# SAMPLING MANUAL
# LONG-TERM GROUNDWATER MONITORING PROGRAM

## LOVE CANAL SITE
## NIAGARA FALLS, NEW YORK

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## 1.0 INTRODUCTION

This report presents the Sampling Manual for the Long-Term Groundwater Monitoring Program (LTGMP) for the Love Canal (Site) located in Niagara Falls, New York. The purpose of the LTGMP is to collect hydraulic and chemical monitoring data to demonstrate that the barrier drain system is effective in capturing leachate from the Site and preventing off-Site migration of chemicals. Details and procedures for implementing the LTGMP are presented herein.

# 2.0 SITE OVERVIEW

## 2.1 SITE DESCRIPTION

The Site is a 70-acre rectangular site bounded by Colvin Boulevard on the north, 99th and 100th Streets to the east, 95th and 97th Streets to the west, and Frontier Avenue to the south. A Site Plan is provided as Figure 2.1.

Operation of the Site was transferred from the New York State Department of Environmental Conservation (NYSDEC) to Occidental Chemical Corporation (OCC) in April 1995. Effective July 1, 1998, Site responsibility was assigned by OCC to Glenn Springs Holdings, Inc. (GSH), an affiliate of OCC. Beginning October 1, 2008, GSH contracted Conestoga-Rovers & Associates (CRA) to perform operation, maintenance, monitoring, and reporting activities for the Site under direct management of GSH.

## 2.2 REMEDIAL SYSTEMS

Operation of remedial systems to prevent the off-Site migration of chemical contaminants from the Site began in October 1978 with the installation of a barrier drain along the east and west sides of the Southern Sector of the Canal. The barrier drain was later extended to completely encompass the entire area of disposed waste within the Central and Northern Sectors of the Canal. The barrier drain, designed to intercept the shallow overburden lateral groundwater flow, consists of a trench approximately 4 feet wide that varies in depth from approximately 12 to 25 feet depending on location at the Site. Installed within the trench is a perforated vitrified clay tile pipe. The pipe is 6-inch diameter in the Central and Northern Sectors and both 6-inch and 8-inch diameter in the Southern Sector. The pipe is centered in a minimum of 2 feet of uniformly sized gravel, which is overlain with coarse sand extending to the existing ground surface present at the time of construction. Thirty-two lateral trenches, approximately 12 to 19 feet deep, filled with a minimum of 2 feet of gravel and overlain with sand similar to the barrier drain, were dug perpendicular to the barrier drain in the direction of the Canal. The majority of these laterals extend into the disposed waste. The barrier drain is graded from two highpoints, one in the southeast corner and the other in the northeast corner, toward a series of manholes which drain to four pump chambers (PC-1A/PC-2A in the Northern/Central Sector and PC-1/PC-2 in the Southern Sector) where the leachate is collected. The leachate is pumped from the pump chambers to two other pump chambers connected to underground holding tanks (PC-3A in the Northern/Central Sector and PC-3 in the Southern Sector) where it is temporarily stored. The leachate is then pumped to the on-Site Love Canal Treatment Facility (LCTF) where it is treated and discharged to the Niagara Falls Water Board (NFWB) sanitary sewer system under the Site's Significant Industrial User (SIU) Permit #44. The locations of the remedial system components are illustrated on the Site Plan presented as Figure 2.1.

The installation of a 22-acre clay cap over the entire former Canal area was completed in October 1980 following completion of the barrier drain collection system. The purpose of the cap is to reduce infiltration of precipitation. The thickness of the clay cap is a minimum of 3 feet. In 1985, a second (40-acre) cap was installed over the initial clay cap area. The newer cap consists of a 40-mil high density polyethylene (HDPE) liner covered by 18 inches of clean soil and vegetation.

In March 1999, the adjacent 102nd Street Landfill Site leachate collection system was connected to the Love Canal Site to facilitate the transfer of leachate from the 102nd Street Landfill into Love Canal's pump chamber PC-3 for treatment at the LCTF.

Figure 2.1 shows the layout of the Site, including the location of the barrier drain, the lateral trenches, the collection sumps, and the LCTF. Figure 2.2 is a generalized cross-section of the Site, depicting the general location of the waste materials, the caps, and the barrier drain system.

## 2.3 SITE GEOLOGY

### 2.3.1 OVERBURDEN

The overburden materials at the Site can be classified from ground surface to top of bedrock as:

i) Thin upper layer of fill and more permeable glacially-derived materials
ii) Clay unit
iii) Till unit

The total thickness of the overburden deposits is about 33 feet for the northern and central portions of the Site property and 36 to 39 feet for the southern portion.

Various layers of silty sand and clayey silt (fill) overlie the clay unit and appear to be derived locally although construction debris and industrial wastes such as coarse-grained carbon wastes are also present. The thickness of the silty sand and clayey silt layer ranges from 0 to 20 feet but is generally about 5 feet. The variable composition at this upper most unit is due in part to the effect of the past activities of excavations and residential development in the Site area.

The glaciolacustrine deposits (clay unit) overlying the till consist of 0 to 31 feet of silty clay. The upper 3 to 8 feet of the silty clay is mostly reddish-brown with dark greyish-brown, greyish-brown and yellowish-brown patches observed. Sandy clay zones were also encountered in the glaciolacustrine deposits.

The glacial till in the vicinity of the Site varies from 0 to 23.8 feet in thickness. At the Canal itself, the till is roughly 14 feet thick in the north decreasing to 4 or 5 feet around Read Avenue and then increasing to 18 feet for most of the area south of Wheatfield Avenue. The till generally consists of reddish brown, silty clay containing from 20 to 60 percent gravel and some cobbles.

### 2.3.2 BEDROCK

Bedrock conditions beneath the Site are typical of those found on a regional scale. The upper surface of the Lockport Formation is relatively smooth and slopes gently to the south. The bedrock surface elevation is about 540 feet above mean sea level (AMSL) beneath the northern and middle portions of the Site and 537 feet AMSL beneath the southern portion. The thickness of the Lockport Formation in the Canal area is reported to range from 162 to 178 feet.

## 2.4 SITE HYDROGEOLOGY

The hydrogeological regime at the Site has been subdivided into five different zones. From uppermost to lowermost, they are:

i) Shallow Overburden
  - Fill, silty sand, and clay loam
  - Seasonally saturated/unsaturated

ii) Confining Overburden Material
  - Clay and till overlying the Lockport Dolomite

iii) Upper Lockport Dolomite
  - Main aquifer located in upper 10-15 feet of formation
  - Horizontal bedding joints that are extensive over a large area
  - Significant vertical fracturing present

iv) Lower Lockport Dolomite

- Lower part of formation (maximum 165 feet thick)
- Bedding joints are the primary groundwater conveyance mechanism
- Rochester Shale
- Regional aquitard

### 2.4.1 OVERBURDEN

Hydraulic testing indicated that all zones of overburden materials have relatively low hydraulic conductivities ranging from $1 \times 10^{-5}$ centimeter per second (cm/s) for the more permeable shallow system to on the order of $1 \times 10^{-8}$ cm/s for the confining clay/till layer. The relatively impermeable deeper clay and till, in which fractures have not been noted, directly overlie the bedrock and serve to impede the vertical movement of groundwater between the overburden and Lockport Dolomite.

Overburden groundwater table elevations are generally in the range of 568 to 571 feet AMSL. For comparison to the overburden groundwater levels, bedrock groundwater levels range from 560 to 565 feet AMSL. These groundwater levels suggest that a significant downward hydraulic gradient would exist from the overburden to the bedrock if it were not for the relatively impermeable deeper clay and till within the overburden which impedes the vertical movement of groundwater.

### 2.4.2 BEDROCK

The Lockport Dolomite has an average transmissivity on the order of 13.9 square centimeters per second ($cm^2/s$) and a storage coefficient of 0.00015. Within the Lockport Dolomite, groundwater is present in bedding joints, vertical joints, and solution cavities. Of these, bedding joints are the dominant mechanisms of groundwater flow. The nearly horizontal bedding joints, which follow the dip of the formation, are usually less than 1/8 inch in size although some have been enlarged by gypsum dissolution. The bedding joints are of much higher permeability than the surrounding bedrock. The bedding joints are fairly continuous in areal extent so that groundwater may flow over long distances within a single bedding joint. Groundwater levels within these joints were found to decrease with depth. Groundwater movement through vertically oriented joints is relatively significant in the top 10 to 15 feet of the formation. In this zone, weathering and dissolution have widened the joints and created a relatively good aquifer at the top of the dolomite. This upper zone is generally considered much more permeable than the remainder of the underlying bedrock.

In general, groundwater flow in the Upper Lockport Dolomite is to the north or northwest away from the Niagara River. The Niagara River is a source of bedrock recharge.

## 3.0 MONITORING PROGRAM

In order to demonstrate that the barrier drain system is functioning as designed, a hydraulic and chemical monitoring program has been established to measure and record overburden and bedrock groundwater levels quarterly and to collect groundwater samples from the Site for laboratory analysis on an annual basis. Details of the program are provided below.

To adequately monitor the performance of the containment system, alteration of the monitoring program may occur following review of previous hydraulic and/or chemical monitoring data or upon request of the NYSDEC or other regulatory agencies.

### 3.1 HYDRAULIC MONITORING

In order to monitor the effectiveness of the barrier drain system in capturing leachate from the Site and preventing off-Site migration of chemicals, a network of overburden piezometers and overburden and bedrock groundwater monitoring wells have been installed on the Site, along the perimeter of the Site, and in the surrounding community. The hydraulic monitoring program consists of the quarterly measurement of water levels in 92 piezometers located in 6 nested piezometer strings around the Site and 13 groundwater monitoring wells. Table 3.1 summarizes the wells utilized for quarterly hydraulic monitoring. Figure 3.1 presents the hydraulic monitoring locations in relation to the barrier drain.

The alignment of the six nested piezometer strings includes piezometers both within and outside the barrier drain. Therefore, it is possible to determine the hydraulic gradient in relation to the barrier drain system and to establish whether this gradient is inward (toward the barrier drain). An inward gradient indicates that the system is functioning properly, capturing leachate from the Site, and preventing off-Site migration of chemicals.

Information on construction of the wells included in the hydraulic monitoring program is presented in Table 3.2. Boring logs and well installations for the piezometers and observation wells are included as Appendix A.

Procedures for hydraulic monitoring are described in Section 5.3.

## 3.2 CHEMICAL MONITORING

In order to measure and monitor groundwater chemistry at the Site, a selection of monitoring wells is sampled on an annual and biannual basis. The chemical monitoring program consists of 24 overburden and bedrock monitoring wells monitored on an annual basis and an additional 25 overburden monitoring wells monitored on a biannual basis. The 25 biannual wells are divided into two groups, with each group being sampled in alternating years. Group 1 consists of 17 wells measured in odd numbered years. Group 2 consists of eight wells measured in even numbered years. Table 3.3 lists the monitoring wells to be sampled annually and the two groups of additional wells which are sampled biannually. Figure 3.2 presents the chemical monitoring locations in relation to the barrier drain.

Additional wells may be added to the chemical monitoring program at the request of the NYSDEC prior to the start of each annual sampling event.

Groundwater samples are analyzed for Site-specific volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, and polychlorinated biphenyls (PCBs). A complete list of the analytical parameters is presented in Table 3.4.

Information regarding documentation of laboratory processing steps, analytical methodologies, quality assurance/quality control (QA/QC) protocols, and reporting format is presented in the "Quality Assurance Project Plan – Groundwater Monitoring" (QAPP), presented as Appendix B.

Information on construction of the wells included in the chemical monitoring program is presented in Table 3.2. Boring logs and well installations for the piezometers and observation wells are included as Appendix A.

Procedures for chemical monitoring are described in Sections 5.4 through 5.11.

## 3.3 MONITORING SCHEDULE

As discussed above, the monitoring programs include quarterly rounds of groundwater level measurements at the locations listed in Table 3.1 and annual chemical monitoring at the locations in Table 3.3, as per the prescribed schedule. Quarterly groundwater level measurements are taken in March, June, September, and December of each year. The annual chemical monitoring program occurs during June of each year. A monitoring summary for the Site is provided in Table 3.5.

## 4.0 PREPARATION FOR CHEMICAL MONITORING

Preparation for the annual chemical monitoring should include the tasks detailed in the following sections.

### 4.1 AGENCY NOTIFICATIONS

The following notifications should be made prior to conducting the sampling field work.

Mr. Brian Sadowski
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, New York 14203-2999
(716) 851-7220

- Notify in writing via email at least 1 week prior to start date
- Notification to be made by project personnel

### 4.2 SAMPLING SUPPLIES AND EQUIPMENT

Sampling supplies and equipment required are listed in the task specific field procedures (FP) included in Appendix C.

### 4.3 EQUIPMENT OPERATION

All project personnel will be trained in the proper use and operation of sampling equipment.

### 4.4 METER CALIBRATION

During field activities, a multi-parameter meter and a turbidity meter are used to obtain measurements of the groundwater (pH, temperature, conductivity, turbidity) in the well. This section provides information on the calibration of these meters to assure accurate and reliable readings are obtained.

### 4.4.1 GENERAL

Each meter to be used should be calibrated to the appropriate calibration reference standard(s) prior to use and in accordance with the manufacturer's directions, guidelines, and specifications. Reference standards must be fresh, untainted, and within the expiration date.

### 4.4.2 MULTI-PARAMETER METER CALIBRATION

A multi-parameter meter (i.e., QED MicroPurge) is used to obtain pH, temperature, and conductivity measurements of the groundwater.

The pH sensor takes a measurement of the available hydrogen ions of a solution. The meter reads on a scale of 0 to 14 with 0 being a very strong acid and 14 being a very strong base. A pH of 7 is neutral. The calibration of this meter is affected by the temperature and age of the reference solution(s).

The specific conductivity sensor measures the conductivity of a liquid, which gives an indication of the presence of dissolved ions in solution. Readings are typically provided on four scales, 0 to 10 micromhos, 0 to 100 micromhos, 0 to 1,000 micromhos, and 0 to 10,000 micromhos.

The temperature sensor measures the temperature of a liquid and is used as an indicator of purging stability. Readings are recorded in degrees Celsius (C).

Manufacturer's information should be consulted prior to calibration and use. Multi-parameter meters require separate calibration of each parameter. The meter is calibrated at the beginning of each day prior to use. Field Procedure 10 (FP-10) and FP-11, contained in Appendix C, describe the procedures to be used to calibrate this meter for pH and specific conductivity, respectively.

### 4.4.3 TURBIDIMETER CALIBRATION

The turbidimeter measures the turbidity (cloudiness) of an aqueous solution. Measurement is made in nephelometric turbidity units (NTU), with a higher reading denoting a cloudier sample, which can affect certain volatile organic and metals analyses. A 0.02-NTU reference standard is supplied with the meter, and daily calibration of the meter is recommended when in use. FP-12, contained in Appendix C, presents the procedure for calibration of the turbidimeter used at the Site.

## 4.5 CLEANING REQUIREMENTS

Any equipment which is not dedicated for use in a specific well must be cleaned before being used and between uses. The cleaning procedure at the Site consists of:

- A wash with a biodegradable non-phosphate soap
- A tap water rinse
- A deionized water rinse
- Allow equipment to air dry and wrap in aluminum foil or plastic to avoid contamination of the equipment

FP-06b, contained in Appendix C, more fully describes the cleaning protocols for the Site.

## 5.0 MONITORING PROCEDURES

The proper collection of water levels and groundwater samples is essential for the Site and, therefore, requires that a consistent set of procedures be followed for each well every time water levels and/or groundwater samples are obtained. Following these procedures will result in the collection of quality data, which is representative of conditions at the Site.

### 5.1 GENERAL PROCEDURES

Certain activities can adversely affect sample quality; therefore, it is imperative that these activities not be done while sampling:

i) Do not smoke.
ii) Do not use bug repellents.
iii) Do not use wasp/hornet spray near a well.
iv) Do not use aftershaves, cologne, or astringents .
v) Be aware of wind direction. Do not run vehicle or small engines upwind of a well being sampled.
vi) Be cognizant of traffic fumes and nearby activities. Suspend sampling if fumes are strong. Make a notation of any such observations in the Groundwater Purge/Sample Record Log.
vii) Be cognizant that the New York State Department of Transportation (NYSDOT) uses herbicides near the wells on the LaSalle Expressway. Suspend sampling if such activities are observed, and make note of type of applications by NYSDOT in the Groundwater Purge/Sample Record Log.
viii) Do not handle or pour gasoline or fuel oils near a well being sampled.

### 5.2 GENERAL HEALTH AND SAFETY

A Site-specific Health and Safety Plan (HASP) has been generated and will be reviewed prior to any field activities. A copy of the HASP is available at the LCTF and also upon request.

During collection of groundwater samples, the following health and safety rules should be applied:

i) Modified Occupational Safety and Health Administration (OSHA) Level D personal protective equipment (PPE), including safety glasses, full length pants, and industrial quality work boots with steel-toe reinforcement is the minimum required personal safety equipment.

ii) Hard hats are to be worn in any areas with the potential for objects to fall from overhead.

iii) Do not eat, drink, or smoke.

iv) Be aware of potential slip, trip, and fall hazards and uneven terrain.

v) Be aware of the hazards of working with portable machinery, electrically operated equipment, and gasoline powered equipment.

vi) Use proper lifting techniques when lifting is required.

vii) Some sampling takes place along a high speed expressway. Be aware of moving vehicles. High visibility safety vests should be worn when working near high traffic areas. Additionally, two people are required for sampling in high traffic areas necessitating a spotter.

viii) Groundwater removed during sampling activities should be considered contaminated and handled accordingly (FP-01a).

ix) Use caution when opening protective covers on wells - wasps, hornets, or bees may be present.

## 5.3 WATER LEVEL MEASUREMENT

Once each quarter, water levels are measured at piezometers and monitoring wells at the Site (refer to Table 3.1 and Figure 3.1).

A water level tape will be used for water level measurements in the piezometers and/or wells on Site. FP-02a describes the water level measurement procedures in detail. Water level measurements shall be recorded on the appropriate field sheets with date and time indicated, and water level tapes must be accurate to the nearest 0.01 foot.

## 5.4 WELL PURGING

Prior to sampling each well, the standing water in the well casing and the water surrounding the well screen will be purged so that representative fresh formation water may be sampled. FP-09a describes the purging procedures in detail.

The volume of water in the well will be calculated by subtracting the depth to water from the total depth of the well. This value (the water column length) will then be multiplied by a coefficient which relates the diameter of the well to gallons per linear foot:

- Multiply by 0.163 for a 2-inch diameter well
- Multiply by 0.367 for a 3-inch diameter well
- Multiply by 0.653 for a 4-inch diameter well
- Multiply by 1.47 for a 6-inch diameter well

Purging may be conducted by several methods including a peristaltic pump, an air lift pump, a bladder pump, or hand bailing. Non-dedicated equipment must be decontaminated between wells as described in FP-06a and FP-06b.

Two criteria will be used to determine if a sufficient volume of groundwater has been purged from the well to yield a representative sample.

These criteria are:

i) The removal of three to five standing well volumes
ii) If a well goes dry, purge one time to dryness

Unless a well goes dry during purging, a minimum of three well volumes will be removed from each well prior to sampling. During purging, field parameters (pH, specific conductance, temperature, and turbidity) will be measured and recorded. One set of readings will be taken at the start of purging, and an additional set will be taken after removal of each standing well volume. If the field parameters stabilize and remain stable, purging can stop when three well volumes are removed.

Field parameters will be considered stable once the following criteria are met:

i) pH varies by less than 0.5 pH units
ii) Specific conductance varies by less than 10 percent
iii) Temperature varies by less than 1°C for two successive measurements

If the field parameters do not stabilize - purging will continue until a maximum of five well volumes have been removed. Sampling will then take place, even if the field parameters have not stabilized. The meters for measuring the field parameters shall be calibrated each morning and whenever deemed necessary by field technicians using the procedures provided in FP-10, FP-11, and FP-12. Periodic recalibration during sampling may be required and should be carried out based on the field technician's knowledge of the Site and experience.

If a well is pumped dry, the well will be allowed to recover a sufficient volume to collect the required samples. The water level measurement tape should be used to verify the well has gone dry, especially when using a peristaltic pump, which has a limited pumping depth. If the well has not gone dry, troubleshoot the pump or switch purging methods.

## 5.5 SAMPLE COLLECTION

After completion of well purging, groundwater samples will be collected. Analytical requirements, sample containers, and laboratory arrangements are discussed in the QAPP (Appendix B).

All samples should be collected using disposable bailers except where dedicated equipment is provided for sampling at an individual well.

Procedures detailing the collection of groundwater samples are presented in FP-04b.

Where a well will not yield the volume of water necessary to immediately fill all required sample containers, as many of the containers as possible will be filled, with the remainder filled as water comes into the well. Samples for VOCs are to be collected within 2 hours of completion of well purging.

Priority of sampling is as follows:

i) Field parameters
ii) VOCs
iii) SVOCs
iv) PCBs
v) All others

Sampling of wells on the expressway during "rush hour" should be avoided due to possible effects of vehicle exhaust and safety concerns. Also, if possible, sampling in the rain should be avoided due to potential for cross-contamination from airborne contaminants picked up by the precipitation. Clean wells should be sampled first to prevent potential cross-contamination. Thus, previous analytical results need to be reviewed to determine the order in which wells will be sampled.

## 5.6 SAMPLE HANDLING AND SAMPLING DOCUMENTATION

The information presented in the following sections describes the proper documentation of field activities, sample storage, sample handling, and chain of custody procedures to be used during the annual chemical monitoring program.

### 5.6.1 SAMPLING DOCUMENTATION

Documentation is a critical part of sampling. The validity of samples collected in the field can only be proven through the use of field activity records. Field conditions, collection, and handling of samples, as well as information about each sample collected, will be recorded in the field and stored on a standardized record form (either hard copy or electronic) or in a designated bound project field notebook. This type of documentation along with chain of custody documentation provides a permanent record of all significant activities during a field investigation. All field sheets and logs should be completed using waterproof pens to prevent smudging if the notes get wet in the field or use of a digital pen with associated hard copy or electronic field forms. Once complete, the standardized forms and logs should be signed and dated on the bottom of each page.

### 5.6.1.1 FIELD RECORDS

The field team will keep field records, including daily logs, sampling events, and field observations in accordance with the QAPP. All field records shall be dated and signed (or initialed) on each page by the person making the entry. Field records will be kept in a secure dry place. Entries must not be made in water-soluble ink. The type of information to be included in field records is:

i) Date
ii) Time
iii) Location
iv) Weather (temperature, cloud cover, humidity, wind, etc.)
v) Sample crew
vi) Work progress
vii) Control samples
viii) Delays
ix) Unusual situations
x) Well damage
xi) Departure from established QA/QC field procedures
xii) Instrument problems
xiii) Accidents
xiv) Field calibrations performed during the sampling
xv) Pertinent health and safety concerns
xvi) Up/down gradient or clean/contaminated designation
xvii) Physical condition of well
xviii) Depth of well (both installed and measured)
xix) Measuring point elevation
xx) Depth to water
xxi) Purge volume
xxii) Purge time (start/stop)
xxiii) Recharge time
xxiv) Time of sample collection
xxv) Important field observations regarding purge or sample water or conditions related to sample integrity

Additional field sheets may be required dependent on the task; specifics are described in the FPs. Any corrections made to the original entries will be initialed by the observer. Any incorrect entries will be crossed out with a single line using permanent ink and initialed by the observer.

### 5.6.1.2 SAMPLE COLLECTION LOGS

The sampling team shall maintain all sampling logs which record information about each sample collected. The logs will be completed at the time of sampling and will provide documentation to indicate that sampling requirements have been met. In addition to project information and well evacuation data, the following information is also included on the sampling log in accordance with the QAPP:

i) Physical appearance of samples
ii) Field observations
iii) Results of field analyses
iv) Sampling methods and materials
v) Constituents sampled
vi) Split sample and QA/QC sample information
vii) Sampling personnel

### 5.6.1.3 INSTRUMENT CALIBRATION AND USE LOGS

Standardized Instrument Calibration Logs for each field instrument will be maintained during all sampling activities to demonstrate properly functioning equipment. Included in the log should be documentation of time of instrument use, operator, and any maintenance performed. Logs for the photoionization detector (PID) will also include daily calibration, type of calibration gas, warm-up time, and lamp type (10.2 eV). This information can be entered onto standardized field data record forms specific to the field instrument.

### 5.7 SAMPLE CONTAINERS

All samples will be placed in new containers provided by the analytical laboratory then sent to the laboratory for chemical analyses. These bottles will be shipped by overnight courier in clean insulated coolers equipped with bottle custody forms. Packing materials will be used to prevent bottle breakage.

## 5.8 SAMPLE IDENTIFICATION

Sample labels are necessary to identify and prevent misidentification of the samples. The labels shall be affixed to the sample container (not the caps) prior to the time of sampling. The labels shall be filled out in waterproof ink at the time of collection. The labels will include the following information:

i) Sample number/identification code
ii) Name/initials of collector
iii) Date and time of sample collection
iv) Site name
v) Project number
vi) Required analysis
vii) Type of preservation (if applicable)

A unique sample numbering system will be used to identify each sample collected. An example of a sample identification number is as follows:

Example: WG-9954-081012–AA–XXX

| | | |
|---|---|---|
| Where: | WG | Designates sample type (WG=Groundwater) |
| | 9954: | Project number |
| | 081012: | Date of collection (mm/dd/yy) |
| | AA: | Sampler initials |
| | XXX: | Unique sample number or location ID |

QC samples will also be numbered with a unique well ID, with the exception of matrix spikes and matrix spike duplicates.

## 5.9 SAMPLE CUSTODY

Sample custody procedures are designed to provide documentation of preparation, handling, storage, and shipping of collected samples. In order to maintain the integrity of samples, chain of custody procedures will be followed. The chain of custody procedures are designed to ensure that:

i) The samples are not tampered with
ii) All persons handling the samples can be traced
iii) All persons handling the samples are accountable

Samples collected will be the responsibility of identified persons from the time they are collected until they, or their derived data, are incorporated into the final report. Stringent chain of custody procedures will be followed to maintain and document sample possession.

### 5.9.1 FIELD CUSTODY

The field personnel are responsible for the care and custody of the samples collected until they are personally delivered to the analytical laboratory or entrusted to a courier. Immediately upon collection, the sample will be placed in the laboratory-supplied insulated cooler and chilled with ice to maintain <6°C within the cooler. Packing materials will be used to prevent bottle breakage. Samples which are not shipped to the laboratory on the same day they are collected will be transferred to the on-Site refrigerator at the end of the day's sampling. A custody seal will be placed on the container prior to placement in the refrigerator to ensure the chain of custody is maintained. The interior of the refrigerator will be maintained at <6°C.

Chain of custody forms will be completed to the fullest extent possible prior to sample shipment. These forms will include the following information:

i) Sample number
ii) Time collected
iii) Date collected
iv) Sample matrix
v) Number of containers
vi) Parameters to be tested
vii) Preservative
viii) Name of sampler

These forms will be filled out in a legible manner, using waterproof ink, and will be signed by the sampler. Similar information will be provided on the sample label, which is securely attached to the sample bottle. In addition, sampling forms will be used to document collection, filtration, and preparation procedures.

### 5.9.2 TRANSFER OF CUSTODY

The following procedures will be used when transferring custody of samples:

i) Samples will always be accompanied by a chain of custody record. When transferring samples, the individuals relinquishing and accepting them will sign, date, and note the time on the record. This record documents sample custody transfer from the sampler, often through another person, to the laboratory. Upon arrival at the laboratory, internal custody procedures will be followed.

ii) Samples will be packaged properly for shipment and dispatched to the appropriate laboratory for analysis, with a separate custody record accompanying each shipment. Shipping containers will be sealed for shipment to the laboratory. The original record of the chain of custody will be sealed within the shipping container. One copy will be retained with the field records, and a photocopy will be transmitted to the project chemist by the next working day. The method of shipment, courier name, and other pertinent information will be entered in the remarks section of the custody record.

### 5.9.3 SAMPLE SHIPMENT PROCEDURES

The following procedures will be followed when shipping samples for laboratory analysis:

i) Only shipping containers which meet all applicable State and Federal standards for safe shipment will be used.

ii) Samples requiring refrigeration will be promptly chilled with ice (in zip-locked bags) to a temperature of <6 C and packaged (with bubble wrap to prevent bottle breakage) in an insulated cooler for transport to the analytical laboratory.

iii) The shipping containers will be sealed with tape and chain of custody seal. Tape is wrapped around the cooler in two locations (across hinges) and custody seal placed across cooler opening. This allows the receiver to quickly identify any tampering which may have taken place during transport to the laboratory.

iv) A copy of the field chain of custody document will be placed inside the shipping container in a sealed plastic envelope.

v) Shipment of all analytical samples will be by commercial or laboratory courier or delivered to the laboratory by the sampler on each day of sampling prior to 8:00 p.m. Samples are to be shipped to the laboratory within 24 to 48 hours of collection.

vi) Proper documentation will be maintained for shipments by commercial courier. (e.g., waybills or bills of lading). (Note: Most common couriers, e.g., FedEx or UPS, will not sign chain of custody records).

## 5.10 DECONTAMINATION PROCEDURES

Decontamination of non-dedicated sampling equipment at the Site is critical to avoid cross-contamination when this equipment is used at multiple locations at the same or different well locations. All non-dedicated equipment is to be cleaned prior to use in a well and after having been used in any other well.

FP-06a and FP-06b present general decontamination procedures at the Site. As no solvents are used, decontamination fluids can be collected and disposed to the LCTF system.

As described in the QAPP (Appendix B), rinse blanks will be collected from cleaned sampling equipment to validate the effectiveness of the decontamination of that equipment.

## 5.11 WASTE MATERIAL HANDLING

### 5.11.1 DECONTAMINATION FLUIDS DISPOSAL

Waste liquids generated from the cleaning of non-dedicated sampling equipment can be disposed of at the LCTF for treatment. Decontamination should be carried out in the designated decontamination bay (first bay) of the Love Canal Drum Storage Facility. Wash water should be disposed of in the trench within the decontamination bay. Where decontamination occurs in the field, wash water should be collected into a 5-gallon pail or can be placed into the overpack drums used to contain groundwater from purging and sampling activities and disposed of within the trench in the decontamination bay.

### 5.11.2 GROUNDWATER DISPOSAL

All groundwater generated from purging and sampling activities will be discharged to the LCTF for treatment.

Discharge to the LCTF will take place by pouring or pumping the water into the trench in the decontamination bay of the Love Canal Drum Storage Facility. The trench flows into a vault that is pumped through a forcemain to the LCTF.

### 5.11.3 SOLID WASTE

Solid waste generated during water level monitoring and groundwater sample collection activities will be placed in plastic garbage bags or 55-gallon drums and stored in the Love Canal Drum Storage Facility pending final disposal in accordance with applicable regulations.

## 6.0 INTERPRETING RESULTS

Hydraulic monitoring data will be used to determine the hydraulic gradient in relation to the barrier drain system and to establish whether this gradient is inward (toward the barrier drain). An inward gradient indicates that the system is functioning properly, capturing leachate from the Site, and preventing off-Site migration of chemicals.

The chemical monitoring data obtained from the laboratory will be used as a determination of whether changes in groundwater chemistry over time are occurring. All analytical results will be subjected to QA/QC review to assess the validity of the data. The validated analytical results, provided by the project chemist, will be compared to historical analytical information for the evaluation.

As a majority of the chemical monitoring wells are placed outside the known limits of contamination, the organic chemistry from these wells should be non-detectable at the method detection limits. MW-10135 is located within a known contaminated area and serves as a "Worst Case" well.

## 7.0 REPORTING

In accordance with the conditions set out in Appendix B of the Consent Judgment between OCC and the State of New York, an annual Periodic Review Report discussing the activities of the previous calendar year (January 1 to December 31) will be prepared for submittal to the NYSDEC.

This report is to be submitted on or before March 30 of each year. The report will be provided as hard (paper) copy and in an acceptable digital format (pdf).

The report will include the following information:

i) A discussion of the major activities occurring at the Site during the reporting period

ii) A summary of the operation of the barrier drain and treatment system, including monthly average flows and any major problems, equipment repairs, and/or changes in the operation of the system

iii) A summary of the findings of the four rounds of hydraulic monitoring, including hydrographs demonstrating hydraulic gradients

iv) A summary of the chemical monitoring program, including a listing of the wells sampled, a discussion of the analytical results, and a comparison of the analytical results to historical Site chemistry

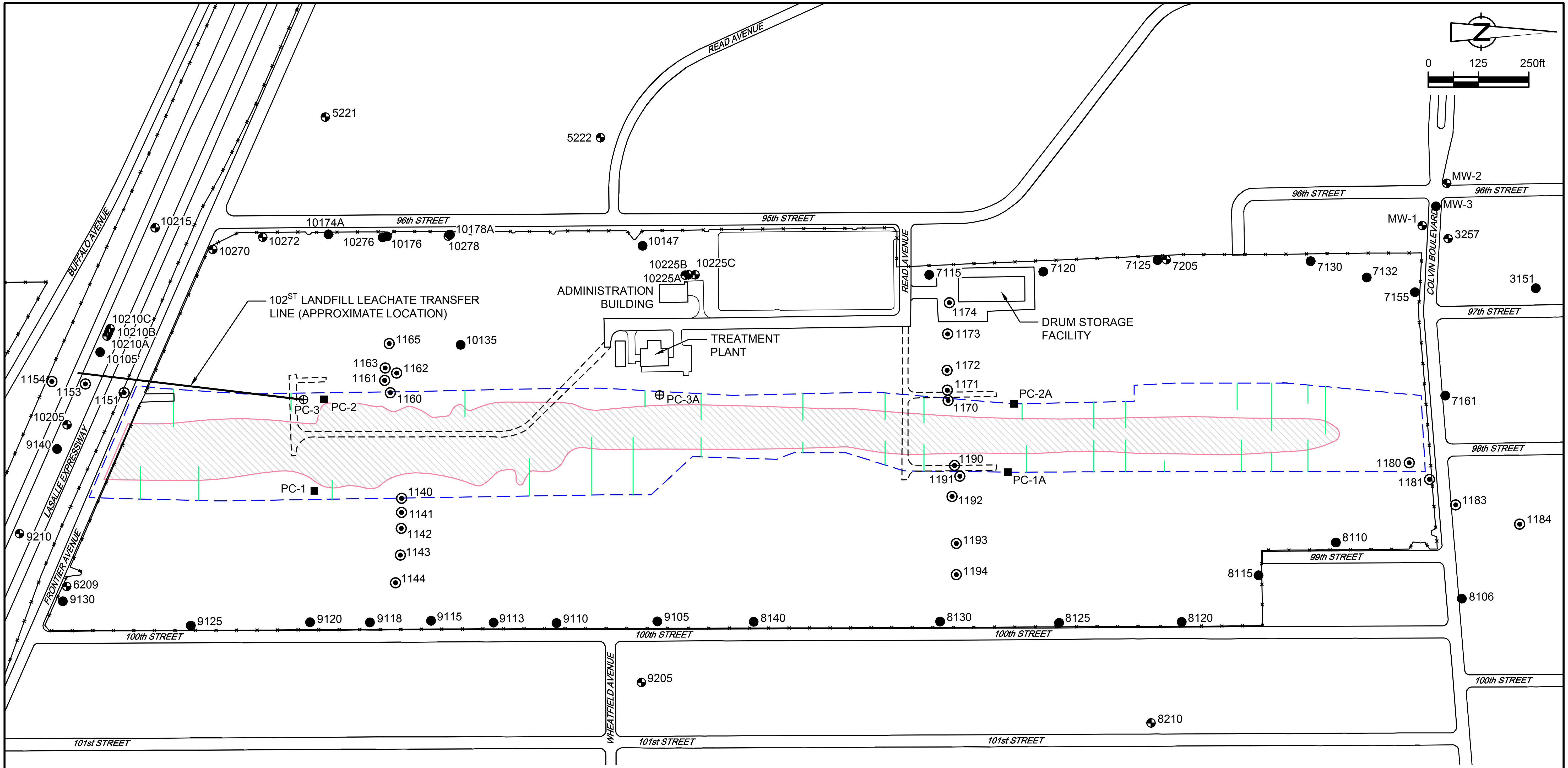
v) Tables listing the water level measurements, the analytical results by well, and the monthly treatment plant flows

vi) A conclusion regarding the overall effectiveness of the remedial systems at the Site

vii) The Institutional and Engineering Controls Certification submittal signed by a representative of GSH and signed and stamped by a Professional Engineer (PE) or a Qualified Environmental Professional (QEP)

Separate annual report requirements applicable to hazardous waste generation, transportation, and storage are also required, as per the appropriate regulations. Any spill events that may occur must also be reported according to the appropriate regulations.

# FIGURES



LEGEND

FENCE LINE

BARRIER DRAIN

LATERAL TRENCH

7105 PIEZOMETER

9120 OVERBURDEN OBSERVATION WELL

10270 BEDROCK OBSERVATION WELL

PC-1 PUMP CHAMBER FOR LEACHATE COLLECTION

PC-3 PUMP CHAMBER / UNDERGROUND LEACHATE STORAGE TANK FOR LEACHATE COLLECTION AND TRANSFER

▨ APPROXIMATE LIMITS OF DISPOSED WASTE

NOTE:
WELL 3151 IS UNABLE TO BE LOCATED
(ASSUMED TO BE PAVED OVER)

figure 2.1

SITE PLAN
LOVE CANAL SITE
GLENN SPRINGS HOLDINGS, INC.
*Niagara Falls, New York*

09954-D23101(025)GN-WA001 JUN 3/2013

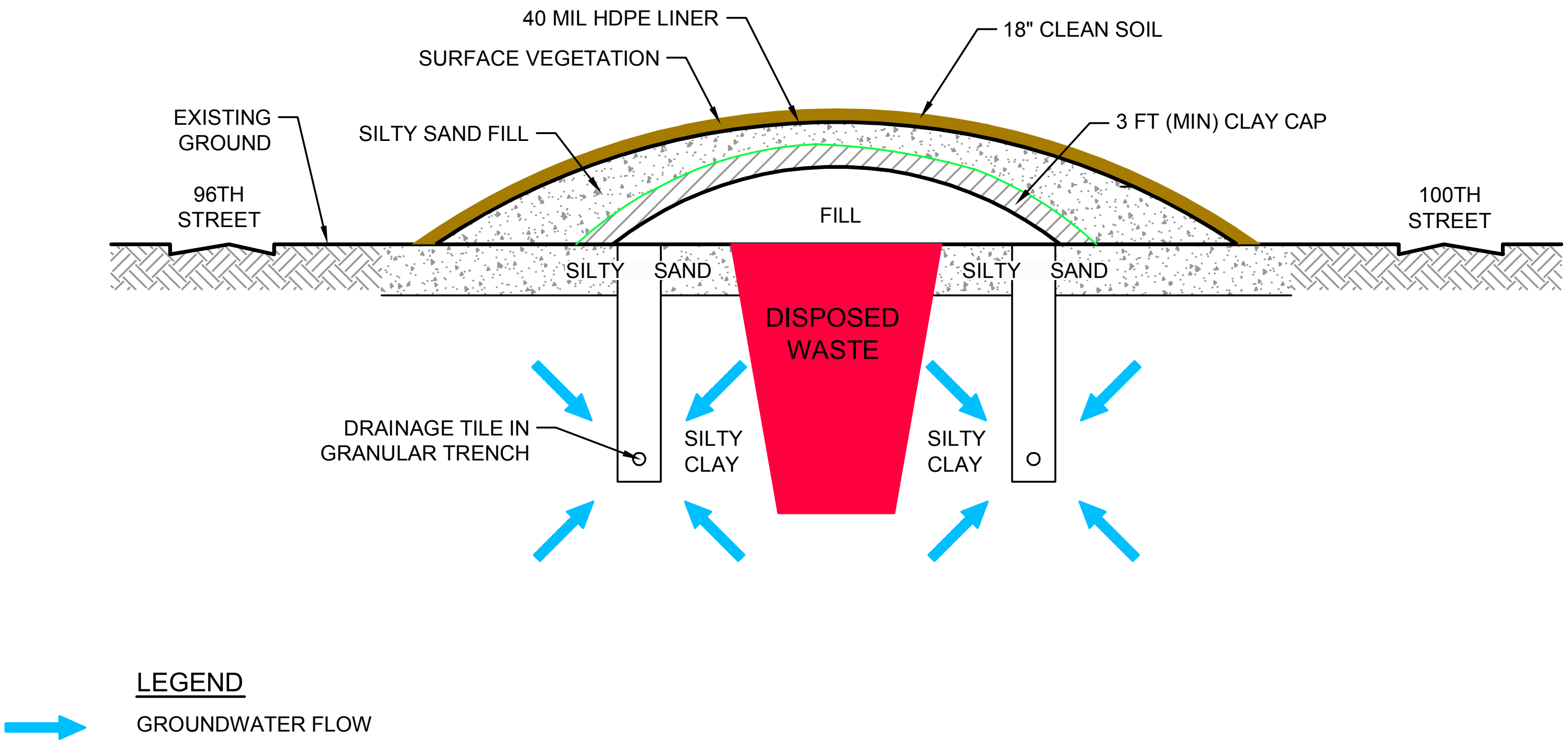
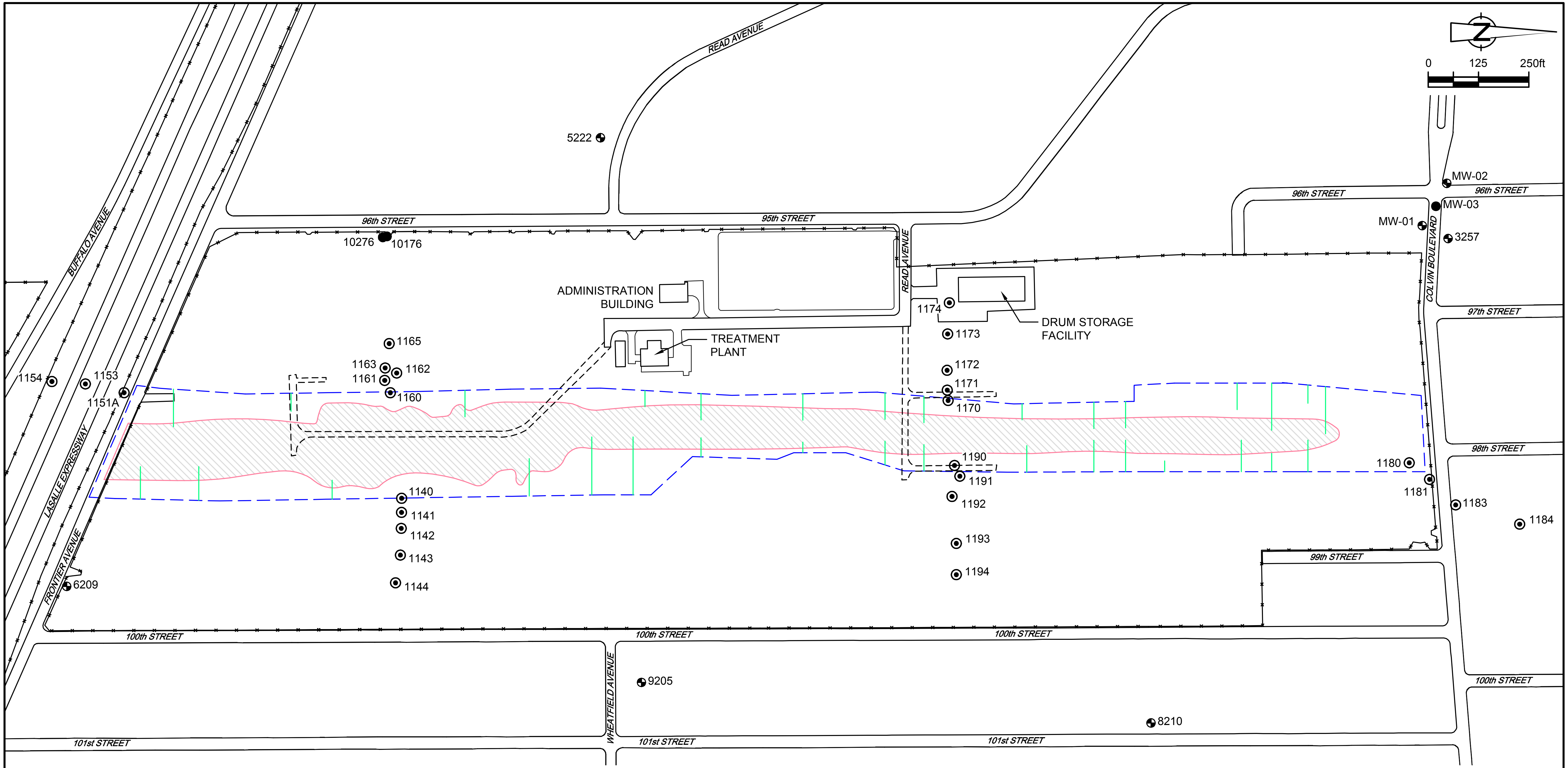


figure 2.2

# TYPICAL BARRIER COLLECTION SYSTEM CROSS-SECTION

LOVE CANAL SITE
GLENN SPRINGS HOLDINGS, INC.
*Niagara Falls, New York*



LEGEND

FENCE LINE

BARRIER DRAIN

LATERAL TRENCH

⦿7105 PIEZOMETER

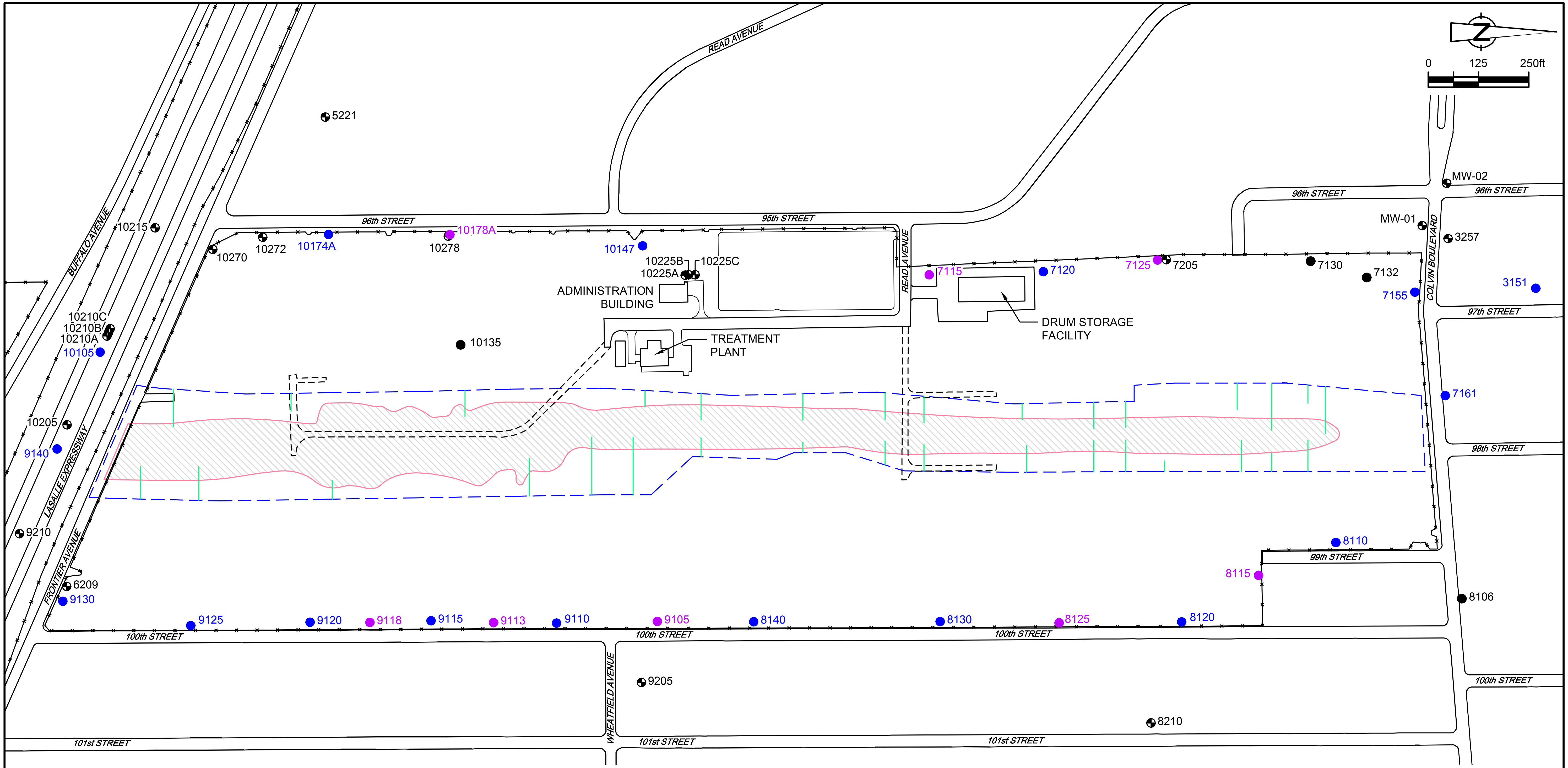
5222 BEDROCK OBSERVATION WELL

●9120 OVERBURDEN OBSERVATION WELL

▨ APPROXIMATE LIMITS OF DISPOSED WASTE

figure 3.1

HYDRAULIC MONITORING LOCATIONS
LOVE CANAL SITE
GLENN SPRINGS HOLDINGS, INC.
*Niagara Falls, New York*



LEGEND

| | | | |
|---|---|---|---|
| —x————x— | FENCE LINE | ● 9118 | OVERBURDEN OBSERVATION WELL - GROUP 2 |
| — — — — — | BARRIER DRAIN | ⊕ 5221 | BEDROCK OBSERVATION WELL |
| ——— | LATERAL TRENCH | ▨ | APPROXIMATE LIMITS OF DISPOSED WASTE |
| ● 10135 | OVERBURDEN OBSERVATION WELL - ANNUAL | | |
| ● 9130 | OVERBURDEN OBSERVATION WELL - GROUP 1 | | |

NOTE:
WELL 3151 IS UNABLE TO BE LOCATED
(ASSUMED TO BE PAVED OVER)

figure 3.2

CHEMICAL MONITORING LOCATIONS
LOVE CANAL SITE
GLENN SPRINGS HOLDINGS, INC.
*Niagara Falls, New York*

09954-D23101(025)GN-WA003 JUN 3/2013

# TABLES

## TABLE 3.1

## HYDRAULIC MONITORING LOCATIONS
## LOVE CANAL SITE
## GLENN SPRINGS HOLDINGS, INC.
## NIAGARA FALLS, NEW YORK

| *Piezometer Identification* | *Geologic Zone Monitored* | *Top of Riser Elevation (feet AMSL)* |
|---|---|---|
| **North Sector Wells** | | |
| 1170A | A | 584.12 |
| 1170B | B | 583.97 |
| 1171A | A | 582.84 |
| 1171B | B | 583.30 |
| 1171C | B | 582.76 |
| 1172A | A | 581.58 |
| 1172B | B | 581.61 |
| 1172C | B | 581.63 |
| 1173A | A | 577.96 |
| 1173B | B | 578.28 |
| 1173C | B | 578.34 |
| 1173D | C | 578.48 |
| 1174A | D | 573.24 |
| 1174B | C | 573.47 |
| 1174C | B | 573.78 |
| 1174D | B | 573.86 |
| 1180A | A | 582.06 |
| 1180B | B | 581.93 |
| 1180C | C | 582.80 |
| 1181A | A | 576.29 |
| 1181B | B | 576.69 |
| 1181C | C | 576.65 |
| 1190A | A | 585.84 |
| 1190B | B | 585.67 |
| 1191A | B | 584.41 |
| 1191B | B | 584.35 |
| 1191C | B | 584.67 |
| 1192A | A | 582.91 |
| 1192B | B | 582.91 |
| 1192C | C | 583.30 |
| 1193A | A | 579.42 |
| 1193B | B | 578.93 |
| 1193C | B | 579.08 |
| 1193D | C | 578.94 |
| 1194A | A | 577.88 |
| 1194B | B | 577.48 |
| 1194C | B | 578.02 |
| 1194D | C | 578.19 |

# TABLE 3.1

# HYDRAULIC MONITORING LOCATIONS
LOVE CANAL SITE
GLENN SPRINGS HOLDINGS, INC.
NIAGARA FALLS, NEW YORK

| *Piezometer Identification* | *Geologic Zone Monitored* | *Top of Riser Elevation (feet AMSL)* |
|---|---|---|
| **South Sector Wells** | | |
| 1140A | B | 582.92 |
| 1140B | A | 582.98 |
| 1141A | B | 581.28 |
| 1141B | A | 581.47 |
| 1142A | C/D | 579.75 |
| 1142B | B | 579.63 |
| 1142C | A | 579.67 |
| 1143A | C | 577.37 |
| 1143B | B | 576.98 |
| 1143C | B | 576.54 |
| 1143D | A | 577.14 |
| 1144A | D | 577.69 |
| 1144B | C | 577.25 |
| 1144C | B | 577.72 |
| 1144D | A | 577.59 |
| 1160A | C | 584.51 |
| 1160C | C | 584.24 |
| 1161A | A | 582.54 |
| 1161B | B | 582.62 |
| 1161C | B | 582.64 |
| 1161D | C | 582.55 |
| 1161E | B | 583.70 |
| 1162A | C | 580.84 |
| 1162C | C | 581.60 |
| 1162D | A | 582.14 |
| 1163A | B | 580.84 |
| 1163B | C | 580.89 |
| 1163C | C | 580.85 |
| 1163D | D | 580.92 |
| 1165A | B | 583.70 |
| 1165B | C | 583.64 |
| 1165C | C | 583.68 |
| 1165D | D | 583.71 |
| 10176A* | B | 576.64 |
| 10176B* | B | 576.80 |
| 10176C* | B | 576.85 |
| 10176D* | A | 579.98 |
| 10276* | - | 577.04 |

# TABLE 3.1

## HYDRAULIC MONITORING LOCATIONS
## LOVE CANAL SITE
## GLENN SPRINGS HOLDINGS, INC.
## NIAGARA FALLS, NEW YORK

| *Piezometer Identification* | *Geologic Zone Monitored* | *Top of Riser Elevation (feet AMSL)* |
|---|---|---|
| **Frontier Avenue and LaSalle Expressway** | | |
| 1151A | A | 577.52 |
| 1151B | B | 577.57 |
| 1151C | C | 577.75 |
| 1151D | D | 577.84 |
| 1153A | A | 577.44 |
| 1153B | B | 576.64 |
| 1153C | B | 577.36 |
| 1153D | C | 577.18 |
| 1153E | C | 576.37 |
| 1154A | A | 572.69 |
| 1154B | B | 573.48 |
| 1154C | B | 573.59 |
| 1154D | C | 573.24 |
| **Colvin Boulevard Area** | | |
| 1183A | A | 572.84 |
| 1183B | C | 572.74 |
| 1183C | C | 572.82 |
| 1183D | D | 572.79 |
| 1184A | A | 571.11 |
| 1184B | B | 570.79 |
| 1184C | C | 571.19 |
| 1184D | D | 571.11 |
| **Other Wells** | | |
| 6209* | BR | 577.55 |
| 5222* | BR | 576.80 |
| 8210* | BR | 573.36 |
| 9205* | BR | 574.38 |
| 3257* | BR | 572.38 |
| MW-01* | BR | 572.09 |
| MW-02* | BR | 571.64 |
| MW-03* | I | 571.25 |

Notes:

A = Glacial till.
B = Lower soft silty clay.
C = Upper stiff silty clay (fractured clay).
D = Upper fractured stiff clay or fill.
BR = Bedrock.
I = Installed in sewer bedding.
* = Observation well.
- = Information not available.
AMSL = Above mean sea level.

## TABLE 3.2

## WELL CONSTRUCTION AND INSTALLATION DETAILS
## LOVE CANAL SITE
## GLENN SPRINGS HOLDINGS, INC.
## NIAGARA FALLS, NEW YORK

| *Well Number* | *Top of Riser Elevation (AMSL)* | *Ground Elevation (AMSL)* | *Well Type* | *Zone Monitored* | *Depth of Well (feet)* | *Casing Diameter (inches)* | *Well Diameter (inches)* | *Well Material* |
|---|---|---|---|---|---|---|---|---|
| 3257 | 572.38 | - | Bedrock | BR | 29.4 | 4 | 2 | PVC |
| 5221 | - | - | Bedrock | BR | 42.6 | 4 | 4 | BI |
| 6209 | 577.55 | - | Bedrock | BR | 42.0 | - | 2 | - |
| 7205 | 576.77 | 574.1 | Bedrock | BR | 48.0 | 4 | 2 | SS |
| 8210 | 573.36 | 573.7 | Bedrock | BR | 43.8 | 4 | 2 | SS |
| 9205 | 574.38 | 574.5 | Bedrock | BR | 48.7 | 3 | 2 | SS |
| 9210 | 581.43 | 582.4 | Bedrock | BR | 82.3 | 4 | 2 | SS |
| 10205 | 577.59 | 578.4 | Bedrock | BR | 54.3 | 4 | 2 | SS |
| 10210A | 576.12 | 577.2 | Bedrock | BR | 217.0 | 4 | 2 | SS |
| 10210B | 576.50 | 577.1 | Bedrock | BR | 140.3 | 4 | 2 | SS |
| 10210C | 576.18 | 577.1 | Bedrock | BR | 84.0 | 4 | 2 | SS |
| 10215 | 576.92 | 578.2 | Bedrock | BR | 59.4 | 4 | 2 | SS |
| 10225A | 576.6 | 574.5 | Bedrock | BR | 205.0 | 4 | 2 | SS |
| 10225B | 576.49 | 574.4 | Bedrock | BR | 137.7 | 4 | 2 | SS |
| 10225C | 576.97 | 574.7 | Bedrock | BR | 62.5 | 4 | 2 | SS |
| 10270 | 575.86 | 574.5 | Bedrock | BR | 47.0 | N/A | 2 | SS |
| 10272 | 577.32 | - | Bedrock | BR | 47.7 | - | 2 | SS |
| 10278 | 575.82 | - | Bedrock | BR | 47.0 | - | 2 | SS |
| MW-01 | 572.09 | - | Bedrock | BR | 36.9 | 12 | 4 | BI |
| MW-02 | 571.64 | - | Bedrock | BR | 37.0 | 12 | 4 | BI |
| 7130 | 576.21 | 574.3 | Overburden | A/B | 27.0 | 4.25 | 2 | SS |
| 7132 | 576.94 | 574.6 | Overburden | A | 28.0 | 4.25 | 2 | SS |
| 8106 | 572.04 | 573.1 | Overburden | A/B | 17.0 | 4.25 | 2 | SS |
| 10135 | 582.3 | 577.1 | Overburden | A/B | 29.5 | 4.25 | 2 | SS |
| 3151 | - | - | Overburden | - | 25.1 | - | 2 | - |
| 7120 | 577.44 | 575.0 | Overburden | A/B | 30.3 | 4.25 | 2 | SS |
| 7155 | 576.15 | 573.2 | Overburden | A/B | 25.6 | 4.25 | 2 | SS |
| 7161 | 571.96 | 573.0 | Overburden | A/B | 21.7 | 4.25 | 2 | SS |
| 8110 | 578.97 | 576.5 | Overburden | A/B/C | 24.0 | 4.25 | 2 | SS |
| 8120 | 575.97 | 573.6 | Overburden | A/B | 27.0 | 4.25 | 2 | SS |
| 8130 | 578.08 | 574.6 | Overburden | A/B | 29.1 | 4.25 | 2 | SS |
| 8140 | 577.77 | 574.7 | Overburden | A/B | 31.0 | 4.25 | 2 | SS |
| 9110 | 576.43 | 573.9 | Overburden | A/B | 24.0 | 4.25 | 2 | SS |
| 9115 | 576.96 | 574.0 | Overburden | A/B/C | 17.9 | 4.25 | 2 | SS |
| 9120 | 576.54 | 574.2 | Overburden | A/B | 20.5 | 4.25 | 2 | SS |
| 9125 | 576.08 | 573.5 | Overburden | A/B | 23.9 | 4.25 | 2 | SS |
| 9130 | 575.31 | 574.3 | Overburden | A/B | 30.5 | 4.25 | 2 | SS |
| 9140 | 577.82 | 578.9 | Overburden | A/B | 29.0 | 4.25 | 2 | SS |
| 10105 | 576.54 | 577.3 | Overburden | A/B | 29.5 | 4.25 | 2 | SS |
| 10147 | 575.29 | 574.4 | Overburden | A/B | 28.0 | 4 | 2 | SS |

# TABLE 3.2

## WELL CONSTRUCTION AND INSTALLATION DETAILS
## LOVE CANAL SITE
## GLENN SPRINGS HOLDINGS, INC.
## NIAGARA FALLS, NEW YORK

| *Well Number* | *Top of Riser Elevation (AMSL)* | *Ground Elevation (AMSL)* | *Well Type* | *Zone Monitored* | *Depth of Well (feet)* | *Casing Diameter (inches)* | *Well Diameter (inches)* | *Well Material* |
|---|---|---|---|---|---|---|---|---|
| 10174A | 576.56 | - | Overburden | - | 11.71 | 4 | 2 | SS |
| 7115 | 578.24 | 574.7 | Overburden | A/B | 31.0 | 4.25 | 2 | SS |
| 7125 | 576.94 | 574.3 | Overburden | A/B | 24.5 | 4.25 | 2 | SS |
| 8115 | 577.54 | 574.6 | Overburden | A/B | 28.5 | 4.25 | 2 | SS |
| 8125 | 577.54 | 573.6 | Overburden | A/B | 27.5 | 4.25 | 2 | SS |
| 9105 | 576.76 | 573.9 | Overburden | A/B | 29.4 | 4.25 | 2 | SS |
| 9113 | 575.82 | 573.4 | Overburden | A | 34.0 | 4.25 | 2 | SS |
| 9118 | 576.17 | 574.1 | Overburden | A | 35.5 | 4.25 | 2 | SS |
| 10178A | 574.55 | - | Overburden | - | 11.01 | 4 | 2 | SS |

Notes:
A = Glacial till.
B = Lower soft silty clay.
C = Upper stiff silty clay (fractured clay).
D = Upper fractured stiff clay or fill.
BR = Bedrock.
- = Information not available.
AMSL = Above mean sea level.
SS = Stainless steel.
PVC = Polyvinyl chloride.
BI = Black Iron.

## TABLE 3.3

## CHEMICAL MONITORING LOCATIONS AND SCHEDULE
## LOVE CANAL SITE
## GLENN SPRINGS HOLDINGS, INC.
## NIAGARA FALLS, NEW YORK

| *Annual Wells* | *Biannual Wells* | |
|---|---|---|
| *Bedrock Wells* | *Overburden Wells Group I* | *Overburden Wells Group II* |
| 3257 | 3151 | 7115 |
| 5221 | 7120 | 7125 |
| 6209 | 7155 | 8115 |
| 7205 | 7161 | 8125 |
| 8210 | 8110 | 9105 |
| 9205 | 8120 | 9113 |
| 9210 | 8130 | 9118 |
| 10205 | 8140 | 10178A |
| 10210A | 9110 | |
| 10210B | 9115 | |
| 10210C | 9120 | |
| 10215 | 9125 | |
| 10225A | 9130 | |
| 10225B | 9140 | |
| 10225C | 10105 | |
| 10270 | 10147 | |
| 10272 | 10174A | |
| 10278 | | |
| MW-01 | | |
| MW-02 | | |
| *Overburden Wells* | | |
| 7130 | | |
| 7132 | | |
| 8106 | | |
| 10135 | | |

Notes:
Group I wells are to be measured in odd years (i.e., 2013).
Group II wells are to be measured in even years (i.e., 2014).

# TABLE 3.4

# SUMMARY OF ANALYTICAL PARAMETERS
# LOVE CANAL SITE
# GLENN SPRINGS HOLDINGS, INC.
# NIAGARA FALLS, NEW YORK

## *Volatile Organic Compounds*

1,1,1-Trichloroethane
1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1-Dichloroethane
1,1-Dichloroethene
1,2-Dichloroethane
1,2-Dichloropropane
2-Butanone (Methyl ethyl ketone) (MEK)
2-Hexanone
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)
Acetone
Benzene
Bromodichloromethane
Bromoform
Bromomethane (Methyl bromide)
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane
Chloroform (Trichloromethane)
Chloromethane (Methyl chloride)
cis-1,2-Dichloroethene
cis-1,3-Dichloropropene
Dibromochloromethane
Ethylbenzene
Methylene chloride
Styrene
Tetrachloroethene
Toluene
trans-1,2-Dichloroethene
trans-1,3-Dichloropropene
Trichloroethene
Vinyl acetate
Vinyl chloride
Xylenes (total)

## TABLE 3.4

## SUMMARY OF ANALYTICAL PARAMETERS
## LOVE CANAL SITE
## GLENN SPRINGS HOLDINGS, INC.
## NIAGARA FALLS, NEW YORK

### *Semi-Volatile Organic Compounds*

1,2,4-Trichlorobenzene
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
2,2'-Oxybis(1-chloropropane) (bis(2-Chloroisopropyl) ether)
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,4-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
2-Chloronaphthalene
2-Chlorophenol
2-Methylnaphthalene
2-Methylphenol
2-Nitroaniline
2-Nitrophenol
3,3'-Dichlorobenzidine
3-Nitroaniline
4,6-Dinitro-2-methylphenol
4-Bromophenyl phenyl ether
4-Chloro-3-methylphenol
4-Chloroaniline
4-Chlorophenyl phenyl ether
4-Methylphenol
4-Nitroaniline
4-Nitrophenol
Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(g,h,i)perylene
Benzo(k)fluoranthene
Benzoic acid
Benzyl alcohol
bis(2-Chloroethoxy)methane
bis(2-Chloroethyl)ether

# TABLE 3.4

# SUMMARY OF ANALYTICAL PARAMETERS
# LOVE CANAL SITE
# GLENN SPRINGS HOLDINGS, INC.
# NIAGARA FALLS, NEW YORK

## *Semi-Volatile Organic Compounds - Continued*

bis(2-Ethylhexyl)phthalate (DEHP)
Butyl benzylphthalate (BBP)
Chrysene
Dibenz(a,h)anthracene
Dibenzofuran
Diethyl phthalate
Dimethyl phthalate
Di-n-butylphthalate (DBP)
Di-n-octyl phthalate (DnOP)
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno(1,2,3-cd)pyrene
Isophorone
Naphthalene
Nitrobenzene
N-Nitrosodi-n-propylamine
N-Nitrosodiphenylamine
Pentachlorophenol
Phenanthrene
Phenol
Pyrene

## *Polychlorinated Biphenyls*

Aroclor-1016 (PCB-1016)
Aroclor-1221 (PCB-1221)
Aroclor-1232 (PCB-1232)
Aroclor-1242 (PCB-1242)
Aroclor-1248 (PCB-1248)
Aroclor-1254 (PCB-1254)
Aroclor-1260 (PCB-1260)

## TABLE 3.4

## SUMMARY OF ANALYTICAL PARAMETERS
## LOVE CANAL SITE
## GLENN SPRINGS HOLDINGS, INC.
## NIAGARA FALLS, NEW YORK

***Pesticides***

4,4'-DDD
4,4'-DDE
4,4'-DDT
Aldrin
alpha-BHC
alpha-Chlordane
beta-BHC
delta-BHC
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan sulfate
Endrin
Endrin ketone
gamma-BHC (lindane)
gamma-Chlordane
Heptachlor
Heptachlor epoxide
Methoxychlor
Toxaphene

# TABLE 3.5

## MONITORING SUMMARY
## LOVE CANAL SITE
## GLENN SPRINGS HOLDINGS, INC.
## NIAGARA FALLS, NEW YORK

| *Frequency* | *Activity* | *Table/Reference* | *Number of Monitoring Locations* | *Field Procedure* | *Report Section* | *Analytical Parameter Suite/Comment* |
|---|---|---|---|---|---|---|
| Quarterly | Hydraulic Monitoring | Table 3.1 | 105 | FP-02a | 3.0 | See Figure 3.1 |
| Annual | Chemical Monitoring | Tables 3.3 and 3.4 | 41[1]/32[2] | FP-04b | 3.0 | VOCs, SVOCs, PCBs, Pesticides/See Figure 3.2 |
| Annual | Report | NA | NA | NA | 7.0 | Data, Evaluations, Review of System Operations, Institutional and Engineer Controls Certification |

Notes:

[1] - odd years (i.e., 2013)

[2] - even years (i.e., 2014)

| | |
|---|---|
| VOCs | - Volatile organic compounds. |
| SVOCs | - Semi-volatile organic compounds. |
| PCBs | - Polychlorinated biphenyls. |

# APPENDIX A

# BORING LOGS AND WELL INSTALLATIONS

# LOVE CANAL REMEDIAL PROJECT

## TASK V-C

# IMPLEMENTATION OF A LONG-TERM MONITORING PROGRAM

## APPENDIX H: BORING LOGS AND WELL INSTALLATIONS

JUNE 1987

## FINAL REPORT

prepared by
E.C. JORDAN CO.
for
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID WASTE
ALBANY, NEW YORK

# IMPLEMENTATION OF A
# LONG-TERM MONITORING PROGRAM
# LOVE CANAL REMEDIAL PROJECT
# APPENDIX H - BORING LOGS

PREPARED BY

E. C. JORDAN CO.

JUNE 1987

FOR

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SOLID AND HAZARDOUS WASTE
ALBANY, NEW YORK

NORMAN H. NOSENCHUCK, P.E., DIRECTOR

# CONTENTS

The logs are arranged in the following sequence of groups.

1. Perimeter overburden borings and wells, including the sewer borings (SB).
2. Nested piezometers.
3. Bedrock wells.
4. Canal wells (CW); swale borings (SW); berm well (BRM-10); and disposal pit (DP) explorations.

# KEY TO SOIL DESCRIPTIONS

## UNIFIED SOIL CLASSIFICATION SYSTEM

| MAJOR DIVISIONS | | | GROUP SYMBOLS | TYPICAL NAMES |
|---|---|---|---|---|
| Coarse-grained soils<br>(More than half of material is larger than No. 200 sieve size) | Gravels<br>(More than half of coarse fraction is larger than No. 4 sieve size) | Clean gravels<br>(Little or no fines) | GW | Well-graded gravels, gravel-sand mixtures, little or no fines |
| | | | GP | Poorly-graded gravels, gravel-sand mixtures, little or no fines |
| | | Gravels with fines<br>(Appreciable amount of fines | GM | Silty gravels, gravel-sand-silt mixtures |
| | | | GC | Clayey gravels, gravel-sand-clay mixtures |
| | Sands<br>(More than half of coarse fraction is smaller than No. 4 sieve size) | Clean sands<br>(Little or no fines) | SW | Well-graded sands, gravelly sands, little or no fines |
| | | | SP | Poorly-graded sands, gravelly sand, little or no fines |
| | | Sands with fines<br>(Appreciable amount of fines | SM | Silty sands, sand-silt mixtures |
| | | | SC | Clayey sands, sand-clay mixtures |
| Fine-grained soils<br>(More than half of material is smaller than No. 200 sieve size) | Silts and clays<br>(Liquid limit less than 50) | | ML | Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity |
| | | | CL | Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays |
| | | | OL | Organic silts and organic silty clays of low plasticity |
| | Silts and clays<br>(Liquid limit greater than 50) | | MH | Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts |
| | | | CH | Inorganic clays of high plasticity, fat clays |
| | | | OH | Organic clays of medium to high plasticity, organic silts |
| | Highly organic soils | | Pt | Peat and other highly organic soils |

## TERMS DESCRIBING CONDITION, CONSISTENCY AND HARDNESS

COARSE GRAINED SOILS (major portion retained on No. 200 sieve): Includes (1) clean gravels; (2) silty or clayey gravels; and (3) silty, clayey or gravelly sands. Consistency is rated according to standard penetration resistance.

| Descriptive Term | Standard Penetration Resistance in Blows/Ft. |
|---|---|
| Very loose | 0 to 4 |
| Loose | 5 to 10 |
| Medium dense | 11 to 30 |
| Dense | 31 to 50 |
| Very dense | Over 50 |

FINE GRAINED SOILS (major portion passing No. 200 sieve): Includes (1) inorganic and organic silts and clays; (2) gravelly, sandy or silty clays; and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings, vane test, or by triaxial test.

