DOE/MC/29105--3970
(DE95000054)

VAC*TRAX℠ Vacuum Thermal Desportion

Topical Report

DISCLAIMER

September 1994

Work Performed Under Contract No.: DE-AC21-92MC29105

For

U.S. Department of Energy
Office of Environmental Management
Office of Technology Development
Washington, DC

U.S. Department of Energy
Office of Fossil Energy
Morgantown Energy Technology Center
Morgantown, West Virginia

By
Clemson Technical Center, Inc.
Anderson, South Carolina

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P.O. Box 880
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By

Clemson Technical Center, Inc.
Clemson Research Park
100 Technology Drive
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September 1994

Technical Report 94-014

FINAL TOPICAL REPORT ON VAC*TRAX^{SM} VACUUM THERMAL DESORPTION

September 30, 1994

Executive Summary

Rust-Clemson Technical Center (CTC) conducted pilot VAC*TRAX treatability testing on RCRA, TSCA, and RCRA/radioactive mixed wastes as part of the Program for Research and Development Announcement (PRDA) Program. This testing is designed to determine the effectiveness of the VAC*TRAX system in remediating organics' contaminated solids, as well as to determine the economic viability of the system for the remediation of a number of mixed waste streams.

The patented VAC*TRAX process is an innovative thermal desorption technology which volatilizes organic compounds by indirectly heating the feed material in a vacuum batch dryer with an inert atmosphere and a high vacuum (> 88 kPa), condensing the organics separately from the remaining solids. This testing was conducted with the VAC*TRAX system at Rust's Clemson Technical Center in Anderson, South Carolina.

A total of seven RCRA and/or TSCA tests were performed, in addition to four tests on RCRA mixed waste. Contaminants of concern included, but were not limited to, tetrachloroethene, bis(2-ethylhexyl)phthalate, pentachlorophenol, and PCBs. Treatment goals, as specified in the contract, were met or exceeded in all cases. Of specific interest were a tetrachloroethene removal efficiency exceeding 99.99% and PCB removal from a starting level of 990 ppm to a final level of less than 1 ppm.

In addition to organics, one of the test runs was spiked with molybdenum trioxide, used to simulate uranium. In this test, it was demonstrated that the molybdenum remained in the treated solids, not transferring to the condensate. Additionally, in the mixed waste tests, uranium present in a feed soil remained in the soil; the filtered condensate was found to be below the drinking water standard for radioactivity.

The test runs were performed in cycle times typically less than eight hours, with heating times of less than 4 hours in some cases. This, in addition to the low temperatures utilized make the design of the full-scale system technically sound, as well as being economically feasible.

The laboratory treatability study was conducted by Michael McElwee and Jeff Finger and supervised by Carl Palmer. This report was written by Michael McElwee and supervised by Carl Palmer.

mgm for Carl Palmer	Michael J. McElwee
Carl Palmer Project Manager	Michael J. McElwee Engineer I

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1.0 INTRODUCTION

The pilot testing operations conducted under the PRDA VAC*TRAX^{SM} program were divided into two parts. The first part involved a series of tests on mixed waste surrogate materials. Surrogates for mixed waste were defined as either soils spiked with representative RCRA regulated contaminants or RCRA or TSCA regulated waste materials that are typical of or identical to mixed wastes but do not contain a radioactive component. The second part involved testing on true mixed-waste samples. This test report presents the results of both parts of the testing. These tests were conducted under tasks 1.4 and 1.5 of the PRDA program.

The VAC*TRAX treatability test runs for Task 1.4 of the VAC*TRAX PRDA Project consisted of seven runs: two runs on a spiked standard reference material (EPA's Synthetic Soil Matrix, aka "SSM"), two on contaminated PPE from the DOE Rocky Flats Site, and three on PCB contaminated soil from the Resolve Superfund Site. Contaminants included volatiles, semi-volatiles, and PCBs. Additionally, one of the reference samples was spiked with molybdenum trioxide.

Task 1.4 of the VAC*TRAX PRDA Program was designed to demonstrate the effectiveness of the VAC*TRAX process on spikes and RCRA waste prior to the testing of mixed waste. Treatment goals, as specified in the contract, are:
(1) to reduce 60% of the contaminants of concern to below regulatory levels, and (2) to reduce the concentrations of 80% of the remaining compounds by 90%. An additional goal, set by CTC, was to demonstrate that metals, particularly radioactive metals such as uranium, would remain in the feed, not transferring in any significant quantity to the residuals. Molybdenum was used to simulate uranium in one of the spiked materials.

The VAC*TRAX treatability test runs for Task 1.5 of the consisted of four runs: two on soil and lint contaminated with volatiles, particularly tetrachloroethylene, and two on soil and rocks contaminated with the same constituents. Depleted uranium was the radioactive constituent in both cases.

Task 1.5 of the VAC*TRAX PRDA Program was designed to demonstrate the effectiveness of the VAC*TRAX process on mixed waste. Treatment goals, as specified in the contract, are: (1) to reduce 60% of the contaminants of concern to below regulatory levels, and (2) to reduce the concentrations of 80% of the remaining compounds by 90%. Ideally, the treatment will be sufficient to allow for the ultimate disposal of the waste in a low-level radioactivity landfill.

The VAC*TRAX treatability testing on the spike samples, as well as the RCRA waste tests, was completed by Michael McElwee and Todd Beaton. The mixed waste testing was performed my Michael McElwee, Michael Duncan, and Jeffrey Finger. Reports on both the RCRA and mixed waste testing were written by Michael McElwee. This work was conducted under the supervision of Carl Palmer. The results of Task 1.4 and Task 1.5 runs are presented in this report.

2.0 DESCRIPTION OF THE LABORATORY SCALE VAC*TRAX UNIT

VAC*TRAX treatment is a low temperature separation process that evaporates or volatilizes organic contaminants from soils, sludges, and other types of solid substances or wastes. It operates by heating the contaminated material in a nitrogen atmosphere in a jacketed vessel; hot oil is passed through the vessel jacket to supply heat to the system. To facilitate desorption, the dryer has the capability to operate at high vacuum, up to 94.6 kPa (28 in. Hg) vacuum. The nitrogen serves as an inert carrier gas for the volatilized organics, transporting them to the gas-treatment system, which consists of a condensing train followed by HEPA filter and activated carbon adsorption beds.

2.1 The Vacuum Dryer System

The function of the pilot unit is to provide a preliminary assessment of VAC*TRAX capability for treating contaminated wastes. The pilot vacuum dryer is heated by a 24 kilowatt hot oil system with a maximum temperature capability of 288°C (550°F). The dryer vessel has a total volume of 54 liters (1.9 cubic feet) and a working volume of 31 liters (1.1 cubic feet). The vessel has a heat transfer area of 1.3 square meters (14 square feet), with a soil to steel contact heat transfer area of 0.78 square meters (8.4 square feet). This configuration is designed to simulate the performance achievable by a full scale VAC*TRAX dryer. The pilot unit can process approximately 50 kg of soil per batch.

A block flow diagram illustrating the process is shown in Figure 2-1 and a process flow diagram in Figure 2-2. The contaminated material is fed into the vacuum dryer through a flanged aperture in the top of the dryer. The hot oil passed though the jackets in the dryer is heated as high as 288°C (550°F) depending on the type of material being treated. The nitrogen carrier gas is preheated, typically up to the oil temperature and introduced into the vessel. Volatilized contaminants and water vapor are transported with the carrier gas to the gas treatment system. Fine particles from the dry treated solids that are entrained in the carrier gas are removed by an integral steel filter in the dryer's cupola section. These particles are blown back into the dryer at the end of the treatment cycle. When the batch has been heated sufficiently, the product may be dropped from the dryer into a gasketed stainless steel collection vessel by means of a door on the bottom of the dryer.

2.2 The Gas Treatment System

The contaminated carrier gas passes through a steel filter in the bonnet of the dryer before exiting the dryer and passing to the gas handling skid. The filter serves to remove particulate matter from the gas stream prior to further treatment. The gas enters the gas treatment system and passes through a shell-and-tube heat exchanger that uses a room temperature 50/50 water/ethylene glycol mixture as the cooling fluid. Next the gas enters another shell-and-tube heat exchanger, this one chilled to 4 °C (40°F) using a 50/50 water/ethylene glycol mixture. These condensers are both before the vacuum pump and are operated at full vacuum during a portion of the drying cycle. The gas then goes through a small cartridge filter and the vacuum pump. The third and final stage of the condensing train is another shell-and-tube heat exchanger cooled with a refrigerated 50/50 glycol/water mixture at 4°C (40°F). Here the carrier gas is cooled to approximately 7°C (45°F) and most of the remaining condensible components are removed. The gas stream then passes through a HEPA filter and two activated carbon adsorption drums in series and is vented to the atmosphere. The vented gas stream is approximately 93-97% nitrogen and 0-7% oxygen, with water and a trace of non-condensible volatile organic compounds making up the balance.

2.3 The Fate of Treatment Residuals

Condensates from the primary, secondary, and tertiary condensers are collected in traps which are drained at regular intervals. Additionally, solids present in the vacuum filter, a filter in place to protect the vacuum pump from damage, will be collected at the end of a test run for disposal purposes. Samples of the treated solids, condensed water, and condensed oil are retained for chemical analyses when available. Condensate oil is typically not recoverable unless the feed material has a significant oil content. The remaining products and residuals are properly packaged for disposal or are returned to the client depending on the clients requirements as well as federal regulations. All solids and liquids are weighed for material balance purposes.

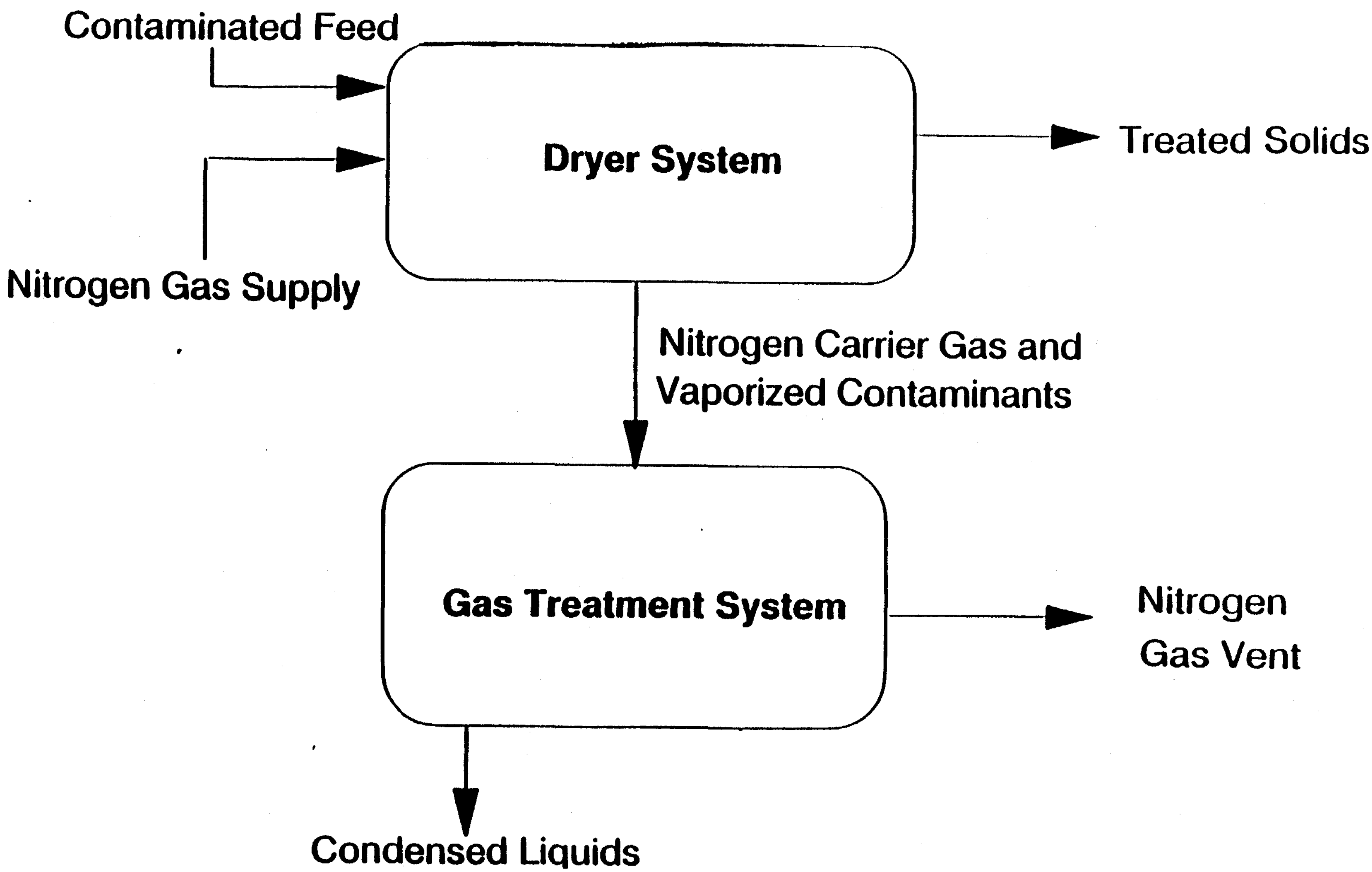

Figure 2.1 Block Flow Diagram of the Laboratory VAC*TRAX Unit

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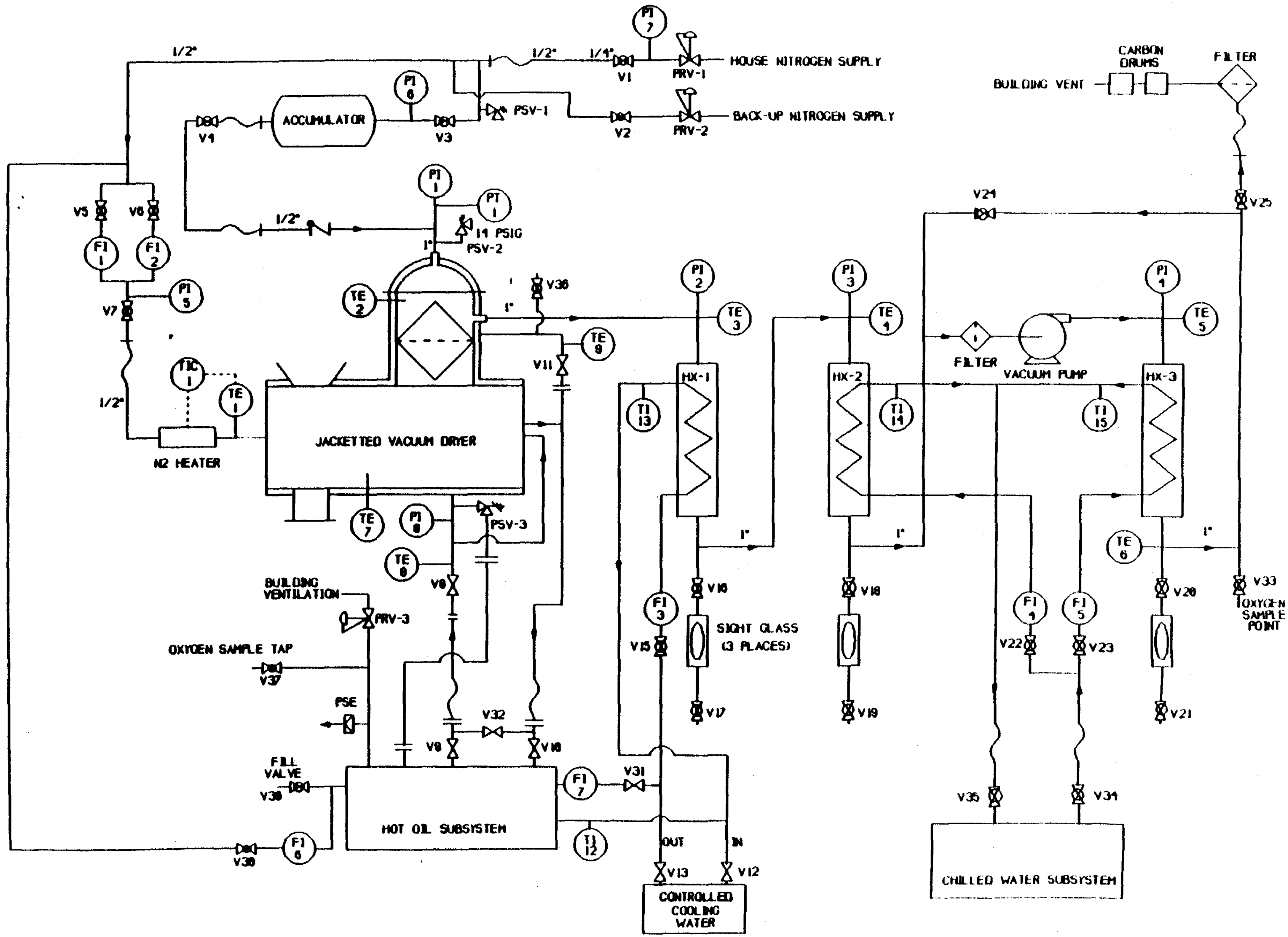

Figure 2-2. Process Flow Diagram of the VAC*TRAX Unit

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Key to Figure 2-2

TE1	thermocouple at nitrogen inlet to dryer, sensing element for controller
TE2	thermocouple in cupola
TE3	thermocouple at gas inlet to first heat exchanger
TE4	thermocouple at gas inlet to second heat exchanger
TE5	thermocouple at gas inlet to third heat exchanger
TE6	thermocouple at gas outlet to third heat exchanger
TE7	thermocouple through bottom of dryer, measuring product temperature
TE8	thermocouple measuring oil temperature entering dryer agitator
TE9	thermocouple measuring oil temperature exiting dryer agitator
TI12	temperature indicator measuring cooling water entering hot oil unit
TI13	temperature indicator measuring cooling water entering first condenser
TI14	temperature indicator measuring cooling water entering second condenser
TI15	temperature indicator measuring cooling water entering third condenser
V1	ball valve for positive shutoff of house nitrogen supply
V2	ball valve for positive shutoff of backup nitrogen supply
V3	ball valve opened when V4 is closed to charge accumulator tank
V4	ball valve used with V3 to charge accumulator to blow back cupola
V5	ball valve used to control nitrogen flow to dryer
V6	ball valve used to control nitrogen flow to dryer
V7	valve adjusted to keep pressure at 0 when nitrogen flows to dryer
V8	gate valve on dryer at oil inlet
V9	gate valve on hot oil unit at oil discharge
V10	gate valve on hot oil unit at oil return
V11	gate valve on dryer at oil outlet
V12	ball valve at controlled cooling water return
V13	ball valve at controlled cooling water supply
V15	ball valve used to adjust flow to condenser 1
V16	ball valve used to isolate system from atmosphere during condensate collection
V17	ball valve for emptying condensate trap
V18	ball valve used to isolate system from atmosphere during condensate collection
V19	ball valve for emptying condensate trap
V20	ball valve used to isolate system from atmosphere during condensate collection
V21	ball valve for emptying condensate trap
V22	ball valve used to control flow to condenser 2
V23	ball valve used to control flow to condenser 3
V24	ball valve used to adjust vacuum in system
V25	ball valve used to adjust flow to ventilation
V30	needle valve used to control nitrogen flow to hot oil system
V31	ball valve used to control flow of cooling water to hot oil system
V32	gate valve used to bypass oil flow to dryer
V33	ball valve used to allow an air sample to be taken for analysis
V34	ball valve at chilled water subsystem supply
V35	ball valve at chilled water subsystem return

V36	ball valve used to bleed air from system
V37	ball valve used to allow an air sample to be taken for analysis
V38	ball valve opened to allow oil to be added to the hot oil system

PI1	pressure indicator at top of cupola
PI2	pressure indicator at gas entry for condenser 1
PI3	pressure indicator at gas entry for condenser 2
PI4	pressure indicator at gas entry for condenser 3
PI5	pressure indicator for nitrogen entering dryer
PI6	pressure indicator for the nitrogen accumulator
PI7	pressure indicator for the house nitrogen supply
PI8	pressure indicator for hot oil entering dryer
PT1	pressure transducer reading pressure at top of cupola
FI1	flow indicator for nitrogen entering dryer - high scale
FI2	flow indicator for nitrogen entering dryer - low scale
FI3	flow indicator for cooling water to condenser 1
FI4	flow indicator for cooling water to condenser 2
FI5	flow indicator for cooling water to condenser 2
FI6	flow indicator for nitrogen to hot oil system
FI7	flow indicator for cooling water to hot oil system

TIC1	temperature controller for nitrogen heater

PRV-1	pressure regulating valve to house nitrogen supply
PRV-2	pressure regulating valve to back-up nitrogen supply
PRV-3	pressure regulating valve to exit vent to hot oil system
PSV-1	pressure safety valve, prevents overpressurizing accumulator
PSV-2	pressure safety valve, prevents overpressurizing dryer
PSV-3	pressure safety valve, prevents overpressurizing agitator
PSE	rupture disc, prevents overpressurizing expansion tank

3.0 STANDARD PROCEDURE FOR TREATABILITY STUDIES

There is a standard procedure for conducting VAC*TRAX treatability studies. The procedure begins with the issuance of a sample authorization number which facilitates tracking. A sample authorization number must be assigned before sample shipment to CTC. Any sample shipped to CTC without a sample authorization number will not be accepted. The received sample is weighed and logged in at the sample receiving area. Feed preparation, process operation, sampling of feed and product streams, system decontamination, and disposal of residuals are discussed below.

3.1 Feed Preparation

The treatability sample size requested is usually 70 liters (15 gallons, in three five-gallon pails). Chain-of-custody documents must accompany all samples. Upon receipt the sample is visually inspected for material larger than 25 mm (1") in size that might damage the vacuum dryer agitator. If large objects are observed in the sample, the sample will be screened to remove the oversize particles. The weights of the screened and oversize fractions are recorded as well as visual observations of the treatability sample. The screened portion is sealed in five-gallon polypropylene or stainless steel pails with gasketed lids. The required amount of feed material (usually one five-gallon pail) is stored at 4°C (39°F), any excess feed is stored at room temperature. The oversize pieces are similarly sealed and stored at room temperature.

After the feed is screened, or after screening is deemed unnecessary, the sample is homogenized by hand mixing. Wet cohesive type soils (clays) are more difficult to homogenize than drier, non-cohesive type soils and may affect the resulting homogeneity. After mixing, a sample is withdrawn for physical and chemical analyses. If the material is difficult to homogenize, the smaller analytical sample is also homogenized to provide a sample of consistent quality to the laboratory. The sample is identified as the preliminary feed and is assigned a sample ID suffix of -01 (Example: CTC-01).

The analyses requested depends on the specific nature of the sample, prior analytical information for the waste, source site history, particular client requests, and the principal contaminants of concern.

The sample is not run through the pilot VAC*TRAX unit until sufficient analytical information is available. This assures that the sample contains the contaminants of concern, allows the identification of extraordinary health and safety requirements, and assures that the appropriate operating conditions are selected.

3.2 Process Operation

To begin the test run, the sample is loaded into the vacuum dryer using a stainless steel funnel bolted to an aperture at the top of the dryer vessel. If the sample emits substantial vapors, a small vacuum hood will be set up above the funnel during sample loading. Approximately 31 liters (1.1 cubic feet) of material is loaded into the system. After loading, the funnel is removed and replaced with the flanged lid for the vacuum dryer. This is resealed securely so that maximum vacuum may be achieved.

After loading the dryer with the sample, the power to the VAC*TRAX system is turned on. At this point, if necessary, oil is added to the hot oil system such that the oil level is between one-quarter and one-half filled as viewed on the expansion tank sight glass. Then, both the dryer and the hot oil system are purged with nitrogen, and oxygen is bled out of the system. The vacuum pump is also turned on at this time, but the vacuum bypass is kept almost all the way open, thus applying only a minimal vacuum to the system. Once an acceptable oxygen concentration has been achieved in the system, less than 7%, the nitrogen flow rate is reduced, typically to around 33.3 L/min (70 SCFH) and the process water and chilled water flows to the condensers are turned on.

Next, the hot oil pump is turned on, and oil is pumped through the agitator and jackets in the dryer. The oil setpoint is set at the initial setpoint, typically 148°C (298°F) and the system is allowed to heat up. During this time, water, as well as low boiling volatiles, will be removed from the sample and condensed by the heat exchangers. The rationale for this reduced drying temperature is to match the drying rate of a full-scale unit having a lower surface area to mass ratio than the pilot unit has. Condensate from heat exchangers 1,2 and 3 will be collected individually, weighed, and then composited so that an adequate amount is available for analysis. During this time, pressure and temperature data will be taken frequently to obtain as much information as possible. Data will be taken at least every fifteen minutes.

While the water and low boiling volatiles are being removed from the sample, both the product and vapor temperatures will increase much more slowly than otherwise. When the water is finally removed, the vapor and product temperatures will again begin to elevate. Additionally, the rate of liquids condensing will decrease as the water is removed, reducing to around zero when almost all of the water has been removed.

Once it is obvious that the bulk of the water has been removed from the solids, the vacuum is gradually increased to full vacuum, being careful not to overload the condensers. Then, the oil setpoint is increased to 288°C (550°F), the maximum temperature achievable for the VAC*TRAX pilot system. This will result in a maximum product temperature of approximately 232-260°C (450-500°F). Once the final solids temperature has been achieved, the temperature will be maintained for a predetermined period of time, to guarantee that all of the soil has been properly heated.

After the soil has been heated for the prescribed amount of time, the vacuum in the system is reduced to slightly negative, around 7 kPa (2 in. Hg). Then, the nitrogen accumulator tank is charged to around 465 mm Hg (9 PSIG) with nitrogen, and then the nitrogen is immediately released into the top of the cupola. In this way, the particles trapped in the filter are blown back onto the soil. After allowing the product to mix a few more minutes, it is then dropped out of the bottom of the dryer into a gasketed stainless steel collection vessel connected to the dryer. The system is allowed to run for another 30 minutes, giving the dryer agitator sufficient time to sweep the majority of the sample into the product hopper. Then, the dryer door is reclosed, and the temperature setpoint for the oil is reduced to 0°C (32°F), and the system is run at only a slight vacuum. The system is allowed to run until the discharge temperature of the hot oil unit is below 68°C (140°F). Then, the hot-oil unit is turned off, the coolant water flows are turned off, the nitrogen is turned off, the dryer agitator is turned off, the vacuum pump is turned off, and then the power to the dryer and gas skids are turned off. The system is still hooked up to the building ventilation, however, so that any fumes or vapors leaving the gas condensing skid will pass through a HEPA filter and two activated carbon drums before being vented to the atmosphere.

3.3 Sampling of Feed and Product Streams

The feed sample is taken just prior to loading the feed into the dryer. Depending on the composition and nature of the feed, the sample will either be taken from the feed bucket or from the dryer, after loading and mixing. In either event, the feed is thoroughly homogenized prior to the taking of the sample to ensure that a representative sample has been taken. The feed sample is identified as the run feed and given the sample ID suffix -02 (i.e. CTC-02).

The solid product is collected from the stainless steel collection hopper after it has been allowed to cool. The sample is given the identifier CTC-03. Typically, duplicate product samples are collected, in which case the sample identifiers will be CTC-03A and CTC-03B, for the first and second samples respectively.

The composited condensates are filtered through Whatman 54 filter paper (nominal 25-micron retention), mixed well, then samples are drawn for chemical analyses. This liquid is identified as condensed water and given the sample ID suffix -06 (i.e. CTC-06).

In the event an oil layer is present in the condensate it is removed prior to filtration if possible. Any oil recovered is weighed, recorded and sent for analysis if a sufficient quantity is recovered. Oil recovered from the condensate is identified as condensed oil and given the sample ID suffix -10 (i.e. CTC-10).

Solid material may collect in the carryover pipe between the dryer outlet and the gas handling system and in the vacuum pump suction filter. This material is recovered, weighed, and if adequate, sent for analysis. The material recovered from the carryover line will be identified with the sample ID suffix -12 (i.e. CTC-12) and the vacuum pump suction filter solids will be identified by the suffix -13 (i.e. CTC-13).

3.4 System Decontamination and Disposal of Residuals

The product, collected in a stainless steel collection vessel, is sampled and then transferred to a 5 gallon pail for disposal purposes. This is accomplished in several steps. The process begins by overlapping the top of the product collection vessel with the opening of a high-strength plastic bag and then duct-taping the bag/vessel seam. This is done with one or two more plastic bags over the original bag, reducing the possibility of a spill due to a bag ripping. Next, the bottom of the plastic bags are placed in a 5 gallon bucket and the product hopper is tipped slightly, allowing the product to pour slowly from the collection vessel to the plastic bags. When the transfer is complete, the product hopper is turned horizontally clockwise several times, causing the top of the plastic bag to twist, sealing the bag. The bag is then cut above the twisted section, separating it from the collection vessel. Transfer is now complete, and the lid can be placed on the bucket.

The dryer vessel will still contain a small amount of solid product. This is recovered by a series of steps. First, a spray bottle containing distilled water is weighed. Next, the top flange on the dryer is removed and the remaining product in the dryer is sprayed with water to prevent dusting. Then, the dryer door is opened, and the remaining sample is removed from the dryer using gloves, brushes, spatulas, etc. as required. The water bottle is weighed at the end of this step, so that the amount of water added to the solids is known. A saranex apron with arm protection or the equivalent is required for this stage. After the solids have been removed, the inside of the dryer is cleaned with a laboratory detergent and scrub brush and rinsed with tap water three times.

The gas handling system is disassembled, and each component is washed with a laboratory detergent and scrub brush. The washed components are then rinsed with tap water three times. The wash water and water from the first two rinses are combined and labeled as waste water that is disposed of as a hazardous waste. If the sample was radioactive, the decontamination liquids will be filtered to remove any radioactive material from the liquids so that it may be disposed of as a hazardous waste.

In some instances, it may be necessary to perform a sand run after testing a sample. In this instance, 10-15 kg of sand will be placed in the vacuum dryer and allowed to agitate for several hours to remove any particles adhering to the walls of the vessel or to the agitator blades. This sand will be tested, and will be disposed of as a hazardous or radioactive waste as appropriate. If the sand is a mixed waste, it must either be returned to the client or else have its hazardous component removed, allowing it to be disposed of as radioactive waste.

All solid product, feed, and scrap is packaged, labeled, and weighed for inventory and mass balance purposes. The fate of the solid material depends on the needs of the client. It is either returned to the client or disposed of as hazardous or radioactive waste, as appropriate. Mixed waste must be returned to the client, if its hazardous constituent cannot be removed. All remaining liquids are packaged properly and disposed of as a hazardous or radioactive waste as appropriate. If radioactive, the liquids will be filtered to remove the radioactive particles. From previous experience, this should reduce the radioactivity level of the liquids to below background. All decontamination and disposal activities are conducted in a manner consistent with all relevant federal, state, and local regulations governing hazardous and/or radioactive waste at the Clemson Technical Center (CTC) facility.

4.0 DESCRIPTION OF THE SURROGATE TESTING TREATABILITY TEST RUNS

A description of the treatability runs is given below. The description includes a discussion of sample preparation, deviations from the standard treatability study procedure, a chronology of significant events during the test, sample collection, and sample analysis.

4.1 Description of the Synthetic Soil Matrix Treatability Study Runs

The first two surrogate tests were performed on spiked soil samples. The soil matrix and spiking compounds that were used was the Synthetic Soil Matrix (SSM) that established by the USEPA [1]. This material was established by EPA as being representative of typical soil found at contaminated sites for the evaluation of treatment processes under Superfund. Also, representative organic and toxic metal contaminants were identified by EPA. This matrix and compounds were used so that the results of the VAC*TRAX testing would be comparable to results obtained by other process development and testing programs. Furthermore, this same matrix and spiking compounds were tested in the lab X*TRAX™ unit early during the X*TRAX development program. By using it in VAC*TRAX a direct performance link is established between the two technologies.

4.1.1 Feed Preparation and Description

Both the first and second VAC*TRAX performance runs, runs SRM and SAR respectively, were completed using the SSM material. Both of these samples were spiked with the same volatiles and semi-volatiles; the second run, SAR, was also spiked with molybdenum trioxide, as a uranium surrogate. The procedures for spiking the reference material are shown in Appendix A. The EPA's "high organics" spiking

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[1] Foster Wheeler Test Report, Contract No. 68-09-0033, "Clean SSM Manufacture, Physical and Chemical Analysis," Aug. 28, 1991.

levels were used, and no hazardous metals were used. Anthracene was eliminated from the mixture, as it is not typical of the DOE contaminant profile.

After the first sample, SRM, was prepared, it was stored in 2, 19 liter (5 gallon) buckets for several weeks. Then, water was added to one of the two buckets the day before the test run to increase the moisture in the soil. All of the bucket that had water added to it, as well as half of the bucket that didn't, was added to the vacuum dryer and allowed to mix for 10 - 15 minutes. Then, the run feed was taken from the dryer and given the identifier SRM-02.

The second sample, SAR, was prepared in the same fashion as SRM. It was only stored for two days before running, however. The day before the test, water was added to one of the buckets, as was done with the SRM sample. Then, all of the bucket with water added, and half of the other bucket was added to the vacuum dryer, the agitator was run for 10 - 15 minutes, and the feed was sampled as before, given the identifier SAR-02.

The spiking compounds used, the spiking levels, and the analytical results for the run feeds from the two test runs (SRM-02 and SAR-02) are shown in Table 4-1. Both the SAR-02 and SRM-02 analyses indicate significantly lower concentrations of volatiles and semi-volatiles then were added to the material. Additionally, the SRM-02 material had significantly lower volatiles concentrations than the SAR-02 sample.

Table 4-1. Analyses of the SRM and SAR Run Feed

Component	Component Concentration in Feed (ppm)		
	Spiking Level	SRM Level	SAR Level
Acetone	6,800	423	1,440
Carbon Tetrachloride	2,500	BQL(31)	91.7
TCE	600	BQL(31)	BQL(78)
Perc	600	31.6	103
Chlorobenzene	400	BQL(31)	BQL(78)
Ethylbenzene	3,200	580	552
Xylene	8,200	1,102	2,342
Styrene	1,000	132	404
Bis(2-ethylhexyl)phthalate	2,500	728	506
1,2 Dichlorophenol	600	BQL(31)	BQL(78)
Pentachlorophenol	1,000	541	480
Molybdenum Trioxide	400*	*	185

* Only the SAR sample was spiked with molybdenum trioxide
All values are reported on an "as received" basis

4.1.2 Test Execution

The SRM and SAR treatability study runs were conducted on 9/30/93 and 10/7/93 respectively. Both runs were conducted using an oil setpoint of 288°C (550°F) and using the same nitrogen and cooling water flows. Insulation of the unit in both cases was equivalent.

Summaries of the first and second tests on the surrogate spike material (SRM and SAR respectively) are shown in Tables 4-2 and 4-3. The tests were performed as expected, with no processing difficulties. Both of the runs were performed with the controlled cooling water system incapacitated; the cooling water was pumped through HX-1 at the appropriate flow rate, but the water was not cooled as it returned to the chiller. Thus, the temperature of the water to HX-1 heated from 25°C to 40°C over the course of each test run. This would affect the amount of vapor condensed in HX-

1, but since HX-2 and HX-3 were operated as designed at 4°C using the chilled water system, the overall gas system performance remained unaffected.

The air turnover in the tent was significantly different for each run. The ventilation was poor, 1-2 air changes per hour, for the SRM test, and much higher, 2-3 air changes per minute, for the SAR run. The greater ventilation was accomplished by including a vacuum hood inside the tent confines. This increased ventilation altered the heat losses from the hot oil system and consequently, slightly changed the product temperature profile for the second run.

The one selected difference between the SRM and SAR treatability studies was a reduction in retention time at temperature; the retention time was set at 90 minutes for the SRM run and at 45 minutes for the SAR run.

Table 4-2. Chronology Table For the First Spiked Soil Run, Retention Time of 90 Minutes (SRM)

Time	Treatability Study Activity Table 4-2
08:00	Arrive at Lab.
08:50	Add feed sample to dryer.
08:57	Turn on dryer agitator, let run for ten minutes.
09:07	Take run feed sample.
09:35	Remove dryer funnel, put on dryer top flange to seal system.
09:37	Turn on nitrogen to system.
09:45	Drop nitrogen rate to 9.4 l/min (20 SCFH) to dryer and 20 l/hr to hot oil system.
10:00	Turn on water flows, increase Budzar hot oil setpoint to 149°C (300°F).
10:26	Increase nitrogen setpoint to 93°C (200°F).
10:41	The first condensate appears in the heat exchangers collection traps.
10:50	Begin collecting condensate.
10:58	Chiller @ 34°C with setpoint at 18°C. This is due to inadequate ventilation as well as a broken compressor.
11:19	Set nitrogen temperature setpoint to 121°C (250°F).
11:40	Condensate from HX-02 has an oil layer observable in the sight glass. Condensate from HX-01 does not.
12:21	Condensate has stopped collecting in the condensate collection traps.
12:25	Increase hot oil setpoint to 288°C (550°F).
12:30	Increase nitrogen temperature setpoint to 149°C (300°F).
12:40	Increase nitrogen temperature setpoint to 204°C (400°F).
12:45	Increase vacuum in system to (9" Hg).
12:48	No significant increase in condensation rate.
13:18	Closed oil bypass (V32) some - this will allow more oil to pass through the dryer jacket.
13:23	Set nitrogen temperature setpoint to 232°C (450°F).
13:32	Close oil bypass (V32) some more.
13:42	Slowly increase vacuum pressure to full vacuum 94.8 kPa (28" Hg).
13:49	Close bypass (V32) some more.

Time	Treatability Study Activity Table 4-2
13:50	Set nitrogen temperature setpoint to 274°C (525°F). Product temperature is at 232°C (450°F).
13:55	Observed creaking noise inside dryer.
13:57	Note small amount of condensate collecting in the condensate trap for HX-03.
14:24	Close oil bypass (V32) some more.
15:20	Let nitrogen charge build up in accumulator tank.
15:22	Blew back cupola filter.
15:25	Reduced hot oil setpoint to 0°C (32°F).
15:26	Reduce nitrogen temperature setpoint to 204°C (400°F).
15:52	Reduce nitrogen temperature setpoint to 93.3°C (200°F).
16:55	Hot oil system off, dryer agitator off, vacuum pump off.
16:57	Coolant flows to hot oil unit and heat exchangers off.
16:58	Nitrogen off, main breakers off.

Table 4-3. Chronology Table For the Second Spiked-Soil Run, Retention Time of 45 Minutes (SAR)

Time	Treatability Study Activity Table 4-3
08:00	Arrive at Lab.
08:50	Add feed sample to dryer.
08:55	Turn on dryer agitator, let run for approximately ten minutes.
09:08	Take run feed sample.
09:40	Remove dryer funnel, put on dryer top flange to seal system.
09:40	Turn on nitrogen to system.
09:55	Increase setpoint on hot oil unit to 149°C (300°F), chiller on with setpoint 10°C, chiller to HX-02 and HX-03 on with setpoint 4°C (40°F) and nitrogen temperature setpoint of 38°C (100°F).
10:20	Noted small amount of brownish/reddish condensate in the traps for condenser 2.
10:25	Increase nitrogen temperature setpoint to 93.3°C (200°F).
10:30	Condensate in condenser traps 1 and 2 evident. Condensate is purplish/brown in color.
10:30	Set nitrogen flow to dryer to 35.4 l/min (75 SCFH). Condensate is lighter, now orangish in color.
10:46	Rate of condensation is increasing.
10:50	Increase nitrogen temperature setpoint to 121°C (250°F); increase nitrogen flow to dryer to 42.5 l/min (90 SCFH).
11:05	Condensate is now clear.
11:50	Condensate rate is beginning to decrease.
12:31	Decrease setpoint of chiller (to HX-02 an.d HX-03) to 0°C (32°F).
12:40	Increase pressure at PI-4 to 13.8 kPa (2 psig).
12:45	Lower nitrogen flow to 35.4 l/min (75 SCFH).
13:00	Condensate is minimal; increase hot oil setpoint to 288°C (550°F). Nitrogen setpoint is increased to 204°C (400°F).
13:10	Increase nitrogen flow to dryer to 47.2 l/min (100 SCFH).
13:15	Increase nitrogen flow to dryer to 51.0 l/min (110 SCFH).
13:25	Close bypass (V32) some to increase flow of hot oil through jackets in dryer.
13:42	Increase nitrogen temperature setpoint to 260°C (500°F).

Time	Treatability Study Activity Table 4-3
14:00	Open bypass a bit - some oil was relieving through PSV-3.
14:20	Increase vacuum to 40.6 kPa (12" Hg).
14:21	Budzar hot oil temperature is still at 260°C (500°F) (Setpoint is 288°C (550°F)).
14:22	Increase vacuum to 50.8 kPa (15" Hg).
14:30	Found inadequately tightened triclamp. Tighten.
14:35	Drop nitrogen flow to dryer to 23.6 l/min (50 SCFH).
14:45	Increase vacuum to 94.8 kPa (28" Hg).
15:00	Product Reaches 232°C (450°F).
15:46	Reduce vacuum to 16.9 kPa (5" Hg).
15:47	Build up nitrogen charge in accumulator; blow back cupola filter.
15:49	Open product door to dump product.
15:50	Reduce hot oil unit setpoint to 0°C (32°F), Nitrogen setpoint to 10°C (50°F).
17:00	Hot oil system off, dryer agitator off, vacuum pump off.
17:02	Coolant flows to hot oil unit and heat exchangers off.
17:03	Nitrogen off, main breakers off.

4.1.3 Sample Collection and Analysis

Feed, solid product and liquid samples were collected using the standard procedures described in Section 3. The physical and chemical analyses requested for this treatability study are shown in Tables 4-4 and 4-5.

Table 4-4. Analyses Performed for the SRM VAC*TRAX Test Run

Sample ID	Description	Analyses									
		Wt	pH	Mst	Ash	O&G	TPH	TDS	TSS	VOA	SVOA
SRM-02	Run Feed	O	Y	Y	Y	Y	Y	-	-	Y	Y
SRM-03	Product	O	Y	D	D	D	D	-	-	D	D
SRM-06	Condensed Liquid	O	Y	-	-	Y	Y	Y	Y	Y	Y
SRM-10	Condensed Oil	O	-	-	Y	-	-	-	-	Y	Y

Table 4-5. Analyses Performed for the SAR VAC*TRAX Test Run

Sample ID	Description	Analyses										
		Wt	pH	Mst	Ash	O&G	TPH	TDS	TSS	TM	VOA	SVOA
SAR-02	Run Feed	O	Y	Y	Y	Y	Y	-	-	Y	Y	Y
SAR-03	Product	O	Y	D	D	D	D	-	-	Y	D	D
SAR-06	Condensed Liquid	O	Y	-	-	Y	Y	Y	Y	Y	Y	Y
SAR-10	Condensed Oil	O	-	-	Y	-	-	-	-	-	Y	Y

Note: Data for both tests was reported at CTC QA/QC Level 1

Legends:

O	=	by operator
D	=	duplicate analysis
Y	=	test requested
-	=	test not requested
Wt	=	total weight of sample
pH	=	solution pH; method SW846-9045 (solid) or SW846-9040 (water)
Mst	=	moisture content; method EPA 160.3 MOD
Ash	=	ash content; method ASTM D-482
O&G	=	oil and grease; method EPA 413.2 or equiv. (water), method EPA 413.2 or equiv. after soxlet extraction (solid)
TPH	=	total petroleum hydrocarbons; method EPA 418.1 after soxlet extraction (solid), method EPA 418.1 (water)
TDS	=	total dissolved solids; method EPA 160.1
TSS	=	total suspended solids; method EPA 160.2
VOA	=	volatile organic analysis; method SW846-8240 or SW846-8260
SVOA	=	semi-volatile organic analysis; method SW846-8270
TM	=	total metals (Molybdenum); methods in SW846

4.2 Description of the Rocky Flats Treatability Runs

A description of the treatability runs is given below. The description includes a discussion of sample preparation, deviations from the standard treatability study procedure, a chronology of significant events during the test, sample collection, and sample analysis.

The second pair of surrogate test runs was performed on a RCRA regulated waste material from the DOE's Rocky Flats Plant (RFP). This waste stream is called "combustible shop waste" by RFP. It consists of cloth, plastics and similar trash type components that are contaminated with solvents and industrial lubricants and oils. It is very typical of a large volume mixed waste stream that has been and continues to be generated at RFP. However, the material tested did not contain the radioactive components of the mixed waste. It was of particular interest to determine if the organic components could be removed by the VAC*TRAX unit while operating the hot oil at a temperature below the melting or degradation point of the waste material. This mode of operation specifically exploited the vacuum environment of the process as the temperature was restricted to well below the maximum thermal capability of the unit.

4.2.1 Feed Preparation and Description

The Rocky Flats sample consisted of PPE, rags, brushes, paint rollers, and plastic contaminated with volatiles. A full drum of material in its "as-generated" form was shipped to CTC for this testing. The material was a RCRA listed waste, having waste codes F001-F005 for solvents from non-specific sources. The material contained many pieces larger than the size requirements for the VAC*TRAX pilot unit. Consequently, size reduction was required. This was accomplished by obtaining a representative sample from the drum and then size reducing that portion using scissors, utility knives, and hack saws as required. The procedure for this step is included in Appendix B. Enough sample material was size reduced for three runs.

After size reducing the material, it was necessary to heat test each of the components in the waste, to determine the maximum temperature that could be used without melting the plastic components. This limiting temperature was used to determine the maximum run temperature for the VAC*TRAX pilot unit for this waste; running above that temperature would cause significant quantities of the waste to melt, adhering to the VAC*TRAX internals and making decontamination and emptying of the unit exceedingly difficult. The procedure for this test is listed in Appendix C. The maximum allowable product temperature, estimated based on the results of this test, was 124°C (255°F). Above this temperature a blue plastic garment suit melted.

4.2.2 Test Execution

The RCF and RKF treatability study runs were conducted on 10/13/93 and 10/26/93 respectively. Both runs were conducted using an oil setpoint of 124°C (255°F) and using the same nitrogen and cooling water flows. No intermediate heating temperature was required for the Rocky Flats tests, as was the case with the soil runs, since any liquid in the feed was expected to be minimal. Insulation of the unit in both cases was equivalent, as was the ventilation in the tent the unit was operated under. The first of the two runs (the RCF run) was performed with the controlled cooling water system incapacitated; the cooling water was pumped through HX-1 at the appropriate flow rate, but the water was not cooled as it returned from the chiller. Thus, the temperature of the water to HX-1 heated from 25°C to 40°C over the course of the test run. This would affect the amount of vapor condensed in HX-1, but would not affect the performance of the VAC*TRAX system on the solids. The closed cooling water system was fully functional for the second Rocky Flats test run (identified as RKF). The total heating time for the first of the tests (RCF) was 4 hours and for the second test it was 6 hours. Chronology tables for the RCF and RKF test runs are presented in Tables 4-6 and 4-7 respectively.

Table 4-6. Chronology Table for the first Rocky Flats Run, 4 hr. retention time (RCF)

Time	Treatability Study Activity — Table 4-6
11:36	Test motor amps for agitator with no load.
12:00	Load dryer with Rocky Flats waste, mix up waste, and take sample for analysis.
12:10	Reseal system. Run agitator forwards and backwards several times, measuring motor amps each time.
12:12	Ammeter reads between 2.3 and 2.4 amps for all cases (less than 3.6 amps, specified as the maximum allowable to protect the agitator). It is decided to reverse agitator rotation direction every minute to prevent jamming.
12:35	System purged with nitrogen, 23.6 l/min (50 SCFH) to dryer, 50 l/hr to hot oil unit. Hot oil unit turned on.
12:37	Hot oil unit setpoint increased to 250 ° F.
12:52	Opened valve inlet to dryer to allow more oil to flow to the dryer.
12:53	Leak noticed in gas system piping; leak corrected by tightening triclamp.
12:55	Increased vacuum to 27 kPa (8" Hg).
13:00	Increased nitrogen heater setpoint to 93.3°C (200°F).
13:15	Increased vacuum to 50.8 kPa (15" Hg).
13:22	Increased vacuum to 94.8 kPa (28" Hg).
13:22	Portable ammeter found to significantly affect value read for "jacket out" temperature; problem corrected by repositioning ammeter.
13:55	Increase nitrogen flow to 47.2 l/min (100 SCFH).
13:57	Increase hot oil setpoint to 124°C (255°F).
14:14	Increase nitrogen heater setpoint to 124°C (255 ° F).
15:00	Close valve to dryer from hot oil unit slightly; some oil was passing through the pressure relief valve PRV-3.
16:29	Charge accumulator to 62 kPa (9 PSI), blow back cupola filter.
16:30	Return system to atmospheric pressure.
16:33	Decrease hot oil unit setpoint to 0°C (32°F).
18:06	Turn off system.
19:11	Empty dryer through dryer door and product door.

Table 4-7. Chronology Table for the second Rocky Flats Run, 6 hr. Retention Time (RKF)

Time	Treatability Study Activity Table 4-7
09:35	Take run feed sample prior to loading. Load dryer and reseal.
10:21	Turn on chiller, set flows for chilled water and controlled cooling water to 3.8 L/min (1 gpm).
10:23	Test agitator with dryer loaded, check motor amps. Results were all between 2.4 and 2.45 amps (Less than the maximum allowable level of 3.6). Agitator turned with less noise than in the previous Rocky Flats run.
10:30	Nitrogen turned on: 47.2 l/min (100 SCFH) to dryer, 50 l/h to hot oil system.
10:31	Vacuum pump turned on.
10:35	Budzar unit will not start; broken 600 V, 1 amp fuse.
10:37	Dump feed back into bucket, hammer on gasketed lid, and place bucket in refrigerator. Shut down nitrogen and water flows.
14:00	After fuse is replaced, take new run feed sample.
14:18	Reload dryer.
14:33	Establish nitrogen and cooling water flows.
14:37	Check motor amps. All were between 2.3 and 2.4 amps.
14:37	Increase nitrogen flow to 47.2 l/min (100 SCFH) to dryer. Flow to hot oil system is 50 l/h.
14:38	Reduced nitrogen flow to 33 l/min (70 SCFH). Turned on vacuum pump.
14:40	Turned on hot oil unit, raise hot oil setpoint to 124°C (255°F).
14:41	Increased nitrogen heater setpoint to 71°C (160°F). Drop nitrogen flow to dryer to 23.6 l/min (50 SCFH).
14:50	Open valve to allow increased flow of oil to dryer jackets.
14:53	Increased vacuum to 27.1 kPa (8" Hg).
15:01	Increased vacuum to 50.8 kPa (15" Hg).
15:03	Increased nitrogen heater setpoint to 116°C (240°F).
15:05	Increase vacuum to 67.7 kPa (20" Hg).
15:16	Increase vacuum to 88 kPa (26" Hg).
15:35	Decrease nitrogen flow to dryer to 28.3 l/min (60 SCFH).
15:45	Increase nitrogen heater setpoint to 127°C (260°F).
16:15	A breaker was tripped on the chiller providing flows to HX-02 and HX-03. This was noted and corrected.

Time	Treatability Study Activity Table 4-7
20:40	Reduce hot oil setpoint to 32°F, drop vacuum to 0 kPa (0" Hg). Reduce controlled cooling water setpoint to 12°C and nitrogen heater setpoint to 21°C (70°F).
20:45	Turned off nitrogen heater
20:46	Charge nitrogen accumulator; blow back cupola.
22:15	Open bottom product door, let most of the product drop into the product hopper.
22:21	Shut down system; gather remaining product from dryer door.

4.2.3 Sample Collection and Analysis

Feed, solid product, and liquid samples were collected using the standard procedures described in Section 3.

The physical and chemical analyses requested for this treatability study are shown in Table 4-8. The analyses requested in both Rocky Flats runs were identical.

Table 4-8. Analyses Performed for the Rocky Flats VAC*TRAX Test Run

Sample ID	Analyses									
	Wt	pH	Mst	Ash	O&G	TPH	TDS	TSS	VOA	SVOA
XXX-02	O	Y	Y	Y	Y	Y	-	-	Y	Y
XXX-03	O	Y	D	D	D	D	-	-	D	D
XXX-06	O	Y	-	-	Y	Y	Y	Y	Y	Y
XXX-10	O	-	-	Y	-	-	-	-	Y	Y

XXX = RCF or RKF, respectively
Note: Data for both tests was reported at CTC QA/QC Level 1

Legends:

O = by operator
D = Duplicate analysis
Y = test requested
\- = test not requested
Wt = total weight of sample
pH = solution pH; method SW846-9045 (solid) or SW846-9040 (water)
Mst = moisture content; method EPA 160.3 MOD
Ash = ash content; method ASTM D-482
O&G = oil and grease; method EPA 413.2 or equiv. (water), method EPA 413.2 or equiv. after soxlet extraction (solid)
TPH = total petroleum hydrocarbons; method EPA 418.1 after soxlet extraction (solid), method EPA 418.1 (water)
TDS = total dissolved solids; method EPA 160.1
TSS = total suspended solids; method EPA 160.2
VOA = volatile organic analysis; method SW846-8240 or SW846-8260
SVOA = semi-volatile organic analysis; method SW846-8270
TM = total metals (Molybdenum); methods in SW846

4.3 Description of the Resolve Superfund Site Testing

A description of the treatability runs is given below. The description includes a discussion of sample preparation, deviations from the standard treatability study procedure, a chronology of significant events during the test, sample collection, and sample analysis.

The material received from the Resolve Superfund Site was soil contaminated with PCBs, with PCB levels as high as 990 ppm (dry weight basis) in the feed. The material was taken directly from excavations in areas that were expected to have high PCB levels at the Resolve Superfund Site prior to being shipped to CTC. This matrix had previously been tested on the X*TRAX thermal desorption system, at both the pilot and full-scale systems. Because of this, the performance of the VAC*TRAX system could be compared to the performance of a system with demonstrated expertise in PCB removal.

4.3.1 Feed Preparation and Description

Three six gallon pails of Resolve soil were shipped to CTC as part of the PRDA testing program. The Resolve sample consisted of solids, mostly sand but with a significant portion of clay. There was still a small amount of oversize (<5%), consisting of large stones, one greater than 50.8mm in size. Homogenizing was not performed (i.e. combining all thee buckets) assuming that the full-scale equipment homogenized the material better than we would be able to achieve. Each batch was allowed to mix thoroughly in the dryer, however, before the run feed sample was taken. This assumption was later proven to be incorrect, in that two of the buckets were very similar, but the third had much lower PCB levels.

4.3.2 Test Execution

The Resolve treatability study runs were conducted on 8/4/94, 8/11/94, and 8/25/94 respectively. All three runs were conducted using an oil setpoint of 288°C (550°F) and using equivalent nitrogen and cooling water flows. An intermediate heating temperature of 149°C (300°F) was used for two of the Resolve tests, and 121°C (250°F) for the third. A temperature of 121°C (250°F) was chosen as the intermediate temperature for the first run to assure that the condensers would not be overloaded. This was observed to not be a problem, so a temperature of 149°C (300°F) was chosen for the final two runs on this matrix. The first test run was operating using a ten hour heating time. The second and third test runs utilized a batch time of four and two hours respectively. Each run was performed after real-time analysis of the previous product was known, using immunoassay testing. This allowed for rapid optimization of the system. Chronology tables for the Resolve studies are presented in Tables 4-9, 4-10, and 4-11.

Table 4-9. Chronology Table for the first Resolve Run, 10 hr. heating time (RES1)

Time	Treatability Study Activity Table 4-9
08:30	Charge dryer with Resolve soil.
08:45	Allow agitator to run for 5 minutes, then take run feed sample.
09:10	Coolant flows on HX-01: 7.5 L/min (2 gpm) (setpoint 1°C (33°F)) HX-02: 3.8 L/min (1 gpm) (setpoint -1°C (31°F)) HX-03: 3.8 L/min (1 gpm) (setpoint -1°C (31°F)) Hot Oil System: 3.4 L/min (0.9 gpm) (setpoint 1°C (33°F))
09:18	Nitrogen flows on, (94 L/min) 200 SCFH to dryer, 50 L/hr to dryer.
09:24	Vacuum pump on full; 67.7 kPa (20" Hg) presently.
09:45	Oxygen concentration is at 6.3%.
09:50	Hot oil system on, setpoint = 121°C (250°F); adjust bypass such that pressure at PSV-3 is at 89.6 kPa.
09:53	Nitrogen heater on, setpoint = 121°C (250°F).
09:55	Pressure at PSV-3 has dropped to 68.9 kPa (10 PSIG); close bypass 1 turn to increase pressure to 89.6 kPa (13 PSIG).
10:00	Oxygen concentration in system is at 5.0%; drop N_2 flow to 70.8 L/min (150 SCFH).
10:19	Oxygen concentration in system is at 4.9%; drop N_2 flow to 47 L/min (100 SCFH).
10:20	Pressure at PSV-3 is at 10 PSIG; close bypass 1 turn to increase pressure to 89.6 kPa (13 PSIG).
10:21	Vacuum at dryer is presently at 77.9 kPa (23" Hg).
10:30	Oxygen concentration in system is at 5.8%; drop N_2 flow to 35.34 L/min (75 SCFH).
11:00	Increase hot oil system setpoint to 288°C (550°F).
11:07	Increase nitrogen heater setpoint to 288° (550°F).
11:10	Close oil bypass fully; pressure at PSV-3 is at 89.6 kPa (13 PSIG).
11:30	Decrease N_2 flow to 23.5 L/min (50 SCFH).
13:20	Unit is smoking slightly at the following locations: • Rotary Union • Union Connections to hose on Cupola • From area around loading flange - most likely smoldering insulation
14:06	HX-01 flow dropped to 0.3 GPM (1.14 L/min).

Time	Treatability Study Activity Table 4-9
16:50	Insulate tee to which "Jacket In" thermocouple is attached.
18:05	It is noted that one of the two readings listed for the "Jacket In" thermocouple is incorrect. The one at the Chessel appears to be correct, the front panel incorrect.
19:47	Decrease vacuum to 67.7 kPa (20" Hg).
19:49	Decrease vacuum to 50.8 kPa (15" Hg).
19:51	Decrease vacuum to 33.9 kPa (10" Hg).
19:55	Decrease vacuum to slightly negative at dryer.
19:57	Open dumping door on dryer.
20:03	Reclose dumping door; unhook hopper from bottom of dryer, move contents to the hood for sampling, sample product, product duplicate.
20:21	Drop hot oil system setpoint to 0°C (32°F), turn off nitrogen heater.
20:22	Blow back cupola 103.4 kPa charge (15 PSIG).
20:35	System shutdown.

Table 4-10. Chronology Table for the second Resolve Run, 4 hr. heating time (RES2)

Time	Treatability Study Activity Table 4-10
08:40	Charge dryer with Resolve soil. Run agitator for 5 minutes, then take run feed sample.
09:30	Vacuum check; vacuum pulls only 74.5kPa (22" Hg) without nitrogen flow. A small squeal is heard upon turning on the vacuum pump; tracked down to the cupola. Tighten cupola bolts.
09:48	Vacuum now pulls > 88.0 kPa (26" Hg).
09:49	Turn on nitrogen flows (70.8 L/min to dryer, 50 L/min to hot oil system). Also turn on coolant flows: HX-01: 3.8 L/min (1 gpm) (Setpoint = 21°C (70°F)) HX-02: 3.8 L/min (1 gpm) (Setpoint = 0°C (32°F)) HX-03: 3.8 L/min (1 gpm) (Setpoint = 0°C (32°F)) Hot Oil system: 3.0 L/min (0.8 gpm) (Setpoint = 21°C (70°F))
09:54	Agitator on, vacuum pump turned on, vacuum at full.
09:56	Vacuum is not pulling; seal at product dumping door has been broken. Vacuum pump, agitator, and nitrogen flows turned off.
10:05	Bottom door opened, gasket and metal face cleared, door reclosed.
10:06	Vacuum and Nitrogen flows on.
10:09	Vacuum at dryer is still > 67.7 kPa (20" Hg).
10:10	Oxygen concentration in gas system is at 2.2%. Hot oil system on, setpoint = 149°C (300°F).
10:12	Nitrogen heater on, setpoint = 300°F.
10:13	Oxygen concentration in gas system is at 2.2%; drop nitrogen flow to 35.4 L/min (75 SCFH).
10:36	Oxygen concentration in gas system is at 3.2%; drop nitrogen flow to 23.6 L/min (50 SCFH).
10:38	Closed bypass about three turns; increased pressure at PSV-3 from 34.5 kPa to 82.7 kPa (5 to 12 PSIG).
10:50	Oxygen concentration in gas system is at 4.0%; drop nitrogen flow to 11.8 L/min (25 SCFH).
10:53	Condensation rate has decreased dramatically; increase hot oil system setpoint to 258° C (550°F).
10:58	Increase nitrogen heater setpoint to 260°C (500°F).

Time	Treatability Study Activity Table 4-10
11:07	Oxygen concentration in gas system is at 7.4%; increase nitrogen flow to 18.9 L/min 40 SCFH).
11:10	Fully close hot oil bypass; increase pressure at PSV-3 from 68.9 kPa to 82.7 kPa (10 to 12 PSIG).
12:19	Smoke noticed from hose on cupola; minimal. Other areas seem OK.
12:31	Decrease nitrogen flow to 14.2 (30 SCFH).
13:13	Gas exiting gas train is > 10°C (50°F); decrease setpoint of chiller to HX-01 to 60°F from 21°C (70°F).
14:08	Decrease vacuum to slightly negative.
14:10	Open dumping door on dryer.
14:15	Close dumping door. Blowback cupola. Drop setpoint on hot oil system to 0°C (32°F), turn off nitrogen heater. Transfer product hopper to hood and collect product and product duplicate. Shutdown system.

