REVISED REMEDIAL INVESTIGATION REPORT

THE ARO CORPORATION-LIFE SUPPORT DIVISION

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EXECUTIVE SUMMARY

A remedial investigation was performed at The Aro Corporation (Aro) - Life Support Division facility located in Cheektowaga, New York, during 1992. The remedial investigation was performed in accordance with a New York State Department of Environmental Conservation (NYSDEC) approved Work Plan, and subsequent, approved revisions. The remedial investigation objectives were to further characterize site geology and hydrogeology; identify the types, magnitude, extent and source of constituents in soil, ground water, surface water and sediment; identify potential Interim Remedial Measures (IRMs) which could be undertaken to control contaminant migration and begin cleanup; and generate data in support of a later feasibility study. The NYSDEC also requested additional assessments to identify and describe natural resources near the site, and to identify routes of exposure, potential receptors and to provide a qualitative assessment of the risk of those receptors.

Remedial investigation activities included: a limited soil-gas/shallow-water survey; 10 soil test borings; installation of three bedrock and seven overburden monitoring wells, and three well points; analyses of 38 soil samples, 25 ground water samples and three surface-water samples; aquifer characterization; data reduction and evaluation; identification of natural resources near the site; and assessment of human-health risk.

The Aro facility is situated on an east-west trending till moraine, underlain by the Moorehouse Limestone Member of the Onondaga Formation. The overburden consists of two till layers, identified as the upper and lower tills, composed of silt, clay and sand. A culvert used for facility storm water and sanitary sewers cuts into the upper till south of the main facility building.

Near-surface ground water beneath the site flows in a general south-southwest direction under water-table conditions. The bedrock wells were dry and bedrock hydraulic conductivity was measured at 1×10^{-7} ft/min. Ground water in the overburden is perched by the low-permeability bedrock. The mean hydraulic conductivity for the overburden was 1×10^{-5} ft/min, and calculated ground water velocities were less than one foot per year. A ground water trough was evident in the vicinity of the culvert south of the main facility building, and a ground water mound was present to the south, where a drainage ditch exits the culvert. The culvert appears to act as a preferential pathway for ground water flow to the south, and the drainage ditch appears to be locally recharging near-surface ground water.

The primary volatile organic compounds (VOCs) detected in soils and ground water were trichloroethylene (TCE), 1,2-dichloroethylene (DCE), and vinyl chloride. TCE was the primary constituent present in the vicinity of the west property boundary. TCE, DCE, and vinyl chloride were present in varying concentrations south of the main facility building. VOC concentrations in ground water were generally greater than New York State Ground water Quality Standards. However, the lateral extent of constituents appears to be limited to the site property, except in the immediate vicinity of the west property boundary. The vertical extent appears to be limited by the unsaturated bedrock.

Metals concentrations in soils were generally within the range of undisturbed soils in the Cheektowaga area. Metal concentrations in unfiltered ground water samples exceeded

New York State Ground Water Quality Standards. However, turbidity in the monitoring wells often exceeded 50 NTUs during purging and sampling. Metals concentrations in filtered samples were generally below New York State Ground Water Quality Standards, indicating the metals detected in the unfiltered samples were, in part, the results of turbidity.

Results of the natural-resources assessment indicate no significant or critical plant or animal habitats occurred within the study area. Assessment of air-emission pathways indicated modeled off-site concentrations of VOC constituents were below applicable New York State Annual Guideline Concentrations.

The original Remedial Investigation Report was submitted to the NYSDEC in December 1992 for review and approval. The New York State Department of Environmental Conservation and Health responded on March 22, 1993, with a remedial investigation comments letter. This letter requested that the following revisions be made to the Remedial Investigation Report: further documentation on Freon's historical usage within the facility; the Natural Resource Assessment be expanded to include a literature search of potential impacts to identified fish and wildlife resources due to the site's contaminated media; the Risk Assessment be expanded to include a human risk assessment identifying all complete routes of exposure, potential receptors, and if appropriate, a qualitative assessment of the risk to those receptors; and the inclusion of reports covering previous investigations at the Aro site.

During the preparation of the Revised Remedial Investigation Report, (dated August 1993) the NYSDEC, requested that Aro perform additional investigation work at the facility. The scope of the additional investigation work was determined following a project meeting held in Cheektowaga, New York, on April 30, 1993, at the NYSDEC offices. The additional work was performed specifically to address the NYSDEC's March 22, 1993, remedial investigation comments letter and to supplement the previously submitted remedial investigation reports.

The general scope of work included collecting both subsurface soil samples and ground water samples from locations identified in the field. The sampling locations were concentrated in several areas on or adjacent to Aro's property. They are described as follows: dense nonaqueous phase layer (DNAPL) evaluation, southern property boundary evaluation, sanitary sewer outfall evaluation, sanitary sewer bedding material evaluation, neighboring property evaluation, interior soil borings evaluation, monitoring well confirmation sampling, sediment and surface water evaluation, and the hazardous waste storage area evaluation. The results from this additional investigation work for the most part supported the information and conclusions presented in the Revised Remedial Investigation Report, dated August 1993. The data generated during the additional investigation work was submitted to the NYSDEC as a Remedial Investigation Supplemental Report (October 1, 1993) and has been incorporated into this Revised Remedial Investigation Report.

Based on site conditions, interim remedial measures do not appear to be appropriate at this site. Further consideration of IRMs will be based on the preliminary screening of remedial alternatives, followed by Treatability Studies (if appropriate), as part of a feasibility study.

1.0 INTRODUCTION

A remedial investigation was performed at an Aro Corporation - Life Support Division facility, located in Cheektowaga, New York, during the period of March through September 1992. The remedial investigation of the Aro facility, requested by the NYSDEC, was performed in general accordance with a NYSDEC-approved Work Plan (August 30, 1991) prepared on behalf of Aro by Capsule Environmental Engineering, Inc. (Capsule), of St. Paul, Minnesota, and others.

Details with regard to site description, previous investigations, regional geologic setting, and objectives and scope of the remedial investigation are provided in Sections 1.1 through 1.4. General description of the format of the remainder of this Remedial Investigation (RI) Report is provided in Section 1.5.

1.1 SITE DESCRIPTION

The Aro Corporation - Life Support Products Division facility is located on a 6.9-acre parcel of land in Town of Cheektowaga, Erie County, in western New York State (Figure 1). The property is bordered to the north by Broadway (Route 130), on the east and west by private residences, and on the south by power company and railroad rights-of-way. The area surrounding the site is zoned as light industrial/residential. There are residences to the east, west and north of the site, and an operating quarry south of the rights-of-way.

Aro purchased the facility in 1958 from the Firewell Corporation, which initiated development of the site in 1955. Aro currently manufactures life-support equipment, cryogenic storage vessels, breathing regulators, and package integrity testing equipment. Manufacturing processes include machining (product prototypes), assembling, testing, deburring (hand filing and lapping), clorofluorocarbon (CFC) Freon degreasing, detergent cleaning, painting, alodining (chromate conversion), passivation, arc welding, heat treating (electric oven), and hand soldering. Support operations consist of product repair, waste-water treatment, water deionization, freon distillation and chemical formulation (silicone parts).

Currently, the main facility building covers approximately 69,000 square feet of the property. The building is used for offices, manufacturing and related operations, and includes a metals-preparation room on its west side. An approximately 4,800 square foot, sheet-metal maintenance and storage building, separated from the main facility building, is located south of the west side of the main facility building (Figure 2). Other property areas include a paved visitor parking area north of the main facility building, and a larger, paved employee parking lot and delivery/pickup areas south of the building. Areas south of the employee parking lot are open fields.

A storm water drainage ditch flows southward along the east property boundary and westward along the southern property boundary. A drainage ditch exits a backfilled culvert on the south side of the parking lot, and flows south to the west-flowing portion of the storm water drainage ditch. The backfilled culvert contains storm water and sanitary sewers. Surface-water discharge from the property occurs near the southwest corner.

The metals-preparation room, located on the west side of the main facility building, is 24.6 feet long by 21.2 feet wide. The room sits on portions of four concrete slab sections, with the majority of the room sitting on two of these slabs. Apart from the floor seams, there are some cracks and fissures in the slabs as well as evidence that the slabs were taken out to allow for the installation of piping beneath the floor. Portions of the floor slope toward the west wall. The floor has recently had an epoxy coating applied to it. Based on interviews of veteran Aro employees (35 years of experience), the Firewell Corporation formerly had a paint shop located near or about the location of the present metals-preparation room.

The facility and the development of its associated structures have undergone several changes and stages of construction since the early 1950's. Additions were made to the building in 1956, 1957, 1958, 1959, 1964, and 1984. Consistent with the changes in the physical facility, the location of the manufacturing processes has undergone several changes. The original operations of the Firewell Corporation occurred along the western portion of the current main facility building.

The Firewell Corporation was primarily a furnace manufacturer, although they also manufactured balers (that is, for baling cardboard) on a smaller scale. After the furnace aspect of the business had been phased out by Firewell, the facility process locations were shifted. The movement of processes over the years was apparently not uncommon. Based on employee interviews, Aro production and prototype machine shops occurred at several locations in the building before their present location along the west side of the main facility building. Aro had small-scale paint operations in the northern portion of the building before moving the operations into the eastern wing of the building in November 1992. Paint stripping has been discontinued at the site, but formerly was conducted using a product containing methylene chloride, formic acid, phenols, and toluene. Stripping is now accomplished by an outside company.

Small-scale chemical lab operations were at one time located in a northern part of the building which is now occupied by the mold room. Additionally, it is probable that the various manufacturing/assembly processes shifted about the facility from time to time with the availability of new structures and to accommodate necessary changes. From approximately March 1977 to February 1988, Aro operated a water-quality/environmental lab in the northwest corner of the building.

Aro had previously used TCE as a degreasing solvent at the facility before switching to a CFC, Freon, degreaser. Based upon available purchase and disposal records, there appears to be a defined transition from the use of TCE to a CFC degreaser material in mid-1985.

This CFC degreaser material is known as Genesolv D (1,1,2-trichloro-1,2,2-trifluoroethane). Based upon available manifest information, the last bulk disposal of TCE occurred between May 1983 and August 1985 and consisted of 495 gallons. Smaller quantities of TCE which may have been associated with the operation of the water-quality lab would have been removed from the facility shortly after the lab ceased operations in February 1988. Aro no longer stores TCE at the site. Based upon information gathered from veteran employees during informal interviews, there are or were degreasing units located in the metals-preparation room, as well as in an area to the east in the years preceding 1985. When CFCs were introduced, it is believed that the degreasing units were originally located in the metals-preparation room, the main production area and rooms adjoining a positive-pressure clean room. At present, only two CFC degreasing units are located in the south and east portions of the main facility building.

The two CFC degreasing units consist of a sonic degreaser with a nominal operating capacity of 30 gallons and a vapor degreaser which has a nominal operating capacity estimated at 10 gallons of cleaning solution. In addition to the degreasing units, the facility has a solvent recovery unit to recover solvent for reuse and minimize disposal and the purchase of new cleaning solution. The condition and integrity of the degreasing and solvent recovery units are checked on a regular basis. The solvents are compatible with the material construction of the equipment and all solvent recovery operations are performed within a diked area. Spill control/containment materials are also readily available in the area.

Prior to the existence of any connection to a water-treatment facility, the Aro facility apparently made use of a septic system for sanitary purposes. Based upon a 1956 Firewell drawing, two main sanitary pipes would have run (primarily north to south) toward a septic tank and filter in the southeast corner of the property. This particular drawing reflects a filter bed that would have been 61 feet long by 43 feet wide by four feet high. Based upon another Firewell drawing from 1953, there appears to have at one time been a 48 foot long by seven foot wide by four foot high sewer filter bed located along the west wall of the building. This possibly served as the sanitary system for the original building.

The Erie County Sewer District #1 was contacted in an effort to establish the date of Aro's sanitary connection to the publicly owned treatment works (POTW) truck line located on the southern portion of the property. The Sewer District records have information for adjoining properties (several connections were made in May 1965) but do not contain any information for the facility. The Sewer District office has indicated that independent contractors were responsible for making connections to the POTW trunk line and that permits may not have been required. The Erie County Department of Environment and Planning was contacted in an effort to gain additional information, but to date, no additional information has been obtained.

1.2 PREVIOUS INVESTIGATIONS

In February 1990, Aro was purchased by the Ingersoll-Rand Company. Ingersoll-Rand commissioned several environmental assessments during the period of January 1990 through February 1991. Assessment activities generally consisted of soil sampling and analyses, installation of 13 monitoring wells, ground water sampling and analyses, and a limited soil-vapor survey.

In January 1990, the first environmental assessment was conducted. Subsurface soil samples were collected in the metals-preparation room where cracks were observed in the concrete floor and along an expansion joint. The samples near cracks in the floor (MP-1) were taken at six- and ten-inch depths, while the expansion joint samples (MP-2 and MP-3) were taken at a depth of 24 inches. The samples were analyzed for phenols, metals (barium, cadmium, chromium, copper, lead, nickel and zinc), cyanide and volatile organic compounds (United States Environmental Protection Agency [EPA] Method 502.2). The results of the chemical analyses are presented in Table 1.

In order to confirm the results of the January 1990 analyses, and to assess the extent of contamination, additional sampling was performed in March 1990. Sampling began in locations where previous samples were taken and radially extended outward beyond the metals-preparation room. These samples (A through M) were taken at depths of one, three and five feet. EPA Method 8240 was used for volatile organic compound analysis, and analyses of metal concentrations were conducted. The results of the analyses are presented in Table 1.

In May 1990, four additional samples (Z-1 through Z-4), were collected to help evaluate the horizontal extent of the elevated volatile organic compound concentrations. These samples were taken at depths of one and five feet and are also presented in Table 1.

Three monitoring wells (MW-1, MW-2 and MW-3) were installed in August 1990. These wells were installed to apparent bedrock and had ten-foot screens at the bottom of the wells. Soil and ground water samples were tested for volatile organic compounds. The results of the soil and ground water chemical analyses are shown in Tables 1 and 2, respectively.

An October 1990 round of sampling was conducted to evaluate the source area(s) of the apparent contamination previously encountered, and to assess whether private property next to the facility had been affected. Sampling was conducted in three different areas: the northwest corner of the building (LF1-10, LF1-11, LF1-12 and NWP-18), the metals-preparation room (TG-1, TG-2, TG-3, MS-4 and MS-5), and an area southeast of the employee parking lot (LF2-1 through LF2-9, NDP-13, AP-14, NPSB-16 and NDP-20). Hand augers were used where possible to advance a borehole and to obtain soil and ground water samples. The results of the chemical analyses for the soil and ground water samples are contained in Tables 1 and 2, respectively. Soil vapor probes collected samples for analysis with a field gas chromatograph (GC) (Table 3). Also, the three monitoring wells drilled in August 1990 were resampled. Prior to sampling, approximately three volumes of the well were removed with a bottom-filling bailer. The samples collected were analyzed for site-specific compounds using EPA Method 8240 (Table 2).

Due to the results of the October 1990 sampling, a verification round of sampling was conducted in November 1990. Soil and ground water samples were taken at the two areas of concern resulting from the October 1990 screening: the metals-preparation room (AW-1 through AW-5, AW-12, AW-13, and SS-13 through SS-15) and an area southeast of the employee parking lot (AW-8 through AW-11, SS-8 through SS-11, and SS-22). A sample grid downgradient (south) of the metals-preparation room was developed and ground water probes were installed and samples collected. The area southeast of the employee parking lot was sampled using hand augers to advance a borehole and to collect soil and ground water samples. Most of the samples were taken on neighboring residential properties. All samples were sent to a laboratory for chemical analysis. Results of soil analyses are presented in Table 1 and ground water results are presented in Table 2.

In October 1990, the NYSDEC was notified of the chlorinated solvents present in the soil at the site. As a result, the site was listed as a Class 2 (significant threat to the public health or environment - action required) Inactive Hazardous Waste Disposal Site (IHWDS) No. 9-15-147 with a Priority Ranking 1, due to the proximity of nearby residences. A Remedial Investigation Work Plan and an Administrative Consent Order were negotiated and approved on January 31, 1992.

In December 1990 and January 1991, ten additional ground water monitoring wells (MW-4 through MW-11, MW-13 and MW-14; no monitoring well MW-12 was installed) were installed at various locations throughout the facility. During drilling, continuous or five-foot interval split-spoon samples were collected for visual classification of soils, which aided in the vertical placement of screens. These samples were obtained using a two-foot long, two-inch outside diameter (OD) split-spoon sampler, advanced with a 140-pound hammer. Blow counts were recorded every six inches and used to help evaluate soil density as outlined in the American Society of Testing Materials (ASTM) Method D 1586. Selected samples were screened on site using the head-space method (Table 4). The results of chemical analyses on the soil samples are presented in Table 1.

After each monitoring well was installed, the wells were developed using either a surge block or a bottom-filling stainless-steel bailer. Well development was performed until a turbidity of less than 50 NTUs was obtained. Well depths, screen intervals and sand pack intervals are presented in Table 5.

The monitoring wells were installed to apparent bedrock with two exceptions (MW-6 and MW-11). A dense gray layer of clay was encountered at 15 feet during installation of monitoring well MW-6. Drilling was stopped and a well was set at this layer. Monitoring well MW-11, located two feet from monitoring well MW-13, is screened from 7½ to 12½ feet (monitoring well MW-13 is screened from 13 to 23 feet). This was done to evaluate the possibility that a natural-occurring clay layer may be restricting the downward migration of contaminants. The ground water samples collected from the monitoring wells were analyzed for site-specific compounds using EPA Method 8240 (Table 2).

Slug tests were performed in selected monitoring wells in January 1991. The results indicate the subsurface to contain low-permeability soils (i.e., clays and silts). The hydraulic conductivity values resulting from the slug tests are listed in Table 6.

In general, results of previous investigations indicated TCE concentrations of up to 96 parts per million (ppm) in soil samples obtained from beneath the concrete-slab floor of the metals-preparation room. TCE concentrations of up to 740 ppm were detected in ground water samples obtained from a monitoring well (MW-3) installed outside the facility building, downgradient of the metals-preparation room. Some additional constituents identified in site soils and ground water were 1,2-dichloroethylene and vinyl chloride.

The site is currently classified by the NYSDEC as a Class 2 ("significant threat to the public health or environment - action required") Inactive Hazardous Waste Disposal Site (No. 9-15-147). The NYSDEC has requested that Aro Corporation conduct a remedial investigation/feasibility study at the site to investigate environmental conditions, identify potential unacceptable risks to human health and the environment, and delineate remedial measures which may be required. A Draft Work Plan for the Aro facility was submitted to the NYSDEC on April 18, 1991. A Revised Work Plan was submitted on August 30, 1991, and was approved by the NYSDEC with provisional comments.

Capsule, of St. Paul, Minnesota, was retained by Ingersoll-Rand to manage the project. Law Environmental was contracted by Ingersoll-Rand to implement the remedial investigation. Law Environmental previously (May 1, 1992) submitted a Stratigraphy Report as part of the remedial investigation.

1.3 REGIONAL GEOLOGIC SETTING

The Aro site is situated within the Great Lakes Section of the Central Lowland Physiographic Province (Fenneman, 1938). The Great Lakes Section is characterized by the dominance and variety of glacial features, such as marginal moraines and outwash plains, and by abundant lakes, including four of the Great (Laurentian) Lakes. The Great Lakes are bordered locally by flat plains, and erosion has produced a series of lowlands and uplands, separated by escarpments. The Niagara Escarpment, which is well known where crossed by the Niagara River, separates Ordovician bedrock from more-resistant Silurian bedrock. The Onondaga Escarpment, which separates Silurian and Devonian bedrock, occurs north of the Aro facility.

The topography in the vicinity of the site is generally flat, with a gentle dip to the south. Nearby surface-water bodies include Cayuga Creek to the south and Scajaquada Creek to the north (Figure 1). Cayuga Creek is one mile south of the site and flows in a west-southwest direction. Scajaquada Creek is approximately one mile north of the site and flows in a westerly direction. Surface-water drainage in the area drains toward Cayuga Creek. Cayuga Creek joins with Cheektowaga Creek approximately 2 miles southwest of the site to form the Cheektowaga River. The Cheektowaga River flows in a westerly direction toward its confluence with Lake Erie.

The site is underlain by south-dipping limestones of the Middle Devonian Onondaga Formation (Rickard and Fisher, 1970). The Onondaga Formation locally includes the Seneca and Moorehouse Limestone Members. The Tioga Bentonite, a thin volcanic ash layer, occurs at the base of the Seneca Limestone and, where present, is underlain by the Moorehouse. The Moorehouse Limestone is distinguished from the Seneca by the presence of varying amounts of chert in the Moorehouse.

Observations made by Law Environmental at a quarry operated by Cheektowaga Crushed Stone, one-half mile south of the site, and discussions with an on-site geologist, indicated that the Seneca Limestone and Tioga Bentonite pinch out east of the site and quarry. At the quarry, the unit thicknesses are estimated as follows:

- Seneca Limestone - 10 feet
- Tioga Bentonite - less than 0.5 feet
- Moorehouse Limestone - in excess of 130 feet (quarry operations have not progressed below the Moorehouse)

The bedrock surface at the quarry appears to be relatively flat lying, with glacial striations. According to the quarry geologist, the overburden consists of approximately 12 to 15 feet of silty clay.

Glacial deposits in western New York State were formed almost entirely during Late Wisconsinan time by an expansion of the Laurentide Ice Sheet that began about 30,000 years ago and culminated about 20,000 years ago (Cadwell, 1988). The Wisconsinan glacier transported and deposited large quantities of clay- to boulder-size sediment. As the glacier retreated from western New York State, it produced a series of proglacial lakes and recessional ice-margin features. As the upland areas were deglaciated, large masses of glacial ice remained in the adjacent lowlands. Glacial ice margins formed when the terminus of the glacier remained at one position for a long time. These margins are progressively younger from south to north. The "Cheektowaga ice margin" has been mapped beneath the Aro facility by Cadwell (1988), where it is represented by a till moraine surrounded to the north and south by lacustrine silts and clays.

The previous May 1, 1992, Stratigraphy Report indicated that the site was underlain by two layers of till, identified as the upper and lower tills. Detailed descriptions of the tills, based on the results of the RI field activities, are provided in subsequent sections of this report.

1.4 REMEDIAL INVESTIGATION OBJECTIVES AND SCOPE

The remedial investigation of the Aro facility in Cheektowaga, New York, was requested by the NYSDEC due to previously-identified constituents in soil and ground water in portions of the property. The objectives of the remedial investigation were to further characterize site geology and hydrogeology; identify the types, magnitude, extent and source of constituents in soil, ground water, surface water and sediments; identify potential IRMs which could be undertaken to control contaminant migration and begin cleanup; and generate data in support of a later feasibility study.

Law Environmental was retained by Capsule to perform the remedial investigation at the site in general accordance with the NYSDEC-approved Revised Work Plan dated August 30, 1991, and additions to the Work Plan authorized by Capsule and the NYSDEC.

Elements of the remedial investigation are as follows:

- Verify analytical data previously generated for soils beneath the metals-preparation room and other building areas, in the adjacent property to the west, and in ground water.
- Evaluate the presence of potential constituent sources other than the metals-preparation room.
- Estimate the horizontal extent of constituents in soil and ground water in the overburden, and further characterize hydrogeologic conditions affecting constituent migration in overburden.
- Assess the presence of constituents in ground water in the upper bedrock, and characterize hydrogeologic conditions affecting constituent migration in bedrock.
- Assess the presence, nature, and magnitude of constituents in surface water and sediment south and east of the site.
- Characterize the effects, if any, of underground sewers or other site facilities on ground water flow and constituent migration.
- Identify constituent-migration pathways and potential exposure routes in the overburden and shallow bedrock.
- Identify and describe natural resources near the site.
- Assess potential off-site constituent migration via the air emissions pathway (risk assessment).
- Provide supportive data for the later feasibility study.

1.5 REPORT ORGANIZATION

Organization of the RI Report is in general accordance with the Section C.10 of Capsule's Request for Quotation and the EPA guidance document for conducting remedial investigations and feasibility studies under CERCLA (EPA, 1988).

Investigation procedures are described in Section 2.0 (Methods of Field Investigations) Section 3.0 (Results) includes discussions of site stratigraphy; laboratory analytical results for soils, ground water and surface water; hydraulic conductivity; and ground water flow direction. The assessment of natural resources is discussed in Section 4.0 and the human-health risk assessment is discussed in Section 5.0. Conclusions are presented in Section 6.0 and cited references are presented in Section 7.0 of the report. Tables, figures and appendices are referenced within the text of the report. Tables and figures are included in Volume 1 of this report following the text. Appendices are included in Volumes 1 and 2 of the report.

2.0 METHODS OF FIELD INVESTIGATIONS

Remedial investigation field activities were conducted during the period of March 9 through September 16, 1992. Remedial investigation field activities were performed in general accordance with the NYSDEC-approved Revised Work Plan (August 30, 1991), the Stratigraphy Report (May 1, 1992), and correspondence between Law Environmental and Capsule concerning appropriate modifications to the scope of work (Appendix A). The RI field activities included the following general tasks:

- Health and safety monitoring
- Ambient-air screening and downwind monitoring
- Soil-gas/shallow-water survey
- Monitoring well and observation well-point installation and development
- Soil, ground water and surface-water sampling
- Aquifer characterization

Drilling operations were performed in two phases. Phase I activities consisted of installation of monitoring wells MW-4R and MW-14R and a soil-gas/shallow-water survey. The May 1, 1992 Stratigraphy Report was issued after completion of the Phase I activities. Phase II activities consisted of installation of monitoring wells MW-15 through MW-20, MW-3R and replacement well MW-3, six interior soil borings (SB-101 through SB-106), three well points (OW-101, OW-102 and OW-103) and two temporary stream-gauging stations; soil, ground water, and surface-water sampling; and hydraulic conductivity testing. Drilling operations were conducted during the period of March 10 to 27, 1992 (Phase I) and June 8 to 18, 1992 (Phase II).

Field activities were performed in general accordance with the NYSDEC-approved Health and Safety Plan (Appendix B). In addition, property boundary (fence line) air monitoring was conducted during drilling operations at the request of the NYS Department of Health (DOH). Field investigation methods or protocol have been identified for each task in the Work Plan. Modifications or exceptions to Work Plan methods or protocol are addressed where applicable.

Prior to commencement of on-site activities by field personnel, health and safety meetings were held on March 10 and 16 and June 8, 1992. The purpose of the meetings was to familiarize field personnel with the main points of the Health and Safety Plan.

Field activities were performed by Law Environmental, with the assistance of selected subcontractors. Tracer Research Corporation of Tuscon, Arizona attempted a soil-gas/shallow-water survey. Drilling and monitoring well installation services were performed by Environmental Products and Services, Inc. (Cheektowaga, New York) and Empire Soil Investigations, Inc. (Hamburg, New York). RECRA Environmental, Inc. of Amherst, New York provided analytical services under separate contract to Ingersoll-Rand. Surveying services were performed by Krehbiel Associates of Tonawanda, New York. Data validation was performed by CC Johnson and Malhotra, PC of Denver, Colorado.

2.1 AMBIENT-AIR SCREENING AND DOWNWIND MONITORING

Baseline interior and exterior ambient-air surveys were conducted at the site prior to initiating Phase I drilling activities. Fence line air monitoring was conducted concurrently with Phase I and Phase II drilling operations at the request of the NYSDOH. These activities are discussed in the following sections.

2.1.1 Ambient-Air Screening

Interior and exterior baseline ambient-air screening was conducted at 29 total locations at the Aro site by Law Environmental during the period of March 9 through 10, 1992 in the presence of representatives of Aro and Capsule. The screening was conducted with an HNu photoionization detector (PID) Model PI-101, equipped with an 11.7 eV bulb. The Work Plan had specified a Foxboro OVA flame-ionization detector (FID) to also be used; however, due to a malfunction in the OVA, only the HNu PID was utilized for the exterior survey. Instrument calibration was performed prior to and after use.

An exterior baseline ambient-air survey was performed on March 9, 1992. The survey area included the property boundary, the employee parking lot, proposed monitoring well locations MW-4R and MW-14R (access to off-site monitoring well location MW-3R was not available at that date), between buildings, and along drainage ditches in the eastern and southeastern sections of the property. In accordance with the Work Plan, air screening was conducted within three feet of the ground surface. The interior baseline ambient air survey was conducted on March 10, 1992. Both the HNu PID and the OVA FID were used for the interior survey.

The results of the baseline exterior and interior ambient-air surveys are discussed in Section 3.1 and presented in Figure 3.

2.1.2 Downwind Monitoring

At the request of the NYSDOH, Section 3.6 of the Health and Safety Plan (Appendix B) was modified to include fence line (downwind) air monitoring as part of a Community Air-Monitoring Plan. Fence line air monitoring was conducted concurrently with Phase I and Phase II drilling operations.

Equipment used for fence line air monitoring included an HNu PI-101 PID equipped with an 10.2 eV bulb connected to an AVB Model SE110 strip-chart recorder. Placement of the monitoring equipment was dependent on the wind direction, which was estimated from daily phone calls to the local weather service and from a windsock mounted on a 14-foot steel pole at the south end of the employee parking lot. The monitoring system was placed approximately 100 feet downwind of each drilling location. Photographs showing the monitoring equipment in use are included in Appendix C (Photographic Portfolio).

Use of the fence line monitoring system during Phase I drilling was sporadic. Extreme weather conditions (snow, cold air temperatures, high winds) encountered at the site resulted in repeated equipment malfunction. During periods of system malfunction, downwind monitoring was accomplished by taking manual readings at frequent intervals during drilling, using the HNu PID and/or the OVA FID. The manual downwind monitoring was performed in conjunction with the routine health-and-safety monitoring conducted within the work zone during drilling operations. The site geologist or site health and safety officer was responsible for collecting downwind data on those occasions when the fence line monitoring system was inoperable.

The HNu PID and strip-chart recorder were placed in a styrofoam cooler during Phase II drilling operations to protect the monitoring equipment. A small hole was made in the side of the cooler through which the HNu PID probe could be extended in order to monitor the outside ambient air. Encasement of the system protected equipment from rain and other weather conditions.

During drilling operations, organic vapor concentrations did not exceed the perimeter monitoring criteria for time durations presented in Section 3.6 of the Health and Safety Plan. On several occasions during drilling of monitoring wells MW-3 and MW-3R (Phase II), there were upgrades of personal protection from Level D to Level C. However, perimeter monitoring at the fence line monitoring system did not indicate the need to stop drilling activities nor trigger reporting requirements.

2.2 SOIL-GAS/SHALLOW-WATER SURVEY

Tracer Research Corporation (TRC) performed a limited soil-gas/shallow-water survey during the period of March 10 through 12, 1992 under the supervision of Law Environmental. The TRC report is included as Appendix D of this report. Due to encountered soil conditions (low permeability and high moisture) and weather, the anticipated scope of the soil-gas survey was significantly reduced from that of the Revised Work Plan.

A total of 26 samples (12 shallow-water samples and 14 soil-gas samples) were obtained from 25 sampling locations (SG-1 through SG-25). When feasible, soil-gas samples were obtained from depths of 2.5 to 5 feet and shallow-water samples were obtained from depths of 3 to 6 feet. Sampling locations are shown on Figure 1 of the TRC report (Appendix D). Sampling areas included the southern portion of the employee parking lot and various locations inside the Aro facility. Ambient-air measurements were obtained by Law Environmental at each interior sampling point using an HNu PID prior to and during soil-gas/shallow-water sample collection.

Attempts were made at each sampling location to obtain a soil-gas sample. However, in many instances only a shallow-water sample was obtainable, due to the low soil permeability and high soil-moisture content. Three vertical soil-gas profiles were attempted; however, a vertical profile was moderately successful only at sampling point SG-23 (soil-gas samples were obtained from depths of 3 and 5 feet). At sample location SG-21, a soil-gas and a shallow-water sample were collected from depths of three and five feet, respectively.

Soil-gas and shallow-water samples were analyzed for trans-1,2-dichloroethylene, 1,1,1-trichloroethane, trichloroethylene, tetrachloroethylene and vinyl chloride. Sampling methodology, quality control/quality assurance procedures, results and contour maps are included in the attached TRC report (Appendix D).

2.3 WELL INSTALLATION AND DEVELOPMENT

Law Environmental and the drilling subcontractors installed ten monitoring wells and three observation well points in two phases during the period of March 10 through June 18, 1992. Three Type III bedrock and seven Type II overburden monitoring wells were installed for the purpose of further characterizing site geology and hydrogeology, and assessing the nature and extent of constituents in soil and ground water. Soils and bedrock were continuously sampled by split-spoon and coring methods, respectively. The three observation well points were installed within the culvert backfill adjacent to storm-sewer piping in the employee parking lot.

Locations of monitoring wells and observation well points are shown on Figure 2. Table 5 lists monitoring well and well-point construction details. Appendix C presents a photographic portfolio of drilling and well installation activities. Test Boring Records for the ten monitoring wells are included in Appendix E.

2.3.1 Bedrock Monitoring Well Installation

Phase I drilling activities for the installation of three bedrock monitoring wells were initiated on March 10, 1992. Two bedrock monitoring wells (MW-4R and MW-14R) were installed during Phase I. A third monitoring well (MW-3R) could not be completed during Phase I and was postponed until Phase II drilling activities in June, 1992.

Soil test borings were initially advanced during Phase I at three locations (Figure 2) for the purpose of installing bedrock monitoring wells MW-3R, MW-4R and MW-14R. Bedrock coring was performed at the three locations during Phase I, and two Type III bedrock monitoring wells (Figure 4) were installed at MW-4R and MW-14R. The initial borehole for proposed monitoring well MW-3R was abandoned during Phase I. A new boring was completed and a Type III monitoring well was installed during subsequent Phase II drilling activities.

Bedrock monitoring well drilling and installation activities were performed in general accordance with Section 2.3.5 of the Work Plan and those modifications agreed to in Law Environmental's letter dated February 27, 1992 (Appendix A). Exceptions to the work plan and modifications are discussed later in this section.

Prior to initiating drilling activities, downhole equipment was steam cleaned within a plastic-lined decontamination pad constructed for the project. Decontamination water was pumped from the decontamination pad into 55-gallon drums. Each drum was appropriately labelled after use. The split-spoon samplers were decontaminated before each use with an Alconox solution wash and potable water rinse, and allowed to air dry.

Test borings were advanced using hollow-stem augers, NX coring, and wash-rotary techniques, and bedrock monitoring wells were installed in accordance with the following procedures:

1. A twelve-inch diameter soil test boring was advanced to refusal using 8¼-inch inside-diameter (ID) hollow-stem augers. Continuous split-spoon samples were obtained while augering. Upon reaching auger refusal, augering was terminated.

2. A six-inch diameter steel casing was installed inside the hollow-stem auger. The annulus between the steel casing and the

borehole wall was filled with a Portland cement/bentonite grout using tremie-pipe techniques as the augers were removed. Additionally, the lower two to three feet of the inside of the steel casing was filled with grout to improve the seal.

3. The grout was allowed to set for a minimum 24-hour waiting period. The borehole was then advanced 20 feet into bedrock using NX-coring techniques and potable water. No additives were used in the coring process. The potable water used was obtained from the same source throughout the drilling process (water tap located in the maintenance and storage building).

4. Following coring operations, the borehole was reamed with a 5 7/8-inch rotary drill bit using potable water obtained from the same source as the water used for coring.

5. A ten-foot section of two-inch ID PVC well screen with 0.010-inch slots and two-inch ID PVC riser were installed into the borehole. A one-foot long tail pipe (sediment sump) was attached to the bottom of the well (except MW-3R).

6. Clean silica sand was placed around the well screen to a level at least two feet above the top of the well screen.

7. An approximately two-foot thick bentonite seal was installed at the top of the sand pack by pouring and tamping bentonite pellets around the PVC riser pipe.

8. The annulus between the PVC riser pipe and the borehole wall above the bentonite seal and up into the steel casing was grouted. Grout was pumped through a tremie pipe extending to the top of the bentonite seal. The tremie pipe was progressively removed as the grout level rose to the surface.

9. A watertight locking cap was placed on the top of the PVC riser pipe. A six-inch diameter protective steel casing with a locking cover, extending approximately two feet above grade, was grouted in place.

Soil cuttings, drilling/coring water and decontamination water generated from drilling activities were containerized in labeled 55-gallon drums. The drums were moved from the boring locations to an on-site staging area located in the southeast corner of the employee parking lot following completion of drilling activities.

Descriptions of the soil samples were recorded by an on-site Law Environmental geologist. Rock cores were placed sequentially by depth in labeled core boxes and photographed (Appendix C). A core log was prepared for each cored section, describing lithology, weathering, recovery, fracture frequency and orientation, Rock Quality Designation (RQD), solution phenomena, and coatings, fillings or staining. Test Boring Records (Appendix E) summarize the soil and bedrock descriptions for each boring.

Exceptions to drilling methods described in the Work Plan occurred at all three bedrock monitoring well locations. Changes to the drilling program were the results of encountered conditions, generally bedrock at greater-than-anticipated depths, and drilling difficulties. The exceptions were approved in the field by DEC, and are summarized as follows:

- Depth to bedrock was found to be greater than anticipated at the MW-4R and MW-14R locations when rock-coring activities encountered very dense, unconsolidated soil below the anticipated bedrock surface. It appears the assumed bedrock surface at MW-4R and MW-14R, based on previous data, was actually a bouldery, basal till.

- Actual top of bedrock was confirmed by advancement of the boreholes using coring techniques. Pilot borings were advanced in the vicinity of MW-14R to identify a location free of boulders that would allow auger access to the actual top of bedrock. Following confirmation of the depth to bedrock, the boreholes for MW-4R and MW-14R were reamed with 8 1/4-inch ID augers prior to setting replacement 6-inch ID steel casing to bedrock.

- The initial, steel-cased boreholes for MW-4R and MW-14R were abandoned by grouting from total depth to ground surface. Replacement 6-inch ID casings for both MW-4R and MW-14R were installed to depths of approximately 25 feet (approximately 10 feet deeper than anticipated for each well).

- After completion of rock coring activities in MW-14R, the rock coring bit got stuck in the core hole and was pulled off of the drilling assembly by a subsurface obstruction. The core bit was pushed down to the bottom of the core hole (approximately 42 feet from ground surface) and abandoned in place with bentonite. Monitoring well MW-14R was installed above the top of the bentonite seal over the abandoned core bit.

- The initial MW-3R 6-inch ID steel casing and the core hole (approximately 42 feet in total depth) were abandoned by grouting to ground surface on March 28, 1992. Abandonment was necessary due to the inability to retrieve a steel hammer inadvertently dropped into the hole.

- Since the substitute borehole for replacement well MW-3R was located within 10 feet of the previous boring location, it was decided that an additional rock core was unnecessary to enhance the stratigraphic description. Therefore, after augering into bedrock approximately 6 inches and grouting the 8-inch steel casing in place, a 5 7/8-inch rotary drill bit was used to complete the boring.

2.3.2 Overburden Monitoring Well Installation

On June 8 through 17, 1992, a Law Environmental geologist supervised the installation of seven overburden ground water monitoring wells (MW-15 to MW-20 and replacement well MW-3). The seven Type II wells were installed in general accordance with the Work Plan and the May 1, 1992 Stratigraphy Report. Type II well construction details are included on the Test Boring Records (Appendix E) and in Table 5 and shown schematically on Figure 5. The monitoring well locations (Figure 2) were selected based upon the results of Phase I drilling activities, presented in the Stratigraphy Report.

In general, the Stratigraphy Report described two overburden layers, labeled as the upper and lower tills. It was recommended in the Stratigraphy Report that the overburden wells be screened in the lower till, due to the anticipated dense nature of constituents previously encountered (for example, trichloroethylene). This and other recommendations resulted in the following changes to the Work Plan:

- Overburden monitoring wells were installed to the top of bedrock without sediment traps and screened in the lower till due to the dense nature of previously-detected constituents.
- Well screen lengths ranged from 5 to 10 feet, rather than the uniform 10-foot length stated in the Work Plan, in order to not intersect the upper till/lower till contact.
- Location of monitoring well MW-18 was moved to correspond to elevated soil-gas readings in the southeast corner of the employee parking lot.
- Monitoring well MW-20 was moved to the west, downgradient of MW-14, to provide information on the lateral extent of constituents previously detected in MW-14 by others.

- Proposed monitoring well MW-21 was eliminated based on the relocation of monitoring well MW-20.

Before each overburden ground water monitoring well was installed, a soil boring was advanced until auger/split-spoon refusal was encountered on bedrock. Depth to bedrock ranged from 21.3 (MW-16) to 25.3 feet (MW-15) below the ground surface. The soil borings were completed using 4 1/4-inch ID hollow-stem augers and employed split-spoon sampling techniques.

Soil sampling and penetration testing were performed in general accordance with ASTM Method D-1586-84. Continuous soil samples were obtained with a two-foot long, two-inch outside-diameter split-spoon sampler at locations MW-15 through MW-20. The sampler was first seated six inches to penetrate any loose cuttings, and then driven an additional eighteen inches with blows of a 140-pound hammer falling thirty inches. The number of hammer blows required to drive the sampler twelve inches was recorded, and is designated the penetration resistance (N).

Drilling equipment, including split-spoons samplers, rods and augers, was steam cleaned in a plastic-lined decontamination pad prior to and between each soil boring. The decontamination water was pumped from the pad into labelled 55-gallon drums and moved to the drum-staging area. Split-spoon samplers were brushed clean in an Alconox solution and rinsed with water between samples. Soil cuttings were containerized in labelled 55-gallon drums and moved from the boring locations to the on-site staging area.

Test borings were advanced using hollow-stem augers and overburden monitoring wells were installed in accordance with the following procedures:

1. An eight-inch diameter soil test boring was advanced to refusal using 4¼-inch inside-diameter (ID) hollow-stem augers. Continuous split-spoon samples were obtained while augering. Upon reaching auger refusal, augering was terminated.

2. A five- to ten-foot section of two-inch ID PVC well screen with 0.010-inch slots, and 15 to 20 feet of two-inch ID PVC riser, were installed into the borehole. A cap was attached to the bottom of the well screen.

3. Clean silica sand was placed around the well screen to a level at least two feet above the top of the well screen.

4. An approximately two-foot thick bentonite seal was installed at the top of the sand pack by pouring and tamping bentonite pellets around the PVC/stainless steel riser pipe.

5. The annulus between the PVC/stainless steel riser pipe and the borehole wall above the bentonite seal and up into the steel casing was grouted. Grout was pumped through a tremie pipe extending to the top of the bentonite seal. The tremie pipe was progressively removed as the grout level rose to the surface.

6. A locking cap was placed on the top of the PVC/stainless steel riser pipe. A six-inch diameter protective steel casing with a locking cover, extending approximately two feet above grade, or a flush-mount well cover, was grouted in place.

During drilling operations, soil cuttings were field screened for the presence of volatile organic compounds with an HNu photoionization detector (PID) equipped with 11.7 eV probe. In addition, PID head-space readings were obtained from the soil samples. The samples were placed in glass jars and covered with aluminum foil. After the jars had reached room temperature (approximately 10 minutes), the foil seals were punctured with the PID probe and readings were obtained. The results of PID head-space analyses are presented in Table 6 and the Test Boring Records (Appendix E).

2.3.3 Additional Well/Soil Boring Installation

Drilling activities which were performed in addition to the Work Plan scope of work included the advancement of a soil test boring adjacent to monitoring well MW-1 during Phase I, and the abandonment and replacement of monitoring well MW-3 during Phase II.

2.3.3.1 Additional soil boring

For the purpose of confirming bedrock depth at the northern boundary of the facility, an additional soil test boring (B-1) in the vicinity of monitoring well MW-1 was added to the Phase I scope of work (Appendix A). Soil test boring B-1 was advanced using a 2¼-inch ID hollow-stem auger with continuous split-spoon soil sampling to a depth of 27.9 feet. Six inches of bentonite were placed above the bedrock surface, as directed by the on-site DEC representative, and the borehole was backfilled with soil cuttings. The Test Boring Record for B-1 is included in Appendix E.

2.3.3.2 MW-3 abandonment and replacement

Abandonment and replacement of monitoring well MW-3 were performed on June 16, 1992. Replacement of monitoring well MW-3 was based on observations made during the Phase I activities. These observations included visual evidence of degradation to a PVC bailer left submerged in the well, elevated concentrations of chlorinated hydrocarbons detected in soil and ground water samples previously obtained at or near this location, and a depth to bedrock which was estimated to be four feet below the base of the well.

An attempt was made to remove the monitoring well from the borehole using the drill rig winch cable; however, the upper section of the PVC riser separated from the below-ground portion of the well immediately after upward pressure was applied. Subsequently, 4 1/4-inch ID hollow-stem augers were employed to remove the remaining well materials and clean out the borehole by over drilling. The borehole was grouted to the surface.

The borehole for replacement well MW-3 was advanced until auger refusal occurred at a depth of approximately 24 feet below the surface using 4 1/4-inch ID hollow-stem augers. Top of rock was indicated by split-spoon refusal.

Well installation methods for replacement well MW-3 were the same as those outlined in Section 2.3.2, with the exception of the well materials. The well was constructed of stainless-steel riser and continuous-wrap 0.010-inch well screen, installed to a depth of 24 feet. Level C protection was required during advancement and removal of augers due to intermittent elevated VOC levels measured in the breathing space. Soil cuttings were containerized in labelled 55-gallon drums and moved from the boring locations to the on-site staging area.

2.3.4 Storm-Sewer Observation Well Points

Three stainless-steel well points (OW-101, OW-102 and OW-103) were installed in storm-sewer and sanitary-sewer backfill areas along culverts in the employee parking lot (Figure 2) on June 11 and 12, 1992. The purpose of the well points was to identify the presence of ground water in the backfill, provide water levels for comparison with wells, and to allow collection of water samples from the backfill for screening. The well points were constructed of two-inch outside-diameter (O.D.) stainless steel, with two feet of continuous-wrap 0.010-inch slot well screen. Figure 6 presents a schematic of an observation well point and Table 5 lists construction details.

Prior to installation, the well points and augers were steam cleaned. To install the well points, a boring first was advanced to the desired depth using 4 1/4-inch I.D. hollow-stem augers. The well point was then set into the borehole and a sand filter pack was placed approximately six to ten inches below the ground surface. Each well point installation was completed with a flush-mount well cover, concrete pad and lockable watertight cap. Soil cuttings were containerized in labelled 55-gallon drums and moved from the boring locations to the on-site staging area.

2.3.5 Building Interior Soil Borings

Six soil borings (SB-101 through SB-106) were advanced inside the Aro main facility building on June 11 and 12, 1992 (Figure 2). The purpose of the soil borings was to obtain soil samples to confirm previous observations by others, to evaluate possible migration pathways and to investigate the lateral extent of constituents within soils below the building.

Prior to initiating soil-sampling activities, a four-inch diameter hole was cored through the concrete floor using a portable coring machine. The borings were advanced using a portable tripod rig and standard split-spoon sampling techniques. Split-spoon sampling techniques were previously described in Section 2.3.2.

The minimum sampling depth of each boring was seven feet. Sample recovery was low for some of the locations due to the presence of coarse gravel or cobbles; therefore, additional samples were obtained up to a depth of nine feet. On conclusion of sampling activities, the core holes were filled to the surface and sealed with concrete. Test Boring Records for these soil borings are included in Appendix E.

2.3.6 Well Development

Well development was conducted during the period of March 27 to 29 and June 12 to 26, 1992, in general accordance with the Work Plan. Development of the monitoring wells was necessary to remove fine sediments from the well and from soil surrounding the well screen to increase the hydraulic connection between the well and the adjacent water-bearing zone.

Dedicated Teflon bailers were used for development and later sampling of the overburden wells; dedicated PVC bailers were used to develop the bedrock wells. To reduce infiltration of fine-grained material, surging techniques were not employed.

Well development completion criteria included the stabilization of pH, specific conductance and temperature, a turbidity of less than 50 nephelometric units (NTU's), and the removal of five borehole volumes of water. However, due to the low yield of several monitoring wells, and lack of recharge to the bedrock wells, these criteria were generally not met. The results of ground water field measurements during development are shown in Table 7.

The following observations were made during well development:

- In general, a slow rate of recharge was observed for all the monitoring wells.
- The yield of MW-16 was considerably lower than the other wells.

- DNAPL was observed in discharge water from replacement monitoring well MW-3. DNAPLs were not observed in discharge water from other monitoring wells.

- Following removal of drilling fluids in borehole storage at bedrock monitoring wells MW-3R, MW-4R and MW-14R, recharge to the wells was not observed.

- Turbidity reading ranged from 31 NTUs (MW-19) to 165 NTUs (MW-17).

Due to the low yield of MW-16, development was not completed prior to sampling. In addition, development of the bedrock wells was suspended after it was apparent that there was a lack of ground water recharging the wells. Well development records are included as Appendix F.

2.4 FIELD SCREENING AND SAMPLING

Headspace screening of split-spoon soil samples was performed using an HNu PID. Headspace screening was used as a means of selecting soil samples for analyses. A total of 38 soil samples were selected for analyses. Soil samples were selected from seven monitoring well soil borings, six interior soil borings and three sediment sampling locations.

2.4.1 Headspace Screening

Headspace screening was performed on the split-spoon soil samples using an HNu PID with an 11.7 eV bulb for purposes of site health and safety, and to screen soil samples for subsequent laboratory analyses. Soil samples were placed in clean glass jars, sealed with aluminum foil and allowed to reach room temperature (approximately 10 minutes). The foil seals were then punctured with the PID probe and the headspace was screened. The results of the headspace screening are presented in Table 6 and noted in the Test Boring Records (Appendix E).

2.4.2 Soil and Sediment Sampling

A total of 38 soil samples were selected from soil borings MW-3R and MW-15 to MW-20, interior soil borings SB-101 to SB-106, and sediment sampling locations SED-101 to SED-103 for laboratory analyses. In general, the samples selected were those which exhibited the highest HNu readings; however, in boring locations where no elevated readings were encountered, samples were obtained from above and below the interface of the upper and lower tills. The samples were placed in glass jars, packed on ice and delivered to or picked up by the analytical laboratory. Chain-of-custody documentation is provided in Appendix G.

With the exception of soil boring MW-3R, the samples were removed from the split-spoon sampler using a clean stainless-steel trowel or spoon, placed into plastic Ziploc-brand bags and labelled. A portion of the sample was also placed into a glass jar for HNu screening. After obtaining the last split-spoon sample from each boring, two samples were selected for analyses. The selected samples were transferred from the Ziploc-brand bags into glass jars for laboratory analysis. At soil boring MW-3R, samples removed from the split-spoon sampler were placed directly into glass jars for analysis.

Sediment samples were obtained with a clean stainless-steel trowel and placed into glass jars.

Thirty-eight soil samples were analyzed for volatile organic compounds (EPA Method 8240), Target Analyte List (TAL) metals (EPA Methods 6010 and 7471) and cyanide (EPA Method 9010). Nine soil samples were analyzed for semivolatile organic compounds (EPA Method 8270). Three sediment samples were also analyzed for total organic carbon (TOC). The analytical results for soil and sediment samples are presented in Tables 8, 9 and 10.

In accordance with the Work Plan (Section 2.4), sample splits were supplied to the NYSDEC on request.

Analyses were performed by Recra Environmental, Inc., a New York State Department of Health ELAP-certified laboratory, under separate contract to Ingersoll-Rand. Results of the analyses are being provided under separate cover. Sample analyses and quality assurance/quality control (QA/QC) were performed in accordance with the NYS December 1989 Analytical Service Protocols (ASP) and the August 30, 1991, Revised Work Plan. The QA/QC samples included the following: trip blanks for each cooler, field blanks, matrix spikes and matrix spike duplicates (MS/MSD). Field blanks and MS/MSDs were collected for each set of 20 samples obtained, or for every seven-day sampling period. As an additional QA/QC measure, a sample of the water used for drilling operations was collected and submitted to Recra for analysis of VOCs, semivolatiles, TAL metals and cyanide. Data validation was performed by CC Johnson and Malhotra of Denver, Colorado. Data validation reports are included as Appendix H.

2.4.3 Ground water and Surface-Water Sampling

Ground water sampling was performed from June 24 to June 28, 1992 in general accordance with the August 1991 Work Plan. Ground water samples were generally obtained with dedicated Teflon bailers from the monitoring wells (MW-1 through MW-20). Surface-water samples were obtained from locations SW-101 to SW-103. The bedrock wells were dry and were not sampled. Field Ground water Sampling Reports and Chain-of-Custody documentation are provided in Appendix G.

Ground water samples were collected according to the following methodology:

- Prior to purging, the depth to water was measured and recorded, along with the date and time. Daily weather reports and changes in wind direction were also noted in the field reports (Appendix G).

- A minimum of three well volumes were purged from each of the wells before sampling using dedicated Teflon bailers, with the exception of MW-2 and OW-1 to OW-3, where a peristaltic pump was used. Field parameters (pH, specific conductance and temperature) were obtained at each well.

- Immediately after purging or after the well had recharged sufficiently to sample, the samples were collected with dedicated Teflon bailers. New rope was used to lower and raise the dedicated bailer for each well. Volatile samples were collected by slowly lowering the bailer into the well to minimize volatilization during sampling.

- Purge water was containerized in 55-gallon drums and moved to the drum staging area.

- Surface-water samples were collected directly from the drainage ditches.

- The samples were placed on ice in a cooler and transported to the on-site work trailer for labeling, filtering (metals only), and sample preservation. The collected samples were recorded in the chain-of-custody forms and in the field log.

- A signed chain-of-custody form accompanied the samples, which were picked up at the site by Recra Environmental.

The riser in monitoring well MW-2 was misaligned with the casing below ground level, making it impossible to pass a bailer through the PVC casing. Therefore, a peristaltic pump was used for purging and sampling. The peristaltic pump was also used to sample the storm-sewer well points.

One water sample was obtained from each sampling location. In accordance with the Work Plan, twenty-five samples were analyzed for VOCs, seven samples were analyzed for semivolatiles, and twenty-five samples were analyzed for TAL metals (filtered and unfiltered) and cyanide. Three surface-water samples were also analyzed for hardness. Tables 11, 12, and 13 present the ground water and surface-water analytical results.

Turbidity measurements were obtained from ten of the monitoring wells during sampling. Results are included on the Field Ground water Sampling Reports (Appendix G) and equaled or exceeded 50 NTUs in six of the ten wells.

2.5 AQUIFER CHARACTERIZATION

Water-level measurements and hydraulic conductivity testing were performed during the course of Phase II activities. Water-level measurements were obtained from overburden monitoring wells and observation well points. Hydraulic conductivity testing was performed on the new overburden and bedrock monitoring wells. These activities are discussed in the following sections.

2.5.1 Ground Water Level Measurements

A set of ground- and surface-water level measurements were obtained on September 16, 1992 by Law Environmental (Table 14). The water levels were obtained using an Oil Recovery Systems (ORS) oil/water interface probe. The water levels are shown on the potentiometric surface map (Figure 7) and on the Test Boring Records (Appendix E).

The water-tight well caps on the flush-mount monitoring wells were not vented. During periods of rising water levels, air trapped in the riser pipe prevented the water in the well from reaching static levels. Due to the low hydraulic conductivity of the surrounding formation, it would often take several hours for static water levels in the wells to be achieved after removing the caps. Therefore, the well caps were loosened by Aro personnel approximately 18 hours prior to the September 16, 1992 water-level measurements to vent the air trapped in the wells.

2.5.2 Hydraulic Conductivity Testing

During the period of July 6 to July 10, and August 3, 1992, Law Environmental performed in-situ hydraulic conductivity testing on each of the ten newly-installed monitoring wells. In general, hydraulic conductivity testing was performed in accordance with slug-testing methods modified from the Work Plan and presented in a letter to Capsule, dated February 27, 1992 (Appendix A). To accommodate varying conditions encountered in some of the wells, the slug-testing methodology was adapted accordingly.

The slug testing consisted of quickly lowering a PVC rod (slug) attached to a rope into the monitoring well. After initial displacement, the rate of ground water decline (falling head) was measured at logarithmically-increasing time increments using a pressure transducer, which was lowered to a depth in the well below the anticipated slug depth, and an In-Situ, Inc. SE1000C Environmental Data Logger. The procedure was repeated after water levels approached stabilization by quickly removing the slug and recording the rate of ground water recovery (rising head). Hydraulic conductivity values were calculated from the water-level/time data utilizing procedures, except where noted, described by Bouwer and Rice (1976) and Bouwer (1989). Hydraulic conductivity documentation and calculations are presented in Appendix I. Results are summarized on Table 15.

As a result of weather conditions and/or location-specific hydrogeologic differences encountered at the site, it was necessary to vary the aforementioned methodology in order to perform hydraulic conductivity testing in overburden monitoring wells MW-3, MW-16, MW-18 and bedrock wells MW-3R, MW-4R and MW-14R.

Due to elevated concentrations of VOCs in well MW-3, a drop pipe was used to protect the pressure transducer and cable. This method was used only for obtaining falling-head data. As described in the August 30, 1991, Revised Work Plan, the pressure transducer and cable were sealed inside interlocking sections of one-inch PVC pipe. In addition to protecting the transducer and cable from contamination, the drop pipe functioned as a slug to displace water in the well. The pressure transducer was fitted with an adaptor which extended outside the bottom of the drop pipe. The drop pipe was lowered to approximately five feet from the base of the well and secured into position. Distilled water was poured into the drop pipe during submersion to reduce buoyancy. After completing the test, the drop pipe (with the pressure transducer) was removed. Removal of the drop pipe required a significant amount of decontamination time due to the constituent concentrations in the well. The water in the well was bailed to a depth below the previously-observed static level, and a rising-head test was initiated. Rising-head data was then obtained manually using an electric water-level indicator and a stop watch.

Monitoring well MW-16 had not achieved a static water level prior to initiation of hydraulic conducting testing. Due to the slow ground water recharge rate of the well, a falling-head test was performed by filling the well to the top of the PVC casing with potable water. A pressure transducer was inserted into the well, and a data logger was used to measure the drop in head over time. A rising-head test was later performed by bailing the well and monitoring recovery over a 24-day period.

Slug testing of MW-18 was interrupted on two occasions by heavy rain. A rising-head test was performed by bailing the well and measuring the rate of recovery using a pressure transducer.

Due to unsaturated (dry) conditions in the bedrock wells MW-3R, MW-4R, and MW-14R, falling-head tests were performed using the methodology described for MW-16. However, since the static water level is one of the variables used in the Bouwer and Rice equation, the hydraulic conductivities were approximated using equations from Cedergren (1967). Response in the bedrock wells to changes in borehole storage of the water introduced was extremely slow. The tests were initiated on July 7, 1992, and decline in head ranging from 13 to 29 feet was observed on August 3, 1992. On September 16, 1992, during water-level measurements, the potable water was still observed in borehole storage.

2.5.3 Elevation Survey

Krehbiel Associates surveyed the locations of installed monitoring wells, well points and temporary stream gauges on June 23, 1992. Locations were surveyed relative to a site datum previously established by Tallamy, Van Kuren, Gertis & Associates on Drawing No. B 15641 (February 23, 1991). In addition, elevations were measured for each top-of-well casing (datum elevation noted by a black mark), the top of ground surface and the reference points on each stream gauge staff. Locations and ground surface were surveyed to the nearest 0.1 feet. The measuring point (datum elevation) of each new monitoring well, well point and stream gauge were surveyed to the nearest 0.01 feet.

The surveyed datum elevations are presented on Table 5. The datum elevations were used during ground water measurements for the purpose of potentiometric mapping of ground water.

2.6 TEMPORARY GAUGING STATION INSTALLATION

Two temporary gauging stations (TG-1 and TG-2) were installed during Phase II activities. Gauging Station TG-1 was installed in the stream bed on the east property boundary in the vicinity of MW-4. Gauging Station TG-2 was installed in the bed of the storm water drainage ditch south of the employee parking lot. The gauging stations were constructed of seven-foot long, 2 x 2-inch wooden stakes driven approximately one foot into the stream/ditch beds. The stakes were supported by stainless-steel guide wires anchored to steel stakes driven into the sides of the stream/ditch banks. Each stake was marked with a reference measuring point. The elevation of the reference points were surveyed by Krehbiel Associates during Phase II activities.

2.7 REMEDIAL INVESTIGATION SUPPLEMENTAL ACTIVITIES

2.7.1 Introduction

As requested by the NYSDEC, Capsule performed additional investigation work at the Aro facility located in Cheektowaga, New York. The additional evaluation at the Aro site was performed specifically to address the NYSDEC's March 22, 1993, remedial investigation comments letter and supplement the previously submitted remedial investigation reports.

The general scope of work included collecting both subsurface soil samples and ground water samples from locations identified in the field. The sampling locations were concentrated in several areas on or adjacent to Aro's property. They are described as follows: DNAPL evaluation, southern property boundary evaluation, sanitary sewer outfall evaluation, sanitary sewer bedding material evaluation, neighboring property evaluation, interior soil borings, monitoring well confirmation sampling, sediment and surface water evaluation, and the hazardous waste storage area.

2.7.2 Field Activities

2.7.2.1 General

Grab soil and ground water samples were collected, unless otherwise noted, during this sampling event using a Geoprobe system. The Geoprobe unit is a modified hydraulic rotary hammer drill mounted on a fold-away assembly in a vehicle. The assembly transfers the weight of the vehicle onto the probe and couples it with the force of a hydraulic hammer. The Geoprobe has attachments to collect soil, soil gas, and ground water samples from discrete zones for field or laboratory screening activities.

Geoprobe equipment decontamination was performed between sample locations and, when applicable, between discrete sample intervals. The decontamination procedures consisted of: an Alquinox wash (with brush), deionized water rinse, and isopropyl rinse and air dry. Decontaminated Geoprobe equipment was wrapped in foil between sample locations and when not in use.

Prior to sampling, all sample collection equipment was decontaminated. Decontamination procedures consisted of an Alquinox wash and a decontamination rinse with distilled water. Soil and ground water samples were stored in the appropriate laboratory certified clean containers for storage prior to chemical analysis. The sample collection, handling, packaging, preservation, and storage were conducted according to EPA protocols (SW-846). All samples were stored at 4 degrees Centigrade pending analysis.

As a result of the discussion between the NYSDEC and the facility during the April 30, 1993, project meeting, analytical services protocol and third party analytical validation were not performed on this round of sample analyses.

2.7.2.2 DNAPL Evaluation

An interface probe was used to determine whether DNAPL was present in monitoring well MW-3. MW-3 was installed to a depth of 24.0 feet and is set directly on the bedrock. In the presence of David Locey, the NYSDEC representative, the probe sensor was lowered to the bottom of the screened section of MW-3 to determine the presence and vertical extent of DNAPL. No measurable volume of DNAPL was identified.

In addition, the Geoprobe system was utilized to identify any zones of highly contaminated soil that would indicate the presence of DNAPL in the metal preparation room area. After discussions with David Locey, soil samples were collected immediately outside the former vapor degreasing unit's location (SS-1, Figure 1, Appendix M). Samples were collected from the 1-foot to 2.8-foot interval and from 8 feet below grade to bedrock (approximately 25 feet). Continuous sampling was performed from 8 feet below grade to bedrock as a means of augmenting information previously gathered in this area that concentrated on the 0-foot to 8-foot range (Sections 1.2 and 2.3.5).

Soil samples were collected at 2-foot intervals and field screened on site using a portable GC. Field screening results are summarized in Table 1, Appendix M with the field screening report.

2.7.2.3 Southern Property Ground Water Evaluation

Five grab ground water samples (SB-1 through SB-5) were collected along the southern property boundary using the Geoprobe system and were field screened to determine the existence and extent of ground water contamination in this area due to the detection of contaminants in MW-20. These ground water samples were collected at a depth of 9 feet, which is approximately 1 foot below the surface of the local ground water table (approximately 8 feet below grade). This was done to determine the representative ground water quality along the southern most portion of the property. This sampling procedure was approved by David Locey prior to sample collection.

2.7.2.4 Sanitary Sewer Outfall Evaluation

Bedding sediment samples and grab water samples were collected adjacent to each of the two sanitary sewer outfalls (OF-1 and OF-2) located on the southern portion of the facility property.

Water samples from within each of the sanitary sewer lines were also collected from OF-1 and OF-2 by accessing the sanitary sewer manholes.

2.7.2.5 Sanitary Sewer Bedding Evaluation

The bedding material and grab water samples of the sanitary sewer running parallel to Aro's western property boundary was evaluated to determine if it was a preferential pathway for contaminant migration. This was performed utilizing the Geoprobe system to collect soil (SS-1 through SS-5) and grab ground water (only SS-1, SS-3, and SS-4) samples from selected locations (Figure 1, Appendix M) within the sanitary sewer bedding material in the vicinity of the metal preparation room. Sample locations SS-2 and SS-5 did not generate any water and, therefore, only the bedding material was sampled. These samples were field screened on site with a GC. Table 1 summarizes the field screening results. Based upon the field screening activities, two samples (SS-1 and SS-4) were selected for analysis by

EPA Method 8240. In addition, the NYSDEC requested that a sanitary sewer bedding sample be collected upgradient (SS-5) and submitted for VOC analysis. Sample SS-5 was not field screened prior to sample analysis. The analytical data sheets are located in Appendix M.

2.7.2.6 Neighboring Property Evaluation

Six soil samples (ZP-1 through ZP-6, Figure 1, Appendix M) were collected on the neighboring property using the Geoprobe system. These samples were collected approximately 2 to 3 feet below the water table at the 10-foot to 12-foot interval. These samples were collected from the saturated zone to assist in delineation of the extent of ground water contamination on the neighboring property.

At each location, an attempt was made to collect an in situ ground water sample. However, due to the tight soils present on site no ground water samples were collected. This situation was discussed with David Locey (NYSDEC on-site representative), and it was determined that soil samples would be collected from within the saturated zone to determine the extent of the soils impacted by the ground water contamination.

2.7.2.7 Interior Soil Borings

One soil boring (SB-107, Figure 1, Appendix M) was performed inside the facility north of the metal preparation room to assist in delineating the extent of soil and ground water contamination beneath the building. The soils beneath the concrete floor were accessed using a concrete coring machine to bore through the concrete floor. A tripod system was constructed with a slide hammer to collect soil samples at 2-foot intervals. Soil samples were collected for field screening and for VOC analysis to a depth of 8 feet.

In addition, one sample (HW-3) was collected adjacent to the tool and part storage area. This sample was collected from within the storm sewer culvert at a depth of 4 feet to 6 feet.

2.7.2.8 Hazardous Waste Storage Area and Storm Sewer Culvert Evaluation

Following negotiations with David Locey, soil samples were collected outside the former shipping and receiving area adjacent to MW-11 and MW-13.

Two soil samples (HW-1 and HW-4) from the bedding material of the storm sewer culvert were collected for field screening and analysis. Bedding sample HW-1 was collected from the 4-foot to 6-foot interval, and sample HW-4 was collected from the 1-foot to 3-foot interval. Field screening results indicated that 4,000 ppb of TCE and 900 ppb of DCE were present in HW-1 (Appendix M). Field screening results of HW-4 identified 100 ppb of TCE and 100 ppb of DCE.

A total of four locations (HW-2, HW-5, HW-6, and HW-7, Figure 1, Appendix M) were evaluated in both the shipping and receiving area and along the sanitary/storm sewer culvert running parallel to it. These samples were collected, field screened, and submitted (HW-5, HW-6, and HW-7) for analysis. The soil samples were collected in a triangular pattern to determine if past operations are contributing to the elevated levels of ground water contamination in MW-11, MW-13, and observation wellpoint (OW) OW-101.

2.7.2.9 Surface Water and Sediment Evaluation

Surface water and sediment samples (Sed-104/SW-104) were collected from the storm water drainage ditch as it leaves Aro's property. These samples were collected, as negotiated with David Locey, after reviewing site conditions.

2.7.2.10 Monitoring Well Confirmation Sampling

As negotiated with the NYSDEC, monitoring wells MW-1, MW-5, MW-7, MW-9, MW-13, MW-14, MW-16, MW-18, MW-20, and OW-101 were sampled to confirm the results of the June 1992 sampling event. These monitoring wells were sampled and analyzed for either metals or VOCs. The monitoring wells were purged three well volumes, and ground water samples were collected utilizing dedicated bailers for each monitoring well. The following two sections describe the volatiles and metals.

3.0 RESULTS

3.1 BASELINE EXTERIOR AND INTERIOR AMBIENT-AIR SURVEY RESULTS

Interior ambient-air survey results were obtained with an HNu photoionization detector (PID), equipped with an 11.7 eV bulb, and an Foxboro OVA flame-ionization detector (FID). Readings were recorded at 29 total locations within the main building and the maintenance and storage building. Results are presented on Figure 3.

HNu readings ranged from 0 to 0.7 ppm in the main building and 0 to 0.2 ppm in the maintenance and storage building. HNu readings above zero were recorded at only six locations in the main building.

OVA readings ranged from 3 to 120 ppm, with most readings recorded in the 3 to 30 ppm range. OVA readings of 55 and 60 ppm were recorded in the east end of the east wing of the main building, in the vicinity of soil boring SB-105 (Figure 3). The highest OVA reading of 120 ppm was recorded in the southwest corner of the main facility building, adjacent to soil boring SB-104. This OVA reading was taken immediately following the work shift when no ventilation equipment was in use. The difference between HNu and OVA readings is attributed to the variation in compounds detected by the two instruments.

Exterior ambient-air survey results were obtained with the HNu PID only. Sampling locations are denoted in Figure 3 by the recorded HNu readings. Recorded readings ranged between 2.2 to 6.0 ppm. Most readings were in the 4.0 to 5.6 ppm range. The property boundary readings were generally greater than 5 ppm. The paved parking lot area in the vicinity of the buildings generally had readings between 4.0 and 4.6 ppm. At the perimeter of the parking lots, the readings were greater than 5 ppm.

3.1.1 Followup Interior Ambient Air Survey

The baseline air study was conducted by ERM on May 5, 1993, during working hours and completed during one work shift. Measurements were collected at 29 locations. One set of data was collected in the morning and a second set of data was collected in the afternoon. Measurements were simultaneously collected with an HNu-PI-101 equipped with an 11.7 eV bulb and an OVA-128 FID. Additionally, particulate concentrations were measured on a Miniram MIE PDM-3, and formaldehyde and total petroleum hydrocarbon measurements were collected using Drager tubes on a Drager-R-ACCURO. Readings were obtained in the approximate location of the breathing space of the workers. Data collection on the HNu and OVA generally followed the methodology used during the precious study to allow comparison of data. Background levels were measured prior to each reading and the instruments were calibrated in general accordance with manufacturer's specifications. A summary of the data collected as well as the reported results of the previous study is included as Table 1, Appendix N.

At the conclusion of the first round of OVA measurements, it was discovered the OVA flame had gone out sometime during the first round. Thus, OVA readings taken during the first round are questionable.

During ERM's baseline air assessment, the following sampling locations had organic vapor concentrations more than 1 ppm above background levels: 2, 5, 8, 13, and 26 on either the PID or the OVA. Particulate readings more than 0.1 mg/cubic meter above background levels were detected at sampling locations 11 and 19. No formaldehyde nor total petroleum hydrocarbon readings were detected using the Drager tubes.

3.2 SOIL-GAS/SHALLOW-WATER SURVEY RESULTS

Due to the low soil permeability, high soil moisture and weather conditions, the amount of sampling performed during the soil-gas/shallow-water survey was significantly reduced from that anticipated by the Work Plan. Available results of the limited soil-gas/shallow-water survey suggest that chlorinated compounds were present at or above trace concentrations at most sample locations (Appendix D). Highest concentrations were observed in samples obtained along the interior western wall of the Aro facility and in the southeastern portion of the employee parking lot.

The soil-gas/shallow-water data suggest that chlorinated compounds occur near the metals-preparation room and along the western facility wall. A water sample (WS-22) with relatively high constituent concentrations (1400 parts per billion (ppb) of trichloroethylene and 11 ppb of vinyl chloride) was obtained along the interior west wall, south of the metals-preparation room. Trichloroethylene concentrations in soil gas were highest in samples obtained in and around the metals-preparation room; however, because of the high soil-moisture content, only a limited number of soil-gas samples were obtained.