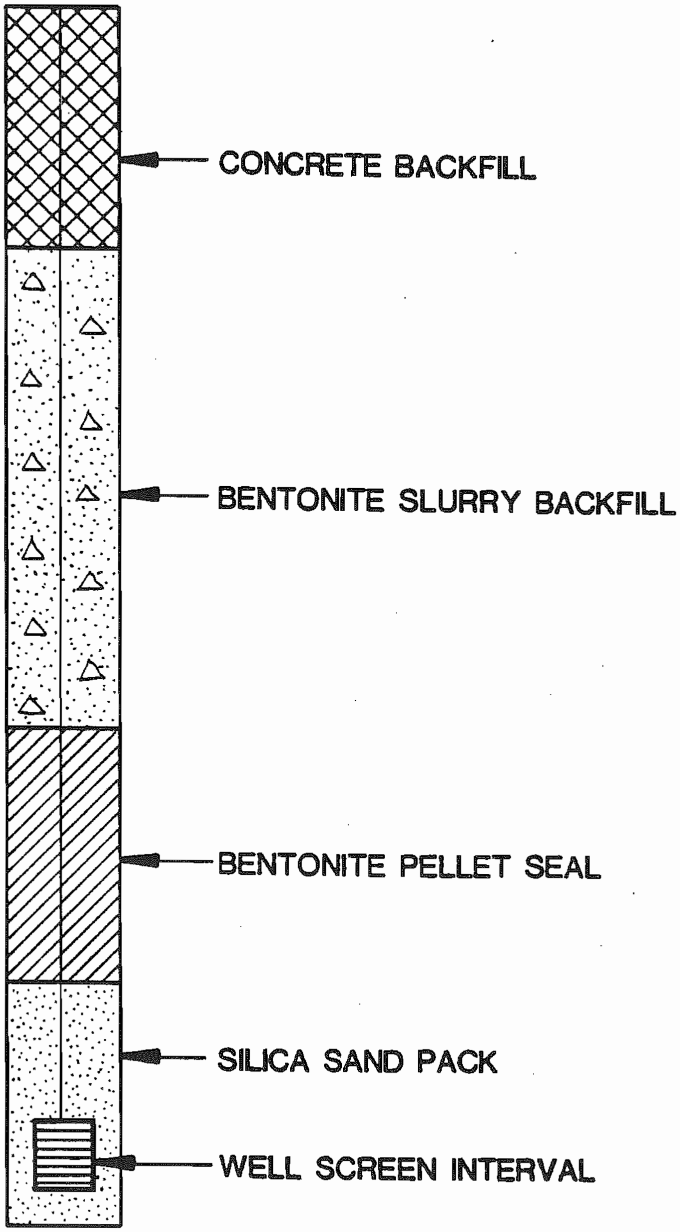
| Descriptive Term | Shear Strength (ksf) |
|---|---|
| Very soft | less than 0.25 |
| Soft | 0.25 to 0.50 |
| Firm | 0.50 to 1.00 |
| Stiff | 1.00 to 2.00 |
| Very stiff | 2.00 to 4.00 |
| Hard | 4.00 and higher |

## SIZE PROPORTIONS

| Designation | Percent by Weight |
|---|---|
| Trace | 0 to 10 |
| Little | 10 to 20 |
| Some | 20 to 35 |
| Silty, Sandy or Gravelly | 35 to 50 |

# LEGEND

## WELL DATA



E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

TASK VC

BORING NO. 7115

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-07

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 11/24/85

COMPLETED 11/25/85

METHOD HSA

CASING SIZE 4.25" ID

HNU 11.7/10.2

PROTECTION LEVEL C

GROUND EL. 574.7'

SOIL DRILLED 33.0'

TOTAL DEPTH 33.0'

▽ BELOW GROUND NA

LOGGED BY C. White

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.0 | S-1 | | Y | N | 4.0<br>1.4 | 0.0 | SILTY CLAY WITH SAND AND GRAVEL AND ORGANICS, LOOSE-STIFF, MOIST<br>(FILL)<br>4.2' | GM<br>CL | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. | | 574.7 |
| 5 | | | | Y | N | | | BROWN SILTY SAND FINE, WET (ALLUVIAL SAND)<br>5.4' | SM | | | 569.7 |
| | 0.0 | S-2 | | N | Y | 5.0<br>4.7 | 0.0 | REDDISH-BROWN SILTY CLAY; STIFF, DRY, VARVED, FRACTURED, SLIGHTLY PLASTIC<br>(LACUSTRINE CLAY)<br>11.0' | CL | | | |
| 10 | 10.0 | S-3 | | | | 5.0<br>4.8 | 0.6 | BROWN TO GRAY SILTY CLAY; SOFT, WET, VARVED, PLASTIC<br>(LACUSTRINE CLAY) | CL<br>CH | | | 564.7 |
| 15 | 0.0 | S-4 | | N | N | 5.0<br>5.0 | 0.0 | | | | | 559.7 |
| 20 | 0.0 | S-5 | | N | N | 5.0<br>4.9 | 0.0 | | | | | 554.7 |
| 25 | 0.0 | S-6 | | N | Y | 5.0<br>4.0 | 0.0 | 27.0' | | | | 549.7 |
| | | | | | | | | BROWN GRAVELLY SILTY SAND, DENSE, DRY, WIDELY GRADED, ABOUT 20% GRAVEL | | | | |
| 30 | 0.0 | S-7 | | N | N | 4.0<br>2.2 | 1.0 | (GLACIAL TILL)<br>33.0' | SM | | | 544.7 |
| 35 | | | | | | | | BOTTOM OF BORING AT 33.0 FEET | | | | 539.7 |
| 40 | | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

## LOVE CANAL REMEDIAL PROJECT
## LONG TERM MONITORING

TASK VC

BORING NO. 7120

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-05

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 10/26/85

COMPLETED 10/26/85

METHOD HSA

CASING SIZE 4.25" ID

HNU 11.7/10.2

PROTECTION LEVEL C

GROUND EL. 575.0'

SOIL DRILLED 31.2'

TOTAL DEPTH 31.2'

▽ BELOW GROUND NA

LOGGED BY B. Fowler

CHECKED BY L. Lewis

DATE 3/24/86

| HNU AMBIENT AIR | SAMPLE NO. & TYPE # | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) |
|---|---|---|---|---|---|
| 0.0 | S-1 | Y | N | 4.0<br>3.5 | 0.1 |
| 0.0 | S-2 | Y | N | 5.0<br>5.0 | 0.1 |
| 0.0 | S-3 | N | N | 5.0<br>5.0 | 0.1 |
| 0.0 | S-4 | N | N | 5.0<br>5.0 | 0.1 |
| 0.0 | S-5 | N | N | 5.0<br>5.0 | 0.1 |
| 0.0 | S-6 | N | N | 5.0<br>3.5 | 0.0 |
| 0.0 | S-7 | N | N | 2.2<br>2.0 | 0.0 |

| SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % |
|---|---|---|
| DARK BROWN MOTTLED SANDY SILT WITH ORGANICS, FRACTURED. DRY (FILL) 3.0' | ML | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. |
| GRAY SILTY SAND, DENSE, DRY (ALLUVIAL SAND) 5.5' | SM | |
| REDDISH-GRAY SILTY CLAY, SOFT, MOIST (LACUSTRINE CLAY) 11.0' | CL | |
| BROWN TO GRAY SILTY CLAY, SOFT MOIST (LACUSTRINE CLAY) 19.0' | CL-CH | |
| BROWN TO GRAY CLAY WITH GRAVEL SOFT, LOOSE, WET (TRANSITIONAL TILL) 26.0' | | |
| BROWN GRAVELLY SILTY SAND WITH CLAY. ABOUT 20% GRAVEL. MOIST, DENSE, WIDELY GRADED (GLACIAL TILL) 31.2' | SW<br>ML | |
| BOTTOM OF BORING AT 31.2 FEET | | |

WELL DATA

| DEPTH (FT) | ELEV(FT) |
|---|---|
| | 575.0 |
| 5 | 570.0 |
| 10 | 565.0 |
| 15 | 560.0 |
| 20 | 555.0 |
| 25 | 550.0 |
| 30 | 545.0 |
| 35 | 540.0 |
| 40 | |

\#U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 7125

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-05

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/26/85

**COMPLETED** 10/26/85

**METHOD** HSA

**CASING SIZE** 4.25" ID

**HNU** 11.7/10.2

**PROTECTION LEVEL** C

**GROUND EL.** 574.3'

**SOIL DRILLED** 26.5'

**TOTAL DEPTH** 26.5'

▽ **BELOW GROUND** NA

**LOGGED BY** B. Fowler

**CHECKED BY** A. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV (FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | S-1 | Y | N | 3.5<br>2.5 | 0.1 | BROWN, SANDY SILT WITH ORGANICS, MOIST, STIFF (FILL) 2.0' | ML | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. | 574.3 |
| | | | | | | | BROWN SILTY SAND, FINE, DRY, DENSE (ALLUVIAL SAND) 4.0' | SM | | |
| 5 | | S-2 | Y | N | 5.0<br>5.0 | 0.0 | REDDISH-BROWN MOTTLED SILTY CLAY, STIFF, DRY, FRACTURED, VARVED<br>(LACUSTRINE CLAY)<br>11.0' | CL | | 569.3 |
| 10 | | | | | | | | | | 564.3 |
| | | S-3 | N | N | 5.0<br>5.0 | 0.0 | BROWN-GRAY SILTY CLAY, SOFT, MOIST, VARVED, PLASTIC<br>(LACUSTRINE CLAY) | CH<br>CL | | |
| 15 | | | | | | | | | | 559.3 |
| | 0.0 | S-4 | N | N | 5.0<br>5.0 | 0.0 | | | | |
| 20 | | | | | | | 21.5' | | | 554.3 |
| | 0.0 | S-5 | N | N | 5.0<br>3.5 | 0.0 | BROWN SANDY, CLAY WITH GRAVEL, WET, SOFT 23.5' | | | |
| 25 | 0.0 | S-6 | N | N | 3.0<br>2.0 | 0.0 | BROWN GRAVELLY SILTY SAND WITH CLAY, MOIST, DENSE. ABOUT 20% GRAVEL, WIDELY GRADED (GLACIAL TILL)<br>26.5' | SM<br>ML | | 549.3 |
| | | | | | | | BOTTOM OF BORING AT 26.5 FEET | | | |
| 30 | | | | | | | | | | 544.3 |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

**WELL DATA**

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

LOVE CANAL REMEDIAL PROJECT
LONG TERM MONITORING

TASK VC

BORING NO. 7130

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-05

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 10/25/85

COMPLETED 10/25/85

METHOD HSA

CASING SIZE 4.25" ID

HNU 11.7/10.2

PROTECTION LEVEL C

GROUND EL. 574.3'

SOIL DRILLED 28.0'

TOTAL DEPTH 28.0'

▽ BELOW GROUND NA

LOGGED BY B. Fowler

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | 0.0 | S-1 |  | Y<br>Y | N<br>N | N | 0.1 | DARK BROWN CLAYEY SILT WITH SAND, MOIST, STIFF (FILL) 2.0 | ML | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. | 574.3 |
|  |  |  |  |  |  |  |  | BROWN MOTTLED SILTY FINE SAND, DRY UNIFORMLY GRADED (ALLUVIAL SAND) 3.5 | SM |  |  |
| 5 | 0.0 | S-2 |  | N | N | N | 0.1 | REDDISH-BROWN SILTY CLAY, STIFF, DRY, FRACTURED, VARVED<br>(LACUSTRINE CLAY) | CL |  | 569.3 |
| 10 | 0.0 | S-3 |  | N | N | N | 0.1 | 12.0 |  |  | 564.3 |
|  |  |  |  |  |  |  |  | BROWNISH-GRAY SILTY CLAY, SOFT WET, PLASTIC<br>(LACUSTRINE CLAY) | CH<br>CL |  |  |
| 15 | 0.0 | S-4 |  | N | N | N | 0.1 |  |  |  | 559.3 |
|  |  |  |  |  |  |  |  | BROWNISH-RED CLAY WITH GRAVEL, SOFT, WET 20.5' |  |  |  |
| 20 | 0.0 | S-5 |  | N | N | N | 0.1 | GRAVELLY SAND, WET, LOOSE, WIDELY GRADED<br>(OUTWASH SAND)<br>28.0 | SW |  | 554.3 |
| 25 |  |  |  |  |  |  |  |  |  |  | 549.3 |
| 30 |  |  |  |  |  |  |  | BOTTOM OF BORING AT 28.0 FEET |  |  | 544.3 |
| 35 |  |  |  |  |  |  |  |  |  |  |  |
| 40 |  |  |  |  |  |  |  |  |  |  |  |

WELL DATA

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

**BORING NO.** 7155

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
**PROJECT NO.** 4844-05
**CONTRACTOR:** J. MATHES ASSOC.
**DATE STARTED** 10/30/85
**COMPLETED** 10/30/85
**METHOD** HSA
**CASING SIZE** 4.25"
**HNU** 11.7/10.2
**PROTECTION LEVEL** C
**GROUND EL.** 573.2'
**SOIL DRILLED** 26.9'
**TOTAL DEPTH** 26.9'
**▽ BELOW GROUND** NA
**LOGGED BY** B. Fowler
**CHECKED BY** R. Lewis
**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE* | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) |
|---|---|---|---|---|---|---|
| 0 | | | Y | N | | |
| | 0.0 | S-1 | | N | 4.0<br>4.0 | 0.0 |
| 5 | | | Y | | | |
| | 0.0 | S-2 | | N | 5.0<br>5.0 | 0.0 |
| 10 | 0.0 | S-3 | N | N | 5.0<br>5.0 | 2.0 |
| 15 | 0.0 | S-4 | N | N | 5.0<br>5.0 | 0.0 |
| 20 | 0.0 | S-5 | N | N | 5.0<br>3.5 | 2.0 |
| 25 | 0.0 | S-6 | N | N | 3.0<br>3.0 | 0.0 |
| 30 | | | | | | |
| 35 | | | | | | |
| 40 | | | | | | |

| SOIL/ROCK DESCRIPTION | | SOIL CLASS |
|---|---|---|
| BROWN SANDY SILT WITH ORGANICS (FILL) MOIST, STIFF | 1.0 | ML |
| BROWN SILTY SAND, FINE, DRY DENSE, UNIFORMLY GRADED (ALLUVIAL SAND) | 4.0 | SM |
| BROWN MOTTLED SILTY CLAY, STIFF, DRY, FRACTURED PLASTIC (LACUSTRINE CLAY) | 11.0 | CL |
| BROWN TO GRAY SILTY CLAY, SOFT, WET, PLASTIC, VARVED (LACUSTRINE CLAY) | 16.0 | CH-CL |
| SOME SAND AND GRAVEL SOFT, WET, PLASTIC | 21.5 | CL |
| REDDISH-BROWN SILTY SAND WITH SOME GRAVEL, TRACE OF CLAY, DRY TO MOIST, DENSE, WIDELY GRADED, ABOUT 20% GRAVEL (GLACIAL TILL) | 26.9 | SM<br>ML |

BOTTOM OF BORING AT 26.9 FT

**BLOWS/6-IN**

NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER.

**WELL DATA**

**ELEV(FT)**

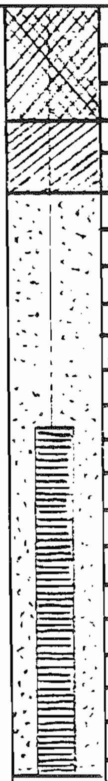
573.2
568.2
563.2
558.2
553.2
548.2
543.2

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

LOVE CANAL REMEDIAL PROJECT
LONG TERM MONITORING
TASK VC
BORING NO. 7161

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
PROJECT NO. 4844-07
CONTRACTOR: J. MATHES ASSOC.
DATE STARTED 11/12/85
COMPLETED 11/12/85
METHOD HSA
CASING SIZE 4.25"
HNU 11.7 / [✓ 10.2]
PROTECTION LEVEL D
GROUND EL. 573.0'
SOIL DRILLED 21.5'
TOTAL DEPTH 21.5'
▽ BELOW GROUND NA
LOGGED BY C. White
CHECKED BY R. Lewis
DATE 3/24/86



| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.0<br>0.0<br>0.0 | S-1 | Y<br>Y | Y<br>Y<br>Y | 4.0<br>3.4 | 0.0<br>0.0 | BROWN MOTTLED SANDY SILT, MOIST, SOFT, PLASTIC (TOPSOIL) 2.0 | SM | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. | 573.0 |
| | | | | | | | LIGHT BROWN MOTTLED SILTY CLAY MOIST, STIFF, PLASTIC | | | |
| 5 | | | | | | | | | | 568.0 |
| | 0.0 | S-2 | N | N | 5.0<br>4.8 | 0.0 | (LACUSTRINE CLAY) | CL | | |
| 10 | | | | | | | | | | 563.0 |
| | 0.0 | S-3 | N | Y | 5.0<br>5.0 | 0.0 | 11.5<br>REDDISH-GRAY MOTTLED SILTY CLAY, VARVED, MOIST, SOFT, PLASTIC | CL | | |
| | | | | | | | (LACUSTRINE CLAY) 16.0 | | | |
| 15 | | | | | | | | | | 558.0 |
| | 0.0 | S-4 | N | N | 5.0<br>2.3 | 0.0 | REDDISH-BROWN SILTY SAND WITH GRAVEL AND CLAY, MOIST, SOFT, SLIGHTLY PLASTIC | SC | | |
| 20 | | | | | | | | | | 553.0 |
| | 0.0 | S-5 | N | Y | 2.5<br>2.4 | 0.0 | (GLACIAL TILL) 21.7 | ML | | |
| | | | | | | | BOTTOM OF BORING AT 21.7 FT | | | |
| 25 | | | | | | | | | | 548.0 |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 8106

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-07

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 11/11/85

COMPLETED 11/11/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7 / 10.2

PROTECTION LEVEL C

GROUND EL. 573.1'

SOIL DRILLED 18.0'

TOTAL DEPTH 18.0'

▽ BELOW GROUND NA

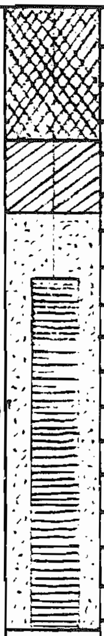
LOGGED BY C. White

CHECKED BY L. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | BROWN MOTTLED SILTY SAND WITH ORGANIC MATTER, MOIST, STIFF, PLASTIC 1.2 | | | 573.1 |
| | 0.4 | S-1 | Y | Y | 2.0/1.3 | ≤0.5 | BROWN MOTTLED SILTY SAND, MOIST UNIFORMLY GRADED (ALLUVIAL SAND)3.0 | SM | 2-4-4-6 | |
| | 0.4 | S-2 | Y | Y | 2.0/1.6 | ≤0.5 | REDDISH-BROWN SILTY CLAY, FRACTURED STAINED, MOIST, STIFF, PLASTIC | | 2-3-7-13 | |
| 5 | 0.4 | S-3 | N | N | 2.0/2.0 | ≤0.5 | | | 5-9-14-20 | 568.1 |
| | 0.4 | S-4 | N | N | 2.0/2.0 | ≤0.5 | (LACUSTRINE CLAY) | CL | 4-8-10-12 | |
| 10 | 0.0 | S-5 | N | N | 2.0/2.0 | 0.0 | | | 1-3-4-5 | 563.1 |
| | 0.4 | S-6 | N | N | 2.0/2.0 | 0.0 | 12.0 | | 3-6 settle 1.0' | |
| | 0.4 | S-7 | Y | Y | 2.0/2.0 | 0.0 | SILTY CLAY WITH GRAVEL AND COARSE SAND, WET, PLASTIC 16.0 | SC<br>ML | 3-3-5 | |
| 15 | 0.4 | S-8 | N | N | 1.7/1.2 | 0.0 | | | 5-8-14 | 558.1 |
| | 0.4 | S-9 | N | N | 2.0/2.0 | 0.0 | SILTY SAND WITH CLAY AND GRAVEL, BROWN, MOIST, DENSE, PLASTIC (GLACIAL TILL)WIDELY GRADED 18.0 | SM<br>ML | 5-6-15-17 | |
| | | | | | | | BOTTOM OF BORING AT 18.0 FT | | | |
| 20 | | | | | | | | | | 553.1 |
| 25 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

WELL DATA



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

| LOVE CANAL REMEDIAL PROJECT<br>LONG TERM MONITORING | TASK VC | BORING NO. 8110 |
|---|---|---|

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-07

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 11/8/85

COMPLETED 11/8/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7 [✓ 10.2]

PROTECTION LEVEL C

GROUND EL. 576.5'

SOIL DRILLED 27.0'

TOTAL DEPTH 27.0'

▽ BELOW GROUND NA

LOGGED BY S. Waite

CHECKED BY L. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | LINER DEPTH 1.3 | | | 576.5 |
| | 0.0 | S-1 | Y | Y | 1.7<br>1.7 | 0.0 | BROWN MOTTLED SANDY SILT WITH ORGANIC MATTER, UNIFORMLY GRADED, MOIST, HARD, PLASTIC 3.0 | SM | 9-15-14-6 | |
| 5 | 0.0 | S-2 | N | N | 2.0<br>2.0 | 0.0 | BROWN SILTY SAND, UNIFORMLY GRADED, DRY DENSE, NON-PLASTIC (ALLUVIAL SAND) 6.0 | SM | 6-8-8-8 | 571.5 |
| | 0.0 | S-3 | Y | Y | | 0.0 | REDDISH-BROWN MOTTLED SILTY CLAY MOIST, STIFF, PLASTIC | CL | 3-4-14-20 | |
| | 0.0 | S-4 | N | N | 2.0<br>2.0 | 0.0 | | | 8-16-22-25 | |
| 10 | 0.0 | S-5 | N | N | | 0.0 | (LACUSTRINE CLAY) | | 8-15-17-19 | 566.5 |
| | 0.0 | S-6 | N | N | 2.0<br>2.0 | 0.0 | 13.0 | | 3-4-4-6 | |
| | 0.0 | S-7 | N | N | 2.0<br>2.0 | 0.0 | BROWN TO GRAY SILTY CLAY, WET, SOFT, VARVED, PLASTIC | CL | 1-1-2-4 | |
| 15 | 0.0 | S-8 | N | N | 2.0<br>1.6 | 0.0 | (LACUSTRINE CLAY) 16.0 | | 3-2-4settle6" | 561.5 |
| | 0.0 | S-9 | N | N | 2.0<br>1.5 | 0.0 | SILTY CLAY WITH TRACES OF SAND AND GRAVEL, WET-MOIST, STIFF, PLASTIC | CL | 1-2-2-4 | |
| 20 | 0.0 | S-10 | N | N | | 1.0 | | | 2-3-7settle6" | 556.5 |
| | 0.0 | S-11 | N | N | | 1.0 | (LACUSTRINE CLAY) 23.0 | | 3-10-7-15 | |
| | 0.0 | S-12 | N | N | | 0.0 | BROWN SILTY SAND WITH TRACE OF CLAY AND SOME GRAVEL, WIDELY GRADED, MOIST, STIFF, PLASTIC | SM<br>ML | 5-10-9-15 | |
| 25 | 0.0 | S-13 | N | N | | 0.0 | (GLACIAL TILL) 27.0 | | 5-8-20-32 | 551.5 |
| | | | | | | | BOTTOM OF BORING AT 27.0 FT | | | |
| 30 | | | | | | | NOTE: PENETRATION/RECOVERY RATIO NOT RECORDED FOR S-10 - S-13 | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

WELL DATA

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

LOVE CANAL REMEDIAL PROJECT
LONG TERM MONITORING

TASK VC

BORING NO. 8115

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-05

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 10/24/85

COMPLETED 10/24/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7 / 10.2

PROTECTION LEVEL C

GROUND EL. 574.6'

SOIL DRILLED 29.2'

TOTAL DEPTH 29.2'

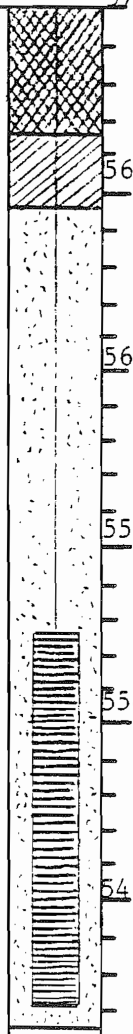
▽ BELOW GROUND NA

LOGGED BY B. Fowler

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.0 | S-1 | Y | Y | 4.0<br>3.0 | 0.0 | SILTY SANDY CLAY, STIFF, DRY, WITH ORGANICS (FILL) 2.6 | CL | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. | 574.6 |
| | | | | Y | | | BROWN SILTY SAND, FINE, WET, UNIFORMLY GRADED, DENSE 4.0 | SM | | |
| 5 | | S-2 | Y | N | 5.0<br>5.0 | 0.0 | BROWN SILTY CLAY, STIFF, DRY, FRACTURED<br>(LACUSTRINE CLAY) 11.0 | CL | | 569.6 |
| 10 | | S-3 | N | N | 5.0<br>4.6 | | BROWN TO GRAY SILTY CLAY, SOFT, VARVED, WET, PLASTIC | CH-CL | | 564.6 |
| 15 | 0.0 | S-4 | N | N | 5.0<br>4.0 | | 16.5<br>REDDISH-BROWN SILTY CLAY WITH GRAVEL, SLIGHTLY STIFF, MOIST 20.0 | | | 559.6 |
| 20 | | S-5 | N | N | 5.0<br>4.0 | | BROWN SILTY SAND WITH SOME GRAVEL AND CLAY, STIFF, DRY, WIDELY GRADED<br>(GLACIAL TILL) | SM<br>ML | | 554.6 |
| 25 | | S-6 | N | N | 5.0<br>3.5 | | ABOUT 20% GRAVEL<br>29.2 | | | 549.6 |
| 30 | | | | | | | BOTTOM OF BORING AT 29.2 ft | | | 544.6 |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 8120

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
**PROJECT NO.** 4844-05
**CONTRACTOR:** J. MATHES ASSOC.
**DATE STARTED** 10/23/85
**COMPLETED** 10/23/85
**METHOD** HSA
**CASING SIZE** 4.25"
**HNU** 11.7 / (10.2)
**PROTECTION LEVEL** C
**GROUND EL.** 573.6'
**SOIL DRILLED** 28.5'
**TOTAL DEPTH** 28.5'
**▽ BELOW GROUND** NA
**LOGGED BY** B. Fowler
**CHECKED BY** R. Lewis
**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | 573.6 |
| | | | | Y | N | | | DARK BROWN SANDY SILT WITH ORGANICS (FILL) MOIST, STIFF 1.0 | SL | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. | | |
| | | | | | | | | BROWN SILTY SAND, FINE, DRY, DENSE (ALLUVIAL SAND) 2.5 | SM | | | |
| | 0.0 | S-1 | | Y | | 4.0<br>4.0 | 0.0 | REDDISH-BROWN MOTTLED SILTY CLAY, STIFF, DRY, FRACTURED | | | | |
| 5 | | | | | | | | | | | | 568.6 |
| | 0.0 | S-2 | | N | N | 5.0<br>4.0 | 1.0 | (LACUSTRINE CLAY) | CL | | | |
| 10 | | | | | | | | 11.5 | | | | 563.6 |
| | 0.0 | S-3 | | N | N | 5.0<br>5.0 | 10.0 | BROWN TO GRAY SILTY CLAY, SOFT, MOIST, VARVED | CH-CL | | | |
| 15 | | | | | | | | (LACUSTRINE CLAY) | | | | 558.6 |
| | 0.0 | S-4 | | N | N | 5.0<br>5.0 | 0.0 | | | | | |
| 20 | | | | | | | | BROWN SILTY CLAY WITH SOME GRAVEL, SOFT, MOIST 22.0 | | | | 553.6 |
| | 0.0 | S-5 | | N | N | 5.0<br>1.5 | 0.0 | BROWN CLAYEY SILTY SAND WITH SOME GRAVEL, ABOUT 20% GRAVEL, DENSE, MOIST, WIDELY GRADED | SM<br>ML | | | |
| 25 | | | | | | | | | | | | 548.6 |
| | 0.0 | S-6 | | N | N | 5.0<br>3.0 | 0.0 | (GLACIAL TILL) 28.5 | | | | |
| | | | | | | | | BOTTOM OF BORING AT 28.5 FT | | | | |
| 30 | | | | | | | | | | | | 543.6 |
| 35 | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

| | | |
|---|---|---|
| LOVE CANAL REMEDIAL PROJECT<br>LONG TERM MONITORING | TASK VC | BORING NO. 8125 |
| CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION | | PROJECT NO. 4844-05 |

| | | | |
|---|---|---|---|
| CONTRACTOR: J. MATHES ASSOC. | DATE STARTED 10/16/85 | | COMPLETED 10/16/85 |
| METHOD HSA | CASING SIZE 4.25" | HNU 11.7 (10.2) | PROTECTION LEVEL C |
| GROUND EL. 573.6' | SOIL DRILLED 28.0' | TOTAL DEPTH 28.0' | ▽ BELOW GROUND NA |
| LOGGED BY B. Fowler | CHECKED BY L. Lewis | DATE 3/24/86 | |

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 573.6 |
| | 0.0 | S-1 | Y | N | 2.0<br>1.8 | 4.0 | BROWN SANDY SILT WITH CLAY AND (FILL) ORGANICS, MOIST, STIFF 1.0<br>BROWN SILTY SAND, FINE, DRY, DENSE (ALLUVIAL SAND) 2.5 | ML<br>SM | 4-11-12-14 | |
| | 0.0 | S-2 | N | N | 1.5<br>1.5 | 3.0 | BROWN MOTTLED SILTY CLAY, STIFF FRACTURED | | 10-14-12 | |
| 5 | 0.0 | S-3 | Y | N | 2.5<br>1.5 | 1.5 | (LACUSTRINE CLAY) | CL | 6-14-15-21-26 | 568.6 |
| | 0.0 | S-4 | N | N | 2.5<br>2.5 | 0.0 | | | 4-17-23-29-29 | |
| 10 | 0.0 | S-5 | N | N | 2.5<br>2.5 | 0.0 | 11.0 | | 5-8-9-10-9 | 563.6 |
| | 0.0 | S-6 | N | N | 2.5<br>2.5 | 0.0 | BROWN TO GRAY SILTY CLAY, SOFT MOIST, VARVED | | 2-1-2-2-2 | |
| 15 | 0.0 | S-7 | N | N | 2.5<br>2.5 | 0.0 | | CH-<br>CL | WOH-1-1-1-2 | 558.6 |
| | 0.0 | S-8 | N | N | 2.5<br>2.5 | 0.0 | (LACUSTRINE CLAY) | | WOH/1.5'-1-2 | |
| 20 | 0.0 | S-9 | N | N | 2.5<br>2.5 | 0.0 | 22.0 | | WOH/1.5'-2-1 | 553.6 |
| | 0.0 | S-10 | N | N | 2.5<br>1.5 | 0.0 | REDDISH-BROWN SILTY CLAY WITH SAND AND GRAVEL, SOFT, MOIST | | WOH-1-1-1-2 | |
| 25 | 0.0 | S-11 | N | N | 2.5<br>1.0 | 0.0 | 26.0 | | WOH-2-2-8-10 | 548.6 |
| | 0.0 | S-12 | N | N | 2.0<br>1.5 | 0.0 | CLAY SILTY SAND WITH GRAVEL, MOIST (GLACIAL TILL) DENSE, WIDELY GRADED | SC-<br>ML | WOH-4-6-13 | |
| | | | | | | | BOTTOM OF BORING AT 28.0 FT | | | |
| 30 | | | | | | | | | | 543.6 |
| | | | | | | | WOH = WEIGHT OF HAMMER | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

WELL DATA

*U: THIN WALL TUBE   S: SPLIT SPOON   R: ROCK

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 8130

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-05

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 10/15/85

COMPLETED 10/15/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7/(10.2)

PROTECTION LEVEL C/D

GROUND EL. 574.6'

SOIL DRILLED 30.2'

TOTAL DEPTH 30.2'

▽ BELOW GROUND NA

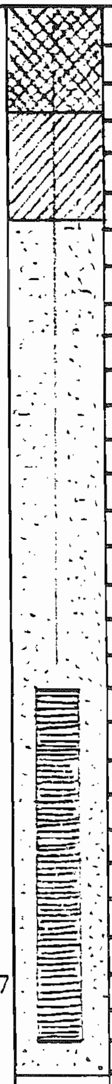
LOGGED BY B. Fowler

CHECKED BY L. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE # | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 574.6 |
| | 0.0 | S-1 | Y | N | 2.0<br>2.0 | 0.0 | BROWN SANDY SILT WITH ORGANICS (FILL) MOIST, STIFF 1.0 | ML | 3-8-10-16 | |
| | 0.0 | S-2 | N | N | 1.5<br>1.5 | 0.0 | BROWN SILTY SAND, FINE, DRY, DENSE, UNIFORMLY GRADED<br>(ALLUVIAL SAND) 4.5 | SM | 12-11-11 | |
| 5 | 0.0 | S-3 | Y | N | 2.5<br>2.0 | 0.0 | BROWN MOTTLED SILTY CLAY, STIFF, DRY, FRACTURED | CL | 7-12-8-14-22 | 569.6 |
| | 0.0 | S-4 | N | N | 2.5<br>2.0 | 0.0 | (LACUSTRINE CLAY) | | 5-10-15-18-24 | |
| 10 | 0.0 | S-5 | N | N | 2.5<br>2.0 | 0.1 | 11.0 | | 6-8-12-15-14 | 564.6 |
| | 0.0 | S-6 | N | N | 2.5<br>2.0 | 0.1 | BROWN TO GRAY SILTY CLAY, SOFT, MOIST, VARVED, PLASTIC | CH-CL | 2-3-2-4-5 | |
| 15 | 0.0 | S-7 | N | N | 2.5<br>2.0 | 0.2 | (LACUSTRINE CLAY) | | 1-1-1-2-3 | 559.6 |
| | 0.0 | S-8 | N | N | 2.5<br>2.0 | 0.1 | | | WOR/2.0'-1 | |
| 20 | 0.0 | S-9 | N | N | 2.5<br>2.0 | 0.0 | | | WOR/2.0'-1 | 554.6 |
| | 0.0 | S-10 | N | N | 2.5<br>2.0 | 0.1 | | CL | WOR/2.0'-2 | |
| 25 | 0.0 | S-11 | N | N | 2.5<br>2.0 | 0.1 | 26.0 | | WOR/2.0'-1 | 549.6 |
| | 0.0 | S-12 | N | N | 2.0<br>1.5 | 0.1 | SILTY CLAY WITH SANDY GRAVEL, SOFT, WET 28.0 | CL | WOR/1.3'-3-4-7 | |
| 30 | 0.0 | S-13 | N | N | 1.7<br>1.7 | 0.0 | SILTY SAND WITH SOME GRAVEL, ABOUT 20% GRAVEL, DENSE, MOIST (GLACIAL TILL) 30.2 | SM<br>ML | 7-13-39 | 544.6 |
| | | | | | | | BOTTOM OF BORING AT 30.2 FT | | | |
| | | | | | | | WOR = WEIGHT OF RODS | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

WELL DATA



#U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C. JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 8140

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-05

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 10/14/85

COMPLETED 10/14/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7 / [✓ 10.2]

PROTECTION LEVEL C

GROUND EL. 574.7'

SOIL DRILLED 32.0'

TOTAL DEPTH 32.0'

▽ BELOW GROUND NA

LOGGED BY B. Fowler

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.0 | S-1 | ☒ | N | N | 1.0<br>0.5 | 0.1 | BROWN SILTY CLAY WITH ORGANICS, GRAVEL, MOIST, STIFF (FILL) 2.0 | GW<br>CL | 3-5 | | 574.7 |
| | 3.5 | S-2 | ☒ | Y | N | 2.5<br>1.0 | 0.1 | BROWN SILTY SAND, FINE, DRY DENSE (ALLUVIAL SAND) 5.0 | SM | 7-13-10-12-15 | | |
| 5 | 0.0 | S-3 | ☒ | Y | N | 2.5<br>0.5 | 0.1 | REDDISH-BROWN CLAY, STIFF, DRY, FRACTURED | | 7-12-11-13-15 | | 569.7 |
| | 0.0 | S-4 | ☒ | N | N | 2.5<br>2.0 | 1.0 | (LACUSTRINE CLAY) | CL | 15-21-24-19-20 | | |
| 10 | 0.0 | S-5 | ☒ | N | N | 2.5<br>1.0 | 1.0 | 11.0 | | 18-21-21-19-14 | | 564.7 |
| | 0.0 | S-6 | ☒ | N | N | 2.5<br>2.5 | 1.0 | BROWN TO GRAY CLAY, SOFT, MOIST | CH-<br>CL | 7-4-2-2-2 | | |
| 15 | 0.0 | S-7 | ☒ | N | N | 2.5<br>2.5 | 0.0 | (LACUSTRINE CLAY) | | WOH-1-2-1-2 | | 559.7 |
| | 0.0 | S-8 | ☒ | N | N | 2.5<br>2.5 | 0.0 | | | WOH/2.0'-2 | | |
| 20 | 0.0 | S-9 | ☒ | N | N | 2.5<br>2.5 | 0.0 | | | WOH/2.0'-2 | | 554.7 |
| | 0.0 | S-10 | ☒ | N | N | 2.5<br>2.5 | 0.0 | 23.5 | | WOH/2.0'-2 | | |
| 25 | 0.0 | S-11 | ☒ | N | N | 2.5<br>2.5 | 0.0 | BROWN SILTY CLAY, SOME SAND AND GRAVEL, SOFT | | WOH/2.0'-1 | | 549.7 |
| | 0.0 | S-12 | ☒ | N | N | 2.5<br>2.5 | 0.0 | 28.0 | | WOH-1-12-45-60 | | |
| 30 | 0.0 | S-13 | ☒ | N | N | 1.0<br>1.0 | 0.0 | SILTY SAND WITH TRACE OF CLAY AND GRAVEL, MOIST, DENSE, WIDELY GRADED, SLIGHTLY PLASTIC (GLACIAL TILL) 32.0 | SM<br>ML | 58-100 | | 544.7 |
| | | | | | | | | BOTTOM OF BORING AT 32.0 FT | | | | |
| 35 | | | | | | | | WOH = WEIGHT OF HAMMER | | | | 539.7 |
| 40 | | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

**BORING NO.** 9105

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-05

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/31/85

**COMPLETED** 10/31/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7/[✓ 10.2]

**PROTECTION LEVEL** C

**GROUND EL.** 573.9'

**SOIL DRILLED** 29.9'

**TOTAL DEPTH** 29.9'

**∇ BELOW GROUND** NA

**LOGGED BY** B. Fowler

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 573.9 |
| | 0.0 | S-1 | | Y | N | 4.0<br>3.6 | 0.0 | DARK-BROWN SANDY SILT WITH GRAVEL AND ORGANICS, DRY, LOOSE<br>(FILL) 2.0 | ML | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. | |
| | | | | Y | | | | BROWN SILTY SAND, FINE, DRY, DENSE<br>(ALLUVIAL SAND) 4.5 | SM | | |
| 5 | | | | | | | | | | | 568.9 |
| | | S-2 | | | N | 5.0<br>5.0 | 0.0 | BROWN MOTTLED SILTY CLAY, STIFF FRACTURED<br>(LACUSTRINE CLAY) | CL | | |
| 10 | | | | | | | | 11.0 | | | 563.9 |
| | | S-3 | | N | N | 5.0<br>5.0 | 0.0 | BROWN TO GRAY MOTTLED CLAY, SOFT WET<br>(LACUSTRINE CLAY) | | | |
| 15 | | | | | | | | | | | 558.9 |
| | 0.0 | S-4 | | N | N | 5.0<br>4.2 | 0.0 | | CL | | |
| 20 | | | | | | | | 21.0 | | | 553.9 |
| | | S-5 | | N | N | 5.0<br>3.6 | 0.0 | TRACES OF SAND AND GRAVEL<br>24.0 | | | |
| 25 | | | | | | | | REDDISH-BROWN SILTY SAND WITH SOME GRAVEL AND TRACE CLAY, MOIST, SLIGHTLY PLASTIC, WIDELY GRADED | | | 548.9 |
| | 1.0 | S-6 | | N | N | 5.0<br>0.0 | 3.0 | (GLACIAL TILL) 29.9 | SM<br>ML | | |
| 30 | 0.0 | | | N | N | | 0.0 | BOTTOM OF BORING AT 29.9 FT | | | 543.9 |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

**BORING NO.** 9110

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-05

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/13/85

**COMPLETED** 10/13/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7 [✓ 10.2]

**PROTECTION LEVEL** C

**GROUND EL.** 573.9'

**SOIL DRILLED** 24.5'

**TOTAL DEPTH** 24.5'

**∇ BELOW GROUND** NA

**LOGGED BY** B. Fowler

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 573.9 |
| | 0.0 | S-1 ☒ | Y | N | 1.0<br>0.5 | 0.2 | BROWN SANDY SILT WITH ORGANICS, (FILL) MOIST, STIFF 1.0 | SM | 2-3 | |
| | 0.0 | S-2 ☒ | N | Y | 2.5<br>2.5 | 0.4 | BROWN MOTTLED SILTY FINE SAND WITH TRACE ORGANICS, DRY, DENSE, NON-PLASTIC<br>(ALLUVIAL SAND) 5.0 | SM | 5-8-9-8-6 | |
| 5 | 0.0 | S-3 ☒ | Y | N | 2.5<br>2.5 | 0.1 | REDDISH-BROWN SILTY CLAY, MOIST SLIGHTLY PLASTIC, STIFF, FRACTURES | | 5-8-8-11-16 | 568.9 |
| | 0.0 | S-4 ☒ | N | N | 2.5<br>2.5 | 0.0 | (LACUSTRINE CLAY) | CL | 7-11-15-24-26 | |
| 10 | 0.0 | S-5 ☒ | N | N | 2.5<br>2.5 | 0.0 | — — — — — — 11.0 | | 6-11-16-17-15 | 563.9 |
| | 0.0 | S-6 ☒ | N | N | 25<br>25 | 0.0 | REDDISH-GRAY SILTY CLAY, WET SOFT, PLASTIC | CH | 2-2-2-2-2 | |
| 15 | 0.0 | S-7 ☒ | N | N | 25<br>25 | 0.1-<br>0.2 | | | 1-2-2-2-2 | 558.9 |
| | 0.0 | S-8 ☒ | | | | 0.0 | (LACUSTRINE CLAY)<br>19.0 | CL | 1-2-2 | |
| 20 | 0.0 | S-9 ☒ | | | | 0.0 | BROWN SILTY SAND WITH SOME GRAVEL AND TRACE OF CLAY, MOIST, DENSE, WIDELY GRADED | SM | 1-1-3-24 | 553.9 |
| | 0.0 | S-10 ☒ | | | | 0.0 | | ML | | |
| | | ☒ | | | | | (GLACIAL TILL) 24.5 | | 18-37-51-46-103 | |
| 25 | | | | | | | BOTTOM OF BORING AT 24.5 FT | | | 548.9 |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

WELL DATA

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

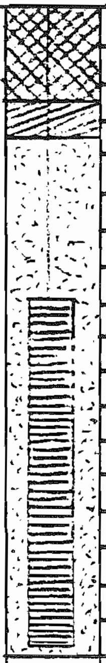
E.C.JORDAN CO.

LOVE CANAL REMEDIAL PROJECT
LONG TERM MONITORING
TASK VC
BORING NO. 9115

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
PROJECT NO. 4844-07
CONTRACTOR: J. MATHES ASSOC.
DATE STARTED 11/6/85
COMPLETED 11/6/85
METHOD HSA
CASING SIZE 4.25"
HNU 11.7 / (10.2)
PROTECTION LEVEL C
GROUND EL. 574.0'
SOIL DRILLED 19.5'
TOTAL DEPTH 19.5'
▽ BELOW GROUND NA
LOGGED BY S. Waite
CHECKED BY L. Lewis
DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE* | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.0 | S-1 | Y | Y | 2.0<br>2.2 | 0.0 | BROWN SANDY SILT, POORLY GRADED, WITH ORGANIC MATTER, SOFT, PLASTIC 2.3 | Pt | 3-3-3-4 | 574.0 |
| | 0.0 | S-2 | N | Y | 2.2<br>2.2 | 0.0 | RED MOTTLED BROWN SILTY SAND AND UNIFORMLY GRADED, MOIST, DENSE, PLASTIC | | 2-4-4-6-5 | |
| 5 | 3.0 | S-3 | Y | N | 2.5<br>2.5 | 2.0 | (ALLUVIAL SAND) 7.3 | SM | 4-9-16-20-26 | 569.0 |
| | 0.0 | S-4 | N | N | 2.5<br>2.5 | 0.0 | REDDISH-BROWN SILTY CLAY, MOIST, STIFF, FRACTURED 9.5 | | 9-15-16-19-18 | |
| 10 | 0.0 | S-5 | N | N | 2.5<br>2.5 | 0.0 | | CL | 3-2-3-3-4 | 564.0 |
| | 0.0 | S-6 | N | N | 2.5<br>2.5 | 1.0 | (LACUSTRINE CLAY) 15.0 | | 1-2-4-4-5 | |
| 15 | 0.0 | S-7 | N | N | 2.5<br>0.5 | 1.0 | REDDISH-BROWN SILTY CLAY WITH SOME BROWN COBBLES, UNIFORMLY GRADED, (GLACIAL TILL) MOIST, DENSE, SL. PLASTIC | CL | -NO BLOW COUNTS RECORDED FOR S-7 AND S-8 | 559.0 |
| | 0.0 | S-8 | N | N | 2.5<br>2.5 | 1.0 | SILTY SAND WITH GRAVEL WITH SOME COBBLES, BROWN, UNIFORMLY GRADED, MOIST, DENSE, SLIGHTLY PLASTIC (GLACIAL TILL) | ML | | |
| 20 | | | | | | | BOTTOM OF BORING AT 19.5 FT | | | 554.0 |
| 25 | | | | | | | | | | 549.0 |
| 30 | | | | | | | | | | 544.0 |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

WELL DATA



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 9120

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-05

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 10/12/85

COMPLETED 10/12/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7/10.2

PROTECTION LEVEL C

GROUND EL. 574.2'

SOIL DRILLED 21.0'

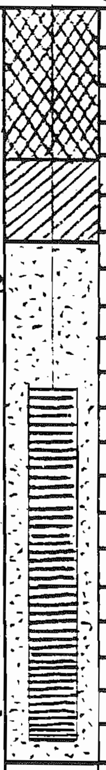
TOTAL DEPTH 21.0'

▽ BELOW GROUND NA

LOGGED BY B. Fowler

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.0 | S-1 ☒ | Y | N | 1.0<br>0.5 | 0.0 | BROWN SANDY SILT WITH ORGANICS, (FILL) MOIST, STIFF 1.0 | ML | 6-7 |  | 574.2 |
| | 0.0 | S-2 ☒ | N | N | 2.5<br>2.5 | 0.0 | BROWN SILTY SAND, DRY, DENSE, FRACTURED, UNIFORMLY GRADED<br>(ALLUVIAL SAND) 4.5 | SM | 5-8-10-13-14 | | |
| 5 | 0.0 | S-3 ☒ | Y | N | 2.5<br>2.5 | 1.3 | REDDISH-BROWN MOTTLED CLAY, STIFF, DRY, FRACTURED<br>(LACUSTRINE CLAY) | CL | 5-10-8-12-18 | | 569.2 |
| | 0.0 | S-4 ☒ | N | N | 2.5<br>2.5 | 0.6 | | | 5-11-15-22-32 | | |
| 10 | 0.0 | S-5 ☒ | N | N | 2.5<br>2.5 | 1.2 | 11.0 | | 5-11-16-18-15 | | 564.2 |
| | 0.0 | S-6 ☒ | N | N | 2.5<br>2.5 | 0.0 | BROWN TO GRAY CLAY, SOFT, MOIST<br>(LACUSTRINE CLAY) | CH-CL | 2-3-4-3-5 | | |
| 15 | 0.0 | S-7 ☒ | N | N | 2.5<br>2.5 | 0.0 | | | 1-1-2-2-2 | | 559.2 |
| | 3.0 | S-8 ☒ | N | N | 2.5<br>2.5 | 20 | 18.0 | | WOR-7-18-42-71 | | |
| 20 | 3.0 | S-9 ☒ | Y | N | 1.5<br>1.5 | 12 | BROWN SANDY, CLAYEY SILT WITH GRAVEL, DRY, FRACTURED, DENSE<br>(GLACIAL TILL) | ML<br>SC | 50-75-REFUSAL | | 554.2 |
| | | | | | | | BOTTOM OF BORING AT 21.0 FT | | | | |
| 25 | | | | | | | WOR = WEIGHT OF RODS | | | | 549.2 |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 9125

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-05

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 10/11/85

COMPLETED 10/11/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7 10.2

PROTECTION LEVEL C

GROUND EL. 573.5'

SOIL DRILLED 26.0'

TOTAL DEPTH 26.0'

▽ BELOW GROUND NA

LOGGED BY B. Fowler

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE # | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 573.5 |
| | 0.0 | S-1 | ☒ | Y | N | 1.0 | 1.0 | DARK BROWN SANDY SILT WITH ORGANICS (FILL) STIFF, DRY 1.0 | ML | 7-10 | |
| | 0.0 | S-2 | ☒ | N | N | 0.3<br>2.5<br>1.7 | 1.0 | BROWN SILTY SAND, DENSE, DRY, UNIFORMLY GRADED (ALLUVIAL SAND) 4.0 | SP | 5-6-9-10-11 | |
| 5 | 0.0 | S-3 | ☒ | Y | N | 2.5<br>2.5 | 0.0 | REDDISH-BROWN SILTY CLAY, MOIST, STIFF, FRACTURES, SLIGHTLY PLASTIC | CL | 4-7-11-13-17 | 568.5 |
| | 0.0 | S-4 | ☒ | N | N | 2.0<br>2.0 | 0.0 | (LACUSTRINE CLAY) 9.0 | | 4-9-15-18-20 | |
| 10 | 0.0 | S-5 | ☒ | N | N | 2.0<br>2.0 | 0.0 | REDDISH-GRAY SILTY CLAY, WET, PLASTIC, SOFT | CL | 4-7-9-10-8 | 563.5 |
| | 0.0 | S-6 | ☒ | N | N | | 0.0 | (LACUSTRINE CLAY) | | 2-2-2-2-2 | |
| 15 | 0.0 | S-7 | ☒ | N | N | 2.0<br>2.0 | 0.0 | | | 2-3 18"SETTLE | 558.5 |
| | 0.0 | S-8 | ☒ | N | N | 2.0<br>1.0 | 0.0 | 18.0<br>TRACES OF SAND AND GRAVEL | CL | 2-2 20"SETTLE | |
| 20 | 0.0 | S-9 | ☒ | N | N | 2.0<br>1.0 | 1.0 | 20.5 | | 4-10-24-34 6" SETTLE | 553.5 |
| | 0.0 | S-10 | ☒ | N | N | 2.5<br>1.0 | 0.0 | BROWN SILTY FINE SAND AND GRAVEL, MOIST, DENSE, SLIGHTLY PLASTIC, WIDELY GRADED | SM<br>ML | 34-40-50-63-44 | |
| 25 | 0.0 | S-11 | ☒ | N | N | 2.5<br>1.0 | 0.0 | (GLACIAL TILL) | | 15-24-52-29-54 REFUSAL | 548.5 |
| | | | | | | | | BOTTOM OF BORING AT 26.0 FT | | | |
| 30 | | | | | | | | | | | 543.5 |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

WELL DATA

#U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 9130

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
**PROJECT NO.** 4844-07
**CONTRACTOR:** J. MATHES ASSOC.
**DATE STARTED** 11/20/85
**COMPLETED** 11/20/85
**METHOD** HSA
**CASING SIZE** 4.25"
**HNU** 11.7 / 10.2
**PROTECTION LEVEL** C to D
**GROUND EL.** 574.3 '
**SOIL DRILLED** 31.0 '
**TOTAL DEPTH** 31.0 '
**▽ BELOW GROUND** NA
**LOGGED BY** B. Fowler
**CHECKED BY**
**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  | 574.3 |
|  | 0.0 | S-1 | Y | N | 3.5<br>3.5 | 14.0 | BROWN SAND WITH CLAY WITH ORGANIC MATTER, MOIST, MEDIUM STIFF, (FILL) PLASTIC 2.0<br>LIGHT BROWN SILTY SAND, OXIDATION STAINING, WET, SOFT, PLASTIC, UNIFORMLY GRADED (ALLUVIAL SAND) 5.5 | SM<br>SM | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. |  |
| 5 |  |  |  |  |  |  |  |  |  | 569.3 |
|  | 0.0 | S-2 | Y | Y | 5.0<br>5.0 | 1.3 | REDDISH-BROWN MOTTLED SILTY CLAY, DRY, STIFF, SLIGHTLY PLASTIC FRACTURED<br>(LACUSTRINE CLAY) 11.0 | CL |  |  |
| 10 |  |  |  |  |  |  |  |  |  | 564.3 |
|  | 0.0 | S-3 | N | N | 5.0<br>5.0 | 1.8 | REDDISH-GRAY SILTY CLAY, UNIFORMLY GRADED, MOIST, SOFT, PLASTIC |  |  |  |
| 15 |  |  |  |  |  |  |  |  |  | 559.3 |
|  | 0.0 | S-4 | N | N | 5.0<br>5.0 | 12.0 |  |  |  |  |
| 20 |  |  |  |  |  |  | (LACUSTRINE CLAY) | CL |  | 554.3 |
|  | 0.0 | S-5 | N | N | 5.0<br>5.0 | 20.0 | 23.5<br>TRACE OF SAND AND GRAVEL 25.0 |  |  |  |
| 25 |  |  |  |  |  |  |  |  |  | 549.3 |
|  |  |  |  |  |  | 6.2 | BROWN SANDY SILT WITH CLAY AND GRAVEL, MOIST, SLIGHTLY PLASTIC, DENSE, WIDELY GRADED | SM |  |  |
|  | 0.0 | S-6 | N | N | 5.0<br>2.0 | 5.2 |  | ML |  |  |
| 30 |  |  |  |  |  | 11.8 | (GLACIAL TILL) |  |  | 544.3 |
|  |  |  |  |  |  |  | BOTTOM OF BORING AT 31.0 FT |  |  |  |
| 35 |  |  |  |  |  |  |  |  |  | 539.3 |
| 40 |  |  |  |  |  |  |  |  |  |  |

**WELL DATA**

U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 9140

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-07

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 11/23/85

COMPLETED 11/23/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7/10.2

PROTECTION LEVEL C

GROUND EL. 578.9'

SOIL DRILLED 29.5'

TOTAL DEPTH 29.5'

▽ BELOW GROUND NA

LOGGED BY B. Fowler

CHECKED BY L. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) |
|---|---|---|---|---|---|---|
| | 0.0 | S-1 | N | N | 3.5<br>3.5 | 0.0 |
| | 0.0 | S-2 | N | N | | 5.0-<br>20 |
| 5 | 0.0 | S-3 | N | N | 5.0<br>4.7 | 0.0 |
| | 0.0 | S-4 | N | N | | 0.0 |
| 10 | 0.0 | S-5 | Y | Y | | 4.0 |
| | 0.0 | S-6 | N | N | 5.0<br>5.0 | 0.0 |
| 15 | 0.0 | S-7 | N | N | 5.0<br>5.0 | 0.0 |
| | 0.0 | S-8 | N | N | | 0.0 |
| 20 | 0.0 | S-9 | N | N | 5.0<br>5.0 | 0.0 |
| | 0.0 | S-10 | N | N | | 0.0 |
| 25 | 0.0 | S-11 | N | N | 5.0<br>4.0 | 0.0 |
| | | S-12 | | | | |
| | | S-13 | | | | |
| 30 | | | | | 1.1<br>1.1 | |

| SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % |
|---|---|---|
| TOPSOIL | | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. |
| BROWN TO GRAY SAND, SILT, CLAY AND GRAVEL, MOIST, LOOSE, WIDELY GRADED<br>(FILL)<br>8.2 | CL-GW | |
| BROWN SILTY FINE SAND UNIFORMLY GRADED<br>9.5 | SP | |
| REDDISH-BROWN SILTY CLAY, MOIST, STIFF, FRACTURES, SLIGHTLY PLASTIC<br>(LACUSTRINE CLAY)<br>16.0 | CL | |
| REDDISH-GRAY SILTY CLAY, SOFT, WET, PLASTIC<br>23.5<br>TRACES OF GRAVEL<br>26.5 | CL | |
| REDDISH-BROWN SILTY SAND WITH SOME GRAVEL, TRACE COBBLES, MOIST, DENSE, SLIGHTLY PLASTIC (GLACIAL TILL) | SM<br>ML | |
| BOTTOM OF BORING AT 29.5 FEET | | |

WELL DATA

ELEV(FT)

578.9
573.9
568.9
563.9
558.9
553.9
548.9
543.9

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 10105

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-07

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 11/21/85

COMPLETED 11/22/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7/10.2

PROTECTION LEVEL C to D

GROUND EL. 577.3'

SOIL DRILLED 30.3'

TOTAL DEPTH 30.3'

▽ BELOW GROUND NA

LOGGED BY B. Fowler

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 150-200<br>POSSIBLE MOISTURE | S-1 | X | Y | Y | 4.0<br>4.0 | 0.1 | BROWN TO BLACK MOTTLED SANDY SILT WITH CLAY AND ORGANIC MATTER, FRACTURED, MOIST, STIFF, PLASTIC (FILL) 4.5 | ML | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. |  | 577.3 |
| 5 | 20-30 | S-2 | X | Y | Y | 5.0<br>5.0 | 0.1 | BROWN SILTY FINE SAND WITH TRACES OF GRAVEL, MOIST, LOOSE, NON-PLASTIC, UNIFORMLY GRADED (ALLUVIAL SAND) 8.5 | SP | | | 572.3 |
| 10 | 0-1 | S-3 | X | N | N | 5.0<br>5.0 | 0-1 | REDDISH-BROWN MOTTLED SILTY CLAY VARVED, MOIST, STIFF, FRACTURED SLIGHTLY PLASTIC<br>(LACUSTRINE CLAY) 14.0 | CL | | | 567.3 |
| 15 | 0-1 | S-4 | X | N | N | 5.0<br>5.0 | 0-1 | REDDISH-GRAY SILTY CLAY, WET, SOFT, PLASTIC | | | | 562.3 |
| 20 | 0-1 | S-5 | X | N | N | 5.0<br>5.0 | 0-1 | (LACUSTRINE CLAY)<br>25.0 | CL | | | 557.3 |
| 25 | 0-1 | S-6 | X | N | N | 5.0<br>2.0 | 0-1 | BROWN SILTY SAND WITH GRAVEL, MOIST, DENSE, SLIGHTLY PLASTIC, WIDELY GRADED | SM<br>ML | | | 552.3 |
| 30 | | S-7 | X | | | 1.5<br>0.5 | | (GLACIAL TILL) 30.5<br>BOTTOM OF BORING AT 30.5 FT | | | | 547.3 |
| 35 | | | | | | | | | | | | 542.3 |
| 40 | | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

TASK VC

BORING NO. 10135

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 11/23/85

COMPLETED 11/23/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7 (10.2)

PROTECTION LEVEL C

GROUND EL. 577.1'

SOIL DRILLED 29.8'

TOTAL DEPTH 29.8'

▽ BELOW GROUND NA

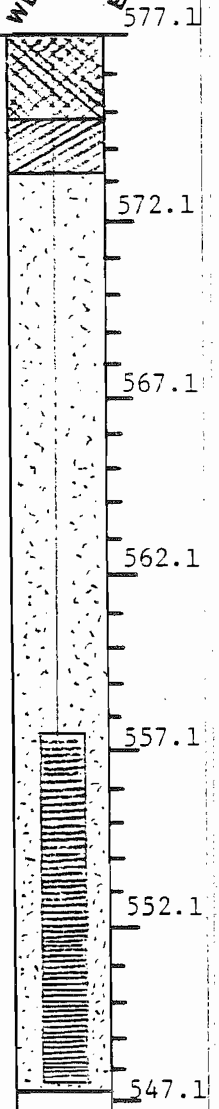
LOGGED BY H.P. Krahn

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) |
|---|---|---|---|---|---|---|
| 0–1.4 | | | | | | |
| 2–4 | 0.0 | S-1 | Y | N | 1.6<br>1.6 | 0.1 |
| 4–8 | 0.0 | S-2 | Y | Y | 5.0<br>5.0 | 0.6 |
| 8–13 | 0.0 | S-3 | N | N | 5.0<br>5.0 | 500 |
| 13–19 | 0.0 | S-4 | N | N | 5.0<br>5.0 | 4.5 |
| 19–23 | 0.0 | S-5 | N | N | 5.0<br>4.6 | 0.3 |
| 23–28 | 0.0 | S-6 | N | N | 5.0<br>2.7 | 0.1 |
| 28–29.8 | 0.0 | S-7 | N | Y | 1.8<br>1.0 | 0.1 |

| SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN |
|---|---|---|
| BOOT: AIR 1.4 | | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. |
| BROWN SILTY SAND, UNIFORMLY GRADED, MEDIUM DENSE, DRY (FILL) 4.2 | SP | |
| CLAY, SILT AND SANDS WITH GRAVEL MOIST, NON-PLASTIC TO PLASTIC, LOOSE (FILL) 8.0 | CL<br>SM | |
| REDDISH-BROWN SILTY CLAY, MOIST, STIFF, SLIGHTLY PLASTIC, FRACTURES (LACUSTRINE CLAY) 13.0 | CL | |
| REDDISH-GRAY SILTY CLAY, WET, PLASTIC, SOFT (LACUSTRINE CLAY) 19.0 | | |
| SILTY CLAY WITH SAND AND TRACE GRAVEL, WET, PLASTIC, SOFT 23.0 | CL | |
| SILTY SAND WITH TRACES OF GRAVEL AND CLAY, ABOUT 20% GRAVEL, MOIST, SLIGHTLY PLASTIC, DENSE, WIDELY GRADED (GLACIAL TILL) | SM<br>ML | |
| BOTTOM OF BORING AT 29.8 FT | | |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1151A

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 12/8/85

**COMPLETED** 12/8/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7/10.2

**PROTECTION LEVEL** B/C

**GROUND EL.** 575.2'

**SOIL DRILLED** 27.7'

**TOTAL DEPTH** 27.7'

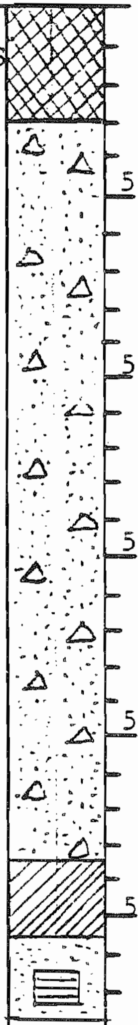
**▽ BELOW GROUND** NA

**LOGGED BY** M. Guay

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | TOPSOIL | | | | 575.2 |
| | 0.0 | S-1 | | N | N | 3.2<br>2.7 | 0.0 | BROWN TO BLACK SANDY SILT WITH CLAY, GRAVEL AND ASH, MOIST, NON PLASTIC, WIDELY GRADED (FILL) 5.5' | SM | NO BLOW COUNTS TAKEN.<br>USED CONTINUOUS SPLIT SPOON SAMPLER | | |
| 5 | | | | | | | | | | | | 570.2 |
| | 0.0 | S-2 | | N | N | 5.0<br>5.0 | 7.0 | BROWN MOTTLED SILTY SAND, LOOSE UNIFORMLY GRADED, WET (ALLUVIAL) 7.1' | SP | | | |
| | | | | | | | | BROWN MOTTLED SILTY CLAY, SLIGHTLY PLASTIC, STIFF, MOIST, FRACTURES. | CL | | | |
| 10 | | | | | | | | | | | | 565.2 |
| | 0.0 | S-3 | | N | N | 5.0<br>5.0 | 50 | 13.0' | | | | |
| | | | | | | | | REDDISH-GRAY SILTY CLAY, PLASTIC SOFT, WET. TRACE SANDY SILT LAYERS. (LACUSTRINE CLAY) | CL | | | |
| 15 | | | | | | | | | | | | 560.2 |
| | 0.0 | S-4 | | N | N | 5.0<br>5.0 | 35 | | | | | |
| 20 | | | | | | | | | | | | 555.2 |
| | 0.0 | S-5 | | N | N | 5.0<br>5.0 | 7.2 | 21.9' | | | | |
| | | | | | | | | TRACES OF GRAVEL 23.5' | | | | |
| | | | | | | | | BROWN SILTY SAND WITH GRAVEL, MOIST, SLIGHTLY PLASTIC, DENSE, WIDELY GRADED. (GLACIAL TILL) | SM | | | |
| 25 | | | | | | | | | | | | 550.2 |
| | 0.0 | S-6 | | N | N | 4.5<br>2.7 | 2.3 | | | | | |
| | | | | | | | | BOTTOM OF BORING AT 27.7' | | | | |
| 30 | | | | | | | | | | | | 545.2 |
| 35 | | | | | | | | | | | | 540.2 |
| 40 | | | | | | | | | | | | 535.2 |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1151B

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 11/24/85

**COMPLETED** 11/24/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7/10.2

**PROTECTION LEVEL** B

**GROUND EL.** 575.2'

**SOIL DRILLED** 18.7'

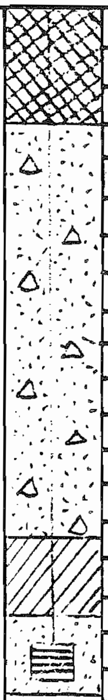
**TOTAL DEPTH** 18.7'

▽ **BELOW GROUND** NA

**LOGGED BY** M. Guay

**CHECKED BY** L. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE # | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | TOPSOIL 0.5 | | |  | 575.2 |
| | | | | | | | SANDY SILT WITH CLAY, GRAVEL AND ASH (FILL) | SM | | | |
| 5 | | | | | | | 5.5 | | | | 570.2 |
| | | | | | | 15* | BROWN FINE SILTY SAND. (ALLUVIAL SAND) 7.1 | SP | | | |
| 10 | | | | | | | BROWN MOTTLED SILTY CLAY, STIFF, MOIST, FRACTURED | CL | | | 565.2 |
| | | | | | | 50* | 13.0 | | | | |
| | | | | | | | REDDISH-GRAY SILTY CLAY, PLASTIC, SOFT | | | | |
| 15 | | | | | | | | | | | 560.2 |
| | | | | | | 1* | (LACUSTRINE CLAY) 18.7 | CL | | | |
| 20 | | | | | | | BOTTOM OF BORING AT 18.5' | | | | 555.2 |
| 25 | | | | | | | RAN AUGERS TO 18.7'. NO SOIL SAMPLES TAKEN. FOR DETAILED SOIL DESCRIPTIONS, SEE LOG OF BORING 1151A. | | | | 550.2 |
| 30 | | | | | | | * HNU READINGS TAKEN ON AUGER CUTTINGS | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

#U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1151C

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 11/25/85

**COMPLETED** 11/25/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7 / [✓ 10.2]

**PROTECTION LEVEL** C

**GROUND EL.** 575.1'

**SOIL DRILLED** 14.5'

**TOTAL DEPTH** 14.5'

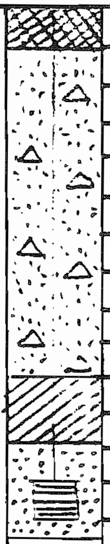
**▽ BELOW GROUND** NA

**LOGGED BY** J. Snowden

**CHECKED BY** L. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | TOPSOIL | | | | 575.1 |
| | | | | | | 0* | SANDY SILT WITH CLAY, GRAVEL, AND ASH (FILL) | SM | | | |
| 5 | | | | | | | 5.5 | | | | 570.1 |
| | | | | | | 0* | BROWN SILTY FINE SAND (ALLUVIAL SAND) 7.1 | SP | | | |
| | | | | | | 50* | BROWN MOTTLED SILTY CLAY, STIFF MOIST, FRACTURED | CL | | | |
| 10 | | | | | | | (LACUSTRINE CLAY) | | | | 565.1 |
| | | | | | | 20* | | | | | |
| 15 | | | | | | | BOTTOM OF BORING AT 14.5' | | | | 560.1 |
| 20 | | | | | | | RAN AUGERS TO 14.5'. NO SOIL SAMPLES TAKEN. FOR DETAILED SOIL DESCRIPTIONS, SEE LOG OF BORING 1151A | | | | 555.1 |
| 25 | | | | | | | * HNU READINGS TAKEN ON AUGER CUTTINGS | | | | 550.1 |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

LOVE CANAL TASK VC

**BORING NO.** 1151D

**CLIENT:** New York State Department of Environmental Conservation

**PROJECT NO.** 4844-24

**CONTRACTOR:** J. Mathes & Assoc.

**DATE STARTED** 11/18/86

**COMPLETED** 11/18/86

**METHOD** HSA

**CASING SIZE** 4.25" I.D.

**HNU** 11.7/10.2 10.2

**PROTECTION LEVEL** D

**GROUND EL.** 575.2

**SOIL DRILLED** 7.1'

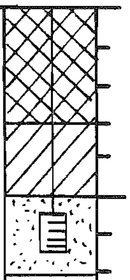
**TOTAL DEPTH** 7.1'

▽ **BELOW GROUND**

**LOGGED BY** C. White

**CHECKED BY** R. Lewis

**DATE** 6/10/87

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | For Detailed Soil Descriptions, see Log of Boring 1151A | | |  | |
| 5 | | | | | | | | | | | |
| | | | | | | | Bottom of Boring at 7.1' | | | | |
| 10 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1153A

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/25/85

**COMPLETED** 10/25/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7 / 10.2

**PROTECTION LEVEL** D

**GROUND EL.** 577.7'

**SOIL DRILLED** 32.0'

**TOTAL DEPTH** 32.0'

▽ **BELOW GROUND** NA

**LOGGED BY** M. Guay

**CHECKED BY** L. Lewis

**DATE** 3/24/86

| HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | BLOWS/6-IN RQD % |
|---|---|---|---|---|---|---|---|
| 0.0 | S-1 | ☒ | N | N | 2.0<br>1.6 | 0.0 | 6-6-17-20 |
| 0.0 | S-2 | ☒ | N | N | 2.5<br>1.8 | 0.0 | 5-12-17-9-10 |
| 0.0 | S-3 | ☒ | N | N | 2.5<br>1.8 | 0.0 | 3-7-8-8-10 |
| 0.0 | S-4 | ☒ | N | N | 2.5<br>2.0 | 0.0 | 3-6-7-7-15 |
| 0.0 | S-5 | ☒ | N | N | 2.5<br>2.5 | 0.0 | 3-10-10-10-20 |
| 0.0 | S-6 | ☒ | N | N | 2.5<br>2.5 | 0.0 | 4-9-12-20-21 |
| 0.0 | S-7 | ☒ | N | N | 2.5<br>2.5 | 0.0 | 1-2-3-4-3 |
| 0.0 | S-8 | ☒ | N | N | 2.5<br>2.5 | 0.0 | 1-1-1-2-1 |
| 0.0 | S-9 | ☒ | N | N | 2.5<br>2.5 | 0.0 | WOH-1-2-3 |
| 0.0 | S-10 | ☒ | N | N | 2.5<br>2.5 | 0.0 | WOH-1-2 |
| 0.0 | S-11 | ☒ | N | N | 2.5<br>2.5 | 0.0 | WOH-6-4 |
| 0.0 | S-12 | ☒ | N | N | 2.5<br>1.3 | 0.0 | 6-54-21-19-25 |
| 0.0 | S-13 | ☒ | N | N | 2.5<br>2.3 | 0.0 | 15-34-45-60-60 |

| SOIL/ROCK DESCRIPTION | DEPTH | SOIL CLASS |
|---|---|---|
| TOPSOIL | 1.3 | |
| BROWN TO BLACK SAND WITH SOME SILT, CLAY, AND GRAVEL, ASH. (FILL) | 4.5 | SM<br>SC |
| BROWN TO BLACK SILTY FINE SAND, LOOSE, MOIST (ALLUVIAL SAND) | 8.1 | SP |
| REDDISH-BROWN SILTY CLAY, STIFF, MOIST, SLIGHTLY PLASTIC FRACTURES PRESENT (LACUSTRINE CLAY) | 14.5 | CL |
| REDDISH-GRAY SILTY CLAY SOFT, WET, PLASTIC | 26.0 | CL |
| TRACES OF GRAVEL | 27.5 | |
| SILTY FINE SAND WITH GRAVEL ABOUT 30% GRAVEL, DENSE, MOIST, NON-PLASTIC WIDELY GRADED (GLACIAL TILL) | | SM |
| BOTTOM OF BORING AT 32.0' | | |

| DEPTH (FT) | ELEV (FT) |
|---|---|
| | 577.7 |
| 5 | 572.7 |
| 10 | 567.7 |
| 15 | 562.7 |
| 20 | 557.7 |
| 25 | 552.7 |
| 30 | 547.7 |
| 35 | 542.7 |
| 40 | |

**WELL DATA**

WOH = WEIGHT OF HAMMER

*U: THIN WALL TUBE   S: SPLIT SPOON   R: ROCK

E.C. JORDAN CO.

**LOVE CANAL REMEDIAL PROJECT**
**LONG TERM MONITORING**

**TASK VC**

**BORING NO.** 1153B

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/26/85

**COMPLETED** 10/26/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7 10.2

**PROTECTION LEVEL** D

**GROUND EL.** 577.5'

**SOIL DRILLED** 21.2'

**TOTAL DEPTH** 21.2'

**∇ BELOW GROUND** NA

**LOGGED BY** M. Guay

**CHECKED BY** L. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | | | | | | TOPSOIL 1.3 | | | | 577.5 |
| | | | | | | | BROWN TO BLACK SAND WITH SOME SILT, CLAY, GRAVEL AND ASH (FILL) 4.5 | SM<br>SC | | | |
| 5 | 0.1 | | | | | | BROWN TO BLACK SILTY FINE SAND (ALLUVIAL SAND) 8.1 | SP | | | 572.5 |
| 10 | 0.1 | | | | | | REDDISH-BROWN, SILTY CLAY MOIST, STIFF, SLIGHTLY PLASTIC, FRACTURES (LACUSTRINE CLAY) 14.5 | CL | | | 567.5 |
| 15 | 0.1 | | | | | | REDDISH-GRAY SILTY CLAY SOFT, WET, PLASTIC | CL | | | 562.5 |
| 20 | 0.1 | | | | | | 21.2 | | | | 557.5 |
| | | | | | | | BOTTOM OF BORING AT 21.2' | | | | |
| 25 | | | | | | | | | | | 552.5 |
| | | | | | | | RAN AUGERS TO 21.2'. NO SOIL SAMPLES TAKEN. FOR DETAILED SOIL DESCRIPTIONS, SEE LOG OF BORING 1153A | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE   S: SPLIT SPOON   R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1153C

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

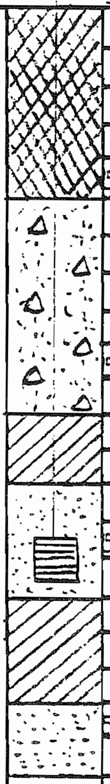
**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.
**DATE STARTED** 10/25/85
**COMPLETED** 10/25/85

**METHOD** HSA
**CASING SIZE** 4.25"
**HNU** 11.7/10.2
**PROTECTION LEVEL** D

**GROUND EL.** 577.6'
**SOIL DRILLED** 21.0'
**TOTAL DEPTH** 21.0'
**▽ BELOW GROUND** NA

**LOGGED BY** M. Guay
**CHECKED BY** K. Lewis
**DATE** 3/24/86



| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.0 | | | | | | TOPSOIL 1.3' | | | | 577.6 |
| | | | | | | | BROWN TO BLACK SAND WITH SOME SILT, CLAY AND GRAVEL, ASH. 4.5' | SM<br>SC | | | |
| 5 | 0.0 | | | | | | BROWN TO BLACK SILTY FINE SAND LOOSE, MOIST<br>(ALLUVIAL SAND) 8.1' | SP | | | 572.6 |
| 10 | 0.0 | | | | | | REDDISH-BROWN SILTY CLAY, STIFF, MOIST, SLIGHTLY PLASTIC FRACTURES<br>(LACUSTRINE CLAY) 14.5' | CL | | | 567.6 |
| 15 | 0.0 | | | | | | REDDISH-GRAY SILTY CLAY WET, SOFT, PLASTIC | | | | 562.6 |
| 20 | 0.0 | | | | | | | CL | | | 557.6 |
| | | | | | | | BOTTOM OF BORING AT 21.0' | | | | |
| 25 | | | | | | | | | | | 552.6 |
| | | | | | | | RAN AUGERS TO 21.0'. NO SOIL SAMPLES TAKEN. FOR DETAILED SOIL DESCRIPTIONS, SEE LOG OF BORING 1153A | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

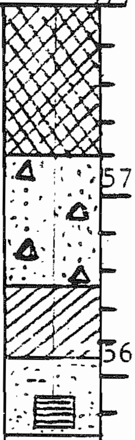
E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1153D

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
**PROJECT NO.** 4844-08
**CONTRACTOR:** J. MATHES ASSOC.
**DATE STARTED** 10/26/85
**COMPLETED** 10/26/85
**METHOD** HSA
**CASING SIZE** 4.25"
**HNU** 11.7/10.2
**PROTECTION LEVEL** D
**GROUND EL.** 577.7'
**SOIL DRILLED** 11.0'
**TOTAL DEPTH** 11.0'
**∇ BELOW GROUND** NA
**LOGGED BY** M. Guay
**CHECKED BY** L. Lewis
**DATE** 3/24/86



| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV (FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 577.7 |
| | 0.1 | | | | | | TOPSOIL 1.3' | | | | |
| | | | | | | | BROWN TO BLACK SAND WITH SOME SILT, CLAY, GRAVEL AND ASH. (FILL) 4.5' | SM<br>SC | | | |
| 5 | 0.1 | | | | | | BROWN TO BLACK SILTY FINE SAND, LOOSE, MOIST (ALLUVIAL SAND) 8.1 | SP | | | 572.2 |
| 10 | 0.1 | | | | | | REDDISH-BROWN SILTY CLAY, STIFF, FRACTURED (LACUSTRINE CLAY) 11.0' | CL | | | 567.7 |
| | | | | | | | BOTTOM OF BORING AT 11.0' | | | | |
| 15 | | | | | | | | | | | 562.7 |
| | | | | | | | RAN AUGERS TO 11.0'. NO SAMPLES TAKEN. FOR DETAILED SOIL DESCRIPTIONS, SEE LOG OF BORING 1153A | | | | |
| 20 | | | | | | | | | | | 557.7 |
| 25 | | | | | | | | | | | 552.7 |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1153E

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-24

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 5/7/86

**COMPLETED** 5/7/86

**METHOD** H.S.A.

**CASING SIZE** 4.25" I.D.

**HNU** 11.7/10.2

**PROTECTION LEVEL** D

**GROUND EL.** 577.4

**SOIL DRILLED** 9.0'

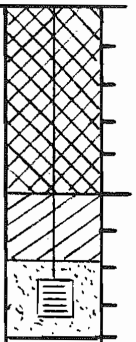
**TOTAL DEPTH** 9.0'

**▽ BELOW GROUND**

**LOGGED BY** C. White

**CHECKED BY** R. Lewis

**DATE** 6/10/87

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Topsoil 1.3 | | |  | |
| | | | | | | | Brown to Black Sand with Some Silt Clay, Gravel, and Ash (FILL) 4.5 | SM<br>SC | | | |
| 5 | | | | | | | Brown to Black Silty Fine Sand (Alluvial Sand) 8.1 | SP | | | |
| | | | | | | | Silty Clay 9.0 | CL | | | |
| 10 | | | | | | | Bottom of Boring at 9.0' | | | | |
| 15 | | | | | | | Ran Augers to 9.0'. No Samples Taken. For Detailed Soil Descriptions, See Log of Boring 1153A. | | | | |
| 20 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1154A

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/27/85

**COMPLETED** 10/28/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7 / 10.2

**PROTECTION LEVEL** D

**GROUND EL.** 574.6'

**SOIL DRILLED** 29.0'

**TOTAL DEPTH** 29.0'

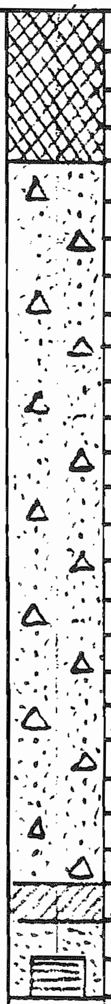
**▽ BELOW GROUND** NA

**LOGGED BY** J. Peterson

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | TOPSOIL 0.7' | | | | 574.6 |
| | | S-1 | ☒ | N | N | 2.5<br>1.6 | 1.0 | BROWN TO BLACK SILT, SAND, AND GRAVEL, MOIST, WIDELY GRADED (FILL) 2.9' | SM | 1-4-9-11-12 | | |
| | | S-2 | ☒ | N | N | 2.5<br>1.8 | 0.8 | BROWN, SILTY FINE SAND, MOIST, LOOSE, UNIFORMLY GRADED (ALLUVIAL SAND) 5.0' | SP | 3-4-11-9-9 | | |
| 5 | | S-3 | ☒ | N | N | 2.5<br>2.0 | 0.6 | REDDISH-BROWN MOTTLED SILTY CLAY STIFF, MOIST, SLIGHTLY PLASTIC, FRACTURED | | 4-6-6-9-12 | | 569.6 |
| | | S-4 | ☒ | N | N | 2.5<br>2.5 | 0.6 | | CL | 4-7-10-13-16 | | |
| 10 | | S-5 | ☒ | N | N | 2.5<br>2.0 | 0.6 | (LACUSTRINE CLAY) 11.5' | | 3-4-6-3-4 | | 564.6 |
| | | S-6 | ☒ | N | N | 2.5<br>2.8 | 0.6 | REDDISH-GRAY SILTY CLAY, SOFT, WET, PLASTIC | | N.A. | | |
| 15 | | S-7 | ☒ | N | N | 2.5<br>2.8 | 0.7 | | CL | 1-1-1-2-2 | | 559.6 |
| | | S-8 | ☒ | N | N | 2.5<br>2.8 | 0.6 | | | WOH-2-2 | | |
| 20 | | S-9 | ☒ | N | N | 2.5<br>2.8 | 0.7 | 21.5' | | WOH-1 | | 554.6 |
| | 0.4 | S-10 | ☒ | N | N | 2.5<br>2.2 | 0.2 | TRACES OF GRAVEL | | WOH-1-5 | | |
| 25 | 0.4 | S-11 | ☒ | N | N | 2.5<br>1.4 | 0.4 | REDDISH-BROWN SILTY SAND WITH GRAVEL. About 20% GRAVEL. MOIST, SLIGHTLY PLASTIC, DENSE, WIDELY GRADED. | | 4-10-20-27-102 | | 549.6 |
| | 0.4 | S-12 | ☒ | N | N | 2.5<br>1.5 | 0.4 | (GLACIAL TILL) 29.0' | SM | 38-64-65-65-84 | | |
| 30 | | | | | | | | BOTTOM OF BORING AT 29.0' | | | | 544.6 |
| | | | | | | | | WELL INSTALLED IN A NEW BORING 4.0' FROM ORIGINAL BORING. ORIGINAL BORING WAS ABANDONED AND GROUTED TO SURFACE DUE TO WELL INSTALLATION PROBLEMS. | | | | |
| 35 | | | | | | | | | | | | |
| 40 | | | | | | | | WOH = WEIGHT OF HAMMER | | | | |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C. JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1154B

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/27/85

**COMPLETED** 10/27/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7/10.2

**PROTECTION LEVEL** D

**GROUND EL.** 574.5'

**SOIL DRILLED** 17.6'

**TOTAL DEPTH** 17.6'

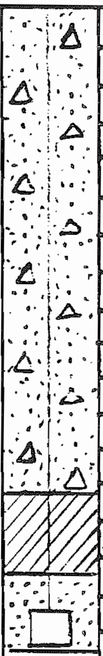
**▽ BELOW GROUND** NA

**LOGGED BY** M. Guay

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE* | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | TOPSOIL 0.7 | | | | 574.5 |
| | 0.2 | | | | | | BROWN TO BLACK SILT, SAND & GRAVEL (FILL) 2.9 | SM | | | |
| 5 | | | | | | | BROWN SILTY FINE SAND (ALLUVIAL SAND 5.0 | SP | | | 569.5 |
| 10 | 0.2 | | | | | | REDDISH-BROWN SILTY CLAY STIFF (LACUSTRINE CLAY) 11.5' | CL | | | 564.5 |
| 15 | 0.2 | | | | | | REDDISH-GRAY SILTY CLAY SOFT 17.6' | CL | | | 559.5 |
| 20<br>25<br>30<br>35<br>40 | | | | | | | BOTTOM OF BORING AT 17.6'<br>RAN AUGERS TO 17.6'. NO SOIL SAMPLES TAKEN. FOR DETAILED SOIL DESCRIPTIONS, SEE LOG OF BORING 1154A. | | | | 554.5<br>549.5 |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1154C

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/27/85

**COMPLETED** 10/27/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7/[✓ 10.2]

**PROTECTION LEVEL** D

**GROUND EL.** 574.4'

**SOIL DRILLED** 13.5'

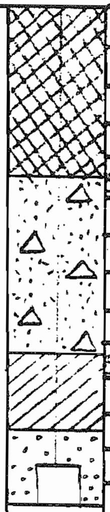
**TOTAL DEPTH** 13.5'

▽ **BELOW GROUND** NA

**LOGGED BY** M. Guay

**CHECKED BY** R. Lewis

**DATE** 3/24/86



| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | TOPSOIL 0.7 | | | 574.4 |
| | 0.2 | | | | | | BROWN TO BLACK SILT, SAND AND GRAVEL (FILL) 2.9 | SM | | |
| | | | | | | | BROWN SILTY FINE SAND (ALLUVIAL SAND) 5.0 | SP | | |
| 5 | 0.2 | | | | | | REDDISH-BROWN SILTY CLAY STIFF<br>(LACUSTRINE CLAY)<br>11.5' | CL | | 569.4 |
| 10 | 0.2 | | | | | | REDDISH-GRAY SILTY CLAY SOFT 13.5' | CL | | 564.4 |
| 15 | | | | | | | BOTTOM OF BORING AT 13.5' | | | 559.4 |
| 20 | | | | | | | RAN AUGERS TO 13.5'. NO SOIL SAMPLES TAKEN. FOR DETAILED SOIL DESCRIPTIONS, SEE LOG OF BORING 1154A. | | | 554.4 |
| 25 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 1154D

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 10/28/85

COMPLETED 10/28/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7/10.2

PROTECTION LEVEL D

GROUND EL. 574.3'

SOIL DRILLED 7.0'

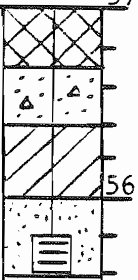
TOTAL DEPTH 7.0'

▽ BELOW GROUND NA

LOGGED BY M. Guay

CHECKED BY L. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | TOPSOIL 0.7 | | |  | 574.3 |
| | 0.2 | | | | | | BROWN TO BLACK SILT, SAND AND GRAVEL (FILL) 2.9 | SM | | | |
| 5 | | | | | | | BROWN SILTY FINE SAND (ALLUVIAL SAND) 5.0 | SP | | | 569.3 |
| | 0.2 | | | | | | REDDISH-BROWN SILTY CLAY STIFF (LACUSTRINE CLAY) 7.0 | CL | | | |
| | | | | | | | BOTTOM OF BORING AT 7.0' | | | | |
| 10 | | | | | | | | | | | 564.3 |
| | | | | | | | RAN AUGERS TO 7.0'. NO SAMPLES TAKEN. SEE BORING LOG 1154A FOR DETAILED SOIL DESCRIPTIONS. | | | | |
| 15 | | | | | | | | | | | 559.3 |
| 20 | | | | | | | | | | | 554.3 |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 1161E

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-24

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 5/2/86

COMPLETED 5/2/86

METHOD H.S.A.

