PERMIT ATTACHMENT K
CLOSURE PLAN

Rinchem Company Inc. (**RCI)** Container Storage Facility (**CSF**) shall continue to be operated as long as it is deemed economically viable, therefore, currently there is no expected date of closure. However, when the CSF is closed, there shall be no partial closures only a final closure.

Hazardous Waste Inventory

RCI shall not manage and/or store more than 55,000 gallons of hazardous waste on-site at any one time, as specified in Permit Attachment B, *Authorized Wastes*. The waste may be managed and stored for up to a year until economic quantity loads can be transported. Some of the wastes shall be bulked and transported in tankers. At the beginning of closure, or before, the waste shall be removed and transported to disposal facilities using the same procedures and practices that are employed in RCI's day-to-day business. An exemplary sampling plan listing the areas and procedures to be used for testing the CSF during closure activities is included in this Permit Attachment.

Closure Performance Standards

Once all of the wastes are removed from the building, a soil gas survey or the latest proven technology being used at the time to detect organic substances shall be used. The survey shall be performed in storage areas C and D, on the docks, in the sumps and any other areas where there is known to have been a spill of any organic solvent or hazardous waste.

In the rooms where corrosive wastes and products have been stored, concrete corings shall be done at several places in each storage area. A pH test shall be conducted on each concrete sample and the soil beneath it, to determine if further investigation is warranted. The pH shall be obtained by adding deionized water to the sample and the result shall be taken from the liquid. If a more current method of detecting corrosives is available at the time of closure, that method shall be used instead of the one described in the current paragraph.

Random sampling of soil for background levels in the surrounding area shall be conducted during the closure process in order to determine the action levels for pH. Sample procedures shall comply with the U.S. EPA's SW - 846: Test Methods for Evaluating Solid Waste - Physical and Chemical Methods. If the pH levels from the CSF are out of the background screening action range, further investigation shall be conducted. All survey samples shall be sent to Hall Environmental Company for analysis, or another qualified contract laboratory with proper quality assurance/quality control (**QA/QC**) procedures in place available at time of Closure of the CSF.

Because of its operational history and RCI's policy that requires all leaks and spills to be cleaned up at the time of the incident, it is expected that very little, if any, cleanup shall have to be done at final closure. However, in case the analysis of the samples described above reveals any areas of contamination, both the concrete and soil shall be excavated in the area of concern, analyzed and disposed of in an appropriate manner and the CSF closed in place as a landfill if RCI cannot clean-close the CSF.

When RCI decides to close the CSF, notices shall be sent to generators employing RCI's services to inform them of the pending discontinuation of receiving their waste and materials. NMED shall be informed at least 60 days prior to the date that final closure is expected to begin. All hazardous wastes shall be removed from the site within 90 days of receipt of the final volume of waste and the closure activities shall be completed within 180 days.

Closure Schedule

The following schedule is proposed for final closure of the CSF after receiving the final volume of hazardous wastes:

Activity	**Dates Performed**
Removal of all remaining wastes to a treatment, storage, and disposal facility	Days 0 - 90
Soil gas survey, concrete coring, sampling and analysis performed	Days 90 - 120
Contingency for excavating, sampling, analyzing and removal of contaminated soil and concrete from site	Days 120 - 170
Site closure complete	Day 180

Certification of Closure

A certification that the CSF has been closed shall be sent by registered mail or hand delivered to NMED within 60 days of the completion of final closure activities. The certification shall be signed by the owner of RCI and a professional engineer registered in the State of New Mexico.

Survey Plat

RCI shall provide a survey plat of the CSF to all local zoning authorities acknowledging closure of the CSF.

Closure Plan Amendments

If an amendment needs to be made to the current Closure Plan, RCI shall submit a written notification or request to NMED for a permit modification. It should therefore be noted that the Sampling Plan presented below is only an example, because as operations within the CSF and testing procedures and requirements change, so shall RCI's sampling plan through Permit Modification, to reflect these changes.

SAMPLING PLAN

The following is RCI's Sampling and Analysis Plan that shall be implemented during closure of the CSF. All sampling procedures shall follow EPA and NMED protocols incorporating SW-846 methods to ensure proper handling of samples including proper **QA/QC** procedures.

Sampling Objectives:

One of the objectives of soil sampling at closure shall be to identify "hot spots" in the warehouse that comprises rooms A, B, E, and F. These four areas are used to store corrosive material and non regulated hazardous materials/products. Sampling shall determine if there is any contamination in the soil by the RCRA eight metals soil sampling results, and if the soil pH level is within the background standards. Background levels shall be determined by taking soil samples from near by areas that have not been impacted by the hazardous waste management, storage and related activities (e.g., loading/unloading) within 180 calendar days from the date the renewed Permit becomes effective.

Background Information on the Rooms Comprising the CSF:

Warehouse areas A, B, E, and F are used to store corrosive liquids and non-regulated materials.

Safety Equipment:

Safety equipment currently used, and which RCI personnel shall continue to utilize include safety glasses, boots and gloves.

Sampling Equipment:

Sampling equipment during closure activities shall include coring machine for concrete, sampling jars, ice packs and a cooler.

Containers, Volumes, Preservation Methods and Holding Time:

Four ounce (4oz), wide mouth jar containers shall be used with no preservative. The holding time for each sample shall be 6 months.

