PROPOSED PROTOCOL FOR CLOSURE

WHOLE EARTH

Whole Earth Environmental, Inc.
19606 San Gabriel, Houston, Texas 77084
281/492-7077 • Fax: 281/646-8996

October 11, 1999

New Mexico Oil Conservation Division
2040 South Pacheco
Sante Fe, New Mexico 87505

Attn: Wayne Price

Dear Wayne:
Enclosed, please find a copy of our proposed protocol for the closure of the Apache Skelly Penrose Central Battery. In working this project, we really got the cart before the horse in that we began the work under the erroneous assumption that we had greater than 50' separation between the bottom of the pit and the water table. In fact the water table is at an approximate depth of 77' below ground level and our pit is presently at a depth of 40'.

I know that you've previously expressed a concern on another Monument Draw area pit that the contamination might hit the solid calichi layer and begin to run laterally so we were especially careful to sample the sidewalls at the interface level immediately above the rock layer. Based on previous core sampling and last week's non-detectable BTEX results, we are certain that the contamination does not extend any appreciable distance into the calichi layer.

As we've now a pretty spectacular crater, your earliest response would be sincerely appreciated.

Warmest regards,

Mike Griffin
President
Whole Earth Environmental, Inc.

CC: Donna Williams / NMOCD - Hobbs

Apache Corporation
Skelly Penrose Central Battery
Pit Closure Protocol

Whole Earth Environmental
19606 San Gabriel
Houston, Tx. 77084

RECEIVED

OCT 12 1999

Environmental Bureau
Oil Conservation Division

Executive Summary

The site to be remediated is an open excavation within the Apache Corporation's Skelly Penrose Central Battery complex located approximately five miles south of Eunice, New Mexico. The pit functioned as an emergency upset diversion impoundment installed by the previous site owner.

Under the NMOCD ranking system for pit closures, the site is greater than 1,000 feet from any surface water body, greater than 1,000 feet from a water source and less than 50' to ground water. Under the ranking system, the site would be required to be excavated to a depth sufficient to achieve TPH concentrations of less than 100 ppm.

The site was previously partially excavated to a depth of approximately ten feet below ground level and the contaminated soils spread in an area immediately adjacent to the excavation. Recent sampling of the spread materials indicates that significant natural remediation has occurred and that the criteria contaminant concentrations within the excavated materials fall below the NMOCD ranking criteria for backfill material.

Though New Mexico presently has no empirical standards for chlorides in soil, we modeled the known concentrations using VADSAT and found that the total salt loading within the pit does not exceed 19 kilograms. Over the course of 100 years, the model predicts that a total of 10.26 kilograms may be leached out into the aquifer. The sodium chloride concentration within the aquifer will never exceed 1 part per million at point of interface.

Site Profile

Location

The emergency pit is situated at the northern end of the Apache Skelly Penrose Central Battery located approximately five miles south of Eunice, New Mexico. The site may accessed by a well maintained lease road intersecting New Mexico State Highway 18. (See attached plat map).

Topography

The surrounding topography is quite unremarkable. The elevation tends to decline in an easterly and southerly direction with no significant deviations to the mean. There are no surface streams or ponds within five miles of the facility.

Land Use

The primary land use for the surrounding area is petroleum extraction. Secondary usage is the grazing of cattle. There are no agricultural or recreational areas within five miles of the facility.

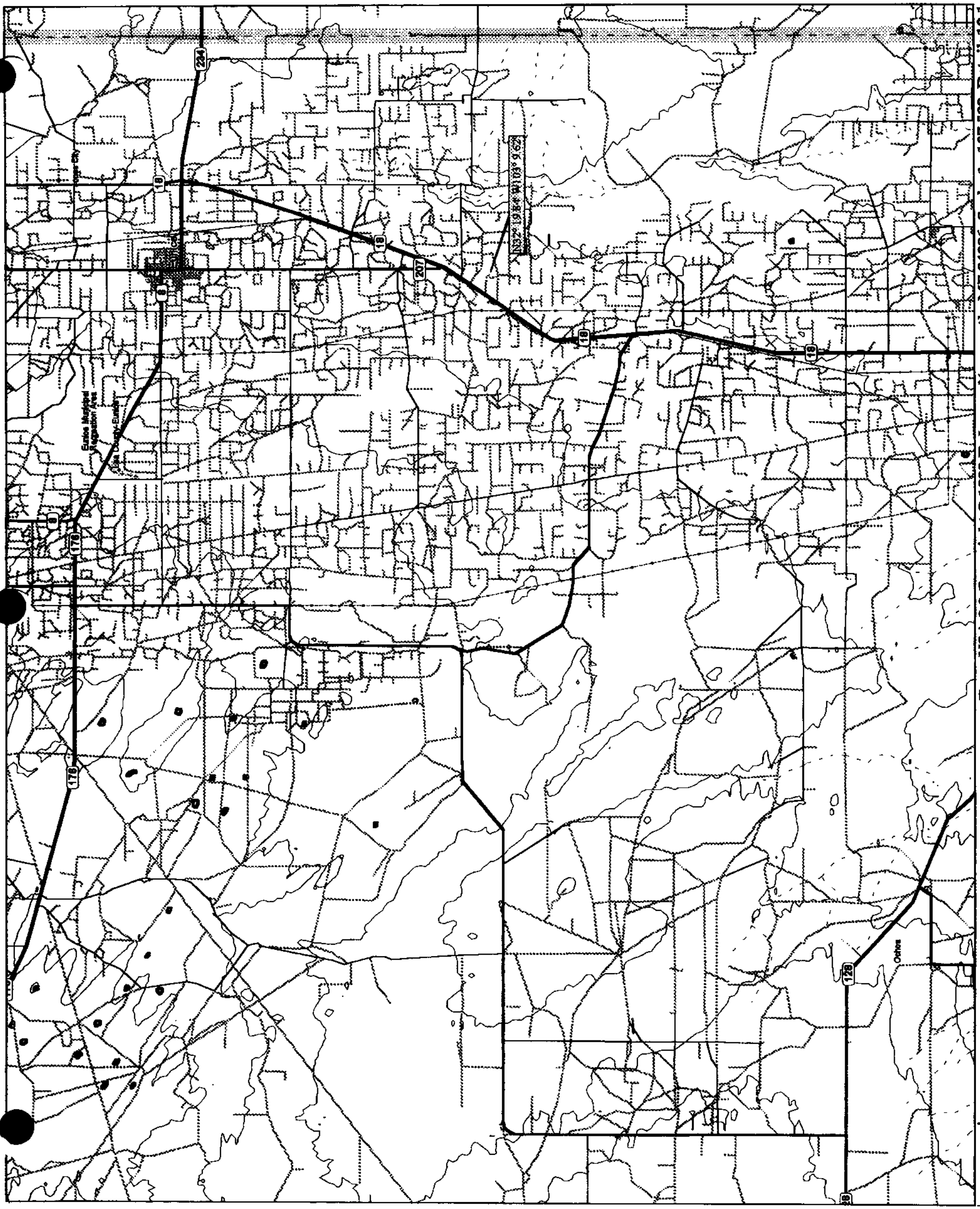
Site History

The pit was installed by a previous operator and was used as an emergency upset facility for the adjacent hydrocarbon storage tanks. The pit was partially lined with a polyethylene liner extending to the surface. Only a small (10' X 10') center section at the bottom of the impoundment was left uncovered.

Partial remediation was undertaken in July 1998. The remediation regime consisted of excavating the contaminated soils and liner to a depth of approximately 10' below ground level and spreading the soils to a depth of approximately 6" at a location immediately adjacent to the pit site. Soil borings taken at the center of the pit indicate that the highest concentrations of hydrocarbons and sodium chlorides remain perched at distance of approximately 15'–22' below ground level, (5'-12' below existing pit depth).

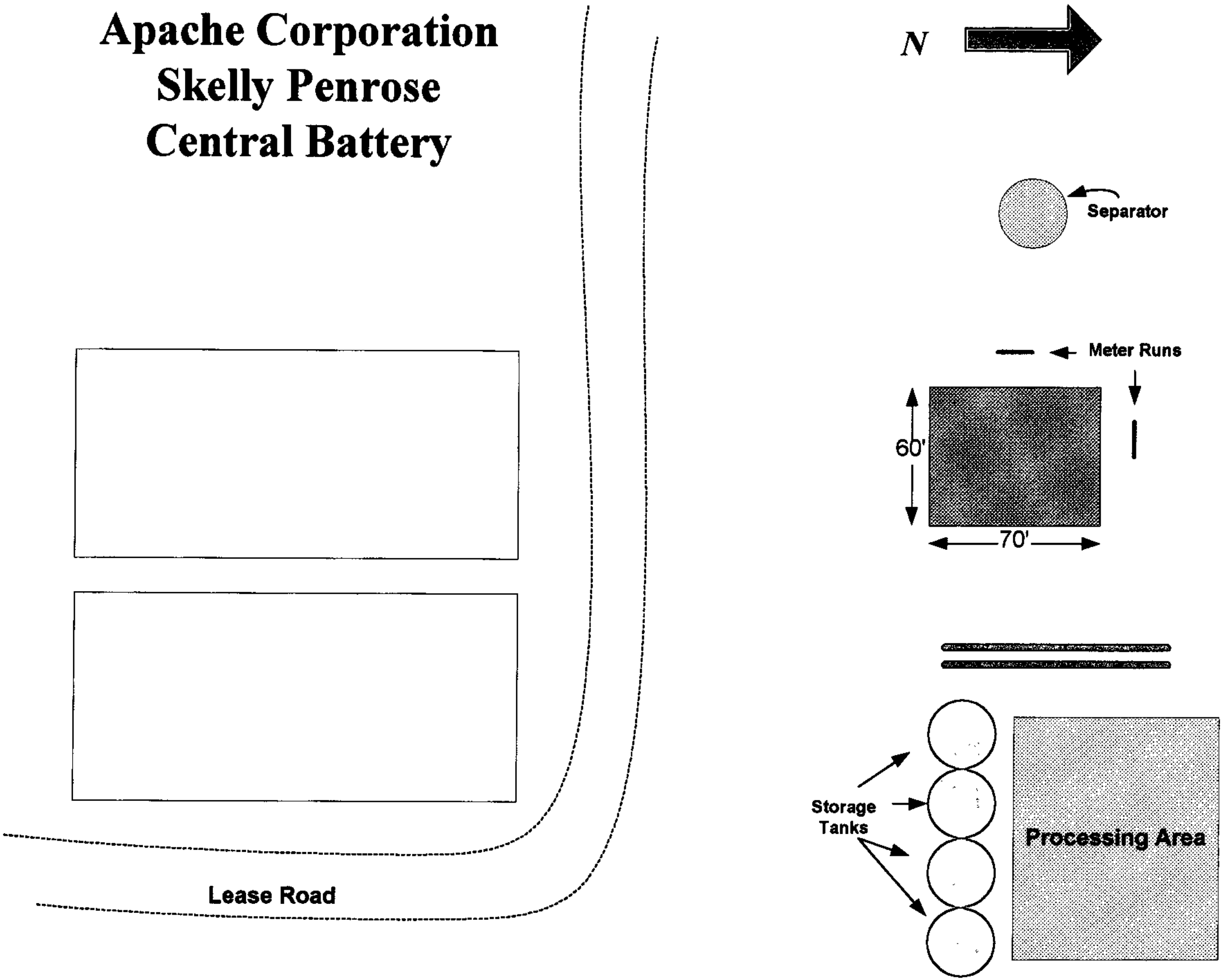
New composite samples taken on September 10th, 1999 indicate that the hydrocarbon contamination within the excavated soils has naturally degraded to concentrations under 1,000 ppm TPH. No BTEX results were provided on the July 1998 sampling however the

