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ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PHASE II INVESTIGATION

ONONDAGA NATION - SITE B
NEDROW (T)

SITE NO. 734027
ONONDAGA (C)

Prepared for:

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
50 Wolf Road, Albany, New York

Thomas C. Jorling, Commissioner

DIVISION OF HAZARDOUS WASTE REMEDIATION

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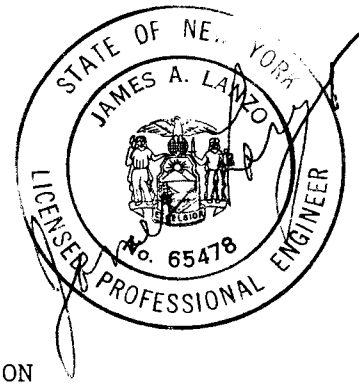
ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES IN THE STATE OF NEW YORK PHASE II INVESTIGATION

FOR

ONONDAGA NATION - SITE B
NEDROW (T), ONONDAGA (C)
SITE NO. 734027

Performed Under:
NYSDEC CONTRACT NO. D002340
NYSDEC WORK ASSIGNMENT NO. D002340-6

By:
URS CONSULTANTS, INC.
282 DELAWARE AVENUE
BUFFALO, NEW YORK 14202



NOVEMBER 1992

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

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SUPPORTING DOCUMENTATION (Bound Separately)

Section	Description
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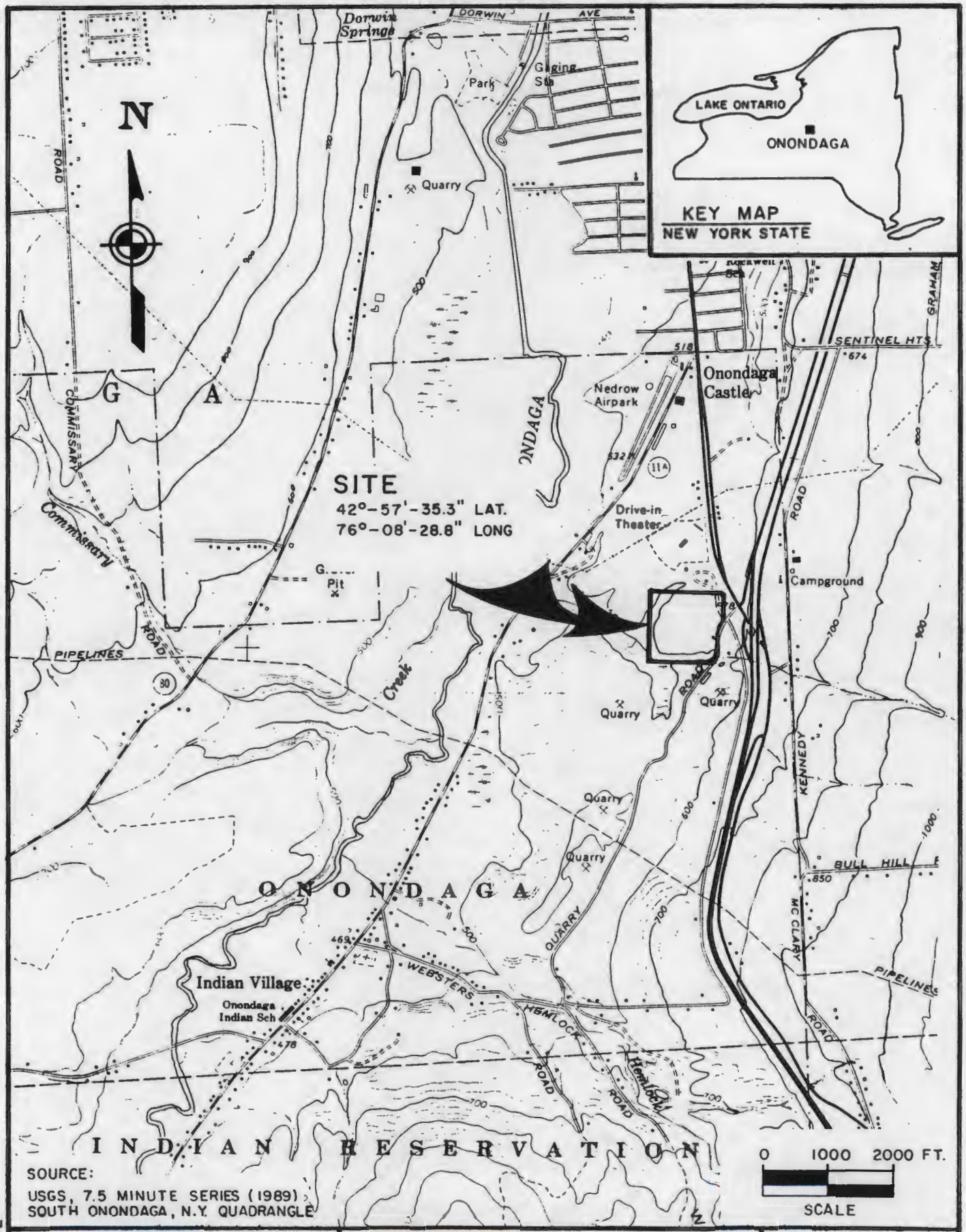
2	Summary of Analytical Results
3	Analytical Data Package
4	Scope of Work Summary Sheets from Work Assignment

1.0 EXECUTIVE SUMMARY

The Onondaga Nation - Site B, (NYSDEC Site #734027) is located just west of Interstate 81 - Exit 16 (Nedrow), in the northeast portion of the Onondaga Nation Indian Reservation in Onondaga County, New York (Figures 1-1 and 1-2). Quarry Road lies directly east of this approximately 25 acre site. The closest municipality is the Town of Nedrow, approximately two-thirds of a mile north of the site. The City of Syracuse is located approximately 1.5 miles north of the site. The site was added to the New York State Registry of Inactive Hazardous Waste Disposal Sites in 1984 and is currently classified as 2a.

A NYSDEC Phase I Investigation of the site was completed by URS Consultants, Inc. in June 1989 (Ref. 1). This study revealed that the site was utilized as a dump and junkyard during the middle to late 1960's by the late Benjamin Shenandoah of the Onondaga Nation. Historic aerial photographs, obtained in the course of the Phase II investigation, indicate disturbed areas on the south end of the site as early as 1959. Surficial debris is not evident in the early photos. Waste disposed of at the site included motor vehicles, tires, scrap lumber, wood pallets, large home appliances and abundant metallic debris. The discarded motor vehicles were subsequently relocated to a junk yard on the reservation located on U.S. Route 11, approximately 0.5 miles north of the site. Other waste disposed of included medical waste, 5-gallon containers of roofing tar, and an estimated 800 55-gallon drums, approximately 200 of which were found to contain varying amounts of liquid and solid waste materials. The majority of the drums were in a deteriorated or perforated state, some having leaked their contents on to the ground (Ref. 1). Field observations indicate that dumping took place on the surface of the site but the presence of drums protruding from the ground surface also indicates the likelihood of buried waste.



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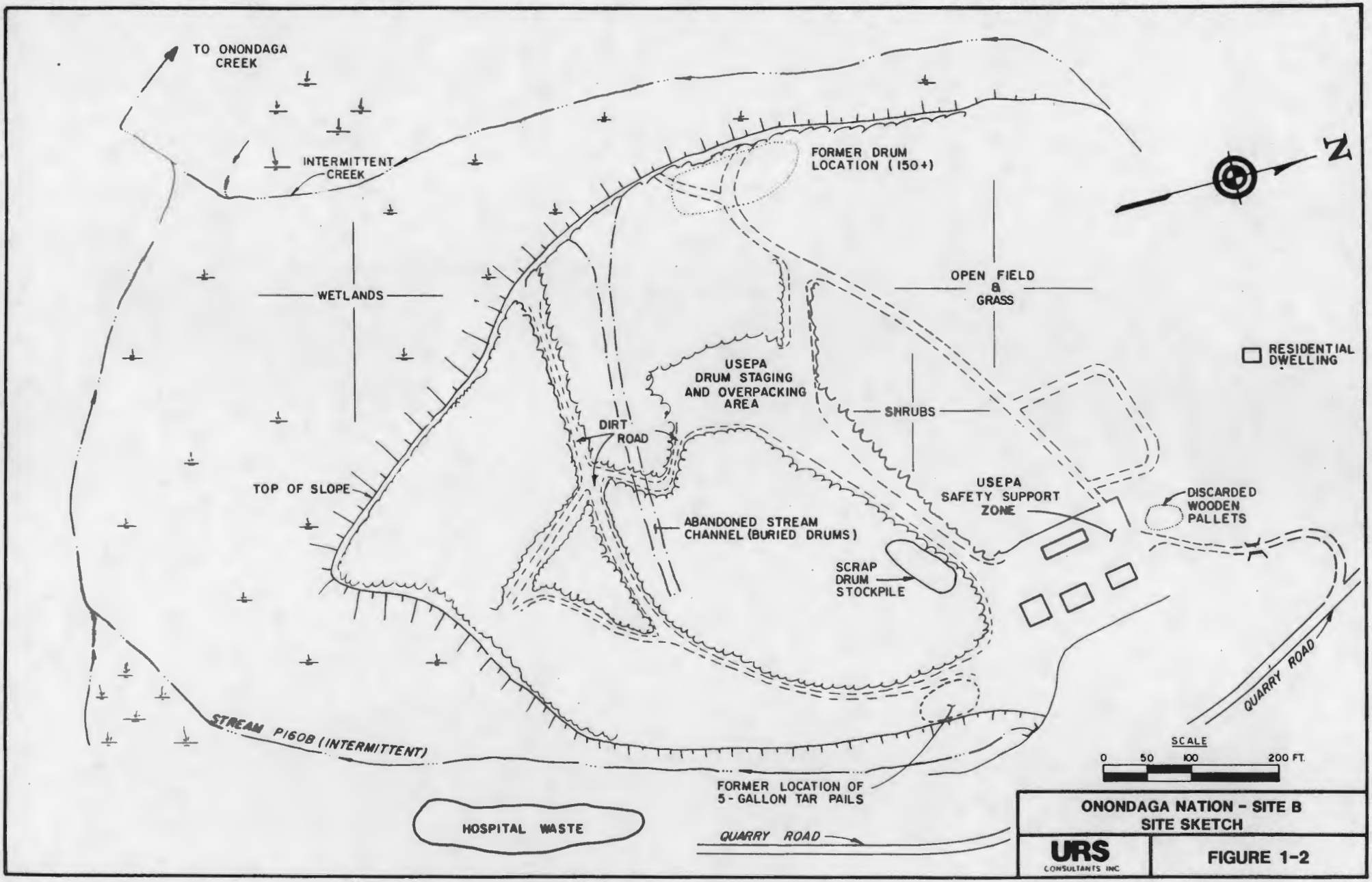
ONONDAGA NATION - SITE B
SITE LOCATION MAP

FIGURE 1-1


TO ONONDAGA CREEK
INTERMITTENT CREEK
FORMER DRUM LOCATION (150+)
N
WETLANDS
OPEN FIELD & GRASS
RESIDENTIAL DWELLING
USEPA DRUM STAGING AND OVERPACKING AREA
SHRUBS
DIRT ROAD
TOP OF SLOPE
USEPA SAFETY SUPPORT ZONE
DISCARDED WOODEN PALLETS
ABANDONED STREAM CHANNEL (BURIED DRUMS)
SCRAP DRUM STOCKPILE
QUARRY ROAD
STREAM P160B (INTERMITTENT)
SCALE
0 50 100 200 FT.
FORMER LOCATION OF 5-GALLON TAR PAILS
HOSPITAL WASTE
QUARRY ROAD
ONONDAGA NATION - SITE B
SITE SKETCH
URS CONSULTANTS INC
FIGURE 1-2

1-2

C-2436

Drum sampling conducted by the NYSDEC prior to the Phase I study indicated the presence of acetone, ethylbenzene, xylene, acetic acid, benzyl alcohol and phenol. Groundwater sampling of residential wells downgradient of the site conducted in 1987 by the New York State Department of Health (NYSDOH) revealed no detectable contamination in the wells. One of these wells is located directly north of the site (Ref. 31).

The medical waste was dumped on the east side of the site, adjacent to an intermittent stream. This material is reportedly from Community General Hospital of Syracuse, New York (Ref. 1). The medical waste was discarded in bags but the condition of the bags, has deteriorated, exposing the waste. The close proximity of the stream has allowed some downstream migration of the medical waste.

The NYSDEC Phase I Investigation of the site resulted in the following Hazard Ranking System (HRS) scores:

S_M = 29.89 (S_{GW} = 50.65, S_{SW} = 10.44, S_A = 0.00)
S_{FE} = 0.00
S_{DC} = 25.00

The groundwater score was greatly affected by the estimated 6,214 persons served by private or community wells within a three-mile radius from the site at the time of the Phase I investigation. The surface water score was based upon the recreational use (including fishing) of Onondaga Creek, located downstream of the site. The site is currently classified as 2a by NYSDEC.

The U.S. Environmental Protection Agency (USEPA), Emergency and Remedial Response Division, is conducting an emergency removal action at the site. USEPA was requested by NYSDEC to perform a federally funded removal action pursuant to the Comprehensive Environmental Response,

Compensation, and Liability Act (CERCLA) Superfund program (Ref. 9, 11). The USEPA has contracted OH Materials as their Emergency Response Cleanup Service (ERCS) contractor to perform the removal action. The first element of the phased removal action was performed in August 1990, and involved the sampling, overpacking, and staging of 20 drums containing waste to minimize the public health threat. Waste material from fourteen of the drums was reported to be ignitable, thus classifying the material as hazardous waste, per RCRA guidelines. The second phase of the removal action was performed from October 1991 through February 1992. This phase involved locating and overpacking surficial, and partially buried, drums and 5-gallon roofing tar containers. Waste compatibility and landfill acceptance analyses were conducted on the wastes to determine the proper handling and ultimate disposal fate of the waste material. The previously estimated number of drums present onsite was clarified during the removal action. Approximately 1,250 drums were located, approximately 250 of which contained solid and liquid wastes. A portion of the empty drums were perforated (Ref. 13). Although the drums were encountered throughout the site, the highest concentration of drums was encountered within a dry stream bed near the center of the site. Field observations during this phase of the removal action indicated the strong possibility of additional buried drums, particularly in the vicinity of the dry stream bed. A third phase of the removal action is scheduled for Summer or Fall 1992, which will involve a subsurface exploration program followed by possible buried drum removal if buried drums are encountered.

This Phase II Investigation was completed to evaluate the potential impacts imposed by the site on the air, soils, sediments, surface water, and groundwater at or near the site. The Phase II field investigation conducted by URS Consultants, Inc., began in October 1991 with a site reconnaissance visit. Photos taken of the site are presented in Figure 1-3. Investigation activities included geophysical surveys, monitoring well installation and development, environmental sampling and analysis, air monitoring, and surveying.

Looking east from the site access road at discarded drums. These drums are located approximately 75' south of MW-2.

Looking south at discarded drums along the access road between MW-2 to MW-3.

FIGURE 1-3 SITE PHOTOGRAPHS
Onondaga Nation - Site B

Looking towards the location of Leachate Sample L-L1 from the southern end of the site on the northern bank of intermittent stream P160B.

The Phase II Investigation boring and monitoring well installation programs indicated a red-brown silty clay overlain by stratified glacial drift consisting of light to dark brown, fine to medium sand, and brown fine to coarse sand and gravel. Limestone bedrock (Onondaga Limestone) underlies the unconsolidated sediments.

Groundwater elevation data compiled from the Phase II Investigation indicates groundwater flow is in a southwesterly direction.

Samples of subsurface soils, surface water and stream sediments, leachate, and groundwater were collected and analyzed for Target Compound List (TCL) analytes. The sample locations are presented in Figure 3-1. Results are summarized by matrix below:

Waste

Although the Phase II investigation did not include sampling of waste material on site, data supplied by the USEPA for seven drum samples collected in 1992 and analyzed during the current site cleanup, was reviewed and incorporated into this report to provide a more complete site assessment. The purpose of the USEPA waste sampling was to determine the appropriate disposal method(s) for the waste. The waste samples were subjected to analytical testing including Target Compound List (TCL) analysis, Toxicity Characteristic Leaching Procedure (TCLP), 40 CFR Part 136 Appendix IX constituents, and RCRA waste characterization analysis.

Volatile organic compounds (VOCs) were detected at percentage level concentrations in each of seven waste samples analyzed. Toluene concentrations ranged from 2,210 to 71,600 parts per million (ppm) and total xylenes ranged from 39,450 to 281,580 ppm for each sample. Benzene was found in only two samples, at 2,140 and 4,010 ppm. Semivolatile compounds (SVOCs) were found in two of the waste samples and included; 1,092 ppm 2-chlorophenol, and 462 ppm 2,4-dimethylphenol. SVOCs in the

form of polynuclear aromatic hydrocarbons (PAHs) were also detected. Total PAHs were 232,650 ppm (23.3%) in one waste sample. No pesticides or PCBs were detected in any of the wastes. None of these seven waste samples were found to be hazardous based on the RCRA characteristic of ignitability, however, 14 drums with ignitable waste were reported in a 1991 USEPA Pollution Report (Ref. 32). Six of the 1992 samples were found to be hazardous based on TCLP levels of mercury and one sample, described as a sludge, was also found to be hazardous based upon TCLP testing for benzene and cresol. At least a portion of the drums were allegedly disposed of on the site by haulers from Solvent Savers, Inc., which conducted a chemical reprocessing operation in the Syracuse area. Legible labels on some drums identified other sources including Cowles Chemical Company, ADA Chemical Company, DOW, and Trenco Roof Preservatives (Ref. 1).

Subsurface Soil

Five soil samples obtained from the five subsurface borings revealed relatively few contaminants. The only organic compounds detected were four SVOCs present in just one sample at concentrations below their quantitation limits, ranging from 41 to 140 parts per billion (ppb). Three of the compounds were PAHs, and the remaining compound was a commonly detected phthalate. Metals concentrations of the soil samples indicated little variance between sample locations. Anomalously high concentrations of metals were not observed and the concentrations detected were within the observed range for metals in naturally occurring soils in the Eastern U.S. (Ref. 2).

Surface Water and Sediment

Chemical analysis was conducted on eight surface water samples collected from intermittent tributaries to Onondaga Creek which surround the site. The tributaries adjacent to the site are classified Class D

surface waters. Onondaga Creek is a Class C water resource. No organic contamination was detected in the surface water samples. The NYSDEC Standards, Criteria, and Guidance (SCG) values for iron (300 ppb) was exceeded for all surface water samples except sample LSW5, the farthest downstream sample, but no other inorganic contaminants exceeded SCGs. Iron concentrations exceeding the SCG ranged from 350 to 15,100 ppb.

Eight sediment samples were taken in conjunction with the surface water samples. Four of the samples contained detectable concentrations of VOCs including 2-butanone (11 to 34 ppb), and chloroform (2 ppb). SVOCs, predominantly PAH compounds, were detected in all of the sediment samples at levels up to 7,000 ppb. The number of SVOC detections per sample ranged from three to eighteen. The farthest upstream sample (LSD1) contained the greatest number of SVOCs. The source of the SVOCs (mainly PAHs) at this location could be attributable to run off from the roadways upstream of the sample point, but the site can not be ruled out as the source of the PAHs. Prior to the recently completed second phase of the USEPA cleanup activity, numerous containers of roofing tar were present adjacent to the location of LSD1 and similar compounds were detected in drum waste samples. Pesticides, including aldrin, heptachlor epoxide, 4,4'-DDE and endosulfan sulfate were detected in four of the sediment samples at concentrations up to 20 ppb. One sample (LSD2) contained the polychlorinated biphenyl (PCB), Aroclor 1254, at a concentration of 450 ppb. The location of the pesticide/PCB detections did not indicate a discernable source within the site for these compounds. Metals concentrations within sediment samples were comparable to the soil samples which were within the observed range for Eastern U.S. soils (Ref. 2).

Leachate

The only organic compound detected in the leachate sample was trichloroethene at a concentration of 1 ppb. This was the only detection of TCE from the Phase II investigation. The suite of metals detected in

the leachate was generally the same as those detected in the surface waters. The concentrations of the metals in the leachate were comparable to the range for surface waters, with the exception of iron and manganese, which were reported in the leachate at concentrations an order of magnitude greater than the surface waters.

Groundwater

Values exceeding groundwater SCGs were reported for acetone, 2-butanone, benzene, and toluene within samples from two monitoring wells positioned upgradient and sidegradient to the site. The benzene and toluene exceeding SCG values were reported in the sample from MW-1, a well situated sidegradient to the site. This monitoring well is located directly downgradient of a truck/car fueling stop located on U.S. Route 11, a possible source of these compounds. The site, however, can not be ruled out as the source since benzene and toluene were detected in the waste material present on site. Monitoring well sample MW-2 exceeded the standards for acetone, 2-butanone, and 4-methyl-2-pentanone was detected below SCG values at 34 ppb. Bis(2-ethylhexyl) phthalate was detected in two groundwater samples at concentrations below 10 ppb. This compound is a common laboratory contaminant making the presence in groundwater suspect. However, it was not detected in the method blank. No other SVOCs were detected in the groundwater. No pesticides or PCBs were detected in the groundwater. Metals analyses of the groundwater samples revealed concentrations of iron, magnesium, and sodium in contravention of the SCG values established for Class GA groundwater.

The following Preliminary Assessment (PA) scores were calculated for the site based upon the Phase II investigation:

Site Score (S_M) = 39

Groundwater Score (S_{GW}) = 35

Surface Water Score (S_{SW}) = 68

Soil Exposure Score (S_S) = 17

Air Pathway Score (S_A) = 7

Documented activities at the site have involved the surficial, and possibly subsurface, disposal of 55-gallon drums of liquid and solid hazardous waste as defined by 6 NYCRR Part 371.3. Although the surficial drums have been secured, additional drums may have been buried on site. In addition, groundwater SCG values have been contravened for acetone, 2-butanone, benzene and toluene in samples from two monitoring wells situated upgradient and sidegradient to the site. The source of these contaminants is uncertain at this time. Although benzene and toluene was detected in the waste samples collected on site by USEPA, their occurrence in the groundwater may be attributable to an offsite source. Additional studies are required to determine the source(s) of the groundwater contaminants. Based upon the presence of hazardous waste on the site, a significant threat to human health via direct contact and to the environment through a reasonably foreseeable release of hazardous wastes is established per NYCRR Part 375 1.4(a). The on-going USEPA emergency removal action addresses only the immediate threat to the environment and public health, not the long-term environmental implications of the dumping that occurred at the site. Therefore, it is recommended that NYSDEC reclassify the site as a Class 2.

1.1 Additions/Changes to Registry

The following form is the completed Additions/Changes to Registry of Inactive Hazardous Waste Disposal Sites for Onondaga Nation - Site B. This form has been updated to incorporate the recommendations of this report that the site be reclassified to a Class 2.

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 NO.	3. TOWN	4. COUNTY
Onondaga Nation - Site B	734027	Nedrow	Onondaga

5. REGION	6. CLASSIFICATION	7. ACTIVITY
7	Current 2a /Proposed 2	☐ Add ☒ Reclassify ☐ Delist ☐ Modify

8a. DESCRIBE LOCATION OF SITE (Attach U.S.G.S. Topographic Map showing site location).

Travel south on Interstate 81 from the City of Syracuse. Exit on Exit 16 (Nedrow). Proceed due west at Intersection of U.S. Route 11 and exit to Quarry Road. Turn right (North) on Quarry Road, site situated at end of Quarry Road.

b. Quadrangle South Onondaga c. Site Latitude 42° 57' 35.3" Longitude 76° 8' 28.8" d. Tax Map Number NA

9a BRIEFLY DESCRIBE THE SITE (Attach site plan showing disposal/sampling locations)

The site is located in the northeast portion of the Onondaga Indian Reservation. Approximately 1200-55 gallon drums were disposed of on the site during the 1960's. The drums contained both liquid and solid wastes. A containerization of the surficial drums was completed by the USEPA in February 1992. The USEPA has scheduled a subsurface investigation for Summer and Fall 1992 to determine the existence of buried drums. Should buried drums be encountered they will be removed at that time.

b. Area 25 acres c. EPA ID Number NYD986883403 d. PA/SI ☒ Yes ☐ No

e. Completed: ☒ Phase I ☒ Phase II ☐ PSA ☒ Sampling

10. BRIEFLY LIST THE TYPE AND QUANTITY OF THE HAZARDOUS WASTE AND THE DATES THAT IT WAS DISPOSED OF AT THIS SITE

Approximately 250 of the 1250 drums encountered on the surface of the site contained waste in which the following compounds were present: acetone (F003), ethylbenzene (F003), total xylenes (F003), toluene (F005), phenol (U188), benzene (F005), cresol (U052), and mercury (U151). Fourteen (14) drums containing ignitable wastes were also discovered. The waste disposal took place in the 1960s.

11a. SUMMARIZED SAMPLING DATA ATTACHED

☐ Air ☒ Groundwater ☒ Surface Water ☒ Soil ☒ Waste ☒ EP Tox ☒ TCLP ☒ Leachate ☒ Sediment

b. List contravened parameters and values

Groundwater: Acetone 350 ppb, benzene 150 ppb, toluene 12 ppb, 2-butanone 55 ppb, iron 9340 ppb, magnesium 43400 ppb and sodium 110000 ppb.

Surface Water: Iron 15100 ppb.

Waste: Exceedances of RCRA characteristics for Hazardous Waste

12. SITE IMPACT DATA

a Nearest surface water: Distance 0 ft. Direction West Classification D

b Nearest groundwater: Depth 14 ft. Flow Direction southwest ☐ Sole Source ☒ Primary ☐ Principal

c. Nearest water supply: Distance 100 ft. Direction North Active ☒ Yes ☐ No

d Nearest building: Distance 100 ft. Direction North Use One family residence

e Crops or livestock on site? ☐ Yes ☒ No

f Exposed hazardous waste? ☒ Yes ☐ No

g Controlled site access? ☐ Yes ☒ No

h Documented fish or wildlife mortality? ☐ Yes ☒ No

i Impact on special status fish or wildlife resource? ☐ Yes ☒ No

j. Within a State Economic Development Zone? ☐ Yes ☒ No

k. For Class 2a: Code _____ Health Model Score _____

l. For Class 2: Priority Category _____

m. ~~HRS Score~~ PA Score Sm=39.00

n. Significant Threat ☒ Yes _____ ☐ No ☐ Unknown

13. SITE OWNER'S NAME	14. ADDRESS	15. TELEPHONE NUMBER
Onondaga Nation	Box 85, Nedrow, N.Y. 13120	( )

16 PREPARER

Daniel M. Sheldon, Geologist, URS Consultants, Inc.
Name, Title and Organization

5/11/92
Date

Daniel M. Sheldon
Signature

17. APPROVED

Name, Title and Organization

Date

Signature

2.0 PURPOSE

The objectives of this Phase II Investigation are:

- To collect and present accurate and defensible information regarding the environmental and health-related significance of the site.
- To document the disposal of hazardous waste as defined by 6 NYCRR Part 371.
- To evaluate the existing conditions and immediate concerns at the site regarding past hazardous waste disposal practices.
- To evaluate the potential impacts imposed by the site on the air, soils, sediments, surface water, and groundwater at or near the site.
- To determine the need for further action at the site and assign an appropriate classification to the site.

The data compiled from this study have been employed to develop a final Preliminary Assessment (PA) score and to make recommendations regarding future action at the site.

3.0 SCOPE OF WORK

3.1 Introduction

The site-specific tasks that were performed for this NYSDEC Phase II Investigation included:

- Records search/data compilation
- Site reconnaissance
- Geophysical survey
- Installation of monitoring wells
- Air monitoring
- Environmental sampling and analysis of subsurface soils, stream sediment, surface water, leachate, and groundwater
- Site survey and mapping
- Site contamination assessment
- Calculation of Final PA Score
- Report preparation

The site-specific tasks are described below. Field activities were supervised by a URS Geologist and conducted in accordance with the NYSDEC Project Work Plan, presented as Section 4 of the Supporting Documentation, and the NYSDEC approved URS Quality Assurance/Quality Control Plan (Ref. 4). Health and safety protocol, as specified in the Health and Safety Plan (HSP) prepared for the U.S. Environmental Protection Agency (USEPA) site remediation contractor, were followed during the field activities (Ref. 5). In accordance with the HSP, all intrusive site activities (soil borings in this case) were performed in Level C personal protective equipment. Sampling and well installation (not including soil boring) were also performed in Level C protection if USEPA site remediation activities were being conducted nearby.

3.2 Records Search/Data Compilation

Information from the 1989 NYSDEC Phase I Investigation report by URS Consultants, Inc., and the ongoing USEPA remedial action were incorporated into this Phase II Report. Additional pertinent data were obtained from the following sources:

- o NYSDEC central and regional offices
- o New York State Department of Health (NYSDOH)
- o Onondaga County Department of Health
- o U.S. Environmental Protection Agency (USEPA)
- o Public libraries
- o Bureau of Indian Affairs
- o Syracuse Onondaga County Planning Agency

3.3 Site Reconnaissance

A site walkover was conducted on October 15, 1991, by URS Geologist Michael Gutmann, accompanied by NYSDEC Engineering Geologist William Shaw. Proposed locations for five monitoring wells were marked in the field with wood stakes. With the exception of MW-2 and MW-5, all the wells were located in close proximity to proposed location specified in the NYSDEC Work Plan. Well location MW-2 was moved approximately 200 feet west of the proposed location due to drill rig access difficulties and MW-5 was moved approximately 75 feet east of it's proposed location for the same reason.

A radiation survey was performed during the site reconnaissance using a Ludlum Survey Meter, Model 44-9. No readings were detected above normal background levels. Rain during the site reconnaissance precluded screening with a photoionization detector (PID), however, screening in the breathing zone during the geophysical survey indicated no organic vapor readings above background levels.

A magnetometer survey was conducted during the site reconnaissance at each proposed monitoring well location. A site-wide magnetometer survey was proposed to locate buried drums, but was deferred pending completion of on-going site remediation efforts by the USEPA.

3.4 Geophysical Survey

The geophysical survey was conducted by ECCO, Inc. of Buffalo, New York on October 15th, 21st, 22nd, and 29th, 1991. The initial magnetometer survey was conducted on October 15 during the site reconnaissance but a loss of data by ECCO necessitated a return to the site on October 29th. The seismic survey was performed on October 21st and 22nd. The geophysical survey report is included as Appendix A. The survey consisted of a magnetometer and a preliminary seismic survey. The purpose of the magnetometer survey was to identify subsurface drilling hazards and buried drum locations. The seismic survey was intended to determine the depth to bedrock across the site.

The results of the Phase II geophysical survey are currently being reviewed by the USEPA geophysical subcontractor to help determine the type of subsurface investigative techniques to be employed during the next phase of the USEPA site remediation. Techniques being considered are ground penetrating radar (GPR) and test trenching (Ref. 13).

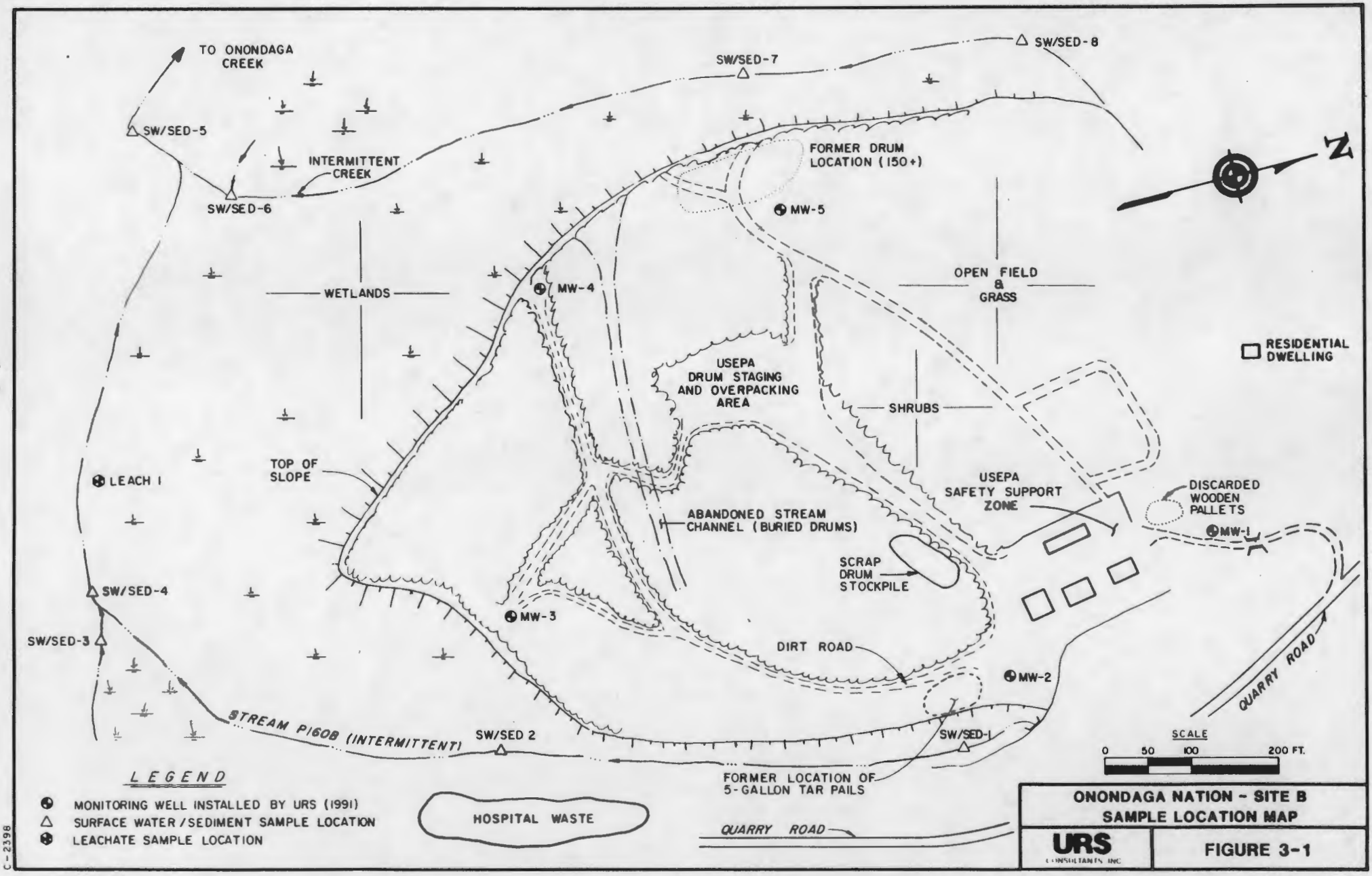
The magnetometer survey was conducted at each proposed monitoring well location. A EG&G Geometrics Model G-856 proton magnetometer with readings taken at 2-5 foot intervals on a 20 by 20-foot grid around each proposed well location. The only exception of this grid pattern occurred at location MW-2 where a 15 by 30-foot grid was used due to the presence of heavy brush and an adjacent ravine. Several magnetic anomalies were identified at the five proposed monitoring well locations. The anomalies could be attributed to the large amount of metallic surface debris present around the proposed monitoring well locations.

A refractive seismic survey was performed using an ABM Miniloc seismic instrument. The survey was conducted along six profile lines across the site, each covering approximately 355 linear feet. The work plan proposed four 500-foot lines across the site in a east-west direction. With the approval of NYSDEC, however, the length of the lines were decreased to allow additional lines and attempt to better assess the depth to bedrock. With the exception of two, the profile lines generally trended east-west across the proposed well locations. Bedrock was detected along three of the profiles run on the northern end of the site. The depth to bedrock along these profiles ranged from 6.5 to 49 feet. Signal attenuation along the remaining three profiles prevented a depth to bedrock determination for the southern portion of the site.

3.5 Soil Borings/Monitoring Well Installation

A total of five (5) soil borings were completed as monitoring wells and were installed around the perimeter of the site during the Phase II field investigation. Soil borings and wells were used to evaluate subsurface conditions at the site, including; stratigraphy, physical and chemical soil properties, and groundwater flow directions and quality. Monitoring well locations are illustrated on Figure 3-1. The drilling program commenced on December 10, 1991 and concluded on December 13, 1991. Drilling operations were performed by American Auger and Ditching Co., Inc., of Constantia, New York, using a truck-mounted Mobile B-57 drill rig.

Before drilling commenced at each well boring, the drill rig and equipment were steam cleaned. Precautions were taken throughout the drilling operations to limit the potential for cross-contamination between or within soil borings.


TO ONONDAGA CREEK
SW/SED-5
SW/SED-6
INTERMITTENT CREEK
SW/SED-7
SW/SED-8
FORMER DRUM LOCATION (150+)
MW-5
MW-4
WETLANDS
OPEN FIELD & GRASS
RESIDENTIAL DWELLING
USEPA DRUM STAGING AND OVERPACKING AREA
SHRUBS
LEACH 1
TOP OF SLOPE
USEPA SAFETY SUPPORT ZONE
DISCARDED WOODEN PALLETS
MW-1
ABANDONED STREAM CHANNEL (BURIED DRUMS)
SCRAP DRUM STOCKPILE
SW/SED-4
SW/SED-3
MW-3
DIRT ROAD
MW-2
QUARRY ROAD
STREAM P160B (INTERMITTENT)
SW/SED 2
SW/SED-1
SCALE
0 50 100 200 FT.
FORMER LOCATION OF 5-GALLON TAR PAILS
HOSPITAL WASTE
QUARRY ROAD
LEGEND
MONITORING WELL INSTALLED BY URS (1991)
SURFACE WATER / SEDIMENT SAMPLE LOCATION
LEACHATE SAMPLE LOCATION
ONONDAGA NATION - SITE B
SAMPLE LOCATION MAP
URS CONSULTANTS, INC.
FIGURE 3-1

C-2398

Soil Borings and Sampling

The borings were advanced with 4-1/4-inch hollow-stem augers to a depth extending at least 8 feet below the surface of the water table at locations where adequate thickness of the water-bearing zone permitted. Due to the limited thickness of the upper water-bearing zone at MW-4 and MW-5 this was not possible. Split-barrel soil samples were taken at 5-foot intervals above the water-table and continuously below the water-table at all well locations except MW-4. Boring MW-4 was sampled continuously from the ground surface to termination depth. Continuous split-barrel sampling were scheduled for location MW-5 but was changed in the field by the NYSDEC representative. The reason for this change, was the closer proximity of MW-4 to the dry stream channel in which drums were encountered. All split-barrel samples were taken using a 2-inch O.D stainless-steel sampler in advance of the lead auger, per American Society of Testing and Materials (ASTM) Method D 1586-84 (Ref. 25). As samples were obtained, the URS geologist provided field descriptions and material classifications in accordance with ASTM D 2488-84 (Ref. 26). Boring logs are included as Appendix B. All split-barrel samples, as well as drill cuttings from unsampled horizons, were inspected for visual signs of contamination and screened for organic vapors with an HNu Model PI 101 photoionization detector (PID). The PID was calibrated daily to a isobutylene standard. No readings above background were detected with the PID except within the 9-11 foot interval sample at MW-1 which registered a reading of 4.0 ppm. An explosimeter was also used during drilling operations to monitor for the presence of explosive gases in the subsurface. All readings taken above the borehole registered zero.

Soil samples were collected and submitted for geotechnical grain size analysis from the water-bearing zone at each boring except MW-5. Insufficient volume, due to collection of the sample for chemical analysis, precluded a grain size sample from the water-bearing zone at MW-5. Samples from other stratigraphic units were also submitted for

classification purposes. Grain size analysis and Atterberg limits were performed on clay encountered in borings MW-4 and MW-5. Appendix C contains the results of the geotechnical analyses. One environmental soil sample was collected for chemical analysis from each boring. Details of the subsurface soil sampling program and analysis are presented in Section 3.6.2. Analytical results are discussed in Section 4.5.3.

Monitoring Well Installation

All wells were constructed using 2-inch ID, Schedule 40 PVC, threaded, flush-jointed riser pipe and either a 10-foot or 5-foot length of 0.010-inch machine-slotted PVC well screen. Five foot screen lengths were used at MW-4 and MW-5 due to the limited thickness of the water bearing zone at these locations. Following the placement of the PVC well materials through the augers, #3 quartz sand (Q-ROK) was backfilled below and around the well screen to approximately 1-2 feet above the top of the well screen. The screened intervals were then sealed with a minimum of 2 feet of bentonite pellets. Bentonite seals were also installed below the well screen at MW-4 and MW-5 to seal off groundwater from sand seams in the lower portion of the silty clay unit encountered at these boring locations. Cement/bentonite grout was tremied above the bentonite seal, up to the ground surface. The well riser was fitted with a vented PVC cap, and secured with a 4-inch ID steel protective casing equipped with a lockable cap. Monitoring well construction details are included in Appendix B. Table 3-1 summarizes well depths and screened intervals.

Upgradient well MW-2 was relocated approximately 70 feet west of the staked location, to avoid encountering bedrock which was indicated at shallow depth with the geophysical survey. This was the second relocation of this well. It's original location, specified in the NYSDEC Work Plan, was changed during the site reconnaissance. The location of MW-5 was moved approximately 75 feet east of its proposed location due to difficult drill rig access caused by filling activities in this area. All well

TABLE 3-1

ONONDAGA NATION-SITE B
MONITORING WELL SUMMARY

Well No.	Ground Elevation (ft)*	Boring Depth (ft)**	Well Depth (ft)**	Hydrological Position	Unit Screened	Screened Interval (ft)**
MW-1	523.67	29.0	28.0	Sidegradient	Sand and Gravel	18.0-28.0
MW-2	531.65	35.5	34.0	Upgradient	Sand and Gravel	24.0-34.0
MW-3	523.53	35.0	33.3	Sidegradient	Sand and Gravel	23.3-33.3
MW-4	517.99	36.0	30.0	Downgradient	Sand/Clay	25.0-30.0
MW-5	512.90	20.0	17.0	Downgradient	Sand, Few Silty Clay Seams	12.0-17.0

* Elevation above mean sea level determined from National Geodetic Vertical Datum 1929 (NGVD).

** Depth below ground surface

well location changes were approved by the NYSDEC representative. No metallic objects or obstructions were encountered during drilling.

Monitoring Well Development

Well development activities were initiated on December 18, 1991 and concluded on January 17, 1992. The purpose of well development is to remove fine-grained sediments within and around the well screen and provide a representative groundwater sample through establishment of a good hydraulic connection between the well and the water-bearing zone.

The monitoring wells were developed with peristaltic (ISCO) and inertial (Wattera Hydro-Lift) pumps and dedicated polyethylene tubing. Prior to pumping, each well was purged of ten gallons of water with a stainless steel bailer to surge the screened interval.

The monitoring wells were pumped and surged until discharge achieved turbidity less than 50 NTUs, and pH, temperature and specific conductance measurements stabilized. This was achieved for all wells, except MW-4, which was set partially in fine sediments, resulting in slow recharge. Development efforts at MW-4 were halted after the removal of 44 gallons, with final turbidity in excess of 200 NTUs. Well development and purge logs are included as Appendix D.

3.6 Environmental Sampling and Analysis

Samples of subsurface soils, surface water and stream sediment, leachate, and groundwater were collected and submitted for chemical analysis. Waste samples were collected by the USEPA site cleanup contractor and analyzed by Alfred Analytical Laboratory, located on the campus of the State University of New York at Alfred. A summary of the Phase II sampling is presented in Table 3-2. Sample locations are presented in Figure 3-1.

TABLE 3-2

ONONDAGA NATION - SITE B
SUMMARY OF PHASE II SAMPLING

Sample ID (depth)	Matrix	Analyses Performed
LMW1 (9-11')	Soil	Full TCL and Cyanide
LMW2 (8-10')	Soil	Full TCL and Cyanide
LMW3 (24-26')	Soil	Full TCL and Cyanide
LMW4 (23-25')	Soil	Full TCL and Cyanide
LMW5 (14-16')	Soil	Full TCL and Cyanide
LSW1	Surface Water	Full TCL and Cyanide
LSD1	Stream Sediment	Full TCL and Cyanide
LSW2	Surface Water	Full TCL and Cyanide
LSD2	Stream Sediment	Full TCL and Cyanide
LSW3	Surface Water	Full TCL and Cyanide
LSD3	Stream Sediment	Full TCL and Cyanide
LSW4	Surface Water	Full TCL and Cyanide
LSD4	Stream Sediment	Full TCL and Cyanide
LSW5	Surface Water	Full TCL and Cyanide
LSD5	Stream Sediment	Full TCL and Cyanide
LSW6	Surface Water	Full TCL and Cyanide
LSD6	Stream Sediment	Full TCL and Cyanide
LSW7	Surface Water	Full TCL and Cyanide
LSD7	Stream Sediment	Full TCL and Cyanide
LSW8	Surface Water	Full TCL and Cyanide
LSD8	Stream Sediment	Full TCL and Cyanide
LL1	Leachate Seep	Full TCL and Cyanide
LMW1GW	Groundwater	Full TCL and Cyanide
LMW2GW	Groundwater	Full TCL and Cyanide
LMW3GW	Groundwater	Full TCL and Cyanide
LMW4GW	Groundwater	Full TCL and Cyanide
LMW5GW	Groundwater	Full TCL and Cyanide
LDW1	Drill Water	Full TCL and Cyanide

TABLE 3-2 (Cont'd)

Sample ID (depth)	Matrix	Analyses Performed
MW-1, S-7 (23-25′)	Soil	Grain Size
MW-2, S-2 (4-6′)	Soil	Grain Size
MW-2, S-7 (25.5-27.5′)	Soil	Grain Size
MW-2, S-10 (31.5-33.5′)	Soil	Grain Size
MW-3, S-2 (4-6′)	Soil	Grain Size
MW-3, S-7 (26-28′)	Soil	Grain Size
MW-4, S-14 (26-28′)	Soil	Grain Size
MW-4, S-8 (14-16′)	Soil	Grain Size and Atterberg Limits
MW-4, S-18 (34-36′)	Soil	Grain Size and Atterberg Limits
MW-5, S-7 (18-20′)	Soil	Grain Size and Atterberg Limits

Each sample was analyzed for complete Target Compound List (TCL) parameters. Field quality control samples analyzed include; groundwater, sediment and subsurface soil sampler rinse blanks, one groundwater trip blank, and a sample of the drill water. Additional environmental sampling not specified in the NYSDEC approved URS QA/QC Plan included three (3) surface water/stream sediment samples and one leachate sample. These additional samples were requested by the NYSDEC representative, who selected the additional sampling locations. The samples were placed in I-Chem 300 Series laboratory containers. Each sample jar was labeled with a site-specific identification code indicating the sample type, location and number. Samples were preserved on ice and shipped under chain-of-custody to Energy and Environmental Engineering, Inc. (E^3I) of Somerville, Massachusetts for chemical analysis. NYSDEC Analytical Services Protocol (ASP), September 1989 was followed for analysis and reporting. Descriptions of the environmental samples are presented in Appendix E. The data validation report, Summary of Analytical Data, and the Analytical Data Package are provided as Supporting Documentation, bound separately.

3.6.1 Waste Sampling and Analysis

Between January 21 and February 6, 1992 seven waste samples were collected for chemical analysis by a USEPA contractor as part of the recently completed second phase of site cleanup. Six composites and one grab sample were obtained from drums encountered on site. Six of the samples were in a solid state, while one was described as a liquid. Analysis included landfill and incineration parameters required to evaluate disposal/treatment options. These analyses included TCL, TCLP, 40 CFR Part 136 Appendix IX constituents and RCRA waste characteristics. The data was not subjected to a QA/QC review. Analytical results of the waste samples are summarized in Section 4.5.2.

3.6.2 Subsurface Soil Sampling and Analysis

A total of five subsurface soil samples (LMW1 through LMW5), one from each soil boring, were collected and analyzed for TCL analytes. The samples were collected between December 10 and 13, 1991. Sample selection was based on PID reading, indicating volatile organics, or the soil horizon immediately above the water table. No visual contamination was observed. Depths and selection criteria are summarized in Table 3-3. Analytical results are summarized in Section 4.5.3.

3.6.3 Surface Water and Sediment Sampling and Analysis

A total of eight surface water (LSW1 through LSW8) and eight companion sediment (LSD1 through LSD8) samples were collected between December 11 and 13, 1991, and analyzed for TCL analytes. The samples were collected from an unnamed intermittent stream, designated P160B and small feeder tributaries to this stream (Ref. 6). Stream P160B is a tributary to Onondaga Creek, which is located approximately 0.6 miles west of the site. The stream and its feeder tributaries encircle all but the northern boundary of the site as indicated in Figure 3-1. Surface water samples were collected by submerging the laboratory-provided sample bottles. Low flow and shallow depth conditions at LSW7 and LSW8 necessitated the excavation of shallow holes in the stream bed in order to pond the stream water and allow for sample collection. Surface water samples LSW3 and LSW7 were resampled for the semivolatile fraction on March 11, 1992 due to a laboratory QA/QC deficiency discussed in Section 1 of the supporting documentation. Sediment samples were collected using a stainless steel sample trowel, decontaminated according to the procedure outlined for bailers in Section 3.6.5. A rinse blank was also produced by collecting analyte-free water poured over the decontaminated sampling trowel. Analytical results for these samples are summarized in Sections 4.5.4.

TABLE 3-3

SUBSURFACE SOIL SAMPLE SUMMARY
ONONDAGA NATION - SITE B

Boring No.	Sample ID	Sample Interval (ft)+	Description	Sample Selection Criteria
MW-1	LMW1	9-11	Brown sand	4 ppm PID readings from sample
MW-2	LMW2	8-10	Clayey silt and gravel	Slightly moist, above water table
MW-3	LMW3	24-26	Brown sand	Immediately above/at water table
MW-4	LMW4	23-25	Brown sand	Immediately above/at water table
MW-5	LMW5	14-16	Brown sand, some clay	Immediately above/at water table

+ Below Ground Surface

3.6.4 Leachate Sampling and Analysis

One leachate sample (LL1) was collected from an active seep along the north bank of the intermittent stream P160B. This sample was collected on December 11, 1991 and was analyzed for TCL analytes. Analytical results for this sample is discussed in Section 4.5.5.

3.6.5 Groundwater Sampling and Analysis

A total of five groundwater samples, one from each monitoring well, were collected on February 5, 1992. All samples, a field blank and a drill water sample, were analyzed for TCL analytes. In addition one trip blank sample was submitted and analyzed for TCL volatiles, as specified in the Quality Assurance/Quality Control Plan (Ref. 4).

Prior to sample collection at each well, the static water level was recorded and the headspace of the well was monitored for the presence of volatile organics with an HNu PID. Headspace readings of 1.6 and 0.2 ppm were detected at monitoring wells MW-2 and MW-5, respectively, while the remaining three wells were at background levels. A persistent gasoline odor was also noted in the vicinity of MW-1. Three well volumes, minimum, were purged from each well, except for MW-4 which was purged to dryness, to ensure that a representative groundwater sample was obtained. Purging was performed with a Waterra Hydro-Lift inertial pump. Samples were obtained with a stainless-steel bailer and dedicated nylon rope. The bailer was decontaminated between sample points with a non-phosphate soap and water wash and successive tap water, pesticide grade methanol, and deionized water rinses, followed by air drying.

3.6.6 Air Monitoring

Air monitoring was performed with an HNu photoionization detector (PID) during the geophysical survey. No volatile organic readings above

background were detected during a site walkover on October 21, 1991. During the drilling operations the PID was used to monitor for the presence of volatile organic compounds within split-spoon samples and drill cuttings. The only reading above background was 4.0 ppm at MW-1 within the 9-11 foot depth sample. No elevated HNu readings were recorded above background in the breathing zone.

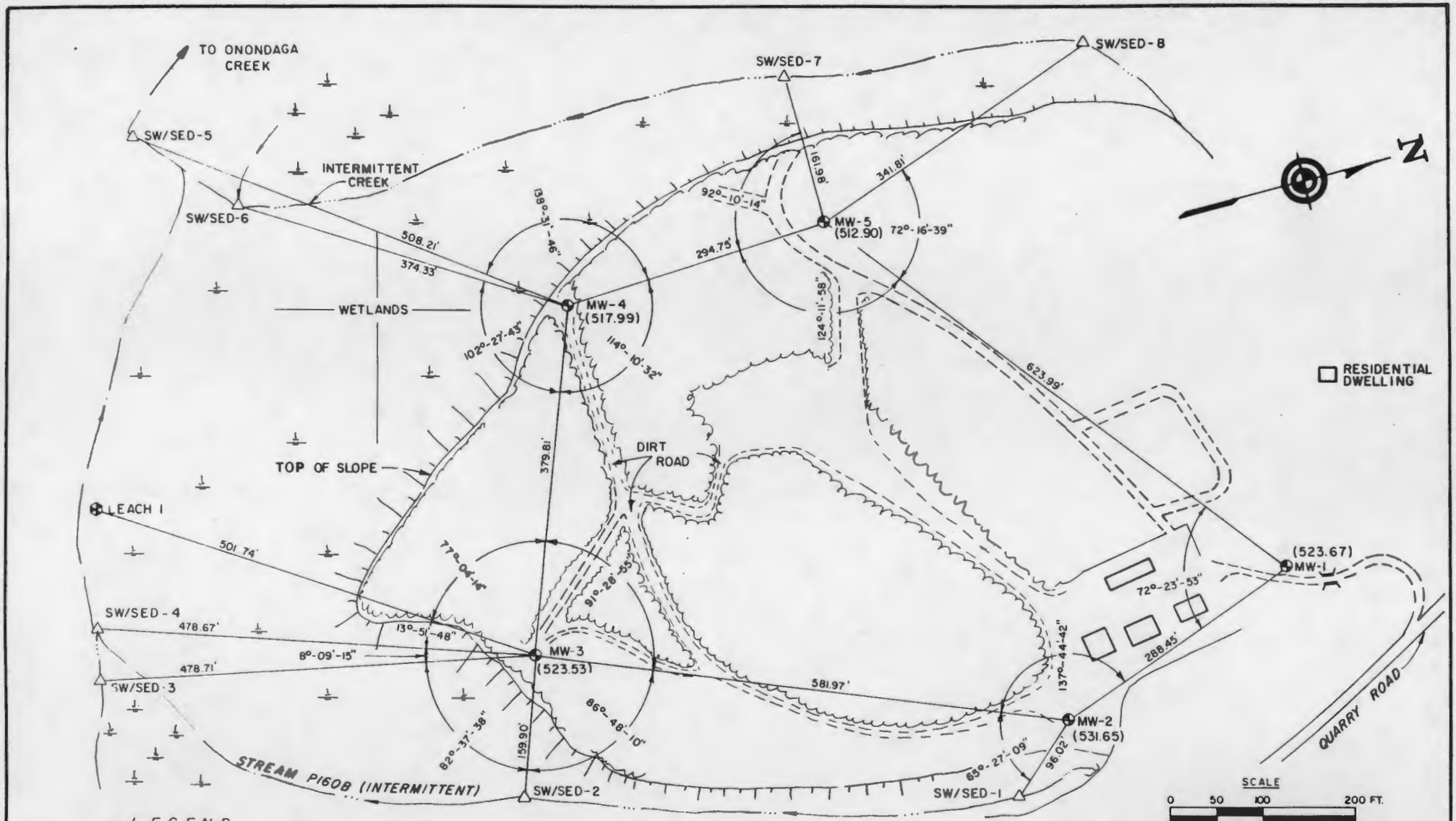
A radiation survey was performed during the site reconnaissance and geophysical survey using a Ludlum Radiation Survey Meter, Model 44-9. No readings above background were detected at that time.

