APPENDIX A1, A2, A3

Focused Remedial Investigation (Work Plan, QAPP, HASP)

ITT Sealectro
Mamaroneck, NY

August 1992

O'BRIEN & GERE
ENGINEERS, INC.

Work Plan

Focused Remedial Investigation

I.T.T. Sealectro
Mamaroneck, NY

September 1991

3356.009

WORK PLAN

FOCUSED REMEDIAL INVESTIGATION

ITT SEALECTRO SITE

MAMARONECK, NEW YORK

SEPTEMBER 1991

O'BRIEN & GERE ENGINEERS, INC.
5000 BRITTONFIELD PARKWAY
SYRACUSE, NEW YORK 13221

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SECTION 1 - INTRODUCTION

1.01 General

This document presents the work plan for the Focused Remedial Investigation (RI) at the ITT Sealectro facility located at 139 and 225 Hoyt Street in Mamaroneck, New York. Figure 1 illustrates the location of the site. This work plan will first present the applicable background information associated with the site, the Interim Remedial Measures that were completed at the site, followed by the Focused RI and Site Investigation Plans. Finally, this work plan presents the Risk Assessment and Focused RI Report format descriptions. This document has been prepared in accordance with the New York State Department of Environmental Conservation (NYSDEC) guidelines for the development of RI Work Plans and United States Environmental Protection Agency (USEPA) guidelines provided in Guidance for Conducting Remedial Investigation and Feasibility Studies under CERCLA (1988). Each aspect of the Focused RI is presented in detail in the following sections.

1.02 Introduction

Since approximately 1960 Sealectro Corporation (predecessor in interest to ITT Sealectro, Inc.) operated a manufacturing facility for miniature electronic components at 139 and 225 Hoyt Street. The previous tenant at the 139 Hoyt Street building is believed to have manufactured jewelry. Electroplating was performed at the 139 Hoyt Street facility until 1986 as part of the manufacturing processes.

In March, 1986, Sealectro Corporation executed a sale-leaseback agreement for the property at 139 Hoyt Street with Northbrook Realty Group (northbrook).

The lease will terminate on March 26, 1993. The 225 Hoyt Street property is currently leased from Tomar Realty Company of Mamaroneck, New York. This property (though not a subject of this report) was used solely for administrative office.

ITT Corporation purchased Sealectro Corporation in August, 1988. The resulting company was ITT Sealectro, Inc., a subsidiary of ITT Corporation. ITT ceased operations at both Mamaroneck facilities in 1990.

The 139 Hoyt Street log consists of 0.92 acres and the 225 Hoyt Street lot 0.61 acres. One large building exists on each log. The entire remaining area at the two properties consists of paved parking areas. A site map has been provided as Figure 2.

The 139 and 225 Hoyt Street properties are relatively flat and are adjacent to the Sheldrake River. The Sheldrake River is a tributary of the Mamaroneck River which drains into the Long Island Sound within one mile of the site (Figure 1). Where it flows past the ITT Sealectro facility, the Sheldrake River is about one foot deep and fifteen feet wide. The river is channeled by stone retaining walls about eight feet high. Site inspections documented the river in this area to contain much debris consisting typically of automobile parts, glass and assorted household refuse.

The ITT Sealectro site is located in an industrialized area of Mamaroneck. Industries in the immediate vicinity of ITT Sealectro include the Blood Brothers Auto Wrecking Yard, which is located to the north across the Sheldrake River; Marvel Industries, Inc., a plastics fabricator located to the west; and a reported metal plating facility to the east. Background and historical records will be reviewed to confirm the presence of the reported metal plating facility. Hoyt Street and an Amtrak Train line border the site to the south.

1.03 Previous Studies

A total of three previous studies have been conducted at the Mamaroneck facility. The first study was a site assessment completed by O'Brien & Gere Engineers, Inc. (O'Brien & Gere) as part of the property transfer from Sealectro to Northbrook Realty Group. The second study was a soil and ground water evaluation conducted by TRC Environmental Consultants (TRC). This study was conducted for ITT Corporation in association with the purchase of Sealectro. The third study was a sampling program implemented by O'Brien & Gere at the former drummed solvent storage pad to delineate soil contamination and to document existing ground water quality conditions. A more detailed summary of each of the previous studies are provided in the Appendices (Site Assessment - Appendix A, Environmental Assessment - Appendix B, and Sampling Program - Appendix C.)

Site Assessment - The objective of the site assessment was to determine the possible existence and nature of contaminants associated with the discontinued electroplating operation. The assessment focused on five potential areas of concern (Figure 2): three 2500 gallon underground wastewater storage tanks, the wastewater treatment building, drummed solvent storage pad, 138/125 Hoyt Street and the Sheldrake River.

The assessment revealed low levels of copper (18-30 ppm) and nickel (20-33 ppm) at shallow depths (4-12 inches) around the former underground waste storage tanks. Slightly higher levels of silver (2-51 ppm), copper (14-510 ppm) and nickel (14-113 ppm) were detected around the former wastewater treatment building. 1,1,1-trichloroethane (0.86 - 160 ppm) was found in the immediate vicinity of the former drummed storage pad.

1,1,1-trichloroethane (12-53 ppb) was detected at depths below the ground water table around the periphery of 139 Hoyt Street and in the vicinity of the 225 Hoyt Street. Copper (47-740 ppm), nickel (12-30 ppm) and 1,1,1-trichloroethane (.01-.18 ppm) were detected in the river sediment. A more detailed summary and specific analytical data are presented in Appendix A.

Environmental Assessment - The second study conducted by TRC, in conjunction with ITT Corporation's purchase of Sealectro, focused on three areas; drummed solvent storage pad, former wastewater treatment area and the Sheldrake River. A ground water monitoring well was installed at the former drummed storage pad. Sampling results revealed VOC's (1,1-dichloroethane 123 ppb, trans-1,2-dichloroethylene 74 ppb, 1,1,1-trichloroethane 94 ppb and trichloroethene 4 ppb) and arsenic (10 ppb) in ground water. 1,1,1-trichloroethane (0.076 - 0.091 ppm) was detected in the soil (0-7 ft) (Appendix B).

A second ground water monitoring well was installed at the former wastewater treatment building. VOCs were detected (dibromochloromethane, 9 ppb; 1,1-dichloroethane 154 ppb; 1,2-dichloroethane 6 ppb; 1,1-dichloroethylene 343 ppb; trans-1,2-dichloroethylene 65 ppb; 1,1,1-trichloroethane 129 ppb and trichloroethene 21 ppb) in the ground water.

Subsurface soil samples revealed detectable levels of copper (296.5 - 465.3 ppm), nickel (26.1 - 46.7 ppm) and silver (0.19 - 0.51 ppm) in surface soil samples. Copper (12.1 - 43 ppm) nickel (5.1 - 15.5) and silver (0..03 - 0.12 ppm) was detected in below surface soil samples (0-7').

Copper (56.1 - 296.4) ppm and silver (4.57 - 7.03) was detected in river sediment. A more detailed summary and specific analytical data are presented in Appendix B.

Sampling Program - The third study conducted by O'Brien & Gere focused on the former drummed solvent storage pad. Soil borings and shallow soil samples showed VOCs (trans-1,2-dichloroethane (BDL), 1,2-dichloroethene (BDL), 1,1,1-trichloroethane (18-16,000 ppb), carbon tetrachloride (120 ppb), trichloroethene (19-5,900 ppb) tetrachloroethene (3,400 ppb) toluene (16 - 3,100 ppb) and xylene (55 - 15,000 ppb)). Each sample collected at the water table interface (with the exception of one) revealed detectable levels of volatile organics. A comparison of the analytical data for each boring indicates a possible upgradient source of toluene and xylene.

The existing ground water monitoring well near the drummed solvent storage pad, was resampled and tested for volatile organic compounds. Vinyl chloride (200 ppb); chloromethane (18 ppb); 1,1,1-trichloroethane (16 ppb); trichloroethene (3 ppb) and benzene (29 ppb) was detected.

The ground water flow direction in the immediate vicinity of the Mamaroneck facility is anticipated to flow in a northerly direction towards the Sheldrake River. The Sheldrake River is expected to be the local discharge point for ground water in this area. A more detailed summary and specific analytical data presented in Appendix C.

SECTION 2 - INTERIM REMEDIAL MEASURES

2.01 Introduction

Based upon the information collected from the three previous site investigations, discussed in Section 1, the following areas of concern are present at the site.

1. Recently identified underground storage tank farm,
2. Drum solvent storage pad

ITT Sealectro has completed the following Interim Remedial Measures (IRM).

1. Underground Storage Tank Removal
2. In - Situ Vapor Extraction
3. Quarterly Ground Water Sampling

Further details about each interim remedial measure are discussed below.

2.02 Underground Storage Tank Removal

The location of the underground storage tanks was discovered in 1990 by representative of ITT Sealectro during a site walk over. The location of these tanks were confirmed by Legette, Brashears & Graham, Inc in their draft Environmental Investigation prepared for BICC in March 1991. The tanks were located using soil vapor analyses, and geophysical methods (EM-31 in-phase and quadraphase). The results of the draft report identified seven underground metallic objects in the southwest corner of the 139 Hoyt Street facility and a 2,500 gallon steel fuel oil tank south of the building and west of the main entrance (Figure 2).

Technical Specifications were prepared by O'Brien & Gere Engineers's to remove the under ground storage tanks in the south west corner of the building. The specifications were in accordance with USEPA regulations 40 CFR Parts 280 and 281, underground Storage Tanks, Technical Requirements and State program Approval; Final results.

OBG Technical Services, Inc. of Syracuse, removed the underground storage tanks. As indicated in Figure 4, eight vertically oriented under ground storage tanks were discovered in the ground. Tanks 2, 4,5,6,7, and 8 were 500 gallons while tanks 1 and 3 were 275 gallons. The NYSDEC was immediately notified of the release to environment (Spill #9101862). Approximately 2,000 gallons of various solvents and waste oil were removed from the tanks and placed in 55 gallons drums for proper disposal. During the excavation program it was noted that six of eight tanks had obvious holes present where product from the tanks could have leaked. Soils at the bottom of the excavation pit also exhibited evidence of leakage from the tanks.

Some of the excavated soil was placed in roll-off boxes and sampled so that proper disposal methods could be determined. The residual soils in the excavation pit were sampled on May 28, 1991. The sampling locations are presented as Figure 4 while the laboratory data is presented in Appendix D. Based upon the data collected, soils in the roll off box and the product removed were incinerated at a permitted facility. Specific details about the underground storage tank removal project and selected remediation is presented in the Underground Storage Tank Closure Report (See Appendix D). As part of the IRM to address the impacted soil from the underground storage tanks, ITT Sealectro is currently designing an excavation program to remove the accessible soils to the top of ground water. An estimated 50 cy of additional soil will be removed from the excavation pit with post excavation sampling planned to document residual contaminant levels. Residual soils not excavated will be addressed as part of the focused RI.

2.03 In-Situ Air Stripping (Former Drum Storage Pad)

Previous investigations had identified that soils adjacent to the former drum storage pad (see Figure 5) had been impacted by VOCs. A pilot study was implemented which confirmed that in-situ air stripping was a viable technology for removing the VOCs present within the unsaturated soil. ITT Sealectro has scheduled implementation of a full scale in-situ air stripping system as an IRM. The system will operate continuously for 4 months, at which time the impacted soils will be resampled to determine overall effectiveness. This data will be used in conjunction with the site-wide RI data to determine if any further remediation is necessary.

2.04 Quarterly Ground Water Sampling

Ground water samples will be collected from the two existing on-site ground water monitoring wells (MW-2, MW-3) on a quarterly basis beginning in July 1991 (Figure 3). The samples will be collected for analyses for volatile organic compounds using USEPA method 8010/8020 and total petroleum hydrocarbons using USEPA method 418.1. The additional wells to be installed as part of the Focused RI will be included in the quarterly sampling. The collected data will then be transmitted to the NYSDEC on a semi-annual basis.

SECTION 3 - REMEDIAL INVESTIGATION PLANS AND MANAGEMENT

3.01 Introduction

The goal of the following Focused Remedial Investigation is to identify the nature and extent of contamination within the site soils, surface water and sediment, and ground water. The approach of the investigation is to sample and analyze the soils, sediment, surface water, and ground water.

Based on the information obtained from previous studies, work efforts have been developed to characterize the nature of contamination and the horizontal and vertical extent of the contamination, if any. To complete the work tasks, a project work plan has been developed. The work plan consists of the following tasks:

Task 1 - Background Information Review

Task 2 - Health and Safety Plan Development

Task 3 - Quality Assurance Project Plan Development

Task 4 - Soil Sampling and Analysis Plan

Task 5 - Ground Water Sampling and Analysis Plan

Task 6 - Hydraulic Conductivity Tests

Task 7 - Surface and Ground Water Elevation Monitoring Plan

Task 8 - Surface Water and Sediment Sampling Plan

Task 9 - Risk Assessment

Task 10 - Focused Remedial Investigation Report

This work plan has been prepared based upon United States Environmental Protection Agency (USEPA) guidelines provided in Guidance for Conducting Remedial Investigation and Feasibility Studies under CERCLA (1988).

3.02 Project Management

A project management team has been assembled to implement and coordinate the site investigation. Progress reports will be submitted on a monthly basis. At a minimum the progress reports will address the following: 1) status of work at the site and progress to date; 2) problems encountered during the reporting period; 3) actions being taken to correct the problems; 4) activities planned for the next month; and 5) changes in key personnel.

The project management team will be coordinated by Mr. Steven Roland, Vice President, O'Brien & Gere Engineers, Inc. and Mr. Guy A. Swenson, CPG, O'Brien & Gere Engineers, Inc. will act as project manager.

3.03 Health and Safety Plan

A site Health and Safety Plan will be prepared for the remedial investigation in accordance with the federal regulations under 29 CFR Part 1910. The Health and Safety plan, included as Task 1 in the following work plan, shall specify the protective measures to be used by investigators and site visitors to minimize exposure to hazardous materials present at the site.

3.04 Quality Assurance Project Plan

A site specific Quality Assurance Project Plan (QAPP) for the investigation is included as Task 3 of the Work Plan. The QAPP is consistent with New York State Department of Environmental Conservation (NYSDEC) and USEPA guidance documents regarding the preparation of quality assurance plans.

3.05 Sampling and Analysis Plan

A site specific sampling plan has been prepared for the investigation of the soils, ground water, surface water and sediment. These efforts are included as Tasks 4, 5, and 6 in Section 4 of this Work Plan.

The sampling and analysis plan discusses the number, location, and type of samples to be collected including the analyses to be conducted. The procedures for installing and sampling the soil borings and monitoring wells as well as the surface water and sediment sample collection specified in the sampling and analysis plan will be included in the QAPP.

SECTION 4 - SITE INVESTIGATION WORK PLAN

4.01 Task 1 - Background Information Review

A comprehensive review of available background information will be conducted to further delineate the existing sources of contamination as well as to identify additional potential contamination sources, if any. In addition the review will be used to identify the potential site contaminants. This background information will provide data for the development of the Health and Safety Plan. The background information will also be used to modify the site sampling plan in order to address the goals of the remedial investigation in an efficient manner.

The information review will include, but not be limited to facility documents, interviews with former employees, historic aerial photographs, geologic and hydrogeologic literature.

4.02 Task 2 - Health and Safety Plan Development

Based on the information derived from previous studies and the background information review, a site specific Health and Safety Plan will be developed. The plan will comply with the federal regulations under 29 CFR Part 1910 and specify the protective measures to be used by site investigators and visitors to minimize exposure to hazardous materials present at the facility.

4.03 Task 3 - Quality Assurance Project Plan Development

A site specific Quality Assurance Project Plan (QAPP) shall be developed based upon the results of previous studies and the background information review. The plan shall be consistent with NYSDEC and USEPA guidance documents regarding the preparation of quality assurance plans. The plan shall address the following:

1. Quality Assurance (QA) objectives for measurement data, in terms of precision, accuracy, completeness, representativeness and comparability.
2. Sampling procedures.
3. Sample custody and chain of custody documentation.
4. Calibration procedures, references and frequency.
5. Internal laboratory Quality Control (QC) checks and frequency.
6. QA performance audits, system audits, and frequency.
7. QA report to management.
8. Preventative maintenance procedures and schedule.
9. Specific procedures to be used to routinely assess data precision, representativeness, comparability, accuracy and completeness of specific measurement parameters involved, and
10. Corrective action.

4.04 Geophysical Studies

Geophysical studies will not be conducted at the site as they are not applicable to the investigation. This is due to the small size of the site (0.92 acres), the fact the buildings occupy approximately one-third of the area, and site is completely paved.

4.05 Task 4 - Soil Sampling and Analysis Plan

The goal of the soil sampling and analysis plan is to define the horizontal and vertical extent of contamination in the four areas of suspected or reported metal or product losses: 1) the drummed solvent storage area; 2) waste water treatment building; 3) former underground storage tank area; and 4) the 2,500 gallon fuel oil tank as illustrated on Figure 6.

In each of the areas of concern the borings will be completed to an approximate depth of the water table or the vertical extent of apparent contamination, whichever is deeper. One boring will be installed within the center of the drummed solvent storage pad area (B-11), and the wastewater treatment building (B-14). to verify previous analytical data. Two borings will be installed outside drum storage pad (B-12 and B-13) and the waste water treatment building (B-15 and B-16) to evaluate the horizontal extent of contamination. One boring (B-17) will be installed through the center of the underground storage tank farm to evaluate the vertical extent of affected soils. Four additional borings (B-18, B-19, B-20 and B-21) will be installed around the perimeter of former underground tank area to evaluate the horizontal extent of any affected soils. Two soil borings (B-22 and B-23) will be completed around the 2,500 gallon fuel oil tank to evaluate the integrity of the tank. Figure 6 illustrates the proposed sampling locations.

Continuous soil samples will be collected in two foot increments from immediately beneath the pavement using hollow stem auger drilling methods and

ASTM D1586-84 split-barrel sampling methods. Up to two soil samples will be selected from each boring for laboratory analysis. Sample selection will be based upon the results of field screening with a photoionization detector and visual examination. Upon completion of each boring, the drilling and sampling equipment will be decontaminated and the boring backfilled as specified in the QAPP.

Based upon the current site information the potential site contaminants are metals, volatile organics and petroleum hydrocarbons. Therefore the soil samples, except for the fuel oil tank area, will be analyzed for Target compound list metals using USEPA Method Series 6000 and 7000, NYSTCL volatile organics using USEPA Methods 8010, 8015, and 8020 and total petroleum hydrocarbons. The fuel tank soil samples will be analyzed for total petroleum hydrocarbons.

Up to one sample from each area of concern, except the fuel oil tank area, will be selected for analysis for the full New York State Target Compound List using New York State Analytical Service Protocols. The objective of these analyses will be to document the nature of the site contaminants. The information developed from these analyses will be used to identify analytical parameters for subsequent sampling events, if any. The data will also be used to evaluate site remedial alternatives. The number of quality control samples and procedures for sample collection shall be as specified in the QAPP. Each sample will be placed in a cooler equipped for transport to an NYSDEC accredited laboratory for analysis. Chain-of-custody documents will be initiated at the time of sample collection and maintained throughout transportation to the laboratory.

4.06 Task 5 - Ground Water Sampling and Analysis Plan

In an effort to further evaluate the extent of volatile organics impacting the site ground water, six additional ground water monitoring wells will be installed throughout the site. Two deep wells (MW-2d, MW-3d) will be installed adjacent to the two existing downgradient shallow wells, MW-2 and MW-3, creating a nested pair. The well nests will provide a means of evaluating the vertical extent of ground water contamination and vertical hydraulic potential. The deep wells will be installed to an approximate depth of 30 feet or the top of bedrock, whichever is encountered first. The remaining shallow wells will be installed approximately 10 feet into the first encountered ground water along the perimeter of the site. Two shallow wells (MW-4 and MW-6) will be installed along the apparent upgradient side of the site to provide information on the ground water quality entering the site. One shallow well (MW-7) will be installed to the southwest of well MW-2 to evaluate the horizontal extent of site ground water contamination. The sixth well will be installed in the immediate vicinity of the underground storage tank area (MW-5). Figure 6 illustrates the approximate location of the proposed shallow and deep wells.

Each well will be completed using the hollow stem auger drilling methods in accordance with the QAPP. Split barrel samples will be collected continuously during the drilling process in accordance with ASTM Method D 1586-84. Each well shall be constructed of 2-inch internal diameter, schedule 40, polyvinyl chloride (PVC) well casing and well screen.

The installation, sampling, and development of each monitor well, including the decontamination of drilling and sampling equipment, will be performed by a qualified contractor under the direct supervision of an O'Brien & Gere Engineers, Inc. hydrogeologist. The well installation, development, and equipment decontamination shall be performed in accordance with the procedures presented in the QAPP.

Ground water samples will be collected from each of the newly installed and existing monitoring wells on two occasions, at least 60 days apart. Based on the known site contaminants the first round of samples will be analyzed for NYSTCL metals using USEPA Methods series 6000 and 7000, NYSTCL volatile organics using USEPA Methods 8010/8020, and total petroleum hydrocarbons using USEPA Method 418.1. The second round of samples will be analyzed for those parameters detected from the first sampling event.

The number of quality control samples and procedures for sample collection will be as specified in the QAPP. Each sample will be placed in a cooler equipped for transport to an acceptable laboratory for analysis. Chain-of-custody documents will be initiated at the time of sample collection and maintained throughout transportation to the laboratory.

Following the completion of the Focused RI ground water samples will be collected from the on-site ground water monitoring wells on a quarterly basis (Figure 6). The samples will be collected for analyses of those parameters detected during the focused RI. The collected data will then be transmitted to the NYSDEC on a semi-annual basis.

4.07 Task 6 - Hydraulic Conductivity Testing

Subsequent to the completion of the well installation and development, hydraulic conductivity tests will be conducted on each monitor well. The tests will evaluate the horizontal hydraulic conductivity of the saturated sediments and the evaluation of the rate of ground water movement beneath the site. The tests will be conducted in accordance with the procedures outlined in the QAPP.

4.08 Task 7 - Surface and Ground Water Elevation Monitoring Plan

Upon completion of the well installation and development, each monitor well will be located horizontally and vertically via field instrument survey. In addition, a water level post from which the elevation of the surface water in the Sheldrake River shall be installed within the river and located via a field survey. The well survey and water level post will permit monitoring of the surface and ground water elevations during each sampling event such that an evaluation can be made regarding the interrelationship between the two systems. Additionally, surface and ground water elevations will be monitored during a storm event. Monitoring will be conducted over a period of 36 hours at 1 hour intervals to evaluate the rate of change in water elevations in the ground water and surface water system.

4.09 Task 8 - Surface Water and Sediment Sampling Plan

Samples will be collected on two occasions from three locations along the Sheldrake River to evaluate the impact, if any, the site may have on the river sediments and surface water quality. One sample of each media (water and sediment) will be collected upstream, one approximate to the midpoint of the site, and one downstream of the site as illustrated on Figure 6. The surface water samples will be analyzed for NYSTCL volatile organics using USEPA Methods 8010 and 8020, NYSTCL metals using USEPA Methods series 6000 and 7000, and total petroleum hydrocarbons using USEPA Method 418.1. Sediment samples will be analyzed for NYSTCL volatile organics using USEPA Methods 8010, 8015, and 8020, NYSTCL metals using USEPA Method series 6000 and 7000, and total petroleum hydrocarbons.

In addition, the stream bank adjacent to the site shall be traversed during each sampling event to locate and sample seeps which may directly discharge to the Sheldrake River. Fluids emanating from observed seeps will be sampled and analyzed for NYSTCL volatile organics using USEPA Methods 8010, and 8020, total petroleum hydrocarbons using USEPA Method 418.1, and NYSTCL metals using EPA Method series 6000 and 7000.

4.10 Task 9 - Data Validation

Prior to submittal of the data to the Project Manager for his review, data will be validated by O'Brien & Gere Engineers, NYSDEC approved data validators. The Project QA/QC Officer will review the Laboratory QA/QC report and documentation and compare the performance to the requirements of the protocols and program objectives. A data validation report will be generated and incorporated into the Focused RI report.

The requirements to be checked for the validation of volatile and semi-volatile organics analyses data are as follows:

1. Holding Times
2. GC/MS Tuning
3. Calibration
4. Blanks
5. Surrogate Recovery

6. Matrix Spike/Matrix Spike Duplicate
7. Field Duplicates
8. Internal Standards Performance
9. TCL Compound Identification
10. Compound Quantitation and Reported Detection Limits
11. Tentatively Identified Compounds
12. System Performance
13. Overall Assessment of Data for a Case

The requirements to be checked for the validation of metals and cyanide analyses data are as follows:

1. Holding Times
2. Calibration
3. Blanks
4. ICP Interference Check Samples ("ICS")
5. Laboratory Control Sample ("LCS")
6. Duplicate Sample Analysis
7. Matrix Spike Sample Analysis
8. Furnace Atomic Absorption QA
9. ICP Serial Dilution
10. Sample Result Verification
11. Field Duplicates
12. Overall Assessment of Data for a Case

The results of the data validation culminate in a data usability report which flags any and all problems and makes recommendations as to the usability of related data.

4.11 Task 10 - Risk Assessment

4.11.1 Introduction

A risk assessment will be performed to evaluate the potential for chemical waste components to be transported from the site, and which components, if any, may produce exposures at levels harmful to human health. A two-phased approach, consistent with current guidelines for the completion of health assessments in accordance with the USEPA Risk Assessment Guidance for Superfund Volume 1, Human Health Evaluation Manual (Part A) (USEPA 1989a), and the USEPA Exposure Factors Handbook (USEPA, 1989b), will be utilized in the preparation of the assessment. The first phase will be a qualitative assessment evaluating potential exposure scenarios at the site. For each potential exposure scenarios identified, the source of contamination, the route of transport, potential receptors, and the likely routes of exposure (e.g., ingestion) will be identified and evaluated.

The second phase, the quantitative assessment, will provide a quantitative estimate of the magnitude of potential exposures. Non-carcinogenic health effects will be evaluated by comparing calculated intakes with appropriate Reference Doses (RFDs) established for the protection of human health. For carcinogenic health effects, the incremental cancer risk associated with potential exposure to chemicals of concern will be calculated using USEPA established slope factors.

4.11.2 Qualitative Exposure Assessment

The first phase of the risk assessment will involve a qualitative evaluation of the site to identify and evaluate the potential exposure pathways. This phase will consist of a characterization of each of the possible exposure pathways (soil, surface water, and ground water) for their potential to facilitate exposure for receptors identified at on-site and off-site locations. Possible transport and exposure scenarios will be evaluated, and those transport scenarios determined to have a functioning waste source, transport mechanism, and human receptor will be termed "complete". Selected complete scenarios will be quantitatively evaluated in the second phase of the assessment. The following is a more detailed description of the qualitative assessment approach and methodology.

A hazardous chemical may represent human risk only if humans have the potential to be exposed to (i.e. contact) the material in sufficient quantity to affect the health of the individual. Exposures to the waste materials can occur in numerous ways. Examples of potential exposure scenarios related to an uncontrolled hazardous waste site evaluated within the risk assessment will include the following:

- Ingestion of surface water or ground water containing solubilized contaminants or ingestion of contaminated surface water sediments.

- Ingestion of biota (e.g., fish) which have bioaccumulated a contaminant released from the waste site.
- Dermal absorption or ingestion of contaminated materials resulting from direct contact with contaminated soil at the waste site.

Three basic exposure pathways will be considered for the assessment of the site: surface water, ground water, and direct contact. Each of these exposure pathways may have one or more exposure scenarios associated with it. Although it may be possible to postulate numerous hypothetical scenarios of exposure for each of the basic exposure pathways, a complete exposure scenario (i.e., one potentially posing a risk) must include the following components:

1. A waste source and a mechanism of release from it. Examples of release mechanisms include volatilization, surface runoff, and leaching.
2. A viable transport pathway (e.g., surface water or ground water) from the waste source to a potential receptor point.
3. A potential receptor population for a contaminant released and transported from the waste source.
4. An exposure and uptake route (inhalation, ingestion, or dermal absorption); i.e., a mechanism by which the receptor absorbs the contaminant, allowing it to exert its toxic effect.

If any one or more of these components are missing, an exposure scenario is, by definition, incomplete and therefore poses no risk to health or the environment. Therefore, the first phase of this risk assessment will be site and waste characterization and the identification of complete exposure pathways. The impacts associated with selected complete pathways will be further evaluated in the next phase, the "quantitative" assessment.

4.11.3 Quantitative Risk Assessment Process

The second phase of the risk assessment will be a quantitative estimation of the magnitude of selected complete exposure scenarios and the human health risks associated with those exposures. This approach is consistent with procedures and guidelines presented in the USEPA Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A) (USEPA 1989a). The approach and procedures in quantitative risk assessment are discussed in further detail in the following section.

A quantitative risk assessment will be carried out for selected complete exposure pathways at the site. The first step will involve: 1) selection of chemicals to serve as indicators of contamination; 2) measurement or estimates of exposure point concentrations at receptor locations; and 3) the comparison of predicted or measured exposure point concentrations with values established for the protection of human health, to establish whether the waste represents an unacceptable risk to human health.

Selection of indicator chemicals for use in the quantitative analysis will be based on a waste characterization which considers 1) the nature and history of the waste material and 2) the environmental dynamics, toxicology, and residue levels of the waste's constituents. Exposure point concentrations will then be established for each selected indicator chemical. Site-specific monitoring data for each indicator chemical and conservative modelling procedures depicting "reasonable worst case" scenarios will be used in this process.

The risks associated with potential exposures to site-related chemicals will be quantified for receptors of concern. Noncarcinogenic health effects will be evaluated by comparing calculated intakes with appropriate RFDs established for the protection of human health. For carcinogenic health effects, the incremental cancer risk associated with exposure to chemicals of concern will be calculated using USEPA-established slope factors.

To assess the risk posed by multiple chemicals, a hazard index approach will be used to calculate the total noncarcinogenic health risks associated with the site. The hazard index is the sum of the ratio of intake to RFD for each chemical of concern. In general, a hazard index of less than unity (one) indicates that adverse health effects are not expected to occur.

4.12 Task 11 - Remedial Investigation Report

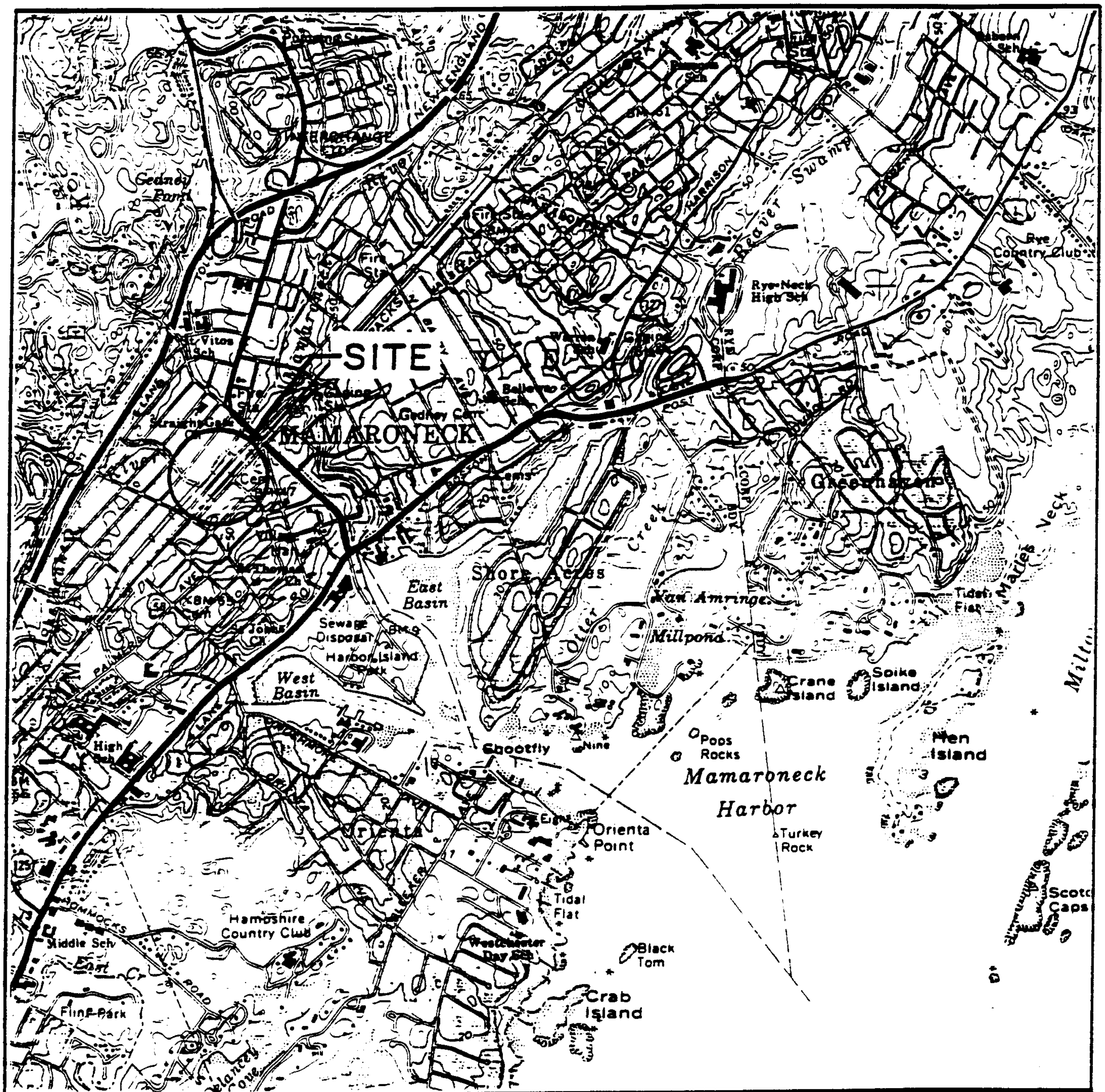
Following completion of the site investigation and risk assessment as outlined in Tasks 1 through 10, a report will be prepared presenting the results of the work efforts. The report will describe the field sampling activities, present the hydrogeologic and analytical data, and include the site risk assessment. The following information will also be included:

- a summary of environmental conditions, including, but not limited to: site drainage, land use, soil conditions, hydrogeologic characteristics, surface and ground water quality, and air quality; along with any maps, tables, graphics, and any other appropriate means of presenting information;

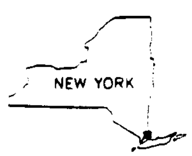
- data collected during the investigations and/or used in preparing the report, including but not limited to: soil boring logs, well data, and the results of chemical analyses performed on samples obtained during the investigation; said data will be presented in tabulated and/or graphic form where appropriate;
- summary tables of previous analytical data collected at the site;
- an evaluation of the types and quantities of hazardous and other wastes present as well as the areal and vertical extent of such wastes.
- a study and evaluation of the hydrogeologic conditions at and the site;
- an evaluation of the nature and extent of release and migration of hazardous and industrial wastes from the site through ground water, air, and soil to areas at and in the vicinity of the site and further off-site;
- an evaluation of the areal and vertical extent to which ground water, air, soil and sediment have been, are being or may be contaminated by hazardous or industrial wastes;
- an assessment of the results of the investigation and a evaluation of the current or potential impacts of any threat to the environment or public health which exists, or may exist in the future, at and in the vicinity of the site as a result of the wastes at the site; and
- references to scientific or technical literature used in the preparation of the Report.

- Recommendations for subsequent investigatory and/or remedial work efforts, if necessary.

FIGURES



ITT SEALECTRO
MAMARONECK, NEW YORK



SITE LOCATION MAP

0 2000 4000

SCALE IN FEET

ADAPTED FROM 7.5 MIN. U.S.G.S. QUAD. MAP, MAMORONECK, NEW YORK

O'BRIEN & GERE ENGINEERS, INC

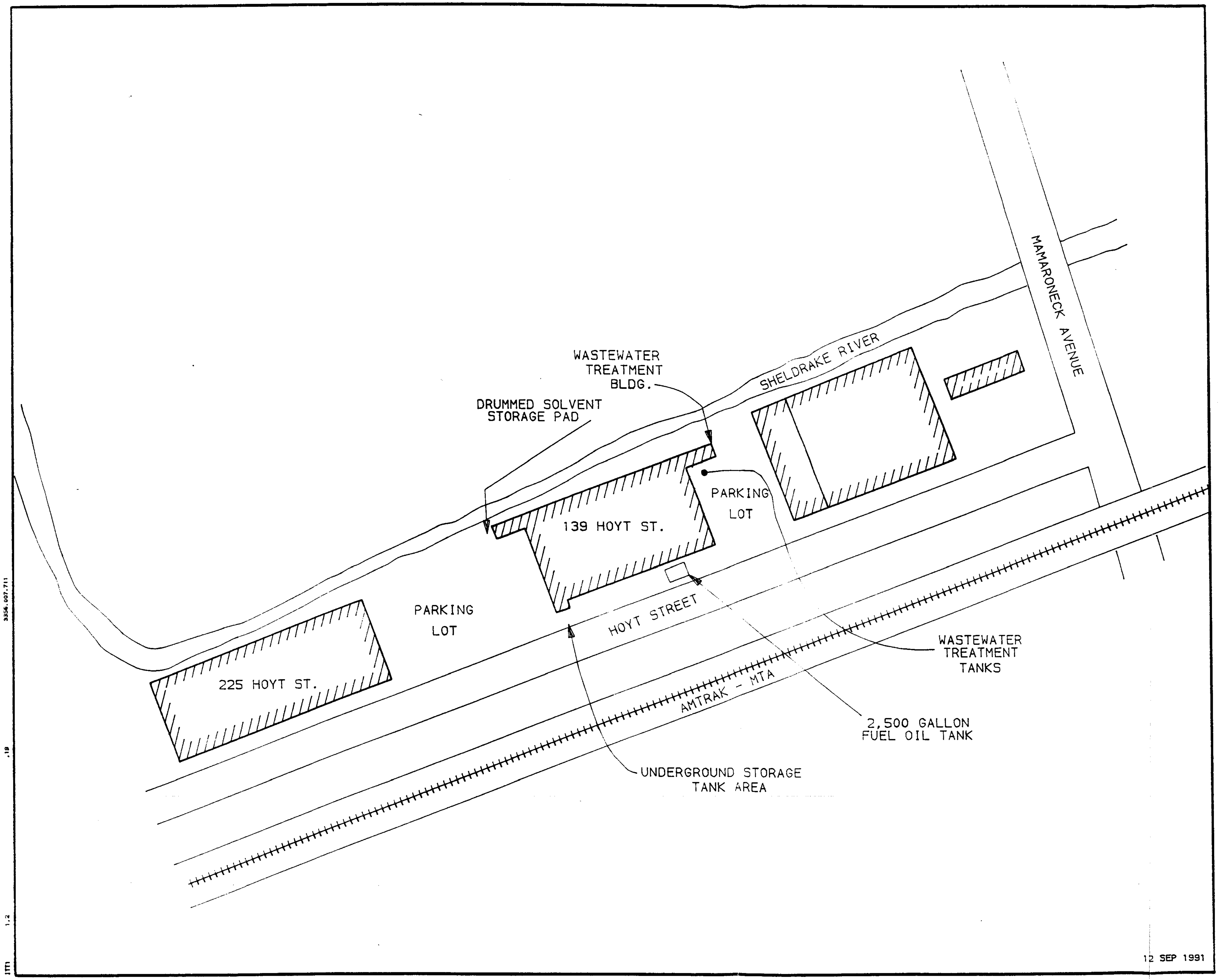
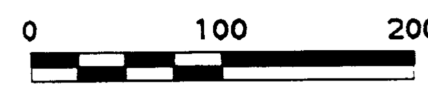


FIGURE 2

ITT SEALECTRO
MAMARONECK, NEW YORK

SITE MAP

LEGEND



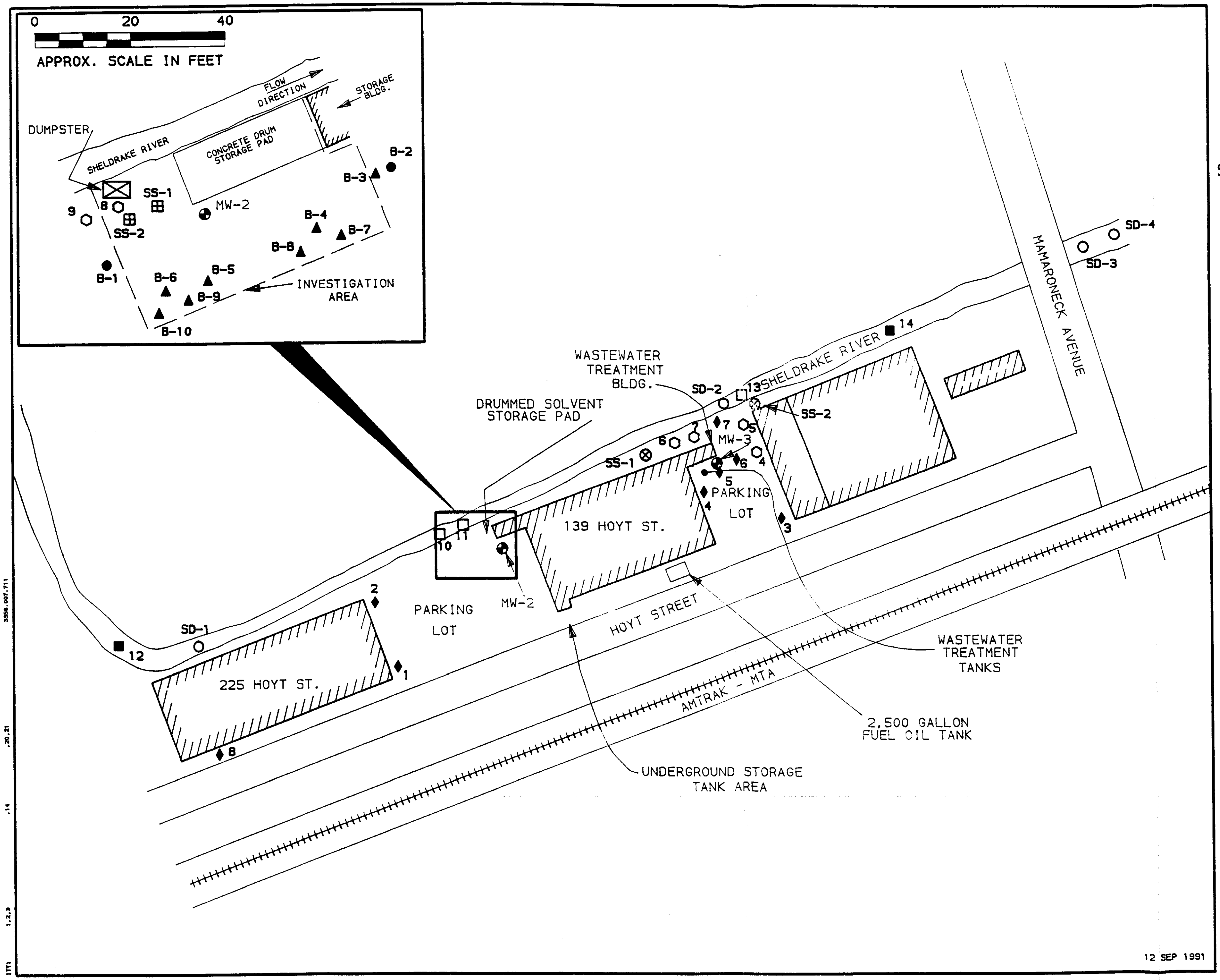
APPROX. SCALE IN FEET

O'BRIEN & GERE
ENGINEERS, INC.

FIGURE 3

ITT SEALECTRO
MAMARONECK, NEW YORK

EXISTING MONITORING WELLS
SOIL BORINGS, SURFACE SOIL &
SURFACE WATER SAMPLE LOCATION



LEGEND

- MONITORING WELL (6/88, TRC)
- SOIL BORING (6/88, TRC)
- SOIL BORING (8/89, OBG)
- SOIL SAMPLE (8/89, OBG)
- SS SOIL SAMPLE (7/88, TRC)
- SOIL BORING (1/86-2/86, OBG)
- SURFACE SOIL SAMPLE (2/86, OBG)
- SURFACE WATER SEDIMENT SAMPLE (2/86, OBG)
- SEDIMENT SAMPLE (2/86, OBG)
- SD SEDIMENT SAMPLE (6/88, OBG)

0 100 200
APPROX. SCALE IN FEET

O'BRIEN & GERE ENGINEERS, INC.

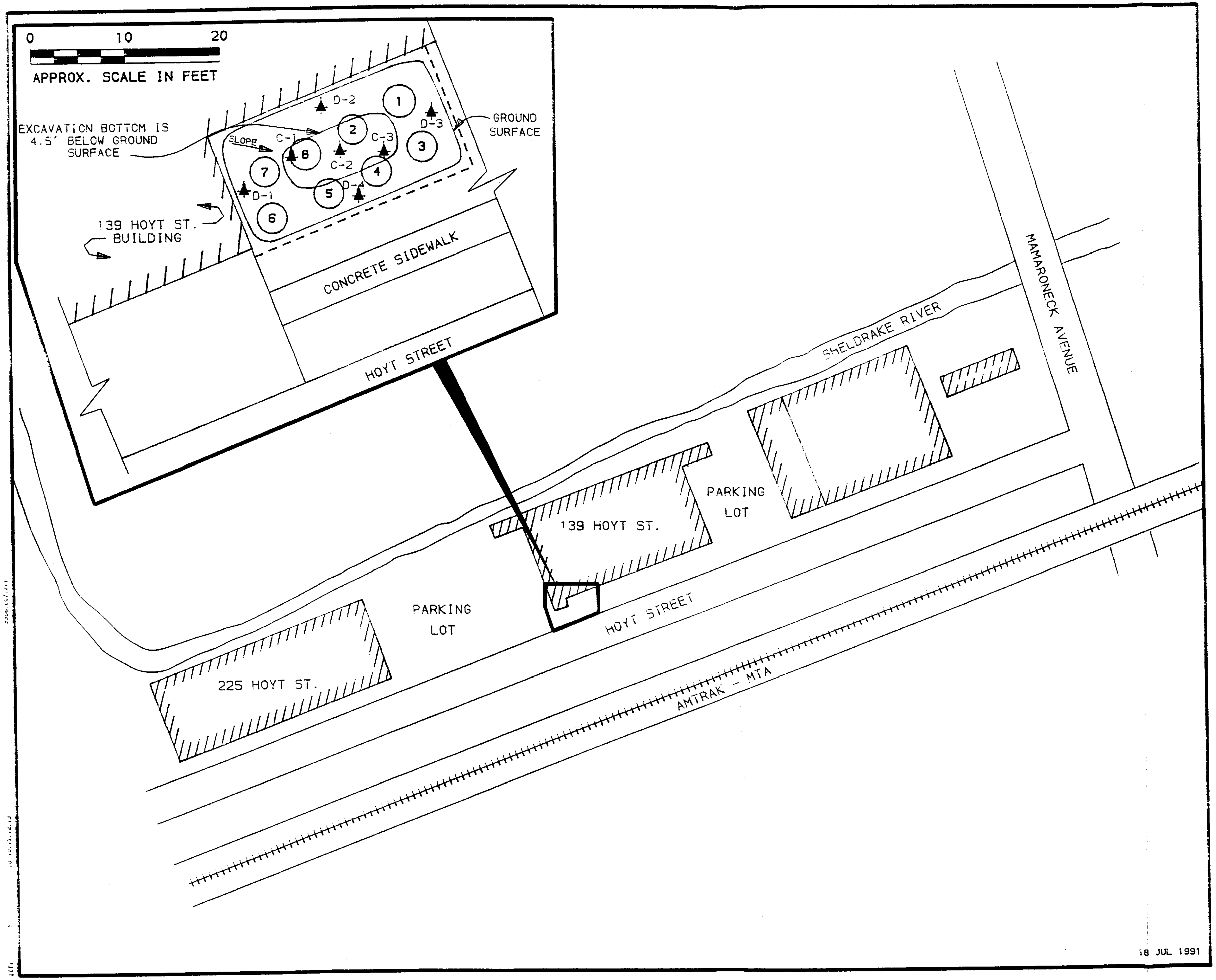


FIGURE 4

ITT SEALECTRO
MAMARONECK, NEW YORK

UNDERGROUND STORAGE TANK
AND SAMPLING LOCATIONS

LEGEND

▲ SOIL SAMPLE LOCATION

(3) FORMER TANK LOCATION

0 100 200
APPROX. SCALE IN FEET

O'BRIEN & GERE
ENGINEERS, INC.