September 1999 sampling revealed no concentrations in excess of NMOCD guidelines. (Analytical reports are contained within the "Lab. Analytical" section of this proposal.).

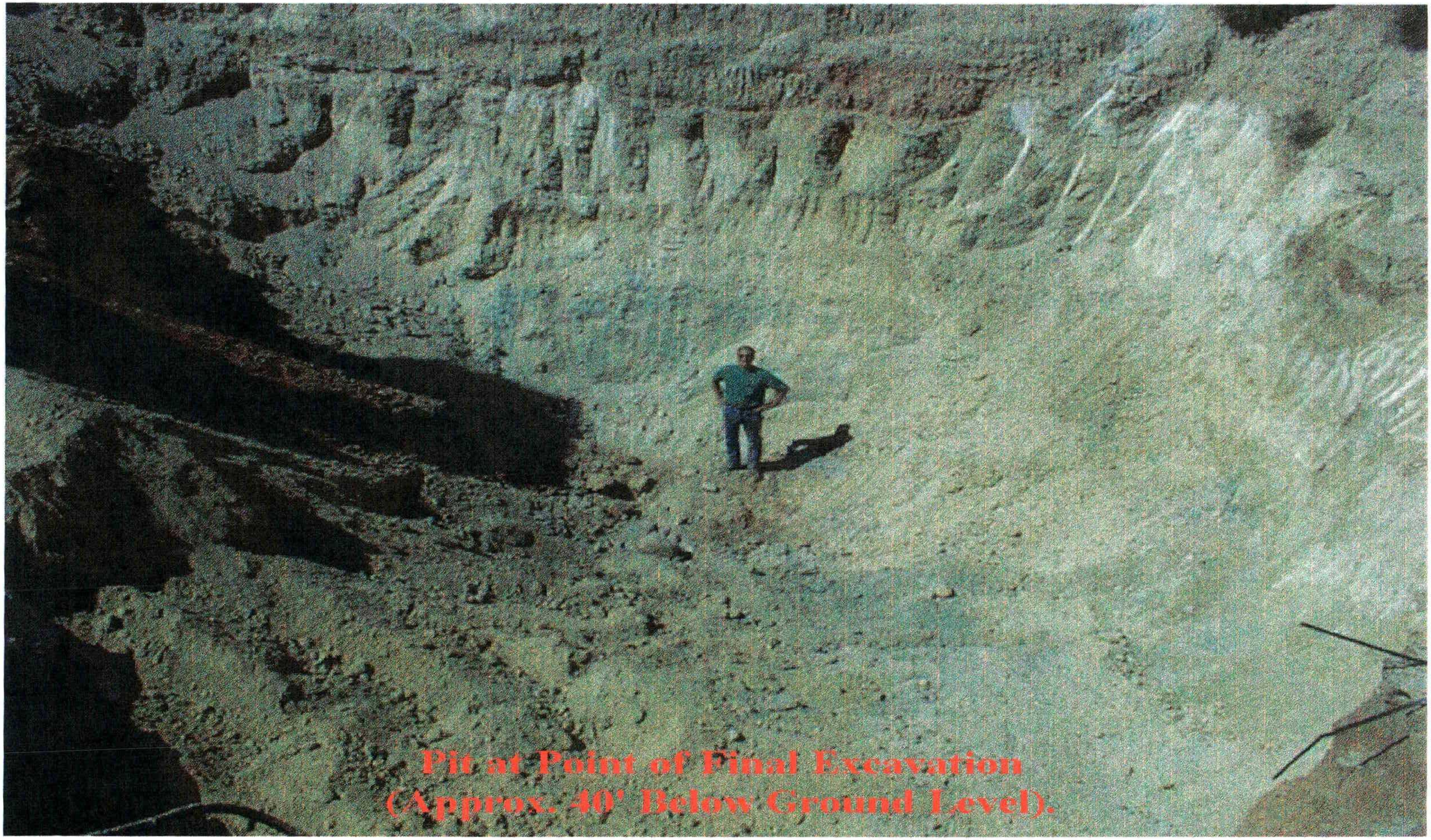


Topo USA 2.0 Copyright © 1999 DeLorme Yarmouth, ME 04096 Scale 1 : 187,500 Detail: 10-1

Apache Corporation
Skelly Penrose
Central Battery



View of Pit Prior to Remedial Excavation



Pit at Point of Final Excavation
(Approx. 40' Below Ground Level).

Protocol

This section contains a copy of the remediation protocol we plan to employ on this project.

PR-22B

Remediation Protocol
Apache Corporation
Shelly Penrose Central Battery

1.0 Purpose

This protocol is to provide a detailed outline of the steps to be employed in the remediation of a spill area located south of Eunice, New Mexico.

2.0 Scope

This protocol is site specific for the Apache remediation project.

3.0 Preliminary

Prior to any field operations, Whole Earth Environmental shall conduct the following activities:

3.1 Client Review

3.1.1 Whole Earth shall meet with cognizant personnel within Apache to review this protocol and make any requested modifications or alterations.

3.1.2 Changes to this protocol will be documented and submitted for final review by Apache prior to the initiation of actual field work.

4.0 Safety

4.1 Prior to work on the site, Whole Earth shall obtain the location and phone numbers of the nearest emergency medical treatment facility. We will review all safety related issues with the appropriate Apache personnel, sub-contractors and exchange phone numbers.

4.2 A tailgate safety meeting shall be held and documented each day. All sub-contractors must attend and sign the daily log-in sheet.

4.3 Anyone allowed on to location must be wearing sleeved shirts, steel toed boots, and long pants. Each vehicle must be equipped with two way communication capabilities.

4.4 Prior to any excavation, New Mexico One Call will be notified. The One Call notification number will be included within the closure report. If lines are discovered within the area to be excavated they shall be marked with pin flags on either side of the line at maximum five foot intervals.

5.0 Remediation Procedure

5.1 All soils containing a TPH concentration >1,000 ppm, and all soils containing a benzene concentration>10ppm or a total BTEX concentration >50ppm will be excavated and placed immediately adjacent to the excavation. The side walls and bottom of the excavation will be field tested for TPH and BTEX concentrations in accordance with WEQP-06 and WEQP-19.

5.2 The Hobbs branch of the OCD will be notified to witness the final confirmation sampling of the side walls and bottom of the excavation. Samples will be collected in accordance with WEQP-77 and analyzed for TPH and BTEX.

5.3 The excavated soils will be mixed and blended with sub-strait materials to achieve a maximum concentration of 5,000 ppm TPH, 10 ppm benzene and 50 ppm total BTEX concentration. A confirmation composite sample will be collected and analyzed in accordance with 5.2 of this protocol.

6.0 Modeling

6.1 The bottom hole benzene concentrations and the depth to ground water will be determined and included within a VADSAT contaminant migration model. The modeled results should project that no benzene concentrations exceeding NMWQCC standards of 10 ppb shall be allowed to impact the ground water within a 100 year model span. Chlorides will be modeled on a concentration of 5,000 ppm and similarly modeled to indicate that no concentration exceeding 250 ppm will reach the water table within a 100 year span.

6.2 The modeled results will be submitted to the Sante Fe office of the NMOCD prior to any materials being re-deposited within the excavation.

7.0 Liner

7.1 Upon approval by the NMOCD, Whole Earth will install a 20 mil polyethylene liner within the excavation. The liner will extend up the side walls to a point within 5' of the ground surface. The excavated soils will be replaced within the liner at concentrations not to exceed those described in paragraph 5.2 of this protocol.

7.2 An additional polyethylene top cover will be erected atop the excavation and overlapped with the bowl liner to insure that no surface water will infiltrate the main plume area. The top liner should be slightly domed to accommodate subsidence and to direct a drainage path away from the main plume. The top of the liner shall be at least 3' below ground level.

8.0 Closure Report

8.1 At the conclusion of the project, Whole Earth shall prepare a closure report which contains the following minimum information:

- Photographs of the location prior to remediation
- Photographs of the location at time of final closure
- Plat map showing sampling locations
- All pre-closure contaminant concentrations
- Contaminant concentrations at the conclusion of the project
- Copies of this protocol and all testing procedures
- Copies of each days tailgate safety meeting
- Copies of daily calibration logs for each instrument
- Independent split sample laboratory analyses
- Copies of the VADSAT contaminate migration model
- MSDS sheets of the liner

Procedures

This section contains copies of the detailed sampling and testing procedures we plan to employ on this project.

WHOLE EARTH ENVIRONMENTAL
QUALITY PROCEDURE

Procedure for Conducting Field TPH Analysis

Completed By: Approved By: Effective Date: 02/15/97

1.0 Purpose

To define the procedure to be used in conducting total percentage hydrocarbon testing in accordance with EPA Method 418.1 (modified) using the "MEGA" TPH Analyzer.

2.0 Scope

This procedure is to be used for field testing and on site remediation information.

