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Bioremediation Demonstration on Kwajalein Island: Site Characterization and On-Site Biotreatability Studies

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Environmental Sciences Division Publication No. 3733

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TJ Phelps

ORNL/TM-11894

BIOREMEDIATION DEMONSTRATION ON KWAJALEIN ISLAND:

SITE CHARACTERIZATION AND ON-SITE BIOTREATABILITY STUDIES

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PREFACE

This document describes environmental research that is part of a field-scale project designed to demonstrate, test, and evaluate bioremediation as an environmental restoration technique for petroleum-contaminated soils on Kwajalein Island, a U.S. Army Kwajalein Atoll (USAKA) facility in the Republic of The Marshall Islands. The overall project is being managed and conducted by a multidisciplinary team of investigators from Oak Ridge National Laboratory (ORNL), Oak Ridge Associated Universities (ORAU), and The University of Tennessee (UT). Some of the key participants are listed below.

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This report describes the methods and results of the first phase of this project, which consisted of a preliminary assessment made by on-site characterization and biotreatability studies conducted during February 1991.

ACKNOWLEDGMENTS

The work described herein was made possible by funding provided by the U.S. Army and administered by the U.S. Department of Energy (DOE) Hazardous Waste Remedial Actions Program (HAZWRAP). Several individuals and organizations contributed to the successful execution of this work. Gratefully acknowledged are the valuable assistance and support of the environmental representative for the U.S. Army Kwajalein Atoll (USAKA), Dr. Don Ott, and the contributions of the HAZWRAP project manager, Mr. Richard Machanoff, and the HAZWRAP site representative, Mr. Cliff Rogers. The U.S. Army Civic Action Team provided necessary support in excavation and closure of backhoe test pits. Harbert International, Inc., cooperated with space needs for a field laboratory and testing facility. Finally, also acknowledged are the collaborative spirit and effort of members of the HAZWRAP investigation team present on USAKA during this study.

SECTION 1

EXECUTIVE SUMMARY

An environmental study was conducted during February 1991 on Kwajalein Island, a U.S. Army Kwajalein Atoll (USAKA) Base in the Republic of the Marshall Islands (RMI). This study was undertaken for the U.S. Department of Energy (DOE) Hazardous Waste Remedial Actions Program (HAZWRAP) acting in behalf of USAKA. The purpose of the study was to determine if selected locations for new construction on Kwajalein Island were contaminated by petroleum hydrocarbons as suspected and, if so, whether bioremediation appeared to be a feasible technology for environmental restoration. Two different sites were evaluated: (1) the site of a planned freshwater production facility and (2) a site adjacent to an aboveground diesel fuel storage tank. A team of scientists and engineers from the Oak Ridge National Laboratory (ORNL) and The University of Tennessee (UT) visited USAKA during February 15-26, 1991, and conducted on-site inspection, subsurface sampling and analyses, and biotreatability experiments. The results of this work are highlighted below.

Subsurface soil materials were characterized as coral-derived sands, alkaline and nutrient deficient. Bacteria were present at concentrations of 10^3 to 10^6 organisms per gram (org/g) of soil. Groundwater occurred at depths of ca. 5 ft. and the water table chemistry showed no marine influence.

Within the proposed construction zone for the freshwater production facility (a.k.a. desalination plant), total petroleum hydrocarbons (TPH) were either absent or at low levels. At some locations, there were trace to low concentrations of volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). The concentrations of organic compounds measured were below commonly accepted reference values for assessing soil as contaminated and in need of remediation. There were no notable concentrations of heavy metal contaminants.

Characterization data for another potential construction site adjacent to an aboveground diesel fuel storage tank southeast of the old diesel power plant revealed high concentrations of diesel fuel in the soil and groundwater beneath the site. TPH concentrations increased from low levels near the ground surface to concentrations in the soil at the water table approaching 9000 mg/kg (ppm). Concentrations of TPH measured were well above the commonly accepted reference values of 10 to 100 mg/kg for assessing soil as contaminated and in need of remediation. There were only trace to low concentrations of VOCs and SVOCs. There were no notable concentrations of heavy metal contaminants.

Biotreatability experiments suggested that microorganisms within the subsurface at those locations where petroleum contamination was present were adapted and able to degrade the hydrocarbon contaminants in the soil. In contrast, microorganisms in the uncontaminated areas were not adapted nor were they readily capable of biodegrading fresh hydrocarbons.

Results of this investigation indicate that there are petroleum-contaminated soils on Kwajalein Island and bioremediation appears to be a viable environmental restoration technique. Further experimentation and field demonstration are required to determine the design and operating conditions that provide for optimum biodegradation and restoration of the petroleum-contaminated soils.

SECTION 2

INTRODUCTION

2.1 BACKGROUND

The U.S. Army Kwajalein Atoll (USAKA) Base is located on Kwajalein Island in the Republic of the Marshall Islands (RMI) which are in the west central Pacific Ocean. Kwajalein Island is approximately 2100 nautical miles (nmi) southwest of Honolulu, Hawaii, and 700 nmi north of the equator (Fig. 2.1). Kwajalein Atoll is the largest enclosed lagoon in the world and consists of approximately 100 small islands with a total area of 5.6 mi^2. Kwajalein Island is approximately 3.5 mi long by 0.3 to 0.5 mi wide with a land surface area of 1.2 mi^2. The population of the Base is ca. 3000, including Army personnel, a host of subcontractors, and family personnel.

The United States and the RMI recently negotiated a compact of free association allowing the United States exclusive use of 11 islands within the Kwajalein Atoll. The compact stipulates that the environment of Kwajalein Atoll will be protected in accordance with U.S. environmental laws (e.g., RCRA, CERCLA, TSCA, CWA). The mechanism for implementing and verifying compliance is not clear, however. For example, the U.S. Environmental Protection Agency (EPA) (i.e., Region IX) determined that it has no regulatory authority within Kwajalein Atoll.

Various potentially environmentally harmful materials have been handled on Kwajalein Island during the past 50 years, and the potential release of hazardous substances through container and piping system leaks, surface spills, and other potentially inadequate material handling and waste management practices may have resulted in contaminated soil and groundwater in the vicinity of the planned construction sites. Consistent with environmental requirements and standard practices in the United States, the proposed construction areas had to be investigated to determine the extent and magnitude of any contamination. If contamination was discovered, the need and extent of environmental restoration had to be evaluated and implemented as necessary and appropriate. To facilitate accomplishment of the required environmental work, USAKA commissioned HAZWRAP in 1990 to assist with and administer the various environmental projects.

One of the early HAZWRAP projects was to determine the extent and magnitude of petroleum hydrocarbon contamination adjacent to diesel-powered generating stations, storage tanks, and piping systems. This was a high-priority effort since several construction projects were planned by USAKA to occur on on Kwajalein Island during the next 5 years in the vicinity of these potential contamination sources, including the construction of a freshwater production facility (a.k.a., desalination water treatment plant) scheduled for FY1991/1992. These proposed construction sites had to be investigated and assessed to be uncontaminated or restored prior to proceeding with construction activities. It was suspected that soil and groundwater contamination by petroleum hydrocarbons and other organics would be encountered and would require environmental restoration.

Given the remoteness of Kwajalein Island, the lack of sophisticated remediation technologies and waste disposal facilities on-site, as well as the amenability of petroleum hydrocarbons to biodegradation, USAKA requested through HAZWRAP that a project be initiated to evaluate the feasibility of using bioremediation for environmental restoration of contaminated sites in Kwajalein Atoll. If it appeared feasible, a technology demonstration would then be initiated to document this feasibility and provide design, operation, and performance data for full-scale

remediation on the atoll. In January 1991, HAZWRAP commissioned a team of scientists and engineers from Oak Ridge National Laboratory (ORNL), Oak Ridge Associated Universities (ORAU), and The University of Tennessee (UT) to conduct a bioremediation demonstration on Kwajalein Island.

2.2 SYNOPSIS OF SITE CONDITIONS

Information available describing the general site conditions of Kwajalein Island was summarized in documents describing prior investigations in the atoll and various construction related activities on Kwajalein Island [1-4]. Highlights of this information are given below.

Kwajalein Atoll consists of sedimentary coral limestone that caps a seamount and extends above the ocean floor [1-2]. The surface of the mass is very irregular and generally is submerged below sea level, while around the periphery is a higher ridge of coral which frequently extends above the water surface. This formation has yielded a crescent-shaped chain of islands surrounding a relatively shallow lagoon. Kwajalein Island, the largest of the chain, lies at the southeast end of the atoll. The land surface topography of Kwajalein Island is level. There has been some ground-filling on the northern and eastern sides of the island over time. The northern portion of the construction area, including that of the proposed desalination plant, appears to be located in a filled area.

Preliminary soil borings in the vicinity of the fuel farm, about 0.3 mi east of the desalination construction site, revealed subsurface conditions composed of tan, poorly graded to silty coral sands (SP-SM). With depth, well-graded sands (SW) and silts (ML) were encountered. Materials encountered during boring were reported to have an "obvious petroleum or hydrocarbon odor" [3].

Groundwater under Kwajalein Island was reported to exist in a freshwater surface lens typical of coral atolls. The water table elevation is typically within +/- 1 ft of the sea level and varies with tidal fluctuations. For the construction area, this information suggested that groundwater would be encountered at approximately 6- to 8-ft depths.

Preliminary information regarding the types of activities occurring on the island, as well as limited results of on-site soil and groundwater investigations, suggested that the construction site for the desalination plant and other nearby sites might be contaminated with petroleum hydrocarbons [3-4]. It was believed that the contamination would be primarily diesel fuel associated with power generation, but contamination by other hydrocarbons (e.g., jet fuel, gasoline, solvents) would be possible. In addition, there could be other organic and inorganic contaminants.

2.3 OBJECTIVES AND SCOPE

The first phase of the bioremediation demonstration described herein involved site characterization and on-site treatability studies to determine the nature and magnitude of contamination present and to determine if bioremediation appeared to be a feasible technology for environmental restoration of petroleum hydrocarbon-contaminated sites in Kwajalein Atoll. To accomplish this goal, a team of scientists and engineers visited USAKA to conduct on-site inspection, subsurface sampling and analyses, and biotreatability experiments. The objectives of the work were to characterize subsurface conditions and assess the feasibility of bioremediation at one or more sites within the construction area (Fig. 2.2). It was acknowledged that the purpose of this work was not to fully delineate the extent or source of contamination at the construction site for the desalination plant or at any other site on Kwajalein

Island. A detailed workplan was developed and approved by HAZWRAP prior to conduct of this work [5].

The study described herein focused on the planned construction area located in the center of USAKA on the atoll side (Fig. 2.3). This area encompasses approximately 20 acres. Within this general construction area, a primary site of interest was the location of a new desalination plant planned for construction during FY1991/1992. This site encompasses approximately 0.3 acres adjacent to the lagoon. Additional areas of interest were adjacent to an old diesel fuel power plant in the center of the planned construction area (Fig. 2.2).

The data quality objectives for this work were developed after consideration of the study purpose and data users. The study was a feasibility assessment, and the principal users of data generated were the technical team responsible for design and conduct of the bioremediation technology demonstration. Because of logistical and technical problems associated with shipping soil materials into the United States from RMI, the remote location of the site, and the need for real-time information to enable field interpretation and decision-making, considerable work had to be carried out on-site using field portable apparatus, instrumentation, and techniques. Given the preceding, the data quality objectives of this field work were HAZWRAP Level A/B. For samples transported to laboratories at ORNL, HAZWRAP Level B/C was to be attained [6-7].

2.4 REPORT ORGANIZATION

A discussion of the materials and methods of the site characterization and on-site treatability experiments is presented in Section 3. The results are summarized in Section 4, and conclusions and recommendations are given in Section 5. It should be noted that off-site treatability experiments are not included; these will be presented in a forthcoming report.

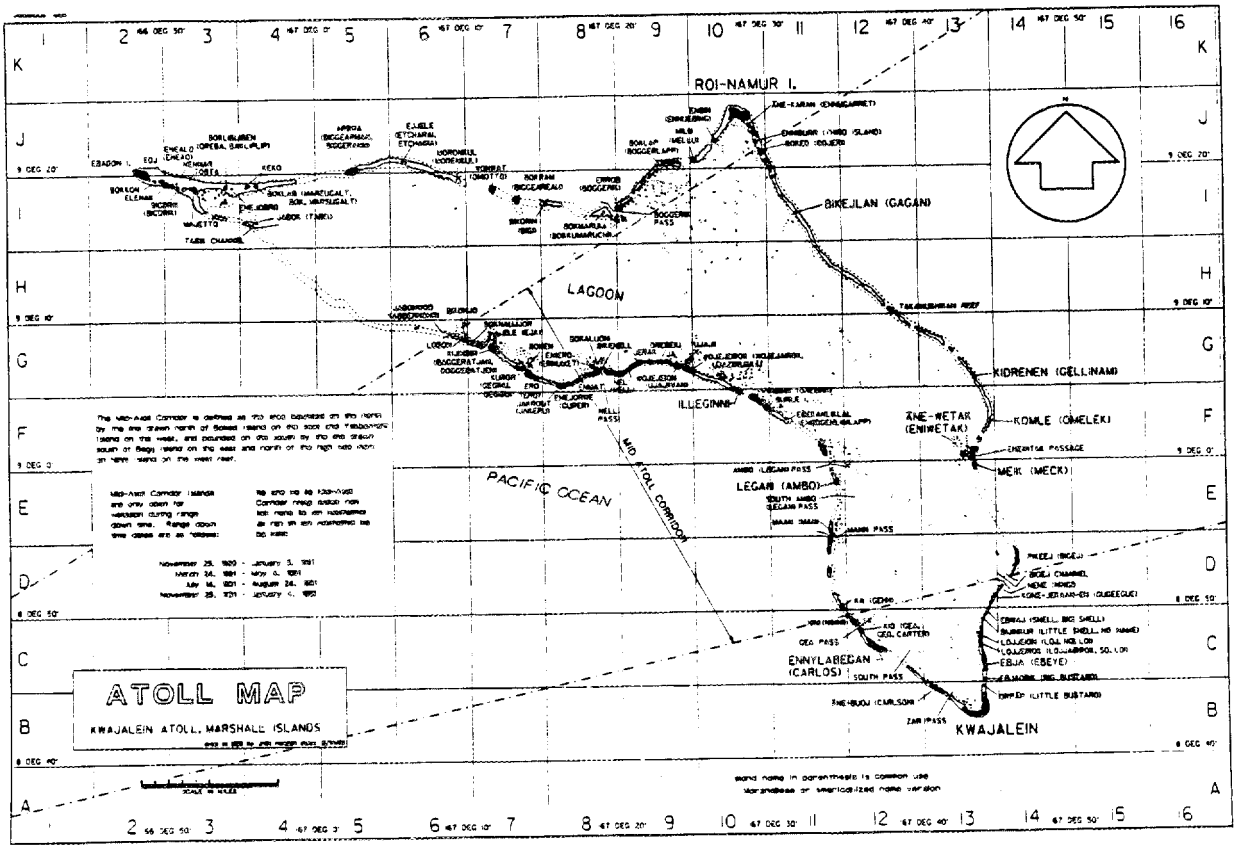

Fig. 2.1. Location map of Kwajalein Island in The Republic of the Marshall Islands (ORNL DWG 91-92748).

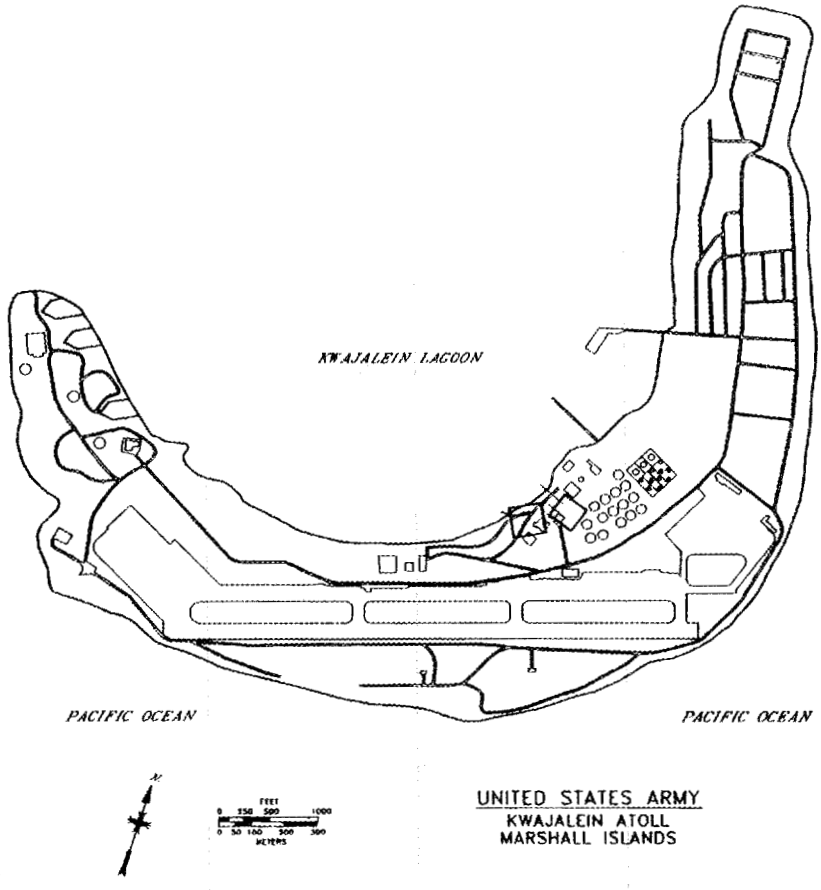

Fig. 2.2. Site map of the construction area on Kwajalein Island (ORNL DWG 91-12745).

Fig. 2.3. Photograph of the construction area on Kwajalein Island (ORNL DWG 6631-91).

SECTION 3

MATERIALS AND METHODS

3.1 INTRODUCTION

This investigation was conducted during a visit to Kwajalein Atoll by a four-person team from ORNL and UT. This team comprised an environmental engineer (R.L. Siegrist), an analytical chemist (N.E. Korte), a geologist (D.A. Pickering) from ORNL, and a microbiologist from UT (T.J. Phelps). A plan was developed for conduct of this work and submitted to HAZWRAP prior to the site visit in February 1991 [5]. This workplan detailed the materials and methods envisioned to be necessary to accomplish the proposed objectives. It also addressed data quality, decontamination and waste management, and health and safety. This section describes the actual materials and methods used during conduct of the on-site testing and experiments as well as the off-site characterization analyses conducted at ORNL.

3.2 SITE PHYSICAL CHARACTERISTICS

3.2.1 Physical Setting

General observations were made of site features and characteristics relevant to implementation of a bioremediation technology demonstration. These included land use, topography, and subsurface conditions. A variety of topographic and utility maps and aerial photographs for the area acquired from USAKA resources were reviewed.

3.2.2 Soil and Geology

Generalized soil and geology characteristics were preliminarily assessed through available published resource information. These included reports by the U.S. Army, the University of Hawaii, and others [1-4].

During the February site investigation, six test pits were made within the construction area using a tractor-mounted backhoe. Three test pits were dug in the desalination plant construction area (Fig. 3.1 and 3.2), while three were made in the vicinity of an aboveground diesel fuel storage tank (Fig. 3.3 and 3.4). Subsurface conditions were observed and recorded with depth within each test pit. A pencil-type soil thermometer was pressed into the sidewall of each pit at several locations to determine soil temperature with depth.

Soil properties were determined by soil sampling and on-site analyses as well as through transportation of samples to ORNL for controlled laboratory analyses. The soil sampling and analyses for basic physical and chemical properties of the soils in the study areas on USAKA are described below. Contaminant sampling and analyses are described in Section 3.3.

3.2.2.1 Soil Sampling

Soil samples for general physical and chemical properties were collected at selected depths from the test pit sidewalls using a precleaned stainless steel trowel. In test pits (TPs) 1 to 4, soil samples were collected near the surface, midway from the surface to the water table, and at the water table. In TPs 5 and 6, soil samples were collected at the water table only. Soil samples for general physical and chemical analyses were containerized in zip-closure

polyethylene bags and labeled accordingly. All samples were placed in coolers containing "blue ice" to maintain the soil temperature near 4°C.

3.2.2.2 Soil Analyses

On-site Soil Analyses: Soil analyses were made on-site at a temporary laboratory set up in an existing building near the investigation area. Soil analyses were conducted as summarized in Table 3.1 and described below.

Soil water content was determined gravimetrically in the field by oven drying a 100-g (field moist weight) sample of soil at 105°C for 24 h.

Soil analyses for pH, conductance, nitrate, and phosphate were performed on saturation extracts. The saturation extract was prepared by a standard U.S. Department of Agriculture (USDA) procedure except that samples did not equilibrate overnight prior to extraction. Limits on space and equipment made the waiting period difficult. Furthermore, the waiting period is to permit water to penetrate clays and release some of the ions present. The coarse-grained nature of the crushed coral suggests that there would be no difference between samples that were extracted within a few minutes of preparation and those permitted to equilibrate overnight.

Approximately 50 g of field moist soil were used to prepare each extract. The sample size was limited in several cases and the coarse and heterogeneous nature of the material indicated that variations in the water needed to prepare an extract would be encountered. Moreover, the saturation extract procedure relies on the judgment of the sample preparer. Coarse-grained samples are very difficult to judge because few clay or silt particles adhere to the spatula during preparation of the extract. These circumstances were expected to introduce additional variability into the analytical results.

The saturation extracts were analyzed on-site for pH, specific conductivity, NO_3-N, and PO_4-P. Specific conductance and pH were measured by means of a pH/conductivity meter (Yellow Springs Instrument Co.). The meter was calibrated within a few minutes of the time of analysis. The temperature of the calibration solutions was within two degrees of the temperature of the samples. Nitrate was determined with a chemical test kit (Hach Chemical Co.). That procedure employs the cadmium reduction of nitrate to nitrite followed by reaction with chromotropic acid as a color reagent. Measurements were made with a UV/visible spectrophotometer. Phosphate was also determined with a chemical test kit (Hach Chemical Co.). That procedure employs the molybdenum blue method in which orthophosphate is reacted with molybdate to form a phosphomolybdate complex. Ascorbic acid is then used to reduce the complex and produce an intense blue color that is quantified with the spectrophotometer.

Off-site Soil Analyses: Soil samples were also containerized and shipped to ORNL under permit from the USDA. Off-site testing was conducted for water content, grain size distribution, exchangeable cations, organic carbon, nitrogen species, phosphate, gross alpha, and gross beta. The analyses listed in Table 3.2 were conducted according to standard practices [4-13].

3.2.3 Hydrogeology

Groundwater conditions at the site were preliminarily evaluated based on the results of prior investigations on the island [1-4]. The depth and general physical/chemical composition of the

groundwater in the study areas on Kwajalein Island were determined by sampling and analyses as described below. Groundwater contamination information is provided in Section 3.3.

3.2.3.1 Groundwater Sampling

During the February 1991 site visit, groundwater depth and composition were determined in six test pits. These determinations were accomplished as follows. Excavation of each test pit was made to the capillary fringe just above the groundwater table. Then the ambient groundwater table was exposed by hand using a precleaned tile spade. This exposure was done in an attempt to minimize disturbance of the groundwater. The depth to groundwater from the ground surface was measured using a steel tape. Observations of the water table surface were made to determine if any floating fuel was present. Samples of groundwater were collected by creating a small sump in the bottom corner of each test pit. A hand pump was used to fill a 1-L vacuum flask. The contents of the flask were then transferred to individual sample containers. Samples for VOCs were collected by immersing a 40-mL vial in the sump.

One sample of surface water from the Kwajalein Atoll lagoon was collected by dipping a container into the lagoon in a rocky area near shore, northwest of the proposed desalination plant area. Collection of a rainwater sample was planned but was not performed because of insufficient rainfall.

3.2.3.2 Groundwater Analyses

On-site Groundwater Analyses: Water samples were taken to a temporary field laboratory and analyzed on-site for specific conductance, pH, and nutrients as described for the saturation extracts in Section 3.2.2.2 (Table 3.1). Specific conductance and pH were measured by a pH/conductivity meter. Alkalinity was measured with a digital titrator. Nitrate and phosphate were determined with a chemical test kit.

Off-site Groundwater Analyses: Water samples were also shipped to ORNL for analyses as summarized in Table 3.2. These samples were placed in coolers containing blue ice to maintain the samples near 4°C. Shipping of the coolers to ORNL occurred by air carrier.

3.3 SITE CONTAMINATION CHARACTERISTICS

The methods used to sample and analyze for soil and groundwater contamination are described in this section.

3.3.1 Diesel Fuel Characteristics

Since diesel fuel was suspected to be the principal contamination in the study areas, a sample of diesel fuel was collected from the fuel storage tanks on USAKA. The fresh fuel was containerized in amber, 40-mL VOA glass vials with Teflon-sealed septa. These were packed in vermiculite inside a secondary glass container and refrigerated for transport to the off-site laboratory for analysis. In addition, subsamples of this material were used for the on-site experimental work (i.e., microcosm studies and respirometer studies).

3.3.2 Soil Contamination

3.3.2.1 Soil Sampling

Soil gas samples were not collected because of the difficulty involved with installing the gas sampling device in the dense fill in the study areas. Based on the results with the barrel auger, it was concluded that the soil gas sampling tool (e.g., Xitech push probe) would be unable to penetrate the crushed coral fill; however, soil gas sampling in certain natural areas on Kwajalein Island and other islands in the atoll (e.g., Roi-Namur) may be possible.

Soil samples for contamination properties were collected at selected depths from the test pit sidewalls using precleaned stainless steel utensils. In TPs 1 to 4, soil samples were collected near the surface, midway from the surface to the water table, and at the water table. In TPs 5 and 6, soil samples were collected at the water table only. Soil samples for analyses of volatile organic compounds (VOC), semivolatile organic compounds (SVOCs), and total petroleum hydrocarbons (TPH) were collected using a stainless steel microcoring device (Manufacturing Sciences, Inc.). For each of these three analysis groups, duplicate samples were containerized in amber, 40-mL Teflon-sealed glass vials. The samples were labeled accordingly and placed in zip-closure polyethylene bags. Samples for heavy metals were collected with a stainless steel trowel and packed into amber, 125-mL Teflon-sealed glass jars. All samples were placed in coolers containing blue ice to maintain the soil temperature at near 4°C.

3.3.2.2 Soil Contamination Analyses

On-site Soil Contamination Analyses: Soil samples were screened on-site for organic contamination as follows. The first method involved a solvent extraction and infrared analysis. Five g of field moist soil were extracted with 10 mL of 1,1,2-trichloro-1,2,2-trifluoroethane if the sample appeared uncontaminated. Smaller weights (down to a few tenths of a gram) were used for soil samples suspected of being highly contaminated. The extract was then measured on an infrared spectrophotometer (Foxboro-Wilks 1ACVF). The measured absorbance of the extract was compared to a working curve made of known amounts of diesel fuel dissolved in the extraction solvent. The diesel fuel used in the standardization was a sample of the diesel fuel used in the power plant on Kwajalein Island.

The second method involved a chemical test kit (Hanby Analytical Laboratories). This test kit measurement is based on the Friedel-Crafts acylation. This reaction involves the combination of an aromatic compound with an acid chloride catalyzed by a Lewis acid such as aluminum chloride to yield a colored product. The hue and intensity of the color are determined by the nature and concentration of the aromatic compounds in the sample. Carbon tetrachloride is the normal extraction reagent. For use on Kwajalein Island, the test kit procedure was modified by substituting 1,1,2-trichloro-1,2,2-trifluoroethane for the carbon tetrachloride. Upon returning to ORNL from the field, diesel fuel standards were prepared in carbon tetrachloride and 1,1,2-trichloro,1,2,2-trifluoroethane. A literature search revealed that the extraction efficiencies of the two solvents are comparable. However, color development in the two solvents was not identical. Thus, a calibration curve should be constructed when a solvent different from carbon tetrachloride is used. Otherwise, it is suitable to use the color comparison charts provided with the kit.

Off-site Soil Contamination Analyses: Soil samples were also containerized and shipped to ORNL under permit from the USDA. Off-site testing was conducted for TPH, VOCs, SVOCs, and heavy metals. Samples were also screened for gross alpha and beta radioactivity. The analyses listed in Table 3.2 were conducted according to standard practices [4-13].

3.3.3 Groundwater Contamination

3.3.3.1 Groundwater Sampling

Groundwater samples for contaminant characterization were collected from each of the backhoe test pits. Samples for VOC, SVOC, and TPH analyses were collected by immersing 40-mL amber glass vials with Teflon septum lined caps, into the sampling sump created in the bottom of each pit. Samples for heavy metals were collected by using the vacuum flask collection technique described above. All groundwater samples were labeled accordingly and then placed in coolers containing blue ice.

3.3.3.2 Groundwater Contamination Analysis

On-site Groundwater Contamination Analyses: Analyses of groundwater for organic contamination were made on-site by two methods as follows.

The first method involved a solvent extraction and infrared analysis. Ten mL of groundwater were extracted with 10 mL of 1,1,2-trichloro,1,2,2-trifluoroethane. The extract was then measured on an infrared spectrophotometer (Foxboro-Wilks 1ACVF). The measured absorbance of the extract was compared to a working curve made of known amounts of diesel fuel dissolved in the extraction solvent. The diesel fuel used in the standardization was a sample of the diesel fuel used in the power plant at Kwajalein.

The second method involved the chemical test kit employing the Friedel-Crafts acylation reaction (Hanby Analytical Laboratories). An aliquot of the extract used in the infrared analysis described above was used for this procedure.

Off-site Groundwater Analyses: Groundwater samples were containerized and shipped to ORNL for further testing. These samples were analyzed for organics (VOCs, SVOCs, TPH) and heavy metals by standard practices [4-13].

3.4 ON-SITE BIOTREATABILITY STUDIES

3.4.1 Microbiology and Microcosm Experiments

An important question when contemplating the use of bioremediation on Kwajalein Island is whether microorganisms exist that are capable of degrading the hydrocarbon contaminants. To address this question, the level of indigenous microorganisms was quantified, and a series of bench-scale experiments were conducted using samples of contaminated soil and qualitative microbiological techniques.

Soil samples for microbiological analyses were collected using sterilized utensils. All utensils used to contact the soil were precleaned by detergent wash and deionized water rinses, then flamed with isopropanol immediately prior to sampling. The soil samples were removed from the test pit using a sterile stainless steel trowel and placed in sterile polyethylene bags, polypropylene bottles, and glass test tubes. These samples were transported to the field

laboratory on USAKA and immediately prepared for analysis. Additional sample materials were placed in coolers containing blue ice to maintain the soil temperature near 4°C pending transport to ORNL for further analyses.

Microbial abundance was assessed by plate count methods using an extremely dilute and a less dilute complex medium. All chemicals used were reagent grade (Mallinckrodt or Sigma Chemical Co.). Resi-analyzed glass distilled solvents and reagents were also used (J.T. Baker Chemical Co.). Total aerobic bacterial spread-plate counts were performed in duplicate with serial dilutions using a medium containing 10 mg/L each of peptone, trypticase, yeast extract and glucose with noble agar (PYTEG), and a medium containing 1000 mg/L of each nutrient (Balkwill). All media contained trace minerals including selenium and molybdate as well as a dilute vitamin mix with a 10-mM bicarbonate plus a 2-mM phosphate buffer. All media were prepared at UT and transported on-site in sealed, sterile containers. Jars containing the sterile agar media were microwave-heated in the field to melt the agar medium. Approximately 10 mL of liquified agar medium was added to sterile petri dishes which were then held in an ultraviolet light-irradiated cabinet. Serial dilutions of sediment slurries were spread onto the agar surfaces. Experiments were incubated at ambient temperatures (i.e., 21 to 24°C). Results were analyzed after 2, 4, and 6 days. After incubation, all petri dishes and dilution tubes were microwaved and then burned prior to on-site disposal.

A selected number of samples were collected from the various test pits and returned to ORNL for further analyses of microbiology characteristics.

Enrichment-broth tubes containing 0.001, 0.1, or 2 g of soil were established with various media. Media included the dilute PTYEG noted above and a basal salts medium. Both media types were used at two different pH's, 7.4 and 8.5. Furthermore, the salinity was varied from fresh water, brackish (i.e., 1% salt), and marine (i.e., 3% salt). Diesel fuel was added as a carbon source. The enrichment tubes were incubated in the inverted position and growth was monitored over 2 to 6 days. Microbial activity was assessed by observations of turbidity, gas bubbles, and color change. Five to 30 uL of gaseous headspace of representative broths exhibiting growth and control vials were analyzed on-site with a field gas chromatograph (Photovac 10S50) equipped with a photoionization detector. At the end of the experiment, all broths were microwaved and then discharged to the sewage treatment plant.

3.4.2 Soil Respiration Experiments

Another approach to assessing bioremediation potential involves measurement of soil respiration rates with material from a contaminated site. To accomplish this, bench-scale experiments were conducted using constant-volume respirometer techniques. Samples of soil materials (ca. 200 g) were collected from various depths and locations and placed in field portable respirometers (ca. 1-L each). Three separate experimental runs were made using soil sample composites from TPs 1, 4, and 5. In each case, replicated treatments were used to assess biodegradability of ambient organic contaminants as estimated by oxygen uptake measurements. The individual treatment conditions included controls (i.e., empty reaction vessel), unamended contaminated soil, contaminated soil spiked with fertilizer nutrients (i.e., N, P, K, and micronutrients), and contaminated soil spiked with nutrients and fresh diesel fuel. The respirometers were incubated under ambient conditions (ca. 21-24°C).

Cumulative oxygen uptake was measured over several days by manometric techniques. Carbon dioxide evolved was trapped in 3 mL of a 10% KOH contained in a vial within each respirometer. The cumulative oxygen uptake was computed using a flask constant calculated for the respirometers (72.1 uL/mm pressure change). The cumulative CO_2 evolved was

estimated by placing the KOH from each respirometer in a 5-mL syringe and then acidifying it with 2 mL of 6 M HCL. The gas volume produced during incubation for several hours was then estimated.

3.5 GENERAL WORK CONDUCT

3.5.1 Decontamination and Waste Management

All apparatus, utensils, and tools that contacted the subsurface were decontaminated after each use. Decontamination occurred at a designated location(s) adjacent to the test pit locations. Decontamination consisted of a detergent wash, tapwater rinses, and a deionized water rinse. The deionized water was prepared on-site using a Nanopure water purifier with Kwajalein tapwater as the feed water.

At the end of an event or each day of activity, quality control samples were collected to verify that decontamination was successfully accomplished. At a minimum, all quality control samples were analyzed for VOCs, SVOCs, and lead.

Minimal waste liquids and solids were generated during the on-site activities. These were packaged, labeled, and handled in accordance with the approved health and safety plan.

3.5.2 Field Data Management and Recording

Project logbooks were maintained throughout the course of the field work. The materials and methods of all field activities were documented in detail. Throughout the course of the field investigation, photographs were taken to record important visual information.

3.5.3 Health and Safety

The health and safety plan developed by the U.S. Army Environmental Hygiene Agency (USEHA) in October 1990 for USAEHA Study 38-26-0365-90/91, Soil and Groundwater Contamination Study, Kwajalein Atoll, was followed in principal [4]. The sections pertinent to the workplan are 1, 3, 4d, 4e, 5a(2), 5a(3), 5a(6), 5b, 5c, 5e, 5f, 5g, 5h, and Table 2. A copy of the approved health and safety plan was maintained on-site during the conduct of this work.

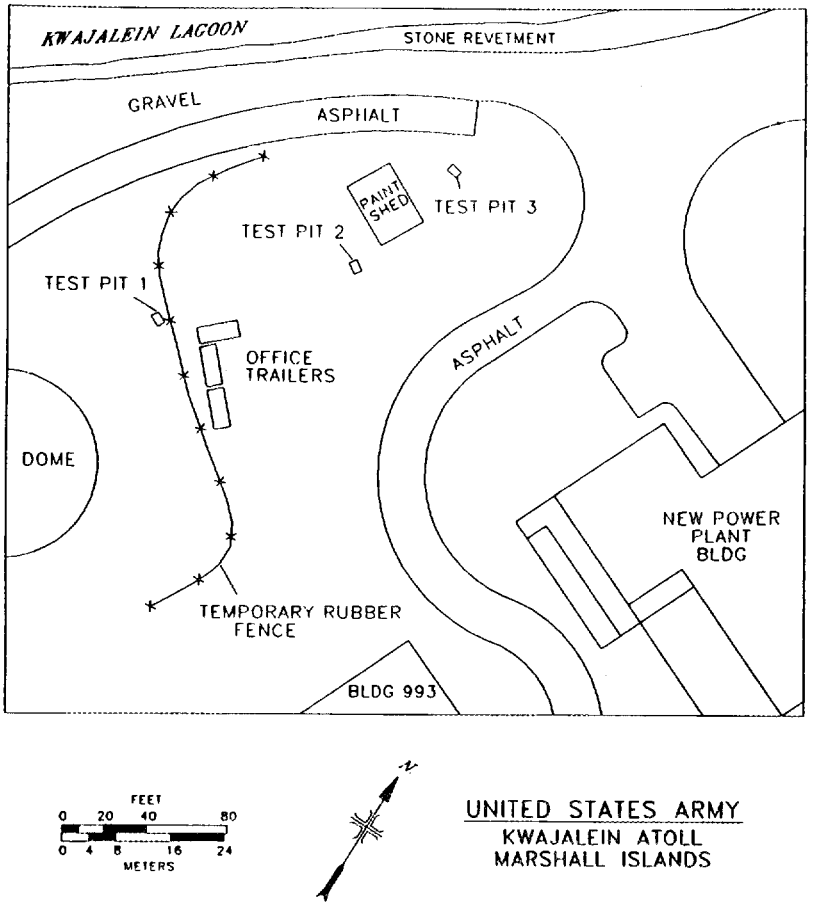

Fig. 3.1. Location of test pits at the proposed desalination plant area on Kwajalein Island (ORNL DWG 91-12747).

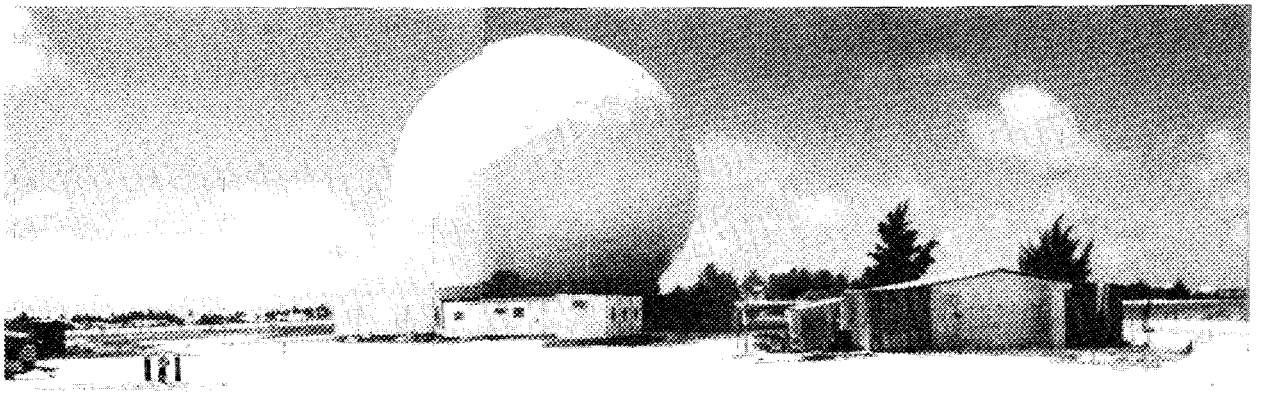

Fig. 3.2. Photograph of the proposed desalination plant area on Kwajalein Island (ORNL DWG 91-6632-91).

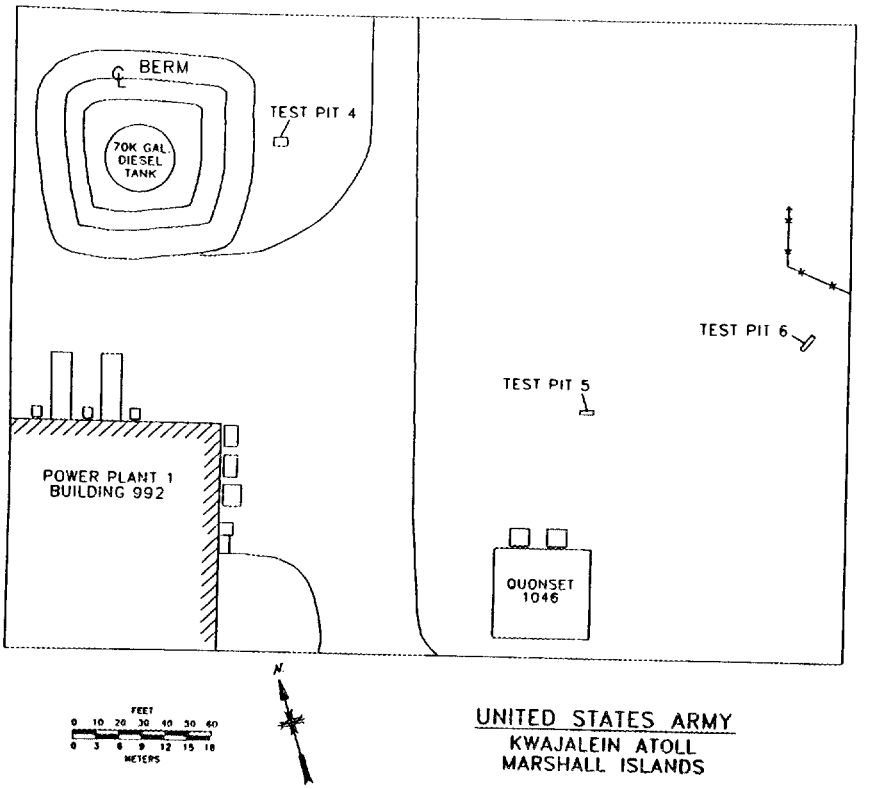

Fig. 3.3. Location of test pits near a diesel fuel storage tank on Kwajalein Island (ORNL DWG 91-12746).

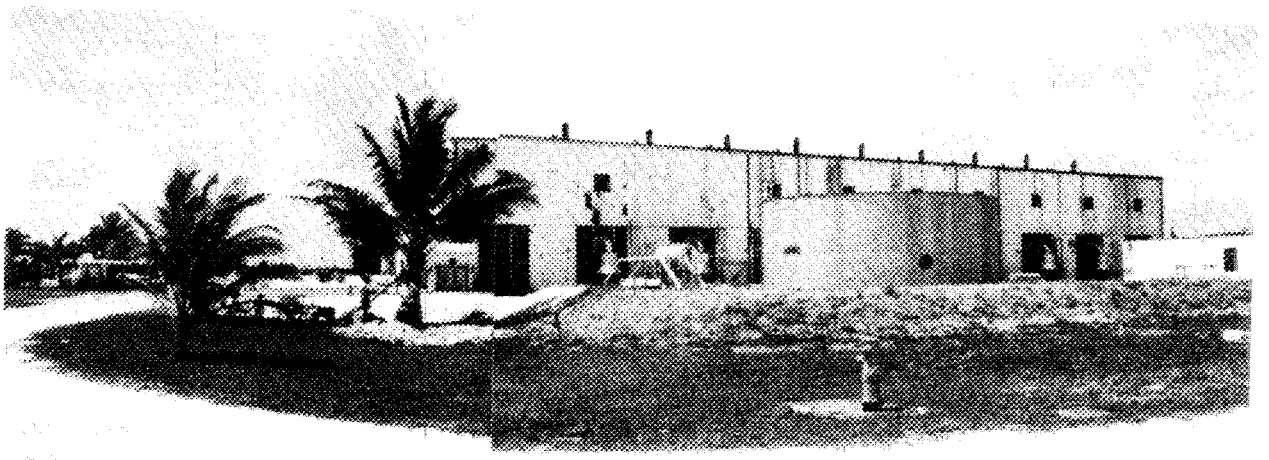

Fig. 3.4. Photograph of the diesel fuel storage tank on Kwajalein Island (ORNL DWG 6633-91).

Table 3.1. On-site analyses of samples collected on Kwajalein Island during February 1991

Parameter	General procedure/field method
Soil	
Water content	Oven drying at 105°C, gravimetric analysis
pH	Saturated paste, vacuum extraction, electrometric analysis
NO_3-N, PO_4-P	Saturated paste, vacuum extraction, colorimetric analysis
Aromatic hydrocarbons	Freon extraction, Friedel-Crafts acylation test kit analysis
TPH	Freon extraction, infrared spectroscopy analysis [a]
Water	
Temperature	Electrometric, thermometric analysis
Conductance	Electrometric analysis
pH	Electrometric analysis
Dissolved oxygen	Electrometric analysis
Aromatic hydrocarbons	Friedel-Crafts acylation test kit analysis
TPH	Freon extraction, infrared spectroscopy analysis[a]

[a] Similar to U.S. EPA method 418.1 (13).

Table 3.2. Off-site analyses of samples collected on Kwajalein Island during February 1991 and transported to ORNL

Media/parameter	Container	Preservation	Reference/analytical method
Soil			
Particle size	1 L polybag	4°C	Methods of Soil Analysis (11)
pH	"	"	"
TKN, NH_4-N, NO_3-N	"	"	"
PO_4-P	"	"	"
SO_4-S	"	"	"
Organic carbon	"	"	"
Exchangeable cations	"	"	"
VOCs	2,40 mL glass	4°C	SW5030/8240 (13)
SVOCs	125 mL glass	4°C	SW3550/8270 (13)
TPH	"	"	California method w/ capillary column (13)
Heavy metals (Pb, Cu, Cr, Hg)	125 mL glass	4°C	SW3050/7191/7210/7421 /7471 (13)
Total plate count	sterile glass or plastic	4°C	DOE Subsurface Microbiology Program methods (12)
Water			
Alkalinity	1 L poly	4°C	APHA Standard Methods (10)
TDS	"	"	"
PO_4-P	"	"	"
SO_4-S	"	"	"
COD	"	"	"
TOC	"	"	"
TKN, NH_4-N, NO_3-N	"	"	"
VOCs	2,40 mL glass	4°C	SW5030/8240 (13)
SVOCs	2,40 mL glass	4°C	SW3550/8270 (13)
Heavy metals (Pb,Cu, Cr, Hg)	0.5 L poly	4°C	SW3020/7191/7210/7421/7471 (13)

SECTION 4

RESULTS AND DISCUSSION

4.1 SITE PHYSICAL CHARACTERISTICS

4.1.1 Landscape and Topography

The landscape in the vicinity of the study area included various buildings associated with a diesel-fueled power plant (Fig. 3.1 to 3.4). The topography was level throughout the study area.

4.1.2 Generalized Subsurface Conditions

Island chains of the Pacific form over "hot spots" in the ocean crust. Submarine volcanoes form over these hot spots as lava flows into the sea. Each volcano eventually rises above sea level to become a volcanic island. In time, the movement of the tectonic plate on which the island rides causes the volcano to move off the hot spot. The volcano dies; however, a new volcano forms at some distance corresponding to the movement of the plate.