Table 4-11. Chronology Table for the third Resolve Run, 2 hr. heating time (RES3)

Time	Treatability Study Activity Table 4-11
10:00	Vacuum check; vacuum pulls > 84.6 kPa (25" Hg).
10:45	Coolant flows on: HX-01: 1 gpm (Setpoint = 10°C (50°F)) HX-02: 1 gpm (Setpoint = 3°C (27°F)) HX-03: 1 gpm (Setpoint = -3°C (27°F)) Hot Oil System: 0.8 gpm (Setpoint = 10°C (50°F))
12:00	Charge dryer with Resolve soil. Run agitator for 5 minutes, then take run feed sample.
13:15	Turn on nitrogen flows (94.5° L/min to dryer, 50 Hg to hot oil system). Vacuum pump on; vacuum pulls 18" Hg at dryer. Turn on agitator. Hot oil system and nitrogen heaters on, setpoint = 149°C (300°F) for both systems. Oxygen concentration is at 5.8%.
13:33	Pressure at PSV-3 is at 68.9 kPa (10 PSIG); close bypass 1 turn, increase pressure to 89.5 kPa (13 PSIG).
13:45	Decrease setpoint of flows to HX-01 and Hot oil system to 4.4°C (40°F).
13:51	Oxygen concentration is at 5.2%; decrease nitrogen flows to 70.9 (150 SCFH).
13:54	Pressure at PSV-3 is at 11 PSIG; close bypass 1 turn, increase pressure to 89.6 kPa (13 PSIG).
14:05	Oxygen concentration is at 4.8%; decrease nitrogen flows to 47.3 L/min (100 SCFH).
14:24	Oxygen concentration is at 5.4%; decrease nitrogen flows to 23 L/min (50 SCFH).
14:40	Oxygen concentration is at 8.3%; increase nitrogen flows to 35.4 L/min (75 SCFH). Add triclamp locks to the bottom of the condensate valves.
14:42	Oxygen concentration is at 6.8%.
14:43	Condensation rate has decreased dramatically; increase hot oil system and nitrogen heater setpoints to 287°C (550°F).
14:46	Oxygen concentration is at 4.7%; decrease nitrogen flows to 23.6 L/min (50 SCFH).
15:00	Oxygen concentration is at 9.5%; increase nitrogen flows to 35.4 L/min (75 SCFH).
15:32	Oxygen concentration is at 3.7%; decrease nitrogen flows to 23.6 L/min (50 SCFH).

Time	Treatability Study Activity Table 4-11
15:43	Product temperature reaches 232°C (450°F).
16:10	Reduce vacuum to slightly negative.
16:13	Open product dumping door.
16:20	Reclose product dumping door; reduce hot oil system and nitrogen heater setpoints to 0°C (32°F). Blow back cupola. Transfer product hopper to hood and collect product samples.
16:30	System shutdown.

4.3.3 Sample Collection and Analysis

Feed, solid product, and liquid samples were collected using the standard procedures described in Section 3.

The physical and chemical analyses requested for this treatability study are shown in Table 4-12. The analyses requested in the three Resolve runs were identical.

Table 4-12. Analyses Performed for the Resolve VAC*TRAX Test Run

Sample ID	Sample Description	Analyses				
		Wt	pH	Mst	TDS TSS	PCB
XXX-02	Run Feed	O	-	Y	-	Y
XXX-03	Product	O	-	-	-	Y
XXX-04	Product Duplicate	O	-	-	-	Y
XXX-06	Condensed Water from All runs	O	Y	-	Y	Y
XXX-10	Condensed Oil From all runs	O	-	-	-	Y

XXX = RES1, RES2, or RES3 respectively
Note: Data for both tests was reported at CTC QA/QC Level 1

Legends:

O = by operator
Y = test requested
\- = test not requested
Wt = total weight of sample
pH = solution pH; method SW 846-9045 (solid) or SW 846-9040 (water)
Mst = moisture content; method EPA 160.3 MOD
TDS = total dissolved solids; method EPA 160.1
TSS = total suspended solids; method EPA 160.2
PCB = polychlorinated biphenyls; method SW 846-8080

5.0 DISCUSSION OF PILOT TEST RESULTS

The pilot VAC*TRAX treatability runs were completed as expected. The treatability results are presented in this section.

5.1 Surrogate Spike Material Test Results

5.1.1 Operating Data Summary

The VAC*TRAX unit was operated at a final oil setpoint of 288°C (550°F) for both test runs. Initially, the oil temperature was set at 148°C (298°F) during the water evaporation phase. It was then increased to 288°C (550°F) when it was apparent that most of the water had been removed from the soil. A summary of the operating conditions for both runs is presented in Table 5-1. The change in product temperature over the course of the SRM and SAR runs are shown in Figures 5-1 and 5-2 respectively.

Table 5-1. Operating Condition Summary For the Synthetic Soil Matrix Test Runs

Sample ID	Feed in Dryer	Oil Temp Drying	Oil Heating Temp	Final Product Temp	Vapor Temp (T-2) Last 30 min
	% Water in Feed	Drying Time	Heating Time	Retention Time	N_2 Flow to Dryer
SRM	37.65 kg	148°C	288°C	247°C	261°C
	6.93%	145 min	85 min	90 min	30.7 l/min
SAR	42.05 kg	148°C	288°C	239°C	253°C
	12.3%	185 min	120 min	45 min	35.7 l/min

5.1.2 Process Component and Overall Mass Balances

The overall and component mass balances for the SRM and SAR runs are presented in Tables 5-2 and 5-3, respectively.

Figure 5-1. Product Temperature Curve for the SRM Treatability Run

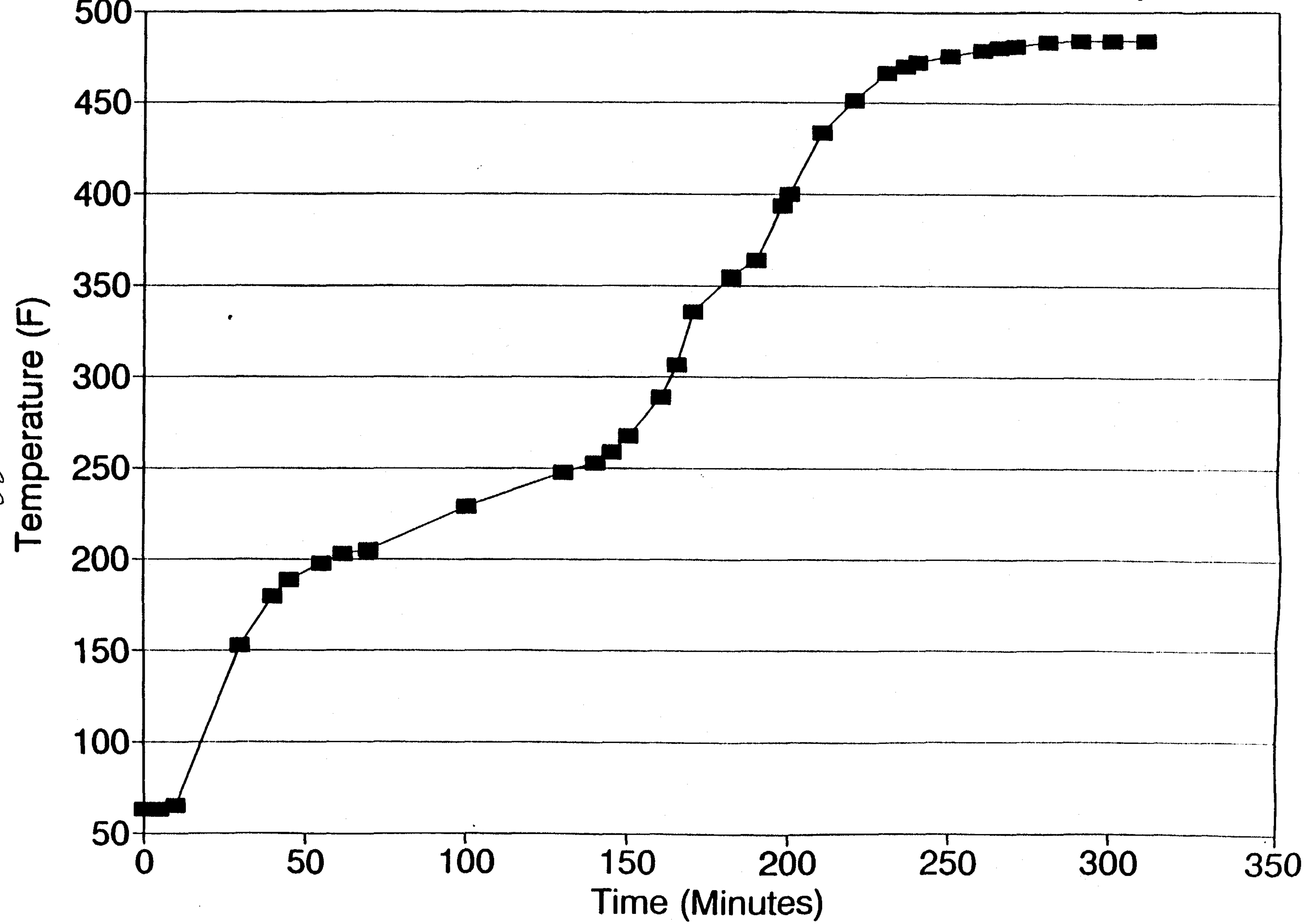

Figure 5-2. Product Temperature Curve for the SAR Treatability Run

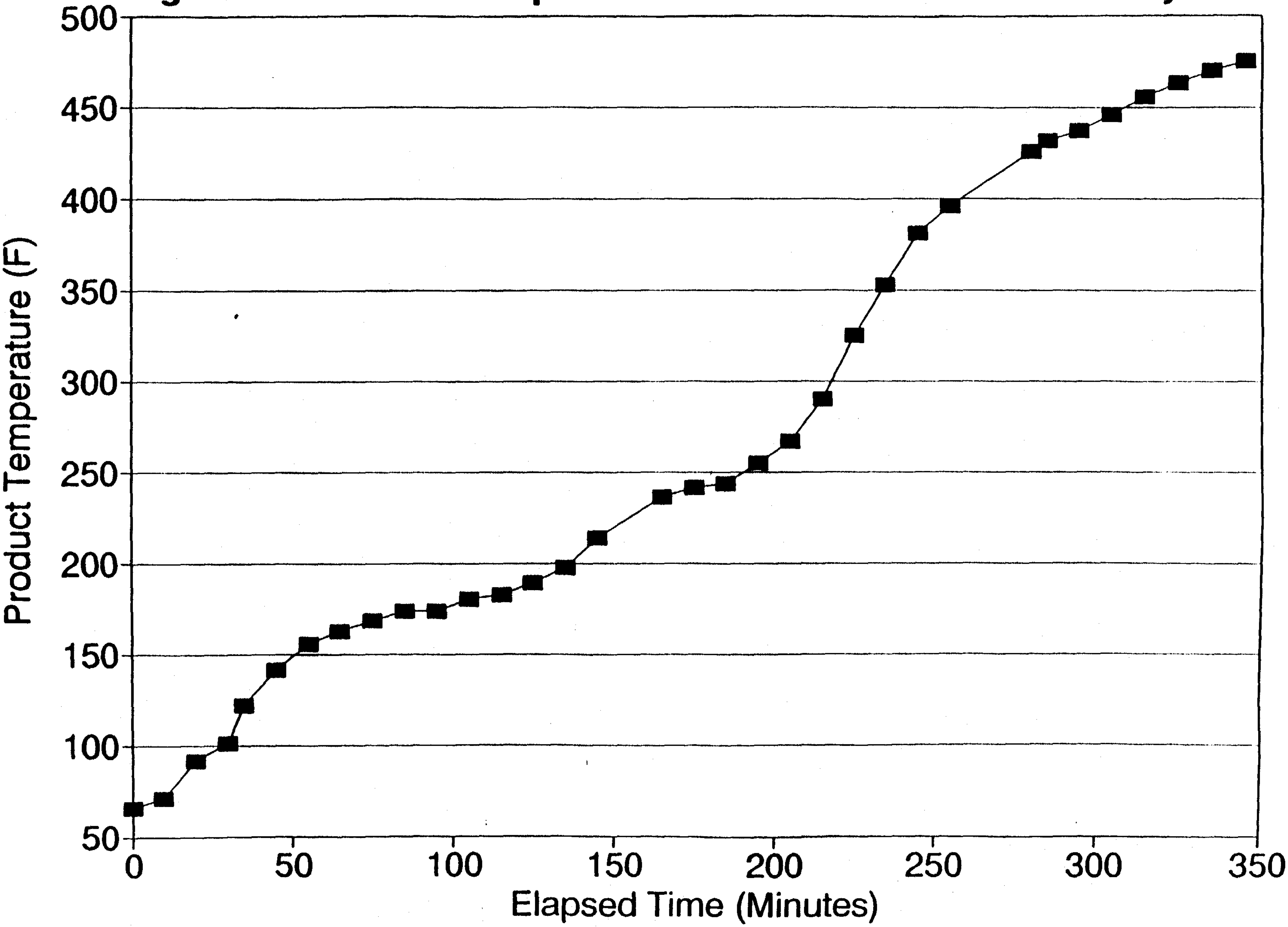

Table 5-2. Component Recoveries for the first Synthetic Soil Matrix Run (SRM)

Component	Total In	Total Out	% Recovery
Total (g)	37,650	37,710	100.2
Solids (g)	35,040	33,561	95.8
Liquids(g)	2,610	4,149	159.0
<u>Volatiles(g)</u>			
Acetone	15.93	3.04	19.0
Carbon Tetrachloride	x	x	x
Trichloroethene	x	x	x
Tetrachloroethylene	1.19	0.012	1.0
Ethylbenzene	21.84	3.49	16.0
Xylene	41.49	5.10	12.3
Styrene	4.95	1.98	40.1
<u>Semi-volatiles(g)</u>			
1,2 Dichloroethane	x	x	x
Pentachlorophenol	20.37	3.56	17.5
bis(2-ethylhexyl)phthalate	27.41	0	0

x = non-quantifiable amount in the feed; calculation of removal efficiency not applicable

Table 5-3. Component Recoveries for the second Reference Material Run (SAR)

Component	Total In	Total Out	% Recovery
Total (g)	41,544	41,202	99.2
Solids (g)	36,840	37,102	101
Liquids(g)	4,704	4,100	87.2
Volatiles(g)			
Acetone	53.1	25.0	47.0
Carbon Tetrachloride	3.38	0	0
Trichloroethene	x	x	x
Tetrachloroethylene	3.76	4.17	111
Ethylbenzene	20.3	24.2	119
Xylene	86.3	97.9	113
Styrene	14.9	15.1	101
Semi-volatiles(g)			
1,2 Dichloroethane	x	x	x
Pentachlorophenol	17.7	5.08	28.7
bis(2-ethylhexyl)phthalate	18.6	0.069	0.37
Molybdenum Trioxide(g)	6.82	6.68	98.0

For the mass balances, the following component definitions apply to all streams.

Solids: The fraction of the material remaining after heating at 105°C

Water: Sample weight loss at 105°C; may include organics of higher volatility. Moisture and water are considered synonymous

Oil and Grease: Oil and grease analyses, or actual liquid oil recovered.

Liquids: The total weight of water (moisture) in and condensate (water and oil) out.

Contaminant concentrations are measured in the solid and liquid streams only. Analysis of contaminants in the gas stream was not within the scope of this testing.

As seen in Figures 5-3 and 5-4, the solids and water recoveries were slightly off for both the SRM and SAR test runs. Here, it is noted that, while one of the phases (solid or liquid) has a higher than 100% recovery, the other has less than 100% recovery. This brings up the possibility that either (1) the moisture analysis for the feed was incorrect or (2) the sample provided for moisture analysis was not reflective of the average moisture concentration of the feed. In any event, the recoveries were acceptable and demonstrate material accountability during the test.

Volatile organic compound recoveries ranged from 1% to 40.1 percent for the first test run (SRM), averaging around 18%. Recoveries for the second test were significantly higher, ranging from 0% to 119%, averaging around 82%. Oil recovery is thought to be the primary difference between the two runs, since over 5½ times as much oil was collected in the second test than in the first. In both tests, the low recoveries for some of the components is misleading. Due to the presence of high quantities of volatiles in the collected oil from both runs, the detection levels for all volatiles in the oil were elevated dramatically, as high as 17,000 ppm for acetone. Then, since components listed as "below the quantitation limit" (BQL) in the oil and other matrices are considered to be zero for component mass balance purposes, the percent recoveries for some components are almost guaranteed to be low. If we instead, for example, assumed all BQL values to be at the quantitation level, the recovery of carbon tetrachloride for the SAR test run would be 84% as opposed to 0%. This most certainly affected semi-volatile results as well; pentachlorophenol recovery was 18% and 29% for the first and second test runs respectively, while bis(2-ethylhexyl)phthalate had effectively a 0% recovery for both runs. Molybdenum recovery was excellent, at 98%. Overall mass recoveries were 100.2% and 99.2% respectively for the first and second test runs (SRM and SAR). These are both excellent recoveries, well within the acceptable range.

5.1.3 Particulate Carryover

As was expected, only very minimal quantities of solids were carried into the gas system piping, due mainly to the filter in the cupola. No measurable solids were recovered, so the percent carryover was less than 0.1%. Based on the quantity of feed and the configuration of the system, a carryover percentage this low is not unusual.

5.1.4 Analytical Results

The analytical results for the SRM and SAR treatability study runs are summarized in Tables 5-4 and 5-5. Tables 5-6 and 5-7 summarize the removal efficiencies for selected components in the SRM and SAR runs respectively.

Table 5-4. Analytical Results for the First Synthetic Soil Matrix (SRM) Run

Component		Run Feed (SRM-02)	Product (SRM-03A)	Product Dup. (SRM-03B)	Cond. Water (SRM-06)	Cond. Oil (SRM-10)
Moisture	%	6.9	0	0	NA	NA
Ash	%	83.6	94.4	87.9	NA	BQL(1)
pH		8.7	8.0	-	7.6	-
oil & grease	ppm	160	BQL(10)	BQL(10)	-	-
Dissolved Solids	ppm	NA	NA	NA	171	-
Suspended Solids	ppm	NA	NA	NA	48	-
Acetone	ppm	423	5.42	3.29	696	BQL(17,000)
Carbon Tetrachloride	ppm	BQL(31)	0.3	BQL(0.21)	BQL(100)	BQL(8,300)
1,2 Dichloroethane	ppm	BQL(31)	0.29	BQL(0.21)	BQL(50)	BQL(8,300)
Trichloroethene	ppm	BQL(31)	0.21	BQL(0.21)	BQL(50)	BQL(8,300)
Tetrachloroethylene	ppm	31.6	0.36	BQL(0.21)	BQL(50)	BQL(8,300)
Ethylbenzene	ppm	580	3.84	0.72	BQL(50)	114,000
M,P Xylene	ppm	790	4.15	0.88	BQL(50)	167,000
O Xylene	ppm	312	1.26	0.25	BQL(100)	82,800
Styrene	ppm	132	0.35	BQL(0.21)	BQL(50)	66,000
Bis(2-ethylhexyl)phthalate	ppm	728	BQL(10)	BQL(10)	BQL(1.0)	BQL(2,500)
Pentachlorophenol	ppm	541	97.0	112	16.0	BQL(2,500)

NOTE: Results are reported on an "as-received" basis

Table 5-5: Removal Efficiencies for the First Synthetic Soil Matrix (SRM) Run

Component	Concentration ppm		Removal %
	SRM-02 Run Feed	SRM-03 (Avg.) Product	
Acetone	454	4.36	99.0%
Tetrachloroethylene	34	0.18	>99.5%
Ethylbenzene	623	2.33	>99.6%
Xylene	1,184	5.03	>99.6%
Styrene	142	BQL(0.21)	>99.9%
Bis(2-ethylhexyl)phthalate	782	BQL(10)	>98.9%
Pentachlorophenol	581	126	83.2%

NOTE: Results are converted to a "dry weight" basis

Table 5-6. Analytical Results for the Second Synthetic Soil Matrix (SAR) Run

Component		Run Feed (SAR-02)	Product (SAR-03A)	Product Dup. (SAR-03B)	Cond. Water (SAR-06)	Cond. Oil (SAR-10)
Moisture		12.4	0	0	NA	-
Ash		83.7	89.17	77.55	NA	BQL(1)
pH		8.7	7.5	-	6.6	-
oil & grease		240	BQL(10)	BQL(10)	19	-
Dissolved Solids		NA	NA	NA	240	-
Suspended Solids		NA	NA	NA	91	-
Acetone	ppm	1,440	9.62	2.33	2,740	98,600
Carbon Tetrachloride	ppm	91.7	BQL(0.6)	BQL(0.2)	BQL(83)	BQL(17,000)
1,2 Dichloroethane	ppm	BQL(78)	BQL(0.6)	BQL(0.2)	BQL(83)	BQL(17,000)
Trichloroethene	ppm	BQL(78)	BQL(0.6)	BQL(0.2)	BQL(83)	BQL(17,000)
Tetrachloroethylene	ppm	103	BQL(0.6)	BQL(0.2)	BQL(83)	27,900
Ethylbenzene	ppm	552	BQL(0.6)	BQL(0.2)	BQL(83)	161,000
M,P Xylene	ppm	1,740	BQL(1.2)	BQL(0.2)	BQL(166)	492,000
O Xylene	ppm	602	BQL(0.6)	BQL(0.2)	BQL(83)	157,000
Styrene	ppm	404	BQL(0.6)	BQL(0.2)	BQL(83)	100,000
Bis(2-ethylhexyl)phthalate	ppm	506	BQL(33)	2.10	BQL(2.5)	BQL(2,300)
Pentachlorophenol	ppm	480	154.0	97.4	15.4	BQL(2,300)
Molybdenum trioxide	ppm	185	203	214	BQL(0.18)	BQL(8.49)

NOTE: Results are reported on an "as received" basis

Table 5-7. Removal Efficiencies For the Second Synthetic Soil Matrix (SAR) Run

Component	Concentration ppm		Removal %
	SAR-02	SAR-03 (Avg.)	
Acetone	1,644	5.98	99.6%
Carbon Tetrachloride	105	BQL(0.2)	>99.8%
Tetrachloroethylene	118	BQL(0.2)	>99.8%
Ethylbenzene	630	BQL(0.2)	>99.9%
Xylene	2,672	BQL(0.2)	>99.9%
Styrene	461	BQL(0.2)	>99.9%
Bis(2-ethylhexyl)phthalate	577	1.05	99.8%
Pentachlorophenol	548	126	77.0%
Molybdenum Trioxide	211	209	0.9%

NOTE: Results are reported on a "dry weight" basis

The remediation goal(s) for the VAC*TRAX testing, as specified in the PRDA Contract are to (1) treat 60% of the organic contaminants to below regulatory limits and, (2) to reduce the concentration of 80% of the remaining organic contaminants by 90%. Of the 9 volatiles and 2 semi-volatiles in the feed, for a total of eleven organic constituents, 10 have been reduced to below the regulatory limits. Matrix interference prevented the quantitation of three of the volatiles in the feed, but the levels to which they were spiked, as well as their presence in very minute quantities in the product, demonstrates their existence. Codes F001-F005 for the volatiles and U028 for the bis(2-ethylhexyl)phthalate were assumed to determine the regulatory limits. Therefore 91% of the organic constituents were reduced to below the regulatory limits, exceeding the 60% requirement. Now, 60% of the constituents would be, rounding up, 7 constituents. Eighty percent of the remaining constituents then, or three of the four remaining components, should have been removed by at least 90% to meet treatment goals. This was accomplished, since, as previously stated, all but one of the components were reduced by at least 99%. Thus, contract goals were met.

5.2 Rocky Flats Test Results

5.2.1 Operating Data Summary

The VAC*TRAX unit was operated at an oil setpoint of 124°C (255°F) for both test runs. For each of these tests, a total heating time was selected because little or no water was present in the solid material; this took the place of a retention time at a temperature. A summary of the operating conditions for both runs is displayed in Table 5-8.

Table 5-8. Operating Condition Summary For the Rocky Flats Test Runs

Sample ID	Feed in Dryer	Oil Temp. Heating	Final Product Temp.	Vapor Temp (T-2) Last 30 Min
	% Water in Feed	Heating Time(min)	Retention Time	N_2 Flow to Dryer
RCF	2.55 kg	124°C	101°C	233°C
	4.5%	240 min	*	38 l/min
RKF	3.10 kg	124°C	104°C	236°C
	3.5%	360 min	*	35 l/min

* There was only one heating region for these tests, since water content was minimal and the total heating time was chosen, as opposed to the retention time.

5.2.2 Process Component and Overall Mass Balances

The overall and component mass balances for both Rocky Flats runs for solids and liquids are shown in Tables 5-9 and 5-10. Due to the very low quantities of feed used, it is not practical to perform a material balance on the individual organic constituents. This is especially true since condensate, while produced, was not in sufficient quantity for organic analysis.

Table 5-9. Component Recoveries for the first Rocky Flats Run (RCF)

Component	Total In	Total Out	% Recovery
Total (g)	2,555	2,469	96.6
Solids (g)	2,440	2,350	96.5
Liquids(g)	115	119	103.5

Table 5-10. Component Recoveries for the second Rocky Flats Run (RKF)

Component	Total In	Total Out	% Recovery
Total (g)	3,105	3,064	98.7
Solids (g)	2,990	3,000	101
Liquids(g)	115	64	55.7

For the mass balances, the following component definitions apply to all streams.

Solids: The fraction of the material remaining after heating at 105°C

Water: Sample weight loss at 105°C; may include organics of higher volatility. Moisture and water are considered synonymous

Oil and Grease: Oil and grease analyses, or actual liquid oil recovered.

Liquids: The total weight of water (moisture) in and condensate (water and oil) out.

Contaminant concentrations are measured in the solid and liquid streams only. Analysis of contaminants in the gas stream was not within the scope of this testing.

As seen in Tables 5-9 and 5-10, the solids and water recoveries were slightly off for both of the Rocky Flats test runs. For the material balance on each run, it is noted that, while one of the phases (solid or liquid) has a higher than 100% recovery, the other has less than 100% recovery. This brings up the possibility that either (1) the moisture analysis for the feed was incorrect or (2) the sample provided for moisture analysis was not reflective of the average moisture concentration of the feed. In either event, the overall component mass balances are excellent for both of the Rocky Flats Runs.

5.2.3 Particulate Carryover

As was expected, only very minimal quantities of solids were carried into the gas system piping, due mainly to the filter in the cupola. No measurable solids were recovered, so the percent carryover was less than 0.1%. Based on the quantity of feed and the configuration of the system, a carryover percentage this low is not unusual.

5.2.4 Analytical Results for the Rocky Flats Test Runs

The analytical results for the RCF and RKF treatability study runs are summarized in Tables 5-11 and 5-13. Tables 5-12 and 5-14 summarize the removal efficiencies for selected components in the RCF and RKF runs respectively.

Table 5-11. Analytical Results for the First Rocky Flats (RCF) VAC*TRAX Run

Component	RCF-02 Run Feed	RCF-03A Product	RCF-03B Product Duplicate	RCF-06
Moisture	4.5	0	0	-
pH	6.3	6.3	-	6.6
TDS	-	-	-	
TSS	-	-	-	
Oil & Grease	-	-	-	
TPH	BQL(10)	BQL(10)	BQL(10)	
Acetone ppm	7.51	< 0.41	< 0.41	11.1
MIBK ppm	18.7	0.81	1.46	4.35
Toluene ppm	3.54	< 0.20	< 0.20	BQL(0.5)
2-Hexanone ppm	5.93	< 0.20	0.39	BQL(0.5)
Ethylbenzene ppm	9.59	< 0.20	0.42	BQL(0.5)
M,P Xylene ppm	37.6	0.68	1.25	BQL(1.0)
O Xylene ppm	12.5	0.26	0.5	BQL(0.5)
Styrene ppm	90.7	2.00	3.46	1.42

Table 5-12. Removal Efficiencies for the First Rocky Flats (RCF) VAC*TRAX Run

Component	RCF-02 Run Feed	RCF-03A Product	RCF-03B Product Duplicate	Avg. Product	% Removal
Acetone ppm	7.51	BQL(0.41)	BQL(0.41)	BQL(0.41)	> 94.5
MIBK ppm	18.7	0.81	1.46	1.14	93.9
Toluene ppm	3.54	BQL(0.20)	BQL(0.20)	BQL(0.20)	> 94.3
2-Hexanone ppm	5.93	BQL(0.20)	0.39	0.20	96.6
Ethylbenzene ppm	9.59	BQL(0.20)	0.42	0.21	97.8
M,P Xylene ppm	37.6	0.68	1.25	0.97	97.4
O Xylene ppm	12.5	0.26	0.5	0.38	97.0
Styrene ppm	90.7	2.00	3.46	2.73	97.0

Table 5-13. Analytical Results for the Second Rocky Flats (RKF) VAC*TRAX Run

Component		RKF-02 Run Feed	RKF-03A Product	RKF-03B Product Duplicate	RKF-06 Cond Water	RKF-10 Cond Oil
Moisture	%	3.7	0	0	-	-
Ash	%				-	-
pH		6.3	6.6	6.6	5.5	-
TDS	ppm	-	-	-	-	-
TSS	ppm	-	-	-	-	-
Oil & Grease	ppm	200,000	200,000	160,000	-	-
TPH	ppm	170,000	180,000	150,000	-	-
Acetone	ppm	1.0	0.053	0.088	-	BQL(50)
MIBK	ppm	15.0	0.24	0.72	-	BQL(50)
Toluene	ppm	6.7	BQL(0.025)	0.110	-	BQL(25)
Ethylbenzene	ppm	20.0	BQL(0.025)	0.150	-	27
Xylene (Total)	ppm	110.0	0.033	0.150	-	210
Styrene	ppm	230.0	0.093	0.190	-	840
Naphthalene	ppm	BQL(84)	BQL(100)	BQL(230)	-	3,800
2-Methylnaphthalene	ppm	BQL(84)	BQL(100)	BQL(230)	-	4,100

Table 5-14. Removal Efficiencies for the Second Rocky Flats (RKF) VAC*TRAX Run

Component		RKF-02 Run Feed	RKF-03A Product	RKF-03B Product Duplicate	Avg. Prod.	% Removal
Acetone	ppm	1.0	0.053	0.088	0.071	92.9
MIBK	ppm	15.0	0.24	0.72	0.48	96.8
Toluene	ppm	6.7	BQL(0.025)	0.110	BQL(0.055)	> 99.2
Ethylbenzene	ppm	20.0	BQL(0.025)	0.150	BQL(0.075)	> 99.6
Xylene (Total)	ppm	110.0	0.033	0.150	0.092	99.9
Styrene	ppm	230.0	0.093	0.190	0.14	99.9

The F001-F005 regulations/limits that apply, as specified by 40 CFR 268.43, are shown in Table 5-15.

Table 5-15. F001-F005 Limits: CCWE - Constituent Concentrations in Waste Extract, Non-wastewaters

Component		Limits (Constituent Concentrations in Waste Extract) (CCWE)
Acetone	mg/L	0.59
MIBK	mg/L	0.33
Toluene	mg/L	0.33
Ethylbenzene	mg/L	0.053
Xylene	mg/L	0.15

The results show a significant reduction in volatile concentrations. TCLP analyses were not performed for the organic constituents. However, as per 40 CFR 261, Appendix II, 1.2:

If a total analysis of the waste demonstrates that individual analytes are not present in the waste, or that they are present but at such low concentrations that the appropriate regulatory levels could not possibly be exceeded, the TCLP need not be run.

This means that, if the regulatory levels could not possibly be exceeded as determined by the TCLP method, then TCLP analyses are not required. Then, from 40 CFR 261 Appendix II, 2.2:

The solid phase is extracted with an amount of extraction fluid equal to twenty times the weight of the solid phase.

This indicates that the maximum concentration of a contaminant in the extract is 1/20 of the concentration in the solid. Therefore, if the concentrations of contaminants in the treated product are less than 20 times the regulatory level, TCLP analyses are not required. A summary of the comparison is shown in Table 5-16.

Table 5-16. Determination of the Necessity for TCLP Testing

Component		Highest Product Conc. Analyzed	20 Times Reg. Limit for CCWE
Acetone	ppm	0.088	11.8
MiBK	ppm	0.72	6.6
Toluene	ppm	0.11	6.6
Ethylbenzene	ppm	0.15	1.06
Xylene (Total)	ppm	0.15	3.0

As can be seen from Table 5-16, the treated Rocky Flat's waste is unquestionably below the regulatory limits for the F001-F005 classification. The comparison was done on a worst case basis: the highest concentration found for each of the components in the treated waste was used, and it was assumed that 100% would leach into the extract, which is unlikely.

5.3 Resolve Material Test Results

5.3.1 Operating Data Summary

The VAC*TRAX unit was operated at a final oil setpoint of 288°C (550°F) for all three test runs. For the first of the three test runs, the oil temperature was initially set at 121 °C (250 °F) during the water evaporation phase; since the condensers easily handled the load, this temperature was increased to 148°C (300°F) for the subsequent two test runs. In all three cases, the hot oil unit setpoint was then increased to 288°C (550°F) when it was apparent that most of the water had been removed from the soil. A summary of the operating conditions for all three runs is presented in Table 5-17.

Table 5-17. Operating Condition Summary For the Resolve Test Runs

Sample ID	Feed in Dryer	Oil Temp Drying	Oil Heating Temp	Final Product Temp	Vapor Temp (T-2) Last 30 min
	% Water in Feed	Drying Time	Heating Time	Retention Time	N_2 Flow to Dryer
RES1	34.15 kg	121°C	288°C	253°C	262°C
	14%	70 min	142 min	462 min	45 SCFH
RES2	29.65 kg	148°C	288°C	252°C	261°C
	10%	43 min	120 min	120 min	30 SCFH
RES3	33.10 kg	148°C	288°C	244°C	249°C
	16%	88 min	min	30 min	50 SCFH

5.3.2 Process Component and Overall Mass Balances

The overall and component mass balances for the Resolve test runs are shown in Table 5-18.

Table 5-18. Overall and Component Mass Balances for the VAC*TRAX Thermal Desorption Testing on Resolve Soil

Identifier	Mass In (kg)	Mass Out (kg)	Difference	% Recovery
RES1				
Solids	29.37	21.34	8.03	72.7
Liquids	4.78	4.57	0.21	95.6
PCBs	0.029	x	NA	NA
TOTAL	34.15	25.91	8.24	75.9
RES2				
Solids	26.69	27.32	-0.63	102.4
Liquids	2.97	2.78	0.19	93.6
PCBs	0.020	x	NA	NA
TOTAL	29.65	30.10	-0.45	101.5
RES3				
Solids	27.8	34.92	-7.12	125.6
Liquids	5.30	5.26	0.04	99.2
PCBs	0.000	x	NA	NA
TOTAL	33.10	40.18	-7.08	121.4
TOTAL				
Solids	83.86	83.58	0.28	99.7
Liquids	13.05	12.61	0.44	96.6
PCBs	0.049	0.044	0.005	89.8
TOTAL	96.90	96.19	0.71	99.3

x = The PCBs were measured in the composited condensate, so only a total balance can be performed on PCBs

NA = Not Applicable

Overall, recoveries were excellent, demonstrating accountability. It should be noted that, while the product was dropped after each run, a fraction of the solids still remain in the dryer. These remaining solids were swept out of the dryer only at the end of the last test run. This accounts for the low solids recovery for the first run, as well as the high solids recovery for the last run. The primary lost component is water. At the point the gas exits the gas skid, its temperature is approximately 45°F. At this temperature, water losses to the vent can still be significant, approximately 0.005 lb. of water for every lb. of nitrogen exiting the system. This can account for the water loss. PCB recovery was excellent at 89.8%. The separated PCB's were recovered primarily in the condensed liquids, demonstrating the basic feature of VAC*TRAX, which is thermal desorption followed by condensation and recovery of the contaminants.

5.3.3 Particulate Carryover

As was expected, no noticeable solids were carried into the gas system piping, due mainly to the filter in the cupola. No measurable solids were recovered, so the percent carryover was less than 0.1%. Based on the quantity of feed and the configuration of the system, a carryover percentage this low is not unusual.

5.3.4 Analytical Results for the Resolve Test Runs

The analytical results for the RES1, RES2, and RES3 treatability study runs are summarized in Table 5-19. Table 5-20 summarizes the removal efficiencies for PCBs in the Resolve test runs.

Table 5-19. Analytical Results for the Resolve VAC*TRAX Test Runs

		Feed	Product	Product Duplicate	Condensed Water[1]
PCBs[2]					
Test 1 (RES1)	ppm	990	BQL(1)[3]	BQL(1)	3,500
Test 2 (RES2)	ppm	760	BQL(1)	BQL(1)	3,500
Test 3 (RES3)	ppm	12	BQL(1)	BQL(1)	3,500
Moisture (%)					
Test 1 (RES1)	ppm	14	-	-	-
Test 2 (RES2)	ppm	10	-	-	-
Test 3 (RES3)	ppm	16	-	-	-
TDS					
Test 1 (RES1)	ppm	-	-	-	68
Test 2 (RES2)	ppm	-	-	-	68
Test 3 (RES3)	ppm	-	-	-	68
TSS					
Test 1 (RES1)	ppm	-	-	-	BQL(5)
Test 2 (RES2)	ppm	-	-	-	BQL(5)
Test 3 (RES3)	ppm	-	-	-	BQL(5)
pH					
Test 1 (RES1)		-	-	-	6.9
Test 2 (RES2)		-	-	-	6.9
Test 3 (RES3)		-	-	-	6.9

NOTES:

1. The condensate was composited from all three test runs and then analyzed, after filtration. Thus, the value found for each of the parameters is listed for all three tests.

2. PCBs are reported on a dry weight basis

3. BQL(A) = Below the Quantitation Limit, where "A" is the quantitation limit

Table 5-20. PCB Removal Efficiencies for the Resolve VAC*TRAX Test Runs

Sample Identifier	PCB Concentration (ppm)		Removal (%)
	Feed	Product	
RES1	990	BQL(1)	> 99.90
RES2	760	BQL(1)	> 99.87
RES3	12	BQL(1)	> 91.7

PART II MIXED WASTE TESTING

6.0 DESCRIPTION OF THE MIXED WASTE TREATABILITY TEST RUNS

A description of the treatability runs is given below. The description includes a discussion of sample preparation, deviations from the standard treatability study procedure, a chronology of significant events during the test, sample collection, and sample analysis.

6.1 Description of the Soil/Lint Treatability Study Runs

Two of the mixed waste tests were performed on dry cleaner's lint-trap waste combined with uranium mill-tailings. This waste consisted of approximately 70% soil and 30% lint. The contaminant of concern was tetrachloroethylene, though trace amounts of other volatiles were present in the feed. The other two mixed waste streams consisted of soil and rocks, with a small portion of lint. The contaminant of concern for this stream was also tetrachloroethylene.

6.1.1 Feed Preparation and Description

Both of the mixed waste streams for VAC*TRAX testing were obtained from RUST-Geotech in Grand Junction, Colorado. These samples were size reduced before shipment to CTC. Consequently, no preparatory steps were required on the feed prior to loading.

The first of the two samples was a brown soil and lint mixture (70% soil/30% lint) contaminated with tetrachloroethylene. The material was low in density, 25kg for 7.5 gallons of material, and had few, if any, rocks.

The second of the two samples was a brown soil with a significant quantity of rocks, many near the size limit for VAC*TRAX. Lint was also present, but in a significantly smaller quantity than in the previous sample. The sample was high in density, perhaps 40kg for a 7.5 gallon vessel.

6.2 Test Execution

The PRDA mixed waste treatability study runs were conducted on 2/17/94, 3/7/94, 3/8/94, and 3/9/94. All runs were conducted using an oil setpoint of 288°C (550°F) and using the same nitrogen and cooling water flows. Insulation of the unit in both cases was equivalent. For the first run on the soil/lint matrix, the run was conducted with minimal vacuum, approximately 27.1 kPa(8" Hg). The other three runs were conducted at approximately 94.8 kPa (28" Hg).

Summaries of the tests on the mixed waste material are shown in Tables 6-1 through 6-4. The tests were performed as expected, with no processing difficulties. All of the test runs were performed after a piping modification was made to the system. This modification, made after the surrogate runs, allowed for the oil to flow to the dryer in parallel rather than in series. This resulted in a significant increase in heating rate, as well as a slight increase in final product temperature.

The first treatability study on mixed waste was performed in the absence of vacuum. The final three runs were performed using full vacuum for the entire duration of the run. Otherwise, the same conditions were used for all four of the VAC*TRAX test runs.

Table 6-1. Chronology Table For the First Mixed Waste Run, Drum 1017, Batch 1 (1017-01)

Time	Treatability Study Activity — Table 6-1
09:00	Arrive at Lab.
11:35	Add feed sample to dryer.
11:55	Turn on dryer agitator, let run for ten minutes. Take run feed sample.
13:05	Turn on nitrogen supply at 23.6 L/min (50 SCFH) and chilled water flows at 3.8 L/min each (1 gpm each)
13:47	Budzar on, Setpoint = 149C (300°F). Bypass is fully open.
13:55	Close Bypass some; increase pressure at pipe to PSV-3 from 68.9 kPa to 82.7 kPa (10 to 12 PSIG).
13:59	Turn on nitrogen heater, setpoint = 66C (150°F).
14:00	Close bypass some; increase pressure at pipe to PSV-3 from 68.9 to 82.7 kPa (10 to 12 PSIG).
14:11	Increase nitrogen setpoint to 121C (250°F).
14:12	Closed bypass some; increase pressure at pipe to PSV-3 from 75.8 kPa to 89.6 kPa (11 to 13 PSIG).
14:15	Increase nitrogen setpoint to 149C (300°F).
14:30	Closed bypass some; increase pressure at pipe to PSV-3 from 82.7 to 89.6 kPa (12 to 13 PSIG).
15:10	Increase Budzar temperature setpoint to 288C (550°F).
15:15	Increase nitrogen setpoint to 168C (335°F).
16:13	Doubled cooling water flow to primary condenser (HX-01).
16:17	Increase nitrogen setpoint to 260C (500°F).
17:04	Increase nitrogen temperature setpoint to 298C (570°F).
17:25	Closed bypass fully. Pressure at pipe to PSV-3 is at 55.1 kPa (8 PSIG).
19:49	Blow back cupola.
19:58	Drop product into product hopper.
20:00	Close dryer product door. Shut down system.

Table 6-2. Chronology Table For the Second Mixed Waste Run, Drum 1016 Batch 5 (1016-05)

Time	Treatability Study Activity Table 6-2
08:00	Arrive at Lab.
09:05	Add feed sample to dryer. Let agitator run, take run feed sample.
09:40	Nitrogen flows on at 94 .4 L/min (200 SCFH), vacuum pump on full, coolant flows on at 7.6 L/min (2 gpm) to condenser 1, 3.8L/min (1 gpm) each to condensers 2 and 3, and 3.0 L/min (0.8 gpm) to hot oil unit, and hot oil unit on, setpoint = 107C (225°F).
09:47	Close bypass some; increase pressure at pipe to PSV-3 from 55.1 to 89.6 kPa (8 to 13 PSIG).
09:49	Turn on nitrogen heater, setpoint = 107C (225°F).
10:07	Oxygen concentration in gas system is at 5.2%. Drop nitrogen flow to 70.8 L/min (150 SCFH).
10:52	Oxygen concentration in gas system is at 4.9%. Drop nitrogen flow to 47.2 L/min (100 SCFH).
11:30	Oxygen concentration in gas system is at 3.6%. Drop nitrogen flow to 35.4 L/min (75 SCFH).
11:47	Oxygen concentration in gas system is at 3.7%. Drop nitrogen flow to 23.6 L/min (50 SCFH).
12:31	Oxygen concentration in gas system is at 3.7%. Drop nitrogen flow to 9.4 L/min (20 SCFH).
15:38	Reduce vacuum to 2", blow back cupola.
15:40	Open product door (Dumping door).
15:46	Close product door.
15:50	Shut down system.

Table 6-3. Chronology Table For the Third Mixed Waste Run, Drum 1017 Batch 7 (1017-07)

Time	Treatability Study Activity Table 6-3
08:00	Arrive at Lab
08:51	Add feed sample to dryer. Let agitator run, take run feed sample.
09:15	Nitrogen flows on 94.4 L/min (200 SCFH), vacuum pump on full, coolant flows on 7.6 L/min (2 gpm) to condenser 1, 3.8 L/min (1 gpm) each to condensers 2 and 3, 3.0 L/min (0.8 gpm) to hot oil unit, nitrogen heater and hot oil unit on, setpoint = 107C (225°F) each.
10:14	Oxygen concentration in gas system is at 5.4%. Drop nitrogen flow to 70.8 L/min (150 SCFH).
10:20	Closed bypass some; raised pressure at pipe to PSV-3 from 68.9 to 89.6 kPa (10 to 13 PSIG).
10:22	Increase hot oil setpoint to 287C (550°F).
11:02	Oxygen concentration in gas system is at 3.6%. Drop nitrogen flow to 28.3 L/min (60 SCFH).
11:04	Fully close bypass; increased pressure at pipe to PSV-3 from 68.9 to 89.6 kPa (10 to 13 PSIG).
11:08	Oxygen concentration in gas system is at 2.2%. Drop nitrogen flow to 14.2 L/min (30 SCFH).
11:34	Oxygen concentration in gas system is at 4.3%. Drop nitrogen flow to 9.4 L/min (20 SCFH).
15:12	Reduce vacuum to 2", blow back cupola.
15:15	Open product door (Dumping door).
15:20	Close product door.
15:23	Shut down system.

Table 6-4. Chronology Table For the Fourth Mixed Waste Run, Drum 1016 Batch 6 (1016-06)

Time	Treatability Study Activity Table 6-4
08:00	Arrive at Lab.
08:59	Add feed sample to dryer. Let agitator run, take run feed sample.
09:38	Nitrogen flows on 94.4 L/min (200 SCFH), vacuum pump on full, coolant flows on 7.6 L/min (2 gpm) to condenser 1, 3.8 L/min (1 gpm) each to condensers 2 and 3, 3.0 L/min (0.8 gpm) to hot oil unit, nitrogen heater and hot oil unit on, setpoint = 107C (225°F) each.
09:50	Closed bypass valve; increased pressure at pipe to PSV-3 from 68.9 to 89.6 kPa (10 to 13 PSIG).
10:05	Closed bypass some; raised pressure at pipe to PSV-3 from 75.8 to 89.6 kPa (11 to 13 PSIG).
10:10	Oxygen concentration in gas system is at 5.4%. Drop nitrogen flow to 70.8 L/min (150 SCFH).
10:30	Oxygen concentration in gas system is at 5.2%. Drop nitrogen flow to 47.2 L/min (100 SCFH).
10:51	Increase hot oil setpoint to 287C (550°F).
11:00	Oxygen concentration in gas system is at 5.4%. Drop nitrogen flow to 28.3 L/min (60 SCFH).
11:18	Oxygen concentration in gas system is at 4.6%. Drop nitrogen flow to 14.2 L/min (30 SCFH).
12:04	Oxygen concentration in gas system is at 4.3%. Drop nitrogen flow to 9.4 L/min (20 SCFH).
12:07	Fully close bypass; increased pressure at pipe to PSV-3 from 62.0 to 75.8 kPa (9 to 11 PSIG).
15:43	Reduce vacuum to 2", blow back cupola.
15:48	Open product door (Dumping door).
15:53	Close product door.
15:56	Shut down system.

6.1.3 Sample Collection and Analysis

Feed, solid product and liquid samples were collected using the standard procedures described in Section 3. The physical and chemical analyses requested for all for mixed waste tests in this treatability study are shown in Table 6-5.

Table 6-5. Analyses Performed for the Mixed Waste VAC*TRAX Test Runs

Sample ID	Description	Analyses									
		Wt	pH	Mst	Ash	O&G	TPH	TDS	TSS	VOA	SVOA
XXX-02	Run Feed	O	Y	Y	Y	Y	Y	-	-	Y	Y
XXX-03	Product	O	Y	D	D	D	D	-	-	D	D
XXX-06	Condensed Liquid	O	Y	-	-	Y	Y	Y	Y	Y	Y
XXX-10	Condensed Oil	O	-	-	Y	-	-	-	-	Y	Y

Note: Data for all tests was analyzed by Geotech Analytical Laboratory

Legends:

O	=	by operator
D	=	duplicate analysis
Y	=	test requested
-	=	test not requested
Wt	=	total weight of sample
pH	=	solution pH; method SW846-9045 (solid) or SW846-9040 (water)
Mst	=	moisture content; method EPA 160.3 MOD
Ash	=	ash content; method ASTM D-482
O&G	=	oil and grease; method EPA 413.2 or equiv. (water), method EPA 413.2 or equiv. after soxlet extraction (solid)
TPH	=	total petroleum hydrocarbons; method EPA 418.1 after soxlet extraction (solid), method EPA 418.1 (water)
TDS	=	total dissolved solids; method EPA 160.1
TSS	=	total suspended solids; method EPA 160.2
VOA	=	volatile organic analysis; method SW846-8240 or SW846-8260
SVOA	=	semi-volatile organic analysis; method SW846-8270
TM	=	total metals (Molybdenum); methods in SW846

7.0 DISCUSSION OF PILOT TEST RESULTS

The pilot VAC*TRAX treatability runs were completed as expected. The treatability results are presented in this section.

7.1.1 Operating Data Summary

The VAC*TRAX unit was operated at a final oil setpoint of 288°C (550°F) for both test runs. For the first test run, no vacuum was pulled on the system. For the remaining three PRDA runs, full vacuum was pulled on the dryer from the beginning of the test. For these three tests, the oil temperature was set at 107°C (225°F) during the water evaporation phase. They were then increased to 550°F when it was apparent that most of the water had been remove from the soil. A summary of the operating conditions for the four runs is presented in Table 7-1.

Table 7-1. Operating Condition Summary For the Synthetic Soil Matrix Test Runs

Sample ID	Feed in Dryer	Oil Temp Drying	Oil Heating Temp	Final Product Temp	Vapor Temp (T-2) Last 30 min
	% Water in Feed	Drying Time	Heating Time	Retention Time	N_2 Flow to Dryer
1017-01	26.55-kg	149°C	288°C	258°C	273°C
	13.78%	83 min	60 min	210 min	23.6 L/min
1016-05	38.30 kg	107°C	288°C	251°C	267°C
	8.61%	65 min	90 min	195 min	9.4 L/min
1017-07	31.30 kg	107°C	288°C	251°C	267°C
	12.42%	60 min	90 min	195	9.4 L/min
1016-06	31.15 kg	107°C	288°C	251°C	267°C
	12.86%	67 min	90 min	195 min	9.4 L/min

7.1.2 Process Component and Overall Mass Balances

The overall mass balances for the PRDA mixed waste runs are shown in Table 7-2. Tables 7-3 - 7-6 show the component mass balance for the mixed waste test runs.

Table 7-2. Overall Mass Balance of the PRDA Mixed Waste Runs

Test Run	Mass In (kg)	Mass Out (kg)	% Recovery
Drum 1017, Batch 1	26.16	16.50	63%[1]
Drum 1017, Batch 7	30.89	31.15	101%
Drum 1016, Batch 5	37.67	35.49	95%
Drum 1016, Batch 6	30.52	32.29	106%

Notes:

1. Based on the nature of the testing, the dryer was emptied solely through the dumping door. Consequently, 6-10 kg of material remained in the dryer after the run. For the remaining test runs, the areas that cannot be cleared using the dumping door had already been filled, accounting for more realistic recoveries. The mass recovery for all of the Geotech test runs combined was in excess of 99%.

Table 7-3. Component Recoveries for the test on Drum 1017, Batch 1

Component	Total In	Total Out	% Recovery
Solids (g)	22,550	12,826	56.9
Liquids(g)	3,610	3,680	101.9

Table 7-4. Component Recoveries for the test on Drum 1016, Batch 5

Component	Total In	Total Out	% Recovery
Solids (g)	34,430	32,360	94.0
Liquids(g)	3,240	3,130	96.6

Table 7-5. Component Recoveries for the test on Drum 1017, Batch 7

Component	Total In	Total Out	% Recovery
Solids (g)	27,050	27,790	102.7
Liquids(g)	3,840	3,350	87.3

Table 7-6. Component Recoveries for the test on Drum 1017, Batch 1

Component	Total In	Total Out	% Recovery
Solids (g)	26,600	28,570	107.4
Liquids(g)	3,930	3,720	94.6

For the mass balances, the following component definitions apply to all streams.

Solids: The fraction of the material remaining after heating at 105°C

Water: Sample weight loss at 105°C; may include organics of higher volatility. Moisture and water are considered synonymous

Oil and Grease: Oil and grease analyses, or actual liquid oil recovered.

Liquids: The total weight of water (moisture) in and condensate (water and oil) out.

Contaminant concentrations are measured in the solid and liquid streams only. Analysis of contaminants in the gas stream was not within the scope of this testing.

7.1.3 Particulate Carryover

As was expected, only very minimal quantities of solids were carried into the gas system piping, due mainly to the filter in the cupola. No measurable solids were recovered, so the percent carryover was less than 0.1%. Based on the quantity of feed and the configuration of the system, a carryover percentage this low is not unusual.

7.1.4 Analytical Results

The analytical results for the PRDA mixed waste treatability study runs are summarized in Tables 7-7 - 7-10. Tables 7-11 - 7-14 summarize the removal efficiencies for selected components in the mixed waste runs.

Table 7-7. Analytical Results for the test run on Drum 1017-01

Component		Run Feed (1017-02-01)	Product (1017-03A-01)	Cond. Water (1017-06-01)
Moisture	%	13.78	0	x
Ash	%	76.2	93.4	x
pH		6.6	5.7	2.4
oil & grease	ppm	4,904	BQL(10)	47.38
TPH		745	BQL(10)	7.94
Dissolved Solids	ppm	x	x	BQL(42 pci/L)
Suspended Solids	ppm	x	x	BQL(49 pci/L)
Gross Alpha	pci/g	10.7	9	x
Gross Beta	pci/g	51.5	x	BQL(0.57 pci/L)
Cesium-137	pci	10.85	x	
Radium-226	pci	269.19	x	
Uranium-238	pci	603.37	x	
VOLATILES				
Acetone	ppb	320	150	98,000
Tetrachloroethylene	ppb	1,000,000	BQL(5)	4,600
2-Butanone	ppb	46	15	28,000
SEMI-VOLATILES				
Bis(2-ethylhexyl)phthalate	ppb	120,000	J (59)	BQL(480)

NOTE: Results are reported on an "as-received" basis

Table 7-8. Analytical Results for the test run on Drum 1016-05

Component		Run Feed (1016-02-05)	Product (1016-03A-05)	Cond. Water (1016-06-05)
Moisture	%	8.6	0.0	x
Ash	%	84.6	92.5	x
pH		7.4	7.0	4.1
oil & grease	ppm	437	BQL(10)	49.9
TPH		467	BQL(10)	42.3
Dissolved Solids	ppm	x	x	2748
Suspended Solids	ppm	x	x	0.017
Gross Alpha	pci/g	8.17	5.75	BQL(52 pci/L)
Gross Beta	pci/g	40.7	x	BQL(50 pci/L)
Cesium-137	pci	x	x	x
Radium-226	pci	518.52	x	BQL(0.73 pci/L)
Uranium-238	pci	393.58	x	x
VOLATILES				
Acetone	ppb	J(21)	610 E	5,100
Tetrachloroethylene	ppb	5,900	17	120
2-Butanone	ppb	25,000	53	2100
SEMI-VOLATILES				
Bis(2-ethylhexyl)phthalate	ppb	J(91)	J(64)	J(230)

NOTE: Results are reported on an "as-received" basis

Table 7-9. Analytical Results for the test run on Drum 1017-07

Component		Run Feed (1017-02-7)	Product (1017-03A-7)	Cond. Water (1017-06-7)	Cond. Oil (1017-10-7)
Moisture	%	12.42	0.0	x	x
Ash	%	78.7	93.1	x	0.18
pH		6.7	6.7	3.33	x
oil & grease	ppm	4715	BQL(10)	75.8	x
TPH		5049	BQL(10)	54.2	x
Dissolved Solids	ppm	x	x	772	x
Suspended Solids	ppm	x	x	30	x
Gross Alpha	pci/g	13.5	10.5	BQL(35 pci/L)	BQL(580 pci/L)
Gross Beta	pci/g	86.4	x	BQL(48 pci/L)	BQL(1,000 pci/L)
Cesium-137	pci	x	x	x	x
Radium-226	pci	1000.6	x	BQL(0.44 pci/L)	x
Uranium-238	pci	1131.1	x	x	x
VOLATILES					
Acetone	ppb	40,000	190	7,300	BQL(10,000)
Tetrachloroethylene	ppb	120,000	J(4)	320	110,000
2-Butanone	ppb	41,000	44	3,900	50,000
SEMI-VOLATILES					
Bis(2-ethylhexyl)phthalate	ppb	110,000	11,000	BQL(480)	1,300,000

NOTE: Results are reported on an "as-received" basis

Table 7-10. Analytical Results for the test run on Drum 1016-06

Component		Run Feed (1016-02-6)	Product (1016-03A-6)	Cond. Water (1016-06-6)	Cond. Oil (1016-10-6)
Moisture	%	12.86	0	x	x
Ash	%	76.2	91.8	x	0.275
pH		7.1	6.7		x
oil & grease	ppm	4,209	BQL(10)	61.34	x
TPH		2,134	BQL(10)	79.16	x
Dissolved Solids	ppm	x	x	1914	x
Suspended Solids	ppm	x	x	0.0226	x
Gross Alpha	pci/g	8.8	8.7	BQL(52 pci/L)	BQL(1440)
Gross Beta	pci/g	43.4	x	BQL(50 pci/L)	BQL(2500)
Cesium-137	pci	10.85	x	x	x
Radium-226	pci	269.19	x	BQL(0.54 pci/L)	x
Uranium-238	pci	603.37	x	x	x
VOLATILES					
Acetone	ppb	110	200	1,200	BQL(10,000)
Tetrachloroethylene	ppb	87,000	J(1)	28	110,000
2-Butanone	ppb	37,000	57	320	BQL(10,000)
SEMI-VOLATILES					
Bis(2-ethylhexyl)phthalate	ppb	88,000	BQL(330)	J(100)	12,000,000

NOTE: Results are reported on an "as-received" basis

Table 7-11. Removal Efficiencies for the PRDA Run on Drum 1017, Batch 1

Component		Concentration ppm		Removal %
		1017-02-01 Run Feed	1017-03-01 (Avg.) Product	
VOLATILES				
Acetone	ppb	320	150	53.1
2-Butanone	ppb	46	16	65.2
Tetrachloroethene	ppb	1,000,000	BQL(5)	> 99.9995
SEMI-VOLATILES				
Bis(2-ethylhexyl)phthalates	ppb	120,000	J(59)	99.95
Oil & Grease	ppm	4,904	BQL(10)	> 99.8
TPH	ppm	745	BQL(10)	98.7

NOTE: Results are converted to a "dry weight" basis

Table 7-12. Removal Efficiencies for the PRDA Run on Drum 1016, Batch 5

Component		Concentration ppm		Removal %
		1016-02-05 Run Feed	1016-03-05 (Avg.) Product	
VOLATILES				
Acetone	ppb	J(21)	610 E	-2800
2-Butanone	ppb	25,000	53	99.8
Tetrachloroethene	ppb	5,900	17	99.7
SEMI-VOLATILES				
Bis(2-ethylhexyl)phthalates	ppb	J(91)	J(64)	29.7
Oil & Grease	ppm	437	BQL(10)	97.7
TPH	ppm	467	BQL(10)	97.9

NOTE: Results are converted to a "dry weight" basis

Table 7-13. Removal Efficiencies for the PRDA Run on Drum 1016, Batch 6

Component		Concentration ppm		Removal %
		1016-02-06 Run Feed	1016-03-06 (Avg.) Product	
VOLATILES				
Acetone	ppb	110	200	- 82
2-Butanone	ppb	37,000	57	99.8
Tetrachloroethene	ppb	87,000	J(1)	> 99.9990
SEMI-VOLATILES				
Bis(2-ethylhexyl)phthalates	ppb	88,000	BQL(330)	> 99.6
Oil & Grease	ppm	4,209	BQL(10)	> 99.8
TPH	ppm	2,134	BQL(10)	> 99.5

NOTE: Results are converted to a "dry weight" basis

Table 7-14. Removal Efficiencies for the PRDA Run on Drum 1017, Batch 7

Component		Concentration ppm		Removal %
		1017-02-07 Run Feed	1017-03-07 (Avg.) Product	
VOLATILES				
Acetone	ppb	40,000	190	99.5
2-Butanone	ppb	41,000	44	99.9
Tetrachloroethene	ppb	120,000	J(4)	> 99.9990
SEMI-VOLATILES				
Bis(2-ethylhexyl)phthalates	ppm	110,000	11,000	90
Oil & Grease	ppm	4,715	BQL(10)	99.8
TPH	ppm	5,049	BQL(10)	99.8

NOTE: Results are converted to a "dry weight" basis

The remediation goal(s) for the VAC*TRAX testing, as specified in the PRDA Contract are to (1) treat 60% of the organic contaminants to below regulatory limits and, (2) to reduce the concentration of 80% of the remaining organic contaminants by 90%. In this case, all of the constituents of concern were treated to below the regulatory limits, with removal efficiencies > 99.9990% for tetrachloroethene, the primary contaminant of concern.

8.0 CONCLUSIONS

Based on the results obtained during the surrogate, RCRA waste, and mixed waste testing program, several key conclusions can be drawn about the VAC*TRAX system. These are:

- VAC*TRAX is an effective tool for the removal of volatiles, PCB's, and select semi-volatiles from both soils and debris-type waste.