Chlorinated compounds (e.g., trichloroethylene) were also detected in shallow-water samples obtained from the southeast portion of the employee parking lot at a maximum concentration of 290 ppm (WS-2). However, analyses of soil-gas samples yielded concentrations less than or equal to 0.001 ppb.

3.3 SITE STRATIGRAPHY

Based on Law Environmental's field observations of soil samples and bedrock cores obtained during Phase I and Phase II drilling, observations from a nearby quarry, and a study of regional geologic reports, it appears that the Aro facility is situated on an east-west trending till moraine marking the Cheektowaga ice margin. Due to the presence of chert, the abundance of fossils and the absence of a bentonite layer, the underlying bedrock has been identified as the Moorehouse Limestone Member of the Onondaga Formation.

Encountered subsurface conditions are illustrated on the Test Boring Records in Appendix E. The previously-existing and recently-installed well data were used to construct cross-sections of the subsurface conditions. Subsurface profile locations are shown on Figure 8 and the profiles appear on Figures 9 through 13.

According to previous surveying conducted by Tallamy, Van Kuren, Gertis and Associates, surface elevations are approximately 655 feet above mean sea level (msl) in the northern portion of the site (MW-1) and 652 feet msl in the southern portion of the site (MW-14). The thickness of till across the site ranges from approximately 23 to 25 feet. Average bedrock elevation is approximately 628 feet msl, or 25.5 feet below the average surface elevation.

Two till layers have been identified at the site - an upper till layer and a lower till layer. The upper till generally consists of a red-brown to gray-brown silt or clay with varying amounts of sand and gravel. Vertical partings were noted in the upper till in nearly all of the borings, except MW-19 and MW-20 (Appendix E). The partings were filled primarily with orange silt; however, gray silt was observed filling the partings at MW-14R. The partings probably represent desiccation fractures indicative of a historical decrease in the moisture content of the upper till after deposition. The upper till appears thickest at B-1 (24.5 feet) in the north end of the site and thinnest at MW-20 (6.3 feet) towards the southern end of the site (Figure 9).

The lower till generally consists of a gray to gray-brown or brown silt or sand with generally greater amounts of sand and gravel than the upper till, and also having embedded cobbles and boulders. The lower till also exhibits a higher density than the upper till as shown by the N values (Appendix E). The boulders within the lower till are of sufficient size to cause split-spoon and auger refusal. At the first location of MW-4R and MW-14R, the limestone boulders, which were cored, were 0.9 to 1.4 feet thick.

The lower till thickens from approximately 0.5 feet in the northern portion of the site at B-1 to greater than 14 feet at MW-20 in the southern portion of the site (Figure 9). The lower till is thickest in the south-central portion of the site. A mounding of the lower till was observed in the southern portion of the site at locations MW-14R, MW-19 and MW-20 (Figures 12 and 13).

The bedrock beneath the site is a gray, fine-to medium-grained limestone. Based on its fossil assemblage, minor bioturbation, the presence of chert nodules, and correlation with a nearby quarry, it has been identified as the Moorehouse Limestone Member of the Middle Devonian Onondaga Formation.

With the exception of the presence of horizontal to sub-horizontal cherty styolites, no solution features were observed in the limestone bedrock. The percentage of recovery for the bedrock cores at all locations (MW-3R, MW-4R, MW-14R) ranged from 88% to 101%. The bedrock Rock Quality Designation (RQD) generally decreased with depth at each location. For the elevation interval of approximately 620 feet to 628 feet msl, RQDs ranged from 73% to 94%; however, for the interval of approximately 610 feet to 620 feet msl, the RQDs dropped to 38% to 60%. The existing fractures which were observed in the cores tended to be adjacent and parallel to the horizontal to sub-horizontal cherty styolites.

3.3.1 <u>Ground Water Flow Direction</u>

On September 16, 1992, ground water elevation measurements were collected from monitoring wells MW-1 through MW-20 and observation well points OW-101 through OW-103 (Table 14) and surface-water elevations were obtained from gauging stations TG-1 and TG-2. Ground water elevation ranged from 653.44 feet msl (MW-1) in the north portion of the site, to 642.39 feet msl (MW-7) in the southwestern portion of the site. Water levels in wells screened in the upper till (for example, MW-11) were consistent with water levels in monitoring wells screened in the upper and lower tills (for example, MW-13) and wells screened exclusively in the lower till (for example, MW-17).

3.3.1.1 Overburden Water-Bearing Zone

Water levels observed in storm-sewer backfill well points and the drainage ditches were generally consistent with measurements obtained from monitoring wells completed in both the upper and lower tills (e.g., OW-101, MW-11 and MW-13). Consistency in water-level measurements for monitoring well, well point and drainage ditches suggest that the upper and lower tills are acting as a single hydrostratigraphic unit, and are in hydrologic connection with surface water. Similarities in the head values also suggest that flow is primarily horizontal and that vertical flow is not a significant factor.

A potentiometric surface map (Figure 7) has been constructed from the September 16, 1992 data. As shown on the potentiometric map, ground water flow is generally to the south-southwest. Ground water gradient is steepest in the southwest corner of the site.

The general south-southwest flow direction is locally interrupted in two areas: near the backfilled culvert south of the main facility building and the south-flowing drainage ditch which exits the culvert (Figure 7). Near the main facility building, the backfilled culvert has been excavated to a depth below the water table (Figure 11). The ground water elevation in observation well point OW-1 (649.18 ft msl), is lower than the ground water elevations in nearby monitoring wells MW-11 and MW-13 (650.36 and 650.37 ft msl, respectively). Therefore, a ground water trough exists along the backfilled culvert, which drains ground water from the adjacent till (Figure 7).

However, south of the culvert, ground water elevations are lower than the floor of the south-flowing ditch which exits the culvert (Figure 12). Since the ditch is unlined, storm water which flows from the culvert may be locally recharging the near-surface ground water. Field evidence for local recharge is provided by the ground water elevation in observation well point OW-103 (649.56 ft msl), completed in the culvert backfill near the discharge point, and the surface-water elevation in the south-flowing drainage ditch at gauging station TG-2 (648.48 ft msl). Both of these elevations are higher than ground water elevations in nearby monitoring wells MW-6 (648.06 ft msl), MW-19 (648.32 ft msl) and MW-14 (648.21 ft msl), all completed in the till. Local recharge to near-surface ground water by the south-flowing ditch has resulted in a ground water mound along the ditch (Figure 7).

A previous interpretation of the site hydrogeology (May 1, 1992 Stratigraphy Report) suggested that the ground water may be under confined conditions. This interpretation assumed that the upper till was unsaturated, based on available data. However, it appears that the water-bearing zone, from near ground surface to the top of bedrock, is unconfined and saturated.

3.3.1.2 Bedrock

Well development data, described in Section 2.3.6, indicated that the upper bedrock, as monitored by wells MW-3R, MW-4R and MW-14R, is dry. Results of hydraulic conductivity testing described in the following section indicate the bedrock has low permeabilities, restricting the downward flow of ground water from the overburden.

3.3.2 Hydraulic Conductivity Results

The results of hydraulic conductivity testing for the newly-installed overburden and bedrock monitoring wells are presented in Table 16. Hydraulic conductivity values for overburden wells (MW-3 and MW-15 to MW-20), which were screened primarily in the lower till, ranged from approximately 2 x 10^{-5} ft/min (MW-19) to 7 x 10^{-7} ft/min (MW-16). The geometric mean value of lower till hydraulic conductivity was 2 x 10^{-6} ft/min.

Results of previous tests performed by others indicate that hydraulic conductivity values for the overburden wells screened exclusively in the upper till or through the upper and lower tills (MW-5 to MW-8, MW-10 and MW-14) ranged from 10^{-4} to 10^{-5} ft/min (geometric mean = 7 x 10^{-5} ft/min). These values are probably a conservative indication of the hydraulic conductivity of the upper till layer.

In general, hydraulic conductivity values are low for overburden monitoring wells, but are probably not inconsistent with the dense, fine-grained tills observed at the site. There appears to be a differential in permeabilities of at least an order of magnitude between the upper and lower tills.

Hydraulic conductivity testing of bedrock wells MW-3R, MW-4R and MW-14R yielded hydraulic conductivity values of 1 x 10^{-7}, 2 x 10^{-7} and 1 x 10^{-8} ft/min, respectively. These data suggest that the bedrock is capable of confining ground water to the overburden.

3.3.3 Ground water Velocity

Hydraulic gradients have been calculated based on the potentiometric surface map (Figure 7). The hydraulic gradients are 0.017 ft/ft in the eastern area of the site; 0.013 ft/ft along the western boundary of the site; and 0.025 ft/ft in the southwest corner of the site property. Utilizing a mean hydraulic conductivity of 1 x 10^{-5} ft/min for both the upper and lower tills, and the calculated hydraulic gradients for the identified site areas, ground water velocities were calculated using Darcy's Law. By Darcy's Law, the ground water velocity is given as $V = ki/n_e$, where:

V = Ground water velocity, in ft/min
n_e = Effective porosity (assumed as 0.2 for the overburden)
k = Hydraulic conductivity (feet/minute)
i = Hydraulic gradient (feet/foot)

Ground water velocities range between 0.41 feet per year (ft/yr) and 0.78 ft/yr. Highest velocities are expected on the southwest corner of the site, where the hydraulic gradient is greatest, and lowest velocities are anticipated along the western boundary.

3.4 HEADSPACE SCREENING RESULTS

Soil samples from 16 locations were screened with an HNu PID (11.7 eV) utilizing headspace screening procedures described in Section 2.4.1. The sampling locations included the 10 monitoring well/test borings and 6 shallow interior soil borings. Headspace screening results are presented on Table 6 and in the Test Boring Records (Appendix E). The results indicate that organic vapors were encountered in all of the monitoring well/test borings and four (SB-101, SB-102, SB-103 and SB-104) of the six interior soil borings. The monitoring well/test borings extended to bedrock and ranged in depth from 21 to 25 feet. Five of the interior soil borings were sampled to a depth of 7 feet and one was sampled to a depth of 9 feet.

Recorded headspace screening results for the monitoring well/test boring samples ranged from 0 to 350 ppm. Headspace readings greater than 10 ppm were recorded at four sampling locations (MW-3R, MW-14R, MW-16 and MW-20). Higher headspace readings were generally recorded from sampling intervals between 2 and 18 feet, with the exception of MW-3R, which maintained levels of 300 ppm to the top of bedrock at 23.5 feet.

Headspace screening results for interior soil borings SB-101 through SB-106 ranged from 0 to 4 ppm. Cores of the concrete flooring had HNu readings of 0 ppm to 14 ppm (SB-102).

3.5 ANALYTICAL RESULTS

As previously stated (Section 2.4), 38 soil samples and 26 ground water, surface-water and tap-water samples were selected for laboratory chemical analyses. Results of these analyses are presented in the following sections. The results of volatile and semivolatile organic compound analyses of soil samples is discussed in Section 3.5.1; results of soil analyses for metals and cyanides are discussed in Section 3.5.2. Volatile and semivolatile compound analyses, and metals and cyanides analyses, of water samples are discussed in Sections 3.5.3 and 3.5.4, respectively.

Results of the ground water analyses are compared to New York State Ground Water Quality Standards and Guidance Values (6 NYCRR Part 703) in the following text and on the data summary tables. However, New York State does not currently have numeric standards or guidance values for soils. According to the New York State Draft Cleanup Policy and Guidelines (October 1991), site-specific soil values must consider the direct threat to human health through inhalation, ingestion and dermal exposure to contaminated soil; the threat to human health through ingestion of contaminated drinking water; and the threat to the environment through direct impact on fish and wildlife (or on fish and wildlife reproduction).

Soil values considering the direct threat to human health are often derived from the EPA's Health Effects Assessment Summary Tables (HEASTs). Soil values protective of fish and wildlife are often established by a Habitat-Based Assessment, unless the soil is in the midst of an industrial plant. Soil concentrations protective of ground water quality may be developed based upon soil/water partitioning theory, Synthetic Precipitation Leaching Procedure testing, or Toxicity Characteristic Leaching Procedure (TCLP) testing. The NYSDEC Bureau of Spill Prevention and Response has developed TCLP Alternative Guidance Values for soils, which establish soil concentration values at twenty times the 6 NYCRR Part 703 Ground water Quality Standards and Guidance Values.

Numeric soil values protective of fish and wildlife are not readily available, and a Habitat-Based Assessment does not appear warranted based on the industrial setting of the Aro facility. Human-health values derived from the EPA HEASTs are often several orders of magnitude greater than ground water protection soil values. Therefore, in the following text and on the data summary tables, soil analytical results are compared to the NYSDEC TCLP Alternative Guidance Values for a conservative estimate of the threat to ground water quality presented by the sampled soils. Because soil cleanup goals are determined on a case-by case basis, it should be noted that the TCLP Alternative Guidance Values are not regulations and are being presented for general comparison purposes only. At the NYSDEC's request, soil cleanup objectives in Technical Assistance Guide Memorandum #4046 will also be considered during the preparation of the Feasibility Study Report for their applicability.

3.5.1 Volatile and Semivolatile Organic Compounds in Soils

A total of thirty-eight soil samples were selected from soil borings MW-3R and MW-15 to MW-20, interior soil borings SB-101 to SB-106, and sediment sampling locations Sed-101 to Sed-103. All thirty-eight samples were analyzed for NYSDEC Toxic Compound List (TCL) VOCs by EPA Method 8240 (Table 8). Nine of the soil samples obtained (MW-3R, MW-15, MW-16, MW-18, SB-101, SB-102, SB-103 and SB-105) were also analyzed for TCL semivolatiles by EPA Method 8270 (Table 9).

Results of VOC analyses of the soil samples indicate that 21 of the 34 TCL VOCs were detected (Table 8). However, many of the VOCs detected were at trace concentrations below the method detection limits. Only three compounds (vinyl chloride, 1,2-dichloroethylene and trichloroethylene) were detected at concentrations equaling or exceeding the NYSDEC TCLP Alternative Guidance Values, and in only 12 of the 38 soil samples.

Concentrations of TCE exceeding the TCLP Alternative Guidance Value of 100 ppb were detected in soil samples from MW-3R, MW-16, MW-17, MW-19, MW-20, SB-101, and SB-103. TCE was identified in all five soil samples from MW-3R, ranging from concentrations of 230 ppb to 250,000 ppb that generally increased with depth to 20.7 feet, after which TCE concentrations decreased noticeably. Concentrations of TCE above the TCLP Alternative Guidance Values in the remaining samples ranged from 140 to 4900 ppb.

Vinyl chloride concentrations ranged from 2 ppb to 40 ppb. In only one instance (SB-103, 5-7 ft.) did the detected concentration of vinyl chloride equal the TCLP Alternative Guidance Value of 40 ppb.

Concentrations of 1,2-DCE greater than the TCLP Alternative Guidance Value of 100 ppb were detected in samples from MW-3R, MW-16, MW-17 and SB-103 (Table 8). DCE concentrations generally decreased with depth. Concentrations of DCE were not detected in the deepest samples from the monitoring well borings, with the exception of MW-19 (18-20 ft) where a trace concentration of 0.5 ppb was detected below the method limit.

Concentrations of DCE were detected in most of the interior soil boring samples. Concentrations ranged from 0.5 ppb to 230 ppb. With the exception of sample SB-103, 5-7 ft. (230 ppb), the results were less than the TCLP Alternative Guidance Value of 100 ppb.

DCE was detected in sediment sample Sed-103 at a trace concentration of 5 ppb. No DCE was detected in samples Sed-101 and Sed-102. Neither TCE nor vinyl chloride were detected in the sediment samples.

Acetone was detected in 15 of the 17 soil samples from interior soil borings, 6 of the 18 samples from monitoring well borings and all three sediment samples (Table 8). Acetone was also detected in some of the laboratory blank samples. There is no TCLP Alternative Guidance Value for acetone.

Semivolatile results for nine selected soil samples from eight sampling locations (MW-3R, MW-15, MW-16, MW-18, SB-101 to SB-103, and SB-105) are presented on Table 9. No TCL semivolatiles were detected in the soil sample from SB-102 (5-7 ft.). Only two semivolatiles compounds (diethylphthalate and bis(2-ethylhexyl)phthalate) were detected in the other soil samples. Detected concentrations of diethylphthalate (160 to 210 ppb) were below the TCLP Alternative Guidance Value of 1000 ppb. Concentrations of bis(2-ethylhexyl)phthalate were also below the guidance value of 1000 ppb, with the exception of one sample (MW-3R, 20-20.7 ft.) at 19,000 ppb.

3.5.2 Metals and Cyanide in Soils

Thirty-eight soil and sediment samples were obtained from interior boring locations (SB-101 to SB-106), seven exterior boring locations (MW-3R and MW-15 to MW-20) and three sediment sampling locations (Sed-101 to Sed-103). The samples were analyzed for Target Analyte List (TAL) metals (Table 10). In Table 10, Priority Pollutant metals have been listed separately from the remaining TAL metals.

Concentrations of metals generally exceeded the NYSDEC TCLP Alternative Guidance Values. However, as shown in Table 16, the levels fall within the ranges for undisturbed, native soils in the Cheektowaga area (Koszalka et al., 1985) and ranges for nationwide, natural soils (EPA, 1984). In addition, based on the results of filtered ground water metals analyses (Section 3.5.4), leaching of metals from soil does not appear to be affecting ground water quality.

Highest concentrations of antimony, chromium, copper, lead, mercury and zinc were encountered in the sediment samples (SED-101 to SED-103). However, concentrations in the upstream sediment sample (SED-101) were frequently similar to, or greater than, the concentrations in the other two samples, suggesting that an off-site source may be responsible for the detected metal concentrations.

Detected concentrations of antimony (12.7 to 33.6 ppm) and silver (4.5 to 6.4 ppm) in the MW-3R samples were elevated above the ranges for natural soils (2 to 10 ppm and 0.01 to 5 ppm, respectively). However, antimony was detected at all sampling locations at concentrations (9 to 34 ppm) in excess of the common range for natural soils, similar to MW-3R. Silver was not detected in any of the other soil samples, except MW-20, 22 - 24 ft (0.32 ppm). Remaining metal concentrations in the MW-3R samples were within the range of nationwide and Cheektowaga-area natural soils.

The following trends were observed for metals concentrations in soil/sediment samples:

- An increase in calcium and magnesium concentrations occurred with depth. The underlying limestone bedrock is possibly the primary contributor of calcium and magnesium.
- A decrease in aluminum, barium, chromium, iron, lead, manganese, nickel, potassium, vanadium and zinc occurred with depth.

3.5.3 Volatile and Semivolatile Organic Compounds in Surface and Ground Water

Ground water samples, obtained from nineteen overburden monitoring wells and three observation well points during the period of June 24 to 28, 1992, were analyzed for Target Compound List (TCL) VOCs by EPA Method 8240. Seven ground water samples from seven overburden monitoring wells (MW-3, MW-4, MW-6, MW-11, MW-15, MW-17 and MW-20) were also analyzed for TCL semivolatiles by EPA Method 8270. Analyses were performed by Recra Environmental Inc. of Amherst, New York. Laboratory analytical results are summarized on Table 11 and 12.

Surface-water samples were obtained at three locations (SW- 101 to SW-103) from drainage ditches near the east and south perimeters of the facility property (Figure 2). The surface-water samples were analyzed for TCL volatiles (Table 11) and hardness (Table 13).

The primary VOC constituents detected in ground water were 1,2-DCE, TCE, and vinyl chloride. One or more of the compounds were detected above NYS Ground water Quality Standards in nine monitoring wells (MW-2, MW-3, MW-6, MW-10, MW-11, MW-13, MW-16, MW-19, and MW-20) and the three observation well points. Figures 15, 16, and 17 present the constituent concentrations for TCE, 1,2-DCE, and vinyl chloride, respectively, and the interpretative extent of these constituents in ground water. Constituent concentrations were greatest outside of the metals-preparation room and along the backfilled culvert.

TCE was detected in ground water at concentrations greater than the NYS Ground water Quality Standard (5 ppb) in wells MW-2 (790 ppb), MW-3 (1,100,000 ppb), MW-6 (100,000 ppb), MW-11 (51,000 ppb), MW-13 (21,000 ppb), MW-19 (12 ppb), MW-20 (4300 ppb), OW-101 (30,000 ppb), OW-102 (7 ppb) and OW-103 (28 ppb) (Figure 15). The highest concentration of TCE was detected in replacement well MW-3, outside of the metals-preparation room, consistent with previous studies.

Vinyl chloride and 1,2-dichloroethylene, chemical breakdown products of trichloroethylene, were detected in the same general area(s) of the facility (Figures 16 and 17) as trichloroethylene (Figure 15), adjacent to the metals-preparation room and facility subsurface piping trenches, and downgradient of the storm water drainage ditch in the vicinity of sampling location SW-101.

Concentrations of 1,2-dichloroethylene (DCE) greater than the NYS Ground water Quality Standard (5 ppb), were detected in eleven of the monitoring wells/observation well points. Detected concentrations of DCE ranged from 16,000 ppb at MW-11 to 8 ppb at MW-16. DCE was detected in the sample from monitoring well MW-3 at a concentration of 810 ppb.

Vinyl chloride concentrations, greater than the NYS Ground water Quality Standard of 5 ppb, were detected in monitoring wells MW-2, MW-6, MW-10, MW-11, MW-13, MW-20 and all three observation well points. Concentrations of vinyl chloride ranged from 730 ppb at MW-11 to 5 ppb at MW-10. Vinyl chloride may have been present in the sample from MW-3 at a concentration below the elevated detection limit (5,000 ppb) for the sample.

Other chlorinated hydrocarbon VOCs detected included 1,1-DCE, chloroform, 1,1,2-trichloroethane (TCA), and tetrachloroethylene. The aromatic VOCs benzene, toluene, ethylbenzene, and total xylenes were also detected at trace concentrations. 1,1-DCE was detected at concentrations greater than the NYS Ground water Quality Standards at only six sampling locations. 1,1,2-TCA and benzene were only detected at three and two locations, respectively, at concentrations greater than the New York State Ground Water Quality Standards. In all cases, the occurrence of the constituent concentrations were associated with the detection of elevated levels of TCE or 1,2-DCE.

No VOCs were detected above the method detection limits in surface-water sample SW-101, obtained on the east property boundary. Only trichloroethylene and 1,2-dichloroethylene were detected in SW-102 and SW-103 at 203 ppb and 190 ppb, and 40 ppb and 26 ppb, respectively. Detected concentrations for both constituents were above NYS Surface-Water Quality Standards.

Semivolatiles were detected in only one (MW-3) of the seven ground water samples analyzed. Detected constituents included bis(2-ethylhexyl)phthalate (8 ppb) and three phenolic compounds: phenol (35 ppb), 4-methylphenol (130 ppb) and 2,4-dimethylphenol (21 ppb). The phenolic compounds both separately and together were greater than the NYS Ground water Quality Standard of 1 ppb.

3.5.4 Metals and Cyanide in Surface and Ground Water

Filtered and unfiltered ground water and surface-water samples were collected from 25 sampling locations (MW-1 to MW-11, MW-13 to MW-20, OW-101 to OW-103 and SW-101 to SW-103) and analyzed for TAL metals.

The results of metals analyses of ground water samples collected in June 1992 are presented in Table 13. As in Table 10, Priority Pollutant metals have been listed separately from the other TAL metals. NYS Ground water Quality Standards are also included in Table 13.

The analytical results indicate that concentrations of several metals exceeded NYS Ground water Quality Standards in all unfiltered samples. However, the turbidity in the monitoring wells often exceeded 50 NTUs during purging and sampling. For example, ground water from monitoring well MW-1 had a turbidity of over 200 NTUs. The MW-1 ground water sample had concentrations of antimony, chromium, lead, cobalt, iron, magnesium, manganese and sodium greater than the corresponding NYS Ground water Quality Standards. It may be observed that monitoring well and observation well points MW-2, OW-101 and OW-102, which generally yielded the lowest concentrations of metals for both filtered and unfiltered samples, were sampled with a peristaltic pump. Sampling with a low flow-rate pump (that is, peristaltic pump) instead of a bailer has been shown to reduce sample turbidity and provide consistency between filtered and unfiltered samples (Puls and Powell, 1992 and Puls, et al., 1992).

Metals concentrations in filtered samples were generally below NYS Ground water Quality Standards. Antimony was the only Priority Pollutant metal detected above the NYS Ground water Quality Standard in the ground water sample from monitoring well MW-1. Antimony was also detected above the NYS Ground water Quality Standard in samples from monitoring wells MW-4, MW-7, and MW-8. None of the four wells with elevated antimony concentrations are located near Aro facility areas expected to contribute constituents to ground water. One to three of the following non-Priority Pollutant metals were detected in the filtered ground water samples from each of the monitoring wells: iron, magnesium, manganese and sodium.

Based on this data, it is concluded that the concentrations of metals detected in the unfiltered ground water samples are biased high due to the turbidity encountered during sampling. Particulates present in the turbid, unfiltered samples are believed to have contributed to the metals concentrations detected. The samples were preserved in the field with a nitric acid solution; contact of the preservative to the particulates present may have elevated the metals concentration in the unfiltered samples.

Metals concentrations in soil samples obtained at the site generally exceeded the TCLP Alternative Guidance Values. However, as the results for filtered ground water samples indicate, the detected concentrations of metals in the soil have not had an adverse impact on ground water quality.

3.6 REMEDIAL INVESTIGATION SUPPLEMENTAL ACTIVITIES ANALYTICAL RESULTS

3.6.1 DNAPL Evaluation

The Geoprobe system was utilized to identify any zones of highly contaminated soil that would indicate the presence of DNAPL in the metal preparation room area. After discussions with David Locey, soil samples were collected from one location immediately outside the former vapor degreasing unit's location (Appendix M, Figure 1, location SS-1). Samples were collected from the 1-foot to 2.8-foot interval and from 8 feet below grade to bedrock (approximately 25 feet). Continuous sampling was performed from 8 feet below grade to bedrock, as a means of augmenting information previously gathered in this area that concentrated on the 0-foot to 8-foot range (Sections 1.2 and 2.3.5).

Soil samples were collected at 2-foot intervals and field screened on site using a portable GC. Field screening results are summarized in Table 1 with the field screening report located in Appendix M.

While elevated levels of TCE were identified in the SS-1 soil samples, no highly saturated zones of contamination were identified either during field screening or confirmation sampling activities as shown in the following table.

Summary of SS-1 TCE Results

Location	Depth	Field Screening	Analytical
SS-1	1'-2.8'	1,000	18,000
SS-1	8'-10'	10,000	13,000
SS-1	10'-12'	51,000	49,000
SS-1	12'-14'	15,000	40,000
SS-1	14'-16'	4,000	14,000
SS-1	16'-18'	15,000	39,000
SS-1	18'-20'	5,000	19,000
SS-1	20'-22'	210,000	78,000
SS-1	22'-24'	12,000	120,000
SS-1	24'-25.5'	Not Screened	15,000

All values are shown in parts per billion (ppb)

SS-1 sample interval 24 feet to 25.5 feet consisted of a fine silty sediment which had poor sample recovery and therefore was not field screened but was submitted for analysis.

This sampling event did not identify any zone of highly contaminated ground water or soils that would indicate the presence of DNAPL beneath the metal preparation room or support areas. Based on the analytical data generated during this and previous investigations with particular attention to sample location SS-1, (which is located approximately 2 1/2 feet from the location of the former vapor degreasing unit) no appreciable amount of DNAPL is present beneath the metal preparation room area.

3.6.2 Southern Property Ground Water Evaluation

Field screening activities revealed nondetectable levels of VOCs as summarized in Table 1 of Appendix M. The field screening report is located in Appendix A. Two samples (SB-1 and SB-5) were selected and submitted for laboratory analysis by EPA Method 8240. The chemical analysis confirmed the nondetectable levels identified in the field screening results. Consequently, a monitoring well will be installed directly south of MW-20 on Aro's southern property boundary to confirm that the ground water plume has not migrated beyond to the property boundary. The proposed well location is identified in Figure 1, Appendix M.

Monitoring wells MW-9, MW-14, and MW-16 VOC analysis confirmed the delineation to the east and west of the ground water plume as outlined in the "Revised RI Report" dated October 1, 1993. Southern property boundary samples (SB-1 through SB-5) indicated that the ground water contamination has not migrated beyond the Aro property line. At the request of the NYSDEC, a monitoring well MW-21 was installed south of MW-20 to confirm this premise and to monitor the southern extent of ground water contamination. Analytical results from MW-21 did not identify any VOCs present by EPA Method 8240. A summary of the installation activities, boring logs, and sample results are located in Appendix L.

3.6.3 Sanitary Sewer Outfall Evaluation

The sample collected from within the bedding material near OF-1 identified 63 ppb of TCE and 14 ppb of DCE present. The bedding material sample collected from OF-2 identified 4 ppb of TCE and 4 ppb of DCE. Grab water samples from the bedding material of OF-1 identified 5 ppb of TCE and 159 ppb of DCE present. Grab water sample analysis from the bedding material of OF-2 identified 7 ppb of TCE and 41 ppb of DCE present.

Manway grab water sample analysis from OF-1 and OF-2 identified 48 ppb of TCE and 89 ppb of DCE, and 18 ppb of TCE and 6 ppb of DCE, respectively.

3.6.4 Sanitary Sewer Bedding Evaluation

Field screening results of TCE in the sanitary sewer bedding material ranged from 1,100 ppb (SS-1) to 120 ppb (SS-3). However, in reviewing the GC field screening graphs, an unidentified peak was found in sample location SS-4. This lead to the decision to submit sample SS-4 instead of sample SS-3 for VOC analysis. Analytical results of the bedding material from SS-1 identified 18,000 ppb of TCE and SS-4 identified 43 ppb of TCE. Grab samples of the water revealed TCE levels of 1,700 ppb and 117 ppb at location SS-1 and SS-4, respectively.

3.6.5 Neighboring Property Evaluation

At each location, an attempt was made to collect an in situ ground water sample. However, due to the tight soils present on site, no ground water samples were collected. This situation was discussed with David Locey, NYSDEC, and it was determined that soil samples would be collected from within the saturated zone to determine the extent of the soils impacted by the ground water contamination.

The samples were field screened and submitted for analysis utilizing EPA Method 8240. The analytical data sheets are located in Appendix M. None of the six-sample analyses revealed any TCE or DCE contamination. These results confirm the computer model (Figure 15) delineating the extent of ground water contamination on the neighboring property.

3.6.6 Interior Soil Borings

One soil boring (SB-107, Appendix M, Figure 1) was advanced inside the facility north of the metal preparation room to assist in delineating the extent of soil and ground water contamination beneath the building. Analytical results from the interior sampling ranged from nondetectable levels (0 feet to 2 feet) to 610 ppb TCE (6 feet to 8 feet).

3.6.7 Hazardous Waste Storage Area and Storm Sewer Culvert Evaluation

Two soil samples (HW-1 and HW-4) from the bedding material of the storm sewer culvert were collected for field screening and analysis. Bedding sample HW-1 was collected from the 4-foot to 6-foot interval and sample HW-4 was collected from the 1-foot to 3-foot interval. Field screening results indicated that 4,000 ppb of TCE and 900 ppb of DCE were present in HW-1 (Appendix M). Confirmation VOC analysis confirmed that TCE was present at 4,000 ppb, but DCE was not detected. Field screening results HW-4 identified 100 ppb of TCE and 100 ppb of DCE. Confirmation analysis identified 180 ppb of TCE and 240 ppb of DCE present.

A total of four locations (HW-2, HW-5, HW-6, and HW-7, Appendix M, Figure 1) were evaluated in both the shipping and receiving area and along the sanitary/storm sewer culvert running parallel to it. These samples were collected, field screened, and submitted (HW-5, HW-6, and HW-7) for analysis. The following table summarizes the analytical results of VOCs in the hazardous waste storage area and the storm sewer culvert.

Summary of TCE and DCE analytical results
for the hazardous waste storage area and sewer culvert

SAMPLE LOCATION	DEPTH	TCE	DCE
HW-1	4' - 6'	4,000	ND
HW-2	0 - 2', 2' - 4'	Archive	Archive
HW-3	4' - 6'	3,700	310
HW-4	1' - 3'	180	240
HW-5	4' - 6'	5,200	930
HW-5	6' - 8'	1,900	240
HW-6	4' - 6'	25	5
HW-7	4' - 6'	3,300	250

All values are expressed in ppb

ND - Not detected

3.6.8 Surface Water and Sediment Evaluation

Surface water and sediment samples (Sed-104/SW-104) were collected from the storm water drainage ditch as it leaves Aro's property. The samples were not field screened but were submitted for VOC analysis by EPA Method 8240. Sed-104 sample analysis identified 170 ppb of TCE and 7 ppb of DCE. Surface water sample SW-104 identified 40 ppb of TCE and 20 ppb of DCE.

3.6.9 Monitoring Well Confirmation Sampling

As negotiated with the NYSDEC, monitoring wells MW-1, MW-5, MW-7, MW-9, MW-13, MW-14, MW-16, MW-18, MW-20, and OW-101 were sampled to confirm the results of the June 1992 sampling event.

Volatiles

Monitoring wells MW-9, MW-14, MW-16, MW-18, and MW-20 were sampled and analyzed for VOCs by EPA Method 8240. Monitoring well MW-20 was analyzed using an expanded 8240-465D parameters list to determine if CFC were present.

In addition, MW-3R and MW-14R were purged and sampled. However, following purging activities, both monitoring wells showed extremely poor recharge. Capsule feels that the ground water purged and collected from MW-3R and MW-14R represent residual fluids from the falling head tests performed during the June 1992 remedial investigation activities. No substantial recharge was observed in these bedrock monitoring wells following the purging and sample collection activities.

A sample was also collected from OW-101 and analyzed for VOCs. The following table summarizes the TCE and DCE levels identified in the monitoring wells by chemical analysis.

Summary of monitoring well TCE and DCE results

SAMPLE LOCATION	TCE	DCE	OTHER
OW-101	59,000	8,600	
MW-3R	14	0.8	
MW-9	ND	ND	
MW-14	ND	ND	
MW-14R	0.1	0.2	
MW-16	ND	ND	
MW-18	0.09	ND	13 (xylene)
MW-20	22,000	5,100	300 (CFC)

CFC - 1,2-Dichloro-1,1,2-Trifluoroethane
ND - Not Detected
All values are expressed in ppb

Sample analysis of MW-20 did confirm the presence (300 ppb) of a CFC compound. However, the CFC compound has not been identified at any other sample location; therefore, it is recommended that no action be taken other than monitoring MW-20 on a regular basis for fluctuations in CFC levels. If the CFC level increases, this matter will be readdressed.

Metals

Unfiltered ground water samples were collected from five monitoring wells (MW-1, MW-5, MW-7, MW-13, and MW-14) and analyzed for total metals parameters. The analytical results indicated that concentrations of several metals exceeded New York State Ground Water Quality Standards in all samples. However, turbidity in the monitoring wells exceeded 50 nephelometric turbidity units (NTUs) during purging and sampling activities.

As discussed in Section 3.5.4, ground water samples exhibiting high turbidity (>200 NTUs) generally yielded the highest concentrations of metals in both filtered and unfiltered samples. As the samples are preserved in the field with a nitric acid solution, contact between the particulates and the preservative could result in elevated metals concentration in the unfiltered samples. Table 17 offers a comparison of unfiltered levels of metals from the June 1992 and July 1993 remedial investigation sampling events. As only two sampling events have been performed, it is difficult to evaluate any trends regarding metal levels in ground water that may be occurring at the site.

4.0 NATURAL RESOURCES ASSESSMENT

The NYSDEC reviewed the previous, December 2, 1992, RI Report for the Aro facility. Comments concerning the natural resources assessment were provided in correspondence (March 22, 1993) from Mr. David Locey, NYSDEC, to Mr. David Cushman, Capsule. In response to Mr. Locey's recommendation, Ms. Judith Ross of NYSDEC, Division of Fish and Wildlife, was contacted by Law Environmental for her specific comments (May 24, 1993). Ms. Ross requested that portions of the Natural Resources Assessment be revised to address the new guidance of the NYSDEC[1]. In particular, she requested that the assessment should demonstrate any potential contaminant pathway, as described under Step II (Part A, Pathway Analysis). This revised natural resources assessment follows Steps I and II of the new guidance. The majority of the information requested under Step I has been previously presented; however, it is repeated here for completeness. The form of the revised report follows the guidance document.

4.1 METHODOLOGY

A literature search was conducted to identify previously-recorded natural resources occurring in or near the Aro site (Figure 1). The Lancaster NE, Cheektowaga NE, Cheektowaga SE and Orchard Park quadrangles for each of the following series were used for preliminary identification of wetlands and waters:

- U.S. Geological Survey (USGS) topographic maps
- U.S. Fish and Wildlife
- National Wetlands Inventory (NWI) maps
- New York State Freshwater Wetlands (NYSFW) maps

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[1] Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites. Prepared by the New York State Department of Environmental Conservation, Division of Fish and Wildlife. June 18, 1991.

NWI wetlands include wetlands of all sizes and are mapped by stereoscopic analysis of aerial photographs which are searched for wetland vegetation, visible hydrology and geography. NYSFW mapping includes wetland areas of 12.4 acres of more, which are regulated by the NYSDEC. Further information on state-mapped wetlands, stream classifications and stream fauna was obtained during a visit to the NYSDEC Region 9 office in Cheektowaga. The USGS maps were used as base maps for Figures 18 through 20, and information from NWI and NYSFW maps, and field observations was incorporated onto the base maps.

Information on significant or critical habitats, and threatened or endangered species, was solicited from the NYSDEC Information Services, Significant Habitat Program and Natural Heritage Program.

A field reconnaissance of the site and surrounding area was made by Law Environmental personnel on June 25, 1992. Law Environmental personnel conducted a survey of the area within two miles of the site and of waters nine miles downstream from the site to assess the validity of information gathered during the literature search. According to the NYSDEC guidance, a nine-mile downstream survey is not specifically required; however, a nine-mile downstream survey was conducted to comply with the previous work plan negotiated between the NYSDEC and Capsule. Additionally, pertinent information collected during the field reconnaissance was incorporated into the natural-resources assessment. In particular, mapped wetlands were visited where readily accessible, and surface waters from the site downstream to the Cheektowaga River were investigated. Wetlands were identified based on the presence of hydrophytic vegetation and positive indication of wetland hydrology; soils were not examined for hydric characteristics.

4.2 FINDINGS

The findings of the natural-resources assessment conducted for the Aro facility and vicinity (Figure 1) are presented below following the format of the NYSDEC guidance. In general, the findings are presented under the half-mile and two-mile radii, and the nine-miles downstream investigated areas. Also, the findings are on maps generated for each of the three investigated areas (Figures 18, 19 and 20).

4.2.1 Step I - Site Description

4.2.1.1 Part A. Site Maps

Special resources occurring within a two-mile radius of the site were identified and located on a map of the area (Figure 18). No significant habitats or protected plants and animals are reported to occur within the two-mile area, according to state and federal resource agencies. One area of wetlands mapped by the U.S. Fish and Wildlife Service National Wetland

Inventory is located approximately 1.4 miles southeast of the site and south of Cayuga Creek. This area, and a second area due north, are mapped as New York State Freshwater Wetlands (LA-6 and LA-7).

For completeness, the covertype map, encompassing a half-mile radius of the Aro facility and developed for the previous, December 2, 1993 RI Report is presented again in this revised report (Figure 19). The covertypes occurring within a half-mile radius of the site were investigated from several information resources and were described during the field reconnaissance conducted on June 25, 1992 by Law Environmental (Please refer to Part B, Section 4.2.1.2).

No major resources that are likely to be affected by site-related contaminants were determined to exist farther than two miles downstream; however, the previous natural resources assessment, in response to NYSDEC-negotiated Work Plan (August 30, 1991), examined aquatic resources for nine miles downstream on Cayuga Creek. This information is included here for completeness (Figure 20).

4.2.1.2 Part B. Description of Fish and Wildlife Resources

A description of fish and wildlife resources is presented for the half-mile and two-mile areas, and for Cayuga Creek for nine miles downstream from the site. The field reconnaissance did not reveal any obviously contaminated areas where there was an alteration in the biota as a result of potential site contamination. Also, no records of past fish and wildlife contamination were revealed from the information provided by the NYSDEC Significant Habitat Unit, Region 9 Division of Fisheries and Wildlife or from NYSDEC water-quality personnel.

4.2.1.2.1 Half-mile radius area

The area within a half mile of the site is primarily industrial, commercial and residential (indicated as open areas on Figure 19). South of the southernmost Conrail Line railroad tracks, the area is dominated by a quarry (Figures 1 and 19).

North of the above-mentioned railroad tracks, the vegetative cover in unpaved areas is generally residential lawns with scattered ornamental trees. Immediately north of these railroad tracks lies a strip of scrub-shrub and emergent wetlands (Cowardin et al, 1979) of varying width (Figure 19). An almost continuous forested strip, south of the wetlands and between the railroad tracks, is dominated by cottonwoods (*Populus deltoides*). Also, willow (*Salix* sp.) and box-elder (*Acer negundo*) are common trees in this area.

No wetlands are indicated on either the NWI or NYSFW maps as occurring within a half-mile radius of the site. Between the site and the Conrail Line railroad tracks (Figure 19), wetlands presumed to meet federal jurisdictional criteria were identified based solely on vegetation and hydrology. Soils were not examined for hydric characteristics. Tentatively-identified wetlands observed in this area consisted of scrub-shrub and emergent wetlands. Dominant shrubs observed in the scrub-shrub wetlands were dogwood (*Cornus* sp.) and arrowwood (*Viburnum recognitum*). Dominant plants observed in the emergent wetland included common reed (*Phragmites australis*) and cattail (*Typha* sp.). Submerged aquatic plants such as water-milfoil (*Myriophyllum* sp.) were observed in open-water pockets, classed as aquatic beds. The wetlands adjacent to the north side of the Conrail railroad tracks were the only wetlands observed within a half mile of the site.

Surface-water features within the half-mile radius are confined to the area south of the main facility building and consisted of storm water drainage ditches less than one foot wide, and two large ponds in an active quarry site approximately one-half mile south of the site. In addition, two narrow ponds are mapped on the Lancaster USGS quadrangle map; they are located between the railroad tracks south and southwest of the site (Figure 19).

The storm water drainage ditches drained the area between the main facility building and the railroad tracks to the south, and the down-gradient slope was generally to the southwest. The drainage ditches joined a ditch line that ran alongside and parallel to the railroad tracks. At the time of the survey, the drainage ditches were mostly dry, but some areas of standing water were observed alongside the railroad bed. A 10- to 12-inch wide drainage way located off the property approximately 600 feet to the west of the site contained flowing water. The flow velocity was low and the water flowed to the ditch line along the railroad bed. This flow continued along the railroad tracks for approximately one-quarter mile and then flowed beneath the railroad through a small culvert. The outflow from this culvert was not located; however, a ditch with areas of standing water was observed south of the railroad tracks. Other areas of standing water and slight flow were observed in the ditch north of the railroad tracks, down-gradient to the culvert. The source of this water appeared to be surface run-off from the undeveloped area north of the railroad tracks and west of the plant site. No aquatic animals were observed in these ditches and conveyances; however, adult dragonflies and damselflies (Insecta: Odonata) were observed in the area.

The industrial, commercial and suburban land use setting of the area within a half-mile radius limits the potential for wildlife species occurrence. During the field reconnaissance, no significant or critical habitats were observed or are reported to occur within a half-mile radius of the site (Mr. Burrell Buffington, NYSDEC Significant Habitat Unit, personal communication). Also, no state or federally-protected plants or animals, or habitat critical to these species, were observed or are known to occur within a half-mile radius of the site (Mr. Burrell Buffington, personal communication).

4.2.1.2.2 Two-mile radius area

The majority of the area within a two-mile radius of the site is developed. Of this, a large proportion is residential, with industrial and commercial areas clustered in and around the subject site and along major roads. Wood lots and undeveloped areas persist along Cayuga Creek, which bisects the southern half of the two-mile radius area (Figure 18). A private nature preserve in the southeastern quadrant of the circle comprises the balance of the forested area.

Combined wetlands included on both NWI and NYSFW maps within two miles of the site total approximately 265 acres (Figure 18). Most of this acreage is forested wetland, with lesser amounts of scrub-shrub and emergent wetlands occurring.

Two wetland areas totalling approximately 150 acres are indicated on NYSFW maps as occurring within two miles of the site. The larger of the two areas (LA-6) encompasses approximately 130 acres of wetlands within the Dr. Victor Reinstein Woods Nature Preserve. According to the NYSDEC Nature Preserve literature, the wetlands and ponds within the preserve are man-made. The other state-mapped wetland (LA-7) is situated on the south side of Cayuga Creek east-southeast of the site. Both areas are also included on the NWI map of the same area.

The majority of NWI-mapped wetlands in the two-mile radius area occur south of Cayuga Creek. Most wetlands south of Cayuga Creek lie within the boundaries of the Dr. Victor Reinstein Woods Nature Preserve, owned and managed by the NYSDEC. Other NWI-mapped wetlands are associated with either Cayuga Creek or an unnamed tributary at the southern edge of the two-mile radius area. Based upon our field reconnaissance, at least one mapped wetland near Losson Road in the southern portion of the subject area has been filled.

NWI-mapped wetlands north of Cayuga Creek occur mainly along Scajaquada Creek. Based on our field reconnaissance, a large area (approximately 30 acres) of the NWI-mapped forested and scrub-shrub wetlands east of Interstate Highway 90 has been filled and replaced with a commercial mall complex. Scajaquada Creek has been channelized through the remaining NWI-mapped wetlands area.

The main surface waters located within a two-mile radius of the site were Cayuga Creek to the south and Scajaquada Creek to the north (Figure 18). The surface-water drainage from the site appeared to flow toward Cayuga Creek; however, a direct surface-water discharge from the site area to Cayuga Creek was not observed. Cayuga Creek generally flowed in a southwesterly direction through the area of interest. Within the two-mile radius area, Cayuga Creek was approximately 50 to 100 feet wide, and the stream consisted of a series of pools, shallows (one to two feet deep), shallow runs, and riffle areas. The substrate was a mixture of bedrock, small boulders (one to two feet in diameter), and silt and sediment. The water was turbid in the downstream portion of the area but was clear upstream of Union Road (Figure 18).

The NYSDEC has rated Cayuga Creek as Class C. The NYSDEC Water-Quality Regulations for Surface Waters and Ground Waters (6 NYCRR, Parts 700-705) state that the best usage of Class C Waters is fishing, and that these waters shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes. NYSDEC water-quality personnel stated that no state permitted facilities discharge to Cayuga Creek. However, the stream does receive inflow from combined sewer overflows, as well as urban, non-point source run-off during storm events.

NYSDEC Division of Fisheries and Wildlife Region 9 records were examined to determine the aquatic life present in the stream. The most recent survey data (1991) indicated that the stream supports a cool water fishery. Species listed included redhorse (*Moxostoma* sp.), white sucker (*Catostomus commersoni*), warmouth (*Lepomis gibbosus*), smallmouth bass (*Micropterus dolomieui*), largemouth bass (*Micropterus salmoides*), freshwater drum (*Aplodinotus grunniens*), and assorted minnows (*Pimephales* sp. and *Notropis* sp.). Aquatic macroinvertebrates such as mayflies (Insecta: Ephemeroptera), caddisflies (Insecta: Trichoptera), and midges (Insecta: Diptera) were also listed as present in this area.

An unnamed tributary to Cayuga Creek drains the area southwest of the site, south of the railroad tracks. It flows southwest and enters Cayuga Creek near William Street approximately 1.8 miles southwest of the site (Figure 18). The source of the stream was not located, but it appeared to originate near Como Park Boulevard southwest of the rock quarry. The stream was approximately six to eight feet wide and had been placed underground in culverts and channelized extensively throughout its length. The tributary stream received urban run-off from the extensive roadways, commercial shopping centers and businesses nearby. A small ditch was located north of Como Park Boulevard but appeared to function as a wet-weather conveyance draining a forested area west of the quarry (outside of the half-mile radius). Small areas of standing water were observed during the site reconnaissance; however, there was no apparent connection to the unnamed tributary south of Como Park Boulevard.

Scajaquada Creek, located approximately one-half mile to the north of the site, is an urban stream that flows in an easterly direction through a mixed residential and urban setting. Within two miles of the site, the creek is approximately 20 feet wide. The creek was a mixture of two- to three-feet deep pools and shallow runs approximately one foot deep. The substrate consisted of a mixture of small boulders one to two feet in diameter, and silt and sediments. The creek appeared to have been channelized or culverted for much of its length in the area of interest.

Scajaquada Creek is rated as Class B by the NYSDEC. The NYSDEC Water Quality Regulations for Surface Waters and Ground Waters (6 NYCRR, parts 700-705) states that the best usages of Class B waters is for primary and secondary contact recreation and fishing, and that the waters shall be suitable for fish propagation and survival. According to personnel at Region 9 of the NYSDEC Division of Water, Scajaquada Creek receives direct inputs from non-contact cooling water and storm water runoff from two industries.

Additionally, five facilities discharge storm water run-off and non-contact cooling water the U-Crest Ditch, which flows into the creek near the western edge of the two-mile radius. The creek also receives pollutants from combined sewer overflows during storm events, as well as non-point source pollutants from the surrounding urban area. At the time of the field survey, the creek was slightly turbid and a coating of algae and silt covered the rocks and substrate.

Examination of 1974 data provided by the NYSDEC Division of Fisheries and Wildlife Region 9 revealed that Scajaquada Creek supported limited aquatic life. Only one species of fish, the fathead minnow (*Pimephales promelas*), was collected in the two-mile radius area. No fish were observed during the current field survey.

Other water bodies within the two-mile radius include a small creek, Slate Bottom Creek, and a series of ponds located on the Dr. Victor Reinstein Woods Nature Preserve. Both of these surface waters are located south of Cayuga Creek and therefore are not likely to receive input from the site.

Just as described for the half-mile radius area, the industrial/commercial and suburban land use setting limits the potential of the area for wildlife species. The Nature Preserve area, however, may be an exception to this. No significant or critical habitats were observed or are reported to occur within two miles of the site (Mr. Burrell Buffington, NYSDEC Significant Habitat Unit, personal communication). Also, no state or federally protected plants or animals, or habitats critical to these species were observed during the field reconnaissance or are known to occur within two miles of the site (Mr. Burrell Buffington, NYSDEC Significant Habitat Unit, personal communication).

4.2.1.2.3 Nine miles downstream

Since the general direction of surface-water flow from the site appeared to be toward Cayuga Creek, the creek and its receiving waters downstream of the site were of interest (Figures 18 and 20). As previously discussed, however, no surface-water discharge from the site to Cayuga Creek was observed. An area for nine miles downstream of the site was visually surveyed and NYSDEC records were examined to determine characteristics of the streams.

Cayuga Creek continues for an additional 2.25 miles outside of the two-mile radius from the site and then joins Cheektowaga Creek to form the Cheektowaga River. The condition of the creek did not substantially change downstream of the two-mile radius area previously described; however, the water appeared much more turbid in this area than in the two-mile radius area. No NYSDEC-permitted waste discharges were located in this area. The fish community in this area, as described in NYSDEC records, is the same as found in the area within the two-mile radius.

The Cheektowaga River flows in a westerly direction toward its confluence with Lake Erie (Figure 20). The area of interest extends downstream from the confluence of Cayuga Creek and Cheektowaga Creek approximately seven miles to the South Park Avenue bridge. The river is approximately 150 feet wide in the upstream portion near the confluence of the two source streams and widens to 250 feet or more in the downstream area. The streams consist of pool areas with some riffles and runs. A large riffle area is present immediately downstream of the confluence of the two source streams. The characteristics of the river change as it approaches Lake Erie. The river becomes a series of long, slow-moving pools, and near the end of the area of interest, it appears to be influenced by Lake Erie and takes on the appearance of a bay of the lake with very little flow. NYSDEC Water Division personnel stated that the stagnant water conditions in this area and non-point-source urban runoff have resulted in water quality problems. NYSDEC personnel also stated that approximately five industries have permits to discharge storm water and treated process waters to the Cheektowaga River in the area of interest. These discharges occur near the downstream end of the area nine miles downstream of the site. Sediment contamination problems associated with an oil refinery located in the area occur, and, according to NYSDEC personnel, the sediment is annually dredged in the area of the South Park Avenue bridge to remove contaminated materials.

The fish community of the Cheektowaga River has been periodically sampled by NYSDEC. The most recent sampling event for which records were available occurred in 1988. Nineteen species of fish were collected in the Seneca Street area using boat electroshocking techniques. The species were cool water species and included gizzard shad (*Dorosoma cepedianum*), carp (*Cyprinus carpio*), golden shiner (*Notemigonus crysoleucus*), minnows (*Notropis* sp.), quillback (*Carpiodes cyprinus*), white sucker, northern hogsucker (*Hypentelium nigricans*), redhorse, bullheads (*Ictalurus* sp.), rock bass (*Ambloplites rupestris*), sunfish, (*Lepomis* sp.), largemouth and smallmouth bass, yellow perch (*Perca flavescens*), walleye (*Stizostedion vitreum*), and freshwater drum.

No state or federally protected species are known to occur in waters nine miles downstream from the site (Mr. Burrell Buffington, NYSDEC Significant Habitat Unit, personal communication). Three species of mussels (*Potamilus alatus, Leptodea fragilis* and *Lasmigona compressa*) listed in the NYSDEC Natural Heritage Program database as rare or limited in range in New York have been observed on either the Cheektowaga River of Cayuga Creek; however, these species are listed as unprotected by State conservation laws.

4.2.1.3 Part C. Value of Fish and Wildlife Resources

The land use setting of the area within 0.5 miles of the site is predominantly industrial/commercial with some suburban residential development. As a result, the flora and fauna are depauperate. The surface water areas occurring within the 0.5 mile radius were limited to the small (less than 1 foot wide) storm water conveyances south of the Aro facility site, and the two large ponds at an active quarry, approximately one-half mile south of the Aro site across the Conrail rail lines. During the field reconnaissance, the storm water drainage ditches associated with the site were mostly dry and no aquatic animals were observed.

Fish and wildlife and resources of potential human value were examined within the study area. Potential candidates for value to humans were examined within a two-mile radius of the site and also for a length of nine miles downstream on Cayuga Creek. Although no direct surface water pathway was identified (see Section 4.2.2, Step II) between the Aro facility site and Cayuga Creek, the creek is included because it is the closest major surface flow that appeared to be downgradient from the site. The NYSDEC has rated Cayuga Creek as Class C usage, indicating that its best usage is fishing, and also primary and secondary contact recreation. During the site reconnaissance, an individual was observed potentially fishing within the two-mile radius of the site on Cayuga Creek downstream of the Union Road Bridge and an individual was observed fishing at the confluence of Cayuga Creek and the Cheektowaga River approximately 2.25 miles outside of the two mile radius from the Aro facility site. Although no fishing was observed, the potential for fishing exists in Cayuga Creek. As previously indicated, however, inflow from combined sewer overflows and non-point source run-off during storm events may limit Cayuga Creek's usage for fishing and recreation in some areas.

The Dr. Victor Reinstein Woods Nature Preserve is an area within the two mile radius that provides recreational and educational values for the residents of the area. Although occurring within the two mile radius, the Nature Preserve is upstream from the Aro site, in relation to Cayuga Creek and is separated by numerous barriers including three main railroad lines, an active quarry, Cayuga Creek and Como Park Boulevard. As a result, there is no direct surface water pathway between the Aro site and the Nature Preserve.

4.2.1.4 Part D. Applicable Fish and Wildlife Criteria

Potentially applicable contaminant-specific criteria include the Ambient Water Quality Criteria of the Clean Water Act, which are derived for the protection of fresh-water aquatic life for acute and chronic toxicity (EPA 1986), and the New York State Ground Water Quality Criteria (6 NYCRR Parts 700-705).

Site-specific, potentially applicable criteria include jurisdictional waters of the U.S. as protected under Section 404 of the Clean Water Act (33 USC 1344). Also, the New York State Freshwater Wetlands Act (6 NYCRR Parts 663 and 664) may potentially be applicable to State jurisdiction of wetland areas. Man-made, channelized drainageways through upland areas for storm water conveyance are typically considered to be non-jurisdictional; however, federal (U.S. Army Corps of Engineers) and State (NYSDEC) regulatory personnel have the final determination of jurisdiction. Remediation, or other land disturbing activities that may potentially impact jurisdictional areas, may require prior authorization by the USACE and/or NYSDEC. At this time, however, no such activities are proposed or anticipated.

4.2.2 Step II - Contaminant-Specific Impact Analysis

Potential contaminants of concern, as related to fish and wildlife resources, were examined for surface-water samples collected at the Aro facility site. In particular, the surface water taken from the drainage ditch sample (SW-103, refer to Figure 15) was examined for concentrations of dichloroethylene (DCE) and TCE due to its location towards the southeastern extreme of the property boundary.

Neither significant sources of contaminants, significant resources or potential pathways were identified for the Aro facility. These three components were examined under Step II.

A potential source of contaminants of concern was identified in surface-water sample SW-103. Of the potential contaminants of concern, only DCE and TCE were present in measurable concentrations. For SW-103, the DCE was 26 ppb and TCE was 40 ppb. These concentrations were well below the listed federal Ambient Water Quality Criteria for fresh-water aquatic life. A concentration of 11,600 ppb DCE is listed for acute toxicity (no chronic value is given), and 45,000 ppb TCE for acute toxicity and a concentration of 21,900 ppb is listed for TCE chronic toxicity. There are currently no New York State Water Quality Criteria for fresh water aquatic life (6 NYCRR Parts 700-705). The concentrations in the SW-103 sample are well below the listed standard criteria and these on-site concentrations are expected to be further attenuated off site due to volatilization and dilution. Due to these very low concentrations, it is anticipated that these contaminants will have minimal impact on the natural resources.

As previously described, the flora and fauna of the area are depauperate due to the land use setting and no significant resources were identified during the natural resources assessment. For those fisheries or aquatic resources that may potentially occur in Cayuga Creek, no direct surface water pathway was identified between the Aro facility site and Cayuga Creek. As previously discussed, Cayuga Creek was included in the assessment because it appeared to be the major water body occurring downgradient of the Aro facility site.

In summary, the lack of significant concentrations of contaminants of concern (as indicated by SW-103), the depauperate flora and fauna, and the absence of a potential direct surface water pathway for contaminant migration and exposure, indicate that the impact to resources is minimal. According to the DEC guidance, no additional analyses are required to further demonstrate minimal impact.

4.3 NATURAL RESOURCES CONCLUSIONS

The majority of both the half-mile and two-mile radius areas is comprised of mixed urban development. Natural areas within the half-mile radius are limited to a strip of scrub-shrub and emergent wetlands north of the southernmost Conrail railroad tracks and an adjacent forested strip. Within the two-mile radius, natural areas are restricted to woodlots and undeveloped areas along Cayuga Creek, and the Dr. Victor Reinstein Woods Nature Preserve in the southeastern portion of the radius circle.

The only wetlands observed within the half-mile radius were the strip of scrub-shrub and emergent wetlands described above. No wetlands are mapped for this area on either U.S. Fish and Wildlife Service National Wetland Inventory (NWI) or New York State Freshwater Wetlands (NYSFW) maps. Approximately 265 acres of wetlands are included on both NWI and NYSFW maps within the two-mile radius. Most of this acreage is forested wetland with lesser amounts of scrub-shrub and emergent wetland present. The majority of these mapped wetlands are associated with Cayuga or Scajaquada Creek.

Aquatic habitats observed within the half-mile radius consisted of four ponds and several small intermittent streams and storm water run-off conveyances. Within the two-mile radius, the main surface waters are Cayuga Creek to the south and Scajaquada Creek to the north. Although Cayuga Creek receives inflows from combined sewer overflows and urban non-point source pollution during storm events, records indicate that it supports a cool-water fishery. Scajaquada Creek flows through a mixed urban area, has been channelized and culverted for much of its length within the study area, and receives various pollutant inputs during storm events. It supports only limited aquatic life.

Aquatic habitats in the area nine miles downstream of the site were also characterized. Approximately 4.25 miles downstream of the site, Cayuga Creek joins Cheektowaga Creek to form the Cheektowaga River, which eventually flows into Lake Erie. The conditions of the portions of Cayuga Creek below the two-mile radius and the upper portions of the Cheektowaga River appear to be similar to those described above for Cayuga Creek within the two-mile radius. As the Cheektowaga River approaches Lake Erie, however, it widens substantially and takes on the appearance of a bay of the lake. Water-quality problems exist in this slow-flowing portion of the river due to stagnate water conditions and numerous pollutant inputs.

No significant or critical habitats and no state or federally protected plant or animal, or habitats critical to these species, were observed or are known to occur within the two-mile radius area, or within nine miles downstream of Cayuga Creek.

The pathway analysis in Step II (Section 4.2.2) demonstrated that significant sources of contaminants do not occur off site based upon surface-water sampling of drainage-ditch water at the southeastern property boundary. Also, significant resources that could potentially be impacted by contaminants of concern do not exist in the vicinity of the site, and, furthermore, no direct, surface-water pathway was identified between the Aro facility and Cayuga Creek. The findings of the pathway analysis demonstrates minimal impact with no requirement for additional analyses.

5.0 QUALITATIVE HUMAN-HEALTH RISK ASSESSMENT

This qualitative human-health risk assessment is divided into two sections. The first section (5.1) discusses potential exposure to soil, air, ground water, surface water, and sediment. The second section (5.2) estimates the "worst-case" air exposure based on modeled emissions from soil.

5.1 EXPOSURE ASSESSMENT

This exposure assessment addresses environmental fate and transport of constituents detected at the site, identifies potential exposure pathways, and presents a qualitative evaluation of potential human health risks.

5.1.1 Contaminant Fate and Transport

The potential for human exposure to a particular compound or element depends on whether it persists in the environmental medium of interest and has a point of contact with a receptor. This section discusses the fate and transport of site contaminants, which depend on the site's physical conditions, the physical and chemical characteristics of the constituents, and the nature and extent of the constituent release. Potential transport processes for constituents of potential concern (metals, volatile organic compounds, and semivolatile organic compounds) detected in soil, ground water, surface water, and sediments at and in the vicinity of the Aro facility are discussed below.

The primary environmental pathways for migration of chemicals detected at the Aro facility are as follows:

- Infiltration from soils to ground water
- Potential ground water discharge to surface water and sediments
- Storm water runoff from soil to surface water
- Dispersion of volatile constituents in air

Metals - Predicting the migration of metals in the environment is complicated because metals can exist in a variety of forms. For instance, metals can exist in different oxidation states. Metals can also exist as charged particles (i.e., ions in solution) or in an uncharged or neutral state. Metals may also interact with both organic and inorganic compounds to form a variety of different compounds. The potential for migration of metals from soil to ground water is dependent upon the solubility of these various forms in water. Metals in solution will exist in an ionic form; non-ionic forms precipitate and bind to soil and sediments with limited actual transport from the site area. Further site-specific data on the ionic forms present for the inorganic chemicals detected at the site would be needed to describe their chemical-specific transport and fate.

The following metals were reported in various media at the Aro facility: aluminum, antimony, arsenic, barium, beryllium, calcium, cadmium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, silver, sodium, vanadium and zinc. No background metal samples were taken in any media preventing a quantitative comparison of naturally-occurring levels of metals to those detected in site media. As shown in Table 16, maximum detected concentrations in subsurface soil samples for antimony, mercury, and silver were above the ranges for natural soils. Also, copper, mercury, nickel, and zinc were detected in subsurface soil samples above the ranges for undisturbed, native soils in the Cheektowaga area. The other metals were detected at concentrations similar to or below the available ranges for natural soils and undisturbed, native soils.

Volatile Organics - The primary environmental transport process for volatile organic compounds is via volatilization. In general, volatile organics have high vapor pressures indicating an increased likelihood the constituent will volatilize from soil. Additionally, these compounds may be quite mobile in soils and do tend to leach to ground water. TCE was detected in ground water samples on the site and after sufficient time and under appropriate conditions biodegradation of this compound can yield 1,1-dichloroethene, 1,2-dichloroethene and vinyl chloride (Davis and Olsen, 1990). The following volatile organic compounds were reported for various site media: acetone, benzene, bromodichloromethane, bromomethane, 2-butanone, carbon disulfide, chloroform, chloromethane, dibromochloromethane, 1,1-dichloroethene, 1,2-dichloroethene (total), ethylbenzene, 2-hexanone, 4-methyl-2-pentanone, styrene, tetrachloroethene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethene, toluene, vinyl chloride, and xylenes (total).

Semivolatile Organics - A variety of semivolatile organic compounds were detected in environmental media sampled at this site. The semivolatile organic compounds detected at the Aro facility may be classified into two groups; phthalate esters and phenolic compounds.

Two phthalate esters (bis(2-ethylhexyl)phthalate and diethyl phthalate) were detected in soils and/or ground water at the site. In general, bis(2-ethylhexyl) phthalate is a common field and laboratory contaminant which results from the use of plastic items such as bottles or latex gloves used by the field or laboratory personnel. Water solubilities of phthalate esters range from very low to moderate, and they have physical and chemical properties which would allow moderate to strong adsorption onto suspended particles and biota. Consequently, adsorption onto soils and sediments may limit ground water migration of these compounds. Due to their low Henry's constant, phthalate esters are not expected to volatilize from water and soils. If they occur in surface waters, they will biodegrade at a moderate rate (half-life of two to three weeks). Biodegradation of these compounds also occur in soils, but at a slightly slower rate than in water. Half-lives in soils and ground water have been estimated to range from ten days to over one year depending on pH and other site-specific conditions (HSDB, 1993).

Phenolic compounds (2,4-dimethylphenol, 4-methylphenol, and phenol) have been detected in soil and ground water sampled at this site. If released to soil or ground water, the primary removal mechanism for phenolics is biodegradation. Despite its high solubility and poor adsorption to soils, biodegradation is typically rapid (days). If phenol is released to surface water, the primary removal process would be degradation, which occurs on the order of hours to days. In the atmosphere, phenol reacts fairly rapidly with hydroxyl radicals. Phenol would not be expected to significantly volatilize, hydrolyze, or adsorb to sediments.

5.1.2 Identification of Exposure Pathways

A complete exposure pathway has four essential components. EPA's "Risk Assessment Guidance for Superfund" (EPA, 1989) defines an exposure pathway as consisting of the following elements:

1. A source and mechanism of chemical release to the environment (that is, source of contamination)
2. An environmental transport medium for the released chemical (for example, ground water, air)
3. A point of potential human or biota contact with the contaminated medium (that is, an exposure point)
4. A route of exposure at the exposure point (for example, ingestion, inhalation, or dermal contact)

Without the presence of all four components, exposure cannot occur. The source of the release, transport mechanisms, exposed populations, and routes of exposure to chemicals at the site are described in the following section. Potential exposure routes and potentially exposed human populations are identified.

Exposure Points and Exposure Routes - A Conceptual Site Model depicting contaminant sources, release mechanisms, exposure pathways, and potential receptors is shown in Figure 21. The potentially complete pathways for the Aro facility include incidental ingestion and dermal contact with soils by utility workers; inhalation of volatile emissions from soils for on-site workers, utility workers, or off-site residents; and dermal contact with surface water or sediments for utility workers or off-site residents. The utility worker category includes the city workers that clean the drainage ditches periodically. A brief discussion of the potential exposure for each of these pathways is provided below.

Summary of Exposure Pathways - There are five potential exposure pathways at the Aro facility. These are exposure to soils, air, ground water, surface water, and sediments.

- Soil Exposure - Direct exposure to soils for on-site workers or off-site residents is not expected to occur due to the large paved area present on site and the vegetation present in the open field south of the paved parking lot. The drainage ditches on the southern portion of the property have been maintained by the city and were cleaned on an annual or bi-annual basis in the past. Therefore, the potential exists for city workers to come into direct contact with soils in the ditches, but exposure is not considered significant due to the low concentrations of constituents detected in soils and sediments and low frequency of exposure. Exposure to potentially contaminated soils may occur in the future if intrusive activities (i.e. excavation) or significant changes in the cover conditions take place at the site.

- Air Exposure - Exposure to volatile emissions is a potentially complete exposure route for on-site workers, utility workers, and off-site residents. An air pathways assessment (see Section 5.2) was evaluated to estimate the "worst-case" emissions from soil, and modeled concentrations were compared to State air quality criteria. Exposure to fugitive dust emissions is not considered complete due to the lack of area without some surface cover. Site areas are either paved or vegetated, which serves to prevent dust generation on site.

- Ground water Exposure - Currently there are no water-supply wells on site, therefore, exposure to ground water beneath the Aro facility is unlikely for on-site workers, utility workers, or off-site residents. All drinking and process water for the Aro facility is received through the city water supply. Residents to the west of the Aro property are not known to have private water wells, and these homes are currently supplied by the city water supply. A potentially complete ground water exposure route may exist if private wells are installed and used by off-site residents (Murszewski, verbal communication).

- Surface Water and Sediment Exposure - Ground water discharging to the south flowing culvert beneath the employee parking lot enters the south flowing drainage ditch at the end of the parking lot. Some constituents have been detected in the surface water and sediment samples collected at the site. The drainage ditches have been observed by field personnel to contain small amounts of standing water. There is unrestricted access to the on-site open field area so the potential exists for access by off-site personnel. The tall grasses and wet soil conditions make this exposure unlikely and trespassers have not been observed by field personnel or the Aro site manager. Potential exposure to utility workers is possible, but is also unlikely to occur due to protection by standard work clothes and boots.

5.1.3 Comparison to Health-Based Standards/Guidance

Several constituents that have the potential for causing adverse human-health effects have been found in the soil, air, ground water, surface water or sediments at the Aro facility. The potential chemical and media-specific guidance values which apply for the chemicals and exposures at this site are summarized below.

Soil Criteria - Currently under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulations, there are no guidelines for allowable soil concentrations. However, proposed Resource Conservation and Recovery Act (RCRA) Corrective Action Levels (Subpart S) have been proposed for soil based on human-health effects due to ingestion. The NYSDEC Bureau of Spill Prevention and response has developed TCLP Alternative Guidance Values for soils, which are soil concentrations developed to be protective of ground water quality. Currently, exposure to soils is not expected to occur, therefore, the comparison to RCRA soil action levels is not applicable. The TCLP Alternative Guidance Values for soils presented on Table 8 to Table 10 and Section 3.5 of the text establish soil-concentration values at twenty times the 6 NYCRR Part 703 Ground water Quality Standards and Guidance Values. The concentrations for antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, magnesium manganese, silver, sodium, zinc, 1,2-dichloroethene, trichloroethene, and vinyl chloride detected in soils generally exceeded the NYSDEC TCLP Alternative Guidance Values.

Air Criteria - Potential ambient air concentrations were evaluated by modeling emissions for the three primary organic compounds detected in subsurface soil at the Aro facility: 1,2-DCE, TCE, and vinyl chloride. Procedures used for the modeling are described in Section 5.2. In summary, modeled "worst-case" concentrations at the site boundary were compared to the NYSDEC Annual Guideline Concentration (see Table 3 of Appendix J). Based on the estimated emission rate calculations and modeling, the projected boundary concentrations of 1,2-dichloroethene, trichloroethene, and vinyl chloride are below applicable NYSDEC Annual Guideline Concentrations.

Ground water Criteria - The National Primary Drinking Water Regulations established by the EPA provide Maximum Contaminant Levels (MCLs) for a number of constituents in ground water. The MCLs are enforceable standards based on health effects data for specific chemicals and other concerns such as analytical detection limits, treatment technology, and economic impact. State values are also available for a number of the constituents. The State drinking water standards are as low or lower than the federal MCLs. Constituents detected in the ground water were compared to the drinking water standards identified in the New York State Ground Water Quality Standards and Guidance Values (6 NYCRR Part 703) in Table 11 through Table 13 and in Section 3.5 of the text. Constituents exceeding NYS Ground water Quality Standards (and federal MCLs) included 1,2-dichloroethene, phenol, 2,4-dimethylphenol, 4-methylphenol, trichloroethene, and vinyl chloride.