The Pacific tectonic plate is moving northwest, leaving chains of islands along a northwest-southeast line. The dead volcanoes or seamounts at the southeast end of the chain are the youngest. The Marshall islands are an excellent example of this process. The ancient hot spot that formed the Marshalls either died or was passed over to take part in creation of the Gilbert Islands.

A dead volcano or seamount begins to sink through the relatively thin oceanic crust because of its own mass at the same time erosion is eating at its shoreline, causing a shallow sloping shore. A coral reef then forms in the shallows. As the volcano continues to sink, the reef grows to form a fringing reef and eventually a barrier reef around the island. In time the island sinks below sea level, leaving only the reef to mark its former outline and a large lagoon within the reef.

In addition to the above processes, changes in sea level caused by tectonic events or the ice ages affect the formation of islands. If the sea level rises and the coral reef drops below the photic zone, the coral polyps die and the reef stops growing. If the sea level drops, portions of the reef may be exposed to additional erosional forces.

When the climate is in a relatively steady state, the reef remains near the surface. Islands are formed and maintained by wave action eroding portions of the sea floor and reef. The eroded material is then deposited behind the reef which forms the island. Storms and wind may deposit additional material to the islands. However, the matrix of the island is primarily coral debris.

The geology of Kwajalein Island consists of heterogeneous coral sands and gravel at the surface ranging from 8 to 12 m in thickness. Lithology is typical of old reef channels, coral rubble piles, and fill. At the base of the sands and gravel is an unconformity typically marked by the occurrence of a hard coral ledge and perhaps conglomerate horizons. However, the hard coral and conglomerates that typically mark this unconformity are not present everywhere on the island [2]. This unconformity also seems to characterize the boundary between the freshwater surface lens and the more saline formation water, with the increase in salinity being described as abrupt at this interface [2].

The freshwater surface lens found on Kwajalein island is typical of coral atolls and can be described by the Ghyben-Herzberg relation [14]. This concept, developed around the turn of the century, has been modified over the years as more information has become available on surficial aquifers. In its more contemporary form, the Ghyben-Herzberg relation allows for mixing salt water and fresh water in a zone of diffusion around the interface between the two.

4.1.3 Soil and Geology

4.1.3.1 Morphology

Three test pits (TP1, TP2, TP3) were excavated in the desalination plant construction area, the deepest to 190 cm (Fig. 3.1). Lithologic logs of the test pit walls indicate that this area is probably fill (Appendix A). The matrix is moderately sorted, fine to medium grained, light tan coral sand with scattered to abundant pebble and cobble size pieces of coral. Optical enhancement showed that even the finest grains were coral reef debris. The first 25 cm in each pit contained pebble size coral pieces; in TP2 and TP3 the pieces increased to cobble size. Organics in the form of fine roots were visible to depths of 15 to 25 cm. No fuel odors were noted for the subsurface soil exposed within these test pits.

The lithology of TP1 was consistent to its total depth. The top 15 cm of TP2 was a gray, moderately sorted, fine to medium grained coral sand, with light tan and dark gray sand stringers intermixed. In TP3, this gray sand showed up from 23 to 28 cm and 36 to 41 cm. Gray coral boulders were observed in the stone revetment adjacent to the lagoon. The gray sands in these pits might be fill derived from these boulders, or from a different area of the island.

Test pits at the diesel fuel tank area (TP4, TP5, TP6) were excavated at the locations shown in Fig. 3.3. The lithologic log of TP4 was detailed, TP5 was logged from the surface because of safety concerns, and TP6 was not logged because of time and safety constraints.

TP4 was in a grassy area adjacent to and just outside of a berm surrounding a diesel fuel tank. The log indicates that this area is probably fill from the mix of sands, pebbles, and cobbles. The top 5 cm was dark gray silt, probably breakdown from the grass, added soil, and possible nutrients. The next 41 cm was gray and tan coral sand, followed by tan sands to a total depth of 173 cm. All levels contained abundant pebble and cobble size pieces of coral. Organic material was abundant to 20 cm with fine roots continuing to 46 cm.

4.1.3.2 Soil Characteristics

On-site Soil Analyses: Analytical results for the saturation extracts are presented in Table 4.1.

The moisture content of the near-surface samples was typically slightly under 10% by weight (Table 4.1). Moisture content increased with depth, with values near 20% for the samples just above the water table and in an intermediate range for samples collected midway in the pit.

The pH of the soil sample extracts was alkaline, ranging from 7.4 to 8.5. Alkaline pH is typical for coral-derived material, and the range in values was due to differences in the material matrix. Although all of the samples were coarse-grained, there were significant differences in the nature of some of the samples. Some of the soil samples were mostly sand-sized particles, while some contained abundant shell and coral fragments.

Specific conductance of the saturation extracts revealed higher conductivities in the shallow soil material in the desalination site than that by the diesel tank site. The results demonstrated that the salinity in these soils is moderate and the shallow groundwater is not affected by marine influences.

None of the test pit soil samples contained nitrate. Because of heavy rainfall and subsequent leaching, the low nitrate concentrations in the fill were expected. The only samples with a positive nitrate reading were composites prepared for use in respirometry experiments. These samples were analyzed in duplicate because the results were anomalous. The reanalysis compared very well to the first in both cases. The reason for these results is unknown.

Soil phosphate results were highly variable. Several samples showed no detectable phosphate, and others showed part-per-million (ppm) levels The most likely explanation is that a particular type of shell or coral fragment was responsible for the phosphate in the extract and that the variations are because of the heterogeneity of the samples.

One soil sample from TP1 was analyzed for potassium; none was detected. This result is consistent with the information presented in the water analysis section in which the low availability of potassium in the subsurface is described.

Off-site Soil Analyses: The results of analyses conducted at ORNL are summarized in Tables 4.2 to 4.5.

The soil materials had a considerable coarse fragment content, 20 to 45% by weight (Table 4.2). The fine soil matrix (i.e., < 2 mm) was characterized as a loamy sand. Water contents ranged from 8% near the surface to saturated at the water table (Table 4.3). The soil pH measured in a distilled water extract was alkaline at 9.1 to 9.6 (Table 4.3). This range was higher than determined on-site.

Nitrogen (organic and/or ammonium) was present in some zones at levels of 0.01 to 0.02% by weight. There was, however, no readily extractable N, P, or S (Table 4.4). The predominant exchangeable cation was calcium, which is as expected for carbonate materials like coral sands (Table 4.5).

4.1.4 Groundwater

4.1.4.1 Groundwater Depth

The depths to groundwater in TP1, TP2, and TP3 were 157, 160, and 188 cm, respectively. These correspond roughly to sea level in Kwajalein Lagoon, 24 to 46 m northwest of these test pits. Similar water levels were measured in the test pits in the vicinity of the diesel fuel tank site. The water level was 132 cm in TP4, 183 cm in TP5, and 168 cm in TP6.

4.1.4.2 Groundwater Composition

On-site Groundwater Analyses: Results of on-site analyses of groundwater samples are summarized in Table 4.6. As shown, pH in the test pits was slightly alkaline and varied from 7.1 to 7.9. The conductivity for groundwater samples from all the test pits demonstrates that the water table is not markedly affected by seawater. Indeed, if the groundwater were used for

irrigation water, these conductivity values would represent a low to medium salinity hazard [15].

Alkalinity results are presented in mg-HCO_3/L . The results vary within a relatively narrow range except for TP5 where the alkalinity was nearly double that measured for the other test pits.

Results of analyses for nitrate demonstrate relatively low levels of this nutrient. Low levels of nitrate are expected, based on the high rainfall and low organic matter content of the subsurface. Since the nutrient solution used to standardize the spectrophotometer was derived from hydrated solid material. Hence, the reported results may be biased low.

Phosphate was present in water from TP2 but was absent in groundwater samples from the other test pits.

Off-site Groundwater Analyses: The results of groundwater analyses conducted at ORNL are summarized in Tables 4.7 to 4.9.

The groundwater was somewhat alkaline with a pH of 7.9 to 8.2. There was no marked marine influence as evidenced by low chloride contents (Table 4.7). There were trace levels of nutrients in some samples. In groundwater at the location of TP4, considerable chemical oxygen demand (COD) and total organic carbon (TOC) were found in the groundwater (Table 4.8). This finding is presumed to be due to the diesel fuel contamination (discussed below). The dominant cations in the groundwater were calcium, magnesium, and sodium (Table 4.9).

4.2 SITE CONTAMINATION CHARACTERISTICS

4.2.1 Diesel Fuel Characteristics

The results of volatile and semivolatile organic analyses of the diesel fuel from USAKA are summarized in Table 4.10. There were no detectable concentrations of VOCs, but low concentrations of a variety of SVOCs were identified including napthalenes, phenanthrene, and other substituted aliphatic and aromatic compounds. As expected, the concentrations of gas chromatographable VOCS and SVOCs in the USAKA diesel fuel were low. Diesel fuel is typically composed of 30% substituted aromatic hydrocarbons and 70% long-chain aliphatic hydrocarbons [16].

4.2.2 Soil Contamination

4.2.2.1 On-site Soil Contaminant Analyses

The results of on-site analyses of soil samples by extraction and infrared (IR) spectrophotometry are summarized in Tables 4.11 and 4.12. Low levels of TPH were detected in the surface soil at TP1. A trace of aromatic hydrocarbons was also present based on the Friedel-Crafts acylation (FCA) test kit. TP1 is near an industrialized area with frequent vehicle traffic. Such an analytic result, therefore, is not believed to be indicative of widespread contamination. The low result also demonstrates that contamination near TP1 is not significant. This conclusion was confirmed by off-site analyses described below, which revealed traces of polyaromatic hydrocarbons frequently found in surface soils adjacent to

roads [17].

IR analysis indicated that no contamination was present in TP2. These results were consistent with the FCA and photoionization detector (PID) results demonstrating that the area near TP2 is not contaminated.

Soil contamination analyses for samples from TP3 were not straightforward. Significant concentrations of hydrocarbons were detected by IR for the sample collected at 39 in., with a much lower concentration at 12-in. Hydrocarbons were not detected in the soil sample collected near the water table although hydrocarbons were detected in the water sample. The FCA results for these same samples showed trace levels in the 12-in. soil sample and nothing detected in the 39- and 72-in. soil samples. These results in conjunction with the IR suggest that whatever was detected by the IR was not fuel. This judgment is based on the fact that it would be unlikely, though not impossible, for significant fuel to be in the sample with no aromatic hydrocarbons present. The area in the vicinity of TP3 is not vegetated. Consequently, natural organic matter is unlikely. This location is near a paint shed, and it is possible that nonvolatile paint components were present.

Results for the other test pits were consistent with the results from other test methods, including visual observations. All samples from TP4 and TP5 were significantly contaminated while those from TP6 showed no contamination (Table 4.12). Results for some of the samples from TP4 were quite high, suggesting the presence of discrete products and not simply oil sorbed onto coral particles. FCA results for TP4 tend to be lower than the IR results. This difference may be because the FCA responds only to aromatic hydrocarbons and not to all hydrocarbons as the IR does.

A conclusion that can be drawn from these data is that the FCA results are consistent with the IR when the contaminants are fuel-based hydrocarbons. This conclusion is also based on a comparison of data from samples collected at Roi-Namur that will be reported separately. Those results for fuel samples showed excellent correlation between the IR and the FCA methods. Results are not consistent at TP3, suggesting again that whatever was detected by the IR is probably not due to fuel, unless it is highly weathered.

4.2.2.2 Off-site Soil Contaminant Analyses

A complete listing of samples collected for off-site analyses may be found in Appendix B, while detailed analytical results are given in Appendix C and D. The summarized results of these analyses are presented in Tables 4.13 to 4.21.

The desalination plant site was found to contain only low levels of TPH and only in TP3 (Table 4.13). TPH concentrations in TP3 were $\leq$5 ppm and were judged to be jet fuel, based on chromatographic characteristics. Low levels of SVOCs (<5 ppm) were determined in the shallow soil (8-in. depth) (Table 4.15). Trace concentrations (i.e., <53 ppb) of a few VOCs (e.g., chloroform and 1,1,1-trichloroethane) were measured in soil samples from TP2 and TP3 (Table 4.17). These VOCs are common components in organic solvents and are not surprising when found at a site where painting activities occur. At the desalination plant site, there were no detectable or marked concentrations of heavy metals or radioactive substances (Tables 4.19 and 4.21).

At the diesel fuel tank site, TPH concentrations were nearly 9000 mg/kg at the water table in TP4 (Table 4.14). There were only trace levels of a few SVOCs and VOCs (Tables 4.16 to 4.18). There were no notable heavy metals or radiochemicals (Tables 4.20 and 4.21).

4.2.3 Groundwater

4.2.3.1 On-site Groundwater Contaminant Analyses

Results of on-site analyses of groundwater samples for hydrocarbons by extraction and infrared spectrophotometry are summarized in Table 4.11 and 4.12.

Of the three test pits at the desalinization site, only TP3 showed detectable hydrocarbons by IR. Because infrared analysis indicates only the presence of carbon-hydrogen bonds, it is difficult to interpret these results, considering that both field screening with a PID and the FCA indicated no detectable contamination. It is possible that relatively nonvolatile contaminants are present. TP3 was in a heavily-used area within a few feet of a paint shed. The surface of the ground was discolored in some areas, and it was evident that some of the drums and paint buckets had leaked or been spilled in the area. A sample of water from TP3 submitted to the off-site analytical laboratory indicated no contamination, although the overlying soil contained traces of jet fuel hydrocarbons.

The IR results for water samples from TP4, TP5, and TP6 were consistent with visual observations and FCA test kit results. TP4 and TP5 contained significant contamination while TP6 was uncontaminated.

Groundwater collected from a monitoring well installed in a previous program by the U. S. Geological Survey (USGS) was also analyzed by the IR method. Monitoring well 17 was northeast of the desalinization site in an area suspected of being contaminated. The IR results revealed some contamination with petroleum hydrocarbons (Table 4.12).

Two liquid samples were collected from the sewerage system yielding the IR results shown in Table 4.12. These samples were collected in the vicinity of the desalination plant and diesel fuel tank site. The results suggest potential contamination with petroleum hydrocarbons.

The results of the FCA indicated that only the obviously contaminated water samples (i.e., TP4 and TP5) were indeed contaminated. The sensitivity of the test kit, however, could be improved dramatically by employing glassware appropriate for performing extractions that concentrate the sample.

4.2.3.2 Off-site Groundwater Contaminant Analyses

A complete listing of samples collected for off-site analyses may be found in Appendix B, while detailed analytical results are given in Appendix C and D. The summarized results of off-site analyses for groundwater contaminants are presented in Tables 4.13 to 4.21.

TPH and SVOCs were not detected in groundwater samples collected from TP1 to TP3 at the desalination plant site (Tables 4.13 and 4.15). Trace concentrations (i.e., parts-per-billion (ppb) and very much less than drinking water standards) of the VOCs, chloroform and 1,1,1-trichloroethane were detected in the shallow groundwater beneath TP2 and TP3 (Table 4.17). These VOCs are commonly found in solvents, such as those used in the painting operation currently located on the desalination plant construction site, and were present in the unsaturated soils in TP2 and TP3. Detection of trace levels in the groundwater could have been due to some unavoidable soil disturbance which occurred during the test pit groundwater sampling procedures.

Significant contamination by organic substances was determined for the diesel fuel tank site. High concentrations of COD (220 mg/L) and TOC (40 mg/L) were in groundwater from TP4

(Table 4.7). TPH was measured at 265 mg/L in TP4 and 110 mg/L in TP5 (Table 4.14). This groundwater contamination is consistent with the high concentrations of petroleum hydrocarbons measured in the overlying soil materials.

At both study sites, concentrations of heavy metals were either nondetectable or at very low levels (i.e., ppb), which could be interpreted as similar to natural conditions (Tables 4.19 and 4.20).

Radiochemical screening of the groundwater samples from TP3 at the desalination plant site and TP4 at the diesel fuel tank site revealed no contamination by radioactive substances (Table 4.21)

4.3 ON-SITE BIOTREATABILITY STUDIES

4.3.1 Microbiology and Microcosm Experiments

Microbiological analyses demonstrated that microorganisms were present in the subsurface on Kwajalein Island in appreciable numbers (e.g., 10^5 to 10^7 org/g) in all areas examined (Table 4.22). These included both uncontaminated (i.e., TP1 to TP3) and contaminated zones (i.e., TP4, TP5).

There were some trends in the microbiology data. Within the shallow soil (e.g., 10 to 12 in. in depth), the colony forming unit (CFU) concentrations were typical of surface soils. Below this depth, CFU concentrations decreased. In the most contaminated zones below 1.5 m (60 in.) in TP4 and TP5, the relatively lower numbers ($<10^5$ org/g) may be due to toxicity effects caused by high hydrocarbon contamination. Also, the relatively higher CFU concentrations determined in the laboratory as compared to the field assays may likely represent growth after sample collection.

The results of the microcosm experiments are summarized in Table 4.23. Enrichment tubes without fuel agreed with the CFU plate counts and indicated microorganism concentrations at $>10^3$ org/g. Most enrichment broth samples exhibited turbidity on fuel at the 2-g/tube level. Soil samples from TP1 at 20 cm (8 in.) in depth exhibited petroleum degradation at a dilution of 10^3/g, while other TP1 samples exhibited petroleum degradation only at 2 g/tube. Samples from TP2 and TP3 exhibited little ability to attack diesel fuel. In contrast, samples from TP4 and TP5 showed ability to attack diesel fuel in fresh or brackish media at pH 7.4 or 8.5 as well as in mineral salt media at 10^3 dilutions. The headspace in several of these tubes exhibiting high growth were analyzed by field gas chromatography. Several samples demonstrated loss of benzene or toluene. For example, an enrichment sample from TP4 at 10 in. in depth indicated the following contaminant losses during incubation: 66% benzene, 95% toluene, and 70% xylenes. Another sample from TP4 at the same depth exhibited losses of >95%. Enrichments from construction zone test pits 2 and 3 also exhibited the ability to degrade petroleum compounds.

4.3.2 Soil Respiration Experiments

Results of the soil respiration experiments are summarized in Table 4.24. Soil materials from an uncontaminated area (i.e., TP1) in the desalination plant site exhibited no oxygen uptake when incubated for several days.

The addition of fresh diesel fuel and/or nutrients had no measurable effect. In contrast, soil materials from a contaminated area (i.e., TP4 and TP5) exhibited noticeable oxygen uptake, but only when fresh fuel was added (concentration of 5000 mg/kg).

The respiration data suggested that the microbes indigenous to the uncontaminated areas were not adapted or readily capable of degrading fresh diesel fuel. Also, for the contaminated soil samples, the indigenous microbes were not respiring at high rates on the ambient or weathered diesel fuel contamination. Only when fresh diesel fuel was added did the respiration rates markedly increase. This suggests that the ambient or weathered diesel fuel may not be readily biodegradable under ambient conditions.

Table 4.1 On-site analyses of saturated soil extracts from soil samples collected on Kwajalein Island during February 1991

Test pit [a] and depth	Water content	pH	Specific conductance	NO_3-N	PO_4-P
	dry wt %		umhos/cm	ppm	ppm
Test pit TP1					
Soil at 08 in.	7.3	7.4	1200	0	3
Soil at 33 in.	14.7	8.16	1320	0	10
Soil at 56 in.	[17.4] [b] 25.3	8.23	525	0	2.75
Soil composite [c]	16.9	7.82	-	7 {6}[d]	6.75
Test pit TP2					
Soil at 06 in.	9.6	8.4	600	0	3.5
Soil at 33 in.	14.7	8.47	540	0	0
Soil at 63 in.	27.2	8.28	150	0	30
Test pit TP3					
Soil at 12 in.	12.2	7.79	880	0	0
Soil at 39 in.	12.6	8.32	1090	0	19.75
Soil at 72 in.	36.8	8.03	860	0	0
Test pit TP4					
Soil at 10 in.	8.2	8.1	309	0	11
Soil at 32 in.	25.6	8.2	370	0	12.9
Soil at 63 in.	27.2	8.04	470	0	4.75
Soil composite [c]	26.9	8.02 {8.18}	500 {370}	5 {7}	13.5 {3.3}
Test pit TP5					
Soil at 62 in.	35.1	7.91	720	0	0
Test pit TP6					
Soil at 63 in.	44.7	8.36	450	0	6

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. 1 in. = 2.54 cm.
[b] [ ] Indicates analysis run twice from same extract.
[c] Composites were made by mixing field moist soil from each of the three depths.
[d] { } Indicates analysis run in duplicate as two separate extracts.

Table 4.2. Physical characteristics of soil samples collected on Kwajalein Island during February 1991

Test pit [a] and depth	Coarse fragments > 2.0 mm	Sand: Coarse 0.5 - 2.0 mm	Sand: Fine 0.045 - 0.5 mm	Silt 0.002 - 0.045 mm	Clay < 0.002 mm
	dry wt.%	dry wt.%	dry wt.%	dry wt.%	dry wt.%
Test pit TP1					
Soil at 08 in.	24	24	35	14.6	2.4
Soil at 33 in.	27	26	34	11.6	1.4
Soil at 56 in.	23	19.7	43.3	13.0	1.0
Test pit TP3					
Soil at 12 in.	21	20	38	17.1	3.9
Soil at 39 in.	24.5	24.6	48.2	2.6	0.1
Soil at 72 in.	45.5	29.5	25.0	0	0
Test pit TP4					
Soil at 10 in.	20	35	38	5.6	0.4
Soil at 32 in.	21	38	40	1.0	0.0
Soil at 65 in.	3	23	74	0	0

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. Analyses conducted in ORNL laboratories. Sand analyses by wet sieving, and silt and clay by hydrometer. 1 in. = 2.54 cm.

Table 4.3. Basic physical/chemical properties of soil samples collected on Kwajalein Island during February 1991

Test pit [a] and depth	USDA Texture [b]	Water content	pH
		dry wt %	
Test pit TP1			
Soil at 08 in.	loamy sand	8.0	9.29
Soil at 33 in.	loamy sand	11.6	9.55
Soil at 56 in.	loamy sand	17.0	9.29
Test pit TP3			
Soil at 12 in.	loamy sand	9.2	9.37
Soil at 39 in.	sand	13.0	9.42
Soil at 72 in.	sand	22.4	9.34
Test pit TP4			
Soil at 10 in.	sand	11.0	9.24
Soil at 32 in.	sand	19.0	9.55
Soil at 65 in.	sand	28.2	9.16

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. Analyses conducted in ORNL laboratories. 1 in. = 2.54 cm.

[b] Based on fine earth fraction (i.e., <2.0 mm diameter particles).

Table 4.4. Nutrient content in soil samples collected on Kwajalein Island during February 1991

Test pit [a] and depth	TKN	NO_3-N [b]	PO_4-P [b]	SO_4-S [b]
	mg-N/kg	mg-N/L	mg-P/L	mg-S/kg
Test pit TP1				
Soil at 08 in.	190	<0.1 [c]	<0.1	0.1
Soil at 33 in.	90	<0.1	<0.1	<0.1
Soil at 56 in.	110	<0.1	<0.1	<0.1
Test pit TP3				
Soil at 12 in.	160	<0.1	<0.1	<0.1
Soil at 39 in.	130	<0.1	<0.1	<0.1
Soil at 72 in.	110	<0.1	<0.1	0.1
Test pit TP4				
Soil at 10 in.	220	<0.1	<0.1	<0.1
Soil at 32 in.	280	<0.1	<0.1	<0.1
Soil at 65 in.	150	<0.1	<0.1	<0.1

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. Analyses conducted in ORNL laboratories. 1 in. = 2.54 cm.

[b] Analyses for N, P, and S were conducted on carbonate/bicarbonate extract of soil (20-g/L ratio).

[c] < Indicates substance not detected at detection limit shown.

Table 4.5. Exchangeable cation content in soil samples collected on Kwajalein Island during February 1991

Test pit [a] and depth	Ba	Ca	Fe	K	Mg	Mn	Mo	Na	Zn
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Test pit TP1									
Soil at 8 in.	<0.3	340	<0.2	0.26	17	<0.004	<0.16	7.6	0.09
Soil at 33 in.	<0.3	410	<0.2	0.24	17	0.014	<0.16	3.3	0.02
Soil at 56 in.	<0.3	440	<0.2	0.16	17	0.015	<0.16	3.2	<0.02
Test pit TP3									
Soil at 12 in.	<0.3	410	<0.2	0.24	16	0.024	<0.16	3.7	0.11
Soil at 39 in.	<0.3	330	<0.2	0.32	21	<0.004	<0.16	3.8	<0.02
Soil at 72 in.	<0.3	350	<0.2	0.52	22	<0.004	<0.16	5.8	<0.02
Test pit TP4									
Soil at 10 in.	<0.3	340	<0.2	0.32	22	0.018	<0.16	3.3	0.044
Soil at 32 in.	<0.3	370	<0.2	0.28	19	<0.004	<0.16	3.1	0.027
Soil at 65 in.	<0.3	440	<0.2	0.16	20	<0.004	<0.16	3.2	0.02

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. Analyses conducted in ORNL laboratories on an ammonium acetate extract. 1 in. = 2.54 cm.

[b] < Indicates cation not detected at detection limit shown.

Table 4.6. On-site analyses for physical/chemical characteristics of groundwater samples collected on Kwajalein Island during February 1991

Test pit [a]	pH	Specific conductance	Alkalinity	NO_3-N	PO_4-P
		umhos/cm	mg-HCO_3/L	ppm	ppm
Test pit TP1	7.92	560	200	0.15	<0.6
Test pit TP2	7.37	890	350	0.65 [0.65] [b]	2.18
Test pit TP3	7.57	750	200	0.15	<0.6
Test pit TP4	7.32	690	360	ND	<0.6
Test pit TP5	7.15	1280	600	- [c]	-
Test pit TP6	7.33	800	-	-	-

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. Groundwater samples were collected at the water table surface, and analyses were conducted on USAKA in a temporary laboratory.

[b] [ ] Indicates duplicate analysis.

[c] - Indicates analysis not run.

Table 4.7. Basic physical/chemical properties of groundwater samples collected on Kwajalein Island during February 1991

Test pit [a]	pH	Alkalinity	Chloride	Chemical oxygen demand	Total organic carbon
	-	mg-$CaCO_3$/L	mg/L	mg/L	mg/L
Test pit TP1	8.19	210	37	7	1.2
Test pit TP3	8.21	214	61	10	2.1
Test pit TP4	7.93	325	- [b]	220	40.0

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. Groundwater samples were collected at the water table surface, and analyses were conducted in ORNL laboratories.

[b] - Indicates analysis not run.

Table 4.8. Macronutrient content in groundwater samples collected on Kwajalein Island during February 1991

Test pit [a]	TKN	NH_4-N	NO_3-N	PO_4-P	SO_4-S	K
	mg-N/L	mg-N/L	mg-N/L	mg-P/L	mg-S/L	mg-K/L
Test pit TP1	<0.2	0.32	<1	<1	14	1.1
Test pit TP3	<0.2	0.21	8.5	<1	75	4.7
Test pit TP4	2.1	0.33	- [b]	-	-	0.2

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. Groundwater samples were collected at the water table surface and analyses were conducted in ORNL laboratories.

[b] - Indicates analysis not run.

Table 4.9. Elemental content in groundwater samples collected on Kwajalein Island during February 1991 [a]

Test pit [b]	Ca	Mg	Na	B	Cu	Fe	Mn	Mo	Al	Zn
	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Test pit TP1	58	33	21	0.011	<7 [c]	<50	<1	<40	<50	<5
Test pit TP3	38	43	65	0.18	<7	<50	<1	<40	<50	<5
Test pit TP4	110	- [d]	<25	<400	<35	<250	<5	<200	-	<25

[a] Groundwater samples were collected at the water table surface, and analyses were conducted in ORNL laboratories.
[b] Refer to Fig. 3.1 to 3.4 for test pit locations.
[c] < Indicates element not detected at detection limit shown.
[d] - Indicates analysis not conducted.

Table 4.10. Concentrations of volatile and semivolatile organic compounds measured in a diesel fuel sample collected from the diesel fuel power plant by ORNL in February 1991

Organic compound [a]	Concentration	Qualifier [b]
	ug/L	
Volatile Organics		
34 Compounds analyzed for and none detected	nd	
Semivolatile Organics		
65 Compounds analyzed for, plus 20 unidentified peaks		
Compounds detected include:		
napthalene	550	J
2-methylnapthalene	2100	
phenanthrene	1200	
Tentatively identified compounds:		
undecane	3900	J
dodecane	5200	J
tridecane	9100	J
dodecane, 2,7,10-trimethyl-	510	J
decane, 2,3,6-trimethyl-	2400	J
napthalene, 1,5-dimethyl-	450	J
napthalene, 1,3-dimethyl-	880	J
napthalene, 1,7-dimethyl-	490	J
unknown hydrocarbon	380	J
unknown hydrocarbon	1300	J
unknown	380	J
tridecane, 6-propyl-	3500	J
tridecane, 5-propyl-	1200	J
unknown hydrocarbon	1900	J
heptadecane	11000	J
pentadecane, 2,6,10,14-tetramethyl-	7500	J
unknown hydrocarbon	1400	J
unknown hydrocarbon	7900	J
unknown	5000	J
unknown	2600	J

[a] Analysis made on a sample of fresh diesel fuel collected on Kwajalein Island. Analysis made in ORNL laboratories by gas chromatography-mass spectroscopy.

[b] J Indicates estimated value.

Table 4.11. Field screening results for total hydrocarbons measured in soil and groundwater samples collected from the desalination plant site by ORNL in February 1991

Test pit [a] and sample depth	Field screening analyses	
	Friedel Crafts acylation [b]	Infrared spectroscopy [c]
	ppm	ppm
Test pit TP1		
Soil at 08 in.	x [d]	40
Soil at 33 in.	x	x
Soil at 56 in.	x	x
Groundwater at 56 in.	x	x
Test pit TP2		
Soil at 06 in.	x	x
Soil at 33 in.	x	x
Soil at 65 in.	x	x
Groundwater at 65 in.	x	x
Test pit TP3		
Soil at 12 in.	x	98
Soil at 39 in.	x	1470 [e]
Soil at 72 in.	x	x
Groundwater at 72 in.	x	35

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. 1 in. = 2.54 cm.
[b] Friedel-Crafts acylation with a freon extraction of a soil sample and color chart comparison.
[c] Infrared analysis of a freon extraction of a soil sample.
[d] x Indicates hydrocarbons not detected (detection limit = ca. 10 ppm).
[e] This high value appears to be an anomaly based on field observations and laboratory data.

Table 4.12. Field screening results for total hydrocarbons measured in soil and groundwater samples collected from the diesel fuel tank site by ORNL in February 1991

Test pit [a] and depth	Field screening analyses	
	Friedel Crafts acylation [b]	Infrared spectroscopy [c]
	ppm	ppm
Test pit TP4		
Soil at 10 in.	1 - 10	235 [490] [d]
Soil at 32 in.	x [e]	1600 [350]
Soil at 65 in.	x	4235 [4176]
Groundwater at 65 in.	500-2000	1100
Test pit TP6		
Soil at 72 in	x	x
Other		
Sewer manhole southeast of TP4	x	3.5
Sewer water	x	2.9
Monitoring well 17	x	17

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. 1 in. = 2.54 cm.
[b] Friedel-Crafts acylation with a freon extraction of a soil sample and color chart comparison.
[c] Infrared analysis of a freon extraction of a soil sample.
[d] [ ] Indicates duplicate analysis.
[e] x Indicates hydrocarbons not detected (detection limit = ca. 10 ppm).

Table 4.13. Concentrations of total petroleum hydrocarbons measured in soil and groundwater samples collected from the desalination plant site by ORNL in February 1991

Test pit [a] and depth	Total hydrocarbon concentration [b]	Substance similarity based on chromatograph
	ppm	
Test pit TP1		
Soil at 08 in.	<10 [c]	-
Soil at 33 in.	<10	-
Soil at 56 in.	<10	-
Groundwater at 56 in.	<10	-
Test pit TP2		
Soil at 63 in.	<10	-
Groundwater at 65 in.	<10	-
Test pit TP3		
Soil at 12 in.	5.0	jet fuel
Soil at 39 in.	1.6	jet fuel
Soil at 72 in.	4.5	jet fuel
Groundwater at 72 in.	<10	-

[a] Refer to Figures 3.1 to 3.4 for test pit locations. 1 in. = 2.54 cm.
[b] Analysis made by gas chromatography.
[c] < Indicates compounds not detected at detection limit shown.

Table 4.14. Concentrations of total petroleum hydrocarbons measured in soil and groundwater samples collected from the diesel fuel tank site by ORNL in February 1991

Test pit [a] and depth	Total hydrocarbon concentration [b]	Substance similarity based on chromatograph
	ppm	
Test pit TP4		
Soil at 10 in.	0.9 (est.)	diesel
Soil at 32 in.	216	diesel
Soil at 65 in.	8920	diesel
Groundwater at 65 in.	265	diesel
Test pit TP5		
Soil at 62 in.	490	diesel
Groundwater at 62 in.	110	diesel

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. 1 in. = 2.54 cm.
[b] Analysis conducted in ORNL laboratories by gas chromatography.

Table 4.15. Concentrations of semivolatile hydrocarbons measured in soil and groundwater samples collected from the desalination plant site by ORNL in February 1991

Test pit [a] and depth	Total SVOC concentration [b]	Typical detection limits	Compounds detected
	mg/kg or mg/L	mg/kg or mg/L	
Test pit TP1			
Soil at 08 in.	4.96	0.3 - 1.7	trace amounts of phenanthrene, fluoranthene, di-n-butyl phthalate, pyrene, benzo(a)anthracene, chrysene and benzo(a)pyrene
Soil at 33 in.	x [c]	0.3 - 1.6	-
Soil at 56 in.	x	0.3 - 1.6	-
Groundwater at 56 in.	x	0.06 - 0.3	-
Test pit TP2			
Groundwater at 65 in.	x	0.08 - 0.43	-
Test pit TP3			
Soil at 12 in.	0.1	0.30 - 1.6	trace amount of phenanthrene estimated
Soil at 39 in.	x	0.30 - 1.5	-
Soil at 72 in.	x	0.30 - 1.6	-
Groundwater at 72 in.	x	0.06 - 0.30	-

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. 1 in. = 2.54 cm.

[b] Analysis conducted in ORNL laboratories by gas chromatography-mass spectroscopy in conformance with U.S. Environmental Protection Agency methods for 65 semivolatiles on the target compound list.

[c] x Indicates semivolatiles not detected at the detection limits shown.

Table 4.16. Concentrations of semivolatile hydrocarbons measured in soil and groundwater samples collected from the diesel fuel tank site by ORNL in February 1991

Test pit [a] and depth	Total SVOC concentration [b]	Typical detection limit	Compounds detected
	mg/kg or mg/L	mg/kg or mg/L	
Test pit TP4			
Soil at 10 in.	x [c]	0.30 - 1.6	-
Soil at 32 in.	x	0.03 - 0.16	-
Soil at 65 in.	0.07 [d]	0.03 - 0.16	4,6-dinitro-2-methylphenol
Groundwater at 65 in.	0.15 [d]	0.06 - 0.16	bis(2-ethylhexyl)phthalate
Test pit TP5			
Soil at 62 in.	- [d]	4.1 - 20	- [d]
Groundwater at 62 in.	- [d]	0.03 - 0.08	- [d]

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. 1 in. = 2.54 cm.

[b] Analyses conducted in ORNL laboratories by gas chromatography-mass spectroscopy in conformance with U.S. Environmental Protection Agency methods for semivolatiles on the target compound list.

[c] x Indicates semivolatiles not detected at detection limits shown.

[d] Unknown hydrocarbons detected, but not quantified; several appeared to be napthalenes.

Table 4.17. Concentrations of volatile hydrocarbons measured in soil and groundwater samples collected from the desalination plant site by ORNL in February 1991

Test pit [a] and depth	Total volatile organic compound concentration[b]	Typical detection limit	Compounds detected
	ug/kg or ug/L	ug/kg or ug/L	
Test pit TP1			
Soil at 08 in.	x [c]	5 - 10	-
Soil at 33 in.	x	5 - 10	-
Soil at 56 in.	x	5 - 10	-
Test pit TP2			
Soil at 63 in.	53	5 - 10	carbon disulfide, chlorobenzene
Groundwater at 65 in.	11	5 - 10	chloroform
Test pit TP3			
Soil at 12 in.	8	5 - 10	1,1,1-trichloroethane
Soil at 39 in.	x	5 - 10	-
Soil at 72 in.	13	5 - 10	1,1,1-trichloroethane
Groundwater at 72 in.	67	5 - 10	chloroform, 1,1,1-trichloroethane

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. 1 in. = 2.54 cm.

[b] Analyses conducted in ORNL laboratories by gas chromatography-mass spectroscopy in conformance with U.S. Environmental Protection Agency methods for volatiles on the target compound list.

[c] "x" Indicates volatiles not detected at detection limits shown.

Table 4.18. Concentrations of volatile hydrocarbons measured in soil and groundwater samples collected from the diesel tank site by ORNL in February 1991

Test pit [a] and depth	Total volatile organic compound concentration [b]	Typical detection limit	Compounds detected
	ug/kg or ug/L	ug/kg or ug/L	
Test pit TP4			
Soil at 10 in.	x [c]	5 - 10	-
Soil at 32 in.	160	5 - 10	acetone
Soil at 65 in.	x	5 - 10	-
Groundwater at 65 in.	580	5 - 50	acetone
Test pit TP4			
Soil at 62 in.	- [d]	5 - 10	- [d]
Groundwater at 62 in.	53 [d]	5 - 10	carbon disulfide, chlorobenzene [d]

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. 1 in. = 2.54 cm.

[b] Analyses conducted in ORNL laboratories by gas chromatography-mass spectroscopy in conformance with U.S. Environmental Protection Agency methods for volatiles on the target compound list.

[c] x Indicates volatiles not detected at detection limits shown.

[d] Unknown hydrocarbons detected, but not quantified; several appeared to be napthalenes.

Table 4.19. Concentrations of heavy metals measured in soil and groundwater samples collected from the desalination plant site by ORNL in February 1991

Test pit [a] and depth	Ag	As	Ba	Cd	Cr	Hg	Pb	Se
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Test pit TP1								
Soil at 08 in.	<1.6 [b]	<16	7.7	<1.6	12	0.01	38	<16
Soil at 33 in.	<1.7	<17	4.7	<1.7	11	<0.01	<17	<17
Soil at 56 in.	1.7	<16	5.7	<1.6	11	<0.01	<16	<16
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Groundwater at 56 in.	<5.0	<50.0	<1.0	<5.0	19	<10	<50.0	<50.0
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Test pit TP3								
Soil at 12 in.	<1.6 [b]	<1.6	6.5	<1.6	13	0.02	<16	<16
Soil at 39 in.	<1.6	<16	5.3	<1.6	11	<0.01	<16	<16
Soil at 72 in.	<1.5	<15	4.2	<1.5	9	<0.01	<15	<15
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Groundwater at 72 in.	<5.0	<50.0	<1.0	<5.0	22	<10	<50.0	<50.0

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. 1 in. = 2.54 cm.
Analyses conducted in ORNL laboratories.

[b] < Indicates heavy metal not detected at detection limit shown.

Table 4.20. Concentrations of heavy metals measured in soil and groundwater samples collected from the diesel fuel tank site by ORNL in February 1991

Test pit [a] and depth	Ag	As	Ba	Cd	Cr	Hg	Pb	Se
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Test pit TP4								
Soil at 10 in.	<1.5 [b]	<15	6.1	<1.5	11	<0.01	<15	<15
Soil at 32 in.	<1.6	<16	4.8	<1.6	8.6	<0.01	<16	<16
Soil at 65 in.	<1.6	<16	5.1	<1.6	8.8	<0.01	<16	<16
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Groundwater at 65 in.	<25	<250	<5.0	-	23	<10	<250	-

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. 1 in. = 2.54 cm.
Analyses conducted in ORNL laboratories.

[b] < Indicates heavy metal not detected at detection limit shown.

Table 4.21. Low-level radiochemical analyses of soil and groundwater samples collected from the desalination plant site and the diesel tank site by ORNL in February 1991

Test pit [a] and depth	Gross Alpha	Gross Beta
	Bq/kg	Bq/kg
Test pit TP3		
Soil at 12 in.	70 +/- 100	10 +/- 120
Soil at 39 in.	76 +/- 90	60 +/- 120
Soil at 72 in.	18 +/- 7	20 +/- 180
Test pit TP4		
Soil at 10 in.	72 +/- 85	120 +/- 100
Soil at 32 in.	5 +/- 48	130 +/- 170
Soil at 65 in.	-21 +/- 54	-110 +/- 240
Groundwater at 65 in.	430 +/- 600	1200 +/- 1400

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. 1 in. = 2.54 cm.
Analyses conducted in ORNL laboratories.

Table 4.22. Microbiological properties of soil and groundwater samples collected on Kwajalein Island during February 1991

Test pit [a] and depth	Microbial colony forming units (CFU) [b]		
	Field analysis	Laboratory analysis (IAM Agar)	Laboratory analysis (Balkwill Agar)
	log org./g dry soil	log org./g dry soil	log org./g dry soil
Test pit TP1			
Soil at 08 in.	6.78	5.98	5.80
Soil at 33 in.	4.30	4.90	4.85
Soil at 56 in.	5.54	5.73	5.70
Groundwater at 56 in.	- [c]	5.86	5.83
Test pit TP2			
Soil at 06 in.	5.20	4.52	4.59
Soil at 63 in.	3.69	5.08	5.20
Test pit TP3			
Soil at 12 in.	5.00	7.46	7.43
Soil at 72 in.	3.08	5.08	5.36
Test pit TP4			
Soil at 10 in.	6.85	-	-
Soil at 32 in.	5.48	5.43	5.45
Soil at 65 in.	4.30	7.47	7.47
Groundwater at 65 in.	4.00	4.96	4.98
Test pit TP5			
Soil at 62 in.	3.70	4.95	4.94
Soil at 70 in.	1.60	3.15	3.11
Other			
Sewage Sludge Drying Bed	-	6.40	6.20

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. 1 in. = 2.54 cm.

[b] On-site analyses conducted on USAKA in a temporary field laboratory, with off-site laboratory analyses conducted at ORNL/IAM laboratories.

[c] - Indicates analysis not conducted.

Table 4.23. Results of on-site microcosm experiments conducted with soil samples collected on Kwajalein Island during February 1991

Test pit [a] and depth	Microbiologic analysis [b]			
	Field analysis CFU	Enrichment tubes	Most probable number: Fuel degraders	Most probable number: BTEX degraders
	Log org./g	Log org./ g	Log org./ g	Log org./ g
Test pit TP1				
Soil at 08 in.	6.78	>4	3	3
Soil at 33 in.	4.30	>4	0	0
Soil at 56 in.	5.54	>4	0	0
Groundwater at 56 in.	- [c]	-	-	-
Test pit TP2				
Soil at 06 in.	5.20	>4	0	0
Soil at 63 in.	3.69	3	3	3
Test pit TP3				
Soil at 12 in.	5.00	>4	0	0
Soil at 72 in.	3.08	3	3	0
Test pit TP4				
Soil at 10 in.	6.85	6	3	3
Soil at 32 in.	5.48	6	3	3
Soil at 65 in.	4.30	4	3	0
Groundwater at 65 in.	4.00	4	3	3
Test pit TP5				
Soil at 62 in.	3.70	3	3	3
Soil at 70 in.	1.60	3	3	3

[a] Refer to Fig. 3.1 to 3.4 for test pit locations. 1 in. = 2.54 cm.

[b] On-site analyses conducted on USAKA in a temporary field laboratory, with off-site laboratory analyses conducted at ORNL/IAM laboratories.

[c] - Indicates analysis not conducted.

Table 4.24. Results of on-site respiration experiments conducted with soil samples collected on Kwajalein Island during February 1991

Test pit [b] sample and amendments	Respirometer conditions[a] and results	
	Cumulative O_2 uptake	Cumulative CO_2 evolved
	uL O_2	uL CO_2
Test pit TP1	40 h incubation at 24°C for a composite sample of soil from 8- (28%), 33- (32%), and 56-in.(40%) depths water content = 16.2% by wt	
Soil + amendments: [c]		
Nutrients	3700	- [d]
Nutrients + fuel	6700	-
Nutrients + fuel + NaOH	1700	-
10 mL of groundwater	2500	-
Blank	0	-
Test pit TP4	83 h incubation at 24°C of composite sample of soil from 10- (22%), 22- (51%), and 65-in. (27%) depths	
Soil + amendments: [e]		
Nutrients	10800	17000
Nutrients + fuel	12000	20000
None	550	5000
Blank	0	<200
Test pit TP5	46 h incubation at 24°C of composite sample of soil from 8-, 33-, and 56-in. depths	
Soil + amendments: [e]		
Nutrients	7900	6500
Nutrients + fuel	6000	6600
None	2400	900
Blank	0	<100

[a] Field moist soil weight per respirometer = 200 g +/- 5%.

[b] Refer to Figures 3.1 to 3.4 for test pit locations. Analyses conducted on Kwajalein Island.

[c] Amendment concentrations based on field moist soil weight.
Groundwater collected from respective test pit.
Nutrient concentrations = 6 mg/kg N,P,K; 1-16 ug/kg S, B, Cu, Fe, Mn, Mo, Zn; 3 mL groundwater; total water = 10 mL.
Fuel = 5000 mg/kg fresh diesel fuel from USAKA.
NaOH = 0.25 mL 5M NaOH.

[d] - Indicates analysis not conducted.

[e] Amendment concentrations based on field moist soil weight:
Nutrient concentrations = 4.5 mg/kg N,P,K; 0.5- 8 ug/kg S, B, Cu, Fe, Mn, Mo, Zn.
Total water = 6 mL.
Fuel = 5000 mg/kg fresh diesel fuel from USAKA; volume = 1.25 mL.

SECTION 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The site characterization and biotreatability studies described herein were conducted to assess the potential for bioremediation as an environmental restoration technique for petroleum-contaminated soils on Kwajalein Island. As a result of the investigations conducted during February 1991, the following conclusions have been reached.

1. The area proposed for construction of a fresh water production facility (a.k.a. desalination plant) is not contaminated by petroleum hydrocarbons at a level warranting further investigation or restoration. An area adjacent to an aboveground diesel storage tank southeast of the old power plant, however, exhibited significant soil and groundwater contamination by diesel fuel at levels well above normal thresholds used for initiating environmental restoration.

2. The subsurface soil materials in the study area on Kwajalein Island contained an abundant biomass, which was able to grow in the presence of and degrade diesel fuel contamination.

3. The subsurface exhibited no apparent adverse environmental conditions that would render bioremediation infeasible. High concentrations of diesel fuel which is likely weathered, high pH, and nutrient deficiencies may somewhat hinder bioremediation processes, but these may be overcome by design and operation.