- Treatment goals, as specified by the PRDA contract, were met or exceeded in every test.

- The appropriateness of the VAC*TRAX unit to processing mixed waste was confirmed. Absolute containment of the radioactive solids was achieved. Molybdenum trioxide, a surrogate for uranium in the same oxidation state and chemical form as uranium is normally found at DOE sites, was quantitatively determined to remain with the solids in the dryer. It was not found in the condensate. Furthermore, when processing radioactive mixed waste both the condensate water and organic phases had no detectible radioactivity, and were disposable at a RCRA incinerator or fuels recovery facility.

- The gas treatment system design was validated a basically sound. It was observed that moist solids with organic liquid foul the vacuum pump inlet filter. The full scale system will need to allow for a duplex filter unit and/or a vacuum pump that is not sensitive to the presence of mists and oil.

- The basic economic viability of the VAC*TRAX process was demonstrated by achieving excellent treatment on a routine basis with both four and six hour heating cycles. Based on CTC's and Rust's experience with the X*TRAX technology, this time-temperature pair should scale up directly to the full-scale. This allows for over two hours to load nd empty the batch dryer and to still achieve the target economic goal of an eight-hour treatment cycle time per batch. This batch cycle time will be competitive with other transportable hazardous waste treatment units.

- Upon completion of the testing, the treated product and process residuals can all be sent to a permanent disposal facility. Thus, the VAC*TRAX process allows for the final disposal of all components of given mixed waste streams, not merely reducing the amount of mixed waste remaining.

- A full-scale VAC*TRAX system of equal or greater capability could be designed feasibly and economically. This is because the oil and solids temperatures used by the pilot VAC*TRAX unit are 55.6°C (100°F) below the practical maximum for a hot oil unit.

- The nitrogen flow required for the pilot VAC*TRAX unit is higher than desired, and if this parameter scales directly to full scale, the nitrogen flow would be roughly 47 L/min (100 SCFM). It is desired to have a full scale nitrogen flow of roughly 23.5 L/min (50 SCFM). However, a full-scale system is likely to have a lower air in-leakage rate per unit volume than the pilot unit, therefore requiring less nitrogen per ton of waste. This is the case for the small-pilot and full-scale X*TRAX thermal desorption units. As such, nitrogen flow is not expected to scale precisely. Further optimization of this parameter will be required during the full scale system design.

- The importance of the degree of vacuum was not explored. The pilot unit was always operated at full vacuum after the majority of the water was removed from the solids. It was found that during this drying phase, that higher vacuum created the potential to overload the condensation capacity of the condensers. Note significant benefit was perceived to operating at less than full vacuum during the heating and hold phases. the minor benefits of lower vacuum operation would be reduced electric power consumption and lower nitrogen use rate, neither having as much economic impact as a shorter cycle time.

In summary, the VAC*TRAX process has been demonstrated in this pilot program to be technically sound. Prior experience with similar technology indicates that the process would also be economically sound. Based on the above conclusions of this work, the broad application of VAC*TRAX to mixed waste remediation is obvious. The system provides a safe, practical, complete and economical method for the ultimate disposal of many mixed waste streams that consist of radioactive solids contaminated with volatile organic compounds. The design and construction of a full-scale VAC*TRAX unit is a logical step based on these results and would appear to have a significant benefit to many DOE sites that are indefinitely storing these mixed waste materials. Clemson technical center recommends proceeding to the next phase of the PRDA program, which is the design of the full-scale VAC*TRAX unit.

APPENDICES

APPENDIX A

Preparation of SARM Spike for VAC*TRAX™ Performance Test

TREATABILITY SITE SPECIFIC PROCEDURE SERIAL NO. ________	SSP NO.
	REVISION NO.
	DATE
	PAGE 1 OF

Preparation of SARM Spike for VAC*TRAX^{TM} Performance Test

Prepared By:

____
M. Todd Duncan
TD&D Associate Chemist
Engineering Lab

Concurrence:

____
David E. McCartney, Ph.D.
Manager, TD&D Laboratories
Clemson Technical Center, Inc.

____
Carl Palmer
Project Engineer
Clemson Technical Center, Inc.

Health and Safety Approval:

____
Daniel Hogan, Manager
Environmental, Health and Safety
Clemson Technical Center, Inc.

SAFETY AND ENVIRONMENTAL COMPLIANCE INSTRUCTIONS

1. All work will be done in a fume hood.

2. PPE

    1. Safety Glasses
    2. Lab coat
    3. Nitrile gloves

3. Completed spike material will be stored in air-tight containment.

4. Personal performing the spike will be familiar with the MSDS material for the spiking components.

5. Warning labels describing contents will be affixed on top of each container

    A. label should read " Open only in fume hood and notify H\S before opening outside of hood ", so that proper safety procedures can be taken i.e. respirators are to be worn, area should be roped off with proper warning signs,etc.

1.0 Applicability

This method is applicable to the preparation of spiked SARM samples for performance test on the VAC*TRAX™ unit.

2.0 Summary of the Method

This method outlines the proper method for spiking of SARM samples for test runs in the VAC*TRAX™ unit. Also listed are the organics to be used and the correct masses of each one.

3.0 Apparatus

3.1 Plastic containment large enough to accommodate mixing of the SARM sample

3.2 Balance readable to 0.01 g

3.3 Scoopula or spatula for mixing of spike sample

3.4 5 gallon containers(2) for storage of the prepared spike material

3.5 Scale capable of weighing up to 50 kg

3.6 SARM material (SSM 006 Foster Wheller Enviresponce, Inc.,Edison,NJ,contact:George Wolf-908-906-6865)

4.0 PROCEDURE

4.1 Preparation of Stock Solution

4.1.1 Quantity of the stock solution components should be calculated from Table 1, based upon the amount of SARM spike being prepared.

4.1.2 Weigh the needed amount of acetone, place into a clean 2L volumetric flask.

4.1.3 Add pentachlorophenol to the acetone. Shake until dissolved.

4.1.4 Add other organics, mixing thoroughly after each addition.

4.2 Preparation of Spike Material

4.2.1 Split the SARM to be spiked into an four or more number of equal masses. The number of masses depends on the size of the mixing containers.

4.2.2 Spike each sub-sample with the appropriate percentage of the stock solution. Creating two equal samples.

4.2.3 Split each sample into two equal masses. Mix one half of each sample together, forming two homogenous samples.

4.2.3 Each half should be placed in a sealed container with an appropriate label. (see Health and Environmental Compliance Instructions)

TABLE 1

SPIKING ORGANICS	GRAMS OF ORGANICS PER KILOGRAM OF SARM
ACETONE	6.8
BIS(2-ETHYLHEXYL)PHTHALATE	2.5
CARBON TETRACHLORIDE	2.5
CHLOROBENZENE	0.4
1,2-DICHLOROPHENOL	0.6
ETHYLBENZENE	3.2
PENTACHLOROPHENOL	1.0
STYRENE	1.0
TETRACHLOROETHYLENE	0.6
TRICHLOROETHENE	0.6
XYLENE	8.2

APPENDIX B

Size Reduction of Compactable Contact Waste for Treatment

ROUTINE TREATABILITY METHOD SERIAL NO. ________	METHOD NO. REVISION NO. DATE 9/7/93 PAGE 1 OF

Size Reduction of Compactable Contact Waste for Treatment

Prepared By:

____
Todd Beaton
Associate Engineer
TD&D Engineering Lab

Concurrence:

____
David E. McCartney, Ph.D.
Manager, TD&D Laboratories
Clemson Technical Center

____
Timothy Pruett
Engineering Group Leader
TD&D Engineering Lab

Health and Safety Approval:

____
Daniel Hogan
Environmental, Health and Safety
Clemson Technical Center

SAFETY AND ENVIRONMENTAL COMPLIANCE INSTRUCTIONS

1. General lab safety rules and personal protective attire must be adhered to at all times.

2. Consult the project workplan for information concerning:

   2.1 Sample specific handling precautions
   2.2 Residuals collection and disposal
   2.3 Sampling and analysis instructions

Size Reduction of Compactable Contact Waste for Treatment

1.0 Scope and Application

This procedure applies to the reduction in size of compactable contact waste material for subsequent treatment. Only compactable material (plastic, paper...) is suitable to be safely reduced under the guidelines of this procedure.

2.0 Summary of Method

Sort the material to be treated. Determine the maximum final size of the material to be reduced. Develop a method for measurement of the final product and reduce the material. Assure uniformity and representative sample of the final reduced material.

3.0 Apparatus

scissors, shears or other applicable apparatus or equipment for reduction of material

4.0 Procedure

4.1 Devise a sorting method for mixed materials as it may be necessary to use different methods of size reduction for different types of materials. Sort the material if necessary. At this point the material should be sorted to reduce the amount of radioactive contamination of any reduction equipment if the original material is radioactive.

4.2 Determine the type of equipment needed for reduction of the sample. (shredder for large plastics, scissors for paper, etc.....)

4.3 Determine the material's maximum allowable size for further treatment based on the treatment method.

4.4 Develop a method of final measurement of the sample, whether it be visual inspection, physical measurement, caliper measurement, change in volume, etc.

4.5 Complete the attached form with the information determined in 4.1 to 4.4 and obtain approval from the Project Manager, TD&D Laboratory Manager and Health and

Safety Coordinator.

4.6 Reduce the material to satisfactory size using the appropriate equipment or apparatus following any necessary safety guidelines associated with the reduction process including radioactive concerns.

4.7 Record physical observations for future modifications to procedure.

SIZE REDUCTION RECORD

Project # ____________________

Source of material ____________________________________

Description of material ______________________________

Purpose of reduction _________________________________

____

____

Treatment technology _________________________________

Maximum final size allowable __________________________

____

Describe sorting method ______________________________

____

____

List apparatus used in size reduction _______________

____

____

Method of final measurement ___________________________

____

<u>Authorization</u>:

Project Manager ___________________________

TD&D Manager ___________________________

Health and Safety ___________________________

APPENDIX C

Oven Heating Test for Material For Subsequent Thermal Treatment (CTC-5038)

OVEN HEATING TEST FOR MATERIAL FOR SUBSEQUENT THERMAL TREATMENT (CTC-5039)

SAMPLE SPECIFIC DETAILS

Project: 892017. PRDA VAC*TRAX

Sample: AN 93-043. Rocky Flats. Shop waste from the fabrication shop. PPE.

Follow procedure CTC-5039 incorporating the following sample specific details.

General procedure: Select 1 or 2.

1) Place 7 sample aliquots in the muffle furnace. Each sample aliquot should be representative of all types of material in the sample to be treated by VAC*TRAX. Raise the temperature to the test initial test temperature. After 30 minutes at that temperature withdraw a sample aliquot, observe the condition of the sample. Raise the temperature to the second test temperature and hold for 30 minutes. Withdraw a second sample aliquot. Repeat this for each test temperature.

2) Sort the sample by major matrix type (such as different types of plastic, cloth, paper, etc. place an aliquot of each matrix type in a separate crucible. Place each crucible in the muffle furnace. Heat to the initial test temperature and hold for 10 minutes. Open the furnace (or observe through the glass door if possible) and observe each sample matrix as directed in procedure CTC 5039. After recording the observations heat to the next test temperature. Repeat for each test temperature. Once a sample matrix melts or combusts, remove that material from the furnace.

Number of sample aliquots to be placed in furnace: 7

Sample size: > 10 cc < 50 cc

Initial operating temperature: 150 F

Hold time at each test temperature: 10 minutes

Test temperatures: 150, 200, 250, 300, 350, 400, 450 F

Comments: Follow general procedure # 2.

Authorization: Chuck H. Reed **Date** 10/6/93

Technical Report
CTC-TR94-014
September 29, 1994

FINAL TOPICAL REPORT ON

VAC*TRAX^{SM}

VACUUM THERMAL DESORPTION

VOLUME II of II
APPENDICES

Prepared by: Clemson Technical Center
Under Contract #DE-AC21-92MC29015

Prepared For: Mr. Mark Estel, Contract Specialist
Morgantown Energy Technology Center, Department of Energy
P.O. Box 880, Morgantown, WV 26507-0880

Clemson Technical Center
Clemson Research Park
100 Technology Drive

92

SRM TEST RUN

ANALYTICAL DATA SHEETS AND

CHAINS OF CUSTODY

Clemson Technical Center, INC.

Clemson Research Park

100 Technology Drive, Anderson, SC 29625

Analytical Results

Submission ID:	100002806
Project Name/ID:	892017-04
Client Name:	TD&D
Client Location:	ANDERSON, SC

CTC Sample ID:	200008606	200008607	200008608		
Client Sample ID:	SRM-02	SRM-03A	SRM-03B		
Waste Type:	SOLID	SOLID	SOLID		
Date Received:	04-OCT-93	04-OCT-93	04-OCT-93		
Date Sampled:	30-SEP-93	30-SEP-93	30-SEP-93		
Parameter	**Result**	**Result**	**Result**	**PQL**	**Unit**
WET CHEMISTRY					
Temp Of Sample	19.2	19.5	-		c
Ph By Meter	8.720	7.965	-		ph
Oil & Grease	160	<10	<10		ppm
Percent Water	6.93	<3	<3		wgt pct
Percent Total Ash	83.57	94.42	87.92		pct
Dissolved Solids	-	-	-		mg/l
Suspended Solids	-	-	-		mg/l
SEMI VOA - TOTAL					
Matrix	SOIL	SOIL	SOIL		
Layer	N/A	N/A	N/A		
Pyridine	< .01	< .01	< .01	.01	ppm
N-Nitrosodimethylamine	< .01	< .01	< .01	.01	ppm
Aniline	< .01	< .01	< .01	.01	ppm
Bis(2-Chloroethyl)Ether	< .01	< .01	< .01	.01	ppm
2-Chlorophenol	< .01	< .01	< .01	.01	ppm
1,3-Dichlorobenzene	< .01	< .01	< .01	.01	ppm
Phenol	< .01	< .01	< .01	.01	ppm
1,4-Dichlorobenzene	< .01	< .01	< .01	.01	ppm
1,2-Dichlorobenzene	< .01	< .01	< .01	.01	ppm
Benzyl Alcohol	< .01	< .01	< .01	.01	ppm
Bis(2-Chloroisopropyl)Ether	< .01	< .01	< .01	.01	ppm
Hexachloroethane	< .01	< .01	< .01	.01	ppm
2-Methylphenol (O-Cresol)	< .01	< .01	< .01	.01	ppm
N-Nitrosodi-N-Propylamine	< .01	< .01	< .01	.01	ppm
Nitrobenzene	< .01	< .01	< .01	.01	ppm
4-Methylphenol (P-Cresol)	< .01	< .01	< .01	.01	ppm
Isophorone	< .01	< .01	< .01	.01	ppm
2-Nitrophenol	< .01	< .01	< .01	.01	ppm
2,4-Dimethylphenol	< .01	< .01	< .01	.01	ppm
Bis(2-Chloroethoxy)Methane	< .01	< .01	< .01	.01	ppm
1,2,4-Trichlorobenzene	< .01	< .01	< .01	.01	ppm
2,4-Dichlorophenol	< .01	< .01	< .01	.01	ppm
Benzoic Acid	< .01	< .01	< .01	.01	ppm
Naphthalene	< .01	< .01	< .01	.01	ppm
4-Chloroaniline	< .01	< .01	< .01	.01	ppm
Hexachlorobutadiene	< .01	< .01	< .01	.01	ppm
2-Methylnaphthalene	< .01	< .01	< .01	.01	ppm
4-Chloro-3-Methyl Phenol	< .01	< .01	< .01	.01	ppm
Hexachlorocyclopentadiene	< .01	< .01	< .01	.01	ppm
2,4,6-Trichlorophenol	< .01	< .01	< .01	.01	ppm
2,4,5-Trichlorophenol	< .01	< .01	< .01	.01	ppm
2-Chloronaphthalene	< .01	< .01	< .01	.01	ppm
2-Nitroaniline	< .01	< .01	< .01	.01	ppm
Acenaphthylene	< .01	< .01	< .01	.01	ppm
Dimethyl Phthalate	< .01	< .01	< .01	.01	ppm
2,6-Dinitrotoluene	< .01	< .01	< .01	.01	ppm

PQL = Practical Quanitation Limit

CTC Sample ID:	200008606	200008607	200008608		
Client Sample ID:	SRM-02	SRM-03A	SRM-03B		
Waste Type:	SOLID	SOLID	SOLID		
Date Received:	04-OCT-93	04-OCT-93	04-OCT-93		
Date Sampled:	30-SEP-93	30-SEP-93	30-SEP-93		
Parameter	**Result**	**Result**	**Result**	**PQL**	**Unit**
SEMI VOA - TOTAL (continued):					
3-Nitroaniline	< .01	< .01	< .01	.01	ppm
Acenaphthene	< .01	< .01	< .01	.01	ppm
2,4-Dinitrophenol	< .01	< .01	< .01	.01	ppm
Dibenzofuran	< .01	< .01	< .01	.01	ppm
4-Nitrophenol	< .01	< .01	< .01	.01	ppm
2,4-Dinitrotoluene	< .01	< .01	< .01	.01	ppm
Fluorene	< .01	< .01	< .01	.01	ppm
4-Chlorophenylphenyl Ether	< .01	< .01	< .01	.01	ppm
Diethyl Phthalate	< .01	< .01	< .01	.01	ppm
4-Nitroaniline	< .01	< .01	< .01	.01	ppm
4,6-Dinitro-2-Methylphenol	< .01	< .01	< .01	.01	ppm
N-Nitrosodiphenylamine	< .01	< .01	< .01	.01	ppm
Azobenzene	< .01	< .01	< .01	.01	ppm
4-Bromophenylphenyl Ether	< .01	< .01	< .01	.01	ppm
Hexachlorobenzene	< .01	< .01	< .01	.01	ppm
Pentachlorophenol	541	97.0	112.0	.01	ppm
Phenanthrene	< .01	< .01	< .01	.01	ppm
Anthracene	< .01	< .01	< .01	.01	ppm
Carbazole	< .01	< .01	< .01	.01	ppm
Di-N-Butyl Phthalate	< .01	< .01	< .01	.01	ppm
Fluoranthene	< .01	< .01	< .01	.01	ppm
Pyrene	< .01	< .01	< .01	.01	ppm
Butylbenzyl Phthalate	< .01	< .01	< .01	.01	ppm
Benzo(A)Anthracene	< .01	< .01	< .01	.01	ppm
3,3-Dichlorobenzidine	< .01	< .01	< .01	.01	ppm
Chrysene	< .01	< .01	< .01	.01	ppm
Bis(2-Ethylhexyl)Phthalate	728	< .01	< .01	.01	ppm
Di-N-Octyl Phthalate	< .01	< .01	< .01	.01	ppm
Benzo(B)Fluoranthene	< .01	< .01	< .01	.01	ppm
Benzo(K)Fluoranthene	< .01	< .01	< .01	.01	ppm
Benzo(A)Pyrene	< .01	< .01	< .01	.01	ppm
Indeno(1,2,3-Cd)Pyrene	< .01	< .01	< .01	.01	ppm
Dibenzo(A,H)Anthracene	< .01	< .01	< .01	.01	ppm
Benzo(G,H,I)Perylene	< .01	< .01	< .01	.01	ppm

COMMENTS:

200008606 -
True PQL = 5000 X listed.
200008607 -
True PQL = Listed X 1000.
200008608 -
True PQL = Listed X 1000.

TPH

Matrix	OTHER SOLID	OTHER SOLID	OTHER SOLID

PQL = Practical Quanitation Limit

CTC Sample ID:	200008606	200008607	200008608		
Client Sample ID:	SRM-02	SRM-03A	SRM-03B		
Waste Type:	SOLID	SOLID	SOLID		
Date Received:	04-OCT-93	04-OCT-93	04-OCT-93		
Date Sampled:	30-SEP-93	30-SEP-93	30-SEP-93		
Parameter	**Result**	**Result**	**Result**	**PQL**	**Unit**
TPH (continued):					
Layer					
Total Petroleum Hydrocarbons	37	5.3	5.1	0	ppm
VOA - TOTAL					
Matrix	SOIL	OTHER SOLID	OTHER SOLID		
Layer	N/A	N/A	N/A		
Acetone	423	5.42	3.29	.01	ppm
Carbon Tetrachloride	< .005	0.30	< .005	.005	ppm
1,2-Dichloroethane	< .005	0.29	< .005	.005	ppm
Trichloroethylene	< .005	0.21	< .005	.005	ppm
Tetrachloroethylene	31.6	0.36	< .005	.005	ppm
Chlorobenzene	< .01	< .01	< .01	.01	ppm
Ethylbenzene	580	3.84	0.72	.005	ppm
M,P-Xylene	790	4.15	0.88	.01	ppm
O-Xylene	312	1.26	0.25	.005	ppm
Styrene	132	0.35	< .005	.005	ppm

COMMENTS:

200008606 -
True PQl's = 6,173 x listed
Sample diluted due to high target components.
200008607 -
True PQL's = 41.1 x listed
Sample preparation- methanol extraction
200008608 -
True PQL's = 41.4 x listed
Sample preparation- methanol extraction

GAMMA ISOTOPIC - SOLID

Ac-228	0.662	0.590	0.660	.453	pci/g
Bi-211	1.209	1.81	1.68	.399	pci/g
Bi-212	0.719	0.737	0.812	.493	pci/g
Bi-214	0.369	0.496	0.530	.293	pci/g
K-40	6.94	7.69	7.68	2.22	pci/g
Pb-212	0.556	0.640	0.614	.097	pci/g
Pb-214	0.464	0.583	0.644	.247	pci/g
Ra-224	1.44	2.06	1.60	1.15	pci/g
Th-229	0.305	-	0.362	.103	pci/g
Tl-208	0.521	0.489	0.545	.27	pci/g
Eu-155	-	< .101	-	.101	pci/g
Cs-137	-	-	< .096	.096	pci/g
Ra-223	-	-	< .31	.31	pci/g

PQL = Practical Quanitation Limit

CTC Sample ID:	200008606	200008607	200008608		
Client Sample ID:	SRM-02	SRM-03A	SRM-03B		
Waste Type:	SOLID	SOLID	SOLID		
Date Received:	04-OCT-93	04-OCT-93	04-OCT-93		
Date Sampled:	30-SEP-93	30-SEP-93	30-SEP-93		
Parameter	**Result**	**Result**	**Result**	**PQL**	**Unit**

GAMMA ISOTOPIC - SOLID

COMMENTS:

200008606 -
k-40 6.94 pcg +/- 0.960 pcg
tl-208 0.521 pcg +/- 0.140 pcg
bi-212 0.719 pcg +/- 0.299 pcg
pb-212 0.556 pcg +/- 0.139 pcg
ra-224 1.44 pcg +/- 0.582 pcg
ac-228 0.662 pcg +/- 0.127 pcg
bi-211 1.209 pcg +/- 0.341 pcg
bi-214 0.369 pcg +/- 0.944 pcg
pb-214 0.464 pcg +/- 0.180 pcg
th-229 0.305 pcg +/- 0.114 pcg
rws 10/10

200008607 -
k-40 7.69 pcg +/- 0.995 pcg
tl-208 0.489 pcg +/- 0.149 pcg
bi-212 0.737 pcg +/- 0.339 pcg
pb-212 0.640 pcg +/- 0.161 pcg
ra-224 2.06 pcg +/- 0.766 pcg
ac-228 0.590 pcg +/- 0.139 pcg
bi-211 1.81 pcg +/- 0.412 pcg
bi-214 0.496 pcg +/- 0.107 pcg
pb-214 0.583 pcg +/- 0.220 pcg
rws 10/10

200008608 -
k-40 7.68 pcg +/- 0.972 pcg
tl-208 0.545 pcg +/- 0.158 pcg
bi-212 0.812 pcg +/- 0.324 pcg
pb-212 0.614 pcg +/- 0.155 pcg
ra-224 1.60 pcg +/- 0.578 pcg
ac-228 0.660 pcg +/- 0.148 pcg
bi-211 1.68 pcg +/- 0.397 pcg
bi-214 0.530 pcg +/- 0.101 pcg
pb-214 0.644 pcg +/- 0.224 pcg
th-229 0.362 pcg +/- 0.127 pcg
rws 10/10

GROSS ALPHA & BETA - SOLID

Gross Alpha	< 2	5.29	6.41	2	pci/g
Gross Beta	4.55	4.35	8.17	2	pci/g

PQL = Practical Quanitation Limit

CTC Sample ID:	200008606	200008607	200008608		
Client Sample ID:	SRM-02	SRM-03A	SRM-03B		
Waste Type:	SOLID	SOLID	SOLID		
Date Received:	04-OCT-93	04-OCT-93	04-OCT-93		
Date Sampled:	30-SEP-93	30-SEP-93	30-SEP-93		
Parameter	**Result**	**Result**	**Result**	**PQL**	**Unit**

GROSS ALPHA & BETA - SOLID

COMMENTS:

200008606 -
GROSS BETA ERROR IS +/- 1.38 pCi/g csj 10-13-93
200008607 -
GROSS ALPHA ERROR IS +/- 1.70 pCi/g GROSS BETA ERROR IS +/- 1.19 pCi/g CSJ 10-13-93
200008608 -
GROSS ALPHA ERROR IS +/- 1.53 pCi/g GROSS BETA ERROR IS +/- 1.47 pCi/g CSJ 10-13-93

PQL = Practical Quanitation Limit

CTC Sample ID:	200008609	200008610			
Client Sample ID:	SRM-06	SRM-10			
Waste Type:	LIQUID	LIQUID			
Date Received:	04-OCT-93	04-OCT-93			
Date Sampled:	30-SEP-93	30-SEP-93			
Parameter	**Result**	**Result**	**Result**	**PQL**	**Unit**
WET CHEMISTRY					
Temp Of Sample	18.6	-			c
Ph By Meter	7.617	-			ph
Oil & Grease	-	-			ppm
Percent Water	-	-			wgt pct
Percent Total Ash	-	<1			pct
Dissolved Solids	171	-			mg/l
Suspended Solids	48	-			mg/l
SEMI VOA - TOTAL					
Matrix	AQUEOUS	AQUEOUS			
Layer	N/A	N/A			
Pyridine	< .01	< .01		.01	ppm
N-Nitrosodimethylamine	< .01	< .01		.01	ppm
Aniline	< .01	< .01		.01	ppm
Bis(2-Chloroethyl)Ether	< .01	< .01		.01	ppm
2-Chlorophenol	< .01	< .01		.01	ppm
1,3-Dichlorobenzene	< .01	< .01		.01	ppm
Phenol	1.28	< .01		.01	ppm
1,4-Dichlorobenzene	< .01	< .01		.01	ppm
1,2-Dichlorobenzene	< .01	< .01		.01	ppm
Benzyl Alcohol	< .01	< .01		.01	ppm
Bis(2-Chloroisopropyl)Ether	< .01	< .01		.01	ppm
Hexachloroethane	< .01	< .01		.01	ppm
2-Methylphenol (O-Cresol)	< .01	< .01		.01	ppm
N-Nitrosodi-N-Propylamine	< .01	< .01		.01	ppm
Nitrobenzene	< .01	< .01		.01	ppm
4-Methylphenol (P-Cresol)	< .01	< .01		.01	ppm
Isophorone	< .01	< .01		.01	ppm
2-Nitrophenol	< .01	< .01		.01	ppm
2,4-Dimethylphenol	< .01	< .01		.01	ppm
Bis(2-Chloroethoxy)Methane	< .01	< .01		.01	ppm
1,2,4-Trichlorobenzene	< .01	< .01		.01	ppm
2,4-Dichlorophenol	< .01	< .01		.01	ppm
Benzoic Acid	< .01	< .01		.01	ppm
Naphthalene	< .01	< .01		.01	ppm
4-Chloroaniline	< .01	< .01		.01	ppm
Hexachlorobutadiene	< .01	< .01		.01	ppm
2-Methylnaphthalene	< .01	< .01		.01	ppm
4-Chloro-3-Methyl Phenol	< .01	< .01		.01	ppm
Hexachlorocyclopentadiene	< .01	< .01		.01	ppm
2,4,6-Trichlorophenol	< .01	< .01		.01	ppm
2,4,5-Trichlorophenol	< .01	< .01		.01	ppm
2-Chloronaphthalene	< .01	< .01		.01	ppm
2-Nitroaniline	< .01	< .01		.01	ppm
Acenaphthylene	< .01	< .01		.01	ppm
Dimethyl Phthalate	< .01	< .01		.01	ppm
2,6-Dinitrotoluene	< .01	< .01		.01	ppm

PQL = Practical Quanitation Limit

CTC Sample ID:	200008609	200008610			
Client Sample ID:	SRM-06	SRM-10			
Waste Type:	LIQUID	LIQUID			
Date Received:	04-OCT-93	04-OCT-93			
Date Sampled:	30-SEP-93	30-SEP-93			
Parameter	**Result**	**Result**	**Result**	**PQL**	**Unit**
SEMI VOA - TOTAL (continued):					
3-Nitroaniline	< .01	< .01		.01	ppm
Acenaphthene	< .01	< .01		.01	ppm
2,4-Dinitrophenol	< .01	< .01		.01	ppm
Dibenzofuran	< .01	< .01		.01	ppm
4-Nitrophenol	< .01	< .01		.01	ppm
2,4-Dinitrotoluene	< .01	< .01		.01	ppm
Fluorene	< .01	< .01		.01	ppm
4-Chlorophenylphenyl Ether	< .01	< .01		.01	ppm
Diethyl Phthalate	< .01	< .01		.01	ppm
4-Nitroaniline	< .01	< .01		.01	ppm
4,6-Dinitro-2-Methylphenol	< .01	< .01		.01	ppm
N-Nitrosodiphenylamine	< .01	< .01		.01	ppm
Azobenzene	< .01	< .01		.01	ppm
4-Bromophenylphenyl Ether	< .01	< .01		.01	ppm
Hexachlorobenzene	< .01	< .01		.01	ppm
Pentachlorophenol	16.0	< .01		.01	ppm
Phenanthrene	< .01	< .01		.01	ppm
Anthracene	< .01	< .01		.01	ppm
Carbazole	< .01	< .01		.01	ppm
Di-N-Butyl Phthalate	< .01	< .01		.01	ppm
Fluoranthene	< .01	< .01		.01	ppm
Pyrene	< .01	< .01		.01	ppm
Butylbenzyl Phthalate	< .01	< .01		.01	ppm
Benzo(A)Anthracene	< .01	< .01		.01	ppm
3,3-Dichlorobenzidine	< .01	< .01		.01	ppm
Chrysene	< .01	< .01		.01	ppm
Bis(2-Ethylhexyl)Phthalate	< .01	< .01		.01	ppm
Di-N-Octyl Phthalate	< .01	< .01		.01	ppm
Benzo(B)Fluoranthene	< .01	< .01		.01	ppm
Benzo(K)Fluoranthene	< .01	< .01		.01	ppm
Benzo(A)Pyrene	< .01	< .01		.01	ppm
Indeno(1,2,3-Cd)Pyrene	< .01	< .01		.01	ppm
Dibenzo(A,H)Anthracene	< .01	< .01		.01	ppm
Benzo(G,H,I)Perylene	< .01	< .01		.01	ppm

COMMENTS:

200008609 -
True PQL = 103 X listed.
200008610 -
True PQL = Listed X 247525. Sample was prepared and analyzed as a waste dilution.

VOA - TOTAL

Matrix	AQUEOUS	AQUEOUS
Layer	N/A	N/A

PQL = Practical Quanitation Limit

CTC Sample ID: 200008609 200008610
Client Sample ID: SRM-06 SRM-10
Waste Type: LIQUID LIQUID
Date Received: 04-OCT-93 04-OCT-93
Date Sampled: 30-SEP-93 30-SEP-93

Parameter	Result	Result	Result	PQL	Unit
VOA - TOTAL (continued):					
Acetone	696	< .01		.01	ppm
Carbon Tetrachloride	< .005	< .005		.005	ppm
1,2-Dichloroethane	< .005	< .005		.005	ppm
Trichloroethylene	< .005	< .005		.005	ppm
Tetrachloroethylene	< .005	< .005		.005	ppm
Chlorobenzene	< .01	< .01		.01	ppm
Ethylbenzene	< .005	114000		.005	ppm
M,P-Xylene	< .01	167000		.01	ppm
O-Xylene	< .005	82800		.005	ppm
Styrene	< .005	66000		.005	ppm

COMMENTS:

200008609 -
True PQl's = 10,000 x listed
Sample preparation- water dilution due to high target components.
200008610 -
True PQL's = 1,666,667 x listed
Sample preparation- water dilution due to high target components.

PQL = Practical Quanitation Limit

Report Date Nov 10, 1993

W J Jameson
Laboratory Manager

11/10/93
Date

Ted Henry
Project Manager

11/11/93
Date

Clems... Technical Center, Inc.

Cl... esearch Park
100 Technology Drive
Anderson, SC 29625
(803) 646-2413
Fax # (803) 646-5311

CHAIN-OF-CUSTODY RECORD

Client: TD&D
Location: CTC
Project/Number: 892017-04
Sample Type(s): LIQUIDS/SOLIDS

Page ____ of ____

SAMPLE IDENTITY	DATE SAMPLED/TIME	LIMS NUMBER	SAMPLE CONTAINER DESCRIPTION								TOTAL	REMARKS
SRM-02	9/30/93	8606 ✓	3								3	SEE SAPF
SRM-03A	9/30/93	8607 ✓	3								3	FOR ANALYSES
SRM-03E	9/30/93	8608 ✓	3								3	
SRM-06	9/30/93	8609 ✓	4								4	
SRM-10	9/30/93	8610 ✓	1								1	
Sub ID # 2806												

Total No. of Containers: 14

Sampled By: Michael J. McElwee

Relinquished by: Michael J. McElwee Organization: TDD
Date: 10/1/93 Time: 14:10

Received by: [signature] Organization: CTC
Date: 10-01-93 Time: 14:10

Relinquished by: ____ Organization: ____
Date: ____ Time: ____

Received by: ____ Organization: ____
Date: ____ Time: ____

Relinquished by: ____ Organization: ____
Date: ____ Time: ____

Received by: ____ Organization: ____
Date: ____ Time: ____

Delivery Method: ____ (attach shipping bill, if any)
Shipping Container ID ____

NOTE: All information concerning the date, time, analyst and method of analysis is recorded in bound log books at CWM-CTC and is available upon request.

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CL. ...NICAL CENTER
SAMPLE ... REQUEST FORM (...ARF)

INITIATOR: Chuck REECE
DATE: 9-30-93
CLIENT: TD+D
TSCA/RCRA HAZARDOUS? RCRA (maybe)
CONTACT: Chuck REECE
REPORT TO: Chuck REECE
RADIOACTIVE? NO (If Yes, Attach)
ADDRESS:
RAD LICENSE NO.:
STD QAPjP: X OTHER ______ (Attach)
PHONE: 803-646-2413
DUE FROM LAB: 14 DAYS FROM RECEIPT
PROJECT NAME VAC *TRAX
DUE TO CLIENT: ______ DAYS FROM RECEIPT
PROJECT NUMBER: 892017-04
NUMBER OF SAMPLES: 5 (including Duplicate)
P.O. / AUTHORIZATION #:
EXPECTED ARRIVAL DATE: 10-1-93

SAMPLE I.D.	MATRIX	PARAMETERS REQUESTED
SRM-02	Feed Soil	See ATTACHED TABLE 2.
SRM-03*	Treated Soil	
SRM-06	Condensed Water	
SRM-10	organic Condensate	

ADDITIONAL COMMENTS: Sample 02 was spiked in accordance with TABLE I. Sample 06 +10 may be heavily contaminated w/organics. Quantify as many of

SAMPLE RESIDUES & SECONDARY WASTES TO: the TABLE I parameters as possible.

* Sample 03 will be submitted. in duplicate. Sample 03 should be relatively clean, expect non-detects for volatiles.

SUBCONTRACT TO: SAVANNAH LABS, DEERFIELD BEACH FL
PARAMETERS: SAMPLES SRM-02 & SRM-03 (w/DUP) FOR OIL & GREASE & TPH BY INFRA RED ANALYSIS.
QUOTE NO.: DQ30245

FINGERPRINT REQUESTED: ______ FULL ______ RAD ✓ ABBREVIATED

TD&D PM APPROVAL: [signature] DATE: 9/30/93

rec'd 2413 10/1/93

A.P. PROJECT MGT APPROVAL: [signature] DATE: 10/4/93

A.P. LAB MGR APPROVAL: [signature] DATE: 10/24/93

DELIVERED OCT 0 1 1993

SKi

AF 1

FORM APPROVED BY: [signature] DATE: 8/9/93
VER.7 REV. 8/93

RRS - Clemson Technical Center, Inc. Clemson Research Park 100 Technology Drive Anderson, South Carolina 29625 **Sampling, Analysis & Data Acquisition Plan**	Issue Date: 08/02/93 Page Number: 12
DOE PRDA VAC*TRAX™ Project **Table 2 Required Sample Analyses for Pilot Test**	Rev. No. (_/_/_)

Sample ID	Analyses												CTC QA/QC Level
	Wt	pH	Mst	Ash	O&G	TPH	TDS	TSS	VOA	SVOA	αβγ		
~~XXX-01~~	~~-~~	~~Y~~	~~Y~~	~~Y~~	~~Y~~	~~Y~~	~~-~~	~~-~~	~~Y~~	~~Y~~	~~Y~~		1
XXX-02	O	✓	✓	✓	✓	✓	-	-	✓	✓	✓		1
XXX-03	O	✓	✓	✓	✓	✓	-	-	✓	✓	✓		1
XXX-06	O	✓	-	[illegible]	X	X	✓	✓	✓	✓	X		1
XXX-08 ok 11/4	X	-	X	X	X	X	-	-	X	X	X		1
XXX-10	O	-	-	✓	-	-	-	-	✓	✓	X		1
XXX-12	O	-	Y	Y	Y	Y	-	-	Y	Y	Y		1
XXX-13	Y	-	Y	Y	Y	Y	-	-	Y	Y	Y		1

Legend:

O = by operator
Y = lab test requested
D = duplicate lab analysis
\- = test not requested
Wt = total weight of sample
pH = solution pH
Mst = moisture content
Ash = ash content
* O&G = oil and grease By IR method
* TPH = total petroleum hydrocarbons By IR method
TDS = total dissolved solids
TSS = total suspended solids
VOA = volatile organic analysis
SVOA = semi-volatile organic compounds
αβγ = gross α, β and γ radiation (for mixed samples)

X = Do not analyze

SAR TEST RUN

ANALYTICAL DATA SHEETS AND

CHAINS OF CUSTODY

Clemson Technical Center, INC.

Clemson Research Park
100 Technology Drive, Anderson, SC 29625

Analytical Results

Submission ID: 100002833

Project Name/ID: 892019 VAC*TRAC

Client Name: TD&D

Client Location: ANDERSON, SC

CTC Sample ID:	200008806	200008807	200008808		
Client Sample ID:	SAR-02	SAR-03A	SAR-03B		
Waste Type:	SOLID	SOLID	SOLID		
Date Received:	08-OCT-93	08-OCT-93	08-OCT-93		
Date Sampled:	07-OCT-93	07-OCT-93	07-OCT-93		
Parameter	**Result**	**Result**	**Result**	**PQL**	**Unit**
WET CHEMISTRY					
Temp Of Sample	24.6	24.4	-		c
Ph By Meter	8.663	7.511	-		ph
Oil & Grease	240	<10	<10		ppm
Percent Water	12.36	<3	<3		wgt pct
Percent Total Ash	83.72	89.17	77.55		pct
Dissolved Solids	-	-	-		mg/l
Suspended Solids	-	-	-		mg/l
SPECTROSCOPY					
Molybedum - Total	185	203	214		ppm
SEMI VOA - TOTAL					
Matrix	SOIL	SOIL	SOIL		
Layer	N/A	N/A	N/A		
Pyridine	< .01	< .01	< .01	.01	ppm
N-Nitrosodimethylamine	< .01	< .01	< .01	.01	ppm
Aniline	< .01	< .01	< .01	.01	ppm
Bis(2-Chloroethyl)Ether	< .01	< .01	< .01	.01	ppm
2-Chlorophenol	< .01	< .01	< .01	.01	ppm
1,3-Dichlorobenzene	< .01	< .01	< .01	.01	ppm
Phenol	< .01	< .01	< .01	.01	ppm
1,4-Dichlorobenzene	< .01	< .01	< .01	.01	ppm
1,2-Dichlorobenzene	< .01	< .01	< .01	.01	ppm
Benzyl Alcohol	< .01	< .01	< .01	.01	ppm
Bis(2-Chloroisopropyl)Ether	< .01	< .01	< .01	.01	ppm
Hexachloroethane	< .01	< .01	< .01	.01	ppm
2-Methylphenol (O-Cresol)	< .01	< .01	< .01	.01	ppm
N-Nitrosodi-N-Propylamine	< .01	< .01	< .01	.01	ppm
Nitrobenzene	< .01	< .01	< .01	.01	ppm
4-Methylphenol (P-Cresol)	< .01	< .01	< .01	.01	ppm
Isophorone	< .01	< .01	< .01	.01	ppm
2-Nitrophenol	< .01	< .01	< .01	.01	ppm
2,4-Dimethylphenol	< .01	< .01	< .01	.01	ppm
Bis(2-Chloroethoxy)Methane	< .01	< .01	< .01	.01	ppm
1,2,4-Trichlorobenzene	< .01	< .01	< .01	.01	ppm
2,4-Dichlorophenol	< .01	< .01	< .01	.01	ppm
Benzoic Acid	< .01	< .01	< .01	.01	ppm
Naphthalene	< .01	< .01	< .01	.01	ppm
4-Chloroaniline	< .01	< .01	< .01	.01	ppm
Hexachlorobutadiene	< .01	< .01	< .01	.01	ppm
2-Methylnaphthalene	< .01	< .01	< .01	.01	ppm
4-Chloro-3-Methyl Phenol	< .01	< .01	< .01	.01	ppm
Hexachlorocyclopentadiene	< .01	< .01	< .01	.01	ppm
2,4,6-Trichlorophenol	< .01	< .01	< .01	.01	ppm
2,4,5-Trichlorophenol	< .01	< .01	< .01	.01	ppm

PQL = Practical Quanitation Limit

CTC Sample ID:	200008806	200008807	200008808		
Client Sample ID:	SAR-02	SAR-03A	SAR-03B		
Waste Type:	SOLID	SOLID	SOLID		
Date Received:	08-OCT-93	08-OCT-93	08-OCT-93		
Date Sampled:	07-OCT-93	07-OCT-93	07-OCT-93		
Parameter	**Result**	**Result**	**Result**	**PQL**	**Unit**
SEMI VOA - TOTAL (continued):					
2-Chloronaphthalene	< .01	< .01	< .01	.01	ppm
2-Nitroaniline	< .01	< .01	< .01	.01	ppm
Acenaphthylene	< .01	< .01	< .01	.01	ppm
Dimethyl Phthalate	< .01	< .01	< .01	.01	ppm
2,6-Dinitrotoluene	< .01	< .01	< .01	.01	ppm
3-Nitroaniline	< .01	< .01	< .01	.01	ppm
Acenaphthene	< .01	< .01	< .01	.01	ppm
2,4-Dinitrophenol	< .01	< .01	< .01	.01	ppm
Dibenzofuran	< .01	< .01	< .01	.01	ppm
4-Nitrophenol	< .01	< .01	< .01	.01	ppm
2,4-Dinitrotoluene	< .01	< .01	< .01	.01	ppm
Fluorene	< .01	< .01	< .01	.01	ppm
4-Chlorophenylphenyl Ether	< .01	< .01	< .01	.01	ppm
Diethyl Phthalate	< .01	< .01	< .01	.01	ppm
4-Nitroaniline	< .01	< .01	< .01	.01	ppm
4,6-Dinitro-2-Methylphenol	< .01	< .01	< .01	.01	ppm
N-Nitrosodiphenylamine	< .01	< .01	< .01	.01	ppm
Azobenzene	< .01	< .01	< .01	.01	ppm
4-Bromophenylphenyl Ether	< .01	< .01	< .01	.01	ppm
Hexachlorobenzene	< .01	< .01	< .01	.01	ppm
Pentachlorophenol	480.0	154.0	97.4	.01	ppm
Phenanthrene	< .01	< .01	< .01	.01	ppm
Anthracene	< .01	< .01	< .01	.01	ppm
Carbazole	< .01	< .01	< .01	.01	ppm
Di-N-Butyl Phthalate	< .01	< .01	< .01	.01	ppm
Fluoranthene	< .01	< .01	< .01	.01	ppm
Pyrene	< .01	< .01	< .01	.01	ppm
Butylbenzyl Phthalate	< .01	< .01	< .01	.01	ppm
Benzo(A)Anthracene	< .01	< .01	< .01	.01	ppm
3,3-Dichlorobenzidine	< .01	< .01	< .01	.01	ppm
Chrysene	< .01	< .01	< .01	.01	ppm
Bis(2-Ethylhexyl)Phthalate	506.0	< .01	2.10	.01	ppm
Di-N-Octyl Phthalate	< .01	< .01	< .01	.01	ppm
Benzo(B)Fluoranthene	< .01	< .01	< .01	.01	ppm
Benzo(K)Fluoranthene	< .01	< .01	< .01	.01	ppm
Benzo(A)Pyrene	< .01	< .01	< .01	.01	ppm
Indeno(1,2,3-Cd)Pyrene	< .01	< .01	< .01	.01	ppm
Dibenzo(A,H)Anthracene	< .01	< .01	< .01	.01	ppm
Benzo(G,H,I)Perylene	< .01	< .01	< .01	.01	ppm

COMMENTS:

200008806 -
True PQL = Listed X 3333.
200008807 -
True PQL = Listed X 3344.
200008808 -
True PQL = 1670 X listed.

PQL = Practical Quanitation Limit

CTC Sample ID:	200008806	200008807	200008808		
Client Sample ID:	SAR-02	SAR-03A	SAR-03B		
Waste Type:	SOLID	SOLID	SOLID		
Date Received:	08-OCT-93	08-OCT-93	08-OCT-93		
Date Sampled:	07-OCT-93	07-OCT-93	07-OCT-93		
Parameter	**Result**	**Result**	**Result**	**PQL**	**Unit**
TPH					
Matrix	OTHER SOLID	OTHER SOLID	OTHER SOLID		
Layer					
Total Petroleum Hydrocarbons	60	5.4	5.1	0	ppm
VOA - TOTAL					
Matrix	OTHER SOLID	OTHER SOLID	OTHER SOLID		
Layer	N/A	N/A	N/A		
Acetone	1440	9.62	2.33	.01	ppm
Carbon Tetrachloride	91.7	< .005	< .005	.005	ppm
Trichloroethylene	< .005	< .005	< .005	.005	ppm
Tetrachloroethylene	103	< .005	< .005	.005	ppm
Chlorobenzene	< .01	< .01	< .01	.01	ppm
Ethylbenzene	552	< .005	< .005	.005	ppm
M,P-Xylene	1740	< .01	< .01	.01	ppm
O-Xylene	602	< .005	< .005	.005	ppm
Styrene	404	< .005	< .005	.005	ppm
Chloromethane	-	< .01	< .01	.01	ppm
Vinyl Chloride	-	< .01	< .01	.01	ppm
Bromomethane	-	< .01	< .01	.01	ppm
Chloroethane	-	< .01	< .01	.01	ppm
Trichlorofluoromethane	-	< .01	< .01	.01	ppm
Acrolein	-	3.75	1.88	.02	ppm
1,1-Dichloroethylene	-	< .005	< .005	.005	ppm
1,1,2-Trichloro-1,2,2-Trifluoroethane	-	< .01	< .01	.01	ppm
Carbon Disulfide	-	< .01	< .01	.01	ppm
Allyl Chloride	-	< .01	< .01	.01	ppm
Methylene Chloride	-	< .005	< .005	.005	ppm
Trans-1,2-Dichloroethylene	-	< .005	< .005	.005	ppm
Acrylonitrile	-	< .01	< .01	.01	ppm
1,1-Dichloroethane	-	< .005	< .005	.005	ppm
2-Butanone (Mek)	-	< .02	< .02	.02	ppm
Cis-1,2-Dichloroethylene	-	< .005	< .005	.005	ppm
Chloroform	-	< .005	< .005	.005	ppm
1,1,1-Trichloroethane	-	< .005	< .005	.005	ppm
Cyclohexane	-	< .01	< .01	.01	ppm
Benzene	-	< .005	< .005	.005	ppm
1,2-Dichloroethane	-	< .005	< .005	.005	ppm
1,2-Dichloropropane	-	< .005	< .005	.005	ppm
Dibromomethane	-	< .005	< .005	.005	ppm
Bromodichloromethane	-	< .005	< .005	.005	ppm
Trans-1,3-Dichloropropene	-	< .005	< .005	.005	ppm
4-Methyl-2-Pentanone (Mibk)	-	1.08	< .005	.005	ppm
Toluene	-	< .005	< .005	.005	ppm
Cis-1,3-Dichloropropene	-	< .005	< .005	.005	ppm
1,1,2-Trichloroethane	-	< .005	< .005	.005	ppm
2-Hexanone	-	< .005	0.44	.005	ppm
Dibromochloromethane	-	< .005	< .005	.005	ppm

PQL = Practical Quanitation Limit

CTC Sample ID:	200008806	200008807	200008808		
Client Sample ID:	SAR-02	SAR-03A	SAR-03B		
Waste Type:	SOLID	SOLID	SOLID		
Date Received:	08-OCT-93	08-OCT-93	08-OCT-93		
Date Sampled:	07-OCT-93	07-OCT-93	07-OCT-93		
Parameter	**Result**	**Result**	**Result**	**PQL**	**Unit**
VOA - TOTAL (continued):					
1,2-Dibromomethane	-	< .005	< .005	.005	ppm
1,1,1,2-Tetrachloroethane	-	< .005	< .005	.005	ppm
Bromoform	-	< .005	< .005	.005	ppm
1,1,2,2-Tetrachloroethane	-	< .005	< .005	.005	ppm
1,2,3-Trichloropropane	-	< .005	< .005	.005	ppm
1,3-Dichlorobenzene	-	< .01	< .01	.01	ppm
1,4-Dichlorobenzene	-	< .01	< .01	.01	ppm
1,2-Dichlorobenzene	-	< .01	< .01	.01	ppm

COMMENTS:

200008806 -
True PQl's = 15,547 x listed
200008807 -
True PQL's = 124 x listed
Sample preparation- methanol extraction
200008808 -
True PQL's = 41.4 x listed

GAMMA ISOTOPIC - SOLID

Bi-211	1.55	1.47	1.96	.399	pci/g
Bi-212	0.984	.988	.814	.493	pci/g
Cs-137	< .096	-	-	.096	pci/g
Eu-155	0.112	-	-	.101	pci/g
K-40	7.92	8.52	8.33	2.22	pci/g
Pb-212	0.707	0.636	0.673	.097	pci/g
Pb-214	0.557	0.554	.582	.247	pci/g
Ra-224	2.24	1.73	2.22	1.15	pci/g
Tl-208	0.581	0.593	.607	.27	pci/g
Ac-228	-	0.732	.770	.453	pci/g
Bi-214	-	.524	-	.293	pci/g
Ra-223	-	< .31	-	.31	pci/g
Th-229	-	0.296	.286	.103	pci/g
Th-231	-	0.503	-	.38	pci/g
Ce-144	-	-	< .24	.24	pci/g

COMMENTS:

200008806 -
K-40 7.92 PCG +/- 1.33 PCG
CS-137 0.0562 PCG +/- 0.0421 PCG
EU-155 0.112 PCG +/- 0.899 PCG
TL-208 0.581 PCG +/- 0.191 PCG
BI-212 0.984 PCG +/- 0.533 PCG
PB-212 0.707 PCG +/- 0.224 PCG
RA-224 2.24 PCG +/- 1.09 PCG

PQL = Practical Quanitation Limit

CTC Sample ID:	200008806	200008807	200008808		
Client Sample ID:	SAR-02	SAR-03A	SAR-03B		
Waste Type:	SOLID	SOLID	SOLID		
Date Received:	08-OCT-93	08-OCT-93	08-OCT-93		
Date Sampled:	07-OCT-93	07-OCT-93	07-OCT-93		
Parameter	**Result**	**Result**	**Result**	**PQL**	**Unit**

GAMMA ISOTOPIC - SOLID (continued):

BI-211 1.55 PCG +/- 0.515 PCG
PB-214 0.557 PCG +/- 0.277 PCG

200008807 -
k-40 8.52 pcg +/- 1.12 pcg
tl-208 0.593 pcg +/- 0.151 pcg
Bi-212 0.988 pcg +/- 0.360 pcg
Pb-212 0.636 pcg +/- 0.157 pcg
Ra-224 1.73 pcg +/- 0.642 pcg
Ac-228 0.732 pcg +/- 0.144 pcg
Bi-211 1.47 pcg +/- 0.388 pcg
Ra-223 0.157 pcg +/- 0.110 pcg
Th-231 0.503 pcg +/- 0.260 pcg
Bi-214 0.525 pcg +/- 0.120 pcg
Pb-214 0.554 pcg +/- 0.207 pcg
Th-229 0.296 pcg +/- 0.111 pcg
200008808 -
k-40 8.33 pcg +/- 1.04 pcg
tl-208 0.607 pcg +/- 0.163 pcg
bi-212 0.814 pcg +/- 0.346 pcg
pb-212 0.673 pcg +/- 0.169 pcg
ra-224 2.22 pcg +/- 0.752 pcg
ac-228 0.770 pcg +/- 0.161 pcg
bi-211 1.96 pcg +/- 0.444 pcg
pb-214 0.582 pcg +/- 0.208 pcg
th-229 0.286 pcg +/- 0.096 pcg

rws 10/12

GROSS ALPHA & BETA - SOLID

Parameter	Result	Result	Result	PQL	Unit
Gross Alpha	3.62	2.14	5.30	2	pci/g
Gross Beta	2.53	3.40	4.24	2	pci/g

COMMENTS:

200008806 -
GROSS ALPHA ERROR IS +/- 1.89 PCL GROSS BETA ERROR IS +/- 1.63 PCL CSJ 10-25-93
200008807 -
GROSS ALPHA ERROR IS +/- 2.44 PCL GROSS BETA ERROR IS +/- 1.65 PCL CSJ 10-25-93
200008808 -
GROSS ALPHA ERROR IS +/- 1.39 PCL GROSS BETA ERROR IS +/- 2.17 PCL CSJ 10-28-93

PQL = Practical Quanitation Limit

CTC Sample ID:	200008809	200008810			
Client Sample ID:	SAR-06	SAR-10			
Waste Type:	LIQUID	LIQUID			
Date Received:	08-OCT-93	08-OCT-93			
Date Sampled:	07-OCT-93	07-OCT-93			
Parameter	**Result**	**Result**	**Result**	**PQL**	**Unit**
WET CHEMISTRY					
Temp Of Sample	17.6	-			c
Ph By Meter	6.58	-			ph
Oil & Grease	19	-			ppm
Percent Water	-	-			wgt pct
Percent Total Ash	-	<1			pct
Dissolved Solids	240	-			mg/l
Suspended Solids	91	-			mg/l
SPECTROSCOPY					
Molybedum - Total	<0.180	<8.49			ppm
SEMI VOA - TOTAL					
Matrix	AQUEOUS	SOIL			
Layer	N/A	N/A			
Pyridine	< .01	< .01		.01	ppm
N-Nitrosodimethylamine	< .01	< .01		.01	ppm
Aniline	< .01	< .01		.01	ppm
Bis(2-Chloroethyl)Ether	< .01	< .01		.01	ppm
2-Chlorophenol	< .01	< .01		.01	ppm
1,3-Dichlorobenzene	< .01	< .01		.01	ppm
Phenol	< .01	< .01		.01	ppm
1,4-Dichlorobenzene	< .01	< .01		.01	ppm
1,2-Dichlorobenzene	< .01	< .01		.01	ppm
Benzyl Alcohol	< .01	< .01		.01	ppm
Bis(2-Chloroisopropyl)Ether	< .01	< .01		.01	ppm
Hexachloroethane	< .01	< .01		.01	ppm
2-Methylphenol (O-Cresol)	< .01	< .01		.01	ppm
N-Nitrosodi-N-Propylamine	< .01	< .01		.01	ppm
Nitrobenzene	< .01	< .01		.01	ppm
4-Methylphenol (P-Cresol)	< .01	< .01		.01	ppm
Isophorone	< .01	< .01		.01	ppm
2-Nitrophenol	< .01	< .01		.01	ppm
2,4-Dimethylphenol	< .01	< .01		.01	ppm
Bis(2-Chloroethoxy)Methane	< .01	< .01		.01	ppm
1,2,4-Trichlorobenzene	< .01	< .01		.01	ppm
2,4-Dichlorophenol	< .01	< .01		.01	ppm
Benzoic Acid	< .01	< .01		.01	ppm
Naphthalene	< .01	< .01		.01	ppm
4-Chloroaniline	< .01	< .01		.01	ppm
Hexachlorobutadiene	< .01	< .01		.01	ppm
2-Methylnaphthalene	< .01	< .01		.01	ppm
4-Chloro-3-Methyl Phenol	< .01	< .01		.01	ppm
Hexachlorocyclopentadiene	< .01	< .01		.01	ppm
2,4,6-Trichlorophenol	< .01	< .01		.01	ppm
2,4,5-Trichlorophenol	< .01	< .01		.01	ppm

PQL = Practical Quanitation Limit

CTC Sample ID:	200008809	200008810			
Client Sample ID:	SAR-06	SAR-10			
Waste Type:	LIQUID	LIQUID			
Date Received:	08-OCT-93	08-OCT-93			
Date Sampled:	07-OCT-93	07-OCT-93			
Parameter	**Result**	**Result**	**Result**	**PQL**	**Unit**
SEMI VOA - TOTAL (continued):					
2-Chloronaphthalene	< .01	< .01		.01	ppm
2-Nitroaniline	< .01	< .01		.01	ppm
Acenaphthylene	< .01	< .01		.01	ppm
Dimethyl Phthalate	< .01	< .01		.01	ppm
2,6-Dinitrotoluene	< .01	< .01		.01	ppm
3-Nitroaniline	< .01	< .01		.01	ppm
Acenaphthene	< .01	< .01		.01	ppm
2,4-Dinitrophenol	< .01	< .01		.01	ppm
Dibenzofuran	< .01	< .01		.01	ppm
4-Nitrophenol	< .01	< .01		.01	ppm
2,4-Dinitrotoluene	< .01	< .01		.01	ppm
Fluorene	< .01	< .01		.01	ppm
4-Chlorophenylphenyl Ether	< .01	< .01		.01	ppm
Diethyl Phthalate	< .01	< .01		.01	ppm
4-Nitroaniline	< .01	< .01		.01	ppm
4,6-Dinitro-2-Methylphenol	< .01	< .01		.01	ppm
N-Nitrosodiphenylamine	< .01	< .01		.01	ppm
Azobenzene	< .01	< .01		.01	ppm
4-Bromophenylphenyl Ether	< .01	< .01		.01	ppm
Hexachlorobenzene	< .01	< .01		.01	ppm
Pentachlorophenol	15.4	< .01		.01	ppm
Phenanthrene	< .01	< .01		.01	ppm
Anthracene	< .01	< .01		.01	ppm
Carbazole	< .01	< .01		.01	ppm
Di-N-Butyl Phthalate	< .01	< .01		.01	ppm
Fluoranthene	< .01	< .01		.01	ppm
Pyrene	< .01	< .01		.01	ppm
Butylbenzyl Phthalate	< .01	< .01		.01	ppm
Benzo(A)Anthracene	< .01	< .01		.01	ppm
3,3-Dichlorobenzidine	< .01	< .01		.01	ppm
Chrysene	< .01	< .01		.01	ppm
Bis(2-Ethylhexyl)Phthalate	< .01	< .01		.01	ppm
Di-N-Octyl Phthalate	< .01	< .01		.01	ppm
Benzo(B)Fluoranthene	< .01	< .01		.01	ppm
Benzo(K)Fluoranthene	< .01	< .01		.01	ppm
Benzo(A)Pyrene	< .01	< .01		.01	ppm
Indeno(1,2,3-Cd)Pyrene	< .01	< .01		.01	ppm
Dibenzo(A,H)Anthracene	< .01	< .01		.01	ppm
Benzo(G,H,I)Perylene	< .01	< .01		.01	ppm

COMMENTS:

200008809 -
True PQL = Listed X 250.

