/Density 3.7 Freezing Point -12°F

Specific Gravity 0.86 Odor/Odor Threshold 0.5 ppm Flammable Limits 1.0% - 7.0%

Incompatabilities STRONG OXIDIZERS, STRONG ACID, HEAT, PEROXIDE

Biological Properties:

TLV-TWA 100 ppm PEL Odor Characteristic AROMATIC

IDLH 10,000 ppm Human iHL TCLO - 200 ppm Aquatic Rat/Mouse IHL LC50 · 5000 ppm/4 HR

Route of Exposure INHALE, SKIN

Carcinogen EXPERIMENTAL Teratogen Mutagen

Handling Recommendations: (Personal protective measures)

IMPERVIOUS CLOTHING, PVC ~~Viton~~ GLOVES, FACESHIELD, AVOID PROLONGED CONTACT. RESPIRATOR W/ ORGANIC VAPOR CARTRIDGE UP TO 5000 ppm, >10,000 ppm USE SCBA

Monitoring Recommendations:

Disposal/Waste Treatment:

OSHA STANDARD 29 CFR 1910.106 APPLIES

Health Hazards and First Aid:

SKIN - WASH W/ SOAP + WATER; EYES - FLUSH W/ WATER; REMOVE TO FRESH AIR IF OVERCOME

Symptoms: Acute: EYE + MUCOUS MEMBRANE IRRITANT, CNS DEPRESSANT. INGESTION CAUSES GASTROINTESTINAL UPSET.

Chronic: MORE SEVERE THAN ABOVE, HYPERPLASIA OF BONE MARROW;

375103
(12/83,OLD)

HAZARD EVALUATION OF CHEMICALS

Chemical Name TOLUENE Date 4-13-89
DOT Name/U.N. No. 1294 Job No. Y01000
CAS Number

References Consulted (circle):
NIOSH/OSHA Pocket Guide Verschueren Merck Index Hazardline Chris (Vol. II)
Toxic and Hazardous Safety Manual ACGIH Other:

Chemical Properties: (Synonyms: METHYL BENZENE, TOLUOL)
Chemical Formula C_7H_8 Molecular Weight 92
Physical State COLORLESS LIQUID Solubility (H_2O) 0.05g/100g H_2O Boiling Point 231° F
Flash Point 40°F Vapor Pressure/Density 3.2 Freezing Point -139°F
Specific Gravity 0.8669 Odor/Odor Threshold 2ppm - BENZENE LIKE ODOR Flammable Limits 1.3% - 7.1%
Incompatabilities STRONG OXIDIZERS, HNO_3, H_2SO_4, O_2, PEROXIDES, HEAT

Biological Properties:
TLV-TWA 200ppm (300 ppm (CEILING) PEL Odor Characteristic BENZENE-LIKE
IDLH 2000 ppm Human IHL TCLO - 200 ppm Aquatic Rat/Mouse
Route of Exposure INHALATION, SKIN
Carcinogen EXPERIMENTAL Teratogen Mutagen

Handling Recommendations: (Personal protective measures)
IMPERVIOUS CLOTHING, VITON GLOVES, FACESHIELD, RESPIRATOR
W/ ORGANIC VAPOR CARTRIDGE UP TO 1000 ppm, >1000 ppm
USE SCBA

Monitoring Recommendations:

Disposal/Waste Treatment:

Health Hazards and First Aid:
FLUSH AREA WITH WATER + WASH WITH SOAP; MOVE TO FRESH
AIR IF BREATHED; IF SWALLOWED, DO NOT INDUCE VOMITTING

Symptoms: Acute: CNS DEPRESSION, FATIGUE, NAUSEA

Chronic: BONE MARROW DEPRESSION, DEFATTING OF SKIN,
DERMATITIS

Hazard Evaluation of Chemicals
Region V - Chicago

ical Name Benzene Date

.assification Job Number

Number 71-43-2

RENCES CONSULTED (circle; also include MSDS if approprate.)
I/OSHA Pocket Guide Merck Index Hazardline Chris(vol.III)
I TLV Booklet Toxic & Hazardous Safety Manual SAX Aldrich
other:

ICAL PROPERTIES: (Synonyms: benzol, benzole, cyclohexatriene)
cal Formula C_6H_6 MW 78 Ionization Potential 9.245ev
.cal State liquid Boiling Point 176° F Freezing Point 42° F
ı Point 12° F Flammable Limits 1.3-7.1% Vapor Pressure 75mm
.fic Gravity/Density 0.879 Odor/Odor Threshold 4.68 ppm
ility-water: slightly Solubility-other:
ıpatabilities & Reactivity: strong oxidizers, chlorine, bromine

IOLOGICAL PROPERTIES:
ıure Limits: TLV-TWA (ACGIH) 10 ppm PEL (OSHA) 10 ppm
L none Ceiling Limits >25<50ppm/10min IDLH 2000 ppm
ity Data: (Indicate duration of study)
an; IHL Tclo 100/CNS Dermal Oral Tdlo 130mg/kg:CNS
./Mouse; IHL Tclo 50/24H Dermal Oral LD50 3800mg/kg
atic: Tlm96:100-10ppm Other: IHL:Man TC 2100mg/m3/4Y; carc.
inogen human-sus Mutagen exper. Reproductive Toxin exper.
(s) of exposure - (circle all that apply): Inhalation Ingestion
l Contact Eye(ocular) Dermal Absorption Other

ING RECOMMENDATIONS: (personal protective measures)
rators: 10 ppm use SCBA
ctive Clothing: excel-viton; good-neoprene, saranax; poor-butyl, natural
r for gloves. Avoid skin/eye contact.
al Equipment: none

SAL, FIRE and SPILLS: (Use numbered codes; see attached sheets for explanation.)
sal D Fire 6,7 Leaks&Spills 3,4,5,6,9
position Products: toxic fumes of carbon dioxide, carbon monoxide

AID:
Do not induce vomiting, give water or milk, medical attent. immed.
Remove to fresh air, give artificial resp. if needed, medical attent.
kin: Flush with water, rinse/wash skin with soap & water thoroughly.

OMS:
(immediate) exposure effects: skin irritant, CNS depressant, mostly
nitial excitation followed by headache, dizziness, vomiting, delirium,
exposure may see tremors, blurred vision, shallow resp., convulsions.

ic(long term) exposure effects: anorexia, drowsiness, anemia, bleeding
skin, reduced blood clotting; liver, kidney, bone marrow damage, leukemia.

luctive effects: None reported in humans.

recycled paper

ecology and environment, inc.

HAZARD EVALUATION OF CHEMICALS

Chemical Name VINYL CHLORIDE Date 4-13-87
DOT Name/U.N. No. 1086 Job No. Y01000
CAS Number

References Consulted (circle):
NIOSH/OSHA Pocket Guide Verschueren Merck Index Hazardline Chris (Vol. II)
Toxic and Hazardous Safety Manual ACGIH Other:

Chemical Properties: (Synonyms: CHLOROETHYLENE, VC, CHLOROETHENE)
Chemical Formula C_2H_3Cl Molecular Weight 62.5
Physical State COLORLESS GAS Solubility (H_2O) NEGLIGIBLE Boiling Point 7°F
Flash Point -108°F Vapor Pressure/Density 2580 mm Freezing Point -245°F
Specific Gravity 0.9121 Odor/Odor Threshold 4100 ppm Flammable Limits 3.6% - 33%
Incompatabilities STRONG OXIDIZERS, STRONG BASES, ALUMINUM POWDER, COPPER, PEROXIDES

Biological Properties:
TLV-TWA 1 ppm PEL Odor Characteristic ODORLESS GAS ETHEREAL ODOR (LIQUID
IDLH 500 ppm Human Aquatic Rat/Mouse ORL.LD50 - 500 ppm
Route of Exposure
Carcinogen HUMAN Teratogen Mutagen SUSPECT

Handling Recommendations: (Personal protective measures)
WASH IMMEDIATELY UPON CONTACT w/ SKIN. IMPERVIOUS CLOTHING, GLOVES, FACESHIELD. 10 ppm - APR w/ ORGANIC CARTRIDGE 25 ppm PAPR 100 ppm - SCBA ~~- MOVE TO FRESH AIR IF OVERCOME, INDUCE~~

Monitoring Recommendations:

Disposal/Waste Treatment:

Health Hazards and First Aid:
WASH SKIN, EYES IMMEDIATELY IF CONTAMINATED. MOVE TO FRESH AIR IF LARGE AMOUNTS ARE BREATHED IN. INDUCE VOMITTING IF SWALLOWED

Symptoms: Acute: GIDDINESS, INTOXICATION, NAUSEA, LIGHTHEADEDNESS CNS DEPRESSION
Chronic: LIVER DAMAGE, CNS DEPRESSION, REPRODUCTIVE EFFECTS

375103

(12/83,DLD)

Hazard Evaluation of Chemicals
Region V - Chicago

emical Name Lead Date

Classification Job Number

S Number 7439-92-1

ENCES CONSULTED (circle; also include MSDS if appropriate.)
OSHA Pocket Guide Merck Index Hazardline Chris(vol.III)
TLV Booklet Toxic & Hazardous Safety Manual SAX Aldrich
) other: Sittig

CAL PROPERTIES:(Synonyms:White lead, plumbum)
cal Formula Pb MW 207 Ionization Potential N/A
cal State Variable Boiling Point 3164° F Freezing Point
Point Incombust. Flammable Limits Incombus Vapor Pressure variable
fic Gravity/Density 11.3 @61° F Odor/ Odor Threshold None
lity-water: Insoluble Solubility-other:
patabilities & Reactivity: Strong oxidizers,perioxides,active metals

OLOGICAL PROPERTIES:
ure Limits: TLV-TWA (ACGIH) .15 mg/m^3 PEL (OSHA) 50ug/m^3
, None est. Ceiling Limits None est. IDLH Variable
ity Data: (Indicate duration of study)
an; IHL Dermal Oral Td10 450mg/kg/6Y
/Mouse;IHL Dermal Oral Tdlo 790mg/kg
tic: Unknown Other: Toxicity varies with lead cpds.
nogen Indef. Mutagen Indef Reproductive Toxin exp.teratogen
(s) of exposure - (circle all that apply): Inhalation Ingestion
Contact Eye(ocular) Dermal Absorption Other

ING RECOMMENDATIONS: (personal protective measures)
rators: 5mg/m3 high efficiency particulate respirator, other
concentrations - SCBA.
ctive Clothing: Avoid skin and eye contact
al Equipment: None

SAL,FIRE and SPILLS:(Use numbered codes;see attached sheets for explanation.)
sal P Fire 13 Leaks&Spills 7,8,10
position Products: Toxic fumes of lead

AID:
Give water, induce vomiting, medical attention immed.
Move to fresh air, artifical resp. if necessary, medical attent.
kin: Irrigate/wash with water. Wash skin thoroughly with soap & water.

OMS:
immediate) exposure effects: Cumulative neurotoxin-commonly occurs
prolonged exposure.Symptoms include stomach distress,vomiting,
ea,black stools, anemia, nervous system effects.
c(long term) exposure effects: 3 clinical types:a-ailmentary-abominal
discomfort,constipation or diarrhea,metallic taste,lead line on gum
che. b-nueromuscular, muscle weakness,joint/muscle pain,dizziness,
nia,paralysis c-encephalic:brain involvement,stupor,coma,death,rare.
luctive effects: Human epid. studies have concluded that lead is a
to male & female germ cells;increased incidence of miscarriages,
births, sterility in females;sperm depression & decreased motiltiy in

Chemical Name Chromium (metal) Date

Γ Classification Job Number

CAS Number 7440-47-3

REFERENCES CONSULTED (circle; also include MSDS if approprate.)
NIOSH/OSHA Pocket Guide Merck Index Hazardline Chris(vol.III)
ACGIH TLV Booklet Toxic & Hazardous Safety Manual SAX Aldrich
RTECS other: Sittig

CHEMICAL PROPERTIES: (Synonyms: Chromiun metal, insoluble salts)
Chemical Formula Cr MW 52 Ionization Potential N/A
Physical State variable Boiling Point 4842° F Freezing Point 3339° F
Flash Point variable Flammable Limits LEL-.23% Vapor Pressure variable
Specific Gravity/Density 7.2@82° F Odor/Odor Threshold none

Solubility-water: Insoluble Solubility-other:
Incompatabilities & Reactivity: strong oxiders, powdered metal is explosive

TOXICOLOGICAL PROPERTIES:
Exposure Limits: TLV-TWA (ACGIH) 0.5 mg/m³ PEL (OSHA) 1.0 mg/m³
STEL none est. Ceiling Limits none est. IDLH 500 mg/m³
Toxicity Data: (Indicate duration of study)
Human; IHL Dermal Oral
Rat/Mouse; IHL Dermal Oral
Aquatic: Other:
Carcinogen N/A Mutagen N/A Reproductive Toxin N/A
Route(s) of exposure - (circle all that apply): Inhalation Ingestion
Dermal Contact Eye(ocular) Dermal Absorption Other

HANDLING RECOMMENDATIONS: (personal protective measures)
Respirators: 5 mg/m³ - SCBA
Protective Clothing: Prevent skin/eye contact.
Special Equipment: Wear impervious clothing.

DISPOSAL, FIRE and SPILLS: (Use numbered codes; see attached sheets for explanation.)
Disposal P,O Fire 13 Leaks&Spills 3,4,6,7,8,9
Decomposition Products:

FIRST AID:
ING: Large amounts of water, induce vomiting, medical attent. immed.
IHL: Move to fresh air, artificial resp. if necessary, medical atten.
Eye/Skin: Irrigate/rinse with large amounts of water. Wash skin thoroughly with soap & water.

SYMPTOMS:
acute(immediate) exposure effects: Contact dermatitis, ulceration of skin & nasal mucosa, irritation of eyes & mucous membranes.

chronic(long term) exposure effects: Not often encountered with the 3+ state since chromium compounds in this state are of a lower order toxicity.

reproductive effects: None specified for humans.

AMENDMENT FOR
LASALLE SITE
SITE-SPECIFIC SAFETY PLAN
Y01020

PROPOSED SITE ACTIVITIES:

Preliminary surface soil, surface water and leachate sampling will be conducted. Sampling will include the collection of six (6) surface soil samples from the playground area as well as two (2) surface water/sediment samples and three (3) seepage samples from the storm water detention basin.

DATE OF PROPOSED ACTIVITIES: May 5, 1989

PERSONNEL ON SITE:

Name:	Position:
Barb Topor	Team Leader
Chad Eich	Site Safety Coordinator
Don Johnson	Sampler

LEVEL(S) OF PROTECTION:

Initial site entry will be made in Level D. Soil sampling to be conducted in Level D. The storm water detention basin will be entered in Level C with a possible downgrade to Level D depending on HNu readings.

INSTRUMENTATION REQUIRED:

HNU with 10.2 eV Lamp
Mini-Rad
O_2/Explosimeter

AREAS OF CONCERN:

There is a steep slope at the southeast end of the site which will be avoided if possible. Hard hats will be worn while inside the storm water detention basin. Sampling of seepage, surface water and sediments may require use of waders or lifelines if leaning out over water is necessary.

Preparer:____________________ **Date:**________
Health and Safety Reviewer: Sherman Ozo **Date:** 4 MAY 89

AMENDMENT FOR
LASALLE RESERVOIR SITE
SITE-SPECIFIC SAFETY PLAN
Y01040

PROPOSED SITE ACTIVITIES:

Installation of three (3) boreholes and groundwater monitoring wells with a drilling rig. Work to include:

- o Split-spoon sampling of soil during borehole establishment; and
- o Development of the monitoring wells.

DATE OF PROPOSED ACTIVITIES: 7/14 - 7/21/89.

PERSONNEL ON SITE:

Name:	Position:
Barbara Topor	Team Leader
Jim Richert	Site Safety Coordinator
Rocky Baye	Driller/Supervisor
John Pietruch	Driller
Kevin Welnol	Driller
Various NYSDEC Representatives	Oversight

LEVEL(S) OF PROTECTION:

Based on previous site surveys, drilling will begin in Level D protection with the ability to upgrade to Level C based on continuous air monitoring at boring locations.

INSTRUMENTATION REQUIRED:

HNU with 11.7 eV Lamp
Combustible Gas Indicator (explosimeter)
Mini Rad

AREAS OF CONCERN:

All field team members will be familiar with the route to nearest hospital before drilling begins. All will be briefed on planned drilling operations and possible problems before work commences. All will be shown the location and operation of "kill switches". These switches will be operationally checked each morning.

Only approved drillers will remain in proximity to the borehole drilling.

Preparer: James D. Snyder **Date:** 7/12/89
Health and Safety Reviewer: [illegible] H/S **Date:** 12 July 89

DRILLING SITE SAFETY CHECKLIST

- o All E&E drilling personnel will have read and understood the terms of E&E drilling SOP.
- o Daily inspection of rig and components - obvious or questionable safety conditions will be cause for work interruption.
- o Only approved drillers will remain in proximity to borehole during drilling and in any event, an approximate 4' x 8' super exclusion area will be in place around moving auger. No personnel will enter this zone while drilling is ongoing.
- o Continuous O_2/explosimeter monitoring at borehole using remote sampling hose.
- o All field team members will be briefed on planned drilling operations and possible problems before work commences on day one. All will be shown location and operation of "kill switches". These switches will be operationally checked each morning.
- o Fire extinguisher(s) will be staged next to rig before drilling/refueling operations.
- o Welding/cutting activities will only be performed at a distance from ignition sources approved as safe by the Site Safety Officer (SSO), Team Leader.
- o Appropriate personnel protective equipment (based on hazards associated with assumed well contaminants) will be worn as directed by the SSO and terms of the site safety plan. As a minimum, steel-toed boots, hard-hats, and face shields will be worn during any active drilling.
- o Outrigger stabilizers must be in place before drilling commences. The rig must also be leveled.
- o Drill rig boom must be horizontal during movement of rig. It will not be erected within 25 feet of overhead lines.
- o Electrical storms within earshot of the job site will be cause for work termination until deemed safe by the SSO and Team Leader.
- o Where underground utilities are suspected in a vacinity of operations, the local utilities shall be contacted. Where utilities are identified, they shall be marked using flags.
- o Where buried drums, etc. are suspected, a full survey of drilling zone is required using appropriate instrumentation prior to ground breaking.

DRILLING SITE SAFETY CHECKLIST continued:

- o Only trained, experienced staff will operate the cathead. Personnel must be knowledgeable in safe good practive procedures for cathead use.
- o Only properly licensed staff will drive the drill rig. A daily safety check of the vehicle will be carried out by the driver, per E&E protocol.
- o Climbing on vertical boom is not permitted by E&E staff.

ecology and environment, inc.

EXISTING SITE SAFETY PLAN ADDENDUM FORM

Site Name: LASALLE RESERVOUR

TDD/Pan/Project Number: YO-1040

Date of original SSP: 4-13-89

Date of amendment: 8-1-89

Date of proposed new work: 8-2-89

Added activities and hazard evaluations: PLAN TO PICK UP (3) 55 GALLON STEEL DRUMS FULL OF DRILLING WATER AND SOIL, AND DELIVER TO A SECURE SITE ≈ 5 MILES AWAY AND OVERPACK THE DRUMS USING A RENTED BOBCAT - BUCKET LIFTER AND A UTILITY STRAP. TRANSPORT WILL BE VIA A RENTED 18' RYDER TRUCK* WITH A POWER LIFT GATE. WASTE IS NOT YET ANALYSED & IS CLASSIFIED AS OTHER REGULATED SUBSTANCES

Added monitoring activities: NONE ANTICIPATED. ONLY TRAINED personnel will operate the "BOBCAT", AND appropriate action will be taken to avoid tipping during drum lifting.

Level of protection: ___ A ___ B ___ C X D

Reason for up/downgrading: WILL ~~WERE~~ HARDHATS, steel toed boots

E: and protective cotton or lether gloves. NO ANTICIPATED UPGRADING OR DOWNGRADING. THIS ASSUMES THAT DRUM LIDS ARE SECURE AND NO LEAKAGE IS OBSERVED. LEAKERS WILL REQ PPE + DECON.

Decon: WASH FACE AND HANDS AFTER WORK IS COMPLETED

Team Members	Responsibility
TIM RICHERT	FIELD TEAM LEADER
SCOTT McCONE	SITE SAFETY OFFICER
DON JOHNSON	TEAM MEMBER
HAD EICH	TEAM MEMBER

Equipment	Quantity	Equipment	Quantity
BOBCAT FOR LIFTING	1		
10' UTILITY STRAP	1		
LABELS	6		
PAINT + MARKER	1 EACH		

TERMS OF THE ORIGINAL SSP SHALL BE IN EFFECT EXCEPT AS NOTED ON THIS FORM.

Prepared by: James J. Richert Date: 8-1-89

Approved by: [signature] Coop HQS group Date: 1 AUG 89

INSTRUCTIONS: This form to be approved through normal channels and attached to original plan.

Form SSP-A

* Ryder truck to be placarded per any applicable DOT regs.

APPENDIX B

GEOPHYSICAL SURVEY

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PHASE II INVESTIGATIONS

GEOPHYSICAL SURVEY

LASALLE RESERVOIR
SITE NUMBER 915033
CITY OF BUFFALO, ERIE COUNTY

July 1989

Prepared for:

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233
Thomas C. Jorling, Commissioner

Division of Hazardous Waste Remediation
Michael J. O'Toole, Jr., P.E., Director

Prepared by:

Ecology and Environment Engineering, P.C.

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1. INTRODUCTION

This geophysical investigation report for the LaSalle Reservoir site (I.D. No. 915033) on East Amherst Street in Buffalo, New York, was prepared by Ecology and Environment Engineering, P.C. (E & E), under contract to the New York State Department of Environmental Conservation (NYSDEC). The geophysical investigation consisted of an EM31 (electromagnetic terrain conductivity) survey and a portable proton magnetometer (total earth field magnetics) survey. This report includes field data (Appendix A) and contour maps (Appendix B) for the geophysical survey performed at this site on June 19, 30, and July 5, 1989, as part of the Phase II Investigation. Additionally, interpretations of the data generated, along with conclusions, are provided in this report.

2. OBJECTIVES

The geophysical survey program at the LaSalle Reservoir site was designed to achieve several general goals. The main objectives of the geophysical methods used were to optimize the locations of the three proposed on-site groundwater monitoring wells; reduce the risks associated with drilling into unknown terrain and wastes; reduce overall project time and cost; improve the accuracy and confidence of the investigation; identify the boundary of the old quarry; identify the existence and boundaries of buried waste or groundwater contamination plumes; and to determine vertical and horizontal anomalies.

3. METHODS

The field work was conducted in two phases. During the first phase, three survey grids (1, 2, and 3) were initially set up at each of the prospective monitoring well locations. During the second phase, three additional grids (1A, 2A, and 3A) were set up in the same manner. The X and Y axes of each survey grid were oriented approximately east-west and north-south, respectively. Precise compass orientations were then obtained for each of the survey grid axes and survey lines. Survey grid coordinate 0,0 is located in the southwest corner of each contour map. Semi-permanent wooden stakes mark the proposed well locations for reference during drilling.

The dimension, station spacing, and orientation of each survey grid and survey line varied due to physical restrictions at each proposed site (i.e., dense vegetation, railroad tracks, power lines, fences, etc.). Both horizontal and vertical dipole readings in north-south/east-west orientations were recorded at each survey grid node while performing the electromagnetic ground conductivity survey using the Geonics, Ltd., EM31 Ground Conductivity Meter. The effective depths of penetration provided by the EM31 in the vertical and horizontal dipole modes is $\leq$18 feet and $\leq$9 feet, respectively. These depths were considered adequate to delineate any buried materials which may be encountered while drilling. Magnetic readings were recorded at each node in both north-south/east-west orientations using the EG+G Unimag II (Model G-846) Portable Proton Magnetometer.

All geophysical field data was recorded in a log book dedicated to this site investigation. Magnetometer data were reduced by averaging station readings for north-south and east-west orientations and correcting these values for diurnal variation based on background station readings. EM31 conductivity data were averaged for north-south and east-west orientations for both vertical and horizontal dipole positions. The reduced geophysical data were then plotted and contoured for each survey (see Appendix A and B).

The fieldwork was performed in two phases. Phase I involved completion of the fieldwork for grids 1, 2, and 3 and the acquisition of historical aerial photographs of the LaSalle Reservoir vicinity (see Figure 3-1).

Phase II included the identification of three new well locations within survey grids 1A, 2A, and 3A. These new well locations were selected and surveyed in order to ensure the placement of the groundwater monitoring wells outside the fill area.

Fig. 3-1 1927 Aerial Photograph of the LaSalle Reservoir Site.

Dashed line defines areal extent of former quarry at LaSalle Reservoir site.

Source:
ERIE COUNTY NEW YORK
OFFICE OF THE COUNTY ENGINEER
GREATER MOTORWAY SYSTE
JUNE 1ST 1927
SCALE

4. DATA INTERPRETATION

The purpose of interpreting the results of the magnetometer and EM31 surveys is to provide a probable explanation for anomalous geophysical contours. The presence of buried utilities, metal objects, wastes, and contaminant plumes is often manifest as relatively elevated or decreased station readings and gradient values. The following interpretations are based on the contour maps (see Appendix B) generated from magnetometer and EM31 data which are listed in Appendix A. Survey grids 1A, 2A, and 3A encompass each of the three groundwater monitoring well locations as proposed by NYSDEC in the Phase II Investigation Work Plan for the LaSalle Reservoir site. Grids 1, 2, and 3 encompass each of the initial well locations which should not be used for well placement based upon results and the 1927 aerial photograph (see Figure 4-1).

The following discussion provides details of each of the three survey Grids that will beused for well placement:

Survey Grid Area No. 1A

A review of magnetometer data contours at the No. 1A grid location indicates that this 1,600-square-foot survey area contains a geomagnetic anomaly in the eastern portion of the grid. This apparent anomalous area was probably caused by utility lines trending north-south across the survey grid. The risk of drilling into any shallow ferrous material within this survey area is expected to be minimal if the eastern portion is avoided.

Electromagnetic conductivity values measured with the EM31 ranged from 5.3 to 26.9 millimhos/meter in both vertical and horizontal dipole modes, along with negative values in the vertical dipole mode. Negative

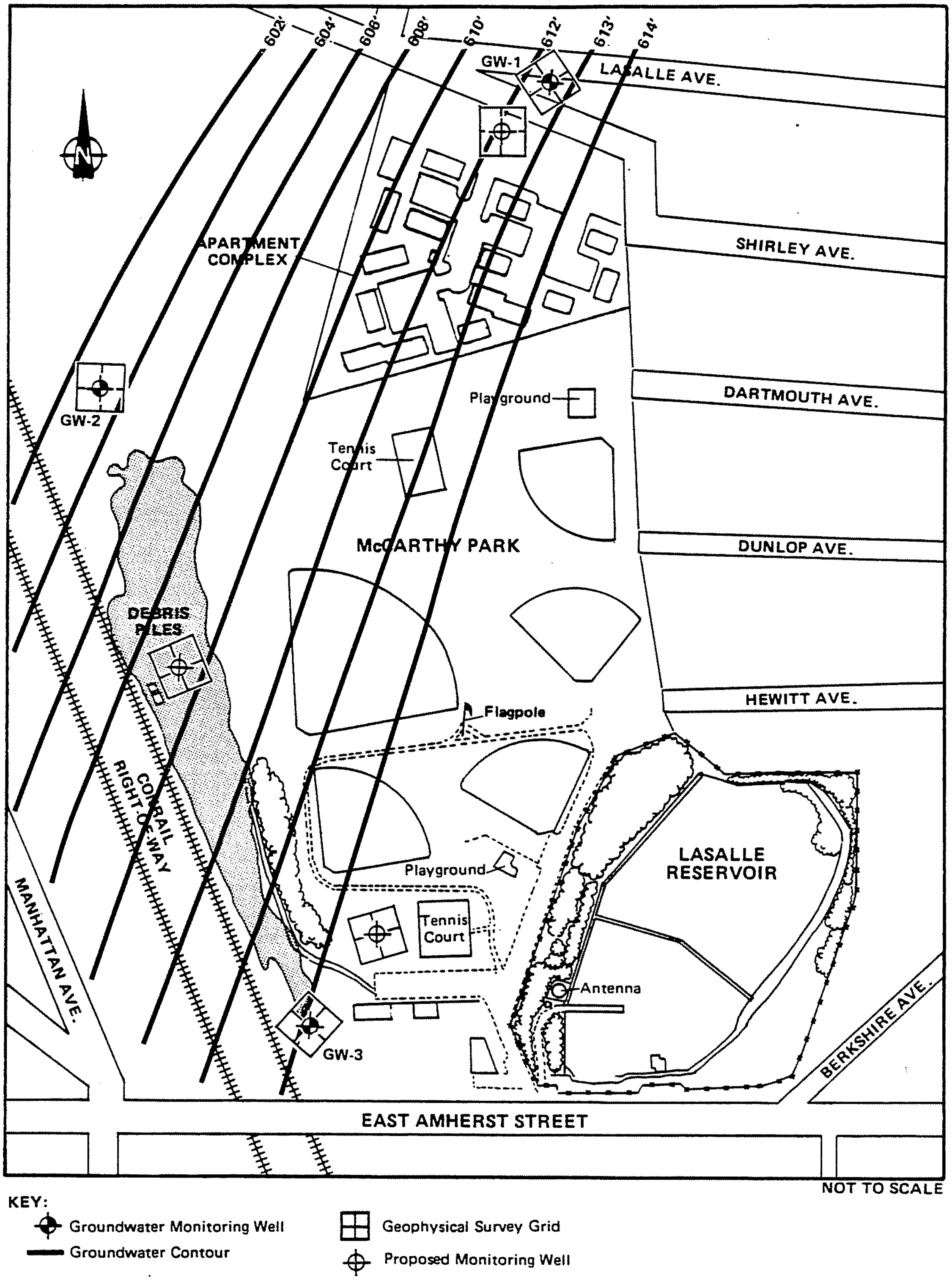


Figure 4—1
MONITORING WELL LOCATIONS, GEOPHYSICAL SURVEY GRIDS, AND GROUNDWATER CONTOURS AT LASALLE RESERVOIR

meter readings indicate very high conductivity beyond the measuring capabilities of the instrument. These high values indicate the presence of near-surface metal objects (probably utility lines) trending east-west outside the northern and southern borders of the survey grid and trending north-south along grid coordinates 30,40 to 30,0.

The installation of the proposed monitoring well GW-1 at the location indicated on the contour map is suitable. The well location may also be moved to the southwest within the survey grid, avoiding the northern and southern borders and the area east of grid coordinates 20,40 to 20,0.

Survey Grid Area No. 2A

A review of magnetometer data contours at the No. 2A grid location indicates that this 1,600-square-foot survey area contains geomagnetic anomalies in the southwest and southeast portions of the survey grid. These anomalies may be due to the presence of scattered metallic objects on the ground surface. The risk of drilling into shallow ferrous material within this grid area is expected to be minimal.

Electromagnetic conductivity values measured with the EM31 were generally low, ranging from 2.6 to 5.4 millimhos/meter, along with some negative values in the vertical and horizontal dipole modes. Negative conductivity readings indicate very high conductivity beyond the measuring capabilities of the instrument. The high values at grid coordinates 20,40; 20,30; and 30,40 indicate the presence of near-surface metal debris. The low and consistent values in both vertical and horizontal dipole modes indicates the presence of bedrock at a shallow depth ($\lesssim$9 feet).

The installation of the proposed monitoring well GW-2 at the location indicated on the contour map is suitable. The well location may also be moved to any other area within the survey grid, avoiding grid coordinates 20,40; 20,30; and 30,40, if necessary to facilitate rig access. The area appears to be covered with a veneer of demolition debris, and depth to bedrock will be shallow.

Survey Grid Area No. 3A

A review of magnetometer data contours at the No. 3A grid location indicates that this 1,600-square-foot survey area contains one geomagnetic anomaly. This anomalous area in the northeast corner of the survey grid is probably due to the effects of a building adjacent to the north corner of the survey grid. The risk of drilling into any shallow ferrous material within this grid area is expected to be minimal.

Low electromagnetic conductivity values measured with the EM31 (3.7 to 10.8 millimhos/meter) were observed in both vertical and horizontal dipole modes. These low values indicate the absence of near-surface metal debris and/or contamination.

The installation of the proposed monitoring well GW-3 at the location indicated on the contour map is suitable. The location may also be moved to any area within the survey grid if required to facilitate rig access.

The following discussion provides details of each of the three survey grids that will not be used for well placement:

Survey Grid Area No. 1

A review of magnetometer data contours at the no. 1 grid location indicates that this 1,600-square-foot survey area contains two geomagnetic anomalies. These apparent anomalous areas were probably caused by interference from power lines to the northeast and apartment buildings to the northwest. The risk of drilling into any shallow ferrous material within this survey area is expected to be minimal.

In general, low electromagnetic conductivity values measured with the EM31 (6.5 to 25.0 millimhos/meter) were observed in both vertical and horizontal dipole modes. These low values indicate the absence of near-surface metal debris and/or contamination. Higher values were observed along the northern border of the survey grid. These values are the result of interference caused by power lines to the northeast and apartment buildings to the northwest.

The installation of the proposed monitoring well GW-1 at the location indicated on the contour map is unsuitable. Based upon the aerial photographs (see Figure 3-1), the location of this survey grid appears to be over the former quarry. Therefore, the groundwater monitoring well should not be installed in this area.

Survey Grid Area No. 2

A review of magnetometer data contours at the No. 2 grid location indicates that this 1,600-square-foot survey area contains several large geomagnetic anomalies across the entire survey area. These anomalies may be due to the presence of demolition debris to the east and buried elongate metallic objects (possibly pipes or railroad tracks) trending north-south through the survey area. The risk of drilling into shallow ferrous material within this grid area is expected to be high.

Electromagnetic conductivity values measured with the EM31 ranged from 4.0 to 29.5 millimhos/meter, along with negative values in the vertical dipole mode. Negative conductivity readings indicate very high conductivity beyond the measuring capabilities of the instrument. These low and high values indicate the presence of near-surface metal debris. There appear to be two north-south-trending metallic objects (possibly pipelines or railroad tracks) along grid coordinates 10,0 to 10,40 and 40,0 to 30,10 to 30,40.

The installation of the proposed monitoring well GW-2 at the location indicated on the contour map is unsuitable. The location should be moved to an area along grid coordinates 0,0 to 0,40 or 20,0 to 20,40 within the survey grid. The anomalous areas may have been enhanced by interference from power lines and demolition debris to the east, and former railroad tracks to the west. Another well location should be considered to avoid the potential hazards of drilling in this area. Therefore, survey grid 2A was chosen for the location of GW-2 based upon Figure 3-1.

Survey Grid Area No. 3

A review of magnetometer data contours at the No. 3 grid location indicates that this 1,600-square-foot survey area is without substantial geomagnetic anomalies. The risk of drilling into shallow ferrous material within this grid area is expected to be minimal.

Low electromagnetic conductivity values measured with the EM31 (6.5 to 10.0 millimhos/meter) were observed in both vertical and horizontal dipole modes. These low values indicate the absence of near-surface metal debris and/or contamination.

The installation of the proposed monitoring well GW-3 at the location indicated on the contour map is unsuitable. Based upon aerial photographs, the location of this survey grid appears to be over the former quarry. Therefore, the groundwater monitoring well should not be installed in this area.

5. CONCLUSIONS AND RECOMMENDATIONS

Based upon the interpretations discussed in Section 4, the proposed locations of the groundwater monitoring wells in grid areas 1 and 3 appear to be over the former quarry, and are therefore unsatisfactory. On-site field observations indicate that survey grid area No. 2 is located adjacent to demolition debris piles and former railroad tracks. Anomalous readings indicate two apparent pipelines or railroad tracks trending north-south through the survey grid. Interpretations of Grids 1, 2, and 3 have been included in section 4 to provide additional information which may possibly used for future additional studies at this site.

The location of GW-2 should be moved to the area designated in grid 2A, however, there is an anomalous area within this grid which should be avoided (i.e., grid coordinates 20, 30; 20, 40; and 30, 40).

Locations of GW-1 and 3 were moved to areas off the former quarry (grids 1A and 3A), based upon evidence provided in the 1927 aerial photograph (Figure 3-1). Grid 1A incorporates an anomalous area in the eastern portion of the grid which should be avoided, probably due to buried utilities. Grid 3A appears to be free from subsurface anomalies.

Prior to drilling, the underground-utility locating service should be contacted to indicate possible public utilities buried in the vicinity of the drill sites.

All proposed well locations should be confirmed with a NYSDEC representative prior to the commencement of drilling. NYSDEC should also be notified that the former quarry extends outside the boundaries of the site designated in the Work Plan (i.e., to the west and southwest of the site on the west side of the railroad tracks and south side of East Amherst Street.

APPENDIX A

MAGNETOMETER AND EM31 SURVEY DATA

Table A-2

AVERAGE NORTH-SOUTH/EAST-WEST GROUND CONDUCTIVITY READINGS WITH EM31

LASALLE RESERVOIR

Survey Grid No. 1

Station #	Vertical Dipole (millimhos/meter)	Horizontal Dipole (millimhos/meter)
0,0	12.0	8.0
0,10	11.5	9.0
0,20	14.0	9.5
0,30	18.5	9.0
0,40	12.5	16.0
10,40	15.0	10.0
10,30	15.5	9.0
10,20	11.0	10.0
10,10	11.0	8.0
10,0	10.0	8.0
20,0	10.0	8.0
20,10	12.0	6.5
20,20	13.0	7.0
20,30	16.0	9.0
20,40	25.0	8.0
30,40	16.5	10.5
30,30	18.5	7.0
30,20	14.0	7.0
30,10	12.0	6.5
30,0	11.0	6.5
40,0	14.0	7.0
40,10	13.5	7.0
40,20	13.5	8.5
40,30	18.5	8.0
40,40	23.0	10.5

Table A-2

AVERAGE NORTH-SOUTH/EAST-WEST GROUND CONDUCTIVITY READINGS WITH EM31

LASALLE RESERVOIR

Survey Grid No. 1A

Station #	Vertical Dipole (millimhos/meter)	Horizontal Dipole (millimhos/meter)
0,0	17.9	8.8
0,10	11.7	5.8
0,20	9.9	6.0
0,30	11.9	5.5
0,40	19.5	5.8
10,40	22.0	6.0
10,30	11.7	5.7
10,20	9.7	5.4
10,10	10.6	5.5
10,0	16.5	7.8
20,0	14.6	6.3
20,10	9.6	5.3
20,20	11.0	5.5
20,30	15.0	6.7
20,40	26.9	6.5
30,40	Neg	30.4
30,30	Neg	24.9
30,20	Neg	12.3
30,10	8.6	6.9
30,0	11.7	6.0
40,0	10.3	5.5
40,10	7.3	4.5
40,20	8.7	5.1
40,30	11.6	4.7
40,40	19.4	4.8

Neg = Negative meter reading. This is caused by very high conductivity beyond the capabilities of the instrument.

Table A-2

AVERAGE NORTH-SOUTH/EAST-WEST GROUND CONDUCTIVITY READINGS WITH EM31

LASALLE RESERVOIR

Survey Grid No. 2

Station #	Vertical Dipole (millimhos/meter)	Horizontal Dipole (millimhos/meter)
0,0	7.5	7.5
0,10	4.0	9.5
0,20	6.0	6.0
0,30	6.0	3.5
0,40	5.0	4.0
10,40	3.0	4.0
10,30	1.5	14.5
10,20	Neg	9.0
10,10	Neg	13.0
10,0	Neg	11.5
20,0	10.0	4.0
20,10	9.5	4.0
20,20	9.5	4.0
20,30	7.5	4.0
20,40	7.0	4.0
30,40	Neg	9.0
30,30	Neg	21.0
30,20	Neg	13.5
30,10	Neg	7.5
30,0	9.0	6.0
40,0	Neg	13.0
40,10	20.5	11.0
40,20	22.5	7.0
40,30	29.5	6.5
40,40	9.0	12.5

Neg = Negative Meter Reading. This is caused by very high conductivity beyond the capabilities of the instrument.

Table A-2

AVERAGE NORTH-SOUTH/EAST-WEST GROUND CONDUCTIVITY READINGS WITH EM31

LASALLE RESERVOIR

Survey Grid No. 2A

Station #	Vertical Dipole (millimhos/meter)	Horizontal Dipole (millimhos/meter)
0,0	3.8	2.6
0,10	3.4	2.7
0,20	3.0	2.9
0,30	2.7	2.8
0,40	3.0	3.0
10,40	3.3	3.4
10,30	3.4	5.6
10,20	3.1	3.0
10,10	3.0	3.1
10,0	3.3	3.4
20,0	3.5	3.5
20,10	3.9	2.6
20,20	3.9	2.9
20,30	Neg	Neg
20,40	3.0	Neg
30,40	Neg	Neg
30,30	5.4	3.8
30,20	4.5	4.1
30,10	3.6	2.5
30,0	4.2	3.4
40,0	4.3	4.8
40,10	4.2	4.5
40,20	4.4	3.9
40,30	4.2	4.5
40,40	5.3	5.4

Neg = Negative Meter Reading. This is caused by very high conductivity beyond the capabilities of the instrument.