Number of Samples to Collect and Sampling Points:

The number of soil samples to be taken shall be determined on a grid sampling plan. RCI shall follow the EPA protocol for systematic random grid sampling.

Sampling Objectives:

Another sampling objective shall be to survey for organics and halogenated organics in warehouse rooms C, D and E along with the dock areas. Figure K-1 shows the locations from which soil samples shall be taken during closure of the CSF.

Background Information on Wastes stored at Rooms C, D, and E:

Warehouse rooms C, D and E are used to store industrial solvents such as Acetone, Toluene, Xylene, etc. It is where flammable wastes are stored. Flammable solvents are packaged at the front dock and the rear dock areas.

Safety Equipment:

Safety equipment include safety boots, gloves and safety glasses.

Sampling Equipment:

Soil survey shall be accomplished by using the Petrex Soil–Gas Survey method which is presented below.

Containers, Volumes, Preservation Methods and Holding Time:

Commercially available glass culture tubes measuring 25mm x 12mm and having a screw cap closure shall be cleaned by hand washing, then run through a wash cycle in a commercial RCI dishwasher, rinsed in methanol, and subsequently baked in an oven at 180 ^{o}C for one hour.

Number of Samples to be collected and Sampling Locations:

Twelve (12) samples shall be collected from Room D, four (4) samples from the Rear Dock Area, and 4 samples from Room B. All samples shall be collected at 25 feet intervals. Samples along the walls of rooms D and B shall be taken on the outside of the walls (See Figure F-1).

FIGURE K-1:

Building Structure:

RCI shall wipe down all walls, doors, pipe works and all other structures to remove dust that might have collected during storage of hazardous wastes and materials at the CSF. Decontamination equipment (sponges, rags, brushes, etc.) shall be placed into United Nations approved containers for hazardous materials. Individual discrete samples shall be taken from the containers for analysis. The soil samples shall be analyzed for the following parameters:

- Total Metals using EPA Methods 1311, 200 and 6000;
- Volatiles, by EPA Method 624;
- Semi-Volatile for Acid Extractables, using EPA Method 625 and Base Neutral Organics, by EPA Method 8270; and
- PCBs, using EPA Method 8080A.

If the analytical data reveals that the decontamination equipment possesses contamination above RCRA regulatory limits, the decontamination equipment shall be disposed of at an appropriate /permitted treatment, storage, and disposal facility (**TSDF**). If the waste is non-RCRA regulated solid waste, it shall be disposed of appropriately/at a local landfill.

Concrete Floors:

Any concrete stains that appear to indicate surface contamination shall be removed utilizing the best available technology at the time (bioremediation , scraping, or washing the floor). If the contamination cannot be removed, the concrete shall be analyzed for the following constituents:

- Total Metals, using EPA Methods 1311, 200 series and 6000 series;
- Volatiles, by EPA Method 624;
- Semi-Volatile for Acid Extractables, by EPA Method 625 and Base Neutral Organics EPA Method 8270;
- PCBs, using EPA Method 8080A; and
- pH using EPA Method 150.1 and 9045.

If analytical results reveal that portions of the concrete are contaminated, the concrete shall be removed utilizing the best available technology at the time. The concrete shall be disposed of at an appropriate TSDF. The amount of concrete to be removed shall be determined by the grid sampling performed. If the sample in a certain grid is found to be contaminated, all the concrete in that grid shall be removed.

Soils under the Concrete Floor:

Soils that are determined to be contaminated with hazardous waste shall be removed by the best available technology. The amount of soil to be removed shall be determined utilizing on-site field instruments, such as a photo-ionization detector (**PID**), Hnu and field screening for metals. A “hit”, utilizing a PID, shall be any amount in excess of 15% of background levels. If no background levels are detectable, then levels shall be considered a “hit” when the levels, (after conversion for the PID), equal the lowest of the suspected contaminants’ levels from the EPA’s Clean Air Act Standards. Confirmation samples shall be taken from each excavated area and be sent to a contract laboratory for analysis. The samples shall be analyzed for the following parameters:

- Total Metals, using EPA Methods 1311, 200 series and 6000 series;
- Volatiles, by EPA Method 624;
- Semi-Volatile for Acid Extractables, by EPA Method 625 and Base Neutral Organics by EPA Method 8270;
- PCBs, EPA Method 8080A; and
- pH, by EPA Method 150.1 and 9045.

Soils that are determined to be contaminated shall be removed and disposed of at an appropriate TSDF or remediated utilizing the best available on-site technology such as bioremediation, soil-washing or soil burning.

Surrounding Soils:

RCI shall obtain background samples from the surrounding area that has not been impacted by hazardous waste storage activities, to establish screening action levels for selected contaminants within 180 calendar days from the effective date of the Permit. If during closure the samples from the CSF are out of the ranges established, further investigation shall be done. During closure, RCI shall perform a gas survey on the remaining portions of the CSF. The area within the fence line shall be divided into grids. The gas survey shall show any volatile and semi-volatile contamination. RCI shall retrieve several composite samples to perform analytical data for 1) Total Metals, EPA Methods 1311, 200 series and 6000 series, 2) Volatiles, EPA Method 624, 3) Semi-Volatile for Acid Extractables, EPA Method 625, Base Neutral Organics, EPA Methods 8270, 4) PCBs, EPA Method 8080A, and 5) pH, EPA Methods 150.1 and 9045.