Surface-Water and Sediment Criteria - For surface water and sediment, dermal exposure is the most likely exposure pathway. The Federal Ambient Water Quality Criteria (AWQC) include human health-based surface-water concentrations based on surface water and/or fish ingestion. These pathways or exposures are not expected at the Aro facility, therefore, the AWQC for the protection of human health are not appropriate. State surface-water standards and AWQC for the protection of aquatic species are discussed in Section 4.0. Currently, there are no human health-based sediment standards available.

5.1.4 Conclusions

The following summarizes the conclusions reached as a result of this qualitative evaluation of potential exposure and associated risks.

Evaluation of Exposure Pathways - As stated in Section 5.1.2 above, four components are essential for a complete exposure pathway. Without all of the four components (a source of the release, transport mechanisms, the point of contact for exposed populations, and routes of exposure), exposure and associated risk to human health cannot occur.

The potential exposure pathways for the Aro facility are presented on the Conceptual Site Model (see Figure 21). As shown on this figure, incomplete soil exposure pathways include: ingestion and dermal contact by on-site workers and off site residents; and inhalation of fugitive dust by on-site workers, utility workers and off-site residents. Exposure pathways for ground water are also incomplete for ingestion, inhalation of volatiles and dermal contact by on-site workers and utility workers. Incomplete surface water/sediment exposure pathways include: ingestion and inhalation of volatiles by on-site workers, utility workers and off-site residents; and dermal contact by on-site workers. Because these pathways are not complete they do not have associated risks to human health.

The exposure pathways identified as complete include incidental ingestion and dermal contact with soils by utility workers; inhalation of volatile emissions from soils for on-site workers, utility workers and off-site residents; and dermal contact with surface water/sediment for utility workers and off-site residents (trespassers). The exposures for incidental ingestion and dermal contact for utility workers have a very low frequency of occurrence. Although contact by trespassers with the area is possible, however, there is no evidence to indicate that this contact is occurring (for example - no visual sightings, or trash left on-site; or footprints; or vehicle tracks). Therefore, the exposures associated with these pathways would not be anticipated to drive remediation or risk management decisions.

Inhalation of volatiles via the air pathway was considered to be a more consistent pathway with potential impacts to off-site residents. Therefore, exposure point concentrations were estimated for the property boundary. Estimates of the "worst-case" air pathways exposure point concentration were based on modeled emissions from soil and are presented in the following section (Section 5.2).

A complete ground water exposure route may exist for off-site residents if private wells are installed downgradient of the site. Currently, however, no private water-supply wells have been identified or are known to exist by Aro personnel (Murszewski, verbal communication), and residents downgradient of the site receive water from the Town of Cheektowaga.

Comparison to Guidance and Standards - Detected soil concentrations were compared to the NYSDEC TCLP Alternative Guidance Values. The concentrations for antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, magnesium, manganese, silver, sodium, zinc, 1,2-dichloroethene, trichloroethene, and vinyl chloride detected in soils exceeded these guidance values. Constituents detected in the ground water were compared to New York State Ground Water Quality Standards and Guidance values (6 NYCRR Part 703) in Section 3.5 of the text. Constituents exceeding NYS Ground water Quality Standards and federal MCLs included 1,2-dichloroethene, phenol, 2,4-dimethylphenol, 4-methylphenol, trichloroethene, and vinyl chloride. It should be noted that the use of ground water for drinking water has not been confirmed.

Exposure to surface water as a source for drinking water or fish consumption is not expected. Therefore, a comparison of surface water concentrations to Federal or State Ambient Water Quality Criteria (AWQC) for the protection of human health via water or fish ingestion is not appropriate. State surface water standards and AWQC for the protection of aquatic species are discussed in Section 4.0. Currently, there are no human health-based sediment standards available.

Even though some of the soil and ground water (drinking water) criteria are exceeded it is unlikely that there is immediate or substantial risk to human receptors due to the limited frequency of soil exposure. In addition, information collected to date does not indicate the use of ground water as drinking water, thus eliminating exposure to this media.

5.2 AIR PATHWAYS ASSESSMENT

VOCs present in the subsurface at the Aro Corporation site may travel to the surface and be emitted to the atmosphere. Potential ambient air concentrations were evaluated by Law Environmental by estimating and modeling emissions of three organic compounds discovered in the subsurface at the site: TCE, 1,2-DCE, and vinyl chloride. The purpose of this evaluation was to estimate reasonable worst-case emissions for the compounds and to compare calculated off-site concentrations with applicable air quality criteria.

These three compounds were selected for this analysis because they were detected in several of the ground water and bulk-soil samples collected from the site. In addition, vinyl chloride is considered a high-toxicity compound by the NYSDEC. Both DCE and TCE are considered to be compounds of moderate toxicity by the Department (NYSDEC, 1991).

The following is a discussion of the procedures used to assess the emissions of these three compounds from the subsurface at the site. The procedures included the calculation of compound-specific emission rates from the site surface and the atmospheric dispersion modeling of the resulting surface emissions to potential receptors located off site.

5.2.1 Emission Rate Development

The emissions of each of the three constituents were estimated in accordance with the procedures described by the EPA (1992). This guidance provides a means of conservatively estimating, for a variety of source types, the surface emissions from available site-specific data, considering the physical and chemical properties of the specific compounds under investigation.

The particular method followed in this study is applicable to the estimation of gaseous emissions from subsurface soils. The method is appropriate for assessing the emissions of volatile compounds from soil-gas or bulk-soil concentration data. The model considers the unsaturated (air-filled) porosity to be the emission path to the surface and molecular diffusion to be the driving force. Site soil-gas sampling efforts were adversely influenced by inclement weather and a shallow water table. For this reason, the emission-rate calculations shown in Appendix J are based on constituent concentrations in bulk-soil samples collected during the installation of several ground water monitoring wells. Sample calculations are provided in Appendix K.

The emission rates developed are considered to be conservative since:

- The highest constituent concentration in each source area was used in the calculation, regardless of sample depth.
- The calculation did not consider the very low hydraulic conductivity of the lithologies underlying the site.
- The value of air-filled porosity used in the calculations is considered to be conservative.

The total porosity of the bulk soil samples was calculated according to the EPA guidance (1992). Default values were used for soil bulk density and mineral particle density. Air-filled porosity was assumed to be 10% of total porosity. Soil moisture content was calculated by an EPA (1992) formula. The EPA (1992) upper-bound residential exposure period of 9.07×10^8 seconds (representing 30 350-day years of exposure) was used in the emission rate calculation. Annual average values of ambient temperature and air pressure representative of local conditions (Greater Cheektowaga International Airport) were also used.

5.2.2 Dispersion Modeling

The Industrial Source Complex Long-Term (ISCLT2) model has been used to characterize the long-term impacts on ambient-air quality surrounding the Aro Corp. site as a result of a constant release of air emissions calculated from concentrations measured in the subsurface of the site. The ISCLT2 (Gaussian) model was developed under the auspices of the EPA. For this study, version number 92062 of the ISCLT2 was used. The model does not consider the hindering influences of snow cover or the downward percolation of melt water or rain on the rate at which subsurface constituents may be emitted at the ground surface. Since these phenomena were not considered during the development of the emission rates, their influence of this study was conservatively ignored.

Many of the model options used were regulatory default values. These regulatory default options generally result in a conservative (i.e., high) estimate of constituent air concentrations. Receptor elevations were assigned the elevation of the area sources due to the reasonably flat terrain of the site and surrounding area. No adjustment was made to account for variations in topography. Dispersion coefficients appropriate for rural settings were implemented on the basis of population and zoning criteria.

The ISCLT2 model requires a statistical summary (STAR format) of hourly meteorological data (e.g., wind speed, direction, etc.) as an input. In this study, a meteorological data set collected over a ten-year period (1964-1973) at the NWS station at the Greater Cheektowaga International Airport was used. This data set was obtained in the STAR format from the meteorological database contained in the EPA-sponsored Graphical Exposure Modeling System (GEMS).

Wind instruments at the Cheektowaga NWS were located 6.1 meters above the ground surface during the ten-year period of data collection. Wind directions were grouped into 16 sectors of 22.5 degrees each. Wind speeds were grouped into the six wind speed classes which are defaults of the ISCLT2 model. This data consisted of the frequency distribution of winds in these speed classes and direction sectors for each of six meteorological stability classes (A-F) over the ten-year period of record.

A wind rose of the STAR data (Figure 1 of Appendix J) was drawn combining the data of all stability classes into a single array by wind speed and direction. It otherwise represents the meteorological data used to model constituent concentrations in ambient air in the vicinity of the site. The wind rose is interpreted to indicate that maximum constituent concentrations should be expected in areas North, East and Northeast of the site.

Three square area sources were delineated for modeling (Figure 2 of Appendix J) based on compound concentration distributions and other general features (that is, the extent of paved areas). Area source 1 lies predominantly off-site west of the metal preparation room. It is 24.4 m on each of its four sides. Area source 2 lies partially off-site, south of area source 1. Area source 2 is approximately 76.2 m on each side. Since portions of these sources lie off-site, each was divided into 4 square sub-sources of equal area to increase the resolution of the model for source-proximal receptors. As shown on Figure 2 of Appendix J, area source 3 lies east of area source 1. Area source 3 overlaps area source 2. This simulates continuity along the direction of ground water flow. The ground water flow direction is across the site to the southwest. The maximum bulk soil constituent concentration in each of the three primary area sources was used in the emission calculations to estimate the emission rates of constituents modeled. Note that, as indicated in Table 2 of Appendix J, no vinyl chloride was detected in the bulk soil samples collected within area source 2. For this reason, no vinyl chloride emissions were modeled from area source 2.

The areas under the existing buildings were not considered sources in the dispersion modeling. The potential for emissions from the subsurface under the buildings is expected to be minimal due to the concrete floor slabs of these buildings.

For the modeling of off-site concentrations, receptors were located on a Cartesian grid centered about the site, and at the site boundary. The maximum distance between adjacent boundary receptors is 100 m. A boundary receptor was located at each corner of the site boundary. The Cartesian receptor grid is square and centered on monitoring well MW-13. The receptor grid is one kilometer on each side. This grid consists of an 11 x 11 receptor array with 100 m receptor spacing. Figures 3, 5, and 7 of Appendix J show the off-site modeled grid-receptor concentrations for TCE, DCE, and vinyl chloride, respectively.

5.2.3 Air Pathways Conclusions

Figures 4, 6, and 8 of Appendix J show contoured isopleths of the modeled off-site (grid and boundary) receptor concentrations of TCE, DCE, and vinyl chloride, respectively. Both DCE and vinyl chloride are indicated to have maximum concentrations to the north, east, and northeast of the site. This was predicted from a review of the wind rose (Figure 1 of Appendix J). The maximum concentration of TCE occurs along the western part of the site. This is interpreted to be due to the contrast in TCE emission rates between area source 1 (much higher) and the other two area sources. It is also due to the fact that area source 1 lies predominantly off-site and close to off-site receptors.

Table 3 of Appendix J shows emission rates modeled for each constituent and area source. Also shown on this table are the maximum modeled off-site concentrations of each constituent. Comparison of the maximum off-site compound concentrations with the NYSDEC Annual Guideline Concentration (DEC AGC, also shown in Table 3 of Appendix J) indicates no modeled concentration in excess of the AGC level for the three constituents.

Concentrations calculated on a reasonable worst-case basis indicate:

- The maximum off-site concentration of TCE is approximately 50% of the AGC.

- The maximum off-site concentration of DCE is several orders of magnitude below its AGC.

- The maximum off-site concentration of vinyl chloride is approximately 1% of its AGC.

Based on the estimated emission rate calculations and modeling procedures described above, the modeled off-site concentrations of TCE, DCE, and vinyl chloride are below applicable New York State Annual Guideline Concentrations.

6.0 CONCLUSIONS

A remedial investigation was conducted at the Aro facility during the period of March 9 through September 16, 1992. During this investigation the following elements of the DEC-approved Revised Work Plan (August 30, 1991) were conducted:

- Interior and exterior baseline ambient air surveys
- Soil gas/shallow water survey
- Installation of 3 bedrock monitoring wells
- Installation of 6 overburden monitoring wells
- Installation of 1 replacement monitoring well (MW-3)
- Installation of 3 observation well points
- Advancement of 6 interior soil borings
- Advancement of 1 exterior soil boring
- Construction of 2 temporary stream gauging stations
- Ground water measurements
- Soil/sediment and ground/surface-water sampling
- Analyses for TCL volatiles and semivolatiles, TAL metals and cyanide, surface-water hardness and sediment total organic carbon

Based on the results of the remedial investigation field activities, Law Environmental has further characterized the site geology and hydrogeology, identified the types, magnitude, extent and source of constituents in soil and ground water, identified and described natural resources near the site and assessed potential off-site constituent migration via the air-emissions pathway.

6.1 SITE GEOLOGY AND HYDROGEOLOGY

The overburden stratigraphy consists of two distinct till layers (upper and lower tills) underlain by limestone bedrock (Moorehouse Limestone). The upper till generally consists of red-brown to gray-brown silt and clay with varying amounts of sand and gravel. Vertical partings were observed in the upper till samples from remedial investigation soil borings, with the exception of MW-19 and MW-20, which are located in the south part of the facility property. The lower till generally consists of gray-brown to brown silt and sand with generally greater amounts of sand and gravel and also has embedded cobbles and boulders. The lower till is consistently more dense than the upper till, as defined by split-spoon penetration values presented on the soil test boring records (Appendix E).

Thickness of the upper till ranges from 24.5 to 6.3 feet and decreases from north to south (Figures 9 through 13). The upper till in the south section of the site tends to decrease in thickness to the east and west. Thickness of the lower till ranges from 0.5 to 14.3 feet and increases from north to south across the site. A mounding of the lower till was observed in the southern portion of the site in the vicinity of borings MW-14R, MW-19, and MW-20 (Figures 12 and 13).

The western area of the employee parking lot is traversed with backfilled culverts (Figure 2), where the upper till has been removed and replaced with fill. The culverts are used for facility storm water and sanitary sewers.

The depth to bedrock across the site ranges from 21.3 to 25.3 feet. The top of bedrock is generally flat, ranging from 627 ft msl to 629 ft msl and generally to the north and west. Bedrock cores obtained from three locations (MW-3R, MW-4R and MW-14R) showed the lithology of the rock to be gray, fine to medium-grained limestone. The RQD generally decreased with depth, from 73%-94% to 38%-60%. Existing fractures observed in the recovered cores tended to be adjacent and parallel to horizontal to sub-horizontal cherty styolites.

Ground water measurements obtained on September 16, 1992 show ground water to be near the ground surface across the site. A potentiometric surface map (Figure 7) based on this data indicates ground water flow is generally to the south-southwest with a general gradient of .017 feet/foot. The potentiometric surface map indicated two anomalies to the general gradient: a steeper gradient of .025 feet/foot in the southwest corner of the site, and a relatively flat gradient of .013 feet/foot in the west area of the employee parking lot.

Ground water elevation measurements observed in the well points and at the storm water gauges were consistent with those measured in the overburden monitoring wells, indicating the upper and lower tills are a single hydrogeologic unit. This interpretation is different than that presented in the Stratigraphy Report (May 1, 1991). Additional data from new overburden wells and well points indicate the saturated zone extends from near ground surface to the top of bedrock.

Two potentiometric anomalies interrupting the general south-southwest ground water flow direction occur in the vicinity of the backfilled culvert south of the main facility building and the south-flowing drainage ditch that exits the culvert. The ground water elevation in

OW-101, installed in the storm-sewer culvert backfill, is lower than adjacent wells (MW-11 and MW-13). A ground water trough draining the surrounding till occurs in the vicinity of the culvert south of the building. The backfill acts as a preferential pathway for ground water flow to the south. Where the ground water exits the culvert to the drainage ditch, the surface water is higher than surrounding ground water. Therefore, storm water in the ditch appears to be locally recharging the near-surface ground water. This recharge is evident by the potentiometric mounding in the ditch vicinity.

The geometric mean hydraulic conductivity for the upper and lower tills is 1×10^{-5} ft/min. The low permeability is consistent with the observed penetration rates and sample descriptions. Three ground water velocities ranging from 0.41 ft/year to 0.78 ft/year were calculated based on the hydraulic conductivity and ground water gradients. In general, low ground water velocities and relatively flat gradients indicate ground water flow is primarily horizontal, very slow and influenced by the backfilled trenches and drainage ditches cut into the upper till.

No ground water was encountered in the three bedrock monitoring wells during the period of this investigation. Hydraulic conductivity results (1×10^{-7} ft/min to 1×10^{-8} ft/min) indicates the bedrock permeability is low. This result is consistent with the descriptions of bedrock cores (Section 3.3). The lack of ground water and low permeability suggest that the top of bedrock is limiting vertical movement of ground water.

6.2 EXTENT OF CONSTITUENTS IN SOILS AND GROUND WATER

As part of this remedial investigation, soil and ground water samples from site-specific locations (Figure 2) were analyzed for TCL VOCs, semivolatiles (sample specific), and TAL metals and cyanide. Total organic carbon (TOC) and hardness analyses were performed on sediment and surface-water samples, respectively.

Based on the results of soil analyses for VOCs and semivolatiles, various constituents occur in soil in the southwest portion of the facility property. Figure 14 shows the interpretive extent of volatile constituents in soils, based on the analytical results of soil samples obtained from soil borings (SB-101 to SB-106), monitoring well borings, and sediment samples. The extent of volatile constituents in soils appears to be limited to the southwest area of the site property and the area of MW-3 and MW-3R, immediately west of the metals-preparation room.

The primary VOC constituents (TCE, DCE and vinyl chloride) exceeding NYS TCLP Alternative Guidance Values were found in soil samples from MW-3R, MW-16, MW-17, MW-19, MW-20, SB-101, and SB-103. The highest concentrations of VOCs and semivolatiles were found immediately west of the metals-preparation room at MW-3R. Other concentrations of TCE within the property boundaries ranged from 140 ppb to 4,900 ppb and were generally limited to the southwest portion of the site property. VOC constituents were found primarily in the vicinity of the storm water/sanitary sewer in the western end of the employee parking lot, in the storm water drainage ditch at the south end of the property, and in adjacent soil borings in both areas.

Ground water and surface-water analytical results indicated VOCs were found in the same general area as VOCs in soil. Figures 15, 16 and 17 show the interpretive areas of extent for TCE, DCE, and vinyl chloride, respectively.

As in the soils, the primary VOC constituents in ground water were TCE, DCE, and vinyl chloride. The highest concentration of TCE was in MW-3 (1,100,000 ppb); however, downgradient concentrations were nondetectable MW-8 and MW-21 or at estimated values less than the 5 ppb method detection limit. Concentrations of TCE, DCE, and vinyl chloride were found in the western parking lot area in the vicinity of monitoring wells, observation well points and adjacent to backfilled trenches for the storm water/sanitary sewers and the storm water drainage ditch.

Based on soil and water quality results and the interpretive extent of TCE, DCE, and vinyl chloride (Figures 14-17), there appears to be two distinctive areas of constituent concentrations. These areas are the vicinity of the metals-preparation room adjacent to MW-3 and MW-3R and the western section of the employee parking lot, south of the main facility building.

The sewer backfill area appears to have provided a preferential pathway for ground water flow and constituent migration. The potentiometric surface map shows a mounding in the area of the south-flowing drainage ditch which would allow for constituent migration into surrounding, upper till soils. The drainage ditch is believed to have provided a preferential pathway for migration of ground water constituents exiting the culvert.

Based on TAL metals and cyanide analytical results (Table 10) for soils and sediment samples, metals concentrations were generally either within the range of natural soils or ranges of undisturbed soils in the Cheektowaga area (Table 16).

Filtered and unfiltered ground water samples were analyzed for metals. Concentrations of metals in unfiltered samples were generally elevated above NYS Ground water Quality Standards. It is believed that these results are biased high due to the turbidity encountered during sampling and are not reflective of actual ground water conditions at the site. Results of filtered samples collected in June 1992 were generally below NYS Ground water Quality Standards. Antimony was the only Priority Pollutant metal detected above the standards, and was only detected at sampling locations MW-1, MW-4, MW-7 and MW-8. Based on the June 1992 analytical results, metals in soil do not appear to be leaching to ground water.

As shown on Figures 14 through 17, the lateral extent of constituent concentrations has been delineated. The absence of ground water in the low-permeability bedrock suggests the limitation of the vertical extent of constituents. Therefore, additional remedial investigation is not warranted.

6.3 NATURAL-RESOURCES AND HUMAN-HEALTH RISK ASSESSMENTS

No significant or critical habitats and no state or federally protected plant or animal, or habitats critical to these species, were observed or are known to occur within the two-mile radius area, or within nine miles downstream of Cayuga Creek.

The pathway analysis in Section 4.2.2 demonstrated that significant sources of contaminants most likely do not exist off site based upon surface-water sampling of drainage-ditch water at the southeastern property boundary. Also, significant resources that could potentially be impacted by contaminants of concern do not exist in the vicinity of the site, and, furthermore, no direct, surface-water pathway was identified between the Aro facility and Cayuga Creek. The findings of the pathway analysis demonstrates minimal impact with no requirement for additional analyses.

The assessment of the air-emissions pathways indicated that the modeled off-site concentrations of TCE, DCE, and vinyl chloride are below applicable NYS Annual Guideline Concentrations (AGC). The maximum impacts of TCE and vinyl chloride are approximately 50% and 10% of the AGC, respectively. The DCE maximum impact is several orders of magnitude below its AGC.

6.4 INTERIM REMEDIAL MEASURES (IRMs)

As previously stated (Section 1.3), one of the objectives of the remedial investigation is to identify potential IRMs which could be undertaken to control contaminant migration and begin cleanup. As discussed in the following paragraphs, the available options for initial actions are limited.

IRMs generally consist of obvious and appropriate activities for either contaminant source control or migration management. Source control measures typically constitute activities such as removal of drums, excavation of contaminated soil, or removal of non-aqueous phase liquids. Migration management limits continued contaminant migration, generally by the use of either hydraulic or physical barriers.

Drums, wastes or other potential contaminant sources were not identified during the remedial investigation, and Aro's current activities and processes are not expected to cause future environmental impairment (trichloroethylene is no longer used as a degreasing solvent). Therefore, control of such potential sources is not necessary.

Soil containing various constituents, including TCE, has been identified on the site but not at sufficient levels to implement an IRM. In some cases, removal of affected soil can constitute an IRM, but at the Aro site, much of the soil is adjacent to or beneath the main facility building (Figure 14). In addition, due to the shallow depth to the water table, dewatering would be necessary to excavate deeper than a few feet. Treatment and disposal of the discharge water, and geotechnical concerns regarding the feasibility of pumping and excavating in the vicinity of existing buildings, preclude soil removal as a potential IRM for the Aro facility.

A small amount of DNAPL was noticed in the development discharge water for replacement monitoring well MW-3. It was not apparent at the time (June 1992) whether the well screen intersected a zone of nonaqueous phase liquid. Subsequent remedial investigation supplemental work performed under the supervision of the NYSDEC in the former vapor degreasing area did not identify any evidence of DNAPL. Therefore, an IRM is not warranted for the MW-3 area in response to a DNAPL concern.

Interpretive maps of the extent of constituents in soil (Figure 14) and ground water (Figures 15 through 17) indicate that previous site activities have only affected the Aro property and a small area immediately adjacent to the western site boundary. Due to the slow rate of ground water flow (less than one foot per year), it does not appear that migration control is warranted.

Therefore, interim remedial action does appear appropriate for the site based on the data obtained to date. A preliminary screening of remedial alternatives, followed by necessary Treatability Studies (if appropriate), will be performed as part of the feasibility study. The Feasibility Study Report will provide a detailed analysis and recommendation of remedial alternatives for the applicable site media. Upon NYSDEC recommendation acceptance, the selected remedial alternatives will be implemented in accordance with a NYSDEC-approved Work Plan following appropriate state and federal guidelines.

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APPENDIX L
SOUTHERN DELINEATION MONITORING WELL
REVISED REMEDIAL INVESTIGATION REPORT
DATED DECEMBER 28, 1993

Introduction

As negotiated with the New York State Department of Environmental Conservation (NYSDEC), additional investigation work was performed at The Aro Corporation facility located in Buffalo, New York. The additional evaluation at the Aro site was performed specifically to address the NYSDEC's March 22, 1993, remedial investigation comments letter and supplement the previously submitted remedial investigation reports. This included the installation of a monitoring well on the facility's southern property boundary to delineate the southern extent of the ground water contamination.

Monitoring Well Installation

Capsule supervised the installation of one monitoring well on September 21, 1993, along the facility's southern property boundary. The attached Figure 1 identifies the location of the monitoring well. The boring for the monitoring well was drilled using the hollow-stem auger drilling method. Sediments were evaluated at 5 foot intervals during the advancement of the boring using a split spoon sampler that was driven ahead of the augers. The split spoon sampler was decontaminated with a soap and water wash followed by a deionized water rinse after each sample was collected.

Sediment samples evaluated during the advancement of the boring were logged by the on-site hydrogeologist. A geologic log and well construction diagram are included and describe the classification of the sediments encountered at the referenced depth and other information pertinent to the advancement of the boring. The sediments logged consisted primarily of silt with small amounts of clay and fine to medium grained sand. Bedrock was encountered in the borehole at a depth of 14 feet below grade level (bgl).

During the advancement of the borehole, sediment samples were screened for the presence of organic vapors by headspace analysis using a photoionization detector (PID). The PID was calibrated with isobutylene referenced to a 57 parts per million (ppm) benzene standard. A quart jar was filled half full with sediment taken from the split spoon. The jars were covered with foil and a lid, shaken vigorously, and allowed to sit for 10 minutes. Each jar was then shaken again, the lid removed, and the instrument tip thrust through the foil into the headspace and the reading was recorded. None of the samples collected contained detectable levels of organic vapors.

One monitoring well, MW-21, was installed in the borehole on September 21, 1993. The monitoring well was constructed using a 2 inch diameter, 10 slot (0.010-inch), polyvinyle chloride (PVC) well screen and PVC casing. The annular space between the well screen and the borehole was filled with No. 1 well gravel to a depth of 1 foot above the top of the screen. Above the filter pack, a 1 foot thick layer of bentonite was added to the annulus. The boring was then grouted to the surface using neat cement. A protective cover with locking cap was installed over the well following its completion. After the monitoring well was installed, the well was developed by bailing until sediment free water was produced. During the development process, measurements of pH, conductivity, and temperature were recorded to verify that the well had been properly developed. All of the development water was containerized and is currently stored on site.

Following development, a ground water sample was collected from the newly installed well. Prior to sampling, the well was evacuated using a dedicated bailer until a minimum of three well volumes of water were removed and three consecutive temperature, pH, and conductivity readings had shown consistent values.

Conclusions

The ground water sample collected from MW-21 was analyzed by U.S. Environmental Protection Agency (EPA) Method 8240. The environmental analysis of MW-21 did not identify any volatile organic compounds present. The analytical data sheets are attached and follow Figure 1.

Based on the placement of the monitoring well and the subsequent analytical results, we believe that the ground water contamination is limited in the southern extent to only the Aro property and does not extend onto the Niagara & Lockport Power Company easement or the Conrail Railroad easement.

PROJECT: ARO - Buffalo, NY

DRILLER: Environmental Products & Services,

PAGE: 1 OF: 1

DATE: September 21, 1993

LOGGED BY: Scott A. Nocton

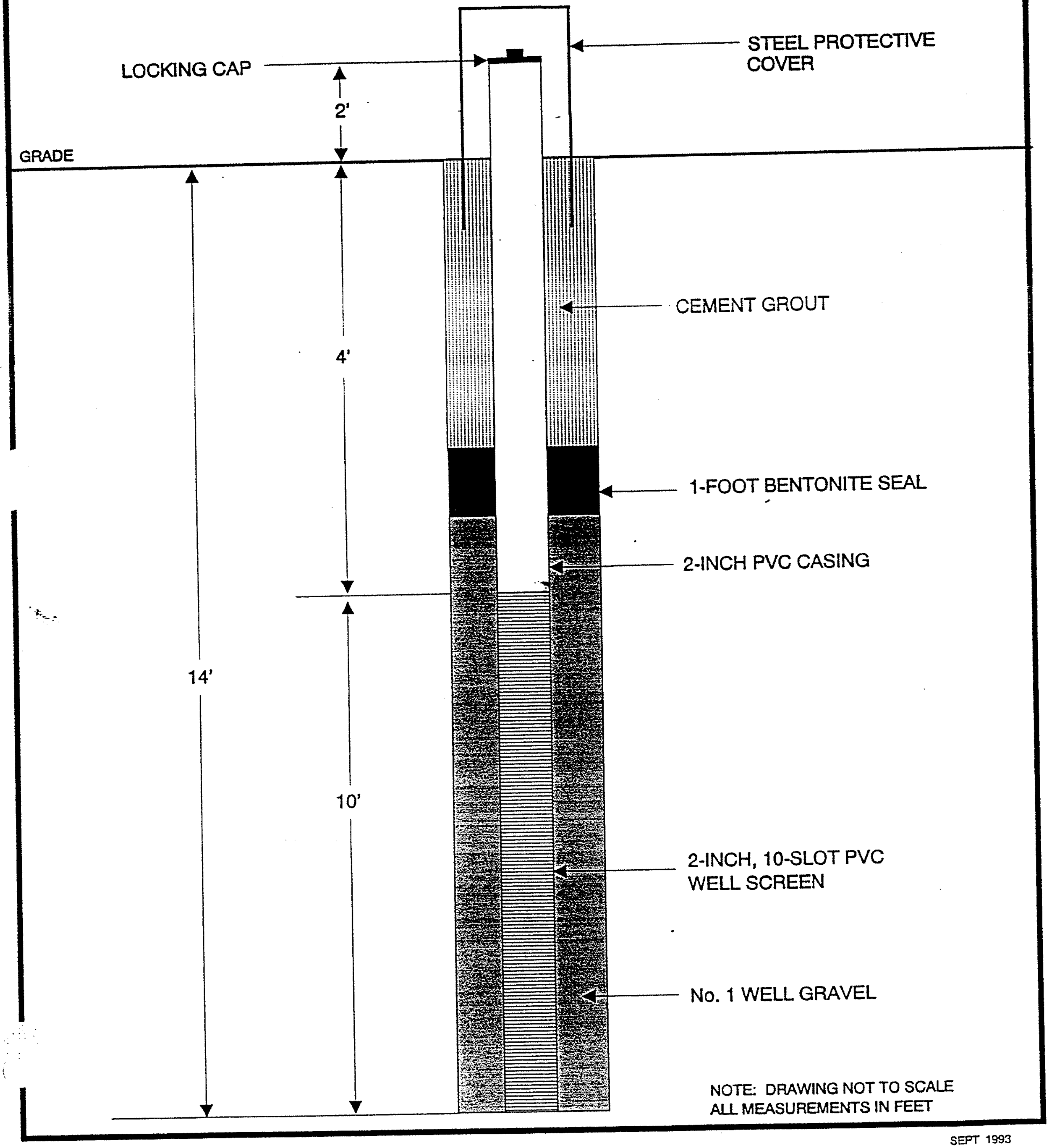
BORING #: MW-21

D ING METHOD: Hollow-Stem Auger

DEPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	OTHER
	Topsoil; dark brown to black silt with trace amounts of sand, organic rich.	4-4-6-10	100%		
5	Silt, grayish brown; some fine to medium grained sand; trace amounts of clay; very hard and dry. (very difficult to drill)	43-45-60-104	80%		
10	same as 4.5 to 6.5 feet bgl to 10.5 feet; then sand, fine grained, moist, gray to 10.5 feet; then grayish brown silt again.	44-65-21-98	75%		
15	Auger refusal at 14.0 feet bgl; attempted to sample but were unable to drive spit spoon any distance after 100 blows; assumed to be top of bedrock.	100+	0%		
20					
25					
30					
35					
40					
45					
50					

ARO CORPORATION
BUFFALO, NEW YORK

CONSTRUCTION DETAILS OF MONITORING WELL MW-21



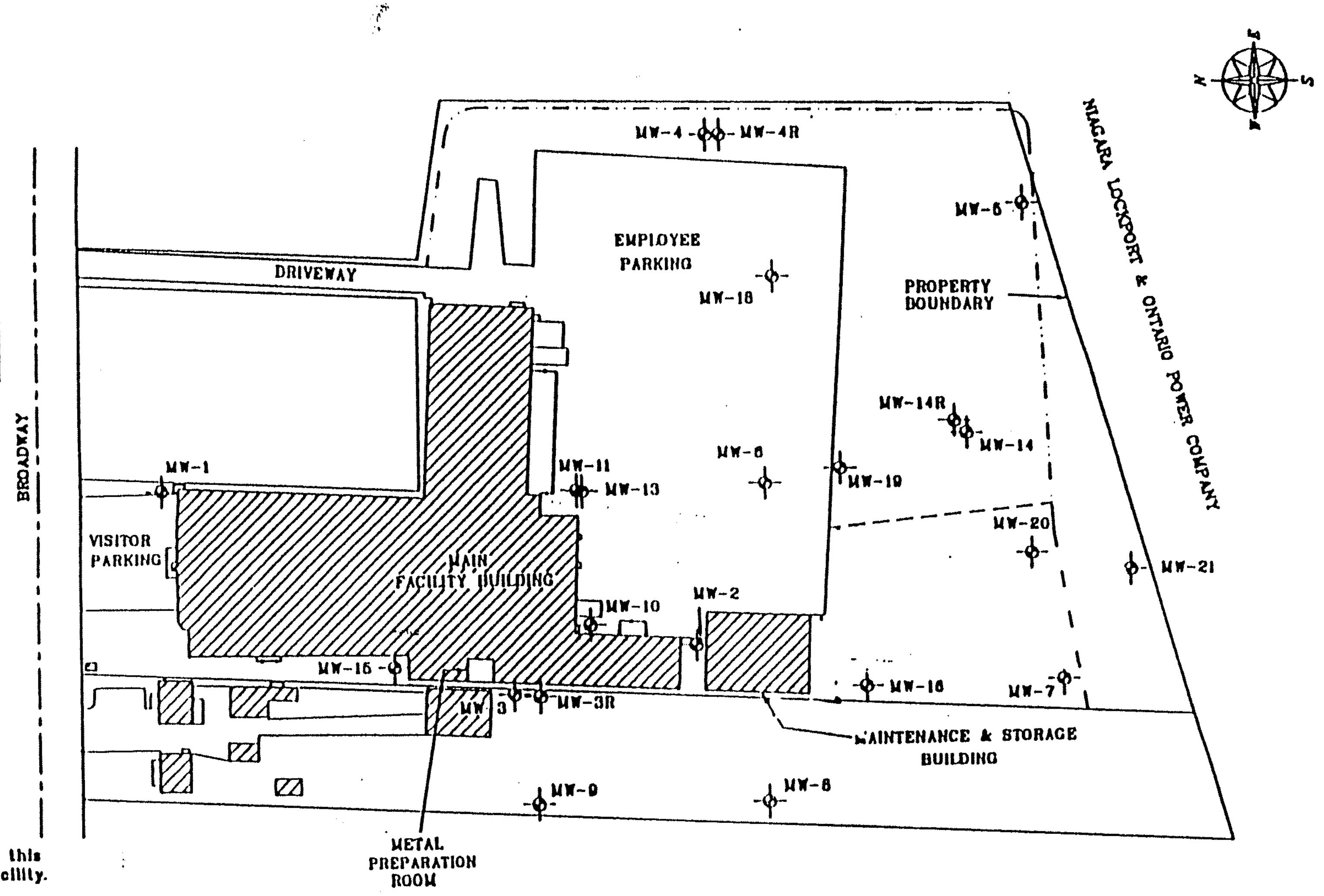
NOTE: DRAWING NOT TO SCALE
ALL MEASUREMENTS IN FEET

CAPSULE ENVIRONMENTAL ENGINEERING, INC.

SEPT 1993

LEGEND

- -⌀- MONITORING WELL
- — — STORM-WATER/ RUNOFF DRAINAGE DITCH
- SUBSURFACE STORM-WATER/ SANITARY SEWERS



NOTE

1.) Additional subsurface utilities not shown on this figure, exist at the facility.

SOURCES:

(1) [illegible] & ASSOCIATES, Dwg. No. [illegible] (FEBRUARY [illegible])

SCALE
1 INCH = 130 FEET

ARO CORPORATION

BUFFALO, NEW YORK

CAPSULE
Environmental Engineering Inc.
1970 OAKCREST AVENUE, SUITE 215, ST PAUL, MINNESOTA 55113
PHONE (612)636-2644 ● FAX (612)636-3106

SITE MAP

PROJECT 128-98 FIGURE L1

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Analysis Services

October 12, 1993

RECEIVED
OCT 18 1993
CAPSULE

ID #: __________
SERVICE: __________
MT: __________

Mr. Tony Grooms
Capsule Environmental Engineering
1970 Oakcrest Avenue
Suite 215
ST. Paul, Minn. 55113

RE: Analytical Results

Dear Mr. Grooms:

Please find enclosed results concerning the analyses of the samples recently submitted by your firm . The Pertinent Information regarding these analyses is listed below:

Quote #:	NY93-644
Project Name:	ARO Corporation
Matrix:	Aqueous
Samples Received:	09/22/93
Sample Date:	09/22/93

If you have any questions concerning these data, please contact Ms. Julie Calvert, Program Manager at (716) 691-2600 and refer to the I.D. number listed below. It has been our pleasure to provide Capsule Environmental Engineering with Environmental Testing Services. We look forward to serving you in the future.

Sincerely,

RECRA ENVIRONMENTAL, INC.

Robert K. Wyeth
Laboratory Director

VDP/RKW/sh
Enclosure

I.D.# 93-3198
NY3A4752

ANALYTICAL RESULTS

Prepared For

Capsule Environmental Engineering
1970 Oakcrest Avenue
Suite 215
ST. Paul, Minn. 55113

Prepared By

Recra Environmental, Inc.
10 Hazelwood Drive, Suite 106
Amherst, New York 14228-2298

METHODOLOGY

The specific methodologies employed in obtaining the enclosed analytical results are indicated on the specific data table. The method numbers presented refer to one of the following U.S. Environmental Protection Agency references.

- U.S. Environmental Protection Agency "Test Methods for Evaluating Solid Waste-Physical/Chemical Methods." Office of Solid Waste and Emergency Response. November 1986, SW-846, Third Edition.

COMMENTS

The enclosed data has been reported utilizing data qualifiers (Q) as defined on the Organic Data Comment Page.

Quality control analyses were performed on a batch basis. All results were within acceptable limits.

No deviations from protocol were encountered during the analytical procedure.

ORGANIC DATA COMMENT PAGE

Laboratory Name RECRA ENVIRONMENTAL, INC.

USEPA Defined Organic Data Qualifiers:

U - Indicates compound was analyzed for but not detected.

J - Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than zero.

C - This flag applies to pesticide results where the identification has been confirmed by GC/MS.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for that specific analysis.

D - This flag identifies all compounds identified in an analysis at a secondary dilution factor.

G - The TCLP Matrix Spike recovery was greater than the upper limit of the analytical method.

L - The TCLP Matrix Spike recovery was lower than the lower limit of the analytical method.

T - This flag is used when the analyte is found in the associated TCLP extraction as well as in the sample.

N - Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search. It is applied to all TIC results.

P - This flag is used for a pesticide/Aroclor target analyte when there is greater than 25% difference for detected concentrations between the two GC columns. The lower of the two values is reported on the Form I and flagged with a "P".

A - This flag indicates that a TIC is a suspected aldol-condensation product.

SAMPLE DATA

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

aboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
ab Job No:	A93-3198	Dilution Factor:	1
ab Sample ID:	AS045812	Sample Date:	09/22/93
lient Sample ID:	MW-21	Analysis Date:	09/23/93

Parameter Units = UG/L	Result	Q
Acetone	10	U
Benzene	5	U
Bromodichloromethane	5	U
Bromoform	5	U
Bromomethane	10	U
2-Butanone	10	U
Carbon Disulfide	5	U
Carbon Tetrachloride	5	U
Chlorobenzene	5	U
Chloroethane	10	U
Chloroform	5	U
Chloromethane	10	U
Dibromochloromethane	5	U
1,1-Dichloroethane	5	U
1 Dichloroethane	5	U
-Dichloroethene	5	U
1,2-Dichloroethene (Total)	5	U
1,2-Dichloropropane	5	U
cis-1,3-Dichloropropene	5	U
trans-1,3-Dichloropropene	5	U
Ethyl benzene	5	U
2-Hexanone	10	U
Methylene chloride	5	U
4-Methyl-2-pentanone	10	U
Styrene	5	U
1,1,2,2-Tetrachloroethane	5	U
Tetrachloroethene	5	U
Toluene	5	U
1,1,1-Trichloroethane	5	U
1,1,2-Trichloroethane	5	U
Trichloroethene	5	U
Vinyl acetate	10	U
Vinyl chloride	10	U
Total Xylenes	5	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-3198
Lab Sample ID: AS045813
Client Sample ID: TRIP BLANK

Matrix: Aqueous
Dilution Factor: 1
Sample Date: 09/22/93
Analysis Date: 09/23/93

Parameter Units = UG/L	Result	Q
Acetone	10	U
Benzene	5	U
Bromodichloromethane	5	U
Bromoform	5	U
Bromomethane	10	U
2-Butanone	10	U
Carbon Disulfide	5	U
Carbon Tetrachloride	5	U
Chlorobenzene	5	U
Chloroethane	10	U
Chloroform	5	U
Chloromethane	10	U
Dibromochloromethane	5	U
1,1-Dichloroethane	5	U
1,2-Dichloroethane	5	U
1,1-Dichloroethene	5	U
1,2-Dichloroethene (Total)	5	U
1,2-Dichloropropane	5	U
cis-1,3-Dichloropropene	5	U
trans-1,3-Dichloropropene	5	U
Ethyl benzene	5	U
2-Hexanone	10	U
Methylene chloride	5	U
4-Methyl-2-pentanone	10	U
Styrene	5	U
1,1,2,2-Tetrachloroethane	5	U
Tetrachloroethene	5	U
Toluene	5	U
1,1,1-Trichloroethane	5	U
1,1,2-Trichloroethane	5	U
Trichloroethene	5	U
Vinyl acetate	10	U
Vinyl chloride	10	U
Total Xylenes	5	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-3198	Dilution Factor:	1
Lab Sample ID:	AR011402	Sample Date:	-
Client Sample ID:	METHOD BLANK(VBLK73)	Analysis Date:	09/23/93

Parameter	Units = UG/L	Result	Q
Acetone		10	U
Benzene		5	U
Bromodichloromethane		5	U
Bromoform		5	U
Bromomethane		10	U
2-Butanone		10	U
Carbon Disulfide		5	U
Carbon Tetrachloride		5	U
Chlorobenzene		5	U
Chloroethane		10	U
Chloroform		5	U
Chloromethane		10	U
Dibromochloromethane		5	U
1,1-Dichloroethane		5	U
1,2-Dichloroethane		5	U
1.[illegible]Dichloroethene		5	U
[illegible]-Dichloroethene (Total)		5	U
1,2-Dichloropropane		5	U
cis-1,3-Dichloropropene		5	U
trans-1,3-Dichloropropene		5	U
Ethyl benzene		5	U
2-Hexanone		10	U
Methylene chloride		5	U
4-Methyl-2-pentanone		10	U
Styrene		5	U
1,1,2,2-Tetrachloroethane		5	U
Tetrachloroethene		5	U
Toluene		5	U
1,1,1-Trichloroethane		5	U
1,1,2-Trichloroethane		5	U
Trichloroethene		5	U
Vinyl acetate		10	U
Vinyl chloride		10	U
Total Xylenes		5	U

CAPSULE ENV ONMENTAL ENG
METHOD 8240 - TCL VOLATILE ORGANICS
WATER INTERNAL STANDARDS RECOVERY

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-3198

Client Sample ID	Lab Sample ID	IS1 BCM #	IS2 DFB #	IS3 CBZ #
METHOD BLANK(VBLK73)	AR011402	93	93	88
MW-21	AS045812	92	94	87
TRIP BLANK	AS045813	92	94	89

				QC Limits
IS1	BCM	=	Bromochloromethane	(50 - 200)
IS2	DFB	=	1,4-Difluorobenzene	(50 - 200)
IS3	CBZ	=	Chlorobenzene-D5	(50 - 200)

Column to be used to flag recovery values
* Values outside of contract required QC limits

CAPSULE ENVIRONMENTAL ENG
METHOD 8240 - TCL VOLATILE ORGANICS
WATER SURROGATE RECOVERY

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-3198

Client Sample ID	Lab Sample ID	S1 TOL #	S2 BFB #	S3 DCE #
METHOD BLANK(VBLK73)	AR011402	103	99	103
MW-21	AS045812	101	99	102
TRIP BLANK	AS045813	101	101	105

				QC Limits
S1	TOL	=	Toluene-D8	(88 - 110)
S2	BFB	=	p-Bromofluorobenzene	(86 - 115)
S3	DCE	=	1,2-Dichloroethane-D4	(76 - 114)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogates diluted out

RECRA ENVIRONMENTAL, INC. *CHAIN OF CUSTODY RECORD*

PROJECT NO 128-98

SITE NAME Aro - Buffalo, NY

SAMPLERS (SIGNATURE)

STATION NO	DATE	TIME	COMP	GRAB	STATION LOCATION	NO OF CONTAINERS	8240						REMARKS
	4-22-93	13:05		X	MW-21	3	X						

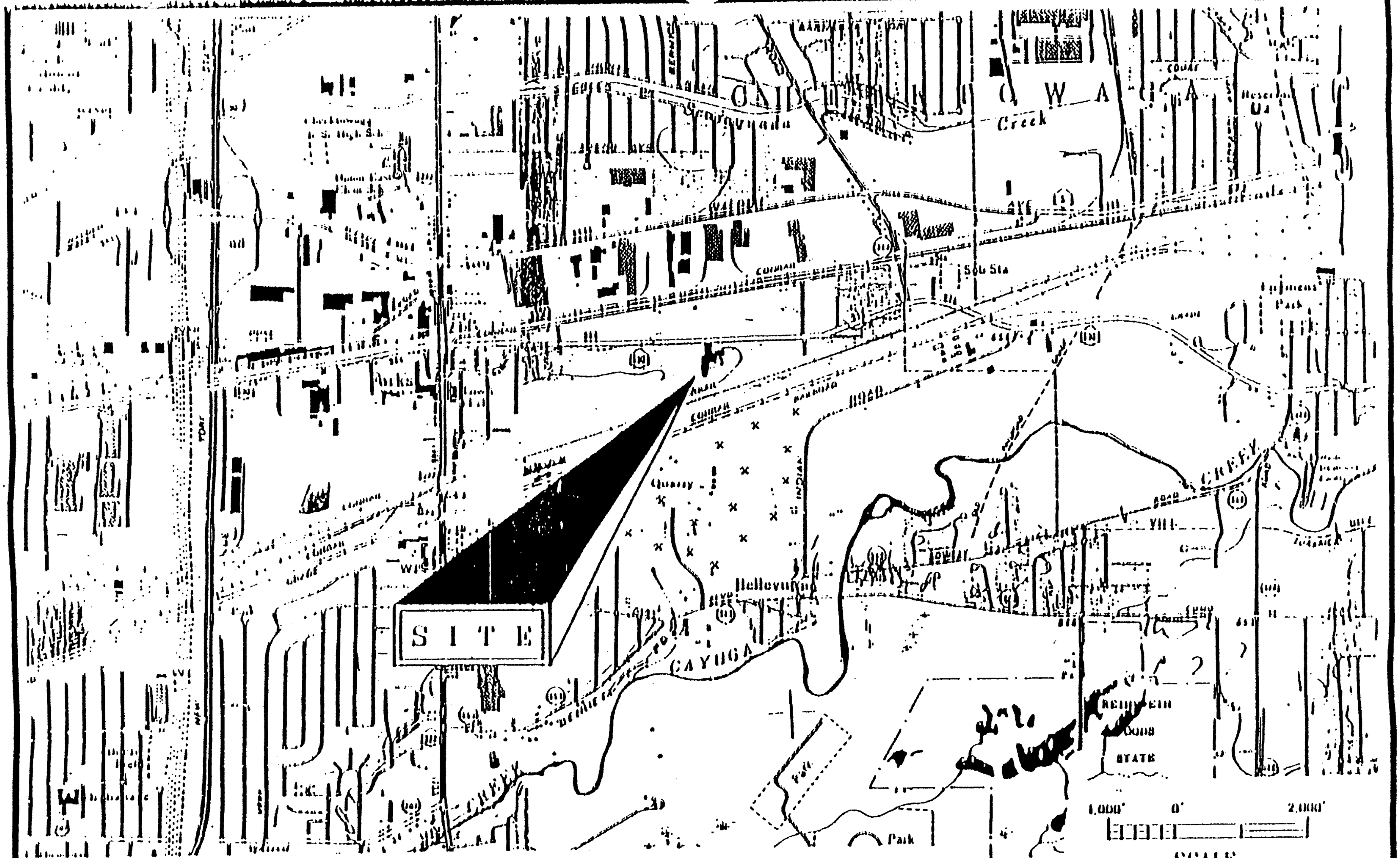
RELINQUISHED BY (SIGNATURE)	DATE / TIME		RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE / TIME		RECEIVED BY (SIGNATURE)
	9-22-93	2:25					
RELINQUISHED BY (SIGNATURE)	DATE / TIME		RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE / TIME		RECEIVED BY (SIGNATURE)
RELINQUISHED BY (SIGNATURE)	DATE / TIME		RECEIVED FOR LABORATORY BY (SIGNATURE)	DATE / TIME		REMARKS	
				9-22-93	1405	Standard T.O.T.	

Distribution: Original accompanies shipment copy to coordinator field files

APPENDIX M

FIGURE

REVISION 2 HMP/11/6/92



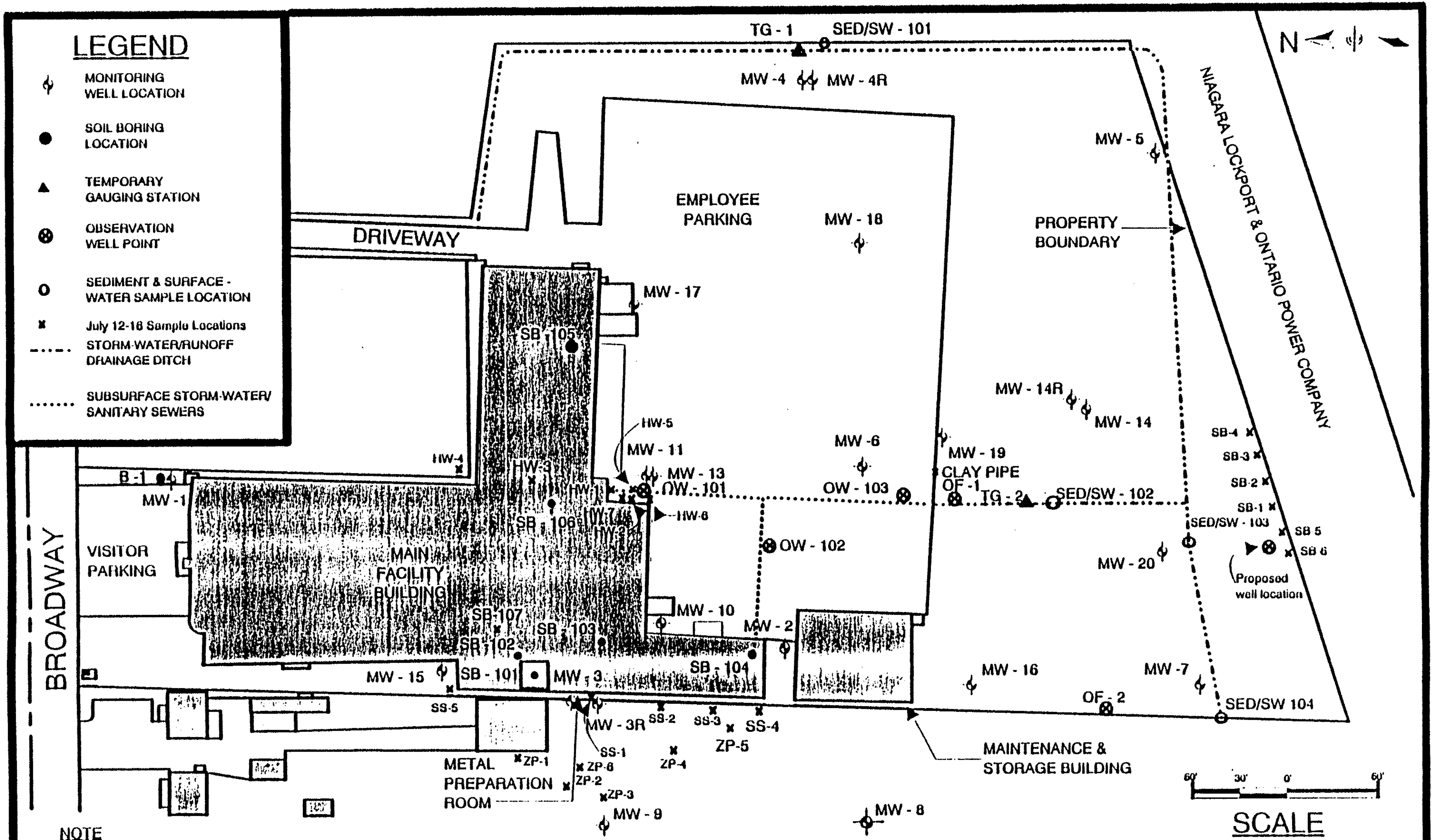
SOURCE : U.S.G.S. 7.5' QUADRANGLES, LANCASTER & BUFFALO NE (1965, PHOTOREVISED 1986)

ARO
CORPORATION
BUFFALO, NEW YORK

LAW
ENVIRONMENTAL
a professional engineering & earth science consulting firm

SITE LOCATION

PROJECT NO.62-2507 FIGURE 1



NOTE

1.) ADDITIONAL SUBSURFACE UTILITIES NOT SHOWN ON THIS FIGURE, EXIST AT THE FACILTY

SOURCES:

(1.) TALLAMY, VAN KUREN, GERTIS & ASSOCIATES, Dwg. No. 15611 (FEBRUARY 23, 1991)

(2.) KREHBIEL ASSOCIATES Dw. No. D-2300 (JUNE 23, 1992)

(3) LAW ENVIRONMENTAL Dwg. No. 52-2507 (DEC. 1, 1992)

ARO CORPORATION

BUFFALO, NEW YORK

CAPSULE
ENVIRONMENTAL ENGINEERING INC
1970 OAKCREST AVENUE, SUITE 216
ST. PAUL, MINNESOTA 55113
(612) [illegible]

SITE PLAN

PROJECT FIGURE 1

TABLE

TABLE 1

SUMMARY OF GAS CHROMATOGRAPH SCREENING TEST RESULTS FOR SOIL SAMPLES

ARO Corporation Site

			TENTATIVE IDENTIFICATION and ESTIMATED CONCENTRATION (mg/kg or ppm)				
SAMPLE LOCATION	DEPTH (FT)	DATE TESTED	trans 1,2 DCE	cis 1,2 DCE	1,1,1 TCA	TCE	REMARKS
SS-1	1-2.8	7/14/93	ND(0.12)	0.14	ND(65)	1	
SS-1	8-10	7/14/93	ND(1.2)	ND(1.2)	ND(650)	10	
SS-1	10-12	7/14/93	ND(1.2)	ND(1.2)	ND(650)	51	
SS-1	12-14	7/14/93	ND(1.2)	ND(1.2)	ND(650)	15	
SS-1	14-16	7/14/93	ND(1.2)	ND(1.2)	ND(650)	4	
SS-1	16-18	7/14/93	ND(1.2)	ND(1.2)	ND(650)	15	
SS-1	18-20	7/14/93	ND(1.2)	ND(1.2)	ND(650)	5	
SS-1	20-22	7/14/93	ND(10)	ND(10)	ND(5000)	210	
SS-1	22-24	7/14/93	ND(1.2)	ND(1.2)	ND(650)	12	
SS-2 sed		7/13/93	ND	0.3	ND	0.02	
SS-3 sed		7/13/93	ND	0.04	ND	ND	
SS-4 sed		7/13/93	ND	0.06	ND	0.03	See Note 10
SS-5	2-4	7/15/93	ND	0.01	ND	0.02	
ZP-1	12-14	7/15/93	ND	ND	ND	ND	
ZP-2	12-14	7/16/93	ND	ND	ND	ND	
ZP-3	12-14	7/15/93	ND	ND	ND	ND	
ZP-4	12-14	7/16/93	ND	ND	ND	ND	
ZP-5	12-14	7/15/93	ND	ND	ND	ND	
ZP-6	12-14	7/16/93	ND	ND	ND	ND	
clay pipe sed		7/12/93	ND	ND	ND	ND	
sewer bedding		7/12/93	ND	0.09	ND	0.04	
OF-2 sed		7/13/93	ND	ND	ND	ND	
SED-104		7/12/93	ND	ND	ND	ND	See Note 9
SB-107	0-2	7/15/93	ND	ND	ND	ND	
SB-107	2-4	7/16/93	0.02	0.1	ND	ND	
SB-107	4-6	7/15/93	ND	ND	0.01	ND	
B-107	6-8	7/16/93	ND(0.05)	0.5	ND(25)	2	
HW-1 sed		7/15/93	ND(0.2)	0.9	ND(125)	4	
HW-2	0-2	7/15/93	ND	0.02	ND	0.1	
HW-2	2-4	7/15/93	ND(1.2)	9	ND(650)	30	
DETECTION LIMIT			0.01	0.01	0.5	0.01	See Note 7

*Refer to notes for additional information.

TABLE 1

SUMMARY OF GAS CHROMATOGRAPH SCREENING TEST RESULTS FOR SOIL SAMPLES

ARO Corporation Site

			TENTATIVE IDENTIFICATION and ESTIMATED CONCENTRATION (mg/kg or ppm)				
SAMPLE LOCATION	DEPTH (FT)	DATE TESTED	trans 1,2 DCE	cis 1,2 DCE	1,1,1 TCA	TCE	REMARKS
HW-3	4-6	7/15/93	ND(0.5)	2	ND(250)	20	
HW-4	1-3	7/15/93	ND	0.1	ND	0.1	
HW-5	2-2.5	7/16/93	ND	0.01	ND	0.04	
HW-5	3	7/15/93	ND(0.2)	0.7	ND(125)	1	
HW-5	3.5-4	7/16/93	0.1	15	ND(65)	4	
HW-5	4-6	7/15/93	ND(0.5)	14	ND(250)	16	
HW-5	6-8	7/16/93	ND(0.2)	2	ND(125)	4	
HW-6	2-4	7/15/93	ND	ND	ND	0.02	
HW-6	4-6	7/16/93	ND(0.05)	0.3	ND(25)	0.3	
HW-7	2-4	7/16/93	ND	0.06	ND	0.09	
HW-7	4-6	7/16/93	ND(0.2)	9	ND(125)	10	
HW-7	6-8	7/16/93	ND(0.2)	10	ND(125)	13	
DETECTION LIMIT			0.01	0.01	0.5	0.01	See Note 7

* Refer to notes for additional information.

TABLE 1

SUMMARY OF GAS CHROMATOGRAPH SCREENING TEST RESULTS FOR WATER SAMPLES

ARO CORPORATION SITE

SAMPLE LOCATION	DEPTH	TRANS 1,2 DCE	CIS 1,2 DCE	1,1,1 TCA	TCE	REMARKS
SB-1	9'-11'	ND	ND	ND	ND	
SB-2	9'-11'	ND	ND	ND	ND	
SB-3	9'-11'	ND	ND	ND	ND	
SB-4	9'-11'	ND	ND	ND	ND	
SB-5	9'-11'	ND	ND	ND	ND	
SW-104	SURFACE	ND	0.03	ND	0.03	
CLAY PIPE	SURFACE	ND	BDL	ND	BDL	
OF-1	12'-13'	ND	0.3	ND	0.02	
OF-2 GRAB	INSIDE MANHOLE	ND	0.1	ND	0.03	
SS-1	1'-2.8'	ND	0.5	ND	1	
SS-3	1.5'-3'	ND	0.3	ND	0.06	
SS-4	1.5'-3.'	ND	0.2	ND	0.06	SEE NOTE 9
DETECTION LIMIT		0.01	0.01	0.5	0.01	SEE NOTE 7

TABLE 1

NOTES:

1. The water samples were collected in the field by Zebra Environmental (ZEBRA) and placed in precleaned 40 ml glass septum vials to exclude air. To prepare the samples for screening, an approximate 15 ml headspace of air was created inside the vial. It was then heated to 30 (7/12/93) or 40 degrees celsius (^{d}C) in a thermostatically controlled water bath. A 2 to 250 ul headspace sample was then withdrawn, using a gas tight syringe and injected directly into the gas chromatograph.

2. Screening was done using a Photovac (Model 10S50) portable photoionization gas chromatograph equipped with a 20 foot CPSIL-5CB capillary column enclosed in an isothermal oven.

3. Gas chromatograph operating conditions:

   Column Temperature; 30 (7/12/93) or 40 degrees celsius)
   Identification Window; + or - 5%
   Gain Setting; 20
   Carrier Gas Flow; 17 ml/min (7/12/93) or 12 ml/min (hydrocarbon free air)

4. The gas chromatograph was calibrated, prior to the analysis of samples, using standard compounds. The standards used were as follows:

   0.016 mg/l trans 1,2 DCE (Dichloroethene)
   0.016 mg/l cis 1,2 DCE
   0.1 mg/l 1,1,1 TCA (Trichloroethane)
   0.017 mg/l TCE (Trichloroethene)

5. Compound were tentatively identified by comparing their elution times to those of the standard compounds referenced in Note 4.

6. Identities and concentrations of volatile organic compounds reported using this screening technique are subject to limitations inherent to this method. If confirmation is desired, duplicate samples should be submitted to a certified analytical laboratory for analysis using methods approved by the USEPA.

7. ND = Compound not detected above the listed detection limit or in the case of samples that were diluted, prior to injection, the detection limit listed in parentheses.

   BDL = Compound detected below method detection limit.

8. Compound with elution times other than those listed in Note 4 were not evaluated during screening. However, if other compounds were detected, this was noted on the summary of test results.

9. Several other unknown compounds also detected in this sample.

TABLE 1

NOTES:

1. The soil samples were collected in the field by Zebra Environmental (ZEBRA) and placed in precleaned glass vials provided by GZA. Sample locations and depth information was provided by ZEBRA. To prepare the samples for screening the estimated dry weight of the soil was determined using a dial-o-gram scale. Deionized water was added to the vial until an approximate 15 ml headspace remained. The soil/water mix was then agitated and heated to 30 (7/12/93) or 40 degrees celsius (°C) in a thermostatically controlled water bath. A 2-250 ul headspace sample was then withdrawn, using a gas tight syringe, and injected directly into the gas chromatograph (GC).

2. Screening was done using a Photovac (Model 10S50) portable photoionization gas chromatograph equipped with a 20 foot CPSIL--5CB capillary column enclosed in an isothermal oven.

3. Gas chromatograph operating conditions:

   Column Temperature; 30(7/12/93) or 40 degrees celsius
   Target Compound Identification Window; + or - 5%
   Gain Setting; 20
   Carrier Gas Flow; 17 ml/min(7/12/93) and 12 ml/min (hydrocarbon free air)

4. The gas chromatograph was calibrated, prior to the analysis of samples, using standard compounds. The standards used were as follows:

   0.32 ug trans 1,2 DCE (Dichloroethene)
   0.96 ug cis 1,2 DCE
   39.9 ug 1,1,1 TCA (Trichloroethane)
   0.73 ug TCE (Trichloroethene)

   The above listed standard compounds were placed in deionized water and prepared for screening using the same procedure as described in note 1 (heated, headspaced and injected directly into the GC). Response factors were determined based on the area of the peak generated by the above listed standards. It was assumed that the response for the range of concentrations measured during this screening was linear. Additionally, it was assumed that 100% of the compounds in the samples were extracted during this procedure.

5. Soil sample compounds were tentatively identified by comparing their elution times to those of the standard compounds referenced in Note 4.

6. Identities and concentrations of volatile organic compounds reported using this screening technique are subject to limitations inherent to this method. If confirmation is desired, duplicate samples should be submitted to a certified analytical laboratory for analysis using methods approved by the USEPA.

7. ND = Compound not detected above the listed detection limit or in the case of samples that were diluted, prior to injection, the detection limit listed between parentheses.

8. Compounds with elution times other than those listed in Note 4 were not evaluated during screening. However, if other compounds were detected, this was noted on the summary of test results.

9. Toluene also detected at approximately 0.08 mg/kg.

10. Several other unknown compounds also detected in this sample.

APPENDIX A

GZA
GeoEnvironmental
of New York

Engineers and
Scientists

364 Nagel Drive
Buffalo, New York
14225
716-685-2300
FAX 716-685-3629

July 22, 1993
File: 6045

Mr. Paul Fleischmann
Zebra Environmental Corporation
427 Fifth Avenue
Cedarhurst, New York 11516

Re: Field Screening Test Results
ARO Corporation Site
Buffalo, New York

Dear Mr. Fleischmann:

In accordance with our proposal dated July 12, 1993 (Attachment A) to Zebra Environmental Corporation (Zebra), GZA GeoEnvironmental of New York (GZA) completed field screening of soil and water samples. Per discussion with Zebra representatives, samples provided were screened for the presence of cis 1,2 - dichlorethene, trans 1,2 - dichlorethene, 1,1,1 - trichloroethane and trichloroethene at the ARO Corporation site. This work was done from July 12 to July 16, 1993. A summary of the results are included in Attachment B.

GZA has enjoyed working with you on this project. Please contact us with any questions you have regarding this information.

Very truly yours,

GZA GEOENVIRONMENTAL OF NEW YORK

Gary J. Klawinski /ep

Gary J. Klawinski
Senior Engineering Technician

Thomas R Heins

Thomas R. Heins, P.E.
Project Manager

GJK/ep
Attachment A: July 12, 1993 Proposal
Attachment B: Summary of Results

cc: Anthony Grooms (Capsule Environmental Engineering, Inc.)

ATTACHMENT A

JULY 12, 1993 PROPOSAL

GZA
GeoEnvironmental
of New York

Engineers and
Scientists

6045.02

COPY
Tom Heins

July 8, 1993
File: 9-93-691

GZA

364 Nagel Drive
Buffalo, New York
14225
716-685-2300
FAX 716-685-3629

Mr. Paul L. Fleischmann
Zebra Environmental Corporation
427 Fifth Avenue
Cedarhurst, New York 11516

Re: Photovac 10S50 Screening Services

Dear Mr. Fleischmann:

GZA GeoEnvironmental of New York (GZA) is pleased to submit this proposal to provide field screening services using a Photovac model 10S50 portable gas chromatograph (portable GC).

BACKGROUND

It is understood that Zebra Environmental Corporation (Zebra) has been retained to provide Geoprobe sampling services during a Remedial Investigation by others at the ARO Corporation in Buffalo, New York. As part of this work, samples of soil and water will be collected by Zebra. These samples will be delivered to an on-site GZA representative for screening using the portable GC. Following this screening, all samples will be returned to Zebra and we understand certain samples will be selected for further chemical analysis.

PURPOSE

The purpose of GZA's work will be to screen samples of soil and water, provided by Zebra, using a portable GC and the test methods outlined herein.

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JUL 13 1993
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SCOPE OF WORK

To achieve the stated purpose, GZA will complete the following scope of work.

1. Provide a Photovac model 10S50 with appropriate ancillary equipment and an operator at the ARO site on July 12, 1993 for a period of five (5) consecutive days thereafter.

2. Prior to use and, as necessary, thereafter calibrate the portable GC with four (4) standards to allow tentative identification and quantification of contaminants of concern. Currently, it is expected these standards will include:

   - Trichloroethene (TCE)
   - 1,1 - Dichloroethene
   - trans 1,2 - Dichloroethene
   - Trichloroethane (TCA)

3. Screen samples of soil provided by Zebra in accordance to the procedures outlined in Attachment A. Water samples will be screened using a similar procedure.

4. Complete QA/QC activities including;

   - duplicate analysis at a rate of 1 per each 10 samples tested
   - syringe blanks between test samples containing target compounds to assure no contamination is "carried over"

5. Verbally report tentative results as they are determined in the field and present written daily reports in a format similar to that outlined in Attachment B.

   [Note: The budget estimate for this work does not include the preparation of a summary report. If such a report is required, GZA will provide an addendum to this proposal.]

BASIS OF FEES

Based on our current understanding of the Client's needs, GZA's services, as outlined herein, will be billed at a lump sum rate of $700.00 per day. This rate assumes an eight (8) hour work day which includes travel to/from the site to GZA's office at 364 Nagel Drive, Buffalo, New York.

GZA's cost estimate is based on the anticipated scope of work outlined above, which represents our best judgement as to the level of effort requested. You will be notified of any conditions requiring an increase in the budget estimate, as soon as such becomes evident.

CONDITIONS OF ENGAGEMENT

This proposal forms the basis of engagement of this firm. Conditions of engagement are described in the attached Statement of Terms and Conditions (Attachment C). This proposal for services and the Statement of Terms and Conditions shall constitute the entire agreement between the parties.

ACCEPTANCE

This proposal may be accepted by signing in the appropriate spaces below and returning one copy to us. The executed agreement must be received prior to initiation of this work. The fee is due within 30 days of receipt of invoice.

Issuance of a purchase order implicitly acknowledges acceptance of the Statement of Terms and Conditions. The proposal for services and the Statement of Terms and Conditions shall constitute the entire agreement between the parties. The proposal is valid for a period of 30 days from the date of issue.

Should you have any questions regarding this proposal, please do not hesitate to contact the undersigned. GZA looks forward to working with Zebra Environmental Corporation.

Very truly yours,

GZA GEOENVIRONMENTAL OF NEW YORK

Thomas R Heins

Thomas R. Heins, P.E.
Project Manager

Raymond L Kampff

Raymond L. Kampff
Associate Principal

TRH/step
Attachment A: Photovac 10S50 Screening Procedures
Attachment B: Typical Report Format
Attachment C: Statement of Terms and Conditions

This proposal for Services and the Statement of Terms and Conditions are hereby accepted and executed by a duly authorized signatory, who by execution hereof, warrants that he/she has full authority to act for, in the name, and on behalf of the Zebra Environmental Corporation.

ZEBRA ENVIRONMENTAL CORPORATION

By: Title: President

Typed Name: Paul Fleischman Date: 7-12-93

ATTACHMENT A

VOLATILE ORGANIC SCREENING OF SOIL SAMPLES

VOLATILE ORGANIC SCREENING
OF SOIL SAMPLES

ANALYTICAL METHODOLOGY

OVERVIEW

This screening technique for volatile organic compounds (VOCs) in soil estimates concentrations (mg/kg) of these compounds from gaseous concentrations measured in air above the water (used to extract the VOCs) and soil sample mixture. VOCs are driven from the soil phase into the water phase by agitation and then to the headspace by increasing the sample temperature. An aliquot of the equilibrated headspace gas is injected into a gas chromatograph equipped with a photoionization detector to provide an indication of VOCs in the soil.

EQUIPMENT CLEANING

The equipment used to collect and screen samples is decontaminated and equipment blank samples collected and screened prior to delivery to the site to evaluate the effectiveness of decontamination. Cleaning includes washing the equipment with laboratory detergent and water, rinsing with potable water, rinsing with deionized water and allowed to air dry. Alternatively, equipment may be washed with laboratory detergent/water and then steam cleaned. Glass parts are cleaned, as previously described, and oven dried.

SAMPLE PREPARATION

The soil test samples consist of about 25 to 35 grams of soil placed in a 40 ml pre-cleaned sample vial with teflon septa top and about 15 to 25 ml of deionized water. The vial is then agitated for about one minute and placed in a 35 degrees Celsius heated water bath for at least 15 minutes.