CASING SIZE 4.25" I.D.

HNU 11.7/10.2 10.2

PROTECTION LEVEL B/C

GROUND EL. 580.7

SOIL DRILLED 27.9'

TOTAL DEPTH 27.9'

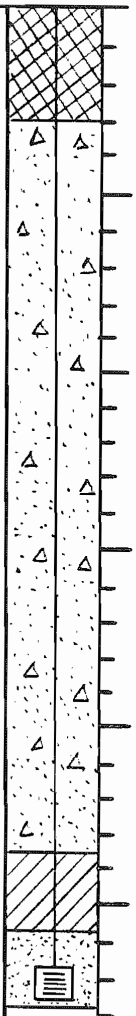
▽ BELOW GROUND

LOGGED BY S. Wibby

CHECKED BY R. Lewis

DATE 6/10/87

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | | | | | | | Soil Descriptions Not Available; See Log of EPA Boring 1161A | | | | |
| 10 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |
| 25 | | | | | | | 27.9 | | | | |
| 30 | | | | | | | Bottom of Boring at 27.9' | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

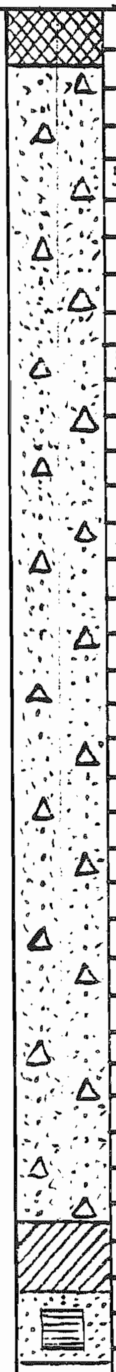


*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C. JORDAN CO.

| | | |
|---|---|---|
| LOVE CANAL REMEDIAL PROJECT<br>LONG TERM MONITORING | TASK VC | BORING NO. 1170A |
| CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION | | PROJECT NO. 4844-08 |
| CONTRACTOR: J. MATHES ASSOC. | DATE STARTED 12/4/85 | COMPLETED 12/4/85 |
| METHOD HSA | CASING SIZE 4.25" | HNU 11.7/10.2 | PROTECTION LEVEL B/C |
| GROUND EL. 581.2' | SOIL DRILLED 37.4' | TOTAL DEPTH 37.4' | ▽ BELOW GROUND NA |
| LOGGED BY M. Guay | CHECKED BY R. Lewis | DATE 3/24/86 | |

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.0 | S-1 | N | N | 2.9<br>1.5 | 0.0 | BROWN SILTY FINE SAND, LOOSE, DRY UNIFORMLY GRADED (FILL) 2.9 | SP | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. | 581.2 |
| 5 | 0.0 | S-2 | N | N | 5.0<br>3.9 | 0.0 | SILTY SANDY CLAY WITH ORGANICS AND GRAVEL, ABOUT 15% GRAVEL, WOOD AND DEBRIS (FILL) 8.7 | SM | | 576.2 |
| 10 | 0.0 | S-3 | N | N | 5.0<br>1.7 | 0.0 | BROWN SILTY FINE SAND WITH GRAY STAINS, LOOSE, MOIST, NON-PLASTIC, UNIFORMLY GRADED (ALLUVIAL SAND) 13.1 | SP | | 571.2 |
| 15 | 0.0 | S-4 | N | N | 5.0<br>5.0 | 0.0 | REDDISH-BROWN SILTY CLAY, DRY TO MOIST, STIFF, SLIGHTLY PLASTIC, FRACTURED (LACUSTRINE CLAY) 20.0 | CL | | 566.2 |
| 20 | 0.0 | S-5 | N | N | 5.0<br>5.0 | 0.0 | REDDISH-GRAY SILTY CLAY, WET, SOFT, PLASTIC | CL | | 561.2 |
| 25 | 0.0 | S-6 | N | N | 5.0<br>5.0 | 0.0 | | | | 556.2 |
| 30 | 0.0 | S-7 | N | N | 5.0<br>5.0 | 0.0 | 35.1 | | | |
| 35 | 0.0 | S-8 | N | N | 4.5<br>3.1 | 0.0 | BROWN SILTY SAND WITH GRAVEL, ABOUT 15% GRAVEL, DENSE, WET SLIGHTLY PLASTIC (GLACIAL TILL) | SM | | |
| | | | | | | | BOTTOM OF EXPLORATION AT 37.4' | | | |
| 40 | | | | | | | | | | |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

**LOVE CANAL REMEDIAL PROJECT**
**LONG TERM MONITORING**

**TASK VC**

**BORING NO.** 1170B

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 12/4/85

**COMPLETED** 12/4/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7/ [✓ 10.2]

**PROTECTION LEVEL** B

**GROUND EL.** 581.3 '

**SOIL DRILLED** 25.6 '

**TOTAL DEPTH** 25.6 '

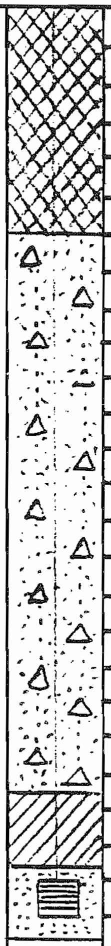
▽ **BELOW GROUND** NA

**LOGGED BY** M. Guay

**CHECKED BY** A. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | BROWN SILTY FINE SAND<br>(FILL)<br>2.9 | SP | | | 581.3 |
| 5 | 0.1<br>0.1 | | | | | | BROWN TO BLACK SILTY SAND CLAY WITH ORGANICS, GRAVEL, WOOD, DEBRIS<br>(FILL)<br>8.7 | SM<br>ML | | | 576.3 |
| 10 | 0.1 | | | | | | BROWN SILTY FINE SAND<br>(ALLUVIAL SAND)<br>13.1 | SP | | | 571.3 |
| 15 | 0.1 | | | | | | REDDISH BROWN SILTY CLAY, STIFF, FRACTURED<br>(LACUSTRINE CLAY)<br>20.0 | CL | | | 566.3 |
| 20 | 0.1 | | | | | | REDDISH GRAY SILTY CLAY, SOFT<br>25.6 | CL | | | 561.3 |
| 25<br>30<br>35<br>40 | | | | | | | BOTTOM OF EXPLORATION AT 25.6<br>RAN AUGERS TO 25.6', NO SOIL SAMPLES TAKEN. FOR DETAILED SOIL DESCRIPTIONS, SEE LOG OF BORING 1170A | | | | 556.3<br>551.3 |



*U: THIN WALL TUBE    S: SPLIT SPOON    R: ROCK

E.C.JORDAN CO.

## LOVE CANAL REMEDIAL PROJECT
## LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1171A

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 11/22/85

**COMPLETED** 11/22/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.~~7~~ 10.2

**PROTECTION LEVEL** B

**GROUND EL.** 580.2'

**SOIL DRILLED** 37.3'

**TOTAL DEPTH** 37.3'

**▽ BELOW GROUND** NA

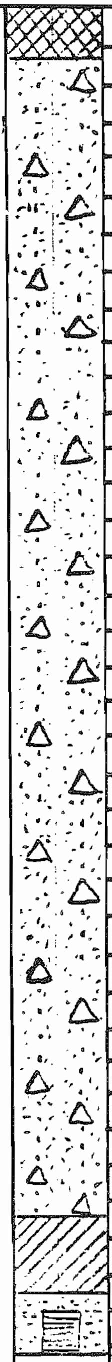
**LOGGED BY** J. Snowden

**CHECKED BY** A. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | AIR: BOOT 1.5 | | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. | 580.2 |
| | 0.0 | S-1 | | N | N | 1.1<br>1.1 | 0.0 | BROWN SILTY FINE SAND WITH SOME GRAVEL, DRY TO MOIST, NON-PLASTIC UNIFORMLY TO WIDELY GRADED (FILL) 8.1 | SP<br>SM | | |
| 5 | 0.0 | S-2 | | N | N | 5.0<br>2.3 | 0.0 | | | | 575.2 |
| 10 | 0.0 | S-3 | | N | N | 5.0<br>5.0 | 0.0 | BROWN SILTY FINE SAND, MOIST, LOOSE, NON-PLASTIC, UNIFORMLY GRADED (ALLUVIAL SAND) 12.1 | SP | | 570.2 |
| 15 | 0.0 | S-4 | | N | N | 4.8<br>4.8 | 0.0 | REDDISH-BROWN SILTY CLAY, MOIST, STIFF, SLIGHTLY PLASTIC, FRACTURED 18.0 | CL | | 565.2 |
| 20 | 0.0 | S-5 | | N | N | 5.0<br>4.6 | 0.0 | REDDISH-GRAY SILTY CLAY, WET, SOFT, PLASTIC (LACUSTRINE CLAY) | CL | | 560.2 |
| 25 | 0.0 | S-6 | | N | N | 5.0<br>5.0 | 0.0 | | | | 555.2 |
| 30 | 0.0 | S-7 | | N | N | 5.0<br>5.0 | 0.0 | 32.1<br>TRACES OF GRAVEL 34.6 | | | 550.2 |
| 35 | 0.0 | S-8 | | N | N | 4.0<br>3.0 | 0.0 | BROWN SILTY SAND, SOME GRAVEL, ABOUT 20% GRAVEL, WIDELY GRADED, DENSE, MOIST (GLACIAL TILL) | SM | | 545.2 |
| | | | | | | | | BOTTOM OF BORING AT 37.3 FT | | | |
| 40 | | | | | | | | | | | 540.2 |

**WELL DATA**



*U: THIN WALL TUBE    S: SPLIT SPOON    R: ROCK

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

TASK VC

**BORING NO.** 1171B

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 11/23/85

COMPLETED 11/23/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7/10.2

PROTECTION LEVEL B

GROUND EL. 580.4'

SOIL DRILLED 25.0'

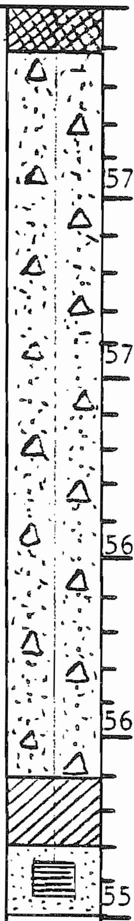
TOTAL DEPTH 25.0'

▽ BELOW GROUND NA

LOGGED BY J. Snowden

CHECKED BY R. Lewis

DATE 3/24/86



| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | AIR: BOOT 1.5 | | | | 580.4 |
| | 0.0 | | | | | | SILTY FINE SAND WITH SOME GRAVEL (FILL) | | | | |
| 5 | | | | | | | | SM | | | 575.4 |
| | 0.0 | | | | | | 8.1 | | | | |
| 10 | | | | | | | BROWN SILTY FINE SAND<br>(ALLUVIAL SAND) 12.1 | SP | | | 570.4 |
| | 0.0 | | | | | | REDDISH-BROWN SILTY CLAY, STIFF, FRACTURED | | | | |
| 15 | | | | | | | | CL | | | 565.4 |
| | 0.0 | | | | | | 18.0 | | | | |
| 20 | | | | | | | REDDISH-GRAY SILTY CLAY, SOFT | CL | | | 560.4 |
| | 0.0 | | | | | | (LACUSTRINE CLAY) 25.0 | | | | |
| 25 | | | | | | | BOTTOM OF BORING AT 25.0 FT | | | | 555.4 |
| | | | | | | | NO SOIL SAMPLES TAKEN.<br>FOR DETAILED SOIL DESCRIPTIONS<br>SEE LOG OF BORING 1171A | | | | |
| 30 | | | | | | | | | | | 550.4 |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1171C

| | |
|---|---|
| **CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION | **PROJECT NO.** 4844-24 |

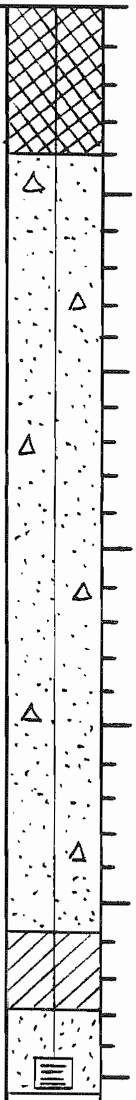
**CONTRACTOR:** J. MATHES ASSOC. **DATE STARTED** 5/2/86 **COMPLETED** 5/2/86

**METHOD** H.S.A. **CASING SIZE** 4.25" I.D. **HNU** 11.7/10.2 10.2 TIP **PROTECTION LEVEL** B/C

**GROUND EL.** 580.2 **SOIL DRILLED** 30.6' **TOTAL DEPTH** 30.6' ▽ **BELOW GROUND**

**LOGGED BY** L. Hoyt **CHECKED BY** R. Lewis **DATE** 6/10/87

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Air: Boot | 1.5 | | | | |
| 5 | | | | | | | Silty Fine Sand with Some Gravel (FILL) | 8.1 | SM | | | |
| 10 | | | | | | | Brown Silty Fine Sand<br>(Alluvial Sand) | 12.1 | SP | | | |
| 15 | | | | | | | Reddish-Brown Silty Clay, Stiff, Fractured | 18.0 | CL | | | |
| 20<br>25<br>30 | | | | | | | Reddish-Gray Silty Clay, Soft<br>(Lacustrine Clay) | 30.6 | CL | | | |
| 35<br>40 | | | | | | | Bottom of Boring at 30.6'<br>No Soil Samples Taken. For Detailed Soil Descriptions, See Log of Boring 1171A. | | | | | |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1172A

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

CONTRACTOR: J. MATHES ASSOC.
DATE STARTED 11/20/85
COMPLETED 11/21/85

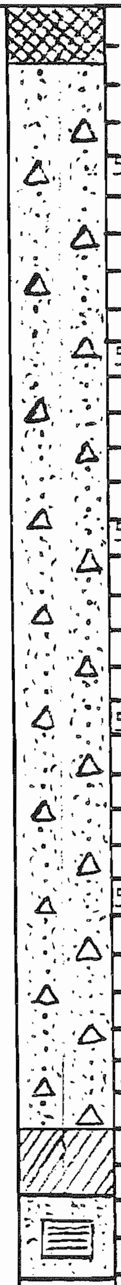
METHOD HSA
CASING SIZE 4.25"
HNU 11.7/(10.2)
PROTECTION LEVEL C

GROUND EL. 578.5'
SOIL DRILLED 35.1'
TOTAL DEPTH 35.1'
▽ BELOW GROUND NA

LOGGED BY H. Krahn
CHECKED BY L. Lewis
DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE* | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | AIR: BOOT 1.4 | | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. | 578.5 |
| | 0.0 | S-1 | N | N | 1.5<br>1.6 | 0.0 | BROWN SILTY FINE SAND, LOOSE, DRY, UNIFORMLY GRADED (FILL) 3.9 | SP | | |
| 5 | 0.0 | S-2 | N | N | 5.0<br>4.3 | 0.0 | GRAY TO BLACK CLAY WITH SAND AND ROOTS (FILL) 6.6 | CL | | 573.5 |
| | | | | | | | REDDISH-BROWN SILTY FINE SAND, LOOSE, NON-PLASTIC, UNIFORMLY GRADED (ALLUVIAL SAND) 8.3 | SP | | |
| 10 | 0.0 | S-3 | N | N | 5.0<br>4.9 | 0.0 | REDDISH-BROWN SILTY CLAY, STIFF, MOIST, SLIGHTLY PLASTIC, FRACTURED | CL | | 568.5 |
| 15 | 0.0 | S-4 | N | N | 5.0<br>4.9 | 0.3 | 17.0 | | | 563.5 |
| 20 | 0.0 | S-5 | N | N | 5.0<br>4.8 | 2.0 | REDDISH-GRAY SILTY CLAY, SOFT, WET, PLASTIC<br>(LACUSTRINE CLAY) | CL | | 558.5 |
| 25 | 0.0 | S-6 | N | N | 5.0<br>5.0 | 0.2 | 26.0<br>TRACES OF GRAVEL AND SAND | CL | | 553.5 |
| 30 | 0.0 | S-7 | N | N | 5.0<br>5.0 | 0.2 | 32.4 | | | 548.5 |
| | 0.0 | S-8 | N | N | 2.2<br>2.2 | 0.3 | REDDISH-BROWN SILTY SAND, SOME GRAVEL, ABOUT 20% GRAVEL, DENSE, MOIST, SLIGHTLY PLASTIC, WIDELY GRADED (GLACIAL TILL) | SM | | |
| 35 | | | | | | | BOTTOM OF BORING AT 35.1 FT | | | 543.5 |
| 40 | | | | | | | | | | 538.5 |

**WELL DATA**



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

LOVE CANAL REMEDIAL PROJECT
LONG TERM MONITORING

TASK VC

BORING NO. 1172B

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 11/21/85

COMPLETED 11/21/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7 (10.2)

PROTECTION LEVEL D

GROUND EL. 578.6'

SOIL DRILLED 25.1'

TOTAL DEPTH 25.1'

▽ BELOW GROUND NA

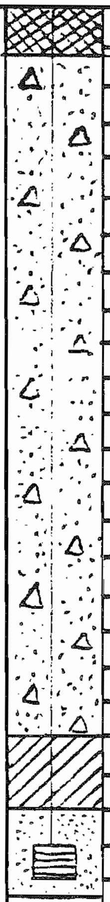
LOGGED BY H. Krahn

CHECKED BY L. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE* | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | AIR: BOOT 1.4 | | | 578.6 |
| | 0.0 | | | | | | BROWN SILTY FINE SAND (FILL) 3.9 | SP | | |
| 5 | | | | | | | CLAY WITH SAND AND ROOTS (FILL) 6.6 | CL | | 573.6 |
| | 0.0 | | | | | | REDDISH-BROWN SILTY FINE SAND (ALLUVIAL SAND) 8.3 | SP | | |
| 10 | | | | | | | REDDISH-BROWN SILTY CLAY STIFF AND FRACTURED | | | 568.6 |
| | 0.0 | | | | | | | CL | | |
| 15 | | | | | | | 17.0 | | | 563.6 |
| | 0.0 | | | | | | REDDISH-GRAY SILTY CLAY SOFT AND WET | | | |
| 20 | | | | | | | | CL | | 558.6 |
| | 0.0 | | | | | | | | | |
| 25 | | | | | | | 25.1 | | | 553.6 |
| | | | | | | | BOTTOM OF BORING AT 25.1 | | | |
| 30 | | | | | | | NO SOIL SAMPLES TAKEN FOR DETAILED SOIL DESCRIPTIONS SEE LOG OF BORING 1172A | | | 548.6 |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

WELL DATA



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1172C

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 11/21/85

**COMPLETED** 11/21/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7 10.2

**PROTECTION LEVEL** D

**GROUND EL.** 578.5'

**SOIL DRILLED** 18.5'

**TOTAL DEPTH** 18.5'

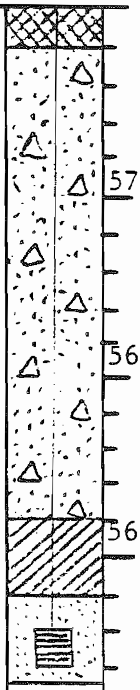
**▽ BELOW GROUND** NA

**LOGGED BY** J. Snowden

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | AIR: BOOT 1.4 | | | | 578.5 |
| | 0.0 | | | | | | BROWN SILTY FINE SAND (FILL) 3.9 | SP | | | |
| 5 | | | | | | | GRAY TO BLACK CLAY WITH SAND AND ROOTS (FILL) 6.6 | CL | | | 573.5 |
| | 0.0 | | | | | | REDDISH-BROWN SILTY FINE SAND (ALLUVIAL SAND) 8.3 | SP | | | |
| 10 | | | | | | | REDDISH-BROWN SILTY CLAY STIFF AND FRACTURED | | | | 568.5 |
| | 0.0 | | | | | | | CL | | | |
| 15 | | | | | | | (LACUSTRINE CLAY) | | | | 563.5 |
| | 0.0 | | | | | | SILTY CLAY, SOFT, WET 18.5 | CL | | | |
| 20 | | | | | | | BOTTOM OF BORING AT 18.5 FT | | | | 558.5 |
| | | | | | | | NO SOIL SAMPLES TAKEN FOR DETAILED SOIL DESCRIPTIONS SEE LOG OF BORING 1172A | | | | |
| 25 | | | | | | | | | | | 553.5 |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1173A

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 11/14/85

**COMPLETED** 11/14/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7 / 10.2

**PROTECTION LEVEL** C

**GROUND EL.** 575.3'

**SOIL DRILLED** 30.8'

**TOTAL DEPTH** 30.8'

▽ **BELOW GROUND**

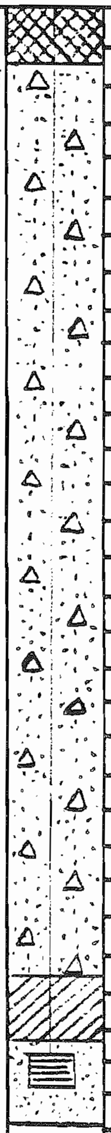
**LOGGED BY** C. Moore

**CHECKED BY** K. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | AIR: BOOT 1.5 | | | 575.3 |
| | 0.0 | S-1 | N | N | 1.4<br>1.4 | 0.2 | BROWN SILTY FINE SAND, LOOSE, DRY, UNIFORMLY GRADED (FILL) 3.0 | SP | NO BLOW COUNTS TAKEN USED CONTINUOUS SPLIT SPOON SAMPLER. | |
| 5 | 0.0 | S-2 | N | N | 5.0<br>4.5 | 0.0 | BROWN MOTTLED SILTY FINE SAND, MOIST, NON-PLASTIC, UNIFORMLY GRADED (ALLUVIAL SAND) 5.9 | SP | | 570.3 |
| | | | | | | | REDDISH-BROWN MOTTLED SILTY CLAY, STIFF, MOIST, FRACTURES PRESENT | CL | | |
| 10 | 0.0 | S-3 | N | N | 5.0<br>5.0 | 0.8 | 13.0 | | | 565.3 |
| 15 | 0.0 | S-4 | N | N | 5.0<br>5.0 | 0.2 | REDDISH-GRAY SILTY CLAY WET, SOFT, PLASTIC<br>(LACUSTRINE CLAY) | CL | | 560.3 |
| 20 | 0.0 | S-5 | N | N | 5.0<br>5.0 | 0.4 | 23.0 | | | 555.3 |
| 25 | 0.0 | S-6 | N | N | 5.0<br>5.0 | 0.0 | TRACES OF GRAVEL AND SAND<br>28.0 | CL | | 550.3 |
| 30 | 0.0 | S-7 | N | N | 1.4<br>1.4 | 0.0 | REDDISH-BROWN SILTY SAND, SOME GRAVEL, ABOUT 20% GRAVEL, MOIST, DENSE, SLIGHTLY PLASTIC (GLACIAL TILL) | SM | | 545.3 |
| | | | | | | | BOTTOM OF BORING AT 30.8 FT | | | |
| 35 | | | | | | | | | | 540.3 |
| 40 | | | | | | | | | | |

**WELL DATA**



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

ECJORDANCO

LOVE CANAL REMEDIAL PROJECT
LONG TERM MONITORING

TASK VC

BORING NO. 1173B

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 11/14/85

COMPLETED 11/14/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.~~7~~ 10.2

PROTECTION LEVEL C

GROUND EL. 575.3'

SOIL DRILLED 20.5'

TOTAL DEPTH 20.5'

▽ BELOW GROUND NA

LOGGED BY H.P. Krahn

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE & SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | AIR: BOOT | | | | 575.3 |
| | | | | | | | BROWN SILTY FINE SAND (FILL) 3.0 | SP | | | |
| | 0.0 | | | | | | | | | | |
| | | | | | | | BROWN MOTTLED SILTY FINE SAND (ALLUVIAL SAND) 5.9 | SP | | | |
| 5 | | | | | | | | | | | 570.3 |
| | 0.0 | | | | | | REDDISH-BROWN SILTY CLAY STIFF AND FRACTURED | CL | | | |
| 10 | | | | | | | | | | | 565.3 |
| | 0.0 | | | | | | 13.0 | | | | |
| | | | | | | | REDDISH-GRAY SILTY CLAY SOFT, WET<br>(LACUSTRINE CLAY) | CL | | | |
| 15 | | | | | | | | | | | 560.3 |
| | 0.0 | | | | | | | | | | |
| 20 | | | | | | | 20.5 | | | | 555.3 |
| | | | | | | | BOTTOM OF BORING AT 20.5 FT<br>NO SOIL SAMPLES TAKEN. FOR DETAILED SOIL DESCRIPTIONS SEE LOG OF BORING 1173A | | | | |
| 25 | | | | | | | | | | | 550.3 |
| 30 | | | | | | | | | | | 545.3 |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

TASK VC

BORING NO. 1173C

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 11/19/85

COMPLETED 11/19/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7 10.2

PROTECTION LEVEL C

GROUND EL. 575.3'

SOIL DRILLED 12.5'

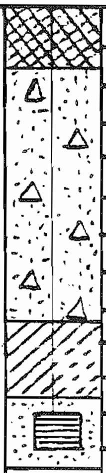
TOTAL DEPTH 12.5'

▽ BELOW GROUND NA

LOGGED BY J. Snowden

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | AIR: BOOT 1.5 | | |  | 575.3 |
| | 0.0 | | | | | | BROWN SILTY FINE SAND (FILL) 3.0 | SP | | | |
| 5 | | | | | | | BROWN MOTTLED SILTY FINE SAND (ALLUVIAL SAND) 5.9 | SP | | | 570.3 |
| | 0.0 | | | | | | REDDISH-BROWN SILTY CLAY STIFF, FRACTURED | CL | | | |
| 10 | | | | | | | | | | | 565.3 |
| | 0.0 | | | | | | 12.5 | | | | |
| | | | | | | | BOTTOM OF BORING AT 12.5 FT | | | | |
| 15 | | | | | | | | | | | 560.3 |
| | | | | | | | NO SOIL SAMPLES TAKEN. FOR DETAILED SOIL DESCRIPTIONS SEE LOG OF BORING 1173A | | | | |
| 20 | | | | | | | | | | | 555.3 |
| 25 | | | | | | | | | | | 550.3 |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

TASK VC

BORING NO. 1173D

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 11/20/85

COMPLETED 11/20/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7 / 10.2

PROTECTION LEVEL C

GROUND EL. 575.5'

SOIL DRILLED 7.0'

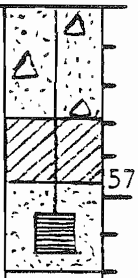
TOTAL DEPTH 7.0'

▽ BELOW GROUND NA

LOGGED BY H.P. Krahn

CHECKED BY L. Lewis

DATE 3/24/86



| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.0 | | | | | | AIR: BOOT 1.5 | | | | 575.5 |
| | | | | | | | BROWN SILTY FINE SAND (FILL) 3.0 | SP | | | |
| 5 | 0.0 | | | | | | BROWN MOTTLED SILTY FINE SAND (ALLUVIAL SAND) 5.9 | SP | | | 570.5 |
| | 0.0 | | | | | | REDDISH-BROWN SILTY CLAY, STIFF, FRACTURED 7.0 | CL | | | |
| | | | | | | | BOTTOM OF BORING AT 7.0 FT<br>NO SAMPLES TAKEN.<br>FOR DETAILED SOIL DESCRIPTIONS SEE LOG OF BORING 1173A | | | | |
| 10 | | | | | | | | | | | 565.5 |
| 15 | | | | | | | | | | | 560.5 |
| 20 | | | | | | | | | | | 555.5 |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE   S: SPLIT SPOON   R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1174A

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/14/85

**COMPLETED** 10/14/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7/10.2

**PROTECTION LEVEL** C/B

**GROUND EL.** 574.5'

**SOIL DRILLED** 29.7'

**TOTAL DEPTH** 29.7'

**▽ BELOW GROUND** NA

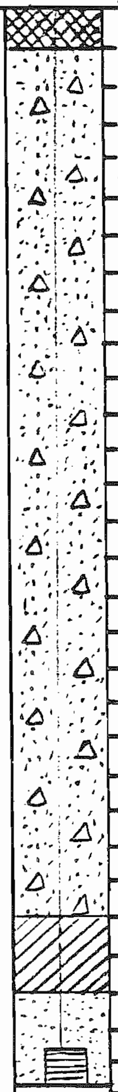
**LOGGED BY** M. Guay

**CHECKED BY** A. Louis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | TOPSOIL 0.2 | | | 574.5 |
| | 0.3 | S-1 | N | N | 2.5<br>2.5 | 0.1 | BROWN TO BLACK SILTY FINE SAND, TRACES OF GRAVEL AND ORGANIC MATTER, LOOSE, MOIST TO VERY | SM | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. | |
| 5 | 0.2 | S-2 | N | N | 2.5<br>0.9 | 0.2 | WET<br>(FILL) | | | 569.5 |
| | 0.4 | S-3 | N | N | 2.5<br>1.3 | 0.0 | BRICKS, WOOD, TILE<br>VERY WET 8.2 | | | |
| 10 | 0.3 | S-4 | N | N | 2.5<br>1.3 | 0.0 | REDDISH-BROWN MOTTLED SILTY CLAY, MOIST, SLIGHTLY PLASTIC, STIFF, | CL | | 564.5 |
| | 0.0 | S-5 | N | N | 2.5<br>2.5 | 0.0 | FRACTURES<br>(LACUSTRINE CLAY) | | | |
| 15 | 0.1 | S-6 | N | N | 2.5<br>2.5 | 0.0 | 15.0 | | | 559.5 |
| | 0.1 | S-7 | N | N | 2.5<br>2.5 | 0.0 | REDDISH-GRAY SILTY CLAY WET, SOFT, PLASTIC | | | |
| 20 | 0.2 | S-8 | N | N | 2.5<br>2.5 | 0.0 | (LACUSTRINE CLAY) | CL | | 554.5 |
| | 0.3 | S-9 | N | N | 2.5<br>2.5 | 0.0 | | | | |
| 25 | 0.2 | S-10 | N | N | 2.5<br>2.5 | 0.0 | 25.0 | | | 549.5 |
| | 0.2 | S-11 | N | N | 2.5<br>2.5 | 0.0 | TRACES OF GRAVEL 26.7<br>REDDISH-BROWN SILTY SAND WITH SOME | | | |
| 30 | 0.0 | S-12 | N | N | 1.8<br>1.3 | 0.0 | GRAVEL, MOIST, DENSE, WIDELY GRADED (GLACIAL TILL) 29.7 | SM | | 544.5 |
| | | | | | | | BOTTOM OF BORING AT 29.7 FT | | | |
| 35 | | | | | | | | | | 539.5 |
| 40 | | | | | | | | | | |

**WELL DATA**



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 1174B

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 10/14/85

COMPLETED 10/14/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7/10.2

PROTECTION LEVEL C

GROUND EL. 574.6 '

SOIL DRILLED 18.2 '

TOTAL DEPTH 18.2 '

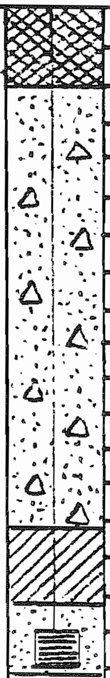
▽ BELOW GROUND NA

LOGGED BY M. Guay

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | TOPSOIL 0.2 | | | | 574.6 |
| | 0.0 | | | | | | BROWN TO BLACK SILTY FINE SAND WITH TRACES OF GRAVEL<br>(FILL) | SM | | | |
| 5 | | | | | | | BRICKS, WOOD AND TILE | | | | 569.6 |
| | 0.0 | | | | | | 8.2 | | | | |
| 10 | | | | | | | REDDISH-BROWN MOTTLED SILTY CLAY | CL | | | 564.6 |
| | 0.0 | | | | | | (LACUSTRINE CLAY)<br>15.0 | | | | |
| 15 | | | | | | | | | | | 559.6 |
| | 0.0 | | | | | | REDDISH-GRAY SILTY CLAY<br>(LACUSTRINE CLAY)<br>18.2 | CL | | | |
| 20 | | | | | | | BOTTOM OF BORING AT 18.2 FT | | | | 554.6 |
| | | | | | | | NO SOIL SAMPLES TAKEN.<br>FOR DETAILED SOIL DESCRIPTIONS<br>SEE LOG OF BORING 1174A | | | | |
| 25 | | | | | | | | | | | 549.6 |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1174C

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/15/85

**COMPLETED** 10/15/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** ~~11.7~~ 10.2

**PROTECTION LEVEL** C

**GROUND EL.** 574.6'

**SOIL DRILLED** 13.5'

**TOTAL DEPTH** 13.5'

▽ **BELOW GROUND** NA

**LOGGED BY** M. Guay

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 574.6 |
| | 0.1 | | | | | | BROWN TO BLACK SILTY FINE SAND, TRACES OF GRAVEL AND ORGANIC MATTER<br>(FILL) | SM | | | |
| 5 | | | | | | | | | | | 569.6 |
| | | | | | | | BRICKS, WOOD, TILE<br>8.2 | | | | |
| 10 | 0.1 | | | | | | REDDISH-BROWN MOTTLED SILTY CLAY<br>(LACUSTRINE CLAY)<br>13.5 | CL | | | 564.6 |
| 15 | | | | | | | BOTTOM OF BORING AT 13.5 FT | | | | 559.6 |
| 20 | | | | | | | NO SOIL SAMPLES TAKEN.<br>FOR DETAILED SOIL DESCRIPTIONS<br>SEE LOG OF BORING 1174A | | | | 554.6 |
| 25 | | | | | | | | | | | 549.6 |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1174D

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/15/85

**COMPLETED** 10/15/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7 / 10.2

**PROTECTION LEVEL** C

**GROUND EL.** 574.6'

**SOIL DRILLED** 7.5'

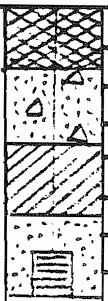
**TOTAL DEPTH** 7.5'

**▽ BELOW GROUND** NA

**LOGGED BY** M. Guay

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | TOPSOIL ↗ ↖0.2 | | | | 574.6 |
| | | | | | | | BROWN TO BLACK SILTY FINE SAND TRACES OF FINE GRAVEL AND ORGANIC MATTER<br>(FILL) | SM | |  | |
| 5 | | | | | | | | | | | 569.6 |
| | | | | | | | 7.5 | | | | |
| | | | | | | | BOTTOM OF BORING AT 7.5 FT | | | | |
| 10 | | | | | | | | | | | 564.6 |
| | | | | | | | NO SOIL SAMPLES TAKEN<br>FOR DETAILED SOIL DESCRIPTIONS<br>SEE LOG OF BORING 1174A | | | | |
| 15 | | | | | | | | | | | 559.6 |
| 20 | | | | | | | | | | | 554.6 |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE  S: SPLIT SPOON  R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 1180A

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 12/5/85

COMPLETED 12/5/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7 / (10.2)

PROTECTION LEVEL B/C

GROUND EL. 579.4'

SOIL DRILLED 32.6'

TOTAL DEPTH 32.6'

▽ BELOW GROUND N/A

LOGGED BY N. Gardner

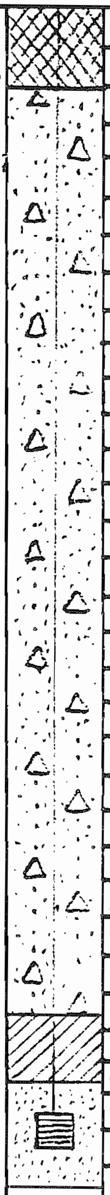
CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) |
|---|---|---|---|---|---|---|---|
| | 0.8 | S-1 | X | N | N | 2.6<br>1.4 | |
| 5 | 0.8 | S-2 | X | N | N | 5.0<br>4.4 | |
| 10 | 4.8 | S-3 | X | N | N | 5.0<br>4.5 | |
| 15 | 0.8 | S-4 | X | N | N | 5.0<br>4.5 | |
| 20 | 0.8 | S-5 | X | N | N | 5.0<br>3.0 | |
| 25 | 0.8 | S-6 | X | N | N | 5.0<br>1.1 | |
| 30 | | S-7 | X | N | N | 5.0<br>4.7 | |
| 35 | | | | | | | |
| 40 | | | | | | | |

| SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN |
|---|---|---|
| AIR: BOOT 1.4 | | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. |
| BROWN SILTY FINE SAND UNIFORMLY GRADED (FILL) 2.6 | SP | |
| REDDISH-BROWN SILTY CLAY VERY STIFF, MOIST, SLIGHTLY PLASTIC, TRACES OF PAPER<br>(FILL)<br>9.6 | CL | |
| BLACK SILTY FINE SAND, WET, LOOSE UNIFORMLY GRADED (ALLUVIAL SAND) 11.0 | SP | |
| REDDISH-BROWN SILTY CLAY, MOIST VERY STIFF, SLIGHTLY PLASTIC, FRACTURES<br>(LACUSTRINE CLAY)<br>17.6<br>REDDISH-GRAY SILTY CLAY SOFT, WET, PLASTIC 20.1<br>TRACES OF GRAVEL<br>22.6 | CL | |
| REDDISH-BROWN SILTY SAND, SOME GRAVEL, 20% GRAVEL, MOIST DENSE, SLIGHTLY PLASTIC WIDELY GRADED<br>(GLACIAL TILL) | SM | |
| BOTTOM OF BORING AT 32.6 FT | | |

WELL DATA



ELEV(FT)

579.4

574.4

569.4

564.4

559.4

554.4

549.4

544.4

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1180B

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 12/5/85

**COMPLETED** 12/5/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7/10.2

**PROTECTION LEVEL** B/C

**GROUND EL.** 579.5'

**SOIL DRILLED** 21.6'

**TOTAL DEPTH** 21.6'

**▽ BELOW GROUND** NA

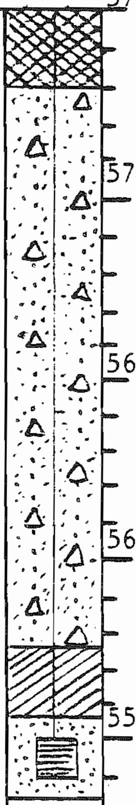
**LOGGED BY** N. Gardiner

**CHECKED BY** K. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | | SOIL CLASS | BLOWS/6-IN |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | AIR: BOOT | 1.4 | | |
| | | | | | | | BROWN SILTY FINE SAND (FILL) | 2.6 | SP | |
| 5 | | | | | | | REDDISH-BROWN SILTY CLAY<br>TRACES OF PAPER<br>(FILL) | 9.6 | CL | |
| 10 | | | | | | | BLACK SILTY FINE SAND (ALLUVIAL SAND) | 11.0 | SP | |
| 15 | | | | | | | REDDISH-BROWN SILTY CLAY<br>(LACUSTRINE CLAY) | | CL | |
| | | | | | | | REDDISH-GRAY SILTY CLAY | 17.6 | | |
| 20 | | | | | | | TRACES OF GRAVEL | 20.1 | CL | |
| 25 | | | | | | | BOTTOM OF BORING AT 21.6'<br>NO SOIL SAMPLES TAKEN.<br>FOR DETAILED SOIL DESCRIPTIONS SEE LOG OF BORING 1180A | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

**WELL DATA**



**ELEV(FT)**

579.5

574.5

569.5

564.5

559.5

554.5

549.5

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1180C

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-24

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 4/30/86

**COMPLETED** 4/30/86

**METHOD** H.S.A.

**CASING SIZE** 4.25" I.D.

**HNU** 11.7 / 10.2 10.2 TIP

**PROTECTION LEVEL** B/C

**GROUND EL.** 579.7

**SOIL DRILLED** 17.1'

**TOTAL DEPTH** 17.1'

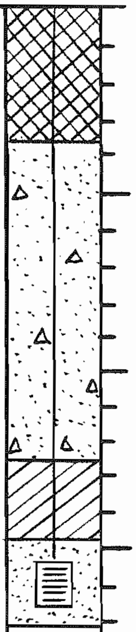
▽ **BELOW GROUND**

**LOGGED BY** S. Wibby

**CHECKED BY** R. Lewis

**DATE** 6/10/87

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Air: Boot 1.4 | | | | |
| | | | | | | | Brown Silty Fine Sand (FILL) 2.6 | SP | | | |
| 5 | | | | | | | Reddish-Brown Silty Clay<br>Traces of Paper<br>(FILL)<br>9.6 | CL | | | |
| 10 | | | | | | | Black Silty Fine Sand (Alluvial Sand) 11.0 | SP | | | |
| 15 | | | | | | | Reddish-Brown Silty Clay<br>(Lacustrine Clay)<br>17.1 | | | | |
| 20 | | | | | | | Bottom of Boring at 17.1'<br>No Soil Samples Taken. For Detailed Soil Descriptions, See Log of Boring 1180A. | | | | |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1181A

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/23/85

**COMPLETED** 10/23/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7 /10.2

**PROTECTION LEVEL** B/C

**GROUND EL.** 574.0'

**SOIL DRILLED** 24.0'

**TOTAL DEPTH** 24.0'

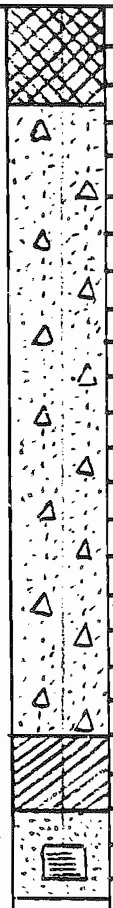
**▽ BELOW GROUND** NA

**LOGGED BY** T. Allen

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 574.0 |
| | 0.0 | S-1 | ☒ | N | N | 2.5<br>1.7 | 0.0 | BROWN TO BLACK SAND AND SILT WITH TRACE OF CLAY, DRY, NON PLASTIC ASH | | 7-8-11-16-12 | |
| | 0.0 | S-2 | ☒ | N | N | 1.5<br>1.5 | 0.0 | (FILL) 4.0 | | 5-4-4 | |
| 5 | 0.0 | S-3 | ☒ | N | N | 2.5<br>2.3 | 0.0 | BROWN TO BLACK SILTY CLAY WITH TRACE SAND AND GRAVEL (FILL) 6.5 | | 10-5-4-4-6 | 569.0 |
| | 0.0 | S-4 | ☒ | N | N | 2.5<br>2.2 | 0.0 | REDDISH-BROWN MOTTLED SILTY CLAY, VERY STIFF, MOIST, SLIGHTLY PLASTIC, FRACTURES | CL | 3-9-17-19-22 | |
| 10 | 0.0 | S-5 | ☒ | N | N | 2.5<br>2.5 | 0.0 | FEW SAND LAYERS | | 2-4-5-8-8 | 564.0 |
| | 0.0 | S-6 | ☒ | N | N | 2.5<br>2.5 | 0.0 | (LACUSTRINE CLAY) | | 1-3-2-4-4 | |
| 15 | 0.0 | S-7 | ☒ | N | N | 2.5<br>2.5 | 0.0 | 15.5<br>TRACES OF GRAVEL 16.5 | CL | 1-2-3-4-100 | 559.0 |
| | 0.0 | S-8 | ☒ | N | N | 2.5<br>2.5 | 0.0 | REDDISH-BROWN SILTY SAND, SOME GRAVEL, 20% GRAVEL, MOIST, SLIGHTLY PLASTIC, WIDELY GRADED, DENSE | | 16-21-22-27-46 | |
| 20 | 0.0 | S-9 | ☒ | N | N | 2.5<br>2.5 | 0.0 | | SM | 14-36-44-42-57 | 554.0 |
| | 0.0 | S-10 | ☒ | N | N | 2.5<br>2.5 | 0.0 | (GLACIAL TILL) 24.0 | | 17-18-33-34-44 | |
| 25 | | | | | | | | BOTTOM OF BORING AT 24.0 FT | | | 549.0 |
| 30 | | | | | | | | | | | 544.0 |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |



WELL DATA

*U: THIN WALL TUBE  S: SPLIT SPOON  R: ROCK

E.C. JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1181B

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/24/85

**COMPLETED** 10/24/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7/(10.2)

**PROTECTION LEVEL** C

**GROUND EL.** 574.0'

**SOIL DRILLED** 16.5'

**TOTAL DEPTH** 16.5'

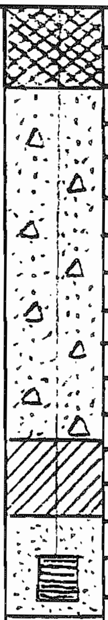
**▽ BELOW GROUND** NA

**LOGGED BY** M. Guay

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | BROWN TO BLACK SAND AND SILT WITH TRACE OF CLAY<br>(FILL) | SM-ML | | | 574.0 |
| 5 | | | | | | | 6.5 | | | | 569.0 |
| 10 | | | | | | | REDDISH-BROWN SILTY CLAY<br>STIFF AND FRACTURED<br>(LACUSTRINE CLAY) | CL | | | 564.0 |
| 15 | | | | | | | 15.5<br>TRACES OF GRAVEL<br>16.5 | | | | 559.0 |
| | | | | | | | BOTTOM OF BORING AT 16.5 FT | | | | |
| 20 | | | | | | | NO SOIL SAMPLES TAKEN - FOR DETAILED DESCRIPTION OF SOILS SEE BORING 1181A | | | | 554.0 |
| 25 | | | | | | | | | | | 549.0 |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |



*U: THIN WALL TUBE   S: SPLIT SPOON   R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1181C

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/24/85

**COMPLETED** 10/24/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7/10.2

**PROTECTION LEVEL** C

**GROUND EL.** 574.1 '

**SOIL DRILLED** 11.3 '

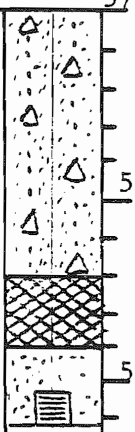
**TOTAL DEPTH** 11.3 '

▽ **BELOW GROUND** NA

**LOGGED BY** M. Guay

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | BROWN TO BLACK SAND AND SILT WITH TRACE OF CLAY<br>(FILL) | SM<br>ML | |  | 574.1 |
| 5 | | | | | | | 6.5 | | | | 569.1 |
| 10 | | | | | | | REDDISH-BROWN SILTY CLAY VERY STIFF, FRACTURED<br>(LACUSTRINE CLAY)<br>11.3 | CL | | | 564.1 |
| 15 | | | | | | | BOTTOM OF BORING AT 11.3 FT<br>NO SAMPLES TAKEN - FOR DETAILED SOIL DESCRIPTIONS SEE LOG OF BORING 1181A | | | | 559.1 |
| 20 | | | | | | | | | | | 554.1 |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

* U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C. JORDAN CO.

LOVE CANAL REMEDIAL PROJECT
LONG TERM MONITORING

TASK VC

BORING NO. 1183A

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 12/5/85

COMPLETED 12/5/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7 / 10.2

PROTECTION LEVEL D

GROUND EL. 573.8'

SOIL DRILLED 24.4'

TOTAL DEPTH 24.4'

▽ BELOW GROUND NA

LOGGED BY M. Guay

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.6 | | | | | | | | TOPSOIL | | |
| | 0.0 | S-1 | | N | N | 3.1<br>3.1 | 0.0 | BROWN TO BLACK SAND, SILT AND CLAY WITH BRICKS, ROCKS AND WOOD, LOOSE, MOIST.<br>(FILL) | SM | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. |
| 8.1 | 0.0 | S-2 | | N | N | 5.0<br>3.2 | 0.0 | | | |
| | 0.0 | S-3 | | N | N | 5.0<br>5.0 | 1.5 | BROWN MOTTLED SILTY CLAY WITH SAND LAYERS, MOIST, SLIGHTLY PLASTIC, STIFF, FRACTURES.<br>(LACUSTRINE CLAY) | CL | |
| 17.6 | 0.0 | S-4 | | N | N | 5.0 | 0.0 | | CL | |
| 18.0 | | | | | | | | TRACE OF GRAVEL | | |
| 24.4 | 0.0 | S-5 | | N | N | 5.0<br>2.5 | 0.0 | REDDISH-BROWN SILTY SAND WITH SOME GRAVEL AND TRACE OF CLAY, WIDELY GRADED DENSE, SLIGHTLY PLASTIC, MOIST<br>(GLACIAL TILL) | SM | |
| | | | | | | | | BOTTOM OF BORING AT 24.4 FT | | |

| DEPTH (FT) | ELEV(FT) |
|---|---|
| 0 | 573.8 |
| 5 | 568.8 |
| 10 | 563.8 |
| 15 | 558.8 |
| 20 | 553.8 |
| 25 | 548.8 |
| 30 | 543.8 |
| 35 | |
| 40 | |

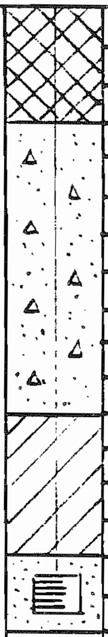
*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

## LOVE CANAL REMEDIAL PROJECT
## LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1183B

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
**PROJECT NO.** 4844-08
**CONTRACTOR:** J. MATHES ASSOC.
**DATE STARTED** 12/6/85
**COMPLETED** 12/6/85
**METHOD** HSA
**CASING SIZE** 4.25"
**HNU** 11.7/[✓ 10.2]
**PROTECTION LEVEL** D
**GROUND EL.** 573.8'
**SOIL DRILLED** 17.0'
**TOTAL DEPTH** 17.0'
**▽ BELOW GROUND** NA
**LOGGED BY** M. Guay
**CHECKED BY** R. Lewis
**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | TOPSOIL 0.6 | | |  | 573.8 |
| | 0.0 | | | | | | BROWN TO BLACK SAND, SILT AND CLAY<br>(FILL)<br>8.1 | SM | | | |
| 5 | 0.0 | | | | | | | | | | 568.8 |
| 10 | 0.1 | | | | | | BROWN MOTTLED SILTY CLAY WITH SAND LAYERS<br>(LACUSTRINE CLAY)<br>17.0 | CL | | | 563.8 |
| | 0.0 | | | | | | | | | | |
| 15 | | | | | | | | | | | 558.8 |
| | | | | | | | BOTTOM OF BORING AT 17.0 FT<br>NO SOIL SAMPLES TAKEN<br>FOR DETAILED SOIL DESCRIPTIONS<br>SEE LOG OF BORING 1183A | | | | |
| 20 | | | | | | | | | | | 553.8 |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1183C

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 12/7/85

**COMPLETED** 12/7/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7/10.2

**PROTECTION LEVEL** D

**GROUND EL.** 573.8'

**SOIL DRILLED** 11.0'

**TOTAL DEPTH** 11.0'

**▽ BELOW GROUND** NA

**LOGGED BY** M. Guay

**CHECKED BY** R Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | TOPSOIL 0.6 | | | | 573.8 |
| | 0.8 | | | | | | BROWN TO BLACK SAND, SILT AND CLAY<br>(FILL) | SM | | | |
| 5 | 0.6 | | | | | | | | | | 568.8 |
| | 3.0 | | | | | | 8.1 | | | | |
| 10 | | | | | | | BROWN MOTTLED SILTY CLAY WITH SAND LAYERS (LACUSTRINE CLAY) 11.0 | CL | | | 563.8 |
| | | | | | | | BOTTOM OF BORING AT 11.0 FT | | | | |
| 15 | | | | | | | NO SAMPLES TAKEN<br>FOR DETAILED SOIL DESCRIPTIONS<br>SEE LOG OF BORING 1183A | | | | 558.8 |
| 20 | | | | | | | | | | | 553.8 |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1183D

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 12/7/85

**COMPLETED** 12/7/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7/10.2

**PROTECTION LEVEL** D

**GROUND EL.** 573.8'

**SOIL DRILLED** 7.5'

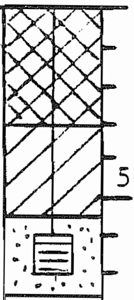
**TOTAL DEPTH** 7.5'

**▽ BELOW GROUND** NA

**LOGGED BY** M. Guay

**CHECKED BY** Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | TOPSOIL 0.6 | | | | 573.8 |
| | | | | | | | BROWN TO BLACK SAND, SILT AND CLAY WITH BRICKS, WOOD AND DEBRIS<br>(FILL)<br>7.5 | SM | |  | |
| 5 | | | | | | | | | | | 568.8 |
| | | | | | | | BOTTOM OF BORING AT 7.5 FT<br>NO SOIL SAMPLES TAKEN FOR DETAILED SOIL DESCRIPTIONS SEE LOG OF BORING 1183A | | | | |
| 10 | | | | | | | | | | | 563.8 |
| 15 | | | | | | | | | | | 558.8 |
| 20 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

LOVE CANAL TASK VC

**BORING NO.** 1184A

**CLIENT:** New York State Department of Environmental Conservation

**PROJECT NO.** 4844-24

**CONTRACTOR:** J. Mathes & Assoc.

**DATE STARTED** 11/22/86

**COMPLETED** 11/22/86

**METHOD** H.S.A.

**CASING SIZE** 4.25" I.D.

**HNU** 11.7 / 10.2 10.2 TIP

**PROTECTION LEVEL** D

**GROUND EL.** 572.3

**SOIL DRILLED** 23.3'

**TOTAL DEPTH** 23.2'

**▽ BELOW GROUND**

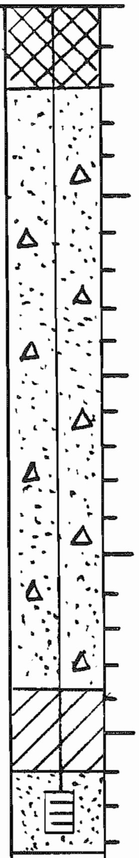
**LOGGED BY** W. Fisher

**CHECKED BY** R. Lewis

**DATE** 6/10/87

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. | & TYPE | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.0 | S -1 | X | N | N | 4.5<br>3.2 | NA | 0-0.7 Brown Silty Fine Sand with Root Fibers, Topsoil<br>0.7-1.9 Brown-Gray Fine Sand and Silt (FILL)<br>3.2 | SM | NA |
| 5 | 0.6 | S-2 | X | N | N | 5.0<br>4.3 | NA | Olive Brown Mottled Silty Clay, Varved, Dry to Moist, Very Stiff, Fractured | CL | NA |
| 10 | 0.0 | S-3 | X | N | N | 5.0<br>4.7 | NA | 11.5<br>Brown to Reddish Brown Silty Clay, Moist to Wet, Soft Very Plastic, Sticky, Massive | CL<br>CL | NA |
| 15 | 0.0 | S-4 | X | N | N | 5.0<br>2.1 | NA | 17.0<br>Reddish-Brown Silty Sand with Gravel & Cobbles, Widely Graded, Dense, Moist, Non-plastic | | NA |
| 20 | 0.0 | S-5 | X | N | N | 3.7<br>0.0 | NA | 23.2 | SM | |
| 25<br>30<br>35<br>40 | | | | | | | | Bottom of Boring at 23.2' | | No Blow Counts Taken. Used Continuous Sample Tube System. |

WELL DATA



ELEV(FT)

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

LOVE CANAL-TASK VC

**BORING NO.** 1184B

**CLIENT:** New York State Department of Environmental Conservation

**PROJECT NO.** 4844-26

**CONTRACTOR:** J. Mathes & Assoc.

**DATE STARTED** 11/22/86

**COMPLETED** 11/22/86

**METHOD** H.S.A.

**CASING SIZE** 4.25" I.D.

**HNU 11.7/10.2** 10.2 TIP

**PROTECTION LEVEL**

**GROUND EL.** 571.9

**SOIL DRILLED** 15.5'

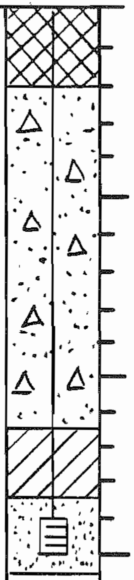
**TOTAL DEPTH** 15.5'

▽ **BELOW GROUND**

**LOGGED BY** C. White

**CHECKED BY** R. Lewis

**DATE** 6/10/87



| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  | Topsoil<br>Brown to Gray Fine Sand and Silt (FILL) | SM |  |  |  |
| 5<br>10 |  |  |  |  |  |  | Olive Brown Mottled Varved Silty Clay; Fractured<br>11.5 | CL |  |  |  |
| 15 |  |  |  |  |  |  | Brown to Reddish Brown Silty Clay, Soft, Moist to Wet<br>15.5 | CL |  |  |  |
| 20<br>25<br>30<br>35<br>40 |  |  |  |  |  |  | Bottom of Boring at 15.5'<br>No Soil Samples taken. For Detailed Soil Descriptions, see log of Boring 1184A. |  |  |  |  |

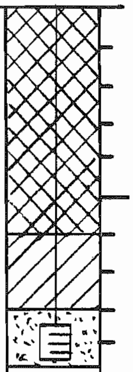
*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

LOVE CANAL TASK VC

**BORING NO.** 1184C

**CLIENT:** New York State Department of Environmental Conservation
**PROJECT NO.** 4844-24
**CONTRACTOR:** J. Mathes & Assoc.
**DATE STARTED** 4/22/86
**COMPLETED** 4/22/86
**METHOD** H.S.A.
**CASING SIZE** 4.25" I.D.
**HNU** 11.7/10.2 10.2 TIP
**PROTECTION LEVEL** D
**GROUND EL.** 572.2
**SOIL DRILLED** 9.8'
**TOTAL DEPTH** 9.8'
**▽ BELOW GROUND**
**LOGGED BY** W. Fisher
**CHECKED BY** R. Lewis
**DATE** 6/10/87

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Topsoil<br>Brown to Gray Fine Sand and Silt (FILL)<br>3.2 | | | | |
| 5 | | | | | | | Olive Brown Mottled Varved Silty Clay, Stiff and Fractured<br>9.8 | | | | |
| 10 | | | | | | | Bottom of Boring at 9.8'<br>No Soil Samples Taken. For Detailed Soil Descriptions, See log of Boring 1184A. | | | | |
| 15 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

LOVE CANAL TASK VC

**BORING NO.** 1184D

**CLIENT:** New York State Department of Environmental Conservation

**PROJECT NO.** 4844-

**CONTRACTOR:** J. Mathes & Assoc.

**DATE STARTED** 11/22/86

**COMPLETED** 11/22/86

**METHOD** H.S.A.

**CASING SIZE** 4.25" I.D.

**HNU** 11.7/10.2

**PROTECTION LEVEL** D

**GROUND EL.** 571.9

**SOIL DRILLED** 5.0'

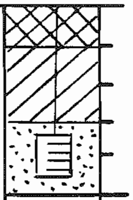
**TOTAL DEPTH** 5.0'

∇ **BELOW GROUND**

**LOGGED BY** W. Fisher

**CHECKED BY** R. Lewis

**DATE** 6/10/87

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Topsoil<br>Brown to Gray Fine Sand and Silt<br>(FILL) 3.2 | | |  | |
| 5 | | | | | | | Olive Brown Mottled Varved Silty Clay 5.0 | CL | CL | | |
| | | | | | | | Bottom of Boring at 5.0'<br>No Soil Samples Taken. For Detailed Soil Descriptions, See Log of Boring 1184A | | | | |
| 10 | | | | | | | | | | | |
| 15 | | | | | | | | | | | |
| 20 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

**LOVE CANAL REMEDIAL PROJECT**
**LONG TERM MONITORING**

**TASK VC**

**BORING NO.** 1190A

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 11/2/85

**COMPLETED** 11/2/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7 10.2

**PROTECTION LEVEL** B

**GROUND EL.** 583.0' / 586.53

**SOIL DRILLED** 40.5'

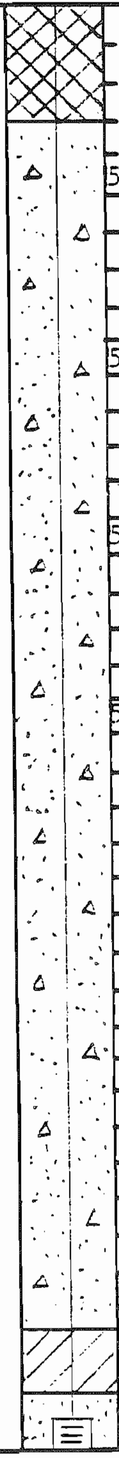
**TOTAL DEPTH** 40.5'

**▽ BELOW GROUND** NA

**LOGGED BY** M. Guay

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE # SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 583.0 |
| | 0.0 | S-1 | N | N | 2.7<br>1.0 | 0.0 | AIR: BOOT 1.5<br>BROWN SILTY FINE SAND, UNIFORMLY GRADED (FILL) 2.1 | SP | NO BLOW COUNTS TAKEN USED CONTINUOUS SPLIT SPOON SAMPLER |  | |
| 5 | 0.0 | S-2 | N | N | 5.0<br>4.6 | 0.0 | BROWN TO BLACK SILTY CLAY WITH LITTLE FINE SAND, DRY, WIDELY GRADED (FILL) 7.9 | ML | | | 578.0 |
| | | | | | | | BROWN SILTY CLAY WITH ROOTS AND ORGANIC MATTER 9.5 | | | | |
| 10 | 0.0 | S-3 | N | N | 5.0<br>4.5 | 0.0 | BROWN MOTTLED SILTY FINE SAND, DRY, LOOSE, UNIFORMLY GRADED (ALLUVIAL SANDS) 13.3 | SP | | | 573.0 |
| 15 | 0.0 | S-4 | N | N | 5.0<br>5.0 | 13.0 | REDDISH-BROWN SILTY CLAY, MOIST, SLIGHTLY PLASTIC, STIFF, FRACTURES<br>(LACUSTRINE CLAY) 19.2 | CL | | | 568.0 |
| 20 | 0.0 | S-5 | N | N | 5.0<br>5.0 | 0.0 | REDDISH-GRAY SILTY CLAY, MOIST TO WET, SOFT, PLASTIC | | | | 563.0 |
| 25 | 0.0 | S-6 | N | N | 5.0<br>4.7 | 0.0 | (LACUSTRINE CLAY) | CL | | | 558.0 |
| 30 | 0.0 | S-7 | N | N | 5.0<br>5.0 | 0.0 | | | | | 553.0 |
| 35 | 0.0 | S-8 | N | N | 5.0<br>5.0 | 0.0 | 35.6<br>TRACES OF SAND AND GRAVEL 38.5 | | | | 548.0 |
| 40 | 0.0 | S-9 | N | N | 2.8<br>2.7 | 0.0 | REDDISH-BROWN SILTY SAND WITH SOME GRAVEL, DENSE, MOIST (GLACIAL TILL) 40.5 | SM | | | 543.0 |

*U: THIN WALL TUBE   S: SPLIT SPOON   R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 1190A

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 11/2/85

COMPLETED 11/2/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7 / 10.2

PROTECTION LEVEL B

GROUND EL. 583.0'

SOIL DRILLED 40.5'

TOTAL DEPTH 40.5'

▽ BELOW GROUND NA

LOGGED BY M. Guay

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | BOTTOM OF BORING AT 40.5 FT | | | | |
| 45 | | | | | | | | | | | |
| 50 | | | | | | | | | | | |
| 55 | | | | | | | | | | | |
| 60 | | | | | | | | | | | |
| 65 | | | | | | | | | | | |
| 70 | | | | | | | | | | | |
| 75 | | | | | | | | | | | |
| 80 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

## LOVE CANAL REMEDIAL PROJECT
## LONG TERM MONITORING

TASK VC

**BORING NO.** 1190B

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 11/27/85

**COMPLETED** 11/27/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7/10.2

**PROTECTION LEVEL** B

**GROUND EL.** 583.1'/586.22

**SOIL DRILLED** 27.4'

**TOTAL DEPTH** 27.4'

**▽ BELOW GROUND** NA

**LOGGED BY** M. Guay

**CHECKED BY** K. Lewis

**DATE** 3/24/86

DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT)

*

AIR: BOOT 1.5

~~BROWN SILTY SAND (FILL)~~ 2.1

BROWN TO BLACK SILTY CLAY WITH LITTLE FINE SAND 7.9 — CL

BROWN SILTY CLAY WITH ROOTS 9.5 — CL

BROWN MOTTLED SILTY FINE SAND (ALLUVIAL SAND) 13.3 — SP

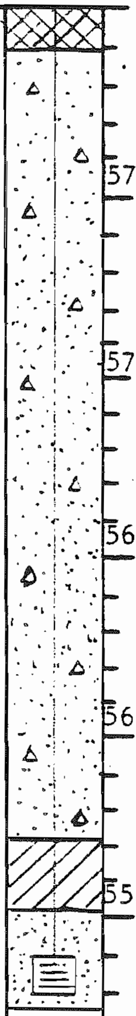
REDDISH-BROWN SILTY CLAY STIFF, FRACTURED (LACUSTRINE CLAY) 19.2 — CL

REDDISH-GRAY SILTY CLAY WET, SOFT (LACUSTRINE CLAY) 27.4 — CL

BOTTOM OF BORING AT 27.4 FT

NO SOIL SAMPLES TAKEN
FOR DETAILED SOIL DESCRIPTIONS
SEE LOG OF BORING 1190B

* NOTE: NO PI READINGS
PI METER MALFUNCTION DUE TO
WEATHER



Depth: 5, 10, 15, 20, 25, 30, 35, 40

Elevation: 583.1, 578.1, 573.1, 568.1, 563.1, 558.1, 553.1, 548.1

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1191A

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 11/5/85 **COMPLETED** 11/6/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7 (10.2)

**PROTECTION LEVEL** B/C

**GROUND EL.** 582.0 ' / 584.91

**SOIL DRILLED** 38.0 '

**TOTAL DEPTH** 38.0 '

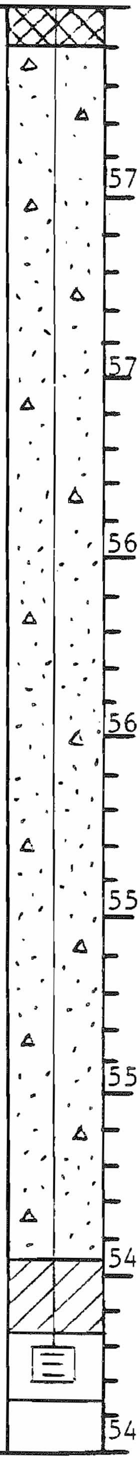
▽ **BELOW GROUND** NA

**LOGGED BY** J. Tewhey

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. | & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 582.0 |
| | | | | | | | | AIR: BOOT 1.5 | | | |
| | | | | | | | | BROWN SILTY FINE SAND<br>(FILL) 3.0 | | | |
| 5 | | | | | | | | OLIVE BROWN SILTY CLAY WITH SAND<br>(FILL)<br>8.4 | CL | | 577.0 |
| 10 | | | | | | | | BROWN MOTTLED SILTY FINE SAND<br>(ALLUVIAL SAND) 12.0 | SP | | 572.0 |
| 15 | | | | | | | | REDDISH-BROWN SILTY CLAY<br>STIFF, FRACTURED<br>(LACUSTRINE CLAY)<br>19.5 | CL | | 567.0 |
| 20 | | | | | | | | REDDISH-GRAY SILTY CLAY<br>WET, SOFT | CL | | 562.0 |
| 25 | | | | | | | | * NO SOIL SAMPLES TAKEN FROM 0.0 TO 32.0 FT. FOR DETAILED SOIL DESCRIPTIONS SEE LOG OF BORING 1191B | | | 557.0 |
| 30 | | | | | | | | | | | 552.0 |
| | | S-1 | ☒ | N | N | 2.0<br>2.0 | 0.4 | 34.5 | | | |
| 35 | | | | | | | | TRACES OF GRAVEL | | | 547.0 |
| | | S-2 | ☒ | N | N | 2.0<br>2.0 | 0.4 | SILTY SAND WITH SOME CLAY AND GRAVEL (GLACIAL TILL) 38.0 | SM | | |
| | | S-3 | | N | N | 0.3<br>0.3 | 0.4 | BOTTOM OF BORING AT 38.0 FT | | | |
| 40 | | | | | | | | | | | 542.0 |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 1191B

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

| | | | | | |
|---|---|---|---|---|---|
| CONTRACTOR: J. MATHES ASSOC. | | DATE STARTED | 10/29/85 | COMPLETED | 10/31/85 |
| METHOD | HSA | CASING SIZE | 4.25" | HNU 11.7 / 10.2 | PROTECTION LEVEL B |
| GROUND EL. | 582.0' / 584.90 | SOIL DRILLED | 38.9' | TOTAL DEPTH 38.9' | ▽ BELOW GROUND NA |
| LOGGED BY | M. Guay | CHECKED BY | L. Lewis | DATE | 3/24/86 |

| SAMPLE NO. | HNU AMBIENT AIR | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN |
|---|---|---|---|---|---|---|---|---|
| | | | | | | AIR: BOOT 1.5 | | |
| S-1 | 0.5 | N | N | 2.5<br>2.3 | 1.8 | BROWN SILTY FINE SAND, DRY, UNIFORMLY GRADED (FILL) 3.0 | SP | 4-11-15-16-18 |
| S-2 | | N | N | 2.5<br>2.3 | 0.2 | OLIVE-BROWN TO BLACK SILTY CLAY WITH SAND, DRY, MEDIUM DENSE, WIDELY GRADED (FILL) 8.4 | CL | 10-7-5-11-14 |
| S-3 | | N | N | 2.5<br>2.5 | 0.2 | BROWN MOTTLED SILTY FINE SAND DRY, MEDIUM DENSE, NON-PLASTIC, UNIFORMLY GRADED (ALLUVIAL SAND) 12.0 | SP | 5-7-7-10-10 |
| S-4 | | N | N | 2.5<br>2.5 | 0.4 | | | 3-4-6-6-7 |
| S-5 | | N | N | 2.5<br>2.5 | 0.2 | REDDISH-BROWN MOTTLED SILTY CLAY DRY TO MOIST, VERY STIFF, FRACTURED (LACUSTRINE CLAY) 19.5 | CL | 3-4-10-13-13 |
| S-6 | | N | N | 2.5<br>2.5 | 0.2 | | | 4-6-11-15-14 |
| S-7 | 3.0 | N | N | 2.5<br>2.5 | 1.2 | | | 7-6-4-4-4 |
| S-8 | | N | N | 2.5<br>2.5 | 0.2 | REDDISH-GRAY SILTY CLAY, WET, SOFT, PLASTIC (LACUSTRINE CLAY) | CL | WOH-1-1-2 |
| S-9 | | N | N | 2.5<br>2.5 | 0.2 | | | WOH-1-1-1-2 |
| S-10 | | N | N | 2.5<br>2.5 | 0.2 | WOH= WEIGHT OF HAMMER<br>WOR= WEIGHT OF RODS | CL | WOH-1-2-1 |
| S-11 | | N | N | 2.5<br>2.5 | 0.2 | | | WOH-WOH-1 |
| S-12 | | N | N | 2.5<br>2.5 | 0.3 | 34.5 | | WOR-WOH-18 |
| S-13 | | N | N | 2.5<br>2.5 | 0.2 | TRACES OF GRAVEL 37.0 | | WOR |
| S-14 | | N | N | 1.9<br>1.8 | 0.2 | REDDISH-BROWN SILTY SAND, SOME CLAY AND GRAVEL, 20% GRAVEL, MOIST SLIGHTLY PLASTIC (GLACIAL TILL) | SM | 4-13-15-100/5" |
| | | | | | | BOTTOM OF BORING AT 38.9 FT | | |

| DEPTH (FT) | ELEV(FT) |
|---|---|
| | 582.0 |
| 5 | 577.0 |
| 10 | 572.0 |
| 15 | 567.0 |
| 20 | 562.0 |
| 25 | 557.0 |
| 30 | 552.0 |
| 35 | 547.0 |
| 40 | 542.0 |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1191C

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-24

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 5/1/86

**COMPLETED** 5/1/86

**METHOD** H.S.A.

**CASING SIZE** 4.25" I.D.

**HNU 11.7/10.2** 10.2 TIP

**PROTECTION LEVEL** B/C

**GROUND EL.** 582.1

**SOIL DRILLED** 32.0'

**TOTAL DEPTH** 32.0'

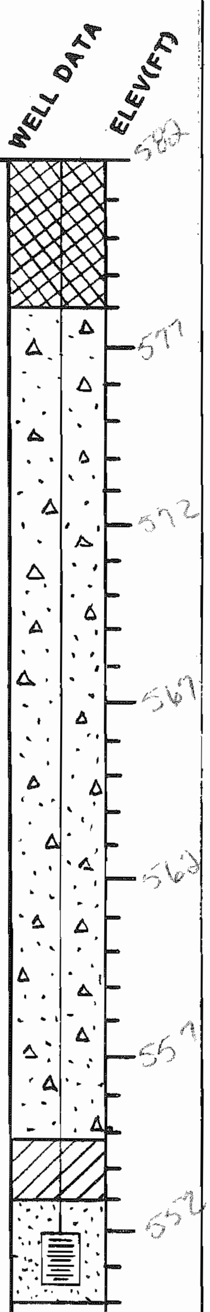
**▽ BELOW GROUND**

**LOGGED BY** L. Hoyt

**CHECKED BY** R. Lewis

**DATE** 6/10/87

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE* | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Air: Boot 1.5 | | |
| | | | | | | | Brown Silty Fine Sand (FILL)<br>Olive Brown Silty Clay with Sand<br>(FILL)<br>8.4 | CL | |
| 10 | | | | | | | Brown Mottled Silty Fine Sand<br>(Alluvial Sand)<br>12.0 | SP | |
| 15 | | | | | | | Reddish-Brown Silty Clay<br>Stiff, Fractured<br>(Lacustrine Clay)<br>19.5 | CL | |
| 20 | | | | | | | Reddish-Gray Silty Clay<br>Wet, Soft<br>32.0 | | |
| 35 | | | | | | | Bottom of Boring at 32.0'<br>Ran Hollow Stem Augers to 32.0'. No Soil Samples Collected. For Detailed Soil Descriptions, See Log of Boring 1191B | | |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

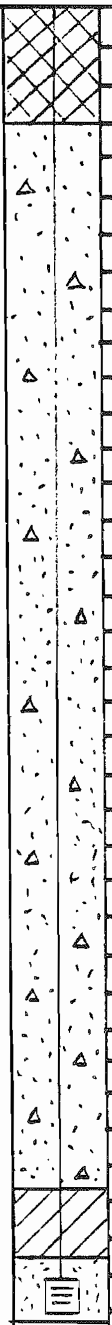
TASK VC

BORING NO. 1192A

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
PROJECT NO. 4844-08
CONTRACTOR: J. MATHES ASSOC.
DATE STARTED 11/7/85
COMPLETED 11/8/85
METHOD HSA
CASING SIZE 4.25"
HNU 11.7/(10.2)
PROTECTION LEVEL C
GROUND EL. 580.3'
SOIL DRILLED 36.3'
TOTAL DEPTH 36.3'
▽ BELOW GROUND NA
LOGGED BY J. Peterson
CHECKED BY R. Lewis
DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | AIR: BOOT 1.1 | | | 580.3 |
| | 0.4 | S-1 | | N | N | 2.8<br>1.7 | 0.4 | SILTY FINE SAND, MOIST, MEDIUM DENSE, UNIFORMLY GRADED (FILL) 3.3 | SP | NO BLOW COUNTS TAKEN. USED CONTINUOUS SPLIT SPOON SAMPLER. | |
| 5 | 0.4 | S-2 | | N | N | 5.0<br>2.2 | 0.4<br>0.4<br>0.4<br>0.4 | BROWN TO BLACK SANDY SILTY CLAY WITH GRAVEL, ORGANIC MATTER AND ASH, MOIST, WIDELY GRADED (FILL) 8.8 | CL | | 575.3 |
| 10 | 0.4 | S-3 | | N | N | 5.0<br>5.0 | 0.4<br>0.4 | BROWN MOTTLED SILTY FINE SAND MEDIUM DENSE, MOIST, UNIFORMLY GRADED (ALLUVIAL SAND) 11.3 | SP | | 570.3 |
| 15 | 0.4 | S-4 | | N | N | 5.0<br>5.0 | 0.4 | REDDISH-BROWN MOTTLED SILTY CLAY MOIST, STIFF, SLIGHTLY PLASTIC, FRACTURED (LACUSTRINE CLAY) | CL | | 565.3 |
| 20 | 0.4 | S-5 | | N | N | 5.0<br>5.0 | 0.4 | 22.3 | | | 560.3 |
| 25 | | S-6 | | N | N | 5.0<br>5.0 | 0.4 | REDDISH-GRAY SILTY CLAY, WET, SOFT, PLASTIC (LACUSTRINE CLAY) | CL | | 555.3 |
| 30 | | S-7 | | N | N | 5.0<br>5.0 | 0.4 | 33.5 | | WOH | 550.3 |
| | | S-8 | | N | N | 2.0<br>2.0 | 0.4 | TRACES OF GRAVEL 34.5 | | | |
| 35 | | S-9 | | N | N | 2.0<br>1.5 | 0.4 | REDDISH-BROWN SILTY SAND WITH GRAVEL, DENSE, MOIST (GLACIAL TILL) 36.3 | SM | WOH-33 | 545.3 |
| | | | | | | | | BOTTOM OF BORING AT 36.3 FT<br>WOH = WEIGHT OF HAMMER | | | |
| 40 | | | | | | | | | | | 540.3 |

WELL DATA



*U: THIN WALL TUBE  S: SPLIT SPOON  R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 1192B

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 11/8/85

COMPLETED 11/9/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7/(10.2)

PROTECTION LEVEL C

GROUND EL. 580.3'

SOIL DRILLED 36.3'

TOTAL DEPTH 36.3'

▽ BELOW GROUND NA

LOGGED BY J. Tewhey

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | AIR: BOOT 1.1 | | * |  | 580.3 |
| | | | | | | | SILTY FINE SAND<br>(FILL) 3.3 | SM | | | |
| 5 | | | | | | | BROWN TO BLACK SANDY SILTY CLAY WITH GRAVEL AND ORGANIC MATTER<br>(FILL) 8.8 | CL | | | 575.3 |
| 10 | | | | | | | BROWN MOTTLEDSILTY FINE SAND<br>(ALLUVIAL SAND) 11.3 | SP | | | 570.3 |
| 15<br>20 | | | | | | | REDDISH-BROWN MOTTLED SILTY CLAY<br>(LACUSTRINE CLAY) 22.3 | CL | | | 565.3<br>560.3 |
| 25<br>30 | | | | | | | REDDISH-GRAY SILTY CLAY, SOFT, WET<br>(LACUSTRINE CLAY) 33.5 | CL | | | 555.3<br>550.3 |
| | | | | | | | TRACES OF GRAVEL 34.5 | | | | |
| 35 | | | | | | | REDDISH-BROWN SILTY SAND WITH GRAVEL (GLACIAL TILL) | SM | | | 545.3 |
| 40 | | | | | | | BOTTOM OF BORING AT 36.3 FT<br>*NO SOIL SAMPLES TAKEN, FOR DETAILED SOIL DESCRIPTIONS, SEE LOG OF BORING 1192A | | | | 540.3 |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 1192C

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 11/10/85

COMPLETED 11/10/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7 / 10.2

PROTECTION LEVEL C

GROUND EL. 580.4'

SOIL DRILLED 20.0'

TOTAL DEPTH 20.0'

▽ BELOW GROUND NA

LOGGED BY J. Tewhey

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 1.1 | | | 580.4 |
| | | | | | | | BROWN SILTY FINE SAND<br>(FILL)<br>3.3 | SM | | |
| 5 | | | | | | | BROWN TO BLACK SANDY SILTY CLAY WITH GRAVEL<br>(FILL)<br>8.8 | CL | | 575.4 |
| 10 | | | | | | | BROWN MOTTLED SILTY FINE SAND,<br>(ALLUVIAL SAND)<br>11.3 | SP | | 570.4 |
| 15 | | | | | | | REDDISH-BROWN MOTTLED SILTY CLAY, STIFF<br>(LACUSTRINE CLAY)<br>20.0 | CL | | 565.4 |
| 20 | | | | | | | BOTTOM OF BORING AT 20.0 FT | | | 560.4 |
| 25 | | | | | | | NO SOIL SAMPLES TAKEN<br>FOR DETAILED SOIL DESCRIPTIONS<br>SEE LOG OF BORING 1192A | | | 555.4 |
| 30 | | | | | | | | | | 550.4 |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1193A

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
**PROJECT NO.** 4844-08
**CONTRACTOR:** J. MATHES ASSOC.
**DATE STARTED** 11/11/85
**COMPLETED** 11/12/85
**METHOD** HSA
**CASING SIZE** 4.25"
**HNU** 11.7 (10.2)
**PROTECTION LEVEL** C
**GROUND EL.** 577.0'
**SOIL DRILLED** 28.0'
**TOTAL DEPTH** 28.0'
**▽ BELOW GROUND** NA
**LOGGED BY** J. Tewhey
**CHECKED BY** R. Lewis
**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | AIR: BOOT 1.1 | | | 577.0 |
| | 0.4 | S-1 | ☒ | N | N | 1.6<br>1.6 | 0.4<br>0.4<br>0.4 | SILTY FINE SAND, BROWN, DRY, LOOSE (FILL) 2.0 | SM | NO BLOW COUNTS TAKEN USED CONTINUOUS SPLIT SPOON SAMPLER | |
| 5 | 0.4 | S-2 | ☒ | N | N | 5.0<br>1.0 | | BROWN TO BLACK SILTY SANDY CLAY WITH ORGANIC DEBRIS, LOOSE, MOIST<br>(FILL)<br>9.5 | CL | | 572.0 |
| 10 | 0.4 | S-3 | ☒ | N | N | 5.0<br>4.5 | 0.4<br>0.4 | REDDISH-BROWN MOTTLED SILTY CLAY, MOIST, SLIGHTLY PLASTIC, STIFF, FRACTURED | CL | | 567.0 |
| 15 | 0.4 | S-4 | ☒ | N | N | 5.0<br>5.0 | 0.4 | (LACUSTRINE CLAY)<br>18.0 | | | 562.0 |
| 20 | 0.4 | S-5 | ☒ | N | N | 5.0<br>5.0 | 0.4 | REDDISH-GRAY SILTY CLAY, SOFT, PLASTIC, WET<br>(LACUSTRINE CLAY) | CL | | 557.0 |
| 25 | 0.4 | S-6 | ☒ | N | N | 5.0<br>5.0 | 0.4 | 27.5 | | | 552.0 |
| | 0.4 | S-7 | ☒ | N | N | 1.5<br>1.5 | 0.4 | REDDISH-BROWN SILTY SAND WITH TRACE OF CLAY, 20% GRAVEL, WIDELY GRADED (GLACIAL TILL) | SM | | |
| 30 | | | | | | | 0.4 | BOTTOM OF BORING AT 29.4 FT | | | 547.0 |
| 35 | | | | | | | | | | | 542.0 |
| 40 | | | | | | | | | | | 537.0 |

**WELL DATA**

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

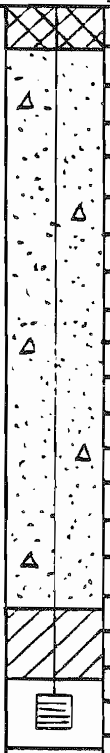
E.C.JORDAN CO.

## LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1193B

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
**PROJECT NO.** 4844-08
**CONTRACTOR:** J. MATHES ASSOC.
**DATE STARTED** 11/12/85
**COMPLETED** 11/12/85
**METHOD** HSA
**CASING SIZE** 4.25"
**HNU** 11.7 / 10.2
**PROTECTION LEVEL** C
**GROUND EL.** 576.7 '
**SOIL DRILLED** 19.4 '
**TOTAL DEPTH** 19.4 '
**▽ BELOW GROUND** NA
**LOGGED BY** C. Moore
**CHECKED BY** A. Lewis
**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | AIR: BOOT 1.1 | | |  | 576.7 |
| | | | | | | | BROWN SILTY FINE SAND 2.0 | SM | | | |
| | 0.4 | | | | | | BROWN TO BLACK SILTY SANDY CLAY WITH ORGANIC DEBRIS | CL | | | |
| 5 | | | | | | | (FILL) | | | | 571.7 |
| | 0.4 | | | | | | 9.5 | | | | |
| 10 | | | | | | | REDDISH-BROWN MOTTLED SILTY CLAY, STIFF-FRACTURES | | | | 566.7 |
| | 0.4 | | | | | | (LACUSTRINE CLAY) | | | | |
| 15 | | | | | | | | CL | | | 561.7 |
| | | | | | | | 18.0 | | | | |
| | 0.4 | | | | | | REDDISH-GRAY SILTY CLAY<br>SOFT PLASTIC, WET 20.4 | | | | |
| 20 | | | | | | | | | | | 556.7 |
| | | | | | | | BOTTOM OF BORING AT 20.4 FT | | | | |
| 25 | | | | | | | NO SOIL SAMPLES TAKEN<br>FOR DETAILED SOIL DESCRIPTIONS<br>SEE LOG OF BORING 1193A | | | | 551.7 |
| 30 | | | | | | | | | | | 546.7 |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 1193C

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 11/12/85

COMPLETED 11/12/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7 / 10.2

PROTECTION LEVEL C

GROUND EL. 576.5'

SOIL DRILLED 16.6'

TOTAL DEPTH 16.6'

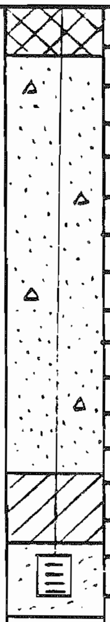
∇ BELOW GROUND NA

LOGGED BY J. Tewhey

CHECKED BY L. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE* | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 576.5 |
| | | | | | | | AIR: BOOT 1.1 | | | | |
| | | | | | | | BROWN SILTY FINE SAND 2.0 | SM | | | |
| | 0.4 | | | | | | BROWN TO BLACK SILTY SANDY CLAY WITH ORGANIC DEBRIS<br>(FILL)<br>9.5 | CL | | | |
| 5 | | | | | | | | | | | 571.5 |
| | 0.4 | | | | | | | | | | |
| 10 | | | | | | | | | | | 566.5 |
| | 0.4 | | | | | | REDDISH-BROWN MOTTLED SILTY CLAY, STIFF FRACTURES<br>(LACUSTRINE CLAY)<br>16.6 | CL | | | |
| 15 | | | | | | | | | | | 561.5 |
| | 0.4 | | | | | | BOTTOM OF BORING AT 16.6 FT | | | | |
| 20 | | | | | | | NO SAMPLES TAKEN<br>FOR DETAILED SOIL DESCRIPTIONS<br>SEE LOG OF BORING 1193A | | | | 556.5 |
| 25 | | | | | | | | | | | 551.5 |
| 30 | | | | | | | | | | | 546.5 |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1193D

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 11/13/85

**COMPLETED** 11/13/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7/(10.2)

**PROTECTION LEVEL** D

**GROUND EL.** 576.6'

**SOIL DRILLED** 10.0'

**TOTAL DEPTH** 10.0'

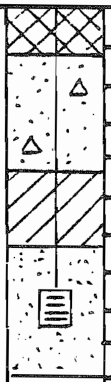
**▽ BELOW GROUND** NA

**LOGGED BY** H.P. Krahn

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE* | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 576.6 |
| | | | | | | | AIR: BOOT 1.1 | | | | |
| | | | | | | | BROWN SILTY FINE SAND 2.0 | SM | | | |
| | | | | | | | BROWN TO BLACK SILTY SANDY CLAY | CL | | | |
| 5 | | S-1 ☒ | N | N | 2.0<br>1.9 | | (FILL) | | 1-1-1-WOH | | 571.6 |
| | | S-2 ☒ | N | N | 2.0<br>1.9 | | | | 1-WOH-6 | | |
| | | S-3 ☒ | N | N | 1.5<br>0.7 | | REDDISH-BROWN SILTY CLAY, STIFF, FRACTURED 9.5 | CL | | | |
| 10 | | | | | | | BOTTOM OF BORING AT 10.0 FT | | | | 566.6 |
| | | | | | | | FOR DETAILED SOIL DESCRIPTIONS SEE LOG OF BORING 1193A | | | | |
| 15 | | | | | | | | | | | 561.6 |
| | | | | | | | WOH = WEIGHT OF HAMMER | | | | |
| 20 | | | | | | | | | | | 556.6 |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 1194A

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 10/11/85

COMPLETED 10/11/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7/10.2

PROTECTION LEVEL C/B

GROUND EL. 575.3'

SOIL DRILLED 31.0'

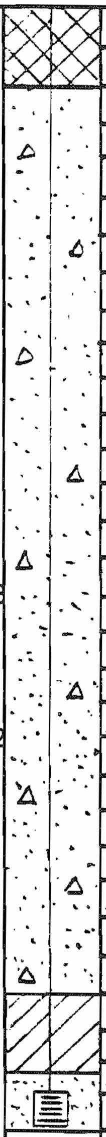
TOTAL DEPTH 31.0'

▽ BELOW GROUND NA

LOGGED BY M. Guay

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | 575.3 |
| | 0.5 | S-1 | ☒ | N | N | 1.7<br>0.9 | 0.5 | TOPSOIL 0.7<br>BROWN SILTY CLAY AND SILTY SAND DRY, LOOSE, NON-PLASTIC (FILL) 3.7 | CL<br>SM | 6-11-37 |  | |
| | 0.5 | S-2 | ☒ | N | N | 2.0<br>1.4 | 0.5 | | | 10-11-12-10 | | |
| 5 | 0.5 | S-3 | ☒ | N | N | 2.0<br>1.3 | 0.5 | BROWN MOTTLED SILTY CLAY, MOIST STIFF, SLIGHTLY PLASTIC, FRACTURED<br>(LACUSTRINE CLAY) | | 2-2-3-5 | | 570.3 |
| | 0.5 | S-4 | ☒ | N | N | 2.0<br>1.3 | 0.5 | | CL | 2-6-9-11 | | |
| | 0.5 | S-5 | ☒ | N | N | 2.0<br>1.0 | 4.5 | | | 2-4-4-8 | | |
| 10 | | | | | | | | | | | | 565.3 |
| | 0.5 | S-6 | ☒ | N | N | 2.5<br>2.5 | 0.5 | | | 1-3-6-10-18 | | |
| | 0.5 | S-7 | ☒ | N | N | 2.5<br>2.5 | 0.5 | 14.7 | | 2-2-3-3-3 | | |
| 15 | | | | | | | | | | | | 560.3 |
| | | S-8 | ☒ | N | N | 2.5<br>2.5 | 0.5 | REDDISH-GRAY SILTY CLAY, VERY SOFT, WET, PLASTIC<br>(LACUSTRINE CLAY) | | WOH-WOH-1-2-3 | | |
| | | S-9 | ☒ | N | N | 2.5<br>2.5 | 0.5 | | | WOH-1-2-2-2 | | |
| 20 | | S-10 | ☒ | N | N | 2.5<br>2.5 | 0.5 | | CL | WOH-WOH-1-2-2 | | 555.3 |
| | | S-11 | ☒ | N | N | 2.5<br>2.5 | 0.5 | | | WOH-WOH-1-2-2 | | |
| 25 | | S-12 | ☒ | N | N | 2.5<br>2.5 | 0.5 | 26.5 | | WOH-3-2-1-2 | | 550.3 |
| | | S-13 | ☒ | N | N | 2.5<br>2.5 | 0.5 | REDDISH-BROWN SILTY SAND TO SANDY CLAY WITH GRAVEL, VERY WET, DENSE, PLASTIC, WIDELY GRADED<br>(GLACIAL TILL) | SM<br>ML | WOH-2-6-7 | | |
| 30 | | S-14 | ☒ | N | N | 1.3<br>0.3 | 0.5 | 31.0 | | 3-4-50<br>REFUSAL | | 545.3 |
| | | | | | | | | BOTTOM OF BORING AT 31.0 FT<br>WOH = WEIGHT OF HAMMER | | | | |
| 35 | | | | | | | | | | | | 540.3 |
| 40 | | | | | | | | | | | | 535.3 |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

TASK VC

BORING NO. 1194B

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 10/12/85

COMPLETED 10/12/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7 / [✓ 10.2]

PROTECTION LEVEL C/D

GROUND EL. 575.3'

SOIL DRILLED 21.3'

TOTAL DEPTH 21.3'

▽ BELOW GROUND NA

LOGGED BY M. Guay

CHECKED BY L. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | TOPSOIL 0.7 | | | | 575.3 |
| | 0.4<br>* | | | | | | BROWN SILTY CLAY AND SILTY SAND (FILL) 3.7 | CL<br>SM | | | |
| 5 | | | | | | | BROWN MOTTLED SILTY CLAY, STIFF, FRACTURES | | | | 570.3 |
| | | | | | | | (LACUSTRINE CLAY) | CL | | | |
| 10 | | | | | | | | | | | 565.3 |
| | | | | | | | 14.7 | | | | |
| 15 | | | | | | | REDDISH-GRAY SILTY CLAY SOFT, WET | CL | | | 560.3 |
| 20 | | | | | | | (LACUSTRINE CLAY) 21.3 | | | | 555.3 |
| | | | | | | | BOTTOM OF BORING AT 21.3 | | | | |
| 25 | | | | | | | NO SAMPLES TAKEN. RAN AUGERS TO 21.3 FT. FOR DETAILED SOIL DESCRIPTIONS, SEE LOG OF BORING 1194A. | | | | 550.3 |
| 30 | | | | | | | * RAIN AND HIGH HUMIDITY PREVENTED ACCURATE AMBIENT AIR HNU READING | | | | 545.3 |
| 35 | | | | | | | | | | | 540.3 |
| 40 | | | | | | | | | | | 535.3 |

*U: THIN WALL TUBE    S: SPLIT SPOON    R: ROCK

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 1194C

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-08

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 11/12/85

COMPLETED 11/13/85

METHOD HSA

CASING SIZE 4.25"

HNU 11.7 (10.2)

PROTECTION LEVEL C

GROUND EL. 575.3'

SOIL DRILLED 16.5'

TOTAL DEPTH 16.5'

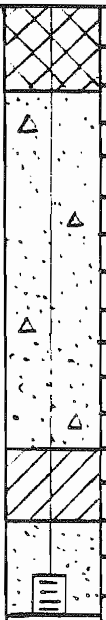
▽ BELOW GROUND NA

LOGGED BY M. Guay

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | TOPSOIL 0.7 | | | | 575.3 |
| | 0.0 | | | | | | BROWN SILTY CLAY AND SILTY SAND<br>DRY, LOOSE<br>(FILL) 3.7 | CL<br>SM | | | |
| 5 | | | | | | | BROWN MOTTLED SILTY CLAY,<br>STIFF, FRACTURES<br>(LACUSTRINE CLAY) | CL | | | 570.3 |
| 10 | 0.0 | | | | | | 14.7 | | | | 565.3 |
| 15 | | | | | | | REDDISH-GRAY SILTY CLAY<br>SOFT, WET 16.5 | CL | | | 560.3 |
| | | | | | | | BOTTOM OF BORING AT 16.5 FT | | | | |
| 20 | | | | | | | NO SAMPLES TAKEN<br>RAN AUGERS TO 16.5 FT<br>FOR DETAILED SOIL DESCRIPTIONS<br>SEE LOG OF BORING 1194A | | | | 555.3 |
| 25 | | | | | | | | | | | 550.3 |
| 30 | | | | | | | | | | | 545.3 |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 1194D

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-08

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/13/85

**COMPLETED** 10/13/85

**METHOD** HSA

**CASING SIZE** 4.25"

**HNU** 11.7 / 10.2

**PROTECTION LEVEL** C

**GROUND EL.** 572.2' / 575.2 ft.

**SOIL DRILLED** 11.8'

**TOTAL DEPTH** 11.8'

**▽ BELOW GROUND** NA

**LOGGED BY** M. Guay

**CHECKED BY** L. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | TOPSOIL 0.7 | | | | 575.2 |
| | 0.1 | | | | | | BROWN SILTY CLAY AND SILTY SAND<br>DRY, LOOSE<br>(FILL) 3.7 | CL<br>SM | | | |
| 5 | | | | | | | BROWN MOTTLED SILTY SAND,<br>STIFF, FRACTURES<br>(LACUSTRINE CLAY) | CL | | | 570.2 |
| | 0.0 | | | | | | | CL | | | |
| 10 | | | | | | | 11.8 | | | | 565.2 |
| | | | | | | | BOTTOM OF BORING AT 11.8 FT | | | | |
| 15 | | | | | | | NO SOIL SAMPLES TAKEN<br>RAN AUGERS TO 11.8 FT<br>FOR DETAILED SOIL DESCRIPTIONS<br>SEE LOG OF BORING 1194A | | | | 560.2 |
| 20 | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 7205

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-09

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/13/85

**COMPLETED** 10/14/85

**METHOD** DRIVE/WASH

**CASING SIZE** 4.0"

**HNU** 11.7 / 10.2

**PROTECTION LEVEL** C/D

**GROUND EL.** 574.1'

**SOIL DRILLED** 30.0'

**TOTAL DEPTH** 49.6'

▽ **BELOW GROUND** NA

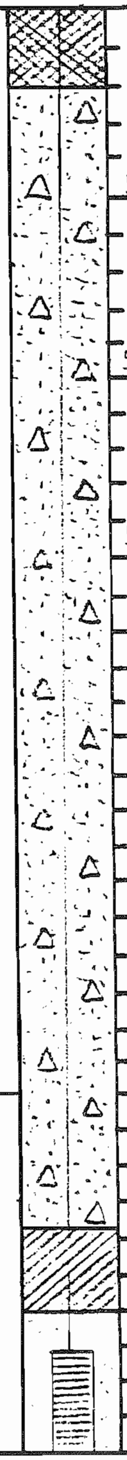
**LOGGED BY** J. Peterson

**CHECKED BY** K. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 574.1 |
| | 0.0 | S-1 ☒ | N | N | 2.0/1.7 | 0.0 | TOPSOIL 1.0<br>BROWN MOTTLED SILTY FINE SAND MEDIUM DENSE, MOIST, NON-PLASTIC, UNIFORMLY GRADED 3.4 | SP | 28-40-32-30 | |
| | 0.0 | S-2 ☒ | N | N | 2.0/1.6 | 0.0 | REDDISH-BROWN SILTY CLAY, MOIST STIFF, FRACTURED, SLIGHTLY PLASTIC | CL | 10-17-17-23 | |
| 5 | | | | | | | | | | 569.1 |
| | | | | | | | (LACUSTRINE CLAY) | | | |
| 10 | 0.0 | S-3 ☒ | N | N | 2.0/1.8 | 0.0 | 11.0 | | 3-4-4-4 | 564.1 |
| | 0.0 | S-4 ☒ | N | N | 2.0/2.0 | 0.0 | REDDISH-GRAY SILTY CLAY, WET, SOFT, PLASTIC | | 1-1-2-3 | |
| 15 | | | | | | | (LACUSTRINE CLAY) | CL | | 559.1 |
| | 0.0 | S-5 ☒ | N | N | 2.0/2.0 | 0.0 | 19.0 | | 1-WOH-2-2 | |
| 20 | | | | | | | BROWN SILTY SAND WITH SOME GRAVEL AND TRACE OF CLAY, ABOUT 20% GRAVEL, WET, DENSE, WIDELY GRADED | | | 554.1 |
| | 0.0 | S-6 ☒ | N | N | 2.0/1.3 | 0.0 | (GLACIAL TILL) | SM ML | 29-59-47-59 | |
| 25 | | | | | | | | | | 549.1 |
| | 0.0 | S-7 ☒ | N | N | 0.3/0.3 | 0.0 | | | 100 FOR 0.3'<br>RQD %<br>20 40 60 80 | |
| 30 | | | | | | | 30.0 | | | 544.1 |
| | | R-1 | | | | | BEDROCK: GRAY DOLOMITE SEE ROCK LOG FOR DESCRIPTION OF FRACTURES | | | |
| 35 | | | | | | | | | | 539.1 |
| 40 | | | | | | | | | | 534.1 |

**WELL DATA**



*U: THIN WALL TUBE  S: SPLIT SPOON  R: ROCK

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 7205

**LIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-09

**ONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/13/85

**COMPLETED** 10/14/85

**METHOD** NX Core

**CASING SIZE** 3.0"

**HNU** 11.7 / 10.2

**PROTECTION LEVEL** C/D

**ROUND EL.** 574.1'

**SOIL DRILLED** 30.0'

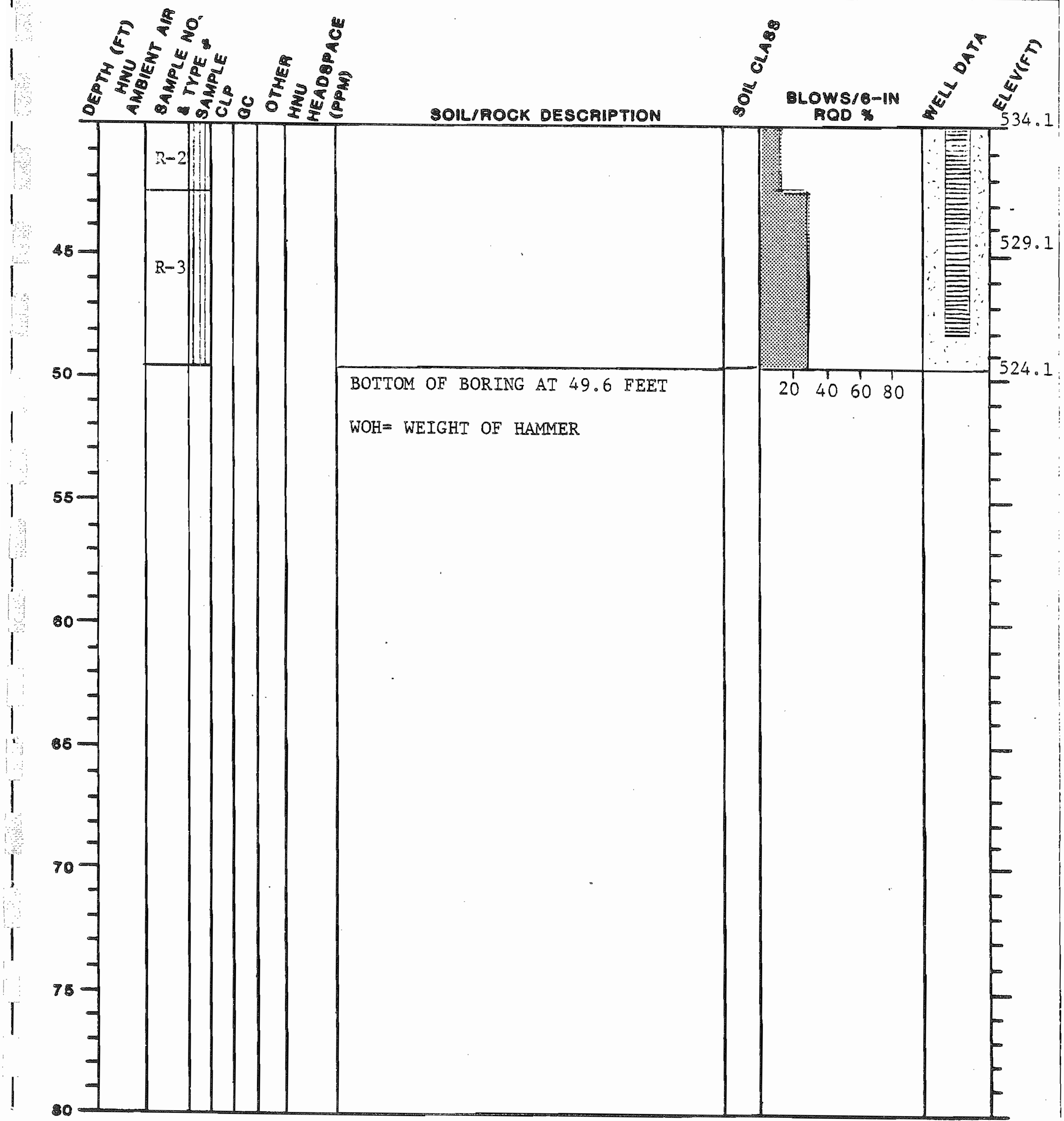
**TOTAL DEPTH** 49.6'

**▽ BELOW GROUND** NA

**LOGGED BY** J. Peterson

**CHECKED BY** L. Lewis

**DATE** 3/24/86



BOTTOM OF BORING AT 49.6 FEET

WOH= WEIGHT OF HAMMER

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

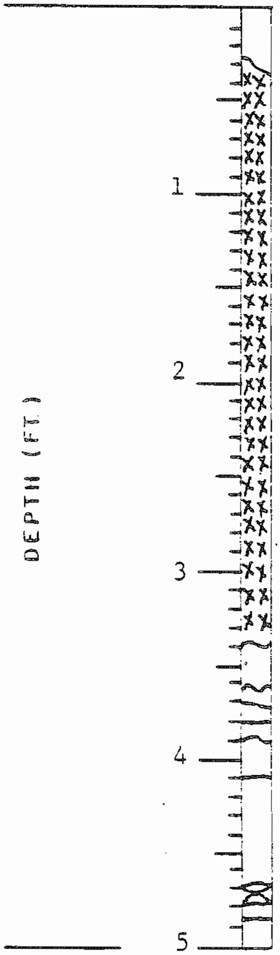
E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 7205 |
| LOGGED BY T. Nowack | DATE 10-14-85 | PROTECTION LEVEL C/D |
| CORE DIAMETER NX | CORE RUN NO. R-1 | DEPTH 30 FT. TO 36.3 FT. |
| CORE RECOVERY 6.3 FT. | RQD 10 % | CORE QUALITY Poor |

| CORE RECOVERY (FT.) | .3 FT. CORE RECOVERY | ROCK DESCRIPTION AND IDENTIFICATION |
|---|---|---|
| | | - DOLOMITE GRAY TO DARK GRAY<br>- MANY SOLUTION CAVITIES, SOME FILLED WITH ANHYDRITE<br>- WEATHERED |



WEATHERED DOLOMITE FRAGMENTS

STAINED FRACTURES

– CHIPS

TOTAL 6.3 (FT ) TOTAL .63 ( FT )

100 % 10 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

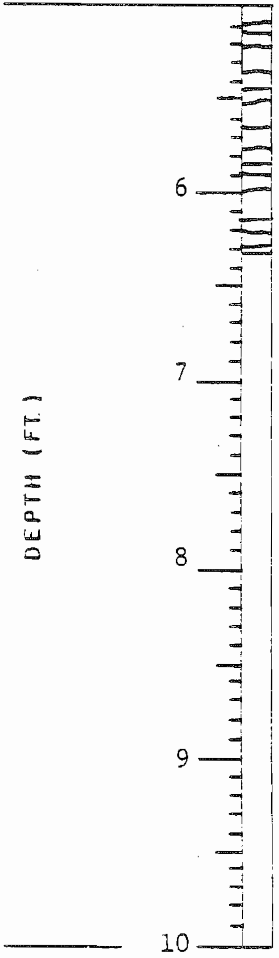
| | | | |
|---|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | | BORING NO.<br>7205 |
| LOGGED BY<br>T. Nowack | DATE<br>10-14-85 | | PROTECTION LEVEL<br>C/D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-1 | DEPTH<br>30 FT. TO 36.3 FT. | |
| CORE RECOVERY<br>6.3 FT. | RQD<br>10 % | CORE QUALITY<br>Poor | |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

DOLOMITE GRAY TO DARK GRAY



- END OF R-1

TOTAL 6.3 (FT )

63 %

TOTAL .63 (FT )

10 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

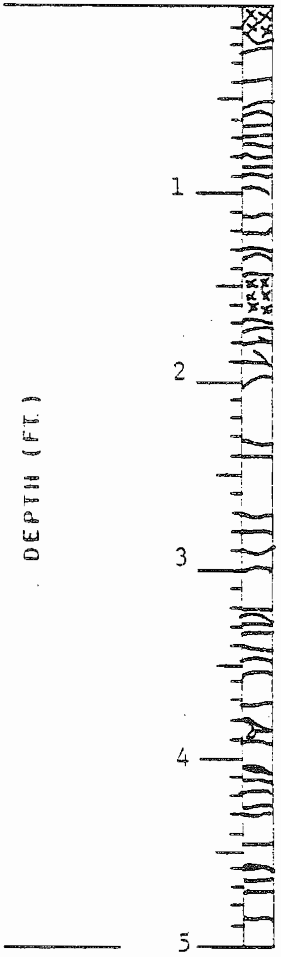
SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 7205 |
| LOGGED BY T. Nowack | DATE 10-14-85 | PROTECTION LEVEL C/D |
| CORE DIAMETER NX | CORE RUN NO. R-2 | DEPTH 36.3 FT. TO 42.8 FT. |
| CORE RECOVERY 6.3 FT. | RQD 10 % | CORE QUALITY Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



-CHIPS

-CHIPS

-VUG FILLED WITH WITH ANHYDRITE/CALCITE

-MECHANICAL FRACTURE

DOLOMITE GRAY TO DARK GRAY

TOTAL 6.5 (FT )

97 %

TOTAL .65 (FT )

10 %

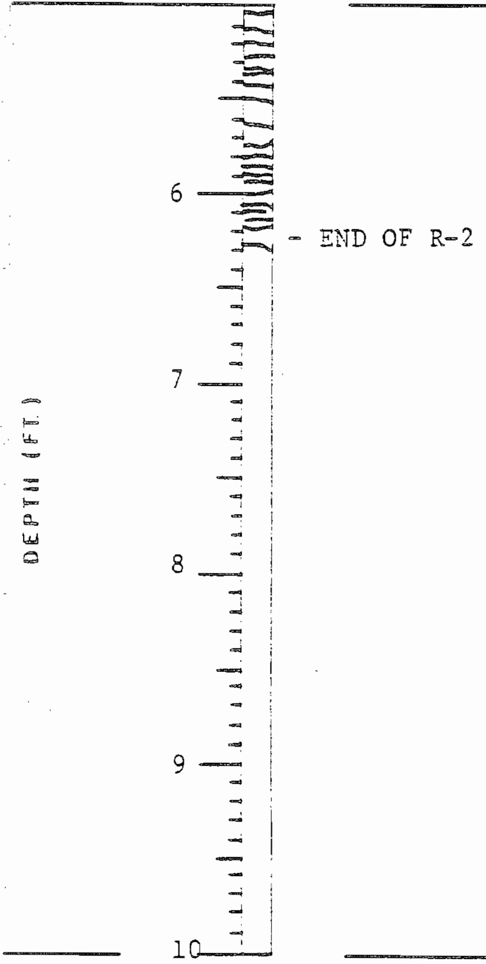
E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>7205 |
| LOGGED BY<br>T. Nowack | DATE<br>10-14-85 | PROTECTION LEVEL<br>C/D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-2 | DEPTH<br>36.3 FT. TO 42.8 FT. |
| CORE RECOVERY<br>6.3 FT. | RQD<br>10 % | CORE QUALITY<br>Poor |

| CORE RECOVERY (FT.) | .3 FT. CORE RECOVERY | ROCK DESCRIPTION AND IDENTIFICATION |
|---|---|---|
| | | DOLOMITE GRAY TO DARK GRAY |



TOTAL 6.5 FT    TOTAL .65 (FT)

97 %    10 %

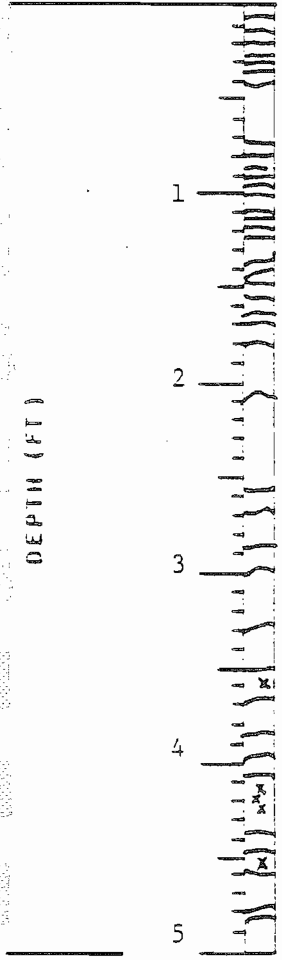
ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 7205 |
| LOGGED BY T. Nowack | DATE 10-14-85 | PROTECTION LEVEL C/D |
| CORE DIAMETER NX | CORE RUN NO. R-3 | DEPTH 42.8 FT. TO 49.6 FT. |
| CORE RECOVERY 6.9 FT. | RQD 25 % | CORE QUALITY Poor |

| CORE RECOVERY (FT.) | .3 FT. CORE RECOVERY | ROCK DESCRIPTION AND IDENTIFICATION |
|---|---|---|
| | | DOLOMITE GRAY TO DARK GRAY |



CHIPS

ANHYDRITE/CALCITE FILLED VUGS

TOTAL 6.8 (FT)
100+ %

TOTAL 1.7 (FT)
25 %

E.C. JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

PROJECT NO. 4844-09

PROJECT NAME Love Canal

BORING NO. 7205

LOGGED BY T. Nowack

DATE 10-14-85

PROTECTION LEVEL C/D

CORE DIAMETER NX

CORE RUN NO. R-3

DEPTH 47.6 FT. TO 49.5 FT.

CORE RECOVERY 6.9 FT.

RQD 25 %

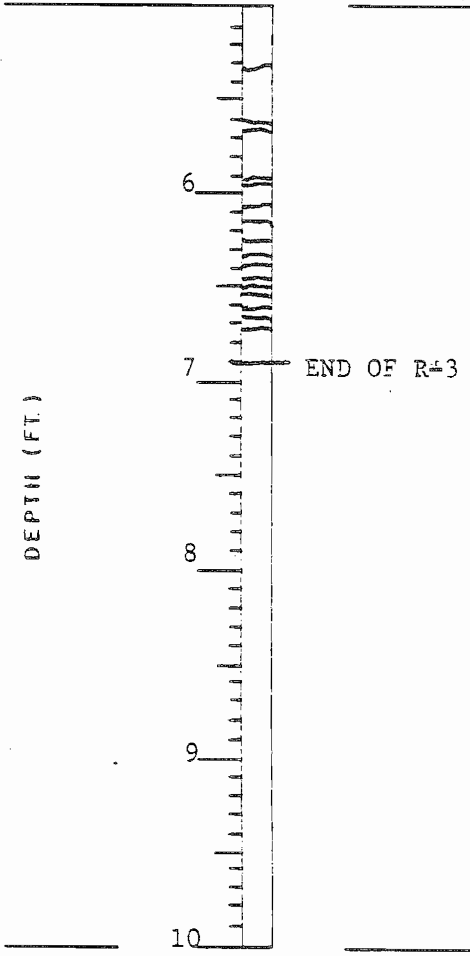
CORE QUALITY Poor

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

DOLOMITE GRAY TO DARK GRAY



TOTAL 6.8 ( FT )

100± %

TOTAL 1.7 (FT )

25 %

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

**TASK VC**

**BORING NO.** 8210

**LIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-09

**ONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/27/85

**COMPLETED** 10/27/85

**METHOD** DRIVE/WASH

**CASING SIZE** 4.0"

**HNU** 11.7/10.2

**PROTECTION LEVEL** D

**ROUND EL.** 573.7'

**SOIL DRILLED** 29.0'

**TOTAL DEPTH** 44.9'

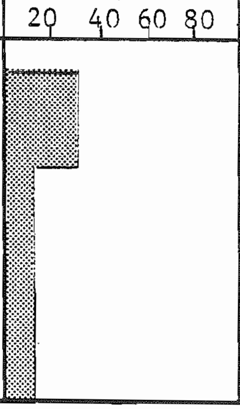
**▽ BELOW GROUND** NA

**LOGGED BY** P. Baker

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | TOPSOIL 0.3 | | | 573.7 |
| | | S-1 | N | N | 2.0/1.1 | 0.2 | BROWN SILTY FINE SAND, MOIST, MEDIUM DENSE, UNIFORMLY GRADED | SP | 2-5-7-11 | |
| 5 | | S-2 | N | N | 2.0/1.6 | 0.2 | (ALLUVIAL SAND) 5.5 | | 4-17-21-23 | 568.7 |
| | 0.2 | | | | | | REDDISH-BROWN SILTY CLAY, MOIST, STIFF FRACTURES, SLIGHTLY PLASTIC | CL | | |
| 10 | | | | | | | | | | 563.7 |
| | | | | | | | (LACUSTRINE CLAY) 12.0 | | | |
| | | S-3 | N | N | 2.0/2.0 | 0.2 | REDDISH-GRAY SILTY CLAY, WET, PLASTIC, SOFT | | WOH-WOH-2 | |
| 15 | 0.2 | | | | | | | | | 558.7 |
| | | | | | | | (LACUSTRINE CLAY) | CL | | |
| | | S-4 | N | N | 2.0/2.0 | 0.2 | | | WOH-WOH-2 | |
| 20 | 0.2 | | | | | | | | | 553.7 |
| | | | | | | | 22.0 | | | |
| | | S-5 | N | N | 2.0/2.0 | 0.2 | BROWN SILTY SAND WITH SOME GRAVEL AND CLAY, ABOUT 20% GRAVEL, MOIST, SLIGHTLY PLASTIC, WIDELY GRADED | | 2-7-11-14 | |
| 25 | 0.2 | | | | | | | SM<br>ML | | 548.7 |
| | | | | | | | | | 11-28-50 | |
| | | S-6 | N | N | 1.5/0.8 | 0.2 | (GLACIAL TILL) 29.0 | | RQD %<br>20 40 60 80 | |
| 30 | | | | | | | BEDROCK: GRAY DOLOMITE SEE ROCK LOGS FOR DESCRIPTION OF FRACTURES | | | 543.7 |
| | | R-1 | | | | | | | | |
| 35 | | | | | | | | | | 538.7 |
| | | R-2 | | | | | | | | |
| 40 | | | | | | | | | | 533.7 |



*U: THIN WALL TUBE   S: SPLIT SPOON   R: ROCK

# OVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

**TASK VC**

**BORING NO.** 8210

**LIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-09

**ONTRACTOR:** J. MATHES ASSOC

**DATE STARTED** 10/27/85

**COMPLETED** 10/27/85

**METHOD** NX CORE

**CASING SIZE** 3.0"

**HNU** 11.7 / 10.2

**PROTECTION LEVEL** D

**ROUND EL.** 573.7'

**SOIL DRILLED** 29.0'

**TOTAL DEPTH** 44.9'

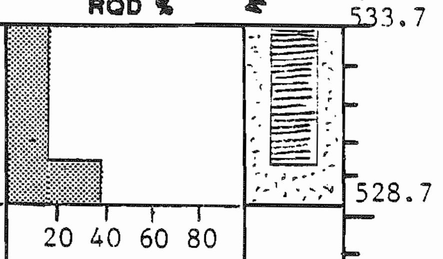
**▽ BELOW GROUND**

**LOGGED BY** P. Baker

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE | CLP | QC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | GRAY DOLOMITE | |
| | | R-2 | | N | N | | | | |
| | | R-3 | | N | N | | | | |
| 45 | | | | | | | | BOTTOM OF BORING AT 44.9 FEET | |
| 50 | | | | | | | | | |
| 55 | | | | | | | | | |
| 60 | | | | | | | | | |
| 65 | | | | | | | | | |
| 70 | | | | | | | | | |
| 75 | | | | | | | | | |
| 80 | | | | | | | | | |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

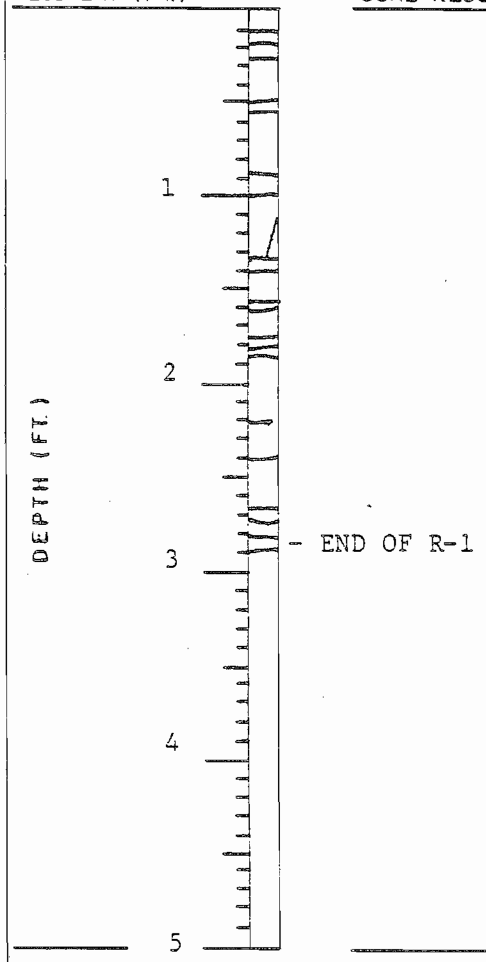
| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>8210 |
| LOGGED BY<br>P. Baker/S. Waite | DATE<br>10-27-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-1 | DEPTH<br>29.8 FT. TO 33.7 FT. |
| CORE RECOVERY<br>2.9 FT. | RQD<br>30 % | CORE QUALITY<br>Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

-DOLOMITE GRAY
-WEATHERED GYPSUM VUGS



TOTAL 3.9 (FT) TOTAL .95 (FT)

78 % 30 %

E.C.JORDAN CO.

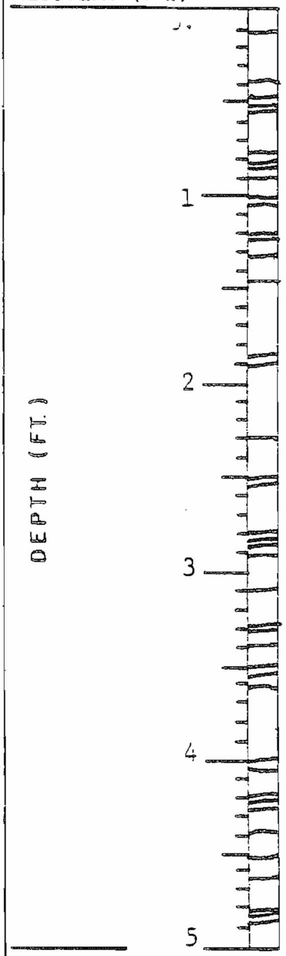
# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>8210 |
| LOGGED BY<br>P. Baker/S. Waite | DATE<br>10-28-85 | PROTECTION LEVEL<br>D |

| | | |
|---|---|---|
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-2 | DEPTH<br>33.7 FT. TO 43.7 FT. |
| CORE RECOVERY<br>8.9 FT. | RQD<br>17 % | CORE QUALITY<br>Very Poor |

CORE RECOVERY (FT.)



.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

- DOLOMITE GRAY
- GYPSUM MINERALS PRESENT
- SOLUTION VUGS

TOTAL 10 ( FT )

89 %

TOTAL 1.2 ( FT )

17 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

**PROJECT NO.** 4844-09

**PROJECT NAME** Love Canal

**BORING NO.** 8210

**LOGGED BY** P. Baker/S. Waite

**DATE** 10-28-85

**PROTECTION LEVEL** D

**CORE DIAMETER** NX

**CORE RUN NO.** R-2

**DEPTH** 33.7 FT. TO 43.7 FT.

**CORE RECOVERY** 8.9 FT.

**RQD** 17 %

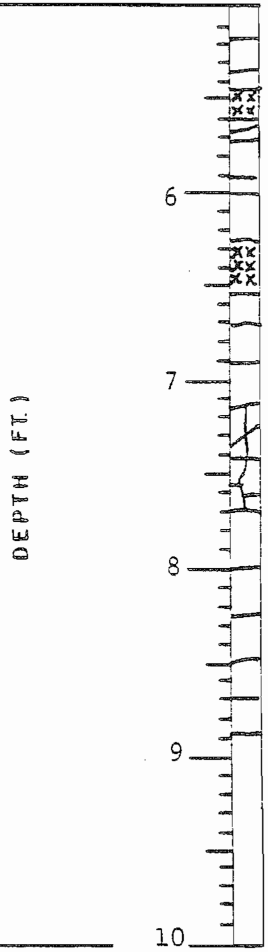
**CORE QUALITY** Very Poor

**CORE RECOVERY (FT.)**

**.3 FT. CORE RECOVERY**

**ROCK DESCRIPTION AND IDENTIFICATION**

- DOLOMITE GRAY



A WASHED SEAM (CLAY?)
APPEARS TO CORRESPOND
WITH LOSS OF WATER
CIRCULATION

- END OF R-2

TOTAL 10.0 ( FT )

89 %

TOTAL 1.5 ( FT )

17 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

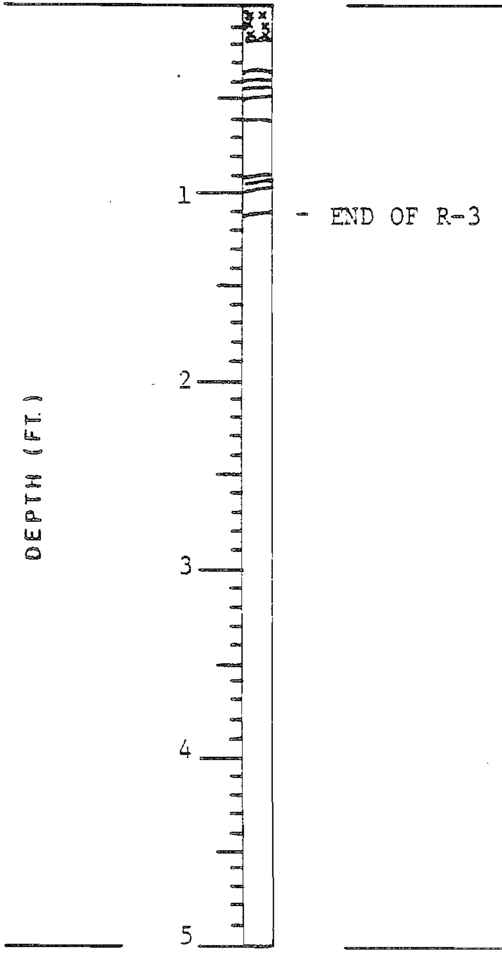
| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>8210 |
| LOGGED BY<br>P. Baker/S. Waite | DATE<br>10-28-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-3 | DEPTH<br>43.7 FT. TO 44.8 FT. |
| CORE RECOVERY<br>1.1 FT. | RQD<br>35 % | CORE QUALITY<br>Fair |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

DOLOMITE GRAY



TOTAL 1.1 ( FT )

100 %

TOTAL 0.3 ( FT)

35 %

E.C.JORDAN CO.

LOVE CANAL REMEDIAL PROJECT
LONG TERM MONITORING

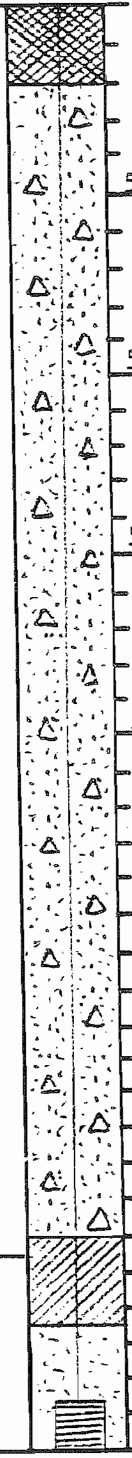
TASK VC

BORING NO. 9205

LIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
PROJECT NO. 4844.09
CONTRACTOR: J. MATHES ASSOC.
DATE STARTED 10/28/85
COMPLETED 10/28/85
METHOD DRIVE/WASH
CASING SIZE 4.0 IN.
HNU 11.7/10.2
PROTECTION LEVEL D
ROUND EL. 574.5'
SOIL DRILLED 32.0'
TOTAL DEPTH 49.7'
BELOW GROUND NA
LOGGED BY P. BAKER
CHECKED BY R. Lewis
DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE # SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 574.5 |
| | | | | | | | TOP SOIL 0.7 | | | |
| | | S-1 | N | N | 2.0<br>1.2 | 0.3 | DARK BROWN SILTY CLAY W/SOME SAND AND GRAVEL, ORGANICS, MOIST (FILL) 3.7 | CL | 3-3-5-5 | |
| | 0.2 | | | | | | | | | |
| 5 | | S-2 | N | N | 2.0<br>1.2 | 0.3 | REDDISH-BROWN MOTTLED SILTY CLAY, STIFF, MOIST, SLIGHTLY PLASTIC, FRACTURES | CL | 5-7-12-13 | 569.5 |
| | 0.2 | | | | | | | | | |
| 10 | | | | | | | (LACUSTRINE CLAY) 12.0 | | | 564.5 |
| | | S-3 | N | N | 2.0<br>2.0 | 0.3 | REDDISH-GRAY SILTY CLAY SOFT, WET, PLASTIC | CL | 1-1-2-2 | |
| 15 | 0.2 | | | | | | | | | 559.5 |
| | | S-4 | N | N | 2.0<br>2.0 | 0.3 | (LACUSTRINE CLAY) B.O. | | WOH-WOH-2-2 | |
| | 0.2 | | | | | | TRACES OF SAND AND GRAVEL 21.0 | CL | | |
| 20 | | | | | | | | | | 554.5 |
| | | S-5 | N | N | 2.0<br>1.2 | 0.3 | BROWN SILTY SAND W/SOME GRAVEL AND TRACES OF CLAY, WET, SLIGHTLY PLASTIC FINES, WELL GRADED | SM<br>ML | 28-50/5" | |
| 25 | | | | | | | | | | 549.5 |
| | | S-6 | N | N | 2.0<br>1.2 | 0.3 | (GLACIAL TILL) | | 9-38-50/5" | |
| 30 | | | | | | | | | | 544.5 |
| | | S-7 | N | N | 0.5<br>0.5 | | 33.0 | | 16-50/6" | |
| | | | | | | | BEDROCK: GRAY DOLOMITE SEE ROCK LOG FOR DESCRIPTION OF FRACTURES | | | |
| 35 | | | | | | | | | | 539.5 |
| | | | | | | | WOH = WEIGHT OF HAMMER | | | |
| 40 | | | | | | | | | | 534.5 |

WELL DATA



*U: THIN WALL TUBE   S: SPLIT SPOON   R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 9205

| | | | |
|---|---|---|---|
| **LIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION | | | **PROJECT NO.** 4844.09 |
| **ONTRACTOR:** J. MATHES ASSOC. | **DATE STARTED** 10/28/85 | | **COMPLETED** 10/28/85 |
| **METHOD** NX CORE | **CASING SIZE** 3.0" | **HNU** 11.7 / 10.2 | **PROTECTION LEVEL** D |
| **ROUND EL.** 574.5' | **SOIL DRILLED** 32.0' | **TOTAL DEPTH** 49.7' | ▽ **BELOW GROUND** |
| **LOGGED BY** P. BAKER | **CHECKED BY** L. Lewis | **DATE** 3/24/86 | |

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 534.5 |
| | | R-1 | | | | | GRAY DOLOMITE | | | | |
| 45 | | R-2 | | | | | | | | | 529.5 |
| | | | | | | | 49.7 | | | | |
| 50 | | | | | | | | | | | 524.5 |
| | | | | | | | BOTTOM OF BORING AT 49.7 FEET | | | | |
| 55 | | | | | | | | | | | |
| 60 | | | | | | | | | | | |
| 65 | | | | | | | | | | | |
| 70 | | | | | | | | | | | |
| 75 | | | | | | | | | | | |
| 80 | | | | | | | | | | | |

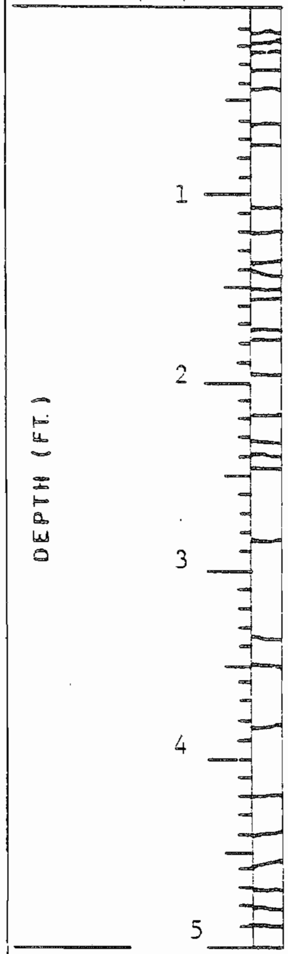
***U:** THIN WALL TUBE **S:** SPLIT SPOON **R:** ROCK

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>9205 |
| LOGGED BY<br>P. Baker/L. Espy | DATE<br>10-29-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-1 | DEPTH<br>34.5 FT. TO 43.5 FT. |
| CORE RECOVERY<br>8.2 FT. | RQD<br>31 % | CORE QUALITY<br>Fair |

CORE RECOVERY (FT.)



TOTAL 9.0 ( FT )

91 %

.3 FT. CORE RECOVERY

TOTAL 1.8 (FT )

31 %

ROCK DESCRIPTION AND IDENTIFICATION

- DOLOMITE GRAY
- GYPSUM AND ANHYDRITE CRYSTALS

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 9205 |
| LOGGED BY P. Baker/L. Espy | DATE 10-29-85 | PROTECTION LEVEL D |

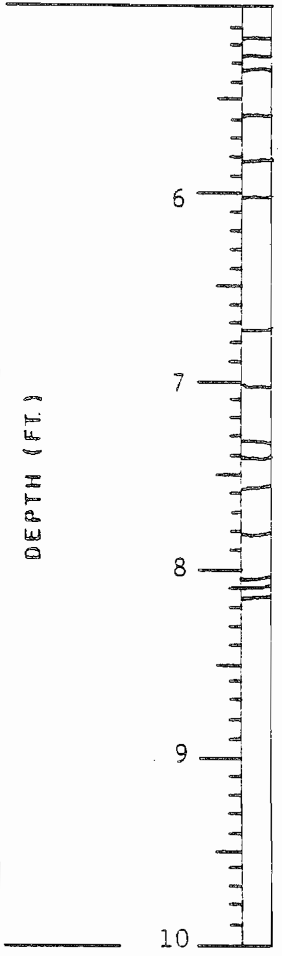
| | | |
|---|---|---|
| CORE DIAMETER NX | CORE RUN NO. R-1 | DEPTH 34.5 FT. TO 43.5 FT. |
| CORE RECOVERY 8.2 FT. | RQD 31 % | CORE QUALITY Fair |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

- DOLOMITE GRAY
- GYPSUM AND ANHYDRITE CRYSTALS



- END OF R-1

TOTAL 8.2 (FT ) TOTAL 1.8 (FT )

91 % 31 %

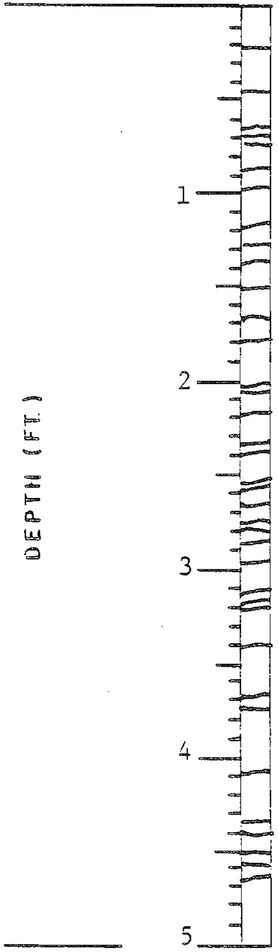
ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>9205 |
| LOGGED BY<br>P. Baker/L. Espy | DATE<br>10-29-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-2 | DEPTH<br>43.5 FT. TO 49.7 FT. |
| CORE RECOVERY<br>6.0 FT. | RQD<br>12 % | CORE QUALITY<br>Very Poor |

CORE RECOVERY (FT.)



TOTAL 6.2 (FT)

96 %

.3 FT. CORE RECOVERY

TOTAL .75 ( FT )

12 %

ROCK DESCRIPTION AND IDENTIFICATION

-DOLOMITE GRAY
-GYPSUM AND ANHYDRITE CRYSTALS

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

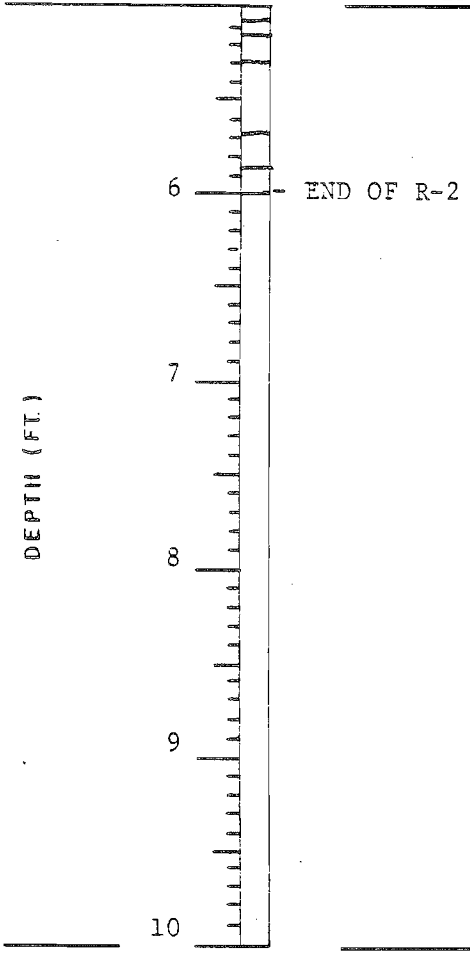
| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>9205 |
| LOGGED BY<br>P. Baker/L. Espy | DATE<br>10-29-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-2 | DEPTH<br>43.5 FT. TO 49.7 FT. |
| CORE RECOVERY<br>6.0 FT. | RQD<br>12 % | CORE QUALITY<br>Very Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

- DOLOMITE GRAY
- GYPSUM AND ANHYDRITE CRYSTALS



TOTAL 6.2 (FT )

96 %

TOTAL .75 (FT )

12 %

**LOVE CANAL REMEDIAL PROJECT**
**LONG TERM MONITORING**

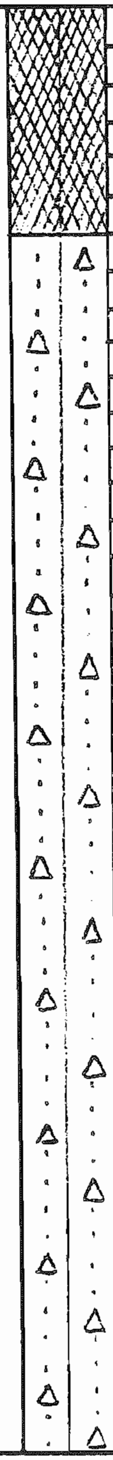
**TASK VC**

**BORING NO.** 9210

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
PROJECT NO. 4844.09
CONTRACTOR: J. MATHES ASSOC.
DATE STARTED 11/20/85
COMPLETED 11/23/85
METHOD DRIVE/WASH
CASING SIZE 4.0 IN.
HNU 11.7 (10.2)
PROTECTION LEVEL D
GROUND EL. 582.4'
SOIL DRILLED 46.2 FT.
TOTAL DEPTH 83.2'
▽ BELOW GROUND NA
LOGGED BY M. MUZZY
CHECKED BY L. Lewis
DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | ELEV (FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | TOP SOIL 0.5 | | | 582.4 |
| | 0.2 | S-1 | ☒ | N | N | 2.0/1.0 | 0.2 | BROWN TO GRAY CLAY AND SAND, TRACE OF GRAVEL, STIFF TO DENSE, | | 4-6-8-10 | |
| 5 | 0.2 | S-2 | ☒ | N | N | 2.0/1.6 | 5.0 | (FILL) 7.0 | CL<br>SM | 12-21-23-20 | 577.4 |
| 10 | | | | | | | | REDDISH-BROWN SILTY CLAY, MOIST, SLIGHTLY PLASTIC, STIFF, FRACTURES | CL | 4-6-11-15 | 572.4 |
| | 0.2 | S-3 | ☒ | N | N | 2.0/1.7 | N.A. | | | | |
| 15 | | | | | | | | (LACUSTRINE CLAY) | | | 567.4 |
| | 0.1 | S-4 | ☒ | N | N | 2.0/2.0 | 0.1 | | CL | 6-13-15-17 | |
| 20 | | | | | | | | 21.0 | | | 562.4 |
| | 0.1 | S-5 | ☒ | N | N | 2.0/2.0 | 0.2 | REDDISH-GRAY SILTY CLAY, SOFT, WET, PLASTIC | CL | 1-1-1-2 | |
| 25 | | | | | | | | (LACUSTRINE CLAY) | | | 557.4 |
| | 0.1 | S-6 | ☒ | N | N | 2.0/2.0 | 0.1 | | CL | WOH-WOH-2-3 | |
| 30 | | | | | | | | BROWN SILTY FINE SAND W/TRACE OF GRAVEL, MOIST SLIGHTLY PLASTIC, DENSE, WIDELY GRADED | | | 552.4 |
| | 0.1 | S-7 | ☒ | N | N | 1.3/1.0 | 0.1 | | SM<br>ML | 40-44-50/0.3 | |
| 35 | | | | | | | | (GLACIAL TILL) | | | 547.4 |
| | 0.1 | S-8 | ☒ | N | N | 1.9/1.0 | 0.1 | | SM<br>ML | 9-32-33-50 | 542.4 |
| 40 | | | | | | | | | | | |

WELL DATA



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 9210

**LIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844.09

**ONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 11/20/85

**COMPLETED** 11/23/85

**METHOD** DRIVE/WASH

**CASING SIZE** 4.0 IN.

**HNU** 11.7/10.2

**PROTECTION LEVEL** D

**ROUND EL.** 582.4'

**SOIL DRILLED** 46.2 FT.

**TOTAL DEPTH** 83.2 FT.

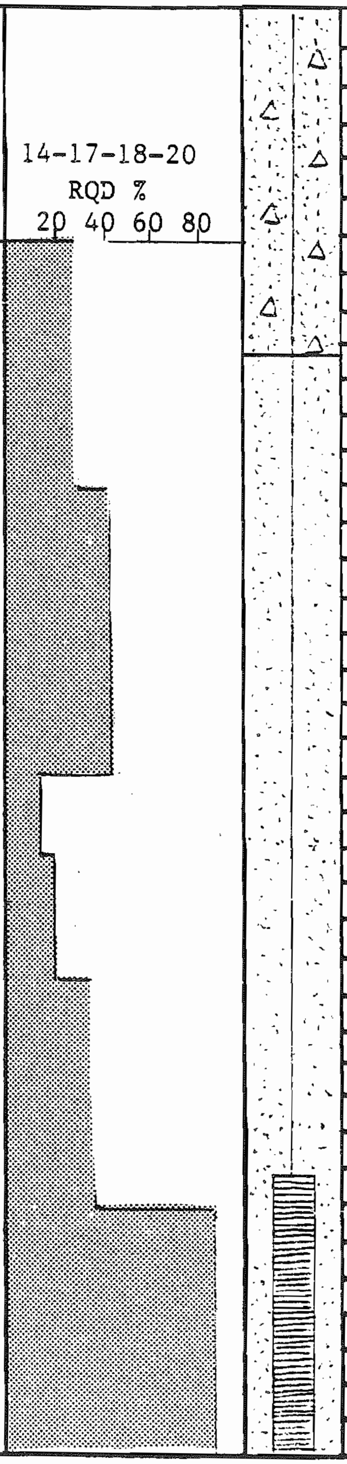
**▽ BELOW GROUND**

**LOGGED BY** M. MUZZY

**CHECKED BY** R. Lewis

**DATE** 3/24/86

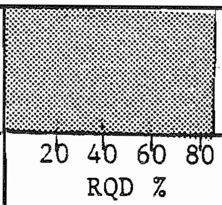
| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 542.4 |
| | 0.1 | S-9 | ☒ | N | N | 2.0<br>1.0 | 0.1 | (GLACIAL TILL) | SM<br>ML | 14-17-18-20 | |
| 45 | | | | | | | | | | RQD % | 537.4 |
| | | | | | | | | 46.2 | | | |
| | | R-1 | | | | | | BEDROCK: GRAY DOLOMITE<br>SEE ROCK LOG FOR DESCRIPTION<br>AND FRACTURES | | | |
| 50 | | | | | | | | | | | 532.4 |
| 55 | | | | | | | | | | | 527.4 |
| | | R-2 | | | | | | | | | |
| 60 | | | | | | | | | | | 522.4 |
| | | R-3 | | | | | | | | | |
| | | R-4 | | | | | | | | | |
| 65 | | | | | | | | | | | 517.4 |
| | | R-5 | | | | | | | | | |
| 70 | | | | | | | | | | | 512.4 |
| | | R-6 | | | | | | | | | |
| 75 | | | | | | | | | | | 507.4 |
| 80 | | | | | | | | | | | 502.4 |

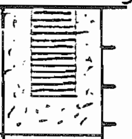


*U: THIN WALL TUBE   S: SPLIT SPOON   R: ROCK

| | | |
|---|---|---|
| LOVE CANAL REMEDIAL PROJECT<br>LONG TERM MONITORING | TASK VC | BORING NO. 9210 |
| LIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION | | PROJECT NO. 4844.09 |
| ONTRACTOR: J. MATHES ASSOC. | DATE STARTED 11/20/85 | COMPLETED 11/23/85 |
| METHOD NX CORE | CASING SIZE 3.0" | HNU 11.7 / 10.2 |
| PROTECTION LEVEL D | | |
| ROUND EL. 582.4' | SOIL DRILLED 46.2 FT. | TOTAL DEPTH 83.2 |
| ▽ BELOW GROUND | | |
| OGGED BY M. MUZZY | CHECKED BY R. Lewis | DATE 3/24/86 |

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 502.4 |
| | | R-6 | | | | | GRAY DOLOMITE | | | | |
| | | | | | | | BOTTOM OF BORING AT 83.2 FEET | | | | |
| 85 | | | | | | | | | | | 497.4 |
| 90 | | | | | | | | | | | |
| 95 | | | | | | | | | | | |
| 100 | | | | | | | | | | | |
| 105 | | | | | | | | | | | |
| 110 | | | | | | | | | | | |
| 115 | | | | | | | | | | | |
| 120 | | | | | | | | | | | |





*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

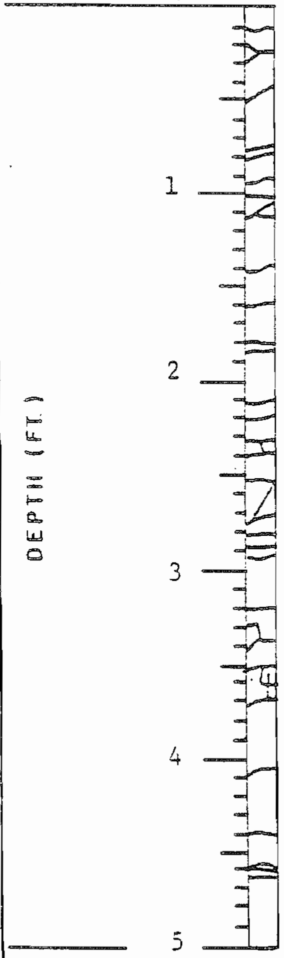
SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>9210 |
| LOGGED BY<br>M. Muzzy | DATE<br>11-22-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-1 | DEPTH<br>46.2 FT. TO 53.2 FT. |
| CORE RECOVERY<br>6.3 FT. | RQD<br>27 % | CORE QUALITY<br>Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



GRAY DOLOMITE WITH GYPSUM SEAMS AND CORRAL VUGS

TOTAL 7.0 (FT)

90 %

TOTAL 1.87 (FT)

27 %

ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

PROJECT NO. 4844-09

PROJECT NAME Love Canal

BORING NO. 9210

LOGGED BY M. Muzzy

DATE 11-22-85

PROTECTION LEVEL D

CORE DIAMETER NX

CORE RUN NO. R-1

DEPTH 46.2 FT. TO 53.2 FT.

CORE RECOVERY 6.3 FT.

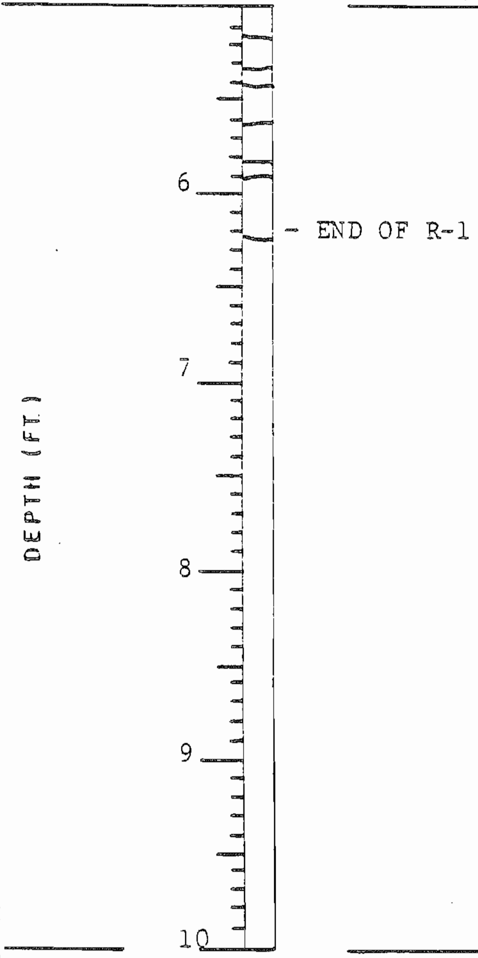
RQD 27 %

CORE QUALITY Poor

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



GRAY DOLOMITE WITH GYPSUM SEAMS AND CORAL VUGS

TOTAL 7.0 (FT )

90 %

TOTAL 1.87 (FT )

27 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 9210 |
| LOGGED BY M. Muzzy | DATE 11-22-85 | PROTECTION LEVEL D |

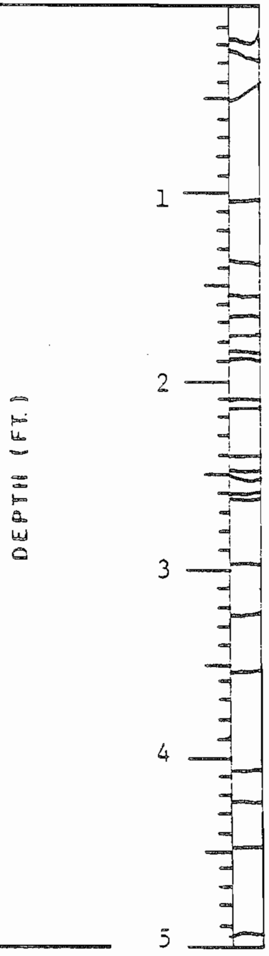
| | | |
|---|---|---|
| CORE DIAMETER NX | CORE RUN NO. R-2 | DEPTH 53.2 FT. TO 61.0 FT. |
| CORE RECOVERY 8.1 FT. | RQD 44 % | CORE QUALITY Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1
LITTLE WATER LOSS



TOTAL 7.8 ( FT ) TOTAL 3.45 ( FT )

100 % 44 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

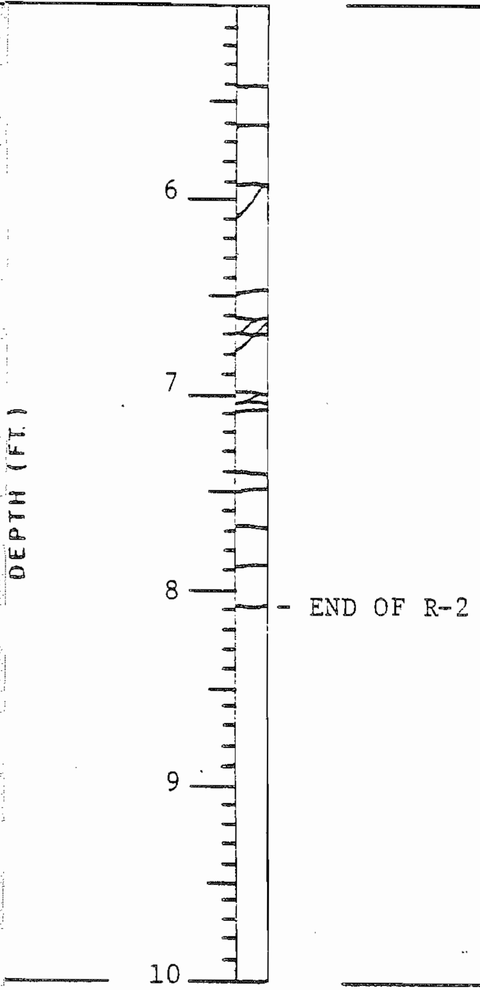
| | | |
|---|---|---|
| ROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>9210 |
| OGGED BY<br>M. Muzzy | DATE<br>11-22-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-2 | DEPTH<br>53.2 FT. TO 61.0 FT. |
| ORE RECOVERY<br>8.1 FT. | RQD<br>44 % | CORE QUALITY<br>Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



TOTAL 7.8 (FT )

100 %

TOTAL 3.45 ( FT )

44 %

ECJORDANCO.