Table A-2

AVERAGE NORTH-SOUTH/EAST-WEST
GROUND CONDUCTIVITY READINGS
WITH EM31

LASALLE RESERVOIR

Survey Grid No. 3

Station #	Vertical Dipole (millimhos/meter)	Horizontal Dipole (millimhos/meter)
0,0	7.5	6.5
0,10	6.5	6.5
0,20	5.5	8.0
0,30	5.0	8.0
0,40	7.0	7.0
10,40	7.5	6.5
10,30	8.0	7.0
10,20	8.0	7.0
10,10	8.0	7.0
10,0	8.0	7.5
20,0	9.0	7.5
20,10	9.0	7.5
20,20	9.0	7.5
20,30	9.0	7.5
20,40	9.0	7.5
30,40	10.0	7.5
30,30	10.0	8.0
30,20	10.0	8.0
30,10	10.0	8.0
30,0	10.0	8.0
40,0	10.5	8.5
40,10	11.0	8.5
40,20	11.0	8.5
40,30	10.0	8.0
40,40	10.0	7.5

Table A-2

AVERAGE NORTH-SOUTH/EAST-WEST GROUND CONDUCTIVITY READINGS WITH EM31

LASALLE RESERVOIR

Survey Grid No. 3A

Station #	Vertical Dipole (millimhos/meter)	Horizontal Dipole (millimhos/meter)
0,0	6.2	6.9
0,10	3.4	7.0
0,20	4.9	8.5
0,30	5.6	6.4
0,40	5.9	6.6
10,40	6.2	6.9
10,30	7.2	6.2
10,20	5.8	6.8
10,10	6.3	6.1
10,0	7.5	5.4
20,0	6.6	5.3
20,10	6.7	5.7
20,20	6.5	6.1
20,30	6.6	6.1
20,40	8.6	5.9
30,40	7.9	6.7
30,30	8.0	4.9
30,20	7.0	5.9
30,10	6.9	5.5
30,0	6.7	5.2
40,0	3.7	7.1
40,10	6.1	5.4
40,20	7.4	6.3
40,30	NA	NA
40,40	10.8	6.0

NA = Data not available due to inaccessibility of survey station.

Table A-1

AVERAGE NORTH-SOUTH/EAST-WEST MAGNETOMETER READINGS

LASALLE RESERVOIR

Grid No. 1

Station #	Average N-S/E-W (Gammas)	Corrected Data* (Gammas)
0,0	56,815	56,815
0,10	56,616	56,614
0,20	56,495	56,490
0,30	56,883	56,876
0,40	56,569	56,559
10,40	56,581	56,568
10,30	57,557	57,542
10,20	56,600	56,583
10,10	56,510	56,490
10,0	56,630	56,607
20,0	56,395	56,370
20,10	56,520	56,493
20,20	56,152	56,122
20,30	55,965	55,932
20,40	55,738	55,701
30,40	55,730	55,690
30,30	55,734	55,691
30,20	56,051	56,006
30,10	56,649	56,602
30,0	56,495	56,445
40,0	55,959	55,906
40,10	57,878	57,821
40,20	57,872	57,812
40,30	56,352	56,289
40,40	56,049	55,982

*Data has been corrected for natural magnetic fluctuations (i.e., drift) by using data obtained at an on-site base station.

Table A-1

AVERAGE NORTH-SOUTH/EAST-WEST MAGNETOMETER READINGS

LASALLE RESERVOIR

Grid No. 2

Station #	Average N-S/E-W (Gammas)	Corrected Data* (Gammas)
0,0	57,200	57,200
0,10	56,334	56,341
0,20	56,806	56,820
0,30	56,947	56,968
0,40	56,169	56,197
10,40	56,427	56,462
10,30	56,289	56,331
10,20	56,831	56,880
10,10	56,881	56,937
10,0	56,410	56,473
20,0	56,482	56,552
20,10	56,454	56,531
20,20	56,495	56,579
20,30	56,523	56,607
20,40	56,750	56,841
30,40	56,411	56,509
30,30	56,431	56,536
30,20	56,469	56,581
30,10	56,544	56,670
30,0	56,466	56,599
40,0	56,280	56,420
40,10	56,334	56,481
40,20	56,374	56,528
40,30	56,381	56,542
40,40	55,950	56,118

*Data has been corrected for natural magnetic fluctuations (i.e., drift) by using data obtained at an on-site base station.

Table A-1

AVERAGE NORTH-SOUTH/EAST-WEST MAGNETOMETER READINGS

LASALLE RESERVOIR

Grid No. 3

Station #	Average N-S/E-W (Gammas)	Corrected Data* (Gammas)
0,0	56,514	56,514
0,10	56,469	56,471
0,20	56,452	56,456
0,30	56,389	56,395
0,40	56,364	56,372
10,40	56,680	56,690
10,30	56,723	56,735
10,20	57,085	57,099
10,10	56,331	56,347
10,0	56,494	56,512
20,0	56,530	56,550
20,10	56,987	57,009
20,20	57,119	57,143
20,30	56,994	57,020
20,40	57,069	57,097
30,40	57,530	57,560
30,30	57,296	57,328
30,20	57,297	57,331
30,10	57,184	57,220
30,0	57,195	57,233
40,0	57,196	57,236
40,10	56,507	56,549
40,20	57,170	57,214
40,30	57,161	57,207
40,40	57,846	57,894

*Data has been corrected for natural magnetic fluctuations (i.e., drift) by using data obtained at an on-site base station.

Table A-1

AVERAGE NORTH-SOUTH/EAST-WEST MAGNETOMETER READINGS

LASALLE RESERVOIR

Grid No. 3A

Station #	Average N-S/E-W (Gammas)	Corrected Data* (Gammas)
0,0	56,479	56,479
0,10	56,321	56,323
0,20	56,956	56,960
0,30	56,284	56,289
0,40	56,357	56,364
10,0	56,483	56,492
10,10	--	--
10,20	56,315	56,328
10,30	56,663	56,678
10,40	56,298	56,314
20,0	56,512	56,530
20,10	56,517	56,537
20,20	56,509	56,531
20,30	55,705	55,729
20,40	56,019	56,045
30,0	56,591	56,618
30,10	56,125	56,154
30,20	56,025	56,056
30,30	54,880	54,913
30,40	55,323	55,358
40,0	56,382	56,419
40,10	55,971	56,009
40,20	55,469	55,509
40,30	--	--
40,40	52,801	52,843

*Data has been corrected for natural magnetic fluctuations (i.e., drift) by using data obtained at an on-site base station.

APPENDIX B

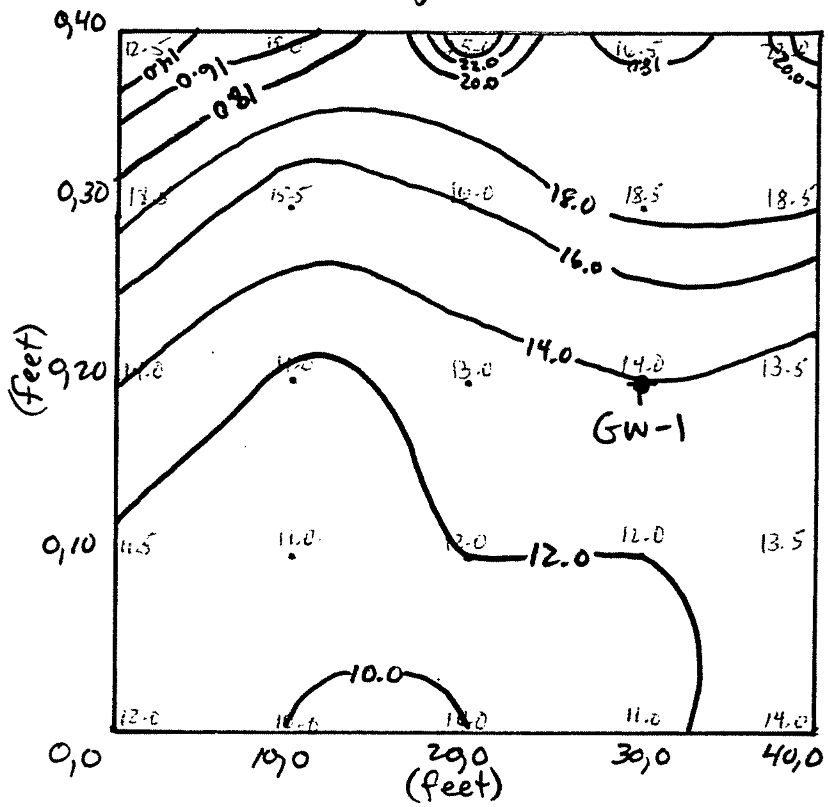
MAGNETOMETER SURVEY AND EM31 SURVEY CONTOUR MAPS

LASALLE RESERVOIR
Site No. 915033

N2E

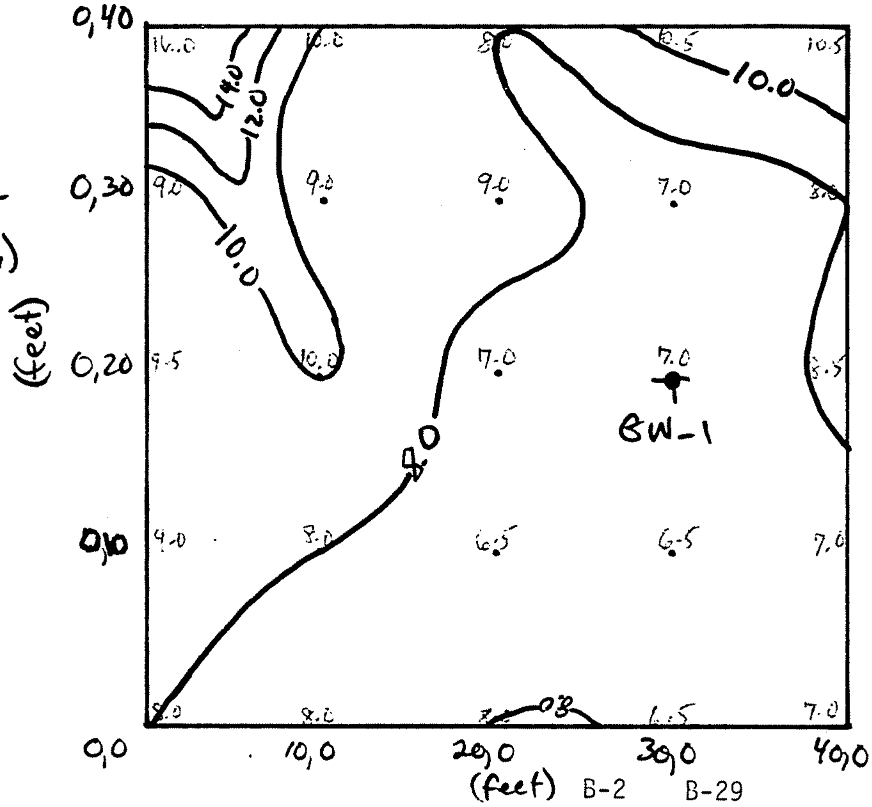
EM31 SURVEY GRID NO. 1

VERTICAL DIPOLE (millimhos/m)



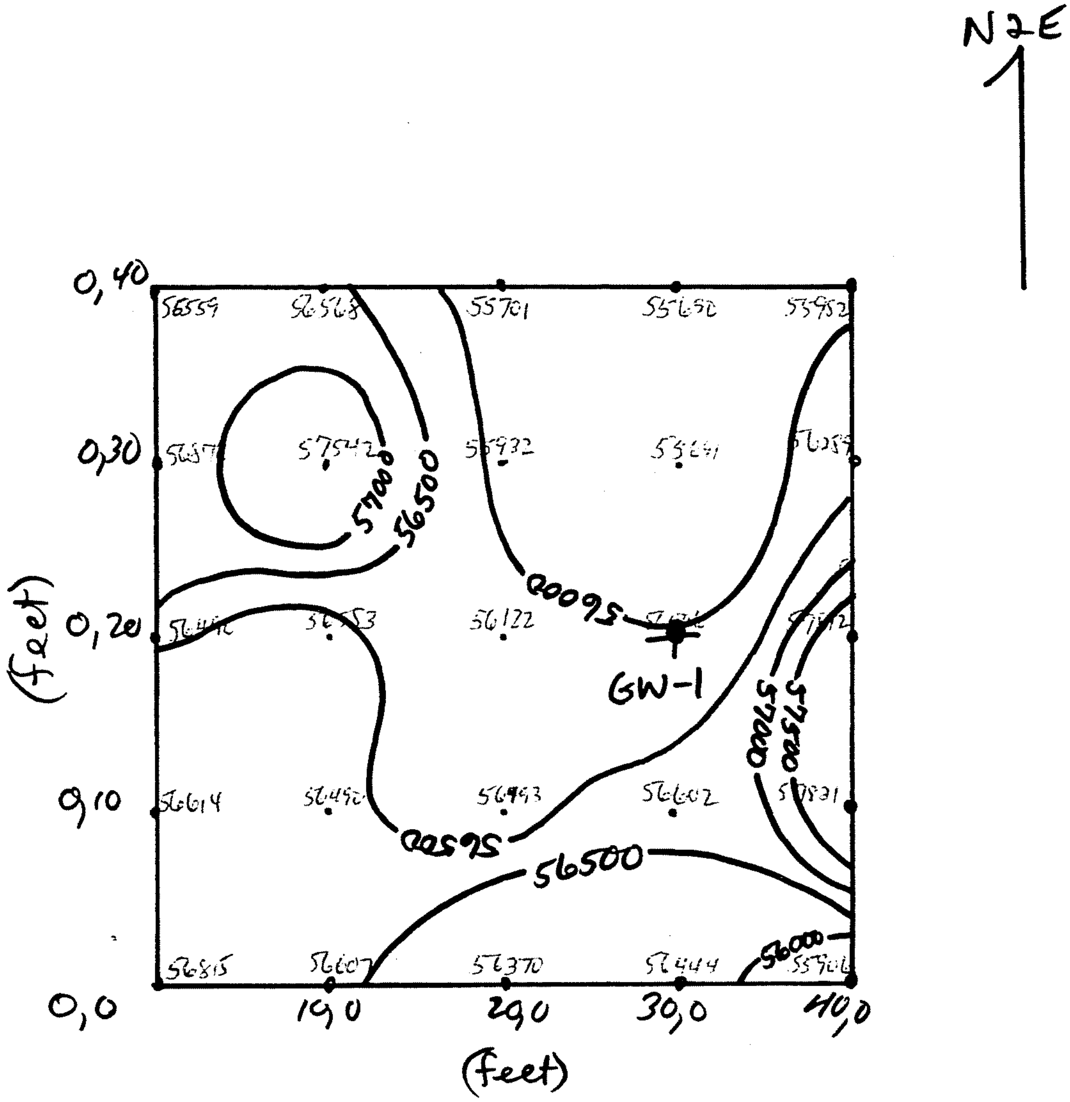
C.I. = 2 millimhos/m
= Proposed well location

HORIZONTAL DIPOLE (millimhos/m)



LASALLE RESERVOIR
Site No. 915033

MAGNETOMETER SURVEY GRID NO. 1
(gammas)



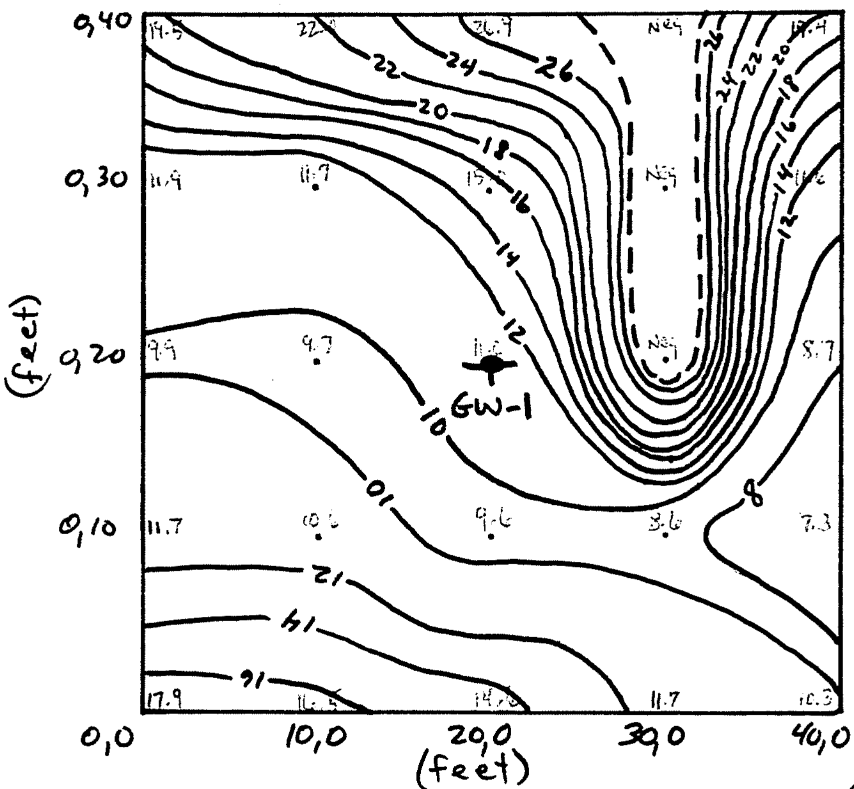
C.I. = 500 gammas
= Proposed well location

LASALLE RESERVOIR
Site No. 915033

EM31 SURVEY GRID NO. 1A

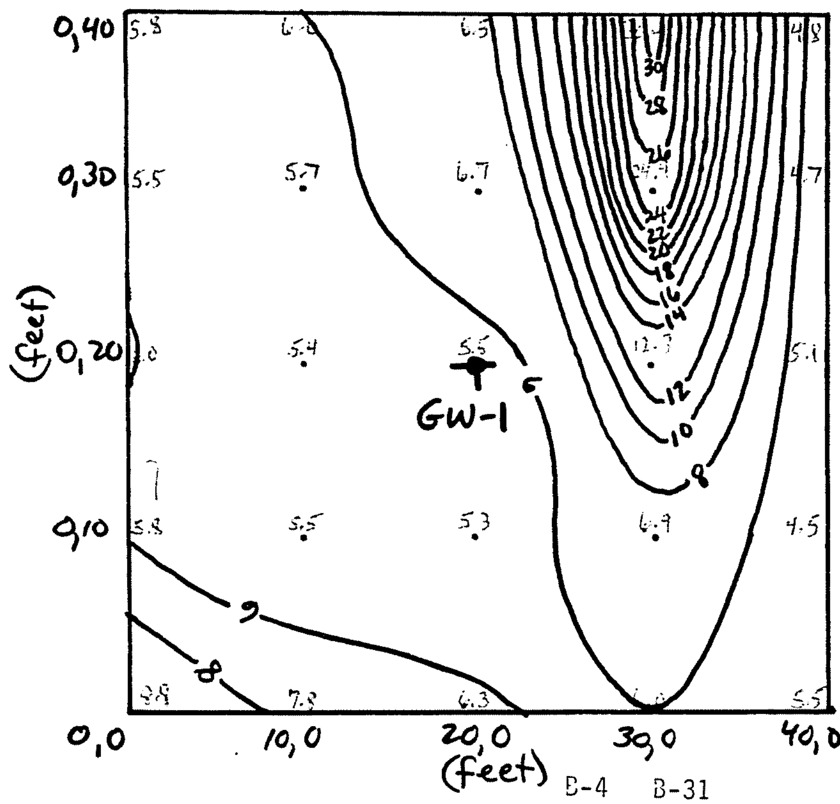
N5W

VERTICAL DIPOLE (millimhos/m)



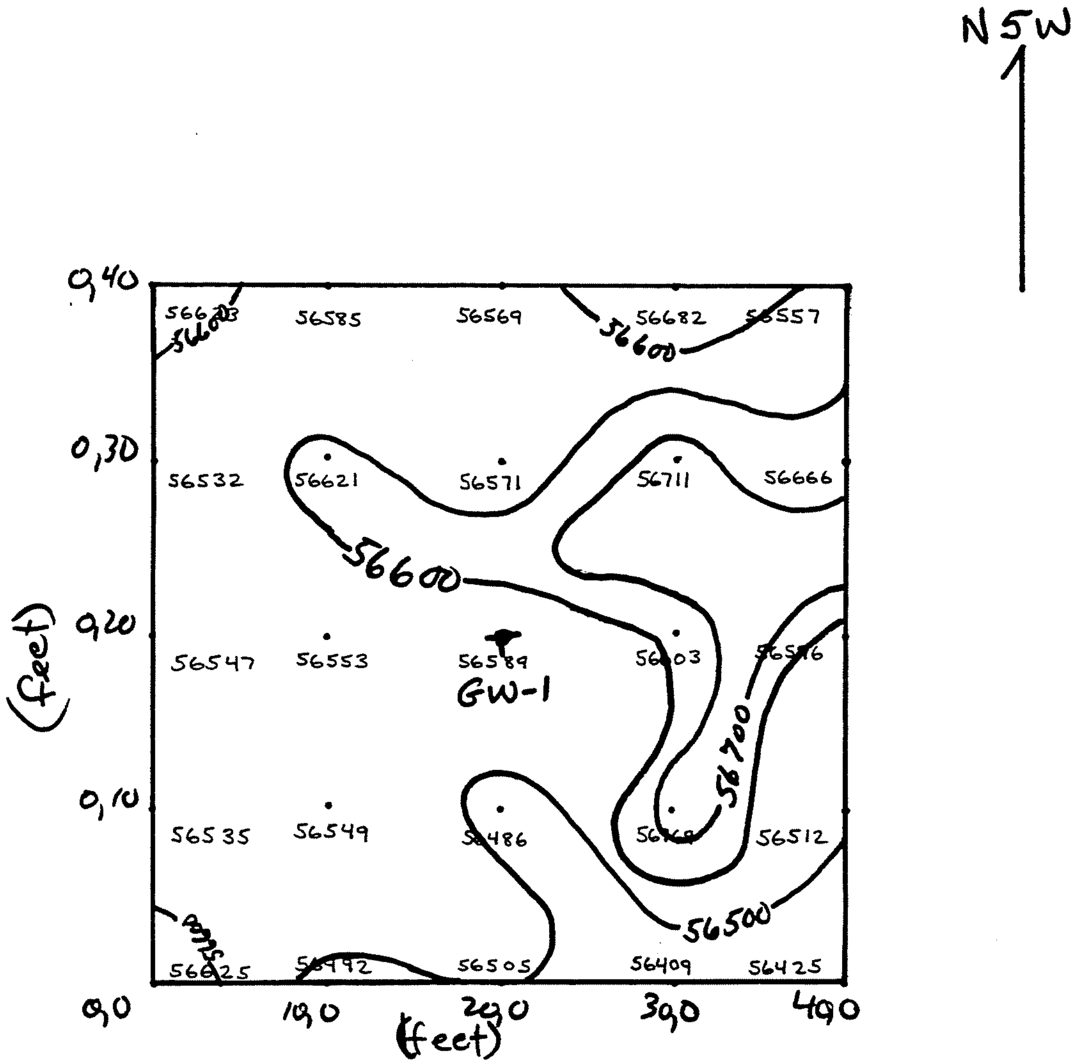
C.I. = 2 millimhos/m
= Proposed well location
Neg = Negative Meter Reading

Horizontal Dipole (millimhos/m)



LASALLE RESERVOIR
Site No. 915033

MAGNETOMETER SURVEY GRID NO. 1A
(gammas)



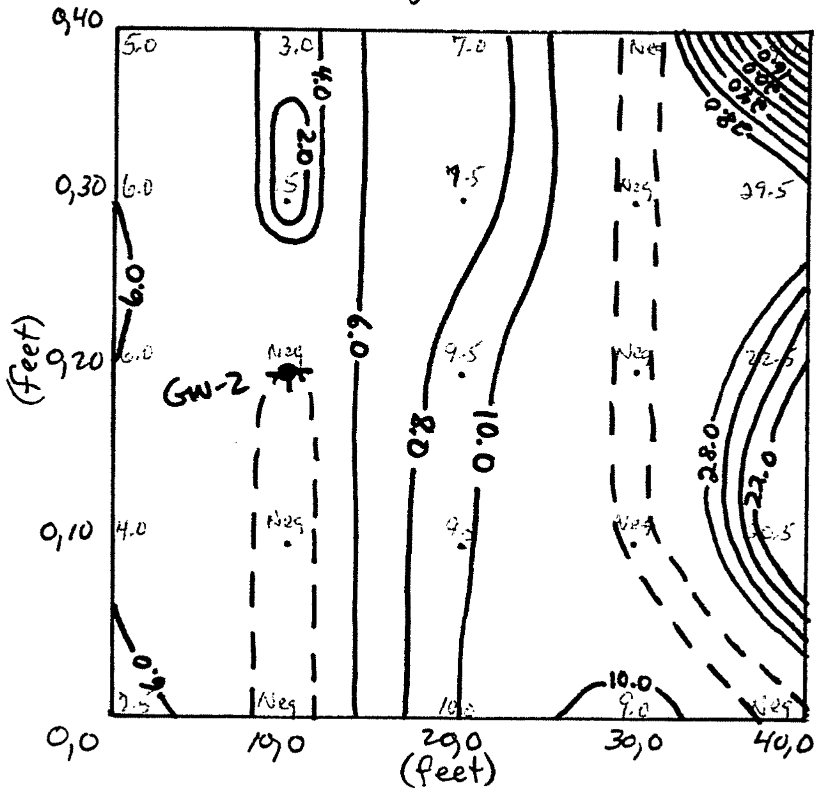
C.I. = 100 gammas
= Proposed Well location

LASALLE RESERVOIR
Site No. 915033

EM31 SURVEY GRID NO. 2

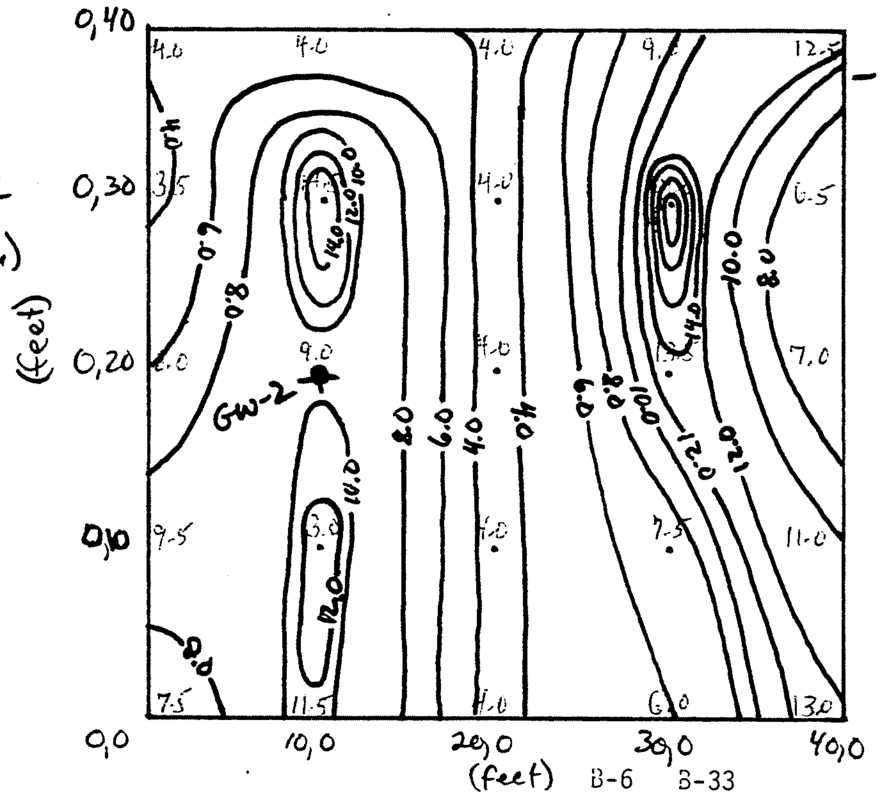
N18W

VERTICAL DIPOLE (millimhos/m)



C.I. = 2 millimhos/m
✝ = Proposed well location
– – – Neg = Negative meter Reading

HORIZONTAL DIPOLE (millimhos/m)



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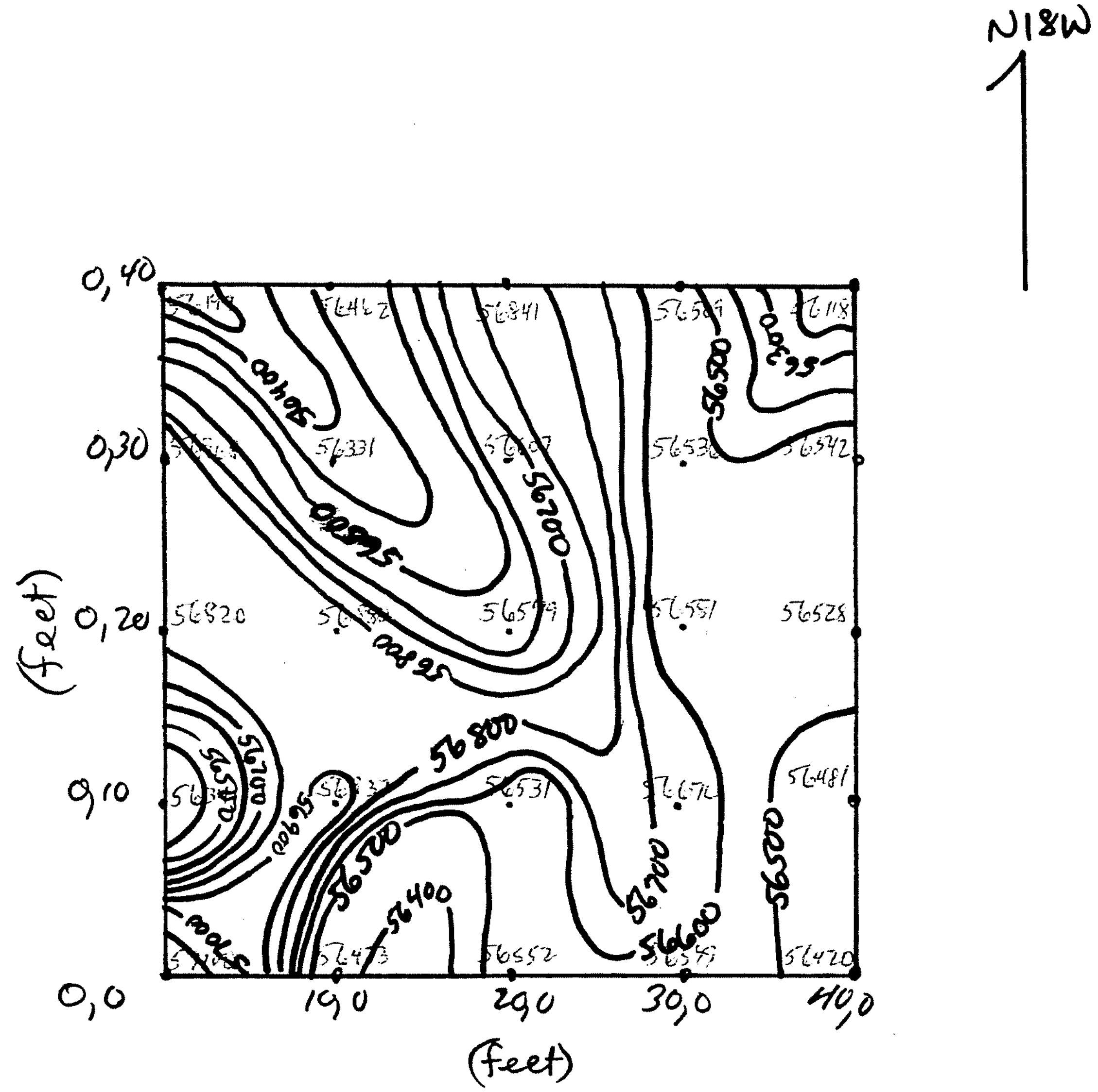
LASALLE RESERVOIR
Site No. 915033

MAGNETOMETER SURVEY GRID No. 2
(gammas)



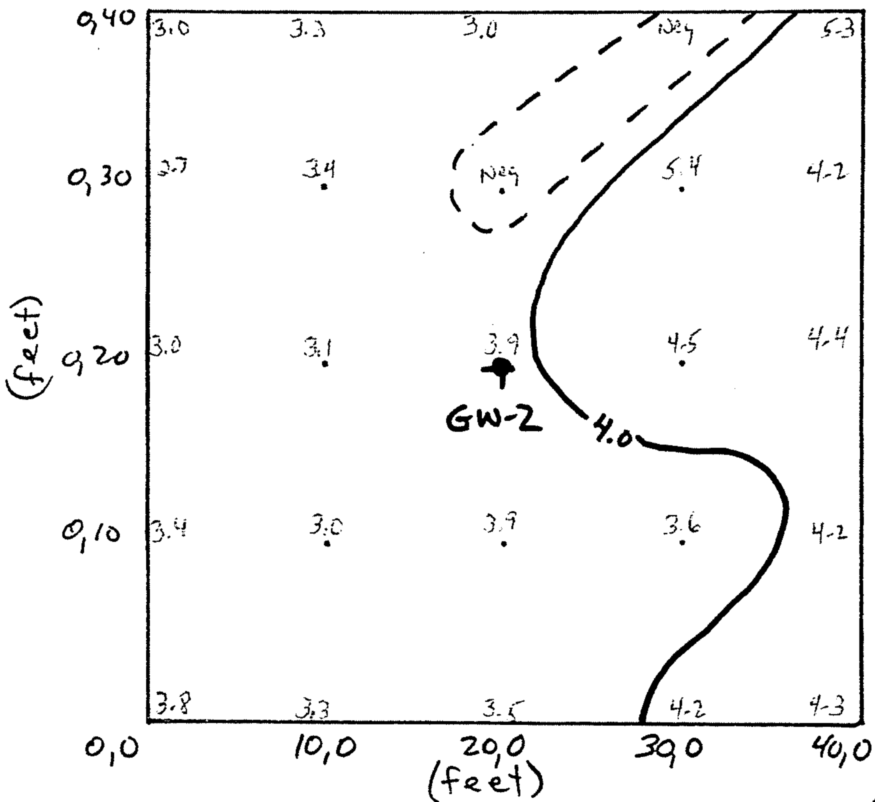
C.I. = 100 gammas
= Proposed well location

LASALLE RESERVOIR
Site No. 915033

EM31 SURVEY GRID NO. 2A

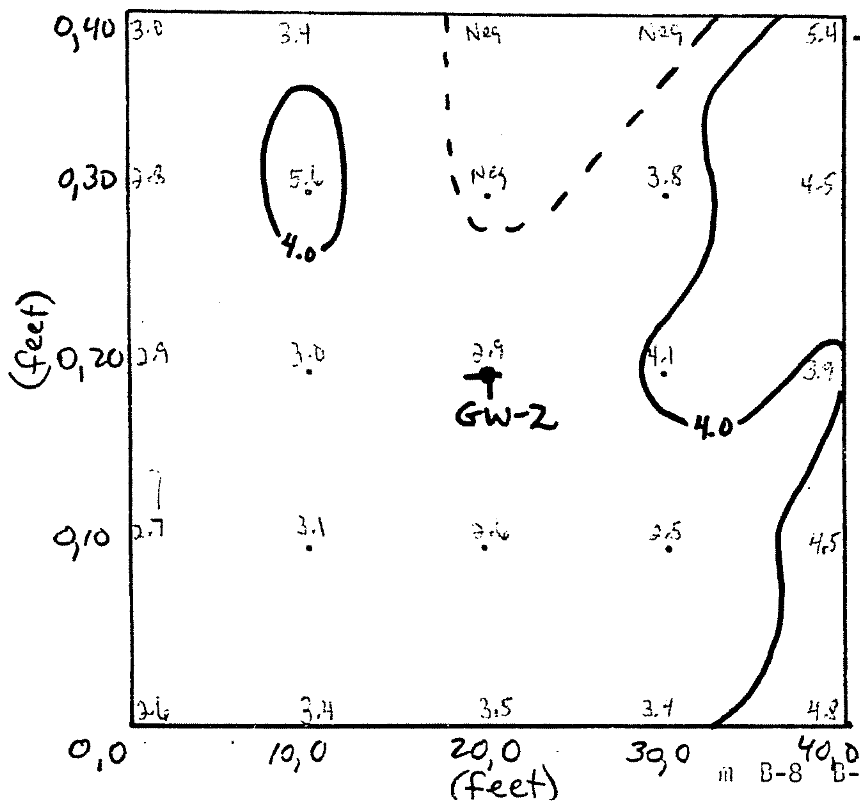
N9E

VERTICAL DIPOLE (millimhos/m)



C.I. = 2 millimhos/m
= Proposed well location
--- Neg = Negative Meter Reading

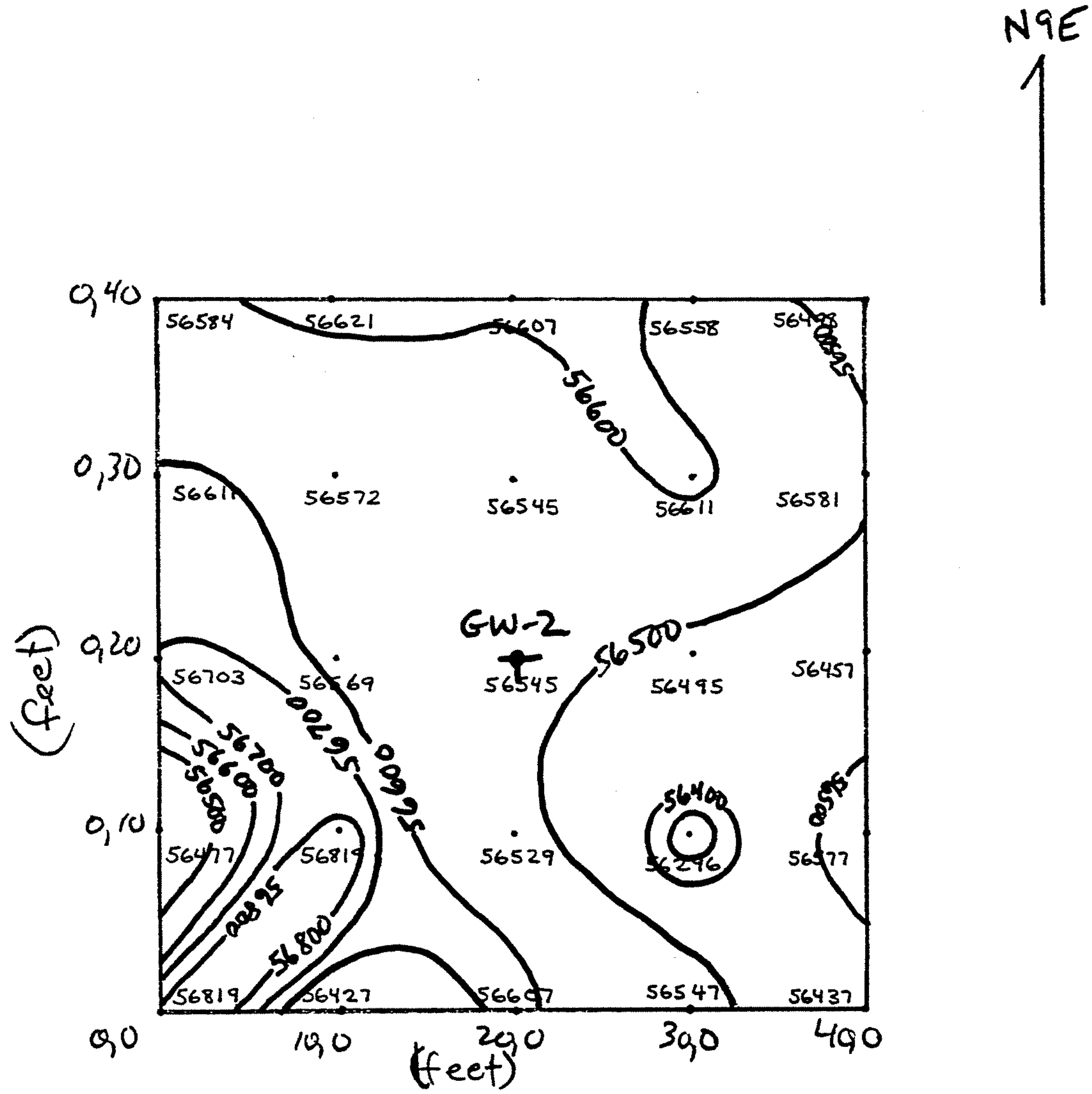
Horizontal Dipole (millimhos/m)



B-8 B-35

LASALLE RESERVOIR
Site No. 915033

MAGNETOMETER SURVEY GRID NO. 2A
(gammas)