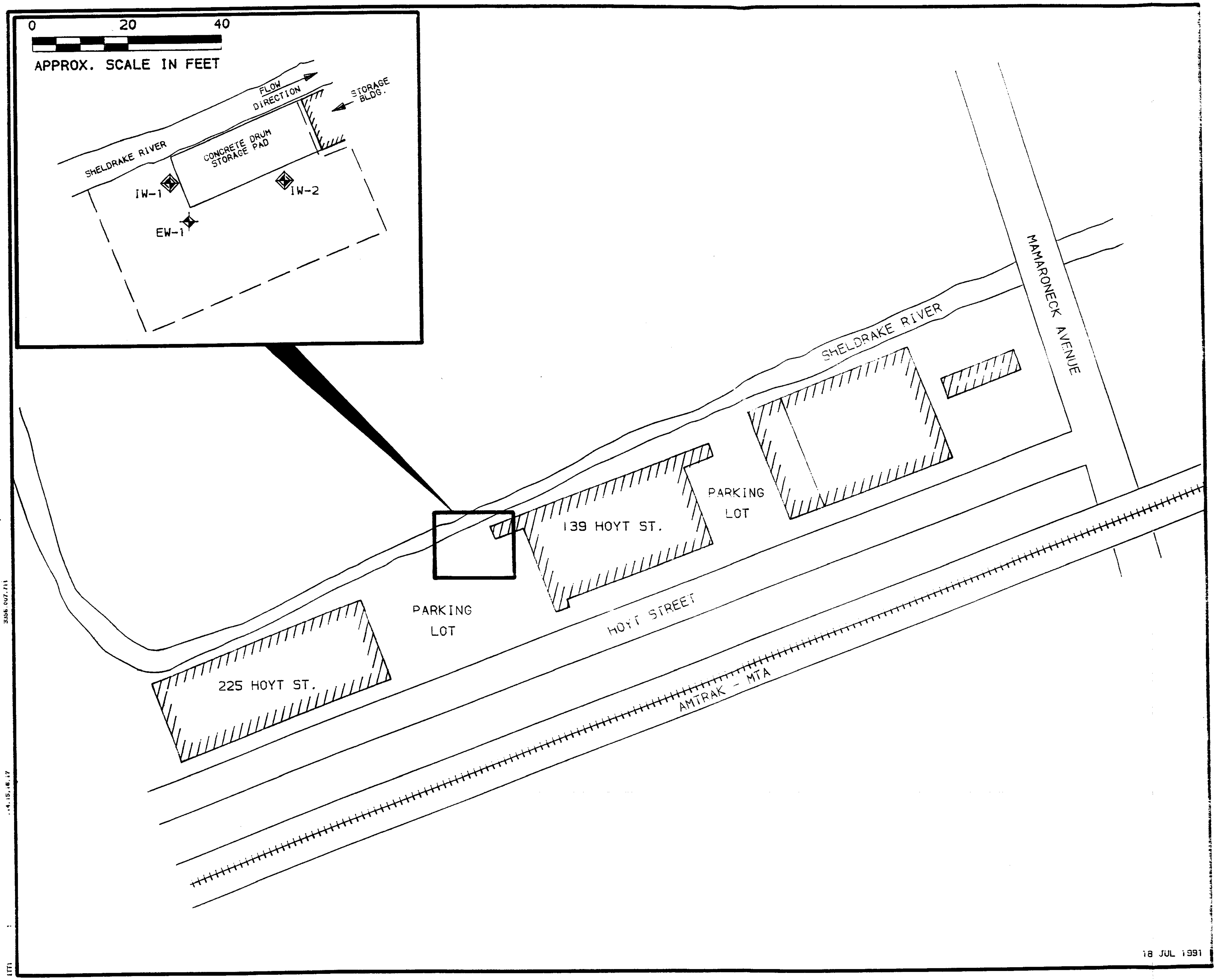


FIGURE 5

ITT SEALECTRO
MAMARONECK, NEW YORK

SOIL VAPOR EXTRACTION
SYSTEM DIAGRAM

LEGEND

VAPOR INLET WELL

VAPOR EXTRACTION WELL

AREA OF CONTAMINATED SOILS (APPROXIMATE)

0 100 200
APPROX. SCALE IN FEET

O'BRIEN & GERE
ENGINEERS, INC.

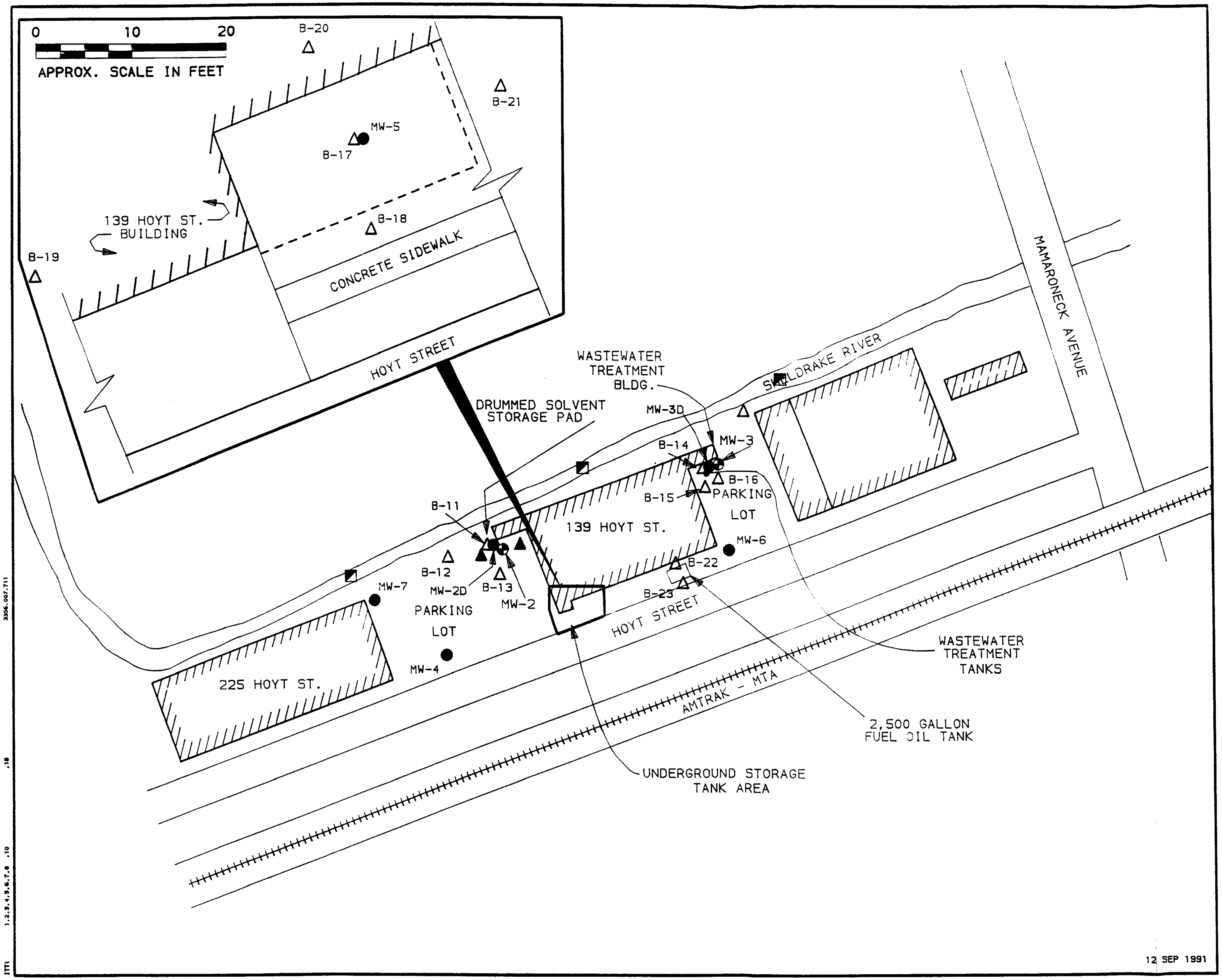


FIGURE 6

ITT SEALECTRO
MAMARONECK, NEW YORK

PROPOSED SOIL BORINGS,
MONITORING WELLS, AND
SURFACE WATER AND SEDIMENT
SAMPLE LOCATIONS

LEGEND

△ PROPOSED SOIL BORING
● PROPOSED MONITORING WELL
◪ PROPOSED SURFACE WATER AND SEDIMENT SAMPLING LOCATION
⊕ EXISTING MONITORING WELL
▲ EXISTING SOIL BORING

0 100 200
APPROX. SCALE IN FEET

O'BRIEN & GERE
ENGINEERS, INC.

APPENDIX A

SITE ASSESSMENT ANALYTICAL DATA SUMMARY - JANUARY 1986

APPENDIX A

SITE ASSESSMENT ANALYTICAL DATA SUMMARY - JANUARY 1986

APPENDIX A

Site Assessment: The objective of the January 1986 Site Assessment was to determine the possible existence and nature of contaminants associated with the electroplating operation. The contaminants typically associated with this type of facility include solvents, cyanide, and metals, which were included in the analyses. Subsurface soil samples from soil borings, surface soil samples, and river sediment samples were collected. The focus of this investigation centered on five areas of potential concern (Figure 2) which were sampled and included the following:

1. Three 2500 Gallon Underground Wastewater Storage Tanks,
2. Wastewater Treatment Building,
3. Drummed Solvent Storage Pad,
4. 139/225 Hoyt Street
5. Sheldrake River

The following text and Figure 3 provide a discussion of the results obtained from each area of concern sampled during the Site Assessment.

1. Three 2500 Gallon Underground Wastewater Storage Tanks: Three borings (#4,#5, #6) were installed and sampled in the immediate vicinity of the tanks. Assuming ground water flow to the Sheldrake River one boring was installed hydraulically upgradient and two borings were installed downgradient of the three wastewater tanks. Soil samples were collected at the depth of the tank bottom (approximately twelve feet below grade). The soil samples were analyzed

forgold, silver, copper, nickel and cyanide, parameters indicative of the wastewater stored and treated in these tanks.

The analytical results for the underground tank area indicated the presence of copper and nickel in each of the three samples. The level of copper ranged from 18 ppm to 30 ppm and the level of nickel ranged from 20 ppm to 33 ppm. Gold, silver and cyanide were reported as less than the method detection limit. The results of this sampling did not suggest a leak had occurred. The analytical results for the underground storage tanks are attached.

2. Wastewater Treatment Building: Four soil samples were collected outside the wastewater treatment facility to determine if residual contamination was present from past activities associated with the treatment operations. Soil samples were collected from below the pavement and from a depth of twelve inches below grade. The soil samples were analyzed for gold, silver, copper, nickel and cyanide, parameters indicative of the wastewater treated in this area.

The results indicate the presence of silver, copper and nickel in the soil beneath the pavement. The silver levels ranged from 2 to 29 ppm at the surface and 4 to 51 ppm at the twelve inch depth. The copper level ranged from 14 to 398 ppm at the surface and 187 to 510 ppm at the twelve inch depth. The nickel levels ranged from 14 to 113 ppm at the surface and 48 to 107 ppm at the twelve inch depth. Gold and cyanide were reported as less than the method detection limit.

The analytical results for the wastewater treatment building are attached.

3. Drummed Solvent Storage Pad: Two soil samples were collected from the immediate vicinity of the drum solvent storage pad area. Samples were collected to determine if past activities impacted the soil in this area. Samples were collected from the surface and from twelve inches below the ground surface. Samples were analyzed for 1,1,1-trichloroethane which is indicative of the solvent stored at this location.

   The results indicate 1,1,1-trichloroethane to be present in the immediate vicinity of the drummed solvent storage pad. The surface samples ranged from 2.6 to 160 ppm and the twelve inch depth samples ranged from 0.86 to 110 ppm. The analytical results for the drummed solvent storage pad are attached.

4. 139/225 Hoyt Street: Two soil borings (#3, #7) were installed around the periphery of 139 Hoyt Street, while 3 soil borings (#1, #2, and #8) were installed around building 225 Hoyt Street. One soil sample from below the ground water table from each boring was analyzed for volatile organics and selected metals. The analytical results from borings #3 and #7 detected 1,1,1 trichloroethane at concentrations ranging from 12 ppb to 53 ppb. The soil samples from the borings in the vicinity of building 225 Hoyt Street (#1, #2, #8) had concentrations of 1,1,1 trichloroethane ranging from 15 ppb to 29 ppb. These concentrations do not appear to represent an area of soil contamination. Since these soil samples were collected from below the ground

water table, it is likely that these concentrations represent ground water quality rather than soil quality.

5. Sheldrake River Sampling: A total of six sediment samples from four locations and four water samples from two locations were collected from the Sheldrake River. Samples were collected at upstream and downstream locations for comparison purposes. River sediments were analyzed for gold, silver, copper, nickel, cyanide and 1,1,1-trichloroethane. Water samples were analyzed for gold, silver, copper, nickel and cyanide.

    The analytical results indicate detectable levels of copper, nickel and 1,1,1-trichloroethane in the river sediment samples. The copper levels ranged from 47 to 740 ppm and the nickel levels ranged from 12 to 30 ppm. The 1,1,1-trichloroethane levels ranged from 0.01 to 0.18 ppm. The levels detected increased in the downstream direction. Gold, silver and cyanide were reported as less than the method detection limit.

    The river water samples indicate a slight increase in the copper levels in the downstream samples. The copper levels in the river were 0.01 ppm in the upstream sample and 0.03 ppm in the downstream sample. Gold, silver, nickel and cyanide were reported as less than the method detection limit. The analytical results for the Sheldrake River sampling are attached.

TABLE 1.1

ANALYTICAL TEST RESULTS
SEALECTRO, INC.

UNDERGROUND STORAGE TANKS

Location No.	Sample No.	Gold (ppm)	Silver (ppm)	Copper (ppm)	Nickel (ppm)	Cyanide (ppm)	PCTS
1	4	1.0	<10	30	28	<5	85.8
2	5	<1.0	<10	18	20	<5	77.2
3	6	<1.0	<10	27	33	<5	73.2

Reported in wet weight basis

TABLE 1.2

ANALYTICAL TEST RESULTS
SEALECTRO, INC.

WASTEWATER TREATMENT BUILDING

Location No.	Sample No.	Gold (ppm)	Silver (ppm)	Copper (ppm)	Nickel (ppm)	Cyanide (ppm)
4 - Surface	1	<10	4	25	14	<5
4 - 12"	2	<10	5	510	107	<5
5 - Surface	3	<10	4	29	35	<5
5 - 12"	4	<10	4	420	48	<5
6 - Surface	5	<10	2	14	17	<5
6 - 12"	6	<10	51	505	53	<5
7 - Surface	7	<10	29	398	113	<5
7 - 12"	8	<10	17	187	90	<5

Reported in wet weight basis

TABLE 1.3

ANALYTICAL TEST RESULTS
SEALECTRO, INC.

SOLVENT STORAGE AREA

Location No.	Sample No.	1,1,1 TCE (PPM)
8-4"	9	160
8-12"	10	110
9-4"	11	2.6
9-12"	12	0.86

Reported in wet weight basis

TABLE 1.4

ANALYTICAL TEST RESULTS
SEALECTRO, INC.

RIVER SAMPLING

Location No.	Sample No.	Gold (ppm)	Silver (ppm)	Copper (ppm)	Nickel (ppm)	Cyanide (ppm)	PCTS	1,1,1 TCE (PPM)
12 - water	14,15	0.1	0.01	0.01	0.01	0.05	N/A	-
14 - water	23,24	0.1	0.01	0.03	0.01	0.05	N/A	-
12 - sediment	17	10	<1	47	30	<5	72.0	-
13 - sediment	20	10	<1	288	12	<5	73.6	-
14 - sediment	21	10	<1	740	22	<5	64.6	-
10 - sediment	18	-	-	-	-	-	72.6	0.01
11 - sediment	19	-	-	-	-	-	67.3	0.18
13 - sediment	16	-	-	-	-	-	72.0	0.01

Reported in wet weight basis

APPENDIX B

ENVIRONMENTAL ASSESSMENT ANALYTICAL DATA SUMMARY - JUNE 1988

APPENDIX B

ENVIRONMENTAL ASSESSMENT ANALYTICAL DATA SUMMARY - JUNE 1988

APPENDIX B

Environmental Assessment: The Environmental Assessment implemented at the Mamaroneck facility was a soil and ground water evaluation conducted by TRC in June 1988. This investigation was conducted for ITT Corporation in association with the purchase of Sealectro. Field work at the site consisted of the installation and sampling of two ground water monitoring wells, the sampling of subsurface soils and stream sediment. The purpose of this investigation was to further address environmental concerns at the following areas:

1. Drummed Solvent Storage Pad
2. Wastewater Treatment Plant
3. Sheldrake River

The following text provides a discussion of the results obtained from each area of concern sampled during the environmental assessment.

1. Drummed Solvent Storage Pad: One monitoring well (MW-2) and two soil borings (B-1 and B-2) were installed and sampled to evaluate the drummed solvent storage pad. The ground water sample collected from MW-2 was analyzed for volatile organics and metals. Four VOC's were detected in the ground water sample: 1,1-dichloroethane (123 ppb); trans-1,2-dichloroethylene (74 ppb); 1,1,1-trichloroethane (94 ppb) and trichloroethene (4 ppb). In the metals scan only arsenic was detected at a level of 10 ppb. Other parameters per the metals scan were reported as below the method detection limit.

Soil samples were submitted from locations MW-2, B-1 and B-2. The samples from MW-2 were submitted from the 0 to 2 foot and the 5 to 7 foot depth interval. The samples from B-1 and B-2 were from the 4 to 6 foot interval. Each soil sample was analyzed for 1,1,1-trichloroethane. 1,1,1-trichloroethane was detected in each of the three soil samples: MW-2 (0 to 2 foot) at 0.131 ppm; MW-2 (5 to 7 foot) at 0.076 ppm; B-1 at 0.080 ppm; and B-2 at 0.091 ppm. The analytical results for the drummed solvent storage pad are attached.

2. Wastewater Treatment Building: One monitoring well (MW-3) was installed and sampled and two soil samples were collected to evaluate the wastewater treatment building area. The ground water sample collected from MW-3 was analyzed for volatile organics and metals. Seven volatile organics were detected in the ground water sample: dibromochloromethane (9 ppb); 1,1-dichloroethane (154 ppb); 1,2-dichloroethane (6 ppb); 1,1-dichloroethylene (343 ppb); trans-1,2-dichloroethylene (65 ppb); 1,1,1-trichloroethane (129 ppb) and trichloroethene (21 ppb). All other parameters, including metals, were reported as below the method detection limit.

Surface Soil samples were collected from two locations adjacent to the wastewater treatment building (SS-1 and SS-2). SS-1 and SS-2 samples were analyzed for copper, nickel and silver. SS-1 revealed detectable levels of copper (296.5 ppm), nickel (46.7 ppm) and silver (0.51 ppm). The sample from SS-2 also revealed detectable levels of copper (465.3), nickel (26.1 ppm) and silver (0.19 ppm). In addition, soil samples collected during the installation of MW-3 were submitted for analyses. Samples from MW-3, collected from the 0 to 2 and 5 to 7 foot depth intervals, were analyzed for 1,1,1-trichloroethane, copper, nickel and silver. 1,1,1-trichloroethane was reported as below the method detection limit for both MW-3 samples. The 0 to 2 foot interval revealed detectable levels of copper (43 ppm), nickel (15.5 ppm) and silver (0.12 ppm). The 5 to 7 foot interval also revealed detectable levels of copper (12.1 ppm), nickel (5.1 ppm) and silver (0.03 ppm). The analytical results for the wastewater treatment building sampling are attached.

3. Sheldrake River: A total of four sediment samples were collected from the Sheldrake River. One sample was collected upstream of the facility (SD-1), one adjacent to the wastewater treatment building (SD-2), and two several hundred feet downstream of the facility (SD-3 and SD-4). Each sample was analyzed for copper and nickel. The analytical results indicate copper to be present in SD-1 (56.1 ppm), SD-2 (114.2 ppm), SD-3 (296.4 ppm) and SD-4 (158.0 ppm). Silver was also present in SD-1 (6.26 ppm), SD-2 (7.03 ppm), SD-3 (6.20 ppm) and SD-4 (4.57 ppm). The analytical results for the Sheldrake River sampling are attached.

4. Monitoring well MW-1: During the 1988 site investigation, TRC installed two monitoring wells, MW-2 and MW-3. Their July 5, 1988 report entitled "Environmental Assessment, Sealectro Corporation 139/225 Hoyt Street, Mamaroneck, New York did not mention MW-1

or why they labeled their first well MW-2. The laboratory data sheets, appended to the report, do include results from a water sample labeled MAM-MW-1 and a soil sample labeled MAM-MW1A; yet, the report does not discuss these samples. The laboratory results indicate that concentrations of volatile organic compounds and metals using EP toxicity testing methods indicate soils (5 ft - 7 ft below ground surface) were below detection limits. Laboratory data indicate that filtered metals analyses were below NYS class GA ground water standards. Efforts to contact TRC about MW-1 were inconclusive.

TABLE 1

ANALYTICAL RESULTS - GROUND WATER[1]
SEALECTRO - MAMARONECK, NY

(All results are in ppb)

SAMPLE ID: DEPTH (FT): TYPE:	MW-2 9.5-14.5 Ground Water	MW-3 9.5-14.5 Ground Water	CRITERIA NY Standard	 Federal MCL
VOLATILE ORGANIC COMPOUNDS				
Dibromochloromethane	-	9	50	
1,1-Dichloroethane	123	154	50	
1,2-Dichloroethane	-	6	0.8	5
1,1-Dichloroethylene	-	343	0.07	7
trans-1,2-Dichloroethylene	74	65	50	
1,1,1-Trichloroethane	94	129	50	200
Trichloroethene	4	21	10	5
METALS				
Arsenic	10	-	50	
Cd, Cr, Pb, Cu, Se, Ag, Hg, Ni	-	-		

[1] Complete analytical results are included in Appendix B.

Dash (-) Indicates concentration below detection limit

TABLE 2

ANALYTICAL RESULTS - SEDIMENT AND SURFACE SOIL[1]
SEALECTRO - MAMARONECK, NY

(Results in ppm)

SAMPLE ID: TYPE:	SD-1 Sediment	SD-2 Sediment	SD-3 Sediment	SD-4 Sediment	SS-1 Soil	SS-2 Soil	New Jersey Cleanup Objective[2]
TOTAL METALS							
Copper	56.1	114.2	296.4	158.0	296.5	465.3	170
Nickel	6.28	7.03	6.20	4.57	46.7	26.1	100
Silver	NA	NA	NA	NA	0.51	0.19	5

1 Complete analytical results are included in Appendix B.

2 New York does not have cleanup objectives for soil.
New Jersey cleanup objectives shown for comparative purposes.

NA - Not Analyzed For

TABLE 3

ANALYTICAL RESULTS - SURFACE SOIL[1]
SEALECTRO - MAMARONECK, NY

(Results in ppm)

SAMPLE ID:	MW-2A	MW-2B	MW-3A	MW-3B	B-1	B-2	New Jersey
TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Cleanup
DEPTH (FT):	0-2	5-7	0-2	5-7	4-6	4-6	Objective[2]
VOLATILE ORGANICS[3]							
1,1,1-Trichloroethane	0.131	0.076		ND	0.080	0.091	1 [4]
TOTAL METALS							
Copper			43.0	12.1			170
Nickel			15.5	5.1			100
Silver			0.12	0.03			5
EP TOXICITY METALS							
Barium				0.25			
Lead				ND			
Chromium				ND			
Cd, As, Se, Hg, Ag				ND			

[1] Complete analytical results are included in Appendix B.

[2] New York does not have cleanup objectives for soil.
New Jersey cleanup objectives shown for comparative purposes.

[3] 1,1,1-TCA was th only volatile organic analyzed for in soil.
Elevated headspace readings suggest additional volatile organics are present.

[4] NJ Cleanup objective for total volatile organics in soil.

ND - Not Detected

Blanks indicate that sample was not analyzed for specific parameter.

APPENDIX C

SAMPLING PROGRAM-ANALYTICAL DATA SUMMARY - AUGUST 1989

APPENDIX C

SAMPLING PROGRAM-ANALYTICAL DATA SUMMARY - AUGUST 1989

APPENDIX C

Sampling Program: The third study at the Mamaroneck facility was a sampling program implemented by O'Brien & Gere in August 1989 focused on the former drummed solvent storage pad. The purpose of this sampling effort was to delineate soil contamination and to document existing ground water quality conditions in the immediate vicinity of the pad.

In order to define the potential areal extent of volatile organic contamination present in the immediate vicinity of the drummed solvent storage pad, eight soil borings (B-3 to B-10) and two shallow soil samples (SS-1 and SS-2) were completed. Two soil samples were collected from each soil boring for laboratory analyses.

Continuous soil samples were collected vertically from the ground surface to the water table interface following standard split barrel sampling methodology. Soil samples were split into discreet intervals and field screened using a photoionization detector (HnU type). The sample with the highest field screening results and the sample from the water table interface were submitted for laboratory analysis. If the field screening showed no detectable level of organics the sample was submitted from the interval approximately one foot above the water table sample. Soil samples were submitted for volatile organic analyses following USEPA Method 601 and 602 for soil. Composite soil samples were also submitted for RCRA Characteristics and total petroleum hydrocarbon analyses. The analytical results for the samples collected during this investigation are attached.

The analytical results for soil samples indicate the following volatile organic compounds to be present: trans-1,2-dichloroethane, 1,2-dichloroethene, 1,1,1-

trichloroethane, carbon tetrachloride, trichloroethene, tetrachloroethene, toluene and xylene. A comparison of the analytical data for each boring indicates a possible upgradient source of toluene and xylene. The soil sample collected from B-8 from the 6.5 to 7.0 depth interval revealed the highest level of xylene at the water table (15,000 ug/kg). The sample from B-8 collected approximately one foot above this sample, 5.0 to 5.5 depth interval, revealed a lower level of xylene (55 ug/kg). Soil samples collected at the water table from borings located closer to the drummed solvent storage pad reveal lower levels of toluene and xylene. The levels would be expected to increase towards the pad if the pad was the potential source of the compounds.

A total of eighteen soil samples were submitted for volatile organic analyses. This included two samples from each of the eight borings and two individual shallow soil samples. One boring, B-10, revealed no detectable levels of volatile organics in the two samples submitted. Each sample collected at the water table interface (with the exception of B-10) revealed detectable levels of volatile organics.

In order to confirm the existing ground water quality conditions in the immediate vicinity of the drummed solvent storage pad, O'Brien & Gere sampled existing monitoring well MW-2. A ground water sample was collected and submitted for volatile organic analyses using USEPA Method 601 and 602. A total of seven volatile organic compounds were detected in ground water. These parameters include: vinyl chloride (200 ppb); chloromethane (18 ppb); 1,1-dichloroethane (63 ppb); trans-1,2-dichloroethene (56 ppb); 1,1,1-trichloroethane (16 ppb); trichloroethene (3 ppb) and benzene (29 ppb). The ground water flow direction in the immediate vicinity of the Mamaroneck facility is anticipated to flow in a northerly direction towards the Sheldrake River. The Sheldrake River is expected to be the local discharge point for ground water in this area.

ITT SEALECTRO
Mamaroneck, New York

INVESTIGATORY SERVICES REPORT

Soils Analytical Summary

Volatile Organic[1] Compounds (Results ug/l)	B3-1 0.5-1.0'	B3-2 6.5-7.0'	B4-1 5.0-5.5'	B4-2 6.0-6.5'	B5-1 5.0-5.5'	B5-2 6.5-7.0'	B6-1 2.0-2.5'	B6-2 6.0-6.5'	B7-1 6.5-7.0'	B7-2 5.0-5.5'
Trans-1,2-dichloroethene	BDL[2]	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	81
1,2-dichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	140	BDL	BDL
1,1,1-trichloroethane	1,400	BDL	BDL	BDL	45	BDL	330	1600	BDL	18
Carbon Tetrachloride	BDL	BDL	BDL	BDL	BDL	BDL	120	BDL	BDL	BDL
Trichloroethene	5,900	BDL	BDL	BDL	BDL	BDL	630	5100	BDL	260
Tetrachloroethene	3,400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	34
Toluene	BDL	BDL	BDL	3,100	16	BDL	BDL	BDL	BDL	BDL
Xylene	BDL	1,500	BDL	3,300	BDL	240	BDL	BDL	BDL	BDL

Note:

(1) ONLY those compounds present above detection limits have been listed.
(2) BDL indicates Below Detection Limits

Volatile Organic[(1)] Compounds (Results ppb)	B8-1 5.0-5.5'	B8-2 6.5-7.0'	B9-1 5.0-5.5'	B9-2 6.5-7.0'	B10-1 1.5-2.0'	B10-2 6.0-6.5'	SS-1 1.5-2.0'	SS-2 1.5-2.0'
Trans-1,2-dichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,2-dichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,1-trichloroethane	15	BDL	150	260	BDL	BDL	16,000	2,100
Carbon Tetrachloride	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Trichloroethene	35	170	120	19	BDL	BDL	BDL	BDL
Tetrachloroethene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Toluene	BDL	BDL	BDL	3,100	BDL	BDL	BDL	BDL
Xylene	55	15,000	BDL	3,300	BDL	BDL	BDL	BDL

Note:

(1) ONLY those compounds present above detection limits have been listed.
(2) BDL indicates Below Detection Limits

ITT SEALECTRO
Mamaroneck, New York

INVESTIGATORY SERVICES REPORT

RCRA Soil Analysis Summary

	Boring Number		
	B-4	B-7	B-8
RCRA Analysis:			
EP Toxicity Metals:			
Silver	0.5	0.5	0.5
Arsenic	0.5	0.5	0.5
Barium	10.0	10.0	10.0
Cadmium	0.1	0.1	0.1
Chromium	0.5	0.5	0.5
Mercury	0.0005	0.0005	0.0005
Lead	0.5	0.5	0.5
Selenium	0.1	0.1	0.1
Other Analysis:			
Flashpoint (c)	65	65	65
Steel Corrosivity mpy	0.074	0.080	0.041
Cyanide, reactive	0.5	0.5	0.5
Sulfide, reactive	1.0	1.2	1.0
pH	5.5	5.8	5.9
Total Petroleum Hydrocarbons	24000	760	130

* All units are ppm unless otherwise noted.

ITT SEALECTRO
Mamaroneck, New York

INVESTIGATORY SERVICES REPORT

Monitoring Well MW-2 Analytical Summary

Volatile Organics (ppb)	August 1989
Vinyl Chloride	200
Chloroethane	18
1,1-Dichloroethane	63
Trans-1,2,-dichloroethene	56
1,1,1-Trichloroethane	16
Trichloroethene	3
Benzene	29

All other compounds tested for in Method 601/602 that are not listed were reported by the laboratory as below detection limits.

APPENDIX D

REPORT - UNDERGROUND STORAGE TANK CLOSURE - SEPTEMBER 1991

APPENDIX D

REPORT - UNDERGROUND STORAGE TANK CLOSURE - SEPTEMBER 1991

Report

Underground Storage Tank Closure

ITT Sealectro
Mamaroneck, New York

September 1991

O'BRIEN & GERE

UNDERGROUND STORAGE TANK CLOSURE

ITT SEALECTRO CORPORATION
Mamaroneck, New York

September 1991

O'BRIEN & GERE ENGINEERS, INC.
Raritan Plaza I
Edison, New Jersey

ITT SEALECTRO CORPORATION
Mamaroneck, New York

UNDERGROUND STORAGE TANK CLOSURE

Table of Contents

EXECUTIVE SUMMARY

O'Brien & Gere Engineers, Inc. (O'Brien & Gere) has been retained by ITT Sealectro Corporation (ITT Sealectro) to provide engineering services associated with the closure of eight Underground Storage Tanks (UST) at the ITT Sealectro facility in Mamaroneck, New York. The USTs had a capacity of 275 gallons (two tanks) and 550 gallons (six tanks). ITT Sealectro elected to remove each tank from the ground. To achieve this end, O'Brien & Gere provided ITT Sealectro with engineering services including the design of Technical Specifications specific to the removal of the USTs, coordination with the New York State Department of Environmental Conservation (NYDEC), observation of field closure activities and soil sampling.

The ITT Sealectro site is located in an industrialized area of Mamaroneck. Industries in the immediate vicinity of ITT Sealectro include the Blood Brothers Auto Wrecking Yard, which is located to the north across the Sheldrake River; Marvel Industries, Inc., a plastics fabricator located to the west; and a metal plating facility to the east. Hoyt Street and an Amtrak Train line border the site to the south. A site location map has been included as Figure 1. The eight USTs were situated beneath the front lawn at the western edge of the building. A detailed UST area site plan, included as Figure 2, identifies the former location of the tanks.

The Technical Specifications for this facility are included in Attachment 1. Technical Specifications for the UST removal have been developed in accordance with American Petroleum Institute Bulletins (API-2015, API-2015A, API-1604) and the National Fire Prevention Association, Volume 30 and 327. Included within these specifications is Section 02005, "Removal and Disposal of Underground Storage Tanks", under which the majority of the closure was performed.

Prior to the closure of this UST system, O'Brien & Gere forwarded a letter dated May 6, 1991 to the NYDEC of ITT Sealectro's decision to remove the USTs from the Mamaroneck, New York facility. In addition, O'Brien & Gere contacted the NYDEC Region 3 office by telephone one week prior to the removal of the tanks to provide the date on which this work will begin.

Closure activities were conducted by OBG Technical Services, Inc. (OBG TECH) from May 14, 1991 through May 22, 1991. Closure of the tank consisted of excavation of soils, removal of each tanks contents, removal and disposal of the tanks, site security, and soil sampling. An O'Brien & Gere representative collected seven soil samples. Samples were analyzed for Total Petroleum Hydrocarbons (TPH) according to EPA Method 418.1 and Volatile Organics (VOC) according to EPA Method 8010/8020. The location of the soil samples and their designations are depicted on Figure 3. Analytical results are listed on Table 1.

SECTION 1 - INTRODUCTION

1.01 General

ITT Sealectro operated an electronics parts assembly facility at 139 Hoyt Street, Mamaroneck, New York since approximately 1960. It is believed that the previous tenant at the 139 Hoyt Street building manufactured jewelry. Electroplating was performed at the 139 Hoyt Street facility until 1986. ITT Sealectro was involved in the manufacture and final assembly of subminiature electronic components.

This project consists of the closure of eight underground storage tanks (UST) at the ITT Sealectro facility located at 139 Hoyt Street. A site map has been provided as Figure 4. This UST system consisted of two 275-gallon tanks and six 550-gallon tanks. ITT Sealectro initiated the steps to close this UST system and the NYDEC granted approval to proceed with the tank removal activity. The tank removal permit is included as Attachment 2.

ITT Sealectro retained OBG TECH as the general contractor responsible for the closure of the UST system. OBG TECH began closure activities on May 14, 1991 and ended this work by temporarily securing the site on May 22, 1991. OBG TECH will continue closure activities pending further site evaluation.

An O'Brien & Gere representative was on-site during these activities to observe field activities and collect soil samples from the excavation pit. Project photographs for this site were taken and are included as Attachment 3. Samples were forwarded to OBG Laboratories, Inc. for analysis. Analytical results were received on June 14, 1991. A laboratory report has been included as Attachment 4.

SECTION 2 - TANK REMOVAL ACTIVITIES

2.01 General

OBG TECH commenced tank closure activities on May 14, 1991 and completed the majority of the work on May 22, 1991. Due to potential Land Ban soil disposal requirements, OBG TECH removed only the soils necessary to excavate the USTs. On March 1, 1991, OBG TECH removed the contents of Tank Nos. 2 and 8.

Closure activities were conducted according to the technical specifications which incorporate industry standards for the closure of UST systems. An O'Brien & Gere representative was on-site during these activities to provide oversight of the work on behalf of ITT Sealectro. Soil sampling was also conducted by the O'Brien & Gere representative. Project photographs, included as Attachment 3, were taken to document the activities conducted by OBG TECH.

2.02 Tank Removal Activities

On May 14, 1991, OBG TECH began removing vegetation and rocks from the excavation area. After vegetation and rocks were removed from the excavation area, they were then stored on polyethylene sheeting in the parking lot adjacent to the rear west side of the building. The Contractor unearthed the tops of the USTs and associated piping. At this time, monitoring equipment was used throughout the tank removal project to record Health and Safety monitoring data (see Table 2). Once the tops of the USTs were exposed it was evident that eight USTs existed (see Figure 2) and all were vertically placed in the ground. Excavated soil was placed in roll-off boxes by the Contractor. The excavated soils removed during this program were contained and covered within the roll-off boxes. The excavation area measured 25 feet long by 13.5 feet wide by 4.5 feet deep.

The UST contents were removed by the Contractor once the tanks were uncovered. The contents of the USTs were pumped into 55-gallon drums and held on-site pending off-site disposal. The drums were labeled with the proper hazardous waste labels, separated by tank designation and stored near the west side of the building. All drums were staged by the Contractor on polyethylene sheeting and secured by a chain link fence.

UST removal was initiated on the afternoon of May 15, 1991. On the morning of May 17, 1991, all eight USTs were removed from the excavation area. Following tank removal activities and soils excavation, the area was secured by the installation of a chain link fence. Tank Nos. 1 and 3 were 275-gallon steel tanks, while the remaining six tanks (Nos. 2, 4, 5, 6, 7 and 8) were 550-gallon steel tanks. During the removal of Tank No. 4, a leak at the bottom of the tank was encountered. The excavation area where Tank No. 4 was pulled from was filled with ground water and a portion of Tank No. 4's contents. OBG TECH pumped the entire product from this hole into a 55-gallon drum(s) designated only for Tank No. 4's product. The NYDEC Spill Hotline was called to report an apparent discharge observed while removing Tank No. 4 (Spill

Report #9101862). During the UST removal activity, groundwater was encountered at approximately 5 feet below ground level (see Figure 5).

On the afternoon of May 17, 1991, OBG TECH staged the tanks on polyethylene sheeting adjacent to the west side of the building and thereafter cut, cleaned, and stored the tank pieces on-site pending off-site disposal. This activity was completed on May 22, 1991 and the site was secured pending further action. The tank pieces were removed to an off-site disposal facility on June 12, 1991. A certification of the disposal of the tanks has been included as Attachment 5.

On August 2, 1991, the off-site disposal activities were conducted for the 55-gallon drums and two roll-off boxes. The tank contents and excavated soil were sent to hazardous waste disposal facilities. The 6,200 pounds of soil was manifested for disposal at the LWD, Inc. Calvert City, Kentucky facility. The 2,800 pounds of solid and 2,575 gallons of liquid collected from the USTs were manifested for disposal at the Environmental Waste Resources, Inc. Waterbury, Connecticut facility. Copies of the manifests are included as Attachment 6.

Due to potential Land Ban soil disposal requirements, only the soils necessary to excavate the underground tanks were removed. Final disposition of residual soils will be evaluated to determine the potential soil disposal options.

2.03 Soil Sampling and Analysis

An O'Brien & Gere representative collected soil samples from the excavation pit on May 28, 1991 to determine the potential impact of the underlying soils. A total of seven samples were collected. Additionally one field blank and one trip blank were collected. Prior to vacating the ITT Sealectro facility, the excavation pit was secured upon completion of sampling. The locations and designations for the soil samples are depicted on Figure 3.

Soil Samples were forwarded to OBG Laboratories, Inc. for analysis. Samples were analyzed for Total Petroleum Hydrocarbons (TPH) according to EPA Method 418.1 and Volatile Organics (VOC) according to EPA Method 8010/8020. Analytical results for all seven soil samples are listed on Table 1. In addition, a laboratory report with the chain-of-custody for these samples is included as Attachment 4.

Tables

O'BRIEN & GERE

Table 1

ITT Sealectro
Mamaroneck, NY
Tank Removal Project

Analytical Results Summary

Parameters	C – 1	C – 2	C – 3	D – 1	D – 2	D – 3	D – 4
Soil Sample Location: / Date Sampled:	5/28/91	5/28/91	5/28/91	5/28/91	5/28/91	5/28/91	5/28/91
Total Petroleum Hydrocarbons (mg/kg)	8100	3500	2600	2100	7000	1200	2500
Percent Total Solids	70%	69%	73%	77%	84%	83%	80%
Volatile Organics (mg/kg dry weight):							
Benzene	<14	<14	<14	<13	<1.2	<1.2	<1.3
Benzyl chloride	<140	<140	<140	<130	<12	<12	<13
Bis (2-chloroethoxy) methane	<7100	<7200	<6800	<6600	<600	<600	<630
Bromobenzene	<71	<72	<68	<66	<6	<6	<6.3
Bromodichloromethane	<14	<14	<14	<13	<1.2	<1.2	<1.3
Bromoform	<140	<140	<140	<130	<12	<12	<13
Bromomethane	<140	<140	<140	<130	<12	<12	<13
Carbon tetrachloride	<14	<14	<14	<13	<1.2	<1.2	<1.3
Chlorobenzene	<14	<14	<14	<13	<1.2	<1.2	<1.3
Chloroethane	<14	<14	<14	<13	<1.2	<1.2	<1.3
2-Chloroethylvinyl ether	<140	<140	<140	<130	<12	<12	<13
Chloroform	<14	<14	<14	<13	<1.2	<1.2	<1.3
1-Chlorohexane	<140	<140	<140	<130	<12	<12	<13
Chloromethane	<140	<140	<140	<130	<12	<12	<13
Chloromethylmethyl ether	<1400	<1400	<1400	<1300	<120	<120	<130
2-Chlorotoluene	<71	<72	<68	<66	<6	<6	<6.3
4-Chlorotoluene	<71	<72	<68	<66	<6	<6	<6.3
Dibromochloromethane	<14	<14	<14	<13	<1.2	<1.2	<1.3
Dibromomethane	<140	<140	<140	<130	<12	<12	<13
1,2-Dichlorobenzene	<71	<72	<68	<66	<6	<6	<6.3
1,3-Dichlorobenzene	<71	<72	<68	<66	<6	<6	<6.3
1,4-Dichlorobenzene	<71	<72	<68	<66	<6	<6	<6.3
Dichlorodifluoromethane	<140	<140	<140	<130	<12	<12	<13
1,1-Dichloroethane	<14	<14	<14	<13	<1.2	<1.2	<1.3
1,2-Dichloroethane	<14	<14	<14	<13	<1.2	<1.2	<1.3
1,1-Dichloroethylene	<14	<14	<14	<13	<1.2	<1.2	<1.3
1,2-Dichloroethylene (total)	<14	<14	<14	<13	<1.2	<1.2	<1.3
Dichloromethane	<14	<14	<14	<13	<1.2	<1.2	<1.3
1,2-Dichloropropane	<14	<14	<14	<13	<1.2	<1.2	<1.3
cis-1,3-Dichloropropylene	<14	<14	<14	<13	<1.2	<1.2	<1.3
trans-1,3-Dichloropropylene	<14	<14	<14	<13	<1.2	<1.2	<1.3
Ethylbenzene	<14	<14	<14	<13	<1.2	<1.2	<1.3
1,1,2,2-Tetrachloroethane	<140	<140	<140	<130	<12	<12	<13
1,1,1,2-Tetrachloroethane	<14	<14	<14	<13	<1.2	<1.2	<1.3
Tetrachloroethylene	2600	1900	1500	1700	200	130	140
Toluene	24	23	30	<13	<1.2	<1.2	1.5
1,1,1-Trichloroethane	1200	720	3300	250	1.9	4.5	5.8
1,1,2-Trichloroethane	<14	<14	<14	<13	<1.2	<1.2	<1.3
Trichloroethylene	<14	<14	<14	<13	<1.2	1.3	<1.3

Parameters	Soil Sample Location: Date Sampled:	C - 1 5/28/91	C - 2 5/28/91	C - 3 5/28/91	D - 1 5/28/91	D - 2 5/28/91	D - 3 5/28/91	D - 4 5/28/91
Volatile Organics (mg/kg dry weight):								
Trichlorofluoromethane		<14	<14	<14	<13	<1.2	<1.2	<1.3
1,2,3-Trichloropropane		<140	<140	<140	<130	<12	<12	<13
Vinyl chloride		<14	<14	<14	<13	<1.2	<1.2	<1.3
Xylene (total)		<43	<43	<41	<39	<3.6	<3.6	<3.8

Notes:
All samples were collected by O'Brien & Gere Engineers, Inc. and analyzed by OBG Laboratories, Inc.
*Analytical Method 8010/8020 was used for analysis of Volatile Organics.
Analytical Method 418.1 was used for analysis of Total Petroleum Hydrocarbons.
Samples identified by the letter "C" are composite samples, whereas samples identified by the letter "D" are grab samples.

ITT Sealectro
Mamaroneck, NY
Tank Removal Project

Monitoring Data
May 14, 1991

Tank Location	Time	Soil	Air	Benzene	LEL %	Reading taken during this activity:
1-2	12:45 pm	10 ppm	0 ppm	0 ppm	0 %	Excavation
1-2	12:50 pm	4 ppm	.5 ppm	0 ppm	0 %	Excavation
1-2	12:53 pm	18 ppm	0 ppm	0 ppm	0 %	Excavation
1-2	1:00 pm	15 ppm	3 ppm	0 ppm	0 %	Excavation
1-2	1:05 pm	12 ppm	0 ppm	0 ppm	0 %	Excavation
1-2	1:10 pm	10 ppm	2 ppm	0 ppm	0 %	Excavation
1-2-3	1:20 pm	7 ppm	0 ppm	0 ppm	0 %	Excavation
1-2-3-4	1:30 pm	10 ppm	2 ppm	–	12 %	Checking fill spout of tank #2
1-2-3-4	1:35 pm	11 ppm	0 ppm	–	12 %	Checking fill spout of tank #2
1-2-3-4	2:00 pm	12 ppm	2 ppm	0 ppm	0 %	Excavation
1-2-3-4	2:15 pm	10 ppm	0 ppm	0 ppm	0 %	Excavation
1-2-3-4	2:45 pm	12 ppm	0 ppm	0 ppm	0 %	Excavation
Tank 4	3:00 pm	15 ppm	2 ppm	–	15 %	Checking fill spout
1-2-3-4	3:15 pm	10 ppm	0 ppm	0 ppm	0 %	Excavation
Tank 5	3:30 pm	14 ppm	0 ppm	–	7 %	Checking fill spout
1-2-3-4-5	3:45 pm	15 ppm	0 ppm	0 ppm	0 %	Excavation
Tank 6	4:00 pm	15 ppm	0 ppm	0 ppm	3 %	Checking fill spout
1-2-3-4-5-6	4:15 pm	8 ppm	1 ppm	0 ppm	0 %	Excavation
Tank 7	4:30 pm	1 ppm	0 ppm	0 ppm	4 %	Checking fill spout
1-2-3-4-5-6-7	4:45 pm	2 ppm	0 ppm	0 ppm	0 %	Excavation
Tank 8	5:00 pm	6 ppm	0 ppm	0 ppm	10 %	Checking fill spout

Note:
* – represents saturation of the Colorimetric Tubing (Draeger Tube) while monitoring the tank's fill spout
* Soil and air monitoring were conducted with an HNU Photoionization Unit.
* Benzene monitoring was conducted with a Colorimetric Tubing (Draeger Tube).
* The LEL % was determined from a MSA Explosimeter Model 260.

ITT Sealectro
Mamaroneck, NY
Tank Removal Project

Monitoring Data
May 15, 1991

Tank Location	Time	Soil	Air	Benzene	LEL %	Reading taken during this activity:
Tank 2	12:30 pm	1 ppm	.5 ppm	0 ppm	0 %	Removal of Product from Tanks
Tank 2	12:45 pm	0 ppm	0 ppm	0 ppm	0 %	Removal of Product from Tanks
Tank 4	1:15 pm	0 ppm	0 ppm	0 ppm	0 %	Removal of Product from Tanks
Tank 4	1:30 pm	0 ppm	0 ppm	0 ppm	0 %	Removal of Product from Tanks
Tank 4	1:45 pm	0 ppm	0 ppm	0 ppm	0 %	Removal of Product from Tanks
Tank 5	2:00 pm	0 ppm	0 ppm	0 ppm	0 %	Removal of Product from Tanks
Tank 5	2:30 pm	1 ppm	0 ppm	0 ppm	0 %	Removal of Product from Tanks
Tank 6	2:45 pm	6 ppm	0 ppm	0 ppm	0 %	Removal of Product from Tanks
Tank 6	3:00 pm	0 ppm	0 ppm	0 ppm	0 %	Removal of Product from Tanks
Tank 7	3:15 pm	6 ppm	0 ppm	0 ppm	0 %	Removal of Product from Tanks
Tank 7	3:30 pm	2 ppm	0 ppm	0 ppm	0 %	Removal of Product from Tanks
Tank 8	3:45 pm	0 ppm	0 ppm	0 ppm	0 %	Removal of Product from Tanks
Tank 8	4:00 pm	0 ppm	0 ppm	0 ppm	0 %	Removal of Product from Tanks
Tank Pull 2	4:50 pm	0 ppm	0 ppm	0 ppm	0 %	Tank Removal
Tank Pull 2	5:00 pm	4 ppm	0 ppm	0 ppm	0 %	Removal of Product from Tanks
Tank Pull 2	5:15 pm	8 ppm	0 ppm	0 ppm	0 %	Tank Removal
Tank Pull 2	5:30 pm	20 ppm	2 ppm	0 ppm	0 %	Removal of Product from Tanks
Tank Pull 2	5:45 pm	15 ppm	1 ppm	0 ppm	0 %	Removal of Product from Tanks

Note:
* Soil and air monitoring were conducted with an HNU Photoionization Unit.
* Benzene monitoring was conducted with a Colorimetric Tubing (Draeger Tube).
* The LEL % was determined from a MSA Explosimeter Model 260.