# VISUAL IDENTIFICATION OF ROCK CORES

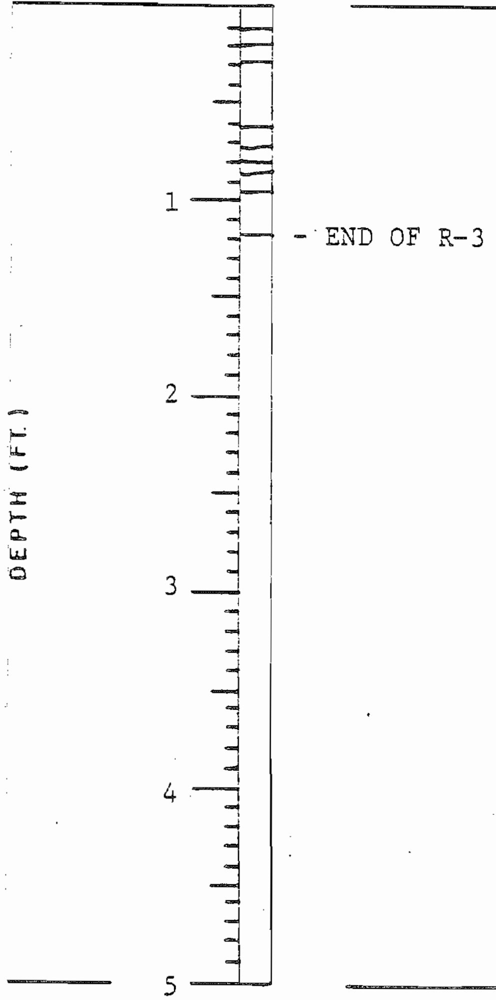
SHEET 1 OF 1

| | | |
|---|---|---|
| OJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>9210 |
| OGGED BY<br>M. Muzzy | DATE<br>11-22-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-3 | DEPTH<br>61.0 FT. TO 63.2 FT. |
| ORE RECOVERY<br>1.2 FT. | RQD<br>15 % | CORE QUALITY<br>Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



SIMILAR TO R-1

BARREL BLOCKED WITH CUTTINGS AT 63.2 FT

TOTAL 2.2 (FT)

54 %

TOTAL .33 (FT)

15 %

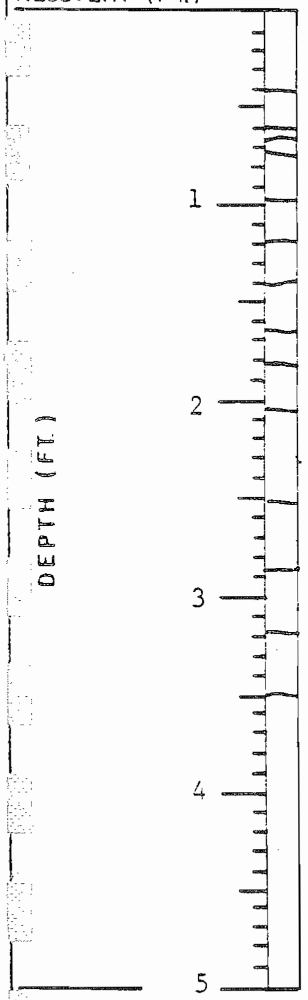
E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

| | | |
|---|---|---|
| ROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 9210 |
| LOGGED BY M. Muzzy | DATE 11-22-85 | PROTECTION LEVEL D |
| CORE DIAMETER NX | CORE RUN NO. R-4 | DEPTH 63.2 FT. TO 67.0 FT. |
| ORE RECOVERY 3.5 FT. | RQD 21 % | CORE QUALITY Poor |

| CORE RECOVERY (FT.) | .3 FT. CORE RECOVERY | ROCK DESCRIPTION AND IDENTIFICATION |
|---|---|---|
| | | SIMILAR TO R-1 |



FRACTURED GYPSUM SEAM

- END OF R-4

TOTAL 3.8 ( FT ) TOTAL 0.82 ( FT )

92 % 21 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

ROJECT NO. 4844-09

PROJECT NAME Love Canal

BORING NO. 9210

LOGGED BY M. Muzzy

DATE 11-23-85

PROTECTION LEVEL D

ORE DIAMETER NX

CORE RUN NO. R-5

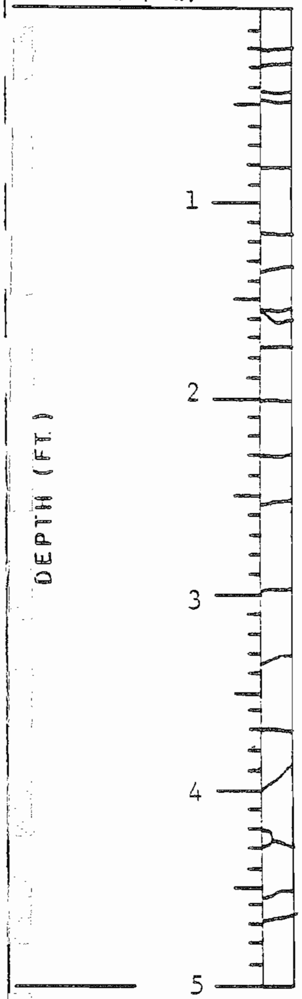
DEPTH 67.0 FT. TO 73.2 FT.

ORE RECOVERY 6.4 FT.

RQD 36 %

CORE QUALITY Poor

ORE RECOVERY (FT.)



.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1

TOTAL 6.2 ( FT )

100 %

TOTAL 2.29 ( FT )

36 %

E.C.JORDAN CO.

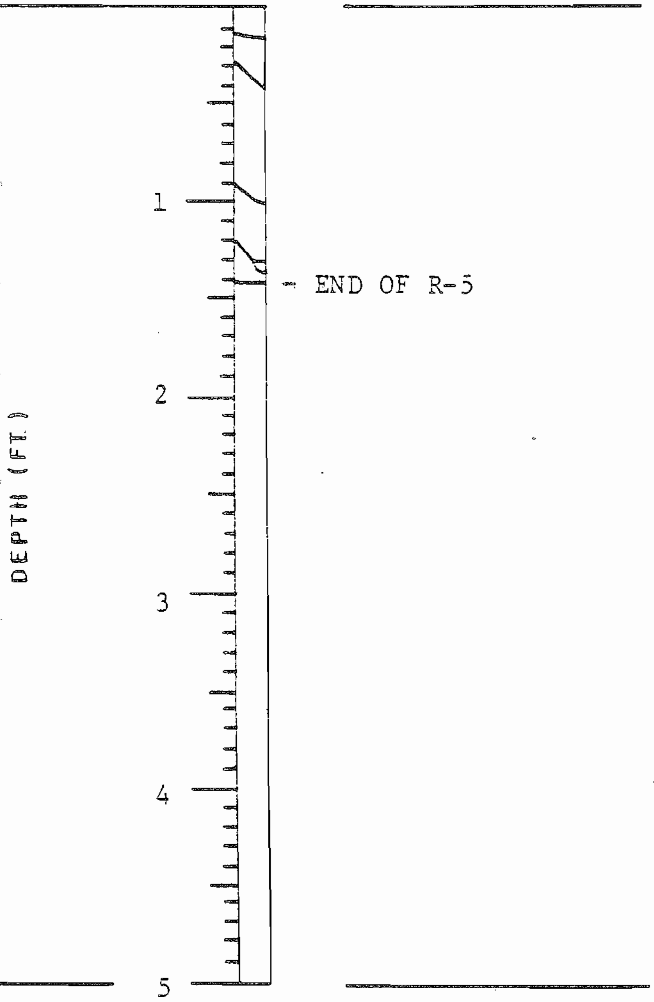
# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

| | | |
|---|---|---|
| ROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 9210 |
| LOGGED BY M. Muzzy | DATE 11-23-85 | PROTECTION LEVEL D |
| ORE DIAMETER NX | CORE RUN NO. R-5 | DEPTH 67.0 FT. TO 73.2 FT. |
| ORE RECOVERY 6.4 FT. | RQD 36 % | CORE QUALITY Poor |

ORE RECOVERY (FT.)

.3 FT. CORE RECOVERY



ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1

TOTAL 6.2 (FT )

100 %

TOTAL 2.29 (FT )

36 %

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

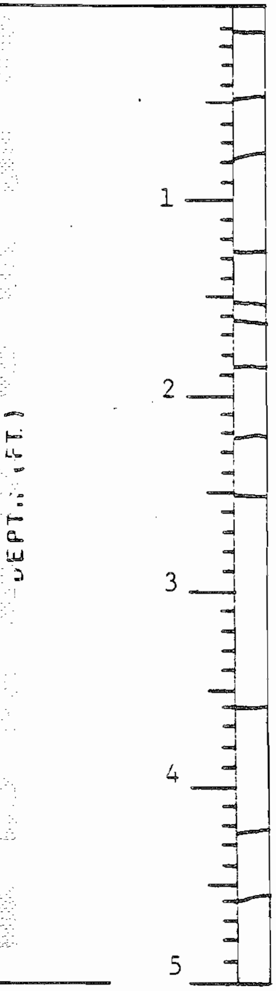
| | | |
|---|---|---|
| OJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>9210 |
| LOGGED BY<br>M. Muzzy | DATE<br>11-23-85 | PROTECTION LEVEL<br>D |
| RE DIAMETER<br>NX | CORE RUN NO.<br>R-6 | DEPTH<br>73.2 FT. TO 83.2 FT. |
| IRE RECOVERY<br>9.9 FT. | RQD<br>85 % | CORE QUALITY<br>Good |

RE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1
OCCASIONAL 1/8" TO 1/4"
PYRITE SEAMS



OTAL 10 (FT)

99 %

TOTAL 8.53 (FT)

85 %

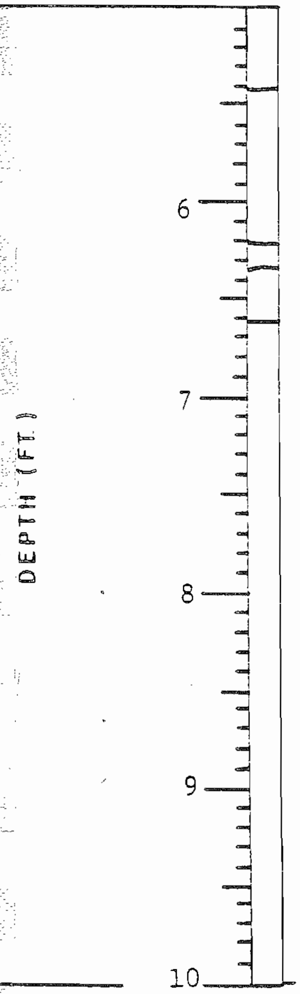
E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

| | | |
|---|---|---|
| OJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 9210 |
| LOGGED BY M. Muzzy | DATE 11-23-85 | PROTECTION LEVEL D |
| ORE DIAMETER NX | CORE RUN NO. R-6 | DEPTH 73.2 FT. TO 83.2 FT. |
| ORE RECOVERY 9.9 FT. | RQD 85 % | CORE QUALITY Good |

| ORE RECOVERY (FT.) | .3 FT. CORE RECOVERY | ROCK DESCRIPTION AND IDENTIFICATION |
|---|---|---|
| | | SIMILAR TO R-1 |



END OF R-6

TOTAL 10.0 ( FT ) TOTAL 8.53 ( FT )

99 % 85 %

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 10205

**LIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-09

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/27/85

**COMPLETED** 10/27/85

**METHOD** DRIVE/WASH

**CASING SIZE** 4.0"

**HNU** 11.7/10.2

**PROTECTION LEVEL** D

**ROUND EL.** 578.4'

**SOIL DRILLED** 39.0'

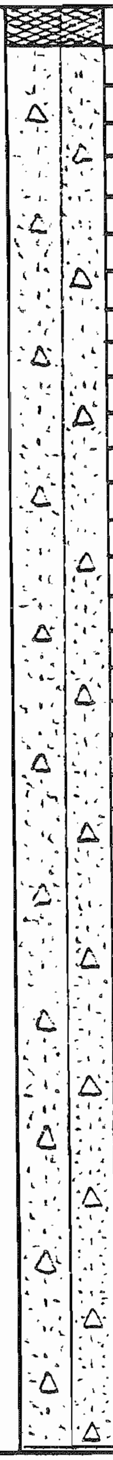
**TOTAL DEPTH** 55.1'

**▽ BELOW GROUND** NA

**LOGGED BY** J. Peterson

**CHECKED BY** R Lewis

**DATE** 3/24/86



| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | TOPSOIL 0.3 | | | | 578.4 |
| | | S-1 | ☒ | N | N | 1.5/0.6 | 0.4 | SILTY CLAY WITH SOME SAND AND GRAVEL, MOIST, STIFF, TRACE OF ORGANIC MATTER (FILL) 3.5 | ML | 2-2-16 | | |
| | 0.4 | | | | | | | | | | | |
| 5 | | S-2 | ☒ | N | N | 2.0/1.2 | 0.4 | REDDISH-BROWN SILTY CLAY, MOIST, SLIGHTLY PLASTIC, STIFF, FRACTURES | CL | 6-6-6-8 | | 575.4 |
| | 0.4 | | | | | | | (LACUSTRINE CLAY) | | | | |
| 10 | | S-3 | ☒ | N | N | 2.0/1.1 | 0.5 | | CL | 7-12-16-23 | | 568.4 |
| | | | | | | | | 13.0 | | | | |
| | 0.4 | | | | | | | REDDISH-GRAY SILTY CLAY, WET, PLASTIC, SOFT | | | | |
| 15 | | | | | | | | | | | | 563.4 |
| | | S-4 | ☒ | N | N | 2.0/2.0 | 0.4 | | | WOH-WOH-2-6 | | |
| | | | | | | | | (LACUSTRINE CLAY) | CL | | | |
| 20 | | | | | | | | | | | | 558.4 |
| | | S-5 | ☒ | N | N | 2.0/1.7 | 0.4 | | CL | WOH-WOH-2 | | |
| | | | | | | | | 25.0 | | | | |
| 25 | | | | | | | | | | | | 553.4 |
| | | | | | | | | TRACES OF GRAVEL 27.0 | | | | |
| | 0.4 | S-6 | ☒ | N | N | 2.0/1.2 | 0.4 | BROWN GRAVELLY SILTY SAND, ABOUT 20% GRAVEL, WET, NON-PLASTIC FINES, WIDELY GRADED, DENSE | SM | 16-34-63/0.5 | | |
| 30 | | | | | | | | | | | | 548.4 |
| | | S-7 | ☒ | N | N | 2.0/1.6 | 0.4 | (GLACIAL TILL) | SM | 12-15-19-50 | | |
| 35 | 0.4 | | | | | | | | | | | 543.4 |
| | | S-8 | ☒ | N | N | 0.7/0.7 | 0.4 | | | 50-50/0.3' | | |
| | | | | | | | | 39.0 | | | | |
| 40 | | | | | | | | | | | | 538.4 |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

**TASK VC**

**BORING NO.** 10205

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-09

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/27/85

**COMPLETED** 10/27/85

**METHOD** Nx CORE

**CASING SIZE** 3.0"

**HNU** 11.7/10.2

**PROTECTION LEVEL** D

**GROUND EL.** 578.4'

**SOIL DRILLED** 39.0'

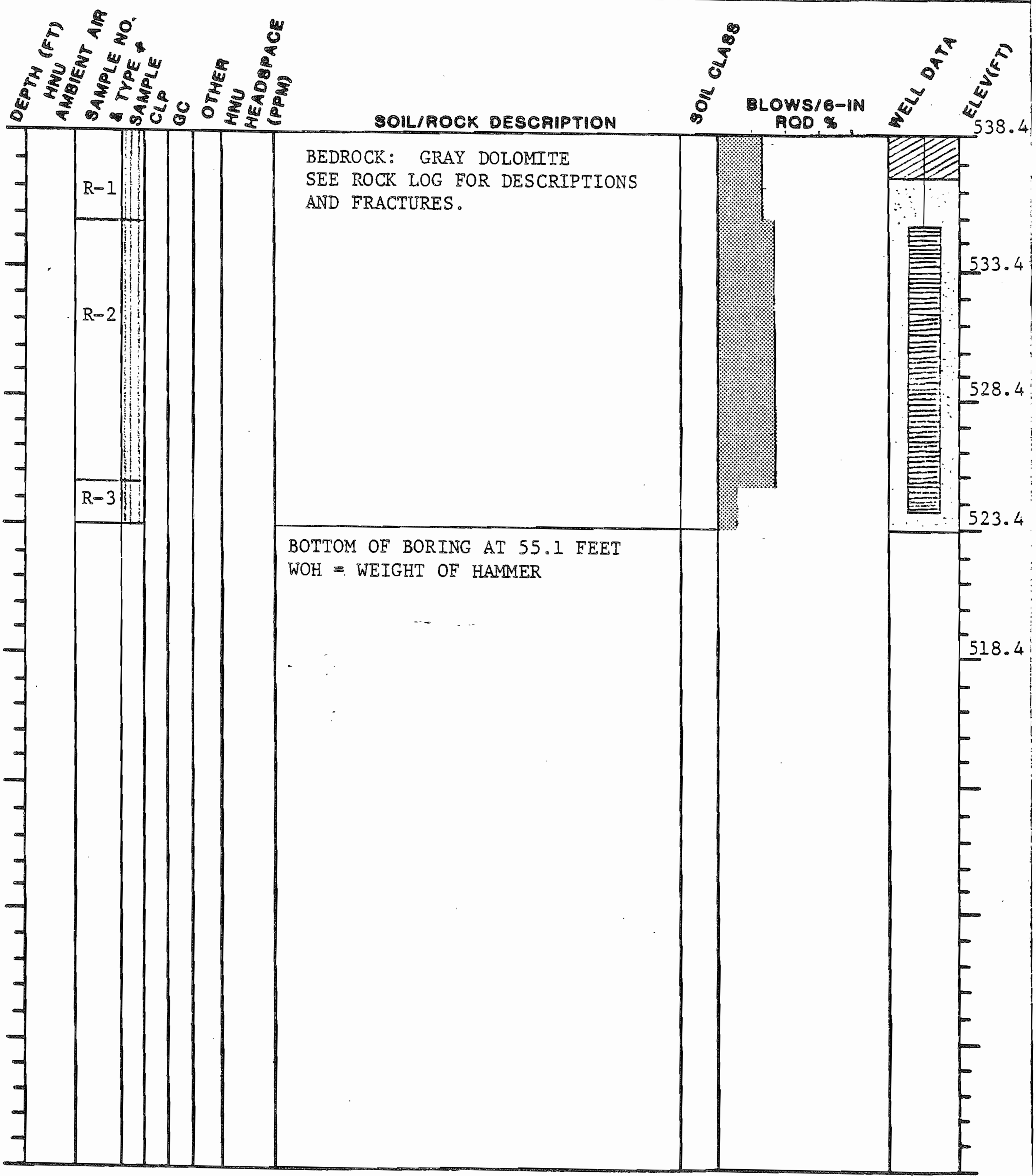
**TOTAL DEPTH** 55.1'

**▽ BELOW GROUND**

**LOGGED BY** J. Peterson

**CHECKED BY** L. Lewis

**DATE** 3/24/86



BEDROCK: GRAY DOLOMITE
SEE ROCK LOG FOR DESCRIPTIONS
AND FRACTURES.

BOTTOM OF BORING AT 55.1 FEET
WOH = WEIGHT OF HAMMER

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

**E.C.JORDAN CO.**

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

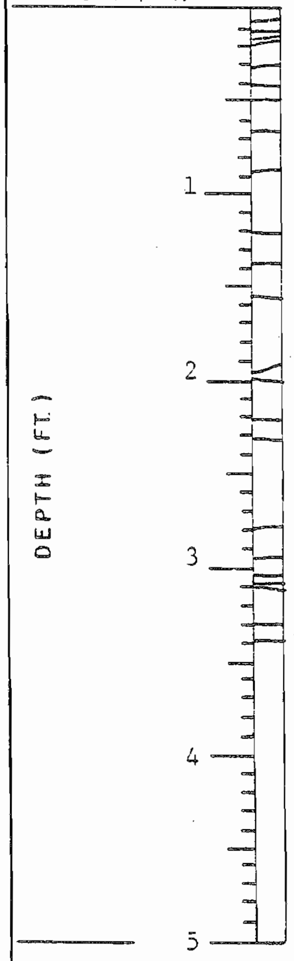
| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10205 |
| LOGGED BY P. Baker | DATE 10-25-85 | PROTECTION LEVEL D |
| CORE DIAMETER NX | CORE RUN NO. R-1 | DEPTH 40.0 FT. TO 43.3 FT. |
| CORE RECOVERY 3.3 FT. | RQD 37 % | CORE QUALITY Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

GRAY DOLOMITE WITH THIN FRACTURES FILLED WITH ANHYDRITE AND GYPSUM



- END OF R-1

TOTAL 3.3 ( FT )

100 %

TOTAL 1.25 (FT )

37 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

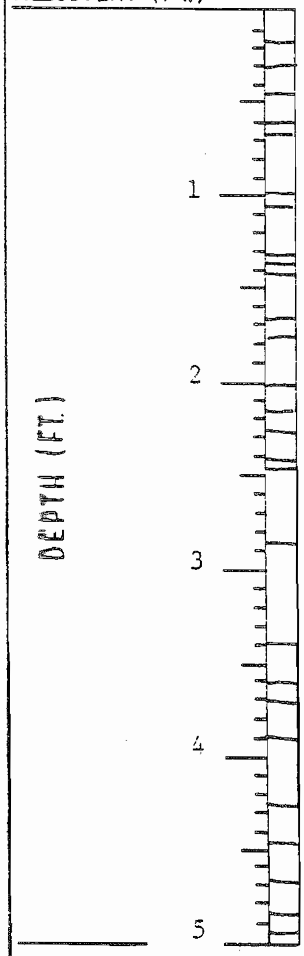
| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10205 |
| LOGGED BY<br>P. Baker | DATE<br>10-26-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-2 | DEPTH<br>43.3 FT. TO 53.3 FT. |
| CORE RECOVERY<br>9.6 FT. | RQD<br>31 % | CORE QUALITY<br>Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



TOTAL 10.0 ( FT )

96 %

TOTAL 3.1 ( FT )

31 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

PROJECT NO. 4844-09

PROJECT NAME Love Canal

BORING NO. 10205

LOGGED BY P. Baker

DATE 10-26-85

PROTECTION LEVEL D

CORE DIAMETER NX

CORE RUN NO. R-2

DEPTH 43.3 FT. TO 53.3 FT.

CORE RECOVERY 9.6 FT.

RQD 31 %

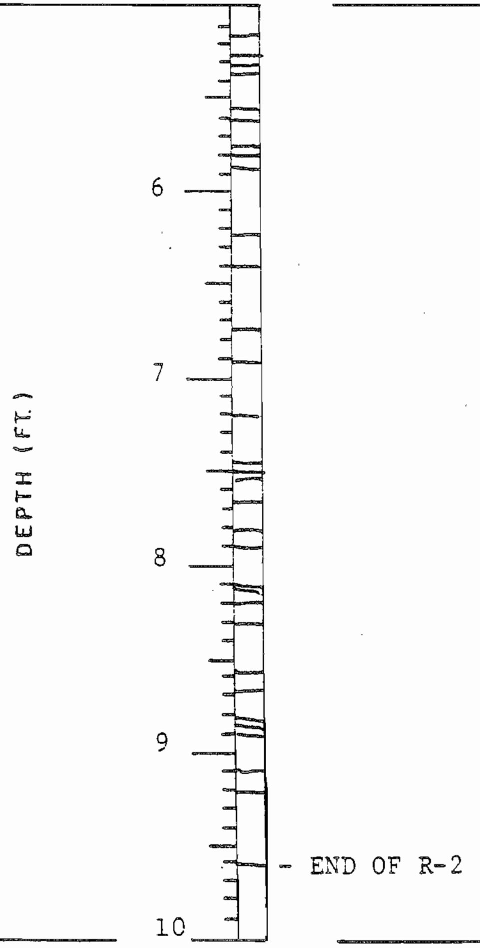
CORE QUALITY Poor

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



TOTAL 10.0 (FT) TOTAL 3.1 (FT)

96 % 31 %

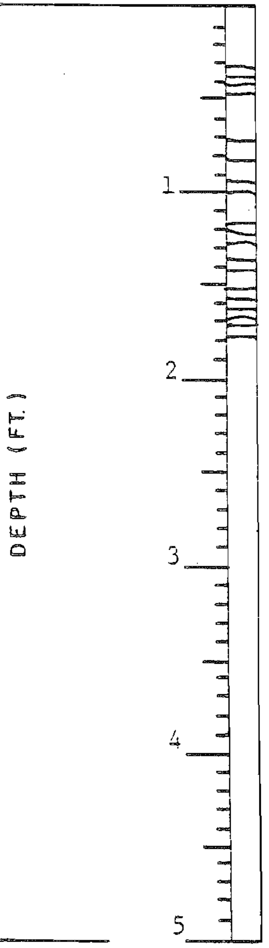
ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10205 |
| LOGGED BY P. Baker | DATE 10-26-85 | PROTECTION LEVEL D |
| CORE DIAMETER NX | CORE RUN NO. R-3 | DEPTH 53.3 FT. TO 55.1 FT. |
| CORE RECOVERY 1.8 FT. | RQD 16 % | CORE QUALITY Very Poor |

| CORE RECOVERY (FT.) | .3 FT. CORE RECOVERY | ROCK DESCRIPTION AND IDENTIFICATION |
|---|---|---|
| | | SIMILAR TO R-1 |



- END OF R-3

TOTAL 1.8 ( FT )

100 %

TOTAL 0.3 ( FT )

16 %

E.C.JORDAN CO.

LOVE CANAL REMEDIAL PROJECT
LONG TERM MONITORING

TASK VC

BORING NO. 10210

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-09

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 12/06/85

COMPLETED 12/10/85

METHOD HSA

CASING SIZE 6.25"

HNU 11.7 / (10.2)

PROTECTION LEVEL D

GROUND EL. 577.2'

SOIL DRILLED 38.6'

TOTAL DEPTH 222.3'

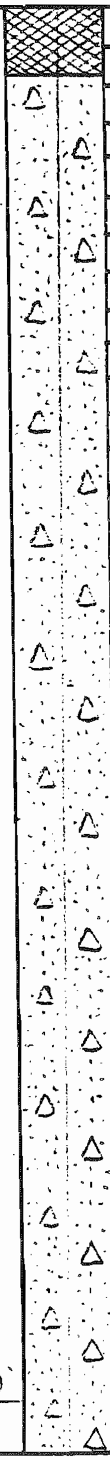
▽ BELOW GROUND NA

LOGGED BY J. Snowden

CHECKED BY L. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | 150-200 POSSIBLE MOISTURE | S-1 | Y | Y | | 0.1 | BROWN TO BLACK MOTTLED SANDY SILT WITH CLAY AND ORGANIC MATTER, FRACTURED, MOIST, STIFF, PLASTIC, (FILL) 4.5 | ML | NO BLOW COUNTS TAKEN USED CONTINUOUS SPLIT SPOON SAMPLER | 577.2 |
| 5 | 20-30 | S-2 | Y | Y | | 0.1 | BROWN SILTY FINE SAND WITH TRACES OF GRAVEL, MOIST, LOOSE, NON-PLASTIC, UNIFORMLY GRADED (ALLUVIAL SAND) 8.5 | SP | | 572.2 |
| 10 | 0-1 | S-3 | N | N | | 0-1 | REDDISH-BROWN MOTTLED SILTY CLAY VARVED, MOIST, STIFF, FRACTURES SLIGHTLY PLASTIC (LACUSTRINE CLAY) 14.0 | CL | | 567.2 |
| 15 | 0-1 | S-4 | N | N | | 0-1 | REDDISH-GRAY SILTY CLAY, WET, SOFT, PLASTIC | | | 562.2 |
| 20 | 0-1 | S-5 | N | N | | 0-1 | (LACUSTRINE CLAY) | CL | | 557.2 |
| 25 | 0-1 | S-6 | N | N | | 0-1 | BROWN SILTY SAND WITH GRAVEL, MOIST, DENSE, SLIGHTLY PLASTIC, WIDELY GRADED (GLACIAL TILL) 30.5 | SM ML | | 552.2 |
| 30 | | S-7 | | | | | | | | 547.2 |
| 35 | | | | | | | | | RQD% 20 40 60 80 | 542.2 |
| 40 | | R-1 | | | | | GRAY DOLOMITE | | | 537.2 |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

OVE CANAL REMEDIAL PROJECT
LONG TERM MONITORING

**TASK VC**

**BORING NO.** 10210

IENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-09

ONTRACTOR: J. MATHES ASSOC.

DATE STARTED 12/06/85

COMPLETED 12/10/85

METHOD Nx CORE

CASING SIZE 3.0"

HNU 11.7/10.2

PROTECTION LEVEL D

ROUND EL. 577.2'

SOIL DRILLED 38.6'

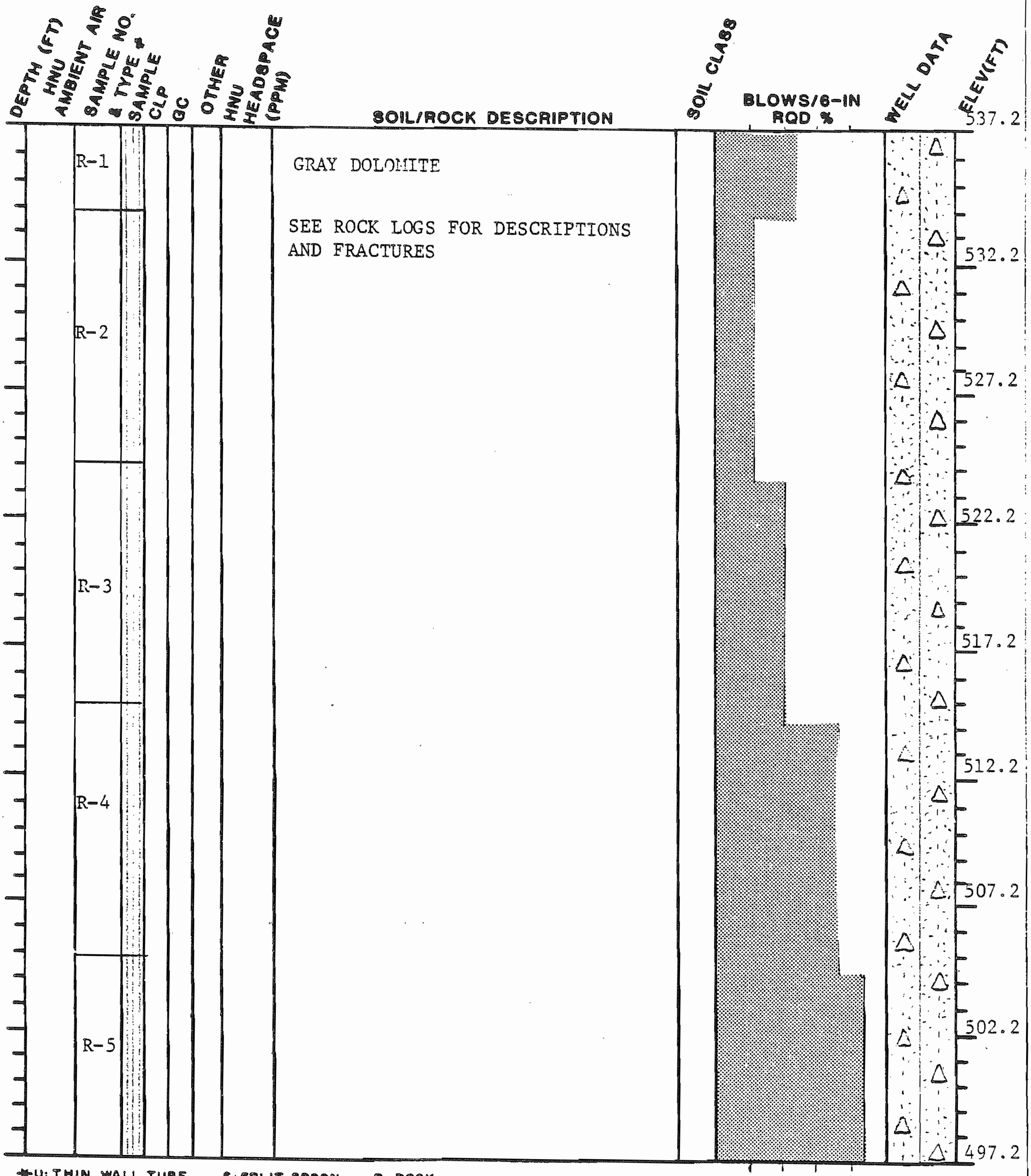
TOTAL DEPTH 222.3'

∇ BELOW GROUND

OGGED BY J. Snowden

CHECKED BY R. Lewis

DATE 3/24/86



GRAY DOLOMITE

SEE ROCK LOGS FOR DESCRIPTIONS AND FRACTURES

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C. JORDAN CO.

OVE CANAL REMEDIAL PROJECT
ONG TERM MONITORING

TASK VC

BORING NO. 10210

ENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-09

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HNU 11.7 (10.2)

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OGGED BY J. Snowden

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 497.2 |
| | | R-5 | | | | | | | | | |
| | | | | | | | GRAY DOLOMITE | | | | |
| 85 | | R-6 | | | | | | | | | 492.2 |
| 90 | | R-7 | | | | | | | | | 487.2 |
| 95 | | | | | | | | | | | 482.2 |
| | | R-8 | | | | | | | | | |
| 100 | | | | | | | | | | | 477.2 |
| 105 | | | | | | | | | | | 472.2 |
| | | R-9 | | | | | | | | | |
| 110 | | | | | | | | | | | 467.2 |
| 115 | | | | | | | | | | | 462.2 |
| | | R-10 | | | | | | | | | |
| 120 | | | | | | | | | | | 457.2 |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

# OVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 10210

**IENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-09

**UNTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 12/06/85

**COMPLETED** 12/10/85

**METHOD** Nx CORE

**CASING SIZE** 3.0"

**HNU** 11.7/10.2

**PROTECTION LEVEL** D

**OUND EL.** 577.2 '

**SOIL DRILLED** 38.6 '

**TOTAL DEPTH** 222.3 '

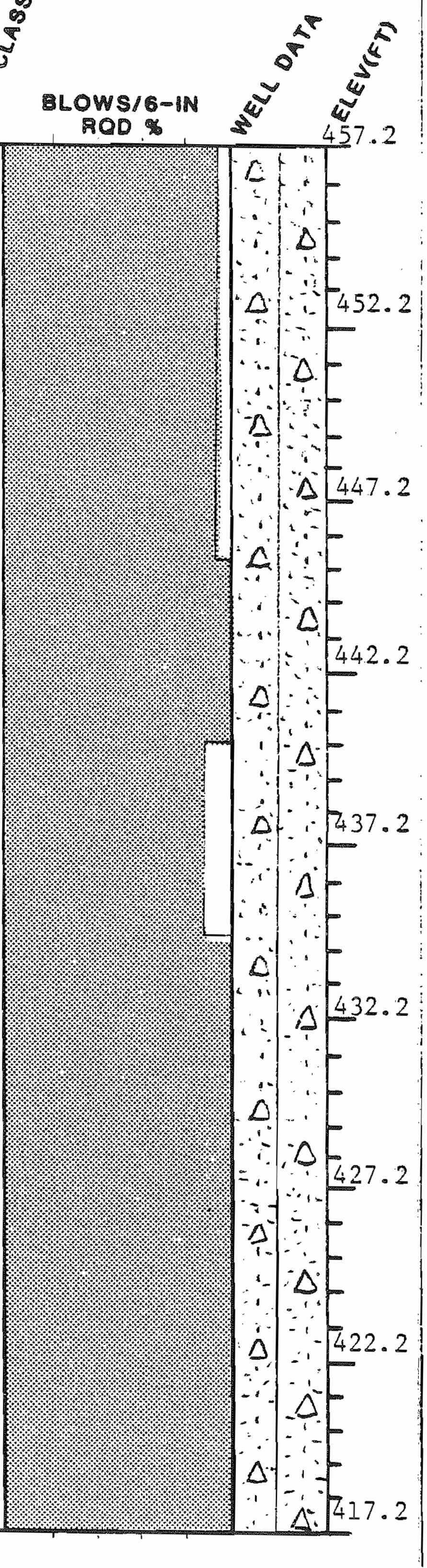
**▽ BELOW GROUND**

**LOGGED BY** J. Snowden

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % |
|---|---|---|---|---|---|---|---|---|---|
|  |  | R-10 |  |  |  |  | GRAY DOLOMITE |  |  |
| 125 |  |  |  |  |  |  |  |  |  |
|  |  | R-11 |  |  |  |  |  |  |  |
| 130 |  |  |  |  |  |  |  |  |  |
|  |  | R-12 |  |  |  |  |  |  |  |
| 135 |  |  |  |  |  |  |  |  |  |
|  |  | R-13 |  |  |  |  |  |  |  |
| 140 |  |  |  |  |  |  |  |  |  |
| 145 |  |  |  |  |  |  |  |  |  |
|  |  | R-14 |  |  |  |  |  |  |  |
| 150 |  |  |  |  |  |  |  |  |  |
| 155 |  |  |  |  |  |  |  |  |  |
|  |  | R-15 |  |  |  |  |  |  |  |
| 160 |  |  |  |  |  |  |  |  |  |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

EC JORDAN CO.

LOVE CANAL REMEDIAL PROJECT
ONG TERM MONITORING

TASK VC

BORING NO. 10210

IENT NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-09

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 12/06/85

COMPLETED 12/10/85

METHOD Nx CORE

CASING SIZE 3.0"

HNU 11.7/10.2

PROTECTION LEVEL D

OUND EL. 577.2

SOIL DRILLED

TOTAL DEPTH

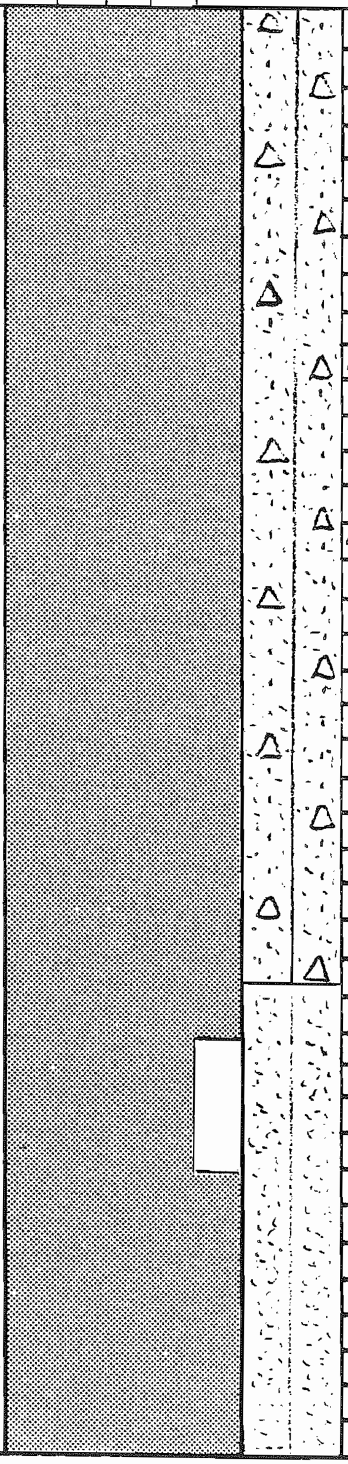
BELOW GROUND

LOGGED BY J. Snowden

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R-15 | | | | | GRAY DOLOMITE | | | | 417.2 |
| 165 | | | | | | | | | | | 412.2 |
| | | R-16 | | | | | | | | | |
| 170 | | | | | | | | | | | 407.2 |
| 175 | | | | | | | | | | | 402.2 |
| | | R-17 | | | | | | | | | |
| 180 | | | | | | | | | | | 397.2 |
| | | R-18 | | | | | | | | | |
| 185 | | | | | | | | | | | 392.2 |
| 190 | | R-19 | | | | | | | | | 387.2 |
| 195 | | | | | | | | | | | 382.2 |
| | | R-20 | | | | | | | | | |
| 200 | | | | | | | | | | | 377.2 |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

**LOVE CANAL REMEDIAL PROJECT**
**ONG TERM MONITORING**

**TASK VC**

**BORING NO.** 10210

**IENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-09

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 12/06/85

**COMPLETED** 12/10/85

**THOD** Nx CORE

**CASING SIZE** 3.0"

**HNU** 11.7 (10.2)

**PROTECTION LEVEL**

**OUND EL.** 577.2'

**SOIL DRILLED** 38.6'

**TOTAL DEPTH** 222.3'

▽ **BELOW GROUND**

**LOGGED BY** J. Snowden

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R-20 | | | | | GRAY DOLOMITE | | | | 377.2 |
| 205 | | R-21 | | | | | | | | | 372.2 |
| 210 | | | | | | | | | | | 367.2 |
| | | | | | | | GRAY SHALE | | | | |
| 215 | | R-22 | | | | | | | | | 362.2 |
| 220 | | | | | | | | | | | 357.2 |
| | | | | | | | BOTTOM OF BORING AT 222.3 FEET | | | | |
| 225 | | | | | | | | | | | 352.2 |
| 230 | | | | | | | | | | | 347.2 |
| 235 | | | | | | | | | | | 342.2 |
| 240 | | | | | | | | | | | 337.2 |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

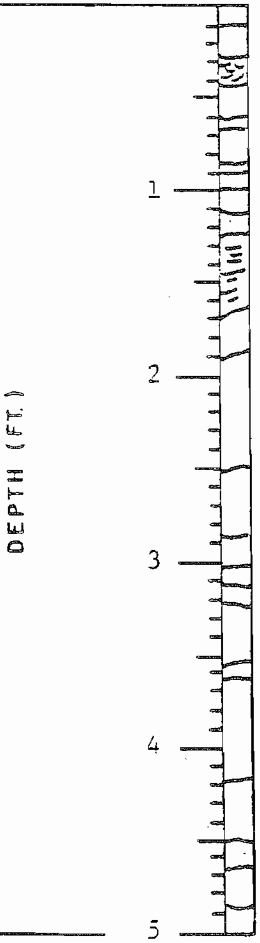
E.C. JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO.<br>4844-08 | PROJECT NAME<br>Love Canal | BORING NO.<br>10210 |
| LOGGED BY<br>M. Muzzy | DATE<br>11-24-85 | PROTECTION LEVEL<br>Mod. D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-1 | DEPTH<br>37.6 FT. TO 43.2 FT. |
| CORE RECOVERY<br>5.5 FT. | RQD<br>48 % | CORE QUALITY<br>Poor |

| CORE RECOVERY (FT.) | .3 FT. CORE RECOVERY | ROCK DESCRIPTION AND IDENTIFICATION |
|---|---|---|
| | | DARK GRAY DOLOMITE WITH GYPSUM SEAMS AND CORAL VUGS |



TOTAL 5.6 (FT) TOTAL 2.6 (FT)

98 % 48 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

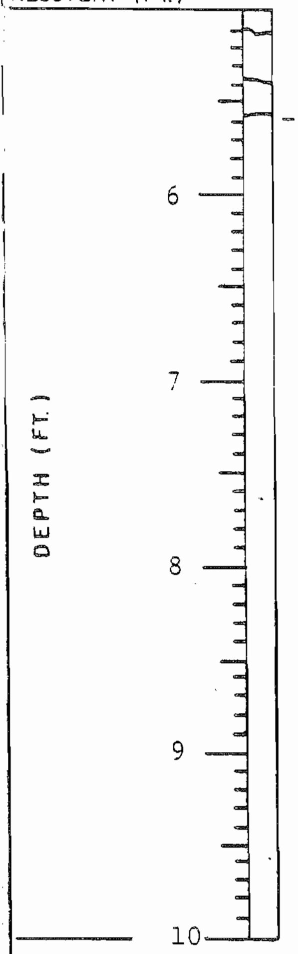
SHEET 2 OF 2

| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10210 |
| LOGGED BY<br>M. Muzzy | DATE<br>11-24-85 | PROTECTION LEVEL<br>Mod. D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-1 | DEPTH<br>37.6 FT. TO 43.2 FT. |
| CORE RECOVERY<br>5.5 FT. | RQD<br>48 % | CORE QUALITY<br>Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



DARK GRAY DOLOMITE WITH GYPSUM AND CORAL VUGS

TOTAL 5.6 (FT)

98 %

TOTAL 2.6 (FT)

48 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

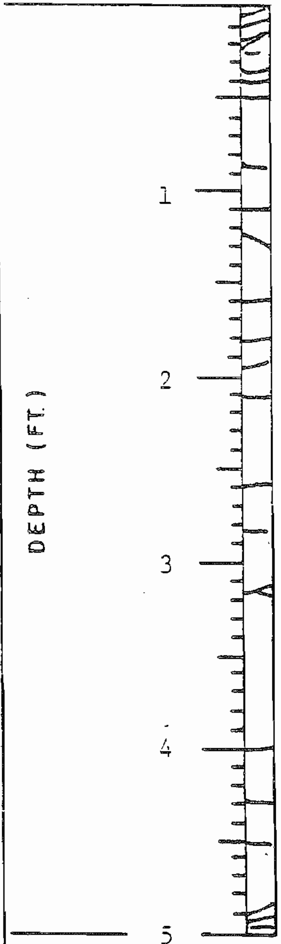
| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10210 |
| LOGGED BY M. Muzzy | DATE 11-24-85 | PROTECTION LEVEL Mod. D |

| | | |
|---|---|---|
| CORE DIAMETER NX | CORE RUN NO. R-2 | DEPTH 43.2 FT. TO 53.0 FT. |
| CORE RECOVERY 10.0 FT. | RQD 23 % | CORE QUALITY Very Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



THINLY BEDDED - PRIMARILY HORIZONTAL

- FRACTURES HEALED WITH GYPSUM

DARK GRAY TO GRAY - COARSE GRAINED
DIRTY DOLOMITE
GYPSUM ALONG HEALED FRACTURES
SIMILAR TO R-1

TOTAL 9.8 ( FT )

+100 %

TOTAL 2.3 ( FT)

23 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

PROJECT NO. 4844-09

PROJECT NAME Love Canal

BORING NO. 10210

LOGGED BY C. White

DATE 11-25-85

PROTECTION LEVEL Mod. D

CORE DIAMETER NX

CORE RUN NO. R-2

DEPTH 43.2 FT. TO 53.0 FT.

CORE RECOVERY 10.0 FT.

RQD 23 %

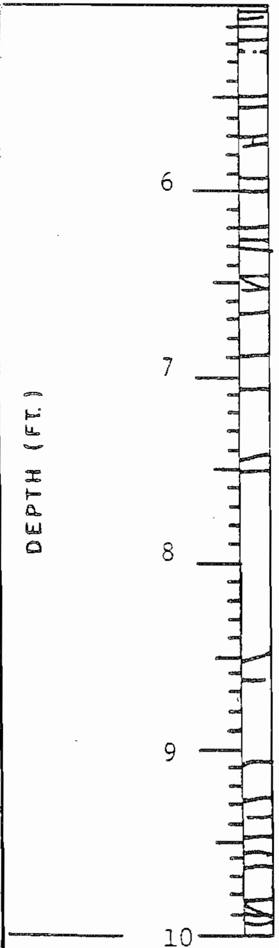
CORE QUALITY Very Poor

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



- FRACTURE WITH CALCITE OR GYPSUM

- LOOKS MORE COMPETENT
BREAKING ALONG HEALED FRACTURES

- HIGHLY WX - HEALED FRACTURES
GYPSUM SEAMS

- END OF R-2

TOTAL 9.8 (FT) TOTAL 2.3 (FT)

+100 % 23 %

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

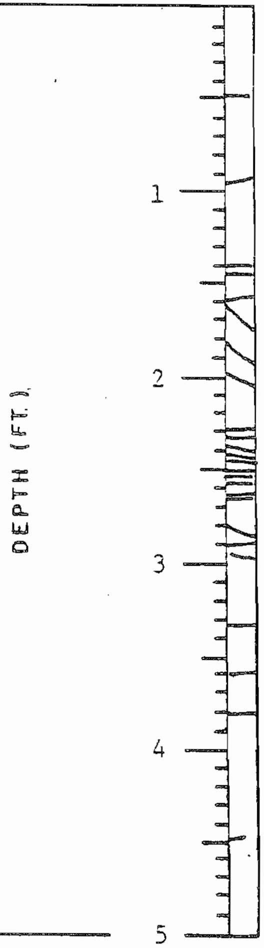
| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10210 |
| LOGGED BY<br>C. White | DATE<br>11-24-85 | PROTECTION LEVEL<br>Mod. D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-3 | DEPTH<br>53.0 FT. TO 62.3 FT. |
| CORE RECOVERY<br>10.0 FT. | RQD<br>40 % | CORE QUALITY<br>Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



- HORIZONTAL PARTINGS ALONG LAYERING
- HIGHLY FRACTURED
- GYPSUM FILLING IN CRACKS

TOTAL 9.3 (FT)

+100 %

TOTAL 4.0 (FT)

40 %

ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

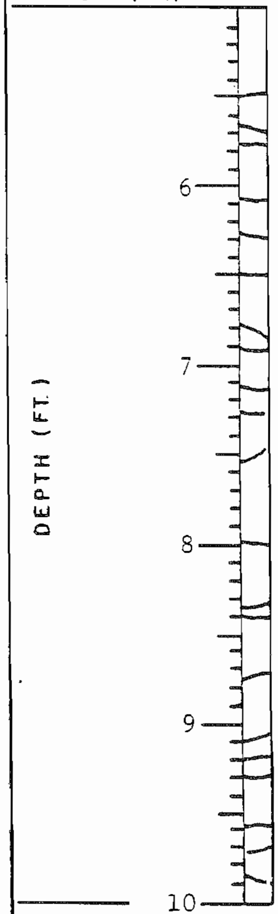
| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10210 |
| LOGGED BY<br>C. White | DATE<br>11-24-85 | PROTECTION LEVEL<br>Mod. D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-3 | DEPTH<br>53.0 FT. TO 62.3 FT. |
| CORE RECOVERY<br>10.0 FT. | RQD<br>40 % | CORE QUALITY<br>Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

DARK GRAY DOLOMITE
THINLY LAMINATED
VERY SHALEY LOOKING



END OF R-3

TOTAL 9.3 (FT)

+100 %

TOTAL 4.0 (FT)

40 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

**PROJECT NO.** 4844-09

**PROJECT NAME** Love Canal

**BORING NO.** 10210

**LOGGED BY** C. White

**DATE** 11-24-85

**PROTECTION LEVEL** Mod. D

**CORE DIAMETER** NX

**CORE RUN NO.** R-4

**DEPTH** 62.3 FT. TO 72.3 FT.

**CORE RECOVERY** 10.0 FT.

**RQD** 70 %

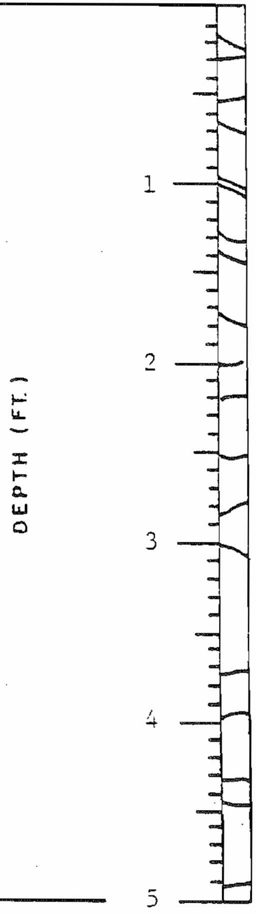
**CORE QUALITY** Fair

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

DARK GRAY MEDIUM-GRAINED DOLOMITE



- GYPSUM AND CALCITE FILLING IN FRACTURES

- ROCK BECOMES MORE COMPETENT WITH DEPTH

TOTAL 10.0 ( FT )

100 %

TOTAL 7.0 ( FT )

70 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

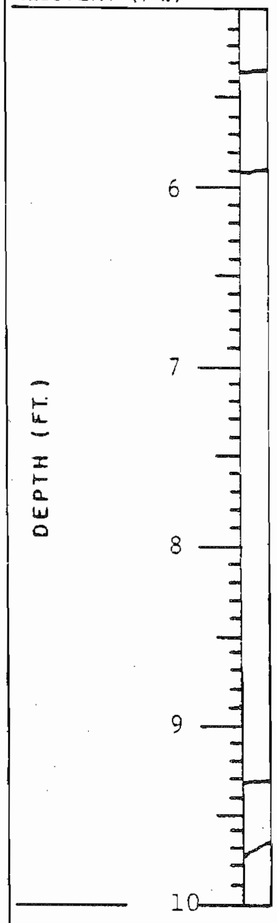
| | | | |
|---|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | | BORING NO.<br>10210 |
| LOGGED BY<br>C. White | DATE<br>11-25-85 | | PROTECTION LEVEL<br>Mod. D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-4 | DEPTH<br>62.3 FT. TO 72.3 FT. | |
| CORE RECOVERY<br>10.0 FT. | RQD<br>70 % | CORE QUALITY<br>Fair | |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

DARK GRAY DOLOMITE WITH
GYPSUM FILLING IN FRACTURES



- DISTORTED LAYERING; HEALED FRACTURES

- END OF R-4

TOTAL 10 ( FT )

100 %

TOTAL 7.05 ( FT )

70 %

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

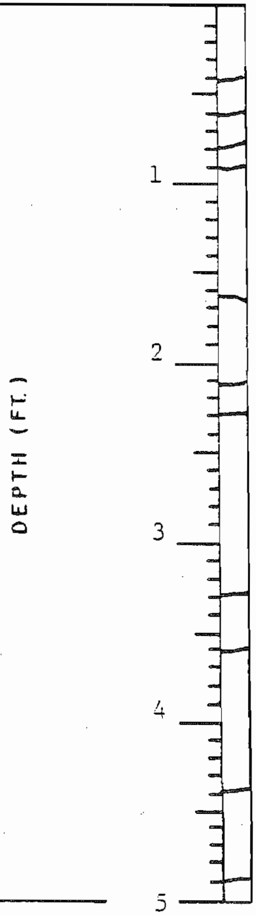
| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10210 |
| LOGGED BY C. White | DATE 11-25-85 | PROTECTION LEVEL Mod. D |
| CORE DIAMETER NX | CORE RUN NO. R-5 | DEPTH 72.3 FT. TO 82.3 FT. |
| CORE RECOVERY 10.0 FT. | RQD 86 % | CORE QUALITY Good |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

DARK GRAY SHALEY DOLOMITE
HORIZONTAL SHALEY LAYERING



- VUGGY, FOSSILIFEROUS

TOTAL 10.0 ( FT )

100 %

TOTAL 8.6 (FT )

86 %

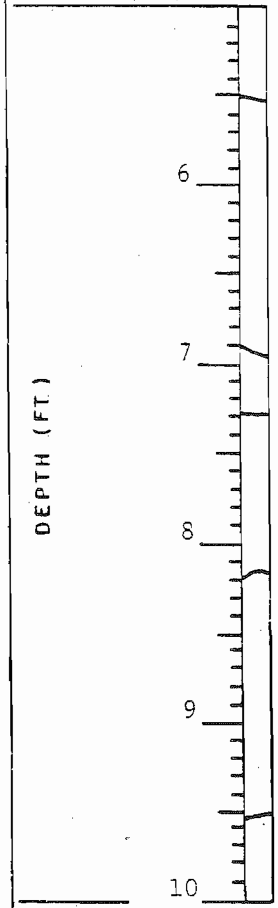
E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10210 |
| LOGGED BY<br>C. White | DATE<br>11-25-85 | PROTECTION LEVEL<br>Mod. D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-5 | DEPTH<br>72.3 FT. TO 82.3 FT. |
| CORE RECOVERY<br>10.0 FT. | RQD<br>86 % | CORE QUALITY<br>Good |

| CORE RECOVERY (FT.) | .3 FT. CORE RECOVERY | ROCK DESCRIPTION AND IDENTIFICATION |
|---|---|---|
| | | DARK GRAY DOLOMITE WITH GYPSUM AND CORAL VUGS |



- VUGGY

- VUGGY - MORE COMPETENT
SHALEY LAYERING - SLIGHTLY DISTORTED

- END OF R-5

TOTAL 10.0 ( FT ) TOTAL 8.6 ( FT )

100 % 86 %

ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10210 |
| LOGGED BY C. White | DATE 11-25-86 | PROTECTION LEVEL Mod. D |

| | | |
|---|---|---|
| CORE DIAMETER NX | CORE RUN NO. R-6 | DEPTH 82.3 FT. TO 87.3 FT. |
| CORE RECOVERY 5.0 FT. | RQD NA % | CORE QUALITY NA |

| CORE RECOVERY (FT.) | .3 FT. CORE RECOVERY | ROCK DESCRIPTION AND IDENTIFICATION |
|---|---|---|
| | | DARK GRAY DOLOMITE WITH GYPSUM AND CORAL VUGS |

DEPTH (FT.)

1

2

3

4

5

TOTAL 5.0 (FT )

100 %

TOTAL NA ( )

NA %

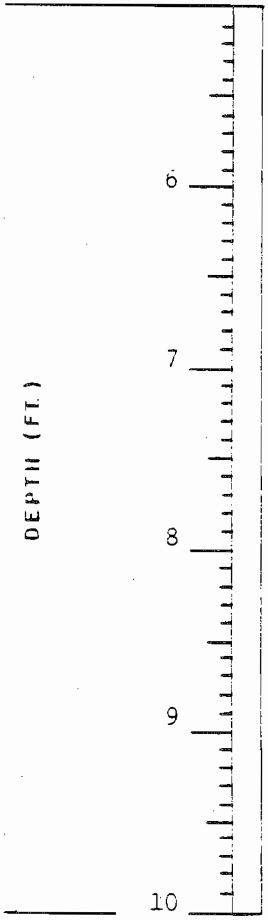
ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10210 |
| LOGGED BY<br>C. White | DATE<br>11-26-85 | PROTECTION LEVEL<br>Mod. D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-7 | DEPTH<br>87.3 FT. TO 92.3 FT. |
| CORE RECOVERY<br>4.9 FT. | RQD<br>NA % | CORE QUALITY<br>NA |

| CORE RECOVERY (FT.) | .3 FT. CORE RECOVERY | ROCK DESCRIPTION AND IDENTIFICATION |
|---|---|---|
| | | DARK GRAY DOLOMITE WITH GYPSUM AND CORAL VUGS |



TOTAL 4.9 ( FT )

98 %

TOTAL NA (     )

NA %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

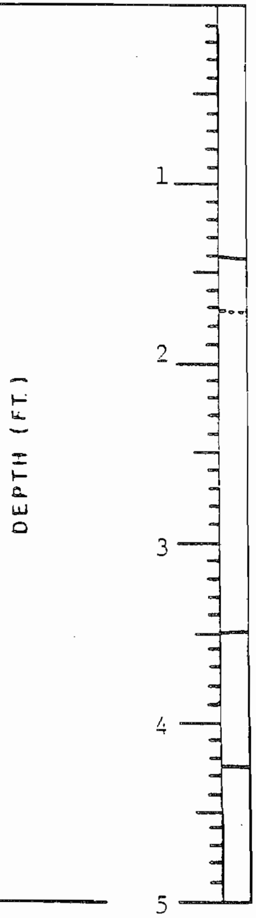
| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10210 |
| LOGGED BY C. White | DATE 11-26-85 | PROTECTION LEVEL Mod. D |
| CORE DIAMETER NX | CORE RUN NO. R-8 | DEPTH 92.3 FT. TO 102.2 FT. |
| CORE RECOVERY 9.9 FT. | RQD 94 % | CORE QUALITY Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

GRAY DOLOMITE



TOTAL 10.0 (FT )

99 %

TOTAL 9.3 (FT )

94 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

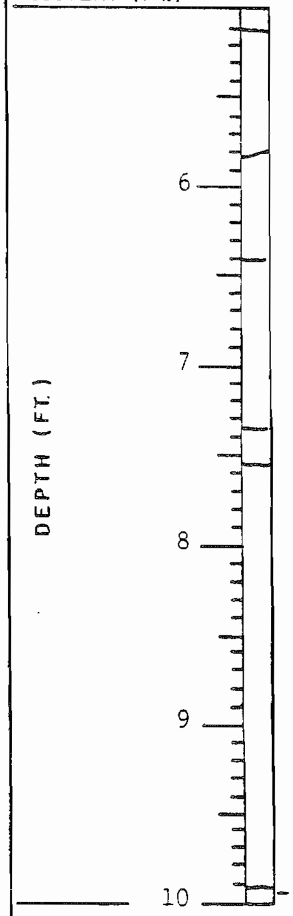
| | | | |
|---|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | | BORING NO. 10210 |
| LOGGED BY C. White | DATE 11-26-85 | | PROTECTION LEVEL Mod. D |
| CORE DIAMETER NX | CORE RUN NO. R-8 | DEPTH 92.3 FT. TO 102.2 FT. | |
| CORE RECOVERY 9.9 FT. | RQD 94 % | CORE QUALITY Excellent | |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

GRAY DOLOMITE



END OF R-8

TOTAL 10.0 ( FT )

99 %

TOTAL 9.3 (FT )

94 %

ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

PROJECT NO. 4844-09

PROJECT NAME Love Canal

BORING NO. 10210

LOGGED BY C. White

DATE 11-26-85

PROTECTION LEVEL Mod. D

CORE DIAMETER NX

CORE RUN NO. R-9

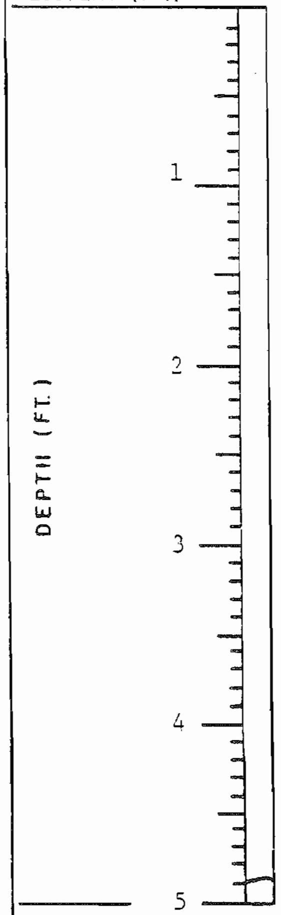
DEPTH 102.3 FT. TO 112.3 FT.

CORE RECOVERY 10.1 FT.

RQD 93 %

CORE QUALITY Excellent

| CORE RECOVERY (FT.) | .3 FT. CORE RECOVERY | ROCK DESCRIPTION AND IDENTIFICATION |
|---|---|---|
| | | GRAY DOLOMITE |



TOTAL 10.0 ( FT )

101 %

TOTAL 9.4 ( FT )

93 %

EC JORDAN CO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

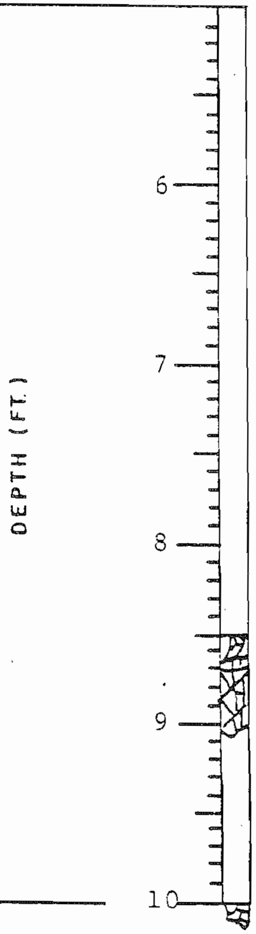
| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10210 |
| LOGGED BY C. White | DATE 11-26-85 | PROTECTION LEVEL Mod. D |
| CORE DIAMETER NX | CORE RUN NO. R-9 | DEPTH 102.3FT. TO 112.3 FT. |
| CORE RECOVERY 10.1 FT. | RQD 93 % | CORE QUALITY Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

GRAY DOLOMITE



- END OF R-9

TOTAL 10.0 ( FT ) TOTAL 9.4 (FT )

101 % 93 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

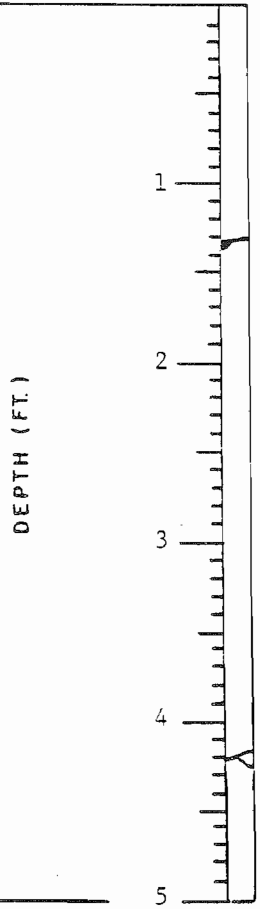
| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10210 |
| LOGGED BY<br>C. White | DATE<br>11-26-85 | PROTECTION LEVEL<br>Mod. D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-10 | DEPTH<br>112.3 FT. TO 122.3 FT. |
| CORE RECOVERY<br>10.0 FT. | RQD<br>93 % | CORE QUALITY<br>Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

GRAY DOLOMITE



TOTAL 10.0 ( FT )

100 %

TOTAL 9.3 ( FT )

93 %

EC JORDAN CO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

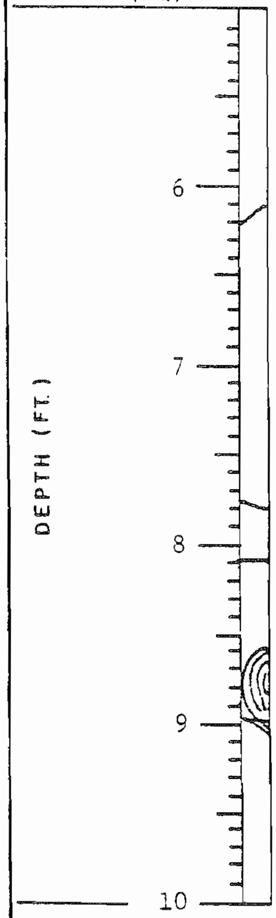
| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10210 |
| LOGGED BY<br>C. White | DATE<br>11-26-85 | PROTECTION LEVEL<br>Mod. D |

| | | |
|---|---|---|
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-10 | DEPTH 112.3 FT. TO 122.3 FT. |
| CORE RECOVERY<br>10.0 FT. | RQD<br>93 % | CORE QUALITY<br>Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



END OF R-10

TOTAL 10.0 (FT ) TOTAL 9.3 (FT )

100 % 93 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

PROJECT NO. 4844-09

PROJECT NAME Love Canal

BORING NO. 10210

LOGGED BY C. White

DATE 11-26-85

PROTECTION LEVEL Mod. D

CORE DIAMETER NX

CORE RUN NO. R-11

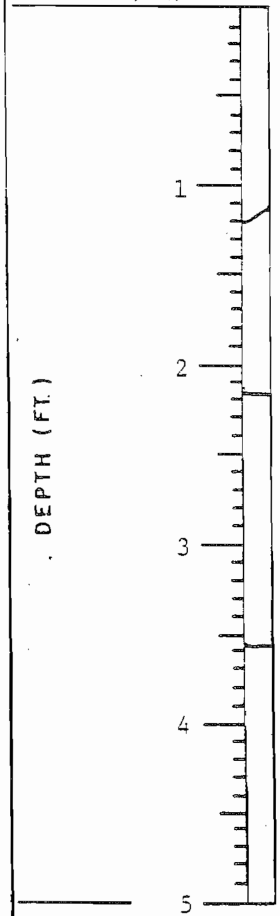
DEPTH 122.3FT. TO 132.3FT.

CORE RECOVERY 10.0 FT.

RQD 94 %

CORE QUALITY Excellent

CORE RECOVERY (FT.)



.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

GRAY DOLOMITE

TOTAL 10.0 ( FT )

100 %

TOTAL 9.4 ( FT )

94 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

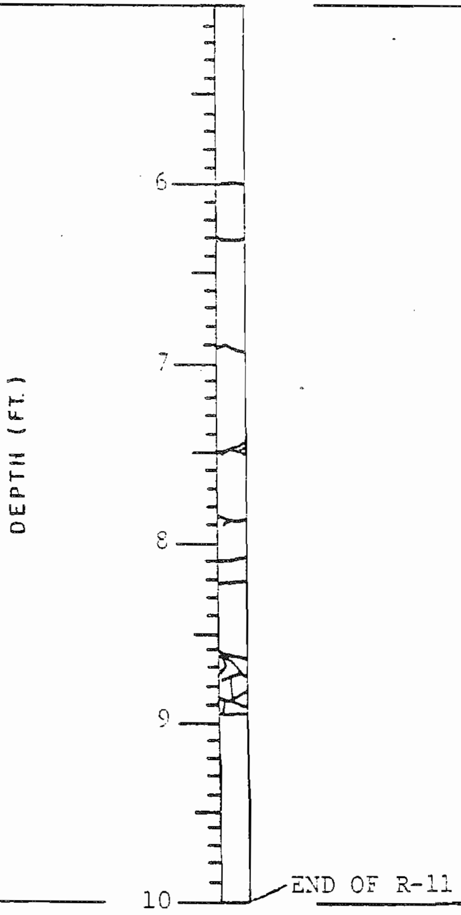
| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10210 |
| LOGGED BY C. White | DATE 11-26-85 | PROTECTION LEVEL Mod. D |
| CORE DIAMETER NX | CORE RUN NO. R-11 | DEPTH 122.3 FT. TO 132.3 FT. |
| CORE RECOVERY 10.0 FT. | RQD 94 % | CORE QUALITY Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

GRAY DOLOMITE



TOTAL 10.0 (FT) 100 %

TOTAL 9.4 (FT) 94 %

E.C.JORDAN CO.

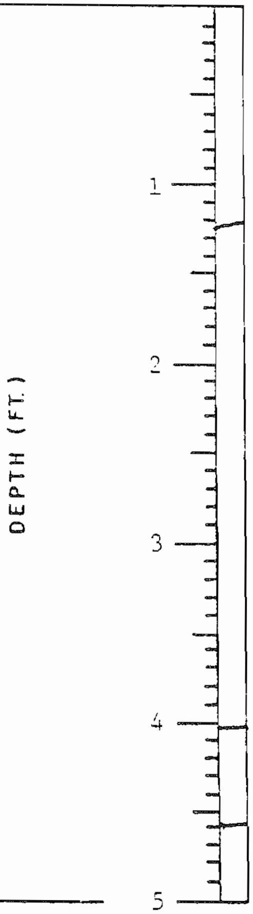
# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10210 |
| LOGGED BY C. White | DATE 11-26-85 | PROTECTION LEVEL Mod. D |

| | | |
|---|---|---|
| CORE DIAMETER NX | CORE RUN NO. R-12 | DEPTH 132.3 FT. TO 137.3 FT. |
| CORE RECOVERY 5.0 FT. | RQD 100 % | CORE QUALITY Excellent |

| CORE RECOVERY (FT.) | .3 FT. CORE RECOVERY | ROCK DESCRIPTION AND IDENTIFICATION |
|---|---|---|
| | | GRAY DOLOMITE |



- END OF R-12

TOTAL 5.0 ( FT )

100 %

TOTAL 5.0 (FT )

100 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

PROJECT NO. 4844-09

PROJECT NAME Love Canal

BORING NO. 10210

LOGGED BY C. White

DATE 11-26-85

PROTECTION LEVEL Mod. D

CORE DIAMETER 1.875"

CORE RUN NO. R-13

DEPTH 137.3 FT. TO 142.9 FT.

CORE RECOVERY 5.6 FT.