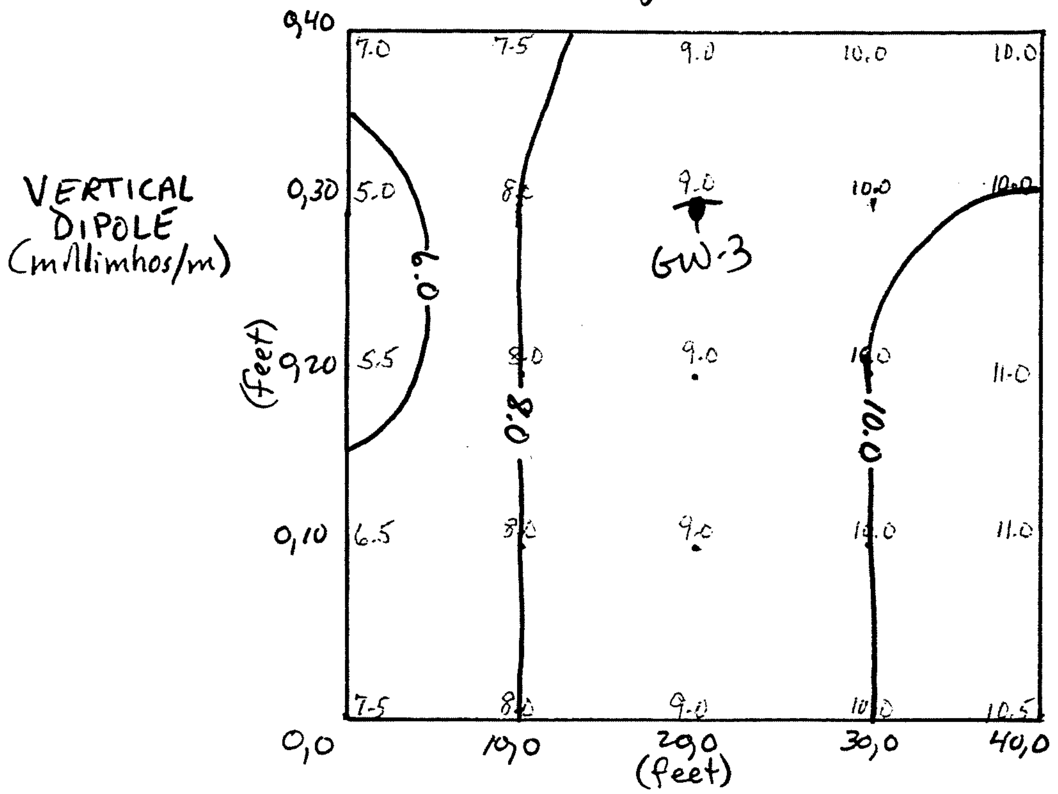


C.I. = 100 gammas
= Proposed Well location

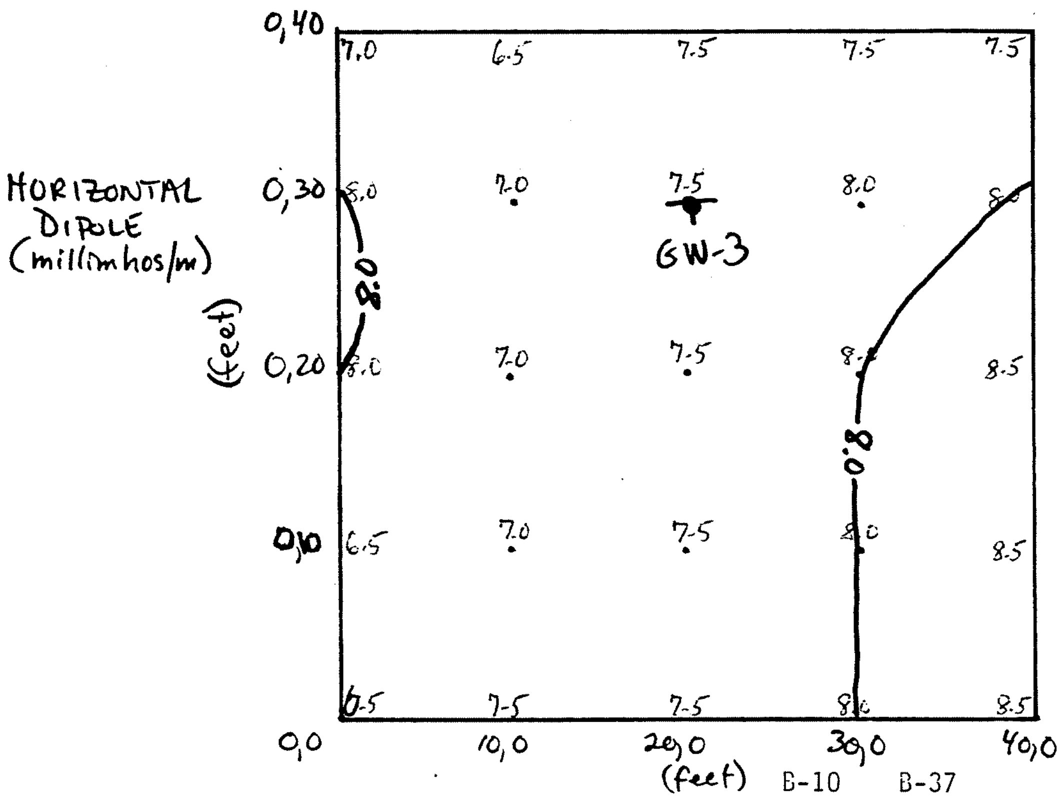
LASALLE RESERVOIR
Site No. 915033

N48W

EM31 SURVEY GRID NO. 3

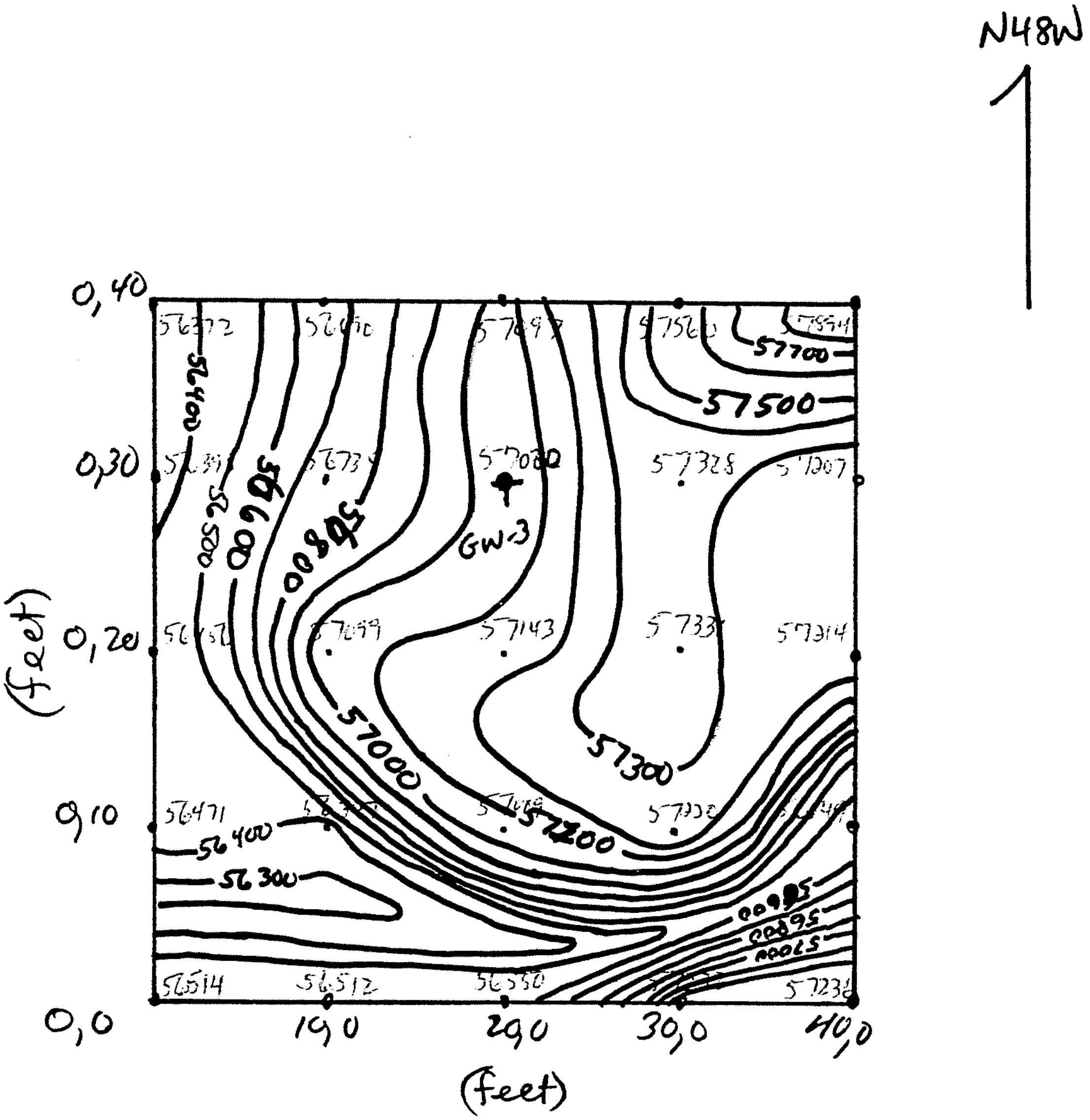


C.I. = 2 millimhos/m
= Proposed well location



LASALLE RESERVOIR
Site No. 915033

MAGNETOMETER SURVEY GRID No. 3
(gammas)



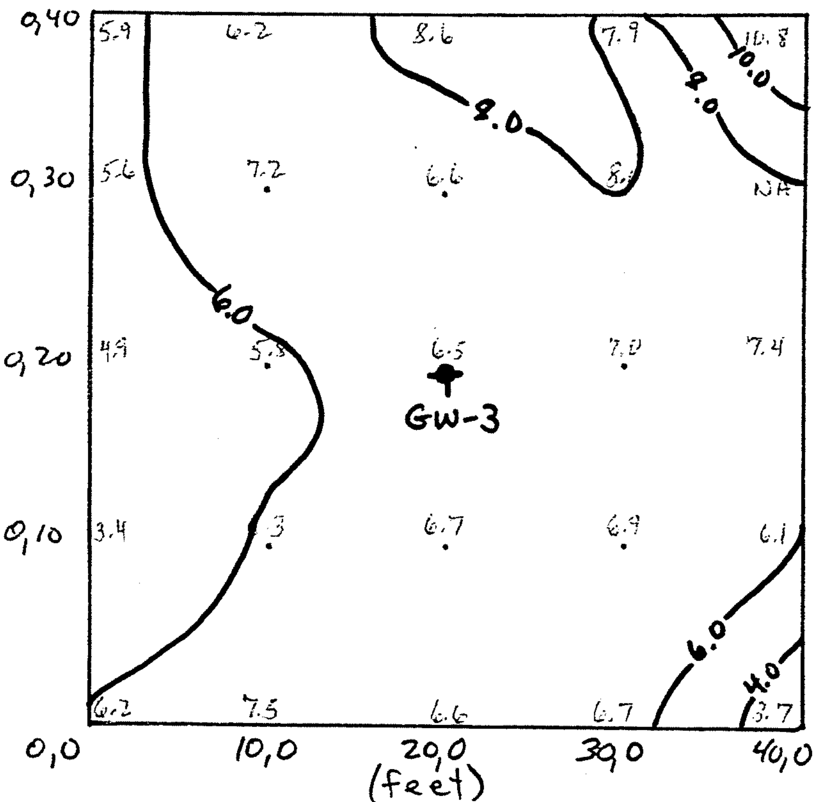
C.I. = 100 gammas
= Proposed well location

LASALLE RESERVOIR
Site No. 915033

EM31 SURVEY GRID NO. 3A

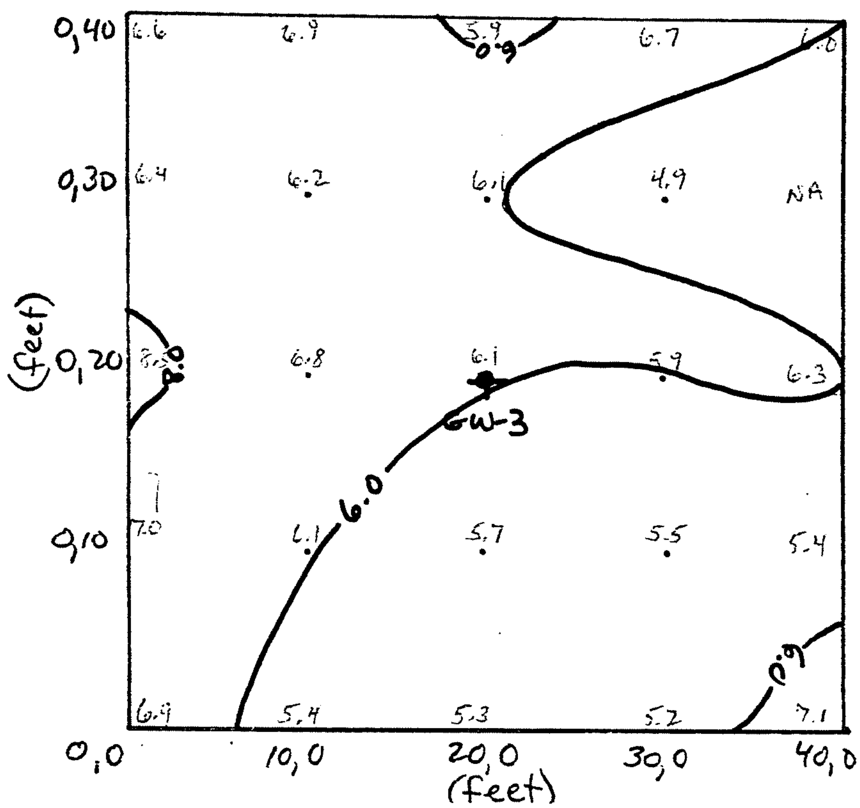
N 40E

VERTICAL DIPOLE (millimhos/m)



C.I. = 2 millimhos/m
= Proposed well location
NA = Data not available

Horizontal Dipole (millimhos/m)



B-12
B-39

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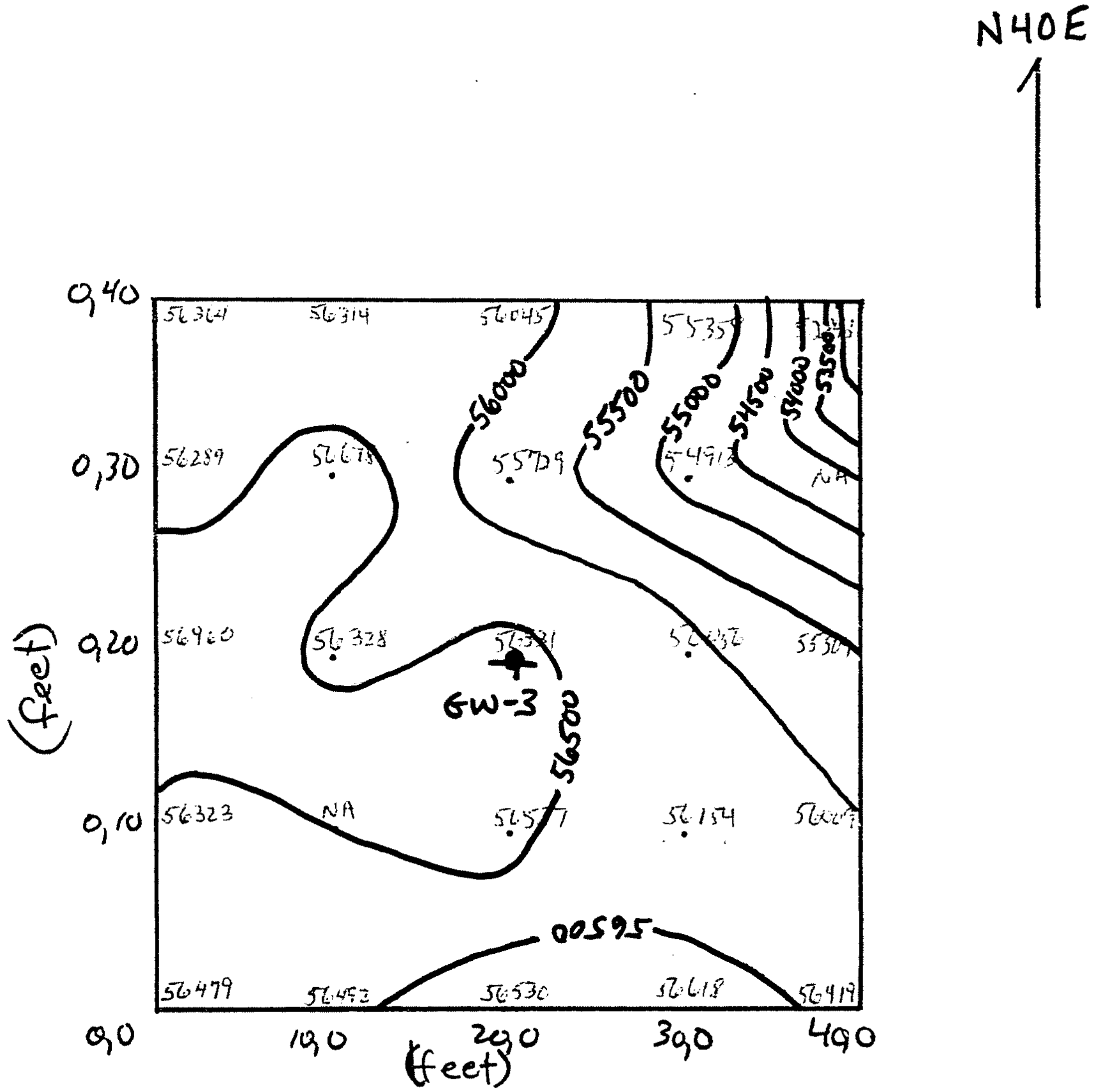
ecology and environment

LASALLE RESERVOIR
Site No. 915033

MAGNETOMETER SURVEY GRID NO. 3A
(gammas)



C.I. = 500 gammas
= Proposed Well location
NA = Data Not Available

APPENDIX C

WELL BORING LOGS

STARTED 7-21-89
FINISHED 7-26-89
SHEET 1 OF 4

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-1
SURFACE ELEVATION
GROUNDWATER DEPTH

PROJECT Lasalle Reservoir Phase II
LOCATION Between LaSalle Ave. and Lasalle Ave. Extension

WELL DIAGRAM	HNU ppm	SAMPLE NO.	BLOWS ON SAMPLER 0-6 / 12-18	BLOWS ON SAMPLER 6-12 / 18-24	PROFILE (Cl Sl Sd Gr)	FIELD IDENTIFICATION OF SOILS	NOTES
	0	GW-1-SS01	5 / 4	8 / 4	varying amounts of gravel throughout	0-2' 0-6" — medium brown silt loam with angular fragments, moist; 6"-2' — fine grained brown silty loam, dry	18" recovery
	0		3 / 4	2 / 5		2'-4' 2'-3' — medium brown silt loam with some clay and angular pebbles, dry; 3'-4' — mottled light brown clayey silt with angular pebbles, moist	12" recovery
	7		2 / 7	5 / 10		4'-6' — very fine grained pinkish clay with angular rock fragments up to 1¼" in length, slightly moist	24" recovery
Grout	0		3 / 32	17 / 35*	7'6"	6'-7'6" 6'-7' — same pinkish clay, dry; 7'-7'6" — dry sandy silt, medium brown, with 50% angular pebbles and rock fragments. Mostly limestone with some pink sandstone	Complete recovery
Rock socket, PVC					Onondaga Limestone	7'6"-12'6" - limestone, light to medium gray, with chert and irregular horizontal stylolites; complete recovery	Begin coring. Install 5' rock socket. RQD = 85%
					30.8' Akron Dolostone	12'6"-17' - same limestone horizontal fractures at 12.9', 13.3', 13.8', 13.88', 13.96', 14.59', 16.13' — believed area of core loss	Begin NX-coring. Run No. 1. Recovery = 93%. RQD = 96%
					Bertie Formation		

*Split spoon refusal at 7'6"

C-2

CLASSIFICATION/BY Bob Meyers

ecology and environment

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DATE
STARTED 7-21-89
FINISHED 7-26-89
SHEET 2 OF 4

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-1
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT LaSalle Reservoir Phase II
LOCATION Between LaSalle Ave. and LaSalle Ave. Extension

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER (0/6, 6/12, 12/18, 18/24)	PROFILE (Cl Sl Sd Gr)	FIELD IDENTIFICATION OF SOILS	NOTES
50						17'–22' — Same light to medium gray limestone (Onondaga) with chert; most fractures at stylolites horizontal fractures at 17.6', 17.91', 18.6', 19.4', 20.45', 20.5', 21.15'	NX Run No. 2 Recovery = 100% RQD = 93%
55						22'–27' — Same Onondaga Limestone horizontal fractures at 22.95', 24.6', 25.3', 25.59' mechanical break at 23.19'	NX Run No. 3 Recovery = 100% RQD = 90%
60						27'–32' 27'–30.8' — Onondaga Limestone horizontal fractures at 28.4', 29.6', 29.7', 29.75', 30.65'	NX Run No. 4 Recovery = 100% RQD = 89%
65					65' B.O.H.	30.8' - Akron Dolostone mottled light gray and tan dolostone with several vugs, some open, some partially to totally filled with gypsum or calcite horizontal fractures at 31.7' to 31.8'	
						32'–37' - Same Akron Dolostone with horizontal fractures at 33.26', 33.33', 34.52', 36.0', 36.12', 36.50'	NX Run No. 5 Recovery = 100% RQD = 96%
						37'–42' 37'–40.57' — Same Akron Dolostone with fewer vugs horizontal fractures at 37.8', 39.37', 40.57'	NX Run No. 6 Recovery = 100% RQD = 95%

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CLASSIFICATION/BY Bob Meyers

TE	E + E DRILLING AND TESTING CO., INC. SUBSURFACE LOG	
STARTED 7-21-89		HOLE NUMBER GW-1
FINISHED 7-26-89		SURFACE ELEVATION
EET 3 OF 4		GROUNDWATER DEPTH ( )

PROJECT La Salle Reservoir Phase II

LOCATION Between La Salle Ave. and La Salle Ave. Extension

WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6, 6/12, 12/18, 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
					mechanical breaks at 38.14', 38.24', 38.77'	NX Run No. 6 continued
					40.57'-42' - Bertie formation medium to dark gray limestone with thin layers of interbedded shale horizontal fractures at shale beds; horizontal fracture at 41.84' probably mechanical	
					42'-47' - Bertie Formation; limestone becoming darker with depth; black shale interbedded from 44.35' to 47'; two pyrite nodules horizontal fractures throughout 14 total	NX Run No. 7 Recovery = 98% RQD = 82%
					47'-52' 47'-50.35' - same Bertie formation; oil odor at breaks 50.35' - becomes Falkirk Dolostone member of the Bertie formation; lighter gray to gray-tan with no shale and convoluted beds; brecciated in some areas	NX Run No. 8 Recovery = 100% RQD = 100%
					52'-56.2' - same dolostone, less convoluted / brecciated; few horizontal fractures	NX Run No. 9 Recovery = 84% RQD = 83%
					56.2'-56.8' - same dolostone, apparently recored section which was left on the bottom after Run No. 9	NX Run No. 10 Recovery = 75% RQD = 0%
					56.8'-61.8' - same dolostone, few stylolites, becoming darker gray	NX Run No. 11 Recovery = 100% RQD = 93%

88

C-4

CLASSIFICATION/BY Bob Meyers

DATE STARTED 7-21-89 FINISHED 7-26-89 SHEET 4 OF 4	E + E DRILLING AND TESTING CO., INC. SUBSURFACE LOG	HOLE NUMBER GW-1 SURFACE ELEVATION GROUNDWATER DEPTH ( )

PROJECT La Salle Reservoir Phase II LOCATION Between LaSalle Ave. and LaSalle Ave. Extension

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6 6/12 12/18 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
						61.8'-65' — same dolostone, four horizontal fractures	NX Run No. 12 Recovery = 100% RQD = 92%
						65'	
						Bottom of Hole	

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CLASSIFICATION/BY Bob Meyers

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recycled paper
ecology and environment

TE STARTED 7-19-89
FINISHED 7-25-89
ET 1 OF 5

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-2
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT LaSalle Reservoir Phase II
LOCATION

WELL DIAGRAM	HNU ppm	SAMPLE NO.	BLOWS ON SAMPLER 0/6, 6/12, 12/18, 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
	0		8, 28, 16, 18		0-2' 0-.6' — silt, ash, pulverized bricks, etc. 0.6'-1.05' — limestone, light gray 1.05'-1.2' — black ash or other industrial by-product	Recovery = 1.2' 1720
	0		14, 9, 13, 1		2'-4' 2'-2.8' — gravelly soil, organic, traces of limestone 2.8'-3.1' — limestone, pulverized from split spoon	Recovery = 1.1' 1730
Grout					4'-6' 4.0'-5.1' — C and D fill, gravel, etc. 5.1'-5.4' — limestone	HNU getting rained on — unreliable
	?		13, 14, 13, 3		6'-8' 6.0-6.5 — limestone with upper cavings	Recovery = 0.5' 1800
PVC					8'-10' 8-9.25' — gravelly silt, brown, damp	Refusal at 9.25' 1805
	0		7, 5, 5, 7		9.25'-14' — dark to medium gray limestone with black chert and stylolites; breaks occur along stylolites; bedding is finely laminated and irregular; top 3" broken (weathered) horizontal fracture at 8.5" from top — Onondaga Limestone	Core No. 1 Recovery = 100%
	0		3, 6, 10, 3"		14'-17' — Onondaga Limestone, chert noted horizontal fractures at 15.0', 15.7', and 16.0' bgs; weathering is low to moderate in these	NX Run No. 1 Recovery = 100% RQD = 85% Water circulation lost at 16'-17'

CLASSIFICATION/BY Jim Richert / Don Johnson

DATE		HOLE NUMBER GW-2
STARTED 7-19-89	**E + E DRILLING AND TESTING CO., INC.**	SURFACE ELEVATION
FINISHED 7-25-89	**SUBSURFACE LOG**	GROUNDWATER DEPTH ( )
SHEET 2 OF 5		

PROJECT LaSalle Reservoir Phase II

LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6, 6/12, 12/18, 18/24	PROFILE (Cl Si Sd Gr)	FIELD IDENTIFICATION OF SOILS	NOTES
	Rock Socket; PVC; Grout				9.25' Bedrock Onondaga Ls.	fractures	Approx. coring rate = 4.25 min/foot
10						17'-22'—light gray, fine grained limestone, fossils minimal horizontal fractures at 17.8', 18.65', 21.8' - moderate weathering, subangular fragments	NX Run No. 2
15	Open Hole						Coring continued with Mobile B-57 truck-mounted drilling rig using NX-size rock core barrel, wire line method
20							
25					27.85' Akron Dolostone		
30					34.9' Bertie Formation	22'-27' - light gray limestone, cont.; horizontal fractures at 24.2', 25.0', 25.2', 25.3', 25.5', 25.6', 25.75', 25.85', 25.95' - moderate to high weathering.	NX Run No. 3 Recovery = 100% RQD = 73%
35							
40						27'-32' 27'-27.85'—Onondaga Limestone 27.85' Suspected formation contact - Onondaga Ls. and underlying Akron Dolostone - light gray, mottled limestone which exhibits small (0.75" ϕ) vugs; green staining (glauconite)	NX Run No. 4 Recovery = 100% RQD = 80%
45							

40088

C-7

CLASSIFICATION/BY Don Johnson

E
STARTED 7-19-89
FINISHED 7-25-89
ET 3 OF 5

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-2
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT La Salle Reservoir Phase II
LOCATION

WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6 6/12 12/18 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
				65' B.O.H.	is visible at 27.85' horizontal fractures at 27.45', 29.0' – clay, limonite filled; moderate to high weathering	NX Run No. 4 continued
					32'-37.25' 32'-34.9' - Akron Dolostone 34.9' - suspected formation contact - Akron and underlying Bertie Formation – medium to dark gray limestone with less mottling than Akron and no vugs; gray clay and limestone fragment layer 0.1' thick is at 36.1' (with oil odor) horizontal fractures at 32.24', 32.8', 33.45', 34.9', 35.65', 36.27', 36.8'	NX Run. No 5 Recovery = 100% RQD = 79%
					37.25'-41.6' - same limestone with 2 additional gray clay and limestone fragment layers 0.15' and 0.20' thick at 39.15' to 39.3' and 41.4' to 41.6' respectively horizontal fractures at the clay layers and at 38.05', 38.10', 38.18', 38.75'	NX Run. No. 6 Recovery = 100% RQD = 89% Took a short core due to clay.
					41.6'-42.75' - same limestone, getting darker with interbedded shale, contains darker bands	NX Run No. 7 Recovery = 100% RQD = 33%

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CLASSIFICATION/BY Don Johnson / Bob Meyers

DATE
STARTED 7-19-89
FINISHED 7-25-89
SHEET 4 OF 5

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-2
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT LaSalle Reservoir Phase II
LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER (0-6, 6-12, 12-18, 18-24)	PROFILE (Cl Sl Sd Gr)	FIELD IDENTIFICATION OF SOILS	NOTES
						of interbedded shale horizontal fractures at 41.7', 41.91', 42.3', 42.58', 42.63', 42.69'	NX Run No. 7 continued
						42.75-45.50' - same limestone, dark gray, with increasing shale, laminated, suspected Scajaquada Member horizontal fractures at 42.9', 43.45', 44.5'; at 43.45' - a weathered, greenish pyrite layer; fractured zone from 44.6' to 45.50' with clay, limestone fragments	NX Run No. 8 Recovery = 100% RQD = 81%
						45.50'-47.40' 45.5'-46' - limestone with some shale and many stylolites (one every 1/4 inch) 46'-47.4' - Suspected Falkirk Member of the Bertie formation; light gray dolostone with brecciated areas and contorted bedding; few pyrite inclusions; no stylolites; 5 horizontal fractures	NX Run No. 9 Recovery = 100% RQD = 65%
						47.4'-52.3' - same dolostone with several stylolites, 8 natural horizontal fractures	NX Run No. 10 Recovery = 98% RQD = 65%
						52.3'-57.4' - same dolostone with six horizontal fractures, some stylolites, and a gypsum stringer at 52.55'	NX Run No. 11 Recovery = 100% RQD = 92%

088

C-9

CLASSIFICATION/BY Bob Meyers

TE STARTED	7-19-89
FINISHED	7-25-89
SHEET 5 OF	5

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-2
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT La Salle Reservoir Phase II

LOCATION

WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6, 6/12, 12/18, 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
					57.4-62.4' 57.4'-61.7' – same dolostone 61.7'-62.4' – brecciated with several vugs filled with pyrite and calcite, also some limonitic staining (highly weathered)	NX Run No. 12 Recovery = 100% RQD = 92%
					62.4'-65.0' – same dolostone with numerous open vugs throughout; no calcite or pyrite visible; highly brecciated throughout; six horizontal fractures as well as a nearly vertical fracture from 62.4' to 63.15'; limonitic staining at 64.2'; some pyrite at 64.9' in fracture	NX Run No. 13 Recovery = 100%
					65' Bottom of Hole	

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CLASSIFICATION/BY Bob Meyers

DATE
STARTED 7-19-89
FINISHED 7-24-89
SHEET 1 OF 4

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-3
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT LaSalle Reservoir Phase II
LOCATION E. Amherst St.

DEPTH – FT	WELL DIAGRAM	HNU ppm	SAMPLE NO.	BLOWS ON SAMPLER 0-6 / 6-12 / 12-18 / 18-24	PROFILE (Cl Sl Sd Gr)	FIELD IDENTIFICATION OF SOILS	NOTES
	PVC	19		3 / 13 / 8 / 13		0-2' 0-0.5' – dark brown organic top soil, silty, trace of limestone chips – PT 0.5'-1.15' – medium brown clay, compact, moderately hard, dry, low plasticity – CL	0840 Recovery = 1.15' Rig is a Mobile B-57 using using 4½" I.D. augers and 2' split spoons
2	Grout	0		5 / 5 / 5 / 6		2'-4' 2-2.15' – top soil as described above, probably cave-in – PT 2.15'-3.4' – medium reddish brown silty clay, non plastic, dry, trace of organic material – OL	Recovery = 1.4'
		0		5 / 3 / 3 / 3		4'-6' same as above – OL	Recovered 0.25' on 1st attempt Resampled interval – Recovery = 0.5'
						6'-8' – dark brown silty clay, damp, piece of glass, may be in fill	Recovery = 0.15'
		0		4 / 3 / 2 / 4		8'-10' – dark gray sandy clay, trace of burnt organic material – OH	Recovery = .5'
		0		3 / 2 / 2 / 3		10'-12' 10'-10.5' – silty clay, dark gray, damp, moderately plastic – OH	Recovery = .7' 1005

0088

CLASSIFICATION/BY Jim Richert

E
STARTED 7-19-89
FINISHED 7-24-89
ET 2 OF 4

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-3
SURFACE ELEVATION
GROUNDWATER DEPTH
( )

PROJECT La Salle Reservoir Phase II
LOCATION E. Amherst St.

WELL DIAGRAM	HNU ppm	SAMPLE NO.	BLOWS ON SAMPLER (0-6 / 6-12 / 12-18 / 18-24)	PROFILE (Cl Sl Sd Gr)	FIELD IDENTIFICATION OF SOILS	NOTES
					10.5'-10.7' — limestone chips; went through a rock	10'-12' continued
PVC	O		3 8 / 3 4		12'-14' medium gray silty clay, moderately plastic, damp, trace chert and limestone — OL	Recovery=1.0'
					14'-16' same as above	Recovery=0.8'
Grout	O		4 2 / 1 2		16'-18' medium gray silty clay, damp, very plastic — CH	Recovery=0.8'
					18'-20' medium gray silty clay, moderately plastic, damp — CL	Recovery=1.45'
	O		2 3 / 2 3		20'-22' clay as above	Recovered 0.1' of clay before refusal Refusal at 20.1' Augered to 22'
					22'-26.5' — dark gray limestone with interbedded black and white chert — Onondaga; irregular stylolites generally horizontal	HQ core run Recovery=96% RQD=88% 1300
			4 2 / 3 4		26.5'-27' — limestone, medium gray, traces of dark gray chert and stylolites	7-24-89 NX Run No. 1 Cored 2.5' but 1.9' was grout from 3" PVC
					27'-32' — limestone as above at 29' — fossil, sea fan looking, possibly a bryozoan?	NX Run No. 2 Recovery=100% RQD=91.6%

C-12

CLASSIFICATION/BY Jim Richert

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DATE	E + E DRILLING AND TESTING CO., INC.	HOLE NUMBER GW-3
STARTED 7-19-89	SUBSURFACE LOG	SURFACE ELEVATION
FINISHED 7-24-89		GROUNDWATER DEPTH ( )
SHEET 3 OF 4		

PROJECT LaSalle Reservoir Phase II

LOCATION

DEPTH – FT	WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER (0/6, 6/12, 12/18, 18/24)	PROFILE (Cl Sl Sd Gr)	FIELD IDENTIFICATION OF SOILS	NOTES
		O		4 2 / 2 5		at 30.7' - "soft spot", took water, filled with clay	NX Run No. 2 continued 1135
9						at 31.1' - green mineral filling a stylolite (glauconite)	
						31.1'-32' - Akron Dolostone, medium gray and brown dolostone; 32' - weathered end, lost water	
20	PVC	O		50 at 1.5"		32'-37' 2 long pieces recovered	NX Run No. 3 Recovery = 99% RQD = 99.9% 1203
21						32.5' - dolomite crystals and pyrite nodules	
						32-37' - light gray and light brown dolostone, traces of pyrite nodules	
22	Grout, Rock socket	O			22' Onondaga Limestone	37-42'	NX Run No. 4 Recovery = 100% RQD = 91.4% 1241
27	Open Hole	O				37'-38.35' - Akron Dolostone, as above; 38.35' - clay filled contact	
					31.1' unconformity Akron Dolostone	38.35'-42.0 - Bertie Formation medium to dark gray dolostone with bands of light grayish brown dolostone; massive; horizontal stylolites; argillaceous	
32		O					
37		O			38.35' Bertie Formation	42'-43.85' - dolostone as above; 43.35' - clay filled seam clogged up bit	NX Run No. 5 Recovery = 100% RQD = 64.9%
42		O				43.85'-47.0' - same as above with a band of white dolomite at 46.8'	NX Run No. 6 Recovery = 100% RQD = 73.8% 1355
		O					

40088

C-13

CLASSIFICATION/BY Jim Richert

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ecology and environment

DATE STARTED	7-19-89
FINISHED	7-24-89
SHEET 4 OF	4

E + E DRILLING AND TESTING CO., INC.
SUBSURFACE LOG

HOLE NUMBER GW-3
SURFACE ELEVATION
GROUNDWATER DEPTH ( )

PROJECT La Salle Reservoir Phase II
LOCATION E. Amherst St.

WELL DIAGRAM	SAMPLE TYPE	SAMPLE NO.	BLOWS ON SAMPLER 0/6, 6/12, 12/18, 18/24	PROFILE Cl Sl Sd Gr	FIELD IDENTIFICATION OF SOILS	NOTES
Open Hole	0 0 0				47.0'-47.75' 47'-47.25' - dolostone as above 47.25'-47.6' - dry clay, light gray, soft 47.6'-47.75' - dolostone as above	NX Run No. 7 Recovery=100% RQD= 0% Core barrel plugged up with rock - short run
	0 20				47.75'-52.0' 47.75-49.8' - dolostone as above 49.8'-52.0' - dolostone, light brown, massive, with few black stylolites	NX Run No. 8 Recovery=100% RQD=92% 1620
				65.3' B.O.H.	52'-57' - Bertie Dolostone as above	NX Run No. 9 Recovery=94% RQD= 79%
					57'-62' - Bertie Dolostone as above	NX Run No. 10 Recovery= 100% RQD= 81.1% 1730
					62'-65.3' - dolostone as above (HNu 20ppm due to moisture of distilled water?) 65.3' Bottom of Hole	NX Run No. 11 Recovery= 100% RQD=100% 1800

CLASSIFICATION/BY Jim Richert

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APPENDIX D

GEOTECHNICAL ANALYSIS

195 SUGG ROAD, P.O. BOX D, BUFFALO, N.Y., 14225, TEL. 716-632-4491
International Specialists in the Environment

8001

CHAIN-OF-CUSTODY RECORD

Project No.: YO-1060
Project Name: NYSDEC PHASE II LA SALLE BS
Project Manager: BARB TOPOR
Samplers: (Signatures) James J. Richart
Field Team Leader: JIM RICHERT

STATION NUMBER	DATE	TIME	SAMPLE TYPE: COMP	SAMPLE TYPE: GRAB	SAMPLE TYPE: AIR	EXPECTED COMPOUNDS (Concentration)*	STATION LOCATION	NUMBER OF CONTAINERS	GRAIN SIZE ANALYSIS	ATTERBURG LIMITS	REMARKS
GW-1	7-21-89	850	X			LOW	GW-1 2-4 FEET	1	X		
GW-1	7-21	1030	X			LOW	GW-1 6-7 FEET	1	X	X	

Jim Richart

Relinquished By: (Signature)	Date/Time:	Received By: (Signature)	Relinquished By: (Signature)	Date/Time:	Received By: (Signature)
Relinquished By: (Signature)	Date/Time:	Received By: (Signature)	Relinquished By: (Signature)	Date/Time:	Received By: (Signature)
Relinquished By: (Signature) James J. Richart	Date/Time: 9-21-89/1415	Received For Laboratory By: (Signature) William H. Hor	Relinquished By: (Signature)	Date/Time:	Received For Laboratory By: (Signature)

Ship Via:

BL/Airbill Number:

Date:

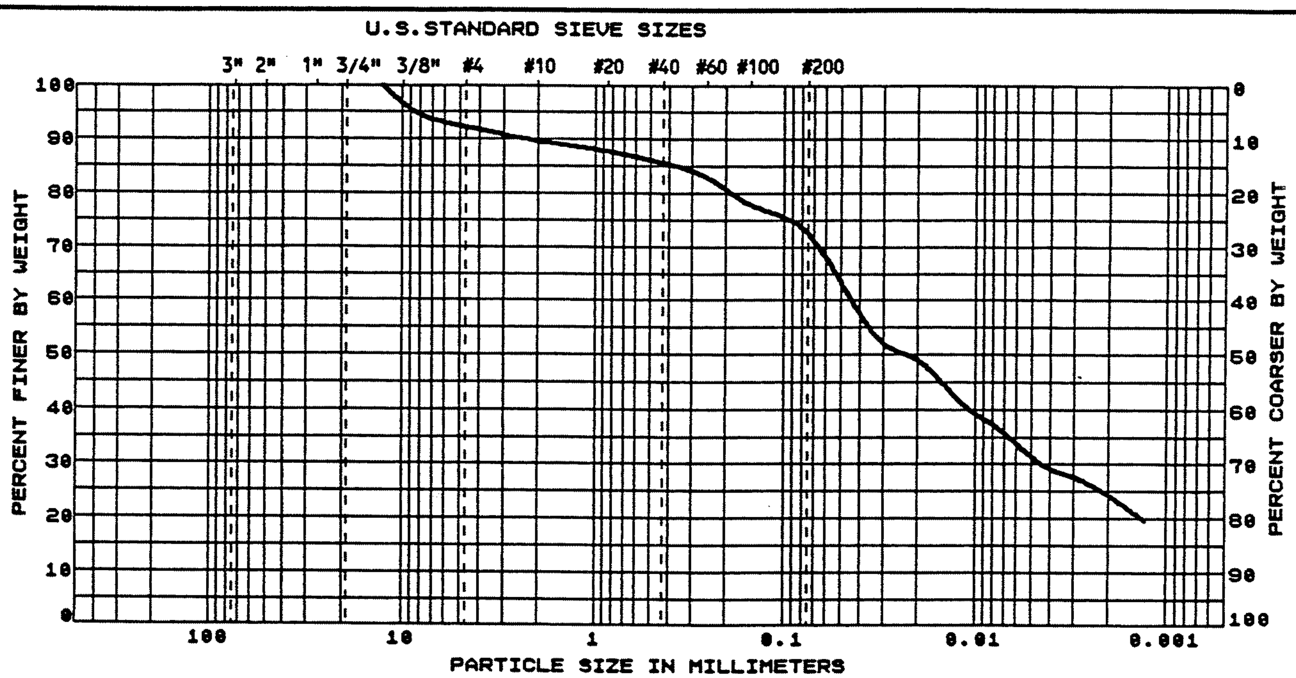
Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files
*See CONCENTRATION RANGE on back of form.