Ground Water Monitoring:

RCI shall continue to monitor the ground water at its existing well. If the direction of ground water has changed then RCI shall install a down gradient ground water monitoring well. The information pertaining to the change of groundwater flow shall be obtained from the United

States Geological Survey data. Using the down gradient well and the gas survey results shall help establish if ground water contamination has occurred. RCI's calculation of groundwater flow at time of closure shall be performed using the current/time water flow from the United States Geological Survey data.

Run-on and Run-off:

RCI property is designed to allow no run-on from near by streets or property. Run-off is limited, because the property is sloped so that rain water remains on the property. All the water that enters the property shall be collected into containment areas. The two containment areas shall be sampled and a full TCLP analysis shall be performed to determine if contamination has occurred.

Analytical Data/Results:

RCI shall submit the results of all analyses performed under this sample Closure Plan to NMED for evaluation and final determination on the closure of the CSF.

1.0 STANDARD OPERATING PROCEDURES FOR PETREX SOIL-GAS SURVEY

.1 Purpose

The steps and information contained herein are the standard procedures for carrying out a PETREX environmental soil gas survey. Minor deviations from these standard procedures may be implemented on-site by authorized field staff to adjust for unique survey conditions, such as frozen ground. PETREX.

1.2 Overview of Management Controls

The PETREX Passive Soil Gas Survey system includes multiple steps, some of which are proprietary, due to the patented nature of the technique. The steps of the process include: manufacture and assembly of the soil gas samplers, field installation and retrieval of the soil gas samplers, laboratory analysis by Mass Spectrometry and/or Gas Chromatography/Mass Spectrometry (**GC/MS**), interpretation of results, and production of the final report on the soil gas survey which includes compound and/or mixture isopleth maps. Each operation has its own set of procedures and quality control steps. With these multiple operations, the Northeast Research Institute (**NERI**) has made serious efforts to staff each of these operations with personnel qualified for the job duties assigned.

1.2.1 Staff Qualifications

NERI's professional staff includes computer specialists, chemists, geologists, and environmental scientists. New staff members are selected based on their educational background and work experience, as required to successfully fulfill their function within the company. In-house training is provided to all new personnel for a minimum period of two weeks. The mass spectrometer operators receive additional training by the instrument manufacturers as required. Personnel that shall be performing field work shall be trained for working on hazardous waste sites. This shall be performed by sending field personnel to outside courses; at a minimum they shall receive the 40 hour Health & Safety course (with yearly 8 hour refresher training) that complies with the OSHA requirements of 29 CFR 1910.120 (e) (3) (i). NERI's personnel are encouraged to continue their education by taking additional course work that shall enhance their job skills and professionalism.

1.3 Assembly of PETREX Soil Gas Samplers

1.3.1 Charcoal Bonding

PETREX collection wires are prepared by applying pre-sieved activated charcoal to the tips of ferromagnetic wires. The resultant collection wires contain size-sorted activated charcoal bonded to the wire one inch from the tip. The specialty wires selected for this process have a Curie point of 358EC.

1.3.2 Sampler Tubes

Sampler tubes have been described above under *"Containers, Preservative, and Holding Time"*.

1.3.3 Cleaning of Collection Wires

The charcoal bonded ferromagnetic wires shall be cleaned by heating in a special high vacuum apparatus at 358EC for 12 minutes. Wires shall be cleaned in lots of 30. The 30 wires will then be sealed in one clean culture tube under an inert atmosphere, assigned a lot number, and the lot(s) placed in inventory.

1.3.4 Lot Release and Repackaging

1.3.4.1 Quality Control and Quality Assurance

Prior to releasing inventory lots for a field survey, two collection wires from each lot shall be tested for cleanliness and adsorption potential. One wire shall be analyzed by mass spectrometry without exposure ("as is"), to verify that the lot is clean. The second wire will be exposed to PCE or TCE vapor for six seconds, and then analyzed in order to verify that the charcoal is highly adsorptive. High adsorption potential is achieved when the analytical responses over a set level is obtained after exposure to a given concentration of PCE/TCE. Exposures shall be conducted in a hood, in a laboratory separated physically and by dedicated ventilation from the storage and analysis of PETREX samplers.

1.3.4.2 Repacking for shipment to the field

Prior to shipment to the field, approved lots shall be removed from inventory, and the collection wires repackaged in pre-cleaned sampler tubes under an inert atmosphere. From each lot containing 30 collection wires, 12 sampler tubes shall be packaged with 2 collection wires and 2 sampler tubes with 3 collection wires. (The basis for having 2 wires in a tube is that it allows NERI to analyze one wire by standard Thermal Desorption Mass Spectrometry (**TD-MS**), with the second wire being retained as a back-up or used later on for analysis by Thermal Desorption Gas Chromatography/Mass Spectrometry (**TDGC/MS**). The third collection wire is used for the mass spectrometer set-up and gain adjustment procedure that is performed for each survey.)