4. There appear to be no concentrations of heavy metals and other hazardous substances that would preclude application of bioremediation due to microbial toxicity nor that would require remediation by a nonbiotechnology.

5.2 RECOMMENDATIONS

Based on the results of this investigation, there are petroleum-contaminated soils on Kwajalein Island, and bioremediation appears to be a viable environmental restoration technique. Further experimentation and field demonstration are required to determine the design and operating conditions that would provide for optimum biodegradation and restoration of petroleum-contaminated soils to an acceptable level.

SECTION 6
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SECTION 7

APPENDICES

APPENDIX A

DESCRIPTIVE LOGS OF BACKHOE TEST PITS

Test Pit Summary Information

ornl OAK RIDGE NATIONAL LABORATORY

Prepared By: D.A. PICKERING Date: 2/18/91 Page: 1 OF 1

Hole No.: TP 1 Csg. Elev.: NA Grd. Elev.: NA Location: DESAL. PLANT SITE

Total Depth: 168cm Number of Completions: NA Rig Type: BACKHOE

Auger Size: NA Sample Type: GBAB AT 20cm, 84cm, AND 157cm

Project: KWAJALEIN ATOLL, BIO-DEMO. Data Verified By: Date:

DEPTH (cm)	SAMPLE TYPE	SAMPLE INTV		LITHOLOGY	DESCRIPTION
0					
10					**PEBBLY SAND:** light tan, moderately sorted, fine to medium grained, angular to sub-angular, coral sand. Lt. green and red grains interspersed. Pebbles are lt. tan corals. Abundant organic material, roots stop at 20cm. Dry, probably fill.
20	GB				
30					
40					**PEBBLY SAND:** as above, lacking organic material.
50					
60					
70					
80	GB				
90					
100					
110					
120					
130					**PEBBLY SAND:** as above, no organics, becoming moist at 130cm, no odor.
140					
150					
160	GB				
170					
180					Water level = 157cm Test pit total depth = 168cm
190					
200					

Test Pit Summary Information

ornl OAK RIDGE NATIONAL LABORATORY

Prepared By: D.A. PICKERING Date: 2/19/91 Page: 1 OF 1

Hole No.: TP 2 Csg. Elev.: NA Grd. Elev.: NA Location: DESAL. PLANT SITE

Total Depth: 168cm Number of Completions: NA Rig Type: BACKHOE

Auger Size: NA Sample Type: GRAB AT 15cm, 84cm, AND 160cm

Project: KWAJALEIN ATOLL, BIO-DEMO. Data Verified By: Date:

DEPTH (cm)	SAMPLE TYPE	SAMPLE INTV		LITHOLOGY	DESCRIPTION
0					**PEBBLY SAND:** gray, moderately sorted, fine to medium grained, rounded coral sand. White and dark gray sand stringers inter-mixed. Occassional lt. tan coral pebbles, organics (roots) to 15 cm. Dry, probably fill.
10	GB				
20					
30					
40					
50					
60					
70					
80	GB				**GRAVELLY SAND:** lt. tan, moderately sorted, fine to medium grained, angular to sub-angular, coral sand. Abundant red and green grains. Abundant pebble to cobble size lt. tan coral pieces. Probably fill. Dry to 152cm, moist to 160cm, no odor.
90					
100					
110					
120					
130					
140					
150	GB				
160					
170					Water level = 160cm Test pit total depth = 168cm
180					
190					
200					

Test Pit Summary Information

ornl OAK RIDGE NATIONAL LABORATORY

Prepared By: D.A. PICKERING Date: 2/19/91 Page: 1 OF 1

Hole No.: TP 3 Csg. Elev.: NA Grd. Elev.: NA Location: DESAL. PLANT SITE

Total Depth: 190cm Number of Completions: NA Rig Type: BACKHOE

Auger Size: NA Sample Type: GRAB AT 30cm, 99cm, AND 183cm

Project: KWAJALEIN ATOLL, BIO-DEMO. Data Verified By: Date:

DEPTH (cm)	SAMPLE TYPE	SAMPLE ENTV		LITHOLOGY	DESCRIPTION
0					**PEBBLY SAND:** light tan, moderately sorted, fine to medium grained, subrounded to subangular coral sand. Red and green grains interspersed. Abundant pebbles, some cobbles, all lt. tan coral. Dry, probably fill, organics to 23cm.
10					
20					**GRAVELLY SAND:** gray sand from 23 to 28cm and 36 to 41cm, lt. gray sand between these layers. Abundant pebbles and cobbles of lt. tan coral in all layers. Sand is moderately sorted, fine to medium grained, rounded coral.
30	GB	X			
40					
50					
60					
70					
80					
90					
100	GB	X			
110					**GRAVELLY SAND:** light tan, moderately sorted, fine to medium grained, subrounded to subangular coral sand. Red and green grains interspersed. Abundant pebbles and cobbles of lt. tan coral. Dry to 165cm, probably fill, no odor.
120					
130					
140					
150					
160					
170					
180	GB	X			
190					Water level = 198cm Test pit total depth = 190cm
200					

Test Pit Summary Information

ornl OAK RIDGE NATIONAL LABORATORY

Prepared By: D.A. PICKERING Date: 2/20/91 Page: 1 OF 1

Hole No.: TP 4 Csg. Elev.: NA Grd. Elev.: NA Location: DESAL. PLANT SITE

Total Depth: 173cm Number of Completions: NA Rig Type: BACKHOE

Auger Size: NA Sample Type: GRAB AT 165cm

Project: KWAJALEIN ATOLL, BIO-DEMO. Data Verified By: _____ Date: _____

DEPTH (cm)	SAMPLE TYPE	SAMPLE INTV		LITHOLOGY	DESCRIPTION
0					**PEBBLY SAND:** gray with lt. tan sand stringers. Thin layer of dk gray silt (5cm) at top. Gray sands are moderately sorted, fine to medium grained, rounded to subrounded. Lt tan sands are moderately sorted, fine to medium grained, angular to subangular. Gray sands become less common w/depth. Abund. pebbles and cobbles of lt tan coral throughout. Abundant org. matl. to 20cm, grass roots cont. to 46cm. Dry.
10					
20					
30					
40					
50					
60					
70					
80					
90					
100					**PEBBLY SAND:** light tan, moderately sorted, fine to medium grained, angular to subangular coral sand. Abundant pebble to cobble size coral pieces throughout. Dry to 112cm, moist to 132cm. Fuel odor.
110					
120					
130					
140					
150					
160	GB				
170					Water level = 132cm Test pit total depth = 173cm
180					
190					
200					

Test Pit Summary Information

ornl OAK RIDGE NATIONAL LABORATORY

Prepared By: D.A. PICKERING Date: 2/23/91 Page: 1 OF 1

Hole No.: TP 5 Csg. Elev.: NA Grd. Elev.: NA Location: DESAL. PLANT SITE

Total Depth: 188cm Number of Completions: NA Rig Type: BACKHOE

Auger Size: NA Sample Type: GRAB AT 157cm AND 188cm

Project: KWAJALEIN ATOLL, BIO-DEMO. Data Verified By: Date:

DEPTH (cm)	SAMPLE TYPE	SAMPLE INTV		LITHOLOGY	DESCRIPTION
0					PEBBLY SAND: lt. tan coral sand. Abundant pebbles of lt. tan coral.
10					
20					
30					
40					PEBBLY SAND: gray-brown coral sand. Abundant lt. tan coral pebbles.
50					
60					
70					
80					
90					GRAVELLY SAND: lt. tan coral sand. Abundant lt. tan coral cobbles. Probably fill.
100					
110					
120					
130					
140					
150					
160	GB				
170					
180	GB				Water level = 183cm Test pit total depth = 188cm
190					Note: Test pit 5 was logged from the surface without detailed samples. The trench was too narrow to enter for detailed lithologic logs.
200					

APPENDIX B

LISTING OF SAMPLES SUBMITTED FOR LABORATORY ANALYSES

Table B.1. Organics analysis listing of samples returned to ORNL from Kwajalein Island on Saturday, February 25, 1991

Field sample ID	Sample description	Sample date	Sample time	Containers	Organics analyses requested
TP01-08	Soil @ 8	2/18/91	18.15	1, 250-mL Q-jar	VOCs, SVOCs, TPH
TP01-33	Soil @ 33	2/18/91	17.55	1, 250-mL Q-jar	VOCs, SVOCs, TPH
TP01-56	Soil @ 56	2/18/91	17.05	1, 250-mL Q-jar	VOCs, SVOCs, TPH
TP01-W	Groundwater @ 56	2/18/91	17.10	2, 40-mL I-VOA	VOCs
TP01-W	Groundwater @ 56	2/18/91	17.10	2, 40-mL I-VOA	SVOCs, TPH
TP02-W	Groundwater @ 63	2/19/91	14.45	2, 40-mL I-VOA	VOCs
TP02-W	Groundwater @ 63	2/19/91	14.45	2, 40-mL I-VOA	SVOCs, TPH
TP03-12	Soil @ 12	2/19/91	16.30	1, 250-mL I-jar	VOCs, SVOCs, TPH
TP03-39	Soil @ 39	2/19/91	16.50	1, 250-mL I-jar	VOCs, SVOCs, TPH
TP03-72	Soil @ 72	2/19/91	16.15	1, 250-mL I-jar	VOCs, SVOCs, TPH
TP03-W	Groundwater @ 72	2/19/91	16.30	2, 40-mL I-VOA	VOCs
TP03-W	Groundwater @ 72	2/19/91	16.30	2, 40-mL I-VOA	SVOCs, TPH
TP04-10	Soil @ 10	2/20/91	12.30	1, 250-mL I-jar	VOCs, SVOCs, TPH
TP04-22	Soil @ 32	2/20/91	12.40	1, 250-mL I-jar	VOCs, SVOCs, TPH
TP04-65	Soil @ 65	2/20/91	12.20	1, 250-mL I-jar	VOCs, SVOCs, TPH
TP04-W	Groundwater @ 65	2/20/91	11.40	2, 40-mL I-VOA	VOCs
TP04-W	Groundwater @ 65	2/20/91	11.40	2, 40-mL I-VOA	SVOCs, TPH
TP04-65A	Soil @ 65	2/20/91	12.20	1, 40-mL I-VOA	VOCs by Standard Method
TP04-65B	Soil @ 65	2/20/91	12.20	1, 40-mL I-VOA	VOCs by MeOH In-vial Extraction
TP03-12A	Soil @ 12	2/19/91	16.30	1, 40-mL I-VOA	VOCs by Standard Method
				1, 40-mL I-VOA	VOCs by MeOH In-vial Extraction
TP03-12B	Soil @ 12	2/19/91	16.30	1, 40-mL I-VOA	VOCs by MeOH In-vial Extraction
TP01-56A	Soil @ 56	2/18/91	17.05	1, 40-mL I-VOA	VOCs by Standard Method
TP01-56B	Soil @ 56	2/18/91	17.05	1, 40-mL I-VOA	VOCs by MeOH In-vial Extraction
Fuel	Diesel Fuel	2/19/91		1, 40-mL I-VOA	VOCs, SVOCs, TPH
TB03	Trip Blank	2/19/91	9.30	2, 40-mL I-VOA	VOCs

Notes: Please analyze and prepare data package in accordance with HAZWRAP Level C data quality for 6 samples: TP01-56; TP01-W; TP03-72; TP04-22; TP04-65; TP04-W.
Analytical methods: VOCs by EPA 5030/8240; SVOCs by 3550/8270; TPH by 8000.
Maintain all unused sample at 4°C. Return all sample material to R.L. Siegrist.

Table B.2. Organics Analysis Listing of Samples Returned to ORNL from Kwajalein Island on Saturday, March 2, 1991

Field sample ID	Sample description	Sample date	Sample time	containers	Organics analyses requested
TB01	Trip Blank - water	2/19/91	9.30	2, 40-mL I-VOA	VOCs
TB02	Trip Blank - water	2/19/91	9.30	2, 40-mL I-VOA	VOCs
TB04	Trip Blank - water	2/19/91	9.30	2, 40-mL I-VOA	VOCs
TB05	Trip Blank - water	2/19/91	9.30	2, 40-mL I-VOA	VOCs
TB06	Trip Blank - water	2/19/91	9.30	2, 40-mL I-VOA	VOCs
ER218	Equipment Blank - water	2/18/91	18.15	2, 40-mL I-VOA	VOCs
ER218	Equipment Blank - water	2/18/91	18.15	2, 40-mL I-VOA	SVOCs, TPH
ER219	Equipment Blank - water	2/19/91	18.15	2, 40-mL I-VOA	VOCs
ER219	Equipment Blank - water	2/18/91	18.15	2, 40-mL I-VOA	SVOCs, TPH
ER220	Equipment Blank - water	2/20/91	13.00	2, 40-mL I-VOA	VOCs
ER220	Equipment Blank - water	2/20/91	13.00	2, 40-mL I-VOA	SVOCs, TPH
FB01	Field Blank - water	2/19/91	16.45	2, 40-mL I-VOA	VOCs
FB01	Field Blank - water	2/19/91	16.45	2, 40-mL I-VOA	SVOCs, TPH
TP02-63	Soil @ 63	2/19/91	14.30	4, 40-mL I-VOA	VOCs
TP02-63	Soil @ 63	2/19/91	14.30	1, 250 mL I-jar	VOCs, SVOCs, TPH
TP02-63 MS	Soil @ 63	2/19/91	14.30	1, 250 mL I-jar	VOCs, SVOCs, TPH
TP02-63 MSD	Soil @ 63	2/19/91	14.30	1, 250 mL I-jar	VOCs, SVOCs, TPH
TP05-62	Soil @ 62	2/23/91	13.05	2, 40-mL I-VOA	VOCs
TP05-62	Soil @ 62	2/23/91	13.05	1, 250 mL I-jar	VOCs, SVOCs, TPH
TP05-62A	Soil @ 62 in isopropanol	2/23/91	13.05	2, 40-mL I-VOA	VOCs
TP05-62B	Soil @ 62	2/23/91	13.05	1, 250 mL I-jar	VOCs, SVOCs, TPH
TP05-W	Groundwater @ 62	2/23/91	13.15	2, 40-mL I-VOA	VOCs
TP05-W	Groundwater @ 62	2/23/91	13.15	2, 40-mL I-VOA	SVOCs, TPH

Notes: Please analyze and prepare data package in accordance with HAZWRAP Level C data quality for 6 samples: TB05, ER219, FB01, TP03-12, TP05-62.
Analytical methods: per U.S. EPA CLP protocols.
Maintain all unused sample at 4°C. Return all sample material to R.L. Siegrist

Table B.3. Inorganics analysis listing of samples returned to ORNL from Kwajalein Island on Saturday, February 25, 1991

Field sample ID	Sample description	Sample date	Sample time	Containers
Analyze nine (9) soil samples for the following properties and characteristics:				
	Water content, pH, TOC, TKN			
	Sodium Carbonate/bicarbonate extraction; SO4, PO4, NO3			
	Acid digestion; total RCRA metals (As, Ba, Cd, Cr, Pb, Cu, Hg, Ag)			
Analyze six (6) soil samples (TP03 and TP04 only) for gross alpha and beta activity:				
TP01-08	Soil @ 8	2/18/91	18.15	1, 100 g poly bag
TP01-33	Soil @ 33	2/18/91	17.55	1, 100 g poly bag
TP01-56	Soil @ 56	2/18/91	17.05	1, 100 g poly bag
TP03-12	Soil @ 12	2/19/91	16.30	1, 100 g poly bag
TP03-39	Soil @ 39	2/19/91	16.50	1, 100 g poly bag
TP03-72	Soil @ 72	2/19/91	16.15	1, 100 g poly bag
TP04-10	Soil @ 10	2/20/91	12.30	1, 100 g poly bag
TP04-22	Soil @ 32	2/20/91	12.40	1, 100 g poly bag
TP04-65	Soil @ 65	2/20/91	12.20	1, 100 g poly bag
TP04-W	Groundwater @ 65	2/20/91	11.40	2, 40-mL I-VOA
TP04-W	Groundwater @ 65	2/20/91	11.40	2, 40-mL I-VOA
Analyze one (1) groundwater sample for the following constituents, characteristics:				
	pH, Alkalinity, TDS, COD, TOC, TKN			
	Fe, Mn, Na, Ca, K, Zn, B, Mo, NH4, Cl, SO4, PO4, NO3			
	RCRA metals (As, Ba, Cd, Cr, Pb, Cu, Hg, Ag)			
	Gross alpha and beta activity			
TP04-W	Groundwater @ 65	2/20/91	11.40	2, 1-L glass jars, 1, 0.5 L bottle
Analyze two (2) nutrient solution samples for the following constituents, characteristics:				
	Fe, Mn, Na, Ca, K, Zn, B, Mo, NH4, Cl, SO4, PO4, NO3			
NPK solution	nutrient solution	2/21/91		1, 40-mL VOA vial
Micronutrient	nutrient solution	2/21/91		1, 12-mL test tube

Notes: Analytical methods: Use U.S. EPA approved methodologies. Provide citation with report. Maintain all unused sample at 4oC. Return all sample material and extracts to R.L. Siegrist.

Table B.4. Inorganics Analysis Listing of Samples Returned to ORNL from Kwajalein Island on Saturday, March 2, 1991

Field sample ID	Sample description	Sample date	Sample time	Containers
TP04-W	Groundwater @ 65	2/20/91	11.40	2, 40-mL I-VOA
TP04-W	Groundwater @ 65	2/20/91	11.40	2, 40-mL I-VOA
Analyze six (6) water samples for the following constituents:				
	pH, Alkalinity, TDS, COD, TOC, TKN			
	Fe, Mn, Na, Ca, K, Zn, B, Mo, NH4, Cl, SO4, PO4, NO3			
	RCRA metals (As, Ba, Cd, Cr, Pb, Cu, Hg, Ag)			
ER218	Equipment Blank	2/18/91	18.15	1, 500 mL, 2, 1-L jars
ER219	Equipment Blank	2/19/91	18.15	1, 500 mL, 2, 1-L jars
ER220	Equipment Blank	2/20/91	13.00	1, 500 mL, 2, 1-L jars
FB01	Field Blank	2/19/91	16.45	2, 1-L jars
TP01-W	Groundwater @ 63	2/18/91	17.00	2, 1-L glass jars, 1, 0.5 L bottle
TP03-W	Groundwater @ 63	2/19/91	16.30	2, 1-L glass jars
Analyze four (4) nutrient solution samples for the following constituents, characteristics:				
	Fe, Mn, Na, Ca, K, Zn, B, Mo, NH4, Cl, SO4, PO4, NO3			
Macro 1X	NPK nutrient solution	3/15/91		75 mL polybottle
Macro 10X	NPK nutrient solution	3/18/91		75 mL polybottle
Micro 1X	Micronutrient solution	3/15/91		75 mL polybottle
Micro 10X	Micronutrient solution	3/18/91		75 mL polybottle

Notes: Analytical methods: Use U.S. EPA approved methodologies. Provide citation with report. Maintain all unused sample at 4°C. Return all sample material and extracts to R.L. Siegrist.

APPENDIX C

LABORATORY RESULTS FOR ORGANIC ANALYSES

Oak Ridge National Laboratory
Analytical Chemistry Division
Results of Analyses
Organic Analysis Laboratory

Customer Name SIEGRIST
Request Number OAL94146
Project Number
Series
Comments

Date Received 27-Feb-1991 14:30
Charge Number 33357130
Dept Number 3335
Date of Report 2-MAY-91

Approved By MP Mackenzie
Date

RETURN ALL MATERIAL TO SIEGRIST. ON SAMPLES LABELLED -B. RECORD WEIGHT BEFORE AND AFTER INJECTING MEOH.
SIEGRIST: 4-7286

Analy No. / Matrix / Frequency	Customers Id / Material Desc.	Date/Time Sampled	Analysis	Result	Units	Procedure No	Completed
910228-052	TP01-08	18-Feb-1991 18:15					
SOIL & WATER	SOIL						
ON REQUEST							
			TPH	< 10	PPM	DEISEL/JET	26-Apr-1991
910228-053	TP01-33	18-Feb-1991 17:55					
SOIL & WATER	SOIL						
ON REQUEST							
			TPH	< 10	PPM	DEISEL/JET	26-Apr-1991
910228-054	TP01-56	18-Feb-1991 17:05					
SOIL & WATER	SOIL						
ON REQUEST							
			TPH	< 10	PPM	LOST SAMPLE	26-Apr-1991
910228-055	TP01-W	19-Feb-1991 14:45					
SOIL & WATER	WATER						
ON REQUEST							
			TPH	< 10	PPM	DEISEL/JET	26-Apr-1991
910228-056	TP02-W	19-Feb-1991 14:45					
SOIL & WATER	WATER						
ON REQUEST							
			TPH	< 10	PPM	DEISEL/JET	26-Apr-1991
910228-057	TP03-12	19-Feb-1991 16:30					
SOIL & WATER	SOIL						
ON REQUEST							
			TPH	5.0	PPM	JET	26-Apr-1991
910228-058	TP03-39	19-Feb-1991 16:50					
SOIL & WATER	SOIL						
ON REQUEST							
			TPH	1.6	PPM	JET	26-Apr-1991
910228-059	TP03-72	19-Feb-1991 16:15					
SOIL & WATER	SOIL						
ON REQUEST							
			TPH	4.5	PPM	JET	26-Apr-1991

910228-059 TP03-72	19-Feb-1991 16:15					
910228-060 TP03-W SOIL & WATER WATER ON REQUEST	19-Feb-1991 16:30	TPH	< 10	PPM	DEISEL/JET	26-Apr-1991
910228-061 TP04-10 SOIL & WATER SOIL ON REQUEST	20-Feb-1991 12:30	TPH	J .90	PPM	DEISEL	26-Apr-1991
910228-062 TP04-22 SOIL & WATER SOIL ON REQUEST	20-Feb-1991 12:40	TPH	216	PPM	DEISEL	26-Apr-1991
910228-063 TP04-65 SOIL & WATER SOIL ON REQUEST	20-Feb-1991 12:20	TPH	8920	PPM	DEISEL	30-Apr-1991
910228-064 TP04-W SOIL & WATER WATER ON REQUEST	20-Feb-1991 11:40	TPH	265	PPM	DEISEL	26-Apr-1991
910228-071 FUEL SOIL & WATER FUEL ON REQUEST	19-Feb-1991	TPH	100	%	STANDARD	30-Apr-1991

End of data for Request Number OAL93624 Total pages = 2 Cust. Copy ____ File Copy ____

Oak Ridge National Laboratory
Analytical Chemistry Division
Results of Analyses
Organic Analysis Laboratory

Customer Name SIEGRIST
Request Number OAL94177
Project Number
Series
Comments ANALYZE AT C LEVEL: TB05, ER219, FB01, TP05-62, TP04-65

Date Received 7-Mar-1991 13:00
Charge Number 33707380
Dept Number 3380
Date of Report 16-MAY-91

Approved By MP Maskarner
Date 17 may

Analy No. / Matrix / Frequency	Customers Id / Material Desc. / Date/Time Sampled	Analysis	Result	Units	Procedure No	Completed
910307-158	TP02-63					
SOIL AND WAT	FUEL CONTAMINATION					
		3550/DATE	031291			29-Apr-1991
		TPH	< 10	PPM	DEISEL/JET	29-Apr-1991
910307-159	TP02-63MS					
SOIL AND WAT	FUEL CONTAMINATION					
		3550/DATE	031291			29-Apr-1991
		TPH	< 10	PPM	DEISEL/JET	29-Apr-1991
910307-160	TP02-63MSD					
SOIL AND WAT	FUEL CONTAMINATION					
		3550/DATE	031291			29-Apr-1991
		TPH	< 10	PPM	DEISEL/JET	29-Apr-1991
910307-161	TP02-62					
SOIL AND WAT	FUEL CONTAMINATION					
		3550/DATE	031291			10-May-1991
		TPH	490	PPM	DEISEL	10-May-1991
910307-164	TP02-W					
SOIL AND WAT	FUEL CONTAMINATION					
		TPH	110	PPM	DEISEL	29-Apr-1991
910307-165	KWAJOIL-2					
SOIL AND WAT	FUEL CONTAMINATION					
		TPH	910	PPM	DEISEL	30-Apr-1991

End of data for Request Number OAL93933 Total pages = 1 Cust. Copy ____ File Copy ____

OAK RIDGE NATIONAL LABORATORY
ANALYTICAL CHEMISTRY DIVISION
RESULTS OF ANALYSES
ORGANIC ANALYSIS LABORATORY

CUSTOMER NAME SIEGRIST
REQUEST NUMBER OAL94176
PROJECT NUMBER
SERIES
COMMENTS RETURN ALL SOIL AND EXTRACT TO SIEGRIST. ANALYZE AT LEVEL C:
IB05, ER219, FB01, TP05-62, TP04-65

DATE RECEIVED 7-MAR-1991 13:00
CHARGE NUMBER 33707380
DEPT NUMBER 3380
DATE OF REPORT 1-MAY-91

APPROVED BY Rosche L
DATE 5/1/91

ANALY NO. CUSTOMERS ID DATE/TIME SAMPLED MATRIX MATERIAL DESC. FREQUENCY	ANALYSIS	RESULT	UNITS	PROCEDURE NO	COMPLETED
910307-154 ER218 SOIL & WATER FUEL CONTAMINATION					
	3510/DATE	031391			29-APR-1991
	TPH	< 10	PPM	DEISEL/JET	29-APR-1991
910307-155 ER219 SOIL & WATER FUEL CONTAMINATION					
	3510/DATE	031391			29-APR-1991
	TPH	< 10	PPM	DEISEL/JET	29-APR-1991
910307-156 ER220 SOIL & WATER FUEL CONTAMINATION					
	3510/DATE	031391			29-APR-1991
	TPH	< 10	PPM	DEISEL/JET	29-APR-1991
910307-157 FB01 SOIL & WATER FUEL CONTAMINATION					
	3510/DATE	031391			30-APR-1991
	TPH	< 10	PPM	DEISEL/JET	30-APR-1991

END OF DATA FOR REQUEST NUMBER OAL94176 TOTAL PAGES = 1 CUST. COPY 1 FILE COPY ____

EXPLANATION OF DATA QUALIFIERS (Q)

Q	Explanation
U	Indicates Compound was analyzed for but not detected. The sample quantitation limit is listed.
J	Indicates that the quantitative value is estimated. Usually this qualifier will appear after a value that is below the quantitation limit, [i.e. the compound was detected, (at some level below the quantitation limit)]. This qualifier may also appear after a tentatively identified compound (TIC) for which no specific calibration was available.
B	This qualifier appears for a compound that was detected in both the sample and its associated blank.
E	This qualifier indicates that the reported concentration of the compound exceeded the calibration range of the instrument.
X	This qualifier indicates _____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

TP01-08

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: 0308

Matrix: (soil/water) SOIL Lab Sample ID: 910228-052

Sample wt/vol: 5 G Lab File ID: >01194

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 8-Mar-1991

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	5.00	U
67-64-1	acetone	10.	U
75-15-0	carbon disulfide	1.00	J
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	5.00	U
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	5.00	U
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	U
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	3.00	J
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	1.00	J
108-90-7	chlorobenzene	1.00	J
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	2.00	J

Reviewed by: [illegible] Date: MAR 1991

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TP01-08

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-052

Sample wt/vol: 5 G Lab File ID: >01194

Date Sampled: 18-Feb-1991 18:15 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 8-Mar-1991

Material Description SOIL Date of Report: 2-MAY-91

Number TICs found: 0 CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG

CAS NO.	COMPOUND NAME	RT	CONC	Q

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP01-08 ✓

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: NR SDG No: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-052

Sample wt/vol: 30.0 G Lab File ID: >C3561

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 19-Mar-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 8-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
108-95-2	phenol	330.	U
111-44-4	bis(2-chloroethyl)ether	330.	U
95-57-8	2-chlorophenol	330.	U
541-73-1	1,3-dichlorobenzene	330.	U
106-46-7	1,4-dichlorobenzene	330.	U
100-51-6	benzyl alcohol	330.	U
95-50-1	1,2-dichlorobenzene	330.	U
95-48-7	2-methylphenol	330.	U
108-60-1	bis(2-chloroisopropyl)ether	330.	U
106-44-5	4-methylphenol	330.	U
621-64-7	n-nitroso-di-n-propylamine	330.	U
67-72-1	hexachloroethane	330.	U
98-95-3	nitrobenzene	330.	U
78-59-1	isophorone	330.	U
88-75-5	2-nitrophenol	330.	U
105-67-9	2,4-dimethylphenol	330.	U
65-85-0	benzoic acid	1700.	U
111-91-1	bis(2-chloroethoxy)methane	330.	U
120-83-2	2,4-dichlorophenol	330.	U
120-82-1	1,2,4-trichlorobenzene	330.	U
91-20-3	naphthalene	330.	U
106-47-8	4-chloroaniline	330.	U
87-68-3	hexachlorobutadiene	330.	U
59-50-7	4-chloro-3-methylphenol	330.	U
91-57-6	2-methylnaphthalene	330.	U
77-47-4	hexachlorocyclopentadiene	330.	U
88-06-2	2,4,6-trichlorophenol	330.	U
95-95-4	2,4,5-trichlorophenol	1700.	U
91-58-7	2-chloronaphthalene	330.	U
88-74-4	2-nitroaniline	1700.	U
131-11-3	dimethylphthalate	330.	U
208-96-8	acenaphthylene	330.	U
606-20-2	2,6-dinitrotoluene	330.	U

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP01-08

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: NR SDG No: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-052

Sample wt/vol: 30.0 G Lab File ID: >C3561

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 19-Mar-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 8-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
99-09-2	3-nitroaniline	1700.	U
83-32-9	acenaphthene	330.	U
51-28-5	2,4-dinitrophenol	1700.	U
100-02-7	4-nitrophenol	1700.	U
132-64-9	dibenzofuran	330.	U
121-14-2	2,4-dinitrotoluene	330.	U
84-66-2	diethylphthalate	87.	JB
7005-72-3	4-chlorophenyl-phenylether	330.	U
86-73-7	fluorene	330.	U
100-01-6	4-nitroaniline	1700.	U
534-52-1	4,6-dinitro-2-methylphenol	1700.	U
86-30-6	n-nitrosodiphenylamine (1)	330.	U
101-55-3	4-bromophenyl-phenylether	330.	U
118-74-1	hexachlorobenzene	330.	U
87-86-5	pentachlorophenol	1700.	U
85-01-8	phenanthrene	630.	
120-12-7	anthracene	66.	J
84-74-2	di-n-butylphthalate	1300.	
206-44-0	fluoranthene	930.	
129-00-0	pyrene	820.	
85-68-7	butylbenzylphthalate	330.	U
91-94-1	3,3'-dichlorobenzidine	670.	U
56-55-3	benzo(a)anthracene	370.	
218-01-9	chrysene	510.	
117-81-7	bis(2-ethylhexyl)phthalate	330.	U
117-84-0	di-n-octylphthalate	330.	U
205-99-2	benzo(b)fluoranthene	330.	U
207-08-9	benzo(k)fluoranthene	330.	U
50-32-8	benzo(a)pyrene	400.	
193-39-5	indeno(1,2,3-cd)pyrene	330.	U
53-70-3	dibenz(a,h)anthracene	330.	U
191-24-2	benzo(g,h,i)perylene	330.	U

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

| TP01-08 |

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-052

Sample wt/vol: 30.0 G Lab File ID: >C3561

Date Sampled: 18-Feb-1991 18:15 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 19-Mar-1991

Material Description SOIL Date of Report: 2-MAY-91

Number TICs found: 3 CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG

CAS NO.	COMPOUND NAME	RT	CONC	Q
1.	TOLUENE-SOLVENT IN STD SOLNS	7.22	270.	JB
2.	UNKNOWN	10.26	140.	JB
3.	ETHANE,1,1,2,2-TETRACHLORO-	11.40	210.	JB

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

TP01-33 ✓

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: 0308

Matrix: (soil/water) SOIL Lab Sample ID: 910228-053

Sample wt/vol: 5 G Lab File ID: >01195

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 8-Mar-1991

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	5.00	U
67-64-1	acetone	10.	U
75-15-0	carbon disulfide	5.00	U
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	5.00	U
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	5.00	U
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	U
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	10.	U
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	5.00	U
108-90-7	chlorobenzene	5.00	U
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	5.00	U

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP01-33

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: NR SDG No: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-053

Sample wt/vol: 30.6 G Lab File ID: >C3562

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 19-Mar-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 8-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
108-95-2	phenol	330.	U
111-44-4	bis(2-chloroethyl)ether	330.	U
95-57-8	2-chlorophenol	330.	U
541-73-1	1,3-dichlorobenzene	330.	U
106-46-7	1,4-dichlorobenzene	330.	U
100-51-6	benzyl alcohol	330.	U
95-50-1	1,2-dichlorobenzene	330.	U
95-48-7	2-methylphenol	330.	U
108-60-1	bis(2-chloroisopropyl)ether	330.	U
106-44-5	4-methylphenol	330.	U
621-64-7	n-nitroso-di-n-propylamine	330.	U
67-72-1	hexachloroethane	330.	U
98-95-3	nitrobenzene	330.	U
78-59-1	isophorone	330.	U
88-75-5	2-nitrophenol	330.	U
105-67-9	2,4-dimethylphenol	330.	U
65-85-0	benzoic acid	1600.	U
111-91-1	bis(2-chloroethoxy)methane	330.	U
120-83-2	2,4-dichlorophenol	330.	U
120-82-1	1,2,4-trichlorobenzene	330.	U
91-20-3	naphthalene	330.	U
106-47-8	4-chloroaniline	330.	U
87-68-3	hexachlorobutadiene	330.	U
59-50-7	4-chloro-3-methylphenol	330.	U
91-57-6	2-methylnaphthalene	330.	U
77-47-4	hexachlorocyclopentadiene	330.	U
88-06-2	2,4,6-trichlorophenol	330.	U
95-95-4	2,4,5-trichlorophenol	1600.	U
91-58-7	2-chloronaphthalene	330.	U
88-74-4	2-nitroaniline	1600.	U
131-11-3	dimethylphthalate	330.	U
208-96-8	acenaphthylene	330.	U
606-20-2	2,6-dinitrotoluene	330.	U

Semivolatile Organic Analysis Data

EPA SAMPLE NO.

TP01-33

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: NR SDG No: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-053

Sample wt/vol: 30.6 G Lab File ID: >C3562

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 19-Mar-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 8-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
99-09-2	3-nitroaniline	1600.	U
83-32-9	acenaphthene	330.	U
51-28-5	2,4-dinitrophenol	1600.	U
100-02-7	4-nitrophenol	1600.	U
132-64-9	dibenzofuran	330.	U
121-14-2	2,4-dinitrotoluene	330.	U
84-66-2	diethylphthalate	330.	U
7005-72-3	4-chlorophenyl-phenylether	330.	U
86-73-7	fluorene	330.	U
100-01-6	4-nitroaniline	1600.	U
534-52-1	4,6-dinitro-2-methylphenol	1600.	U
86-30-6	n-nitrosodiphenylamine (1)	330.	U
101-55-3	4-bromophenyl-phenylether	330.	U
118-74-1	hexachlorobenzene	330.	U
87-86-5	pentachlorophenol	1600.	U
85-01-8	phenanthrene	330.	U
120-12-7	anthracene	330.	U
84-74-2	di-n-butylphthalate	330.	U
206-44-0	fluoranthene	330.	U
129-00-0	pyrene	330.	U
85-68-7	butylbenzylphthalate	330.	U
91-94-1	3,3'-dichlorobenzidine	650.	U
56-55-3	benzo(a)anthracene	330.	U
218-01-9	chrysene	330.	U
117-81-7	bis(2-ethylhexyl)phthalate	330.	U
117-84-0	di-n-octylphthalate	330.	U
205-99-2	benzo(b)fluoranthene	330.	U
207-08-9	benzo(k)fluoranthene	330.	U
50-32-8	benzo(a)pyrene	330.	U
193-39-5	indeno(1,2,3-cd)pyrene	330.	U
53-70-3	dibenz(a,h)anthracene	330.	U
191-24-2	benzo(g,h,i)perylene	330.	U

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

TP01-33

Semivolatile Organic Analysis Data

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-053

Sample wt/vol: 30.6 G Lab File ID: >C3562

Date Sampled: 18-Feb-1991 17:55 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 19-Mar-1991

Material Description SOIL Date of Report: 2-MAY-91

Number TICs found: 4 CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG

CAS NO.	COMPOUND NAME	RT	CONC	Q
1.	TOLUENE-SOLVENT IN STD SOLNS	7.22	210.	JB
2.	UNKNOWN	8.35	110.	J
3.	UNKNOWN	10.25	120.	JB
4.	ETHANE,1,1,2,2-TETRACHLORO-	11.39	220.	JB

Reviewed by:_____ Date:_____

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TP01-56

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: G304

Matrix: (soil/water) SOIL Lab Sample ID: 910228-054

Sample wt/vol: 5 G Lab File ID: >G2139

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 4-Mar-1991

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	5.00	U
67-64-1	acetone	10.	U
75-15-0	carbon disulfide	5.00	U
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	5.00	U
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	5.00	U
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	U
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	10.	U
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	5.00	U
108-90-7	chlorobenzene	5.00	U
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	5.00	U

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

| TP01-56 |

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-054

Sample wt/vol: 5 G Lab File ID: >G2139

Date Sampled: 18-Feb-1991 17:05 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 4-Mar-1991

Material Description SOIL Date of Report: 2-MAY-91

Number TICs found: 0 CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG

CAS NO.	COMPOUND NAME	RT	CONC	Q

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

TP01-W

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: G228

Matrix: (soil/water) WATER Lab Sample ID: 910228-055

Sample wt/vol: 5 ML Lab File ID: >G2109

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 28-Feb-1991

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	5.00	U
67-64-1	acetone	10.	U
75-15-0	carbon disulfide	5.00	U
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	5.00	U
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	5.00	U
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	U
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	10.	U
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	5.00	U
108-90-7	chlorobenzene	5.00	U
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	5.00	U

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

TP01-W

VOLATILE ORGANICS ANALYSIS DATA SHEET

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-055

Sample wt/vol: 5 ML Lab File ID: >G2109

Date Sampled: 19-Feb-1991 14:45 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 28-Feb-1991

Material Description WATER Date of Report: 2-MAY-91

Number TICs found: 0 CONCENTRATION UNITS: (UG/L or UG/KG) UG/L

CAS NO.	COMPOUND NAME	RT	CONC	Q

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP01-W ✓

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: CLP SAS No: NR SDG No: C425

Matrix: (soil/water) WATER Lab Sample ID: 910228-055

Sample wt/vol: 165 ML Lab File ID: >C3764

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 25-Apr-1991

Extraction: (Sepf/Cont/Sonc) SEPF Date Extracted: 18-Mar-1991

GPC Cleanup: (Y/N) N pH: 8.83 Dilution Factor: 6.1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
108-95-2	phenol	61.	U
111-44-4	bis(2-chloroethyl)ether	61.	U
95-57-8	2-chlorophenol	61.	U
541-73-1	1,3-dichlorobenzene	61.	U
106-46-7	1,4-dichlorobenzene	61.	U
100-51-6	benzyl alcohol	61.	U
95-50-1	1,2-dichlorobenzene	61.	U
95-48-7	2-methylphenol	61.	U
108-60-1	bis(2-chloroisopropyl)ether	61.	U
106-44-5	4-methylphenol	61.	U
621-64-7	n-nitroso-di-n-propylamine	61.	U
67-72-1	hexachloroethane	61.	U
98-95-3	nitrobenzene	61.	U
78-59-1	isophorone	61.	U
88-75-5	2-nitrophenol	61.	U
105-67-9	2,4-dimethylphenol	61.	U
65-85-0	benzoic acid	300.	U
111-91-1	bis(2-chloroethoxy)methane	61.	U
120-83-2	2,4-dichlorophenol	61.	U
120-82-1	1,2,4-trichlorobenzene	61.	U
91-20-3	naphthalene	61.	U
106-47-8	4-chloroaniline	61.	U
87-68-3	hexachlorobutadiene	61.	U
59-50-7	4-chloro-3-methylphenol	61.	U
91-57-6	2-methylnaphthalene	61.	U
77-47-4	hexachlorocyclopentadiene	61.	U
88-06-2	2,4,6-trichlorophenol	61.	U
95-95-4	2,4,5-trichlorophenol	300.	U
91-58-7	2-chloronaphthalene	61.	U
88-74-4	2-nitroaniline	300.	U
131-11-3	dimethylphthalate	61.	U
208-96-8	acenaphthylene	61.	U
606-20-2	2,6-dinitrotoluene	61.	U

EPA SAMPLE NO.