Explosive conditions were monitored for during drilling operations with a Gastech 1214S combination O_2/LEL meter. All LEL (lower explosive limit) readings were zero.

3.7 Surveying and Mapping

Following completion of the Phase II monitoring well installation and field sampling program, the wells and sampling points were surveyed for horizontal location. Vertical locations were obtained for the monitoring wells. This data was then used in the preparation of site maps, which were used in the overall site assessment. The horizontal datum was local and site-specific. The vertical datum was based on the National Geodetic Vertical Datum of 1929 (NGVD) as established on a benchmark set by others during the construction of Interstate Route 81. This benchmark, designated DR-13, is located on a concrete head wall at Construction Survey Baseline Station 188+04, 301 feet left. It has an elevation established at 591.15 feet above mean sea level. Further information regarding this mark can be found on plans on file in the Region 3 offices of the New York State Department of Transportation, Syracuse, New York.

All surveying was done under the supervision of a New York State licensed Land Surveyor. A map of the site was then prepared based on the Phase I site sketch, aerial photography, and field notes compiled by URS surveyors. Important additional topographic features were added as necessary. Wells and sample points were plotted to an appropriate scale using the survey data. The relative vertical and horizontal locations of the monitoring wells and sampling points are presented in Figure 3-2.



LEGEND

- MONITORING WELL INSTALLED BY URS (1991)
- SURFACE WATER / SEDIMENT SAMPLE LOCATION
- LEACHATE SAMPLE LOCATION
- (52367) GROUND ELEVATION AT MONITORING WELL (IN FEET)

ONONDAGA NATION - SITE B
RELATIVE LOCATION OF SAMPLE POINTS

URS CONSULTANTS INC

FIGURE 3-2

C-2416

4.0 SITE ASSESSMENT

4.1 Site History

The site is located within the boundaries of the Onondaga Nation Indian Reservation, Onondaga County, New York. During the 1960s, Benjamin Shenandoah of the Onondaga Nation operated a dump and junk yard at the site, disposing of such wastes as motor vehicles, tires, washing machines, and scrap lumber. The motor vehicles were subsequently moved to a junkyard on the reservation located on U.S. Route 11, immediately north of the site. Sometime during the mid to late 1960s, the site was also used for the disposal of hospital waste, as well as several hundred 55-gallon drums containing liquid and solid waste and containers of roofing tar. Shortly thereafter, the Onondaga Nation terminated Shenandoah's operation. Mr. Shenandoah is now deceased. The hospital waste is reportedly from Community General Hospital of Syracuse, New York (Ref. 1). Whether any of this waste should be regarded as biohazardous is not known at this time but, considering its age, it most likely is not. The waste does, however, pose a physical hazard due to the presence of broken glass and syringes.

The site was first inspected in May 1983 by the Onondaga County Department of Health, Division of Environmental Sanitation. This inspection was prompted by a complaint, filed by a member of the Onondaga Nation to the NYSDEC, concerning six drums discovered at a drive-in theater on the reservation. The drive-in theater is located 1/4 mile north of the site and was designated Site A. During the course of the inspection, Chief Bill Lazore of the Onondaga Nation informed the Onondaga Health Department inspector of a larger waste site just south of the drive-in, presently designated Site B. The Chief suspected that radioactive material may have been disposed of on this site. The health department inspector, accompanied by the Chief, inspected Site B equipped with a radiation survey meter. No readings above background levels were detected. During the site inspection, an estimated 200 drums were

discovered. Many of the drums were deteriorated and some contained waste material. A few of the drums contained legible labels which read: Cowles Chemical Company, ADA Chemical Company, DOW, and Trenco Roof Preservative. Upon completion of the site inspection, the Onondaga County Department of Health informed the Region 7 NYSDEC of their findings (Ref. 1).

The NYSDEC Bureau of Remedial Action conducted an inspection of the Onondaga Nation-Site B drum site on September 28, 1983. During the course of this investigation, two waste samples were collected from drums encountered on site. Indications of contaminants were noted but only benzyl alcohol was identified. On November 16, 1983 the NYSDEC (through an attorney for the New York State Department of Law) were informed of possible past disposal of hazardous waste at the site by haulers from Solvent Savers, Inc., which operated a chemical reprocessing operation in the Syracuse area. During the 1960s, Solvent Savers purchased drums of chemicals from several companies, then after redistillation, sold the chemicals either back to the same company or to a third party. Reportedly, chemicals which were not able to be redistilled were commonly buried (Ref. 1). A former partner/hauler of Solvent Savers identified Cowles Chemical Company as a generator of such waste. Furthermore, the Onondaga Nation site was identified as a disposal area for Solvent Saver's wastes. The site was added to the New York State Registry of Inactive Hazardous Waste Disposal Sites in December 1984 (Ref. 7).

A subsequent site inspection was conducted by the New York State Department of Health (NYSDOH) in June 1987. The NYSDOH inspectors were escorted around the site by members of the Council of Chiefs of the Onondaga Nation. In July 1987, the NYSDOH collected groundwater samples from four downgradient wells located on the Onondaga Nation. One of these wells is located directly north of the site. No contaminants were detected in any of the groundwater samples. In August 1987, the NYSDEC performed a facility inspection at the site to determine the volume of hospital waste present in a intermittent stream bed (designated P160B)

situated along the east side of the site. Linear measurements of the medical waste were taken to quantify the waste for removal considerations. The bulk of the waste was calculated to occupy a 0.5 acre area, varying in height from 1 to 8 feet. The close proximity of the stream has promoted downstream entrainment of the medical waste (Ref. 8). In November 1987, NYSDEC and NYSDOH collected four (4) waste samples from onsite drums. Although analytical results detected several Hazardous Substance List (HSL) compounds, the samples did not exhibit characteristics of hazardous waste per New York State or Federal standards.

In April 1988, the acting director of the NYSDEC Division of Hazardous Waste Remediation referred the site to the director of the USEPA Emergency and Remedial Response Division (ERRD) for a federally funded removal action pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Superfund program (Ref. 9). In August 1988, after assessing the site, the USEPA decided that a drum removal action was not warranted at that time, based on the drum sample analyses conducted by the NYSDEC in November 1987, which did not indicate the presence of hazardous waste (Ref. 10). In March 1990, NYSDEC collected eleven (11) additional samples to further evaluate the site and to determine if hazardous wastes existed onsite. Ten of the samples were wastes collected from drums. The remaining sample was a soil sample. Sample analyses results indicated the presence of phenol and xylene in most of the samples in the part per million range. However, the waste did not exhibit RCRA characteristics for hazardous waste, therefore, the NYSDEC was unable to initiate cleanup action. In an effort to expedite the steps necessary to initiate a site cleanup, the director of the NYSDEC Division of Hazardous Waste Remediation formally requested the USEPA ERRD to take action on this case (Ref. 11). This request resulted in the August 17, 1990 authorization by the Director of the USEPA ERRD to conduct the first phase of an expedited removal action at the Onondaga Nation site. This action took place on August 22 and 23, 1990 and involved the overpacking and staging of 20 drums previously sampled by the NYSDEC.

Other tasks accomplished during this removal action included drum sampling (to determine ultimate disposition of the waste), construction of a fenced area for drum staging, and posting of warning signs to minimize the health threat to the public (Ref. 12).

On October 21, 1991, the USEPA Emergency Response Cleanup Service (ERCS) Contractor and Technical Assistance Team (TAT) mobilized to the site to continue the removal action. Following construction of a support zone in the northeast corner of the site, the surficial and partially buried waste drums encountered on the site were identified. Approximately 1,250 drums were encountered, an estimated 250 of which contained variable quantities of waste (Ref. 27). Empty drums, of which there were many due to physical damage and deterioration, were stockpiled and eventually removed from the site. A portion of the empty drums showed signs of physical damage in the form of perforations. The drums containing waste were sampled and analyzed for waste compatibility. Five waste stream were identified: organic solids, flammable solids, organic liquids, aqueous liquids, and tar scrapings (Ref. 13). Table 4-1 summarizes the disposition of the waste. Based upon the results of the compatability analysis the waste was segregated and containerized in 55-gallon drums. A total of 60 drums was generated from this effort. The drums are presently staged in a secure area on site. An examination of the medical waste situated on the east side of the site during this phase of the cleanup resulted in a volume estimation of 100-500 cubic yards of material (Ref. 29). A third phase of the removal action is slated for Summer and Fall 1992 which will involve a preassessment of the subsurface to determine the existence of buried drums. If buried drums are identified they will be removed in a later stage of that phase.

TABLE 4-1

ONONDAGA NATION - SITE B
DISPOSITION OF WASTE

WASTESTREAM	QUANTITY	DISPOSITION
Empty Drums	1,046 Drums	Recycled offsite
Organic Solids	29 Drums	Repacked and staged
Organic Liquids	9 Drums	Repacked and staged
Tar Scrapings	17 Drums	Repacked and staged
Aqueous Liquid	1 Drum	Repacked and staged
Flammable Solids	4 Drums	Repacked and staged

Sources: Reference No. 13 and No. 30.

Note: Repacked drum totals reflect waste stream segregation and consolidation

4.2 Regional Setting

4.2.1 Regional Geology and Hydrogeology

The site is situated on the northern margin of the Appalachian Uplands physiographic province. This area was formed by the dissection of the uplifted, but relatively flat-lying, sandstones and shales of the Middle and Upper Devonian Catskill Delta. Limestone and dolostones of Lower to Middle Devonian-age underlay glacial deposits formed during Pleistocene time. These underlying sedimentary rock units exhibit a subtle regional dip to the south-southwest.

Pleistocene glaciation and deglaciation led to the varied sequence of till, kame, outwash and lacustrine deposits that mantle much of the region. Only the recent alluvium of the flood plains is post-glacial in age. Dominant surficial features of the region include the east-west trending glacial meltwater channels north of the site, formed by the eastward drainage of impounded pro-glacial meltwaters.

With the exception of the City of Syracuse, groundwater in the region is supplied by springs and wells. The wells are screened in the glacial drift deposits of predominantly sand and gravel and in the underlying sedimentary bedrock. Groundwater occurs in the fractures and bedding joints of the consolidated rock units and within the pore spaces of the unconsolidated drift deposits (Ref. 1). The regional shallow groundwater flow is directed longitudinally northward within the Onondaga Trough. Local groundwater flow in the region is towards the center of the north-south trending glacial troughs (Ref. 28).

4.2.2 Soils

Surficial soils at the site were not surveyed during preparation of the Onondaga County soil survey conducted by the USDA Soil Conservation

TABLE 4 – 3

ONONDAGA NATION – SITE B

SUMMARY OF DETECTED COMPOUNDS FROM PREVIOUS NYSDEC SAMPLING

SAMPLE I.D.		01	02	03	04	05	07A	08A	09A	010A	011A	012A	013A	014A	016A	017A	018A
SAMPLE TYPE		WASTE	WASTE	WASTE	WASTE	WASTE	WASTE	WASTE	WASTE	WASTE	WASTE	WASTE	SOIL	WASTE	WASTE	WASTE	WASTE
COLLECTION DATE		11/24/87	11/24/87	11/24/87	11/24/87	11/24/87	3/8/90	3/8/90	3/8/90	3/8/90	3/8/90	3/8/90	3/8/90	3/8/90	3/8/90	3/8/90	3/8/90
PARAMETER	TYPE																
ACETONE	VOC		15,000 J	420 J		350 J											
ETHYLBENZENE	VOC				16,000												
TOTAL XYLENES	VOC		193,000	8,200	2,441,000	1,500											
ACETIC ACID (METHYL ESTER)	SEMI					800 J											
BENZOIC ACID (3-METHYL)	SEMI					2,390,000 J											
EP TOX BARIUM	MET		353														
EP TOX CADMIUM	MET	91															
EP TOX CHROMIUM	MET			11													
EP TOX LEAD	MET		727														
ORTHO-XYLENE	VOC						370	420	65	150	175	160	NA	NA	2,100	8,900	NA
PHENOL	SEMI						125	69	374	148	140	175			217	227	76
ARSENIC	MET												3.0	3.2			
BARIUM	MET												300	140		10	
CADMIUM	MET															9.4	
CHROMIUM	MET						2.8		3.3		8.8		26	16			
COBALT	MET						210	240	12	21	66		150	2,200	1,300	110	12,000
LEAD	MET												250	83		59	
MERCURY	MET								0.22	0.20				NA	0.20	NA	1.4
THALLIUM	MET																89
VANADIUM	MET										13			15			
ZINC	MET						12	16	5.8	19	86	28	300	120	32	4,100	6.6
CORROSIVITY (BY pH)	HWC	NON (6.50)	NON (3.80)	NON (3.07)	NON (8.60)	NON (4.80)	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON
IGNITABILITY	HWC	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON
REACTIVE CYANIDE	HWC	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON
REACTIVE SULFIDE	HWC	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON	NON

All results reported in ug/kg or ug/L (ppb).

Only detected results are reported.

Note : Organic Analyses not performed in sample #01 due to sample breakage.

NA – Not Analyzed due to insufficient sample volume

J – Estimated Value

VOC – Volatile Organic Compound

SEMI – Semivolatile Organic Compound

MET – Metal

HWC – Hazardous Waste Characteristic

the potential of groundwater and surface water contamination from the site, the site was assessed a score of 28.89.

In September 1983, NYSDEC collected and analyzed two waste samples from drums found on the site. Data generated from these analyses was insufficient to determine if the waste was hazardous. Gas Chromatography/ Mass Spectrometry (GS/MS) results indicated that unidentified organic compounds were present and benzyl alcohol was identified in one sample. Five additional waste samples from on site drums were collected in November 1987 by NYSDEC. Analytical results indicated the presence of total xylenes and ethyl-benzene at maximum concentrations of 2,441 and 16 ppm respectively. Acetone and acetic acid were also identified, but at concentrations less than their detection limits. Tentatively Identified Compounds (TICs), including base neutral/acid extractable compounds (BNA), were detected at a total concentration of 22,928 ppm. One waste sample was subjected to pesticide/PCB analysis, however, none of these compounds were detected. Waste characterization analyses (EP-Toxicity metals, reactivity, corrosivity and ignitability) performed on the five waste samples showed these materials were not hazardous (Ref. 1). EP-Toxicity metals analysis did, however, reveal detectable concentrations of barium, cadmium, chromium, and lead, but at levels below RCRA hazardous waste guidelines.

A third drum sampling event conducted by NYSDEC took place in March 1990. A total of ten additional drums and one surface soil point were sampled to further evaluate the site and determine if hazardous wastes existed onsite. A full Target Compound List (TCL) scan was requested, but due to the nature of the waste, the laboratory was unable to complete the full analyses. Analytical results from the analyses indicated the presence of xylene (65-8900 ppm) and phenol (69-374 ppm) in most of the samples. The waste did not exhibit RCRA characteristics for hazardous waste.

In July 1987, NYSDOH collected groundwater samples from four private residential wells located on the Onondaga Nation, downgradient of the site. One of these wells is located directly north of the site at the Derrick residence (Ref. 31). This well is still utilized by the residence as a drinking water source. The samples were analyzed for priority pollutant volatile organic compounds (VOCs), organochlorine pesticides, semivolatile organic compounds (SVOCs), and indicator parameters. No contaminants were detected in any of the groundwater samples at that time.

4.5.2 Waste Contamination Assessment

Waste analysis data compiled by the USEPA site cleanup contractor is presented in this section to evaluate waste types present at the site. Results from chemical analysis for seven waste composite samples is presented in Table 4-4. These results include six solid waste samples and one liquid sample. Analytes detected in the waste samples are discussed below by chemical class.

Volatiles

Toluene and xylene were detected in all the waste samples. Concentrations of toluene ranged from 2,210 to 71,600 ppm and xylene ranged from 39,450 to 281,580 ppm. Benzene was reported in two waste samples at concentrations of 4,010 and 2,140 ppm.

Semivolatiles

The phenolic compound 2-chlorophenol was detected in one sample at a concentration of 1,092 ppm. One sample, described as a black sludge, contained seven (7) polynuclear aromatic hydrocarbons (PAHs) ranging in concentration from 1,196 to 93,334 ppm. The presence of the PAHs in this sample is likely attributable to cresol also present in the sample at a

TABLE 4-4
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - USEPA WASTE SAMPLES

SAMPLE ID		001	002	003	004	007	010	008
SAMPLE TYPE		WASTE	WASTE	WASTE	WASTE	WASTE	WASTE	WASTE
PHYSICAL STATE		SOLID	SOLID	SOLID	SOLID	SOLID	SLUDGE	LIQUID
COLLECTION DATE		1/21/92	1/22/92	1/23/92	1/29/92	1/29/92	2/6/92	1/30/92
PARAMETER	TYPE							
CHLOROMETHANE	VOC							
BROMOMETHANE	VOC							
VINYL CHLORIDE	VOC							
CHLOROETHANE	VOC							
METHYLENE CHLORIDE	VOC							
ACETONE	VOC							
CARBON DISULFIDE	VOC							
1,1-DICHLOROETHENE	VOC							
1,1-DICHLOROETHANE	VOC							
1,2-DICHLOROETHENE (TOTAL)	VOC							
CHLOROFORM	VOC							
1,2-DICHLOROETHANE	VOC							
2-BUTANONE	VOC							
1,1,1-TRICHLOROETHANE	VOC							
CARBON TETRACHLORIDE	VOC							
VINYL ACETATE	VOC							
BROMODICHLOROMETHANE	VOC							
1,2-DICHLOROPROPANE	VOC							
CIS-1,3-DICHLOROPROPENE	VOC							
TRICHLOROETHENE	VOC							
DIBROMOCHLOROMETHANE	VOC							
1,1,2-TRICHLOROETHANE	VOC							
BENZENE	VOC				2140		4010	
TRANS-1,3-DICHLOROPROPENE	VOC							
BROMOFORM	VOC							
4-METHYL-2-PENTANONE	VOC							
2-HEXANONE	VOC							
TETRACHLOROETHENE	VOC							
1,1,2,2-TETRACHLOROETHANE	VOC							
TOLUENE	VOC	12070	2210	2330	71600	9720	17360	37890
CHLOROBENZENE	VOC							
ETHYLBENZENE	VOC							
STYRENE	VOC							
TOTAL XYLENES	VOC	109830	39450	47630	200000	70840	57750	281580

All results reported in mg/kg (ppm).

Only detected results are reported.

VOC - Volatile Organic Compound

Note: Samples collected from drums by the USEPA remediation contractor. All samples were composites, with exception of sample 010.

TABLE 4-4
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - USEPA WASTE SAMPLES

SAMPLE ID		001	002	003	004	007	010	008
SAMPLE TYPE		WASTE	WASTE	WASTE	WASTE	WASTE	WASTE	WASTE
PHYSICAL STATE		SOLID	SOLID	SOLID	SOLID	SOLID	SLUDGE	LIQUID
COLLECTION DATE		1/21/92	1/22/92	1/23/92	1/29/92	1/29/92	2/6/92	1/30/92
PARAMETER	TYPE							
PHENOL	SEMI							
BIS(2-CHLOROETHYL) ETHER	SEMI							
2-CHLOROPHENOL	SEMI				1092			
1,3-DICHLOROBENZENE	SEMI							
1,4-DICHLOROBENZENE	SEMI							
BENZYL ALCOHOL	SEMI							
1,2-DICHLOROBENZENE	SEMI							
2-METHYLPHENOL	SEMI							
BIS(2-CHLOROISOPROPYL) ETHER	SEMI							
4-METHYLPHENOL	SEMI							
N-NITROSO-DI-N-PROPYLAMINE	SEMI							
HEXACHLOROETHANE	SEMI							
NITROBENZENE	SEMI							
ISOPHORONE	SEMI							
2-NITROPHENOL	SEMI							
2,4-DIMETHYLPHENOL	SEMI						462	
BENZOIC ACID	SEMI							
BIS(2-CHLOROETHOXY)METHANE	SEMI							
2,4-DICHLOROPHENOL	SEMI							
1,2,4-TRICHLOROBENZENE	SEMI							
NAPHTHALENE	SEMI						93334	
4-CHLOROANILINE	SEMI							
HEXACHLOROBUTADIENE	SEMI							
4-CHLORO-3-METHYLPHENOL	SEMI							
2-METHYLNAPHTHALENE	SEMI							
HEXACHLOROCYCLOPENTADIENE	SEMI							
2,4,6-TRICHLOROPHENOL	SEMI							
2,4,5-TRICHLOROPHENOL	SEMI							
2-CHLORONAPHTHALENE	SEMI							
2-NITROANILINE	SEMI							
DIMETHYLPHTHALATE	SEMI							
ACENAPHTHYLENE	SEMI						4914	
2,6-DINITROTOLUENE	SEMI							
3-NITROANILINE	SEMI							

All results reported in mg/kg (ppm).

Only detected results are reported.

SEMI-Semivolatile Organic Compound

Note: Samples collected from drums by the USEPA remediation contractor. All samples were composites, with exception of sample 010.

TABLE 4-4
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - USEPA WASTE SAMPLES

SAMPLE ID		001	002	003	004	007	010	008
SAMPLE TYPE		WASTE	WASTE	WASTE	WASTE	WASTE	WASTE	WASTE
PHYSICAL STATE		SOLID	SOLID	SOLID	SOLID	SOLID	SLUDGE	LIQUID
COLLECTION DATE		1/21/92	1/22/92	1/23/92	1/29/92	1/29/92	2/6/92	1/30/92
PARAMETER	TYPE							
ACENAPHTHENE	SEMI						7174	
2,4-DINITROPHENOL	SEMI							
4-NITROPHENOL	SEMI							
DIBENZOFURAN	SEMI							
2,4-DINITROTOLUENE	SEMI							
DIETHYLPHTHALATE	SEMI							
4-CHLOROPHENYL-PHENYL ETHER	SEMI							
FLUORENE	SEMI						15782	
4-NITROANILINE	SEMI							
4,6-DINITRO-2-METHYLPHENOL	SEMI							
N-NITROSODIPHENYLAMINE	SEMI							
4-BROMOPHENYL-PHENYL ETHER	SEMI							
HEXACHLOROBENZENE	SEMI							
PENTACHLOROPHENOL	SEMI							
PHENANTHRENE	SEMI						84788	
ANTHRACENE	SEMI							
DI-N-BUTYLPHTHALATE	SEMI							
FLUORANTHENE	SEMI						25462	
PYRENE	SEMI							
BUTYLBENZYLPHTHALATE	SEMI							
3,3'-DICHLOROBENZIDINE	SEMI							
BENZO(A)ANTHRACENE	SEMI							
CHRYSENE	SEMI						1196	
BIS(2-ETHYLHEXYL)PHTHALATE	SEMI							
DI-N-OCTYL PHTHALATE	SEMI							
BENZO(B)FLUORANTHENE	SEMI							
BENZO(K)FLUORANTHENE	SEMI							
BENZO(A)PYRENE	SEMI							
INDENO(1,2,3-CD)PYRENE	SEMI							
DIBENZ(A,H)ANTHRACENE	SEMI							
BENZO(G,H,I)PERYLENE	SEMI							

All results reported in mg/kg (ppm).

Only detected results are reported.

SEMI-Semivolatile Organic Compound

Note: Samples collected from drums by the USEPA remediation contractor. All samples were composites, with exception of sample 010.

TABLE 4-4
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - USEPA WASTE SAMPLES

SAMPLE ID		001	002	003	004	007	010	008
SAMPLE TYPE		WASTE	WASTE	WASTE	WASTE	WASTE	WASTE	WASTE
PHYSICAL STATE		SOLID	SOLID	SOLID	SOLID	SOLID	SLUDGE	LIQUID
COLLECTION DATE		1/21/92	1/22/92	1/23/92	1/29/92	1/29/92	2/6/92	1/30/92
PARAMETER	TYPE							
ALPHA-BHC	PST							
BETA-BHC	PST							
DELTA-BHC	PST							
GAMMA-BHC (LINDANE)	PST							
HEPTACHLOR	PST							
ALDRIN	PST							
HEPTACHLOR EPOXIDE	PST							
ENDOSULFAN I	PST							
DIELDRIN	PST							
4,4'-DDE	PST							
ENDRIN	PST							
ENDOSULFAN II	PST							
4,4'-DDD	PST							
ENDOSULFAN SULFATE	PST							
4,4'-DDT	PST							
METHOXYCHLOR	PST							
ENDRIN KETONE	PST							
ALPHA-CHLORDANE	PST							
GAMMA-CHLORDANE	PST							
TOXAPHENE	PST							
AROCLOR-1016	PCB							
AROCLOR-1221	PCB							
AROCLOR-1232	PCB							
AROCLOR-1242	PCB							
AROCLOR-1248	PCB							
AROCLOR-1254	PCB							
AROCLOR-1260	PCB							

All results reported in mg/kg (ppm).

Only detected results are reported.

PST-Pesticide

PCB-Polychlorinated Biphenyl

Note: Samples collected from drums by the USEPA remediation contractor. All samples were composites, with exception of sample 010.

TABLE 4-4
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - USEPA WASTE SAMPLES

SAMPLE ID		001	002	003	004	007	010	008
SAMPLE TYPE		WASTE	WASTE	WASTE	WASTE	WASTE	WASTE	WASTE
PHYSICAL STATE		SOLID	SOLID	SOLID	SOLID	SOLID	SLUDGE	LIQUID
COLLECTION DATE		1/21/92	1/22/92	1/23/92	1/29/92	1/29/92	2/6/92	1/30/92
PARAMETER	TYPE							
ANTIMONY	MET	0.21			0.26	0.4	0.3	
ARSENIC	MET	0.054	0.030	0.019	0.041	0.159	0.049	0.060
BARIUM	MET			0.42		0.32	0.35	
BERYLLIUM	MET							0.009
CADMIUM	MET	1.22	1.85	3274	23.82	2.33	1.0	579.6
CHROMIUM	MET	77.0	12.0	17.2	11.3	262	235	6.73
COPPER	MET	0.55	0.52	0.82	0.88	0.64	0.44	0.64
IRON	MET	33.77	9.23	19.03	27.43	115.30	19.75	10.80
LEAD	MET	0.4	0.1	0.2	0.8	4.0	0.2	0.6
MOLYBDEMUM	MET	0.04	0.41	0.60		0.27	0.75	0.25
MANGANESE	MET	0.34	0.09	0.35	0.48	2.22	0.38	0.59
MERCURY	MET	0.089	0.14	0.151	0.124	0.142	0.105	0.099
NICKEL	MET	0.068	0.064	0.124	0.106	0.166	0.454	0.045
POTASSIUM	MET	1.14	0.13	0.53	1.26	2.84	1.04	0.92
SELENIUM	MET	0.023	0.026	0.008	0.010	0.123	0.034	0.017
SILVER	MET			0.03		0.04		0.07
SODIUM	MET	6.01	5.65	3.37	9.66	6.85	5.88	25.46
THALLIUM	MET	0.08	0.02	0.01	0.04	0.14	0.09	0.04
VANADIUM	MET	0.084	0.015		0.036	0.075	0.172	0.007
ZINC	MET	1.484	7.667	0.203	7.859	2.351	1.114	2.764
CYANIDE	CN	0.57				0.14		NA

All results reported in mg/kg (ppm).
Only detected results are reported.
MET-Metals.
CN-Cyanide.

Note: Samples collected from drums by the USEPA remediation contractor. All samples were composites, with exception of sample 010.
NA-Not-Analyzed.

TABLE 4-4
ONONDAGA NATION-SITE B
RCRA WASTE CHARACTERISTICS AND MISCELLANEOUS PARAMETERS
ANALYTICAL RESULTS - USEPA WASTE SAMPLES

SAMPLE ID		Maximum allowable values for non-hazardous waste # @	001	002	003	004	007	010	008
SAMPLE TYPE			WASTE	WASTE	WASTE	WASTE	WASTE	WASTE	WASTE
PHYSICAL STATE			SOLID	SOLID	SOLID	SOLID	SOLID	SLUDGE	LIQUID
COLLECTION DATE			1/21/92	1/22/92	1/23/92	1/29/92	1/29/92	2/6/92	1/30/92
PARAMETER	TYPE								
CORROSIVITY (by pH)	HWC	>2 AND <12.5	10.5	6.2	7.0	5.1	5.2	4.1	6.2
IGNITABILITY (°C)	HWC	≤ 60	66	61	72	83	>100	62	78
REACTIVE CYANIDE (mg/kg)	HWC	500 ##	0.57				0.14		
REACTIVE SULFIDE (mg/kg)	HWC	250 ##	52.7	32.06	36.4	47.8	33.6	47.23	
FLAMMABILITY	MISC	NA	POS	POS	POS	POS	NEG	POS	NT
SULFUR (%)	MISC	NA	0.99	0.08	0.19			47.23	63.5
ASH WEIGHT (%)	MISC	NA	44.13	19.3	54.85	40.3	61.3	29.0	9.6
HEAT OF COMBUSTION (BTU/lb)	MISC	NA	8183.8	11808	5637.4	8886.1	10494	13424	12867
PHENOL * (mg/kg)	MISC	NA	217.7	408.4	355.7	332.2	63.6	1298.0	
OXIDIZER	MISC	NA	NO	YES	YES	YES	NO	NO	NO

Note: Samples collected from drums by the USEPA remediation contractor. All samples were composites, with exception of sample 010.

Only detected results reported.

HWC-Hazardous Waste Characteristics.

MISC-Miscellaneous Characteristics.

@-All values reported in ppm, unless otherwise specified.

#-Source: 6NYCRR Part 371, December 25,1988

##-NYSDEC Guidance values.

* - Phenol analyzed by method EPA 335.2

NT - Not Tested

NA - Not Applicable

TABLE 4-4
ONONDAGA NATION-SITE B
TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP) RESULTS
ANALYTICAL RESULTS - USEPA WASTE SAMPLES

SAMPLE ID		TCLP	001	002	003	004	007	010	008
SAMPLE TYPE		Regulatory	WASTE	WASTE	WASTE	WASTE	WASTE	WASTE	WASTE
PHYSICAL STATE		Levels	SOLID	SOLID	SOLID	SOLID	SOLID	SLUDGE	LIQUID
COLLECTION DATE		(ppm) #	1/21/92	1/22/92	1/23/92	1/29/92	1/29/92	2/6/92	1/30/92
PARAMETER	TYPE								
BENZENE	VOC	0.5						676.9	
CARBON TETRACHLORIDE	VOC	0.5							
CHLOROBENZENE	VOC	100							
CHLOROFORM	VOC	6.0							
2-BUTANONE	VOC	200							
TETRACHLOROETHYLENE	VOC	0.7							
TRICHOROETHYLENE	VOC	0.5							
VINYL CHOLRIDE	VOC	0.2							
1,2-DICHLOROETHANE	VOC	0.5							
1,4-DICHLOROBENZENE	SEMI	7.5							
HEXACHOLORETHANE	SEMI	3.0							
NITROBENZENE	SEMI	2.0							
HEXACHLOROBUTADIENE	SEMI								
2,4,6-TRICHLOROPHENOL	SEMI								
2,4,5-TRICHLOROPHENOL	SEMI	400							
2,4-DINITROTOLUENE	SEMI	0.13							
HEXACHLOROBENZENE	SEMI	0.13							
PENTACHLOROPHENOL	SEMI	100							
2-METHYLPHENOL	SEMI	200							
3-METHYLPHENOL	SEMI	200							
4-METHYLPHENOL	SEMI	200							
CRESOL (TOTAL)	SEMI	200						45217.8	
PYRIDINE	SEMI	5.0							
CHLORDANE	PST	0.03							
ENDRIN	PST	0.02							
HEPTACHLOR	PST	0.008							
LINDANE	PST	0.4							
METHOXYCHLOR	PST	10							
TOXAPHENE	PST	0.5							
2,4 D	HERB	10							
SILVEX	HERB	1.0							

All results reported in (ppm).

Only detected results are reported.

Note: Samples collected from drums by the USEPA remediation contractor. All samples were composites, with exception of sample 010.

- Federal Register Vol. 55, No. 61, 3/29/90, Rules and Regulations.

123 - Shading indicates TCLP exceedance.

VOC - Volatile Organic Compound

SEMI-Semivolatiles Organic Compound

PST-Pesticide

HERB-Herbicide

TABLE 4-4
ONONDAGA NATION-SITE B
TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP) RESULTS
ANALYTICAL RESULTS - USEPA WASTE SAMPLES

SAMPLE ID		TCLP	001	002	003	004	007	010	008
SAMPLE TYPE		Regulatory	WASTE	WASTE	WASTE	WASTE	WASTE	WASTE	WASTE
PHYSICAL STATE		Levels	SOLID	SOLID	SOLID	SOLID	SOLID	SLUDGE	LIQUID
COLLECTION DATE		(ppm) #	1/21/92	1/22/92	1/23/92	1/29/92	1/29/92	2/6/92	1/30/92
PARAMETER	TYPE								
ARSENIC	MET	5	0.073	0.118	0.088	0.267	0.110	0.096	0.167
BARIUM	MET	100		0.44	0.21	0.22	1.59		
CADMIUM	MET	1	0.026	0.018	0.019	0.033	0.033	0.006	0.024
CHROMIUM	MET	5			0.12	0.030	0.13		
LEAD	MET	5	0.2		0.2	1.1	0.3	0.2	0.5
MERCURY	MET	0.2	1.041	0.607	1.291	1.669	0.229	0.102	1.076
SELENIUM	MET	1	0.111	0.130	0.117	0.182	0.112	0.172	0.120
SILVER	MET	5							

All results reported in mg/kg (ppm).

Note: Samples collected from drums by the USEPA remediation contractor. All samples were composites, with exception of sample 010.

Only detected results reported.

MET-Metals.

#-Source: 6NYCRR Part 371, December 25,1988

123 - Shading indicates TCLP exceedance.

leachable (TCLP) concentration of 45,217.8 ppm. This sample also contained 2,4-dimethyphenol at a concentration of 462 ppm.

Pesticide/PCBs

No pesticides or PCBs were detected in the waste samples.

Metals and Cyanide

Metals concentrations of the waste generally varied little between samples. Cadmium concentrations were below 25 ppm, with the exception of two samples which had concentrations of 576.9 and 3,274 ppm. Two samples reported chromium concentrations of 262 and 235 ppm, well above the range of the remaining samples which were reported at 77 ppm or less. Cyanide was detected in two samples at concentrations of 0.57 and 0.14 ppm.

RCRA Characterization

The samples were subjected to RCRA waste characteristic testing including corrosivity, ignitability, reactivity, and TCLP analyses. As indicated on Table 4-4 all samples except one contained TCLP levels of mercury above the USEPA TCLP value of 0.2 ppm. Concentrations of benzene cresol were found to be in contravention of USEPA TCLP regulatory guidelines. Waste samples compatibility analyzed by the USEPA cleanup contractor in 1990, determined that a portion of the drums contained ignitable material, thus classifying the waste as hazardous per RCRA guidelines.

4.5.3 Phase II Subsurface Soil Contamination Assessment

One (1) subsurface soil sample from each of the five (5) monitoring well borings was obtained during the Phase II investigation. The soil samples were designated LMW1 through LMW5, corresponding numerically to

the monitoring well borings from which they were taken. The samples were analyzed for TCL analytes. The results of these analyses are presented in Table 4-5. The locations of the sampling points are indicated on Figure 3-1.

Volatiles

No VOCs were detected in any of the soil samples.

Semivolatiles

Only one of the soil samples (LMW2) contained detectable levels of SVOCs. Three PAH compounds and one phthalate (phenanthrene, fluoranthene, pyrene and bis[2-ethylhexyl]phthalate), were reported at concentrations less than the quantitation limit, and ranging from 41 to 140 ppb. The presence of the PAHs at this location may be attributable to 5-gallon containers of roofing tar which were situated near the location prior to the recently completed second phase of the USEPA site cleanup.

Pesticide/PCBs

No pesticides or PCBs were detected in any of the soil samples.

Metals and Cyanide

Nineteen (19) metals were identified from the soil analyses. The only metals not detected were cadmium, mercury, selenium, and silver. Cyanide was not detected in any of the samples. The concentrations of metals did not vary significantly between sampling points, and were within the range of values observed for naturally occurring soils in the Eastern U.S. (Ref. 2).

TABLE 4-5
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - SUBSURFACE SOIL SAMPLES

SAMPLE I.D.		LMW1	LMW2	LMW3	LMW4	LMW5
SAMPLE TYPE		SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE DEPTH		9-11 FT	8-10 FT	24-26 FT	23-25 FT	14-16 FT
COLLECTION DATE		12/11/91	12/10/91	12/11/91	12/12/91	12/13/91
PARAMETER	TYPE					
CHLOROMETHANE	VOC					
BROMOMETHANE	VOC					
VINYL CHLORIDE	VOC					
CHLOROETHANE	VOC					
METHYLENE CHLORIDE	VOC	R	R	R		R
ACETONE	VOC	R	R	R	R	R
CARBON DISULFIDE	VOC					
1,1-DICHLOROETHENE	VOC					
1,1-DICHLOROETHANE	VOC					
1,2-DICHLOROETHENE (TOTAL)	VOC					
CHLOROFORM	VOC					
1,2-DICHLOROETHANE	VOC					
2-BUTANONE	VOC					
1,1,1-TRICHLOROETHANE	VOC					
CARBON TETRACHLORIDE	VOC					
VINYL ACETATE	VOC					
BROMODICHLOROMETHANE	VOC					
1,2-DICHLOROPROPANE	VOC					
CIS-1,3-DICHLOROPROPENE	VOC					
TRICHLOROETHENE	VOC					
DIBROMOCHLOROMETHANE	VOC					
1,1,2-TRICHLOROETHANE	VOC					
BENZENE	VOC					
TRANS-1,3-DICHLOROPROPENE	VOC					
BROMOFORM	VOC					
4-METHYL-2-PENTANONE	VOC					
2-HEXANONE	VOC					
TETRACHLOROETHENE	VOC					
1,1,2,2-TETRACHLOROETHANE	VOC					
TOLUENE	VOC					
CHLOROBENZENE	VOC					
ETHYLBENZENE	VOC					
STYRENE	VOC					
TOTAL XYLENES	VOC					

All results reported in µg/kg (ppb).
Only detected results are reported.
VOC-Volatile Organic Compound

R - Compound rejected due to associated blank contamination.

TABLE 4-5
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - SUBSURFACE SOIL SAMPLES

SAMPLE I.D.		LMW1	LMW2	LMW3	LMW4	LMW5
SAMPLE TYPE		SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE DEPTH		9-11 FT	8-10 FT	24-26 FT	23-25 FT	14-16 FT
COLLECTION DATE		12/11/91	12/10/91	12/11/91	12/12/91	12/13/91
PARAMETER	TYPE					
PHENOL	SEMI					
BIS(2-CHLOROETHYL) ETHER	SEMI					
2-CHLOROPHENOL	SEMI					
1,3-DICHLOROBENZENE	SEMI					
1,4-DICHLOROBENZENE	SEMI					
BENZYL ALCOHOL	SEMI					
1,2-DICHLOROBENZENE	SEMI					
2-METHYLPHENOL	SEMI					
BIS(2-CHLOROISOPROPYL) ETHER	SEMI					
4-METHYLPHENOL	SEMI					
N-NITROSO-DI-N-PROPYLAMINE	SEMI					
HEXACHLOROETHANE	SEMI					
NITROBENZENE	SEMI					
ISOPHORONE	SEMI					
2-NITROPHENOL	SEMI					
2,4-DIMETHYLPHENOL	SEMI					
BENZOIC ACID	SEMI					
BIS(2-CHLOROETHOXY)METHANE	SEMI					
2,4-DICHLOROPHENOL	SEMI					
1,2,4-TRICHLOROBENZENE	SEMI					
NAPHTHALENE	SEMI					
4-CHLOROANILINE	SEMI					
HEXACHLOROBUTADIENE	SEMI					
4-CHLORO-3-METHYLPHENOL	SEMI					
2-METHYLNAPHTHALENE	SEMI					
HEXACHLOROCYCLOPENTADIENE	SEMI					
2,4,6-TRICHLOROPHENOL	SEMI					
2,4,5-TRICHLOROPHENOL	SEMI					
2-CHLORONAPHTHALENE	SEMI					
2-NITROANILINE	SEMI					
DIMETHYLPHTHALATE	SEMI					
ACENAPHTHYLENE	SEMI					
2,6-DINITROTOLUENE	SEMI					
3-NITROANILINE	SEMI					

All results reported in µg/kg (ppb).
Only detected results are reported.
SEMI-Semivolatile Organic Compound

TABLE 4-5
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - SUBSURFACE SOIL SAMPLES

SAMPLE I.D.		LMW1	LMW2	LMW3	LMW4	LMW5
SAMPLE TYPE		SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE DEPTH		9-11 FT	8-10 FT	24-26 FT	23-25 FT	14-16 FT
COLLECTION DATE		12/11/91	12/10/91	12/11/91	12/12/91	12/13/91
PARAMETER	TYPE					
ACENAPHTHENE	SEMI					
2,4-DINITROPHENOL	SEMI					
4-NITROPHENOL	SEMI					
DIBENZOFURAN	SEMI					
2,4-DINITROTOLUENE	SEMI					
DIETHYLPHTHALATE	SEMI					
4-CHLOROPHENYL-PHENYL ETHER	SEMI					
FLUORENE	SEMI					
4-NITROANILINE	SEMI					
4,6-DINITRO-2-METHYLPHENOL	SEMI					
N-NITROSODIPHENYLAMINE	SEMI					
4-BROMOPHENYL-PHENYL ETHER	SEMI					
HEXACHLOROBENZENE	SEMI					
PENTACHLOROPHENOL	SEMI					
PHENANTHRENE	SEMI		41 J			
ANTHRACENE	SEMI					
DI-N-BUTYLPHTHALATE	SEMI					
FLUORANTHENE	SEMI		56 J			
PYRENE	SEMI		46 J			
BUTYLBENZYLPHTHALATE	SEMI					
3,3'-DICHLOROBENZIDINE	SEMI					
BENZO(A)ANTHRACENE	SEMI					
CHRYSENE	SEMI					
BIS(2-ETHYLHEXYL)PHTHALATE	SEMI		140 J			
DI-N-OCTYL PHTHALATE	SEMI					
BENZO(B)FLUORANTHENE	SEMI					
BENZO(K)FLUORANTHENE	SEMI					
BENZO(A)PYRENE	SEMI					
INDENO(1,2,3-CD)PYRENE	SEMI					
DIBENZ(A,H)ANTHRACENE	SEMI					
BENZO(G,H,I)PERYLENE	SEMI					

All results reported in µg/kg (ppb).

Only detected results are reported.

SEMI-Semivolatile Organic Compound

J-The reported value is less than the sample quantitation limit but greater than zero.

TABLE 4-5
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - SUBSURFACE SOIL SAMPLES

SAMPLE I.D.		LMW1	LMW2	LMW3	LMW4	LMW5
SAMPLE TYPE		SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE DEPTH		9-11 FT	8-10 FT	24-26 FT	23-25 FT	14-16 FT
COLLECTION DATE		12/11/91	12/10/91	12/11/91	12/12/91	12/13/91
PARAMETER	TYPE					
ALPHA-BHC	PST					
BETA-BHC	PST					
DELTA-BHC	PST					
GAMMA-BHC (LINDANE)	PST					
HEPTACHLOR	PST					
ALDRIN	PST					
HEPTACHLOR EPOXIDE	PST					
ENDOSULFAN I	PST					
DIELDRIN	PST					
4,4'-DDE	PST					
ENDRIN	PST					
ENDOSULFAN II	PST					
4,4'-DDD	PST					
ENDOSULFAN SULFATE	PST					
4,4'-DDT	PST					
METHOXYCHLOR	PST					
ENDRIN KETONE	PST					
ALPHA-CHLORDANE	PST					
GAMMA-CHLORDANE	PST					
TOXAPHENE	PST					
AROCLOR-1016	PCB					
AROCLOR-1221	PCB					
AROCLOR-1232	PCB					
AROCLOR-1242	PCB					
AROCLOR-1248	PCB					
AROCLOR-1254	PCB					
AROCLOR-1260	PCB					

All results reported in µg/kg (ppb).

Only detected results are reported.

PST-Pesticide

PCB-Polychlorinated biphenyl

TABLE 4-5
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - SUBSURFACE SOIL SAMPLES

SAMPLE I.D.		Observed Range In Eastern U.S. (ppm)#	LMW1	LMW2	LMW3	LMW4	LMW5
SAMPLE TYPE			SOIL	SOIL	SOIL	SOIL	SOIL
SAMPLE DEPTH			9-11 FT	8-10 FT	24-26 FT	23-25 FT	14-16 FT
COLLECTION DATE			12/11/91	12/10/91	12/11/91	12/12/91	12/13/91
PARAMETER	TYPE						
ALUMINUM	MET	7000-100000	3860	16200	5170	4030	9840
ANTIMONY	MET	<1-8.8					11.4 BN
ARSENIC	MET	<0.1-73	3.1 N	7.3 N	6.1 N	3.9 N	4.7
BARIUM	MET	10-1500	32.5 BEN	102 EN	143 EN	38.0 EN	111
BERYLLIUM	MET	<1-7	0.22 B	0.73 B	0.70 B	0.21 B	0.35 B
CADMIUM	MET						
CALCIUM	MET	100-280000	60700 E	3250 E	91400 E	54900 E	47500
CHROMIUM	MET	1-1000	6.4	25.5	7.9	7.2	12.6 N
COBALT	MET	<0.3-70	3.6 B	11.8	4.7 B	4.2 B	9.9 B
COPPER	MET	<1-700	12.8	24.6	17.2	18.0	15.9
IRON	MET	100->100000	9770 E	34600 E	13600 E	11000 E	18300
LEAD	MET	10-300	4.8	17.0	8.4	6.9	6.9
MAGNESIUM	MET	50-50000	11800 *	6130 *	13700 *	10900 *	11800
MANGANESE	MET	<2-7000	194 E	374 E	309 E	213 E	340 N *
MERCURY	MET	0.01-3.4					
NICKEL	MET	<5-700	14.0	43.1	24.8	14.4	14.4
POTASSIUM	MET	50-37000	719 B	1710	778 B	727 B	2070
SELENIUM	MET	<0.1-3.9					
SILVER	MET						
SODIUM	MET	<500-50000			59.6 B		62.4 B
THALLIUM	MET	2.2-23				0.67 BW	
VANADIUM	MET	<7-300	9.6 B	24.7	10.4	8.5 B	19.0
ZINC	MET	<5-2900	30.1 E	139 E	31.2 E	27.5 E	32.0
CYANIDE	CN						

All results reported in mg/kg (ppm)

Only detected results are reported.

MET-Metal

CN-Cyanide

*-Duplicate analysis not within control limits.

N-Spiked sample recovery not within control limits.

B-The reported value is less than quantitation limit but greater than or equal to instrument detection limit.

W-Post-digestion spike for Furnace AA analysis is out of control limits.

E-The reported value is estimated due to presence of interference.

#-Observed range in Eastern U.S. obtained from Shacklette and Boerngen, 1984.

4.5.4 Phase II Surface Water and Sediment Contamination Assessment

Eight surface water and associated stream sediment samples were collected and analyzed for TCL parameters. Surface water samples were designated LSW1 through LSW8 and the stream sediments were designated LSD1 through LSD8. The samples were collected from intermittent Stream, P160B, and feeder streams as shown in Figure 3-1. The summary of compounds detected in surface water and stream sediments is presented in Tables 4-8 and 4-7, respectively. Analytes detected in the surface water samples were compared to Standards, Criteria, and Guidance (SCG) values for Class D surface water.

Surface Water

Volatiles

No VOCs were reported above detection limits in any of the surface water samples.

Semivolatiles

No SVOCs were detected in any of the surface water samples.

Pesticides/PCBs

No pesticides or PCBs were reported above detection limits in the surface water samples.

Metals and Cyanide

The greatest number of metals detected was twelve (12) in upstream sample LSW1. With the exception of LSW5, all the surface water samples contained iron concentrations in excess of the established SCG value of

TABLE 4-6
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - SURFACE WATER SAMPLES

SAMPLE I.D.		CLASS D STREAM SCGs (ppb)#	LSW1	LSW2	LSW3	LSW4	LSW5	LSW6	LSW7	LSW8
SAMPLE TYPE			SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER
COLLECTION DATE			12/13/91	12/13/91	12/12/91	12/12/91	12/11/91	12/12/91	12/12/91	12/12/91
PARAMETER	TYPE									
CHLOROMETHANE	VOC									
BROMOMETHANE	VOC									
VINYL CHLORIDE	VOC									
CHLOROETHANE	VOC									
METHYLENE CHLORIDE	VOC				R	R			R	R
ACETONE	VOC				R					
CARBON DISULFIDE	VOC									
1,1-DICHLOROETHENE	VOC									
1,1-DICHLOROETHANE	VOC									
1,2-DICHLOROETHENE (TOTAL)	VOC									
CHLOROFORM	VOC									
1,2-DICHLOROETHANE	VOC									
2-BUTANONE	VOC									
1,1,1-TRICHLOROETHANE	VOC									
CARBON TETRACHLORIDE	VOC									
VINYL ACETATE	VOC									
BROMODICHLOROMETHANE	VOC									
1,2-DICHLOROPROPANE	VOC									
CIS-1,3-DICHLOROPROPENE	VOC									
TRICHLOROETHENE	VOC	11 G								
DIBROMOCHLOROMETHANE	VOC									
1,1,2-TRICHLOROETHANE	VOC									
BENZENE	VOC	6 G								
TRANS-1,3-DICHLOROPROPENE	VOC									
BROMOFORM	VOC									
4-METHYL-2-PENTANONE	VOC									
2-HEXANONE	VOC									
TETRACHLOROETHENE	VOC	1 G								
1,1,2,2-TETRACHLOROETHANE	VOC									
TOLUENE	VOC									
CHLOROBENZENE	VOC									
ETHYLBENZENE	VOC	50								
STYRENE	VOC									
TOTAL XYLENES	VOC									

All results reported in µg/L (ppb).
Only detected results are reported.
VOC-Volatile Organic Compound
G - Guidance Value

R-Compound rejected due to associated blank contamination.
#-SCG(Standards, Criteria, and Guidance) Values: NYSDEC Water Quality Standards and Guidance Values, TOGS 1.1.1 9/25/90; 6NYCRR Part 700-705, 9/1/91.

TABLE 4-6
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - SURFACE WATER SAMPLES

SAMPLE I.D.		CLASS D	LSW1	LSW2	LSW3	LSW4	LSW5	LSW6	LSW7	LSW8
SAMPLE TYPE		STREAM	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER
COLLECTION DATE		SCGs	12/13/91	12/13/91	12/12/91	12/12/91	12/11/91	12/12/91	12/12/91	12/12/91
PARAMETER	TYPE	(ppb)#								
PHENOL	SEMI	5(up)								
BIS(2-CHLOROETHYL) ETHER	SEMI									
2-CHLOROPHENOL	SEMI	1(cp)								
1,3-DICHLOROBENZENE	SEMI	50(1)								
1,4-DICHLOROBENZENE	SEMI	50(1)								
BENZYL ALCOHOL	SEMI									
1,2-DICHLOROBENZENE	SEMI	50(1)								
2-METHYLPHENOL	SEMI	5(up)								
BIS(2-CHLOROISOPROPYL) ETHER	SEMI									
4-METHYLPHENOL	SEMI	5(up)								
N-NITROSO-DI-N-PROPYLAMINE	SEMI									
HEXACHLOROETHANE	SEMI									
NITROBENZENE	SEMI									
ISOPHORONE	SEMI									
2-NITROPHENOL	SEMI	5(up)								
2,4-DIMETHYLPHENOL	SEMI	5(up)								
BENZOIC ACID	SEMI									
BIS(2-CHLOROETHOXY)METHANE	SEMI									
2,4-DICHLOROPHENOL	SEMI	1(up)								
1,2,4-TRICHLOROBENZENE	SEMI	50								
NAPHTHALENE	SEMI									
4-CHLOROANILINE	SEMI									
HEXACHLOROBUTADIENE	SEMI	10								
4-CHLORO-3-METHYLPHENOL	SEMI	1(cp)								
2-METHYLNAPHTHALENE	SEMI									
HEXACHLOROCYCLOPENTADIENE	SEMI	4.5								
2,4,6-TRICHLOROPHENOL	SEMI	1(cp)								
2,4,5-TRICHLOROPHENOL	SEMI	1(cp)								
2-CHLORONAPHTHALENE	SEMI									
2-NITROANILINE	SEMI									
DIMETHYLPHTHALATE	SEMI									
ACENAPHTHYLENE	SEMI									
2,6-DINITROTOLUENE	SEMI									
3-NITROANILINE	SEMI									

All results reported in µg/L (ppb).
Only detected results are reported.
SEMI-Semivolatile Organic Compound

(up)-Standard applies to the sum of total unchlorinated phenols.
(cp)-Standard applies to the sum of the total chlorinated phenols.
(1)-Applies to the sum of all isomers.
#-SCG(Standards, Criteria, and Guidance) Values: NYSDEC Water Quality Standards and Guidance Values, TOGS 1.1.1 9/25/90; 6NYCRR Part 700-705, 9/1/91.