3.0 Procedure

3.1 The G.A.C. "MEGA" TPH analyzer is an instrument that measures concentrations of aliphatic hydrocarbons by means of infra-red spectrometry. It is manufactured to our specifications and can accurately measure concentrations from two parts per million through 100,000 parts per million. The unit is factory calibrated however minor calibration adjustments may be made in the field. Quality Procedure 25 defines the field calibration methods to be employed.

3.2 Prior to taking the machine into the field, insert a 500 ppm and 5,000 ppm calibration standard into the sample port of the machine. Zero out the Range dial until the instrument records the exact standard reading.

3.3 Once in the field, insert a large and small cuvette filled with clean Freon 113 into the sample port of the machine. Use the range dial to zero in the reading. If the machine does not zero, do not attempt to adjust the span dial. Immediately implement Quality Procedure 25 .

3.4 Place a 100 g. weight standard on the field scale to insure accuracy. Zero out the scale as necessary.

3.5 Tare a clean 100 ml. sample vial with the Teflon cap removed. Add 10 g. (+/- .01 g), of sample soil into the vial taking care to remove rocks or vegetable matter from the sample to be tested. If the sample is wet, add up to 5 g. silica gel or anhydrous sodium sulfate to the sample after weighing.

3.6 Dispense 10 ml. Freon 113 into the sample vial.

3.7 Cap the vial and shake for five minutes.

3.8 Carefully decant the liquid contents of the vial into a filter/desiccant cartridge and affix the cartridge cap. Recap the sample vial and set aside.

3.9 Insert the metal tip of the pressure syringe into the cap opening and slowly pressurize. **WARNING: APPLY ONLY ENOUGH PRESSURE ON THE SYRINGE TO EFFECT FLOW THROUGH THE FILTERS. TOO MUCH PRESSURE MAY CAUSE THE CAP TO SEPARATE FROM THE BODY OF THE CARTRIDGE.** Once flow is established through the cartridge direct the flow into the 5 cm. cuvette until the cuvette is full. Reverse the pressure on the syringe and remove the syringe tip from the cartridge cap. Set the cartridge aside in vertical position.

3.10 The cuvette has two clear and two frosted sides. Hold the cuvette by the frosted sides and carefully insert into the sample port of the machine. Read the right hand digital read-out of the instrument. If the reading is less than 1,000 ppm. the results shall be recorded in the field Soil Analysis Report. If the result is higher than 1,000 ppm, continue with the dilution procedure.

4.0 Dilution Procedure

4.1 When initial readings are greater than 1,000 ppm using the 5 cm. cuvette, pour the contents of the 5 cm. cuvette into a 1 cm. cuvette. Insert the 1. cm cuvette into the metal holder and insert into the test port of the instrument.

4.1 Read the left hand digital read-out of the machine. If the results are less than 10,000 ppm, record the results into the field Soil Analysis Report. If greater than 10,000 ppm, continue the dilution process. **Concentrations >10,000 ppm are to be used for field screen purposes only.**

4.2 Pour the contents of the small cuvette into a graduated glass pipette. Add 10 ml. pure Freon 113 into the pipette. Shake the contents and pour into the 1cm. cuvette. Repeat step 4.2. adding two zeros to the end of the displayed number. If the reported result is greater than 100,000 ppm. the accuracy of further readings through additional dilutions is extremely questionable. **Do not use for reporting purposes.**

4.4 **Pour all sample Freon into the recycling container.**

5.0 Split Samples

5.1 Each tenth test sample shall be a split sample. Decant approximately one half of the extraction solvent through a filter cartridge and insert into the instrument to obtain a concentration reading. Clean and rinse the cuvette and decant the remainder of the fluid to obtain a second concentration reading from the same sample. If the second reading varies by more than 1% from the original, it will be necessary to completely recalibrate the instrument.

QP-12

WHOLE EARTH ENVIRONMENTAL
QUALITY PROCEDURE

Procedure for Soil Sample Preparation: Moisture Weight Percentage

Completed By: Approved By: Effective Date: / /

1.0 Purpose

This procedure outlines the methods to be employed in preparing samples to be tested for electrical conductivity and cation exchange capacities.

2.0 Scope

This procedure shall be followed when preparing any electrical conductivity, (EC), or cation exchange capacity, (CEC), testing.

3.0 Procedure

3.1 Field collection of all soil samples shall be in plastic containers. Samples may be stored for a maximum of five days prior to processing.

3.2 Homogenize sample thoroughly. Test for hydrophobic characteristics as follows:

a. examine for visible globs of oil or grease
b. press soil sample to determine if it compresses into a damp mass
c. test to determine if the sample stains filter paper

If the sample exhibits hydrophobic characteristics, prepare in accordance with 3.3.2 below. Otherwise, prepare in accordance with 3.3.1.

3.3.1 Weigh 120 +/- 0.1g sample into tared crucible and dry at 105^0 C for 1 hour. Cool and reweigh. Repeat until weight difference is less than 1% value.

3.3.2 Weigh 120 +/- 0.1 g sample into tared crucible and dry in oven at 250^0 C for one hour. Cool and heat with propane torch until sample just begins to smoke. Maintain gradual heating until smoke dissipates (approximately 1/2 hour). **DO NOT ALLOW THE SAMPLE TO CATCH FIRE OR EXCEED 390^0 C.** Cool and reweigh. Grind to pass 2mm sieve.

3.4 Report percent moisture to three significant figures as follows:

Moisture % = [(W - D)/D] X 100
W = wet sample weight
D = dry sample weight

3.5 References

Diagnosis and Improvement of Saline and Alkali Soils; U.S. Salinity Laboratory Staff, Agriculture Handbook No. 60; 1954

Deuel & Holliday, Soil Remediation for the Petroleum Extraction Industry; Houston, Tx. 1993.

QP-14

WHOLE EARTH ENVIRONMENTAL QUALITY PROCEDURE

Procedure for Conducting Sodium Adsorption Ratio (SAR) Testing

Completed By: Approved By: Effective Date: / /

1.0 Purpose

This procedure defines the methods to be employed when conducting sodium adsorption ratio testing from paste extract samples.

2.0 Scope

This procedure shall be used in all SAR's obtained from sample paste extracts.

3.0 Procedure

3.1 All samples shall be prepared in accordance with QP-12 and 13.

3.2 Calibration of the equipment shall be performed daily. Calibrate using a 5 point series of standards. The range of standards must include a blank, and should span the range of expected concentrations of the samples. The following concentrations are appropriate:

Low Range: 0, 1.0, 3.0, 5.0, 10.0 ppm
High Range: 0, 10.0, 20.0, 50.0, 100 ppm

With the instrument on, inject standard mixture with 10 µL syringe and start data collection. Store calibration data under the date of generation for use in subsequent analyses.

3.3 Calibrate instrument in accordance with 3.2. Dilute aqueous extract volumetrically so that sample concentrations fall within the working range of the instrument. Enter sample I.D. and operator name into data collection system. Inject 10 µL sample and start data collection.

3.4 *Report cation concentrations to three significant digits. Milliequivilents* conversions are automatically performed in the calculation for SAR as follows:

$$\text{soluble cations (meq/100g)} = \left(\left\{\frac{[Na]}{23.0} + \frac{[Ca]}{20.0} + \frac{[Mg]}{12.2} + \frac{[K]}{39.1}\right\} \text{ X SP}\right) / 1000$$

$$\text{SAR} = \frac{[Na]}{23.0} / \left(0.5\left\{\frac{[Ca]}{20.0} + \frac{[Mg]}{12.2}\right\}\right)^{-1/2}$$

Where [ ] = concentration in ppm

QP-15

WHOLE EARTH ENVIRONMENTAL
QUALITY PROCEDURE

Procedure for Determining Distribution of Exchangeable Cations

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Completed By: Approved By: Effective Date: / /

1.0 Purpose

This procedure defines the methods to be employed when determining the distribution of cations adsorbed on the solid phase.

2.0 Scope

This procedure shall be used in all exchangeable cation distribution testing.

3.0 Procedure

3.1 All samples shall be prepared in accordance with QP-12 and 13.

3.2 Calibration of the equipment shall be performed daily. Calibrate using a 5 point series of standards. The range of standards must include a blank, and should span the range of expected concentrations of the samples. The following concentrations are appropriate:

Low Range: 0, 1.0, 3.0, 5.0, 10.0 ppm
High Range: 0, 10.0, 20.0, 50.0, 100 ppm

With the instrument on, inject standard mixture with 10 µL syringe and start data collection. Store calibration data under the date of generation for use in subsequent analyses.

3.3 Weigh 5 +/- 0.01g sample into fritted extraction tube. Add 20 mL ammonium acetate, cap and shake for 5 minutes. Connect tube into filtration apparatus and collect extract. Repeat three times. Enter sample I.D. and operator name in data collection system. Inject 10 µL into 100mL container of deionized water and shake. Extract 10 µL of dilute sample and inject into sampling port of the ion Chromatograph.

3.4 Report cation concentrations to three significant digits. Milliequivilents conversions are automatically performed in the calculation for SAR as follows:

$$\text{extractable cations} = \left(\left\{\frac{[Na]}{23.0} + \frac{[Ca]}{20.0} + \frac{[Mg]}{12.2} + \frac{[K]}{39.1}\right\} \text{ X } 10\right) / W$$

soluble cations = (SC X SP) / 1000

EC = extractable cations - soluble cations

Where [ ] = concentration in ppm
W = sample weight, grams

3.5 References:

Methods for Chemical analysis of Water and Wastes; USEPA; EMSL, Cincinnati, OH 1979

Deuel and Holliday, Soil Remediation for the Petroleum Extraction Industry; Houston, Tx., 1993

QP-19

WHOLE EARTH ENVIRONMENTAL
QUALITY PROCEDURE

Sampling and Testing Protocol
BTEX Speciation in Soil

Completed By: Approved By: Effective Date: / /

1.0 Purpose

This procedure is to be used to determine the concentrations of Benzene, Toluene, Ethyl-Benzene and Xylene (BTEX) in soils.

2.0 Scope

This procedure is to be used as the standard field measurement for soil BTEX concentrations. It is not to be used as a substitute for full spectrographic speciation of organic compounds.

3.0 Procedure

3.1 Sample Collection and Preparation

3.1.1 Collect at least 500 g. of soil from the sample collection point. Take care to insure that the sample is representative of the general background to include visible concentrations of hydrocarbons and soil types. If necessary, prepare a composite sample of soils obtained at several points in the sample area. Take care to insure that no loose vegetation, rocks or liquids are included in the sample(s).