Repackaged tubes with 2 and 3 collection wires shall be assembled into batches of 25 sampler tubes with either 2 or 3, three-wire tubes in each batch. Where multiple batches are used, packaging assures that a minimum of 10% of sampler tubes have 3 wires. The batches shall be held in inventory, with a unique inventory number (dated), until release for use on a project.

1.3.5 Custody Document

A "Chain-of-Custody Document" shall accompany each batch or group of batches of samplers released to the field for a project. This document shall accompany the sampler tubes through all transportation, field, analyses, and disposal stages.

1.4 Petrex Field Operations

NERI can Supply its services on a turnkey basis. NERI has a mandatory training program for non-NERI personnel that explains in detail, all of the field related steps for installing PETREX surveys.

1.4.1 Locating Sampler Sites

Sampler placement sites, usually predetermined on an accepted survey proposal, are located from a nearby, surveyable landmark using a compass and pacing, or some other measuring device (e.g., pacing wheel, hip chain, or tape measure). A transit may be used for more accurate placement.

1.4.2 Soil Coring

Once a sampler site has been established, a hole shall be cored to a predetermined depth (sampler placement depth is held constant for a given survey). This shall be accomplished using a variety of tools depending on the nature of the material to be cored. The holes shall be vertical and as free from debris as possible. When a survey is performed in areas covered by asphalt or concrete, an electric- powered rotary hammer drill with a carbide-tipped bit shall be used to drill a 1-1/2 inch diameter hole in the cover. A hand auger shall be used to remove the cuttings and road base from the hole. Down hole tools shall be decontaminated between each boring by following the procedure outlined in Section 2.4.9 of this Closure Plan.

1.4.3 Sampler Placement

Immediately after the hole is cored, a sampler tube shall be removed from the Ziploc bag and the bag resealed. The cap shall then be removed from the tube, placed vertically, open end down into the hole. (As an option, clean galvanized wire may be attached the tube for ease in later retrieval.) The opening of the hole is then plugged with aluminum foil, with sod or sod placed on top of the foil to bring the hole back to an even grade. The sampler cap is placed in a clean Ziploc bag to be used during sampler retrieval. Samplers placed under asphalt or concrete are treated the same as those in uncovered soil, except for modifications to allow easy retrieval and to avoid potential down-hole contamination from surface cuttings. To allow retrieval of these samplers, a piece of galvanized steel wire is twisted around the neck of the tube and run to the surface so that the tube may be recovered by pulling on the retrieval wire. An aluminum plug is then placed near the top of the hole, and the remainder of the hole is plugged with quick setting hydraulic cement.

1.4.4 Sampler Location Marking

Each sampler location position shall be flagged using pin flags, spray paint or ribbon flagging, then the location shall be marked and numbered on a base map. A field notebook shall be used to record the date, sampler number, sampler location description, soil type, and general observations.

1.4.5 Special Use PETREX Samplers

All PETREX surveys include samplers that monitor the field exposure time period (referred to as "time calibration samplers"), and others that monitor the integrity of the shipment ("travel blanks").

A series of "time calibration" samplers are included as part of every survey. These samplers are placed in an area of known or suspected contamination. Sets are retrieved and analyzed at specified time intervals to determine the appropriate field residence time for the survey. A sampler submittal form is used when submitting time calibration samplers to a laboratory. These samplers are analyzed within 2 days of receipt in the laboratory, so that the length of exposure for the entire survey can be rapidly ascertained and communicated to field personnel.
A minimum of two "travel blanks" samplers are included on each PETREX survey and they remain unopened through all transportation steps and during transit. They are then monitored for potential contamination acquired during transit. The "travel blanks" are then returned with the survey samplers, with notation made on the form as to the number of travel blanks submitted. Travel blanks are analyzed at the same time as the entire survey set.

1.4.6 Sampler Retrieval

All samplers from a survey are retrieved when analysis of the time calibration samplers indicates that there has been sufficient loading of gases onto the charcoal absorbent. The steps in the retrieval process shall be as follows:

(1) Soil is gently excavated until the tube is exposed.

(1) A cap is taken from the sealed Ziploc bag. The Viton seal is checked to make sure it is seated inside the cap.

(1) The sampler tube is removed from the hole, and any dirt that is on the threads of the tube is wiped off with a clean cloth. If the tube is broken or cracked, the collection wires are transferred to a new tube using forceps.

(4) The tube is capped tightly, numbered and placed in a Ziploc bag.

(5) Bore holes are filled or patched as required.

(6) Flagging material and any other debris are removed from the survey area.

1.4.7 Sampler Tube Numbering

Each sampler tube shall be numbered immediately according to the scheme established in the field notes and on the base map. The location number shall be written on an adhesive label which shall be applied to the tube cap. In practice, labels are normally pre-numbered before starting the survey retrieval process, to ensure that no two sample locations have the same number. Field staff are expected to supply notations regarding the site conditions and the condition of samplers when retrieved.

1.4.8 Sampler Shipment

Once all samplers have been retrieved, they shall be sealed in Ziploc bags, wrapped in bubble packing material, and packed lightly in a box for shipment. (Packing materials such as Styrofoam, vermiculite, or newspaper can introduce contaminants, and therefore should not be used for packaging.) The samplers, field notes, base map, and chain-of-custody document and the sampler submittal form shall either be hand-carried or shipped by overnight courier service to NERI's laboratory.