RQD 87 %

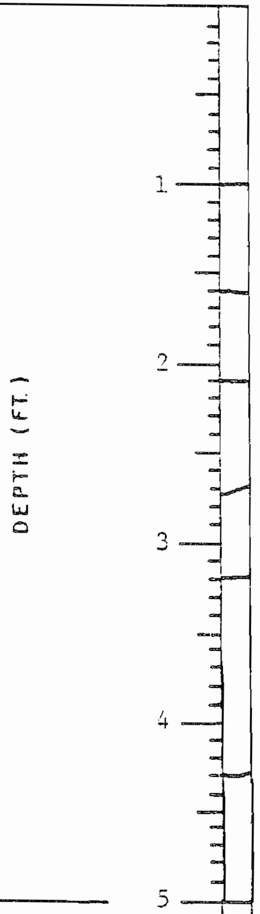
CORE QUALITY Good

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

GRAY DOLOMITE



TOTAL 5.6 FT ( )

100 %

TOTAL 5.0 (FT )

87 %

END OF R-13

ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO.<br>4344-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10210 |
| LOGGED BY<br>C. White | DATE<br>11-26-85 | PROTECTION LEVEL<br>Mod. D |

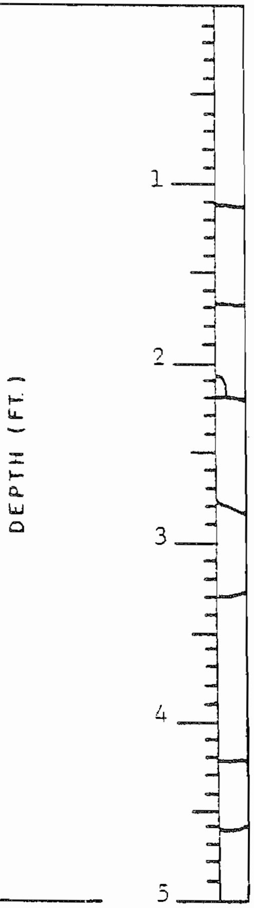
| | | |
|---|---|---|
| CORE DIAMETER<br>1.875" | CORE RUN NO.<br>R-14 | DEPTH<br>142.9 FT. TO 152.8 FT. |
| CORE RECOVERY<br>9.9 FT. | RQD<br>98 % | CORE QUALITY<br>Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

GRAY DOLOMITE



TOTAL 10.0 (FT )

99 %

TOTAL 9.7 (FT )

98 %

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

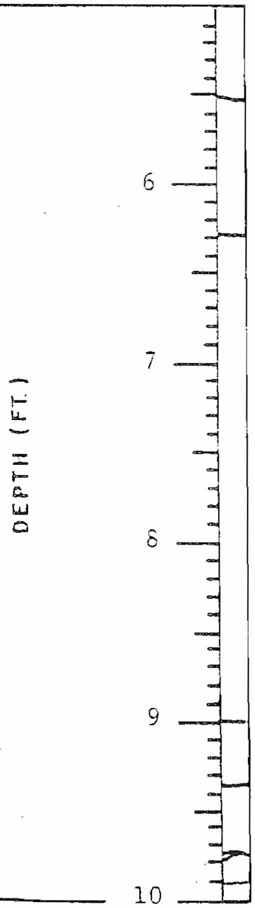
| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10210 |
| LOGGED BY C. White | DATE 11-26-85 | PROTECTION LEVEL Mod. D |
| CORE DIAMETER 1.875" | CORE RUN NO. R-14 | DEPTH 142.9 FT. TO 152.8 FT. |
| CORE RECOVERY 9.9 FT. | RQD 98 % | CORE QUALITY Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

GRAY DOLOMITE



- END OF R-14

TOTAL 10 ( FT )

99 %

TOTAL 9.8 ( FT )

98 %

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

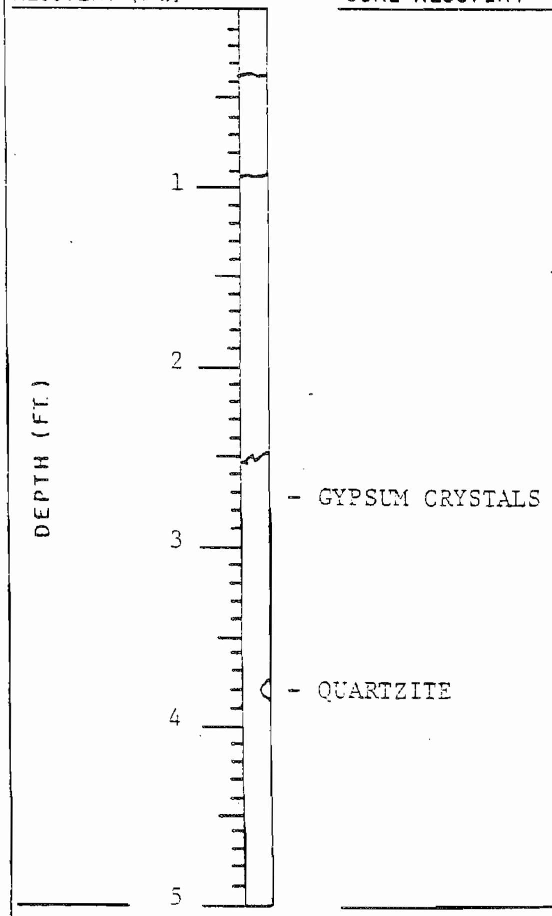
| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10210 |
| LOGGED BY<br>M. Muzzy | DATE<br>11-26-85 | PROTECTION LEVEL<br>Mod. D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-15 | DEPTH<br>152.8 FT. TO 162.8 FT. |
| CORE RECOVERY<br>10.0 FT. | RQD<br>100 % | CORE QUALITY<br>Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

GRAY DOLOMITE



TOTAL 10 (FT) TOTAL 9.8 (FT)

100 % 100 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10210 |
| LOGGED BY M. Muzzy | DATE 11-26-85 | PROTECTION LEVEL Mod. D |

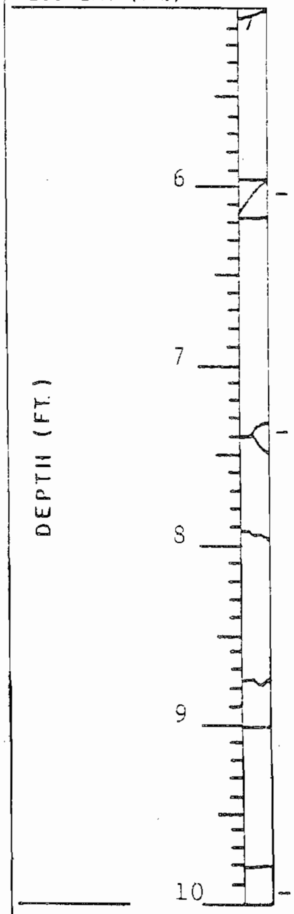
| | | |
|---|---|---|
| CORE DIAMETER NX | CORE RUN NO. R-15 | DEPTH 152.8 FT. TO 162.8 FT. |
| CORE RECOVERY 10 FT. | RQD 100 % | CORE QUALITY Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

GRAY DOLOMITE



- MORE COARSE GRAINE
LIGHTER COLOR
GYPSUM CRYSTALS

- MORE COARSE GRAINED
LIGHTER COLOR

- END OF R-15

TOTAL 10.0 ( FT ) TOTAL 9.8 (FT )

100 % 100 %

ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

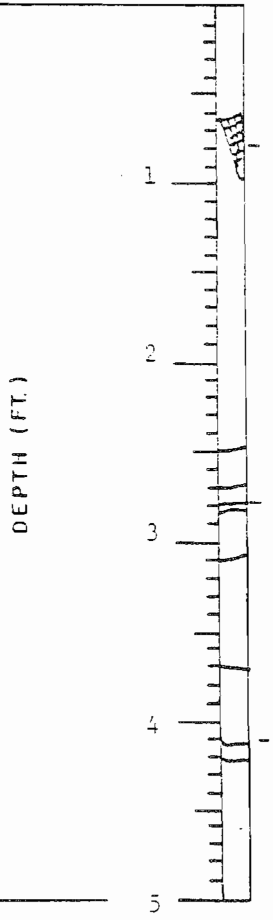
SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10210 |
| LOGGED BY M. Muzzy | DATE 11-27-85 | PROTECTION LEVEL Mod. D |
| CORE DIAMETER NX | CORE RUN NO. R-16 | DEPTH 162.8 FT. TO 172.8 FT. |
| CORE RECOVERY 10 FT. | RQD 100 % | CORE QUALITY Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



CORAL VUG

GYPSUM SEAM

ALL CONE BREAKS ARE MECHANICAL
RQD =100%

DOLOMITE

TOTAL 10.0 ( FT )

100 %

TOTAL 10.2 ( FT )

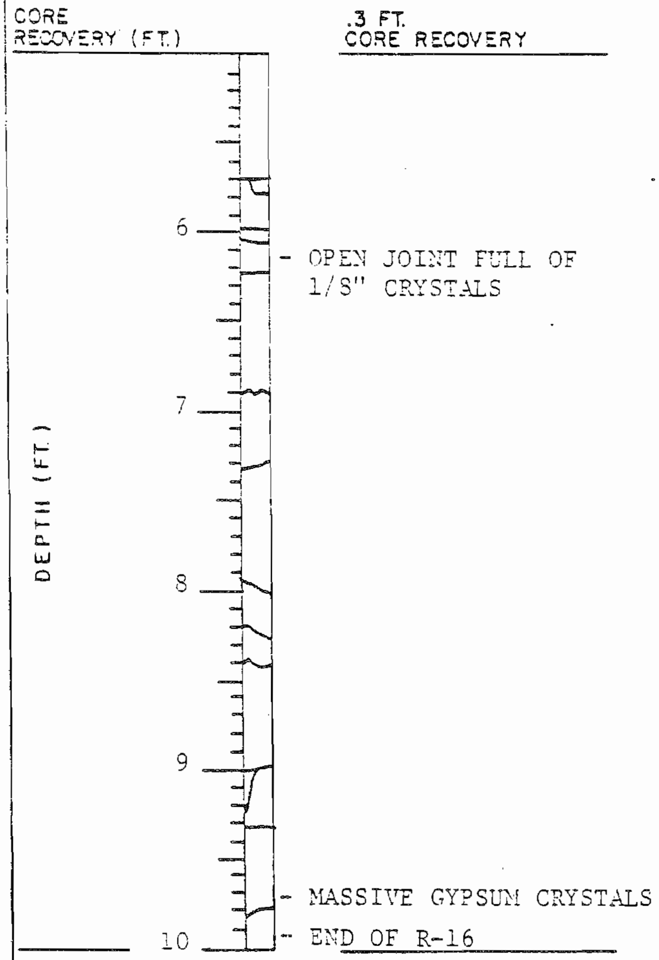
100 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10210 |
| LOGGED BY M. Muzzy | DATE 11-29-85 | PROTECTION LEVEL Mod. D |
| CORE DIAMETER NX | CORE RUN NO. R-16 | DEPTH 162.8 FT. TO 172.8 FT. |
| CORE RECOVERY 10.0 FT. | RQD 100 % | CORE QUALITY Excellent |



ROCK DESCRIPTION AND IDENTIFICATION

DARK GRAY DOLOMITE

TOTAL 10.0 (FT) TOTAL 10.2 (FT)

100 % 100 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

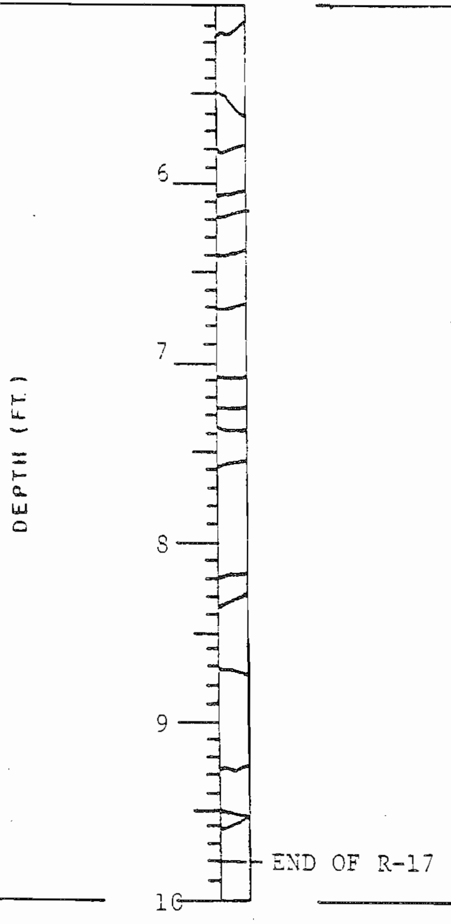
| | | | |
|---|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | | BORING NO. 10210 |
| LOGGED BY M. Muzzy | DATE 11-24-85 | | PROTECTION LEVEL Mod. D |
| CORE DIAMETER NX | CORE RUN NO. R-17 | DEPTH 172.8 FT. TO 182.6 FT. | |
| CORE RECOVERY 9.8 FT. | RQD 100 % | CORE QUALITY Excellent | |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

DOLOMITE WITH GYPSUM SEAMS



TOTAL 9.8 (FT ) 100 %

TOTAL 9.8 (FT ) 100 %

ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

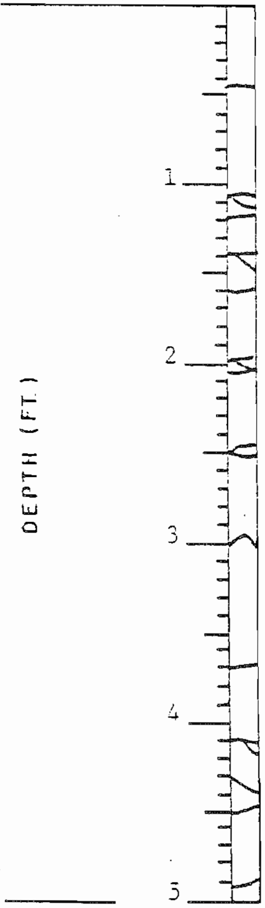
| | | | |
|---|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | | BORING NO. 10210 |
| LOGGED BY M. Muzzy | DATE 11-27-85 | | PROTECTION LEVEL Mod. D |
| CORE DIAMETER NX | CORE RUN NO. R-17 | DEPTH 172.8 FT. TO 182.6 FT. | |
| CORE RECOVERY 9.8 FT. | RQD 100 % | CORE QUALITY Excellent | |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

DARK GRAY DOLOMITE WITH GYPSUM SEAMS



- ALL BREAKS ARE MECHANICAL RQD = 100%

- HEALED WITH GYPSUM

TOTAL 9.8 (FT) 100 %

TOTAL 9.8 (FT) 100 %

ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

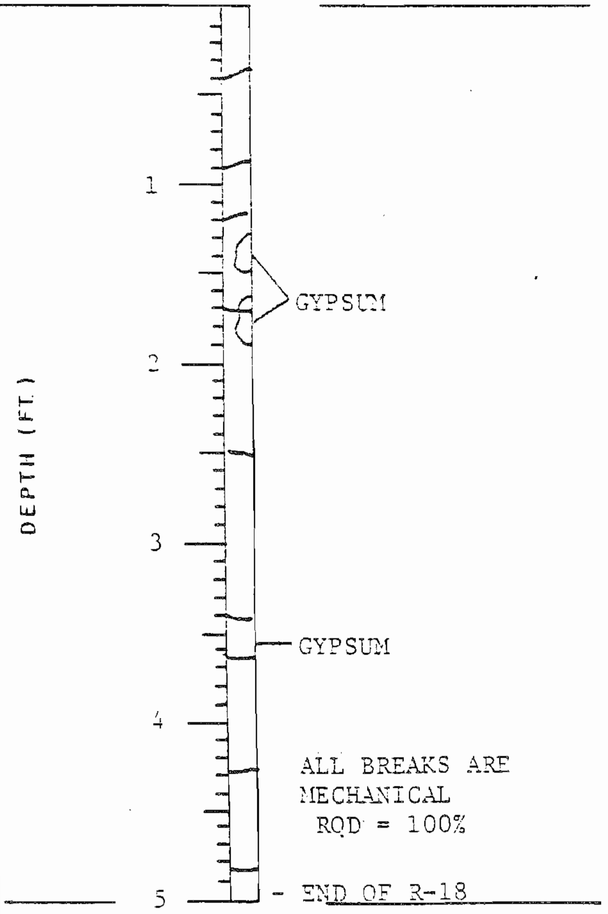
SHEET 1 OF 1

| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10210 |
| LOGGED BY M. Muzzy | DATE 11-27-85 | PROTECTION LEVEL Mod. D |

| | | |
|---|---|---|
| CORE DIAMETER NX | CORE RUN NO. R-18 | DEPTH 182.6 FT. TO 187.6 FT. |
| CORE RECOVERY 5.0 FT. | RQD 100 % | CORE QUALITY Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY



ALL BREAKS ARE MECHANICAL
RQD = 100%

ROCK DESCRIPTION AND IDENTIFICATION

DOLOMITE WITH GYPSUM SEAMS

TOTAL 5.0 ( FT )
100 %

TOTAL 5.0 ( FT )
100 %

ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

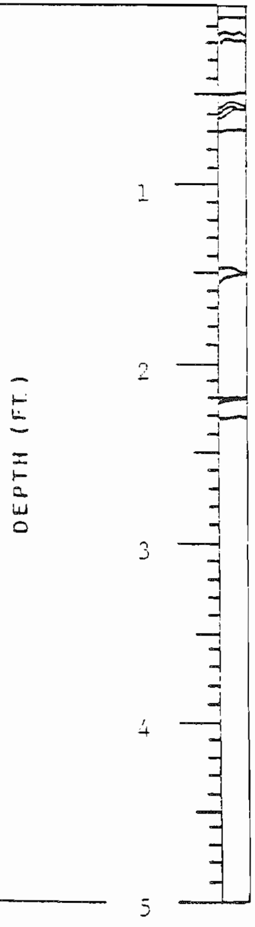
| | | | |
|---|---|---|---|
| PROJECT NO.<br>4841-09 | PROJECT NAME<br>Love Canal | | BORING NO.<br>10210 |
| LOGGED BY<br>J. Snowden | DATE<br>12-4-85 | | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>2" | CORE RUN NO.<br>R-19 | DEPTH<br>187.2 FT. TO 192.6 FT. | |
| CORE RECOVERY<br>5.2 FT. | RQD<br>80 % | CORE QUALITY<br>Good | |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

- DARK GRAY DOLOMITE
- FRACTURES FILLED WITH GYPSUM



LIGHTER COLOR

VUGGY, FOSSILIFEROUS

LARGE FRACTURE AT BOTTOM OF CORE

- END OF R-19

TOTAL 5.4 ( FT ) TOTAL 4.2 (FT )

96 % 80 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

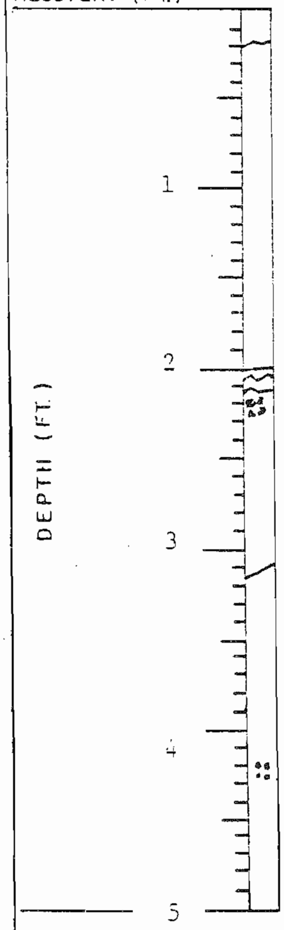
| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10210 |
| LOGGED BY J. Snowden | DATE 12-4-85 | PROTECTION LEVEL D |

| | | |
|---|---|---|
| CORE DIAMETER 2" | CORE RUN NO. R-20 | DEPTH 192.6 FT. TO 202.4 FT. |
| CORE RECOVERY 9.8 FT. | RQD 98 % | CORE QUALITY Good |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



GYPSUM LAYER
VUGGY

LIGHT GRAY DOLOMITE WITH
THIN GYPSUM LAYERS

TOTAL 9.8 ( FT ) 100 %

TOTAL 9.8 (FT ) 98 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

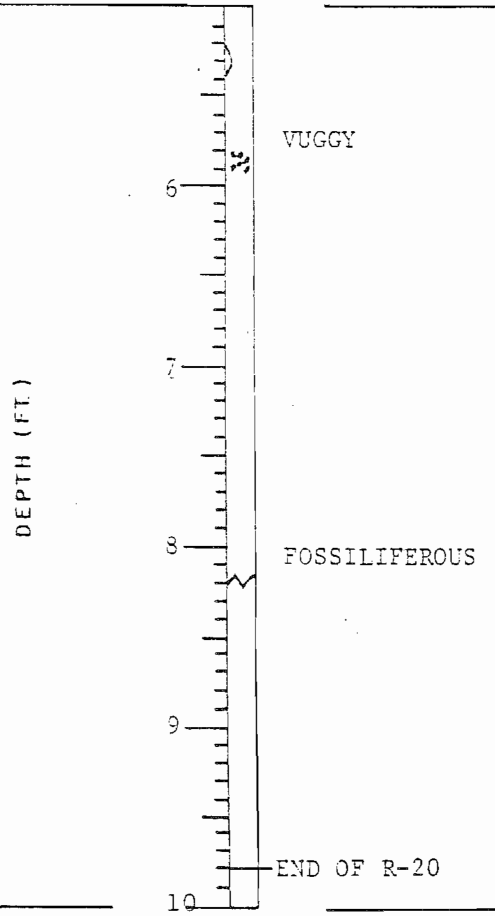
| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10210 |
| LOGGED BY<br>J. Snowden | DATE<br>12-4-85 | PROTECTION LEVEL<br>D |

| | | |
|---|---|---|
| CORE DIAMETER<br>2" | CORE RUN NO.<br>R-20 | DEPTH<br>192.6 FT. TO 202.4 FT. |
| CORE RECOVERY<br>9.8 FT. | RQD<br>98 % | CORE QUALITY<br>Good |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



LIGHT GRAY DOLOMITE WITH
THIN GYPSUM LAYERS

TOTAL 9.8 (FT )

100 %

TOTAL 9.8 (FT )

98 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

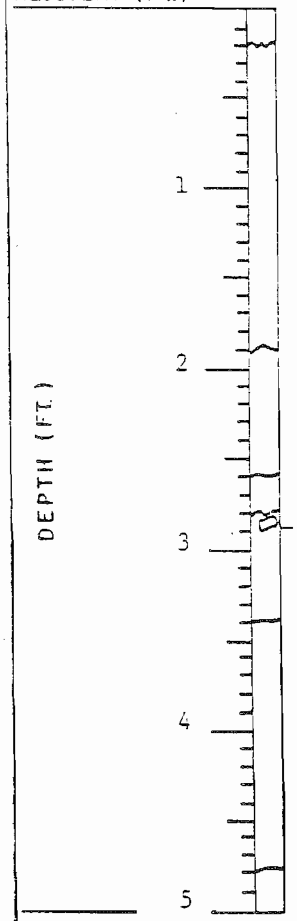
SHEET 1 OF 2

| | | | |
|---|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | | BORING NO. 10210 |
| LOGGED BY J. Snowden | DATE 12/5/85 | | PROTECTION LEVEL D |
| CORE DIAMETER 2" | CORE RUN NO. R-21 | DEPTH 202.4 FT. TO 212.4 FT. | |
| CORE RECOVERY 9.8 FT. | RQD 99 % | CORE QUALITY Good | |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



CRYSTALS IN VUGS

DARK GRAY DOLOMITE WITH
CRYSTAL - FILLED VUGS AND
FOSSIL FRAGMENTS

TOTAL 9.8 (FT)
98 %

TOTAL 9.7 ( )
99 %

ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

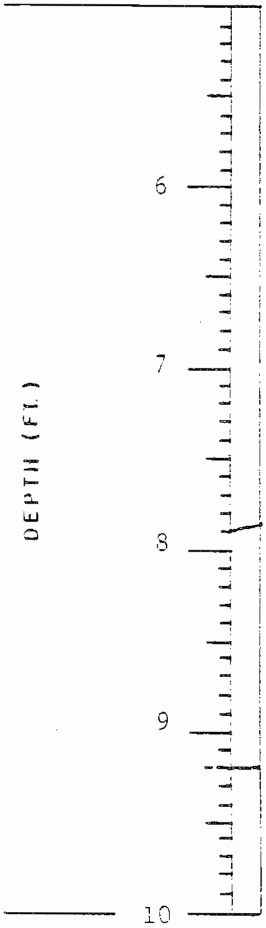
| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10210 |
| LOGGED BY J. Snowden | DATE 12/5/85 | PROTECTION LEVEL D |
| CORE DIAMETER 2" | CORE RUN NO. R-21 | DEPTH 202.4 FT. TO 212.4 FT. |
| CORE RECOVERY 9.8 FT. | RQD 99 % | CORE QUALITY Good |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

GRAY DOLOMITE WITH LIGHT
AND DARK LAYERS



- SHARP FRACTURE

DARK GRAY BEDDING
BECOMES MORE DEFINED
(POSSIBLE BEGINNING OF SHALE)

END OF R-21

TOTAL 9.8 (FT) TOTAL 9.7 (FT)

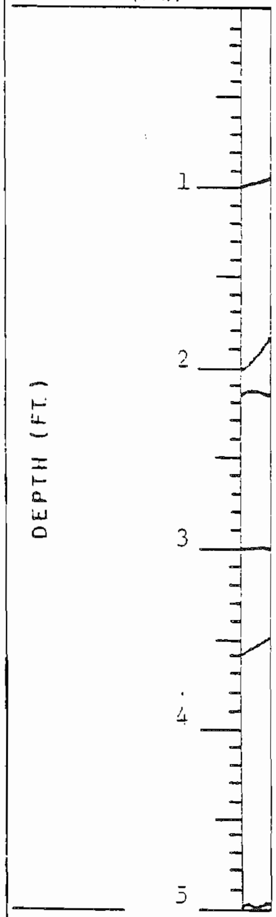
98 % 99 %

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO. 4344-09 | PROJECT NAME Love Canal | BORING NO. 10210 |
| LOGGED BY J. Snowden | DATE 12-5-85 | PROTECTION LEVEL D |
| CORE DIAMETER NX | CORE RUN NO. R-22 | DEPTH 212.4 FT. TO 222.3 FT. |
| CORE RECOVERY 9.9 FT. | RQD 98 % | CORE QUALITY Excellent |

| CORE RECOVERY (FT.) | .3 FT. CORE RECOVERY | ROCK DESCRIPTION AND IDENTIFICATION |
|---|---|---|
| | | GRAY DOLOMITE<br>TRANSITION TO GRAY SHALE WITH WELL-DEFINED BEDDING |



GYPSUM CRYSTALS FILLING IN FRACTURE

ALL CORE BREAKS WERE MECHANICAL

VUGGY

TOTAL 9.9 ( FT )

100 %

TOTAL 9.8 ( FT )

98 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

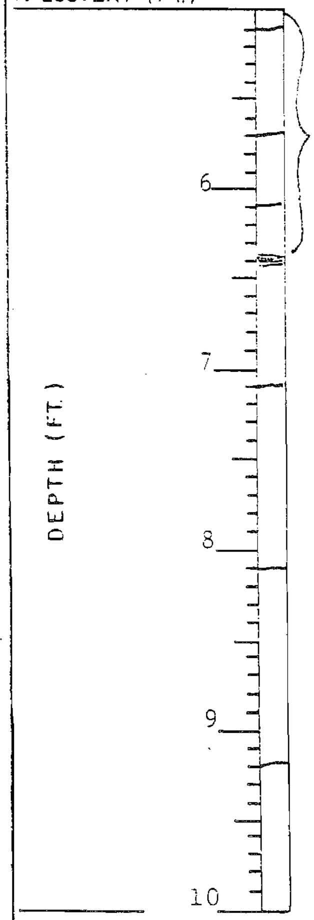
| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10210 |
| LOGGED BY J. Snowden | DATE 12-5-85 | PROTECTION LEVEL D |

| | | |
|---|---|---|
| CORE DIAMETER NX | CORE RUN NO. R-22 | DEPTH 212.4 FT. TO 222.3 FT. |
| CORE RECOVERY 9.9 FT. | RQD 98 % | CORE QUALITY Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



TRANSITION ZONE
DOLOMITE TO SHALE

SHALE CONTACT

ALL CORE BREAKS WERE
MECHANICAL

END OF R-22

GRAY DOLOMITE CHANGES TO
GRAY SHALE

SHALE BELOW IS SOFTER THAN
IN THE TRANSITION ZONE ABOVE

TOTAL 9.9 ( FT )
100 %

TOTAL 9.8 ( FT )
98 %

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 10210B

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-23

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 5/2/86

**COMPLETED** 5/5/86

**METHOD** H.S.A.

**CASING SIZE** 6.0

**HNU 11.7 / 10.2** 10.2 TIP

**PROTECTION LEVEL** D

**GROUND EL.** 577.1

**SOIL DRILLED** 38.0

**TOTAL DEPTH** 144.0

∇ **BELOW GROUND**

**LOGGED BY** C. White

**CHECKED BY** R. Lewis R.L.

**DATE** 6/10/87

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Brown to Black Mottled Sandy Silt with Clay and Organic Matter, Fractured, Moist, Stiff, Plastic, (FILL) 4.5 | ML | No Soil Samples Taken | | |
| 5 | | | | | | | Brown Silty Fine Sand with Traces of Gravel, Moist, Loose, Non-Plastic, Uniformly Graded (Alluvial Sand) 8.5 | SP | | | |
| 10 | | | | | | | Reddish-Brown Mottled Silty Clay, Varved, Moist, Stiff, Fractures Slightly Plastic<br>(Lacustrine Clay) 14.0 | CL | | | |
| 15<br>20 | | | | | | | Reddish-Gray Silty Clay, Wet, Soft, Plastic<br>(Lacustrine Clay) | CL | | | |
| 25<br>30<br>35 | | | | | | | Brown Silty Sand with Gravel, Moist, Dense, Slightly Plastic, Widely Graded<br>(Glacial Till) 30.5 | SM<br>ML | | | |
| 40 | | | | | | | Bedrock: Gray Dolomite | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

**LOVE CANAL REMEDIAL PROJECT**
**LONG TERM MONITORING**

**TASK VC**

**BORING NO.** 10210B

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-23

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 5/2/86

**COMPLETED** 5/5/86

**METHOD** Wash/Rotary

**CASING SIZE** 6.0"

**HNU** 11.7 / 10.2

**PROTECTION LEVEL** D

**GROUND EL.** 577.1

**SOIL DRILLED** 38.0

**TOTAL DEPTH** 144.0

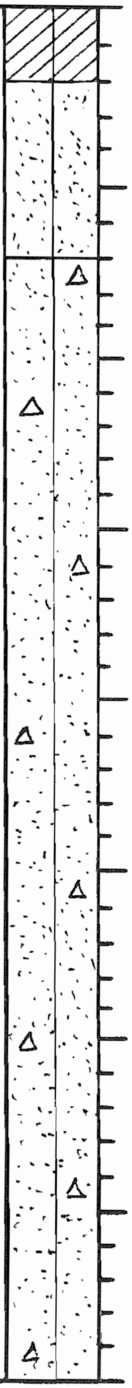
▽ **BELOW GROUND**

**LOGGED BY** C. White

**CHECKED BY** R Lewis

**DATE** 6/10/87

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | See Rock Logs for Boring 10210A for detailed descriptions and fractures. | | | | |
| 45 | | | | | | | | | | | |
| 50 | | | | | | | | | | | |
| 55 | | | | | | | | | | | |
| 60 | | | | | | | | | | | |
| 65 | | | | | | | | | | | |
| 70 | | | | | | | | | | | |
| 75 | | | | | | | | | | | |
| 80 | | | | | | | | | | | |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 10210B

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-23

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 5/2/86

COMPLETED 5/5/86

METHOD Wash/Rotary

CASING SIZE 6.0"

HNU 11.7 / 10.2 10.2

PROTECTION LEVEL D

GROUND EL. 577.1

SOIL DRILLED 38.0'

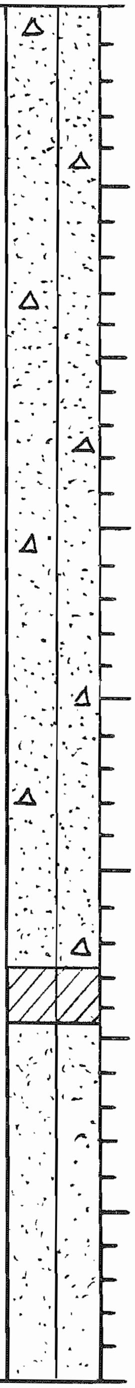
TOTAL DEPTH 144.0'

BELOW GROUND

LOGGED BY C. White

CHECKED BY R. Lewis

DATE 6/10/87

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Bedrock: Dolomite | | |  | |
| 85 | | | | | | | | | | | |
| 90 | | | | | | | | | | | |
| 95 | | | | | | | | | | | |
| 100 | | | | | | | | | | | |
| 105 | | | | | | | | | | | |
| 110 | | | | | | | | | | | |
| 115 | | | | | | | | | | | |
| 120 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 10210B

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-23

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 5/2/86

COMPLETED 5/5/86

METHOD Wash/Rotary

CASING SIZE 6.0"

HNU 11.7 / 10.2 10.2

PROTECTION LEVEL D

GROUND EL. 577.1

SOIL DRILLED 38.0'

TOTAL DEPTH 144.0'

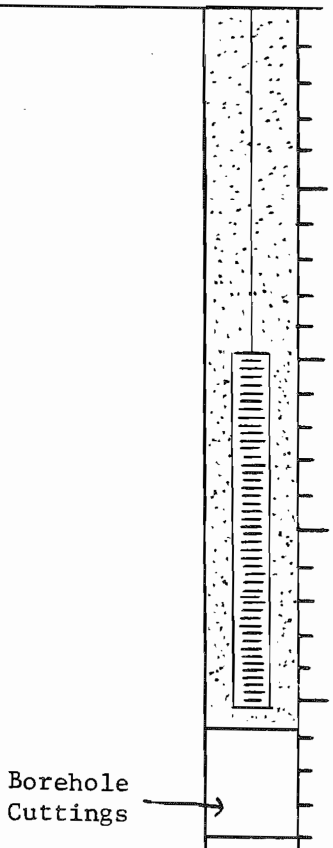
▽ BELOW GROUND

LOGGED BY C. White

CHECKED BY R. Lewis

DATE 6/10/87

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Bedrock: Dolomite | | | | |
| 125 | | | | | | | | | | | |
| 130 | | | | | | | | | | | |
| 135 | | | | | | | | | | | |
| 140 | | | | | | | | | | | |
| 145 | | | | | | | Bottom of Boring at 144.0' | | | | |
| 150 | | | | | | | | | | | |
| 155 | | | | | | | | | | | |
| 160 | | | | | | | | | | | |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

## LOVE CANAL REMEDIAL PROJECT
## LONG TERM MONITORING

**TASK VC**

**BORING NO.** 10210C

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-23

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 5/6/86

**COMPLETED** 5/6/86

**METHOD** H.S.A.

**CASING SIZE** 6.0"

**HNU 11.7 / 10.2** 10.2

**PROTECTION LEVEL** D

**GROUND EL.** 577.1

**SOIL DRILLED** 37.5'

**TOTAL DEPTH** 86.5'

**▽ BELOW GROUND**

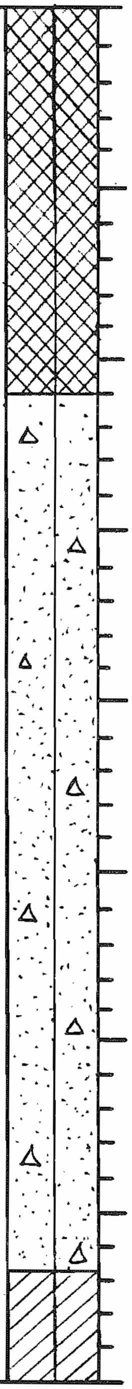
**LOGGED BY** C. White

**CHECKED BY** R. Lewis

**DATE** 6/10/87

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Brown to Black Mottled Sandy Silt with Clay and Organic Matter, Fractured, Moist, Stiff, Plastic, (FILL)<br>4.5 | ML | No Soil Samples Taken |
| 5 | | | | | | | Brown Silty Fine Sand with Traces of Gravel, Moist, Loose, Non-Plastic, Uniformly Graded (Alluvial Sand)<br>8.5 | SP | |
| 10 | | | | | | | Reddish-Brown Mottled Silty Clay, Varved, Moist, Stiff, Fractures Slightly Plastic<br>(Lacustrine Clay)<br>14.0 | CL | |
| 15<br>20<br>25 | | | | | | | Reddish-Gray Silty Clay, Wet, Soft, Plastic<br>(Lacustrine Clay) | CL | |
| 30<br>35 | | | | | | | Brown Silty Sand with Gravel, Moist, Dense, Slightly Plastic, Widely Graded<br>(Glacial Till)<br>30.5 | SM<br>ML | |
| 40 | | | | | | | Bedrock: Gray Dolomite | | |

WELL DATA | ELEV(FT)



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

**LOVE CANAL REMEDIAL PROJECT**
**LONG TERM MONITORING**

**TASK VC**

**BORING NO.** 10210C

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.**

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 5/6/86

**COMPLETED** 5/6/86

**METHOD** Wash/Rotary

**CASING SIZE** 6.0"

**HNU 11.7 / 10.2** 10.2

**PROTECTION LEVEL** D

**GROUND EL.** 577.1

**SOIL DRILLED** 37.5

**TOTAL DEPTH** 86.5

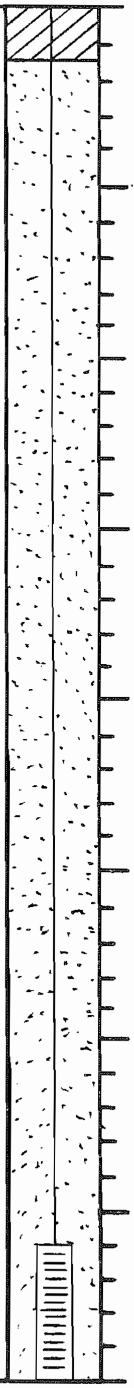
**▽ BELOW GROUND**

**LOGGED BY** C. White

**CHECKED BY** R. Lewis

**DATE** 6/10/87

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | See Rock Logs for Boring 10210A for descriptions and fractures. Hole reamed with 3 7/8-inch bit to 86.5 feet. | | | | |
| 45 | | | | | | | | | | | |
| 50 | | | | | | | | | | | |
| 55 | | | | | | | | | | | |
| 60 | | | | | | | | | | | |
| 65 | | | | | | | | | | | |
| 70 | | | | | | | | | | | |
| 75 | | | | | | | | | | | |
| 80 | | | | | | | | | | | |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 10210C

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-23

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 5/6/86

**COMPLETED** 5/6/86

**METHOD** Wash/Rotary

**CASING SIZE** 6.0"

**HNU 11.7/10.2** 10.2

**PROTECTION LEVEL** D

**GROUND EL.** 577.1

**SOIL DRILLED** 37.5'

**TOTAL DEPTH** 86.5'

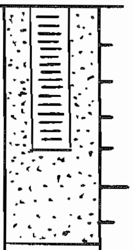
**∇ BELOW GROUND**

**LOGGED BY** C. White

**CHECKED BY** R. Lewis

**DATE** 6/10/87

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Dolomite | | | | |
| 85 | | | | | | | | | | | |
| | | | | | | | Bottom of Boring at 86.5' | | | | |
| 90 | | | | | | | | | | | |
| 95 | | | | | | | | | | | |
| 100 | | | | | | | | | | | |
| 105 | | | | | | | | | | | |
| 110 | | | | | | | | | | | |
| 115 | | | | | | | | | | | |
| 120 | | | | | | | | | | | |



*U: THIN WALL TUBE  S: SPLIT SPOON  R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

**BORING NO.** 10215

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-09

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 10/23/85

COMPLETED 10/24/85

METHOD DRIVE/WASH

CASING SIZE 4.0"

HNU 11.7/10.2

PROTECTION LEVEL D

GROUND EL. 578.2'

SOIL DRILLED 45.5'

TOTAL DEPTH 61.0'

▽ BELOW GROUND NA

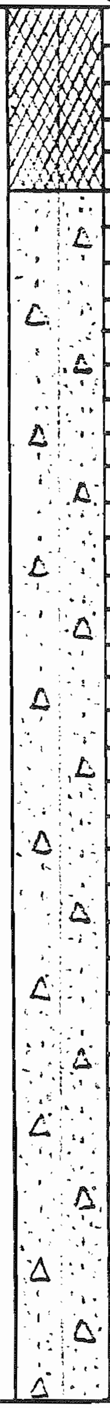
LOGGED BY P. Baker

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  | TOPSOIL 0.4 |  |  | 578.2 |
|  | 0.6 | S-1 | ☒ | N | N | 2.0<br>1.0 | 0.6 | SAND, SILT, CLAY WITH TRACE OF GRAVEL, MOIST, SLIGHTLY PLASTIC TRACE OF ORGANICS |  | 4-7-19-21 |  |
| 5 | 0.6 | S-2 | ☒ | N | N | 2.0<br>1.4 | 0.6 | (FILL) | SM | 5-8-9-11 | 573.2 |
|  |  |  |  |  |  |  |  | 8.5 |  |  |  |
| 10 | 0.6 | S-3 | ☒ | N | N | 2.0<br>1.4 | 0.6 | REDDISH-BROWN SILTY CLAY, MOIST, SLIGHTLY PLASTIC, STIFF FRACTURES | CL | 8-24-40-51 | 568.2 |
|  | 0.6 | S-4 | ☒ | N | N | 2.0<br>1.9 | 0.6 | (LACUSTRINE CLAY) |  | 6-13-19-13 |  |
|  |  |  |  |  |  |  |  | 14.0 | CL |  |  |
| 15 |  |  |  |  |  |  |  | REDDISH-GRAY SILTY CLAY, WET, SOFT, PLASTIC |  |  | 563.2 |
|  | 0.6 | S-5 | ☒ | N | N | 2.0<br>2.0 | 0.6 | (LACUSTRINE CLAY) | CL | WOH-WOH-WOH<br>2 |  |
| 20 |  |  |  |  |  |  |  |  |  |  | 558.2 |
|  | 0.6 | S-6 | ☒ | N | N | 2.0<br>2.0 | 0.6 |  | CL | WOR-WOR-WOR<br>WOR |  |
| 25 |  |  |  |  |  |  |  |  |  |  | 553.2 |
|  | 0.6 | S-7 | ☒ | N | N | 2.0<br>2.0 | 0.6 |  | CL | WOH-WOH-WOH<br>WOH |  |
| 30 |  |  |  |  |  |  |  |  |  |  | 548.2 |
|  |  |  |  |  |  |  |  | 31.0 |  |  |  |
|  | 0.6 | S-8 | ☒ | N | N | 2.0<br>1.3 | 0.6 | BROWN GRAVELLY SILTY SAND WITH TRACE OF CLAY, MOIST, SLIGHTLY PLASTIC, WIDELY GRADED, DENSE, ABOUT 20% GRAVEL | SM<br>ML | 13-17-14-34 |  |
| 35 |  |  |  |  |  |  |  | (GLACIAL TILL) |  |  | 543.2 |
|  | 0.6 | S-9 | ☒ | N | N | 0.9<br>0.8 | 0.6 |  | ML<br>SM | 36-62 |  |
| 40 |  |  |  |  |  |  |  |  |  |  | 538.2 |

WELL DATA



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 10215

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-09

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 10/23/85

COMPLETED 10/24/85

METHOD DRIVE/WASH

CASING SIZE 4.0"

HNU 11.7 / 10.2

PROTECTION LEVEL D

GROUND EL. 578.2'

SOIL DRILLED 45.5'

TOTAL DEPTH 61.0'

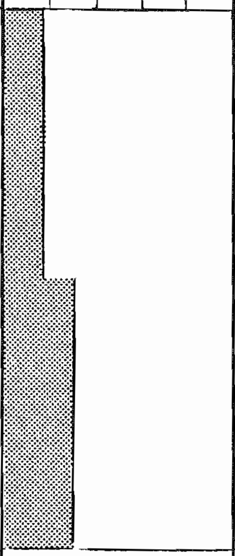
▽ BELOW GROUND NA

LOGGED BY P. Baker

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | 538.2 |
| | 0.6 | S-10 | ☒ | N | N | | 0.6 | GRAVELLY SILTY SAND WITH TRACE OF CLAY, WIDELY GRADED, DENSE<br>(GLACIAL TILL) | SM<br>ML | 60 FOR 0.5 FT<br>RQD %<br>20 40 60 80 | | |
| 45 | | | | | | | | 45.5 | | | | 533.2 |
| | | | | | | | | BEDROCK: GRAY DOLOMITE<br>SEE ROCK LOG FOR DESCRIPTIONS AND FRACTURES<br>BOTTOM OF BORING AT 61.0 FEET<br>WOH = WEIGHT OF HAMMER<br>WOR = WEIGHT OF RODS | | | | |
| 50 | | | | | | | | | | | | 528.2 |
| | | R-1 | | | | | | | | | | |
| 55 | | | | | | | | | | | | 523.2 |
| | | R-2 | | | | | | | | | | |
| 60 | | | | | | | | | | | | 518.2 |
| | | | | | | | | BOTTOM OF BORING AT 61.0 FT | | | | |
| 65 | | | | | | | | | | | | 513.2 |
| 70 | | | | | | | | | | | | |
| 75 | | | | | | | | | | | | |
| 80 | | | | | | | | | | | | |



U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

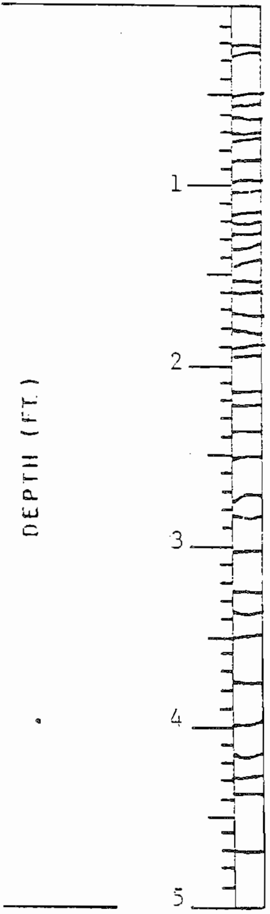
# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10215 |
| LOGGED BY<br>P. Baker | DATE<br>10-23-85 | PROTECTION LEVEL<br>D |

| | | |
|---|---|---|
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-1 | DEPTH<br>44.5 FT. TO 53.8 FT. |
| CORE RECOVERY<br>8.2 FT. | RQD<br>16 % | CORE QUALITY<br>Very Poor |

CORE RECOVERY (FT.)



TOTAL 9.3 ( FT )

88 %

.3 FT. CORE RECOVERY

TOTAL 1.5 ( FT )

16 %

ROCK DESCRIPTION AND IDENTIFICATION

GRAY DOLOMITE WITH THIN FRACTURES FILLED WITH ANHYDRITE AND GYPSUM

ECJORDANCO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10215 |
| LOGGED BY<br>P. Baker | DATE<br>10-23-85 | PROTECTION LEVEL<br>D |

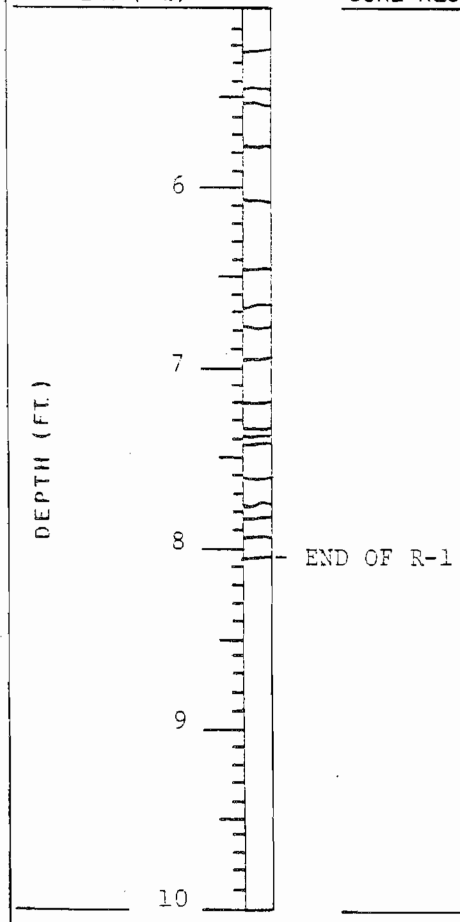
| | | |
|---|---|---|
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-1 | DEPTH<br>44.5 FT. TO 53.8 FT. |
| CORE RECOVERY<br>8.2 FT. | RQD<br>16 % | CORE QUALITY<br>Very Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

GRAY DOLOMITE WITH THIN FRACTURES FILLED WITH ANHYDRITE AND GYPSUM



TOTAL 9.3 ( FT )

88 %

TOTAL 1.5 ( FT )

16 %

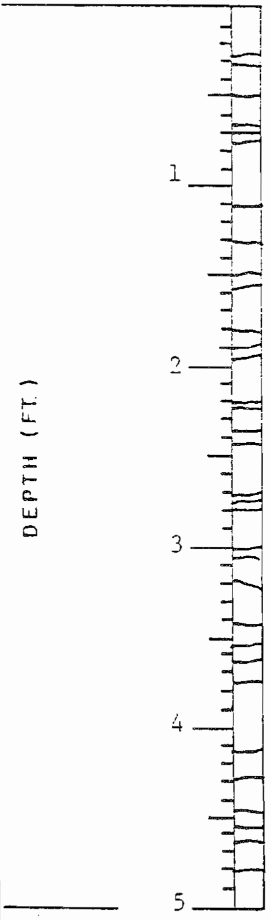
ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO.<br>4344-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10215 |
| LOGGED BY<br>P. Baker | DATE<br>10-24-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-2 | DEPTH<br>53.8 FT. TO 61.0 FT. |
| CORE RECOVERY<br>7.2 FT. | RQD<br>34 % | CORE QUALITY<br>Poor |

| CORE RECOVERY (FT.) | .3 FT. CORE RECOVERY | ROCK DESCRIPTION AND IDENTIFICATION |
|---|---|---|
| | | SIMILAR TO R-1 |



TOTAL 7.2 (FT)

100 %

TOTAL 2.5 (FT)

34 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

PROJECT NO. 4344-09

PROJECT NAME Love Canal

BORING NO. 10215

LOGGED BY P. Baker

DATE 10-24-85

PROTECTION LEVEL D

CORE DIAMETER NX

CORE RUN NO. R-2

DEPTH 53.8 FT. TO 61.0 FT.

CORE RECOVERY 7.2 FT.

RQD 34 %

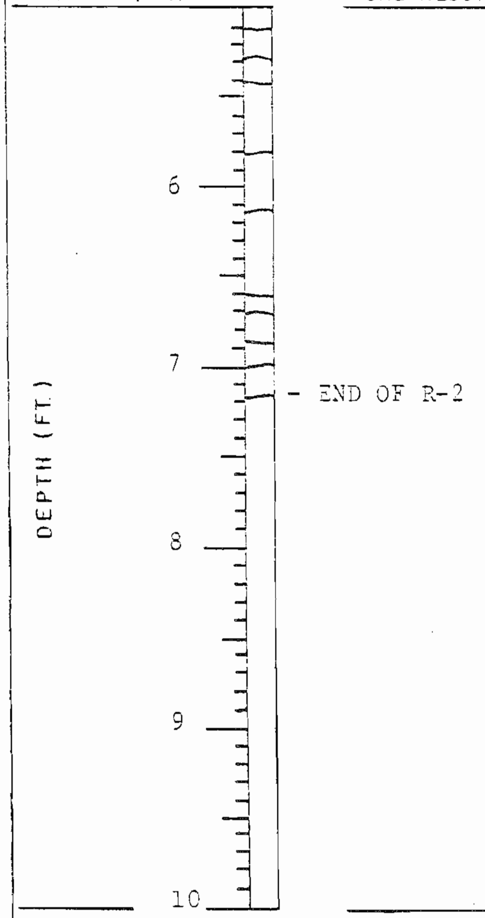
CORE QUALITY Poor

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



TOTAL 7.2 (FT )

100 %

TOTAL 2.5 (FT )

34 %

ECJORDANCO

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

**BORING NO.** 10225A

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-09

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/15/85

**COMPLETED** 11/14/85

**METHOD** DRIVE/WASH

**CASING SIZE** 4.0"

**HNU** 11.7/(10.2)

**PROTECTION LEVEL** C/D

**GROUND EL.** 574.5'

**SOIL DRILLED** 32.4'

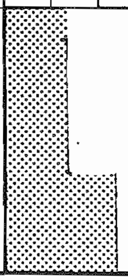
**TOTAL DEPTH** 213.7'

▽ **BELOW GROUND**

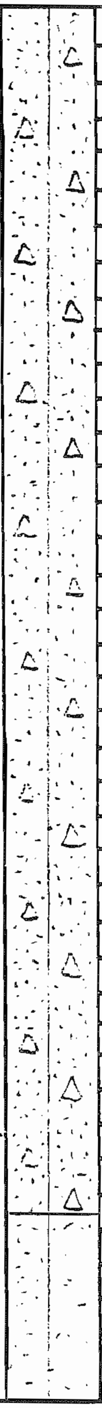
**LOGGED BY** T. Nowack

**CHECKED BY**

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE* | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | TOPSOIL 0.5 | | | 574.5 |
| | 0.3 | S-1 | N | N | 2.0<br>1.0 | 0.0 | BROWN TO BLACK SANDY SILT, TRACE OF GRAVEL AND CLAY, DRY, MEDIUM DENSE (FILL) 4.1 | ML | 6-12-11-12 | |
| 5 | 0.3 | S-2 | N | N | 2.0<br>1.3 | 0.0 | REDDISH-BROWN SILTY CLAY, MOIST, STIFF, SLIGHTLY PLASTIC, FRACTURES | CL | 9-9-12-23 | 569.5 |
| 10 | 0.3 | S-3 | N | N | 2.0<br>0.3 | 0.0 | (LACUSTRINE CLAY) | CL | 6-11-11-11 | 564.5 |
| | | | | | | | 12.0 | | | |
| | 0.0 | S-4 | N | N | 2.0<br>1.8 | 0.0 | REDDISH-GRAY SILTY CLAY, WET, PLASTIC, SOFT | CL | 2-2-2-1 | |
| 15 | | | | | | | | | | 559.5 |
| | 0.0 | S-5 | N | N | 2.0<br>2.0 | 0.0 | (LACUSTRINE CLAY) | CL | WOH-WOH-2-1 | |
| 20 | | | | | | | | | | 554.5 |
| | 0.0 | S-6 | N | N | 2.0<br>2.0 | 0.0 | | CL | WOH-WOH-2-2 | |
| 25 | | | | | | | | | | 549.5 |
| | | | | | | | 27.0 | | | |
| | 0.0 | S-7 | N | N | 2.0<br>1.9 | 0.0 | SILTY SAND WITH SOME GRAVEL, TRACE OF CLAY, WIDELY GRADED, DENSE, WET | SM<br>ML | 23-37-21-48 | |
| 30 | | | | | | | (GLACIAL TILL) 32.4 | | RQD%<br>20 40 60 80 | 544.5 |
| | | R-1 | | | | | BEDROCK: GRAY DOLOMITE, SEE ROCK LOGS FOR DESCRIPTIONS AND FRACTURES. | |  | |
| 35 | | R-2 | | | | | | | | 539.5 |
| | | R-3 | | | | | WOH = WEIGHT OF HAMMER | | | |
| 40 | | | | | | | | | | 534.5 |

WELL DATA



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

## LOVE CANAL REMEDIAL PROJECT
## LONG TERM MONITORING

**TASK VC**

**BORING NO.** 10225A

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-09

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 10/15/85

**COMPLETED** 11/14/85

**METHOD** Nx CORE

**CASING SIZE** 3.0"

**HNU** 11.7 (10.2)

**PROTECTION LEVEL** C/D

**GROUND EL.** 574.5'

**SOIL DRILLED** 32.4'

**TOTAL DEPTH** 213.7'

**∇ BELOW GROUND**

**LOGGED BY** T. Nowack

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 534.5 |
| | | R-3 | | | | | GRAY DOLOMITE | | | | |
| 45 | | R-4 | | | | | | | | | 529.5 |
| 50 | | R-5 | | | | | | | | | 524.5 |
| 55 | | R-6 | | | | | | | | | 519.5 |
| 60 | | R-7 | | | | | | | | | 514.5 |
| 65 | | R-8 | | | | | | | | | 509.5 |
| 70 | | | | | | | | | | | 504.5 |
| 75 | | R-9 | | | | | | | | | 499.5 |
| 80 | | | | | | | | | | | 494.5 |

*U: THIN WALL TUBE  S: SPLIT SPOON  R: ROCK

E.C.JORDAN CO.

## LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

**TASK VC**

**BORING NO.** 10225A

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-09

CONTRACTOR: J. MATHES ASSOC

DATE STARTED 10/15/85

COMPLETED 11/14/85

METHOD Nx CORE

CASING SIZE 3.0"

HNU 11.7 (10.2)

PROTECTION LEVEL C/D

GROUND EL. 574.5'

SOIL DRILLED 32.4'

TOTAL DEPTH 213.7'

▽ BELOW GROUND

LOGGED BY T. Nowack

CHECKED BY K. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R-9 | | | | | GRAY DOLOMITE | | | | 494.5 |
| | | R-10 | | | | | | | | | |
| 85 | | R-11 | | | | | | | | | 489.5 |
| 90 | | | | | | | | | | | 484.5 |
| 95 | | R-12 | | | | | | | | | 479.5 |
| 100 | | | | | | | | | | | 474.5 |
| 105 | | R-13 | | | | | | | | | 469.5 |
| 110 | | | | | | | | | | | 464.5 |
| 115 | | R-14 | | | | | | | | | 459.5 |
| 120 | | | | | | | | | | | 454.5 |

*U: THIN WALL TUBE   S: SPLIT SPOON   R: ROCK

E.C. JORDAN CO.

LOVE CANAL REMEDIAL PROJECT
LONG TERM MONITORING

TASK VC

BORING NO. 10225A

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO 4844-09

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 10/15/85

COMPLETED 11/14/85

METHOD Nx CORE

CASING SIZE 3.0"

HNU 11.7 (10.2)

PROTECTION LEVEL C/D

GROUND EL. 574.5'

SOIL DRILLED 32.4'

TOTAL DEPTH 213.7'

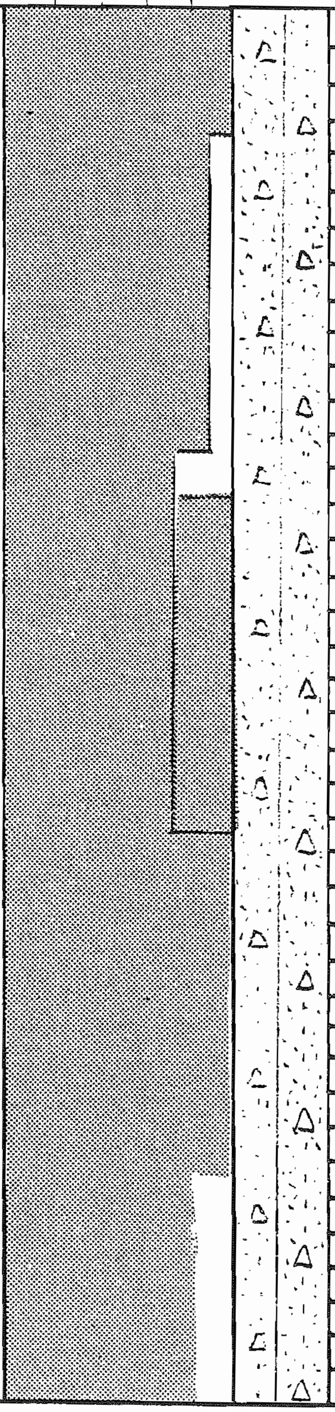
▽ BELOW GROUND

LOGGED BY T. Nowack

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  | 454.5 |
|  |  | R-14 |  |  |  |  | GRAY DOLOMITE |  |  |  |  |
| 125 |  |  |  |  |  |  |  |  |  |  | 449.5 |
|  |  | R-15 |  |  |  |  |  |  |  |  |  |
| 130 |  |  |  |  |  |  |  |  |  |  | 444.5 |
|  |  | R-16 |  |  |  |  |  |  |  |  |  |
| 135 |  |  |  |  |  |  |  |  |  |  | 439.5 |
|  |  | R-17 |  |  |  |  |  |  |  |  |  |
| 140 |  |  |  |  |  |  |  |  |  |  | 434.5 |
| 145 |  |  |  |  |  |  |  |  |  |  | 429.5 |
|  |  | R-18 |  |  |  |  |  |  |  |  |  |
| 150 |  |  |  |  |  |  |  |  |  |  | 424.5 |
| 155 |  |  |  |  |  |  |  |  |  |  | 419.5 |
|  |  | R-19 |  |  |  |  |  |  |  |  |  |
| 160 |  |  |  |  |  |  |  |  |  |  | 414.5 |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 10225A

CLIENT NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-09

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 10/15/85

COMPLETED 11/14/85

METHOD Nx CORE

CASING SIZE 3.0"

HNU 11.7/10.2

PROTECTION LEVEL C/D

GROUND EL. 574.5'

SOIL DRILLED 32.4'

TOTAL DEPTH 213.7'

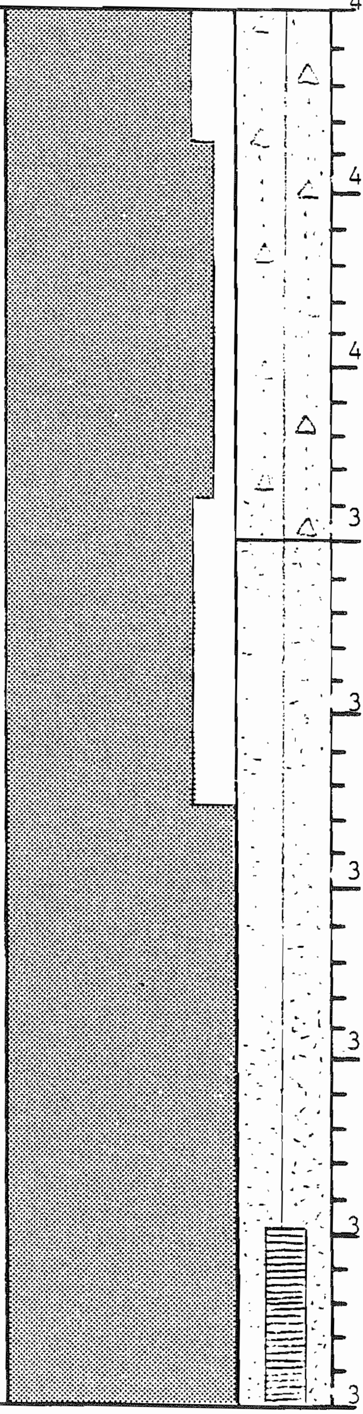
▽ BELOW GROUND

LOGGED BY T. Nowack

CHECKED BY A. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  | R-19 |  |  |  |  | GRAY DOLOMITE |  |  |  | 414.5 |
| 165 |  |  |  |  |  |  |  |  |  |  | 409.5 |
|  |  | R-20 |  |  |  |  |  |  |  |  |  |
| 170 |  |  |  |  |  |  |  |  |  |  | 404.5 |
| 175 |  |  |  |  |  |  |  |  |  |  | 399.5 |
|  |  | R-21 |  |  |  |  |  |  |  |  |  |
| 180 |  |  |  |  |  |  |  |  |  |  | 394.5 |
|  |  | R-22 |  |  |  |  |  |  |  |  |  |
| 185 |  |  |  |  |  |  |  |  |  |  | 389.5 |
|  |  | R-23 |  |  |  |  |  |  |  |  |  |
| 190 |  |  |  |  |  |  |  |  |  |  | 384.5 |
| 195 |  |  |  |  |  |  |  |  |  |  | 379.5 |
|  |  | R-24 |  |  |  |  |  |  |  |  |  |
| 200 |  |  |  |  |  |  |  |  |  |  | 374.5 |



*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 10225A

**CLIENT**: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-09

**CONTRACTOR**: J. MATHES ASSOC.

**DATE STARTED** 10/15/85

**COMPLETED** 11/14/85

**METHOD** Nx CORE

**CASING SIZE** 3.0"

**HNU** 11.7/(10.2)

**PROTECTION LEVEL** C/D

**GROUND EL.** 574.5'

**SOIL DRILLED** 32.4'

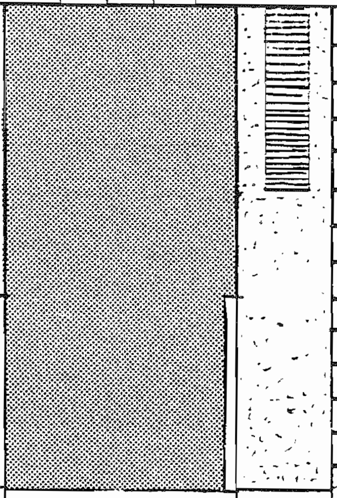
**TOTAL DEPTH** 213.7'

▽ **BELOW GROUND**

**LOGGED BY** T. Nowack

**CHECKED BY** R. Lewis

**DATE** 3/24/86



| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | R-24 | | | | | GRAY DOLOMITE | | | | 374.5 |
| 205 | | R-25 | | | | | | | | | 369.5 |
| 210 | | R-26 | | | | | GRAY DOLOMITIC SHALE | | | | 364.5 |
| 215 | | | | | | | BOTTOM OF BORING AT 213.7 FEET | | | | 359.5 |
| 220 | | | | | | | | | | | |
| 225 | | | | | | | | | | | |
| 230 | | | | | | | | | | | |
| 235 | | | | | | | | | | | |
| 240 | | | | | | | | | | | |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

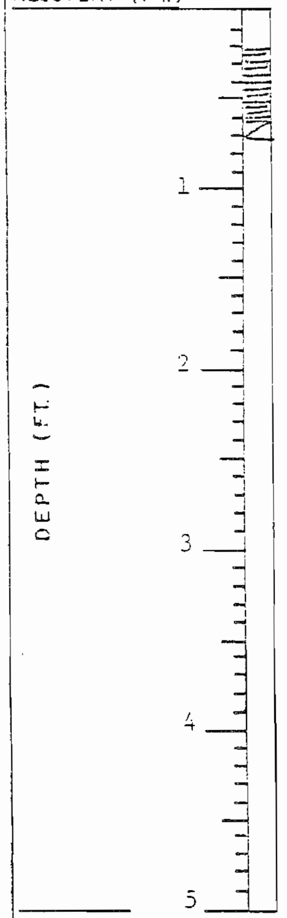
| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10225 |
| LOGGED BY<br>T. Nowack | DATE<br>10-15-85 | PROTECTION LEVEL<br>C/D |

| | | |
|---|---|---|
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-2 | DEPTH<br>32.4 FT. TO 33.4 FT. |
| CORE RECOVERY<br>0.7 FT. | RQD<br>0 % | CORE QUALITY<br>Very Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



GRAY DOLOMITE WITH
GYPSUM FILLED VUGS

TOTAL 1.0 (FT )

70 %

TOTAL 0 ( )

0 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

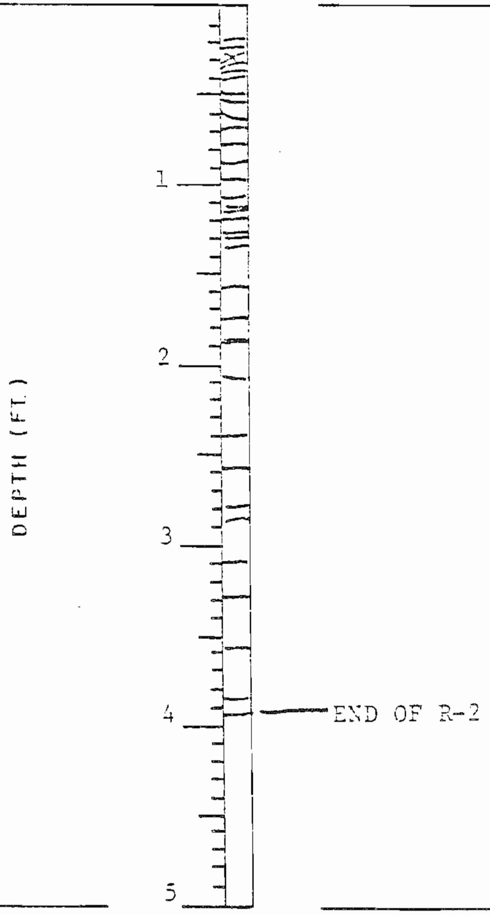
SHEET 1 OF 1

| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10225 |
| LOGGED BY<br>T. Nowack | DATE<br>10-15-85 | PROTECTION LEVEL<br>C/D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-2 | DEPTH<br>33.4 FT. TO 37.4 FT. |
| CORE RECOVERY<br>3.9 FT. | RQD<br>23 % | CORE QUALITY<br>Very Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



TOTAL 4.0 (FT)

98 %

TOTAL 0.9 (FT)

23 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET ____ OF ____

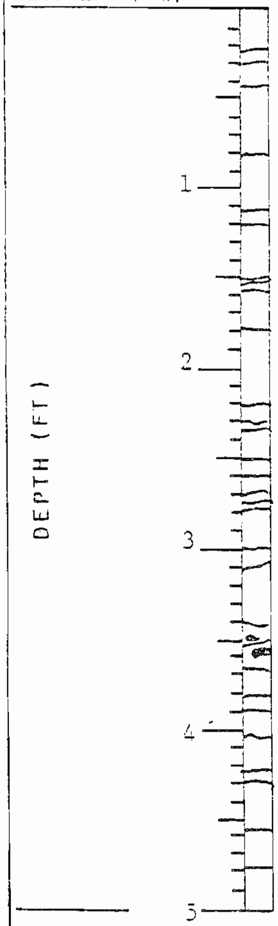
| | | | |
|---|---|---|---|
| PROJECT NO. 4341-09 | PROJECT NAME Love Canal | | BORING NO. 10225 |
| LOGGED BY T. Nowack | DATE 10-15-85 | | PROTECTION LEVEL C/D |
| CORE DIAMETER NX | CORE RUN NO. R-3 | DEPTH 37.4 FT. TO 43.4 FT. | |
| CORE RECOVERY 5.7 FT. | RQD 27 % | CORE QUALITY Very Poor | |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



ANHYDRITE FILLED VUGS

TOTAL 6.0 (FT)

95 %

TOTAL 1.7 (FT)

27 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

PROJECT NO. 46-4-09

PROJECT NAME Love Canal

BORING NO. 10225

LOGGED BY T. Nowack

DATE 10-15-85

PROTECTION LEVEL C/D

CORE DIAMETER NX

CORE RUN NO. R-3

DEPTH 42.4 FT. TO 43.4 FT.

CORE RECOVERY 5.7 FT.

RQD 27 %

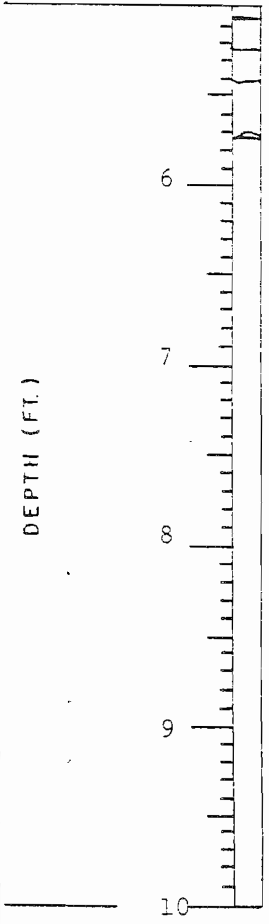
CORE QUALITY Poor

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



- END OF R-3

TOTAL 6.0 ( FT )

95 %

TOTAL 1.7 ( FT )

27 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

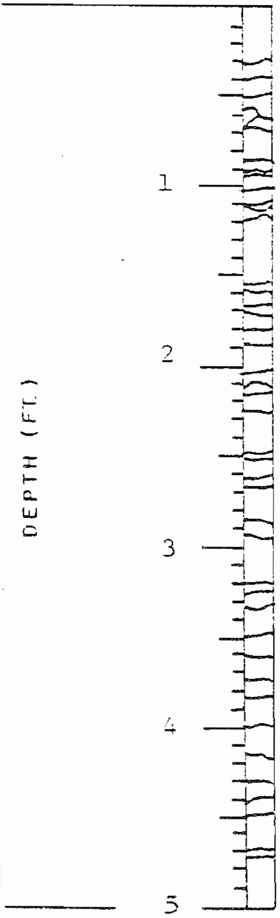
| | | | |
|---|---|---|---|
| PROJECT NO<br>4344-09 | PROJECT NAME<br>Love Canal | | BORING NO.<br>10225 |
| LOGGED BY<br>T. Nowack | DATE<br>10-15-85 | | PROTECTION LEVEL<br>C/D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-4 | DEPTH<br>43.4 FT. TO 50.2 FT. | |
| CORE RECOVERY<br>5.7 FT. | RQD<br>25 % | CORE QUALITY<br>Poor | |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



GYPSUM FILLED FRACTURES

TOTAL 6.8 (FT)

84 %

TOTAL 1.7 (FT)

25 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

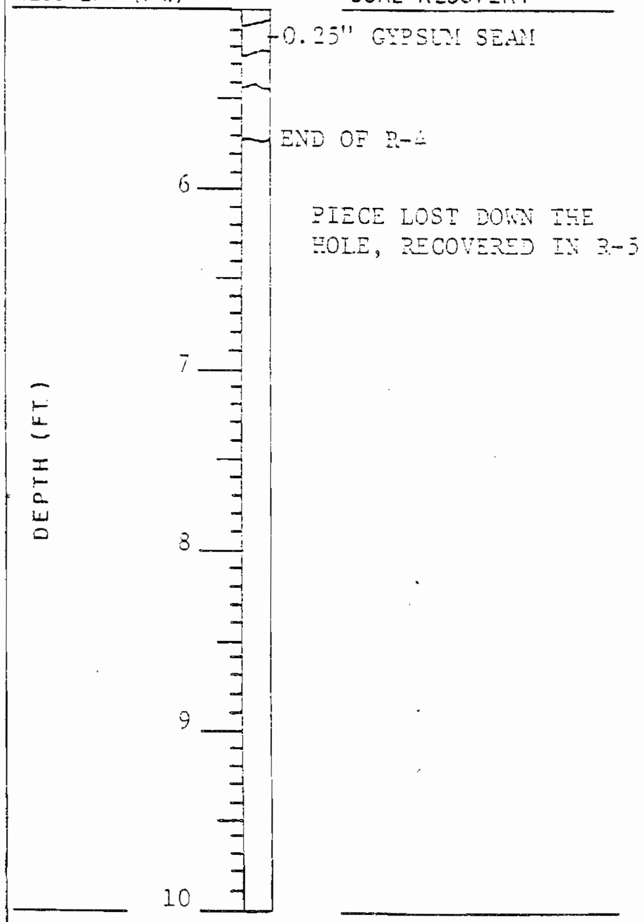
SHEET 2 OF 2

| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10225 |
| LOGGED BY T. Nowack | DATE 10-15-85 | PROTECTION LEVEL C/D |
| CORE DIAMETER NX | CORE RUN NO. R-4 | DEPTH 43.4 FT. TO 50.2 FT. |
| CORE RECOVERY 5.7 FT. | RQD 25 % | CORE QUALITY Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



PIECE LOST DOWN THE HOLE, RECOVERED IN R-5

SIMILAR TO R-1

TOTAL 6.8 (FT )

84 %

TOTAL 1.7 (FT )

25 %

E.C.JORDAN CO.

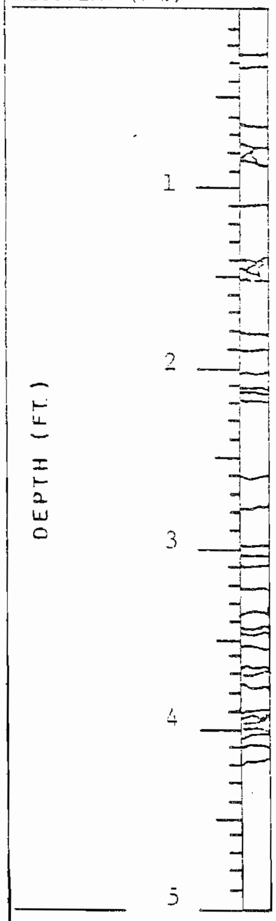
# VISUAL IDENTIFICATION OF ROCK CORES

SHEET ___ OF ___

| | | |
|---|---|---|
| PROJECT NO.<br>4344-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10225 |
| LOGGED BY<br>T. Nowack | DATE<br>10-15-85 | PROTECTION LEVEL<br>C/D |

| | | |
|---|---|---|
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-5 | DEPTH<br>50.2 FT. TO 53.2 FT. |
| CORE RECOVERY<br>4.2 FT. | RQD<br>38 % | CORE QUALITY<br>Poor |

CORE RECOVERY (FT.)



.3 FT. CORE RECOVERY

LOST PIECE FROM R-4

- END OF R-5

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1

- RUN INCLUDES LOST SECTION OF R-4

TOTAL 3.0 (FT)

* 100+ %

TOTAL 1.6 (FT)

38 %

* - EXCESS CORE DUE TO RECOVERY OF LOST PIECE FROM R-4.

ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

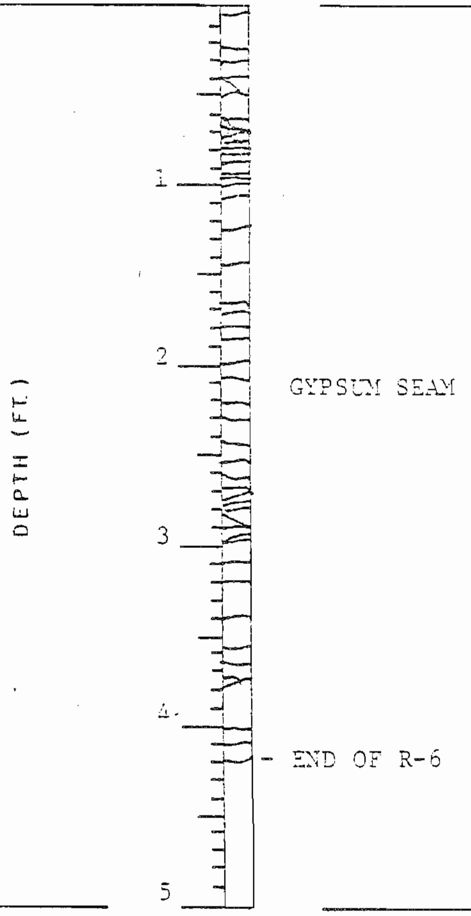
SHEET [illegible] OF [illegible]

| | | |
|---|---|---|
| PROJECT NO.<br>4344-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10225 |
| LOGGED BY<br>T. Nowack | DATE<br>10-15-85 | PROTECTION LEVEL<br>C/D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-6 | DEPTH<br>53.4 FT. TO 57.6 FT. |
| CORE RECOVERY<br>4.2 FT. | RQD<br>0 % | CORE QUALITY<br>Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



SIMILAR TO R-1

TOTAL 4.2 (FT) TOTAL 0 (FT)

100 % 0 %

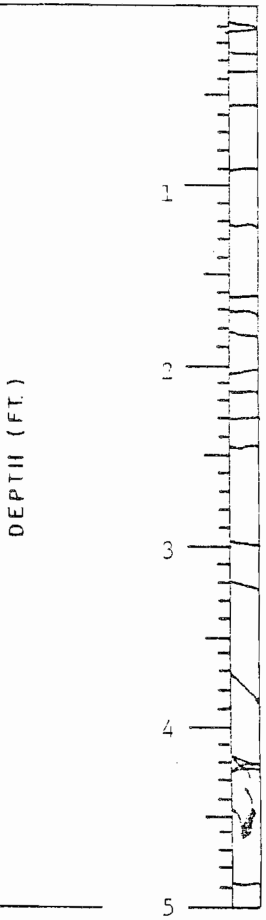
ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

| | | |
|---|---|---|
| PROJECT NO<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10225 |
| LOGGED BY<br>T. Nowack | DATE<br>10-16-85 | PROTECTION LEVEL<br>C/D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-7 | DEPTH<br>57.6 FT. TO 63.4 FT. |
| CORE RECOVERY<br>5.6 FT. | RQD<br>46 % | CORE QUALITY<br>Poor |

CORE RECOVERY (FT.)



TOTAL 5.8 ( FT )

96 %

.3 FT. CORE RECOVERY

TOTAL 2.7 ( FT )

46 %

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1

- ROCK BECOMING MORE COMPETENT WITH DEPTH

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET [illegible] OF [illegible]

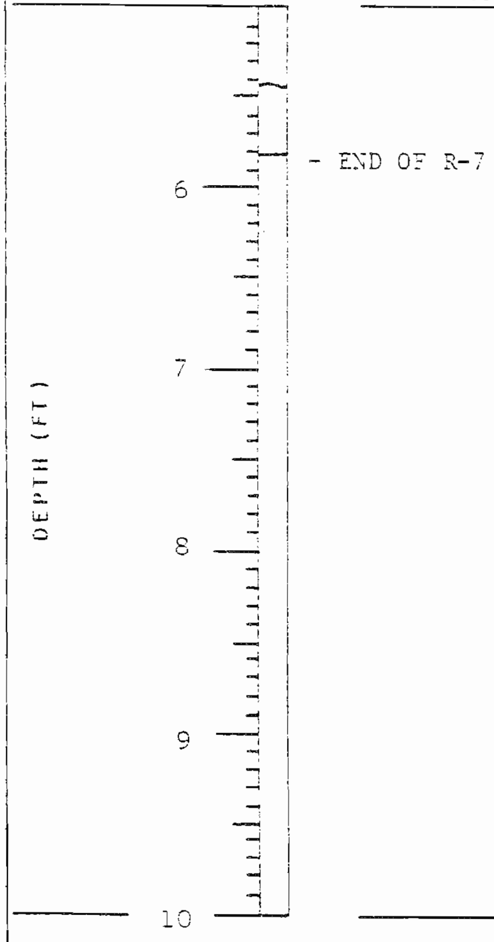
| | | |
|---|---|---|
| PROJECT NO.<br>4 344-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10225 |
| LOGGED BY<br>T. Nowack | DATE<br>10-16-85 | PROTECTION LEVEL<br>C/D |

| | | |
|---|---|---|
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-7 | DEPTH<br>57.6 FT. TO 63.4 FT. |
| CORE RECOVERY<br>5.6 FT. | RQD<br>46 % | CORE QUALITY<br>Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



SIMILAR TO R-1

TOTAL 5.8 ( FT )

96 %

TOTAL 2.7 ( FT )

46 %

ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 3

PROJECT NO. 4844-09

PROJECT NAME Love Canal

BORING NO. 10223

LOGGED BY T. Nowack

DATE 10-16-85

PROTECTION LEVEL C/D

CORE DIAMETER NX

CORE RUN NO. R-8

DEPTH 63.4 FT. TO 73.4 FT.

CORE RECOVERY 10.0 FT.