LAW ENVIRONMENTAL, INC.
112 TOWNPARK DRIVE
KENNESAW, GEORGIA 30144-5599
404-421-3400

PARTICLE SIZE DISTRIBUTION & PHYSICAL PROPERTIES

CLIENT Ecology and Environment, Inc.
4285 Genesee Street
Buffalo, New York 14225

JOB NO. 41-8985.10 DATE October 17, 1989
LAB NO. 9530 PAGE 11
PROJECT E & E P.O. #48252
SAMPLE ID GW 1-SS-05 50309.01



COBBLES	GRAVEL		SAND			SILT & CLAY
	COARSE	MEDIUM	CO.	MEDIUM	FINE	

U.S. STANDARD SIEVE SIZE		PERCENT PASSING		HYDROMETER
SIEVE NO.	SIEVE SIZE (MILLIMETERS)			PARTICLE DIAMETER (MILLIMETERS)
3"	75			0.050
2"	50		49.0	0.020
1-1/2"	37.5		31.5	0.005
1"	25		23.7	0.002
3/4"	19			0.001
1/2"	12.5	100.0		
3/8"	9.5	96.2		
#4	4.75	92.3		
#10	2.00	89.7		
#20	0.850	87.8		
#40	0.425	85.6		
#60	0.250	82.9		
#100	0.150	78.0		
#200	0.075	72.5		

POROSITY (%)
EFFECTIVE SIZE (mm)
COEFFICIENT OF UNIFORMITY
COEFFICIENT OF CURVATURE
LIQUID LIMIT 29
PLASTIC LIMIT 17
PLASTICITY INDEX 12
CLASSIFICATION LEAN CLAY with SAND (CL)
WATER CONTENT (%) 11.4
DRY DENSITY (PCF)
SPECIFIC GRAVITY
HYDRAULIC CONDUCTIVITY (cm/sec - 20C)
TEST PROCEDURES: ASTM D422, D4318, D2216, D4287; CORPS OF ENGRS EM-1110-2-1906

LAW ENVIRONMENTAL, INC.
M.A. O'Kelley

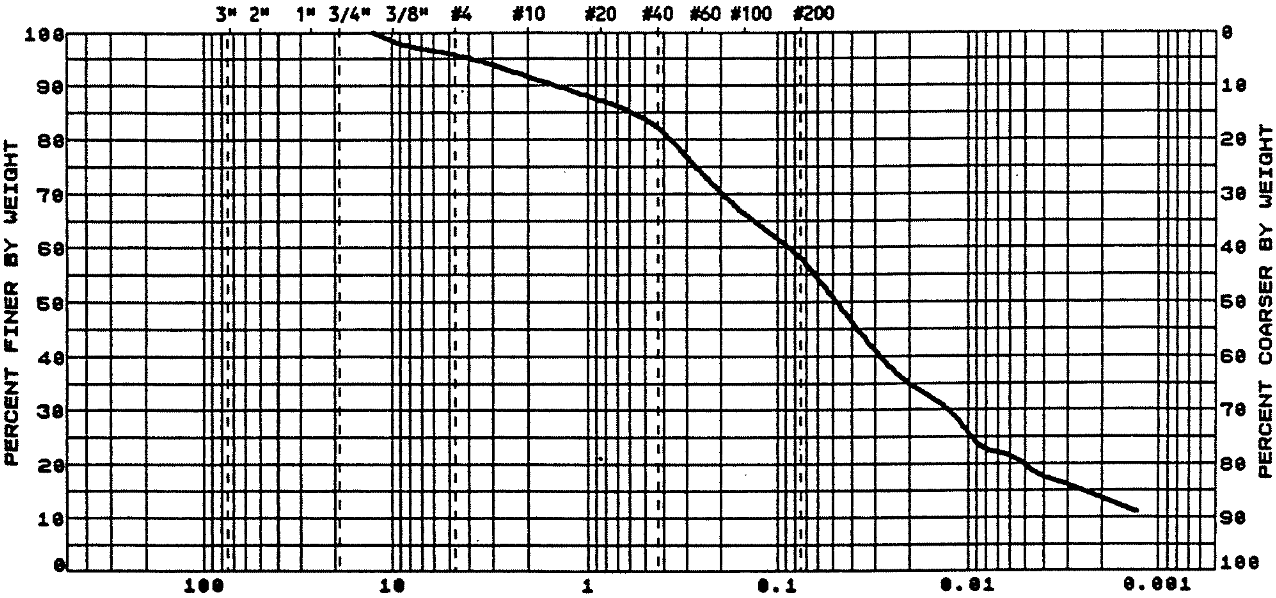
LAW ENVIRONMENTAL, INC.
112 TOWNPARK DRIVE
KENNESAW, GEORGIA 30144-5599
404-421-3400

PARTICLE SIZE DISTRIBUTION & PHYSICAL PROPERTIES

CLIENT Ecology and Environment, Inc.
4285 Genesee Street
Buffalo, New York 14225

JOB NO. 41-8905.10 DATE October 17, 1989
LAB NO. 9529 PAGE 10
PROJECT E & E P.O.#48252
SAMPLE ID GW 1-SS-03 50308.01

U.S. STANDARD SIEVE SIZES



PARTICLE SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT & CLAY
	COARSE	MEDIUM	CO.	MEDIUM	FINE	

U.S. STANDARD SIEVE SIZE		PERCENT PASSING		HYDROMETER
SIEVE NO.	SIEVE SIZE (MILLIMETERS)			PARTICLE DIAMETER (MILLIMETERS)
3"	75			0.050
2"	50		35.0	0.020
1-1/2"	37.5		19.7	0.005
1"	25		13.6	0.002
3/4"	19			0.001
1/2"	12.5	100.0		
3/8"	9.5	98.2		
#4	4.75	95.9		
#10	2.00	91.8		
#20	0.850	87.3		
#40	0.425	82.0		
#60	0.250	73.7		
#100	0.150	66.4		
#200	0.075	58.0		

POROSITY (%)
EFFECTIVE SIZE (mm)
COEFFICIENT OF UNIFORMITY
COEFFICIENT OF CURVATURE
LIQUID LIMIT
PLASTIC LIMIT
PLASTICITY INDEX
CLASSIFICATION ()

WATER CONTENT (%) 13.9
DRY DENSITY (PCF)
SPECIFIC GRAVITY
HYDRAULIC CONDUCTIVITY (cm/sec - 20C)
TEST PROCEDURES: ASTM D422, D4318, D2216, D4287; CORPS OF ENGRS EM-1110-2-1906

LAW ENVIRONMENTAL, INC.
M.A. O'Kelley

APPENDIX E

RAW ANALYTICAL DATA SUMMARY SHEETS
FROM WATER AND SOIL SAMPLING

SURFACE SOIL SAMPLES

1
INORGANIC ANALYSIS DATA SHEET

NYSDEC SAMPLE
SS1

Lab Name: Ecology & Environment Inc.   Contract: D001549

Lab Code: ______   Case No.: 820.001   SAS No.: Y01020   SDG No.: SS1

Matrix (soil/water): SOIL   Lab Sample ID: 39619

Level (low/med): LOW   Date Received: 05/05/8

% Solids: 89.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10400			P
7440-36-0	Antimony	13.4	U	N	P
7440-38-2	Arsenic	4.2		N	F
7440-39-3	Barium	118			P
7440-41-7	Beryllium	0.45	U		P
7440-43-9	Cadmium	1.9		N	P
7440-70-2	Calcium	46300			P
7440-47-3	Chromium	18.6			P
7440-48-4	Cobalt	6.0	B		P
7440-50-8	Copper	49.3			P
7439-89-6	Iron	24400			P
7439-92-1	Lead	215			P
7439-95-4	Magnesium	15000			P
7439-96-5	Manganese	555		*	P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	18.0			P
7440-09-7	Potassium	1680			P
7782-49-2	Selenium	1.1	U	W N	F
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	155	B		P
7440-28-0	Thallium	1.1	U		F
7440-62-2	Vanadium	21.2			P
7440-66-6	Zinc	222			P
	Cyanide	1.1	U		C

BMK 6/6/89

Color Before: ______   Clarity Before: ______   Texture: Homog

Color After: ______   Clarity After: ______   Artifacts: ______

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

NYSDEC SAMPLE NC

SS2

ab Name: Ecology & Environment Inc. Contract: D001549

ab Code: ______ Case No.: 820.001 SAS No.: Y01020 SDG No.: SS1

atrix (soil/water): SOIL Lab Sample ID: 39620

evel (low/med): LOW Date Received: 05/05/89

Solids: 86.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1820			P
7440-36-0	Antimony	13.8	U	N	P
7440-38-2	Arsenic	2.0		N	F
7440-39-3	Barium	12.0	B		P
7440-41-7	Beryllium	0.46	U		P
7440-43-9	Cadmium	1.2	U	N	P
7440-70-2	Calcium	76400			P
7440-47-3	Chromium	3.0			P
7440-48-4	Cobalt	2.3	U		P
7440-50-8	Copper	4.7	B		P
7439-89-6	Iron	4970			P
7439-92-1	Lead	7.0			F
7439-95-4	Magnesium	36300			P
7439-96-5	Manganese	174		*	P
7439-97-6	Mercury	0.12	U		CV
7440-02-0	Nickel	3.4	U		P
7440-09-7	Potassium	478	B		P
7782-49-2	Selenium	1.2	U	W N	F
7440-22-4	Silver	2.3	U		P
7440-23-5	Sodium	126	B		P
7440-28-0	Thallium	1.2	U		F
7440-62-2	Vanadium	5.4	B		P
7440-66-6	Zinc	36.1			P
	Cyanide	1.2	U		C

BMM 6/6/89

lor Before: ______ Clarity Before: ______ Texture: SAND

lor After: ______ Clarity After: ______ Artifacts: ______

mments:

FORM I - IN

1
INORGANIC ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.
SS3

Lab Name: Ecology & Environment Inc. Contract: D001549

Lab Code: ______ Case No.: 820.001 SAS No.: Y01020 SDG No.: SS1

Matrix (soil/water): SOIL Lab Sample ID: 39621

Level (low/med): LOW Date Received: 05/05/89

% Solids: 80.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12800			P
7440-36-0	Antimony	15.0	U	N	P
7440-38-2	Arsenic	4.5		N	F
7440-39-3	Barium	77.4			P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	1.2	U	N	P
7440-70-2	Calcium	6680			P
7440-47-3	Chromium	17.8			P
7440-48-4	Cobalt	5.9	B		P
7440-50-8	Copper	24.9			P
7439-89-6	Iron	20900			P
7439-92-1	Lead	131			P
7439-95-4	Magnesium	4380			P
7439-96-5	Manganese	580		*	P
7439-97-6	Mercury	0.12	U		CV
7440-02-0	Nickel	13.0			P
7440-09-7	Potassium	1380			P
7782-49-2	Selenium	1.2	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	74.5	B		P
7440-28-0	Thallium	1.2	U		F
7440-62-2	Vanadium	26.5			P
7440-66-6	Zinc	123			P
	Cyanide	1.2	U		C

Color Before: ______ Clarity Before: ______ Texture: Homogeneous

Color After: ______ Clarity After: ______ Artifacts: ______

Comments:

1
INORGANIC ANALYSIS DATA SHEET

NYSDEC SAMPLE NO
SS4

ab Name: ECOLOGY & ENVIRONMENT INC. Contract: D001549

ab Code: ______ Case No.: 820.001 SAS No.: Y01020 SDG No.: SS1

atrix (soil/water): SOIL Lab Sample ID: 39622

evel (low/med): LOW Date Received: 05/05/89

Solids: 88.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8580			P
7440-36-0	Antimony	13.6	U	N	P
7440-38-2	Arsenic	2.8		N	F
7440-39-3	Barium	75.0			P
7440-41-7	Beryllium	0.45	U		P
7440-43-9	Cadmium	1.1	U	N	P
7440-70-2	Calcium	22700			P
7440-47-3	Chromium	12.1			P
7440-48-4	Cobalt	5.8	B		P
7440-50-8	Copper	17.1			P
7439-89-6	Iron	15900			P
7439-92-1	Lead	27.1			P
7439-95-4	Magnesium	65100			P
7439-96-5	Manganese	436		*	P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	13.4			P
7440-09-7	Potassium	1600			P
7782-49-2	Selenium	1.1	U	W N	F
7440-22-4	Silver	2.3	U		P
7440-23-5	Sodium	170	B		P
7440-28-0	Thallium	1.1	U		F
7440-62-2	Vanadium	17.8			P
7440-66-6	Zinc	88.4			P
	Cyanide	1.1	U		C

4/6/89

lor Before: ________ Clarity Before: ______ Texture: CLAY

lor After: ________ Clarity After: ______ Artifacts: ______

nments:

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1
INORGANIC ANALYSIS DATA SHEET

NYSDEC SAMPLE NO: SS5

Lab Name: ECOLOGY & ENVIRONMENT INC. Contract: D001549

Lab Code: ______ Case No.: 820.001 SAS No.: Y01020 SDG No.: SS1

Matrix (soil/water): SOIL Lab Sample ID: 39623

Level (low/med): LOW Date Received: 05/05/89

% Solids: 83.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	13900			P
7440-36-0	Antimony	14.4	U	N	P
7440-38-2	Arsenic	2.6		N	F
7440-39-3	Barium	110			P
7440-41-7	Beryllium	0.48	U		P
7440-43-9	Cadmium	1.2	U	N	P
7440-70-2	Calcium	66900			P
7440-47-3	Chromium	19.4			P
7440-48-4	Cobalt	10.8	B		P
7440-50-8	Copper	16.5			P
7439-89-6	Iron	23700			P
7439-92-1	Lead	17.9			F
7439-95-4	Magnesium	18100			P
7439-96-5	Manganese	590		*	P
7439-97-6	Mercury	0.12	U		CV
7440-02-0	Nickel	20.1			P
7440-09-7	Potassium	2680			P
7782-49-2	Selenium	1.2	U	WN	F
7440-22-4	Silver	2.4	U		P
7440-23-5	Sodium	233	B		P
7440-28-0	Thallium	1.2	U		F
7440-62-2	Vanadium	24.7			P
7440-66-6	Zinc	64.6			P
	Cyanide	1.2	U		C

BM 6/6/89

Color Before: ______ Clarity Before: ______ Texture: CLAY

Color After: ______ Clarity After: ______ Artifacts: ______

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

NYSDEC SAMPLE N[o]

SS6

Lab Name: Ecology & Environment Inc.   Contract: D001549

Lab Code: ______   Case No.: 820.001   SAS No.: Y01020   SDG No.: SS1

Matrix (soil/water): SOIL   Lab Sample ID: 39624

Level (low/med): LOW   Date Received: 05/05/89

% Solids: 77.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12800			P
7440-36-0	Antimony	15.4	U	N	P
7440-38-2	Arsenic	4.3		N	F
7440-39-3	Barium	71.0			P
7440-41-7	Beryllium	0.51	U		P
7440-43-9	Cadmium	1.4		N	P
7440-70-2	Calcium	7490			P
7440-47-3	Chromium	14.3			P
7440-48-4	Cobalt	9.2	B		P
7440-50-8	Copper	17.3			P
7439-89-6	Iron	23200			P
7439-92-1	Lead	50.5			P
7439-95-4	Magnesium	5320			P
7439-96-5	Manganese	639		*	P
7439-97-6	Mercury	0.13	U		CV
7440-02-0	Nickel	17.6			P
7440-09-7	Potassium	1100			P
7782-49-2	Selenium	1.3	U	W N	F
7440-22-4	Silver	2.6	U		P
7440-23-5	Sodium	102	B		P
7440-28-0	Thallium	1.3	U		F
7440-62-2	Vanadium	24.6			P
7440-66-6	Zinc	97.6			P
	Cyanide	1.3	U		C

AH 6/6/89

Color Before: ______   Clarity Before: ______   Texture: Homogene

Color After: ______   Clarity After: ______   Artifacts: ______

Comments:

FORM I - IN

WASTE SAMPLES

DATA SUMMARY FORM: V O L A T I L E S 1

SOIL SAMPLES
(ug/Kg)

Site Name: LASALLE RESERVOIR

Case #: 820-006 Sampling Date(s): 12/20/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100

Sample No.	WS-7		WS-7RE		WS-8		WS-9		WS-10		WS-11		WS-12		WS-13		WS-14	
Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
% Moisture	19		19		23		13		22		21		13		21		19	
Location																		
COMPOUND																		
Chloromethane																		
Bromomethane																		
Vinyl Chloride																		
Chloroethane																		
Methylene Chloride	10	B	8	B	11	B	8	B	10	B	8	B	8	B	15	B	14	B
Acetone	59	B	26	B	52	B	47	B	87	B	43	B	24	B	160	B	61	B
Carbon Disulfide																		
1,1-Dichloroethene																		
1,1-Dichloroethane																		
Total-1,2 Dichloroethene																		
Chloroform	3	J	4	J	3	J	3	J	3	J	3	J	2	J	3	J	3	J
1,2-Dichloroethane																		
2-Butanone																		
1,1,1-Trichloroethane																		
Carbon Tetrachloride																		
Vinyl Acetate																		
Bromodichloromethane																		

RDL = Contract Required Detection Limit

SEE NARRATIVE FOR CODE DEFINITIONS

E-10

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DATA SUMMARY FORM: V O L A T I L E S 2

SOIL SAMPLES
(ug/Kg)

Site Name: LASALLE RESERVOIR

Case #: 820-006 Sampling Date(s): 12/20/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/1

QL	Sample No.	WS-7		WS-7RE		WS-8		WS-9		WS-10		WS-11		WS-12		WS-13		WS-14	
	Dilution Factor	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0	
	% Moisture	19		19		23		13		22		21		13		21		19	
	Location																		
	COMPOUND																		
	1,2 Dichloropropane																		
	Cis-1,3 Dichloropropene																		
	Trichloroethene																		
	Dibromochloromethane																		
	1,1,2 Trichloroethane																		
	Benzene																		
	Trans-1,3-Dichloropropene																		
	Bromoform																		
0	4-Methyl-2-pentanone																		
0	2-Hexanone																		
	Tetrachloroethene																		
	1,1,2,2-Tetrachloroethane																		
	Toluene																		
	Chlorobenzene									2	J								
	Ethylbenzene																		
	Styrene																		
	Total Xylenes									6	J								

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: VOLATILES 1

SOIL SAMPLES
(ug/Kg)

Site Name: LASALLE RESERVOIR

Case #: 820-006 Sampling Date(s): 12/20/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100

Sample No.	WS-15		WS-10MS		WS-10MSD											
Dilution Factor	1.0		1.0		1.0											
% Moisture	20		22		22											
Location																
COMPOUND																
Chloromethane																
Bromomethane																
Vinyl Chloride																
Chloroethane																
Methylene Chloride	12	B	16	B	14	B										
Acetone	68	B	93	B	87	B										
Carbon Disulfide																
1,1-Dichloroethene																
1,1-Dichloroethane																
Total-1,2 Dichloroethene																
Chloroform	2	J	4	J	3	J										
1,2-Dichloroethane																
2-Butanone																
1,1,1-Trichloroethane																
Carbon Tetrachloride																
Vinyl Acetate																
Bromodichloromethane																

CRDL = Contract Required Detection Limit

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DATA SUMMARY FORM: V O L A T I L E S 2

SOIL SAMPLES
(ug/Kg)

Site Name: LASALLE RESERVOIR

Case #: 820-006 Sampling Date(s): 12/20/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/1(

	Sample No.	WS-15		WS-10MS		WS-10MSD						
	Dilution Factor	1.0		1.0		1.0						
	% Moisture	20		22		22						
	Location											
ɔL	COMPOUND											
	1,2-Dichloropropane											
	Cis-1,3 Dichloropropene											
	Trichloroethene											
	Dibromochloromethane											
	1,1,2 Trichloroethane											
	Benzene											
	Trans-1,3-Dichloropropene											
	Bromoform											
)	4 Methyl-2-pentanone											
)	2-Hexanone											
	Tetrachloroethene											
	1,1,2,2-Tetrachloroethane											
	Toluene											
	Chlorobenzene	2	J									
	Ethylbenzene	1	J									
	Styrene											
	Total Xylenes	8		6	J	8						

CRQL = Contract Required Quantitation Limit

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E-13

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ecology and environment

DATA SUMMARY FORM: T E N T A T I V E L Y I N D E N T I F I E D C O M P O U N D S

Site Name: LASALLE RESERVOIR

Case #: 820-006 Sampling Date: 2/20/89

SOIL SAMPLES
(ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((1 - % moisture/100)

CRQL	Sample No.	WS-7	WS-7RE	WS-8	WS-9	WS10	WS-11	WS-12	WS-13	WS-14
	Dilution Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	% Moisture	19	19	23	13	22	21	13	21	19
	Location									
	COMPOUND									
	Hexane		12 J							

CRQL = Contract Required Quantitation Limit

DATA SUMMARY FORM: TENTATIVELY INDENTIFIED COMPOUNDS

Site Name: LASALLE RESERVOIR

SOIL SAMPLES
(ug/Kg)

Case #: 820-006 Sampling Date: 12/20/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((1 - % moisture/100)

E-15

CRQL	Sample No.	WS-15	WS-9MS	WS-9MSD					
	Dilution Factor	10.0	2.0	2.0					
	% Moisture	20	20	13					
	Location								
	COMPOUND								

CRQL = Contract Required Quantitation Limit

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ecology and environment

DATA SUMMARY FORM: B N A S 1

Site Name: LASALLE RESERVOIR

SOIL SAMPLES
(ug/Kg)

Case #: 820-006 Sampling Date(s): 12/20/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

CRQL	Sample No.	WS-7	WS-8	WS-9	WS-10	WS-11	WS-12	WS-13	WS-15	WS-9MS
	Dilution Factor	1.0	2.0	2.0	10.0	1.0	2.0	2.0	10.0	2.0
	% Moisture	19	23	13	22	21	13	21	20	13
	Location								Dup S-10	
	COMPOUND									
330	Phenol									
330	bis(2-Chloroethyl)ether									
330	2-Chlorophenol									
330	1,3-Dichlorobenzene									
330	1,4-Dichlorobenzene									
330	Benzyl Alcohol									
330	1,2-Dichlorobenzene									
330	2-Methylphenol									
330	bis(2-Chloroisopropyl)ether									
330	4-Methylphenol			150 J	530 J				470 J	
330	N-Nitroso-di-n-propylamine									
330	Hexachloroethane									
330	Nitrobenzene									
330	Isophorone									
330	2-Nitrophenol									
330	2,4-Dimethylphenol				280 J				320 J	
1600	Benzoic Acid									
330	bis(2-Chloroethoxy)methane									
330	2,4-Dichlorophenol									
330	1,2,4-Trichlorobenzene									
330	Naphthalene -*			2800	9000	67 J	180 J	48 J	8700	1100
330	4-Chloroaniline									

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: B N A S 2

SOIL SAMPLES
(ug/Kg)

Site Name: LASALLE RESERVOIR

Case #: 820-006 Sampling Date(s): 12/20/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/10

E-17

RQL	Sample No.	WS-7	WS-8	WS-9	WS-10	WS-11	WS-12	WS-13	WS-15	WS-9MS
	Dilution Factor	1.0	2.0	2.0	10.0	1.0	2.0	2.0	10.0	2.0
	% Moisture	19	23	13	22	21	13	21	20	13
	Location								Dup S-10	
	COMPOUND									
330	Hexachlorobutadiene									
330	4-Chloro-3-methylphenol									
330	2-Methylnaphthalene *			1300	6900		100 J		6700	540
330	Hexachlorocyclopentadiene									
330	2,4,6-Trichlorophenol									
1600	2,4,5-Trichlorophenol									
330	2-Chloronaphthalene									
1600	2-Nitroaniline									
330	Dimethylphthalate									
330	Acenaphthylene *			120 J	270 J				380 J	160 J
330	2,6-Dinitrotoluene									
1600	3-Nitroaniline									
330	Acenaphthene *		88 J	2200	7800	89 J	340 J	45 J	7300	
1600	2,4-Dinitrophenol									
1600	4-Nitrophenol									
330	Dibenzofuran			2200	12000	84 J	200 J	45 J	11000	1300
330	2,4-Dinitrotoluene									
330	Diethylphthalate									
330	4-Chlorophenyl-phenylether									
330	Fluorene *		94 J	2700	16000	92 J	400 J	65 J	16000	1800
1600	4-Nitroaniline									
1600	4,6-Dinitro-2-methylphenol									

CRQL = Contract Required Quantitation Limit

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ecology and environment

Site Name: LASALLE RESERVOIR

SOIL SAMPLES
(ug/Kg)

Case #: 820-006 Sampling Date(s): 12/20/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/1

recycled paper E-18

CRQL	COMPOUND	WS-7		WS-8		WS-9		WS-10		WS-11		WS-12		WS-13		WS-15		WS-9M
	Sample No.	WS-7		WS-8		WS-9		WS-10		WS-11		WS-12		WS-13		WS-15		WS-9M
	Dilution Factor	1.0		2.0		2.0		10.0		1.0		2.0		2.0		10.0		2.0
	% Moisture	19		23		13		22		21		13		21		20		13
	Location															Dup S-10		
330	N-Nitrosodiphenylamine																	
330	4-Bromophenyl phenylether																	
330	Hexachlorobenzene																	
1600	Pentachlorophenol																	
330	Phenanthrene *	150	J	910		15000	E	73000	E	860		3100		490	J	65000		8500
330	Anthracene *			240	J	4000		23000		280	J	960		100	J	20000		2300
330	Di-n-butylphthalate	170	BJ	120	BJ	140	BJ			280	BJ	150	BJ	160	BJ			
330	Fluoranthene *	190	J	1300		12000		53000		3200		2900		640	J	50000		8400
330	Pyrene *	180	J	1200		13000	E	47000		5100		4800		670	J	48000		
330	Butylbenzylphthalate			93	J													
1600	3,3-Dichlorobenzidine																	
330	Benzo(a)anthracene *			710	J	7000		31000		4600		1900		400	J	29000		6300
330	Chrysene *	110	J	950		8100		30000		4600		2700		410	J	30000		5700
330	bis(2-Ethylhexyl)phthalate	1300	B	930	B	960	B	2800	BJ	910	B	1100	B	1100	B	3000	BJ	900
330	Di-n-octylphthalate															310	J	
330	Benzo(b)fluoranthene *	99	J	1100		9200		32000		11000	E	2900		570	J	22000		7800
330	Benzo(k)fluoranthene *																	
330	Benzo(a)pyrene *			650	J	6400		21000		6900	E	2100		300	J	19000		4300
330	Indeno(1,2,3-cd)pyrene *			630	J	3600		11000		7200	E	1300		310	J	9500		4100
330	Dibenz(a,h)anthracene *			210	J	1000		4100	J	2600		400	J			3600	J	920
330	Benzo(g,h,i)perylene *			530	J	3000		4900		5400		1200		240	J	8200		2900

ecology and environment

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: B N A S 1

Site Name: LASALLE RESERVOIR

SOIL SAMPLES
(ug/Kg)

Case #: 820-006 Sampling Date(s): 12/20/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/

CRQL	Sample No.	WS-9MSD	WS-14						
	Dilution Factor	2.0	2.0						
	% Moisture	13	19						
	Location								
	COMPOUND								
330	Phenol								
330	bis(2-Chloroethyl)ether								
330	2-Chlorophenol								
330	1,3 Dichlorobenzene								
330	1,4 Dichlorobenzene								
330	Benzyl Alcohol								
330	1,2 Dichlorobenzene								
330	2-Methylphenol								
330	bis(2-Chloroisopropyl)ether								
330	4-Methylphenol								
330	N-Nitroso-di-n-propylamine								
330	Hexachloroethane								
330	Nitrobenzene								
330	Isophorone								
330	2-Nitrophenol								
330	2,4-Dimethylphenol								
1600	Benzoic Acid								
330	bis(2-Chloroethoxy)methane								
330	2,4 Dichlorophenol								
330	1,2,4-Trichlorobenzene								
330	Naphthalene *	1000							
330	4-Chloroaniline								

CRQL = Contract Required Quantitation Limit

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E-19

Site Name: LASALLE RESERVOIR

SOIL SAMPLES
(ug/Kg)

Case #: 820-006 Sampling Date(s): 12/20/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/

recycled paper E-20

CRQL	Sample No.	WS-9MSD		WS-14															
	Dilution Factor	2.0		2.0															
	% Moisture	13		19															
	Location																		
	COMPOUND																		
30	Hexachlorobutadiene																		
30	4-Chloro-3-methylphenol																		
30	2-Methylnaphthalene	510	J																
30	Hexachlorocyclopentadiene																		
30	2,4,6-Trichlorophenol																		
300	2,4,5-Trichlorophenol																		
30	2-Chloronaphthalene																		
300	2-Nitroaniline																		
30	Dimethylphthalate																		
30	Acenaphthylene	220	J																
30	2,6-Dinitrotoluene																		
300	3-Nitroaniline																		
30	Acenaphthene			51	J														
300	2,4-Dinitrophenol																		
300	4-Nitrophenol																		
30	Dibenzofuran	1200																	
30	2,4-Dinitrotoluene																		
30	Diethylphthalate																		
30	4-Chlorophenyl-phenylether																		
30	Fluorene	1700		56	J														
300	4-Nitroaniline																		
300	4,6-Dinitro-2-methylphenol																		

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITION

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DATA SUMMARY FORM: B N A S 3

SOIL SAMPLES
(ug/Kg)

Site Name: LASALLE RESERVOIR

Case #: 820-006 Sampling Date(s): 12/20/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/

recycled paper E-21

CRQL	Sample No.	WS-9MSD		WS-74	
	Dilution Factor	2.0		2.0	
	% Moisture	13		19	
	Location				
	COMPOUND				
330	N-Nitrosodiphenylamine				
330	4-Bromophenyl phenylether				
330	Hexachlorobenzene				
1600	Pentachlorophenol				
330	Phenanthrene	9100		510	J
330	Anthracene	2700		84	J
330	Di-n-butylphthalate			77	BJ
330	Fluoranthene	11000		650	J
330	Pyrene			830	
330	Butylbenzylphthalate				
1600	3,3-Dichlorobenzidine				
330	Benzo(a)anthracene	7800		390	J
330	Chrysene	6900		400	J
330	bis(2-Ethylhexyl)phthalate	1000	B	980	B
330	Di-n-octylphthalate			84	J
330	Benzo(b)fluoranthene	11000		550	J
330	Benzo(k)fluoranthene				
330	Benzo(a)pyrene	5800		250	J
330	Indeno(1,2,3-cd)pyrene	5200		290	J
330	Dibenz(a,h)anthracene	1200			
330	Benzo(g,h,i)perylene	3600		230	J

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: TENTATIVELY INDENTIFIED COMPOUNDS

Site Name: LASALLE RESERVOIR

Case #: 820-006 Sampling Date: 12/20/89

SOIL SAMPLES
(ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((1 - % moisture/100)

CRQL	Sample No.	WS-7		WS-8		WS-9		WS-10		WS-11		WS-12		WS-13		WS-15		WS-9MS	
	Dilution Factor	1.0		2.0		2.0		10.0		1.0		2.0		2.0		10.0		2.0	
	% Moisture	19		23		13		22		21		13		21		20		13	
	Location																		
CRQL	COMPOUND																		
	Dibenzothiophene					1700	J												
	9H-Carbazole					1300	J	8500	J							6200	J		
	9H-Fluoren-9-one							5600	J							4600	J		

CRQL = Contract Required Quantitation Limit

DATA SUMMARY FORM: PESTICIDES AND PCBS

Site Name: LASALLE RESERVOIR

SOIL SAMPLES
(ug/Kg)

Case #: 820-006 Sampling Date(s): 12/20/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

CRQL	COMPOUND	WS-7	WS-8	WS-9	WS-10	WS-11	WS-12	WS-13	WS-14	WS-15
	Dilution Factor	1.0	4.0	10.0	40.0	2.0	2.0	1.0	1.0	40.0
	% Moisture									
	Location									Dup S-10
8	alpha-BHC									
8	beta-BHC									
8	delta-BHC									
8	Gamma-BHC (Lindane)									
8	Heptachlor									
8	Aldrin									
8	Heptachlor Epoxide								6.8 J	
8	Endosulfan I									
16	Dieldrin		80 J							
16	4,4'-DDE							12 J		
16	Endrin									
16	Endosulfan II									
16	4,4'-DDD		290		140 J			6 J	28 J	220 J
16	Endosulfan Sulfate									
16	4,4'-DDT							25		
80	Methoxychlor									
16	Endrin ketone									
80	Alpha-Chlordane								20 J	
80	Gamma-Chlordane								18 J	
160	Toxaphene									
80	Aroclor-1016									
80	Aroclor-1221									
80	Aroclor-1232									
80	Aroclor-1242									
80	Aroclor-1248									
160	Aroclor-1254									
160	Aroclor-1260									

CRQL = Contract Required Quantitation Limit

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DATA SUMMARY FORM: P E S T I C I D E S A N D P C B S

Site Name: LASALLE RESERVOIR

SOIL SAMPLES
(ug/Kg)

Case #: 820-006 Sampling Date(s): 12/20/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

E-24

	Sample No.	WS-9MS	WS-9MSD							
	Dilution Factor	10.0	10.0							
	% Moisture									
	Location									
CRQL	COMPOUND									
8	alpha-BHC									
8	beta-BHC									
8	delta-BHC									
8	Gamma-BHC (Lindane)									
8	Heptachlor									
8	Aldrin									
8	Heptachlor Epoxide									
8	Endosulfan I									
16	Dieldrin									
16	4,4'-DDE									
16	Endrin									
16	Endosulfan II									
16	4,4'-DDD									
16	Endosulfan Sulfate									
16	4,4'-DDT									
80	Methoxychlor									
16	Endrin ketone									
80	Alpha-Chlordane									
80	Gamma-Chlordane									
160	Toxaphene									
80	Aroclor-1016									
80	Aroclor-1221									
80	Aroclor-1232									
80	Aroclor-1242									
80	Aroclor-1248									
160	Aroclor-1254									
160	Aroclor-1260									

CRQL = Contract Required Quantitation Limit

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1

NYSDEC SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

WS-7

Lab Name: Ecology & Environment Inc. Contract: D001549

Lab Code: ______ Case No.: 820.006 SAS No.: Y01060 SDG No.: ______

Matrix (soil/water): SOIL Lab Sample ID: 60558

Level (low/med): LOW Date Received: 12/20/89

% Solids: 81.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	~~Q~~	~~M~~
7429-90-5	Aluminum	8600			P
7440-36-0	Antimony	14.8	U		P
7440-38-2	Arsenic	3.2			F
7440-39-3	Barium	65.0			P
7440-41-7	Beryllium	0.49	U		P
7440-43-9	Cadmium	2.0			P
7440-70-2	Calcium	39900			P
7440-47-3	Chromium	13.0			P
7440-48-4	Cobalt	5.6	B		P
7440-50-8	Copper	14.5			P
7439-89-6	Iron	15800			P
7439-92-1	Lead	49.4			F
7439-95-4	Magnesium	15800			P
7439-96-5	Manganese	349			P
7439-97-6	Mercury	0.12	U		CV
7440-02-0	Nickel	12.3			P
7440-09-7	Potassium	801			P
7782-49-2	Selenium	1.2	U		F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	133	B		P
7440-28-0	Thallium	1.2	U		F
7440-62-2	Vanadium	16.9			P
7440-66-6	Zinc	68.9			P
	Cyanide	1.2	U		C

Color Before: ______ Clarity Before: ______ Texture: CLAY

Color After: ______ Clarity After: ______ Artifacts: ______

Comments:

FORM I - IN

1
INORGANIC ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.
WS-8

ab Name: ECOLOGY & ENVIRONMENT INC. Contract: D001549

ab Code: ______ Case No.: 820.006 SAS No.: Y01060 SDG No.: ______

atrix (soil/water): SOIL Lab Sample ID: 60559

evel (low/med): LOW Date Received: 12/20/89

Solids: 77.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8370			P
7440-36-0	Antimony	15.5	U		P
7440-38-2	Arsenic	4.6			F
7440-39-3	Barium	97.3			P
7440-41-7	Beryllium	0.52	U		P
7440-43-9	Cadmium	2.5			P
7440-70-2	Calcium	53300			P
7440-47-3	Chromium	23.1			P
7440-48-4	Cobalt	7.8	B		P
7440-50-8	Copper	50.0			P
7439-89-6	Iron	20800			P
7439-92-1	Lead	436			P
7439-95-4	Magnesium	15700			P
7439-96-5	Manganese	459			P
7439-97-6	Mercury	0.21			CV
7440-02-0	Nickel	19.3			P
7440-09-7	Potassium	1160	B		P
7782-49-2	Selenium	1.3	U	W	F
7440-22-4	Silver	2.6	U		P
7440-23-5	Sodium	152	B		P
7440-28-0	Thallium	1.3	U		F
7440-62-2	Vanadium	21.1			P
7440-66-6	Zinc	266			P
	Cyanide	1.3	U		C

olor Before: ______ Clarity Before: ______ Texture: MIXTURE

olor After: ______ Clarity After: ______ Artifacts: ______

omments:

FORM I - IN

1

NYSDEC SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

WS-9

Lab Name: ECOLOGY & ENVIRONMENT INC. Contract: D001549

Lab Code: ______ Case No.: 820.006 SAS No.: Y01060 SDG No.: ______

Matrix (soil/water): SOIL Lab Sample ID: 60560

Level (low/med): LOW Date Received: 12/20/89

% Solids: 86.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5670			P
7440-36-0	Antimony	13.9	U		P
7440-38-2	Arsenic	5.7			F
7440-39-3	Barium	250			P
7440-41-7	Beryllium	0.46	U		P
7440-43-9	Cadmium	3.6			P
7440-70-2	Calcium	49400			P
7440-47-3	Chromium	16.1			P
7440-48-4	Cobalt	6.3	B		P
7440-50-8	Copper	323			P
7439-89-6	Iron	16400			P
7439-92-1	Lead	576			P
7439-95-4	Magnesium	12700			P
7439-96-5	Manganese	381			P
7439-97-6	Mercury	0.23			CV
7440-02-0	Nickel	19.3			P
7440-09-7	Potassium	776	B		P
7782-49-2	Selenium	1.2	U	W	F
7440-22-4	Silver	2.3	U		P
7440-23-5	Sodium	153	B		P
7440-28-0	Thallium	1.2	U		F
7440-62-2	Vanadium	14.7			P
7440-66-6	Zinc	459			P
	Cyanide	1.2	U		C

Color Before: ______ Clarity Before: ______ Texture: FINE SOIL

Color After: ______ Clarity After: ______ Artifacts: ROCKS

Comments:

FORM I - IN

E-27

1

INORGANIC ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

WS-10

ab Name: Ecology & Environment Inc. Contract: D001549

ab Code: ______ Case No.: 820.006 SAS No.: Y01060 SDG No.: ______

atrix (soil/water): SOIL Lab Sample ID: 60561

evel (low/med): LOW Date Received: 12/20/89

Solids: 78.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11000			P
7440-36-0	Antimony	15.3	U		P
7440-38-2	Arsenic	7.8			F
7440-39-3	Barium	205			P
7440-41-7	Beryllium	0.51	U		P
7440-43-9	Cadmium	8.2			P
7440-70-2	Calcium	34400			P
7440-47-3	Chromium	45.1			P
7440-48-4	Cobalt	11.0	B		P
7440-50-8	Copper	158			P
7439-89-6	Iron	47500			P
7439-92-1	Lead	263			P
7439-95-4	Magnesium	9790			P
7439-96-5	Manganese	478			P
7439-97-6	Mercury	0.17			CV
7440-02-0	Nickel	31.3			P
7440-09-7	Potassium	1080	B		P
7782-49-2	Selenium	1.3	U	W	F
7440-22-4	Silver	2.6	U		P
7440-23-5	Sodium	284	B		P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	23.8			P
7440-66-6	Zinc	300			P
	Cyanide	1.3	U		C

olor Before: ______ Clarity Before: ______ Texture: CLAY

olor After: ______ Clarity After: ______ Artifacts: ______

omments:

1
INORGANIC ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

WS-11

Lab Name: Ecology & Environment Inc. Contract: D001549

Lab Code: ______ Case No.: 820.006 SAS No.: Y01060 SDG No.: ______

Matrix (soil/water): SOIL Lab Sample ID: 60562

Level (low/med): LOW Date Received: 12/20/89

% Solids: 79.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	~~Q~~	M
7429-90-5	Aluminum	6440			P
7440-36-0	Antimony	15.2	U		P
7440-38-2	Arsenic	6.5			F
7440-39-3	Barium	559			P
7440-41-7	Beryllium	0.51	U		P
7440-43-9	Cadmium	1.4			P
7440-70-2	Calcium	29700			P
7440-47-3	Chromium	12.9			P
7440-48-4	Cobalt	7.0	B		P
7440-50-8	Copper	45.0			P
7439-89-6	Iron	14100			P
7439-92-1	Lead	202			P
7439-95-4	Magnesium	8480			P
7439-96-5	Manganese	235			P
7439-97-6	Mercury	0.13	U		CV
7440-02-0	Nickel	19.2			P
7440-09-7	Potassium	800	B		P
7782-49-2	Selenium	1.3	U		F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	159	B		P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	22.7			P
7440-66-6	Zinc	176			P
	Cyanide	1.3	U		C

Color Before: ______ Clarity Before: ______ Texture: MIXTURE

Color After: ______ Clarity After: ______ Artifacts: ______

Comments:

FORM I - IN

1

INORGANIC ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

WS-12

ab Name: Ecology & Environment Inc. Contract: D001549

ab Code: ____ Case No.: 820.006 SAS No.: Y01060 SDG No.: ____

atrix (soil/water): SOIL Lab Sample ID: 60563

evel (low/med): LOW Date Received: 12/20/89

Solids: 87.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9210			P
7440-36-0	Antimony	13.8	U		P
7440-38-2	Arsenic	5.2			F
7440-39-3	Barium	139			P
7440-41-7	Beryllium	0.46	U		P
7440-43-9	Cadmium	3.3			P
7440-70-2	Calcium	56600			P
7440-47-3	Chromium	36.7			P
7440-48-4	Cobalt	7.1	B		P
7440-50-8	Copper	156			P
7439-89-6	Iron	22300			P
7439-92-1	Lead	252			P
7439-95-4	Magnesium	13200			P
7439-96-5	Manganese	684			P
7439-97-6	Mercury	0.23			CV
7440-02-0	Nickel	29.3			P
7440-09-7	Potassium	1240			P
7782-49-2	Selenium	1.1	U	W	F
7440-22-4	Silver	2.3	U		P
7440-23-5	Sodium	154	B		P
7440-28-0	Thallium	1.1	U	W	F
7440-62-2	Vanadium	24.4			P
7440-66-6	Zinc	285			P
	Cyanide	1.1	U		C

olor Before: ____ Clarity Before: ____ Texture: CLAY

olor After: ____ Clarity After: ____ Artifacts: ____

omments:

FORM I - IN

1

INORGANIC ANALYSIS DATA SHEET

NYSDEC SAMPLE NO. WS13

Lab Name: ECOLOGY & ENVIRONMENT INC. Contract: D001549

Lab Code: ______ Case No.: 820.006 SAS No.: Y01060 SDG No.: ______

Matrix (soil/water): SOIL Lab Sample ID: 60564

Level (low/med): LOW Date Received: 12/20/89

% Solids: 79.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9210			P
7440-36-0	Antimony	15.2	U		P
7440-38-2	Arsenic	3.1			F
7440-39-3	Barium	56.3			P
7440-41-7	Beryllium	0.51	U		P
7440-43-9	Cadmium	1.7			P
7440-70-2	Calcium	11000			P
7440-47-3	Chromium	12.2			P
7440-48-4	Cobalt	4.8	B		P
7440-50-8	Copper	14.3			P
7439-89-6	Iron	14200			P
7439-92-1	Lead	72.8			F
7439-95-4	Magnesium	3850			P
7439-96-5	Manganese	238			P
7439-97-6	Mercury	0.13	U		CV
7440-02-0	Nickel	8.7	B		P
7440-09-7	Potassium	530	B		P
7782-49-2	Selenium	1.3	U		F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	80.6	B		P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	19.6			P
7440-66-6	Zinc	73.9			P
	Cyanide	1.3	U		C

Color Before: ______ Clarity Before: ______ Texture: CLAY

Color After: ______ Clarity After: ______ Artifacts: ______

Comments:

NYSDEC SAMPLE NO.