TABLE 4-6
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - SURFACE WATER SAMPLES

SAMPLE I.D.		CLASS D STREAM SCGs (ppb)#	LSW1	LSW2	LSW3	LSW4	LSW5	LSW6	LSW7	LSW8
SAMPLE TYPE			SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER
COLLECTION DATE			12/13/91	12/13/91	12/12/91	12/12/91	12/11/91	12/12/91	12/12/91	12/12/91
PARAMETER	TYPE									
ACENAPHTHENE	SEMI									
2,4-DINITROPHENOL	SEMI	5(up)								
4-NITROPHENOL	SEMI	5(up)								
DIBENZOFURAN	SEMI									
2,4-DINITROTOLUENE	SEMI									
DIETHYLPHTHALATE	SEMI									
4-CHLOROPHENYL-PHENYL ETHER	SEMI									
FLUORENE	SEMI									
4-NITROANILINE	SEMI									
4,6-DINITRO-2-METHYLPHENOL	SEMI	5(up)								
N-NITROSODIPHENYLAMINE	SEMI									
4-BROMOPHENYL-PHENYL ETHER	SEMI									
HEXACHLOROBENZENE	SEMI									
PENTACHLOROPHENOL	SEMI	1(cp)								
PHENANTHRENE	SEMI									
ANTHRACENE	SEMI									
DI-N-BUTYLPHTHALATE	SEMI									
FLUORANTHENE	SEMI									
PYRENE	SEMI									
BUTYLBENZYLPHTHALATE	SEMI									
3,3'-DICHLOROBENZIDINE	SEMI									
BENZO(A)ANTHRACENE	SEMI									
CHRYSENE	SEMI									
BIS(2-ETHYLHEXYL)PHTHALATE	SEMI									
DI-N-OCTYL PHTHALATE	SEMI									
BENZO(B)FLUORANTHENE	SEMI									
BENZO(K)FLUORANTHENE	SEMI									
BENZO(A)PYRENE	SEMI	0.0012 G								
INDENO(1,2,3-CD)PYRENE	SEMI									
DIBENZ(A,H)ANTHRACENE	SEMI									
BENZO(G,H,I)PERYLENE	SEMI									

All results reported in µg/L (ppb).

Only detected results are reported.

SEMI-Semivolatile Organic Compound

G-Guidance Value

(up)-Standard applies to the sum of total unchlorinated phenols.

(cp)-Standard applies to the sum of the total chlorinated phenols.

#-SCG(Standards, Criteria, and Guidance) Values: NYSDEC Water Quality Standards and Guidance Values, TOGS 1.1.1 9/25/90; 6NYCRR Part 700-705, 9/1/91.

TABLE 4-6
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - SURFACE WATER SAMPLES

SAMPLE I.D.		CLASS D STREAM SCGs (ppb)#	LSW1	LSW2	LSW3	LSW4	LSW5	LSW6	LSW7	LSW8
SAMPLE TYPE			SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER
COLLECTION DATE			12/13/91	12/13/91	12/12/91	12/12/91	12/11/91	12/12/91	12/12/91	12/12/91
PARAMETER	TYPE									
ALPHA-BHC	PST	2(2)								
BETA-BHC	PST	2(2)								
DELTA-BHC	PST	2(2)								
GAMMA-BHC (LINDANE)	PST	2(2)								
HEPTACHLOR	PST	0.001(3)								
ALDRIN	PST	0.001(4)								
HEPTACHLOR EPOXIDE	PST	0.001(3)								
ENDOSULFAN I	PST	0.22(5)								
DIELDRIN	PST	0.001(4)								
4,4'-DDE	PST	0.001(6)								
ENDRIN	PST	0.001								
ENDOSULFAN II	PST	0.22(5)								
4,4'-DDD	PST	0.001(6)								
ENDOSULFAN SULFATE	PST	0.22(5)								
4,4'-DDT	PST	0.001(6)								
METHOXYCHLOR	PST									
ENDRIN KETONE	PST									
ALPHA-CHLORDANE	PST	0.002(7)G								
GAMMA-CHLORDANE	PST	0.002(7)G								
TOXAPHENE	PST	1.6								
AROCLOR-1016	PCB	0.001(8)								
AROCLOR-1221	PCB	0.001(8)								
AROCLOR-1232	PCB	0.001(8)								
AROCLOR-1242	PCB	0.001(8)								
AROCLOR-1248	PCB	0.001(8)								
AROCLOR-1254	PCB	0.001(8)								
AROCLOR-1260	PCB	0.001(8)								

All results reported in µg/L (ppb).
Only detected results are reported.
PST-Pesticide
PCB-Polychlorinated biphenyl
G-Guidance Value
#-SCG(Standards, Criteria, and Guidance) Values: NYSDEC Water Quality Standards and Guidance Values, TOGS 1.1.1 9/25/90; 6NYCRR Part 700-705, 9/1/91.

(2)-Standard applies to total hexachlorocyclohexanes.
(3)-Standard applies to the sum of heptachlor and heptachlor epoxide.
(4)-Applies to the sum of aldrin and dieldrin.
(5)-Applies to endosulfan.
(6)-Standard applies to the sum of DDE, DDD, and DDT.
(7)-Applies to chlordane.
(8)-Applies to total PCBs.

TABLE 4-6
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - SURFACE WATER SAMPLES

SAMPLE I.D.		CLASS D	LSW1	LSW2	LSW3	LSW4	LSW5	LSW6	LSW7	LSW8
SAMPLE TYPE		STREAM	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER	SURFACE WATER
COLLECTION DATE		SCGs	12/13/91	12/13/91	12/12/91	12/12/91	12/11/91	12/12/91	12/12/91	12/12/91
PARAMETER	TYPE	(ppb)#								
ALUMINUM	MET		201	595	212					1810
ANTIMONY	MET									
ARSENIC	MET	360	2.5 B	3.3 B	7.9 B				1.4 B	8.3 B
BARIUM	MET		99 B	114 B	806 N	131 BN	133 BN	165 BN	148 BN	183 BN
BERYLLIUM	MET									
CADMIUM	MET	CALC								
CALCIUM	MET		83500	94100	158000	94200	90800	113000	112000	125000
CHROMIUM	MET	CALC								
COBALT	MET	110 G	10.8 B							
COPPER	MET	CALC			9.1 B					
IRON	MET	300	574	1070	15100	350	206	804	762	6370
LEAD	MET	CALC	2.2 B			2.4 BW	1.2 B	1.4 B	2.4 BW	8.7
MAGNESIUM	MET		18200	20500	39400	22000	20300	25600	23900	24400
MANGANESE	MET		7.2 B	24.8	1710	34.4	61.8	340	233	588
MERCURY	MET	0.2 G								
NICKEL	MET	CALC								
POTASSIUM	MET		1780 B	1600 B	592 B	1680 B	1590 B	1870 B	2950 B	1870 B
SELENIUM	MET									
SILVER	MET	CALC								
SODIUM	MET		32200	30800	10200	40400	39900	37400	14800	52100
THALLIUM	MET	20								
VANADIUM	MET	190		6.5 B						
ZINC	MET	CALC	55.6	32.1	4.1 B					20.8
CYANIDE	CN	22								

All results reported in µg/L (ppb).
Only detected results are reported.
MET-Metal
CN-Cyanide
G-Guidance Value

B-Value is less than quantitation limit but greater than or equal to instrument detection limit.
N-Spiked sample recovery not within control limits.
W-Post-digestion spike for Furnace AA anlysis is out of control limits.
CALC-Calculated, sample-specific SCG as a function of hardness.
123 -Shading indicates an exceedance of the SCG value.
#-SCG(Standards, Criteria, and Guidance) Values: NYSDEC Water Quality Standards and Guidance Values, TOGS 1.1.1 9/25/90; 6NYCRR Part 700-705, 9/1/91.

TABLE 4-7
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - STREAM SEDIMENT SAMPLES

SAMPLE I.D.		LSD1	LSD2	LSD3	LSD4	LSD5	LSD6	LSD7	LSD8
SAMPLE TYPE		SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
COLLECTION DATE		12/13/91	12/13/91	12/12/91	12/12/91	12/11/91	12/12/91	12/12/91	12/12/91
PARAMETER	TYPE								
CHLOROMETHANE	VOC								
BROMOMETHANE	VOC								
VINYL CHLORIDE	VOC								
CHLOROETHANE	VOC								
METHYLENE CHLORIDE	VOC	R	R	R	R	R	R	R	R
ACETONE	VOC			R	R		R	R	R
CARBON DISULFIDE	VOC								
1,1-DICHLOROETHENE	VOC								
1,1-DICHLOROETHANE	VOC								
1,2-DICHLOROETHENE (TOTAL)	VOC								
CHLOROFORM	VOC			2 J					
1,2-DICHLOROETHANE	VOC								
2-BUTANONE	VOC			11 J			34	25	28
1,1,1-TRICHLOROETHANE	VOC								
CARBON TETRACHLORIDE	VOC								
VINYL ACETATE	VOC								
BROMODICHLOROMETHANE	VOC								
1,2-DICHLOROPROPANE	VOC								
CIS-1,3-DICHLOROPROPENE	VOC								
TRICHLOROETHENE	VOC								
DIBROMOCHLOROMETHANE	VOC								
1,1,2-TRICHLOROETHANE	VOC								
BENZENE	VOC								
TRANS-1,3-DICHLOROPROPENE	VOC								
BROMOFORM	VOC								
4-METHYL-2-PENTANONE	VOC								
2-HEXANONE	VOC								
TETRACHLOROETHENE	VOC								
1,1,2,2-TETRACHLOROETHANE	VOC								
TOLUENE	VOC								
CHLOROBENZENE	VOC								
ETHYLBENZENE	VOC								
STYRENE	VOC								
TOTAL XYLENES	VOC								

All results reported in µg/kg (ppb).
Only detected results are reported.
VOC-Volatile Organic Compound

R-Compound rejected due to associated blank contamination.
J-The reported value is less than the sample quantitation limit but greater than zero.

TABLE 4-7
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - STREAM SEDIMENT SAMPLES

SAMPLE I.D.		LSD1	LSD2	LSD3	LSD4	LSD5	LSD6	LSD7	LSD8
SAMPLE TYPE		SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
COLLECTION DATE		12/13/91	12/13/91	12/12/91	12/12/91	12/11/91	12/12/91	12/12/91	12/12/91
PARAMETER	TYPE								
PHENOL	SEMI								
BIS(2-CHLOROETHYL) ETHER	SEMI								
2-CHLOROPHENOL	SEMI								
1,3-DICHLOROBENZENE	SEMI								
1,4-DICHLOROBENZENE	SEMI								
BENZYL ALCOHOL	SEMI								
1,2-DICHLOROBENZENE	SEMI								
2-METHYLPHENOL	SEMI								
BIS(2-CHLOROISOPROPYL) ETHER	SEMI								
4-METHYLPHENOL	SEMI								
N-NITROSO-DI-N-PROPYLAMINE	SEMI								
HEXACHLOROETHANE	SEMI								
NITROBENZENE	SEMI								
ISOPHORONE	SEMI								
2-NITROPHENOL	SEMI								
2,4-DIMETHYLPHENOL	SEMI								
BENZOIC ACID	SEMI								
BIS(2-CHLOROETHOXY)METHANE	SEMI								
2,4-DICHLOROPHENOL	SEMI								
1,2,4-TRICHLOROBENZENE	SEMI								
NAPHTHALENE	SEMI	110 JX							
4-CHLOROANILINE	SEMI								
HEXACHLOROBUTADIENE	SEMI								
4-CHLORO-3-METHYLPHENOL	SEMI								
2-METHYLNAPHTHALENE	SEMI	150 JX							
HEXACHLOROCYCLOPENTADIENE	SEMI								
2,4,6-TRICHLOROPHENOL	SEMI								
2,4,5-TRICHLOROPHENOL	SEMI								
2-CHLORONAPHTHALENE	SEMI								
2-NITROANILINE	SEMI								
DIMETHYLPHTHALATE	SEMI								
ACENAPHTHYLENE	SEMI	110 JX						93 J	
2,6-DINITROTOLUENE	SEMI								
3-NITROANILINE	SEMI								

All results reported in µg/kg (ppb).
Only detected results are reported.
SEMI-Semivolatile Organic Compound

J-The reported value is less than the sample quantitation limit but greater than zero.
X - The sample was reanalyzed. The greater of the two values is reported.

TABLE 4-7
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - STREAM SEDIMENT SAMPLES

SAMPLE I.D.		LSD1	LSD2	LSD3	LSD4	LSD5	LSD6	LSD7	LSD8
SAMPLE TYPE		SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
COLLECTION DATE		12/13/91	12/13/91	12/12/91	12/12/91	12/11/91	12/12/91	12/12/91	12/12/91
PARAMETER	TYPE								
ACENAPHTHENE	SEMI	620 X							
2,4-DINITROPHENOL	SEMI								
4-NITROPHENOL	SEMI								
DIBENZOFURAN	SEMI	500 X							
2,4-DINITROTOLUENE	SEMI								
DIETHYLPHTHALATE	SEMI								
4-CHLOROPHENYL-PHENYL ETHER	SEMI								
FLUORENE	SEMI	1100 X							
4-NITROANILINE	SEMI								
4,6-DINITRO-2-METHYLPHENOL	SEMI								
N-NITROSODIPHENYLAMINE	SEMI								
4-BROMOPHENYL-PHENYL ETHER	SEMI								
HEXACHLOROBENZENE	SEMI								
PENTACHLOROPHENOL	SEMI								
PHENANTHRENE	SEMI	4900 X		230 J	78 J	49 J	130 J	600 J	380 J
ANTHRACENE	SEMI	1800 X						110 J	
DI-N-BUTYLPHTHALATE	SEMI								
FLUORANTHENE	SEMI	4800 X	43 J	510 J	110 J	78 J	230 J	1300	800
PYRENE	SEMI	7000 EX	71 J	470 J	97 J	84 J	210 J	1500	890
BUTYLBENZYLPHTHALATE	SEMI								
3,3'-DICHLOROBENZIDINE	SEMI								
BENZO(A)ANTHRACENE	SEMI	2600 X		240 J	56 J		110 J	640 J	400 J
CHRYSENE	SEMI	2500 X		270 J	50 J		120 J	790 J	510 J
BIS(2-ETHYLHEXYL)PHTHALATE	SEMI	200 JX	49 J						
DI-N-OCTYL PHTHALATE	SEMI								
BENZO(B)FLUORANTHENE	SEMI	1900 X		210 J	53 J		99 J	900	420 J
BENZO(K)FLUORANTHENE	SEMI	1900 X		200 J			88 J	660 J	500 J
BENZO(A)PYRENE	SEMI	1800 X		240 J	48 J		81 J	790 J	500 J
INDENO(1,2,3-CD)PYRENE	SEMI	590 X		120 J				240 J	210 J
DIBENZ(A,H)ANTHRACENE	SEMI	120 JX							
BENZO(G,H,I)PERYLENE	SEMI	540 X		84 J				180 J	160 J

All results reported in µg/kg (ppb).

Only detected results are reported.

SEMI-Semivolatile Organic Compound

E-Compound concentration exceeds the linear range of calibration.

J-The reported value is less than the sample quantitation limit but greater than zero.

X - The sample was reanalyzed. The greater of the two values is reported.

TABLE 4-7
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - STREAM SEDIMENT SAMPLES

SAMPLE I.D.		LSD1	LSD2	LSD3	LSD4	LSD5	LSD6	LSD7	LSD8
SAMPLE TYPE		SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
COLLECTION DATE		12/13/91	12/13/91	12/12/91	12/12/91	12/11/91	12/12/91	12/12/91	12/12/91
PARAMETER	TYPE								
ALPHA-BHC	PST								
BETA-BHC	PST								
DELTA-BHC	PST								
GAMMA-BHC (LINDANE)	PST								
HEPTACHLOR	PST								
ALDRIN	PST		15 J						
HEPTACHLOR EPOXIDE	PST				5.8 J				
ENDOSULFAN I	PST								
DIELDRIN	PST								
4,4'-DDE	PST			11 J				9.0 J	
ENDRIN	PST								
ENDOSULFAN II	PST								
4,4'-DDD	PST								
ENDOSULFAN SULFATE	PST							19 J	
4,4'-DDT	PST								
METHOXYCHLOR	PST								
ENDRIN KETONE	PST								
ALPHA-CHLORDANE	PST								
GAMMA-CHLORDANE	PST								
TOXAPHENE	PST								
AROCLOR-1016	PCB								
AROCLOR-1221	PCB								
AROCLOR-1232	PCB								
AROCLOR-1242	PCB								
AROCLOR-1248	PCB								
AROCLOR-1254	PCB		450 J						
AROCLOR-1260	PCB								

All results reported in µg/kg (ppb).
Only detected results are reported.
PST-Pesticide
PCB-Polychlorinated biphenyl

J-Indicates the value is less than the sample quantitation limit but greater than zero.

TABLE 4-7
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - STREAM SEDIMENT SAMPLES

SAMPLE I.D.		Observed	LSD1	LSD2	LSD3	LSD4	LSD5	LSD6	LSD7	LSD8
SAMPLE TYPE		Range In	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT	SEDIMENT
COLLECTION DATE		Eastern U.S.	12/13/91	12/13/91	12/12/91	12/12/91	12/11/91	12/12/91	12/12/91	12/12/91
PARAMETER	TYPE	(ppm)#								
ALUMINUM	MET	7000-100000	5520	5720	7670	5890	5770	8080	15300	10300
ANTIMONY	MET	<1-8.8								
ARSENIC	MET	<0.1-73	5.8	4.6	5.5 N	9.1 N	5.0 N	6.4 N	9.6 N	7 N
BARIUM	MET	10-1500	80.9	66.3	253 E N	135 EN	171 EN	185 E N	212 EN	173 EN
BERYLLIUM	MET	<1-7	0.22 B	0.18 B	0.86 B	0.27 B	0.38 B	0.41 B	0.77 B	0.47 B
CADMIUM	MET									
CALCIUM	MET	100-280000	159000	167000	62700 E	84800 E	99200 E	47500 E	34900 E	27700 E
CHROMIUM	MET	1-1000	9.6 N	7.9 N	11.5	9.3	9.7	11.9	22.8	14.7
COBALT	MET	<0.3-70	6.6 B	6.5 B	9.5 B	4.9 B	4.3 B	11.0 B	12.8	8.3 B
COPPER	MET	<1-700	14.1	15.0	30.9	17.8	13.8	26.9	30.5	21.5
IRON	MET	100->100000	13500	14800	16900 E	23600 E	15500 E	20700 E	29500 E	25700 E
LEAD	MET	10-300	22.8	23.0	19.1	14.0	18.0	59.2	43.0	56.8
MAGNESIUM	MET	50-50000	19400	22100	16400 *	14900 *	15400 *	11200 *	14100 *	10500 *
MANGANESE	MET	<2-7000	265 N *	251 N *	325 E	276 E	840 E	478 E	431 E	1090 E
MERCURY	MET	0.01-3.4	0.39							
NICKEL	MET	<5-700	16.7	14.9	29.4	19.4	17.2	28.6	38.6	29.0
POTASSIUM	MET	50-37000	1070 B	1020 B	1030 B	769 B	916 B	1050 B	1850 B	1510 B
SELENIUM	MET	<0.1-3.9								
SILVER	MET									
SODIUM	MET	<500-50000	111 B	107 B	64.2 B	47.0 B				
THALLIUM	MET	2.2-23			0.80 BW					
VANADIUM	MET	<7-300	16.7	13.6	16.9	13.1	11.7 B	18.7 B	27.8	22.2
ZINC	MET	<5-2900	41.8	52.3	59.6 E	38.5 E	39.5 E	88.0 E	131 E	92.1 E
CYANIDE	CN									

All results reported in mg/kg (ppm)
Only detected results are reported.
MET-Metal
CN-Cyanide

B-The reported value is less than quantitation limit but greater than or equal to instrument detection limit.
N-Spiked sample recovery not within control limits.
*-Duplicate analysis not within control limits.
E-The reported value is estimated due to presence of interference.
W-Post-digestion spike for Furnace AA analysis is out of control limits.
#-Observed range in eastern U.S. obtained from Shacklette and Boerngen, 1984.

300 ppb. Sample LSW5, the farthest downstream sample, contained an iron concentration below the SCG value. Iron concentrations constituting SCG exceedances ranged from 350 to 15,100 ppb. Iron was the only metal that exceeded the SCG established for Class D waters.

Stream Sediment

Volatiles

Four stream sediment samples contained detectable concentrations of 2-butanone (11 to 34 ppb). One of these samples also contained 2 ppb chloroform. Three of the four 2-butanone detections were reported in samples LSD6, 7, and 8 collected downgradient of an area that contained over 150 discarded drums (Ref. 4). The drums were overpacked during the recently completed phase of site cleanup.

Semivolatiles

SVOCs, in the form of PAHs and one phthalate compound, were detected in stream sediment samples. The number of SVOC detections per sample ranged from three to eighteen. The farthest downstream sample (LSW5) contained just three PAHs (phenanthrene, fluoranthene, and pyrene), reported at concentrations below quantitation limits. The farthest upstream sample (LSD1) contained the greatest number of SVOCs, at concentrations generally an order of magnitude greater than the other samples. The PAH concentrations reported for sample LSD1 ranged from 110 to 7,000 ppb, with a total concentration of 31,420 ppb. Pyrene was present at the greatest concentration. The occurrence of the PAHs at this location could be attributable to its close proximity to Interstate 81, Route 11, and the two truckstops upstream of the sample point. Surface runoff from these sources discharges to Stream P160B, from which the sample was obtained. The site can not, however, be totally ruled out as the source of the PAHs detected in sample LSD1. Prior to the recently

completed second phase of the USEPA cleanup activity, numerous 5-gallon pails containing varying amounts of roofing tar were present adjacent to the location of sample LSD1 and similar compounds were detected in drum waste samples.

Pesticide/PCBs

Aldrin, heptachlor epoxide, 4,4'-DDE and endosulfan sulfate were detected in four of the eight sediment samples at concentrations below their quantitation limits (5.8 to 19 ppb). Stream sediment sample LSD2 contained 450 ppb Aroclor 1254. This was the only detection of a PCB in the stream sediments analyzed, and the only PCB detection for all the media sampled.

Metals and Cyanide

Metals concentrations of the stream sediments were comparable to the soils, and within the observed ranges for Eastern U.S. soils (Ref. 2). Cyanide was not detected in any of the sediment samples. On the whole, sediment samples LSD6, 7, and 8 contained slightly elevated concentrations of metals compared to the other samples.

4.5.5 Phase II Leachate Contamination Assessment

One leachate sample, designated LL1, was collected from an active seep located on the north bank of Stream P160B, south of the site. The seep exhibited iron staining and a oily sheen. The leachate was analyzed for TCL analytes and the results are presented in Table 4-8.

TABLE 4-8
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - LEACHATE SAMPLE

SAMPLE I.D.		LL1
SAMPLE TYPE		LEACHATE
COLLECTION DATE		12/11/91
PARAMETER	TYPE	
CHLOROMETHANE	VOC	
BROMOMETHANE	VOC	
VINYL CHLORIDE	VOC	
CHLOROETHANE	VOC	
METHYLENE CHLORIDE	VOC	R
ACETONE	VOC	R
CARBON DISULFIDE	VOC	
1,1-DICHLOROETHENE	VOC	
1,1-DICHLOROETHANE	VOC	
1,2-DICHLOROETHENE (TOTAL)	VOC	
CHLOROFORM	VOC	
1,2-DICHLOROETHANE	VOC	
2-BUTANONE	VOC	
1,1,1-TRICHLOROETHANE	VOC	
CARBON TETRACHLORIDE	VOC	
VINYL ACETATE	VOC	
BROMODICHLOROMETHANE	VOC	
1,2-DICHLOROPROPANE	VOC	
CIS-1,3-DICHLOROPROPENE	VOC	
TRICHLOROETHENE	VOC	1 J
DIBROMOCHLOROMETHANE	VOC	
1,1,2-TRICHLOROETHANE	VOC	
BENZENE	VOC	
TRANS-1,3-DICHLOROPROPENE	VOC	
BROMOFORM	VOC	
4-METHYL-2-PENTANONE	VOC	
2-HEXANONE	VOC	
TETRACHLOROETHENE	VOC	
1,1,2,2-TETRACHLOROETHANE	VOC	
TOLUENE	VOC	
CHLOROBENZENE	VOC	
ETHYLBENZENE	VOC	
STYRENE	VOC	
TOTAL XYLENES	VOC	

All results reported in µg/L (ppb).
Only detected results are reported.
VOC-Volatile Organic Compound

R-Compound rejected due to associated blank contamination.
J-Indicates the value is less than the sample quantitation limit but greater than zero.

TABLE 4-8
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - LEACHATE SAMPLE

SAMPLE I.D.		LL1
SAMPLE TYPE		LEACHATE
COLLECTION DATE		12/11/91
PARAMETER	TYPE	
PHENOL	SEMI	
BIS(2-CHLOROETHYL) ETHER	SEMI	
2-CHLOROPHENOL	SEMI	
1,3-DICHLOROBENZENE	SEMI	
1,4-DICHLOROBENZENE	SEMI	
BENZYL ALCOHOL	SEMI	
1,2-DICHLOROBENZENE	SEMI	
2-METHYLPHENOL	SEMI	
BIS(2-CHLOROISOPROPYL) ETHER	SEMI	
4-METHYLPHENOL	SEMI	
N-NITROSO-DI-N-PROPYLAMINE	SEMI	
HEXACHLOROETHANE	SEMI	
NITROBENZENE	SEMI	
ISOPHORONE	SEMI	
2-NITROPHENOL	SEMI	
2,4-DIMETHYLPHENOL	SEMI	
BENZOIC ACID	SEMI	
BIS(2-CHLOROETHOXY)METHANE	SEMI	
2,4-DICHLOROPHENOL	SEMI	
1,2,4-TRICHLOROBENZENE	SEMI	
NAPHTHALENE	SEMI	
4-CHLOROANILINE	SEMI	
HEXACHLOROBUTADIENE	SEMI	
4-CHLORO-3-METHYLPHENOL	SEMI	
2-METHYLNAPHTHALENE	SEMI	
HEXACHLOROCYCLOPENTADIENE	SEMI	
2,4,6-TRICHLOROPHENOL	SEMI	
2,4,5-TRICHLOROPHENOL	SEMI	
2-CHLORONAPHTHALENE	SEMI	
2-NITROANILINE	SEMI	
DIMETHYLPHTHALATE	SEMI	
ACENAPHTHYLENE	SEMI	
2,6-DINITROTOLUENE	SEMI	
3-NITROANILINE	SEMI	

All results reported in µg/L (ppb).

Only detected results are reported.

SEMI-Semivolatile Organic Compound

TABLE 4-8
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - LEACHATE SAMPLE

SAMPLE I.D.		LL1
SAMPLE TYPE		LEACHATE
COLLECTION DATE		12/11/91
PARAMETER	TYPE	
ACENAPHTHENE	SEMI	
2,4-DINITROPHENOL	SEMI	
4-NITROPHENOL	SEMI	
DIBENZOFURAN	SEMI	
2,4-DINITROTOLUENE	SEMI	
DIETHYLPHTHALATE	SEMI	
4-CHLOROPHENYL-PHENYL ETHER	SEMI	
FLUORENE	SEMI	
4-NITROANILINE	SEMI	
4,6-DINITRO-2-METHYLPHENOL	SEMI	
N-NITROSODIPHENYLAMINE	SEMI	
4-BROMOPHENYL-PHENYL ETHER	SEMI	
HEXACHLOROBENZENE	SEMI	
PENTACHLOROPHENOL	SEMI	
PHENANTHRENE	SEMI	
ANTHRACENE	SEMI	
DI-N-BUTYLPHTHALATE	SEMI	
FLUORANTHENE	SEMI	
PYRENE	SEMI	
BUTYLBENZYLPHTHALATE	SEMI	
3,3'-DICHLOROBENZIDINE	SEMI	
BENZO(A)ANTHRACENE	SEMI	
CHRYSENE	SEMI	
BIS(2-ETHYLHEXYL)PHTHALATE	SEMI	
DI-N-OCTYL PHTHALATE	SEMI	
BENZO(B)FLUORANTHENE	SEMI	
BENZO(K)FLUORANTHENE	SEMI	
BENZO(A)PYRENE	SEMI	
INDENO(1,2,3-CD)PYRENE	SEMI	
DIBENZ(A,H)ANTHRACENE	SEMI	
BENZO(G,H,I)PERYLENE	SEMI	

All results reported in µg/L (ppb).

Only detected results are reported.

SEMI-Semivolatile Organic Compound

TABLE 4-8
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - LEACHATE SAMPLE

SAMPLE I.D.		LL1
SAMPLE TYPE		LEACHATE
COLLECTION DATE		12/11/91
PARAMETER	TYPE	
ALPHA-BHC	PST	
BETA-BHC	PST	
DELTA-BHC	PST	
GAMMA-BHC (LINDANE)	PST	
HEPTACHLOR	PST	
ALDRIN	PST	
HEPTACHLOR EPOXIDE	PST	
ENDOSULFAN I	PST	
DIELDRIN	PST	
4,4'-DDE	PST	
ENDRIN	PST	
ENDOSULFAN II	PST	
4,4'-DDD	PST	
ENDOSULFAN SULFATE	PST	
4,4'-DDT	PST	
METHOXYCHLOR	PST	
ENDRIN KETONE	PST	
ALPHA-CHLORDANE	PST	
GAMMA-CHLORDANE	PST	
TOXAPHENE	PST	
AROCLOR-1016	PCB	
AROCLOR-1221	PCB	
AROCLOR-1232	PCB	
AROCLOR-1242	PCB	
AROCLOR-1248	PCB	
AROCLOR-1254	PCB	
AROCLOR-1260	PCB	

All results reported in µg/L (ppb).
Only detected results are reported.
PST-Pesticide
PCB-Polychlorinated biphenyl

TABLE 4-8
ONONDAGA NATION-SITE B
ANALYTICAL RESULTS - LEACHATE SAMPLE

SAMPLE I.D.		LL1
SAMPLE TYPE		LEACHATE
COLLECTION DATE		12/11/91
PARAMETER	TYPE	
ALUMINUM	MET	1020
ANTIMONY	MET	
ARSENIC	MET	28.3
BARIUM	MET	636 N
BERYLLIUM	MET	
CADMIUM	MET	
CALCIUM	MET	138000
CHROMIUM	MET	
COBALT	MET	12.1 B
COPPER	MET	8.0 B
IRON	MET	53500
LEAD	MET	3.8 B
MAGNESIUM	MET	29500
MANGANESE	MET	9200
MERCURY	MET	
NICKEL	MET	34.2 B
POTASSIUM	MET	1590 B
SELENIUM	MET	
SILVER	MET	
SODIUM	MET	59500
THALLIUM	MET	
VANADIUM	MET	
ZINC	MET	11.8 B
CYANIDE	CN	

All results reported in µg/L (ppb).
Only detected results are reported.
MET-Metal
CN-Cyanide

B-Value is less than quantitation limit but greater than or equal to the instrument detection limit.
N-Spiked sample recovery not within control limits.

Volatiles

The only VOC detected in the leachate was trichloroethene at a concentration of 1 ppb. This was the only detection of this compound on the site.

Semivolatiles

No SVOCs were reported above detection limits in the leachate sample.

Pesticide/PCBs

No pesticides or PCBs were reported above detection limits in the leachate sample.

Metals and Cyanide

A total of fourteen metals were detected in the leachate. The suite of metals detected was generally the same as that detected in the surface waters. Cyanide was not detected in the leachate. The concentration of the metals was within the range of concentrations reported for the surface water samples, with the exception of iron and manganese which were an order of magnitude greater than the surface waters.

4.5.6 Phase II Groundwater Contamination Assessment

Five groundwater samples were collected from five monitoring wells installed during the Phase II investigation. The wells were constructed to monitor the water-table aquifer. The monitoring well locations are shown in Figure 3-1. The groundwater samples were designated LMW1GW through LMW5GW. Each sample was analyzed for TCL analytes. Results are reported and compared to NYSDEC SCG values in Table 4-9.

TABLE 4-9
ONONDAGA NATION - SITE B
ANALYTICAL RESULTS - GROUNDWATER SAMPLES

SAMPLE ID		CLASS GA	LMW1GW	LMW2GW	LMW3GW	LMW4GW	LMW5GW	LDW1
SAMPLE TYPE		SCGs	GROUNDWATER	GROUNDWATER	GROUNDWATER	GROUNDWATER	GROUNDWATER	DRILL WATER
COLLECTION DATE		(ppb)#	2/5/92	2/5/92	2/5/92	2/5/92	2/5/92	12/12/91
PARAMETER	TYPE							
CHLOROMETHANE	VOC	5						
BROMOMETHANE	VOC	5						
VINYL CHLORIDE	VOC	2						
CHLOROETHANE	VOC	5						
METHYLENE CHLORIDE	VOC	5		R				
ACETONE	VOC	50 G	R	350 BEX			R	
CARBON DISULFIDE	VOC	50 G						
1,1-DICHLOROETHENE	VOC	5						
1,1-DICHLOROETHANE	VOC	5						
1,2-DICHLOROETHENE (TOTAL)	VOC	5						
CHLOROFORM	VOC	7						
1,2-DICHLOROETHANE	VOC	5						
2-BUTANONE	VOC	50 G		55 X				
1,1,1-TRICHLOROETHANE	VOC	5						
CARBON TETRACHLORIDE	VOC	5						
VINYL ACETATE	VOC	50 G						
BROMODICHLOROMETHANE	VOC	50 G						
1,2-DICHLOROPROPANE	VOC	5						
CIS-1,3-DICHLOROPROPENE	VOC	5						
TRICHLOROETHENE	VOC	5						
DIBROMOCHLOROMETHANE	VOC	50 G						
1,1,2-TRICHLOROETHANE	VOC	5						
BENZENE	VOC	0.7	150					
TRANS-1,3-DICHLOROPROPENE	VOC	5						
BROMOFORM	VOC	50 G						
4-METHYL-2-PENTANONE	VOC	50 G		34 X				
2-HEXANONE	VOC	50 G						
TETRACHLOROETHENE	VOC	5						
1,1,2,2-TETRACHLOROETHANE	VOC	5						
TOLUENE	VOC	5	12 J					
CHLOROBENZENE	VOC	5						
ETHYLBENZENE	VOC	5						
STYRENE	VOC	5						
TOTAL XYLENES	VOC	5@						

All results reported in µg/L (ppb).
Only detected results are reported.
VOC-Volatile Organic Compound
G-Guidance Value
E-Compound concentration exceeds the linear range of calibration.
#-SCG(Standards, Criteria, and Guidance) Values: NYSDEC Water Quality Standards and Guidance Values, TOGS 1.1.1, 9/25/90; 6NYCRR 700-705, effective 9/1/91.

R-Compound rejected due to associated blank contamination.
B-Compound detected in associated method blank.
J-Indicates the value is less than the sample quantitation limit but greater than zero.
@-Applies to each isomer[(1,2-), (1,3-)and (1,4-)] indvidually.
X - The sample was reanalyzed. The greater of the two values is reported.
- Shading indicates value exceeds the NYSDEC Water Quality and Guidance Values.

TABLE 4-9
ONONDAGA NATION - SITE B
ANALYTICAL RESULTS - GROUNDWATER SAMPLES

SAMPLE ID		CLASS GA	LMW1GW	LMW2GW	LMW3GW	LMW4GW	LMW5GW	LDW1
SAMPLE TYPE		SCGs	GROUNDWATER	GROUNDWATER	GROUNDWATER	GROUNDWATER	GROUNDWATER	DRILL WATER
COLLECTION DATE		(ppb)#	2/5/92	2/5/92	2/5/92	2/5/92	2/5/92	12/12/91
PARAMETER	TYPE							
PHENOL	SEMI	1(p)						DR
BIS(2-CHLOROETHYL) ETHER	SEMI	1						DR
2-CHLOROPHENOL	SEMI	1(p)						DR
1,3-DICHLOROBENZENE	SEMI	5						DR
1,4-DICHLOROBENZENE	SEMI	4.7 @						DR
BENZYL ALCOHOL	SEMI	50 G						DR
1,2-DICHLOROBENZENE	SEMI	4.7 @						DR
2-METHYLPHENOL	SEMI	1(p)						DR
BIS(2-CHLOROISOPROPYL) ETHER	SEMI	5						DR
4-METHYLPHENOL	SEMI	1(p)						DR
N-NITROSO-DI-N-PROPYLAMINE	SEMI	50 G						DR
HEXACHLOROETHANE	SEMI	5						DR
NITROBENZENE	SEMI	5						DR
ISOPHORONE	SEMI	50 G						DR
2-NITROPHENOL	SEMI	1(p)						DR
2,4-DIMETHYLPHENOL	SEMI	1(p)						DR
BENZOIC ACID	SEMI	50 G						DR
BIS(2-CHLOROETHOXY)METHANE	SEMI	5						DR
2,4-DICHLOROPHENOL	SEMI	1(p)						DR
1,2,4-TRICHLOROBENZENE	SEMI	5						DR
NAPHTHALENE	SEMI	10 G						DR
4-CHLOROANILINE	SEMI	5						DR
HEXACHLOROBUTADIENE	SEMI	5						DR
4-CHLORO-3-METHYLPHENOL	SEMI	1(p)						DR
2-METHYLNAPHTHALENE	SEMI	5						DR
HEXACHLOROCYCLOPENTADIENE	SEMI	5						DR
2,4,6-TRICHLOROPHENOL	SEMI	1(p)						DR
2,4,5-TRICHLOROPHENOL	SEMI	1(p)						DR
2-CHLORONAPHTHALENE	SEMI	5						DR
2-NITROANILINE	SEMI	5						DR
DIMETHYLPHTHALATE	SEMI	50 G						DR
ACENAPHTHYLENE	SEMI	50 G						DR
2,6-DINITROTOLUENE	SEMI	5						DR
3-NITROANILINE	SEMI	5						DR

All results reported in µg/L (ppb).
Only detected results are reported.
SEMI-Semivolatile Organic Compound
G- Guidance Value
(p)-Phenolic compound standard is for total phenols.
@-Applies to sum of (1,4-) and (1,2-) dichlorobenzene.
#-SCG(Standards, Criteria, and Guidance) Values: NYSDEC Water Quality Standards and Guidance Values, TOGS 1.1.1, 9/25/90; 6NYCRR 700-705, effective 9/1/91.
DR - Data rejected due to NYSDEC ASP violation.

TABLE 4-9
ONONDAGA NATION - SITE B
ANALYTICAL RESULTS - GROUNDWATER SAMPLES

SAMPLE ID		CLASS GA	LMW1GW	LMW2GW	LMW3GW	LMW4GW	LMW5GW	LDW1
SAMPLE TYPE		SCGs	GROUNDWATER	GROUNDWATER	GROUNDWATER	GROUNDWATER	GROUNDWATER	DRILL WATER
COLLECTION DATE		(ppb)#	2/5/92	2/5/92	2/5/92	2/5/92	2/5/92	12/12/91
PARAMETER	TYPE							
ACENAPHTHENE	SEMI	20 G						DR
2,4-DINITROPHENOL	SEMI	1(p)						DR
4-NITROPHENOL	SEMI	1(p)						DR
DIBENZOFURAN	SEMI	50 G						DR
2,4-DINITROTOLUENE	SEMI	5						DR
DIETHYLPHTHALATE	SEMI	50 G						DR
4-CHLOROPHENYL-PHENYL ETHER	SEMI	5						DR
FLUORENE	SEMI	50 G						DR
4-NITROANILINE	SEMI	5						DR
4,6-DINITRO-2-METHYLPHENOL	SEMI	1(p)						DR
N-NITROSODIPHENYLAMINE	SEMI	50 G						DR
4-BROMOPHENYL-PHENYL ETHER	SEMI	5						DR
HEXACHLOROBENZENE	SEMI	0.35						DR
PENTACHLOROPHENOL	SEMI	1(p)						DR
PHENANTHRENE	SEMI	50 G						DR
ANTHRACENE	SEMI	50 G						DR
DI-N-BUTYLPHTHALATE	SEMI	50						DR
FLUORANTHENE	SEMI	50 G						DR
PYRENE	SEMI	50 G						DR
BUTYLBENZYLPHTHALATE	SEMI	50 G						DR
3,3'-DICHLOROBENZIDINE	SEMI	5						DR
BENZO(A)ANTHRACENE	SEMI	0.002 G						DR
CHRYSENE	SEMI	0.002 G						DR
BIS(2-ETHYLHEXYL)PHTHALATE	SEMI	50			7 J		3 J	DR
DI-N-OCTYL PHTHALATE	SEMI	50 G						DR
BENZO(B)FLUORANTHENE	SEMI	0.002 G						DR
BENZO(K)FLUORANTHENE	SEMI	0.002 G						DR
BENZO(A)PYRENE	SEMI							DR
INDENO(1,2,3-CD)PYRENE	SEMI	0.002 G						DR
DIBENZ(A,H)ANTHRACENE	SEMI	50						DR
BENZO(G,H,I)PERYLENE	SEMI	50						DR

All results reported in µg/L (ppb).
Only detected results are reported.
SEMI-Semivolatile Organic Compound
G- Guidance Value

J-Indicates the value is less than the sample quantitation limit but greater than zero.
(p)-Phenolic compound standard is for total phenols.
#-SCG(Standards, Criteria, and Guidance) Values: NYSDEC Water Quality Standards and Guidance Values, TOGS 1.1.1, 9/25/90; 6NYCRR 700-705, effective 9/1/91.
DR - Data rejected due to NYSDEC ASP violation.

TABLE 4-9
ONONDAGA NATION - SITE B
ANALYTICAL RESULTS - GROUNDWATER SAMPLES

SAMPLE ID		CLASS GA	LMW1GW	LMW2GW	LMW3GW	LMW4GW	LMW5GW	LDW1
SAMPLE TYPE		SCGs	GROUNDWATER	GROUNDWATER	GROUNDWATER	GROUNDWATER	GROUNDWATER	DRILL WATER
COLLECTION DATE		(ppb)#	2/5/92	2/5/92	2/5/92	2/5/92	2/5/92	12/12/91
PARAMETER	TYPE							
ALPHA-BHC	PST	ND						
BETA-BHC	PST	ND						
DELTA-BHC	PST	ND						
GAMMA-BHC (LINDANE)	PST	ND						
HEPTACHLOR	PST	ND						
ALDRIN	PST	ND						
HEPTACHLOR EPOXIDE	PST	ND						
ENDOSULFAN I	PST	5						
DIELDRIN	PST	ND						
4,4'-DDE	PST	ND						
ENDRIN	PST	ND						
ENDOSULFAN II	PST	5						
4,4'-DDD	PST	ND						
ENDOSULFAN SULFATE	PST	5						
4,4'-DDT	PST	ND						
METHOXYCHLOR	PST	35						
ENDRIN KETONE	PST	5						
ALPHA-CHLORDANE	PST	0.1(+)						
GAMMA-CHLORDANE	PST	0.1(+)						
TOXAPHENE	PST	ND						
AROCLOR-1016	PCB	0.1(x)						
AROCLOR-1221	PCB	0.1(x)						
AROCLOR-1232	PCB	0.1(x)						
AROCLOR-1242	PCB	0.1(x)						
AROCLOR-1248	PCB	0.1(x)						
AROCLOR-1254	PCB	0.1(x)						
AROCLOR-1260	PCB	0.1(x)						

All results reported in µg/L (ppb).
Only detected results are reported.
PST-Pesticide
PCB-Polychlorinated Biphenyl

ND-Non detectable.
(x)-Applies to total PCBs.
(+)-Applies to chlordane.
#-SCG(Standard Criteria and Guidance) Values:NYSDEC Water Quality Standards and guidance values, TOGS 1.1.1, 9/25/90 6NYCRR 700-705, effective 9/1/91.

TABLE 4-9
ONONDAGA NATION - SITE B
ANALYTICAL RESULTS - GROUNDWATER SAMPLES

SAMPLE ID		CLASS GA	LMW1GW	LMW2GW	LMW3GW	LMW4GW	LMW5GW	LDW1
SAMPLE TYPE		SCGs	GROUNDWATER	GROUNDWATER	GROUNDWATER	GROUNDWATER	GROUNDWATER	DRILL WATER
COLLECTION DATE		(ppb)#	2/5/92	2/5/92	2/5/92	2/5/92	2/5/92	12/12/91
PARAMETER	TYPE							
ALUMINUM	MET			4040	676	426	1550	328
ANTIMONY	MET	3 G						
ARSENIC	MET	25		2.4 B			1.6 B	2.7 B
BARIUM	MET	1000	206	308	151 B	170 B	164 B	39.0 BN
BERYLLIUM	MET	3 G						
CADMIUM	MET	10					4.1 B	
CALCIUM	MET		106000	170000	113000	105000	138000	41100
CHROMIUM	MET	50	6.5 B	19.1	11.4	9.5 B	7.4 B	
COBALT	MET							
COPPER	MET	200		22.2 B	4.9 B		8.8 B	12.4 B
IRON	MET	300(x)	80.0 B	9340	1580	843	2930	1170
LEAD	MET	25	1.4 B	16.3	3.2 B	2.4 B	4.0 B	3.5 BW
MAGNESIUM	MET	35000 G	21200	43400	25000	25800	19600	8400
MANGANESE	MET	300(x)	16.7	211	64.1	100	81.8	37.1
MERCURY	MET	2						
NICKEL	MET			21.4 B				
POTASSIUM	MET		2480 B	3580 B	2690 B	2430 B	1720 B	1100 B
SELENIUM	MET	10						
SILVER	MET	50						
SODIUM	MET	20000	110000	19300	81500	2800 B	14200	5280
THALLIUM	MET	4 G						
VANADIUM	MET			11.2 B			5.5 B	
ZINC	MET	300		46.6	18.1 B	6.7 B	35.0	155
CYANIDE	CN	100						

All results reported in µg/L (ppb).
Only detected results are reported.
MET - Metal
CN - Cyanide
G-Guidance Value

#-SCG(Standard Criteria and Guidance) Values:NYSDEC Water Quality Standards and guidance values, TOGS 1.1.1, 9/25/90 6NYCRR 700-705, effective 9/1/91.
B - Value is less than quantitation limit but greater than or equal to instrument detection limit.
(x)-Standard for sum of iron and manganese is 500ppb.
*-Duplicate analysis not within control limits.
N-Spiked sample recovery not within control limits.
W-Post-digestion spike for Furnace AA is out of control limits.
123 -Shading indicates an exceedance of SCG value.

Volatiles

Groundwater sample LMW1GW, collected from monitoring well MW-1, contained benzene at a concentration of 150 ppb, and toluene at a concentration of 12 ppb, in excess of their respective SCG values of 0.7 ppb and 5 ppb. These compounds are commonly detected constituents of gasoline or diesel fuel. The source of these compounds is believed to be the truck/car fueling stop located immediately upgradient of the monitoring well. A persistent odor of gasoline was noted in the area of the well by USEPA personnel during the site activities (Ref. 21). The possibility that the site may be the source of the benzene and toluene can not be ruled out since these compounds were present in waste material encountered on the site. Additional studies would be needed to delineate the source of the VOC contraventions. A PID reading of 4.0 ppm was recorded from the 9-11 foot split-spoon sample taken from this monitoring well boring, verifying the presence of volatile organic compounds at this location.

Groundwater sample LMW2GW, collected from monitoring well MW-2 contained the ketone, 2-butanone, at a concentration of 55 ppb which exceeds the 50 ppb SCG value established for this compound. This sample also contained the ketone, 4-methyl-2-pentanone, at a concentration of 34 ppb. The established SCG value for this compound is 50 ppb. Acetone, at a concentration of 350 ppb, was also reported for this sample in contravention of the 50 ppb SCG value. It should be noted that acetone was detected in the method blank for this sample therefore, its presence in the sample be partly attributed to laboratory contamination.

Semivolatiles

Groundwater samples LMW3GW and LMW5GW contained trace concentrations of bis(2-ethylhexyl)phthalate at 7 ppb and 3 ppb, respectively. This compound is a common laboratory contaminant making its presence in the

groundwater suspect. However, none was detected in the method blank. No other SVOCs were detected in the groundwater samples.

Pesticide/PCBs

No pesticides of PCBs were detected in the groundwater samples.

Metals and Cyanide

Metals analyses of the groundwater samples revealed that concentrations of iron, magnesium, and sodium exceeded the SCG values for Class GA groundwater, as indicated in Table 4-9. Iron exceeded SCG values at all monitoring well locations, with the exception of MW-1. The highest concentration of iron detected in the groundwater was 9,340 ppb in well MW-2. The sample from this well also contained magnesium at a concentration of 43,400 ppb, exceeding the SCG of 35,000 ppb. The SCG value for sodium (20,000 ppb) was exceeded for samples collected from MW-1 and MW-3, detected at concentrations of 110,000 and 81,500 respectively. Monitoring wells MW-2 and MW-5 contained the greatest number of metals detections at fifteen. Monitoring well MW-1 contained the fewest metals detections at nine. The SCG metals exceedances occurred in upgradient as well as downgradient wells. Cyanide was not detected in any of the groundwater samples.

4.5.7 Phase II Air Quality Assessment

VOCs were not detected above background levels in the breathing zone during the geophysical survey or drilling program. However, an HNu reading of 4.0 ppm was recorded from the 9-11 foot split-spoon sample from boring MW-1.

4.6 Summary of Conclusions

Based upon this Phase II investigation and on other sources of site-specific information used to compile this report, the following conclusions may be drawn:

- Waste samples collected by the USEPA cleanup contractor from surficial and partially buried drums encountered on site indicated the presence of hazardous waste as defined by 6NYCRR Part 371. TCLP analysis of the waste samples revealed leachable concentrations of benzene, mercury, and cresol in contravention of RCRA hazardous waste guidelines. TCL sampling showed volatile organic compounds including toluene and xylene were detected in all samples at concentrations ranging from 2,210 to 37,890 ppm and 39,450 to 281,580 ppm, respectively. Benzene was detected in two samples at concentrations of 677 and 2,140 ppm. Drum sampling conducted by USEPA in 1990 determined that a portion of the waste material was ignitable, thus classifying the waste as hazardous per RCRA guidelines. Approximately 250 drums, containing varying quantities of waste, were encountered during the recently completed second phase of the site cleanup. Approximately 1,000 empty drums were found on the site. Some of the drums showed evidence of perforation. Based upon the findings of the Phase I investigation, and discussions with the USEPA regarding the ongoing site cleanup, a strong probability of buried drums also exists. The contents of the buried drums is likely similar in nature to the material encountered in the surficial drums.

- One subsurface soil sample, obtained from one of the five subsurface borings, contained low levels of four organic compounds including phenanthrene, fluoranthene, pyrene and

bis(2-ethylhexyl)phthalate. These compounds were not detected in any of the groundwater samples. No other organic compounds were detected in the subsurface soil samples. The metals concentrations of the soil were within the range of metals observed in Eastern U.S. soils and showed little variation in concentration between sample locations.

- The eight surface water samples collected from Stream P160B and its tributaries contained no detectable concentrations of organic compounds. All but one of the surface water samples contained concentrations of iron that exceed the Class D stream SCG value for this analyte. The only surface water sample that contained a concentration of iron below the established SCG was the farthest downstream sample (LSW5).

Associated stream sediment samples contained varying concentrations of organic compounds. Four of the sediment samples contained detectable levels of 2-butanone (none greater than 34 ppb), and one of these samples (an upstream sample) also contained 2 ppb chloroform. Three of the four 2-butanone detections were reported in samples downgradient of the former large drum area on the west side of the site. SVOCs, in the form of PAHs and one phthalate compound, were detected in the stream sediments. The farthest downstream sample contained the least number of PAHs whereas the farthest upstream sample (LSD1) contained the greatest, reporting a total PAH concentration of 31,420 ppb. A sole source for the PAHs at this location could not be identified. The sample location is directly downstream of surface run-off sources from Interstate-81, US Route 11 and two truckstops. A second possible source is the former location of roofing tar containers that was situated adjacent to the sample point. The containers were removed during the on-going USEPA site

cleanup. Similar compounds were also detected in the drum waste samples. The pesticides aldrin, heptachlor epoxide, 4,4'-DDE, and endosulfan sulfate were detected in four of the stream sediment samples at concentrations ranging from 5.8 to 19 ppb. The PCB Aroclor 1254, at a concentration of 450 ppb, was detected in one stream sediment sample collected along the east side of the site. This was the only PCB detected on the site. The location of the pesticide/PCB occurrence(s) does not indicate a discernable source for these analytes. The metals concentrations of the sediments were comparable to the soils, and were within the observed range for Eastern U.S. soils. Stream sediment samples LSD6, 7, and 8 contained slightly elevated concentrations of metals compared to the other samples. As was the case with the surface waters, the farthest downstream sediment sample (LSD5) contained fewer detectable analytes at generally lower concentrations.

- The leachate sample collected from the northern bank of the Stream P160B, south of the site contained only one organic compound, trichloroethene at a concentration of 1 ppb. This was the only detection of this compound on the site. The suite of metals detected in the leachate sample was generally the same as those detected in the surface waters at comparable concentrations with the exceptions of iron and manganese which was reported in the leachate at concentrations an order of magnitude greater than the surface waters.

- Established groundwater SCG values were exceeded for 2-butanone, benzene, and toluene within groundwater samples from two monitoring wells. The benzene and toluene exceedances were reported for the groundwater samples collected from the upgradient well, MW-1, situated in the northeast corner of the site. The presence of these compounds at this location is

possibly attributable to the truck/car fueling station situated directly upgradient of the well. This assumption is supported by the persistent odor of gasoline noted in the area of the well by USEPA cleanup personnel. These compounds were not detected in any other well on site. The possibility that the site may be the source of the benzene and toluene detections at MW-1 can not be totally ruled out since these two compounds were also detected in the waste material present onsite. Additional studies are necessary to determine the source of these groundwater contraventions. The 2-butanone exceeding SCG values was reported for the sample collected from MW-2. This sample also contained another ketone, 4-methyl-2-pentanone, at a concentration of 34 ppb. The low concentrations of these ketones and their sole occurrence at MW-2 suggests a localized source for these compounds. The presence of these compounds could be attributed to past site activities allegedly conducted by Solvent Savers. Waste types encountered on the Solvent Savers Site, another registered inactive hazardous waste site in Linckleen, Chenango County, also included 2-butanone (Ref. 22).

- Groundwater elevation data compiled from the Phase II investigation indicates groundwater flow is in a generally southwesterly direction.

- An active shallow residential potable water well is situated approximately 100 feet north of the site. Current groundwater flow data indicated that this well could be positioned sidegradient to the site. The Phase II monitoring well that reported the benzene and toluene contraventions is located approximately 200 feet from the residential well. The residential well was sampled in 1987 by NYSDOH. No contaminants were detected at that time (Ref. 1 and 31).