200008810 -
True PQL = Listed X 233863.
Sample diluted due to high concentration of non target

PQL = Practical Quanitation Limit

CTC Sample ID:	200008809	200008810			
Client Sample ID:	SAR-06	SAR-10			
Waste Type:	LIQUID	LIQUID			
Date Received:	08-OCT-93	08-OCT-93			
Date Sampled:	07-OCT-93	07-OCT-93			

Parameter	Result	Result	Result	PQL	Unit
SEMI VOA - TOTAL (continued):					
compounds.					
TPH					
Matrix	OTHER SOLID	-			
Layer		-			
Total Petroleum Hydrocarbons	14	-		0	ppm
VOA - TOTAL					
Matrix	AQUEOUS	OTHER LIQUID			
Layer	N/A	N/A			
Acetone	2740	98600		.01	ppm
Carbon Tetrachloride	< .005	< .005		.005	ppm
Trichloroethylene	< .005	< .005		.005	ppm
Tetrachloroethylene	< .005	27900		.005	ppm
Chlorobenzene	< .01	< .01		.01	ppm
Ethylbenzene	< .005	161000		.005	ppm
M,P-Xylene	< .01	492000		.01	ppm
O-Xylene	< .005	157000		.005	ppm
Styrene	< .005	100000		.005	ppm
Chloromethane	-	< .01		.01	ppm
Vinyl Chloride	-	< .01		.01	ppm
Bromomethane	-	< .01		.01	ppm
Chloroethane	-	< .01		.01	ppm
Trichlorofluoromethane	-	< .01		.01	ppm
Acrolein	-	< .02		.02	ppm
1,1-Dichloroethylene	-	< .005		.005	ppm
1,1,2-Trichloro-1,2,2-Trifluoroethane	-	< .01		.01	ppm
Carbon Disulfide	-	< .01		.01	ppm
Allyl Chloride	-	< .01		.01	ppm
Methylene Chloride	-	< .005		.005	ppm
Trans-1,2-Dichloroethylene	-	< .005		.005	ppm
Acrylonitrile	-	< .01		.01	ppm
1,1-Dichloroethane	-	< .005		.005	ppm
2-Butanone (Mek)	-	< .02		.02	ppm
Cis-1,2-Dichloroethylene	-	< .005		.005	ppm
Chloroform	-	< .005		.005	ppm
1,1,1-Trichloroethane	-	< .005		.005	ppm
Cyclohexane	-	< .01		.01	ppm
Benzene	-	< .005		.005	ppm
1,2-Dichloroethane	-	< .005		.005	ppm
1,2-Dichloropropane	-	< .005		.005	ppm
Dibromomethane	-	< .005		.005	ppm
Bromodichloromethane	-	< .005		.005	ppm
Trans-1,3-Dichloropropene	-	< .005		.005	ppm

PQL = Practical Quanitation Limit

CTC Sample ID: 200008809 200008810
Client Sample ID: SAR-06 SAR-10
Waste Type: LIQUID LIQUID
Date Received: 08-OCT-93 08-OCT-93
Date Sampled: 07-OCT-93 07-OCT-93

Parameter	Result	Result	Result	PQL	Unit
VOA - TOTAL (continued):					
4-Methyl-2-Pentanone (Mibk)	-	< .005		.005	ppm
Toluene	-	< .005		.005	ppm
Cis-1,3-Dichloropropene	-	< .005		.005	ppm
1,1,2-Trichloroethane	-	< .005		.005	ppm
2-Hexanone	-	< .005		.005	ppm
Dibromochloromethane	-	< .005		.005	ppm
1,2-Dibromomethane	-	< .005		.005	ppm
1,1,1,2-Tetrachloroethane	-	< .005		.005	ppm
Bromoform	-	< .005		.005	ppm
1,1,2,2-Tetrachloroethane	-	< .005		.005	ppm
1,2,3-Trichloropropane	-	< .005		.005	ppm
1,3-Dichlorobenzene	-	< .01		.01	ppm
1,4-Dichlorobenzene	-	< .01		.01	ppm
1,2-Dichlorobenzene	-	< .01		.01	ppm

COMMENTS:

200008809 -
True PQL's = 16,667 x listed
200008810 -
True PQL's = 3,333,333 x listed

PQL = Practical Quanitation Limit

Report Date Nov 11, 1993

W J Cameron
Laboratory Manager

11/11/93
Date

Ted Henry
Project Manager

11/11/93
Date

Clemsor 'echnical Center, Inc.

Clemsc 'search Park
100 ', .nology Drive
Anderson, SC 29625
(803) 646-2413
Fax # (803) 646-5311

CHAIN-OF-CUSTODY RECORD

Client PRDA - VAC*TRAX
Location CTC
Project/Number 892017-04
Sample Type(s) SOLIDS / LIQUIDS

SAMPLE CONTAINER DESCRIPTION

SAMPLE IDENTITY		DATE SAMPLED/TIME	LIMS NUMBER									TOTAL	REMARKS
SAR-02	S	10/7/93 1600	8806 ✓									2	Run Feed
SAR-03A	S	10/7/93 1600	8807 ✓									2	Product
SAR-03B	S	10/7/93 1600	8808 ✓									2	Product
SAR-06	L	10/7/93 1600	8809 ✓									~~2~~4	Condensed LIQUID
SAR-10	L	10/7/93 1600	8810 ✓									2	CONDENSED OIL
SCL TP # 2833													Perform ANALYSES
													AS PER THE SARF

Total No. of Containers 12

Sampled By Michael J. McElwee

Relinquished by: Michael J McElwee Organization: TDED
Date: 10/8/93 Time: 13:22

Received by: [illegible] O'Connell Organization: CTC
Date: 10/08/93 Time: 13:22

Relinquished by: ________ Organization: ________
Date: ________ Time: ________

Received by: ________ Organization: ________
Date: ________ Time: ________

Relinquished by: ________ Organization: ________
Date: ________ Time: ________

Received by: ________ Organization: ________
Date: ________ Time: ________

Delivery Method ________ (attach shipping bill, if ar Shipping Container ID ________

NOTE: All informa. .ncerning the date, time, analyst and method of analysis is recorded in bound log b. .t CWM-CTC and is available upon request.

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SAMP· 'ENTER FORM '⁶ARF)

INITIATOR: Chuck REECE

DATE: 10/7/93

CLIENT: TD+D

TSCA/RCRA HAZARDOUS? Possibly RCRA characteristic

CONTACT: Chuck REECE

REPORT TO: Chuck REECE

RADIOACTIVE? NO (If Yes, Attach)

ADDRESS:

RAD LICENSE NO.:

STD QAPjP: ✓ OTHER (Attach)

PHONE: 803-646-2413

DUE FROM LAB: 14 DAYS FROM RECEIPT

PROJECT NAME VAC *TRAX

DUE TO CLIENT: 14 DAYS FROM RECEIPT

PROJECT NUMBER: 892017-04

NUMBER OF SAMPLES: 5 (including Duplicate)

P.O. / AUTHORIZATION #:

EXPECTED ARRIVAL DATE: 10/8/93

SAMPLE I.D.	MATRIX	PARAMETERS REQUESTED
~~SE~~ SAR 02	Feed Soil	SEE ATTACHED Table 2.
SAR 03A	Treated Soil	plus
SAR 03B	~~Condens~~ Treated Soil	[redacted] Molybdenum
SAR 06	Condensed Water	on all Samples
SAR 10	Organic Condensate	

ADDITIONAL COMMENTS: Sample 02 was spiked in accordance with Table I.✓ Samples 06 + 10 may be heavily contaminated with organics. Quantif as many of the Table I parameters as possible.✓

~~SAMPLE RESIDUES & SECONDARY WASTES TO:~~ Sample 03 A + B (Dups) Should be relatively clean, except for molybdenum. Expect non-detects for organics on ~~Volatiles~~ 03 A + B.✓

SUBCONTRACT TO: SAVANNAH LABS

PARAMETERS: SAR 03A, SAR03B, SAR02, SAR06 FOR OIL & GREASE, TPH (BOTH BY IR)

QUOTE NO.: DQ30256

FINGERPRINT REQUESTED: ______ FULL ______ RAD ______ ABBREVIATED

TD&D PM APPROVAL: CRC

DATE: 10/7/93

A.P. PROJECT MGT APPROVAL: Ted Henry

DATE: 10/7/93

A.P. LAB MGR APPROVAL: J. Walcott

DATE: 10/8/93

DELIVERED OCT 07 1993

AF 1

FORM APPROVED BY: DG

VER.7 REV. 8/93

DATE: 8/9/93

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TABLE 1

SPIKING COMPOUNDS	GRAMS OF CONSTITUENT PER KILOGRAM OF SARM (1000 ppm)
ACETONE	6.8 x1000
BIS(2-ETHYLHEXYL)PHTHALATE	2.5
CARBON TETRACHLORIDE	2.5
CHLOROBENZENE	0.4
1,2-DICHLOROPHENOL	0.6
ETHYLBENZENE	3.2
PENTACHLOROPHENOL	1.0
STYRENE	1.0
TETRACHLOROETHYLENE	0.6
TRICHLOROETHENE	0.6
XYLENE	8.2
MOLYBDENUM TRIOXIDE	0.4

TABLE 2

RRS - Clemson Technical Center, Inc. Clemson Research Park 100 Technology Drive Anderson, South Carolina 29625 <u>Sampling, Analysis & Data Acquisition Plan</u>	Issue Date	Page Number
	08/02/93	12
DOE PRDA VAC*TRAX™ Project **Table 2 Required Sample Analyses for Pilot Test**	Rev. No. (_/_/_)	

Sample ID	Analyses												CTC QA/QC Level
	Wt	pH	Mst	Ash	O & G *	T P H *	T D S	T S S	V O A	S V O A	α β γ		
~~XXX-01~~	~~-~~	~~Y~~	~~Y~~	~~Y~~	~~Y~~	~~Y~~	~~-~~	~~-~~	~~Y~~	~~Y~~	~~Y~~		1
XXX-02	O	Y✓	Y✓	Y✓	Y✓	Y✓	-	-	Y✓	Y✓	Y✓		1
XXX-03	O	Y✓	D✓	D✓	D✓	D✓	-	-	D✓	D✓	D✓		1
XXX-06	O	Y✓	-	-	Y✓	Y✓	Y✓	Y✓	Y✓	Y✓	X		1
XXX-08	Y	-	Y	Y	Y	Y	-	-	Y	Y	Y		1
XXX-10	O	-	-	Y✓	-	-	-	-	Y✓	Y✓	X		1
XXX-12	O	-	Y	Y	Y	Y	-	-	Y	Y	Y		1
XXX-13	Y	-	Y	Y	Y	Y	-	-	Y	Y	Y		1

Legend:
- O = by operator
- Y = lab test requested
- D = duplicate lab analysis (Submitted as 03A + 03B
- \- = test not requested
- Wt = total weight of sample
- pH = solution pH
- Mst = moisture content
- Ash = ash content
- * O&G = oil and grease By IR method
- * TPH = total petroleum hydrocarbons By IR method
- TDS = total dissolved solids
- TSS = total suspended solids
- VOA = volatile organic analysis
- SVOA = semi-volatile organic compounds
- $\alpha\beta\gamma$ = gross α, β and γ radiation (for mixed samples)

X = Do not analyze

Clemson Technical Center, INC.
Clemson Research Park
100 Technology Drive, Anderson, SC 29625

Analytical Results

Submission ID: 100002832

Project Name/ID: 892017 VAC*TRAX

Client Name: TD&D

Client Location: ANDERSON, SC

CTC Sample ID: 200008805
Client Sample ID: RCF-01
Waste Type: SOLID
Date Received: 08-OCT-93
Date Sampled: 07-OCT-93

Parameter	Result	Result	Result	PQL	Unit
VOA - TOTAL					
Matrix	OTHER SOLID				
Layer	N/A				
Chloromethane	< .01			.01	ppm
Vinyl Chloride	< .01			.01	ppm
Bromomethane	< .01			.01	ppm
Chloroethane	< .01			.01	ppm
Trichlorofluoromethane	< .01			.01	ppm
Acrolein	< .02			.02	ppm
1,1-Dichloroethylene	< .005			.005	ppm
1,1,2-Trichloro-1,2,2-Trifluoroethane	< .01			.01	ppm
Acetone	< .01			.01	ppm
Carbon Disulfide	< .01			.01	ppm
Allyl Chloride	< .01			.01	ppm
Methylene Chloride	< .005			.005	ppm
Trans-1,2-Dichloroethylene	< .005			.005	ppm
Acrylonitrile	< .01			.01	ppm
1,1-Dichloroethane	< .005			.005	ppm
2-Butanone (Mek)	< .02			.02	ppm
Cis-1,2-Dichloroethylene	< .005			.005	ppm
Chloroform	< .005			.005	ppm
1,1,1-Trichloroethane	< .005			.005	ppm
Cyclohexane	< .01			.01	ppm
Carbon Tetrachloride	< .005			.005	ppm
Benzene	< .005			.005	ppm
1,2-Dichloroethane	< .005			.005	ppm
Trichloroethylene	< .005			.005	ppm
1,2-Dichloropropane	< .005			.005	ppm
Dibromomethane	< .005			.005	ppm
Bromodichloromethane	< .005			.005	ppm
Trans-1,3-Dichloropropene	< .005			.005	ppm
4-Methyl-2-Pentanone (Mibk)	1670			.005	ppm
Toluene	< .005			.005	ppm
Cis-1,3-Dichloropropene	< .005			.005	ppm
1,1,2-Trichloroethane	< .005			.005	ppm
Tetrachloroethylene	< .005			.005	ppm
2-Hexanone	< .005			.005	ppm
Dibromochloromethane	< .005			.005	ppm
1,2-Dibromomethane	< .005			.005	ppm
Chlorobenzene	< .01			.01	ppm
1,1,1,2-Tetrachloroethane	< .005			.005	ppm
Ethylbenzene	1110			.005	ppm
M,P-Xylene	4220			.01	ppm
O-Xylene	1390			.005	ppm
Styrene	13200			.005	ppm
Bromoform	< .005			.005	ppm
1,1,2,2-Tetrachloroethane	< .005			.005	ppm
1,2,3-Trichloropropane	< .005			.005	ppm
1,3-Dichlorobenzene	< .01			.01	ppm
1,4-Dichlorobenzene	< .01			.01	ppm

PQL = Practical Quanitation Limit

CTC Sample ID: 200008805
Client Sample ID: RCF-01
Waste Type: SOLID
Date Received: 08-OCT-93
Date Sampled: 07-OCT-93

Parameter	Result	Result	Result	PQL	Unit
VOA - TOTAL (continued):					
1,2-Dichlorobenzene	< .01			.01	ppm

COMMENTS:

200008805 -
True PQL's = 124,378 x listed
Matrix characteristics prevented low level analysis from being performed.
Library Search Components:
Cyclotetrasiloxane, octamethyl 4730ppm match quality 87%
Decane 3340ppm match quality 95%
Benzene, 1,2,4- trimethyl 3320ppm match quality 91%
Benzene, 1,3- diethyl 2780ppm match quality 81%

PQL = Practical Quanitation Limit

Report Date Nov 4, 1993

Laboratory Manager ____________________ 11/4/93
Date

Project Manager ____________________ 11/4/93
Date

Clemson Technical Center, Inc.

Clemson Research Park
100 Technology Drive
Anderson, SC 29625
(803) 646-2413
Fax # (803) 646-5311

CHAIN-OF-CUSTODY RECORD

Client PRDA VAC*TRAX

Location CTC

Project/Number 892017-04

Sample Type(s) 1 SOLID

Page 1 of 1

SAMPLE IDENTITY	DATE SAMPLED/TIME	LIMS NUMBER	SAMPLE CONTAINER DESCRIPTION								TOTAL	REMARKS
RCF-01	10/7/93 7AM	1805									1	ANALYZE USIN'
												ENTIRE SAMPLE.
SCL ID # 7832												

Total No. of Containers 1

Sampled By Michael J. McElwee

Relinquished by: Michael J. McElwee Organization: TD&D
Date: 10/8/93 Time: 13:22

Received by: [signature] O'Connell Organization: CTC
Date: 10/08/93 Time: 13:22

Relinquished by: ______ Organization: ______
Date: ______ Time: ______

Received by: ______ Organization: ______
Date: ______ Time: ______

Relinquished by: ______ Organization: ______
Date: ______ Time: ______

Received by: ______ Organization: ______
Date: ______ Time: ______

Delivery Metho ______ (attach shipping bill, if ' hipping Container ID ______

NOTE: All inforn cerning the date, time, analyst and method of analysis is recorded in bound log CWM-CTC and is av

RCF TEST RUN

ANALYTICAL DATA SHEETS AND

CHAINS OF CUSTODY

Clemson Technical Center, INC.

Clemson Research Park

100 Technology Drive, Anderson, SC 29625

Analytical Results

Submission ID: 100002856

Project Name/ID: 892017-04

Client Name: TD&D

Client Location: ANDERSON, SC

CTC Sample ID:	200008965	200008966	200008967		
Client Sample ID:	RCF-02	RCF-03A	RCF-03B		
Waste Type:	SOLID	SOLID	SOLID		
Date Received:	14-OCT-93	14-OCT-93	14-OCT-93		
Date Sampled:	13-OCT-93	13-OCT-93	13-OCT-93		
Parameter	**Result**	**Result**	**Result**	**PQL**	**Unit**
WET CHEMISTRY					
Temp Of Sample	25	25	-		c
Ph By Meter	6.271	6.313	-		ph
Oil & Grease-Solid	2.0	2.8	2.2		pct
Percent Total Solids	95.47	99.97	99.97		pct
TPH					
Matrix	OTHER SOLID	OTHER SOLID	OTHER SOLID		
Layer					
Total Petroleum Hydrocarbons	17000	25000	19000	10	ppm
VOA - TOTAL					
Matrix	OTHER SOLID	OTHER SOLID	OTHER SOLID		
Layer	N/A	N/A	N/A		
Chloromethane	< .01	< .01	< .01	.01	ppm
Vinyl Chloride	< .01	< .01	< .01	.01	ppm
Bromomethane	< .01	< .01	< .01	.01	ppm
Chloroethane	< .01	< .01	< .01	.01	ppm
Trichlorofluoromethane	< .01	< .01	< .01	.01	ppm
Acrolein	< .02	< .02	< .02	.02	ppm
1,1-Dichloroethylene	< .005	< .005	< .005	.005	ppm
1,1,2-Trichloro-1,2,2-Trifluoroethane	< .01	< .01	< .01	.01	ppm
Acetone	7.51	< .01	< .01	.01	ppm
Carbon Disulfide	< .01	< .01	< .01	.01	ppm
Allyl Chloride	< .01	< .01	< .01	.01	ppm
Methylene Chloride	< .005	< .005	< .005	.005	ppm
Trans-1,2-Dichloroethylene	< .005	< .005	< .005	.005	ppm
Acrylonitrile	< .01	< .01	< .01	.01	ppm
1,1-Dichloroethane	< .005	< .005	< .005	.005	ppm
2-Butanone (Mek)	< .02	< .02	< .02	.02	ppm
Cis-1,2-Dichloroethylene	< .005	< .005	< .005	.005	ppm
Chloroform	< .005	< .005	< .005	.005	ppm
1,1,1-Trichloroethane	< .005	< .005	< .005	.005	ppm
Cyclohexane	< .01	< .01	< .01	.01	ppm
Carbon Tetrachloride	< .005	< .005	< .005	.005	ppm
Benzene	< .005	< .005	< .005	.005	ppm
1,2-Dichloroethane	< .005	< .005	< .005	.005	ppm
Trichloroethylene	< .005	< .005	< .005	.005	ppm
1,2-Dichloropropane	< .005	< .005	< .005	.005	ppm
Dibromomethane	< .005	< .005	< .005	.005	ppm
Bromodichloromethane	< .005	< .005	< .005	.005	ppm
Trans-1,3-Dichloropropene	< .005	< .005	< .005	.005	ppm
4-Methyl-2-Pentanone (Mibk)	18.7	0.81	1.46	.005	ppm
Toluene	3.54	< .005	< .005	.005	ppm
Cis-1,3-Dichloropropene	< .005	< .005	< .005	.005	ppm
1,1,2-Trichloroethane	< .005	< .005	< .005	.005	ppm

PQL = Practical Quanitation Limit

CTC Sample ID:	200008965	200008966	200008967		
Client Sample ID:	RCF-02	RCF-03A	RCF-03B		
Waste Type:	SOLID	SOLID	SOLID		
Date Received:	14-OCT-93	14-OCT-93	14-OCT-93		
Date Sampled:	13-OCT-93	13-OCT-93	13-OCT-93		
Parameter	**Result**	**Result**	**Result**	**PQL**	**Unit**
VOA - TOTAL (continued):					
Tetrachloroethylene	< .005	< .005	< .005	.005	ppm
2-Hexanone	5.93	< .005	0.39	.005	ppm
Dibromochloromethane	< .005	< .005	< .005	.005	ppm
1,2-Dibromomethane	< .005	< .005	< .005	.005	ppm
Chlorobenzene	< .01	< .01	< .01	.01	ppm
1,1,1,2-Tetrachloroethane	< .005	< .005	< .005	.005	ppm
Ethylbenzene	9.59	< .005	0.42	.005	ppm
M,P-Xylene	37.6	0.68	1.25	.01	ppm
O-Xylene	12.5	0.26	0.50	.005	ppm
Styrene	90.7	2.00	3.46	.005	ppm
Bromoform	< .005	< .005	< .005	.005	ppm
1,1,2,2-Tetrachloroethane	< .005	< .005	< .005	.005	ppm
1,2,3-Trichloropropane	< .005	< .005	< .005	.005	ppm
1,3-Dichlorobenzene	< .01	< .01	< .01	.01	ppm
1,4-Dichlorobenzene	< .01	< .01	< .01	.01	ppm
1,2-Dichlorobenzene	< .01	< .01	< .01	.01	ppm

COMMENTS:

200008965 -
Sample preparation- methanol extraction due to matrix characteristics
True PQL's = 611 x listed
200008966 -
Sample preparation- methanol extraction
Matrix characteristics prevented low level analysis.
True PQL's = 40.8 x listed
200008967 -
True PQL's = 40.8 x listed
Matrix characteristics prevented low level analysis.

PQL = Practical Quanitation Limit

CTC Sample ID:	200008968	200008970	
Client Sample ID:	RCF-06	RCF-18	
Waste Type:	LIQUID	LIQUID	
Date Received:	14-OCT-93	14-OCT-93	
Date Sampled:	13-OCT-93	13-OCT-93	

Parameter	Result	Result	Result	PQL	Unit
WET CHEMISTRY					
Temp Of Sample	25	-			c
Ph By Meter	6.637	-			ph
Oil & Grease-Solid	-	-			pct
Percent Total Solids	-	-			pct
VOA - TOTAL					
Matrix	AQUEOUS	AQUEOUS			
Layer	N/A	N/A			
Chloromethane	< .01	< .01		.01	ppm
Vinyl Chloride	< .01	< .01		.01	ppm
Bromomethane	< .01	< .01		.01	ppm
Chloroethane	< .01	< .01		.01	ppm
Trichlorofluoromethane	< .01	< .01		.01	ppm
Acrolein	< .02	< .02		.02	ppm
1,1-Dichloroethylene	< .005	< .005		.005	ppm
1,1,2-Trichloro-1,2,2-Trifluoroethane	< .01	< .01		.01	ppm
Acetone	11.1	< .01		.01	ppm
Carbon Disulfide	< .01	< .01		.01	ppm
Allyl Chloride	< .01	< .01		.01	ppm
Methylene Chloride	< .005	< .005		.005	ppm
Trans-1,2-Dichloroethylene	< .005	< .005		.005	ppm
Acrylonitrile	< .01	< .01		.01	ppm
1,1-Dichloroethane	< .005	< .005		.005	ppm
2-Butanone (Mek)	< .02	< .02		.02	ppm
Cis-1,2-Dichloroethylene	< .005	< .005		.005	ppm
Chloroform	< .005	< .005		.005	ppm
1,1,1-Trichloroethane	< .005	< .005		.005	ppm
Cyclohexane	< .01	< .01		.01	ppm
Carbon Tetrachloride	< .005	< .005		.005	ppm
Benzene	< .005	< .005		.005	ppm
1,2-Dichloroethane	< .005	< .005		.005	ppm
Trichloroethylene	< .005	< .005		.005	ppm
1,2-Dichloropropane	< .005	< .005		.005	ppm
Dibromomethane	< .005	< .005		.005	ppm
Bromodichloromethane	< .005	< .005		.005	ppm
Trans-1,3-Dichloropropene	< .005	< .005		.005	ppm
4-Methyl-2-Pentanone (Mibk)	4.35	< .005		.005	ppm
Toluene	< .005	< .005		.005	ppm
Cis-1,3-Dichloropropene	< .005	< .005		.005	ppm
1,1,2-Trichloroethane	< .005	< .005		.005	ppm
Tetrachloroethylene	< .005	< .005		.005	ppm
2-Hexanone	< .005	< .005		.005	ppm
Dibromochloromethane	< .005	< .005		.005	ppm
1,2-Dibromomethane	< .005	< .005		.005	ppm
Chlorobenzene	< .01	< .01		.01	ppm
1,1,1,2-Tetrachloroethane	< .005	< .005		.005	ppm
Ethylbenzene	< .005	< .005		.005	ppm

PQL = Practical Quanitation Limit

CTC Sample ID:	200008968	200008970			
Client Sample ID:	RCF-06	RCF-18			
Waste Type:	LIQUID	LIQUID			
Date Received:	14-OCT-93	14-OCT-93			
Date Sampled:	13-OCT-93	13-OCT-93			

Parameter	Result	Result	Result	PQL	Unit
VOA - TOTAL (continued):					
M,P-Xylene	< .01	< .01		.01	ppm
O-Xylene	< .005	< .005		.005	ppm
Styrene	1.42	< .005		.005	ppm
Bromoform	< .005	< .005		.005	ppm
1,1,2,2-Tetrachloroethane	< .005	< .005		.005	ppm
1,2,3-Trichloropropane	< .005	< .005		.005	ppm
1,3-Dichlorobenzene	< .01	< .01		.01	ppm
1,4-Dichlorobenzene	< .01	< .01		.01	ppm
1,2-Dichlorobenzene	< .01	< .01		.01	ppm

COMMENTS:

200008968 -
True PQl's = 100 x listed
Hydrocarbons prevented low level analysis.

PQL = Practical Quanitation Limit

Report Date Dec 1, 1993

Laboratory Manager ______ Date 12/1/93 WC.

Project Manager ______ Date 12/1/93

Clemsٮ.. Technical Center, Inc.

Cle. search Park
100 Technology Drive
Anderson, SC 29625
(803) 646-2413
Fax # (803) 646-5311

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Client PRDA - VACTRAX

Location

Project/Number 892Ø17-Ø4

Sample Type(s) SOLIDS/LIQUIDS

Scc-ID: 2856

SAMPLE IDENTITY	DATE SAMPLED/TIME	LIMS NUMBER	SAMPLE CONTAINER DESCRIPTION								TOTAL	REMARKS
RCF-02	10-13-93	8965 ✓									1	ANALYSES
RCF-03A		8966 ✓									2	AS PER
RCF-03B		8967 ✓									2	SAPF.
RCF-06		8968 ✓									1	
RCF-10		8969 ✓									1	
RCF-~~10~~ 18		8970 ✓									1	
mgm 10/13												

135

Total No. of Containers 8

Sampled By Michael G. McElwee

Relinquished by: Charles N. Reen Organization: CTC
Date: 10/14/93 Time: 14:00

Received by: [signature] Organization: CTC
Date: 10/14/93 Time: 14:00

Relinquished by: Organization:
Date: Time:

Received by: Organization:
Date: Time:

Relinquished by: Organization:
Date: Time:

Received by: Organization:
Date: Time:

Delivery Method: (attach shipping bill, if any) Shipping Container ID

NOTE: All information concerning the date, time, analyst and method of analysis is recorded in bound log books at CWM-CTC and is available upon request.

RKF TEST RUN

ANALYTICAL DATA SHEETS AND

CHAINS OF CUSTODY

JAN 7, 1994

Mr. Mike McElwee
Clemson Technical Center
Clemson Research Park
100 Technology Drive
Anderson, SC 29625

Dear Mr. McElwee:

Enclosed are the results of the analyses performed on the three soil and two aqueous samples from Clemson Technical Center (Enseco-East Project No. 031221). These samples were received under chain of custody at Enseco-East Laboratory on October 28, 1993. A brief description of the Quality Assurance/Quality Control and method references employed by Enseco is contained within the report. This letter authorizes the release of the analytical results and should be considered an integral part of this report.

All analyses performed by Schwarzkopf Microanalytical Laboratory can be found in the appendix of this report.

Please refer to this project by the Enseco-East Laboratory Project Number to help expedite any future discussions. We will be happy to answer any questions or concerns that you may have.

Sincerely,

ENSECO-EAST LABORATORY

Donald [illegible]

Lynne Buzzi
Program Manager

Encl.

LB/pm

QUALITY ASSURANCE/QUALITY CONTROL

To ensure data quality, an extensive QA/QC program has been implemented at Enseco - East which incorporates the following controls (as applicable).

Reagent or analytical blanks are analyzed to assess the level of contamination which exists in the analytical system. An analytical blank, analyzed with every batch of samples, consists of reagents specific to the method. This blank is carried through every aspect of the procedure, including preparation, cleanup, and analysis. Ideally, the concentration of an analyte in the blank is below the reporting limit for that analyte. However, some common laboratory solvents and metals are difficult to eliminate to the part-per-billion levels commonly reported in environmental analyses.

Duplicate control samples (DCS) are used to monitor the laboratory's day-to-day performance of routine analytical methods. A DCS consists of a standard, control matrix which is spiked with a group of target compounds representative of the method analytes. The DCS is analyzed with environmental samples to provide evidence that the laboratory is performing the method within accepted QC guidelines.

A DCS has been established for most routine analytical methods. Reagent water is used as the control matrix for the analysis of aqueous samples. The DCS compounds are spiked into reagent water and carried through the appropriate steps of the analysis. As stated in SW-846 (third edition), a universal blank matrix does not exist for solid samples and therefore no matrix is used. The DCS for solid samples consists of the appropriate steps of the analysis. The data thus obtained are used to set the DCS control limits. The control limits for accuracy are based on the historical average recovery of the DCS plus or minus three standard deviation units. The control limits for precision are based on the historical relative percent difference (RPD) and range from zero (no difference between duplicate samples) to the average RPD plus three standard deviation units.

Surrogates are organic compounds that are similar to the analytes of interest in chemical behavior but which are not normally found in environmental samples. Surrogates are routinely added to samples requiring GC/MS analysis to monitor the effect of the matrix on the accuracy of the analysis. Results are reported in terms of percent recovery.

ANALYTICAL RESULTS

The method number provided on each data report sheet refers to a publication originating from a regulatory or standard-setting organization. In general, the methods employed are those specified by the U.S. Environmental Protection Agency and other state and federal agencies. In cases where an approved regulatory method does not exist, a method developed by Enseco will be employed to meet the specific needs of the client. The methods commonly employed by Enseco are based on methods from the following references.

U.S. Environmental Protection Agency. Methods for Chemical Analysis of Water and Wastes. EPA-600/4-79-020. Cincinnati, OH, March, 1993.

U.S. Environmental Protection Agency. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846). Washington, D.C., November, 1986.

U.S. Environmental Protection Agency. Methods for Determination of Organic Compounds in Finished Drinking Water and Raw Source Water. Cincinnati, OH, September, 1986.

"Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act," 40 CFR, Part 136; Federal Register, 1984.

American Public Health Association, American Water Works Association, Water Pollution Control Federation. Standard Methods for the Examination of Water and Wastewater, 16th Edition. Washington, D.C., April, 1985.

EPA Contract Laboratory Program (CLP) protocols for the analysis of organic and inorganic hazardous substances.

Case Narrative for Enseco-East Project No. 031221

GC/MS Semivolatile Analysis:

Enseco-East sample numbers 031221-0001, 0002, and 0003 required dilutions of 1:200 and Enseco-East sample number 031221-0005 required a dilution of 1:20 due to matrix. As a result, several surrogate compounds were diluted out.

Due to limited sample volume, the initial volume of sample used for the extraction of Enseco-East sample numbers 031221-0001, 0002, and 0003 was 24.62g, 19.87g, and 8.77g, respectively. The reporting limits have been adjusted to reflect this anomaly.

GC/MS Volatile Analysis:

Enseco-East sample 031221-0001 was analyzed as a medium level soil due to the presence of target compounds.

The reporting limits were raised for Enseco-East sample 031221-0002 due to sample volume limitations.

The surrogates Toluene-d8 and 4-Bromofluorobenzene for Enseco-East sample 031221-0003 were outside QC limits due to matrix, as verified by re-analysis.

Total Petroleum Hydrocarbons:

Results for samples 031221-0001 through 0003 are greater than 100% because the hydrocarbon in the sample absorbs more Infra-red energy than the Enseco-East Reference Oil. This is Due to average length of the hydrocarbon chain. The TPHC test run on these samples is designed only for PPM levels.

Dennis W. Flynn
Dennis W. Flynn
Organic Laboratory Director

1-10-94
Date

Enseco-East Inorganic Case Narrative for Project No. 031221

General Chemistry:

Samples 031221-0001 through 0004 were analyzed beyond the holding time for pH due to late sample arrival at the lab.

FOR Phyllis A. Conley
Inorganic Laboratory Director

1-10-94
Date

SAMPLE DESCRIPTION INFORMATION
for
Clemson Technical Center

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
031221-0001-SA	RKF-02	SOIL	26 OCT 93		28 OCT 93
031221-0002-SA	RKF-03A	SOIL	26 OCT 93		28 OCT 93
031221-0003-SA	RKF-03B	SOIL	26 OCT 93		28 OCT 93
031221-0004-SA	RKF-06	AQUEOUS	26 OCT 93		28 OCT 93
031221-0005-SA	RKF-10	WASTE	26 OCT 93		28 OCT 93

TCL Volatile Organics

Method 8240

Client Name: Clemson Technical Center
Client ID: RKF-02
Lab ID: 031221-0001-SA
Matrix: SOIL

Sampled: 26 OCT 93
Received: 28 OCT 93
Authorized: 31 OCT 93

Prepared: 09 NOV 93
Analyzed: 09 NOV 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit	
Chloromethane	ND	ug/kg	1000	
Bromomethane	ND	ug/kg	1000	
Vinyl Chloride	ND	ug/kg	1000	
Chloroethane	ND	ug/kg	1000	
Methylene chloride	ND	ug/kg	520	
Acetone	1000	ug/kg	1000	
Carbon disulfide	ND	ug/kg	520	
1,1-Dichloroethene	ND	ug/kg	520	
1,1-Dichloroethane	ND	ug/kg	520	
1,2-Dichloroethene (cis/ trans)	ND	ug/kg	520	
Chloroform	ND	ug/kg	520	
1,2-Dichloroethane	ND	ug/kg	520	
2-Butanone	ND	ug/kg	1000	
1,1,1-Trichloroethane	ND	ug/kg	520	
Carbon tetrachloride	ND	ug/kg	520	
Vinyl Acetate	ND	ug/kg	1000	
Bromodichloromethane	ND	ug/kg	520	
1,2-Dichloropropane	ND	ug/kg	520	
cis-1,3-Dichloropropene	ND	ug/kg	520	
Trichloroethene	ND	ug/kg	520	
Dibromochloromethane	ND	ug/kg	520	
1,1,2-Trichloroethane	ND	ug/kg	520	
Benzene	ND	ug/kg	520	
trans-1,3-Dichloropropene	ND	ug/kg	520	
Bromoform	ND	ug/kg	520	
4-Methyl-2-Pentanone	15000	ug/kg	1000	
2-Hexanone	ND	ug/kg	1000	
1,1,2,2-Tetrachloroethane	ND	ug/kg	520	
Tetrachloroethene	ND	ug/kg	520	
Toluene	6700	ug/kg	520	
Chlorobenzene	ND	ug/kg	520	
Ethylbenzene	20000	ug/kg	10000	D
Styrene	230000	ug/kg	10000	D

Percent moisture is 3.7%. All results and limits are reported on a dry weight basis.

D = Compound quantitated using a secondary dilution.
ND = Not Detected

Reported By: Kelvin Wang

Approved By: David Ercoliani

TCL Volatile Organics

Method 8240
(cont.)

Client Name: Clemson Technical Center
Client ID: RKF-02
Lab ID: 031221-0001-SA
Matrix: SOIL

Sampled: 26 OCT 93
Received: 28 OCT 93
Authorized: 31 OCT 93
Prepared: 09 NOV 93
Analyzed: 09 NOV 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit	
Xylenes (total)	110000	ug/kg	10000	D

Surrogate	Recovery	
1,2-Dichloroethane-d4	100	%
Toluene-d8	94	%
4-Bromofluorobenzene	102	%

Percent moisture is 3.7%. All results and limits are reported on a dry weight basis.

D = Compound quantitated using a secondary dilution.

Reported By: Kelvin Wang Approved By: David Ercoliani

TCL Volatile Organics

Method 8240

Client Name: Clemson Technical Center
Client ID: RKF-03A
Lab ID: 031221-0002-SA   Sampled: 26 OCT 93
Matrix: SOIL   Received: 28 OCT 93   Prepared: NA
Authorized: 31 OCT 93   Analyzed: 09 NOV 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit	
Chloromethane	ND	ug/kg	50	t
Bromomethane	ND	ug/kg	50	
Vinyl Chloride	ND	ug/kg	50	
Chloroethane	ND	ug/kg	50	
Methylene chloride	ND	ug/kg	25	
Acetone	53	ug/kg	50	
Carbon disulfide	ND	ug/kg	25	
1,1-Dichloroethene	ND	ug/kg	25	
1,1-Dichloroethane	ND	ug/kg	25	
1,2-Dichloroethene (cis/ trans)	ND	ug/kg	25	
Chloroform	ND	ug/kg	25	
1,2-Dichloroethane	ND	ug/kg	25	
2-Butanone	ND	ug/kg	50	
1,1,1-Trichloroethane	ND	ug/kg	25	
Carbon tetrachloride	ND	ug/kg	25	
Vinyl Acetate	ND	ug/kg	50	
Bromodichloromethane	ND	ug/kg	25	
1,2-Dichloropropane	ND	ug/kg	25	
cis-1,3-Dichloropropene	ND	ug/kg	25	
Trichloroethene	ND	ug/kg	25	
Dibromochloromethane	ND	ug/kg	25	
1,1,2-Trichloroethane	ND	ug/kg	25	
Benzene	ND	ug/kg	25	
trans-1,3-Dichloropropene	ND	ug/kg	25	
Bromoform	ND	ug/kg	25	
4-Methyl-2-Pentanone	240	ug/kg	50	
2-Hexanone	ND	ug/kg	50	
1,1,2,2-Tetrachloroethane	ND	ug/kg	25	
Tetrachloroethene	ND	ug/kg	25	
Toluene	ND	ug/kg	25	
Chlorobenzene	ND	ug/kg	25	
Ethylbenzene	ND	ug/kg	25	

Percent moisture results not available.
t = Reporting limits raised due to sample volume limitations.
NA = Not Applicable
ND = Not Detected

Reported By: Kelvin Wang   Approved By: David Ercoliani

TCL Volatile Organics

Method 8240
(cont.)

Client Name: Clemson Technical Center
Client ID: RKF-03A
Lab ID: 031221-0002-SA
Matrix: SOIL

Sampled: 26 OCT 93
Received: 28 OCT 93
Authorized: 31 OCT 93

Prepared: NA
Analyzed: 09 NOV 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit
Styrene	93	ug/kg	25
Xylenes (total)	33	ug/kg	25

Surrogate	Recovery	
1,2-Dichloroethane-d4	96	%
Toluene-d8	112	%
4-Bromofluorobenzene	89	%

Percent moisture results not available.
NA = Not Applicable

Reported By: Kelvin Wang

Approved By: David Ercoliani

TCL Volatile Organics

Method 8240

Client Name: Clemson Technical Center
Client ID: RKF-03B
Lab ID: 031221-0003-SA   Sampled: 26 OCT 93
Matrix: SOIL   Received: 28 OCT 93   Prepared: NA
Authorized: 31 OCT 93   Analyzed: 09 NOV 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit	
Chloromethane	ND	ug/kg	50	u
Bromomethane	ND	ug/kg	50	
Vinyl Chloride	ND	ug/kg	50	
Chloroethane	ND	ug/kg	50	
Methylene chloride	ND	ug/kg	25	
Acetone	88	ug/kg	50	
Carbon disulfide	ND	ug/kg	25	
1,1-Dichloroethene	ND	ug/kg	25	
1,1-Dichloroethane	ND	ug/kg	25	
1,2-Dichloroethene (cis/ trans)	ND	ug/kg	25	
Chloroform	ND	ug/kg	25	
1,2-Dichloroethane	ND	ug/kg	25	
2-Butanone	ND	ug/kg	50	
1,1,1-Trichloroethane	ND	ug/kg	25	
Carbon tetrachloride	ND	ug/kg	25	
Vinyl Acetate	ND	ug/kg	50	
Bromodichloromethane	ND	ug/kg	25	
1,2-Dichloropropane	ND	ug/kg	25	
cis-1,3-Dichloropropene	ND	ug/kg	25	
Trichloroethene	ND	ug/kg	25	
Dibromochloromethane	ND	ug/kg	25	
1,1,2-Trichloroethane	ND	ug/kg	25	
Benzene	ND	ug/kg	25	
trans-1,3-Dichloropropene	ND	ug/kg	25	
Bromoform	ND	ug/kg	25	
4-Methyl-2-Pentanone	720	ug/kg	50	
2-Hexanone	ND	ug/kg	50	
1,1,2,2-Tetrachloroethane	ND	ug/kg	25	
Tetrachloroethene	ND	ug/kg	25	
Toluene	110	ug/kg	25	
Chlorobenzene	ND	ug/kg	25	
Ethylbenzene	150	ug/kg	25	

Percent moisture results not available.
u = All reporting limits raised due to high levels of target analytes.
NA = Not Applicable
ND = Not Detected

Reported By: Kelvin Wang   Approved By: David Ercoliani

TCL Volatile Organics

Method 8240
(cont.)

Client Name: Clemson Technical Center
Client ID: RKF-03B
Lab ID: 031221-0003-SA
Matrix: SOIL

Sampled: 26 OCT 93
Received: 28 OCT 93
Authorized: 31 OCT 93

Prepared: NA
Analyzed: 09 NOV 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit	
Styrene	190	ug/kg	25	
Xylenes (total)	150	ug/kg	25	
Surrogate	**Recovery**			
1,2-Dichloroethane-d4	94	%		
Toluene-d8	140	%		v
4-Bromofluorobenzene	68	%		v

Percent moisture results not available.
v = Surrogate recovery outside of QC limits due to sample matrix interference as verified by reanalysis.
NA = Not Applicable

Reported By: Kelvin Wang

Approved By: David Ercoliani

TCL Volatile Organics

Method 8240

Client Name: Clemson Technical Center
Client ID: RKF-10
Lab ID: 031221-0005-SA Sampled: 26 OCT 93
Matrix: WASTE Received: 28 OCT 93 Prepared: 29 NOV 93
Authorized: 31 OCT 93 Analyzed: 29 NOV 93

Parameter	Result	Units	Reporting Limit	
Chloromethane	ND	mg/kg	50	u
Bromomethane	ND	mg/kg	50	
Vinyl Chloride	ND	mg/kg	50	
Chloroethane	ND	mg/kg	50	
Methylene chloride	ND	mg/kg	25	
Acetone	ND	mg/kg	50	
Carbon disulfide	ND	mg/kg	25	
1,1-Dichloroethene	ND	mg/kg	25	
1,1-Dichloroethane	ND	mg/kg	25	
1,2-Dichloroethene (cis/ trans)	ND	mg/kg	25	
Chloroform	ND	mg/kg	25	
1,2-Dichloroethane	ND	mg/kg	25	
2-Butanone	ND	mg/kg	50	
1,1,1-Trichloroethane	ND	mg/kg	25	
Carbon tetrachloride	ND	mg/kg	25	
Vinyl Acetate	ND	mg/kg	50	
Bromodichloromethane	ND	mg/kg	25	
1,2-Dichloropropane	ND	mg/kg	25	
cis-1,3-Dichloropropene	ND	mg/kg	25	
Trichloroethene	ND	mg/kg	25	
Dibromochloromethane	ND	mg/kg	25	
1,1,2-Trichloroethane	ND	mg/kg	25	
Benzene	ND	mg/kg	25	
trans-1,3-Dichloropropene	ND	mg/kg	25	
Bromoform	ND	mg/kg	25	
4-Methyl-2-Pentanone	ND	mg/kg	50	
2-Hexanone	ND	mg/kg	50	
1,1,2,2-Tetrachloroethane	ND	mg/kg	25	
Tetrachloroethene	ND	mg/kg	25	
Toluene	ND	mg/kg	25	
Chlorobenzene	ND	mg/kg	25	
Ethylbenzene	27	mg/kg	25	
Styrene	840	mg/kg	25	

u = All reporting limits raised due to high levels of target analytes.
ND = Not Detected

Reported By: Kelvin Wang Approved By: Wayne Halozan

TCL Volatile Organics

Method 8240
(cont.)

Client Name: Clemson Technical Center
Client ID: RKF-10
Lab ID: 031221-0005-SA
Matrix: WASTE

Sampled: 26 OCT 93
Received: 28 OCT 93
Authorized: 31 OCT 93

Prepared: 29 NOV 93
Analyzed: 29 NOV 93

Parameter	Result	Units	Reporting Limit
Xylenes (total)	210	mg/kg	25

Surrogate	Recovery	
1,2-Dichloroethane-d4	94	%
Toluene-d8	104	%
4-Bromofluorobenzene	108	%

Reported By: Kelvin Wang

Approved By: Wayne Halozan

QC LOT ASSIGNMENT REPORT
TCL Volatile Organics

Method 8240

Laboratory Sample Number	QC Matrix	QC Category	QC Lot	QC Run
031221-0001-SA	SOIL	8240-S	05 NOV 93-S	09 NOV 93-A

DUPLICATE CONTROL SAMPLE REPORT

TCL Volatile Organics

Method 8240
Project: 031221

Category: 8240-S Volatile Organics
Matrix: SOIL
QC Lot: 05 NOV 93-S
Concentration Units: ug/kg

Analyte	Concentration				Accuracy Average(%)		Precision (RPD)	
	Spiked	Measured						
		DCS1	DCS2	AVG	DCS	Limits	DCS	Limit
1,1-Dichloroethene	5000	5010	4900	4960	99	59-172	2.2	22
Trichloroethene	5000	4490	4450	4470	89	62-137	0.89	24
Benzene	5000	4780	4650	4720	94	66-142	2.8	21
Toluene	5000	4650	4630	4640	93	59-139	0.43	21
Chlorobenzene	5000	4640	4680	4660	93	60-133	0.86	21

Calculations are performed before rounding to avoid round-off errors in calculated result

SINGLE CONTROL SAMPLE REPORT

TCL Volatile Organics

Method 8240
Project: 031221

Category: 8240-S Volatile Organics
Matrix: SOIL
QC Lot: 05 NOV 93-S QC Run: 09 NOV 93-A
Concentration Units: ug/kg

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
1,2-Dichloroethane-d4	5000	5610	112	70-121
4-Bromofluorobenzene	5000	5530	111	74-121
Toluene-d8	5000	5430	109	81-117

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK SAMPLE REPORT

TCL Volatile Organics

Method 8240
Project: 031221

Category: 8240-S Volatile Organics
Matrix:
QC Lot: 05 NOV 93-S QC Run: 09 NOV 93-A

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/kg	1000
Bromomethane	ND	ug/kg	1000
Vinyl Chloride	ND	ug/kg	1000
Chloroethane	ND	ug/kg	1000
Methylene chloride	ND	ug/kg	500
Acetone	ND	ug/kg	1000
Carbon disulfide	ND	ug/kg	500
1,1-Dichloroethene	ND	ug/kg	500
1,1-Dichloroethane	ND	ug/kg	500
1,2-Dichloroethene (cis/ trans)	ND	ug/kg	500
Chloroform	ND	ug/kg	500
1,2-Dichloroethane	ND	ug/kg	500
2-Butanone	ND	ug/kg	1000
1,1,1-Trichloroethane	ND	ug/kg	500
Carbon tetrachloride	ND	ug/kg	500
Vinyl Acetate	ND	ug/kg	1000
Bromodichloromethane	ND	ug/kg	500
1,2-Dichloropropane	ND	ug/kg	500
cis-1,3-Dichloropropene	ND	ug/kg	500
Trichloroethene	ND	ug/kg	500
Dibromochloromethane	ND	ug/kg	500
1,1,2-Trichloroethane	ND	ug/kg	500
Benzene	ND	ug/kg	500
trans-1,3-Dichloropropene	ND	ug/kg	500
Bromoform	ND	ug/kg	500
4-Methyl-2-Pentanone	ND	ug/kg	1000
2-Hexanone	ND	ug/kg	1000
1,1,2,2-Tetrachloroethane	ND	ug/kg	500
Tetrachloroethene	ND	ug/kg	500
Toluene	ND	ug/kg	500
Chlorobenzene	ND	ug/kg	500
Ethylbenzene	ND	ug/kg	500
Styrene	ND	ug/kg	500
Xylenes (total)	ND	ug/kg	500

QC LOT ASSIGNMENT REPORT
TCL Volatile Organics

Method 8240

Laboratory Sample Number	QC Matrix	QC Category	QC Lot	QC Run
031221-0002-SA	SOLID	8240-SL	06 NOV 93-S	09 NOV 93-B
031221-0003-SA	SOLID	8240-SL	06 NOV 93-S	09 NOV 93-B

DUPLICATE CONTROL SAMPLE REPORT

TCL Volatile Organics

Method 8240
Project: 031221

Category: 8240-SL Volatile Organics in solids--low level
Matrix: SOLID
QC Lot: 06 NOV 93-S
Concentration Units: ug/kg

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision (RPD) Limit
1,1-Dichloroethene	50.0	52.3	52.3	52.3	105	59-172	0.0	22
Trichloroethene	50.0	45.1	43.6	44.4	89	62-137	3.4	24
Benzene	50.0	46.2	45.9	46.0	92	66-142	0.65	21
Toluene	50.0	48.3	49.7	49.0	98	59-139	2.9	21
Chlorobenzene	50.0	49.0	47.9	48.4	97	60-133	2.3	21

Calculations are performed before rounding to avoid round-off errors in calculated result

SINGLE CONTROL SAMPLE REPORT

TCL Volatile Organics

Method 8240
Project: 031221

Category: 8240-SL   Volatile Organics in solids--low level
Matrix: SOLID
QC Lot: 06 NOV 93-S   QC Run: 09 NOV 93-B
Concentration Units: ug/kg

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
1,2-Dichloroethane-d4	50.0	50.0	100	70-121
4-Bromofluorobenzene	50.0	48.2	96	74-121
Toluene-d8	50.0	52.4	105	81-117

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK SAMPLE REPORT

TCL Volatile Organics

Method 8240
Project: 031221

Category: 8240-SL   Volatile Organics in solids--low level
Matrix: SOIL
QC Lot: 06 NOV 93-S   QC Run: 09 NOV 93-B

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/kg	10
Bromomethane	ND	ug/kg	10
Vinyl Chloride	ND	ug/kg	10
Chloroethane	ND	ug/kg	10
Methylene chloride	ND	ug/kg	5.0
Acetone	ND	ug/kg	10
Carbon disulfide	ND	ug/kg	5.0
1,1-Dichloroethene	ND	ug/kg	5.0
1,1-Dichloroethane	ND	ug/kg	5.0
1,2-Dichloroethene (cis/ trans)	ND	ug/kg	5.0
Chloroform	ND	ug/kg	5.0
1,2-Dichloroethane	ND	ug/kg	5.0
2-Butanone	ND	ug/kg	10
1,1,1-Trichloroethane	ND	ug/kg	5.0
Carbon tetrachloride	ND	ug/kg	5.0
Vinyl Acetate	ND	ug/kg	10
Bromodichloromethane	ND	ug/kg	5.0
1,2-Dichloropropane	ND	ug/kg	5.0
cis-1,3-Dichloropropene	ND	ug/kg	5.0
Trichloroethene	ND	ug/kg	5.0
Dibromochloromethane	ND	ug/kg	5.0
1,1,2-Trichloroethane	ND	ug/kg	5.0
Benzene	ND	ug/kg	5.0
trans-1,3-Dichloropropene	ND	ug/kg	5.0
Bromoform	ND	ug/kg	5.0
4-Methyl-2-Pentanone	ND	ug/kg	10
2-Hexanone	ND	ug/kg	10
1,1,2,2-Tetrachloroethane	ND	ug/kg	5.0
Tetrachloroethene	ND	ug/kg	5.0
Toluene	ND	ug/kg	5.0
Chlorobenzene	ND	ug/kg	5.0
Ethylbenzene	ND	ug/kg	5.0
Styrene	ND	ug/kg	5.0
Xylenes (total)	ND	ug/kg	5.0

QC LOT ASSIGNMENT REPORT
TCL Volatile Organics

Method 8240

Laboratory Sample Number	QC Matrix	QC Category	QC Lot	QC Run
031221-0005-SA	WASTE	8240-W	29 NOV 93-D	29 NOV 93-A

DUPLICATE CONTROL SAMPLE REPORT

TCL Volatile Organics

Method 8240
Project: 031221

Category: 8240-W Method 8240 - Volatile Organics by GC/MS
Matrix: WASTE
QC Lot: 29 NOV 93-D
Concentration Units: mg/kg

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision (RPD) Limit
1,1-Dichloroethene	5.00	5.32	5.35	5.34	107	59-172	0.56	22
Trichloroethene	5.00	5.05	4.89	4.97	99	62-137	3.2	24
Benzene	5.00	5.17	5.32	5.24	105	66-142	2.9	21
Chlorobenzene	5.00	4.88	4.91	4.90	98	60-133	0.61	21
Toluene	5.00	5.01	5.12	5.06	101	59-139	2.2	21

Calculations are performed before rounding to avoid round-off errors in calculated result

SINGLE CONTROL SAMPLE REPORT

TCL Volatile Organics

Method 8240
Project: 031221

Category: 8240-W   Method 8240 - Volatile Organics by GC/MS
Matrix: WASTE
QC Lot: 29 NOV 93-D   QC Run: 29 NOV 93-A
Concentration Units: mg/kg

	Concentration		Accuracy(%)	
Analyte	Spiked	Measured	SCS	Limits
1,2-Dichloroethane-d4	5.00	4.85	97	70-121
4-Bromofluorobenzene	5.00	4.95	99	74-121
Toluene-d8	5.00	4.88	98	81-117

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK SAMPLE REPORT

TCL Volatile Organics

Method 8240
Project: 031221

Category: 8240-W   Method 8240 - Volatile Organics by GC/MS
Matrix: WASTE
QC Lot: 29 NOV 93-D   QC Run: 29 NOV 93-A

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	mg/kg	10
Bromomethane	ND	mg/kg	10
Vinyl Chloride	ND	mg/kg	10
Chloroethane	ND	mg/kg	10
Methylene chloride	ND	mg/kg	5.0
Acetone	0.0024 J	mg/kg	10
Carbon disulfide	ND	mg/kg	5.0
1,1-Dichloroethene	ND	mg/kg	5.0
1,1-Dichloroethane	ND	mg/kg	5.0
1,2-Dichloroethene (cis/ trans)	ND	mg/kg	5.0
Chloroform	ND	mg/kg	5.0
1,2-Dichloroethane	ND	mg/kg	5.0
2-Butanone	0.0045 J	mg/kg	10
1,1,1-Trichloroethane	ND	mg/kg	5.0
Carbon tetrachloride	ND	mg/kg	5.0
Vinyl Acetate	ND	mg/kg	10
Bromodichloromethane	ND	mg/kg	5.0
1,2-Dichloropropane	ND	mg/kg	5.0
cis-1,3-Dichloropropene	ND	mg/kg	5.0
Trichloroethene	ND	mg/kg	5.0
Dibromochloromethane	ND	mg/kg	5.0
1,1,2-Trichloroethane	ND	mg/kg	5.0
Benzene	ND	mg/kg	5.0
trans-1,3-Dichloropropene	ND	mg/kg	5.0
Bromoform	ND	mg/kg	5.0
4-Methyl-2-Pentanone	ND	mg/kg	10
2-Hexanone	ND	mg/kg	10
1,1,2,2-Tetrachloroethane	ND	mg/kg	5.0
Tetrachloroethene	ND	mg/kg	5.0
Toluene	ND	mg/kg	5.0
Chlorobenzene	ND	mg/kg	5.0
Ethylbenzene	ND	mg/kg	5.0
Styrene	ND	mg/kg	5.0
Xylenes (total)	ND	mg/kg	5.0

TCL Semivolatile Organics

Method 8270

Client Name: Clemson Technical Center
Client ID: RKF-02
Lab ID: 031221-0001-SA Sampled: 26 OCT 93
Matrix: SOIL Received: 28 OCT 93 Prepared: 05 NOV 93
Authorized: 31 OCT 93 Analyzed: 15 NOV 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit	
Phenol	ND	ug/kg	84000	d
bis(2-Chloroethyl) ether	ND	ug/kg	84000	
2-Chlorophenol	ND	ug/kg	84000	
1,3-Dichlorobenzene	ND	ug/kg	84000	
1,4-Dichlorobenzene	ND	ug/kg	84000	
1,2-Dichlorobenzene	ND	ug/kg	84000	
2-Methylphenol	ND	ug/kg	84000	
bis(2-Chloroisopropyl) ether	ND	ug/kg	84000	
4-Methylphenol	ND	ug/kg	84000	
N-Nitroso-di-n-propylamine	ND	ug/kg	84000	
Hexachloroethane	ND	ug/kg	84000	
Nitrobenzene	ND	ug/kg	84000	
Isophorone	ND	ug/kg	84000	
2-Nitrophenol	ND	ug/kg	84000	
2,4-Dimethylphenol	ND	ug/kg	84000	
bis(2-Chloroethoxy)-methane	ND	ug/kg	84000	
2,4-Dichlorophenol	ND	ug/kg	84000	
1,2,4-Trichlorobenzene	ND	ug/kg	84000	
Naphthalene	ND	ug/kg	84000	
4-Chloroaniline	ND	ug/kg	84000	
Hexachlorobutadiene	ND	ug/kg	84000	
4-Chloro-3-methylphenol	ND	ug/kg	84000	
2-Methylnaphthalene	ND	ug/kg	84000	
Hexachlorocyclo-pentadiene	ND	ug/kg	84000	
2,4,6-Trichlorophenol	ND	ug/kg	84000	
2,4,5-Trichlorophenol	ND	ug/kg	410000	
2-Chloronaphthalene	ND	ug/kg	84000	
2-Nitroaniline	ND	ug/kg	410000	
Dimethyl phthalate	ND	ug/kg	84000	
Acenaphthylene	ND	ug/kg	84000	

Percent moisture is 3.7%. All results and limits are reported on a dry weight basis.

d = All reporting limits raised due to matrix interferences.
ND = Not Detected

Reported By: Hina R. Patel Approved By: Susan Loseby

TCL Semivolatile Organics

Method 8270
(cont.)

Client Name: Clemson Technical Center
Client ID: RKF-02
Lab ID: 031221-0001-SA
Matrix: SOIL

Sampled: 26 OCT 93
Received: 28 OCT 93
Authorized: 31 OCT 93
Prepared: 05 NOV 93
Analyzed: 15 NOV 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit
3-Nitroaniline	ND	ug/kg	410000
Acenaphthene	ND	ug/kg	84000
2,4-Dinitrophenol	ND	ug/kg	410000
4-Nitrophenol	ND	ug/kg	410000
Dibenzofuran	ND	ug/kg	84000
2,4-Dinitrotoluene	ND	ug/kg	84000
2,6-Dinitrotoluene	ND	ug/kg	84000
Diethyl phthalate	ND	ug/kg	84000
4-Chlorophenyl phenyl ether	ND	ug/kg	84000
Fluorene	ND	ug/kg	84000
4-Nitroaniline	ND	ug/kg	410000
4,6-Dinitro-2-methylphenol	ND	ug/kg	410000
N-Nitrosodiphenylamine	ND	ug/kg	84000
4-Bromophenyl phenyl ether	ND	ug/kg	84000
Hexachlorobenzene	ND	ug/kg	84000
Pentachlorophenol	ND	ug/kg	410000
Phenanthrene	ND	ug/kg	84000
Anthracene	ND	ug/kg	84000
9H-Carbazole	ND	ug/kg	84000
Di-n-butyl phthalate	ND	ug/kg	84000
Fluoranthene	ND	ug/kg	84000
Pyrene	ND	ug/kg	84000
Butyl benzyl phthalate	ND	ug/kg	84000
3,3'-Dichlorobenzidine	ND	ug/kg	170000
Benzo(a)anthracene	ND	ug/kg	84000
bis(2-Ethylhexyl) phthalate	ND	ug/kg	84000
Chrysene	ND	ug/kg	84000
Di-n-octyl phthalate	ND	ug/kg	84000
Benzo(b)fluoranthene	ND	ug/kg	84000
Benzo(k)fluoranthene	ND	ug/kg	84000

Percent moisture is 3.7%. All results and limits are reported on a dry weight basis.

ND = Not Detected

Reported By: Hina R. Patel Approved By: Susan Loseby

TCL Semivolatile Organics

Method 8270
(cont.)

Client Name: Clemson Technical Center
Client ID: RKF-02
Lab ID: 031221-0001-SA
Matrix: SOIL

Sampled: 26 OCT 93
Received: 28 OCT 93
Authorized: 31 OCT 93
Prepared: 05 NOV 93
Analyzed: 15 NOV 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit	
Benzo(a)pyrene	ND	ug/kg	84000	
Indeno(1,2,3-cd)pyrene	ND	ug/kg	84000	
Dibenz(a,h)anthracene	ND	ug/kg	84000	
Benzo(g,h,i)perylene	ND	ug/kg	84000	
Surrogate	**Recovery**			
Nitrobenzene-d5	ND	%		H
2-Fluorobiphenyl	75	%		
Terphenyl-d14	39	%		
Phenol-d5	ND	%		H
2-Fluorophenol	ND	%		H
2,4,6-Tribromophenol	ND	%		H

Percent moisture is 3.7%. All results and limits are reported on a dry weight basis.