ITT Sealectro
Mamaroneck, NY
Tank Removal Project

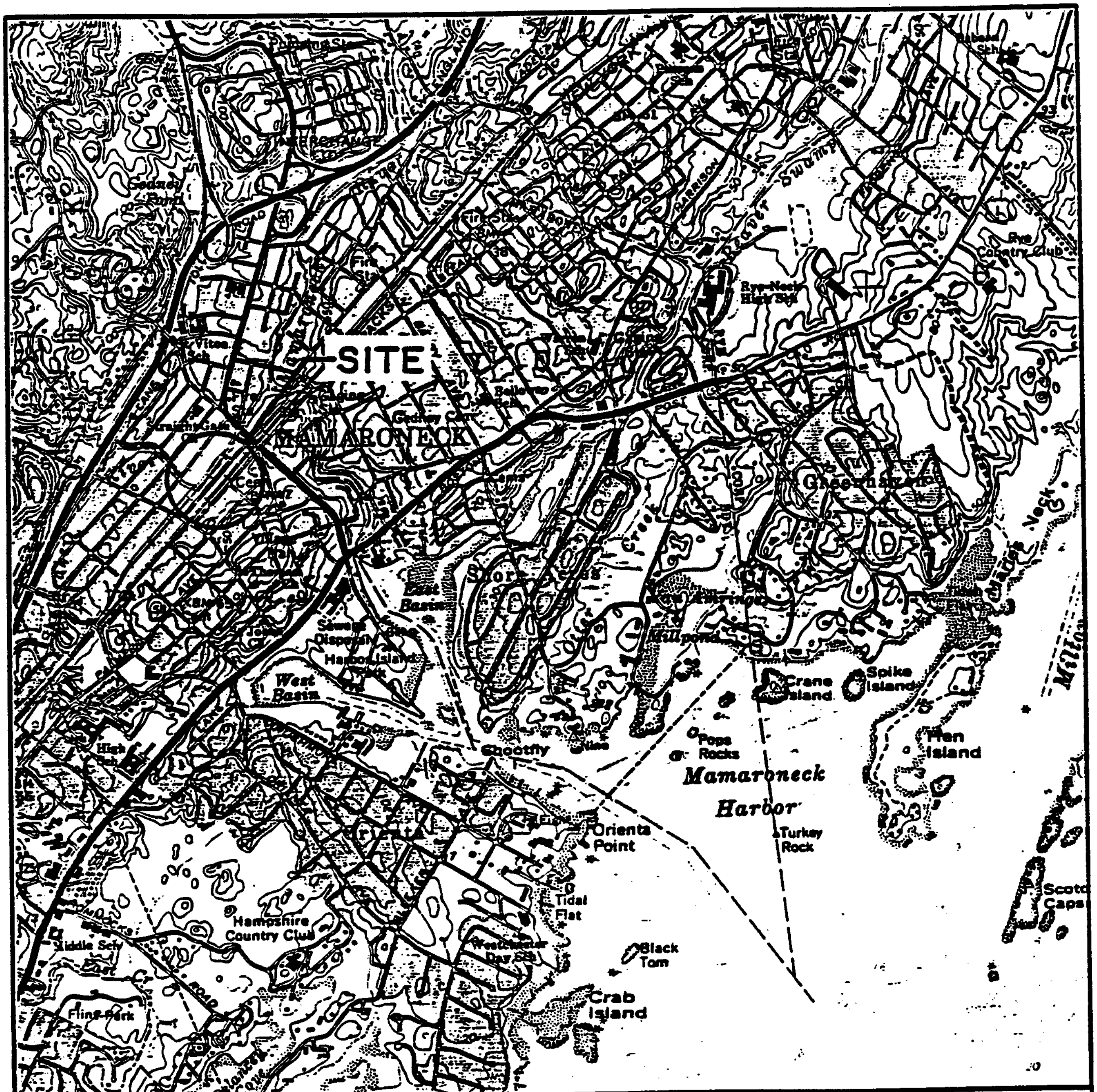
Monitoring Data
May 16, 1991

Tank Location	Time	Soil	Air	Benzene	LEL %	Reading taken during this activity:
Tank 1	7:20 am	+/- 15 ppm	2 ppm	0 ppm	0 %	Pulling Tanks
Tank 1	7:30 am	+/- 15 ppm	1 ppm	0 ppm	0 %	Pulling Tanks
Tank 1	7:45 am	+/- 10 ppm	0 ppm	0 ppm	0 %	Pulling Tanks
Tank 1	8:00 am	+/- 5 ppm	0 ppm	0 ppm	0 %	Pulling Tanks
Tank 4	8:15 am	+/- 13 ppm	0 ppm	0 ppm	0 %	Pulling Tanks
Tank 4	8:20 am	+/- 10 ppm	1 ppm	0 ppm	0 %	Pulling Tanks
Tank 4	8:25 am	+/- 10 ppm	0 ppm	0 ppm	2 %	Pulling Tanks
Tank 4	8:30 am	+/- 10 ppm	2 ppm	0 ppm	0 %	Pulling Tanks
Tank 4	8:35 am	+/- 10 ppm	0 ppm	0 ppm	0 %	Tank Removal
Tank 2	1:40 pm	+/- 15 ppm	1 ppm	0 ppm	0 %	Pulling Tanks
Tank 2	1:45 pm	+/- 10 ppm	1 ppm	0 ppm	0 %	Pulling Tanks
Tank 2	1:50 pm	+/- 10 ppm	3 ppm	0 ppm	0 %	Pulling Tanks
Tank 2	1:51 pm	+/- 10 ppm	2 ppm	0 ppm	0 %	Pulling Tanks
Tank 2	1:53 pm	+/- 14 ppm	1 ppm	0 ppm	0 %	Pulling Tanks
Tank 2	2:10 pm	+/- 12 ppm	0 ppm	0 ppm	0 %	Pulling Tanks
Tank 5	2:35 pm	+/- 12 ppm	1 ppm	0 ppm	0 %	Pulling Tanks
Tank 5	2:45 pm	+/- 12 ppm	2 ppm	0 ppm	0 %	Pulling Tanks
Tank 8	3:00 pm	+/- 12 ppm	0 ppm	0 ppm	0 %	Pulling Tanks
Tank 8	3:30 pm	+/- 12 ppm	2 ppm	0 ppm	0 %	Pulling Tanks
Tank 8	4:00 pm	+/- 12 ppm	0 ppm	0 ppm	0 %	Pulling Tanks
Tank 5	4:15 pm	+/- 10 ppm	2 ppm	0 ppm	0 %	Pulling Tanks
Tanks 6-7	4:35 pm	+/- 15 ppm	2 ppm	0 ppm	0 %	Pulling Tanks
Tanks 6-7	4:40 pm	+/- 15 ppm	6 ppm	0 ppm	0 %	Pulling Tanks
Tanks 6-7	5:00 pm	+/- 12 ppm	2 ppm	0 ppm	0 %	Pulling Tanks

Figures

O'BRIEN & GERE

FIGURE 1



ITT SEALECTRO
MAMORONECK, NEW YORK

QUADRANGLE LOCATION

SITE LOCATION MAP

0 2000 4000

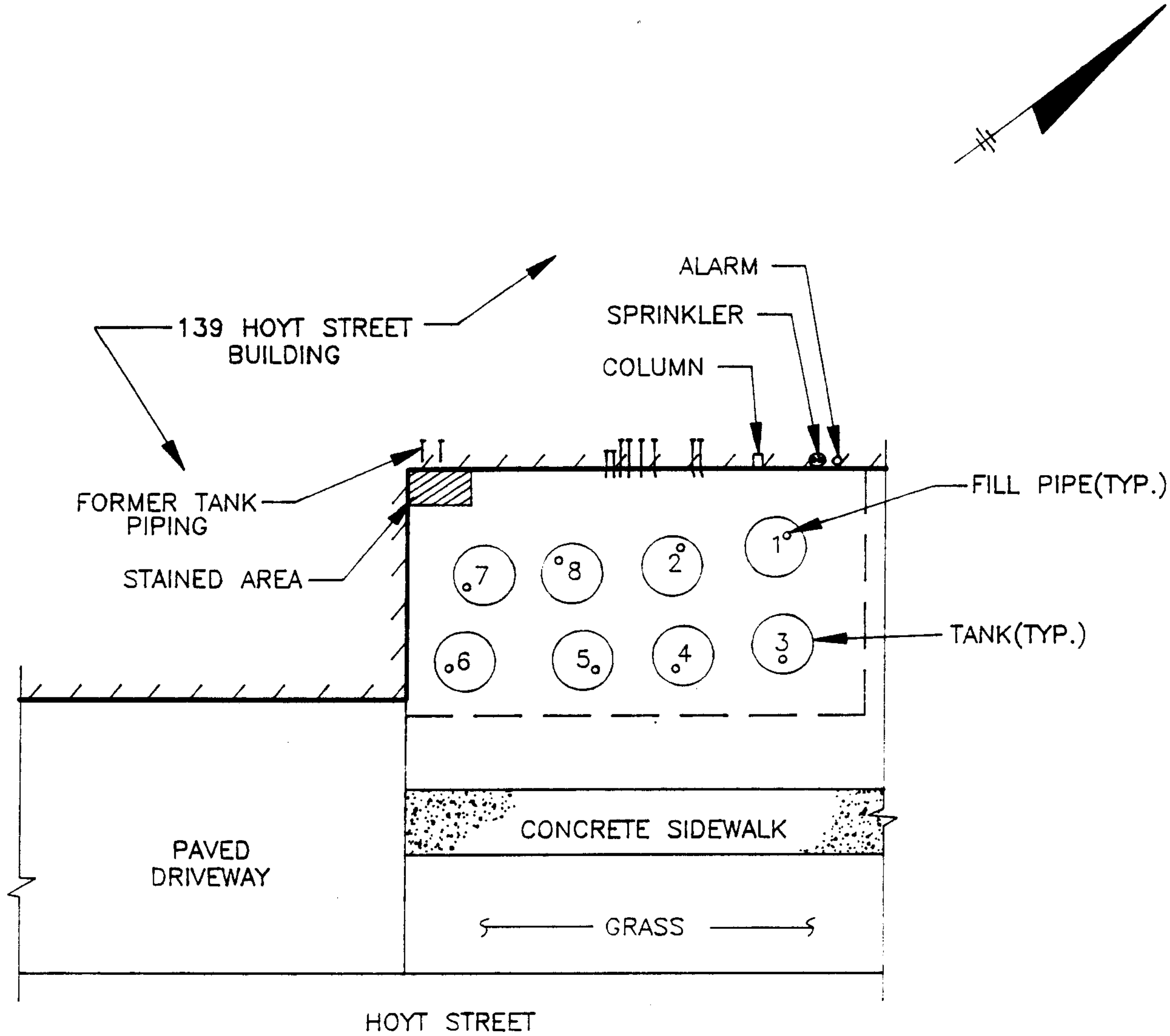
SCALE IN FEET

ADAPTED FROM 7.5 MIN. U.S.G.S. QUAD. MAP, MAMORONECK, NEW YORK

7/18/90 3356.07.711 8.5X11

O'BRIEN & GERE ENGINEERS, INC.

FIGURE 2



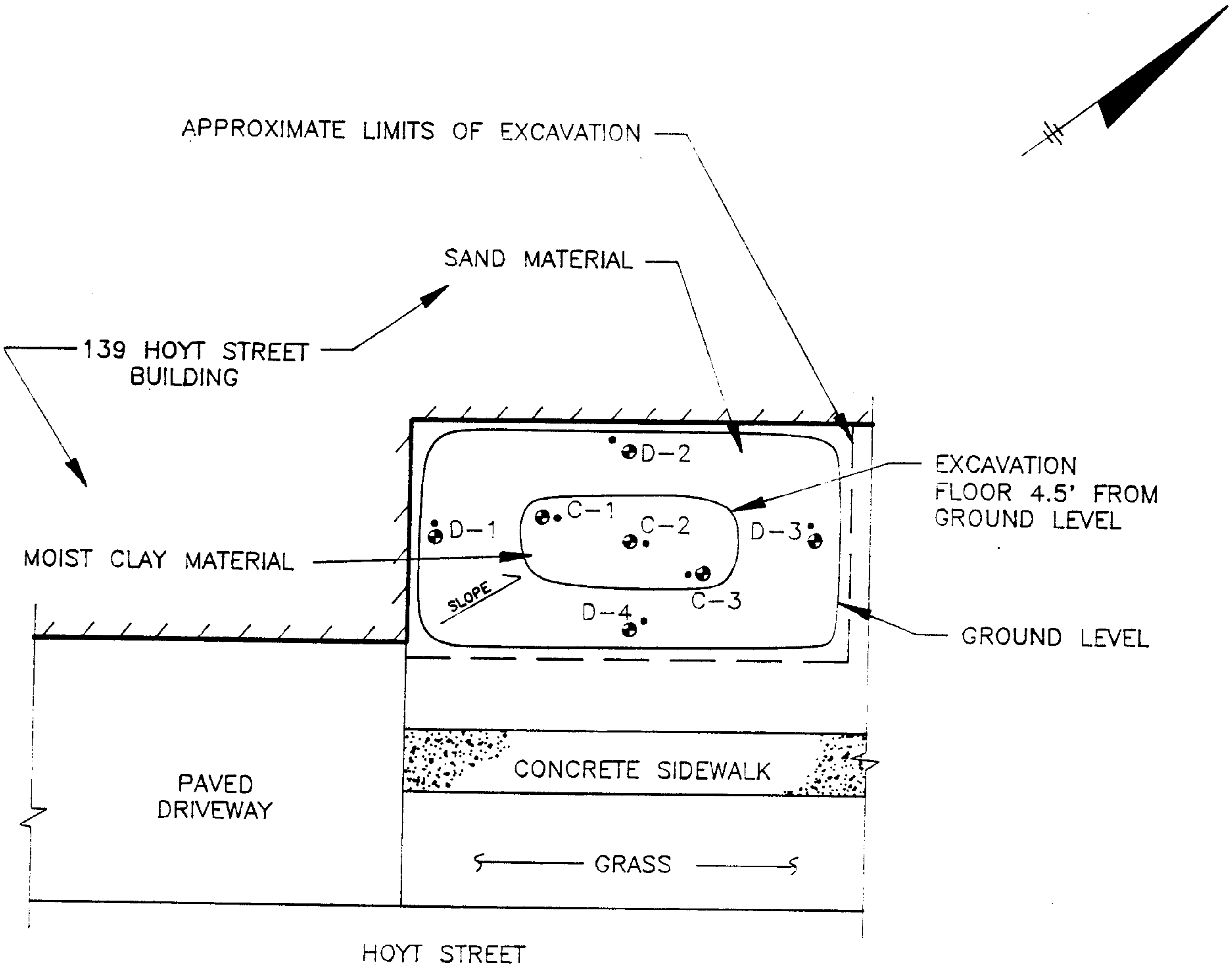
DETAILED UST AREA

TANK REMOVAL PROJECT
ITT SEALECTRO CORPORATION
MAMARONECK, NEW YORK

10 0 10 20
1"=10'-0"

ENGINEERS INC.
Edison, New Jersey

FIGURE 3



DESIGNATION	HNU READINGS (ppm)	SOIL SAMPLE DESCRIPTION
C-1	10-15	WET
C-2	20-30	WET
C-3	45-50	MOIST
D-1	15-20	MOIST
D-2	13-15	MOIST
D-3	10-15	DRY
D-4	10-15	MOIST

LEGEND

- ● SOIL SAMPLE LOCATION
- D-1 GRAB SAMPLE 1
- C-1 COMPOSITE SAMPLE 1
- • HNU MONITORING MEASUREMENT LOCATION

NOTES:

1. REFER TO TABLE 1 FOR SAMPLE ANALYSIS
2. HNU READINGS ARE LISTED AS A RANGE BECOUSE OF INSTRUMENT VARIABILITY.

SOIL SAMPLING LOCATION PLAN

TANK REMOVAL PROJECT
ITT SEALECTRO CORPORATION
MAMARONECK, NEW YORK

10 0 10 20

1"=10'-0"

O'BRIEN & GERE ENGINEERS INC.
Edison, New Jersey

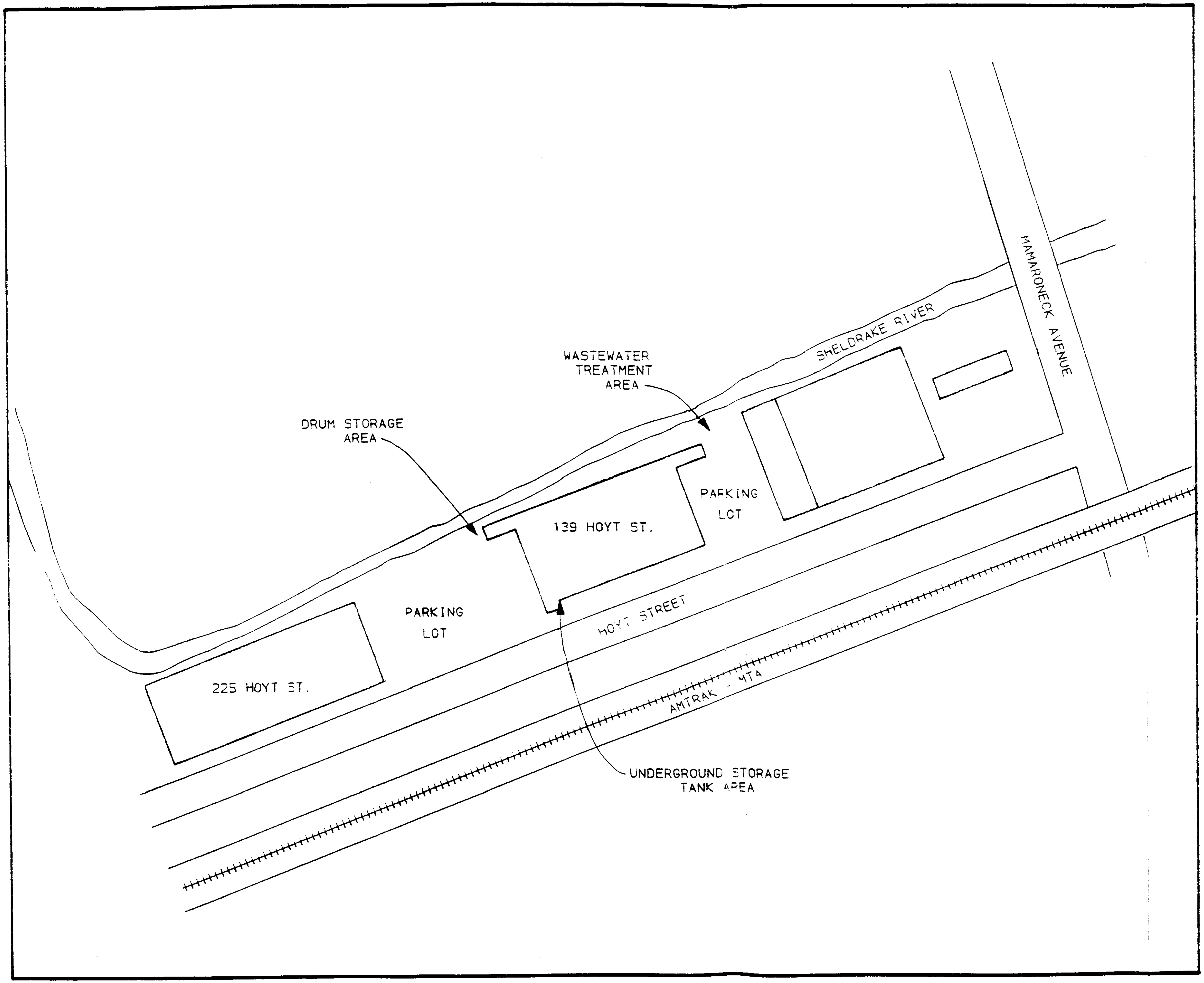


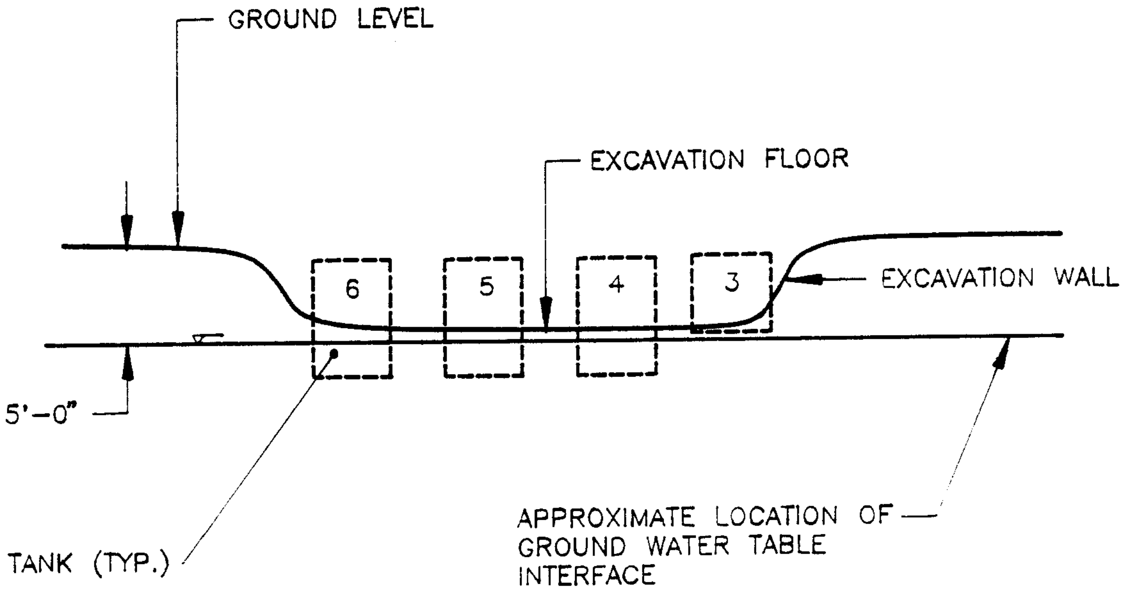
FIGURE 4

ITT SEALECTRO
MAMARONECK, NEW YORK

SITE MAP

0 100 200
APPROX. SCALE IN FEET

O'BRIEN & GERE
ENGINEERS, INC.
Edison, New Jersey



CROSS-SECTION OF EXCAVATION AREA

TANK REMOVAL PROJECT
ITT SEALECTRO CORPORATION
MAMARONECK, NEW YORK

10 0 10 20

1" = 10'-0"

ENGINEERS INC.

Attachments

O'BRIEN & GERE

ATTACHMENT 1

Technical Specifications

3356.009

TECHNICAL SPECIFICATIONS

UNDERGROUND STORAGE TANK CLOSURE

ITT SEALECTRO
Mamaroneck, New York

January 1991

O'BRIEN & GERE ENGINEERS, INC.
Raritan Plaza I
Edison, New Jersey

ITT SEALECTRO COMPANY
Mamaroneck, New York

UNDERGROUND STORAGE TANK CLOSURE

Table of Contents

SECTION 1 - INTRODUCTION

BACKGROUND

ITT Sealectro formerly operated an electrical connector assembly facility at 139 Hoyt Street in Mamaroneck, New York. It is reported that in 1960, Sealectro installed two 550 gallon and two or three 275-gallon underground storage tanks beneath the front lawn at the western edge of the building. The two 550 gallon tanks are connected and reportedly used to store lubricating oils for the cleaning of machinery. The 275 gallon tanks are also connected and were reportedly used for the storage of cleaning solvents and lubricating oils. The use of these tanks ceased in 1975.

Recently analysis performed on samples of the tanks contents has yielded the following:

Fill Port	Constituent	Concentration
1	1,1 - Dichloroethylene	3%
	Tetrachloroethylene	55%
	1,1,1 - Trichloroethane	42%
2	1,1 - Dichloroethylene	5%
	Tetrachloroethylene	21%
	1,1,1 - Trichloroethane	74%

SCOPE OF WORK

This project consists of the closure of the aforementioned underground storage tanks at the ITT facility in Mamaroneck, New York. The above referenced tanks, associated piping shall be removed along with impacted soil encountered during the closure process. The tank, piping, concrete, liquid or sludge material and excavated soils shall be disposed of properly, and the surfaces restored to their existing condition as specific in these Technical Specifications.

SPECIAL PROVISIONS

SPECIAL CONDITIONS OF WORK

SP-1.00 EMERGENCY CALLS

The Contractor shall provide the Owner with the phone numbers of at least three (3) responsible persons, to be used during non-working hours and weekends, who shall be in a position to dispatch men and equipment to the project in the event of an emergency.

SP-2.00 HEALTH AND SAFETY REGULATIONS

Contractor shall be responsible for the health and safety of his personnel. At a minimum, all work shall be performed in accordance with Corporate and plant standard health and safety requirements developed by the Owner.

SP-3.00 PERMITS AND NOTIFICATIONS

The Contractor is required to obtain, at his own expense, all necessary permits, licenses, and approvals required by law or municipal ordinance, required for the timely completion of the project. These permits include but are not limited to a local demolition permit and a local building permit.

SP-4.00 EXISTING UTILITIES

Special precautions shall be observed so the work does not interfere with or cause damage to any existing utilities. The Contractor shall notify the proper utility companies at least seventy-two (72) hours before construction is started adjacent to such utilities. Proof of such notification shall be filed with the Engineer. Failure to provide such proof shall be cause for automatic cessation of the work. The utilities shall be protected in the manner prescribed by the utility company or the Engineer. The Contractor shall excavate, locate, and verify existing utilities in advance of his operations where deemed necessary.

SP-5.00 EXCAVATION

Excavation shall be executed according to the following Special Provisions:

A. Excavation Limits of Soil

The Engineer shall be responsible for determining the amount of additional excavation necessary after removal of the tank.

B. Facility Operations

The Contractor shall perform work so as to minimize interference with normal facility operations. Access to the building and public facilities shall be made available at all times.

C. Water

The Contractor shall be responsible for providing and maintaining proper and satisfactory means and devices for the removal of all water entering the excavations during the tank removal. The Contractor shall be responsible for obtaining written permission from local authorities before discharging water to any storm or sanitary sewer. If such permission cannot be obtained or if the Engineer determines the water is impacted, the Contractor shall store the water on site in suitable drums or temporary tanks, properly labelled. The Contractor shall be responsible for the characterization and proper disposal of this water.

D. Existing Structures

The Contractor shall be responsible for all existing structures and materials at the site remaining intact. If existing structures are damaged during performance of the work, these structures and materials shall be replaced by the Contractor at his own expense in accordance with the Engineer's direction.

E. Excavation Monitoring

The Contractor shall be responsible for monitoring the tank excavation for volatile organic compounds (VOCs).

SP-6.00 CONTRACT WORK AREA PROTECTION

All existing facilities adjacent to the site shall remain intact. If any facilities are damaged during construction, the Contractor shall replace them at his own expense in accordance with the Engineer's direction.

SP-7.00 SAFETY FACILITIES

The Contractor shall provide emergency and first aid equipment for use at the site. This equipment shall be kept clean and in proper working condition. Emergency and first aid facilities shall consist of a minimum of one (1) Class ABC Fire Extinguisher (Protectoseal Model No. 2A105A or equal) and a first aid kit (Bullard Manufacturer Company Model #136 or equal) on each piece of construction equipment.

SP-8.00 TANK CONTENTS

The Contractor shall be responsible for the removal of all free product and sludge found in the tank and piping scheduled for removal. The Contractor is alerted that product residues remaining in the tank may be extremely flammable. The Contractor shall take necessary precautions when cutting the tanks, cutting only after all vapors have been purged or by cold cutting.

SP-9.00 TEMPORARY SUPPORT OF OTHER STRUCTURES

The Contractor shall provide temporary support or protection for any utilities, pipe chases, fire hydrants, or structures endangered by the excavation of tanks or soils.

SP-10.00 STORAGE, TRANSPORTATION, AND DISPOSAL OF WASTE

All waste shall be segregated, stockpiled and maintained in accordance with Local, State and Federal regulations.

The Contractor shall load the outbound material from the stockpile area onto vehicles bound for final disposal. After loading, the Contractor shall transport the waste from the project site to the applicable disposal site in accordance with all Local, State, and Federal regulations.

The Contractor shall sample and/or test the waste as required for the bill of lading and/or manifests in accordance with Local, State, or Federal regulations for the transportation and disposal of waste. Copies of all analyses, bills of lading, manifests, and certifications shall be submitted to the Owner for his records.

All waste shall be disposed of at an approved disposal site as defined by Local, State, or Federal regulations.

EARTHWORK - SECTION 02000

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. Excavation, trenching, and backfilling including the loosening, removing, refilling, transporting, storage and disposal of all materials classified as "earth" necessary to be removed for the completion of the work.

2. Excavation to the widths and depths specified or directed by the Engineer, or required to complete the work of this Contract.

3. All labor, materials, services, and equipment necessary for the removal and disposal of any soils contaminated with hydrocarbons, as designated by the Engineer.

B. Related Work Specified Elsewhere

1. Select Fill: Section 02001
2. Removal and Disposal of Underground Storage Tanks: Section 02005

1.02 TESTING

A. All soil compaction testing services including field and laboratory services shall be provided by the Contractor.

B. Characterization of all contaminated wastes, solid or liquid, which are to be disposed of offsite.

1.03 SUBMITTALS

A. Soil compaction testing results

B. Manifests of the impacted wastes, solid or liquid, which are to be disposed of offsite

EARTHWORK - SECTION 02000

PART 2 - PRODUCTS

2.01 DESCRIPTION

A. Wood Sheeting and Bracing

1. Shall be sound and straight; free from cracks, shakes and large or loose knots, and shall have dressed edges where directed.

2. Shall conform to National Design Specifications for Stress Grade Lumber having a minimum fiber stress of 1200 pounds per square inch.

3. Sheeting and bracing to be left in place shall be pressure treated in accordance with ASTM D 1760 for the type of lumber used and with a preservative approved by the Engineer.

B. Steel Sheeting and Bracing

1. Shall be sound.

2. Shall conform to ASTM A328 with a minimum thickness of 3/8 inch.

PART 3 - EXECUTION

3.01 GENERAL

A. Limits of Excavation

1. Excavations shall be made to the elevations or subgrades as specified in Section 2005, Removal and Disposal of Underground Storage Tanks or as directed by the Engineer.

2. Whenever excavations are carried beyond or below the lines and grades as directed by the Engineer, all such excavated space shall be refilled with embankment material as directed by the Engineer. All refilling of unauthorized excavations shall be at the Contractor's expense.

3. All material which slides, falls or caves in to the established limits of excavations due to any cause whatsoever shall be removed and disposed of at the Contractor's expense as designated by the Engineer and no extra compensation will be paid to the Contractor for any materials ordered for refilling the void areas left by the slide, fall or cave in.

4. In no case will undercutting excavation faces be permitted.

B. Dust Control

1. The Contractor shall provide control of dust, at times designated by the Engineer by wetting surfaces contributing to the dust problem. The use of calcium chloride or oils to control dust on surfaces is prohibited.

3.02 REMOVAL OF WATER

A. General

1. The Contractor shall, at all times during construction, provide and maintain proper and satisfactory means and devices for the removal of all water entering the excavations in any manner, and shall remove all such water as fast as it may collect, in such manner as shall not interfere with the progression of the work.

2. Unless otherwise specified, all excavations which extend down to or below the static ground water elevations shall be dewatered by lowering and maintaining the ground water beneath such excavations at all times when work thereon is in progress.

3. Water pumped or drained from excavations encountered in the work, shall be disposed in a manner acceptable to the Engineer and in compliance with applicable codes and regulations.

4. Any damage caused by or resulting from dewatering operations shall be the sole responsibility of the Contractor.

3.03 SHEETING AND BRACING

A. General

1. Provide all bracing, sheeting and shoring, where necessary to retain the sides of excavations and to prevent movement or settlement of adjacent structures, utilities, piping, conduit, roads and streets, etc. The Contractor shall be entirely responsible for the strength and adequacy of all such bracing, sheeting and shoring, and shall, if required, submit fully detailed Shop Drawings for review. The Contractor is solely and entirely responsible for the safety and support of such structures, utilities, etc., and is liable for any damage or injury caused by or resulting from any such movement or settlement.

B. Installation, Maintenance and Removal

1. After review of the procedure by the Engineer, install all bracing, sheeting and shoring exactly as shown on drawings and specifications prepared by the Contractor's structural engineer. Review of such documents by the Engineer shall not relieve the Contractor and his structural engineer of their sole responsibility for the strength and adequate performance of all sheeting, bracing and shoring included in the Work.

2. In no case will bracing be permitted against pipes or other structures in trenches or other excavations.

3. Sheeting shall be driven as the excavation progresses, and in such a manner as to maintain pressure against the original ground at all times. Steel sheeting shall be driven by a vibratory hammer. All sheeting shall be driven vertically with the edges tight together, and all bracing shall be of such design and strength as to maintain the sheeting in its proper position.

4. During the course of the Work, maintain continuous level readings at established points on all nearby structures that could be affected by excavation in progress or completed. Install additional bracing, sheeting and shoring as necessary to prevent damaging movement from occurring. The

Contractor is solely and entirely responsible for the safety and support of such structures, utilities, etc., and is liable for any damage or injury caused by or resulting from any movement or settlement.

5. Keep all bracing, sheeting and shoring in place and functioning as designed until replaced by permanent construction.

B. Removal

1. When no longer required, remove all bracing, sheeting and shoring outside of building lines, as well as all such work within the building except that which was specifically designed, with the review by the Engineer, to remain as part of the permanent structure.

2. After final use, all sheeting shall be cleaned and decontaminated and removed from the site.

3. If sheeting is ordered to be left in place, it shall be cut off or driven down as directed so that no portion shall remain within 12 inches of the finished ground surface.

3.04 BACKFILLING AND COMPACTION

A. General

1. Backfill excavations as promptly as work permits, but not until completion of the following work:

a. Acceptance by the Engineer of construction below finish grade including, where applicable, waterproofing, perimeter insulation, damp-proofing and drain tile system.

b. Inspection, testing, approval, and recording locations of underground utilities.

c. Removal of shoring and bracing and backfilling of voids with satisfactory materials.

d. Removal of trash and debris from excavation.

2. Grades shall be uniform levels or slopes between points where elevations are given or between such points and existing grades. Abrupt changes in slopes shall be rounded.

3. All excavations shall be backfilled to the original surface of the ground or to such other grades specified or directed.

4. Backfilling shall be completed with Type "E" Select Fill material that can be satisfactorily compacted during refilling of the excavation.

5. Any settlement occurring in the backfilled excavations shall be refilled and compacted.

B. Unsuitable Materials

1. Stones, pieces of rock or pieces of pavement greater than 3 inches in any single dimension shall not be used in any portion of the backfill.

2. All stones, pieces of rock or pavement shall be distributed through the backfill and alternated with earth backfill in such a manner that all interstices between them shall be filled with earth.

C. Compaction and Density Control

1. Place compacted fill material in horizontal layers not exceeding 8 inches in thickness. Placement shall start in the deepest area and progress approximately parallel to the finished grade.

2. Each layer shall be compacted by means of a suitable grid, smooth wheel, pneumatic tire roller, track mounted machine or equal. Compaction around obstructions or adjacent to structures shall be obtained by means of hand-held pneumatic or gasoline engine operated compactors.

3. Compact each layer of fill in the specified area to achieve the following percentages of maximum density at optimum moisture as determined by ASTM D1557-78, or equivalent if tested in accordance with ASTM D4253-83:

a. Under slabs on grade, walks, drives and other paved areas: 95%.

b. Adjacent to foundations: 95%.

c. Adjacent to grade beams and pile caps: 95%.

d. In areas of general grading: 85%.

4. Perform the tests specified and obtain approval before the next layer is started.

5. Do not compact material when the moisture varies more than 2% from the optimum moisture content. A uniform moisture content will be required throughout the layers of fill material. Wetting or drying manipulation shall be required if necessary to accomplish this. Suspend compacting operations when, in the Soil Consultant's opinion, satisfactory results cannot be obtained because of rain or other unsatisfactory conditions.

6. The Contractor shall be responsible for all damage or injury done to pipes, structures, property or persons due to improper placing or compacting of backfill.

3.05 STORAGE OF MATERIALS

A. Excavated Materials

1. All on-site excavated materials shall be stored in on-site locations so as not to endanger the work, and so that easy access may be had at all times to all parts of the excavation.

2. Impacted excavated material, prior to being transported off-site, shall be placed on polyethylene sheeting. The stored material shall be covered with polyethylene sheeting secured in place to prevent precipitation and runoff water infiltration. The sheeting shall have a minimum thickness of 6 mils and shall be inspected and repaired as directed by the Engineer. All stockpiled soils shall be sufficiently bermed at the bottom to prevent precipitation runoff.

3.06 DISPOSAL OF MATERIALS

A. Disposal

1. All spoil material shall be disposed of offsite at a location approved by the Engineer.

2. The Contractor shall be responsible for the characterization and disposal of impacted soil (hazardous and non-hazardous) at a solid waste management facility permitted to receive wastes of this type. Transport shall be by a permitted solid waste transporter and the Contractor will provide all required permits and manifests.

3.07 OTHER REQUIREMENTS

A. Unfinished Work

1. When, for any reason, the work is left unfinished, all trenches shall be filled and all watercourses left unobstructed with the surfaces in a safe and satisfactory condition.

B. Hauling Material on Streets

1. When it is necessary to haul material over streets or pavements, the Contractor shall provide suitable tight vehicles so as to prevent deposits on the streets or pavements. In all cases where any materials are dropped from the vehicles, the Contractor shall clean up the same as often as required to keep the streets and pavements clean and free from dirt, mud, stone, and other hauled material. The Contractor is responsible for obtaining all state, county, and town permits, or variations to allow transport of any and all materials or equipment on public roadways.

- END OF SECTION -

SELECT FILL - SECTION 02001

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

Select fill materials shall be used as specified or as directed by the Engineer.

B. Related Work Specified Elsewhere

1. Earthwork - Section 2000

1.02 TESTING

A. All soil testing services necessary for the Contractor to obtain an approved select fill material shall be provided by the Contractor. All density testing including field and laboratory services required during installation of the select fill material shall also be provided by the Contractor.

1.03 SUBMITTALS

A. The name and location of the source of the material.

B. Samples and test reports of the material.

C. Soil compaction testing results.

PART 2 - PRODUCTS

2.01 LISTING OF SELECTED FILL MATERIALS

A. Type A

1. Thoroughly washed screened gravel or clean, sound, tough, hard stone free from coatings. It shall consist of crushed and uncrushed particles and shall have a gradation by weight of 100% passing a 1-1/2 inch square opening, not more than 25% passing a 3/4 inch square opening and not more than 5% passing a 1/2 inch square opening.

SELECT FILL - SECTION 02001

B. Type B

1. Thoroughly washed clean, sound, tough, hard crushed limestone or approved equal free from coatings. Gradation of particles by weight shall be the same as specified for Type A material.

C. Type C

1. Thoroughly washed, clean, sound, tough, hard, crushed limestone or approved equal free from coatings. It shall have a gradation by weight of 100% passing a one inch square opening and not more than 15% passing a 1/4 inch square opening.

D. Type D

1. Washed coarse sand having the following gradation by weight:

% Passing	Sieve
100	3/8-inch
95 - 100	No. 4
80 - 100	No. 8
50 - 85	No. 16
25 - 60	No. 30
10 - 30	No. 50
2 - 10	No. 100

E. Type E

1. Gravel - 20% or less passing No. 50 sieve and no more than 5% passing No. 200 sieve.

F. Type F

1. Run-of-crusher hard durable limestone or approved equal having the following gradation by weight:

% Passing	Sieve
100	1-1/2 inch
95 - 100	1 inch
65 - 80	1/2 inch
40 - 60	1/4 inch
0 - 10	No. 200

PART 3 - EXECUTION

3.01 PLACEMENT AND COMPACTION

A. Select Fill materials shall be placed in lifts not greater than 8-inches in thickness unless greater thickness is allowed by the Engineer upon demonstration by the Contractor that the material and compaction efforts are adequate to obtain the required density.

B. If the required density is not obtained, compaction of the Select Fill material shall continue until specified densities are obtained. Improperly compacted Select Fill material shall be removed.

C. All areas receiving Select Fill material shall be compacted to 95% of the maximum density achieved during the standard proctor density test (ASTM D-698).

D. Select Fill where specified or directed shall be placed in accordance with Section 02000 - Earthwork.

3.02 SETTLEMENTS

A. Any settlement in the finished work that occurs during the contract period shall be corrected by the Contractor at his own cost and expense.

SELECT FILL - SECTION 02001

3.03 HAULING MATERIAL ON STREETS

1. When it is necessary to haul material over streets or pavements, the Contractor shall provide suitable tight vehicles so as to prevent deposits on the streets or pavements. In all cases where any materials are dripped from the vehicles, the Contractor shall clean up the same as often as required to keep the streets and pavements clean from dirt, mud, stone or other hauled material. The Contractor is responsible for obtaining all state, county, and town permits or variations to allow transport of any and all materials or equipment or public roadways.

- END OF SECTION -

REMOVAL AND DISPOSAL OF UNDERGROUND STORAGE TANKS - SECTION 02005

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. All labor, materials, services, and equipment necessary for the removal and disposal of the underground storage tank in accordance with the specifications outlined herein.

B. Related Work Specified Elsewhere

1. Earthwork: Section 02000
2. Restoration of Surfaces: Section 02007

1.02 QUALITY ASSURANCE

A. The minimum Applicable Codes, Standards, and Specifications

1. USEPA 40 CFR Parts 280-281. Technical Requirements and State Approval Program: Final Rules

2. National Fire Prevention Association. Volume 30. "Flammable and Combustible Liquids Code"

3. National Fire Protection Association, Volume 327, "Cleaning or Safeguarding Small Tanks and Containers"

4. American Petroleum Institute, API-2015, "Cleaning Petroleum Storage Tanks"

5. American Petroleum Institute, API-2015A, "A Guide for Controlling the Lead Hazard Associated with Tank Entry and Cleaning"

6. American Petroleum Institute, API-1604, "Recommended Practice for Abandonment or Removal of Used Underground Service Station Tanks"

7. American National Standards Institute, ANSI-Z28.2 "Standard Practices for Respiratory Protection"

8. National Institute for Occupational Safety and Health, NIOSH, "Working in Confined Space"

9. Any State, City and/or County Regulations Related to the Areas Represented above

1.03 SUBMITTALS

A. Copies of all necessary permits and certifications of waste haulers and disposal facilities must be submitted to the Engineer before commencing work, and written intent of plans for disposing of the tank and associated piping.

B. Copies of any other permits required to be obtained by the Contractor to do the work stated in the Contract Documents.

C. Written certification of proper transport and final disposal of tanks, contaminated soils, rinsates, and any liquids or sludges found in the tanks shall be submitted to the Engineer within ten (10) working days after disposal.

D. A written Health and Safety Plan to include but not limited to names of key personnel and alternate responsible for site safety and health; list of personal safety equipment and protective clothing to be available; site control measures; list of emergency and first aid equipment; and emergency names and phone numbers along with map and directions to the hospital.

E. The Contractor shall provide documentation that all workers who will be working on site have received appropriate health and safety training, 40 Hour Hazardous Waste Operations Safety Training in accordance with 29 CFR 1910.120.

F. State certified lab's name, address and State facility ID Number.

REMOVAL AND DISPOSAL OF UNDERGROUND STORAGE TANKS - SECTION 02005

PART 2 - EXECUTION

2.01 GENERAL

A. Prior to the removal of the tank, the Contractor shall drain the piping between the tank and the dispensers. The piping between the tank and the dispensers, the aboveground portion of the fill ports, and the vent lines shall be removed. The abandoned vent lines shall also be removed. The Contractor shall plug all openings in the tank except for one (1) vent hole.

B. The Contractor shall remove all free liquid product. The Contractor shall remove residual liquids and any sludges or solids from the tank. These liquids and sludges shall be disposed of as hazardous waste in a manner consistent with all applicable State waste disposal regulations and as directed by the Engineer. It shall be the responsibility of the Contractor to perform any sampling and analyses required to characterize any free liquids or solids in conformance with all applicable State and County waste disposal regulations, prior to disposal.

C. After all free liquid has been removed from the tank, any remaining residual liquids and any sludges or solids shall be removed by cleaning the interior of the tank with either high pressure water or steam. The interior of the tank shall be further cleaned by swabbing with a cloth saturated with an approved solvent (i.e. kerosene).

1. Prior to entering the tank to perform the cleaning activities, the tank shall be purged of gases and then tested for combustible vapors in accordance with NFPA 327.

2. If the tank is free of combustible vapors and the oxygen content is greater than 19.5 percent, personnel entering the tank shall employ Level C protection.

REMOVAL AND DISPOSAL OF
UNDERGROUND STORAGE TANKS - SECTION 02005

3. If the tank is free of combustible vapors, but the oxygen content is less than 19.5 percent, personnel entering the tank shall employ Level B protection.

4. Continued monitoring of the oxygen content and combustible vapors shall be employed while any personnel are within the tank. At a minimum, backup protection shall include not fewer than two additional personnel above the tank, standby SCBA, and rope harnesses.

5. All solvents and cleaning materials shall be removed for proper disposal as hazardous waste in accordance with all applicable State waste disposal regulations.

D. It is the Contractor's responsibility to disconnect electrical power to the tank accessory systems. Conduit and wiring located under the pavement will be abandoned in place.

E. The Contractor shall provide at least the following personal protective equipment as categorized:

1. Equipment for Level B protection:

a. Positive pressure SCBA or supplied air respirator system (MSHA/NIOSH approved), operated in positive pressure mode.

b. Hooded, one or two piece chemical resistant suit, Saranex coated Tyvek or equivalent.

c. Gloves - Outer, (Neoprene, nitrile or equivalent).

d. Gloves - Inner, (latex).

e. Long Underwear, (cotton).

f. Boots - Outer, (Neoprene).

g. Boots - Inner, (steel toe and shank).

h. Two-way radio communications.

i. Hard hat.

j. Escape air mask.

2. Equipment for Level C protection:

a. Full-face, air-purifying respirator with combination organic vapor, and high efficiency particulate cartridges (MSHA/NIOSH approved).

b. Hooded one or two piece chemical resistant suit. Saranex coated Tyvek or equivalent.

c. Gloves - Outer, (Neoprene. nitrile or equivalent).

d. Gloves - Inner (latex).

e. Long Underwear, (cotton).

f. Hard hat.

g. Boots - Outer. (Neoprene).

h. Boots - Inner, (steel toe and shank).

i. Two-way radio communications.

j. Escape air mask.

2.02 TANK REMOVALS

A. Before the initiation of any excavation by the Contractor, the location of all utilities (water, sewer, gas, electric, phone, etc.) should be noted by the Contractor in order to prevent any damage to the utilities during the excavation.

B. The Contractor shall excavate the tank, removing soil as necessary for removal of the tank. This soil shall be handled as specified in Section 02000 - Earthwork.

C. The Contractor shall excavate all tank bedding material and an amount of soil as directed by the Engineer.

2.03 EXCAVATION BACKFILL

A. Prior to backfill of the excavation, the Engineer shall visually examine the excavation for contamination. The Contractor shall remove subsurface soil to the limits as directed by the Engineer and stockpile it as directed by the Engineer.

B. Any excavation shall then be backfilled by the Contractor unless directed, by the Engineer, that the excavation remain open. If the excavation is to remain open, the Contractor shall be responsible for maintaining the structural stability of the excavation to ensure the integrity of the surrounding structures. The Contractor shall be responsible for securing the excavation to prevent injury to facility personnel.

C. When directed by the Engineer, the Contractor will be required to cover the excavation with plastic, a minimum of 6 mils thick, at the end of each working day.

2.04 DISPOSAL OF REMOVED TANK AND SOILS

A. After being rendered gas free, the tank shall be rendered unfit for further use by the Contractor. This shall be done by making a sufficient number (as determined by the Engineer) of holes or openings in the tank or by other acceptable methods as approved by the Engineer.

B. The Contractor shall obtain all required permits and manifests for transportation and disposal of the tank.

C. The Contractor shall dispose of the tank at a facility permitted to receive and dispose of wastes of this type, and provide a certificate of destruction for the tank.