WS-14

1

INORGANIC ANALYSIS DATA SHEET

Name: Ecology & Environment Inc. Contract: D001549

Code: ______ Case No.: 820.006 SAS No.: Y01060 SDG No.: ______

Matrix (soil/water): SOIL Lab Sample ID: 60565

Level (low/med): LOW Date Received: 12/20/89

% Solids: 80.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	~~Q~~	M
7429-90-5	Aluminum	10300			P
7440-36-0	Antimony	14.9	U		P
7440-38-2	Arsenic	4.5	-		F
7440-39-3	Barium	100	-		P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	1.8	-		P
7440-70-2	Calcium	58300	-		P
7440-47-3	Chromium	14.9	-		P
7440-48-4	Cobalt	6.4	B		P
7440-50-8	Copper	21.5	-		P
7439-89-6	Iron	18600	-		P
7439-92-1	Lead	85.5	-		F
7439-95-4	Magnesium	19500	-		P
7439-96-5	Manganese	569	-		P
7439-97-6	Mercury	1.2	U		CV
7440-02-0	Nickel	17.4	-		P
7440-09-7	Potassium	1440	-		P
7782-49-2	Selenium	1.2	U		F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	126	B		P
7440-28-0	Thallium	1.2	U		F
7440-62-2	Vanadium	23.0	-		P
7440-66-6	Zinc	110	-		P
	Cyanide	1.2	U		C

Color Before: ______ Clarity Before: ______ Texture: CLAY

Color After: ______ Clarity After: ______ Artifacts: STONES

Comments:

1

INORGANIC ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.: WS-15

Lab Name: ECOLOGY & ENVIRONMENT INC. Contract: D001549

Lab Code: ______ Case No.: 820.006 SAS No.: Y01060 SDG No.: ______

Matrix (soil/water): SOIL Lab Sample ID: 60566

Level (low/med): LOW Date Received: 12/20/89

% Solids: 80.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9700			P
7440-36-0	Antimony	15.0	U		P
7440-38-2	Arsenic	7.8			F
7440-39-3	Barium	161			P
7440-41-7	Beryllium	0.50	U		P
7440-43-9	Cadmium	4.5			P
7440-70-2	Calcium	87000			P
7440-47-3	Chromium	30.7			P
7440-48-4	Cobalt	8.9	B		P
7440-50-8	Copper	106			P
7439-89-6	Iron	24100			P
7439-92-1	Lead	155			P
7439-95-4	Magnesium	15700			P
7439-96-5	Manganese	586			P
7439-97-6	Mercury	0.16			CV
7440-02-0	Nickel	22.3			P
7440-09-7	Potassium	1140	B		P
7782-49-2	Selenium	1.2	U	W	F
7440-22-4	Silver	2.5			P
7440-23-5	Sodium	211	B		P
7440-28-0	Thallium	1.2	U	W	F
7440-62-2	Vanadium	20.6			P
7440-66-6	Zinc	253			P
	Cyanide	1.3			C

Color Before: ______ Clarity Before: ______ Texture: CLAY

Color After: ______ Clarity After: ______ Artifacts: STONES

Comments:

DRILLING WATER

DATA SUMMARY FORM: V O L A T I L E S 1

WATER SAMPLES
(ug/L)

Site Name: LASALLE RESERVOIR

Case #: 820003 Sampling Date(s): 7/21/89

To calculate sample quantitation limit: (CRQL * Dilution Factor)

E-35

	Sample No.	GW-1-W-01															
	Dilution Factor	1.0															
	Location																
CRQL	COMPOUND																
10	Chloromethane																
10	Bromomethane																
10	*Vinyl Chloride																
10	Chloroethane																
5	*Methylene Chloride	6	B														
10	Acetone	29	B														
5	Carbon Disulfide																
5	*1,1-Dichloroethene																
5	1,1-Dichloroethane																
5	*Total-1,2-Dichloroethene																
5	Chloroform	11															
5	*1,2-Dichloroethane																
10	*2-Butanone																
5	*1,1,1-Trichloroethane																
5	*Carbon Tetrachloride																
10	Vinyl Acetate																
5	Bromodichloromethane	7															

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: V O L A T I L E S 2

Site Name: LASALLE RESERVOIR

WATER SAMPLES
(ug/L)

Case #: 820-003 Sampling Date(s): 7/21/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

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E-36

	Sample No.	GW-1-W-01								
	Dilution Factor	1.0								
	Location									
QL	COMPOUND									
	*1,2-Dichloropropane									
	Cis-1,3-Dichloropropene									
	Trichloroethene									
	Dibromochloromethane	4 J								
	1,1,2-Trichloroethane									
	*Benzene									
	Trans-1,3-Dichloropropene									
	Bromoform									
	4-Methyl-2-pentanone									
	2-Hexanone									
	*Tetrachloroethene									
	1,1,2,2-Tetrachloroethane									
	*Toluene									
	*Chlorobenzene									
	*Ethylbenzene									
	*Styrene									
	*Total Xylenes									

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: B N A S 1

WATER SAMPLES
(ug/L)

Site Name: LASALLE RESERVOIR

Case #: S20-003 Sampling Date(s): 7/21/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

CRQL	Sample No.	GW-1-W-01								
	Dilution Factor	1.0								
	Location									
	COMPOUND									
10	Phenol									
10	bis(2-Chloroethyl)ether									
10	2-Chlorophenol									
10	*1,3-Dichlorobenzene									
10	*1,4-Dichlorobenzene									
10	Benzyl Alcohol									
10	1,2 Dichlorobenzene									
10	2-Methylphenol									
10	bis(2-Chloroisopropyl)ether									
10	4-Methylphenol									
10	N-Nitroso-di-n-propylamine									
10	Hexachloroethane									
10	Nitrobenzene									
10	Isophorone									
10	2-Nitrophenol									
10	2,4-Dimethylphenol									
50	Benzoic Acid									
10	bis(2-Chloroethoxy)methane									
10	2,4-Dichlorophenol									
10	1,2,4-Trichlorobenzene									
10	Naphthalene									
10	4-Chloroaniline									

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: B N A S 2

Site Name: LASALLE RESERVOIR

Case #: 820-003 Sampling Date(s): 7/21/89

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

CRQL	Sample No. / Dilution Factor / Location / COMPOUND	G(W)-1-W-01 / 1.0								
10	Hexachlorobutadiene									
10	4-Chloro-3-methylphenol									
10	2-Methylnaphthalene									
10	Hexachlorocyclopentadiene									
10	2,4,6-Trichlorophenol									
50	2,4,5-Trichlorophenol									
10	2-Chloronaphthalene									
50	2-Nitroaniline									
10	Dimethylphthalate									
10	Acenaphthylene									
10	2,6-Dinitrotoluene									
50	3-Nitroaniline									
0	Acenaphthene									
50	2,4-Dinitrophenol									
50	4-Nitrophenol									
0	Dibenzofuran									
0	2,4-Dinitrotoluene									
0	Diethylphthalate									
0	4-Chlorophenyl phenylether									
0	Fluorene									
0	4-Nitroaniline									
0	4,6-Dinitro-2-methylphenol									

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: B N A S 3

WATER SAMPLES
(ug/L)

Site Name: LASALLE RESERVOIR

Case #: 820-003 Sampling Date(s): 7/21/89

To calculate sample quantitation limits
(CRQL * Dilution Factor)

CRDL	Sample No.	GW-1-W-01								
	Dilution Factor	1.0								
	Location									
	COMPOUND									
10	N-Nitrosodiphenylamine									
10	4-Bromophenyl phenylether									
10	*Hexachlorobenzene									
50	*Pentachlorophenol									
10	Phenanthrene									
10	Anthracene									
10	Di-n-butylphthalate									
10	Fluoranthene									
10	Pyrene									
10	Butylbenzylphthalate									
20	3,3-Dichlorobenzidine									
10	Benzo(a)anthracene									
10	Chrysene									
10	bis(2-Ethylhexyl)phthalate	10								
10	Di-n-octylphthalate									
10	Benzo(b)fluoranthene									
10	Benzo(k)fluoranthene									
10	Benzo(a)pyrene									
10	Indeno(1,2,3-cd)pyrene									
10	Dibenz(a,h)anthracene									
10	Benzo(g,h,i)perylene									

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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E-39

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DATA SUMMARY FORM: TENTATIVELY INDENTIFIED COMPOUNDS

Site Name: LASALLE RESERVOIR

Case #: 820-003 Sampling Date: 7/21/89

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

CRQL	Sample No. / Dilution Factor / Location / COMPOUND	GW-1-W-01 / 1.0																			
	Cyclotetrasiloxane, octometh.	19	J																		

CRQL = Contract Required Quantitation Limit

DATA SUMMARY FORM: PESTICIDES AND PCBS

WATER SAMPLES (ug/L)

Site Name: LASALLE RESERVOIR

Case #: 820-003 Sampling Date(s): 7/21/89

To calculate sample quantitation limit: (CRQL * Dilution Factor)

E-41

CRQL	Sample No. / Dilution Factor / Location / COMPOUND	GW-1-W-01 / 1.0							
0.05	alpha-BHC								
0.05	beta-BHC								
0.05	delta-BHC								
0.05	*Gamma-BHC (Lindane)								
0.05	*Heptachlor								
0.05	Aldrin								
0.05	Heptachlor Epoxide								
0.05	Endosulfan I								
0.10	Dieldrin								
0.10	4,4'-DDE								
0.10	*Endrin								
0.10	Endosulfan II								
0.10	4,4'-DDD								
0.10	Endosulfan Sulfate								
0.10	4,4'-DDT								
0.5	*Methoxychlor								
0.10	Endrin ketone								
0.5	*Alpha-Chlordane								
0.5	*Gamma-Chlordane								
1.0	*Toxaphene								
0.5	*Aroclor-1016								
0.5	*Aroclor-1221								
0.5	*Aroclor-1232								
0.5	*Aroclor-1242								
0.5	*Aroclor-1248								
1.0	*Aroclor-1254								
1.0	*Aroclor-1260								

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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NYSDEC

1

INORGANIC ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

GW-1-W-01

ıame: ECOLOGY & ENVIRONMENT INC. Contract: D001549

:ode: ______ Case No.: 820.003 SAS No.: YD-1040 SDG No.: ______

.x (soil/water): WATER Lab Sample ID: 45026

. (low/med): LOW Date Received: 7/21/89

.ids: 0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	151	B		P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	5.0	U	W	F
7440-39-3	Barium	21.6	B		P
7440-41-7	Beryllium	2.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	37100			P
7440-47-3	Chromium	10.0	U		P
7440-48-4	Cobalt	10.0	U		P
7440-50-8	Copper	10.0	U		P
7439-89-6	Iron	82.0	B		P
7439-92-1	Lead	5.0	U	W	F
7439-95-4	Magnesium	8670			P
7439-96-5	Manganese	16.5			P
7439-97-6	Mercury	0.2	U		CV
7440-02-0	Nickel	15.0	U		P
7440-09-7	Potassium	1300	B		P
7782-49-2	Selenium	5.0	W		F
7440-22-4	Silver	10.0	U		P
7440-23-5	Sodium	11000			P
7440-28-0	Thallium	5.0	U		F
7440-62-2	Vanadium	10.0	U		P
7440-66-6	Zinc	10.0	U		P
	Cyanide	10.0	U		C

Before: CLEAR Clarity Before: CLEAR Texture: ______

After: ______ Clarity After: ______ Artifacts: ______

ıts:

225

SOIL SAMPLES FROM BORINGS

DATA SUMMARY FORM: VOLATILES 1

SOIL SAMPLES
(ug/Kg)

Site Name: LASALLE RESERVOIR

Case #: 820.003 Sampling Date(s): 7/21/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

Sample No.	GW-1-SS-01																	
Dilution Factor	1.0																	
% Moisture	22																	
Location																		
COMPOUND																		
Chloromethane																		
Bromomethane																		
Vinyl Chloride																		
Chloroethane																		
Methylene Chloride	29	B																
Acetone	29	B																
Carbon Disulfide																		
1,1-Dichloroethene																		
1,1-Dichloroethane																		
Total-1,2-Dichloroethene																		
Chloroform																		
1,2-Dichloroethane																		
2-Butanone																		
1,1,1-Trichloroethane																		
Carbon Tetrachloride																		
Vinyl Acetate																		
Bromodichloromethane																		

CRDL = Contract Required Detection Limit

SEE NARRATIVE FOR CODE DEFINITIONS

revised 12/88

recycled paper

E-44

ecology and environment

DATA SUMMARY FORM: V O L A T I L E S 2

SOIL SAMPLES
(ug/Kg)

Site Name: LASALLE RESERVOIR

Case #: 820-005 Sampling Date(s): 7/21/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

	Sample No.	GW-1-SS-01								
	Dilution Factor	1.0								
	% Moisture	22								
	Location									
RQL	COMPOUND									
5	1,2 Dichloropropane									
5	Cis-1,3 Dichloropropene									
5	Trichloroethene									
5	Dibromochloromethane									
5	1,1,2 Trichloroethane									
5	Benzene									
5	Trans-1,3-Dichloropropene									
5	Bromoform									
10	4 Methyl-2-pentanone									
10	2-Hexanone									
5	Tetrachloroethene									
5	1,1,2,2-Tetrachloroethane									
5	Toluene									
5	Chlorobenzene									
5	Ethylbenzene									
5	Styrene									
5	Total Xylenes									

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

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recycled paper

ecology and environment

DATA SUMMARY FORM: B N A S 1

Site Name: LASALLE RESERVOIR

SOIL SAMPLES
(ug/Kg)

Case #: 820-003 Sampling Date(s): 7/21/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

recycled paper

E-46

CRQL	Sample No.	GW-1-SS-01								
	Dilution Factor	2.0								
	% Moisture	22								
	Location									
CRQL	COMPOUND									
330	Phenol									
330	bis(2-Chloroethyl)ether									
330	2-Chlorophenol									
330	1,3 Dichlorobenzene									
330	1,4 Dichlorobenzene									
330	Benzyl Alcohol									
330	1,2-Dichlorobenzene									
330	2-Methylphenol									
330	bis(2-Chloroisopropyl)ether									
330	4-Methylphenol									
330	N-Nitroso-di-n-propylamine									
330	Hexachloroethane									
330	Nitrobenzene									
330	Isophorone									
330	2-Nitrophenol									
330	2,4-Dimethylphenol									
1600	Benzoic Acid									
330	bis(2-Chloroethoxy)methane									
330	2,4 Dichlorophenol									
330	1,2,4-Trichlorobenzene									
330	Naphthalene									
330	4-Chloroaniline									

ecology and environment

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: B N A S 2

SOIL SAMPLES
(ug/Kg)

Site Name: LASALLE RESERVOIR

Case #: 820-003 Sampling Date(s): 7/21/87

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/1(

CRQL	Sample No.	GW-1-SS-01								
	Dilution Factor	2.0								
	% Moisture	27								
	Location									
	COMPOUND									
330	Hexachlorobutadiene									
330	4-Chloro-3 methylphenol									
330	2 Methylnaphthalene									
330	Hexachlorocyclopentadiene									
330	2,4,6-Trichlorophenol									
1600	2,4,5-Trichlorophenol									
330	2-Chloronaphthalene									
1600	2-Nitroaniline									
330	Dimethylphthalate									
330	Acenaphthylene									
330	2,6-Dinitrotoluene									
1600	3-Nitroaniline									
330	Acenaphthene									
1600	2,4-Dinitrophenol									
1600	4-Nitrophenol									
330	Dibenzofuran									
330	2,4-Dinitrotoluene									
330	Diethylphthalate									
330	4-Chlorophenyl-phenylether									
330	Fluorene									
1600	4-Nitroaniline									
1600	4,6-Dinitro-2-methylphenol									

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

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recycled paper

E-47

ecology and environment

recycled paper

ecology and environment

Site Name: LASALLE RESERVOIR

SOIL SAMPLES (ug/Kg)

Case #: 820-003 Sampling Date(s): 7/21/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/1

	Sample No.	GW-1-SS-01									
	Dilution Factor	2.0									
	% Moisture	22									
	Location										
CRQL	COMPOUND										
330	N-Nitrosodiphenylamine										
330	4-Bromophenyl phenylether										
330	Hexachlorobenzene										
1600	Pentachlorophenol										
330	Phenanthrene										
330	Anthracene										
330	Di-n-butylphthalate										
330	Fluoranthene										
330	Pyrene										
330	Butylbenzylphthalate										
1600	3,3-Dichlorobenzidine										
330	Benzo(a)anthracene										
330	Chrysene										
330	bis(2-Ethylhexyl)phthalate	500	BJ								
330	Di-n-octylphthalate										
330	Benzo(b)fluoranthene										
330	Benzo(k)fluoranthene										
330	Benzo(a)pyrene										
330	Indeno(1,2,3-cd)pyrene										
330	Dibenz(a,h)anthracene										
330	Benzo(g,h,i)perylene										

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITION

revised 12/88

DATA SUMMARY FORM: P E S T I C I D E S AND P C B S

Site Name: LASALLE RESERVOIR

SOIL SAMPLES
(ug/Kg)

Case #: 820-003 Sampling Date(s): 7/21/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

E-49

	Sample No.	GW-1-SS-01
	Dilution Factor	1.0
	% Moisture	22
	Location	
CRQL	COMPOUND	
8	alpha-BHC	
8	beta-BHC	
8	delta-BHC	
8	Gamma-BHC (Lindane)	
8	Heptachlor	
8	Aldrin	
8	Heptachlor Epoxide	
8	Endosulfan I	
16	Dieldrin	
16	4,4'-DDE	
16	Endrin	
16	Endosulfan II	
16	4,4'-DDD	
16	Endosulfan Sulfate	
16	4,4'-DDT	
80	Methoxychlor	
16	Endrin ketone	
80	Alpha-Chlordane	
80	Gamma-Chlordane	
160	Toxaphene	
80	Aroclor-1016	
80	Aroclor-1221	
80	Aroclor-1232	
80	Aroclor-1242	
80	Aroclor-1248	
160	Aroclor-1254	
160	Aroclor-1260	

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS
revised 12/88

1

INORGANIC ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

GW-1-SS-01

Name: Ecology & Environment Inc. Contract: D001549

Code: ______ Case No.: 820.003 SAS No.: Y0-1040 SDG No.: GW-1-S

ix (soil/water): SOIL Lab Sample ID: 45026

l (low/med): LOW Date Received: 7/21/89

lids: 78.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12000			P
7440-36-0	Antimony	15.3	U		P
7440-38-2	Arsenic	1.3	U		F
7440-39-3	Barium	104			P
7440-41-7	Beryllium	0.51			P
7440-43-9	Cadmium	1.3	U		P
7440-70-2	Calcium	134000			P
7440-47-3	Chromium	16.9			P
7440-48-4	Cobalt	6.8	B		P
7440-50-8	Copper	19.8			P
7439-89-6	Iron	22000			P
7439-92-1	Lead	10.1			F
7439-95-4	Magnesium	27800			P
7439-96-5	Manganese	456			P
7439-97-6	Mercury	0.13	U		CV
7440-02-0	Nickel	14.9			P
7440-09-7	Potassium	1660			P
7782-49-2	Selenium	1.3	U	W	F
7440-22-4	Silver	2.6	U		P
7440-23-5	Sodium	167	B		P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	21.1			P
7440-66-6	Zinc	104			P
	Cyanide	1.3	U		C

or Before: ______ Clarity Before: ______ Texture: CLAY

or After: ______ Clarity After: ______ Artifacts: ______

ments:

DATA SUMMARY FORM: VOLATILES 1

SOIL SAMPLES
(ug/Kg)

Site Name: LASALLE RESERVOIR

Case #: 820-002 Sampling Date(s): 7/19/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

Sample No.	GW-3	GW-3MS	GW-3MSD						
Dilution Factor	1.0	1.0	1.0						
% Moisture	23	23	27						
Location	0-2'	0-2'	0-2'						
COMPOUND									
Chloromethane									
Bromomethane									
Vinyl Chloride									
Chloroethane									
Methylene Chloride									
Acetone	33	28	44						
Carbon Disulfide									
1,1-Dichloroethene									
1,1-Dichloroethane									
Total-1,2-Dichloroethene									
Chloroform									
1,2-Dichloroethane									
2-Butanone									
1,1,1-Trichloroethane									
Carbon Tetrachloride									
Vinyl Acetate									
Bromodichloromethane									

CRDL = Contract Required Detection Limit

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E-51.

recycled paper

ecology and environment

DATA SUMMARY FORM: VOLATILES 2

Site Name: LASALLE RESERVOIR

Case #: 820 007 Sampling Date(s): 7/19/89

SOIL SAMPLES
(ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100

recycled paper

E-52

CRQL	Sample No.	GW-3	GW-3MS	GW-34SD					
	Dilution Factor	1.0	1.0	1.0					
	% Moisture	23	23	23					
	Location	0-2'	0-2'	0-2'					
	COMPOUND								
5	1,2-Dichloropropane								
5	Cis-1,3 Dichloropropene								
5	Trichloroethene								
5	Dibromochloromethane								
5	1,1,2 Trichloroethane								
5	Benzene								
5	Trans-1,3-Dichloropropene								
5	Bromoform								
10	4-Methyl-2-pentanone								
10	2-Hexanone								
5	Tetrachloroethene								
5	1,1,2,2-Tetrachloroethane								
5	Toluene								
5	Chlorobenzene								
5	Ethylbenzene								
5	Styrene								
5	Total Xylenes								

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

revised 12/88

ecology and environment

DATA SUMMARY FORM: B N A S 1

Site Name: LASALLE RESERVOIR

SOIL SAMPLES
(ug/Kg)

Case #: 820-002 Sampling Date(s): 7/19/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

CRQL	Sample No.	GW-3	GW-3MS	GW-3MSD						
	Dilution Factor	2.0	2.0	2.0						
	% Moisture	23	23	23						
	Location	0-2'	0-2'	0-2'						
	COMPOUND									
330	Phenol									
330	bis(2-Chloroethyl)ether									
330	2-Chlorophenol									
330	1,3 Dichlorobenzene									
330	1,4 Dichlorobenzene									
330	Benzyl Alcohol									
330	1,2 Dichlorobenzene									
330	2 Methylphenol									
330	bis(2-Chloroisopropyl)ether									
330	4 Methylphenol									
330	N-Nitroso-di-n-propylamine									
330	Hexachloroethane									
330	Nitrobenzene									
330	Isophorone									
330	2-Nitrophenol									
330	2,4-Dimethylphenol									
1600	Benzoic Acid									
330	bis(2-Chloroethoxy)methane									
330	2,4-Dichlorophenol									
330	1,2,4-Trichlorobenzene									
330	Naphthalene									
330	4-Chloroaniline									

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

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E-53

recycled paper

ecology and environment

DATA SUMMARY FORM: B N A S 2

Site Name: LASALLE RESERVOIR

Case #: 820-002 Sampling Date(s): 7/19/89

SOIL SAMPLES
(ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

recycled paper

E-54

CRQL	Sample No.	GW-3	GW-3 MS	GW-3 MSD					
	Dilution Factor	2.0	2.0	2.0					
	% Moisture	23	23	23					
	Location	0-2'	0-2'	0-2'					
	COMPOUND								
330	Hexachlorobutadiene								
330	4-Chloro-3 methylphenol								
330	2-Methylnaphthalene								
330	Hexachlorocyclopentadiene								
330	2,4,6-Trichlorophenol								
1600	2,4,5-Trichlorophenol								
330	2-Chloronaphthalene								
1600	2-Nitroaniline								
330	Dimethylphthalate								
330	Acenaphthylene								
330	2,6-Dinitrotoluene								
1600	3-Nitroaniline								
330	Acenaphthene								
1600	2,4-Dinitrophenol								
1600	4-Nitrophenol								
330	Dibenzofuran								
330	2,4-Dinitrotoluene								
330	Diethylphthalate								
330	4-Chlorophenyl-phenylether								
330	Fluorene		67 J	90 J					
1600	4-Nitroaniline								
1600	4,6-Dinitro-2-methylphenol								

ecology and environment

CRQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS

revised 12/88

DATA SUMMARY FORM: B N A S 3

SOIL SAMPLES
(ug/Kg)

Site Name: LASALLE RESERVOIR

Case #: 820-002 Sampling Date(s): 7/19/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/1

CRQL*	Sample No.	GW-3		GW-3MS		GW-3MSD	
	Dilution Factor	2.0		2.0		2.0	
	% Moisture	23		23		23	
	Location	0-2'		0-2'		0-2'	
	COMPOUND						
330	N-Nitrosodiphenylamine						
330	4-Bromophenyl phenylether						
330	Hexachlorobenzene						
1600	Pentachlorophenol						
330	Phenanthrene	300	J	1200		970	
330	Anthracene	44	J	180	J	200	J
330	Di-n-butylphthalate	67	J				
330	Fluoranthene	570	J	1200		1300	
330	Pyrene	410	J				
330	Butylbenzylphthalate						
1600	3,3 Dichlorobenzidine						
330	Benzo(a)anthracene	250	J	520	J	510	J
330	Chrysene	310	J	610	J	610	J
330	bis(2-Ethylhexyl)phthalate	400	BJ	320	BJ	250	BJ
330	Di-n-octylphthalate						
330	Benzo(b)fluoranthene	450	J	830	J	860	
330	Benzo(k)fluoranthene						
330	Benzo(a)pyrene	220	J	480	J	450	J
330	Indeno(1,2,3-cd)pyrene	130	J	270	J	250	J
330	Dibenz(a,h)anthracene			72	J	80	J
330	Benzo(g,h,i)perylene	140	J	270	J	240	J

CRQL = Contract Required Quantitation Limit

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ecology and environment

DATA SUMMARY FORM: P E S T I C I D E S A N D P C B S

Site Name: LASALLE RESERVOIR

Case #: 820-002 Sampling Date(s): 7/19/89

SOIL SAMPLES (ug/Kg)

To calculate sample quantitation limit:
(CRQL * Dilution Factor) / ((100 - % moisture)/100)

CRQL	Sample No.	GW-3		GW-3MS		GW-3MSD	
	Dilution Factor	1.0		1.0		1.0	
	% Moisture	23		23		23	
	Location	0-2'		0-2'		0-2'	
CRQL	COMPOUND						
8	alpha-BHC						
8	beta-BHC						
8	delta BHC						
8	Gamma-BHC (Lindane)						
8	Heptachlor						
8	Aldrin						
8	Heptachlor Epoxide						
8	Endosulfan I						
16	Dieldrin						
16	4,4'-DDE	10	J				
16	Endrin						
16	Endosulfan II						
16	4,4'-DDD						
16	Endosulfan Sulfate						
16	4,4'-DDT	28					
80	Methoxychlor						
16	Endrin ketone						
80	Alpha-Chlordane						
80	Gamma-Chlordane						
160	Toxaphene						
80	Aroclor-1016						
80	Aroclor-1221						
80	Aroclor-1232						
80	Aroclor-1242						
80	Aroclor-1248						
160	Aroclor-1254						
160	Aroclor-1260						

CRQL = Contract Required Quantitation Limit

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1

NYSDEC SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

GW-3

Lab Name: ECOLOGY & ENVIRONMENT INC. Contract: D001549

Lab Code: ______ Case No.: 820.002 SAS No.: YO-1040 SDG No.: GW-2

Matrix (soil/water): SOIL Lab Sample ID: 44456

Level (low/med): LOW Date Received: 7/19/89

% Solids: 77.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	16600			P
7440-36-0	Antimony	15.6	U		P
7440-38-2	Arsenic	5.4			F
7440-39-3	Barium	246			P
7440-41-7	Beryllium	0.52	U		P
7440-43-9	Cadmium	1.3	U		P
7440-70-2	Calcium	40300			P
7440-47-3	Chromium	23.3			P
7440-48-4	Cobalt	11.7	B		P
7440-50-8	Copper	72.4			P
7439-89-6	Iron	29000			P
7439-92-1	Lead	165			P
7439-95-4	Magnesium	17900			P
7439-96-5	Manganese	1220			P
7439-97-6	Mercury	0.27			CV
7440-02-0	Nickel	23.2			P
7440-09-7	Potassium	2390			P
7782-49-2	Selenium	1.3	U	W	F
7440-22-4	Silver	2.6	U		P
7440-23-5	Sodium	161	B		P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	33.3			P
7440-66-6	Zinc	644			P
	Cyanide	1.3	U		C

Color Before: ______ Clarity Before: ______ Texture: GRANULAR

Color After: ______ Clarity After: ______ Artifacts: ______

Comments:

GROUNDWATER SAMPLES

DATA SUMMARY FORM: V O L A T I L E S 1

WATER SAMPLES
(ug/L)

Site Name: LASALLE RESERVOIR

Case #: 820-004 Sampling Date(s): 8/14/87

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

CRQL	Sample No. / Dilution Factor / Location / COMPOUND	GW-1		GW-2		GW-3		GW-3MS		GW-3MSD									
	Dilution Factor	1.0		1.0		2.0		1.0		1.0									
	Location																		
10	Chloromethane																		
10	Bromomethane																		
10	*Vinyl Chloride																		
10	Chloroethane																		
5	*Methylene Chloride							3	J										
10	Acetone																		
5	Carbon Disulfide																		
5	*1,1-Dichloroethene					13													
5	1,1-Dichloroethane					140		150		140									
5	*Total-1,2-Dichloroethene					21		23		21									
5	Chloroform																		
5	*1,2-Dichloroethane																		
10	*2-Butanone																		
5	*1,1,1-Trichloroethane					280		330	E	330	E								
5	*Carbon Tetrachloride																		
10	Vinyl Acetate																		
5	Bromodichloromethane																		

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

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DATA SUMMARY FORM: V O L A T I L E S 2

ite Name: LASALLE RESERVOIR

WATER SAMPLES
(ug/L)

ase #: 820-004 Sampling Date(s): 8/14/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

QL	Sample No.	GW-1	GW-2	GW-3	GW-3MS	GW-3MSD			
	Dilution Factor	1.0	1.0	2.0	1.0	1.0			
	Location								
	COMPOUND								
	*1,2-Dichloropropane								
	Cis-1,3-Dichloropropene								
	Trichloroethene			5 J					
	Dibromochloromethane								
	1,1,2-Trichloroethane								
	*Benzene								
	Trans-1,3-Dichloropropene								
	Bromoform								
0	4-Methyl-2-pentanone								
0	2-Hexanone								
	*Tetrachloroethene			5 J	6	6			
	1,1,2,2-Tetrachloroethane								
	*Toluene								
	*Chlorobenzene								
	*Ethylbenzene								
	*Styrene								
	*Total Xylenes			3 J	4 J	4 J			

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

revised 12/88

DATA SUMMARY FORM: B N A S 1

Site Name: LaSalle Reservoir

Case #: 820-004 Sampling Date(s): 8/14/89

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit: (CRQL * Dilution Factor)

E-61

CRQL	Sample No.	GW-1	GW-2	GW-3	GW-1MS	GW-1MSD			
	Dilution Factor	1.0	1.0	1.0	1.0	1.0			
	Location								
	COMPOUND								
10	Phenol								
10	bis(2-Chloroethyl)ether								
10	2-Chlorophenol		1 J						
10	*1,3-Dichlorobenzene								
10	*1,4-Dichlorobenzene								
10	Benzyl Alcohol								
10	1,2 Dichlorobenzene								
10	2-Methylphenol								
10	bis(2-Chloroisopropyl)ether								
10	4-Methylphenol								
10	N-Nitroso-di-n-propylamine								
10	Hexachloroethane								
10	Nitrobenzene								
10	Isophorone								
10	2-Nitrophenol								
10	2,4-Dimethylphenol								
50	Benzoic Acid								
10	bis(2-Chloroethoxy)methane								
10	2,4-Dichlorophenol								
10	1,2,4-Trichlorobenzene								
10	Naphthalene								
10	4-Chloroaniline								

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

revised 12/88

DATA SUMMARY FORM: B N A S 2

WATER SAMPLES
(ug/L)

Site Name: LASALLE RESERVOIR

Case #: 920-004 Sampling Date(s): 8/14/89

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

E-62

	Sample No.	GW-1	GW-2	GW-3	GW-1MS	GW-1MSD				
	Dilution Factor	1.0	1.0	1.0	1.0	1.0				
	Location									
RQL	COMPOUND									
10	Hexachlorobutadiene									
10	4-Chloro-3-methylphenol									
10	2-Methylnaphthalene									
10	Hexachlorocyclopentadiene									
10	2,4,6-Trichlorophenol									
50	2,4,5-Trichlorophenol									
10	2-Chloronaphthalene									
50	2-Nitroaniline									
10	Dimethylphthalate									
10	Acenaphthylene									
10	2,6 Dinitrotoluene									
50	3-Nitroaniline									
10	Acenaphthene									
50	2,4-Dinitrophenol									
50	4-Nitrophenol									
10	Dibenzofuran									
10	2,4-Dinitrotoluene									
10	Diethylphthalate									
10	4-Chlorophenyl-phenylether									
10	Fluorene									
50	4-Nitroaniline									
50	4,6-Dinitro-2-methylphenol									

CRDL = Contract Required Detection Limit

*Action Level Exists

SEE NARRATIVE FOR CODE DEFINITIONS

DATA SUMMARY FORM: B N A S 3

WATER SAMPLES
(ug/L)

Site Name: LASALLE RESERVOIR

Case #: 820-004 Sampling Date(s): 8/14/89

To calculate sample quantitation limits
(CRQL * Dilution Factor)

E-63

CRDL	Sample No.	GW-1		GW-2		GW-3		GW-1MS		GW-1MSD							
	Dilution Factor	1.0		1.0		1.0		1.0		1.0							
	Location																
	COMPOUND																
10	N-Nitrosodiphenylamine																
10	4-Bromophenyl-phenylether																
10	*Hexachlorobenzene																
50	*Pentachlorophenol																
10	Phenanthrene																
10	Anthracene																
10	Di-n-butylphthalate																
10	Fluoranthene																
10	Pyrene																
10	Butylbenzylphthalate																
20	3,3-Dichlorobenzidine																
10	Benzo(a)anthracene																
10	Chrysene																
10	bis(2-Ethylhexyl)phthalate	2	BJ	3	BJ	2	BJ	4	BJ	6	BJ						
10	Di-n-octylphthalate																
10	Benzo(b)fluoranthene																
10	Benzo(k)fluoranthene																
10	Benzo(a)pyrene																
10	Indeno(1,2,3-cd)pyrene																
10	Dibenz(a,h)anthracene																
10	Benzo(g,h,i)perylene																

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

revised 12/88

DATA SUMMARY FORM: PESTICIDES AND PCBS

Site Name: LASALLE RESERVOIR

Case #: 820-004 Sampling Date(s): 8/14/89

WATER SAMPLES
(ug/L)

To calculate sample quantitation limit:
(CRQL * Dilution Factor)

E-64

CRQL	Sample No.	GW-1	GW-2	GW-3	GW-1MS	GW-1MSD			
	Dilution Factor	1.0	1.0	1.0	1.0	1.0			
	Location								
	COMPOUND								
0.05	alpha-BHC								
0.05	beta-BHC								
0.05	delta-BHC								
0.05	*Gamma-BHC (Lindane)								
0.05	*Heptachlor								
0.05	Aldrin								
0.05	Heptachlor Epoxide								
0.05	Endosulfan I								
0.10	Dieldrin								
0.10	4,4'-DDE								
0.10	*Endrin								
0.10	Endosulfan II								
0.10	4,4'-DDD								
0.10	Endosulfan Sulfate								
0.10	4,4'-DDT								
0.5	*Methoxychlor								
0.10	Endrin ketone								
0.5	*Alpha-Chlordane								
0.5	*Gamma-Chlordane								
1.0	*Toxaphene								
0.5	*Aroclor-1016								
0.5	*Aroclor-1221								
0.5	*Aroclor-1232								
0.5	*Aroclor-1242								
0.5	*Aroclor-1248								
1.0	*Aroclor-1254								
1.0	*Aroclor-1260								

CRDL = Contract Required Detection Limit *Action Level Exists SEE NARRATIVE FOR CODE DEFINITIONS

revised 12/88

NYSDEC

1

INORGANIC ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.

GW-1

) Name: ECOLOGY & ENVIRONMENT INC. Contract: D001549

) Code: ______ Case No.: 820.004 SAS No.: Y0-1060 SDG No.: GW-1

:rix (soil/water): WATER Lab Sample ID: 46814

/el (low/med): LOW Date Received: 8/14/89

;olids: 0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	100	U		P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	5.0	U	W	F
7440-39-3	Barium	44.3	B		P
7440-41-7	Beryllium	2.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	103000			P
7440-47-3	Chromium	10.0	U		P
7440-48-4	Cobalt	10.0	U		P
7440-50-8	Copper	10.0	U		P
7439-89-6	Iron	67.0	B		P
7439-92-1	Lead	5.0	U		F
7439-95-4	Magnesium	43600			P
7439-96-5	Manganese	11.7	B		P
7439-97-6	Mercury	0.20	U		CV
7440-02-0	Nickel	15.0	U		P
7440-09-7	Potassium	3050	B		P
7782-49-2	Selenium	5.0	U	N	F
7440-22-4	Silver	10.0	U		P
7440-23-5	Sodium	43400			P
7440-28-0	Thallium	5.0	U		F
7440-62-2	Vanadium	10.0	U		P
7440-66-6	Zinc	10.0	U		P
	Cyanide	10.0	U		C

.or Before: CLEAR Clarity Before: CLEAR Texture: ______

.or After: ______ Clarity After: ______ Artifacts: ______

ıments:

FORM I - IN

NYSDEC

1

INORGANIC ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.: GW-2

Name: ECOLOGY & ENVIRONMENT INC. Contract: D001549

Code: ______ Case No.: 820.004 SAS No.: Y0-1060 SDG No.: GW-1

ix (soil/water): WATER Lab Sample ID: 46815

l (low/med): LOW Date Received: 8/14/89

lids: 0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	129	B		P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	5.0	U	W	F
7440-39-3	Barium	53.2	B		P
7440-41-7	Beryllium	2.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	159000			P
7440-47-3	Chromium	10.0	U		P
7440-48-4	Cobalt	10.0	U		P
7440-50-8	Copper	10.0	U		P
7439-89-6	Iron	574			P
7439-92-1	Lead	5.0	U		F
7439-95-4	Magnesium	103000			P
7439-96-5	Manganese	75.3			P
7439-97-6	Mercury	0.20	U		CV
7440-02-0	Nickel	15.0	U		P
7440-09-7	Potassium	16500			P
7782-49-2	Selenium	5.0	U	N	F
7440-22-4	Silver	10.0	U		P
7440-23-5	Sodium	21100			P
7440-28-0	Thallium	5.0	U		F
7440-62-2	Vanadium	10.0	U		P
7440-66-6	Zinc	24.6			P
	Cyanide	10.0	U		C

or Before: CLEAR Clarity Before: CLEAR Texture: ______

or After: ______ Clarity After: ______ Artifacts: ______

ments:

1
INORGANIC ANALYSIS DATA SHEET

NYSDEC SAMPLE NO.
GW-3

ab Name: ECOLOGY & ENVIRONMENT INC. Contract: D001549

ab Code: ______ Case No.: 820.004 SAS No.: Y0-1060 SDG No.: GW-I

atrix (soil/water): WATER Lab Sample ID: 46816

evel (low/med): LOW Date Received: 8/14/89

Solids: 0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1240			P
7440-36-0	Antimony	60.0	U		P
7440-38-2	Arsenic	5.0	U	W	F
7440-39-3	Barium	36.2	B		P
7440-41-7	Beryllium	2.0	U		P
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	94300			P
7440-47-3	Chromium	10.0	U		P
7440-48-4	Cobalt	10.0	U		P
7440-50-8	Copper	10.0	U		P
7439-89-6	Iron	2800			P
7439-92-1	Lead	5.4			F
7439-95-4	Magnesium	24100			P
7439-96-5	Manganese	114			P
7439-97-6	Mercury	0.20	U		CV
7440-02-0	Nickel	15.0	U		P
7440-09-7	Potassium	3190			P
7782-49-2	Selenium	5.0	U	N	F
7440-22-4	Silver	10.0	U		P
7440-23-5	Sodium	67200			P
7440-28-0	Thallium	5.0	U		F
7440-62-2	Vanadium	10.0	U		P
7440-66-6	Zinc	31.0			P
	Cyanide	10.0	U		C

olor Before: CLEAR Clarity Before: CLEAR Texture: ______

olor After: ______ Clarity After: ______ Artifacts: ______

omments:

FORM I - IN

APPENDIX F

NYSDEC MEMORANDUM AND
1927 AERIAL PHOTOGRAPH OF THE LASALLE RESERVOIR SITE

New York State Department of Environmental Conservation

MEMORANDUM

TO: File
FROM: John Hyden
SUBJECT: LaSalle Reservoir
Site #915033
DATE: December 12, 1988

This past August, Mr. Peter F. Schregel, P.E., a Consulting Engineer, came to our offices to report on his speculations that the area of the LaSalle Reservoir Inactive Hazardous Waste Site may be larger than what has been declared in previous DEC reports. Generally, he believes that the original rock quarrying area, and resulting waste disposal site(s) includes not only the presently designated site but also the area west of it to Main St. This area is outlined on the photocopy of the site map from the LaSalle Reservoir Phase I Plan.