TP01-W

Semivolatile Organic Analysis Data

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: CLP SAS No: NR SDG No: C425

Matrix: (soil/water) WATER Lab Sample ID: 910228-055

Sample wt/vol: 165 ML Lab File ID: >C3764

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 25-Apr-1991

Extraction: (Sepf/Cont/Sonc) SEPF Date Extracted: 18-Mar-1991

GPC Cleanup: (Y/N) N pH: 8.83 Dilution Factor: 6.1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
99-09-2	3-nitroaniline	300.	U
83-32-9	acenaphthene	61.	U
51-28-5	2,4-dinitrophenol	300.	U
100-02-7	4-nitrophenol	300.	U
132-64-9	dibenzofuran	61.	U
121-14-2	2,4-dinitrotoluene	61.	U
84-66-2	diethylphthalate	61.	U
7005-72-3	4-chlorophenyl-phenylether	61.	U
86-73-7	fluorene	61.	U
100-01-6	4-nitroaniline	300.	U
534-52-1	4,6-dinitro-2-methylphenol	300.	U
86-30-6	n-nitrosodiphenylamine (1)	61.	U
101-55-3	4-bromophenyl-phenylether	61.	U
118-74-1	hexachlorobenzene	61.	U
87-86-5	pentachlorophenol	300.	U
85-01-8	phenanthrene	61.	U
120-12-7	anthracene	61.	U
84-74-2	di-n-butylphthalate	61.	U
206-44-0	fluoranthene	61.	U
129-00-0	pyrene	61.	U
85-68-7	butylbenzylphthalate	120.	B
91-94-1	3,3'-dichlorobenzidine	120.	U
56-55-3	benzo(a)anthracene	61.	U
218-01-9	chrysene	61.	U
117-81-7	bis(2-ethylhexyl)phthalate	61.	U
117-84-0	di-n-octylphthalate	61.	U
205-99-2	benzo(b)fluoranthene	61.	U
207-08-9	benzo(k)fluoranthene	61.	U
50-32-8	benzo(a)pyrene	61.	U
193-39-5	indeno(1,2,3-cd)pyrene	61.	U
53-70-3	dibenz(a,h)anthracene	61.	U
191-24-2	benzo(g,h,i)perylene	61.	U

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

| TP01-W |

Semivolatile Organic Analysis Data

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-055

Sample wt/vol: 165 ML Lab File ID: >C3764

Date Sampled: 19-Feb-1991 14:45 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 25-Apr-1991

Material Description WATER Date of Report: 2-MAY-91

Number TICs found: 0 CONCENTRATION UNITS: (UG/L or UG/KG) UG/L

CAS NO.	COMPOUND NAME	RT	CONC	Q

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

TP02-W

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: G228

Matrix: (soil/water) WATER Lab Sample ID: 910228-056

Sample wt/vol: 5 ML Lab File ID: >G2110

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 28-Feb-1991

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	5.00	U
67-64-1	acetone	10.	U
75-15-0	carbon disulfide	5.00	U
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	11.	
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	5.00	U
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	U
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	10.	U
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	5.00	U
108-90-7	chlorobenzene	5.00	U
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	5.00	U

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

| TP02-W |

VOLATILE ORGANICS ANALYSIS DATA SHEET

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-056

Sample wt/vol: 5 ML Lab File ID: >G2110

Date Sampled: 19-Feb-1991 14:45 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 28-Feb-1991

Material Description WATER Date of Report: 2-MAY-91

Number TICs found: 0 CONCENTRATION UNITS: (UG/L or UG/KG) UG/L

CAS NO.	COMPOUND NAME	RT	CONC	Q

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

| TP02-W |

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: CLP SAS No: NR SDG No: C425

Matrix: (soil/water) WATER Lab Sample ID: 910228-056

Sample wt/vol: 115 ML Lab File ID: >C3765

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 25-Apr-1991

Extraction: (Sepf/Cont/Sonc) SEPF Date Extracted: 18-Mar-1991

GPC Cleanup: (Y/N) N pH: 8.95 Dilution Factor: 8.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
108-95-2	phenol	87.	U
111-44-4	bis(2-chloroethyl)ether	87.	U
95-57-8	2-chlorophenol	87.	U
541-73-1	1,3-dichlorobenzene	87.	U
106-46-7	1,4-dichlorobenzene	87.	U
100-51-6	benzyl alcohol	87.	U
95-50-1	1,2-dichlorobenzene	87.	U
95-48-7	2-methylphenol	87.	U
108-60-1	bis(2-chloroisopropyl)ether	87.	U
106-44-5	4-methylphenol	87.	U
621-64-7	n-nitroso-di-n-propylamine	87.	U
67-72-1	hexachloroethane	87.	U
98-95-3	nitrobenzene	87.	U
78-59-1	isophorone	87.	U
88-75-5	2-nitrophenol	87.	U
105-67-9	2,4-dimethylphenol	87.	U
65-85-0	benzoic acid	430.	U
111-91-1	bis(2-chloroethoxy)methane	87.	U
120-83-2	2,4-dichlorophenol	87.	U
120-82-1	1,2,4-trichlorobenzene	87.	U
91-20-3	naphthalene	87.	U
106-47-8	4-chloroaniline	87.	U
87-68-3	hexachlorobutadiene	87.	U
59-50-7	4-chloro-3-methylphenol	87.	U
91-57-6	2-methylnaphthalene	87.	U
77-47-4	hexachlorocyclopentadiene	87.	U
88-06-2	2,4,6-trichlorophenol	87.	U
95-95-4	2,4,5-trichlorophenol	430.	U
91-58-7	2-chloronaphthalene	87.	U
88-74-4	2-nitroaniline	430.	U
131-11-3	dimethylphthalate	87.	U
208-96-8	acenaphthylene	87.	U
606-20-2	2,6-dinitrotoluene	87.	U

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP02-W

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: CLP SAS No: NR SDG No: C425

Matrix: (soil/water) WATER Lab Sample ID: 910228-056

Sample wt/vol: 115 ML Lab File ID: >C3765

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 25-Apr-1991

Extraction: (Sepf/Cont/Sonc) SEPF Date Extracted: 18-Mar-1991

GPC Cleanup: (Y/N) N pH: 8.95 Dilution Factor: 8.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
99-09-2	3-nitroaniline	430.	U
83-32-9	acenaphthene	87.	U
51-28-5	2,4-dinitrophenol	430.	U
100-02-7	4-nitrophenol	430.	U
132-64-9	dibenzofuran	87.	U
121-14-2	2,4-dinitrotoluene	87.	U
84-66-2	diethylphthalate	87.	U
7005-72-3	4-chlorophenyl-phenylether	87.	U
86-73-7	fluorene	87.	U
100-01-6	4-nitroaniline	430.	U
534-52-1	4,6-dinitro-2-methylphenol	430.	U
86-30-6	n-nitrosodiphenylamine (1)	87.	U
101-55-3	4-bromophenyl-phenylether	87.	U
118-74-1	hexachlorobenzene	87.	U
87-86-5	pentachlorophenol	430.	U
85-01-8	phenanthrene	87.	U
120-12-7	anthracene	87.	U
84-74-2	di-n-butylphthalate	87.	U
206-44-0	fluoranthene	87.	U
129-00-0	pyrene	87.	U
85-68-7	butylbenzylphthalate	160.	B
91-94-1	3,3'-dichlorobenzidine	170.	U
56-55-3	benzo(a)anthracene	87.	U
218-01-9	chrysene	87.	U
117-81-7	bis(2-ethylhexyl)phthalate	87.	U
117-84-0	di-n-octylphthalate	87.	U
205-99-2	benzo(b)fluoranthene	87.	U
207-08-9	benzo(k)fluoranthene	87.	U
50-32-8	benzo(a)pyrene	87.	U
193-39-5	indeno(1,2,3-cd)pyrene	87.	U
53-70-3	dibenz(a,h)anthracene	87.	U
191-24-2	benzo(g,h,i)perylene	87.	U

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

TP02-W

Semivolatile Organic Analysis Data

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-056

Sample wt/vol: 115 ML Lab File ID: >C3765

Date Sampled: 19-Feb-1991 14:45 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 25-Apr-1991

Material Description WATER Date of Report: 2-MAY-91

Number TICs found: 0 CONCENTRATION UNITS: (UG/L or UG/KG) UG/L

CAS NO.	COMPOUND NAME	RT	CONC	Q

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

TP03-12

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: 0308

Matrix: (soil/water) SOIL Lab Sample ID: 910228-057

Sample wt/vol: 5 G Lab File ID: >01196

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 8-Mar-1991

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	5.00	U
67-64-1	acetone	10.	U
75-15-0	carbon disulfide	5.00	U
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	5.00	U
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	8.00	
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	U
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	10.	U
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	5.00	U
108-90-7	chlorobenzene	5.00	U
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	5.00	U

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP03-12

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: NR SDG No: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-057

Sample wt/vol: 30.4 G Lab File ID: >C3563

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 19-Mar-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 8-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
108-95-2	phenol	330.	U
111-44-4	bis(2-chloroethyl)ether	330.	U
95-57-8	2-chlorophenol	330.	U
541-73-1	1,3-dichlorobenzene	330.	U
106-46-7	1,4-dichlorobenzene	330.	U
100-51-6	benzyl alcohol	330.	U
95-50-1	1,2-dichlorobenzene	330.	U
95-48-7	2-methylphenol	330.	U
108-60-1	bis(2-chloroisopropyl)ether	330.	U
106-44-5	4-methylphenol	330.	U
621-64-7	n-nitroso-di-n-propylamine	330.	U
67-72-1	hexachloroethane	330.	U
98-95-3	nitrobenzene	330.	U
78-59-1	isophorone	330.	U
88-75-5	2-nitrophenol	330.	U
105-67-9	2,4-dimethylphenol	330.	U
65-85-0	benzoic acid	1600.	U
111-91-1	bis(2-chloroethoxy)methane	330.	U
120-83-2	2,4-dichlorophenol	330.	U
120-82-1	1,2,4-trichlorobenzene	330.	U
91-20-3	naphthalene	330.	U
106-47-8	4-chloroaniline	330.	U
87-68-3	hexachlorobutadiene	330.	U
59-50-7	4-chloro-3-methylphenol	330.	U
91-57-6	2-methylnaphthalene	330.	U
77-47-4	hexachlorocyclopentadiene	330.	U
88-06-2	2,4,6-trichlorophenol	330.	U
95-95-4	2,4,5-trichlorophenol	1600.	U
91-58-7	2-chloronaphthalene	330.	U
88-74-4	2-nitroaniline	1600.	U
131-11-3	dimethylphthalate	330.	U
208-96-8	acenaphthylene	330.	U
606-20-2	2,6-dinitrotoluene	330.	U

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP03-12

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: NR SDG No: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-057

Sample wt/vol: 30.4 G Lab File ID: >C3563

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 19-Mar-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 8-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
99-09-2	3-nitroaniline	1600.	U
83-32-9	acenaphthene	330.	U
51-28-5	2,4-dinitrophenol	1600.	U
100-02-7	4-nitrophenol	1600.	U
132-64-9	dibenzofuran	330.	U
121-14-2	2,4-dinitrotoluene	330.	U
84-66-2	diethylphthalate	49.	JB
7005-72-3	4-chlorophenyl-phenylether	330.	U
86-73-7	fluorene	330.	U
100-01-6	4-nitroaniline	1600.	U
534-52-1	4,6-dinitro-2-methylphenol	1600.	U
86-30-6	n-nitrosodiphenylamine (1)	330.	U
101-55-3	4-bromophenyl-phenylether	330.	U
118-74-1	hexachlorobenzene	330.	U
87-86-5	pentachlorophenol	1600.	U
85-01-8	phenanthrene	95.	J
120-12-7	anthracene	330.	U
84-74-2	di-n-butylphthalate	330.	U
206-44-0	fluoranthene	330.	U
129-00-0	pyrene	330.	U
85-68-7	butylbenzylphthalate	330.	U
91-94-1	3,3'-dichlorobenzidine	660.	U
56-55-3	benzo(a)anthracene	330.	U
218-01-9	chrysene	330.	U
117-81-7	bis(2-ethylhexyl)phthalate	330.	U
117-84-0	di-n-octylphthalate	330.	U
205-99-2	benzo(b)fluoranthene	330.	U
207-08-9	benzo(k)fluoranthene	330.	U
50-32-8	benzo(a)pyrene	330.	U
193-39-5	indeno(1,2,3-cd)pyrene	330.	U
53-70-3	dibenz(a,h)anthracene	330.	U
191-24-2	benzo(g,h,i)perylene	330.	U

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

| TP03-12 |

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-057

Sample wt/vol: 30.4 G Lab File ID: >C3563

Date Sampled: 19-Feb-1991 16:30 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 19-Mar-1991

Material Description SOIL Date of Report: 2-MAY-91

Number TICs found: 8 CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG

CAS NO.	COMPOUND NAME	RT	CONC	Q
1.	TOLUENE-SOLVENT IN STD SOLNS	7.23	420.	JB
2.	UNKNOWN	8.33	180.	J
3.	UNKNOWN	8.60	230.	J
4.	UNKNOWN	8.86	170.	J
5.	UNKNOWN	10.26	130.	JB
6.	UNKNOWN	11.32	130.	J
7.	ETHANE,1,1,2,2-TETRACHLORO-	11.40	230.	JB
8.	UNKNOWN	15.14	160.	J

Reviewed by:_____ Date:_____

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TP03-39

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: 0308

Matrix: (soil/water) SOIL Lab Sample ID: 910228-058

Sample wt/vol: 5 G Lab File ID: >01197

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 8-Mar-1991

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	5.00	U
67-64-1	acetone	10.	U
75-15-0	carbon disulfide	5.00	U
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	5.00	U
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	5.00	U
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	U
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	10.	U
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	5.00	U
108-90-7	chlorobenzene	5.00	U
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	5.00	U

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP03-39

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: NR SDG No: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-058

Sample wt/vol: 32.7 G Lab File ID: >C3564

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 20-Mar-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 8-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
108-95-2	phenol	310.	U
111-44-4	bis(2-chloroethyl)ether	310.	U
95-57-8	2-chlorophenol	310.	U
541-73-1	1,3-dichlorobenzene	310.	U
106-46-7	1,4-dichlorobenzene	310.	U
100-51-6	benzyl alcohol	310.	U
95-50-1	1,2-dichlorobenzene	310.	U
95-48-7	2-methylphenol	310.	U
108-60-1	bis(2-chloroisopropyl)ether	310.	U
106-44-5	4-methylphenol	310.	U
621-64-7	n-nitroso-di-n-propylamine	310.	U
67-72-1	hexachloroethane	310.	U
98-95-3	nitrobenzene	310.	U
78-59-1	isophorone	310.	U
88-75-5	2-nitrophenol	310.	U
105-67-9	2,4-dimethylphenol	310.	U
65-85-0	benzoic acid	1500.	U
111-91-1	bis(2-chloroethoxy)methane	310.	U
120-83-2	2,4-dichlorophenol	310.	U
120-82-1	1,2,4-trichlorobenzene	310.	U
91-20-3	naphthalene	310.	U
106-47-8	4-chloroaniline	310.	U
87-68-3	hexachlorobutadiene	310.	U
59-50-7	4-chloro-3-methylphenol	310.	U
91-57-6	2-methylnaphthalene	310.	U
77-47-4	hexachlorocyclopentadiene	310.	U
88-06-2	2,4,6-trichlorophenol	310.	U
95-95-4	2,4,5-trichlorophenol	1500.	U
91-58-7	2-chloronaphthalene	310.	U
88-74-4	2-nitroaniline	1500.	U
131-11-3	dimethylphthalate	310.	U
208-96-8	acenaphthylene	310.	U
606-20-2	2,6-dinitrotoluene	310.	U

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP03-39

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: NR SDG No: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-058

Sample wt/vol: 32.7 G Lab File ID: >C3564

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 20-Mar-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 8-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
99-09-2	3-nitroaniline	1500.	U
83-32-9	acenaphthene	310.	U
51-28-5	2,4-dinitrophenol	1500.	U
100-02-7	4-nitrophenol	1500.	U
132-64-9	dibenzofuran	310.	U
121-14-2	2,4-dinitrotoluene	310.	U
84-66-2	diethylphthalate	59.	JB
7005-72-3	4-chlorophenyl-phenylether	310.	U
86-73-7	fluorene	310.	U
100-01-6	4-nitroaniline	1500.	U
534-52-1	4,6-dinitro-2-methylphenol	1500.	U
86-30-6	n-nitrosodiphenylamine (1)	310.	U
101-55-3	4-bromophenyl-phenylether	310.	U
118-74-1	hexachlorobenzene	310.	U
87-86-5	pentachlorophenol	1500.	U
85-01-8	phenanthrene	310.	U
120-12-7	anthracene	310.	U
84-74-2	di-n-butylphthalate	310.	U
206-44-0	fluoranthene	310.	U
129-00-0	pyrene	310.	U
85-68-7	butylbenzylphthalate	310.	U
91-94-1	3,3'-dichlorobenzidine	610.	U
56-55-3	benzo(a)anthracene	310.	U
218-01-9	chrysene	310.	U
117-81-7	bis(2-ethylhexyl)phthalate	310.	U
117-84-0	di-n-octylphthalate	310.	U
205-99-2	benzo(b)fluoranthene	310.	U
207-08-9	benzo(k)fluoranthene	310.	U
50-32-8	benzo(a)pyrene	310.	U
193-39-5	indeno(1,2,3-cd)pyrene	310.	U
53-70-3	dibenz(a,h)anthracene	310.	U
191-24-2	benzo(g,h,i)perylene	310.	U

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

TP03-39

Semivolatile Organic Analysis Data

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-058

Sample wt/vol: 32.7 G Lab File ID: >C3564

Date Sampled: 19-Feb-1991 16:50 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 20-Mar-1991

Material Description SOIL Date of Report: 2-MAY-91

Number TICs found: 9 CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG

CAS NO.	COMPOUND NAME	RT	CONC	Q
1.	TOLUENE-SOLVENT IN STD SOLNS	7.19	200.	JB
2.	UNKNOWN	8.31	140.	J
3.	UNKNOWN	8.57	130.	J
4.	ETHANE,1,1,2,2-TETRACHLORO-	11.39	130.	JB
5.	UNKNOWN	32.78	280.	J
6.	UNKNOWN	33.93	670.	J
7.	UNKNOWN	35.03	690.	J
8.	UNKNOWN	36.08	480.	J
9.	UNKNOWN	37.10	240.	J

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

TP03-72

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: G304

Matrix: (soil/water) SOIL Lab Sample ID: 910228-059

Sample wt/vol: 5 G Lab File ID: >G2142

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 4-Mar-1991

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	2.00	JB
67-64-1	acetone	10.	U
75-15-0	carbon disulfide	5.00	U
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	5.00	U
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	13.	
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	U
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	10.	U
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	5.00	U
108-90-7	chlorobenzene	5.00	U
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	5.00	U

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

| TP03-72 |

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-059

Sample wt/vol: 5 G Lab File ID: >G2142

Date Sampled: 19-Feb-1991 16:15 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 4-Mar-1991

Material Description SOIL Date of Report: 2-MAY-91

Number TICs found: 0 CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG

CAS NO.	COMPOUND NAME	RT	CONC	Q

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP03-72 ✓

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: NR SDG No: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-059

Sample wt/vol: 31.2 G Lab File ID: >C3559

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 19-Mar-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 8-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
108-95-2	phenol	320.	U
111-44-4	bis(2-chloroethyl)ether	320.	U
95-57-8	2-chlorophenol	320.	U
541-73-1	1,3-dichlorobenzene	320.	U
106-46-7	1,4-dichlorobenzene	320.	U
100-51-6	benzyl alcohol	320.	U
95-50-1	1,2-dichlorobenzene	320.	U
95-48-7	2-methylphenol	320.	U
108-60-1	bis(2-chloroisopropyl)ether	320.	U
106-44-5	4-methylphenol	320.	U
621-64-7	n-nitroso-di-n-propylamine	320.	U
67-72-1	hexachloroethane	320.	U
98-95-3	nitrobenzene	320.	U
78-59-1	isophorone	320.	U
88-75-5	2-nitrophenol	320.	U
105-67-9	2,4-dimethylphenol	320.	U
65-85-0	benzoic acid	1600.	U
111-91-1	bis(2-chloroethoxy)methane	320.	U
120-83-2	2,4-dichlorophenol	320.	U
120-82-1	1,2,4-trichlorobenzene	320.	U
91-20-3	naphthalene	320.	U
106-47-8	4-chloroaniline	320.	U
87-68-3	hexachlorobutadiene	320.	U
59-50-7	4-chloro-3-methylphenol	320.	U
91-57-6	2-methylnaphthalene	320.	U
77-47-4	hexachlorocyclopentadiene	320.	U
88-06-2	2,4,6-trichlorophenol	320.	U
95-95-4	2,4,5-trichlorophenol	1600.	U
91-58-7	2-chloronaphthalene	320.	U
88-74-4	2-nitroaniline	1600.	U
131-11-3	dimethylphthalate	320.	U
208-96-8	acenaphthylene	320.	U
606-20-2	2,6-dinitrotoluene	320.	U

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP03-72

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: NR SDG No: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-059

Sample wt/vol: 31.2 G Lab File ID: >C3559

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 19-Mar-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 8-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
99-09-2	3-nitroaniline	1600.	U
83-32-9	acenaphthene	320.	U
51-28-5	2,4-dinitrophenol	1600.	U
100-02-7	4-nitrophenol	1600.	U
132-64-9	dibenzofuran	320.	U
121-14-2	2,4-dinitrotoluene	320.	U
84-66-2	diethylphthalate	48.	JB
7005-72-3	4-chlorophenyl-phenylether	320.	U
86-73-7	fluorene	320.	U
100-01-6	4-nitroaniline	1600.	U
534-52-1	4,6-dinitro-2-methylphenol	1600.	U
86-30-6	n-nitrosodiphenylamine (1)	320.	U
101-55-3	4-bromophenyl-phenylether	320.	U
118-74-1	hexachlorobenzene	320.	U
87-86-5	pentachlorophenol	1600.	U
85-01-8	phenanthrene	320.	U
120-12-7	anthracene	320.	U
84-74-2	di-n-butylphthalate	320.	U
206-44-0	fluoranthene	320.	U
129-00-0	pyrene	320.	U
85-68-7	butylbenzylphthalate	320.	U
91-94-1	3,3'-dichlorobenzidine	640.	U
56-55-3	benzo(a)anthracene	320.	U
218-01-9	chrysene	320.	U
117-81-7	bis(2-ethylhexyl)phthalate	320.	U
117-84-0	di-n-octylphthalate	320.	U
205-99-2	benzo(b)fluoranthene	320.	U
207-08-9	benzo(k)fluoranthene	320.	U
50-32-8	benzo(a)pyrene	320.	U
193-39-5	indeno(1,2,3-cd)pyrene	320.	U
53-70-3	dibenz(a,h)anthracene	320.	U
191-24-2	benzo(g,h,i)perylene	320.	U

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

Semivolatile Organic Analysis Data

EPA SAMPLE NO.

TP03-72

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-059

Sample wt/vol: 31.2 G Lab File ID: >C3559

Date Sampled: 19-Feb-1991 16:15 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 19-Mar-1991

Material Description SOIL Date of Report: 2-MAY-91

Number TICs found: 13 CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG

CAS NO.	COMPOUND NAME	RT	CONC	Q
1.	ACETIC ACID	5.29	3900.	JB
2.	TOLUENE-SOLVENT IN STD SOLNS	7.25	360.	JB
3.	UNKNOWN	8.62	180.	J
4.	ETHANE,1,1,2,2-TETRACHLORO	11.41	190.	JB
5.	UNKNOWN	32.79	130.	J
6.	UNKNOWN	33.93	410.	J
7.	UNKNOWN	35.03	730.	J
8.	UNKNOWN	36.05	860.	J
9.	UNKNOWN	37.11	840.	J
10.	UNKNOWN	38.08	650.	J
11.	UNKNOWN	39.03	680.	J
12.	UNKNOWN	40.03	440.	J
13.	UNKNOWN	41.15	180.	J

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

TP03-W

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: G228

Matrix: (soil/water) WATER Lab Sample ID: 910228-060

Sample wt/vol: 5 ML Lab File ID: >G2111

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 28-Feb-1991

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	5.00	U
67-64-1	acetone	10.	U
75-15-0	carbon disulfide	5.00	U
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	18.	
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	49.	
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	J
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	10.	U
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	5.00	U
108-90-7	chlorobenzene	5.00	U
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	5.00	U

Reviewed by:_____ Date:_____

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TP03-W

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-060

Sample wt/vol: 5 ML Lab File ID: >G2111

Date Sampled: 19-Feb-1991 16:30 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 28-Feb-1991

Material Description WATER Date of Report: 2-MAY-91

Number TICs found: 0 CONCENTRATION UNITS: (UG/L or UG/KG) UG/L

CAS NO.	COMPOUND NAME	RT	CONC	Q

Reviewed by:_____ Date:_____

Semivolatile Organic Analysis Data

EPA SAMPLE NO.

TP03-W ✓

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: CLP SAS No: NR SDG No: C425

Matrix: (soil/water) WATER Lab Sample ID: 910228-060

Sample wt/vol: 150 ML Lab File ID: >C3766

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 25-Apr-1991

Extraction: (Sepf/Cont/Sonc) SEPF Date Extracted: 18-Mar-1991

GPC Cleanup: (Y/N) N pH: 8.86 Dilution Factor: 6.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
108-95-2	phenol	67.	U
111-44-4	bis(2-chloroethyl)ether	67.	U
95-57-8	2-chlorophenol	67.	U
541-73-1	1,3-dichlorobenzene	67.	U
106-46-7	1,4-dichlorobenzene	67.	U
100-51-6	benzyl alcohol	67.	U
95-50-1	1,2-dichlorobenzene	67.	U
95-48-7	2-methylphenol	67.	U
108-60-1	bis(2-chloroisopropyl)ether	67.	U
106-44-5	4-methylphenol	67.	U
621-64-7	n-nitroso-di-n-propylamine	67.	U
67-72-1	hexachloroethane	67.	U
98-95-3	nitrobenzene	67.	U
78-59-1	isophorone	67.	U
88-75-5	2-nitrophenol	67.	U
105-67-9	2,4-dimethylphenol	67.	U
65-85-0	benzoic acid	330.	U
111-91-1	bis(2-chloroethoxy)methane	67.	U
120-83-2	2,4-dichlorophenol	67.	U
120-82-1	1,2,4-trichlorobenzene	67.	U
91-20-3	naphthalene	67.	U
106-47-8	4-chloroaniline	67.	U
87-68-3	hexachlorobutadiene	67.	U
59-50-7	4-chloro-3-methylphenol	67.	U
91-57-6	2-methylnaphthalene	67.	U
77-47-4	hexachlorocyclopentadiene	67.	U
88-06-2	2,4,6-trichlorophenol	67.	U
95-95-4	2,4,5-trichlorophenol	330.	U
91-58-7	2-chloronaphthalene	67.	U
88-74-4	2-nitroaniline	330.	U
131-11-3	dimethylphthalate	67.	U
208-96-8	acenaphthylene	67.	U
606-20-2	2,6-dinitrotoluene	67.	U

Semivolatile Organic Analysis Data

EPA SAMPLE NO.

TP03-W

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: CLP SAS No: NR SDG No: C425

Matrix: (soil/water) WATER Lab Sample ID: 910228-060

Sample wt/vol: 150 ML Lab File ID: >C3766

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 25-Apr-1991

Extraction: (Sepf/Cont/Sonc) SEPF Date Extracted: 18-Mar-1991

GPC Cleanup: (Y/N) N pH: 8.86 Dilution Factor: 6.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
99-09-2	3-nitroaniline	330.	U
83-32-9	acenaphthene	67.	U
51-28-5	2,4-dinitrophenol	330.	U
100-02-7	4-nitrophenol	330.	U
132-64-9	dibenzofuran	67.	U
121-14-2	2,4-dinitrotoluene	67.	U
84-66-2	diethylphthalate	67.	U
7005-72-3	4-chlorophenyl-phenylether	67.	U
86-73-7	fluorene	67.	U
100-01-6	4-nitroaniline	330.	U
534-52-1	4,6-dinitro-2-methylphenol	330.	U
86-30-6	n-nitrosodiphenylamine (1)	67.	U
101-55-3	4-bromophenyl-phenylether	67.	U
118-74-1	hexachlorobenzene	67.	U
87-86-5	pentachlorophenol	330.	U
85-01-8	phenanthrene	67.	U
120-12-7	anthracene	67.	U
84-74-2	di-n-butylphthalate	67.	U
206-44-0	fluoranthene	67.	U
129-00-0	pyrene	67.	U
85-68-7	butylbenzylphthalate	120.	B
91-94-1	3,3'-dichlorobenzidine	130.	U
56-55-3	benzo(a)anthracene	67.	U
218-01-9	chrysene	67.	U
117-81-7	bis(2-ethylhexyl)phthalate	67.	U
117-84-0	di-n-octylphthalate	67.	U
205-99-2	benzo(b)fluoranthene	67.	U
207-08-9	benzo(k)fluoranthene	67.	U
50-32-8	benzo(a)pyrene	67.	U
193-39-5	indeno(1,2,3-cd)pyrene	67.	U
53-70-3	dibenz(a,h)anthracene	67.	U
191-24-2	benzo(g,h,i)perylene	67.	U

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

| TP03-W |

Semivolatile Organic Analysis Data

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-060

Sample wt/vol: 150 ML Lab File ID: >C3766

Date Sampled: 19-Feb-1991 16:30 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 25-Apr-1991

Material Description WATER Date of Report: 2-MAY-91

Number TICs found: 0 CONCENTRATION UNITS: (UG/L or UG/KG) UG/L

CAS NO.	COMPOUND NAME	RT	CONC	Q

Reviewed by:_____ Date:_____

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TP04-10 ✓

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: 0308

Matrix: (soil/water) SOIL Lab Sample ID: 910228-061

Sample wt/vol: 5 G Lab File ID: >01198

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 8-Mar-1991

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	5.00	U
67-64-1	acetone	10.	U
75-15-0	carbon disulfide	5.00	U
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	5.00	U
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	5.00	U
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	U
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	10.	U
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	5.00	U
108-90-7	chlorobenzene	5.00	U
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	5.00	U

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

TP04-10

Semivolatile Organic Analysis Data

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: NR SDG No: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-061

Sample wt/vol: 32.0 G Lab File ID: >C3565

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 20-Mar-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 8-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
108-95-2	phenol	310.	U
111-44-4	bis(2-chloroethyl)ether	310.	U
95-57-8	2-chlorophenol	310.	U
541-73-1	1,3-dichlorobenzene	310.	U
106-46-7	1,4-dichlorobenzene	310.	U
100-51-6	benzyl alcohol	310.	U
95-50-1	1,2-dichlorobenzene	310.	U
95-48-7	2-methylphenol	310.	U
108-60-1	bis(2-chloroisopropyl)ether	310.	U
106-44-5	4-methylphenol	310.	U
621-64-7	n-nitroso-di-n-propylamine	310.	U
67-72-1	hexachloroethane	310.	U
98-95-3	nitrobenzene	310.	U
78-59-1	isophorone	310.	U
88-75-5	2-nitrophenol	310.	U
105-67-9	2,4-dimethylphenol	310.	U
65-85-0	benzoic acid	1600.	U
111-91-1	bis(2-chloroethoxy)methane	310.	U
120-83-2	2,4-dichlorophenol	310.	U
120-82-1	1,2,4-trichlorobenzene	310.	U
91-20-3	naphthalene	310.	U
106-47-8	4-chloroaniline	310.	U
87-68-3	hexachlorobutadiene	310.	U
59-50-7	4-chloro-3-methylphenol	310.	U
91-57-6	2-methylnaphthalene	310.	U
77-47-4	hexachlorocyclopentadiene	310.	U
88-06-2	2,4,6-trichlorophenol	310.	U
95-95-4	2,4,5-trichlorophenol	1600.	U
91-58-7	2-chloronaphthalene	310.	U
88-74-4	2-nitroaniline	1600.	U
131-11-3	dimethylphthalate	310.	U
208-96-8	acenaphthylene	310.	U
606-20-2	2,6-dinitrotoluene	310.	U

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP04-10

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: NR SDG No: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-061

Sample wt/vol: 32.0 G Lab File ID: >C3565

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 20-Mar-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 8-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
99-09-2	3-nitroaniline	1600.	U
83-32-9	acenaphthene	310.	U
51-28-5	2,4-dinitrophenol	1600.	U
100-02-7	4-nitrophenol	1600.	U
132-64-9	dibenzofuran	310.	U
121-14-2	2,4-dinitrotoluene	310.	U
84-66-2	diethylphthalate	310.	U
7005-72-3	4-chlorophenyl-phenylether	310.	U
86-73-7	fluorene	310.	U
100-01-6	4-nitroaniline	1600.	U
534-52-1	4,6-dinitro-2-methylphenol	1600.	U
86-30-6	n-nitrosodiphenylamine (1)	310.	U
101-55-3	4-bromophenyl-phenylether	310.	U
118-74-1	hexachlorobenzene	310.	U
87-86-5	pentachlorophenol	1600.	U
85-01-8	phenanthrene	310.	U
120-12-7	anthracene	310.	U
84-74-2	di-n-butylphthalate	310.	U
206-44-0	fluoranthene	310.	U
129-00-0	pyrene	310.	U
85-68-7	butylbenzylphthalate	310.	U
91-94-1	3,3'-dichlorobenzidine	630.	U
56-55-3	benzo(a)anthracene	310.	U
218-01-9	chrysene	310.	U
117-81-7	bis(2-ethylhexyl)phthalate	310.	U
117-84-0	di-n-octylphthalate	310.	U
205-99-2	benzo(b)fluoranthene	310.	U
207-08-9	benzo(k)fluoranthene	310.	U
50-32-8	benzo(a)pyrene	310.	U
193-39-5	indeno(1,2,3-cd)pyrene	310.	U
53-70-3	dibenz(a,h)anthracene	310.	U
191-24-2	benzo(g,h,i)perylene	310.	U

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

| TP04-10 |

Semivolatile Organic Analysis Data

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-061

Sample wt/vol: 32.0 G Lab File ID: >C3565

Date Sampled: 20-Feb-1991 12:30 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 20-Mar-1991

Material Description SOIL Date of Report: 2-MAY-91

Number TICs found: 0 CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG

CAS NO.	COMPOUND NAME	RT	CONC	Q

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

| TP04-22 ✓ |

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: G304

Matrix: (soil/water) SOIL Lab Sample ID: 910228-062

Sample wt/vol: 5 G Lab File ID: >G2143

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 4-Mar-1991

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	1.00	JB
67-64-1	acetone	160.	
75-15-0	carbon disulfide	5.00	U
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	5.00	U
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	5.00	U
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	U
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	10.	U
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	5.00	U
108-90-7	chlorobenzene	5.00	U
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	5.00	U

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

TP04-22

VOLATILE ORGANICS ANALYSIS DATA SHEET

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-062

Sample wt/vol: 5 G Lab File ID: >G2143

Date Sampled: 20-Feb-1991 12:40 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 4-Mar-1991

Material Description SOIL Date of Report: 2-MAY-91

Number TICs found: 0 CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG

CAS NO.	COMPOUND NAME	RT	CONC	Q

Reviewed by:_____ Date:_____

Semivolatile Organic Analysis Data

EPA SAMPLE NO.

TP04-22

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: NR SDG No: C319 (32 IN.)

Matrix: (soil/water) SOIL Lab Sample ID: 910228-062

Sample wt/vol: 32.0 G Lab File ID: >C3558

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 19-Mar-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 8-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 100.

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
108-95-2	phenol	31.	U
111-44-4	bis(2-chloroethyl)ether	31.	U
95-57-8	2-chlorophenol	31.	U
541-73-1	1,3-dichlorobenzene	31.	U
106-46-7	1,4-dichlorobenzene	31.	U
100-51-6	benzyl alcohol	31.	U
95-50-1	1,2-dichlorobenzene	31.	U
95-48-7	2-methylphenol	31.	U
108-60-1	bis(2-chloroisopropyl)ether	31.	U
106-44-5	4-methylphenol	31.	U
621-64-7	n-nitroso-di-n-propylamine	31.	U
67-72-1	hexachloroethane	31.	U
98-95-3	nitrobenzene	31.	U
78-59-1	isophorone	31.	U
88-75-5	2-nitrophenol	31.	U
105-67-9	2,4-dimethylphenol	31.	U
65-85-0	benzoic acid	160.	U
111-91-1	bis(2-chloroethoxy)methane	31.	U
120-83-2	2,4-dichlorophenol	31.	U
120-82-1	1,2,4-trichlorobenzene	31.	U
91-20-3	naphthalene	31.	U
106-47-8	4-chloroaniline	31.	U
87-68-3	hexachlorobutadiene	31.	U
59-50-7	4-chloro-3-methylphenol	31.	U
91-57-6	2-methylnaphthalene	31.	U
77-47-4	hexachlorocyclopentadiene	31.	U
88-06-2	2,4,6-trichlorophenol	31.	U
95-95-4	2,4,5-trichlorophenol	160.	U
91-58-7	2-chloronaphthalene	31.	U
88-74-4	2-nitroaniline	160.	U
131-11-3	dimethylphthalate	31.	U
208-96-8	acenaphthylene	31.	U
606-20-2	2,6-dinitrotoluene	31.	U

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP04-22

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: NR SDG No: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-062

Sample wt/vol: 32.0 G Lab File ID: >C3558

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 19-Mar-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 8-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 100.

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
99-09-2	3-nitroaniline	160.	U
83-32-9	acenaphthene	31.	U
51-28-5	2,4-dinitrophenol	160.	U
100-02-7	4-nitrophenol	160.	U
132-64-9	dibenzofuran	31.	U
121-14-2	2,4-dinitrotoluene	31.	U
84-66-2	diethylphthalate	31.	U
7005-72-3	4-chlorophenyl-phenylether	31.	U
86-73-7	fluorene	31.	U
100-01-6	4-nitroaniline	160.	U
534-52-1	4,6-dinitro-2-methylphenol	160.	U
86-30-6	n-nitrosodiphenylamine (1)	31.	U
101-55-3	4-bromophenyl-phenylether	31.	U
118-74-1	hexachlorobenzene	31.	U
87-86-5	pentachlorophenol	160.	U
85-01-8	phenanthrene	31.	U
120-12-7	anthracene	31.	U
84-74-2	di-n-butylphthalate	31.	U
206-44-0	fluoranthene	31.	U
129-00-0	pyrene	31.	U
85-68-7	butylbenzylphthalate	31.	U
91-94-1	3,3'-dichlorobenzidine	63.	U
56-55-3	benzo(a)anthracene	31.	U
218-01-9	chrysene	31.	U
117-81-7	bis(2-ethylhexyl)phthalate	31.	U
117-84-0	di-n-octylphthalate	31.	U
205-99-2	benzo(b)fluoranthene	31.	U
207-08-9	benzo(k)fluoranthene	31.	U
50-32-8	benzo(a)pyrene	31.	U
193-39-5	indeno(1,2,3-cd)pyrene	31.	U
53-70-3	dibenz(a,h)anthracene	31.	U
191-24-2	benzo(g,h,i)perylene	31.	U

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

TP04-22

Semivolatile Organic Analysis Data

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-062

Sample wt/vol: 32.0 G Lab File ID: >C3558

Date Sampled: 20-Feb-1991 12:40 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 19-Mar-1991

Material Description SOIL Date of Report: 2-MAY-91

Number TICs found: 0 CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG

CAS NO.	COMPOUND NAME	RT	CONC	Q

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

TP04-65

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: 0308

Matrix: (soil/water) SOIL Lab Sample ID: 910228-063

Sample wt/vol: 5 G Lab File ID: >01199

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 8-Mar-1991

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	5.00	U
67-64-1	acetone	10.	U
75-15-0	carbon disulfide	5.00	U
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	5.00	U
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	5.00	U
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	U
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	10.	U
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	5.00	U
108-90-7	chlorobenzene	5.00	U
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	5.00	U

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

TP04-65

VOLATILE ORGANICS ANALYSIS DATA SHEET

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-063

Sample wt/vol: 5 G Lab File ID: >01199

Date Sampled: 20-Feb-1991 12:20 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 8-Mar-1991

Material Description SOIL Date of Report: 2-MAY-91

Number TICs found: 12 CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG

CAS NO.	COMPOUND NAME	RT	CONC	Q
1.	UNKNOWN	2.38	990.	J
2.	UNKNOWN	16.01	190.	J
3.	UNKNOWN	19.03	250.	J
4.	UNKNOWN	20.31	140.	J
5.	UNKNOWN HYDROCARBON	20.52	150.	J
6.	UNKNOWN	21.01	230.	J
7.	UNKNOWN HYDROCARBON	22.43	150.	J
8.	UNKNOWN	22.60	150.	J
9.	UNKNOWN	22.74	210.	J
10.	UNKNOWN	27.70	200.	J
11.	UNKNOWN	28.29	150.	J
12.	UNKNOWN	28.47	140.	J

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP04-65 ✓

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: NR SDG No: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-063

Sample wt/vol: 32.0 G Lab File ID: >C3560

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 19-Mar-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 8-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 100.

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
108-95-2	phenol	31.	U
111-44-4	bis(2-chloroethyl)ether	31.	U
95-57-8	2-chlorophenol	31.	U
541-73-1	1,3-dichlorobenzene	31.	U
106-46-7	1,4-dichlorobenzene	31.	U
100-51-6	benzyl alcohol	31.	U
95-50-1	1,2-dichlorobenzene	31.	U
95-48-7	2-methylphenol	31.	U
108-60-1	bis(2-chloroisopropyl)ether	31.	U
106-44-5	4-methylphenol	31.	U
621-64-7	n-nitroso-di-n-propylamine	31.	U
67-72-1	hexachloroethane	31.	U
98-95-3	nitrobenzene	31.	U
78-59-1	isophorone	31.	U
88-75-5	2-nitrophenol	31.	U
105-67-9	2,4-dimethylphenol	31.	U
65-85-0	benzoic acid	160.	U
111-91-1	bis(2-chloroethoxy)methane	31.	U
120-83-2	2,4-dichlorophenol	31.	U
120-82-1	1,2,4-trichlorobenzene	31.	U
91-20-3	naphthalene	31.	U
106-47-8	4-chloroaniline	31.	U
87-68-3	hexachlorobutadiene	31.	U
59-50-7	4-chloro-3-methylphenol	31.	U
91-57-6	2-methylnaphthalene	31.	U
77-47-4	hexachlorocyclopentadiene	31.	U
88-06-2	2,4,6-trichlorophenol	31.	U
95-95-4	2,4,5-trichlorophenol	160.	U
91-58-7	2-chloronaphthalene	31.	U
88-74-4	2-nitroaniline	160.	U
131-11-3	dimethylphthalate	31.	U
208-96-8	acenaphthylene	31.	U
606-20-2	2,6-dinitrotoluene	31.	U

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP04-65

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: NR SDG No: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-063

Sample wt/vol: 32.0 G Lab File ID: >C3560

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 19-Mar-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 8-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 100.

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
99-09-2	3-nitroaniline	160.	U
83-32-9	acenaphthene	31.	U
51-28-5	2,4-dinitrophenol	160.	U
100-02-7	4-nitrophenol	160.	U
132-64-9	dibenzofuran	31.	U
121-14-2	2,4-dinitrotoluene	31.	U
84-66-2	diethylphthalate	31.	U
7005-72-3	4-chlorophenyl-phenylether	31.	U
86-73-7	fluorene	31.	U
100-01-6	4-nitroaniline	160.	U
534-52-1	4,6-dinitro-2-methylphenol	70.	
86-30-6	n-nitrosodiphenylamine (1)	31.	U
101-55-3	4-bromophenyl-phenylether	31.	U
118-74-1	hexachlorobenzene	31.	U
87-86-5	pentachlorophenol	160.	U
85-01-8	phenanthrene	31.	U
120-12-7	anthracene	31.	U
84-74-2	di-n-butylphthalate	31.	U
206-44-0	fluoranthene	31.	U
129-00-0	pyrene	31.	U
85-68-7	butylbenzylphthalate	31.	U
91-94-1	3,3'-dichlorobenzidine	63.	U
56-55-3	benzo(a)anthracene	31.	U
218-01-9	chrysene	31.	U
117-81-7	bis(2-ethylhexyl)phthalate	31.	U
117-84-0	di-n-octylphthalate	31.	U
205-99-2	benzo(b)fluoranthene	31.	U
207-08-9	benzo(k)fluoranthene	31.	U
50-32-8	benzo(a)pyrene	31.	U
193-39-5	indeno(1,2,3-cd)pyrene	31.	U
53-70-3	dibenz(a,h)anthracene	31.	U
191-24-2	benzo(g,h,i)perylene	31.	U

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

| TP04-65 |

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-063

Sample wt/vol: 32.0 G Lab File ID: >C3560

Date Sampled: 20-Feb-1991 12:20 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 19-Mar-1991

Material Description SOIL Date of Report: 2-MAY-91

Number TICs found: 20 CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG

CAS NO.	COMPOUND NAME	RT	CONC	Q
1.	OCTANE,2,3,7-TRIMETHYL-	19.12	36.	J
2.	UNKNOWN	20.50	18.	J
3.	DODECANE,2,7,10-TRIMETHYL-	21.03	75.	J
4.	UNKNOWN	21.14	52.	J
5.	NAPHTHALENE,1,6-DIMETHYL-	21.81	25.	J
6.	UNKNOWN	22.05	60.	J
7.	UNKNOWN	22.10	53.	J
8.	NAPHTHALENE,1,5-DIMETHYL-	22.15	21.	J
9.	UNKNOWN	22.40	18.	J
10.	UNKNOWN HYDROCARBON	22.50	120.	J
11.	UNKNOWN	22.57	24.	J
12.	UNKNOWN	22.74	58.	J
13.	UNKNOWN	22.82	17.	J
14.	UNKNOWN	23.35	21.	J
15.	UNKNOWN	23.60	22.	J
16.	NAPHTHALENE,1,4,5-TRIMETHYL-	23.95	25.	J
17.	UNKNOWN	24.49	27.	J
18.	UNKNOWN	25.47	94.	J
19.	PENTADECANE,2,6,10,14-TETRAM	26.34	180.	J
20.	UNKNOWN	28.94	14.	J

Reviewed by:_____ Date:_____

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TP04-W ✓

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: G228

Matrix: (soil/water) WATER Lab Sample ID: 910228-064

Sample wt/vol: 1 ML Lab File ID: >G2114

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 28-Feb-1991

Column: (pack/cap) PACK Dilution Factor: 5.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
74-87-3	chloromethane	50.	U
74-83-9	bromomethane	50.	U
75-01-4	vinyl chloride	50.	U
75-00-3	chloroethane	50.	U
75-09-2	methylene chloride	5.00	U
67-64-1	acetone	580.	
75-15-0	carbon disulfide	25.	U
75-35-4	1,1-dichloroethene	25.	U
75-34-3	1,1-dichloroethane	25.	U
540-59-0	1,2-dichloroethene (total)	25.	U
67-66-3	chloroform	25.	U
107-06-2	1,2-dichloroethane	25.	U
78-93-3	2-butanone	50.	U
71-55-6	1,1,1-trichloroethane	25.	U
56-23-5	carbon tetrachloride	25.	U
108-05-4	vinyl acetate	50.	U
75-27-4	bromodichloromethane	25.	U
78-87-5	1,2-dichloropropane	25.	U
10061-01-5	cis-1,3-dichloropropene	25.	U
79-01-6	trichloroethene	25.	U
124-48-1	dibromochloromethane	25.	U
79-00-5	1,1,2-trichloroethane	25.	U
71-43-2	benzene	25.	U
10061-02-06	trans-1,3-dichloropropene	25.	U
75-25-2	bromoform	25.	U
108-10-1	4-methyl-2-pentanone	50.	U
591-78-6	2-hexanone	50.	U
127-18-4	tetrachloroethene	25.	U
79-34-5	1,1,2,2-tetrachloroethane	25.	U
108-88-3	toluene	25.	U
108-90-7	chlorobenzene	25.	U
100-41-4	ethylbenzene	25.	U
100-42-5	styrene	25.	U
1330-20-7	xylene (total)	25.	U

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

| TP04-W |

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-064

Sample wt/vol: 1 ML Lab File ID: >G2114

Date Sampled: 20-Feb-1991 11:40 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 28-Feb-1991

Material Description WATER Date of Report: 2-MAY-91

Number TICs found: 1 CONCENTRATION UNITS: (UG/L or UG/KG) UG/L

CAS NO.	COMPOUND NAME	RT	CONC	Q
1.	UNKNOWN	9.72	39.	J

Reviewed by:_____ Date:_____

Semivolatile Organic Analysis Data

EPA SAMPLE NO.