H = Surrogate not detected because of required sample dilution.
ND = Not Detected

Reported By: Hina R. Patel Approved By: Susan Loseby

TCL Semivolatile Organics

Method 8270

Client Name: Clemson Technical Center
Client ID: RKF-03A
Lab ID: 031221-0002-SA   Sampled: 26 OCT 93
Matrix: SOIL   Received: 28 OCT 93   Prepared: 05 NOV 93
Authorized: 31 OCT 93   Analyzed: 15 NOV 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit	
Phenol	ND	ug/kg	100000	d
bis(2-Chloroethyl) ether	ND	ug/kg	100000	
2-Chlorophenol	ND	ug/kg	100000	
1,3-Dichlorobenzene	ND	ug/kg	100000	
1,4-Dichlorobenzene	ND	ug/kg	100000	
1,2-Dichlorobenzene	ND	ug/kg	100000	
2-Methylphenol	ND	ug/kg	100000	
bis(2-Chloroisopropyl) ether	ND	ug/kg	100000	
4-Methylphenol	ND	ug/kg	100000	
N-Nitroso-di-n-propylamine	ND	ug/kg	100000	
Hexachloroethane	ND	ug/kg	100000	
Nitrobenzene	ND	ug/kg	100000	
Isophorone	ND	ug/kg	100000	
2-Nitrophenol	ND	ug/kg	100000	
2,4-Dimethylphenol	ND	ug/kg	100000	
bis(2-Chloroethoxy)-methane	ND	ug/kg	100000	
2,4-Dichlorophenol	ND	ug/kg	100000	
1,2,4-Trichlorobenzene	ND	ug/kg	100000	
Naphthalene	ND	ug/kg	100000	
4-Chloroaniline	ND	ug/kg	100000	
Hexachlorobutadiene	ND	ug/kg	100000	
4-Chloro-3-methylphenol	ND	ug/kg	100000	
2-Methylnaphthalene	ND	ug/kg	100000	
Hexachlorocyclo-pentadiene	ND	ug/kg	100000	
2,4,6-Trichlorophenol	ND	ug/kg	100000	
2,4,5-Trichlorophenol	ND	ug/kg	490000	
2-Chloronaphthalene	ND	ug/kg	100000	
2-Nitroaniline	ND	ug/kg	490000	
Dimethyl phthalate	ND	ug/kg	100000	
Acenaphthylene	ND	ug/kg	100000	

Percent moisture results not available.
d = All reporting limits raised due to matrix interferences.
ND = Not Detected

Reported By: Hina R. Patel   Approved By: Susan Loseby

TCL Semivolatile Organics

Method 8270
(cont.)

Client Name: Clemson Technical Center
Client ID: RKF-03A
Lab ID: 031221-0002-SA
Matrix: SOIL

Sampled: 26 OCT 93
Received: 28 OCT 93
Authorized: 31 OCT 93

Prepared: 05 NOV 93
Analyzed: 15 NOV 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit
3-Nitroaniline	ND	ug/kg	490000
Acenaphthene	ND	ug/kg	100000
2,4-Dinitrophenol	ND	ug/kg	490000
4-Nitrophenol	ND	ug/kg	490000
Dibenzofuran	ND	ug/kg	100000
2,4-Dinitrotoluene	ND	ug/kg	100000
2,6-Dinitrotoluene	ND	ug/kg	100000
Diethyl phthalate	ND	ug/kg	100000
4-Chlorophenyl phenyl ether	ND	ug/kg	100000
Fluorene	ND	ug/kg	100000
4-Nitroaniline	ND	ug/kg	490000
4,6-Dinitro-2-methylphenol	ND	ug/kg	490000
N-Nitrosodiphenylamine	ND	ug/kg	100000
4-Bromophenyl phenyl ether	ND	ug/kg	100000
Hexachlorobenzene	ND	ug/kg	100000
Pentachlorophenol	ND	ug/kg	490000
Phenanthrene	ND	ug/kg	100000
Anthracene	ND	ug/kg	100000
9H-Carbazole	ND	ug/kg	100000
Di-n-butyl phthalate	ND	ug/kg	100000
Fluoranthene	ND	ug/kg	100000
Pyrene	ND	ug/kg	100000
Butyl benzyl phthalate	ND	ug/kg	100000
3,3'-Dichlorobenzidine	ND	ug/kg	200000
Benzo(a)anthracene	ND	ug/kg	100000
bis(2-Ethylhexyl) phthalate	ND	ug/kg	100000
Chrysene	ND	ug/kg	100000
Di-n-octyl phthalate	ND	ug/kg	100000
Benzo(b)fluoranthene	ND	ug/kg	100000
Benzo(k)fluoranthene	ND	ug/kg	100000

Percent moisture results not available.
ND = Not Detected

Reported By: Hina R. Patel

Approved By: Susan Loseby

TCL Semivolatile Organics

Method 8270
(cont.)

Client Name: Clemson Technical Center
Client ID: RKF-03A
Lab ID: 031221-0002-SA
Matrix: SOIL

Sampled: 26 OCT 93
Received: 28 OCT 93
Authorized: 31 OCT 93

Prepared: 05 NOV 93
Analyzed: 15 NOV 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit	
Benzo(a)pyrene	ND	ug/kg	100000	
Indeno(1,2,3-cd)pyrene	ND	ug/kg	100000	
Dibenz(a,h)anthracene	ND	ug/kg	100000	
Benzo(g,h,i)perylene	ND	ug/kg	100000	
Surrogate	**Recovery**			
Nitrobenzene-d5	ND	%		H
2-Fluorobiphenyl	62	%		
Terphenyl-d14	30	%		
Phenol-d5	ND	%		H
2-Fluorophenol	ND	%		H
2,4,6-Tribromophenol	ND	%		H

Percent moisture results not available.
H = Surrogate not detected because of required sample dilution.
ND = Not Detected

Reported By: Hina R. Patel
Approved By: Susan Loseby

TCL Semivolatile Organics

Method 8270

Client Name: Clemson Technical Center
Client ID: RKF-03B
Lab ID: 031221-0003-SA Sampled: 26 OCT 93
Matrix: SOIL Received: 28 OCT 93 Prepared: 05 NOV 93
Authorized: 31 OCT 93 Analyzed: 15 NOV 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit	
Phenol	ND	ug/kg	230000	d
bis(2-Chloroethyl) ether	ND	ug/kg	230000	
2-Chlorophenol	ND	ug/kg	230000	
1,3-Dichlorobenzene	ND	ug/kg	230000	
1,4-Dichlorobenzene	ND	ug/kg	230000	
1,2-Dichlorobenzene	ND	ug/kg	230000	
2-Methylphenol	ND	ug/kg	230000	
bis(2-Chloroisopropyl) ether	ND	ug/kg	230000	
4-Methylphenol	ND	ug/kg	230000	
N-Nitroso-di-n-propylamine	ND	ug/kg	230000	
Hexachloroethane	ND	ug/kg	230000	
Nitrobenzene	ND	ug/kg	230000	
Isophorone	ND	ug/kg	230000	
2-Nitrophenol	ND	ug/kg	230000	
2,4-Dimethylphenol	ND	ug/kg	230000	
bis(2-Chloroethoxy)-methane	ND	ug/kg	230000	
2,4-Dichlorophenol	ND	ug/kg	230000	
1,2,4-Trichlorobenzene	ND	ug/kg	230000	
Naphthalene	ND	ug/kg	230000	
4-Chloroaniline	ND	ug/kg	230000	
Hexachlorobutadiene	ND	ug/kg	230000	
4-Chloro-3-methylphenol	ND	ug/kg	230000	
2-Methylnaphthalene	ND	ug/kg	230000	
Hexachlorocyclo-pentadiene	ND	ug/kg	230000	
2,4,6-Trichlorophenol	ND	ug/kg	230000	
2,4,5-Trichlorophenol	ND	ug/kg	1100000	
2-Chloronaphthalene	ND	ug/kg	230000	
2-Nitroaniline	ND	ug/kg	1100000	
Dimethyl phthalate	ND	ug/kg	230000	
Acenaphthylene	ND	ug/kg	230000	

Percent moisture results not available.
d = All reporting limits raised due to matrix interferences.
ND = Not Detected

Reported By: Hina R. Patel Approved By: Susan Loseby

TCL Semivolatile Organics

Method 8270
(cont.)

Client Name: Clemson Technical Center
Client ID: RKF-03B
Lab ID: 031221-0003-SA   Sampled: 26 OCT 93
Matrix: SOIL   Received: 28 OCT 93   Prepared: 05 NOV 93
Authorized: 31 OCT 93   Analyzed: 15 NOV 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit
3-Nitroaniline	ND	ug/kg	1100000
Acenaphthene	ND	ug/kg	230000
2,4-Dinitrophenol	ND	ug/kg	1100000
4-Nitrophenol	ND	ug/kg	1100000
Dibenzofuran	ND	ug/kg	230000
2,4-Dinitrotoluene	ND	ug/kg	230000
2,6-Dinitrotoluene	ND	ug/kg	230000
Diethyl phthalate	ND	ug/kg	230000
4-Chlorophenyl phenyl ether	ND	ug/kg	230000
Fluorene	ND	ug/kg	230000
4-Nitroaniline	ND	ug/kg	1100000
4,6-Dinitro-2-methylphenol	ND	ug/kg	1100000
N-Nitrosodiphenylamine	ND	ug/kg	230000
4-Bromophenyl phenyl ether	ND	ug/kg	230000
Hexachlorobenzene	ND	ug/kg	230000
Pentachlorophenol	ND	ug/kg	1100000
Phenanthrene	ND	ug/kg	230000
Anthracene	ND	ug/kg	230000
9H-Carbazole	ND	ug/kg	230000
Di-n-butyl phthalate	ND	ug/kg	230000
Fluoranthene	ND	ug/kg	230000
Pyrene	ND	ug/kg	230000
Butyl benzyl phthalate	ND	ug/kg	230000
3,3'-Dichlorobenzidine	ND	ug/kg	460000
Benzo(a)anthracene	ND	ug/kg	230000
bis(2-Ethylhexyl) phthalate	ND	ug/kg	230000
Chrysene	ND	ug/kg	230000
Di-n-octyl phthalate	ND	ug/kg	230000
Benzo(b)fluoranthene	ND	ug/kg	230000
Benzo(k)fluoranthene	ND	ug/kg	230000

Percent moisture results not available.
ND = Not Detected

Reported By: Hina R. Patel   Approved By: Susan Loseby

TCL Semivolatile Organics

Method 8270
(cont.)

Client Name: Clemson Technical Center
Client ID: RKF-03B
Lab ID: 031221-0003-SA
Matrix: SOIL

Sampled: 26 OCT 93
Received: 28 OCT 93
Authorized: 31 OCT 93
Prepared: 05 NOV 93
Analyzed: 15 NOV 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit	
Benzo(a)pyrene	ND	ug/kg	230000	
Indeno(1,2,3-cd)pyrene	ND	ug/kg	230000	
Dibenz(a,h)anthracene	ND	ug/kg	230000	
Benzo(g,h,i)perylene	ND	ug/kg	230000	
Surrogate	**Recovery**			
Nitrobenzene-d5	ND	%		H
2-Fluorobiphenyl	52	%		
Terphenyl-d14	69	%		
Phenol-d5	ND	%		H
2-Fluorophenol	ND	%		H
2,4,6-Tribromophenol	ND	%		H

Percent moisture results not available.
H = Surrogate not detected because of required sample dilution.
ND = Not Detected

Reported By: Hina R. Patel

Approved By: Susan Loseby

TCL Semivolatile Organics

Method 8270

Client Name: Clemson Technical Center
Client ID: RKF-10
Lab ID: 031221-0005-SA   Sampled: 26 OCT 93
Matrix: WASTE   Received: 28 OCT 93   Prepared: 04 NOV 93
Authorized: 31 OCT 93   Analyzed: 12 NOV 93

Parameter	Result	Units	Reporting Limit	
Phenol	ND	mg/kg	1000	d
bis(2-Chloroethyl) ether	ND	mg/kg	1000	
2-Chlorophenol	ND	mg/kg	1000	
1,3-Dichlorobenzene	ND	mg/kg	1000	
1,4-Dichlorobenzene	ND	mg/kg	1000	
Benzyl alcohol	ND	mg/kg	1000	
1,2-Dichlorobenzene	ND	mg/kg	1000	
2-Methylphenol	ND	mg/kg	1000	
bis(2-Chloroisopropyl) ether	ND	mg/kg	1000	
4-Methylphenol	ND	mg/kg	1000	
N-Nitroso-di-n-propylamine	ND	mg/kg	1000	
Hexachloroethane	ND	mg/kg	1000	
Nitrobenzene	ND	mg/kg	1000	
Isophorone	ND	mg/kg	1000	
2-Nitrophenol	ND	mg/kg	1000	
2,4-Dimethylphenol	ND	mg/kg	5000	
Benzoic acid	ND	mg/kg	1000	
bis(2-Chloroethoxy)-methane	ND	mg/kg	1000	
2,4-Dichlorophenol	ND	mg/kg	1000	
1,2,4-Trichlorobenzene	ND	mg/kg	1000	
Naphthalene	3800	mg/kg	1000	
4-Chloroaniline	ND	mg/kg	1000	
Hexachlorobutadiene	ND	mg/kg	1000	
4-Chloro-3-methylphenol	ND	mg/kg	1000	
2-Methylnaphthalene	4100	mg/kg	1000	
Hexachlorocyclo-pentadiene	ND	mg/kg	1000	
2,4,6-Trichlorophenol	ND	mg/kg	1000	
2,4,5-Trichlorophenol	ND	mg/kg	5000	
2-Chloronaphthalene	ND	mg/kg	1000	
2-Nitroaniline	ND	mg/kg	5000	

d = All reporting limits raised due to matrix interferences.
ND = Not Detected

Reported By: David Ercoliani   Approved By: Susan Loseby

TCL Semivolatile Organics

Method 8270
(cont.)

Client Name: Clemson Technical Center
Client ID: RKF-10
Lab ID: 031221-0005-SA   Sampled: 26 OCT 93
Matrix: WASTE   Received: 28 OCT 93   Prepared: 04 NOV 93
Authorized: 31 OCT 93   Analyzed: 12 NOV 93

Parameter	Result	Units	Reporting Limit
Dimethyl phthalate	ND	mg/kg	1000
Acenaphthylene	ND	mg/kg	1000
3-Nitroaniline	ND	mg/kg	5000
Acenaphthene	ND	mg/kg	1000
2,4-Dinitrophenol	ND	mg/kg	5000
4-Nitrophenol	ND	mg/kg	5000
Dibenzofuran	ND	mg/kg	1000
2,4-Dinitrotoluene	ND	mg/kg	1000
2,6-Dinitrotoluene	ND	mg/kg	1000
Diethyl phthalate	ND	mg/kg	1000
4-Chlorophenyl phenyl ether	ND	mg/kg	1000
Fluorene	ND	mg/kg	1000
4-Nitroaniline	ND	mg/kg	5000
4,6-Dinitro-2-methylphenol	ND	mg/kg	5000
N-Nitrosodiphenylamine	ND	mg/kg	1000
4-Bromophenyl phenyl ether	ND	mg/kg	1000
Hexachlorobenzene	ND	mg/kg	1000
Pentachlorophenol	ND	mg/kg	5000
Phenanthrene	ND	mg/kg	1000
Anthracene	ND	mg/kg	1000
Di-n-butyl phthalate	ND	mg/kg	1000
Fluoranthene	ND	mg/kg	1000
Pyrene	ND	mg/kg	1000
Butyl benzyl phthalate	ND	mg/kg	1000
3,3'-Dichlorobenzidine	ND	mg/kg	2000
Benzo(a)anthracene	ND	mg/kg	1000
bis(2-Ethylhexyl) phthalate	ND	mg/kg	1000
Chrysene	ND	mg/kg	1000
Di-n-octyl phthalate	ND	mg/kg	1000
Benzo(b)fluoranthene	ND	mg/kg	1000

ND = Not Detected

Reported By: David Ercoliani   Approved By: Susan Loseby

TCL Semivolatile Organics

Method 8270
(cont.)

Client Name: Clemson Technical Center
Client ID: RKF-10
Lab ID: 031221-0005-SA   Sampled: 26 OCT 93
Matrix: WASTE   Received: 28 OCT 93   Prepared: 04 NOV 93
Authorized: 31 OCT 93   Analyzed: 12 NOV 93

Parameter	Result	Units	Reporting Limit	
Benzo(k)fluoranthene	ND	mg/kg	1000	
Benzo(a)pyrene	ND	mg/kg	1000	
Indeno(1,2,3-cd)pyrene	ND	mg/kg	1000	
Dibenz(a,h)anthracene	ND	mg/kg	1000	
Benzo(g,h,i)perylene	ND	mg/kg	1000	
Surrogate	**Recovery**			
Nitrobenzene-d5	ND	%		H
2-Fluorobiphenyl	132	%		
Terphenyl-d14	121	%		
Phenol-d5	ND	%		H
2-Fluorophenol	66	%		
2,4,6-Tribromophenol	ND	%		H

H = Surrogate not detected because of required sample dilution.
ND = Not Detected

Reported By: David Ercoliani   Approved By: Susan Loseby

QC LOT ASSIGNMENT REPORT
TCL Semivolatile Organics

Method 8270

Laboratory Sample Number	QC Matrix	QC Category	QC Lot	QC Run
031221-0001-SA	SOIL	8270-S	04 NOV 93-F	05 NOV 93-K1
031221-0002-SA	SOIL	8270-S	04 NOV 93-F	05 NOV 93-K1
031221-0003-SA	SOIL	8270-S	04 NOV 93-F	05 NOV 93-K1

DUPLICATE CONTROL SAMPLE REPORT

TCL Semivolatile Organics

Method 8270
Project: 031221

Category: 8270-S   Acid, Base and Neutrals by GC/MS.
Matrix: SOIL
QC Lot: 04 NOV 93-F
Concentration Units: ug/kg

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Phenol	6670	4500	3880	4190	63	26-90	15	35
2-Chlorophenol	6670	4820	4170	4500	67	25-102	14	50
1,4-Dichlorobenzene	3330	2700	2310	2500	75	28-104	16	27
N-Nitroso-di- n-propylamine	3330	2890	2530	2710	81	41-126	13	38
1,2,4-Trichlorobenzene	3330	2960	2430	2700	81	38-107	20	23
4-Chloro-3-methylphenol	6670	4730	4510	4620	69	26-103	4.8	33
Acenaphthene	3330	2840	2450	2640	79	31-137	15	19
4-Nitrophenol	6670	4840	5020	4930	74	11-114	3.7	50
2,4-Dinitrotoluene	3330	3560	3200	3380	102	28-89	11	47
Pentachlorophenol	6670	5550	5650	5600	84	17-109	1.8	47
Pyrene	3330	3410	3020	3220	97	35-142	12	36

Calculations are performed before rounding to avoid round-off errors in calculated result.

SINGLE CONTROL SAMPLE REPORT

TCL Semivolatile Organics

Method 8270
Project: 031221

Category: 8270-S Acid, Base and Neutrals by GC/MS.
Matrix: SOIL
QC Lot: 04 NOV 93-F QC Run: 05 NOV 93-K1
Concentration Units: ug/kg

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Nitrobenzene-d5	1670	1140	68	23-120
2-Fluorobiphenyl	1670	1230	74	30-115
Terphenyl-d14	1670	1390	83	18-137
2-Fluorophenol	3330	2230	67	25-121
Phenol-d5	3330	2230	67	24-113
2,4,6-Tribromophenol	3330	2080	62	19-122

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK SAMPLE REPORT

TCL Semivolatile Organics

Method 8270
Project: 031221

Category: 8270-S Acid, Base and Neutrals by GC/MS.
Matrix: SOIL
QC Lot: 04 NOV 93-F QC Run: 05 NOV 93-K1

Parameter	Result	Units	Reporting Limit
Phenol	ND	ug/kg	330
bis(2-Chloroethyl) ether	ND	ug/kg	330
2-Chlorophenol	ND	ug/kg	330
1,3-Dichlorobenzene	ND	ug/kg	330
1,4-Dichlorobenzene	ND	ug/kg	330
1,2-Dichlorobenzene	ND	ug/kg	330
2-Methylphenol	ND	ug/kg	330
bis(2-Chloroisopropyl) ether	ND	ug/kg	330
4-Methylphenol	ND	ug/kg	330
N-Nitroso-di-n-propylamine	ND	ug/kg	330
Hexachloroethane	ND	ug/kg	330
Nitrobenzene	ND	ug/kg	330
Isophorone	ND	ug/kg	330
2-Nitrophenol	ND	ug/kg	330
2,4-Dimethylphenol	ND	ug/kg	330
bis(2-Chloroethoxy)-methane	ND	ug/kg	330
2,4-Dichlorophenol	ND	ug/kg	330
1,2,4-Trichlorobenzene	ND	ug/kg	330
Naphthalene	ND	ug/kg	330
4-Chloroaniline	ND	ug/kg	330
Hexachlorobutadiene	ND	ug/kg	330
4-Chloro-3-methylphenol	ND	ug/kg	330
2-Methylnaphthalene	ND	ug/kg	330
Hexachlorocyclo-pentadiene	ND	ug/kg	330
2,4,6-Trichlorophenol	ND	ug/kg	330
2,4,5-Trichlorophenol	ND	ug/kg	1600
2-Chloronaphthalene	ND	ug/kg	330
2-Nitroaniline	ND	ug/kg	1600
Dimethyl phthalate	ND	ug/kg	330
Acenaphthylene	ND	ug/kg	330
3-Nitroaniline	ND	ug/kg	1600
Acenaphthene	ND	ug/kg	330
2,4-Dinitrophenol	ND	ug/kg	1600
4-Nitrophenol	ND	ug/kg	1600
Dibenzofuran	ND	ug/kg	330
2,4-Dinitrotoluene	ND	ug/kg	330
2,6-Dinitrotoluene	ND	ug/kg	330
Diethyl phthalate	ND	ug/kg	330

Calculations are performed before rounding to avoid round-off errors in calculated result

METHOD BLANK SAMPLE REPORT

TCL Semivolatile Organics

Method 8270
Project: 031221 (cont.)

Category: 8270-S Acid, Base and Neutrals by GC/MS. (cont.)
Matrix: SOIL
QC Lot: 04 NOV 93-F QC Run: 05 NOV 93-K1

Parameter	Result		Units	Reporting Limit
4-Chlorophenyl phenyl ether	ND		ug/kg	330
Fluorene	ND		ug/kg	330
4-Nitroaniline	ND		ug/kg	1600
4,6-Dinitro-2-methylphenol	ND		ug/kg	1600
N-Nitrosodiphenylamine	ND		ug/kg	330
4-Bromophenyl phenyl ether	ND		ug/kg	330
Hexachlorobenzene	ND		ug/kg	330
Pentachlorophenol	ND		ug/kg	1600
Phenanthrene	ND		ug/kg	330
Anthracene	ND		ug/kg	330
9H-Carbazole	ND		ug/kg	330
Di-n-butyl phthalate	ND		ug/kg	330
Fluoranthene	ND		ug/kg	330
Pyrene	ND		ug/kg	330
Butyl benzyl phthalate	ND		ug/kg	330
3,3'-Dichlorobenzidine	ND		ug/kg	660
Benzo(a)anthracene	ND		ug/kg	330
bis(2-Ethylhexyl) phthalate	37	J	ug/kg	330
Chrysene	ND		ug/kg	330
Di-n-octyl phthalate	ND		ug/kg	330
Benzo(b)fluoranthene	ND		ug/kg	330
Benzo(k)fluoranthene	ND		ug/kg	330
Benzo(a)pyrene	ND		ug/kg	330
Indeno(1,2,3-cd)pyrene	ND		ug/kg	330
Dibenz(a,h)anthracene	ND		ug/kg	330
Benzo(g,h,i)perylene	ND		ug/kg	330

QC LOT ASSIGNMENT REPORT
TCL Semivolatile Organics

Method 8270

Laboratory Sample Number	QC Matrix	QC Category	QC Lot	QC Run
031221-0005-SA	WASTE	8270-W	04 NOV 93-W	04 NOV 93-W2

DUPLICATE CONTROL SAMPLE REPORT

TCL Semivolatile Organics

Method 8270
Project: 031221

Category: 8270-W Method 8270 - TCL Semivolatile Organics
Matrix: WASTE
QC Lot: 04 NOV 93-W
Concentration Units: mg/kg

Analyte	Concentration: Spiked	Measured: DCS1	Measured: DCS2	Measured: AVG	Accuracy Average(%): DCS	Accuracy Average(%): Limits	Precision (RPD): DCS	Precision (RPD): Limit
Phenol	200	206	208	207	104	26-90	0.97	35
2-Chlorophenol	200	207	210	208	104	25-102	1.4	50
1,4-Dichlorobenzene	100	104	107	106	106	28-104	2.8	27
N-Nitroso-di- n-propylamine	100	112	114	113	113	41-126	1.8	38
1,2,4-Trichlorobenzene	100	113	113	113	113	38-107	0.0	23
4-Chloro-3-methylphenol	200	218	212	215	108	26-103	2.8	33
Acenaphthene	100	117	119	118	118	31-137	1.7	19
4-Nitrophenol	200	165	146	156	78	11-114	12	50
2,4-Dinitrotoluene	100	96.7	93.7	95.2	95	28-89	3.2	47
Pentachlorophenol	200	189	171	180	90	17-109	10	47
Pyrene	100	109	113	111	111	35-142	3.6	36

Calculations are performed before rounding to avoid round-off errors in calculated results.

SINGLE CONTROL SAMPLE REPORT

TCL Semivolatile Organics

Method 8270
Project: 031221

Category: 8270-W Method 8270 - TCL Semivolatile Organics
Matrix: WASTE
QC Lot: 04 NOV 93-W QC Run: 04 NOV 93-W2
Concentration Units: mg/kg

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Nitrobenzene-d5	50.0	54.4	109	23-120
2-Fluorobiphenyl	50.0	62.1	124	30-115
Terphenyl-d14	50.0	62.3	125	18-137
2-Fluorophenol	100	108	108	25-121
Phenol-d5	100	108	108	24-113
2,4,6-Tribromophenol	100	100	100	19-122

Calculations are performed before rounding to avoid round-off errors in calculated result

METHOD BLANK SAMPLE REPORT

TCL Semivolatile Organics

Method 8270
Project: 031221

Category: 8270-W   Method 8270 - TCL Semivolatile Organics
Matrix: WASTE
QC Lot: 04 NOV 93-W   QC Run: 04 NOV 93-W2

Parameter	Result	Units	Reporting Limit
Phenol	ND	mg/kg	50
bis(2-Chloroethyl) ether	ND	mg/kg	50
2-Chlorophenol	ND	mg/kg	50
1,3-Dichlorobenzene	ND	mg/kg	50
1,4-Dichlorobenzene	ND	mg/kg	50
Benzyl alcohol	ND	mg/kg	50
1,2-Dichlorobenzene	ND	mg/kg	50
2-Methylphenol	ND	mg/kg	50
bis(2-Chloroisopropyl) ether	ND	mg/kg	50
4-Methylphenol	ND	mg/kg	50
N-Nitroso-di-n-propylamine	ND	mg/kg	50
Hexachloroethane	ND	mg/kg	50
Nitrobenzene	ND	mg/kg	50
Isophorone	ND	mg/kg	50
2-Nitrophenol	ND	mg/kg	50
2,4-Dimethylphenol	ND	mg/kg	250
Benzoic acid	ND	mg/kg	50
bis(2-Chloroethoxy)-methane	ND	mg/kg	50
2,4-Dichlorophenol	ND	mg/kg	50
1,2,4-Trichlorobenzene	ND	mg/kg	50
Naphthalene	ND	mg/kg	50
4-Chloroaniline	ND	mg/kg	50
Hexachlorobutadiene	ND	mg/kg	50
4-Chloro-3-methylphenol	ND	mg/kg	50
2-Methylnaphthalene	ND	mg/kg	50
Hexachlorocyclo-pentadiene	ND	mg/kg	50
2,4,6-Trichlorophenol	ND	mg/kg	50
2,4,5-Trichlorophenol	ND	mg/kg	250
2-Chloronaphthalene	ND	mg/kg	50
2-Nitroaniline	ND	mg/kg	250
Dimethyl phthalate	ND	mg/kg	50
Acenaphthylene	ND	mg/kg	50
3-Nitroaniline	ND	mg/kg	250
Acenaphthene	ND	mg/kg	50
2,4-Dinitrophenol	ND	mg/kg	250
4-Nitrophenol	ND	mg/kg	250
Dibenzofuran	ND	mg/kg	50
2,4-Dinitrotoluene	ND	mg/kg	50

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK SAMPLE REPORT

TCL Semivolatile Organics

Method 8270
Project: 031221 (cont.)

Category: 8270-W Method 8270 - TCL Semivolatile Organics (cont.)
Matrix: WASTE
QC Lot: 04 NOV 93-W QC Run: 04 NOV 93-W2

Parameter	Result	Units	Reporting Limit
2,6-Dinitrotoluene	ND	mg/kg	50
Diethyl phthalate	ND	mg/kg	50
4-Chlorophenyl phenyl ether	ND	mg/kg	50
Fluorene	ND	mg/kg	50
4-Nitroaniline	ND	mg/kg	250
4,6-Dinitro-2-methylphenol	ND	mg/kg	250
N-Nitrosodiphenylamine	ND	mg/kg	50
4-Bromophenyl phenyl ether	ND	mg/kg	50
Hexachlorobenzene	ND	mg/kg	50
Pentachlorophenol	ND	mg/kg	250
Phenanthrene	ND	mg/kg	50
Anthracene	ND	mg/kg	50
Di-n-butyl phthalate	ND	mg/kg	50
Fluoranthene	ND	mg/kg	50
Pyrene	ND	mg/kg	50
Butyl benzyl phthalate	ND	mg/kg	50
3,3'-Dichlorobenzidine	ND	mg/kg	100
Benzo(a)anthracene	ND	mg/kg	50
bis(2-Ethylhexyl) phthalate	ND	mg/kg	50
Chrysene	ND	mg/kg	50
Di-n-octyl phthalate	ND	mg/kg	50
Benzo(b)fluoranthene	ND	mg/kg	50
Benzo(k)fluoranthene	ND	mg/kg	50
Benzo(a)pyrene	ND	mg/kg	50
Indeno(1,2,3-cd)pyrene	ND	mg/kg	50
Dibenz(a,h)anthracene	ND	mg/kg	50
Benzo(g,h,i)perylene	ND	mg/kg	50

Total Petroleum Hydrocarbons by IR

Client Name: Clemson Technical Center
Client ID: RKF-02
Lab ID: 031221-0001-SA
Matrix: SOIL

Sampled: 26 OCT 93
Received: 28 OCT 93
Authorized: 31 OCT 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date	
Total Petroleum Hydrocarbons	170000	mg/kg	21000	418.1	04 NOV 93	08 NOV 93	1R

Percent moisture is 3.7%. All results and limits are reported on a dry weight basis.

1 = All results taken from a 1:1000 dilution.
R = Reporting limit changed due to sample volume limitations.

Reported By: Richard Bozenbury   Approved By: Wayne Halozan

Total Petroleum Hydrocarbons by IR

Client Name: Clemson Technical Center
Client ID: RKF-03A
Lab ID: 031221-0002-SA
Matrix: SOIL

Sampled: 26 OCT 93
Received: 28 OCT 93
Authorized: 31 OCT 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date	
Total Petroleum Hydrocarbons	180000	mg/kg	20000	418.1	04 NOV 93	08 NOV 93	1R

Percent moisture results not available.
1 = All results taken from a 1:1000 dilution.
R = Reporting limit changed due to sample volume limitations.

Reported By: Richard Bozenbury Approved By: Wayne Halozan

Total Petroleum Hydrocarbons by IR

Client Name: Clemson Technical Center
Client ID: RKF-03B
Lab ID: 031221-0003-SA   Sampled: 26 OCT 93
Matrix: SOIL   Received: 28 OCT 93
Authorized: 31 OCT 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date	
Total Petroleum Hydrocarbons	1500000	mg/kg	20000	418.1	04 NOV 93	08 NOV 93	1R

Physically Impossible. That's 150%.

Percent moisture results not available.
1 = All results taken from a 1:1000 dilution.
R = Reporting limit changed due to sample volume limitations.

Reported By: Richard Bozenbury   Approved By: Wayne Halozan

QC LOT ASSIGNMENT REPORT
Total Petroleum Hydrocarbons by IR

Laboratory Sample Number	QC Matrix	QC Category	QC Lot	QC Run
031221-0001-SA	SOIL	TPH-IR-S	04 NOV 93-A	04 NOV 93-A
031221-0002-SA	SOIL	TPH-IR-S	04 NOV 93-A	04 NOV 93-A
031221-0003-SA	SOIL	TPH-IR-S	04 NOV 93-A	04 NOV 93-A

DUPLICATE CONTROL SAMPLE REPORT

Total Petroleum Hydrocarbons by IR

Project: 031221

Category: TPH-IR-S   Total Petroleum Hydrocarbons by IR
Matrix: SOIL
QC Lot: 04 NOV 93-A
Concentration Units: mg/kg

Analyte	Concentration				Accuracy Average(%)		Precision (RPD)	
	Spiked	Measured						
		DCS1	DCS2	AVG	DCS	Limits	DCS	Limit
Total Petroleum Hydrocarbons	50.0	42.4	40.3	41.3	83	75-125	5.1	20

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK SAMPLE REPORT

Total Petroleum Hydrocarbons by IR

Project: 031221

Category: TPH-IR-S Total Petroleum Hydrocarbons by IR
Matrix:
QC Lot: 04 NOV 93-A QC Run: 04 NOV 93-A

Parameter	Result	Units	Reporting Limit
Total Petroleum Hydrocarbons	ND	mg/kg	20

Oil and Grease, IR

Method 3550/413.2

Client Name: Clemson Technical Center
Client ID: RKF-02
Lab ID: 031221-0001-SA
Matrix: SOIL

Sampled: 26 OCT 93
Received: 28 OCT 93
Authorized: 31 OCT 93

Prepared: 30 NOV 93
Analyzed: 30 NOV 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit	
Oil and Grease	200000	mg/kg	26000	2

Percent moisture is 3.7%. All results and limits are reported on a dry weight basis.

2 = All results taken from a 1:1250 dilution.

Reported By: Richard Bozenbury Approved By: Wayne Halozan

Oil and Grease, IR

Method 3550/413.2

Client Name: Clemson Technical Center
Client ID: RKF-03A
Lab ID: 031221-0002-SA
Matrix: SOIL

Sampled: 26 OCT 93
Received: 28 OCT 93
Authorized: 31 OCT 93

Prepared: 30 NOV 93
Analyzed: 30 NOV 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit	
Oil and Grease	200000	mg/kg	20000	3R

Percent moisture results not available.
3 = All results taken from a 1:1000 dilution.
R = Reporting limit changed due to sample volume limitations.

Reported By: Richard Bozenbury

Approved By: Wayne Halozan

Oil and Grease, IR

Method 3550/413.2

Client Name: Clemson Technical Center
Client ID: RKF-03B
Lab ID: 031221-0003-SA
Matrix: SOIL

Sampled: 26 OCT 93
Received: 28 OCT 93
Authorized: 31 OCT 93

Prepared: 30 NOV 93
Analyzed: 30 NOV 93

Parameter	Result	DRY WEIGHT Units	Reporting Limit	
Oil and Grease	160000	mg/kg	20000	3R

Percent moisture results not available.
3 = All results taken from a 1:1000 dilution.
R = Reporting limit changed due to sample volume limitations.

Reported By: Richard Bozenbury   Approved By: Wayne Halozan

QC LOT ASSIGNMENT REPORT
Oil and Grease, IR

Method 3550/413.2

Laboratory Sample Number	QC Matrix	QC Category	QC Lot	QC Run
031221-0001-SA	SOIL	O&G-IR-S	21 OCT 93-A	30 NOV 93-A
031221-0002-SA	SOIL	O&G-IR-S	21 OCT 93-A	30 NOV 93-A
031221-0003-SA	SOIL	O&G-IR-S	21 OCT 93-A	30 NOV 93-A

DUPLICATE CONTROL SAMPLE REPORT

Oil and Grease, IR

Method 3550/413.2
Project: 031221

Category: O&G-IR-S Oil & Grease by IR
Matrix: SOIL
QC Lot: 21 OCT 93-A
Concentration Units: mg/kg

Analyte	Concentration: Spiked	Measured: DCS1	Measured: DCS2	Measured: AVG	Accuracy Average(%): DCS	Accuracy Average(%): Limits	Precision (RPD): DCS	Precision (RPD): Limit
Oil and Grease	50.0	45.7	46.5	46.1	92	75-125	1.9	20

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK SAMPLE REPORT

Oil and Grease, IR

Method 3550/413.2
Project: 031221

Category: O&G-IR-S   Oil & Grease by IR
Matrix: SOIL
QC Lot: 21 OCT 93-A   QC Run: 30 NOV 93-A

Parameter	Result	Units	Reporting Limit
Oil and Grease	ND	mg/kg	20

General Chemistry

Client Name: Clemson Technical Center
Client ID: RKF-02
Lab ID: 031221-0001-SA Sampled: 26 OCT 93
Matrix: SOIL Received: 28 OCT 93
Authorized: 31 OCT 93

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
pH	6.3	units	0.010	SW-846 9045	NA	05 NOV 93 w

w = Overaged.
NA = Not Applicable

Reported By: Elmaurie Galvez Approved By: Arthur Hannemann

General Chemistry

Client Name: Clemson Technical Center
Client ID: RKF-03A
Lab ID: 031221-0002-SA
Matrix: SOIL

Sampled: 26 OCT 93
Received: 28 OCT 93
Authorized: 31 OCT 93

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
pH	6.6	units	0.010	SW-846 9045	NA	05 NOV 93 w

w = Overaged.
NA = Not Applicable

Reported By: Elmaurie Galvez

Approved By: Arthur Hannemann

General Chemistry

Client Name: Clemson Technical Center
Client ID: RKF-03B
Lab ID: 031221-0003-SA
Matrix: SOIL

Sampled: 26 OCT 93
Received: 28 OCT 93
Authorized: 31 OCT 93

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
pH	6.6	units	0.010	SW-846 9045	NA	05 NOV 93 w

w = Overaged.
NA = Not Applicable

Reported By: Elmaurie Galvez

Approved By: Arthur Hannemann

General Chemistry

Client Name: Clemson Technical Center
Client ID: RKF-06
Lab ID: 031221-0004-SA
Matrix: AQUEOUS

Sampled: 26 OCT 93
Received: 28 OCT 93
Authorized: 31 OCT 93

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
pH	5.5	units	0.010	EPA 150.1/9040	NA	02 DEC 93 w

w = Overaged.
NA = Not Applicable

Reported By: Katherine Dupont

Approved By: Joasia Przyluska

QC LOT ASSIGNMENT REPORT
General Chemistry

Laboratory Sample Number	QC Matrix	QC Category	QC Lot	QC Run
031221-0001-SA	AQUEOUS	PH-A	05 NOV 93-A	
031221-0002-SA	AQUEOUS	PH-A	05 NOV 93-A	
031221-0003-SA	AQUEOUS	PH-A	05 NOV 93-A	
031221-0004-SA	AQUEOUS	PH-A	02 DEC 93-A	

DUPLICATE CONTROL SAMPLE REPORT

General Chemistry

Project: 031221

Category: PH-A pH for Aqueous Samples
Matrix: AQUEOUS
QC Lot: 05 NOV 93-A
Concentration Units: units

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
pH	7.00	7.05	7.04	7.04	101	98-102	0.14	2.0

Category: PH-A pH for Aqueous Samples
Matrix: AQUEOUS
QC Lot: 02 DEC 93-A
Concentration Units: units

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
pH	7.00	7.10	7.09	7.10	101	98-102	0.14	2.0

Calculations are performed before rounding to avoid round-off errors in calculated resul

Clemsc . chnical Center

PLEASE SIGN C . , Return Copy to CTC

Cler ch Park
10. Technology Drive
Anderson, SC 29625
(803) 646-2413
Fax # (803) 646-5311

CHAIN-OF-CUSTODY RECORD

3/22/

Page 1 of 2

~~Client~~ Clemson Technical Center - Mike McElwee
~~Location~~ 100 Technology Drive Anderson, SC 29625
~~Project/Number~~ (803) 646-2413 X221
Sample Type(s) SOLIDS/ LIQUIDS

SAMPLE IDENTITY	DATE SAMPLED/TIME	LIMS NUMBER	SAMPLE CONTAINER DESCRIPTION								TOTAL	REMARKS
1 RKF-02											2	
2 RKF-03A											2	
3 RKF-03B											2	
4 RKF-06											1	
RKF-10											1	+ condensed oil - headspace will not affect readings
												Extract Volatiles
												Samples USING ENTIRE
												SAMPLE PROVIDED
												See ANALYSES ON
												NEXT PAGE

Total No. of Containers 8

Sampled By Michael J. McElwee

Relinquished by: Michael J. McElwee Organization: Clemson Tech. Center
Date: 10/27/93 Time:

Received by: [illegible] Organization: [illegible]
Date: 10/28/93 Time: 10:00

Relinquished by: Organization:
Date: Time:

Received by: Organization:
Date: Time:

Relinquished by: Organization:
Date: Time:

Received by: Organization:
Date: Time:

Delivery Method: (attach shipping bill, if any) Shipping Container ID

NOTE: All information concerning the date, time, analyst and method of analysis is recorded in bound log books at CTC and is available upon request.

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Appendix

SCHWARZKOPF MICROANALYTICAL LABORATORY
56-19 37TH AVENUE
WOODSIDE, NY 11377
(718) 429-6248

FRANK E. MAPLE, PRES.
FLORENCE WOHL, EXEC. V.P.

Jan. 3, 1994

TO: Report Production
ENSECO

RESULTS OF ANALYSIS

Sample No.: 31221-5

SML No.: D42087

Ash: <0.05%

SCHWARZKOPF MICROANALYTICAL LABORATORY

Edmund Petro

Edmund Petro
Technical Director

EP:ls

SCHWARZKOPF MICROANALYTICAL LABORATORY
56-19 37TH AVENUE
WOODSIDE, NY 11377
(718) 429-6248

FRANK E. MAPLE, PRES.
FLORENCE WOHL, EXEC. V.P.

Nov. 8, 1993

TO: REPORT PRODUCTION
ENSECO EAST

RESULTS OF ANALYSIS

Sample No.	SML No.	% Ash
31221-01	D40495	64.57
31221-02	40496	69.51
31221-03	40497	40.11

SCHWARZKOPF MICROANALYTICAL LABORATORY

Edmund Petro

Edmund Petro
Technical Director

EP;ls

ANALYTICAL REPORT

TO: KEVIN HARTMANN

PROJECT: 9VACTX102

DATE: Friday, April 1, 1994

REQUISITION(S): 12412

PREPARED BY:

CHEM-NUCLEAR GEOTECH ANALYTICAL LABORATORY
2597 B 3/4 ROAD
P.O. BOX 14000
GRAND JUNCTION, COLORADO 81502-5504
(303-248-6165)

(SECTION II)

VOLATILE ORGANIC

SUPPORTING DOCUMENTATION

Requisition No. 12412

This section contains the analytical raw data for volatile organic analysis.

PROCEDURE:

BB-1 Gas Chromatography-Mass Spectrometry

QUALITY CONTROL CODES

An "S" or "MS" suffix is added to the sample number for matrix spike analysis, and an "SD" or "MSD" suffix is added for matrix spike duplicate analysis.

(SECTION II)

Volatile Organic

Data Package

for

Requisition 12412

The samples in this requisition were analyzed for volatile organic compounds according to Geotech procedure BB-1, the laboratory standard operating procedure for EPA Method 8240 from SW-846. The analyte list was the Target Compound List from the Contract Laboratory Program statement of work dated 2/88. The following conditions applied to the analyses:

All samples were analyzed on instrument Extrel 2, using the soil method from BB-1.

Sample 218034 was a water blank. A 5 milliliter volume was used for this sample.

Samples 218033 and 218035 were each analyzed using a 5 gram sample weight. Both of these samples exceeded the calibration range for acetone, and were reanalyzed using a 1 gram sample weight. Both sets of data are included in this report. The results from the reanalysis are denoted by a -DL suffix in the laboratory number. Sample 218035DL still exceeded the calibration range for acetone, but, under direction from the project, was not reanalyzed by the medium level method.

Target compounds and their concentrations or detection limits are shown on Form 1A. Tentatively Identified Compounds (TICs) and their estimated concentrations, where applicable, are shown on Form 1E. All quality control parameters were within laboratory acceptability limits.

Analyst: Gretchen Loshbaugh
Gretchen Loshbaugh
25 March 1994

P.S. for SED
3-28-94

QC'd
SLO
3/30/94

QC prelim ok
Sue Lipston
3/29/94

(SECTION II)

DEFINITION OF QUALIFIERS

Volatiles Data

U This qualifier indicates that the compound was analyzed for but not detected.

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

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

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

X,Y,Z These are laboratory-defined qualifiers. If used, they will be fully described in the analytical summary.

[illegible]
[illegible]

(SECTION II) 7

Lab Name: [illegible] Contract: [illegible]

Lab Code: [illegible] Case No: SAS No: SDG No:

Lab File ID: JAN18BFB BFB Injection Date: 1/18/94

Instrument ID: EXTRE BFB Injection Time: [illegible]

Matrix: (soil/water) Level: (low/med) Column: (pack/cap) CAP

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	15.6
75	30.0 - 60.0% of mass 95	41.3
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.8
173	Less than 2.0% of mass 174	1.0 (1.4)1
174	Greater than 50.0% of mass 95	75.9
175	5.0 - 9.0% of mass 174	[illegible] ([illegible])1
176	Greater than 95.0%, but less than 101.0% of mass 174	73.6 (97.2)1
177	5.0 - 9.0% of mass 176	5.2 (7.0)2

1-Value is % mass 174 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
1	JAN18S5		JAN18S50	1/18/94	9:00
2	JAN18S1		JAN18S100	1/18/94	9:41
3	JAN18S1		JAN18S150	1/18/94	10:18
4	JAN18S2		JAN18S200	1/18/94	10:54
5	JAN18S2		JAN18S20	1/18/94	11:35
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

5A

VOLATILE ORGANIC GC/MS TUNING AND MASS
CALIBRATION - BROMOFLUOROBENZENE (BFB)

(SECTION II) 8

Lab Name: GEOTEC Contract: 1

Lab Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12412

Lab File ID: MAR17BFB BFB Injection Date: 3/17/94

Instrument ID: INTF2 BFB Injection Time: 8:18

Matrix: (soil/water) WATER Level: (low/med) LOW Column: (pack/cap) CAP

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	16.6
75	30.0 - 60.0% of mass 95	41.8
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.3
173	Less than 2.0% of mass 174	0.7 (1.0)1
174	Greater than 50.0% of mass 95	66.6
175	5.0 - 9.0% of mass 174	5.7 (8.3)1
176	Greater than 95.0%, but less than 101.0% of mass 174	63.3 (95.1)1
177	5.0 - 9.0% of mass 176	5.0 (7.6)2

1-Value is % mass 174 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
1	MAR17CC		MAR17CCC	3/17/94	9:20
2	MAR17B	MAR17BLK	MAR17BLK	3/17/94	10:01
3	1016BLAN	218034	218034	3/17/94	10:47
4	1016036	218032	218032	3/17/94	11:27
5	1016037	218033	218033	3/17/94	12:05
6	1016035	218035	218035	3/17/94	12:47
7	1017037	218036	218036	3/17/94	13:30
8	1016037	218033DL	218033DL	3/17/94	14:11
9	1016035	218035DL	218035DL	3/17/94	14:48
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

[illegible]

Lab Name: [illegible] Contract: [illegible]

Lab Code: [illegible] Case No.: [illegible] SAS No.: [illegible] SDG No.: 12412

Matrix: (soil/water) SOIL Lab Sample ID: 218035 139

Sample wt/vol: 5.0 (g/mL) [illegible] Lab File ID: E18035

Level: (low/med) LOW Date Received: 3/10/94

% Moisture: not dec. [illegible] SECTION II Date Analyzed: 3/17/94

Column: (pack/cap) CAP Dilution Factor: [illegible]

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.	U
67-64-1	ACETONE	610.	E
75-15-0	CARBON DISULFIDE	5.	U
75-35-4	1,1-DICHLOROETHENE	5.	U
75-34-3	1,1-DICHLOROETHANE	5.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	5.	U
156-59-2	CIS-1,2-DICHLOROETHENE	5.	U
67-66-3	CHLOROFORM	5.	U
107-06-2	1,2-DICHLOROETHANE	5.	U
78-93-3	2-BUTANONE	53.	
71-55-6	1,1,1-TRICHLOROETHANE	5.	U
56-23-5	CARBON TETRACHLORIDE	5.	U
108-05-4	VINYL ACETATE	10.	U
75-27-4	BROMODICHLOROMETHANE	5.	U
78-87-5	1,2-DICHLOROPROPANE	5.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	5.	U
79-01-6	TRICHLOROETHENE	5.	U
124-48-1	DIBROMOCHLOROMETHANE	5.	U
79-00-5	1,1,2-TRICHLOROETHANE	5.	U
71-43-2	BENZENE	12.	
10061-02-6	TRANS-1,3-DICHLOROPROPENE	5.	U
75-25-2	BROMOFORM	5.	U
108-10-1	4-METHYL-2-PENTANONE	10.	U
591-78-6	2-HEXANONE	10.	U
127-18-4	TETRACHLOROETHENE	17.	
79-34-5	1,1,2,2-TETRACHLOROETHANE	5.	U
108-88-3	TOLUENE	14.	
108-90-7	CHLOROBENZENE	5.	U
100-41-4	ETHYLBENZENE	2.	J
100-42-5	STYRENE	5.	U
1330-20-7	M,P-XYLENE	9.	
95-47-6	O-XYLENE	2.	J

(SECTION I)

ANALYTICAL DATA SUMMARY

This section contains 12 pages, not including this page.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1016036

b Name: GEOTEC   Contract: 1

Lab Code: GEOTEC   Case No.: 1   SAS No.:   SDG No.: 12412

13

Matrix: (soil/water) SOIL   Lab Sample ID: 218032

Sample wt/vol: 5.0 (g/mL) G   Lab File ID: 218032

Level: (low/med) LOW   Date Received: 3/15/94

% Moisture: not dec. 0.   **(SECTION II)**   Date Analyzed: 3/17/94

Column: (pack/cap) CAP   Dilution Factor: 1.00

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.	U
67-64-1	ACETONE	200.	
75-15-0	CARBON DISULFIDE	4.	J
75-35-4	1,1-DICHLOROETHENE	5.	U
75-34-3	1,1-DICHLOROETHANE	5.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	5.	U
156-59-2	CIS-1,2-DICHLOROETHENE	5.	U
67-66-3	CHLOROFORM	5.	U
107-06-2	1,2-DICHLOROETHANE	5.	U
78-93-3	2-BUTANONE	57.	
71-55-6	1,1,1-TRICHLOROETHANE	5.	U
56-23-5	CARBON TETRACHLORIDE	5.	U
108-05-4	VINYL ACETATE	10.	U
75-27-4	BROMODICHLOROMETHANE	5.	U
78-87-5	1,2-DICHLOROPROPANE	5.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	5.	U
79-01-6	TRICHLOROETHENE	5.	U
124-48-1	DIBROMOCHLOROMETHANE	5.	U
79-00-5	1,1,2-TRICHLOROETHANE	5.	U
71-43-2	BENZENE	14.	
10061-02-6	TRANS-1,3-DICHLOROPROPENE	5.	U
75-25-2	BROMOFORM	5.	U
108-10-1	4-METHYL-2-PENTANONE	10.	U
591-78-6	2-HEXANONE	5.	J
127-18-4	TETRACHLOROETHENE	1.	J
79-34-5	1,1,2,2-TETRACHLOROETHANE	5.	U
108-88-3	TOLUENE	8.	
108-90-7	CHLOROBENZENE	5.	U
100-41-4	ETHYLBENZENE	2.	J
100-42-5	STYRENE	5.	U
1330-20-7	M,P-XYLENE	3.	J
95-47-6	O-XYLENE	5.	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

1016036

Lab Name: GEOTEC Contract: 1

Lab Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12412 14

Matrix: (soil/water) SOIL Lab Sample ID: 218032

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 218032

Level: (low/med) LOW Date Received: 3/15/94

(SECTION II)

% Moisture: not dec. 0. Date Analyzed: 3/17/94

Column: (pack/cap) CAP Dilution Factor: 1.00

CONCENTRATION UNITS:

Number TICs found: 8 (ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	692-45-5	Formic acid, ethenyl ester	1.42	20.	J
2.	78-78-4	Butane, 2-methyl-	1.87	20.	J
3.	- -	UNKNOWN	2.87	50.	J
4.	- -	UNKNOWN HYDROCARBON	6.83	10.	J
5.	- -	UNKNOWN	13.63	6.	J
6.	- -	UNKNOWN	18.27	6.	J
7.	100-52-7	Benzaldehyde	20.52	50.	J
8.	- -	UNKNOWN AROMATIC	23.48	6.	J
9.					
10.					
11.					
12.					
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(SECTION III)

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

1016025

41

ab Name: GEOTEC Contract: 1

b Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12345

atrix: (soil/water) SOIL Lab Sample ID: 217964

ample wt/vol: 1.0 (g/mL) G Lab File ID: 217964

evel: (low/med) LOW Date Received: 3/10/94

Moisture: not dec. 10. Date Analyzed: 3/22/94

olumn: (pack/cap) CAP Dilution Factor: 1.00

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/KG	Q
74-87-3	CHLOROMETHANE	56.	U
74-83-9	BROMOMETHANE	56.	U
75-01-4	VINYL CHLORIDE	56.	U
75-00-3	CHLOROETHANE	56.	U
75-09-2	METHYLENE CHLORIDE	28.	U
67-64-1	ACETONE	21.	BJ
75-15-0	CARBON DISULFIDE	28.	U
75-35-4	1,1-DICHLOROETHENE	28.	U
75-34-3	1,1-DICHLOROETHANE	28.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	28.	U
156-59-2	CIS-1,2-DICHLOROETHENE	28.	U
67-66-3	CHLOROFORM	28.	U
107-06-2	1,2-DICHLOROETHANE	28.	U
78-93-3	2-BUTANONE	87.	B
71-55-6	1,1,1-TRICHLOROETHANE	28.	U
56-23-5	CARBON TETRACHLORIDE	28.	U
108-05-4	VINYL ACETATE	56.	U
75-27-4	BROMODICHLOROMETHANE	28.	U
78-87-5	1,2-DICHLOROPROPANE	28.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	28.	U
79-01-6	TRICHLOROETHENE	28.	U
124-48-1	DIBROMOCHLOROMETHANE	28.	U
79-00-5	1,1,2-TRICHLOROETHANE	28.	U
71-43-2	BENZENE	28.	U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	28.	U
75-25-2	BROMOFORM	28.	U
108-10-1	4-METHYL-2-PENTANONE	56.	U
591-78-6	2-HEXANONE	56.	U
127-18-4	TETRACHLOROETHENE	8200.	E
79-34-5	1,1,2,2-TETRACHLOROETHANE	28.	U
108-88-3	TOLUENE	28.	U
108-90-7	CHLOROBENZENE	28.	U
100-41-4	ETHYLBENZENE	28.	U
100-42-5	STYRENE	28.	U
1330-20-7	M,P-XYLENE	28.	U
95-47-6	O-XYLENE	28.	U

1E (SECTION III) EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

1016025

Lab Name: GEOTEC Contract: 1

Lab Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12345 42

Matrix: (soil/water) SOIL Lab Sample ID: 217964

Sample wt/vol: 1.0 (g/mL) G Lab File ID: 217964

Level: (low/med) LOW Date Received: 3/10/94

% Moisture: not dec. 10. Date Analyzed: 3/22/94

Column: (pack/cap) CAP Dilution Factor: 1.00

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
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1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

(SECTION IV)

EPA SAMPLE NO.

1016025

Lab Name: RUST   Contract: 1

Lab Code: RUST   Case No.: 1   SAS No.:   SDG No.: 12345

46

Matrix: (soil/water) SOIL   Lab Sample ID: 217964

Sample wt/vol: 4.0 (g/mL) G   Lab File ID: 217964M

Level: (low/med) MED   Date Received: 3/10/94

% Moisture: not dec. 10.   Date Analyzed: 3/21/94

Column: (pack/cap) CAP   Dilution Factor: 500.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	CHLOROMETHANE	2500.	U
74-83-9	BROMOMETHANE	2500.	U
75-01-4	VINYL CHLORIDE	2500.	U
75-00-3	CHLOROETHANE	2500.	U
75-09-2	METHYLENE CHLORIDE	1200.	U
67-64-1	ACETONE	2500.	U
75-15-0	CARBON DISULFIDE	1200.	U
75-35-4	1,1-DICHLOROETHENE	1200.	U
75-34-3	1,1-DICHLOROETHANE	1200.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	1200.	U
156-59-2	CIS-1,2-DICHLOROETHENE	1200.	U
67-66-3	CHLOROFORM	1200.	U
107-06-2	1,2-DICHLOROETHANE	1200.	U
78-93-3	2-BUTANONE	25000.	
71-55-6	1,1,1-TRICHLOROETHANE	1200.	U
56-23-5	CARBON TETRACHLORIDE	1200.	U
108-05-4	VINYL ACETATE	2500.	U
75-27-4	BROMODICHLOROMETHANE	1200.	U
78-87-5	1,2-DICHLOROPROPANE	1200.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	1200.	U
79-01-6	TRICHLOROETHENE	1200.	U
124-48-1	DIBROMOCHLOROMETHANE	1200.	U
79-00-5	1,1,2-TRICHLOROETHANE	1200.	U
71-43-2	BENZENE	1200.	U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	1200.	U
75-25-2	BROMOFORM	1200.	U
108-10-1	4-METHYL-2-PENTANONE	2500.	U
591-78-6	2-HEXANONE	2500.	U
127-18-4	TETRACHLOROETHENE	5900.	
79-34-5	1,1,2,2-TETRACHLOROETHANE	1200.	U
108-88-3	TOLUENE	1200.	U
108-90-7	CHLOROBENZENE	1200.	U
100-41-4	ETHYLBENZENE	1200.	U
100-42-5	STYRENE	1200.	U
1330-20-7	M,P-XYLENE	1200.	U
95-47-6	O-XYLENE	1200.	U

FORM I VOA   1/87 Rev.

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(SECTION IV)

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

1016025

47

ab Name: RUST Contract: 1

ab Code: RUST Case No.: 1 SAS No.: SDG No.: 12345

atrix: (soil/water) SOIL Lab Sample ID: 217964

ample wt/vol: 4.0 (g/mL) G Lab File ID: 217964M

evel: (low/med) MED Date Received: 3/10/94

Moisture: not dec. 10. Date Analyzed: 3/21/94

olumn: (pack/cap) CAP Dilution Factor: 500.00

CONCENTRATION UNITS:
umber TICs found: 0 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
2.				
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FORM I VOA-TIC 1/87 Rev.