ANALYTICAL METHODOLOGY

A 250 ml aliquot of heated headspace gas is withdrawn manually with a syringe. This is injected in the sample port of a Photovac Model 10S50 gas chromatograph, fitted with a 29 foot long CPSIL-5 fused silica capillary column enclosed in a isothermal oven, for analysis. The identification of specific sample compounds is based on comparing the elution time to standard chromatograms. The concentrations are determined by comparing the peak area of the sample compounds to those of the

CALIBRATION

The response of the gas chromatograph is calibrated with external standards prepared by spiking VOC free soil samples with a known quantity of target VOCs and then preparing and screening the samples in the same manner as the unknown samples.

Sample peaks are identified by comparing their retention times to retention times of calibration standards. Qualitative comparisons are made between the two sets of test data for each sample. Sample peaks identified as known compounds are quantified according to response factors determined from calibration standards.

ATTACHMENT B

SAMPLE REPORT

SUMMARY OF GAS CHROMATOGRAPH SCREENING TEST RESULTS FOR STORM/SANITARY SEWER WATER SAMPLES

PHASE II ENVIRONMENTAL SITE ASSESSMENT

[redacted]

	TENTATIVE IDENTIFICATION and ESTIMATED CONCENTRATION (mg/l or ppm)						
SAMPLE LOCATION	BENZENE	TRICHLOROETHENE	TOLUENE	TETRACHLOROETHENE	ETHYLBENZENE	TOTAL XYLENE	OTHERS
W1	0.006	ND	0.008	ND	ND	0.01	NO
W2 (Comp)	ND	ND	ND	ND	ND	ND	NO
W3(Comp)	ND	ND	ND	ND	ND	ND	NO
W4	ND	ND	ND	ND	ND	ND	NO
W5(1st Flush)	ND	ND	ND	ND	0.005	ND	NO
W6	ND	ND	ND	0.006	ND	ND	NO
W7	ND	ND	ND	ND	ND	ND	NO
W8	ND	ND	ND	ND	ND	ND	NO
W9	ND	ND	ND	ND	ND	ND	NO
W10	ND	ND	ND	ND	ND	ND	NO
W11	ND	ND	ND	ND	ND	ND	NO
W12	ND	ND	ND	ND	ND	ND	NO
W13	ND	ND	ND	ND	ND	ND	NO
W14	ND	ND	ND	ND	ND	ND	NO
W15	ND	ND	ND	ND	ND	ND	NO
DETECTION LIMIT	0.005	0.005	0.005	0.005	0.005	0.01	

* Refer to notes on next page for additional information.

NOTES:

1. The water samples were collected in the field by GZA ______________________ and placed in precleaned 40 ml glass septum vials to exclude air. To prepare the samples for screening, a 15 ml headspace of air was created inside the vial. It was then heated to 30 degrees celsius (°C) in a thermostatically controlled water bath. A 250 ul headspace sample was then withdrawn and injected directly into the gas chromatograph.

2. Screening was done using a Photovac (Model 10S50) portable photoionization gas chromatograph equipped with a 20 foot CPSIL-5CB capillary column enclosed in an isothermal oven.

3. Gas chromatograph operating conditions:

   Column Temperature; 30 degrees celsius)
   Identification Window; + or - 5%
   Gain Setting; 20
   Carrier Gas Flow; 17 ml/min (hydrocarbon free air)

4. The gas chromatograph was calibrated, prior to the analysis of samples, using standard compounds. The standards used were as follows:

   0.02 mg/l Benzene
   0.02 mg/l Trichloroethene
   0.02 mg/l Toluene
   0.02 mg/l Tetrachloroethene
   0.05 mg/l Ethylbenzene
   0.05 mg/l M and P Xylene
   0.05 mg/l O-Xylene

5. Water sample compound were tentatively identified by comparing their elution times to those of the standard compounds referenced in Note 4.

6. Identities and concentrations of volatile organic compounds reported using this screening technique are subject to limitations inherent to this method. If confirmation is desired, duplicate samples should be submitted to a certified analytical laboratory for analysis using methods approved by the USEPA.

7. ND = Compound not detected above the listed detection limit.

8. Compound with elution times other than those listed in Note 4 were not evaluated during screening. However, if other compounds were detected, this was noted on the summary of test results.

SUMMARY OF GAS CHROMATOGRAPH SCREENING TEST RESULTS FOR SOIL SAMPLES

PHASE II ENVIRONMENTAL SITE ASSESSMENT

[redacted]

		TENTATIVE IDENTIFICATION and ESTIMATED CONCENTRATION (mg/kg or ppm)						
SAMPLE LOCATION	DEPTH (FT)	BENZENE	TRICHLOROETHENE	TOLUENE	TETRACHLOROETHENE	ETHYLBENZENE	TOTAL XYLENE	OTHERS
S-1 S-2T	2-3.7	ND	ND	ND	ND	ND	ND	NO
S-2 S-2	2-4	ND	ND	ND	ND	ND	ND	NO
S-3 S-1B	1-2	0.01	ND	0.01	ND	0.02	0.02	NO
S-4 S-2T	2-3.2	ND	ND	ND	ND	ND	ND	NO
S-5 S-2A	2-3	ND	ND	ND	ND	ND	0.02	NO
S-5 S-4A	6-7	ND	ND	ND	ND	ND	ND	NO
S-6 S-2	2-4	ND	ND	ND	ND	ND	0.02	NO
S-6 S-5A	8-9	ND	ND	ND	ND	0.03	ND	NO
S-7 S-2	2-4	ND	ND	ND	ND	ND	ND	NO
S-7 S-4	6-8	ND	ND	ND	ND	ND	ND	NO
S-8 S-2T	2-3.5	ND	ND	ND	ND	ND	ND	NO
S-8 S-3	4-6	ND	ND	ND	ND	ND	ND	NO
S-8 S-6	10-12	ND	ND	ND	ND	ND	ND	NO
S-8 S-10	18-20	ND	ND	0.02	ND	0.03	0.05	YES
S-8 S-12	22-23.2	ND	ND	0.03	ND	0.04	0.04	YES
S-9 S2&3	2-6	ND	ND	ND	ND	ND	ND	NO
S-9 S-5	8-10	ND	ND	ND	ND	ND	ND	NO
S-10 S-3	4-6	ND	ND	ND	ND	0.01	0.02	NO
S-10 S-4	6-8	ND	ND	ND	ND	0.02	ND	NO
S-11 S-4	5.5-7	ND	ND	ND	ND	ND	ND	NO
S-11 S-6M	7-9	ND	ND	ND	ND	ND	ND	NO
S-11 S-10	17-19	ND	ND	ND	ND	ND	ND	NO
S-12 S-2	2-4	ND	ND	ND	ND	ND	ND	NO
S-12 S-6	10-12	ND	ND	ND	ND	ND	ND	NO
S-13 S-2	2-4	ND	ND	ND	ND	ND	ND	NO
S-14 S-3	4-4.7	ND	ND	ND	ND	0.02	0.02	NO
S-14 S-6T	10-11	ND	ND	ND	ND	ND	ND	NO
S-15 S-7	12-14	ND	ND	ND	ND	ND	0.03	YES
S-15 S-8	14-15	ND	ND	ND	ND	ND	0.03	YES
S-16 S-2	2-4	ND	ND	ND	ND	ND	ND	NO
DETECTION LIMIT		0.01	0.01	0.01	0.01	0.01	0.02	

*Refer to notes on next page for additional information.

NOTES:

1. The soil samples were collected in the field by GZA and placed in precleaned glass jars. To prepare the samples for screening the estimated dry weight of the soil was determined followed by the addition of hydrocarbon free water to the vial until a 15 ml headspace remained. The soil/water mix was then agitated and heated to 30 degrees celsius (°C) in a thermostatically controlled water bath. A 250 ul headspace sample was then withdrawn and injected directly into the gas chromatograph.

2. Screening was done using a Photovac (Model 10S50) portable photoionization gas chromatograph equipped with a 20 foot CPSIL-5CB capillary column enclosed in an isothermal oven.

3. Gas chromatograph operating conditions:

   Column Temperature; 30 degrees celsius)
   Target Compound Identification Window; + or - 5%
   Gain Setting; 20
   Carrier Gas Flow; 17 ml/min (hydrocarbon free air)

4. The gas chromatograph was calibrated, prior to the analysis of samples, using standard compounds. The standards used were as follows:

   0.0008 mg Benzene
   0.0008 mg Trichloroethene
   0.0009 mg Toluene
   0.0009 mg Tetrachloroethene
   0.002 mg Ethylbenzene
   0.003 mg M and P Xylene
   0.003 mg O-Xylene

5. Soil sample compound were tentatively identified by comparing their elution times to those of the standard compounds referenced in Note 4.

6. Identities and concentrations of volatile organic compounds reported using this screening technique are subject to limitations inherent to this method. If confirmation is desired, duplicate samples should be submitted to a certified analytical laboratory for analysis using methods approved by the USEPA.

7. ND = Compound not detected above the listed detection limit.

8. Compound with elution times other than those listed in Note 4 were not evaluated during screening. However, if other compounds were detected, this was noted on the summary of test results.

ATTACHMENT C

STATEMENT OF TERMS AND CONDITIONS

TERMS & CONDITIONS OF ENGAGEMENT

The Terms and Conditions and the "Proposal" dated July 8, 1993 submitted by GZA GeoEnvironmental of NY ("we" or "us") to Zebra Environmental Corp. ("you"), make up the "Agreement" between us. THESE TERMS CONTAIN LIMITATIONS IN OUR LIABILITY TO YOU, AND OTHERS, FOR ANY CLAIMS ARISING OUT OF OUR SERVICES:

1. SERVICES: THE "SERVICES" FOR THE "PROJECT", "SITE" AND ANY OTHER CONSULTING SERVICES WE MAY PERFORM REFERRED TO IN OUR PROPOSAL WILL BE PERFORMED FOR YOUR EXCLUSIVE USE. OUR SERVICES ADDRESS CURRENT CONDITIONS. ANY DELAYED USE OF THE RESULTS OF OUR SERVICES WILL REQUIRE UPDATES. YOU ACKNOWLEDGE, BY ENTERING INTO THIS AGREEMENT, THE INHERENT RISKS AND UNCERTAINTIES ASSOCIATED WITH THE INVESTIGATION OF SUBSURFACE CONDITIONS FOR CONSTRUCTION PURPOSES AND ASSESSMENT OR REMEDIATION OF HAZARDOUS SUBSTANCES. YOU HAVE BEEN ADVISED, AND ACKNOWLEDGE, THAT OUR DECISIONS ARE JUDGMENTS BASED UPON LIMITED DATA RATHER THAN UPON SCIENTIFIC FACT.

2. PAYMENT: INVOICES WILL BE SUBMITTED TO YOU MONTHLY, OR SEMI-MONTHLY, AT OUR DISCRETION. PAYMENT IS DUE WITHIN THIRTY (30) DAYS FROM INVOICE DATE. AN INVOICE REMAINING UNPAID AFTER THIRTY (30) DAYS WILL BEAR INTEREST AT THE LESSER OF THE MAXIMUM LAWFUL ANNUAL INTEREST RATE OR 1-1/2% PER MONTH. IF YOU DO NOT PAY AN INVOICE WITHIN THIRTY (30) DAYS, WE MAY, THEREAFTER, ON TEN (10) DAYS PRIOR WRITTEN NOTICE, ELECT TO TERMINATE ALL FURTHER SERVICES, WITHOUT INCURRING ANY LIABILITY TO YOU. ON TERMINATION OF SERVICES FOR NON-PAYMENT, WE RETAIN ALL OUR RIGHTS AND CLAIMS. IF ANY STATE IMPOSES A SERVICE, SALES OR SIMILAR TAX ON OUR SERVICES, YOU WILL PAY THAT TAX AS AN ADDITIONAL ITEM ON OUR INVOICES.

IF WE TERMINATE SERVICES BECAUSE OF NON-PAYMENT, YOU WILL PAY US FOR ALL SERVICES AND EXPENSES, ACCORDING TO THE AGREEMENT, THROUGH THE TERMINATION DATE, PLUS EXPENSES OF TERMINATION, INTEREST AND COSTS OF COLLECTION, INCLUDING REASONABLE ATTORNEY'S FEES. ANY OBJECTION TO AN INVOICE MUST BE MADE BY YOU, IN WRITING, WITHIN TEN (10) DAYS, OR THE OBJECTION WILL BE WAIVED.

3. INSURANCE: WE MAINTAIN THE FOLLOWING INSURANCE: WORKERS COMPENSATION WITH STATUTORILY REQUIRED LIMITS; COMPREHENSIVE GENERAL LIABILITY; AUTOMOBILE (VARIOUS COVERAGES); PROFESSIONAL LIABILITY, ENVIRONMENTAL IMPAIRMENT LIABILITY AND CONTRACTORS POLLUTION LIABILITY. WE FURNISH YOU CERTIFICATES OF INSURANCE UPON YOUR REQUEST.

OUR LIABILITY FOR CLAIMS AND EXPENSES IS LIMITED TO THE AMOUNTS, LIMITS, EXCLUSIONS AND CONDITIONS OF THE INSURANCE MAINTAINED BY US. A SEPARATE LIMIT OF OUR LIABILITY FOR NEGLIGENT PROFESSIONAL ACTS, ERRORS OR OMISSIONS OR BREACH OF CONTRACT IS SET OUT IN SECTION 15. WE WILL NOT BE RESPONSIBLE FOR CLAIMS CAUSED BY YOUR NEGLIGENCE OR BY THAT OF ANY PERSON OR ENTITY FOR WHOSE CONDUCT WE ARE NOT LEGALLY LIABLE. YOU MAY ELECT TO APPLY FOR HIGHER INSURANCE COVERAGES THROUGH PROJECT-SPECIFIC INSURANCE. IF

A DANGER TO PUBLIC HEALTH, SAFETY OR THE ENVIRONMENT, INCLUDING SUBSTANCES DEFINED IN THE FEDERAL WATER POLLUTION CONTROL ACT; FEDERAL COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA); RESOURCE CONSERVATION AND RECOVERY ACT AND IN STATE AND LOCAL LAWS, CODES AND REGULATIONS.

7. CONSTRUCTION OBSERVATION SERVICES: IF OUR SERVICES INCLUDE OBSERVATION OF CONSTRUCTION ON A SITE, WE WILL CARRY OUT OUR OBSERVATION IN ACCORDANCE WITH GENERALLY ACCEPTED PROFESSIONAL PRACTICES OF SIMILAR ENGINEERS AND CONSULTANTS. OUR SERVICES WILL NOT INCLUDE ANY SUPERVISION OF ANY CONTRACTOR OR SUBCONTRACTOR OTHER THAN OUR OWN. YOUR CONTRACTOR WILL REMAIN SOLELY AND COMPLETELY RESPONSIBLE FOR ENFORCEMENT AND COMPLIANCE BY IT, AND ITS SUBCONTRACTORS, AND CONTRACT PLANS, SPECIFICATIONS AND SAFETY REQUIREMENTS FOR ALL SITE WORKING CONDITIONS, AND SAFETY REQUIREMENTS, DAY AND NIGHT, FOR BOTH PERSONS AND PROPERTY. THESE INCLUDE ALL OSHA, NIOSH, U.S. EPA AND ANY OTHER APPLICABLE GOVERNMENTAL REGULATIONS. OUR OBSERVATIONS AND MONITORING SERVICES DO NOT INCLUDE REVIEW OF THE SUFFICIENCY OF THE CONTRACTOR'S HEALTH AND SAFETY MEASURES AT OR NEAR THE CONSTRUCTION SITE.

8. OWNERSHIP OF DOCUMENTS: EVERYTHING WE PREPARE, AS INSTRUMENTS OF SERVICE, WHETHER REPORTS, BORING LOGS, FIELD DATA AND NOTES, LABORATORY TESTS AND DATA, CALCULATIONS, ESTIMATES OR OTHER DOCUMENTS OR MEMORANDA, WILL REMAIN OUR SOLE PROPERTY. REPORTS AND OTHER WORK PRODUCT FURNISHED BY US WHICH ARE NOT PAID FOR PURSUANT TO OUR INVOICES WILL BE RETURNED TO US, ON OUR REQUEST, AND WILL NOT BE USED BY YOU OR ANY OTHERS FOR ANY PURPOSE. THE REPORTS AND OTHER MATERIALS WE PREPARE ARE NOT SUITABLE FOR LATER REUSE BY YOU OR OTHERS ON THE PROJECT, ANY EXTENSION, OR OTHER SITES OR PROJECTS, NOR AT FUTURE TIMES NOT CONTEMPLATED BY OUR REPORTS. IF YOU REUSE ANYTHING WE PREPARE, OR IF OTHERS SEEK TO USE THEM, IT WILL BE AT YOUR, AND THEIR, SOLE RISK, WITHOUT LIABILITY ON OUR PART. IN CASE OF SUCH UNAUTHORIZED RE-USE, YOU WILL HOLD US HARMLESS FOR ALL CLAIMS.

9. DISCLOSURE OF HAZARDS: TAKING INTO ACCOUNT THE INFORMATION YOU PROVIDE US, WE WILL TAKE REASONABLE PRECAUTIONS FOR THE HEALTH AND SAFETY OF OUR PERSONNEL WHILE AT THE SITE. BEFORE YOU DIRECT US TO PROCEED WITH OUR SERVICES, YOU WILL GIVE US ANY INFORMATION IN YOUR POSSESSION REGARDING THE EXISTENCE OF ANY HAZARDOUS SUBSTANCES UNDER OR ADJACENT TO THE SITE. THIS INCLUDES ALL PERMITS, MANIFESTS AND ANY RECORDS OF COMPLIANCE, OR NON-COMPLIANCE, WITH LAW. IF YOU, YOUR COUNSEL OR ANY OTHER OF YOUR REPRESENTATIVES FAIL TO FURNISH US WITH SUCH INFORMATION, TO THE EXTENT IT IS IN YOUR POSSESSION, AND THE POSSIBLE PRESENCE OF SUCH HAZARDOUS SUBSTANCES IS NOT DISCLOSED IN THE INFORMATION YOU PROVIDE TO US, YOU WILL BE RESPONSIBLE TO US, AND TO ANY CLAIMANTS, FOR PROPERTY DAMAGES AND CONSEQUENTIAL DAMAGES, AS SPELLED OUT IN SECTION 14 AND FOR ANY CLAIMS, DEMANDS, SUITS AND LIABILITIES FOR PERSONAL INJURY, DISEASE, MEDICAL EXPENSES (INCLUDING HEALTH MONITORING AND DEATH CLAIMS).

10. UNANTICIPATED HAZARDOUS MATERIALS: IF HAZARDOUS SUBSTANCES, NOT ANTICIPATED IN THE SCOPE OF WORK, WHICH ARE A THREAT TO HEALTH, SAFETY OR THE ENVIRONMENT ARE ENCOUNTERED IN THE COURSE OF OUR SERVICES, WE CAN SUSPEND OUR SERVICES. WE WILL COOPERATE WITH YOU IN ORDER TO

OTHERWISE IN CONNECTION WITH A RELEASE OF HAZARDOUS SUBSTANCES; BODILY INJURY, DISABILITY, DEATH, MEDICAL EXPENSES, PROPERTY DAMAGE AND OTHER EXPENSES AND ECONOMIC LOSS, ALLEGED TO HAVE BEEN CAUSED BY THE RELEASE, REMOVAL, REMEDIAL ACTION OR INVESTIGATION OF HAZARDOUS SUBSTANCES; AND ANY ASSESSMENT OF FINES OR PENALTIES RELATED TO HAZARDOUS SUBSTANCES OR THEIR REMEDIATION.

YOUR OBLIGATION TO INDEMNIFY US DOES NOT APPLY TO CLAIMS, DAMAGES, LOSSES OR RELEASES AND EXPOSURE TO POLLUTANTS WHICH ARE ADJUDICATED TO HAVE RESULTED FROM OUR GROSS NEGLIGENCE OR WILLFUL MISCONDUCT IN OUR PERFORMANCE OF THE SERVICES.

15. LIMITATION OF PROFESSIONAL LIABILITY: YOU AGREE THAT YOUR AGGREGATE MAXIMUM RECOVERY AGAINST US FOR ANY CLAIMS BASED ON THE PERFORMANCE OF OUR PROFESSIONAL SERVICES, WHETHER IN CONTRACT, TORT OR OTHERWISE, IS LIMITED TO THE GREATER OF $50,000 OR THE AMOUNT OF FEES PAID TO US WITH RESPECT TO THIS AGREEMENT.

WE SHALL NOT BE LIABLE ON ANY BASIS FOR YOUR LOSS OF PROFITS, DELAY, DAMAGES OR ANY SPECIAL OR CONSEQUENTIAL DAMAGES OF ANY TYPE.

YOU MAY ELECT TO INCREASE THE LIMIT OF LIABILITY FOR DAMAGES, UP TO $100,000, IF YOU DO THE FOLLOWING: INDICATE BELOW THAT YOU ELECT TO INCREASE THE LIMIT TO ONE OF THE LEVELS DESIGNATED BELOW AND PAY THE ADDITIONAL FEE SHOWN OPPOSITE THE INCREASED LEVEL, PAYMENT TO BE MADE SIMULTANEOUSLY WITH THE EXECUTION OF THIS AGREEMENT.

THE ADDITIONAL CHARGE SERVES AS CONSIDERATION FOR OUR UNDERTAKING THE GREATER RISK INVOLVED IN PERFORMING SERVICES FOR YOU UNDER AN INCREASED LIMIT OF LIABILITY FOR DAMAGES ABOVE $50,000.

INCREASED LIMIT OF LIABILITY FOR DAMAGES	ADDITIONAL FEE	CLIENT MUST INITIAL
$ 75,000	$1,000	______
$100,000	2,000	______

YOU AGREE THAT YOUR PAYMENT OF THE ADDITIONAL FEE DOES NOT CONSTITUTE A CHARGE FOR PLACEMENT OF ADDITIONAL PROFESSIONAL LIABILITY INSURANCE.

16. GOVERNING LAW; SEVERABILITY MODIFICATIONS; ASSIGNMENT: THIS AGREEMENT SHALL BE GOVERNED AND ENFORCEABLE IN ACCORDANCE WITH THE LAWS OF NEW YORK, THE STATE IN WHICH OUR PRINCIPAL OFFICE IS LOCATED, WHICH SHALL BE DEEMED THE PLACE OF CONTRACTING.

THE PROVISIONS OF THIS AGREEMENT ARE SEVERABLE. THE INVALIDITY OF ANY PROVISION SHALL NOT AFFECT THE VALIDITY AND ENFORCEABILITY OF ANY OTHER PROVISIONS. THIS AGREEMENT, MADE UP OF OUR PROPOSAL AND THESE TERMS AND CONDITIONS, CANNOT BE MODIFIED ORALLY, OR BY ANY COURSE OF CONDUCT, AND SHALL CONTROL OVER ANY INCONSISTENT OR CONTRARY PROVISIONS IN ANY PROPOSAL, CONTRACT FORM, PURCHASE ORDER OR OTHER DOCUMENT ISSUED BY YOU. THESE TERMS AND CONDITIONS SHALL SURVIVE THE COMPLETION, OR TERMINATION, OF OUR SERVICES FOR THE PROJECT. ANY ASSIGNMENT OF YOUR RIGHTS UNDER THIS AGREEMENT REQUIRES OUR PRIOR WRITTEN CONSENT.

ATTACHMENT B

SUMMARY OF RESULTS

SUMMARY OF GAS CHROMATOGRAPH SCREENING TEST RESULTS FOR SOIL SAMPLES

ARO Corporation Site

			TENTATIVE IDENTIFICATION and ESTIMATED CONCENTRATION (mg/kg or ppm)				
SAMPLE LOCATION	DEPTH (FT)	DATE TESTED	trans 1,2 DCE	cis 1,2 DCE	1,1,1 TCA	TCE	REMARKS
SS-1	1-2.8	7/14/93	ND(0.12)	0.14	ND(65)	1	
SS-1	8-10	7/14/93	ND(1.2)	ND(1.2)	ND(650)	10	
SS-1	10-12	7/14/93	ND(1.2)	ND(1.2)	ND(650)	51	
SS-1	12-14	7/14/93	ND(1.2)	ND(1.2)	ND(650)	15	
SS-1	14-16	7/14/93	ND(1.2)	ND(1.2)	ND(650)	4	
SS-1	16-18	7/14/93	ND(1.2)	ND(1.2)	ND(650)	15	
SS-1	18-20	7/14/93	ND(1.2)	ND(1.2)	ND(650)	5	
SS-1	20-22	7/14/93	ND(10)	ND(10)	ND(5000)	210	
SS-1	22-24	7/14/93	ND(1.2)	ND(1.2)	ND(650)	12	
SS-2 sed		7/13/93	ND	0.3	ND	0.02	
SS-3 sed		7/13/93	ND	0.04	ND	ND	
SS-4 sed		7/13/93	ND	0.06	ND	0.03	See Note 10
SS-5	2-4	7/15/93	ND	0.01	ND	0.02	
ZP-1	12-14	7/15/93	ND	ND	ND	ND	
ZP-2	12-14	7/16/93	ND	ND	ND	ND	
ZP-3	12-14	7/15/93	ND	ND	ND	ND	
ZP-4	12-14	7/16/93	ND	ND	ND	ND	
ZP-5	12-14	7/15/93	ND	ND	ND	ND	
ZP-6	12-14	7/16/93	ND	ND	ND	ND	
clay pipe sed		7/12/93	ND	ND	ND	ND	
sewer bedding		7/12/93	ND	0.09	ND	0.04	
OF-2 sed		7/13/93	ND	ND	ND	ND	
SED-104		7/12/93	ND	ND	ND	ND	See Note 9
SB-107	0-2	7/15/93	ND	ND	ND	ND	
SB-107	2-4	7/16/93	0.02	0.1	ND	ND	
SB-107	4-6	7/15/93	ND	ND	0.01	ND	
B-107	6-8	7/16/93	ND(0.05)	0.5	ND(25)	2	
HM-1 sed		7/15/93	ND(0.2)	0.3	ND(125)	4	
HM-2	0-2	7/15/93	ND	0.02	ND	0.1	
HM-2	2-4	7/15/93	ND(1.2)	8	ND(650)	80	
DETECTION LIMIT			0.01	0.01	0.5	0.01	See Note 7

*Refer to notes for additional information.

SUMMARY OF GAS CHROMATOGRAPH SCREENING TEST RESULTS FOR SOIL SAMPLES

ARO Corporation Site

			TENTATIVE IDENTIFICATION and ESTIMATED CONCENTRATION (mg/kg or ppm)				
SAMPLE LOCATION	DEPTH (FT)	DATE TESTED	trans 1,2 DCE	cis 1,2 DCE	1,1,1 TCA	TCE	REMARKS
HW-3	4-6	7/15/93	ND(0.5)	2	ND(250)	20	
HW-4	1-3	7/15/93	ND	0.1	ND	0.1	
HW-5	2-2.5	7/16/93	ND	0.01	ND	0.04	
HW-5	3	7/15/93	ND(0.2)	0.7	ND(125)	1	
HW-5	3.5-4	7/16/93	0.1	15	ND(65)	4	
HW-5	4-6	7/15/93	ND(0.5)	14	ND(250)	16	
HW-5	6-8	7/16/93	ND(0.2)	2	ND(125)	4	
HW-6	2-4	7/15/93	ND	ND	ND	0.02	
HW-6	4-6	7/16/93	ND(0.05)	0.3	ND(25)	0.3	
HW-7	2-4	7/16/93	ND	0.06	ND	0.09	
HW-7	4-6	7/16/93	ND(0.2)	9	ND(125)	10	
HW-7	6-8	7/16/93	ND(0.2)	10	ND(125)	13	
DETECTION LIMIT			0.01	0.01	0.5	0.01	See Note 7

* Refer to notes for additional information.

SUMMARY OF GAS CHROMATOGRAPH SCREENING TEST RESULTS FOR WATER SAMPLES

ARO Corporation Site

		TENTATIVE IDENTIFICATION and ESTIMATED CONCENTRATION (mg/l or ppm)				
SAMPLE LOCATION	DATE TESTED	trans 1,2 DCE	cis 1,2 DCE	1,1,1 TCA	TCE	REMARKS
SB-1	7/12/93	ND	ND	ND	ND	
SB-2	7/12/93	ND	ND	ND	ND	
SB-3	7/12/93	ND	ND	ND	ND	
SB-4	7/12/93	ND	ND	ND	ND	
SB-5	7/12/93	ND	ND	ND	ND	
SW-104	7/12/93	ND	0.03	ND	0.03	
Clay pipe	7/12/93	ND	BDL	ND	BDL	
OF-1	7/13/93	ND	0.3	ND	0.02	
OF-2(grab)	7/13/93	ND	0.1	ND	0.03	
OF-2(bedding)	7/13/93	ND	0.05	ND	BDL	
SS-1	7/13/93	ND(0.12)	0.5	ND(65)	1	
SS-3	7/13/93	ND(0.05)	0.3	ND(2.5)	0.02	
SS-4	7/13/93	ND(0.05)	0.2	ND(2.5)	0.06	See Note 9
DETECTION LIMIT		0.01	0.01	0.5	0.01	See Note 7

* Refer to notes on next page for additional information.

NOTES:

1. The water samples were collected in the field by Zebra Environmental (ZEBRA) and placed in precleaned 40 ml glass septum vials to exclude air. To prepare the samples for screening, an approximate 15 ml headspace of air was created inside the vial. It was then heated to 30 (7/12/93) or 40 degrees celsius (°C) in a thermostatically controlled water bath. A 2 to 250 ul headspace sample was then withdrawn, using a gas tight syringe and injected directly into the gas chromatograph.

2. Screening was done using a Photovac (Model 10S50) portable photoionization gas chromatograph equipped with a 20 foot CPSIL-5CB capillary column enclosed in an isothermal oven.

3. Gas chromatograph operating conditions:

   Column Temperature; 30 (7/12/93) or 40 degrees celsius)
   Identification Window; + or - 5%
   Gain Setting; 20
   Carrier Gas Flow; 17 ml/min (7/12/93) or 12 ml/min (hydrocarbon free air)

4. The gas chromatograph was calibrated, prior to the analysis of samples, using standard compounds. The standards used were as follows:

   0.016 mg/l trans 1,2 DCE (Dichloroethene)
   0.016 mg/l cis 1,2 DCE
   0.1 mg/l 1,1,1 TCA (Trichloroethane)
   0.017 mg/l TCE (Trichloroethene)

5. Compound were tentatively identified by comparing their elution times to those of the standard compounds referenced in Note 4.

6. Identities and concentrations of volatile organic compounds reported using this screening technique are subject to limitations inherent to this method. If confirmation is desired, duplicate samples should be submitted to a certified analytical laboratory for analysis using methods approved by the USEPA.

7. ND = Compound not detected above the listed detection limit or in the case of samples that were diluted, prior to injection, the detection limit listed in parentheses.

   BDL = Compound detected below method detection limit.

8. Compound with elution times other than those listed in Note 4 were not evaluated during screening. However, if other compounds were detected, this was noted on the summary of test results.

9. Several other unknown compounds also detected in this sample.

NOTES:

1. The soil samples were collected in the field by Zebra Environmental (ZEBRA) and placed in precleaned glass vials provided by GZA. Sample locations and depth information was provided by ZEBRA. To prepare the samples for screening the estimated dry weight of the soil was determined using a dial-o-gram scale. Deionized water was added to the vial until an approximate 15 ml headspace remained. The soil/water mix was then agitated and heated to 30 (7/12/93) or 40 degrees celsius (°C) in a thermostatically controlled water bath. A 2-250 ul headspace sample was then withdrawn, using a gas tight syringe, and injected directly into the gas chromatograph (GC).

2. Screening was done using a Photovac (Model 10S50) portable photoionization gas chromatograph equipped with a 20 foot CPSIL--5CB capillary column enclosed in an isothermal oven.

3. Gas chromatograph operating conditions:

   Column Temperature; 30(7/12/93) or 40 degrees celsius
   Target Compound Identification Window; + or - 5%
   Gain Setting; 20
   Carrier Gas Flow; 17 ml/min(7/12/93) and 12 ml/min (hydrocarbon free air)

4. The gas chromatograph was calibrated, prior to the analysis of samples, using standard compounds. The standards used were as follows:

   0.32 ug trans 1,2 DCE (Dichloroethene)
   0.96 ug cis 1,2 DCE
   39.9 ug 1,1,1 TCA (Trichloroethane)
   0.73 ug TCE (Trichloroethene)

   The above listed standard compounds were placed in deionized water and prepared for screening using the same procedure as described in note 1 (heated, headspaced and injected directly into the GC). Response factors were determined based on the area of the peak generated by the above listed standards. It was assumed that the response for the range of concentrations measured during this screening was linear. Additionally, it was assumed that 100% of the compounds in the samples were extracted during this procedure.

5. Soil sample compounds were tentatively identified by comparing their elution times to those of the standard compounds referenced in Note 4.

6. Identities and concentrations of volatile organic compounds reported using this screening technique are subject to limitations inherent to this method. If confirmation is desired, duplicate samples should be submitted to a certified analytical laboratory for analysis using methods approved by the USEPA.

7. ND = Compound not detected above the listed detection limit or in the case of samples that were diluted, prior to injection, the detection limit listed between parentheses.

8. Compounds with elution times other than those listed in Note 4 were not evaluated during screening. However, if other compounds were detected, this was noted on the summary of test results.

9. Toluene also detected at approximately 0.08 mg/kg.

10. Several other unknown compounds also detected in this sample.

APPENDIX B

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Analysis Services

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August 14, 1993

File Project: ____
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Mr. Tony Grooms
Capsule Environmental Engineering
1970 Oakcrest Avenue
Suite 215
ST. Paul, Minn. 55113

RE: Analytical Results

Dear Mr. Grooms:

Please find enclosed Total Colbalt reanalysis results for MW-13, MW-14, and MW-7. The Pertinent Information regarding these analyses is listed below:

Quote #:	NY93-515
Project Name:	ARO CORP / CAPSULE
Matrix:	Aqueous / Soil
Samples Received:	07/13/93
Sample Date:	07/12,13/93

If you have any questions concerning these data, please contact Ms. Julie Calvert, Project Manager at (716) 691-2600 and refer to the I.D. number listed below. We apologize for any inconvenience we may have caused. It has been our pleasure to provide Capsule Environmental Engineering with Environmental Testing Services. We look forward to serving you in the future.

Sincerely,

RECRA ENVIRONMENTAL, INC.

Robert K. Wyeth
Laboratory Director

RCO/RKW/rco
Enclosure

I.D.# 93-2159
NY3A4645

CAPSULE ENVIRONMENTAL ENG

Total Metals Analysis

aboratory: Recra Environmental, Inc. - RECNY
ab Job No: A93-2159
ab Sample ID: AS039256RE
lient Sample ID: MW-13RE

Matrix: Aqueous
Sample Date: 07/13/93

Dilution Factor: 1

Parameter Units = MG/L	Method	Digestion Date	Analysis Date	Result	Q
Cobalt - Total	6010	08/10/93	08/12/93	0.026	

CAPSULE ENVIRONMENTAL ENG

Total Metals Analysis

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2159
Lab Sample ID: AS039258RE
Client Sample ID: MW-14RE

Matrix: Aqueous
Sample Date: 07/13/93

Dilution Factor: 1

Parameter	Units = MG/L	Method	Digestion Date	Analysis Date	Result	Q
Cobalt - Total		6010	08/10/93	08/12/93	0.0050	U

CAPSULE ENVIRONMENTAL ENG

Total Metals Analysis

aboratory: Recra Environmental, Inc. - RECNY
ab Job No: A93-2159
ab Sample ID: AS039264RE
lient Sample ID: MW-7RE

Matrix: Aqueous
Sample Date: 07/13/93

Dilution Factor: 1

Parameter Units = MG/L	Method	Digestion Date	Analysis Date	Result	Q
Cobalt - Total	6010	08/10/93	08/12/93	0.0050	U

CAPSULE ENVIRONMENTAL ENG

Total Metals Analysis

aboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
ab Job No:	A93-2159	Sample Date:	-
ab Sample ID:	AR010113	Dilution Factor:	1
lient Sample ID:	METHOD BLANK		

Parameter	Units = MG/L	Method	Digestion Date	Analysis Date	Result	Q
Cobalt - Total		6010	08/10/93	08/12/93	0.0050	U

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Analysis Services

August 14,1993

Mr. Tony Grooms
Capsule Environmental Engineering
1970 Oakcrest Avenue
Suite 215
St. Paul, Minnesota 55113

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AUG 20 1993
CAPSULE

File Project: ________
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RE: Analytical Results

Dear Mr. Grooms:

Please find enclosed Total Colbalt reanalysis results for MW-1 and MW-5. The Pertinent Information regarding these analyses is listed below:

Quote #: NY93-515
Project Name: ARO CORP / CAPSULE
Matrix: Aqueous / Soil
Samples Received: 07/16/93
Sample Date: 07/12,14,15/93

If you have any questions concerning these data, please contact Ms. Julie Calvert, Project Manager at (716) 691-2600 and refer to the I.D. number listed below. We apologize for any inconvenience we may have caused. It has been our pleasure to provide Capsule Environmental Engineering with Environmental Testing Services. We look forward to serving you in the future.

Sincerely,

RECRA ENVIRONMENTAL, INC.

Robert K. Wyeth
Laboratory Director

RCO/RKW/rco
Enclosure

I.D.# 93-2197
\# NY3A4645

CAPSULE ENVIRONMENTAL ENG

Total Metals Analysis

aboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
ab Job No:	A93-2197	Sample Date:	07/14/93
ab Sample ID:	AS039604RE	Dilution Factor:	1
lient Sample ID:	MW-1RE		

Parameter	Units = MG/L	Method	Digestion Date	Analysis Date	Result	Q
Cobalt - Total		6010	08/10/93	08/12/93	0.0050	U

CAPSULE ENVIRONMENTAL ENG

Total Metals Analysis

boratory: Recra Environmental, Inc. - RECNY
b Job No: A93-2197
b Sample ID: AS039605RE
ient Sample ID: MW-5RE

Matrix: Aqueous
Sample Date: 07/14/93

Dilution Factor: 1

Parameter Units = MG/L	Method	Digestion Date	Analysis Date	Result	Q
obalt - Total	6010	08/10/93	08/12/93	0.0050	U

B-9A

RECRA 8/5/93

5. SS-4 water volatiles ✓
6 " soil bedding "
7 MW18 water "
8 MW 14 water "
9 SS-1 soil bedding "
10 " "DL " "
11 " water bedding " ✓
2 MW-9 water "
13 SC 1 water "
14 SC 5 water "
15 SED 104 soil "
16 SED 104 DL " "
17 SW 104 water "
8 OF 1 MANWAY water "
19 OF1 BEDDING soil "
20 " " WATER "
21 OF 2 BEDDING " "
22 23 24 MISSING . . . ← MW 20 ? " no break in the pg #'s at bottom of pg.
→ 23 24 Shows up in RECRA 8/11/93
25 OF 2 " soil "
26 OF 2 water "
27 — 41 QA/QC

42 MW 13 water metals
43 MW 14 " "
44 MW 7 " "
45-46 QA/QC
47 SS-1 UNSAT SOIL TOC
48 " SAT " "
49 SB-1 UNSAT " "
50 " SAT " "
51-52 QA/QC
53-54 COC

CAPSULE ENVIRONMENTAL ENG

Total Metals Analysis

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2197	Sample Date:	-
Lab Sample ID:	AR010113		
Client Sample ID:	METHOD BLANK	Dilution Factor:	1

Parameter Units = MG/L	Method	Digestion Date	Analysis Date	Result	Q
Cobalt - Total	6010	08/10/93	08/12/93	0.0050	U

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Analysis Services

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File Project: ____________
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August 5, 1993

Mr. Tony Grooms
Capsule Environmental Engineering
1970 Oakcrest Avenue
Suite 215
St. Paul, Minn. 55113

RE: Analytical Results

Dear Mr. Grooms:

Please find enclosed results concerning the analyses of the samples recently submitted by your firm . The Pertinent Information regarding these analyses is listed below:

Quote #: NY93-515
Project Name: ARO CORP / CAPSULE
Matrix: Aqueous / Soil
Samples Received: 07/13/93
Sample Date: 07/12,13/93

If you have any questions concerning these data, please contact Ms. Julie Calvert, Project Manager at (716) 691-2600 and refer to the I.D. number listed below. It has been our pleasure to provide Capsule Environmental Engineering with Environmental Testing Services. We look forward to serving you in the future.

Sincerely,

RECRA ENVIRONMENTAL, INC.

Robert K. Wyeth
Laboratory Director

RCO/RKW/rco
Enclosure

I.D.# 93-2159 (Partial)
NY3A4645

ANALYTICAL RESULTS

Prepared For

Capsule Environmental Engineering
1970 Oakcrest Avenue
Suite 215
St. Paul, Minn. 55113

Prepared By

Recra Environmental, Inc.
10 Hazelwood Drive, Suite 106
Amherst, New York 14228-2298

METHODOLOGIES

The specific methodologies employed in obtaining the enclosed analytical results are indicated on the specific data table. The method numbers presented refer to one of the following U.S. Environmental Protection Agency references.

* U.S. Environmental Protection Agency "Test Methods for Evaluating Solid Waste-Physical/Chemical Methods." Office of Solid Waste and Emergency Response. November 1986, SW-846, Third Edition.

* Total Organic Carbon analysis was performed utilizing Modified Method SD1,S3.

COMMENTS

Comments pertain to data on one or all pages of this report.

The enclosed data has been reported utilizing data qualifiers (Q) as defined on the Organic and Inorganic Data Comment Pages.

Results for the analysis of soils are corrected for moisture content and reported on a dry weight basis.

VOLATILE DATA

Sample SS-1 BEDDING required medium level analysis due to the high concentration of Trichloroethene and 1,2-Dichloroethene (Total) in the sample.

Sample SED-104 required a dilution factor of five (5) due to the high concentration of Acetone in the sample.

Sample MW-20 was analyzed at an initial dilution factor of one thousand (1000) due to the high concentrations of 1,2-Dichloroethene (Total), Trichloroethene and Vinyl Chloride in the sample.

A concentration of Toluene was detected in Volatile Method Blank 36 at a level below the detection limit.

A concentration of Ethyl Benzene was detected in Volatile Method Blank 37 at a level below the detection limit.

METALS DATA

The Matrix Spike Blank exhibited the % spike recovery for Lead as outside quality control limits. The % RPD for Lead was also outside quality control limits.

The Matrix Spike Blank Duplicate exhibited the % spike recovery for Silver as outside quality control limits.

The detection limit for Colbalt exceeds the NYS Groundwater Quality Standards Limit due to laboratory error. Presently samples MW-13,MW-14,and MW-7 are being redigested and reanalyzed in order to acheive an acceptable detection limit at or below 0.0050 mg/l. An addendum to this report will be sent upon completion of the reanalyses. Cobalt results with incorrect detection limits have been submitted with this report without charge.

ORGANIC DATA COMMENT PAGE

Laboratory Name RECRA ENVIRONMENTAL, INC.

USEPA Defined Organic Data Qualifiers:

U - Indicates compound was analyzed for but not detected.

J - Indicates an estimate value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than zero.

C - This flag applies to pesticide results where the identification has been confirmed by GC/MS.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for that specific analysis.

D - This flag identifies all compounds identified in an analysis at a secondary dilution factor.

G - The TCLP Matrix Spike recovery was greater than the upper limit of the analytical method.

L - The TCLP Matrix Spike recovery was lower than the lower limit of the analytical method.

T - This flag is used when the analyte is found in the associated TCLP extraction as well as in the sample.

N - Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search. It is applied to all TIC results.

P - This flag is used for a pesticide/Aroclor target analyte when there is greater than 25% difference for detected concentrations between the two GC columns. The lower of the two values is reported on Form I and flagged with a "P".

A - This flag indicates that a TIC is a suspected aldol-condensation product.

INORGANIC DATA COMMENT PAGE

Laboratory Name RECRA ENVIRONMENTAL, INC.

USEPA Defined Inorganic Data Qualifiers:

B - Indicates a value greater than or equal to the instrument detection limit but less than the contract required detection limit.

U - Indicates element was analyzed for but not detected. Report with the detection limit value (e.g., 100).

E - Indicates a value estimated or not reported due to the presence of interference.

S - Indicates value determined by Method of Standard Addition.

N - Indicates spike sample recovery is not within control limits.

* - Indicates duplicate analysis is not within control limits.

+ - Indicates the correlation coefficient for method of standard addition is less than 0.995.

M - Indicates duplicate injection results exceeded control limits.

W - Post digestion spike for Furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

G - The TCLP Matrix Spike recovery was greater than the upper limit of the analytical method.

L - The TCLP Matrix Spike recovery was lower than the lower limit of the analytical method.

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2159	Dilution Factor:	20
Lab Sample ID:	AS039254	Sample Date:	07/13/93
Client Sample ID:	SS-4 H20	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	964	
Benzene	10	U
Bromodichloromethane	10	U
Bromoform	10	U
Bromomethane	10	U
2-Butanone	100	U
Carbon Disulfide	10	U
Carbon Tetrachloride	10	U
Chlorobenzene	10	U
Chloroethane	10	U
Chloroform	2	J
Chloromethane	10	U
Dibromochloromethane	10	U
1,1-Dichloroethane	10	U
1,2-Dichloroethane	10	U
1,1-Dichloroethene	10	U
1,2-Dichloroethene (Total)	191	
1,2-Dichloropropane	10	U
cis-1,3-Dichloropropene	10	U
trans-1,3-Dichloropropene	10	U
Ethyl benzene	10	U
2-Hexanone	100	U
Methylene chloride	10	U
4-Methyl-2-pentanone	100	U
Styrene	10	U
1,1,2,2-Tetrachloroethane	10	U
Tetrachloroethene	10	U
Toluene	10	U
1,1,1-Trichloroethane	10	U
1,1,2-Trichloroethane	10	U
Trichloroethene	117	
Vinyl acetate	10	U
Vinyl chloride	10	U
Total Xylenes	29	

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2159	Dilution Factor:	1
Lab Sample ID:	AS039255	Sample Date:	07/13/93
Client Sample ID:	SS-4 SOIL/BEDDING	Analysis Date:	07/15/93
		% Dry Weight:	76.80

Parameter Units = UG/KG	Result	Q
Acetone	53	
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	13	U
2-Butanone	13	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	13	U
Chloroform	6	U
Chloromethane	13	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	6	U
1,2-Dichloroethene (Total)	39	
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	13	U
Methylene chloride	6	U
4-Methyl-2-pentanone	13	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	2	J
Tetrachloroethene	6	U
Toluene	1	BJ
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	6	U
Trichloroethene	43	
Vinyl acetate	13	U
Vinyl chloride	13	U
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2159	Dilution Factor:	1
Lab Sample ID:	AS039257	Sample Date:	07/13/93
Client Sample ID:	MW-18	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	5	U
Benzene	0.3	J
Bromodichloromethane	0.5	U
Bromoform	0.5	U
Bromomethane	0.5	U
2-Butanone	5	U
Carbon Disulfide	0.5	U
Carbon Tetrachloride	0.5	U
Chlorobenzene	0.5	U
Chloroethane	0.5	U
Chloroform	0.5	U
Chloromethane	0.5	U
Dibromochloromethane	0.5	U
1,1-Dichloroethane	0.5	U
1,2-Dichloroethane	0.5	U
1,1-Dichloroethene	0.5	U
1,2-Dichloroethene (Total)	0.5	U
1,2-Dichloropropane	0.5	U
cis-1,3-Dichloropropene	0.5	U
trans-1,3-Dichloropropene	0.5	U
Ethyl benzene	2	
2-Hexanone	5	U
Methylene chloride	0.5	U
4-Methyl-2-pentanone	5	U
Styrene	0.5	U
1,1,2,2-Tetrachloroethane	0.5	U
Tetrachloroethene	0.5	U
Toluene	0.2	J
1,1,1-Trichloroethane	0.5	U
1,1,2-Trichloroethane	0.5	U
Trichloroethene	0.09	J
Vinyl acetate	0.5	U
Vinyl chloride	0.5	U
Total Xylenes	13	

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2159
Lab Sample ID: AS039258
Client Sample ID: MW-14

Matrix: Aqueous
Dilution Factor: 1
Sample Date: 07/13/93
Analysis Date: 07/22/93

Parameter Units = UG/L	Result	Q
Acetone	5	U
Benzene	0.5	U
Bromodichloromethane	0.5	U
Bromoform	0.5	U
Bromomethane	0.5	U
2-Butanone	5	U
Carbon Disulfide	0.5	U
Carbon Tetrachloride	0.5	U
Chlorobenzene	0.5	U
Chloroethane	0.5	U
Chloroform	0.5	U
Chloromethane	0.5	U
Dibromochloromethane	0.5	U
1,1-Dichloroethane	0.5	U
1,2-Dichloroethane	0.5	U
1,1-Dichloroethene	0.5	U
1,2-Dichloroethene (Total)	0.5	U
1,2-Dichloropropane	0.5	U
cis-1,3-Dichloropropene	0.5	U
trans-1,3-Dichloropropene	0.5	U
Ethyl benzene	0.5	U
2-Hexanone	5	U
Methylene chloride	0.5	U
4-Methyl-2-pentanone	5	U
Styrene	0.5	U
1,1,2,2-Tetrachloroethane	0.5	U
Tetrachloroethene	0.5	U
Toluene	0.5	U
1,1,1-Trichloroethane	0.5	U
1,1,2-Trichloroethane	0.5	U
Trichloroethene	0.5	U
Vinyl acetate	0.5	U
Vinyl chloride	0.5	U
Total Xylenes	0.5	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2159
Lab Sample ID: AS039259
Client Sample ID: SS-1 BEDDING

Matrix: Soil
Dilution Factor: 1
Sample Date: 07/13/93
Analysis Date: 07/15/93
% Dry Weight: 81.80

Parameter Units = UG/KG	Result	Q
Acetone	25	
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	12	U
2-Butanone	4	J
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	12	U
Chloroform	6	U
Chloromethane	12	U
Dibromochloromethane	6	U
1-Dichloroethane	6	U
2-Dichloroethane	6	U
1,1-Dichloroethene	3	J
1,2-Dichloroethene (Total)	820	E
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	1	J
2-Hexanone	12	U
Methylene chloride	2	J
4-Methyl-2-pentanone	12	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	2	J
Toluene	18	B
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	3	J
Trichloroethene	5600	E
Vinyl acetate	12	U
Vinyl chloride	6	J
Total Xylenes	4	J

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2159
Lab Sample ID: AS039259ML
Client Sample ID: SS-1 BEDDING DL

Matrix: Soil
Dilution Factor: 1
Sample Date: 07/13/93
Analysis Date: 07/19/93
% Dry Weight: 81.80

Parameter Units = UG/KG	Result	Q
Acetone	1400	U
Benzene	730	U
Bromodichloromethane	730	U
Bromoform	730	U
Bromomethane	1400	U
2-Butanone	1400	U
Carbon Disulfide	730	U
Carbon Tetrachloride	730	U
Chlorobenzene	730	U
Chloroethane	1400	U
Chloroform	730	U
Chloromethane	1400	U
Dibromochloromethane	730	U
1,1-Dichloroethane	730	U
1,2-Dichloroethane	730	U
1,1-Dichloroethene	730	U
1,2-Dichloroethene (Total)	920	D
1,2-Dichloropropane	730	U
cis-1,3-Dichloropropene	730	U
trans-1,3-Dichloropropene	730	U
Ethyl benzene	730	U
2-Hexanone	1400	U
Methylene chloride	730	U
4-Methyl-2-pentanone	1400	U
Styrene	730	U
1,1,2,2-Tetrachloroethane	730	U
Tetrachloroethene	730	U
Toluene	730	U
1,1,1-Trichloroethane	730	U
1,1,2-Trichloroethane	730	U
Trichloroethene	18000	D
Vinyl acetate	1400	U
Vinyl chloride	1400	U
Total Xylenes	730	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2159
Lab Sample ID: AS039260
Client Sample ID: SS-1 BEDDING H20

Matrix: Aqueous
Dilution Factor: 100
Sample Date: 07/13/93
Analysis Date: 07/22/93

Parameter Units = UG/L	Result	Q
Acetone	500	U
Benzene	50	U
Bromodichloromethane	50	U
Bromoform	50	U
Bromomethane	50	U
2-Butanone	500	U
Carbon Disulfide	50	U
Carbon Tetrachloride	50	U
Chlorobenzene	50	U
Chloroethane	50	U
Chloroform	50	U
Chloromethane	50	U
Dibromochloromethane	50	U
1,1-Dichloroethane	50	U
2-Dichloroethane	50	U
1-Dichloroethene	50	U
1,2-Dichloroethene (Total)	50	U
1,2-Dichloropropane	50	U
cis-1,3-Dichloropropene	50	U
trans-1,3-Dichloropropene	50	U
Ethyl benzene	50	U
2-Hexanone	500	U
Methylene chloride	50	U
4-Methyl-2-pentanone	500	U
Styrene	50	U
1,1,2,2-Tetrachloroethane	50	U
Tetrachloroethene	50	U
Toluene	50	U
1,1,1-Trichloroethane	50	U
1,1,2-Trichloroethane	50	U
Trichloroethene	1700	
Vinyl acetate	50	U
Vinyl chloride	50	U
Total Xylenes	50	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2159
Lab Sample ID: AS039263
Client Sample ID: MW-9

Matrix: Aqueous
Dilution Factor: 1
Sample Date: 07/13/93
Analysis Date: 07/22/93

Parameter Units = UG/L	Result	Q
Acetone	5	U
Benzene	0.5	U
Bromodichloromethane	0.5	U
Bromoform	0.5	U
Bromomethane	0.5	U
2-Butanone	5	U
Carbon Disulfide	0.5	U
Carbon Tetrachloride	0.5	U
Chlorobenzene	0.5	U
Chloroethane	0.5	U
Chloroform	0.5	U
Chloromethane	0.5	U
Dibromochloromethane	0.5	U
1,1-Dichloroethane	0.5	U
1,2-Dichloroethane	0.5	U
1,1-Dichloroethene	0.5	U
1,2-Dichloroethene (Total)	0.5	U
1,2-Dichloropropane	0.5	U
cis-1,3-Dichloropropene	0.5	U
trans-1,3-Dichloropropene	0.5	U
Ethyl benzene	0.5	U
2-Hexanone	5	U
Methylene chloride	0.5	U
4-Methyl-2-pentanone	5	U
Styrene	0.5	U
1,1,2,2-Tetrachloroethane	0.5	U
Tetrachloroethene	0.5	U
Toluene	0.5	U
1,1,1-Trichloroethane	0.5	U
1,1,2-Trichloroethane	0.5	U
Trichloroethene	0.5	U
Vinyl acetate	0.5	U
Vinyl chloride	0.5	U
Total Xylenes	0.5	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2159	Dilution Factor:	1
Lab Sample ID:	AS039265	Sample Date:	07/12/93
Client Sample ID:	SB-1	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	5	U
Benzene	0.5	U
Bromodichloromethane	0.5	U
Bromoform	0.5	U
Bromomethane	0.5	U
2-Butanone	5	U
Carbon Disulfide	0.2	J
Carbon Tetrachloride	0.5	U
Chlorobenzene	0.5	U
Chloroethane	0.5	U
Chloroform	0.5	U
Chloromethane	0.5	U
Dibromochloromethane	0.5	U
1,1-Dichloroethane	0.5	U
2-Dichloroethane	0.5	U
1,1-Dichloroethene	0.5	U
1,2-Dichloroethene (Total)	0.5	U
1,2-Dichloropropane	0.5	U
cis-1,3-Dichloropropene	0.5	U
trans-1,3-Dichloropropene	0.5	U
Ethyl benzene	0.05	J
2-Hexanone	5	U
Methylene chloride	0.5	U
4-Methyl-2-pentanone	5	U
Styrene	0.5	U
1,1,2,2-Tetrachloroethane	0.5	U
Tetrachloroethene	0.5	U
Toluene	0.5	U
1,1,1-Trichloroethane	0.5	U
1,1,2-Trichloroethane	0.5	U
Trichloroethene	0.1	J
Vinyl acetate	0.5	U
Vinyl chloride	0.5	U
Total Xylenes	0.3	J

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2159	Dilution Factor:	1
Lab Sample ID:	AS039266	Sample Date:	07/12/93
Client Sample ID:	SB-5	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	5	U
Benzene	0.3	J
Bromodichloromethane	0.5	U
Bromoform	0.5	U
Bromomethane	0.5	U
2-Butanone	5	U
Carbon Disulfide	0.2	J
Carbon Tetrachloride	0.5	U
Chlorobenzene	0.5	U
Chloroethane	0.5	U
Chloroform	0.5	U
Chloromethane	0.5	U
Dibromochloromethane	0.5	U
1,1-Dichloroethane	0.5	U
1,2-Dichloroethane	0.5	U
1,1-Dichloroethene	0.5	U
1,2-Dichloroethene (Total)	0.5	U
1,2-Dichloropropane	0.5	U
cis-1,3-Dichloropropene	0.5	U
trans-1,3-Dichloropropene	0.5	U
Ethyl benzene	0.05	J
2-Hexanone	5	U
Methylene chloride	0.5	U
4-Methyl-2-pentanone	5	U
Styrene	0.5	U
1,1,2,2-Tetrachloroethane	0.5	U
Tetrachloroethene	0.5	U
Toluene	0.5	
1,1,1-Trichloroethane	0.5	U
1,1,2-Trichloroethane	0.5	U
Trichloroethene	0.1	J
Vinyl acetate	0.5	U
Vinyl chloride	0.5	U
Total Xylenes	0.4	J

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2159	Dilution Factor:	1
Lab Sample ID:	AS039267	Sample Date:	07/12/93
Client Sample ID:	SED-104	Analysis Date:	07/15/93
		% Dry Weight:	68.20

Parameter Units = UG/KG	Result	Q
Acetone	640	E
Benzene	7	U
Bromodichloromethane	7	U
Bromoform	7	U
Bromomethane	14	U
2-Butanone	140	
Carbon Disulfide	7	U
Carbon Tetrachloride	7	U
Chlorobenzene	7	U
Chloroethane	14	U
Chloroform	7	U
Chloromethane	14	U
Dibromochloromethane	7	U
1,1-Dichloroethane	7	U
1,2-Dichloroethane	7	U
1,1-Dichloroethene	7	U
1,2-Dichloroethene (Total)	7	
1,2-Dichloropropane	7	U
cis-1,3-Dichloropropene	7	U
trans-1,3-Dichloropropene	7	U
Ethyl benzene	7	U
2-Hexanone	14	U
Methylene chloride	7	U
4-Methyl-2-pentanone	14	U
Styrene	7	U
1,1,2,2-Tetrachloroethane	7	U
Tetrachloroethene	7	U
Toluene	48	B
1,1,1-Trichloroethane	7	U
1,1,2-Trichloroethane	7	U
Trichloroethene	170	
Vinyl acetate	14	U
Vinyl chloride	14	U
Total Xylenes	7	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2159	Dilution Factor:	5
Lab Sample ID:	AS039267DL	Sample Date:	07/12/93
Client Sample ID:	SED-104 DL	Analysis Date:	07/15/93
		% Dry Weight:	68.20

Parameter Units = UG/KG	Result	Q
Acetone	360	
Benzene	37	U
Bromodichloromethane	37	U
Bromoform	37	U
Bromomethane	73	U
2-Butanone	92	
Carbon Disulfide	37	U
Carbon Tetrachloride	37	U
Chlorobenzene	37	U
Chloroethane	73	U
Chloroform	37	U
Chloromethane	73	U
Dibromochloromethane	37	U
1,1-Dichloroethane	37	U
1,2-Dichloroethane	37	U
1,1-Dichloroethene	37	U
1,2-Dichloroethene (Total)	37	U
1,2-Dichloropropane	37	U
cis-1,3-Dichloropropene	37	U
trans-1,3-Dichloropropene	37	U
Ethyl benzene	37	U
2-Hexanone	73	U
Methylene chloride	37	U
4-Methyl-2-pentanone	73	U
Styrene	37	U
1,1,2,2-Tetrachloroethane	37	U
Tetrachloroethene	37	U
Toluene	51	B
1,1,1-Trichloroethane	37	U
1,1,2-Trichloroethane	37	U
Trichloroethene	28	J
Vinyl acetate	73	U
Vinyl chloride	73	U
Total Xylenes	37	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2159	Dilution Factor:	2
Lab Sample ID:	AS039268	Sample Date:	07/12/93
Client Sample ID:	SW-104	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	10	U
Benzene	1	U
Bromodichloromethane	1	U
Bromoform	1	U
Bromomethane	1	U
2-Butanone	10	U
Carbon Disulfide	1	U
Carbon Tetrachloride	1	U
Chlorobenzene	1	U
Chloroethane	1	U
Chloroform	1	U
Chloromethane	1	U
Dibromochloromethane	1	U
1,1-Dichloroethane	1	U
1,2-Dichloroethane	1	U
1,1-Dichloroethene	1	U
1,2-Dichloroethene (Total)	20	
1,2-Dichloropropane	1	U
cis-1,3-Dichloropropene	1	U
trans-1,3-Dichloropropene	1	U
Ethyl benzene	1	U
2-Hexanone	10	U
Methylene chloride	1	U
4-Methyl-2-pentanone	10	U
Styrene	1	U
1,1,2,2-Tetrachloroethane	1	U
Tetrachloroethene	1	U
Toluene	1	U
1,1,1-Trichloroethane	1	U
1,1,2-Trichloroethane	1	U
Trichloroethene	40	
Vinyl acetate	1	U
Vinyl chloride	1	U
Total Xylenes	1	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2159	Dilution Factor:	4
Lab Sample ID:	AS039271	Sample Date:	07/12/93
Client Sample ID:	OUTFALL 1 MANWAY	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	20	U
Benzene	2	U
Bromodichloromethane	2	U
Bromoform	2	U
Bromomethane	2	U
2-Butanone	20	U
Carbon Disulfide	2	U
Carbon Tetrachloride	2	U
Chlorobenzene	2	U
Chloroethane	2	U
Chloroform	12	
Chloromethane	2	U
Dibromochloromethane	2	U
1,1-Dichloroethane	2	U
1,2-Dichloroethane	2	U
1,1-Dichloroethene	0.3	J
1,2-Dichloroethene (Total)	89	
1,2-Dichloropropane	2	U
cis-1,3-Dichloropropene	2	U
trans-1,3-Dichloropropene	2	U
Ethyl benzene	2	U
2-Hexanone	20	U
Methylene chloride	2	
4-Methyl-2-pentanone	20	U
Styrene	2	U
1,1,2,2-Tetrachloroethane	2	U
Tetrachloroethene	2	U
Toluene	2	U
1,1,1-Trichloroethane	2	U
1,1,2-Trichloroethane	2	U
Trichloroethene	48	
Vinyl acetate	2	U
Vinyl chloride	13	
Total Xylenes	2	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2159	Dilution Factor:	1
Lab Sample ID:	AS039272	Sample Date:	07/12/93
Client Sample ID:	OUTFALL 1 BEDDING	Analysis Date:	07/15/93
		% Dry Weight:	88.10

Parameter Units = UG/KG	Result	Q
Acetone	11	U
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	11	U
Chloroform	6	U
Chloromethane	11	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
2-Dichloroethane	6	U
1,1-Dichloroethene	6	U
1,2-Dichloroethene (Total)	14	
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	11	U
Methylene chloride	6	U
4-Methyl-2-pentanone	11	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	6	U
Toluene	6	U
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	6	U
Trichloroethene	63	
Vinyl acetate	11	U
Vinyl chloride	11	U
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2159	Dilution Factor:	10
Lab Sample ID:	AS039273	Sample Date:	07/13/93
Client Sample ID:	OUTFALL 1 BED. H20	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	50	
Benzene	5	U
Bromodichloromethane	5	U
Bromoform	5	U
Bromomethane	5	U
2-Butanone	50	U
Carbon Disulfide	2	J
Carbon Tetrachloride	5	U
Chlorobenzene	5	U
Chloroethane	5	U
Chloroform	5	U
Chloromethane	5	U
Dibromochloromethane	5	U
1,1-Dichloroethane	5	U
1,2-Dichloroethane	5	U
1,1-Dichloroethene	5	U
1,2-Dichloroethene (Total)	159	
1,2-Dichloropropane	5	U
cis-1,3-Dichloropropene	5	U
trans-1,3-Dichloropropene	5	U
Ethyl benzene	5	U
2-Hexanone	50	U
Methylene chloride	5	U
4-Methyl-2-pentanone	50	U
Styrene	5	U
1,1,2,2-Tetrachloroethane	5	U
Tetrachloroethene	5	U
Toluene	5	U
1,1,1-Trichloroethane	5	U
1,1,2-Trichloroethane	5	U
Trichloroethene	5	
Vinyl acetate	5	U
Vinyl chloride	6	
Total Xylenes	5	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2159	Dilution Factor:	2
Lab Sample ID:	AS039274	Sample Date:	07/13/93
Client Sample ID:	OUTFALL 2 BED. H2	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	37	
Benzene	1	U
Bromodichloromethane	1	U
Bromoform	1	U
Bromomethane	1	U
2-Butanone	10	U
Carbon Disulfide	1	U
Carbon Tetrachloride	1	U
Chlorobenzene	1	U
Chloroethane	1	U
Chloroform	2	
Chloromethane	1	U
Dibromochloromethane	1	U
1,1-Dichloroethane	1	U
1,2-Dichloroethane	1	U
1,1-Dichloroethene	1	U
1,2-Dichloroethene (Total)	41	
1,2-Dichloropropane	1	U
cis-1,3-Dichloropropene	1	U
trans-1,3-Dichloropropene	1	U
Ethyl benzene	1	U
2-Hexanone	10	U
Methylene chloride	1	
4-Methyl-2-pentanone	10	U
Styrene	1	U
1,1,2,2-Tetrachloroethane	1	U
Tetrachloroethene	1	U
Toluene	0.3	J
1,1,1-Trichloroethane	1	U
1,1,2-Trichloroethane	1	U
Trichloroethene	7	
Vinyl acetate	1	U
Vinyl chloride	3	
Total Xylenes	1	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2159	Dilution Factor:	1
Lab Sample ID:	AS039277	Sample Date:	07/13/93
Client Sample ID:	OUTFALL 2 BEDDING	Analysis Date:	07/16/93
		% Dry Weight:	83.20

Parameter Units = UG/KG	Result	Q
Acetone	12	U
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	12	U
2-Butanone	12	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	0.9	BJ
Chloroethane	12	U
Chloroform	6	U
Chloromethane	12	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	6	U
1,2-Dichloroethene (Total)	4	J
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	12	U
Methylene chloride	6	U
4-Methyl-2-pentanone	12	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	6	U
Toluene	0.8	BJ
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	6	U
Trichloroethene	4	BJ
Vinyl acetate	12	U
Vinyl chloride	12	U
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2159	Dilution Factor:	1
Lab Sample ID:	AS039278	Sample Date:	07/13/93
Client Sample ID:	OUTFALL 2	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	5	U
Benzene	0.5	U
Bromodichloromethane	0.5	U
Bromoform	0.5	U
Bromomethane	0.5	U
2-Butanone	5	U
Carbon Disulfide	0.5	U
Carbon Tetrachloride	0.5	U
Chlorobenzene	0.5	U
Chloroethane	0.5	U
Chloroform	0.5	
Chloromethane	0.5	U
Dibromochloromethane	0.5	U
1,1-Dichloroethane	0.5	U
1,2-Dichloroethane	0.5	U
1,1-Dichloroethene	0.5	U
1,2-Dichloroethene (Total)	6	
1,2-Dichloropropane	0.5	U
cis-1,3-Dichloropropene	0.5	U
trans-1,3-Dichloropropene	0.5	U
Ethyl benzene	0.5	U
2-Hexanone	5	U
Methylene chloride	0.5	U
4-Methyl-2-pentanone	5	U
Styrene	0.5	U
1,1,2,2-Tetrachloroethane	0.5	U
Tetrachloroethene	0.5	U
Toluene	0.5	U
1,1,1-Trichloroethane	0.5	U
1,1,2-Trichloroethane	0.5	U
Trichloroethene	18	
Vinyl acetate	0.5	U
Vinyl chloride	0.2	J
Total Xylenes	0.5	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2159	Dilution Factor:	1
Lab Sample ID:	AS039279	Sample Date:	07/12/93
Client Sample ID:	TRIPBLANK	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	5	U
Benzene	0.5	U
Bromodichloromethane	0.5	U
Bromoform	0.5	U
Bromomethane	0.5	U
2-Butanone	5	U
Carbon Disulfide	0.5	U
Carbon Tetrachloride	0.5	U
Chlorobenzene	0.5	U
Chloroethane	0.5	U
Chloroform	0.5	U
Chloromethane	0.5	U
Dibromochloromethane	0.5	U
1,1-Dichloroethane	0.5	U
1,2-Dichloroethane	0.5	U
1,1-Dichloroethene	0.5	U
1,2-Dichloroethene (Total)	0.5	U
1,2-Dichloropropane	0.5	U
cis-1,3-Dichloropropene	0.5	U
trans-1,3-Dichloropropene	0.5	U
Ethyl benzene	0.5	U
2-Hexanone	5	U
Methylene chloride	0.5	U
4-Methyl-2-pentanone	5	U
Styrene	0.5	U
1,1,2,2-Tetrachloroethane	0.5	U
Tetrachloroethene	0.5	U
Toluene	0.5	U
1,1,1-Trichloroethane	0.5	U
1,1,2-Trichloroethane	0.5	U
Trichloroethene	0.5	U
Vinyl acetate	0.5	U
Vinyl chloride	0.5	U
Total Xylenes	0.5	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2159
Lab Sample ID: AS039279
Client Sample ID: TRIPBLANK

Matrix: Aqueous
Dilution Factor: 1
Sample Date: 07/12/93
Analysis Date: 07/22/93

Parameter Units = UG/L	Result	Q
1,2-Dichloro-1,1,2-Trifluoroethane	0.5	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2159	Dilution Factor:	1
Lab Sample ID:	AR009752	Sample Date:	-
Client Sample ID:	METHOD BLANK(VBLK79)	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	5	U
Benzene	0.5	U
Bromodichloromethane	0.5	U
Bromoform	0.5	U
Bromomethane	0.5	U
2-Butanone	5	U
Carbon Disulfide	0.5	U
Carbon Tetrachloride	0.5	U
Chlorobenzene	0.5	U
Chloroethane	0.5	U
Chloroform	0.5	U
Chloromethane	0.5	U
Dibromochloromethane	0.5	U
1,1-Dichloroethane	0.5	U
1,2-Dichloroethane	0.5	U
1,1-Dichloroethene	0.5	U
1,2-Dichloroethene (Total)	0.5	U
1,2-Dichloropropane	0.5	U
cis-1,3-Dichloropropene	0.5	U
trans-1,3-Dichloropropene	0.5	U
Ethyl benzene	0.5	U
2-Hexanone	5	U
Methylene chloride	0.5	U
4-Methyl-2-pentanone	5	U
Styrene	0.5	U
1,1,2,2-Tetrachloroethane	0.5	U
Tetrachloroethene	0.5	U
Toluene	0.5	U
1,1,1-Trichloroethane	0.5	U
1,1,2-Trichloroethane	0.5	U
Trichloroethene	0.5	U
Vinyl acetate	0.5	U
Vinyl chloride	0.5	U
Total Xylenes	0.5	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2159
Lab Sample ID: AR009826
Client Sample ID: METHOD BLANK(VBLK80)