3.1.2 The soil sample(s) shall be immediately inserted into a one quart or larger polyethylene freezer bag and sealed. When sealed, the bag should contain a nearly equal space between the soil sample and trapped air.

3.1.3 The sealed samples shall be allowed to set for a minimum of five minutes at a minimum temperature of 70^0F.

3.1.4 The sealed sample bag should be massaged to break up any clods, and to provide the soil sample with as much exposed surface area as practically possible.

3.2 Sampling Procedure

3.2.1 The instrument to be used in conducting VOC concentration testing shall be a Photovac Ion-chromatograph with BTEX Module. Prior to use the instrument shall be zeroed out in accordance with QP-55.

3.2.2 Carefully open one end of the collection bag and insert the probe tip into the bag taking care that the probe tip not touch the soil sample or the side walls of the bag. If VOC analysis was conducted on the sample prior to BTEX analysis, care should be taken to insure that a sufficient air volume exists in the bag to provide accurate results. **If the available air space within the bag is insufficient to run a full analysis, the sample shall be discarded.**

3.2.3 Set the instrument to retain the highest result reading value. Record the reading onto the Field Analytical Report Form and additionally enter the location code into the instrument data logger.

4.0 After testing, the soil samples shall be returned to the sampling location, and the bags collected for off-site disposal. **IN NO CASE SHALL THE SAME BAG BE USED TWICE. EACH SAMPLE CONTAINER MUST BE DISCARDED AFTER EACH USE.**

QP-25

WHOLE EARTH ENVIRONMENTAL
QUALITY PROCEDURE

Procedure for Instrument Calibration and Quality Assurance Analysis for General Analysis "MEGA" TPH Analyzer

Completed By: Approved By: Effective Date: / /

1.0 Purpose

This procedure outlines the methods to be employed in calibrating the GAC MEGA TPH analyzer and for determining and reporting of accuracy curves.

2.0 Scope

This procedure shall be followed each day that the instrument is used.

3.0 Procedure

3.1 Turn the instrument on and allow to warm up with no cuvette in the receptacle. The instrument will take between five and ten minutes to come to equilibrium as can be determined by the concentration display readings moving a maximum of 5 ppm on the low scale. If the instrument continues to display erratic readings greater than 5 ppm, remove the cover and check both the mirrors and chopper to insure cleanliness.

3.2 All TPH standards shall be purchased form Environmental Resources Corporation and as a condition of their manufacture subject to independent certification by third party laboratories. Each standard is received with a calibration certificate.

3.3 Insert the low range (100 ppm) calibration standard into the receiving port and note the result on the right hand digital display. If the displayed reading is less than 98 ppm or greater than 102 ppm, remove the circuit board cover panel and zero out the instrument in accordance with QP-26.

(Note: Except in New Mexico, set the span to read 105% of actual standard).

3.4 Repeat the process with the mid range (500 ppm) calibration standard. If the displayed reading is less than 490 ppm or greater than 510 ppm zero out the span as described in QP-26.

3.5 Repeat the process again with the 1,000 and 5,000 ppm calibration standards.

3.6 Pour clean Freon 113 into a filter cartridge and extract into 10 ml cuvette. Insert the cuvette into the receiving port and zero out the instrument reading using the far right adjustment knob on the instrument. Repeat using the 1 ml cuvette and the left hand zero dial.

4.0 Determining & Reporting Instrument Accuracy

4.1 After making the fine adjustment with the zero dials reinsert each calibration standard into the instrument and note the concentration values. ***If any concentration value exceeds 2% of the standard set point, repeat all steps in section 3.0 of this Procedure.*** Note the actual concentration values displayed by the instrument after each calibration standard.

4.2 The four calibration standards shall be used in reporting span deviation as follows:

Standards Range			
100 ppm	**500 ppm**	**1,000 ppm**	**5,000 ppm**
0-250 ppm	251-750 ppm	751-2,500 ppm	2,501-10,000 ppm

4.3 Divide the actual instrument reading value of each calibration sample by the concentration shown on the standard (e.g.. 501 ppm instrument reading / 500 ppm standard = 1.002%). These readings shall be reported for each test performed.

5.0 Re-calibration

5.1 If any sample exceeds the concentration of 1,000 ppm on the 10 ml cuvette or 10,000 ppm on the 1 ml cuvette, the cuvette must be thoroughly rinsed with clean Freon and the instrument re-zeroed in accordance with 3.6 of this procedure.

QP-55

WHOLE EARTH ENVIRONMENTAL
QUALITY PROCEDURE

Procedure for Instrument Calibration and Quality Assurance Analysis for Photovac Gas Chromatograph

Completed By: Approved By: Effective Date: / /

1.0 Purpose

This procedure outlines the methods to be employed in calibrating the Photovac analyzer in the BTEX mode and for determining and reporting of accuracy curves.

2.0 Scope

This procedure shall be followed each day that the instrument is used.

3.0 Procedure

Start-up

3.1 Turn the instrument on and press the Battery button. A battery status report will appear on the screen. If the charge level is less than 8.0, either charge the battery or insert a fresh battery pack.

3.2 Open carrier gas valve on right side of instrument. The instrument is now tuning the lamp. If any "boot" problems occur during warm-up, the "chck" symbol will appear on the screen. Pressing TUTOR will prompt the instrument to provide details. The instrument will not progress beyond the start-up mode until all prompts are cleared.

3.3 The next screen display will be "purj" and will last approximately ten minutes. The instrument is purging the column.

Calibrate

3.4 Connect the regulator to cylinder of calibration gas. Connect calibration adapter and tee assembly to both the regulator and instrument. **DO NOT FORCE ANY CONNECTION!**

3.5 Inspect the open end of the tee vent to insure unobstructed flow.

3.6 Enter CAL on the key pad. The instrument will query "benzene?". Following the prompts and using the key pad, set the concentrations to those defined on the calibration gas bottle. Follow the same procedure for toluene, ethyl-benzene and xylene. After each compound, the instrument will read that the next analysis will be a calibration.

3.7 Press ENTER on key pad. The instrument will calibrate itself for the concentrations specified.

Confirmation Sample

3.8 After each calibration, run the calibration gas through the instrument once again. The display readings should be **exactly** those of the concentrations displayed on the calibration gas bottle. **If they are not, the instrument needs factory calibration; do not use.**

4.0 Re-calibration

4.1 The instrument is designed with software that prompts you to recalibrate each day, each thirty minutes of use, and after running a sample with high concentrations of one or more of the detected compounds.

5.0 Reporting Instrument Accuracy

5.1 The instrument accuracy as certified by the factory is 15% within one decade of instrument set point. Lower detection limits are 0.1 ppm for benzene and 1.0 ppm for toluene, ethylbenzene and xylene.

5.2 These standards and detection limits must be shown on all reports in which the instrument is used.

QP-77

WHOLE EARTH ENVIRONMENTAL
QUALITY PROCEDURE

Procedure for Obtaining
Soil Samples for Transportation to a Laboratory

Completed By:	Approved By:	Effective Date: / /

1.0 Purpose

This procedure outlines the methods to be employed when obtaining soil samples to be taken to a laboratory for analysis.

2.0 Scope

This procedure shall be used for developed, cased water monitoring wells. It is not to be used for standing water samples such as ponds or streams.

3.0 Preliminary

3.1 Obtain sterile sampling containers from the testing laboratory designated to conduct analyses of the soil. The shipment should include a Certificate of Compliance from the manufacturer of the collection bottle or vial and a Serial Number for the lot of containers. Retain this Certificate for future documentation purposes.

3.2 If collecting TPH, BTEX, RCRA 8 metals, cation / anions or O&G, the sample jar may be a clear 4 oz. container with Teflon lid. If collecting PAH's, use an amber 4 oz. container with Teflon lid.

4.0 Chain of Custody

4.1 Prepare a Sample Plan. The plan will list the number, location and designation of each planned sample and the individual tests to be performed on the sample. The sampler will check the list against the available inventory of appropriate sample collection bottles to insure against shortage.

4.2 Transfer the data to the Laboratory Chain of Custody Form. Complete all sections of the form except those that relate to the time of delivery of the samples to the laboratory.

4.3 Pre-label the sample collection jars. Include all requested information except time of collection. (Use a fine point Sharpie to insure that the ink remains on the label). Affix the labels to the jars.

5.0 Sampling Procedure

5.1 Go to the sampling point with the sample container. If not analyzing for ions or metals, use a trowel to obtain the soil. Do not touch the soil with your bare hands. Use new latex gloves with each sample to help minimize any cross-contamination.

5.2 Pack the soil tightly into the container leaving the top slightly domed. Screw the lid down tightly. Enter the time of collection onto the sample collection jar label.

5.3 Place the sample directly on ice for transport to the laboratory.

5.4 Complete the Chain of Custody form to include the collection times for each sample. Deliver all samples to the laboratory.

7.0 Documentation

7.1 The testing laboratory shall provide the following minimum information:

A. Client, Project and sample name.
B. Signed copy of the original Chain of Custody Form including data on the time the sample was received by the lab.
C. Results of the requested analyses
D. Test Methods employed
E. Quality Control methods and results

Laboratory Analytical Reports

This section contains copies of the field and laboratory analyses performed on this project.

The first report from Western Environmental Consultants shows the TPH, BTEX and chloride concentrations obtained from coring at the approximate center of the pit after having excavated the site to a depth of approximately 10' below ground level. The report shows a clear drop in TPH concentrations at a depth of approximately 26' below ground level.

Whole Earth Environmental excavated to a depth of approximately 40' below ground level and encountered an impermeable calichi layer extending to an unknown depth. Our field testing revealed that the hydrocarbon concentrations dropped dramatically within the first few inches of this layer.

The second set of analyses are composites of the pit surface and side walls and the spread zone taken on September 9, 1999. No reportable concentrations were found.

The third set of results were obtained on October 7, 1999. The side wall analyses were composite samples taken immediately above the calichi layer. The bottom sample was discrete and obtained from a depth of approximately 40' below ground and approximately 6" into the calichi zone.