D. The Contractor shall dispose of all soils in accordance with Section 02000 - Earthwork.

- END OF SECTION -

RESTORATION OF SURFACES - SECTION 02007

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. Surfaces disturbed, damaged or destroyed during the performance of the work under or as a result of the operations of the Contract, shall be restored and maintained, as specified herein or as directed.

2. The quality of materials and the performance of work used in the restoration shall produce a surface or feature equal to the condition of each before the work began.

3. The replacement of surfaces at anytime, as scheduled or as directed, shall not relieve the Contractor of responsibility to repair damages by settlement or other failures.

B. Related Work Specified Elsewhere

1. Earthwork: Section 02000
2. Reinforced Concrete: Section 03200

PART 2 - EXECUTION

2.01 TEMPORARY AREAS

A. For dust prevention, the Contractor will spray areas excavated and stockpiled with water when directed by the Engineer.

2.02 PERMANENT PAVEMENT REPLACEMENT

A. The permanent and final repaving of all streets, driveways and similar surfaces where pavement has been removed, disturbed, settled or damaged by or as a result of performance of the Contract shall be repaired and replaced by the Contractor, by a new and similar pavement.

RESTORATION OF SURFACES - SECTION 02007

1. The top surface shall conform with the grade of existing adjacent pavement and the entire replacement shall meet requirements specified in Section 03200 - Concrete or Section 03201 - Bituminous Concrete as appropriate.

2.03 PREPARATION FOR PERMANENT PAVEMENT

A. The base for permanent pavement will be prepared to conform with existing adjacent pavement.

1. The base shall be brought to the required grade and cross-section and thoroughly compacted before placing the permanent pavement.

2. Any base material which has become unstable for any reason shall be removed and replaced with compacted base materials.

B. Prior to placing the permanent pavement all service boxes, manhole frames and covers and similar structures within the area shall be adjusted to the established grade and cross-section.

2.04 ASPHALT PAVEMENT

A. The permanent asphalt pavement replacement for streets, driveways and parking area surfaces shall be replaced with bituminous materials of the same depth and kind as the existing unless otherwise specified.

B. Prior to placing of any bituminous pavement a sealer shall be applied to the edges of the existing pavement and other features.

C. The furnishing, handling and compaction of all bituminous materials shall be in accordance with the New York State Department of Transportation Standard Specifications.

D. Paving slabs or concrete bases shall be constructed to extend one foot beyond each side of the trench and be supported on undisturbed soil. Where such extension of the pavement will leave less than two feet of original pavement slab or base, the repair of the pavement slab or base shall be extended to replace the slab to the original edge of the pavement or base unless otherwise directed by the Engineer.

2.05 CONCRETE PAVEMENT AND PAVEMENT BASE

A. Concrete pavements and concrete bases for asphalt, brick or other pavement surfaces shall be replaced with Class "B" Concrete, air-entrained.

B. Paving slabs or concrete bases shall be constructed to extend one foot beyond each side of the trench and be supported on undisturbed soil. Where such extension of the pavement will leave less than two feet of original pavement slab or base, the repair of the pavement slab or base shall be extended to replace the slab to the original edge of the pavement or base.

C. Where the edge of the pavement slab or concrete base slab falls within the excavation, the excavation shall be backfilled with Special Backfill compacted to 95% maximum dry density as determined by ASTM D 698 up to the base of the concrete.

D. The new concrete shall be of the same thickness as the slab being replaced and shall contain reinforcement equal to the old pavement.

   1. New concrete shall be placed and cured in accordance with the applicable provisions of the New York State Department of Transportation Standards.

2.06 CONCRETE WALKS, CURBS, AND GUTTER REPLACEMENT

A. Concrete walks, curbs, and gutters removed or damaged in connection with or as a result of the construction operations shall be replaced with new construction.

   1. The minimum replacement will be a flag or block of sidewalk and five feet of curb or gutter.

B. Walks shall be constructed of Class "B" concrete, air-entrained with NYSDOT #1 stone aggregate on a 4-inch base of compacted gravel or stone.

RESTORATION OF SURFACES - SECTION 02007

1. The walk shall be not less than 4 inches in thickness or the thickness of the replaced walk where greater than 4 inches, shall have construction joints spaced not more than 50 feet apart and shall be sloped at right angles to the longitudinal centerline approximately 1/8 inch per foot of width.

C. One-half inch expansion joint material shall be placed around all objects within the sidewalk area as well as objects to which the new concrete will abut, such as valve boxes, manhole frames, curbs, buildings and others.

D. Walks shall be hand-floated and broom-finished, edged and grooved at construction joints and at intermediate intervals matching those intervals of the walk being replaced.

1. The intermediate grooves shall be scored a minimum of 1/4 of the depth of the walk.

2. The lengths of blocks formed by the grooving tool, and distances between construction and expansion joints shall be uniform throughout the length of the walk in any one location.

E. The minimum length of curb or gutter to be left in place or replaced shall be 5 feet. Where a full section is not being replaced, the existing curb or gutter shall be saw cut to provide a true edge.

1. The restored curb or gutter shall be the same shape, thickness and finish as being replaced and shall be built of the same concrete and have construction and expansion joints as stated above for sidewalks.

F. All concrete shall be placed and cured as specified in the Section for concrete.

- END OF SECTION -

CONCRETE - SECTION 03200

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Formwork, shoring, bracing, and anchorage.

B. Concrete reinforcement and accessories.

C. Cast-in-place concrete.

1.02 REFERENCES

A. ACI 301-84 - Specifications of Structural Concrete for Buildings

B. ASTM A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement

C. ASTM C33 - Concrete Aggregates

D. ASTM C94 - Ready-Mixed Concrete

E. ASTM C150 - Portland Cement

F. ASTM C260 - Air-Entraining Admixtures for Concrete

1.03 QUALITY ASSURANCE

A. Perform work in accordance with ACI 301-84.

1.04 TESTS

A. Submit proposed mix design of each class of concrete for review prior to commencement of work.

B. Submit proposed mix design of each class of concrete for review prior to commencement of work.

C. Testing firm will take cylinders and perform slump and air-entrainment tests in accordance with ACI 301-84.

CONCRETE - SECTION 03200

1.05 SUBMITTALS

A. Submit shop drawings of reinforcing steel under provisions of General Provisions.

B. Indicate reinforcement sizes, spacings, locations and quantities of reinforcing steel, and supporting and spacing devices.

PART 2 - PRODUCTS

2.01 FORM MATERIALS

A. Conform to ACI 301-84

2.02 REINFORCING STEEL

A. Reinforcing Steel: ASTM A615, 60 ksi yield grade billet steel deformed bars; uncoated finish

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150, Type 11A - Air-Entraining Portland, grey color

B. Fine and Coarse Aggregates: ASTM C33

C. Water: Clean and not detrimental to concrete

2.04 ADMIXTURES

A. Air Entrainment Admixture: ASTM C260

2.06 CURING MATERIALS

A. Water: Clean and drinkable

B. Absorptive Mat: Burlap-polyethylene, 8 oz/sq yd bonded to prevent separation during use.

2.07 CONCRETE

A. Mix concrete in accordance with ASTM C94

B. Concrete:

1. Compressive Strength (7 days): 3,000 psi
2. Compressive Strength (28 days): 4,000 psi
3. Slump: 4 inch
4. Water-Cement Ratio: .45

C. Add air-entraining agent to mix for concrete exposed to freeze-thaw cycling.

PART 3 - EXECUTION

3.01 FORMWORK ERECTION

A. Verify lines, levels, and measurement before proceeding with formwork.

B. Hand trim and bottom of earth forms: remove loose dirt.

C. Align form joints.

D. Coordinate work of other Sections in setting openings, bolts, anchors, and other inserts.

3.02 REINFORCEMENT

A. Place, support, and secure reinforcement against displacement.

3.03 FLOOR SLABS

A. Broom finish surface.

B. Moist-cure slabs in accordance with ACI 301-84, 12.2.1.1 to 12.2.1.6 inclusive.

- END OF SECTION -

BITUMINOUS CONCRETE - SECTION 03201

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. Construction of two courses of bituminous concrete pavement on a prepared base laid to the required grade, thickness and cross-section as directed by the Engineer.

2. The quality of materials and performance of the work shall be in accordance with the New York State Department of Transportation Standard Specifications unless otherwise specified in this Section.

B. Related Work Specified Elsewhere

1. Select Fill: Section 02001

PART 2 - PRODUCTS

2.01 BITUMINOUS BASE COURSE

A. Bituminous base course for pavement shall conform to the following composition of mixtures:

TYPE A

Sieve Size	% Passing Min.	% Passing Max.
Passing ½ inch sieve	100	...
Passing ½ inch sieve, retained on 3/8 inch sieve	0	29
Passing 3/8 inch sieve, retained on 4 sieve	20	45
Passing No. 4 sieve, retained on No. 10 sieve	7	35
Passing No. 10 sieve, retained on No. 40 sieve	8	30
Passing No. 40 sieve, retained on No. 80 sieve	5	20
Passing No. 80 sieve, retained on No. 200 sieve	3	18
Passing No. 200 sieve	4	10
Asphalt Cement	3.5	8

B. Type A mixtures shall contain approximately 80 percent of an approved crushed porphyry rock.

2.02 BITUMINOUS TOP COURSE

A. Bituminous top course for pavement shall conform to the following composition of mixtures:

TYPE C

Sieve Size	% Passing Min.	% Passing Max.
Passing 3/4 inch sieve	100	...
Passing 3/4 inch sieve, retained on ½ inch sieve	0	3
Passing ½ inch sieve, retained on 3/8 inch sieve	0	25
Passing 3/8 inch sieve, retained on No. 4 sieve	20	45
Passing No. 4 sieve, retained on No. 10 sieve	7	20
Passing No. 10 sieve, retained on No. 40 sieve	7	20
Passing No. 40 sieve, retained on No. 80 sieve	5	20
Passing No. 80 sieve, retained on No. 200 sieve	3	18
Passing No. 200 sieve	4	10
Asphalt Cement	3.5	7

B. Type C mixtures shall contain between 20 and 35 percent of material designated as fine aggregate.

PART 3 - INSTALLATION

3.01 SUBGRADE

A. The subgrade shall be shaped to line and grade and compacted with self-propelled rollers.

B. All depressions which develop under rolling shall be filled with acceptable material and the area re-rolled.

C. Soft areas shall be removed and filled with acceptable materials and the area re-rolled.

D. Should the subgrade become rutted or displaced prior to the placing of the subbase it shall be reworked to bring to line and grade.

3.02 SUBBASE

A. The subbase shall consist of a layer of granular material rolled to a minimum final thickness of eight inches.

B. Rolling shall be done with a self-propelled roller weighing not less than five tons.

C. Rolling shall begin at the sides and continue toward the center and shall continue until there is no movement ahead of the roller.

D. After completion of the subbase rolling there shall be no hauling over the subbase other than the delivery of material for the base course.

3.03 BITUMINOUS MATERIAL

A. The bituminous pavement shall be of 3 inch compacted depth.

B. The bituminous top course shall be of 1 inch compacted depth.

C. Prior to placing the bituminous base course a prime coat shall be applied to the granular subbase.

D. A tack coat shall be applied to the edges of existing pavement, curbing, gutters, manholes and other structures, before placing any bituminous concrete.

3.04 TESTING

A. The finish pavement shall be to the grades and cross-section as directed by the Engineer.

1. The surface tolerance shall not exceed 1/4 inch in 10 feet.

2. There shall be no depressions which will retain standing water.

BITUMINOUS CONCRETE - SECTION 03201

B. Variations exceeding 1/4 inch or depressions shall be satisfactorily corrected.

- END OF SECTION -

ATTACHMENT 2

Tank Removal Permit

This Card Must Be Posted in a Conspicuous Place Before Any Work is Started

VILLAGE OF MAMARONECK
BUILDING DEPARTMENT

PERMISSION IS GRANTED

FOR THE ERECTION OF TANK REMOVAL

LOCATION 139 Hoyt Street SEC. 8 BLOCK 112 LOT 46B-55 56C1-57C

OWNER ITT Selectro ADDRESS Mamaroneck, NY

ARCHITECT ADDRESS

BUILDER Joseph Sorena ADDRESS Edison, NJ

PERMIT No. 17975 DATE ISSUED MAY 30 1991 19 EXPIRES NOV 30 1991 19

NOTICE: CONCRETE for footings, walls, etc., shall be poured between approved forms. Concrete shall not be poured against earth or in open trenches. Footings shall not be poured until the Building Inspector has inspected the soil on which they are to rest and has given his approval to the conditions present.

BEFORE THE BUILDING OR ANY PART THEREOF IS OCCUPIED A CERTIFICATE OF OCCUPANCY MUST BE OBTAINED FROM THE BUILDING DEPARTMENT.

As Per Resolution,

Board of Appeals # 19

Ernest Lacasa
Building Inspector — Village of Mamaroneck

ATTACHMENT 3

Project Photographs

Front view of ITT Sealectro prior to starting the tank removal project.

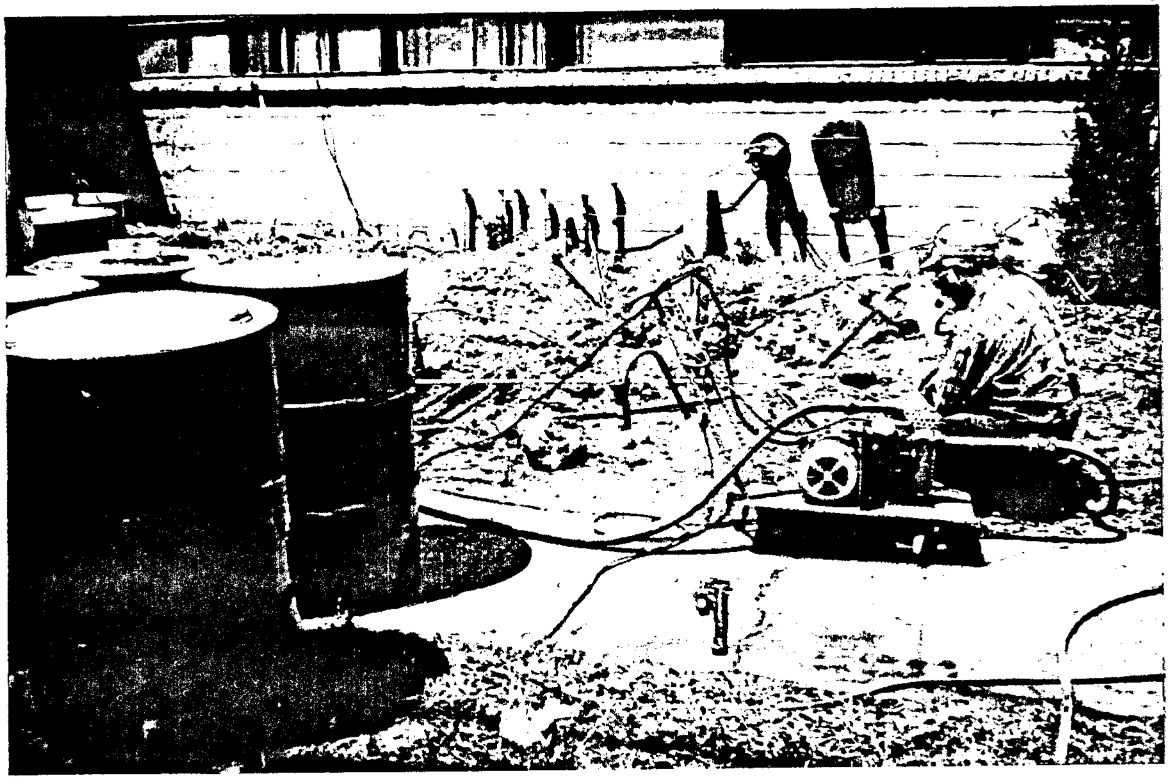
Bobcat clearing UST area of all vegetation before excavation activities begin.

OBG Technical Services, Inc. personnel collect all trash from the UST area.

Bobcat clearing UST area of all rocks before excavation activities begin.

OBG Technical Services, Inc. personnel determine organic vapor concentrations within UST area soil.

Backhoe excavating the UST area to determine actual number of tanks.

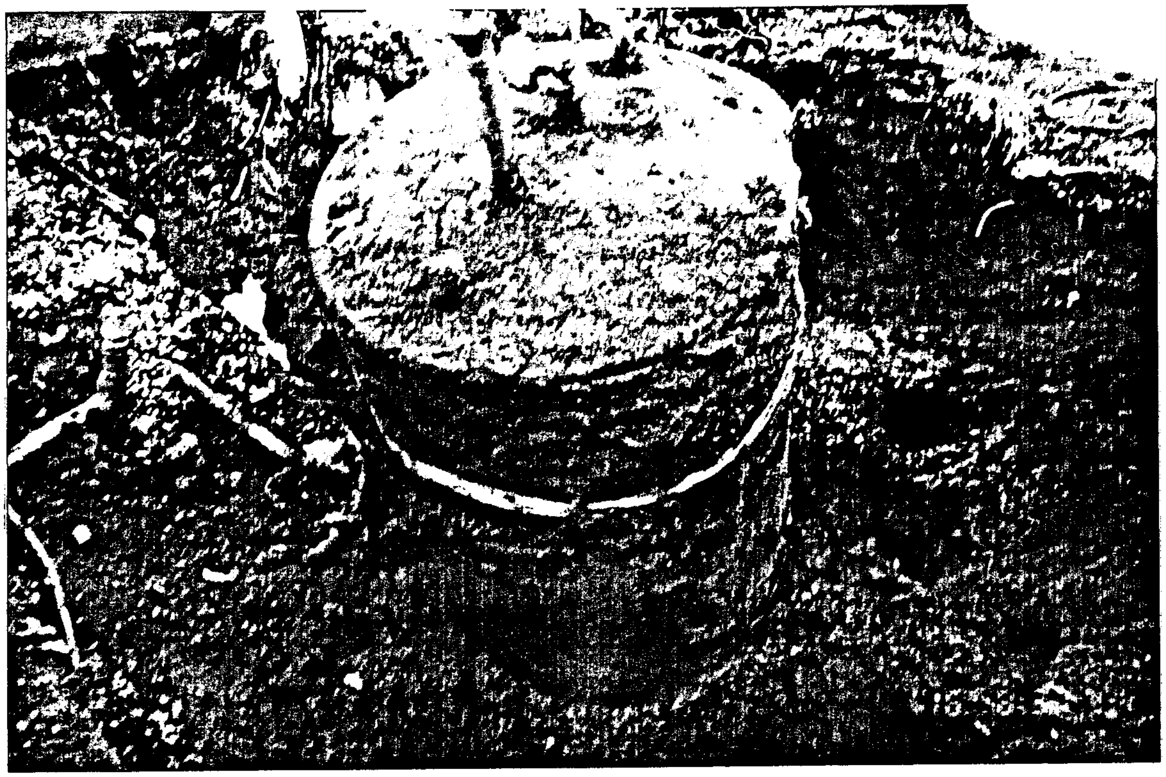


UST contents are being pumped into 55-gallon drums.

Vacuum truck, provided by Environmental Products and Services, Inc., transfers UST contents into 55-gallon drums.

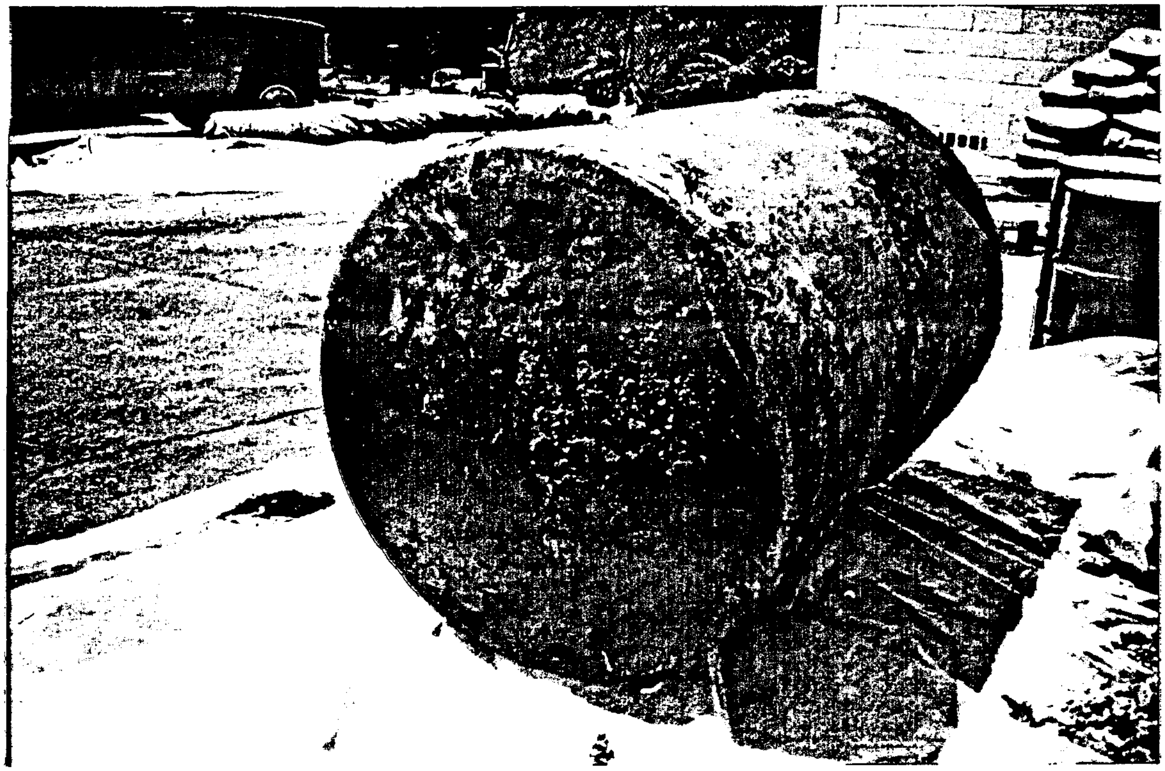
The removal of Tank #3 (275-gallon UST) from the excavation pit.

Backhoe releasing Tank #6 (550-gallon UST) from its ground location.



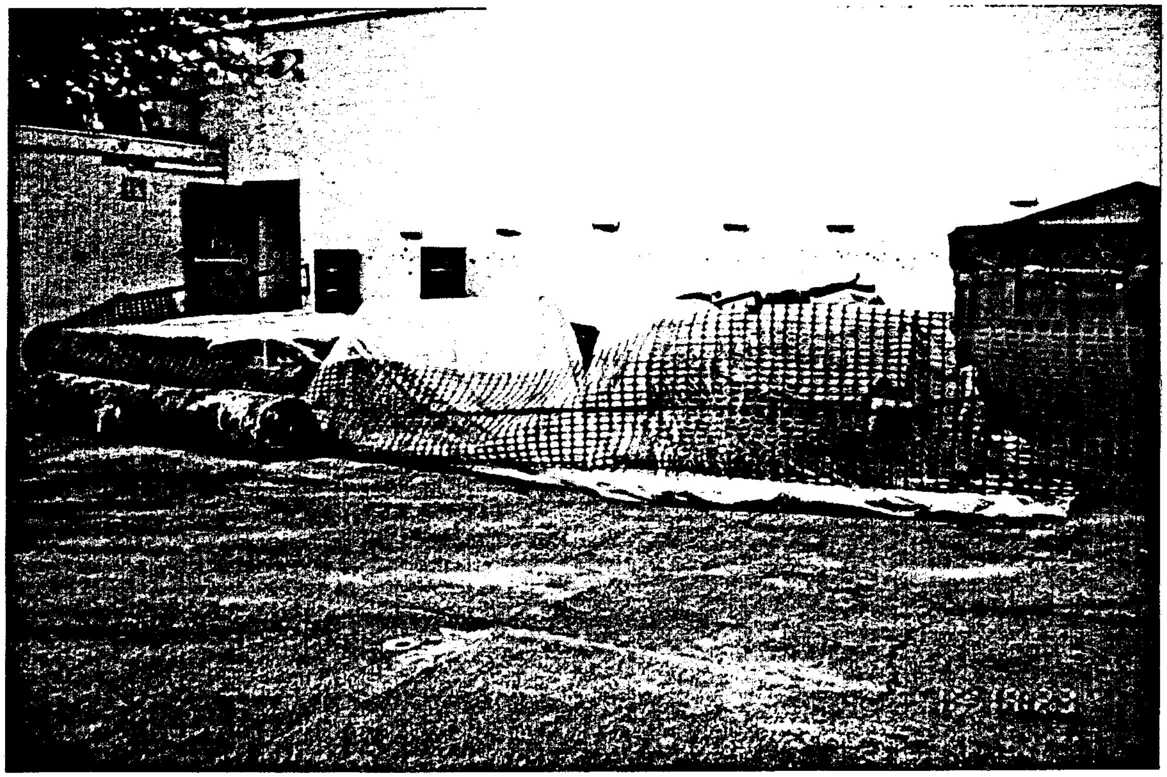
The removal of Tank #4 (550-gallon UST) from the excavation pit.

Backhoe excavating dirt around Tank #2 (550-gallon UST).



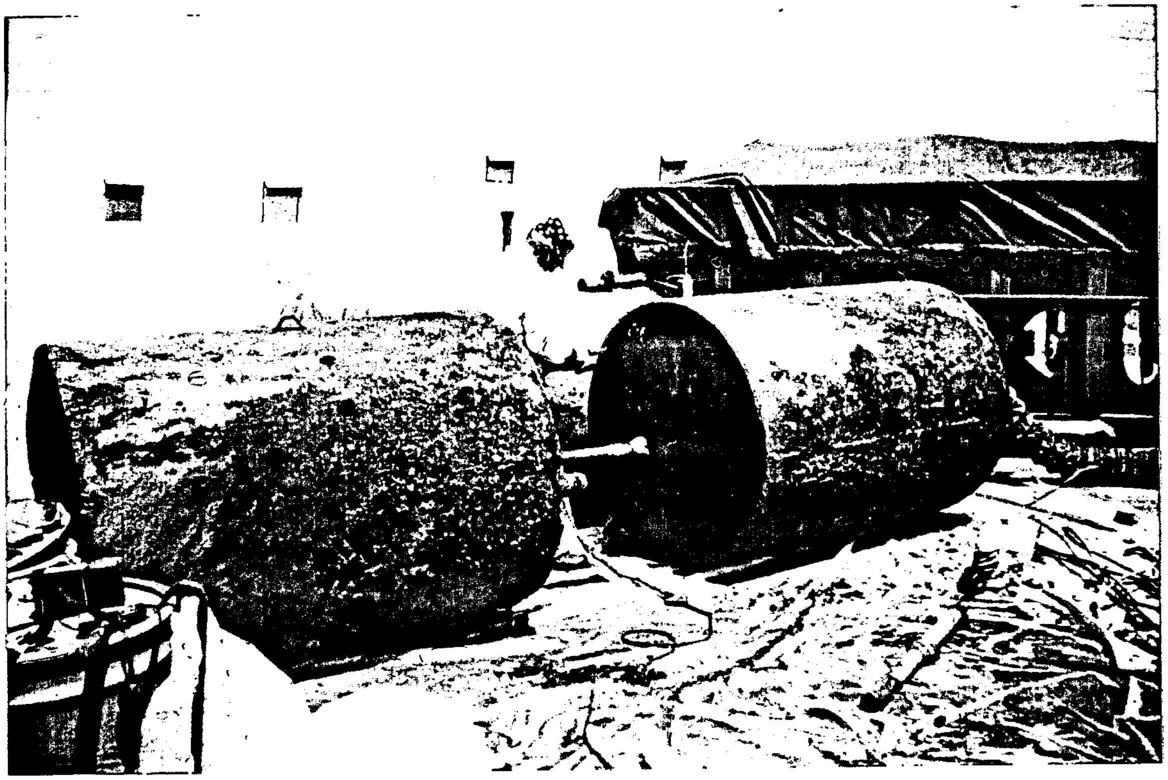
A 550-gallon UST after it was removed from the excavation pit (note holes in bottom).

Backhoe leveling off excavation pit.

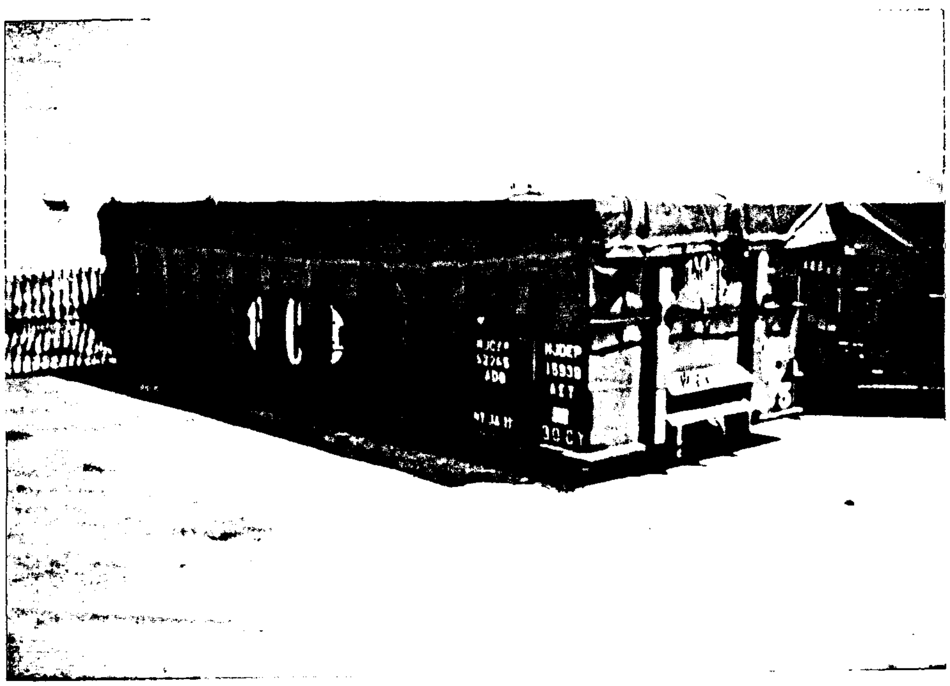


55-gallon drum, roll-off container and UST storage area secured by plastic mesh and absorbent berm.

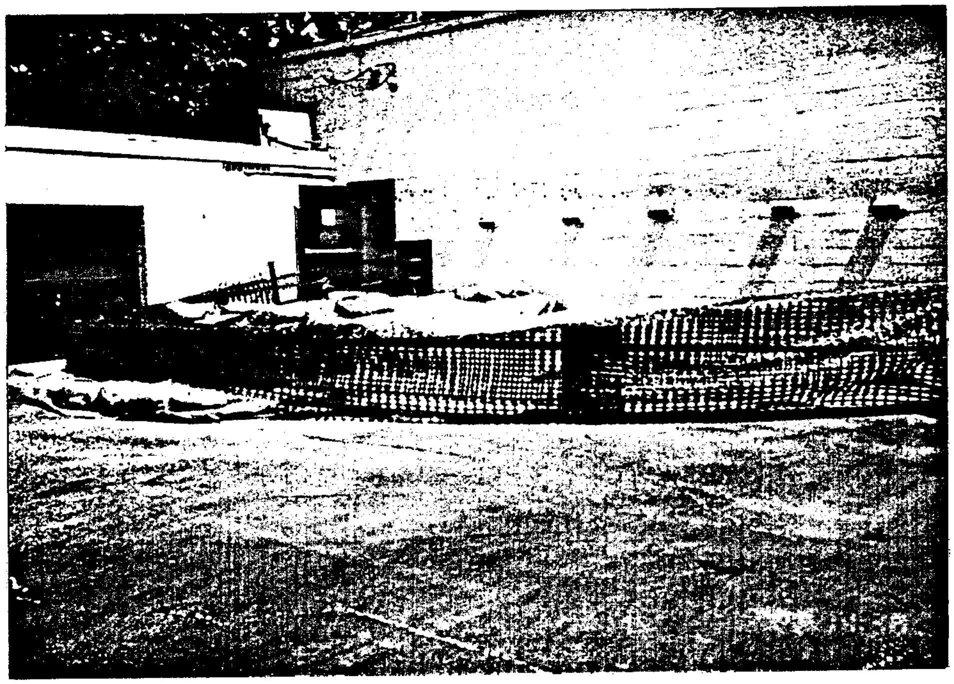
Side view of the UST area following the removal of eight underground storage tanks.



OBG Technical Services, Inc. technician prepares tanks for disposal.



Secured roll-off container located on site.



55-gallon drum storage area secured by plastic mesh and absorbent berm.

UST area security depicting plastic mesh and barracade arrangement.

ATTACHMENT 4

Laboratory Report

LABORATORIES, INC.

Laboratory Report

CLIENT I.T.T. SEALECTRO JOB NO. 3356.001.517

DESCRIPTION Mamaroneck, NY

MATRIX: See Below

DATE COLLECTED 5-28-91 DATE RECEIVED 5-29-91

Description		Sample #	TOTAL PETRO-LEUM HYDRO-CARBONS	PERCENT TOTAL SOLIDS	
Soils:	**(mg/kg dry weight)**				
C-1		M5092	8100.	70.	
C-2		M5093	3500.	69.	
C-3		M5094	2600.	73.	
D-1		M5095	2100.	77.	
D-2		M5096	7000.	84.	
D-3		M5097	1200.	83.	
D-4		M5098	2500.	80.	
Water:	**(mg/l)**				
Field Blank		M5099	1.	-	

Comments:

Certification No.: 10155

Units: See Above

Authorized: [signature]

Date: June 10, 1991

OBG Laboratories, Inc., *an O'Brien & Gere Limited Company*
5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

OBG LABORATORIES, INC.

Volatile Organics
Method 8010/8020

CLIENT: I.T.T. SEALECTRO — JOB NO. 3356.001.517

DESCRIPTION: Mamaroneck, NY

MATRIX: Soil

DATE COLLECTED: 5-28-91 — DATE RECEIVED: 5-29-91 — DATE ANALYZED: 5-30,31-91

DESCRIPTION:	C-1	C-2	C-3	D-1	D-2	D-3
SAMPLE NO.:	M5092	M5093	M5094	M5095	M5096	M5097
Benzene	<14,000.	<14,000.	<14,000.	<13,000.	<1200.	<1200.
Benzyl chloride	<140,000.	<140,000.	<140,000.	<130,000.	<12,000.	<12,000.
Bis (2-chloroethoxy) methane	<7,100,000.	<7,200,000.	<6,800,000.	<6,600,000.	<600,000.	<600,000.
Bromobenzene	<71,000.	<72,000.	<68,000.	<66,000.	<6000.	<6000.
Bromodichloromethane	<14,000.	<14,000.	<14,000.	<13,000.	<1200.	<1200.
Bromoform	<140,000.	<140,000.	<140,000.	<130,000.	<12,000.	<12,000.
Bromomethane	<140,000.	<140,000.	<140,000.	<130,000.	<12,000.	<12,000.
Carbon tetrachloride	<14,000.	<14,000.	<14,000.	<13,000.	<1200.	<1200.
Chlorobenzene	↓	↓	↓	↓	↓	↓
Chloroethane	↓	↓	↓	↓	↓	↓
2-Chloroethylvinyl ether	<140,000.	<140,000.	<140,000.	<130,000.	<12,000.	<12,000.
Chloroform	<14,000.	<14,000.	<14,000.	<13,000.	<1200.	<1200.
1-Chlorohexane	<140,000.	<140,000.	<140,000.	<130,000.	<12,000.	<12,000.
Chloromethane	<140,000.	<140,000.	<140,000.	<130,000.	<12,000.	<12,000.
Chloromethylmethyl ether	<1,400,000.	<1,400,000.	<1,400,000.	<1,300,000.	<120,000.	<120,000.
2-Chlorotoluene	<71,000.	<72,000.	<68,000.	<66,000.	<6000.	<6000.
4-Chlorotoluene	<71,000.	<72,000.	<68,000.	<66,000.	<6000.	<6000.
Dibromochloromethane	<14,000.	<14,000.	<14,000.	<13,000.	<1200.	<1200.
Dibromomethane	<140,000.	<140,000.	<140,000.	<130,000.	<12,000.	<12,000.
1,2-Dichlorobenzene	<71,000.	<72,000.	<68,000.	<66,000.	<6000.	<6000.
1,3-Dichlorobenzene	↓	↓	↓	↓	↓	↓
1,4-Dichlorobenzene	↓	↓	↓	↓	↓	↓
Dichlorodifluoromethane	<140,000.	<140,000.	<140,000.	<130,000.	<12,000.	<12,000.

Authorized: Michael D. [signature]

Date: June 11, 1991

OBG Laboratories, Inc., *an O'Brien & Gere Limited Company*
5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

OBG LABORATORIES, INC.

Volatile Organics
Method 8010/8020

CLIENT I.T.T. SEALECTRO JOB NO. 3356.001.517

DESCRIPTION Mamaroneck, NY

MATRIX: Soil

DATE COLLECTED 5-28-91 DATE RECEIVED 5-29-91 DATE ANALYZED 5-30,31-91

DESCRIPTION:	C-1	C-2	C-3	D-1	D-2	D-3
SAMPLE NO.:	M5092	M5093	M5094	M5095	M5096	M5097
1,1-Dichloroethane	<14,000.	<14,000.	<14,000.	<13,000.	<1200.	<1200.
1,2-Dichloroethane						
1,1-Dichloroethylene						
1,2-Dichloroethylene (total)						
Dichloromethane						
1,2-Dichloropropane						
cis-1,3-Dichloropropylene						
trans-1,3-Dichloropropylene						
Ethylbenzene						
1,1,2,2-Tetrachloroethane	<140,000.	<140,000.	<140,000.	<130,000.	<12,000.	<12,000.
1,1,1,2-Tetrachloroethane	<14,000.	<14,000.	<14,000.	<13,000.	<1200.	<1200.
Tetrachloroethylene	2,600,000.	1,900,000.	1,500,000.	1,700,000.	200,000.	130,000.
Toluene	24,000.	23,000.	30,000.	<13,000.	<1200.	<1200.
1,1,1-Trichloroethane	1,200,000.	720,000.	3,300,000.	250,000.	1900.	4500.
1,1,2-Trichloroethane	<14,000.	<14,000.	<14,000.	<13,000.	<1200.	<1200.
Trichloroethylene						1300.
Trichlorofluoromethane						<1200.
1,2,3-Trichloropropane	<140,000.	<140,000.	<140,000.	<130,000.	<12,000.	<12,000.
Vinyl chloride	<14,000.	<14,000.	<14,000.	<13,000.	<1200.	<1200.
Xylene (total)	<43,000.	<43,000.	<41,000.	<39,000.	<3600.	<3600.

Comments:

Methodology: USEPA SW-846, November 1986, 3rd Edition

Certification No.: 10155

Units: µg/kg dry weight

Authorized: Michael O. [signature]

Date: June 11, 1991

OBG Laboratories, Inc., *an O'Brien & Gere Limited Company*
5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

LABORATORIES, INC.

Volatile Organics
Method 8010/8020

CLIENT: I.T.T. SEALECTRO JOB NO. 3356.001.517

DESCRIPTION: Mamaroneck, NY

MATRIX: Soil, Water

DATE COLLECTED: 5-28-91 DATE RECEIVED: 5-29-91 DATE ANALYZED: 5-31 to 6-3-91

DESCRIPTION:	D-4	Field Blank	QC Trip Blank		
SAMPLE NO.:	M5098*	M5099**	M5100**		
Benzene	<1300.	<1.	<1.		
Benzyl chloride	<13,000.	<10.	<10.		
Bis (2-chloroethoxy) methane	<630,000.	<500.	<500.		
Bromobenzene	<6300.	<5.	<5.		
Bromodichloromethane	<1300.	<1.	<1.		
Bromoform	<13,000.	<10.	<10.		
Bromomethane	<13,000.	<10.	<10.		
Carbon tetrachloride	<1300.	<1.	<1.		
Chlorobenzene	↓	↓	↓		
Chloroethane	↓	↓	↓		
2-Chloroethylvinyl ether	<13,000.	<10.	<10.		
Chloroform	<1300.	<1.	<1.		
1-Chlorohexane	<13,000.	<10.	<10.		
Chloromethane	<13,000.	<10.	<10.		
Chloromethylmethyl ether	<130,000.	<100.	<100.		
2-Chlorotoluene	<6300.	<5.	<5.		
4-Chlorotoluene	<6300.	<5.	<5.		
Dibromochloromethane	<1300.	<1.	<1.		
Dibromomethane	<13,000.	<10.	<10.		
1,2-Dichlorobenzene	<6300.	<5.	<5.		
1,3-Dichlorobenzene	↓	↓	↓		
1,4-Dichlorobenzene	↓	↓	↓		
Dichlorodifluoromethane	<13,000.	<10.	<10.		

Authorized: [signature]

Date: June 11, 1991

OBG Laboratories, Inc., *an O'Brien & Gere Limited Company*
5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

LABORATORIES, INC.

Volatile Organics
Method 8010/8020

CLIENT I.T.T. SEALECTRO JOB NO. 3356.001.517

DESCRIPTION Mamaroneck, NY

MATRIX: Soil, Water

DATE COLLECTED 5-28-91 DATE RECEIVED 5-29-91 DATE ANALYZED 5-31 to 6-3-91

DESCRIPTION:	D-4	Field Blank	QC Trip Blank		
SAMPLE NO.:	M5098*	M5099**	M5100**		
1,1-Dichloroethane	<1300.	<1.	<1.		
1,2-Dichloroethane					
1,1-Dichloroethylene					
1,2-Dichloroethylene (total)					
Dichloromethane					
1,2-Dichloropropane					
cis-1,3-Dichloropropylene					
trans-1,3-Dichloropropylene					
Ethylbenzene					
1,1,2,2-Tetrachloroethane	<13,000.				
1,1,1,2-Tetrachloroethane	<1300.				
Tetrachloroethylene	140,000.				
Toluene	1500.				
1,1,1-Trichloroethane	5800.		2.		
1,1,2-Trichloroethane	<1300.		<1.		
Trichloroethylene					
Trichlorofluoromethane					
1,2,3-Trichloropropane	<13,000.				
Vinyl chloride	<1300.				
Xylene (total)	<3800.	<3.	<3.		

Comments:

Methodology: USEPA.SW-846. November 1986. 3rd Edition

Certification No.: 10155

Units: *µg/kg dry weight

**µg/1

Authorized: [signature]

Date: June 11, 1991

OBG Laboratories, Inc., *an O'Brien & Gere Limited Company*
5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

OBG LABORATORIES, INC.

CHAIN OF CUSTODY RECORD

SURVEY: I.T.T Sealectro

LOCATION: Mamaroneck, N.Y

SAMPLED BY: Peter Bogardus / Karen Edw

ORGANIZATION: O'Brien + Gere Engineers, Inc

STATION NUMBER	SAMPLE LOCATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	COMP. OR GRAB	NO. OF CONTAINERS	ANALYSIS REQUIRED
	C-1	5/28/91	11:40	Soil	Comp	2	TPH / VOC
	C-2		12:05			2	
	C-3		12:40			2	
	D-1		11:50		Grab	2	
	D-2		12:10			2	
	D-3		12:30			2	
	D-4		12:45			2	
	Field Blank		1:15	water	N/A	2	
	Trip Blank	5/16/91	N/A	water	N/A	1	VOC

Relinquished By:	DATE	TIME	Received By:	DATE	TIME
Karen J Edwards	5/28/91	5:15pm			
Relinquished By:	DATE	TIME	Received By:	DATE	TIME
Relinquished By:	DATE	TIME	Received by Laboratory: Ann Barnes	5/29/91	11:10

COMMENTS:

* shipped with 5 ice packs

METHOD OF SHIPMENT: Federal Express #5964751376

0364854151

OBG Laboratories, Inc., an O'Brien & Gere Limited Company
5000 Brittonfield Parkway / Suite 300 / PO Box 4942 / Syracuse, NY 13221 / (315) 437-0200

CASE FILE

Survey: I.T.T. Sealectro Date Collected: 5-28-91

Sampler: P. Bogardus/K. Edward Date Received: 5-29-91

Client Name and Ref. #: O'Brien & Gere Engineer.

OBG Laboratory Client #: 3356.001.577.

CONDITION OF SHIPMENT: Satisfactory

Analysis changed according to Fax.

8010/8020 instead of 8240.

RADIOACTIVITY SCREENING*:

X The sample cooler(s) were screened for radioactivity and found safe for handling.

___ The samples come from a safe source and do not need to be screened.

Signed: Ann Barnes.
Sample Coordinator

****

DISPOSAL PROCEDURE**: Routine

Signed: [signature]

Date: 6/12/91

*The radioactivity screen is performed to alert our employees of unexpected radioactivity at hazardous waste sites.

**Samples are disposed of four (4) weeks after a typed report is signed and mailed to the client. The routine method of disposal is: water samples are filtered through carbon to a sanitary sewer, solid samples are sent to a sanitary landfill.

CHAIN OF CUSTODY RECORD

OBG
LABORATORIES, INC.

SURVEY: I.T.T Sealectro
LOCATION: Mamaroneck, N.Y

SAMPLED BY: Peter Bogardus / Karen Edwards
ORGANIZATION: O'Brien + Gere Engineers, Inc

STATION NUMBER	SAMPLE LOCATION	DATE COLLECTED	TIME COLLECTED	SAMPLE MATRIX	COMP. OR GRAB	NO. OF CONTAINERS	ANALYSIS REQUIRED
	C-1	5/28/91	11:45	Soil	Comp	2	TPH / VOC
	C-2		12:05			2	
	C-3		12:40			2	
	D-1		11:50		Grab	2	
	D-2		12:10			2	
	D-3		12:30			2	
	D-4		12:45			2	
	Field Blank		1:15	water	N/A	2	
	Trip Blank	5/16/91	N/A	water	N/A	1	VOC

Relinquished By:	DATE	TIME	Received By:	DATE	TIME
Karen J Edwards	5/28/91	6:15pm			

Relinquished By:	DATE	TIME	Received By:	DATE	TIME

Relinquished By:	DATE	TIME	Received by Laboratory:	DATE	TIME

COMMENTS:
* shipped with 5 ice packs
** please do a standard analysis VOC (8010/8020) and TPH (418.1)

METHOD OF SHIPMENT: Federal Express #596475137 6

ATTACHMENT 5

Tank Disposal Certification

TECHNICAL SERVICES

July 15, 1991

Mr. Kevin Edwards
O'BRIEN & GERE ENGINEERS, INC.
Raritan Plaza I
Edison, NJ 08837

Re: ITT Mamaroneck

Subj: Tank Disposal

File: C407

Dear Mr. Edwards:

In response to your request for verification of the disposal of the tank structures from the project for ITT Scalectro in Mamaroneck, New York this letter serves as that verification. The tanks were cleaned on-site and cut into manageable pieces. They were then transported to our facility in Syracuse, New York and cut into pieces 2 foot by 4 foot or smaller. These pieces were disposed of as scrap metal at Ross Smelting Corporation located in Syracuse, New York.

I hope this information is sufficient for your needs. Should you have any questions or comments, please feel free to contact me at my Syracuse office.

Very truly yours,

OBG TECHNICAL SERVICES, INC.

Anthony J. Geiss
Project Supervisor

AJG/klk

OBG Technical Services, Inc. an O'Brien & Gere Limited Company
Box 5240 / 5000 Brittonfield Parkway, Suite 200 / Syracuse, New York 13220 / (315) 437-6400 FAX (315) 437-9800
Blue Bell, PA (215) 628-8595

ATTACHMENT 6

Hazardous Waste Disposal Manifests

48-14-1 (5/87)—7f

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

HAZARDOUS WASTE MANIFEST

P.O. Box 12820, Albany, New York 12212

Please print or type.

Form Approved. OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator's US EPA No. N YD 0 01 6 04 42 0	Manifest Document No. 0 00 0 2	2. Page 1 of 1	Information in the shaded areas is not required by Federal Law.

3. Generator's Name and Mailing Address: IT&T Sealectro, 139 Hoyt Street, Mamaroneck, NY 10543

4. Generator's Phone (203223-2700

A. State Manifest Document No. NY A732799 8

B. Generator's ID

5. Transporter 1 (Company Name): Freehold Cartage, Inc.

6. US EPA ID Number: N Y D0 54 1 26 1 64

C. State Transporter's ID

D. Transporter's Phone (

7. Transporter 2 (Company Name)

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone ( )

9. Designated Facility Name and Site Address: LWD, Inc., PO Box 327, Calvert, KY 42029

10. US EPA ID Number: N Y D0 01 6 04 4 20

G. State Facility's ID

H. Facility's Phone ( )

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Hazardous Waste- Solid, N.O.S. (F001) ORM-E, NA 9181	0 02	~~RO~~	0 31 0 0	lbs.	
b.					
c.					
d.					