RQD 80 %

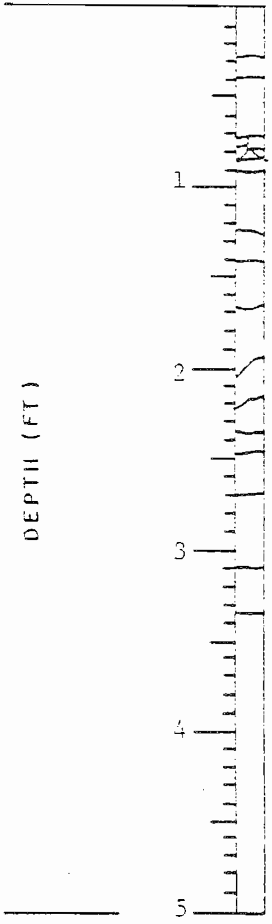
CORE QUALITY Good

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



MECHANICAL BREAK

TOTAL 10.0 (FT)

100 %

TOTAL 8.0 (FT)

80 %

EC JORDAN CO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

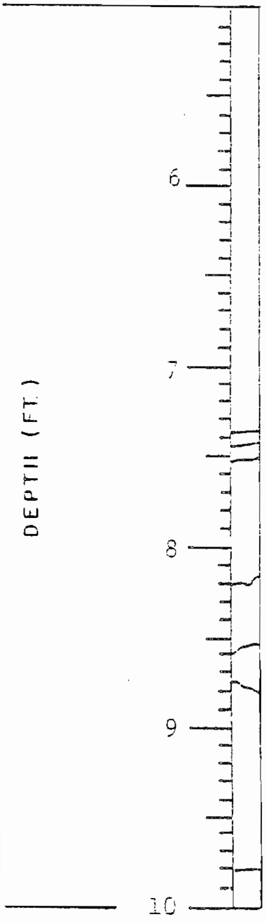
| | | |
|---|---|---|
| PROJECT NO. 4344-09 | PROJECT NAME Love Canal | BORING NO. 10225 |
| LOGGED BY T. Nowack | DATE 10-16-85 | PROTECTION LEVEL C/D |
| CORE DIAMETER NX | CORE RUN NO. R-8 | DEPTH 63.4 FT. TO 73.4 FT. |
| CORE RECOVERY 10.0 FT. | RQD 80 % | CORE QUALITY Good |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



SHALEY ZONE

END OF R-8

TOTAL 10.0 ( FT ) TOTAL 8.0 ( FT )

100 % 80 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

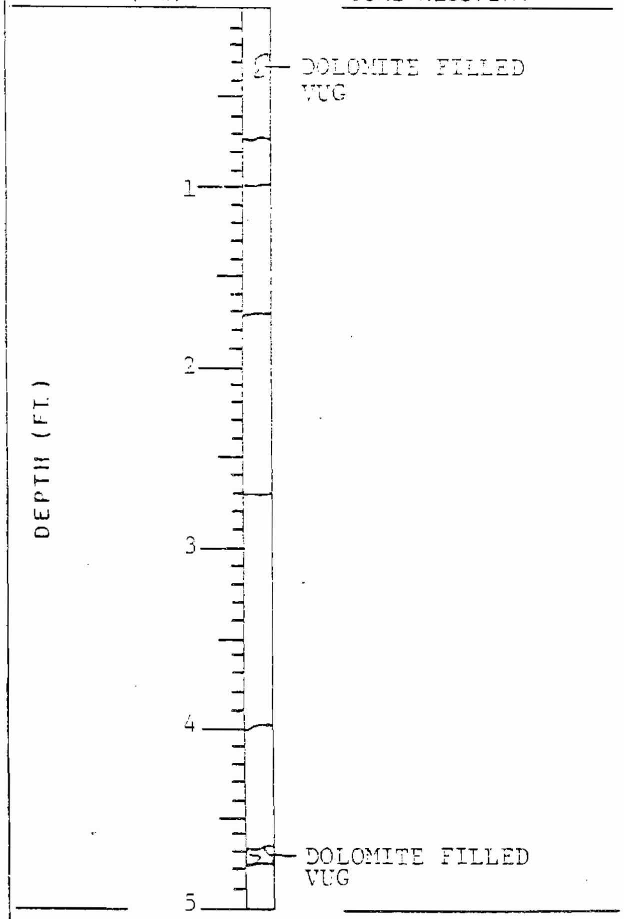
| | | |
|---|---|---|
| PROJECT NO. -844-09 | PROJECT NAME Love Canal | BORING NO. 10225 |
| LOGGED BY T. Nowack | DATE 10-16-85 | PROTECTION LEVEL C/D |
| CORE DIAMETER NX | CORE RUN NO. R-9 | DEPTH 73.4 FT. TO 82.4 FT. |
| CORE RECOVERY 9.0 FT. | RQD 100 % | CORE QUALITY Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



TOTAL 9.0 ( FT )

100 %

TOTAL 9.0 ( FT )

100 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

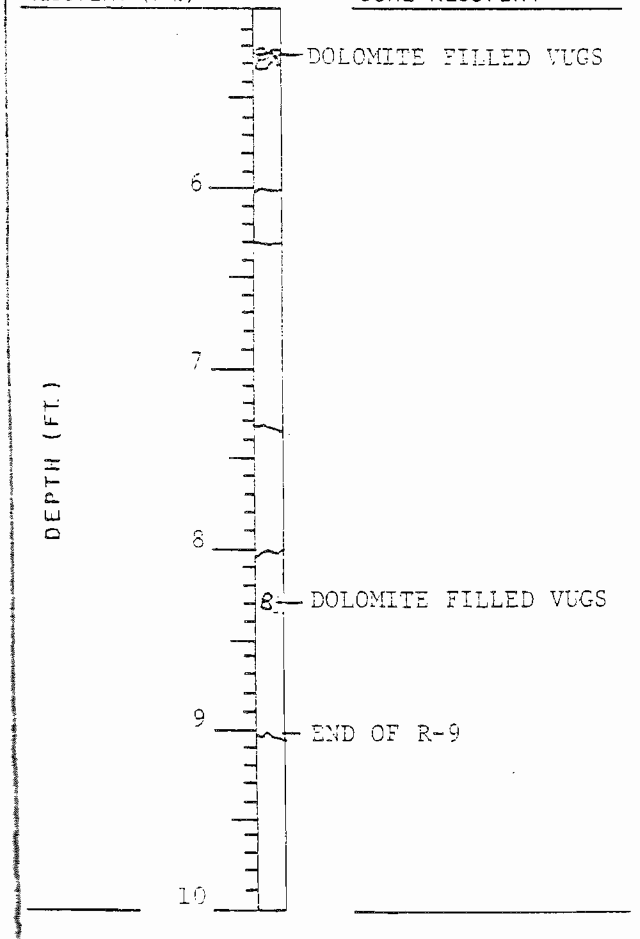
SHEET 2 OF 2

| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10225 |
| LOGGED BY<br>T. Nowack | DATE<br>10-16-85 | PROTECTION LEVEL<br>C/D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-9 | DEPTH<br>73.4 FT. TO 82.4 FT. |
| CORE RECOVERY<br>9.0 FT. | RQD<br>100 % | CORE QUALITY<br>Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



SIMILAR TO R-1

TOTAL 9.0 (FT )

100 %

TOTAL 9.0 (FT )

100 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

| | | |
|---|---|---|
| PROJECT NO. 48 11-09 | PROJECT NAME Love Canal | BORING NO. 10225 |
| LOGGED BY I. Nowack | DATE 10-31-85 | PROTECTION LEVEL D |

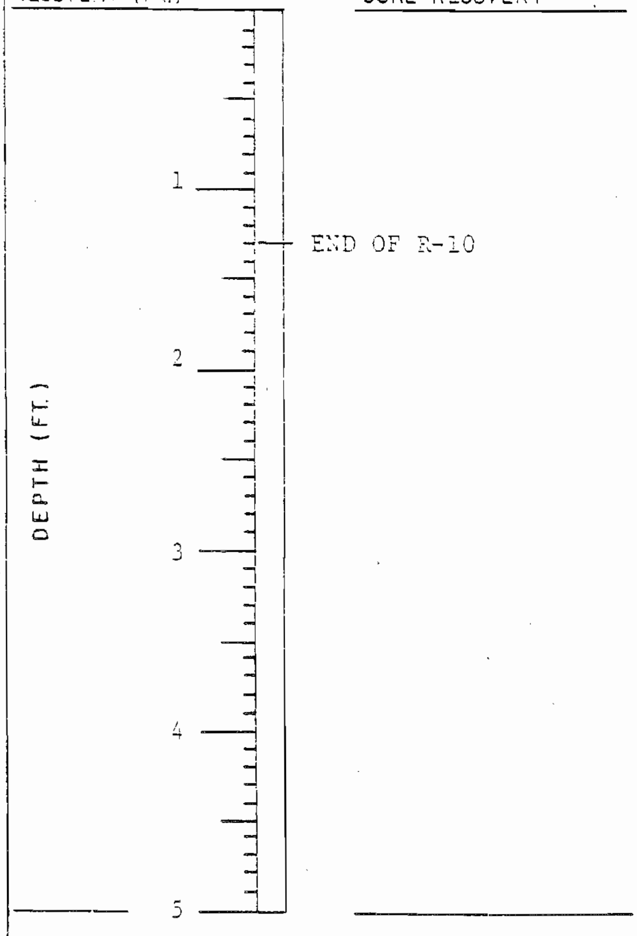
| | | |
|---|---|---|
| CORE DIAMETER NX | CORE RUN NO. R-10 | DEPTH 82.4 FT. TO 83.7 FT. |
| CORE RECOVERY 1.3 FT. | RQD 100 % | CORE QUALITY Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



TOTAL 1.3 ( FT )

100 %

TOTAL 1.3 (FT )

100 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

PROJECT NO. 4341-09

PROJECT NAME Love Canal

BORING NO. 10225

LOGGED BY P. Baker

DATE 10-31-85

PROTECTION LEVEL D

CORE DIAMETER NX

CORE RUN NO. R-11

DEPTH 83.7 FT. TO 93.7 FT.

CORE RECOVERY 10.0 FT.

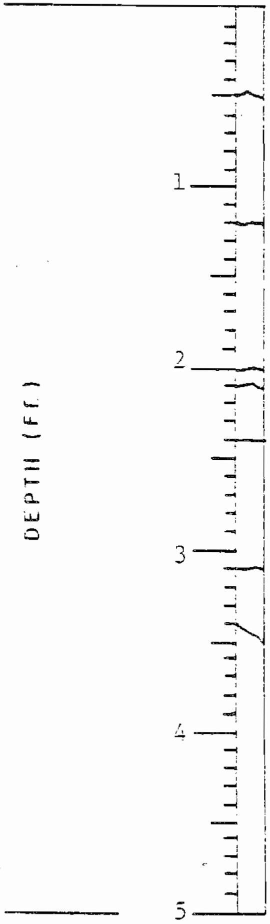
RQD 92 %

CORE QUALITY Excellent

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



SIMILAR TO R-1

TOTAL 10.0 ( FT )

100 %

TOTAL 9.2 ( FT )

92 %

EC JORDAN CO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10225 |
| LOGGED BY P. Baker | DATE 10-31-85 | PROTECTION LEVEL D |

| | | |
|---|---|---|
| CORE DIAMETER NX | CORE RUN NO. R-11 | DEPTH 83.7 FT. TO 93.7 FT. |
| CORE RECOVERY 10.0 FT. | RQD 92 % | CORE QUALITY Excellent |

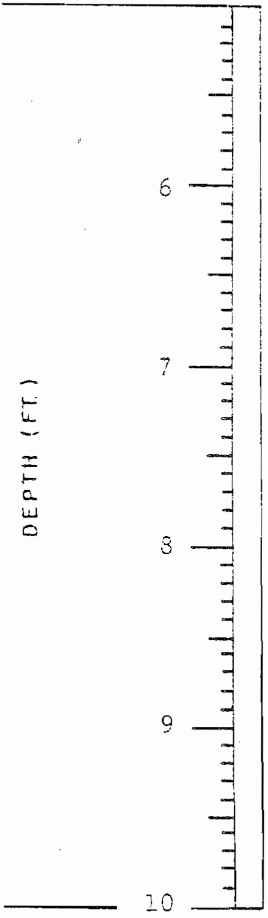
CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1

- SOLID 5 FT RUN



END OF R-11

TOTAL 10.0 ( FT )

100 %

TOTAL 9.2 ( FT )

92 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

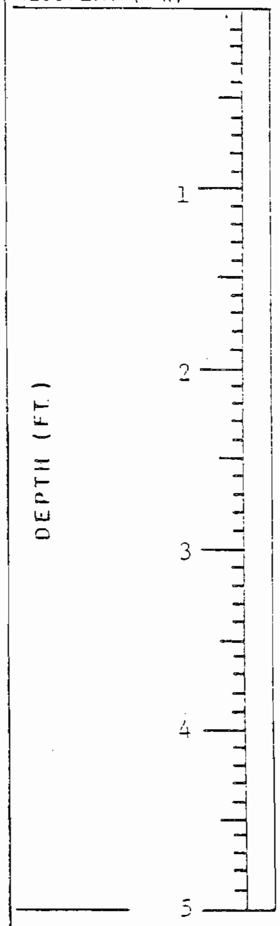
|  |  |  |
|---|---|---|
| PROJECT NO. 4344-09 | PROJECT NAME Love Canal | BORING NO. 10225 |
| LOGGED BY P. Baker | DATE 10-31-85 | PROTECTION LEVEL D |

|  |  |  |
|---|---|---|
| CORE DIAMETER NX | CORE RUN NO. R-12 | DEPTH 93.7 FT. TO 103.7 FT. |
| CORE RECOVERY 9.9 FT. | RQD 99 % | CORE QUALITY Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



SIMILAR TO R-1

- SOLID 5 FT RUN

TOTAL 9.9 ( FT )

99 %

TOTAL 9.9 (FT )

99 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10225 |
| LOGGED BY P. Baker | DATE 10-31-85 | PROTECTION LEVEL D |

| | | |
|---|---|---|
| CORE DIAMETER NX | CORE RUN NO. R-12 | DEPTH 93.7 FT. TO 103.7 FT. |
| CORE RECOVERY 9.9 FT. | RQD 99 % | CORE QUALITY Excellent |

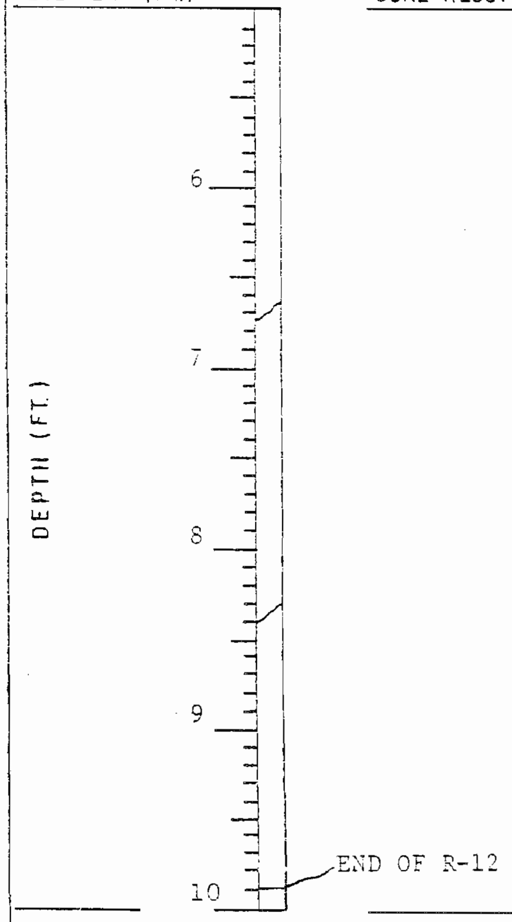
CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1

- OCCURANCE OF CORAL FOSSILS INCREASING WITH DEPTH



TOTAL 10.0 ( FT )

99 %

TOTAL 9.9 ( FT )

99 %

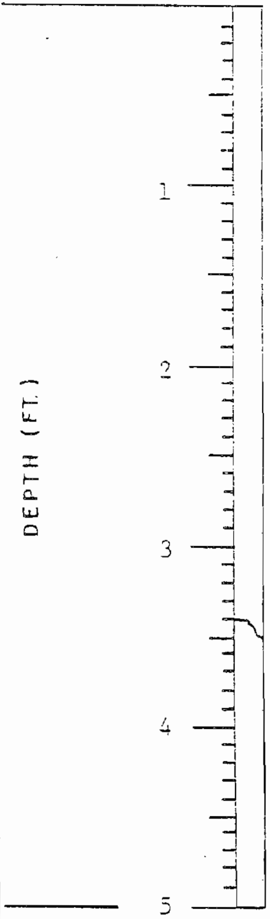
E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10225 |
| LOGGED BY P. Baker | DATE 10-31-85 | PROTECTION LEVEL D |
| CORE DIAMETER NX | CORE RUN NO. R-13 | DEPTH 103.7 FT. TO 113.7 FT. |
| CORE RECOVERY 9.8 FT. | RQD 89 % | CORE QUALITY Good |

CORE RECOVERY (FT.)



TOTAL 9.8 (FT)

98 %

.3 FT. CORE RECOVERY

TOTAL 8.9 (FT)

89 %

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1

- BECOMING SHALEY WITH DEPTH

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

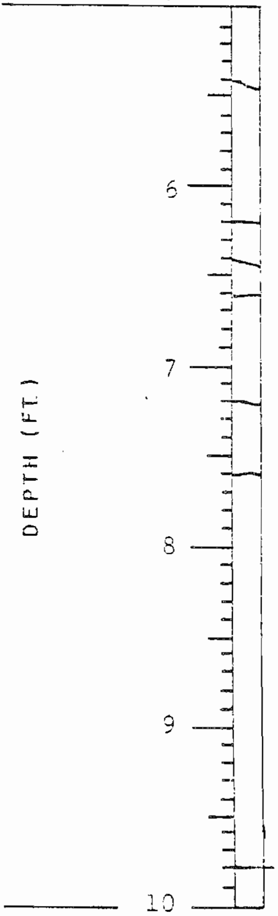
| | | |
|---|---|---|
| PROJECT NO. 1344-09 | PROJECT NAME Love Canal | BORING NO. 10225 |
| LOGGED BY P. Baker | DATE 10-31-85 | PROTECTION LEVEL D |
| CORE DIAMETER NX | CORE RUN NO. R-13 | DEPTH 103.7 FT. TO 113.7 FT. |
| CORE RECOVERY 9.8 FT. | RQD 89 % | CORE QUALITY Good |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



TOTAL 10.0 (FT) 98 %

TOTAL 8.9 (FT) 89 %

ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

PROJECT NO 4844-09

PROJECT NAME Love Canal

BORING NO. 10225

LOGGED BY P. Baker

DATE 10-31-85

PROTECTION LEVEL D

CORE DIAMETER NX

CORE RUN NO. R-14

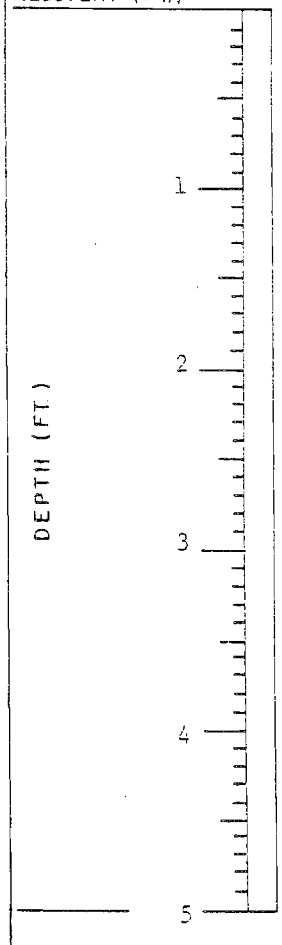
DEPTH 113.7 FT. TO 123.7 FT.

CORE RECOVERY 10.0 FT.

RQD 100 %

CORE QUALITY Excellent

CORE RECOVERY (FT.)



TOTAL 10.0 (FT )

100 %

.3 FT. CORE RECOVERY

TOTAL 10.0 (FT )

100 %

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1

- SOLID 5 FT RUN

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

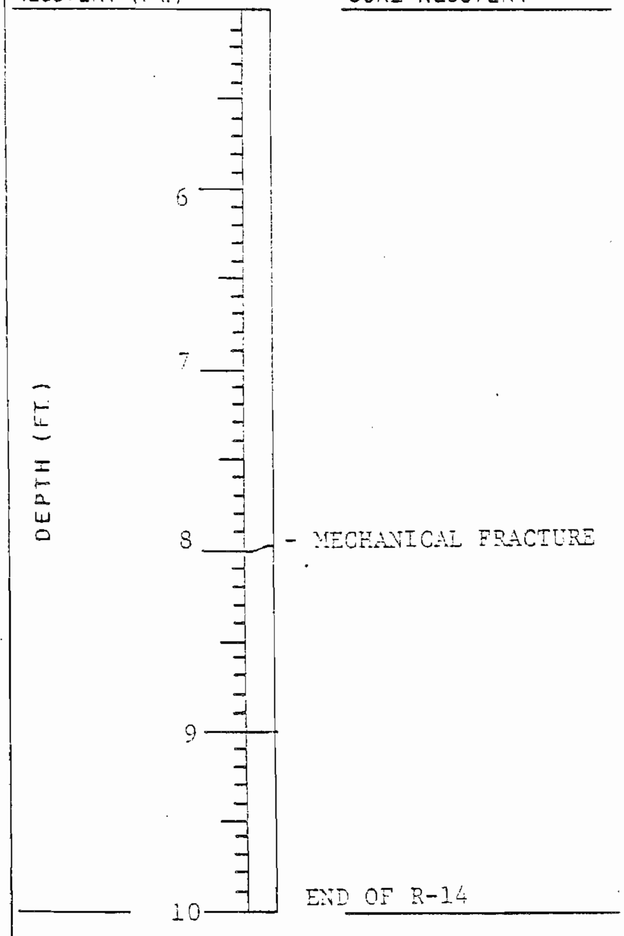
SHEET 2 OF 2

| | | | |
|---|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | | BORING NO. 10225 |
| LOGGED BY P. Baker | DATE 10-31-85 | | PROTECTION LEVEL D |
| CORE DIAMETER NX | CORE RUN NO. R-14 | DEPTH 113.7 FT. TO 123.7 FT. | |
| CORE RECOVERY 10.0 FT. | RQD 100 % | CORE QUALITY Excellent | |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



SIMILAR TO R-1

VUGS AND CORAL
INCREASING WITH DEPTH

TOTAL 10.0 (FT) TOTAL 10.0 (FT)

100 % 100 %

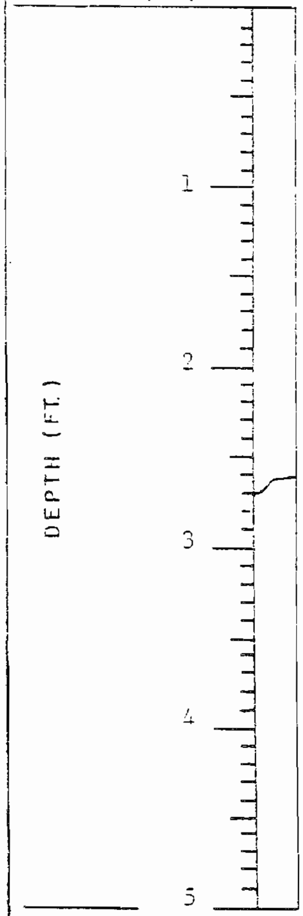
E.C.JORDAN CO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO.<br>1344-03 | PROJECT NAME<br>Love Canal | BORING NO.<br>10225 |
| LOGGED BY<br>P. Baker | DATE<br>10-31-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-15 | DEPTH<br>123.7 FT. TO 132.7 FT. |
| CORE RECOVERY<br>9.0 FT. | RQD<br>84 % | CORE QUALITY<br>Good |

CORE RECOVERY (FT.)



TOTAL 9.0 ( FT )

+100 %

.3 FT. CORE RECOVERY

TOTAL 8.4 ( FT )

84 %

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1

INTERBEDDED SHALE INCREASING IN FREQUENCY WITH DEPTH

ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET [illegible] OF 2

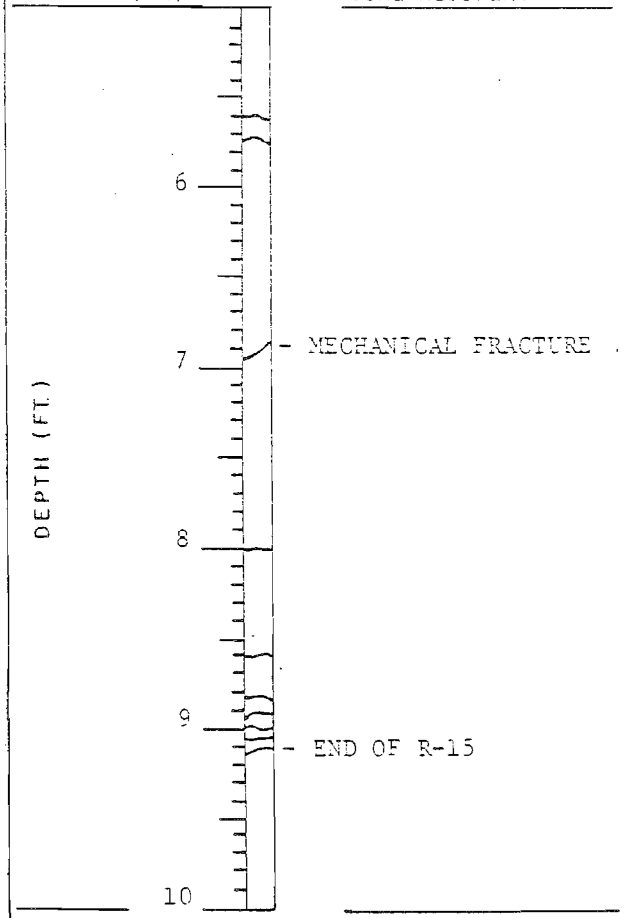
| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10225 |
| LOGGED BY P. Baker | DATE 10-31-85 | PROTECTION LEVEL D |
| CORE DIAMETER NX | CORE RUN NO. R-15 | DEPTH 123.7 FT. TO 132.7 FT. |
| CORE RECOVERY 9.2 FT. | RQD 84 % | CORE QUALITY Good |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



TOTAL 9.0 (FT )

+100 %

TOTAL 8.4 ( FT)

84 %

E.C.JORDAN CO.

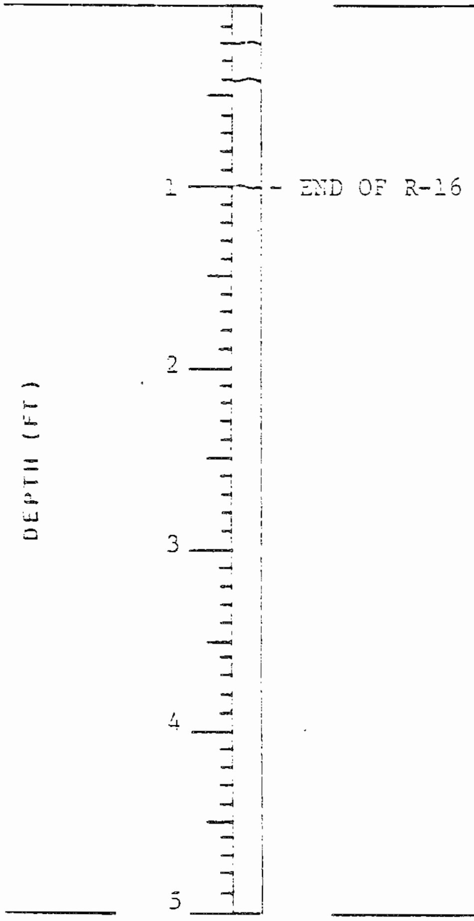
# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

|  |  |  |  |
|---|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | | BORING NO. 10225 |
| LOGGED BY P. Baker | DATE 11-6-85 | | PROTECTION LEVEL D |
| CORE DIAMETER NX | CORE RUN NO. R-16 | DEPTH 132.7 FT. TO 133.7 FT. | |
| CORE RECOVERY 1.0 FT. | RQD 75 % | CORE QUALITY | |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY



ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1

TOTAL 1.0 (FT)

100 %

TOTAL .75 (FT)

75 %

EC JORDAN CO

# VISUAL IDENTIFICATION OF ROCK CORES

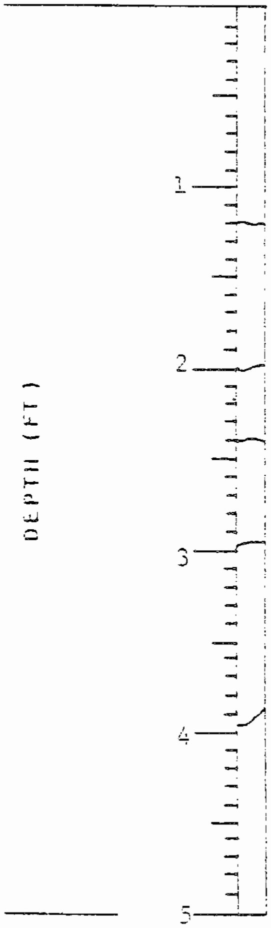
SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO.<br>1844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10225 |
| LOGGED BY<br>P. Baker | DATE<br>11-6-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-17 | DEPTH<br>133.7 FT. TO 143.7 FT. |
| CORE RECOVERY<br>10.0 FT. | RQD<br>99 % | CORE QUALITY<br>Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



SIMILAR TO R-1

- INTERBEDDED SHALE LAYERS INCREASING WITH DEPTH

TOTAL 10.0 (FT)

100 %

TOTAL 9.9 (FT)

99 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

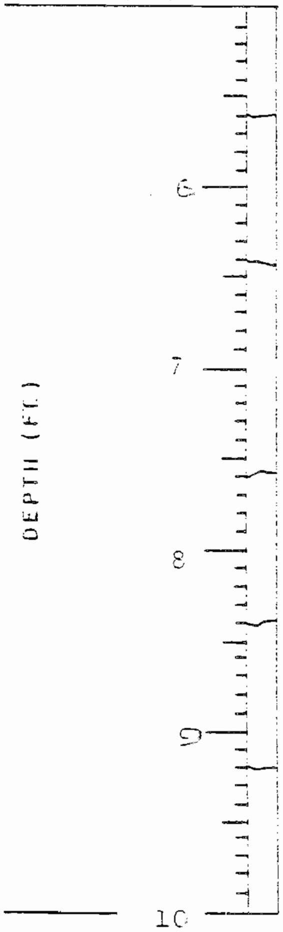
| | | | |
|---|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | | BORING NO.<br>10225 |
| LOGGED BY<br>P. Baker | DATE<br>11-6-85 | | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-17 | DEPTH<br>133.7 FT. TO 143.7 FT. | |
| CORE RECOVERY<br>10.0 FT. | RQD<br>99 % | CORE QUALITY<br>Excellent | |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



END OF R-17

TOTAL 10.0 ( FT )

100 %

TOTAL 9.9 ( FT )

99 %

ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

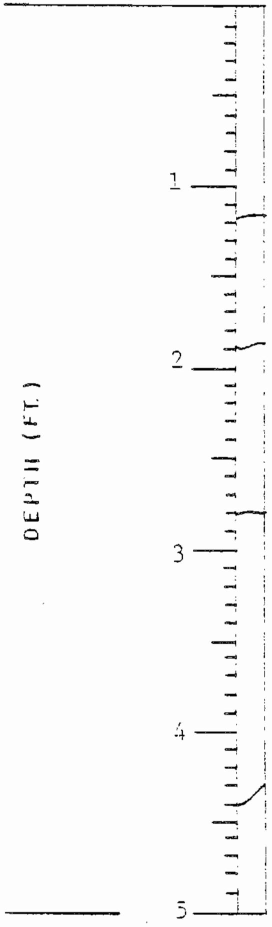
SHEET 1 OF 1

| | | |
|---|---|---|
| PROJECT NO<br>4344-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10225 |
| LOGGED BY<br>P. Baker | DATE<br>11-6-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-18 | DEPTH<br>143.7 FT. TO 153.7 FT. |
| CORE RECOVERY<br>10.0 FT. | RQD<br>96 % | CORE QUALITY<br>Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



SIMILAR TO R-1

SOME LIGHT GRAY CLASTS OF CARBONATE ROCKS AND GYPSUM CRYSTALS ARE PRESENT

TOTAL 10.0 ( FT )

100 %

TOTAL 9.6 ( FT )

96 %

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

PROJECT NO. 4844-09

PROJECT NAME Love Canal

BORING NO. 10225

LOGGED BY P. Baker

DATE 11-6-85

PROTECTION LEVEL D

CORE DIAMETER NX

CORE RUN NO. R-18

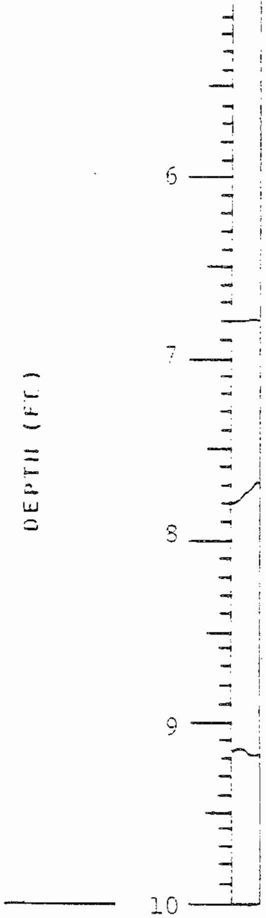
DEPTH 143.7 FT. TO 153.7 FT.

CORE RECOVERY 10.0 FT.

RQD 96 %

CORE QUALITY Excellent

CORE RECOVERY (FT.)



.3 FT. CORE RECOVERY

END OF R-18

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1

TOTAL 10.0 (FT)

100 %

TOTAL 9.6 (FT)

96 %

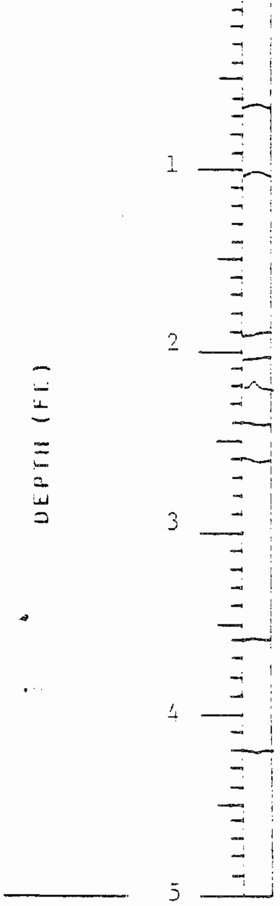
ECJORDANCO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10225 |
| LOGGED BY<br>P. Baker | DATE<br>11-6-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-19 | DEPTH<br>153.7 FT. TO 163.7 FT. |
| CORE RECOVERY<br>10.0 FT. | RQD<br>91 % | CORE QUALITY<br>Excellent |

CORE RECOVERY (FT.)



.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1

AT ROUGHLY 158' COLOR CHANGE TO LIGHT GRAY. THEN AT ROUGHLY 162' COLOR CHANGE BACK TO DARK GRAY.

TOTAL 10.0 (FT)

100 %

TOTAL 9.1 (FT)

91 %

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

PROJECT NO. 4844-09

PROJECT NAME Love Canal

BORING NO. 10225

LOGGED BY P. Baker

DATE 11-6-85

PROTECTION LEVEL D

CORE DIAMETER NX

CORE RUN NO. R-19

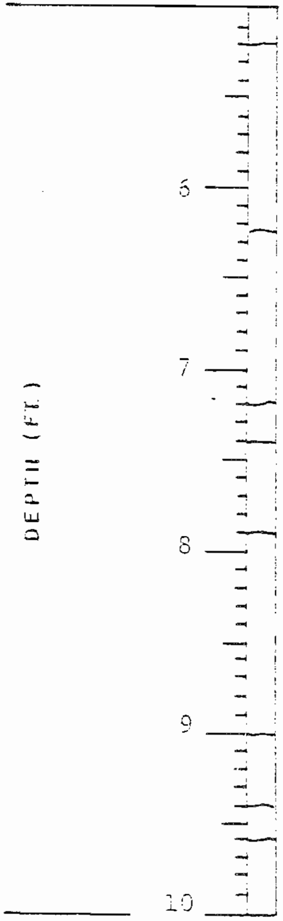
DEPTH 153.7 FT. TO 163.7 FT.

CORE RECOVERY 10.0 FT.

RQD 91 %

CORE QUALITY Excellent

| CORE RECOVERY (FT.) | .3 FT. CORE RECOVERY | ROCK DESCRIPTION AND IDENTIFICATION |
|---|---|---|
| | | SIMILAR TO R-1 |



END OF R-19

TOTAL 10.0 (FT) TOTAL 9.1 (FT)

100 % 91 %

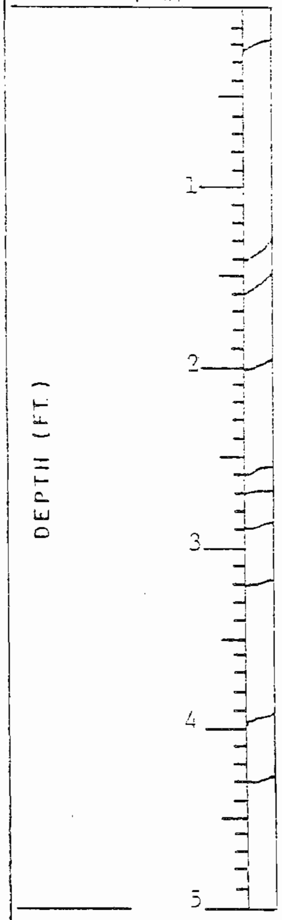
ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

|  |  |  |
|---|---|---|
| PROJECT NO.<br>1841-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10225 |
| LOGGED BY<br>P. Baker | DATE<br>11-6-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-20 | DEPTH<br>163.7 FT. TO 173.7 FT. |
| CORE RECOVERY<br>10.0 FT. | RQD<br>82 % | CORE QUALITY<br>Good |

CORE RECOVERY (FT.)



TOTAL 10.0 ( FT )

100 %

.3 FT. CORE RECOVERY

TOTAL 8.2 ( FT )

82 %

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1

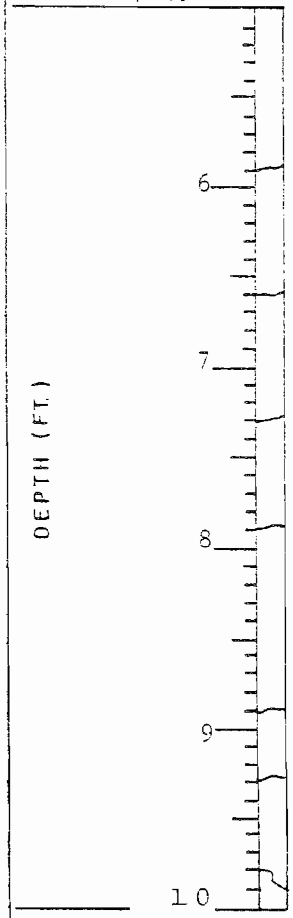
E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

| | | | |
|---|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | | BORING NO.<br>10225 |
| LOGGED BY<br>P. Baker | DATE<br>11-6-85 | | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-20 | DEPTH<br>163.7 FT. TO 173.7 FT. | |
| CORE RECOVERY<br>10.0 FT. | RQD<br>82 % | CORE QUALITY<br>Good | |

| CORE RECOVERY (FT.) | .3 FT. CORE RECOVERY | ROCK DESCRIPTION AND IDENTIFICATION |
|---|---|---|
| | | SIMILAR TO R-1 |



END OF R-20

TOTAL 10.0 ( FT ) TOTAL 8.2 ( FT )

100 % 82 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

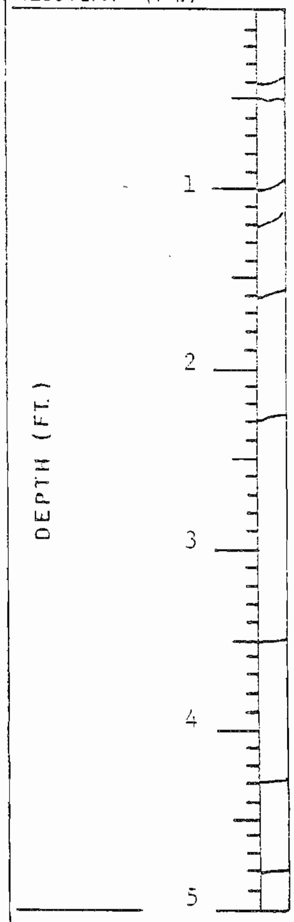
| | | |
|---|---|---|
| PROJECT NO. 18-1-09 | PROJECT NAME Love Canal | BORING NO. 10225 |
| LOGGED BY P. Baker | DATE 11-6-85 | PROTECTION LEVEL D |
| CORE DIAMETER NX | CORE RUN NO. R-11 | DEPTH 173.7 FT. TO 182.7 FT. |
| CORE RECOVERY 9.0 FT. | RQD 82 % | CORE QUALITY Good |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



TOTAL 9.0 (FT)

100 %

TOTAL 7.4 (FT)

82 %

EC JORDAN CO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

| | | |
|---|---|---|
| PROJECT NO.<br>4644-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10225 |
| LOGGED BY<br>P. Baker | DATE<br>11-6-85 | PROTECTION LEVEL<br>D |

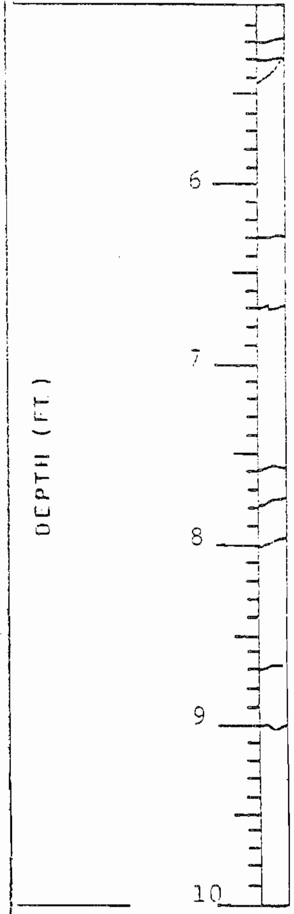
| | | |
|---|---|---|
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-21 | DEPTH<br>173.7 FT. TO 182.7 FT. |
| CORE RECOVERY<br>9.0 FT. | RQD<br>82 % | CORE QUALITY<br>Good |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



TOTAL 9.0 (FT)

100 %

TOTAL 7.4 (FT)

82 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

| | | |
|---|---|---|
| PROJECT NO. 4814-09 | PROJECT NAME Love Canal | BORING NO. 10225 |
| LOGGED BY P. Baker | DATE 11-6-85 | PROTECTION LEVEL D |

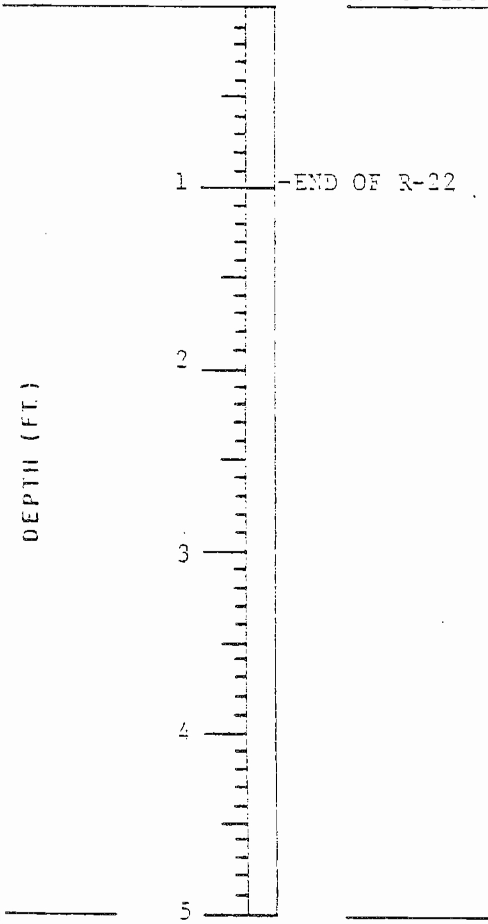
| | | |
|---|---|---|
| CORE DIAMETER NX | CORE RUN NO. R-22 | DEPTH 182.7 FT. TO 183.7 FT. |
| CORE RECOVERY 1.0 FT. | RQD 99 % | CORE QUALITY Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



TOTAL 1.0 (FT ) TOTAL .99 ( FT )

100 % 99 %

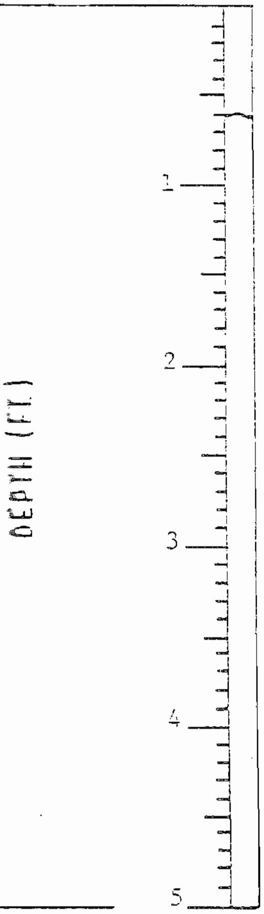
E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

| | | |
|---|---|---|
| PROJECT NO.<br>4341-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10225 |
| LOGGED BY<br>P. Baker | DATE<br>11-6-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-23 | DEPTH<br>183.7 FT. TO 193.7 FT. |
| CORE RECOVERY<br>10.0 FT. | RQD<br>100 % | CORE QUALITY<br>Excellent |

CORE RECOVERY (FT.)



.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1

TOTAL 10.0 (FT)

100 %

TOTAL 10.0 (FT)

100 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

| | | |
|---|---|---|
| PROJECT NO.<br>4811-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10225 |
| LOGGED BY<br>P. Baker | DATE<br>11-6-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-23 | DEPTH<br>183.7 FT. TO 193.7 FT. |
| CORE RECOVERY<br>10.0 FT. | RQD<br>100 % | CORE QUALITY<br>Excellent |

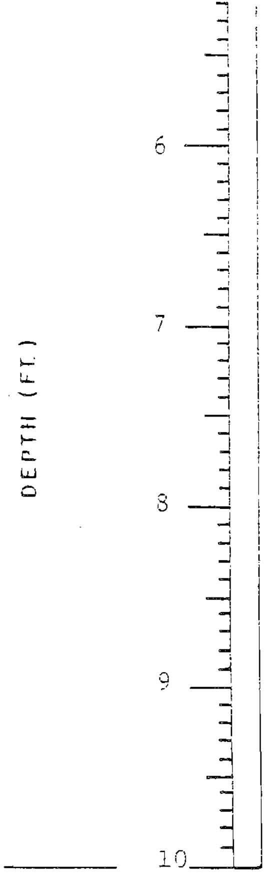
CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1

SOLID 5 FT RUN



END OF R-23

TOTAL 10.0 (FT) TOTAL 10.0 (FT)

100 % 100 %

ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

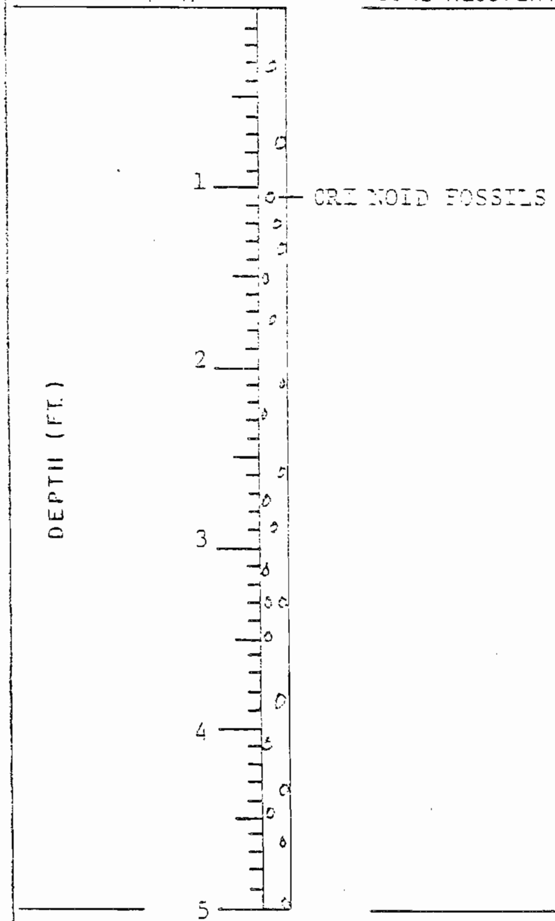
| | | |
|---|---|---|
| PROJECT NO.<br>4844-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10225 |
| LOGGED BY<br>P. Baker | DATE<br>11-6-85 | PROTECTION LEVEL<br>D |

| | | |
|---|---|---|
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-24 | DEPTH<br>193.7 FT. TO 203.7 FT. |
| CORE RECOVERY<br>10.0 FT. | RQD<br>100 % | CORE QUALITY<br>Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



DOLOMITE LIMESTONE
CONTAINING FOSSILS

TOTAL 10.0 (FT)
100 %

TOTAL 10.0 (FT)
100 %

ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

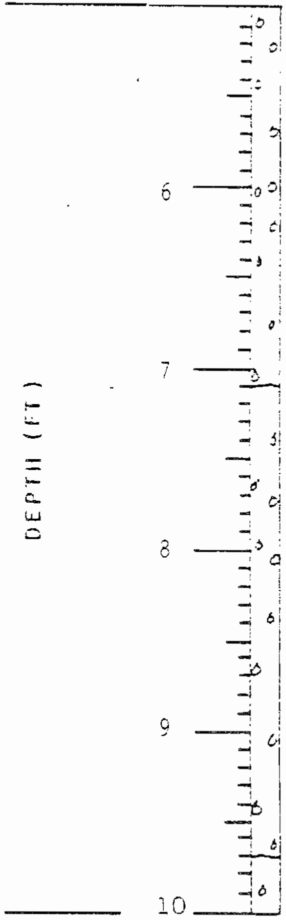
SHEET 2 OF 2

| | | |
|---|---|---|
| PROJECT NO. A 344-09 | PROJECT NAME Love Canal | BORING NO. 10225 |
| LOGGED BY P. Baker | DATE 11-6-85 | PROTECTION LEVEL D |
| CORE DIAMETER NX | CORE RUN NO. R-24 | DEPTH 193.7 FT. TO 203.7 FT. |
| CORE RECOVERY 10.0 FT. | RQD 100 % | CORE QUALITY Excellent |

CORE RECOVERY (FT)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION



AT ROUGHLY 200' CORE APPEARS TO CHANGE TO A SHALEY DOLOMITE.

AT ROUGHLY 203' CORE APPEARS TO CHANGE TO SHALE STRATA. DARK BLACKISH-GRAY IN COLOR.

END OF R-24

TOTAL 10.0 (FT)

100 %

TOTAL 10.0 (FT)

100 %

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

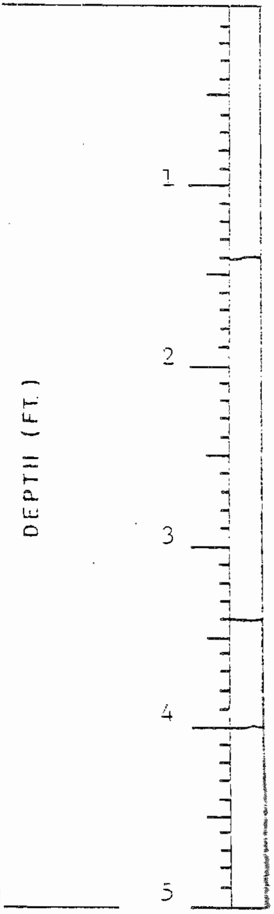
| | | |
|---|---|---|
| PROJECT NO.<br>4344-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10225 |
| LOGGED BY<br>P. Baker | DATE<br>11-6-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NX | CORE RUN NO.<br>R-25 | DEPTH<br>203.7 FT. TO 208.7 FT. |
| CORE RECOVERY<br>5.0 FT. | RQD<br>100 % | CORE QUALITY<br>Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



END OF R-25

TOTAL 5.0 (FT)

100 %

TOTAL 5.0 (FT)

100 %

EC JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

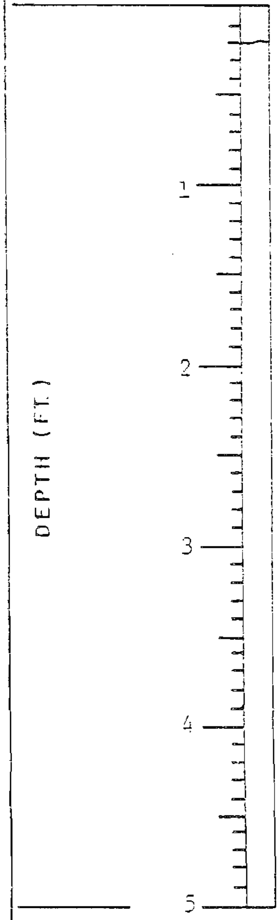
|  |  |  |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10225 |
| LOGGED BY P. Baker | DATE 11-7-85 | PROTECTION LEVEL D |
| CORE DIAMETER NX | CORE RUN NO. R-26 | DEPTH 203.7 FT. TO 213.7 FT. |
| CORE RECOVERY 5.0 FT. | RQD 96 % | CORE QUALITY Excellent |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



END OF R-26

TOTAL 5.0 (FT)

100 %

TOTAL 4.8 (FT)

96 %

E.C.JORDAN CO.

**LOVE CANAL REMEDIAL PROJECT**
**LONG TERM MONITORING**
**TASK VC**
**BORING NO.** 10225B

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
**PROJECT NO.** 4844-09
**CONTRACTOR:** J. MATHES ASSOC.
**DATE STARTED** 11/10/85
**COMPLETED** 11/12/85
**METHOD** DRIVE/WASH
**CASING SIZE** 4.0"
**HNU** 11.7/(10.2)
**PROTECTION LEVEL** D
**GROUND EL.** 574.4'
**SOIL DRILLED** 32.4'
**TOTAL DEPTH** 138.6'
**▽ BELOW GROUND** NA
**LOGGED BY** S. Waite
**CHECKED BY** F. Lewis
**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE* | SAMPLE | CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | TOPSOIL 0.5 | | | 574.5 |
| | 0.3 | S-1 | X | N | N | 2.0<br>1.0 | 0.0 | BROWN TO BLACK SANDY SILT, TRACE OF GRAVEL AND CLAY, DRY, MEDIUM DENSE (FILL) 4.1 | ML | 6-12-11-12 | |
| 5 | 0.3 | S-2 | X | N | N | 2.0<br>1.3 | 0.0 | REDDISH-BROWN SILTY CLAY, MOIST, STIFF, SLIGHTLY PLASTIC, FRACTURES | CL | 9-9-12-23 | 569.5 |
| 10 | 0.3 | S-3 | X | N | N | 2.0<br>0.3 | 0.0 | (LACUSTRINE CLAY) 12.0 | CL | 6-11-11-11 | 564.5 |
| | 0.0 | S-4 | X | N | N | 2.0<br>1.8 | 0.0 | REDDISH-GRAY SILTY CLAY, WET, PLASTIC, SOFT | CL | 2-2-2-1 | |
| 15 | | | | | | | | | | | 559.5 |
| | 0.0 | S-5 | X | N | N | 2.0<br>2.0 | 0.0 | (LACUSTRINE CLAY) | CL | WOH-WOH-2-1 | |
| 20 | | | | | | | | | | | 554.5 |
| | 0.0 | S-6 | X | N | N | 2.0<br>2.0 | 0.0 | | CL | WOH-WOH-2-2 | |
| 25 | | | | | | | | 27.0 | | | 549.5 |
| | 0.0 | S-7 | X | N | N | 2.0<br>1.9 | 0.0 | SILTY SAND WITH SOME GRAVEL, TRACE OF CLAY, WIDELY GRADED, DENSE, WET (GLACIAL TILL) 32.4 | SM<br>ML | 23-37-21-48 | |
| 30 | | | | | | | | | | | 544.5 |
| | | R-1 | | | | | | BEDROCK: GRAY DOLOMITE, SEE ROCK LOGS FOR BORING NO. 10225A FOR DESCRIPTIONS AND FRACTURES. | | | |
| 35 | | R-2 | | | | | | | | | 539.5 |
| | | R-3 | | | | | | WOH = WEIGHT OF HAMMER | | | |
| 40 | | | | | | | | | | | 534.5 |

*U: THIN WALL TUBE    S: SPLIT SPOON    R: ROCK

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

**TASK VC**

**BORING NO.** 10225B

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

**PROJECT NO.** 4844-09

**CONTRACTOR:** J. MATHES ASSOC.

**DATE STARTED** 11/10/85

**COMPLETED** 11/12/85

**METHOD** DRIVE/WASH

**CASING SIZE** 4.0"

**HNU** 11.7/10.2

**PROTECTION LEVEL** D

**GROUND EL.** 574.5'

**SOIL DRILLED** 32.4'

**TOTAL DEPTH** 138.6'

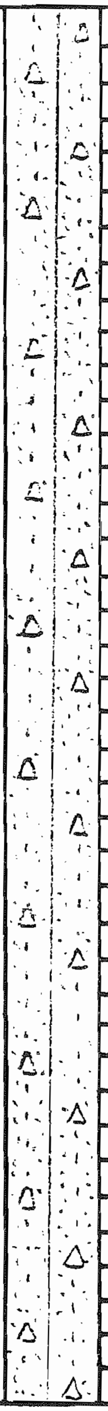
**▽ BELOW GROUND** NA

**LOGGED BY** S. Waite

**CHECKED BY** R. Lewis

**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 534.5 |
| | | | | | | | GRAY DOLOMITE | | | | |
| | | R-3 | | | | | | | | | |
| 45 | | | | | | | | | | | 529.5 |
| | | R-4 | | | | | | | | | |
| 50 | | | | | | | | | | | 524.5 |
| | | R-5 | | | | | | | | | |
| 55 | | | | | | | | | | | 519.5 |
| | | R-6 | | | | | | | | | |
| 60 | | R-7 | | | | | | | | | 514.5 |
| 65 | | | | | | | | | | | 509.5 |
| | | R-8 | | | | | | | | | |
| 70 | | | | | | | | | | | 504.5 |
| 75 | | R-9 | | | | | | | | | 499.5 |
| 80 | | | | | | | | | | | 494.5 |



U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

.OVE CANAL REMEDIAL PROJECT
LONG TERM MONITORING

TASK VC

BORING NO. 10225B

:LIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-09

:ONTRACTOR: J. MATHES ASSOC.

DATE STARTED 11/10/85

COMPLETED 11/12/85

METHOD DRIVE/WASH

CASING SIZE 4.0"

HNU 11.7 / 10.2

PROTECTION LEVEL D

GROUND EL. 574.4'

SOIL DRILLED 32.4'

TOTAL DEPTH 138.6'

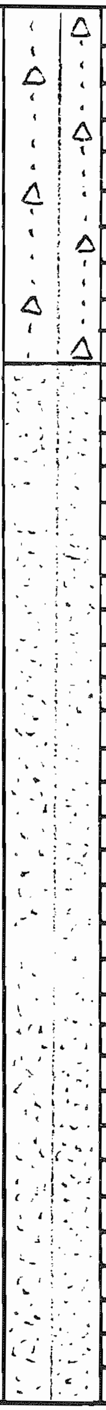
▽ BELOW GROUND NA

LOGGED BY S. Waite

CHECKED BY R. Lewis

DATE 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE # | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 494.5 |
| | | R-9 | | | | | GRAY DOLOMITE | | | | |
| | | R-10 | | | | | | | | | |
| 85 | | | | | | | | | | | 489.5 |
| | | R-11 | | | | | | | | | |
| 90 | | | | | | | | | | | 484.5 |
| 95 | | | | | | | | | | | 479.5 |
| | | R-12 | | | | | | | | | |
| 100 | | | | | | | | | | | 474.5 |
| 105 | | | | | | | | | | | 469.5 |
| | | R-13 | | | | | | | | | |
| 110 | | | | | | | | | | | 464.5 |
| 115 | | | | | | | | | | | 459.5 |
| | | R-14 | | | | | | | | | |
| 120 | | | | | | | | | | | 454.5 |



#U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

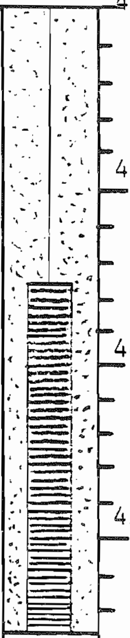
E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT LONG TERM MONITORING

**TASK VC**

**BORING NO.** 10225B

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
**PROJECT NO.** 4844-09
**CONTRACTOR:** J. MATHES ASSOC.
**DATE STARTED** 11/10/85
**COMPLETED** 11/12/85
**METHOD** DRIVE/WASH
**CASING SIZE** 4.0"
**HNU** 11.7 / 10.2
**PROTECTION LEVEL** D
**GROUND EL.** 574.4'
**SOIL DRILLED** 32.4'
**TOTAL DEPTH** 138.6'
**▽ BELOW GROUND** NA
**LOGGED BY** S. Waite
**CHECKED BY** R. Lewis
**DATE** 3/24/86



| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % | WELL DATA | ELEV(FT) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 454.5 |
| | | R-14 | | | | | GRAY DOLOMITE | | | | |
| 125 | | | | | | | | | | | 449.5 |
| | | R-15 | | | | | | | | | |
| 130 | | | | | | | | | | | 444.5 |
| | | R-16 | | | | | | | | | |
| 135 | | | | | | | | | | | 439.5 |
| | | R-17 | | | | | | | | | |
| | | | | | | | BOTTOM OF BORING AT 138.6 FEET | | | | |
| 140 | | | | | | | | | | | 434.5 |
| 145 | | | | | | | | | | | 429.5 |
| 150 | | | | | | | | | | | 424.5 |
| 155 | | | | | | | | | | | 419.5 |
| 160 | | | | | | | | | | | 414.5 |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

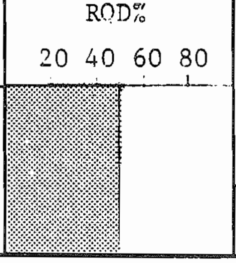
# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

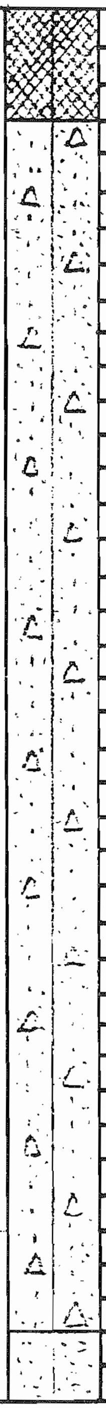
**TASK VC**

**BORING NO.** 10225C

**CLIENT:** NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
**PROJECT NO.** 4844-09
**CONTRACTOR:** J. MATHES ASSOC.
**DATE STARTED** 11/14/85
**COMPLETED** 11/20/85
**METHOD** DRIVE/WASH
**CASING SIZE** 4.0"
**HNU** 11.7 / 10.2
**PROTECTION LEVEL** D
**GROUND EL.** 575.2'
**SOIL DRILLED** 35.1'
**TOTAL DEPTH** 63.2'
**▽ BELOW GROUND** NA
**LOGGED BY** M. Muzzy
**CHECKED BY** L. Lewis
**DATE** 3/24/86

| DEPTH (FT) | HNU AMBIENT AIR | SAMPLE NO. & TYPE * | SAMPLE CLP | GC | OTHER | HNU HEADSPACE (PPM) | SOIL/ROCK DESCRIPTION | SOIL CLASS | BLOWS/6-IN RQD % |
|---|---|---|---|---|---|---|---|---|---|
| 2.4 | | | | | | | BROWN MOTTLED GRAVELLY SANDY SILT, DRY, LOOSE, ORGANICS (FILL) | GM | |
| 5.4 | | | | | | | BROWN SILTY SAND, FINE, MOIST, WELL COMPACTED | SM | |
| 9.4 | | | | | | | BROWN MOTTLED SILTY CLAY WITH TRACE SAND, DRY, STIFF, FRACTURED VARVED (LACUSTRINE CLAY) | CL | |
| 24.4 | | | | | | | BROWN TO GRAY MOTTLED SILTY CLAY, MOIST-WET, SOFT, PLASTIC, VARVED | CH-CL | |
| 27.0 | | | | | | | GRAYISH-BROWN CLAY WITH SAND: WITH TRACE GRAVEL, SOFT, MOIST (TRANSITIONAL TILL) | | |
| 35.0 | | | | | | | REDDISH-BROWN SILTY SAND WITH CLAY AND GRAVEL, DRY-MOIST, STIFF<br>(GLACIAL TILL) | | |
| 40 | | R-1 | | | | | GRAY DOLOMITE | | RQD%<br>20 40 60 80 |





| DEPTH (FT) | ELEV(FT) |
|---|---|
| 0 | 575.2 |
| 5 | 570.2 |
| 10 | 565.2 |
| 15 | 560.2 |
| 20 | 555.2 |
| 25 | 550.2 |
| 30 | 545.2 |
| 35 | 540.2 |
| 40 | 535.2 |

*U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C.JORDAN CO.

# LOVE CANAL REMEDIAL PROJECT
# LONG TERM MONITORING

TASK VC

BORING NO. 10225C

CLIENT: NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT NO. 4844-09

CONTRACTOR: J. MATHES ASSOC.

DATE STARTED 11/14/85

COMPLETED 11/20/85

METHOD Nx CORE

CASING SIZE 3.0"

HNU 11.7/(10.2)

PROTECTION LEVEL D

GROUND EL. 575.2'

SOIL DRILLED 35.1'

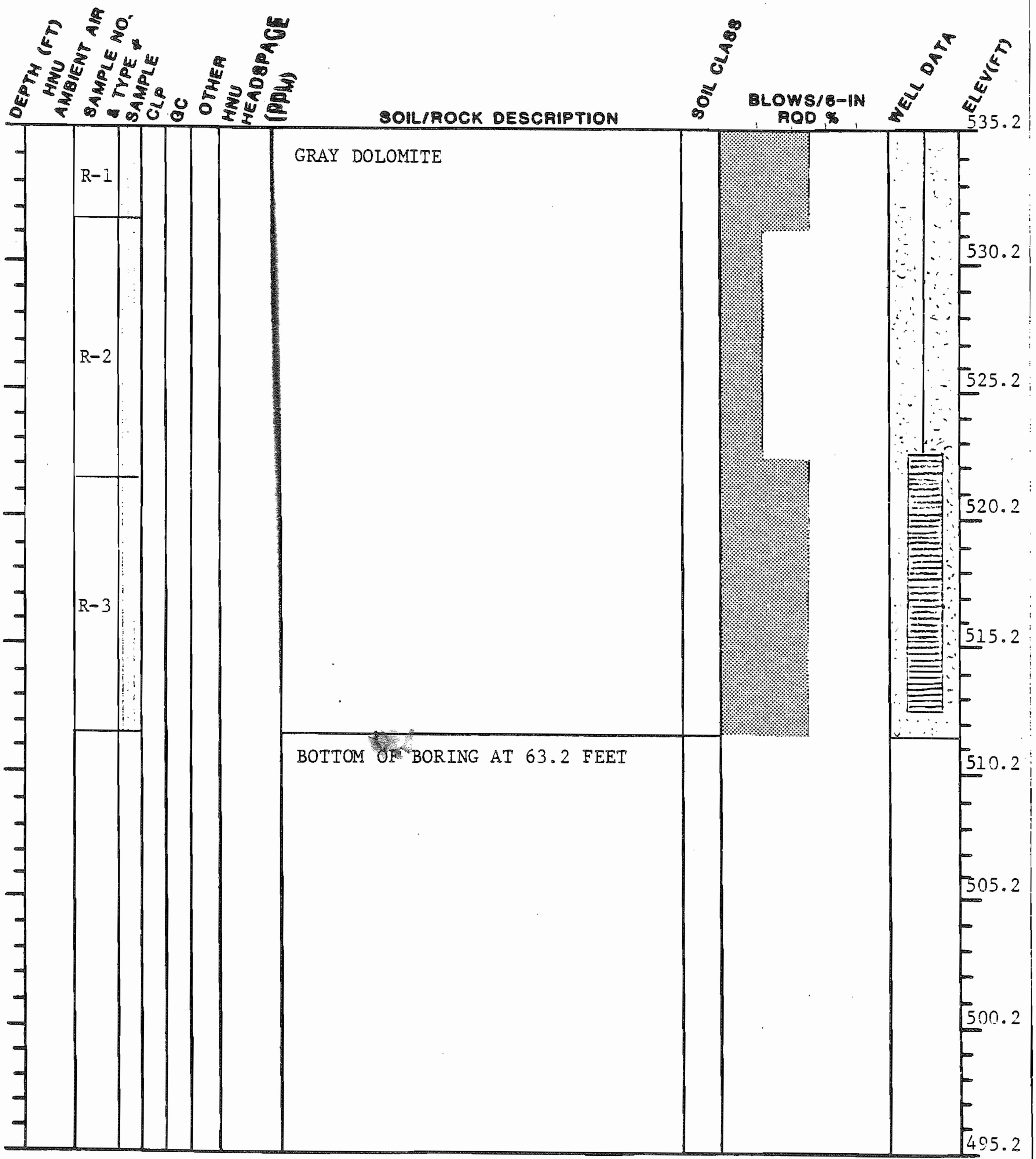
TOTAL DEPTH 63.2'

▽ BELOW GROUND

LOGGED BY M. Muzzy

CHECKED BY R. Lewis

DATE 3/24/86



GRAY DOLOMITE

BOTTOM OF BORING AT 63.2 FEET

U: THIN WALL TUBE S: SPLIT SPOON R: ROCK

E.C. JORDAN CO.

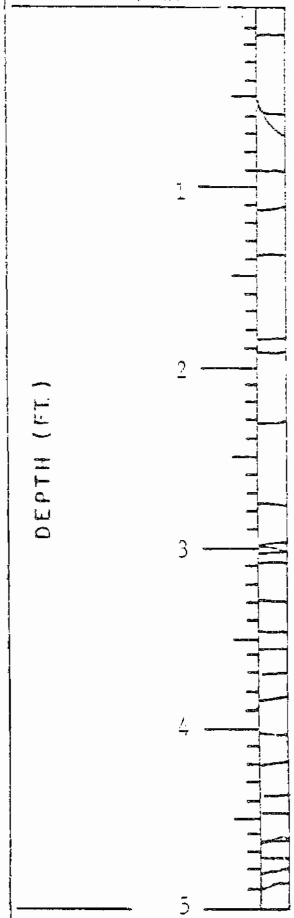
# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

| | | |
|---|---|---|
| PROJECT NO 4844-09 | PROJECT NAME Love Canal | BORING NO. 10225-C |
| LOGGED BY M. Muzzy | DATE 11-19-85 | PROTECTION LEVEL D |

| | | |
|---|---|---|
| CORE DIAMETER NQ | CORE RUN NO. R-1 | DEPTH 35.1 FT. TO 43.5 FT. |
| CORE RECOVERY 7.95 FT. | RQD 47 % | CORE QUALITY Poor |

CORE RECOVERY (FT.)



TOTAL 7.9 (FT )

94 %

.3 FT. CORE RECOVERY

TOTAL 3.9 (FT )

47 %

ROCK DESCRIPTION AND IDENTIFICATION

GRAY DOLOMITE WITH CORAL AND VUGS AS WELL AS GYPSUM FILLED FRACTURES

ECJORDANCO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

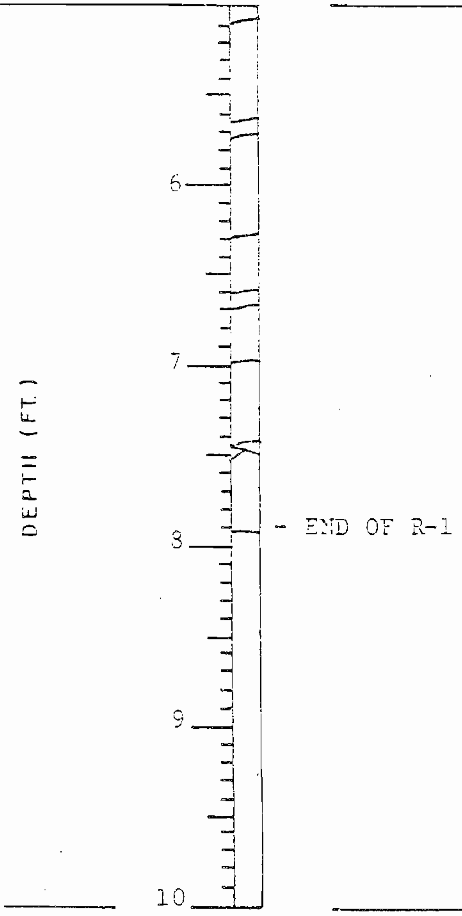
| | | |
|---|---|---|
| PROJECT NO.<br>1544-09 | PROJECT NAME<br>Love Canal | BORING NO.<br>10225-3 |
| LOGGED BY<br>M. Muzzy | DATE<br>11-19-85 | PROTECTION LEVEL<br>D |
| CORE DIAMETER<br>NQ | CORE RUN NO.<br>R-1 | DEPTH<br>35.1 FT. TO 43.5 FT. |
| CORE RECOVERY<br>7.95 FT. | RQD<br>47 % | CORE QUALITY<br>Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

GRAY DOLOMITE WITH CORAL AND VUGS AS WELL AS GYPSUM FILLED FRACTURES



TOTAL 7.9 (FT )

94 %

TOTAL 3.9 (FT )

47 %

E.C.JORDAN CO.

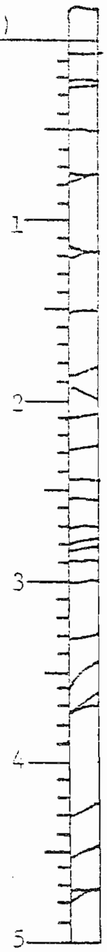
# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 2

| | | |
|---|---|---|
| PROJECT NO. 1344-09 | PROJECT NAME Love Canal | BORING NO. 10225-C |
| LOGGED BY M. Muszy | DATE 11-19-85 | PROTECTION LEVEL D |
| CORE DIAMETER NQ | CORE RUN NO. R-2 | DEPTH 43.5 FT. TO 53.5 FT. |
| CORE RECOVERY 10.3 FT. | RQD 24 % | CORE QUALITY Very Poor |

| CORE RECOVERY (FT.) | .3 FT. CORE RECOVERY | ROCK DESCRIPTION AND IDENTIFICATION |
|---|---|---|
| | RECOVERED 0.3 FT FROM R-1 | SIMILAR TO R-1 |

DEPTH (FT.)



TOTAL 10.0 ( FT )

+100 %

TOTAL 2.4 ( FT )

24 %

E.C. JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

| | | |
|---|---|---|
| PROJECT NO. 4844-09 | PROJECT NAME Love Canal | BORING NO. 10225-C |
| LOGGED BY M. Muzzy | DATE 11-19-85 | PROTECTION LEVEL D |

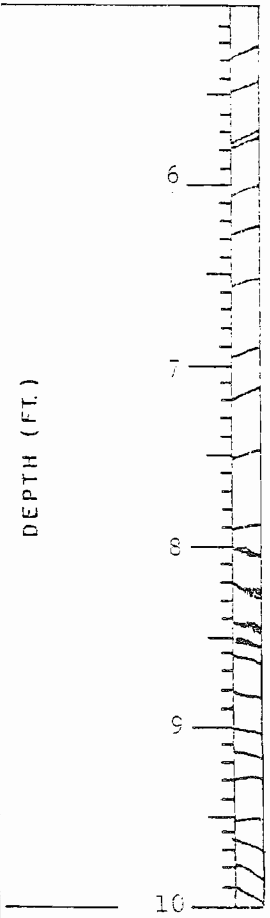
| | | |
|---|---|---|
| CORE DIAMETER NQ | CORE RUN NO. R-2 | DEPTH 43.5 FT. TO 53.5 FT. |
| CORE RECOVERY 10.3 FT. | RQD 24 % | CORE QUALITY Very Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



END OF R-2

TOTAL 10.0 ( FT ) TOTAL 2.4 (FT )

±100 % 24 %

ECJORDANCO

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 1 OF 1

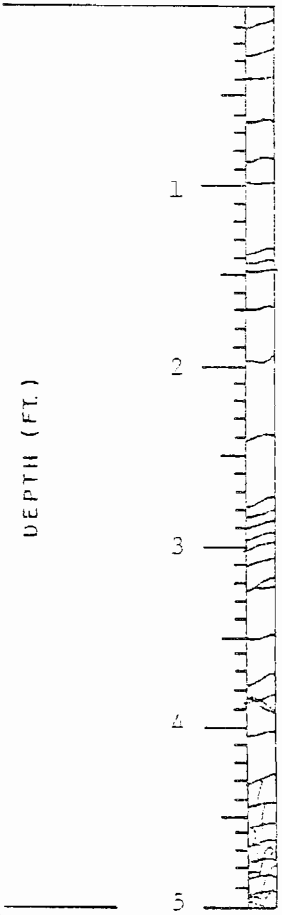
| | | |
|---|---|---|
| PROJECT NO. 85-1-09 | PROJECT NAME Love Canal | BORING NO. 10225-C |
| LOGGED BY M. Muzzy | DATE 11-20-85 | PROTECTION LEVEL D |
| CORE DIAMETER NQ | CORE RUN NO. R-3 | DEPTH 53.5 FT. TO 63.2 FT. |
| CORE RECOVERY 10.2 FT. | RQD 48 % | CORE QUALITY Poor |

CORE RECOVERY (FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



TOTAL 9.7 (FT)

100 %

TOTAL 4.86 (FT)

48 %

EXCESS CORE RECOVERY DUE TO EXPANSION OF CORE WHEN PLACED IN CORE BOX.

E.C.JORDAN CO.

# VISUAL IDENTIFICATION OF ROCK CORES

SHEET 2 OF 2

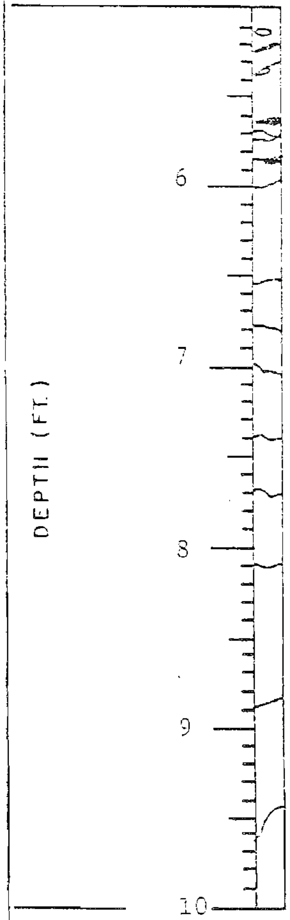
| | | |
|---|---|---|
| PROJECT NO. [illegible] | PROJECT NAME Love Canal | BORING NO. 10225-C |
| LOGGED BY [illegible] | DATE 11-20-85 | PROTECTION LEVEL D |
| CORE DIAMETER NQ | CORE RUN NO. R-3 | DEPTH 53.5 FT. TO 63.2 FT. |
| CORE RECO VERY 10.2 FT. | RQD 48 % | CORE QUALITY Poor |

CORE RECOVERY ( FT.)

.3 FT. CORE RECOVERY

ROCK DESCRIPTION AND IDENTIFICATION

SIMILAR TO R-1



BOTTOM OF BORING AT 63.2'

TOTAL 9.7 (FT ) TOTAL 4.86 (FT )

+100 % 48 %

EXCESS CORE RECOVERY DUE TO EXPANSION OF CORE WHEN PLAC_D IN CORE BOX.