Matrix: Aqueous
Dilution Factor: 1
Sample Date: -
Analysis Date: 07/22/93

Parameter Units = UG/L	Result	Q
Acetone	5	U
Benzene	0.5	U
Bromodichloromethane	0.5	U
Bromoform	0.5	U
Bromomethane	0.5	U
2-Butanone	5	U
Carbon Disulfide	0.5	U
Carbon Tetrachloride	0.5	U
Chlorobenzene	0.5	U
Chloroethane	0.5	U
Chloroform	0.5	U
Chloromethane	0.5	U
Dibromochloromethane	0.5	U
1,1-Dichloroethane	0.5	U
1,2-Dichloroethane	0.5	U
1,1-Dichloroethene	0.5	U
1,2-Dichloroethene (Total)	0.5	U
1,2-Dichloropropane	0.5	U
cis-1,3-Dichloropropene	0.5	U
trans-1,3-Dichloropropene	0.5	U
Ethyl benzene	0.5	U
2-Hexanone	5	U
Methylene chloride	0.5	U
4-Methyl-2-pentanone	5	U
Styrene	0.5	U
1,1,2,2-Tetrachloroethane	0.5	U
Tetrachloroethene	0.5	U
Toluene	0.5	U
1,1,1-Trichloroethane	0.5	U
1,1,2-Trichloroethane	0.5	U
Trichloroethene	0.5	U
Vinyl acetate	0.5	U
Vinyl chloride	0.5	U
Total Xylenes	0.5	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2159	Dilution Factor:	1
Lab Sample ID:	AR009826	Sample Date:	-
Client Sample ID:	METHOD BLANK(VBLK80)	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
1,2-Dichloro-1,1,2-Trifluoroethane	0.5	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2159	Dilution Factor:	1
Lab Sample ID:	AR009823	Sample Date:	-
Client Sample ID:	METHOD BLANK(VBLK36)	Analysis Date:	07/15/93
		% Dry Weight:	100.00

Parameter Units = UG/KG	Result	Q
Acetone	10	U
Benzene	5	U
Bromodichloromethane	5	U
Bromoform	5	U
Bromomethane	10	U
2-Butanone	10	U
Carbon Disulfide	5	U
Carbon Tetrachloride	5	U
Chlorobenzene	1	J
Chloroethane	10	U
Chloroform	5	U
Chloromethane	10	U
Dibromochloromethane	5	U
1,1-Dichloroethane	5	U
1,2-Dichloroethane	5	U
1,1-Dichloroethene	5	U
1,2-Dichloroethene (Total)	5	U
1,2-Dichloropropane	5	U
cis-1,3-Dichloropropene	5	U
trans-1,3-Dichloropropene	5	U
Ethyl benzene	5	U
2-Hexanone	10	U
Methylene chloride	5	U
4-Methyl-2-pentanone	10	U
Styrene	5	U
1,1,2,2-Tetrachloroethane	5	U
Tetrachloroethene	5	U
Toluene	1	J
1,1,1-Trichloroethane	5	U
1,1,2-Trichloroethane	5	U
Trichloroethene	5	U
Vinyl acetate	10	U
Vinyl chloride	10	U
Total Xylenes	5	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2159	Dilution Factor:	1
Lab Sample ID:	AR009824	Sample Date:	-
Client Sample ID:	METHOD BLANK(VBLK37)	Analysis Date:	07/16/93
		% Dry Weight:	100.00

Parameter Units = UG/KG	Result	Q
Acetone	10	U
Benzene	5	U
Bromodichloromethane	5	U
Bromoform	5	U
Bromomethane	10	U
2-Butanone	10	U
Carbon Disulfide	5	U
Carbon Tetrachloride	5	U
Chlorobenzene	2	J
Chloroethane	10	U
Chloroform	5	U
Chloromethane	10	U
Dibromochloromethane	5	U
1,1-Dichloroethane	5	U
1,2-Dichloroethane	5	U
1,1-Dichloroethene	5	U
1,2-Dichloroethene (Total)	5	U
1,2-Dichloropropane	5	U
cis-1,3-Dichloropropene	5	U
trans-1,3-Dichloropropene	5	U
Ethyl benzene	0.2	J
2-Hexanone	10	U
Methylene chloride	5	U
4-Methyl-2-pentanone	10	U
Styrene	5	U
1,1,2,2-Tetrachloroethane	0.4	J
Tetrachloroethene	5	U
Toluene	1	J
1,1,1-Trichloroethane	5	U
1,1,2-Trichloroethane	5	U
Trichloroethene	0.9	J
Vinyl acetate	10	U
Vinyl chloride	10	U
Total Xylenes	5	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2159	Dilution Factor:	1
Lab Sample ID:	AR009825	Sample Date:	-
Client Sample ID:	METHOD BLANK(VBLK70)	Analysis Date:	07/19/93
		% Dry Weight:	100.00

Parameter Units = UG/KG	Result	Q
Acetone	1200	U
Benzene	620	U
Bromodichloromethane	620	U
Bromoform	620	U
Bromomethane	1200	U
2-Butanone	1200	U
Carbon Disulfide	620	U
Carbon Tetrachloride	620	U
Chlorobenzene	620	U
Chloroethane	1200	U
Chloroform	620	U
Chloromethane	1200	U
Dibromochloromethane	620	U
1,1-Dichloroethane	620	U
1,2-Dichloroethane	620	U
1,1-Dichloroethene	620	U
1,2-Dichloroethene (Total)	620	U
1,2-Dichloropropane	620	U
cis-1,3-Dichloropropene	620	U
trans-1,3-Dichloropropene	620	U
Ethyl benzene	620	U
2-Hexanone	1200	U
Methylene chloride	620	U
4-Methyl-2-pentanone	1200	U
Styrene	620	U
1,1,2,2-Tetrachloroethane	620	U
Tetrachloroethene	620	U
Toluene	620	U
1,1,1-Trichloroethane	620	U
1,1,2-Trichloroethane	620	U
Trichloroethene	620	U
Vinyl acetate	1200	U
Vinyl chloride	1200	U
Total Xylenes	620	U

CAPSULE ENVIRONMENTAL ENG
MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES
WATER INTERNAL STANDARDS RECOVERY

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2159

Client Sample ID	Lab Sample ID	IS1 DCB #	IS2 CBZ #	IS3 DFB #
METHOD BLANK (VBLK79)	AR009752	80	83	89
MW-14	AS039258	83	87	90
MW-16	AS039275	73	72	74
MW-18	AS039257	95	97	99
MW-9	AS039263	77	79	79
OUTFALL 1 BED. H20	AS039273	76	76	77
OUTFALL 1 MANWAY	AS039271	72	72	75
OUTFALL 2	AS039278	76	75	81
OUTFALL 2 BED. H2	AS039274	74	72	77
SB-1	AS039265	79	80	83
SB-5	AS039266	76	77	78
SS-1 BEDDING H20	AS039260	76	80	86
SS-4 H20	AS039254	103	84	82
SW-104	AS039268	70	72	78

IS1 DCB = 1,4-Dichlorobenzene-D4
IS2 CBZ = Chlorobenzene-D5
IS3 DFB = 1,4-Difluorobenzene

Column to be used to flag recovery values
* Values outside of contract required QC limits

CAPSULE ENV NMENTAL ENG
MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES
WATER INTERNAL STANDARDS RECOVERY

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2159

Client Sample ID	Lab Sample ID	IS1 DCB #	IS2 CBZ #	IS3 DFB #
METHOD BLANK(VBLK80)	AR009826	78	84	89
MW-20	AS039276	76	76	86
TRIPBLANK	AS039279	78	80	87

IS1 DCB = 1,4-Dichlorobenzene-D4
IS2 CBZ = Chlorobenzene-D5
IS3 DFB = 1,4-Difluorobenzene

Column to be used to flag recovery values
* Values outside of contract required QC limits

CAPSULE ENVIRONMENTAL ENG
METHOD 8240 - TCL VOLATILE ORGANICS
SOIL INTERNAL STANDARDS RECOVERY

aboratory: Recra Environmental, Inc. - RECNY
ab Job No: A93-2159

Client Sample ID	Lab Sample ID	IS1 BCM #	IS2 DFB #	IS3 CBZ #
METHOD BLANK(VBLK36)	AR009823	99	93	87
METHOD BLANK(VBLK37)	AR009824	96	90	86
METHOD BLANK(VBLK70)	AR009825	99	107	107
OUTFALL 1 BEDDING	AS039272	87	84	76
OUTFALL 2 BEDDING	AS039277	90	83	70
SED-104	AS039267	105	92	83
SED-104 DL	AS039267DL	94	90	84
SS-1 BEDDING	AS039259	94	91	78
SS-1 BEDDING DL	AS039259ML	100	108	106
SS-1 BEDDING MS	AS039259MS	104	111	109
SS-1 BEDDING SD	AS039259SD	101	110	108
SS-4 SOIL/BEDDING	AS039255	98	93	88

IS1 BCM = Bromochloromethane
IS2 DFB = 1,4-Difluorobenzene
IS3 CBZ = Chlorobenzene-D5

Column to be used to flag recovery values
* Values outside of contract required QC limits

CAPSULE ENV. MENTAL ENG
MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES
WATER SURROGATE RECOVERY

aboratory: Recra Environmental, Inc. - RECNY
ab Job No: A93-2159

Client Sample ID	Lab Sample ID	S1 BFB #
METHOD BLANK(VBLK79)	AR009752	85
MW-14	AS039258	89
MW-16	AS039275	93
MW-18	AS039257	93
MW-9	AS039263	93
OUTFALL 1 BED. H20	AS039273	90
OUTFALL 1 MANWAY	AS039271	87
OUTFALL 2	AS039278	87
OUTFALL 2 BED. H2	AS039274	85
SB-1	AS039265	88
SB-5	AS039266	93
SS-1 BEDDING H20	AS039260	85
SS-4 H20	AS039254	111
SW-104	AS039268	85

S1 BFB = p-Bromofluorobenzene

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogates diluted out

CAPSULE ENVIRONMENTAL ENG
MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES
WATER SURROGATE RECOVERY

aboratory: Recra Environmental, Inc. - RECNY
ab Job No: A93-2159

Client Sample ID	Lab Sample ID	S1 BFB #
METHOD BLANK(VBLK80)	AR009826	86
MW-20	AS039276	86
TRIPBLANK	AS039279	87

S1 BFB = p-Bromofluorobenzene

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogates diluted out

CAPSULE ENVI MENTAL ENG
METHOD 8240 - TCL VOLATILE ORGANICS
SOIL SURROGATE RECOVERY

aboratory: Recra Environmental, Inc. - RECNY
ab Job No: A93-2159

Client Sample ID	Lab Sample ID	S1 TOL #	S2 BFB #	S3 DCE #
METHOD BLANK (VBLK36)	AR009823	100	96	96
METHOD BLANK (VBLK37)	AR009824	98	103	90
METHOD BLANK (VBLK70)	AR009825	100	100	101
OUTFALL 1 BEDDING	AS039272	104	91	101
OUTFALL 2 BEDDING	AS039277	106	96	89
SED-104	AS039267	102	92	94
SED-104 DL	AS039267DL	101	96	103
SS-1 BEDDING	AS039259	108	80	92
SS-1 BEDDING DL	AS039259ML	99	100	100
SS-1 BEDDING MS	AS039259MS	100	100	100
SS-1 BEDDING SD	AS039259SD	99	100	102
SS-4 SOIL/BEDDING	AS039255	101	98	100

S1 TOL = Toluene-D8
S2 BFB = p-Bromofluorobenzene
S3 DCE = 1,2-Dichloroethane-D4

\# Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogates diluted out

CAPSULE ENVIRONMENTAL ENG
METHOD 8240 - TCL VOLATILE ORGANICS
SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

0041

Lab Name: Recra Environmental, Inc. Contract: ___________

Lab Code: RECNY Case No.: _____ SAS No.: ______ SDG No.: ______

Matrix Spike - Client Sample No.: SS-1 BEDDING DL Level:(low/med) MED

COMPOUND	SPIKE ADDED UG/KG	SAMPLE CONCENTRATION UG/KG	MS CONCENTRATION UG/KG	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	7300	0	6900	94	59 - 172
Trichloroethene	7300	18000	23000	68	62 - 137
Benzene	7300	0	7500	103	66 - 142
Toluene	7300	0	7300	100	59 - 139
Chlorobenzene	7300	0	7100	97	60 - 133

COMPOUND	SPIKE ADDED UG/KG	MSD CONCENTRATION UG/KG	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene	7300	6800	93	1	22	59 - 172
Trichloroethene	7300	24000	82	19	24	62 - 137
Benzene	7300	7600	104	1	21	66 - 142
Toluene	7300	7500	103	3	21	59 - 139
Chlorobenzene	7300	7300	100	3	21	60 - 133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: ____0 out of ____5 outside limits
Spike recovery: ____0 out of ____10 outside limits

Comments: ______________________________

CAPSULE ENVIRONMENTAL ENG

Total Metals Analysis

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2159
Lab Sample ID: AS039256
Client Sample ID: MW-13

Matrix: Aqueous
Sample Date: 07/13/93

Dilution Factor: 1

Parameter	Units = MG/L	Method	Digestion Date	Analysis Date	Result	Q
Aluminum - Total		7020	07/21/93	07/27/93	31.6	
Antimony - Total		7041	07/21/93	07/26/93	0.003	U
Arsenic - Total		7060	07/21/93	07/26/93	0.008	
Barium - Total		6010	07/21/93	07/26/93	0.49	
Beryllium - Total		6010	07/21/93	07/26/93	0.003	U
Cadmium - Total		7131	07/21/93	07/26/93	0.0007	
Calcium - Total		6010	07/21/93	07/28/93	507	
Chromium - Total		6010	07/21/93	07/26/93	0.062	
Cobalt - Total		6010	07/21/93	07/26/93	0.032	
Copper - Total		6010	07/21/93	07/26/93	0.005	U
Iron - Total		6010	07/21/93	07/26/93	62.8	
Lead - Total		7421	07/21/93	07/26/93	0.039	
Magnesium - Total		6010	07/21/93	07/26/93	178	
Manganese - Total		6010	07/21/93	07/26/93	1.9	
Mercury - Total		7470	07/21/93	07/21/93	0.0002	U
Nickel - Total		6010	07/21/93	07/26/93	0.071	
Potassium - Total		6010	07/21/93	07/26/93	11.9	
Selenium - Total		7740	07/21/93	07/23/93	0.002	U
Silver - Total		6010	07/21/93	07/26/93	0.010	U
Sodium - Total		6010	07/21/93	07/28/93	30.0	
Thallium - Total		7841	07/21/93	07/27/93	0.002	U
Vanadium - Total		6010	07/21/93	07/26/93	0.079	
Zinc - Total		6010	07/21/93	07/26/93	0.23	

CAPSULE ENVIRONMENTAL ENG

Total Metals Analysis

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2159
Lab Sample ID: AS039258
Client Sample ID: MW-14

Matrix: Aqueous
Sample Date: 07/13/93

Dilution Factor: 1

Parameter	Units = MG/L	Method	Digestion Date	Analysis Date	Result	Q
Aluminum - Total		7020	07/21/93	07/27/93	1.2	
Antimony - Total		7041	07/21/93	07/26/93	0.003	U
Arsenic - Total		7060	07/21/93	07/26/93	0.002	U
Barium - Total		6010	07/21/93	07/26/93	0.072	
Beryllium - Total		6010	07/21/93	07/26/93	0.003	U
Cadmium - Total		7131	07/21/93	07/26/93	0.0004	
Calcium - Total		6010	07/21/93	07/28/93	204	
Chromium - Total		6010	07/21/93	07/26/93	0.010	U
Cobalt - Total		6010	07/21/93	07/26/93	0.020	U
Copper - Total		6010	07/21/93	07/26/93	0.005	U
Iron - Total		6010	07/21/93	07/26/93	3.1	
Lead - Total		7421	07/21/93	07/26/93	0.004	
Magnesium - Total		7421	07/21/93	07/26/93	100	
Manganese - Total		6010	07/21/93	07/26/93	0.29	
Mercury - Total		7470	07/21/93	07/21/93	0.0002	U
Nickel - Total		6010	07/21/93	07/26/93	0.030	U
Potassium - Total		6010	07/21/93	07/26/93	2.2	
Selenium - Total		7740	07/21/93	07/23/93	0.002	U
Silver - Total		6010	07/21/93	07/26/93	0.010	U
Sodium - Total		6010	07/21/93	07/28/93	74.0	
Thallium - Total		7841	07/21/93	07/27/93	0.002	U
Vanadium - Total		6010	07/21/93	07/26/93	0.020	U
Zinc - Total		6010	07/21/93	07/26/93	0.030	

CAPSULE ENVIRONMENTAL ENG

Total Metals Analysis

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2159
Lab Sample ID: AS039264
Client Sample ID: MW-7

Matrix: Aqueous
Sample Date: 07/13/93

Dilution Factor: 1

Parameter Units = MG/L	Method	Digestion Date	Analysis Date	Result	Q
Aluminum - Total	7020	07/21/93	07/27/93	2.9	
Antimony - Total	7041	07/21/93	07/26/93	0.003	U
Arsenic - Total	7060	07/21/93	07/26/93	0.002	U
Barium - Total	6010	07/21/93	07/26/93	0.11	
Beryllium - Total	6010	07/21/93	07/26/93	0.003	U
Cadmium - Total	7131	07/21/93	07/26/93	0.0001	
Calcium - Total	6010	07/21/93	07/28/93	102	
Chromium - Total	6010	07/21/93	07/26/93	0.010	U
Cobalt - Total	6010	07/21/93	07/26/93	0.020	U
Copper - Total	6010	07/21/93	07/26/93	0.005	U
Iron - Total	6010	07/21/93	07/26/93	6.7	
Lead - Total	7421	07/21/93	07/26/93	0.005	
Magnesium - Total	6010	07/21/93	07/26/93	94.6	
Manganese - Total	6010	07/21/93	07/26/93	0.14	
Mercury - Total	7470	07/21/93	07/21/93	0.0002	U
Nickel - Total	6010	07/21/93	07/26/93	0.030	U
Potassium - Total	6010	07/21/93	07/26/93	3.2	
Selenium - Total	7740	07/21/93	07/23/93	0.002	U
Silver - Total	6010	07/21/93	07/26/93	0.010	U
Sodium - Total	6010	07/21/93	07/28/93	29.3	
Thallium - Total	7841	07/21/93	07/27/93	0.002	U
Vanadium - Total	6010	07/21/93	07/26/93	0.020	U
Zinc - Total	6010	07/21/93	07/26/93	0.027	

CAPSULE ENVIRONMENTAL ENG

Total Metals Analysis

aboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
ab Job No:	A93-2159		
ab Sample ID:	AR009821		
lient Sample ID:	METHOD BLANK	Dilution Factor:	1

Parameter Units = MG/L	Method	Digestion Date	Analysis Date	Result	Q
Aluminum - Total	7020	07/21/93	07/27/93	0.20	U
Antimony - Total	7041	07/21/93	07/26/93	0.003	U
Arsenic - Total	7060	07/21/93	07/26/93	0.002	U
Barium - Total	6010	07/21/93	07/26/93	0.020	U
Beryllium - Total	6010	07/21/93	07/26/93	0.003	U
Cadmium - Total	7131	07/21/93	07/26/93	0.0001	U
Calcium - Total	6010	07/21/93	07/28/93	1.0	U
Chromium - Total	6010	07/21/93	07/26/93	0.010	U
Cobalt - Total	6010	07/21/93	07/26/93	0.020	U
Copper - Total	6010	07/21/93	07/26/93	0.005	U
Iron - Total	6010	07/21/93	07/26/93	0.050	U
Lead - Total	7421	07/21/93	07/26/93	0.001	U
Magnesium - Total	6010	07/21/93	07/26/93	0.30	U
Manganese - Total	6010	07/21/93	07/26/93	0.005	U
Mercury - Total	7470	07/21/93	07/21/93	0.0002	U
Nickel - Total	6010	07/21/93	07/26/93	0.030	U
Potassium - Total	6010	07/21/93	07/26/93	0.20	U
Selenium - Total	7740	07/21/93	07/23/93	0.002	U
Silver - Total	6010	07/21/93	07/26/93	0.010	U
Sodium - Total	6010	07/21/93	07/28/93	0.80	U
Thallium - Total	7841	07/21/93	07/27/93	0.002	U
Vanadium - Total	6010	07/21/93	07/26/93	0.020	U
Zinc - Total	6010	07/21/93	07/26/93	0.010	U

Date : 08/04/93 10:14
Job No: A93-2159

CAPSULE ENVIRONMENTAL ENG
QUALITY CONTROL SPIKE ANALYSIS

Rept: AN0364

Client Sample ID: METHOD BLANK MATRIX SPIKE BLANK MATRIX SPIKE BL DUP
Lab Sample ID: AR009821 AR009902 AR009903

Analyte	Units of Measure	Concentration		Spike Amount		% Recovery			% RPD	QC LIMITS	
		Matrix Spike	Spike Blank Dup	MS	MSD	MS	MSD	Avg		RPD	REC.
ALUMINUM ANALYSIS											
TOTAL ALUMINUM	MG/L	3.7	3.5	4.0	4.0	92	88	90	4	20.0	75-125
TOTAL ANTIMONY	MG/L	0.20	0.21	0.20	0.20	100	105	103	5	20.0	75-125
TOTAL ARSENIC	MG/L	0.075	0.080	0.080	0.080	94	100	97	6	20.0	75-125
TOTAL BARIUM	MG/L	4.2	4.1	4.0	4.0	105	102	104	3	20.0	75-125
TOTAL BERYLLIUM	MG/L	0.10	0.10	0.10	0.10	100	100	100	0	20.0	75-125
TOTAL CADMIUM	MG/L	0.011	0.011	0.010	0.010	110	110	110	0	20.0	75-125
TOTAL CALCIUM	MG/L	96.4	95.0	100	100	96	95	96	1	20.0	75-125
TOTAL CHROMIUM	MG/L	0.40	0.40	0.40	0.40	100	100	100	0	20.0	75-125
TOTAL COBALT	MG/L	1.0	1.0	1.0	1.0	100	100	100	0	20.0	75-125
TOTAL COPPER	MG/L	0.52	0.52	0.50	0.50	104	104	104	0	20.0	75-125
TOTAL IRON	MG/L	2.1	2.1	2.0	2.0	105	105	105	0	20.0	75-125
TOTAL LEAD	MG/L	0.026	0.043	0.040	0.040	65 *	108	87	50 *	20.0	75-125
TOTAL MAGNESIUM	MG/L	50.6	51.2	50.0	50.0	101	102	102	1	20.0	75-125
TOTAL MANGANESE	MG/L	1.0	1.1	1.0	1.0	100	110	105	10	20.0	75-125
TOTAL MERCURY	MG/L	0.0078	0.0077	0.0080	0.0080	98	96	97	2	20.0	75-125
TOTAL NICKEL	MG/L	1.0	1.0	1.0	1.0	100	100	100	0	20.0	75-125
TOTAL POTASSIUM	MG/L	51.5	51.2	50.0	50.0	103	102	103	1	20.0	75-125
TOTAL SELENIUM	MG/L	0.021	0.020	0.020	0.020	105	100	103	5	20.0	75-125
TOTAL SILVER	MG/L	0.080	0.072	0.10	0.10	80	72 *	76	10	20.0	75-125
TOTAL SODIUM	MG/L	105	104	100	100	105	104	105	1	20.0	75-125
TOTAL THALLIUM	MG/L	0.10	0.11	0.10	0.10	100	110	105	10	20.0	75-125
TOTAL VANADIUM	MG/L	1.0	1.0	1.0	1.0	100	100	100	0	20.0	75-125
TOTAL ZINC	MG/L	1.0	1.0	1.0	1.0	100	100	100	0	20.0	75-125

0045

* Indicates Result is outside QC Limits
NC = Not Calculated ND = Not Calculated

CAPSULE ENVIRONMENTAL ENG

Wet Chemistry Analysis

aboratory: Recra Environmental, Inc.- RECNY
ab Job No: A93-2159
ab Sample ID: AS039261
ient Sample ID: SS-1 UNSATUR

Matrix: Soil
Sample Date: 07/13/93

Dilution Factor: 1

Parameter	Units of Measure	Method	Analysis Date	Result	Q
Total Organic Carbon	MG/KG	S1D,S3	07/30/93	28500	

CAPSULE ENVIRONMENTAL ENG

Wet Chemistry Analysis

aboratory: Recra Environmental, Inc.- RECNY
ab Job No: A93-2159
ab Sample ID: AS039262
lient Sample ID: SS-1 SATURATED

Matrix: Soil
Sample Date: 07/13/93

Dilution Factor: 1

Parameter	Units of Measure	Method	Analysis Date	Result	Q
Total Organic Carbon	MG/KG	S1D,S3	07/30/93	30000	

CAPSULE ENVIRONMENTAL ENG

Wet Chemistry Analysis

aboratory:	Recra Environmental, Inc.- RECNY	Matrix:	Soil
ab Job No:	A93-2159	Sample Date:	07/12/93
ab Sample ID:	AS039269		
lient Sample ID:	SB-1 UNSAT	Dilution Factor:	1

Parameter	Units of Measure	Method	Analysis Date	Result	Q
Total Organic Carbon	MG/KG	S1D,S3	07/30/93	35300	

CAPSULE ENVIRONMENTAL ENG

Wet Chemistry Analysis

aboratory:	Recra Environmental, Inc.- RECNY	Matrix:	Soil
ab Job No:	A93-2159	Sample Date:	07/12/93
ab Sample ID:	AS039270		
lient Sample ID:	SB-1 SATUR	Dilution Factor: 1	

Parameter	Units of Measure	Method	Analysis Date	Result	Q
Total Organic Carbon	MG/KG	S1D,S3	07/30/93	18900	

WQSPK3rd

QUALITY CONTROL INFORMATION - ACCURACY
SOIL MATRIX
WATER QUALITY TESTING

LAB NAME RECRA ENVIRONMENTAL INC.
RECRA SAMPLE IDENTIFICATION AS039270 MS
CLIENT SAMPLE IDENTIFICATION SB-1 SATUR MS

PARAMETER	METHOD NUMBER	GRAMS of BENZOIC ACID	PERCENT RECOVERY	Q
Total Organic Carbon	9060	0.1	100.	

ID# 93-2159

QUALITY CONTROL INFORMATION-PRECISION
SOIL MATRIX
WATER QUALITY TESTING

LAB NAME RECRA ENVIRONMENTAL INC.
RECRA SAMPLE IDENTIFICATION AS039270 MD
CLIENT SAMPLE IDENTIFICATION SB-1 SATUR

PARAMETER	METHOD NUMBER	UNITS OF MEASURE	VALUE 1	Q	VALUE 2	Q	MEAN	Q	S.D.
Total Organic Carbon	9060	mg/l	18900		19000		19000		70.7

SD=STANDARD DEVIATION
ID #93-2159

RECRA ENVIRONMENTAL, INC.

CHAIN OF CUSTODY RECORD

PROJECT NO: 128-98

SITE NAME: ARO Corp / Capsule

SAMPLERS (SIGNATURE):

STATION NO	DATE	TIME	COMP	GRAB	STATION LOCATION	NO OF CONTAINERS	8240 Low level	TOC	8240-465D				REMARKS
~~SB~~ 1	7/12			X	SB-1	3	X						
2	7/12			X	SB-5	3	X						
3	7/12			X	SED-104	2	X						
4	7/12			X	SW-104	2	X						
5	7/12			X	SB-1 ~~[illegible]~~ unsat.	1		X					
6	7/12			X	SB-1 SATUR.	1		X					
7	7/12			X	outfall 1 Manway	3	X						
8	7/12			X	outfall 1 bedding	2	X						
9	7/13			X	outfall 1 bedding H₂O	3	X						
10	7/13			X	Outfall 2 bedding H₂O	3	X						
11	7/13			X	MW-16	3	X						
12	7/13			X	MW-20	3			X				
13	7/13			X	outfall 2 bedding	3	X						
14	7/12				Trip Blanks	2	X						

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
	7/13/93	7:15	7/13/93 7:16			

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)

RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY (SIGNATURE)	DATE/TIME	REMARKS
				* Received 1 Sample not under COC OUTFALL 2 (H₂O) Sampled 7/13/93 @ 0950 AM

Distribution: Original accompanies shipment copy to coordinator field files

7/14/93

RECRA ENVIRONMENTAL, INC.

CHAIN OF CUSTODY RECORD

PROJECT NO 128-98

SITE NAME Alco Corp - Capsule

SAMPLERS (SIGNATURE) Rooms

STATION NO	DATE	TIME	COMP	GRAB	STATION LOCATION	NO OF CONTAINERS	8240 low level	6010 metals	TOC				REMARKS
1	7/13			X	SS-4 H_2O	3	X ✓						
2	7/13			X	SS-4 soil/bedding	3	X ✓						
3	7/13			X	MW-13	1		X ✓					
4	7/13			X	MW-18	3	X ✓						
5	7/13			X	MW-14	3	X ✓						
6	7/13			X	MW-14	1		X ✓					
7	7/13			X	SS-1 bedding	3	X ✓						
8	7/13			X	SS-1 bedding H_2O	3	X ✓						
9	7/13			X	SS-1 unsatur.	1			X ✓				
10	7/13			X	SS-1 Saturated	1			X ✓				
11	7/13			X	MW-9	3	X ✓						
12	7/13			X	MW-7	1		X ✓					
					Outfall 2		X						

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)
	7/13/93	7:15	7-13-93 7:17				

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY (SIGNATURE)	DATE	TIME	REMARKS

Distribution: Original accompanies shipment copy to coordinator field files

RECRA
ENVIRONMENTAL
INC.

Chemical and Environmental Analysis Services

August 11,1993

Mr. Tony Grooms
Capsule Environmental Engineering
1970 Oakcrest Avenue
Suite 215
St. Paul, Minnesota 55113

RECEIVED
AUG 1 6 1993
CAPSULE

File Project:
Return To File Basket

RE: Analytical Results

Dear Mr. Grooms:

Please find enclosed results concerning the analyses of the samples recently submitted by your firm . The Pertinent Information regarding these analyses is listed below:

Quote #: NY93-515
Project Name: ARO CORP / CAPSULE
Matrix: Aqueous / Soil
Samples Received: 07/16/93
Sample Date: 07/12,14,15/93

If you have any questions concerning these data, please contact Ms. Julie Calvert, Project Manager at (716) 691-2600 and refer to the I.D. number listed below. It has been our pleasure to provide Capsule Environmental Engineering with Environmental Testing Services. We look forward to serving you in the future.

Sincerely,

RECRA ENVIRONMENTAL, INC.

Robert K. Wyeth
Laboratory Director

RCO/RKW/rco
Enclosure

I.D.# 93-2197 (Partial)
NY3A4645

B-63A

Pg # upper right

1 RECRA 8/11/93

7 HW-1(4-6) ML soil volatiles.
8 SS-5 (2-4) " "
9 OW 101 water "
" " DL " "
HW-3 (4-6) soil "
12 " " ML " "
13 HW-4 (1-3) " "
14 " " DL " "
15 HW-5 (4-6) " "
16 " " ML " "
17 HW-6 (4-6) " "
18-21 missing : (pg # at bottom shows no break)
22 MW 16 water "
23,24 MW 20 " "
18 HW-7 (4-6) soil "
19 " ML " "
20 MW-14R water "
22 MW-3R DL water "
21 MW-3R " "
23 SS-1 (8-10) soil "
24 " ML " "
25 SS-1 (10-12) " "
26 " " DL " "
27 SS-1 (12-14) " "
28 " DL " "

54. ZP-6 SOIL VOLATILES
55 MW-1 water metals
56 MW-5 " "
57-77 QA/QC
79-81 COC

29. SS-1 (14-16) soil "
30 " "ML" "
31 SS-1 (16-18) " "
32. " " DL " "
33 " (18-20) " "
34 " " ML " "
35 SS-1 (20-22) " "
36 " " DL " "
37 SS-1 (22-24) ML " "
38 " " DL " "
39 SS-1 (24-25.5) " "
40. " " ML " "
41 HW 5 (6-8) " "
42 " " ML " "
43 TB
44 SB107 (0-2) " "
45 " (2-4) " "
46 " (4-6) " "
47 " (6-8) " "
48 " (6-8) DL " "
49 ZB-4 (12-14) " "
50 ZP-1 (12-14) " "
51 ZP-2 " "
52. ZP-3 (12-14) " "
53 ZP-5 (12-14) " "

ANALYTICAL RESULTS

Prepared For

Capsule Environmental Engineering
1970 Oakcrest Avenue
Suite 215
St. Paul, Minnesota 55113

Prepared By

Recra Environmental, Inc.
10 Hazelwood Drive, Suite 106
Amherst, New York 14228-2298

METHODOLOGIES

The specific methodologies employed in obtaining the enclosed analytical results are indicated on the specific data table. The method numbers presented refer to one of the following U.S. Environmental Protection Agency references.

- U.S. Environmental Protection Agency "Test Methods for Evaluating Solid Waste-Physical/Chemical Methods." Office of Solid Waste and Emergency Response. November 1986, SW-846, Third Edition.
- Aqueous Low Level Volatile Analyses were performed in accordance with the Contract Laboratory Protocol 10/92 Statement of Work with SW-846 Third Edition Criteria.

COMMENTS

Comments pertain to data on one or all pages of this report.

The enclosed data has been reported utilizing data qualifiers (Q) as defined on the Organic and Inorganic Data Comment Pages.

Results for the analysis of soils are corrected for moisture content and reported on a dry weight basis.

VOLATILE DATA

Sample OW-101 was analyzed at an initial dilution factor of two thousand (2000) due to the high concentrations of 1,2-Dichloroethene (Total) and Trichloroethene in the sample. A further dilution factor of four thousand (4000) was required due to the high concentration of Trichloroethene in the sample.

Samples HW-3 (4-6), HW-5 (4-6), SS-1 (8-10), SS-1 (14-16), SS-1 (24-25.5) and HW-5 (6-8) required medium level analysis due to the high concentrations of 1,2-Dichloroethene (Total) and Trichloroethene in the sample.

Sample HW-4 (1-3) required a dilution factor of 4.5 due to the high concentration of Trichloroethene in the sample.

Samples HW-7 (4-6) and SS-1 (18-20) required medium level analysis due to the high concentration of Trichloroethene in the sample.

Sam~~p~~ples SS-1 (10-12) and SS-1 (20-22) required a medium level analysis at a dilution factor of four (4) due to the high concentration of Trichloroethene in the sample.

Samples SS-1 (12-14) and SS-1 (16-18) required a medium level analysis at a dilution factor of two (2) due to the high concentration of Trichloroethene in the sample.

Sample SS-1 (22-24) was analyzed initially at medium level analysis due to the high concentration of Trichloroethene in the sample. A further dilution factor of five (5) was required at medium level due to the high concentration of Trichloroethene in the sample.

Sample SB-107 (6-8) required a dilution factor of 4.3 due to the high concentration of Trichloroethene in the sample.

Sample MW-3R was analyzed at an initial dilution factor factor of two (2) due to the high concentrations of several compounds. A further dilution of Ten (10) was required due to the high concentrations of Acetone and Total Xylenes in the sample.

Samples SS-1 (10-12) and SS-1 (12-14) both exhibited surrogates Toluene-D8 and p-Bromofluorobenzene as outside of quality control limits. Samples SS-1 (10-12)ML and SS-1 (12-14)ML reanalysis exhibited all surrogates as compliant, indicating a possible matrix interference.

A concentration of Toluene was detected in Volatile Method Blank 39 at a level below the detection limit.

Concentrations of Chlorobenzene and Toluene were detected in Volatile Method Blank 40 at a level below the detection limit.

Concentrations of Chlorobenzene, Toluene and Total Xylenes were detected in Volatile Method Blank 41 at a level below the detection limit.

Variations in results between low level and medium level analysis are due to the saturation of specific compounds on the instrument in the low level analysis.(Eg. 1,2-Dichloroethene(Total) and Trichloroethene) Sample results affected are: HW-5(4-6), SS-1(8-10), SS-1(10-12), SS-1(12-14), SS-1(14-16), SS-1(16-18), SS-1(18-20), SS-1(20-22), and SS-1(24-25.5).

METALS DATA

The Matrix Spike Blank exhibited the % spike recovery for Lead as outside quality control limits. The % RPD for Lead was also outside quality control limits.

The Matrix Spike Blank Duplicate exhibited the % spike recovery for Silver as outside quality control limits.

The detection limit for Cobalt exceeds the NYS Groundwater Quality Standards Limit due to laboratory error. Presently samples MW-1 and MW-5 are being redigested and reanalyzed in order to acheive an acceptable detection limit at or below 0.0050 mg/l. An addendum to this report will be sent upon completion of the reanalyses. Cobalt results with incorrect detection limits have been submitted with this report without charge.

ORGANIC DATA COMMENT PAGE

Laboratory Name RECRA ENVIRONMENTAL, INC.

USEPA Defined Organic Data Qualifiers:

U - Indicates compound was analyzed for but not detected.

J - Indicates an estimate value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than zero.

C - This flag applies to pesticide results where the identification has been confirmed by GC/MS.

B - This flag is used when the analyte is found in the associated blank as well as in the sample.

E - This flag identifies compounds whose concentrations exceed the calibration range of the GC/MS instrument for that specific analysis.

D - This flag identifies all compounds identified in an analysis at a secondary dilution factor.

G - The TCLP Matrix Spike recovery was greater than the upper limit of the analytical method.

L - The TCLP Matrix Spike recovery was lower than the lower limit of the analytical method.

T - This flag is used when the analyte is found in the associated TCLP extraction as well as in the sample.

N - Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search. It is applied to all TIC results.

P - This flag is used for a pesticide/Aroclor target analyte when there is greater than 25% difference for detected concentrations between the two GC columns. The lower of the two values is reported on Form I and flagged with a "P".

A - This flag indicates that a TIC is a suspected aldol-condensation product.

INORGANIC DATA COMMENT PAGE

Laboratory Name RECRA ENVIRONMENTAL, INC.

USEPA Defined Inorganic Data Qualifiers:

B - Indicates a value greater than or equal to the instrument detection limit but less than the contract required detection limit.

U - Indicates element was analyzed for but not detected. Report with the detection limit value (e.g., 100).

E - Indicates a value estimated or not reported due to the presence of interference.

S - Indicates value determined by Method of Standard Addition.

N - Indicates spike sample recovery is not within control limits.

* - Indicates duplicate analysis is not within control limits.

+ - Indicates the correlation coefficient for method of standard addition is less than 0.995.

M - Indicates duplicate injection results exceeded control limits.

W - Post digestion spike for Furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

G - The TCLP Matrix Spike recovery was greater than the upper limit of the analytical method.

L - The TCLP Matrix Spike recovery was lower than the lower limit of the analytical method.

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039590	Sample Date:	07/14/93
Client Sample ID:	FIELD BLANK (2P-3)	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	5	U
Benzene	0.5	U
Bromodichloromethane	0.5	U
Bromoform	0.5	U
Bromomethane	0.5	U
2-Butanone	5	U
Carbon Disulfide	0.5	U
Carbon Tetrachloride	0.3	J
Chlorobenzene	0.5	U
Chloroethane	0.5	U
Chloroform	0.4	J
Chloromethane	0.5	U
Dibromochloromethane	0.5	U
1,1-Dichloroethane	0.5	U
1,2-Dichloroethane	0.5	U
1,1-Dichloroethene	0.5	U
1,2-Dichloroethene (Total)	0.5	U
1,2-Dichloropropane	8	
cis-1,3-Dichloropropene	0.5	U
trans-1,3-Dichloropropene	0.5	U
Ethyl benzene	0.5	U
2-Hexanone	5	U
Methylene chloride	0.5	U
4-Methyl-2-pentanone	5	U
Styrene	0.5	U
1,1,2,2-Tetrachloroethane	0.5	U
Tetrachloroethene	0.5	U
Toluene	0.5	U
1,1,1-Trichloroethane	0.5	U
1,1,2-Trichloroethane	0.5	U
Trichloroethene	0.5	U
Vinyl acetate	0.5	U
Vinyl chloride	0.5	U
Total Xylenes	0.5	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039591	Sample Date:	07/15/93
Client Sample ID:	HW-1(4-6)ML	Analysis Date:	07/20/93
		% Dry Weight:	85.70

Parameter Units = UG/KG	Result	Q
Acetone	1300	U
Benzene	670	U
Bromodichloromethane	670	U
Bromoform	670	U
Bromomethane	1300	U
2-Butanone	1300	U
Carbon Disulfide	670	U
Carbon Tetrachloride	670	U
Chlorobenzene	670	U
Chloroethane	1300	U
Chloroform	670	U
Chloromethane	1300	U
Dibromochloromethane	670	U
1,1-Dichloroethane	670	U
1,2-Dichloroethane	670	U
1,1-Dichloroethene	670	U
1,2-Dichloroethene (Total)	670	U
1,2-Dichloropropane	670	U
cis-1,3-Dichloropropene	670	U
trans-1,3-Dichloropropene	670	U
Ethyl benzene	670	U
2-Hexanone	1300	U
Methylene chloride	670	U
4-Methyl-2-pentanone	1300	U
Styrene	670	U
1,1,2,2-Tetrachloroethane	670	U
Tetrachloroethene	670	U
Toluene	670	U
1,1,1-Trichloroethane	670	U
1,1,2-Trichloroethane	670	U
Trichloroethene	4000	
Vinyl acetate	1300	U
Vinyl chloride	1300	U
Total Xylenes	670	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039592	Sample Date:	07/15/93
Client Sample ID:	SS-5(2-4)	Analysis Date:	07/19/93
		% Dry Weight:	86.70

Parameter Units = UG/KG	Result	Q
Acetone	11	U
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	11	U
Chloroform	6	U
Chloromethane	11	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	6	U
1,2-Dichloroethene (Total)	9	
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	11	U
Methylene chloride	6	U
4-Methyl-2-pentanone	11	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	6	U
Toluene	6	U
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	6	U
Trichloroethene	20	
Vinyl acetate	11	U
Vinyl chloride	11	U
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2197	Dilution Factor:	2000
Lab Sample ID:	AS039593	Sample Date:	07/15/93
Client Sample ID:	OW-101	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	10000	U
Benzene	1000	U
Bromodichloromethane	1000	U
Bromoform	1000	U
Bromomethane	1000	U
2-Butanone	10000	U
Carbon Disulfide	1000	U
Carbon Tetrachloride	1000	U
Chlorobenzene	1000	U
Chloroethane	1000	U
Chloroform	1000	U
Chloromethane	1000	U
Dibromochloromethane	1000	U
1,1-Dichloroethane	1000	U
1,2-Dichloroethane	1000	U
1,1-Dichloroethene	1000	U
1,2-Dichloroethene (Total)	11000	
1,2-Dichloropropane	1000	U
cis-1,3-Dichloropropene	1000	U
trans-1,3-Dichloropropene	1000	U
Ethyl benzene	1000	U
2-Hexanone	10000	U
Methylene chloride	1000	U
4-Methyl-2-pentanone	10000	U
Styrene	1000	U
1,1,2,2-Tetrachloroethane	1000	U
Tetrachloroethene	1000	U
Toluene	1000	U
1,1,1-Trichloroethane	1000	U
1,1,2-Trichloroethane	1000	U
Trichloroethene	67000	E
Vinyl acetate	1000	U
Vinyl chloride	680	J
Total Xylenes	1000	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2197	Dilution Factor:	4000
Lab Sample ID:	AS039593DL	Sample Date:	07/15/93
Client Sample ID:	OW-101 DL	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	20000	U
Benzene	2000	U
Bromodichloromethane	2000	U
Bromoform	2000	U
Bromomethane	2000	U
2-Butanone	20000	U
Carbon Disulfide	2000	U
Carbon Tetrachloride	2000	U
Chlorobenzene	2000	U
Chloroethane	2000	U
Chloroform	2000	U
Chloromethane	2000	U
Dibromochloromethane	2000	U
1,1-Dichloroethane	2000	U
1,2-Dichloroethane	2000	U
1,1-Dichloroethene	2000	U
1,2-Dichloroethene (Total)	8600	D
1,2-Dichloropropane	2000	U
cis-1,3-Dichloropropene	2000	U
trans-1,3-Dichloropropene	2000	U
Ethyl benzene	2000	U
2-Hexanone	20000	U
Methylene chloride	2000	U
4-Methyl-2-pentanone	20000	U
Styrene	2000	U
1,1,2,2-Tetrachloroethane	2000	U
Tetrachloroethene	2000	U
Toluene	2000	U
1,1,1-Trichloroethane	2000	U
1,1,2-Trichloroethane	2000	U
Trichloroethene	59000	D
Vinyl acetate	2000	U
Vinyl chloride	430	DJ
Total Xylenes	2000	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039596	Sample Date:	07/15/93
Client Sample ID:	HW-3(4-6)	Analysis Date:	07/19/93
		% Dry Weight:	86.30

Parameter Units = UG/KG	Result	Q
Acetone	12	U
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	12	U
2-Butanone	12	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	12	U
Chloroform	0.8	J
Chloromethane	12	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
2-Dichloroethane	6	U
1,1-Dichloroethene	2	J
1,2-Dichloroethene (Total)	310	E
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	12	U
Methylene chloride	6	U
4-Methyl-2-pentanone	12	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	11	
Toluene	1	J
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	3	J
Trichloroethene	2500	E
Vinyl acetate	12	U
Vinyl chloride	2	J
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039596ML	Sample Date:	07/15/93
Client Sample ID:	HW-3(4-6)ML	Analysis Date:	07/20/93
		% Dry Weight:	86.30

Parameter Units = UG/KG	Result	Q
Acetone	1300	U
Benzene	670	U
Bromodichloromethane	670	U
Bromoform	670	U
Bromomethane	1300	U
2-Butanone	1300	U
Carbon Disulfide	670	U
Carbon Tetrachloride	670	U
Chlorobenzene	670	U
Chloroethane	1300	U
Chloroform	670	U
Chloromethane	1300	U
Dibromochloromethane	670	U
1,1-Dichloroethane	670	U
1,2-Dichloroethane	670	U
1,1-Dichloroethene	670	U
1,2-Dichloroethene (Total)	670	U
1,2-Dichloropropane	670	U
cis-1,3-Dichloropropene	670	U
trans-1,3-Dichloropropene	670	U
Ethyl benzene	670	U
2-Hexanone	1300	U
Methylene chloride	670	U
4-Methyl-2-pentanone	1300	U
Styrene	670	U
1,1,2,2-Tetrachloroethane	670	U
Tetrachloroethene	670	U
Toluene	670	U
1,1,1-Trichloroethane	670	U
1,1,2-Trichloroethane	670	U
Trichloroethene	3700	D
Vinyl acetate	1300	U
Vinyl chloride	1300	U
Total Xylenes	670	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039597	Sample Date:	07/15/93
Client Sample ID:	HW-4(1-3)	Analysis Date:	07/20/93
		% Dry Weight:	86.20

Parameter Units = UG/KG	Result	Q
Acetone	30	
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	12	U
2-Butanone	6	J
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	12	U
Chloroform	6	U
Chloromethane	12	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1-Dichloroethene	6	U
1,2-Dichloroethene (Total)	120	
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	12	U
Methylene chloride	6	U
4-Methyl-2-pentanone	12	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	6	U
Toluene	6	U
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	6	U
Trichloroethene	320	E
Vinyl acetate	12	U
Vinyl chloride	2	J
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	4.50
Lab Sample ID:	AS039597DL	Sample Date:	07/15/93
Client Sample ID:	HW-4(1-3)DL	Analysis Date:	07/21/93
		% Dry Weight:	86.20

Parameter Units = UG/KG	Result	Q
Acetone	54	U
Benzene	27	U
Bromodichloromethane	27	U
Bromoform	27	U
Bromomethane	54	U
2-Butanone	54	U
Carbon Disulfide	27	U
Carbon Tetrachloride	27	U
Chlorobenzene	27	U
Chloroethane	54	U
Chloroform	27	U
Chloromethane	54	U
Dibromochloromethane	27	U
1,1-Dichloroethane	27	U
1,2-Dichloroethane	27	U
1,1-Dichloroethene	27	U
1,2-Dichloroethene (Total)	240	D
1,2-Dichloropropane	27	U
cis-1,3-Dichloropropene	27	U
trans-1,3-Dichloropropene	27	U
Ethyl benzene	27	U
2-Hexanone	54	U
Methylene chloride	27	U
4-Methyl-2-pentanone	54	U
Styrene	27	U
1,1,2,2-Tetrachloroethane	27	U
Tetrachloroethene	27	U
Toluene	27	U
1,1,1-Trichloroethane	27	U
1,1,2-Trichloroethane	27	U
Trichloroethene	180	D
Vinyl acetate	54	U
Vinyl chloride	33	DJ
Total Xylenes	27	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

aboratory: Recra Environmental, Inc. - RECNY
ab Job No: A93-2197
ab Sample ID: AS039598
lient Sample ID: HW-5(4-6)

Matrix: Soil
Dilution Factor: 1
Sample Date: 07/15/93
Analysis Date: 07/20/93
% Dry Weight: 89.80

Parameter Units = UG/KG	Result	Q
Acetone	9	J
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	11	U
Chloroform	2	J
Chloromethane	11	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	6	
1,2-Dichloroethene (Total)	1300	E
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	0.2	J
2-Hexanone	11	U
Methylene chloride	6	U
4-Methyl-2-pentanone	11	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	3	J
Toluene	4	J
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	7	
Trichloroethene	2400	E
Vinyl acetate	11	U
Vinyl chloride	58	
Total Xylenes	5	J

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039598ML	Sample Date:	07/15/93
Client Sample ID:	HW-5(4-6)ML	Analysis Date:	07/20/93
		% Dry Weight:	89.80

Parameter Units = UG/KG	Result	Q
Acetone	1200	U
Benzene	630	U
Bromodichloromethane	630	U
Bromoform	630	U
Bromomethane	1200	U
2-Butanone	1200	U
Carbon Disulfide	630	U
Carbon Tetrachloride	630	U
Chlorobenzene	630	U
Chloroethane	1200	U
Chloroform	630	U
Chloromethane	1200	U
Dibromochloromethane	630	U
1,1-Dichloroethane	630	U
1,2-Dichloroethane	630	U
1,1-Dichloroethene	630	U
1,2-Dichloroethene (Total)	930	D
1,2-Dichloropropane	630	U
cis-1,3-Dichloropropene	630	U
trans-1,3-Dichloropropene	630	U
Ethyl benzene	630	U
2-Hexanone	1200	U
Methylene chloride	630	U
4-Methyl-2-pentanone	1200	U
Styrene	630	U
1,1,2,2-Tetrachloroethane	630	U
Tetrachloroethene	630	U
Toluene	630	U
1,1,1-Trichloroethane	630	U
1,1,2-Trichloroethane	630	U
Trichloroethene	5200	D
Vinyl acetate	1200	U
Vinyl chloride	1200	U
Total Xylenes	630	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039601	Sample Date:	07/15/93
Client Sample ID:	HW-6(4-6)	Analysis Date:	07/21/93
		% Dry Weight:	84.50

Parameter , Units = UG/KG	Result	Q
Acetone	12	U
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	12	U
2-Butanone	12	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	12	U
Chloroform	6	U
Chloromethane	12	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
2-Dichloroethane	6	U
1,1-Dichloroethene	6	U
1,2-Dichloroethene (Total)	5	J
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	12	U
Methylene chloride	6	U
4-Methyl-2-pentanone	12	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	0.7	J
Toluene	6	U
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	6	U
Trichloroethene	25	
Vinyl acetate	12	U
Vinyl chloride	12	U
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2159
Lab Sample ID: AS039275
Client Sample ID: MW-16

Matrix: Aqueous
Dilution Factor: 1
Sample Date: 07/13/93
Analysis Date: 07/22/93

Parameter Units = UG/L	Result	Q
Acetone	5	U
Benzene	0.5	U
Bromodichloromethane	0.5	U
Bromoform	0.5	U
Bromomethane	0.5	U
2-Butanone	5	U
Carbon Disulfide	0.5	U
Carbon Tetrachloride	0.5	U
Chlorobenzene	0.5	U
Chloroethane	0.5	U
Chloroform	0.5	U
Chloromethane	0.5	U
Dibromochloromethane	0.5	U
1,1-Dichloroethane	0.5	U
1,2-Dichloroethane	0.5	U
1,1-Dichloroethene	0.5	U
1,2-Dichloroethene (Total)	7	U
1,2-Dichloropropane	0.5	U
cis-1,3-Dichloropropene	0.5	U
trans-1,3-Dichloropropene	0.5	U
Ethyl benzene	0.5	U
2-Hexanone	5	U
Methylene chloride	0.5	U
4-Methyl-2-pentanone	5	U
Styrene	0.5	U
1,1,2,2-Tetrachloroethane	0.5	U
Tetrachloroethene	0.5	U
Toluene	0.5	U
1,1,1-Trichloroethane	0.5	U
1,1,2-Trichloroethane	0.5	U
Trichloroethene	0.2	J
Vinyl acetate	0.5	U
Vinyl chloride	0.5	U
Total Xylenes	0.5	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2159	Dilution Factor:	1000
Lab Sample ID:	AS039276	Sample Date:	07/13/93
Client Sample ID:	MW-20	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	5000	U
Benzene	500	U
Bromodichloromethane	500	U
Bromoform	500	U
Bromomethane	500	U
2-Butanone	5000	U
Carbon Disulfide	500	U
Carbon Tetrachloride	500	U
Chlorobenzene	500	U
Chloroethane	500	U
Chloroform	500	U
Chloromethane	500	U
Dibromochloromethane	500	U
1,1-Dichloroethane	500	U
1,2-Dichloroethane	500	U
1,1-Dichloroethene	500	U
1,2-Dichloroethene (Total)	5100	
1,2-Dichloropropane	500	U
cis-1,3-Dichloropropene	500	U
trans-1,3-Dichloropropene	500	U
Ethyl benzene	500	U
2-Hexanone	5000	U
Methylene chloride	500	U
4-Methyl-2-pentanone	5000	U
Styrene	500	U
1,1,2,2-Tetrachloroethane	500	U
Tetrachloroethene	500	U
Toluene	500	U
1,1,1-Trichloroethane	500	U
1,1,2-Trichloroethane	500	U
Trichloroethene	22200	
Vinyl acetate	500	U
Vinyl chloride	500	
Total Xylenes	500	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2159
Lab Sample ID: AS039276
Client Sample ID: MW-20

Matrix: Aqueous
Dilution Factor: 1000
Sample Date: 07/13/93
Analysis Date: 07/22/93

Parameter Units = UG/L	Result	Q
1,2-Dichloro-1,1,2-Trifluoroethane	300	J

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039603
Client Sample ID: HW-7(4-6)

Matrix: Soil
Dilution Factor: 1
Sample Date: 07/15/93
Analysis Date: 07/20/93
% Dry Weight: 86.40

Parameter Units = UG/KG	Result	Q
Acetone	54	U
Benzene	27	U
Bromodichloromethane	27	U
Bromoform	27	U
Bromomethane	54	U
2-Butanone	54	U
Carbon Disulfide	27	U
Carbon Tetrachloride	27	U
Chlorobenzene	27	U
Chloroethane	54	U
Chloroform	27	U
Chloromethane	54	U
Dibromochloromethane	27	U
1,1-Dichloroethane	27	U
1,2-Dichloroethane	27	U
1,1-Dichloroethene	27	U
1,2-Dichloroethene (Total)	320	
1,2-Dichloropropane	27	U
cis-1,3-Dichloropropene	27	U
trans-1,3-Dichloropropene	27	U
Ethyl benzene	27	U
2-Hexanone	54	U
Methylene chloride	27	U
4-Methyl-2-pentanone	54	U
Styrene	27	U
1,1,2,2-Tetrachloroethane	27	U
Tetrachloroethene	2	J
Toluene	4	BJ
1,1,1-Trichloroethane	27	U
1,1,2-Trichloroethane	10	J
Trichloroethene	3500	BE
Vinyl acetate	54	U
Vinyl chloride	54	U
Total Xylenes	27	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039603ML	Sample Date:	07/15/93
Client Sample ID:	HW-7(4-6)ML	Analysis Date:	07/20/93
		% Dry Weight:	86.40

Parameter Units = UG/KG	Result	Q
Acetone	1300	U
Benzene	630	U
Bromodichloromethane	630	U
Bromoform	630	U
Bromomethane	1300	U
2-Butanone	1300	U
Carbon Disulfide	630	U
Carbon Tetrachloride	630	U
Chlorobenzene	630	U
Chloroethane	1300	U
Chloroform	630	U
Chloromethane	1300	U
Dibromochloromethane	630	U
1,1-Dichloroethane	630	U
1,2-Dichloroethane	630	U
1,1-Dichloroethene	630	U
1,2-Dichloroethene (Total)	250	DJ
1,2-Dichloropropane	630	U
cis-1,3-Dichloropropene	630	U
trans-1,3-Dichloropropene	630	U
Ethyl benzene	630	U
2-Hexanone	1300	U
Methylene chloride	630	U
4-Methyl-2-pentanone	1300	U
Styrene	630	U
1,1,2,2-Tetrachloroethane	630	U
Tetrachloroethene	630	U
Toluene	630	U
1,1,1-Trichloroethane	630	U
1,1,2-Trichloroethane	630	U
Trichloroethene	3300	D
Vinyl acetate	1300	U
Vinyl chloride	1300	U
Total Xylenes	630	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039606
Client Sample ID: MW-14R

Matrix: Aqueous
Dilution Factor: 1
Sample Date: 07/14/93
Analysis Date: 07/22/93

Parameter Units = UG/L	Result	Q
Acetone	5	U
Benzene	0.5	U
Bromodichloromethane	1	
Bromoform	0.5	U
Bromomethane	0.5	U
2-Butanone	5	U
Carbon Disulfide	0.5	U
Carbon Tetrachloride	0.5	U
Chlorobenzene	0.5	U
Chloroethane	0.5	U
Chloroform	7	
Chloromethane	1	
Dibromochloromethane	0.6	
1,1-Dichloroethane	0.5	U
1,2-Dichloroethane	0.5	U
1,1-Dichloroethene	0.5	U
1,2-Dichloroethene (Total)	0.5	U
1,2-Dichloropropane	0.2	J
cis-1,3-Dichloropropene	0.5	U
trans-1,3-Dichloropropene	0.5	U
Ethyl benzene	0.5	U
2-Hexanone	5	U
Methylene chloride	0.5	U
4-Methyl-2-pentanone	5	U
Styrene	0.5	U
1,1,2,2-Tetrachloroethane	0.5	U
Tetrachloroethene	0.5	U
Toluene	0.5	U
1,1,1-Trichloroethane	0.5	U
1,1,2-Trichloroethane	0.5	U
Trichloroethene	0.1	J
Vinyl acetate	0.5	U
Vinyl chloride	0.5	U
Total Xylenes	0.5	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2197	Dilution Factor:	10
Lab Sample ID:	AS039607DL	Sample Date:	07/14/93
Client Sample ID:	MW-3RDL	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	340	D
Benzene	14	D
Bromodichloromethane	5	U
Bromoform	5	U
Bromomethane	5	U
2-Butanone	50	U
Carbon Disulfide	5	U
Carbon Tetrachloride	5	U
Chlorobenzene	5	U
Chloroethane	5	U
Chloroform	8	D
Chloromethane	21	D
Dibromochloromethane	5	U
1,1-Dichloroethane	5	U
1,2-Dichloroethane	5	U
1,1-Dichloroethene	5	U
1,2-Dichloroethene (Total)	5	U
1,2-Dichloropropane	5	U
cis-1,3-Dichloropropene	5	U
trans-1,3-Dichloropropene	5	U
Ethyl benzene	11	D
2-Hexanone	50	U
Methylene chloride	1	DJ
4-Methyl-2-pentanone	50	U
Styrene	5	U
1,1,2,2-Tetrachloroethane	5	U
Tetrachloroethene	5	U
Toluene	5	D
1,1,1-Trichloroethane	5	U
1,1,2-Trichloroethane	5	U
Trichloroethene	14	D
Vinyl acetate	5	U
Vinyl chloride	5	U
Total Xylenes	190	D

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2197	Dilution Factor:	2
Lab Sample ID:	AS039607	Sample Date:	07/14/93
Client Sample ID:	MW-3R	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	450	E
Benzene	14	
Bromodichloromethane	1	U
Bromoform	1	U
Bromomethane	1	U
2-Butanone	10	U
Carbon Disulfide	1	U
Carbon Tetrachloride	1	U
Chlorobenzene	1	U
Chloroethane	1	U
Chloroform	9	
Chloromethane	43	
Dibromochloromethane	1	U
1,1-Dichloroethane	1	U
2-Dichloroethane	1	U
,1-Dichloroethene	1	U
1,2-Dichloroethene (Total)	0.8	J
1,2-Dichloropropane	0.2	J
cis-1,3-Dichloropropene	1	U
trans-1,3-Dichloropropene	1	U
Ethyl benzene	14	
2-Hexanone	10	U
Methylene chloride	0.4	J
4-Methyl-2-pentanone	10	U
Styrene	1	U
1,1,2,2-Tetrachloroethane	1	U
Tetrachloroethene	1	U
Toluene	6	
1,1,1-Trichloroethane	1	U
1,1,2-Trichloroethane	1	U
Trichloroethene	18	
Vinyl acetate	1	U
Vinyl chloride	0.3	J
Total Xylenes	130	E

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039608	Sample Date:	07/14/93
Client Sample ID:	SS-1(8-10)	Analysis Date:	07/20/93
		% Dry Weight:	88.90

Parameter Units = UG/KG	Result	Q
Acetone	11	U
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	6	U
Carbon Tetrachloride	0.5	J
Chlorobenzene	6	U
Chloroethane	11	U
Chloroform	2	J
Chloromethane	11	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	3	J
1,2-Dichloroethene (Total)	240	E
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	1	J
2-Hexanone	11	U
Methylene chloride	2	J
4-Methyl-2-pentanone	11	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	6	
Toluene	25	
1,1,1-Trichloroethane	1	J
1,1,2-Trichloroethane	8	
Trichloroethene	4200	E
Vinyl acetate	11	U
Vinyl chloride	2	J
Total Xylenes	6	

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039608ML
Client Sample ID: SS-1(8-10)ML

Matrix: Soil
Dilution Factor: 1
Sample Date: 07/14/93
Analysis Date: 07/20/93
% Dry Weight: 88.90

Parameter Units = UG/KG	Result	Q
Acetone	1300	U
Benzene	660	U
Bromodichloromethane	660	U
Bromoform	660	U
Bromomethane	1300	U
2-Butanone	1300	U
Carbon Disulfide	660	U
Carbon Tetrachloride	660	U
Chlorobenzene	660	U
Chloroethane	1300	U
Chloroform	660	U
Chloromethane	1300	U
Dibromochloromethane	660	U
1,1-Dichloroethane	660	U
1,2-Dichloroethane	660	U
1,1-Dichloroethene	660	U
1,2-Dichloroethene (Total)	660	U
1,2-Dichloropropane	660	U
cis-1,3-Dichloropropene	660	U
trans-1,3-Dichloropropene	660	U
Ethyl benzene	660	U
2-Hexanone	1300	U
Methylene chloride	660	U
4-Methyl-2-pentanone	1300	U
Styrene	660	U
1,1,2,2-Tetrachloroethane	660	U
Tetrachloroethene	660	U
Toluene	660	U
1,1,1-Trichloroethane	660	U
1,1,2-Trichloroethane	660	U
Trichloroethene	13000	D
Vinyl acetate	1300	U
Vinyl chloride	1300	U
Total Xylenes	660	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039609	Sample Date:	07/14/93
Client Sample ID:	SS-1(10-12)	Analysis Date:	07/20/93
		% Dry Weight:	85.80

Parameter Units = UG/KG	Result	Q
Acetone	11	U
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	11	U
Chloroform	19	
Chloromethane	11	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	0.8	J
1,1-Dichloroethene	1	J
1,2-Dichloroethene (Total)	36	
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	11	U
Methylene chloride	0.6	J
4-Methyl-2-pentanone	11	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	6	U
Toluene	1	J
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	5	J
Trichloroethene	6600	E
Vinyl acetate	11	U
Vinyl chloride	11	U
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	4
Lab Sample ID:	AS039609DL	Sample Date:	07/14/93
Client Sample ID:	SS-1(10-12)DL	Analysis Date:	07/21/93
		% Dry Weight:	85.80

Parameter Units = UG/KG	Result	Q
Acetone	5500	U
Benzene	2700	U
Bromodichloromethane	2700	U
Bromoform	2700	U
Bromomethane	5500	U
2-Butanone	5500	U
Carbon Disulfide	2700	U
Carbon Tetrachloride	2700	U
Chlorobenzene	2700	U
Chloroethane	5500	U
Chloroform	2700	U
Chloromethane	5500	U
Dibromochloromethane	2700	U
1,1-Dichloroethane	2700	U
1,2-Dichloroethane	2700	U
1-Dichloroethene	2700	U
1,2-Dichloroethene (Total)	2700	U
1,2-Dichloropropane	2700	U
cis-1,3-Dichloropropene	2700	U
trans-1,3-Dichloropropene	2700	U
Ethyl benzene	2700	U
2-Hexanone	5500	U
Methylene chloride	2700	U
4-Methyl-2-pentanone	5500	U
Styrene	2700	U
1,1,2,2-Tetrachloroethane	2700	U
Tetrachloroethene	2700	U
Toluene	2700	U
1,1,1-Trichloroethane	2700	U
1,1,2-Trichloroethane	2700	U
Trichloroethene	49000	D
Vinyl acetate	5500	U
Vinyl chloride	5500	U
Total Xylenes	2700	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

aboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
ab Job No:	A93-2197	Dilution Factor:	1
ab Sample ID:	AS039610	Sample Date:	07/14/93
lient Sample ID:	SS-1(12-14)	Analysis Date:	07/20/93
		% Dry Weight:	87.10

Parameter Units = UG/KG	Result	Q
Acetone	12	
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	11	
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	11	U
Chloroform	6	U
Chloromethane	11	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	10	
1,2-Dichloroethene (Total)	800	E
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	11	U
Methylene chloride	6	U
4-Methyl-2-pentanone	11	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	6	U
Toluene	0.6	J
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	6	U
Trichloroethene	4700	E
Vinyl acetate	11	U
Vinyl chloride	3	J
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

aboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
ab Job No:	A93-2197	Dilution Factor:	2
ab Sample ID:	AS039610DL	Sample Date:	07/14/93
lient Sample ID:	SS-1(12-14)DL	Analysis Date:	07/21/93
		% Dry Weight:	87.10

Parameter Units = UG/KG	Result	Q
etone	2700	U
Benzene	1400	U
Bromodichloromethane	1400	U
Bromoform	1400	U
Bromomethane	2700	U
-Butanone	2700	U
Carbon Disulfide	1400	U
Carbon Tetrachloride	1400	U
Chlorobenzene	1400	U
Chloroethane	2700	U
Chloroform	1400	U
Chloromethane	2700	U
Dibromochloromethane	1400	U
1,1-Dichloroethane	1400	U
1,2-Dichloroethane	1400	U
1,1-Dichloroethene	1400	U
1,2-Dichloroethene (Total)	1400	U
1,2-Dichloropropane	1400	U
cis-1,3-Dichloropropene	1400	U
trans-1,3-Dichloropropene	1400	U
Ethyl benzene	1400	U
2-Hexanone	2700	U
Methylene chloride	1400	U
4-Methyl-2-pentanone	2700	U
Styrene	1400	U
1,1,2,2-Tetrachloroethane	1400	U
Tetrachloroethene	1400	U
Toluene	1400	U
1,1,1-Trichloroethane	1400	U
1,1,2-Trichloroethane	1400	U
Trichloroethene	40000	D
Vinyl acetate	2700	U
Vinyl chloride	2700	U
Total Xylenes	1400	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039611
Client Sample ID: SS-1(14-16)

Matrix: Soil
Dilution Factor: 1
Sample Date: 07/14/93
Analysis Date: 07/20/93
% Dry Weight: 87.60

Parameter Units = UG/KG	Result	Q
Acetone	11	U
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	11	U
Chloroform	6	U
Chloromethane	11	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	9	
1,2-Dichloroethene (Total)	810	E
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	11	U
Methylene chloride	6	U
4-Methyl-2-pentanone	11	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	6	U
Toluene	6	U
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	6	U
Trichloroethene	4200	E
Vinyl acetate	11	U
Vinyl chloride	4	J
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039611ML
Client Sample ID: SS-1(14-16)ML

Matrix: Soil
Dilution Factor: 1
Sample Date: 07/14/93
Analysis Date: 07/20/93
% Dry Weight: 87.60

Parameter Units = UG/KG	Result	Q
Acetone	1300	U
Benzene	670	U
Bromodichloromethane	670	U
Bromoform	670	U
Bromomethane	1300	U
2-Butanone	1300	U
Carbon Disulfide	670	U
Carbon Tetrachloride	670	U
Chlorobenzene	670	U
Chloroethane	1300	U
Chloroform	670	U
Chloromethane	1300	U
Dibromochloromethane	670	U
1,1-Dichloroethane	670	U
1,2-Dichloroethane	670	U
1,1-Dichloroethene	670	U
1,2-Dichloroethene (Total)	580	DJ
1,2-Dichloropropane	670	U
cis-1,3-Dichloropropene	670	U
trans-1,3-Dichloropropene	670	U
Ethyl benzene	670	U
2-Hexanone	1300	U
Methylene chloride	670	U
4-Methyl-2-pentanone	1300	U
Styrene	670	U
1,1,2,2-Tetrachloroethane	670	U
Tetrachloroethene	670	U
Toluene	670	U
1,1,1-Trichloroethane	670	U
1,1,2-Trichloroethane	670	U
Trichloroethene	14000	D
Vinyl acetate	1300	U
Vinyl chloride	1300	U
Total Xylenes	670	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039612	Sample Date:	07/14/93
Client Sample ID:	SS-1(16-18)	Analysis Date:	07/20/93
		% Dry Weight:	74.50

Parameter Units = UG/KG	Result	Q
Acetone	13	U
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	13	U
2-Butanone	13	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	13	U
Chloroform	3	J
Chloromethane	13	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	12	
1,2-Dichloroethene (Total)	190	
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	0.9	J
2-Hexanone	13	U
Methylene chloride	2	J
4-Methyl-2-pentanone	13	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	3	J
Toluene	7	
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	2	J
Trichloroethene	4200	E
Vinyl acetate	13	U
Vinyl chloride	4	J
Total Xylenes	6	

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039612DL
Client Sample ID: SS-1(16-18)DL

Matrix: Soil
Dilution Factor: 2
Sample Date: 07/14/93
Analysis Date: 07/21/93
% Dry Weight: 74.50

Parameter Units = UG/KG	Result	Q
Acetone	3000	U
Benzene	1500	U
Bromodichloromethane	1500	U
Bromoform	1500	U
Bromomethane	3000	U
2-Butanone	3000	U
Carbon Disulfide	1500	U
Carbon Tetrachloride	1500	U
Chlorobenzene	1500	U
Chloroethane	3000	U
Chloroform	1500	U
Chloromethane	3000	U
Dibromochloromethane	1500	U
1,1-Dichloroethane	1500	U
1,2-Dichloroethane	1500	U
1,1-Dichloroethene	1500	U
1,2-Dichloroethene (Total)	1500	U
1,2-Dichloropropane	1500	U
cis-1,3-Dichloropropene	1500	U
trans-1,3-Dichloropropene	1500	U
Ethyl benzene	1500	U
2-Hexanone	3000	U
Methylene chloride	1500	U
4-Methyl-2-pentanone	3000	U
Styrene	1500	U
1,1,2,2-Tetrachloroethane	1500	U
Tetrachloroethene	1500	U
Toluene	1500	U
1,1,1-Trichloroethane	1500	U
1,1,2-Trichloroethane	1500	U
Trichloroethene	39000	D
Vinyl acetate	3000	U
Vinyl chloride	3000	U
Total Xylenes	1500	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039613	Sample Date:	07/14/93
Client Sample ID:	SS-1(18-20)	Analysis Date:	07/20/93
		% Dry Weight:	85.00

Parameter Units = UG/KG	Result	Q
Acetone	11	U
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	11	U
Chloroform	6	U
Chloromethane	11	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	5	J
1,2-Dichloroethene (Total)	120	
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	11	U
Methylene chloride	2	J
4-Methyl-2-pentanone	11	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	6	U
Toluene	6	U
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	6	U
Trichloroethene	2800	E
Vinyl acetate	11	U
Vinyl chloride	2	J
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039613ML
Client Sample ID: SS-1(18-20)ML