(SECTION IV)

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1016065

Lab Name: RUST Contract: 1

Lab Code: RUST Case No.: 1 SAS No.: SDG No.: 12345

68

Matrix: (soil/water) WATER Lab Sample ID: 217966

Sample wt/vol: 0.1 (g/mL) ML Lab File ID: 217966

Level: (low/med) LOW Date Received: 3/10/94

% Moisture: not dec. 100. Date Analyzed: 3/21/94

Column: (pack/cap) CAP Dilution Factor: 50.00

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	CHLOROMETHANE	100.	U
74-83-9	BROMOMETHANE	100.	U
75-01-4	VINYL CHLORIDE	100.	U
75-00-3	CHLOROETHANE	100.	U
75-09-2	METHYLENE CHLORIDE	50.	U
67-64-1	ACETONE	5100.	
75-15-0	CARBON DISULFIDE	50.	U
75-35-4	1,1-DICHLOROETHENE	50.	U
75-34-3	1,1-DICHLOROETHANE	50.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	50.	U
156-59-2	CIS-1,2-DICHLOROETHENE	50.	U
67-66-3	CHLOROFORM	50.	U
107-06-2	1,2-DICHLOROETHANE	50.	U
78-93-3	2-BUTANONE	2100.	
71-55-6	1,1,1-TRICHLOROETHANE	50.	U
56-23-5	CARBON TETRACHLORIDE	50.	U
108-05-4	VINYL ACETATE	100.	U
75-27-4	BROMODICHLOROMETHANE	50.	U
78-87-5	1,2-DICHLOROPROPANE	50.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	50.	U
79-01-6	TRICHLOROETHENE	50.	U
124-48-1	DIBROMOCHLOROMETHANE	50.	U
79-00-5	1,1,2-TRICHLOROETHANE	50.	U
71-43-2	BENZENE	50.	U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	50.	U
75-25-2	BROMOFORM	50.	U
108-10-1	4-METHYL-2-PENTANONE	100.	U
591-78-6	2-HEXANONE	100.	U
127-18-4	TETRACHLOROETHENE	120.	
79-34-5	1,1,2,2-TETRACHLOROETHANE	94.	
108-88-3	TOLUENE	50.	U
108-90-7	CHLOROBENZENE	50.	U
100-41-4	ETHYLBENZENE	50.	U
100-42-5	STYRENE	50.	U
1330-20-7	M,P-XYLENE	50.	U
95-47-6	O-XYLENE	50.	U

(SECTION IV)

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

1016065

Lab Name: RUST Contract: 1

Lab Code: RUST Case No.: 1 SAS No.: SDG No.: 12345

Matrix: (soil/water) WATER Lab Sample ID: 217966

69

Sample wt/vol: 0.1 (g/mL) ML Lab File ID: 217966

Level: (low/med) LOW Date Received: 3/10/94

% Moisture: not dec. 100. Date Analyzed: 3/21/94

Column: (pack/cap) CAP Dilution Factor: 50.00

Number TICs found: 4

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	692-45-5	Formic acid, ethenyl ester	1.77	1000.	J
2.	431-03-8	2,3-Butanedione	3.17	1000.	J
3.	- -	UNKNOWN AROMATIC	21.18	3000.	J
4.	124-13-0	Octanal	21.97	700.	J
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1016035

Lab Name: GEOTEC Contract: 1

Lab Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12412

Matrix: (soil/water) SOIL Lab Sample ID: 218035

139

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 218035

Level: (low/med) LOW Date Received: 3/10/94

% Moisture: not dec. 0. **(SECTION II)** Date Analyzed: 3/17/94

Column: (pack/cap) CAP Dilution Factor: 1.00

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.	U
67-64-1	ACETONE	610.	E
75-15-0	CARBON DISULFIDE	5.	U
75-35-4	1,1-DICHLOROETHENE	5.	U
75-34-3	1,1-DICHLOROETHANE	5.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	5.	U
156-59-2	CIS-1,2-DICHLOROETHENE	5.	U
67-66-3	CHLOROFORM	5.	U
107-06-2	1,2-DICHLOROETHANE	5.	U
78-93-3	2-BUTANONE	53.	
71-55-6	1,1,1-TRICHLOROETHANE	5.	U
56-23-5	CARBON TETRACHLORIDE	5.	U
108-05-4	VINYL ACETATE	10.	U
75-27-4	BROMODICHLOROMETHANE	5.	U
78-87-5	1,2-DICHLOROPROPANE	5.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	5.	U
79-01-6	TRICHLOROETHENE	5.	U
124-48-1	DIBROMOCHLOROMETHANE	5.	U
79-00-5	1,1,2-TRICHLOROETHANE	5.	U
71-43-2	BENZENE	12.	
10061-02-6	TRANS-1,3-DICHLOROPROPENE	5.	U
75-25-2	BROMOFORM	5.	U
108-10-1	4-METHYL-2-PENTANONE	10.	U
591-78-6	2-HEXANONE	10.	U
127-18-4	TETRACHLOROETHENE	17.	
79-34-5	1,1,2,2-TETRACHLOROETHANE	5.	U
108-88-3	TOLUENE	14.	
108-90-7	CHLOROBENZENE	5.	U
100-41-4	ETHYLBENZENE	2.	J
100-42-5	STYRENE	5.	U
1330-20-7	M,P-XYLENE	9.	
95-47-6	O-XYLENE	2.	J

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

1016035

Lab Name: GEOTEC Contract: 1

Lab Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12412

Matrix: (soil/water) SOIL Lab Sample ID: 218035 **140**

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 218035

Level: (low/med) LOW Date Received: 3/10/94

% Moisture: not dec. 0. **(SECTION II)** Date Analyzed: 3/17/94

Column: (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 9

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	- -	UNKNOWN	1.42	40.	J
2.	78-78-4	Butane, 2-methyl-	1.88	70.	J
3.	109-66-0	Pentane	2.20	30.	J
4.	110-54-3	Hexane	5.18	20.	J
5.	79-46-9	Propane, 2-nitro-	13.67	30.	J
6.	100-52-7	Benzaldehyde	20.52	100.	J
7.	- -	UNKNOWN AROMATIC	20.65	20.	J
8.	- -	UNKNOWN AROMATIC	23.50	30.	J
9.	95-93-2	Benzene, 1,2,4,5-tetramethyl	24.03	10.	J
10.					
11.					
12.					
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1016035

Lab Name: GEOTEC   Contract: 1

Lab Code: GEOTEC   Case No.: 1   SAS No.:   SDG No.: 12412

Matrix: (soil/water) SOIL   Lab Sample ID: 218035DL 192

Sample wt/vol: 1.0 (g/mL) G   Lab File ID: 218035DL

Level: (low/med) LOW   Date Received: 3/15/94

(SECTION II)

% Moisture: not dec. 0.   Date Analyzed: 3/17/94

Column: (pack/cap) CAP   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	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	25.	U
67-64-1	ACETONE	1700.	E
75-15-0	CARBON DISULFIDE	25.	U
75-35-4	1,1-DICHLOROETHENE	25.	U
75-34-3	1,1-DICHLOROETHANE	25.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	25.	U
156-59-2	CIS-1,2-DICHLOROETHENE	25.	U
67-66-3	CHLOROFORM	25.	U
107-06-2	1,2-DICHLOROETHANE	25.	U
78-93-3	2-BUTANONE	160.	
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	30.	
10061-02-6	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	32.	
79-34-5	1,1,2,2-TETRACHLOROETHANE	25.	U
108-88-3	TOLUENE	29.	
108-90-7	CHLOROBENZENE	25.	U
100-41-4	ETHYLBENZENE	5.	J
100-42-5	STYRENE	25.	U
1330-20-7	M,P-XYLENE	17.	J
95-47-6	O-XYLENE	7.	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1016BLAN

Lab Name: GEOTEC Contract: 1

Lab Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12412

131

Matrix: (soil/water) WATER Lab Sample ID: 218034

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 218034

Level: (low/med) LOW Date Received: 3/15/94

% Moisture: not dec. 100. (SECTION II) Date Analyzed: 3/17/94

Column: (pack/cap) CAP Dilution Factor: 1.00

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.	U
67-64-1	ACETONE	10.	U
75-15-0	CARBON DISULFIDE	5.	U
75-35-4	1,1-DICHLOROETHENE	5.	U
75-34-3	1,1-DICHLOROETHANE	5.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	5.	U
156-59-2	CIS-1,2-DICHLOROETHENE	5.	U
67-66-3	CHLOROFORM	5.	U
107-06-2	1,2-DICHLOROETHANE	5.	U
78-93-3	2-BUTANONE	10.	U
71-55-6	1,1,1-TRICHLOROETHANE	5.	U
56-23-5	CARBON TETRACHLORIDE	5.	U
108-05-4	VINYL ACETATE	10.	U
75-27-4	BROMODICHLOROMETHANE	5.	U
78-87-5	1,2-DICHLOROPROPANE	5.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	5.	U
79-01-6	TRICHLOROETHENE	5.	U
124-48-1	DIBROMOCHLOROMETHANE	5.	U
79-00-5	1,1,2-TRICHLOROETHANE	5.	U
71-43-2	BENZENE	5.	U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	5.	U
75-25-2	BROMOFORM	5.	U
108-10-1	4-METHYL-2-PENTANONE	10.	U
591-78-6	2-HEXANONE	10.	U
127-18-4	TETRACHLOROETHENE	5.	U
79-34-5	1,1,2,2-TETRACHLOROETHANE	5.	U
108-88-3	TOLUENE	5.	U
108-90-7	CHLOROBENZENE	5.	U
100-41-4	ETHYLBENZENE	5.	U
100-42-5	STYRENE	5.	U
1330-20-7	M,P-XYLENE	5.	U
95-47-6	O-XYLENE	5.	U

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

1016BLAN

'ab Name: GEOTEC Contract: 1

Lab Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12412

Matrix: (soil/water) WATER Lab Sample ID: 218034 **132**

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 218034

Level: (low/med) LOW Date Received: 3/15/94

% Moisture: not dec. 100. Date Analyzed: 3/17/94

(SECTION II)

Column: (pack/cap) CAP Dilution Factor: 1.00

CONCENTRATION UNITS:

Number TICs found: 0 (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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(SECTION III)

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1016026

ab Name: GEOTEC Contract: 1

b Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12345 53

atrix. (soil/water) SOIL Lab Sample ID: 218027

ample wt/vol: 1.0 (g/mL) G Lab File ID: 218027

evel: (low/med) LOW Date Received: 3/15/94

Moisture: not dec. 14. Date Analyzed: 3/22/94

lumn: (pack/cap) CAP Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	CHLOROMETHANE	58.	U
74-83-9	BROMOMETHANE	58.	U
75-01-4	VINYL CHLORIDE	58.	U
75-00-3	CHLOROETHANE	58.	U
75-09-2	METHYLENE CHLORIDE	29.	U
67-64-1	ACETONE	110.	B
75-15-0	CARBON DISULFIDE	29.	U
75-35-4	1,1-DICHLOROETHENE	29.	U
75-34-3	1,1-DICHLOROETHANE	29.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	29.	U
156-59-2	CIS-1,2-DICHLOROETHENE	11.	J
67-66-3	CHLOROFORM	29.	U
107-06-2	1,2-DICHLOROETHANE	29.	U
78-93-3	2-BUTANONE	97.	B
71-55-6	1,1,1-TRICHLOROETHANE	29.	U
56-23-5	CARBON TETRACHLORIDE	29.	U
108-05-4	VINYL ACETATE	58.	U
75-27-4	BROMODICHLOROMETHANE	29.	U
78-87-5	1,2-DICHLOROPROPANE	29.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	29.	U
79-01-6	TRICHLOROETHENE	130.	
124-48-1	DIBROMOCHLOROMETHANE	29.	U
79-00-5	1,1,2-TRICHLOROETHANE	29.	U
71-43-2	BENZENE	29.	U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	29.	U
75-25-2	BROMOFORM	29.	U
108-10-1	4-METHYL-2-PENTANONE	58.	U
591-78-6	2-HEXANONE	58.	U
127-18-4	TETRACHLOROETHENE	45000.	E
79-34-5	1,1,2,2-TETRACHLOROETHANE	29.	U
108-88-3	TOLUENE	29.	U
108-90-7	CHLOROBENZENE	38.	
100-41-4	ETHYLBENZENE	29.	U
100-42-5	STYRENE	29.	U
1330-20-7	M,P-XYLENE	29.	U
95-47-6	O-XYLENE	7.	J

(SECTION III)

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

1016026

Lab Name: GEOTEC Contract: 1

Lab Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12345

54

Matrix: (soil/water) SOIL Lab Sample ID: 218027

Sample wt/vol: 1.0 (g/mL) G Lab File ID: 218027

Level: (low/med) LOW Date Received: 3/15/94

% Moisture: not dec. 14. Date Analyzed: 3/22/94

Column: (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 3

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	- -	UNKNOWN HYDROCARBON	19.18	600.	J
2.	106-46-7	Benzene, 1,4-dichloro-	21.32	800.	J
3.	- -	UNKNOWN AROMATIC	25.18	400.	J
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(SECTION IV)

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1016026

Lab Name: RUST Contract: 1

Lab Code: RUST Case No.: 1 SAS No.: SDG No.: 12345 57

Matrix: (soil/water) SOIL Lab Sample ID: 21~~9~~8027 3/24/94

Sample wt/vol: 4.0 (g/mL) G Lab File ID: 218027M

Level: (low/med) MED Date Received: 3/15/94

% Moisture: not dec. 14. Date Analyzed: 3/21/94

Column: (pack/cap) CAP Dilution Factor: 500.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	CHLOROMETHANE	2500.	U
74-83-9	BROMOMETHANE	2500.	U
75-01-4	VINYL CHLORIDE	2500.	U
75-00-3	CHLOROETHANE	2500.	U
75-09-2	METHYLENE CHLORIDE	1200.	U
67-64-1	ACETONE	2500.	U
75-15-0	CARBON DISULFIDE	1200.	U
75-35-4	1,1-DICHLOROETHENE	1200.	U
75-34-3	1,1-DICHLOROETHANE	1200.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	1200.	U
156-59-2	CIS-1,2-DICHLOROETHENE	1200.	U
67-66-3	CHLOROFORM	1200.	U
107-06-2	1,2-DICHLOROETHANE	1200.	U
78-93-3	2-BUTANONE	37000.	
71-55-6	1,1,1-TRICHLOROETHANE	1200.	U
56-23-5	CARBON TETRACHLORIDE	1200.	U
108-05-4	VINYL ACETATE	2500.	U
75-27-4	BROMODICHLOROMETHANE	1200.	U
78-87-5	1,2-DICHLOROPROPANE	1200.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	1200.	U
79-01-6	TRICHLOROETHENE	1200.	U
124-48-1	DIBROMOCHLOROMETHANE	1200.	U
79-00-5	1,1,2-TRICHLOROETHANE	1200.	U
71-43-2	BENZENE	1200.	U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	1200.	U
75-25-2	BROMOFORM	1200.	U
108-10-1	4-METHYL-2-PENTANONE	2500.	U
591-78-6	2-HEXANONE	2500.	U
127-18-4	TETRACHLOROETHENE	87000.	
79-34-5	1,1,2,2-TETRACHLOROETHANE	1200.	U
108-88-3	TOLUENE	1200.	U
108-90-7	CHLOROBENZENE	1200.	U
100-41-4	ETHYLBENZENE	1200.	U
100-42-5	STYRENE	1200.	U
1330-20-7	M,P-XYLENE	1200.	U
95-47-6	O-XYLENE	1200.	U

(SECTION IV)

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

1016026

58

ab Name: RUST Contract: 1

b Code: RUST Case No.: 1 SAS No.: SDG No.: 12345

atrix: (soil/water) SOIL

8

Lab Sample ID: 21~~7~~027 SK 3/24/94

ample wt/vol: 4.0 (g/mL) G Lab File ID: 218027M

evel: (low/med) MED Date Received: 3/15/94

Moisture: not dec. 14 Date Analyzed: 3/21/94

olumn: (pack/cap) CAP Dilution Factor: [illegible]00.00

CONCENTRATION UNITS:

Number TICs found: 0 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
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3.				
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(SECTION IV)

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

10160606

156

Lab Name: RUST Contract: 1

Lab Code: RUST Case No.: 1 SAS No.: SDG No.: 12345

Matrix: (soil/water) WATER Lab Sample ID: 218029

Sample wt/vol: 0.5 (g/mL) ML Lab File ID: 218029

Level: (low/med) LOW Date Received: 3/15/94

% Moisture: not dec. 100. Date Analyzed: 3/22/94

Column: (pack/cap) CAP Dilution Factor: 10.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	CHLOROMETHANE	20.	U
74-83-9	BROMOMETHANE	20.	U
75-01-4	VINYL CHLORIDE	20.	U
75-00-3	CHLOROETHANE	20.	U
75-09-2	METHYLENE CHLORIDE	10.	U
67-64-1	ACETONE	1200.	
75-15-0	CARBON DISULFIDE	10.	U
75-35-4	1,1-DICHLOROETHENE	10.	U
75-34-3	1,1-DICHLOROETHANE	10.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	10.	U
156-59-2	CIS-1,2-DICHLOROETHENE	10.	U
67-66-3	CHLOROFORM	10.	U
107-06-2	1,2-DICHLOROETHANE	10.	U
78-93-3	2-BUTANONE	320.	
71-55-6	1,1,1-TRICHLOROETHANE	10.	U
56-23-5	CARBON TETRACHLORIDE	10.	U
108-05-4	VINYL ACETATE	20.	U
75-27-4	BROMODICHLOROMETHANE	10.	U
78-87-5	1,2-DICHLOROPROPANE	10.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	10.	U
79-01-6	TRICHLOROETHENE	10.	U
124-48-1	DIBROMOCHLOROMETHANE	10.	U
79-00-5	1,1,2-TRICHLOROETHANE	10.	U
71-43-2	BENZENE	10.	U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	10.	U
75-25-2	BROMOFORM	10.	U
108-10-1	4-METHYL-2-PENTANONE	20.	U
591-78-6	2-HEXANONE	20.	U
127-18-4	TETRACHLOROETHENE	28.	
79-34-5	1,1,2,2-TETRACHLOROETHANE	10.	U
108-88-3	TOLUENE	10.	U
108-90-7	CHLOROBENZENE	10.	U
100-41-4	ETHYLBENZENE	10.	U
100-42-5	STYRENE	10.	U
1330-20-7	M,P-XYLENE	10.	U
95-47-6	O-XYLENE	10.	U

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(SECTION IV)

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

10160606

Lab Name: RUST Contract: 1

Lab Code: RUST Case No.: 1 SAS No.: SDG No.: 12345

157

Matrix: (soil/water) WATER Lab Sample ID: 218029

Sample wt/vol: 0.5 (g/mL) ML Lab File ID: 218029

Level: (low/med) LOW Date Received: 3/15/94

% Moisture: not dec. 100. Date Analyzed: 3/22/94

Column: (pack/cap) CAP Dilution Factor: 10.00

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

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	78-84-2	Propanal, 2-methyl-	5.72	200.	J
2.	- -	UNKNOWN	19.07	300.	J
3.	- -	UNKNOWN AROMATIC	21.17	200.	J
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1A (SECTION IV) EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

1016106

Lab Name: RUST Contract: 1

Lab Code: RUST Case No.: 1 SAS No.: SDG No.: 12345 122

Matrix: (soil/water) SOIL Lab Sample ID: 218030

Sample wt/vol: 1.0 (g/mL) G Lab File ID: 218030

Level: (low/med) MED Date Received: 3/15/94

% Moisture: not dec. 0. Date Analyzed: 3/22/94

Column: (pack/cap) CAP Dilution Factor: 500.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	CHLOROMETHANE	10000.	U
74-83-9	BROMOMETHANE	10000.	U
75-01-4	VINYL CHLORIDE	10000.	U
75-00-3	CHLOROETHANE	10000.	U
75-09-2	METHYLENE CHLORIDE	5000.	U
67-64-1	ACETONE	10000.	U
75-15-0	CARBON DISULFIDE	5000.	U
75-35-4	1,1-DICHLOROETHENE	5000.	U
75-34-3	1,1-DICHLOROETHANE	5000.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	5000.	U
156-59-2	CIS-1,2-DICHLOROETHENE	5000.	U
67-66-3	CHLOROFORM	5000.	U
107-06-2	1,2-DICHLOROETHANE	5000.	U
78-93-3	2-BUTANONE	10000.	U
71-55-6	1,1,1-TRICHLOROETHANE	5000.	U
56-23-5	CARBON TETRACHLORIDE	5000.	U
108-05-4	VINYL ACETATE	10000.	U
75-27-4	BROMODICHLOROMETHANE	5000.	U
78-87-5	1,2-DICHLOROPROPANE	5000.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	5000.	U
79-01-6	TRICHLOROETHENE	5000.	U
124-48-1	DIBROMOCHLOROMETHANE	5000.	U
79-00-5	1,1,2-TRICHLOROETHANE	5000.	U
71-43-2	BENZENE	5000.	U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	5000.	U
75-25-2	BROMOFORM	5000.	U
108-10-1	4-METHYL-2-PENTANONE	10000.	U
591-78-6	2-HEXANONE	10000.	U
127-18-4	TETRACHLOROETHENE	110000.	
79-34-5	1,1,2,2-TETRACHLOROETHANE	5000.	U
108-88-3	TOLUENE	5000.	U
108-90-7	CHLOROBENZENE	5000.	U
100-41-4	ETHYLBENZENE	5000.	U
100-42-5	STYRENE	5000.	U
1330-20-7	M,P-XYLENE	5000.	U
95-47-6	O-XYLENE	5000.	U

(SECTION IV)

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

1016106

123

ab Name: RUST Contract: 1

ab Code: RUST Case No.: 1 SAS No.: SDG No.: 12345

atrix: (soil/water) SOIL Lab Sample ID: 218030

Sample wt/vol: 1.0 (g/mL) G Lab File ID: 218030

Level: (low/med) MED Date Received: 3/15/94

Moisture: not dec. 0. Date Analyzed: 3/22/94

olumn: (pack/cap) CAP Dilution Factor: 500.00

CONCENTRATION UNITS:
Number TICs found: 6 (ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	- -	UNKNOWN	23.38	60000.	J
2.	4994-16-5	Benzene, 3-cyclohexen-1-yl-	24.42	60000.	J
3.	92-52-4	1,1'-Biphenyl	26.08	70000.	J
4.	16587-48-7	Benzo[b]thiophene, 2,5-dimet	26.43	60000.	J
5.	827-54-3	Naphthalene, 2-ethenyl-	27.75	100000.	J
6.	575-41-7	Naphthalene, 1,3-dimethyl-	29.28	60000.	J
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\ULUIIUIN II)

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

10170201

Lab Name: GEOTEC Contract: 1

Lab Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12345 35

Matrix: (soil/water) SOIL Lab Sample ID: 217608

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 217608

Level: (low/med) LOW Date Received: 2/22/94

% Moisture: not dec. 15. Date Analyzed: 3/ 2/94

Column: (pack/cap) CAP Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	CHLOROMETHANE	12.	U
74-83-9	BROMOMETHANE	12.	U
75-01-4	VINYL CHLORIDE	12.	U
75-00-3	CHLOROETHANE	12.	U
75-09-2	METHYLENE CHLORIDE	6.	U
67-64-1	ACETONE	620.	E
75-15-0	CARBON DISULFIDE	6.	U
75-35-4	1,1-DICHLOROETHENE	6.	U
75-34-3	1,1-DICHLOROETHANE	6.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	6.	U
156-59-2	CIS-1,2-DICHLOROETHENE	10.	
67-66-3	CHLOROFORM	6.	U
107-06-2	1,2-DICHLOROETHANE	6.	U
78-93-3	2-BUTANONE	46.	
71-55-6	1,1,1-TRICHLOROETHANE	6.	U
56-23-5	CARBON TETRACHLORIDE	6.	U
108-05-4	VINYL ACETATE	12.	U
75-27-4	BROMODICHLOROMETHANE	6.	U
78-87-5	1,2-DICHLOROPROPANE	6.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	6.	U
79-01-6	TRICHLOROETHENE	68.	
124-48-1	DIBROMOCHLOROMETHANE	6.	U
79-00-5	1,1,2-TRICHLOROETHANE	6.	U
71-43-2	BENZENE	6.	U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	6.	U
75-25-2	BROMOFORM	6.	U
108-10-1	4-METHYL-2-PENTANONE	12.	U
591-78-6	2-HEXANONE	12.	U
127-18-4	TETRACHLOROETHENE	9800.	E
79-34-5	1,1,2,2-TETRACHLOROETHANE	6.	U
108-88-3	TOLUENE	2.	J
108-90-7	CHLOROBENZENE	42.	
100-41-4	ETHYLBENZENE	4.	J
100-42-5	STYRENE	6.	U
1330-20-7	M,P-XYLENE	3.	J
95-47-6	O-XYLENE	11.	

(SECTION II)

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

10170201

Lab Name: GEOTEC Contract: 1

) Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12345

Matrix: (soil/water) SOIL Lab Sample ID: 217608DL 52

Sample wt/vol: 1.0 (g/mL) G Lab File ID: 217608DL

Level: (low/med) LOW Date Received: 2/22/94

% Moisture: not dec. 15. Date Analyzed: 3/ 2/94

Column: (pack/cap) CAP Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	CHLOROMETHANE	59.	U
74-83-9	BROMOMETHANE	59.	U
75-01-4	VINYL CHLORIDE	59.	U
75-00-3	CHLOROETHANE	59.	U
75-09-2	METHYLENE CHLORIDE	29.	U
67-64-1	ACETONE	320.	
75-15-0	CARBON DISULFIDE	29.	U
75-35-4	1,1-DICHLOROETHENE	29.	U
75-34-3	1,1-DICHLOROETHANE	29.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	29.	U
156-59-2	CIS-1,2-DICHLOROETHENE	6.	J
67-66-3	CHLOROFORM	29.	U
107-06-2	1,2-DICHLOROETHANE	29.	U
78-93-3	2-BUTANONE	17.	J
71-55-6	1,1,1-TRICHLOROETHANE	29.	U
56-23-5	CARBON TETRACHLORIDE	29.	U
108-05-4	VINYL ACETATE	59.	U
75-27-4	BROMODICHLOROMETHANE	29.	U
78-87-5	1,2-DICHLOROPROPANE	29.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	29.	U
79-01-6	TRICHLOROETHENE	39.	
124-48-1	DIBROMOCHLOROMETHANE	29.	U
79-00-5	1,1,2-TRICHLOROETHANE	29.	U
71-43-2	BENZENE	29.	U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	29.	U
75-25-2	BROMOFORM	29.	U
108-10-1	4-METHYL-2-PENTANONE	59.	U
591-78-6	2-HEXANONE	59.	U
127-18-4	TETRACHLOROETHENE	15000.	E
79-34-5	1,1,2,2-TETRACHLOROETHANE	29.	U
108-88-3	TOLUENE	29.	U
108-90-7	CHLOROBENZENE	21.	J
100-41-4	ETHYLBENZENE	29.	U
100-42-5	STYRENE	29.	U
1330-20-7	M,P-XYLENE	29.	U
95-47-6	O-XYLENE	29.	U

1E (SECTION II)

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

10170201

Lab Name: GEOTEC Contract: 1

b Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12345

53

Matrix: (soil/water) SOIL Lab Sample ID: 217608DL

Sample wt/vol: 1.0 (g/mL) G Lab File ID: 217608DL

Level: (low/med) LOW Date Received: 2/22/94

% Moisture: not dec. 15. Date Analyzed: 3/ 2/94

Column: (pack/cap) CAP Dilution Factor: 1.00

CONCENTRATION UNITS:
Number TICs found: 2 (ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	106-46-7	Benzene, 1,4-dichloro-	21.28	800.	J
2.	- -	UNKNOWN MIXTURE	25.18	300.	J
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

(SOLUTION III)

EPA SAMPLE NO.

10170201

Lab Name: GEOTEC   Contract:

b Code: GEOTEC   Case No.: 1   SAS No.:   SDG No.: 12345

75

Matrix: (soil/water) SOIL   Lab Sample ID: 217608M

Sample wt/vol: 4.0 (g/mL) G   Lab File ID: 217608M

Level: (low/med) MED   Date Received: 2/22/94

% Moisture: not dec. 15.   Date Analyzed: 3/ 4/94

Column: (pack/cap) CAP   Dilution Factor: 2000.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	CHLOROMETHANE	59000.	U
74-83-9	BROMOMETHANE	59000.	U
75-01-4	VINYL CHLORIDE	59000.	U
75-00-3	CHLOROETHANE	59000.	U
75-09-2	METHYLENE CHLORIDE	29000.	U
67-64-1	ACETONE	59000.	U
75-15-0	CARBON DISULFIDE	29000.	U
75-35-4	1,1-DICHLOROETHENE	29000.	U
75-34-3	1,1-DICHLOROETHANE	29000.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	29000.	U
156-59-2	CIS-1,2-DICHLOROETHENE	29000.	U
67-66-3	CHLOROFORM	29000.	U
107-06-2	1,2-DICHLOROETHANE	29000.	U
78-93-3	2-BUTANONE	59000.	U
71-55-6	1,1,1-TRICHLOROETHANE	29000.	U
56-23-5	CARBON TETRACHLORIDE	29000.	U
108-05-4	VINYL ACETATE	59000.	U
75-27-4	BROMODICHLOROMETHANE	29000.	U
78-87-5	1,2-DICHLOROPROPANE	29000.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	29000.	U
79-01-6	TRICHLOROETHENE	29000.	U
124-48-1	DIBROMOCHLOROMETHANE	29000.	U
79-00-5	1,1,2-TRICHLOROETHANE	29000.	U
71-43-2	BENZENE	29000.	U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	29000.	U
75-25-2	BROMOFORM	29000.	U
108-10-1	4-METHYL-2-PENTANONE	59000.	U
591-78-6	2-HEXANONE	59000.	U
127-18-4	TETRACHLOROETHENE	1000000.	
79-34-5	1,1,2,2-TETRACHLOROETHANE	29000.	U
108-88-3	TOLUENE	29000.	U
108-90-7	CHLOROBENZENE	29000.	U
100-41-4	ETHYLBENZENE	29000.	U
100-42-5	STYRENE	29000.	U
1330-20-7	M,P-XYLENE	29000.	U
95-47-6	O-XYLENE	29000.	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

(SECTION II)

EPA SAMPLE NO.

10170301

Lab Name: GEOTEC Contract: 1

b Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12345

83

Matrix: (soil/water) SOIL Lab Sample ID: 217609

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 217609

Level: (low/med) LOW Date Received: 2/22/94

% Moisture: not dec. 0. Date Analyzed: 3/ 2/94

Column: (pack/cap) CAP Dilution Factor: 1.00

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.	U
67-64-1	ACETONE	150.	
75-15-0	CARBON DISULFIDE	5.	U
75-35-4	1,1-DICHLOROETHENE	5.	U
75-34-3	1,1-DICHLOROETHANE	5.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	5.	U
156-59-2	CIS-1,2-DICHLOROETHENE	5.	U
67-66-3	CHLOROFORM	5.	U
107-06-2	1,2-DICHLOROETHANE	5.	U
78-93-3	2-BUTANONE	15.	
71-55-6	1,1,1-TRICHLOROETHANE	5.	U
56-23-5	CARBON TETRACHLORIDE	5.	U
108-05-4	VINYL ACETATE	10.	U
75-27-4	BROMODICHLOROMETHANE	5.	U
78-87-5	1,2-DICHLOROPROPANE	5.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	5.	U
79-01-6	TRICHLOROETHENE	5.	U
124-48-1	DIBROMOCHLOROMETHANE	5.	U
79-00-5	1,1,2-TRICHLOROETHANE	5.	U
71-43-2	BENZENE	11.	
10061-02-6	TRANS-1,3-DICHLOROPROPENE	5.	U
75-25-2	BROMOFORM	5.	U
108-10-1	4-METHYL-2-PENTANONE	10.	U
591-78-6	2-HEXANONE	10.	U
127-18-4	TETRACHLOROETHENE	220.	E
79-34-5	1,1,2,2-TETRACHLOROETHANE	5.	U
108-88-3	TOLUENE	5.	J
108-90-7	CHLOROBENZENE	4.	J
100-41-4	ETHYLBENZENE	5.	U
100-42-5	STYRENE	5.	U
1330-20-7	M,P-XYLENE	5.	U
95-47-6	O-XYLENE	5.	U

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1E

(SECTION II)

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

10170301

Lab Name: GEOTEC Contract: 1

Lab Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12345

84

Matrix: (soil/water) SOIL Lab Sample ID: 217609

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 217609

Level: (low/med) LOW Date Received: 2/22/94

% Moisture: not dec. 0. Date Analyzed: 3/ 2/94

Column: (pack/cap) CAP Dilution Factor: 1.00

CONCENTRATION UNITS:

Number TICs found: 4 (ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	- -	UNKNOWN	1.45	7.	J
2.	- -	UNKNOWN AROMATIC	20.53	8.	J
3.	100-47-0	Benzonitrile	21.55	30.	J
4.	- -	UNKNOWN AROMATIC	23.52	7.	J
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(SOLUTION II)

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

10170301

Lab Name: GEOTEC Contract: 1

Lab Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12345

Matrix: (soil/water) SOIL Lab Sample ID: 217609RE 114

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 217609RE

Level: (low/med) LOW Date Received: 2/22/94

% Moisture: not dec. 0. Date Analyzed: 3/ 3/94

Column: (pack/cap) CAP Dilution Factor: 1.00

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.	U
67-64-1	ACETONE	110.	B
75-15-0	CARBON DISULFIDE	5.	U
75-35-4	1,1-DICHLOROETHENE	5.	U
75-34-3	1,1-DICHLOROETHANE	5.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	5.	U
156-59-2	CIS-1,2-DICHLOROETHENE	5.	U
67-66-3	CHLOROFORM	5.	U
107-06-2	1,2-DICHLOROETHANE	5.	U
78-93-3	2-BUTANONE	16.	
71-55-6	1,1,1-TRICHLOROETHANE	5.	U
56-23-5	CARBON TETRACHLORIDE	5.	U
108-05-4	VINYL ACETATE	10.	U
75-27-4	BROMODICHLOROMETHANE	5.	U
78-87-5	1,2-DICHLOROPROPANE	5.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	5.	U
79-01-6	TRICHLOROETHENE	5.	U
124-48-1	DIBROMOCHLOROMETHANE	5.	U
79-00-5	1,1,2-TRICHLOROETHANE	5.	U
71-43-2	BENZENE	12.	
10061-02-6	TRANS-1,3-DICHLOROPROPENE	5.	U
75-25-2	BROMOFORM	5.	U
108-10-1	4-METHYL-2-PENTANONE	10.	U
591-78-6	2-HEXANONE	10.	U
127-18-4	TETRACHLOROETHENE	3.	BJ
79-34-5	1,1,2,2-TETRACHLOROETHANE	5.	U
108-88-3	TOLUENE	3.	J
108-90-7	CHLOROBENZENE	3.	J
100-41-4	ETHYLBENZENE	5.	U
100-42-5	STYRENE	5.	U
1330-20-7	M,P-XYLENE	5.	U
95-47-6	O-XYLENE	5.	U

1A (SECTION II)
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

10170601

Lab Name: GEOTEC Contract:

b Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12345

Matrix: (soil/water) WATER Lab Sample ID: 217610 127

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 217610

Level: (low/med) LOW Date Received: 2/22/94

% Moisture: not dec. 100. Date Analyzed: 3/ 1/94

Column: (pack/cap) CAP Dilution Factor: 5.00

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	25.	U
67-64-1	ACETONE	16000.	E
75-15-0	CARBON DISULFIDE	25.	U
75-35-4	1,1-DICHLOROETHENE	25.	U
75-34-3	1,1-DICHLOROETHANE	25.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	10.	J
156-59-2	CIS-1,2-DICHLOROETHENE	8.	J
67-66-3	CHLOROFORM	25.	U
107-06-2	1,2-DICHLOROETHANE	25.	U
78-93-3	2-BUTANONE	3500.	E
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	16.	J
10061-02-6	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	110.	
127-18-4	TETRACHLOROETHENE	3100.	E
79-34-5	1,1,2,2-TETRACHLOROETHANE	25.	U
108-88-3	TOLUENE	8.	J
108-90-7	CHLOROBENZENE	12.	J
100-41-4	ETHYLBENZENE	11.	J
100-42-5	STYRENE	31.	
1330-20-7	M,P-XYLENE	25.	U
95-47-6	O-XYLENE	25.	U

(SOLUTION II)

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

10170601

Lab Name: GEOTEC Contract:

b Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12345

Matrix: (soil/water) WATER Lab Sample ID: 217610 128

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: 217610

Level: (low/med) LOW Date Received: 2/22/94

% Moisture: not dec. 100. Date Analyzed: 3/ 1/94

Column: (pack/cap) CAP Dilution Factor: 5.00

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

(SECTION II)

EPA SAMPLE NO.

10170601

Lab Name: GEOTEC   Contract:

Lab Code: GEOTEC   Case No.: 1   SAS No.:   SDG No.: 12345   146

Matrix: (soil/water) WATER   Lab Sample ID: 217610DL

Sample wt/vol: 5.0 (g/mL) ML   Lab File ID: 217610DL

Level: (low/med) LOW   Date Received: 2/22/94

% Moisture: not dec. 100.   Date Analyzed: 3/ 1/94

Column: (pack/cap) CAP   Dilution Factor: 500.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	CHLOROMETHANE	5000.	U
74-83-9	BROMOMETHANE	5000.	U
75-01-4	VINYL CHLORIDE	5000.	U
75-00-3	CHLOROETHANE	5000.	U
75-09-2	METHYLENE CHLORIDE	2500.	U
67-64-1	ACETONE	98000.	
75-15-0	CARBON DISULFIDE	2500.	U
75-35-4	1,1-DICHLOROETHENE	2500.	U
75-34-3	1,1-DICHLOROETHANE	2500.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	2500.	U
156-59-2	CIS-1,2-DICHLOROETHENE	2500.	U
67-66-3	CHLOROFORM	2500.	U
107-06-2	1,2-DICHLOROETHANE	2500.	U
78-93-3	2-BUTANONE	28000.	
71-55-6	1,1,1-TRICHLOROETHANE	2500.	U
56-23-5	CARBON TETRACHLORIDE	2500.	U
108-05-4	VINYL ACETATE	5000.	U
75-27-4	BROMODICHLOROMETHANE	2500.	U
78-87-5	1,2-DICHLOROPROPANE	2500.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	2500.	U
79-01-6	TRICHLOROETHENE	2500.	U
124-48-1	DIBROMOCHLOROMETHANE	2500.	U
79-00-5	1,1,2-TRICHLOROETHANE	2500.	U
71-43-2	BENZENE	2500.	U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	2500.	U
75-25-2	BROMOFORM	2500.	U
108-10-1	4-METHYL-2-PENTANONE	5000.	U
591-78-6	2-HEXANONE	5000.	U
127-18-4	TETRACHLOROETHENE	4600.	
79-34-5	1,1,2,2-TETRACHLOROETHANE	2500.	U
108-88-3	TOLUENE	2500.	U
108-90-7	CHLOROBENZENE	2500.	U
100-41-4	ETHYLBENZENE	2500.	U
100-42-5	STYRENE	2500.	U
1330-20-7	M,P-XYLENE	2500.	U
95-47-6	O-XYLENE	2500.	U

(SECTION III)

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1017027

Lab Name: GEOTEC Contract: 1

Lab Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12345

18

Matrix: (soil/water) SOIL Lab Sample ID: 217960

Sample wt/vol: 1.0 (g/mL) G Lab File ID: 217960

Level: (low/med) LOW Date Received: 3/10/94

% Moisture: not dec. 13. Date Analyzed: 3/21/94

Column: (pack/cap) CAP Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	CHLOROMETHANE	58.	U
74-83-9	BROMOMETHANE	58.	U
75-01-4	VINYL CHLORIDE	58.	U
75-00-3	CHLOROETHANE	58.	U
75-09-2	METHYLENE CHLORIDE	29.	U
67-64-1	ACETONE	170.	B
75-15-0	CARBON DISULFIDE	29.	U
75-35-4	1,1-DICHLOROETHENE	29.	U
75-34-3	1,1-DICHLOROETHANE	29.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	29.	U
156-59-2	CIS-1,2-DICHLOROETHENE	29.	U
67-66-3	CHLOROFORM	29.	U
107-06-2	1,2-DICHLOROETHANE	29.	U
78-93-3	2-BUTANONE	98.	B
71-55-6	1,1,1-TRICHLOROETHANE	29.	U
56-23-5	CARBON TETRACHLORIDE	29.	U
108-05-4	VINYL ACETATE	58.	U
75-27-4	BROMODICHLOROMETHANE	29.	U
78-87-5	1,2-DICHLOROPROPANE	29.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	29.	U
79-01-6	TRICHLOROETHENE	17.	J
124-48-1	DIBROMOCHLOROMETHANE	29.	U
79-00-5	1,1,2-TRICHLOROETHANE	29.	U
71-43-2	BENZENE	29.	U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	29.	U
75-25-2	BROMOFORM	29.	U
108-10-1	4-METHYL-2-PENTANONE	58.	U
591-78-6	2-HEXANONE	58.	U
127-18-4	TETRACHLOROETHENE	25000.	E
79-34-5	1,1,2,2-TETRACHLOROETHANE	29.	U
108-88-3	TOLUENE	29.	U
108-90-7	CHLOROBENZENE	27.	J
100-41-4	ETHYLBENZENE	29.	U
100-42-5	STYRENE	29.	U
1330-20-7	M,P-XYLENE	29.	U
95-47-6	O-XYLENE	7.	J

(SECTION III)

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

1017027

Lab Name: GEOTEC   Contract: 1

Lab Code: GEOTEC   Case No.: 1   SAS No.:   SDG No.: 12345   19

Matrix: (soil/water) SOIL   Lab Sample ID: 217960

Sample wt/vol: 1.0 (g/mL) G   Lab File ID: 217960

Level: (low/med) LOW   Date Received: 3/10/94

% Moisture: not dec. 13.   Date Analyzed: 3/21/94

Column: (pack/cap) CAP   Dilution Factor: 1.00

Number TICs found: 2   CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	124-18-5	Decane	20.25	400.	J
2.	106-46-7	Benzene, 1,4-dichloro-	21.30	1000.	J
3.					
4.					
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FORM I VOA-TIC   1/87 Rev.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1017037

207

Lab Name: GEOTEC Contract: 1

Lab Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12412

Matrix: (soil/water) SOIL Lab Sample ID: 218036

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 218036

Level: (low/med) LOW Date Received: 3/10/94

% Moisture: not dec. 0. **(SECTION II)** Date Analyzed: 3/17/94

Column: (pack/cap) CAP Dilution Factor: 1.00

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.	U
67-64-1	ACETONE	190.	
75-15-0	CARBON DISULFIDE	5.	U
75-35-4	1,1-DICHLOROETHENE	5.	U
75-34-3	1,1-DICHLOROETHANE	5.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	5.	U
156-59-2	CIS-1,2-DICHLOROETHENE	5.	U
67-66-3	CHLOROFORM	5.	U
107-06-2	1,2-DICHLOROETHANE	5.	U
78-93-3	2-BUTANONE	44.	
71-55-6	1,1,1-TRICHLOROETHANE	5.	U
56-23-5	CARBON TETRACHLORIDE	5.	U
108-05-4	VINYL ACETATE	10.	U
75-27-4	BROMODICHLOROMETHANE	5.	U
78-87-5	1,2-DICHLOROPROPANE	5.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	5.	U
79-01-6	TRICHLOROETHENE	5.	U
124-48-1	DIBROMOCHLOROMETHANE	5.	U
79-00-5	1,1,2-TRICHLOROETHANE	5.	U
71-43-2	BENZENE	12.	
10061-02-6	TRANS-1,3-DICHLOROPROPENE	5.	U
75-25-2	BROMOFORM	5.	U
108-10-1	4-METHYL-2-PENTANONE	10.	U
591-78-6	2-HEXANONE	10.	U
127-18-4	TETRACHLOROETHENE	4.	J
79-34-5	1,1,2,2-TETRACHLOROETHANE	5.	U
108-88-3	TOLUENE	9.	
108-90-7	CHLOROBENZENE	5.	U
100-41-4	ETHYLBENZENE	2.	J
100-42-5	STYRENE	5.	U
1330-20-7	M,P-XYLENE	6.	
95-47-6	O-XYLENE	2.	J

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

1017037

Lab Name: GEOTEC Contract: 1

Lab Code: GEOTEC Case No.: 1 SAS No.: SDG No.: 12412

Matrix: (soil/water) SOIL Lab Sample ID: 218036

208

Sample wt/vol: 5.0 (g/mL) G Lab File ID: 218036

Level: (low/med) LOW Date Received: 3/10/94

% Moisture: not dec. 0. Date Analyzed: 3/17/94

(SECTION II)

Column: (pack/cap) CAP Dilution Factor: 1.00

CONCENTRATION UNITS:

Number TICs found: 8 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 75-28-5	Propane, 2-methyl-	1.10	30.	J
2. - -	UNKNOWN	1.38	90.	J
3. 78-78-4	Butane, 2-methyl-	1.88	300.	J
4. 109-66-0	Pentane	2.22	100.	J
5. 107-83-5	Pentane, 2-methyl-	3.88	80.	J
6. 96-14-0	Pentane, 3-methyl-	4.45	20.	J
7. 110-54-3	Hexane	5.23	30.	J
8. 100-52-7	Benzaldehyde	20.53	60.	J
9.				
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SAMPLE CROSS REFERENCE

GRAND JUNCTION PROJECTS OFFICE ANALYTICAL LABORATORY

REQUISITION(S): 12345

CUSTOMER ID	LAB ID	
1016-02-5	217964	
1016-02-6	218027	
1016-03A,B-5	217965	
1016-03A,B-6	218028	
1016-06-5	217966	
1016-06-6	218029	
1016-10-6	218030	
1017-02-1	217608	
1017-02-7	217960	
1017-03-1	217655	
1017-03-1	217609	
1017-03-2A	217658	
1017-03-2B	217659	
1017-03A,B-7	217959	
1017-06-1	217610	
1017-06-7	217961	
1017-10-7	217962	
1017-BL-2	217660	
1017-BLANK	217963	

(SECTION VII)

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217608

ab Name: CN GEOTECH Contract:

Lab Code: Case No.: 12345 SAS No.: SDG No.:

48

Matrix: (soil/water) SOIL Lab Sample ID: 217608

Sample wt/vol: 30.00 (g/mL) G Lab File ID: AS706

Level: (low/med) LOW Date Received: 02/22/94

% Moisture: 15 decanted: (Y/N) N Date Extracted: 02/23/94

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 03/10/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.6

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	320	BJ
111-44-4	bis(2-Chloroethyl)Ether	1600	U
95-57-8	2-Chlorophenol	1600	U
541-73-1	1,3-Dichlorobenzene	1600	U
106-46-7	1,4-Dichlorobenzene	1900	
95-50-1	1,2-Dichlorobenzene	1600	U
95-48-7	2-Methylphenol	1600	U
108-60-1	2,2'-oxybis(1-Chloropropane)	1600	U
106-44-5	4-Methylphenol	1600	U
621-64-7	N-Nitroso-Di-n-Propylamine	1600	U
67-72-1	Hexachloroethane	1600	U
98-95-3	Nitrobenzene	1600	U
78-59-1	Isophorone	1600	U
88-75-5	2-Nitrophenol	1600	U
105-67-9	2,4-Dimethylphenol	1600	U
111-91-1	bis(2-Chloroethoxy)Methane	1600	U
120-83-2	2,4-Dichlorophenol	1600	U
120-82-1	1,2,4-Trichlorobenzene	1600	U
91-20-3	Naphthalene	160	J
106-47-8	4-Chloroaniline	1600	U
87-68-3	Hexachlorobutadiene	1600	U
59-50-7	4-Chloro-3-Methylphenol	1600	U
91-57-6	2-Methylnaphthalene	270	J
77-47-4	Hexachlorocyclopentadiene	1600	U
88-06-2	2,4,6-Trichlorophenol	1600	U
95-95-4	2,4,5-Trichlorophenol	3800	U
91-58-7	2-Chloronaphthalene	1600	U
88-74-4	2-Nitroaniline	3800	U
131-11-3	Dimethylphthalate	1600	U
208-96-8	Acenaphthylene	1600	U
606-20-2	2,6-Dinitrotoluene	1600	U
99-09-2	3-Nitroaniline	3800	U
83-32-9	Acenaphthene	1600	U

(SECTION VII)

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217608

.b Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______ 47

Matrix: (soil/water) SOIL Lab Sample ID: 217608

Sample wt/vol: 30.00 (g/mL) G Lab File ID: AS706

Level: (low/med) LOW Date Received: 02/22/94

% Moisture: 15 decanted: (Y/N) N Date Extracted: 02/23/94

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 03/10/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.6

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	3800	U
100-02-7	4-Nitrophenol	3800	U
132-64-9	Dibenzofuran	1600	U
121-14-2	2,4-Dinitrotoluene	1600	U
84-66-2	Diethylphthalate	590	J
7005-72-3	4-Chlorophenyl-phenylether	1600	U
86-73-7	Fluorene	1600	U
100-01-6	4-Nitroaniline	3800	U
534-52-1	4,6-Dinitro-2-Methylphenol	3800	U
86-30-6	N-Nitrosodiphenylamine (1)	1600	U
101-55-3	4-Bromophenyl-phenylether	1600	U
118-74-1	Hexachlorobenzene	1600	U
87-86-5	Pentachlorophenol	3800	U
85-01-8	Phenanthrene	630	J
120-12-7	Anthracene	1600	U
86-74-8	Carbazole	1600	U
84-74-2	Di-n-Butylphthalate	7300	B
206-44-0	Fluoranthene	280	J
129-00-0	Pyrene	560	J
85-68-7	Butylbenzylphthalate	9500	
91-94-1	3,3'-Dichlorobenzidine	1600	U
56-55-3	Benzo(a)Anthracene	1600	U
218-01-9	Chrysene	1600	U
117-81-7	bis(2-Ethylhexyl)Phthalate	81000	BE
117-84-0	Di-n-Octyl Phthalate	2300	
205-99-2	Benzo(b)Fluoranthene	1600	U
207-08-9	Benzo(k)Fluoranthene	1600	U
50-32-8	Benzo(a)Pyrene	1600	U
193-39-5	Indeno(1,2,3-cd)Pyrene	1600	U
53-70-3	Dibenz(a,h)Anthracene	1600	U
191-24-2	Benzo(g,h,i)Perylene	1600	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-2 3/90

(SECTION VII)

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

217608

ab Name: CN GEOTECH Contract: ____

Lab Code: ____ Case No.: 12345 SAS No.: ____ SDG No.: ____ 48

Matrix: (soil/water) SOIL Lab Sample ID: 217608

Sample wt/vol: 30.00 (g/mL) G Lab File ID: AS706

Level: (low/med) LOW Date Received: 02/22/94

% Moisture: 15 decanted: (Y/N) N Date Extracted: 02/23/94

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 03/10/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.6

Number TICs found: 21

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 123-42-2	2-Pentanone, 4-hydroxy-4-met	5.30	2500	BJN
2.	UNKNOWN	7.92	2800	J
3.	UNKNOWN	11.94	3100	J
4. 112-40-3	Dodecane	12.72	1600	JN
5. 629-59-4	Tetradecane	15.75	2400	JN
6. 629-62-9	Pentadecane	17.10	2700	JN
7. 1921-70-6	Pentadecane, 2,6,10,14-tetra	19.64	14000	JN
8. 544-63-8	Tetradecanoic acid	20.37	11000	JN
9.	UNKNOWN	21.47	4500	J
10. 544-76-3	Hexadecane	21.87	5800	JN
11.	UNKNOWN	22.77	110000	J
12. 6912-07-8	Hexadecane, 5-butyl-	22.95	5800	JN
13.	UNKNOWN HYDROCARBON	23.95	4900	J
14. 57-11-4	Octadecanoic acid	24.79	33000	JN
15.	UNKNOWN HYDROCARBON	25.86	2700	J
16. 646-31-1	Tetracosane	26.76	3300	JN
17.	UNKNOWN HYDROCARBON	28.67	3100	J
18.	UNKNOWN HYDROCARBON	29.91	2500	J
19.	UNKNOWN HYDROCARBON	38.29	1400	J
20.	UNKNOWN HYDROCARBON	39.72	1600	J
21.	UNKNOWN HYDROCARBON	40.77	1300	J

(SECTION VII)

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217608DL

ɔ Name: CN GEOTECH   Contract:

Lab Code: Case No.: 12345   SAS No.:   SDG No.:

Matrix: (soil/water) SOIL   Lab Sample ID: 217608DL

Sample wt/vol: 30.00 (g/mL) G   Lab File ID: AS737 94

Level: (low/med) LOW   Date Received: 02/22/94

% Moisture: 15   decanted: (Y/N) N   Date Extracted: 02/23/94

Concentrated Extract Volume: 2000 (uL)   Date Analyzed: 03/25/94

Injection Volume: 2.0(uL)   Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y   pH: 6.6

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	16000	U
111-44-4	bis(2-Chloroethyl)Ether	16000	U
95-57-8	2-Chlorophenol	16000	U
541-73-1	1,3-Dichlorobenzene	16000	U
106-46-7	1,4-Dichlorobenzene	1900	DJ
95-50-1	1,2-Dichlorobenzene	16000	U
95-48-7	2-Methylphenol	16000	U
108-60-1	2,2'-oxybis(1-Chloropropane)	16000	U
106-44-5	4-Methylphenol	16000	U
621-64-7	N-Nitroso-Di-n-Propylamine	16000	U
67-72-1	Hexachloroethane	16000	U
98-95-3	Nitrobenzene	16000	U
78-59-1	Isophorone	16000	U
88-75-5	2-Nitrophenol	16000	U
105-67-9	2,4-Dimethylphenol	16000	U
111-91-1	bis(2-Chloroethoxy)Methane	16000	U
120-83-2	2,4-Dichlorophenol	16000	U
120-82-1	1,2,4-Trichlorobenzene	16000	U
91-20-3	Naphthalene	16000	U
106-47-8	4-Chloroaniline	16000	U
87-68-3	Hexachlorobutadiene	16000	U
59-50-7	4-Chloro-3-Methylphenol	16000	U
91-57-6	2-Methylnaphthalene	16000	U
77-47-4	Hexachlorocyclopentadiene	16000	U
88-06-2	2,4,6-Trichlorophenol	16000	U
95-95-4	2,4,5-Trichlorophenol	38000	U
91-58-7	2-Chloronaphthalene	16000	U
88-74-4	2-Nitroaniline	38000	U
131-11-3	Dimethylphthalate	16000	U
208-96-8	Acenaphthylene	16000	U
606-20-2	2,6-Dinitrotoluene	16000	U
99-09-2	3-Nitroaniline	38000	U
83-32-9	Acenaphthene	16000	U

FORM I SV-1   3/90

1017-02-1

(SECTION VII)

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217608DL

ab Name: CN GEOTECH Contract:

Lab Code: Case No.: 12345 SAS No.: SDG No.:

95

Matrix: (soil/water) SOIL Lab Sample ID: 217608DL

Sample wt/vol: 30.00 (g/mL) G Lab File ID: AS737

Level: (low/med) LOW Date Received: 02/22/94

% Moisture: 15 decanted: (Y/N) N Date Extracted: 02/23/94

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 03/25/94

Injection Volume: 2.0(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.6

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	38000	U
100-02-7	4-Nitrophenol	38000	U
132-64-9	Dibenzofuran	16000	U
121-14-2	2,4-Dinitrotoluene	16000	U
84-66-2	Diethylphthalate	16000	U
7005-72-3	4-Chlorophenyl-phenylether	16000	U
86-73-7	Fluorene	16000	U
100-01-6	4-Nitroaniline	38000	U
534-52-1	4,6-Dinitro-2-Methylphenol	38000	U
86-30-6	N-Nitrosodiphenylamine (1)	16000	U
101-55-3	4-Bromophenyl-phenylether	16000	U
118-74-1	Hexachlorobenzene	16000	U
87-86-5	Pentachlorophenol	38000	U
85-01-8	Phenanthrene	16000	U
120-12-7	Anthracene	16000	U
86-74-8	Carbazole	16000	U
84-74-2	Di-n-Butylphthalate	8400	BDJ
206-44-0	Fluoranthene	16000	U
129-00-0	Pyrene	16000	U
85-68-7	Butylbenzylphthalate	11000	DJ
91-94-1	3,3'-Dichlorobenzidine	16000	U
56-55-3	Benzo(a)Anthracene	16000	U
218-01-9	Chrysene	16000	U
117-81-7	bis(2-Ethylhexyl)Phthalate	120000	BD
117-84-0	Di-n-Octyl Phthalate	16000	U
205-99-2	Benzo(b)Fluoranthene	16000	U
207-08-9	Benzo(k)Fluoranthene	16000	U
50-32-8	Benzo(a)Pyrene	16000	U
193-39-5	Indeno(1,2,3-cd)Pyrene	16000	U
53-70-3	Dibenz(a,h)Anthracene	16000	U
191-24-2	Benzo(g,h,i)Perylene	16000	U

(1) - Cannot be separated from Diphenylamine

(SECTION VII)

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217609

Name: CN GEOTECH   Contract: ______

Lab Code: ______   Case No.: 12345   SAS No.: ______   SDG No.: ______

103

Matrix: (soil/water) SOIL   Lab Sample ID: 217609

Sample wt/vol: 30.20 (g/mL) G   Lab File ID: AS705

Level: (low/med) LOW   Date Received: 02/22/94

% Moisture: 0   decanted: (Y/N) N   Date Extracted: 02/23/94

Concentrated Extract Volume: 500.0 (uL)   Date Analyzed: 03/10/94

Injection Volume: 2.0(uL)   Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y   pH: 5.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	62	BJ
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
95-50-1	1,2-Dichlorobenzene	330	U
95-48-7	2-Methylphenol	330	U
108-60-1	2,2'-oxybis(1-Chloropropane)	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
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	790	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	790	U
131-11-3	Dimethylphthalate	330	U
208-96-8	Acenaphthylene	330	U
606-20-2	2,6-Dinitrotoluene	330	U
99-09-2	3-Nitroaniline	790	U
83-32-9	Acenaphthene	330	U

(SECTION VII) 1017-03-1

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217609

Lab Name: CN GEOTECH Contract: ________

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______ 104

Matrix: (soil/water) SOIL Lab Sample ID: 217609

Sample wt/vol: 30.20 (g/mL) G Lab File ID: AS705

Level: (low/med) LOW Date Received: 02/22/94

% Moisture: 0 decanted: (Y/N) N Date Extracted: 02/23/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	790	U
100-02-7	4-Nitrophenol	790	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	790	U
534-52-1	4,6-Dinitro-2-Methylphenol	790	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	790	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
86-74-8	Carbazole	330	U
84-74-2	Di-n-Butylphthalate	70	BJ
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	330	U
56-55-3	Benzo(a)Anthracene	330	U
218-01-9	Chrysene	330	U
117-81-7	bis(2-Ethylhexyl)Phthalate	59	BJ
117-84-0	Di-n-Octyl Phthalate	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

WAS 120,000 in Feed.