Mr. Schregel based his conclusion on his observations of the 1926 Erie County Highway Department map, which shows a cement plant on the south side of the present Amherst St., and quarrying on the north side of the cement plant from Main St. eastward to the east side of the present reservoir. Mr. Schregel made these observations while conducting an environmental survey on property in this vicinity.

I recommend that future work (e.g. Phase II reports) on this site include investigations to determine the extent of previous disposal activities in this area, and adjust the scope of this inactive hazardous waste site project as necessary.

JWH:jps

ERIE COUNTY NEW YORK

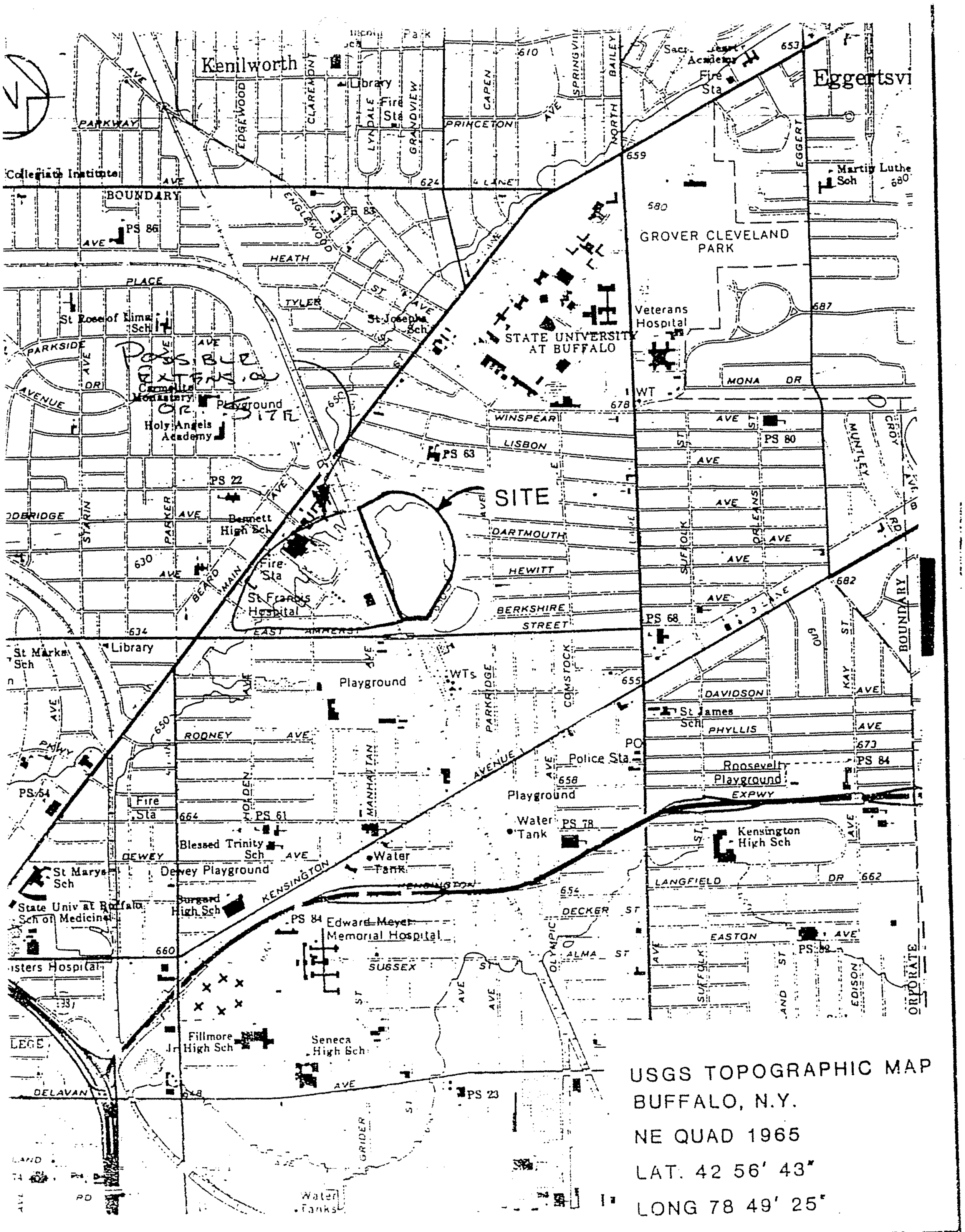
OFFICE OF THE COUNTY ENGINEER

GREATER MOTORWAY SYSTEM

JUNE 1ST 1927

SCALE

F-3



Scale 1:24,000	LASALLE RESERVOIR		
Dwn.	BUF[illegible]O, N.Y.	VI[illegible] MAP	
Chk.	N.Y.S. [illegible]ERFUND		
Ap'vd.			
Rev.	Project No. [illegible]380400	A	FIGURE 1

SECTION 2

SECTION 3

SECTION 4

APPENDIX G

PHOTOGRAPHIC LOG

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

Date/Time: 5-5-89/900

Lens: Type 35 mm f11

SN: --

Frame No.: 1

Comments: Southern end of site adjoining detention basin. Note: Satellite dish in center of photograph.

[UZ]YO1080:D2826, #2681

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

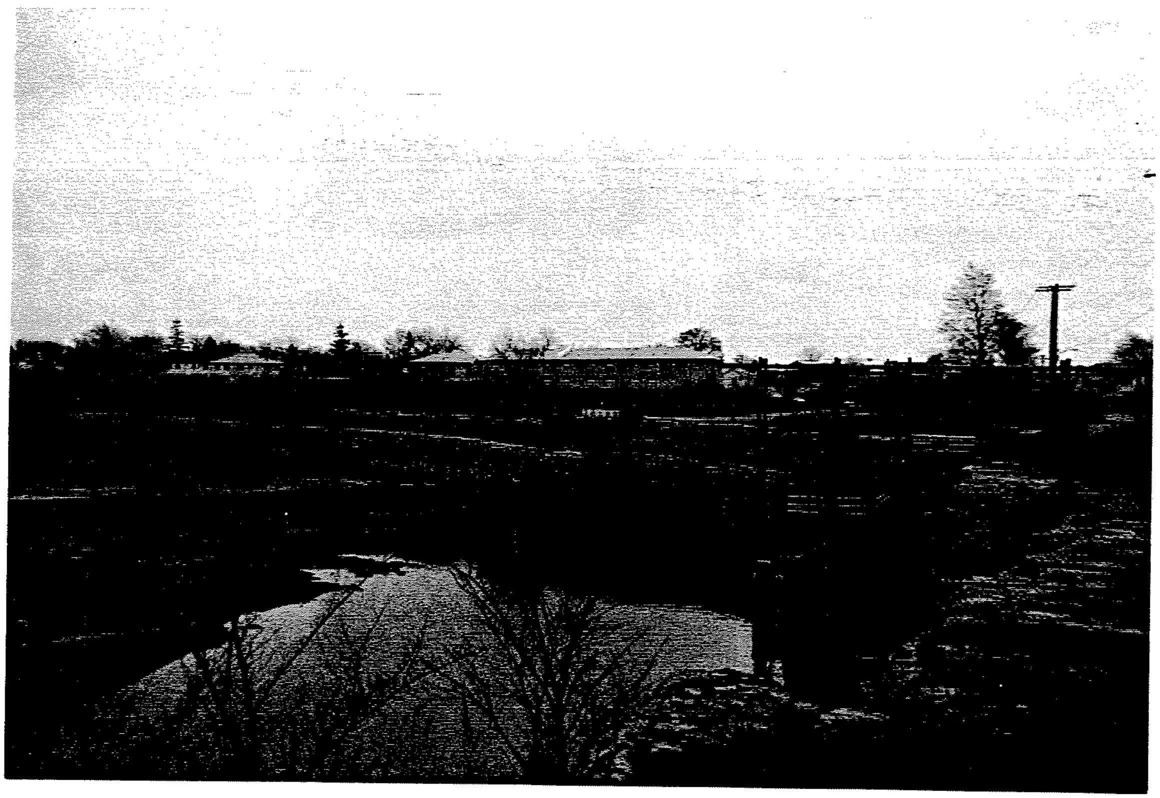
Date/Time: 5/5/89/900

Lens: Type 35 mm f11

SN: --

Frame No.: 2

Comments: Stormwater detention basin - southeast of site.



[UZ]YO1080:D2826, #2681

ecology and environment, inc.

P H O T O G R A P H I C   R E C O R D

Client: NYSDEC E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm SN: --

Photographer: B. Topor Date/Time: 5-5-89/900

Lens: Type 35 mm f11 SN: -- Frame No.: 3

Comments: Location of surface soil sample SS-4, facing south.

[UZ]YO1080:D2826, #2681

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

Date/Time: 5-5-89/900

Lens: Type 35 mm f11

SN: --

Frame No.: 5

Comments: Location of surface soil sample SS-3, facing north.

[UZ]YO1080:D2826, #2681

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

Date/Time: 5-5-89/900

Lens: Type 35 mm f11

SN: --

Frame No.: 6

Comments: Location of surface soil sample SS-6, facing west.

[UZ]YO1080:D2826, #2681

ecology and environment, inc.

P H O T O G R A P H I C   R E C O R D

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

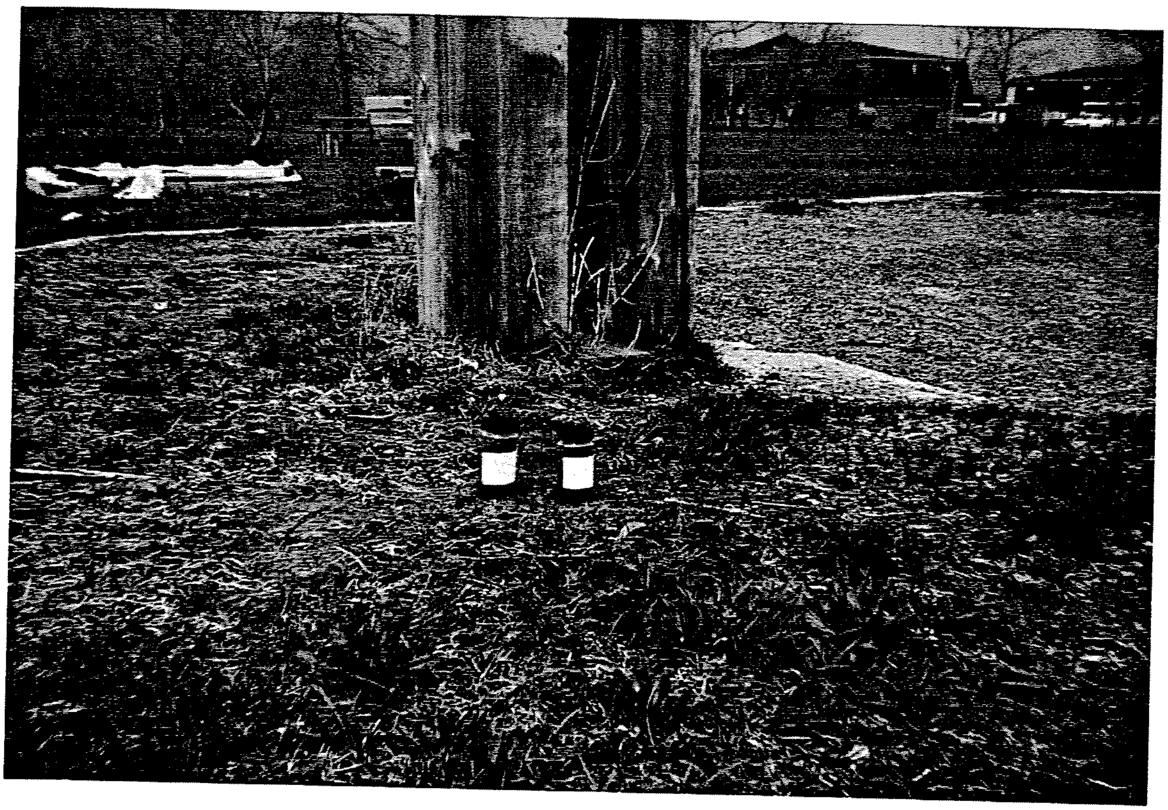
Date/Time: 5-5-89/900

Lens: Type 35 mm f11

SN: --

Frame No.: 7

Comments: Location of surface soil sample SS-2, facing west.



[UZ]YO1080:D2826, #2681

ecology and environment, inc.

P H O T O G R A P H I C   R E C O R D

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

Date/Time: 5-5-89/900

Lens: Type 35 mm f11

SN: --

Frame No.: 8

Comments: Highly decomposed drum coming to the surface, location of surface soil sample SS-1, facing south.

[UZ]YO1080:D2826, #2681

ecology and environment, inc.

P H O T O G R A P H I C   R E C O R D

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

Date/Time: 5-5-89/900

Lens: Type 35 mm f11

SN: --

Frame No.: 10

Comments: Miscellaneous debris along railroad tracks, facing south.

[UZ]YO1080:D2826, #2681

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm SN: --

Photographer: B. Topor Date/Time: 5-5-89/900

Lens: Type 35 mm f11 SN: -- Frame No.: 12

Comments: Demolition debris piles, facing east along railroad tracks.

[UZ]YO1080:D2826, #2681

ecology and environment, inc.

P H O T O G R A P H I C   R E C O R D

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

Date/Time: 5-5-89/900

Lens: Type 35 mm f11

SN: --

Frame No.: 13

Comments: Debris strewn along railroad tracks, piles to the left.

[UZ]YO1080:D2826, #2684

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC   E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm   SN: --

Photographer: B. Topor   Date/Time: 5-5-89/900

Lens: Type 35 mm f11   SN: --   Frame No.: 14

Comments: Debris piles along railroad tracks, facing east.

[UZ]YO1080:D2826, #2684

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

Date/Time: 5-5-89/900

Lens: Type 35 mm f11

SN: --

Frame No.: 15

Comments: Debris piles, facing southeast along railroad tracks.

[UZ]YO1080:D2826, #2684

ecology and environment, inc.

P H O T O G R A P H I C   R E C O R D

Client: NYSDEC E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm SN: --

Photographer: B. Topor Date/Time: 5-5-89/900

Lens: Type 35 mm f11 SN: -- Frame No.: 16

Comments: Debris piles along railroad tracks, facing south.

[UZ]YO1080:D2826, #2684

ecology and environment, inc.

P H O T O G R A P H I C   R E C O R D

Client: NYSDEC   E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm   SN: --

Photographer: B. Topor   Date/Time: 5-5-89/900

Lens: Type 35 mm f11   SN: --   Frame No.: 17

Comments: Miscellaneous debris, decaying drum, residences in rear, facing north along railroad tracks.

[UZ]YO1080:D2826, #2684

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

Date/Time: 5-5-89/900

Lens: Type 35 mm f11

SN: --

Frame No.: 18

Comments: Miscellaneous debris along railroad tracks, facing north.

[UZ]YO1080:D2826, #2684

ecology and environment, inc.

P H O T O G R A P H I C   R E C O R D

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

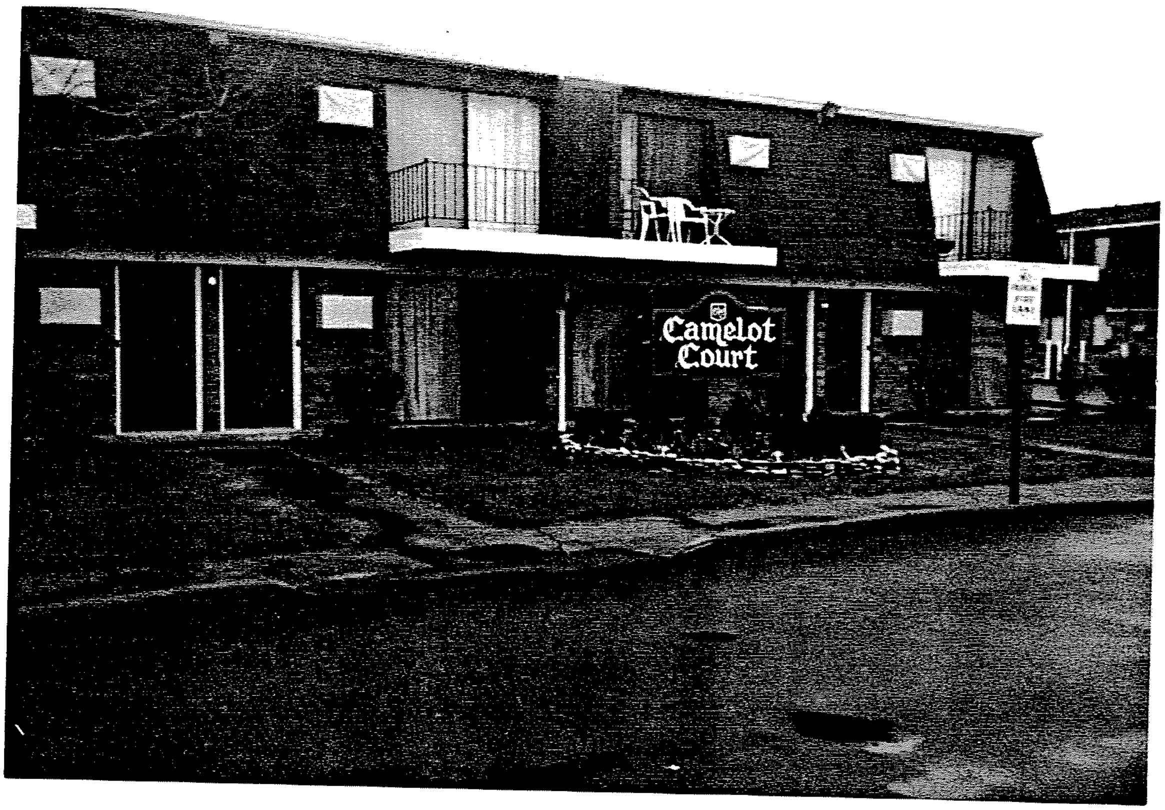
Date/Time: 5-5-89/900

Lens: Type 35 mm f11

SN: --

Frame No.: 21

Comments: Apartment complex on LaSalle Avenue, facing south.



[UZ]YO1080:D2826, #2684

ecology and environment, inc.

P H O T O G R A P H I C   R E C O R D

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

Date/Time: 5-5-89/900

Lens: Type 35 mm f11

SN: --

Frame No.: 22

Comments: Playground area, houses in background, facing west.

[UZ]YO1080:D2826, #2684

ecology and environment, inc.

P H O T O G R A P H I C   R E C O R D

Client: NYSDEC E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm SN: --

Photographer: B. Topor Date/Time: 5-5-89/900

Lens: Type 35 mm f11 SN: -- Frame No.: 23

Comments: Facing north, debris piles, chimney of Bennett High School in background.

[UZ]YO1080:D2826, #2684

ecology and environment, inc.

P H O T O G R A P H I C   R E C O R D

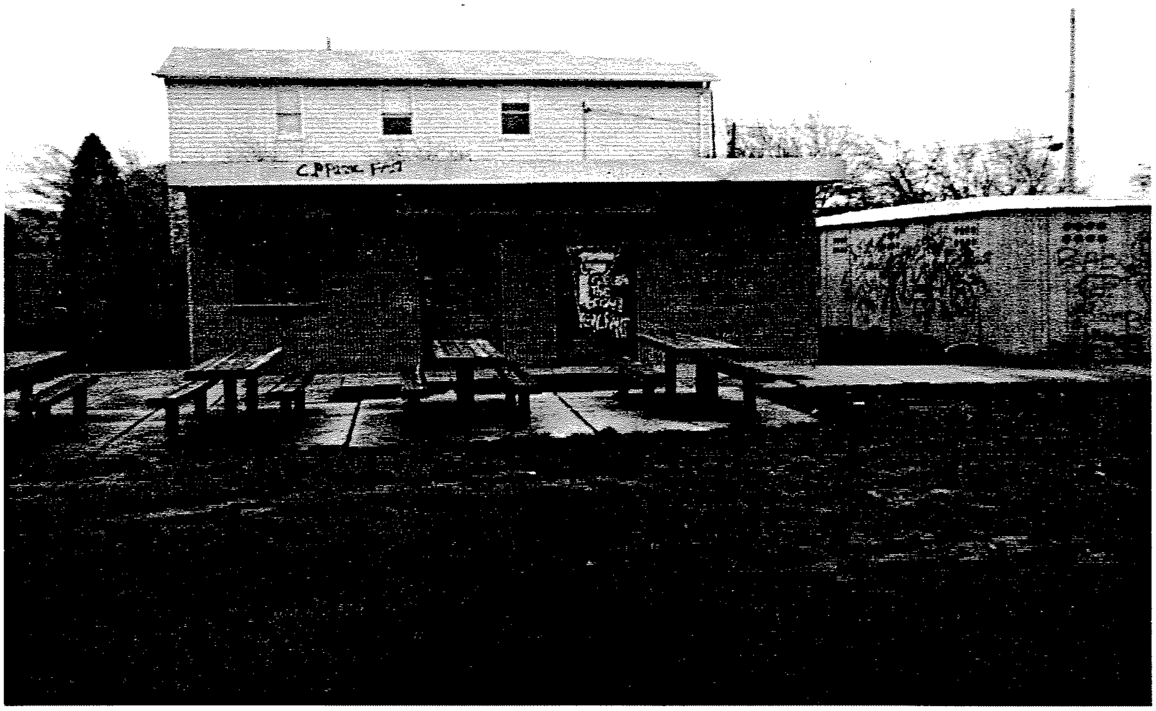
Client: NYSDEC   E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm   SN: --

Photographer: B. Topor   Date/Time: 5-5-89/900

Lens: Type 35 mm f11   SN: --   Frame No.: 24

Comments: Comfort station in park, facing east.



[UZ]YO1080:D2826, #2684

ecology and environment, inc.

P H O T O G R A P H I C   R E C O R D

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

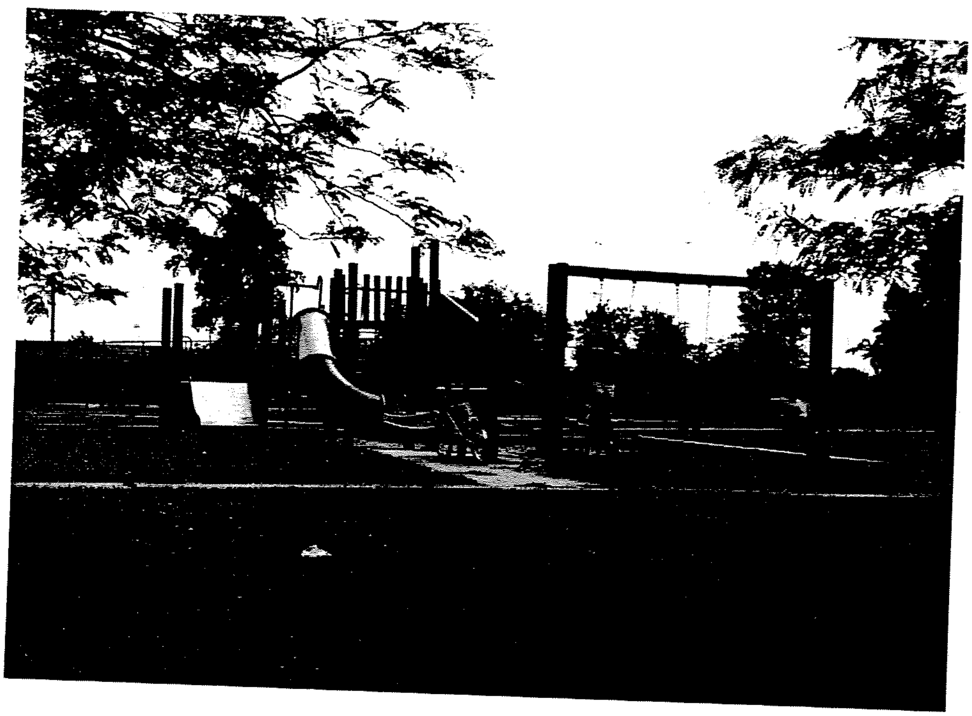
Date/Time: 7-19-89

Lens: Type 35 mm f11

SN: --

Frame No.:

Comments: Playground area, facing north.



[UZ]YO1080:D2826, #2685

ecology and environment, inc.

P H O T O G R A P H I C   R E C O R D

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

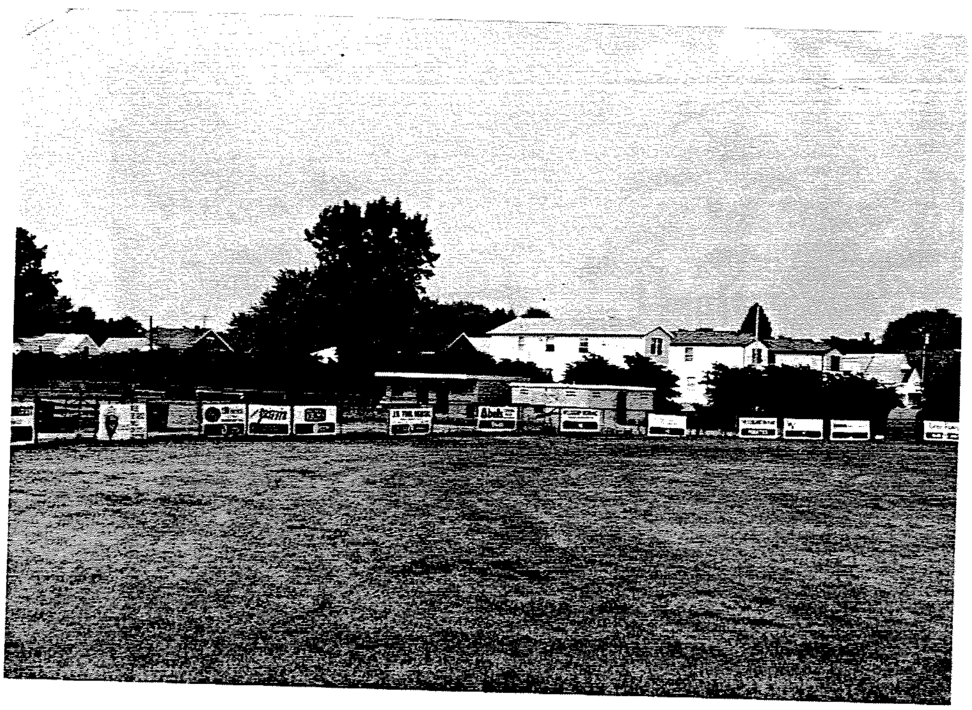
Date/Time: 7-19-89

Lens: Type 35 mm f11

SN: --

Frame No.:

Comments: Baseball diamond outfield, residences in rear, facing east.



[UZ]YO1080:D2826, #2685

ecology and environment, inc.

P H O T O G R A P H I C   R E C O R D

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

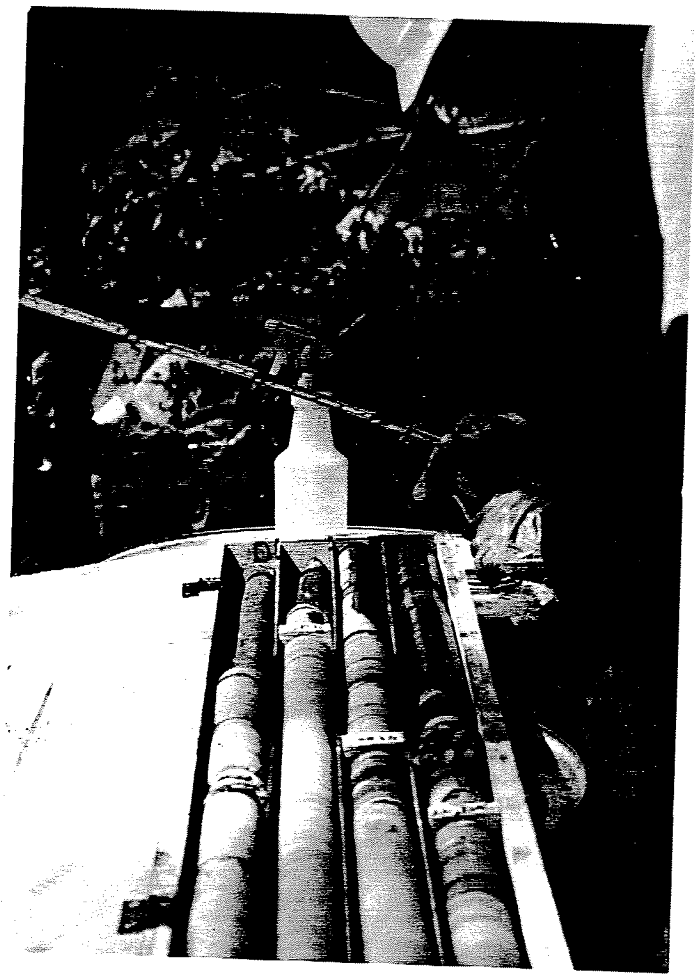
Date/Time: 7-19-89

Lens: Type 35 mm f11

SN: --

Frame No.:

Comments: Core from GW-3, determining RQD values.



[UZ]YO1080:D2826, #2685

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

Date/Time: 7-19-89

Lens: Type 35 mm f11

SN: --

Frame No.:

Comments: Stormwater detention basin, facing north.

[UZ]YO1080:D2826, #2685

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

Date/Time: 7-19-89

Lens: Type 35 mm f11

SN: --

Frame No.:

Comments: Drill rig setting up over location of GW-3, facing west.

[UZ]YO1080:D2826, #2685

ecology and environment, inc.

P H O T O G R A P H I C   R E C O R D

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

Date/Time: 7-19-89

Lens: Type 35 mm f11

SN: --

Frame No.:

Comments: Rock wall of stormwater detention basin, facing north.

[UZ]YO1080:D2826, #2685

ecology and environment, inc.

P H O T O G R A P H I C   R E C O R D

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

Date/Time: 7-19-89

Lens: Type 35 mm f11

SN: --

Frame No.:

Comments: Air monitoring during drilling of GW-3.

[UZ]YO1080:D2826, #2685

ecology and environment, inc.

P H O T O G R A P H I C   R E C O R D

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

Date/Time: 7-19-89

Lens: Type 35 mm f11

SN: --

Frame No.:

Comments: Facing northwest, abandoned quarry used as stormwater detention basin by Buffalo Sewer Authority.

[UZ]YO1080:D2826, #2685

ecology and environment, inc.

P H O T O G R A P H I C   R E C O R D

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

Date/Time: 7-19-89

Lens: Type 35 mm f11

SN: --

Frame No.:

Comments: Surface debris near monitoring well GW-3, facing east.

[UZ]YO1080:D2826, #2685

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

Date/Time: 5-5-89/900

Lens: Type 35 mm f11

SN: --

Frame No.: 4

Comments: Location of surface soil sample SS-5, facing north.

[UZ]YO1080:D2826, #2685

ecology and environment, inc.

PHOTOGRAPHIC RECORD

Client: NYSDEC

E & E Job No.: YO 1000

Camera: Make Kodak Fling 35mm

SN: --

Photographer: B. Topor

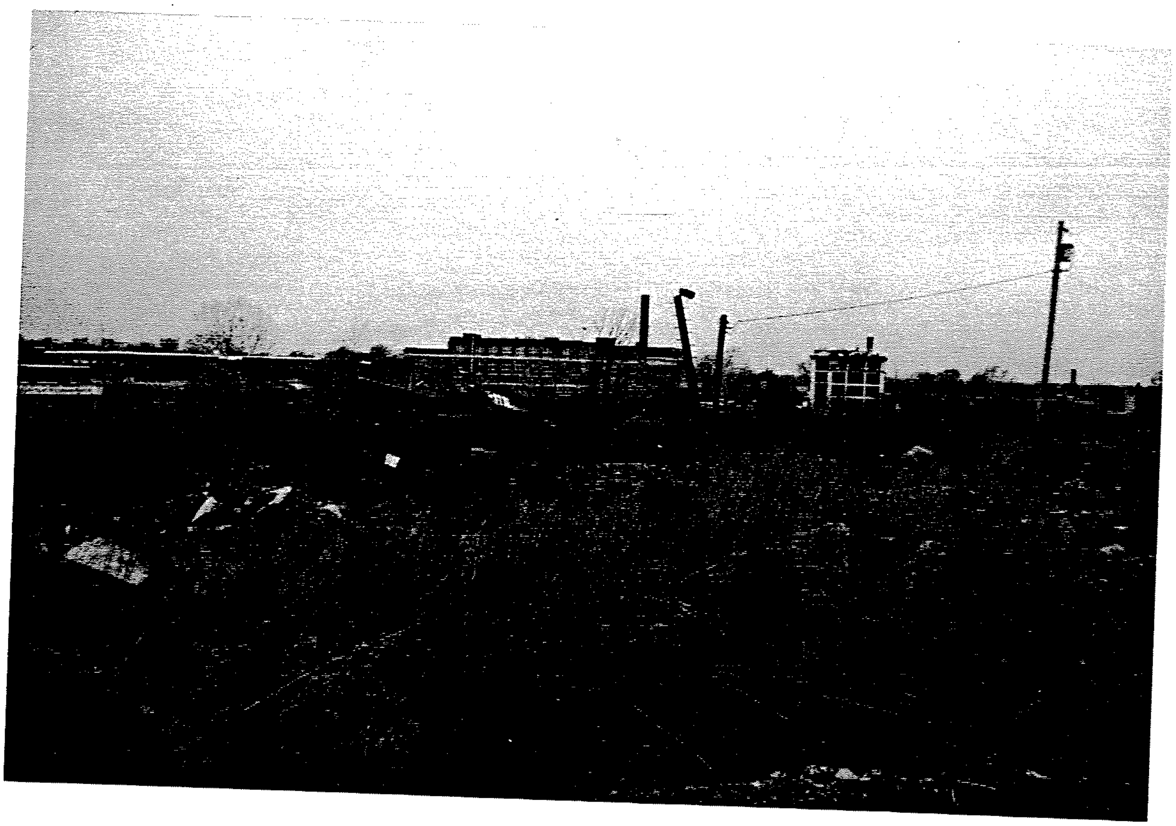
Date/Time: 5-5-89/900

Lens: Type 35 mm f11

SN: --

Frame No.: 11

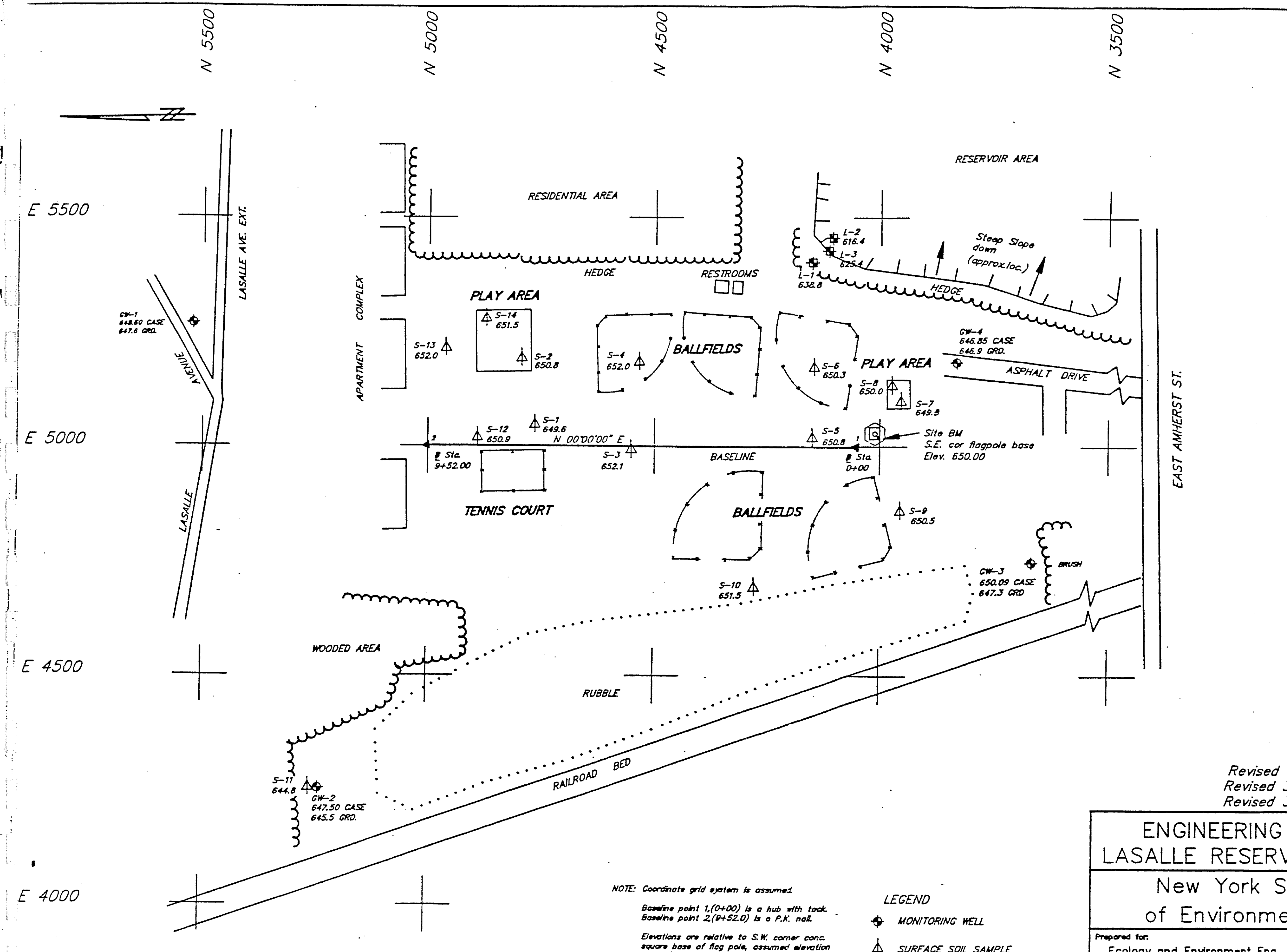
Comments: Facing west, surface debris, Bennett High School in background.

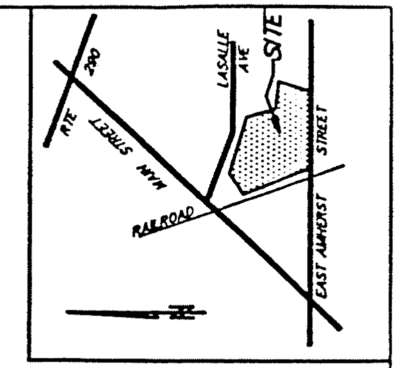


[UZ]YO1080:D2826, #2685

APPENDIX H

SITE SURVEY MAP





LOCATION SKETCH
N.T.S.

COORDINATE LIST		
NAME	NORTH	EAST
GW-1	5517	5281
GW-2	5252	4267
GW-3	3672	4729
GW-4	3827	5166
S-1	4765	5046
S-2	4792	5190
S-3	4556	4985
S-4	4533	5179
S-5	4150	5008
S-6	4145	5158
S-7	3953	5083
S-8	3976	5116
S-9	3958	4843
S-10	4286	4684
S-11	5275	4267
S-12	4891	5021
S-13	4961	5213
S-14	4870	5279
L-1	4143	5391
L-2	4098	5445
L-3	4105	5416
Hub 1	4048.02	5000.00
Pk. 2	5000.00	5000.00

NOTE: Coordinate grid system is assumed.

Baseline point 1,(0+00) is a hub with tack.
Baseline point 2,(9+52.0) is a P.K. nail.

Elevations are relative to S.W. corner conc. square base of flag pole, assumed elevation 650.00'.