J. Additional Descriptions for Materials listed Above: a. b. c. d.

K. Handling Codes for Wastes Listed Above: a. b. c. d.

15. Special Handling Instructions and Additional Information
Product Code: JJ42 facility description
Emergency Contact Number: Mr. Jeffry Malouey
Home: (203) 582-6338, Work: (203)223-2700 ex 310

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.

If I am a large quantity generator, I certify that I have program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR if I am a small generator, I have made a good faith effort to minimize my waste and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Mo. Day Year
JOSEPH CORVO	Joseph Corvo	8 2 91

17. Transporter 1 (Acknowledgement of Receipt of Materials)

Printed/Typed Name	Signature	Mo. Day Year
Michael T. EAST SR	Michael T. East Sr.	08 02 91

18. Transporter 2 (Acknowledgement or Receipt of Materials)

Printed/Typed Name	Signature	Mo. Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Mo. Day Year

NYA 732799 8

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

48-14-1 (5/87)—7

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

HAZARDOUS WASTE MANIFEST

P.O. Box 12820, Albany, New York 12212

Please print or type.

Form Approved. OMB No. 2050-0039. Expires 9-30-88

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA No. N Y D 0 0 1 6 0 4 4 2 0 — Manifest Document No. 0 0 0 0 1
2. Page 1 of 1

Information in the shaded areas is not required by Federal Law.

3. Generator's Name and Mailing Address
ITT Sealectro
139 Hoyt Street Mamaroneck, NY 10543

4. Generator's Phone 203 223-2700

A. State Manifest Document No. NY A 732798 9

B. Generator's ID

5. Transporter 1 (Company Name) Freehold Cartage, Inc.
6. US EPA ID Number N J D 0 5 4 1 2 6 1 6 4

C. State Transporter's ID 3P113
D. Transporter's Phone (908 462-1001

7. Transporter 2 (Company Name)
8. US EPA ID Number

E. State Transporter's ID
F. Transporter's Phone ( )

9. Designated Facility Name and Site Address
LWD, Inc.
PO Box 327
Calvert, KY 42029

10. US EPA ID Number K Y D 0 8 1 6 0 4 4 2 0

G. State Facility's ID

H. Facility's Phone ( )

11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Hazardous Waste- Solid N.O.S. (F001)ORM-E, NA 9181	0 0 1	DO	0 3 10 0	lbs	
b.					
c.					
d.					

GENERATOR

J. Additional Descriptions for Materials listed Above
a
b
c
d

K. Handling Codes for Wastes Listed Above
a
b
c
d

15. Special Handling Instructions and Additional Information
Product Code:JJ42 facility description
Emergency Contact Number: Mr. Jeffry Maloney
Home: (203)382-4338, Work: (203)223-2700 ex310

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and state laws and regulations.

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Printed/Typed Name JOSEPH CORVO — Signature Joseph Corvo — Mo. Day Year 8 2 91

TRANSPORTER

17. Transporter 1 (Acknowledgement of Receipt of Materials)
Printed/Typed Name DAVE FLOREK — Signature — Mo. Day Year 08 02 91

18. Transporter 2 (Acknowledgement or Receipt of Materials)
Printed/Typed Name — Signature — Mo. Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Mo. Day Year

NY A 732798 9

EPA Form 8700-22 (Rev. 9-86) Previous edition is obsolete.

COPY 8 — Generator — retained by generator

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Hazardous Waste MANIFEST PROGRAM, State Office Building
Hartford, CT 06106

Please type (or print)

FOR STATE USE ONLY

UNIFORM HAZARDOUS WASTE MANIFEST — Page 1 of 1

Information in the shaded areas is not required by Federal law, but may be required by State law

3. Generator's Name and Mailing Address: 06051-

4. Generator's Phone 315-437-6400 203-233-2700

A. State Manifest Document Number CT F 0032354

B. G.S.I. (Gen. Site Address) 139 HOYT STREET MAMARONECK, NY

5. Transporter 1 Company Name: ENVIRONMENTAL PRODUCTS & SERVICES — US EPA ID Number ...9 8 0 7 6 1 1 9 1

C. S.T.I. (Trans. Lic. Plate #)

D. Tran. Phone (315) 471-0503

7. Transporter 2 Company Name — US EPA ID Number

E. S.T.I. (Trans. Lic. Plate #)

F. Tran. Phone (

9. Designated Facility Name and Site Address — US EPA ID Number
ENVIRONMENTAL WASTE RESOURCES, INC.
130 FREIGHT STREET
WATERBURY, CT ...0 7 2 1 3 8 9 6 9

G. State Facility's ID (Not Required)

H. Facility's Phone 203-755-2283

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ WASTE FLAMMABLE LIQUID, N.O.S. (ISOPROPYL ALCOHOL) FLAMMABLE LIQUID UN1993	020	DM	01000	G	EPA D001 / STATE
b. RQ HAZARDOUS WASTE LIQUID, N.O.S. (CHROMIUM, LEAD) 1,1,1 trichloroethane ORM-E NA9189	001	DM	00050	G	EPA / STATE
c. RQ HAZARDOUS WASTE SOLID, N.O.S. (LEAD, TOLUENE) xylene, benzene ORM-E NA9189	007	DM	02800	P	EPA D018 / STATE
d. RQ WASTE FLAMMABLE LIQUID, N.O.S. (MEK, TOLUENE) FLAMMABLE LIQUID UN1993	006	DM	00300	G	EPA F003, F005 / STATE

J. Additional Descriptions for Materials Listed Above
a. F003, F005 D008 D018 SOLVENT SLUDGE
b. F001, D006, D008 DEGREASING SLUDGE ~~F003~~ F003 F005 SPENT SOLVENTS D001 F005

K. Handling Codes for Wastes Listed Above
a. NY=T c. NY=B
b. NY=B d. NY=T

15. Special Handling Instructions and Additional Information
a. 33027 c. 33029 JOB #: 01890
b. 33028 d. 33030 EMERGENCY PHONE: (315) 471-0503

Point of Departure: MAMARONECK, NY

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations and all applicable State laws and regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name — Signature — Month Day Year

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22 (Rev. 9/88) Form Approved OMB

COPY 5: TRANSPORTER 1 RETAINS

CT F 0032354

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Hazardous Waste MANIFEST PROGRAM, State Office Building
Hartford, CT 06106

FOR STATE USE ONLY

Please type (or print)

UNIFORM HAZARDOUS WASTE MANIFEST

Manifest Document No. Page 1 of 1

Information in the shaded areas is not required by Federal law, but may be required by State law.

3. Generator's Name and Mailing Address

05051-

4. Generator's Phone 315 437-6400 203-233-0700

A. State Manifest Document Number CT F 0032356

B. G.S.I. (Gen. Site Address) 139 HOYT STREET MAMARONECK, NY

5. Transporter 1 Company Name ENVIRONMENTAL PRODUCTS&SERVICES, INC. US EPA ID Number N Y D 9 8 0 7 5 1 1 9 1

C. S.T.I. (Trans. Lic. Plate #) NJ

D. Tran. Phone (315) 471-0503

7. Transporter 2 Company Name US EPA ID Number

E. S.T.I. (Trans. Lic. Plate #)

F. Tran. Phone ( )

9. Designated Facility Name and Site Address US EPA ID Number
ENVIRONMENTAL WASTE RESOURCES, INC.
130 FREIGHT STREET
WATERBURY, CT 06725 C T D 0 7 2 1 3 8 9 6 9

G. State Facility's ID (Not Required)

H. Facility's Phone 203-755-2283

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ HAZARDOUS WASTE LIQUID, N.O.S. (LEAD, XYLENE) toluene, 1,1,1-trichloroethane ORM-E NA9189	0 0 9	D M	0 0 4 9 5	G	EPA D008, F003 F005, F005 STATE
b. RQ WASTE FLAMMABLE LIQUID, N.O.S. (LEAD, XYLENE) toluene, 1,1,1-trichloroethane FLAMMABLE LIQUID UN1993	~~0 0 7~~ 008	D M	~~0 0 3 5 0~~ 00400	G	EPA STATE
c. RQ WASTE FLAMMABLE LIQUID, N.O.S. (XYLENE, TRICHLORO-ETHANE, TETRACHLOROETHYLENE) chromium, lead FLAMMABLE LIQUID UN1993	0 0 5	D M	0 0 3 3 0	G	EPA D001, D008 STATE
d.					EPA STATE

J. Additional Descriptions for Materials Listed Above
a. F005 F001, D008 F003
c. D001 F001 D005 D008 SPENT SOLVENT/LEAD
b. F001 F005 F003 D008 SPENT SOLVENTS D008

K. Handling Codes for Wastes Listed Above
Interim / Final
a. NY=T
b. NY=B
c. NY=T, B
d.

15. Special Handling Instructions and Additional Information
a. 33031 c. 33033
b. 33032
24-HR EMERGENCY PHONE: (315) 471-0503
Point of Departure: MAMARONECK, NY

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations, and all applicable State laws and regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name | Signature | Month Day Year 8 29 91

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name DAVID J MUNRO | Signature | Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name | Signature | Month Day Year

EPA Form 8700-22 (Rev. 9-88) Form Approved OMB No. 2050-0039. Previous edition is obsolete.

COPY 8: GENERATOR RETAINS

Div 82

Quality Assurance Project Plan

Focused Remedial Investigation

I.T.T. Sealectro
Mamaroneck, NY

January 1992

O'BRIEN & GERE

JANUARY 1992

QUALITY ASSURANCE PROJECT PLAN

REMEDIAL INVESTIGATION/FEASIBILITY STUDY

I.T.T SEALECTRO

MAMARONECK, NY FACILITY

DATE 1/16/92
REVISION 0

O'BRIEN & GERE ENGINEERS, INC.
5000 BRITTONFIELD PARKWAY
SYRACUSE, NEW YORK 13221

I.T.T. Sealectro

Prepared by: O'Brien & Gere Engineers, Inc.

Approved by: ______________________________ Date:_____

Project Officer
Steven J. Roland
Vice President

Approved by: ______________________________ Date:_____

Project Manager
Guy A. Swenson
Managing Geologist

Approved by: ______________________________ Date:_____

Quality Assurance Officer
Michael A. Caputo
Scientist

TABLE OF CONTENTS

SECTION 1 - PROJECT DESCRIPTION

1.01 General

This Quality Assurance Project Plan (QAPP) provides quality assurance/quality control (QA/QC) criteria for work efforts associated with the installation of monitoring wells, ground water sampling, soil boring, hydraulic conductivity measurement, surface and ground water elevation monitoring, surface water and sediment sampling, and related sampling tasks described in the ITT Sealectro Focused Remedial Investigation Work Plan, September 1991 (Work Plan). Methods for sample analysis have been selected to reflect past waste disposal at the site and sampling results obtained during previous site studies.

1.02 Site Background and History

The Sealectro Corporation operated an electronics parts manufacturing and assembly facility at the 139 Hoyt Street location since approximately 1960. It is believed that the previous tenant at the building manufactured jewelry. In March 1986, Sealectro sold the building and land to 139 Hoyt Street Associates, who in turn leased the same property back to Sealectro. In November 1986, BICC Group (a holding firm/manufacturing conglomerate) acquired Sealectro. ITT Corporation purchased Sealectro from BICC Group in August 1988. The resulting company was ITT Sealectro, an ITT Electronics Components, Inc. Company (now known as ITT Components, Inc.). The 139 Hoyt Street property is presently owned by 139 Hoyt Street Associates but is managed through Northbrook Management Corporation of White Plains, New York. ITT Sealectro ceased operations at the Mamaroneck facility in November 1990. In July 1991, foreclosure action against 139 Hoyt Street Associates was reportedly initiated by National Westminster Bank in New York, New York and is currently pending.

The NYSDEC was initially informed about the site in a letter dated January 15, 1991 where ITT Sealectro registered several USTs and notified the agency of the intent to remove the USTs. During the UST removal (May 16, 1991), it was evident that the USTs had leaked, and the NYSDEC was immediately notified by ITT Sealectro (Spill #9101862). A Corrective Action Plan dated August 28, 1991 was then submitted to the NYSDEC. As part of the Corrective Action Plan, quarterly sampling of existing wells MW-2 and MW-3 (July 1991 and October 1991) and the preparation of a Focused RI Work Plan was initiated. The Focused Work Plan was submitted to the NYSDEC on September 16, 1991, while the July quarterly sampling data was sent on October 15, 1991. On November 20, 1991, a site tour of the facility was attended by the NYSDEC.

The scope of work for the RI is detailed in the Focused RI Work Plan dated September 1991 which was submitted to the NYSDEC in September 1991.

The ITT Sealectro site is located in an industrialized area of Mamaroneck. Industries in the immediate vicinity of the site include the Blood Brothers Auto Wrecking Yard which is located to the north across the Sheldrake River; Marvel Industries, Inc., a plastics fabricator located to the west; and a photographic film processing facility to the east. Hoyt Street and an Amtrak Train line border the site to the south.

The 0.92 acre site is relatively flat and is adjacent to the Sheldrake River. One larger building exists on the lot and nearly the entire remaining area consists of paved parking areas. The Sheldrake River, a tributary of the Mamoroneck River, drains into the Long Island Sound within one mile of the site (Figure 1). Where it flows past the Sealectro facility, the Sheldrake River is about 1 foot deep and 15 feet wide. The river is channeled by stone retaining walls about 8 feet high. Site inspections documented that the river in this area contains debris typically consisting of automobile parts, glass and assorted household refuse.

1.03 Previous Studies

Four previous studies have been conducted at the Mamaroneck facility. Figures 3, 4, and 5 summarize the location of existing monitoring wells, soil borings, surface soil and surface water sample locations. The first study was a site assessment completed by O'Brien & Gere Engineers, Inc. (O'Brien & Gere) as part of the property transfer from Sealectro to Northbrook Realty Group. The second study was a soil and ground water evaluation conducted by TRC Environmental Consultants (TRC). This study was conducted for ITT Corporation in association with the purchase of Sealectro. The third study was a sampling program implemented by O'Brien & Gere at the former drummed solvent storage pad to delineate soil contamination and to document existing ground water quality conditions. The fourth study was an Environmental Investigation prepared by Legette, Brashears, Inc. in May 1991 for BICC Group to verify the existence of USTs and the possible presence of organic vapors in the subsurface soils. A more detailed summary of each of the previous studies are provided in the Work Plan Appendices (Site Assessment - Appendix A, Environmental Assessment - Appendix B, and Sampling Program - Appendix C.)

1.04 Project Description

This Remedial Investigation involves a variety of tasks requiring QA/QC oversight, including:

1) Monitoring well installation
2) Hydraulic conductivity testing
3) Subsurface soil sampling
4) Ground water sampling
5) Sediment sampling
6) Surface and ground water elevation monitoring
7) Surface water sampling

1.05 Quality Assurance Project Plan Objectives

This document is site-specific and has been prepared for the Remedial Investigation of the Focused Remedial Investigation, of the I.T.T. Sealectro facility. It was prepared in accordance with US EPA's *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans*, QAMS-005/80, 1980. Prior to deviation from the protocols outlined herein, the Project Quality Assurance Officer will be consulted.

The objectives of this QAPP are to provide sufficiently thorough and concise descriptions of the measures to be applied during the Remedial Investigation (RI) such that the data generated will be of a known and acceptable level of precision and accuracy. This QAPP provides comprehensive information regarding the project description and personnel responsibilities, and sets forth specific procedures to be used during sampling of relevant environmental matrices, other field activities, and analyses of data.

The following Quality Assurance (QA) topics are addressed in this plan:

1. Data Quality Objectives (DQOs) for measurement of data, including precision, accuracy, completeness, representativeness and comparability
2. project organization and responsibility
3. sampling procedures
4. hydrogeological procedures
5. sample custody
6. analytical procedures
7. calibration procedures, references and frequency
8. internal Quality Control (QC) checks and frequency
9. QA performance audits, system audits and frequency
10. QA reports to management
11. preventative maintenance procedures and scheduling
12. specific procedures to be used to routinely assess data precision, representativeness, comparability, accuracy and completeness
13. data validation, and
14. corrective action.

SECTION 2 - PROJECT ORGANIZATION AND RESPONSIBILITY

2.01 Project Organization

While each person involved in the investigation and in the generation of data are implicitly a part of the overall project and quality assurance program, certain individuals have specifically designated responsibilities. Within O'Brien & Gere, these are the Project Officer, the Project Manager, the Quality Assurance Officer, the Data Validator, the Field Operations Manager, and the Field Geologists and Environmental Technicians. OBG Laboratories, Inc., (Syracuse, New York) will provide analytical services for the investigation. Laboratory personnel with quality assurance/quality control responsibilities include the Laboratory Quality Assurance Coordinator and Laboratory Sample Custodian. Figure 7 illustrates key project personnel. Table 1 contains the primary contacts for the project. Resumes of some key individuals are provided in the Appendix.

2.02 Project Officer

Mr. Steven Roland will serve as project officer for this project. As project officer, he will be responsible for the over-all management of the investigation and for the completion of work specified in the contract. He will interface between regulatory agency personnel, the client, and O'Brien & Gere management staff. He will also be responsible for budget and administrative oversight.

2.03 Project Manager

Mr. Guy A. Swenson, CPG will act as the Project Manager for this investigation. As Project Manager, Mr. Swenson will monitor the investigation's progress, regularly review the project schedule, and review major work elements prior to submittal. The Project Manager will oversee scheduling and budgeting, and serves as the primary contact with state, local and federal agencies.

2.04 Quality Assurance Officer

Mr. Michael Caputo of O'Brien & Gere Engineers, Inc., will serve as Quality Assurance Officer and is responsible for overall project quality assurance. Mr. Caputo will review project plans and revisions to the plans to maintain proper quality assurance throughout the Remedial Investigation. In addition, Mr. Caputo will be responsible for performance and systems audits, data processing activities, data processing quality control, data quality review, and coordinating the efforts between O'Brien & Gere Engineers, Inc., and OBG Laboratories, Inc.

2.05 Data Validator

Mr. Michael Caputo of O'Brien & Gere Engineers, Inc., an approved NYSDEC data validator, will also be responsible for reviewing chemical data, and validating laboratory analytical data.

2.06 Field Operations Manager/Project Geologist

Mr. Peter Bogardus has been assigned the responsibilities of Field Operations Manager/Project Geologist. The Field Operations Manager/Project Geologist reports directly to the Project Manager and is immediately responsible for the day-to-day activities of O'Brien & Gere field personnel. In this capacity, the Field Operations Manager is responsible for day-to-day quality assurance project activities and reports directly to the Project officer concerning the maintenance of the QAPP. Further responsibilities include the initialing and accuracy verification of field notebooks, driller's logs, chain-of-custody records, sample labels, and other field-related documentation.

2.07 Site Geologists and Environmental Technicians

Ground water, soil, surface water, and sediment sampling tasks required by this investigation will be conducted by experienced geologists and/or environmental technicians. Their responsibilities will include the documentation of the proper sample collection protocols, sample collection, field measurements, equipment decontamination, and chain-of-custody documentation.

2.08 OBG Laboratories, Inc., Quality Assurance Coordinator

Colleen Burke will serve as OBG Laboratories, Inc., Quality Assurance Coordinator and will be responsible for laboratory quality assurance and quality control activities associated with the project. The specific duties of the Laboratory Quality Assurance Coordinator include ensuring that analyses are conducted within the appropriate holding times and laboratory custody procedures are followed. Moreover, the Laboratory Quality Assurance Coordinator monitors daily precision and accuracy records, maintains detailed copies of all procedures, reschedules analyses based upon unacceptable data accuracy or precision, and identifies and implements corrective actions necessary to maintain quality assurance standards.

Ms. Burke or her assignee will conduct initial validations and assessments of analytical results and report the findings directly to the Quality Assurance Officer.

2.09 Laboratory Sample Custodian

Ms. Anne Barnes will serve as project Laboratory Sample Custodian for OBG Laboratories, Inc.,. The Sample Custodian's responsibilities include verification of proper sample entry and sample handling procedures by laboratory personnel.

SECTION 3 - DATA QUALITY OBJECTIVES

3.01 Objectives

The overall objectives of this investigation are the following:

1. to identify and characterize contamination associated with the site;
2. to assess the nature and extent of contamination and characterize these properties;
3. to assess migration pathways of the contamination; and
4. to assess routes of exposure and potential receptors.

To achieve these project objectives, Data Quality Objectives (DQOs) were established in order to develop an analytical database of sufficient quality to support conclusions made as a result of this investigation. Therefore, requirements for data quality parameters such as: detection limits, accuracy, precision, sample representativeness, data comparability and data completeness are specified in this document.

DQOs are quantitative and qualitative statements specifying the quality of the environmental data required to support the decision-making process. DQOs define the total uncertainty in the data that is acceptable for each specific activity during the investigation. This uncertainty includes both sampling error and analytical error. Ideally, zero uncertainty is the intent; however, the variables associated with the process (field and laboratory) inherently contribute to the uncertainty of the data. It is the overall objective to keep the total uncertainty within an acceptable range that will not hinder the intended use of the data.

DQOs equivalent to Level III and Level IV, depending on the type of laboratory analysis, as described in the U.S. EPA guidance document: *Data Quality*

Objectives for Remedial Response Activities (U.S. EPA 540/G-87/1003), will be achieved. Superfund analyses will adhere to DQO Level IV while other NYSDEC ASP analyses will adhere to DQO Level III. These DQO levels imply the use of NYSDEC ASP analytical methods and Superfund and non-CLP Category B reporting and deliverable requirements. Data quality of at least level III is required for data to be used in a quantitative risk assessment. Field analyses and measurements will adhere to Level I DQOs. Level I implies the use of portable instruments for field screening. The remainder of this QAPP describes the specific approaches that will be taken to achieve the required DQOs. Tables 2 to 6 list methods and method specific quality control criteria which will be adhered to during sample collection and analysis.

Data collected during the field investigation will be of sufficient quality to meet these DQOs. In order to assess adherence to DQOs, O'Brien & Gere has developed the QA/QC program described in this QAPP. The U.S. EPA Contract Laboratory Program (CLP), states that the purpose of the QA/QC program "is the definition of procedures for the evaluation and documentation of sampling and analytical methodologies and the reduction and reporting of data. The objective is to provide a uniform basis for sample collection and handling, instrument and methods maintenance, performance evaluation, and analytical data gathering and reporting." This QAPP for sampling, analysis and data handling is consistent with the requirements set forth by the US EPA and the NYSDEC Analytical Services Protocol (ASP).

Two types of analytical support will be utilized to achieve the DQOs necessary for this investigation: field analyses and laboratory analyses.

3.02 Field Analyses and Measurements

Field analyses will include on-site analysis of pH, Temperature, turbidity, and specific conductance of ground water and the field screening of ambient air for health and safety purposes. These field investigation activities do not require sample collection, but nonetheless involve measurements for which QA concerns are appropriate. Therefore, these activities will adhere to DQO Level I.

These DQOs will be accomplished through the use of procedures described throughout this QAPP. Where specific procedures are not specified, appropriate references are provided. Proper sampling techniques and equipment as presented in the U.S. EPA guidance document: *A Compendium of Superfund Field Operations Methods* (U.S. EPA 600/2-80-018) have been specified. The appropriate sampling methods are presented in Section 4.

3.03 Laboratory Analyses

Ground water samples collected during the RI will be collected on two occasions at least 60 days apart up to two soil samples will be selected from each soil boring. Sample selection will be based upon the results of field screening with a photoionization detector and visual examination. Surface water and sediment samples will be collected on two occasions from water bodies in the vicinity of the site. Samples collected from each matrix will be analyzed for NYSDEC ASP Target Compound List (TCL) metals using method series 6000 and 7000, volatile organics using methods 8010, 8015, and 8020, and total petroleum hydrocarbons using method 418.1. In addition, one soil sample from each area of concern, except the fuel oil tank area, will be analyzed for the full NYSDEC ASP TCL by Superfund methods.

The TCL analytes, method detection limits, audit frequency, and control limits for their analysis are compiled in Table 2. To obtain data of a quality sufficient to meet the overall RI objectives listed above, the following general approach will be taken:

To obtain data of a quality sufficient to meet the DQOs, listed above, the following general approach will be taken:

1. U.S. EPA sampling protocols outlined in *A Compendium of Superfund Field Operations Methods* (U.S. EPA 600/2-80-018) will be used in collection of representative environmental samples.
2. Laboratory analysis, analytical QA/QC and data reporting will adhere to guidelines outlined in the *NYSDEC Analytical Services Protocol*, September 1989. Deliverable and reporting requirements for these analyses will adhere to NYSDEC ASP Superfund and non-CLP Category B requirements.

3.04 Definitions

The following is a brief description/definition of data quality parameters addressed in the QAPP.

Representativeness refers to the degree to which a sample taken from a Site accurately represents the matrix at the Site. Representativeness will be achieved by the use of U.S. EPA procedures for the collection and preservation of samples.

Comparability refers to the use of consistent procedures, reporting units, standardized methods of field analysis and standardized data format with document control. Adherence to standard procedures maximizes the probability that data generated from different laboratories can be validly compared to one another.

Completeness refers to the process of obtaining all required data as outlined in the Work Plan. Completeness is also defined as the percentage of measurements judged to be valid. On a nationwide basis, the U.S. EPA has found CLP data to be 80-85% complete.

Precision describes the reproducibility of results. It is defined as the agreement between the numerical values of two or more measurements that have made in an identical manner. Precision can be expressed in a variety of manners, including the absolute methods of deviation from the mean or median values, standard deviation and variance, or by relative methods, such as relative deviation from the mean or median. Precision will be determined through the analysis of duplicate samples and through duplicate analysis of the same sample.

Accuracy is a measure of closeness of an individual measurement or an average of a number of measurements to the true value, and is expressed in terms of absolute or relative error. Accuracy will be determined through analysis of spiked samples and through the analysis of standards with known concentrations.

SECTION 4 - SAMPLING PROCEDURES

4.01 Objective

The objective of this sampling section is to document the sampling procedures and practices that will be used in the field investigation of the I.T.T. Sealectro facility. Information will be obtained as to the location, amount, and vertical and horizontal extent of residuals migrating from the site. The methods that will be used to carry out these activities are detailed in the following subsections.

4.02 General Sampling Locations and Numbers

4.02.1 Sample Locations

Sub-surface Soil - The goal of the soil sampling plan is to aid in defining the horizontal and vertical extent of contamination in the four areas of suspected or reported metal or product losses: 1) the drummed solvent storage area; 2) waste water treatment building; 3) former underground storage tank area; and 4) the 2,500 gallon fuel oil tank as illustrated on Figure 6.

In each of the areas of concern the borings will be completed to an approximate depth of the water table or the vertical extent of apparent contamination, whichever is deeper. One boring will be installed within the center of the drummed solvent storage pad area (B-11), and the wastewater treatment building (B-14) to verify previous analytical data. Two borings will be installed outside the drum storage pad (B-12 and B-13) and the waste water treatment building (B-15 and B-16) to evaluate the horizontal extent of contamination. One boring (B-17) will be installed through the center of the underground storage tank farm to evaluate the vertical extent of affected soils. Four additional borings (B-18, B-19, B-20 and B-21) will be installed around the perimeter of former underground tank to evaluate the horizontal extent of any affected soils. Two soil borings (B-22 and B-23) will be completed around the 2,500 gallon fuel oil tank to evaluate the integrity of the tank. Figure 6 illustrates the proposed sampling locations.

Ground Water - In an effort to further evaluate the extent of volatile organics impacting the site ground water, six additional ground water monitoring wells will be installed throughout the site. Two deep wells (MW-2d, MW-3d) will be installed adjacent to the two existing downgradient shallow wells, MW-2 an MW-3, creating a nested pair. The well nests will provide a means of evaluating the vertical extent of ground water contamination and vertical hydraulic potential. The deep wells will be installed to an approximate depth of 50 feet or the top of bedrock, whichever is encountered first. The remaining shallow wells will be installed approximately 8 feet into the first encountered ground water along the perimeter of the site. Two shallow wells (MW-4 and MW-6) will be installed along the apparent upgradient side of the site to provide information on the ground water quality entering the site. One shallow well (MW-7) will be installed to the southwest of well MW-2 to evaluate the horizontal extent of site ground water contamination. The sixth well will be installed in the immediate vicinity of the underground storage tank area (MW-5). Figure 6 illustrates the approximate location of the proposed shallow and deep wells.

Ground water samples will be collected from each of the newly installed and existing monitoring wells on two occasions, at least 60 days apart.

Surface Water and Sediment - Samples will be collected on two occasions from three locations along the Sheldrake River to evaluate the impact, if any, the site may have on the river sediments and surface water quality. One sample of each media (water and sediment) will be collected upstream, on approximate to the midpoint of the site, and one downstream of the site as illustrated on Figure 6.

In addition, the stream bank adjacent to the site shall be traversed during each sampling event to locate and sample seeps which may directly discharge to the Sheldrake River.

4.02.2 Sample Numbering System

A sample numbering system will be used to identify each sample taken during the field investigation sampling program. This numbering system will provide a tracking procedure to allow retrieval of information regarding a particular sample and to assure that each sample is uniquely numbered. A listing of the sample identification numbers will be maintained by the sample team leader.

4.03 Sample Matrices

The following matrices will be sampled and analyzed as part of this investigations sampling efforts:

1) Ground Water

2) Subsurface Soil

3) Surface Water

4) Sediment Sampling

4.04 Field QA/QC Samples

In order to evaluate data quality, the following QA/QC sample types will be collected during the field investigation. Table 3 lists the number of samples to be collected by matrix type and the number of field QC samples to be collected.

4.04.1 Duplicate Samples

Collection of laboratory duplicate samples for inorganic analyses provide for the evaluation of the laboratory's performance by comparing analytical results of two samples from the same location. Field duplicate samples are collected to evaluate field sample collection procedures. Field duplicate samples are duplicate samples collected from one location which are delivered to the laboratory blind (with two different sample numbers). Field and laboratory duplicate samples are to be included for each matrix at a minimum rate of five percent (5%) each. If less then twenty samples are taken during a particular sampling episode, then one duplicate collection should be performed. The number of duplicate samples to be collected is listed in Table 3.

Duplicate water samples will be obtained by alternately filling sample containers from the same sampling device for each parameter. Samples for volatile organic analysis from monitor wells will be filled from the same bailer full of water whenever possible and be the first set of containers filled. When other sampling devices are used (bladder pumps, etc.), the vials for volatile organics should be alternately filled.

4.04.2 Matrix Spikes (MS) and Matrix Spike Duplicates (MSD)

Matrix spike and matrix spike duplicate (organic analyses) samples are essentially duplicate samples that have matrix spiking solutions added. The percent recovery of the spiked amount indicates the accuracy and efficiency of the analysis extraction as well as interferences caused by the matrix. Relative percent differences between spike samples for organic analyses will indicate the precision of the data. Matrix spike and matrix spike duplicate samples are to be included for each matrix at a minimum rate of five percent (5%) each. If less than twenty samples are collected during a particular sampling episode, then one MS and one MSD collection should be performed. The number of matrix spike and matrix spike duplicates to be collected is listed in Table 3.

4.04.3 Field/Equipment Blanks

Field/equipment blanks will consist of a sample of the distilled water that is used to rinse the decontaminated sampling equipment. These blanks will be collected at a frequency of at least one per twenty samples per matrix where sampling equipment is reused. These samples will be subjected to the same analyses as the environmental samples. The number of field/equipment blanks to be collected is listed in Table 3.

4.04.4 Trip Blanks

Trip blanks will consist of distilled water from the laboratory performing the volatiles analyses. The trip blanks will be shipped in the same containers, at the same time, on the same carrier, and to the same destination as each shipment of samples. The trip blanks will be analyzed for the same volatile organic analyses as those environmental samples contained in the cooler. The number of trip blanks to be collected is listed in Table 3.

4.05 Sampling Procedures

Table 4 lists the sample containers and types of preservatives that will be used for sample collection. Table 5 presents holding times that will be met during sample collection and analysis.

4.05.1 Drilling/Subsurface Soil Sampling Procedures

A total of five monitoring wells will be installed at the I.T.T. Sealectro Property to further evaluate site hydrogeology and ground water quality. The approximate locations of these wells are shown on Figure 6.

Borings for the installation of monitoring wells shall be completed using hollow stem augers and/or other applicable drilling methods (i.e. water rotary, spin casing) to a depth specified by the supervising hydrogeologist. If the hollow stem auger drilling method is utilized for monitoring well completion, the minimum inside diameter of the augers shall be 4 1/4 inches.

Samples of the encountered subsurface materials will be collected continuously to provide physical descriptions of the material in the deep boring at each nested location. The sampling method employed will be the ASTM Method D-1586-84 using either a standard 2 foot long, 2-inch outside diameter split-barrel sampler with a 140 lb. hammer or a 3-inch outside diameter sampler with a 300 lb. hammer. Upon retrieval of the sampling barrel, the collected sample shall be described, labelled, and placed in a glass jar.

A hydrogeologist will be on-site during the drilling and sampling operations to fully describe each soil sample including but not limited to ; 1) soil type, 2) color, 3) percent recovery, 4) moisture content, 5) odor and other including miscellaneous observations, such as organic content and cohesiveness. The supervising hydrogeologist will be responsible for retaining a representative portion of each sample in a glass jar labeled with: 1) site name; 2) boring number; 3) sample interval; 4) date; and, 5) time of sample collection. Split-spoon soil samples will be field screened with a PID and the readings will be recorded in the field log.

The drilling contractor will be responsible for obtaining accurate and representative samples, informing the supervising hydrogeologist of changes in drilling pressure, and keeping a separate general log of soils encountered. Included in this log must be a record of blow counts (i.e. the number of blows from a 140 or 300 pound soil sampling drive weight required to drive the split-barrel sampler 6 inches). The drilling contractor will also be responsible for installing monitoring wells to depths directed by the supervising hydrogeologist following specifications further outlined in this protocol.

4.05.2 Monitoring Well Completion

Ground water monitoring wells installed at the I.T.T. Sealectro property will be constructed of 5 or 10 feet of 2 inch I.D. machine slotted PVC well screen (0.006 inch or 0.010 inch slot size) and flush joint threaded PVC riser casing. The well casing will extend from the screened interval to 2 to 3 feet above the ground surface. Other materials utilized for completion will be washed graded silica sand appropriate for the slotted screen, bentonite pellets or slurry, bentonite/cement grout, concrete, and protective steel locking well casing with keyed alike locks.

The monitoring well installation method for 2-inch wells installed within unconsolidated sediments will be to place the screen and riser assembly into the augers once the screen interval has been selected. At that time, a washed graded silica sand pack will be placed around the well screen and shall extend a minimum one foot above the top of the screen. Two feet of bentonite pellets or slurry will then be added to the annular space above the sand pack to create a proper seal. Cement/bentonite grout will then be added during the extraction of the augers until the grout is emplaced to within about 1 foot from the ground surface. During placement of sand and bentonite, frequent measurements will be made to check the elevation of the sand pack and the thickness of bentonite layer by a weighted tape measure.

A protective steel casing of flush mount cover will be installed over each PVC well casing. The protective casing will extend about 2.5 feet below grade and 2.5 feet above grade. A concrete pad 1 foot deep will extend laterally about 1 foot in all directions from the protective casing or flush mount cover and slope gently away to drain water away from the well. A vented lockable cover will be fitted on each protective casing.

Each monitoring well will be developed to clear the casing and screen of fine-grained materials that have settled in or around the well screen during installation. Attempts will be made to develop the well such that the water exhibits a turbidity of 50 NTUs or lower. If this proves impossible, the wells will be developed for a minimum of 2 hours. In this manner, it is assumed that the well is transmitting representative portions of ground water. The well development will be accomplished by either pumping or bailing. Ground water removed from the wells will be allowed to drain onto the ground surface.

Equipment that is placed in a monitoring well will be cleaned following decontamination procedures as described in Section 4.06.

4.05.3 In Situ Hydraulic Conductivity Testing

Subsequent to the completion of the well installation and development, hydraulic conductivity tests will be conducted on each monitor well. The test will evaluate the horizontal conductivity of the saturated sediments and the evaluation of the rate of ground water movement beneath the site. The tests will be conducted in accordance with the procedures outlined below.In situ hydraulic conductivity tests will be performed by removing a volume of water from the well through the use of a pump or bailer. If a sufficient difference in head is obtained by this method (at least 10% to 25% of the length of the water column in the well), recovery data will be collected. Through the use of a water level measuring tape/probe, the subsequent rise of the water level in the well will be measured as a function of time, until either the head approaches static (rapid recovery) or at least 75% of the original head difference is recovered (slow recovery). Measurements will be collected at frequent time intervals appropriate to the rate of recovery in the well.

If a significant drawdown is not anticipated or cannot be obtained by this method, an pressure transducer system will be utilized. Equipment will be pre-cleaned by an appropriate method prior to use in the well. The test will involve pre-insertion of a pressure transducer into the well followed by insertion of a Teflon or PVC rod in order to create a positive flow potential from the well into the aquifer. Following measurement by the transducer system, the Teflon or PVC rod will be removed in order to create a negative flow potential.

Data from tests conducted on unconfined aquifers will be evaluated using either Hvorslev's graphic analysis of recovery data after Hvoslev, M.J., "Time Lag and Soil Permeability in Groundwater Observations", 1951 or the Bouwer and Rice Method, "A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells", Water Resources Research; Volume 12, No. 3; 1976; pp 423-428.

Data from tests conducted on confined aquifers will be evaluated using the Cooper, et al method, after Cooper Jr., H.H., Bredehoeft, J.D., and Papadopulos, I.S., "Response of a Finite Diameter Well to an Instantaneous Charge of Water" , Water Resources Research - US Geological Survey, Washington, D.C. First Quarter 1967, Vol. 3, No.1, pp.9-15.

4.05.4 Ground Water Sampling

The following procedures will be used to obtain representative ground water samples at the site. A low volume pump may be used to evacuate monitoring wells containing more than a few gallons of water. If pumping is used to purge wells, dedicated tubing will be used at each location.

Sampling Procedures (BAILER)

1. Identify the well and record the location on the Ground Water Sampling Field Log (field log) or in a field book.
2. Put on a new pair of disposable gloves.
3. Cut a slit in the center of a clean plastic sheet, and slip it over the well creating a clean surface onto which the sampling equipment can be positioned.
4. Using an electric well probe, measure the depth to the water table. Record this information on the field log.
5. Clean the well depth probe and rinse it with distilled water after use.
6. Compute the volume of water in the well, and record this volume on the field log.

7. Attach enough polypropylene rope to a bailer to reach the bottom of the well, and lower the bailer slowly into the well making certain to submerge it only far enough to fill it one-half full. In this manner, oily film present on the ground water surface can be discerned.

8. Pull the bailer out of the well keeping the polypropylene rope on the plastic sheet. Empty the ground water from the bailer into a clean glass container and observe its appearance.

9. Record the physical appearance on the field log.

10. If a floating product is observed, estimate its volume and note this on the field log. Before proceeding, a bailer should be collected from the bottom of the well for observation of appearance of a dense non-aqueous phase liquid, if present.

11. Initiate bailing the well from the top of the water table making certain to keep the polypropylene rope on the plastic sheet. The quantity of water removed from the well should be recorded.

12. Continue bailing the well until a minimum of three volumes of ground water in the well have been removed, or until the well is bailed dry. If the well is bailed dry, allow sufficient time for the well to recover before proceeding with the next step. Record this information on the field log.

13. Remove the sampling bottles from their transport containers, and prepare the bottles for receiving samples. Inspect all labels to ensure proper sample identification. Sample bottles should be kept cool with their caps on until they are ready to receive samples. Arrange the

sampling containers to allow for convenient filling. Always fill the containers labeled "volatiles" (40 ml VOA bottles) first.

14. To minimize agitation of the water in the well, initiate sampling by lowering the bottom loading stainless steel bailer slowly into the well making certain to submerge it only far enough to fill it completely.

15. If the sample bottles cannot be filled quickly, keep them cool with the caps on until they are filled. The vials labelled "volatiles" should be filled from one bailer, then securely capped. To avoid agitation, carefully fill the 40 ml VOA vials. Cap the VOA vials, turn each vial upside down and check for air bubbles. If properly filled, there should not be visible air bubbles. Collect samples for metals analysis. Samples scheduled for filtered metals analysis will be prepared by field filtering through a 0.45 micron filter. Adjust the pH of the metals samples to less than 2 with American Chemical Society (ACS) reagent grade, concentrated (approximately 69-71%) nitric acid. Return each sample bottle to its proper transport container. Samples must not be allowed to freeze.

16. Record the physical appearance of the ground water observed during sampling on the field log.

17. After the last sample has been collected, record the date and time. Fill a beaker with water from the surface of the water table and measure and record the pH, specific conductivity, turbidity and temperature. Follow the procedures outlined in the equipment

operation manuals. Record this information on the field log. The beaker must then be rinsed with distilled water prior to reuse.

18. Begin the Chain of Custody Record.

19. Clean the bailer using the decontamination procedures in Section 4.06. Store the clean bailer in a clean plastic bag.

20. Replace the well cap, and lock the well protection assembly before leaving the well location.

21. Place the polypropylene rope, gloves, and plastic sheeting into a plastic bag for disposal.

Sampling Procedures (PUMP)

1. Identify the well and record the location on the Ground Water Sampling Field Log.

2. Put on a new pair of disposable gloves.

3. Cut a slit in the center of a clean plastic sheet, and slip it over the well creating a clean surface onto which the sampling equipment can be positioned.

4. Using an electric well probe, measure the depth to the water table and the bottom of the well. Record this information in the Ground Water Sampling Field Log. As previously mentioned, all depth to water table and well depth measurements will be taken for all wells before sampling begins.

5. Clean the well depth probe and rinse it with distilled water after use.

6. Compute the volume of water in the well, and record this volume on the Ground Water Sampling Field Log.

7. Attach enough polypropylene rope to a bailer to reach just below the surface of the water table, and lower the bailer slowly in to the well making certain to submerge it only far enough to fill it one-half full. The purpose of this is to recover any oily film which might be present at the surface of the water table.

8. Pull the bailer out of the well keeping the polypropylene rope on the plastic sheet. Empty the ground water from the bailer into a clean glass container and observe its appearance.

9. Record the physical appearance (color, odor, turbidity, and presence of floating product) of the ground water on the Ground Water Sampling Field Log.

10. If a floating product is found, follow the procedures in Step 10 of the BAILER section.

11. Prepare the pump for operation. Connect the dedicated polyethylene tubing to a delrin foot valve. Additional information regarding the pump's operation will accompany the pump. Each pump will be dedicated to a well and therefore not used to purge any other well.

12. Lower the pump to near the top of the water table and pump the ground water into a graduated pail. Pumping should continue until a minimum of three well volumes have been removed or the well is pumped dry. If the well is pumped dry, allow sufficient time for the well to recover before proceeding with the next step. Record this information on the Ground Water Sampling Field Log. The pump will

be used only to evacuate the monitoring well. A stainless steel bailer will be used to collect samples.

13. Remove the sampling bottles from their transport containers, and prepare the bottles for receiving samples. Inspect all labels to insure proper sample identification. Sample bottles should be kept cool with their caps on until they are ready to receive samples. Arrange the sampling containers to allow for convenient filling. Always fill the vials labelled "volatiles" (40 ml VOA vials) first. Collect unfiltered samples for metals analysis. If the turbidity of the sample is greater than 50 NTUs, both filtered and unfiltered samples should be collected for metals analyses. Add nitric acid, as previously discussed in the BAILER section, to adjust the pH to less than 2. Preserve the volatiles samples with hydrochloric acid as previously discussed in the BAILER section.

14. To minimize agitation of the water in the well, initiate sampling by lowering the bottom loading stainless steel bailer slowly into the well making certain to submerge it only far enough to fill it completely. Pull five bailer volumes before taking the first sample.

15. If the sample bottles cannot be filled quickly, keep them cool with the caps on until they are filled. Return each sample bottle to its proper transport container. Samples must not be allowed to freeze.

16. Record the physical appearance of the ground water observed during sampling on the Ground Water Sampling Field Log.

17. After the last sample has been collected, record the date and time. Fill a beaker with water from the surface of the water table and measure and record the pH, specific conductivity, turbidity and temperature. Follow the procedures outlined in the equipment operation manuals. Record this information on the Ground Water Sampling Field Log. The beaker must then be rinsed with distilled water prior to reuse.
18. Begin the Chain of Custody Record.
19. Clean the bailer using the decontamination procedures in Section 4.06. Store the clean bailer in a fresh plastic bag.
20. Replace the well cap, and lock the well protection assembly before leaving the well location.
21. Place the polypropylene rope, gloves, and plastic sheet into a plastic bag for disposal.

4.05.5 Sediment Sampling

Sediment samples will be collected at approximately 3 locations in the area of the site. The sediment samples will be collected from the same areas as the surface water samples. Surface water samples will be collected prior to the collection of sediment samples to minimize disturbances due to sample collection. Approximate sampling locations are identified on Figure 6. A log book listing the various samples to be collected will be prepared for use on-site.

Sediment samples will be obtained by compositing subsamples of approximately 40 grams each collected from four equally spaced locations on the arc of a three meter circle. The size of the circle may be modified as necessitated by field conditions. One subsample will be collected at each of the four quadrant points of the circle.

A disposable 2-inch diameter Lexan^R core, a steel split-spoon sampler or other suitable device capable of a vertical penetration into mineral soil 3-inches deep will be used to extract the four 3-inch deep core subsamples. The composite samples will consist of all four (4) subsamples placed in the same sample container. A new Lexan^R core will be used to collect samples at the same locations representing soils 3 inches to 6 inches below the top of the sediment.

The field sampling team will be responsible for adhering to the following sample collection guidelines:

1. Locate collection sites as far as possible from vehicle activity such as streets, driveways, and parking areas;
2. If possible, avoid collecting samples under or immediately adjacent to trees, shrubs, and/or structures;
3. Enter a site description in the field log;
4. A new piece of Lexan^R will be used for collecting subsamples at each location. The Lexan^R corer will be disposed of appropriately after sampling at each location; and
5. Complete a chain of custody form for each sample.

4.05.6 Surface Water Sampling

Surface water samples will be collected prior to the collection of sediment samples to minimize disturbances due to sample collection. Sampling locations are identified on Figure 6. A log book listing the various samples to be collected will be prepared for use on-site. The surface water sampling protocol will be as follows:

1. When sampling from an open body of water, care must be exercised to collect a representative sample. The sample should cause as little disturbance to the water body as possible. Avoid taking a sample of water which shows evidence of sediment, debris or other material which may have been stirred up by the presence of the sampler.
2. At each sampling point, subsamples will be collected, representative of the depth of the water body. The subsamples will then be composited into a single sample, except for the sample collected for volatile analysis.
3. Samples should be taken while facing upstream, away from the influence of the sampler on water flow (if applicable). Downstream samples should be collected first.
4. Collection is accomplished by submerging a clean container at the sampling point to the depth required. For deep streams or ponds, a Kemmer, VanDorn or other sampler specifically designed for this purpose may be used. For shallow locations (i.e. less than 3 feet deep), an inverted sample container may be carefully submerged by hand and then slowly allowed to fill.

5. Samples should then be placed in the proper containers, preserved and stored as necessary for the analyses to be run. Containers and preservatives are presented in Table 4. Pertinent information should be recorded including sample date and location, sample identification and chain-of-custody forms.

4.06 Decontamination of Sampling and Drilling Equipment

Decontamination procedures will be applicable to drilling and sampling activities. Drilling and well construction equipment mobilized to the site will receive an initial decontamination. Decontamination will consist of steam cleaning of the entire rig and associated equipment to the satisfaction of the supervising hydro-geologist. The rear portion of the drill rig will be decontaminated by steam cleaning between monitoring well installations. In addition, equipment entering a well but not used for sample collection will be decontaminated using a high pressure steam cleaner followed by a tap water rinse in order to remove soil and volatilize organics. Drilling equipment will be decontaminated prior to removing the equipment from the site.

The field sampling equipment cleaning and decontamination procedures will be as follows:

1. Non-phosphate detergent wash
2. Tap water rinse
3. Distilled/deionized water rinse
4.* 10% nitric acid rinse
5.* Distilled/deionized water rinse

6.** Methanol rinse

7.** Air dry or nitrogen blow out

8.** Distilled/deionized water rinse

*Only if sample is to be analyzed for metals

**Only if sample is to be analyzed for organics

When possible, samplers should be numbered in a manner that will not affect their integrity and wrapped in a material that will prevent them from becoming contaminated. Equipment should be custody sealed and information concerning decontamination methodology, date, time, and personnel should be recorded in the field log book. Field decontamination wastes will be disposed of at the on-site designated location(s).

4.07 Sample Preparation and Preservation

Filtering of aqueous samples for metals analysis will be accomplished by passing the sample through a 0.45 um membrane (cellulose ester) filter prior to preservation to allow determination of dissolved metals. The filtering system used will be consistent with the US EPA guidelines and will be cleaned before and between samples with 10% HNO_3 solution and deionized water. In addition, a field blank will be filtered and analyzed to assess whether samples are being cross contaminated by either the filter paper or the decontamination procedure.