WESTERN
ENVIRONMENTAL
CONSULTANTS

O. Box 1010
, New Mexico 88241

Phone (505) 392-5021
Fax (505) 397-2597

SOIL ANALYSIS REPORT

DATE : 7-24-98
CLIENT: Apache Corp.
SUPERVISOR: A. Hodge
Sample Matrix: Soil

FACILITY: Skelly Penrose Central Battery
Test Method: EPA 418.1
Order No. Don Baucham
SAMPLE RECEIVED: Intact on site

	TPH		DEPTH	LOCATION
SAMPLE NO. 1:	9,410	PPM	10'	Surface of Pit Bottom
SAMPLE NO. 2:	18,570	PPM	15'-17'	Center of Pit
SAMPLE NO. 3:	9,987	PPM	20'-22'	Center of Pit
SAMPLE NO. 4:	178	PPM	25'-27'	Center of Pit
SAMPLE NO. 5:	104	PPM	30'-32'	Center of Pit
SAMPLE NO. 6:	81	PPM	35'-37'	Center of Pit
SAMPLE NO. 7:	16	PPM	40'-42'	Center of Pit
SAMPLE NO. 8:	11,045	PPM	4"-6"	Composite of stockpiled soils
SAMPLE NO. 9:		PPM		
SAMPLE NO. 10:		PPM		

COMMENTS: These samples were taken using a Hollow Stem Auger and split spoon to sample. These samples were taken to define the vertical impact of Total Petroleum Hydrocarbons at the central battery pit. Sample # 7 was split and sent to a third party lab to confirm TPH and BTEX levels. Sample # 8 was a composite sample taken from the stockpiled soils that have been placed on plastic at the central battery.

WESTERN
ENVIRONMENTAL
CONSULTANTS

[illegible]O. Box 1816
New Mexico 88241

Phone (505) 392-5021
Fax (505) 397-2597

SOIL ANALYSIS REPORT

DATE : 7-24-98
CLIENT: Apache Corp.
SUPERVISOR: A. Hodge
Sample Matrix: Soil

FACILITY: Skelly Penrose Central Battery
Test Method: EPA 325.3
Order No. Don Baucham
SAMPLE RECEIVED: Intact on site

	CL		DEPTH	LOCATION
SAMPLE NO. 1:	2,000	PPM	10'	Surface of Pit Bottom
SAMPLE NO. 2:	12,000	PPM	15'-17'	Center of Pit
SAMPLE NO. 3:	7,500	PPM	20'-22'	Center of Pit
SAMPLE NO. 4:	2,800	PPM	25'-27'	Center of Pit
SAMPLE NO. 5:	1,000	PPM	30'-32'	Center of Pit
SAMPLE NO. 6:	<500	PPM	35'-37'	Center of Pit
SAMPLE NO. 7:	<500	PPM	40'-42'	Center of Pit
SAMPLE NO. 8:		PPM		
SAMPLE NO. 9:		PPM		
SAMPLE NO. 10:		PPM		

COMMENTS: These samples were taken using a Hollow Stem Auger and split spoon to sample. These samples were taken to define the vertical impact of chlorides at the central battery pit. Sample # 7 was split and sent to a third party lab to confirm CL levels.

nvironmental Lab of Texas, Inc. 12600 West I-20 East Odessa, Texas 7976
(915) 563-1800 FAX (915) 563-171

C ... C ... ODY ... ANALYSIS REQUE

ct Manager: M. Gatlin
Phone #: (800) 854-4358
FAX #: (28) 446-8996
any Name & Address: Whole Earth
ect #: B-52 Pit
Project Name: Apache
ct Location:
Sampler Signature:

NA SIS QUEST

LAB # AB USE ONLY	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	OTHER	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	OTHER	SAMPLING: DATE	TIME	BTEX 8020	TPH 418.1	TCLP Metals	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI	DRO-GRO			
19916	N	1			✓						✓			on Bottles		✓								x			
9917	S	1			✓						✓					✓											
9918	E	1			✓						✓					✓											
19919	W	1			✓						✓					✓											
19920	B	1			✓						✓					✓								+			
19949	Spread Comp	1			✓						✓					✓											

linquished by:	Date: 9/10/99	Time: 1630	Received by:	REMARK
linquished by:	Date:	Time:	Received by:	
linquished by:	Date:	Time:	Received by Laboratory:	

ENVIRONMENTAL
LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL
ATTN: MR. MIKE GRIFFIN
19606 SAN GABRIEL
HOUSTON, TEXAS 77084
[illegible]

Sample Type: Soil
Sample Condition: Intact/Iced
Project #: B-52 Pit
Project Name: Apache
Project Location: None Given

Sampling Date: 09/10/99
Receiving Date: 09/10/99
Analysis Date: 09/11 & 9/14/99

ELT#	FIELD CODE	GRO C6-C10 (mg/kg)	DRO >C10-C25 (mg/kg)
19916	N	<10	53
19917	S	<10	34
19918	E	<10	20
19919	W	<10	<10
19920	B	<10	<10
19949	Spread Comp.	<10	798

%INSTRUMENT ACCURACY 1	104	116
% EXTRACTION ACCURACY 1	130	114
BLANK 1	<10	<10
% INSTRUMENT ACCURACY 2	103	103
RACY 2	122	115

Raland K Tuttle — 9-15-99
Raland K. Tuttle — Date

ENVIRONMENTAL
LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL
ATTN: MR. MIKE GRIFFIN
19608 SAN GABRIEL
HOUSTON, TEXAS 77084
FAX: 1-281-646-8996

SampleType: Soil
Sample Condition: Intact/ Iced
Project #: B-52 Pit
Project Name: Apache
Project Location: None Given

Sampling Date: 09/10/99
Receiving Date: 09/10/99
Analysis Date: 09/13/99

ELT#	FIELD CODE	BENZENE mg/kg	TOLUENE mg/kg	ETHYLBENZENE mg/kg	m,p-XYLENE mg/kg	o-XYLENE mg/kg
19916	N	<0.100	<0.100	<0.100	<0.100	<0.100
19917	S	<0.100	<0.100	<0.100	<0.100	<0.100
19918	E	<0.100	0.108	0.109	0.171	<0.100
19919	W	<0.100	0.125	<0.100	0.100	<0.100
19920	B	<0.100	<0.100	<0.100	<0.100	<0.100
19949	Spread Comp.	<0.100	<0.100	<0.100	<0.100	<0.100
	% IA	90	85	86	88	87
	% EA	102	98	96	98	97
	BLANK	<0.100	<0.100	<0.100	<0.100	<0.100

METHODS: SW 846-8020,5030

Raland K. Tuttle

9-15-99
Date

ENVIRONMENTAL
LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL
ATTN: MR. MIKE GRIFFIN
19606 SAN GABRIEL
HOUSTON, TEXAS 77084
FAX: 281-646-8996

Sample Type: Soil
Sample Condition: Intact/Iced
Project #: Apache
Project Name: Skelly-Penrose Unit/ B-52 Pit
Project Location: Eunice, N.M.

Sampling Date: 10/07/99
Receiving Date: 10/07/99
Analysis Date: 10/08/99

ELT#	FIELD CODE	Chloride (mg/kg)	GRO C6-C10 (mg/kg)	DRO >C10-C25 (mg/kg)
20667	N	*	<10	<10
20668	S	*	<10	719
20669	E	*	<10	108
20670	W	*	<10	<10
20671	Btm.	2012	<10	652

%IA	99	89	82
% EA	*	114	90
BLANK	<10	<10	<10

Methods: EPA SW 846-8015M GRO/DRO, 9252

Raland K. Tuttle

10-11-99
Date

ENVIRONMENTAL
LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL
ATTN: MR. MIKE GRIFFIN
19606 SAN GABRIEL
HOUSTON, TEXAS 77084
FAX: 1-281-646-8996

SampleType: Soil
Sample Condition: Intact/ Iced
Project #: Skelly-Penrose Unit/ B-52
Project Name: Apache
Project Location: Eunice, NM

Sampling Date: 10/07/99
Receiving Date: 10/07/99
Analysis Date: 10/11/99

ELT#	FIELD CODE	BENZENE mg/kg	TOLUENE mg/kg	ETHYLBENZENE mg/kg	m,p-XYLENE mg/kg	o-XYLENE mg/kg
20667	North	<0.100	<0.100	<0.100	<0.100	<0.100
20668	South	<0.100	<0.100	<0.100	<0.100	<0.100
20669	East	<0.100	<0.100	<0.100	<0.100	<0.100
20670	West	<0.100	<0.100	<0.100	<0.100	<0.100
20671	Bottom	<0.100	<0.100	<0.100	<0.100	<0.100

	BENZENE	TOLUENE	ETHYLBENZENE	m,p-XYLENE	o-XYLENE
% IA	97	94	93	93	92
% EA	94	88	87	88	90
BLANK	<0.100	<0.100	<0.100	<0.100	<0.100

METHODS: SW 846-8020,5030

Raland K. Tuttle

10-11-99
Date

12600 West I-20 East • Odessa, Texas 79765 • (915) 563-1800 • Fax (915) 563-1713

Environmental Lab of Texas, Inc.

12600 West I-20 East Odessa, Texas 79763
(915) 563-1800 FAX (915) 563-1713

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Elliot Werner

Phone #:

FAX #:

Company Name & Address: Whole Earth / APACHE

Project #: Skelly-Penrose Unit / B-52 Pit

Project Name :

Project Location: Eunice N.M

Sampler Signature:

ANALYSIS REQUEST

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	MATRIX: SOIL	MATRIX: AIR	MATRIX: SLUDGE	MATRIX: OTHER	PRESERVATIVE METHOD: HCL	PRESERVATIVE METHOD: HNO3	PRESERVATIVE METHOD: ICE	PRESERVATIVE METHOD: NONE	PRESERVATIVE METHOD: OTHER	SAMPLING: DATE	SAMPLING: TIME	BTEX 8020/5030	TPH 418.1	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI	GRODRO	Cl
20667	N	1			✓						✓			10-7-99	1005	✓								✓	
0668	S	1			✓						✓				1007	✓								✓	
0669	E	1			✓						✓				1015	✓								✓	
0670	W	1			✓						✓				1020	✓								✓	
0671	BTM.	1			✓						✓				1025	✓								✓	✓

DRO - all
GRO - all
Chloride
random only
BTEX - All

quished by:	Date: 10-7-99	Time: 1335	Received by:
quished by:	Date:	Time:	Received by:
quished by:	Date:	Time:	Received by Laboratory:

REMARKS

Modeling

This section contains the results of VADSAT modeling performed on this project.