TP04-W

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: CLP SAS No: NR SDG No: C425

Matrix: (soil/water) WATER Lab Sample ID: 910228-064

Sample wt/vol: 160 ML Lab File ID: >C3767

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 25-Apr-1991

Extraction: (Sepf/Cont/Sonc) SEPF Date Extracted: 18-Mar-1991

GPC Cleanup: (Y/N) N pH: 8.08 Dilution Factor: 6.3

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
108-95-2	phenol	63.	U
111-44-4	bis(2-chloroethyl)ether	63.	U
95-57-8	2-chlorophenol	63.	U
541-73-1	1,3-dichlorobenzene	63.	U
106-46-7	1,4-dichlorobenzene	63.	U
100-51-6	benzyl alcohol	63.	U
95-50-1	1,2-dichlorobenzene	63.	U
95-48-7	2-methylphenol	63.	U
108-60-1	bis(2-chloroisopropyl)ether	63.	U
106-44-5	4-methylphenol	63.	U
621-64-7	n-nitroso-di-n-propylamine	63.	U
67-72-1	hexachloroethane	63.	U
98-95-3	nitrobenzene	63.	U
78-59-1	isophorone	63.	U
88-75-5	2-nitrophenol	63.	U
105-67-9	2,4-dimethylphenol	63.	U
65-85-0	benzoic acid	310.	U
111-91-1	bis(2-chloroethoxy)methane	63.	U
120-83-2	2,4-dichlorophenol	63.	U
120-82-1	1,2,4-trichlorobenzene	63.	U
91-20-3	naphthalene	63.	U
106-47-8	4-chloroaniline	63.	U
87-68-3	hexachlorobutadiene	63.	U
59-50-7	4-chloro-3-methylphenol	63.	U
91-57-6	2-methylnaphthalene	63.	U
77-47-4	hexachlorocyclopentadiene	63.	U
88-06-2	2,4,6-trichlorophenol	63.	U
95-95-4	2,4,5-trichlorophenol	310.	U
91-58-7	2-chloronaphthalene	63.	U
88-74-4	2-nitroaniline	310.	U
131-11-3	dimethylphthalate	63.	U
208-96-8	acenaphthylene	63.	U
606-20-2	2,6-dinitrotoluene	63.	U

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP04-W

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: CLP SAS No: NR SDG No: C425

Matrix: (soil/water) WATER Lab Sample ID: 910228-064

Sample wt/vol: 160 ML Lab File ID: >C3767

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 25-Apr-1991

Extraction: (Sepf/Cont/Sonc) SEPF Date Extracted: 18-Mar-1991

GPC Cleanup: (Y/N) N pH: 8.08 Dilution Factor: 6.3

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
99-09-2	3-nitroaniline	310.	U
83-32-9	acenaphthene	63.	U
51-28-5	2,4-dinitrophenol	310.	U
100-02-7	4-nitrophenol	310.	U
132-64-9	dibenzofuran	63.	U
121-14-2	2,4-dinitrotoluene	63.	U
84-66-2	diethylphthalate	63.	U
7005-72-3	4-chlorophenyl-phenylether	63.	U
86-73-7	fluorene	63.	U
100-01-6	4-nitroaniline	310.	U
534-52-1	4,6-dinitro-2-methylphenol	310.	U
86-30-6	n-nitrosodiphenylamine (1)	63.	U
101-55-3	4-bromophenyl-phenylether	63.	U
118-74-1	hexachlorobenzene	63.	U
87-86-5	pentachlorophenol	310.	U
85-01-8	phenanthrene	63.	U
120-12-7	anthracene	63.	U
84-74-2	di-n-butylphthalate	63.	U
206-44-0	fluoranthene	63.	U
129-00-0	pyrene	63.	U
85-68-7	butylbenzylphthalate	130.	B
91-94-1	3,3'-dichlorobenzidine	130.	U
56-55-3	benzo(a)anthracene	63.	U
218-01-9	chrysene	63.	U
117-81-7	bis(2-ethylhexyl)phthalate	150.	
117-84-0	di-n-octylphthalate	63.	U
205-99-2	benzo(b)fluoranthene	63.	U
207-08-9	benzo(k)fluoranthene	63.	U
50-32-8	benzo(a)pyrene	63.	U
193-39-5	indeno(1,2,3-cd)pyrene	63.	U
53-70-3	dibenz(a,h)anthracene	63.	U
191-24-2	benzo(g,h,i)perylene	63.	U

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

TP04-W

Semivolatile Organic Analysis Data

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-064

Sample wt/vol: 160 ML Lab File ID: >C3767

Date Sampled: 20-Feb-1991 11:40 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 25-Apr-1991

Material Description WATER Date of Report: 2-MAY-91

Number TICs found: 20 CONCENTRATION UNITS: (UG/L or UG/KG) UG/L

CAS NO.	COMPOUND NAME	RT	CONC	Q
1.	UNKNOWN	13.58	130.	J
2.	UNKNOWN	13.83	93.	J
3.	UNKNOWN	14.21	100.	J
4.	UNKNOWN HYDROCARBON	14.55	230.	J
5.	UNK SUBSTITUTED CYLCLOHEXANE	15.00	180.	J
6.	UNKNOWN HYDROCARBON	15.16	140.	J
7.	UNKNOWN HYDROCARBON	15.50	370.	J
8.	UNKNOWN HYDROCARBON	16.17	110.	J
9.	UNKNOWN	16.32	91.	J
10.	UNKNOWN	16.62	95.	J
11.	UNKNOWN HYDROCARBON	17.09	110.	J
12.	UNK NAPHTHALENE, -DIMETHYL	17.94	280.	J
13.	UNKNOWN	18.15	110.	J
14.	UNKNOWN HYDROCARBON	18.32	250.	J
15.	UNKNOWN HYDROCARBON	19.50	68.	J
16.	UNKNOWN	19.64	150.	J
17.	UNKNOWN	19.83	77.	J
18.	UNKNOWN HYDROCARBON	20.69	150.	J
19.	UNKNOWN HYDROCARBON	21.43	800.	J
20.	UNKNOWN	23.44	84.	J

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

TP04-65A

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: 0308

Matrix: (soil/water) SOIL Lab Sample ID: 910228-065

Sample wt/vol: 5 G Lab File ID: >01200

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 8-Mar-1991

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	5.00	U
67-64-1	acetone	270.	E
75-15-0	carbon disulfide	5.00	U
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	5.00	U
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	5.00	U
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	U
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	10.	U
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	5.00	U
108-90-7	chlorobenzene	5.00	U
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	5.00	U

Reviewed by:_____ Date:_____

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TP04-65B

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: 0308

Matrix: (soil/water) SOIL Lab Sample ID: 910228-066

Sample wt/vol: 0.8 G Lab File ID: >01210

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 9-Mar-1991

Column: (pack/cap) CAP Dilution Factor: 50

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
74-87-3	chloromethane	500.	U
74-83-9	bromomethane	500.	U
75-01-4	vinyl chloride	500.	U
75-00-3	chloroethane	500.	U
75-09-2	methylene chloride	250.	U
67-64-1	acetone	5400.	
75-15-0	carbon disulfide	250.	U
75-35-4	1,1-dichloroethene	250.	U
75-34-3	1,1-dichloroethane	250.	U
540-59-0	1,2-dichloroethene (total)	250.	U
67-66-3	chloroform	250.	U
107-06-2	1,2-dichloroethane	250.	U
78-93-3	2-butanone	240.	J
71-55-6	1,1,1-trichloroethane	250.	U
56-23-5	carbon tetrachloride	250.	U
108-05-4	vinyl acetate	500.	U
75-27-4	bromodichloromethane	250.	U
78-87-5	1,2-dichloropropane	250.	U
10061-01-5	cis-1,3-dichloropropene	250.	U
79-01-6	trichloroethene	250.	U
124-48-1	dibromochloromethane	250.	U
79-00-5	1,1,2-trichloroethane	250.	U
71-43-2	benzene	250.	U
10061-02-06	trans-1,3-dichloropropene	250.	U
75-25-2	bromoform	250.	U
108-10-1	4-methyl-2-pentanone	500.	U
591-78-6	2-hexanone	500.	U
127-18-4	tetrachloroethene	250.	U
79-34-5	1,1,2,2-tetrachloroethane	250.	U
108-88-3	toluene	250.	U
108-90-7	chlorobenzene	250.	U
100-41-4	ethylbenzene	250.	U
100-42-5	styrene	250.	U
1330-20-7	xylene (total)	250.	U

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

TP03-12A

Lab Name: Oak Ridge National Lab Contract:

Lab Code: Case no: SAS No: SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 910228-067

Sample wt/vol: ML Lab File ID:

Level: (low/med) Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 30-Apr-1991

Column: (pack/cap) Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
74-87-3	chloromethane	********	U
74-83-9	bromomethane	********	U
75-01-4	vinyl chloride	********	U
75-00-3	chloroethane	********	U
75-09-2	methylene chloride	********	U
67-64-1	acetone	********	U
75-15-0	carbon disulfide	********	U
75-35-4	1,1-dichloroethene	********	U
75-34-3	1,1-dichloroethane	********	U
540-59-0	1,2-dichloroethene (total)	********	U
67-66-3	chloroform	********	U
107-06-2	1,2-dichloroethane	********	U
78-93-3	2-butanone	********	U
71-55-6	1,1,1-trichloroethane	********	U
56-23-5	carbon tetrachloride	********	U
108-05-4	vinyl acetate	********	U
75-27-4	bromodichloromethane	********	U
78-87-5	1,2-dichloropropane	********	U
10061-01-5	cis-1,3-dichloropropene	********	U
79-01-6	trichloroethene	********	U
124-48-1	dibromochloromethane	********	U
79-00-5	1,1,2-trichloroethane	********	U
71-43-2	benzene	********	U
10061-02-06	trans-1,3-dichloropropene	********	U
75-25-2	bromoform	********	U
108-10-1	4-methyl-2-pentanone	********	U
591-78-6	2-hexanone	********	U
127-18-4	tetrachloroethene	********	U
79-34-5	1,1,2,2-tetrachloroethane	********	U
108-88-3	toluene	********	U
108-90-7	chlorobenzene	********	U
100-41-4	ethylbenzene	********	U
100-42-5	styrene	********	U
1330-20-7	xylene (total)	********	U

Reviewed by:_____ Date:_____

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TP03-12B

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: 0308

Matrix: (soil/water) SOIL Lab Sample ID: 910228-068

Sample wt/vol: 0.8 G Lab File ID: >01211

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 9-Mar-1991

Column: (pack/cap) CAP Dilution Factor: 50

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
74-87-3	chloromethane	500.	U
74-83-9	bromomethane	500.	U
75-01-4	vinyl chloride	500.	U
75-00-3	chloroethane	500.	U
75-09-2	methylene chloride	250.	U
67-64-1	acetone	500.	U
75-15-0	carbon disulfide	250.	U
75-35-4	1,1-dichloroethene	250.	U
75-34-3	1,1-dichloroethane	250.	U
540-59-0	1,2-dichloroethene (total)	250.	U
67-66-3	chloroform	250.	U
107-06-2	1,2-dichloroethane	250.	U
78-93-3	2-butanone	500.	U
71-55-6	1,1,1-trichloroethane	70.	J
56-23-5	carbon tetrachloride	250.	U
108-05-4	vinyl acetate	500.	U
75-27-4	bromodichloromethane	250.	U
78-87-5	1,2-dichloropropane	250.	U
10061-01-5	cis-1,3-dichloropropene	250.	U
79-01-6	trichloroethene	250.	U
124-48-1	dibromochloromethane	250.	U
79-00-5	1,1,2-trichloroethane	250.	U
71-43-2	benzene	250.	U
10061-02-06	trans-1,3-dichloropropene	250.	U
75-25-2	bromoform	250.	U
108-10-1	4-methyl-2-pentanone	500.	U
591-78-6	2-hexanone	500.	U
127-18-4	tetrachloroethene	250.	U
79-34-5	1,1,2,2-tetrachloroethane	250.	U
108-88-3	toluene	250.	U
108-90-7	chlorobenzene	* 83.	J
100-41-4	ethylbenzene	250.	U
100-42-5	styrene	250.	U
1330-20-7	xylene (total)	250.	U

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

TP01-56A

Lab Name: Oak Ridge National Lab Contract:

Lab Code: Case no: SAS No: SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 910228-069

Sample wt/vol: ML Lab File ID:

Level: (low/med) Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 30-Apr-1991

Column: (pack/cap) Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
74-87-3	chloromethane	********	U
74-83-9	bromomethane	********	U
75-01-4	vinyl chloride	********	U
75-00-3	chloroethane	********	U
75-09-2	methylene chloride	********	U
67-64-1	acetone	********	U
75-15-0	carbon disulfide	********	U
75-35-4	1,1-dichloroethene	********	U
75-34-3	1,1-dichloroethane	********	U
540-59-0	1,2-dichloroethene (total)	********	U
67-66-3	chloroform	********	U
107-06-2	1,2-dichloroethane	********	U
78-93-3	2-butanone	********	U
71-55-6	1,1,1-trichloroethane	********	U
56-23-5	carbon tetrachloride	********	U
108-05-4	vinyl acetate	********	U
75-27-4	bromodichloromethane	********	U
78-87-5	1,2-dichloropropane	********	U
10061-01-5	cis-1,3-dichloropropene	********	U
79-01-6	trichloroethene	********	U
124-48-1	dibromochloromethane	********	U
79-00-5	1,1,2-trichloroethane	********	U
71-43-2	benzene	********	U
10061-02-06	trans-1,3-dichloropropene	********	U
75-25-2	bromoform	********	U
108-10-1	4-methyl-2-pentanone	********	U
591-78-6	2-hexanone	********	U
127-18-4	tetrachloroethene	********	U
79-34-5	1,1,2,2-tetrachloroethane	********	U
108-88-3	toluene	********	U
108-90-7	chlorobenzene	********	U
100-41-4	ethylbenzene	********	U
100-42-5	styrene	********	U
1330-20-7	xylene (total)	********	U

Reviewed by:_____ Date:_____

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TP01-56B

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: 0308

Matrix: (soil/water) SOIL Lab Sample ID: 910228-070

Sample wt/vol: 0.8 G Lab File ID: >01212

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 9-Mar-1991

Column: (pack/cap) CAP Dilution Factor: 50

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
74-87-3	chloromethane	500.	U
74-83-9	bromomethane	500.	U
75-01-4	vinyl chloride	500.	U
75-00-3	chloroethane	500.	U
75-09-2	methylene chloride	250.	U
67-64-1	acetone	500.	U
75-15-0	carbon disulfide	250.	U
75-35-4	1,1-dichloroethene	250.	U
75-34-3	1,1-dichloroethane	250.	U
540-59-0	1,2-dichloroethene (total)	250.	U
67-66-3	chloroform	250.	U
107-06-2	1,2-dichloroethane	250.	U
78-93-3	2-butanone	500.	U
71-55-6	1,1,1-trichloroethane	250.	U
56-23-5	carbon tetrachloride	250.	U
108-05-4	vinyl acetate	500.	U
75-27-4	bromodichloromethane	250.	U
78-87-5	1,2-dichloropropane	250.	U
10061-01-5	cis-1,3-dichloropropene	250.	U
79-01-6	trichloroethene	250.	U
124-48-1	dibromochloromethane	250.	U
79-00-5	1,1,2-trichloroethane	250.	U
71-43-2	benzene	250.	U
10061-02-06	trans-1,3-dichloropropene	250.	U
75-25-2	bromoform	250.	U
108-10-1	4-methyl-2-pentanone	500.	U
591-78-6	2-hexanone	500.	U
127-18-4	tetrachloroethene	250.	U
79-34-5	1,1,2,2-tetrachloroethane	250.	U
108-88-3	toluene	250.	U
108-90-7	chlorobenzene	250.	U
100-41-4	ethylbenzene	250.	U
100-42-5	styrene	250.	U
1330-20-7	xylene (total)	250.	U

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

FUEL

Lab Name: Oak Ridge National Lab Contract:

Lab Code: Case no: SAS No: NR SDG No:

Matrix: (soil/water) WATER Lab Sample ID: 910228-071

Sample wt/vol: ML Lab File ID:

Level: (low/med) Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 11-Mar-1991

Column: (pack/cap) Dilution Factor:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
74-87-3	chloromethane	********	U
74-83-9	bromomethane	********	U
75-01-4	vinyl chloride	********	U
75-00-3	chloroethane	********	U
75-09-2	methylene chloride	********	U
67-64-1	acetone	********	U
75-15-0	carbon disulfide	********	U
75-35-4	1,1-dichloroethene	********	U
75-34-3	1,1-dichloroethane	********	U
540-59-0	1,2-dichloroethene (total)	********	U
67-66-3	chloroform	********	U
107-06-2	1,2-dichloroethane	********	U
78-93-3	2-butanone	********	U
71-55-6	1,1,1-trichloroethane	********	U
56-23-5	carbon tetrachloride	********	U
108-05-4	vinyl acetate	********	U
75-27-4	bromodichloromethane	********	U
78-87-5	1,2-dichloropropane	********	U
10061-01-5	cis-1,3-dichloropropene	********	U
79-01-6	trichloroethene	********	U
124-48-1	dibromochloromethane	********	U
79-00-5	1,1,2-trichloroethane	********	U
71-43-2	benzene	********	U
10061-02-06	trans-1,3-dichloropropene	********	U
75-25-2	bromoform	********	U
108-10-1	4-methyl-2-pentanone	********	U
591-78-6	2-hexanone	********	U
127-18-4	tetrachloroethene	********	U
79-34-5	1,1,2,2-tetrachloroethane	********	U
108-88-3	toluene	********	U
108-90-7	chlorobenzene	********	U
100-41-4	ethylbenzene	********	U
100-42-5	styrene	********	U
1330-20-7	xylene (total)	********	U

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

FUEL

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: WASTE SAS No: NR SDG No: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-071

Sample wt/vol: .1 G Lab File ID: >C3566

Level: (low/med) MED Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 20-Mar-1991

Extraction: (Sepf/Cont/Sonc) DIL Date Extracted: 11-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 100.

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
108-95-2	phenol	1000.	U
111-44-4	bis(2-chloroethyl)ether	1000.	U
95-57-8	2-chlorophenol	1000.	U
541-73-1	1,3-dichlorobenzene	1000.	U
106-46-7	1,4-dichlorobenzene	1000.	U
100-51-6	benzyl alcohol	1000.	U
95-50-1	1,2-dichlorobenzene	1000.	U
95-48-7	2-methylphenol	1000.	U
108-60-1	bis(2-chloroisopropyl)ether	1000.	U
106-44-5	4-methylphenol	1000.	U
621-64-7	n-nitroso-di-n-propylamine	1000.	U
67-72-1	hexachloroethane	1000.	U
98-95-3	nitrobenzene	1000.	U
78-59-1	isophorone	1000.	U
88-75-5	2-nitrophenol	1000.	U
105-67-9	2,4-dimethylphenol	1000.	U
65-85-0	benzoic acid	5000.	U
111-91-1	bis(2-chloroethoxy)methane	1000.	U
120-83-2	2,4-dichlorophenol	1000.	U
120-82-1	1,2,4-trichlorobenzene	1000.	U
91-20-3	naphthalene	550.	J
106-47-8	4-chloroaniline	1000.	U
87-68-3	hexachlorobutadiene	1000.	U
59-50-7	4-chloro-3-methylphenol	1000.	U
91-57-6	2-methylnaphthalene	2100.	
77-47-4	hexachlorocyclopentadiene	1000.	U
88-06-2	2,4,6-trichlorophenol	1000.	U
95-95-4	2,4,5-trichlorophenol	5000.	U
91-58-7	2-chloronaphthalene	1000.	U
88-74-4	2-nitroaniline	5000.	U
131-11-3	dimethylphthalate	1000.	U
208-96-8	acenaphthylene	1000.	U
606-20-2	2,6-dinitrotoluene	1000.	U

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

FUEL

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: WASTE SAS No: NR SDG No: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-071

Sample wt/vol: .1 G Lab File ID: >C3566

Level: (low/med) MED Date Received 28-Feb-1991

% Moisture: not dec. dec. Date Analyzed: 20-Mar-1991

Extraction: (Sepf/Cont/Sonc) DIL Date Extracted: 11-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 100.

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
99-09-2	3-nitroaniline	5000.	U
83-32-9	acenaphthene	1000.	U
51-28-5	2,4-dinitrophenol	5000.	U
100-02-7	4-nitrophenol	5000.	U
132-64-9	dibenzofuran	1000.	U
121-14-2	2,4-dinitrotoluene	1000.	U
84-66-2	diethylphthalate	1000.	U
7005-72-3	4-chlorophenyl-phenylether	1000.	U
86-73-7	fluorene	1000.	U
100-01-6	4-nitroaniline	5000.	U
534-52-1	4,6-dinitro-2-methylphenol	5000.	U
86-30-6	n-nitrosodiphenylamine (1)	1000.	U
101-55-3	4-bromophenyl-phenylether	1000.	U
118-74-1	hexachlorobenzene	1000.	U
87-86-5	pentachlorophenol	5000.	U
85-01-8	phenanthrene	1200.	
120-12-7	anthracene	1000.	U
84-74-2	di-n-butylphthalate	1000.	U
206-44-0	fluoranthene	1000.	U
129-00-0	pyrene	1000.	U
85-68-7	butylbenzylphthalate	1000.	U
91-94-1	3,3'-dichlorobenzidine	2000.	U
56-55-3	benzo(a)anthracene	1000.	U
218-01-9	chrysene	1000.	U
117-81-7	bis(2-ethylhexyl)phthalate	1000.	U
117-84-0	di-n-octylphthalate	1000.	U
205-99-2	benzo(b)fluoranthene	1000.	U
207-08-9	benzo(k)fluoranthene	1000.	U
50-32-8	benzo(a)pyrene	1000.	U
193-39-5	indeno(1,2,3-cd)pyrene	1000.	U
53-70-3	dibenz(a,h)anthracene	1000.	U
191-24-2	benzo(g,h,i)perylene	1000.	U

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

FUEL

Semivolatile Organic Analysis Data

Request Number: OAL94146

Procedure Number: 8240 Matrix: SOIL & WATER

Series: Frequency: ON REQUEST Charge Number: 33357130

Customer Name: SIEGRIST Lab Sample ID: 910228-071

Sample wt/vol: .1 G Lab File ID: >C3566

Date Sampled: 19-Feb-1991 Date Received 27-Feb-1991 14:30

% Moisture: not dec. dec: Date Analyzed: 20-Mar-1991

Material Description FUEL Date of Report: 2-MAY-91

Number TICs found: 20 CONCENTRATION UNITS: (UG/L or UG/KG) UG/L

CAS NO.	COMPOUND NAME	RT	CONC	Q
1.	UNDECANE	15.65	3900.	J
2.	DODECANE	17.72	5200.	J
3.	TRIDECANE	19.66	9100.	J
4.	DODECANE,2,7,10-TRIMETHYL-	21.03	510.	J
5.	DECANE,2,3,6-TRIMETHYL-	21.48	2400.	J
6.	NAPHTHALENE,1,5-DIMETHYL	21.82	450.	J
7.	NAPHTHALENE,1,3-DIMETHYL	22.10	880.	J
8.	NAPHTHALENE,1,7-DIMETHYL	22.16	490.	J
9.	UNKNOWN HYDROCARBON	22.35	380.	J
10.	UNKNOWN HYDROCARBON	22.52	1300.	J
11.	UNKNOWN	24.07	380.	J
12.	TRIDECANE,6-PROPYL-	24.79	3500.	J
13.	TRIDECANE,5-PROPYL-	25.50	1200.	J
14.	UNKNOWN HYDROCARBON	25.70	1900.	J
15.	HEPTADECANE	26.30	11000.	J
16.	PENTADECANE,2,6,10,14-TETRAM	26.37	7500.	J
17.	UNKNOWN HYDROCARBON	26.88	1400.	J
18.	UNKNOWN HYDROCARBON	27.72	7900.	J
19.	UNKNOWN	29.08	5000.	J
20.	UNKNOWN	30.37	2600.	J

Reviewed by:_____ Date:_____

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB03

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: G228

Matrix: (soil/water) WATER Lab Sample ID: 910228-072

Sample wt/vol: 5 ML Lab File ID: >G2112

Level: (low/med) LOW Date Received 28-Feb-1991

% Moisture: not dec. Date Analyzed: 28-Feb-1991

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	1.00	JB
67-64-1	acetone	10.	U
75-15-0	carbon disulfide	5.00	U
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	5.00	U
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	5.00	U
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	U
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	10.	U
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	5.00	U
108-90-7	chlorobenzene	5.00	U
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	5.00	U

Reviewed by:_____ Date:_____

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

910228-062MS

Lab Name: OAK RIDGE NATIONAL LAB Contract: NR

Lab Code: OR Case No.: NR SAS No.: NR SDG No.: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-062MS

Sample wt/vol: 30.9 (g/mL) G Lab File ID: >C3556

Level: (low/med) LOW Date Received: 2/28/91

% Moisture: not dec. NR dec. NR Date Extracted: 3/08/91

Extraction: (Sepf/Cont/Sonc) SONC Date Analyzed: 3/19/91

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 100.

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) mg/Kg	Q
110-86-1	Pyridine	32.	U
208-95-2	Phenol	32.	U
111-44-4	bis(-2-Chloroethyl)ether	32.	U
95-57-8	2-Chlorophenol	32.	U
541-73-1	1,3-Dichlorobenzene	32.	U
206-46-7	1,4-Dichlorobenzene	32.	U
200-51-6	Benzyl alcohol	32.	U
95-50-1	1,2-Dichlorobenzene	32.	U
95-48-7	2-Methylphenol	32.	U
39638-32-9	bis(2-chloroisopropyl)ether	32.	U
206-44-5	4-Methylphenol	32.	U
621-64-7	N-Nitroso-di-n-propylamine	32.	U
67-72-1	Hexachloroethane	32.	U
98-95-3	Nitrobenzene	32.	U
78-59-1	Isophorone	32.	U
88-75-5	2-Nitrophenol	32.	U
205-67-9	2,4-Dimethylphenol	32.	U
65-85-0	Benzoic acid	160.	U
111-91-1	bis(-2-Chloroethoxy)methane	32.	U
120-83-2	2,4-Dichlorophenol	32.	U
120-82-1	1,2,4-Trichlorobenzene	32.	U
91-20-3	Naphthalene	32.	U
206-47-8	4-Chloroaniline	32.	U
87-68-3	Hexachlorobutadiene	32.	U
59-50-7	4-Chloro-3-methylphenol	32.	U
91-57-6	2-Methylnaphthalene	32.	U
77-47-4	Hexachlorocyclopentadiene	32.	U
88-06-2	2,4,6-Trichlorophenol	32.	U
95-95-4	2,4,5-Trichlorophenol	160.	U
91-58-7	2-Chloronaphthalene	32.	U
88-74-4	2-Nitroaniline	160.	U
131-11-3	Dimethyl Phthalate	32.	U
208-96-8	Acenaphthylene	32.	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

910228-062MS

Lab Name: OAK RIDGE NATIONAL LAB Contract: NR

Lab Code: OR Case No.: NR SAS No.: NR SDG No.: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-062MS

Sample wt/vol: 30.9 (g/mL) G Lab File ID: >C3556

Level: (low/med) LOW Date Received: 2/28/91

% Moisture: not dec. NR dec. NR Date Extracted: 3/08/91

Extraction: (Sepf/Cont/Sonc) SONC Date Analyzed: 3/19/91

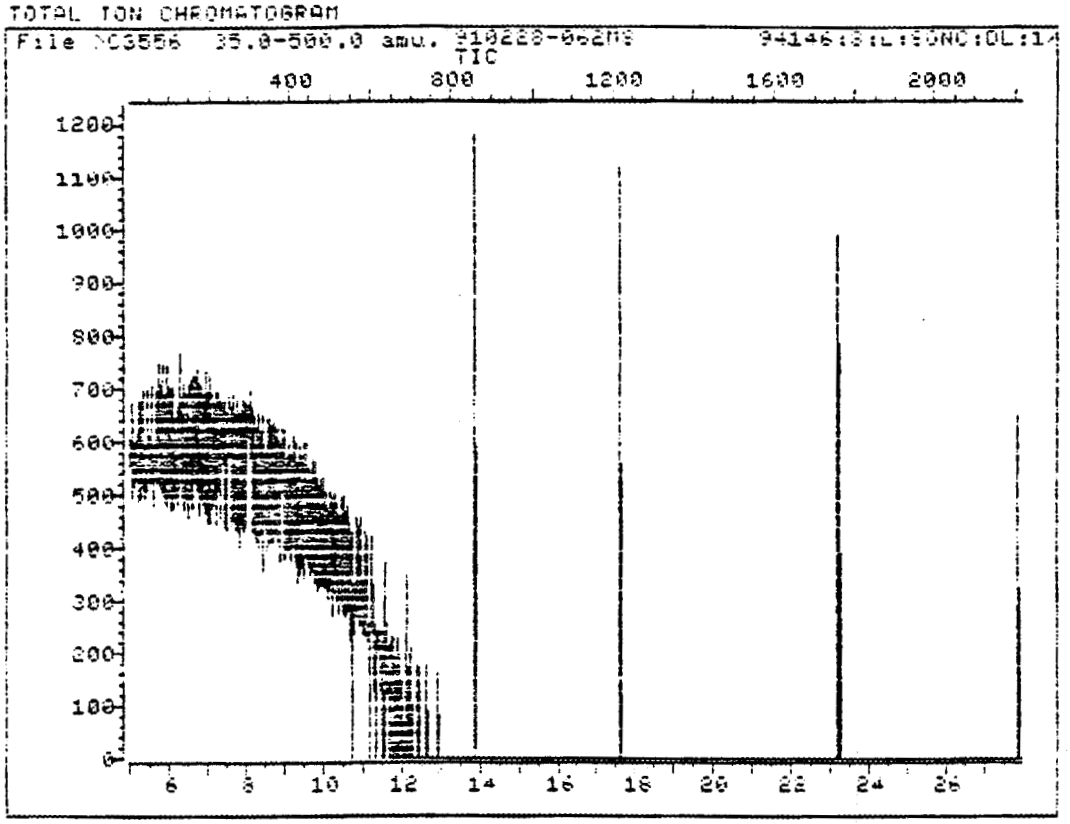
GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 100.

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) mg/Kg	Q
606-20-2	2,6-Dinitrotoluene	32.	U
99-09-2	3-Nitroaniline	160.	U
83-32-9	Acenaphthene	32.	U
51-28-5	2,4-Dinitrophenol	160.	U
200-02-7	4-Nitrophenol	160.	U
132-64-9	Dibenzofuran	32.	U
121-14-2	2,4-Dinitrotoluene	32.	U
84-66-2	Diethylphthalate	32.	U
7005-72-3	4-Chlorophenyl-phenylether	32.	U
86-73-7	Fluorene	32.	U
200-01-6	4-Nitroaniline	160.	U
534-52-1	4,6-Dinitro-2-methylphenol	160.	U
86-30-6	N-Nitrosodiphenylamine (1)	32.	U
201-55-3	4-Bromophenyl-phenylether	32.	U
118-74-1	Hexachlorobenzene	32.	U
87-86-5	Pentachlorophenol	160.	U
85-01-8	Phenanthrene	32.	U
120-12-7	Anthracene	32.	U
84-74-2	Di-n-butylphthalate	32.	U
206-44-0	Fluoranthene	32.	U
129-00-0	Pyrene	32.	U
85-68-7	Butylbenzylphthalate	32.	U
91-94-1	3,3'-Dichlorobenzidine	65.	U
56-55-3	Benzo(a)anthracene	32.	U
218-01-9	Chrysene	32.	U
117-81-7	bis(2-Ethylhexyl)phthalate	32.	U
117-84-0	Di-n-octyl_Phthalate	32.	U
205-99-2	Benzo(b)fluoranthene	32.	U
207-08-9	Benzo(k)fluoranthene	32.	U
50-32-8	Benzo(a)pyrene	32.	U
193-39-5	Indeno(1,2,3-cd)pyrene	32.	U
53-70-3	Dibenzo(a,h)anthracene	32.	U
191-24-2	Benzo(g,h,i)perylene	32.	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-2 1/87 Rev.

TOTAL ION CHROMATOGRAM



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Misc: 94146:S:L:SONC:DL:1/100 BTL# 0

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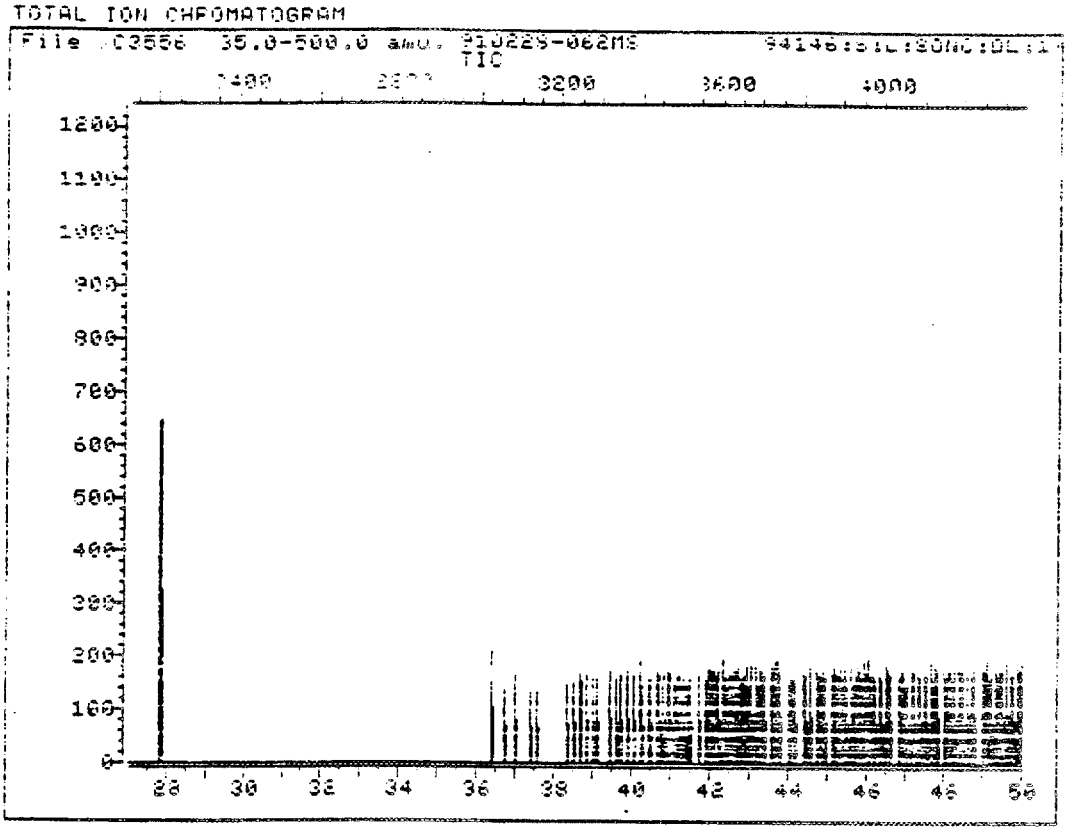
Title: DAILY CALIBRATION INSTR. C 2/28/91 RRS/GEF
Last Calibration: 910319 11:10

Operator ID: SANDRA
Quant Time: 910319 15:51
Injected at: 910319 15:00

TIC page 1 of 2

TOTAL ION CHROMATOGRAM



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Name: 910229-062MS
Misc: 94146:S:L:SONC:DL:1/100 BTL# 5

Id File: ID_130::C1
Title: DAIL7 CALIBRATION INSTR. C 2/28/91 RRS/GSF
Last Calibration: 910319 11:10

Operator ID: SANDRA
Quant Time: 910319 16:51
Injected at: 910319 15:00

TIC page 2 of 2

QUANT REPORT

Operator ID: SANDRA
Output File: ^C3556::D1
Data File: >C3566::D2
Name: 910228-062MS
Misc: 94146:S:L:SONC:DL:1/100

Quant Rev: 6
Quant Time: 910319 15:51
Injected at: 910319 15:00
Dilution Factor: 1.00000

B/L# 6

ID File: ID_130::C1
Title: DAIL7 CALIBRATION INSTR. C 2/28/91 RRS/GSF
Last Calibration: 910319 11:10

	Compound	R.T.	Q ion	Area	Conc	Units
1)	*d4-1,4-Dichlorobenzene	13.81	152.0	234M	40.00	UG/L
17)	*d8-Naphthalene	17.59	136.0	2085M	40.00	UG/L
32)	*d10-Acenaphthene	23.15	164.0	898M	40.00	UG/L
52)	*d10-Phenanthrene	27.82	188.0	1306M	40.00	UG/L
63)	*d12-Chrysene	30.32	[illegible]	[illegible]M	40.00	UG/L

* Compound is [illegible]

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

910228-062MSD

Lab Name: OAK RIDGE NATIONAL LAB Contract: NR

Lab Code: OR Case No.: NR SAS No.: NR SDG No.: C319

Matrix: (soil/water) SOIL Lab Sample ID: 910228-062MSD

Sample wt/vol: 30.9 (g/mL) G Lab File ID: >C3557

Level: (low/med) LOW Date Received: 2/28/91

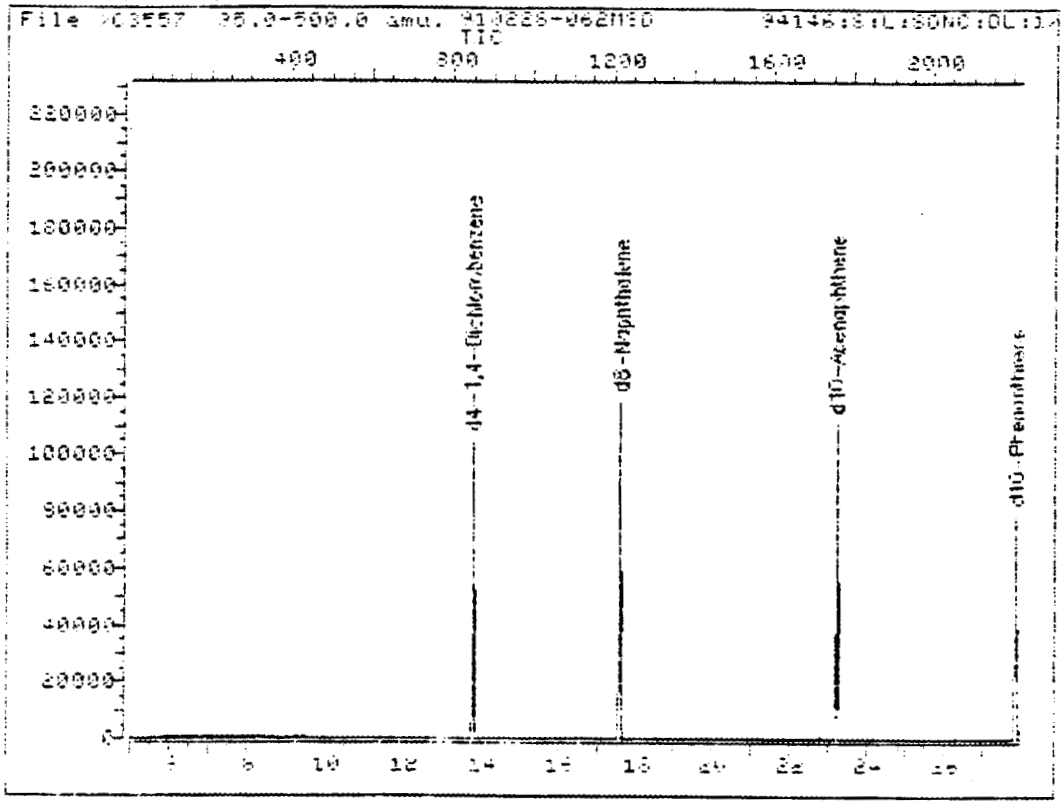
% Moisture: not dec. NR dec. NR Date Extracted: 3/08/91

Extraction: (Sepf/Cont/Sonc) SONC Date Analyzed: 3/19/91

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 100.

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) mg/Kg	Q
110-86-1	Pyridine	32.	U
208-95-2	Phenol	32.	U
111-44-4	bis(-2-Chloroethyl)ether	32.	U
95-57-8	2-Chlorophenol	32.	U
541-73-1	1,3-Dichlorobenzene	32.	U
206-46-7	1,4-Dichlorobenzene	32.	U
200-51-6	Benzyl alcohol	32.	U
95-50-1	1,2-Dichlorobenzene	32.	U
95-48-7	2-Methylphenol	32.	U
39638-32-9	bis(2-chloroisopropyl)ether	32.	U
206-44-5	4-Methylphenol	32.	U
621-64-7	N-Nitroso-di-n-propylamine	32.	U
67-72-1	Hexachloroethane	32.	U
98-95-3	Nitrobenzene	32.	U
78-59-1	Isophorone	32.	U
88-75-5	2-Nitrophenol	32.	U
205-67-9	2,4-Dimethylphenol	32.	U
65-85-0	Benzoic acid	160.	U
111-91-1	bis(-2-Chloroethoxy)methane	32.	U
120-83-2	2,4-Dichlorophenol	32.	U
120-82-1	1,2,4-Trichlorobenzene	32.	U
91-20-3	Naphthalene	32.	U
206-47-8	4-Chloroaniline	32.	U
87-68-3	Hexachlorobutadiene	32.	U
59-50-7	4-Chloro-3-methylphenol	32.	U
91-57-6	2-Methylnaphthalene	32.	U
77-47-4	Hexachlorocyclopentadiene	32.	U
88-06-2	2,4,6-Trichlorophenol	32.	U
95-95-4	2,4,5-Trichlorophenol	160.	U
91-58-7	2-Chloronaphthalene	32.	U
88-74-4	2-Nitroaniline	160.	U
131-11-3	Dimethyl Phthalate	32.	U
208-96-8	Acenaphthylene	32.	U

TOTAL ION CHROMATOGRAM



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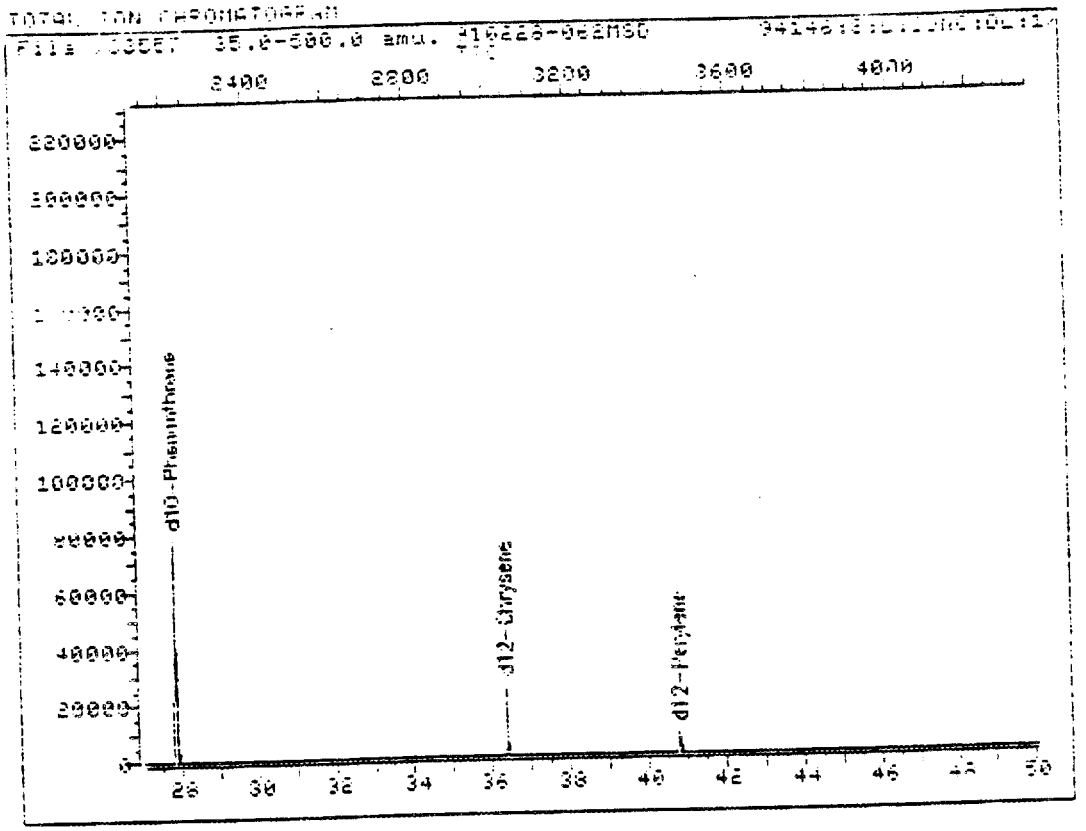
Last Calibration: 910314 11:10

Operator ID: SANDPW
Quant Time: 910319 17:02
Injected at: 910319 16:1[illegible]

TIC page 1 of 2



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Misc: 94146:S:L:SONC:DL:1/100

Quant Output File: 3C3557::01

BTL# 7

Id File: ID_130::C1
Title: DAILY CALIBRATION .NSTP. C 2/28/91 RPS/GSF
Last Calibration: 910319 11:10

Operator ID: SANDRA
Quant Time: 910319 17:07
Injected at: 910319 16:17

TIC page 2 of 2

QUANT REPORT

Operator ID: SANDRA
Output File: >C3557::D1
Data File: >C3557::D2
Name: 910228-062MSD
Misc: 94146:S:L:SONC:DL:1/100

Quant Rev: 6
Quant Time: 910319 17:07
Injected at: 910319 16:17
Dilution Factor: 1.00000

BTL# 7

ID File: ID_130::C1
Title: DAILY CALIBRATION INSTR. C 2/28/91 RPS/GSF
Last Calibration: 910319 11:10

	Compound	R.T.	Q ion	Area	Conc	Units
1)	*d4-1,4-Dichlorobenzene	13.75	152.0	31083	40.00	UG/L
17)	*d8-Naphthalene	17.58	136.0	114019	40.00	UG/L
50)	*d10-Acenaphthene	23.15	154.0	60572	40.00	UG/L
52)	*d10-Phenanthrene	27.83	188.0	78406	40.00	UG/L
65)	*d12-Chrysene	36.34	240.0	24176	40.00	UG/L
71)	*d12-Perylene	40.79	264.0	11410	40.00	UG/L

* Compound is ISTD

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB01

LAB NAME: OAK RIDGE NATIONAL LAB CONTRACT: NR

LAB CODE: CASE NO: ORNL SAS NO: NR SDG NO: 0309

MATRIX: (SOIL/WATER) WATER LAB SAMPLE ID: 910307-149

SAMPLE WT/VOL: 5 ML LAB FILE ID: >01218

LEVEL: (LOW/MED) LOW DATE RECEIVED 7-MAR-1991

% MOISTURE: NOT DEC. DATE ANALYZED: 9-MAR-1991

COLUMN: (PACK/CAP) CAP DILUTION FACTOR: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L	Q
74-87-3	CHLOROMETHANE	1.00	J
74-83-9	BROMOMETHANE	10.	U
75-01-4	VINYL CHLORIDE	10.	U
75-00-3	CHLOROETHANE	10.	U
75-09-2	METHYLENE CHLORIDE	5.00	U
67-64-1	ACETONE	10.	U
75-15-0	CARBON DISULFIDE	5.00	U
75-35-4	1,1-DICHLOROETHENE	5.00	U
75-34-3	1,1-DICHLOROETHANE	5.00	U
540-59-0	1,2-DICHLOROETHENE (TOTAL)	5.00	U
67-66-3	CHLOROFORM	5.00	U
107-06-2	1,2-DICHLOROETHANE	5.00	U
78-93-3	2-BUTANONE	10.	U
71-55-6	1,1,1-TRICHLOROETHANE	5.00	U
56-23-5	CARBON TETRACHLORIDE	5.00	U
108-05-4	VINYL ACETATE	10.	U
75-27-4	BROMODICHLOROMETHANE	5.00	U
78-87-5	1,2-DICHLOROPROPANE	5.00	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	5.00	U
79-01-6	TRICHLOROETHENE	5.00	U
124-48-1	DIBROMOCHLOROMETHANE	5.00	U
79-00-5	1,1,2-TRICHLOROETHANE	5.00	U
71-43-2	BENZENE	5.00	U
10061-02-06	TRANS-1,3-DICHLOROPROPENE	5.00	U
75-25-2	BROMOFORM	5.00	U
108-10-1	4-METHYL-2-PENTANONE	10.	U
591-78-6	2-HEXANONE	10.	U
127-18-4	TETRACHLOROETHENE	5.00	U
79-34-5	1,1,2,2-TETRACHLOROETHANE	5.00	U
108-88-3	TOLUENE	5.00	U
108-90-7	CHLOROBENZENE	5.00	U
100-41-4	ETHYLBENZENE	5.00	U
100-42-5	STYRENE	5.00	U
1330-20-7	XYLENE (TOTAL)	5.00	U

REVIEWED BY: CMEdwards DATE: 5/7/91

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

TB02

LAB NAME: OAK RIDGE NATIONAL LAB CONTRACT: NR

LAB CODE: CASE NO: ORNL SAS NO: NR SDG NO: 0309

MATRIX: (SOIL/WATER) WATER LAB SAMPLE ID: 910307-150

SAMPLE WT/VOL: 5 ML LAB FILE ID: >01219

LEVEL: (LOW/MED) LOW DATE RECEIVED 7-MAR-1991

% MOISTURE: NOT DEC. DATE ANALYZED: 9-MAR-1991

COLUMN: (PACK/CAP) CAP DILUTION FACTOR: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L	Q
74-87-3	CHLOROMETHANE	10.	U
74-83-9	BROMOMETHANE	10.	U
75-01-4	VINYL CHLORIDE	10.	U
75-00-3	CHLOROETHANE	10.	U
75-09-2	METHYLENE CHLORIDE	5.00	U
67-64-1	ACETONE	10.	U
75-15-0	CARBON DISULFIDE	5.00	U
75-35-4	1,1-DICHLOROETHENE	5.00	U
75-34-3	1,1-DICHLOROETHANE	5.00	U
540-59-0	1,2-DICHLOROETHENE (TOTAL)	5.00	U
67-66-3	CHLOROFORM	5.00	U
107-06-2	1,2-DICHLOROETHANE	5.00	U
78-93-3	2-BUTANONE	10.	U
71-55-6	1,1,1-TRICHLOROETHANE	5.00	U
56-23-5	CARBON TETRACHLORIDE	5.00	U
108-05-4	VINYL ACETATE	10.	U
75-27-4	BROMODICHLOROMETHANE	5.00	U
78-87-5	1,2-DICHLOROPROPANE	5.00	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	5.00	U
79-01-6	TRICHLOROETHENE	5.00	U
124-48-1	DIBROMOCHLOROMETHANE	5.00	U
79-00-5	1,1,2-TRICHLOROETHANE	5.00	U
71-43-2	BENZENE	5.00	U
10061-02-06	TRANS-1,3-DICHLOROPROPENE	5.00	U
75-25-2	BROMOFORM	5.00	U
108-10-1	4-METHYL-2-PENTANONE	10.	U
591-78-6	2-HEXANONE	10.	U
127-18-4	TETRACHLOROETHENE	5.00	U
79-34-5	1,1,2,2-TETRACHLOROETHANE	5.00	U
108-88-3	TOLUENE	5.00	U
108-90-7	CHLOROBENZENE	5.00	U
100-41-4	ETHYLBENZENE	5.00	U
100-42-5	STYRENE	5.00	U
1330-20-7	XYLENE (TOTAL)	5.00	U