Matrix: Soil
Dilution Factor: 1
Sample Date: 07/14/93
Analysis Date: 07/20/93
% Dry Weight: 85.00

Parameter Units = UG/KG	Result	Q
Acetone	1300	U
Benzene	660	U
Bromodichloromethane	660	U
Bromoform	660	U
Bromomethane	1300	U
2-Butanone	1300	U
Carbon Disulfide	660	U
Carbon Tetrachloride	660	U
Chlorobenzene	660	U
Chloroethane	1300	U
Chloroform	660	U
Chloromethane	1300	U
Dibromochloromethane	660	U
1,1-Dichloroethane	660	U
1,2-Dichloroethane	660	U
1,1-Dichloroethene	660	U
1,2-Dichloroethene (Total)	660	U
1,2-Dichloropropane	660	U
cis-1,3-Dichloropropene	660	U
trans-1,3-Dichloropropene	660	U
Ethyl benzene	660	U
2-Hexanone	1300	U
Methylene chloride	660	U
4-Methyl-2-pentanone	1300	U
Styrene	660	U
1,1,2,2-Tetrachloroethane	660	U
Tetrachloroethene	660	U
Toluene	660	U
1,1,1-Trichloroethane	660	U
1,1,2-Trichloroethane	660	U
Trichloroethene	19000	D
Vinyl acetate	1300	U
Vinyl chloride	1300	U
Total Xylenes	660	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039614
Client Sample ID: SS-1(20-22)

Matrix: Soil
Dilution Factor: 1
Sample Date: 07/14/93
Analysis Date: 07/20/93
% Dry Weight: 90.60

Parameter Units = UG/KG	Result	Q
Acetone	11	U
Benzene	5	U
Bromodichloromethane	5	U
Bromoform	5	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	5	U
Carbon Tetrachloride	5	U
Chlorobenzene	5	U
Chloroethane	11	U
Chloroform	5	U
Chloromethane	11	U
Dibromochloromethane	5	U
1,1-Dichloroethane	5	U
1,2-Dichloroethane	5	U
1,1-Dichloroethene	9	
1,2-Dichloroethene (Total)	47	
1,2-Dichloropropane	5	U
cis-1,3-Dichloropropene	5	U
trans-1,3-Dichloropropene	5	U
Ethyl benzene	5	U
2-Hexanone	11	U
Methylene chloride	4	J
4-Methyl-2-pentanone	11	U
Styrene	5	U
1,1,2,2-Tetrachloroethane	5	U
Tetrachloroethene	5	U
Toluene	5	U
1,1,1-Trichloroethane	5	U
1,1,2-Trichloroethane	5	U
Trichloroethene	5200	E
Vinyl acetate	11	U
Vinyl chloride	11	U
Total Xylenes	5	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	4
Lab Sample ID:	AS039614DL	Sample Date:	07/14/93
Client Sample ID:	SS-1(20-22)DL	Analysis Date:	07/21/93
		% Dry Weight:	90.60

Parameter Units = UG/KG	Result	Q
Acetone	5000	U
Benzene	2500	U
Bromodichloromethane	2500	U
Bromoform	2500	U
Bromomethane	5000	U
2-Butanone	5000	U
Carbon Disulfide	2500	U
Carbon Tetrachloride	2500	U
Chlorobenzene	2500	U
Chloroethane	5000	U
Chloroform	2500	U
Chloromethane	5000	U
Dibromochloromethane	2500	U
1,1-Dichloroethane	2500	U
1,2-Dichloroethane	2500	U
1,1-Dichloroethene	2500	U
1,2-Dichloroethene (Total)	2500	U
1,2-Dichloropropane	2500	U
cis-1,3-Dichloropropene	2500	U
trans-1,3-Dichloropropene	2500	U
Ethyl benzene	2500	U
2-Hexanone	5000	U
Methylene chloride	2500	U
4-Methyl-2-pentanone	5000	U
Styrene	2500	U
1,1,2,2-Tetrachloroethane	2500	U
Tetrachloroethene	2500	U
Toluene	2500	U
1,1,1-Trichloroethane	2500	U
1,1,2-Trichloroethane	2500	U
Trichloroethene	78000	D
Vinyl acetate	5000	U
Vinyl chloride	5000	U
Total Xylenes	2500	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039615	Sample Date:	07/14/93
Client Sample ID:	SS-1(22-24)ML	Analysis Date:	07/21/93
		% Dry Weight:	91.50

Parameter Units = UG/KG	Result	Q
Acetone	1200	U
Benzene	630	U
Bromodichloromethane	630	U
Bromoform	630	U
Bromomethane	1200	U
2-Butanone	1200	U
Carbon Disulfide	630	U
Carbon Tetrachloride	630	U
Chlorobenzene	630	U
Chloroethane	1200	U
Chloroform	630	U
Chloromethane	1200	U
Dibromochloromethane	630	U
1,1-Dichloroethane	630	U
1,2-Dichloroethane	630	U
1,1-Dichloroethene	630	U
1,2-Dichloroethene (Total)	630	U
1,2-Dichloropropane	630	U
cis-1,3-Dichloropropene	630	U
trans-1,3-Dichloropropene	630	U
Ethyl benzene	630	U
2-Hexanone	1200	U
Methylene chloride	630	U
4-Methyl-2-pentanone	1200	U
Styrene	630	U
1,1,2,2-Tetrachloroethane	630	U
Tetrachloroethene	630	U
Toluene	630	U
1,1,1-Trichloroethane	630	U
1,1,2-Trichloroethane	630	U
Trichloroethene	98000	E
Vinyl acetate	1200	U
Vinyl chloride	1200	U
Total Xylenes	630	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039615DL
Client Sample ID: SS-1(22-24)DL

Matrix: Soil
Dilution Factor: 5
Sample Date: 07/14/93
Analysis Date: 07/21/93
% Dry Weight: 91.50

Parameter Units = UG/KG	Result	Q
Acetone	6300	U
Benzene	3100	U
Bromodichloromethane	3100	U
Bromoform	3100	U
Bromomethane	6300	U
2-Butanone	6300	U
Carbon Disulfide	3100	U
Carbon Tetrachloride	3100	U
Chlorobenzene	3100	U
Chloroethane	6300	U
Chloroform	3100	U
Chloromethane	6300	U
Dibromochloromethane	3100	U
1,1-Dichloroethane	3100	U
1,2-Dichloroethane	3100	U
1,1-Dichloroethene	3100	U
1,2-Dichloroethene (Total)	3100	U
1,2-Dichloropropane	3100	U
cis-1,3-Dichloropropene	3100	U
trans-1,3-Dichloropropene	3100	U
Ethyl benzene	3100	U
2-Hexanone	6300	U
Methylene chloride	3100	U
4-Methyl-2-pentanone	6300	U
Styrene	3100	U
1,1,2,2-Tetrachloroethane	3100	U
Tetrachloroethene	3100	U
Toluene	3100	U
1,1,1-Trichloroethane	3100	U
1,1,2-Trichloroethane	3100	U
Trichloroethene	120000	D
Vinyl acetate	6300	U
Vinyl chloride	6300	U
Total Xylenes	3100	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039616
Client Sample ID: SS-1(24-25.5)

Matrix: Soil
Dilution Factor: 1
Sample Date: 07/14/93
Analysis Date: 07/20/93
% Dry Weight: 89.90

Parameter Units = UG/KG	Result	Q
Acetone	11	U
Benzene	5	U
Bromodichloromethane	5	U
Bromoform	5	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	5	U
Carbon Tetrachloride	5	U
Chlorobenzene	5	U
Chloroethane	11	U
Chloroform	5	U
Chloromethane	11	U
Dibromochloromethane	5	U
1,1-Dichloroethane	5	U
1,2-Dichloroethane	5	U
1,1-Dichloroethene	2	J
1,2-Dichloroethene (Total)	26	
1,2-Dichloropropane	5	U
cis-1,3-Dichloropropene	5	U
trans-1,3-Dichloropropene	5	U
Ethyl benzene	5	U
2-Hexanone	11	U
Methylene chloride	2	J
4-Methyl-2-pentanone	11	U
Styrene	5	U
1,1,2,2-Tetrachloroethane	5	U
Tetrachloroethene	5	U
Toluene	1	BJ
1,1,1-Trichloroethane	5	U
1,1,2-Trichloroethane	5	U
Trichloroethene	4800	E
Vinyl acetate	11	U
Vinyl chloride	11	U
Total Xylenes	0.4	J

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

aboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
ab Job No:	A93-2197	Dilution Factor:	1
ab Sample ID:	AS039616ML	Sample Date:	07/14/93
lient Sample ID:	SS-1(24-25.5)ML	Analysis Date:	07/21/93
		% Dry Weight:	89.90

Parameter Units = UG/KG	Result	Q
Acetone	1300	U
Benzene	670	U
Bromodichloromethane	670	U
Bromoform	670	U
Bromomethane	1300	U
2-Butanone	1300	U
Carbon Disulfide	670	U
Carbon Tetrachloride	670	U
Chlorobenzene	670	U
Chloroethane	1300	U
Chloroform	670	U
Chloromethane	1300	U
Dibromochloromethane	670	U
1,1-Dichloroethane	670	U
1,2-Dichloroethane	670	U
1,1-Dichloroethene	670	U
1,2-Dichloroethene (Total)	670	U
1,2-Dichloropropane	670	U
cis-1,3-Dichloropropene	670	U
trans-1,3-Dichloropropene	670	U
Ethyl benzene	670	U
2-Hexanone	1300	U
Methylene chloride	670	U
4-Methyl-2-pentanone	1300	U
Styrene	670	U
1,1,2,2-Tetrachloroethane	670	U
Tetrachloroethene	670	U
Toluene	670	U
1,1,1-Trichloroethane	670	U
1,1,2-Trichloroethane	670	U
Trichloroethene	15000	D
Vinyl acetate	1300	U
Vinyl chloride	1300	U
Total Xylenes	670	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039617	Sample Date:	07/15/93
Client Sample ID:	HW-5(6-8)	Analysis Date:	07/20/93
		% Dry Weight:	88.60

Parameter Units = UG/KG	Result	Q
Acetone	11	U
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	1	BJ
Chloroethane	11	U
Chloroform	0.7	J
Chloromethane	11	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	6	U
1,2-Dichloroethene (Total)	390	E
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	11	U
Methylene chloride	6	U
4-Methyl-2-pentanone	11	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	0.6	J
Toluene	2	BJ
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	3	J
Trichloroethene	2400	BE
Vinyl acetate	11	U
Vinyl chloride	11	U
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039617ML	Sample Date:	07/15/93
Client Sample ID:	HW-5(6-8)ML	Analysis Date:	07/20/93
		% Dry Weight:	88.60

Parameter Units = UG/KG	Result	Q
Acetone	1400	U
Benzene	690	U
Bromodichloromethane	690	U
Bromoform	690	U
Bromomethane	1400	U
2-Butanone	1400	U
Carbon Disulfide	690	U
Carbon Tetrachloride	690	U
Chlorobenzene	690	U
Chloroethane	1400	U
Chloroform	690	U
Chloromethane	1400	U
Dibromochloromethane	690	U
1,1-Dichloroethane	690	U
1,2-Dichloroethane	690	U
1,1-Dichloroethene	690	U
1,2-Dichloroethene (Total)	240	DJ
1,2-Dichloropropane	690	U
cis-1,3-Dichloropropene	690	U
trans-1,3-Dichloropropene	690	U
Ethyl benzene	690	U
2-Hexanone	1400	U
Methylene chloride	690	U
4-Methyl-2-pentanone	1400	U
Styrene	690	U
1,1,2,2-Tetrachloroethane	690	U
Tetrachloroethene	690	U
Toluene	690	U
1,1,1-Trichloroethane	690	U
1,1,2-Trichloroethane	690	U
Trichloroethene	1900	
Vinyl acetate	1400	U
Vinyl chloride	1400	U
Total Xylenes	690	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039618	Sample Date:	07/12/93
Client Sample ID:	TRIPBLANK	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	5	U
Benzene	0.5	U
Bromodichloromethane	0.5	U
Bromoform	0.5	U
Bromomethane	0.5	U
2-Butanone	5	U
Carbon Disulfide	0.5	U
Carbon Tetrachloride	0.5	U
Chlorobenzene	0.5	U
Chloroethane	0.5	U
Chloroform	0.5	U
Chloromethane	0.5	U
Dibromochloromethane	0.5	U
1,1-Dichloroethane	0.5	U
1,2-Dichloroethane	0.5	U
1,1-Dichloroethene	0.5	U
1,2-Dichloroethene (Total)	0.5	U
1,2-Dichloropropane	0.5	U
cis-1,3-Dichloropropene	0.5	U
trans-1,3-Dichloropropene	0.5	U
Ethyl benzene	0.5	U
2-Hexanone	5	U
Methylene chloride	0.5	U
4-Methyl-2-pentanone	5	U
Styrene	0.5	U
1,1,2,2-Tetrachloroethane	0.5	U
Tetrachloroethene	0.5	U
Toluene	0.5	U
1,1,1-Trichloroethane	0.5	U
1,1,2-Trichloroethane	0.5	U
Trichloroethene	0.5	U
Vinyl acetate	0.5	U
Vinyl chloride	0.5	U
Total Xylenes	0.5	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039619	Sample Date:	07/14/93
Client Sample ID:	SB-107(0-2)	Analysis Date:	07/21/93
		% Dry Weight:	88.80

Parameter Units = UG/KG	Result	Q
Acetone	11	U
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	11	U
Chloroform	6	U
Chloromethane	11	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	6	U
1,2-Dichloroethene (Total)	2	J
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	11	U
Methylene chloride	6	U
4-Methyl-2-pentanone	11	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	6	U
Toluene	6	U
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	6	U
Trichloroethene	6	B
Vinyl acetate	11	U
Vinyl chloride	11	U
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039620
Client Sample ID: SB-107(2-4)

Matrix: Soil
Dilution Factor: 1
Sample Date: 07/14/93
Analysis Date: 07/20/93
% Dry Weight: 80.50

Parameter Units = UG/KG	Result	Q
Acetone	40	
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	12	U
2-Butanone	12	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	12	U
Chloroform	6	U
Chloromethane	12	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	6	U
1,2-Dichloroethene (Total)	58	
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	12	U
Methylene chloride	6	U
4-Methyl-2-pentanone	12	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	6	U
Toluene	6	U
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	6	U
Trichloroethene	67	B
Vinyl acetate	12	U
Vinyl chloride	4	J
Total Xylenes	1	J

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039621
Client Sample ID: SB-107(4-6)

Matrix: Soil
Dilution Factor: 1
Sample Date: 07/14/93
Analysis Date: 07/20/93
% Dry Weight: 86.30

Parameter Units = UG/KG	Result	Q
Acetone	12	U
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	12	U
2-Butanone	12	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	12	U
Chloroform	6	U
Chloromethane	12	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	6	U
1,2-Dichloroethene (Total)	7	
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	12	U
Methylene chloride	6	U
4-Methyl-2-pentanone	12	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	6	U
Toluene	6	U
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	6	U
Trichloroethene	62	B
Vinyl acetate	12	U
Vinyl chloride	12	U
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039622
Client Sample ID: SB-107(6-8)

Matrix: Soil
Dilution Factor: 1
Sample Date: 07/14/93
Analysis Date: 07/20/93
% Dry Weight: 86.80

Parameter Units = UG/KG	Result	Q
Acetone	11	U
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	11	U
Chloroform	6	U
Chloromethane	11	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	6	U
1,2-Dichloroethene (Total)	4	J
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	11	U
Methylene chloride	6	U
4-Methyl-2-pentanone	11	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	6	U
Toluene	6	U
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	6	U
Trichloroethene	540	E
Vinyl acetate	11	U
Vinyl chloride	11	U
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

aboratory: Recra Environmental, Inc. - RECNY
ab Job No: A93-2197
ab Sample ID: AS039622DL
lient Sample ID: SB-107(6-8)DL

Matrix: Soil
Dilution Factor: 4.30
Sample Date: 07/14/93
Analysis Date: 07/20/93
% Dry Weight: 86.80

Parameter Units = UG/KG	Result	Q
Acetone	53	U
Benzene	26	U
Bromodichloromethane	26	U
Bromoform	26	U
Bromomethane	53	U
2-Butanone	53	U
Carbon Disulfide	26	U
Carbon Tetrachloride	26	U
Chlorobenzene	26	U
Chloroethane	53	U
Chloroform	26	U
Chloromethane	53	U
Dibromochloromethane	26	U
1,1-Dichloroethane	26	U
1,2-Dichloroethane	26	U
1,1-Dichloroethene	26	U
1,2-Dichloroethene (Total)	4	DJ
1,2-Dichloropropane	26	U
cis-1,3-Dichloropropene	26	U
trans-1,3-Dichloropropene	26	U
Ethyl benzene	26	U
2-Hexanone	53	U
Methylene chloride	26	U
4-Methyl-2-pentanone	53	U
Styrene	26	U
1,1,2,2-Tetrachloroethane	26	U
Tetrachloroethene	26	U
Toluene	26	U
1,1,1-Trichloroethane	26	U
1,1,2-Trichloroethane	26	U
Trichloroethene	610	ED
Vinyl acetate	53	U
Vinyl chloride	53	U
Total Xylenes	26	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039623
Client Sample ID: 2B-4(12-14)

Matrix: Soil
Dilution Factor: 1
Sample Date: 07/14/93
Analysis Date: 07/20/93
% Dry Weight: 88.20

Parameter Units = UG/KG	Result	Q
Acetone	14	
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	11	U
Chloroform	6	U
Chloromethane	11	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	6	U
1,2-Dichloroethene (Total)	6	U
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	11	U
Methylene chloride	6	U
4-Methyl-2-pentanone	11	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	6	U
Toluene	6	U
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	6	U
Trichloroethene	19	B
Vinyl acetate	11	U
Vinyl chloride	11	U
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039624
Client Sample ID: 2P-1(12-14)

Matrix: Soil
Dilution Factor: 1
Sample Date: 07/14/93
Analysis Date: 07/21/93
% Dry Weight: 87.80

Parameter Units = UG/KG	Result	Q
Acetone	11	U
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	11	U
Chloroform	6	U
Chloromethane	11	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	6	U
1,2-Dichloroethene (Total)	6	U
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	11	U
Methylene chloride	6	U
4-Methyl-2-pentanone	11	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	6	U
Toluene	6	U
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	6	U
Trichloroethene	2	BJ
Vinyl acetate	11	U
Vinyl chloride	11	U
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039625
Client Sample ID: 2P-2

Matrix: Soil
Dilution Factor: 1
Sample Date: 07/14/93
Analysis Date: 07/21/93
% Dry Weight: 88.30

Parameter Units = UG/KG	Result	Q
Acetone	11	U
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	11	U
Chloroform	6	U
Chloromethane	11	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	6	U
1,2-Dichloroethene (Total)	6	U
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	11	U
Methylene chloride	6	U
4-Methyl-2-pentanone	11	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	6	U
Toluene	6	U
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	6	U
Trichloroethene	6	U
Vinyl acetate	11	U
Vinyl chloride	11	U
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
ab Job No: A93-2197
ab Sample ID: AS039626
Client Sample ID: 2P-3(12-14)

Matrix: Soil
Dilution Factor: 1
Sample Date: 07/14/93
Analysis Date: 07/20/93
% Dry Weight: 89.40

Parameter Units = UG/KG	Result	Q
Acetone	11	U
Benzene	5	U
Bromodichloromethane	5	U
Bromoform	5	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	5	U
Carbon Tetrachloride	5	U
Chlorobenzene	5	U
Chloroethane	11	U
Chloroform	5	U
Chloromethane	11	U
Dibromochloromethane	5	U
1,1-Dichloroethane	5	U
1,2-Dichloroethane	5	U
1,1-Dichloroethene	5	U
1,2-Dichloroethene (Total)	5	U
1,2-Dichloropropane	5	U
cis-1,3-Dichloropropene	5	U
trans-1,3-Dichloropropene	5	U
Ethyl benzene	5	U
2-Hexanone	11	U
Methylene chloride	5	U
4-Methyl-2-pentanone	11	U
Styrene	5	U
1,1,2,2-Tetrachloroethane	5	U
Tetrachloroethene	5	U
Toluene	5	U
1,1,1-Trichloroethane	5	U
1,1,2-Trichloroethane	5	U
Trichloroethene	5	U
Vinyl acetate	11	U
Vinyl chloride	11	U
Total Xylenes	5	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039627
Client Sample ID: 2P-5(12-14)

Matrix: Soil
Dilution Factor: 1
Sample Date: 07/14/93
Analysis Date: 07/21/93
% Dry Weight: 87.90

Parameter Units = UG/KG	Result	Q
Acetone	11	U
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	11	U
Chloroform	6	U
Chloromethane	11	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	6	U
1,2-Dichloroethene (Total)	6	U
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	11	U
Methylene chloride	6	U
4-Methyl-2-pentanone	11	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	6	U
Toluene	6	U
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	6	U
Trichloroethene	5	J
Vinyl acetate	11	U
Vinyl chloride	11	U
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AS039628	Sample Date:	07/14/93
Client Sample ID:	2P-6	Analysis Date:	07/20/93
		% Dry Weight:	88.50

Parameter · Units = UG/KG	Result	Q
Acetone	11	U
Benzene	6	U
Bromodichloromethane	6	U
Bromoform	6	U
Bromomethane	11	U
2-Butanone	11	U
Carbon Disulfide	6	U
Carbon Tetrachloride	6	U
Chlorobenzene	6	U
Chloroethane	11	U
Chloroform	6	U
Chloromethane	11	U
Dibromochloromethane	6	U
1,1-Dichloroethane	6	U
1,2-Dichloroethane	6	U
1,1-Dichloroethene	6	U
1,2-Dichloroethene (Total)	6	U
1,2-Dichloropropane	6	U
cis-1,3-Dichloropropene	6	U
trans-1,3-Dichloropropene	6	U
Ethyl benzene	6	U
2-Hexanone	11	U
Methylene chloride	6	U
4-Methyl-2-pentanone	11	U
Styrene	6	U
1,1,2,2-Tetrachloroethane	6	U
Tetrachloroethene	6	U
Toluene	6	U
1,1,1-Trichloroethane	6	U
1,1,2-Trichloroethane	6	U
Trichloroethene	2	BJ
Vinyl acetate	11	U
Vinyl chloride	11	U
Total Xylenes	6	U

CAPSULE ENVIRONMENTAL ENG

Total Metals Analysis

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039604
Client Sample ID: MW-1

Matrix: Aqueous
Sample Date: 07/14/93

Dilution Factor: 1

Parameter Units = MG/L	Method	Digestion Date	Analysis Date	Result	Q
Aluminum - Total	7020	07/21/93	07/27/93	0.82	
Antimony - Total	7041	07/21/93	07/26/93	0.0030	U
Arsenic - Total	7060	07/21/93	07/26/93	0.0020	
Barium - Total	6010	07/21/93	07/26/93	0.033	
Beryllium - Total	6010	07/21/93	07/26/93	0.0030	U
Cadmium - Total	7131	07/21/93	07/26/93	0.00020	
Calcium - Total	6010	07/21/93	07/28/93	58.6	
Chromium - Total	6010	07/21/93	07/26/93	0.010	U
Cobalt - Total	6010	07/21/93	07/26/93	0.020	U
Copper - Total	6010	07/21/93	07/26/93	0.0050	U
Iron - Total	6010	07/21/93	07/26/93	0.81	
Lead - Total	7421	07/21/93	07/27/93	0.0010	U
Magnesium - Total	6010	07/21/93	07/26/93	48.5	
Manganese - Total	6010	07/21/93	07/26/93	0.077	
Mercury - Total	7470	07/26/93	07/26/93	0.00020	U
Nickel - Total	6010	07/21/93	07/26/93	0.030	U
Potassium - Total	6010	07/21/93	07/26/93	10.4	
Selenium - Total	7740	07/21/93	07/23/93	0.0020	U
Silver - Total	6010	07/21/93	07/26/93	0.010	U
Sodium - Total	6010	07/21/93	07/28/93	58.1	
Thallium - Total	7841	07/21/93	07/27/93	0.0020	U
Vanadium - Total	6010	07/21/93	07/26/93	0.020	U
Zinc - Total	6010	07/21/93	07/26/93	0.013	

CAPSULE ENVIRONMENTAL ENG

Total Metals Analysis

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AS039605
Client Sample ID: MW-5

Matrix: Aqueous
Sample Date: 07/14/93

Dilution Factor: 1

Parameter	Units = MG/L	Method	Digestion Date	Analysis Date	Result	Q
Aluminum - Total		7020	07/21/93	07/27/93	2.9	
Antimony - Total		7041	07/21/93	07/26/93	0.0030	U
Arsenic - Total		7060	07/21/93	07/26/93	0.0020	U
Barium - Total		6010	07/21/93	07/26/93	0.11	
Beryllium - Total		6010	07/21/93	07/26/93	0.0030	U
Cadmium - Total		7131	07/21/93	07/26/93	0.00060	
Calcium - Total		6010	07/21/93	07/28/93	76.8	
Chromium - Total		6010	07/21/93	07/26/93	0.010	U
Cobalt - Total		6010	07/21/93	07/26/93	0.020	U
Copper - Total		6010	07/21/93	07/26/93	0.0050	U
Iron - Total		6010	07/21/93	07/26/93	6.2	
Lead - Total		7421	07/21/93	07/21/93	0.0030	
Magnesium - Total		6010	07/21/93	07/26/93	75.0	
Manganese - Total		6010	07/21/93	07/26/93	0.19	
Mercury - Total		7470	07/26/93	07/26/93	0.00020	U
Nickel - Total		6010	07/21/93	07/26/93	0.030	U
Potassium - Total		6010	07/21/93	07/26/93	4.0	
Selenium - Total		7740	07/21/93	07/23/93	0.0020	U
Silver - Total		6010	07/21/93	07/26/93	0.010	U
Sodium - Total		6010	07/21/93	07/28/93	32.2	
Thallium - Total		7841	07/21/93	07/27/93	0.0020	U
Vanadium - Total		6010	07/21/93	07/26/93	0.020	U
Zinc - Total		6010	07/21/93	07/26/93	0.027	

CAPSULE ENVIRONMENTAL ENG
MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES
WATER SURROGATE RECOVERY

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197

Client Sample ID	Lab Sample ID	S1 BFB #
FIELD BLANK (2P-3)	AS039590	91
METHOD BLANK (VBLK79)	AR009752	85
METHOD BLANK (VBLK80)	AR009826	86
MW-14R	AS039606	86
MW-3R	AS039607	111
MW-3RDL	AS039607DL	96
OW-101	AS039593	91
OW-101 DL	AS039593DL	85
TRIPBLANK	AS039618	89

		QC Limits
S1 BFB	= p-Bromofluorobenzene	(80 - 120)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogates diluted out

CAPSULE ENVIRONMENTAL ENG
METHOD 8240 - TCL VOLATILE ORGANICS
SOIL SURROGATE RECOVERY

Laboratory: Recra Environmental, Inc. - RECNY.
Lab Job No: A93-2197

Client Sample ID	Lab Sample ID	S1 TOL #	S2 BFB #	S3 DCE #
2B-4(12-14)	AS039623	116	89	92
2P-1(12-14)	AS039624	110	85	98
2P-2	AS039625	114	83	100
2P-3(12-14)	AS039626	113	86	86
2P-5(12-14)	AS039627	106	85	101
2P-6	AS039628	110	74	88
HW-1(4-6)ML	AS039591	106	99	106
HW-3(4-6)	AS039596	112	83	97
HW-3(4-6)ML	AS039596ML	104	96	101
HW-4(1-3)	AS039597	112	83	100
HW-4(1-3)DL	AS039597DL	101	87	106
HW-5(4-6)	AS039598	109	82	97
HW-5(4-6)ML	AS039598ML	104	98	103
HW-5(6-8)	AS039617	114	80	93
HW-5(6-8)ML	AS039617ML	106	100	104
HW-6(4-6)	AS039601	101	87	101
HW-7(4-6)	AS039603	105	90	102
HW-7(4-6)ML	AS039603ML	107	99	105

QC Limits

S1 TOL = Toluene-D8 (81 - 117)
S2 BFB = p-Bromofluorobenzene (74 - 121)
S3 DCE = 1,2-Dichloroethane-D4 (70 - 121)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogates diluted out

CAPSULE ENVIRONMENTAL ENG
METHOD 8240 - TCL VOLATILE ORGANICS
SOIL SURROGATE RECOVERY

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197

Client Sample ID	Lab Sample ID	S1 TOL	#	S2 BFB	#	S3 DCE	#
METHOD BLANK (VBLK39)	AR009947	99		96		96	
METHOD BLANK (VBLK40)	AR009948	98		94		99	
METHOD BLANK (VBLK41)	AR009949	98		92		94	
METHOD BLANK (VBLK85)	AR009944	99		99		100	
METHOD BLK (VBLK15) ML	AR009945	106		98		102	
METHOD BLK (VBLK16) ML	AR009946	104		101		110	
SB-107 (0-2)	AS039619	102		94		101	
SB-107 (2-4)	AS039620	105		90		100	
SB-107 (4-6)	AS039621	106		90		101	
SB-107 (6-8)	AS039622	107		86		93	
SB-107 (6-8) DL	AS039622DL	104		92		101	
SS-1 (10-12)	AS039609	120	*	71	*	97	
SS-1 (10-12) DL	AS039609DL	104		98		103	
SS-1 (10-12) ML	AS039609ML	107		97		106	
SS-1 (12-14)	AS039610	121	*	73	*	99	
SS-1 (12-14) DL	AS039610DL	106		98		104	
SS-1 (12-14) ML	AS039610ML	102		94		102	
SS-1 (14-16)	AS039611	112		80		99	

			QC Limits
S1	TOL	= Toluene-D8	(81 - 117)
S2	BFB	= p-Bromofluorobenzene	(74 - 121)
S3	DCE	= 1,2-Dichloroethane-D4	(70 - 121)

\# Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogates diluted out

CAPSULE L RONMENTAL ENG
METHOD 8240 - TCL VOLATILE ORGANICS
SOIL SURROGATE RECOVERY

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197

Client Sample ID	Lab Sample ID	S1 TOL #	S2 BFB #	S3 DCE #
SS-1(14-16)ML	AS039611ML	106	100	104
SS-1(16-18)	AS039612	105	82	101
SS-1(16-18)DL	AS039612DL	104	100	102
SS-1(16-18)ML	AS039612ML	102	98	104
SS-1(18-20)	AS039613	108	84	100
SS-1(18-20)ML	AS039613ML	108	98	107
SS-1(20-22)	AS039614	112	80	99
SS-1(20-22)DL	AS039614DL	103	105	107
SS-1(20-22)ML	AS039614ML	104	96	105
SS-1(22-24)DL	AS039615DL	104	105	106
SS-1(22-24)ML	AS039615	104	99	104
SS-1(24-25.5)	AS039616	108	81	91
SS-1(24-25.5)ML	AS039616ML	103	97	104
SS-1(8-10)	AS039608	106	85	100
SS-1(8-10)ML	AS039608ML	102	97	102
SS-5(2-4)	AS039592	106	89	99

			QC Limits
S1	TOL	= Toluene-D8	(81 - 117)
S2	BFB	= p-Bromofluorobenzene	(74 - 121)
S3	DCE	= 1,2-Dichloroethane-D4	(70 - 121)

\# Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogates diluted out

CAPSULE ENVIRONMENTAL ENG
MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES
WATER INTERNAL STANDARDS RECOVERY

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197

Client Sample ID	Lab Sample ID	IS1 DCB ‖	IS2 CBZ ‖	IS3 DFB ‖
FIELD BLANK (2P-3)	AS039590	82	81	84
METHOD BLANK (VBLK79)	AR009752	80	83	89
METHOD BLANK (VBLK80)	AR009826	78	84	89
MW-14R	AS039606	83	87	93
MW-3R	AS039607	112	92	92
MW-3RDL	AS039607DL	96	90	94
OW-101	AS039593	91	93	100
OW-101 DL	AS039593DL	89	90	97
TRIPBLANK	AS039618	80	83	84

QC Limits

IS1 DCB = 1,4-Dichlorobenzene-D4 (60 - 140)
IS2 CBZ = Chlorobenzene-D5 (60 - 140)
IS3 DFB = 1,4-Difluorobenzene (60 - 140)

‖ Column to be used to flag recovery values
* Values outside of contract required QC limits

CAPSULE ENVIRONMENTAL ENG
METHOD 8240 - TCL VOLATILE ORGANICS
SOIL INTERNAL STANDARDS RECOVERY

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197

Client Sample ID	Lab Sample ID	IS1 BCM #	IS2 DFB #	IS3 CBZ #
2B-4(12-14)	AS039623	108	92	71
2P-1(12-14)	AS039624	95	89	71
2P-2	AS039625	93	82	63
2P-3(12-14)	AS039626	90	74	57
2P-5(12-14)	AS039627	104	104	93
2P-6	AS039628	99	71	56
HW-1(4-6)ML	AS039591	102	106	96
HW-3(4-6)	AS039596	98	88	73
HW-3(4-6)ML	AS039596ML	103	106	98
HW-4(1-3)	AS039597	90	81	68
HW-4(1-3)DL	AS039597DL	102	104	93
HW-5(4-6)	AS039598	101	94	79
HW-5(4-6)ML	AS039598ML	104	104	97
HW-5(6-8)	AS039617	112	98	77
HW-5(6-8)ML	AS039617ML	102	107	96
HW-6(4-6)	AS039601	104	100	90
HW-7(4-6)	AS039603	115	117	102
HW-7(4-6)ML	AS039603ML	101	101	93

QC Limits

IS1 BCM = Bromochloromethane (50 - 200)
IS2 DFB = 1,4-Difluorobenzene (50 - 200)
IS3 CBZ = Chlorobenzene-D5 (50 - 200)

Column to be used to flag recovery values
* Values outside of contract required QC limits

CAPSULE ENVIRONMENTAL ENG
METHOD 8240 - TCL VOLATILE ORGANICS
SOIL INTERNAL STANDARDS RECOVERY

Laboratory: Recra Environmental, Inc. - RECNY .
Lab Job No: A93-2197

Client Sample ID	Lab Sample ID	IS1 BCM ‖	IS2 DFB ‖	IS3 CBZ ‖
METHOD BLANK (VBLK39)	AR009947	98	97	94
METHOD BLANK (VBLK40)	AR009948	110	110	106
METHOD BLANK (VBLK41)	AR009949	105	98	94
METHOD BLANK (VBLK85)	AR009944	99	97	94
METHOD BLK (VBLK15) ML	AR009945	87	85	81
METHOD BLK (VBLK16) ML	AR009946	91	95	87
SB-107 (0-2)	AS039619	106	108	102
SB-107 (2-4)	AS039620	107	107	97
SB-107 (4-6)	AS039621	111	108	96
SB-107 (6-8)	AS039622	98	90	78
SB-107 (6-8) DL	AS039622DL	119	114	107
SS-1 (10-12)	AS039609	101	86	64
SS-1 (10-12) DL	AS039609DL	100	105	99
SS-1 (10-12) ML	AS039609ML	102	106	98
SS-1 (12-14)	AS039610	104	96	65
SS-1 (12-14) DL	AS039610DL	100	105	97
SS-1 (12-14) ML	AS039610ML	105	105	100
SS-1 (14-16)	AS039611	84	71	52

			QC Limits
IS1	BCM	= Bromochloromethane	(50 - 200)
IS2	DFB	= 1,4-Difluorobenzene	(50 - 200)
IS3	CBZ	= Chlorobenzene-D5	(50 - 200)

‖ Column to be used to flag recovery values
* Values outside of contract required QC limits

CAPSULE ENVIRONMENTAL ENG
METHOD 8240 - TCL VOLATILE ORGANICS
SOIL INTERNAL STANDARDS RECOVERY

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197

Client Sample ID	Lab Sample ID	IS1 BCM ‖	IS2 DFB ‖	IS3 CBZ ‖
SS-1(14-16)ML	AS039611ML	104	107	98
SS-1(16-18)	AS039612	95	90	77
SS-1(16-18)DL	AS039612DL	98	102	95
SS-1(16-18)ML	AS039612ML	102	107	99
SS-1(18-20)	AS039613	102	95	78
SS-1(18-20)ML	AS039613ML	102	110	98
SS-1(20-22)	AS039614	108	99	79
SS-1(20-22)DL	AS039614DL	95	95	89
SS-1(20-22)ML	AS039614ML	104	109	104
SS-1(22-24)DL	AS039615DL	95	95	87
SS-1(22-24)ML	AS039615	105	112	104
SS-1(24-25.5)	AS039616	93	87	74
SS-1(24-25.5)ML	AS039616ML	106	114	104
SS-1(8-10)	AS039608	92	84	75
SS-1(8-10)ML	AS039608ML	99	105	98
SS-5(2-4)	AS039592	88	84	74

				QC Limits
IS1	BCM	=	Bromochloromethane	(50 - 200)
IS2	DFB	=	1,4-Difluorobenzene	(50 - 200)
IS3	CBZ	=	Chlorobenzene-D5	(50 - 200)

‖ Column to be used to flag recovery values
* Values outside of contract required QC limits

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AR009752	Sample Date:	-
Client Sample ID:	METHOD BLANK(VBLK79)	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	5	U
Benzene	0.5	U
Bromodichloromethane	0.5	U
Bromoform	0.5	U
Bromomethane	0.5	U
2-Butanone	5	U
Carbon Disulfide	0.5	U
Carbon Tetrachloride	0.5	U
Chlorobenzene	0.5	U
Chloroethane	0.5	U
Chloroform	0.5	U
Chloromethane	0.5	U
Dibromochloromethane	0.5	U
1,1-Dichloroethane	0.5	U
1,2-Dichloroethane	0.5	U
1,1-Dichloroethene	0.5	U
1,2-Dichloroethene (Total)	0.5	U
1,2-Dichloropropane	0.5	U
cis-1,3-Dichloropropene	0.5	U
trans-1,3-Dichloropropene	0.5	U
Ethyl benzene	0.5	U
2-Hexanone	5	U
Methylene chloride	0.5	U
4-Methyl-2-pentanone	5	U
Styrene	0.5	U
1,1,2,2-Tetrachloroethane	0.5	U
Tetrachloroethene	0.5	U
Toluene	0.5	U
1,1,1-Trichloroethane	0.5	U
1,1,2-Trichloroethane	0.5	U
Trichloroethene	0.5	U
Vinyl acetate	0.5	U
Vinyl chloride	0.5	U
Total Xylenes	0.5	U

CAPSULE ENVIRONMENTAL ENG

MODIFIED METHOD EPA10/92 CLP - LOW LEVEL VOLATILES

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AR009826	Sample Date:	-
Client Sample ID:	METHOD BLANK(VBLK80)	Analysis Date:	07/22/93

Parameter Units = UG/L	Result	Q
Acetone	5	U
Benzene	0.5	U
Bromodichloromethane	0.5	U
Bromoform	0.5	U
Bromomethane	0.5	U
2-Butanone	5	U
Carbon Disulfide	0.5	U
Carbon Tetrachloride	0.5	U
Chlorobenzene	0.5	U
Chloroethane	0.5	U
Chloroform	0.5	U
Chloromethane	0.5	U
Dibromochloromethane	0.5	U
1,1-Dichloroethane	0.5	U
1,2-Dichloroethane	0.5	U
1,1-Dichloroethene	0.5	U
1,2-Dichloroethene (Total)	0.5	U
1,2-Dichloropropane	0.5	U
cis-1,3-Dichloropropene	0.5	U
trans-1,3-Dichloropropene	0.5	U
Ethyl benzene	0.5	U
2-Hexanone	5	U
Methylene chloride	0.5	U
4-Methyl-2-pentanone	5	U
Styrene	0.5	U
1,1,2,2-Tetrachloroethane	0.5	U
Tetrachloroethene	0.5	U
Toluene	0.5	U
1,1,1-Trichloroethane	0.5	U
1,1,2-Trichloroethane	0.5	U
Trichloroethene	0.5	U
Vinyl acetate	0.5	U
Vinyl chloride	0.5	U
Total Xylenes	0.5	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AR009944
Client Sample ID: METHOD BLANK (VBLK85)

Matrix: Soil
Dilution Factor: 1
Sample Date: -
Analysis Date: 07/19/93
% Dry Weight: 100.00

Parameter Units = UG/KG	Result	Q
Acetone	10	U
Benzene	5	U
Bromodichloromethane	5	U
Bromoform	5	U
Bromomethane	10	U
2-Butanone	10	U
Carbon Disulfide	5	U
Carbon Tetrachloride	5	U
Chlorobenzene	5	U
Chloroethane	10	U
Chloroform	5	U
Chloromethane	10	U
Dibromochloromethane	5	U
1,1-Dichloroethane	5	U
1,2-Dichloroethane	5	U
1,1-Dichloroethene	5	U
1,2-Dichloroethene (Total)	5	U
1,2-Dichloropropane	5	U
cis-1,3-Dichloropropene	5	U
trans-1,3-Dichloropropene	5	U
Ethyl benzene	5	U
2-Hexanone	10	U
Methylene chloride	5	U
4-Methyl-2-pentanone	10	U
Styrene	5	U
1,1,2,2-Tetrachloroethane	5	U
Tetrachloroethene	5	U
Toluene	5	U
1,1,1-Trichloroethane	5	U
1,1,2-Trichloroethane	5	U
Trichloroethene	5	U
Vinyl acetate	10	U
Vinyl chloride	10	U
Total Xylenes	5	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AR009945	Sample Date:	-
Client Sample ID:	METHOD BLK(VBLK15)ML	Analysis Date:	07/20/93
		% Dry Weight:	100.00

Parameter Units = UG/KG	Result	Q
Acetone	1200	U
Benzene	620	U
Bromodichloromethane	620	U
Bromoform	620	U
Bromomethane	1200	U
2-Butanone	1200	U
Carbon Disulfide	620	U
Carbon Tetrachloride	620	U
Chlorobenzene	620	U
Chloroethane	1200	U
Chloroform	620	U
Chloromethane	1200	U
Dibromochloromethane	620	U
1,1-Dichloroethane	620	U
1,2-Dichloroethane	620	U
1,1-Dichloroethene	620	U
1,2-Dichloroethene (Total)	620	U
1,2-Dichloropropane	620	U
cis-1,3-Dichloropropene	620	U
trans-1,3-Dichloropropene	620	U
Ethyl benzene	620	U
2-Hexanone	1200	U
Methylene chloride	620	U
4-Methyl-2-pentanone	1200	U
Styrene	620	U
1,1,2,2-Tetrachloroethane	620	U
Tetrachloroethene	620	U
Toluene	620	U
1,1,1-Trichloroethane	620	U
1,1,2-Trichloroethane	620	U
Trichloroethene	620	U
Vinyl acetate	1200	U
Vinyl chloride	1200	U
Total Xylenes	620	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AR009946	Sample Date:	-
Client Sample ID:	METHOD BLK(VBLK16)ML	Analysis Date:	07/21/93
		% Dry Weight:	100.00

Parameter Units = UG/KG	Result	Q
Acetone	1200	U
Benzene	620	U
Bromodichloromethane	620	U
Bromoform	620	U
Bromomethane	1200	U
2-Butanone	1200	U
Carbon Disulfide	620	U
Carbon Tetrachloride	620	U
Chlorobenzene	620	U
Chloroethane	1200	U
Chloroform	620	U
Chloromethane	1200	U
Dibromochloromethane	620	U
1,1-Dichloroethane	620	U
1,2-Dichloroethane	620	U
1,1-Dichloroethene	620	U
1,2-Dichloroethene (Total)	620	U
1,2-Dichloropropane	620	U
cis-1,3-Dichloropropene	620	U
trans-1,3-Dichloropropene	620	U
Ethyl benzene	620	U
2-Hexanone	1200	U
Methylene chloride	620	U
4-Methyl-2-pentanone	1200	U
Styrene	620	U
1,1,2,2-Tetrachloroethane	620	U
Tetrachloroethene	620	U
Toluene	620	U
1,1,1-Trichloroethane	620	U
1,1,2-Trichloroethane	620	U
Trichloroethene	620	U
Vinyl acetate	1200	U
Vinyl chloride	1200	U
Total Xylenes	620	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AR009947	Sample Date:	-
Client Sample ID:	METHOD BLANK(VBLK39)	Analysis Date:	07/20/93
		% Dry Weight:	100.00

Parameter Units = UG/KG	Result	Q
Acetone	10	U
Benzene	5	U
Bromodichloromethane	5	U
Bromoform	5	U
Bromomethane	10	U
2-Butanone	10	U
Carbon Disulfide	5	U
Carbon Tetrachloride	5	U
Chlorobenzene	1	J
Chloroethane	10	U
Chloroform	5	U
Chloromethane	10	U
Dibromochloromethane	5	U
1,1-Dichloroethane	5	U
1,2-Dichloroethane	5	U
1-Dichloroethene	5	U
1,2-Dichloroethene (Total)	5	U
1,2-Dichloropropane	5	U
cis-1,3-Dichloropropene	5	U
trans-1,3-Dichloropropene	5	U
Ethyl benzene	5	U
2-Hexanone	10	U
Methylene chloride	5	U
4-Methyl-2-pentanone	10	U
Styrene	5	U
1,1,2,2-Tetrachloroethane	5	U
Tetrachloroethene	5	U
Toluene	1	J
1,1,1-Trichloroethane	5	U
1,1,2-Trichloroethane	5	U
Trichloroethene	5	U
Vinyl acetate	10	U
Vinyl chloride	10	U
Total Xylenes	5	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Soil
Lab Job No:	A93-2197	Dilution Factor:	1
Lab Sample ID:	AR009948	Sample Date:	-
Client Sample ID:	METHOD BLANK(VBLK40)	Analysis Date:	07/20/93
		% Dry Weight:	100.00

Parameter Units = UG/KG	Result	Q
Acetone	10	U
Benzene	5	U
Bromodichloromethane	5	U
Bromoform	5	U
Bromomethane	10	U
2-Butanone	10	U
Carbon Disulfide	5	U
Carbon Tetrachloride	5	U
Chlorobenzene	0.7	J
Chloroethane	10	U
Chloroform	5	U
Chloromethane	10	U
Dibromochloromethane	5	U
1,1-Dichloroethane	5	U
1,2-Dichloroethane	5	U
1,1-Dichloroethene	5	U
1,2-Dichloroethene (Total)	5	U
1,2-Dichloropropane	5	U
cis-1,3-Dichloropropene	5	U
trans-1,3-Dichloropropene	5	U
Ethyl benzene	5	U
2-Hexanone	10	U
Methylene chloride	5	U
4-Methyl-2-pentanone	10	U
Styrene	5	U
1,1,2,2-Tetrachloroethane	5	U
Tetrachloroethene	5	U
Toluene	1	J
1,1,1-Trichloroethane	5	U
1,1,2-Trichloroethane	5	U
Trichloroethene	0.6	J
Vinyl acetate	10	U
Vinyl chloride	10	U
Total Xylenes	5	U

CAPSULE ENVIRONMENTAL ENG

METHOD 8240 - TCL VOLATILE ORGANICS

aboratory: Recra Environmental, Inc. - RECNY
ab Job No: A93-2197
ab Sample ID: AR009949
lient Sample ID: METHOD BLANK(VBLK41)

Matrix: Soil
Dilution Factor: 1
Sample Date: -
Analysis Date: 07/21/93
% Dry Weight: 100.00

Parameter Units = UG/KG	Result	Q
Acetone	10	U
Benzene	5	U
Bromodichloromethane	5	U
Bromoform	5	U
Bromomethane	10	U
2-Butanone	10	U
Carbon Disulfide	5	U
Carbon Tetrachloride	5	U
Chlorobenzene	1	J
Chloroethane	10	U
Chloroform	5	U
Chloromethane	10	U
Dibromochloromethane	5	U
1,1-Dichloroethane	5	U
1,2-Dichloroethane	5	U
1,1-Dichloroethene	5	U
1,2-Dichloroethene (Total)	5	U
1,2-Dichloropropane	5	U
cis-1,3-Dichloropropene	5	U
trans-1,3-Dichloropropene	5	U
Ethyl benzene	5	U
2-Hexanone	10	U
Methylene chloride	5	U
4-Methyl-2-pentanone	10	U
Styrene	5	U
1,1,2,2-Tetrachloroethane	5	U
Tetrachloroethene	5	U
Toluene	1	J
1,1,1-Trichloroethane	5	U
1,1,2-Trichloroethane	5	U
Trichloroethene	5	U
Vinyl acetate	10	U
Vinyl chloride	10	U
Total Xylenes	0.2	J

CAPSULE ENVIRONMENTAL ENG

Total Metals Analysis

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A93-2197
Lab Sample ID: AR009959
Client Sample ID: METHOD BLANK

Matrix: Aqueous
Sample Date: -

Dilution Factor: 1

Parameter Units = MG/L	Method	Digestion Date	Analysis Date	Result	Q
Aluminum - Total	7020	07/21/93	07/27/93	0.20	U
Antimony - Total	7041	07/21/93	07/26/93	0.0030	U
Arsenic - Total	7060	07/21/93	07/26/93	0.0020	U
Barium - Total	6010	07/21/93	07/26/93	0.020	U
Beryllium - Total	6010	07/21/93	07/26/93	0.0030	U
Cadmium - Total	7131	07/21/93	07/26/93	0.00010	U
Calcium - Total	6010	07/21/93	07/28/93	1.0	U
Chromium - Total	6010	07/21/93	07/26/93	0.010	U
Cobalt - Total	6010	07/21/93	07/26/93	0.020	U
Copper - Total	6010	07/21/93	07/26/93	0.0050	U
Iron - Total	6010	07/21/93	07/26/93	0.050	U
Lead - Total	7421	07/21/93	07/27/93	0.0010	U
Magnesium - Total	6010	07/21/93	07/26/93	0.30	U
Manganese - Total	6010	07/21/93	07/26/93	0.0050	U
Mercury - Total	7470	07/26/93	07/26/93	0.00020	U
Nickel - Total	6010	07/21/93	07/26/93	0.030	U
Potassium - Total	6010	07/21/93	07/26/93	0.20	U
Selenium - Total	7740	07/21/93	07/23/93	0.0020	U
Silver - Total	6010	07/21/93	07/26/93	0.010	U
Sodium - Total	6010	07/21/93	07/28/93	0.80	U
Thallium - Total	7841	07/21/93	07/27/93	0.0020	U
Vanadium - Total	6010	07/21/93	07/26/93	0.020	U
Zinc - Total	6010	07/21/93	07/26/93	0.010	U

CAPSULE ENVIRONMENTAL ENG

Total Metals Analysis

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Aqueous
Lab Job No:	A93-2197	Sample Date:	-
Lab Sample ID:	AR009821		
Client Sample ID:	METHOD BLANK	Dilution Factor:	1

Parameter Units = MG/L	Method	Digestion Date	Analysis Date	Result	Q
Aluminum - Total	7020	07/21/93	07/27/93	0.20	U
Antimony - Total	7041	07/21/93	07/26/93	0.0030	U
Arsenic - Total	7060	07/21/93	07/26/93	0.0020	U
Barium - Total	6010	07/21/93	07/26/93	0.020	U
Beryllium - Total	6010	07/21/93	07/26/93	0.0030	U
Cadmium - Total	7131	07/21/93	07/26/93	0.00010	U
Calcium - Total	6010	07/21/93	07/28/93	1.0	U
Chromium - Total	6010	07/21/93	07/26/93	0.010	U
Cobalt - Total	6010	07/21/93	07/26/93	0.020	U
Copper - Total	6010	07/21/93	07/26/93	0.0050	U
Iron - Total	6010	07/21/93	07/26/93	0.050	U
Lead - Total	7421	07/21/93	07/26/93	0.0010	U
Magnesium - Total	6010	07/21/93	07/26/93	0.30	U
Manganese - Total	6010	07/21/93	07/26/93	0.0050	U
Mercury - Total	7470	07/21/93	07/21/93	0.00020	U
Nickel - Total	6010	07/21/93	07/26/93	0.030	U
Potassium - Total	6010	07/21/93	07/26/93	0.20	U
Selenium - Total	7740	07/21/93	07/23/93	0.0020	U
Silver - Total	6010	07/21/93	07/26/93	0.010	U
Sodium - Total	6010	07/21/93	07/28/93	0.80	U
Thallium - Total	7841	07/21/93	07/27/93	0.0020	U
Vanadium - Total	6010	07/21/93	07/26/93	0.020	U
Zinc - Total	6010	07/21/93	07/26/93	0.010	U

Client Sample ID: METHOD BLANK(VBLK40) MATRIX SPIKE BLANK MATRIX SPIKE BL DUP
Lab Sample ID: AR009948 AR010046 AR010047

Analyte	Units of Measure	Concentration		Spike Amount		% Recovery			% RPD	QC LIMITS	
		Matrix Spike	Spike Blank Dup	MS	MSD	MS	MSD	Avg		RPD	REC.
METHOD 8240 - TCL VOLATILE ORGANICS											
1,1-Dichloroethene	UG/KG	48	45	50	50	96	90	93	6	22.0	59-172
Trichloroethene	UG/KG	49	46	50	50	97	91	94	6	24.0	62-137
Benzene	UG/KG	48	45	50	50	96	90	93	6	21.0	66-142
Toluene	UG/KG	50	48	50	50	98	94	96	4	21.0	59-139
Chlorobenzene	UG/KG	51	51	50	50	101	101	101	0	21.0	60-133

* Indicates Result is outside QC Limits
NC = Not Calculated ND = Not Calculated

Date : 08/11/93 1
Job No: A93-2197

CAPSULE ENVIRON L ENG
QUALITY CONTROL S ANALYSIS

': AN0364

Client Sample ID: METHOD BLK(VBLK15)ML MATRIX SPIKE BLANK MATRIX SPIKE BL DUP
Lab Sample ID: AR009945 AR010048 AR010049

Analyte	Units of Measure	Concentration		Spike Amount		% Recovery			% RPD	QC LIMITS	
		Matrix Spike	Spike Blank Dup	MS	MSD	MS	MSD	Avg		RPD	REC.
METHOD 8240 - TCL VOLATILE ORGANICS											
1,1-Dichloroethene	UG/KG	5400	5400	6200	6200	87	87	87	0	22.0	59-172
Trichloroethene	UG/KG	5400	5500	6200	6200	87	89	88	2	24.0	62-137
Benzene	UG/KG	6400	6500	6200	6200	103	105	104	2	21.0	66-142
Toluene	UG/KG	6600	6800	6200	6200	106	110	108	4	21.0	59-139
Chlorobenzene	UG/KG	5800	6000	6200	6200	94	97	96	3	21.0	60-133

B-141

0076

* Indicates Result is outside QC Limits
NC = Not Calculated ND = Not Calculated

Date : 08/11/93 15
Job No: A93-2197

CAPSULE ENVIRC TAL ENG
QUALITY CONTROL SPIKE ANALYSIS

pt: AN0364

Client Sample ID: METHOD BLANK MATRIX SPIKE BLANK MATRIX SPIKE BL DUP
Lab Sample ID: AR009821 AR009902 AR009903

Analyte	Units of Measure	Concentration		Spike Amount		% Recovery			% RPD	QC LIMITS	
		Matrix Spike	Spike Blank Dup	MS	MSD	MS	MSD	Avg		RPD	REC.
ALUMINUM ANALYSIS											
TOTAL ALUMINUM	MG/L	3.7	3.5	4.0	4.0	92	88	90	4	20.0	75-125
TOTAL ANTIMONY	MG/L	0.20	0.21	0.20	0.20	100	105	103	5	20.0	75-125
TOTAL ARSENIC	MG/L	0.075	0.080	0.080	0.080	94	100	97	6	20.0	75-125
TOTAL BARIUM	MG/L	4.2	4.1	4.0	4.0	105	102	104	3	20.0	75-125
TOTAL BERYLLIUM	MG/L	0.10	0.10	0.10	0.10	100	100	100	0	20.0	75-125
TOTAL CADMIUM	MG/L	0.011	0.011	0.010	0.010	110	110	110	0	20.0	75-125
TOTAL CALCIUM	MG/L	96.4	95.0	100	100	96	95	96	1	20.0	75-125
TOTAL CHROMIUM	MG/L	0.40	0.40	0.40	0.40	100	100	100	0	20.0	75-125
TOTAL COBALT	MG/L	1.0	1.0	1.0	1.0	100	100	100	0	20.0	75-125
TOTAL COPPER	MG/L	0.52	0.52	0.50	0.50	104	104	104	0	20.0	75-125
TOTAL IRON	MG/L	2.1	2.1	2.0	2.0	105	105	105	0	20.0	75-125
TOTAL LEAD	MG/L	0.026	0.043	0.040	0.040	65 *	108	87	50 *	20.0	75-125
TOTAL MAGNESIUM	MG/L	50.6	51.2	50.0	50.0	101	102	102	1	20.0	75-125
TOTAL MANGANESE	MG/L	1.0	1.1	1.0	1.0	100	110	105	10	20.0	75-125
TOTAL MERCURY	MG/L	0.0078	0.0077	0.0080	0.0080	98	96	97	2	20.0	75-125
TOTAL NICKEL	MG/L	1.0	1.0	1.0	1.0	100	100	100	0	20.0	75-125
TOTAL POTASSIUM	MG/L	51.5	51.2	50.0	50.0	103	102	103	1	20.0	75-125
TOTAL SELENIUM	MG/L	0.021	0.020	0.020	0.020	105	100	103	5	20.0	75-125
TOTAL SILVER	MG/L	0.080	0.072	0.10	0.10	80	72 *	76	10	20.0	75-125
TOTAL SODIUM	MG/L	105	104	100	100	105	104	105	1	20.0	75-125
TOTAL THALLIUM	MG/L	0.10	0.11	0.10	0.10	100	110	105	10	20.0	75-125
TOTAL VANADIUM	MG/L	1.0	1.0	1.0	1.0	100	100	100	0	20.0	75-125
TOTAL ZINC	MG/L	1.0	1.0	1.0	1.0	100	100	100	0	20.0	75-125

* Indicates Result is outside QC Limits
NC = Not Calculated ND = Not Calculated

0077

RECRA ENVIRONMENTAL, INC.

CHAIN OF CUSTODY RECORD

PROJECT NO: 128-95

SITE NAME: Aro Corp - Capsule

SAMPLERS (SIGNATURE)

STATION NO	DATE	TIME	COMP	GRAB	STATION LOCATION	NO OF CONTAINERS	8240 low level	6010 metals	Archive *				REMARKS
1	7/14			X	Field Blank (2P-3)	3	X						* Archive - Hold until
2	7/15			X	HW-1 4'-6'	1	X						field screening Complete
3	7/15			X	SS-5 2'-4'	1	X						7/17/93
4	7/15			X	OW-101	3	X						
5	7/15			X	HW-2 0'-2'	1			X				
6	7/15			X	HW-2 2'-4'	1			X				
7	7/15			X	HW-3 4'-6'	1	X						
8	7/15			X	HW-4 1'-3'	1	X						
9	7/15			X	HW-5 4'-6'	1	X						screened on site 'Hot'
10	7/15			X	HW-5 3'	1			X				
11	7/15			X	HW-6 2-4'	1			X				
12	7/15			X	HW-6 4'-6'	1	X	X					Vol.
13	7/15			X	HW-7 2'-4'	1			X				
14	7/15			X	HW-7 4'-6'	1	X	X					Vol

RELINQUISHED BY (SIGNATURE)	DATE 7/16 TIME 7:42	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE TIME	RECEIVED BY (SIGNATURE)
RELINQUISHED BY (SIGNATURE)	DATE TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE TIME	RECEIVED BY (SIGNATURE)
RELINQUISHED BY (SIGNATURE)	DATE TIME	RECEIVED FOR LABORATORY BY (SIGNATURE) Daniel S Bleau	DATE 7-16-93 TIME [illegible]	REMARKS	

Distribution: Original accompanies shipment; copy to coordinator field files

RECRA ENVIRONMENTAL, INC.

CHAIN OF CUSTODY RECORD

PROJECT NO: 128-98

SITE NAME: Aro- Buffalo

SAMPLERS (SIGNATURE)

STATION NO	DATE	TIME	COMP	GRAB	STATION LOCATION	NO OF CONTAINERS	8240 (Low level)	Metals 6010					REMARKS
	7-14-93	9:00	H_2O	X	MW-1	1		X					
		9:40			MW-5	1		X					
		10:30			MW-14R	3	X						
		11:20			MW-3R	3	X						
		8:45	Soil		SS-1; 8-10'	1	X						
		8:50			SS-1; 10-12'	1	X						
		8:35			SS-1; 12-14'	1	X						
		9:55			SS-1; 14-16'	1	X						
		10:50			SS-1; 16-18'	1	X						
		10:55			SS-1; 18-20'	1	X						
		11:15			SS-1; 20-22'	1	X						
		11:20			SS-1; 22-24'	1	X						
		11:10			SS-1; 24-25.5	1	X						

RELINQUISHED BY (SIGNATURE)	DATE TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE / TIME	RECEIVED BY (SIGNATURE)
RELINQUISHED BY (SIGNATURE)	DATE TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE / TIME	RECEIVED BY (SIGNATURE)
RELINQUISHED BY (SIGNATURE)	DATE TIME	RECEIVED FOR LABORATORY BY (SIGNATURE)	DATE/TIME 7-16-93 0740	REMARKS	

Distribution: Original accompanies shipment copy to coordinator field files

RECRA ENVIRONMENTAL, INC.

CHAIN OF CUSTODY RECORD

PROJECT NO 128-98

SITE NAME 128-98 Arco Comp Capsule

SAMPLERS (SIGNATURE)

STATION NO	DATE	TIME	COMP	GRAB	STATION LOCATION	NO OF CONTAINERS	8240 low level *						REMARKS
1	7/15			X	HW-5 6'-8'	1	X						
1	7/14			X	Outfall 2 *	3	X						Found in Rpt 93-2159
1	7/12			X	Trip Blank	2	X						
													* shipped in prior cooler

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED FOR LABORATORY BY (SIGNATURE)	DATE	TIME	REMARKS
				7-16-93	0740	

RECRA ENVIRONMENTAL, INC.

CHAIN OF CUSTODY RECORD

PROJECT NO.: 128-98

SITE NAME: Aro Corp - Capsule

SAMPLERS (SIGNATURE)

STATION NO	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	8240						REMARKS
	7/11/93				SB-107 (0-2)	1	X						Samples received
					SB-107 (2-4)	1	X						without COC
					SB-107 (4-6)	1	X						from field.
					SB-107 (6-8)	1	X						DMC 7/16/93
					2B-4 (12-14)	1	X						
					2P-1 (12-14)	1	X						
					2P-2	1	X						
					2P-3 (12-14)	1	X						
					2P-5 (12-14)	1	X						
					2P-6	1	X						

RELINQUISHED BY (SIGNATURE)	DATE/TIME 7/16/93 0700	RECEIVED BY (SIGNATURE): J. Carter for DSB	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED BY (SIGNATURE)
RELINQUISHED BY (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY (SIGNATURE)	DATE/TIME	REMARKS	

Distribution: Original accompanies shipment; copy to coordinator field files

APPENDIX N

ecology and environment, inc.
BUFFALO CORPORATE CENTER
368 PLEASANTVIEW DRIVE, LANCASTER, NEW YORK 14086, TEL. 716/684-8060
International Specialists in the Environment

November 13, 1990

Mr. Darryl Murszewski
Environmental Coordinator
The ARO Corporation
Life Support Products Division
3695 Broadway
Buffalo, NY 14227

RE: Industrial Hygiene Services, October 31, 1990
your P.O. # 00643

Dear Mr. Murszewski:

On October 31, 1990, Ecology and Environment, Inc. (E & E), performed an industrial hygiene survey at your direction in a specific area of your facility for purposes of measuring airborne concentrations of trichloroethylene.

The areas in question included the machine shop, chemical storage area, and an adjacent area containing tanks.

The sampling train was comprised of a Gilian low-flow personal·sampling pump fitted with charcoal sorbent tube per National Institute of Occupational Safety and Health (NIOSH) protocols. Four locations were each sampled for 4 hours. Analysis was performed the following day at E & E Analytical Service Center in Buffalo using procedures set forth in the NIOSH "Manual of Analytical Methods". A trip blank was included in the sample set.

Analytical results indicated that only one location (Sample ID-ARO-01) had airborne trichloroethylene levels above the laboratory minimum level of detection which was 5.0 μg. Results are summarized as follows:

Location/Sample ID	Concentration (ppm air)
Machine Shop Cage ARO-01	0.02
Chemical Storage Area ARO-02	BDL
Chemical Storage Area ARO-03	BDL
Adjacent to Chemical Storage Tanks ARO-04	not detected

BDL = Below minimum lab detection limit, 5 ug/tube.
Sampling period = 240 minutes
flow rate = 200 cc/min, nominal

Occupational Exposure Values:

TLV(90-91)-TWA=50ppm PEL(OSHA)=50ppm REL(NIOSH)=25ppm
defined by NIOSH as carcinogen.

These results indicate that airborne trichloroethylene concentrations at the time of this sampling effort were either non-detectable or at trace levels. Of further interest however, is the fact that laboratory instrumentation indicated that two or more additional volatile organic compounds were observed during analysis at concentrations that appeared to be greater than the compound of interest. Due to the cost and time constraints on this project, however, these materials were not identified. Further investigation, preferably using Tenax traps would result in enhanced results.

Thank you for selecting E & E to assist you in this investigation. Please feel free to contact myself or the industrial hygienist who performed the site work, Keith Horn, should you have further questions or wish to discuss additional sampling recommendations.

Truly,

SJSherman

Steven J. Sherman, CIH
Senior Industrial Hygienist

SJS/kvk/AS6010

ECOLOGY AND ENVIRONMENT, INC.

Air Tube Analysis by GCM
Volatile Organic Compo

(all results

Sampling Date: January 31, 1989

Tom Bosc
[illegible]

DArryL:
this is an example of a single run of a tenax trap sample. Cost runs approx $300 per sample (yield at least 25 compounds.)

$ 250 analysis

ID
elete

Library Search → $225
624
waste water
8240 well wat

Compound	E & E Lab. No. 89- Sample Identity	Meth Blan				
chloromethane		ND				
✓bromomethane		ND				
✓vinyl chloride		ND	ND	ND	ND	ND
chloroethane		ND	ND	ND	ND	ND
methylene chloride		1.3	0.7 B*	ND	1.5 B	1.4 B
acetone		5.7	7.6 B	3.8 B	12 B	10 B
trichlorofluoromethane		1.3	1.6 B	ND	0.9 B*	ND
carbon disulfide		ND	ND	ND	ND	ND
1,1-dichloroethene		ND	ND	ND	ND	ND
1,1-dichloroethane		ND	ND	ND	ND	ND
trans-1,2-dichloroethene		ND	ND	ND	ND	ND
chloroform		ND	ND	ND	ND	ND
1,2-dichloroethane		ND	ND	ND	ND	ND
2-butanone		ND	ND	ND	1.7 *	ND
1,1,1-trichloroethane		ND	29	ND	1.5	1.5
carbon tetrachloride		ND	ND	ND	ND	ND
vinyl acetate		ND	ND	ND	ND	ND
bromodichloromethane		ND	ND	ND	ND	ND
1,2-dichloropropane		ND	ND	ND	ND	ND
trans-1,3-dichloropropene		ND	ND	ND	ND	ND
trichloroethene		ND	ND	ND	ND	ND
dibromochloromethane		ND	ND	ND	ND	ND
1,1,2-trichloroethane		ND	ND	ND	ND	ND
benzene		ND	ND	ND	ND	ND
cis-1,3-dichloropropene		ND	ND	ND	ND	ND
2-chloroethylvinyl ether		ND	ND	ND	ND	ND
bromoform		ND	ND	ND	ND	ND
4-methyl-2-pentanone		ND	ND	ND	ND	ND
2-hexanone		ND	ND	ND	ND	ND
tetrachloroethene		ND	1.5	ND	20	12
1,1,2,2-tetrachloroethane		ND	ND	ND	ND	ND
toluene		ND	1.0	ND	1.6	1.9
chlorobenzene		ND	ND	ND	ND	ND
ethylbenzene		ND	ND	ND	ND	ND
styrene		ND	ND	ND	ND	ND
total xylenes		ND	ND	ND	2.1	2.4

ND = Not detected
B = Compound also detected in laboratory method blank.
* = Compound present below measurable detection limit.

ERM-Northeast

5500 Main Street
Williamsville, NY 14221
(716) 633-5920
(716) 633-5924 (Fax)

May 7, 1993

Mr. Daryl Murszewski
Environmental Coordinator
The ARO Corporation
3695 Broadway
Buffalo, New York 14227-1184

ERM

Re: Supplemental Baseline Air Assessment at The ARO Corporation Facility, Buffalo, New York.

Dear Daryl:

ERM-Northeast, Inc. (ERM) completed a baseline air assessment on May 5, 1993 at the ARO Corporation (ARO) facility in Buffalo, New York. This work was conducted in accordance with our April 14, 1993 proposal/contract.

BACKGROUND

ARO has an approximate 68,720 square-foot facility that employs approximately 100 people. A recent air quality survey conducted by others during an ongoing RI at the site raised some concerns regarding air quality in some areas of the facility. Thus, ARO requested that ERM conduct a supplemental baseline air study under working conditions, and based on the results of this study prepare a scope-of-work for a subsequent quantification survey of specific contaminants.

PURPOSE

The purpose of this air study was to provide ARO with the data requirements presented in the RFP.

A member of the Environmental
Resources Management Group

SCOPE-OF-WORK

The baseline air survey included the following two tasks:

1) Review and Identification of Sampling Locations; and
2) Baseline Air Study.

The components of the subtasks are summarized in the following paragraphs.

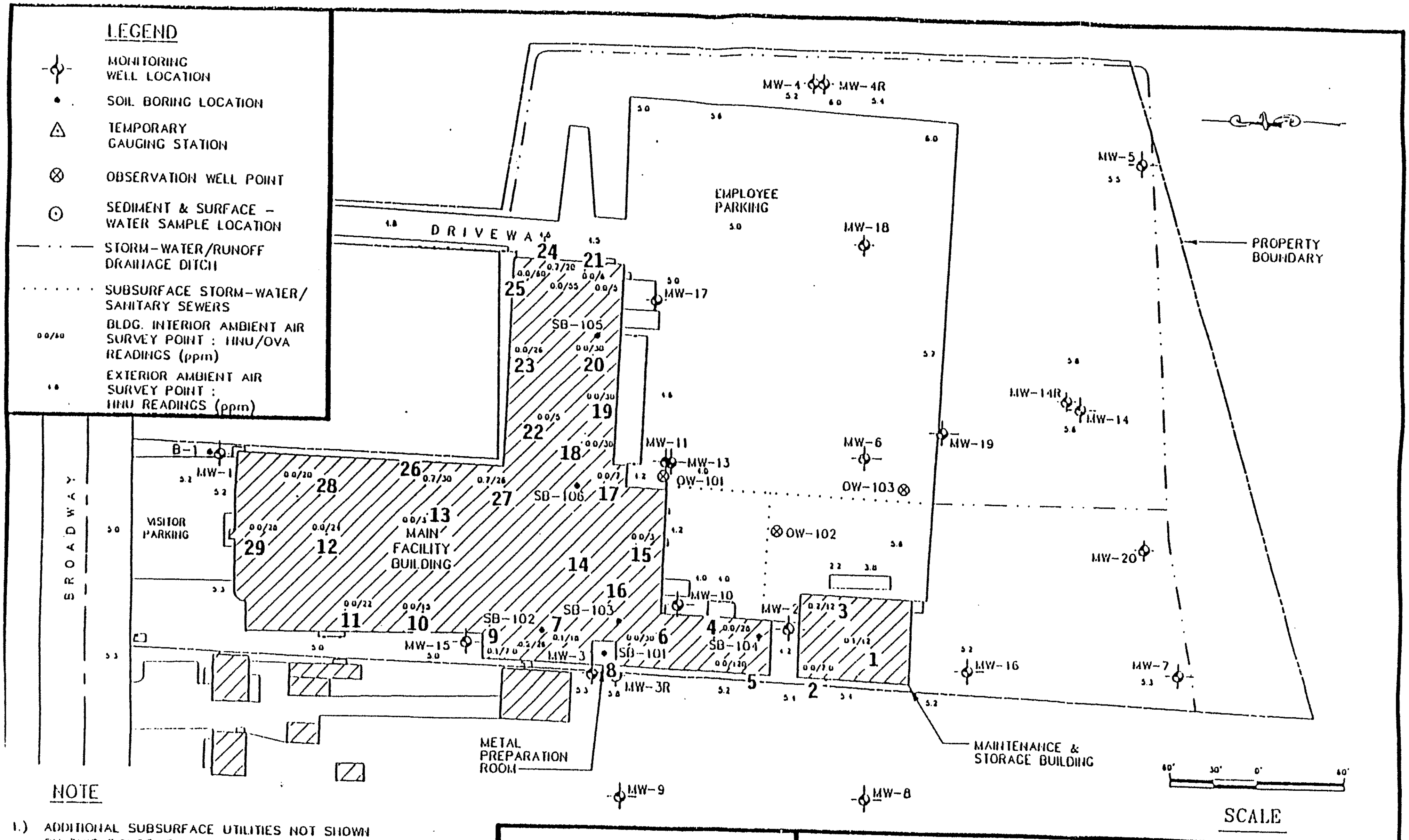
TASK 1 - Review and Identification of Sampling Locations

ERM initially conducted a walkthrough of the facility to observe the locations previously sampled and to identify additional potential areas for sampling. This walkthrough was conducted by Robert T. Fabian on May 5, 1993, and he was accompanied by Daryl Murszewski of ARO. During this walkthrough ERM observed activities and material usage in each area and identified the sampling locations on a Site Plan (provided by ARO). These locations were assigned numbers consistent with the sequence of the walkthrough (Figure 1). Based on the walkthrough and ARO's understanding of the activities in certain areas, three areas previously sampled were not resampled during ERM's assessment and three areas (8, 14 and 16) were added to the program.