- o Observations by USEPA indicate that the greatest concentrations of drums was encountered within an abandoned stream bed. Indications of buried drums were also noted in the area of the dry stream bed.

- o The medical waste in an intermittent stream bed on the east side of the site presents a physical, and possibly a biological hazard, to the public. The close proximity of the exposed waste material to the stream continues to promote the downstream entrainment of the waste. The volume of the material is estimated to be between 100-500 cubic yards.

4.7 Recommendations

There is documentation of the disposal of hazardous waste at Onondaga Nation-Site B. Waste material sampling conducted by the USEPA cleanup contractor verified that surficial drums on the site contained waste that is classified as hazardous per 6 NYCRR Part 371 guidelines. The existence of buried drums, that also contain hazardous waste, is a strong possibility. The ongoing phased cleanup of the site by USEPA has to date secured surficial drums containing waste. A later phase of the cleanup may include the removal of subsurface drums, should they be definitely located. Therefore, upon completion of the drum removal activities, it is recommended that shallow surface soil samples be collected at the site to determine the existence of soil contamination.

The source of the groundwater SCG value contraventions for acetone, 2-butanone, benzene and toluene at upgradient and sidegradient monitoring wells can not be accurately assessed from the data compiled from the Phase II investigation. The hydrological positioning of these two wells suggests influence from an upgradient, off-site source. In order to delineate the source of the SCG value contraventions, additional groundwater monitoring wells should be installed. The additional

monitoring wells would also better define groundwater flow beneath the site.

The existence of the exposed medical waste on the east side of the site presents a potential health threat. The close proximity of the exposed waste to an intermittent stream poses an additional threat to downstream targets. It is recommended that the medical waste be removed from the site and disposed of in a proper facility.

The resident directly north of the site relies on groundwater derived from the overburden aquifer as a source of potable water. In light of the reported groundwater SCG contraventions, and the close proximity of this well to the site, it is recommended that the well be monitored.

4.7.1 Interim Remedial Measures

In light of the ongoing USEPA sponsored site cleanup, State-funded Interim Remedial Measures are not warranted. However, consideration should be given to fencing the site to restrict access during the scheduled drum removal activities.

4.7.2 Disposition/Classification

Based upon the verification of hazardous waste present on site, and significant threat to the environment per 6 NYCRR Part 375 - 1.4(a) posed by these wastes, it is recommended that the site be reclassified to a Class 2 status.

4.7.3 Additional Studies

The source of the groundwater contaminants exceeding SCG values can not currently be determined. Benzene and toluene at MW-1 are likely

attributable to the fueling station upgradient of the well. This assumption is supported by a persistent odor of gasoline in the vicinity of the well. Nonetheless, past disposal practices on the site can not be ruled out as the source of the benzene and toluene detections since both of these compounds were detected in the waste material present on the site. Similarly, 2-butanone exceeding SCG values for the groundwater sample collected from the assumed upgradient well MW-2 may also be attributed to offsite sources. In order to delineate the source(s) of the detections it is proposed that at least two additional monitoring wells be installed. One well should be installed between MW-1 and the truck/car fueling stop located directly east of this well in order to delineate the source of the benzene and toluene detections reported for MW-1. This well would also serve as a background monitor for MW-2. The location of the second well will depend upon the results of the scheduled USEPA buried drum investigation. The proposed well should be positioned directly downgradient of the area containing the greatest number of buried drums. The wells would also provide additional groundwater elevation data that would better define groundwater flow beneath the site.

The Phase II investigation sampling program did not address the chemical status of the surface material at the site. Considering the history of surficial dumping on the site and the ongoing drum removal activities, the presence of contaminants in the shallow soil should be addressed. Direct contact with the surface materials is a distinct possibility, considering the open access to the site. In order to determine the presence of contaminants in the shallow surface soils, a series of samples should be collected from an established grid pattern over the site and analyzed for TCL parameters.

The source of the PAH detections in the upstream sediment sample (LSD1) was not identified. The location of this sample point could be influenced by both onsite and offsite sources of contamination. In order

to delineate the source of the PAHs a sediment sample should be collected farther upstream of the site, possibly on the east side of Quarry Road.

5.0 PRELIMINARY ASSESSMENT SCORESHEETS

The completed Preliminary Assessment (PA) Scoresheets are included in this section per the NYSDEC work assignment.

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

OMB Approval Number: 2050-0095
Approved for Use Through: 4/95

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT FORM	IDENTIFICATION	
	State: NY	CERCLIS Number: NYD986883403
	CERCLIS Discovery Date: 11/11/88	

1. General Site Information

Name:		Street Address:			
Onondaga Nation - Site B		Quarry Road and NYS RT. 11			
City:	State:	Zip Code:	County:	Co. Code:	Cong. Dist:
Nedrow	NY	13215	Onondaga	067	
Latitude: 42° 57' 35.2"	Longitude: 76° 8' 28.7"	Approx. Area of Site: 20 acres		Status of Site: Inactive	

2. Owner/Operator Information

Owner:			Operator:		
Onondaga Nation			Benjamin Shenandoah (deceased)		
Street Address:			Street Address:		
P.O. Box 85					
City:			City:		
Nedrow					
State:	Zip Code:	Telephone:	State:	Zip Code:	Telephone:
NY	13120				
Type of Ownership:			How Initially Identified:		
Other			Citizen Complaint		
Native American					

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT FORM	IDENTIFICATION	
	State: NY	CERCLIS Number: NYD986883403
	CERCLIS Discovery Date: 11/11/88	

3. Site Evaluator Information		
Name of Evaluator: Phyllis Rettke	Agency/Organization: URS Consultants,Inc.	Date Prepared: 3/23/92

Street Address: 282 Delaware Avenue	City: Buffalo	State: NY
Name of EPA or State Agency Contact: Martin Brand NYSDEC	Telephone: (518) 457-9538	
Street Address: 50 Wolf Road	City: Albany	State: NY

4. Site Disposition (for EPA use only)		
Emergency Response/Removal Assessment Recommendation: Yes Date: INPROGRESS	CERCLIS Recommendation: Higher Priority SI Date:	Signature: Name: Position:

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT FORM	IDENTIFICATION	
	State: NY	CERCLIS Number: NYD986883403
	CERCLIS Discovery Date: 11/11/88	

5. General Site Characteristics

Predominant Land Uses Within 1 Mile of Site:	Site Setting:	Years of Operation:
Residential Other: Indian Reservation	Rural	Beginning Year: 1959 Ending Year: 1969

Type of Site Operations:	Waste Generated:
Other Landfill	Offsite
	Waste Deposition Authorized By: Present Owner
	Waste Accessible to the Public: Yes
	Distance to Nearest Dwelling, School, or Workplace: 100 Feet

6. Waste Characteristics Information

Source Type	Quantity	Tier
Drums	1.25e+03 drums	V

Tier Legend
C = Constituent W = Wastestream
V = Volume A = Area

General Types of Waste:
Solvents
Laboratory/Hospital Waste
Acids/Bases

Physical State of Waste as Deposited
Solid
Liquid

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT FORM	IDENTIFICATION	
	State: NY	CERCLIS Number: NYD986883403
	CERCLIS Discovery Date: 11/11/88	

7. Ground Water Pathway

Is Ground Water Used for Drinking Water Within 4 Miles: Yes Type of Ground Water Wells Within 4 Miles: Municipal Private	Is There a Suspected Release to Ground Water: Yes Have Primary Target Drinking Water Wells Been Identified: Yes Primary Target Population: 2	List Secondary Target Population Served by Ground Water Withdrawn From:
Depth to Shallowest Aquifer: 14 Feet Karst Terrain/Aquifer Present: No	Nearest Designated Wellhead Protection Area: None within 4 Miles	

0 - 1/4 Mile	6
>1/4 - 1/2 Mile	68
>1/2 - 1 Mile	115
>1 - 2 Miles	1010
>2 - 3 Miles	598
>3 - 4 Miles	4344
Total	6141

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT FORM	IDENTIFICATION	
	State: NY	CERCLIS Number: NYD986883403
	CERCLIS Discovery Date: 11/11/88	

8. Surface Water Pathway	Part 1 of 4
Type of Surface Water Draining Site and 15 Miles Downstream: Stream River Lake	Shortest Overland Distance From Any Source to Surface Water: 5 Feet 0.0 Miles
Is there a Suspected Release to Surface Water: No	Site is Located in: Annual - 10 yr floodplain

8. Surface Water Pathway	Part 2 of 4

Drinking Water Intakes Along the Surface Water Migration Path: No

Have Primary Target Drinking Water Intakes Been Identified: No

Secondary Target Drinking Water Intakes:
None

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT FORM	IDENTIFICATION	
	State: NY	CERCLIS Number: NYD986883403
	CERCLIS Discovery Date: 11/11/88	

8. Surface Water Pathway — Part 3 of 4

Fisheries Located Along the Surface Water Migration Path: Yes

Have Primary Target Fisheries Been Identified: No

Secondary Target Fisheries:

Fishery Name	Water Body Type/Flow(cfs)
Onondaga Creek	moderate-large stream/ >100-1000
Trib. P106 B	minimal stream/ <10
Trib. 7	minimal stream/ <10
Onondaga Lake	large stream/river/ >1000-10000

8. Surface Water Pathway — Part 4 of 4

Wetlands Located Along the Surface Water Migration Path? (y/n) Yes

Have Primary Target Wetlands Been Identified? (y/n) No

Secondary Target Wetlands:
None

Other Sensitive Environments Along the Surface Water Migration Path: Yes

Have Primary Target Sensitive Environments Been Identified: No

Secondary Target Sensitive Environments:

Water Body/Flow(cfs)	Sensitive Environment Type
moderate-large stream/ >100-1000	State designated areas for aquatic life u
minimal stream/ <10	State designated areas for aquatic life u
minimal stream/ <10	State designated areas for aquatic life u
large stream/river/ >1000-10000	Habitat for Federally designated endanger

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT FORM	IDENTIFICATION	
	State: NY	CERCLIS Number: NYD986883403
	CERCLIS Discovery Date: 11/11/88	

9. Soil Exposure Pathway

Are People Occupying Residences or Attending School or Daycare on or Within 200 Feet of Areas of Known or Suspected Contamination: Yes Total Resident Population: 2	Number of Workers Onsite: None

Have Terrestrial Sensitive Environments Been Identified on or Within 200 Feet of Areas of Known or Suspected Contamination: No

10. Air Pathway

Total Population on or Within:	
Onsite	2
0 - 1/4 Mile	6
>1/4 - 1/2 Mile	68
>1/2 - 1 Mile	138
>1 - 2 Miles	2467
>2 - 3 Miles	14444
>3 - 4 Miles	17209
Total	34334

Is There a Suspected Release to Air: No

Wetlands Located Within 4 Miles of the Site: No

Other Sensitive Environments Located Within 4 Miles of the Site: No

Sensitive Environments Within 1/2 Mile of the Site:
None

OMB Approval Number: 2050-0095
Approved for Use Through: 4/95

PA-Score

PA Scoresheets

Site Name: Onondaga Nation - Site B
CERCLIS ID No.: NYD986883403
Street Address: Quarry Road and NYS RT. 11
City/State/Zip: Nedrow, NY 13215

Investigator: Phyllis Rettke
Agency/Organization: URS Consultants,Inc.
Street Address: 282 Delaware Avenue
City/State: Buffalo, NY

Date: 3/23/92

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

WASTE CHARACTERISTICS

Waste Characteristics (WC) Calculations:

1 Onondaga Nation	Drums	Ref: 1,5	WQ value	maximum
Volume	1.25E+03 drums		1.25E+02	1.25E+02

** Only First WC Page Is Printed **

Waste Characteristics Score: WC = 32

Ground Water Pathway Criteria List Suspected Release	
Are sources poorly contained? (y/n/u)	Y
Is the source a type likely to contribute to ground water contamination (e.g., wet lagoon)? (y/n/u)	Y
Is waste quantity particularly large? (y/n/u)	Y
Is precipitation heavy? (y/n/u)	N
Is the infiltration rate high? (y/n/u)	N
Is the site located in an area of karst terrain? (y/n)	N
Is the subsurface highly permeable or conductive? (y/n/u)	Y
Is drinking water drawn from a shallow aquifer? (y/n/u)	Y
Are suspected contaminants highly mobile in ground water? (y/n/u)	Y
Does analytical or circumstantial evidence suggest ground water contamination? (y/n/u)	Y
Other criteria? (y/n)	N
SUSPECTED RELEASE? (y/n)	Y

Summarize the rationale for Suspected Release:

Benzene and toluene were detected in a side gradient well.

Ref: 5

Ground Water Pathway Criteria List
Primary Targets

Is any drinking water well nearby? (y/n/u)	Y
Has any nearby drinking water well been closed? (y/n/u)	N
Has any nearby drinking water well user reported foul-testing or foul-smelling water? (y/n/u)	N
Does any nearby well have a large drawdown/high production rate? (y/n/u)	N
Is any drinking water well located between the site and other wells that are suspected to be exposed to a hazardous substance? (y/n/u)	N
Does analytical or circumstantial evidence suggest contamination at a drinking water well? (y/n/u)	N
Does any drinking water well warrant sampling? (y/n/u)	Y

Other criteria? (y/n) N

PRIMARY TARGET(S) IDENTIFIED? (y/n) Y

Summarize the rationale for Primary Targets:

A resident 100' to the north of the site is currently using groundwater drawn from a private well.

Ref: 5

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

GROUND WATER PATHWAY SCORESHEETS

Pathway Characteristics

		Ref.
Do you suspect a release? (y/n)	Yes	
Is the site located in karst terrain? (y/n)	No	1
Depth to aquifer (feet):	14	5
Distance to the nearest drinking water well (feet):	100	2

LIKELIHOOD OF RELEASE	Suspected Release	No Suspected Release	References
1. SUSPECTED RELEASE	550		
2. NO SUSPECTED RELEASE		0	
LR =	550	0	

Targets

TARGETS	Suspected Release	No Suspected Release	References
3. PRIMARY TARGET POPULATION 2 person(s)	20		
4. SECONDARY TARGET POPULATION Are any wells part of a blended system? (y/n) N	87	0	
5. NEAREST WELL	50	0	
6. WELLHEAD PROTECTION AREA None within 4 Miles	0	0	
7. RESOURCES	5	0	
T =	162	0	

WASTE CHARACTERISTICS

WC =	32	0

GROUND WATER PATHWAY SCORE: 35

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

Ground Water Target Populations

Primary Target Population Drinking Water Well ID	Dist. (miles)	Population Served	Reference	Value
1 L. Derrick	0.01	2	5	20

*** Note : Maximum of 5 Wells Are Printed *** Total 20

Secondary Target Population Distance Categories	Population Served	Reference	Value
0 to 1/4 mile	6	1,5	1
Greater than 1/4 to 1/2 mile	68	1,5	3
Greater than 1/2 to 1 mile	115	1,5	5
Greater than 1 to 2 miles	1010	1,5	29
Greater than 2 to 3 miles	598	1,5	7
Greater than 3 to 4 miles	4344	1,5	42
		Total	87

Apportionment Documentation for a Blended System

Surface Water Pathway Criteria List Suspected Release	
Is surface water nearby? (y/n/u)	Y
Is waste quantity particularly large? (y/n/u)	Y
Is the drainage area large? (y/n/u)	Y
Is rainfall heavy? (y/n/u)	N
Is the infiltration rate low? (y/n/u)	N
Are sources poorly contained or prone to runoff or flooding? (y/n/u)	N
Is a runoff route well defined(e.g.ditch/channel to surf.water)? (y/n/u)	N
Is vegetation stressed along the probable runoff path? (y/n/u)	N
Are sediments or water unnaturally discolored? (y/n/u)	N
Is wildlife unnaturally absent? (y/n/u)	N
Has deposition of waste into surface water been observed? (y/n/u)	Y
Is ground water discharge to surface water likely? (y/n/u)	Y
Does analytical/circumstantial evidence suggest S.W. contam? (y/n/u)	N
Other criteria? (y/n) N	
SUSPECTED RELEASE? (y/n)	N

Summarize the rationale for Suspected Release:

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

Surface Water Pathway Criteria List
Primary Targets

Is any target nearby? (y/n/u) If yes: Y
- N Drinking water intake
- Y Fishery
- Y Sensitive environment

Has any intake, fishery, or recreational area been closed? (y/n/u) N

Does analytical or circumstantial evidence suggest surface water contamination at or downstream of a target? (y/n/u) N

Does any target warrant sampling? (y/n/u) If yes: Y
- N Drinking water intake
- Y Fishery
- N Sensitive environment

Other criteria? (y/n) N

PRIMARY INTAKE(S) IDENTIFIED? (y/n) N

Summarize the rationale for Primary Intakes:

continued -------

continued -------

Other criteria? (y/n) N

PRIMARY FISHERY(IES) IDENTIFIED? (y/n) N

Summarize the rationale for Primary Fisheries:

Other criteria? (y/n) N

PRIMARY SENSITIVE ENVIRONMENT(S) IDENTIFIED? (y/n) N

Summarize the rationale for Primary Sensitive Environments:

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

SURFACE WATER PATHWAY SCORESHEETS

Pathway Characteristics		Ref.
Do you suspect a release? (y/n)	No	
Distance to surface water (feet):	5	5
Flood frequency (years):	1-10	5
What is the downstream distance (miles) to:		
a. the nearest drinking water intake?	N.A.	5
b. the nearest fishery?	0.2	5
c. the nearest sensitive environment?	0.0	5

LIKELIHOOD OF RELEASE	Suspected Release	No Suspected Release	References
1. SUSPECTED RELEASE	0		
2. NO SUSPECTED RELEASE		500	
LR =	0	500	

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

Drinking Water Threat Targets

TARGETS	Suspected Release	No Suspected Release	References
3. Determine the water body type, flow (if applicable), and number of people served by each drinking water intake.			
4. PRIMARY TARGET POPULATION 0 person(s)	0		
5. SECONDARY TARGET POPULATION Are any intakes part of a blended system? (y/n): N	0	0	
6. NEAREST INTAKE	0	0	
7. RESOURCES	0	5	
T =	0	5	

Drinking Water Threat Target Populations

Intake Name	Primary (y/n)	Water Body Type/Flow	Population Served	Ref.	Value
None					

Total Primary Target Population Value	0
Total Secondary Target Population Value	0

*** Note : Maximum of 6 Intakes Are Printed ***

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

Apportionment Documentation for a Blended System

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

Human Food Chain Threat Targets

TARGETS	Suspected Release	No Suspected Release	References
8. Determine the water body type and flow for each fishery within the target limit.			
9. PRIMARY FISHERIES	0		
10. SECONDARY FISHERIES	0	210	
T =	0	210	

Human Food Chain Threat Targets

Fishery Name	Primary (y/n)	Water Body Type/Flow	Ref.	Value
1 Onondaga Creek	N	>100-1000 cfs	3,4	12
2 Trib. P106 B	N	<10 cfs	3,4	210
3 Trib. 7	N	<10 cfs	3,4	210
4 Onondaga Lake	N	>1000-10000 cfs	3,4	12

Total Primary Fisheries Value 0
Total Secondary Fisheries Value 0

*** Note : Maximum of 6 Fisheries Are Printed ***

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

Environmental Threat Targets

TARGETS	Suspected Release	No Suspected Release	References
11. Determine the water body type and flow (if applicable) for each sensitive environment.			
12. PRIMARY SENSITIVE ENVIRONMENTS	0		
13. SECONDARY SENSITIVE ENVIRONS.	0	10	
T =	0	10	

Environmental Threat Targets

Sensitive Environment Name	Primary (y/n)	Water Body Type/Flow	Ref.	Value
1 Onondaga Creek	N	>100-1000 cfs	3,4	0
2 Trib. P 160B	N	<10 cfs	3,4	5
3 Trib. 7	N	<10 cfs	3,4	5
4 Onondaga Lake	N	>1000-10000 cfs	3,4	0

Total Primary Sensitive Environments Value 0
Total Secondary Sensitive Environments Value 0

*** Note: Maximum of 6 Sensitive Environments Are Printed ***

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

Surface Water Pathway Threat Scores

Threat	Likelihood of Release(LR) Score	Targets(T) Score	Pathway Waste Characteristics (WC) Score	Threat Score LR x T x WC / 82,500
Drinking Water	500	5	32	1
Human Food Chain	500	210	32	41
Environmental	500	10	32	2

SURFACE WATER PATHWAY SCORE:	44

Soil Exposure Pathway Criteria List Resident Population	
Is any residence, school, or daycare facility on or within 200 feet of an area of suspected contamination? (y/n/u)	Y
Is any residence, school, or daycare facility located on adjacent land previously owned or leased by the site owner/operator? (y/n/u)	N
Is there a migration route that might spread hazardous substances near residences, schools, or daycare facilities? (y/n/u)	N
Have onsite or adjacent residents or students reported adverse health effects, exclusive of apparent drinking water or air contamination problems? (y/n/u)	N
Does any neighboring property warrant sampling? (y/n/u)	N
Other criteria? (y/n)	N
RESIDENT POPULATION IDENTIFIED? (y/n)	Y

Summarize the rationale for Resident Population:

A family dwelling is located 100' to the north of the site.

Ref: 1,5

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

SOIL EXPOSURE PATHWAY SCORESHEETS

Pathway Characteristics		Ref.
Do any people live on or within 200 ft of areas of suspected contamination? (y/n)	Yes	2,5
Do any people attend school or daycare on or within 200 ft of areas of suspected contamination? (y/n)	No	2,5
Is the facility active? (y/n):	No	2,5

LIKELIHOOD OF EXPOSURE	Suspected Contamination	References
1. SUSPECTED CONTAMINATION LE =	550	

Targets

2. RESIDENT POPULATION 2 resident(s) 0 school/daycare student(s)	20	2,5 1,5
3. RESIDENT INDIVIDUAL	50	
4. WORKERS None	0	5
5. TERRES. SENSITIVE ENVIRONMENTS	0	
6. RESOURCES	5	
T =	75	

WASTE CHARACTERISTICS

WC = 32

RESIDENT POPULATION THREAT SCORE: 16

NEARBY POPULATION THREAT SCORE: 1

Population Within 1 Mile: 1 - 10,000

SOIL EXPOSURE PATHWAY SCORE: 17

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

Soil Exposure Pathway Terrestrial Sensitive Environments

Terrestrial Sensitive Environment Name	Reference	Value
None		
Total Terrestrial Sensitive Environments Value		

*** Note : Maximum of 7 Sensitive Environments Are Printed ***

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

Air Pathway Criteria List Suspected Release	
Are odors currently reported? (y/n/u)	N
Has release of a hazardous substance to the air been directly observed? (y/n/u)	N
Are there reports of adverse health effects (e.g., headaches, nausea, dizziness) potentially resulting from migration of hazardous substances through the air? (y/n/u)	N
Does analytical/circumstantial evidence suggest release to air? (y/n/u)	N
Other criteria? (y/n)	N
SUSPECTED RELEASE? (y/n)	N

Summarize the rationale for Suspected Release:

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

AIR PATHWAY SCORESHEETS

Pathway Characteristics

		Ref.
Do you suspect a release? (y/n)	No	
Distance to the nearest individual (feet):	100	1,5

LIKELIHOOD OF RELEASE	Suspected Release	No Suspected Release	References
1. SUSPECTED RELEASE	0		
2. NO SUSPECTED RELEASE		500	
LR =	0	500	

Targets

TARGETS	Suspected Release	No Suspected Release	References
3. PRIMARY TARGET POPULATION 0 person(s)	0		
4. SECONDARY TARGET POPULATION	0	11	
5. NEAREST INDIVIDUAL	0	20	
6. PRIMARY SENSITIVE ENVIRONS.	0		
7. SECONDARY SENSITIVE ENVIRONS.	0	0	
8. RESOURCES	0	5	
T =	0	36	

WASTE CHARACTERISTICS

WC =	0	32

AIR PATHWAY SCORE:	7

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

Air Pathway Secondary Target Populations

Distance Categories	Population	References	Value
Onsite	2	1	1
Greater than 0 to 1/4 mile	6	1	1
Greater than 1/4 to 1/2 mile	68	1	1
Greater than 1/2 to 1 mile	138	1	1
Greater than 1 to 2 miles	2467	1	1
Greater than 2 to 3 miles	14444	1	4
Greater than 3 to 4 miles	17209	1	2
		Total Secondary Population Value	11

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

Air Pathway Primary Sensitive Environments

Sensitive Environment Name	Reference	Value
None		
Total Primary Sensitive Environments Value		

*** Note : Maximum of 7 Sensitive Environments Are Printed***

Air Pathway Secondary Sensitive Environments

Sensitive Environment Name	Distance	Reference	Value
None			
Total Secondary Sensitive Environments Value			

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

SITE SCORE CALCULATION	SCORE
GROUND WATER PATHWAY SCORE:	35
SURFACE WATER PATHWAY SCORE:	44
SOIL EXPOSURE PATHWAY SCORE:	17
AIR PATHWAY SCORE:	7
SITE SCORE:	29

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

SUMMARY

1. Is there a high possibility of a threat to any nearby drinking water well(s) by migration of a hazardous substance in ground water? Yes

   If yes, identify the well(s).
   L. Derrick well located 100' north of the site.

   If yes, how many people are served by the threatened well(s)? 2

2. Is there a high possibility of a threat to any of the following by hazardous substance migration in surface water?
   A. Drinking water intake — No
   B. Fishery — Yes
   C. Sensitive environment (wetland, critical habitat, others) — No

   If yes, identity the target(s).
   Onondaga Creek, a class C stream is located approximately 0.5 miles west of the site. Trib. P 106B to Onondaga Creek is located within 0.2 miles of the site. Medical waste was observed in Trib P106 B.

3. Is there a high possibility of an area of surficial contamination within 200 feet of any residence, school, or daycare facility? No

   If yes, identify the properties and estimate the associated population(s)

4. Are there public health concerns at this site that are not addressed by PA scoring considerations? Yes

   If yes, explain:
   Medical waste is exposed in the stream bed of Trib P 106 B. At this time (12/91) there is an EPA cleanup and drum removal. Until the cleanup is completed, exposure to wastes is possible.

PA-Score 2.0 Scoresheets
Onondaga Nation - Site B - 10/12/92

REFERENCE LIST

1. NYSDOT Topographic Maps, South Onondaga(need names of the other quads)

2. NYSDEC, 1989. Phase I Investigation of the Onondaga Nation- Site B, URS Consultants, Inc.

3. USGS, 1989. Water Resources Data, New York Water Year 1989. Volume 3, Western New York.

4. NYSDEC, 1973. New York State Freshwater Wetlands Maps, Onondaga County. South Onondaga, Map 14 of 21.

5. URS Consultants, Inc., 1991. Field Investigation for the Phase II Investigation of the Onondaga Nation - Site B.

6. NYSDOH, 1982. Atlas of Community Water Systems.

7. Lewis,J., Bureau of Indian Affairs. Personal communication with Phyllis Rettke RE: Source of water at the Onondaga Nation, March 24, 1991,

6.0 GENERAL REFERENCES

1. NYSDEC, 1989. Phase I Investigation: Onondaga Nation-Site B, URS Consultants, Inc.

2. Schacklette, H.T., and Boerngen, J.G., "Element Concentrations in Soil and Other Surficial Materials of Conterminous United States", U.S. Geological Survey, Professional Paper 1270, 1984.

3. NYSDEC, 1990 Phase II (Fifth Round) Work Plan, Onondaga Nation-Site B.

4. URS Consultants, Inc., May 1991, Phase II (Fifth Round) Quality Assurance/Quality Control Plan, Onondaga Nation-Site B.

5. Envirogenics, November 1991 Site Specific Health and Safety Plan for Onondaga Nation-Site B.

6. New York State Official Compilation of Codes, Rules and Regulation, 1983, V.6., Conservation (E): Division of Water Resources.

* 7. Beagle, Linda, NYSDEC, February 19, 1992. Personal Communication with Daniel Sheldon of URS Consultants Inc.

* 8. NYSDEC, August 26, 1987. Facility Inspection Report, RE: Medical Waste Volume.

* 9. NYSDEC, April 22, 1988. Letter from Michael J. O'Toole, Jr., PE to Stephen Luftig (USEPA), RE: Request for Removal Action.

* Reference included with this report.

*10. USEPA, August 8, 1988. Letter from Stephen Luftig to Michael J. O'Toole (NYSDEC), RE: Response to NYSDEC request of 4/22/88 (see Ref. 9).

*11. NYSDEC, August 10, 1990. Letter from Michael J. O'Toole, Jr. P.E., to Richard Caspe (USEPA), RE: Second Request for Removal Action.

*12. USEPA, August 31, 1990. Initial Pollution Report (POLREP), RE: Initial Actions Towards Removal.

13. Harkay, Daniel, January 30 and March 11, 1992. USEPA Onsite Coordinator (OSC) for Onondaga Nation-Site B Removal Action, Personal Communication with Daniel Sheldon of URS Consultants RE: Cleanup Activities Update.

14. Hutton, F.Z. Jr. and Rice, E., "Soil Survey of Onondaga County, New York", U.S. Department of Agriculture, Soil Conservation Service, 1977.

*15. Lewis, Jody, March 24, 1991, Bureau of Indian Affairs. Personal Communication with Phyllis Rettke of URS Consultants RE: Water Supplies of Onondaga Indian Reservation.

16. NYSDOH, 1982. Atlas of Community Water Systems.

17. USEPA, 1991. Guidance for Performing Preliminary Assessments Under CERCLA, Appendix E.

18. NYSDOT Topographic Maps: South Onondaga 1989, Syracuse East 1990, Syracuse West 1990, and Jamesville 1990 Quadrangles.

* Reference included with this report.

19. Bureau of Indian Affairs, April 16, 1992. Personal Communication with Daniel Sheldon of URS Consultants. RE: Current Population of Onondaga Nation Indian Reservation.

20. Grasso, Thomas X., "Proglacial Lake Sequence in the Tully Village", Onondaga County. The New York State Geological Association: 42nd Annual Meeting, Cortland, NY 1970.

21. Harkay, Daniel, March 30, 1992. USEPA Onondaga Nation Drum Site OSC. Personal Communication with Daniel Sheldon of URS Consultants. RE: VOC detection in monitoring well MW-1.

22. NYSDEC, April 1991, Division of Hazardous Waste Remediation. "Inactive Hazardous Waste Disposal Sites in New York State", Annual Report, Volume 7.

23. NYSDOT Topographic Map: 1955 South Onondaga Quadrangle.

24. Derrick, L. April 8, 1992, Property Owner of Residence North of Site, Personal Communication with Daniel Sheldon of URS Consultants, Inc., RE: Existence and Use of Potable Water Well.

25. ASTM D 1586-84, Standard Method for Penetration Test and Split-Barrel Sampling of Soils.

26. ASTM D 2488-84 Standard Practice for Description and Identification of Soil (Visual-Manual Procedures).

27. US Environmental Protection Agency: Pollution Report (POlREP) No. 7, December 13, 1991. RE: Drum Totals.

28. Winkley, Steven J., March 1989. The Hydrogeology of Onondaga County, New York.

30. US Environmental Protection Agency: POLREP No. 13, February 28, 1992. RE: Disposition of Wastes.

31. Hamlin, Henrietta, May 8, 1992. New York State Department of Health Representative. Personal Communication with Daniel Sheldon of URS Consultants. RE: 1987 Sampling of L. Derrick Well Located Directly North of Site.

32. US Environmental Protection Agency: POLREP No. 1, Onondaga Nation Drum Site, October 25, 1991. RE: Ignitable Wastes.

URS

AN INTERNATIONAL PROFESSIONAL SERVICES ORGANIZATION

7

JOB NO. 35235.08/11 JOB NAME Keck Farm / Onondaga Nation - Site 8

MEMO OF TELECON

DATE 2/19/92 TELEPHONE

PERSON CALLING Linda Beagle PERSON CALLED Dan Sheldon

REPRESENTING NYSDEC REPRESENTING URS Consultants

PURPOSE OF TELECON AND/OR EQUIPMENT INVOLVED: Listing dates for the above sites.

TEXT OF TELECON

Linda returned my call of 2/13 regarding the dates which the Keck Farm and Onondaga site were added to the N.Y.S. Registry of Inactive Hazardous Waste Sites. The dates are as follows:

Keck Farm - Dec. 1983

Onondaga Nation - Site 8 - Dec. 1984

cc:

REGION 7

47-15-1 (11/83) — 2bb

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

FACILITY INSPECTION REPORT

LEACHATE
1. Leachate is entering surface water.
2. Leachate is known to be contravening groundwater standards.
3. Waste is being placed into water.

BURNING
4. Refuse is burning without permit or not under permit conditions.
5. There is evidence of unapproved previous burning.

COVER
6. Previous days waste is not covered.
7. Refuse is protruding through daily, intermediate or final cover.
8. Intermediate or final cover is not in place or properly applied.

GRADING
9. Depressions, ponding, cracked cover, or slopes steeper than 1 on 3 exist.
10. Vegetative cover is missing or inadequate on completed areas.
11. Soil erosion or other drainage problems exist.

SEPARATION DISTANCES
12. Waste is closer than 50 feet to site boundaries.
13. Refuse is being placed less than 5 feet above groundwater or bedrock.
14. Waste is being placed too close to surface water.

NUISANCE CONDITIONS
15. Odors are detectable off site.
16. Blowing dust or dirt is a nuisance.
17. Papers are uncontrolled or blowing off site.
18. Noise is a nuisance off site.

OPERATION CONTROL
19. Operation Permit conditions are being violated. (List conditions)
20. Waste is not sufficiently confined or controlled.
21. Refuse is spread in layers thicker than 2 feet.
22. Refuse is not compacted or compacted insufficiently.
23. The working face height is greater than 10 feet.
24. Equipment on the site is not adequate for proper operation.

SAFETY AND HEALTH
25. Salvaging is uncontrolled or is creating a safety hazard.
26. Rodents, insects, birds, or other vectors are not controlled.
27. Unsafe conditions or equipment exist. (List items)
28. Methane gas is known to be leaving the site.

ACCESS CONTROL
29. Access to the site is improper, unsafe, or inadequately controlled.
30. The site is open without an attendant.
31. Information about the site is not posted (e.g. hours of operation)
32. Access to the operating area is poor or unsafe.

OTHER
33. Uncontrolled leachate is visible on, or near the site.
34. The quality of cover material is inadequate.
35. Slope of working face is steeper than 1 on 3.
36. Monitoring wells are not operative.
37. Unapproved wastes have been deposited since last inspection.
38. Operator is unfamiliar with site boundaries, operation plan or permit.
39. Land application of waste to frozen/snow covered ground or during periods of rain.
40. Soil pH is below 6.5.

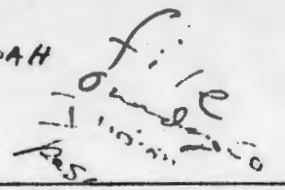
CENTRAL OFFICE COPY

1 TRANS TYPE ☐ Delete ☑ Add | 2 FACILITY NO. | 8 DATE 09/12/17 | 9 | 14 TIME 17 | CARD 21 TYPE 1 | 22 INSPECTOR'S NAME ABBOTT | 36 | 37 | 38 T | CARD 21 TYPE 1 2 | REMARKS SITE ISOLATED WASTE LESS THAN FIFTEEN YEARS

FACILITY NAME	LOCATION
ONONDAGA INDIAN RESERVATION DUMP	QUARRY ROAD ONONDAGA INDIAN RESERVATION NATION

PERSONS INTERVIEWED AND TITLES

CHIEF COOK
CHIEF SHENANDOAH



SITE SKETCH /COMMENTS (additional sheets attached) ☒ Yes ☐ No

A SITE INSPECTION WAS HELD TO DETERMINE THE VOLUME OF HOSPITAL WASTE TO BE REMOVED FROM THIS OLD DUMPSITE. THIS SITE WAS LAST USED MORE THAN FIFTEEN YEARS BACK. THE HOSPITAL WASTE IS LOCATED IN A INTERMITTENT STREAM BED.

A NUMBER OF BARRELS ARE ALSO LOCATED AT THIS SITE. SOME OF THE BARRELS HAVE DETERIORATED AND OTHERS STILL HAVE MATERIAL IN THEM. A TEST OF THIS MATERIAL WAS CONDUCTED APPROX. 2 YEARS BACK BY D.E.C. PERSONNEL OUT OF THE ALBANY OFFICE. PLANS FOR REMOVAL OF THESE BARRELS ARE STILL BEING FORMULATED.

ATTACHED IS A SIGN IN SHEET OF ALL PARTIES WHO ATTENDED THIS INSPECTION.

ALSO ATTACHED IS A SKETCH PREPARED BY MYSELF, DAN ABBOTT, SHOWING THE ROUGH CONFIGURATION AND DIMENSIONS OF THE HOSPITAL WASTE AREA ONLY.

8

D. P. Abbott

ONONDAGA COUNTY DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL SANITATION
Mailing Address
P.O. Box 190, Syracuse, New York 13215-0190
Location
4894 Onondaga Road
Peter Gucia, P.

(8)

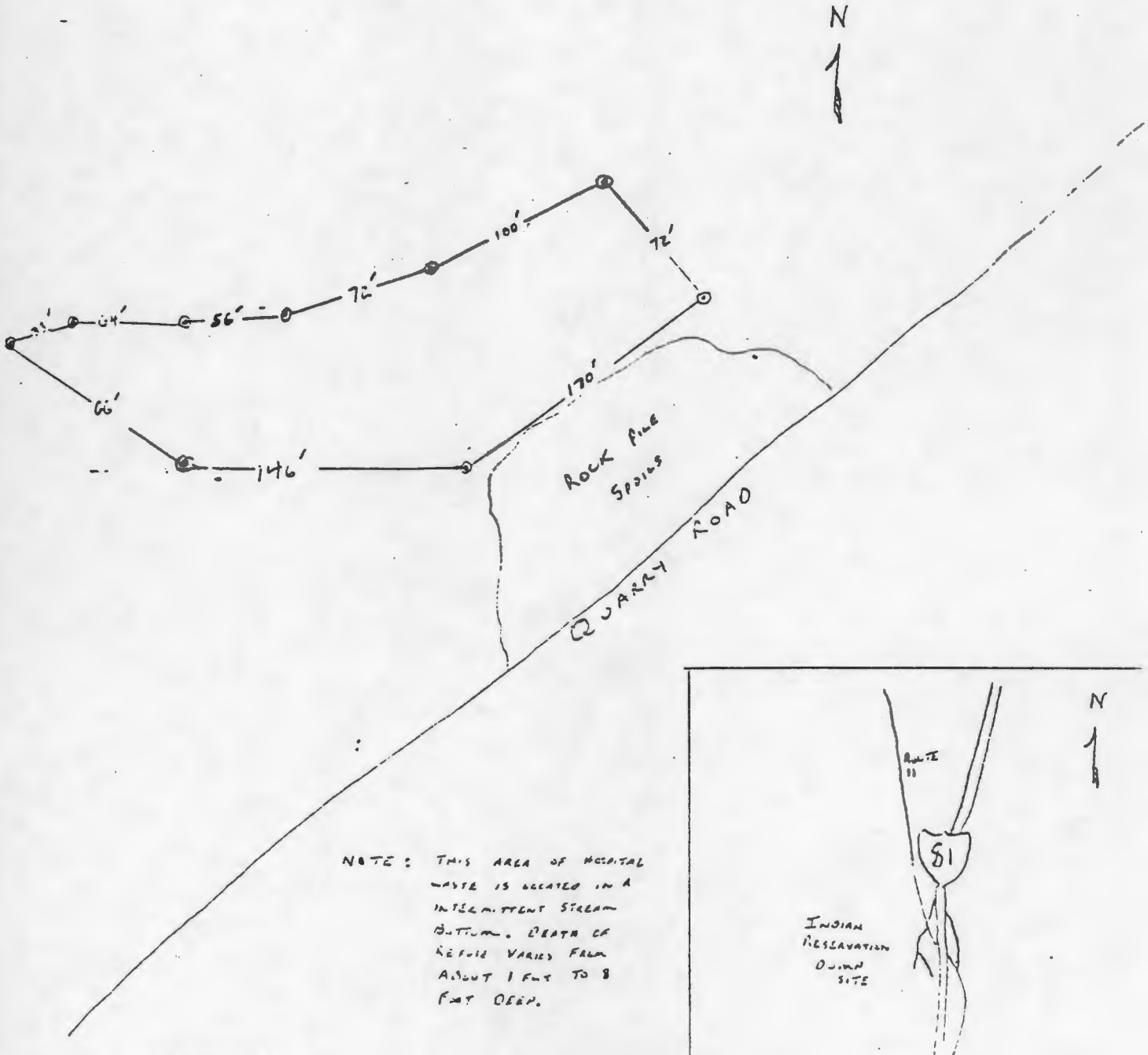
MEMO

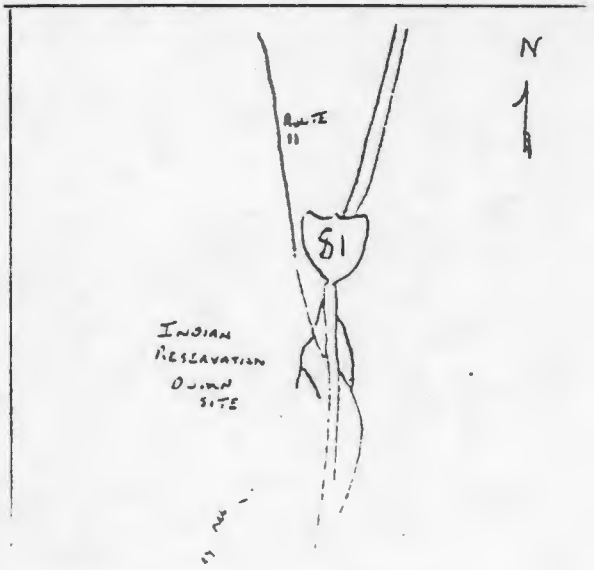
TO Ron Hekins NYS DOH

DATE 8/26/87

FROM Dan Abbott

SUBJECT Onondaga Indian Reservation Dumpsite Quarry Road





SKETCH BY
Daniel C. Abbott
Environ. Health
8/26/87

McCleck

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233 - 7010

9

APR 22 1988

Thomas C. Jorling
Commissioner

Mr. Stephen Luftig
Director
Emergency and Remedial Response Division
U.S. Enviromental Protection Agency
Region II
26 Federal Plaza
New York, NY 10278

Re: Removal Action at Onondaga Nation
Site B (734027)
Onondaga County, New York

Dear Mr. Luftig:

The New York State Department of Environmental Conservation requests that the United States Environmental Protection Agency take any appropriate response allowable under the removal action program at the referenced inactive hazardous waste site. As further support and clarification of the reason for this request, we realize under Section 104 of CERCLA as amended by SARA that the President of the United States may respond to any release or threat of release of a hazardous substance, if in the President's discretion it constitutes a public health or environmental emergency and no other person with the authority and capability to respond to the emergency will do so in a timely manner.

The parties responsible for the disposal of the waste are reportedly deceased. The Onondaga Nation also does not possess the required resources to accomplish a remedial action. As this site falls within the jurisdiction of the Onondaga Nation (and perhaps technically outside the jurisdiction of New York State), it would be most appropriate for the Federal Government, through the USEPA, to conduct a removal action at this site.

Even if the State has authority to act, it does not at the present time have emergency contract authority or anv standing agreement with contractors that would allow a response to be implemented and completed in a timely manner. The New York State Department of Environmental Conservation would have to prepare plans and specifications, publicly bid the work and follow through with the normal contract award process. This procedure would take six to eight months just to get a contract awarded. Therefore, we are requesting that the USEPA respond under your removal action program.

9

The site consists of approximately 800 55-gallon drums lying exposed to the environment on property within the Onondaga Indian Nation near Syracuse, New York. A location map and detailed site maps have been provided for your reference. Approximately 200 of the drums contain sludge or liquids that may be hazardous in nature. The remaining drums (600) are either empty or contain remnants of roofing tar. The drums are in generally poor condition and in several areas have leaked their contents onto the ground.

Staff from the Bureau of Hazardous Site Control and Region 7 sampled several of the drums on November 24, 1987. Analytical results indicate the presence of volatile and semi-volatile compounds in the mg/kg (parts per million) range of concentration. Specifically, ethylbenzene (16 mg/kg), xylene (2,441 mg/kg), acetic acid (methyl ester) (0.800 mg/kg), and benzoic acid (3-methyl) (2,390 mg/kg) have been detected as well as a number of unknown or tentatively identified compounds (total concentration 22,928 mg/kg). Analysis of drum samples taken by NYSDEC in 1983 also detected benzyl alcohol. A summary sheet showing these results, as well as the analytical data sheets, are enclosed.

If you have any questions, please contact Mr. Alan Rockmore of my staff at (518) 457-9280.

Sincerely,

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

Enclosures

cc, w/Enclosures: Mr. B. Sprague - USEPA Edison, NJ
Mr. G. Pavlou, USEPA Region II
Mr. R. Tramontano - NYSDOH
Dr. N. Kim - NYSDOH
Mr. R.Burdick - Onondaga County D.O.H.

JVH/mc
bcc: Commissioner Jorling
N. Sullivan
M. O'Toole (2)
C. Goddard
A. Rockmore
J. Van Hoesen
L. Gross - NYSDEC Region 7
F. Ricotta
M. Brand

1. J.V.H.
2. A.K.
(10)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

File: Inactive Onondaga Indian Reservation

8 1989

Mr. Michael J. O'Toole, Jr., P.E., Director
Division of Solid and Hazardous Waste
New York State Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233

Dear Mr. O'Toole:

On June 13, 1988, we conducted a preliminary site assessment at the Onondaga Indian Nation with representatives from the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH).

At this time, the presence of drums and debris at this site do not meet the criteria for a CERCLA removal action. Analytical data from samples collected by NYSDEC personnel indicated that no sample exhibited hazardous waste characteristics. The site assessment was unable to identify threats to the public health nor to the environment. However, further characterization of the hospital related waste should be undertaken to insure the non-existance of any related health/environmental threats.

Any questions regarding this site should be directed to Mr. Jack D. Harmon, of my staff, at (201) 321-6789.

Sincerely yours,

Stephen D. Luftig, Director
Emergency and Remedial Response Division

cc: R. Salkie, 2ERR-DD
A. Rockmore, NYSDEC

AUG 11 1989

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

7010

Thomas C. Jorling
Commissioner

Mr. Richard Caspe
Director
Emergency and Remedial Response Division
U.S. Environmental Protection Agency
Region II
26 Federal Plaza
New York, New York 10278

Dear Mr. Caspe:

Re: ~~Site No. 7-34-027~~
Onondaga Nation - Site B
~~Onondaga County~~, New York

The New York State Department of Environmental Conservation (NYSDEC) requests that the United States Environmental Protection Agency (USEPA) take any appropriate response allowable under the removal action program at the above referenced inactive hazardous waste site. As you are aware, this site was originally referred by NYSDEC in April 1988 to the USEPA for a federally funded removal action. However, at that time a preliminary site assessment was unable to identify threats to the public health or the environment and failed to show that the presence of drums and debris met the criteria for a CERCLA removal action.

On March 8, 1990 NYSDEC sampled twelve (12) additional drums to further evaluate the site and attempt to detect the presence of hazardous wastes. Analyses for volatile compounds, metals, EP-Toxicity, ignitability, corrosivity and reactivity were completed. A TCL scan was requested, but due to the nature of the waste, the laboratory was unable to complete the full analysis.

The enclosed analytical results show that phenol and xylene were detected in most of the samples in the part per million range. The levels of phenol ranged from 69 to 374 ppm and xylene ranged from 65 to 8900 ppm. All sampled drums were labelled with spray paint using a number that corresponds to the location number shown on the laboratory analysis report.

However, the waste did not fail RCRA characteristics for hazardous waste and, therefore, we are unable to act. Furthermore, the Onondaga Indian Nation has grown increasingly frustrated with the State and Federal regulatory agencies inability to act and, consequently, additional sampling is not possible at this time. The Department believes the waste is similar to hazardous waste found at other remedial sites and believes there is the potential for finding drums with enough xylene remaining to fail the characteristic of ignitability.

11

Therefore, it is felt that it is necessary to take immediate steps towards a site cleanup. The site is bordered on one edge by a creek that feeds into the Onondaga Creek and this poses a potential for the spread of contamination. Also, there are an undetermined number of buried drums at the site. Finally, the drums are in generally poor condition and in several areas have leaked their contents onto the ground.

As further support and clarification of the reason for this request, we realize under Section 104 of CERCLA, as amended by SARA, that the President of the United States may respond to any release or threat of release of a hazardous substance, if in the President's discretion it constitutes a public health or environmental emergency and no other person with the authority and capability to respond to the emergency will do so in a timely manner.

The NYSDEC cannot respond in as timely a manner as can EPA. Also, it may not have authority to respond since the site is located on the land of the Onondaga Indian Nation.

If you have any questions, please contact Mr. James Van Hoesen, of my staff, at (518) 457-9279.

Sincerely,

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

Enclosure
cc: w/Enc.: R. Salkie - USEPA - Region II

MC/tr
bcc: M. O'Toole (2)
C. Goddard
A. Rockmore
J. Van Hoesen
M. Cruden
C. Branagh - NYSDEC - Region 7
W. Demick - NYSDEC - BHSC
R. Tramontano - NYSDOH
R. Burdick - Onondaga County D.O.H.

POLLUTION REPORT

U.S. ENVIRONMENTAL PROTECTION AGENCY

DATE: August 31, 1990

Region II
Removal Action Branch
Edison, New Jersey 08837
(201) 548-8730 - Commercial and FTS
24 Hour Emergency

TO: R. Caspe, EPA
R. Salkie, EPA
J. Marshall, EPA
W. Mugdan, EPA
G. Pavlou, EPA
G. Zachos, EPA
R. Hardgrove, EPA
S. Becker, EPA
ERD Washington
(E-Mail)
/M. O'Toole, NYSDEC
TAT

POLREP NO.:	Initial (1)
INCIDENT NAME:	Onondaga Nation Drum Site
SITE/SPILL NO.:	5T
POLLUTANT:	Aromatic Hydrocarbons
CLASSIFICATION:	Major
SOURCE:	Unknown
LOCATION:	Onondaga, Onondaga County, New York
AREA:	20 Acres
WATER BODY:	Onondaga Creek

1. **SITUATION**

The Onondaga Nation Drum Site is located within the Onondaga Indian Reservation in Onondaga County, New York. The 20-acre site was used for disposal of industrial waste, household trash and construction debris from the late 1960s through the 1970s.

Site investigations conducted by New York State Department of Environmental Conservation (NYSDEC), in 1987, identified approximately 800 drums scattered on the surface, at the site, roughly 200 of which contain solid or liquid residues. Many of these drums are in poor condition and appear to have leaked their contents onto the ground. In addition, an unspecified number of buried drums are located at the site as evidenced by a number of partially buried drums found in the vicinity of the stockpiled aboveground drums. Analysis of samples collected by NYSDEC indicated the presence of xylene, ethylbenzene, and phenols at elevated levels in the drummed wastes at the site.

RECEIVED
SEP 10 1990
DIVISION OF HAZARDOUS WASTE REMEDIATION
SEP 17

(12)

Also, included at the site is an area which was used for disposal of bagged medical waste. These bags are in a deteriorated condition. The bags and their contents are spread over an area of roughly 150' by 50'. This area is adjacent to a dry creekbed which during times of heavy rainfall has reportedly flooded carrying waste down stream to the Onondaga River which flows south into the City of Onondaga.

2. **ACTIONS TAKEN**

A. On August 17, 1990 the Director of EPA's Emergency and Remedial Response Division granted verbal authorization to conduct an expedited Removal Action at the Onondaga Nation Drum Site. This action is the result of a request made by the Director of NYSDEC's Division of Hazardous Waste Remediation and received by EPA on August 16, 1990.

B. On August 22, EPA's Removal Action Branch, Emergency Response Cleanup Service Contractor (ERCS), and Technical Assistance Team (TAT) mobilized to site to initiate the Removal Action. The scope of work authorized includes staging, overpacking; sampling and securing of all drums previously identified by NYSDEC as containing hazardous materials.

C. Upon arrival at the site EPA and TAT met with representatives of NYSDEC and the Onondaga People. This meeting resulted in the Onondaga People granting EPA access to the site for the purpose of removing hazardous materials stored there. Following this meeting the NYSDEC contact briefed EPA on the history of the site and conducted a site tour identifying locations of stockpiled drums.

D. On August 23, site work began with the sampling of drums for compatibility and disposal analysis. By August 24, EPA, TAT and ERCS had completed identifying, sampling, overpacking and staging the 20 drums previously sampled by NYSDEC. High visibility fencing was erected surrounding the overpacked drums to form a containment area. This area was posted with warning signs to minimize the health threat to the public from direct contact with drums containing hazardous materials.

3. **FUTURE PLANS AND RECOMMENDATIONS**

A. Upon receipt of analytical results, arrangements for waste acceptance will be made with disposal facilities.

B. An Action Memorandum will be prepared requesting funding to address removal of the balance of hazardous materials located at the site including the remaining visible drums and medical waste.

15

URS

AN INTERNATIONAL PROFESSIONAL SERVICES ORGANIZATION

JOB NO. 35235 JOB NAME Onondaga Nation

MEMO OF TELECON

DATE 3/24/92 TELEPHONE 315-423-5476

PERSON CALLING Phyllis Cottle PERSON CALLED Jody Lewis

REPRESENTING URS REPRESENTING Bureau of Indian Affairs

PURPOSE OF TELECON AND/OR EQUIPMENT INVOLVED:

TEXT OF TELECON

There is a very limited municipal system on the Onondaga Nation.

These people living on the west side of Rt 11A are hooked up to this municipal system.

Everyone else has private wells.