REVIEWED BY:_____ DATE:_____

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB04

LAB NAME: OAK RIDGE NATIONAL LAB CONTRACT: NR

LAB CODE: CASE NO: ORNL SAS NO: NR SDG NO: 0309

MATRIX: (SOIL/WATER) WATER LAB SAMPLE ID: 910307-151

SAMPLE WT/VOL: 5 ML LAB FILE ID: >01220

LEVEL: (LOW/MED) LOW DATE RECEIVED 7-MAR-1991

% MOISTURE: NOT DEC. DATE ANALYZED: 9-MAR-1991

COLUMN: (PACK/CAP) CAP DILUTION FACTOR: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L	Q
74-87-3	CHLOROMETHANE	10.	U
74-83-9	BROMOMETHANE	10.	U
75-01-4	VINYL CHLORIDE	10.	U
75-00-3	CHLOROETHANE	10.	U
75-09-2	METHYLENE CHLORIDE	5.00	U
67-64-1	ACETONE	10.	U
75-15-0	CARBON DISULFIDE	5.00	U
75-35-4	1,1-DICHLOROETHENE	5.00	U
75-34-3	1,1-DICHLOROETHANE	5.00	U
540-59-0	1,2-DICHLOROETHENE (TOTAL)	5.00	U
67-66-3	CHLOROFORM	5.00	U
107-06-2	1,2-DICHLOROETHANE	5.00	U
78-93-3	2-BUTANONE	10.	U
71-55-6	1,1,1-TRICHLOROETHANE	5.00	U
56-23-5	CARBON TETRACHLORIDE	5.00	U
108-05-4	VINYL ACETATE	10.	U
75-27-4	BROMODICHLOROMETHANE	5.00	U
78-87-5	1,2-DICHLOROPROPANE	5.00	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	5.00	U
79-01-6	TRICHLOROETHENE	5.00	U
124-48-1	DIBROMOCHLOROMETHANE	5.00	U
79-00-5	1,1,2-TRICHLOROETHANE	5.00	U
71-43-2	BENZENE	5.00	U
10061-02-06	TRANS-1,3-DICHLOROPROPENE	5.00	U
75-25-2	BROMOFORM	5.00	U
108-10-1	4-METHYL-2-PENTANONE	10.	U
591-78-6	2-HEXANONE	10.	U
127-18-4	TETRACHLOROETHENE	5.00	U
79-34-5	1,1,2,2-TETRACHLOROETHANE	5.00	U
108-88-3	TOLUENE	5.00	U
108-90-7	CHLOROBENZENE	5.00	U
100-41-4	ETHYLBENZENE	5.00	U
100-42-5	STYRENE	5.00	U
1330-20-7	XYLENE (TOTAL)	5.00	U

REVIEWED BY:_____ DATE:_____

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB05

LAB NAME: OAK RIDGE NATIONAL LAB CONTRACT:

LAB CODE: CASE NO: ORNL SAS NO: SDG NO: 0309

MATRIX: (SOIL/WATER) WATER LAB SAMPLE ID: 910307-152

SAMPLE WT/VOL: 5 ML LAB FILE ID: >01221

LEVEL: (LOW/MED) LOW DATE RECEIVED 7-MAR-1991

% MOISTURE: NOT DEC. DATE ANALYZED: 29-APR-1991

COLUMN: (PACK/CAP) CAP DILUTION FACTOR: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L	Q
74-87-3	CHLOROMETHANE	10.	U
74-83-9	BROMOMETHANE	10.	U
75-01-4	VINYL CHLORIDE	10.	U
75-00-3	CHLOROETHANE	10.	U
75-09-2	METHYLENE CHLORIDE	5.00	U
67-64-1	ACETONE	8.0	J
75-15-0	CARBON DISULFIDE	5.00	U
75-35-4	1,1-DICHLOROETHENE	5.00	U
75-34-3	1,1-DICHLOROETHANE	5.00	U
540-59-0	1,2-DICHLOROETHENE (TOTAL)	5.00	U
67-66-3	CHLOROFORM	5.00	U
107-06-2	1,2-DICHLOROETHANE	5.00	U
78-93-3	2-BUTANONE	10.	U
71-55-6	1,1,1-TRICHLOROETHANE	5.00	U
56-23-5	CARBON TETRACHLORIDE	5.00	U
108-05-4	VINYL ACETATE	10.	U
75-27-4	BROMODICHLOROMETHANE	5.00	U
78-87-5	1,2-DICHLOROPROPANE	5.00	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	5.00	U
79-01-6	TRICHLOROETHENE	5.00	U
124-48-1	DIBROMOCHLOROMETHANE	5.00	U
79-00-5	1,1,2-TRICHLOROETHANE	5.00	U
71-43-2	BENZENE	5.00	U
10061-02-06	TRANS-1,3-DICHLOROPROPENE	5.00	U
75-25-2	BROMOFORM	5.00	U
108-10-1	4-METHYL-2-PENTANONE	10.	U
591-78-6	2-HEXANONE	10.	U
127-18-4	TETRACHLOROETHENE	5.00	U
79-34-5	1,1,2,2-TETRACHLOROETHANE	5.00	U
108-88-3	TOLUENE	5.00	U
108-90-7	CHLOROBENZENE	5.00	U
100-41-4	ETHYLBENZENE	5.00	U
100-42-5	STYRENE	5.00	U
1330-20-7	XYLENE (TOTAL)	5.00	U

REVIEWED BY:_____ DATE:_____

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TB06

LAB NAME: OAK RIDGE NATIONAL LAB CONTRACT: NR

LAB CODE: CASE NO: ORNL SAS NO: NR SDG NO: 0309

MATRIX: (SOIL/WATER) WATER LAB SAMPLE ID: 910307-153

SAMPLE WT/VOL: 5 ML LAB FILE ID: >01222

LEVEL: (LOW/MED) LOW DATE RECEIVED 7-MAR-1991

% MOISTURE: NOT DEC. DATE ANALYZED: 9-MAR-1991

COLUMN: (PACK/CAP) CAP DILUTION FACTOR: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L	Q
74-87-3	CHLOROMETHANE	10.	U
74-83-9	BROMOMETHANE	10.	U
75-01-4	VINYL CHLORIDE	10.	U
75-00-3	CHLOROETHANE	10.	U
75-09-2	METHYLENE CHLORIDE	5.00	U
67-64-1	ACETONE	10.	U
75-15-0	CARBON DISULFIDE	5.00	U
75-35-4	1,1-DICHLOROETHENE	5.00	U
75-34-3	1,1-DICHLOROETHANE	5.00	U
540-59-0	1,2-DICHLOROETHENE (TOTAL)	5.00	U
67-66-3	CHLOROFORM	5.00	U
107-06-2	1,2-DICHLOROETHANE	5.00	U
78-93-3	2-BUTANONE	10.	U
71-55-6	1,1,1-TRICHLOROETHANE	5.00	U
56-23-5	CARBON TETRACHLORIDE	5.00	U
108-05-4	VINYL ACETATE	10.	U
75-27-4	BROMODICHLOROMETHANE	5.00	U
78-87-5	1,2-DICHLOROPROPANE	5.00	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	5.00	U
79-01-6	TRICHLOROETHENE	5.00	U
124-48-1	DIBROMOCHLOROMETHANE	5.00	U
79-00-5	1,1,2-TRICHLOROETHANE	5.00	U
71-43-2	BENZENE	5.00	U
10061-02-06	TRANS-1,3-DICHLOROPROPENE	5.00	U
75-25-2	BROMOFORM	5.00	U
108-10-1	4-METHYL-2-PENTANONE	10.	U
591-78-6	2-HEXANONE	10.	U
127-18-4	TETRACHLOROETHENE	5.00	U
79-34-5	1,1,2,2-TETRACHLOROETHANE	5.00	U
108-88-3	TOLUENE	5.00	U
108-90-7	CHLOROBENZENE	5.00	U
100-41-4	ETHYLBENZENE	5.00	U
100-42-5	STYRENE	5.00	U
1330-20-7	XYLENE (TOTAL)	5.00	U

REVIEWED BY:_____ DATE:_____

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ER218

LAB NAME: OAK RIDGE NATIONAL LAB CONTRACT: NR

LAB CODE: CASE NO: ORNL SAS NO: NR SDG NO: 0309

MATRIX: (SOIL/WATER) WATER LAB SAMPLE ID: 910307-154

SAMPLE WT/VOL: 5 ML LAB FILE ID: >01223

LEVEL: (LOW/MED) LOW DATE RECEIVED 7-MAR-1991

% MOISTURE: NOT DEC. DATE ANALYZED: 9-MAR-1991

COLUMN: (PACK/CAP) CAP DILUTION FACTOR: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L	Q
74-87-3	CHLOROMETHANE	10.	U
74-83-9	BROMOMETHANE	10.	U
75-01-4	VINYL CHLORIDE	10.	U
75-00-3	CHLOROETHANE	10.	U
75-09-2	METHYLENE CHLORIDE	5.00	U
67-64-1	ACETONE	62.	B
75-15-0	CARBON DISULFIDE	5.00	U
75-35-4	1,1-DICHLOROETHENE	5.00	U
75-34-3	1,1-DICHLOROETHANE	5.00	U
540-59-0	1,2-DICHLOROETHENE (TOTAL)	5.00	U
67-66-3	CHLOROFORM	5.00	U
107-06-2	1,2-DICHLOROETHANE	5.00	U
78-93-3	2-BUTANONE	10.	U
71-55-6	1,1,1-TRICHLOROETHANE	5.00	U
56-23-5	CARBON TETRACHLORIDE	5.00	U
108-05-4	VINYL ACETATE	10.	U
75-27-4	BROMODICHLOROMETHANE	5.00	U
78-87-5	1,2-DICHLOROPROPANE	5.00	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	5.00	U
79-01-6	TRICHLOROETHENE	5.00	U
124-48-1	DIBROMOCHLOROMETHANE	5.00	U
79-00-5	1,1,2-TRICHLOROETHANE	5.00	U
71-43-2	BENZENE	5.00	U
10061-02-06	TRANS-1,3-DICHLOROPROPENE	5.00	U
75-25-2	BROMOFORM	5.00	U
108-10-1	4-METHYL-2-PENTANONE	10.	U
591-78-6	2-HEXANONE	10.	U
127-18-4	TETRACHLOROETHENE	5.00	U
79-34-5	1,1,2,2-TETRACHLOROETHANE	5.00	U
108-88-3	TOLUENE	3.00	J
108-90-7	CHLOROBENZENE	1.00	J
100-41-4	ETHYLBENZENE	5.00	U
100-42-5	STYRENE	5.00	U
1330-20-7	XYLENE (TOTAL)	5.00	U

REVIEWED BY:_____ DATE:_____

SEMIVOLATILE ORGANIC ANALYSIS DATA

EPA SAMPLE NO.

ER218

LAB NAME: OAK RIDGE NATIONAL LAB CONTRACT: NR

LAB CODE: CASE NO: NR SAS NO: NR SDG NO: C424

MATRIX: (SOIL/WATER) WATER LAB SAMPLE ID: 910307-154

SAMPLE WT/VOL: 100 ML LAB FILE ID: >C3756

LEVEL: (LOW/MED) LOW DATE RECEIVED 7-MAR-1991

% MOISTURE: NOT DEC. DEC. DATE ANALYZED: 24-APR-1991

EXTRACTION: (SEPF/CONT/SONC) SEPF DATE EXTRACTED: 13-MAR-1991

GPC CLEANUP: (Y/N) N PH: 6.19 DILUTION FACTOR: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L	Q
108-95-2	PHENOL	50.	U
111-44-4	BIS(2-CHLOROETHYL)ETHER	50.	U
95-57-8	2-CHLOROPHENOL	50.	U
541-73-1	1,3-DICHLOROBENZENE	50.	U
106-46-7	1,4-DICHLOROBENZENE	50.	U
100-51-6	BENZYL ALCOHOL	50.	U
95-50-1	1,2-DICHLOROBENZENE	50.	U
95-48-7	2-METHYLPHENOL	50.	U
108-60-1	BIS(2-CHLOROISOPROPYL)ETHER	50.	U
106-44-5	4-METHYLPHENOL	50.	U
621-64-7	N-NITROSO-DI-N-PROPYLAMINE	50.	U
67-72-1	HEXACHLOROETHANE	50.	U
98-95-3	NITROBENZENE	50.	U
78-59-1	ISOPHORONE	50.	U
88-75-5	2-NITROPHENOL	50.	U
105-67-9	2,4-DIMETHYLPHENOL	50.	U
65-85-0	BENZOIC ACID	250.	U
111-91-1	BIS(2-CHLOROETHOXY)METHANE	50.	U
120-83-2	2,4-DICHLOROPHENOL	50.	U
120-82-1	1,2,4-TRICHLOROBENZENE	50.	U
91-20-3	NAPHTHALENE	50.	U
106-47-8	4-CHLOROANILINE	50.	U
87-68-3	HEXACHLOROBUTADIENE	50.	U
59-50-7	4-CHLORO-3-METHYLPHENOL	50.	U
91-57-6	2-METHYLNAPHTHALENE	50.	U
77-47-4	HEXACHLOROCYCLOPENTADIENE	50.	U
88-06-2	2,4,6-TRICHLOROPHENOL	50.	U
95-95-4	2,4,5-TRICHLOROPHENOL	250.	U
91-58-7	2-CHLORONAPHTHALENE	50.	U
88-74-4	2-NITROANILINE	250.	U
131-11-3	DIMETHYLPHTHALATE	50.	U
208-96-8	ACENAPHTHYLENE	50.	U
606-20-2	2,6-DINITROTOLUENE	50.	U

EPA SAMPLE NO.

SEMIVOLATILE ORGANIC ANALYSIS DATA

ER218

LAB NAME: OAK RIDGE NATIONAL LAB CONTRACT: NR

LAB CODE: CASE NO: NR SAS NO: NR SDG NO: C424

MATRIX: (SOIL/WATER) WATER LAB SAMPLE ID: 910307-154

SAMPLE WT/VOL: 100 ML LAB FILE ID: >C3756

LEVEL: (LOW/MED) LOW DATE RECEIVED 7-MAR-1991

% MOISTURE: NOT DEC. DEC. DATE ANALYZED: 24-APR-1991

EXTRACTION: (SEPF/CONT/SONC) SEPF DATE EXTRACTED: 13-MAR-1991

GPC CLEANUP: (Y/N) N PH: 6.19 DILUTION FACTOR: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L	Q
99-09-2	3-NITROANILINE	50.	U
83-32-9	ACENAPHTHENE	50.	U
51-28-5	2,4-DINITROPHENOL	250.	U
100-02-7	4-NITROPHENOL	250.	U
132-64-9	DIBENZOFURAN	50.	U
121-14-2	2,4-DINITROTOLUENE	50.	U
84-66-2	DIETHYLPHTHALATE	50.	U
7005-72-3	4-CHLOROPHENYL-PHENYLETHER	50.	U
86-73-7	FLUORENE	50.	U
100-01-6	4-NITROANILINE	250.	U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	250.	U
86-30-6	N-NITROSODIPHENYLAMINE (1)	50.	U
101-55-3	4-BROMOPHENYL-PHENYLETHER	50.	U
118-74-1	HEXACHLOROBENZENE	50.	U
87-86-5	PENTACHLOROPHENOL	250.	U
85-01-8	PHENANTHRENE	50.	U
120-12-7	ANTHRACENE	50.	U
84-74-2	DI-N-BUTYLPHTHALATE	50.	U
206-44-0	FLUORANTHENE	50.	U
129-00-0	PYRENE	50.	U
85-68-7	BUTYLBENZYLPHTHALATE	50.	U
91-94-1	3,3'-DICHLOROBENZIDINE	100.	U
56-55-3	BENZO(A)ANTHRACENE	50.	U
218-01-9	CHRYSENE	50.	U
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	50.	U
117-84-0	DI-N-OCTYLPHTHALATE	50.	U
205-99-2	BENZO(B)FLUORANTHENE	50.	U
207-08-9	BENZO(K)FLUORANTHENE	50.	U
50-32-8	BENZO(A)PYRENE	50.	U
193-39-5	INDENO(1,2,3-CD)PYRENE	50.	U
53-70-3	DIBENZ(A,H)ANTHRACENE	50.	U
191-24-2	BENZO(G,H,I)PERYLENE	50.	U

(1) - CANNOT BE SEPARATED FROM DIPHENYLAMINE

REVIEWED BY:_____ DATE:_____

SEMIVOLATILE ORGANIC ANALYSIS DATA

EPA SAMPLE NO.

ER218

REQUEST NUMBER: OAL94176

PROCEDURE NUMBER: 8240 MATRIX: SOIL & WATER

SERIES: FREQUENCY: CHARGE NUMBER: 33707380

CUSTOMER NAME: SIEGRIST LAB SAMPLE ID: 910307-154

SAMPLE WT/VOL: 100 ML LAB FILE ID: >C3756

DATE SAMPLED: DATE RECEIVED 7-MAR-1991 13:00

% MOISTURE: NOT DEC. DEC: DATE ANALYZED: 24-APR-1991

MATERIAL DESCRIPTION FUEL CONTAMINATION DATE OF REPORT: 1-MAY-91

NUMBER TICS FOUND: 0 CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L

CAS NO.	COMPOUND NAME	RT	CONC	Q

REVIEWED BY:_____ DATE:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

ER219

LAB NAME: OAK RIDGE NATIONAL LAB CONTRACT:

LAB CODE: CASE NO: ORNL SAS NO: SDG NO: 0309

MATRIX: (SOIL/WATER) WATER LAB SAMPLE ID: 910307-155

SAMPLE WT/VOL: 5 ML LAB FILE ID: >01224

LEVEL: (LOW/MED) LOW DATE RECEIVED 7-MAR-1991

% MOISTURE: NOT DEC. DATE ANALYZED: 9-MAR-1991

COLUMN: (PACK/CAP) CAP DILUTION FACTOR: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L	Q
74-87-3	CHLOROMETHANE	10.	U
74-83-9	BROMOMETHANE	10.	U
75-01-4	VINYL CHLORIDE	10.	U
75-00-3	CHLOROETHANE	10.	U
75-09-2	METHYLENE CHLORIDE	5.00	U
67-64-1	ACETONE	10.	U
75-15-0	CARBON DISULFIDE	5.00	U
75-35-4	1,1-DICHLOROETHENE	5.00	U
75-34-3	1,1-DICHLOROETHANE	5.00	U
540-59-0	1,2-DICHLOROETHENE (TOTAL)	5.00	U
67-66-3	CHLOROFORM	5.00	U
107-06-2	1,2-DICHLOROETHANE	5.00	U
78-93-3	2-BUTANONE	10.	U
71-55-6	1,1,1-TRICHLOROETHANE	5.00	U
56-23-5	CARBON TETRACHLORIDE	5.00	U
108-05-4	VINYL ACETATE	10.	U
75-27-4	BROMODICHLOROMETHANE	5.00	U
78-87-5	1,2-DICHLOROPROPANE	5.00	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	5.00	U
79-01-6	TRICHLOROETHENE	5.00	U
124-48-1	DIBROMOCHLOROMETHANE	5.00	U
79-00-5	1,1,2-TRICHLOROETHANE	5.00	U
71-43-2	BENZENE	5.00	U
10061-02-06	TRANS-1,3-DICHLOROPROPENE	5.00	U
75-25-2	BROMOFORM	5.00	U
108-10-1	4-METHYL-2-PENTANONE	10.	U
591-78-6	2-HEXANONE	10.	U
127-18-4	TETRACHLOROETHENE	5.00	U
79-34-5	1,1,2,2-TETRACHLOROETHANE	5.00	U
108-88-3	TOLUENE	12.0	
108-90-7	CHLOROBENZENE	5.00	U
100-41-4	ETHYLBENZENE	5.00	U
100-42-5	STYRENE	5.00	U
1330-20-7	XYLENE (TOTAL)	5.00	U

REVIEWED BY:_____ DATE:_____

SEMIVOLATILE ORGANIC ANALYSIS DATA

EPA SAMPLE NO.

ER219

LAB NAME: OAK RIDGE NATIONAL LAB CONTRACT: NR

LAB CODE: CASE NO: NR SAS NO: NR SDG NO: C424

MATRIX: (SOIL/WATER) WATER LAB SAMPLE ID: 910307-155

SAMPLE WT/VOL: 100 ML LAB FILE ID: >C3757

LEVEL: (LOW/MED) LOW DATE RECEIVED 7-MAR-1991

% MOISTURE: NOT DEC. DEC. DATE ANALYZED: 24-APR-1991

EXTRACTION: (SEPF/CONT/SONC) SEPF DATE EXTRACTED: 13-MAR-1991

GPC CLEANUP: (Y/N) N PH: 6.58 DILUTION FACTOR: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L	Q
108-95-2	PHENOL	50.	U
111-44-4	BIS(2-CHLOROETHYL)ETHER	50.	U
95-57-8	2-CHLOROPHENOL	50.	U
541-73-1	1,3-DICHLOROBENZENE	50.	U
106-46-7	1,4-DICHLOROBENZENE	50.	U
100-51-6	BENZYL ALCOHOL	50.	U
95-50-1	1,2-DICHLOROBENZENE	50.	U
95-48-7	2-METHYLPHENOL	50.	U
108-60-1	BIS(2-CHLOROISOPROPYL)ETHER	50.	U
106-44-5	4-METHYLPHENOL	50.	U
621-64-7	N-NITROSO-DI-N-PROPYLAMINE	50.	U
67-72-1	HEXACHLOROETHANE	50.	U
98-95-3	NITROBENZENE	50.	U
78-59-1	ISOPHORONE	50.	U
88-75-5	2-NITROPHENOL	50.	U
105-67-9	2,4-DIMETHYLPHENOL	50.	U
65-85-0	BENZOIC ACID	250.	U
111-91-1	BIS(2-CHLOROETHOXY)METHANE	50.	U
120-83-2	2,4-DICHLOROPHENOL	50.	U
120-82-1	1,2,4-TRICHLOROBENZENE	50.	U
91-20-3	NAPHTHALENE	50.	U
106-47-8	4-CHLOROANILINE	50.	U
87-68-3	HEXACHLOROBUTADIENE	50.	U
59-50-7	4-CHLORO-3-METHYLPHENOL	50.	U
91-57-6	2-METHYLNAPHTHALENE	50.	U
77-47-4	HEXACHLOROCYCLOPENTADIENE	50.	U
88-06-2	2,4,6-TRICHLOROPHENOL	50.	U
95-95-4	2,4,5-TRICHLOROPHENOL	250.	U
91-58-7	2-CHLORONAPHTHALENE	50.	U
88-74-4	2-NITROANILINE	250.	U
131-11-3	DIMETHYLPHTHALATE	50.	U
208-96-8	ACENAPHTHYLENE	50.	U
606-20-2	2,6-DINITROTOLUENE	50.	U

EPA SAMPLE NO.

SEMIVOLATILE ORGANIC ANALYSIS DATA

ER219

LAB NAME: OAK RIDGE NATIONAL LAB CONTRACT: NR

LAB CODE: CASE NO: NR SAS NO: NR SDG NO: C424

MATRIX: (SOIL/WATER) WATER LAB SAMPLE ID: 910307-155

SAMPLE WT/VOL: 100 ML LAB FILE ID: >C3757

LEVEL: (LOW/MED) LOW DATE RECEIVED 7-MAR-1991

% MOISTURE: NOT DEC. DEC. DATE ANALYZED: 24-APR-1991

EXTRACTION: (SEPF/CONT/SONC) SEPF DATE EXTRACTED: 13-MAR-1991

GPC CLEANUP: (Y/N) N PH: 6.58 DILUTION FACTOR: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L	Q
99-09-2	3-NITROANILINE	50.	U
83-32-9	ACENAPHTHENE	50.	U
51-28-5	2,4-DINITROPHENOL	250.	U
100-02-7	4-NITROPHENOL	250.	U
132-64-9	DIBENZOFURAN	50.	U
121-14-2	2,4-DINITROTOLUENE	50.	U
84-66-2	DIETHYLPHTHALATE	50.	U
7005-72-3	4-CHLOROPHENYL-PHENYLETHER	50.	U
86-73-7	FLUORENE	50.	U
100-01-6	4-NITROANILINE	250.	U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	250.	U
86-30-6	N-NITROSODIPHENYLAMINE (1)	50.	U
101-55-3	4-BROMOPHENYL-PHENYLETHER	50.	U
118-74-1	HEXACHLOROBENZENE	50.	U
87-86-5	PENTACHLOROPHENOL	250.	U
85-01-8	PHENANTHRENE	50.	U
120-12-7	ANTHRACENE	50.	U
84-74-2	DI-N-BUTYLPHTHALATE	50.	U
206-44-0	FLUORANTHENE	50.	U
129-00-0	PYRENE	50.	U
85-68-7	BUTYLBENZYLPHTHALATE	50.	U
91-94-1	3,3'-DICHLOROBENZIDINE	100.	U
56-55-3	BENZO(A)ANTHRACENE	50.	U
218-01-9	CHRYSENE	50.	U
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	50.	U
117-84-0	DI-N-OCTYLPHTHALATE	50.	U
205-99-2	BENZO(B)FLUORANTHENE	50.	U
207-08-9	BENZO(K)FLUORANTHENE	50.	U
50-32-8	BENZO(A)PYRENE	50.	U
193-39-5	INDENO(1,2,3-CD)PYRENE	50.	U
53-70-3	DIBENZ(A,H)ANTHRACENE	50.	U
191-24-2	BENZO(G,H,I)PERYLENE	50.	U

(1) - CANNOT BE SEPARATED FROM DIPHENYLAMINE

REVIEWED BY:_____ DATE:_____

EPA SAMPLE NO.

ER219

SEMIVOLATILE ORGANIC ANALYSIS DATA

REQUEST NUMBER: OAL94176

PROCEDURE NUMBER: 8240 MATRIX: SOIL & WATER

SERIES: FREQUENCY: CHARGE NUMBER: 33707380

CUSTOMER NAME: SIEGRIST LAB SAMPLE ID: 910307-155

SAMPLE WT/VOL: 100 ML LAB FILE ID: >C3757

DATE SAMPLED: DATE RECEIVED 7-MAR-1991 13:00

% MOISTURE: NOT DEC. DEC: DATE ANALYZED: 24-APR-1991

MATERIAL DESCRIPTION FUEL CONTAMINATION DATE OF REPORT: 1-MAY-91

NUMBER TICS FOUND: 0 CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L

CAS NO.	COMPOUND NAME	RT	CONC	Q

REVIEWED BY:_____ DATE:_____

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

ER220

LAB NAME: OAK RIDGE NATIONAL LAB CONTRACT: NR

LAB CODE: CASE NO: ORNL SAS NO: NR SDG NO: 0309

MATRIX: (SOIL/WATER) WATER LAB SAMPLE ID: 910307-156

SAMPLE WT/VOL: 5 ML LAB FILE ID: >01225

LEVEL: (LOW/MED) LOW DATE RECEIVED 7-MAR-1991

% MOISTURE: NOT DEC. DATE ANALYZED: 9-MAR-1991

COLUMN: (PACK/CAP) CAP DILUTION FACTOR: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L	Q
74-87-3	CHLOROMETHANE	10.	U
74-83-9	BROMOMETHANE	10.	U
75-01-4	VINYL CHLORIDE	10.	U
75-00-3	CHLOROETHANE	10.	U
75-09-2	METHYLENE CHLORIDE	5.00	U
67-64-1	ACETONE	10.	U
75-15-0	CARBON DISULFIDE	5.00	U
75-35-4	1,1-DICHLOROETHENE	5.00	U
75-34-3	1,1-DICHLOROETHANE	5.00	U
540-59-0	1,2-DICHLOROETHENE (TOTAL)	5.00	U
67-66-3	CHLOROFORM	5.00	U
107-06-2	1,2-DICHLOROETHANE	5.00	U
78-93-3	2-BUTANONE	10.	U
71-55-6	1,1,1-TRICHLOROETHANE	5.00	U
56-23-5	CARBON TETRACHLORIDE	5.00	U
108-05-4	VINYL ACETATE	10.	U
75-27-4	BROMODICHLOROMETHANE	5.00	U
78-87-5	1,2-DICHLOROPROPANE	5.00	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	5.00	U
79-01-6	TRICHLOROETHENE	5.00	U
124-48-1	DIBROMOCHLOROMETHANE	5.00	U
79-00-5	1,1,2-TRICHLOROETHANE	5.00	U
71-43-2	BENZENE	5.00	U
10061-02-06	TRANS-1,3-DICHLOROPROPENE	5.00	U
75-25-2	BROMOFORM	5.00	U
108-10-1	4-METHYL-2-PENTANONE	10.	U
591-78-6	2-HEXANONE	10.	U
127-18-4	TETRACHLOROETHENE	5.00	U
79-34-5	1,1,2,2-TETRACHLOROETHANE	5.00	U
108-88-3	TOLUENE	14.	
108-90-7	CHLOROBENZENE	7.00	
100-41-4	ETHYLBENZENE	5.00	U
100-42-5	STYRENE	5.00	U
1330-20-7	XYLENE (TOTAL)	5.00	U

REVIEWED BY:_____ DATE:_____

EPA SAMPLE NO.

SEMIVOLATILE ORGANIC ANALYSIS DATA

ER220

LAB NAME: OAK RIDGE NATIONAL LAB CONTRACT: NR

LAB CODE: CASE NO: NR SAS NO: NR SDG NO: C424

MATRIX: (SOIL/WATER) WATER LAB SAMPLE ID: 910307-156

SAMPLE WT/VOL: 100 ML LAB FILE ID: >C3758

LEVEL: (LOW/MED) LOW DATE RECEIVED 7-MAR-1991

% MOISTURE: NOT DEC. DEC. DATE ANALYZED: 25-APR-1991

EXTRACTION: (SEPF/CONT/SONC) SEPF DATE EXTRACTED: 13-MAR-1991

GPC CLEANUP: (Y/N) N PH: 6.36 DILUTION FACTOR: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L	Q
108-95-2	PHENOL	50.	U
111-44-4	BIS(2-CHLOROETHYL)ETHER	50.	U
95-57-8	2-CHLOROPHENOL	50.	U
541-73-1	1,3-DICHLOROBENZENE	50.	U
106-46-7	1,4-DICHLOROBENZENE	50.	U
100-51-6	BENZYL ALCOHOL	50.	U
95-50-1	1,2-DICHLOROBENZENE	50.	U
95-48-7	2-METHYLPHENOL	50.	U
108-60-1	BIS(2-CHLOROISOPROPYL)ETHER	50.	U
106-44-5	4-METHYLPHENOL	50.	U
621-64-7	N-NITROSO-DI-N-PROPYLAMINE	50.	U
67-72-1	HEXACHLOROETHANE	50.	U
98-95-3	NITROBENZENE	50.	U
78-59-1	ISOPHORONE	50.	U
88-75-5	2-NITROPHENOL	50.	U
105-67-9	2,4-DIMETHYLPHENOL	50.	U
65-85-0	BENZOIC ACID	250.	U
111-91-1	BIS(2-CHLOROETHOXY)METHANE	50.	U
120-83-2	2,4-DICHLOROPHENOL	50.	U
120-82-1	1,2,4-TRICHLOROBENZENE	50.	U
91-20-3	NAPHTHALENE	50.	U
106-47-8	4-CHLOROANILINE	50.	U
87-68-3	HEXACHLOROBUTADIENE	50.	U
59-50-7	4-CHLORO-3-METHYLPHENOL	50.	U
91-57-6	2-METHYLNAPHTHALENE	50.	U
77-47-4	HEXACHLOROCYCLOPENTADIENE	50.	U
88-06-2	2,4,6-TRICHLOROPHENOL	50.	U
95-95-4	2,4,5-TRICHLOROPHENOL	250.	U
91-58-7	2-CHLORONAPHTHALENE	50.	U
88-74-4	2-NITROANILINE	250.	U
131-11-3	DIMETHYLPHTHALATE	50.	U
208-96-8	ACENAPHTHYLENE	50.	U
606-20-2	2,6-DINITROTOLUENE	50.	U

SEMIVOLATILE ORGANIC ANALYSIS DATA

EPA SAMPLE NO.

ER220

LAB NAME: OAK RIDGE NATIONAL LAB CONTRACT: NR

LAB CODE: CASE NO: NR SAS NO: NR SDG NO: C424

MATRIX: (SOIL/WATER) WATER LAB SAMPLE ID: 910307-156

SAMPLE WT/VOL: 100 ML LAB FILE ID: >C3758

LEVEL: (LOW/MED) LOW DATE RECEIVED 7-MAR-1991

% MOISTURE: NOT DEC. DEC. DATE ANALYZED: 25-APR-1991

EXTRACTION: (SEPF/CONT/SONC) SEPF DATE EXTRACTED: 13-MAR-1991

GPC CLEANUP: (Y/N) N PH: 6.36 DILUTION FACTOR: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L	Q
99-09-2	3-NITROANILINE	50.	U
83-32-9	ACENAPHTHENE	50.	U
51-28-5	2,4-DINITROPHENOL	250.	U
100-02-7	4-NITROPHENOL	250.	U
132-64-9	DIBENZOFURAN	50.	U
121-14-2	2,4-DINITROTOLUENE	50.	U
84-66-2	DIETHYLPHTHALATE	50.	U
7005-72-3	4-CHLOROPHENYL-PHENYLETHER	50.	U
86-73-7	FLUORENE	50.	U
100-01-6	4-NITROANILINE	250.	U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	250.	U
86-30-6	N-NITROSODIPHENYLAMINE (1)	50.	U
101-55-3	4-BROMOPHENYL-PHENYLETHER	50.	U
118-74-1	HEXACHLOROBENZENE	50.	U
87-86-5	PENTACHLOROPHENOL	250.	U
85-01-8	PHENANTHRENE	50.	U
120-12-7	ANTHRACENE	50.	U
84-74-2	DI-N-BUTYLPHTHALATE	27.	J
206-44-0	FLUORANTHENE	50.	U
129-00-0	PYRENE	50.	U
85-68-7	BUTYLBENZYLPHTHALATE	50.	U
91-94-1	3,3'-DICHLOROBENZIDINE	100.	U
56-55-3	BENZO(A)ANTHRACENE	50.	U
218-01-9	CHRYSENE	50.	U
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	50.	U
117-84-0	DI-N-OCTYLPHTHALATE	50.	U
205-99-2	BENZO(B)FLUORANTHENE	50.	U
207-08-9	BENZO(K)FLUORANTHENE	50.	U
50-32-8	BENZO(A)PYRENE	50.	U
193-39-5	INDENO(1,2,3-CD)PYRENE	50.	U
53-70-3	DIBENZ(A,H)ANTHRACENE	50.	U
191-24-2	BENZO(G,H,I)PERYLENE	50.	U

(1) - CANNOT BE SEPARATED FROM DIPHENYLAMINE

REVIEWED BY:_____ DATE:_____

SEMIVOLATILE ORGANIC ANALYSIS DATA

EPA SAMPLE NO.

ER220

REQUEST NUMBER: OAL94176

PROCEDURE NUMBER: 8240 MATRIX: SOIL & WATER

SERIES: FREQUENCY: CHARGE NUMBER: 33707380

CUSTOMER NAME: SIEGRIST LAB SAMPLE ID: 910307-156

SAMPLE WT/VOL: 100 ML LAB FILE ID: >C3758

DATE SAMPLED: DATE RECEIVED 7-MAR-1991 13:00

% MOISTURE: NOT DEC. DEC: DATE ANALYZED: 25-APR-1991

MATERIAL DESCRIPTION FUEL CONTAMINATION DATE OF REPORT: 1-MAY-91

NUMBER TICS FOUND: 0 CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L

CAS NO.	COMPOUND NAME	RT	CONC	Q

REVIEWED BY:_____ DATE:_____

EPA SAMPLE NO.

FB01

VOLATILE ORGANICS ANALYSIS DATA SHEET

LAB NAME: OAK RIDGE NATIONAL LAB CONTRACT:

LAB CODE: CASE NO: SAS NO: SDG NO:

MATRIX: (SOIL/WATER) WATER LAB SAMPLE ID: 910307-157

SAMPLE WT/VOL: ML LAB FILE ID:

LEVEL: (LOW/MED) DATE RECEIVED 7-MAR-1991

% MOISTURE: NOT DEC. DATE ANALYZED: 9-MAR-1991

COLUMN: (PACK/CAP) DILUTION FACTOR: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L	Q
74-87-3	CHLOROMETHANE	********	U
74-83-9	BROMOMETHANE	********	U
75-01-4	VINYL CHLORIDE	********	U
75-00-3	CHLOROETHANE	********	U
75-09-2	METHYLENE CHLORIDE	********	U
67-64-1	ACETONE	********	U
75-15-0	CARBON DISULFIDE	********	U
75-35-4	1,1-DICHLOROETHENE	********	U
75-34-3	1,1-DICHLOROETHANE	********	U
540-59-0	1,2-DICHLOROETHENE (TOTAL)	********	U
67-66-3	CHLOROFORM	********	U
107-06-2	1,2-DICHLOROETHANE	********	U
78-93-3	2-BUTANONE	********	U
71-55-6	1,1,1-TRICHLOROETHANE	********	U
56-23-5	CARBON TETRACHLORIDE	********	U
108-05-4	VINYL ACETATE	********	U
75-27-4	BROMODICHLOROMETHANE	********	U
78-87-5	1,2-DICHLOROPROPANE	********	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	********	U
79-01-6	TRICHLOROETHENE	********	U
124-48-1	DIBROMOCHLOROMETHANE	********	U
79-00-5	1,1,2-TRICHLOROETHANE	********	U
71-43-2	BENZENE	********	U
10061-02-06	TRANS-1,3-DICHLOROPROPENE	********	U
75-25-2	BROMOFORM	********	U
108-10-1	4-METHYL-2-PENTANONE	********	U
591-78-6	2-HEXANONE	********	U
127-18-4	TETRACHLOROETHENE	********	U
79-34-5	1,1,2,2-TETRACHLOROETHANE	********	U
108-88-3	TOLUENE	********	U
108-90-7	CHLOROBENZENE	********	U
100-41-4	ETHYLBENZENE	********	U
100-42-5	STYRENE	********	U
1330-20-7	XYLENE (TOTAL)	********	U

REVIEWED BY:_____ DATE:_____

not analyzed

SEMIVOLATILE ORGANIC ANALYSIS DATA

EPA SAMPLE NO.

FB01

LAB NAME: OAK RIDGE NATIONAL LAB CONTRACT: NR

LAB CODE: CASE NO: NR SAS NO: NR SDG NO: C424

MATRIX: (SOIL/WATER) WATER LAB SAMPLE ID: 910307-157

SAMPLE WT/VOL: 100 ML LAB FILE ID: >C3759

LEVEL: (LOW/MED) LOW DATE RECEIVED 7-MAR-1991

% MOISTURE: NOT DEC. DEC. DATE ANALYZED: 25-APR-1991

EXTRACTION: (SEPF/CONT/SONC) SEPF DATE EXTRACTED: 13-MAR-1991

GPC CLEANUP: (Y/N) N PH: 6.43 DILUTION FACTOR: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L	Q
108-95-2	PHENOL	50.	U
111-44-4	BIS(2-CHLOROETHYL)ETHER	50.	U
95-57-8	2-CHLOROPHENOL	50.	U
541-73-1	1,3-DICHLOROBENZENE	50.	U
106-46-7	1,4-DICHLOROBENZENE	50.	U
100-51-6	BENZYL ALCOHOL	50.	U
95-50-1	1,2-DICHLOROBENZENE	50.	U
95-48-7	2-METHYLPHENOL	50.	U
108-60-1	BIS(2-CHLOROISOPROPYL)ETHER	50.	U
106-44-5	4-METHYLPHENOL	50.	U
621-64-7	N-NITROSO-DI-N-PROPYLAMINE	50.	U
67-72-1	HEXACHLOROETHANE	50.	U
98-95-3	NITROBENZENE	50.	U
78-59-1	ISOPHORONE	50.	U
88-75-5	2-NITROPHENOL	50.	U
105-67-9	2,4-DIMETHYLPHENOL	50.	U
65-85-0	BENZOIC ACID	250.	U
111-91-1	BIS(2-CHLOROETHOXY)METHANE	50.	U
120-83-2	2,4-DICHLOROPHENOL	50.	U
120-82-1	1,2,4-TRICHLOROBENZENE	50.	U
91-20-3	NAPHTHALENE	50.	U
106-47-8	4-CHLOROANILINE	50.	U
87-68-3	HEXACHLOROBUTADIENE	50.	U
59-50-7	4-CHLORO-3-METHYLPHENOL	50.	U
91-57-6	2-METHYLNAPHTHALENE	50.	U
77-47-4	HEXACHLOROCYCLOPENTADIENE	50.	U
88-06-2	2,4,6-TRICHLOROPHENOL	50.	U
95-95-4	2,4,5-TRICHLOROPHENOL	250.	U
91-58-7	2-CHLORONAPHTHALENE	50.	U
88-74-4	2-NITROANILINE	250.	U
131-11-3	DIMETHYLPHTHALATE	50.	U
208-96-8	ACENAPHTHYLENE	50.	U
606-20-2	2,6-DINITROTOLUENE	50.	U

EPA SAMPLE NO.

SEMIVOLATILE ORGANIC ANALYSIS DATA

FB01

LAB NAME: OAK RIDGE NATIONAL LAB CONTRACT: NR

LAB CODE: CASE NO: NR SAS NO: NR SDG NO: C424

MATRIX: (SOIL/WATER) WATER LAB SAMPLE ID: 910307-157

SAMPLE WT/VOL: 100 ML LAB FILE ID: >C3759

LEVEL: (LOW/MED) LOW DATE RECEIVED 7-MAR-1991

% MOISTURE: NOT DEC. DEC. DATE ANALYZED: 25-APR-1991

EXTRACTION: (SEPF/CONT/SONC) SEPF DATE EXTRACTED: 13-MAR-1991

GPC CLEANUP: (Y/N) N PH: 6.43 DILUTION FACTOR: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L OR UG/KG) UG/L	Q
99-09-2	3-NITROANILINE	50.	U
83-32-9	ACENAPHTHENE	50.	U
51-28-5	2,4-DINITROPHENOL	250.	U
100-02-7	4-NITROPHENOL	250.	U
132-64-9	DIBENZOFURAN	50.	U
121-14-2	2,4-DINITROTOLUENE	50.	U
84-66-2	DIETHYLPHTHALATE	50.	U
7005-72-3	4-CHLOROPHENYL-PHENYLETHER	50.	U
86-73-7	FLUORENE	50.	U
100-01-6	4-NITROANILINE	250.	U
534-52-1	4,6-DINITRO-2-METHYLPHENOL	250.	U
86-30-6	N-NITROSODIPHENYLAMINE (1)	50.	U
101-55-3	4-BROMOPHENYL-PHENYLETHER	50.	U
118-74-1	HEXACHLOROBENZENE	50.	U
87-86-5	PENTACHLOROPHENOL	250.	U
85-01-8	PHENANTHRENE	50.	U
120-12-7	ANTHRACENE	50.	U
84-74-2	DI-N-BUTYLPHTHALATE	50.	U
206-44-0	FLUORANTHENE	50.	U
129-00-0	PYRENE	50.	U
85-68-7	BUTYLBENZYLPHTHALATE	50.	U
91-94-1	3,3'-DICHLOROBENZIDINE	100.	U
56-55-3	BENZO(A)ANTHRACENE	50.	U
218-01-9	CHRYSENE	50.	U
117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE	50.	U
117-84-0	DI-N-OCTYLPHTHALATE	50.	U
205-99-2	BENZO(B)FLUORANTHENE	50.	U
207-08-9	BENZO(K)FLUORANTHENE	50.	U
50-32-8	BENZO(A)PYRENE	50.	U
193-39-5	INDENO(1,2,3-CD)PYRENE	50.	U
53-70-3	DIBENZ(A,H)ANTHRACENE	50.	U
191-24-2	BENZO(G,H,I)PERYLENE	50.	U

(1) - CANNOT BE SEPARATED FROM DIPHENYLAMINE

REVIEWED BY:_____ DATE:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

TP02-63 ✓

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: 0308

Matrix: (soil/water) SOIL Lab Sample ID: 910307-158

Sample wt/vol: 5 G Lab File ID: >01203

Level: (low/med) LOW Date Received 7-Mar-1991

% Moisture: not dec. Date Analyzed: 8-Mar-1991

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	5.00	U
67-64-1	acetone	10.	U
75-15-0	carbon disulfide	5.00	U
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	5.00	U
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	5.00	U
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	U
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	10.	U
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	5.00	U
108-90-7	chlorobenzene	5.00	U
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	5.00	U

Reviewed by: MPM Date: MAY 17 1991

Semivolatile Organic Analysis Data

EPA SAMPLE NO.