(1) - Cannot be separated from Diphenylamine

(SECTION VII)

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

217609

Name: CN GEOTECH Contract: ____

Lab Code: ____ Case No.: 12345 SAS No.: ____ SDG No.: ____

105

Matrix: (soil/water) SOIL Lab Sample ID: 217609

Sample wt/vol: 30.20 (g/mL) G Lab File ID: AS705

Level: (low/med) LOW Date Received: 02/22/94

% Moisture: 0 decanted: (Y/N) N Date Extracted: 02/23/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/10/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.7

Number TICs found: 20

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER		COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	4.97	530	J
2.	98-01-1	2-Furancarboxaldehyde	5.05	99	JN
3.	123-42-2	2-Pentanone, 4-hydroxy-4-met	5.33	1500	JN
4.	79-34-5	Ethane, 1,1,2,2-tetrachloro-	7.35	99	JN
5.		UNKNOWN	7.93	460	J
6.	100-52-7	Benzaldehyde	8.27	200	JN
7.		UNKNOWN	9.97	99	J
8.	98-86-2	Ethanone, 1-phenyl-	10.39	170	JN
9.	65-85-0	BENZOIC ACID	12.49	28000	JN
10.	55-21-0	Benzamide	14.80	170	JN
11.	85-41-6	1H-Isoindole-1,3(2H)-dione	16.74	360	JN
12.	74381-40-1	Propanoic acid, 2-methyl-, 1	18.24	99	JN
13.		UNKNOWN	21.62	66	J
14.		UNKNOWN	21.84	66	J
15.		UNKNOWN	22.80	66	J
16.		UNKNOWN	23.75	99	J
17.	57-11-4	Octadecanoic acid	24.45	66	JN
18.	123-79-5	Hexanedioic acid, dioctyl es	26.56	170	JN
19.		UNKNOWN	30.87	330	J
20.	612-71-5	1,1':3',1''-Terphenyl, 5'-ph	33.94	430	JN

(SECTION VII)

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217610

ıb Name: CN GEOTECH Contract:

Lab Code: Case No.: 12345 SAS No.: SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 217610

Sample wt/vol: 840.0 (g/mL) ML Lab File ID: AS714 141

Level: (low/med) LOW Date Received: 02/22/94

% Moisture: decanted: (Y/N) Date Extracted: 02/24/94

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 03/18/94

Injection Volume: 2.0(uL) Dilution Factor: 20.0

GPC Cleanup: (Y/N) Y pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	35000	E
111-44-4	bis(2-Chloroethyl)Ether	480	U
95-57-8	2-Chlorophenol	480	U
541-73-1	1,3-Dichlorobenzene	480	U
106-46-7	1,4-Dichlorobenzene	480	U
95-50-1	1,2-Dichlorobenzene	480	U
95-48-7	2-Methylphenol	800	
108-60-1	2,2'-oxybis(1-Chloropropane)	480	U
106-44-5	4-Methylphenol	3200	
621-64-7	N-Nitroso-Di-n-Propylamine	480	U
67-72-1	Hexachloroethane	480	U
98-95-3	Nitrobenzene	480	U
78-59-1	Isophorone	480	U
88-75-5	2-Nitrophenol	480	U
105-67-9	2,4-Dimethylphenol	480	U
111-91-1	bis(2-Chloroethoxy)Methane	480	U
120-83-2	2,4-Dichlorophenol	480	U
120-82-1	1,2,4-Trichlorobenzene	480	U
91-20-3	Naphthalene	480	U
106-47-8	4-Chloroaniline	480	U
87-68-3	Hexachlorobutadiene	480	U
59-50-7	4-Chloro-3-Methylphenol	480	U
91-57-6	2-Methylnaphthalene	480	U
77-47-4	Hexachlorocyclopentadiene	480	U
88-06-2	2,4,6-Trichlorophenol	480	U
95-95-4	2,4,5-Trichlorophenol	1200	U
91-58-7	2-Chloronaphthalene	480	U
88-74-4	2-Nitroaniline	1200	U
131-11-3	Dimethylphthalate	480	U
208-96-8	Acenaphthylene	480	U
606-20-2	2,6-Dinitrotoluene	480	U
99-09-2	3-Nitroaniline	1200	U
83-32-9	Acenaphthene	480	U

(SECTION VII)

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217610

b Name: CN GEOTECH Contract: ____

Lab Code: ____ Case No.: 12345 SAS No.: ____ SDG No.: ____

142

Matrix: (soil/water) WATER Lab Sample ID: 217610

Sample wt/vol: 840.0 (g/mL) ML Lab File ID: AS714

Level: (low/med) LOW Date Received: 02/22/94

% Moisture: ____ decanted: (Y/N) ____ Date Extracted: 02/24/94

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 03/18/94

Injection Volume: 2.0(uL) Dilution Factor: 20.0

GPC Cleanup: (Y/N) Y pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	1200	U
100-02-7	4-Nitrophenol	1200	U
132-64-9	Dibenzofuran	480	U
121-14-2	2,4-Dinitrotoluene	480	U
84-66-2	Diethylphthalate	140	J
7005-72-3	4-Chlorophenyl-phenylether	480	U
86-73-7	Fluorene	480	U
100-01-6	4-Nitroaniline	1200	U
534-52-1	4,6-Dinitro-2-Methylphenol	1200	U
86-30-6	N-Nitrosodiphenylamine (1)	480	U
101-55-3	4-Bromophenyl-phenylether	480	U
118-74-1	Hexachlorobenzene	480	U
87-86-5	Pentachlorophenol	6200	
85-01-8	Phenanthrene	480	U
120-12-7	Anthracene	480	U
86-74-8	Carbazole	480	U
84-74-2	Di-n-Butylphthalate	480	U
206-44-0	Fluoranthene	480	U
129-00-0	Pyrene	480	U
85-68-7	Butylbenzylphthalate	480	U
91-94-1	3,3'-Dichlorobenzidine	480	U
56-55-3	Benzo(a)Anthracene	480	U
218-01-9	Chrysene	480	U
117-81-7	bis(2-Ethylhexyl)Phthalate	480	U
117-84-0	Di-n-Octyl Phthalate	480	U
205-99-2	Benzo(b)Fluoranthene	480	U
207-08-9	Benzo(k)Fluoranthene	480	U
50-32-8	Benzo(a)Pyrene	480	U
193-39-5	Indeno(1,2,3-cd)Pyrene	480	U
53-70-3	Dibenz(a,h)Anthracene	480	U
191-24-2	Benzo(g,h,i)Perylene	480	U

(1) - Cannot be separated from Diphenylamine

(SECTION VII)

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

217610

b Name: CN GEOTECH Contract: ____

Lab Code: ____ Case No.: 12345 SAS No.: ____ SDG No.: ____

143

Matrix: (soil/water) WATER Lab Sample ID: 217610

Sample wt/vol: 840.0 (g/mL) ML Lab File ID: AS714

Level: (low/med) LOW Date Received: 02/22/94

% Moisture: ____ decanted: (Y/N) ____ Date Extracted: 02/24/94

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 03/18/94

Injection Volume: 2.0 (uL) Dilution Factor: 20.0

GPC Cleanup: (Y/N) Y pH: ____

Number TICs found: 5

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 98-01-1	2-FURANCARBOXALDEHYDE	5.53	62000	BJN
2. 620-02-0	2-Furancarboxaldehyde, 5-met	8.65	90000	JN
3. 123-39-7	Formamide, N-methyl-	12.17	10000	JN
4. 98-55-5	.alpha.-Terpineol	12.90	1700	JN
5. 121-33-5	Benzaldehyde, 4-hydroxy-3-me	15.92	1600	JN

(SECTION VII)

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217610DL

Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______

159

Matrix: (soil/water) WATER Lab Sample ID: 217610DL

Sample wt/vol: 840.0 (g/mL) ML Lab File ID: AS738

Level: (low/med) LOW Date Received: 02/22/94

% Moisture: ______ decanted: (Y/N) ___ Date Extracted: 02/24/94

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 03/28/94

Injection Volume: 2.0(uL) Dilution Factor: 200.0

GPC Cleanup: (Y/N) Y pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	38000	D
111-44-4	bis(2-Chloroethyl)Ether	4800	U
95-57-8	2-Chlorophenol	4800	U
541-73-1	1,3-Dichlorobenzene	4800	U
106-46-7	1,4-Dichlorobenzene	4800	U
95-50-1	1,2-Dichlorobenzene	4800	U
95-48-7	2-Methylphenol	960	DJ
108-60-1	2,2'-oxybis(1-Chloropropane)	4800	U
106-44-5	4-Methylphenol	4000	DJ
621-64-7	N-Nitroso-Di-n-Propylamine	4800	U
67-72-1	Hexachloroethane	4800	U
98-95-3	Nitrobenzene	4800	U
78-59-1	Isophorone	4800	U
88-75-5	2-Nitrophenol	4800	U
105-67-9	2,4-Dimethylphenol	4800	U
111-91-1	bis(2-Chloroethoxy)Methane	4800	U
120-83-2	2,4-Dichlorophenol	4800	U
120-82-1	1,2,4-Trichlorobenzene	4800	U
91-20-3	Naphthalene	4800	U
106-47-8	4-Chloroaniline	4800	U
87-68-3	Hexachlorobutadiene	4800	U
59-50-7	4-Chloro-3-Methylphenol	4800	U
91-57-6	2-Methylnaphthalene	4800	U
77-47-4	Hexachlorocyclopentadiene	4800	U
88-06-2	2,4,6-Trichlorophenol	4800	U
95-95-4	2,4,5-Trichlorophenol	12000	U
91-58-7	2-Chloronaphthalene	4800	U
88-74-4	2-Nitroaniline	12000	U
131-11-3	Dimethylphthalate	4800	U
208-96-8	Acenaphthylene	4800	U
606-20-2	2,6-Dinitrotoluene	4800	U
99-09-2	3-Nitroaniline	12000	U
83-32-9	Acenaphthene	4800	U

(SECTION VII)

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217610DL

Lab Name: CN GEOTECH Contract: ____

Lab Code: ____ Case No.: 12345 SAS No.: ____ SDG No.: ____

Matrix: (soil/water) WATER Lab Sample ID: 217610DL 160

Sample wt/vol: 840.0 (g/mL) ML Lab File ID: AS738

Level: (low/med) LOW Date Received: 02/22/94

% Moisture: ____ decanted: (Y/N) ____ Date Extracted: 02/24/94

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 03/28/94

Injection Volume: 2.0 (uL) Dilution Factor: 200.0

GPC Cleanup: (Y/N) Y pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	12000	U
100-02-7	4-Nitrophenol	12000	U
132-64-9	Dibenzofuran	4800	U
121-14-2	2,4-Dinitrotoluene	4800	U
84-66-2	Diethylphthalate	4800	U
7005-72-3	4-Chlorophenyl-phenylether	4800	U
86-73-7	Fluorene	4800	U
100-01-6	4-Nitroaniline	12000	U
534-52-1	4,6-Dinitro-2-Methylphenol	12000	U
86-30-6	N-Nitrosodiphenylamine (1)	4800	U
101-55-3	4-Bromophenyl-phenylether	4800	U
118-74-1	Hexachlorobenzene	4800	U
87-86-5	Pentachlorophenol	4200	DJ
85-01-8	Phenanthrene	4800	U
120-12-7	Anthracene	4800	U
86-74-8	Carbazole	4800	U
84-74-2	Di-n-Butylphthalate	4800	U
206-44-0	Fluoranthene	4800	U
129-00-0	Pyrene	4800	U
85-68-7	Butylbenzylphthalate	4800	U
91-94-1	3,3'-Dichlorobenzidine	4800	U
56-55-3	Benzo(a)Anthracene	4800	U
218-01-9	Chrysene	4800	U
117-81-7	bis(2-Ethylhexyl)Phthalate	4800	U
117-84-0	Di-n-Octyl Phthalate	4800	U
205-99-2	Benzo(b)Fluoranthene	4800	U
207-08-9	Benzo(k)Fluoranthene	4800	U
50-32-8	Benzo(a)Pyrene	4800	U
193-39-5	Indeno(1,2,3-cd)Pyrene	4800	U
53-70-3	Dibenz(a,h)Anthracene	4800	U
191-24-2	Benzo(g,h,i)Perylene	4800	U

(1) - Cannot be separated from Diphenylamine

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217959

Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) SOIL Lab Sample ID: 217959

Sample wt/vol: 30.60 (g/mL) G Lab File ID: AS730 168

Level: (low/med) LOW Date Received: 03/10/94

% Moisture: 0 decanted: (Y/N) N Date Extracted: 03/14/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	72	J
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	130	J
95-50-1	1,2-Dichlorobenzene	320	U
95-48-7	2-Methylphenol	320	U
108-60-1	2,2'-oxybis(1-Chloropropane)	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
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	780	U
91-58-7	2-Chloronaphthalene	320	U
88-74-4	2-Nitroaniline	780	U
131-11-3	Dimethylphthalate	320	U
208-96-8	Acenaphthylene	320	U
606-20-2	2,6-Dinitrotoluene	320	U
99-09-2	3-Nitroaniline	780	U
83-32-9	Acenaphthene	320	U

(SECTION VII)

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217959

Lab Name: CN GEOTECH   Contract: ______

Lab Code: ______   Case No.: 12345   SAS No.: ______   SDG No.: ______

169

Matrix: (soil/water) SOIL   Lab Sample ID: 217959

Sample wt/vol: 30.60 (g/mL) G   Lab File ID: AS730

Level: (low/med) LOW   Date Received: 03/10/94

% Moisture: 0   decanted: (Y/N) N   Date Extracted: 03/14/94

Concentrated Extract Volume: 500.0 (uL)   Date Analyzed: 03/24/94

Injection Volume: 2.0(uL)   Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y   pH: 6.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	780	U
100-02-7	4-Nitrophenol	780	U
132-64-9	Dibenzofuran	320	U
121-14-2	2,4-Dinitrotoluene	320	U
84-66-2	Diethylphthalate	320	U
7005-72-3	4-Chlorophenyl-phenylether	320	U
86-73-7	Fluorene	320	U
100-01-6	4-Nitroaniline	780	U
534-52-1	4,6-Dinitro-2-Methylphenol	780	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	780	U
85-01-8	Phenanthrene	61	J
120-12-7	Anthracene	320	U
86-74-8	Carbazole	320	U
84-74-2	Di-n-Butylphthalate	570	
206-44-0	Fluoranthene	42	J
129-00-0	Pyrene	99	J
85-68-7	Butylbenzylphthalate	1000	
91-94-1	3,3'-Dichlorobenzidine	320	U
56-55-3	Benzo(a)Anthracene	320	U
218-01-9	Chrysene	320	U
117-81-7	bis(2-Ethylhexyl)Phthalate	13000	E
117-84-0	Di-n-Octyl Phthalate	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

(SECTION VII)

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

217959

Name: CN GEOTECH Contract: ____

Lab Code: ____ Case No.: 12345 SAS No.: ____ SDG No.: ____ 170

Matrix: (soil/water) SOIL Lab Sample ID: 217959

Sample wt/vol: 30.60 (g/mL) G Lab File ID: AS730

Level: (low/med) LOW Date Received: 03/10/94

% Moisture: 0 decanted: (Y/N) N Date Extracted: 03/14/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.7

Number TICs found: 17

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER		COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	5.02	290	J
2.	123-42-2	2-Pentanone, 4-hydroxy-4-met	5.40	1500	JN
3.	79-34-5	Ethane, 1,1,2,2-tetrachloro-	7.42	160	JN
4.		UNKNOWN	8.02	1200	J
5.		UNKNOWN	8.28	650	J
6.		UNKNOWN HYDROCARBON	10.19	260	J
7.	98-86-2	Ethanone, 1-phenyl-	10.47	230	JN
8.		UNKNOWN	18.32	160	J
9.		UNKNOWN HYDROCARBON	18.45	160	J
10.	1921-70-6	Pentadecane, 2,6,10,14-tetra	19.70	750	JN
11.	544-63-8	Tetradecanoic acid	20.35	200	JN
12.		UNKNOWN HYDROCARBON	21.94	130	J
13.		UNKNOWN	22.65	720	J
14.		UNKNOWN HYDROCARBON	22.99	160	J
15.		UNKNOWN	23.10	200	J
16.	57-11-4	Octadecanoic acid	24.67	330	JN
17.		UNKNOWN HYDROCARBON	38.54	98	J

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217959DL

Lab Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) SOIL Lab Sample ID: 217959DL

Sample wt/vol: 30.60 (g/mL) G Lab File ID: AS744

Level: (low/med) LOW Date Received: 03/10/94

% Moisture: 0 decanted: (Y/N) N Date Extracted: 03/14/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/29/94

Injection Volume: 2.0(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	3200	U
111-44-4	bis(2-Chloroethyl)Ether	3200	U
95-57-8	2-Chlorophenol	3200	U
541-73-1	1,3-Dichlorobenzene	3200	U
106-46-7	1,4-Dichlorobenzene	3200	U
95-50-1	1,2-Dichlorobenzene	3200	U
95-48-7	2-Methylphenol	3200	U
108-60-1	2,2'-oxybis(1-Chloropropane)	3200	U
106-44-5	4-Methylphenol	3200	U
621-64-7	N-Nitroso-Di-n-Propylamine	3200	U
67-72-1	Hexachloroethane	3200	U
98-95-3	Nitrobenzene	3200	U
78-59-1	Isophorone	3200	U
88-75-5	2-Nitrophenol	3200	U
105-67-9	2,4-Dimethylphenol	3200	U
111-91-1	bis(2-Chloroethoxy)Methane	3200	U
120-83-2	2,4-Dichlorophenol	3200	U
120-82-1	1,2,4-Trichlorobenzene	3200	U
91-20-3	Naphthalene	3200	U
106-47-8	4-Chloroaniline	3200	U
87-68-3	Hexachlorobutadiene	3200	U
59-50-7	4-Chloro-3-Methylphenol	3200	U
91-57-6	2-Methylnaphthalene	3200	U
77-47-4	Hexachlorocyclopentadiene	3200	U
88-06-2	2,4,6-Trichlorophenol	3200	U
95-95-4	2,4,5-Trichlorophenol	7800	U
91-58-7	2-Chloronaphthalene	3200	U
88-74-4	2-Nitroaniline	7800	U
131-11-3	Dimethylphthalate	3200	U
208-96-8	Acenaphthylene	3200	U
606-20-2	2,6-Dinitrotoluene	3200	U
99-09-2	3-Nitroaniline	7800	U
83-32-9	Acenaphthene	3200	U

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217959DL

Lab Name: CN GEOTECH   Contract: ______

Lab Code: ______   Case No.: 12345   SAS No.: ______   SDG No.: ______

Matrix: (soil/water) SOIL   Lab Sample ID: 217959DL

Sample wt/vol: 30.60 (g/mL) G   Lab File ID: AS744

Level: (low/med) LOW   Date Received: 03/10/94

% Moisture: 0   decanted: (Y/N) N   Date Extracted: 03/14/94

Concentrated Extract Volume: 500.0 (uL)   Date Analyzed: 03/29/94

Injection Volume: 2.0(uL)   Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y   pH: 6.7

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	UG/KG	Q
51-28-5	2,4-Dinitrophenol	7800	U
100-02-7	4-Nitrophenol	7800	U
132-64-9	Dibenzofuran	3200	U
121-14-2	2,4-Dinitrotoluene	3200	U
84-66-2	Diethylphthalate	3200	U
7005-72-3	4-Chlorophenyl-phenylether	3200	U
86-73-7	Fluorene	3200	U
100-01-6	4-Nitroaniline	7800	U
534-52-1	4,6-Dinitro-2-Methylphenol	7800	U
86-30-6	N-Nitrosodiphenylamine (1)	3200	U
101-55-3	4-Bromophenyl-phenylether	3200	U
118-74-1	Hexachlorobenzene	3200	U
87-86-5	Pentachlorophenol	7800	U
85-01-8	Phenanthrene	3200	U
120-12-7	Anthracene	3200	U
86-74-8	Carbazole	3200	U
84-74-2	Di-n-Butylphthalate	640	DJ
206-44-0	Fluoranthene	3200	U
129-00-0	Pyrene	3200	U
85-68-7	Butylbenzylphthalate	910	DJ
91-94-1	3,3'-Dichlorobenzidine	3200	U
56-55-3	Benzo(a)Anthracene	3200	U
218-01-9	Chrysene	3200	U
117-81-7	bis(2-Ethylhexyl)Phthalate	11000	D
117-84-0	Di-n-Octyl Phthalate	3200	U
205-99-2	Benzo(b)Fluoranthene	3200	U
207-08-9	Benzo(k)Fluoranthene	3200	U
50-32-8	Benzo(a)Pyrene	3200	U
193-39-5	Indeno(1,2,3-cd)Pyrene	3200	U
53-70-3	Dibenz(a,h)Anthracene	3200	U
191-24-2	Benzo(g,h,i)Perylene	3200	U

(1) - Cannot be separated from Diphenylamine

(SECTION VII)

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217960

Lab Name: CN GEOTECH   Contract: ______

Lab Code: ______   Case No.: 12345   SAS No.: ______   SDG No.: ______

Matrix: (soil/water) SOIL   Lab Sample ID: 217960

Sample wt/vol: 32.40 (g/mL) G   Lab File ID: AS731 222

Level: (low/med) LOW   Date Received: 03/10/94

% Moisture: 13   decanted: (Y/N) N   Date Extracted: 03/14/94

Concentrated Extract Volume: 3000 (uL)   Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL)   Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y   pH: 6.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	340	J
111-44-4	bis(2-Chloroethyl)Ether	2100	U
95-57-8	2-Chlorophenol	2100	U
541-73-1	1,3-Dichlorobenzene	2100	U
106-46-7	1,4-Dichlorobenzene	2000	J
95-50-1	1,2-Dichlorobenzene	2100	U
95-48-7	2-Methylphenol	2100	U
108-60-1	2,2'-oxybis(1-Chloropropane)	2100	U
106-44-5	4-Methylphenol	2100	U
621-64-7	N-Nitroso-Di-n-Propylamine	2100	U
67-72-1	Hexachloroethane	2100	U
98-95-3	Nitrobenzene	2100	U
78-59-1	Isophorone	2100	U
88-75-5	2-Nitrophenol	2100	U
105-67-9	2,4-Dimethylphenol	2100	U
111-91-1	bis(2-Chloroethoxy)Methane	2100	U
120-83-2	2,4-Dichlorophenol	2100	U
120-82-1	1,2,4-Trichlorobenzene	2100	U
91-20-3	Naphthalene	2100	U
106-47-8	4-Chloroaniline	2100	U
87-68-3	Hexachlorobutadiene	2100	U
59-50-7	4-Chloro-3-Methylphenol	2100	U
91-57-6	2-Methylnaphthalene	270	J
77-47-4	Hexachlorocyclopentadiene	2100	U
88-06-2	2,4,6-Trichlorophenol	2100	U
95-95-4	2,4,5-Trichlorophenol	5100	U
91-58-7	2-Chloronaphthalene	2100	U
88-74-4	2-Nitroaniline	5100	U
131-11-3	Dimethylphthalate	2100	U
208-96-8	Acenaphthylene	2100	U
606-20-2	2,6-Dinitrotoluene	2100	U
99-09-2	3-Nitroaniline	5100	U
83-32-9	Acenaphthene	2100	U

1C (SECTION VII)

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217960

b Name: CN GEOTECH Contract: ________

Lab Code: ________ Case No.: 12345 SAS No.: ________ SDG No.: ________ 223

Matrix: (soil/water) SOIL Lab Sample ID: 217960

Sample wt/vol: 32.40 (g/mL) G Lab File ID: AS731

Level: (low/med) LOW Date Received: 03/10/94

% Moisture: 13 decanted: (Y/N) N Date Extracted: 03/14/94

Concentrated Extract Volume: 3000 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	5100	U
100-02-7	4-Nitrophenol	5100	U
132-64-9	Dibenzofuran	2100	U
121-14-2	2,4-Dinitrotoluene	2100	U
84-66-2	Diethylphthalate	640	J
7005-72-3	4-Chlorophenyl-phenylether	2100	U
86-73-7	Fluorene	2100	U
100-01-6	4-Nitroaniline	5100	U
534-52-1	4,6-Dinitro-2-Methylphenol	5100	U
86-30-6	N-Nitrosodiphenylamine (1)	2100	U
101-55-3	4-Bromophenyl-phenylether	2100	U
118-74-1	Hexachlorobenzene	2100	U
87-86-5	Pentachlorophenol	5100	U
85-01-8	Phenanthrene	650	J
120-12-7	Anthracene	2100	U
86-74-8	Carbazole	2100	U
84-74-2	Di-n-Butylphthalate	7600	
206-44-0	Fluoranthene	460	J
129-00-0	Pyrene	510	J
85-68-7	Butylbenzylphthalate	10000	
91-94-1	3,3'-Dichlorobenzidine	2100	U
56-55-3	Benzo(a)Anthracene	2100	U
218-01-9	Chrysene	2100	U
117-81-7	bis(2-Ethylhexyl)Phthalate	130000	E
117-84-0	Di-n-Octyl Phthalate	2900	
205-99-2	Benzo(b)Fluoranthene	2100	U
207-08-9	Benzo(k)Fluoranthene	2100	U
50-32-8	Benzo(a)Pyrene	2100	U
193-39-5	Indeno(1,2,3-cd)Pyrene	2100	U
53-70-3	Dibenz(a,h)Anthracene	2100	U
191-24-2	Benzo(g,h,i)Perylene	2100	U

(1) - Cannot be separated from Diphenylamine

(SECTION IV)

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1017027

Lab Name: RUST Contract: 1

Lab Code. RUST Case No.: 1 SAS No.: SDG No.: 12345

Matrix: (soil/water) SOIL Lab Sample ID: 217960 **34**

Sample wt/vol: 4.0 (g/mL) G Lab File ID: 217960M

Level: (low/med) MED Date Received: 3/10/94

% Moisture: not dec. 13. Date Analyzed: 3/21/94

Column: (pack/cap) CAP Dilution Factor: 500.00

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG Q

CAS NO.	COMPOUND	CONCENTRATION	Q
74-87-3	CHLOROMETHANE	2500.	U
74-83-9	BROMOMETHANE	2500.	U
75-01-4	VINYL CHLORIDE	2500.	U
75-00-3	CHLOROETHANE	2500.	U
75-09-2	METHYLENE CHLORIDE	1200.	U
67-64-1	ACETONE	40000.	
75-15-0	CARBON DISULFIDE	1200.	U
75-35-4	1,1-DICHLOROETHENE	1200.	U
75-34-3	1,1-DICHLOROETHANE	1200.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	1200.	U
156-59-2	CIS-1,2-DICHLOROETHENE	1200.	U
67-66-3	CHLOROFORM	1200.	U
107-06-2	1,2-DICHLOROETHANE	1200.	U
78-93-3	2-BUTANONE	41000.	
71-55-6	1,1,1-TRICHLOROETHANE	1200.	U
56-23-5	CARBON TETRACHLORIDE	1200.	U
108-05-4	VINYL ACETATE	2500.	U
75-27-4	BROMODICHLOROMETHANE	1200.	U
78-87-5	1,2-DICHLOROPROPANE	1200.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	1200.	U
79-01-6	TRICHLOROETHENE	1200.	U
124-48-1	DIBROMOCHLOROMETHANE	1200.	U
79-00-5	1,1,2-TRICHLOROETHANE	1200.	U
71-43-2	BENZENE	1200.	U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	1200.	U
75-25-2	BROMOFORM	1200.	U
108-10-1	4-METHYL-2-PENTANONE	2500.	U
591-78-6	2-HEXANONE	2500.	U
127-18-4	TETRACHLOROETHENE	120000.	
79-34-5	1,1,2,2-TETRACHLOROETHANE	1200.	U
108-88-3	TOLUENE	1200.	U
108-90-7	CHLOROBENZENE	1200.	U
100-41-4	ETHYLBENZENE	1200.	U
100-42-5	STYRENE	1200.	U
1330-20-7	M,P-XYLENE	1200.	U
95-47-6	O-XYLENE	1200.	U

(SECTION IV)

1E

EPA SAMPLE NO

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

1017027

ab Name: RUST Contract: 1

Code: RUST Case No.: 1 SAS No.: SDG No.: 12345 35

atrix: (soil/water) SOIL Lab Sample ID: 217960

ample wt/vol: 4.0 (g/mL) G Lab File ID: 217960M

evel: (low/med) MED Date Received: 3/10/94

Moisture: not dec. 13. Date Analyzed: 3/21/94

olumn: (pack/cap) CAP Dilution Factor: 500.00

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
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(SECTION IV)

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1017067

Lab Name: RUST Contract: 1

Lab Code: RUST Case No.: 1 SAS No. SDG No.: 10045

Matrix: (soil/water) WATER Lab Sample ID: 217961 18

Sample wt/vol: 0.1 (g/mL) ML Lab File ID: 217961

Level: (low/med) LOW Date Received: 3/10/94

% Moisture: not dec. Date Analyzed: 3/21/94

Column: (pack/cap) CAP Dilution Factor: 50.00

CONCENTRATION UNITS:

CAS NO.	COMPOUND	(ug/L or ug/Kg) UG/L	Q
74-87-3	CHLOROMETHANE	100.	U
74-83-9	BROMOMETHANE	100.	U
75-01-4	VINYL CHLORIDE	100.	U
75-00-3	CHLOROETHANE	100.	U
75-09-2	METHYLENE CHLORIDE	50.	U
67-64-1	ACETONE	7300.	
75-15-0	CARBON DISULFIDE	50.	U
75-35-4	1,1-DICHLOROETHENE	50.	U
75-34-3	1,1-DICHLOROETHANE	50.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	50.	U
156-59-2	CIS-1,2-DICHLOROETHENE	50.	U
67-66-3	CHLOROFORM	50.	U
107-06-2	1,2-DICHLOROETHANE	50.	U
78-93-3	2-BUTANONE	3900.	
71-55-6	1,1,1-TRICHLOROETHANE	50.	U
56-23-5	CARBON TETRACHLORIDE	50.	U
108-05-4	VINYL ACETATE	100.	U
75-27-4	BROMODICHLOROMETHANE	50.	U
78-87-5	1,2-DICHLOROPROPANE	50.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	50.	U
79-01-6	TRICHLOROETHENE	50.	U
124-48-1	DIBROMOCHLOROMETHANE	50.	U
79-00-5	1,1,2-TRICHLOROETHANE	50.	U
71-43-2	BENZENE	50.	U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	50.	U
75-25-2	BROMOFORM	50.	U
108-10-1	4-METHYL-2-PENTANONE	100.	U
591-78-6	2-HEXANONE	100.	U
127-18-4	TETRACHLOROETHENE	320.	
79-34-5	1,1,2,2-TETRACHLOROETHANE	50.	U
108-88-3	TOLUENE	50.	U
108-90-7	CHLOROBENZENE	50.	U
100-41-4	ETHYLBENZENE	50.	U
100-42-5	STYRENE	50.	U
1330-20-7	M,P-XYLENE	50.	U
95-47-6	O-XYLENE	50.	U

(SECTION IV)

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

[illegible]

Lab Name: RUST Contract: 1

Lab Code: RUST Case No.: 1 SAS No.: SDG No.: 12345

19

Matrix: (soil/water) WATER Lab Sample ID: 217961

Sample wt/vol: 0.1 (g/mL) ML Lab File ID: 217961

Level: (low/med) LOW Date Received: 3/10/94

% Moisture: not dec. 100 Date Analyzed: 3/21/94

Column: (pack/cap) CAP Dilution Factor: 50.00

Number TICs found: 1

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	- -	UNKNOWN AROMATIC	21.18	600.	J
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FORM I VOA-TIC 1/87 Rev.

(SECTION IV)

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

1017107

106

Lab Name: RUST Contract: 1

Lab Code: RUST Case No.: 1 SAS No.: SDG No.: 12345

Matrix: (soil/water) SOIL Lab Sample ID: 217962

Sample wt/vol: 1.0 (g/mL) G Lab File ID: 217962

Level: (low/med) MED Date Received: 3/10/94

% Moisture: not dec. 0. Date Analyzed: 3/22/94

Column: (pack/cap) CAP Dilution Factor: 500.00

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND		Q
74-87-3	CHLOROMETHANE	10000.	U
74-83-9	BROMOMETHANE	10000.	U
75-01-4	VINYL CHLORIDE	10000.	U
75-00-3	CHLOROETHANE	10000.	U
75-09-2	METHYLENE CHLORIDE	38000.	
67-64-1	ACETONE	10000.	U
75-15-0	CARBON DISULFIDE	5000.	U
75-35-4	1,1-DICHLOROETHENE	5000.	U
75-34-3	1,1-DICHLOROETHANE	5000.	U
156-60-5	TRANS-1,2-DICHLOROETHENE	5000.	U
156-59-2	CIS-1,2-DICHLOROETHENE	5000.	U
67-66-3	CHLOROFORM	5000.	U
107-06-2	1,2-DICHLOROETHANE	5000.	U
78-93-3	2-BUTANONE	50000.	
71-55-6	1,1,1-TRICHLOROETHANE	5000.	U
56-23-5	CARBON TETRACHLORIDE	5000.	U
108-05-4	VINYL ACETATE	10000.	U
75-27-4	BROMODICHLOROMETHANE	5000.	U
78-87-5	1,2-DICHLOROPROPANE	5000.	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	5000.	U
79-01-6	TRICHLOROETHENE	5000.	U
124-48-1	DIBROMOCHLOROMETHANE	5000.	U
79-00-5	1,1,2-TRICHLOROETHANE	5000.	U
71-43-2	BENZENE	5000.	U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	5000.	U
75-25-2	BROMOFORM	5000.	U
108-10-1	4-METHYL-2-PENTANONE	10000.	U
591-78-6	2-HEXANONE	10000.	U
127-18-4	TETRACHLOROETHENE	110000.	
79-34-5	1,1,2,2-TETRACHLOROETHANE	5000.	U
108-88-3	TOLUENE	5000.	U
108-90-7	CHLOROBENZENE	5000.	U
100-41-4	ETHYLBENZENE	5000.	U
100-42-5	STYRENE	5000.	U
1330-20-7	M,P-XYLENE	5000.	U
95-47-6	O-XYLENE	5000.	U

(SECTION IV)

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

1017107

Lab Name: RUST Contract: 1

Lab Code: RUST Case No.: 1 SAS No.: SDG No.: 12345 107

Matrix: (soil/water) SOIL Lab Sample ID: 217962

Sample wt/vol: 1.0 (g/mL) G Lab File ID: 217962

Level: (low/med) MED Date Received: 3/10/94

% Moisture: not dec. 0. Date Analyzed: 3/22/94

Column: (pack/cap) CAP Dilution Factor: 500.00

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. - -	UNKNOWN	8.33	200000.	J
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(SECTION IV)

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

| 1017BLK |

Lab Name: RUST   Contract: 1

Lab Code: RUST   Case No.: 1   SAS No.   SDG No.: 12345

97

Matrix: (soil/water) WATER   Lab Sample ID: 217963

Sample wt/vol: 5.0 (g/mL) ML   Lab File ID: 217963

Level: (low/med) LOW   Date Received: 3/15/94

% Moisture: not dec. 100.   Date Analyzed: 3/22/94

Column: (pack/cap) CAP   Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	CHLOROMETHANE	2.	U
74-83-9	BROMOMETHANE	2.	U
75-01-4	VINYL CHLORIDE	2.	U
75-00-3	CHLOROETHANE	2.	U
75-09-2	METHYLENE CHLORIDE	1.0	U
67-64-1	ACETONE	2.	U
75-15-0	CARBON DISULFIDE	1.0	U
75-35-4	1,1-DICHLOROETHENE	1.0	U
75-34-3	1,1-DICHLOROETHANE	1.0	U
156-60-5	TRANS-1,2-DICHLOROETHENE	1.0	U
156-59-2	CIS-1,2-DICHLOROETHENE	1.0	U
67-66-3	CHLOROFORM	1.0	U
107-06-2	1,2-DICHLOROETHANE	1.0	U
78-93-3	2-BUTANONE	2.	U
71-55-6	1,1,1-TRICHLOROETHANE	1.0	U
56-23-5	CARBON TETRACHLORIDE	1.0	U
108-05-4	VINYL ACETATE	2.	U
75-27-4	BROMODICHLOROMETHANE	1.0	U
78-87-5	1,2-DICHLOROPROPANE	1.0	U
10061-01-5	CIS-1,3-DICHLOROPROPENE	1.0	U
79-01-6	TRICHLOROETHENE	1.0	U
124-48-1	DIBROMOCHLOROMETHANE	1.0	U
79-00-5	1,1,2-TRICHLOROETHANE	1.0	U
71-43-2	BENZENE	1.0	U
10061-02-6	TRANS-1,3-DICHLOROPROPENE	1.0	U
75-25-2	BROMOFORM	1.0	U
108-10-1	4-METHYL-2-PENTANONE	2.	U
591-78-6	2-HEXANONE	2.	U
127-18-4	TETRACHLOROETHENE	1.0	U
79-34-5	1,1,2,2-TETRACHLOROETHANE	1.0	U
108-88-3	TOLUENE	1.0	U
108-90-7	CHLOROBENZENE	1.0	U
100-41-4	ETHYLBENZENE	1.0	U
100-42-5	STYRENE	1.0	U
1330-20-7	M,P-XYLENE	1.0	U
95-47-6	O-XYLENE	1.0	U

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1E
(SECTION IV)

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

1017BLK

Lab Name: RUST   Contract: 1

Lab Code: RUST   Case No.: 1   SAS No.:   SDG No.: 12345   98

Matrix: (soil/water) WATER   Lab Sample ID: 217963

Sample wt/vol: 5.0 (g/mL) ML   Lab File ID: 217963

Level: (low/med) LOW   Date Received: 3/15/94

% Moisture: not dec. 100.   Date Analyzed: 3/22/94

Column: (pack/cap) CAP   Dilution Factor: 1.00

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

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
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19.				
20.				
21.				
22.				
23.				
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25.				
26.				
27.				
28.				
29.				
30.				

(SECTION VII)

1017-02-7

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

217960

b Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______

224

Matrix: (soil/water) SOIL Lab Sample ID: 217960

Sample wt/vol: 32.40 (g/mL) G Lab File ID: AS731

Level: (low/med) LOW Date Received: 03/10/94

% Moisture: 13 decanted: (Y/N) N Date Extracted: 03/14/94

Concentrated Extract Volume: 3000 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.7

Number TICs found: 16

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	12.00	2300	J
2. 629-59-4	Tetradecane	15.80	3200	JN
3. 629-62-9	Pentadecane	17.17	3200	JN
4. 544-76-3	Hexadecane	18.45	4700	JN
5. 629-78-7	Heptadecane	19.67	6400	JN
6. 544-63-8	Tetradecanoic acid	20.45	5300	JN
7.	UNKNOWN HYDROCARBON	20.90	1100	J
8.	UNKNOWN	21.54	1300	J
9.	UNKNOWN	21.75	1700	J
10.	UNKNOWN HYDROCARBON	21.94	2600	J
11. 57-10-3	Hexadecanoic acid	22.85	62000	JN
12.	UNKNOWN HYDROCARBON	23.00	3000	J
13. 506-12-7	Heptadecanoic acid	23.69	2300	JN
14. 629-94-7	Heneicosane	24.02	3600	JN
15. 57-11-4	Octadecanoic acid	24.85	10000	JN
16.	UNKNOWN HYDROCARBON	26.81	640	J

(SECTION VII)

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217960DL

Lab Name: CN GEOTECH Contract: ____

Lab Code: ____ Case No.: 12345 SAS No.: ____ SDG No.: 264

Matrix: (soil/water) SOIL Lab Sample ID: 217960DL

Sample wt/vol: 32.40 (g/mL) G Lab File ID: AS740

Level: (low/med) LOW Date Received: 03/10/94

% Moisture: 13 decanted: (Y/N) N Date Extracted: 03/14/94

Concentrated Extract Volume: 3000 (uL) Date Analyzed: 03/28/94

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	21000	U
111-44-4	bis(2-Chloroethyl)Ether	21000	U
95-57-8	2-Chlorophenol	21000	U
541-73-1	1,3-Dichlorobenzene	21000	U
106-46-7	1,4-Dichlorobenzene	2200	DJ
95-50-1	1,2-Dichlorobenzene	21000	U
95-48-7	2-Methylphenol	21000	U
108-60-1	2,2'-oxybis(1-Chloropropane)	21000	U
106-44-5	4-Methylphenol	21000	U
621-64-7	N-Nitroso-Di-n-Propylamine	21000	U
67-72-1	Hexachloroethane	21000	U
98-95-3	Nitrobenzene	21000	U
78-59-1	Isophorone	21000	U
88-75-5	2-Nitrophenol	21000	U
105-67-9	2,4-Dimethylphenol	21000	U
111-91-1	bis(2-Chloroethoxy)Methane	21000	U
120-83-2	2,4-Dichlorophenol	21000	U
120-82-1	1,2,4-Trichlorobenzene	21000	U
91-20-3	Naphthalene	21000	U
106-47-8	4-Chloroaniline	21000	U
87-68-3	Hexachlorobutadiene	21000	U
59-50-7	4-Chloro-3-Methylphenol	21000	U
91-57-6	2-Methylnaphthalene	21000	U
77-47-4	Hexachlorocyclopentadiene	21000	U
88-06-2	2,4,6-Trichlorophenol	21000	U
95-95-4	2,4,5-Trichlorophenol	51000	U
91-58-7	2-Chloronaphthalene	21000	U
88-74-4	2-Nitroaniline	51000	U
131-11-3	Dimethylphthalate	21000	U
208-96-8	Acenaphthylene	21000	U
606-20-2	2,6-Dinitrotoluene	21000	U
99-09-2	3-Nitroaniline	51000	U
83-32-9	Acenaphthene	21000	U

1017-02-0-7

(SECTION VII)

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217960DL

b Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______ 265

Matrix: (soil/water) SOIL Lab Sample ID: 217960DL

Sample wt/vol: 32.40 (g/mL) G Lab File ID: AS740

Level: (low/med) LOW Date Received: 03/10/94

% Moisture: 13 decanted: (Y/N) N Date Extracted: 03/14/94

Concentrated Extract Volume: 3000 (uL) Date Analyzed: 03/28/94

Injection Volume: 2.0(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	51000	U
100-02-7	4-Nitrophenol	51000	U
132-64-9	Dibenzofuran	21000	U
121-14-2	2,4-Dinitrotoluene	21000	U
84-66-2	Diethylphthalate	21000	U
7005-72-3	4-Chlorophenyl-phenylether	21000	U
86-73-7	Fluorene	21000	U
100-01-6	4-Nitroaniline	51000	U
534-52-1	4,6-Dinitro-2-Methylphenol	51000	U
86-30-6	N-Nitrosodiphenylamine (1)	21000	U
101-55-3	4-Bromophenyl-phenylether	21000	U
118-74-1	Hexachlorobenzene	21000	U
87-86-5	Pentachlorophenol	51000	U
85-01-8	Phenanthrene	21000	U
120-12-7	Anthracene	21000	U
86-74-8	Carbazole	21000	U
84-74-2	Di-n-Butylphthalate	7800	DJ
206-44-0	Fluoranthene	21000	U
129-00-0	Pyrene	21000	U
85-68-7	Butylbenzylphthalate	10000	DJ
91-94-1	3,3'-Dichlorobenzidine	21000	U
56-55-3	Benzo(a)Anthracene	21000	U
218-01-9	Chrysene	21000	U
117-81-7	bis(2-Ethylhexyl)Phthalate	110000	D
117-84-0	Di-n-Octyl Phthalate	21000	U
205-99-2	Benzo(b)Fluoranthene	21000	U
207-08-9	Benzo(k)Fluoranthene	21000	U
50-32-8	Benzo(a)Pyrene	21000	U
193-39-5	Indeno(1,2,3-cd)Pyrene	21000	U
53-70-3	Dibenz(a,h)Anthracene	21000	U
191-24-2	Benzo(g,h,i)Perylene	21000	U

(1) - Cannot be separated from Diphenylamine

(SECTION VII)

1917-06-7

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

217961

Lab Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______

266

Matrix: (soil/water) WATER Lab Sample ID: 217961

Sample wt/vol: 920.0 (g/mL) ML Lab File ID: AS719

Level: (low/med) LOW Date Received: 03/10/94

% Moisture: ______ decanted: (Y/N) ___ Date Extracted: 03/15/94

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 03/18/94

Injection Volume: 2.0(uL) Dilution Factor: 4.0

GPC Cleanup: (Y/N) N pH: ____

Number TICs found: 20

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 98-01-1	2-Furancarboxaldehyde	5.17	1800	BJN
2.	UNKNOWN	7.13	480	J
3. 100-52-7	Benzaldehyde	8.40	7400	BJN
4. 98-03-3	2-Thiophenecarboxaldehyde	9.19	520	JN
5.	UNKNOWN	9.79	570	J
6. 98-86-2	Ethanone, 1-phenyl-	10.49	1800	JN
7.	UNKNOWN	11.05	390	J
8.	UNKNOWN AROMATIC	12.30	430	J
9. 65-85-0	BENZOIC ACID	12.80	34000	JN
10. 95-16-9	Benzothiazole	13.32	830	JN
11.	UNKNOWN	14.14	910	J
12. 85-44-9	1,3-Isobenzofurandione	14.62	570	JN
13.	UNKNOWN AROMATIC	15.05	350	J
14.	UNKNOWN	15.47	740	J
15.	UNKNOWN	16.60	480	J
16. 85-41-6	1H-Isoindole-1,3(2H)-dione	16.89	1700	JN
17.	UNKNOWN	18.00	430	J
18.	UNKNOWN AROMATIC	18.14	350	J
19.	UNKNOWN	18.84	350	J
20.	UNKNOWN	19.87	650	J

IC17-5-7

(SECTION VII)

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217962

Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______ 305

Matrix: (soil/water) SOIL Lab Sample ID: 217962

Sample wt/vol: 0.085 (g/mL) G Lab File ID: AS717

Level: (low/med) MED Date Received: 03/10/94

% Moisture: ______ decanted: (Y/N) N Date Extracted: 03/17/94

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 03/18/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ______

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	1200000	U
111-44-4	bis(2-Chloroethyl)Ether	1200000	U
95-57-8	2-Chlorophenol	1200000	U
541-73-1	1,3-Dichlorobenzene	1200000	U
106-46-7	1,4-Dichlorobenzene	1200000	U
95-50-1	1,2-Dichlorobenzene	1200000	U
95-48-7	2-Methylphenol	1200000	U
108-60-1	2,2'-oxybis(1-Chloropropane)	1200000	U
106-44-5	4-Methylphenol	1200000	U
621-64-7	N-Nitroso-Di-n-Propylamine	1200000	U
67-72-1	Hexachloroethane	1200000	U
98-95-3	Nitrobenzene	1200000	U
78-59-1	Isophorone	1200000	U
88-75-5	2-Nitrophenol	1200000	U
105-67-9	2,4-Dimethylphenol	1200000	U
111-91-1	bis(2-Chloroethoxy)Methane	1200000	U
120-83-2	2,4-Dichlorophenol	1200000	U
120-82-1	1,2,4-Trichlorobenzene	1200000	U
91-20-3	Naphthalene	1200000	U
106-47-8	4-Chloroaniline	1200000	U
87-68-3	Hexachlorobutadiene	1200000	U
59-50-7	4-Chloro-3-Methylphenol	1200000	U
91-57-6	2-Methylnaphthalene	1200000	U
77-47-4	Hexachlorocyclopentadiene	1200000	U
88-06-2	2,4,6-Trichlorophenol	1200000	U
95-95-4	2,4,5-Trichlorophenol	2900000	U
91-58-7	2-Chloronaphthalene	1200000	U
88-74-4	2-Nitroaniline	2900000	U
131-11-3	Dimethylphthalate	1200000	U
208-96-8	Acenaphthylene	1200000	U
606-20-2	2,6-Dinitrotoluene	1200000	U
99-09-2	3-Nitroaniline	2900000	U
83-32-9	Acenaphthene	1200000	U

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(SECTION VII) 1017-10-7 OIL

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
217962

Lab Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) SOIL Lab Sample ID: 217962 306

Sample wt/vol: 0.085 (g/mL) G Lab File ID: AS717

Level: (low/med) MED Date Received: 03/10/94

% Moisture: ______ decanted: (Y/N) N Date Extracted: 03/17/94

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 03/18/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ______

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	2900000	U
100-02-7	4-Nitrophenol	2900000	U
132-64-9	Dibenzofuran	1200000	U
121-14-2	2,4-Dinitrotoluene	1200000	U
84-66-2	Diethylphthalate	1200000	U
7005-72-3	4-Chlorophenyl-phenylether	1200000	U
86-73-7	Fluorene	1200000	U
100-01-6	4-Nitroaniline	2900000	U
534-52-1	4,6-Dinitro-2-Methylphenol	2900000	U
86-30-6	N-Nitrosodiphenylamine (1)	1200000	U
101-55-3	4-Bromophenyl-phenylether	1200000	U
118-74-1	Hexachlorobenzene	1200000	U
87-86-5	Pentachlorophenol	2900000	U
85-01-8	Phenanthrene	1200000	U
120-12-7	Anthracene	1200000	U
86-74-8	Carbazole	1200000	U
84-74-2	Di-n-Butylphthalate	1200000	U
206-44-0	Fluoranthene	1200000	U
129-00-0	Pyrene	1200000	U
85-68-7	Butylbenzylphthalate	1200000	U
91-94-1	3,3'-Dichlorobenzidine	1200000	U
56-55-3	Benzo(a)Anthracene	1200000	U
218-01-9	Chrysene	1200000	U
117-81-7	bis(2-Ethylhexyl)Phthalate	1300000	
117-84-0	Di-n-Octyl Phthalate	1200000	U
205-99-2	Benzo(b)Fluoranthene	1200000	U
207-08-9	Benzo(k)Fluoranthene	1200000	U
50-32-8	Benzo(a)Pyrene	1200000	U
193-39-5	Indeno(1,2,3-cd)Pyrene	1200000	U
53-70-3	Dibenz(a,h)Anthracene	1200000	U
191-24-2	Benzo(g,h,i)Perylene	1200000	U

(1) - Cannot be separated from Diphenylamine

1017-207

(SECTION VII)

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

217962

b Name: CN GEOTECH Contract: ____

Lab Code: ____ Case No.: 12345 SAS No.: ____ SDG No.: ____

Matrix: (soil/water) SOIL Lab Sample ID: 217962 307

Sample wt/vol: 0.085 (g/mL) G Lab File ID: AS717

Level: (low/med) MED Date Received: 03/10/94

% Moisture: ____ decanted: (Y/N) N Date Extracted: 03/17/94

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 03/18/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____

Number TICs found: 21

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 112-72-1	1-Tetradecanol	18.37	470000	JN
2. 544-76-3	Hexadecane	18.45	470000	JN
3. 1081-75-0	Benzene, 1,1'-(1,3-propanedi	19.24	1400000	JN
4. 629-78-7	Heptadecane	19.67	1900000	JN
5.	UNKNOWN HYDROCARBON	20.89	1100000	J
6. 506-51-4	1-Tetracosanol	21.04	590000	JN
7.	UNKNOWN HYDROCARBON	21.94	1800000	J
8. 112-39-0	Hexadecanoic acid, methyl es	22.19	710000	JN
9. 57-10-3	Hexadecanoic acid	22.57	2400000	JN
10.	UNKNOWN HYDROCARBON	23.00	1200000	J
11.	UNKNOWN	23.87	940000	J
12.	UNKNOWN HYDROCARBON	24.00	710000	J
13.	UNKNOWN	24.07	1300000	J
14. 112-61-8	Octadecanoic acid, methyl es	24.25	820000	JN
15.	UNKNOWN	24.57	1600000	J
16. 92-06-8	1,1':3',1''-Terphenyl	24.67	820000	JN
17. 629-97-0	Docosane	24.97	1200000	JN
18.	UNKNOWN HYDROCARBON	25.91	1500000	J
19. 646-31-1	Tetracosane	26.79	1600000	JN
20.	UNKNOWN HYDROCARBON	28.71	2000000	J
21.	UNKNOWN HYDROCARBON	29.96	2400000	J

(SECTION VII) 1016-02-5

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217964

Lab Name: CN GEOTECH Contract:

Lab Code: Case No.: 12345 SAS No.: SDG No.:

334

Matrix: (soil/water) SOIL Lab Sample ID: 217964

Sample wt/vol: 33.50 (g/mL) G Lab File ID: AS732

Level: (low/med) LOW Date Received: 03/10/94

% Moisture: 10 decanted: (Y/N) N Date Extracted: 03/14/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.4

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	100	J
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
95-50-1	1,2-Dichlorobenzene	330	U
95-48-7	2-Methylphenol	330	U
108-60-1	2,2'-oxybis(1-Chloropropane)	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
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	800	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	800	U
131-11-3	Dimethylphthalate	330	U
208-96-8	Acenaphthylene	330	U
606-20-2	2,6-Dinitrotoluene	330	U
99-09-2	3-Nitroaniline	800	U
83-32-9	Acenaphthene	330	U

(SECTION VII)

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217964

ıb Name: CN GEOTECH   Contract: ______

Lab Code: ______   Case No.: 12345   SAS No.: ______   SDG No.: ______

Matrix: (soil/water) SOIL   Lab Sample ID: 217964 335

Sample wt/vol: 33.50 (g/mL) G   Lab File ID: AS732

Level: (low/med) LOW   Date Received: 03/10/94

% Moisture: 10   decanted: (Y/N) N   Date Extracted: 03/14/94

Concentrated Extract Volume: 500.0 (uL)   Date Analyzed: 03/24/94

Injection Volume: 2.0(uL)   Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y   pH: 7.4

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	800	U
100-02-7	4-Nitrophenol	800	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	800	U
534-52-1	4,6-Dinitro-2-Methylphenol	800	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	800	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
86-74-8	Carbazole	330	U
84-74-2	Di-n-Butylphthalate	63	J
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	330	U
56-55-3	Benzo(a)Anthracene	330	U
218-01-9	Chrysene	330	U
117-81-7	bis(2-Ethylhexyl)Phthalate	91	J
117-84-0	Di-n-Octyl Phthalate	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

(SECTION VII)

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

217964

Lab Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______

336

Matrix: (soil/water) SOIL Lab Sample ID: 217964

Sample wt/vol: 33.50 (g/mL) G Lab File ID: AS732

Level: (low/med) LOW Date Received: 03/10/94

% Moisture: 10 decanted: (Y/N) N Date Extracted: 03/14/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.4

Number TICs found: 21 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NUMBER		COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	5.03	460	J
2.	123-42-2	2-Pentanone, 4-hydroxy-4-met	5.43	2800	JN
3.	79-34-5	Ethane, 1,1,2,2-tetrachloro-	7.40	200	JN
4.		UNKNOWN	8.00	530	J
5.		UNKNOWN	8.28	700	J
6.	100-52-7	Benzaldehyde	8.35	830	JN
7.		UNKNOWN	10.15	230	J
8.	98-86-2	Ethanone, 1-phenyl-	10.47	600	JN
9.	112-05-0	Nonanoic acid	13.89	66	JN
10.	118-29-6	1H-Isoindole-1,3(2H)-dione,	16.80	300	JN
11.		UNKNOWN	17.94	200	J
12.	74381-40-1	Propanoic acid, 2-methyl-, 1	18.30	270	JN
13.		UNKNOWN	18.79	100	J
14.		UNKNOWN HYDROCARBON	19.64	100	J
15.	544-63-8	Tetradecanoic acid	20.35	200	JN
16.		UNKNOWN	22.59	600	J
17.	94-41-7	Chalcone	23.07	100	JN
18.		UNKNOWN	23.55	100	J
19.	57-11-4	Octadecanoic acid	24.59	1200	JN
20.		UNKNOWN	26.66	460	J
21.		UNKNOWN	31.06	600	J

10-0-0375

(SECTION VII)

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

373

EPA SAMPLE NO.

217965

ab Name: CN GEOTECH Contract:

Lab Code: Case No.: 12345 SAS No.: SDG No.:

Matrix: (soil/water) SOIL Lab Sample ID: 217965

Sample wt/vol: 34.50 (g/mL) G Lab File ID: AS733

Level: (low/med) LOW Date Received: 03/10/94

% Moisture: 0 decanted: (Y/N) N Date Extracted: 03/14/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	35	J
111-44-4	bis(2-Chloroethyl)Ether	290	U
95-57-8	2-Chlorophenol	290	U
541-73-1	1,3-Dichlorobenzene	290	U
106-46-7	1,4-Dichlorobenzene	290	U
95-50-1	1,2-Dichlorobenzene	290	U
95-48-7	2-Methylphenol	290	U
108-60-1	2,2'-oxybis(1-Chloropropane)	290	U
106-44-5	4-Methylphenol	290	U
621-64-7	N-Nitroso-Di-n-Propylamine	290	U
67-72-1	Hexachloroethane	290	U
98-95-3	Nitrobenzene	290	U
78-59-1	Isophorone	290	U
88-75-5	2-Nitrophenol	290	U
105-67-9	2,4-Dimethylphenol	290	U
111-91-1	bis(2-Chloroethoxy)Methane	290	U
120-83-2	2,4-Dichlorophenol	290	U
120-82-1	1,2,4-Trichlorobenzene	290	U
91-20-3	Naphthalene	290	U
106-47-8	4-Chloroaniline	290	U
87-68-3	Hexachlorobutadiene	290	U
59-50-7	4-Chloro-3-Methylphenol	290	U
91-57-6	2-Methylnaphthalene	290	U
77-47-4	Hexachlorocyclopentadiene	290	U
88-06-2	2,4,6-Trichlorophenol	290	U
95-95-4	2,4,5-Trichlorophenol	700	U
91-58-7	2-Chloronaphthalene	290	U
88-74-4	2-Nitroaniline	700	U
131-11-3	Dimethylphthalate	290	U
208-96-8	Acenaphthylene	290	U
606-20-2	2,6-Dinitrotoluene	290	U
99-09-2	3-Nitroaniline	700	U
83-32-9	Acenaphthene	290	U

FORM I SV-1 3/90

1016-53-5

(SECTION VII)

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217965

Lab Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) SOIL Lab Sample ID: 217965 37A

Sample wt/vol: 34.50 (g/mL) G Lab File ID: AS733

Level: (low/med) LOW Date Received: 03/10/94

% Moisture: 0 decanted: (Y/N) N Date Extracted: 03/14/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	700	U
100-02-7	4-Nitrophenol	700	U
132-64-9	Dibenzofuran	290	U
121-14-2	2,4-Dinitrotoluene	290	U
84-66-2	Diethylphthalate	290	U
7005-72-3	4-Chlorophenyl-phenylether	290	U
86-73-7	Fluorene	290	U
100-01-6	4-Nitroaniline	700	U
534-52-1	4,6-Dinitro-2-Methylphenol	700	U
86-30-6	N-Nitrosodiphenylamine (1)	290	U
101-55-3	4-Bromophenyl-phenylether	290	U
118-74-1	Hexachlorobenzene	290	U
87-86-5	Pentachlorophenol	700	U
85-01-8	Phenanthrene	290	U
120-12-7	Anthracene	290	U
86-74-8	Carbazole	290	U
84-74-2	Di-n-Butylphthalate	290	U
206-44-0	Fluoranthene	290	U
129-00-0	Pyrene	290	U
85-68-7	Butylbenzylphthalate	290	U
91-94-1	3,3'-Dichlorobenzidine	290	U
56-55-3	Benzo(a)Anthracene	290	U
218-01-9	Chrysene	290	U
117-81-7	bis(2-Ethylhexyl)Phthalate	64	J
117-84-0	Di-n-Octyl Phthalate	290	U
205-99-2	Benzo(b)Fluoranthene	290	U
207-08-9	Benzo(k)Fluoranthene	290	U
50-32-8	Benzo(a)Pyrene	290	U
193-39-5	Indeno(1,2,3-cd)Pyrene	290	U
53-70-3	Dibenz(a,h)Anthracene	290	U
191-24-2	Benzo(g,h,i)Perylene	290	U

(1) - Cannot be separated from Diphenylamine

(SECTION VII)

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

217965

Lab Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) SOIL Lab Sample ID: 217965 375

Sample wt/vol: 34.50 (g/mL) G Lab File ID: AS733

Level: (low/med) LOW Date Received: 03/10/94

% Moisture: 0 decanted: (Y/N) N Date Extracted: 03/14/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0

Number TICs found: 21

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	5.03	610	J
2.	123-42-2	2-Pentanone, 4-hydroxy-4-met	5.37	840	JN
3.	79-34-5	Ethane, 1,1,2,2-tetrachloro-	7.40	140	JN
4.		UNKNOWN	8.00	1100	J
5.		UNKNOWN	8.25	380	J
6.	100-52-7	Benzaldehyde	8.34	290	JN
7.		UNKNOWN	8.94	140	J
8.	98-86-2	Ethanone, 1-phenyl-	10.45	410	JN
9.	65-85-0	BENZOIC ACID	12.22	2400	JN
10.	87-41-2	1(3H)-Isobenzofuranone	15.09	58	JN
11.	91-64-5	2H-1-Benzopyran-2-one	16.40	87	JN
12.	85-41-6	1H-Isoindole-1,3(2H)-dione	16.79	290	JN
13.		UNKNOWN	18.30	140	J
14.		UNKNOWN	19.84	87	J
15.	486-25-9	9H-Fluoren-9-one	20.29	58	JN
16.		UNKNOWN	21.27	58	J
17.		UNKNOWN PHTHALATE	22.52	87	J
18.	94-41-7	Chalcone	23.07	120	JN
19.		UNKNOWN	24.54	87	J
20.	123-79-5	Hexanedioic acid, dioctyl es	26.64	170	JN
21.		UNKNOWN	31.04	230	J

1010-0607

(SECTION VII)

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217966

b Name: CN GEOTECH Contract:

Lab Code: Case No.: 12345 SAS No.: SDG No.: 311

Matrix: (soil/water) WATER Lab Sample ID: 217966

Sample wt/vol: 810.0 (g/mL) ML Lab File ID: AS720

Level: (low/med) LOW Date Received: 03/10/94

% Moisture: decanted: (Y/N) Date Extracted: 03/15/94

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 03/18/94

Injection Volume: 2.0(uL) Dilution Factor: 4.0

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
108-95-2	Phenol	13000	E
111-44-4	bis(2-Chloroethyl)Ether	490	U
95-57-8	2-Chlorophenol	490	U
541-73-1	1,3-Dichlorobenzene	490	U
106-46-7	1,4-Dichlorobenzene	490	U
95-50-1	1,2-Dichlorobenzene	490	U
95-48-7	2-Methylphenol	880	
108-60-1	2,2'-oxybis(1-Chloropropane)	490	U
106-44-5	4-Methylphenol	5700	
621-64-7	N-Nitroso-Di-n-Propylamine	490	U
67-72-1	Hexachloroethane	490	U
98-95-3	Nitrobenzene	1600	
78-59-1	Isophorone	490	U
88-75-5	2-Nitrophenol	490	U
105-67-9	2,4-Dimethylphenol	1700	
111-91-1	bis(2-Chloroethoxy)Methane	490	U
120-83-2	2,4-Dichlorophenol	490	U
120-82-1	1,2,4-Trichlorobenzene	490	U
91-20-3	Naphthalene	490	U
106-47-8	4-Chloroaniline	490	U
87-68-3	Hexachlorobutadiene	490	U
59-50-7	4-Chloro-3-Methylphenol	490	U
91-57-6	2-Methylnaphthalene	490	U
77-47-4	Hexachlorocyclopentadiene	490	U
88-06-2	2,4,6-Trichlorophenol	490	U
95-95-4	2,4,5-Trichlorophenol	1200	U
91-58-7	2-Chloronaphthalene	490	U
88-74-4	2-Nitroaniline	1200	U
131-11-3	Dimethylphthalate	490	U
208-96-8	Acenaphthylene	490	U
606-20-2	2,6-Dinitrotoluene	490	U
99-09-2	3-Nitroaniline	1200	U
83-32-9	Acenaphthene	490	U

(SECTION VII)

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217966

Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______

412

Matrix: (soil/water) WATER Lab Sample ID: 217966

Sample wt/vol: 810.0 (g/mL) ML Lab File ID: AS720

Level: (low/med) LOW Date Received: 03/10/94

% Moisture: ______ decanted: (Y/N) ___ Date Extracted: 03/15/94

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 03/18/94

Injection Volume: 2.0(uL) Dilution Factor: 4.0

GPC Cleanup: (Y/N) N pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	1200	U
100-02-7	4-Nitrophenol	1200	U
132-64-9	Dibenzofuran	490	U
121-14-2	2,4-Dinitrotoluene	490	U
84-66-2	Diethylphthalate	490	U
7005-72-3	4-Chlorophenyl-phenylether	490	U
86-73-7	Fluorene	490	U
100-01-6	4-Nitroaniline	1200	U
534-52-1	4,6-Dinitro-2-Methylphenol	1200	U
86-30-6	N-Nitrosodiphenylamine (1)	490	U
101-55-3	4-Bromophenyl-phenylether	490	U
118-74-1	Hexachlorobenzene	490	U
87-86-5	Pentachlorophenol	1200	U
85-01-8	Phenanthrene	490	U
120-12-7	Anthracene	490	U
86-74-8	Carbazole	490	U
84-74-2	Di-n-Butylphthalate	490	U
206-44-0	Fluoranthene	490	U
129-00-0	Pyrene	490	U
85-68-7	Butylbenzylphthalate	490	U
91-94-1	3,3'-Dichlorobenzidine	490	U
56-55-3	Benzo(a)Anthracene	490	U
218-01-9	Chrysene	490	U
117-81-7	bis(2-Ethylhexyl)Phthalate	230	BJ
117-84-0	Di-n-Octyl Phthalate	490	U
205-99-2	Benzo(b)Fluoranthene	490	U
207-08-9	Benzo(k)Fluoranthene	490	U
50-32-8	Benzo(a)Pyrene	490	U
193-39-5	Indeno(1,2,3-cd)Pyrene	490	U
53-70-3	Dibenz(a,h)Anthracene	490	U
191-24-2	Benzo(g,h,i)Perylene	490	U

(1) - Cannot be separated from Diphenylamine

(SECTION VII)

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

217966

b Name: CN GEOTECH Contract: ____

Lab Code: ____ Case No.: 12345 SAS No.: ____ SDG No.: ____

Matrix: (soil/water) WATER Lab Sample ID: 217966 413

Sample wt/vol: 810.0 (g/mL) ML Lab File ID: AS720

Level: (low/med) LOW Date Received: 03/10/94

% Moisture: ____ decanted: (Y/N) ____ Date Extracted: 03/15/94

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 03/18/94

Injection Volume: 2.0(uL) Dilution Factor: 4.0

GPC Cleanup: (Y/N) N pH: ____

Number TICs found: 19

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	4.70	440	J
2. 98-01-1	2-Furancarboxaldehyde	5.28	3500	BJN
3.	UNKNOWN	6.22	440	J
4.	UNKNOWN	7.05	350	J
5.	UNKNOWN	7.20	300	J
6.	UNKNOWN	7.37	250	J
7.	UNKNOWN	7.65	200	J
8. 620-02-0	2-Furancarboxaldehyde, 5-met	8.50	8400	JN
9. 22122-36-7	2(5H)-Furanone, 3-methyl-	8.69	250	JN
10. 104-76-7	1-Hexanol, 2-ethyl-	9.87	990	JN
11.	UNKNOWN	9.99	200	J
12. 122-78-1	Benzeneacetaldehyde	10.12	350	JN
13. 98-86-2	Ethanone, 1-phenyl-	10.54	400	JN
14.	UNKNOWN	12.65	200	J
15. 95-16-9	Benzothiazole	13.35	540	JN
16.	UNKNOWN	14.17	400	J
17.	UNKNOWN	15.49	200	J
18. 85-41-6	1H-Isoindole-1,3(2H)-dione	16.85	300	JN
19. 65-85-0	BENZOIC ACID	13.20	46000	JN

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

(SECTION VII)

EPA SAMPLE NO.