ECJORDANCO

# STRATIGRAPHIC AND INSTRUMENTATION LOG
# (OVERBURDEN)

PROJECT NAME: LOVE CANAL
PROJECT NUMBER: 009954
CLIENT: GLENN SPRINGS HOLDINGS
LOCATION: NIAGARA FALLS, NEW YORK
LOCATION DESCRIPTION: COLVIN BLVD AND 96TH ST

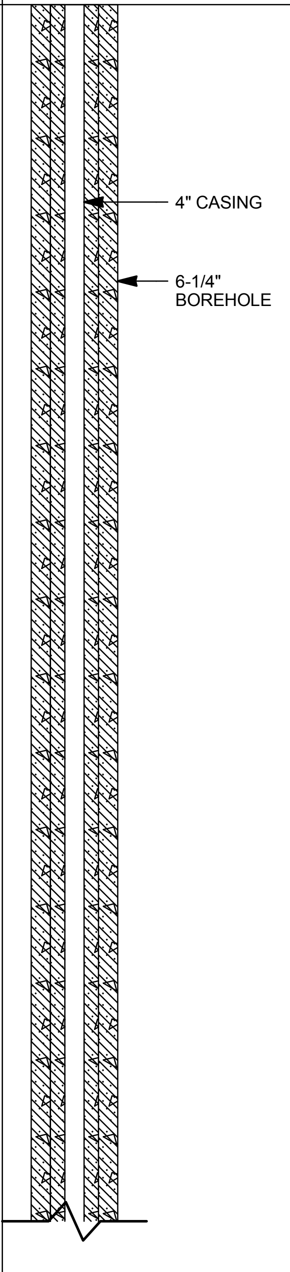
HOLE DESIGNATION: MW-01
DATE COMPLETED: June 29, 2011
DRILLING METHOD: HSA
FIELD PERSONNEL: S. MCEVOY

NORTHING: 1124218
EASTING: 1049984

| | |
|---|---|
| TOP OF CASING | 571.98 |
| GROUND SURFACE | 571.97 |
| TOP OF RISER | 571.55 |

| STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft |
|---|---|
| GP-GRAVEL, stones | 571.47 |
| CL/ML-SILTY CLAY, with coarse gravel, stiff, low plasticity, olive gray, dry | 570.47 |
| CL-CLAY, medium stiff, light brown, dry, no odor<br>- stiff, light gray at 2.0ft BGS | 567.97 |
| CL/ML-CLAY TO SILTY CLAY, low plasticity, stiff, light brown/light gray, dry, no odor | 565.97 |
| CL/ML-SILTY CLAY, stiff, medium plasticity, olive gray, dry, no odor<br>- medium stiff, light brown/light gray at 9.0ft BGS<br>- soft, high plasticity, light brown/light gray at 10.5ft BGS<br>- moist at 11.0ft BGS | 557.97 |
| CL-CLAY, with small amount of fine gravel, very soft, high plasticity, light brown/light gray, moist to wet<br>- large rock, no odor at 17.0ft BGS | 553.97 |
| CL-CLAY, some fine gravel, soft, high plasticity, light brown/light gray, moist, no odor | 552.47 |
| CL/ML-SILTY CLAY, with coarse gravel, medium stiff, medium plasticity, light brown/light gray, no odor<br>with rock fragments and coarse gravel layered, low plasticity, limestone fragments | 549.97 |
| CL-CLAY, with coarse gravel, limestone fragments, stiff, brittle, light gray, no odor,<br>- moist at 24.0ft BGS | 546.47 |
| SM-SILTY SAND, fine sand, loose, light gray/light brown, moist, no odor | 545.47 |
| CL/ML-SILTY CLAY, coarse sand, medium stiff, light gray, moist, no odor | 543.97 |
| SP-SAND, fine grained, with fine gravel, medium dense, light gray, wet, no odor<br>- rock fragments, fractured limestone, some fine sand, dark gray, wet, no odor at 29.0ft BGS | 541.22 |
| BEDROCK<br>END OF OVERBURDEN HOLE @ 30.8ft BGS | |

MONITORING WELL



SAMPLE

| NUMBER | INTERVAL | REC (%) | BLOW COUNTS | PID (ppm) |
|---|---|---|---|---|
| 1HSA | | 63 | 12 | 0.0 |
| 2HSA | | 83 | 17 | 0.0 |
| 3HSA | | 92 | 23 | 0.0 |
| 4HSA | | 92 | 26 | 0.0 |
| 5HSA | | 100 | 11 | 0.0 |
| 6HSA | | 100 | 5 | 0.0 |
| 7HSA | | 100 | 3 | 0.0 |
| 8HSA | | 100 | 4 | 0.0 |
| 9HSA | | 67 | 5 | 0.0 |
| 10HSA | | 75 | 10 | 0.0 |
| 11HSA | | 100 | 40 | 0.0 |
| 12HSA | | 100 | 42 | 0.0 |
| 13HSA | | 100 | 65 | 0.0 |
| 14HSA | | 75 | 25 | 0.0 |
| 15HSA | | 100 | 31 | 0.0 |
| 16HSA | | 67 | 100/ 2" | 0.0 |

DEPTH ft BGS: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34

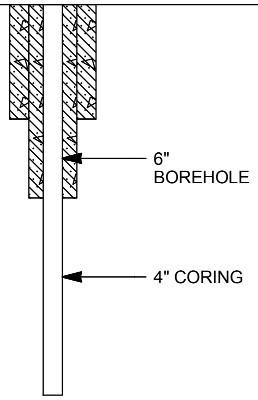
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

# STRATIGRAPHIC AND INSTRUMENTATION LOG
# (BEDROCK)

PROJECT NAME: LOVE CANAL
PROJECT NUMBER: 009954
CLIENT: GLENN SPRINGS HOLDINGS
LOCATION: NIAGARA FALLS, NEW YORK
LOCATION DESCRIPTION: COLVIN BLVD AND 96TH ST

HOLE DESIGNATION: MW-01
DATE COMPLETED: June 29, 2011
DRILLING METHOD: HSA
FIELD PERSONNEL: S. MCEVOY

| DEPTH ft BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft | MONITORING WELL | RUN NUMBER | CORE RECOVERY % | RQD % |
|---|---|---|---|---|---|---|
| 30 | SP-SAND, fine grained, with fine gravel, medium dense, light gray, wet, no odor<br>- rock fragments, fractured limestone, some fine sand, dark gray, wet, no odor at 29.0ft BGS | 543.97 | | | | |
| 32<br>34<br>36 | BEDROCK<br>- very fractured, no solid core bigger than 0.15" from 33.1 to 34.1ft at 33.1ft BGS<br>- horizontal fractures at 34.2, 34.5, 34.6, 35.1, 35.3, 36.4, 36.5 and 37.1ft at 34.2ft BGS | 541.22 | | | | 35 |
| 38<br>40<br>42<br>44<br>46<br>48<br>50<br>52<br>54<br>56<br>58<br>60<br>62 | END OF BOREHOLE @ 37.9ft BGS<br>NOTE: WATER LOSS = 15% | 534.07 | | | | |



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

# STRATIGRAPHIC AND INSTRUMENTATION LOG
# (OVERBURDEN)

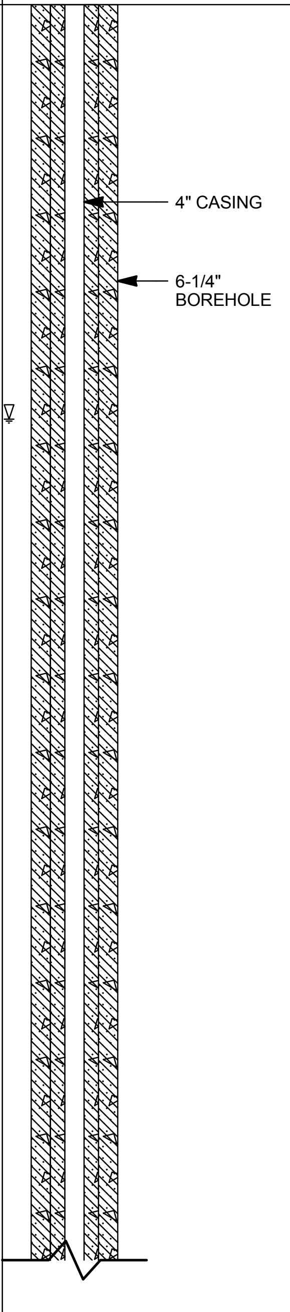
PROJECT NAME: LOVE CANAL
PROJECT NUMBER: 009954
CLIENT: GLENN SPRINGS HOLDINGS
LOCATION: NIAGARA FALLS, NEW YORK
LOCATION DESCRIPTION: COLVIN BLVD AND 96TH ST
HOLE DESIGNATION: MW-02
DATE COMPLETED: June 27, 2011
DRILLING METHOD: HSA
FIELD PERSONNEL: J. POLOVICH

NORTHING: 1124279
EASTING: 1049879

| | ELEV. ft |
|---|---|
| GROUND SURFACE | 571.39 |
| TOP OF CASING | 571.24 |
| TOP OF RISER | 571.10 |

| STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft |
|---|---|
| TOPSOIL, with brown organics | |
| SC-SAND/SILTY CLAY, some organics, medium brown, dry, no odor | 570.69 |
| CL/ML-SILTY CLAY, medium stiff, olive gray, dry, no odor | 569.39 |
| - hard, brittle, low plasticity at 4.0ft BGS | |
| - slightly plastic, light gray/brown at 7.0ft BGS | |
| - soft, high plasticity, light gray/brown at 9.5ft BGS | |
| CL-CLAY, soft, high plasticity, light gray/light brown, moist, no odor | 560.89 |
| - minor rock fragments at 13.0ft BGS | |
| CL/ML-SILTY CLAY, very soft, light gray/light brown, moist, no odor | 557.39 |
| CLS-SANDY CLAY, mixed with pebbles/stones, very soft, high plasticity, moist to wet | 554.39 |
| - rock fragments, limestone, crystalline structure, layered, gray at 20.9ft BGS | 550.39 |
| CL-CLAY, with rock fragments, high sand content, dense, angular limestone fragments, brown | |
| - rock fragments at 23.0ft BGS | 547.39 |
| AUGER REFUSAL | |
| CL-CLAY, with rock fragments, soft, gray, moist, no odor | 545.89 |
| SP-SAND, medium grained, minor black grains, gray, saturated, no odor | 544.89 |
| - rock fragments at 28.4ft BGS | 542.89 |
| SP-SAND, running sand, probably sluff, gray | |
| TILL MATERIAL, clay, hard, mixed with running sand, rocks, light brown/light gray | 539.89 |
| END OF OVERBURDEN HOLE @ 31.8ft BGS | |

MONITORING WELL



SAMPLE

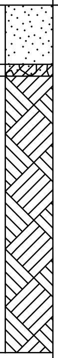
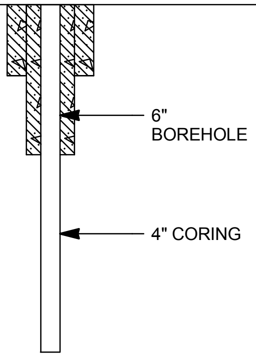
| NUMBER | INTERVAL | REC (%) | BLOW COUNTS | PID (ppm) |
|---|---|---|---|---|
| 1HSA | | 50 | 5 | 0.0 |
| 2HSA | | 54 | 13 | 0.0 |
| 3HSA | | 75 | 18 | 0.0 |
| 4HSA | | 75 | 10 | 0.0 |
| 5HSA | | 100 | 11 | 0.0 |
| 6HSA | | 100 | 4 | 0.0 |
| 7HSA | | 100 | 1 | 0.0 |
| 8HSA | | 100 | 1 | 0.0 |
| 9HSA | | 100 | | 0.0 |
| 10HSA | | 100 | 5 | 0.0 |
| 11HSA | | 79 | 48 | 0.0 |
| 12HSA | | 100 | 93 | 0.0 |
| 13HSA | | 8 | | 0.0 |
| 14HSA | | 83 | 50 | 0.0 |
| 15HSA | | 33 | 75 | 0.0 |
| 16HSA | | 88 | 100/ 3" | 0.0 |
| 17HSA | | 100 | | 0.0 |

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽

# STRATIGRAPHIC AND INSTRUMENTATION LOG
# (BEDROCK)

PROJECT NAME: LOVE CANAL
PROJECT NUMBER: 009954
CLIENT: GLENN SPRINGS HOLDINGS
LOCATION: NIAGARA FALLS, NEW YORK
LOCATION DESCRIPTION: COLVIN BLVD AND 96TH ST

HOLE DESIGNATION: MW-02
DATE COMPLETED: June 27, 2011
DRILLING METHOD: HSA
FIELD PERSONNEL: J. POLOVICH

| DEPTH ft BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft | MONITORING WELL | RUN NUMBER | CORE RECOVERY % | RQD % |
|---|---|---|---|---|---|---|
| 32 | TILL MATERIAL, clay, hard, mixed with running sand, rocks, light brown/light gray<br>BEDROCK<br> | 539.89<br>539.59 |  | | | |
| 34 | - horizontal fractures at 34.2, 34.5, 34.7, 34.9, 35.4, 35.6, 36.1, 36.2, 36.6, 37.3, 37.4, 37.5, 37.6, 37.7 and 37.8ft at 34.2ft BGS | | | | | |
| 36 | | | | | | 22 |
| 38 | END OF BOREHOLE @ 38.8ft BGS | 532.59 | | | | |
| 40 | NOTE: WATER LOSS = ~50% | | | | | |
| 42 | | | | | | |
| 44 | | | | | | |
| 46 | | | | | | |
| 48 | | | | | | |
| 50 | | | | | | |
| 52 | | | | | | |
| 54 | | | | | | |
| 56 | | | | | | |
| 58 | | | | | | |
| 60 | | | | | | |
| 62 | | | | | | |
| 64 | | | | | | |

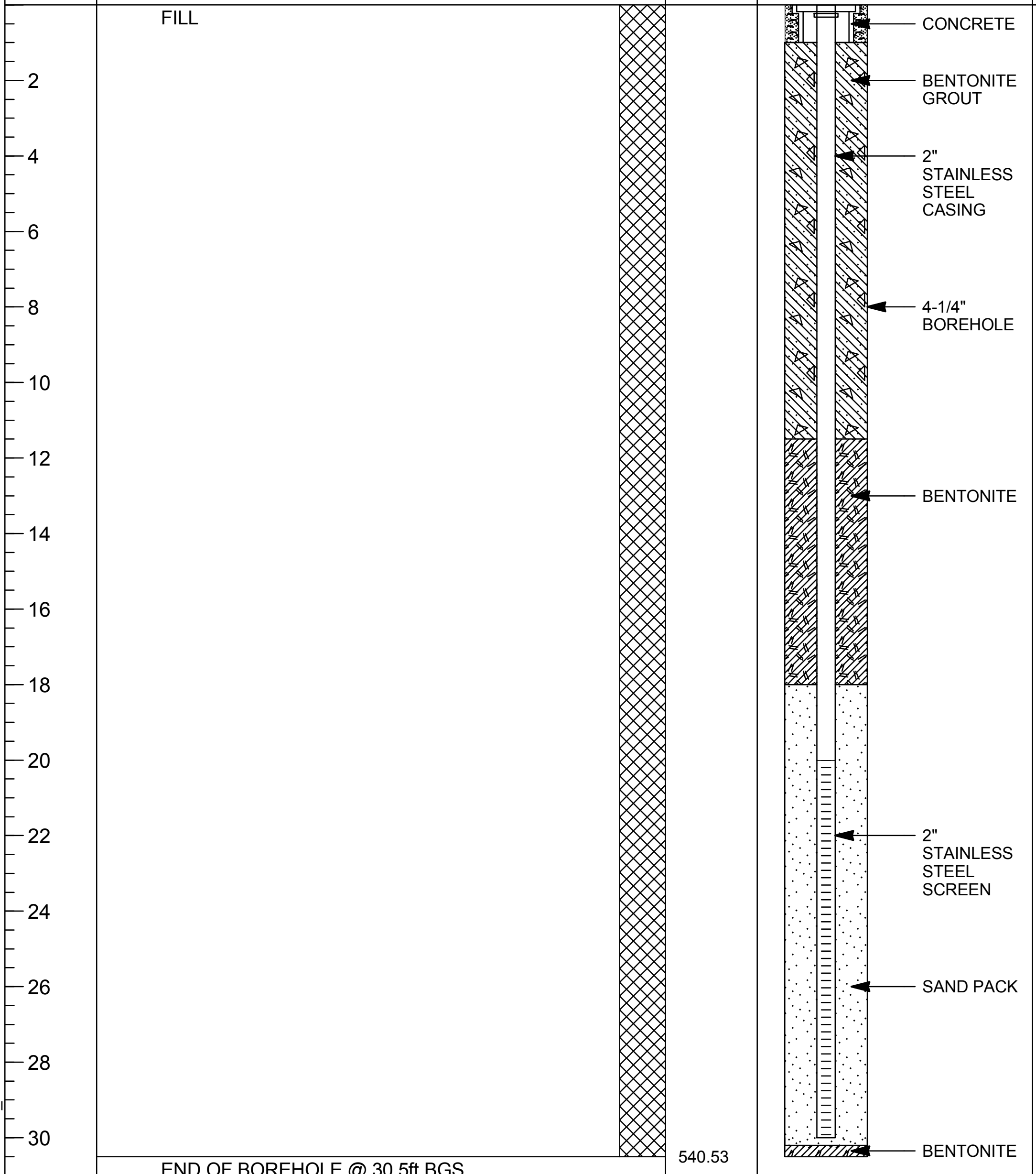
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽

# STRATIGRAPHIC AND INSTRUMENTATION LOG
# (OVERBURDEN)

PROJECT NAME: LOVE CANAL
PROJECT NUMBER: 009954
CLIENT: GLENN SPRINGS HOLDINGS
LOCATION: NIAGARA FALLS, NEW YORK
LOCATION DESCRIPTION: COLVIN BLVD AND 96TH ST

HOLE DESIGNATION: MW-03
DATE COMPLETED: July 1, 2011
DRILLING METHOD: HSA
FIELD PERSONNEL: S. MCEVOY

| DEPTH ft BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft | MONITORING WELL | SAMPLE NUMBER | SAMPLE INTERVAL | SAMPLE REC (%) | SAMPLE BLOW COUNTS |
|---|---|---|---|---|---|---|---|
| | NORTHING: 1124252<br>EASTING: 1049936<br>TOP OF CASING<br>GROUND SURFACE<br>TOP OF RISER | <br><br>571.05<br>571.03<br>570.71 | | | | | |



WELL DETAILS
Screened interval:
551.03 to 541.03ft
20.00 to 30.00ft BGS
Length: 10ft
Diameter: 2in
Slot Size: 0.010

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

# STRATIGRAPHIC AND INSTRUMENTATION LOG
# (OVERBURDEN)

PROJECT NAME: LOVE CANAL
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DATE COMPLETED: July 1, 2011
DRILLING METHOD: HSA
FIELD PERSONNEL: S. MCEVOY

| DEPTH ft BGS | STRATIGRAPHIC DESCRIPTION & REMARKS | ELEV. ft | MONITORING WELL | SAMPLE | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | NUMBER | INTERVAL | REC (%) | BLOW COUNTS | |
| 36<br>38<br>40<br>42<br>44<br>46<br>48<br>50<br>52<br>54<br>56<br>58<br>60<br>62<br>64<br>66<br>68 | | | Material: STAINLESS STEEL<br>Seal:<br>559.53 to 553.03ft<br>11.50 to 18.00ft BGS<br>Material: BENTONITE<br>Sand Pack:<br>553.03 to 540.83ft<br>18.00 to 30.20ft BGS<br>Material: SAND | | | | | |

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

# APPENDIX B

# QUALITY ASSURANCE PROJECT PLAN

## TABLE OF CONTENTS

# LIST OF TABLES
(Following Text)

## 1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) is Site-specific and has been prepared for the Remedial Action of the Love Canal Site, located in the southeast corner of the City of Niagara Falls, New York, bounded by Colvin Boulevard on the north, 99th and 100th Streets to the east, 95th and 97th Streets to the west; and Frontier Avenue to the south.

This QAPP provides comprehensive information regarding the project personnel responsibilities and sets forth specific procedures to be used during the analysis of groundwater samples.

## 2.0 PROJECT BACKGROUND

A detailed description of the history and background information for the Site is presented in the Love Canal Sampling Manual, June 2013.

### 2.1 GENERAL

This QAPP provides quality assurance/quality control (QA/QC) criteria for work efforts associated with sample analyses of groundwater. Methods for sample analyses have been selected to provide results which characterize the samples, such that the sampling objectives can be met.

## 3.0 PROJECT ORGANIZATION AND RESPONSIBILITY

A brief description of the duties of the key project personnel is presented below.

Project Manager – John Pentilchuk/Dennis Hoyt

i) Provides day-to-day project management

ii) Provides managerial guidance to the QA/QC Officer - Sampling and Analytical Activities

iii) Prepares and reviews reports

iv) Conducts preliminary chemical data interpretation and assessment

v) Responsible for overall project completion in accordance with the approved design

QA/QC Officer - Sampling and Analytical Activities – Susan Scrocchi

i) Oversees and reviews laboratory activities

ii) Determines laboratory data corrective action

iii) Performs analytical data validation and assessment

iv) Reviews laboratory QA/QC

v) Assists in preparation and review of final report

vi) Provides technical representation for analytical activities

vii) Provides managerial and technical guidance to the Field Sampling Supervisor

Field Sampling Supervisor

i) Provides immediate supervision of all on-Site activities

ii) Provides field management of sample collection and field QA/QC

iii) Provides technical representation for field activities

iv) Is responsible for maintenance of the field equipment

Laboratory - Project Manager, Analytical Contractor

i) Ensures resources of laboratory are available on an as-required basis

ii) Coordinates laboratory analyses

iii) Supervises laboratory's in-house chain of custody

iv) Schedules analyses of samples

v) Oversees review of data

vi) Oversees preparation of analytical reports

vii) Approves final analytical reports

Laboratory - QA/QC Officer, Analytical Contractor

i) Overviews laboratory QA/QC

ii) Overviews QA/QC documentation

iii) Conducts detailed data review

iv) Decides laboratory corrective actions, if required

v) Provides technical representation for laboratory QA/QC procedures

Laboratory - Sample Custodian, Analytical Contractor

i) Receives and inspects the sample containers

ii) Records the condition of the sample containers

iii) Signs appropriate documents

iv) Verifies chain of custody and their correctness

v) Notifies Laboratory Project Manager and Laboratory QA/QC Officer of sample receipt and inspection

vi) Assigns a unique laboratory identification number correlated to the field sample identification number and enters each into the sample receiving log

vii) Initiates transfer of samples to the appropriate lab sections with assistance from the Laboratory Project Manager

viii) Controls and monitors access to and storage of samples and extracts

The analytical laboratory selected to perform the environmental analyses is TestAmerica Laboratories, Inc. (TA), located in Pittsburgh, Pennsylvania. TA is a New York State Department of Health (NYSDOH) approved laboratory certified under the National Environmental Laboratory Approval Program (NELAP).

# 4.0 PROJECT OBJECTIVES

## 4.1 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The overall QA objective is to develop and implement procedures for sample collection and analyses which will provide data with an acceptable level of accuracy and precision.

Quality assurance measures for this project will begin with sample containers. Sample containers for waters will be purchased from a certified manufacturer and will be pre-cleaned (I-Chem Series 200 or equivalent).

## 4.2 LABORATORY QUALITY ASSURANCE

The following subsections define the QA goals required to meet the Data Quality Objectives (DQOs) of the project.

### 4.2.1 ACCURACY, PRECISION, AND SENSITIVITY OF ANALYSES

The fundamental QA objective with respect to the accuracy, precision, and sensitivity of analytical data is to meet the QC acceptance criteria of each analytical protocol. Analytical methods and targeted quantitation limits listed have been specified to meet the groundwater quality standards.

A summary of the targeted quantitation limits is provided in Table 4.1. It should be noted that these limits are targeted quantitation limits only; limits are highly matrix dependent and may not always be achieved.

The method accuracy (percent recovery) will be determined by spiking selected samples (matrix spikes [MS]) with the method recommended spiking compounds. Accuracy will be reported as the percent recovery of the spiking compound(s) and will compare with the criteria given in the appropriate methods, as identified in Section 7.0.

The method(s) precision (reproducibility between duplicate analyses) will be determined based on the duplicate analysis of matrix spike samples. Precision will be reported as Relative Percent Differences (RPDs) between duplicate analyses; acceptance criteria will be as specified in the appropriate methods identified in Section 7.0.

### 4.2.2 COMPLETENESS, REPRESENTATIVENESS AND COMPARABILITY

A completeness requirement of 90 percent will be targeted for the program (see Section 13.1.3 for definition of completeness).

The quantity of samples to be collected has been estimated in an effort to effectively represent the population being studied. A summary of the sampling and analysis programs is presented in Table 4.2.

## 5.0 SAMPLING PROCEDURES

The sample collection procedures are described in the Love Canal Sampling Manual, June 2013.

The sample container, preservation, shipping, and packaging requirements are identified in Table 5.1 and Section 6.3.

## 6.0 SAMPLE CUSTODY AND DOCUMENT CONTROL

The following documentation procedures will be used during sampling and analysis to provide chain of custody control during transfer of samples from collection through storage. Recordkeeping documentation will include use of the following:

i) Field logbooks (bound with numbered pages) to document sampling activities in the field
ii) Labels to identify individual samples
iii) Chain of custody record sheet to document analyses to be performed
iv) Laboratory sample custody logbook

### 6.1 FIELD LOGBOOK

The field team may use bound notebooks, sample collection logs, or electronic journals to record daily logs, sampling events, and field observations. Regardless of the media, entries should be dated and signed (or initialed) by the person making the entry. Entries on paper should be made with waterproof ink. The type of information to be recorded in the field includes:

i) Date
ii) Time
iii) Field calibrations performed during the sampling
iv) Location and Sample ID
v) Pertinent health and safety concerns
vi) Up/downgradient or clean/contaminated designation
vii) Physical condition of well
viii) Depth of well (both installed and measured)
ix) Weather conditions (temperature, cloud cover, humidity, wind, etc.)
x) Sample crew and/or agency names
xi) Work progress
xii) Measuring point elevation
xiii) Depth to water
xiv) Purge volume

xv) Purge time (start/stop)

xvi) Recharge time

xvii) Time of sample collection

xviii) Important field observations regarding purge or sample water or conditions related to sample integrity

xix) QA/QC samples

xx) Name of laboratory(ies) performing analysis

xxi) Delays

xxii) Comments (e.g., unusual situations, well damage, departure from established QA/QC field procedures, instrument problems, accidents, etc.)

## 6.2 SAMPLE NUMBERING

A sample numbering system will be used to uniquely identify each collected sample. This system will provide a tracking number to allow retrieval and cross-referencing of sample information. An example sample numbering system is described as follows:

Example: WG-9954-081012–AA–XXX
Where: WG - Designates sample type
(WG=Groundwater)
9954: Project number
081012: Date of collection (mm/dd/yy)
AA: Sampler initials
XXX: Unique sample number or location ID

QC samples will also be numbered with a unique well ID, with the exception of matrix spikes and matrix spike duplicates.

Sample labels shall be affixed to each sample container (not the caps). The labels shall be completed in waterproof ink. All labels (except weatherproof labels) should be taped to the sample containers with clear package sealing tape. The labels will include the following information:

i) Sample number/identification code

ii) Name/initials of sampler

iii) Date and time of sample collection

iv) Site name
v) Project number
vi) Required analysis
vii) Type of preservation (if applicable)

## 6.3 CHAIN OF CUSTODY RECORDS

Chain of custody forms will be completed for all samples collected during the program.

The chain of custody form will document the transfer of sample containers. Custody seals will be placed on each cooler. The cooler will then be sealed with packing tape. Sample container labels will include sample number, place of collection, and date and time of collection. All samples will be refrigerated using wet ice at <6°C and delivered to the analytical laboratory within 24 to 48 hours of collection. All samples will be delivered to the laboratory by commercial courier or Contractor personnel. All samples will be stored at <6°C at the laboratory.

The chain of custody record, completed at the time of sampling, will contain, but not be limited to, the sample number, date and time of sampling, and the name of the sampler. The chain of custody document will be signed, timed, and dated by the sampler when transferring the samples.

Each sample cooler being shipped to the laboratory will contain a chain of custody form. The chain of custody form will consist of two originals which will be distributed as follows:

i) The shipper will maintain one original while the other will be enclosed in a waterproof envelope within the cooler with the samples
ii) The cooler will then be sealed properly for shipment
iii) The laboratory, upon receiving the samples, will complete the original and make copies
iv) The laboratory will maintain a copy for their records
v) One copy will be returned to the Laboratory QA/QC Officer upon receipt of the samples by the laboratory
vi) The laboratory original will be returned to the Data Management Consultant with the data deliverables package

## 6.4 SAMPLE DOCUMENTATION IN THE LABORATORY

Upon receipt of the cooler at the laboratory, the shipping cooler and the custody seal will be inspected by the Sample Custodian. The condition of the cooler and the custody seal will be noted on the chain of custody record sheet by the Sample Custodian. The Sample Custodian will record the temperature of one sample (or temperature blank) from each cooler, and the temperature will be noted on the chain of custody. If the shipping cooler seal is intact, the sample containers will be accepted for analyses. The Sample Custodian will document the date and time of receipt of the container and sign the form.

If damage or discrepancies are noticed (including sample temperature exceedances), they will be recorded in the remarks column of the record sheet, dated and signed. Any damage or discrepancies will be reported to the Laboratory Project Manager and Laboratory QA/QC Officer before samples are processed.

Each sample or group of samples shipped to the laboratory for analysis will be given a unique identification number. The Sample Custodian will record the client name, number of samples, and date of receipt of samples in the Sample Control Logbook. Samples removed from storage for analyses will be documented in the Sample Control Logbook.

The laboratory will be responsible for maintaining analytical logbooks and laboratory data as well as a sample (on hand) inventory for submittal to Glenn Springs Holdings, Inc. (GSH) on an "as required" basis. Raw laboratory data produced from the analysis of samples submitted for this program will be inventoried and maintained by the laboratory for a period of 5 years; at which time, GSH will advise the laboratory regarding the need for additional storage.

## 6.5 STORAGE OF SAMPLES

After the Sample Custodian has completed the chain of custody forms and the incoming sample log, the chain of custody will be checked to ensure that all samples are stored in the appropriate locations. All samples will be stored within an access controlled custody room and will be maintained at <6°C until all analytical work is complete.

## 7.0 ANALYTICAL PROCEDURES FOR CHEMICAL ANALYSES

Samples collected for laboratory chemical analyses will be analyzed for the parameters listed in Table 4.1, using the methods cited in Table 4.2. These methods have been selected to meet the DQOs for each sampling activity.

Data deliverables for this program will include final results for the investigative samples and corresponding QC parameters as specified in Section 9.2.

All sample results will be calculated using external standards with the exception of the samples analyzed by gas chromatograph/mass spectrometer (GC/MS); these methods employ the use of internal standards or isotopic dilution for analyte quantitation. The specific procedures for target analyte quantitation are detailed in the appropriate analytical methods.

## 8.0 CALIBRATION PROCEDURES AND FREQUENCY

Calibration of instrumentation is required to ensure that the analytical system is operating correctly and functioning at the proper sensitivity to meet established reporting limits. Each instrument is calibrated with standard solutions appropriate to the type of instrument and the linear range established for the analytical method. The frequency of calibration and the concentration of calibration standards are determined by the manufacturer's guidelines, the analytical method, or the requirements of special contracts.

A bound notebook will be kept with each instrument requiring calibration in which the activities associated with QA monitoring and repairs program will be recorded. These records will be checked during periodic equipment review and internal and external QA/QC audits.

### 8.1 GAS CHROMATOGRAPHY/MASS SPECTROMETRY

It is necessary to establish that a given GC/MS meets the standard mass spectral abundance criteria prior to initiating any ongoing data collection. This is accomplished through the analyses of tuning compounds as specified in the analytical methods.

Calibration of the GC/MS system will be performed daily at the beginning of the day or with each 12 hours of instrument operating time. All method-specified calibration criteria must be met prior to sample analyses. All calibrations must be performed using either average response factors or first-order linear regression (with a correlation coefficient requirement of ≥0.995). Higher order fits will not be allowed.

### 8.2 GAS CHROMATOGRAPHY

Quantification of samples that are analyzed by GC with element selective detectors shall be performed by external standard calibration. Standards containing the compounds of interest will be analyzed at a minimum of five concentrations to establish the linear range of the detector. Single point calibration will be performed at the beginning of each day and at every tenth injection. The response factors from the single point calibration will be checked against the average response factors from multi-level calibration. If deviations in response factors are greater than those allowed by the analytical method protocols, then system recalibration will be performed. Alternatively, fresh calibration standards will be prepared and analyzed to verify instrument calibration.

All method-specified calibration criteria must be met prior to sample analyses. All calibrations must be performed using either average response factors or first-order linear regression (with a correlation coefficient requirement of ≥0.995). Higher order fits will not be allowed.

## 9.0 DATA REDUCTION, VALIDATION ASSESSMENT, AND REPORTING

### 9.1 GENERAL

The contract laboratory will perform analytical data reduction and validation in-house under the direction of the Laboratory QA/QC Officer. The Laboratory QA/QC Officer will be responsible for assessing data quality and advising of any data which were rated "preliminary" or "unacceptable" or other qualifications based on the QC criteria outlined in the relevant methods, which would caution the data user of possible unreliability. Data reduction, validation, and reporting by the laboratory will be conducted as detailed in the following:

i) Raw data produced and checked by the responsible analysts are turned over for independent review by another analyst
ii) The area supervisor reviews the data for attainment of quality control criteria presented in the referenced analytical methods
iii) Upon completion of all reviews and acceptance of the raw data by the laboratory operations manager, a computerized report will be generated and sent to the Laboratory QA/QC Officer
iv) The Laboratory QA/QC Officer will complete a thorough inspection of all reports
v) The Laboratory QA/QC Officer and area supervisor will decide whether any sample reanalysis is required
vi) Upon acceptance of the preliminary reports by the Laboratory QA/QC Officer, final reports will be generated and signed by the Laboratory Project Manager

Validation of the analytical data will be performed by the QA/QC Officer - Sampling and Analytical Activities. The data validation will be performed in accordance with the document "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review," United States Environmental Protection Agency (USEPA) 540/R-99/008, October 1999.

Assessment of analytical data will include the following checks:

1. Ensure that the data package is complete
2. Check all holding times against the requirements in Table 5.1
3. Check all QC data fall within the required limits and specifications

4. Confirm that the proper methods were utilized
5. Compare raw data to summary sheets
6. Confirm the proper data qualifiers were used

Assessment of the data will include checks on data consistency by looking for comparability of duplicate analyses, comparability to previous data from the same sampling location (if available), adherence to accuracy and precision control criteria detailed in this QAPP, and anomalously high or low parameter values.

The results of these data validations will be reported to the Project Manager and the contract laboratory, noting any discrepancies and their effect upon acceptability of the data.

Raw data from field measurements and sample collection activities that are used in project reports will be appropriately identified and appended to the report. Where data have been reduced or summarized, the method of reduction will be documented in the report. Field data will be audited for anomalously high or low values that may appear to be inconsistent with other data.

## 9.2 LABORATORY REPORTING, DATA, PRESENTATION AND FINAL REPORT

Reporting and deliverables shall include, but not limited to, all items listed in Table 9.1.

All sample data and corresponding QA/QC data as specified in the analytical methods shall be maintained accessible either in hard copy or on magnetic tape or disk (computer data files).

The laboratory will submit one copy of the final analytical report within 15 business days of receipt of the final sample included in the sample delivery group (SDG). An electronic copy of the results and QC in EQuIS format will also be required with the disc copy.

## 9.3 DOCUMENT CONTROL SYSTEM

A document control system ensures that all documents are accounted for when the project is complete.

A project number will be assigned to the project. This number will appear on sample identification tags, logbooks, data sheets, control charts, project memos and analytical reports, document control logs, corrective action forms and logs, QA plans, and other project analytical records.

## 9.4 QC CHECK POINTS AND DATA FLOW

The following specific QC check points will be common to all GC and GC/MS analyses. They are presented with the decision points.

Chemist - Bench Level Checks:

- Systems check: Sensitivity, linearity, and reproducibility within specified limits
- Duplicate analyses within control limits
- Matrix spike results within control limits
- Surrogate spike results within control limits
- Calculation/data reduction checks: Calculations cross-checked, any discrepancies between forms and results evident, results tabulated sequentially on the correct forms

Laboratory Project Manager:

- Systems operating within limits
- Data transcription correct
- Data complete
- Data acceptable

Sample Control:

- Samples returned to sample control following analysis

Laboratory QA/QC Officer:

- QA objectives met
- QC checks are completed
- Final data and report package is complete

## 10.0 INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY

### 10.1 QC FOR LABORATORY ANALYSES

Specific procedures related to internal laboratory QC samples are described in the following subsections.

### 10.1.1 REAGENT BLANKS

A reagent blank will be analyzed by the laboratory at a frequency of one blank per analytical batch. The reagent blank, an aliquot of analyte-free water or solvent, will be carried through the entire analytical procedure.

### 10.1.2 MATRIX SPIKE/MATRIX SPIKE DUPLICATE ANALYSES

A matrix spike/matrix spike duplicate (MS/MSD) sample will be analyzed for all parameters at a minimum frequency of one per analytical batch. Acceptable criteria and analytes that will be used for MS are identified in the methods. Where method specified limits were not available, general control limits were used. Percent spike recoveries will be used to evaluate analytical accuracy while percent relative standard deviation or the RPD between duplicate analyses will be used to assess analytical precision.

### 10.1.3 SURROGATE ANALYSES

Surrogates are organic compounds which are similar to the analytes of interest, but which are not normally found in environmental samples. Surrogates are added to samples to monitor the effect of the matrix on the accuracy of the analysis. Every blank, standard, and environmental sample analyzed by GC or GC/MS, including MS/MSD samples, will be spiked with surrogate compounds prior to sample preparation.

The compounds that will be used as surrogates, and the levels of recommended spiking are specified in the methods. Surrogate spike recoveries must fall within the control limits specified in the methods. If surrogate recoveries are excessively low (<10 percent), the laboratory will contact the QA/QC Officer - Sampling and Analytical Activities for further instructions. Dilution of samples to bring the analyte concentration into the linear range of calibration may dilute the surrogates out of the quantification limit. Reanalysis of these samples is not required. Assessment of analytical quality in these cases will be based on the MS/MSD sample analysis results.

## 10.2 QC FOR FIELD SAMPLING

To assess the quality of data resulting from the field sampling program, field duplicate and field blank samples will be collected (where appropriate) and submitted to the analytical laboratory as samples.

### 10.2.1 FIELD (RINSE) BLANKS

When well-dedicated equipment is not used and/or on the first sampling event in which non-certified clean equipment is used, field blanks will be used during the sampling programs to detect contamination introduced through sample collection procedures and equipment, external field conditions, sample transport, sample container preparation, sample storage, and/or the analytical process.

### 10.2.2 TRIP BLANKS

Trip blanks for volatile analyses will be prepared by the laboratory using analyte-free water and submitted with the sample collection containers. Trip blanks will be kept unopened in the field with sample bottles. Trip blanks will be transported to the laboratory on a daily basis with each batch of aqueous volatile samples. The laboratory will analyze trip blanks as samples.

### 10.2.3 FIELD DUPLICATE SAMPLES

Field duplicate samples will be collected and used to assess the aggregate precision of sampling techniques and laboratory analysis. For every 20 investigative samples, a field duplicate sample will be collected using standard sampling procedures. This duplicate will be packed and shipped to the laboratory for analysis.

## 11.0 PERFORMANCE AND SYSTEM AUDITS

For the purpose of external evaluation, performance evaluation check samples are analyzed periodically by the laboratory. Internally, the evaluation of data from these samples is done on a continuing basis over the duration of a given project.

The QA/QC Officer - Sampling and Analytical Activities may carry out performance and/or systems audits to insure that data of known and defensible quality are consistently produced during this program.

Systems audits are qualitative evaluations of all components of field and laboratory quality control measurement systems. They determine if the measurement systems are being used appropriately. The audits may be carried out before all systems are operational, during the program, or after completion of the program. Such audits typically involve a comparison of the activities given in the QA/QC Plan described herein, with activities actually scheduled or performed. A special type of systems audit is the data management audit. This audit addresses only data collection and management activities.

The performance audit is a quantitative evaluation of the measurement systems used for a monitoring program. It requires testing the measurement systems with samples of known composition or behavior to quantitatively evaluate precision and accuracy. A performance audit may be carried out by or under the auspices of the QA/QC Officer - Sampling and Analytical Activities without the knowledge of the analyst during each sampling event for this program.

It should be noted, however, that any additional external QA audits will only be performed if deemed necessary.

## 12.0 PREVENTATIVE MAINTENANCE

This section applies to both field and laboratory equipment. Specific preventive maintenance procedures for field equipment will be consistent with the manufacturer's guidelines. Specific preventive maintenance protocols for laboratory equipment will be consistent with the contract laboratory's Standard Operating Procedures (SOPs).

All analytical instruments to be used in this project will be serviced by laboratory personnel at regularly scheduled intervals in accordance with the manufacturers' recommendations. Instruments may also be serviced at other times due to failure. Requisite servicing beyond the abilities of laboratory personnel will be performed by the equipment manufacturer or their designated representative.

Routine maintenance of the instruments will be performed as per manufacturers' recommendations. The Laboratory Project Manager is responsible for the preventive maintenance of the instruments.

## 13.0 SPECIFIC ROUTINE PROCEDURES USES TO ASSESS DATA PRECISION, ACCURACY, AND COMPLETENESS

### 13.1 QA MEASUREMENT QUALITY INDICATORS

### 13.1.1 PRECISION

Precision will be assessed by comparing the analytical results between duplicate spike analyses. Precision as percent relative difference will be calculated as follows for values significantly greater than the associated quantitation limit:

$$\text{Precision} = \frac{(D_2 - D_1)}{(D_1 + D_2)/2} \times 100$$

- $D_1$ = matrix spike recovery
- $D_2$ = matrix spike duplicate spike recovery

For results near the associated quantitation limits, precision will be assessed based on the following criteria:

Precision = Original result - duplicate result <CRDL[1]

### 13.1.2 ACCURACY

Accuracy will be assessed by comparing a set of analytical results to the accepted or "true" values that would be expected. In general, MS/MSD and check sample recoveries will be used to assess accuracy. Accuracy as percent recovery will be calculated as follows:

$$\text{Accuracy} = \frac{A - B}{C} \times 100$$

- A = The analyte determined experimentally from the spike sample
- B = The background level determined by a separate analysis of the unspiked sample
- C = The amount of spike added

---

[1] CRDL - Contract Required Detection Limit.

In some cases, MS and/or MSD recoveries may not be available due to elevated levels of the spiked analyte in the investigative sample. In such cases, accuracy will be assessed based on surrogate spike recoveries and/or laboratory control samples.

### 13.1.3 COMPLETENESS

Completeness is a measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under normal conditions.

To be considered complete, the data set must contain all QC check analyses verifying precision and accuracy for the analytical protocol. In addition, all data are reviewed in terms of stated goals in order to determine if the database is sufficient.

When possible, the percent completeness for each set of samples will be calculated as follows:

$$\text{Completeness} = \frac{\text{usable data obtained}}{\text{total data planned}} \text{ x 100 percent}$$

### 13.1.4 QC EXCEEDANCES

Procedures discussed previously will be followed for documenting deviations. In the event that a result deviates significantly from method established control limits, this deviation will be noted and its effect on the quality of the remaining data assessed and documented.

## 14.0 CORRECTIVE ACTION

The need for corrective action may be identified by system or performance audits or by standard QC procedures. The essential steps in the corrective actions system will be:

i) Checking the predetermined limits for data acceptability beyond which corrective action is required
ii) Identifying and defining problems
iii) Assigning responsibility for investigating the problem
iv) Investigating and determining the cause of the problem
v) Determination of a corrective action to eliminate the problem (this may include reanalysis or resampling and analyses)
vi) Assigning and accepting responsibility for implementing the corrective action
vii) Implementing the corrective action and evaluating the effectiveness
viii) Verifying that the corrective action has eliminated the problem
ix) Documenting the corrective action taken

For each measurement system, the Laboratory QA/QC Officer will be responsible for initiating the corrective action and the Laboratory Project Manager will be responsible for implementing the corrective action.

# TABLES

## TABLE B.4.1

## ANALYTICAL PARAMETERS
## LONG-TERM GROUNDWATER MONITORING PROGRAM
## LOVE CANAL SITE
## NIAGARA FALLS, NEW YORK

| | *CAS Number* | *Groundwater Quantitation Limits μg/L* |
|---|---|---|
| ***Volatile Organic Compounds*** | | |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | 10 |
| 1,1,2-Trichloroethane | 79-00-5 | 10 |
| 1,1-Dichloroethane | 75-34-3 | 10 |
| 1,1-Dichloroethylene | 75-35-4 | 10 |
| 1,2-Dichloroethane | 107-06-2 | 10 |
| 1,2-Dichloropropane | 78-87-5 | 10 |
| Bromodichloromethane | 75-27-4 | 10 |
| Bromoform | 75-25-2 | 10 |
| Carbon tetrachloride | 56-23-5 | 10 |
| Chlorobenzene | 108-90-7 | 10 |
| Chloroethane | 75-00-3 | 10 |
| Chloroform | 67-66-3 | 10 |
| cis-1,3-Dichloropropene | 10061-01-5 | 10 |
| Dibromochloromethane | 124-48-1 | 10 |
| Bromomethane | 74-83-9 | 10 |
| Chloromethane | 74-87-3 | 10 |
| Methylene chloride | 75-09-2 | 10 |
| Tetrachloroethylene | 127-18-4 | 10 |
| trans-1,2-Dichloroethylene | 156-60-5 | 10 |
| trans-1,3-Dichloropropene | 10061-02-6 | 10 |
| Trichloroethylene | 79-01-6 | 10 |
| Vinyl chloride | 75-01-4 | 10 |
| 4-Methyl-2-pentanone | 108-10-1 | 10 |
| 2-Butanone | 78-93-3 | 10 |
| Benzene | 71-43-2 | 10 |
| Ethylbenzene | 100-41-4 | 10 |
| Styrene | 100-42-5 | 10 |
| Toluene | 108-88-3 | 10 |
| Xylene(total) | 1330-20-7 | 10 |
| 1,1,1-Trichloroethane | 71-55-6 | 10 |
| 2-Hexanone | 591-78-6 | 10 |
| Acetone | 67-64-1 | 10 |
| Carbon disulfide | 75-15-0 | 10 |
| cis-1,2-Dichloroethene | 156-59-2 | 10 |
| Vinyl acetate | 108-08-4 | 10 |
| ***Semi-Volatile Organic Compounds*** | | |
| 1,2,4-Trichlorobenzene | 120-82-1 | 10 |
| 1,2-Dichlorobenzene | 95-50-1 | 10 |
| 1,3-Dichlorobenzene | 541-73-1 | 10 |
| 1,4-Dichlorobenzene | 106-46-7 | 10 |
| 2,4,5-Trichlorophenol | 95-95-4 | 25 |
| 2,4,6-Trichlorophenol | 88-06-2 | 10 |
| 2,4-Dichlorophenol | 120-83-2 | 10 |

## TABLE B.4.1

## ANALYTICAL PARAMETERS
## LONG-TERM GROUNDWATER MONITORING PROGRAM
## LOVE CANAL SITE
## NIAGARA FALLS, NEW YORK

| | *CAS Number* | *Groundwater Quantitation Limits μg/L* |
|---|---|---|
| ***Semi-Volatile Organic Compounds - Continued*** | | |
| 2,4-Dimethylphenol | 105-67-9 | 10 |
| 2,4-Dinitrophenol | 51-28-5 | 25 |
| 2,4-Dinitrotoluene | 121-14-2 | 10 |
| 2,6-Dinitrotoluene | 606-20-2 | 10 |
| 2-Chloronaphthalene | 91-58-7 | 10 |
| 2-Chlorophenol | 95-57-8 | 10 |
| 2-Methylnaphthalene | 91-57-6 | 10 |
| 2-Methylphenol | 95-48-7 | 10 |
| 2-Nitroaniline | 88-74-4 | 25 |
| 2-Nitrophenol | 88-75-5 | 10 |
| 3,3'-Dichlorobenzidine | 91-94-1 | 10 |
| 3-Nitroaniline | 99-09-2 | 25 |
| 4,6-Dinitro-2-methylphenol | 534-52-1 | 25 |
| 4-Bromophenylphenylether | 101-55-3 | 10 |
| 4-Chloro-3-methylphenol | 59-50-7 | 10 |
| 4-Chloroaniline | 106-47-8 | 10 |
| 4-Chlorophenylphenylether | 7005-72-3 | 10 |
| 4-Methylphenol | 106-44-5 | 10 |
| 4-Nitroaniline | 100-01-6 | 25 |
| 4-Nitrophenol | 100-02-7 | 25 |
| Acenaphthene | 83-32-9 | 10 |
| Acenaphthylene | 208-96-8 | 10 |
| Anthracene | 120-12-7 | 10 |
| Benzo(a)anthracene | 56-55-3 | 10 |
| Benzo(a)pyrene | 50-32-8 | 10 |
| Benzo(b)fluoranthene | 205-99-2 | 10 |
| Benzo(g,h,i)perylene | 191-24-2 | 10 |
| Benzo(k)fluoranthene | 207-08-9 | 10 |
| Benzoic acid | 65-85-0 | 25 |
| Benzyl alcohol | 100-51-6 | 10 |
| Bis(2-chloroethoxy)methane | 111-91-1 | 10 |
| Bis(2-chloroethyl)ether | 111-44-4 | 10 |
| Bis(2-chloroisopropyl)ether | 108-60-1 | 10 |
| Bis(2-ethylhexyl)phthalate | 117-81-7 | 10 |
| Butyl benzyl phthalate | 85-68-7 | 10 |
| Chrysene | 218-01-9 | 10 |
| Dibenzo(a,h)anthracene | 53-70-3 | 10 |
| Dibenzofuran | 132-64-9 | 10 |
| Diethylphthalate | 84-66-2 | 10 |
| Dimethylphthalate | 131-11-3 | 10 |
| Di-n-butylphthalate | 84-74-2 | 10 |

### TABLE B.4.1

### ANALYTICAL PARAMETERS
### LONG-TERM GROUNDWATER MONITORING PROGRAM
### LOVE CANAL SITE
### NIAGARA FALLS, NEW YORK

| | *CAS Number* | *Groundwater Quantitation Limits μg/L* |
|---|---|---|
| ***Semi-Volatile Organic Compounds - Continued*** | | |
| Di-n-octylphthalate | 117-84-0 | 10 |
| Fluoranthene | 206-44-0 | 10 |
| Fluorene | 86-73-7 | 10 |
| Hexachlorobenzene | 118-74-1 | 10 |
| Hexachlorobutadiene | 87-68-3 | 10 |
| Hexachlorocyclopentadiene | 77-47-4 | 10 |
| Hexachloroethane | 67-72-1 | 10 |
| Indeno(1,2,3-c,d)pyrene | 193-39-5 | 10 |
| Isophorone | 78-59-1 | 10 |
| Naphthalene | 91-20-3 | 10 |
| Nitrobenzene | 98-95-3 | 10 |
| n-Nitrosodi-n-propylamine | 621-64-7 | 10 |
| n-Nitrosodiphenylamine | 86-30-6 | 10 |
| Pentachlorophenol | 87-86-5 | 25 |
| Phenanthrene | 85-01-8 | 10 |
| Phenol | 108-95-2 | 10 |
| Pyrene | 129-00-0 | 10 |
| ***Pesticides*** | | |
| 4,4'-DDD | 72-54-8 | 0.10 |
| 4,4'-DDE | 72-55-9 | 0.10 |
| 4,4'-DDT | 50-29-3 | 0.10 |
| Aldrin | 309-00-2 | 0.05 |
| alpha-BHC | 319-84-6 | 0.05 |
| beta-BHC | 319-85-7 | 0.05 |
| delta-BHC | 319-86-8 | 0.05 |
| Dieldrin | 60-57-1 | 0.10 |
| Endosulfan I | 959-98-8 | 0.05 |
| Endosulfan II | 33213-65-9 | 0.10 |
| Endosulfan sulfate | 1031-07-8 | 0.10 |
| Endrin | 72-20-8 | 0.10 |
| Endrin ketone | 53494-70-5 | 0.10 |
| gamma-BHC | 58-89-9 | 0.05 |
| Heptachlor | 76-44-8 | 0.05 |
| Heptachlor epoxide | 1024-57-3 | 0.05 |
| Methoxychlor | 72-43-5 | 0.50 |
| Toxaphene | 8001-35-2 | 5.0 |
| alpha-Chlordane | 5103-71-9 | 0.05 |
| gamma-Chlordane | 5103-74-2 | 0.05 |
| ***Polychlorinated Biphenyls*** | | |
| Aroclor-1016 | 12674-11-2 | 1.0 |
| Aroclor-1221 | 11104-28-2 | 1.0 |
| Aroclor-1232 | 11141-16-5 | 1.0 |
| Aroclor-1242 | 53469-21-9 | 1.0 |
| Aroclor-1248 | 12672-29-6 | 1.0 |
| Aroclor-1254 | 11097-69-1 | 1.0 |
| Aroclor-1260 | 11096-82-5 | 1.0 |

# TABLE B.4.2

# SAMPLING AND ANALYSIS SUMMARY
# LONG-TERM GROUNDWATER MONITORING PROGRAM
# LOVE CANAL SITE
# NIAGARA FALLS, NEW YORK

| *Analytical Parameter* | *Matrix* | *Analytical Method* | *Estimated Number of Samples/Event* | *Field Duplicates* | *Trip Blanks* | *MS/MSD* |
|---|---|---|---|---|---|---|
| ***<u>Even Years</u>*** | | | | | | |
| Volatile Organic Compounds | Groundwater | SW-846-8260(1) | 32 | 2 | 1 per day | 2/2 |
| Semi-Volatile Organic Compounds | Groundwater | SW-846-8270(1) | 32 | 2 | - | 2/2 |
| Pesticides | Groundwater | SW-846-8081(1) | 32 | 2 | - | 2/2 |
| Polychlorinated Biphenyls | Groundwater | SW-846-8082(1) | 32 | 2 | - | 2/2 |
| ***<u>Odd Years</u>*** | | | | | | |
| Volatile Organic Compounds | Groundwater | SW-846-8260(1) | 41 | 3 | 1 per day | 3/3 |
| Semi-Volatile Organic Compounds | Groundwater | SW-846-8270(1) | 41 | 3 | - | 3/3 |
| Pesticides | Groundwater | SW-846-8081(1) | 41 | 3 | - | 3/3 |
| Polychlorinated Biphenyls | Groundwater | SW-846-8082(1) | 41 | 3 | - | 3/3 |

Notes:

| | |
|---|---|
| (1) | "Test Methods for Solid Waste/Physical Chemical Methods," SW-846, 3rd Edition, September 1986 (with all subsequent revisions). |
| - | Not applicable. |
| MS | Matrix Spike. |
| MSD | Matrix Spike Duplicate. |

## TABLE B.5.1

## SAMPLE CONTAINER, PRESERVATION, AND HOLDING TIME PERIODS
## LONG-TERM GROUNDWATER MONITORING PROGRAM
## LOVE CANAL SITE
## NIAGARA FALLS, NEW YORK

| *Analyses* | *Samples Containers* | *Preservation* | *Maximum Holding Time* | *Notes* |
|---|---|---|---|---|
| ***Groundwater*** | | | | |
| Volatile Organic Compounds | Three 40-mL glass vials<br>Teflon-lined septum | Cool <6°C<br>pH<2 HCl | 14 days from collection to analysis | Fill completely with no head space |
| Semi-Volatile Organic Compounds | 2-L Amber | Cool <6°C | 7 days from collection to extraction<br>40 days from extraction to analysis | Fill completely |
| Pesticides | 2-L Amber | Cool <6°C | 7 days from collection to extraction<br>40 days from extraction to analysis | Fill completely |
| Polychlorinated Biphenyls | 2-L Amber | Cool <6°C | 7 days from collection to extraction<br>40 days from extraction to analysis | Fill completely |

# TABLE B.9.1

# LABORATORY REPORTING DELIVERABLES - FULL
# LONG-TERM GROUNDWATER MONITORING PROGRAM
# LOVE CANAL SITE
# NIAGARA FALLS, NEW YORK

A detailed report narrative should accompany each submission, summarizing the contents and results.

A. Chain of Custody Documentation and Detailed Narrative [(1)]

B. Sample Information
   1. Date collected
   2. Date extracted or digested
   3. Date analyzed
   4. Analytical method and reference

C. Data (including all raw data and CLP-like summary forms)
   1. Samples
   2. Laboratory duplicates [(2)]
   3. Method blanks
   4. Spikes, spike duplicates [(2)] [(3)]
   5. Surrogate recoveries [(2)]
   6. Internal standard recoveries
   7. Calibration
   8. Any other applicable quality control (QC) data (i.e., serial dilution)
   9. Tentatively identified compounds (TICs) (if applicable)

D. Miscellaneous
   1. Method detection limits and/or instrument detection limits
   2. Percent solids (where applicable)
   3. Metals run logs
   4. Standard preparation logs
   5. Sample preparation logs

All sample data and its corresponding quality assurance/quality control (QA/QC) data shall be maintained accessible to CRA either in hard copy or on magnetic tape or disc (computer data files). All solid sample results must be reported on a dry-weight basis.

Notes:

(1) Any QC outliers must be addressed and corrective action taken must be specified.

(2) Laboratory must specify applicable control limits for all QC sample results.

(3) A blank spike must be prepared and analyzed with each sample batch.

(4) Tentatively Identified Compounds (TICs).

# APPENDIX C

# FIELD PROCEDURES

# APPENDIX C

## FIELD PROCEDURES

## FP-01A: WASTE MANAGEMENT

Disposables (Personal Protective Equipment [PPE], Towels, Tubing, etc.)

All field disposables will be placed in 55-gallon waste disposal drums at the Love Canal Treatment Facility (LCTF) for management as Hazardous Solid Waste.

Purge Water

All purge water generated from sampling activities will be disposed of at the LCTF.

Decontamination Liquids

Alconox® Wash: All decontamination wash is disposed of in the same manner as purged groundwater.

Solvents: Minimal volumes of solvents are used. Small quantities of solvents (Citri-Clean and Halso 99) that are spilled during decontamination may be washed into the decontamination containment area.

## FP-02A: GROUNDWATER LEVEL MEASUREMENT

### Equipment

1. PPE (according to Site Health and Safety Plan [HASP])
2. Keys to the wells
3. Water level indicator
4. Low phosphate soap (Alconox® or equivalent)
5. Decontamination solvents (Site-specific)
6. Distilled water
7. Paper towels or cotton rags
8. Buckets
9. Water level measurement form or field logbook
10. Pens with waterproof ink
11. Trash bags
12. Site map
13. A table of well depths and previous water level(s)

### Pre-Field Activities

1. All personnel making depth to water measurements are required to have reviewed the Site-Specific Health and Safety Plan for the Glenn Springs Holdings, Inc. (GSH) Western New York, have up-to-date Occupational Safety and Health Administration (OSHA) Health and Safety Training, have up-to-date medical monitoring, and have reviewed the field procedure within 1 year of performing this task.
2. Collect equipment.
3. Using a glass of water, check that the water level indicator is functioning. Measure the distance from the reference point on the indicator probe to the 2-foot mark on the tape – this should be 2 feet.
4. Decontaminate the water level indicator. Wash the probe and entire length of tape with a low phosphate soap solution followed by a tap water rinse. Dry with a clean cloth or paper towel. If the tape or probe has been in contact with non-aqueous phase liquid (NAPL), remove NAPL with a rag soaked in Citri-Clean, followed by the soap wash described above and a water rinse. Any liquid wastes will be contained and disposed of as described below.

Field Procedures

1. Check well identification. If there is any uncertainty that the correct well is being measured, measure the total depth of the well using a separate tape with a solid weight. Compare the measured depth of the well with the reported depth of the well.
2. Check the condition of the protective casing, cement, etc., and make notes as necessary. (Serious problems regarding the well condition should be communicated to the project coordinator; i.e., the protective casing has been broken into). Problems that require general maintenance should be documented and added to the Well Maintenance List.
3. Remove the cap from the well. If there is a sound of air entering or escaping, make a note of this, and check to see if there is a vent hole in the cap. Should this occur, it may be necessary to wait several minutes for the water level to equilibrate to the ambient conditions.
4. Check for the measuring point mark on the well riser and for any sharp edges, which may damage the water level indicator tape.
5. Slowly lower the water level indicator probe until contact with the water surface is indicated, either by audible alarm or by light. To the extent possible, avoid dragging the indicator cable on the top edge of the well casing; this can damage the cable and potentially introduce shavings from the cable into the well.
6. Read the depth to water at the measuring point and record the measurement to the nearest 0.01 foot.
7. Retract the tape by winding onto the spool, holding a clean paper towel to remove water and/or debris.
8. For newly installed wells and wells with known contamination, decontaminate the probe and tape between wells with soap and water wash. Rinse with distilled or deionized water. If necessary, decontamination solvents may be used to remove heavy contamination.
9. Replace the well cap, and relock the well.

Note: Whenever possible, water level measurements should be collected from least to most contaminated wells.

### Decontamination of Water Level Indicator

At the end of each day of use, decontaminate the water level indicator as described under Pre-Field Preparation, above.

### Disposal of Wastes

All solid waste materials from monitoring will be placed in a plastic garbage bag. At the end of each day, these wastes will be placed in an approved/labeled 55-gallon waste disposal drum at the LCTF for management as Hazardous Solid Waste.

### Reporting

Field data will be entered into the field database management system or an Excel spreadsheet. The CRA project coordinator will specify formats and procedure.

## FP-04B: GROUNDWATER SAMPLING – MONITORING WELLS

### Equipment

1. PPE.
2. Purging equipment: Water level indicator, pumps (Grundfos, peristaltic pumps, hand bailers, or bladder pumps), generator, and air compressor. Water storage tank for purged water.
3. Field parameter monitoring instruments: Multi-parameter (pH, specific conductance, and temperature) flow-though cell.
4. Decontamination equipment: Plastic sheeting, low phosphate soap (Alconox®), distilled water, paper towels, and buckets.
5. Groundwater sampling forms or field logbook and a Site map.

### Pre-Field Activities

1. At least 1 week prior to the sampling event, complete appropriate sampling forms, and submit to the CRA laboratory coordinator.
2. Contact laboratory to acquire sample bottles.
3. Prepare bottle labels (list of wells to sample is in the Site Sampling and Analysis Plan).
4. Complete chain of custody form.
5. Print field log/data recording sheets (preprinted with location IDs).
6. Calibrate pH, specific conductance, and turbidimeter instruments; record calibration results.
7. For peristaltic pumps, decontamination is replacement of used tubing with new tubing cleaned by the manufacturer. For inertial pumps (WaTerra), decontaminate the check valves and replace the tubing. The following procedure is for any submersible pumps. Wearing appropriate PPE:
    - Remove all visible sediment/soil by hand brush scrubbing or power washing.
    - Remove drain plug from pump and drain trapped water. Refill pump with DI water. Replace the drain plug.
    - Submerge pump in a 5-gallon bucket of low-phosphate soap water, and recirculate soap solution for 5 minutes.

- Remove drain plug from pump and drain trapped water. Refill pump with DI water. Replace the drain plug.
- Submerge pump in a 5-gallon bucket of tap water, and recirculate water for 5 minutes.
- Rinse equipment with tap water.
- An equipment blank may be required. The equipment blank is collected by pumping 1 gallon of deionized water through the clean pump. Equipment blanks should be managed consistent with water samples as described below.

Note: If the pump is contaminated with NAPL, the pump will be cleaned outside with Citri-Clean, pressure washed outside, the drain plug removed to drain residual water, refill the pump with DI water and replace plug, run through a 5-minute recirculation with a Citri-Clean solution, and then pressure washed. Following this aggressive cleaning, the procedure defined above will be completed.

Field Procedures

1. Measure the water level and record on the field log. Determine the volume of water to be purged according to the diameter of the well and the formulas provided on the sample collection forms.
2. Install pump into well for purging. Lower pump deep enough that the well does not go dry during purging. It is necessary to place the pump at a point in the water column such that all standing water above the pump is removed during the purge. This ensures that the bailer is not lowered into "stale" casing water, but "new" aquifer water when sampling. If it is determined that water remains above the pump at the conclusion of purging, the pump should be raised very slowly while still running to remove the stale casing water.
    - Purge tubing is dedicated to each well and remains in the well between sampling events. A decontaminated pump will be used for each well purging. The dedicated tubing is pulled from the well and connected to the decontaminated pump.
    - Care must be taken to ensure that the dedicated tubing is not contaminated when it is removed from the well and that no debris is introduced into the well when the pump is lowered.
    - Pumps are not field decontaminated. Pumps are decontaminated nightly at the LCTF.

3. Start pump and purge as follows:

    - Start pump and adjust flow rate to a rate sustainable by the well. The goal of the sampling is to purge and sample without exceeding the groundwater recharge rate of the well.
    - Monitor field parameters (pH, specific conductance, and temperature), water level, and pumping rate, and record on the field log including the time of the measurements. One set of readings will be taken at the start of purging and an additional set of readings will be taken after the removal of each standing well volume.
    - If the well goes dry, purge on 3 consecutive days to dryness and then sample. Full recovery is not necessary. Sampling can commence on the third day if water is available and can be conducted over the next 4 days if required to fill the sample bottles.
    - If the well goes dry, a sustainable pumping rate should be determined for future sampling events. Contact the CRA project coordinator regarding adjustment of pumping rates.

4. Samples shall be collected using a pre-cleaned stainless steel or Teflon bailer:

    - If possible, sampling in the rain should be avoided to avoid cross-contamination from airborne contaminants picked up in the precipitation.
    - Wells should be sampled beginning with the lowest concentration wells, progressing to the highest concentration wells. This minimizes the potential for cross-contamination.

5. Securely pack samples in ice-filled coolers for shipment to the appropriate laboratory. Coolers must:

    - Have chain of custody forms in a zip-lock bag in the cooler.
    - Be securely taped closed with security seals across the cooler opening.

6. Remove pump and disconnect from purge tubing. Purge tubing should be returned to the well:

    - Care must be taken to ensure that the dedicated tubing is not contaminated when it is removed from the well and that no debris is introduced to the well when the tubing is lowered into the well.

7. Manage purge water and sampling disposables as described below.

## Disposal of Wastes

All solid waste materials from sampling will be placed in a plastic garbage bag. At the end of each day, these wastes will be placed in an approved/labeled 55-gallon waste disposal drum at the LCTF. Purge water and decontamination liquids will be collected. Solid and liquid waste will be managed according to Field Procedure (FP)-01a.

## Reporting

Field data will be entered into the field database management system or an Excel spreadsheet. The CRA project coordinator will specify formats and procedures.

A copy of the chain of custody forms must be sent to the Laboratory Coordinator.

## FP-06A: DECONTAMINATION CLEANERS

The following cleaners/solvents are used for decontamination. A short summary of the use and precautions to follow when using these solvents is presented for each cleaner. These summaries are not complete; the manufacturer's guidelines and Material Safety Data Sheets (MSDS) should be read and understood before using any of these cleaners.

### Low-Phosphate Soap: Alconox® or Equivalent

Alconox® is formulated to be "free rinsing" (i.e., easily rinsed off with running tap or distilled water) with virtually no redeposition of removed (and unwanted) materials, all of which translates to virtually a complete absence of residues.

Use Alconox® at a 1-percent solution, which is equivalent to approximately 2½ tablespoons (1¼ ounces [oz.]) per gallon of cold, warm, or hot water. Alconox® is not formulated for spray machines since it will foam. For critical cleaning, do final or all rinsing with distilled, deionized, or purified water.

Alconox® has a shelf life of 2 years after the date of manufacture.

### Citri-Clean

Protective gloves and goggles should be worn when using Citri-Clean. Do not use near fire, flame, spark, or any ignition source. It is harmful if swallowed.

Heavily caked grease/NAPL areas should be scraped before application.

The standard solution for Citri-Clean is 15 percent (20 oz. of Citri-Clean concentrate in 1 gallon of water). Citri-Clean may be used at up to 100 percent concentrate to remove heavy contamination. Citri-Clean can be applied with sprayer or other conventional means. Following application, allow the materials to stand for 2-10 minutes. After allowing the materials to stand, scrub the contaminated area, and flush with water to remove loose particles. Reapply to areas where stains remain or where heavy accumulations of oil, grease, or other contaminants have occurred.

### Halso 99

**Halso 99 should be used only to remove NAPL.** Halso 99 is the Occidental Chemical Corporation (OxyChem) trade name for the chlorinated solvent, monochlorotoluene. It should be handled with care. It should not be used on equipment that will be used for sampling wells that are not impacted by NAPL. Monochlorotoluene is a potential groundwater contaminant, and the use of Halso 99 could create low concentrations of monochlorotoluene in groundwater samples.

From the MSDS sheet:

> "*Avoid breathing vapor, use with adequate ventilation. Wear NIOSH/MSHA approved respiratory protection if there is potential for exposure above the exposure limits. Do not get in eyes, on skin or clothing. Wear personal protective equipment as described in Exposure Controls/Personal Protection (Section 8) of the MSDS. Wash thoroughly with soap and water after handling. Keep away from heat, sparks, pilot lights, welding operations, and open flame. Do not eat, drink, or smoke in areas where this material is used. Ground all equipment.*
>
> *Vapors are heavier than air and will tend to collect in low areas. Avoid use in confined spaces. Areas of poor ventilation could contain concentrations high enough to cause unconsciousness and death. Use approved supplied air respirator following manufacturer's recommendations where vapors may be generated. Do not reuse containers.*
>
> *Avoid contact with oxidizing agents. [Examples of common oxidizing agents are: sodium hypochlorite (bleach), hydrogen peroxide, potassium permanganate.]*"

## FP-06B: DECONTAMINATION PROCEDURES

This procedure describes the methodology for cleaning of non-dedicated field and sampling equipment. The purpose of describing this procedure is to avoid or limit potential for cross-contamination due to reuse of dirty equipment.

### Equipment

1. PPE
2. Non-phosphate soap
3. Deionized water
4. Tap water
5. Scrub brush
6. Abrasive pads (sponge-type pads)
7. Paper towels or cotton rags
8. Aluminum foil
9. Plastic bags
10. Equipment to be cleaned
11. Squirt bottles

### Procedures

The general cleaning procedure for cleaning all groundwater sampling equipment is:

1. Mix up soap/water wash.
2. Disassemble all equipment if appropriate.
3. Removal all visible sediment/soil by scrubbing by hand.
4. Wet equipment with tap water.
5. Wash equipment with soapy water using scrub brush, or abrasive pad/sponge to remove all sediment/soil and discoloration.
6. Rinse equipment with tap water.
7. Rinse equipment with deionized water two times.
8. Allow equipment to air dry.
9. When dry - reassemble equipment and place in plastic bag to avoid re-contaminating equipment.

10. A rinse blank is required as part of the Long-Term Monitoring Program (LTMP) as a check on the adequacy of the cleaning process. This rinse blank is collected by pouring deionized water over the item of cleaned equipment and catching the water in an appropriate set of sample containers.

11. Decontamination wash water should be collected for proper disposal at the LCTF.

## FP-09A: WELL PURGING

This operating procedure describes acceptable methodologies for purging standing water in monitoring wells so that representative groundwater samples can be collected. The purpose of describing this procedure is to create uniform purging procedures between field personnel, provide groundwater representative of the aquifer from which it came, and maintain proper quality control practices.

### Equipment

1. PPE
2. Disposable gloves
3. Water level tape
4. Photoionization Detection (PID)
5. Compressors
6. Generator
7. Field forms and field logbook
8. Plastic garbage bags
9. Cotton string
10. Appropriate purge pump or bailer
11. Discharge tubing
12. pH meter
13. Conductivity meter
14. Temperature meter
15. Turbidity meter
16. Clear glass sample jars
17. Well keys

### Procedures

1. Locate and identify the monitoring well to be purged.
2. Unlock protective casing and remove well cap.
3. Use masonry trays or tubs to collect spillage. Don clean disposable gloves.
4. Position PID at well head to detect organic vapors for selection of appropriate level of PPE. Record PID readings of well riser headspace and background.

5. Measure depth to water and total depth of well. Do not use the water level indicator to sound the bottom of the wells to prevent damage to the water level indicator. A separate tape with a solid weight should be used. Record information on appropriate field logs. Compare the total depth of the well to the previously recorded depth shown to ensure that the correct well is being monitored. This measurement also provides an indication regarding "silting up" of the well (i.e., sand and/or silt from the formation has migrated into the well). If the well has significantly silted up (i.e., 50 percent or more of the screened interval), then the well will be need to be redeveloped prior to sample collection).

6. Calculate the volume of water initially in the well by subtracting the water level from the total depth and multiplying by:
   - 0.163 gallons/foot for a 2-inch diameter well.
   - 0.367 gallons/foot for a 3-inch diameter well.
   - 0.653 gallons/foot for a 4-inch diameter well.

7. Prepare the appropriate purge pump for well purging by attaching the appropriate type of discharge tubing to the pump.

8. Lower the pump or discharge tubing into the well to the depth where water is encountered. As the discharge tubing is lowered, wipe it with paper towels dampened with deionized water to remove any debris which may be adhering to its surface.

9. Connect the pump to the appropriate power source (generator or compressor) and turn pump on. Be sure that the discharge from the pump is directed into a proper storage container.

10. Lower the pump or discharge tubing, while it is pumping, to the midpoint region of the saturated level of an open borehole or to the mid-screen point in screened monitoring wells.

11. Mark time when pumping began in field book and on sampling log.

12. Take pH, specific conductance, temperature, and turbidity readings during the evacuation process and record the readings obtained on appropriate sampling logs. The meters used to measure the field parameters should be calibrated each morning or as required during purging and sampling. Field parameter readings are to be taken at the start of purging and after each calculated well volume has been removed.

13. Continue to take indicator measurements for each well volume removed for the duration of time required to evacuate a minimum of three well volumes.

14. Once three well volumes of groundwater have been removed from the well and pH, specific conductance, and temperature have stabilized, slowly remove the

pump from the saturated zone. The well will be considered stabilized when two successive measures of pH are within 0.5 unit, temperature within 1.0°C, and specific conductance is within 10 percent. If stability is not obtained, pump a maximum of five calculated well volumes.

15. If the pump is not to be used for sample collection, then, when the standing water has been purged from the well, remove the pump from the well while still running. Turn off the pump.

16. Disconnect discharge tubing from the pump and properly dispose of or store the tubing. Tubing not being stored for reuse should be disposed of in conjunction with used PPE. Tubing that requires disposal is tubing that cannot be stored within the well between monitoring events. If tubing must be removed from the well to facilitate sampling, either new tubing must be utilized for the next event or the removed tubing must be thoroughly cleaned prior to placement back into the well. If tubing is going to be stored within the well, it should be tied off to the well itself.

17. If the pump is to be used to collect samples at completion of purging, proceed right into collection of groundwater samples.

## FP-10: PH METER CALIBRATION

This procedure describes the calibration of a standard pH meter and the determination of pH in an aqueous media.

The purpose of this procedure is to provide a uniform basis for calibration of field pH meters and ensure continuity between field personnel. Additionally, the method provides quality control steps necessary for obtaining reliable and representative pH readings.

### Equipment

1. pH meter
2. Buffers
3. Polypropylene beakers
4. Paper towels
5. Calibration logs
6. Field logs
7. Distilled water
8. Thermometer
9. Extra batteries

### Calibration Procedures

1. Check to make sure batteries are fully charged.
2. Turn meter on and allow it to stabilize for 3 to 5 minutes.
3. Select pH buffers, 7, 4, and 10 and check temperatures of each. Record pertinent information on field calibration logs.
4. Fill the calibration cup about ¾ full with desired pH buffer.
5. Place meter into the buffer, while in calibration mode, and allow it to stabilize.
6. Record the "before" reading.
7. Using the up/down arrows, adjust the meter to reflect the actual pH buffer, then hit the enter button.
8. Return to measurement mode and record the "after" reading.
9. Remove probe and clean with distilled water.

10. Place probe in second calibration buffer and repeat calibration process.
11. Remove probe, rinse with distilled water, and check reading in the pH 7.00 buffer. If reading is off by more than 0.05 pH unit, recalibrate as described above.
12. Rinse probe and insert in groundwater sample. Record result on field logs.
13. This calibration procedure should be performed:
    - When meter reads erratically or varies from historic readings for that well.
    - At the beginning of sampling day.

Note: Some meters also have an Autocalibration Mode. See specific calibration information for specific details.

## FP-11: SPECIFIC CONDUCTIVITY METER CALIBRATION

This procedure describes the calibration of a portable field specific conductivity meter for obtaining measurements in aqueous media. The purpose of this procedure is to provide a uniform means for calibration and operation of portable field specific conductance meters between field personnel. Additionally, the method provides quality control steps necessary for obtaining reliable and representative readings.

### Equipment

1. Conductivity meter
2. Reference solutions
3. Distilled water

### Calibration Procedures

1. Check to make sure batteries are fully charged
2. Fill the calibration cup approximately ¾ full with conductivity reference solution
3. While in calibration mode, place the meter into the reference solution and allow the reading to stabilize
4. Record the "before" reading
5. Using the up/down arrows, adjust the meter to reflect the actual conductivity of the reference solution, then hit the enter button
6. Return to the measurement mode and record the "after" reading
7. Remove the meter and rinse with the DI water
8. Discard used reference solution

### Meter Usage

1. Fill sample cup to just below the top edge with the aqueous sample
2. Place meter in the cup and allow it to stabilize
3. Record sample number, date, time, project, and resulting conductivity value on appropriate field logs

4. This calibration procedure should be repeated:
    - When the meter reads erratically or varies from historic readings for that well
    - At the beginning of the sampling day

Note: Specific calibration may be required for specific meters. Check manual for specific product details.

## FP-12: TURBIDIMETER CALIBRATION

This procedure describes the calibration of a portable field turbidity meter for obtaining measurements in aqueous media. The purpose of this procedure is to provide a uniform means for calibration and operation of portable turbidity meter between field personnel. Additionally, the method provides quality control steps necessary for obtaining reliable and representative readings.

### Equipment

1. Turbidity meter
2. Reference Gelex standards
3. Field data record form

### Calibration

A. Primary and Secondary Standards

Standards are solutions with a known turbidity which are used for calibrating the turbidimeter. Note: Do not allow standards to freeze.

Primary standards are standards which are acceptable to the Environmental Protection Agency (EPA) for calibrating turbidimeters.

There are only two:

1. Formazin
2. Styrene divinylbenzene polymer beads

The same glass cuvette must be used when calibrating the turbidimeter with the primary standards and when measuring the unknown sample.

Secondary standards are defined by the EPA as Sealed Standards. Secondary Standards can be used for calibrating turbidimeters if the secondary standards are first calibrated with primary standards. The use of secondary standards can save time and money.

B. Calibrating with Primary Standards

Procedure

1. Turn on the turbidimeter
2. Record the actual nephelometric turbidity units (NTU) of Low (0-10) Gelex standard on the record form, and then place the standard in the receptacle and close the light shield
3. Press the read button and record the result
4. Repeat the above procedure with the medium (0-100) and high (0-1000) Gelex standards