The model indicates that the total sodium chloride loading within the saturated zone calculated as lying between 10-20' below ground level is slightly more than 19 Kg. The model predicts that over a 100 year period, the site will leach out a total of 10.26 Kg or approximately one tenth of a kilogram per year. The resulting concentrations within the center of the plume will never exceed .1 ppm.

Modeling Data Entry
Apache Corporation
Skelly Penrose Central Battery
Emergency Brine Storage Inpoundment
NaCl

Control Data	Entry	U / M
Deterministic	Yes	
Monte Carlo	No	
Low Permeability Layer Below Contamination	No	

Source Data		
Waste Zone Thickness	3	meters
Waste Zone Area	533	sq. meters
Ratio of Length to Width	1:1.5	
Soil Thickness Above Waste Zone	3	meter
Soluable Concentration in Soil / Waste Zone	5,000	ppm

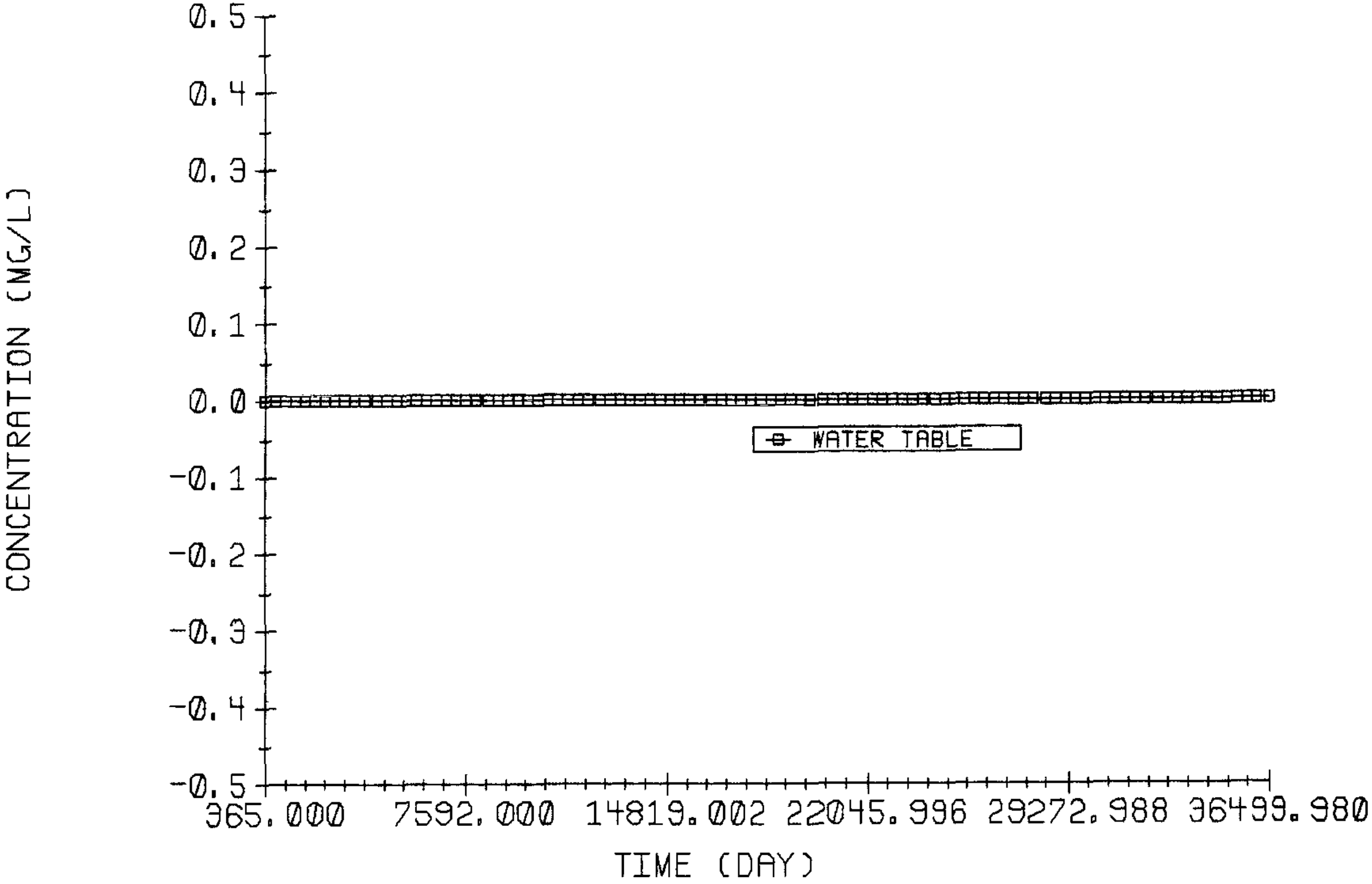
Chemical Data	
NaCl	Yes

Unsaturated Zone		
Biodecay Cooefficient	0.001	1 / day
Soil Database	Sandy Clay	
Hydrological Database	Sedimentary	
Unsaturated Zone Thickness	9.23	Meters
Soil Database	Sandy Clay	
van Genuchten n	1.09	(Default)
Residual Water Content	0.01001	
Unsaturated Zone Dispersivity	0	**Internally**

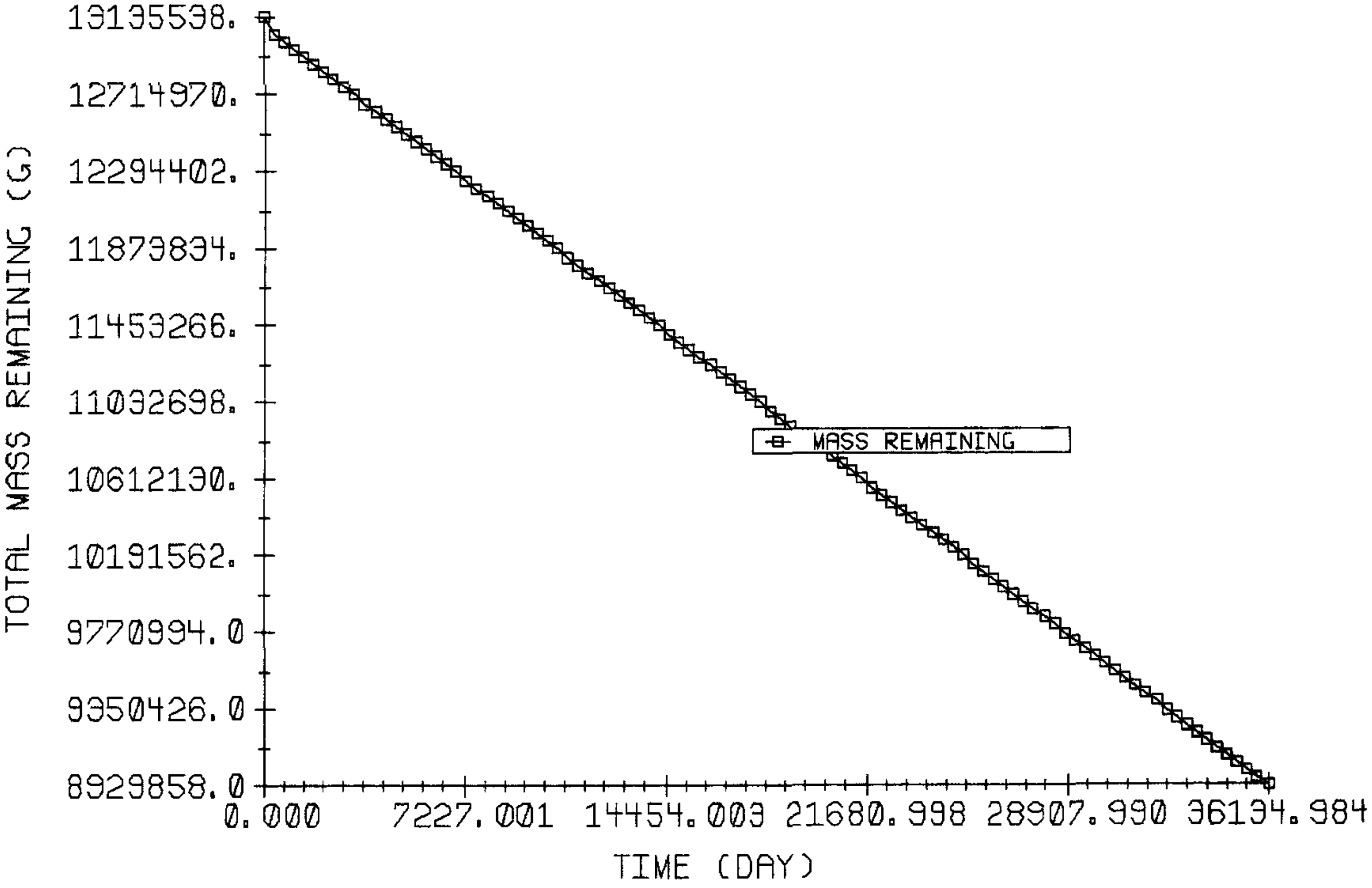
Saturated Zone		
Aquifer Porosity	0.2	(Default)
Longitudinal Dispersivity	0	**Internally**
Ratio of Long. / Trans. Dispersivities	3	
Ratio of Trans. / Vert. Dispersivities	87	
Hydrological Database	Sedimentary	
Aquifer Thickness	10	meters
Aquifer Gradient	0.023	
Saturated Hydraulic Conductivity	0.13	meters / day

Net Infiltration Rate	0.00001	ft. / day

APACHE SKELLY



MASS REMAINING VS TIME (APACHE SKELLY)



NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

April 11, 1999

CERTIFIED MAIL
RETURN RECEIPT NO. P 288 259 104

Mr. Michael Bernard
Apache Corporation
2000 Post Oak Boulevard
Suite 100
Houston, Texas 77056-4400

Re: **Assessment of the Vertical Hydrocarbon Impact at the Skelly Penrose "A" Central Battery Pit: (Abandoned emergency overflow pit)**

Located: SE/4SE/4 Sec 4-Ts23s-R37e

Dear Mr. Bernard:

The New Mexico Oil Conservation Division (NMOCD) is in receipt of Apache Corporation's (AC) letter dated October 9, 1998 for the pit closure referenced above. **The NMOCD hereby approves of AC's proposed work plan for the spring of 1999, subject to the following conditions:**

1. After the additional excavation has taken place, AC shall take confirmation samples from the bottom of the excavation and sidewalls. Soil samples shall be analyzed for TPH, BTEX and Chlorides all per EPA SW-846 methods.