217966DL

b Name: CN GEOTECH Contract: ______

ab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______

443

Matrix: (soil/water) WATER Lab Sample ID: 217966DL

Sample wt/vol: 810.0 (g/mL) ML Lab File ID: AS741

Level: (low/med) LOW Date Received: 03/10/94

% Moisture: ______ decanted: (Y/N) ___ Date Extracted: 03/15/94

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 03/28/94

Injection Volume: 2.0 (uL) Dilution Factor: 20.0

GPC Cleanup: (Y/N) N pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	13000	D
111-44-4	bis(2-Chloroethyl)Ether	2500	U
95-57-8	2-Chlorophenol	2500	U
541-73-1	1,3-Dichlorobenzene	2500	U
106-46-7	1,4-Dichlorobenzene	2500	U
95-50-1	1,2-Dichlorobenzene	2500	U
95-48-7	2-Methylphenol	970	DJ
108-60-1	2,2'-oxybis(1-Chloropropane)	2500	U
106-44-5	4-Methylphenol	5800	D
621-64-7	N-Nitroso-Di-n-Propylamine	2500	U
67-72-1	Hexachloroethane	2500	U
98-95-3	Nitrobenzene	1600	DJ
78-59-1	Isophorone	2500	U
88-75-5	2-Nitrophenol	2500	U
105-67-9	2,4-Dimethylphenol	1500	DJ
111-91-1	bis(2-Chloroethoxy)Methane	2500	U
120-83-2	2,4-Dichlorophenol	2500	U
120-82-1	1,2,4-Trichlorobenzene	2500	U
91-20-3	Naphthalene	2500	U
106-47-8	4-Chloroaniline	2500	U
87-68-3	Hexachlorobutadiene	2500	U
59-50-7	4-Chloro-3-Methylphenol	2500	U
91-57-6	2-Methylnaphthalene	2500	U
77-47-4	Hexachlorocyclopentadiene	2500	U
88-06-2	2,4,6-Trichlorophenol	2500	U
95-95-4	2,4,5-Trichlorophenol	6200	U
91-58-7	2-Chloronaphthalene	2500	U
88-74-4	2-Nitroaniline	6200	U
131-11-3	Dimethylphthalate	2500	U
208-96-8	Acenaphthylene	2500	U
606-20-2	2,6-Dinitrotoluene	2500	U
99-09-2	3-Nitroaniline	6200	U
83-32-9	Acenaphthene	2500	U

(SECTION VIII)

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

217966DL

Lab Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: 217966DL

Sample wt/vol: 810.0 (g/mL) ML Lab File ID: AS741

444

Level: (low/med) LOW Date Received: 03/10/94

% Moisture: ______ decanted: (Y/N) ___ Date Extracted: 03/15/94

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 03/28/94

Injection Volume: 2.0(uL) Dilution Factor: 20.0

GPC Cleanup: (Y/N) N pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	6200	U
100-02-7	4-Nitrophenol	6200	U
132-64-9	Dibenzofuran	2500	U
121-14-2	2,4-Dinitrotoluene	2500	U
84-66-2	Diethylphthalate	2500	U
7005-72-3	4-Chlorophenyl-phenylether	2500	U
86-73-7	Fluorene	2500	U
100-01-6	4-Nitroaniline	6200	U
534-52-1	4,6-Dinitro-2-Methylphenol	6200	U
86-30-6	N-Nitrosodiphenylamine (1)	2500	U
101-55-3	4-Bromophenyl-phenylether	2500	U
118-74-1	Hexachlorobenzene	2500	U
87-86-5	Pentachlorophenol	6200	U
85-01-8	Phenanthrene	2500	U
120-12-7	Anthracene	2500	U
86-74-8	Carbazole	2500	U
84-74-2	Di-n-Butylphthalate	2500	U
206-44-0	Fluoranthene	2500	U
129-00-0	Pyrene	2500	U
85-68-7	Butylbenzylphthalate	2500	U
91-94-1	3,3'-Dichlorobenzidine	2500	U
56-55-3	Benzo(a)Anthracene	2500	U
218-01-9	Chrysene	2500	U
117-81-7	bis(2-Ethylhexyl)Phthalate	2500	U
117-84-0	Di-n-Octyl Phthalate	2500	U
205-99-2	Benzo(b)Fluoranthene	2500	U
207-08-9	Benzo(k)Fluoranthene	2500	U
50-32-8	Benzo(a)Pyrene	2500	U
193-39-5	Indeno(1,2,3-cd)Pyrene	2500	U
53-70-3	Dibenz(a,h)Anthracene	2500	U
191-24-2	Benzo(g,h,i)Perylene	2500	U

(1) - Cannot be separated from Diphenylamine

10-2-92-3

(SECTION VII)

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

218027

b Name: CN GEOTECH Contract: ____

Lab Code: ____ Case No.: 12345 SAS No.: ____ SDG No.: ____

Matrix: (soil/water) SOIL Lab Sample ID: 218027 453

Sample wt/vol: 31.60 (g/mL) G Lab File ID: AS734

Level: (low/med) LOW Date Received: 03/15/94

% Moisture: 14 decanted: (Y/N) N Date Extracted: 03/16/94

Concentrated Extract Volume: 3000 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.1

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	UG/KG	Q
108-95-2	Phenol	220	J
111-44-4	bis(2-Chloroethyl)Ether	2200	U
95-57-8	2-Chlorophenol	2200	U
541-73-1	1,3-Dichlorobenzene	2200	U
106-46-7	1,4-Dichlorobenzene	1600	J
95-50-1	1,2-Dichlorobenzene	2200	U
95-48-7	2-Methylphenol	2200	U
108-60-1	2,2'-oxybis(1-Chloropropane)	2200	U
106-44-5	4-Methylphenol	2200	U
621-64-7	N-Nitroso-Di-n-Propylamine	2200	U
67-72-1	Hexachloroethane	2200	U
98-95-3	Nitrobenzene	2200	U
78-59-1	Isophorone	2200	U
88-75-5	2-Nitrophenol	2200	U
105-67-9	2,4-Dimethylphenol	2200	U
111-91-1	bis(2-Chloroethoxy)Methane	2200	U
120-83-2	2,4-Dichlorophenol	2200	U
120-82-1	1,2,4-Trichlorobenzene	2200	U
91-20-3	Naphthalene	2200	U
106-47-8	4-Chloroaniline	2200	U
87-68-3	Hexachlorobutadiene	2200	U
59-50-7	4-Chloro-3-Methylphenol	2200	U
91-57-6	2-Methylnaphthalene	2200	U
77-47-4	Hexachlorocyclopentadiene	2200	U
88-06-2	2,4,6-Trichlorophenol	2200	U
95-95-4	2,4,5-Trichlorophenol	5300	U
91-58-7	2-Chloronaphthalene	2200	U
88-74-4	2-Nitroaniline	5300	U
131-11-3	Dimethylphthalate	2200	U
208-96-8	Acenaphthylene	2200	U
606-20-2	2,6-Dinitrotoluene	2200	U
99-09-2	3-Nitroaniline	5300	U
83-32-9	Acenaphthene	2200	U

(SECTION VII)

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

218027

Lab Name: CN GEOTECH   Contract: ______

Lab Code: ______   Case No.: 12345   SAS No.: ______   SDG No.: ______

454

Matrix: (soil/water) SOIL   Lab Sample ID: 218027

Sample wt/vol: 31.60 (g/mL) G   Lab File ID: AS734

Level: (low/med) LOW   Date Received: 03/15/94

% Moisture: 14   decanted: (Y/N) N   Date Extracted: 03/16/94

Concentrated Extract Volume: 3000 (uL)   Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL)   Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y   pH: 7.1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	5300	U
100-02-7	4-Nitrophenol	5300	U
132-64-9	Dibenzofuran	2200	U
121-14-2	2,4-Dinitrotoluene	2200	U
84-66-2	Diethylphthalate	470	J
7005-72-3	4-Chlorophenyl-phenylether	2200	U
86-73-7	Fluorene	2200	U
100-01-6	4-Nitroaniline	5300	U
534-52-1	4,6-Dinitro-2-Methylphenol	5300	U
86-30-6	N-Nitrosodiphenylamine (1)	2200	U
101-55-3	4-Bromophenyl-phenylether	2200	U
118-74-1	Hexachlorobenzene	2200	U
87-86-5	Pentachlorophenol	5300	U
85-01-8	Phenanthrene	450	J
120-12-7	Anthracene	2200	U
86-74-8	Carbazole	2200	U
84-74-2	Di-n-Butylphthalate	5800	
206-44-0	Fluoranthene	350	J
129-00-0	Pyrene	360	J
85-68-7	Butylbenzylphthalate	7300	
91-94-1	3,3'-Dichlorobenzidine	2200	U
56-55-3	Benzo(a)Anthracene	2200	U
218-01-9	Chrysene	2200	U
117-81-7	bis(2-Ethylhexyl)Phthalate	91000	E
117-84-0	Di-n-Octyl Phthalate	1900	J
205-99-2	Benzo(b)Fluoranthene	2200	U
207-08-9	Benzo(k)Fluoranthene	2200	U
50-32-8	Benzo(a)Pyrene	2200	U
193-39-5	Indeno(1,2,3-cd)Pyrene	2200	U
53-70-3	Dibenz(a,h)Anthracene	2200	U
191-24-2	Benzo(g,h,i)Perylene	2200	U

(1) - Cannot be separated from Diphenylamine

(SECTION VIII)

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

218027

ıb Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______ 455

Matrix: (soil/water) SOIL Lab Sample ID: 218027

Sample wt/vol: 31.60 (g/mL) G Lab File ID: AS734

Level: (low/med) LOW Date Received: 03/15/94

% Moisture: 14 decanted: (Y/N) N Date Extracted: 03/16/94

Concentrated Extract Volume: 3000 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.1

CONCENTRATION UNITS:

Number TICs found: 18 (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	5.03	4000	J
2. 123-42-2	2-Pentanone, 4-hydroxy-4-met	5.37	2400	BJN
3. 498-81-7	p-Menthan-8-ol	12.00	2900	JN
4.	UNKNOWN	12.77	1500	J
5. 629-59-4	Tetradecane	15.80	1300	JN
6. 629-62-9	Pentadecane	17.15	1100	JN
7.	UNKNOWN HYDROCARBON	18.44	1300	J
8.	UNKNOWN HYDROCARBON	19.70	5100	J
9. 544-63-8	Tetradecanoic acid	20.37	2200	JN
10.	UNKNOWN HYDROCARBON	20.90	1500	J
11.	UNKNOWN HYDROCARBON	21.50	1800	J
12.	UNKNOWN HYDROCARBON	21.94	1100	J
13. 57-10-3	Hexadecanoic acid	22.69	20000	JN
14.	UNKNOWN HYDROCARBON	22.99	1500	J
15.	UNKNOWN	23.10	1100	J
16.	UNKNOWN HYDROCARBON	23.72	1300	J
17.	UNKNOWN HYDROCARBON	24.00	880	J
18. 57-11-4	Octadecanoic acid	24.72	3800	JN

(SECTION VII)

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

218027DL

Lab Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) SOIL Lab Sample ID: 218027DL 496

Sample wt/vol: 32.40 (g/mL) G Lab File ID: AS745

Level: (low/med) LOW Date Received: 03/15/94

% Moisture: 14 decanted: (Y/N) N Date Extracted: 03/16/94

Concentrated Extract Volume: 3000 (uL) Date Analyzed: 03/29/94

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.1

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	21000	U
111-44-4	bis(2-Chloroethyl)Ether	21000	U
95-57-8	2-Chlorophenol	21000	U
541-73-1	1,3-Dichlorobenzene	21000	U
106-46-7	1,4-Dichlorobenzene	21000	U
95-50-1	1,2-Dichlorobenzene	21000	U
95-48-7	2-Methylphenol	21000	U
108-60-1	2,2'-oxybis(1-Chloropropane)	21000	U
106-44-5	4-Methylphenol	21000	U
621-64-7	N-Nitroso-Di-n-Propylamine	21000	U
67-72-1	Hexachloroethane	21000	U
98-95-3	Nitrobenzene	21000	U
78-59-1	Isophorone	21000	U
88-75-5	2-Nitrophenol	21000	U
105-67-9	2,4-Dimethylphenol	21000	U
111-91-1	bis(2-Chloroethoxy)Methane	21000	U
120-83-2	2,4-Dichlorophenol	21000	U
120-82-1	1,2,4-Trichlorobenzene	21000	U
91-20-3	Naphthalene	21000	U
106-47-8	4-Chloroaniline	21000	U
87-68-3	Hexachlorobutadiene	21000	U
59-50-7	4-Chloro-3-Methylphenol	21000	U
91-57-6	2-Methylnaphthalene	21000	U
77-47-4	Hexachlorocyclopentadiene	21000	U
88-06-2	2,4,6-Trichlorophenol	21000	U
95-95-4	2,4,5-Trichlorophenol	52000	U
91-58-7	2-Chloronaphthalene	21000	U
88-74-4	2-Nitroaniline	52000	U
131-11-3	Dimethylphthalate	21000	U
208-96-8	Acenaphthylene	21000	U
606-20-2	2,6-Dinitrotoluene	21000	U
99-09-2	3-Nitroaniline	52000	U
83-32-9	Acenaphthene	21000	U

(SECTION VII)

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

218027DL

Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) SOIL Lab Sample ID: 218027DL 497

Sample wt/vol: 32.40 (g/mL) G Lab File ID: AS745

Level: (low/med) LOW Date Received: 03/15/94

% Moisture: 14 decanted: (Y/N) N Date Extracted: 03/16/94

Concentrated Extract Volume: 3000 (uL) Date Analyzed: 03/29/94

Injection Volume: 2.0(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	52000	U
100-02-7	4-Nitrophenol	52000	U
132-64-9	Dibenzofuran	21000	U
121-14-2	2,4-Dinitrotoluene	21000	U
84-66-2	Diethylphthalate	21000	U
7005-72-3	4-Chlorophenyl-phenylether	21000	U
86-73-7	Fluorene	21000	U
100-01-6	4-Nitroaniline	52000	U
534-52-1	4,6-Dinitro-2-Methylphenol	52000	U
86-30-6	N-Nitrosodiphenylamine (1)	21000	U
101-55-3	4-Bromophenyl-phenylether	21000	U
118-74-1	Hexachlorobenzene	21000	U
87-86-5	Pentachlorophenol	52000	U
85-01-8	Phenanthrene	21000	U
120-12-7	Anthracene	21000	U
86-74-8	Carbazole	21000	U
84-74-2	Di-n-Butylphthalate	5900	DJ
206-44-0	Fluoranthene	21000	U
129-00-0	Pyrene	21000	U
85-68-7	Butylbenzylphthalate	7300	DJ
91-94-1	3,3'-Dichlorobenzidine	21000	U
56-55-3	Benzo(a)Anthracene	21000	U
218-01-9	Chrysene	21000	U
117-81-7	bis(2-Ethylhexyl)Phthalate	88000	D
117-84-0	Di-n-Octyl Phthalate	21000	U
205-99-2	Benzo(b)Fluoranthene	21000	U
207-08-9	Benzo(k)Fluoranthene	21000	U
50-32-8	Benzo(a)Pyrene	21000	U
193-39-5	Indeno(1,2,3-cd)Pyrene	21000	U
53-70-3	Dibenz(a,h)Anthracene	21000	U
191-24-2	Benzo(g,h,i)Perylene	21000	U

(1) - Cannot be separated from Diphenylamine

(SECTION VII)

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

218028

Lab Name: CN GEOTECH   Contract: ______

Lab Code: ______   Case No.: 12345   SAS No.: ______   SDG No.: ______

Matrix: (soil/water) SOIL   Lab Sample ID: 218028 504

Sample wt/vol: 30.30 (g/mL) G   Lab File ID: AS735

Level: (low/med) LOW   Date Received: 03/15/94

% Moisture: 0   decanted: (Y/N) N   Date Extracted: 03/16/94

Concentrated Extract Volume: 500.0 (uL)   Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL)   Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y   pH: 6.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	120	J
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
95-50-1	1,2-Dichlorobenzene	330	U
95-48-7	2-Methylphenol	330	U
108-60-1	2,2'-oxybis(1-Chloropropane)	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
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	790	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	790	U
131-11-3	Dimethylphthalate	330	U
208-96-8	Acenaphthylene	330	U
606-20-2	2,6-Dinitrotoluene	330	U
99-09-2	3-Nitroaniline	790	U
83-32-9	Acenaphthene	330	U

(SECTION VII)

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

218028

Lab Name: CN GEOTECH Contract:

Lab Code: Case No.: 12345 SAS No.: SDG No.:

Matrix: (soil/water) SOIL Lab Sample ID: 218028 505

Sample wt/vol: 30.30 (g/mL) G Lab File ID: AS735

Level: (low/med) LOW Date Received: 03/15/94

% Moisture: 0 decanted: (Y/N) N Date Extracted: 03/16/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	790	U
100-02-7	4-Nitrophenol	790	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	790	U
534-52-1	4,6-Dinitro-2-Methylphenol	790	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	790	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
86-74-8	Carbazole	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	330	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-Octyl Phthalate	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

(SECTION VIII)

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

218028

Lab Name: CN GEOTECH Contract: ____

Lab Code: ____ Case No.: 12345 SAS No.: ____ SDG No.: 508

Matrix: (soil/water) SOIL Lab Sample ID: 218028

Sample wt/vol: 30.30 (g/mL) G Lab File ID: AS735

Level: (low/med) LOW Date Received: 03/15/94

% Moisture: 0 decanted: (Y/N) N Date Extracted: 03/16/94

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 03/24/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.7

Number TICs found: 22

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN	5.07	1300	J
2.	123-42-2	2-Pentanone, 4-hydroxy-4-met	5.42	2300	JN
3.	79-34-5	Ethane, 1,1,2,2-tetrachloro-	7.42	660	JN
4.		UNKNOWN	8.27	400	J
5.	100-52-7	Benzaldehyde	8.35	920	JN
6.		UNKNOWN	9.30	260	J
7.	98-86-2	Ethanone, 1-phenyl-	10.45	530	JN
8.	65-85-0	BENZOIC ACID	12.69	7200	JN
9.		UNKNOWN	13.92	130	J
10.	85-41-6	1H-Isoindole-1,3(2H)-dione	16.82	330	JN
11.		UNKNOWN	17.95	160	J
12.		UNKNOWN	18.79	130	J
13.	544-63-8	Tetradecanoic acid	20.35	230	JN
14.		UNKNOWN	21.47	160	J
15.	57-10-3	Hexadecanoic acid	22.59	1800	JN
16.		UNKNOWN HYDROCARBON	23.85	230	J
17.		UNKNOWN HYDROCARBON	24.05	160	J
18.	57-11-4	Octadecanoic acid	24.59	860	JN
19.		UNKNOWN	25.54	160	J
20.		UNKNOWN	26.66	160	J
21.		UNKNOWN	31.09	400	J
22.	612-71-5	1,1':3',1''-Terphenyl, 5'-ph	34.26	990	JN

(SECTION VII)

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

218029

Name: CN GEOTECH   Contract: ____

Lab Code: ____   Case No.: 12345   SAS No.: ____   SDG No.: ____

542

Matrix: (soil/water) WATER   Lab Sample ID: 218029

Sample wt/vol: 940.0 (g/mL) ML   Lab File ID: AS736

Level: (low/med) LOW   Date Received: 03/15/94

% Moisture: ____ decanted: (Y/N) ____   Date Extracted: 03/16/94

Concentrated Extract Volume: 2000 (uL)   Date Analyzed: 03/25/94

Injection Volume: 2.0 (uL)   Dilution Factor: 10.0

GPC Cleanup: (Y/N) N   pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	7100	E
111-44-4	bis(2-Chloroethyl)Ether	210	U
95-57-8	2-Chlorophenol	210	U
541-73-1	1,3-Dichlorobenzene	210	U
106-46-7	1,4-Dichlorobenzene	210	U
95-50-1	1,2-Dichlorobenzene	210	U
95-48-7	2-Methylphenol	600	
108-60-1	2,2'-oxybis(1-Chloropropane)	210	U
106-44-5	4-Methylphenol	2700	
621-64-7	N-Nitroso-Di-n-Propylamine	210	U
67-72-1	Hexachloroethane	210	U
98-95-3	Nitrobenzene	210	U
78-59-1	Isophorone	210	U
88-75-5	2-Nitrophenol	210	U
105-67-9	2,4-Dimethylphenol	730	
111-91-1	bis(2-Chloroethoxy)Methane	210	U
120-83-2	2,4-Dichlorophenol	210	U
120-82-1	1,2,4-Trichlorobenzene	210	U
91-20-3	Naphthalene	210	U
106-47-8	4-Chloroaniline	210	U
87-68-3	Hexachlorobutadiene	210	U
59-50-7	4-Chloro-3-Methylphenol	210	U
91-57-6	2-Methylnaphthalene	210	U
77-47-4	Hexachlorocyclopentadiene	210	U
88-06-2	2,4,6-Trichlorophenol	210	U
95-95-4	2,4,5-Trichlorophenol	530	U
91-58-7	2-Chloronaphthalene	210	U
88-74-4	2-Nitroaniline	530	U
131-11-3	Dimethylphthalate	210	U
208-96-8	Acenaphthylene	210	U
606-20-2	2,6-Dinitrotoluene	210	U
99-09-2	3-Nitroaniline	530	U
83-32-9	Acenaphthene	210	U

FORM I SV-1   3/90

(SECTION VIII)

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

218029

Lab Name: CN GEOTECH   Contract: ______

Lab Code: ______   Case No.: 12345   SAS No.: ______   SDG No.: ______

543

Matrix: (soil/water) WATER   Lab Sample ID: 218029

Sample wt/vol: 940.0 (g/mL) ML   Lab File ID: AS736

Level: (low/med) LOW   Date Received: 03/15/94

% Moisture: ______ decanted: (Y/N) ___   Date Extracted: 03/16/94

Concentrated Extract Volume: 2000 (uL)   Date Analyzed: 03/25/94

Injection Volume: 2.0 (uL)   Dilution Factor: 10.0

GPC Cleanup: (Y/N) N   pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	530	U
100-02-7	4-Nitrophenol	530	U
132-64-9	Dibenzofuran	210	U
121-14-2	2,4-Dinitrotoluene	210	U
84-66-2	Diethylphthalate	210	U
7005-72-3	4-Chlorophenyl-phenylether	210	U
86-73-7	Fluorene	210	U
100-01-6	4-Nitroaniline	530	U
534-52-1	4,6-Dinitro-2-Methylphenol	530	U
86-30-6	N-Nitrosodiphenylamine (1)	45	J
101-55-3	4-Bromophenyl-phenylether	210	U
118-74-1	Hexachlorobenzene	210	U
87-86-5	Pentachlorophenol	530	U
85-01-8	Phenanthrene	210	U
120-12-7	Anthracene	210	U
86-74-8	Carbazole	210	U
84-74-2	Di-n-Butylphthalate	210	U
206-44-0	Fluoranthene	210	U
129-00-0	Pyrene	210	U
85-68-7	Butylbenzylphthalate	210	U
91-94-1	3,3'-Dichlorobenzidine	210	U
56-55-3	Benzo(a)Anthracene	210	U
218-01-9	Chrysene	210	U
117-81-7	bis(2-Ethylhexyl)Phthalate	100	BJ
117-84-0	Di-n-Octyl Phthalate	210	U
205-99-2	Benzo(b)Fluoranthene	210	U
207-08-9	Benzo(k)Fluoranthene	210	U
50-32-8	Benzo(a)Pyrene	210	U
193-39-5	Indeno(1,2,3-cd)Pyrene	210	U
53-70-3	Dibenz(a,h)Anthracene	210	U
191-24-2	Benzo(g,h,i)Perylene	210	U

(1) - Cannot be separated from Diphenylamine

(SECTION VII)

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

218029

Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) WATER Lab Sample ID: 218029 544

Sample wt/vol: 940.0 (g/mL) ML Lab File ID: AS736

Level: (low/med) LOW Date Received: 03/15/94

% Moisture: ______ decanted: (Y/N) ___ Date Extracted: 03/16/94

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 03/25/94

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) N pH: ____

CONCENTRATION UNITS:
Number TICs found: 21 (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	4.73	550	J
2. 98-01-1	2-Furancarboxaldehyde	5.42	4700	BJN
3. 108-94-1	Cyclohexanone	6.82	210	JN
4.	UNKNOWN	7.03	130	J
5. 1192-62-7	Ethanone, 1-(2-furanyl)-	7.20	400	JN
6.	UNKNOWN	7.33	510	J
7.	UNKNOWN	7.57	85	J
8. 620-02-0	2-Furancarboxaldehyde, 5-met	8.55	6600	JN
9. 22122-36-7	2(5H)-Furanone, 3-methyl-	8.65	85	JN
10. 98-03-3	2-Thiophenecarboxaldehyde	9.25	190	JN
11. 104-76-7	1-Hexanol, 2-ethyl-	9.87	300	JN
12. 90-02-8	Benzaldehyde, 2-hydroxy-	10.10	150	JN
13. 98-86-2	Ethanone, 1-phenyl-	10.55	660	JN
14.	UNKNOWN	11.54	64	J
15.	UNKNOWN	12.32	64	J
16. 65-85-0	BENZOIC ACID	13.24	30000	JN
17. 95-16-9	Benzothiazole	13.35	130	JN
18.	UNKNOWN	14.09	85	J
19.	UNKNOWN	15.47	43	J
20.	UNKNOWN	16.74	64	J
21. 85-41-6	1H-Isoindole-1,3(2H)-dione	16.87	85	JN

(SECTION VII)

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

218029DL

Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______ 581

Matrix: (soil/water) WATER Lab Sample ID: 218029DL

Sample wt/vol: 940.0 (g/mL) ML Lab File ID: AS743

Level: (low/med) LOW Date Received: 03/15/94

% Moisture: ______ decanted: (Y/N) ___ Date Extracted: 03/16/94

Concentrated Extract Volume: 2000 (uL) Date Analyzed: 03/28/94

Injection Volume: 2.0(uL) Dilution Factor: 100.0

GPC Cleanup: (Y/N) N pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	7800	D
111-44-4	bis(2-Chloroethyl)Ether	2100	U
95-57-8	2-Chlorophenol	2100	U
541-73-1	1,3-Dichlorobenzene	2100	U
106-46-7	1,4-Dichlorobenzene	2100	U
95-50-1	1,2-Dichlorobenzene	2100	U
95-48-7	2-Methylphenol	550	DJ
108-60-1	2,2'-oxybis(1-Chloropropane)	2100	U
106-44-5	4-Methylphenol	2400	D
621-64-7	N-Nitroso-Di-n-Propylamine	2100	U
67-72-1	Hexachloroethane	2100	U
98-95-3	Nitrobenzene	760	DJ
78-59-1	Isophorone	2100	U
88-75-5	2-Nitrophenol	2100	U
105-67-9	2,4-Dimethylphenol	710	DJ
111-91-1	bis(2-Chloroethoxy)Methane	2100	U
120-83-2	2,4-Dichlorophenol	2100	U
120-82-1	1,2,4-Trichlorobenzene	2100	U
91-20-3	Naphthalene	2100	U
106-47-8	4-Chloroaniline	2100	U
87-68-3	Hexachlorobutadiene	2100	U
59-50-7	4-Chloro-3-Methylphenol	2100	U
91-57-6	2-Methylnaphthalene	2100	U
77-47-4	Hexachlorocyclopentadiene	2100	U
88-06-2	2,4,6-Trichlorophenol	2100	U
95-95-4	2,4,5-Trichlorophenol	5300	U
91-58-7	2-Chloronaphthalene	2100	U
88-74-4	2-Nitroaniline	5300	U
131-11-3	Dimethylphthalate	2100	U
208-96-8	Acenaphthylene	2100	U
606-20-2	2,6-Dinitrotoluene	2100	U
99-09-2	3-Nitroaniline	5300	U
83-32-9	Acenaphthene	2100	U

(SECTION VII)

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

218029DL

582

Lab Name: CN GEOTECH   Contract:

Lab Code: Case No.: 12345   SAS No.:   SDG No.:

Matrix: (soil/water) WATER   Lab Sample ID: 218029DL

Sample wt/vol: 940.0 (g/mL) ML   Lab File ID: AS743

Level: (low/med) LOW   Date Received: 03/15/94

% Moisture: decanted: (Y/N)   Date Extracted: 03/16/94

Concentrated Extract Volume: 2000 (uL)   Date Analyzed: 03/28/94

Injection Volume: 2.0(uL)   Dilution Factor: 100.0

GPC Cleanup: (Y/N) N   pH:

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
51-28-5	2,4-Dinitrophenol	5300	U
100-02-7	4-Nitrophenol	5300	U
132-64-9	Dibenzofuran	2100	U
121-14-2	2,4-Dinitrotoluene	2100	U
84-66-2	Diethylphthalate	2100	U
7005-72-3	4-Chlorophenyl-phenylether	2100	U
86-73-7	Fluorene	2100	U
100-01-6	4-Nitroaniline	5300	U
534-52-1	4,6-Dinitro-2-Methylphenol	5300	U
86-30-6	N-Nitrosodiphenylamine (1)	2100	U
101-55-3	4-Bromophenyl-phenylether	2100	U
118-74-1	Hexachlorobenzene	2100	U
87-86-5	Pentachlorophenol	5300	U
85-01-8	Phenanthrene	2100	U
120-12-7	Anthracene	2100	U
86-74-8	Carbazole	2100	U
84-74-2	Di-n-Butylphthalate	2100	U
206-44-0	Fluoranthene	2100	U
129-00-0	Pyrene	2100	U
85-68-7	Butylbenzylphthalate	2100	U
91-94-1	3,3'-Dichlorobenzidine	2100	U
56-55-3	Benzo(a)Anthracene	2100	U
218-01-9	Chrysene	2100	U
117-81-7	bis(2-Ethylhexyl)Phthalate	2100	U
117-84-0	Di-n-Octyl Phthalate	2100	U
205-99-2	Benzo(b)Fluoranthene	2100	U
207-08-9	Benzo(k)Fluoranthene	2100	U
50-32-8	Benzo(a)Pyrene	2100	U
193-39-5	Indeno(1,2,3-cd)Pyrene	2100	U
53-70-3	Dibenz(a,h)Anthracene	2100	U
191-24-2	Benzo(g,h,i)Perylene	2100	U

(1) - Cannot be separated from Diphenylamine

(SECTION VII) 1050-200

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

218030

Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) SOIL Lab Sample ID: 218030 591

Sample wt/vol: 0.010 (g/mL) G Lab File ID: AS718

Level: (low/med) MED Date Received: 03/10/94

% Moisture: ______ decanted: (Y/N) N Date Extracted: 03/17/94

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 03/18/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ______

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	10000000	U
111-44-4	bis(2-Chloroethyl)Ether	10000000	U
95-57-8	2-Chlorophenol	10000000	U
541-73-1	1,3-Dichlorobenzene	10000000	U
106-46-7	1,4-Dichlorobenzene	10000000	U
95-50-1	1,2-Dichlorobenzene	10000000	U
95-48-7	2-Methylphenol	10000000	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10000000	U
106-44-5	4-Methylphenol	10000000	U
621-64-7	N-Nitroso-Di-n-Propylamine	10000000	U
67-72-1	Hexachloroethane	10000000	U
98-95-3	Nitrobenzene	10000000	U
78-59-1	Isophorone	10000000	U
88-75-5	2-Nitrophenol	10000000	U
105-67-9	2,4-Dimethylphenol	10000000	U
111-91-1	bis(2-Chloroethoxy)Methane	10000000	U
120-83-2	2,4-Dichlorophenol	10000000	U
120-82-1	1,2,4-Trichlorobenzene	10000000	U
91-20-3	Naphthalene	10000000	U
106-47-8	4-Chloroaniline	10000000	U
87-68-3	Hexachlorobutadiene	10000000	U
59-50-7	4-Chloro-3-Methylphenol	10000000	U
91-57-6	2-Methylnaphthalene	10000000	U
77-47-4	Hexachlorocyclopentadiene	10000000	U
88-06-2	2,4,6-Trichlorophenol	10000000	U
95-95-4	2,4,5-Trichlorophenol	25000000	U
91-58-7	2-Chloronaphthalene	10000000	U
88-74-4	2-Nitroaniline	25000000	U
131-11-3	Dimethylphthalate	10000000	U
208-96-8	Acenaphthylene	10000000	U
606-20-2	2,6-Dinitrotoluene	10000000	U
99-09-2	3-Nitroaniline	25000000	U
83-32-9	Acenaphthene	10000000	U

(SECTION VII)

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

218030

Lab Name: CN GEOTECH Contract: ____

Lab Code: ____ Case No.: 12345 SAS No.: ____ SDG No.: ____

Matrix: (soil/water) SOIL Lab Sample ID: 218030 592

Sample wt/vol: 0.010 (g/mL) G Lab File ID: AS718

Level: (low/med) MED Date Received: 03/10/94

% Moisture: ____ decanted: (Y/N) N Date Extracted: 03/17/94

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 03/18/94

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ____

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	25000000	U
100-02-7	4-Nitrophenol	25000000	U
132-64-9	Dibenzofuran	10000000	U
121-14-2	2,4-Dinitrotoluene	10000000	U
84-66-2	Diethylphthalate	10000000	U
7005-72-3	4-Chlorophenyl-phenylether	10000000	U
86-73-7	Fluorene	10000000	U
100-01-6	4-Nitroaniline	25000000	U
534-52-1	4,6-Dinitro-2-Methylphenol	25000000	U
86-30-6	N-Nitrosodiphenylamine (1)	10000000	U
101-55-3	4-Bromophenyl-phenylether	10000000	U
118-74-1	Hexachlorobenzene	10000000	U
87-86-5	Pentachlorophenol	25000000	U
85-01-8	Phenanthrene	10000000	U
120-12-7	Anthracene	10000000	U
86-74-8	Carbazole	10000000	U
84-74-2	Di-n-Butylphthalate	10000000	U
206-44-0	Fluoranthene	10000000	U
129-00-0	Pyrene	10000000	U
85-68-7	Butylbenzylphthalate	10000000	U
91-94-1	3,3'-Dichlorobenzidine	10000000	U
56-55-3	Benzo(a)Anthracene	10000000	U
218-01-9	Chrysene	10000000	U
117-81-7	bis(2-Ethylhexyl)Phthalate	12000000	
117-84-0	Di-n-Octyl Phthalate	10000000	U
205-99-2	Benzo(b)Fluoranthene	10000000	U
207-08-9	Benzo(k)Fluoranthene	10000000	U
50-32-8	Benzo(a)Pyrene	10000000	U
193-39-5	Indeno(1,2,3-cd)Pyrene	10000000	U
53-70-3	Dibenz(a,h)Anthracene	10000000	U
191-24-2	Benzo(g,h,i)Perylene	10000000	U

(1) - Cannot be separated from Diphenylamine

(SECTION VII)

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

218030

Name: CN GEOTECH Contract: ______

Lab Code: ______ Case No.: 12345 SAS No.: ______ SDG No.: ______

Matrix: (soil/water) SOIL Lab Sample ID: 218030 593

Sample wt/vol: 0.010 (g/mL) G Lab File ID: AS718

Level: (low/med) MED Date Received: 03/10/94

% Moisture: ______ decanted: (Y/N) N Date Extracted: 03/17/94

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 03/18/94

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ______

Number TICs found: 21

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 629-62-9	Pentadecane	17.17	6000000	JN
2. 629-73-2	1-Hexadecene	18.37	6000000	JN
3. 544-76-3	Hexadecane	18.45	6000000	JN
4. 1081-75-0	Benzene, 1,1'-(1,3-propanedi	19.22	16000000	JN
5. 629-78-7	Heptadecane	19.67	18000000	JN
6.	UNKNOWN HYDROCARBON	20.89	7000000	J
7.	UNKNOWN HYDROCARBON	21.94	18000000	J
8. 112-39-0	Hexadecanoic acid, methyl es	22.20	7000000	JN
9. 57-10-3	Hexadecanoic acid	22.57	22000000	JN
10.	UNKNOWN HYDROCARBON	22.99	13000000	J
11.	UNKNOWN HYDROCARBON	23.89	8000000	J
12.	UNKNOWN HYDROCARBON	24.00	7000000	J
13.	UNKNOWN	24.07	10000000	J
14. 57-11-4	Octadecanoic acid	24.57	14000000	JN
15. 629-97-0	Docosane	24.97	11000000	JN
16.	UNKNOWN HYDROCARBON	25.89	14000000	J
17.	UNKNOWN HYDROCARBON	26.79	19000000	J
18. 630-01-3	Hexacosane	28.71	17000000	JN
19.	UNKNOWN HYDROCARBON	29.96	21000000	J
20.	UNKNOWN HYDROCARBON	38.24	17000000	J
21.	UNKNOWN	38.84	11000000	J

Grand Junction Projects Office Analytical Laboratory

V1.05

ANALYTICAL RESULTS

(SECTION ?)

Customer ID: 1017-02-1
Ticket ID:

Date: May 9, 1994
Lab ID: 217608

Requestor: KEVIN HARTMANN
Sample Matrix: SOIL
Project Number: W00000CR8

Case: 12345
Date Received: Feb 22, 1994
Date Collected: Feb 17, 1994

ANALYSIS REQUESTED	RESULTS	ERROR	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Gross Alpha	10.7	2.4	PCI/G	04/05/94	RC-3 R01
Mass Percent Ash	76.2		%	03/21/94	ASTM D482
Gross Beta	51.5	5.1	PCI/G	04/19/94	RC-3 R01
Cesium-137	10.85	8.89	PCI	03/22/94	GS-1 R00
Radium-226	269.19	36.28	PCI	03/22/94	GS-1 R00
Uranium-238	603.37	158.54	PCI	03/22/94	GS-1 R00
Loss On Drying	13.78		%	02/23/94	SP-5 R00
Oil and Grease	4904		MG/KG	04/28/94	CC-1 R02
pH	6.55			03/21/94	H-4 R03
Total Petroleum Hydrocarbon	745		MG/KG	04/29/94	CC-1 R02
Total Solids	860900		MG/KG	03/21/94	K-3 R05

Grand Junction Projects Office Analytical Laboratory

V1.05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 1017-03-1
Ticket ID:

Requestor: KEVIN HARTMANN
Sample Matrix: SOIL
Project Number: W00000CR8

Date: May 18, 1994
Lab ID: 217609

Case: 12345
Date Received: Feb 22, 1994
Date Collected: Feb 17, 1994

ANALYSIS REQUESTED	RESULTS	ERROR	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Mass Percent Ash	93.4		%	03/21/94	ASTM D482
Loss On Drying	0		%	02/23/94	SP-5 R00
Oil and Grease	<10		MG/KG	04/28/94	CC-1 R02
pH	5.67			03/21/94	H-4 R03
Total Petroleum Hydrocarbon	<10		MG/KG	04/29/94	CC-1 R02
Total Solids	1000000		MG/KG	03/21/94	K-3 R05
Gross Alpha	9.0	2.1	PCI/G	04/05/94	RC-3 R01

V1.05 ANALYTICAL RESULTS **(SECTION I)**

Customer ID: 1017-06-1
Ticket ID:

Date: May 18, 1994
Lab ID: 217610

Requestor: KEVIN HARTMANN
Sample Matrix: LIQUID
Project Number: W00000CR8

Case: 12345
Date Received: Feb 22, 1994
Date Collected: Feb 18, 1994

ANALYSIS REQUESTED	RESULTS	ERROR	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Gross Alpha	<42	NA	PCI/L	03/24/94	RC-3 R01
Mass Percent Ash	0.026		%	02/24/94	ASTM D482
Gross Beta	<49	NA	PCI/L	03/24/94	RC-3 R01
Oil and Grease	47.38		MG/L	04/28/94	CC-1 R02
pH	2.4			02/23/94	H-4 R03
Radium-226	<0.57	NA	PCI/L	04/19/94	RC-5 R00
Total Dissolved Solids	1962		MG/L	02/24/94	K-3 R05
Total Petroleum Hydrocarbon	7.94		MG/L	04/28/94	CC-1 R02
Total Solids	1874		MG/L	02/24/94	K-3 R05
Total Suspended Solids	<5		MG/L	02/24/94	K-3 R05

V1.05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 1017-03-1
Ticket ID:

Date: May 9, 1994
Lab ID: 217655

Requestor: KEVIN HARTMANN
Sample Matrix: SOIL
Project Number: W00000CR8

Case: 12345
Date Received: Feb 22, 1994
Date Collected: Feb 17, 1994

ANALYSIS REQUESTED	RESULTS	ERROR	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Loss On Drying	0.19		%	02/24/94	SP-5 R00

V1.05

ANALYTICAL RESULTS

Customer ID: 1017-03A,B-7
Ticket ID:

Requestor: KEVIN HARTMANN
Sample Matrix: SOIL
Project Number: W00000CR8

Date: May 9, 1994
Lab ID: 217959

Case: 12345
Date Received: Mar 10, 1994
Date Collected: Mar 8, 1994

ANALYSIS REQUESTED	RESULTS	ERROR	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Gross Alpha	10.5	2.3	PCI/G	04/05/94	RC-3 R01
Mass Percent Ash	93.1		%	03/21/94	ASTM D482
Oil and Grease	<10		MG/KG	04/28/94	CC-1 R02
pH	6.74			03/21/94	H-4 R03
Total Petroleum Hydrocarbon	<10		MG/KG	04/29/94	CC-1 R02
Total Solids	1000000		MG/KG	03/21/94	K-3 R05

V1.05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 1017-02-7
Ticket ID:

Date: May 9, 1994
Lab ID: 217960

Requestor: KEVIN HARTMANN
Sample Matrix: SOIL
Project Number: W00000CR8

Case: 12345
Date Received: Mar 10, 1994
Date Collected: Mar 8, 1994

ANALYSIS REQUESTED	RESULTS	ERROR	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Gross Alpha	13.5	2.7	PCI/G	04/05/94	RC-3 R01
Mass Percent Ash	78.7		%	03/21/94	ASTM D482
Gross Beta	86.4	6.3	PCI/G	04/19/94	RC-3 R01
Radium-226	1000.6	55.74	PCI	03/21/94	GS-1 R00
Uranium-235	71.59	40.42	PCI	03/21/94	GS-1 R00
Uranium-238	1131.0	222.93	PCI	03/21/94	GS-1 R00
Oil and Grease	4715		MG/KG	04/28/94	CC-1 R02
pH	6.71			03/21/94	H-4 R03
Total Petroleum Hydrocarbon	5049		MG/KG	04/29/94	CC-1 R02
Total Solids	875800		MG/KG	03/21/94	K-3 R05

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ANALYTICAL RESULTS (SECTION !)

Customer ID: 1017-06-7
Ticket ID:

Date: May 9, 1994
Lab ID: 217961

Requestor: KEVIN HARTMANN
Sample Matrix: LIQUID
Project Number: W00000CR8

Case: 12345
Date Received: Mar 10, 1994
Date Collected: Mar 9, 1994

ANALYSIS REQUESTED	RESULTS	ERROR	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Gross Alpha	<35	NA	PCI/L	03/24/94	RC-3 R01
Mass Percent Ash	~0.0114		%	03/15/94	ASTM D482
Gross Beta	<48	NA	PCI/L	03/24/94	RC-3 R01
Oil and Grease	75.76		MG/L	04/28/94	CC-1 R02
pH	3.33			03/11/94	H-4 R03
Radium-226	<0.44	NA	PCI/L	04/19/94	RC-5 R00
Total Dissolved Solids	682		MG/L	03/15/94	K-3 R05
Total Petroleum Hydrocarbon	54.22		MG/L	04/28/94	CC-1 R02
Total Solids	772		MG/L	03/15/94	K-3 R05
Total Suspended Solids	~30		MG/L	03/15/94	K-3 R05

V1.05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 1017-10-7
Ticket ID:

Date: May 9, 1994
Lab ID: 217962

Requestor: KEVIN HARTMANN
Sample Matrix: ORGANIC SOLUTION
Project Number: W00000CR8

Case: 12345
Date Received: Mar 10, 1994
Date Collected: Mar 9, 1994

ANALYSIS REQUESTED	RESULTS	ERROR	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Gross Alpha	<580	NA	PCI/L	04/25/94	RC-3 R01
Mass Percent Ash	0.18		%	04/22/94	ASTM D482
Gross Beta	<1000	NA	PCI/L	04/25/94	RC-3 R01

71.05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 1016-02-5
Ticket ID:

Date: May 9, 1994
Lab ID: 217964

Requestor: KEVIN HARTMANN
Sample Matrix: SOIL
Project Number: W00000CR8

Case: 12345
Date Received: Mar 10, 1994
Date Collected: Mar 7, 1994

ANALYSIS REQUESTED	RESULTS	ERROR	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Gross Alpha	8.16	1.99	PCI/G	04/06/94	RC-3 R01
Mass Percent Ash	84.6		%	03/21/94	ASTM D482
Gross Beta	40.7	3.9	PCI/G	04/19/94	RC-3 R01
Radium-226	518.52	42.24	PCI	03/21/94	GS-1 R00
Uranium-238	393.58	187.57	PCI	03/21/94	GS-1 R00
Oil and Grease	437		MG/KG	04/28/94	CC-1 R02
pH	7.40			03/21/94	H-4 R03
Total Petroleum Hydrocarbon	467		MG/KG	04/29/94	CC-1 R02
Total Solids	913900		MG/KG	03/21/94	K-3 R05

V1.05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 1016-03A,B-5
Ticket ID:

Date: May 9, 1994
Lab ID: 217965

Requestor: KEVIN HARTMANN
Sample Matrix: SOIL
Project Number: W00000CR8

Case: 12345
Date Received: Mar 10, 1994
Date Collected: Mar 7, 1994

ANALYSIS REQUESTED	RESULTS	ERROR	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Gross Alpha	5.75	1.65	PCI/G	04/06/94	RC-3 R01
Mass Percent Ash	92.5		%	03/21/94	ASTM D482
Oil and Grease	<10		MG/KG	04/28/94	CC-1 R02
pH	6.99			03/21/94	H-4 R03
Total Petroleum Hydrocarbon	<10		MG/KG	04/29/94	CC-1 R02
Total Solids	999600		MG/KG	03/21/94	K-3 R05

71.05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 1016-06-5
Ticket ID:

Requestor: KEVIN HARTMANN
Sample Matrix: LIQUID
Project Number: W00000CR8

Date: May 9, 1994
Lab ID: 217966

Case: 12345
Date Received: Mar 10, 1994
Date Collected: Mar 8, 1994

ANALYSIS REQUESTED	RESULTS	ERROR	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Gross Alpha	<52	NA	PCI/L	03/24/94	RC-3 R01
Mass Percent Ash	~0.017		%	03/15/94	ASTM D482
Gross Beta	<50	NA	PCI/L	03/24/94	RC-3 R01
Oil and Grease	49.89		MG/L	04/28/94	CC-1 R02
pH	4.08			03/11/94	H-4 R03
Radium-226	<0.73	NA	PCI/L	04/19/94	RC-5 R00
Total Dissolved Solids	2152		MG/L	03/15/94	K-3 R05
Total Petroleum Hydrocarbon	42.30		MG/L	04/28/94	CC-1 R02
Total Solids	2748		MG/L	03/15/94	K-3 R05
Total Suspended Solids	~31		MG/L	03/15/94	K-3 R05

V1.05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 1016-02-6
Ticket ID:

Date: May 9, 1994
Lab ID: 218027

Requestor: KEVIN HARTMANN
Sample Matrix: SOIL
Project Number: W00000CR8

Case: 12345
Date Received: Mar 15, 1994
Date Collected: Mar 9, 1994

ANALYSIS REQUESTED	RESULTS	ERROR	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Gross Alpha	8.8	2.1	PCI/G	04/06/94	RC-3 R01
Mass Percent Ash	76.2		%	03/21/94	ASTM D482
Gross Beta	43.4	4.0	PCI/G	04/19/94	RC-3 R01
Cesium-137	10.85	8.89	PCI	03/22/94	GS-1 R00
Radium-226	269.19	36.28	PCI	03/22/94	GS-1 R00
Uranium-238	603.37	158.54	PCI	03/22/94	GS-1 R00
Oil and Grease	4209		MG/KG	04/28/94	CC-1 R02
pH	7.09			03/21/94	H-4 R03
Total Petroleum Hydrocarbon	2134		MG/KG	04/29/94	CC-1 R02
Total Solids	871400		MG/KG	03/21/94	K-3 R05

/1.05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 1016-03A,B-6
Ticket ID:

Requestor: KEVIN HARTMANN
Sample Matrix: SOIL
Project Number: W00000CR8

Date: May 9, 1994
Lab ID: 218028

Case: 12345
Date Received: Mar 15, 1994
Date Collected: Mar 9, 1994

ANALYSIS REQUESTED	RESULTS	ERROR	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Gross Alpha	8.7	2.1	PCI/G	04/06/94	RC-3 R01
Mass Percent Ash	91.8		%	03/21/94	ASTM D482
Oil and Grease	<10		MG/KG	04/28/94	CC-1 R02
pH	6.72			03/21/94	H-4 R03
Total Petroleum Hydrocarbon	<10		MG/KG	04/29/94	CC-1 R02
Total Solids	1000000		MG/KG	03/21/94	K-3 R05

/1.05

ANALYTICAL RESULTS

(SECTION I)

Customer ID: 1016-06-6
Ticket ID:

Date: May 9, 1994
Lab ID: 218029

Requestor: KEVIN HARTMANN
Sample Matrix: LIQUID
Project Number: W00000CR8

Case: 12345
Date Received: Mar 15, 1994
Date Collected: Mar 10, 1994

ANALYSIS REQUESTED	RESULTS	ERROR	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Gross Alpha	<52	NA	PCI/L	03/24/94	RC-3 R01
Mass Percent Ash	~0.0226		%	03/17/94	ASTM D482
Gross Beta	<50	NA	PCI/L	03/24/94	RC-3 R01
Oil and Grease	61.34		MG/L	04/28/94	CC-1 R02
pH	3.09			03/15/94	H-4 R03
Radium-226	<0.54	NA	PCI/L	04/19/94	RC-5 R00
Total Dissolved Solids	1358		MG/L	03/17/94	K-3 R05
Total Petroleum Hydrocarbon	79.16		MG/L	04/28/94	CC-1 R02
Total Solids	1914		MG/L	03/17/94	K-3 R05
Total Suspended Solids	~33		MG/L	03/17/94	K-3 R05

V1.05

ANALYTICAL RESULTS **(SECTION I)**

Customer ID: 1016-10-6
Ticket ID:

Requestor: KEVIN HARTMANN
Sample Matrix: ORGANIC SOLUTION
Project Number: W00000CR8

Date: May 9, 1994
Lab ID: 218030

Case: 12345
Date Received: Mar 15, 1994
Date Collected: Mar 9, 1994

ANALYSIS REQUESTED	RESULTS	ERROR	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Gross Alpha	<1440	NA	PCI/L	04/25/94	RC-3 R01
Mass Percent Ash	0.275		%	04/22/94	ASTM D482
Gross Beta	<2500	NA	PCI/L	04/25/94	RC-3 R01

ANALYTICAL REPORT

TO: KEVIN HARTMANN

PROJECT: W00000CR8

DATE: Monday, May 9, 1994

REQUISITION(S): 12345

PREPARED BY:

GRAND JUNCTION PROJECTS OFFICE ANALYTICAL LABORATORY
2597 B 3/4 ROAD
P.O. BOX 14000
GRAND JUNCTION, COLORADO 81502-5504
(303-248-6165)

This package contains the total solids, loss on drying, and ash results for samples submitted by Clemson Technical Center to RUST-Geotech for analysis under the VACTRAX project.

The mass percent ash was determined in accordance with ASTM Standard D 482-91.

One of the requested analyses on the the analyte list submitted to Geotech by the Clemson Technical Center was percent moisture by EPA Method 160.3 MOD. The analysis for percent moisture was done and reported in accordance with Geotech Standard Operating Procedure K-3, which is the Laboratory's SOP for EPA Methods 160.1 through 160.4. The results are reported as percent solids, rather than as percent moisture. EPA Method 160.3 indicates that results should be reported as total residue. If an assumption is made that the weight lost during drying is entirely water, the weight percent moisture may be calculated by dividing the total solids result in mg/kg by 1,000,000, subtracting the result from one, and multiplying by one hundred. The laboratory was initially going to determine percent moisture in accordance with Geotech SOP SP-5, loss on drying (LOD). Three samples were analyzed for LOD before the test was changed to total solids. One of these samples had an LOD of only 0.19%, and was not reanalyzed for total solids. The LOD data are included in this report. EPA Method 160.3 indicates that the practical range of the determination is from 10 mg/l to 20,000 mg/l.

5/9/94

V1.05

ANALYTICAL RESULTS

Customer ID: 1017-02-1
Ticket ID:

Requestor: KEVIN HARTMANN
Sample Matrix: SOIL
Project Number: W00000CR8

Date: May 9, 1994
Lab ID: 217608

Case: 12345
Date Received: Feb 22, 1994
Date Collected: Feb 17, 1994

ANALYSIS REQUESTED	RESULTS	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Mass Percent Ash	76.2	%	03/21/94	ASTM D482
Loss On Drying	13.78	%	02/23/94	SP-5 R00
Total Solids	860900	MG/KG	03/21/94	K-3 R05

Grand Junction Projects Office Analytical Laboratory

V1.05

ANALYTICAL RESULTS

Customer ID: 1017-03-1
Ticket ID:

Requestor: KEVIN HARTMANN
Sample Matrix: SOIL
Project Number: W00000CR8

Date: May 9, 1994
Lab ID: 217609

Case: 12345
Date Received: Feb 22, 1994
Date Collected: Feb 17, 1994

ANALYSIS REQUESTED	RESULTS	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Mass Percent Ash	93.4	%	03/21/94	ASTM D482
Loss On Drying	0	%	02/23/94	SP-5 R00
Total Solids	1000000	MG/KG	03/21/94	K-3 R05

Grand Junction Projects Office Analytical Laboratory

V1.05

ANALYTICAL RESULTS

Customer ID: 1017-06-1
Ticket ID:

Requestor: KEVIN HARTMANN
Sample Matrix: LIQUID
Project Number: W00000CR8

Date: May 9, 1994
Lab ID: 217610

Case: 12345
Date Received: Feb 22, 1994
Date Collected: Feb 18, 1994

ANALYSIS REQUESTED	RESULTS	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Mass Percent Ash	0.026	%	02/24/94	ASTM D482
Total Solids	1874	MG/L	02/24/94	K-3 R05

Grand Junction Projects Office Analytical Laboratory

V1.05

ANALYTICAL RESULTS

Customer ID: 1017-03-1
Ticket ID:

Date: May 9, 1994
Lab ID: 217655

Requestor: KEVIN HARTMANN
Sample Matrix: SOIL
Project Number: W00000CR8

Case: 12345
Date Received: Feb 22, 1994
Date Collected: Feb 17, 1994

ANALYSIS REQUESTED	RESULTS	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Loss On Drying	0.19	%	02/24/94	SP-5 R00

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V1.05

ANALYTICAL RESULTS

Customer ID: 1017-03A,B-7
Ticket ID:

Date: May 9, 1994
Lab ID: 217959

Requestor: KEVIN HARTMANN
Sample Matrix: SOIL
Project Number: W00000CR8

Case: 12345
Date Received: Mar 10, 1994
Date Collected: Mar 8, 1994

ANALYSIS REQUESTED	RESULTS	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Mass Percent Ash	93.1	%	03/21/94	ASTM D482
Total Solids	1000000	MG/KG	03/21/94	K-3 R05

V1.05

ANALYTICAL RESULTS

Customer ID: 1017-02-7
Ticket ID:

Requestor: KEVIN HARTMANN
Sample Matrix: SOIL
Project Number: W00000CR8

Date: May 9, 1994
Lab ID: 217960

Case: 12345
Date Received: Mar 10, 1994.
Date Collected: Mar 8, 1994

ANALYSIS REQUESTED	RESULTS	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Mass Percent Ash	78.7	%	03/21/94	ASTM D482
Total Solids	875800	MG/KG	03/21/94	K-3 R05

Grand Junction Projects Office Analytical Laboratory

V1.05

ANALYTICAL RESULTS

Customer ID: 1017-06-7
Ticket ID:

Requestor: KEVIN HARTMANN
Sample Matrix: LIQUID
Project Number: W00000CR8

Date: May 9, 1994
Lab ID: 217961

Case: 12345
Date Received: Mar 10, 1994.
Date Collected: Mar 9, 1994

ANALYSIS REQUESTED	RESULTS	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Mass Percent Ash	~0.0114	%	03/15/94	ASTM D482
Total Solids	772	MG/L	03/15/94	K-3 R05

Grand Junction Projects Office Analytical Laboratory

V1.05

ANALYTICAL RESULTS

Customer ID: 1017-10-7
Ticket ID:

Requestor: KEVIN HARTMANN
Sample Matrix: ORGANIC SOLUTION
Project Number: W00000CR8

Date: May 9, 1994
Lab ID: 217962

Case: 12345
Date Received: Mar 10, 1994
Date Collected: Mar 9, 1994

ANALYSIS REQUESTED	RESULTS	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Mass Percent Ash	0.18	%	04/22/94	ASTM D482

Grand Junction Projects Office Analytical Laboratory

V1.05

ANALYTICAL RESULTS

Customer ID: 1016-02-5
Ticket ID:

Requestor: KEVIN HARTMANN
Sample Matrix: SOIL
Project Number: W00000CR8

Date: May 9, 1994
Lab ID: 217964

Case: 12345
Date Received: Mar 10, 1994
Date Collected: Mar 7, 1994

ANALYSIS REQUESTED	RESULTS	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Mass Percent Ash	84.6	%	03/21/94	ASTM D482
Total Solids	913900	MG/KG	03/21/94	K-3 R05

V1.05

ANALYTICAL RESULTS

Customer ID: 1016-03A,B-5
Ticket ID:

Requestor: KEVIN HARTMANN
Sample Matrix: SOIL
Project Number: W00000CR8

Date: May 9, 1994
Lab ID: 217965

Case: 12345
Date Received: Mar 10, 1994
Date Collected: Mar 7, 1994

ANALYSIS REQUESTED	RESULTS	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Mass Percent Ash	92.5	%	03/21/94	ASTM D482
Total Solids	999600	MG/KG	03/21/94	K-3 R05

V1.05

ANALYTICAL RESULTS

Customer ID: 1016-06-5
Ticket ID:

Requestor: KEVIN HARTMANN
Sample Matrix: LIQUID
Project Number: W00000CR8

Date: May 9, 1994
Lab ID: 217966

Case: 12345
Date Received: Mar 10, 1994.
Date Collected: Mar 8, 1994

ANALYSIS REQUESTED	RESULTS	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Mass Percent Ash	~0.017	%	03/15/94	ASTM D482
Total Solids	2748	MG/L	03/15/94	K-3 R05

V1.05

ANALYTICAL RESULTS

Customer ID: 1016-02-6
Ticket ID:

Date: May 9, 1994
Lab ID: 218027

Requestor: KEVIN HARTMANN
Sample Matrix: SOIL
Project Number: W00000CR8

Case: 12345
Date Received: Mar 15, 1994
Date Collected: Mar 9, 1994

ANALYSIS REQUESTED	RESULTS	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Mass Percent Ash	76.2	%	03/21/94	ASTM D482
Total Solids	871400	MG/KG	03/21/94	K-3 R05

ANALYTICAL RESULTS

Customer ID: 1016-03A,B-6
Ticket ID:

Requestor: KEVIN HARTMANN
Sample Matrix: SOIL
Project Number: W00000CR8

Date: May 9, 1994
Lab ID: 218028

Case: 12345
Date Received: Mar 15, 1994
Date Collected: Mar 9, 1994

ANALYSIS REQUESTED	RESULTS	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Mass Percent Ash	91.8	%	03/21/94	ASTM D482
Total Solids	1000000	MG/KG	03/21/94	K-3 R05

ANALYTICAL RESULTS

Customer ID: 1016-06-6
Ticket ID:

Requestor: KEVIN HARTMANN
Sample Matrix: LIQUID
Project Number: W00000CR8

Date: May 9, 1994
Lab ID: 218029

Case: 12345
Date Received: Mar 15, 1994
Date Collected: Mar 10, 1994

ANALYSIS REQUESTED	RESULTS	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Mass Percent Ash	~0.0226	%	03/17/94	ASTM D482
Total Solids	1914	MG/L	03/17/94	K-3 R05

V1.05

ANALYTICAL RESULTS

Customer ID: 1016-10-6
Ticket ID:

Requestor: KEVIN HARTMANN
Sample Matrix: ORGANIC SOLUTION
Project Number: W00000CR8

Date: May 9, 1994
Lab ID: 218030

Case: 12345
Date Received: Mar 15, 1994
Date Collected: Mar 9, 1994

ANALYSIS REQUESTED	RESULTS	UNITS	DATE ANALYZED	METHOD OF ANALYSIS
Mass Percent Ash	0.275	%	04/22/94	ASTM D482