Immediately after collection, samples will be transferred to properly labeled sample containers and properly preserved. Table 4 lists the proper container materials, volume requirements, and preservation needed for the site analyses. Samples requiring refrigeration for preservation will be immediately transferred to coolers packed with ice and/or ice packs. Samples will be shipped within 24 hours of being collected and will arrive at the laboratory no later than 48 hours after sample collection. Proper chain of custody documentation will be maintained as discussed in Section 5. Samples will be analyzed within the holding times specified in Table 5.

SECTION 5 - SAMPLE CUSTODY

Chain of custody procedures will be instituted and followed throughout the study. These procedures include field custody, laboratory custody, and evidence files. Samples are physical evidence and will be handled according to strict chain of custody protocol. The Quality Assurance Officer must be prepared to produce documentation that traces the samples from the field to the laboratory and through the analyses. The National Enforcement Center of the US EPA has defined custody of evidence as follows:

- in actual physical possession
- in view after being in physical possession
- in a locked laboratory
- in a secure, restricted area.

Quality Assurance measures for this project will begin with the sample containers. Sample containers will be purchased from a U.S. EPA certified manufacturer and will be pre-cleaned (I-Chem series 200 or equivalent). Chain of custody records will be kept starting in the field when sample collection has been completed. In the field log book, samplers will note meteorological data, equipment employed during collection, evacuation techniques and calculations. Physical characteristics of the samples, time of day and location of sample collection, and any abnormalities noted during sampling will be recorded in the field log book and on the chain of custody form.

The sampler will complete the custody form, package the samples including the custody form, and seal the package with evidence tape. Shipment may be made by commercial vendors, and their policy will be to document the transfer of the package within their organization. When the samples arrive at the laboratory, the sample custodian will sign the vendor's air bill or bill of lading. The sample custodian's duties and responsibilities upon sample receipt will be to:

- Document receipt of samples.
- Inspect sample shipping containers for the presence or absence of custody seals, locks, and evidence tape, and for container integrity.
- Record condition of the shipping and sample containers in the log books.
- Sign the appropriate forms or documents.
- Verify and record the agreement or disagreement of information on sample documents and if there are discrepancies, record the problem and notify the Quality Assurance Officer.
- Label sample with laboratory sample number.
- Place samples in secure storage.

The hand-to-hand custody of samples in the laboratory will be maintained through preparation, extraction, and analysis. The analyst will be required to log samples into and from storage as the analysis proceeds. Samples will be returned to secure storage at the close of business. Log sheets will incorporate options for multiple entries, so that several people can handle the samples throughout the analytical scheme. Written records will be kept of each and every time the sample changes hands. The laboratory records may also be used as evidence in enforcement proceedings. Care must be exercised, therefore, to properly complete, date, and sign the items needed to generate data. Copies of the following items will be stored:

- Documentation of the preparation and analysis of samples, including copies of the analyst's notebooks.
- Bench sheets, graphs, computer printouts, chromatograms, and mass spectra.
- Copies of QA/QC data.
- Instrument logs showing the date, time, and identity of the analyst.
- Analytical tracking forms that record the date, time, and the identity of the analyst for each step of the sample preparation, extraction, and analysis.

The sample custodian will log in samples on a log-in form and note the appropriate information, including sample identification and the condition of the samples. Any inconsistencies in paperwork or comments on the condition of the samples will be duly noted on the form and filed with the case.

To further document the custody of each sample, the analyst will complete the Sample Preparation and Extraction Log and instrument log books. The chemist or technician will sign and date the appropriate forms when handling the samples. During the analyses, these forms will be maintained in a secure file. Following the completion of the analysis of a group of samples, appropriate forms and data sheets will be collected and stored in the files.

Upon completion of the analysis, the Quality Assurance Officer or his assignee will begin assimilating the field and laboratory data reports. In this way, the evidence file for the project will be generated. The file will be chronologically arranged for ease of review. When the information has been gathered, the file will be inventoried, numbered, and stored for future reference.

SECTION 6 - CALIBRATION AND FREQUENCY

6.01 Laboratory Equipment Calibration

Calibration of laboratory analytical instrumentation is essential for the generation of reliable data which meets project data quality objectives. Analytical instrument calibration is monitored through the use of control limits which are established for individual analytical methods. Analytical methods to be used during this project and the corresponding control limits may be found in Table 2. Calibration procedures to be followed are specified, in detail, in the analytical methods. These procedures specify the type of calibration, calibration materials to be used, range of calibration, and frequency of calibration.

OBG Laboratories, Inc., will be responsible for the proper calibration and maintenance of laboratory analytical equipment. General calibration procedures are contained in the OBG Laboratories, Inc., Quality Assurance/Quality Control Plan, December 1990.

6.02 Field Equipment Calibration

Field equipment used during this investigation, will be calibrated in a manner and at a frequency in accordance with the manufacturer's instructions. The equipment will also be operated in accordance with the manufacturer's instructions. Field equipment used during this project that is not covered by the standard operating procedures referenced herein will have a specific calibration and operation instruction sheet prepared for it by the personnel who will be using the equipment in the field. Calibration procedures undertaken involving field equipment will be recorded in a field notebook.

Generally, field equipment will be calibrated on a daily basis. The calibration range will be designed to bracket the concentrations of concern.

6.03 Standards

Standards may be generally grouped into two classifications: primary and secondary. Primary standards include United States Pharmacopoeia (USP) drugs, National Institute of Science and Technology (NIST) and ASTM materials, and certain designated U.S. EPA reference materials. Other standards are to be considered secondary. No testing of primary standards is necessary. Primary standards should not be used if there is any physical indication of contamination or decomposition (i.e. partially discolored, etc.) or if they are expired. Secondary standards should be examined when first received, either by comparison to an existing primary standard or by comparing known physical properties to literature values. The less stable standards will be rechecked at appropriate intervals, usually six months to one year.

6.04 Records

A records book will be kept for each standard and will include:

1. Name and date received
2. Source
3. Code or lot number
4. Purity

5. Testing data including all raw work and calculations
6. Special storage requirements
7. Storage location
8. Expiration Date.

These records will be checked periodically as part of the laboratory internal audit process.

6.05 Equipment

6.05.1 General

1. Each major piece of analytical laboratory instrumentation that will be used on this project has been documented and is on file with the analytical laboratory.
2. An equipment form will be prepared for each new purchase and old forms will be discarded when the instrument is replaced.

6.05.2 Testing

1. Each equipment form will detail both preventive maintenance activities and the required QA testing and monitoring.
2. In the event the instrument does not perform within the limits specified on the monitoring form, the Laboratory Manager will be notified and a decision will be made as to what corrective action is necessary. The corrective action procedure shall be documented in the instrument log.

3. If repair is necessary, an "out-of-order" sign will be placed on the instrument until repairs are effected. Repairs made to the instrument will be documented in the instrument log book. Required QA/QC testing and monitoring will be completed prior to the resumption of sample analysis.

6.06 Calibration Records

A bound notebook will be kept with each instrument requiring calibration in which will be recorded activities associated with QA monitoring and repairs program. These records will be checked during periodic equipment review and internal and external QA/QC audits.

SECTION 7 - ANALYTICAL PROCEDURES

7.01 Field and Laboratory Analytical Procedures

Detection limits for analytical parameters are given in Table 2. The accuracy and precision of the data generated by the laboratory will be determined through analysis of duplicates, spiked samples, synthetic reference standard samples, and field and laboratory blanks analyzed along with each set of samples. Interferences will be identified and documented.

When matrix interferences are noted during sample analysis, actions will be taken by the laboratory to achieve the specified detection limits. Samples will not be diluted by more than a factor of five to reduce matrix effects. (Samples may diluted to a greater extent if analytes of concern generate responses in excess of the linear response of the instrument.) The laboratory will re-extract, re-sonicate, and/or use any of the clean-up methods presented in the NYSDEC Analytical Services Protocol (ASP). In such cases, the Laboratory Quality Assurance Coordinator will assure that the laboratory demonstrates good analytical practices and that such practices are documented in order to achieve the specified detection limits.

In general, the methods accuracy and precision will be determined by spiking the sample matrix with the analyte. Percent recoveries of the spikes will be calculated and compared with control limits listed in Table 2. A measure of precision will be obtained through the relative percent difference (RPD) between matrix spikes and matrix spike duplicates for organic compounds and as the RPD between laboratory duplicates for metals. Sampling precision will be evaluated based on the relative percent difference of duplicate field samples. RPDs will be compared to those control limits listed in Table 2.

The data generated will, whenever possible, be input to the laboratory database management system. Analyst's work sheets will be filed and stored for future reference. When approved and signed, data reports and pertinent information will be reported to the NYSDEC.

Complete descriptions of analytical procedures to be used in the field and laboratory are described in the *NYSDEC Analytical Services Protocol (ASP)* . A list of the analytical procedures to be used is as follows.

7.01.1 Ground Water Sampling

The first round of samples will be analyzed for NYSDEC ASP TCL metals using methods series 6000 and 7000, volatile organics using methods 8010, 8015, and 8020, and total petroleum hydrocarbons using method 418.1. The second round of samples will be analyzed for those parameters detected during the first sampling event. Data reporting and deliverables will adhere to NYSDEC ASP non-CLP Category B requirements.

7.01.2 Subsurface Soil Sampling

The samples will be analyzed for NYSDEC ASP TCL metals using method series 6000 and 7000, volatile organics using methods 8010, 8015, and 8020 and total petroleum hydrocarbons using method 418.1. The fuel tank soil samples will be analyzed for total petroleum hydrocarbons using method

418.1. Data reporting and deliverables will adhere to NYSDEC ASP non-CLP Category B requirements.

In addition, one sample from each area of concern, except the fuel oil tank area, will be analyzed for the NYSDEC ASP TCL using NYSDEC ASP Superfund methods 89-1, 89-2, 89-3, 200.7, 206.2, 239.2, 270.2, 272.2, 279.2, and 245.1. Data reporting and deliverables for these samples will adhere to NYSDEC ASP Superfund reporting requirements.

7.01.3 Surface Water Sampling

The surface water samples will be analyzed for NYSDEC ASP TCL volatile organics using methods 8010, 8015, and 8020, metals using method series 6000 and 7000, and total petroleum hydrocarbons using USEPA Method 418.1. Data reporting and deliverables will adhere to NYSDEC ASP non-CLP Category B requirements.

7.01.4 Sediment Sampling

Sediment samples will be analyzed for NYSDEC ASP TCL volatile organics using method 8010, 8015, and 8020, metals using method series 6000 and 7000, and total petroleum hydrocarbons using method 418.1. Data reporting and deliverables will adhere to NYSDEC ASP non-CLP Category B requirements.

SECTION 8 - DATA REDUCTION, VALIDATION, AND REPORTING

8.01 General

OBG Laboratories, Inc., of Syracuse, New York will be conducting analysis on collected samples in accordance with NYSDEC ASP protocols. Data reduction and laboratory validation will be incorporated into the in-house effort for all parameters and will follow NYSDEC ASP Superfund and non-CLP Category B requirements guidelines, depending on the analysis.

8.02 Data Production, Handling, and Reporting

The following data handling procedures will be followed at the laboratory.

8.02.1 Gas Chromatography

Instrumentation

1. Three Tracor 540 GCs with Tracor PID and HECD detectors and one Tracor 565 GC with Tracor PID and HECD detectors for volatile analysis.
2. Two Hewlett Packard HP 5890 and two Hewlett Packard HP5880 GC's and six Hewlett Packard ECD detectors and two Hewlett Packard FID detectors for semi-volatile analysis.

This auto injection system is used for positive identification and quantification of sample extracts. Output from the GC unit is processed for presentation in two forms:

1. A real time chromatogram

2. A post-run integration report containing the following:

    a. Retention time

    b. Response factors calculated from standards

    c. Surrogate standard recoveries

    d. Listing of all positively identified compounds

Quality Assurance/Quality Control data such as spikes, spike duplicates, and calibration curves are also processed and stored in post integration reports.

8.02.2 Gas Chromatography/Mass Spectrometry

Instrumentation

1. One Hewlett Packard 5995 GC/MS system and one Hewlett Packard 5970 GC/MS system for semi-volatile analysis. The GC/MS's are connected to a HP1000 RTE-6 Series Computer.
2. One Hewlett Packard 5970 GC/MS system and one Hewlett Packard 5987A GC/MS system for volatile analysis. The GC/MS's are connected to a HP1000 RET-6 Series Computer.

These instruments are used for positive identification and quantification of volatile organics and sample extracts. Both instruments use an Aquarius software package for data reduction. Output from the GC/MS units is processed for presentation in three formats:

1. A real-time total multiple ion mass chromatogram.

2. A post-run investigation report containing the following:

   a. Listing of all compounds

   b. Retention time (relative and absolute)

   c. Response factor (relative and absolute)

   d. Primary, secondary and tertiary ions with corresponding abundances

   e. Quantification ion

   f. Reference library name

   g. Concentration

3. A visual comparison of the subject mass spectral output to the library compounds.

Quality Assurance/Quality Control data such as resolution and calibration standards and DFTPP/BFB spectra are also processed and stored in the above manner.

8.02.3 Inductively Coupled Plasma Spectrometry (ICP)

Instrumentation

1. One Thremo Jarrell Ash ICAP-61, 29 channel 0.75 meter direct reading simultaneous spectrometer for metals analysis.

This instrumentation is used for the quantification of some trace metals. Data is directly transmitted to an IBM PC/AT computer for storage and manipulation. The computer is configured with a 640 KB single floppy, 1.2 MB disk drive, and a 30 MB hard disk. A printer provides a hard copy of the analytical data, as well as a graphics display of the spectral line profiles that assists in producing interelement corrections.

The instrument is standardized daily for each element to be analyzed. Standardization is confirmed by analysis of a laboratory control sample that contains each element in question. Continuing calibration standards, contract required detection limit (CRDL) standards, interference check samples, blanks, duplicates and matrix spikes are analyzed to measure accuracy, precision, and matrix effects.

Reduction of data from the analysis of the metals is minimal and consists primarily of tabulating the results and performing basic descriptive statistics on the data.

8.02.4 Atomic Absorption Spectrophotometry

Instrumentation

1. One Perkin-Elmer 5100-PC Atomic Absorption Spectrometer, Zeeman system with an optical interface for metals analysis.
2. One Thermo Jarrell Ash Smith-Hieftje 22 Atomic Absorption Dual Channel Spectrometer for metals analysis.
3. One Varian AA-575 Atomic Absorption Spectrometer, double beam optical spectrometer used predominately

for flame atomic absorption and cold vapor atomic absorption techniques.

Both instruments are equipped with an HGA600 furnace and are used for the low level detection of metals by conventional flame and graphite furnace techniques.

The atomic absorption spectrophotometers are calibrated using four to five calibrating standards. The results of the initial calibration are used to generate standard curves by least squares fit of the data via computer programs. The deviation of the standards from the least squares fit (standard curves) and the standard deviation of the fit are printed on the daily printout and the data stored accordingly in appropriate computer bases. If deviations from accepted values occur, analysis of sample and instrumental calibrations are repeated. Standard curves are generated regularly.

8.02.5 Data Distribution

Following final review by the appropriate Group Leaders, Quality Assurance Personnel and Manager of Analytical Services, two copies of the results of the analytical determination will be shipped to O'Brien & Gere Engineers, Inc.

8.02.6 Reporting

As specified by NYSDEC, ASP reporting will constitute 100% of the data. Data reporting and deliverable requirements will adhere to NYSDEC ASP Superfund and non-CLP Category B requirements, depending on analysis. The data report forms will be securely bound and all pages will be sequentially numbered.

The analytical data reports for all sample matrices will include the following information:

- Case Narrative
- Date of sampling
- Case file
- Description of samples
- Description of sample extraction and clean-up procedures
- Indication of analytical method
- Analytical results of all samples plus trip blank, field blank, and method blank (including tentatively identified compounds, if applicable)
- Analytical results of QA/QC sample analyses
- Summarized calibration data
- Detection limits for parameters analyzed
- QA/QC data summaries (i.e. MS/MSD results and summaries)
- Copies of completed chain-of-custody forms
- Notebook accountability record
- Appropriate raw instrument outputs (e.g. GC/MS spectral printouts)
- Example calculations for each analysis

Review and cross checking procedures will be per standard operating procedures of the laboratory and will ensure that the raw data and calculation results are properly, completely, and accurately transferred to the reporting format used by the laboratories' CLP program.

8.03 Data Validation

The laboratory validation process begins with the group leaders who will review the raw and reduced data for possible calculation and transcription errors. Additionally, the group leaders will check unusually high or low parameter values. The Laboratory QA Coordinator will perform a final laboratory validation of the data which will include a review of quality control sample analyses and data completeness. The laboratory report will then be reviewed and approved by the manager of analytical services prior to its release.

Prior to submittal of the data to the Project Manager for his review, data will be validated by O'Brien & Gere Engineers, NYSDEC approved data validators. Data validation is a systematic process of evaluating analytical data quality by comparing the data generation process (sample collection through sample analysis) to quality control criteria established prior to the initiation of the field investigation. Data quality criteria are established based on the project data quality objectives which are, in turn, established based on the intended use of the data. A data validation report establishes data usability by determining the degree of adherence to quality control criteria. As a result, sample data is determined to be usable as is, approximate, or unusable for the particular use established by the project data quality objectives. A data validation report will be generated and incorporated into the Interim Sampling Reports, as required.

The requirements to be checked for the validation of metals analyses are as follows:

1. Document Completeness
2. Holding Times
3. Calibration
4. Blanks
5. ICP Interference Check Samples ("ICS")
6. Laboratory Control Sample ("LCS")
7. Duplicate Sample Analysis
8. Matrix Spike Sample Analysis
9. Furnace Atomic Absorption QC
10. Sample Result Verification
11. Field Duplicates
12. Overall Assessment of Data for a Case

The requirements to be checked for the validation of volatile and semi-volatile organics analyses data are as follows:

1. Documentation Completeness
2. Holding Times
3. Calibration
4. Blanks
5. Surrogate Recovery
6. Matrix Spike/Matrix Spike Duplicate
7. Field Duplicate
8. TCL Compound Identification

9. Compound Quantification and Reported Detection Limits

10. System Performance

11. Overall Assessment of Data for a Case

The requirements to be checked for the validation of PCB/pesticide analyses data are as follows:

1. Holding Times
2. Pesticides Instrument Performance
    a. DDT Retention Time
    b. Standards Retention Time Windows
    c. DDT and Endrin Degradation
    d. DBC Retention Time Check
3. Calibration
    a. Initial Calibration
    b. Analytical Sequence Verification
    c. Continuing Calibration Verification
4. Blank Analysis
5. Surrogate Recovery
6. Matrix Spike/Matrix Spike Duplicate Analysis
7. Field Duplicate Analysis
8. TCL Compound Identification
9. Compound Quantification and Reported Detection Limits
10. Overall Data Assessment

The requirements to be checked for the validation of total petroleum hydrocarbon analyses are as follows:

1. Documentation Completeness
2. Calibration
3. Blank Analysis
4. Field Duplicate Analysis
5. Laboratory Duplicate Analysis
6. Sample Quantification
7. Overall Data Assessment

SECTION 9 - QUALITY CONTROL CHECKS

9.01 QC Checks

9.01.1 Laboratory

The numbers of QA/QC samples that must be taken for each sample matrix are listed in Table 3. Table 2 contains information regarding the audits, frequency and control limits for acceptability. Upon completion of analysis, the results of QA/QC data will be reviewed to verify compliance with the criteria listed. When results are reported to the Quality Assurance Officer, QA/QC data will be included in the package for review. Matrix spikes and surrogates will be used to monitor the methodology and recoveries will be compared to the QA/QC criteria presented in Table 2. Matrix spike duplicates and duplicate samples will be incorporated as an indicator of the precision of the sample results. The relative percent difference calculations will also be compared to the QA/QC criteria presented in Table 2.

9.01.2 Field

Field instrument calibrations will be performed both prior to and following the day's surveys. Calibrations will be performed for equipment used in field activities according to manufacturers recommendations. The calibration range will be designed to encompass the sample readings. The standards used in the field will be checked and replaced with fresh standards as they expire. The distilled water used in the field to clean the pH and other meter probes will be checked for conductance. Instrument conditions and calibration procedures will be checked by the on-site sampling team leader. On each day of field sampling, approximately 5% of temperature, specific conductance, turbidity and pH measurements will be checked by duplicate measurements.

9.02 Field Sampling Quality Control

Field sampling crews will always be under the direct supervision of a field sampling leader. Bound log books and appropriate data sheets will be used to document the collection of samples and data so that any individual sample or data set can be traced back to its point of origin, sampler and sampling equipment used. Sampling will be performed according to the methods provided in this document. Blind field duplicate samples will be collected by the sampling team. These samples will be sent to the laboratory for analysis in conjunction with the environmental samples. Field sampling precision will be evaluated through the relative percent difference (RPD) of the duplicate sample analyses results. Control limits for field duplicate precision have been established and may be found on Table 2. Decontamination of sampling equipment will be verified through the analysis of equipment blanks. Proper chain of custody protocols, as presented in this document, will be followed.

9.03 Field Analytical Procedures Quality Control

Field measurements of pH, Temperature, turbidity, and specific conductance will be taken on ground water samples. The pH meter will be checked against two known standard pH buffers (7 and 10) before and after each day's use. Temperature measurements will be made with a digital Celsius thermometer. The thermometer will be checked periodically against a precision thermometer certified by the National Institute of Science and Technology. Conductivity readings will be made with a portable specific conductivity meter. The meter will be calibrated against a 0.010 N potassium chloride solution at least twice a day.

The photo-ionizing detector and explosive atmosphere detector which are to be used for health and safety purposes will be calibrated according to the manufacturer's specifications.

SECTION 10 - PERFORMANCE AND SYSTEM AUDITS

O'Brien & Gere has designated a Quality Assurance Officer as indicated in Table 1. A performance audit consisting of analysis of appropriate blanks, spiked samples, and standard solutions will be performed. The specific schedule for QA/QC auditing is presented in Table 2. O'Brien & Gere's Quality Assurance Officer will maintain a record of such audits. These audits will test not only the total system's response, but major measurement methods. O'Brien & Gere's Quality Assurance Officer will report to the Project officer the result of the assessment of the accuracy, precision, and completeness of the data, results of the performance and system audits, and any problems encountered in the analytical procedures. The Quality Assurance Officer, and Data Validator, in conjunction with the Laboratory QA Coordinator, the analyst, analyst's supervisor, and Project Manager will formulate recommendations to correct any deficiencies in the analytical protocols or data. These corrective measures will be in accord with on-going good laboratory practices and the overall QA/QC program.

SECTION 11 - PREVENTIVE MAINTENANCE

Preventive maintenance procedures will be carried out on field equipment in accordance with the procedures outlined by the manufacturer's equipment manuals. Field equipment used during this project will have a specific maintenance instruction sheet accompanying it. Maintenance activities involving field equipment will be recorded in a field log book.

A preventive maintenance schedule is followed and a maintenance log is kept for each laboratory instrument. Instrument downtime will be kept to a minimum, by maintaining service contracts on essential instrumentation and maintaining a supply of critical spare parts. OBG Laboratories, Inc., staff is experienced in cleaning, maintaining, and troubleshooting instrumentation. Maintenance, whether performed by laboratory or manufacturer personnel, is documented on the appropriate instrument log. Log entries include, the reason for maintenance, maintenance performed, date and initials of person in charge during maintenance.

SECTION 12 - DATA ASSESSMENT PROCEDURES

The Laboratory Quality Assurance Coordinator and the Quality Assurance Officer will be responsible for data assessment. Data quality assessment will be based on instrument tuning criteria, calibration and performance, surrogate recoveries, blanks and the analysis of quality control samples. Procedures for data assessment will be consistent with those recommended by the NYSDEC ASP for the Contract Laboratory Program.

Precision and accuracy will be assessed utilizing control charts. Control charts will consist of bar-line graphs which provide a continuous graphic representation of the state of each analytical procedure. Control charts are utilized by OBG Laboratories, to identify problems before corrective action procedures become necessary. For example, 6 to 7 points in succession below the mean may indicate deterioration of a reference standard or spiking solution. The reference or spiking solution can be remade and the next few data points assessed to determine if the trend was in fact due to deterioration of the solution. Trend analysis, is essential in assisting the laboratory QA Coordinator in pinpointing possible problems in the analytical procedure before an "out of control" situation develops. The analytical laboratory will also utilize warning limits set at ± 2 standard deviations of the mean to assist in determining procedural problems before "out of control" situations develop. Reducing "out of control" situations is important to produce valid analytical data in a timely fashion, since reanalysis time is minimized.

In general, the accuracy of the methods will be determined by spiking the sample matrix with the analyte. The spiking levels will be selected to bracket the concentration of interest. Percent recoveries of the spikes will be calculated and compared to the limits presented in Table 2. The precision of the methods will be determined by the analysis of matrix spike and laboratory and field duplicate samples. The precision will be evaluated by calculating the relative percent difference (RPD) between the duplicates. Relative percent difference calculations will be compared to the limits presented in Table 2.

The definitions and equations used for the assessment of data quality are the following:

a. Accuracy and Precision - Accuracy is a measure of the nearness of an analytical result, or a set of results, to the true value. It is usually expressed in terms of error, bias, or percent recovery (%R).

Normally the term "accuracy" is used synonymously with "percent recovery". It describes either the recovery of a synthetic standard of known value, or the recovery of known amount of analyte (spike) added to a sample of known value. The percent recovery (%R) or "accuracy" can be calculated by using:

1. standards: %R = (observed value/true value) x 100

2. spikes: $$\%R = \frac{\text{(conc. spike + sample) - sample}}{\text{conc. spike}} \times 100$$

Precision refers to the agreement or reproducability of a set of replicate results among themselves without assumption of any prior information as to the true result. It is usually expressed in terms of the percent difference or relative percent difference.

b. Average - The average or arithmetic mean (X) of a set of n values (Xi) is calculated by summing the individual values and dividing by n:

$$X = (\sum Xi_{i=1 \text{ to } n})/n$$

n = number of values

c. Range - The range (R_i) is the difference between the highest and lowest value in a group. For n sets of duplicate values (X_2, X_1) the range (R_i) of the duplicates and the average range (R) of the n sets are calculated by:

$$R_i = X_2 - X_1$$

and

$$R = \sum Ri_{i=1 \text{ to } n}/n$$

d. Standard Deviation and Variation - The standard deviation (S) of a sample of n results is the most widely used measure to describe the dispersion of a data set. It is calculated by using the equation.

$$S = \sqrt{\frac{\sum(Xi - X)^2_{i-1 \text{ to } n}}{n}}$$

where X is the average of the n results and Xi is the value of result i. Normally, X ± S will include 68% and X ± 2S about 95% of the data in a normal distribution curve.

The variance is equal to S^2. The percent relative standard deviation (%RSD) or coefficient of variation (CV) is the standard deviation divided by the mean and multiplied by 100, i.e,

$$CV = 100S/X$$

The Laboratory QA Coordinator, with individual laboratory group leaders, will identify any data that should be rated as "unacceptable", based on the assessment of the QA/QC criteria.

SECTION 13 - CORRECTIVE ACTION

Corrective action procedures will be implemented based on unacceptable audit results or upon detection of data unacceptability. The data generation process will be audited by assessing adherence to laboratory control limits specified in Table 2. If required, corrective action procedures will be developed on a case-by-case basis. The enacted corrective actions will be documented in the appropriate laboratory notebook, instrument log, or case file.

Generally, the following actions may be taken. When calibration, instrument performance, and blank criteria are not met, the cause of the problem will be located and corrected. The analytical system will then be recalibrated. Sample analysis will not begin until calibration, instrument performance, and blank criteria are met. When matrix spike, reference standard or duplicate analyses are out of control, samples analysis will cease. The problem will be investigated. Depending on the results of overall quality control program for the sample set, the data may be accepted with qualification or rejected. If the laboratory rejects data, those samples will be reprepared and reanalyzed. If matrix interferences are suspected, samples will be subjected to one or more of the clean-up techniques specified in the analytical methods. If QC criteria are met upon reanalysis, only the new results are reported. If quality control criteria are still not met upon reanalysis, both sets of sample results will be reported. The laboratory will make every reasonable effort to correct quality control excursions and to document the presence of matrix interferences. In this way, unnecessary resampling of difficult matrices may be avoided. However, if matrix interferences are not documented resampling may be required.

SECTION 14 - QUALITY ASSURANCE REPORTS TO MANAGEMENT

The deliverables associated with the Tasks identified in the Work Plan will contain separate QA sections in which data quality information collected during the Task is summarized. Those reports will be prepared by the Project Manager and will include the Quality Assurance Officer report on the accuracy, precision, and completeness of the data and the results of the performance and system audits.

Tables

O'BRIEN & GERE

TABLE 1

FOCUSED REMEDIAL INVESTIGATION, I.T.T. SELECTRO REMEDIAL INVESTIGATION/FEASIBILITY STUDY

PRIMARY CONTACTS

Name and Responsibility	Organization and Address	Phone Number
Steven Roland Project Officer	O'Brien & Gere Engineers, Inc. Raritan Plaza I Edison, NJ 08837	(908)225-7380
Guy A. Swenson Project Manager	O'Brien & Gere Engineers, Inc. 5000 Brittonfield Parkway Syracuse, New York 13221	(315) 437-6100
Michael Caputo Quality Assurance Officer	O'Brien & Gere Engineers, Inc. 5000 Brittonfield Parkway Syracuse, New York 13221	(315) 437-6100

Table 2 (1 of 7)
Control Limits
Volatiles: Soil and Water Matrix
U.S. EPA Methods 8010/8020

AUDIT	FREQUENCY	CONTROL LIMITS
Reagent Blank	Initial and Daily	Less than 5x DL for CLP common laboratory contaminants, less than DL for all others.
MS/MSD/Field Duplicate	1 each per 20 samples	Within 50% of known value. RPD within 50%.
Surrogate Spike	All samples and blanks (including MS/MSD)	Recovery limits within those of method.
Continuing Calibration	Each 12 hours	15% difference for any check compound.
Method/Field blank	1 in 20 provided by sample crew	Same as reagent blank.
Initial Calibration	At beginning of analysis	Five concentrations-linear range volatiles 20-200 ug/l for all compounds of interest. <20% RSD for R(f).
Detection Limit	On-going	As specified in the NYSDEC ASP CLP method.

TABLE 2 (2 of 7)
LABORATORY CONTROL LIMITS

Total Recoverable Petroleum Hydrocarbons: U.S. EPA Method 418.1

Audit	Frequency	Control Limit
Method Blank	Prior to sample analysis and every 12 hours	Less than IDL for all compounds of interest
Initial Calibration	Prior to sample analysis and when continuing calibration criteria is not met	A minimum of three standards that define the concentration range of samples analyzed
Continuing Calibration	Each 12 hours	<25% difference from initial calibration
Duplicate Analysis	One per analytical batch, or matrix type, or every 20 samples whichever is most frequent	RPD within 50%.
Detection Limit	Established for each GC system prior to sample analysis and whenever the GC system is modified	As specified by method.

TABLE 2 (3 of 7)
LABORATORY CONTROL LIMITS

Inorganics: U.S. EPA Methods 6010, 7060, 7421, 7470, 7740, and 7841

AUDIT	FREQUENCY	CONTROL LIMIT
Calibration Blank	At beginning and end of run and at a rate of 10% during run	Less than IDLs
Calibration Verification	Calibrated daily (with minimum of 2 standards for ICP and 4 standards for AA furnace) and each time the instrument is set up; verify at a frequency of 10% or every 2 hours whichever is greater	Calibration correlation coefficients for furnace AA $\geq$ 0.995 %Recovery 90%-110% for metals %Recovery 80%-120% for cyanide and mercury
Preparation Blank	1 per matrix, 1 per digestion batch, and every 20 samples of similar matrix	Less than IDLs
Spiked Sample Analysis	1 per matrix, 1 per digestion batch and every 20 samples of similar matrix	%Recovery 75%-125%
Duplicate	Same as spiked sample analysis	RPD $\leq$ 20% or ± IDL for samples <5xIDL
Laboratory Control Sample	1 per digestion batch and matrix type	For soils: Values must be within EPA established limits; For waters: %Recovery 80%-120%
Furnace Analysis	Every sample must be injected in duplicate and spiked; method of standard additions is required when sample absorbance or concentration $\geq$ 50% of spike concentration and %recovery is not within 85%-115%	%RSD of duplicate injections $\leq$ 20% ; %Recovery of spikes 85%-115%
Detection Limit	Established for each instrument system and updated whenever instrument is modified	0.1 - 1000mg/kg for soils 1ug/L - 1000ug/L for waters

TABLE 2 (4 of 7)
LABORATORY CONTROL LIMITS
NYSDEC ASP Superfund Methods 200.7/245.1/239.2/206.2/270.2/279.2

AUDIT	FREQUENCY	CONTROL LIMITS
Initial Calibration	Each time the instrument is set-up (ICP with a minimum of 2 standards; furnace AA with 4 standards)	Calibration correlation coefficients for furnace AA $\geq$ 0.995
Continuing Calibration Verification	Immediately after initial calibration, every 10 samples and at the end of an analysis run	%Recovery 90%-110%
Calibration Blank	Prior to sample analysis, every 10 samples and at the end of an analysis run (after every continuing calibration standard)	Less than CRDLs
Preparation Blank	1 per matrix, 1 per digestion batch and every 20 samples of similiar matrix	Less than CRDLs
CRDL Standard Analysis	ICP: at the beginning and end of analysis; AA: prior to sample analysis	%Recovery 80%-120%; except for mercury - CRDL not required
Laboratory Duplicate Analysis	1 per matrix, 1 per digestion batch and every 20 samples of similiar matrix	%D $\leq$ 20% or $\pm$ CRDL for samples <5xCRDL
Matrix Spike Analysis	1 per matrix, 1 per digestion batch and every 20 samples of similiar matrix	%Recovery 75%-125%
Laboratory Control Sample	1 per matrix, 1 per digestion batch and every 20 samples of similiar matrix	For soils: Values must be within those defined by EPA or EPA certified manufacturer of reference standard For waters: 80%-120%
ICP Analysis	Interference Check Sample (ICS): at the beginning and end of analysis sequence Serial Dilution Analysis: for each matrix and for each sample delivery group whichever is more frequent	ICS: $\pm$ 20% of true value Serial Dilution: %D <10% when sample concentration is $\geq$ 50 x IDL
Furnace Analysis	Every sample must be injected in duplicate and spiked; Method of Standard Additions is required when sample absorbance or concentration is $\geq$ 50% of spike concentration and %recovery is not within 85%-115%	%RSD of duplicate injections $\leq$ 20% %Recovery of spikes 85%-115%
Instrument Detection Limits	Quarterly	Must be at or lower than CRDLs

TABLE 2 (page 5 of 7)

LABORATORY CONTROL LIMITS

NYSDEC ASP Superfund Method: 89-3

AUDIT	FREQUENCY	CONTROL LIMITS
3 point calibration for each parameter of interest, one of the standards must be near but above the CRQL (contract required quantitation limit)	Prior to sample analysis and each time a new column is installed	%RSD <10% for quantitation column
Continuing Calibration Verification - 2 Individual Standard Mixes at concentrations specified in the SOW	At the beginning and end of analysis sequence and as specified by 72 hour sequence outlined in SOW	%D < 15% for quantitation column %D < 20% for confirmation column
Method Blank Analysis	1 per matrix , every 20 samples of similiar matrix and whenever samples are extracted by the same procedure	Less than CRDL for all PCB/pesticide compounds and peaks that would interfer with sample identification or quantitation must not be present
Surrogate Analysis (Dibutylchlorendate)	All samples, blanks, duplicates, spikes and external check standards	Retention time shift < 2% difference for packed columns from initial standard analysis. %Recovery 24%-154% for water samples and %Recovery 20%-150% for soil/sediment samples
Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis	1 per matrix, 1 per concentration level (soils only) and every 20 samples of similiar matrix. The spiking compounds specified in the SOW must be used.	Percent Recovery and Relative Percent Difference (RPD) must be within those limits established by the SOW
Matrix Spike Blank Analysis	Must be set up with each MS/MSD pair	%Recovery 75%-125%
GC Operating Conditions	Must be adjusted prior to establishing retention time windows	Retention time of 4,4'-DDT $\geq$ 12 minutes on packed GC column
Retention Time Windows	At the beginning of the contract and each time a new GC column is installe using three standard injections	Retention time window for the 72 hour analytical sequence is defined as $\pm$ 3 x (standard deviation) of the retention time established by the first PCB/pesticide standard analysis.
% Breakdown for 4,4'-DDT and Endrin	For each evaluation standard mix	%breakdown < 20% for 4,4'-DDT and Endrin
Confirmation Analysis	For each PCB/pesticide compound detected	Confirmation must be done using a dissimilar GC column. If concentration is sufficient GC/MS confirmation must also be done
Instrument Detection Limit	Quarterly	Must be $\leq$ CRQL specified in the SOW; Cleanup procedures must be employed when necessary to meet instrument detection limits

LABORATORY CONTROL LIMITS

NYSDEC ASP Superfund Method 89-2

AUDIT	FREQUENCY	CONTROL LIMIT
GC/MS Tuning	Prior to sample analysis and every 12 hours	DFTPP key ions and abundance criteria must be met for all 13 ions
Method Blank	Prior to sample analysis and every 12 hours	Less than 5xCRDL for CLP common laboratory contaminants; Less than CRDL for all others
Initial Calibration	Prior to sample analysis and whenever continuing calibration criteria is not met	Five concentrations – linear range semi–volatiles 20 –160 ng, except for 9 compounds, (phenols and analine) 4 concentrations 50 – 160 ug/L. Minimum Response factor (RF) >0.050 for System Performance Check Compounds; < 30% RSD for RFs
Continuing Calibration	Initially and every 12 hours	Minimum RF >0.050 for System Performance Check Compounds; less than 30% difference for Calibration Check Compounds
Internal Standards Evaluation	All samples and blanks (including MS/MSD samples)	Retention times within 30 seconds and internal standard areas within a factor of two from latest daily 12 hour continuing calibration standard
Surrogate Spike	All samples and blanks (including MS/MSD samples)	%Recovery within control limits established in method
MS/MSD	1 per matrix and every 20 samples of similiar matrix	%Recovery within control limits established in method
Detection Limit	Established for each GC/MS system prior to sample analysis and up–dated whenever GC/MS system is modified	Must be lower than CRDL

TABLE 2 (7 of 7)

LABORATORY CONTROL LIMITS

NYSDEC ASP Superfund Method 89-1

AUDIT	FREQUENCY	CONTROL LIMIT
GC/MS Tuning	Prior to sample analysis and every 12 hours	BFB key ions and abundance criteria must be met for all 9 ions
Method Blank	Prior to sample analysis and every 12 hours	Less than 5xCRDL for CLP common laboratory contaminants; Less than CRDL for all others.
Initial Calibration	Prior to sample analysis and whenver continuing calibration criteria is not met	Five concentrations – linear range volatiles 20 –200 ug/L for all compounds of interest. Minimum Respone factor (RF) for System Performance Check Compounds < 0.300 (0.250 for bromoform); <30% RSD for RFs
Continuing Calibration	Initially and every 12 hours	Minimum RF for System Performance Check Compounds < 0.300 (0.250 for bromoform); %Difference < 20% for Calibration Check Compounds
Internal Standards Evaluation	All samples and blanks (including MS/MSD samples)	Retention time within 30 seconds and internal standard areas within factor of two from latest daily 12 hour continuing calibration standard
Surrogate Spike	All samples and blanks (including MS/MSD samples)	%Recovery within control limits established in method
MS/MSD	1 per matrix and every 20 samples of similiar matrix	%Recovery within control limits established in method
Detection Limit	Established for each GC/MS system prior to sample analysis and up-dated whenever GC/MS system is modified	Must be lower than CRDL 5–10ug/L for waters

TABLE 3

FIELD QUALITY CONTROL SAMPLES
FOCUSED REMEDIAL INVESTIGATION, I.T.T. SEALECTRO

Remedial Investigation/Feasibility Study

NUMBER OF SAMPLES TO BE COLLECTED

Matrix	Environmental Samples	Matrix Spike	Matrix Spike Duplicate* or Duplicate **	Field Duplicate	Field/ Equipment Blank	Trip Blank
Ground Water	40***	1 per sampling round	1 per sampling round	1 per sampling round	1 per sampling round	1 per trip
Surface Water	12	1	1	1	1	1 per trip
Subsurface Soil	30	2	2	2	2	1 per trip
Subsurface Soil****	3	1	1	-	1	-
Sediment	12	1	1	1	1	1 per trip

NOTES:

* - organic analysis
** - inorganic analysis
*** - total number of samples collected in two sampling events
**** - samples to be analyzed by NYSDEC ASP Superfund methods

TABLE 4

FOCUSED REMEDIAL INVESTIGATION, I.T.T. SEALECTRO REMEDIAL INVESTIGATION/FEASIBILITY STUDY

SAMPLE CONTAINERS AND PRESERVATION REQUIREMENTS

Analysis	Sample Containers	Preservation
WATER:		
Volatile Organics	2-40 ml glass vials with teflon backed silicon septum caps	Cool to 4° C HCL to pH less than or equal to 2
Metals (Dissolved)	1-1 liter polyethylene bottle with poly cap	Field filter w/.45 filter followed by HNO_3 to pH less than or equal to 2
Metals (Total)	1-1 litre polyethylene bottle with poly cap	HNO_3 to pH less than or equal to 2
Total Petroleum Hydrocarbons	32 oz. glass jar with poly cap	Cool to 4° C HCL to pH less than or equal to 2
SOIL SAMPLES:		
Volatile Organics	2-120 ml wide mouth glass vials	Cool to 4° C
Semi-Volatile Organics	1 - 8 oz. wide mouth glass jar with teflon lined phenolic cap	Cool to 4° C
PCB/Pesticides	1 - 8 oz. wide mouth glass jar with teflon lined phenolic cap	Cool to 4° C
Metals	1-8 oz. wide mouth glass jar with teflon lined phenolic cap	Cool to 4° C
Total Petroleum Hydrocarbons	16 oz. glass jar with teflon lined phenolic cap	Cool to 4° C

TABLE 5
FOCUSED REMEDIAL INVESTIGATION, I.T.T. SEALECTRO
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
RECOMMENDED HOLDING TIMES

Sample Analysis	Water	Soil
Volatile Organics	7 days from VTSR	7 days from VTSR
Semi-Volatile Organics		5 days until extraction 40 days until analysis from extraction
PCBs/Pesticides		5 days until extraction 40 days until analysis from extaction
Metals	six months from VTSR	six months from VTSR
Mercury	26 days from VTSR	26 days from VTSR
Total Petroleum Hydrocarbons	26 days from VTSR	26 days from VTSR

VTSR = verified time of sample receipt

TABLE 6

FOCUSED REMEDIAL INVESTIGAITON, I.T.T. SEALECTRO
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

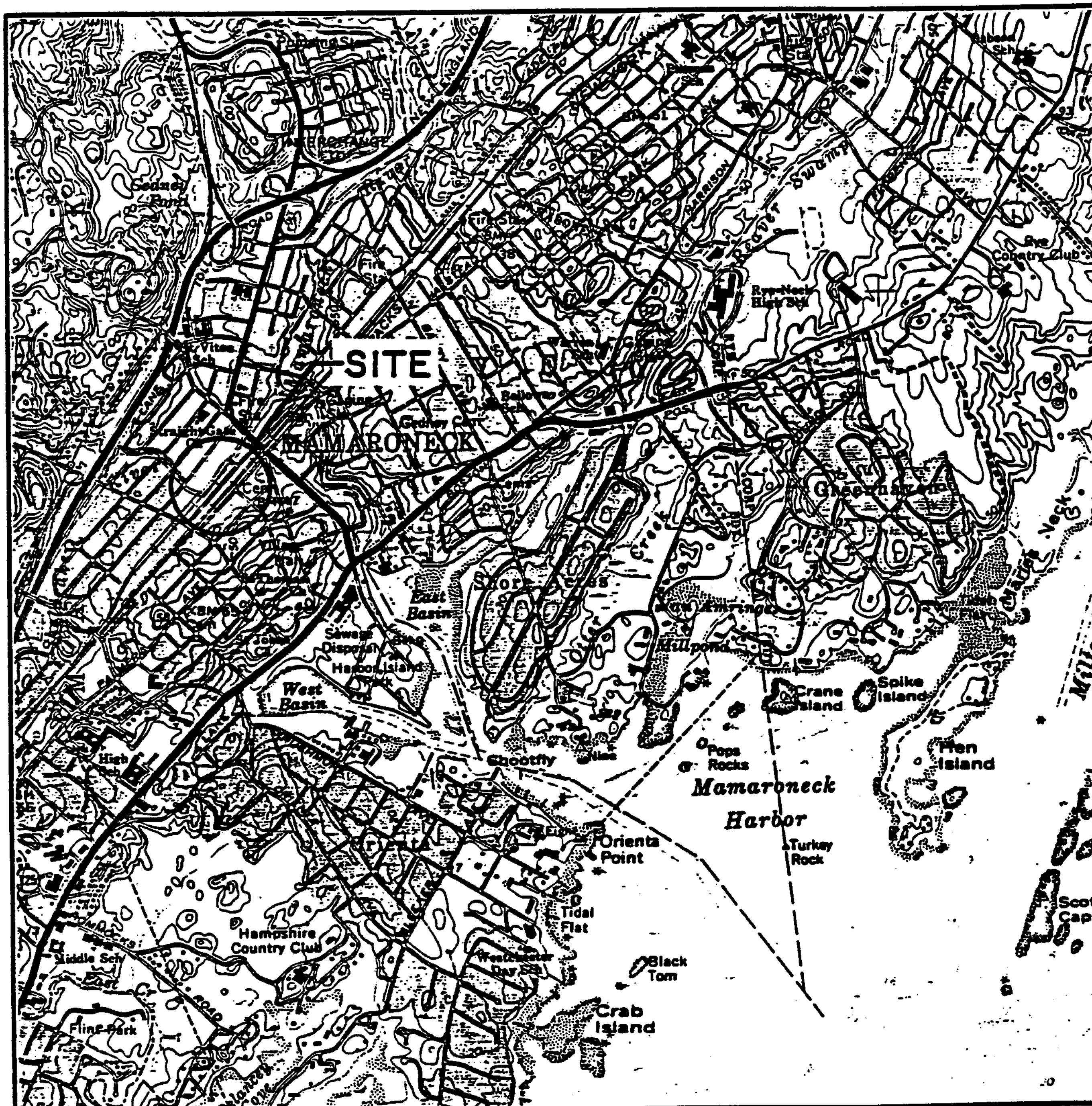
ANALYTICAL METHOD NUMBERS

Sample Analysis	NYSDEC ASP Method
TCL Volatiles	8010/8020, 8015
TCL Superfund Volatiles	89-1
TCL Superfund Semi-Volaties	89-2
TCL Superfund PCBs/Pesticides	89-3
TCL Inorganics	6010, 7060, 7421, 7470, 7740, 7841
TCL Superfund Inorganics	200.7, 245.2, 239.2, 206.2, 270.2, 279.2
Total Petroleum Hydrocarbons	418.1

Figures

O'BRIEN & GERE

FIGURE 1



ITT SEALECTRO
MAMORONECK, NEW YORK

QUADRANGLE LOCATION

SITE LOCATION MAP

0 2000 4000

SCALE IN FEET

ADAPTED FROM 7.5 MIN. U.S.G.S. QUAD. MAP, MAMORONECK, NEW YORK

O'BRIEN & GERE ENGINEERS, INC.