TP02-63

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: C423-2

Matrix: (soil/water) SOIL Lab Sample ID: 910307-158

Sample wt/vol: 29.8 G Lab File ID: >C3740

Level: (low/med) LOW Date Received 7-Mar-1991

% Moisture: not dec. dec. Date Analyzed: 24-Apr-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 12-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
108-95-2	phenol	400.	U
111-44-4	bis(2-chloroethyl)ether	400.	U
95-57-8	2-chlorophenol	400.	U
541-73-1	1,3-dichlorobenzene	400.	U
106-46-7	1,4-dichlorobenzene	400.	U
100-51-6	benzyl alcohol	400.	U
95-50-1	1,2-dichlorobenzene	400.	U
95-48-7	2-methylphenol	400.	U
108-60-1	bis(2-chloroisopropyl)ether	400.	U
106-44-5	4-methylphenol	400.	U
621-64-7	n-nitroso-di-n-propylamine	400.	U
67-72-1	hexachloroethane	400.	U
98-95-3	nitrobenzene	400.	U
78-59-1	isophorone	400.	U
88-75-5	2-nitrophenol	400.	U
105-67-9	2,4-dimethylphenol	400.	U
65-85-0	benzoic acid	2000.	U
111-91-1	bis(2-chloroethoxy)methane	400.	U
120-83-2	2,4-dichlorophenol	400.	U
120-82-1	1,2,4-trichlorobenzene	400.	U
91-20-3	naphthalene	400.	U
106-47-8	4-chloroaniline	400.	U
87-68-3	hexachlorobutadiene	400.	U
59-50-7	4-chloro-3-methylphenol	400.	U
91-57-6	2-methylnaphthalene	400.	U
77-47-4	hexachlorocyclopentadiene	400.	U
88-06-2	2,4,6-trichlorophenol	400.	U
95-95-4	2,4,5-trichlorophenol	2000.	U
91-58-7	2-chloronaphthalene	400.	U
88-74-4	2-nitroaniline	2000.	U
131-11-3	dimethylphthalate	400.	U
208-96-8	acenaphthylene	400.	U
606-20-2	2,6-dinitrotoluene	400.	U

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP02-63

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: C423-2

Matrix: (soil/water) SOIL Lab Sample ID: 910307-158

Sample wt/vol: 29.8 G Lab File ID: >C3740

Level: (low/med) LOW Date Received 7-Mar-1991

% Moisture: not dec. dec. Date Analyzed: 24-Apr-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 12-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
99-09-2	3-nitroaniline	2000.	U
83-32-9	acenaphthene	400.	U
51-28-5	2,4-dinitrophenol	2000.	U
100-02-7	4-nitrophenol	2000.	U
132-64-9	dibenzofuran	400.	U
121-14-2	2,4-dinitrotoluene	400.	U
84-66-2	diethylphthalate	400.	U
7005-72-3	4-chlorophenyl-phenylether	400.	U
86-73-7	fluorene	400.	U
100-01-6	4-nitroaniline	2000.	U
534-52-1	4,6-dinitro-2-methylphenol	2000.	U
86-30-6	n-nitrosodiphenylamine (1)	400.	U
101-55-3	4-bromophenyl-phenylether	400.	U
118-74-1	hexachlorobenzene	400.	U
87-86-5	pentachlorophenol	2000.	U
85-01-8	phenanthrene	400.	U
120-12-7	anthracene	400.	U
84-74-2	di-n-butylphthalate	400.	U
206-44-0	fluoranthene	400.	U
129-00-0	pyrene	400.	U
85-68-7	butylbenzylphthalate	400.	U
91-94-1	3,3'-dichlorobenzidine	810.	U
56-55-3	benzo(a)anthracene	400.	U
218-01-9	chrysene	400.	U
117-81-7	bis(2-ethylhexyl)phthalate	400.	U
117-84-0	di-n-octylphthalate	400.	U
205-99-2	benzo(b)fluoranthene	400.	U
207-08-9	benzo(k)fluoranthene	400.	U
50-32-8	benzo(a)pyrene	400.	U
193-39-5	indeno(1,2,3-cd)pyrene	400.	U
53-70-3	dibenz(a,h)anthracene	400.	U
191-24-2	benzo(g,h,i)perylene	400.	U

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

| TP02-63 |

Semivolatile Organic Analysis Data

Request Number: OAL94177

Procedure Number: 8240 Matrix: SOIL AND WATER

Series: Frequency: Charge Number: 33707380

Customer Name: SIEGRIST Lab Sample ID: 910307-158

Sample wt/vol: 29.8 G Lab File ID: >C3740

Date Sampled: Date Received 7-Mar-1991 13:00

% Moisture: not dec. dec: Date Analyzed: 24-Apr-1991

Material Description FUEL CONTAMINATION Date of Report: 16-MAY-91

Number TICs found: 0 CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG

CAS NO.	COMPOUND NAME	RT	CONC	Q

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

TP02-63MS

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: 0308

Matrix: (soil/water) SOIL Lab Sample ID: 910307-159

Sample wt/vol: 5 G Lab File ID: >01204

Level: (low/med) LOW Date Received 7-Mar-1991

% Moisture: not dec. Date Analyzed: 8-Mar-1991

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	5.00	U
67-64-1	acetone	10.	U
75-15-0	carbon disulfide	5.00	U
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	5.00	U
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	5.00	U
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	U
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	10.	U
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	5.00	U
108-90-7	chlorobenzene	5.00	U
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	5.00	U

Reviewed by:_____ Date:_____

Semivolatile Organic Analysis Data

EPA SAMPLE NO.

TP02-63MS

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: C423-2

Matrix: (soil/water) SOIL Lab Sample ID: 910307-159

Sample wt/vol: 29.9 G Lab File ID: >C3735

Level: (low/med) LOW Date Received 7-Mar-1991

% Moisture: not dec. dec. Date Analyzed: 23-Apr-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 12-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
108-95-2	phenol	1800.	MS
111-44-4	bis(2-chloroethyl)ether	410.	U
95-57-8	2-chlorophenol	1700.	MS
541-73-1	1,3-dichlorobenzene	410.	U
106-46-7	1,4-dichlorobenzene	570.	MS
100-51-6	benzyl alcohol	410.	U
95-50-1	1,2-dichlorobenzene	410.	U
95-48-7	2-methylphenol	410.	U
108-60-1	bis(2-chloroisopropyl)ether	410.	U
106-44-5	4-methylphenol	410.	U
621-64-7	n-nitroso-di-n-propylamine	1300.	MS
67-72-1	hexachloroethane	410.	U
98-95-3	nitrobenzene	410.	U
78-59-1	isophorone	410.	U
88-75-5	2-nitrophenol	410.	U
105-67-9	2,4-dimethylphenol	410.	U
65-85-0	benzoic acid	2100.	U
111-91-1	bis(2-chloroethoxy)methane	410.	U
120-83-2	2,4-dichlorophenol	410.	U
120-82-1	1,2,4-trichlorobenzene	1000.	MS
91-20-3	naphthalene	410.	U
106-47-8	4-chloroaniline	410.	U
87-68-3	hexachlorobutadiene	410.	U
59-50-7	4-chloro-3-methylphenol	2400.	MS
91-57-6	2-methylnaphthalene	410.	U
77-47-4	hexachlorocyclopentadiene	410.	U
88-06-2	2,4,6-trichlorophenol	410.	U
95-95-4	2,4,5-trichlorophenol	2100.	U
91-58-7	2-chloronaphthalene	410.	U
88-74-4	2-nitroaniline	2100.	U
131-11-3	dimethylphthalate	410.	U
208-96-8	acenaphthylene	410.	U
606-20-2	2,6-dinitrotoluene	410.	U

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP02-63MS

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: C423-2

Matrix: (soil/water) SOIL Lab Sample ID: 910307-159

Sample wt/vol: 29.9 G Lab File ID: >C3735

Level: (low/med) LOW Date Received 7-Mar-1991

% Moisture: not dec. dec. Date Analyzed: 23-Apr-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 12-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
99-09-2	3-nitroaniline	2100.	U
83-32-9	acenaphthene	1200.	MS
51-28-5	2,4-dinitrophenol	2100.	U
100-02-7	4-nitrophenol	2600.	MS
132-64-9	dibenzofuran	410.	U
121-14-2	2,4-dinitrotoluene	1300.	MS
84-66-2	diethylphthalate	410.	U
7005-72-3	4-chlorophenyl-phenylether	410.	U
86-73-7	fluorene	410.	U
100-01-6	4-nitroaniline	2100.	U
534-52-1	4,6-dinitro-2-methylphenol	2100.	U
86-30-6	n-nitrosodiphenylamine (1)	410.	U
101-55-3	4-bromophenyl-phenylether	410.	U
118-74-1	hexachlorobenzene	410.	U
87-86-5	pentachlorophenol	4400.	MS
85-01-8	phenanthrene	410.	U
120-12-7	anthracene	410.	U
84-74-2	di-n-butylphthalate	410.	U
206-44-0	fluoranthene	410.	U
129-00-0	pyrene	1900.	MS
85-68-7	butylbenzylphthalate	410.	U
91-94-1	3,3'-dichlorobenzidine	820.	U
56-55-3	benzo(a)anthracene	410.	U
218-01-9	chrysene	410.	U
117-81-7	bis(2-ethylhexyl)phthalate	410.	U
117-84-0	di-n-octylphthalate	410.	U
205-99-2	benzo(b)fluoranthene	410.	U
207-08-9	benzo(k)fluoranthene	410.	U
50-32-8	benzo(a)pyrene	410.	U
193-39-5	indeno(1,2,3-cd)pyrene	410.	U
53-70-3	dibenz(a,h)anthracene	410.	U
191-24-2	benzo(g,h,i)perylene	410.	U

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TP02-63MSD

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: 0308

Matrix: (soil/water) SOIL Lab Sample ID: 910307-160

Sample wt/vol: 5 G Lab File ID: >01205

Level: (low/med) LOW Date Received 7-Mar-1991

% Moisture: not dec. Date Analyzed: 8-Mar-1991

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	5.00	U
67-64-1	acetone	10.	U
75-15-0	carbon disulfide	5.00	U
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	5.00	U
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	5.00	U
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	U
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	10.	U
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	5.00	U
108-90-7	chlorobenzene	5.00	U
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	5.00	U

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP02-63MSD

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: C423-2

Matrix: (soil/water) SOIL Lab Sample ID: 910307-160

Sample wt/vol: 29.2 G Lab File ID: >C3736

Level: (low/med) LOW Date Received 7-Mar-1991

% Moisture: not dec. dec. Date Analyzed: 23-Apr-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 12-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
108-95-2	phenol	1400.	MS
111-44-4	bis(2-chloroethyl)ether	420.	U
95-57-8	2-chlorophenol	520.	MS
541-73-1	1,3-dichlorobenzene	420.	U
106-46-7	1,4-dichlorobenzene	26.	JM
100-51-6	benzyl alcohol	420.	U
95-50-1	1,2-dichlorobenzene	420.	U
95-48-7	2-methylphenol	420.	U
108-60-1	bis(2-chloroisopropyl)ether	420.	U
106-44-5	4-methylphenol	420.	U
621-64-7	n-nitroso-di-n-propylamine	1100.	MS
67-72-1	hexachloroethane	420.	U
98-95-3	nitrobenzene	420.	U
78-59-1	isophorone	420.	U
88-75-5	2-nitrophenol	420.	U
105-67-9	2,4-dimethylphenol	420.	U
65-85-0	benzoic acid	2100.	U
111-91-1	bis(2-chloroethoxy)methane	420.	U
120-83-2	2,4-dichlorophenol	420.	U
120-82-1	1,2,4-trichlorobenzene	470.	MS
91-20-3	naphthalene	420.	U
106-47-8	4-chloroaniline	420.	U
87-68-3	hexachlorobutadiene	420.	U
59-50-7	4-chloro-3-methylphenol	2200.	MS
91-57-6	2-methylnaphthalene	420.	U
77-47-4	hexachlorocyclopentadiene	420.	U
88-06-2	2,4,6-trichlorophenol	420.	U
95-95-4	2,4,5-trichlorophenol	2100.	U
91-58-7	2-chloronaphthalene	420.	U
88-74-4	2-nitroaniline	2100.	U
131-11-3	dimethylphthalate	420.	U
208-96-8	acenaphthylene	420.	U
606-20-2	2,6-dinitrotoluene	420.	U

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP02-63MSD

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: C423-2

Matrix: (soil/water) SOIL Lab Sample ID: 910307-160

Sample wt/vol: 29.2 G Lab File ID: >C3736

Level: (low/med) LOW Date Received 7-Mar-1991

% Moisture: not dec. dec. Date Analyzed: 23-Apr-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 12-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
99-09-2	3-nitroaniline	2100.	U
83-32-9	acenaphthene	1000.	MS
51-28-5	2,4-dinitrophenol	2100.	U
100-02-7	4-nitrophenol	1500.	JM
132-64-9	dibenzofuran	420.	U
121-14-2	2,4-dinitrotoluene	1100.	MS
84-66-2	diethylphthalate	420.	U
7005-72-3	4-chlorophenyl-phenylether	420.	U
86-73-7	fluorene	420.	U
100-01-6	4-nitroaniline	2100.	U
534-52-1	4,6-dinitro-2-methylphenol	2100.	U
86-30-6	n-nitrosodiphenylamine (1)	420.	U
101-55-3	4-bromophenyl-phenylether	420.	U
118-74-1	hexachlorobenzene	420.	U
87-86-5	pentachlorophenol	3700.	MS
85-01-8	phenanthrene	420.	U
120-12-7	anthracene	420.	U
84-74-2	di-n-butylphthalate	420.	U
206-44-0	fluoranthene	420.	U
129-00-0	pyrene	1700.	MS
85-68-7	butylbenzylphthalate	420.	U
91-94-1	3,3'-dichlorobenzidine	840.	U
56-55-3	benzo(a)anthracene	420.	U
218-01-9	chrysene	420.	U
117-81-7	bis(2-ethylhexyl)phthalate	420.	U
117-84-0	di-n-octylphthalate	420.	U
205-99-2	benzo(b)fluoranthene	420.	U
207-08-9	benzo(k)fluoranthene	420.	U
50-32-8	benzo(a)pyrene	420.	U
193-39-5	indeno(1,2,3-cd)pyrene	420.	U
53-70-3	dibenz(a,h)anthracene	420.	U
191-24-2	benzo(g,h,i)perylene	420.	U

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

TP06-62

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: 0308

Matrix: (soil/water) SOIL Lab Sample ID: 910307-161

Sample wt/vol: 5 G Lab File ID: >01208

Level: (low/med) LOW Date Received 7-Mar-1991

% Moisture: not dec. Date Analyzed: 9-Mar-1991

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	5.00	U
67-64-1	acetone	10.	U
75-15-0	carbon disulfide	5.00	U
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	5.00	U
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	5.00	U
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	U
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	10.	U
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	2.00	J
108-90-7	chlorobenzene	3.00	J
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	5.00	U

Reviewed by:_____ Date:_____

Semivolatile Organic Analysis Data

EPA SAMPLE NO.

TP0[illegible]-62

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: C423-2

Matrix: (soil/water) SOIL Lab Sample ID: 910307-161

Sample wt/vol: 30.1 G Lab File ID: >C3741

Level: (low/med) MED Date Received 7-Mar-1991

% Moisture: not dec. dec. Date Analyzed: 24-Apr-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 12-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
108-95-2	phenol	4100.	UD
111-44-4	bis(2-chloroethyl)ether	4100.	UD
95-57-8	2-chlorophenol	4100.	UD
541-73-1	1,3-dichlorobenzene	4100.	UD
106-46-7	1,4-dichlorobenzene	4100.	UD
100-51-6	benzyl alcohol	4100.	UD
95-50-1	1,2-dichlorobenzene	4100.	UD
95-48-7	2-methylphenol	4100.	UD
108-60-1	bis(2-chloroisopropyl)ether	4100.	UD
106-44-5	4-methylphenol	4100.	UD
621-64-7	n-nitroso-di-n-propylamine	4100.	UD
67-72-1	hexachloroethane	4100.	UD
98-95-3	nitrobenzene	4100.	UD
78-59-1	isophorone	4100.	UD
88-75-5	2-nitrophenol	4100.	UD
105-67-9	2,4-dimethylphenol	4100.	UD
65-85-0	benzoic acid	20000.	UD
111-91-1	bis(2-chloroethoxy)methane	4100.	UD
120-83-2	2,4-dichlorophenol	4100.	UD
120-82-1	1,2,4-trichlorobenzene	4100.	UD
91-20-3	naphthalene	4100.	UD
106-47-8	4-chloroaniline	4100.	UD
87-68-3	hexachlorobutadiene	4100.	UD
59-50-7	4-chloro-3-methylphenol	4100.	UD
91-57-6	2-methylnaphthalene	4100.	UD
77-47-4	hexachlorocyclopentadiene	4100.	UD
88-06-2	2,4,6-trichlorophenol	4100.	UD
95-95-4	2,4,5-trichlorophenol	20000.	UD
91-58-7	2-chloronaphthalene	4100.	UD
88-74-4	2-nitroaniline	20000.	UD
131-11-3	dimethylphthalate	4100.	UD
208-96-8	acenaphthylene	4100.	UD
606-20-2	2,6-dinitrotoluene	4100.	UD

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP05-62

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: ORNL SAS No: NR SDG No: C423-2

Matrix: (soil/water) SOIL Lab Sample ID: 910307-161

Sample wt/vol: 30.1 G Lab File ID: >C3741

Level: (low/med) MED Date Received 7-Mar-1991

% Moisture: not dec. dec. Date Analyzed: 24-Apr-1991

Extraction: (Sepf/Cont/Sonc) SONC Date Extracted: 12-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 10

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG	Q
99-09-2	3-nitroaniline	20000.	UD
83-32-9	acenaphthene	4100.	UD
51-28-5	2,4-dinitrophenol	20000.	UD
100-02-7	4-nitrophenol	20000.	UD
132-64-9	dibenzofuran	4100.	UD
121-14-2	2,4-dinitrotoluene	4100.	UD
84-66-2	diethylphthalate	4100.	UD
7005-72-3	4-chlorophenyl-phenylether	4100.	UD
86-73-7	fluorene	4100.	UD
100-01-6	4-nitroaniline	20000.	UD
534-52-1	4,6-dinitro-2-methylphenol	20000.	UD
86-30-6	n-nitrosodiphenylamine (1)	4100.	UD
101-55-3	4-bromophenyl-phenylether	4100.	UD
118-74-1	hexachlorobenzene	4100.	UD
87-86-5	pentachlorophenol	20000.	UD
85-01-8	phenanthrene	4100.	UD
120-12-7	anthracene	4100.	UD
84-74-2	di-n-butylphthalate	4100.	UD
206-44-0	fluoranthene	4100.	UD
129-00-0	pyrene	4100.	UD
85-68-7	butylbenzylphthalate	4100.	UD
91-94-1	3,3'-dichlorobenzidine	8200.	UD
56-55-3	benzo(a)anthracene	4100.	UD
218-01-9	chrysene	4100.	UD
117-81-7	bis(2-ethylhexyl)phthalate	4100.	UD
117-84-0	di-n-octylphthalate	4100.	UD
205-99-2	benzo(b)fluoranthene	4100.	UD
207-08-9	benzo(k)fluoranthene	4100.	UD
50-32-8	benzo(a)pyrene	4100.	UD
193-39-5	indeno(1,2,3-cd)pyrene	4100.	UD
53-70-3	dibenz(a,h)anthracene	4100.	UD
191-24-2	benzo(g,h,i)perylene	4100.	UD

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP05-62

Request Number: OAL94177

Procedure Number: 8240 Matrix: SOIL AND WATER

Series: Frequency: Charge Number: 33707380

Customer Name: SIEGRIST Lab Sample ID: 910307-161

Sample wt/vol: 30.1 G Lab File ID: >C3741

Date Sampled: Date Received 7-Mar-1991 13:00

% Moisture: not dec. dec: Date Analyzed: 24-Apr-1991

Material Description FUEL CONTAMINATION Date of Report: 16-MAY-91

Number TICs found: 20 CONCENTRATION UNITS: (UG/L or UG/KG) UG/KG

CAS NO.	COMPOUND NAME	RT	CONC	Q
1.	UNKNOWN	14.81	320.	J
2.	UNKNOWN HYDROCARBON	15.49	230.	J
3.	UNKNOWN	15.92	200.	J
4.	UNKNOWN	16.31	300.	J
5.	UNKNOWN HYDROCARBON	17.04	550.	J
6.	UNKNOWN	17.19	580.	J
7.	UNKNOWN	17.31	310.	J
8.	DIMETHYL NAPHTHALENE	17.83	370.	J
9.	UNKNOWN	17.90	860.	J
10.	UNKNOWN	17.95	570.	J
11.	UNKNOWN	18.11	360.	J
12.	UNKNOWN HYDROCARBON	18.24	1000.	J
13.	UNKNOWN	18.48	970.	J
14.	UNKNOWN	19.35	330.	J
15.	UNKNOWN	19.45	340.	J
16.	UNKNOWN	19.57	540.	J
17.	UNKNOWN	19.78	650.	J
18.	UNKNOWN HYDROCARBON	20.64	940.	J
19.	UNKNOWN HYDROCARBON	21.35	3800.	J
20.	UNKNOWN HYDROCARBON	23.44	550.	J

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

TP05-W ✓

Lab Name: Oak Ridge National Lab Contract:

Lab Code: Case no: ORNL SAS No: SDG No: 0309

Matrix: (soil/water) WATER Lab Sample ID: 910307-164

Sample wt/vol: 5 ML Lab File ID: >01232

Level: (low/med) LOW Date Received 7-Mar-1991

% Moisture: not dec. Date Analyzed: 9-Mar-1991

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
74-87-3	chloromethane	10.	U
74-83-9	bromomethane	10.	U
75-01-4	vinyl chloride	10.	U
75-00-3	chloroethane	10.	U
75-09-2	methylene chloride	5.00	U
67-64-1	acetone	10.	U
75-15-0	carbon disulfide	20.0	
75-35-4	1,1-dichloroethene	5.00	U
75-34-3	1,1-dichloroethane	5.00	U
540-59-0	1,2-dichloroethene (total)	5.00	U
67-66-3	chloroform	5.00	U
107-06-2	1,2-dichloroethane	5.00	U
78-93-3	2-butanone	10.	U
71-55-6	1,1,1-trichloroethane	5.00	U
56-23-5	carbon tetrachloride	5.00	U
108-05-4	vinyl acetate	10.	U
75-27-4	bromodichloromethane	5.00	U
78-87-5	1,2-dichloropropane	5.00	U
10061-01-5	cis-1,3-dichloropropene	5.00	U
79-01-6	trichloroethene	5.00	U
124-48-1	dibromochloromethane	5.00	U
79-00-5	1,1,2-trichloroethane	5.00	U
71-43-2	benzene	5.00	U
10061-02-06	trans-1,3-dichloropropene	5.00	U
75-25-2	bromoform	5.00	U
108-10-1	4-methyl-2-pentanone	10.	U
591-78-6	2-hexanone	10.	U
127-18-4	tetrachloroethene	5.00	U
79-34-5	1,1,2,2-tetrachloroethane	5.00	U
108-88-3	toluene	5.00	U
108-90-7	chlorobenzene	33.0	
100-41-4	ethylbenzene	5.00	U
100-42-5	styrene	5.00	U
1330-20-7	xylene (total)	5.00	U

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP05-W

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: NR SDG No: C425

Matrix: (soil/water) WATER Lab Sample ID: 910307-164

Sample wt/vol: 130 ML Lab File ID: >C3768

Level: (low/med) LOW Date Received 7-Mar-1991

% Moisture: not dec. dec. Date Analyzed: 25-Apr-1991

Extraction: (Sepf/Cont/Sonc) SEPF Date Extracted: 18-Mar-1991

GPC Cleanup: (Y/N) N pH: 7.80 Dilution Factor: 7.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
108-95-2	phenol	77.	U
111-44-4	bis(2-chloroethyl)ether	77.	U
95-57-8	2-chlorophenol	77.	U
541-73-1	1,3-dichlorobenzene	77.	U
106-46-7	1,4-dichlorobenzene	77.	U
100-51-6	benzyl alcohol	77.	U
95-50-1	1,2-dichlorobenzene	77.	U
95-48-7	2-methylphenol	77.	U
108-60-1	bis(2-chloroisopropyl)ether	77.	U
106-44-5	4-methylphenol	77.	U
621-64-7	n-nitroso-di-n-propylamine	77.	U
67-72-1	hexachloroethane	77.	U
98-95-3	nitrobenzene	77.	U
78-59-1	isophorone	77.	U
88-75-5	2-nitrophenol	77.	U
105-67-9	2,4-dimethylphenol	77.	U
65-85-0	benzoic acid	380.	U
111-91-1	bis(2-chloroethoxy)methane	77.	U
120-83-2	2,4-dichlorophenol	77.	U
120-82-1	1,2,4-trichlorobenzene	77.	U
91-20-3	naphthalene	14.	J
106-47-8	4-chloroaniline	77.	U
87-68-3	hexachlorobutadiene	77.	U
59-50-7	4-chloro-3-methylphenol	77.	U
91-57-6	2-methylnaphthalene	26.	J
77-47-4	hexachlorocyclopentadiene	77.	U
88-06-2	2,4,6-trichlorophenol	77.	U
95-95-4	2,4,5-trichlorophenol	380.	U
91-58-7	2-chloronaphthalene	77.	U
88-74-4	2-nitroaniline	380.	U
131-11-3	dimethylphthalate	77.	U
208-96-8	acenaphthylene	77.	U
606-20-2	2,6-dinitrotoluene	77.	U

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

TP05-W

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: NR SDG No: C425

Matrix: (soil/water) WATER Lab Sample ID: 910307-164

Sample wt/vol: 130 ML Lab File ID: >C3768

Level: (low/med) LOW Date Received 7-Mar-1991

% Moisture: not dec. dec. Date Analyzed: 25-Apr-1991

Extraction: (Sepf/Cont/Sonc) SEPF Date Extracted: 18-Mar-1991

GPC Cleanup: (Y/N) N pH: 7.80 Dilution Factor: 7.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) UG/L	Q
99-09-2	3-nitroaniline	380.	U
83-32-9	acenaphthene	77.	U
51-28-5	2,4-dinitrophenol	380.	U
100-02-7	4-nitrophenol	380.	U
132-64-9	dibenzofuran	77.	U
121-14-2	2,4-dinitrotoluene	77.	U
84-66-2	diethylphthalate	77.	U
7005-72-3	4-chlorophenyl-phenylether	77.	U
86-73-7	fluorene	77.	U
100-01-6	4-nitroaniline	380.	U
534-52-1	4,6-dinitro-2-methylphenol	380.	U
86-30-6	n-nitrosodiphenylamine (1)	77.	U
101-55-3	4-bromophenyl-phenylether	77.	U
118-74-1	hexachlorobenzene	77.	U
87-86-5	pentachlorophenol	380.	U
85-01-8	phenanthrene	77.	U
120-12-7	anthracene	77.	U
84-74-2	di-n-butylphthalate	77.	U
206-44-0	fluoranthene	77.	U
129-00-0	pyrene	77.	U
85-68-7	butylbenzylphthalate	170.	B
91-94-1	3,3'-dichlorobenzidine	150.	U
56-55-3	benzo(a)anthracene	77.	U
218-01-9	chrysene	77.	U
117-81-7	bis(2-ethylhexyl)phthalate	77.	U
117-84-0	di-n-octylphthalate	77.	U
205-99-2	benzo(b)fluoranthene	77.	U
207-08-9	benzo(k)fluoranthene	77.	U
50-32-8	benzo(a)pyrene	77.	U
193-39-5	indeno(1,2,3-cd)pyrene	77.	U
53-70-3	dibenz(a,h)anthracene	77.	U
191-24-2	benzo(g,h,i)perylene	77.	U

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

TP06-W

Semivolatile Organic Analysis Data

Request Number: OAL94177

Procedure Number: 8240 Matrix: SOIL AND WATER

Series: Frequency: Charge Number: 33707380

Customer Name: SIEGRIST Lab Sample ID: 910307-164

Sample wt/vol: 130 ML Lab File ID: >C3768

Date Sampled: Date Received 7-Mar-1991 13:00

% Moisture: not dec. dec: Date Analyzed: 25-Apr-1991

Material Description FUEL CONTAMINATION Date of Report: 16-MAY-91

Number TICs found: 20 CONCENTRATION UNITS: (UG/L or UG/KG) UG/L

CAS NO.	COMPOUND NAME	RT	CONC	Q
1.	UNKNOWN HYDROCARBON	14.52	170.	J
2.	UNKNOWN	15.16	150.	J
3.	UNKNOWN HYDROCARBON	15.46	220.	J
4.	UNKNOWN	16.58	560.	J
5.	UNKNOWN	17.03	640.	J
6.	UNKNOWN HYDROCARBON	17.39	380.	J
7.	UNKNOWN	17.48	360.	J
8.	UNK NAPHTHALENE, -DIMETHYL	17.56	340.	J
9.	UNK NAPHTHALENE, -DIMETHYL	17.79	360.	J
10.	UNK NAPHTHALENE, -DIMETHYL	17.85	600.	J
11.	UNKNOWN	18.08	380.	J
12.	UNKNOWN HYDROCARBON	18.22	1300.	J
13.	UNKNOWN HYDROCARBON	18.47	660.	J
14.	UNKNOWN	19.43	360.	J
15.	UNKNOWN HYDROCARBON	19.54	420.	J
16.	UNKNOWN HYDROCARBON	19.58	350.	J
17.	UNKNOWN	19.78	470.	J
18.	UNKNOWN HYDROCARBON	20.63	930.	J
19.	UNKNOWN HYDROCARBON	21.33	2800.	J
20.	UNKNOWN HYDROCARBON	21.75	340.	J

Reviewed by:_____ Date:_____

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

KWAJOIL-2

Lab Name: Oak Ridge National Lab Contract:

Lab Code: Case no: SAS No: SDG No:

Matrix: (soil/water) SOIL Lab Sample ID: 910307-165

Sample wt/vol: .005 G Lab File ID:

Level: (low/med) MED Date Received 7-Mar-1991

% Moisture: not dec. Date Analyzed: 19-Mar-1991

Column: (pack/cap) DIL-GC Dilution Factor: 100

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) MG/KG	Q
74-87-3	chloromethane	1000.	U
74-83-9	bromomethane	1000.	U
75-01-4	vinyl chloride	1000.	U
75-00-3	chloroethane	1000.	U
75-09-2	methylene chloride	500.	U
67-64-1	acetone	1000.	U
75-15-0	carbon disulfide	500.	U
75-35-4	1,1-dichloroethene	500.	U
75-34-3	1,1-dichloroethane	500.	U
540-59-0	1,2-dichloroethene (total)	500.	U
67-66-3	chloroform	500.	U
107-06-2	1,2-dichloroethane	500.	U
78-93-3	2-butanone	1000.	U
71-55-6	1,1,1-trichloroethane	500.	U
56-23-5	carbon tetrachloride	500.	U
108-05-4	vinyl acetate	1000.	U
75-27-4	bromodichloromethane	500.	U
78-87-5	1,2-dichloropropane	500.	U
10061-01-5	cis-1,3-dichloropropene	500.	U
79-01-6	trichloroethene	500.	U
124-48-1	dibromochloromethane	500.	U
79-00-5	1,1,2-trichloroethane	500.	U
71-43-2	benzene	500.	U
10061-02-06	trans-1,3-dichloropropene	500.	U
75-25-2	bromoform	500.	U
108-10-1	4-methyl-2-pentanone	1000.	U
591-78-6	2-hexanone	1000.	U
127-18-4	tetrachloroethene	500.	U
79-34-5	1,1,2,2-tetrachloroethane	500.	U
108-88-3	toluene	500.	U
108-90-7	chlorobenzene	500.	U
100-41-4	ethylbenzene	500.	U
100-42-5	styrene	500.	U
1330-20-7	xylene (total)	500.	U

Reviewed by:_____ Date:_____

Semivolatile Organic Analysis Data

EPA SAMPLE NO.

KWAJOIL-2

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: ORNL SDG No: C502

Matrix: (soil/water) SOIL Lab Sample ID: 910307-165

Sample wt/vol: 0.1 G Lab File ID: >C3798

Level: (low/med) MED Date Received 7-Mar-1991

% Moisture: not dec. dec. Date Analyzed: 2-May-1991

Extraction: (Sepf/Cont/Sonc) DIL Date Extracted: 12-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 100

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) MG/KG	Q
108-95-2	phenol	1000.	U
111-44-4	bis(2-chloroethyl)ether	1000.	U
95-57-8	2-chlorophenol	1000.	U
541-73-1	1,3-dichlorobenzene	1000.	U
106-46-7	1,4-dichlorobenzene	1000.	U
100-51-6	benzyl alcohol	1000.	U
95-50-1	1,2-dichlorobenzene	1000.	U
95-48-7	2-methylphenol	1000.	U
108-60-1	bis(2-chloroisopropyl)ether	1000.	U
106-44-5	4-methylphenol	1000.	U
621-64-7	n-nitroso-di-n-propylamine	1000.	U
67-72-1	hexachloroethane	1000.	U
98-95-3	nitrobenzene	1000.	U
78-59-1	isophorone	1000.	U
88-75-5	2-nitrophenol	1000.	U
105-67-9	2,4-dimethylphenol	1000.	U
65-85-0	benzoic acid	5000.	U
111-91-1	bis(2-chloroethoxy)methane	1000.	U
120-83-2	2,4-dichlorophenol	1000.	U
120-82-1	1,2,4-trichlorobenzene	1000.	U
91-20-3	naphthalene	570.	J
106-47-8	4-chloroaniline	1000.	U
87-68-3	hexachlorobutadiene	1000.	U
59-50-7	4-chloro-3-methylphenol	1000.	U
91-57-6	2-methylnaphthalene	2100.	
77-47-4	hexachlorocyclopentadiene	1000.	U
88-06-2	2,4,6-trichlorophenol	1000.	U
95-95-4	2,4,5-trichlorophenol	5000.	U
91-58-7	2-chloronaphthalene	1000.	U
88-74-4	2-nitroaniline	5000.	U
131-11-3	dimethylphthalate	1000.	U
208-96-8	acenaphthylene	1000.	U
606-20-2	2,6-dinitrotoluene	1000.	U

EPA SAMPLE NO.

Semivolatile Organic Analysis Data

KWAJOIL-2

Lab Name: Oak Ridge National Lab Contract: NR

Lab Code: Case no: NR SAS No: ORNL SDG No: C502

Matrix: (soil/water) SOIL Lab Sample ID: 910307-165

Sample wt/vol: 0.1 G Lab File ID: >C3798

Level: (low/med) MED Date Received 7-Mar-1991

% Moisture: not dec. dec. Date Analyzed: 2-May-1991

Extraction: (Sepf/Cont/Sonc) DIL Date Extracted: 12-Mar-1991

GPC Cleanup: (Y/N) N pH: NR Dilution Factor: 100

CAS NO.	COMPOUND	CONCENTRATION UNITS: (UG/L or UG/KG) MG/KG	Q
99-09-2	3-nitroaniline	5000.	U
83-32-9	acenaphthene	1000.	U
51-28-5	2,4-dinitrophenol	5000.	U
100-02-7	4-nitrophenol	5000.	U
132-64-9	dibenzofuran	1000.	U
121-14-2	2,4-dinitrotoluene	1000.	U
84-66-2	diethylphthalate	1000.	U
7005-72-3	4-chlorophenyl-phenylether	1000.	U
86-73-7	fluorene	1000.	U
100-01-6	4-nitroaniline	5000.	U
534-52-1	4,6-dinitro-2-methylphenol	5000.	U
86-30-6	n-nitrosodiphenylamine (1)	1000.	U
101-55-3	4-bromophenyl-phenylether	1000.	U
118-74-1	hexachlorobenzene	1000.	U
87-86-5	pentachlorophenol	5000.	U
85-01-8	phenanthrene	2200.	
120-12-7	anthracene	1000.	U
84-74-2	di-n-butylphthalate	1000.	U
206-44-0	fluoranthene	1000.	U
129-00-0	pyrene	1000.	U
85-68-7	butylbenzylphthalate	1000.	U
91-94-1	3,3'-dichlorobenzidine	2000.	U
56-55-3	benzo(a)anthracene	1000.	U
218-01-9	chrysene	1000.	U
117-81-7	bis(2-ethylhexyl)phthalate	1000.	U
117-84-0	di-n-octylphthalate	1000.	U
205-99-2	benzo(b)fluoranthene	1000.	U
207-08-9	benzo(k)fluoranthene	1000.	U
50-32-8	benzo(a)pyrene	1000.	U
193-39-5	indeno(1,2,3-cd)pyrene	1000.	U
53-70-3	dibenz(a,h)anthracene	1000.	U
191-24-2	benzo(g,h,i)perylene	1000.	U

(1) - Cannot be separated from Diphenylamine

Reviewed by:_____ Date:_____

EPA SAMPLE NO.

KWAJOIL-2

Semivolatile Organic Analysis Data

Request Number: OAL94177

Procedure Number: 8240 Matrix: SOIL AND WATER

Series: Frequency: Charge Number: 33707380

Customer Name: SIEGRIST Lab Sample ID: 910307-165

Sample wt/vol: 0.1 G Lab File ID: >C3798

Date Sampled: Date Received 7-Mar-1991 13:00

% Moisture: not dec. dec: Date Analyzed: 2-May-1991

Material Description FUEL CONTAMINATION Date of Report: 16-MAY-91

Number TICs found: 20 CONCENTRATION UNITS: (UG/L or UG/KG) MG/KG

CAS NO.	COMPOUND NAME	RT	CONC	Q
1.	UNKNOWN HYDROCARBON	12.53	2600.	J
2.	UNKNOWN HYDROCARBON	14.22	4600.	J
3.	UNKNOWN HYDROCARBON	16.92	3300.	J
4.	UNKNOWN HYDROCARBON	17.26	18000.	J
5.	NAPHTHALENE, DIMETHYL-	17.69	3400.	J
6.	NAPHTHALENE, DIMETHYL-	17.75	3600.	J
7.	UNKNOWN	17.96	4000.	J
8.	UNKNOWN HYDROCARBON	18.11	8700.	J
9.	UNKNOWN HYDROCARBON	18.64	23000.	J
10.	NAPHTHALENE, TRIMETHYL-	19.21	3600.	J
11.	NAPHTHALENE, TRIMETHYL-	19.43	4100.	J
12.	UNKNOWN HYDROCARBON	19.93	28000.	J
13.	UNKNOWN HYDROCARBON	20.52	1400.	J
14.	UNKNOWN	20.68	750.	J
15.	UNKNOWN HYDROCARBON	21.15	4800.	J
16.	UNKNOWN HYDROCARBON	21.23	3100.	J
17.	UNKNOWN HYDROCARBON	22.26	1000.	J
18.	UNKNOWN HYDROCARBON	23.38	2600.	J
19.	UNKNOWN HYDROCARBON	24.41	1900.	J
20.	UNKNOWN HYDROCARBON	25.39	1100.	J

Reviewed by:_____ Date:_____

APPENDIX D

LABORATORY RESULTS FOR INORGANIC ANALYSES

OAK RIDGE NATIONAL LABORATORY
ANALYTICAL CHEMISTRY DIVISION
RESULTS OF ANALYSES
CHEMICAL AND PHYSICAL ANALYSIS

CUSTOMER NAME R.L.SIEGRIST
REQUEST NUMBER CPA11895
PROJECT NUMBER
SERIES

DATE RECEIVED 20-MAR-1991
CHARGE NUMBER 33707380
DEPT NUMBER 3370
DATE OF REPORT 26-APR-91

APPROVED BY J.G.Pace
DATE 4-26-91

ANALY NO. / MATRIX / FREQUENCY	CUSTOMERS ID / MATERIAL DESC.	DATE/TIME SAMPLED	ANALYSIS	RESULT	UNITS	PROCEDURE NO	COMPLETED
910320-126	TP01-08						
SOIL&WATER	FUEL CONTAMINATED SOIL						
			% MOISTURE	8.0	%		11-APR-1991
			AG	< 1.6E+00	MG/KG	EPA 200.7	23-APR-1991
			AS	< 1.6E+01	MG/KG	EPA 200.7	23-APR-1991
			BA	7.7E+00	MG/KG	EPA 200.7	23-APR-1991
			CD	< 1.6E+00	MG/KG	EPA 200.7	23-APR-1991
			CR	1.2E+01	MG/KG	EPA 200.7	23-APR-1991
			HG	0.01	MG/KG	EPA 245.1	2-APR-1991
			NITRATE (AS N)	< 0.1	MG/L	SMEWW 429	1-APR-1991
			PB	3.8E+01	MG/KG	EPA 200.7	23-APR-1991
			PH	9.29		EPA 150.1	20-MAR-1991
			PHOSPHATE AS (P)	< 0.1	MG/L	SMEWW 429	1-APR-1991
			SE	< 1.6E+01	MG/KG	EPA 200.7	23-APR-1991
			SULFATE (AS S)	0.1	MG/L	SMEWW 429	1-APR-1991
			TOTAL KJELDAHL NITROGEN	0.019	%	EPA.357.2	24-APR-1991
910320-127	TP01-33						
SOIL&WATER	FUEL CONTAMINATED SOIL						
			% MOISTURE	11.6	%		11-APR-1991
			AG	< 1.7E+00	MG/KG	EPA 200.7	23-APR-1991
			AS	< 1.7E+01	MG/KG	EPA 200.7	23-APR-1991
			BA	4.7E+00	MG/KG	EPA 200.7	23-APR-1991
			CD	< 1.7E+00	MG/KG	EPA 200.7	23-APR-1991
			CR	1.1E+01	MG/KG	EPA 200.7	23-APR-1991
			HG	< 0.01	MG/KG	EPA 245.1	2-APR-1991
			NITRATE (AS N)	< 0.1	MG/L	SMEWW 429	1-APR-1991
			PB	< 1.7E+01	MG/KG	EPA 200.7	23-APR-1991
			PH	9.55		EPA 150.1	20-MAR-1991
			PHOSPHATE AS (P)	< 0.1	MG/L	SMEWW 429	1-APR-1991
			SE	< 1.7E+01	MG/KG	EPA 200.7	23-APR-1991
			SULFATE (AS S)	< 0.1	MG/L	SMEWW 429	1-APR-1991
			TOTAL KJELDAHL NITROGEN	0.009	%	EPA.357.2	24-APR-1991
910320-128	TP01-56						
SOIL&WATER	FUEL CONTAMINATED SOIL						
			% MOISTURE	17.0	%		11-APR-1991

910320-128 TP01-56

AG	1.7E+00	MG/KG	EPA 200.7	23-APR-1991
AS	< 1.6E+01	MG/KG	EPA 200.7	23-APR-1991
BA	5.7E+00	MG/KG	EPA 200.7	23-APR-1991
CD	< 1.6E+00	MG/KG	EPA 200.7	23-APR-1991
CR	1.1E+01	MG/KG	EPA 200.7	23-APR-1991
HG	< 0.01	MG/KG	EPA 245.1	2-APR-1991
NITRATE (AS N)	< 0.1	MG/L	SMEWW 429	1-APR-1991
PB	< 1.6E+01	MG/KG	EPA 200.7	23-APR-1991
PH	9.29		EPA 150.1	20-MAR-1991
PHOSPHATE AS (P)	< 0.1	MG/L	SMEWW 429	1-APR-1991
SE	< 1.6E+01	MG/KG	EPA 200.7	23-APR-1991
SULFATE (AS S)	< 0.1	MG/L	EMEWW 429	1-APR-1991
TOTAL KJELDAHL NITROGEN	0.011	%	EPA.357.2	24-APR-1991

910320-129 TP03-12
SOIL&WATER FUEL CONTAMINATED SOIL

% MOISTURE	9.2	%		11-APR-1991
AG	< 1.6E+00	MG/KG	EPA 200.7	23-APR-1991
AS	< 1.6E+01	MG/KG	EPA 200.7	23-APR-1991
BA	6.5E+00	MG/KG	EPA 200.7	23-APR-1991
CD	< 1.6E+00	MG/KG	EPA 200.7	23-APR-1991
CR	1.3E+01	MG/KG	EPA 200.7	23-APR-1991
HG	0.02	MG/KG	EPA 245.1	2-APR-1991
NITRATE (AS N)	< 0.1	MG/L	SMEWW 429	1-APR-1991
PB	< 1.6E+01	MG/KG	EPA 200.7	23-APR-1991
PH	9.37		EPA 150.1	20-MAR-1991
PHOSPHATE AS (P)	< 0.1	MG/L	SMEWW 429	1-APR-1991
SE	< 1.6E+01	MG/KG	EPA 200.7	23-APR-1991
SULFATE (AS S)	< 0.1	MG/L	SMEWW 429	1-APR-1991
TOTAL KJELDAHL NITROGEN	0.016	%	EPA.357.2	24-APR-1991

910320-130 TP03-39
SOIL&WATER FUEL CONTAMINATED SOIL

% MOISTURE	13.0	%		11-APR-1991
AG	< 1.6E+00	MG/KG	EPA 200.7	23-APR-1991
AS	< 1.6E+01	MG/KG	EPA 200.7	23-APR-1991
BA	5.3E+00	MG/KG	EPA 200.7	23-APR-1991
CD	< 1.6E+00	MG/KG	EPA 200.7	23-APR-1991
CR	1.1E+01	MG/KG	EPA 200.7	23-APR-1991
HG	< 0.01	MG/L	EPA 245.1	2-APR-1991
NITRATE (AS N)	< 0.1	MG/L	SMEWW 429	1-APR-1991
PB	< 1.6E+01	MG/KG	EPA 200.7	23-APR-1991
PH	9.42		EPA 150.1	20-MAR-1991

910320-130 TP03-39

PHOSPHATE AS (P)	< 0.1	MG/L	SMEWW 429	1-APR-1991
SE	< 1.6E+01	MG/KG	EPA 200.7	23-APR-1991
SULFATE (AS S)	< 0.1	MG/L	SMEWW 429	1-APR-1991
TOTAL KJELDAHL NITROGEN	0.013	%	EPA.357.2	24-APR-1991

910320-131 TP03-72
SOIL&WATER FUEL CONTAMINATED SOIL

% MOISTURE	22.4	%		11-APR-1991
AG	< 1.5E+00	MG/KG	EPA 200.7	23-APR-1991
AS	< 1.5E+01	MG/KG	EPA 200.7	23-APR-1991
BA	4.2E+00	MG/KG	EPA 200.7	23-APR-1991
CD	< 1.5E+00	MG/KG	EPA 200.7	23-APR-1991
CR	9.0E+00	MG/KG	EPA 200.7	23-APR-1991
HG	< 0.01	MG/KG	EPA 245.1	2-APR-1991
NITRATE (AS N)	< 0.1	MG/L	SMEWW 429	1-APR-1991
PB	< 1.5E+01	MG/KG	EPA 200.7	23-APR-1991
PH	9.34		EPA 150.1	20-MAR-1991
PHOSPHATE AS (P)	< 0.1	MG/L	SMEWW 429	1-APR-1991
SE	< 1.5E+01	MG/KG	EPA 200.7	23-APR-1991
SULFATE (AS S)	0.1	MG/L	SMEWW 429	1-APR-1991
TOTAL KJELDAHL NITROGEN	0.011	%	EPA.357.2	24-APR-1991

205

910320-132 TP04-10
SOIL&WATER FUEL CONTAMINATED SOIL

% MOISTURE	11.0	%		11-APR-1991
AG	< 1.5E+00	MG/KG	EPA 200.7	23-APR-1991
AS	< 1.5E+01	MG/KG	EPA 200.7	23-APR-1991
BA	6.1E+00	MG/KG	EPA 200.7	23-APR-1991
CD	< 1.5E+00	MG/KG	EPA 200.7	23-APR-1991
CR	1.1E+01	MG/KG	EPA 200.7	23-APR-1991
HG	< 0.01	MG/KG	EPA 245.1	2-APR-1991
NITRATE (AS N)	< 0.1	MG/L	SMEWW 429	1-APR-1991
PB	< 1.5E+01	MG/KG	EPA 200.7	23-APR-1991
PH	9.24		EPA 150.1	20-MAR-1991
PHOSPHATE AS (P)	< 0.1	MG/L	SMEWW 429	1-APR-1991
SE	< 1.5E+01	MG/KG	EPA 200.7	23-APR-1991
SULFATE (AS S)	< 0.1	MG/L	SMEWW 429	1-APR-1991
TOTAL KJELDAHL NITROGEN	0.022	%	EPA.357.2	24-APR-1991

910320-133 TP04-22
SOIL&WATER FUEL CONTAMINATED SOIL

% MOISTURE	19.0	%		11-APR-1991

910320-133 TP04-22

AG	1.6E+00	MG/KG	EPA 200.7	23-APR-1991
AS	< 1.6E+01	MG/KG	EPA 200.7	23-APR-1991
BA	4.8E+00	MG/KG	EPA 200.7	23-APR-1991
CD	< 1.6E+00	MG/KG	EPA 200.7	23-APR-1991
CR	8.6E+00	MG/KG	EPA 200.7	23-APR-1991
HG	< 0.01	MG/KG	EPA 245.1	2-APR-1991
NITRATE (AS N)	< 0.1	MG/L	SMEWW 429	1-APR-1991
PB	< 1.6E+01	MG/KG	EPA 200.7	23-APR-1991
PH	9.55		EPA 150.1	20-MAR-1991
PHOSPHATE AS (P)	< 0.1	MG/L	SMEWW 429	1-APR-1991
SE	< 1.6E+01	MG/KG	EPA 200.7	23-APR-1991
SULFATE (AS S)	< 0.1	MG/L	SMEWW 429	1-APR-1991
TOTAL KJELDAHL NITROGEN	0.028	%	EPA.357.2	24-APR-1991