Many people go to springs at the old dam or on Conesus St and collect water in buckets.

cc:

APPENDIX A

GEOPHYSICAL SURVEY REPORT AND RESULTS

GEOPHYSICAL INVESTIGATION AT

ONONDAGA NATION SITE B

SITE CODE NO. 734027

NYS STANDBY CONTRACT W.A. D002340-6

INACTIVE HAZARDOUS WASTE SITE

NEDROW, NEW YORK

Prepared for:
URS Consultants, Inc.
282 Delaware Avenue
Buffalo, New York 14202

Prepared by:
ECCO, Inc.
403 Main Street
515 Brisbane Building
Buffalo, New York 14203

Date: October, 1991

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2.0	Purpose of Investigation	3
3.0	Investigative Methodology	5
	3.1 Magnetometer Survey	5
	3.2 Seismic Survey	6
4.0	Results of the Investigation	8
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1 - Site Location Map
2 - Site Plan
3 - Magnetometer Grid Map at MW-1
4 - Magnetometer Grid Map at MW-2
5 - Magnetometer Grid Map at MW-3
6 - Magnetometer Grid Map at MW-4
7 - Magnetometer Grid Map at MW-5
8 - Distance versus Time Curve/Velocity Curve for Profile SP-1
9 - Model Response to Velocity Curve/Interpretive Model for SP-1
10 - Distance versus Time Curve/Velocity Curve for Profile SP-2
11 - Model Response to Velocity Curve/Interpretive Model for SP-2
12 - Distance versus Time Curve/Velocity Curve for Profile SP-3
13 - Model Response to Velocity Curve/Interpretive Model for SP-3
14 - Distance versus Time Curve/Velocity Curve for Profile SP-4
15 - Model Response to Velocity Curve/Interpretive Model for SP-4
16 - Distance versus Time Curve/Velocity Curve for Profile SP-5
17 - Model Response to Velocity Curve/Interpretive Model for SP-5
18 - Distance versus Time Curve/Velocity Curve for Profile SP-6
19 - Model Response to Velocity Curve/Interpretive Model for SP-6

Appendices

A-1 Diurnally Corrected Magnetometer Field Data for Locations MW-1 Through MW-5
A-2 Magnetometer Profiles for Locations MW-1 Through MW-5
B-1 First Arrival Times - Field Data
B-2 Seismic Model Data

1.0 INTRODUCTION

ECCO, Inc., was retained by URS Consultants, Inc. (URS), Buffalo, New York, to perform a geophysical investigation for a New York State standby superfund phase II investigation. The investigation was performed under URS's NYSDEC Standby Contract No. D002340-6 at the Onondaga Nation Site B Property (Site Code No. 734027) located in the Town of Nedrow, Onondaga County, New York.

The geophysical investigation consisted of two (2) phases: (1) a portable proton magnetometer (total earth field magnetics) survey and (2) a preliminary seismic survey. The magnetometer survey was conducted at grid locations generally centered at proposed subsurface drilling locations throughout the site. The purpose of the magnetometer investigation was drilling hazard identification. An open area magnetometer survey was also proposed for the site by URS. This open-area magnetometer survey has been deferred pending completion by the U.S. Environmental Protection Agency (USEPA) of ongoing site activities.

The purpose of the seismic survey was to determine the depth to bedrock along profile lines established in the field by the URS field representative and the New York State Department of Environmental Conservation (NYSDEC) on-site coordinator. Both the drilling location magnetometer and seismic surveys were completed during this investigation. The open area magnetometer survey was not performed.

Several magnetic anomalies were identified at the five (5) proposed drilling locations. It should be stressed that drilling sites MW-2 through MW-5 were located in areas of the site that contained considerable surface debris and fill. The resultant magnetic field intensity at these locations, therefore, has been affected by the surface debris and fills, as witnessed by the contoured field data.

The seismic survey was conducted along 648 meters (approximately 2,125 linear feet) of line equally divided into six (6), 108-meter profiles. Interpretive models generated by the seismograph software indicate that bedrock was encountered along profiles SP-1, SP-2 and SP-5. Bedrock could not be determined along profiles SP-3, SP-4 and SP-6 due to signal attenuation, presumably a result of subsurface, heterogeneous fill materials. By their nature, these fills may

restrict or scatter the penetration of the generated seismic waves and, therefore, limit the reception of deeper (i.e., bedrock) signals.

This report presents the results of the geophysical investigation conducted at the site on October 15, 21, 22 and 29, 1991, in the form of field data, magnetic profile lines along grid lines at the proposed drilling locations, associated density contour maps for each location and seismic profiles and model interpretations.

2.0 PURPOSE OF INVESTIGATION

ECCO, Inc., was retained by URS Consultants, Inc. (URS), of Buffalo, New York, to perform a geophysical investigation at a New York State Department of Environmental Conservation (NYSDEC) inactive hazardous waste site. The investigation was performed under URS's NYSDEC Standby Contract No. D002340-6 at the Onondaga Nation Site B Property (Site Code No. 734027) located in the Town of Nedrow, Onondaga County, New York (Figure 1, Site Location Map).

The geophysical investigation consisted of two (2) phases: (1) a portable proton magnetometer (total earth field magnetics) survey and (2) a preliminary seismic survey.

The magnetometer survey was conducted at established grids generally centered at proposed subsurface drilling locations MW-1 through MW-5 (Figure 2, Site Plan). An open-area magnetometer survey was also proposed for the site by URS. This open-area magnetometer survey has been deferred by URS and the NYSDEC to a later date pending completion of ongoing site activities by the U.S. Environmental Protection Agency (USEPA).

The purpose of the magnetometer investigation at the Onondaga Nation Site B Property was designed to accomplish the following goal:

- optimization of proposed subsurface drilling and monitoring well locations and drilling hazard identification.

This goal was accomplished in the field, at the site, on October 15 and 29, 1991, and during the preparation of this report. The initial magnetometer survey was performed on October 15, 1991. During the reduction of the magnetometer data, some data was lost necessitating a return to the site on October 29, 1991. This additional access to the site was arranged by URS and the NYSDEC.

Suggested alternate drilling locations are presented in subsequent sections of this report, along with the field data (corrected for diurnal variations), magnetic line profiles and a density contour map for each of the drilling locations. Examination of the density contour maps is limited to a qualitative interpretation of the observed magnetic anomalies.

A seismic survey was also performed along a total of six (6) lines, seismic profiles SP-1 through SP-6, established in the field by the URS and NYSDEC representatives (Figure 2, Site Plan). The purpose of the seismic investigation at the Onondaga Nation Site B Property was designed to accomplish the following goal:

- determination of the depth to bedrock along six (6) profiles.

This goal was accomplished on site on October 21 and 22, 1991, during collection of refraction seismic data and the subsequent reduction and interpretation of the data performed during the completion of this report.

3.0 INVESTIGATIVE METHODOLOGY

3.1 Magnetometer Survey

ECCO, Inc., established survey grid lines by taping methods at each of the five (5) drilling locations. These were generally centered at the URS markers. URS and the NYSDEC representatives located the drilling markers.

An on-site base station was established by ECCO, Inc., at the northern portion of the property, northeast of the nearby residence. The base station was established for the purpose of determining the diurnal variation of the earth's magnetic field during the survey. The selection of the base station required a diligent survey of the surrounding property to preclude man-made interference. However, on-site conditions such as overhead power lines, surface debris and vehicular traffic may have influenced the base station readings. Magnetic field intensity base station readings were obtained at approximately hourly intervals and at the beginning and end of the survey period on October 29, 1991.

An EG&G Geometrics Model G-856 proton magnetometer was utilized to obtain total intensity magnetic field measurements at each node point along the established grid lines. The node points were located with flagging at two (2)- to five (5)-foot intervals along the established grid lines.

The proton magnetometer utilizes the precession of spinning protons of the hydrogen atoms comprising the decane fluid surrounding the sensor. These spinning protons act as small magnetic dipoles. An electrical current is generated by the sensor coil, causing the protons to align themselves with respect to the coil. An electrical current is applied and removed by the magnetometer circuitry. As the electrical current is removed, the protons precess in the direction of the earth's magnetic field. This field is influenced by the presence of external interferences such as power lines, ferrous materials (drums, barrels, metallic fills, etc.) and magnetic minerals in the soil and bedrock.

A signal produced by the spinning protons generates a frequency which is proportional to the field intensity specific to the node point being measured. This field data is recorded by the

magnetometer and subsequently downloaded to a laptop computer for reduction and analysis. The data is corrected for diurnal variation, lines are reversed and resequenced, if necessary, and profiles and contour maps are generated. The diurnally corrected field data is presented in Appendix A-1. The profiles for the five (5) drilling locations are presented in Appendix A-2. The generated magnetic density contour maps are presented as Figures 3 through 7.

3.2 Seismic Survey

A refraction seismic survey was conducted along the previously described seismic profile lines. In this method an elastic pulse is generated at the ground surface and the resulting motion is detected by small seismometers known as geophones. The elastic pulse is generated by means of a falling weight (i.e., sledgehammer) striking a rubber plate. The use of a falling weight was deemed desirable at the subject property due to the unknown and potentially hazardous nature of the subsurface fills with regard to drums and waste.

Measurements of time intervals required for the elastic wave to travel from the source to the geophone are recorded and the velocity of propagation is calculated for the subsurface material(s). The velocity of propagation represents a velocity boundary which generally represents a change in the subsurface geology, although the two may not necessarily be the same.

An ABEM Miniloc seismic unit was utilized for the investigation. This unit consists of a recording terminal with a built-in graphic display and velocity calculation and modelling capabilities connected to a 108-meter-long electrical cable to which three (3), 14 Hertz (Hz) geophones have been attached. The geophones are attached near the ends of the cable and at the middle. Thirty-six (36) "shot points" are located at three (3)-meter intervals along the cable. The sledgehammer then generates the elastic waves at each of the "shot points." Internal stacking in the recording terminal indicates when sufficient signal strength has been generated. Once recorded, first arrival times are displayed on the terminal for editing and subsequent downloading and interpretation.

The ABEM Miniloc was chosen since the defined purpose of the seismic investigation was depth-to-bedrock determination. This unit provides this information when there is sufficient velocity contrast between the overlying drift or fill material and the

underlying bedrock. However, fill heterogeneity may cause signal attenuation and, therefore, signal loss prior to refraction at the bedrock interface.

The standard 108-meter profile layout of the ABEM Miniloc allows for simultaneous forward and reverse data collection and processing. That is, this standard layout does not require multiple "shot points" in both the forward and reverse directions to collect data along dipping velocity boundaries.

The first arrival times for the six (6) profile lines are presented in Appendix B-1. Appendix B-2 presents the ABEM Miniloc's interpretation of the calculated velocity data through a model representation. This model presents the number of layers interpreted, along with the velocity and depth of each velocity boundary or geologic unit. Figures 8 through 19 represent four distinct data sets: (1) distance versus time curves, (2) velocity curves, (3) model response to velocity curves, and (4) interpretive model curves for each profile.

4.0 RESULTS OF INVESTIGATION

The results of the geophysical investigation at the Onondaga Nation Site B property are limited to a qualitative analysis of (1) the magnetic field data presented in the form of profiles along drilling location grid lines and density contour maps and (2) first arrival times, velocity data and interpretive models for the seismic profiles.

4.1 Magnetic

Magnetic field intensity grid maps were prepared based on the geophysical investigation conducted at each proposed drilling location. These magnetic grid maps present density contours and profiles as generated by the EG&G Geometrics software, MAGPAC, and are presented as Figures 3 through 7. Total magnetic field anomalies were observed at the five (5) drilling locations (i.e., MW-1, MW-2, MW-3, MW-4 and MW-5). Based on the results of the base station readings, anomalies at drilling locations appear to reflect the total magnetic field intensity associated with on-site surface debris and fill materials.

Based on the extent of fill materials, it would be prudent, therefore, to relocate the proposed drilling locations to areas of relatively lesser total magnetic field intensity. Suggested alternate drilling locations, based on the orientation of the survey grid lines, are presented as follows:

- Proposed Drilling Location MW-1 (Figure 3):
  Alternate Location #1 - 15 feet north, 3 feet east of MW-1;

- Proposed Drilling Location MW-2 (Figure 4):
  Alternate Location #1 - 7 feet north, 5 feet west of MW-2;
  Alternate Location #2 - 7 feet north, 27 feet west of MW-2;

- Proposed Drilling Location MW-3 (Figure 5):
  Alternate Location #1 - 7 feet south, 3 feet west of MW-3;

- Proposed Drilling Location MW-4 (Figure 6):
  Alternate Location #1 - 12 feet north, 12 feet west of MW-4;

- Proposed Drilling Location MW-5 (Figure 7):
  Alternate Location #1 - 6 feet north, 2 feet west of MW-5

The magnetic field intensities at these proposed drilling locations represent one or all of the following conditions:

- small magnetic (metallic) objects at shallow depths;
- small magnetic (metallic) objects at greater depths;
- large magnetic (metallic) objects at shallow depths;
- large magnetic (metallic) objects at greater depths.

As previously stated, the surface is littered with both metallic and non-metallic automobile parts, piping, sheet metal, debris, soil and fill materials. The magnetic anomalies observed at the site (especially MW-2 through MW-5) were not readily attributable to any individual or specific surface debris source. These areas would require confirmatory investigation.

ECCO, Inc., strongly cautions against a literal interpretation of the magnetic data due to the following conditions:

- the location of the base station, although sited with due diligence, is within close proximity to the subject property and, therefore, within potential influence of both visible and concealed (subsurface) on-site metallic debris, overhead power lines and vehicular traffic;

- daily communications with the National Oceanic and Atmospheric Administration (NOAA) in Boulder, Colorado, during the magnetometer survey indicated that "medium" magnetic events were occurring on October 28 through 29, 1991. Although the data presented is corrected for the average diurnal variation, individual, undetected, solar magnetic events may have influenced the local magnetic field and, therefore, the data at unknown time intervals; and

- the extent of the surface and subsurface metallic debris and waste is uncertain. Surface debris exhibited a distinct effect on the local magnetic field, as indicated by the density contour maps, but the full affect was not known at the time of the survey.

It should be stressed that confirmation of the observed magnetic anomalies is usually achieved by means of excavation. The actual size, quantity, depth and relative spacing of the magnetic (metallic) objects will affect the magnetic field intensity readings and should be considered during the confirmatory excavation.

4.2 Seismic

Bedrock was encountered along seismic profiles SP-1, SP-2 and SP-5. Bedrock could not be determined along profiles SP-3, SP-4 and SP-6 due to signal attenuation, presumably a result of the subsurface, heterogeneous fill materials. By their nature, these fills may have restricted or scattered the penetration of the generated seismic waves and limited the reception of deeper (i.e., bedrock) signals.

Seismic Profile SP-1

This profile was performed in a southeast-to-northwest direction; the interpretive model, however, is generated by the ABEM Miniloc in a northwest-to-southeast direction. Four (4) velocity boundaries were encountered by the ABEM Miniloc with velocities of 117, 384, 1515 and 4999 meters per second (m/s), respectively. These velocities may be presumed to be associated with the following geologic materials:

- 117 m/s: loose, light, dry topsoil
- 384 m/s: moist loamy or silty soil
- 1515 m/s: wet, sandy soil
- 4999 m/s: limestone rock

The depth to bedrock varies from 2 to 6.5 meters (approximately 6.5 to 21 feet) below the surface grade along the profile.

Seismic Profile SP-2

This profile was performed in a southeast-to-northwest direction. Four (4) velocity boundaries were encountered by the ABEM Miniloc with velocities of 203, 701, 1904 and 5714 meters per second (m/s), respectively. These velocities may be presumed to be associated with the following geologic materials:

- 203 m/s: loose, light, dry topsoil
- 701 m/s: moist loamy or silty soil or gravel
- 1904 m/s: wet, sandy soil
- 5714 m/s: limestone rock

The depth to bedrock varies from 10 to 14 meters (approximately 33 to 46 feet) below the surface grade along the profile.

Seismic Profile SP-3

This profile was performed in a southwest-to-northeast direction. Three (3) velocity boundaries were encountered by the ABEM Miniloc with velocities of 125, 511 and 1086 meters per second (m/s), respectively. These velocities may be presumed to be associated with the following geologic materials:

- 125 m/s: loose, light, dry topsoil
- 511 m/s: moist loamy or silty soil or fill
- 1086 m/s: wet, sandy soil or fill

The depth to bedrock was not determined along this profile due to potential signal attenuation.

Seismic Profile SP-4

This profile was performed in a southeast-to-northwest direction. Three (3) velocity boundaries were encountered by the ABEM Miniloc with velocities of 146, 754 and 1333 meters per second (m/s), respectively. These velocities may be presumed to be associated with the following geologic materials:

- 146 m/s: loose, light, dry topsoil
- 754 m/s: moist loamy or silty soil or gravel
- 1333 m/s: wet, sandy soil

The depth to bedrock was not determined along this profile due to potential signal attenuation.

Seismic Profile SP-5

This profile was performed in a west-to-east direction. Five (5) velocity boundaries were encountered by the ABEM Miniloc with velocities of 229, 526, 714, 3333 and 6666 meters per second

(m/s), respectively. These velocities may be presumed to be associated with the following geologic materials:

- 229 m/s: loose, light, dry topsoil
- 526 m/s: moist loamy or silty soil or gravel
- 714 m/s: gravel or rubble
- 3333 m/s: weathered or fractured limestone
- 6666 m/s: limestone

The depth to bedrock varies from 12 to 15 meters (approximately 39 to 49 feet) below the surface grade along the profile.

Seismic Profile SP-6

This profile was performed in a south-to-north direction. Three (3) velocity boundaries were encountered by the ABEM Miniloc with velocities of 212, 500 and 775 meters per second (m/s), respectively. These velocities may be presumed to be associated with the following geologic materials:

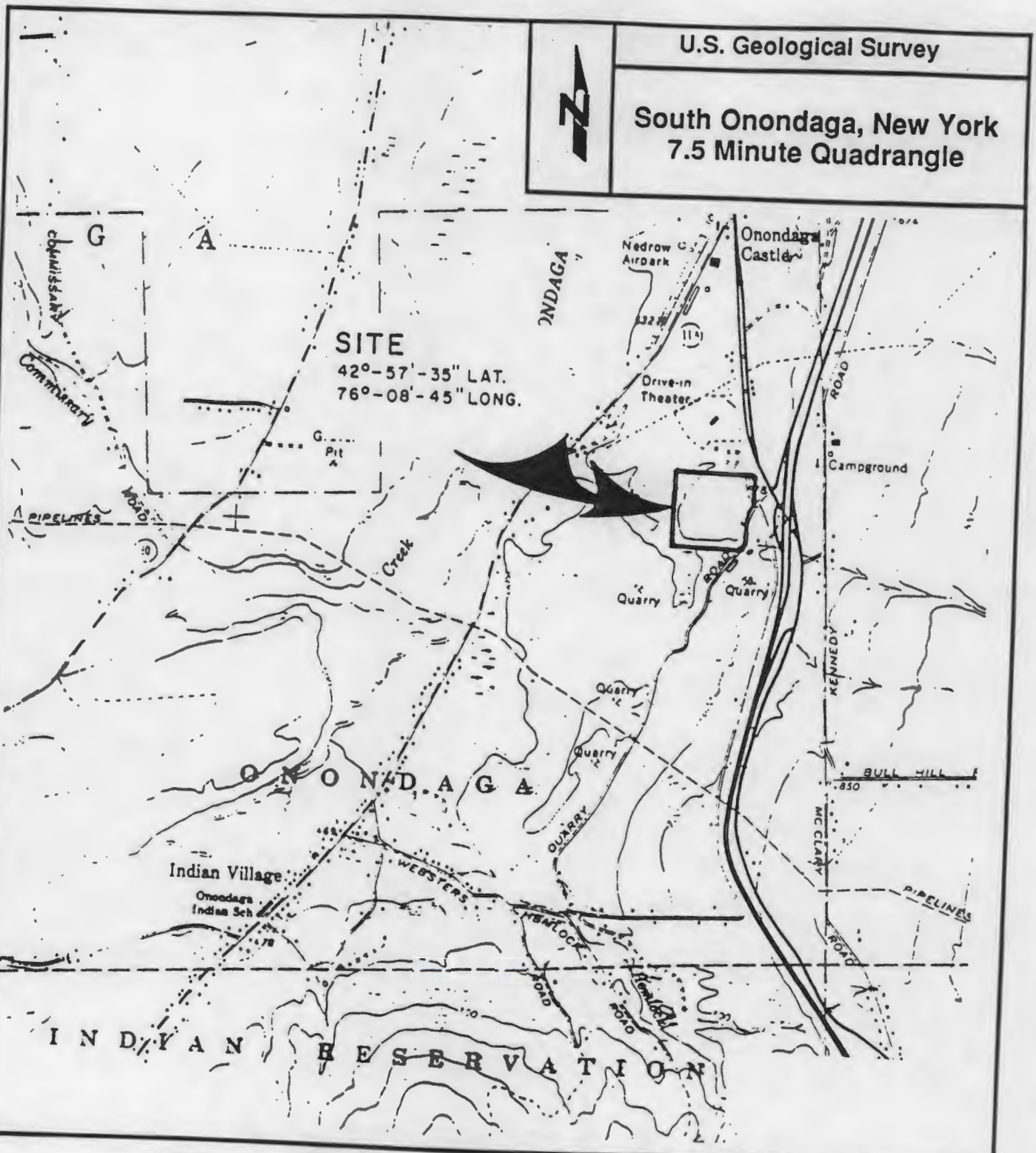
- 212 m/s: loose, light, dry topsoil
- 500 m/s: moist to wet loamy or silty soil
- 775 m/s: rubble or gravel

The depth to bedrock was not determined along this profile due to potential signal attenuation.

The velocity data of primary seismic waves in various materials was obtained from several sources including Lahee (1961), Jakosky (1957), Redpath (1973), Dobrin (1976) and Kesel (1976).

Due to the present nature of the on-site debris, drums and fill materials, ECCO, Inc., suggests that these materials be removed from the site or isolated if further seismic investigations requiring explosive charges are to be conducted.

Figures



Geophysical Investigation
Onondaga Nation Site "B"
Nedrow, New York

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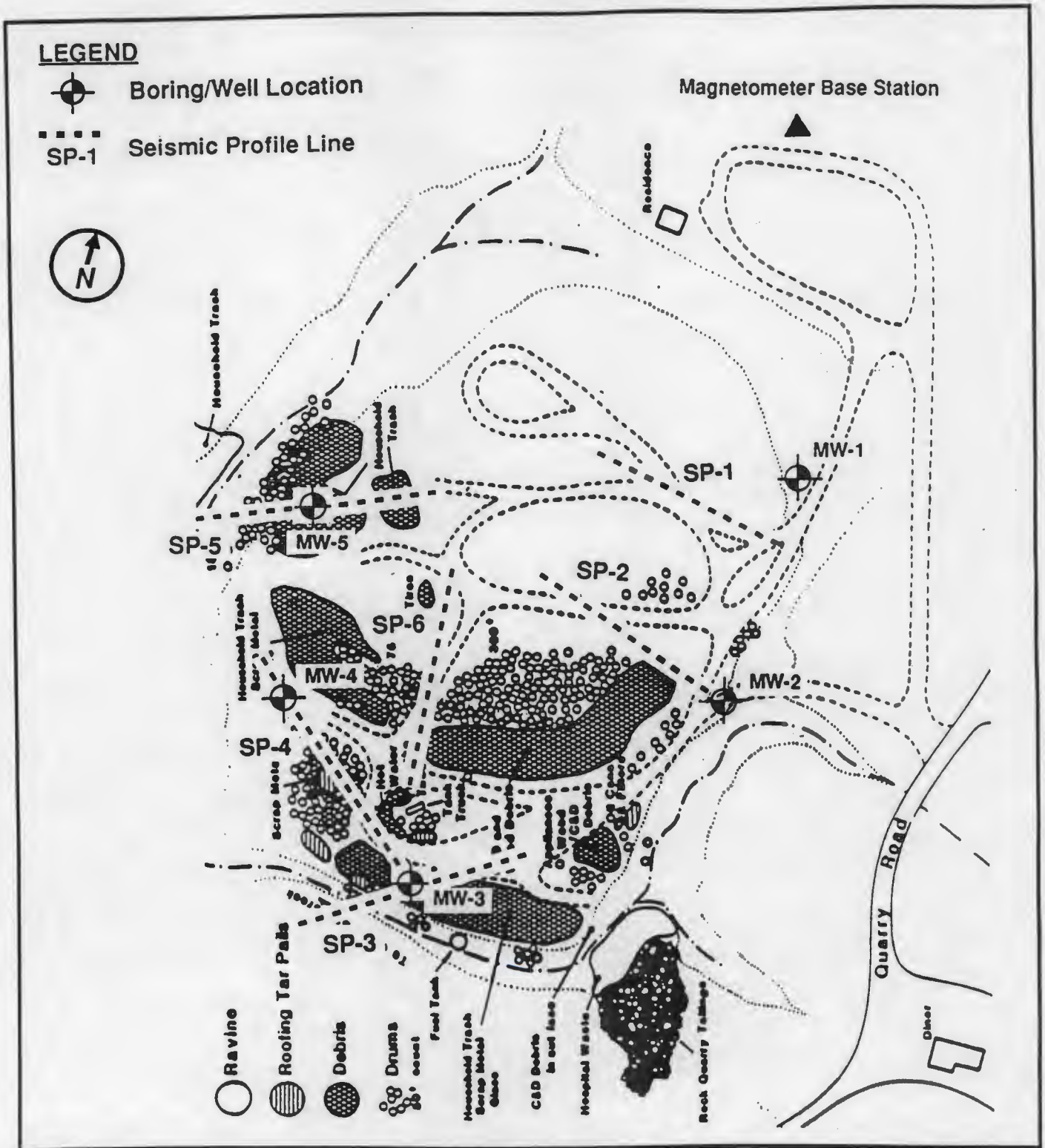
Figure 1
Site Location Map
Scale: 1" = 2,000'



Geophysical Investigation
Onondaga Nation Site "B"
Nedrow, New York

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Figure 2
Site Plan
Scale: None

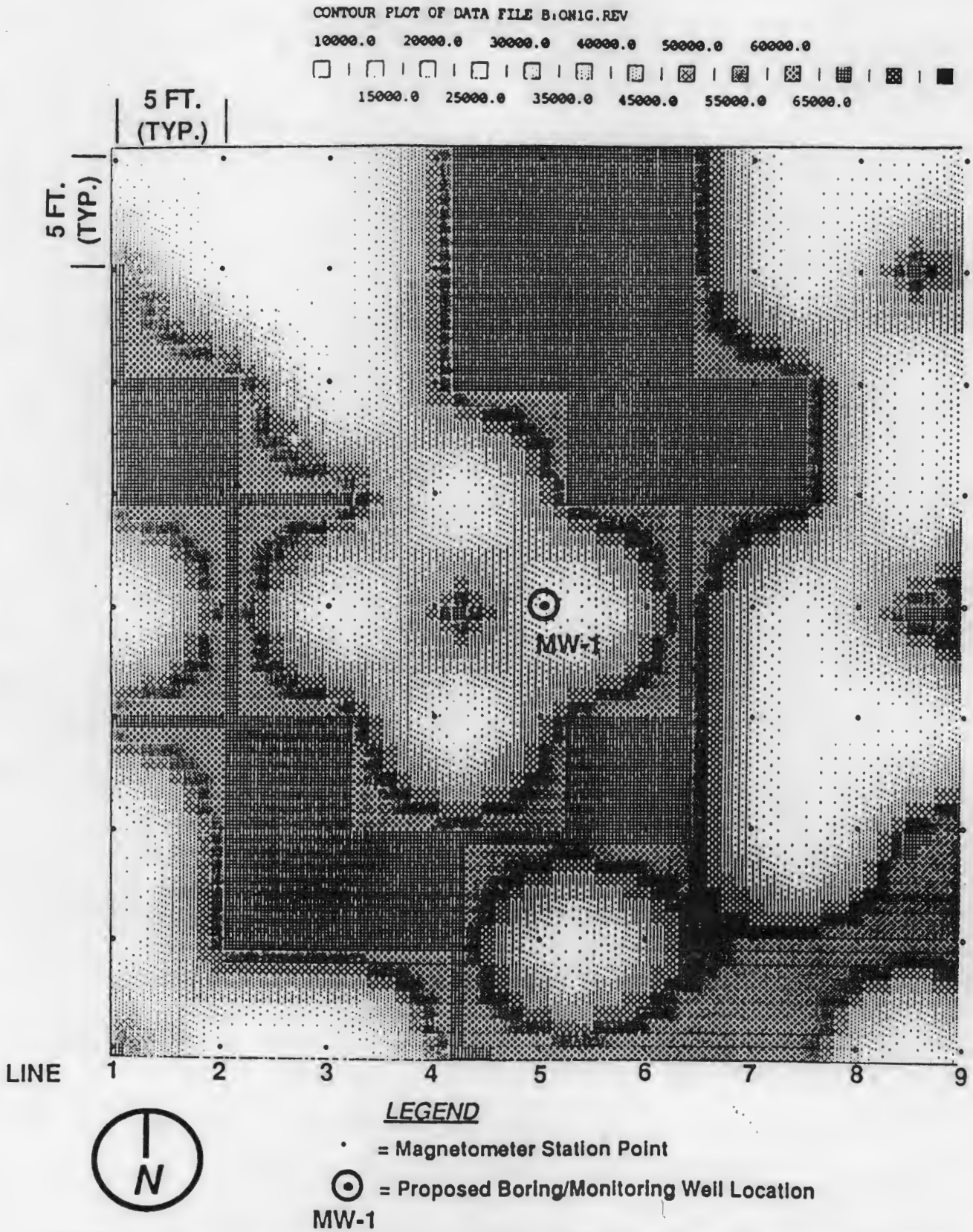

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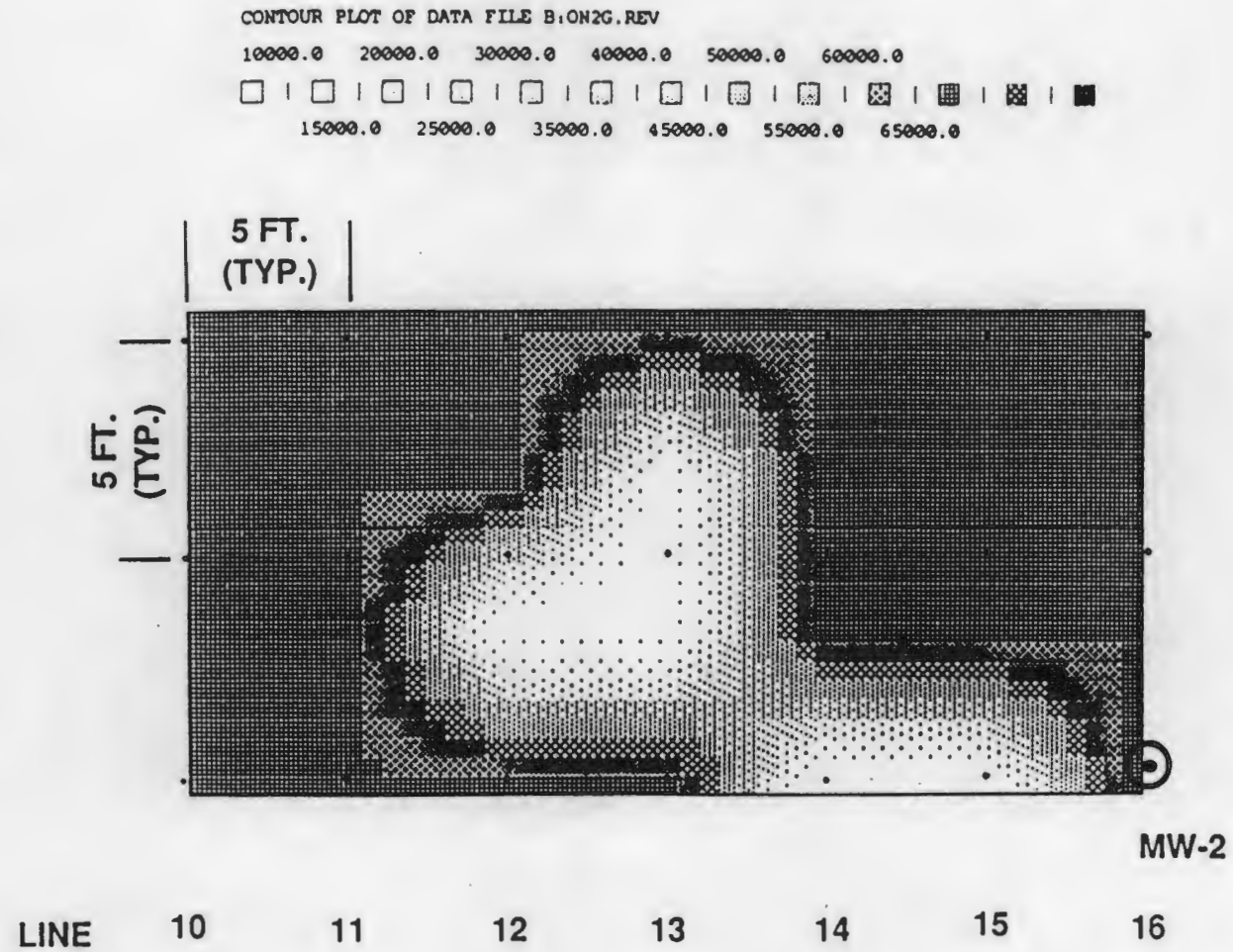
FIGURE 3 - Location MW-1
Magnetometer Grid Map
Onondaga "B" Site,
Nedrow, New York
October 29,1991



ecco INC. THE ENVIRONMENTAL CONSULTING COMPANY	FIGURE 4 - Location MW-2 Magnetometer Grid Map Onondaga "B" Site, Nedrow, New York October 29,1991

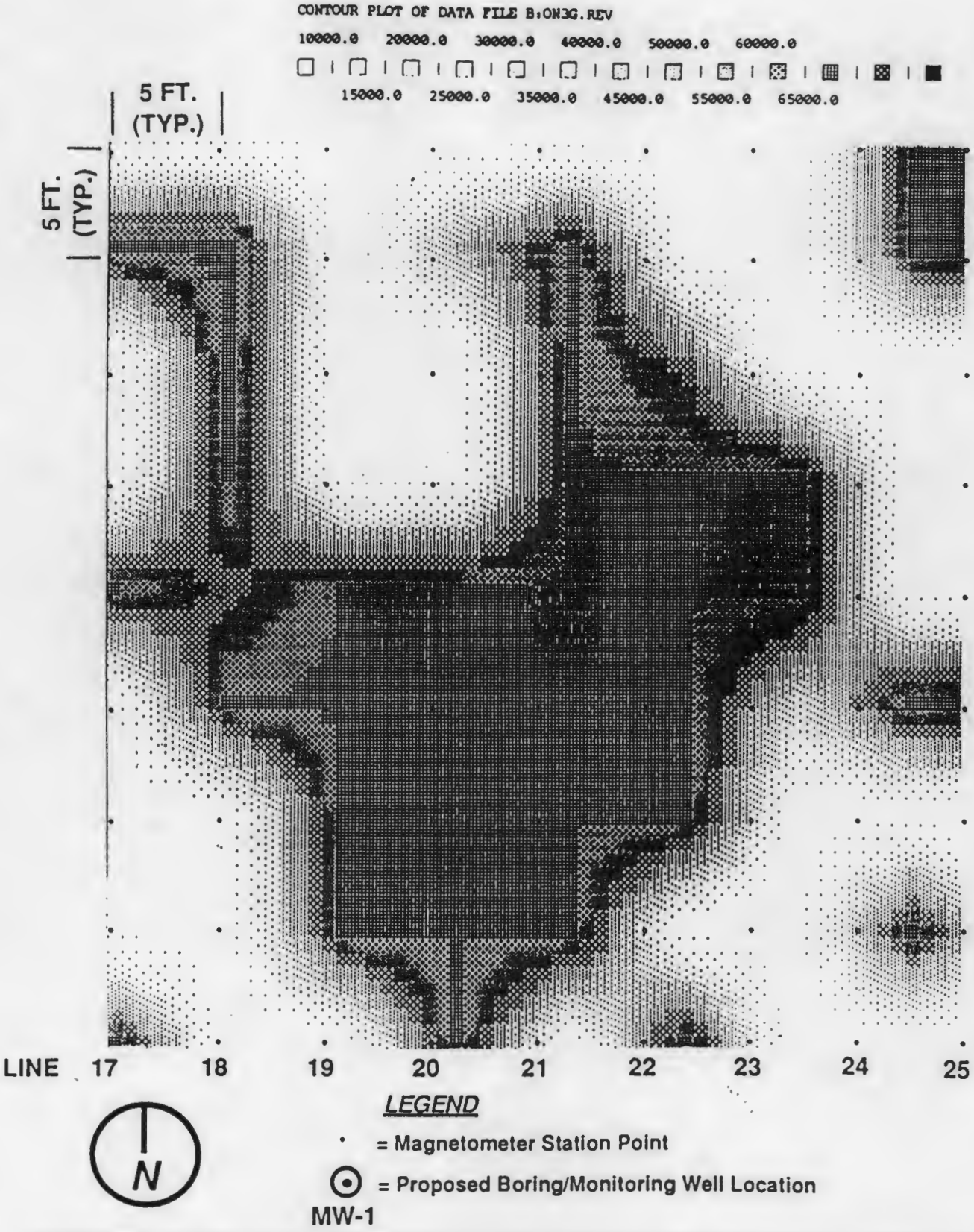


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FIGURE 5 - Location MW-3
Magnetometer Grid Map
Onondaga "B" Site,
Nedrow, New York
October 29,1991

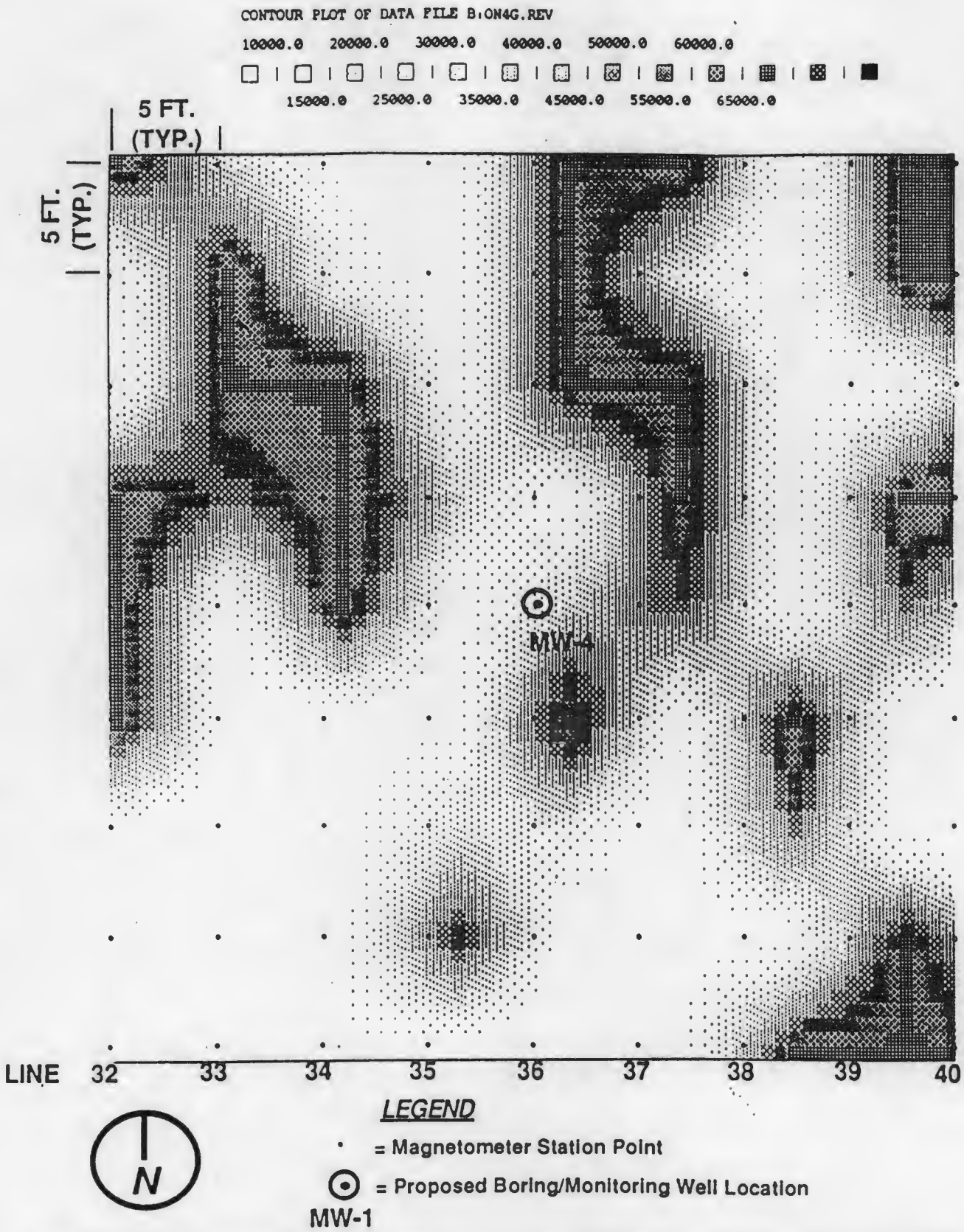

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FIGURE 6 - Location MW-4 Magnetometer Grid Map Onondaga "B" Site, Nedrow, New York October 29,1991

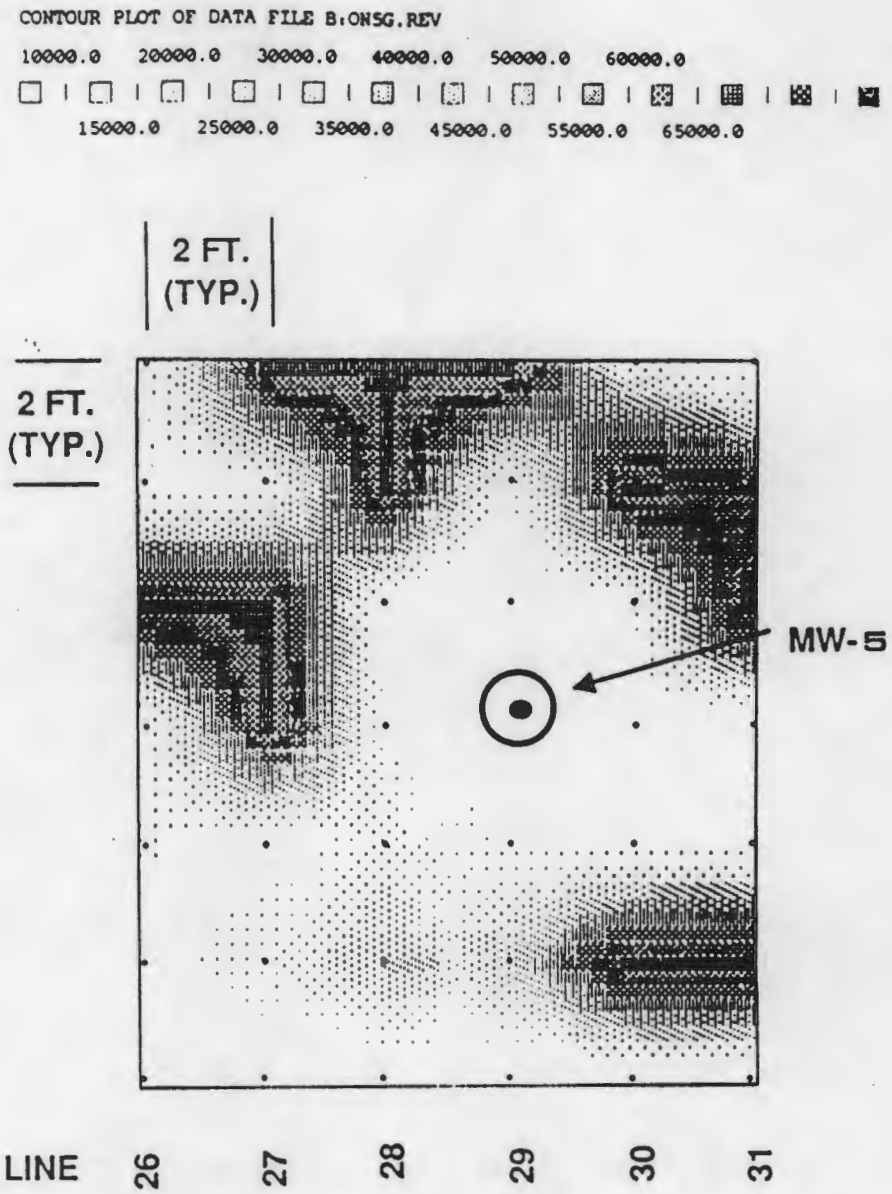

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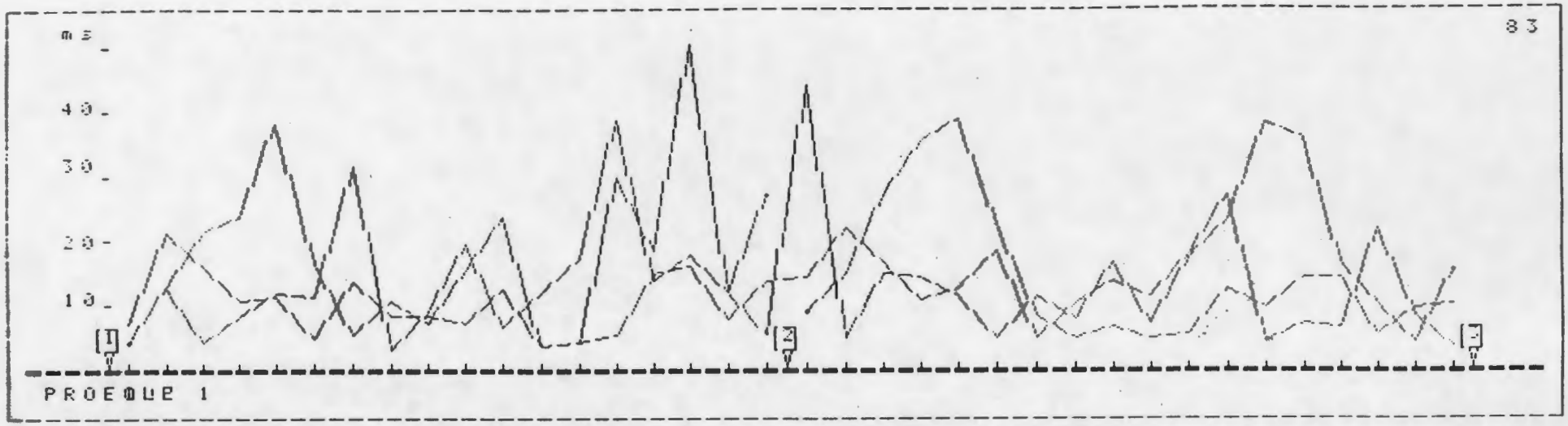
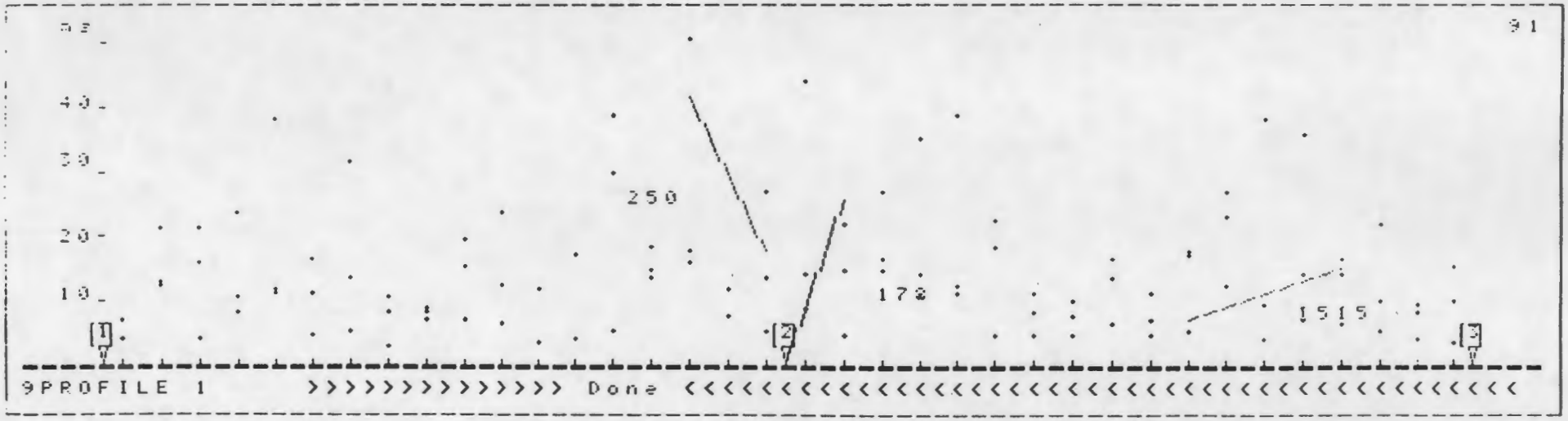
FIGURE 7 - Location MW-5
Magnetometer Grid Map
Onondaga "B" Site,
Nedrow, New York
October 29,1991



DISTANCE (x, meters) - TIME (t, seconds) CURVE


91
40
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9PROFILE 1
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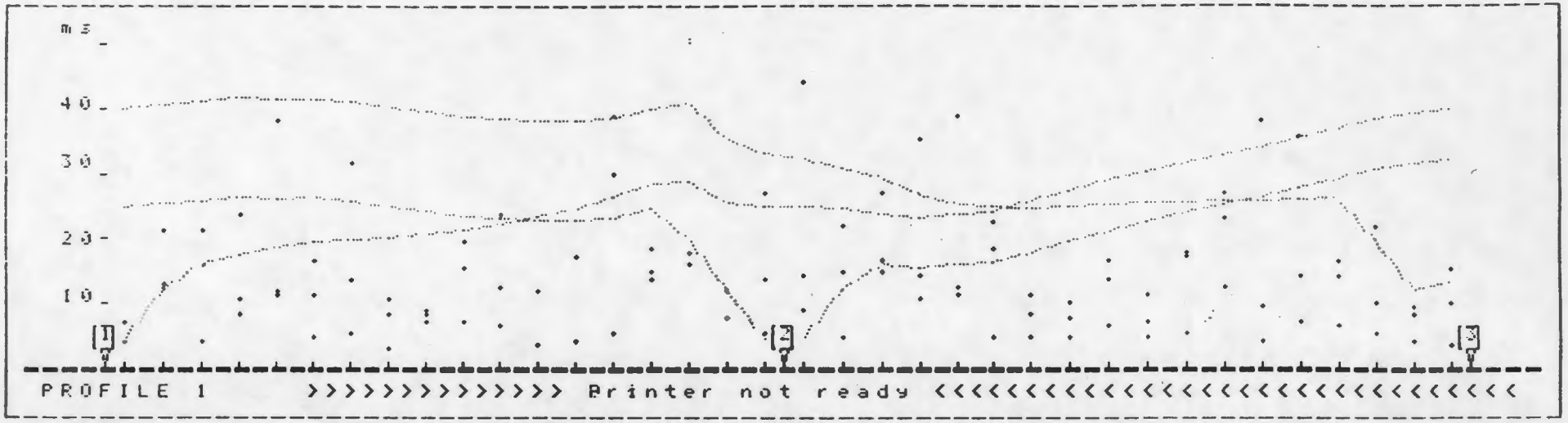
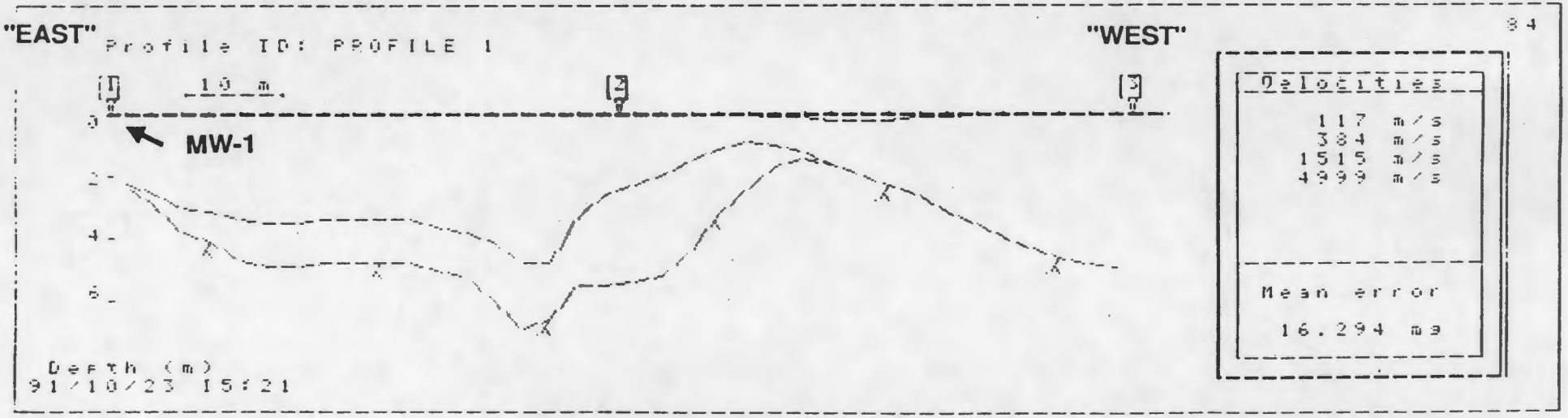