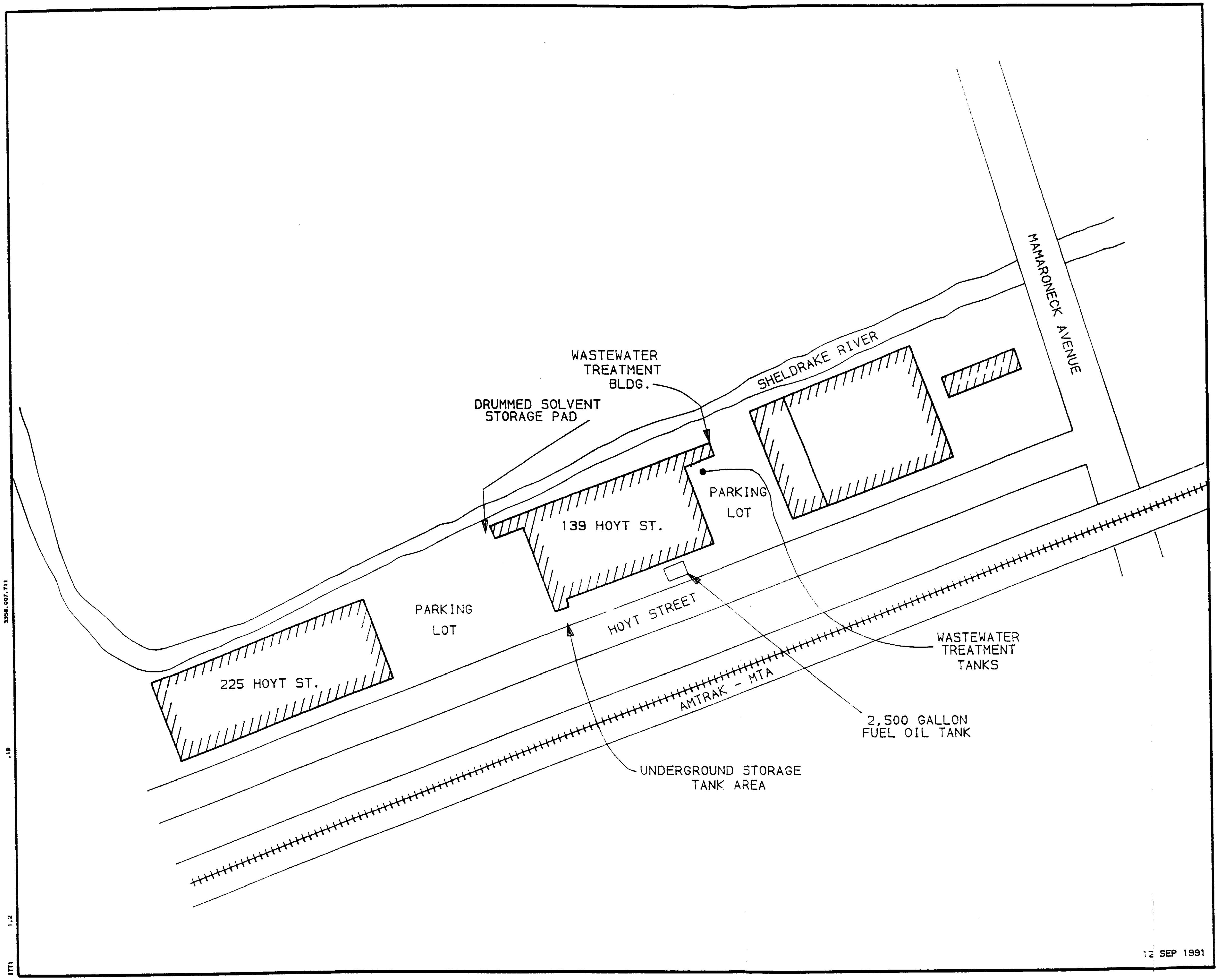
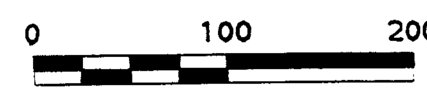


FIGURE 2

ITT SEALECTRO
MAMARONECK, NEW YORK

SITE MAP

LEGEND



APPROX. SCALE IN FEET

O'BRIEN & GERE
ENGINEERS, INC.

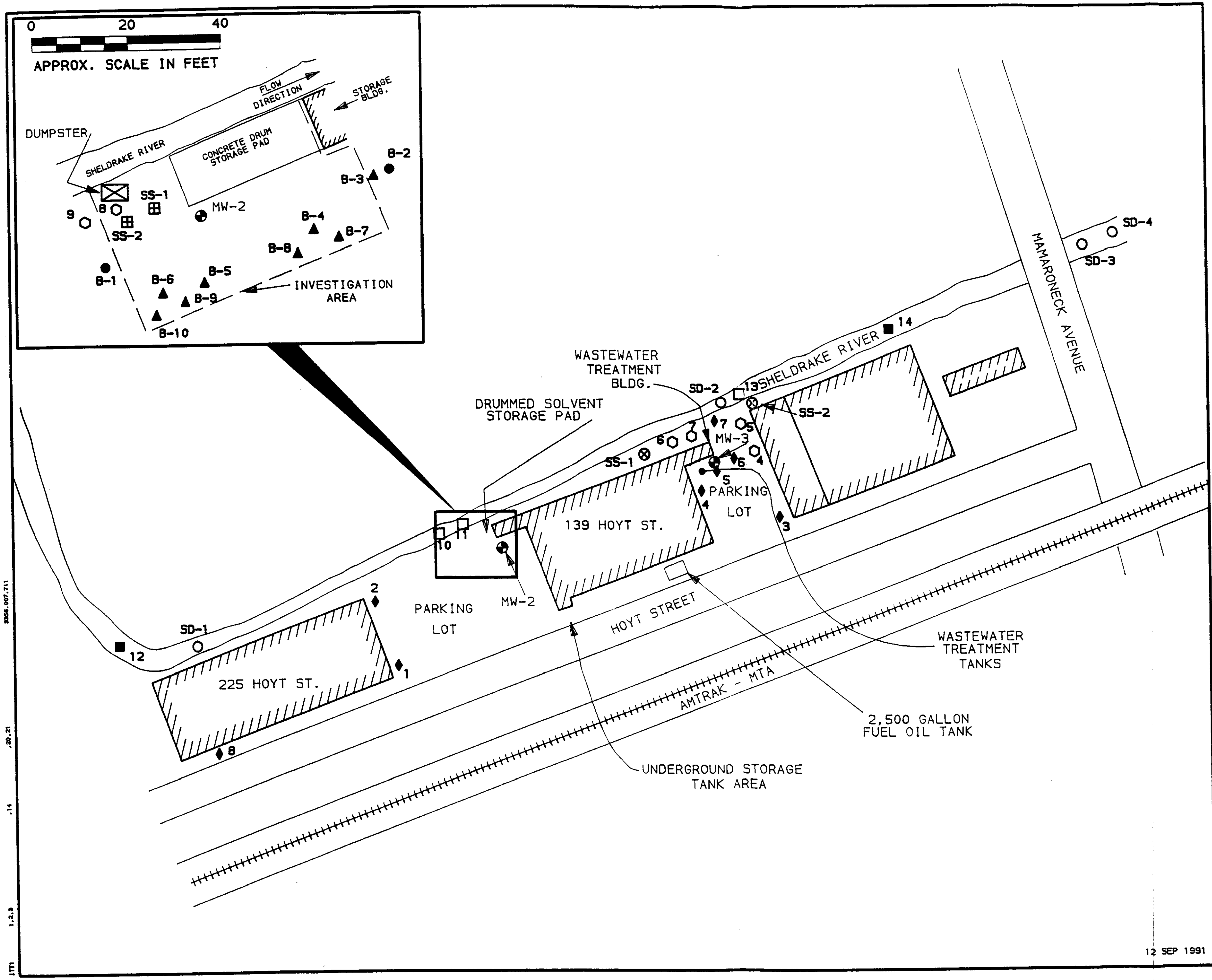
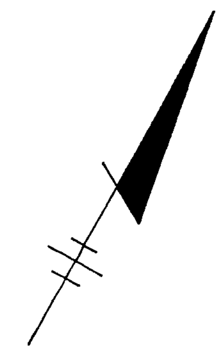


FIGURE 3

ITT SEALECTRO
MAMARONECK, NEW YORK

EXISTING MONITORING WELLS
SOIL BORINGS, SURFACE SOIL &
SURFACE WATER SAMPLE LOCATION



LEGEND

- MONITORING WELL (6/88, TRC)
- SOIL BORING (6/88, TRC)
- SOIL BORING (8/89, OBG)
- SOIL SAMPLE (8/89, OBG)
- SS SOIL SAMPLE (7/88, TRC)
- SOIL BORING (1/86-2/86, OBG)
- SURFACE SOIL SAMPLE (2/86, OBG)
- SURFACE WATER SEDIMENT SAMPLE (2/86, OBG)
- SEDIMENT SAMPLE (2/86, OBG)
- SD SEDIMENT SAMPLE (6/88, OBG)

0 100 200
APPROX. SCALE IN FEET

O'BRIEN & GERE
ENGINEERS, INC.
New York

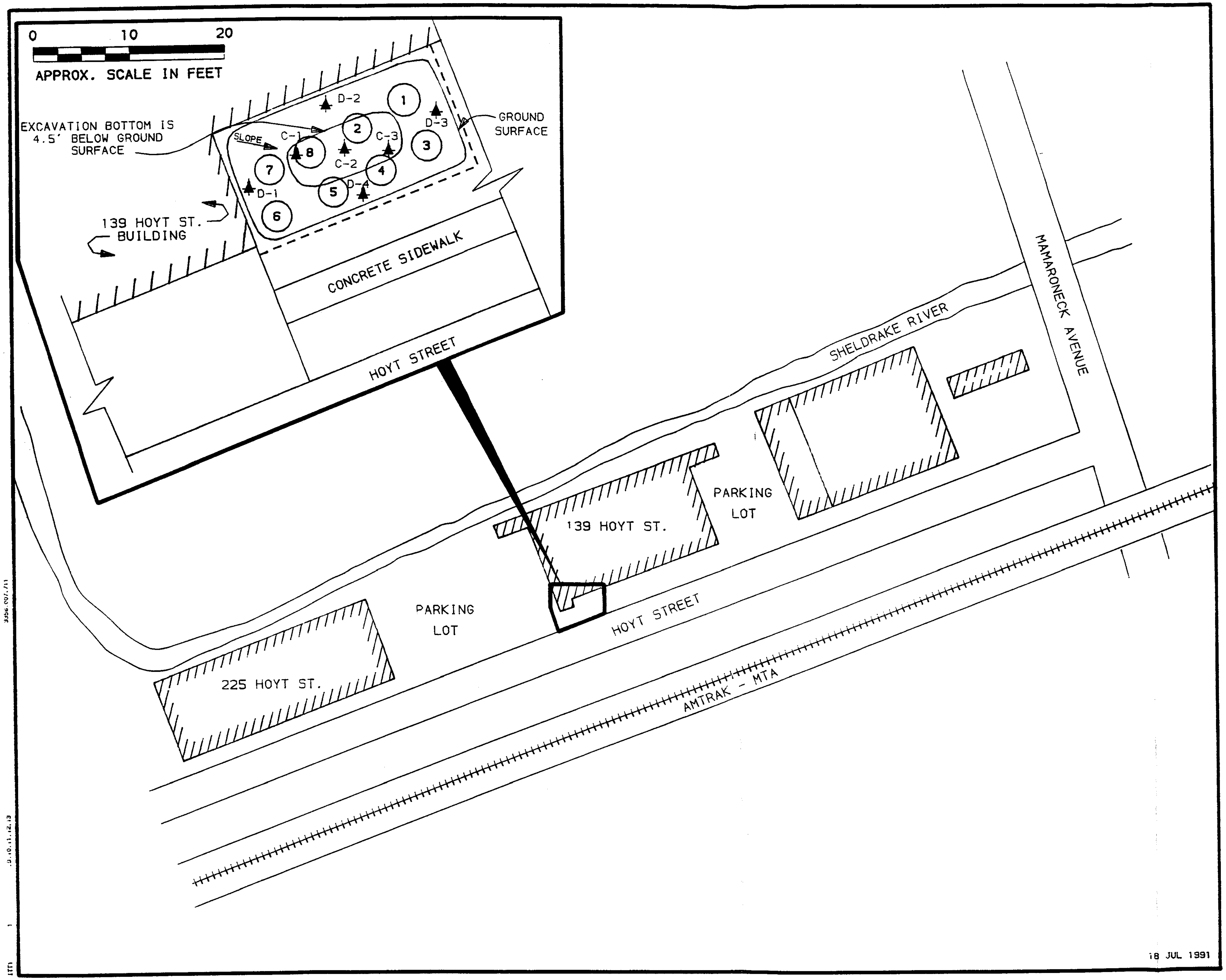
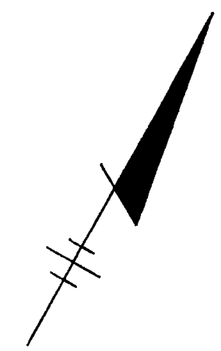


FIGURE 4

ITT SEALECTRO
MAMARONECK, NEW YORK

UNDERGROUND STORAGE TANK
AND SAMPLING LOCATIONS



LEGEND

SOIL SAMPLE LOCATION

(3) FORMER TANK LOCATION

0 100 200

APPROX. SCALE IN FEET

O'BRIEN & GERE
ENGINEERS, INC.
Syracuse New York

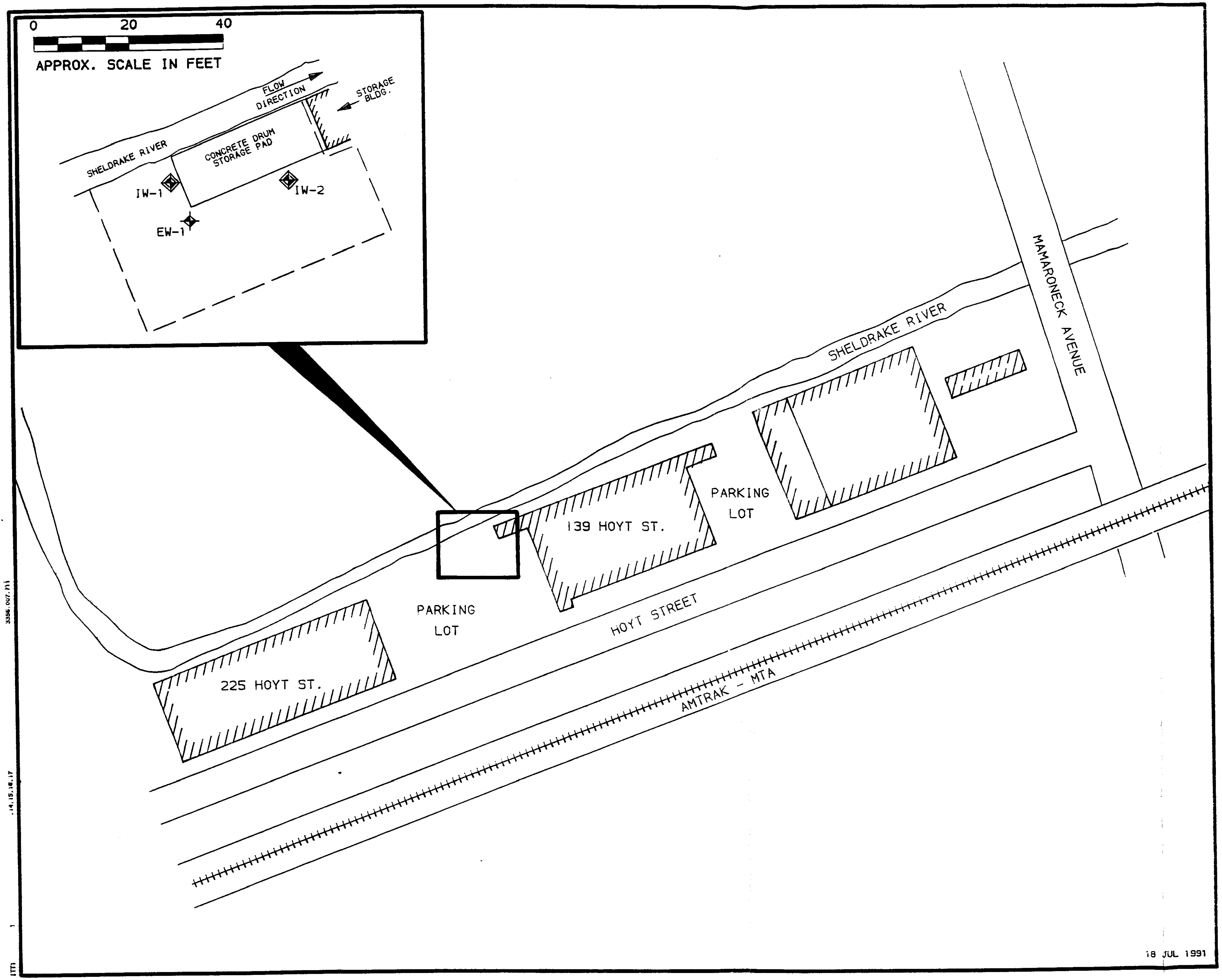


FIGURE 5

ITT SEALECTRO
MAMARONECK, NEW YORK

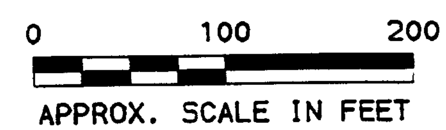
SOIL VAPOR EXTRACTION
SYSTEM DIAGRAM

LEGEND

VAPOR INLET WELL

VAPOR EXTRACTION WELL

AREA OF CONTAMINATED SOILS (APPROXIMATE)



O'BRIEN & GERE
ENGINEERS, INC.

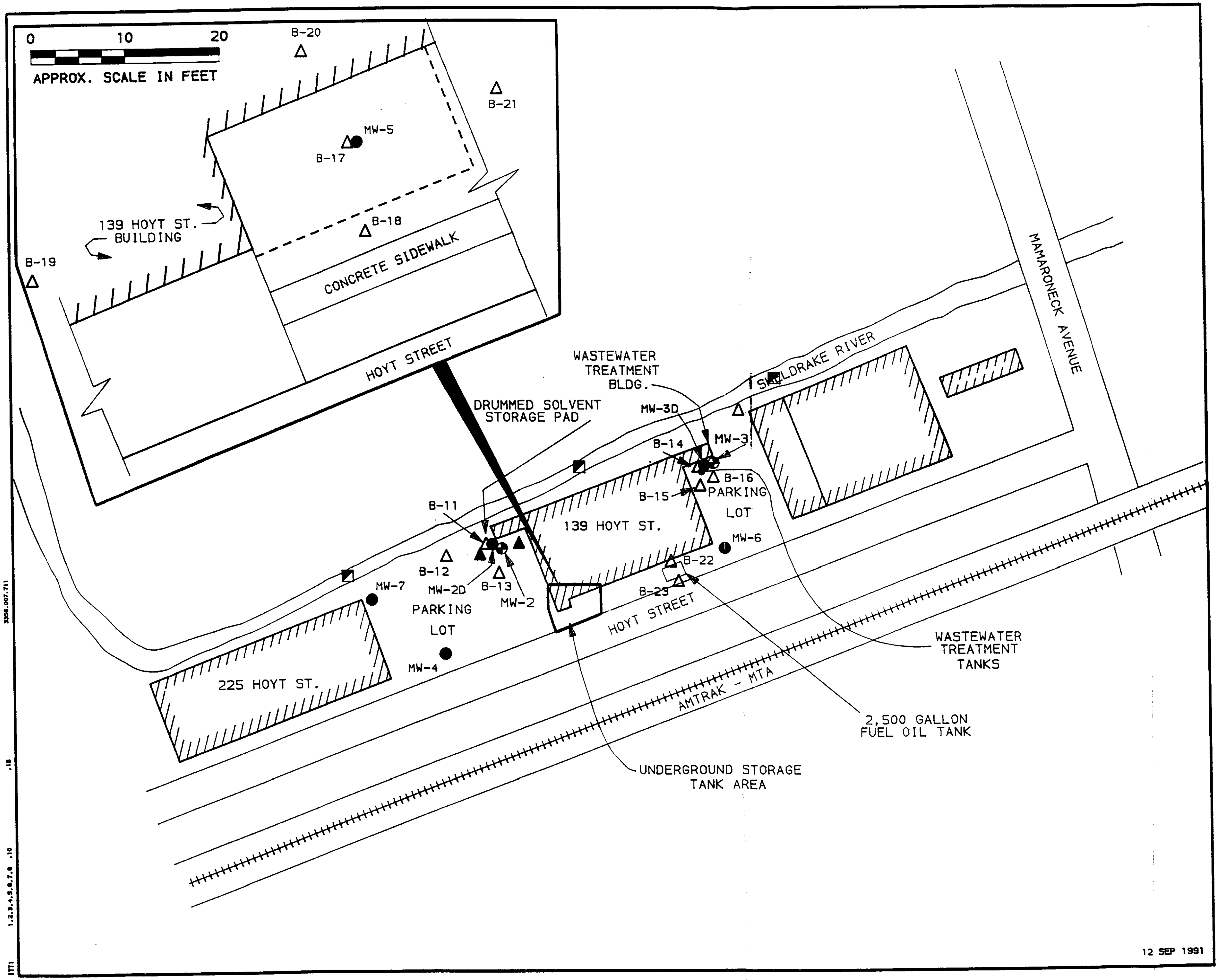


FIGURE 6

ITT SEALECTRO
MAMARONECK, NEW YORK

PROPOSED SOIL BORINGS, MONITORING WELLS, AND SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS

LEGEND

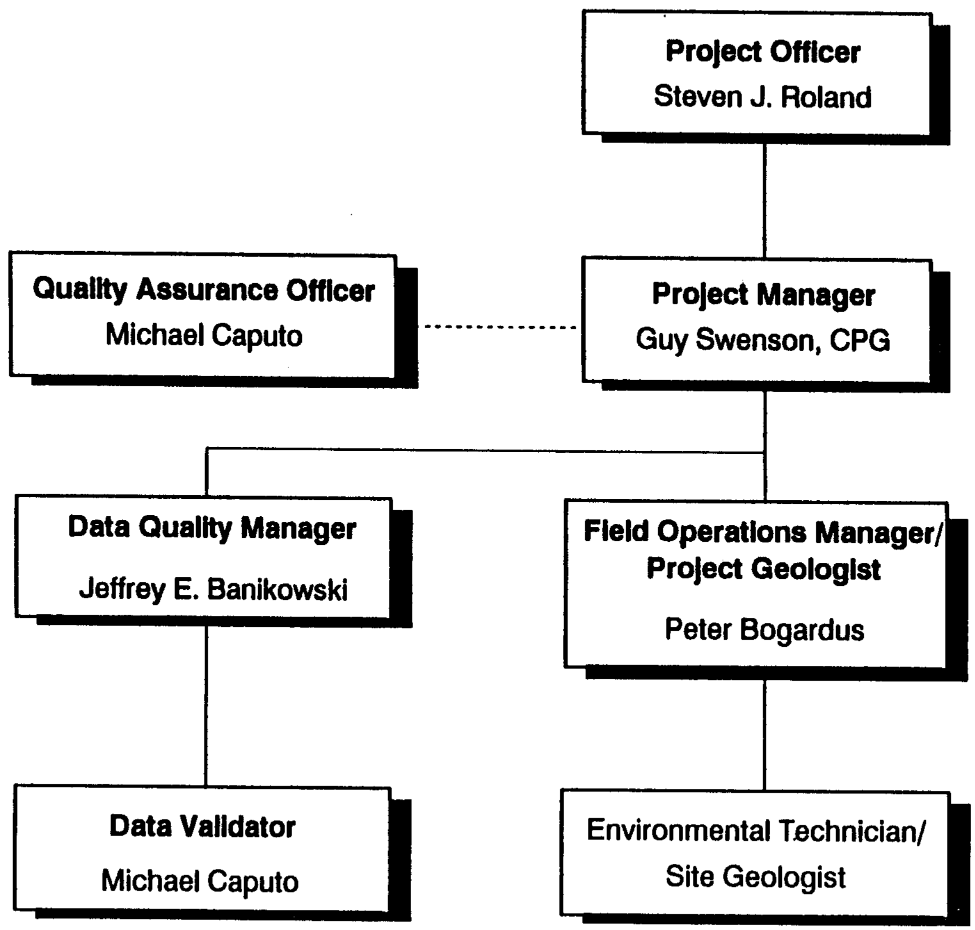
△ PROPOSED SOIL BORING
● PROPOSED MONITORING WELL
◪ PROPOSED SURFACE WATER AND SEDIMENT SAMPLING LOCATION
◕ EXISTING MONITORING WELL
▲ EXISTING SOIL BORING

0 100 200
APPROX. SCALE IN FEET

O'BRIEN & GERE ENGINEERS, INC.
Syracuse, New York

Figure 7

O'Brien & Gere Engineers, Inc.
Project Organization Chart



Appendices

O'BRIEN & GERE

APPENDICES

PROFESSIONAL PROFILE

Mr. Roland joined O'Brien & Gere Engineers, Inc. in 1978 as a Design Engineer. He was promoted to Senior Project Engineer in 1984, Managing Engineer in 1986 and Vice President in 1988.

Education

Union College, 1978, BS/Civil and Environmental Engineering

Registrations

New York, New Jersey, North Carolina, Michigan

Professional Affiliations

American Society of Civil Engineers
American Water Works Association
Water Pollution Control Federation

Special Training

Certified Petro-Tite^R Tank Tester

TECHNICAL EXPERTISE

- Hazardous/solid waste site investigations and remediation design
- New Jersey Environmental Cleanup Responsibility Act (ECRA) assessments and cleanup plans
- Hazardous waste management
- Industrial wastewater design

MANAGEMENT CAPABILITIES

Mr. Roland has provided management services on over 40 hazardous waste projects, project costs ranging from $25,000 to $1.5 million with total hazardous waste management project costs of approximately $14,000,000. He plans, conducts, and supervises these projects of major significance and consistently seeks remedial alternatives which are protective of human health and the environment, are cost-effective, and utilize innovative, current technologies to the maximum extent practicable.

Supervising multi-disciplinary professionals, Mr. Roland provides direction, coordination of work efforts, and executive supervision to project teams which may include civil, chemical, and environmental engineers; hydrogeologists; industrial hygienists; toxicologists; and chemists. He is Officer in Charge of O'Brien & Gere's Edison, New Jersey regional office, demonstrates technical, budgeting, and scheduling expertise, and is responsible for final review of all project deliverables.

EXPERIENCE

WASTEWATER, MUNICIPAL:

Directed Sewer System Evaluation Survey encompassing 282 miles of separate sanitary sewers and 80 miles of storm drains. Technical evaluating hydraulic analysis of existing 400 ft. and 800 ft. inverted

Officer in charge of directing the remedial design of four CERCLA sites with total remediation costs exceeding $70 million. Remedial designs included RCRA cap of a 65-acre landfill, including active gas collection system, ground water recovery, and 100,000 gpd wastewater treatment facility; fuel blending facility for the conveyance, heating and blending of 6 million gallons of waste coal tar sludges for off-site recycling; excavation of 3,000 cubic yards of VOC and metals-contaminated soils, including treatment by on-site low temperature thermal treatment, off-site stabilization, building demolition, underground storage tank removal, and excavation design; soil excavation program to remove approximately 2,000 cubic yards of VOC and metals -contaminated soils for on-site low temperature thermal treatment, ground water dewatering and treatment system, and roadway replacement design. Plan development in support of these remedial programs has included quality assurance project plan, health and safety plan, design analysis report, field sampling and testing plan, and site monitoring plan. Remedial designs have also included permit application preparation, acquisition including wetlands, stream encroachment, air emission and control devices, landfill disruption, ground water diversion, NJPDES treatment works approval, and other associated permits.

Directed the preparation of the site investigation/remedial services required in accordance with New Jersey's ECRA for a total of thirty-five industrial sites in New Jersey. Representative sites include: a 20 acre machine parts manufacturing facility; a 20 acre chemical manufacturing facility and a 25 acre industrial wastewater treatment plant. Work efforts on these projects included negotiations with the NJDEP-ECRA personnel, providing input and working with client's counsel, the preparation of pre-ECRA assessments, development of preliminary remedial cost estimates, the implementation of site sampling plans, the preparation of site assessment reports, development of remedial action plan, and negotiation of negative declarations of site contamination.

Directed the remedial investigation and remedial design for the PCB cleanup for two natural gas transmission companies. Sites included four compressor stations, a maintenance station, and over 120 miles of natural gas transmission lines encompassing 71 areas requiring remedial investigation. Remedial design of three compressor stations and one maintenance station has included development of contract documents including design drawings and technical specifications for the excavation and off-site disposal of the impacted soils, treatment and disposal of contact surface water, and site restoration. Remediation of these four facilities has encompassed over 10,000 cubic yards of contaminated soils at a cost of over $12 million.

Directed the site remediation program of a former electroplating operation including excavation and removal of eight waste solvent siphons, and evaluation of preliminary designs for alternative conveyance systems under existing harbor.

Provided construction review and design of required modifications for 0.7 mgd extended aeration, activated sludge plant.

WASTEWATER, INDUSTRIAL:

Directed evaluation of industrial wastewater conveyance and treatment system. Conveyance and treatment system included a combined process/storm sewer system, pump station and primary treatment facilities. Evaluation included investigations into wastewater segregation, storm water handling and treatment, and sewer remediation.

Directed the feasibility study and final design of industrial wastewater treatment facilities for a phosphor manufacturing operation. Wastewater treatment processes evaluated included, chemical precipitation evaporation, filtration and ion exchange for the removal of heavy metals. Work efforts included treatability testing, pilot testing, final design and negotiations with state and federal agencies.

Major Clients:

American Cyanamid Company	CIBA-GEIGY Corporation
E.I. DuPont de Nemours	Rhone-Poulenc, Inc.
Engelhard Corporation	Reichhold Chemical, Inc.
Morton Thiokol	Singer
Sandoz	Coca-Cola
General Motors	Airco Industrial Gases

HAZARDOUS WASTE MANAGEMENT:

Directed various programs associated with a ground water remediation program for a major chemical industry. Project involves investigation and remediation of a total of 17 lagoons containing in excess of 400,000 tons of organic and inorganic sludges, and the upgrading of wastewater conveyance and primary treatment facilities. Work completed to date includes: characterization of lagoon contents; evaluation of remedial alternatives for two lagoons considering effectiveness, implementability, and cost factors; preparation of a feasibility study of the wastewater conveyance/primary treatment system; preparation of a feasibility study for four lagoons; preparation of a RCRA Part B permit application for a surface impoundment and the preparation of RCRA closure plans for three surface impoundments.

underground storage tanks and associate impacted soils, ground water recovery and on-site treatment of the contaminant plume and in situ air stripping of VOC-contaminated soils. Activities conducted as interim remedial measures (IRM) program concurrent with remedial investigation program. Design activities included pilot program to establish basis of design for in situ air stripping system, sheeting design for excavation adjacent to existing structure and design of ground water recovery and treatment system. IRM and remedial investigation results to be presented to regulatory agency in support of voluntary remedial program.

Directed evaluation of remedial actions for two lagoons containing 10 million gallons of sludges and tars from a coke distillation process. Remedial action alternatives investigated included in-place containment, incineration, recycle/reuse, solidification/fixation, landfilling, and in-place biodegradation. Selected remedial action was incineration for energy recovery. Selected remedial action entailed the blending of the contents of these lagoons into a No. 6 fuel oil type material for use as a fuel extender.

Directed design of demonstration scale facility for the blending of the contents of two lagoons into No. 6 like fuel oil material for use as a fuel extender. Demonstration scale facility included material handling and two stage blending. Blending facility was designed to produce a No. 6 fuel like material to establish viscosity and particle size criteria. Additionally, directed the preparation of contract documents and specifications for the closure of these lagoons. Specifications developed included excavation, waste handling, waste storage and lagoon closure.

Directed the remedial investigation/feasibility study (RI/FS) conducted to address organic contamination of the local ground water system and wide spread soils contamination at a metal fabrication facility as part of an ECRA program. RI consisted of complete definition of on-site and off-site ground water plume and assessment of on-site soils and four (4) underground tanks as potential sources. FS evaluated ground water recovery (pump test), ground water treatment by air stripping and carbon adsorption (treatability study), biodegradation, excavation and off-site disposal, and risk assessment. Remedial Action Plan (RAP) consisted of designing ground water recovery/treatment system, tank excavation and removal, and soils excavation with off-site disposal and encapsulation.

Provided consulting services associated with the review of RCRA compliance programs to a number of industries. Directed the preparation of Part B permit applications for four storage facilities for two pharmaceutical manufacturers and a ferric oxide reclamation facility. Provided sampling and analytical services associated with RCRA waste streams and was responsible for development and updating of two RCRA Compliance Manuals, including procedures for handling hazardous waste, waste analysis plans for hazardous waste streams, and closure plans for hazardous waste facilities. Prepared audio-visual personnel training program dealing with the RCRA regulations.

Directed multi-faceted technical team in the remedial investigation of a former 3300 acre military ordnance facility. Contaminants of concern include mustard gas, potassium cyanide, TNT, and live ordnance. RI included geophysical studies (magnetometer and ground penetrating radar) and subsurface investigations (soil borings and ground water monitoring wells). Detailed Work Plans included Health & Safety Plan, Site Operations Plan (SOP), and Quality Assurance Project Plan (QAPP).

Directed ECRA site assessment program of a plastics manufacturer including initial ECRA notice, development and implementation of sampling program and Remedial Action Plan (RAP). RAP included tank removal, soils excavation, and encapsulation and sediment removal from adjacent stream. Negative declaration negotiated with regulatory agency and approved with alternative clean-up standards.

Directed ECRA site assessment program of two (2) 100-acre phenolic resin facilities. Remedial investigation included geophysical survey (magnetometer and electromagnetic) and ground water and soil assessment. Remedial Action Plan (RAP) included removal of leaking underground storage tank, collection system to recover floating product, and soils excavation and disposal. Additionally, provided oversight of a 12,000 drum removal/disposal program to ensure compliance with hazardous waste classification, QAPP, SOP and proper manifesting.

Provided technical assistance for ongoing litigation concerning extensive PCB contamination of a former dye cast manufacturing operation. Activities included development/implementation of sampling program, negotiation of clean-up standards with regulatory agencies to establish clean-up standards based on pilot program results and risk assessment evaluation, and work plan development including health & safety plan, and Quality Assurance Project Plan (QAPP).

Directed the ECRA site assessment program for the closing of a former pigments manufacturing facility. Program included developing initial ECRA notice and cost effective decommissioning plan for the demolition of 10 buildings and the decontamination of 6 buildings. Demolition/decontamination specification package developed for bidding.

Directed remedial investigation of a 300-acre former rail facility prior to acquisition. Activities included ground water and tidal assessments, identification of contaminated soils. Also included were sampling and inventory of approximately 250 unmarked drums for disposal. A 30-year monitoring program was developed for monitoring ground water during the lease period.

Directed the preliminary design for the final cover of a 12 acre RCRA hazardous waste landfill. Design developed as part of closure program in accordance with RCRA design criteria modified to minimize capital costs. Modifications negotiated and supported by use of EPA Hydrologic Evaluation of Landfill Performance computer model. Additionally, directed the design of (2) 5000-gallon hazardous waste storage tanks for an electroplating operation.

Directed the preparation and development of RCRA Closure Plans for three surface impoundments, 2 ordnance storage facilities, (2) 5,000-gallon storage tanks, a 0.5 mg equalization surface impoundment and a pharmaceutical storage facility.

Developed Spill Prevention Control and Countermeasure (SPCC) Plans for four industrial manufacturing sites incorporating RCRA requirements for hazardous substance storage and disposal.

ASBESTOS MANAGEMENT:

U.S. Army Corps of Engineers, New York District - Project officer for asbestos survey, sampling, laboratory analysis and development of a Management Plan for 31 buildings at Picatinny Arsenal, Dover, NJ, encompassing approximately 1 million square feet.

Westfield Board of Education, Westfield, NY - Project officer for survey of 12 buildings for asbestos-containing materials (ACM) and preparation of management plans in accordance with AHERA and State of New Jersey requirements. Preparation of asbestos removal contract documents and construction inspection and air monitoring (AST) services for Franklin Elementary School for abatement in boiler room and steam piping in crawl spaces throughout the building.

Randolph Township, NJ - Project officer for preparation of asbestos removal contract documents and construction inspection and air monitoring (AST) services for Center Grove Elementary School.

State of New Jersey, Division of Building and Construction - Project officer for asbestos abatement in several academic buildings and dormitories at Montclair and Trenton State Colleges.

Elizabeth, NJ - Project officer for decontamination and demolition of a chemical manufacturing facility, including the removal of USTs and asbestos-containing materials, and decontamination and demolition of a manufacturing area located on a 27-acre site.

ENVIRONMENTAL AUDITS:

Directed environmental audit for assessment of environmental regulatory compliance for a major chemical manufacturing facility, two ink formulating facilities and two cosmetic manufacturing facilities. Work efforts also included developing recommended compliance program.

Directed acquisition audits to determine potential environmental liability of companies under consideration for buy-out. Audits consist of site inspection and file review to determine compliance with regulatory statutes and cost development to address noncompliant areas and areas of known contamination. Audit examples include a 300-acre former rail facility, a chemical manufacturer facility with 6 facilities nationwide, a 200-acre pharmaceutical facility, and an inorganic manufacturing facility with 5 North American facilities.

PUBLICATIONS

Groundwater Migration of Rehabilitated Infiltration Sources. Presented at the 55th Annual Water Pollution Control Federation, October 1982.

PROFESSIONAL PROFILE

Education

Occidental College, 1974, BA/Geology
San Diego State University, 1981, MS/Geology
WSU/NWWA Summer Field Practice Program: Exploration Geophysics for Engineering and Hydrogeologic Applications I; August 1982
Butler University - Holcomb Research Institute; Basics of Modeling Ground Water Flow and Pollution; March 1983
Butler University - Holcomb Research Institute; USGS Modular Flow Model for Simulation of Ground Water Flow and Advective Transport; April 1990

Registrations

Certified Professional Geologist, #7574

Professional Affiliations

National Water Well Association
Geological Society of America
American Institute of Professional Geologists

MANAGEMENT CAPABILITIES

As Managing Hydrogeologist, Mr. Swenson provides technical direction to scientists and engineers engaged in ground water evaluations, geophysical surveys, geologic mapping, and computer modeling of groundwater flow and contaminant transport. With over 12 years of experience as a professional geologist, he is thoroughly familiar with hydrogeologic considerations in connection with hazardous waste management, spill prevention control and countermeasures (SPCC), water resources, environmental assessments, and landfill siting. Mr. Swenson has been involved with these kinds of projects in diverse environments such as unconsolidated, glacial, fluvial, and marine deposits, as well as fractured bedrock and karst terrain.

Mr. Swenson's management capabilities include technical review, scheduling, budgeting, staff supervision, and coordination of projects with other divisions of the firm. In addition, he acts as liaison between clients and regulatory agencies, and develops and conducts ongoing, in-house training programs.

Mr. Swenson has managed programs for major industrial firms in the electronics, automotive, chemical, and pharmaceutical industries, as well as for legal firms acting on behalf of clients. He has extensive experience with all phases of Remedial Investigation/Feasibility Studies (RI/FS), and with state and federal regulatory compliance issues.

EXPERIENCE

Hazardous Waste Management:

Mr. Swenson's hazardous waste management experience includes site investigations and assessment, remedial design, and risk assessment for industrial waste facilities, contaminant bases and petroleum hydrocarbon bases. He has worked with both analytical and numerical computer modeling, and has supervised and performed:

- monitor well installations
- soil and ground water sampling
- aerial photograph interpretation
- geologic mapping
- aquifer performance tests
- evaluation of direction and rate of ground water flow
- negotiations with regulatory agencies
- test pit installations
- test borings
- hydrogeologic literature review
- geophysical surveys

Projects representative of his work with hazardous waste include:

New York State - Responsible for developing work plan, conducting investigation, preparing report and evaluating remedial options for RI/FS in several counties; remedial options included ground water pumping, vacuum extraction, soil removal, and no action.
New York State, New Jersey, Indiana, and Puerto Rico - Responsible for supervising and performing site investigations and hydrogeologic assessments of both active and closed municipal and industrial landfills.

New York State, New Jersey, Ohio, and Maryland - Responsible for supervising and performing site investigations and hydrogeologic assessments of active and closed waste lagoons at industrial facilities.

New York State, New Jersey, Virginia, Missouri, Illinois, Massachusetts, Pennsylvania, California, Michigan, Puerto Rico, and India - Responsible for developing, supervising and performing site investigations and hydrogeologic assessments of sites of organic and inorganic contaminant bases and disposal at both industrial and non-industrial facilities.

New Jersey and New York State - Responsible for supervising and performing hydrogeologic evaluations and design of proposed passive in-place containment structures for municipal and industrial landfills.

New York State, California, Maryland, Idaho, New Jersey, and Massachusetts - Responsible for supervising and performing hydrogeologic evaluations and design of proposed and existing ground water control/recovery systems.

New York State, Pennsylvania - Conducted hydrogeologic evaluations and predictions for environmental assessments at industrial waste facilities and other properties.

Spill Prevention Control and Countermeasures:

Mr. Swenson has extensive experience in site investigations, hydrogeologic assessments, and remedial design and implementation for petroleum hydrocarbon losses. He has supervised and performed these projects in California, Ohio, Massachusetts, and New York State. Programs have involved:

- geophysical surveys
- review of hydrogeologic literature
- monitoring wells
- soil and ground water sampling
- negotiations with regulatory agencies
- evaluations of the direction and rate of ground water and immiscible product flow
- hydrogeologic design and implementation of product recovery systems
- geologic mapping
- test borings
- test pits

Environmental Assessment:

Mr. Swenson has supervised and performed hydrogeologic assessments including those involving pesticide application and New Jersey ECRA laws. These assessments include:

- review of hydrogeologic and soils literature
- test borings and monitor well installations
- soil and ground water sampling
- hydrogeologic evaluations of the test sites

Representative projects include:

Middlesex and Union Counties, NJ - Responsible for supervising and performing hydrogeologic environmental assessments (NJ ECRA) of industrial facilities.

Caroline and Dorchester Counties, MD - Responsible for supervising and performing an environmental assessment of pesticide applications.

Adirondacks, NY - Responsible for design and implementation of field study of pesticide and herbicide impact on ground water; involved installation of monitoring wells, in situ permeability tests, in situ tracer studies, and ground water and contaminant transport modeling.

Water Resources:

Mr. Swenson has evaluated ground water resources and designed and implemented ground water supply wells in various locations. These programs have involved:

- electrical resistivity surveys
- aquifer performance tests
- geologic mapping
- literature research
- design of production wells
- well logging
- water chemistry
- meteorologic data
- remote sensed data
- exploratory drilling

Representative projects include:

New York State, Delaware, Pennsylvania, Maryland - Evaluated ground water resources in unconsolidated deposits and bedrock for municipal water supplies and irrigation systems.

San Diego County, CA, and Baja, MX - Conducted an extensive study of a rural valley to provide a qualitative description of tne ground water hydrology and geology.

New London County, CT - Conducted a seismic refraction survey to delineate bedrock topography for a proposed dam overflow channel.

Onondaga County, NY - Provided technical consulting for the installation of two 1300 ft. salt brine wells for a local industry.

Solid Waste:

Mr. Swenson has designed, managed, and performed hydrogeologic evaluations of proposed landfill sites. He has implemented these programs in Seneca, Tompkins, Cayuga, Dutchess and Orleans Counties in New York State. Programs have involved:

- surface geophysical surveys
- aquifer testing
- test borings
- installation of ground water observation wells

Data evaluation has included determination of three dimensional ground water flow direction and rates, development of water budgets and chemical characterization of aquifers.

PUBLICATIONS

Evaluation of Patapsco Aquifer Hydraulics by Tidal Fluctuation Responses. Bogardus, Peter, Swenson, Guy, and Mickam, James. Proceedings of Groundwater Issues and Solutions in the Potomac River Basin/Chesapeake Bay Region. March 1989.

Ground Water Models: Tracking Contaminant Migration. In Hazardous Waste Site Remediation - The Engineer's Perspective. Ed. O'Brien & Gere Engineers, Inc. Van Nostrand Reinhold Co. (New York, 1988).

Design and Evaluation of In-Place Containment Structures Utilizing Ground Water Cutoff Walls; Lynch, Edward R., Anagnost, Stephen W., Swenson, Guy A., and Lee, George W; Proceedings of the Fourth National Symposium and Exposition on Aquifer Restoration and Groundwater Monitoring; May 1984.

Post Construction Ground Water Hydraulics at Loeffel Site at Southern Rensselaer County, NY; Lee, George W., Bhatia, S.K., Swenson, Guy A., III, Clemence, S.P.; International Symposium on Case Histories in Geotechnical Engineering, April 1984.

Evaluations of Ground Water Hydraulics with Respect to Remedial Design, Blasland, Warren V., Jr., Lee, George W., Jr., Swenson, Guy A., III 4th National Conference on Management of Uncontrolled Hazardous Waste Sites, October 1983.

Upper Cretaceous Deep-Sea Fan Deposits, San Diego co-author; in Geological Excursions in The Southern California Area, Geological Society of America, 1979.

PROFESSIONAL PROFILE

Education

State University of New York at Fredonia, 1972, BS/Geology
Syracuse University, 1984, MS/Geology

Certification

Certified as a Senior Public Health Sanitarian by the State of New York, Certificate #1526.

Professional Affiliations

Health Physics Society: Western New York Chapter
Society for Risk Analysis

MANAGEMENT CAPABILITIES

Mr. Banikowski joined O'Brien & Gere in 1988. He has extensive experience in hazardous and toxic waste management, mixed waste, radon assessment and mitigation, air and ground water sampling, data validation, and quality assurance for municipal and industrial clients. Prior to joining the firm, Mr. Banikowski served for 15 years with the Onondaga County Department of Health, where he acted as first responder in emergencies involving the accidental release of potentially hazardous substances. He received extensive training in emergency response through the Federal and State Emergency Management Associations and the New York State Police Department.

Mr. Banikowski manages projects involving multidisciplinary teams of scientists and engineers. He serves as liaison with the clients' technical managers and coordinates project activities with laboratories performing the project sampling. He also supervises report writing and is responsible for billing, quality control, and technical accuracy.

As manager of Remedial Investigations/Feasibility Studies (RI/FS), Mr. Banikowski is conversant with both federal and state regulatory issues and agencies, and has worked extensively with the New York State Department of Environmental Conservation (NYSDEC). He provides technical support for other divisions within the firm, particularly in the areas of risk assessment and quality assurance plans. Mr. Banikowski also supervises laboratory and field audits to assess compliance with regulatory standards.

EXPERIENCE

Hazardous and Toxic Waste Management:

Mr. Banikowski's hazardous and toxic waste management experience includes a wide range of programs, involving:

- RI/FS
- risk assessment
- biological waste
- soil-gas vapor surveys
- QA/QC Plans
- landfill closures
- Health and Safety Plans

He has managed numerous sampling programs for RI/FS and has prepared QA/QC plans for activities associated with them. In addition, Mr. Banikowski has written Health and Safety Plans for a variety of health risks related to worker exposure to toxic substances, and has developed sampling methods to determine the presence of pathogenic organisms at biological waste sites.

Mr. Banikowski is thoroughly familiar with procedures for the collection, transport, and analysis of samples, as detailed by EPA's Compendium of Field Sampling and individual state guidelines. A representative list of his hazardous and toxic waste management projects includes:

Former Chemical Manufacturer, NY - Responsible for overall RI/FS management for an 11-acre, state-listed site containing a variety of PAHs derived from the distillation of coal. Developed project deliverables, maintained client contact , and performed budgetary and scheduling oversight throughout the project.

Former Chemical Manufacturer, NY - Provided project management for the RI/FS of a former chlor-alkali facility of about 10 acres. A major concern was the presence of mercury and chlorobenzene isomers. Responsibilities included client contact, scheduling, and budget oversight.

City of Utica, NY - RI/FS at a former metal plating facility located in a residential neighborhood where health concerns arose from the on-site disposal of metals, cyanides, and solvents. Responsibilities included project coordination, a public health evaluation, and implementation of interim remedial measures.

City of Utica, NY - State-listed site involving remediation of a former metal stamping facility; included typical study components as well as the salvage of usable equipment, removal of PCB-contaminated material, and the recommendation for building demolition rather than renovation. The project was partially funded through Superfund.

Department of the Air Force - Provided technical coordination on a company-wide basis for a $50 million contact with the USAF. Projects included Whiteman AFB (soil removal), AF Plant 85, Columbus, OH (contaminated soil and ground water), the Duluth International Airport (contaminated ground water), and Patricks AFB/Cape Canaveral (on-going, 13 RI/FS).

Manufacturer, Syracuse, NY - Conducted oversight of Phase I and Phase II investigations conducted by a private consulting firm on behalf of the Onondaga County Department of Health and NYSDEC.

Chemical Corporation, NY - Reviewed interim clean-up measures and assisted the NYS Department of Health in assessing the health implications associated with an on-site landfill.

Waste Site, NY - Prepared bid specifications for the installation of monitoring wells, provided field oversight for all work activities, obtained ground water samples and soil samples; presented findings to Town Officials and members of the County Legislature.

Inventoried hazardous waste sites located in Onondaga County in conjunction with City-County Planning Agency.

Administered environmental lead program on behalf of Onondaga County for a period of 2 years.

NPL Site, Casper, WY - Participated in soil-gas vapor survey.

Landfill, Van Buren, NY - Developed criteria for a Phase II investigation prior to closure.

Landfill, West Caln Township, PA - Prepared QA/QC Plan for pre-design activities associated with RI/FS.

Fort Drum, NY - Administered preparation of QA/QC Plan for RI/FS.

Landfill, Parkersburg, WV - Prepared site Health and Safety Plan for drum disposal characterization and removal work.