TASK 2 - Baseline Air Study

The baseline air study was conducted during working hours and completed during one work shift. Measurements were collected at 29 locations. One set of data was collected in the morning and a second set of data was collected in the afternoon. Measurements were simultaneously collected with an HNu-PI-101 equipped with an 11.7 eV bulb and an OVA-128 FID. Additionally, particulate concentrations were measured on a Miniram MIE PDM-3, and formaldehyde and total petroleum hydrocarbon measurements were collected using Drager tubes on a Drager-R-ACCURO. Readings were obtained in the approximate location of the breathing space of the workers. Data collection on the HNu and OVA generally followed the methodology used during the previous study to allow comparison of data. Background levels were measured prior to each reading and the instruments were calibrated in general accordance with manufacturer's specifications. A summary of the data collected as well as the reported results of the previous study is included as Table 1.

At the conclusion of the first round of OVA measurements, it was discovered that the OVA flame had gone-out sometime during the first round. Thus, OVA readings taken during the first round are questionable.



NOTE

1.) ADDITIONAL SUBSURFACE UTILITIES NOT SHOWN ON THIS FIGURE, EXIST AT THE FACILITY

SOURCES :
(1.) TALLAMY, VAN KUREN, GERTIS & ASSOCIATES, Dwg. No.D-15641 (FEBRUARY 23,1991)
(2.) KREHBIEL ASSOCIATES Dwg. No.D-2300 (JUNE 23,1992)

ARO CORPORATION
BUFFALO, NEW YORK

ARO CORPORATION BASELINE AIR ASSESSMENT

5-May-93

SAMPLING ID	SAMPLING LOCATION	TIME	FORMAL-DEHYDE	TPH	MINI-RAM mg/cubic-m		HNU ppm		OVA ppm	
					Background	Reading	Background	Reading	Background	Reading
1	BUILDING 10	909	ND	ND	0.00	0.00	0.40	1.20	0.00	0.20
		1345	ND	ND	0.00	0.00	0.00	0.00	1.00	1.40
		Previous	NA	NA	NA	NA	NA	0.10	NA	12.00
2	BUILDING 10	920	ND	ND	0.00	0.00	0.60	1.00	0.20	0.20
		1350	ND	ND	0.00	0.00	0.00	0.00	1.00	2.50
		Previous	NA	NA	NA	NA	NA	0.00	NA	7.00
3	BUILDING 10	925	ND	ND	0.00	0.04	0.80	0.80	0.20	0.30
		1400	ND	ND	0.00	0.00	0.00	0.00	1.00	1.60
		Previous	NA	NA	NA	NA	NA	0.20	NA	12.00
4	BUILDING 2	930	ND	ND	0.00	0.00	0.00	0.30	0.00	0.01
		1405	ND	ND	0.00	0.02	0.00	0.10	1.00	1.00
		Pevious	NA	NA	NA	NA	NA	0.00	NA	28.00
5	BUILDING 2	937	ND	ND	0.00	0.00	0.00	7.00	0.00	0.40
		1410	ND	ND	0.00	0.00	0.00	20.00	1.00	70.00
		Previous	NA	NA	NA	NA	NA	0.00	NA	120.00
6	BUILDING 2	945	ND	ND	0.00	0.00	0.20	0.20	0.00	0.40
		1420	ND	ND	0.00	0.04	0.00	0.00	1.00	1.00
		Previous	NA	NA	NA	NA	NA	0.00	NA	30.00
7	BUILDING 2	955	ND	ND	0.00	0.00	0.20	0.20	0.50	0.50
		1430	ND	ND	0.00	0.02	0.10	0.20	1.00	1.00
		Previous	NA	NA	NA	NA	NA	0.10	NA	18.00
8	BUILDING 2	1004	ND	ND	0.00	0.00	0.00	0.20	0.40	0.40
		1432	ND	ND	0.00	0.02	0.20	0.40	1.00	3.50
		Previous	ND	ND	NA	NA	NA	NA	NA	NA
9	BUILDING 2	1006	ND	ND	0.00	0.00	0.10	0.10	0.40	0.40
		1434	ND	ND	0.00	0.02	0.20	0.40	1.00	1.00
		Previous	NA	NA	NA	NA	NA	0.00	NA	7.00
10	BUILDING 1	1010	ND	ND	0.00	0.00	0.10	0.10	0.40	0.40
		1436	ND	ND	0.00	0.02	0.00	0.00	1.00	1.20
		Previous	NA	NA	NA	NA	NA	0.00	NA	15.00
11	BUILDING 1	1018	ND	ND	0.00	0.00	0.10	0.10	0.40	0.40
		1449	ND	ND	0.00	0.24	0.00	0.00	1.00	1.60
		Previous	NA	NA	NA	NA	NA	0.00	NA	22.00
12	BUILDING 11	1022	ND	ND	0.00	0.00	0.10	0.10	0.40	0.40
		1454	ND	ND	0.00	0.00	0.20	0.20	1.00	1.00
		Previous	NA	NA	NA	NA	NA	0.00	NA	24.00
13	BUILDING 11	1027	ND	ND	0.00	0.00	0.20	0.20	0.40	0.50
		1458	ND	ND	0.00	0.00	0.40	0.80	1.00	10.00
		Previous	NA	NA	NA	NA	NA	0.00	NA	3.00
14	BUILDING 11	1035	ND	ND	0.00	0.00	0.00	0.00	0.40	0.40
		1510	ND	ND	0.00	0.00	0.00	0.00	1.00	1.60
		Previous	NA	NA	NA	NA	NA	NA	NA	NA
15	BUILDING 11	1040	ND	ND	0.00	0.00	0.00	0.00	0.40	0.40
		1527	ND	ND	0.00	0.02	0.00	0.20	1.00	1.00
		Previous	NA	NA	NA	NA	NA	0.00	NA	3.00
16	BUILDING 11	1045	ND	ND	0.00	0.00	0.00	0.20	0.40	0.40
		1532	ND	ND	0.00	0.00	0.00	0.20	1.00	1.60
		Previous	NA	NA	NA	NA	NA	NA	NA	NA
17	BUILDING 7	1050	ND	ND	0.00	0.00	0.00	0.00	0.30	0.30
		1535	ND	ND	0.00	0.02	0.00	0.00	1.00	1.00
		Previous	NA	NA	NA	NA	NA	0.00	NA	7.00
18	BUILDING 6	1053	ND	ND	0.00	0.00	0.00	0.00	0.30	0.30
		1536	ND	ND	0.00	0.00	0.00	0.00	1.00	1.00
		Previous	NA	NA	NA	NA	NA	0.00	NA	30.00
19	BUILDING 6	1058	ND	ND	0.00	0.00	0.00	0.00	0.40	0.40
		1539	ND	ND	0.00	0.12	0.00	0.00	1.00	1.20
		Previous	NA	NA	NA	NA	NA	0.00	NA	30.00
20	BUILDING 6	1106	ND	ND	0.00	0.00	0.00	0.00	0.30	0.30
		1541	ND	ND	0.00	0.02	0.00	0.00	1.00	1.00
		Previous	NA	NA	NA	NA	NA	0.00	NA	30.00
21	BUILDING 6	1115	ND	ND	0.00	0.00	0.00	0.00	0.30	0.30
		1545	ND	ND	0.00	0.02	0.00	0.00	1.00	1.00
		Previous	ND	ND	NA	NA	NA	0.00	NA	6.00
22	BUILDING 5	1125	ND	ND	0.00	0.00	0.10	0.20	0.30	0.30
		1550	ND	ND	0.00	0.02	0.00	0.60	1.00	1.60
		Previous	ND	ND	NA	NA	NA	0.00	NA	5.00
23	BUILDING 5	1130	ND	ND	0.00	0.00	0.10	0.10	0.30	0.30
		1600	ND	ND	0.00	0.02	0.00	2.00	1.00	1.40
		Previous	NA	NA	NA	NA	NA	0.00	NA	26.00
24	BUILDING 5	1135	ND	ND	0.00	0.08	0.10	0.10	0.30	0.30
		1603	ND	ND	0.00	0.02	0.00	0.00	1.00	1.20
		Previous	NA	NA	NA	NA	NA	0.70	NA	20.00
25	BUILDING 5	1148	ND	ND	0.00	0.00	0.10	0.10	0.30	0.30
		1605	ND	ND	0.00	0.00	0.00	0.00	1.00	1.00
		Previous	NA	NA	NA	NA	NA	0.00	NA	60.00
26	BUILDING 4	1153	ND	ND	0.00	0.00	0.10	0.80	0.30	0.30
		1608	ND	ND	0.00	0.00	0.00	1.40	1.00	8.00
		Previous	NA	NA	NA	NA	NA	0.70	NA	30.00
27	BUILDING 4	1206	ND	ND	0.00	0.00	0.20	0.20	0.40	0.40
		1612	ND	ND	0.00	0.02	0.00	0.00	1.00	1.20
		Previous	NA	NA	NA	NA	NA	0.70	NA	26.00
28	BUILDING 3	1211	ND	ND	0.00	0.00	0.20	0.20	0.30	0.30
		1615	ND	ND	0.00	0.00	0.00	0.00	1.00	1.40
		Previous	NA	NA	NA	NA	NA	0.00	NA	20.00
29	BUILDING 8	1217	ND	ND	0.00	0.02	0.20	0.20	0.20	0.40
		1618	ND	ND	0.00	0.00	0.00	0.20	1.00	1.00
		Previous	NA	NA	NA	NA	NA	0.00	NA	28.00

NOTES:

NA=NOT AVAILABLE; ND=NOT DETECTED; TPH=TOTAL PETROLEUM HYDROCARBONS

Previous=DATA COLLECTED BY OTEHRS DURING A PREVIOUS EVENT.

RESULTS

Based on our experience, organic vapor concentrations greater than 1 part per million (ppm) above background levels and particulate readings greater than 0.1 mg/cubic-meter above background levels are considered elevated and should be further evaluated. During ERM's baseline air assessment, the following sampling locations had organic vapor concentrations more than 1 part per million above background levels: 1, 2, 5, 8, 13 and 26 on either the PID or the OVA. Particulate readings more than 0.1 mg/cubic meter above background levels were detected at sampling locations 11 and 19. No formaldehyde nor total petroleum hydrocarbon readings were detected using the Drager tubes.

RECOMMENDATIONS FOR QUANTIFICATION OF SPECIFIC CONTAMINANTS

Based on the results of ERM's baseline air assessment, the following Phase II program is proposed:

Sampling ID	Recommended Test Parameters
1,2,5,8,13 and 26	CARBO TRAP TUBE by GC/MS for: volatiles, MEK, 1,4-Dioxin, Mineral Spirits and 1,2,3-Cl$_3$ - 1,2,2-F$_3$ ethane
11 and 19	Total Dust

We would be pleased to complete the Phase II work at sampling locations 1,2,5,8,13 and 26 for a unit cost of $500/location. The dust sampling at locations 11 and 19 could be completed for a unit cost of $200/location. The total project cost would be $3,400.

We appreciate the opportunity to implement Phase I of our proposal and look forward to working with you and your colleagues on Phase II. If any aspect of this report requires clarification or discussion, please call me at (716) 633-5920.

Very truly yours,

Jeffrey A. Wittlinger, P.E.
Group Manager, Engineering

James Testo /JAF

James Testo, CIH
Industrial Hygiene Director

TABLE 17

TABLE 17
Comparison of Metals levels in Ground Water
Aro Corporation Buffalo, New York
All values are expressed in parts per million

	Cr	Pb	Co	Iron	Mg	Mn	Na	Ba	As	Zn
Upgradient										
Orig. MW-1	.051	.429	.0209	45.9	98.4	1.1	58.7	.266	.013	.296
Supp. MW-1	.010	.0010	.020	.81	48.5	.077	58.1	.033.	.0020	.027
Downgradient										
Orig. MW-5	.263	.165	.0824	203	551	5.17	36.7	1.17	0.31	.786
Supp. MW-5	.010	.0030	.020	6.2	75.0	.190	32.2	.110	.0020	.027
Orig. MW-7	.060	.032	<.02	50.6	180	1.03	31.6	.441	.022	.169
Supp. MW-7	.010	.005	.020	6.7	94.6	.14	29.3	.11	.002	.027
Orig. MW-13	.220	.191	.074	176	397	4.72	33.8	1.15	.0279	.604
Supp. MW-13	.062	.039	.032	62.8	178	1.9	30.0	.49	.008	.23
Orig. MW-14	.164	.1289	.0423	98.1	260	2.840	69.2	.756	.0142	.329
Supp. MW-14	.010	.004	.020	3.1	100	.29	74	.072	.002	.30
NYS GW Standard	.050	.025	.005	.300	35	.300	20	1.0	.025	.300

Orig. Analytical data generated during the initial RI field work performed in June 1992.

Supp. Analytical data generated during the supplemental RI field work performed in July 1993.

TABLE 18

TABLE 18

Summary of Historical Monitoring Well TCE and DCE Results

SAMPLE LOCATION	TCE June 1992	TCE July 1993	DCE June 1992	DCE July 1993	OTHER
OW-101	30,000	59,000	5,400	8,600	
OW-102	ND	NS	180	NS	
OW-103	ND	NS	ND	NS	
OW-104	NS	NS	NS	NS	
MW-1	ND	NS	ND	NS	
MW-2	790	NS	2,600	NS	700 (Vinyl Chloride)
MW-3	1,100,000	14	810	0.8	
MW-3R	–	–	–	–	Dry Bedrock Well
MW-4	ND	NS	ND	NS	
MW-4R	–	–	–	–	Dry Bedrock Well
MW-5	ND	NS	ND	NS	
MW-6	100,000	NS	2,100	NS	
MW-7	0.9	NS	ND	NS	
MW-8	ND	NS	ND	NS	
MW-9	0.7	ND	ND	ND	
MW-10	0.7	NS	200	ND	
MW-11	51,000	NS	16,000	NS	
MW-13	21,000	NS	9,900	NS	
MW-14	ND	ND	ND	ND	
MW-14R	–	0.1	–	0.2	Dry Bedrock Well
MW-15	<5	NS	ND	NS	
MW-16	3	ND	ND	ND	
MW-17	ND	NS	ND	NS	
MW-18	5	0.09	ND	ND	13 (xylene)
MW-19	ND	NS	0.9	NS	
MW-20	4,300	22,000	2,900	5,100	300 (CFC)
MW-21	*NS	ND	*NS	ND	*

CFC - 1,2-Dichloro-1,1,2-Trifluoroethane
ND - Not Detected
NS - Not Sampled
* - MW-21 was installed in October 1993.
All values are expressed in ppb.

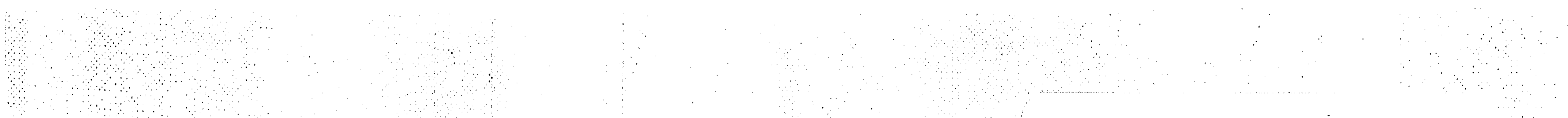
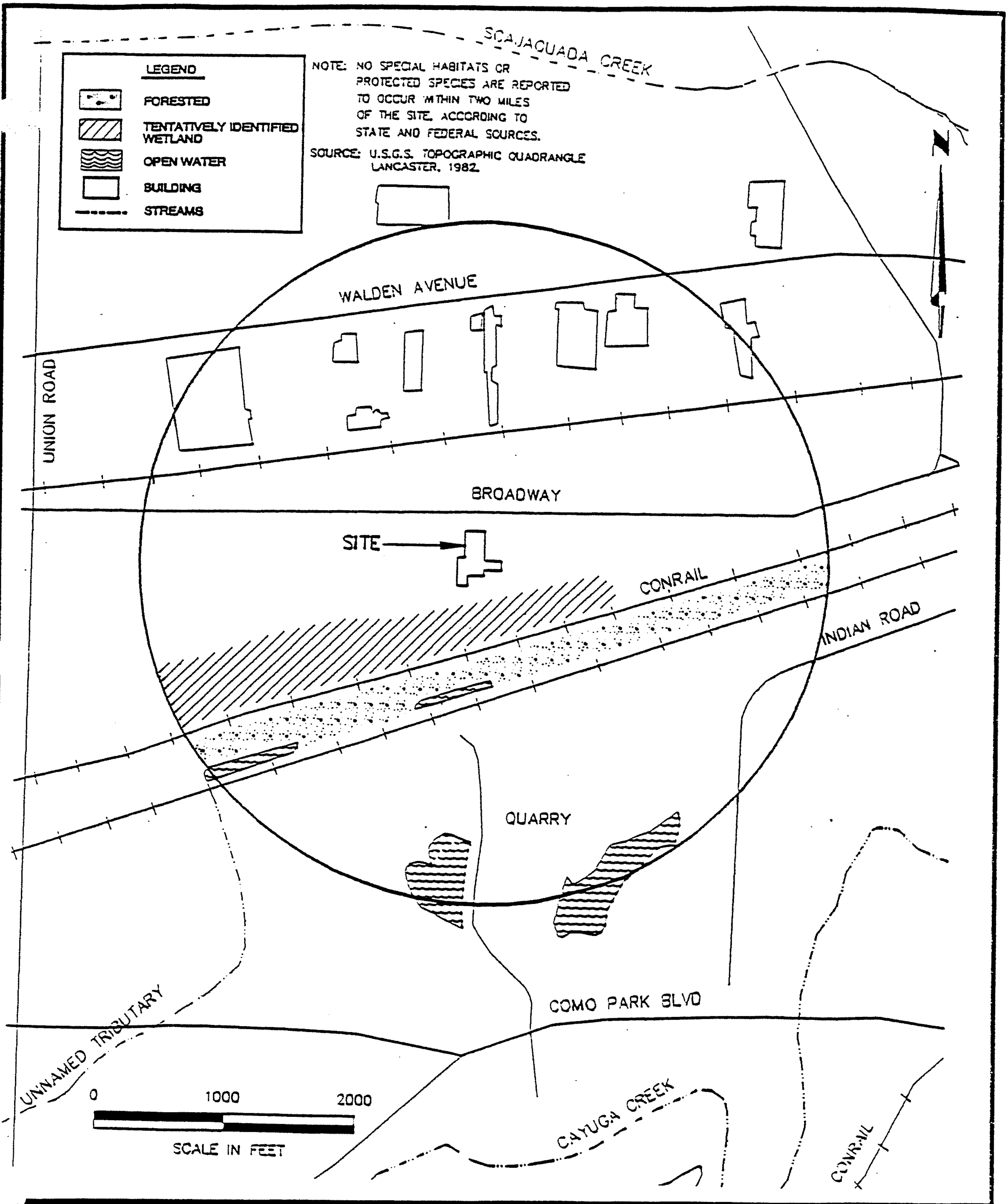


FIGURE 18



NOTE: NO SPECIAL HABITATS OR PROTECTED SPECIES ARE REPORTED TO OCCUR WITHIN TWO MILES OF THE SITE, ACCORDING TO STATE AND FEDERAL SOURCES.

SOURCE: U.S.G.S. TOPOGRAPHIC QUADRANGLE LANCASTER, 1982.

CAPSULE
ENVIRONMENTAL ENGINEERING INC.
1970 OAKCREST AVENUE, SUITE 215
ST. PAUL, MINNESOTA 55113
(612) 636-2644

THE ARO CORPORATION
BUFFALO, NEW YORK

VEGETATIVE COVERTYPE MAP - HALF MILE RADIUS

DATE: APRIL 1994 | FIGURE: 18

TABLES

TABLE 1
RESULTS OF PREVIOUS SOIL SAMPLE ANALYSES
ARO - BUFFALO, NEW YORK
LAW ENVIRONMENTAL PROJECT NO. 52-2507

Sample No.	Depth	TCE	Trans DCE	DCE	VC	Ba	Cd	Cr	Cu	Pb	Ni	Zn	Date
MP-1	0.5'	0.79	N/D	---	---	---	---	---	---	---	---	---	01-90
MP-1	1'	7.6	N/D	---	---	---	---	---	---	---	---	---	01-90
MP-2	2'	1.63	N/D	---	---	36.2	0.5	9.5	19	11.2	18.4	56.5	01-90
MP-3	2'	0.19	0.18	---	---	52.3	5.2	19.7	36.2	15.8	25.3	73.5	01-90
M-1	Composite	---	---	---	---	23.9	21.7	8.4	26.1	85.2	18.4	77.5	01-90
A-1	1'	9.7	0.25	---	---	---	---	---	---	---	---	---	03-90
A-1	1'	3.1	BPQL	---	---	30	1.1	9.7	48	28	21	64	03-90
A-3	3'	BPQL	1.7	---	---	72	1.2	17	23	28	30	83	03-90
A-5	5'	0.30	0.91	---	---	67	1.2	14	14	33	16	63	03-90
B-1	1'	1.5	0.76	---	---	29	<0.7	36	29	22	21	73	03-90
B-3	3'	0.38	3.8	---	---	56	0.79	28	23	32	20	79	03-90
B-5	5'	BPQL	0.77	---	---	---	---	---	---	---	---	---	03-90
C-1	1'	4.8	0.30	---	---	19	0.84	7.5	26	25	19	63	03-90
C-3	3'	BPQL	BPQL	---	---	130	1.1	18	30	36	21	110	03-90
C-5	5'	0.20	BPQL	---	---	---	---	---	---	---	---	---	03-90
D-1	1'	1.2	N/D	---	---	16	0.62	6.7	19	21	17	47	03-90
D-3	3'	BPQL	BPQL	---	---	---	---	---	---	---	---	---	03-90

Sample No.	Depth	TCE	Trans DCE	DCE	VC	Ba	Cd	Cr	Cu	Pb	Ni	Zn	Date
D-5	5'	0.4	BPQL	---	---	---	---	---	---	---	---	---	03-90
E-1	1'	BPQL	N/D	---	---	59	0.88	14	25	25	25	79	03-90
E-3	3'	BPQL	0.93	---	---	97	0.91	19	14	17	19	18	03-90
E-5	5'	0.31	BPQL	---	---	---	---	---	---	---	---	---	03-90
F-1	1'	1.7	7.7	---	---	110	1.2	17	36	29	23	110	03-90
F-3	3'	0.62	3.0	---	---	---	---	---	---	---	---	---	03-90
F-5	5'	0.46	0.79	---	---	---	---	---	---	---	---	---	03-90
J-1	1'	91	0.53	---	---	32	0.63	110	30	27	25	100	03-90
J-3	3'	96	2.5	---	---	---	---	---	---	---	---	---	03-90
J-5	5'	41	2.1	---	---	---	---	---	---	---	---	---	03-90
K-1	1'	0.27	N/D	---	---	35	<0.6	12	30	18	22	70	03-90
K-3	3'	BPQL	N/D	---	---	---	---	---	---	---	---	---	03-90
K-5	5'	BPQL	N/D	---	---	---	---	---	---	---	---	---	03-90
L-1	1'	10	0.42	---	---	26	0.84	8.3	30	37	14	66	03-90
L-3	3'	3.9	14	---	---	---	---	---	---	---	---	---	03-90
L-5	5'	3.2	8.0	---	---	---	---	---	---	---	---	---	03-90
M-1	1'	0.33	N/D	---	---	32	0.65	11	38	30	25	79	03-90
Z-1	1'	7.0	BPQL	---	---	---	---	---	---	---	---	---	05-90
Z-1	5'	95	6.6	---	---	---	---	---	---	---	---	---	05-90

Sample No.	Depth	TCE	Trans DCE	DCE	VC	Ba	Cd	Cr	Cu	Pb	Ni	Zn	Date
Z-2	1'	12	2.5	---	---	---	---	---	---	---	---	---	05-90
Z-2	5'	0.45	0.23	---	---	---	---	---	---	---	---	---	05-90
Z-3	5'	0.93	0.41	---	---	---	---	---	---	---	---	---	05-90
Z-4	1'	8.3	1.1	---	---	---	---	---	---	---	---	---	05-90
Z-4	5'	2.4	28	---	---	---	---	---	---	---	---	---	05-90
MW-4	15.8'	N/D	---	N/D	---	---	---	---	---	---	---	---	12-90
MW-5	23'	0.0008	---	N/D	---	---	---	---	---	---	---	---	12-90
MW-6	15'	0.035	---	0.003	---	---	---	---	---	---	---	---	12-90
MW-7	0' to 5'	N/D	---	N/D	N/D	---	---	---	---	---	---	---	01-91
MW-7	18' to 20'	N/D	---	N/D	N/D	---	---	---	---	---	---	---	01-91
MW-8	15' to 17'	N/D	---	N/D	N/D	---	---	---	---	---	---	---	01-91
MW-9	22.5'	N/D	---	N/D	N/D	---	---	---	---	---	---	---	01-91
MW-9	23'	N/D	---	N/D	N/D	---	---	---	---	---	---	---	01-91
MW-10	22'	0.055	---	0.57	0.045	---	---	---	---	---	---	---	12-90
MW-10	22.5'	0.0006	---	0.027	0.001	---	---	---	---	---	---	---	12-90
MW-13	23'	0.088	---	0.014	N/D	---	---	---	---	---	---	---	01-91
MW-14	19'	N/D	---	N/D	N/D	---	---	---	---	---	---	---	01-91
LF1-10	3'	N/D	---	N/D	---	---	---	---	---	---	---	---	10-90
LF1-10	7'	N/D	---	N/D	---	---	---	---	---	---	---	---	10-90

Sample No.	Depth	TCE	Trans DCE	DCE	VC	Ba	Cd	Cr	Cu	Pb	Ni	Zn	Date
LF1-11	5'	N/D	---	N/D	---	---	---	---	---	---	---	---	10-90
LF1-12A	3'	N/D	---	N/D	---	---	---	---	---	---	---	---	10-90
LF1-12B	3'	N/D	---	N/D	---	---	---	---	---	---	---	---	10-90
AP-14	N/R	N/D	---	N/D	---	---	---	---	---	---	---	---	10-90
NWP-18	N/R	N/D	---	N/D	---	---	---	---	---	---	---	---	10-90
SS-8	N/R	N/D	---	N/D	---	---	---	---	---	---	---	---	11-90
SS-9	N/R	N/D	---	N/D	---	---	---	---	---	---	---	---	11-90
SS-10	N/R	N/D	---	N/D	---	---	---	---	---	---	---	---	11-90
SS-11	N/R	0.001	---	N/D	---	---	---	---	---	---	---	---	11-90
SS-13	N/R	0.86	---	0.19	---	---	---	---	---	---	---	---	11-90
SS-14	N/R	N/D	---	N/D	---	---	---	---	---	---	---	---	11-90
SS-15	N/R	N/D	---	N/D	---	---	---	---	---	---	---	---	11-90
SS-22	N/R	N/D	---	N/D	---	---	---	---	---	---	---	---	11-90

TCE = Trichloroethylene
Trans-DCE = Trans-dichloroethylene
DCE = Dichloroethylene
VC = Vinyl Chloride
BPQL = Below Practical Quantitation Limit
N/R = Not Reported
N/D = Not Detected

All Analytical Values measured in Parts Per Million.

TABLE 2
RESULTS OF PREVIOUS GROUND-WATER SAMPLE ANALYSES
ARO - BUFFALO, NEW YORK
LAW ENVIRONMENTAL PROJECT NO. 52-2507

Monitoring Well	Date	TCE	DCE	VC
MW-1	10-90	N/D	N/D	---
	02-91	N/D	N/D	N/D
MW-2	10-90	12,000	N/D	---
	02-91	4,300	1,700	34
MW-3	10-90	1,300,000	---	---
	01-91	720,000	2,100	64
	02-91	740,000	---	---
MW-4	12-90	N/D	N/D	---
	01-91	7	N/D	N/D
	02-91	N/D	N/D	N/D
MW-5	12-90	1	N/D	---
	01-91	2	N/D	N/D
	02-91	N/D	N/D	N/D
MW-6	12-90	37,000	1,300	---
	01-91	32,000	1,300	240
	02-91	31,000	1,300	N/D
MW-7	01-91	17	1	N/D
	02-91	N/D	N/D	N/D
MW-8	01-91	2	N/D	N/D
	02-91	N/D	N/D	N/D
MW-9	01-91	N/D	N/D	N/D
	02-91	N/D	N/D	N/D
MW-10	12-90	150	1,700	---
	01-91	54	800	12
	02-91	31	830	N/D
MW-11	01-91	9,000	2,300	92
	02-91	28,000	6,300	230
MW-13	01-91	3,400	2,400	13
	02-91	7,200	4,600	N/D
MW-14	01-91	6	0.5	N/D
	02-91	0.6	N/D	N/D

Monitoring Well	Date	TCE	DCE	VC
LF1-10	10-90	N/D	N/D	---
LF1-11	10-90	N/D	N/D	---
LF1-12	10-90	N/D	N/D	---
LF2-3	10-90	N/D	N/D	---
NDP-13	10-90	2,500	N/D	---
NWP-18	10-90	N/D	N/D	---
AW-1	11-90	1,400	1,600	66
AW-2	11-90	0.7	N/D	---
AW-3	11-90	N/D	N/D	---
AW-4	11-90	N/D	N/D	---
AW-5	11-90	N/D	N/D	---
AW-8	11-90	0.5	0.4	---
AW-9	11-90	N/D	N/D	---
AW-10	11-90	N/D	N/D	---
AW-11	11-90	N/D	N/D	---
AW-12	11-90	N/D	310	35
AW-13	11-90	34,000	7,400	---
AW-22	11-90	N/D	N/D	---

TCE = Trichloroethylene
DCE = Dichloroethylene
VC = Vinyl Chloride
N/D = Not Detected

All Analytical Values measured in Parts Per Billion.

TABLE 3
PREVIOUS GC FIELD SCREENING RESULTS
ARO - BUFFALO, NEW YORK
LAW ENVIRONMENTAL PROJECT NO. 52-2507

LEACHFIELD #2			
LF2-1	Vinyl Chloride Trans DCE	1026 PPB 228.9 PPB	Vapor Point 7.5'
LF2-2	Vinyl Chloride Trans DCE	4731 PPB 513 PPB	Vapor Point 8.5'
LF2-3	Vinyl Chloride Trans DCE	4992 PPB 444.6 PPB	Vapor Point 7.5'
LF2-5	Vinyl Chloride Trans DCE	3599 PPB 282.7 PPB	Vapor Point 10'
LF2-6	Vinyl Chloride Trans DCE	2062 PPB 619.5 PPB	Vapor Point 10.5'
LF2-7	Vinyl Chloride Trans DCE TCE	1901 PPB 326.5 PPB 11.27 PPB	Vapor Point 7.5'
LF2-8	Vinyl Chloride Trans DCE	869.8 PPB 96.13 PPB	Vapor Point 10'
LF2-9	Vinyl Chloride Trans DCE	767.4 PPB 120.5 PPB	Vapor Point 8.0'
SAMPLE COLLECTION ON NEIGHBORING PROPERTY			
NDP-13	Vinyl Chloride Trans DCE	205.9 PPB 2891 PPB	Composite Head Space 0-5'
AP-14	Vinyl Chloride Trans DCE	1122 PPB 178 PPB	Composite Head Space 0-10'
NPSB-16	Vinyl Chloride Trans DCE	N/D N/D	Composite Head Space 0-7'
NDP-20	Vinyl Chloride Trans DCE	647 PPB 16 PPB	Composite Head Space 0-7'
BACKGROUND SAMPLES			
BW-23	Vinyl Chloride 1,1,1 TCA	146 PPB 45.86 PPB	Vapor Point 3'
PL-22	Vinyl Chloride 1,1,1 TCA	3100 PPB 502400	Vapor Point 3.5'

METAL PREPARATION ROOM			
TG-1	Vinyl Chloride Trans DCE TCE	90.17 PPB 3400 PPB 382500 PPM	Vapor Point 5.0'
TG-2	Trans DCE TCE	221.3 PPB 32.8 PPB	Vapor Point 7.0'
TB-3	Vinyl Chloride Trans DCE TCE	791 PPB 33 PPB 654.7 PPB	Vapor Point 3.0'
MACHINE SHOP			
MS-4	Vinyl Chloride 1,1,1 TCA Trans DCE TCE	94.8 PPB 263200 PPB 39.21 PPB 6240 PPB	Vapor Point 3.0'
MS-5	Trans DCE	6100 PPB	Vapor Point 3.0'
AP-21	Vinyl Chloride Trans DCE	314 PPB 39 PPB	Vapor Point 7.5'
MW2-19	Vinyl Chloride TCE Toluene	1500 PPB 922 PPB 37 PPB	Vapor Point 5.0'
Ambient Air	N/D		

TCE = Trichloroethylene
DCE = Dichloroethylene
N/D = Compounds analyzed for were not present

NOTE: This was used only as a screening method, because the GC has a high potential of error, the results do not reflect true values. Values present are for screening purposes only and are not considered.

TABLE 4
RESULTS OF PREVIOUS HEAD-SPACE ANALYSES
ARO - BUFFALO, NEW YORK
LAW ENVIRONMENTAL PROJECT NO. 52-2507

SAMPLE ID NO.	SAMPLE DEPTH	DATE OF SAMPLING	H-NU RESULTS	DATE OF ANALYSIS
MW-7	0-5'	1/9/91	20	1/9/91
	5'-7'	1/9/91	19	1/9/91
	10'-12'	1/9/91	13	1/9/91
	15'-17'	1/9/91	18	1/9/91
MW-8	2'-4'	1/9/91	32	1/10/91
	4'-6'	1/9/91	30	1/10/91
	6'-8'	1/9/91	29	1/10/91
	8'-10'	1/9/91	25	1/10/91
	10'-12'	1/9/91	28	1/10/91
MW-9	5'-7'	1/10/91	4	1/10/91
	10'-12'	1/10/91	12	1/10/91
	12'-14'	1/10/91	18	1/10/91
	14'-16'	1/10/91	9	1/10/91
	16'-18'	1/10/91	10	1/10/91
	18'-20'	1/10/91	11	1/10/91
	20'-22'	1/10/91	8	1/10/91
	22'-23.5'	1/10/91	19	1/10/91
MW-11	0-2'	1/10/91	160	1/10/91
	2'-4'	1/10/91	700	1/10/91
	4'-6'	1/10/91	1090	1/10/91
	6'-8'	1/10/91	890	1/10/91
	8'-10'	1/10/91	525	1/10/91
	10'-12'	1/10/91	30	1/10/91
	12'-14'	1/10/91	90	1/10/91
	14'-16'	1/10/91	32	1/10/91
	16'-17.5'	1/10/91	15	1/10/91
MW-13	5'-7'	1/7/91	875	1/9/91
	10'-12'	1/7/91	110	1/9/91
	15'-17'	1/7/91	16	1/9/91
MW-14	5'-7'	1/8/91	15	1/9/91
	10'-12'	1/8/91	40	1/9/91
	15'-17'	1/8/91	25	1/9/91

TABLE 5
MONITORING WELL AND WELL POINT CONSTRUCTION DATA
ARO - BUFFALO, NEW YORK
LAW ENVIRONMENTAL PROJECT NO. 52.2507

Monitoring Well/ Well Point No.	Year Installed	Total Boring Depth (ft)	Depth to Top of Bedrock (ft)	Depth of Screened Interval (ft)	Sand Pack Interval (ft)	Riser Length (ft)	Total Well Depth (ft)	Well Material	Datum Elevation	Ground Elevation	Comments
Bedrock Wells:											
MW-3R	1992	42.0	24.4	34.0 - 44.0	30.0 - 42.0	36.1	44.1	2-inch ID PVC	654.31	652.2	Extended riser
MW-4R	1992	42.4	23.0	33.0 - 43.0	31.0 - 42.0	34.9	44.1	2-inch ID PVC	653.73	651.8	Extended riser
MW-14R	1992	42.8	23.6	30.7 - 40.7	28.0 - 42.8	32.7	43.4	2-inch ID PVC	654.55	652.6	Extended riser
Overburden Wells:											
MW-1	1990	27.0	27.0	17.0 - 27.0	15.0 - 27.0	18.8	27.0	2-inch ID PVC	657.47	655.72	Extended riser
MW-2	1990	20.5	--	8.5 - 19.5	6.5 - 18.5	10.3	19.5	2-inch ID PVC	654.07	652.25	Extended riser
MW-3 (Replacement)	1992	24.0	24.0	19.0 - 23.7	18.0 - 24.0	20.0	25.0	2-inch Stainless	652.99	652.0	Extended riser
MW-4	1990	15.8	--	5.8 - 15.8	3.0 - 16.0	9.9	15.8	2-inch ID PVC	656.10	652.01	Extended riser
MW-5	1990	23.0	23.0	13.0 - 23.0	9.0 - 23.0	16.3	23.0	2-inch ID PVC	656.12	652.87	Extended riser
MW-6	1990	15.0	--	5.0 - 15.0	3.5 - 15.0	4.6	15.0	2-inch ID PVC	651.26	651.68	Flush mount
MW-7	1991	19.5	--	14.0 - 19.0	13.0 - 19.0	17.5	19.0	2-inch ID PVC	654.89	651.43	Extended riser
MW-8	1991	17.0	--	7.0 - 17.0	4.0 - 17.0	8.2	17.0	2-inch ID PVC	652.23	651.02	Extended riser
MW-9	1991	24.0	23.5	18.5 - 23.5	13.0 - 23.5	19.8	23.5	2-inch ID PVC	653.16	651.85	Extended riser
MW-10	1990	22.5	22.5	12.0 - 22.0	7.0 - 22.0	11.6	23.0	2-inch ID PVC	652.11	652.52	Flush mount
MW-11	1991	17.5	--	7.5 - 12.5	4.0 - 12.5	7.0	12.5	2-inch ID PVC	652.62	653.08	Flush mount
MW-13	1991	23.0	--	13.0 - 23.0	7.0 - 23.0	12.6	23.0	2-inch ID PVC	652.68	653.05	Flush mount
MW-14	1991	19.5	--	9.0 - 19.0	6.0 - 19.0	12.7	19.0	2-inch ID PVC	655.85	652.19	Extended riser
MW-15	1992	25.3	25.3	20.0 - 25.0	19.3 - 25.3	22.4	25.2	2-inch ID PVC	655.97	653.6	Extended riser
MW-16	1992	21.3	21.3	16.3 - 21.1	14.5 - 21.3	18.5	21.2	2-inch ID PVC	652.48	650.3	Extended riser
MW-17	1992	24.3	24.3	19.0 - 24.0	18.1 - 24.3	18.5	24.3	2-inch ID PVC	652.68	653.2	Flush mount
MW-18	1992	23.1	23.1	15.9 - 23.1	15.0 - 23.1	15.7	23.1	2-inch ID PVC	651.23	651.4	Flush mount
MW-19	1992	21.8	21.8	14.4 - 21.2	12.0 - 21.8	16.7	21.2	2-inch ID PVC	653.26	651.0	Extended riser
MW-20	1992	22.3	22.3	13.0 - 23.0	11.0 - 23.3	15.0	23.8	2-inch ID PVC	654.45	652.4	Extended riser

NOTES: "--" Boring terminated above top-of-bedrock surface.
\TABLE-5.WQ1

TABLE 5
MONITORING WELL AND WELL POINT CONSTRUCTION DATA
ARO - BUFFALO, NEW YORK
LAW ENVIRONMENTAL PROJECT NO. 52.2507

Monitoring Well/ Well Point No.	Year Installed	Total Boring Depth (ft)	Depth to Top of Bedrock (ft)	Depth of Screened Interval (ft)	Sand Pack Interval (ft)	Riser Length (ft)	Total Well Depth (ft)	Well Material	Datum Elevation	Ground Elevation	Comments
Points:											
OW-101	1992	6.7	--	4.0 - 6.0	2.0 - 6.7	3.7	6.7	Stainless Steel	652.70	653.0	Flush mount
OW-102	1992	5.3	--	2.8 - 4.8	2.8 - 5.3	2.5	5.3	Stainless Steel	651.47	651.8	Flush mount
OW-103	1992	3.1	--	0.4 - 2.4	0.1 - 3.1	0.2	3.1	Stainless Steel	651.17	651.35	Flush mount
Test Boring:											
B-1	1992	28.0	27.4	NA	NA	NA	NA	NA	NA	NA	NA

NOTES:

-- - Boring terminated above top-of-bedrock surface.
NA - Not Applicable

\TABLE-5.WQ1

TABLE 6
RESULTS OF HEAD-SPACE ANALYSES
ARO - BUFFALO, NY
SEPTEMBER 1992
LAW ENVIRONMENTAL PROJECT NO. 52.2507

SAMPLE INTERVAL (feet)	B-1	MW-3R	MW-4R	MW-14R	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20
0-2	0	1	4	3	*	0	*	3	4	1.5
2-4	0	3	4	32	1	0	3	5	1.5	2
4-6	0	80	2	20	*	0	7	4	*	1
6-8	0	250	3	15	<1	1	9	3	4	4
8-10	0	240	4	35	<1	12	5	7	9	10
10-12	0	250	3	13.5	<1	3	5	4	7	5
12-14	*	75	3	16.5	<1	13	5	6	*	60
14-16	0.1	350	3	11	*	3	7	*	*	30
16-18	3.0	300	8 (1)	10	<1	2	4	5	1.5	12
18-20	2.8	300	5 (2)	18	*	2	5	8	1.5	6
20-22	2.5	350	5	2	<1	2	4	*	1	4
22-24	3.0	300	5	3	<1	--	*	5	--	4
24-26	3.0	300 (3)	--	10 (3)	<1	--	--	--	--	--
26-28	2.5	--	--	--	--	--	--	--	--	--

NOTES:

(1) Sample obtained from 15'-17' interval
(2) Sample obtained from 17'-19' interval
(3) Sample obtained from 23'-23.5' interval
* Indicates very limited or no sample recovery
-- Indicates that the soil boring did not extend to this depth

HNu Photoionization Detector (PID) readings indicate total ionizable compounds in parts per million (ppm). The HNu PID model 101 with an 11.7 eV bulb was calibrated to an isobutylene standard.

TABLE 6
RESULTS OF HEAD-SPACE ANALYSES
ARO - BUFFALO, NY
SEPTEMBER 1992
LAW ENVIRONMENTAL PROJECT NO. 52.2507

SAMPLE INTERVAL (feet)	SB101	SB102	SB103	SB104	SB105	SB106
Concrete Core	3	14	0	0	0	0
1-3	1	3	0	0	0	0
3-5	1	4	*	0	0	0
5-7	0	4	1	1	0	0
7-9	--	--	--	--	0	--

NOTES:
* Indicates very limited or no sample recovery
-- Indicates that the soil boring did not extend to this depth

HNu Photoionization Detector (PID) readings indicate total ionizable compounds in parts per million (ppm). The HNu PID model 101 with an 11.7 eV bulb was calibrated to an isobutylene standard.

\TABLE-6.WQ1

TABLE 7
MONITORING WELL DEVELOPMENT MEASUREMENTS
ARO - BUFFALO, NEW YORK
JUNE 1992
LAW ENVIRONMENTAL PROJECT NO. 52.2507

	MW-3	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20
pH (S.U.)							
Initial	9.1	11.2	NA	6.2	12.9	10.6	8.2
Intermediate	9.1	10.4	NA	7.8	12.0	8.6	8.2
Final	9.2	8.9	NA	7.3	11.8	7.2	7.3
TEMPERATURE (Celsius)							
Initial	20.0	21.0	NA	18.0	22.0	16.0	17.0
Intermediate	17.0	18.0	NA	15.0	18.0	15.0	17.0
Final	15.2	15.0	NA	18.0	16.0	15.0	13.0
SPECIFIC CONDUCTANCE (umhos/cm)							
Initial	150	500	NA	30	800	265	120
Intermediate	60	200	NA	80	40	100	50
Final	100	65	NA	40	40	55	40
TURBIDITY (NTUs)							
Initial	154	139	NA	140	<200	<200	<200
Final	55	33	NA	165	80	31	37

NOTES: NA - Not available; data not obtained due to low well yield

\TABLE-7.WQ1

TABLE 8
RESULTS OF VOC ANALYSES OF SOIL SAMPLES
ARO - BUFFALO, NEW YORK
LAW ENVIRONMENTAL PROJECT NO. 52.2507

COMPOUND	NYSDEC TCLP ALTERNATIVE GUIDANCE VALUES (ppb)	Results in ug/kg WELL NUMBER (Depth in feet)																	
		✓ MW-3R					✓ MW-15		✓ MW-16			✓ MW-17		✓ MW-18		✓ MW-19		✓ MW-20	
		(4-6)	(7-8)	(11.5-12)	(20-20.7)	(24-24.5)	(12-14)	(24-26)	(6-8)	(8-10)	(20-22)	(6-8)	(18-22)	(8-10)	(22-24)	(6-8)	(18-20)	(12-14)	(22-24)
Chloromethane	100	<1400	<1400	<11	3(J)	<11	<11	<10	<11	<11	<11	0.7(J)	0.4(J)	0.5(J)	0.5(J)	<11	0.4(J)	<10	<11
Bromomethane	100	<1400	<1400	<11	<11	<11	<11	<10	<11	<11	<11	2(J)	<10(B)	0.9(J)	<10	0.6(J)	<11	<10	<11
Vinyl Chloride	40	<1400	<1400	<11	2(J)	<11	<11	<10	<11	<11	<11	14	<11	<11	<10	<11	<11	<10	<11
Chloroethane	100	<1400	<1400	<11	<11	<11	<11	<10	<11	<11	<11	<11	<11	<11	<10	<11	<11	<10	<11
Methylene Chloride	100	<720	<710	<6(B)	<5(B)	<5(B)	<5(B)	<5	<5(B)	<5	<5(B)	<1(B)	<5(B)	<5(B)	<5(B)	<6(B)	<5(B)	<5(B)	<5(B)
Acetone	NA (1)	<1400	<1400	<11(B)	<11(B)	14	<11	11	10(J)	<11	<11	22(B)	9(J)	<10(B)	<10(B)	<11(B)	<11	9(J)	6(J)
Carbon Disulfide	NA	<720	<710	<6	7	<5	<5	<5	<6	<5	<5	<5	1(J)	<5	1(J)	<6	<5	<5	<5
1,1 Dichloroethene	100	<720	<710	<6	5(J)	<5	<5	<5	<6	<5	<5	2(J)	<5	<5	<5	<6	<5	<5	<5
1,1 Dichloroethane	100	<720	<710	<6	<5	<5	<5	<5	<6	<5	<5	<5	<5	<5	<5	<6	<5	<5	<5
1,2 Dichloroethene (Total)	100	230(J)	280(J)	17	39	<5	<5	<5	<6	140	<5	420(D)	<5	<5	<5	28	0.5(J)	16	<5
Chloroform	140	<720	<710	2(J)	<5	<5	<5	<5	<6	<5	<5	<5	<5	<5	<5	<6	<5	<5	<5
1,2-Dichloroethane	100	<720	<710	<6	<5	<5	<5	<5	<6	<5	<5	<5	<5	<5	<5	<6	<5	<5	<5
2 Butanone	NA	<1400	<1400	<6(B)	<5(B)	<11	<11	<10	<11	<11	<11	<11	<11	<11	<10	3(J)	<11	<10	<11
1,1,1 Trichloroethane	100	<720	<710	<6	<5	<5	<5	<5	<6	<5	<5	0.8(J)	<5	<5	<5	<6	<5	<5	<5
Carbon Tetrachloride	100	<720	<710	<6	<5	<5	<5	<5	<6	<5	<5	<5	<5	<5	<5	<6	<5	<5	<5
Vinyl Acetate	NA	<1400	<1400	<11	<11	<11	<11	<10	<11	<11	<11	<11	<11	<11	<10	<11	<11	<10	<11
Bromodichloromethane	1000	<720	<710	<6	<5	<5	<5	<5	<6	<5	<5	<5	<5	<5	<5	<6	<5	<5	<5
1,2-Dichloropropane	100	<720	<710	<6	<5	<5	<5	<5	<6	<5	<5	<5	<5	<5	<5	<6	<5	<5	<5
cis-1,3-Dichloropropene	100	<720	<710	<6	<5	<5	<5	<5	<6	<5	<5	<5	<5	<5	<5	<6	<5	<5	<5
Trichloroethene	100	5800(D)	43000(D)	20000(D)	250000(D)	230	<5	<5	<6	4900(D)	<5	2400(D)	2(J)	0.7(J)	0.4(J)	220(D)	9	3500(D)	<5
Dibromochloromethane	1000	<720	<710	<6	<5	<5	<5	<5	15	<5	<5	<5	<5	<5	<5	<6	<5	<5	<5
1,1,2-Trichloroethane	100	<720	<710	<6	<5	<5	<5	<5	<6	<5	<5	4(J)	<5	<5	<5	1(J)	<5	<5	<5
Benzene	14	<720	<710	<6	<5	<5	<5	<5	<6	<5	<5	1(J)	0.3(J)	0.8(J)	0.8(J)	0.7(J)	1(J)	<5	<5
Trans-1,3 Dichloropropene	100	<720	<710	<6	<5	<5	<5	<5	<6	<5	<5	<5	<5	<5	<5	<6	<5	<5	<5
Bromoform	1000	<720	<710	<6	<5	<5	<5	<5	<6	<5	<5	<5	<5	<5	<5	<6	<5	<5	<5
4 Methyl-2-Pentanone	NA	<1400	<1400	<11	<11	<11	<11	<10	<6	<11	<11	2(J)	<11	0.9(J)	<10	<11	<11	<10	<11
2 Hexanone	1000	<1400	<1400	<11	<11	<11	<11	<10	<11	<11	<11	3(J)	<11	<11	<10	<11	<11	<10	<11
Tetrachloroethene	100	<720	<710	<6	0.6(J)	<5	<5	<5	<11	<5	<5	<5	<5	<5	<5	<6	<5	<5	<5
1,1,2,2-Tetrachloroethane	100	<720	<710	<6	<5	<5	<5	<5	<6	<5	<5	<5	<5	<5	<5	<6	<5	<5	<5
Toluene	100	<720	<710	<6	<5	<5	<5	<5	<6	<5	<5	<5(B)	<5(B)	<5(B)	<5(B)	<6(B)	<5(B)	6	<5
Chlorobenzene	100	<720	<710	<6	<5	<5	<5	<5	<6	<5	<5	<5	<5	<5	<5	<6	<5	<5	<5
Ethylbenzene	100	<720	<710	<6	<5	<5	<5	<5	<6	<5	<5	<5	0.2(J)	<5	<5	<6	<5	2(J)	<5
Styrene	100	<720	<710	<6	<5	<5	<5	<5	<6	<5	<5	0.08(J)	0.2(J)	<5	<5	<6	<5	<5	<5
Total Xylenes	100	<720	<710	<6	<5	<5	<5	<5	<6	<5	<5	0.5(J)	2(J)	0.3(J)	1(J)	<6	1(J)	4(J)	<5
TENTATIVELY IDENTIFIED COMPOUNDS																			
Oxygenated compound		..	..	..	..	..	..	..	..	..	..	12	..	11	..	..	14	..	..
Tetrahydrofuran		..	..	20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1,1,2 Trichloro-1,2,2-Triflu		..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	13	..

NOTES: (1) "NA" indicates no TCLP Alternative Guidance Value available.

Explanation of Organic Data Qualifiers:

- (J) Estimated value below required detection limit
- (B) Estimated detection limit; compound identified in laboratory blank
- (D) Value obtained from medium-level or dilution analysis
- (E) Estimated value due to instrument calibration or other problems

Analyses performed by Recra Environmental, Inc., using 1989 New York State Analytical Services Protocol
Data validation performed by C.C. Johnson & Malhotra, P.C.

\TABLE 8.WQ1

TABLE 8
RESULTS OF VOC ANALYSES OF
SOIL SAMPLES
ARO - BUFFALO, NEW YORK
LAW ENVIRONMENTAL PROJECT NO. 52.2507

Results in ug/kg

WELL NUMBER
(Depth in feet)

COMPOUND	NYSDEC TCLP ALTERNATIVE GUIDANCE VALUE (ppb)	SB101			SB102			SB103		SB104		SB105				SB106			SED-101	SED-102	SED 103
		(1-3)	(3-5)	(5-7)	(1-3)	(3-5)	(5-7)	(1-3)	(8-10)	(1-3)	(5-7)	(1-3)	(3-5)	(5-7)	(7-9)	(1-3)	(3-5)	(5-7)			
Chloromethane	100	0.5(J)	<11	<12	<11	<11	<11	<11	<12	0.6(J)	<13	0.5(J)	<11	<11	<11	<12	<12	<11	<23	3(J)	<28
Bromomethane	100	<11	<11	<12	<11	<11	<11	<11	<12	1(J)	<13	<12	<11	<11	2(J)	<12	<12	<11	<23	8(J)	<28
Vinyl Chloride	40	<11	3(J)	2(J)	<11	<11	<11	<11	40	<11	7(J)	37	<11	<11	<11	<12	0.7(J)	<11	<23	<15	<28
Chloroethane	100	<11	<11	<12	<11	<11	<11	<11	<12	<11	<13	<12	<11	<11	<11	<12	<12	<11	<23	<15	<28
Methylene Chloride	100	<5(B)	<5(B)	<5(B)	<5(B)	<5(B)	<5(B)	<5(B)	<5(B)	<5(B)	<5(B)	<5(B)	<5(B)	<5(B)	<5(B)	<5(B)	<5(B)	<5(B)	<12(B)	<8(B)	<14(B)
Acetone	NA (1)	<12(B)	62	24	13	42	86	85	29	26	130	65	<82(B)	15(B)	11(J)	44	24	50	52	25	48
Carbon Disulfide	NA	<5	1(J)	<6	<5	<6	<6	<5	<6	<5	2(J)	2(J)	<6	<6	<6	<6	<6	<6	<12	<8	<14
1,1 Dichloroethene	100	<5	<6	<6	<5	<6	<6	<5	0.7(J)	<5	<7	<6	<6	<6	<6	<6	<6	<6	<12	<8	<14
1,1 Dichloroethane	100	<5	<6	<6	<5	<6	<6	<5	<6	<5	<7	<6	<6	<6	<6	<6	<6	<6	<12	<8	<14
1,2 Dichloroethene (Total)	100	3(J)	47	40	2(J)	2(J)	3(J)	<5	230(E)	15	59	95	0.5(J)	2(J)	8	11	14	12	<12	<8	5(J)
Chloroform	140	<5	<6	<6	<5	<6	<6	<5	<6	<5	<7	<6	<6	<6	<6	<6	<6	<6	<12	<8	<14
1,2 Dichloroethane	100	<5	<6	<6	<5	<6	<6	<5	<6	<5	<7	<6	<6	<6	<6	<6	<6	<6	<12	<8	<14
2 Butanone	NA	1(J)	13	5(J)	0.3(J)	4(J)	4(J)	3(J)	<12	<11	28	16	9(J)	<11	<11	2(J)	<12	3(J)	<3	<15	<28
1,1,1 Trichloroethane	100	<5	<6	<6	<5	<6	<6	<5	<6	<5	<7	<6	<6	<6	<6	<6	<6	<6	<12	<8	<14
Carbon Tetrachloride	100	<5	<6	<6	<5	<6	<6	<5	<6	<5	<7	<6	<6	<6	<6	<6	<6	<6	<12	<8	<14
Vinyl Acetate	NA	<11	<11	<12	<11	<11	<11	<11	<12	<11	<13	<12	<11	<11	<11	<12	<12	<11	<23	<15	<28
Bromodichloromethane	1000	<5	<6	<6	<5	<6	<6	<5	<6	<5	<7	<6	<6	<6	<6	<6	<6	<6	<12	<8	<14
1,2 Dichloropropane	100	<5	<6	<6	<5	<6	<6	<5	<6	<5	<7	<6	<6	<6	<6	<6	<6	<6	<12	<8	<14
cis-1,3 Dichloropropene	100	<5	<6	<6	<5	<6	<6	<5	<6	<5	<7	<6	<6	<6	<6	<6	<6	<6	<12	<8	<14
Trichloroethene	100	290(D)	140	17	23	0.9(J)	1(J)	54	1500(D)	8	1(J)	0.8(J)	<6	<6	<6	14	1(J)	1(J)	<12	<8	<14
Dibromochloromethane	1000	<5	<6	<6	<5	<6	<6	<5	<6	<5	<7	<6	<6	<6	<6	<6	<6	<6	<12	<8	<14
1,1,2-Trichloroethane	100	<5	<6	<6	<5	<6	<6	<5	0.3(J)	<5	<7	<6	<6	<6	<6	<6	<6	<6	<12	<8	<14
Benzene	14	<5	0.6(J)	0.5(J)	0.4(J)	<6	0.3(J)	0.6(J)	0.5(J)	0.5(J)	1(J)	0.5(J)	<6(B)	<6(B)	<6	<6	<6	0.3(J)	<12	<8	<14
Trans-1,3-Dichloropropene	100	<5	<6	<6	<5	<6	<6	<5	<6	<5	<7	<6	<6	<6	<6	<6	<6	<6	<12	<8	<14
Bromoform	1000	<5	<6	<6	<5	<6	<6	<5	<6	<5	<7	<6	<6	<6	<6	<6	<6	<6	<12	<8	<14
4 Methyl-2 Pentanone	NA	0.8(J)	1(J)	1(J)	<11	<11	2(J)	3(J)	<12	1(J)	1(J)	2(J)	1(J)	<11	<11	<12	<12	2(J)	<23	<15	<28
2 Hexanone	1000	<11	<11	<12	<11	<11	<11	<11	<12	<11	<13	<12	0.9(J)	<11	<11	<12	<12	<11	<23	<15	<28
Tetrachloroethene	100	2(J)	<6	<6	<5	<6	<6	<5	<6	<5	<7	<6	<6	<6	<6	<6	<6	<6	<12	<8	<14
1,1,2,2-Tetrachloroethane	100	<5	<6	<6	<5	<6	<6	<5	<6	<5	<7	<6	<6	<6	<6	<6	<6	<6	<12	<8	<14
Toluene	100	<5(B)	2(J)	1(J)	0.4(J)	0.3(J)	0.5(J)	0.6(J)	0.9(J)	1(J)	2(J)	0.7(J)	<6(B)	<6(B)	0.4(J)	0.2(J)	0.3(J)	0.5(J)	<12	4(J)	<14
Chlorobenzene	100	<5	<6	<6	<5	<6	<6	<5	<6	<5	<7	<6	<6	<6	<6	<6	<6	<6	<12	<8	<14
Ethylbenzene	100	<5	0.2(J)	0.3(J)	<5	<6	<6	<5	<6	<5	0.2(J)	<6	<6	<6	<6	<6	<6	<6	<12	<8	<14
Styrene	100	<5	<6	<6	<5	<6	<6	<5	<6	<5	<7	<6	<6	<6	0.05(J)	<6	<6	<6	<12	<8	<14
Total Xylenes	100	0.6(J)	2(J)	1(J)	0.3(J)	0.3(J)	0.4(J)	0.4(J)	0.7(J)	1(J)	2(J)	0.5(J)	0.2(J)	<6	0.5(J)	<6	<6	0.3(J)	<12	<8	<14
TENTATIVELY IDENTIFIED COMPOUNDS																					
Ethane,1,1,2-Trichloro-1,2,2		19	--	--	--	--	--	23	11	9.3	--	--	--	--	--	--	--	--	--	--	--
Ethane,1,2-Dichloro-1,1,2-tr		--	--	--	--	--	--	--	9.1	--	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane		--	--	--	--	--	--	--	--	5.6	--	--	--	--	--	--	--	--	--	--	--
Unknown Oxygenated Compound		--	10	--	--	--	--	17	--	--	--	--	--	--	--	--	--	--	--	--	--
Unknown Hydrocarbon MW98		--	--	--	--	--	--	--	--	--	7.2	--	--	--	--	--	--	--	--	--	--
Unknown Cycloalkane MW126		--	--	--	--	--	--	--	--	--	6.7	--	--	--	--	--	--	--	--	--	--
Unknown Cycloalkane		--	--	--	--	--	--	--	--	--	8.8	--	--	--	--	--	--	--	--	--	--
Unknown Silane		--	--	--	3.7	6.1	--	--	--	--	--	16	--	--	--	--	8.9	--	--	--	--
Unknown 1		--	9.5	9.3	--	--	8.8	9.8	--	--	11	7.4	--	--	--	14	--	6.3	--	--	--
2		--	--	14	--	--	8.4	5.5	--	--	9.1	--	--	--	--	13	--	--	--	--	--
3		--	--	14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4		--	--	8.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

NOTES: (1) - "NA" indicates no TCLP Alternative Guidance Value available.

Explanation of Organic Data Qualifiers:

(J) - Estimated value below required detection limit
(B) - Estimated detection limit; compound identified in laboratory blank
(D) - Value obtained from medium-level or dilution analysis
(E) - Estimated value due to instrument calibration or other problems

Analyses performed by Recra Environmental, Inc., using 1989 New York State Analytical Services Protocol
Data validation performed by C.C. Johnson & Malhotra, P.C.

TABLE 9
RESULTS OF SEMI-VOLATILE ANALYSES OF SOIL SAMPLES
ARO - BUFFALO, NEW YORK
LAW ENVIRONMENTAL PROJECT NO. 52.2507

COMPOUND	NYSDEC ALTERNATIVE GUIDANCE VALUE (1) (ppm)	Results in ug/kg WELL NUMBER (Depth in Feet)								
		MW-3R (4-6)	MW-3R (20-20.7)	MW-15 (24-26)	MW-16 (6-8)	MW-18 (22-24)	SB101 (1-3)	SB102 (5-7)	SB103 (5-7)	SB105 (7-9)
Phenol	20	<760	<710	<690	<730	<690	<690	<750	<750	<760
Bis(2-Chloroethyl)Ether	20	<760	<710	<690	<730	<690	<690	<750	<750	<760
2-Chlorophenol	20	<760	<710	<690	<730	<690	<690	<750	<750	<760
1,3-Dichlorobenzene	100	<760	<710	<690	<730	<690	<690	<750	<750	<760
1,4-Dichlorobenzene	940	<760	<710	<690	<730	<690	<690	<750	<750	<760
Benzyl Alcohol	NA	<760	<710	<690	<730(E1)	<690(E1)	<690	<750	<750	<760
1,2-Dichlorobenzene	940	<760	<710	<690	<730	<690	<690	<750	<750	<760
2-Methylphenol	20	<760	<710	<690	<730	<690	<690	<750	<750	<760
Bis (2-Chloroisopropyl)Ether	NA	<760	<710	<690	<730	<690	<690	<750	<750	<760
4-Methylphenol	20	<760	<710	<690	<730	<690	<690	<750	<750	<760
N-Nitroso-Di-n-Propylamine	NA	<760	<710	<690	<730	<690	<690	<750	<750	<760
Hexachloroethane	100	<760	<710	<690	<730	<690	<690	<750	<750	<760
Nitrobenzene	100	<760	<710	<690	<730	<690	<690	<750	<750	<760
Isophorone	1000	<760	<710	<690	<730	<690	<690	<750	<750	<760
2-Nitrophenol	20	<760	<710	<690	<730	<690	<690	<750	<750	<760
2,4-Dimethylphenol	20	<760	<710	<690	<730	<690	<690	<750	<750	<760
Benzoic Acid	NA	<3700	<3400	<3300	<3500	<3400	<3300	<3600	<3600	<3700
Bis (2-Chloroethoxy)Methane	100	<760	<710	<690	<730	<690	<690	<750	<750	<760
2,4-Dichlorophenol	20	<760	<710	<690	<730	<690	<690	<750	<750	<760
1,2,4-Trichlorobenzene	100	<760	<710	<690	<730	<690	<690	<750	<750	<760
Naphthalene	200	<760	<710	<690	<730	<690	<690	<750	<750	<760
4-Chloroaniline	100	<760	<710	<690	<730	<690	<690	<750	<750	<760
Hexachlorobutadiene	100	<760	<710	<690	<730	<690	<690	<750	<750	<760
4-Chloro-3-Methylphenol	20	<760	<710	<690	<730	<690	<690	<750	<750	<760
2-Methylnaphthalene	100	<760	<710	<690	<730	<690	<690	<750	<750	<760
Hexachlorocyclopentadiene	100	<760	<710	<690	<730	<690	<690	<750	<750	<760
2,4,6-Trichlorophenol	20	<760	<710	<690	<730	<690	<690	<750	<750	<760
2,4,5-Trichlorophenol	20	<3700	<3400	<3300	<3500	<3400	<3300	<3600	<3600	<3700
2-Chloronaphthalene	200	<760	<710	<690	<730	<690	<690	<750	<750	<760
2-Nitroaniline	100	<3700	<3400	<3300	<3500	<3400	<3300	<3600	<3600	<3700
Dimethyl Phthalate	1000	<760	<710	<690	<730	<690	<690	<750	<750	<760
Acenaphthylene	NA	<760	<710	<690	<730	<690	<690	<750	<750	<760
2,6-Dinitrotoluene	100	<760	<710	<690	<730	<690	<690	<750	<750	<760
3-Nitroaniline	100	<3700	<3400	<3300	<3500	<3400	<3300	<3600	<3600	<3700
Acenaphthene	400	<760	<710	<690	<730	<690	<690	<750	<750	<760
2,4-Dinitrophenol	20	<3700	<3400	<3300	<3500	<3400	<3300	<3600	<3600	<3700
4-Nitrophenol	20	<3700	<3400	<3300	<3500	<3400	<3300	<3600	<3600	<3700
Dibenzofuran	NA	<760	<710	<690	<730	<690	<690	<750	<750	<760
2,4-Dinitrotoluene	100	<760	<710	<690	<730	<690	<690	<750	<750	<760
Diethylphthalate	1000	<760	<710	<690	180(J)	<690	160(J)	<750	210(J)	210(J)
4-Chlorophenyl-phenylether	NA	<760	<710	<690	<730	<690	<690	<750	<750	<760
Fluorene	1000	<760	<710	<690	<730	<690	<690	<750	<750	<760
4-Nitroaniline	100	<3700	<3400	<3300	<3500	<3400	<3300	<3600	<3600	<3700
4,6-Dinitro-2-Methylphenol	20	<3700	<3400	<3300	<3500	<3400	<3300	<3600	<3600	<3700
N-Nitrosodiphenylamine	1000	<760	<710	<690	<730	<690	<690	<750	<750	<760
4-Bromophenyl-phenylether	NA	<760	<710	<690	<730	<690	<690	<750	<750	<760
Hexachlorobenzene	7.0	<760	<710	<690	<730	<690	<690	<750	<750	<760
Pentachlorophenol	20	<760	<3400	<3300	<3500	<3400	<3300	<3600	<3600	<3700
Phenanthrene	1000	<760	<710	<690	<730	<690	<690	<750	<750	<760
Anthracene	1000	<760	<710	<690	<730	<690	<690	<750	<750	<760
Di-n-Butylphthalate	NA	<2300(B)	<3600(B)	<690(B)	<770(B)	<690(B)	<690(B)	<750	<750(B)	<840(B)
Fluoranthene	1000	<760	<710	<690	<730	<690	<690	<750	<750	<760
Pyrene	1000	<760	<710	<690	<730	<690	<690	<750	<750	<760
Butyl benzyl phthalate	1000	<760	<710	<690	<730	<690	<690	<750	<750	<760
3,3'-Dichlorobenzidine	100	<1500	<1400	<1400	<1500	<1400	<1400	<1500	<1500	<1500
Benz(a)Anthracene	0.04	<760	<710	<690	<730	<690	<690	<750	<750	<760
Chrysene	0.04	<760	<710	<690	<730	<690	<690	<750	<750	<760
Bis(2-Ethylhexyl)Phthalate	1000	440(J)	19000(D)	150(J)	<730	410(J)	<690	<750	360(J)	<760
Di-n-Octyl Phthalate	1000	<760	<710	<690	<730	<690	<690	<750	<750	<760
Benzo(b)Fluoranthene	0.04	<760	<710	<690	<730	<690	<690	<750	<750	<760
Benzo(k)Fluoranthene	0.04	<760	<710	<690	<730	<690	<690	<750	<750	<760
Benzo(a)Pyrene	NA	<760	<710	<690	<730	<690	<690	<750	<750	<760
Indeno(1,2,3-cd)Pyrene	0.04	<760	<710	<690	<730	<690	<690	<750	<750	<760
Dibenz(a,h)Anthracene	NA	<760	<710	<690	<730	<690	<690	<750	<750	<760
Benzo(g,h,i)Perylene	NA	<760	<710	<690	<730	<690	<690	<750	<750	<760

NOTES: (1) - "NA" indicates no TCLP Alternative Guidance Value available.

EXPLANATION OF ORGANIC DATA QUALIFIERS:

(J)	Estimated value below required detection limit
(B)	Estimated detection limit; compound identified in laboratory blank
(D)	Value obtained from medium-level or dilution analysis
(E)	Estimated value due to instrument calibration problems
(E1)	Estimated detection limit due to instrument calibration problems

Analyses performed by Recra Environmental, Inc., using 1989 New York State Analytical Services Protocol
Data validation performed by C.C. Johnson & Malhotra, P.C.