2. AC must seek NMOCD approval prior to the placement of any remediated soils. Please submit analytical results of the remediated soils to include TPH, BTEX and Chlorides.

3. AC will notify the OCD Santa Fe office and the OCD District office at least 48 hours in advance of all scheduled activities such that the OCD has the opportunity to witness the events and split samples. This event shall take place during NMOCD's normal working hours.

Please be advised that NMOCD approval of this work plan does not relieve AC of liability should their operations fail to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve AC of responsibility for compliance with any other federal, state, or local laws and/or regulations.

If you require any further information or assistance please do not hesitate to write or call me at (505-827-7155).

Sincerely Yours,

Wayne

Wayne Price-Pet. Engr. Spec.
Environmental Bureau

cc: OCD Hobbs District

Is your RETURN ADDRESS completed on the reverse side?

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write *"Return Receipt Requested"* on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee): wp
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
APACHE CORPORATION
2000 POST OAK BLVD.
SUITE 100
HOUSTON, TEXAS 77056-4400

4a. Article Number
P288 259 104

4b. Service Type
☒ Registered ☒ Certified
☐ Express Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

7. Date of Delivery
4-15-99

5. Received By: *(Print Name)*

8. Addressee's Address *(Only if requested and fee is paid)*

6. Signature: *(Addressee or Agent)*
X Burford, J.

PS Form **3811**, December 1994 102595-98-B-0229 Domestic Return Receipt

Apache
CORPORATION
2000 POST OAK BOULEVARD / SUITE 100 / HOUSTON, TEXAS 77056-4400
(713) 296-6000

October 9, 1998

OCT 12 [illegible]

Mr. Wayne Price
New Mexico Oil Conservation Division
2040 South Pacheco
Santa Fe, New Mexico 87505

Re: Assessment of the Vertical Hydrocarbon Impact at the Skelly Penrose "A" Central Battery Pit

Dear Mr. Price:

Apache Corporation contracted Rhino Environmental Services, Inc. to conduct an environmental investigation of an abandoned emergency overflow pit at the above referenced facility. The Central Battery is located in the SE/4 of the SE/4 of Section 4, T23S, R37E, Lea County, New Mexico.

The pit, encompassing an area 64 feet by 61 feet, was excavated to depth of 10 feet in 1996. The estimated 1750 cubic yards of excavated soil was placed on a plastic liner within a diked area to prevent contaminated storm water run off.

On July 24, 1998, a ramp was cut in the south wall to allow a Hollow Stem Auger Rig access to the pit bottom. A single soil boring was placed in the center of the excavated area in an effort to determine the vertical extent of the impacted soils. A soil sample was taken immediately below the surface of the pit bottom and designated as Sample #1 – 10'. Sampling was conducted using a split spoon at 5' intervals to a depth of 42' below surface grade. The soil was analyzed on site for Total Petroleum Hydrocarbon (TPH) and chlorides (Cl-). The results are as follows:

Sample Number	**Depth Below Surface**	**TPH**	**Cl-**
No. 1	10'	9,410 ppm	2,000 ppm
No. 2	15'-17'	18,570 ppm	12,000 ppm
No. 3	20'-22'	9,987 ppm	7,500 ppm
No. 4	25'-27'	178 ppm	2,800 ppm
No. 5	30'-32'	104 ppm	1,000 ppm
No. 6	35'-37'	81 ppm	<500 ppm
No. 7	40'-42'	16 ppm	<500 ppm

Sample No. 7 was split and sent to a third party laboratory for confirmation of the analytical results. The suite of soil analysis was limited to TPH, BTEX and Chlorides. The results are as follows:

Sample Number	**Depth Below Surface**	**TPH**	**BTEX**	**Cl-**
No. 7	40'-42'	<5.0 ppm	<.50 ppm	4.6 ppm

Copies of all analytical results and photographs of the project are included with this correspondence.

Upon completion of the soil boring, the borehole was plugged using a bentonite/cement grout. The plug was poured in from the surface and backfilled to the top of the borehole at the base of the excavation. This technique was used to seal the borehole and prevent any downward migration of contaminants.

According to the NMOCD *Guidelines for Remediation of Leaks, Spills and Releases,* the soil cleanup goal for sites with a 40 point rating is 100 ppm TPH. It appears that the estimated total depth for excavation should be approximately 33' below surface grade, or an additional 22 feet. Apache Corporation proposes to remove the impacted soils to a depth that will meet the NMOCD TPH standard, resulting in an additional estimated 3100 cubic yards. The excavated soil will be blended with the previously removed soil and landfarmed near the Central Tank Battery. When the cleanup goal is reached, the soil will be placed back into the open pit or used as construction material for dikes.

Apache Corporation proposes initiating the final remediation plan in the spring of 1999. Should you have any questions or comments, please feel free to call me at (713) 296-6555.

Respectfully,
APACHE CORPORATION

Michael Bernard
Environmental Coordinator

CC: Paul Griesedieck - EH&S Manager
Doug O'Neil – Production Manager
Jon Hale – District Manager
Jim Ellison – Superintendent


7 23 '98

WESTERN
ENVIRONMENTAL
CONSULTANTS

P.O. Box 1816
Hobbs, New Mexico 88241

Phone (505) 392-5021
Fax (505) 397-2597

SOIL ANALYSIS REPORT

DATE : 7-24-98
CLIENT: Apache Corp.
SUPERVISOR: A. Hodge
Sample Matrix: Soil

FACILITY: Skelly Penrose Central Battery
Test Method: EPA 418.1
Order No. Don Baucham
SAMPLE RECEIVED: Intact on site

	TPH		DEPTH	LOCATION
SAMPLE NO. 1:	9,410	PPM	10'	Surface of Pit Bottom
SAMPLE NO. 2:	18,570	PPM	15'-17'	Center of Pit
SAMPLE NO. 3:	9,987	PPM	20'-22'	Center of Pit
SAMPLE NO. 4:	178	PPM	25'-27'	Center of Pit
SAMPLE NO. 5:	104	PPM	30'-32'	Center of Pit
SAMPLE NO. 6:	81	PPM	35'-37'	Center of Pit
SAMPLE NO. 7:	16	PPM	40'-42'	Center of Pit
SAMPLE NO. 8:	11,045	PPM	4"-6"	Composite of stockpiled soils
SAMPLE NO. 9:		PPM		
SAMPLE NO. 10:		PPM		

COMMENTS: These samples were taken using a Hollow Stem Auger and split spoon to sample. These samples were taken to define the vertical impact of Total Petroleum Hydrocarbons at the central battery pit. Sample # 7 was split and sent to a third party lab to confirm TPH and BTEX levels. Sample # 8 was a composite sample taken from the stockpiled soils that have been placed on plastic at the central battery.

WESTERN
ENVIRONMENTAL
CONSULTANTS

P.O. Box 1816
Hobbs, New Mexico 88241

Phone (505) 392-5021
Fax (505) 397-2597

SOIL ANALYSIS REPORT

DATE : 7-24-98
CLIENT: Apache Corp.
SUPERVISOR: A. Hodge
Sample Matrix: Soil

FACILITY: Skelly Penrose Central Battery
Test Method: EPA 325.3
Order No. Don Baucham
SAMPLE RECEIVED: Intact on site

	CL		DEPTH	LOCATION
SAMPLE NO. 1:	2,000	PPM	10'	Surface of Pit Bottom
SAMPLE NO. 2:	12,000	PPM	15'-17'	Center of Pit
SAMPLE NO. 3:	7,500	PPM	20'-22'	Center of Pit
SAMPLE NO. 4:	2,800	PPM	25'-27'	Center of Pit
SAMPLE NO. 5:	1,000	PPM	30'-32'	Center of Pit
SAMPLE NO. 6:	<500	PPM	35'-37'	Center of Pit
SAMPLE NO. 7:	<500	PPM	40'-42'	Center of Pit
SAMPLE NO. 8:		PPM		
SAMPLE NO. 9:		PPM		
SAMPLE NO. 10:		PPM		

COMMENTS: These samples were taken using a Hollow Stem Auger and split spoon to sample. These samples were taken to define the vertical impact of chlorides at the central battery pit. Sample # 7 was split and sent to a third party lab to confirm CL levels.

LAB ANALYSIS REPORTS

ANACHEM INC.

8 Prestige Circle, Suite 104 Allen, Texas 75002
972/727-9003 • FAX # 972/727-9686 • 1-800-966-1186

Customer Name:	Rhino Env. - Hobbs
Date Received:	July 29, 1998 at 10:00:00
Date Reported:	August 6, 1998
Submission #:	9807000409
Project:	APACHE OIL CO.

SAMPLES The submission consisted of 1 sample with sample I.D. shown in the attached data table.

TESTS The sample listed in the attached result pages was analyzed for:
* BTEX (EPA 8020)
* CHLORIDE (EPA 300.0)
* TPH DIESEL-RANGE (MOD 8015)

Distribution Of Reports
1-Mr. Allen Hodge of Rhino Env. - Hobbs
Ph. 505-392-4498 Fax 505-392-4498

Respectfully Submitted,
Anachem, Inc.

Howard H. Hayden, B.S.
Chemist

C Newton

C.E. Newton, Ph.D.
Chemist

Submission #: 9807000409 lims

NOTE: Submitted material will be retained for 60 days unless notified or consumed in analysis. Material determined to be hazardous will be returned or a $20 disposal fee will be assessed. Our letters and reports are for the exclusive use of the client to whom they are addressed. The use of our name must receive our prior written approval. Our letters and reports apply to the sample tested and/or inspected, and are not necessarily indicative of the qualitites of apparently identical or similar materials.