Sussex County, NJ - Prepared site Health and Safety Plan for workers engaged in the excavation and heat treatment of 10,000 cubic yards of soil.

Fort Drum, Fort Drum, NY - Prepared Health and Safety Plan for RI/FS work activities.

Schilling Atlas Missile Sites 3,4,5,6,7, and 8, KS and MO - Wrote Health and Safety Plans for work associated with the evaluation of potential on-site chemical contamination.

Richards-Gebaur AFB, Belton, MO - Developed Health and Safety Plans for an RI/FS related to five areas of potential chemical contamination.

<u>Mixed Waste</u>:

Mr. Banikowski has supervised and performed risk assessments and survey and sampling plans for hazardous waste sites containing both chemical and radioactive wastes. In addition, he has supervised the development and implementation of Health and Safety Plans for investigation of such sites. Representative mixed waste projects include:

Electronics Manufacturer, SC - Supervised the preparation of a risk assessment to evaluate the risks associated with potential on- and off-site contamination from the disposal of both chemical and radioactive waste material; included several on-site inspections, preparation of exposure scenarios for review by U.S. EPA, and a final risk characterization report.

Airplane Component Manufacturer, OH - Developed a survey and sampling scheme to identify locations where radiation levels would exceed conservatively established limits for the protection of on-site workers at a privately owned, former municipal landfill. Consulted with U.S. EPA prior to development of a sit-wide Health and Safety Plan.

Norton AFB, CA - Designed a statistically valid sampling plan to compare the radioactivity content of upgradient and downgradient ground water wells.

GSA, Watertown, MA - Developed and supervised the implementation of a Health and Safety Plan for the investigation of the Watertown Arsenal. The plan incorporated applicable provisions OSHA 29CFR1910 and USNRC 10CFR20. The major hazard at the site, as identified by Argonne National Laboratory, was depleted uranium at a former burn-pit area. Following the investigation, an assessment was prepared in accordance with U.S. EPA requirements for risks related to depleted uranium and its progeny.

<u>Risk Assessment</u>:

Mr. Banikowski has supervised and prepared over sixty evaluations of potential risk from exposure to hazardous materials. These evaluations were conducted using both U.S. EPA and applicable state guidance materials, and involved:

- PCBs
- heavy metals
- lead
- biological waste
- VOCs
- petroleum hydrocarbons

Representative projects include:

Medical Research Facility, Midwest - Evaluation of biological waste residues at a former vaccine production and research facility; included risk characterization and development of sampling and analytical methods.

NPL Site, WY - Risk assessment addressing exposures at an oil refinery complex. Quantitated risks associated with exposures to petroleum hydrocarbons in ground water and soil, and modeled flow rates and fate and transport of chemical residuals.

Pedricktown, NJ - Risk assessment of exposures at a former secondary lead smelter. Exposures to heavy metals and volatile organic compounds in soil, ground water, sediments, and surface water were quantitated.

U.S. Army Corps of Engineers, Richards-Gebaur AFB, MO - Risk assessment involving six spill areas; quantifies exposures to lead, petroleum hydrocarbons, and jet fuel.

Automotive Manufacturer, NY - Evaluated health and environmental risks associated with PCBs in soils, surface water, and sediment.

Industrial Hygiene/Occupational Health:

Mr. Banikowski provides expert guidance to clients on the evaluation of exposures to chemical and physical hazards and the development of appropriate remedial actions. He has a broad range of experience in industrial hygiene/occupational health programs involving such diverse concerns as:

- dioxins
- infectious organisms
- aldehydes
- toxic fumes
- acids
- noxious odors

Mr. Banikowski has performed relevant exposure evaluations, risk assessments, and air surveys, sampling, and monitoring. Representative industrial hygiene projects include:

Manufacturer, NY - Developed occupational risk assessment for dioxin exposure at a 500 person manufacturing facility; assessment used current TCDD-equivalent methodology.

Manufacturer, NY - Literature review of esophageal cancer risk to workers exposed to fumes created in an anechoic chamber. Provided client with overview in anticipation of litigation.

Syracuse City School District, NY - Prepared sampling program to evaluate exposures to chlamydia and cryptococci.

Public Service Electric and Gas, NJ - Developed and implemented indoor air survey and sampling procedures related to former coal gas manufacturing plant.

Fairmount Gardens Senior Citizen Center, Camillus, NY - Developed indoor air sampling program for formaldehyde and other aldehydes; recommended changes in ventilation system and removal of source materials.

Stanton Foundries, Solvay, NY - Evaluated health risk posed to workers following an acid spill inside a production facility.

Syroco Corporation, Van Buren, NY - Assessed source and impact of fumes creating noxious odors inside plant facility following its evacuation.

North Area Garage Facility, North Syracuse, NY - Developed sampling program for airborne pollutants and made recommendations for ventilation and structural changes; building housed 40 vehicles.

Air and Ground Water Sampling:

Mr. Banikowski has designed and implemented a broad range of programs involving air and ground water sampling and monitoring, particularly related to public health issues such as:

- odor control
- drinking water supplies near landfills
- radon screening and abatement
- asbestos compliance review
- formaldehyde screening and abatement

Representative projects include the following:

Developed ground water evaluation program for Onondaga County, NY, in conjunction with Syracuse University and the Central New York Environmental Management Council.

Initiated program to sample over 200 private drinking water supplies situated in the vicinity of active and inactive landfills.

Performed ambient air monitoring for ammonia and hydrogen sulfide at the Allied-Signal waste beds in Camillus, NY, in response to odor complaints; determined health risk to area residents.

Established ground water and surface water sampling program on behalf of residents living near a former chemical recycling center in Pompey, NY. As a result of the program, the EPA established an emergency water supply for several residents and placed the center on the National Priorities List (NPL) of hazardous waste sites.

Implemented a sampling program involving 45 private water supplies located around the Clay Landfill, Clay, NY, following allegations of PCB laden material entering the waste stream; presented findings to the Onondaga County Legislature, and a public water supply line was installed for the affected residential units.

Designed and implemented a Radon Pilot Screening Program on behalf of the Onondaga County Department of Health. This program won recognition from the NY State and National Association of Counties as an innovative and model program for local health departments. Findings from the program were presented to the County Executive, New York State Department of Health, County Legislature, news media, Home Builders Association, and numerous civic groups by request.

Administered a residential program on behalf of New York State to assess short and long term retention of formaldehyde in air following installation of urea-formaldehyde foam insulation.

North Syracuse High School, North Syracuse, NY - Performed indoor air sampling related to the replacement of a hot-tar roof; reviewed asbestos documentation to determine compliance with existing regulations and recommended additional necessary work.

Emergency Response:

Mr. Banikowski has extensive experience dealing with emergency response to the accidental release of potentially hazardous substances. He has coordinated relevant activities for schools, commercial and residential buildings, industrial facilities, and public water supplies.
Mr. Banikowski's experience includes:

- source determination
- risk assessment
- alternatives evaluation
- odor abatement
- Emergency Response Plans

Representative projects include:

Liverpool High School, Liverpool, NY - Assisted in the closure and reopening of the High School following a herbicide spraying incident in which 22 people required medical attention.

Amtrak, Minoa, NY - Coordinated with Chemtrek and local fire department to resolve problems associated with a tank car leaking fuming nitric acid.

Skaneateles Lake, Skaneateles, NY - Assisted NYS Department of Environmental Conservation in evaluating remedial alternatives after a truck overturned and released emulsified asphalt into Skaneateles Lake, which provides water to the City of Syracuse.

Prepared emergency response protocol to PCB ballast failures for use by local fire departments.

Developed procedure for removal of underground transformer located in a downtown building in the City of Syracuse.

Developed Division of Environmental Health, Onondaga County Department of Health Emergency Response Plan.

PUBLICATIONS

Hand, Bryce M. and Banikowski, Jeffrey E., 1988, **Radon in Onondaga County, New York: Paleohydrogeology and redistribution of uranium in Paleozoic sedimentary rocks**, Journal of Geology, v. 16, p. 775-778.

Hand, Bryce M., and Banikowski, Jeffrey E., 1988, **Geologic factors affecting indoor radon in Onondaga County**, NY, Northeastern Geology Abstracts:Radon in the Northeast: Perspectives and Geologic Research, v. 10, no. 3, p. 176.

Hand, Bryce M., and Banikowski, Jeffrey E., 1988, **Radon in Onondaga County, New York: Cenozoic Redistribution of Uranium in Paleozoic Sediments**, EOS, Transactions of the American Geophysical Union, v. 69, no. 16, p. 359-360.

PROFESSIONAL PROFILE

Mr. Caputo joined O'Brien & Gere Engineers, Inc. in 1989 and presently works in the Environmental Toxicology Section. Prior to joining O'Brien & Gere, Mr. Caputo worked for NUS Corporation, Boston, MA. His responsibilities included the coordination of EPA Contract Lab Program (CLP) activities and managing site assessment projects. Mr. Caputo validated data packages and reviewed validations, as well as instructed employees in CLP data validation protocols. He also authored guidelines for an abbreviated CLP data validation protocol.

Education

Hobart and William Smith Colleges, 1983, BS/Chemistry
University of California at Davis, 1987, MS/Agricultural and Environmental Chemistry

Special Training

Hazardous Waste Operations Training, 40 Hour OSHA Certification
Radiation Worker Training
Red Cross Advanced First Aid
New York State Department of Environmental Conservation Approved Data Validator

TECHNICAL EXPERTISE

- Performing health hazard evaluations
- Preparing Quality Control/Quality Assurance Plans, Work Plans and Design Specifications for work to be undertaken at hazardous waste sites
- Environmental sampling protocols and health hazard evaluations
- Performs data validations, interpretation and usability assessments to qualify analytical sample results according to various state and federal agency guidelines

REPRESENTATIVE PROJECTS

HAZARDOUS WASTE MANAGEMENT:

City of Utica, Bossert Site, Utica, NY - Served as Quality Assurance Officer for a remedial program at a former metal machining facility. The project involved the removal of PCB and mercury contaminated wastes and the decontamination of equipment.

Confidential - Served as Quality Assurance Officer for a sampling and analysis program. The investigation involved river sediment and water sampling. The samples were analyzed for total and congener specific PCBs under strict quality control guidelines.

Thaler and Thaler/Hinman, Howard and Kattell, Attorneys; Weitsman Site, Owego, NY - Served as Quality Assurance Officer for a Phase II investigation.

General Electric Company, GE Aircraft Engines, Cincinnati, OH - Served as Quality Assurance Officer for a USEPA RCRA facility investigation. The facility develops, assembles, and tests jet engines.

City of Utica - Primoshield Site, Utica, NY - Prepared a Work Plan for an RI/FS. The investigation involved a hydrogeological investigation and public health evaluation of a former metal plating facility. Served as Quality Assurance Officer for the investigation.

General Services Administration - Federal Property Resource Center, Watertown, MA - Acted as Site Health and Safety Officer for a site investigation which included monitoring well installation and field sampling. Project involved mixed radioactive/chemical waste personnel protective equipment and procedures.

RISK ASSESSMENT:

General Services Administration - Federal Property Resource Center, Watertown, MA - Prepared a Qualitative and Quantitative Health Risk Assessment Report pursuant to MGL Chapter 21E. The report addressed both chemical and radioactive waste materials.

Dewitt Landfill, Town of Dewitt, NY - Prepared a conceptual site model for the scoping of an RI/FS and Interim Remedial Measures.

HEALTH HAZARD EVALUATIONS:

US Air Force - Duluth International Airport, Site 7; Runway 13 Northeast - Prepared a Health and Safety Plan for the Stage 4, Interim Remedial Measure (IRM) to be performed in connection with the Installation Restoration Program. The IRM involved a subsurface investigation and a removal operation.

Erdle Perforating Company - Prepared a Site Safety and Health Plan for an RI/FS of a former underground tank farm.

Ashland Chemical Company - Prepared a Site Safety and Health Plan for a subsurface hazardous waste investigation at an active chemical manufacturing plant.

City of Niagara Falls, NY - Prepared a Site Safety and Health Plan for a subsurface investigation in connection with a utility and road reconstruction in an area surrounded by several chemical manufacturing plants.

QUALITY ASSURANCE/QUALITY CONTROL:

Town of Dewitt, NY - Prepared a Quality Assurance Project Plan for an RI/FS of a municipal landfill.

Confidential - Hudson River PCBs site, National Priorities List, Superfund Site - Prepared a Quality Assurance project plan for work conducted in connection with a site investigation. The work involved development of a CLP quality reporting and validation procedure for congener specific PCB analyses.

Public Service Electric and Gas - Prepared a Quality Assurance Project Plan for an RI/FS of a former coal degasification plant.

US Army Corps of Engineers - Metaltec/Aerosystems National Priorities List Superfund site -Prepared construction specifications for a Chemical Quality Control Plan and Site Health and Safety Plan.

Allied-Signal Chemical Company - Prepared a Quality Assurance Project Plan for an RI/FS of a former wastewater lagoon area.

US Army Corps of Engineers - D'Imperio Property Site, National Priorities List Superfund - Prepared a Chemical Data Acquisition Plan for a pre-design bench scale wastewater treatment facility.

DATA VALIDATION:

Mr. Caputo has seven years of experience working and teaching in inorganic and organic research labs, and has worked as a research biochemist in a hospital biomedical lab. His work involved high pressure liquid chromatography, gas chromatography/mass spectrometry, atomic absorption spectrometry and wet chemistry.

Representative Site Assessment EPA CLP data validation projects include: Annelli Property, Johnson Carlyle Machine Company, Posick Property, Wiremold Company, Highland Avenue Landfill, City of Lowell Landfill, J. and L. Vinagro Landfills, Washington Well #1, Nadeau Landfill and Wessner Landfill.

Alcan Aluminum Corporation, Site #828005 - Prepared a Data Validation/Data Usability Report for data collected in connection with a focused remedial investigation.

Confidential - Prepared a Data Validation/Data Usability Report for data collected in connection with a preliminary investigation of a metal machining facility.

Confidential - Hudson River PCBs Site - National priorities list, Superfund Site. Prepared a Data Validation/Data Usability Report for data from the analysis of hundreds of sediment and water samples. The samples were analyzed for total and congener specific PCBs.

Amphenol Corporation, Richardson Hill Road Landfill Site, National Priorities List, Superfund Site - Prepared a Data Validation Report for data collected in connection with an RI/FS.

Stauffer Management Corporation, Maestri Site - Prepared a Data Validation/Data Usability Report for data collected in connection with a Supplemental Remedial Investigation.

Beveridge and Diamond - Performed a data quality review of gas chromatographic fingerprint analyses of petroleum contaminated soils collected in connection with the investigation of a former tank farm.

Smith Corona Corporation - Prepared a Data Validation Report for data collected in connection with the supplemental remedial investigation of a former manufacturing facility in Groton, New York. The field investigation involved the collection of approximately 350 water, soil, and sediment samples.

NL Industries, Inc., National Smelting of New Jersey Site - National Priorities List Superfund Site -Prepared a Data Validation/Data Usability Report for data from the analysis of approximately 400 samples collected in connection with an RI/FS.

US Army Corps of Engineers, Richards-Gebaur Air Force Base - Prepared a Quality Control Data Validation Summary Report for data collected in connection with an RI/FS.

Cliffs-Dow Site - Prepared a CLP Data Validation report for data collected for approximately 200 samples in connection with an RI prepared on behalf of a PRP.

Peter Cooper/Markham Site - Prepared a Data Validation/Data Usability Report for data collected in connection with a drum and contaminated soil removal project.

Ludlow Sanitary Landfill - National Priorities List Superfund Site - Prepared a Data Validation/Data Usability Report for data collected in connection with an RI/FS prepared on behalf of a PRP.

Health and Safety Plan

Focused Remedial Investigation

I.T.T. - Sealectro
Mamaroneck, NY

January 1992

HEALTH AND SAFETY PLAN

FOCUSED REMEDIAL INVESTIGATION

ITT SEALECTRO

MAMORONECK, NEW YORK

JANUARY 1991

O'BRIEN & GERE ENGINEERS, INC.
5000 BRITTONFIELD PARKWAY
SYRACUSE, NEW YORK 13221

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SECTION 1 - INTRODUCTION

This Health and Safety Plan (HASP) has been developed to provide the requirements and general procedures to be followed by O'Brien & Gere Engineers, Inc. (O'Brien & Gere) personnel, while performing a Focused Remedial Investigation (RI) of the former ITT Sealectro Site in Mamaroneck, New York. This HASP describes the responsibilities, training requirements, protective equipment, and standard operating procedures to be utilized by O'Brien & Gere personnel while on the site to address potential exposure to identified contaminant levels. This plan specifies procedures and equipment to be utilized to minimize exposures of O'Brien & Gere personnel to hazardous materials as well as measures to be employed by O'Brien & Gere personnel for decontamination of personal protective and other field equipment and during emergency response. This HASP incorporates by reference the applicable Occupational Safety and Health Administration requirements in 29 CFR 1910 and 29 CFR 1926.

The requirements and guidelines in this HASP are based on a review of available information and an evaluation of potential on-site hazards. This HASP will be discussed with site personnel and will be available on-site for review while work is underway. On-site O'Brien & Gere personnel report to the O'Brien & Gere Site Safety and Health Officer (SSHO) in matters of health and safety. The on-site O'Brien & Gere project supervisors are responsible for enforcement and implementation of the O'Brien & Gere HASP.

This HASP is specifically intended for the conduct of activities within the defined scope of work in specified areas of the site. Changes in site conditions and future actions that may be conducted at this site may necessitate the modification of the requirements of this HASP.

1.01 Site Background and Description

Since approximately 1960, a manufacturing facility for miniature electronic components has been operated at 139 Hoyt Street, Mamaroneck, NY. Electroplating was performed at the 139 Hoyt Street facility until 1984 as part of the manufacturing processes. Operations ceased at the facility in 1990.

The property is relatively small and flat (0.92 acres) and contains a large building. The entire remaining area consists of paved parking areas. The site is located in an industrialized area of Mamaroneck, adjacent to the Sheldrake River, a one foot deep and fifteen foot wide tributary of the Mamaroneck River.

Four previous studies: a site assessment, an environmental assessment, a sampling program, and Environmental Investigation have been conducted at the facility. Detectable amounts of volatile organic compounds and selected metals were found. Underground storage tanks were identified in 1990 and removed in 1991. Portions of the site surrounding and underlying the tanks are schedule for remediation. Details of the studies and the remediation are included in the work plan.

1.02 Work Activities

The purpose of the RI is to collect data to evaluate the nature and extent of contamination within the site soils, surface water, sediment, and ground water. Based future actions that may be conducted at this site may necessitate the modification of the requirements of this HASP.

1.01 Site Background and Description

Since approximately 1960, a manufacturing facility for miniature electronic components has been operated at 139 Hoyt Street, Mamaroneck, NY. Electroplating was performed at the 139 Hoyt Street facility until 1984 as part of the manufacturing processes. Operations ceased at the facility in 1990.

The property is relatively small and flat (0.92 acres) and contains a large building. The entire remaining area at the two properties consists of paved parking areas. The site is located in an industrialized area of Mamaroneck, adjacent to the Sheldrake River, a one foot deep and fifteen foot wide tributary of the Mamaroneck River.

Four previous studies: a site assessment, an environmental assessment, a sampling program, and Environmental Investigation have been conducted at the facility. Detectable amounts of volatile organic compounds and selected metals were found. Underground storage tanks were identified in 1990 and removed in 1991. Portions of the site surrounding and underlying the tanks are schedule for remediation. Details of the studies and the remediation are included in the work plan.

1.02 Work Activities

The purpose of the RI is to collect data to evaluate the nature and extent of contamination within the site soils, surface water, sediment, and ground water. Based upon this evaluation the necessity of further site remediation will be assessed. The following tasks will be performed:

- Sampling of subsurface soil;
- Ground Water Sampling;
- Ground water elevation monitoring;
- Sampling of Surface Water and Stream Sediments.

Details of the work activities are included in the Focused Remedial Investigation work plan dated September 1991.

SECTION 2 - PROJECT PERSONNEL

While each person involved in the RI implicitly has a part in implementing the overall project health and safety plan, certain individuals have specifically designated responsibilities. Within O'Brien & Gere, these are the Project Officer, Project Supervisor, and the Health & Safety Coordinator.

Project Officer

Mr. Steve Roland is the Project Officer. The Project Officer is responsible for the overall administration and technical execution of the project. The Project Officer is further responsible for the acquisition and delegation of resources necessary for project completion and HASP implementation.

Project Supervisor

Mr. Guy Swenson is the Project Supervisor. The Project Supervisor is directly responsible for the technical progress and financial control of the project. The Project Supervisor will see that the HASP is implemented.

Company Safety and Health Officer

Dr. Swiatoslav Kaczmar is the Company Safety and Health Officer for this study. The Company Safety and Health Officer is responsible for the development of this HASP.

Site Safety and Health Officer

Mr. Peter Bogardus, or a designee, is the O'Brien & Gere Site Safety and Health Officer for this study. The Site Safety and Health Officer (SSHO) for O'Brien & Gere employees enforces the health and safety operating standards for the project supervisor and coordinates overall O'Brien & Gere project safety and health activities at the site. The SSHO reviews project plans and revisions to plans to determine that safety and health procedures are maintained throughout the RI. The SSHO suggests changes, if necessary, to the project supervisor. Specifically the SSHO is responsible for:

1. Providing a copy of the HASP at the site prior to the start of RI activities and familiarizing workers with it.
2. Conducting on-site health and safety training and briefing sessions.
3. Documenting the availability, use, and maintenance of personal protective, decontamination and other safety or health equipment.
4. Maintaining safety awareness among O'Brien & Gere employees and communicating safety and health matters to them.
5. Reviewing field activities for performance in a manner consistent with O'Brien & Gere policy and this HASP.
6. Monitoring health and safety conditions during field activities.
7. Coordinating with emergency response personnel and medical support facilities.
8. Initiating corrective actions in the event of an emergency, an accident or identification of a potentially unsafe condition.
9. Notifying the project supervisor of an emergency, an accident, the presence of a potentially unsafe condition, a health or safety problem encountered or an exception to this HASP.
10. Recommending improvements in safety and health measures to the project supervisor.
11. Conducting safety and health performance and system audits.

The SSHO has the authority to:

1. Suspend field activities or otherwise limit exposures if the health or safety of any O'Brien & Gere employee appears to be endangered.
2. Advise O'Brien & Gere personnel to alter work practices that the SSHO deems to not protect them or the environment surrounding the former ITT Sealectro site.
3. Recommend suspension of an O'Brien & Gere employee from field activities for violation of the requirements of this HASP.

SECTION 3 - HEALTH AND SAFETY HAZARDS

Materials that have been detected on the site at concentrations in the soil or water at greater than 2% of the OSHA PEL during previous investigative studies are listed in Table 1. The compounds were found in soil and from water samples collected from monitoring wells on the site.

TABLE 1
CHEMICALS FOUND ON SITE

Chemical	CAS	PEL (ppb)	TLV (ppb)	Reported Concentration (ppb)
trichloroethene	79-01-6	100,000	50,000	4 - 5,900
vinyl chloride	75-01-4	1,000	5,000 (Carcinogen)	200
dibromochloromethane	124-48-1	NL[1]	NL	9
1,1-dichloroethylene	75-35-4	NL	5,000 (Carcinogen)	343
toluene	108-88-3	200,000	100,000 (Changing to 50,000)	16 - 3,100
tetrachloroethene	127-18-4	100,000	50,000 (Carcinogen)	3,400
xylene	1330-20-7	100,000	100,000	55 - 15,000
benzene	71-43-2	1,000	10,000 (Carcinogen)	29
1,1,1-trichloroethane	71-55-6	350,000	350,000	15 - 16,000

Notes:	CAS:	Chemical Abstract System Identification Number
	PEL:	Permissible Exposure Limit (OSHA)
	TLV:	Threshold Limit Value (ACGIH)
	ppb:	Parts per Billion
	NL:	None Listed
	1:	NYS Drinking Water Standard is 50 ppb.

Metals, including Arsenic, Copper, Nickel, and Silver, were detected in the wells or soils at levels greater than the background levels expected of these metals in the ground water or soils.

The chemicals listed in Table 1 may be ingested, may be inhaled or may penetrate the intact skin. These chemicals affect the central nervous and gastrointestinal systems. An increase in complaints of fatigue, drowsiness, headache, confusion, increased irritability, or dizziness may be the result of overexposure by inhalation. Overexposure of the skin may result in eye or skin irritation, nasal irritation and drying, cracked skin.

The metals identified in the ground water or soils are poisons through inhalation or ingestion but will not penetrate the intact skin. Skin contact with concentrated solutions of these metals may present a dermatitis problem. Inhalation of these metals is a likely route of exposure during the RI because of the way that the soil and water will be handled.

A limited potential for drowning exists because of the need to collect water and sediment samples from the river bordering the site. Other safety hazards, such as tripping and loose soil, that are normally associated with on-site testing and investigations have been identified. Increased awareness of these hazards will be communicated to the personnel involved. The anticipated timing of this project is such that cold injury may pose a threat to the health and safety of workers.

Measures within this HASP have been selected to protect workers from dust and water entering the eyes and contacting the skin. Protection from exposure of the respiratory system to mixtures of the volatile and semi-volatile organic compounds identified in the soil and ground water and to respirable dusts generated during the RI has also been considered. Protection to limit the risk of drowning and the effects of work in the cold are also specified.

Use of the existing O'Brien & Gere Standard Operating Procedures and the engineering controls, work practices and personal protective equipment specified in this HASP is intended to minimize the risks of potential overexposure to hazardous materials and conditions. If field measurements or observations indicate that a potential exposure is greater than the protection afforded by the equipment or procedures specified below, work is to be stopped and O'Brien & Gere personnel are to leave the site until the potential exposure has been reduced to specified limits and/or the level of protection provided has been increased.

SECTION 4 - PERSONAL PROTECTIVE EQUIPMENT

Personnel will be provided with personal safety equipment and protective clothing selected for the work tasks. Each individual will be trained in the use of this safety equipment before the start of field activities. Cleaning and maintaining equipment and clothing in accordance with the manufacturer's specifications is the responsibility of project personnel. The SSHO will monitor the protective equipment maintenance procedures.

Levels of protective clothing and equipment have been assigned to specific work tasks at EPA Modified Level D. Safety equipment and protective clothing will be used as directed by this HASP. Personal protective equipment will be worn at times designated by this HASP.

Only respiratory protective equipment approved by NIOSH/MSHA will be used. No excessive facial hair that interferes with the effectiveness of a respirator will be permitted on personnel potentially required to wear respiratory protection equipment. The respirator must seal against the face so that the wearer receives air only through the air purifying cartridges attached to the respirator. Fit testing will be performed prior to respirator use to provide that a proper seal is obtained by the wearer. Respirators will be inspected daily by the user. Respirators will be issued for the exclusive use of one worker and will be cleaned and disinfected at the end of each workday that it is used by the worker. Cartridges for air-purifying respirators in use will be changed weekly, at a minimum.

Modified Level D Protection

1. Water repellant coveralls or an apron over work clothes.

2. Nitrile gloves (taped over the coveralls).

3. Leather, steel-toed boots.

4. Eye Protection. Splash protective goggles or a full face shield.

5. As required

   a. Disposable outer boots.

   b. Waders selected for the stream depth.

   c. A full-face air-purifying respirator equipped with organic vapor cartridges and high-efficiency dust filters available for use by each potential user. Each user must have been trained and medically approved for such use.

   d. Personal Floatation Device during in-stream sampling.

If any equipment fails and/or any employee experiences a failure or other alteration of their protective equipment that may affect its protective ability, that buddy team will immediately leave the work area. Re-entry will not be permitted until the equipment has been repaired or replaced and the cause of the failure identified. The Project Supervisor and the SSHO will be notified and, after reviewing the situation, determine the effect of the failure on the continuation of ongoing operations. If the failure affects the safety of personnel, the worksite or the surrounding environment, personnel will be evacuated until appropriate corrective actions have been taken.

SECTION 5 - SITE ACTIVITIES AND ASSOCIATED PERSONAL PROTECTIVE REQUIREMENTS

The levels of protection assigned to each activity below represent a best estimate of exposure potential and protective equipment needed for that exposure. Determination of levels was based on data provided by previous studies of the work site. The SSHO may recommend revisions of these levels of protection based on air monitoring results and on-site assessment of actual exposures.

The work activity governed by this HASP is the conduct of a RI.

5.01 Soil Sampling and Preparation for Analysis

1. Operation and tasks to be performed: Soil samples will be collected from 13 soil borings. At each location the soil will be screened with an photoionization detector (PID).
2. Potential health hazards and contaminants: There is the potential for release of vapors from the off-gassing of newly exposed soil. VOC's and SVOC's were detected in the ground water. Elevated levels of arsenic, copper, nickel and silver were detected in soil samples. The potential exists for their presence in the subsurface soil samples. During sampling, the possibility exists for splash of the sampler contents onto personnel. The chemicals may be released at levels that may present a skin contact hazard.
3. Contaminant dispersion pathways: The contaminants can be spread through the air and by skin contact.

4. Contaminant control: Workers will wear Modified Level D protective clothing. Use the PID to monitor potential contaminant levels during the sampling operations. Response to the monitoring will be in accordance with the action levels in Section 6.

5.02 Ground Water Sampling and Preparation for Analysis

1. Operation and tasks to be performed: Ground water samples will be collected twice.
2. Potential health hazards and contaminants: VOC's and SVOC's were detected in the ground water. Elevated levels of arsenic, copper, nickel and silver were detected in soil samples. The potential exists for their presence in the ground water. During sampling, the possibility exists for splash of the sampler contents onto personnel. The chemicals may be released at levels that may present a skin contact hazard.
3. Contaminant dispersion pathways: The contaminants can be spread through the air and through skin contact.
4. Contaminant control: Workers will wear Modified Level D protective clothing.

5.03 Ground Water Elevation Monitoring

1. Operation and tasks to be performed: Surface water and ground water elevations will be collected on two occasions which coincide with

sampling events. Decontamination of the well evacuation equipment will be performed in the field.

2. Potential health hazards and contaminants: VOC's and SVOC's were detected in the ground water. Elevated levels of arsenic, copper, nickel and silver were detected in soil samples. The potential exists for their presence in the well water. During sampling, the possibility exists for splash of the sampler contents onto personnel. The chemicals may be released at levels that may present a skin contact hazard.

3. Contaminant dispersion pathways: The contaminants can be spread through the air and through skin contact.

4. Contaminant control: Workers will wear Modified Level D protective clothing.

5.04 Surface Water and Stream Sediment Collection and Preparation for Analysis

1. Operation and tasks to be performed: Surface water and stream sediment samples will be collected from the Sheldrake River bordering the site.

2. Potential health hazards and contaminants: VOC's and SVOC's were detected in the ground water. Elevated levels of arsenic, copper, nickel and silver were detected in soil samples. The potential exists for their presence in the river water. During sampling and measuring, the possibility exists for splash of the contents onto personnel and for workers to fall into the stream. The chemicals may be released at levels that may present a skin contact hazard.

3. Contaminant dispersion pathways: The contaminants can be spread through the air and through skin contact.

4. Contaminant control: Workers will wear Modified Level D protective clothing including waders. Personal floatation devices will be worn in water deeper than 24 inches.

SECTION 6 - AIR MONITORING AND ACTION LEVELS

Concentrations of VOC's and metals in air are expected to be below the OSHA PEL's. Monitoring of soil and water samples with a photoionization detector (PID) for volatile hydrocarbon content is being performed as part of the sample screening. These measurements will be used as an indication of the need to initiate personal monitoring and/or increase worker protective measures. Because there is minimal potential for methane and hydrogen sulfide to be released, an explosive gas monitor will not be used.

Air monitoring will be conducted as follows:

- Monitor for volatile hydrocarbons continuously during active work.
- If the PID reading at the sample is greater than 10 ppm above background levels, stop work, remove workers at least 10 feet from the sample site and return and monitor the air at the breathing zone location of the sampler.
- If PID analysis of breathing zone air indicates that more than 5 ppm of volatile organic compounds are present, respirators equipped with organic vapor cartridges will be worn by the samplers.
- If PID analysis of breathing zone air indicates that more than 250 ppm of volatile organic compounds are present, personnel will remain out of the area until the level is below 250 ppm.

Records meeting the requirements of 29 CFR 1910.20 will be kept of all of the air monitoring done for health and safety protection.

SECTION 7 - SITE ACCESS AND SITE CONTROL

Site control procedures will be established to reduce the possibility of worker contact with contaminants present, to protect the public in the area surrounding the site by preventing the movement of contaminated materials and contaminants from the site and to limit access to the site to these personnel required to be on it.

Work zones that will accomplish the general objective stated above will be established by the Project Supervisor working with the SSHO. Three categories of work zones: an exclusion/contaminated work zone, a contamination reduction/buffer zone and a support/clean zone, will be established. A map depicting these work zones will be posted in a conspicuous location and reviewed during daily safety briefings. The Project Supervisor and the SSHO will establish a system appropriate to the site, the work and the work zones that will provide routine and emergency communications within and off the site.

Site access will be monitored by the SSHO, who will maintain a log-in sheet for personnel, that will include, at the minimum, personnel on the site, their arrival and departure times and their destination on the site.

Personnel exiting the exclusion zone will be decontaminated prior to entering the support zone. The Project Supervisor and the SSHO will establish a decontamination system and decontamination procedures appropriate to the site and the work that will prevent potentially hazardous materials from leaving the site (See Section 10). The decontamination procedures will be reviewed at each daily safety briefing.

Personal hygiene facilities meeting at least the minimum requirements of 29 CFR 1910.120 will be provided in the support zone.

SECTION 8 - MEDICAL SURVEILLANCE

The potential chemical hazards identified for this project (See Section 3) will not require any medical monitoring beyond that provided by the O'Brien & Gere Health and Safety Program.

The OSHA has established requirements for medical surveillance programs designed to monitor and reduce health risks to employees potentially exposed to hazardous materials (29 CFR 1910.120). This program has been designed to provide baseline medical data for each employee involved in hazardous waste operations and to determine the ability to wear personal protective equipment, such as chemical resistant clothing and respirators.

Employees who wear or may wear respiratory protection will be provided respirators as regulated by 29 CFR 1910.134. This Standard requires that an individual's ability to wear respiratory protection be medically certified before performing designated duties. Where medical requirements of 29 CFR 1910.120 overlap those of 29 CFR 1910.134, the most stringent of the two will be enforced.

Medical examinations are administered on a pre-employment and annual basis and as warranted by symptoms of exposure or specialized activities. The examining physician makes a report to O'Brien & Gere of any medical condition which would place O'Brien & Gere employees that are performing the RI at increased risk when wearing a respirator or other personal protective equipment. O'Brien & Gere maintains the medical records of O'Brien & Gere site personnel, as regulated by 29 CFR 1910.120 and 29 CFR 1910.20, where applicable.

SECTION 9 - PERSONNEL TRAINING

Employees involved with on site RI activities will meet one of the following requirements prior to the start of work on site:

1. An off-site training course of at least 40 hours that meets the requirements specified in 29 CFR 1910.120(e) on safety and health at hazardous waste operations within the last 12 months.
2. An off-site refresher course of at least 8 hours meeting the requirements of 29 CFR 1910.120(e) on safety and health at hazardous waste operations within the last 12 months.

On-site management and supervisors have completed an off-site training course of at least 8 hours meeting the requirements of 29 CFR 1910.120(e) on supervisor responsibilities for safety and health at hazardous waste operations within the last 12 months. Employees who will respond to emergency situations involving hazardous materials have been trained in how to respond to such emergencies in accordance with the provisions of 29 CFR 1910.120(q).

A copy of the written certification of training completion will be maintained on site for each employee, supervisor and emergency responder requiring such training.

Site specific training will be provided to each employee and will be reviewed at daily safety briefings. Personnel will be briefed by the Project Supervisor or the SSHO as to the potential hazards to be encountered. Topics will include:

- Availability of this HASP.

- General site hazards and specific hazards in the work areas including those attributable to the chemicals present.
- Selection, use, testing and care of the body, eye, hand and foot protection being worn, with the limitations of each.
- Decontamination procedures for personnel, their personal protective equipment and other equipment used on the site.
- Emergency response procedures and requirements.
- Emergency alarm systems and other forms of notification, and evacuation routes to be followed.
- Methods to obtain emergency assistance and medical attention.

SECTION 10 - DECONTAMINATION

Splash protection garments will be washed with soap and clean potable water upon leaving the exclusion zone and will be air dried prior to storage. Dirt, oil grease or other foreign materials that are visible will be removed from surfaces. Scrubbing with a brush may be required to remove materials that adhere to the surfaces. Decontamination waste waters will be disposed of with the waste waters from the sampling equipment decontamination.

Sampling equipment will be segregated and, after decontamination, stored separately from splash protection equipment. Decontaminated, or clean sampling equipment not in use, will be covered with plastic and stored in a designated storage area in the support zone.

SECTION 11 - EMERGENCY RESPONSE

11.01 Notification of Site Emergencies

In the event of an emergency, personnel will signal distress with three blasts from a horn provided by O'Brien & Gere (vehicle horn, air horn, etc.). The Project Supervisor and the SSHO will then be immediately notified of the nature and extent of the emergency.

Table 2 contains Emergency Response Telephone Numbers. Table 3 contains directions to the supporting hospital. These tables will be maintained at the work site by the SSHO. The location of the nearest telephone will be determined prior to initiation of on-site activities.

11.02 Responsibilities

The SSHO will be responsible for responding to emergencies, and will:

1. Notify individuals, authorities and/or health care facilities of the potentially hazardous activities and potential wastes that may develop as a result of the investigation;
2. Confirm that the following safety equipment is available: eyewash station, first aid supplies, personal floatation devices, and fire extinguishers;
3. Have a working knowledge of the safety equipment available; and
4. Confirm that a map detailing the most direct route to the Hospital is prominently posted with the emergency telephone numbers.

The SSHO will be responsible for directing notification, response and follow-up actions and for contacting outside response personnel (ambulance, fire department or others).

In the case of an evacuation, the SSHO will account for personnel. A log of individuals entering and leaving the site will be kept so that everyone can be accounted for in an emergency.

Upon notification of an exposure incident, the SSHO will contact the appropriate emergency response personnel for recommended medical diagnosis and, if necessary, treatment. The SSHO will determine whether and at what levels exposure actually occurred, the cause of such exposure, and the means to prevent similar incidents from occurring.

11.03 Accidents and Injuries

Personnel trained in first aid will be present during site activities to treat injuries or illnesses occurring during operations. In the event of an accident or injury, measures will be taken to assist those who have been injured or exposed and to protect others from hazards. If necessary, immediate medical care will be provided by O'Brien & Gere personnel trained and competent in first aid procedures. Other on-site medical and/or first aid response to an injury or illness will only be provided by trained personnel competent in such matters.

If an individual is transported to a hospital or doctor, a copy of the HASP will accompany the individual.

The SSHO will be notified and will respond according to the seriousness of the incident. The SSHO will perform an investigation of the incident and prepare a signed and dated report documenting the investigation. An exposure-incident reporting form will also be completed by the SSHO, the Project Supervisor and the exposed individual. The form will be filed with the employee's medical and safety records to serve as documentation of the incident and the actions taken.

11.04 Communications

Portable telephones will be used during field activities to provide emergency response communications.

11.05 Safe Refuge

Vehicles or project trailers will serve as the immediate place of refuge in the event of an emergency. If evacuation from the area is necessary, project vehicles will be used to transport on-site personnel to safety.

11.06 Security and Control

Site security and control during emergencies, accidents and incidents will be monitored by the on-site Project Supervisor and the SSHO. They are responsible for limiting access to the site to authorized personnel and for oversight of reaction activities.

11.07 Emergency Evacuation

In case of an emergency, personnel will evacuate to the safe refuge identified by the Project Supervisor, both for their personal safety and to prevent the hampering of response/rescue efforts.

11.08 Resuming Work

Before on-site work is resumed following an emergency, necessary emergency equipment will be recharged, refilled or replaced. Government agencies will be notified as appropriate.

11.09 Fire Fighting Procedures

A fire extinguisher will be available in the on-site Project Supervisor's vehicle during on-site activities. This extinguisher is intended for small fires. When a fire cannot be controlled with the extinguisher, the area will be evacuated immediately. The SSHO will be responsible for directing notification, response and follow-up actions and for contacting ambulance and fire department personnel.

11.10 Emergency Decontamination Procedure

The extent of emergency decontamination depends on the severity of the injury or illness and the nature of the contamination. Whenever possible, minimum decontamination will consist of washing, rinsing and/or removal of contaminated outer clothing and equipment. If time does not permit decontamination, the person will be given first aid treatment, and then wrapped in plastic or a blanket prior to transport to medical care. If heat stress is a factor in the victim's illness/injury, the outer protective garment will be removed from the victim immediately.

11.11 Emergency Equipment

The following on-site equipment for safety and emergency response will be maintained in the on-site field vehicle of the Project Supervisor and/or the SSHO:

1. fire extinguisher;

2. first aid kit;

3. eye wash station (wash bottles at a minimum);

4. extra copy of this Health and Safety Plan.

SECTION 12 - SPECIAL PRECAUTIONS AND PROCEDURES

The activities associated with this investigation may involve potential risks of exposure to both chemical and physical hazards. The potential for chemical exposure to hazardous substances will be significantly reduced through the use of air monitoring, personal protective clothing, engineering controls, and implementation of safe work practices.

Other potential hazards that are associated with the RI activities may include heat stress and working around heavy equipment. Precautionary measures have been established to reduce these risks to a minimum during work activities.

12.01 Heat Stress/Cold Injury Prevention

Training in prevention of heat and/or cold injuries will be provided as part of the site specific training. The anticipated timing of this project may be such that heat stress/cold stress may pose a threat to the health and safety of personnel. Work/rest regimens will be employed as necessary so that personnel do not suffer adverse effects from heat stress/cold stress. Special clothing and appropriate diet and fluid intake regimes will be recommended to personnel to further reduce these temperature-related hazards. A warm dry rest area will be required because of the possibility of exposure to cold and/or wet conditions.

12.02 Site Refuse

Site refuse will be contained in appropriate areas or facilities. Personnel will make certain that trash is not scattered throughout the area of activity and that trash and scrap materials are immediately and properly disposed of.

12.03 Additional Safety Practices

The following are important safety precautions which will be enforced during this investigation:

1. Activities in the exclusion zone will be conducted using the "Buddy System". The Buddy is another worker fully dressed in the appropriate personal protective equipment, who can perform the following activities:
   a. Provide the partner with assistance;
   b. Observe the partner for sign of chemical or heat exposure;
   c. Periodically check the integrity of the partner's personal protective equipment; and
   d. Notify others if emergency help is needed.
2. Medicine and alcohol can potentiate the effect from exposure to certain compounds. Controlled substances and alcoholic beverages will not be consumed during investigation activities. Consumption of prescribed drugs will only be at the direction of a physician familiar with the person's work.

3. Eating, drinking, chewing gum or tobacco, smoking, or other practices that increase the probability of hand-to-mouth transfer and ingestion of material is prohibited except in areas designated by the SSHO.

4. Contact with potentially contaminated surfaces will be avoided whenever possible. Workers will not unnecessarily walk through puddles, mud, or other discolored surfaces; kneel on the ground; or lean, sit or place equipment on drums, containers, vehicles or the ground.

5. Personnel and equipment in the work areas will be minimized, consistent with effective site operations.

6. Unsafe equipment left unattended will be identified by a "DANGER, DO NOT OPERATE" tag.

7. Work areas for various operational activities will be established.

12.04 Daily Log Contents

The Project Supervisor and the SSHO will establish a system appropriate to the site, the work and the work zones that will record, at a minimum, the following information:

1. Personnel on the site, their arrival and departure times and their destination on the site.

2. Incidents and unusual activities that occur on the site such as, but not limited to, accidents, spills, breaches of security, injuries, equipment failures and weather related problems.

3. Conversations that may affect the work such as: media visits; safety and health inspections by the SSHO and external agencies; owner/agency meetings; and employee/union meetings.

4. Changes to the Work Plan and the HASP.

5. Daily information generated such as: changes to work and health and safety plans; work accomplished and the current site status; and air monitoring results.

TABLE 2

EMERGENCY RESPONSE TELEPHONE NUMBERS

United Hospital, Port Chester, NY	
Emergency	914-939-7000
Ambulance	914-698-2400
Police	914-698-2400
Fire Department	914-698-0200
On-Site Contact (Joe Corvo)	203-223-2700 (W)
O'Brien & Gere Contract (Guy Swenson)	315-437-6100 (W) 315-673-3250 (H)

TABLE 3

DIRECTIONS TO UNITED HOSPITAL, PORT CHESTER

Turn Left onto Hoyt Avenue from site.

Turn Right onto Mamaroneck Avenue.

Turn left onto US 1, heading North.

Six miles to United Hospital, Port Chester.

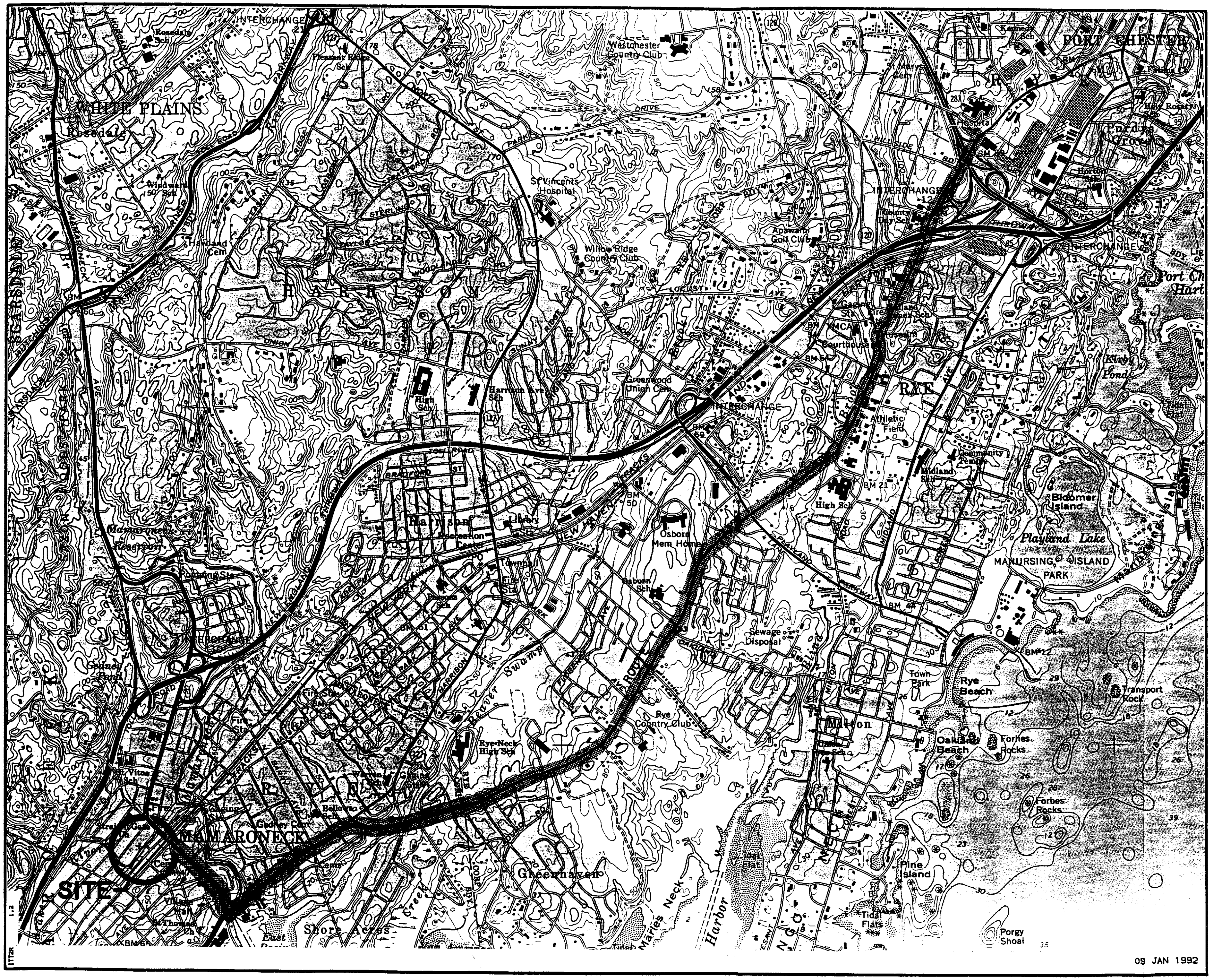

FIGURE 1

ITT SEALECTRO
MAMARONECK, NEW YORK

ROUTE FROM SITE TO HOSPITAL

2000 0 2000

SCALE IN FEET

3356.011.111

O'BRIEN & GERE ENGINEERS, INC.