Well elevations are top of well casing.

LEGEND

- MONITORING WELL
- SURFACE SOIL SAMPLE
- LEACHATE SAMPLE LOCATION

Revised 4/02/90 misc.mapping changes
Revised 3/26/90 symbol changes
Revised 3/12/90 added ground elevations

ENGINEERING INVESTIGATIONS AT LASALLE RESERVOIR Site No. 915033

New York State Department of Environmental Conservation

Prepared for:
Ecology and Environment Eng., P.C.
368 Pleasantview Drive
Lancaster, New York 14086

Prepared by:
OM P. POPLI, P.E.,P.L.S.
2140 South Clinton Avenue
Rochester, New York 14618
Tel. No. 716-442-6940

DATE	SCALE	SHEET
11/09/89	1"= 200'	1

APPENDIX I

SITE LOGS

ecology and environment, inc.

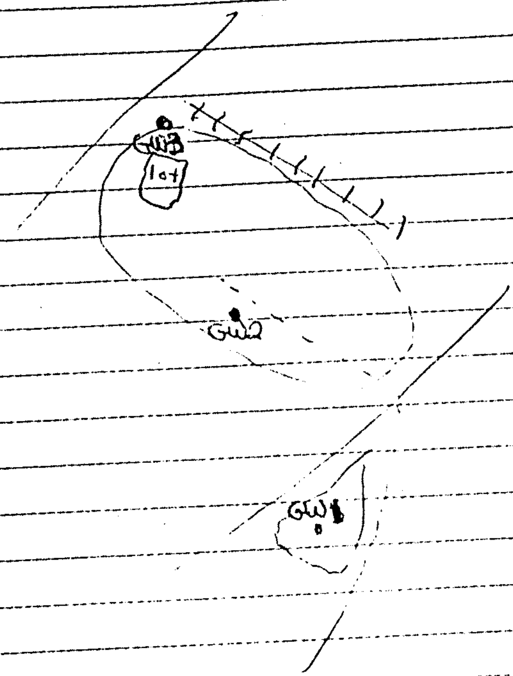
International Specialists in the Environment

Job Number Y01040

Drilling &
Site Safety
+
Drill log

Recycled Paper / 568019

2



7-18-89

People on Site

Tuesday 7-18-89

arrived:

Glen May before 10:45
DEC - bflo region

Martha Doelle 10:45
E&E

Barb Topor 11:00
E&E

Jim Rickert 11:30
E&E

Driller Truck on Site before 10:45. Operators in transit from Marilla LF

Weather - Sunny, Strong wind, 80+ °F

B. Topor 7-18-89

2 4

Jim Reichert 7-18-89

7-18-8

underground utility
provided clearance for
all 3 drill locations

Read Site safety packet
provided by Barb Topo.

Decon + protective wea
brought to site by Jim R
Plan for level D protectio

12:15
Drove hospital route
to Sisters hospital (ma st
With Jim R.
Picked up over pack drin
and lunch

B. Topov 7-18-89

6

Jim Richart 7-18-89

(Martha & Ji

13:15 return to site w/drum

13:15 drill crew arrives.

American Auger

John Pietruch
Kevin Welnel

Drillers reviewed site safety plan - <u>All have seen and signed</u> site safety plan

13:30 walked the site drill locations

Physical hazards - well 3 debris, brush

well site near parkin needs clearing - building

well location # - no U.G. (utility may be problem site is on island.

well 2 - debris, ~~Power~~ Tele. li in area

B Topor 7/18/89

J. Rickert 7-18-89

7-18-89

(14:15) ~~2:15~~ Jim R & John P drove to find decon area for $ the three gw wells

decon will take place before drilling, in between each location & after drilling

14:45 back at well 3 unload ovr picks

15:00 Drillers back at well 3 unload Bobcat - bulldoze site ~~fill water tank~~

Covered bulldozer safety measures

15:30 Setting up + calibrating of HNu by Jim R.

calibration gas 55 ppm

B. Tipper 7/18/89

Jim Richert 7-18-89

I-7

7-18

16:00 HNu background = 0.

no hits near bulldozed debris

debris consists of bricks, shingles, cement, wood, household garbage, tires,

16:15 Barb + Glen leave site

16:30 Martha leaves site

17:00 Decon of equipment

18:00 All off site

B. Topor / 7/18/89

Jim Richart 7-19-89

7/19

8:00 McDoelle on Site
at well # 3

Drilling crew
John + Kevin
already on Site

Gene Florintino &
Jim Richart on Site

Background minirad
is 14 counts/min

HNu calibrated

Explosimeter calibrated
O2 and LEL checked
by Martha and Gene

All E&E people
wearing booties, gloves
and coveralls, hard hat
Gene - the only new
person - reviewed
the safety plan

Jim Rickert 7-19-89

7-19-89

8:30 Site safety [illegible]

[illegible]

8:45 Life line on Pass. side out
first soil sample
from split spoon
[illegible]

Auger + background
[illegible] HNU

9:15 [illegible]
[illegible] HNU
auger = 0
third spoon - HNU
reading = 0
auger reading = 0

9.30 spoon no. 4
no HNU reading
on auger [illegible]

glass in spoon
may be on fill

10:00 BarbT visited site
for a few mins

Jim Rickert 7-19-89

7-19-89

Spoon 5
no HNU readings

10:30 Spoon 7
HNU
no readings

Spoon
no readings

Spoon 9
no HNU readings
in auger

Some lady at site - citizen
stayed at front of rig

11:00 Spoon 10
no HNU readings

Spoon 11
no HNU readings
Hit Bedrock! 22 ft

18

Jim Reichert 7-19-89

7/19/89

12:00 Drill rig set up for rock

Martha D leaves site 12:00

1210 Bruce Kohrn arrived on site. (E&E) He will be observing drilling on E&E overhead, and will not be billed to the NYSDEC.

1240 Finished Coring to 4.5 feet
0 PPM in borehole
0 PPM from core

1335 G. Florentino
B. Kohrn
J. Reichert
} Depart site for lunch + phone calls

1515 Crew returned to site

Gene Florentino 7/19/89

7/19/89 Wednesday

1530 Drill GF crew set surface casing and is beginning to decon rig and augers

1630 Drill crew setting up to drill GW-2. Bulldozing area.

B. Kohn departed site at 1530, and will return at 1700.

1720 GW 2 split spoon #1
0-2' 0 ppm (HNu)
Auger 0-2' 0 ppm

1730 split spoon #2 0 ppm
2-4'

1745 Auger 0-4' 7 ppm
Rain may cause erroneous Reading
Split spoon #3 4-6' 0 ppm

SBK 7/19/89

I-1

7/19/89 WEDNESDAY

1800 Auger 0-6' 0 ppm
Split spoon 6-8 0 ppm

1805 Auger 0-8' 0 ppm
split spoon 8-9 0 ppm

1815 BEDROCK REFUSAL
SHUTDOWN FOR NIGHT.

1830 ALL PERSONNEL LEAVE SITE

SBK 7-19-89

7/20/89 Thursday

weather: Rain

0730 C Florentin Picked up equipment at ETE'S Rsc

0800 Arrived onsite
Present onsite
B. Meyers (ETE)
J. Pittman } Amer.
K. Kline } Auger
G. May

HNu Calibrated but not functioning properly due to rain

0815 Began Coring using HQ core GW-2
600 PSI (weight)
350 RPM

0850 Completed Coring
(see drill log for description

Gee Florentin 7/20/89

7/20/89

0910 Departed site to call ETE Heavy rain, HNu not functioning.

left message with B. Topor regarding job status

P. Felgemacher said there are no OVA'S available

0920 After socket is set in GW-2 drillers will shut down until rain stops

1005 PVC Grouted in Place and protective casing placed on PVC

1020 G. Florentin & B meyers departed site

Gee Florentin 7/20/89

FRIDAY JULY 21, 1989

WEATHER: PTLY CLOUDY, WARM
65° WINDS LIGHT

PERSONNEL ON-SITE: C. EICH, B.
MEYERS (E+E), GLEN MAY (DEC)
KEVIN V. + JOHN V. (AA DRILLERS)
WELLNER PIETRUCH

0730 C. EICH ARRIVES ON-SITE
DRILLERS ALSO ON-SITE

0745 B. MEYERS ARRIVES ON-SITE.
HAD DRILLERS SET UP ON
GW-1.

0800 CALLED E+E FOR B. TOPOR, NOT
IN YET. CALIBRATED HNU. 55 ppm
@ 9.8 SPAN.

0815 G. MAY ON-SITE. HAD GW-1
LOCATION MOVED ~20' WEST

0845 BEGAN DRILLING - COLLECTED
0-2' SPLIT SPOON GW-1-SS-01
0 ppm ON HNU, ARCHIVED

0850 GW-1-SS-02 2-4' SAMPLE (2-3')
GW-1-SS-03 (3'-4') Chad

7/21/89

0 ppm ON HNU.

0905 AUGERING TO 4'

0920 HNU IN HOLE @ 4' UP TO 10 ppm,
BZ < 1

0925 SPLIT SPOON SAMPLE 4'-6'
~7 ppm ON BOTTOM OF SAMPLE.
GW-1-SS-04 TCL SAMPLE
IN AUGER UP TO 50 ppm.
5 ppm IN BZ. TCL SAMPLE
LABELED AS GW-1-SS-01

0935 GLEN + BOB LEAVE SITE TO
CALL BARB TOPOR

MONITORED HOLE. 5-7 ppm IN
AUGER. SOIL AROUND AUGER
UP TO 900 ppm. BZ < 1

0945 IN AUGER 5-7 ppm
SOIL CUTTINGS TO 800 ppm

1000 BOB + GLEN RETURN TO SITE
INFORMED THEM OF SITUATION.

Chad Eich 7/21/89

7/21/89 FRIDAY

1003 TOOK READINGS. 5 ppm IN AUGER
<1 ppm IN B.Z. 400 ppm IN
SOIL AROUND AUGER.

1005 DRILLERS LEAVE SITE TO PICK UP
A DRUM FOR THE SOIL.
1010 B. KOHRN ARRIVES ON SITE
1020 CONTAINMENT DRUM 2 ppm
BZ ~ 1 ppm (BEHIND RIG)
~~B~~ SBK
DRILLING CONTINUES

1035 AUGER 400 ppm 4-6'
INSIDE AUGER 4 1/2 ppm

I-15

1045 BZ - 0 ppm WHILE SPLIT-SPOONING
SPLIT SPOON REFUSED AT 7' 8 1/2"
SPLIT SPOON 5 ppm (AT SHOE)
AUGER (INSIDE) - ~~3~~ SBK 0 ppm
SOIL AROUND AUGER 300 ppm
SAMPLE IN SPLIT SPOON 0 ppm
2ND SNIFF OF SHOE 0 ppm.
1107 AUGER 6-7 1/2' >200 ppm
GW1-SS-05 6-7'
GW1-SS-06 7-7 1/2'
SBK 7-21-89

7-21-89 FRIDAY

AUGER REFUSAL AT 7 1/2'

STILL GETTING HIGH READINGS 300-400 ppm
IN SOIL AROUND AUGER. LIFTED UP
CATCH BASIN TO SHOVEL SOIL OUT FROM
AROUND AUGER. SOIL DAMP, READINGS
MAY POSSIBLY BE DUE TO MOISTURE IN
SOIL + AUGER. LETTING AUGER AIR
OUT, DRILLERS PREPARING FOR ROCK
CORING.

1130 BOB + GLEN LEAVE SITE TO CALL
OFFICE.

1140 READINGS IN AUGER UP TO 50 ppm.
SOIL (GROUND) AROUND AUGER ~15 ppm.

1151 BOB + GLEN RETURN TO SITE. BARB
NOT AT OFFICE. JIM FERON (DEC)
WAS INFORMED OF SITUATION AT GW-1.
HE WAS NOT CONCERNED ABOUT READINGS
STATING THAT IT WAS PROBABLY A THIN
LAYER OF CONTAMINATION IN THE
CLAY. HE OK'D USE OF GW-1 AS
Chad [illegible] 7/21/89

7/21/89

THE UPGRADIENT WELL BUT ULTIMATELY IT IS E+E'S DECISION.

WE DECIDED WE WILL CORE THE FIRST 5' SECTION + CHECK IT WITH THE HNU + BASED ON READINGS DECIDE HOW TO CONTINUE.

305 BEGAN CORING - TO CLEAN OUT THE AUGER

313 BEGAN CORING. FILLED UP CATCH BASIN WITH WATER AND THEN BEGAN RECIRCULATING WATER TO MINIMIZE THE AMOUNT OF WATER TO BE CONTAINERIZED.

50 FINISHED 1ST 5' CORE 12½' 0ppm ON HNU ON CORE, IN AUGER AND IN CORE BARREL

10 BOB + CHAD LEAVE SITE TO PICK UP LUNCH

Chad Seel 7/21/89

7/21/89

1330 RETURNED TO SITE. DRILLERS MIXING GROUT, D. JOHNSON ON-SITE TO LOOK OVER SAMPLES + DISCUSS SITE SITUATION.

1340 HOLE ~~BEING~~ GROUTED + PVC PIPE, CAPPED ON BOTH ENDS, BEING PUSHED INTO HOLE.

1345 DRILL WATER PUMPED INTO 1 DRUM. D. JOHNSON LEAVES SITE.

1350 BEGAN PULLING UP AUGER.

1405 DRILLERS LEAVE SITE TO PICK UP MORE DRUMS

1418 DRILLERS RETURN WITH 2 DRUMS, TOOK DRUM OF WATER FOR STORAGE NEAR GW-3.

1420 DRILL WATER BEING PUMPED INTO 2ND DRUM.

Chad Seel 7/21/89

7/21/89

1436 STEEL PROTECTIVE CASING PLACED OVER PVC.

1447 COLLECTED DRILL WATER SAMPLE GW-1-W-01

1500 CLEANED UP AREA, BAGGED TRASH.
HEADING TO GW-3 TO DROP OFF DRUMS OF DRILL CUTTINGS + DRILL WATER.

510 DROPPED DRUMS OFF AT GW-3. LEFT SITE TO TAKE SAMPLES TO LAB.

00 DROPPED SAMPLES OFF AT LAB. WENT TO OFFICE TO TALK TO BARB TOPOR @ SITE ACTIVITIES.
CALLED BUDGET TO KEEP VAN UNTIL 7/25.

0 LEFT FOR HOME

Chad Eil 7/21/89

MONDAY JULY 24, 1989

WEATHER SUNNY, WARM, HUMID.

PERSONNEL ON SITE.
C. EICH
J. RICHERT
G. MAY
K. WELLNEL
J. PIETRUCH

0900 C. EICH + J. RICHERT ARRIVE ON-SITE. INSPECTED GW-2

0923 G MAY ARRIVES ON-SITE.

0950 DRILLERS ARRIVE ON-SITE. SETTING UP TO CORE GW-3

1000 CALIBRATED HNU TO 55 ppm @ 8.48 SPAN

1009 UNCAPPED GW-3 + SNIFFED WELL W/ HNU - 0 ppm

Chad Eil 7/24/89

7/24/89

THERE WAS NO CHARGER IN THE EXPLOSIMETER CASE SO IT WAS NOT CHARGED.

1037 NX CORE SITUATED IN HOLE.

1040 BEGAN CORING - BEGINNING AT 26½' - RUN #2

1050 CORED 4'. CASING DID NOT SEAT IN THE BOTTOM OF THE ROCK SOCKET SO WE CORED THROUGH SEV. FEET OF GROUT.

1053 PULLING UP CORE.

1058 TWO EMPLOYEES OF HARRISON RADIATOR STOPPED BY BECAUSE SOMEONE HAD CALLED + REPORTED SEEING DRUMS + ASSUMED THE DRUMS WERE FROM HARRISON. GLEN SPOKE WITH THEM, AND INFORMED THEM OF OUR WORK HERE

100 HARRISON EMPLOYEES LEFT.

Chad Seil 7/24/89

BUEHLER + TESMER - GEO. OF ERIE CO.
BUFF. MUSEUM OF SCI.

7/24/89 CORE EXTRUDED ~2' OF GROUT + 6" OF ROCK → 0ppm ON HNU

1110 CORING 5' - BEGINNING @ 27' RUN #3

1128 ~30½' INTO CORE HIT BROWN CLAYEY LAYER ~2-3" THICK
SEAFAN LOOKING FOSSILE ~29'

1132 FINISHED CORING TO 32'. TOOK ~4 MINS./FOOT. HOLE IS TAKING WATER.

1150 BEGIN RUN #4. 5.2' RECOVERED IN RUN 3

0ppm ON HNU ON CORE

1202 END RUN 4 - 37'

1218 BEGIN RUN 5 - 37'

1240 END RUN 5 - 42' - FULL RECOVERY
0ppm ON HNU

1253 BEGIN RUN 6 - 42'

Chad Seil 7/24/89

7-24-89

1325 PULLED UP CORE AFTER ONLY 1.75' AS CORING TUBE BECAME BLOCKED + NO WATER WOULD GO DOWN TUBE. CLAY ON BOTTOM OF CORE.

1355 COMPLETED RUN 6 - 47'
STATIC WATER LEVEL 29.8' FROM GROUND. (33.8' TOC)

1410 ATTEMPTING TO PUMP WATER FROM HOLE TO SEE IF IT IS MAKING WATER.

1417 PUMPED DOWN TO 34.4' TOC

CHECKED WATER LEVEL 34.2 TOC

1435 WATER LEVEL 34.2' TOC
PULLING UP TREMIE LINE.

1440 GLEN + JIM LEAVE SITE

1443 BEGAN RUN 7 47'

1450 CORE ~~TUBE~~ OE BLOCKAGE, PULLED UP AFTER ~~1'~~ 12" 6"

Chad Seil 7/24/89

7-24-89

CLAY IN BOTTOM OF TUBE.
BRUCE KOEBEN ARRIVES ON SITE.

1503 CONTINUING RUN 7

1508 GLEN + JIM RETURN TO SITE. THEY LEFT TO CHECK WATER LEVEL AT HA-4, A WELL 129' DEEP OWNED BY BUFFALO SEWER AUTH.

1517 ~~END RUN 7~~ OE. BARB TOPOR + TIM SALTER ARRIVE ON-SITE.
TIM IS TAKING PICTURES
CONTINUING RUN 7.

1530 END RUN 7 - 52'
0ppm ON HNU. FULL RECOVERY

1549 BEGINNING RUN 8

1555 Bob Meyers arrives on site.

1600 C. EICH LEAVING SITE

1615 End Run 8
HNU Read 0ppm on the Core.

1620 Drill crew leaves to get drilling water

1630 Barb Topor departs to get Water + Ice

7-24-89 Robert A Meyers

recycled paper

ecology and environment

7-24-89

1636 Barb Returns

1652 Drill crew returns with enough water to complete coring

1737 End Run 9 (TD = 62')
0ppm from the Core using HNU.

1741 Begin Coring Run 10, have decided to core for 3' to get a total Depth of 65'

1757 Completed Run 10
TD = 65'
HNU Read ~~0ppm~~ 1ppm on the Core

AM ~~1800 Bob Meyers Departs site.~~

1800 Re checked cores with HNU got Reading up to 20 ppm, believes due to high humidity.

1815 Bob Meyers departs site.

Robert A. Meyers
7-24-89

I-20

7-25-89 Tuesday

0800 JOHNSON, KOHRN ARRIVE ON-SITE
GLENN MAY ARRIVES
WEATHER: SUNNY, MUGGY 80° F

0835 GW-3 42.85' Below steel casing
DRILLERS DECON RIG
DRILLERS: WELLNER, PIETRUCH

0900 DRILLERS SET-UP ON GW-2

0925 H+S MEETING
DISCUSSED HNU READINGS YESTERDAY WHICH WERE APPARENTLY DUE TO HIGH HUMIDITY
DISCUSSED HEAT + FATIGUE
DISCUSSED LOCATION OF KILL SWITCHES ON RIG
WORK TO BE PERFORMED IN

~~0930~~ 1 SBK MODIFIED LEVEL D TO ~~OF~~ SBK AVOID HEAT STRESS. HISTORICALLY, CONTAMINATION ON-SITE IS MINIMAL.

SBK 7-25-89

7-25-89

0935 COMMENCE DRILLING GW-2
RUN #1

1004 RUN #1 complete
14 ft to 17.67'
HNU READING OFF ~~Hole~~ Barrel SBK 8 PPM
BZ = 0.5 PPM

1043 COMMENCE RUN #2

1100 RUN #2 complete 17-22'
HNU - ~~Hole~~ Barrel SBK 0 PPM
Core 0 PPM

1115 RUN #3 Begun

1135 RUN #3 FINISHED 22-27'
HNU - BARREL 0 PPM
CORE 0 PPM

1140 ~~5~~ 4 SBK th RUN COMMENCED

1200 4th Run completed
HNU Barrel 0 PPM core 0 PPM
SBK 7/25/89

7-25-89

1215 5th RUN Begun
C. EICH, B. Meyers ARRIVE
1245 D. JOHNSON Leaves
B. KOHRN, G. MAY ~~LEAVE~~ SBK MOVE
GW-3 TO BAIL

~~STATIC~~ SBK WATER LEVEL 43.05'
Below casing
1305 AFTER BAILING - WATER LEVEL
IS 44.0'.
WATER RUNNING INTO WELL.
BAILER SLIPPED OFF ROPE.
FROM 7-24-89: weathered
FRACTURE AT 43.8'. ~~presented~~ SBK
THIS IS PROBABLE source of water
RUNNING INTO HOLE from above

1320 Level 43.875'
Based on the drilling log,
AT 43.8', the weathered fracture
zone is a clay zone. This blocked
the core. The clay zone is
probably the water-bearing zone
SBK 7/25/89

7-25-89

1330. Water level 43.85'
Locked capped on well.
Bailer lost down well.
(dropped at 1305)

1335 B. KOHEN G. May return to GW-2

1349 ARRIVE GW-2. RUN #7 IN progress

~~1443~~ 1405 SBK Drillers leave site for water

1443 DRILLERS RETURN

1529 END RUN #7

1547 Begin RUN 8 47.4'

1607 END RUN 8

1614 Begin Run 9 52.3'
1630 B. KOHEN Leaves site

SBK 7/25/89

I-22

WEDNESDAY JULY 26, 1989
WEATHER. HAZY, HOT + HUMID, 75°.

~~SAME~~ CE PERSONNEL ON-SITE: ~~AS 7~~ CE
C. EICH, B. MEYERS, G. MAY
0800 B. MEYERS, ~~C. EICH~~ CE G. MAY ON-SITE
0815 C. EICH ON-SITE. STOPPED AT LAB
0827 WATER LEVEL IN GW-3
44.08' TOC
DRILLERS STILL NOT ON-SITE.
NO WORD FROM THEM + THEY
SAID THEY WOULD BE HERE AT
0730. WALKED TO GW-2

0841 WATER LEVEL IN GW-2 52.44' TOC

0859 WALKED BACK TO GW-3 +
DRILLERS STILL NOT ON-SITE

0945 WENT TO CALL BARB TOPOR +
JIM FERON. DRILLERS SUPPOSEDLY
ON THEIR WAY AFTER MEETING ROCKY
THIS MORNING IN ROCHESTER.
J. FERON SAID WE HAVE OK FROM
BUFF. SEWER AUTH. TO SAMPLE
SEEPS IN QUARRY. BARB WILL

Chad [signature] 7-26-89

7/26/89

CALL JIM TO CONFIRM THIS.

1010 DRILLERS ARRIVE ON-SITE. THEY DID NOT PICK UP A PUMP CAPABLE OF DEVELOPING THE WELLS HERE. WILL EITHER HAVE TO RENT ONE OR BAIL.

1027 DROVE OVER TO GW-1

045 CALIBRATED HNu TO 55 ppm @ 9.66 SPAN.
HUMIDITY IS CAUSING A BACKGROUND READING OF APPROX 13-14 ppm.

DRILL RIG IS SET UP OVER WELL GW-1

055 HNu OF WELL ~ 5.5 ppm IN HOLE, 0ppm (ABOVE BACKGROUND) IN B.Z.

1116 BEGIN CORING : STARTING AT 12½' (RUN 1)

Chad Eil 7/26/89

7/26/89

1120 HNu IS NOW READING 0ppm FOR BACKGROUND

1149 END RUN 1 NX CORING 4.5'
0ppm ON HNu.
4.2' RECOVERED.

1156 BEGAN RUN 2 -

1225 END RUN 2 - 22'
INNER BARREL STUCK IN TUBE

1233 EXTRUDED CORE - 0ppm ON HNu OF CORE AND IN HOLE

1248 BEGIN RUN 3

1317 END RUN 3 - 0ppm ON HNu

1326 BEGIN RUN 4

1340 BOB + GLEN LEAVE SITE TO CALL BARB TOPOR ABOUT WELL DEVEL. TOMORROW, SEEP SAMPLING IN QUARRY ETC.

CAN HEAR THUNDER IN THE DISTANCE

Chad Eil 7/26/89

7/26/89

1350 END RUN 4 32'
O ppm ON HNu

1401 BEGIN RUN 5

1422 END RUN 5 - 37'
O ppm ON HNu* (*HNu IS ACTING UP AGAIN DUE TO ↑ HUMIDITY + IMPENDING RAIN)

1430 A FEW DROPS OF RAIN ARE FALLING.

1508 END RUN 6 42'

1520 BEGIN RUN 7 + BLOCKED OFF ALMOST IMMEDIATELY

DRILLERS HAD TO GET WATER.

1545 DRILLERS RETURN TO SITE
CONTINUE RUN 7

1608 END RUN 7 47'

Chad Eich 7-26-89

7-26-89

1620 C. EICH LEAVES SITE TO CALL B. TOPOR
- AIRLIFT OK FOR DEVELOPMENT IF DONE ON OTHER SITES.
GET GLEN'S OK
- NO NEPHALOMETER TILL TUESDAY POSSIBLY GET SAMPLE + USE THE ONE AT THE LAB.
- WE WILL HAVE TURBIDITY METER

1648 C. EICH RETURNED TO SITE.
RUN 8 COMPLETED - 52'
RUN 9 IN PROGRESS

1710 BLOCKED OFF AT 56.2' PULLED UP CORE.

1728 CORING ~ 10" TO GET TO 57'
HEARING THUNDER BUT HAVEN'T SEEN LIGHTNING

1734 COMPLETED 10" CORE - RUN 9 OK

1745 BEGAN RUN 10

Chad Eich 7-26-89

7/26/89

1810 END RUN 10 61.8'

1823 BEGIN RUN 11

1839 END RUN 11 3.2'

TD GW-1 65'

1921 CAN HEAR WATER RUNNING INTO WELL,
WATER LEVEL 45.74 TOC

1925 LEAVING SITE

Chad Eich 7/26/89

THURSDAY JULY 27, 1989

WEATER HAZY, HUMID CLOUDY.
LOOKS LIKE RAIN.

1100 B. MEYERS + C. EICH ARRIVE
ON-SITE. MIKE RYAN + GLEN
MAY (DEC) ON-SITE AT GW-3.
AIRLIFT METHOD NOT WORKING
TO DEVELOP WELL. TOO DEEP.
(BOB + CHAD STOPPED AT LAB
TO DROP OFF EXPLOSIMETER + HNU,
PICKED UP TURBIDITY METER AND
PH/TEMP/COND. METER.)

1110 GLEN + MIKE LEAVE TO INSPECT
OTHER WELL LOCATIONS.
JOHN TRIED TO PUMP WELL
TO DEVELOP IT BUT IT IS
TO DEEP.

1130 BOB + CHAD GOING TO TAKE
WATER LEVEL IN GW-1 +
PICK-UP SUPPLIES AT HARDWARE
STORE. WATER LEVEL 46.08' TOC.

Chad Eich

BOB + CHAD 7/27/89

1225 ARRIVE BACK ON-SITE AT GW-2
GW-2 IS BEING AIRLIFTED.

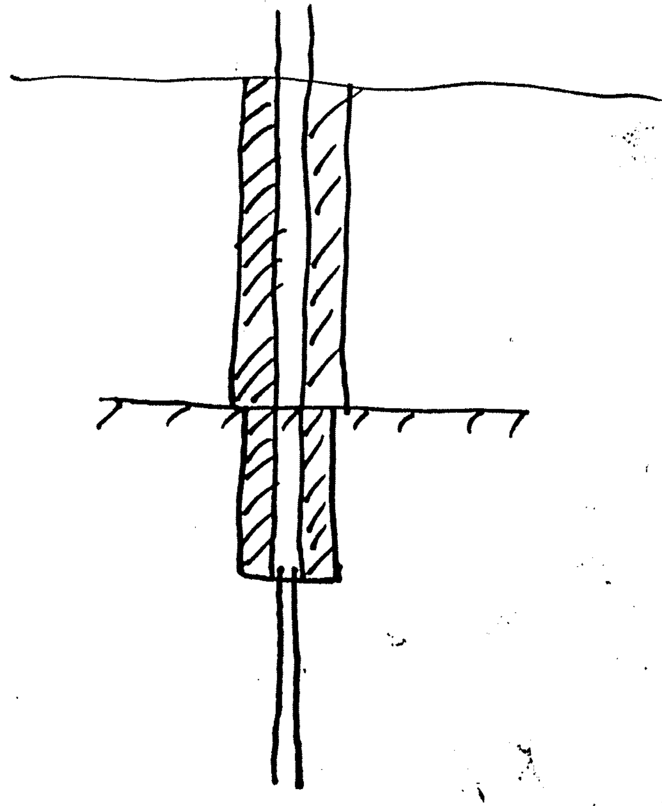
1245 HEADING TO GW-3 TO FISH
OUT BAILER + BEGIN BAILING
AIRLIFT WILL CONTINUE FOR
A FEW MORE MINUTES + THEN
MOVE TO GW-1 + BEGIN AIRLIFT.

1300 B. TOPAZ + G. MAY LEAVE SITE
FOR LUNCH

1330 QUIT ATTEMPT TO FISH OUT
BAILER. WATER LEVEL IN GW-3
37.23' TOC PRIOR TO
BAILING.

1332 pH - 6.88
COND - 736
TEMP - 65.4
WATER VERY CLEAR LOOKS
LIKE DRINKING WATER
BOB + KEVIN LEAVE TO BAIL
GW-2

1419 BAILED 10 GALS,
WATER LEVEL 35.36 TOC



1435 TURBIDITY 3.6 NTU'S
TEMP 63.7
COND 791
pH 6.83
1440 BAILED 5 MORE GALLONS (15 GAL TOTAL)
1448 WATER LEVEL 35.67
pH. 6.89
TEMP 64.8
COND 814
1500 LEAVING GW-3

Chad 7-27-89

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LA SALLE RESERVOIR

NYSDEC PHASE II INV.

Job Number Y0 1000

DRILLING

I-27

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ecology and environment

B. Todor 7/18/89

7/18/89

1030 E+E ARRIVES ON SITE

MARTHA DOELLE

NYSDEC ALREADY HERE - Glenn May

1100 BARB TODOR ARRIVES ON SITE

WEATHER : 75° F Sunny no clouds
winds 5-10 NE

Jan PICKERT AT LASALLE AVE + L. AVE EXT
MEETING W/ UNDERGROUND UTILITY
PERSONS FOR GW-1 + GW-2.

• Martha reviews site safety plan.

Drillers trucks are here but no one from American Auger is here. BT.
They are in route to site from Marilla L.F.

1130 J. Pickert returns to meeting area and informs us that the underground utilities have been marked and cleared.

1145 Discussing over packing of drums with NYSDEC (procedures).

B. Todor 7/18/89

B. Topol 7/18/89

7/18/89.

1200 Martha + Jim drive route to hospital (Sisters on Main St) and to p.u. drums from location near William st.

1315 Martha + Jim return.

1320 American Auger drillers arrive on site.

John Pietruch –
Kevin Welvel

American Auger reviews our site safety plan.

1325 Went GW-3.

1330 Went to GW-1 – LaSalle Ave + L.S. Ext
Utility lines may be present.
Jim Pietut will look into if it is or not.

1400 Went GW-2 near telephone lines
found stake. Discussed where
D-Con area will be.
J. Pietut + J. Pietruch proceed
down dirt rd along tracks
to find D-Con area for all
3 GW-1 well installations

D-Con will take place before
drilling – in between each

B. Topol – 7/18/89

6

B. T??? 7/18/89

7/18/89

well location and before departing the site.

1430 D-con area established. Drillers & J. Rickert go to fire hydrant (H_2O source).

1500 Drillers return to GW-3. Mobilizing heavy equipment towards GW-3. Drums (empty) unloaded in woods in area of GW-3.

1530 E+E + NYSDEC Review Geotechnical report submitted to BSA for approximate H_2O level elevations + formations encountered. The H_2O Depth after drilling was noted to be ≈ 40 below surface. Static groundwater estimated to be at 50' - 60' bgs.

Glenn will talk to M. Ryan as to approval for open hole well construction. Continuous sampling to take place as per NYSDEC request (every 5' in workplan). Ask about how far bgs we should drill in case H_2O isn't encountered.

1600 Clearing MW-3 of trees + brush for drill rig excess

B. T??? 7/18/89

B. Topor 7/18/89

7/18/89

1600 Cleared area around GW-3
Pathway cleared of debris piles
HNU used and no readings
above background encountered.
In immediate area around
GW-3 rocks (broken chunks)
concrete & brick encountered.
Area in pathway had shingles
wood paper etc (household garbage)
in way. Pathway was also
cleared to establish road (path)
to D-Con area along tracks.

B. Topor 7/18/89

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Job Number Y01000

LASALLE RESERVOIR

B. Topor 5/5/89

I-33

5/5/89

830 E+E ARRIVES ON SITE

B. TOPOR, C. EICH, D. JOHNSON
↳ SITE SAFETY OFFICER

CLOUDY - WINDS FROM SE (STRONG WINDS)
TEMP ≈ 45°

HELD A SITE SAFETY MEETING TO DISCUSS HAZARDS + PRECAUTIONS THAT MUST BE TAKEN. CHAD STARTS + CHECKS HNU. DISCUSSED PLANS TO PERFORM SITE RECON + AIR MONITORING. WILL WALK PERIMETER OF SITE TO DELINEATE SITE BOUNDARIES. WILL ALSO LOCATE SOIL SAMPLE LOCATIONS + TAKE SAMPLES AND DETERMINE WELL LOCATIONS BASED ON WORK PLAN.

DON JOHNSON WILL ALSO BRIEF US ON ANY POSSIBLE INTERFERENCES THAT MAY CAUSE PROBLEMS DURING GEOPHYSICAL INVESTIGATION. (EM31 + MA

9000 56 ppm at a span of ~~9.4~~ 9.8 S.I. CALIBRATION OF HNU EXPLOSIMETER IS FUNCTIONING.

BACKGROUND 0 ppm.

B. Topor 5/5/89

B. Topor 5/5/83

5/5/83

PHOTO LOG

#		FACING
1	FACING E CONCESSION STAND	
2	BASEBALL FIELD #2 DEMO IN BACKGROUND	W
3	PLAYGROUND	W
4	APARTMENTS	S
5	RD ALONG APTS	W
6	area E of Apts	S
7	NW CORNER OF SITE WOODED DIRT PATH	S
8	DRUM NW PART OF SITE	W E
9	DEMO DEBRIS	S
10	"	"
11	Facing Demo.	W
12	Standing on old RR Bed. near stadium - to the west.	S
13	in Demo Debs Remnant HB Berm (track?)	SE W

B. Topor 5/5/83

B. [illegible] 5/5/85

5/5/85

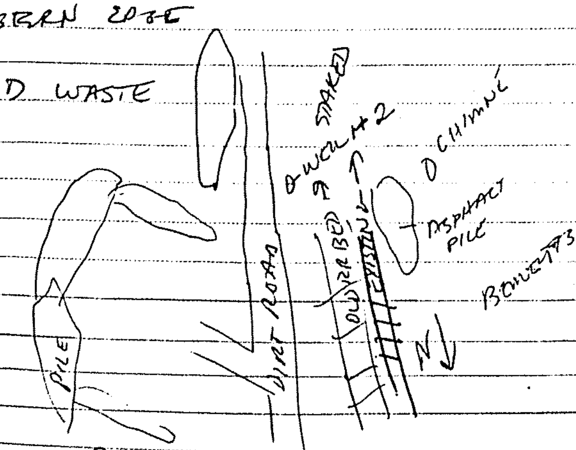
GW-1 POOR TO FAIR POSSIBILITY FOR GEOPHYSICS ON ROAD PAVING APTS. (IF THATS A POSSIBLE LOCATION) IF THIS WELL IS UP GRADIENT BOUNDARY OF QUARRY WILL BE NECESSARY. (ie geophysics)

NO READING ABOVE BACKGROUND DOWN UP ~~GRADIENT~~ AT LANDS AT TOWER NE PART OF SITE. FILL OBSERVED SLAG + CONCRETE. PATHWAY BEDSPRINGS — SMALL PILES OF ASPHALT. SOME (2-3) OLD DETERIORATED DRUMS. WIRE GASOLINE CANS. ELECTRICAL COMPONENTS.

1015 NO READING ABOVE BACKGROUND

DEMOLITION DEBRIS ≈ 40' HIGH WESTERN EDGE

C+D WASTE



Geophysics is highly unlikely due to fill - TRUCKS metal debris

Barbara [illegible] 5/5/85

B. Topor 5/5/87

5/5/87

1045 Are still at Background.

EM 34 may be a better choice for delineating quarry boundary

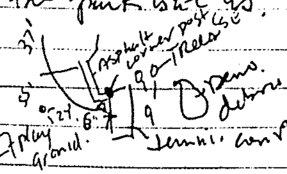
MW-3 - geophysics is probable in the immediate area only.
Depth to Bedrock appears to be 5-6 below surface.

No rats seen

Utilities don't appear to be a problem except in MW-1 area.

Nothing above background but local odor noticeable at entrance of site

1115 Don J. Depart site
Bob + Chad take SS-1
near tennis court.
several locations where (3-4) drums + assoc ga[...]
are coming to surface
No one is at the park but us.



SS-1 silty sand
w/ little clay.
drum cover.
near by moist.

B. Topor 5/5/87

B. Topor 5/5/87

I-37

Photolog 5/5/87 1.

14.