1.4.9 Decontamination of Equipment and Tools

All down-hole equipment and tool parts which contact excavated soil shall be constructed of heavy gauge steel. These tools shall be decontaminated between use at each sampling location by rotation through a four step cleaning process. The steps are:

- Loose material is removed from the tools.
- Immersion and vigorous scrubbing in a mild solution of laboratory grade detergent until all visual accumulations of soil are removed.
- Thorough rinsing with potable water.

- Spray rinsing with methyl alcohol.

- Air drying.

All derived liquids (and sediment) shall be contained in dedicated disposable vessels.

1.5 PETREX Sampler Laboratory analysis Procedures

1.5.1. Sampler Receipt and Preparation

1.5.1.1 Incoming Inspections

The laboratory supervisor or trained delegate shall open the box(es) containing PETREX samplers, and verify that samplers were received in good condition, are suitable for analysis, and that the Sample Submittal Form and other paper-work have been properly filled out. The sample number on each tube shall be recorded and any missing or duplicated numbers shall be noted. (A missing number may indicate that the sampler could not be retrieved. Samplers with Identical numbers generally cannot be analyzed unless their true site location can be established). If there are any discrepancies, the laboratory supervisor shall place the project “on-hold" until problematic issues are resolved.

1.5.1.2 Holding Time

Exposed PETREX soil gas collection wires contain a minute quantity of various volatile organic compounds sorbed onto activated charcoal; the protective glass tube is effectively sealed when the Viton-lined cap is seated properly. Maximum holding time is a function of both the chemical stability of the sorbed compounds, and the integrity of the seal on the tube. However, it is NERI's practice to analyze all samplers within three weeks from the time the samplers are received in the laboratory.

1.5.1.3 Separation of TD-MS and TD-GC/MS Collection Wires

Because each sampler contains a wire for TD-MS and TDGC/MS, the wires must be separated into individual tubes. One collection wire is removed from each survey using tweezers and inserted into an analytical crystal; the assembly is placed into a second pre-cleaned tube, sealed, and labeled identically to that of the original survey. The collection wire/crystal assembly shall be placed directly into the mass spectrometer for analysis. The original tube shall then resealed and reserved for possible TDGC/MS analysis.

1.5.2 TD MS Analysis

1.5.2.1 Instrumentation Used to Analyze PETREX Samplers

Thermal desorption is accomplished using a Fisher radio frequency power supply and a Curie point pyrolyzer connected to a custom designed inlet. The mass spectrometer used is an Extrel Spectrel C-50 quadruple mass spectrometer. The analysis is controlled and recorded by a 486

DX33 computer with a 320 MM hard drive. Data are archived on 3.5" diskettes. Data are kept in perpetuity.

1.5.2.2 Calibration

1.5.2.2.1 Record Keeping

All daily instrument calibration steps shall be printed out and kept in a 3-ring binder near the instrument. The date and all details of the calibration procedures shall be recorded by the mass spectrometer operator.

1.5.2.2.2 Perfluorotributylamine Tuning

Mass assignment and resolution are manually adjusted to a Perfluorotributylamine (**PFTBA**) standard. The calibration standard is purchased from Scientific Instrument Services, Ringoes, New Jersey. This standard is produced by 3M, and is repackaged and sold to NERI under Product Code FC - 43 Perfluorotributylamine. NERI maintains the specifications, product number, and supplier identification in the maintenance for the mass spectrometer.

A linear correction, based on the known spectrum of PFRBA, is calculated. This correction is applied to a second PFI-BA spectrum. If correct mass (**M/Z**) values are obtained, the operator proceeds to the next turning step. If not, Step I is repeated until correct masses are obtained. Peak intensity ratios are set from the major peaks in the PFRBA spectrum using the following values:

Mass Spectrum (M/Z) Intensities:

69	=	100%
131	=	48% +20%
219	=	51% +20%

Electron energy is set to 70 electron volts and emission is set at 12 milliamps. All other operating parameters, such as scans and scan range are established in the computer program. These values may only be changed by the laboratory manager. Tuning is confirmed at the beginning of each day so that a complete survey is analyzed using the same instrument settings.

1.5.2.3 Instrument Parameters

The instrument is normally operated with the following parameters:

Vacuum	$< 4 \times 10^{-7}$torr
Ionization Energy	70 eV
Ionization Current	12.0 mA
Desorption Temperature	358EC
Number of Scans/Sample	22

Scan Rate 550 amu/sec.

1.5.2.4 Mass Spectrometer Analysis and QA/QC

Survey samplers are analyzed in random order. Every effort shall be made to analyze all samplers from one survey without interruption.

The organic gases adsorbed onto the charcoal shall be thermally desorbed, separated according to ion mass counted, and a mass spectrum of masses in the range of 47 to 267 atomic mass units (**amu**) is obtained.

Periodic background analyses shall be performed as a QC measure to assure minimal influence from cross contamination. If there are peaks that are not related to atmospheric gases (e.g. O_2, N, Ar, CO2, etc.) the supervisor is informed and corrective action taken as appropriate.