MODEL RESPONSE TO VELOCITY CURVE



INTERPRETIVE MODEL

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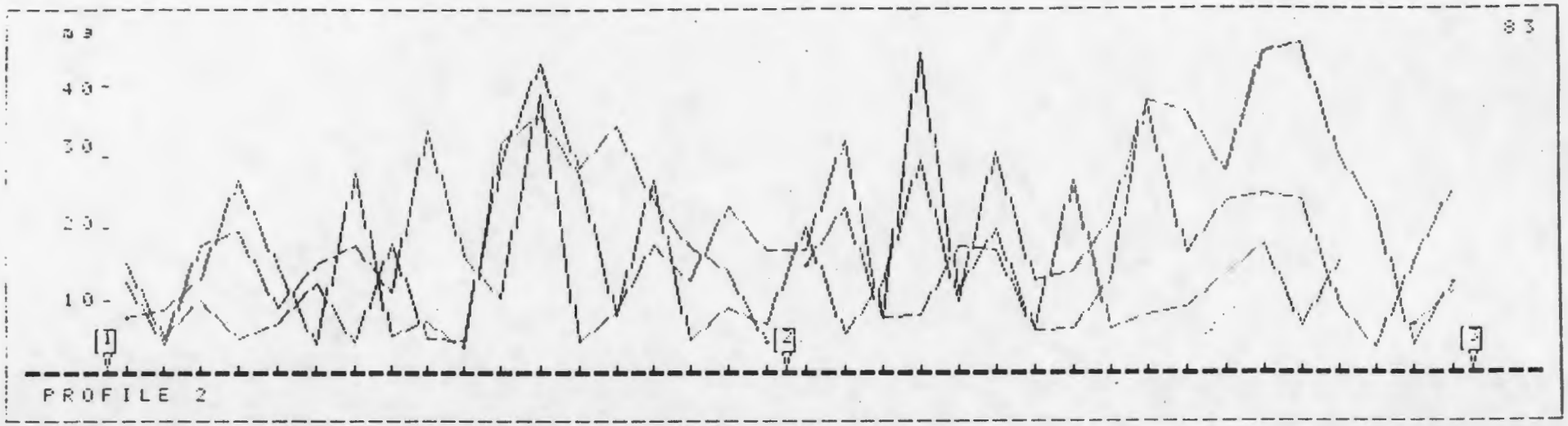
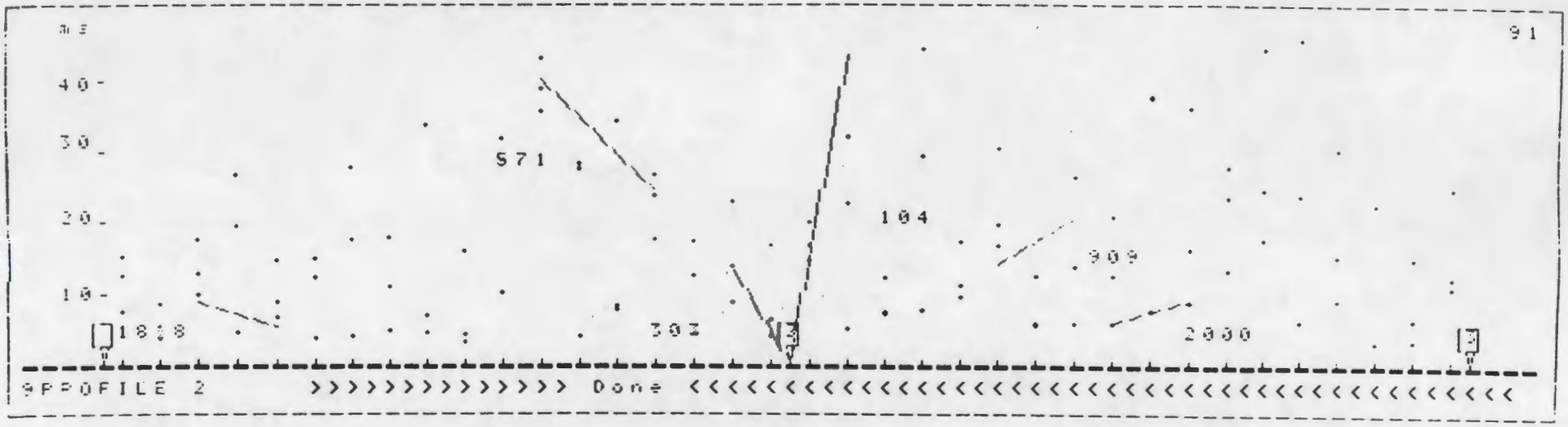
FIGURE 9 Profile SP-1
Onondaga "B" Site,
Nedrow, New York
October 22,1991

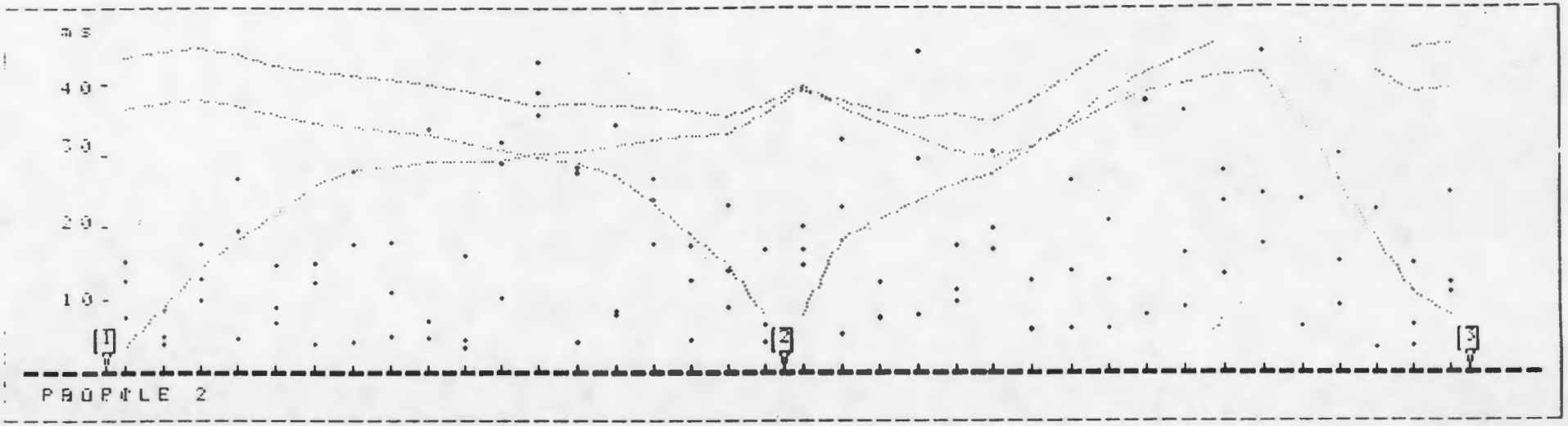


DISTANCE (x, meters) - TIME (t, seconds) CURVE

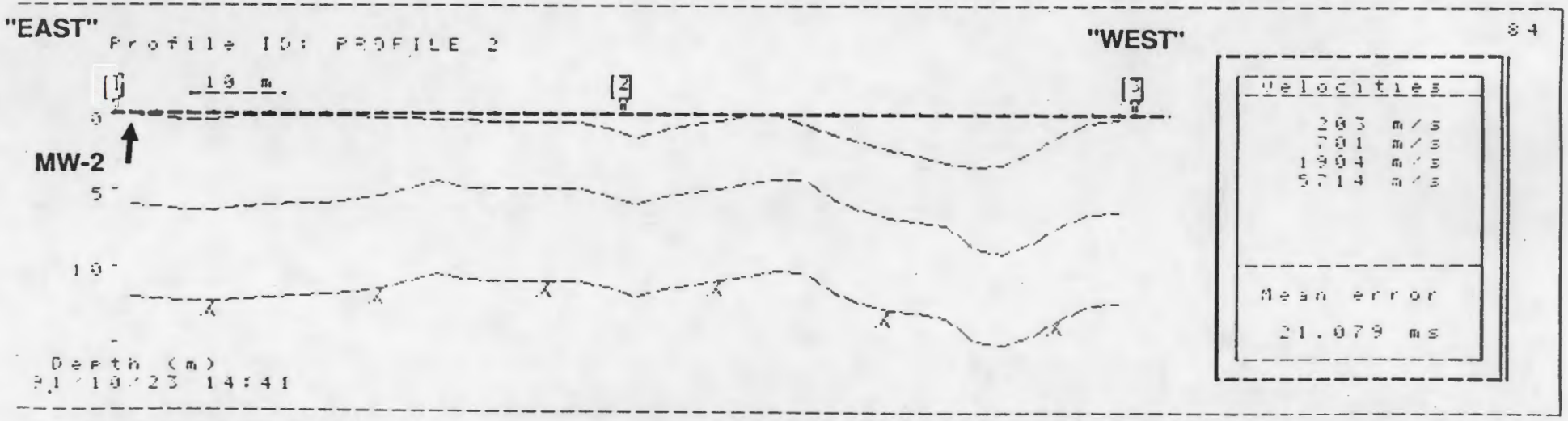


VELOCITY CURVE (meters/second)

ecco INC. THE ENVIRONMENTAL CONSULTING COMPANY	FIGURE 10 Profile SP-2 Onondaga "B" Site, Nedrow, New York October 22,1991



MODEL RESPONSE TO VELOCITY CURVE



INTERPRETIVE MODEL

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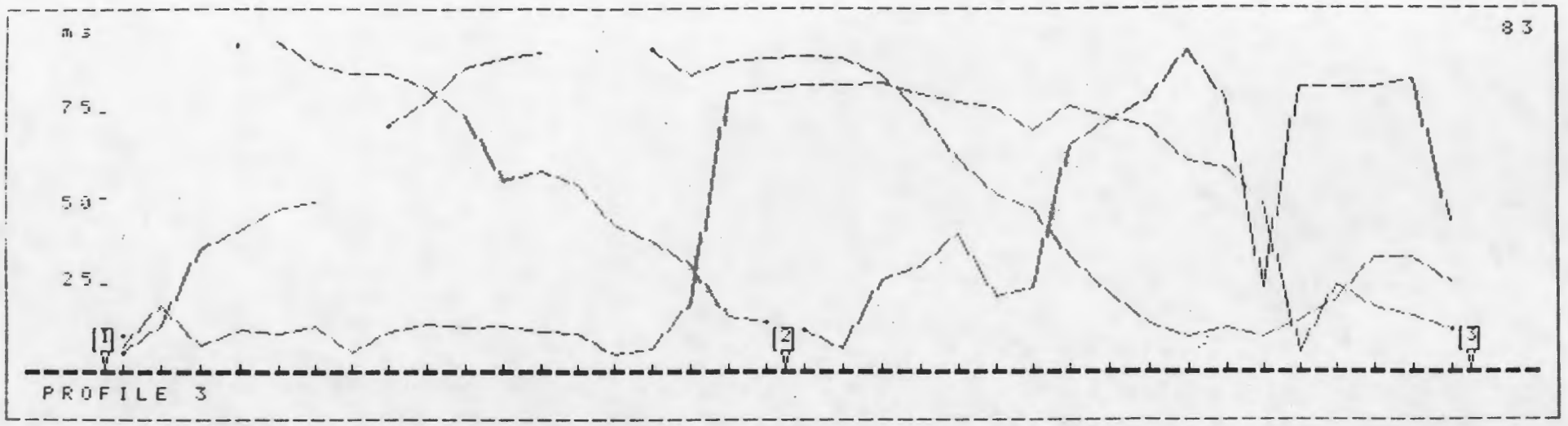
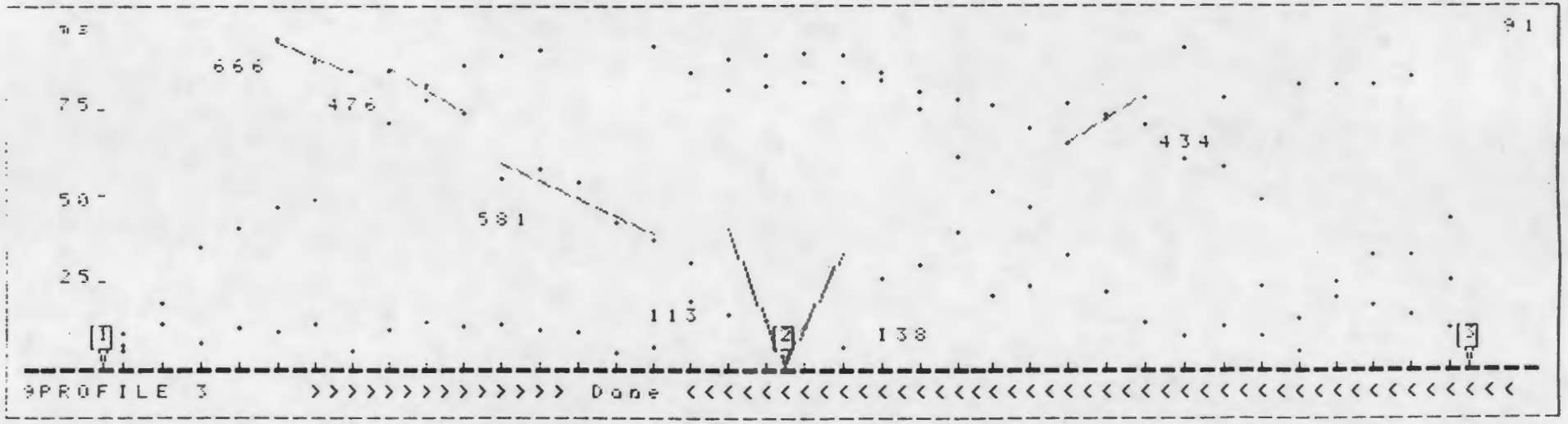
FIGURE 11 Profile SP-2
Onondaga "B" Site,
Nedrow, New York
October 22,1991



DISTANCE (x, meters) - TIME (t, seconds) CURVE



VELOCITY CURVE (meters/second)

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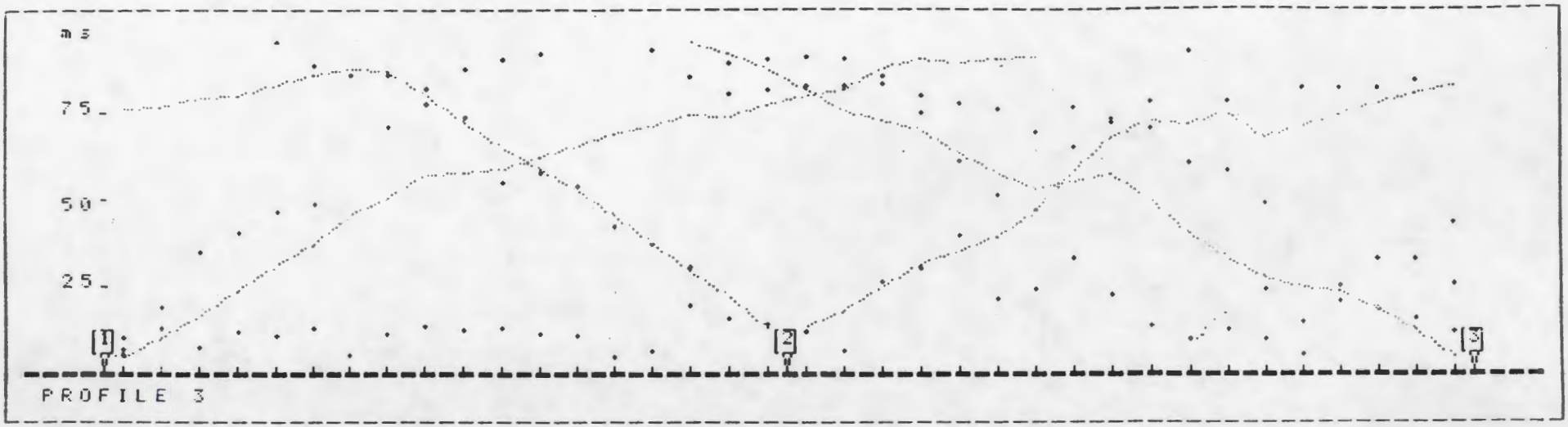
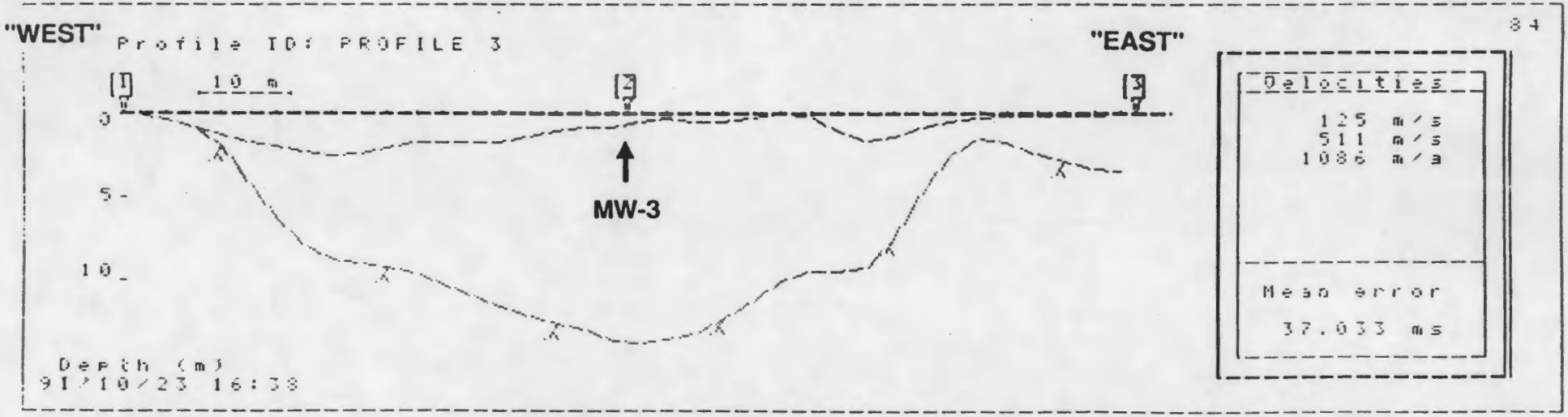
FIGURE 12 Profile SP-3
Onondaga "B" Site,
Nedrow, New York
October 22,1991



MODEL RESPONSE TO VELOCITY CURVE



INTERPRETIVE MODEL

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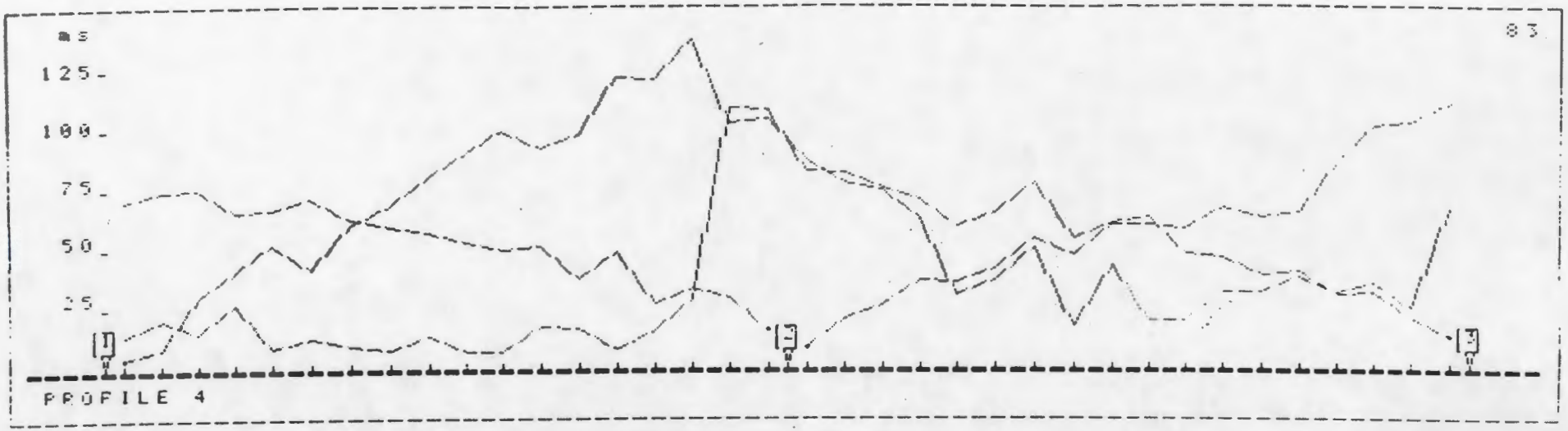
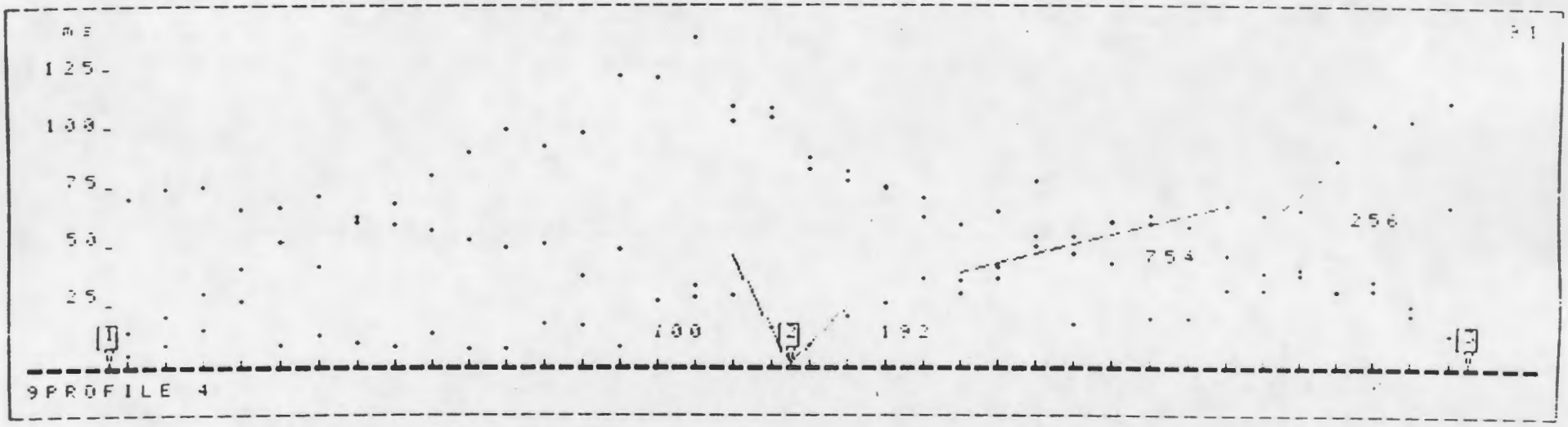
FIGURE 13 Profile SP-3
Onondaga "B" Site,
Nedrow, New York
October 22,1991



DISTANCE (x, meters) - TIME (t, seconds) CURVE



VELOCITY CURVE (meters/second)

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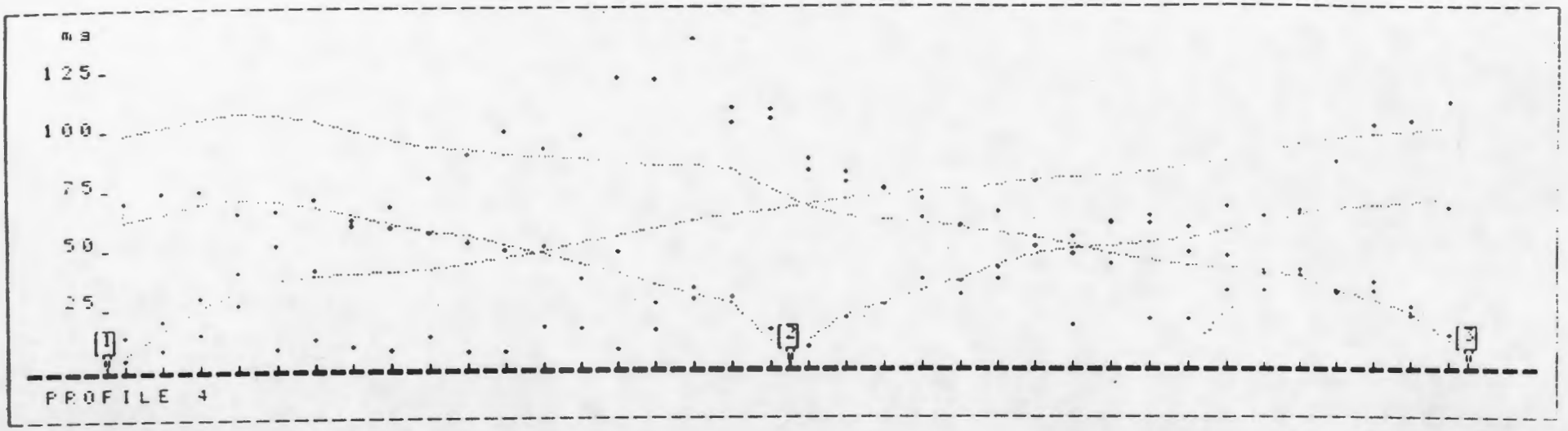
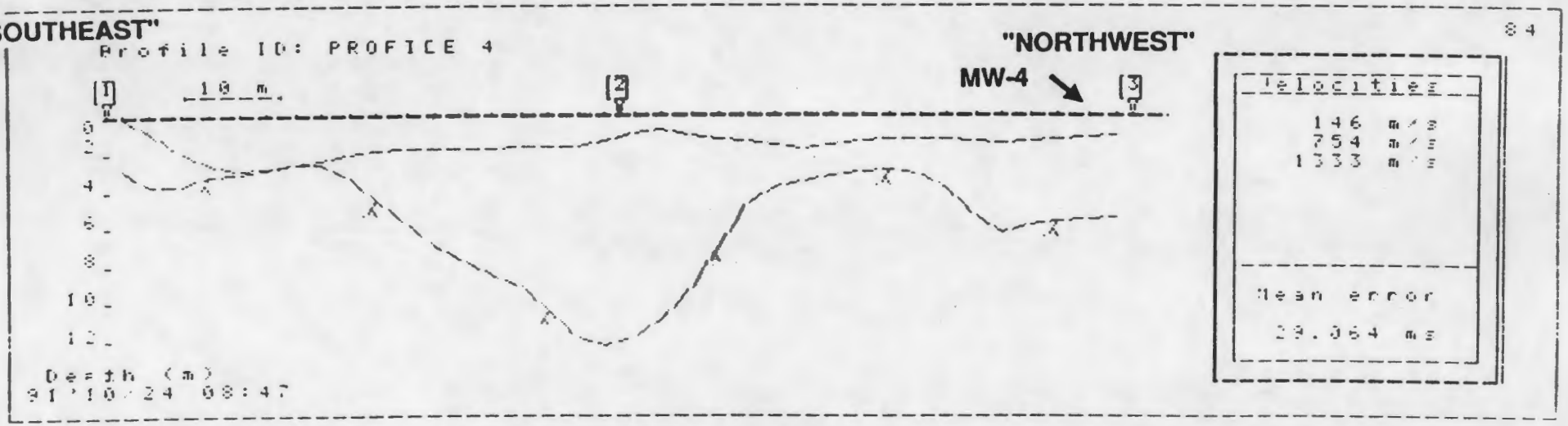
FIGURE 14 Profile SP-4
Onondaga "B" Site,
Nedrow, New York
October 22,1991



MODEL RESPONSE TO VELOCITY CURVE



INTERPRETIVE MODEL

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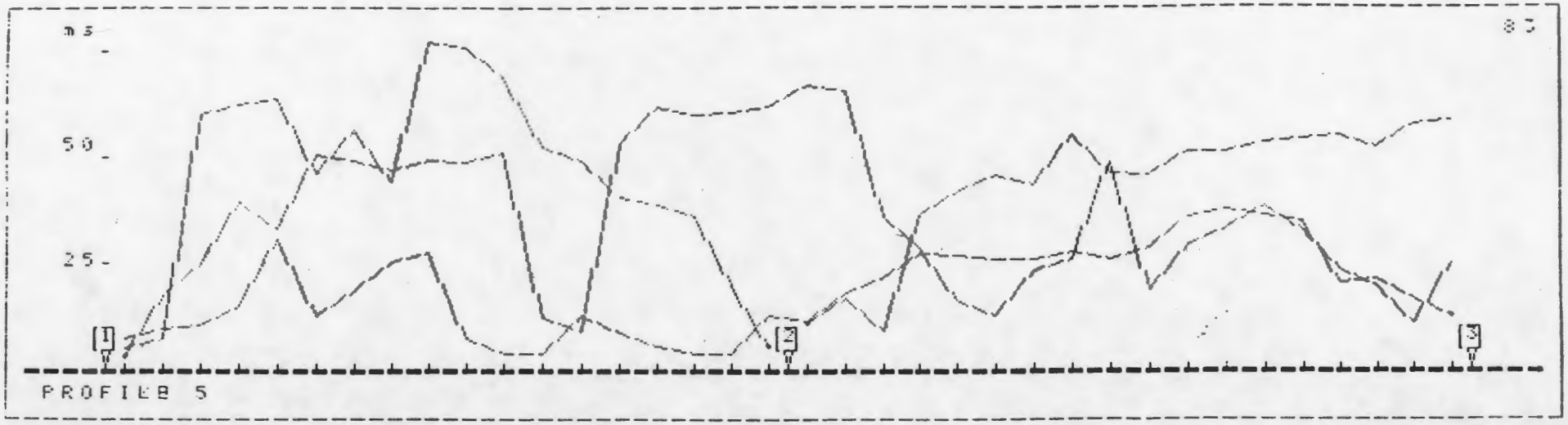
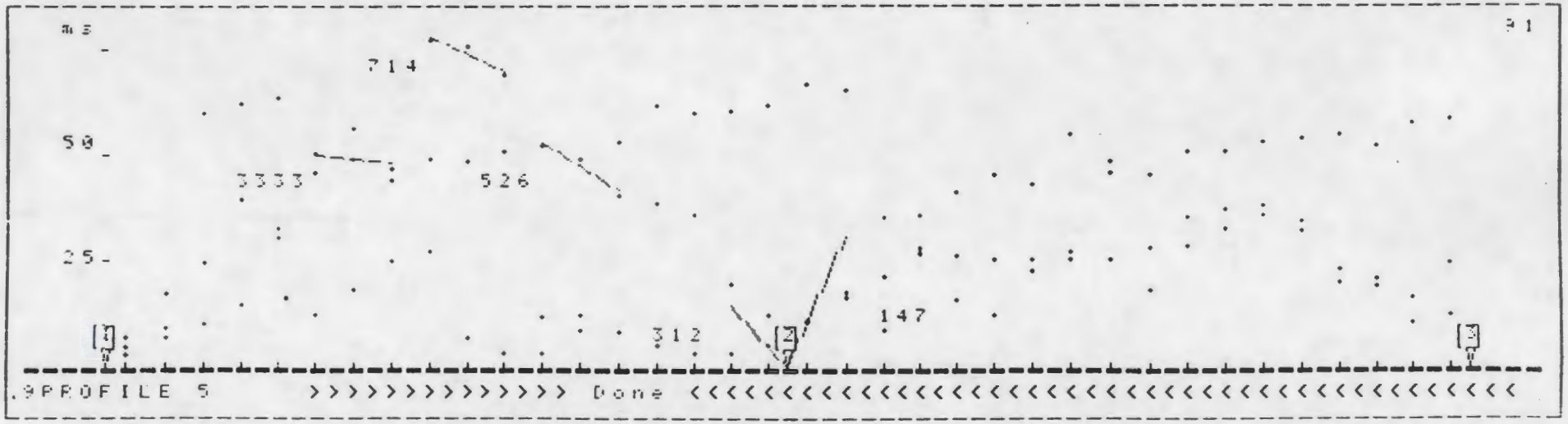
FIGURE 15 Profile SP-4
Onondaga "B" Site,
Nedrow, New York
October 22,1991



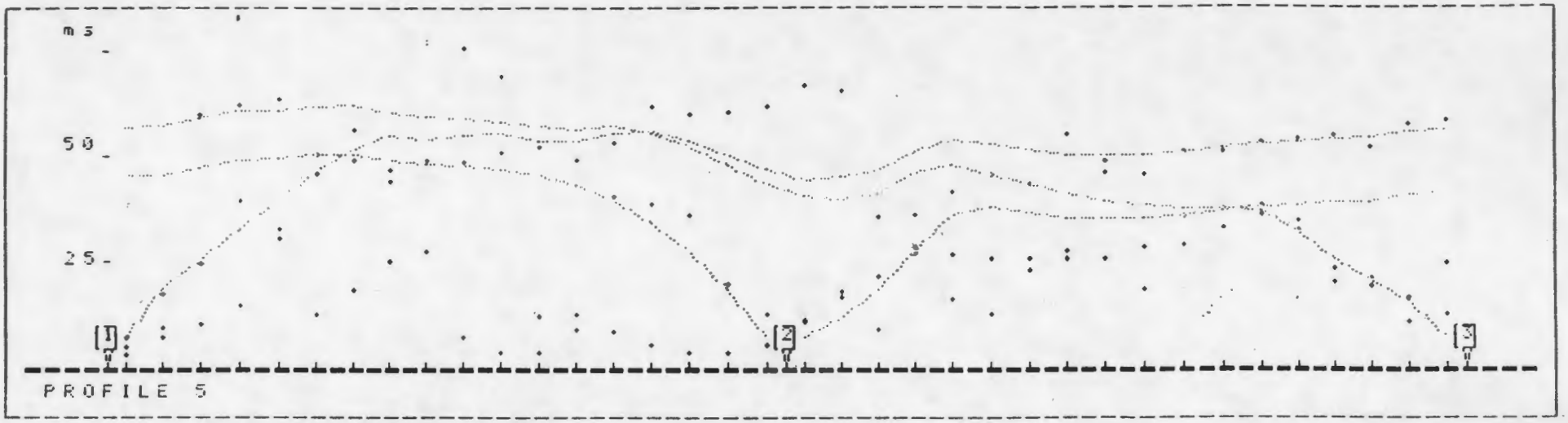
DISTANCE (x, meters) - TIME (t, seconds) CURVE



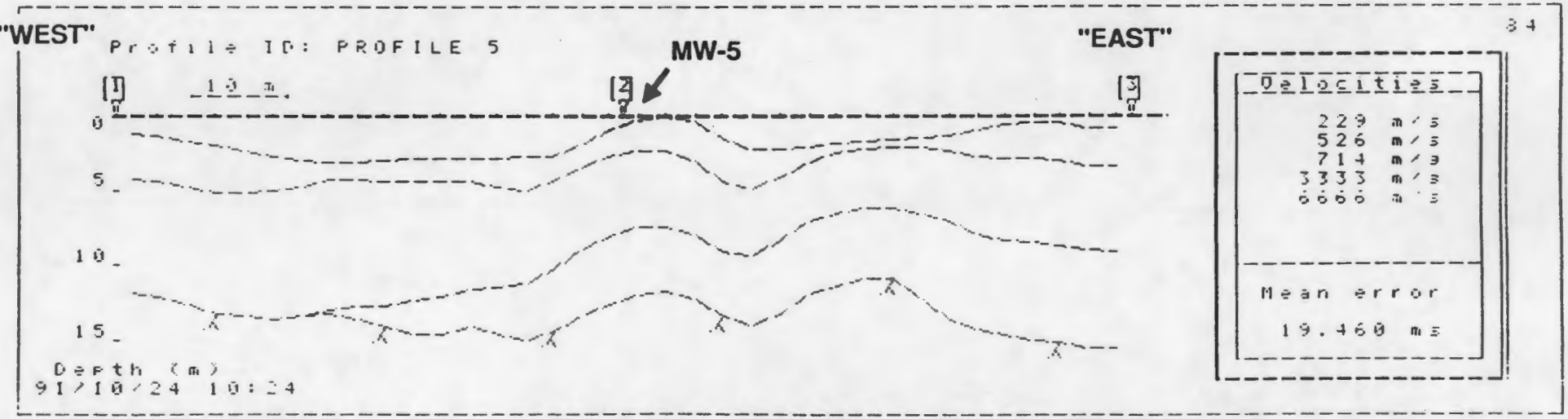
VELOCITY CURVE (meters/second)

ecco INC.
THE ENVIRONMENTAL CONSULTING COMPANY

FIGURE 16 Profile SP-5
Onondaga "B" Site,
Nedrow, New York
October 22,1991



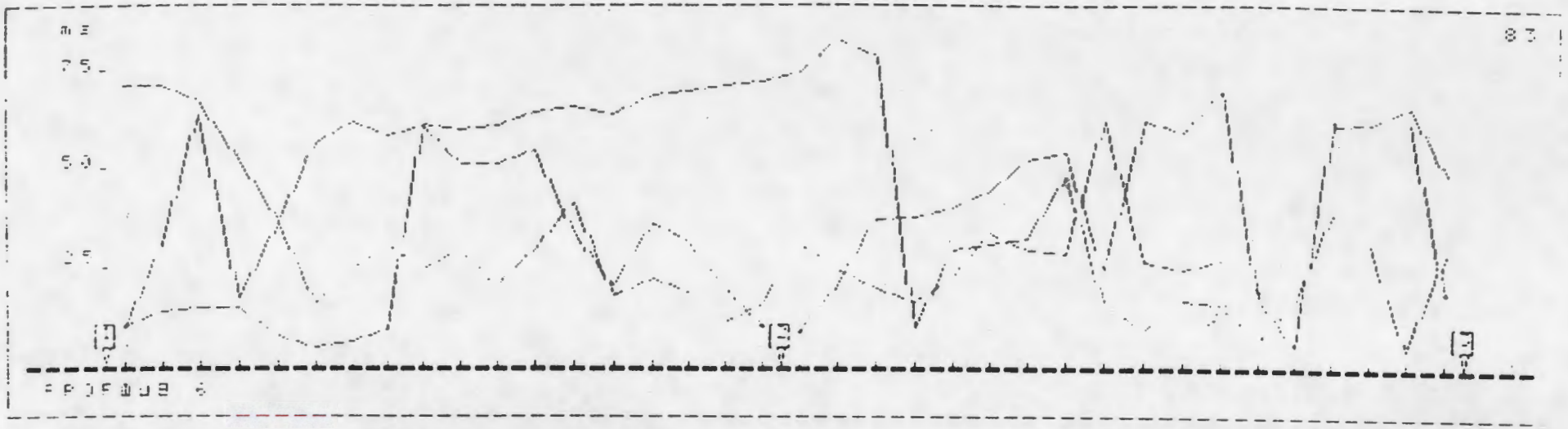
MODEL RESPONSE TO VELOCITY CURVE



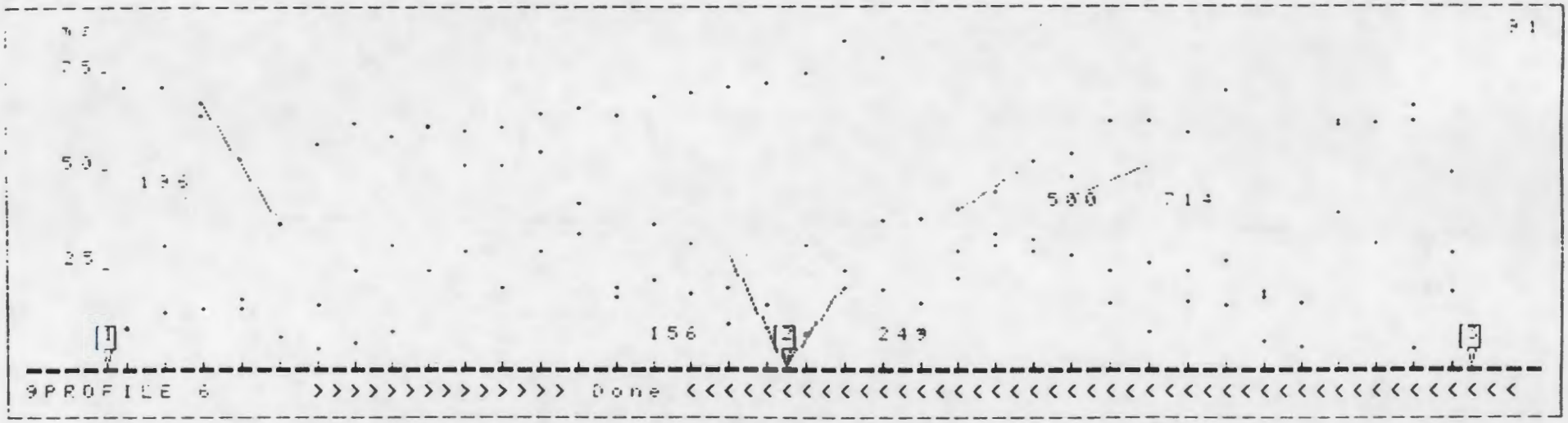
INTERPRETIVE MODEL

ecco INC.
THE ENVIRONMENTAL CONSULTING COMPANY

FIGURE 17 Profile SP-5
Onondaga "B" Site,
Nedrow, New York
October 22,1991

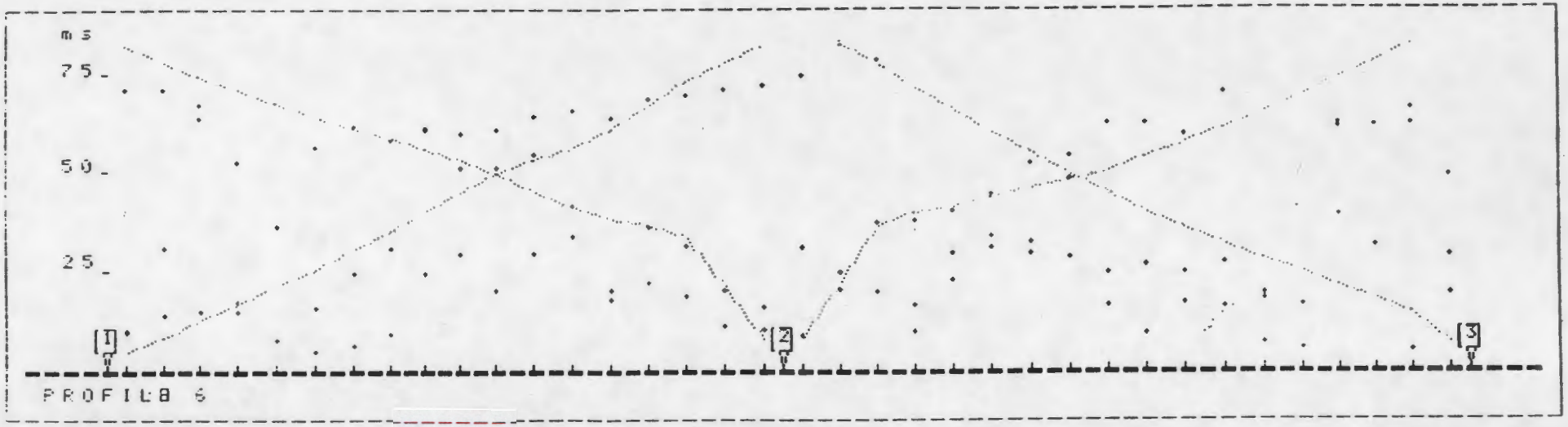


DISTANCE (x, meters) - TIME (t, seconds) CURVE

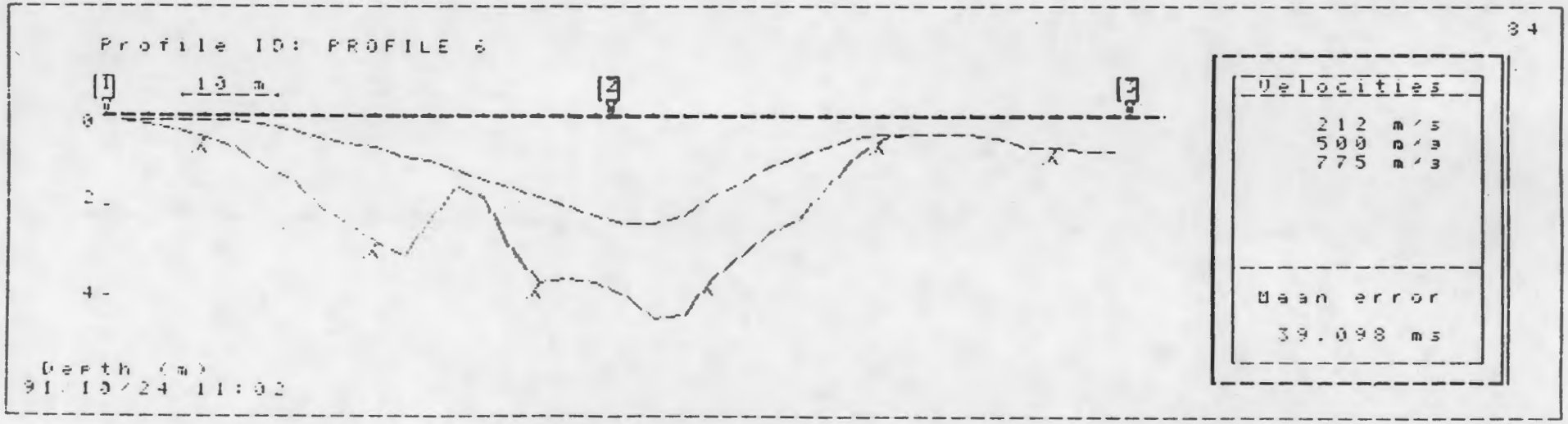


VELOCITY CURVE (meters/second)

ecco INC. THE ENVIRONMENTAL CONSULTING COMPANY	FIGURE 18 Profile SP-6 Onondaga "B" Site, Nedrow, New York October 22,1991



MODEL RESPONSE TO VELOCITY CURVE



INTERPRETIVE MODEL

ecco INC.
THE ENVIRONMENTAL CONSULTING COMPANY

FIGURE 19 Profile SP-6
Onondaga "B" Site,
Nedrow, New York
October 22,1991

APPENDIX B

TEST BORING/MONITORING WELL LOGS AND DETAILS

URS CONSULANTS, INC.
Definition of Terms Used to Describe Subsurface Materials

I. Soil Terms

A. Grain Size

Size Fraction	Subcategory	Dimensions (mm)
o Boulder		> 12 inch
o Cobbles		76.2 (3 inch)-12 inch
o Gravel	Coarse	76.2 - 19.1
	Fine	19.1 - 4.76 (#4 mesh)
o Sand	Coarse	4.76 - 2.0
	Medium	2.0 - 0.42
	Fine	0.42 - 0.074 (#200 mesh)
o Silt	(Non-plastic/ granular)	0.074 - 0.005
o Clay	(Plastic/ cohesive)	< 0.005

B. Moisture Condition

o Dry:	Absence of moisture, dusty, dry to the touch, cohesive soils generally hard.
o Moist:	Damp but no visible water, cohesive soils deform with moderate effort.
o Very Moist:	Soil is damp and contains appreciable water, cohesive soils pliable.
o Wet:	Soil is completely saturated and may be dripping, cohesive soils soft to very soft.

C. Consistency

Granular Soils		Cohesive Soils		
Term	Blows per Foot.N	Term	Blows per Foot.	Field Identification
o Very Loose	0 - 4	o Very Soft (<0.25 TSF)	<2	penetrated several inches by fist
o Loose	5 - 10	o Soft (<0.5 TSF)	3 - 5	penetrated several inches by thumb
o Medium Dense	11 - 30	o Medium Stiff (<1.0 TSF)	6 - 15	penetrated several inches with moderate effort
o Dense	31 - 50	o Stiff (<2 TSF)	16 - 25	indented by thumb with great effort
o Very Dense	Over 50	o Very Stiff (<4 TSF)	25 - 50	indented by thumbnail
		o Hard (>4 TSF)	>50	indented with difficulty by thumbnail

NOTE: Large particles in the soils will often significantly influence the blows per foot recorded during the Penetration Test.

D. Textural Class Description

Textural classification of a soil is determined based on the distribution of grain size fractions. The portions by weight of each soil fraction is commonly used as the basis for determining textural class as follows:

- o Primary component: >35% grain size fraction
- o Secondary component: 15 - 35% grain size fraction

Example: Sample with 60% fine sand and 25% silt, described as Silty Fine Sand

Modifying Terms:

AND	Indicates approximately equal amounts of materials, such as a sand and gravel mixture. If the materials occur in thin separate seams, it is noted in the detailed work classification. The thickness is given where possible. Example: Medium dense sand and gravel, or dense interbedded coarse sand and gravel (1/4" - 3/4" thick)
SOME	Indicates a significant amount (10-25%) of the accessory material. Example: Medium dense silty sand - some gravel
TRACE	Indicates a minor amount (<10%) of the accessory material. Example: Loose silty sand - tracel of gravel
INTERBEDDED	Used to describe thin alternating seams. Thickness is given where possible. Example: Stiff interbedded silt and clay (approx. 1/16" thick)
POORLY GRADED	Indicates coarse grain soil that has a predominant grain size. Example: Poorly graded fine sand, trace silt
WELL GRADED	Indicates coarse grain soil that has a wide range of grain sizes. Example: Well graded silty sand, some fine gravel (15-20%)

3196A

E. Mass Structure

Term	Characteristic
Layer	Soil unit more than 6" thick
Seam	Soil unit less than 6" thick.
Parting	Soil unit less than 1/8" thick.
Stratified	Alternating seams of varying material with layers greater than 1/8" thick.
Laminated	Alternating lamina of varying soil with layers less than 1/8" thick.

II. ROCK TERMS

A. Sedimentary Rock Classification

Rock Type	Characteristics
Sandstone	Made up predominantly of granular material ranging between 1/16 and 2 mm in diameter.
Siltstone	Made up of granular materials less than 1/16 mm in diameter Fractures irregularly. Medium thick to thick bedded.
Claystone	Very fine grained rock made up of clay materials. Fractures irregularly. Very smooth to touch. Generally has irregularly spaced pitting on surface of drilled cores.
Shale	A fissile very fine grained rock. Fractures along bedding planes.
Limestone	Rock made up predominantly of calcite (calcium carbonate) effervesces upon the application of hydrochloric acid.
Coal	Rock consisting mainly of organic remains.

B. Modifying Terms

SEAM/LENS	Areally continuous/discontinuous bed Example: Coal seam/sandstone lens
SOME	Indicates significant (15 to 40 percent) amounts of the accessory material. Example: Rock composed of sandstone (70%) and seams of shale (30%) would be: sandstone, some shale seams
FEW	Indicates minor (0-15 percent) amounts of the accessory material. Example: Rock composed of sandstone (90%) and seams of shale (10%) would be: sandstone, few shale seams
INTERBEDDE	Used to indicate thin or very thin alternating seams of material occurring in approximately equal amounts. Example: Rock composed of sandstone (50%) and shale (50%) seams would be: interbedded sandstone and shale

C. Hardness

Term	Definition
Soft	Scratched by fingernail
Medium Hard	Scratched easily by knife
Hard	Scratched with difficulty by penknife
Very Hard	Cannot be scratched by penknife

D. Brokenness

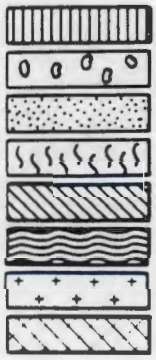
Terms	Spacing
Very Broken (V.BR.)	< 2 inches
Broken (BR.)	2 in. - 1 ft.
Blocky (BL.)	1 ft. - 3 ft.
Massive (M.)	3 ft. - 10 ft.

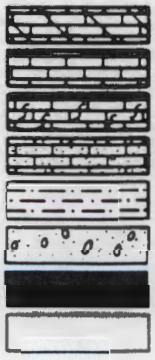
E. Bedding

Term		Dimensions
Very Thin	Natural breaks	<1"
Thin Bedded	in Rock Layers	1" - 4"
Bedded		4" - 12"
Thick Bedded		12" - 36"
Massive		>36"

RQD - Rock Quality Designation is cumulative length of pices of core equal to or greater than four inches in length divided by the total length of core run. expressed as a percentage.

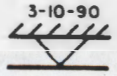
LEGEND





Length of Core Recovered

Length of Drill Run



Groundwater Level and

Date of Observation

60/0.3

Indicates 60 Blows Required for Split Barrel to Penetrate 0.3 Feet

Approximate Top of Rock

31968

URS CONSULTANTS, Inc.

TEST BORING LOG
BORING NO. MW-1

PROJECT: ONONDAGA NATION - SITE B
CLIENT: NYSDEC
BORING CONTRACTOR: AMERICAN AUGER
GROUND WATER:

DATE	TIME	LEV	TYPE
12/11	9:30A	22.0'	Hole at 23'*
12/12	9:50A	21.9'	Top of Riser
12/18	1:40P	22.50	Top of Riser

* Measurements From GRADE

	CAS.	SAMP	CORE	TUBE
TYPE		SS (Split-Spoon)		
DIA.		2"		
WT.		140lb.		
FALL		30"		

* POCKET PENETROMETER READING

SHEET NO. 1 OF 1
JOB NO.: 35235.12
BORING LOCATION: Side Gradient
GROUND ELEVATION: 523.67
DATE STARTED: 12/11/91
DATE FINISHED: 12/11/91
DRILLER: Rocky BAYE
GEOLOGIST: DANIEL Sheldon
REVIEWED BY:

DEPTH FT	STRATA	SAMPLE NO.	SAMPLE TYPE	BLOWS PER 6"	RECOVERY RQD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS	HNU (ppm)	REMARKS
		S-1	SS	2 6 / 5 5	35	GRAY-BRN	MED STIFF	Clayey Silt, TRACE to Some well SORTED GRAVEL	ML	0.0	• SL. MOIST
										–	• HARD Augering 3-4'
5		S-2	SS	12 17 / 11 9	20	BRN	STIFF			0.0	• Limestone Frags. at 6'
										–	
9											
10		S-3	SS	13 9 / 7 6	45	BRN	MED DENSE	FINE to MEDIUM SAND, Few COARSE SAND AND GRAVEL Seams (6" TYP) TRACE Silt	SW	4.0	• MOIST • ENVIRONMENTAL SAMPLE 9-11'
										–	
15		S-4	SS	3 5 / 7 7	50	Lt. BRN				0.0	• V. MOIST AT 15'
										–	
20	12/18	S-5	SS	7 7 / 11 13	60	DARK BRN	MED DENSE	FINE to COARSE SAND AND GRAVEL, trace Silt AND Clay	SW-GW	0.0	• Wet at 20.5'
21		S-6	SS	7 6 / 6 4	25					0.0	• Geotech. Sample 23-25'
25		S-7	SS	8 6 / 6 7	35					0.0	
		S-8	SS	8 12 / 11 10	30					0.0	
28.5'		S-9	SS	3 4 / 4 7	40		LOOSE			0.0	
						RD/BRN	MED STIFF	CLAY, SOME Silt, tr. SAND	CL		
30	END OF BORING							Boring Completed AT 21.5'			
35											

COMMENTS Hole ADVANCED with A Mobile B-57 drill rig equipped with 4¼" Augers. PID readings taken on Split Spoon SAMPLES AND drill cuttings.