15. Facing Road N
that leads to [illegible]
W-edge of site
Stationed SW corner of site

16 towards Amherst St S
MW-3 location
SW corner of site

17 SS-1 near tennis courts S

18 SS-2 near swings W
first std.

19 SS-4 BDA2 facing S

20 SS-3 near Rock & walkway N

21 SS-5 facing N

22 Reservoir – E. Amherst. E

23 Reservoir E

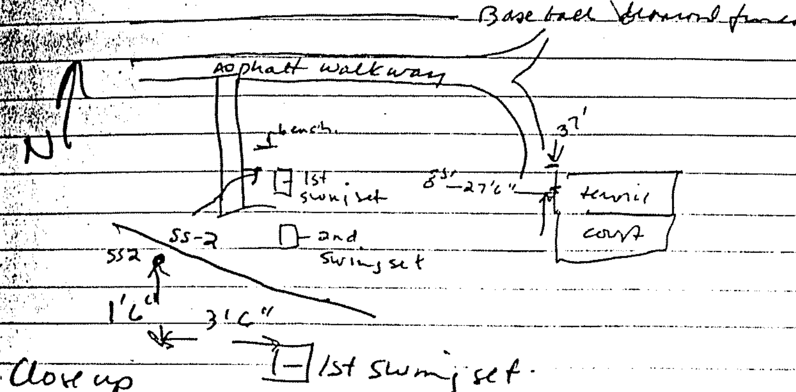
* Direction based on arrow on work plan map

B. Topor 5/5/87

B. Tyer 5/5/83

5/5/83

1130 SS-2 Lt. Brown Sand Moist



Close up

1145 SS-~~3~~4 BT

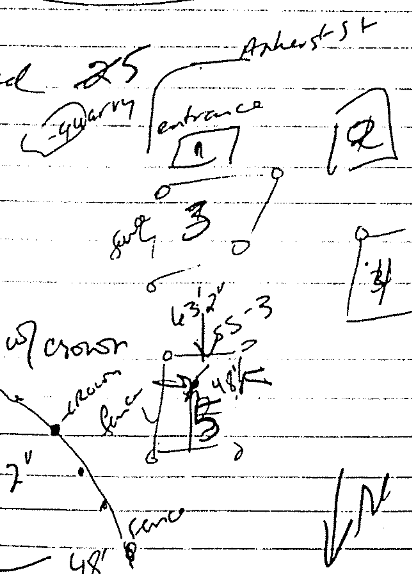
Baseball diamond ~~2~~5

Reddish clay w/ little silt

clay bricks moist

2 fence post from post w/ crown

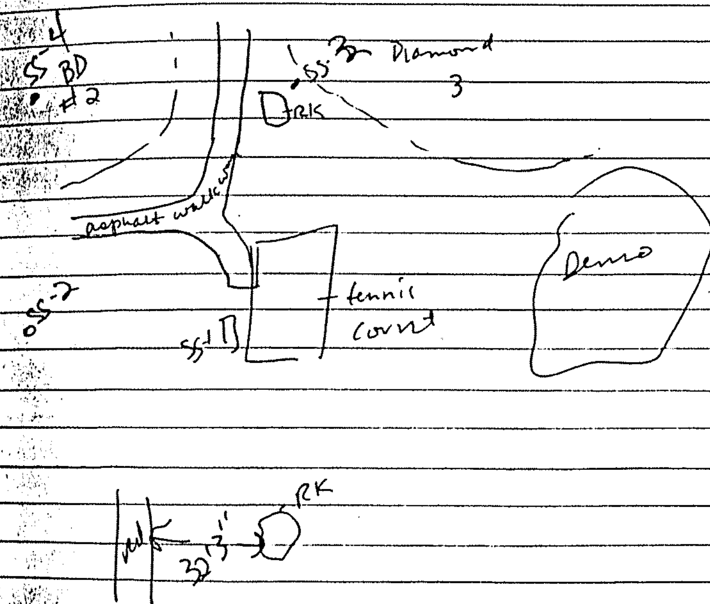
No phone onsite



Barbara Tyer 5/5/83

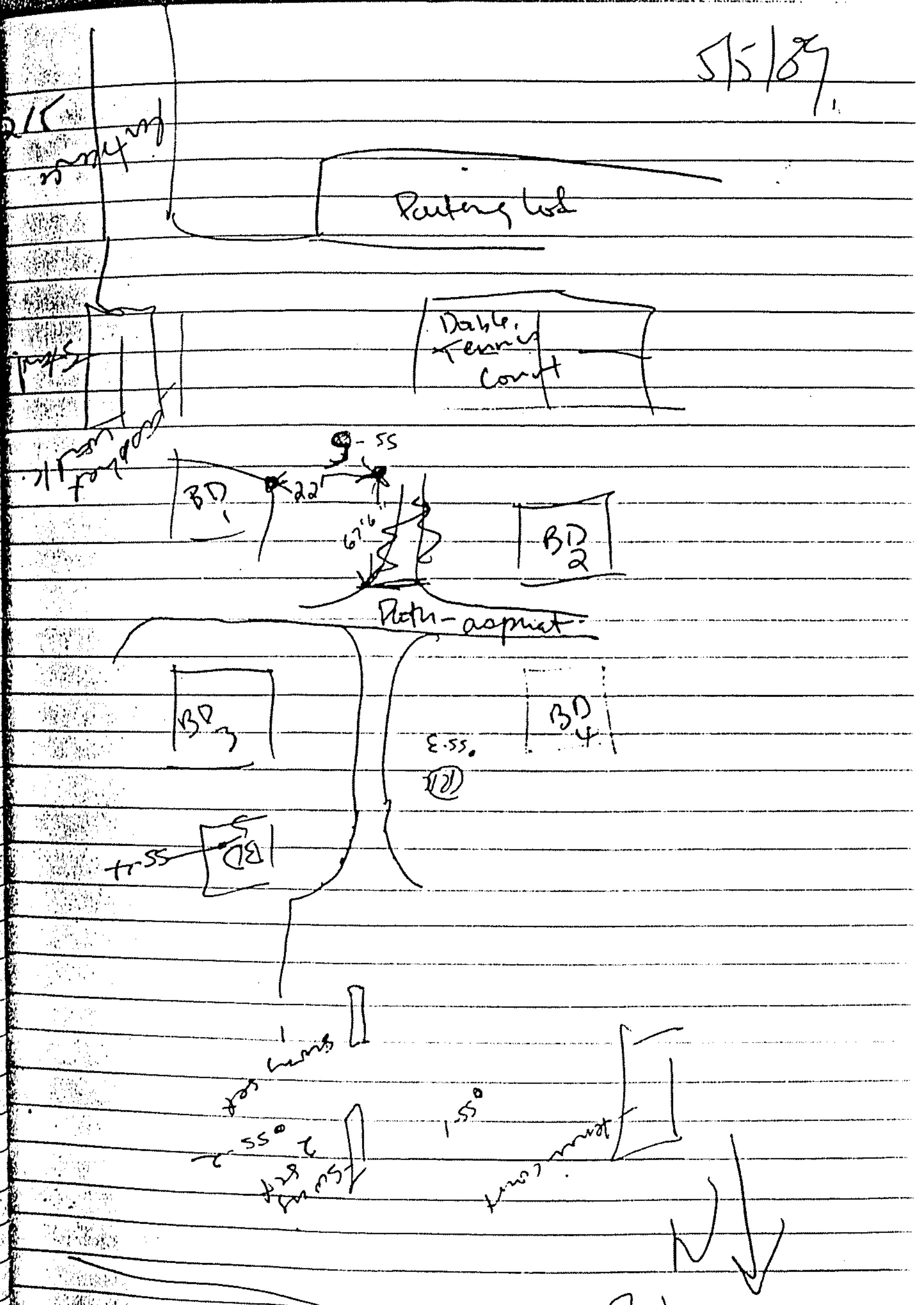
B. Dyer 5/5/89

SS-3



B. Tipor 5/5/89

B. Tapar 5/5/89



B. Tapar 5/5/89

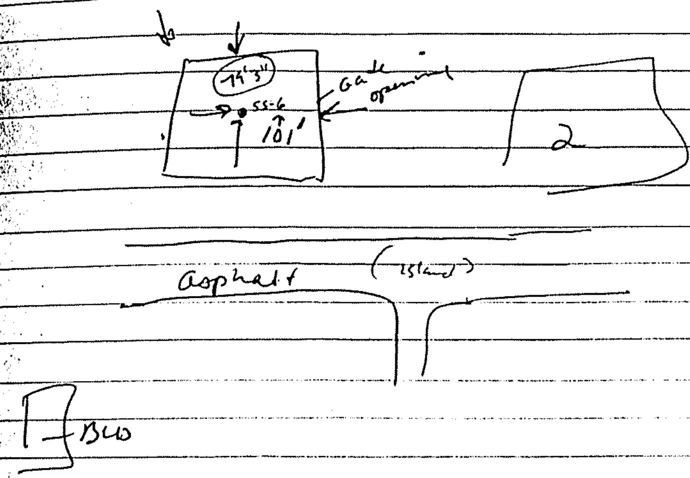
B. Tobor 5/5/85

I-41

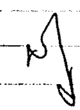
5/5/85

1230 SS-6 parking lot

BD-1



SS-6



Brown
Sandy loam
w/ a some silt.

1245 Return back to car. Fill out chain of custody seals + forms. Pack age soil samples.

B. Tobor 5/5/85

B. Topor 5/5/85

5-5-85

1:00 Load up equipment. No readings were above background during the sampling activities.

1:15 Take last few pictures of the E. Amherst Quarry. Discuss site conditions. Geophysics info will be limited due to the approximate depths of fill and the metal debris that is associated with the fill. Well #1 location will need to discussed of the State

1:45 E+E departs site, Chad is delivering the samples to the ASC.

B. Topor 5/5/85

WED 9-13-89

TASK - BEGIN SURVEYING

0945 J. RICHERT ARRIVES ON SITE TO MEET OM POPLI SURVEY CREW.

0947 MEET ~~BRAD~~ BRIAN JR AND TOM OF OM POPLI THEY WERE HERE SINCE 0930

BARB TOPOR WILL MEET US ON SITE AT ≈ 1045 TO STAKE 10 MORE SS LOCATIONS.

1000
JIM RICHERT + TOM + ~~BRAD~~ BRIAN JR WALK TO FLAG ALL 3 WELL LOCATIONS

1015 ALL THREE PEOPLE BEGIN TRYING TO FIND THE STEAKS FOR SS-1 THRU SS-6

HAVING GREAT DIFFICULTY FINDING THEM.

1100 RICHERT INSTRUCTS SURVEYORS TO BEGIN SURVEYING WELLS WHILE HE CONTINUES TO SEARCH FOR SOIL SAMPLE LOCATIONS.

1115 RICHERT HAS FOUND SS-~~4~~ 4JR, SS-5, SS-6 NO LUCK W/ SS-1, 2, 3.

1130 BARB NOT YET ON SITE SO SURVEYORS DEPART FOR LUNCH.

1150 SURVEYORS RETURN W/ LUNCH + ALL EAT LUNCH
1200 RICHERT DEPARTS SITE TO CALL BARB TOPOR.

J. Richert

WED 9-13-89

1203 Richert leaves a message on BARB'S PHONE RECORDER.

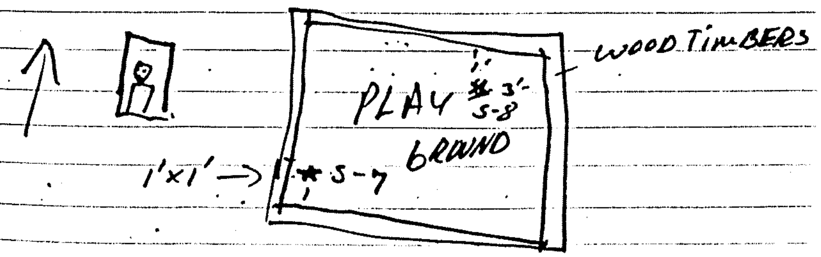
1205 Richert Returns on site

1210 Richert Begins to search again for SS-1, SS-2, SS-3.

1230 BARB TOPOR ARRIVES ON SITE WE FIND S-1, S-2, + S-3.

1300 WE STAKE S-7 → S-14

S-7 IN SW CORNER OF SOUTHERN MOST PLAY GROUND



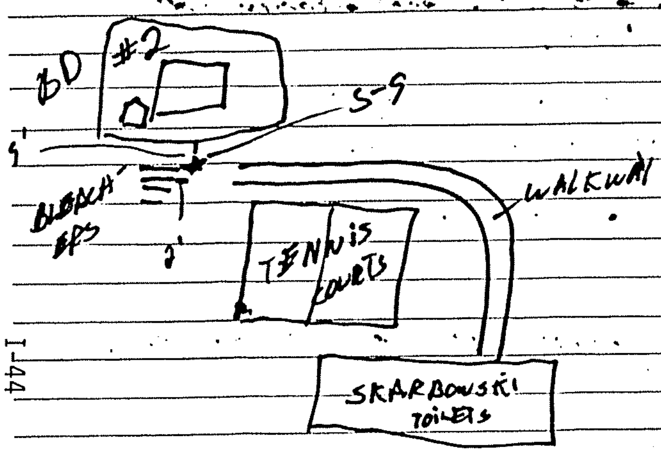
S-8 = IN SAME PLAY GROUND IN NE CORNER 1' FROM NORTH TIMBER + 3' WEST OF EAST TIMBER

Jim Richert

WED 9-13-89

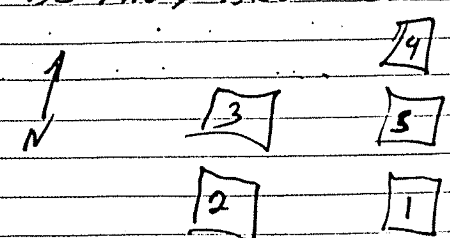
1305 STAKE: S-9

LOCATION is 9-feet SOUTH OF BASEBALL DIAMOND #2 FENCE
2' EAST OF BOTTOM SEAT OF WOOD BLEACHERS.
(STEEL FRAME)



if Bleachers get moved IT IS ≈ 30' EAST OF
WESTERN MOST TREE IN THE E TO W LINE.

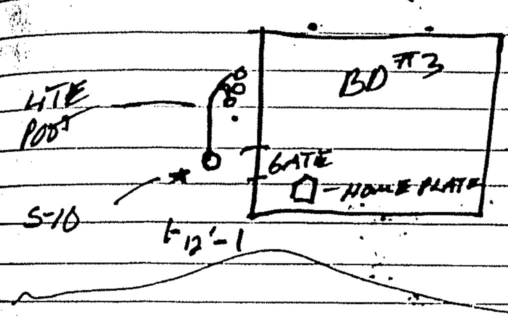
NOTE: that from page 24 ON in THIS NOTE BOOK
THE BASEBALL DIAMONDS ARE #'ERD CORRECTLY
AS THEY ARE: SEE BELOW



J. Dighont

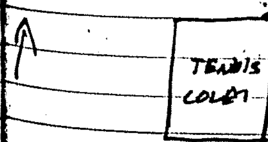
WED 9-13-89

S-10 LOCATION is WEST OF BD #3
GO TO WEST ENTRANCE OF BD #3
STAKE is ≈ 12' WEST OF GATE OR ≈ 3'
W/SW OF THE TALL TRIPLE LIGHT POST.



1315 S-11 IS 20' NORTH OF
WELL # GW-2

1330 LOCATED S-12
40' NORTH
23' EAST



NE of NE CORNER POST OF
NORTHERN MOST TENNIS COURT

STAKE is IN A SLIGHT DEPRESSION

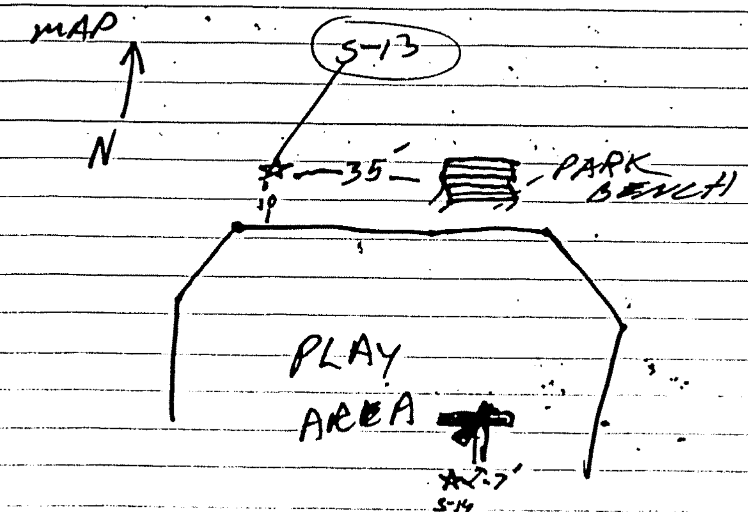
1335 STAKE S-13 is ≈ 10' NORTH OF
NORTHERN MOST PLAY GROUND + ≈ 35' WEST OF
PARK BENCH IN A AREA OF LITTLE VEGETATION
see p. 28

J. Dighont

28

WED 9-13-89

S-13 MAP



1340 STAKE S-14 IN SAME PLAY AREA AS S-13. DIRECTLY UNDER THE ~~SO~~ END OF THE SOUTH ARM OF A BIG CROSS LIKE STRUCTURE IN A LOW SPOT ≈ 7' SOUTH OF THE CROSS MAIN VERTICLE SUPPORT

1350 STAKED L-1 GO TO TURN IN QUARRY FENCE ON NW CORNER OF QUARRY. AT OLD PHONE POLE - A BIG BREAK IN FENCE NEAR A ROAD GUARD RAIL. FALLOW FOOT PATH DOWN ≈ 45 FEET TO A DRAINAGE OUTLET. STAKE IS ≈ 3' DOWN STREAM FROM CONCRETE

1355 STAKE L-2 =
CONTINUE DOWN PATH TO ≈ 23' BEFORE CONCRETE WATER AQUIDUCT WALL. STAKE IN ERODED DITCH.

J. Reichat

I-45

WED 9-13-89

NOTE: that TO THIS POINT ALL SS samples SHOULD ACTUALLY BE "S" SAMPLES. NO SS's YET.

JJR
1400 BARB TELLS OM POPLI TO STAKE A 3RD LEACHATE SAMPLE. BETWEEN L-1 AND L-2
IT will BE CALLED L-3.
L-1, L-2, L-3, All ARE IN THE SAME DITCH. ON NW CORNER OF THE PRESENT QUARRY

1415 WE DISCUSS PROBLEMS WITH E&E/OM POPLI COMMUNICATIONS - MAPS, DELAYS ETC.

1430 All Deposit sole

OM P. POPLI SURVEYORS will START TOMARROW

J. Reichat

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Job Number Y01060

LA SALLE RESERVOIR

Recycled Paper / 568019

WED. DECEMBER 20, 1989

WEATHER: PTLY CLOUDY, COLD, 12°F
WINDY, WINDCHILL -29°F

PERSONNEL + EQUIP. ON-SITE:
C. EICH
M. WITNAUER
J. RICHERT

12 PASSENGER RENTAL VAN, DODGE.

0800 J. RICHERT + M. WITNAUER ARRIVE ON-SITE AND FLAG SAMPLE LOCATIONS S-7 THRU S-14. GROUND IS FROZEN.

0830 C. EICH ARRIVES ON-SITE WITH RENTAL VAN AND SAMPLING GEAR, BEGINS LABELING SAMPLE JARS.

0850 M. WITNAUER + J. RICHERT FINISH FLAGGING SAMPLING LOCATIONS. J. RICHERT LEAVES SITE

Chad Eich

12/20/89

CONTINUED READYING SAMPLING EQUIP.

0905 M. WITNAUER CALIBRATED HNU TO 69 ppm @ SPAN 10.0.
COLD MAY BE CAUSING PROBLEMS W/ HNU.

BACKGROUND IS 3 ppm

0915 WALKED TO STATION S-7. USED SHOVEL TO DIG THROUGH FROZEN GROUND + DOWN TO APPROX. 18". 0 ppm ON HNU

AUGERED THROUGH SAND TO 2' THEN HIT LAYER OF ROCKS + GRAVEL. BELOW ROCKS WAS BROWN CLAYEY SOIL, CONTINUED TO 5'. HIT WATER @ 5'

1000 COLLECTED SAMPLE S-7. MADE A COMPOSITE FROM 3'-5', PUT SOIL IN SS BOWL. THE SOIL

Chad Eich

12/20/89

BEGAN TO FREEZE QUICKLY. TOOK SOIL BACK TO VAN TO THAW. DECONNED AUGER AND WENT TO STATION S-8

1010 SHOVELED. DOWN TO APPROX. 2' + HIT ROCKS. COULD NOT AUGER OR SHOVEL THROUGH ROCKS. MOVED LOCATION 1' ~~NE~~ or SE

1030 AUGERED THROUGH ROCKS BUT HIT REFUSAL @ 3.5'-4'. SAMPLE RECOVERED WAS DARK BROWN, FILL TYPE SOIL, NOT LIKE CLAY IN S-7. TOOK S-8 SOIL BACK TO VAN TO THAW.

1040 DECONNED AUGER + PLACED SOIL FROM S-7 + S-8 IN SAMPLE JARS.

PHOTO 1 - LOCATION S-7
PHOTO 2 - LOCATION S-8.

1050 AT LOCATION S-9. DUG TO 6"

Chad [illegible]

12/20/89

1100 BEGAN AUGERING AT LOCATION S-9. DUG TO JUST OVER 2' AND MET REFUSAL. MOVED LOCATION 2' EAST

1120 AUGERED TO BETWEEN 3.5'-4' AND MET REFUSAL. WILL COMPOSITE THE SOIL WE HAVE AS WE ARE CLEARLY IN THE FILL. BITS OF GLASS, BRICK + DARK SANDY SOIL.

WENT BACK TO VAN TO DECON AUGER AND PACKAGE SAMPLE S-9.

1135 HEADING FOR S-10 GROUND HARDER HERE THAN ANY PREVIOUS LOCATION. USED SHOVEL FOR TOP 3" ONLY. AUGER VERY DIFFICULT

1155 AUGERED TO 3', BEGAN THE COMPOSITE. SOIL DARK, CLAYEY WITH OILY ODOR. 0ppm ON HNU

Chad [illegible]

12/20/89

MET AUGER REFUSAL @ 4'.
S-10, COMPOSITE 3'-4'.
1215 TOOK SOIL + GEAR BACK TO VAN.

1220 DECONNED AUGER + PLACED
SAMPLE S-10 INTO CONTAINERS.

ENOUGH SOIL LEFT TO DO A
DUPLICATE.

1230 SAMPLE S-15, DUPLICATE OF
S-10

1245 BROKE FOR LUNCH

1315 BACK ON SITE. FINISHED
LABELING REMAINING SAMPLE
CONTAINERS.
MOVED VAN TO END OF DARTMOUTH
ST. WHICH IS CLOSER TO NEXT
SAMPLING LOCATIONS

1530 BEGAN AUGERING AT S-14.
GOT DOWN TO 3' AND MET
REFUSAL. ~~MOVED 2' EAST~~ CE.
Chad

~~GOT DOWN @ 2' AND MET~~ CE
~~REFUSAL~~ CE.
MOVED NORTH 2'.

AUGERED DOWN TO 3' - 0PPM HNU

1410 BEGAN COLLECTING S-14,
DARK, CLAYEY, SANDY SOIL. NOT
FILL-LIKE SOIL. COMPOSITE 3'-4+

1418 AUGER MET REFUSAL AT JUST
PAST 4'

1420 WENT BACK TO VAN TO DECON.
PUT SOIL IN VAN TO THAW.

1435 AT STATION S-13. AUGERED
TO 3' + MET REFUSAL, MOVED
2' N AND MET REFUSAL AT
2'. MOVED EAST 1' AND AUGERED
TO 4' BEFORE MEETING REFUSAL

1458 COLLECTED SAMPLE S-13, COMPOSITE
3'-4' DARK, SANDY, CLAYEY, 0PPM
ON HNU
Chad

12/20/89

1500 WENT BACK TO VAN.
DECONNED AUGER AND PUT
S-13 + S-14 IN SAMPLE
CONTAINERS.

MOVED VAN TO CAMELOT COURT
PARKING LOT TO ACCESS LAST
2 SAMPLE LOCATIONS.

1515 AT LOCATION S-12, IN A
SMALL DEPRESSION. USING
SHOVEL WE COULD NOT GET
ANY DEEPER THAN ~18" DUE
TO MANY COBBLE SIZE ROCKS.
WE TRIED 4 DIFF. LOCATIONS
AROUND THE FLAG + NEVER
GOT ANY DEEPER THAN 18".

1548 TOOK SAMPLE S-12. COMPOSITE
OF 12"-18" FROM 4 LOCATIONS
AROUND FLAG. STONY SOIL.
0 ppm ON HNU.
WENT BACK TO VAN TO
DECON. DROVE TO S-11.

12/20/89

1603 AT S-11. SOIL VERY ROCKY
AROUND FLAG. TRIED TO SHOVEL
BUT MET REFUSAL @ 12"-14".
MOVED LOCATION 6 TIMES
AROUND THE FLAG + AUGER
WOULD NOT GO DOWN. TOOK
6"-12" SAMPLES FOR COMPOSITE

1638 COLLECTED SAMPLE S-11.
SANDY, STONEY, SOIL. 0ppm H

WENT BACK TO VAN TO
PACK UP SAMPLES.

1700 LEFT SITE

1720 ARRIVED AT FISH FARM
TO DROP OF EQUIP. NOONE
THERE.

HEADED TO LAB.

1730 DROPPED SAMPLES OFF AT LAB.
UNLOADED EQUIPMENT OUT OF
VAN

10

1800 RETURNED RENTAL VAN

ecology and environment, inc.
International Specialists in the Environment

Job Number YO-1040

LA SALLE RES

I-52

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TUES 7-18-89

RICHERT
1015 PICKED UP RENTAL VAN
1030 Richert loaded equipment AT ASC
1100 Richert Met 3 underground utilities Repr to show them the proposed well locations

NFG - ED OFF
NIAG MOHAWK - JIM MOORE
NY TEL - DAN SMITH
all 3 UTILITIES SAID LOCATIONS LOOK OK TO drill

1115 could not find exact location of MW-2 but utility repr. said the whole general area is clear.

1130 Met Barb Topor - MARTHA DOELLE of E+E and Glen May of DEC at South entrance to McCarthy park waiting for drillers to arrive w/ 2nd trip w/ Bulldozer.

1145 Driller - American Auger + Ditch
815
JOHN PIETRUCHA Driller and [illegible] WELNEL - HELPER arrived on site.

1200 Richert + Doelle drive Hospital Route and continue to pick up 9 - 55 GAL DRUMS from FELDMAN BARREL + DRUM INC. still Have 11 more Drums + 20 overpacks to pick up later

1330 - All six examine the 3 drilling sites.

Jim Richert

7-18-89 TUESDAY

1345 Noticed that someone, presumable a utility rep. painted 'NO/G' near the well stake of MW-1. This may mean that further data showed a buried utility line. GAS? will check this out before drilling.

1430 Pick two decon locations + discuss drumming water with DEC + drillers.

1435 Dec gives permission to [illegible] drum decon water from steaming back of Rig + DOZER. [illegible] all other decon water must be drummed.

1500 waiting for drillers to return to SW entrance of site. Must be [illegible]

1515 [illegible]

1530 [illegible] BULLDOZER AT MW-3

1600 clearing drilling locations for #3 + #2.

1630 DON JOHNSON ARRIVED ON SITE

1640 DON JOHNSON, BARB TOPOR + GLEN MAY DEPART SITE FOR DAY - will call DEC ALBANY ABOUT COMPLETING WELLS AS OPEN CORE HOLE (NO SCRE[illegible]

1650 MARTHA DOELLE Departs site for day.

1655 drillers + Richert drive along Conrail ROW. TO Decon area.

1700 drill Rig runs over a RR spike + punctures inside RIGHT REAR TIRE. Driller says he can still drive rig with no problem since its A 6-wheeler

Jim Richert

7-18-89 TUES.

?5 Drillers at fire hydrant located at NE corner of LASALLE AVE + CORDOVA ST. filling water tank for decon + drilling.

?15 water tank is full + drillers returns to decon station.

?20 DRILLERS BEGIN DECONNING RIG + AUGERS + SPLIT SPOONS

?45 drillers finished steam cleaning will drive water truck + Rig Back to Paved Parking lot behind MW-3

?50 Rig + water truck arrive at Parking lot to Park for the NIGHT

?00 Drillers + Richert depart site for the day

all drilling equipt is secured.

will meet at 0730 tomorrow.

Jim Richert

7-19-89 WED.

0730 RICHERT MET FLORENTINO AT THE LAB.

0800 ARRIVE ON SITE - DRILLERS ON SITE

0805 MARTHA DOELLE ARRIVES ON SITE.

G. FLORENTINO - SSO

J. RICHERT - TEAM LEADER - GEOLOGIST

M. DOELLE - IN TRAINING XA-602

-> will not change the job

0806 GLEN MAY SDEC ON SITE. gave official OK to complete wells open hole (NO SCREEN) in bedrock.

0820 Richert restricts access to site w/ orange tape

drillers setting up to drill GW-3

0835 FLORENTINO HELD A SAFETY MEETING.

0840 BEGIN 1st split spoon 0-2'

0845 DESCRIBING SOIL. HNU READS 19 PPM FROM THE CLAY

0850 Drillers setting up the tub to collect water for coring. will re-circulate water if they get water returns.

0905 SS-2 2-4' split spoon

0918 SS-3 4-6' LOW BLOW COUNTS BUT ONLY RECOVERED .25' SO WE HAD THEM RE-SAMPLED 4-6' + RECOVERED .5'

0PPM ON HNU.

Jim Richert

7-19-89 WED

015 Recovered SS-7 12-14' Recov. 1'
still in clay. 0 PPM ON HNU

Barb TOPOR WAS ON SITE FROM
0530-1000 She + Glen May decided
to continue drilling this location
even though we expected bedrock at 1-2'

1120 augering on rock at ~21'

1135 Refusal at 22-feet - Bedrock?
drillers setting up to core.

1200 Begin Rock CORING w/a 3.78" OD
WEIGHT ON BIT = 300 PSI
ROTATION speed is = 300 RPM
LOST WATER DOWN HOLE WITHIN 1ST FOOT.
1214 CORED 2' SO FAR RATE IS ≈ 7 MIN/FOOT
1221 CORED ANOTHER FOOT RATE IS ≈ 7 " "
1220 BRUCE KORN OF E+E ARRIVED ON SITE
TO BE TRAINED (KA-GOT TIME) will NOT
CHARGE HIS TIME TO THIS JOB.
1237 will pull out 4.5' core
BOTTOM OF HOLE AT 26.5'
1310 drillers Begin mixing cement.
1330 Florentine, Rickert, + Korn leave site
for lunch. Drillers mixing grout
for GW-3. will set PVC + decon
+ prep GW-2 site. 1515 return from LUNCH B. KORN DEPARTS
1520 PVC + set + grouted - TOOK 6 BAGS of cement
1530 Drillers steam cleaning augers.
1630 JOHN the driller clearing GW-2 location w/ BULL DOZER.

Jim Rickert

7-19-89 WED.

1720 BEGAN SPLITSPOONING 0-2' GW-2
WEATHER LOOKS THREATENING.
(WIND, CLOUDS, LIGHT RAIN, DARK SKY)

1813 Rap stop for the day. Hit Bedrock
at 9.25'

1845 all leave site
1910 Rickert arrive at ASC to deliver
soil samples + leave van for Florentine
for tomorrow.

Jim Rickert

7-24-89 MONDAY

RICHERT WAS ON VACATION 7-20 & 7-21-89 work continued with other GEOLOGIST.

ALL 3 WELLS HAVE PVC CASING SET INTO 5' Rock SOCKETS. will BEGIN CORING TODAY.

0900 RICHERT MEETS C. EICH ON SITE
Drillers not yet here.
0920 Glenn May of DEC ARRIVES ON SITE
0940 Drillers arrive on site.

WEATHER: SUNNY - HOT + HUMID
HIGH OF 90°F.

I-56

C. EICH = SITE SAFETY OFFICER
J. RICHERT = FIELD TEAM LEADER/GEOLOGIST
G. MAY = DEC REP.

1005 C. EICH TEST BOREHOLE OF GW-3
W/HNU - NO READING ABOVE BACKGROUND
1036 BEGIN CORING AT ~~22~~ 26.5'
1050 Stop 1st NX CORE RUN (2.5' LONG) driller said the 3" ID PVC IS NOT SET ON BOTTOM BUT IS STILL IN ROCK SOCKET. DRILLED MUCH GROUT.
1055 2 REPS. FROM HARRISON RADIATOR ARRIVED ON SITE TO INQUIRE ABOUT A REPORT OF DRUMS.
GLENN MAY EXPLAINED THE DRUMS WERE PROBABLY OURS & WHAT WE WERE DOING.
1100 CORE WAS EMPTIED. 2.5' RECOVERED (100%)
1.9' of GROUT. .6' of LIMESTONE.

Jim Richert

7-24-89 MON.

Rock CORE YIELDED 0 PPM ON HNU.

1115 Begin 3'RD RUN

Drilling w/ NX CORE BIT W/ ≈ 400 PSI
AND A ROTATION RATE OF ≈ 350 RPM

Drillers are re-circulating water - losing NO ~~X~~ WATER. Rate is ≈ 4 MIN PER FOOT.

1130 Drillers REPORTED SOFT SPOT AT ≈ 30.5' water came up Brown + we lost circulation temporarily.

1135 finished 3'RD Run 27-32'. Rate = 4 min/ft
Hole is now taking all water.

1150 Begin 4th Run 32-37'

1203 End 4th Run ~~[illegible]~~
CROSSED UNCONFORMITY + CONTACT BETWEEN
1218 Began 5th Run 37-42'
ONONDAGA to AKRON AT 31.1'

1241 Done w/ 5th Run - Rate is 4.5 MIN/FOOT
1253 Begin 6th ~~[illegible]~~ RUN
1305 DRILL ROD STUCK IN THE HOLE
1320 GLENN MAY DEPARTS SITE TO BUY LUNCH
DRILLERS STILL STUCK IN THE HOLE
1325 RECOVERE CORE BARREL. AFTER A SHORT RUN 1.85' 42-43.85'

Jim Richert

7-24-89 MON

1335 GLENN MAY RETURNS TO SITE
1340 Core Barrel un-stuck + coring
Run #7 44-47'

1355 RUN #7 DOWN

1405 ∇ WATER LEVEL before Pumping
AT 29.8' + HOLDING.

1410 will pump WATER OUT if POSS.
PUMP COULD ONLY PUMP ≈ .6' of water
NOW AT 30.4' w/TREMIE ROD in HOLE.
WATER NOT RAISING. ....

WATER TEST

1417 water level 33.8' TOP of drip pipe
1430 " " 34.2' - water dropping
1435 " " 34.7' STEADY

will CONTINUE CORING

1450 Rickert + MAY ∇ water level
of HA-4 55.8' from TOP OF CASING
+ 56.1' from GROUND level
(well is a flush mount to street
level), screened 127-119'
TIP AT 129', TD. 127', Bored to 170'
Drilled By Empire Soil for Buffalo
Sewer auth.

1510 RUN #8 SHORT RUN BECAUSE
OF CORE BARREL JAMMED UP w/FRACTURED
ROCK FRAGMENTS

— Jim Rickert

7-24-89 MON

Note: at ≈ 1500 BRUCE KOHRN SOK
BARB TOPOR
TIM SALTER
} of E

arrive on site.

1535 RUN # 9 Down 4.25' 47.75-52
1550 Begin Run #10 52'-57'
1615 DONE WITH RUN #10 57'
1620 BOB MEYERS REPLACES C. EICH
1625 Drillers leave site for water
1652 drillers returned with water
We monitored the water level while
drillers were gone, it stayed at
one level 33.35' from Top of drill pipe
≈ 3.5' high - from GROUND LEVEL.

1700 Began Run #11 57'-62'
1730 DONE WITH RUN #11 6 MIN/FOOT = RATE
1745 Begin Run #12 A 3' RUN 62-65'
1800 End RUN #12 5 MIN/FOOT
1820 finished drilling for the day at 65.3
will take water level today + in morning
1843 checked water level to be
37.1' from steel casing

— Rickert + May depart site —

I-57

7-25-89 YO-1040

0800 – E+E DAJ onsite

0835 – w.l. @ GW-3 = 42.85' below steel casing

0840 – Drillers have deconned along the rail road tracks

Personnel onsite 7-25-89 as of 0835 include:

American Auger	OEC	E+E
John Pietruch	Glenn May	Don Johnson
Kevin Wellnel		Bruce K

0845 – Objective: Mobilize to GW-2 and begin rock coring (NX)

0900 – At GW-2 location, drillers are setting up coring equipment.

Weather: Warm (80°F), sunny and very humid, no wind.

0930 – 0935 Daily Health & Safety meeting is held. Heat problems and stress symptoms are discussed. Drillers working in modified level D as per B. Topor, M. Ryan of NYSDEC.

DAJ

7-25-89 YO-1040

0940 – Commence NX coring at GW-2 @ ≈ 13.5' bgs. Grout from rock socket will be removed first w/ core.

0955 – After coring through .5' of grout. NX-Coring rate is ≈ 4min 15 sec. (14.0'-15.0' bgs)

0958 16.0' – Driller loses water ~~3 8.67~~ DAJ

1008 – Run No. 1 complete 3.67' in length

1008 - 1235 SEE SITE SAFETY LOG BOOK

1235 C. EICH + B. METERS ARRIVE ON-SITE PICKED UP ROPE, BAILERS AND REPLACEMENT HNU + EXPLOSIMETER. EXPLOSIMETER NOT WORKING DUE TO LOW BATTERY

1245 D. JOHNSON LEAVES SITE. G. MAY + B. KOHEN GO TO GW-1 WITH A BAILER TO SEE IF THERE IS WATER IN THE WELL + HOW FAST IT RECHARGES

END RUN 5 - FULL RECOVERY. DEPTH OF WELL NOW 37.25

CLAY / FRACTURED LIMESTONE ZONE @ ~36.1' (.1" THICK) SMELLS OF OIL / PETROLEUM. 0ppm ON HNU

1253 BEGIN RUN 6

Robert A. Meyer 7-25-89

7-25-89

1309 END RUN 6 - JOHN SAID HE WAS ~
6" SHY OF DRILLING THE FULL 5'
4.35' OF RECOVERY
CLAY LAYER AT ~ 39.25' .15" THICK HAS SLIGHT
PETROLEUM ODOR. 0ppm ON HNU
CLAY AT BOTTOM OF CORE HAS NO ODOR 41.4'-41.6' (.2' THICK)

1323 BEGIN RUN 7
CORE KEEPS GETTING BLOCKED BY CLAY

1336 PULLED UP CORE AFTER 1.15' DUE TO
BLOCKAGE

1341 CONTINUING RUN 7

1349 G. MAY + B. KOHRN RETURNED TO GW-2
GW-1 IS RECHARGING WELL.
BAILER WAS LOST DOWN THE WELL +
WILL HAVE TO BE FISHED OUT

1357 CORE BLOCKED AGAIN. TRIED TO PULL UP
INNER BARREL BUT IT IS STUCK. GOING TO
LET IT SIT + MAYBE LOOSEN UP

1405 DRILLERS LEAVING SITE TO GET WATER

1443 DRILLERS RETURN TO SITE
BEGAN PULLING UP CORE BARREL TO
FREE INNER BARREL

1500 EXTRUDED CORE 2.75'. DEPTH 45.5'

1519 BEGAN CORING

Robert A Meyers 7-25-89

7-25-89

1529 END RUN 7 (WHICH IN DRILLERS LOG IS RUN 9)
~1.5'
0ppm ON HNU OF CORE + DOWNHOLE

1547 BEGINNING RUN 8 -47.4'

1607 END RUN 8 ~~51.9~~ 52.3' TD 4.9' REC

1614 BEGIN RUN 9

1626 B. KOHRN LEAVES SITE

1631 END RUN 9 57.4' 5.1' RECOVERY

BEGAN RUN 10

1700 END RUN 10

1709 BEGIN RUN 11 62.4' (DRILLING ~ 2.5')

1719 END RUN 11 2.5' RECOVERED - END DRILLING
64.9' TD OF WELL.

1749 WATER LEVEL 62.55' TOC

1814 CHECKED WATER LEVEL IN GW-1 43.9' TOC

1820 LEAVING SITE

Chad [illegible] 7-25-89

I-59

recycled paper

ecology and environment

16

Robert a Meyer 7-27-89

Robert a Meyer 7-27-89

Robert A. Myers 7-27-84

Robert A. Myers 7-27-84

18

Robert A Meyer 7-27-89

Robert A Meyer 7-27-90

Robert A. Maguire 7-22-89

Robert A. Maguire 7-21-89

22

Robert a [illegible] 7-27-89

Robert a [illegible] 7-27-89

Robert A Meyer 7-27-89

7-27-89

A The following log is continued from the site safety log (Sm. log book

Well developement

GW-2

Time	H2O Level	Ph	Temp.	Cond	H2O Bailed	Turbidity
1359	49.5 TOC	6.67	67.8	892	0 gallons	
1425	51.7 TOC	6.57	67.1	945	5 gallons	
1454	—	—	—	—	12 gallons	—
1508	51.6 TOC					
1514						17.9 NTU's
1518		6.54	61.9	807		

GW-1

Time	H2O Level	Ph	Temp.	Cond	H2O Bailed	Turbidity
1550	46.0'					
1623		6.70	62.8	1012	0 gallons	
		6.65	59.5	952	10 gallons	32.9 NTU's

Wells considered developed.

1701 Everyone departs site

7-27-89

Robert A Meyer

8-14-89 YO-1060

0900-1200 hrs. Mobilization including pick-up of rental van, rope, and other sampling equip.

1200-1230 - Lunch break

1230 - E+E personnel D. Johnson, J. Richart Onsite. E+E personnel D. Kohrn onsite as an observer.

1240 - GW-1 W.L. 35.35' below steel
B.O.W. 66.95' " "

1245 - Objective: Evacuate and sample groundwater monitoring wells GW-1, GW-2, and GW-3.

1250 - Weather: Sunny, warm (80°F), winds are gusty from the SWest.

1255 - GW-1: HNU response
W.L. = 35.35' below steel casing
B.O.W = 66.95' " " "

11.6 gals = 1 standing vol.
x3 = 34.81 gals.
35 gals. = evacuation

1430 EVACUATION COMPLETED
WATER LEVEL IS 35.35' FROM TOP OF STEEL CASING - FULL RECHARGE

Jim Richart

8-14-89 MONDAY YO-1060

PH-TEMP-CONDUCTIVITY TABLE

READING TIME	TEMP	PH	CONDUCTIVITY	SAMPLE #	COMMEN
1435	82.6	7.10	998	GW-1	TAKEN AT 1
1440	83.3	7.18	1025	GW-1-2	TAKEN 145
1820	83.2	6.89	829	GW-2-2	TAKEN AT 1
1824	83.0	7.02	653	GW-3-2	TAKEN AT

TURBIDITY	
GW-1	5 NTU
GW-2	10 NTU
GW-3	32 NTU

1455 Depart site after sampling
1510 arrive at GW-3 after buying
rest drink $4.85
open well - HNU NO RESPONSE

1315 WATER level = 33.2'
BOTTOM of well = 62.7' + 4.0 = 66.7' TOP OF STEEL

LENGTH OF BAILER LEFT IN HOLE

33.5X 12.3 X 3 VOLUMES 36.9 GAL

66.7
- 33.2
33.5' = WATER COLUMN

Jim Richart

8-14-89 ~~MONDAY~~

1520 can't get Bailer down past about 30' - hitting something that floats

WATER level at 44.45' from top of steel
TOTAL depth is 67.0'

67.0
− 44.45
22.55 ' = water column
× .3672
8.28 × 3 = 24.8 GALL. = 3 volumes

1545 Began Bailing GW-2

Bruce Horn + Jim Richart Bailers
DON JOHNSON LEFT SITE TO CALL office
+ PICK UP A FLASHLIGHT FROM HIS HOUSE
FOR USE AT GW-3 -

1641 finished evacuating + sampling well GW-2

water level at 44.5'

1650 DON JOHNSON ARRIVES BACK ON SITE
+ ALL depart GW-2 TO GW-3

1655 ARRIVE AT GW-3
1700 FISHOUT A PVC BAILER WITH ~~3/4~~ JR THIN WHITE CORD ATTACHED
1715 Began evacuating 3 Volumes of water. 36.9 GAL.

Jim Richart

I-67

8-14-89 MONDA

~~1740~~ 1805 finished evacuation + began sampling GW-3

1815 finished sampling GW-3
TOOK TEMP, PH, + COND. Readings of GW-2 + GW-
1825 finished work.

1830 Depart site w/ work accomplished.

No sample required filtering because < 50 NTU's in all 3 wells.

GW-1 = 5 NTU
GW-2 = 10 NTU
GW-3 = 32 NTU

1840 arrived at ASC to deliver samples

1930 HOME

J Richart