A written sample number record shall be kept during the analysis to prevent accidental cross numbering. The mass spectrometer control program prompts the operator with a warning if a sample number is entered that has already been used. The operator then checks the current number, along with the disk storage location of the previously entered number, to resolve the true numbering situation.

1.5.2.5 Project Identification

The raw data file generated by the each analysis is given a unique file name for storage. The NERI project number is the prefix of the data file number.

1.5.2.6 Maintenance

A record of the maintenance activity shall be recorded and kept in a log book near the instrument.

Frequency	Activity
1,000 Analyses	Cleaning of sample introduction area, ion source, and expansion chamber by in-house technicians.
4,000 Analyses	Above noted procedures plus quadruples and replacing multiplier.
Annually:	Preventive maintenance program conducted by manufacturer's service representative.

1.5.3 TD-GC/MS

Upon completion of TD-MS analyses, selected duplicate collection wires set aside as described in Section 1.5.1.3 above, shall be obtained from storage for TD GC/MS analysis.

Curie-point thermal desorption of PETREX collection wires into the GC inlet is accomplished by using a customized tunable radio frequency (RF) power supply and a Fischer Curie-point Pyrolyzer. The pyrolysis chamber is surrounded by the tunable RF coil. One PETREX collection wire at a time is loaded into the pyrolysis chamber by inserting the wire to a predetermined depth. The power supply is adjusted such that the field strength generated is sufficient to reach the Curie point of the PETREX wire, thereby allowing the sample to be desorbed from the charcoal contained on the PETREX wire.

The desorbate is then concentrated by cryofocusing and injected into the GC by flash desorption. The analysis begins when the cryogenic trap begins to desorb. Data collection begins immediately after the void volume elutes.

1.5.3.1 <u>TD GC/MS Instrumentation</u>

Thermal desorption is accomplished by using a Fisher power supply linked to a Tekmar Model 5010 cryofocusing unit, for analysis using a Hewlett Packard 5987 Gas Chromatograph/Mass Spectrometer system. The GC/MS is computer controlled on an HP a series computer, using an RTE operating system.

1.5.3.2 <u>Calibration</u>

1.5.3.2.1 <u>Record Keeping</u>

All instrument calibration steps are recorded-in permanently bound logbooks kept in the laboratory. The data and all details of calibration are recorded by the GC/MS operator and checked by the supervisor.

1.5.3.2.2 <u>Tuning</u>

The instrument calibration is confirmed at the beginning of each day using 4-Bromofluorobenzene (**BFB**). This calibration standard is obtained from Aldrich Chemical Company. If tuning does not pass listed criteria, corrective action is taken prior to analysis.

1.5-3.3 <u>Instrument Parameters</u>

The parameters listed below are used for standard environmental sample analyses. Specific targeted analytes may require different columns/conditions.

1.5.3.3.1 <u>Thermal Desorption and Injection</u>

Desorption Time: 2 x 95 seconds (190 seconds total)
Desorbate Transfer Temperature: 150EC.
Cryofocusing Trap Temperature: -150EC.
Desorbate concentrated on cyrogenic trap and held until injection Desorbate injection: by thermal desorption
Injection temperature: 250EC for 1 minute.

1.5.3.3.2 Gas Chromatograph

Carrier Gas: Helium @ 15 pounds per square inch (**psi**) head pressure.
Injection temperature: 250EC.
Oven temperature programs: 350EC for 2 minutes; increasing 10EC per minute to 235EC; hold for 12 minutes.
Data Acquisition Delay: 3 minutes.
Total run time: 34 minutes.
Transfer Line temperature: 250EC.
Interface is direct to MS source.

1.5.3.3.3 Mass Spectrometer

Scan rate: 1.07 scans/second

Scan range: 35 to 300 amu,

Source temperature: 200EC.

Electron energy: 70 eV.

Electron emission: 300 uA.

Electron multiplier voltage: as per Autotune specifications for PFTBA.

Spectrometer tuning: Performed and recorded in bound Instrument log book, using tuning parameters for BFB listed in the Table below.

EFE Tuning Parameters

M/Z	Ion Abundance Criteria
50	15-40% of the base peak.
75	30-60% of the base peak.
95	Base Peak: 100% relative abundance.
96	5-9 % of the base peak.
173	< I % of the base peak.
174	> 50% of the base peak.
175	5-9 % of mass 174
176	> 95 % but < 101 % of mass 174
177	5-9 % of mass 176

1.5.3.4 Quality Assurance and Qualitv Control

1.5.3.4.1 System Blank

The TD-GC/MS system is tuned daily according to the operational parameters described above. After the results of the tuning are verified, a minimum of one system blank is run. A system blank is an analysis in which all procedures are followed, but no sample (i.e. PETREX) collection is introduced. A typical system blank reveals a TD-GC/MS peak at a retention time of 12.9 minutes and a molecular weight of 207 amus, which corresponds to a known component bleeding off the GC column. If any other unusual compounds are detected, the cause is investigated, correction made, and another system blank is run prior to analyzing any other samples.

1.5.3.4.2 TD-GCIMS Calibration

Qualitative accuracy and precision are the goals of this step. Purchased standards of a series of commonly observed volatile organic compounds from PETREX surveys were analyzed using NERI's standard conditions for TD-GC/MS. The retention times are used as an indication of the performance of the GC column. The accuracy of the mass spectrometer is checked daily using the BFB tuning parameters described above.