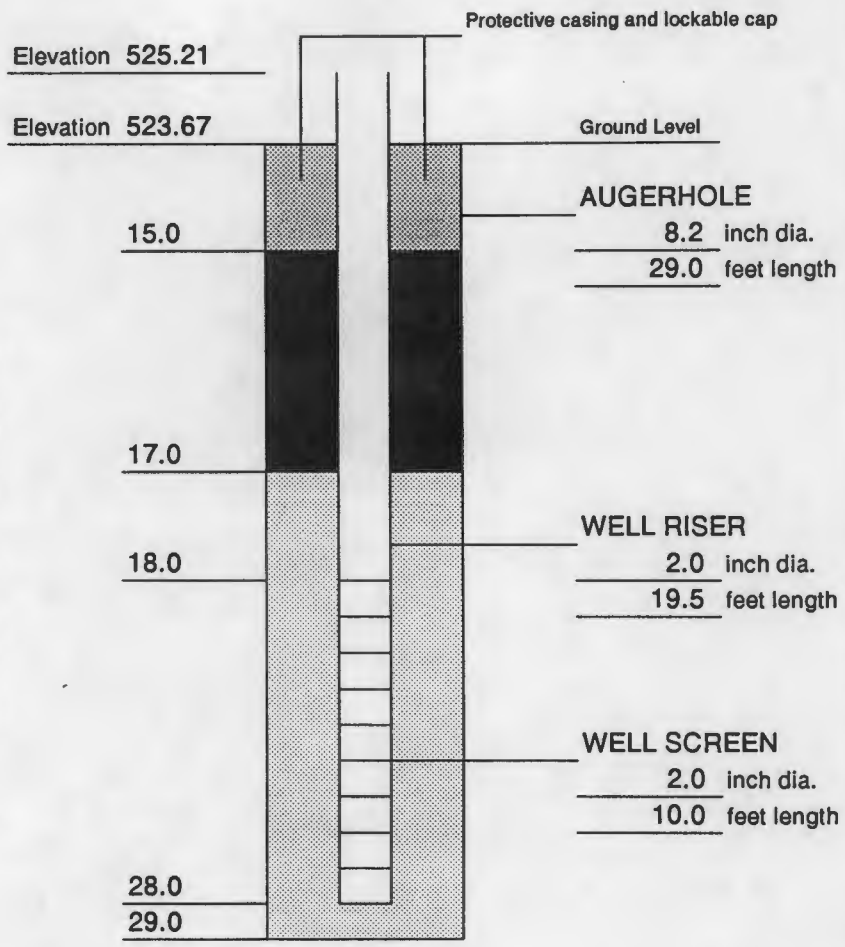
PROJECT NO. 35235.12
BORING NO. MW-1

A-3205

DRILLING SUMMARY
Geologist: Daniel Sheldon
Drilling Company: American Auger
Driller: Rocky Baye
Date: 12/11/91

GEOLOGIC LOG

depth(ft.)	lithology
0–9.0	Clayey silt, trace to some gravel
9.0–19.0	F/m sand, some gravel
19.0–28.5	F/c sand and gravel
28.5–29.0	Clay, some silt



WELL DESIGN

CASING MATERIAL	*SCREEN MATERIAL*	*SEAL MATERIAL*
Surface: Steel	Type: Schedule 40 PVC	Seal #1 Type Bentonite Pellets Setting: 15.0'–17.0'
Monitor: Schedule 40 PVC	Slot Size: .010"	Seal #2 Type NA Setting:

FILTER MATERIAL	*ROCK CORING*	*LEGEND*
Type: #3 Q-Rok	Cored Interval: NA	Cement/Bentonite Grout
Setting: 17.0'–29.0'	Core Diameter: NA	Bentonite Seal
	Reamed Diameter: NA	Silica Sandpack

Client: NYSDEC	Project: Onondaga Nation Site–B	Project No. 35235.12
U R S Consultants Inc.	Monitoring Well Construction Details	Well Number: MW–1

URS CONSULTANTS, Inc.

TEST BORING LOG
BORING NO. MW-2

PROJECT: ONONDAGA NATION - SITE B	SHEET NO. 1 OF 1
CLIENT: NYSDEC	JOB NO.: 35235.12.
BORING CONTRACTOR: AMERICAN AUGER	BORING LOCATION: Upgradient
GROUND WATER:	GROUND ELEVATION: 531.65
DATE / TIME / LEV* / TYPE	DATE STARTED: 12/10/91
12/10 2:00 PM 28.5 Hole at 31.5'	DATE FINISHED: 12/10/91
12/10 32.1 " " 32.8'	DRILLER: ROCKY BAYE
* FROM GROUND SURFACE	GEOLOGIST: DANIEL SHELDON
12/13 1:15 P 28.22 TOP OF RISER	REVIEWED BY:

	CAS.	SAMP	CORE	TUBE
TYPE		SS (Split-Spoon)		
DIA.		2"		
WT.		140lb.		
FALL		30"		

* POCKET PENETROMETER READING

DEPTH FT	STRATA	SAMPLE NO.	SAMPLE TYPE	BLOWS PER 6"	RECOVERY RQD %	DESCRIPTION: COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS	REMARKS
		S-1	SS	2 2 / 5 10	60	D. BRN	SOFT	CLAYEY Silt, Some Fill	—	• Brick Frags.
						LT. BRN	MED STIFF	Fine to Coarse SAND AND Silt, Some Clay, TRACE GRAVEL	ML-SW	• Geotechnical sample, 4-6'
5		S-2	SS	6 5 / 4 4	40					• Sl. Moist
										• Environmental Sample, 8-10'
		S-3	SS	4 4 / 6 6	60	BRN + GRAY	LOOSE	COARSE GRAVEL, Some Silt AND SAND, TRACE CLAY. SOME Limestone Fragments	GM	• Sl. Moist
10										
		S-4	SS	15 26 / 25 19	20		V. DENSE			
15										• HARD Augering at 16.0 Feet
19		S-5	SS	49 60 / 34 22	45					Clayey Silt layer 19-20'
20										
		S-6	SS	19 40 / 43 43	5					
25										
25.5	12/18 ▽	S-7	SS	12 17 / 15 14	60	BRN	DENSE	FINE to COARSE SAND, Trace gravel, Silt AND CLAY	SW	• WET • Geotech Sample 25.5-27.5'
27.5		S-8	SS	6 12 / 17 21	70		MED DENSE			
30		S-9	SS	4 5 / 8 12	80					• Geotech Sample 31.5-33.5'
31.5		S-10	SS	13 10 / 14 17	70	BRN	MED DENSE	FINE to COARSE SAND AND GRAVEL. Tr. Silt	SW-GM	Boring Completed at 35.5'
33.5		S-11	SS	13 8 / 17 12	65					
35										
35.5										

A-3205

COMMENTS Hole ADVANCED with a Mobile B-57 drill rig equipped with 4¼" Augers. PID readings taken on split spoon samples AND drill cuttings. No readings ABOVE background.

PROJECT NO. 35235.12
BORING NO. MW-2

DRILLING SUMMARY

Geologist: Daniel Sheldon

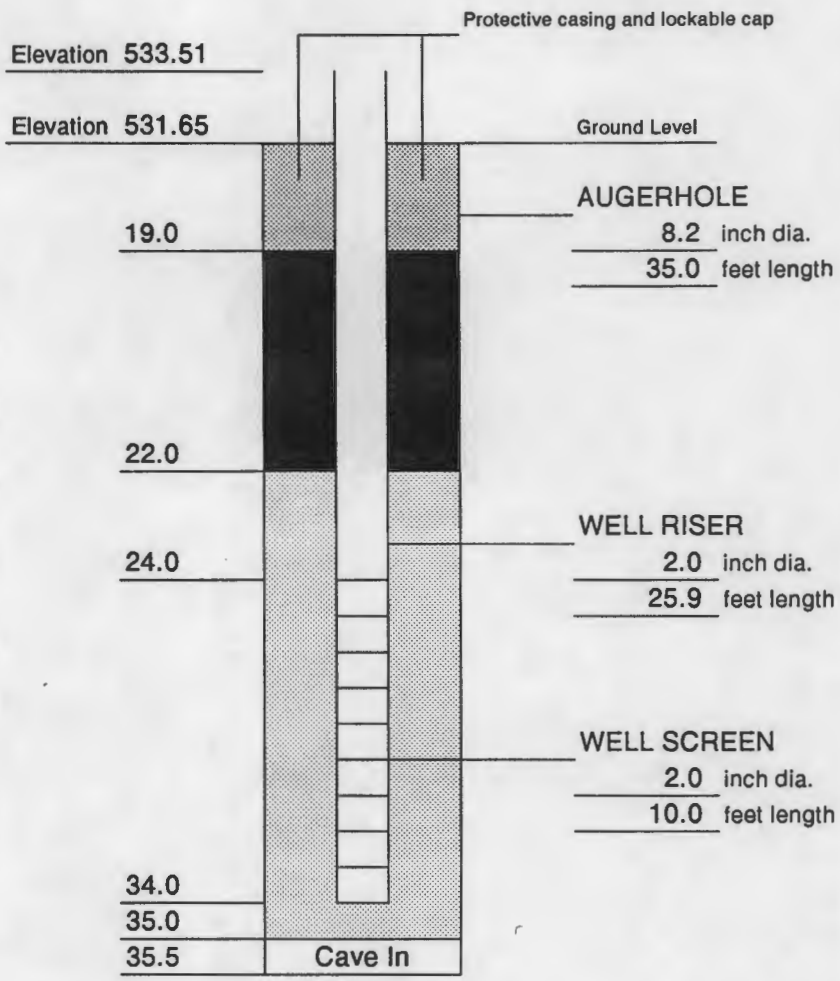
Drilling Company: American Auger

Driller: Rocky Baye

Date: 12/10/91

GEOLOGIC LOG

depth(ft.)	lithology
0–1.0	Clayey silt, some fill
1.0–7.0	F/c sand and silt, trace gravel
7.0–25.0	Coarse gravel, some clayey silt and limestone fragments
25.0–32.5	F/c sand, trace gravel
32.5–35.5	F/c sand and gravel



WELL DESIGN

CASING MATERIAL

Surface: Steel

Monitor: Schedule 40 PVC

SCREEN MATERIAL

Type: Schedule 40 PVC

Slot Size: .010″

SEAL MATERIAL

Seal #1 Type: Bentonite Pellets
Setting: 19.0'–22.0'

Seal #2 Type: NA
Setting:

FILTER MATERIAL

Type: #3 Q-Rok

Setting: 22.0'–35.0'

ROCK CORING

Cored Interval: NA

Core Diameter: NA

Reamed Diameter: NA

LEGEND

Cement/Bentonite Grout

Bentonite Seal

Silica Sandpack

Client: NYSDEC	Project: Onondaga Nation Site–B	Project No. 35235.12
U R S Consultants Inc.	Monitoring Well Construction Details	Well Number: MW–2

URS CONSULTANTS, Inc.

TEST BORING LOG
BORING NO. MW-3

PROJECT: ONONDAGA NATION - SITE B
CLIENT: NYSDEC
BORING CONTRACTOR: AMERICAN AUGER
GROUND WATER:

DATE	TIME	LEV*	TYPE
12/11	2:15P	25.5	BOREHOLE
			Completion
*FROM GROUND			SURFACE
12/13	1:20P	27.80	TOP OF RISER

	CAS.	SAMP	CORE	TUBE
TYPE	SS (Split-Spoon)			
DIA.		2"		
WT.		140lb		
FALL		30"		

* POCKET PENETROMETER READING

SHEET NO. 1 OF 1
JOB NO. : 35235.12
BORING LOCATION: SIDEGRADIENT
GROUND ELEVATION: 523.53
DATE STARTED: 12/11/91
DATE FINISHED: 12/11/91
DRILLER: RICKY BAYE
GEOLOGIST: DANIEL SHELDON
REVIEWED BY:

DEPTH FT	STRATA	SAMPLE NO.	SAMPLE TYPE	BLOWS PER 6"	RECOVERY RQD %	DESCRIPTION COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS	REMARKS
2		S-1	SS	4 7 / 4 8	65	D. BRN	MED STIFF	CLAYEY SILT, TRACE to SOME GRAVEL	ML	• Rust mottles at 2'
5		S-2	SS	5 6 / 6 7	50	Lt. BRN	MED. DENSE	FINE to MEDium SAND, TRACE Silt	SW	• Geotech. Sample • DRY
10		S-3	SS	4 4 / 4 4	75		LOOSE			
15		S-4	SS	3 3 / 3 3	60	BRN.				• DRY
20		S-5	SS	5 4 / 6 8	90					• moist at 20.5'
25	12/18	S-6	SS	1 2 / 1 2	90					• ENV. Sample • Wet at 25' • Geotech. Sample 26-28'
28		S-7	SS	3 1 / 2 6	80					
30		S-8	SS	14 17 / 11 17	5	BRN	MED DENSE	FINE to COARSE SAND AND GRAVEL, TRACE Silt	SW-GW	
		No Sample, Over-drilled								
		S-9	SS	5 6 / 6 8	65					
35		S-10	SS	6 5 / 7 9	75	GRAY				• WET
								BORING Completed AT 35.0'		

COMMENTS: HOLE ADVANCED with a Mobile B-57 drill rig equipped with 4¼" Augers. PID reading taken on split-spoon samples AND drill cuttings. No readings ABOVE background.

PROJECT NO. 35235.12
BORING NO. MW-3

4-3208

DRILLING SUMMARY

Geologist: Daniel Sheldon

Drilling Company: American Auger

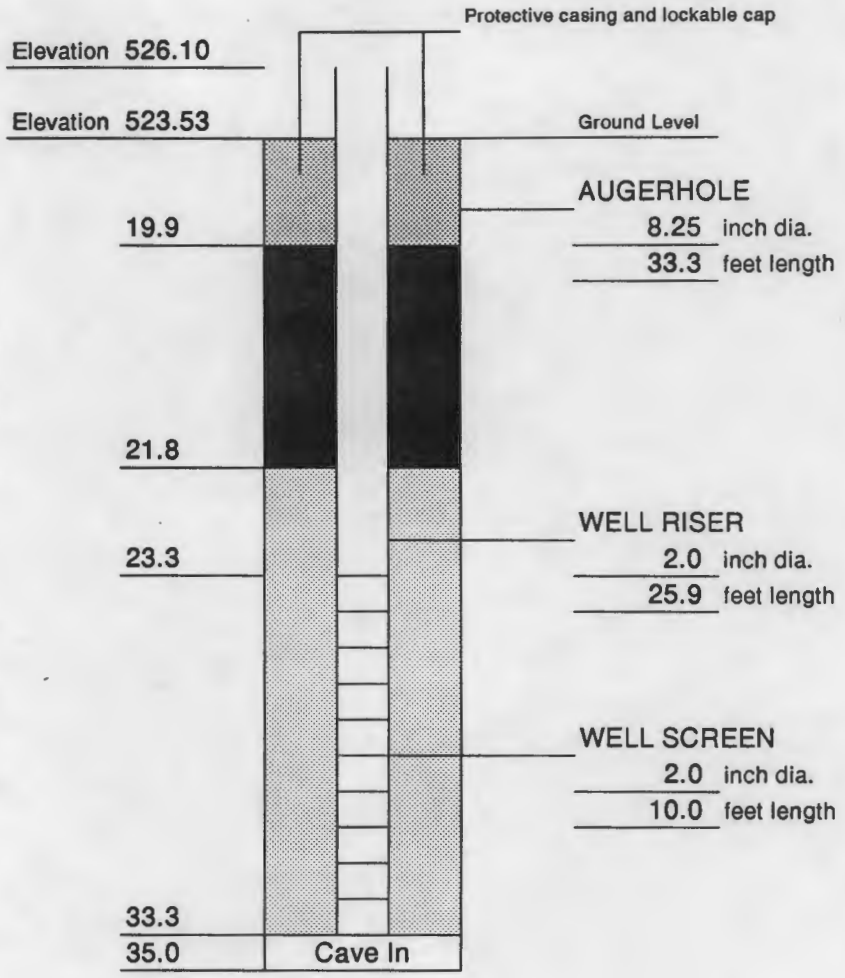
Driller: Rocky Baye

Date: 12/11/91

GEOLOGIC LOG

depth(ft.)	lithology
0–2.0	Clayey silt
2.0–28.0	F/m sand trace silt
28.0–35.0	F/c sand and gravel, trace silt

DEPTH (Ft.)



WELL DESIGN

CASING MATERIAL

Surface: Steel

Monitor: Schedule 40 PVC

SCREEN MATERIAL

Type: Schedule 40 PVC

Slot Size: .010″

SEAL MATERIAL

Seal #1 Type Bentonite Pellets
Setting: 19.9'–21.8'

Seal #2 Type NA
Setting:

FILTER MATERIAL

Type: #3 Q-Rok

Setting: 21.8'–33.3'

ROCK CORING

Cored Interval: NA

Core Diameter: NA

Reamed Diameter: NA

LEGEND

Cement/Bentonite Grout

Bentonite Seal

Silica Sandpack

Client: NYSDEC

Project: Onondaga Nation Site B

Project No. 35235.12

URS Consultants Inc.

Monitoring Well Construction Details

Well Number: MW-3

URS CONSULTANTS, Inc.

TEST BORING LOG
BORING NO. MW-4

PROJECT: ONONDAGA NATION - SITE B
CLIENT: NYSDEC
BORING CONTRACTOR: AMERICAN AUGER
GROUND WATER:

DATE	TIME	LEV	TYPE
12/12	1:00 P	29.0'	BOREHOLE
			Completion,
			From G.S.
12/13	1:24P	29.3'	Top of Riser

	CAS.	SAMP	CORE	TUBE
TYPE	SS (Split-Spoon)			
DIA.		2"		
WT.		140 lb.		
FALL		30"		

* POCKET PENETROMETER READING

SHEET NO. 1 OF 1
JOB NO.: 35235.12
BORING LOCATION: DOWNGRADIENT
GROUND ELEVATION: 517.99
DATE STARTED: 12/12/91
DATE FINISHED: 12/12/91
DRILLER: ROCKY BAYE
GEOLOGIST: DANIEL SHELDON
REVIEWED BY:

DEPTH FT	STRATA	SAMPLE NO.	TYPE	BLOWS PER 6"	RECOVERY RQD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS	REMARKS
2		S-1	SS	2 7 / 7 6	40	D.BRN Lt.BRN	MED STIFF	CLAYEY SILT, TRACE ORGANIC MATERIAL	ML	• Olive Green mottles
5		S-2	SS	2 2 / 2 3	20	BRN	LOOSE	FINE TO MEDIUM SAND, SOME FINE TO COARSE GRAVEL. TRACE TO SOME SILT	SW-SM	• SL. MOIST
		S-3	SS	2 3 / 3 3	20					• TRACE ROOT MATERIAL
		S-4	SS	2 2 / 3 3	40					• SL. MOIST
10		S-5	SS	7 6 / 6 6	50		MED DENSE			
11.6		S-6	SS	5 5 / 6 7	60					
		S-7	SS	5 6 / 7 8	60	BRN	MED DENSE	FINE SAND, TRACE SILT	SW	• SL. MOIST
15		S-8	SS	4 3 / 11 12	70	RD/BRN	MED STIFF	CLAYEY SILT, TR. SAND	CL-ML	CLAY layer 14.5 - 15.4'. ROOT HOLES
		S-9	SS	6 5 / 7 9	75	BRN	MED DENSE	FINE TO MEDIUM SAND	SW	
20		S-10	SS	6 8 / 9 11	70	RD/BRN	STIFF	CLAY, TRACE SAND IN PARTINGS	CL	CLAY layer 19.3-19.4'
20.5						BRN	MED DENSE	FINE TO MEDIUM SAND	SW	
21.5		S-11	SS	7 7 / 15 15	90	RD/BRN	STIFF	CLAY, TR. SAND IN PARTINGS	CL	BRN. clayey Silt seam (1") at 20'
		S-12 **	SS	7 10 / 15 17	70	BRN	MED DENSE	FINE TO MEDIUM SAND, TRACE SILT	SW	ROOT material present
25		** S-13	SS	6 8 / 1 8	80					• MOIST @ 25.5'
	12/18 ▽	* S-14	SS	9 6 / 6 6	90					• WET @ 26'
27.3						RD/BRN	MED STIFF	CLAYEY SILT, TRACE FINE TO MEDIUM SAND	CL	
30		S-15	SS	6 7 / 7 7	90					
		S-16	SS	4 4 / 4 5	85					• MOIST GRAY SAND PARTINGS 31 - 32'
		S-17	SS	2 2 / 4 4	95					
35		S-18	SS	2 6 / 7 8	90					• WET GRAY SILTY SAND SEAM AT 35' (3")
36										

COMMENTS Boring completed at 36'. Hole advanced with a Mobile B-57 drill rig equipped with 4 1/4" augers. PID readings taken on split-spoon samples and drill cuttings. No readings above background.

* Environmental Sample
** Geotech. Sample

PROJECT NO. 35235.12
BORING NO. MW-4

A-3206

DRILLING SUMMARY

Geologist: Daniel Sheldon

Drilling Company: American Auger

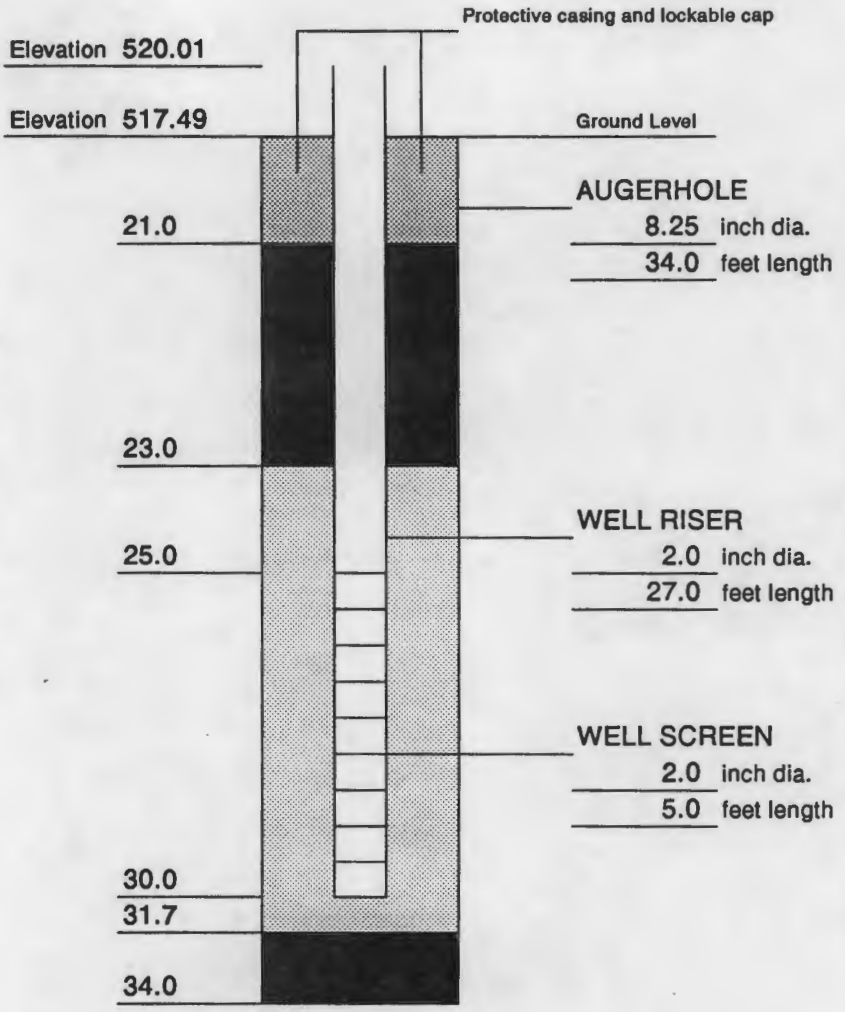
Driller: Rocky Baye

Date: 12/12/91

GEOLOGIC LOG

depth(ft.)	lithology
0–2.0	Clayey silt
2.0–27.3	F/m sand with silty clay layers
27.3–36.0	Silty clay, trace f/m sand

DEPTH (Ft.)



WELL DESIGN

CASING MATERIAL

Surface: Steel

Monitor: Schedule 40 PVC

SCREEN MATERIAL

Type: Schedule 40 PVC

Slot Size: .010″

SEAL MATERIAL

Seal #1 Type Bentonite Pellets
Setting: 31.7'–34.0'

Seal #2 Type Bentonite Pellets
Setting: 21.0'–23.0'

FILTER MATERIAL

Type: #3 Q-Rok

Setting: 23.0'–31.7'

ROCK CORING

Cored Interval: NA

Core Diameter: NA

Reamed Diameter: NA

LEGEND

Cement/Bentonite Grout

Bentonite Seal

Silica Sandpack

Client: NYSDEC	Project: Onondaga Nation Site-B	Project No. 35235.12
URS Consultants Inc.	Monitoring Well Construction Details	Well Number: MW-4

URS CONSULTANTS, Inc.

TEST BORING LOG
BORING NO. MW-5

PROJECT: ONONDAGA NATION - SITE B
CLIENT: NYSDEC
BORING CONTRACTOR: AMERICAN AUGER
GROUND WATER:

DATE	TIME	LEV	TYPE
12/18	—	16.43	TOP of Riser
12/19	—	16.56	" " "

	CAS.	SAMP	CORE	TUBE
TYPE	SS (Split-Spoon)			
DIA.		2"		
WT.		140 lb.		
FALL		30"		

* POCKET PENETROMETER READING

SHEET NO. 1 OF 1
JOB NO.: 35235.12
BORING LOCATION: DOWNGRADIENT
GROUND ELEVATION: 512.90
DATE STARTED: 12/13/91
DATE FINISHED: 12/13/91
DRILLER: ROCKY BAYE
GEOLOGIST: DANIEL SHELDON
REVIEWED BY:

DEPTH FT	STRATA	SAMPLE NO.	SAMPLE TYPE	BLOWS PER 6"	RECOVERY RQD %	DESCRIPTION COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS	REMARKS
1.5		S-1	SS	2 2 / 6 9	60	BRN	MED STIFF	CLAYEY SILT, Root Material	ML	
5		S-2	SS	5 4 / 4 6	45	BRN	LOOSE	Fine to MEDium SAND, Some Fine to COARSE GRAVEL, TRACE SILT	SW	• Rock in NOSE of SAMPLER
6										
10		S-3	SS	4 4 / 4 5	55	BRN	LOOSE / MED DENSE	Fine to MEDium SAND, TRACE SILT, Few CLAY SEAMS (3" TYP)	SW	• MOIST @ 8' RED/BRN CLAY SEAMS (3") AT 9' AND 10.5'
12/18		S-4	SS	5 7 / 8 9	40					
15		S-5	SS	3 4 / 2 3	70		LOOSE			• WET @ 15' • ENVIRONMENTAL SAMPLE, 14-16'
16.5		S-6	SS	2 2 / 3 7	70	RED/BRN	SOFT	CLAY, Some SILT, FINE SAND IN PARTINGS	CL	• Wet GRAY SAND PARTINGS 19.5 - 20.0'
20		*S-7	SS	4 2 / 2 4	90					
	END OF BORING						BORING Completed AT 20.0'			
25										
30										
35										

COMMENTS HOLE ADVANCED with A MobILE B-57 drill rig equipped with 4 1/4" Augers. PID readings taken on split-spoon samples and drill cuttings. No readings above background.

* Geotechnical Sample

PROJECT NO. 35235.12
BORING NO. MW-5

A-3205

DRILLING SUMMARY

Geologist: Daniel Sheldon

Drilling Company: American Auger

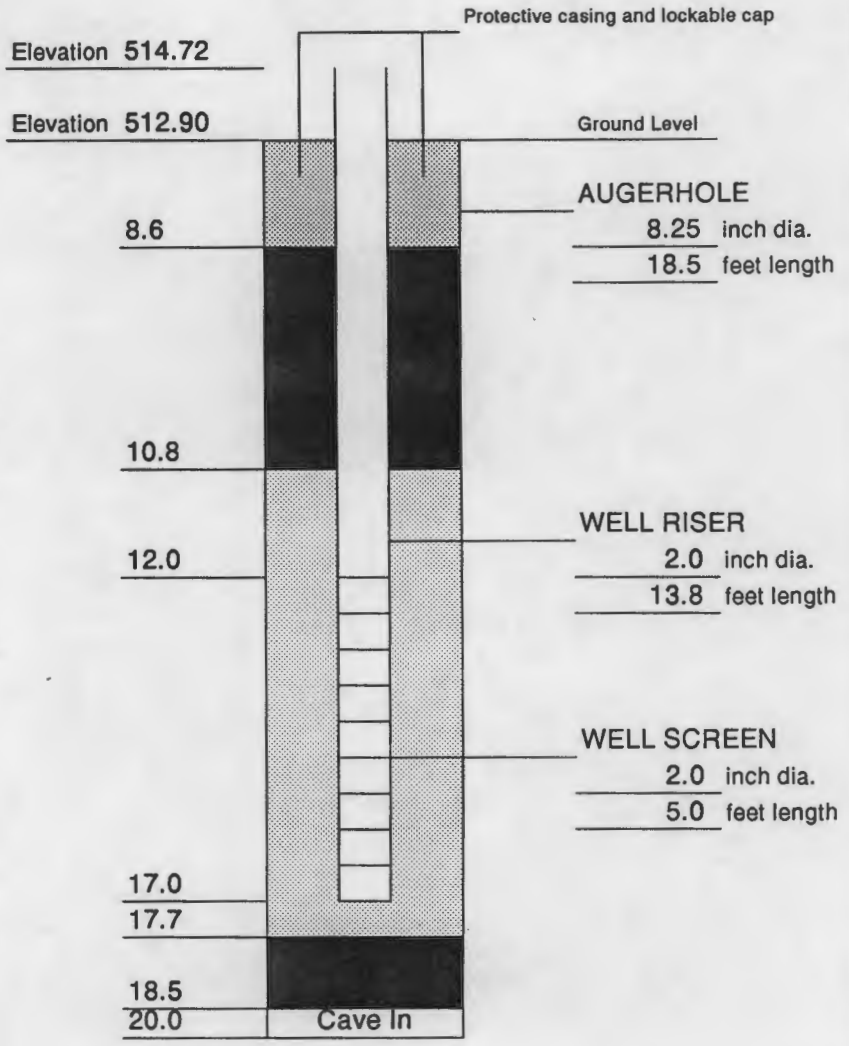
Driller: Rocky Baye

Date: 12/13/91

GEOLOGIC LOG

depth(ft.)	lithology
0–1.5	Clayey silt
1.5–16.5	F/m sand trace silt, silty clay seams
16.5–20.0	Silty clay, trace f/m sand

DEPTH (Ft.)



WELL DESIGN

CASING MATERIAL

Surface: Steel

Monitor: Schedule 40 PVC

SCREEN MATERIAL

Type: Schedule 40 PVC

Slot Size: .010″

SEAL MATERIAL

Seal #1 Type Bentonite Pellets
Setting: 17.7'–18.5'

Seal #2 Type Granular Bentonite
Setting: 8.6'–10.8'

FILTER MATERIAL

Type: #3 Q-Rok

Setting: 10.8'–17.7'

ROCK CORING

Cored Interval: NA

Core Diameter: NA

Reamed Diameter: NA

LEGEND

Cement/Bentonite Grout

Bentonite Seal

Silica Sandpack

Client: NYSDEC	Project: Onondaga Nation Site-B	Project No. 35235.12
URS Consultants Inc.	Monitoring Well Construction Details	Well Number: MW-5

APPENDIX C

GEOTECHNICAL ANALYSIS RESULTS

BUFFALO DRILLING COMPANY
INC.
955 NIAGARA STREET
BUFFALO, NEW YORK
14213
(716) 886-0375

JAN 8 1992

January 6, 1992 JOB NO: 91-1227H

URS Company, Inc.
570 Delaware Avenue
Buffalo, New York 14202

ATTN: Mr. Daniel Sheldon

RE: Laboratory Soil Analysis
Results for Onongaga Nation
Site (35235.12.0400).

Gentlemen:

The enclosed table and graphs present laboratory soil testing results for samples provided by URS Company, Inc. for the above referenced project. The samples were tested in accordance with the following methods.

- ASTM D4318 Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- ASTM D422 Particle Size Analysis of Soils.
- ASTM D1140 Amount of Material in Soils finer than the No. 200 sieve.

Thank you for the opportunity to assist on this project. Please call at your earliest convenience, if questions should arise.

Very truly yours,
BUFFALO DRILLING COMPANY, INC.

Michael A. Vogl
Senior Geologist

enc.

CLIENT: URS Consultants, Inc.
PROJECT: Onondaga Nation (35235.12.0400)
JOB NO: 91-1227H

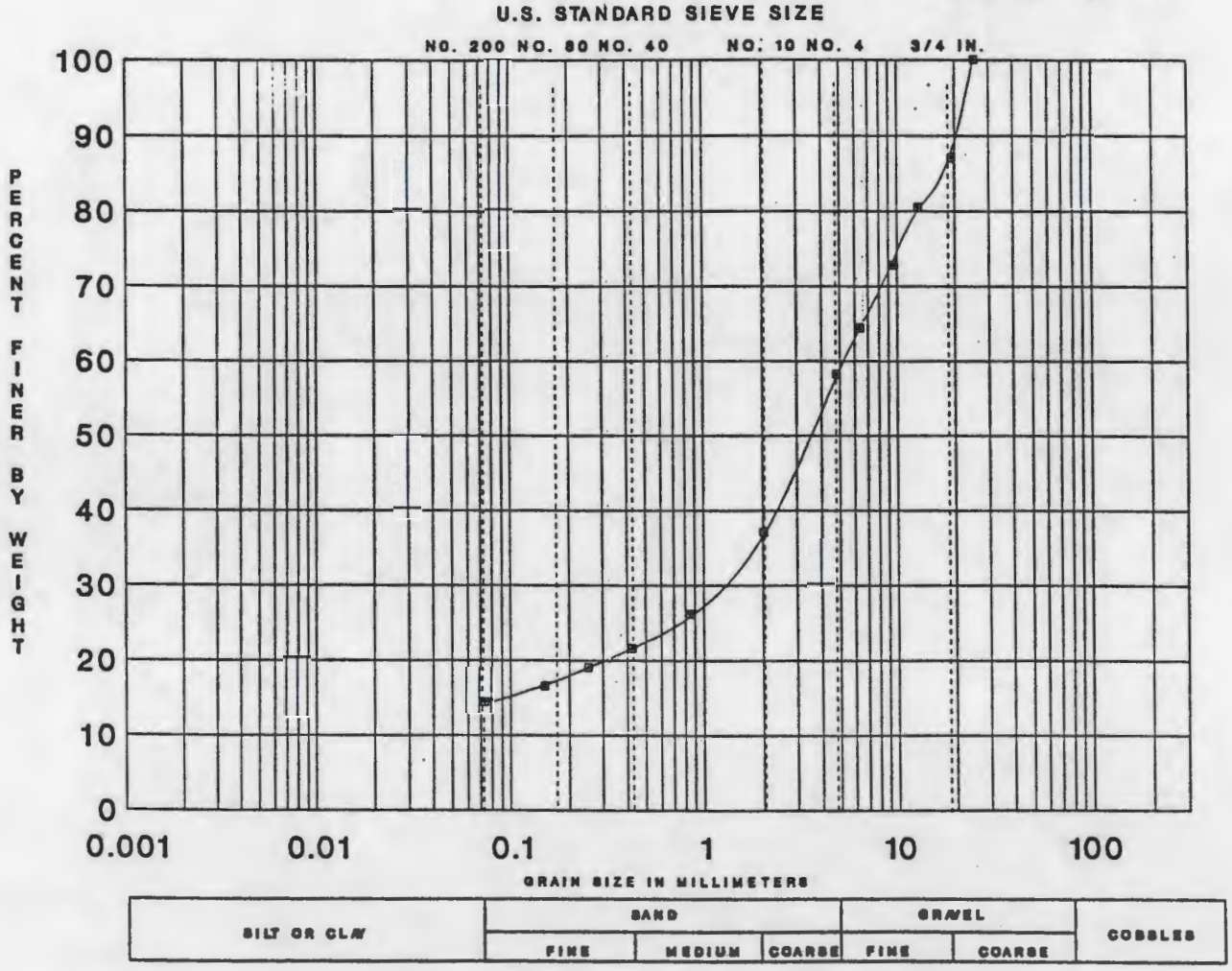
TABLE 1

STATION LOCATION	DEPTH (ft.)	ATTERBERG LIMITS			GRADATION ANALYSIS				SAMPLE DESCRIPTION
		LL (%)	PL (%)	PI (%)	GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)	
MW-1, S-7	23-25	-			41.8	44.0	14.2		f/c Sand and Gravel, tr. Silt, tr. Clay
MW-2, S-2	4-6	-			0.7	44.7	37.0	17.6	f/c Sand and Silt, l. Clay, tr. Gravel
MW-2, S-7	25.5-27.5	-			8.4	77.4	14.2		f/c Sand, l. Silt, tr. Gravel, tr. Clay
MW-2, S-10	31.5-33.5	-			10.6	74.8	14.6		f/c Sand, l. Gravel, tr. Silt, tr. Clay
MW-3, S-2	4-6	-			0.0	77.0	23.0		f/m Sand, l. Silt, tr. Clay
MW-3, S-7	26-28	-			1.1	88.1	10.8		f/c Sand, tr. Silt, tr.Clay, tr. Gravel
MW-4, S-14	26-28	-			0.0	94.7	5.3		f. Sand, tr. Silt, tr. Clay
MW-4, S-8	14-16	41	29	12	0.0	2.7	36.0	61.3	Clay and Silt, tr. f/m Sand
MW-4, S-18	34-36	32	17	15	0.0	4.6	41.0	54.4	Clay and Silt, tr. f/m Sand
MW-5, S-7	18-20	34	17	17	0.0	7.6	30.7	61.7	Clay, s. Silt, tr. f/c Sand

GRAIN SIZE ANALYSIS

GRAIN SIZE ANALYSIS

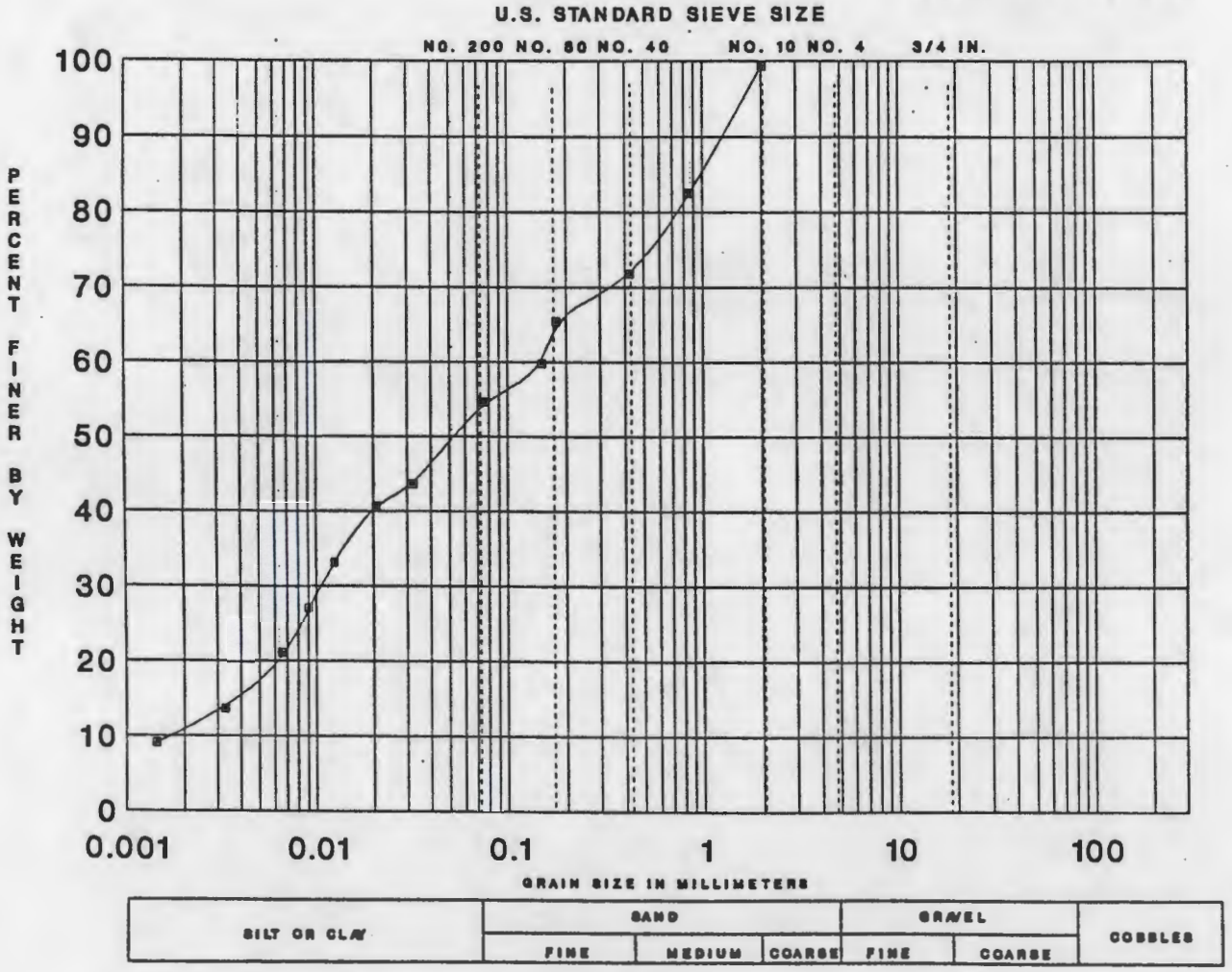
Boring No: MW-1 Sample No: S-7
December 19, 1991



BUFFALO DRILLING COMPANY, INC.

GRAIN SIZE ANALYSIS

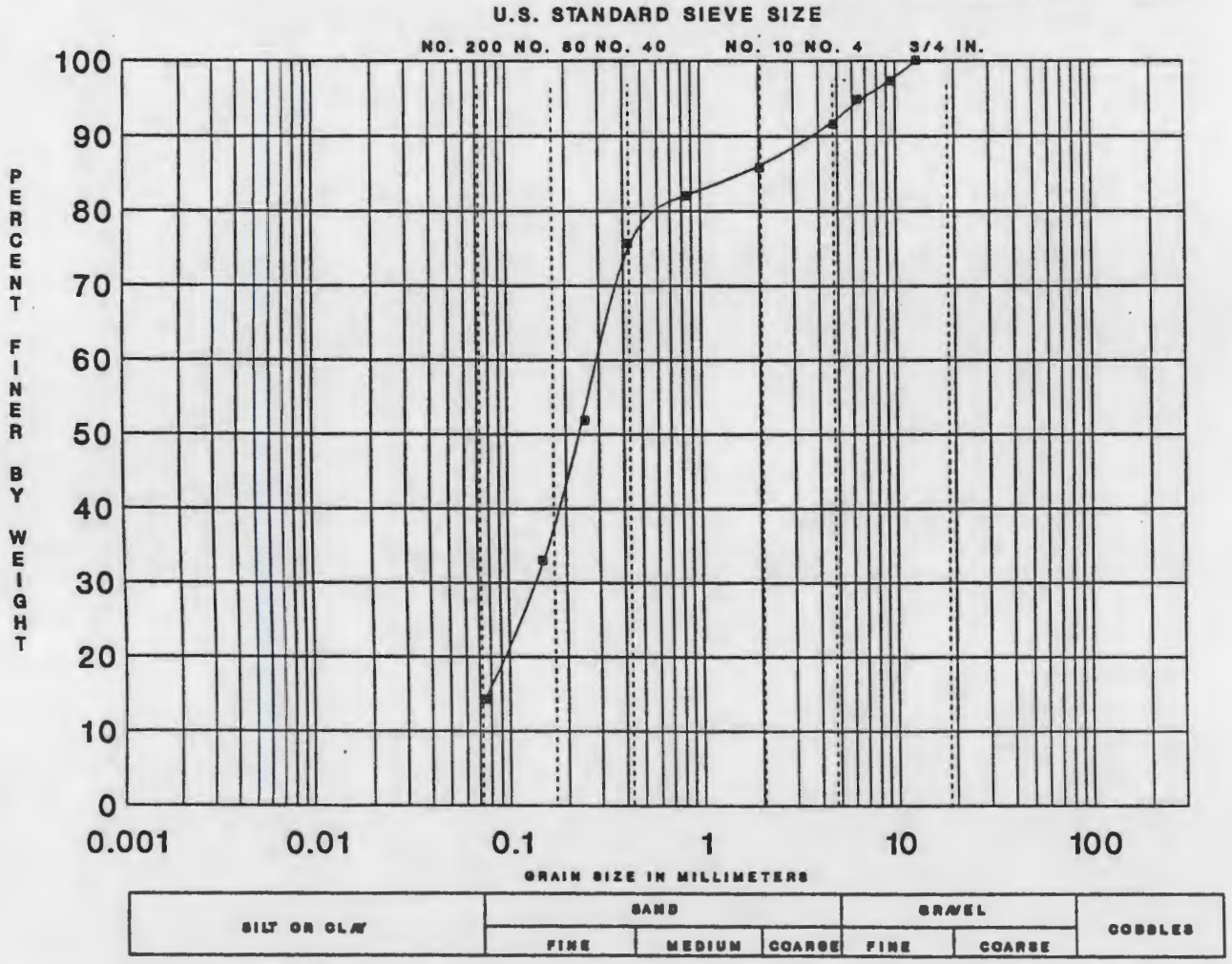
Boring No: MW-2 Sample No: S-2
December 19, 1991



BUFFALO DRILLING COMPANY, INC.

GRAIN SIZE ANALYSIS

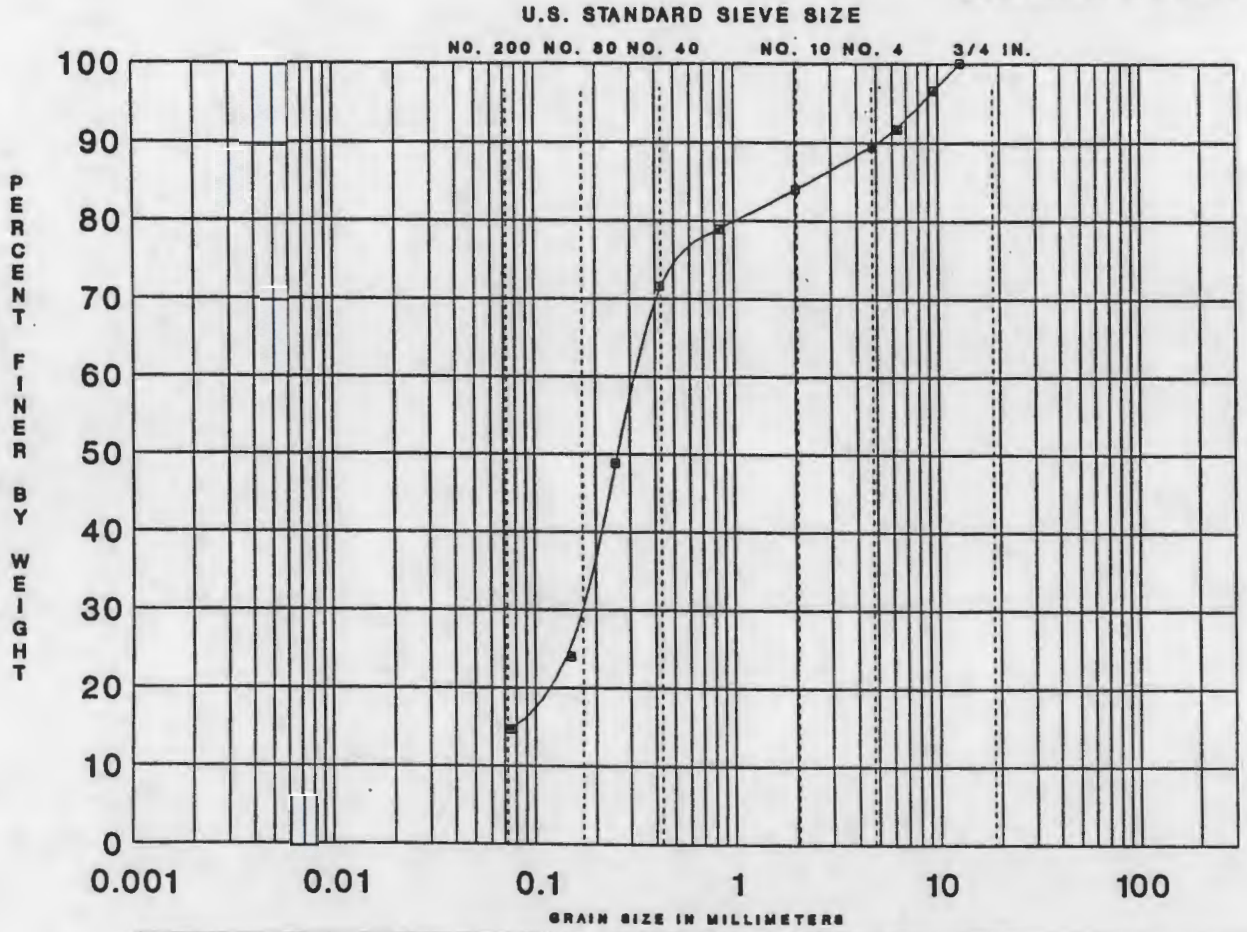
Boring No: MW-2 Sample No: S-7
December 19, 1991



BUFFALO DRILLING COMPANY, INC.

GRAIN SIZE ANALYSIS

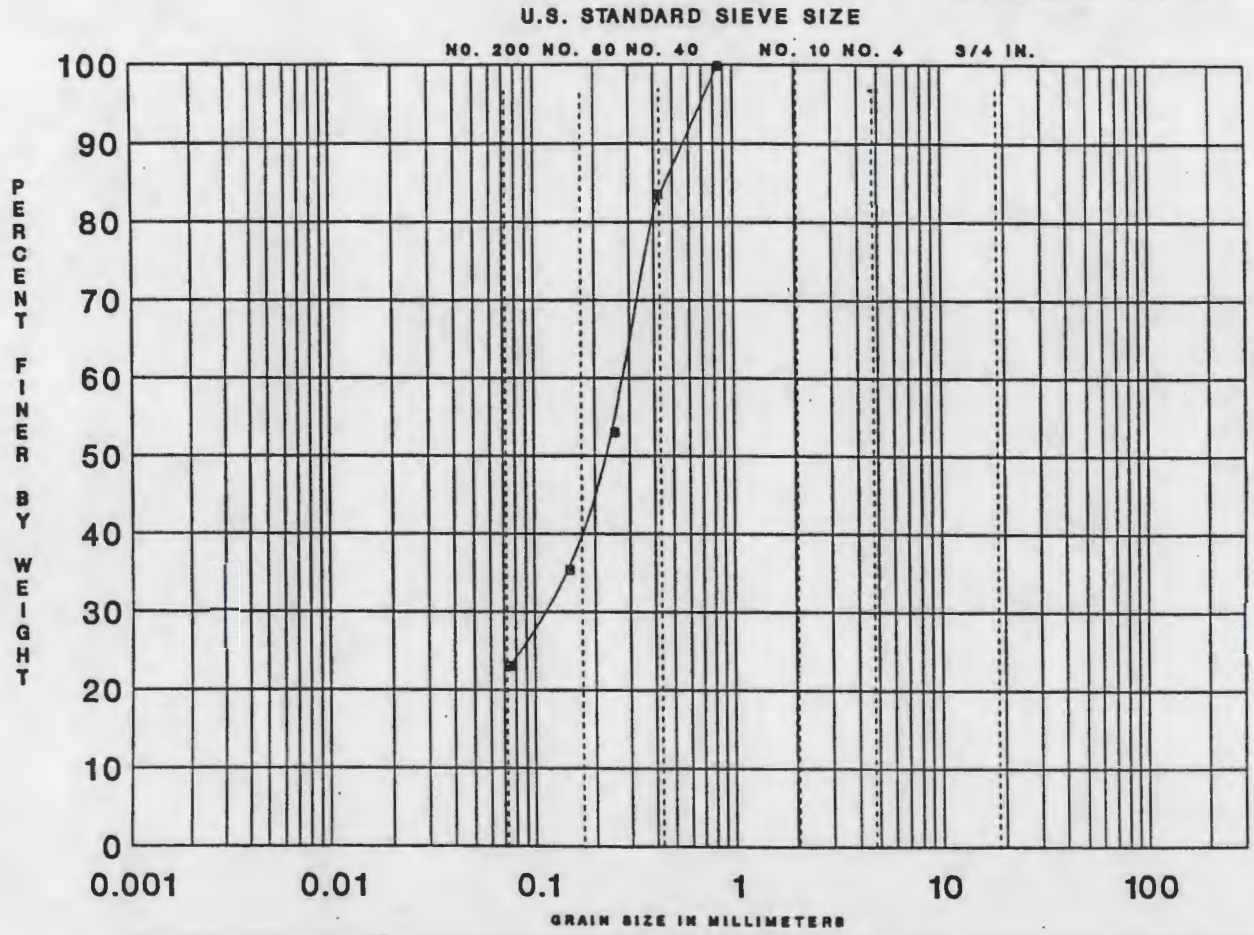
Boring No: MW-2 Sample No: S-10
December 19, 1991



BUFFALO DRILLING COMPANY, INC.

GRAIN SIZE ANALYSIS

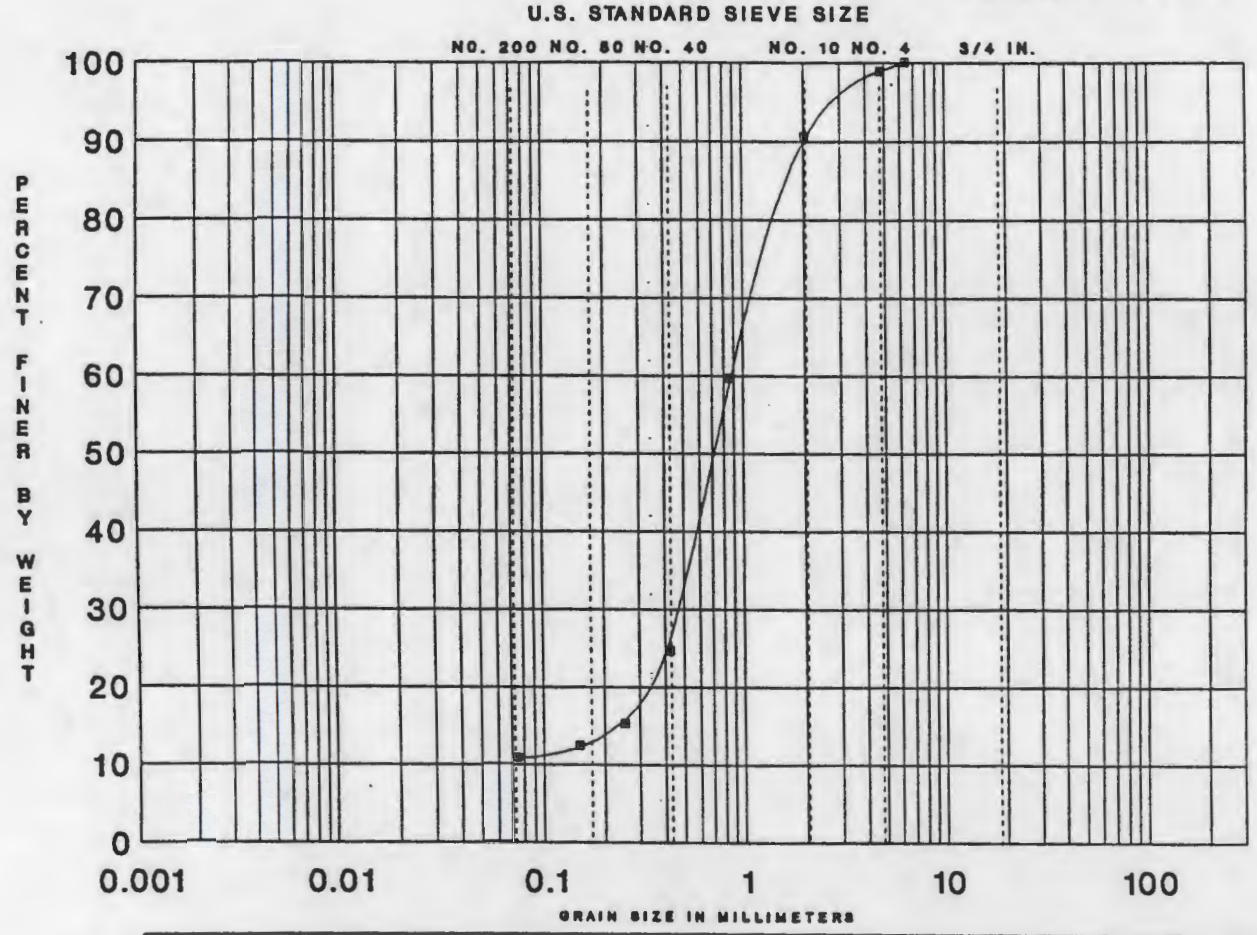
Boring No: MW-3 Sample No: S-2
December 20, 1991



BUFFALO DRILLING COMPANY, INC.