TABLE 9
RESULTS OF SEMI-VOLATILE ANALYSES OF
SOIL SAMPLES
ARO - BUFFALO, NEW YORK
LAW ENVIRONMENTAL PROJECT NO. 52.2507

TENTATIVELY IDENTIFIED COMPOUNDS (TICs)	Results in ug/kg WELL NUMBER (Depth in Feet)								
	MW-3R (4-6)	MW-3R (20-20.7	MW-15 (24-26)	MW-16 (6-8)	MW-18 (22-24)	SB101 (1-3)	SB102 (5-7)	SB103 (5-7)	SB105 (7-9)
Unknown Oxygenated Compound 1	--	--	550	480	470	--	--	440	--
Unknown Oxygenated Compound 2	--	--	1100	--	--	--	--	--	--
Unknown Hydrocarbon 1	--	--	460	--	410	440	--	430	--
Unknown Hydrocarbon 2	--	--	470	--	640	470	--	350	--
Unknown Hydrocarbon 3	--	--	350	--	530	790	--	380	--
Unknown Hydrocarbon 4	--	--	360	--	420	640	--	380	--
Unknown Hydrocarbon 5	--	--	460	--	450	610	--	--	--
Unknown Hydrocarbon 6	--	--	1500	--	400	600	--	--	--
Unknown Hydrocarbon 7	--	--	--	--	370	520	--	--	--
Unknown Hydrocarbon 8	--	--	--	--	340	520	--	--	--
Unknown Hydrocarbon 9	--	--	--	--	--	610	--	--	--
Unknown Hydrocarbon 10	--	--	--	--	--	590	--	--	--
Unknown Hydrocarbon 11	--	--	--	--	--	1200	--	--	--
Unknown Hydrocarbon 12	--	--	--	--	--	690	--	--	--
Unknown Hydrocarbon 13	--	--	--	--	--	720	--	--	--
Unknown Hydrocarbon 14	--	--	--	--	--	750	--	--	--
Unknown Hydrocarbon 15	--	--	--	--	--	680	--	--	--
Unknown Hydrocarbon 16	--	--	--	--	--	560	--	--	--
Unknown Hydrocarbon 17	--	--	--	--	--	480	--	--	--
Unknown Ketone 1	--	--	--	--	870	550	530	620	620
Unknown Ketone 2	--	--	--	--	--	1100	990	930	920
Unknown Alkane	--	--	--	--	760	--	--	--	--
Unknown Brominated Compound	--	--	--	--	--	--	600	--	--
Unknown 1	--	--	--	740	570	--	--	640	590
Unknown 2	--	--	--	--	--	--	--	440	360
Suspected Aldol Cond. Prod.	--	320	--	--	--	--	--	--	--

NOTES: (1) - "NA" indicates no TCLP Alternative Guidance Value available.

EXPLANATION OF ORGANIC DATA QUALIFIERS:

(J)	Estimated value below required detection limit
(B)	Estimated detection limit; compound identified in laboratory blank
(D)	Value obtained from medium-level or dilution analysis
(E)	Estimated value due to instrument calibration problems
(E1)	Estimated detection limit due to instrument calibration problems

Analyses performed by Recra Environmental, Inc., using 1989 New York State Analytical Services Protocol
Data validation performed by C.C. Johnson & Malhotra, P.C.

\TABLE-9.WQ1

TABLE 10
RESULTS OF METALS AND CYANIDE ANALYSES OF SOIL SAMPLES
ARO - BUFFALO, NY
LAW ENVIRONMENTAL PROJECT NO. 52.2507

TAL METALS	NYSDEC TCLP ALTERNATIVE GUIDANCE VALUE (1) (ppm)	WELL NUMBER/DEPTH All Results in mg/kg (ppm)									
		MW-3R					MW-15		MW-16		
		(4-6)	(7-8)	(10-12)	(20-20.7)	(24-24.5)	(12-14)	(24-26)	(6-8)	(8-10)	(20-22)
Priority Pollutant Metals											
Antimony	0.06	16.0(E)	<11.6(R)	12.7(EB)	27.7(E)	33.6(E)	19.4(E)	32.7(E)	22.9(E)	19.6(E)	28.7(E)
Arsenic	0.5	2.2(E)	3.9(E)	3.1(E)	2.2(E)	2.8(E)	1.8(B)	1.1(B)	2.9	2.3	1.0(EB)
Beryllium	0.06	<1.1(E)	<1.2(E1)	<1.1(E1)	<1.1(E1)	<1.1(E1)	<1.1	<1.1	<1.1	<1.1	<1.1
Cadmium	0.20	0.18(EB)	0.21(EB)	0.18(EB)	0.11(EB)	0.15(EB)	<1.1(E1)	<1.1(E1)	<1.1(E1)	<1.1(E1)	<1.1(E1)
Chromium	1.0	19.2(E)	20.0(E)	18.0(E)	12.0(E)	15.3(E)	9.2(E)	2.7(E)	12.0(E)	11.4(E)	6.7(E)
Copper	4.0	9.0(E)	9.3(E)	10.7(E)	4.6(E)	7.1(E)	5.0(EB)	6.9(E)	4.8(EB)	2.9(EB)	3.3(EB)
Lead	0.5	13.3(E)	17.4(E)	15.1(E)	5.9(E)	13.6(E)	8.4	3.5	10.0	8.2	5.4
Mercury	0.04	<0.10	<0.11	<0.11	<0.10	<0.09	<0.10	<0.09	<0.10	<0.11	<0.09
Nickel	NA	28.6(E)	23.7(E)	22.0(E)	12.8(E)	21.5(E)	16.7	7.7(B)	22.1	20.8	12.1
Selenium	0.20	<1.1(R)	<1.1(R)	<1.1(R)	<1.1(R)	<1.1(R)	<1.1(R)	<1.1(R)	<1.1(R)	<1.1(R)	<1.1(R)
Silver	1.0	6.0(E)	<5.1(E)	4.5(E)	6.4(E)	5.7(E)	<0.07(E1)	<0.07(E1)	<0.07(E1)	<0.08(E1)	<0.07(E1)
Thallium	0.08	<1.6(E1)	<1.5(E1)	<1.6(E1)	<1.5(E1)	<1.5(E1)	<1.1	<1.1	<1.1	<1.1	<1.0
Zinc	6.0	65.7(E)	61.9(E)	68.5(E)	38.3(E)	37.2(E)	64.3(E)	29.1(E)	64.8(E)	61.9(E)	28.9(E)
Cyanide	2.0	<1.4	<1.4	<1.4	<1.3	<1.3	<1.4(E1)	<1.3(E1)	<1.4(E1)	<1.4(E1)	<1.3(E1)
Other TAL Metals											
Aluminum	NA	10500	8930	9830	6460	7670	8160(E)	1730(E)	9480(E)	8010(E)	4010(E)
Barium	20	97.8(E)	91.4(E)	87.4(E)	51.5(E)	44.1(E)	76.0	17.5(B)	76.2	67.9	33.2(B)
Calcium	NA	85800(E)	75500(E)	76100(E)	102000(E)	125000(E)	77700	127000	73800	76500	97900
Cobalt	0.10	9.2(EB)	9.6(EB)	8.9(EB)	5.4(EB)	5.5(EB)	4.8(B)	<4.4	7.0(B)	6.7(B)	<4.3
Iron	6.0	20500	20600	18700	11200	13800	16200	4930	18100	17000	8880
Magnesium	700	28500	27600	28200	29600	47600	31800	31500	26100	29700	36600
Manganese	6.0	514	390	343	266	603	348(E)	176(E)	418(E)	380(E)	273(E)
Potassium	NA	3300	2480	2710	1920	2310	1090	251(B)	1370	1500	634(B)
Sodium	400	634(B)	<461	<449	472(B)	678(B)	130(B)	104(B)	131(B)	146(B)	136(B)
Vanadium	NA	31.8(E)	28.5(E)	26.2(E)	18.1(E)	17.1(E)	12.7	5.3(B)	15.8	15.4	10.0(B)

NOTES: (1) - Listed values are 20 times the constituent NYS Standard for Ground Water.
(2) - "NA" indicates no TCLP Alternative Guidance Value available.

Explanation of Data Qualifiers:
(E) - Estimated value due to instrument calibration, spike recovery, interference problems or control limits.
(E1) - Estimated detection limit due to instrument calibration, spike recovery or interference problems.
(E2) - Estimated detection limit due to exceedance of holding time and instrument calibration problems.
(B) - Estimated value or detection limit; compound identified in laboratory blank.
(R) - Rejected data due to matrix spike recoveries outside of control limits.

Analyses performed by Recra Environmental, Inc., using 1989 New York State Analytical Services Protocol.
Data validation performed by C.C. Johnson & Malhotra, P.C.
\TABLE-10.WQ1

TABLE 10
RESULTS OF METALS AND CYANIDE
ANALYSES OF SOIL SAMPLES
ARO - BUFFALO, NY
LAW ENVIRONMENTAL PROJECT NO. 52.2507

TAL METALS	NYSDEC TCLP ALTERNATIVE GUIDANCE VALUE (1) (ppm)	WELL NUMBER/DEPTH All Results in mg/kg (ppm)							
		MW-17		MW-18		MW-19		MW-20	
		(6-8)	(18-22)	(8-10)	(22-24)	(6-8)	(18-22)	(12-14)	(22-24)
Priority Pollutant Metals									
Antimony	0.06	20.4(E)	21.2(E)	25.2(E)	28.8(E)	16.7(E)	20.2(E)	25.2(E)	20.4(E)
Arsenic	0.5	3.3	1.1(B)	2.9	<1.1	7.1(E)	<1.1	1.1(B)	<1.1
Beryllium	0.06	<1.1	<1.1	<1.2	<1.1	<1.1	<1.1	<1.1	<1.0
Cadmium	0.20	<1.1(E1)	<1.1(E1)	<1.2(E1)	<1.1(E1)	<1.1(E1)	<1.1(E1)	<1.1(E1)	<1.0(E1)
Chromium	1.0	12.2(E)	8.6(E)	13.6(E)	6.2(E)	16.1(E)	6.8(E)	6.2(E)	7.5(E)
Copper	4.0	3.0(EB)	10.1(E)	1.4(EB)	3.5(EB)	8.1(E)	3.0(E)	3.4(EB)	3.3(EB)
Lead	0.5	9.4	5.1(E)	8.4	4.1	11.7	2.6(E)	4.8(E)	4.8(E)
Mercury	0.04	<0.11	<0.10	<0.10	<0.10	<0.11	<0.10	0.21	<0.10
Nickel	NA	20.8	14.2	21.1	8.2(B)	34.1	10.3	9.9	10.5
Selenium	0.20	<1.1(R)	<1.1(R)	<1.1(R)	<1.1(R)	<1.1(R)	<1.1(R)	<1.1(R)	<1.1(R)
Silver	1.0	<0.07(E1)	<0.07(E1)	<0.07(E1)	<0.07(E1)	<0.07(E1)	<0.07(E1)	<0.07(E1)	0.32(E)
Thallium	0.08	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
Zinc	6.0	69.4(E)	33.8(E)	58.4(E)	29.1(E)	69.8(E)	25.9(E)	39.9(E)	53.7(E)
Cyanide	2.0	<1.4(E1)	<1.4(E1)	<1.4(E1)	<1.3(E1)	<1.4(E1)	<1.3(E1)	<1.3(E1)	<1.3(E1)
Other TAL Metals									
Aluminum	NA	6660(E)	3310(E)	9380(E)	2670(E)	11600(E)	2030(E)	2840(E)	4530(E)
Barium	20	68.5	42.9(B)	72.7	31.5(B)	101	24.7(B)	29.4(B)	46.1
Calcium	NA	76000	97500	73900	113000	59900	78700	102000	90700
Cobalt	0.10	5.0(B)	<4.4	7.4(B)	<4.3	10.8(B)	<4.2	<4.3	<4.2
Iron	6.0	13500	7500	18700	6370	22300	5770	6380	9010
Magnesium	700	28600	38000	24300	30000	21600	26900	30100	30200
Manganese	6.0	332(E)	290(E)	359(E)	213(E)	490(E)	200(E)	230(E)	282(E)
Potassium	NA	1450	842(B)	1740	511(B)	1780	362(B)	723(B)	836(B)
Sodium	400	146(B)	158(B)	163(B)	141(B)	170(B)	130(B)	143(B)	138(B)
Vanadium	NA	16.9	9.3 (B)	19.1	7.0(B)	22.5	7.3(B)	9.0(B)	9.9(B)

NOTES: (1) - Listed values are 20 times the constituent NYS Standard for Ground Water.
(2) - "NA" indicates no TCLP Alternative Guidance Value available.

Explanation of Data Qualifiers:
(E) - Estimated value due to instrument calibration, spike recovery, interference problems or control limits.
(E1) - Estimated detection limit due to instrument calibration, spike recovery or interference problems.
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Analyses performed by Recra Environmental, Inc., using 1989 New York State Analytical Services Protocol.
Data validation performed by C.C. Johnson & Malhotra, P.C.
\TABLE-10.WQ1

TABLE 10
RESULTS OF METALS AND CYANIDE ANALYSES OF SOIL SAMPLES
ARO - BUFFALO, NY
LAW ENVIRONMENTAL PROJECT NO. 52.2507

TAL METALS	NYSDEC TCLP ALTERNATIVE GUIDANCE VALUE (1) (ppm)	WELL NUMBER/DEPTH All Results in mg/kg (ppm)									
		SB101			SB102			SB103		SB104	
		(1-3)	(3-5)	(5-7)	(1-3)	(3-5)	(5-7)	(1-3)	(5-7)	(1-3)	(5-7)
Priority Pollutant Metals											
Antimony	0.06	24.5(E)	<9.8(E1)	11.2(EB)	<9.4(E1)	9.2(EB)	21.2(E)	26.7(E)	11.7(EB)	13.8(E)	<11.1(E1)
Arsenic	0.5	5.6(E)	4.4(E)	5.3(E)	5.4(E)	3.2(E)	4.8(E)	4.3(E)	2.8(E)	4.6(E)	4.5(E)
Beryllium	0.06	<1.1	<1.2	<1.3	<1.2	<1.2	<1.2	<1.1	<1.2	<1.1	<1.4
Cadmium	0.20	<1.1(E1)	<1.2(E1)	<1.3(E1)	<1.2(E1)	<1.2(E1)	<1.2(E1)	<1.1(E1)	<1.2(E1)	<1.1(E1)	<1.4(E1)
Chromium	1.0	10.7	13.7	19.6	10.8	15.9	16.7	13.6	17.3	20.1	21.6
Copper	4.0	34.5(E)	19.6(E)	49.2(E)	16.6(E)	3.0(EB)	2.2(EB)	48.9(E)	11.7(E)	31.0(E)	23.7(E)
Lead	0.5	10.8(E)	38.9	14.3(E)	11.5(E)	11.9(E)	14.6(E)	8.8(E)	10.7(E)	8.2(E)	39.1(E)
Mercury	0.04	<0.11	<0.11	<0.13	0.31	0.24	<0.10	<0.11	<0.10	<0.10	0.39
Nickel	NA	44.1	30.1	38.7	26.7	26.3	26.6	37.9	28.0	38.1	35.1
Selenium	0.20	<1.1(E1)	<1.2(E1)	<1.3(E1)	<1.1(E1)	<1.1(E1)	<1.1(E1)	<1.1(E1)	<1.2(E1)	<1.1(E1)	<1.3(E1)
Silver	1.0	<2.3(E1)	<2.4(E1)	<2.6(E1)	<2.3(E1)	<2.4(E1)	<2.4(E1)	<2.3(E1)	<2.4(E1)	<2.1(E1)	<2.8(E1)
Thallium	0.08	<1.1	<1.2	<1.3	<1.1	<1.1	<1.2	<1.1	<1.2	<1.1	<1.3
Zinc	6.0	81.3(E)	71.1(E)	109(E)	56.2(E)	62.3(E)	63.4(E)	94.1(E)	74.3(E)	70.1(E)	119(E)
Cyanide	2.0	<1.4(E1)	<1.5(E1)	<1.6(E1)	<1.4(E1)	<1.5(E1)	<1.4(E1)	<1.4(E1)	<1.5(E1)	<1.5(E1)	<1.7(E1)
Other TAL Metals											
Aluminum	NA	6050(E)	8200(E)	9930(E)	5760(E)	10400(E)	10500(E)	7020(E)	11800(E)	7610(E)	15700(E)
Barium	20	27.0(B)	58.8	57.4	23.3(B)	76.1	77.1	28.6(B)	87.2	49.2	138
Calcium	NA	91500(EB)	23300(E)	37500 (EB)	23100(E)	56800(EB)	73100(EB)	93700(EB)	48700(EB)	49000(EB)	17500(E)
Cobalt	0.10	8.2(B)	7.9(B)	9.5(B)	5.8(B)	8.9(B)	8.7(B)	9.3(B)	7.9(B)	10.4(B)	10.2(B)
Iron	6.0	16100	17800	23200	13900	20200	18900	17700	20500	46000	26300
Magnesium	700	14100(E)	4640(E)	7590(E)	5070(E)	26300(E)	30500(E)	13800(E)	19100(E)	8970(E)	6170(E)
Manganese	6.0	639(E)	612(E)	461(E)	274(E)	383(E)	532(E)	540(E)	636(E)	400(E)	625(E)
Potassium	NA	1050(B)	1310	1840	1040(B)	1520	2200	1460	1770	1660	1930
Sodium	400	239(B)	234(B)	316(B)	252(B)	278(B)	305(B)	276(B)	282(B)	287(B)	306(B)
Vanadium	NA	13.1	17.0	20.7	10.7(B)	24.4	22.9	16.6	24.0	17.1	28.1

NOTES: (1) - Listed values are 20 times the constituent NYS Standard for Ground Water.
(2) - "NA" indicates no TCLP Alternative Guidance Value available.

Explanation of Data Qualifiers:
(E) - Estimated value due to instrument calibration, spike recovery, interference problems or control limits.
(E1) - Estimated detection limit due to instrument calibration, spike recovery or interference problems.
(E2) - Estimated detection limit due to exceedance of holding time and instrument calibration problems.
(B) - Estimated value or detection limit; compound identified in laboratory blank.
(R) - Rejected data due to matrix spike recoveries outside of control limits.

Analyses performed by Recra Environmental, Inc., using 1989 New York State Analytical Services Protocol.
Data validation performed by C.C. Johnson & Malhotra, P.C.
\TABLE-10.WQ1

TABLE 10
RESULTS OF METALS AND CYANIDE ANALYSES OF SOIL SAMPLES
ARO - BUFFALO, NY
LAW ENVIRONMENTAL PROJECT NO. 52.2507

TAL METALS	NYSDEC TCLP ALTERNATIVE GUIDANCE VALUE (1) (ppm)	WELL NUMBER/DEPTH All Results in mg/kg (ppm)									
		SB105				SB106			SED-101	SED-102	SED-103
		(1-3)	(3-5)	(5-7)	(7-9)	(1-3)	(3-5)	(5-7)			
Priority Pollutant Metals											
Antimony	0.06	22.8(E)	25.1(E)	11.9(EB)	21.7(E)	<9.8(E1)	26.8(E)	<9.3(E1)	32.2 (E)	<12.8 (E1)	35.6
Arsenic	0.5	5.0(E)	7.6(E)	3.3(E)	3.3(E)	12.2(E)	2.8(E)	5.1(E)	<2.4(E1)	3.1(E)	10.2(E)
Beryllium	0.06	<1.2	<1.1	<1.2	<1.2	<1.2	<1.2	<1.2	<2.4	<1.6	<2.9
Cadmium	0.20	<1.2(E1)	<1.1(E1)	<1.2(E1)	<1.2(E1)	<1.2(E1)	<1.2(E1)	<1.2(E1)	<2.4(E1)	<1.6(E1)	<2.9(E1)
Chromium	1.0	11.6	15.8	18.0	16.4	20.1	15.7	16.8	32.3(E)	12.8(E)	33.9(E)
Copper	4.0	<1.2(E1)	10.3(E)	4.3(EB)	10.2(E)	6.0(EB)	3.9(EB)	<1.2(E1)	56.2(E)	20.4(E)	43.0(E)
Lead	0.5	30.6(E)	44.8(E)	12.5(E)	33.4(E)	32.1(E)	11.9(E)	12.7(E)	168(E)	360(E)	144(E)
Mercury	0.04	<0.11	<0.11	<0.11	<0.11	<0.11	<0.10	<0.10	0.36	0.72	0.83
Nickel	NA	26.8	28.9	24.4	29.8	30.9	19.7	28.5	26.6	14.1	35.4
Selenium	0.20	<1.2(E1)	<1.2(E1)	<1.1(E1)	<1.2(E1)	<1.3(E1)	<1.2(E1)	<1.1(E1)	<2.4(E1)	<1.6	<3.0
Silver	1.0	<2.5(E1)	<2.3(E1)	<2.2(E1)	<2.3(E1)	<2.4(E1)	<2.3(E1)	<2.3(E1)	<4.9(E1)	<3.2(E1)	<5.8(E1)
Thallium	0.08	<1.2	<1.2	<1.1	<1.2	<1.3	<1.2	<1.1	<2.4	<1.6	<3.0
Zinc	6.0	146(E)	195(E)	65.1(E)	176(E)	76.3(E)	60.6(E)	67.6(E)	750(E)	189(E)	443(E)
Cyanide	2.0	<1.5(E1)	<1.4(E2)	<1.4(E2)	<1.4(E2)	<1.5(E2)	<1.5(E2)	<1.5(E2)	<3.0(E1)	<2.0(E1)	<3.6(E1)
Other TAL Metals											
Aluminum	NA	6200(E)	8300(E)	10800(E)	8390(E)	15100(E)	9240(E)	9950(E)	7980	5860	14700
Barium	20	36.3(B)	46.5	89.3	44.4(B)	105	86.0	99.9	106	60.4(B)	135
Calcium	NA	86600(EB)	97900(EB)	74100(EB)	94400(EB)	18300(E)	81600(EB)	67100(EB)	98400(E)	66300(E)	121000(E)
Cobalt	0.10	9.0(B)	11.7	9.2(B)	9.7(B)	12.3	7.4(B)	8.3(B)	<9.8	7.5(B)	13.8(B)
Iron	6.0	15300	19600	18600	18400	25300	17000	18200	16300	12700	24400
Magnesium	700	46400(E)	50500(E)	27500(E)	45200(E)	10300(E)	32700(E)	27300(E)	7920(E)	18300(E)	12000(E)
Manganese	6.0	621(E)	385(E)	397(E)	333(E)	330(E)	337(E)	343(E)	419(E)	295(E)	442(E)
Potassium	NA	1360	1710	2680	2110	1640	1280	2080	996(B)	701(B)	2250(B)
Sodium	400	350(B)	361(B)	295(B)	351(B)	254(B)	267(B)	293(B)	681(B)	396(B)	863(B)
Vanadium	NA	18.8	21.3	23.1	21.9	32.7	19.2	21.2	21.0(B)	15.3(B)	34.8
Total Organic Carbon	--	--	--	--	--	--	--	--	36300(E)	44600(E)	66900(E)

NOTES:
(1) - Listed values are 20 times the constituent NYS Standard for Ground Water.
(2) - "NA" indicates no TCLP Alternative Guidance Value available.

Explanation of Data Qualifiers:
(E) - Estimated value due to instrument calibration, spike recovery, interference problems or control limits.
(E1) - Estimated detection limit due to instrument calibration, spike recovery or interference problems.
(E2) - Estimated detection limit due to exceedance of holding time and instrument calibration problems.
(B) - Estimated value or detection limit; compound identified in laboratory blank.
(R) - Rejected data due to matrix spike recoveries outside of control limits.

Analyses performed by Recra Environmental, Inc., using 1989 New York State Analytical Services Protocol.
Data validation performed by C.C. Johnson & Malhotra, P.C.

TABLE 11
RESULTS OF VOC ANALYSES OF WATER SAMPLES
ARO - BUFFALO, NEW YORK
LAW ENVIRONMENTAL PROJECT. NO. 52.2507

COMPOUND	NYS Ground-Water Quality Standards (ug/L)	All results in ug/L												
		Tap Water (2)	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-13
Chloromethane	5	<10	<10	<10	<5000	<10	<10	<10(E1)	<10	<10	<10	<10	<10(E1)	<10(E1)
Bromomethane	5	<10	<10	<10	<5000	<10	<10	<10(E1)	<10	<10	<10	<10	<10(E1)	<10(E1)
Vinyl Chloride	2	<10	<10	700(D)	<5000	<10	<10	300(E)	<10	<10	<10	5(J)	730(E)	51(E)
Chloroethane	5	<10	<10	<10	<5000	<10	<10	<10(E1)	<10	<10	<10	<10	<10(E1)	<10(E1)
Methylene Chloride	5	<5	<5	<5	<2500	<5	<5	<5(E1)	<5	<5	<5	<5	<5(E1)	<5(E1)
Acetone	NA (1)	<10	<10	<10	<5000	<10	<10	<10(E1)	<10	<10	<10	<10	<10(E1)	<10(E1)
Carbon Disulfide	NA	<5	<5	<5	<2500	<5	<5	<5(E1)	<5	<5	<5	<5	<5(E1)	<5(E1)
1,1-Dichloroethene	5	<5	<5	15	<2500	<5	<5	25(E)	<5	<5	<5	<5	28(E)	55(E)
1,1-Dichloroethane	5	<5	<5	<5	<2500	<5	<5	<5(E1)	<5	<5	<5	<5	<5(E1)	<5(E1)
1,2-Dichloroethene	5	<5	<5	2600(D)	810(J)	<5	<5	2100(JD)	<5	<5	<5	200(D)	16000(D)	9900(D)
Chloroform	7	26	<5	<5	<2500	<5	<5	3(E)	<5	<5	<5	<5	<5(E1)	<5(E1)
1,2-Dichloroethane	5	<5	<5	<5	<2500	<5	<5	<5(E1)	<5	<5	<5	<5	<5(E1)	<5(E1)
2-Butanone	NA	<10	<10	<10	<5000	<10	<10	<10(E1)	<10	<10	<10	<10	<10(E1)	<10(E1)
1,1,1-Trichloroethane	5	<5	<5	<5	<2500	<5	<5	<5(E1)	<5	<5	<5	<5	<5(E1)	<5(E1)
Carbon Tetrachloride	5	<5	<5	<5	<2500	<5	<5	<5(E1)	<5	<5	<5	<5	<5(E1)	<5(E1)
Vinyl Acetate	NA	<10	<10	<10	<5000	<10	<10	<10(E1)	<10	<10	<10	<10	<10(E1)	<10(E1)
Bromodichloromethane	50	12	<5	<5	<2500	<5	<5	<5(E1)	<5	<5	<5	<5	<5(E1)	<5(E1)
1,2-Dichloropropane	5	<5	<5	<5	<2500	<5	<5	<5(E1)	<5	<5	<5	<5	<5(E1)	<5(E1)
cis-1,3-Dichloropropene	5	<5	<5	<5	<2500	<5	<5	<5(E1)	<5	<5	<5	<5	<5(E1)	<5(E1)
Trichloroethene	5	<5	<5	790(DB)	1100000(DB)	<5	<5	100000(D)	0.9(E)	<5	0.7(E)	0.7(E)	51000(DB)	21000(DB)
Dibromochloromethane	50	<5	<5	<5	<2500	<5	<5	<5(E1)	<5	<5	<5	<5	<5(E1)	<5(E1)
1,1,2-Trichloroethane	5	<5	<5	<5	<2500	<5	<5	7(E)	<5	<5	<5	<5	9(E)	<5(E1)
Benzene	0.7	<5	<5	0.7(J)	<2500	<5	<5	<5(E1)	<5	<5	<5	<5	<5(E1)	<5(E1)
trans-1,3-dichloropropene	5	<5	<5	<5	<2500	<5	<5	<5(E1)	<5	<5	<5	<5	<5(E1)	<5(E1)
Bromoform	50	<5	<5	<5	<2500	<5	<5	<5(E1)	<5	<5	<5	<5	<5(E1)	<5(E1)
4-Methyl-2-Pentanone	NA	<10	<10	<10	<5000	<10	<10	<10(E1)	<10	<10	<10	<10	<10(E1)	<10(E1)
2-Hexanone	50	<10	<10	<10	<5000	<10	<10	<10(E1)	<10	<10	<10	<10	<10(E1)	<10(E1)
Tetrachloroethene	5	<5	<5	<5	<2500	<5	<5	2(E)	<5	<5	<5	<5	<5(E1)	<5(E1)
1,1,2,2-Tetrachloroethane	5	<5	<5	<5	<2500	<5	<5	<5(E1)	<5	<5	<5	<5	<5(E1)	<5(E1)
Toluene	5	0.9(J)	<5	<5	<2500	<5	<5	4(E)	<5	<5	<5	<5	<5(E1)	<5(E1)
Chlorobenzene	5	<5	<5	<5	<2500	<5	<5	<5(E1)	<5	<5	<5	<5	<5(E1)	<5(E1)
Ethylbenzene	5	<5	<5	<5	<2500	<5	<5	<5(E1)	<5	<5	<5	<5	<5(E1)	<5(E1)
Styrene	5	<5	<5	<5	<2500	<5	<5	<5(E1)	<5	<5	<5	<5	<5(E1)	<5(E1)
Total Xylenes	5	28	<5	<5	<2500	<5	<5	<5(E1)	<5	<5	<5	<5	<5(E1)	<5(E1)

OTES: (1) - "NA" indicates no NYS Ground-Water Quality Standard is available.
(2) - Tap water sample analysis for TCL Volatiles. Water was used for drilling of bedrock monitoring wells and decontamination activities during Phase I and II activities. Water was obtained from one source on-site (water tap in the sheet metal building).

xplanation of Data Qualifiers:

(J)	Estimated value below required detection limit.
(D)	Value obtained from medium-level or dilution analysis.
(B) -	Estimated detection limit; compound identified in laboratory blank.
(B1) -	Estimated value; compound identified in laboratory blank.
(E)	Estimated value due to instrument, spike and standard calibration problems.
(E1) -	Estimated detection limit due to spike and/or standard recovery problems.

nalyses performed by Recra Environmental, Inc., using 1989 New York State Analytical Services Protocol
ata validation performed by C.C. Johnson & Malhotra, P.C.

\TABLE 11.WQ1

TABLE 11
RESULTS OF VOC ANALYSES OF WATER SAMPLES
ARO - BUFFALO, NEW YORK
LAW ENVIRONMENTAL PROJECT. NO. 52.2507

COMPOUND	NYS Ground-Water Quality Standards (ug/L)	Results in ug/L							Results in ug/L			Results in ug/l		
		MW-14	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20	OW-101	OW-102	OW-103	SW-101	SW-102	SW-103
Chloromethane	5	<10	<10	<10	<10	<10	<10	<10	<10(E1)	<10	<10	<10	<10	<10
Bromomethane	5	<10	<10	<10	<10	<10	<10	<10	<10(E1)	<10	<10	<10	<10	<10
Vinyl Chloride	2	<10	<10	<10	<10	<10	<10	650(E)	170(E)	10	8(J)	<10	<10	<10
Chloroethane	5	<10	<10	<10	<10	<10	<10	<10	<10(E1)	<10	<10	<10	<10	<10
Methylene Chloride	5	<5	<5	<5	<5	<5	<5	<5	<5(E1)	<5	<5	<5	<5	<5
Acetone	NA (1)	<10	<10	<10	<10	<10	<10	<10	<10(E1)	<10	<10	<10	<10	<10
Carbon Disulfide	NA	<5	<5	<5	<5	<5	<5	<5	<5(E1)	<5	<5	<5	<5	<5
1,1-Dichloroethene	5	<5	<5	<5	<5	<5	<5	10	14(E)	<5	<5	<5	<5	<5
1,1-Dichloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5(E1)	<5	<5	<5	<5	<5
1,2-Dichloroethene	5	<5	<5	8	<5	<5	0.9(E)	2900(D)	5400(D)	180	36	<5	190(D)	26
Chloroform	7	<5	<5	<5	<5	<5	<5	<5	3(E)	<5	<5	<5	<5	<5
1,2-Dichloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5(E1)	<5	<5	<5	<5	<5
2-Butanone	NA	<10	<10	<10	<10	<10	<10	<10	<10(E1)	<10	<10	<10	<10	<10
1,1,1-Trichloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5(E1)	<5	<5	<5	<5	<5
Carbon Tetrachloride	5	<5	<5	<5	<5	<5	<5	<5	<5(E1)	<5	<5	<5	<5	<5
Vinyl Acetate	NA	<10	<10	<10	<10	<10	<10	<10	<10(E1)	<10	<10	<10	<10	<10
Bromodichloromethane	50	<5	<5	<5	<5	<5	<5	<5	<5(E1)	<5	<5	<5	<5	<5
1,2-Dichloropropane	5	<5	<5	<5	<5	<5	<5	<5	<5(E1)	<5	<5	<5	<5	<5
cis-1,3-Dichloropropene	5	<5	<5	<5	<5	<5	<5	<5	<5(E1)	<5	<5	<5	<5	<5
Trichloroethene	5	5	<5(E1B)	3(E)	<5	5(B1)	12	4300(DB1)	30000(DB1)	7	28	<5	230(D)	40
Dibromochloromethane	50	<5	<5	<5	<5	<5	<5	<5	<5(E1)	<5	<5	<5	<5	<5
1,1,2-Trichloroethane	5	<5	<5	<5	<5	<5	<5	<5	13(E)	<5	<5	<5	<5	<5
Benzene	0.7	<5	<5	<5	<5	<5	<5	1(J)	<5(E1)	<5	<5	<5	<5	<5
trans-1,3-dichloropropene	5	<5	<5	<5	<5	<5	<5	<5	<5(E1)	<5	<5	<5	<5	<5
Bromoform	50	<5	<5	<5	<5	<5	<5	<5	<5(E1)	<5	<5	<5	<5	<5
4-Methyl-2-Pentanone	NA	<10	<10	<10	<10	<10	<10	<10	<10(E1)	<10	<10	<10	<10	<10
2-Hexanone	50	<10	<10	<10	<10	<10	<10	<10	<10(E1)	<10	<10	<10	<10	<10
Tetrachloroethene	5	<5	<5	<5	<5	<5	<5	<5	0.8(E)	<5	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	5	<5	<5	<5	<5	<5	<5	<5	<5(E1)	<5	<5	<5	<5	<5
Toluene	5	<5	<5	<5	<5	0.5(J)	<5	4(J)	0.7(E)	<5	<5	<5	<5	<5
Chlorobenzene	5	<5	<5	<5	<5	<5	<5	<5	<5(E1)	<5	<5	<5	<5	<5
Ethylbenzene	5	<5	<5	<5	<5	0.6(J)	<5	<5	<5(E1)	<5	<5	<5	<5	<5
Styrene	5	<5	<5	<5	<5	<5	<5	<5	<5(E1)	<5	<5	<5	<5	<5
Total Xylenes	5	<5	<5	<5	<5	1(J)	<5	<5	<5(E1)	<5	<5	<5	<5	<5
TENTATIVELY IDENTIFIED COMPOUNDS														
1,2 Dichloro 1,1,2-Trifluoro		--	--	--	--	--	--	46	--	--	--	--	--	--
Chlorinated Compound		--	--	--	--	--	--	46	--	--	--	--	--	--
Unknown		--	-	--	--	--	--	--	12	--	--	--	--	

NOTES: (1) - "NA" indicates no NYS Ground-Water Quality Standard is available.
(2) Tap water sample analysis for TCL Volatiles. Water was used for drilling of bedrock monitoring wells and decontamination activities during Phase I and II activities. Water was obtained from one source on-site (water tap in the sheet metal building).

Explanation of Data Qualifiers:

(J) - Estimated value below required detection limit.
(D) - Value obtained from medium-level or dilution analysis.
(B) - Estimated detection limit; compound identified in laboratory blank.
(B1) - Estimated value; compound identified in laboratory blank.
(E) - Estimated value due to instrument, spike and standard calibration problems.
(E1) - Estimated detection limit due to spike and/or standard recovery problems.

Analyses performed by Recra Environmental, Inc., using 1989 New York State Analytical Services Protocol
Data validation performed by C.C. Johnson & Malhotra, P.C.

\TABLE-11.WQ1

TABLE 12
RESULTS OF SEMI-VOLATILE ANALYSES
OF WATER SAMPLES
ARO - BUFFALO, NEW YORK
LAW ENVIRONMENTAL PROJECT NO. 52.2507

COMPOUND	NYS GROUND-WATER QUALITY STANDARDS (ug/L)	Results in ug/L							
		MW-3	MW-4	MW-6	MW-11	MW-15	MW-17	MW-20	Tap Water
Phenol	1* (1)	35	<10	<10	<10	<12	<10	<10(E1)	<12
Bis(2-Chloroethyl)Ether	1	<10	<10	<10	<10	<12	<10	<10(E1)	<12
2-Chlorophenol	1*	<10	<10	<10	<10	<12	<10	<10(E1)	<12
1,3-Dichlorobenzene	5	<10	<10	<10	<10	<12	<10	<10(E1)	<12
1,4-Dichlorobenzene	4.7	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Benzyl Alcohol	NA (2)	<10	<10	<10	<10	<12	<10	<10(E1)	<12
1,2-Dichlorobenzene	4.7	<10	<10	<10	<10	<12	<10	<10(E1)	<12
2-Methylphenol	1*	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Bis (2-Chloroisopropyl)Ether	NA	<10	<10	<10	<10	<12	<10	<10(E1)	<12
4-Methylphenol	1*	130	<10	<10	<10	<12	<10	<10(E1)	<12
N-Nitroso-Di-n-Propylamine	NA	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Hexachloroethane	5	<10	<10	<10	<10	<12	<10	<10(ET)	<12
Nitrobenzene	5	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Isophorone	50	<10	<10	<10	<10	<12	<10	<10(E1)	<12
2-Nitrophenol	1*	<10	<10	<10	<10	<12	<10	<10(E1)	<12
2,4-Dimethylphenol	1*	21	<10	<10	<10	<12	<10	<10(E1)	<12
Benzoic Acid	NA	<52	<50	<50	<50	<62	<50	<51(E1)	<62
Bis (2-Chloroethoxy)Methane	5	<10	<10	<10	<10	<12	<10	<10(E1)	<12
2,4-Dichlorophenol	1*	<10	<10	<10	<10	<12	<10	<10(E1)	<12
1,2,4-Trichlorobenzene	5	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Naphthalene	10	<10	<10	<10	<10	<12	<10	<10(E1)	<12
4-Chloroaniline	5	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Hexachlorobutadiene	5	<10	<10	<10	<10	<12	<10	<10(E1)	<12
4-Chloro-3-Methylphenol	1*	<10	<10	<10	<10	<12	<10	<10(E1)	<12
2-Methylnaphthalene	5	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Hexachlorocyclopentadiene	5	<10	<10(E1)	<10	<10(E1)	<12	<10(E1)	<10(E1)	<12
2,4,6-Trichlorophenol	1*	<10	<10	<10	<10	<12	<10	<10(E1)	<12
2,4,5-Trichlorophenol	1*	<52	<50	<50	<50	<62	<50	<51(E1)	<62
2-Chloronaphthalene	10	<10	<10	<10	<10	<12	<10	<10(E1)	<12
2-Nitroaniline	5	<52	<50	<50	<50	<62	<50	<51(E1)	<62
Dimethyl Phthalate	50	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Acenaphthylene	NA	<10	<10	<10(E1)	<10	<12	<10	<10(E1)	<12
2,6-Dinitrotoluene	5	<10	<10	<10	<10	<12	<10	<10(E1)	<12
3-Nitroaniline	5	<52	<50	<50	<50	<62	<50	<51(E1)	<62
Acenaphthene	20	<10	<10	<10	<10	<12	<10	<10(E1)	<12
2,4-Dinitrophenol	1*	<52(E1)	<50	<50	<50	<62(E1)	<50	<51(E1)	<62
4-Nitrophenol	1*	<52	<50	<50	<50	<62	<50	<51(E1)	<62
Dibenzofuran	NA	<10	<10	<10	<10	<12	<10	<10(E1)	<12
2,4-Dinitrotoluene	5	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Diethylphthalate	50	<10	<10	<10	<10	<12	<10	<10(E1)	<12
4-Chlorophenyl-phenylether	NA	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Fluorene	50	<10	<10	<10	<10	<12	<10	<10(E1)	<12
4-Nitroaniline	5	<52	<50	<50	<50	<62	<50	<51(E1)	<62
4,6-Dinitro-2-Methylphenol	1*	<52(E1)	<50	<50	<50	<62(E1)	<50	<51(E1)	<62
N-Nitrosodiphenylamine	50	<10	<10	<10	<10	<12	<10	<10(E1)	<12
4-Bromophenyl-phenylether	NA	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Hexachlorobenzene	0.35	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Pentachlorophenol	1*	<52(E1)	<50	<50	<50	<62(E1)	<50	<51(E1)	<62
Phenanthrene	50	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Anthracene	50	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Di-n-Butylphthalate	NA	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Fluoranthene	50	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Pyrene	50	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Butyl benzyl phthalate	50	<10	<10	<10	<10	<12	<10	<10(E1)	<12
3,3'-Dichlorobenzidine	5	<21	<20	<20	<20	<25	<20	<20(E1)	<25
Benz(a)Anthracene	0.002	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Chrysene	0.002	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Bis(2-Ethylhexyl)Phthalate	50	8(J)	<10	<10	<10	<12	<10	<10(E1)	<12
Di-n-Octyl Phthalate	50	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Benzo(b)Fluoranthene	0.002	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Benzo(k)Fluoranthene	0.002	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Benzo(a)Pyrene	NA	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Indeno(1,2,3-cd)Pyrene	0.002	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Dibenz(a,h)Anthracene	NA	<10	<10	<10	<10	<12	<10	<10(E1)	<12
Benzo(g,h,i)Perylene	NA	<10	<10	<10	<10	<12	<10	<10(E1)	<12
TENTATIVELY IDENTIFIED COMPOUNDS									
Dimethyl Phenol Isomer		22	--	--	--	--	--	--	--
Phsophoric Acid Derivative		33	--	--	--	--	--	--	--
Unknown 1		38	--	--	--	--	--	--	--
Unknown 2		77	--	--	--	--	--	--	--
Unknown 3		120	--	--	--	--	--	--	--
Unknown 4		95	--	--	--	--	--	--	--
Unknown 5		54	--	--	--	--	--	--	--
Unknown 6		12	--	--	--	--	--	--	--
Unknown 7		140	--	--	--	--	--	--	--
Unknown 8		110	--	--	--	--	--	--	--

NOTES: (1) - "*" indicates no inserted value applies to the sum of the phenolic compounds.
(2) - "NA" indicates no NYS Ground-Water Quality Standard.

Explanation of Data Qualifiers:

(J) - Esimated value below required detection limit.
(E1) - Estimated detection limit due to instrument calibration problems or exceedance of holding time.

Analyses performed by Recra Environmental, Inc., using 1989 New York State Analytical Services Protocol.
Data validation performed by C.C. Johnson & Malhotra, P.C.

\TABLE-12.WQ1

TABLE 13
RESULTS OF METALS AND CYANIDE ANALYSES
OF WATER SAMPLES
ARO - BUFFALO, NY
LAW ENVIRONMENTAL PROJECT NO. 52.2507
Results in ppm

COMPOUND	NYS Ground-Water Quality Standards mg/L	Tap Water	MW-1 U (3)	MW-1 F (4)	MW-2 U	MW-2 F	MW-3 U	MW-3 F	MW-4 U	MW-4 F	MW-5 U	MW-5 F
Priority Pollutant Metals												
Antimony	0.003	<.005	0.105	.0448(B)	<.030	<.040	.0445(B)	<.040	0.0872	0.0705	.472(E)	<.040
Arsenic	0.025	<.005	0.013	<.005	<.005	<.005	<.005	<.005	.0013(E)	<.005	0.031	<.005
Beryllium	0.003	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	0.0053	<.005
Cadmium	0.010	.0004(EB)	<.005(E1)	<.005(E1)	<.005(R)	<.005(E1)	<.005(R)	.0053(E)	<.005(E1)	<.005	<.005(E1)	<.005
Chromium	0.050	<.010	.051(E)	<.010	<.010(E1)	<.010	.038(E)	<.010	.062(E)	<.010	.263(E)	<.010
Copper	0.200	<.010	<.005	<.005	0.0299	<.005	.022(B)	.0056(B)	0.0274	.0083(B)	.014(E)	<.005
Lead	0.025	<.003	0.429(E)	<.003(E1)	.006(E)	<.003(E1)	.0933(E)	<.003(E1)	.0598(E)	<.003	.165(E)	.0043(E)
Mercury	0.002	<.0002	<.002	<.002	0.0003	<.0002	<.0002	<.0002	<.0002	<.0002	0.00041	<.0002
Nickel	NA (1)	<.020	.0691(E)	<.020	<.020	<.020	.0333(B)	<.020	.0658(E)	<.020	.238(E)	<.020
Selenium	0.010	<.005(E1)	<.005(R)	<.005	<.010(E1)	<.005	<.005(E1)	<.005(E1)	<.025(R)	<.005	<.005(R)	<.005(E1)
Silver	0.050	<.010	<.010(E1)	<.010	<.010	<.010	<.010	<.010	<.010(E1)	<.010	<.010(E1)	<.010
Thallium	0.004	<.070	<.005(E1)	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Zinc	0.300	0.0445	.296(E)	<.010(E1)	0.0214	<.010	0.0623	<.010	.232(E)	<.010(E1)	.786(E)	<.010(E1)
Cyanide	0.100	<.010	<.010(E2)	---	<.010(E1)	---	<.010(E1)	---	<.010(E2)	---	<.010(E1)	---
Other TAL Metals												
Aluminum	NA	.137(B)	31.3(E)	<.050(E1)	.586(E)	<.050(E1)	6.63(E)	<.050(E1)	28.9(E)	<.050(E1)	120(E)	<.050(E1)
Barium	1.0	<.030	.266(E)	.0262(EB)	.0911(B)	.0857(B)	.125(B)	.0586(B)	.266(E)	.0309(EB)	1.17(E)	.0977(EB)
Calcium	NA	39.5	213(E)	49.9(E)	59.4	56.9(E)	112(E)	51.7(E)	274(E)	145(E)	1820(E)	43.6(E)
Cobalt	0.005	<.020	.0209(B)	<.020	<.020	<.020	<.020	<.020	.0235(B)	<.020	0.0824	<.020
Iron	0.300 (2)	.0935(B)	45.9(E)	<.030(E1)	1.44	0.304	9.09	<.030	45.8(E)	<.030(E1)	203(E)	<.030(E1)
Magnesium	35	8.77	98.4(E)	34.4(E)	45.8(E)	45.5(E)	96.2(E)	63.6(E)	166(E)	121(E)	551(E)	65.8(E)
Manganese	0.300 (2)	.0068(B)	1.1(E)	.0571(E)	.120(E)	.130(E)	.223(E)	.0083(E)	1.23(E)	.187(E)	5.17(E)	.0362(E)
Potassium	NA	<5.0	18.8	14.3	11.5	12.9	32.1	31.1	13.3	5.59	32	3.06(B)
Sodium	20	12.1	58.7(E)	63.8(E)	7.9(E)	81.3(E)	110(E)	69.6(E)	45.8(E)	45.4(E)	36.7(E)	31.5(E)
Vanadium	NA	<.030	0.0554	<.020	<.020	<.020	<.020	<.020	0.0527	<.020	0.237	<.020

NOTES:
(1) "NA" indicates no NYS Ground-Water Quality Standard available.
(2) Ground-water standard of iron and manganese together is 0.500 ppm.
(3) "U" indicates unfiltered samples
(4) "F" indicates filtered samples

Explanation of Data Qualifiers:

(E) - Estimated value due to instrument calibration, spike recovery, interference problems or control limits.
(E1) - Estimated detection limit due to instrument calibration, spike recovery or interference problems.
(E2) - Estimated detection limit due to exceedance of holding time and instrument calibration problems.
(B) - Estimated value or detection limit; compound identified in laboratory blank.
(R) - Rejected data due to matrix spike recoveries outside of control limits.

Analyses performed by Recra Environmental, Inc., using 1989 New York State Analytical Services Protocol.
Data validation performed by C.C. Johnson & Malhotra, P.C.

TABLE 13
RESULTS OF METALS AND CYANIDE ANALYSES OF WATER SAMPLES
ARO - BUFFALO, NY
LAW ENVIRONMENTAL PROJECT NO. 52.2507
Results in ppm

COMPOUND	NYS Ground-Water Quality Standards mg/L	MW-6 U	MW-6 F	MW-7 U	MW-7 F	MW-8 U	MW-8 F	MW-9 U	MW-9 F	MW-10 U	MW-10 F
Priority Pollutant Metals											
Antimony	0.003	.113(E)	<.040	.156(E)	.0495(B)	0.0643	.0419(B)	.217(E)	<.040	<.040	<.040
Arsenic	0.025	0.015	<.005	0.022	<.005	<.005	<.005	0.022	<.005(E1)	<.005(E1)	<.005
Beryllium	0.003	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Cadmium	0.010	<.005(E1)	<.005	<.005(E1)	<.005	<.005(E1)	<.005	<.005(E1)	<.005	<.005(E1)	<.005
Chromium	0.050	.066(E)	<.010	.060(E)	<.010	.013(E)	<.010	.138(E)	<.010	.020(E)	<.010
Copper	0.200	.019(EB)	.0057(B)	.0132(EB)	.006(B)	.0195(B)	.0059(B)	.0085(EB)	<.005	<.005	<.005
Lead	0.025	.131(E)	0.003	.032(E)	<.003	.0184(E)	<.003(E)	.202(E)	<.003	.0461(E)	<.003
Mercury	0.002	0.00021	<.0002	0.0021	<.0002	<.0002	0.00021	0.00024	<.0002	0.00021	0.00021
Nickel	NA (1)	.0823(E)	<.020	.0483(E)	<.020	<.020(E1)	<.020	.133(E)	<.020	.0211(EB)	<.020
Selenium	0.010	<.005(R)	<.005	<.025(R)	<.005(E1)	<.005(R)	<.005(E1)	<.025(R)	<.005	<.025(R)	<.005
Silver	0.050	<.010(E1)	<.010	<.010(E1)	<.010	<.010(E1)	<.010	<.010(E1)	<.010	<.010(E1)	<.010
Thallium	0.004	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Zinc	0.300	.342(E)	<.010(E1)	.169(E)	<.010(E1)	.015(E)	<.010(E1)	.334(E)	<.010(E1)	.131(E)	<.010(E1)
Cyanide	0.100	<.010(E1)	---	<.010(E2)	---	<.010(E2)	---	<.010(E2)	---	<.010(E2)	---
Other TAL Metals											
Aluminum	NA	35.9(E)	<.050(E1)	22.3(E)	<.050(E1)	5.49(E)	<.050(E1)	69.1(E)	.255(E)	8.89(E)	<.050(E1)
Barium	1.0	.479(E)	.0799(EB)	.441(E)	.0797(EB)	.139(EB)	.0583(EB)	.628(E)	.040(EB)	.136(EB)	.0619(EB)
Calcium	NA	421(E)	141(E)	397(E)	72.8(E)	111(E)	96.1(E)	720(E)	57.1(E)	112(E)	44.1(E)
Cobalt	0.005	.026(B)	<.020	<.020	<.020	<.020	<.020	.0365(B)	<.020	<.020	<.020
Iron	0.300 (2)	59.0(E)	.0816(EB)	50.6(E)	.143(E)	8.13(E)	.113(E)	97.8(E)	.500(E)	13(E)	<.030(E1)
Magnesium	35	171(E)	78.2(E)	180(E)	91.5(E)	74.4(E)	68.9(E)	263(E)	56(E)	66.8(E)	44.5(E)
Manganese	0.300 (2)	1.66(E)	.325(E)	1.03(E)	.0483(E)	.386(E)	.233(E)	2.61(E)	.149(E)	.465(E)	.128(E)
Potassium	NA	13.1	2.38(B)	10.1	3.23(B)	4.7(B)	3.16(B)	21.7	1.98(B)	6	3.34(B)
Sodium	20	59.0(E)	52.4(E)	31.6(E)	29.8(E)	27.1(E)	26.1(E)	48.8(E)	44.9(E)	46.3(E)	47.7(E)
Vanadium	NA	0.069	<.020	.0418(B)	<.020	<.020	<.020	0.122	<.020	<.020	<.020

NOTES:
(1) "NA" indicates no NYS Ground-Water Quality Standard available.
(2) Ground-water standard of iron and manganese together is 0.500 ppm.
(3) "U" indicates unfiltered samples
(4) "F" indicates filtered samples

Explanation of Data Qualifiers:

(E) - Estimated value due to instrument calibration, spike recovery, interference problems or control limits.
(E1) - Estimated detection limit due to instrument calibration, spike recovery or interference problems.
(E2) - Estimated detection limit due to exceedance of holding time and instrument calibration problems.
(B) - Estimated value or detection limit; compound identified in laboratory blank.
(R) - Rejected data due to matrix spike recoveries outside of control limits.

Analyses performed by Recra Environmental, Inc., using 1989 New York State Analytical Services Protocol.
Data validation performed by C.C. Johnson & Malhotra, P.C.
\TABLE-13.WQ1

TABLE 13
RESULTS OF METALS AND CYANIDE ANALYSES OF WATER SAMPLES
ARO - BUFFALO, NY
LAW ENVIRONMENTAL PROJECT NO. 52.2507
Results in ppm

COMPOUND	NYS Ground-Water Quality Standards mg/L	MW-11 U	MW-11 F	MW-13 U	MW-13 F	MW-14 U	MW-14 F	MW-15 U	MW-15 F	MW-16 U	MW-16 F
Priority Pollutant Metals											
Antimony	0.003	<.040	<.040	.358(E)	<.040	.251(E)	<.040	0.0771	<.040	.101(E)	<.040
Arsenic	0.025	<.005(E1)	<.005	.0279(E)	<.005	.0142 S	<.005	<.005	<.005(E1)	.005(B)	<.005(E1)
Beryllium	0.003	<.005	<.005	.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Cadmium	0.010	<.005(E1)	<.005	<.005(E1)	<.005	<.005(E1)	<.005	<.005(R)	<.005	<.005(E1)	<.005
Chromium	0.050	.032(E)	<.010	.220(E)	<.010	.164(E)	<.010	.026(E)	<.010	.042(E)	<.010
Copper	0.200	.0193(B)	<.005	.018(EB)	<.005	.0875(E)	.0097(B)	<.005	<.005	<.005	<.005
Lead	0.025	.0648(E)	<.003(E1)	.191(E)	<.003(E1)	.1289(E)	<.003	.033(E)	.0044(e)	.0304(E)	<.003(E)
Mercury	0.002	<.0002	0.00021	0.00041	0.00029	0.00029	<.0002	<.0002	<.0002	<.0002	<.0002
Nickel	NA (1)	.045(E)	<.020	.244(E)	<.020	.153(E)	<.020	.0286(B)	<.020	.111(E)	<.020
Selenium	0.010	<.005(R)	<.005	<.025(R)	<.005(E1)	<.025(R)	<.005	<.005(E1)	<.005	<.005(R)	<.005
Silver	0.050	<.010(E1)	<.010	<.010(E1)	<.010	<.010(E1)	<.010	<.010	<.010	<.010(E1)	<.010
Thallium	0.004	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Zinc	0.300	.217(E)	<.010(E1)	.604(E)	<.010(E1)	.327(E)	<.010(E1)	0.0762	<.010	.140(E)	<.010(E1)
Cyanide	0.100	<.010(E2)	---	<.010(E2)	---	<.010(E2)	---	<.010(E1)	---	<.010(E2)	---
Other TAL Metals											
Aluminum	NA	15.7(E)	<.050(E1)	113(E)	<.050(E1)	59.2(E)	<.050(E1)	14.3(E)	<.050(E1)	22.3(E)	<.050(E1)
Barium	1.0	.328(E)	.0862(EB)	1.15(E)	.0774(EB)	.756(E)	.0468(EB)	.187(B)	.0546(B)	.244(E)	.0674(EB)
Calcium	NA	150(E)	65.6(E)	1290(E)	37.2(E)	858(E)	147(E)	244(E)	32.2	334(E)	38.4(E)
Cobalt	0.005	<.020	<.020	0.074	<.020	.0423(B)	<.020	<.020	<.020	<.020	<.020
Iron	0.300 (2)	21(E)	<.030(E1)	176(E)	<.030	98.1(E)	<.030(E1)	20.4	<.030	30.3(E)	<.030(E1)
Magnesium	35	70.1(E)	47.4(E)	397(E)	45.7(E)	260(E)	80(E)	85(E)	38.6(E)	179(E)	68.8(E)
Manganese	0.300 (2)	.652(E)	.207(E)	4.72(E)	.135(E)	2.840(E)	.167(E)	.521(E)	.0074(EB)	.902(E)	.0128(EB)
Potassium	NA	11.6	7.72	32	1.68(B)	20.3	3.66(B)	28.5	22	27.1	20.5
Sodium	20	47.4(E)	45.9(E)	33.8(E)	27.3(E)	69.2(E)	70(E)	60.6(E)	60.6(E)	89.7(E)	85.6(E)
Vanadium	NA	.0326(B)	<.020	0.22	<.020	0.110	<.020	.0339(B)	<.020	.0419(B)	<.020

NOTES:
(1) "NA" indicates no NYS Ground-Water Quality Standard available.
(2) Ground-water standard of iron and manganese together is 0.500 ppm.
(3) "U" indicates unfiltered samples
(4) "F" indicates filtered samples

Explanation of Data Qualifiers:

(E) - Estimated value due to instrument calibration, spike recovery, interference problems or control limits.
(E1) - Estimated detection limit due to instrument calibration, spike recovery or interference problems.
(E2) - Estimated detection limit due to exceedance of holding time and instrument calibration problems.
(B) - Estimated value or detection limit; compound identified in laboratory blank.
(R) - Rejected data due to matrix spike recoveries outside of control limits.

Analyses performed by Recra Environmental, Inc., using 1989 New York State Analytical Services Protocol.
Data validation performed by C.C. Johnson & Malhotra, P.C.

TABLE 13
RESULTS OF METALS AND CYANIDE ANALYSES OF WATER SAMPLES
ARO - BUFFALO, NY
LAW ENVIRONMENTAL PROJECT NO. 52.2507
Results in ppm

COMPOUND	NYS Ground-Water Quality Standards mg/L	MW-17 U	MW-17 F	MW-18 U	MW-18 F	MW-19 U	MW-19 F	MW-20 U	MW-20 F	OW-101 U	OW-101 F
Priority Pollutant Metals											
Antimony	0.003	<.040	<.040	0.281	<.040	<.040	<.040	0.182	<.040	<.040	<.040
Arsenic	0.025	<.005(E1)	<.005	0.018	.005(E)	<.005	<.005	.009(B)	<.005	<.005(E1)	<.005
Beryllium	0.003	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005
Cadmium	0.010	<.005(E1)	<.005	<.005(R)	<.005(E1)	<.005(E1)	<.005	<.005(R)	<.005	<.005(E1)	<.005
Chromium	0.050	<.010	<.010	.145(E)	<.010	<.010	<.010	.087(E)	<.010	.050(E)	<.010
Copper	0.200	0.169	<.005	<.005	<.005	0.0297	<.005	.0104(EB)	<.005	0.0302	.0087(B)
Lead	0.025	.010(E)	<.003(E1)	.116(E)	.003(E)	.009(E)	<.003(E1)	.123(E)	<.003	.010(E)	<.003
Mercury	0.002	0.00027	<.0002	.00031	<.0002	<.0002	<.0002	0.00039	<.0002	<.0002	<.0002
Nickel	NA (1)	0.020	<.020	0.125	<.020	<.020(E1)	<.020	0.0796	<.020	.122(E)	0.0443
Selenium	0.010	<.005(R)	<.025	<.010(E1)	<.005	<.005(R)	<.005	<.010(E1)	<.005(E1)	<.005(R)	<.005
Silver	0.050	<.010(E1)	<.010	<.010	<.010	<.010(E1)	<.010	<.010	<.010	<.010(E1)	<.010
Thallium	0.004	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005(E1)	<.005
Zinc	0.300	.181(E)	<.010(E1)	0.267	<.010	.0854(E)	<.010(E1)	0.171	<.010	.035(E)	<.010(E1)
Cyanide	0.100	<.010(E1)	---	<.010(E1)	---	<.010(E1)	---	<.010(E1)	---	<.010(E1)	---
Other TAL Metals											
Aluminum	NA	3.84(E)	.158(EB)	67.4(E)	<.050(E1)	.809(E)	<.050(E1)	42.3(E)	<.050(E1)	.465(E)	<.050(E1)
Barium	1.0	.117(EB)	.0814(EB)	0.680	.0606(B)	.0819(EB)	.0671(EB)	0.630	0.201	.101(EB)	.0898(EB)
Calcium	NA	87.1(E)	38.4(E)	1180(E)	8.67(E)	56.5(E)	46.6(E)	744(E)	51.6(E)	88.8(E)	88.3(E)
Cobalt	0.005	<.020	<.020	.042(B)	<.020	<.020	<.020	.0337(B)	<.020	<.020	<.020
Iron	0.300 (2)	4.93(E)	.250(E)	96.3	<.030	1.09(E)	<.030(E1)	604	<.030	1.07(E)	<.030(E1)
Magnesium	35	59(E)	44.8(E)	321(E)	24.9(E)	59.4(E)	56.3(E)	288(E)	10.3(E)	43.5(E)	43.4(E)
Manganese	0.300 (2)	.154(E)	.0183(E)	2.56(E)	<.005(E1)	.0495(E)	.0234(E)	1.72(E)	.0223(E)	.117(E)	.089(E)
Potassium	NA	5.96	7.39	117	94.3	5.66	5.07	21.8	9.69	5.14	4.82(B)
Sodium	20	34.2(E)	36.8(E)	107(E)	111(E)	20.(E)	189(E)	290(E)	23.5(E)	78.6(E)	75.1(E)
Vanadium	NA	<.020	<.020	0.13	<.020	<.020	<.020	0.0829	<.020	<.020	<.020

NOTES:
(1) "NA" indicates no NYS Ground-Water Quality Standard available.
(2) Ground-water standard of iron and manganese together is 0.500 ppm.
(3) "U" indicates unfiltered samples
(4) "F" indicates filtered samples

Explanation of Data Qualifiers:

(E) - Estimated value due to instrument calibration, spike recovery, interference problems or control limits.
(E1) - Estimated detection limit due to instrument calibration, spike recovery or interference problems.
(E2) - Estimated detection limit due to exceedance of holding time and instrument calibration problems.
(B) - Estimated value or detection limit; compound identified in laboratory blank.
(R) - Rejected data due to matrix spike recoveries outside of control limits.

Analyses performed by Recra Environmental, Inc., using 1989 New York State Analytical Services Protocol.
Data validation performed by C.C. Johnson & Malhotra, P.C.

TABLE 13
RESULTS OF METALS AND CYANIDE ANALYSES
OF WATER SAMPLES
ARO - BUFFALO, NY
LAW ENVIRONMENTAL PROJECT NO. 52.2507
Results in ppm

COMPOUND	NYS Ground-Water Quality Standards mg/L	OW-102 U	OW-102 F	OW-103 U	OW-103 F	NYS Class D Surface Water Standards mg/L	SW-101 U	SW-101 F	SW-102 U	SW-102 F	SW-103 U	SW-103 F
Priority Pollutant Metals												
Antimony	0.003	.051(B)	<.040	.005(E)	<.040(B)	NA	<.040	<.040(B)	.0424(B)	.0486(B)	<.040	<.040(B)
Arsenic	0.025	<.005(E1)	<.005	<.005	<.005	0.036	<.005(E1)	<.005	<.005(E1)	<.005	<.005(E1)	<.005
Beryllium	0.003	<.005	<.005	<.005(E1)	<.005	NA	<.005	<.005	<.005	<.005	<.005	<.005
Cadmium	0.010	<.005(E1)	<.005	.0015(E)	<.005	(5)	<.005(E1)	<.005	<.005(E1)	<.005	<.005(E1)	<.005
Chromium	0.050	.452(E)	<.010	4.02(E)	<.010	0.016	<.010	<.010	<.010	<.010	<.010	<.010
Copper	0.200	0.169	.0118(B)	0.093	0.026	(6)	.0162(B)	.0066(B)	0.0347	.0058(B)	0.102	.0056(B)
Lead	0.025	.0317(E)	<.003	.014(E)	<.003	(7)	.0572(E)	.004	.0224(E)	0.0003	.018(E)	.0003(E)
Mercury	0.002	0.00021	0.00021	<.0002	<.0002	NA	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002
Nickel	NA (1)	1.03(E)	.0243(B)	2.55(E)	.036(B)	(8)	<.020(E1)	<.020	.0215(EB)	<.020	.0243(EB)	<.020
Selenium	0.010	<.005(R)	<.005	<.005(R)	<.005	NA	<.005(R)	<.005(E1)	<.005(R)	<.005	<.005(R)	<.005(E1)
Silver	0.050	<.010(E1)	<.010	<.0003(E1)	<.010	(9)	<.010(E1)	<.010	<.010(E1)	<.010	<.010(E1)	<.010
Thallium	0.004	<.005	<.005	<.005	<.005	0.02	<.005(E1)	<.005	<.005(E1)	<.005	<.005	<.005
Zinc	0.300	.176(E)	<.010(E1)	.041(E)	<.010(E1)	(10)	.180(E)	.0402(E)	.546(E)	.382(E)	.207(E)	.0252(E)
Cyanide	0.100	<.010(E2)	---	---	---	0.022	<.010(E1)	--	<.010(E2)	--	<.010(E2)	--
Other TAL Metals												
Aluminum	NA	2.54(E)	<.050(E1)	0.680	<.050(E1)	NA	.992(E)	<.050(E1)	2.3(E)	<.050(E1)	.564(E)	<.050(E1)
Barium	1.0	.162(EB)	.113(EB)	.136(EB)	.079(EB)	NA	.0494(EB)	.0313(EB)	.0678(EB)	.0533(EB)	.0441(EB)	.0364(EB)
Calcium	NA	142(E)	80.7(E)	79.2(E)	39.1(E)	NA	68.2(E)	55.4(E)	96.3(E)	88.3(E)	67.1(E)	66.3(E)
Cobalt	0.005	<.020	<.020	.028(B)	<.020	0.110	<.020	<.020	<.020	<.020	<.020	<.020
Iron	0.300 (2)	8.86(E)	<.030(E1)	12(E)	<.030(E1)	0.300	1.74(E)	.0344(EB)	2.73(E)	<.030(E1)	.716(E)	<.030(E1)
Magnesium	35	40.4(E)	28.1(E)	15(E)	4.87(EB)	NA	6.74(E)	5.91(E)	18.5(E)	17.2(E)	9.03(E)	9.02(E)
Manganese	0.300 (2)	.535(E)	.0842(E)	.726(E)	.029(E)	NA	.181(E)	.0466(E)	.0593(E)	.0117(EB)	.208(E)	.0614(E)
Potassium	NA	7.67	3.37(B)	6.27	9.86	NA	3.86(B)	3.55(B)	1.95(B)	1.41(B)	1.41(B)	1.09(B)
Sodium	20	335(E)	183(E)	284	127(E)	NA	59.8(E)	60.5(E)	62.5(E)	67.9(E)	31.8(E)	32(E)
Vanadium	NA	<.020	<.020	.040(B)	<.020	0.190	<.020	<.020	<.020	<.020	<.020	<.020
Hardness	--	--	--	--	--	NA	180	--	310	--	188	--

NOTES: (1) "NA" indicates no NYS Ground-Water Quality Standard available.
(2) Ground-water standard of iron and manganese together is 0.500 ppm.
(3) "U" indicates unfiltered samples
(4) "F" indicates filtered samples
(5) Class D Surface Water Standard for cadmium = exp(1.128 [ln(ppm hardness)]-3.828)
(6) Class D Surface Water Standard for copper = exp(0.9422 [ln(ppm hardness)]-1.464
(7) Class D Surface Water Standard for lead = exp(1.266 [ln(ppm hardness)]-1.416)
(8) Class D Surface Water Standard for nickel = exp(0.76 [ln(ppm hardness)]+4.02)
(9) Class D Surface Water Standard for silver = exp(1.72 [ln(ppm hardness)]-6.52)
(10) Class D Surface Water Standard for zinc = exp(0.83 [ln(ppm hardness)]+1.95)

Explanation of Data Qualifiers:

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(B) -	Estimated value or detection limit; compound identified in laboratory blank.
(R)	Rejected data due to matrix spike recoveries outside of control limits.

Analyses performed by Recra Environmental, Inc., using 1989 New York State Analytical Services Protocol.
Data validation performed by C.C. Johnson & Malhotra, P.C.

TABLE 14
WATER-LEVEL ELEVATION MEASUREMENTS
ARO - BUFFALO, NY
MARCH - SEPTEMBER 1992
LAW ENVIRONMENTAL PROJECT NO. 52.2507

WELL	DATUM ELEVATION (1)	DEPTH TO WATER 09/16/92	WATER ELEVATION 09/16/92
MW-1	657.47	4.03	653.44
MW-2	654.07	3.86	650.21
MW-3	652.99	2.13	650.86
MW-4	656.10	5.69	650.41
MW-5	656.12	10.29	645.83
MW-6	651.26	3.20	648.06
MW-7	654.89	12.50	642.39
MW-8	652.23	2.93	649.30
MW-9	652.16	3.57	649.59
MW-10	652.11	1.67	650.44
MW-11	652.62	2.26	650.36
MW-13	652.68	2.31	650.37
MW-14	655.85	7.64	648.21
MW-15	655.97	3.90	652.07
MW-16	652.48	5.16	647.32
MW-17	652.68	1.08	651.60
MW-18	651.23	2.41	648.82
MW-19	653.26	4.94	648.32
MW-20	654.45	8.75	645.70
OW-101	652.70	3.52	649.18
OW-102	651.47	1.10	650.37
OW-103	651.17	1.61	649.56
TG-1	655.93	5.55	650.38
TG-2	655.28	6.80	648.48

NOTES: (1) Datum elevations for MW-1, MW-2 and MW-4 to MW-14 were obtained from Tallamy, Van Kuren, Gertis and Associates, Drawing No. B-15641 (February 23, 1992). Datum elevations for remaining monitoring wells and sample locations were obtained from Krehbiel Associates, Drawing No. D-2300 (June 23, 1992).

\TABLE-14.WQ1

TABLE 15
HYDRAULIC CONDUCTIVITY TEST RESULTS
ARO - BUFFALO, NY
LAW ENVIRONMENTAL PROJECT NO. 52.2507

WELL NO.	AVERAGE HYDRAULIC CONDUCTIVITY (ft/min)	TYPE OF TEST
MW-3	3×10^{-6}	Slug In/Rising Head
MW-15	1×10^{-6}	Slug In/Slug Out
MW-16	2×10^{-7}	Falling Head/Rising Head
MW-17	6×10^{-6}	Slug In/Slug Out
MW-18	3×10^{-7}	Rising Head
MW-19	2×10^{-5}	Slug In/Slug Out
MW-20	1×10^{-5}	Slug In/Slug Out
MW-3R	1×10^{-7}	Falling Head
MW-4R	2×10^{-7}	Falling Head
MW-14R	1×10^{-8}	Falling Head

\2507J1.TAB

TABLE 16
COMPARISON METALS CONCENTRATIONS
ARO - BUFFALO, NY
LAW ENVIRONMENTAL PROJECT NO. 52.2507

All Results in ppm

METALS	TCLP ALTERNATIVE GUIDANCE VALUES (1)	RANGES IN BUFFALO, NY (2)	RANGES IN NATURAL SOILS (3)	RANGES IN ON-SITE SUBSURFACE SOILS	RANGES IN ON-SITE SURFACE SEDIMENTS
Antimony	0.06	NA	2-10	9-34	ND-36
Arsenic	0.5	NA	1-50	1-12	3-10
Barium	20	NA	100-3000	17-138	60-135
Cadmium	0.20	5-9	0.01-0.7	0.11-0.21	ND
Chromium	1.0	8-30	1-1000	3-21	13-34
Copper	4.0	7-40	2-100	1-49	20-56
Lead	0.5	20-290	2-200	3-44	144-360
Mercury	0.04	0.09-0.28	0.01-0.3	0.2-0.4 (3)	0.4-0.8
Nickel	NA	10-40	5-500	8-44	14-35
Silver	1.0	NA	0.01-5	5-6 (4)	ND
Zinc	6.0	31-160	10-300	26-195	189-750

NOTES:

(1) - Source: Koszalka, et. al., 1985
(2) - Source: US EPA, 1984
(3) - Mercury detected only in MW-20, SB-102 and SB-104 samples
(4) - Silver detected only in MW-3R soil samples
(NA) - Not available
(ND) - Not detected below method limit

\TABLE-16.WQ1