NERI's quality program, which includes analysis of a system blank, daily tuning of the mass spectrometer, and evaluation of the performance of the gas chromatograph, all provide assurance that the system is performing to acceptable standards for TD-GC/MS analysis. The analyst shall proceed to analyze project samples only when all quality checks are acceptable. If not, the Laboratory Manager is informed and sample analysis shall stop until the Laboratory Manager approves the system for use.

1.5.3.5 Sample Analysis and Data Management

1.5.3.5.1 Sample Analysis

A PETREX collection wire is removed form the sampler tube with tweezers, then inserted to a predetermined depth into the pyrolysis chamber. The system operating parameters are then verified and recorded in a log book that is kept next to the instrument. Parameters recorded routinely are NERI project number, operator name, date, set-up conditions, and any comments that are considered important by the analyst. Sample analysis then begins using the standard run conditions. Data acquisition is computerized, with data processing and printing occurring as acquisition is conducted.

The data package of results, with accompanying forms, is first evaluated by the GC/MS supervisor, and if acceptable, is then delivered to the project manager for review and incorporation of the results into the project report.

1.5.3.5.2 Data Management

1.5.3.5.2.1 File Naming

Quality Control data files are named according to the quality control process and the date the file was created. Project data files are named by giving them project numbers, unique four digit code that is used on all paperwork.

1.5.3.5.2.2 Data Storage

Calibration files and data generated from analysis of project samples are stored on the B:P 5987 GC/MS computer. At the completion of the project, the files are transferred to a magnetic tape for long term storage. A copy of the directory/file listing is kept with the tape. Tapes are archived in a cool, dry environment, free from magnetic fields.

1.6 Data Interpretation and Preservation

1.6.1 Quality Control

Experienced project managers perform the data review, analysis, and interpretation. Their work is reviewed and always countersigned by the Project Operations Manager or his specific designee. The vice president of operations reviews a project through all stages (including survey design, quotation, data analysis, reporting, and map production) on regular basis. This routine audit has proven sufficient to ensure data integrity, maintain presentation consistency, and provides for a rapid solution if any deviations from standard procedures are uncovered.

1.6.2 Compound Identification

Individual compounds are identified from TD-MS data by comparing the mass spectrum that is obtained from each sampler collection wire to a library of reference mass spectra. Several thousand pure compound spectra have been developed by the U.S. Bureau of Standards and are available for spectral comparison. NERI has also developed its own library of spectra through head space analysis of pure compounds using the PETREX process. Once a compound has been identified in this manner, the ion count of this compound is defined as the total ion current for the "parent peak" or an appropriate indicator peak of that compound. In a typical PETREX survey, numerous compounds are identified from each analysis. In the event that the presence of very complex mixtures masks targeted compounds, the 17D GC/MS process is used to confirm identifications. Retention indices (for common VOCS) can be used in combination with mass spectra for verification.

1.6.3 Compound Mapping

1.6.3.1 Production of Sampler Location Map

Sampler location maps are created by placing, the field base map on a digitizing board and entering each sampler location (and its respective identifying number) on an X-Y coordinate.

Cultural and topographic features can also be digitized onto the map as reference points. The relative ion current (or ion count) for each compound can then be plotted at the exact sampler locations.

1.6.3.2 Production of PETREX Isopleth Maps

The process of plotting ion counts of indicator peaks from the compound(s) identified in the soil gas survey is computerized. Thus the summed ion counts from multiple indicator peaks of identified compounds are matched with the sampler location on the base map, and the numeric value is plotted. The data are then contoured to taking into account all other available data, such as geologic setting, soil types, groundwater conditions, type of contaminant, and site history.

The resultant maps show, per compound or class of compounds, isopleth lines that describe the distribution and relative intensity of soil gas constituents throughout the survey area. Soil gas isopleth maps are useful for interpreting the areal extent of contamination, the location of source areas and relative "hot spots", and/or the apparent direction of movement of the contaminants.

The entire PETREX process permits the collection, identification and mapping of numerous compounds simultaneously. This information is used to differentiate multiple compounds and multiple source areas within a single survey.

1.6.4 Data Presentation in Report Form

Once the data have been compiled, interpreted, and mapped, a report is produced. Also, isopleth maps are finalized and printed using a sophisticated plotter and CAD software. Reports are signed by both the assigned project manager and the Project Operations Manager before they are released.

1.6.4.1 Final Storage of Project Files

NERI maintains all project reports and raw data for a minimum of 7 years. Completed projects are stored by project number in secure, dedicated storage areas. Duplicate copies of the final report are stored at both of NERI's offices (Lakewood, Colorado and Farmington, Connecticut) to protect against potential loss due to fire or other events.

1.7 Guidance on the Interpretation of Soil Gas Results

Confirmation and quantification of soil gas results are generally conducted using standard field sampling methods for soil and groundwater analysis. The soil gas maps are used to guide the placement of borings and wells.

In general extreme caution needs to be exercised when trying to extrapolate soil gas results (without the above sampling and analysis) to predict exact source of the soil gas signal (i.e. soil or groundwater), the depth of the signal, or concentrations of contaminants. In NERI's experience, the following hold true:

- Results from soil gas surveys that have been conducted at a uniform shallow depth cannot be used to calculate the depth to the source or the absolute concentration of contaminants at depth. Depth profiling (see section 1.8.2.) can greatly enhance the interpretation of the survey results.