GRAIN SIZE ANALYSIS

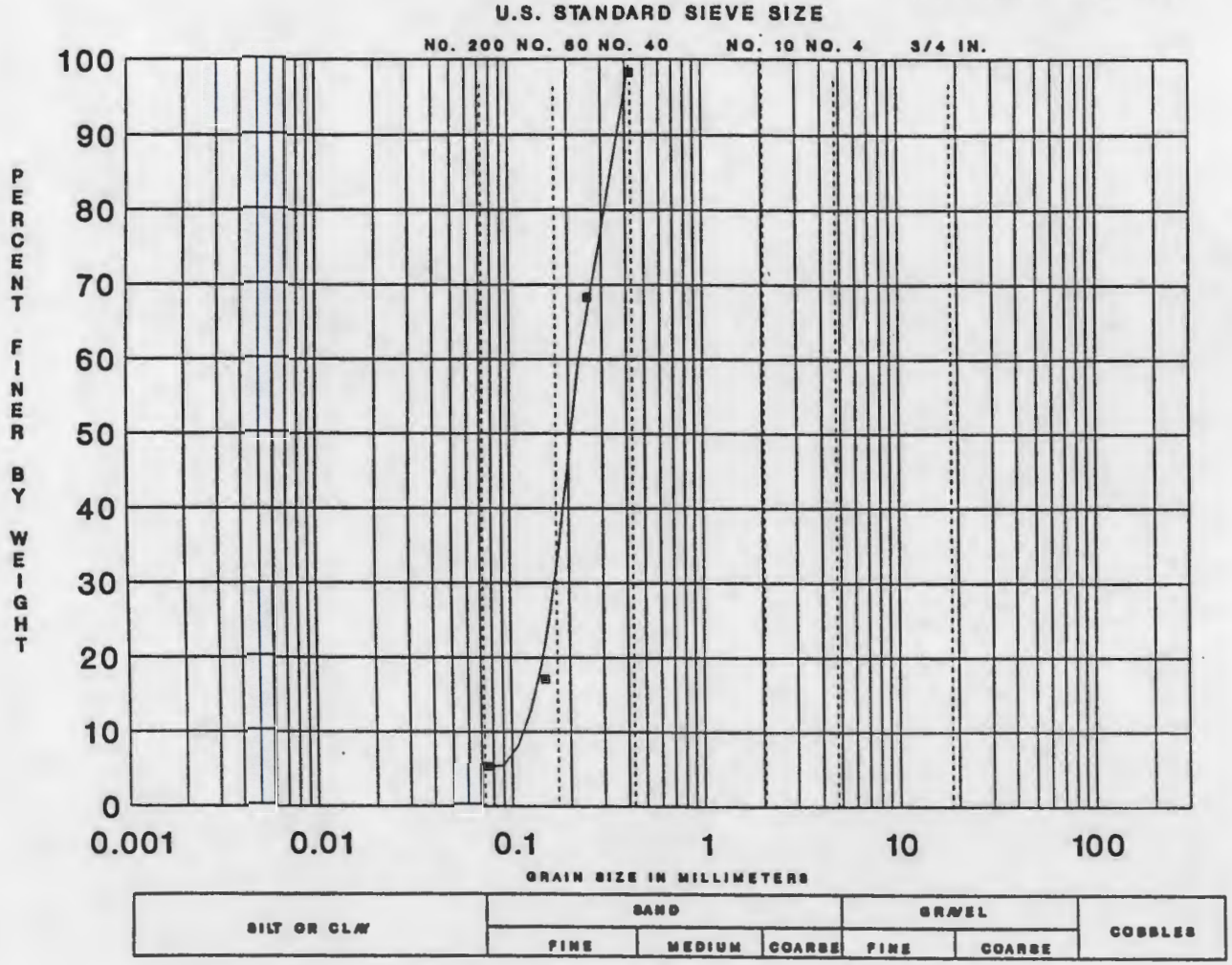
Boring No: MW-3 Sample No: S-7
December 20, 1991



BUFFALO DRILLING COMPANY, INC.

GRAIN SIZE ANALYSIS

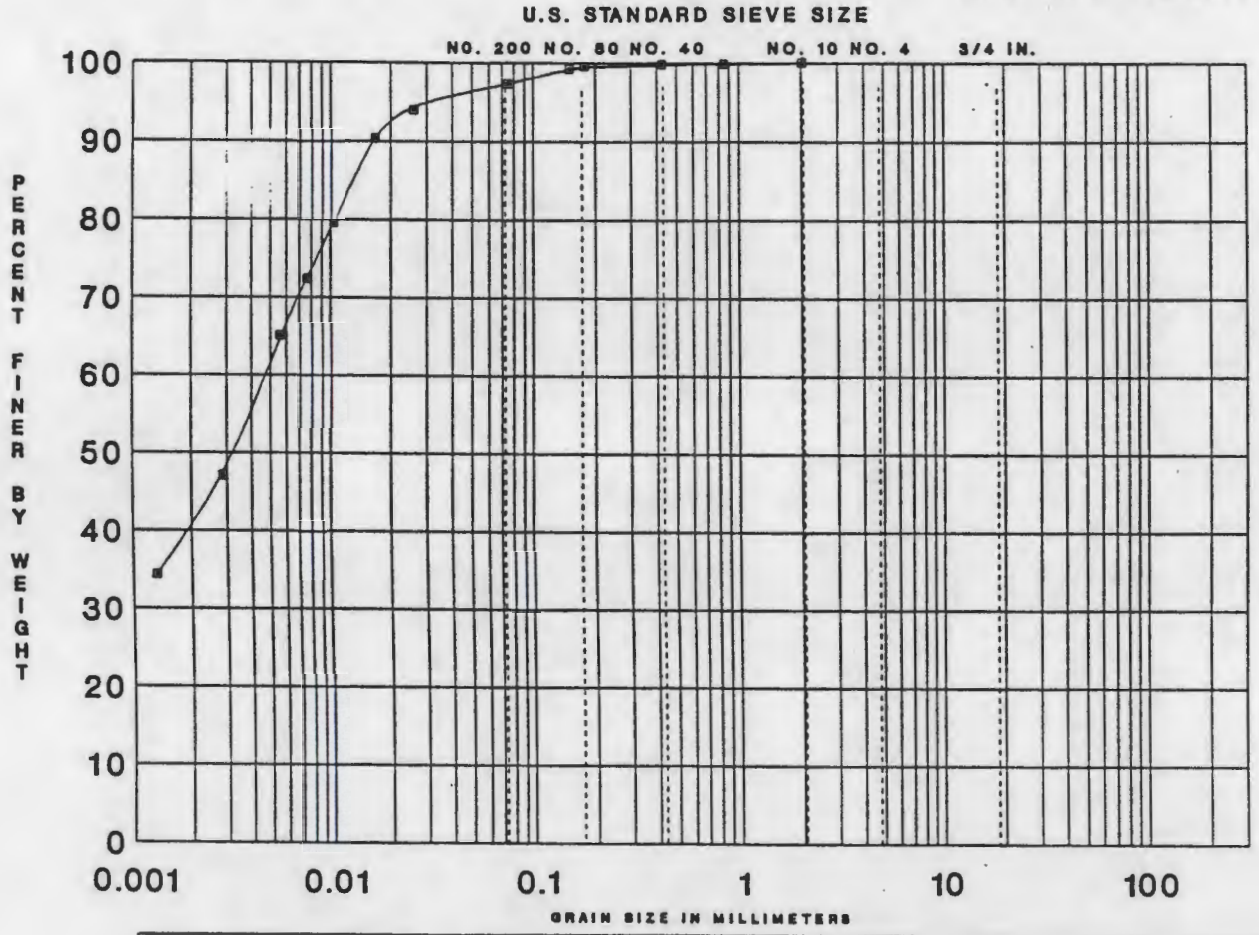
Boring No: MW-4 Sample No: S-14
December 22, 1991



BUFFALO DRILLING COMPANY, INC.

GRAIN SIZE ANALYSIS

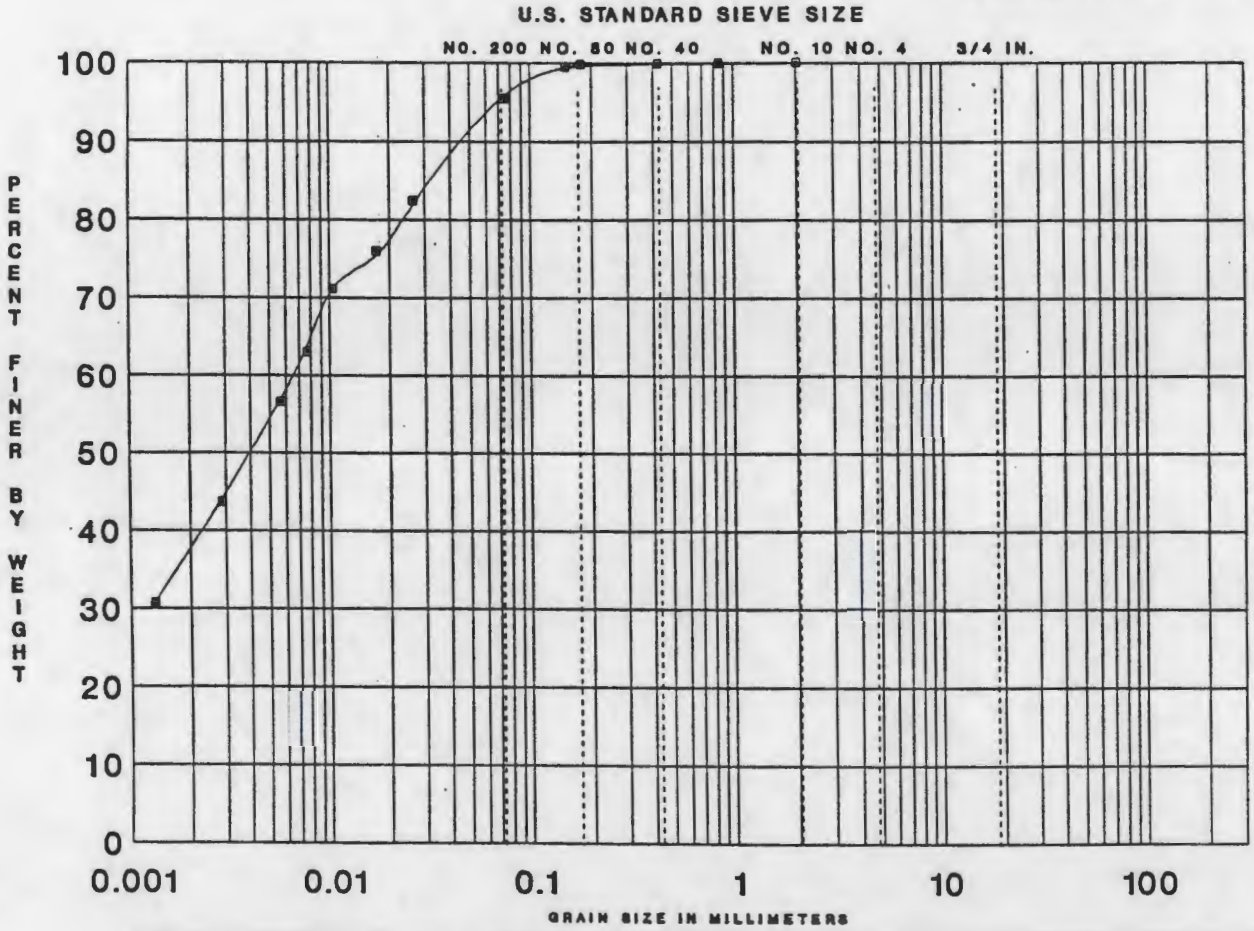
Boring No: MW-4 Sample No: S-8(14-16)
December 19, 1991



BUFFALO DRILLING COMPANY, INC.

GRAIN SIZE ANALYSIS

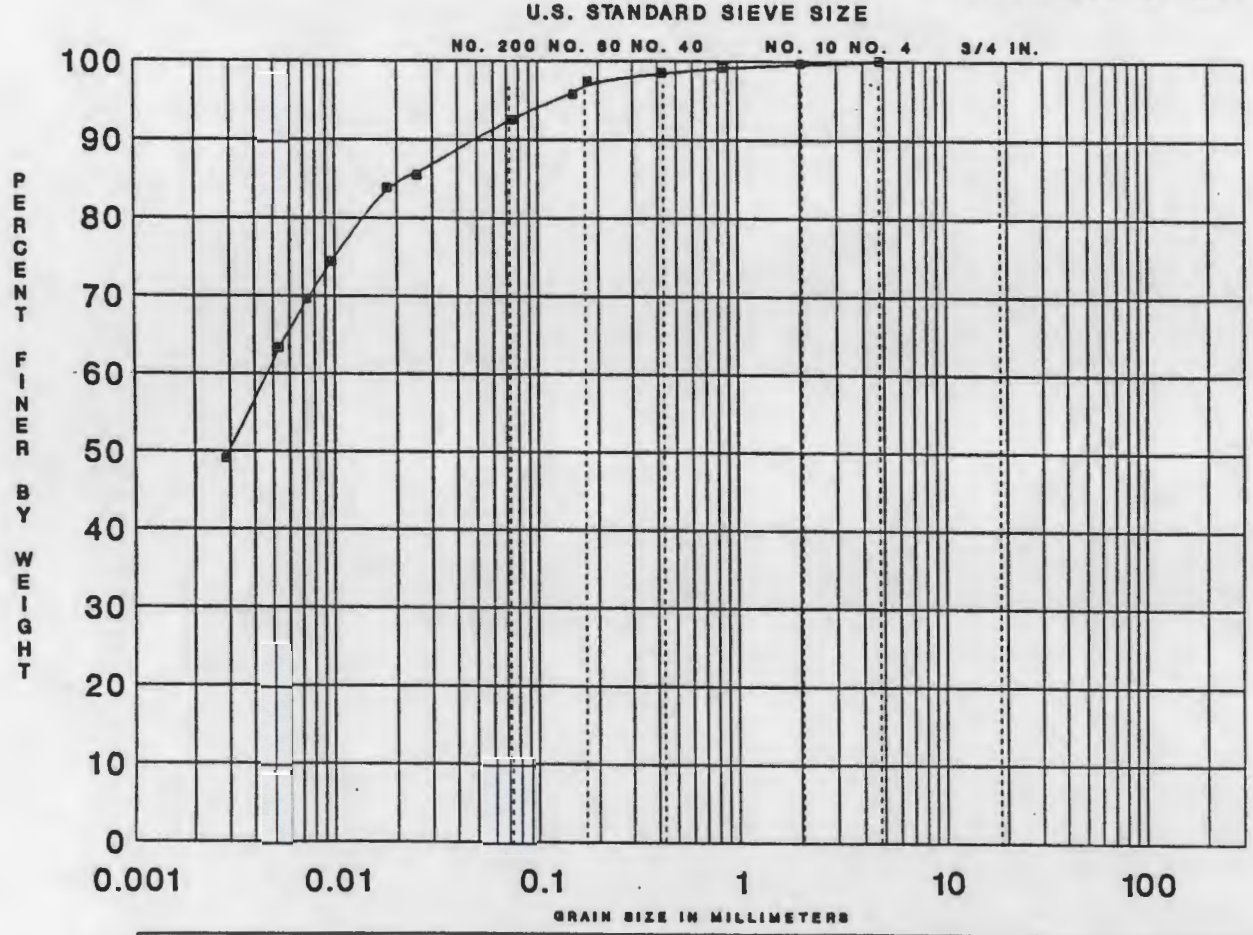
Boring No: MW-4 Sample No: S-18
December 19, 1991



BUFFALO DRILLING COMPANY, INC.

GRAIN SIZE ANALYSIS

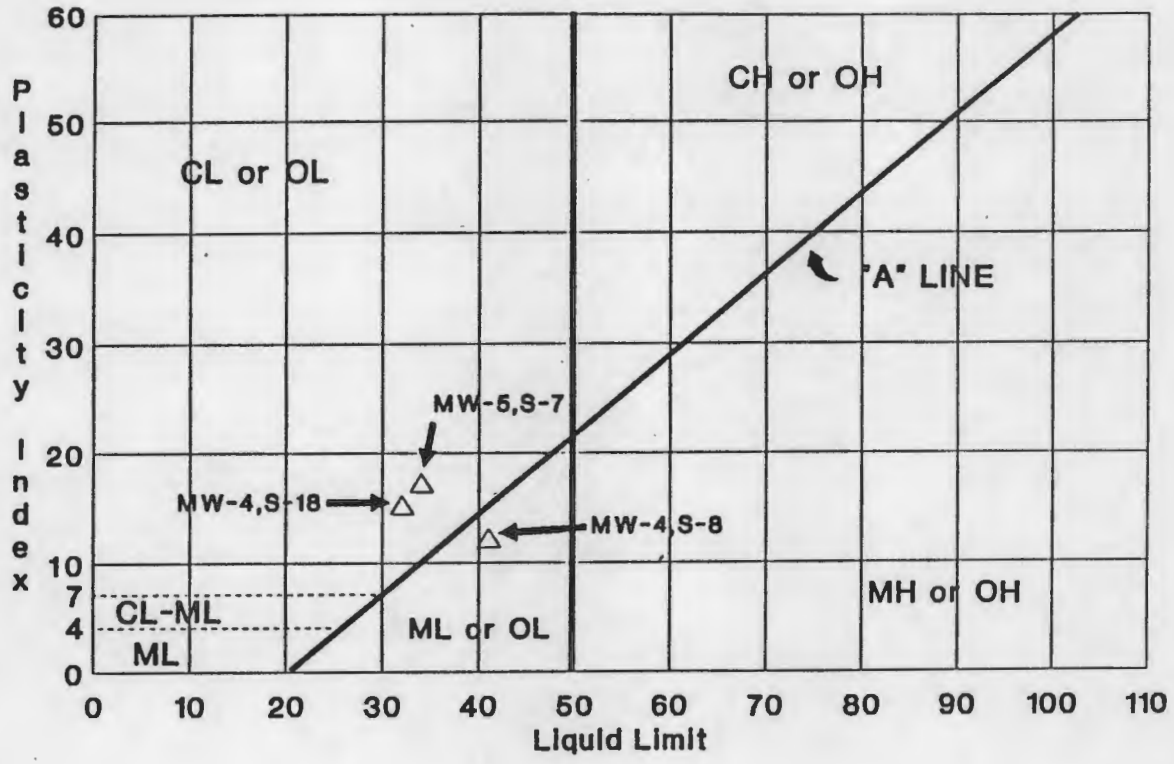
Boring No: MW-5 Sample No: S-7
December 19, 1991



BUFFALO DRILLING COMPANY, INC.

PLASTICITY CHART

PLASTICITY CHART
ASTM D4318



BORING NO.	SAMPLE NO.	LL (%)	PL (%)	PI (%)
MW-4	S-8 (14-16')	41	29	12
MW-4	S-18 (34-36')	32	17	15
MW-5	S-7 (18-20')	34	17	17

BUFFALO DRILLING COMPANY, INC.

APPENDIX D

WELL DEVELOPMENT/PURGING LOGS

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nations

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nossaragge / J. Richards / S. Kreuzer / S. Lamb

DATE: 12-18-91 / 12-19-91

WELL NO.: MW-1

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	29.54	1"	0.04
② CASING INTERNAL DIAMETER (in.):	2	2"	0.17
③ WATER LEVEL BELOW TOP OF CASING (FT.)	22.50	3"	0.38
④ VOLUME OF WATER IN CASING (GAL.)	1.15	4"	0.66
		5"	1.04
		6"	1.50
		8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 3.45 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	5	10	Initial 10	15	20	25	30	35	40	45
pH	7.15	7.28	7.39	7.37	7.32	7.34	7.33	7.32	7.16	7.10	7.42
Spec. Cond. (µmho)	1132	1147	1136	1450	1490	1500	1450	1050	1470	1425	1410
Turbidity (NTU)	>200	>200	>200	>100	>100	>100	>100	>100	>100	>100	99
Temperature (°C)	8	8	8	4.3	6.6	7.2	7.3	7.0	7.0	7.1	7.1
Depth to H2O (Ft)	22.50			22.57							
	12-18-91			12-19-91							→

COMMENTS: The first 10 gallons were removed with a stainless steel bailer.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nations

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nossavage / J. Richards / S. Kreuzer / S. Lamb

DATE: 12-19-91 / 12-20-91 / 1-6-92

WELL NO.: MW-1

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	29.54	1"	0.04
② CASING INTERNAL DIAMETER (in.):	2	2"	0.17
③ WATER LEVEL BELOW TOP OF CASING (FT.)	22.64	3"	0.38
④ VOLUME OF WATER IN CASING (GAL.)	1.12	4"	0.66
		5"	1.04
		6"	1.50
		8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 3.36 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	50	initial 50	55	60	65	70	75	80	initial 80	85	90
pH	7.31	7.52	7.31	7.20	7.23	7.26	7.27	7.26	6.90	7.01	7.04
Spec. Cond. (µmho)	1510	1420	1420	1400	1390	1270	1430	1330	1350	1375	1380
Turbidity (NTU)	61	>100	>100	>100	>100	>100	>100	>100	17	>100	>100
Temperature (°C)	7.1	7.0	8.0	8.0	8.0	8.0	8.0	8.0	7.2	8.4	7.0
Depth to H2O: (ft)		22.64							21.63		
	12-19-91	12-20-91							1-6-92		

COMMENTS: Waterra system used.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nations

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nassavage / J. Richards / S. Lamb / S. Kreuzer

DATE: 1-6-92

WELL NO.: MW-1

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	29.54	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	21.63	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	1.29	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 3.87 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	95	100	105	110	115	120	125	130	135	140	145
pH	7.07	7.17	7.05	7.14	7.15	7.24	7.22	7.45	7.42	7.36	7.36
Spec. Cond. (µmho)	1390	1400	1350	1375	1400	1400	1400	1425	1400	1400	1400
Turbidity (NTU)	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100
Temperature (°C)	7.1	6.0	6.5	6.4	6.3	6.3	6.2	5.3	6.0	5.9	5.9
Depth to H2O: (Ft.)											
	1-6-92										→

COMMENTS: Waterra system used.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nussavage / J. Richards / S. Kreuzer / S. Lamb

DATE: 1-6-92 / 1-13-92

WELL NO.: MW-1

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	29.54	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	21.54	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	1.30	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 3.90 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	150	Initial 150	155	160	165	170	175	180	185	190	195
pH	7.37	7.25	7.24	7.24	7.25	7.26	7.24	7.25	7.26	7.25	7.26
Spec. Cond. (µmho)	1400	1035	953	941	900	926	936	949	943	938	960
Turbidity (NTU)	>100	70	178	110	76	38	>200	>200	>200	>200	>200
Temperature (°C)	5.9	7.8	7.9	7.7	7.8	7.7	7.9	7.8	8.0	7.9	7.9
Depth to H2O: (ft)		21.54									
		1-13-92									→

COMMENTS: Waterra system used.

A-2347

URS CONSULTANTS, INC.	WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nossaraga / J. Richards / S. Kreuzer / S. Lamb

DATE: 1-13-92 / 1-14-92

WELL NO.: MW-1

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	29.54	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	21.59	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	1.30	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 3.90 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	200	205	210	215	220	225	230	235	Initial 235	240	245
pH	7.26	7.25	7.24	7.25	7.23	7.21	7.24	7.24	7.05	7.17	7.18
Spec. Cond. (µmho)	937	938	954	919	948	914	954	956	959	926	952
Turbidity (NTU)	172	170	140	120	124	118	>200	>200	>200	>200	>200
Temperature (°C)	7.8	7.9	8.0	7.9	7.8	8.0	7.7	10.0	10.0	10.0	10.0
Depth to H2O: (Ft.)									21.59		
	1-13-92								1-14-92 →		

COMMENTS: Waterra System used.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35-235-12

STAFF: D. Sheppard / K. Nossavage / J. Richards / S. Kreuzer / S. Lamb

DATE: 1-14-92

WELL NO.: MW-1

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	29.54	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	21.59	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	1.30	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 3.90 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	250	255	260	265	270	275	280	285	290	295	300
pH	7.19	7.23	7.24	7.24	7.21	7.22	7.25	7.30	7.26	7.26	7.27
Spec. Cond. (μmho)	953	954	951	951	926	924	938	948	928	911	901
Turbidity (NTU)	144	138	136	102	96	85	70	68	60	51	32
Temperature (°C)	10	10	10	10	10	10	10	10	10	10	10
Depth to H2O: (Ft.)											

1-14-92

COMMENTS: Waterra system used.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nossavage / J. Richards / S. Kreuzer / S. Lamb

DATE: 1-14-92

WELL NO.: MW-1

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	29.54	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	21.59	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	1.30	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 3.90 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	305	310	315	320	325	330	335	340	345	350	353
pH	7.24	7.30	7.23	7.23	7.20	7.20	7.19	7.18	7.17	7.19	7.19
Spec. Cond. (µmho)	948	953	925	931	945	943	944	943	946	945	945
Turbidity (NTU)	>200	>200	>200	>200	>200	122	80	66	50	42	36
Temperature (°C)	11	10	10	10	10	10	10	10	10	10	10
Depth to H_2O: (ft)											
						1-14-92					→

COMMENTS: Waterra system used.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nations

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nossavage / J. Richards / S. Kreuzer / S. Lamb

DATE: 1-14-92

WELL NO.: MW-1

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	29.54	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	21.59	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	1.30	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 3.90 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	360	365	370	375	380	385	390	395	400	405	410
pH	7.23	7.25	7.25	7.24	7.22	7.26	7.22	7.21	7.25	7.24	7.22
Spec. Cond. (µmho)	937	938	948	930	938	936	941	931	936	931	930
Turbidity (NTU)	100	>200	124	76	52	29	18	26	14	13	21
Temperature (°C)	10	10	10	10	10	10	10	10	10	10	10
Depth to H2O (Ft.)											

1-14-92 →

COMMENTS: Watera system used.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nessenger / S. Richards / S. Kreuzer / S. Lamb

DATE: 1-14-92

WELL NO.: MW-1

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	29.54	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	21.59	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	1.30	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 3.90 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	415	420	425	430	435	440	445	450	455	460	465
pH	7.26	7.24	7.25	7.22	7.22	7.23	7.26	7.24	7.25	7.26	7.24
Spec. Cond. (µmho)	953	935	950	939	938	940	935	945	949	924	928
Turbidity (NTU)	12	10	9	>200	>200	>200	>200	>200	150	52	34
Temperature (°C)	10	10	10	10	10	10	10	10	10	10	10
Depth to H2O (ft.)											

COMMENTS: Waterra system used.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nations

PROJECT NO.: 35235-12

STAFF: D.Sheppard / b.Nossavage / J.Richards / S.Krevzer / S.Lamb

DATE: 1-14-92 / 1-15-92

WELL NO.: MW-1

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	29.54	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	21.56	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	1.30	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③)$ = 3.90 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	470	475	480	485	Initial 485	490	495	500	505	510	515
pH	7.24	7.25	7.25	7.27	6.98	7.09	7.09	7.17	7.21	7.24	7.21
Spec. Cond. (µmho)	951	950	951	946	1400	1250	1240	1225	1210	1225	1225
Turbidity (NTU)	25	19	6.5	3.7	13	67	70	61	53	49	42
Temperature (°C)	10	10	10	10	7.7	5.3	4.4	3.8	7.7	7.3	7.1
Depth to H2O: (Ft.)					21.66						
	1-14-92				1-15-92						

COMMENTS: Waterra system used.

A-2347

URS CONSULTANTS, INC.	WELL DEVELOPMENT / PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nassauage / J. Richards / S. Kreuzer / S. Lamb

DATE: 1-15-97

WELL NO.: MW-1

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	29.54	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	21.56	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	1.30	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 3.90 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	520	525	530	535	540	545	550	555	560	565	570
pH	7.23	7.32	7.28	7.28	7.38	7.43	7.44	7.35	7.34	7.38	7.37
Spec. Cond. (µmho)	1225	1225	1210	1210	1200	1210	1200	1210	1210	1200	1210
Turbidity (NTU)	>100	87	76	56	46	38	32	>100	>100	99	79
Temperature (°C)	7.5	5.4	7.1	7.2	7.7	6.8	6.2	7.5	8.0	7.6	8.0
Depth to H2O: (ft.)											

1-15-97

COMMENTS:

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nossavage / J. Richards / S. Kreuzer / S. Lamb

DATE: 1-15-92

WELL NO.: MW-1

① TOTAL CASING AND SCREEN LENGTH (FT.):	29.54
② CASING INTERNAL DIAMETER (in.):	2
③ WATER LEVEL BELOW TOP OF CASING (FT.)	21.56
④ VOLUME OF WATER IN CASING (GAL.)	1.30

WELL I.D.	VOL. GAL./FT.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 3.90 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	575	580	585	590	595	600	605	610	615	620	625
pH	7.35	7.34	7.33	7.36	7.37	7.38	7.31	7.34	7.33	7.35	7.32
Spec. Cond. (µmho)	1195	1200	1200	1200	1210	1200	1200	1200	1150	1210	1200
Turbidity (NTU)	65	61	49	47	>100	57	36	>100	>100	>100	>100
Temperature (°C)	8.0	8.0	8.0	8.1	8.0	8.2	8.0	8.3	8.2	8.2	8.3
Depth to H2O: (ft.)											
	1-15-92										

COMMENTS: Waterra System used.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-17

STAFF: D. Sheppard / K. Nascarage / J. Richards / S. Kreuzer / S. Lamb

DATE: 1-15-92

WELL NO.: MW-1

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	29.54	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	21.56	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	1.30	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 3.90 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	630	635	640	645	650	655	660	665	670	675	
pH	7.30	7.27	7.24	7.22	7.22	7.26	7.24	7.25	7.25	7.25	
Spec. Cond. (µmho)	1210	1210	1210	1210	1210	1225	1200	1200	1210	1200	
Turbidity (NTU)	>100	>100	>100	>100	89	77	41	30	22	17	
Temperature (°C)	8.2	8.2	7.9	8.1	8.7	8.2	8.1	9.0	7.7	8.2	
Depth to H2O: (Ft.)											

COMMENTS: Waterra system used.

Developed = 675 gallons

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT / PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nossavage

DATE: 12-19-91 / 12-20-91 / 1-7-92

WELL NO.: MW-2

		WELL I.D.	VOL. GAL./FT.
(1) TOTAL CASING AND SCREEN LENGTH (FT.):	35.86	1"	0.04
		2"	0.17
(2) CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
(3) WATER LEVEL BELOW TOP OF CASING (FT.)	29.91	5"	1.04
		6"	1.50
(4) VOLUME OF WATER IN CASING (GAL.)	5.95	8"	2.60

$V = 0.0408 ((2)^2 \times ((1)-(3)) =$ 0.97 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	5	10	Initial 10	15	20	Initial 20	25	30	(dry) 35	Initial 35
pH	7.60	7.44	7.45	7.40	7.40	7.36	7.35	7.30	7.33	7.38	7.37
Spec. Cond. (µmho)	894	910	898	766	878	824	908	935	892	862	751
Turbidity (NTU)	>200	>200	>200	>200	>200	>200	32	>200	73	>200	>200
Temperature (°C)	8	8	8	8	8	8	8	8	8	8	8
Depth to H2O: (Ft.)	29.91						28.89				34.88
	12-19-91						12-20-91				1-7-92 →

COMMENTS: The first 10 gallons were removed with a bailer.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. NoSavage

DATE: 1-7-92

WELL NO.: MW-2

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	35.86	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	24.88	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	1.78	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 5.34 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	40	45	50	55	60	65	70	75	80	85	90
pH	7.30	7.08	7.17	7.18	7.20	7.21	7.22	7.22	7.21	7.12	7.19
Spec. Cond. (μmho)	778	758	769	767	769	773	766	754	758	720	738
Turbidity (NTU)	>200	>200	>200	>200	>200	>200	>200	170	142	117	98
Temperature (°C)	8	8	8	8	8	8	8	8	8	8	8
Depth to H2O (Ft)											
	1-7-92 →										

COMMENTS: Waterra system used.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nassavage

DATE: 1-7-92

WELL NO.: MW-2

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	35.86	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	24.78	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	1.81	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 5.43 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	95	Initial 95	100	105	110	115	120	125	130	135	140
pH	7.22	6.85	6.78	6.91	6.96	6.99	7.09	7.11	7.08	7.22	7.25
Spec. Cond. (µmho)	708	825	826	828	815	781	783	742	758	757	757
Turbidity (NTU)	>200	141	>200	>200	>200	>200	>200	32	181	32	10
Temperature (°C)	8	7.6	7.6	7.7	7.6	7.6	7.4	7.8	7.7	7.6	7.6
Depth to H2O: (ft.)		24.78									
	1-7-92	1-10-92									→

COMMENTS: Waterra system used.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-17

STAFF: D. Sheppard / K. Nosseveage

DATE: 1-10-92

WELL NO.: MW-2

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	35.86	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	24.78	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	1.81	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③)$ = 5.43 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	145	150									
pH	7.25	7.29									
Spec. Cond. (µmho)	766	759									
Turbidity (NTU)	6	9									
Temperature (°C)	7.8	7.5									
Depth to H2O (Ft.)											

COMMENTS: Waterra system used.

Developed @ 150 gallons

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nossavage

DATE: 12-19-91 / 12-20-91

WELL NO.: MW-3

① TOTAL CASING AND SCREEN LENGTH (FT.):	35.57
② CASING INTERNAL DIAMETER (in.):	2
③ WATER LEVEL BELOW TOP OF CASING (FT.)	27.94
④ VOLUME OF WATER IN CASING (GAL.)	1.24

WELL I.D.	VOL. GAL./FT.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 4.72 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	5	10	Initial 10	15	20	25	30	35	40	45
pH	7.47	7.40	7.52	6.65	6.76	6.84	6.71	6.74	6.88	6.91	6.86
Spec. Cond. (µmho)	783	805	810	816	825	865	882	866	915	916	890
Turbidity (NTU)	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200
Temperature (°C)	8	8	8	8	8	8	8	8	8	8	8
Depth to H2O: (Ft.)	27.94			27.34							
	12-19-91			12-20-91							→

COMMENTS: The first 10 gallons were removed with a bailer.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT / PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 36235-12

STAFF: D. Sheppard / K. Nossavage

DATE: 12-20-91

WELL NO.: MW-3

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	35.57	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	27.94	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	1.24	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 4.72 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	50	60	70	80	90	100	110	120	130	140	150
pH	6.94	7.04	6.99	7.13	7.16	7.23	7.28	7.31	7.29	7.49	7.33
Spec. Cond. (μmho)	885	874	862	883	906	870	901	873	885	897	903
Turbidity (NTU)	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200
Temperature (°C)	8	8	8	8	8	8	8	8	8	8	8
Depth to H2O: (ft.)											

COMMENTS: Waterra system used.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-17

STAFF: D. Sheppard / K. Nessvage

DATE: 12-20-91

WELL NO.: MW-3

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	35.57	1"	0.04
② CASING INTERNAL DIAMETER (in.):	2	2"	0.17
③ WATER LEVEL BELOW TOP OF CASING (FT.)	26.77	3"	0.38
④ VOLUME OF WATER IN CASING (GAL.)	1.43	4"	0.66
		5"	1.04
		6"	1.50
		8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 4.29 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	160	170	180	190	200	Initial 200	210	220	230	240	250
pH	7.35	7.34	7.33	7.20	7.33	7.33	7.28	7.23	7.26	7.29	7.25
Spec. Cond. (µmho)	905	904	907	890	905	827	845	804	790	760	821
Turbidity (NTU)	>700	>200	>200	>700	>700	123	118	91	70	50	42
Temperature (°C)	8	8	8	8	8	8	8	8	8	8	8
Depth to H2O: (ft.)						26.77					
	12-20-91					1-7-92					→

COMMENTS: Waterra system used.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nossavage

DATE: 1-7-92

WELL NO.: MW-3

① TOTAL CASING AND SCREEN LENGTH (FT.):	35.57
② CASING INTERNAL DIAMETER (in.):	2
③ WATER LEVEL BELOW TOP OF CASING (FT.)	26.77
④ VOLUME OF WATER IN CASING (GAL.)	1.43

WELL I.D.	VOL. GAL./FT.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 4.29 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	260	270	280	290	300						
pH	7.52	7.46	7.30	7.28	7.26						
Spec. Cond. (µmho)	847	846	755	802	795						
Turbidity (NTU)	31	27	21	19	13						
Temperature (°C)	8	8	8	8	8						
Depth to H_2O: (F_t)											
	1-7-92										

COMMENTS: Waterra system used.

Developed @ 300 gallons

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-17

STAFF: D. Sheppard / K. Noissevage

DATE: 12-19-91 / 1-7-92 / 1-10-92

WELL NO.: MW-4

		WELL I.D.	VOL. GAL./FT.
(1) TOTAL CASING AND SCREEN LENGTH (FT.):	32.02	1"	0.04
		2"	0.17
(2) CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
(3) WATER LEVEL BELOW TOP OF CASING (FT.)	29.37	5"	1.04
		6"	1.50
(4) VOLUME OF WATER IN CASING (GAL.)	0.43	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 1.29 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	(dry) 3.5	(dry) 10	Initial 10	(dry) 13	(dry) 14.5	Initial 14.5	(dry) 16	Initial 16	(dry) 17	(dry) 18
pH	7.10	7.04	7.39	7.47	7.57	7.40	7.21	7.50	7.33	N/T	7.40
Spec. Cond. (µmho)	644	593	555	541	559	511	553	573	567	N/T	569
Turbidity (NTU)	68	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200
Temperature (°C)	8	8	8	8	8	8	7.2	7.1	7.9	N/T	9.0
Depth to H2O: (Ft.)	29.37			29.49			29.42		29.60		
	12-19-91			1-7-92			1-10-92		1-13-92		

COMMENTS: The first 10 gallons were removed with a bailer.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nations

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nossavage

DATE: 1-14-92 / 1-15-92

WELL NO.: MW-4

① TOTAL CASING AND SCREEN LENGTH (FT.):	32.02
② CASING INTERNAL DIAMETER (in.):	2
③ WATER LEVEL BELOW TOP OF CASING (FT.)	29.47
④ VOLUME OF WATER IN CASING (GAL.)	.41

WELL I.D.	VOL. GAL./FT.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 1.23 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	Initial 18	(dry) 19.5	(dry) 21	(dry) 22	(dry) 23	(dry) 25	Initial 25	(dry) 26.5	(dry) 27.5	(dry) 28.5	(dry) 29
pH	7.31	N/T	7.50	7.46	N/T	7.48	7.35	N/T	7.68	7.44	7.42
Spec. Cond. (µmho)	560	N/T	561	556	N/T	554	567	N/T	542	561	546
Turbidity (NTU)	>200	>200	>200	>200	N/T	140	>200	N/T	177	180	>200
Temperature (°C)	10	NT	11	10	N/T	9	8	N/T	9	9	10
Depth to H2O: (Ft.)	29.47						29.51				
	1-14-92						1-15-92				→

COMMENTS: Waterra system used.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nossavage

DATE: 1-15-92 / 1-16-92 / 1-17-92

WELL NO.: MW-4

① TOTAL CASING AND SCREEN LENGTH (FT.):	32.02
② CASING INTERNAL DIAMETER (in.):	2
③ WATER LEVEL BELOW TOP OF CASING (FT.)	29.54
④ VOLUME OF WATER IN CASING (GAL.)	0.40

WELL I.D.	VOL. GAL./FT.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 1.20 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	(dry) 30	Initial 30	(dry) 31	(dry) 32	(dry) 33	(dry) 34	(dry) 35	(dry) 36	Initial 36	(dry) 38	Initial 38
pH	7.47	7.62	N/T	7.30	7.39	7.66	7.55	7.50	6.95	7.20	7.28
Spec. Cond. (µmho)	515	625	N/T	598	589	598	604	595	576	589	597
Turbidity (NTU)	137	>200	N/T	120	>200	>200	176	120	>200	98	>200
Temperature (°C)	8	9	N/T	9	9	9	9	9	10	10	10
Depth to H2O: (ft.)		29.54							29.56		
	1-15-92	1-16-92							1-17-92		→

COMMENTS: Waterra system used.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nessarage

DATE: 1-17-92

WELL NO.: MW-4

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	32.02	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	29.56	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	0.40	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 1.20 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	(dry) 39	Initial 39	(dry) 40	Initial 40	(dry) 41	Initial 41	(dry) 42	Initial 42	(dry) 43	Initial 43	(dry) 44
pH	7.30	7.30	7.37	7.37	7.38	7.38	7.34	7.28	7.31	7.44	7.40
Spec. Cond. (µmho)	581	577	580	594	587	582	568	576	575	581	578
Turbidity (NTU)	>200	>200	>200	132	188	168	>200	>200	>200	>200	>200
Temperature (°C)	10	10	10	10	10	10	10	10	10	10	10
Depth to H2O (Ft.)											
Date	1-17-92										

COMMENTS: Waterra system used.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT / PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nossaugge

DATE: 12-18-91 / 12-19-91 / 12-20-91 /

WELL NO.: MW-5

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	18.82	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	16.43	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	0.39	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 1.17 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	5	Initial 9	10	15	20	Initial 20	25	30	35	40
pH	7.23	7.11	7.30	7.20	7.27	7.44	7.42	7.39	7.43	7.44	7.47
Spec. Cond. (µmho)	709	739	687	655	657	668	658	653	570	618	611
Turbidity (NTU)	>200	>200	46	>200	>200	>200	>200	>200	40	15	20
Temperature (°C)	8	8	8	8	8	8	8	8	8	8	8
Depth to H_2O (Ft.)	16.43		16.56				16.60				
	12-18-91		12-19-91				12-20-91				

COMMENTS: First 10 gallons removed with a bailer

Large amount of Q-Rock sand pack was removed from the bottom of the well.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / L. Nessenger

DATE: 12-20-91

WELL NO.: MW-5

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	18.82	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	16.60	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	0.36	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 1.08 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	45	50	55	60	65	70	75	80	85	90	95
pH	7.39	N/T	N/T	N/T	N/T	7.38	7.36	7.33	7.34	7.35	N/T
Spec. Cond. (µmho)	620	N/T	N/T	N/T	N/T	685	651	610	630	633	N/T
Turbidity (NTU)	>200	N/T	N/T	N/T	N/T	>200	>200	26	77	>200	N/T
Temperature (°C)	8	N/T	N/T	N/T	N/T	8	8	8	8	8	N/T
Depth to H2O: (Ft.)											

12-20-91 →

COMMENTS: ISCO Peristaltic Pump used.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nossavage

DATE: 12-20-91 / 1-14-92 / 1-15-92

WELL NO.: MW-5

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	18.82	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	14.54	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	0.70	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 2.10 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	100	Initial 100 *	105 *	110 *	Initial 110	115	120	125	130	135	140
pH	7.50	7.18	7.19	7.21	7.30	6.90	7.17	7.13	7.11	7.14	7.18
Spec. Cond. (µmho)	610	624	620	633	652	631	644	632	631	643	640
Turbidity (NTU)	56	>200	>200	>200	>200	>200	>200	76	>200	>200	>200
Temperature (°C)	8	10	10	10	10	10	10	9	9	9	8
Depth to H2O: (Ft.)		14.54			14.20						
	12-20-91	1-14-92			1-15-92						→

COMMENTS: ISCO peristaltic pump used.

* Bailer surge.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nessavage

DATE: 1-15-92

WELL NO.: MW-5

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	18.82	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	14.20	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	0.75	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 2.25 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	145	150	155	160	165	170	175	180	185	190	195
pH	7.09	7.08	7.11	7.10	7.12	7.10	7.10	7.20	7.16	7.19	7.15
Spec. Cond. (µmho)	640	641	643	635	640	649	648	648	648	649	647
Turbidity (NTU)	>200	>200	>200	124	120	140	136	166	112	104	100
Temperature (°C)	9	9	9	10	9	9	9	10	9	8	8
Depth to H2O (ft)											

COMMENTS: ISCO peristaltic pump used.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nossavage

DATE: 1-15-92

WELL NO.: MW-5

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	18.82	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	14.20	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	0.75	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 2.25 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	200	205	210	215	220	225	230	initial 230	235	240	245
pH	7.16	7.16	7.17	7.02	7.06	7.13	7.21	7.30	7.10	7.14	7.18
Spec. Cond. (µmho)	647	650	647	637	649	646	646	714	709	691	709
Turbidity (NTU)	92	63	54	54	88	61	27	192	33	154	>200
Temperature (°C)	8	9	8	8	9	8	8	7	7	8	8
Depth to H2O: (Ft.)											
	1-15-92							1-16-92			→

COMMENTS: ISCO peristaltic pump used.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35225-12

STAFF: D. Sheppard / K. Nossavage

DATE: 1-16-92

WELL NO.: MW-5

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	18.82	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	14.20	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	0.75	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③)$ = 2.25 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	250	255	260	265	270	275	280	285	290	295	300
pH	6.96	7.38	7.37	7.31	6.98	7.30	7.21	7.42	7.34	7.31	7.32
Spec. Cond. (µmho)	704	714	715	680	679	707	701	707	705	706	704
Turbidity (NTU)	>200	146	57	38	70	25	49	31	5.1	2.2	1.0
Temperature (°C)	8	8	8	8	8	8	8	8	8	8	7

1-16-92

COMMENTS: ISCO peristaltic Pump used.

Developed w 300 gallons.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT / PURGE

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nossavage

DATE: 2-4-92

Purge log

WELL NO.: MW-1

WELL I.D.	VOL. GAL./FT.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

① TOTAL CASING AND SCREEN LENGTH (FT.): 29.54

② CASING INTERNAL DIAMETER (in.): 2

③ WATER LEVEL BELOW TOP OF CASING (FT.) 21.66

④ VOLUME OF WATER IN CASING (GAL.) 1.28

$V = 0.0408 (②)^2 \times (① - ③) =$ 3.84 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	4									
pH	7.76	7.63									
Spec. Cond. (µmho)	1064	1114									
Turbidity (NTU)	14	23									
Temperature (°C)	5.1	5.9									
PID (ppm)	ND	-									

COMMENTS: Waterra system used to evacuate well.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT / PURGE

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nossavage

DATE: 2-4-92

WELL NO.: MW-2

Purge log

① TOTAL CASING AND SCREEN LENGTH (FT.):	35.86
② CASING INTERNAL DIAMETER (in.):	2
③ WATER LEVEL BELOW TOP OF CASING (FT.)	26.00
④ VOLUME OF WATER IN CASING (GAL.)	1.61

WELL I.D.	VOL. GAL./FT.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 4.83 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	8									
pH	7.35	7.44									
Spec. Cond. (µmho)	840	871									
Turbidity (NTU)	28	>100									
Temperature (°C)	5.9	6.9									
PID: (ppm)	1.6	–									

COMMENTS: Waterra system used to evacuate well.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGE

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nossavage

DATE: 2-4-92

WELL NO.: MW-3

Purge log

① TOTAL CASING AND SCREEN LENGTH (FT.):	35.57
② CASING INTERNAL DIAMETER (in.):	2
③ WATER LEVEL BELOW TOP OF CASING (FT.)	26.41
④ VOLUME OF WATER IN CASING (GAL.)	1.49

WELL I.D.	VOL. GAL./FT.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 4.47 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	8.5									
pH	6.95	6.95									
Spec. Cond. (µmho)	878	1003									
Turbidity (NTU)	33	46									
Temperature (°C)	5.7	7.1									
PID: (ppm)	ND	–	–								

COMMENTS: Waterra system used to evacuate well.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT/PURGING LOG

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nassavage

DATE: 2-4-92

Purge log

WELL NO.: MW-4

① TOTAL CASING AND SCREEN LENGTH (FT.):	32.02
② CASING INTERNAL DIAMETER (in.):	2
③ WATER LEVEL BELOW TOP OF CASING (FT.)	29.32
④ VOLUME OF WATER IN CASING (GAL.)	0.44

WELL I.D.	VOL. GAL./FT.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 1.32 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	(dry) 1.3									
pH	6.71	6.91									
Spec. Cond. (µmho)	583	557									
Turbidity (NTU)	92	>100									
Temperature (°C)	5.1	6.5									
PID: (ppm)	ND	-									

COMMENTS: Waterra system used to evacuate well.

A-2347

URS CONSULTANTS, INC.

WELL DEVELOPMENT / PURGE

PROJECT TITLE: Onondaga Nation

PROJECT NO.: 35235-12

STAFF: D. Sheppard / K. Nassauage

DATE: 2-5-92

Purge log

WELL NO.: MW-5

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	18.82	1"	0.04
		2"	0.17
② CASING INTERNAL DIAMETER (in.):	2	3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	13.89	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	0.80	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ 2.40 GAL. (3 casings)

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	3.5									
pH	7.66	7.47									
Spec. Cond. (µmho)	704	688									
Turbidity (NTU)	14	>100									
Temperature (°C)	6.8	6.6									
PID: (ppm)	0.2	-									

COMMENTS: Waterra system used to evacuate well.

A-2347

APPENDIX E
ANALYTICAL SAMPLE DESCRIPTIONS

SAMPLE DESCRIPTIONS

SAMPLE ID	DATE SAMPLED	SAMPLE TYPE	DESCRIPTION	LOCATION
LMW1 (9-11')	12-11-91	Subsurface Soil	Brown sand, trace silt	Northeast corner of site, east of site entrance road.
LMW2 (8-10')	12-10-91	Subsurface Soil	Clayey silt and Gravel	East side of site, northwest of intermittent stream P160B.
LMW3 (24-26')	12-11-91	Subsurface Soil	Light brown sand, trace silt	Southeast corner of site.
LMW4 (23-25')	12-12-91	Subsurface Soil	Brown sand, trace silt	380' east of MW-3, southwest of buried stream bed.
LMW5 (14-16')	12-13-91	Subsurface Soil	Brown sand, some clay, trace silt	Northwest corner of site.
LSW1	12-13-91	Surface Water	Clear, no odor, moderate stream flow	In stream P160B, 100' southeast of MW-2.
LSW2	12-13-91	Surface Water	Clear, no odor, moderate stream flow	In stream P160B, adjacent to hospital waste.
LSW3	12-12-91	Surface Water	Clear, no odor, moderate stream flow	In stream P160B. South of site. Downstream of rust stained area.
LSW4	12-12-91	Surface Water	Clear, no odor, moderate stream flow	In stream P160B, south of site. Downstream of rust stained area.
LSW5	12-11-91	Surface Water	Clear, no odor, moderate stream flow	In stream P160B, approximately 100 feet downstream of confluence with south flowing tributary.
LSW6	12-12-91	Surface Water	Clear, no odor, moderate stream flow	South flowing tributary to stream P160B. Southwest of site.

SAMPLE DESCRIPTIONS (Cont'd)

SAMPLE ID	DATE SAMPLED	SAMPLE TYPE	DESCRIPTION	LOCATION
LSW7	12-12-91	Surface Water	Clear, no odor, Low stream flow	South flowing tributary to stream P160B. Approximately 150 feet west of MW-5.
LSW8	12-12-91	Surface Water	Clear, no odor, low to very low stream flow.	South flowing tributary to stream P160B. Northwest corner of site.
LSD1	12-13-91	Stream Sediment	Brown medium to fine sand, some coarse gravel	Adjacent to LSW1.
LSD2	12-13-91	Stream Sediment	Brown medium sand, some coarse gravel	Adjacent to LSW2.
LSD3	12-12-91	Stream Sediment	Brown silty clay, some sand and organic debris	Adjacent to LSW3.
LSD4	12-12-91	Stream Sediment	Brown well sorted sand and gravel, trace clay	Adjacent to LSW4.
LSD5	12-11-91	Stream Sediment	Brown fine sand	Adjacent to LSW5.
LSD6	12-12-91	Stream Sediment	Brown fine sand, some coarse gravel and organic debris.	Adjacent to LSW6.
LSD7	12-12-91	Stream Sediment	Brown sandy silt, some organic debris.	Adjacent to LSW7.
LSD8	12-12-91	Stream Sediment	Brown sandy silt, slight odor.	Adjacent to LSW8.
LL1	12-11-91	Leachate	Orange colloidal material, some sediment. Oily sheen.	Leachate seep on the north bank of stream P160B. South of site.

SAMPLE DESCRIPTIONS (Cont'd)

SAMPLE ID	DATE SAMPLED	SAMPLE TYPE	DESCRIPTION	LOCATION
LMW1GW	2/5/92	Groundwater	Clear	Northeast corner of site, east side of site entrance road.
LMW2GW	2/5/92	Groundwater	Clear to turbid	East side of site, northwest of stream P160B.
LMW3GW	2/5/92	Groundwater	Clear	Southeast corner of site, north of stream P160B.
LMW4GW	2/5/92	Groundwater	Clear to slightly turbid	South end of site, approximately 300 feet east of MW-3.
LMW5GW	2/5/92	Groundwater	Clear to slightly turbid	Northwest corner of site.
LDW1	12/12/91	Drill Water	Clear	Source: Nedrow Fire Department.