910320-134 TP04-65
SOIL&WATER FUEL CONTAMINATED SOIL

% MOISTURE	28.2	%		11-APR-1991
AG	< 1.6E+00	MG/KG	EPA 200.7	23-APR-1991
AS	< 1.6E+01	MG/KG	EPA 200.7	23-APR-1991
BA	5.1E+00	MG/KG	EPA 200.7	23-APR-1991
CD	< 1.6E+00	MG/KG	EPA 200.7	23-APR-1991
CR	8.8E+00	MG/KG	EPA 200.7	23-APR-1991
HG	< 0.01	MG/KG	EPA 245.1	2-APR-1991
NITRATE (AS N)	< 0.1	MG/L	SMEWW 429	1-APR-1991
PB	< 1.6E+01	MG/KG	EPA 200.7	23-APR-1991
PH	9.16		EPA 150.1	20-MAR-1991
PHOSPHATE AS (P)	< 0.1	MG/L	SMEWW 429	1-APR-1991
SE	< 1.6E+01	MG/KG	EPA 200.7	23-APR-1991
SULFATE (AS S)	< 0.1	MG/L	SMEWW 420	1-APR-1991
TOTAL KJELDAHL NITROGEN	0.015	%	EPA.357.2	24-APR-1991

ANALY NO. CUSTOMERS ID DATE/TIME SAMPLED MATRIX MATERIAL DESC. FREQUENCY	ANALYSIS	RESULT	UNITS	PROCEDURE NO	COMPLETED
910320-135 TP04-W SOIL&WATER FUEL CONTAMINATED SOIL					
	AG	< 2.5E-02	MG/L	EPA 200.7	24-APR-1991
	ALKALINITY	325	MG CACO3/L	EPA 310.1	24-APR-1991
	AS	< 2.5E-01	MG/L	EPA 200.7	24-APR-1991
	B	< 4.0E-01	MG/L	EPA 200.7	24-APR-1991
	BA	< 5.0E-03	MG/L	EPA 200.7	24-APR-1991
	CA	1.1E+02	MG/L	EPA 200.7	24-APR-1991
	COD	220	MG/L	EPA 410.4	24-APR-1991
	CR	2.3E-02	MG/L	EPA 200.7	24-APR-1991
	CU	< 3.5E-02	MG/L	EPA 200.7	24-APR-1991
	FE	< 2.5E-01	MG/L	EPA 200.7	24-APR-1991
	HG	< 0.01	MG/L	EPA 245.1	23-APR-1991
	K	0.2	MG/L	258.1	25-APR-1991
	MN	< 5.0E-03	MG/L	EPA 200.7	24-APR-1991
	MO	< 2.0E-01	MG/L	EPA 200.7	24-APR-1991
	NA	< 2.5E+01	MG/L	EPA 200.7	24-APR-1991
	NH3 (AS N)	0.33	MG/L	EPA 350.2/.3	25-APR-1991
	PB	< 2.5E-01	MG/L	EPA 200.7	24-APR-1991
	PH	7.93		EPA 150.1	24-APR-1991
	TOC	40	MG/L	415.1	23-APR-1991
	TOT. DISSOLVED SOLIDS	.		INSUFF.S.	24-APR-1991
	TOTAL KJELDAHL NITROGEN	2.1	MG/L	EPA.357.2	25-APR-1991
	ZN	< 2.5E-02	MG/L	EPA 200.7	24-APR-1991
910320-136 NPK SOLUTION SOIL&WATER FUEL CONTAMINATED SOIL					
	B	5.5E-01	MG/L	EPA 200.7	23-APR-1991
	CA	9.5E-01	MG/L	EPA 200.7	23-APR-1991
	FE	7.6E-01	MG/L	EPA 200.7	23-APR-1991
	MN	3.1E-01	MG/L	EPA 200.7	23-APR-1991
	MO	< 4.0E-02	MG/L	EPA 200.7	23-APR-1991
	NA	5.1E+00	MG/L	EPA 200.7	23-APR-1991
	NH3 (AS N)	.		INSUFF.S	19-APR-1991
	NITRATE (AS N)	.		INSUFF.S.	24-APR-1991
	ZN	3.8E-02	MG/L	EPA 200.7	23-APR-1991
910320-137 MICRONUTRIENT SOIL&WATER FUEL CONTAMINATED SOIL					
	B	< 4.8E-01	MG/L	EPA 200.7	23-APR-1991

910320-137 MICRONUTRIENT

CA	3.8E+01	MG/L	EPA 200.7	23-APR-1991
FE	4.2E+00	MG/L	EPA 200.7	23-APR-1991
MN	1.8E+00	MG/L	EPA 200.7	23-APR-1991
NO	< 2.4E-01	MG/L	EPA 200.7	23-APR-1991
NA	< 3.0E+01	MG/L	EPA 200.7	23-APR-1991
NH3 (AS N)	.		INSUFF.S	19-APR-1991
NITRATE (AS N)	.		INSUFF.S.	24-APR-1991
ZN	1.4E+00	MG/L	EPA 200.7	23-APR-1991

END OF DATA FOR REQUEST NUMBER CPA11895 TOTAL PAGES = 6 CUST. COPY ✓ FILE COPY ____

OAK RIDGE NATIONAL LABORATORY
ANALYTICAL CHEMISTRY DIVISION
RESULTS OF ANALYSES
CHEMICAL AND PHYSICAL ANALYSIS

CUSTOMER NAME R.L.SIEGRIST
REQUEST NUMBER CPA11966
PROJECT NUMBER
SERIES

DATE RECEIVED
CHARGE NUMBER 33707380
DEPT NUMBER 3370
DATE OF REPORT 26-APR-91

APPROVED BY
DATE 4-26-91

ANALY NO. / MATRIX / FREQUENCY	CUSTOMERS ID / MATERIAL DESC.	DATE/TIME SAMPLED	ANALYSIS	RESULT	UNITS	PROCEDURE NO	COMPLETED
910408-073	ER218	20-FEB-1991					
SOIL-WATER							
			AG	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
			AL	5.3E-02	MG/L	EPA 200.7	23-APR-1991
			ALKALINITY	1.5	MG CACO3/L	EPA 310.1	22-APR-1991
			AS	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
			B	< 8.0E-02	MG/L	EPA 200.7	23-APR-1991
			BA	< 1.0E-03	MG/L	EPA 200.7	23-APR-1991
			BE	< 3.0E-04	MG/L	EPA 200.7	23-APR-1991
			CA	2.1E-02	MG/L	EPA 200.7	23-APR-1991
			CD	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
			CHLORIDE	< 0.1	MG/L	SMEWW 429	23-APR-1991
			CO	4.4E-03	MG/L	EPA 200.7	23-APR-1991
			COD	8	MG/L	410.4	18-APR-1991
			CR	< 4.0E-03	MG/L	EPA 200.7	23-APR-1991
			CU	< 7.0E-03	MG/L	EPA 200.7	23-APR-1991
			FE	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
			HG	< 0.01	MG/L	245.1	23-APR-1991
			K	< 0.1	MG/L	258.1	25-APR-1991
			LI	< 1.5E+01	MG/L	EPA 200.7	23-APR-1991
			MG	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991
			MN	< 1.0E-03	MG/L	EPA 200.7	23-APR-1991
			MO	< 4.0E-02	MG/L	EPA 200.7	23-APR-1991
			NA	< 5.0E+00	MG/L	EPA 200.7	23-APR-1991
			NH3 (AS N)	0.04	MG/L	EPA 350.2/.3	19-APR-1991
			NI	< 4.0E-03	MG/L	EPA 200.7	23-APR-1991
			NITRATE	< 1	MG/L	SMEWW 429	23-APR-1991
			P	< 3.0E-01	MG/L	EPA 200.7	23-APR-1991
			PB	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
			PH	6.24		EPA 150.1	18-APR-1991
			PHOSPHATE	< 1	MG/L	SMEWW 429	23-APR-1991
			SB	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
			SE	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
			SI	< 2.0E-01	MG/L	EPA 200.7	23-APR-1991
			SN	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
			SR	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
			SULFATE	< 1	MG/L	SMEWW 429	23-APR-1991

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TI	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991
TOC	1.6	MG/L	415.1	23-APR-1991
TOT. DISSOLVED SOLIDS	.		INSUFF.S	24-APR-1991
TOTAL KJELDAHL NITROGEN	< 0.2	MG/L	EPA.357.2	25-APR-1991
V	< 2.0E-03	MG/L	EPA 200.7	23-APR-1991
ZN	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
ZR	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991

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AG	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
AL	5.8E-02	MG/L	EPA 200.7	23-APR-1991
ALKALINITY	1.5	MG CACO3/L	EPA 310.1	22-APR-1991
AS	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
B	< 8.0E-02	MG/L	EPA 200.7	23-APR-1991
BA	< 1.0E-03	MG/L	EPA 200.7	23-APR-1991
BE	< 3.0E-04	MG/L	EPA 200.7	23-APR-1991
CA	3.3E-02	MG/L	EPA 200.7	23-APR-1991
CD	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
CHLORIDE	< 0.1	MG/L	SMEWW 429	23-APR-1991
CO	< 4.0E-03	MG/L	EPA 200.7	23-APR-1991
COD	6	MG/L	410.4	18-APR-1991
CR	< 4.0E-03	MG/L	EPA 200.7	23-APR-1991
CU	< 7.0E-03	MG/L	EPA 200.7	23-APR-1991
FE	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
HG	< 0.01	MG/L	245.1	23-APR-1991
K	< 0.1	MG/L	258.1	25-APR-1991
LI	< 1.5E+01	MG/L	EPA 200.7	23-APR-1991
MG	2.1E-02	MG/L	EPA 200.7	23-APR-1991
MN	< 1.0E-03	MG/L	EPA 200.7	23-APR-1991
MO	< 4.0E-02	MG/L	EPA 200.7	23-APR-1991
NA	< 5.0E+00	MG/L	EPA 200.7	23-APR-1991
NH3 (AS N)	0.06	MG/L	EPA 350.2/.3	19-APR-1991
NI	< 4.0E-03	MG/L	EPA 200.7	23-APR-1991
NITRATE	< 1	MG/L	SMEWW 429	23-APR-1991
P	< 3.0E-01	MG/L	EPA 200.7	23-APR-1991
PB	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
PH	6.28		EPA 150.1	18-APR-1991
PHOSPHATE	< 1	MG/L	SMEWW 429	23-APR-1991
SB	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
SE	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
SI	2.3E-01	MG/L	EPA 200.7	23-APR-1991
SN	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
SR	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991

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SULFATE	< 1	MG/L	SMEWW 429	23-APR-1991
TI	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991
TOC	0.8	MG/L	415.1	23-APR-1991
TOT. DISSOLVED SOLIDS	.		INSUFF.S	24-APR-1991
TOTAL KJELDAHL NITROGEN	< 0.2	MG/L	EPA.357.2	25-APR-1991
V	< 2.0E-03	MG/L	EPA 200.7	23-APR-1991
ZN	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
ZR	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991

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AG	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
AL	5.8E-02	MG/L	EPA 200.7	23-APR-1991
ALKALINITY	3.0	MG CACO3/L	EPA 310.1	22-APR-1991
AS	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
B	< 8.0E-02	MG/L	EPA 200.7	23-APR-1991
BA	< 1.0E-03	MG/L	EPA 200.7	23-APR-1991
BE	< 3.0E-04	MG/L	EPA 200.7	23-APR-1991
CA	< 1.0E-02	MG/L	EPA 200.7	23-APR-1991
CD	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
CHLORIDE	< 0.1	MG/L	SMEWW 429	23-APR-1991
CO	4.7E-03	MG/L	EPA 200.7	23-APR-1991
COD	< 5	MG/L	410.4	18-APR-1991
CR	< 4.0E-03	MG/L	EPA 200.7	23-APR-1991
CU	< 7.0E-03	MG/L	EPA 200.7	23-APR-1991
FE	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
HG	< 0.01	MG/L	245.1	23-APR-1991
K	< 0.1	MG/L	258.1	25-APR-1991
LI	< 1.5E+01	MG/L	EPA 200.7	23-APR-1991
MG	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991
MN	< 1.0E-03	MG/L	EPA 200.7	23-APR-1991
MO	< 4.0E-02	MG/L	EPA 200.7	23-APR-1991
NA	< 5.0E+00	MG/L	EPA 200.7	23-APR-1991
NH3 (AS N)	0.06	MG/L	EPA 350.2/.3	19-APR-1991
NI	< 4.0E-03	MG/L	EPA 200.7	23-APR-1991
NITRATE	< 1	MG/L	SMEWW 429	23-APR-1991
P	< 3.0E-01	MG/L	EPA 200.7	23-APR-1991
PB	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
PH	6.64		EPA 150.1	18-APR-1991
PHOSPHATE	< 1	MG/L	SMEWW 429	23-APR-1991
SB	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
SE	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
SI	< 2.0E-01	MG/L	EPA 200.7	23-APR-1991
SN	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991

10408-075 ER220	20-FEB-1991					
		SR	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
		SULFATE	< 1	MG/L	SMEWW 429	23-APR-1991
		TI	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991
		TOC	< 0.5	MG/L	415.1	23-APR-1991
		TOT. DISSOLVED SOLIDS	.		INSUFF.S	24-APR-1991
		TOTAL KJELDAHL NITROGEN	< 0.2	MG/L	EPA.357.2	25-APR-1991
		V	< 2.0E-03	MG/L	EPA 200.7	23-APR-1991
		ZN	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
		ZR	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991
910408-076 FB01	20-FEB-1991					
SOIL-WATER						
		AG	< 5.0E-03	MG/L	EPA 200.7	24-APR-1991
		AL	7.3E-02	MG/L	EPA 200.7	24-APR-1991
		ALKALINITY	2.5	MG CACO3/L	EPA 310.1	22-APR-1991
		AS	< 5.0E-02	MG/L	EPA 200.7	24-APR-1991
		B	< 8.0E-02	MG/L	EPA 200.7	24-APR-1991
		BA	< 1.0E-03	MG/L	EPA 200.7	24-APR-1991
		BE	< 3.0E-04	MG/L	EPA 200.7	24-APR-1991
		CA	1.4E-01	MG/L	EPA 200.7	24-APR-1991
		CD	< 5.0E-03	MG/L	EPA 200.7	24-APR-1991
		CHLORIDE	0.2	MG/L	SMEWW 429	23-APR-1991
		CO	< 4.0E-03	MG/L	EPA 200.7	24-APR-1991
		COD	6	MG/L	410.4	18-APR-1991
		CR	< 4.0E-03	MG/L	EPA 200.7	24-APR-1991
		CU	< 7.0E-03	MG/L	EPA 200.7	24-APR-1991
		FE	< 5.0E-02	MG/L	EPA 200.7	24-APR-1991
		HG	< 0.01	MG/L	245.1	23-APR-1991
		K	< 0.1	MG/L	258.1	25-APR-1991
		LI	< 1.5E+01	MG/L	EPA 200.7	24-APR-1991
		MG	< 2.0E-02	MG/L	EPA 200.7	24-APR-1991
		MN	< 1.0E-03	MG/L	EPA 200.7	24-APR-1991
		MO	< 4.0E-02	MG/L	EPA 200.7	24-APR-1991
		NA	< 5.0E+00	MG/L	EPA 200.7	24-APR-1991
		NH3 (AS N)	0.03	MG/L	EPA 350.2/.3	19-APR-1991
		NI	8.9E-03	MG/L	EPA 200.7	24-APR-1991
		NITRATE	< 1	MG/L	SMEWW 429	23-APR-1991
		P	< 3.0E-01	MG/L	EPA 200.7	24-APR-1991
		PB	< 5.0E-02	MG/L	EPA 200.7	24-APR-1991
		PH	6.56		EPA 150.1	18-APR-1991
		PHOSPHATE	< 1	MG/L	SMEWW 429	23-APR-1991
		SB	< 5.0E-02	MG/L	EPA 200.7	24-APR-1991
		SE	< 5.0E-02	MG/L	EPA 200.7	24-APR-1991
		SI	3.0E-01	MG/L	EPA 200.7	24-APR-1991

910408-076 FB01	20-FEB-1991					
		SN	< 5.0E-02	MG/L	EPA 200.7	24-APR-1991
		SR	< 5.0E-03	MG/L	EPA 200.7	24-APR-1991
		SULFATE	< 1	MG/L	SMEWW 429	23-APR-1991
		TI	< 2.0E-02	MG/L	EPA 200.7	24-APR-1991
		TOC	1.6	MG/L	415.1	23-APR-1991
		TOT. DISSOLVED SOLIDS	.		INSUFF.S	24-APR-1991
		TOTAL KJELDAHL NITROGEN	< 0.2	MG/L	EPA.357.2	25-APR-1991
		V	< 2.0E-03	MG/L	EPA 200.7	24-APR-1991
		ZN	< 5.0E-03	MG/L	EPA 200.7	24-APR-1991
		ZR	< 2.0E-02	MG/L	EPA 200.7	24-APR-1991
910408-077 TP01-W	20-FEB-1991					
SOIL-WATER						
		AG	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
		AL	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
		ALKALINITY	210	MG CACO3/L	EPA 310.1	22-APR-1991
		AS	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
		B	1.1E-01	MG/L	EPA 200.7	23-APR-1991
		BA	< 1.0E-03	MG/L	EPA 200.7	23-APR-1991
		BE	< 3.0E-04	MG/L	EPA 200.7	23-APR-1991
		CA	5.8E+01	MG/L	EPA 200.7	23-APR-1991
		CD	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
		CHLORIDE	37	MG/L	SMEWW 429	23-APR-1991
		CO	< 4.0E-03	MG/L	EPA 200.7	23-APR-1991
		COD	7	MG/L	410.4	18-APR-1991
		CR	1.9E-02	MG/L	EPA 200.7	23-APR-1991
		CU	< 7.0E-03	MG/L	EPA 200.7	23-APR-1991
		FE	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
		HG	< 0.01	MG/L	245.1	23-APR-1991
		K	1.1	MG/L	258.1	25-APR-1991
		LI	< 1.5E+01	MG/L	EPA 200.7	23-APR-1991
		MG	3.3E+01	MG/L	EPA 200.7	23-APR-1991
		MN	< 1.0E-03	MG/L	EPA 200.7	23-APR-1991
		MO	< 4.0E-02	MG/L	EPA 200.7	23-APR-1991
		NA	2.1E+01	MG/L	EPA 200.7	23-APR-1991
		NH3 (AS N)	0.32	MG/L	EPA 350.2/.3	19-APR-1991
		NI	< 4.0E-03	MG/L	EPA 200.7	23-APR-1991
		NITRATE	< 1	MG/L	SMEWW 429	23-APR-1991
		P	< 3.0E-01	MG/L	EPA 200.7	23-APR-1991
		PB	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
		PH	8.19		EPA 150.1	18-APR-1991
		PHOSPHATE	< 1	MG/L	SMEWW 429	23-APR-1991
		SB	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
		SE	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991

910408-077 TP01-W	20-FEB-1991					
		SI	1.4E+00	MG/L	EPA 200.7	23-APR-1991
		SN	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
		SR	1.6E+00	MG/L	EPA 200.7	23-APR-1991
		SULFATE	14	MG/L	SMEWW 429	23-APR-1991
		TI	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991
		TOC	1.2	MG/L	415.1	23-APR-1991
		TOT. DISSOLVED SOLIDS	.		INSUFF.S.	24-APR-1991
		TOTAL KJELDAHL NITROGEN	< 0.2	MG/L	EPA.357.2	25-APR-1991
		V	1.2E-02	MG/L	EPA 200.7	23-APR-1991
		ZN	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
		ZR	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991
910408-078 TP03-W SOIL-WATER	20-FEB-1991					
		AG	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
		AL	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
		ALKALINITY	214	MG CACO3/L	EPA 310.1	22-APR-1991
		AS	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
		B	1.8E-01	MG/L	EPA 200.7	23-APR-1991
		BA	< 1.0E-03	MG/L	EPA 200.7	23-APR-1991
		BE	< 3.0E-04	MG/L	EPA 200.7	23-APR-1991
		CA	3.8E+01	MG/L	EPA 200.7	23-APR-1991
		CD	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
		CHLORIDE	61	MG/L	SMEWW 429	23-APR-1991
		CO	< 4.0E-03	MG/L	EPA 200.7	23-APR-1991
		COD	10	MG/L	410.4	18-APR-1991
		CR	2.2E-02	MG/L	EPA 200.7	23-APR-1991
		CU	< 7.0E-03	MG/L	EPA 200.7	23-APR-1991
		FE	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
		HG	< 0.01	MG/L	245.1	23-APR-1991
		K	4.7	MG/L	258.1	25-APR-1991
		LI	< 1.5E+01	MG/L	EPA 200.7	23-APR-1991
		MG	4.3E+01	MG/L	EPA 200.7	23-APR-1991
		MN	< 1.0E-03	MG/L	EPA 200.7	23-APR-1991
		MO	< 4.0E-02	MG/L	EPA 200.7	23-APR-1991
		NA	6.5E+01	MG/L	EPA 200.7	23-APR-1991
		NH3 (AS N)	0.21	MG/L	EPA 350.2/.3	19-APR-1991
		NI	< 4.0E-03	MG/L	EPA 200.7	23-APR-1991
		NITRATE	8.5	MG/L	SMEWW 429	23-APR-1991
		P	< 3.0E-01	MG/L	EPA 200.7	23-APR-1991
		PB	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
		PH	8.21		EPA 150.1	18-APR-1991
		PHOSPHATE	< 1	MG/L	SMEWW 429	23-APR-1991
		SB	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991

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SE	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
SI	6.3E+00	MG/L	EPA 200.7	23-APR-1991
SN	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
SR	1.1E+00	MG/L	EPA 200.7	23-APR-1991
SULFATE	75	MG/L	SMEWW 429	23-APR-1991
TI	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991
TOC	2.1	MG/L	415.1	23-APR-1991
TOT. DISSOLVED SOLIDS	.		INSUFF.S	24-APR-1991
TOTAL KJELDAHL NITROGEN	< 0.2	MG/L	EPA.357.2	25-APR-1991
V	4.6E-02	MG/L	EPA 200.7	23-APR-1991
ZN	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
ZR	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991

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AG	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
AL	6.1E-02	MG/L	EPA 200.7	23-APR-1991
AS	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
B	< 8.0E-02	MG/L	EPA 200.7	23-APR-1991
BA	< 1.0E-03	MG/L	EPA 200.7	23-APR-1991
BE	< 3.0E-04	MG/L	EPA 200.7	23-APR-1991
CA	5.0E-02	MG/L	EPA 200.7	23-APR-1991
CD	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
CO	< 4.0E-03	MG/L	EPA 200.7	23-APR-1991
CR	< 4.0E-03	MG/L	EPA 200.7	23-APR-1991
CU	1.8E-02	MG/L	EPA 200.7	23-APR-1991
FE	1.4E-01	MG/L	EPA 200.7	23-APR-1991
LI	< 1.5E+01	MG/L	EPA 200.7	23-APR-1991
MG	1.0E-01	MG/L	EPA 200.7	23-APR-1991
MN	5.8E-02	MG/L	EPA 200.7	23-APR-1991
MO	< 4.0E-02	MG/L	EPA 200.7	23-APR-1991
NA	< 5.0E+00	MG/L	EPA 200.7	23-APR-1991
NI	< 4.0E-03	MG/L	EPA 200.7	23-APR-1991
P	2.7E+01	MG/L	EPA 200.7	23-APR-1991
PB	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
SB	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
SE	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
SI	< 2.0E-01	MG/L	EPA 200.7	23-APR-1991
SN	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
SR	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
TI	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991
V	< 2.0E-03	MG/L	EPA 200.7	23-APR-1991
ZN	9.4E-03	MG/L	EPA 200.7	23-APR-1991
ZR	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991

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SOIL-WATER

AG	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
AL	7.1E-02	MG/L	EPA 200.7	23-APR-1991
AS	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
B	1.1E-01	MG/L	EPA 200.7	23-APR-1991
BA	< 1.0E-03	MG/L	EPA 200.7	23-APR-1991
BE	< 3.0E-04	MG/L	EPA 200.7	23-APR-1991
CA	9.9E-02	MG/L	EPA 200.7	23-APR-1991
CD	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
CHLORIDE	6.8	MG/L	CAWW-300.0	25-APR-1991
CO	2.0E-02	MG/L	EPA 200.7	23-APR-1991
CR	1.2E-02	MG/L	EPA 200.7	23-APR-1991
CU	1.2E-01	MG/L	EPA 200.7	23-APR-1991
FE	1.5E+00	MG/L	EPA 200.7	23-APR-1991
FLUORIDE	.	MG/L	CAWW-300.0	25-APR-1991
K	311	MG/L	258.1	25-APR-1991
LI	< 1.5E+01	MG/L	EPA 200.7	23-APR-1991
MG	1.1E+00	MG/L	EPA 200.7	23-APR-1991
MN	7.2E-01	MG/L	EPA 200.7	23-APR-1991
MO	< 4.0E-02	MG/L	EPA 200.7	23-APR-1991
NA	9.7E+00	MG/L	EPA 200.7	23-APR-1991
NI	< 4.0E-03	MG/L	EPA 200.7	23-APR-1991
NITRATE	2.4	MG/L	CAWW-300.0	25-APR-1991
P	2.3E+02	MG/L	EPA 200.7	23-APR-1991
PB	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
PHOSPHATE	< 0.5	MG/L	CAWW-300.0	25-APR-1991
SB	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
SE	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
SI	< 2.0E-01	MG/L	EPA 200.7	23-APR-1991
SN	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
SR	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
SULFATE	30	MG/L	CAWW-300.0	25-APR-1991
TI	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991
V	< 2.0E-03	MG/L	EPA 200.7	23-APR-1991
ZN	7.0E-02	MG/L	EPA 200.7	23-APR-1991
ZR	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991

ANALY NO. CUSTOMERS ID DATE/TIME SAMPLED MATRIX MATERIAL DESC. FREQUENCY	ANALYSIS	RESULT	UNITS	PROCEDURE NO	COMPLETED
910408-081 MICRO1X 20-FEB-1991 SOIL-WATER					
	AG	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
	AL	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
	AS	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
	B	2.7E-01	MG/L	EPA 200.7	23-APR-1991
	BA	3.0E-02	MG/L	EPA 200.7	23-APR-1991
	BE	< 3.0E-04	MG/L	EPA 200.7	23-APR-1991
	CA	4.1E+01	MG/L	EPA 200.7	23-APR-1991
	CD	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
	CHLORIDE	1.4	MG/L	CAWW-300.0	25-APR-1991
	CO	< 4.0E-03	MG/L	EPA 200.7	23-APR-1991
	CR	1.1E-02	MG/L	EPA 200.7	23-APR-1991
	CU	1.2E-01	MG/L	EPA 200.7	23-APR-1991
	FE	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
	FLUORIDE	.	MG/L	CAWW-300.0	25-APR-1991
	K	1.5	MG/L	258.1	25-APR-1991
	LI	< 1.5E+01	MG/L	EPA 200.7	23-APR-1991
	MG	1.0E+01	MG/L	EPA 200.7	23-APR-1991
	MN	1.6E+00	MG/L	EPA 200.7	23-APR-1991
	MO	< 4.0E-02	MG/L	EPA 200.7	23-APR-1991
	NA	< 5.0E+00	MG/L	EPA 200.7	23-APR-1991
	NI	< 4.0E-03	MG/L	EPA 200.7	23-APR-1991
	NITRATE	< 0.5	MG/L	CAWW-300.0	25-APR-1991
	P	< 3.0E-01	MG/L	EPA 200.7	23-APR-1991
	PB	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
	PHOSPHATE	< 0.5	MG/L	CAWW-300.0	25-APR-1991
	SB	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
	SE	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
	SI	2.4E+00	MG/L	EPA 200.7	23-APR-1991
	SN	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
	SR	9.7E-02	MG/L	EPA 200.7	23-APR-1991
	SULFATE	78	MG/L	CAWW-300.0	25-APR-1991
	TI	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991
	V	< 2.0E-03	MG/L	EPA 200.7	23-APR-1991
	ZN	8.9E-01	MG/L	EPA 200.7	23-APR-1991
	ZR	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991

ANALY NO. CUSTOMERS ID DATE/TIME SAMPLED MATRIX MATERIAL DESC. FREQUENCY	ANALYSIS	RESULT	UNITS	PROCEDURE NO	COMPLETED
910408-082 MICRO10X 20-FEB-1991 SOIL-WATER					
	AG	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
	AL	6.4E-02	MG/L	EPA 200.7	23-APR-1991
	AS	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
	B	3.0E+00	MG/L	EPA 200.7	23-APR-1991
	BA	6.7E-03	MG/L	EPA 200.7	23-APR-1991
	BE	< 3.0E-04	MG/L	EPA 200.7	23-APR-1991
	CA	2.6E-01	MG/L	EPA 200.7	23-APR-1991
	CD	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
	CHLORIDE	2.7	MG/L	CAWW-300.0	25-APR-1991
	CO	1.2E-02	MG/L	EPA 200.7	23-APR-1991
	CR	8.6E-03	MG/L	EPA 200.7	23-APR-1991
	CU	7.5E+00	MG/L	EPA 200.7	23-APR-1991
	FE	1.4E+01	MG/L	EPA 200.7	23-APR-1991
	FLUORIDE	.	MG/L	CAWW-300.0	25-APR-1991
	K	0.1	MG/L	258.1	25-APR-1991
	LI	< 1.5E+01	MG/L	EPA 200.7	23-APR-1991
	MG	3.2E-01	MG/L	EPA 200.7	23-APR-1991
	MN	1.9E+01	MG/L	EPA 200.7	23-APR-1991
	MO	< 4.0E-02	MG/L	EPA 200.7	23-APR-1991
	NA	< 5.0E+00	MG/L	EPA 200.7	23-APR-1991
	NI	< 4.0E-03	MG/L	EPA 200.7	23-APR-1991
	NITRATE	553	MG/L	CAWW-300.0	25-APR-1991
	P	7.5E-01	MG/L	EPA 200.7	23-APR-1991
	PB	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
	PHOSPHATE	481	MG/L	CAWW-300.0	25-APR-1991
	SB	5.2E-02	MG/L	EPA 200.7	23-APR-1991
	SE	6.8E-02	MG/L	EPA 200.7	23-APR-1991
	SI	< 2.0E-01	MG/L	EPA 200.7	23-APR-1991
	SN	< 5.0E-02	MG/L	EPA 200.7	23-APR-1991
	SR	< 5.0E-03	MG/L	EPA 200.7	23-APR-1991
	SULFATE	5.4	MG/L	CAWW-300.0	25-APR-1991
	TI	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991
	V	< 2.0E-03	MG/L	EPA 200.7	23-APR-1991
	ZN	9.2E+00	MG/L	EPA 200.7	23-APR-1991
	ZR	< 2.0E-02	MG/L	EPA 200.7	23-APR-1991

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OAK RIDGE NATIONAL LABORATORY
ANALYTICAL CHEMISTRY DIVISION
RESULTS OF ANALYSES
CHEMICAL AND PHYSICAL ANALYSIS

CUSTOMER NAME R/L/ SIEGRIST 3-20
REQUEST NUMBER CPA11857
PROJECT NUMBER
SERIES

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APPROVED BY J.L. Puir
DATE 4-26-91

ANALY NO. CUSTOMERS ID DATE/TIME SAMPLED MATRIX MATERIAL DESC. FREQUENCY	ANALYSIS	RESULT	UNITS	PROCEDURE NO	COMPLETED
910313-045 TR01-01 A 18-FEB-1991 AMMONIUM ACE AMMONUIM ACETATE EXTRACTION					
	B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991
	CA	3.4E+02	MG/L	EPA 200.7	25-APR-1991
	FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
	K	0.26	MG/L	258.1	18-MAR-1991
	MG	1.7E+01	MG/L	EPA 200.7	25-APR-1991
	MN	< 4.0E-03	MG/L	EPA 200.7	25-APR-1991
	MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991
	NA	7.6	MG/L		18-MAR-1991
	ZN	9.2E-02	MG/L	EPA 200.7	25-APR-1991
910313-046 TR01-01 B 18-FEB-1991 AMMONIUM ACE AMMONUIM ACETATE EXTRACTION					
	B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991
	CA	3.6E+02	MG/L	EPA 200.7	25-APR-1991
	FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
	K	0.32	MG/L	258.1	18-MAR-1991
	MG	1.7E+01	MG/L	EPA 200.7	25-APR-1991
	MN	< 4.0E-03	MG/L	EPA 200.7	25-APR-1991
	MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991
	NA	8.3	MG/L		18-MAR-1991
	ZN	9.0E-02	MG/L	EPA 200.7	25-APR-1991
910313-047 TR01-33 A 18-FEB-1991 AMMONIUM ACE AMMONUIM ACETATE EXTRACTION					
	B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991
	CA	4.1E+02	MG/L	EPA 200.7	25-APR-1991
	FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
	K	0.24	MG/L	258.1	18-MAR-1991
	MG	1.7E+01	MG/L	EPA 200.7	25-APR-1991
	MN	1.4E-02	MG/L	EPA 200.7	25-APR-1991
	MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991
	NA	3.3	MG/L		18-MAR-1991
	ZN	2.4E-02	MG/L	EPA 200.7	25-APR-1991

910313-047 TR01-33 A 18-FEB-1991

910313-048 TR01-33 B 18-FEB-1991
AMMONIUM ACE AMMONUIM ACETATE EXTRACTION

B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991
CA	4.3E+02	MG/L	EPA 200.7	25-APR-1991
FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
K	0.17	MG/L	258.1	18-MAR-1991
MG	1.6E+01	MG/L	EPA 200.7	25-APR-1991
MN	1.7E-02	MG/L	EPA 200.7	25-APR-1991
MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991
NA	3.2	MG/L		18-MAR-1991
ZN	2.1E-02	MG/L	EPA 200.7	25-APR-1991

910313-049 TR01-56 A 18-FEB-1991
AMMONIUM ACE AMMONUIM ACETATE EXTRACTION

B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991
CA	4.4E+02	MG/L	EPA 200.7	25-APR-1991
FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
K	0.16	MG/L	258.1	18-MAR-1991
MG	1.7E+01	MG/L	EPA 200.7	25-APR-1991
MN	1.5E-02	MG/L	EPA 200.7	25-APR-1991
MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991
NA	3.2	MG/L		18-MAR-1991
ZN	< 2.0E-02	MG/L	EPA 200.7	25-APR-1991

910313-050 TR01-56 B 18-FEB-1991
AMMONIUM ACE AMMONUIM ACETATE EXTRACTION

B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991
CA	4.2E+02	MG/L	EPA 200.7	25-APR-1991
FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
K	0.20	MG/L	258.1	18-MAR-1991
MG	1.7E+01	MG/L	EPA 200.7	25-APR-1991
MN	1.2E-02	MG/L	EPA 200.7	25-APR-1991
MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991
NA	3.3	MG/L		18-MAR-1991
ZN	2.3E-02	MG/L	EPA 200.7	25-APR-1991

910313-051 TR03-12 A 19-FEB-1991
AMMONIUM ACE AMMONUIM ACETATE EXTRACTION

B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991
CA	4.1E+02	MG/L	EPA 200.7	25-APR-1991

910313-051 TR03-12 A 19-FEB-1991

FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
K	0.24	MG/L	258.1	18-MAR-1991
MG	1.6E+01	MG/L	EPA 200.7	25-APR-1991
MN	2.4E-02	MG/L	EPA 200.7	25-APR-1991
MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991
NA	3.7	MG/L		18-MAR-1991
ZN	1.1E-01	MG/L	EPA 200.7	25-APR-1991

910313-052 TR03-12 B 19-FEB-1991
AMMONIUM ACE AMMONUIM ACETATE EXTRACTION

B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991
CA	3.9E+02	MG/L	EPA 200.7	25-APR-1991
FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
K	0.16	MG/L	258.1	18-MAR-1991
MG	1.5E+01	MG/L	EPA 200.7	25-APR-1991
MN	2.5E-02	MG/L	EPA 200.7	25-APR-1991
MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991
NA	3.4	MG/L		18-MAR-1991
ZN	1.6E-01	MG/L	EPA 200.7	25-APR-1991

910313-053 TR03-39 A 19-FEB-1991
AMMONIUM ACE AMMONUIM ACETATE EXTRACTION

B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991
CA	3.3E+02	MG/L	EPA 200.7	25-APR-1991
FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
K	0.32	MG/L	258.1	18-MAR-1991
MG	2.1E+01	MG/L	EPA 200.7	25-APR-1991
MN	< 4.0E-03	MG/L	EPA 200.7	25-APR-1991
MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991
NA	3.8	MG/L		18-MAR-1991
ZN	< 2.0E-02	MG/L	EPA 200.7	25-APR-1991

910313-054 TR03-39 B 19-FEB-1991
AMMONIUM ACE AMMONUIM ACETATE EXTRACTION

B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991
CA	3.3E+02	MG/L	EPA 200.7	25-APR-1991
FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
K	0.40	MG/L	258.1	18-MAR-1991
MG	2.1E+01	MG/L	EPA 200.7	25-APR-1991
MN	< 4.0E-03	MG/L	EPA 200.7	25-APR-1991
MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991
NA	3.8	MG/L		18-MAR-1991

910313-054 TR03-39 B 19-FEB-1991

ZN	< 2.0E-02	MG/L	EPA 200.7	25-APR-1991

910313-055 TR03-72 A 19-FEB-1991
AMMONIUM ACE AMMONUIM ACETATE EXTRACTION

B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991
CA	3.5E+02	MG/L	EPA 200.7	25-APR-1991
FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
K	0.52	MG/L	258.1	18-MAR-1991
MG	2.2E+01	MG/L	EPA 200.7	25-APR-1991
MN	< 4.0E-03	MG/L	EPA 200.7	25-APR-1991
MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991
NA	5.8	MG/L		18-MAR-1991
ZN	< 2.0E-02	MG/L	EPA 200.7	25-APR-1991

910313-056 TR03-72 B 19-FEB-1991
AMMONIUM ACE AMMONUIM ACETATE EXTRACTION

B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991
CA	3.5E+02	MG/L	EPA 200.7	25-APR-1991
FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
K	0.31	MG/L	258.1	18-MAR-1991
MG	2.2E+01	MG/L	EPA 200.7	25-APR-1991
MN	< 4.0E-03	MG/L	EPA 200.7	25-APR-1991
MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991
NA	6.3	MG/L		18-MAR-1991
ZN	< 2.0E-02	MG/L	EPA 200.7	25-APR-1991

910313-057 TR04-10 A 20-FEB-1991
AMMONIUM ACE AMMONUIM ACETATE EXTRACTION

B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991
CA	3.4E+02	MG/L	EPA 200.7	25-APR-1991
FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
K	0.32	MG/L	258.1	18-MAR-1991
MG	2.2E+01	MG/L	EPA 200.7	25-APR-1991
MN	1.8E-02	MG/L	EPA 200.7	25-APR-1991
MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991
NA	3.3	MG/L		18-MAR-1991
ZN	4.4E-02	MG/L	EPA 200.7	25-APR-1991

910313-058 TR04-10 B 20-FEB-1991
AMMONIUM ACE AMMONUIM ACETATE EXTRACTION

B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991

910313-058 TR04-10 B 20-FEB-1991

CA	3.5E+02	MG/L	EPA 200.7	25-APR-1991
FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
K	0.36	MG/L	258.1	18-MAR-1991
MG	2.2E+01	MG/L	EPA 200.7	25-APR-1991
MN	2.6E-02	MG/L	EPA 200.7	25-APR-1991
MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991
NA	3.6	MG/L		18-MAR-1991
ZN	4.0E-02	MG/L	EPA 200.7	25-APR-1991

910313-059 TR04-22 A 20-FEB-1991
AMMONIUM ACE AMMONUIM ACETATE EXTRACTION

B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991
CA	3.7E+02	MG/L	EPA 200.7	25-APR-1991
FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
K	0.28	MG/L	258.1	18-MAR-1991
MG	1.9E+01	MG/L	EPA 200.7	25-APR-1991
MN	< 4.0E-03	MG/L	EPA 200.7	25-APR-1991
MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991
NA	3.1	MG/L		18-MAR-1991
ZN	2.7E-02	MG/L	EPA 200.7	25-APR-1991

910313-060 TR04-22 B 20-FEB-1991
AMMONIUM ACE AMMONUIM ACETATE EXTRACTION

B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991
CA	4.0E+02	MG/L	EPA 200.7	25-APR-1991
FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
K	0.28	MG/L	258.1	18-MAR-1991
MG	2.0E+01	MG/L	EPA 200.7	25-APR-1991
MN	< 4.0E-03	MG/L	EPA 200.7	25-APR-1991
MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991
NA	3.0	MG/L		18-MAR-1991
ZN	2.0E-02	MG/L	EPA 200.7	25-APR-1991

910313-061 TR04-65 A 20-FEB-1991
AMMONIUM ACE AMMONUIM ACETATE EXTRACTION

B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991
CA	4.4E+02	MG/L	EPA 200.7	25-APR-1991
FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
K	0.16	MG/L	258.1	18-MAR-1991
MG	2.0E+01	MG/L	EPA 200.7	25-APR-1991
MN	< 4.0E-03	MG/L	EPA 200.7	25-APR-1991
MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991

910313-061 TR04-65 A 20-FEB-1991

NA	3.2	MG/L		18-MAR-1991
ZN	< 2.0E-02	MG/L	EPA 200.7	25-APR-1991

910313-062 TR04-65 B 20-FEB-1991
AMMONIUM ACE AMMONUIM ACETATE EXTRACTION

B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991
CA	4.0E+02	MG/L	EPA 200.7	25-APR-1991
FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
K	0.16	MG/L	258.1	18-MAR-1991
MG	1.9E+01	MG/L	EPA 200.7	25-APR-1991
MN	< 4.0E-03	MG/L	EPA 200.7	25-APR-1991
MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991
NA	2.8	MG/L		18-MAR-1991
ZN	< 2.0E-02	MG/L	EPA 200.7	25-APR-1991

ANALY NO. CUSTOMERS ID DATE/TIME SAMPLED MATRIX MATERIAL DESC. FREQUENCY	ANALYSIS	RESULT	UNITS	PROCEDURE NO	COMPLETED
910326-035 AMMONIUM ACETAT AMMONIUM ACETATE EXTRACTION					
	AG	< 2.0E-02	MG/L	EPA 200.7	25-APR-1991
	AL	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
	AS	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
	B	< 3.2E-01	MG/L	EPA 200.7	25-APR-1991
	BA	< 4.0E-03	MG/L	EPA 200.7	25-APR-1991
	BE	< 1.2E-03	MG/L	EPA 200.7	25-APR-1991
	CA	3.1E+00	MG/L	EPA 200.7	25-APR-1991
	CD	< 2.0E-02	MG/L	EPA 200.7	25-APR-1991
	CO	< 1.6E-02	MG/L	EPA 200.7	25-APR-1991
	CR	< 1.6E-02	MG/L	EPA 200.7	25-APR-1991
	CU	< 2.8E-02	MG/L	EPA 200.7	25-APR-1991
	FE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
	LI	< 6.0E+01	MG/L	EPA 200.7	25-APR-1991
	MG	2.4E-01	MG/L	EPA 200.7	25-APR-1991
	MN	< 4.0E-03	MG/L	EPA 200.7	25-APR-1991
	MO	< 1.6E-01	MG/L	EPA 200.7	25-APR-1991
	NA	< 2.0E+01	MG/L	EPA 200.7	25-APR-1991
	NI	< 1.6E-02	MG/L	EPA 200.7	25-APR-1991
	P	< 1.2E+0[illegible]	MG/L	EPA 200.7	25-APR-1991
	PB	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
	SB	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
	SE	< 2.0E-01	MG/L	EPA 200.7	25-APR-1991
	SI	8.8E-01	MG/L	EPA 200.7	25-APR-1991
	SN	3.9E-01	MG/L	EPA 200.7	25-APR-1991
	SR	< 2.0E-02	MG/L	EPA 200.7	25-APR-1991
	TI	< 8.0E-02	MG/L	EPA 200.7	25-APR-1991
	V	< 8.0E-03	MG/L	EPA 200.7	25-APR-1991
	ZN	9.9E-02	MG/L	EPA 200.7	25-APR-1991
	ZR	< 8.0E-02	MG/L	EPA 200.7	25-APR-1991

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OAK RIDGE NATIONAL LABORATORY
ANALYTICAL CHEMISTRY DIVISION
RESULTS OF ANALYSES
LOW LEVEL RADIOCHEMICAL ANALYSIS

CUSTOMER NAME RL SIEGRIST
REQUEST NUMBER LLL12588
PROJECT NUMBER
SERIES

DATE RECEIVED 1-MAR-1991 14:16
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DATE 3-20-91

CUSTOMER ID / SAMPLE MATRIX / MATERIAL DESCRIPTION	ACD NUMBER / FREQUENCY	DATE SAMPLED	G-ALPHA	G-BETA
TP03-12 WATER SOIL AND WATER	910301-162	19-FEB-1991 16:30	70 +/- 100 BQ/KG EPA-900.0	10 +/- 120 BQ/KG EPA-900.0
TP03-39 WATER SOIL AND WATER	910301-163	19-FEB-1991 16:50	76 +/- 90 BQ/KG EPA-900.0	60 +/- 120 BQ/KG EPA-900.0
TP03-72 WATER SOIL AND WATER	910301-164	19-FEB-1991 16:15	18 +/- 7 BQ/KG EPA-900.0	20 +/- 180 BQ/KG EPA-900.0
TP04-10 WATER SOIL AND WATER	910301-165	20-FEB-1991 12:30	72 +/- 85 BQ/KG EPA-900.0	120 +/- 100 BQ/KG EPA-900.0
TP04-22 WATER SOIL AND WATER	910301-166	20-FEB-1991 12:40	5 +/- 48 BQ/KG EPA-900.0	130 +/- 170 BQ/KG EPA-900.0

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CUSTOMER ID / SAMPLE MATRIX / MATERIAL DESCRIPTION	ACD NUMBER / FREQUENCY	DATE SAMPLED	G-ALPHA	G-BETA
TP04-65 WATER SOIL AND WATER	910301-167	20-FEB-1991 12:20	-21 +/- 54 BQ/KG EPA-900.0	-110 +/- 240 BQ/KG EPA-900.0
TP04-W WATER SOIL AND WATER	910301-168	20-FEB-1991 11:40	430 +/- 600 BQ/KG EPA-900.0	1200 +/- 1400 BQ/KG EPA-900.0

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