- Ion counts for any compound at one sample location can only be compared to another location within the same survey for the same compound. Ion counts of different compounds cannot be compared to each other.

- The isopleth maps from one survey cannot be quantitatively compared to the results of any other survey, or between two surveys conducted at the same site at different times of the year. However, the same "hot spots" and migration pathways normally are detected in the same place over multiple surveys at a given site, allowing for migration.

1.8 Additional Use of PETREX Samplers

PETREX samplers have numerous other uses, and the techniques described below are often incorporated into the soil gas survey design. (Specific instructions on sampling, shipment methods, and blanks are provided for each project.)

1.8.1 Head Space Analysis of Soils and Water

Head space analysis can be used to establish a mass spectrometric pattern of compounds from soils or water. The results approximate what happens in the environment, measuring those components that partition from the solid or aqueous phase to the vapor phase. The resulting pattern can then be used during interpretation of the soil gas survey by searching for the head space pattern in the results obtained from the soil gas survey. This approach is very helpful for verifying sources or for mapping specific blends of commercial products at a site.
A soil sample is heads paced by filling a thermochemically cleaned head space container with the sample soil. A clean PETREX culture tube is often used. The sample is shipped to NERI's laboratory, where approximately 25 grains of soil shall be placed in another clean tube and several PETREX collection wires are added. The sample is allowed to equilibrate for up to 24 hours. The exposed wires are then removed and prepared for thermal desorption mass spectrometric analysis as described earlier. A similar process is used for screening water samples and oil samples.

1.8.2 Immersion Sampling of water

It is frequently necessary to establish the presence of any organics present in water, whether they partition or not. In such a case, the wire is immersed in water and allowed to equilibrate for up to 24 hours. Both low and high solubility components are trapped on the charcoal for more complete characterization.

1.8.3 Depth Sampling

At sites exhibiting extensive near surface soil contamination, but where the sources and the extent of groundwater contamination are less evenly distributed, sampling at depth (e.g. 3-6' below surface) shall enable the mapping of deeper subsurface contamination, avoiding the incidental contaminants at the surface.

1.8.4 Depth Profiling

In order to determine if the source of the soil gas signal is near surface or in a deeper vadose/saturated zone, depth profiling can be used. At each selected location, shallow bore holes are drilled a few feet apart to depths such as 1, 2, 4, and 6 feet deep. After all the loose cuttings and cave-ins have been removed from the bottom of the hole, a core of soil may be taken for head space analysis. Next, a PETREX Sampler is installed as described earlier. The samplers remain in place for the same length of time as the rest of the PETREX survey.

Each of the PETREX sampling methods addresses different questions concerning the source of the VOC signal as detected during a soil gas survey.

In the case of soil head space analysis, detection of VOCs indicates that the VOCs are actually contained within the soil matrix. When the VOC is anthropogenic in nature, the VOC presence is indicative of soil contamination at that depth interval.

When performing passive soil gas sampling with PETREX samplers, the sampler serves as both an extended head space sampler relative to the soil matrix in its immediate vicinity, as well as measuring the relative rate of soil gas movement through that zone during the exposure period. Soil gas movement through the vadose zone is theorized to be a diffusion process. If the soil head space data indicate that the VOCs are not present in the soil matrix, then the depth profiling samplers should show a relative increase of ion counts as the depth increases. By combining results from depth profiling and head space analyses, the nature of the VOC source (near surface or deep vadose/saturated) can be inferred.

CLOSURE COST ESTIMATE

The following is RCI's copy of the most recent closure cost estimate for the CSF and a copy of the trust agreement which demonstrates financial assurance. The cost estimate is based on hiring a third party to close the CSF at a point in the CSF's active life when the extent and manner of its operation would make closure most expensive.

SCHEDULE A

EPA Identification Number:: NMD002208627

Facility Name: Rinchem Company, Inc.

Address: 6133 Edith Boulevard NE
Albuquerque, NM 87107

Summary of Closure Costs

Transport of 500 drums to a TSDF (Average cost of $246.94 per drum)	$123,472
Soil gas survey	$13,113
Concrete coring and sampling in corrosive room	$3,442
Contingency for excavating, sampling and disposal of soil	$28,815
Certification of complete closure by Professional Engineer	$6,556
Closure Report to NMED	$6,556
Total Estimated Closure Cost (1998 dollars)	$181,954

POST-CLOSURE CARE PLAN

Based upon RCI's procedures, continuous monitoring and policies that are in place, including the fact that any spills or leaks be cleaned up at the time of the incident, there shall be a very minimal post-closure care period. Upon completion of closure activities at the CSF, RCI shall present a certification of Closure to the Secretary, NMED. After complete closure of the CSF, subsequent use of the property shall be for non hazardous waste warehouse operations.

However, if RCI cannot achieve clean closure it shall submit to NMED a Post-Closure care Plan within 90 calendar days from the date the owner/operator or the secretary determines that the CSF must be closed as a landfill, as required by 20.4.1.500 NMAC, incorporating 40 CFR §264.118 through §264.120.