111145 to 111145

Page 1 of 3

Client Name: Rhino Env. - Hobbs
Submission #: 9807000409
Project Name: APACHE OIL CO.
Report Date: 08/06/98

Client Sample #: SPLIT SPOON SAMPLE 40-42'
Laboratory ID #: 111145 *Order Type: Normal Matrix: Soil*
Sample Container: *4oz EPA Approved Glass Jar\Gray Lid*
Sampling Location: *SKELLY PENROSE A-UNIT CENTRAL BATTERY*
Sampling Date: *07/24/98*

BTEX (EPA 8020)

Analyte	Results(mg/kg)	Detection Limit
Benzene	<0.40	0.40
Toluene	<0.50	0.50
Ethyl Benzene	<0.50	0.50
Xylenes	<0.50	0.50

CHLORIDE (EPA 300.0)

Analyte	Results(mg/l)	Detection Limit
Chloride	4.66	0.1

TPH DIESEL-RANGE (MOD 8015)

Analyte	Results(mg/kg)	Detection Limit
Diesel-Range Petroleum Hydrocarbons	<5.0	5.0

Report To: Rhino Environmental Services
Lab Number: 9807000409
Page 3 of 3

Project: Apache Oil Co.

QUALITY CONTROL DATA

METHOD	ANALYST	MATRIX	DATE EXTRACTED	DATE ANALYZED
BTEX 8020	Howard Hayden	Solid	7/28/98	7/28/98

SPIKE COMPOUND	SPIKE AMOUNT	% REC 1	% REC 2	% REC QC LIMIT	% VAR.	% VAR QC LIMIT
Benzene	100 ppb	84.9	82.9	80-120	2.3	20.0
Toluene	100 ppb	86.8	84.8	80-120	2.3	20.0
Ethyl Benzene	100 ppb	90.2	88.5	80-120	1.8	20.0
Xylenes	300 ppb	90.2	88.5	80-120	1.8	20.0

QUALITY CONTROL DATA

METHOD	ANALYST	MATRIX	DATE EXTRACTED	DATE ANALYZED
8015 Mod.	Howard Hayden	Solid	7/29/98	7/29/98

SPIKE COMPOUND	SPIKE AMOUNT	% REC 1	% REC 2	% REC QC LIMIT	% VAR.	% VAR QC LIMIT
Diesel Fuel	6085 ppm	93.4	87.4	20-150	6.4	30

QUALITY CONTROL DATA

ANALYTE	DATE ANALYZED	SPIKE (ppm)	STAND. DEV.	COEFF. OF VAR %	REC1/%	REC2%
Chloride	8/4/98	----	1.25	3.7	110	100

Standard Deviation = (x1-x2)/1.414
Coefficient of Variability % = (S.D./Avg.) X 100
Recovery % = [(spiked-unspiked)/expected] X 100

Apache
CORPORATION

2000 POST OAK BOULEVARD / SUITE 100 / HOUSTON, TEXAS 77056-4400

WWW.APACHECORP.COM
(713) 296-6000

March 21, 2000

RECEIVED

MAR 24 2000

Environmental Bureau
Oil Conservation Division

Mr. Wayne Price
NMOCD
2040 S. Pacheco
Santa Fe, New Mexico 87505

Subject: Skelly Penrose Central Battery Pit Closure

Dear Mr. Price:

Enclosed please find the closure report for the subject site as submitted by Whole Earth Environmental. This report contains a summary of work performed to date as well as analytical results from soil samples collected during the last phase of the project.

The last section of the report contains the data from the VASDAT modeling pertaining to this site. Based on the results of the modeling exercise, it is Apache Corporation's belief that the contaminates associated with this pit should not be considered a threat to groundwater below the site.

Apache Corporation respectfully requests that you consider this pit closed, and that you submit correspondence confirming the same.

Please contact me at 713-296-6555 if you have questions or comments. Thank you in advance for your time and consideration.

Sincerely,

David E. Urbanski

David E. Urbanski
Environmental Coordinator

RECEIVED

MAR 24 2000

Environmental Bureau
Oil Conservation Division

Enc.

cc: Ms. Donna Williams
NMOCD Hobbs, NM

Apache Corporation
Skelly Penrose Central Battery
Pit Closure Project

Whole Earth Environmental
19606 San Gabriel
Houston, Tx. 77084

Executive Summary

Whole Earth Environmental, Inc. began the remediation of the Apache Skelly Penrose site on October 5th, 1999. The project was concluded on March 6th, 2000.

Remediation Detail
The pit area is bordered on three sides by piping or meter runs. The original pit dimensions were approximately 70' X 60' X 5'. The pit was used as an emergency upset impoundment for several storage tanks within the facility. The pit contents were primarily produced water with minor hydrocarbon fractions. Over time, the light end hydrocarbons weathered, producing a thick asphaltine coating over the bottom of the structure.

In July, 1998, this heavy-end sludge was excavated and placed within a landfarm area immediately to the south of the site. The pit center was cored by Western Environmental Consultants on July 24th, 1998 and found to meet OCD TPH closure concentrations at an approximate depth of 40' below ground level.

Whole Earth Environmental continued the vertical excavation of the site to a depth of approximately 40' below ground level. Further vertical excavation was precluded not only by a dense calichi layer but also due to safety considerations resulting from the presence of high-pressure lines at the pit perimeter.

Testing of the final excavation was witnessed by Gary Wink of the Hobbs NMOCD on January 12th, and again by Donna Williams on January 14th. Split samples from this second witness event revealed non-detectable BTEX concentrations, negligible TPH and a chloride concentration of 3,400 ppm (Traceanalysis lab no. 138794 included within the Laboratory Analytical section of this report).

A thirty millimeter polyethylene liner was placed atop the excavation and the remediated materials re-deposited within the pit. A second thirty millimeter liner was installed over the excavation at an average depth of 5' below ground level. Each corner of the excavated area will be marked with a steel post and permanent sign designating the site as containing a lined pit.

Potential Impact to Groundwater

The modeling section of this report contains two VADSAT contaminant migration studies based on actual site test results for chlorides and benzene. Each study reflects that no detectable contaminant concentration will reach the groundwater within the next 100 years. The study is backed up by actual core test results obtained during the July 24th sampling event reflecting a 16 ppm TPH and <500 ppm chloride concentration at a depth of 40-42' below ground level.

Site Profile

Location

The emergency pit is situated at the northern end of the Apache Skelly Penrose Central Battery located approximately five miles south of Eunice, New Mexico. The site may accessed by a well maintained lease road intersecting New Mexico State Highway 18. (See attached plat map).

Topography

The surrounding topography is quite unremarkable. The elevation tends to decline in an easterly and southerly direction with no significant deviations to the mean. There are no surface streams or ponds within five miles of the facility.

Land Use

The primary land use for the surrounding area is petroleum extraction. Secondary usage is the grazing of cattle. There are no agricultural or recreational areas within five miles of the facility.

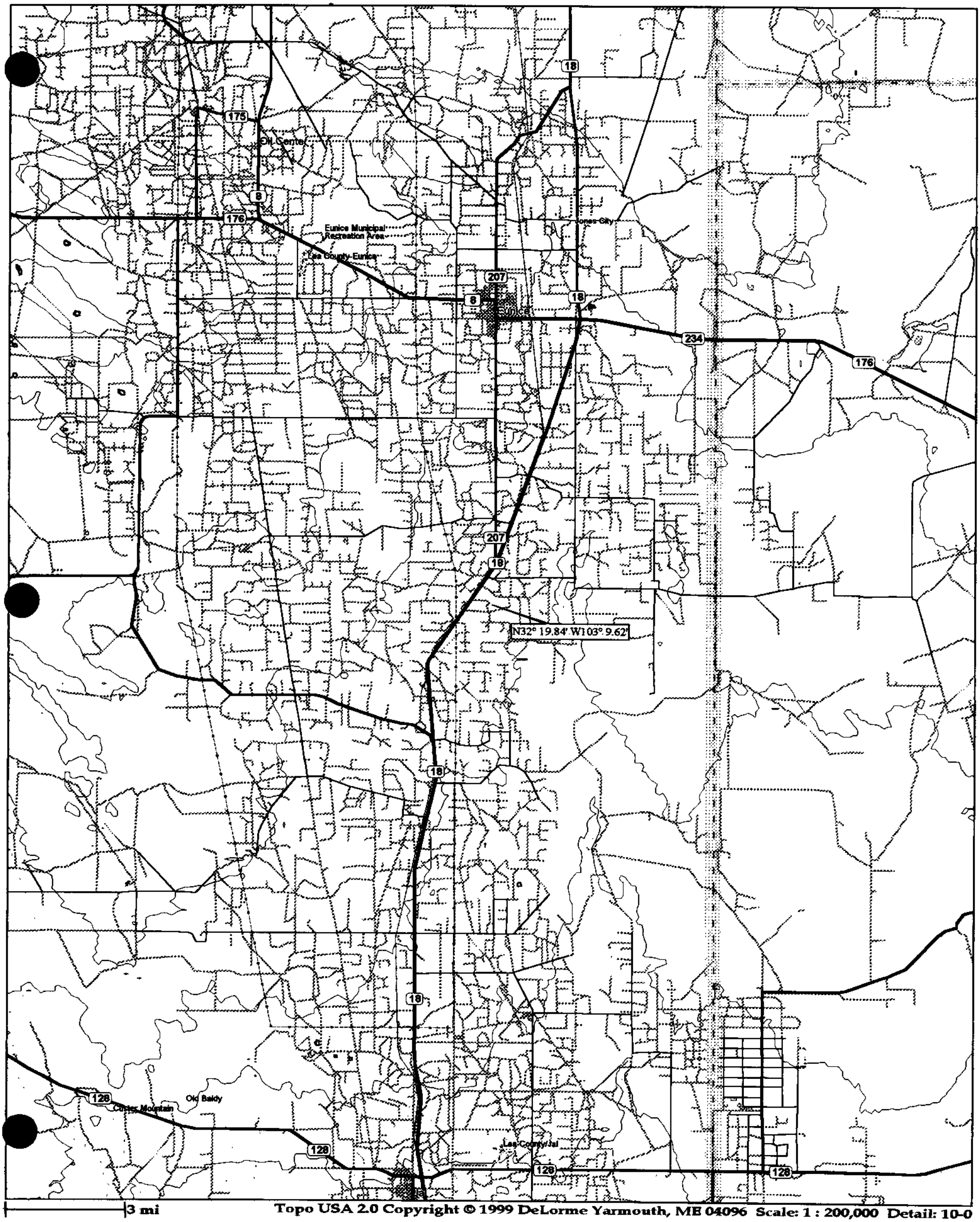
Site History

The pit was installed by a previous operator and was used as an emergency upset facility for the adjacent hydrocarbon storage tanks. The pit was partially lined with a polyethylene liner extending to the surface. Only a small (10' X 10') center section at the bottom of the impoundment was left uncovered.

Partial remediation was undertaken in July 1998. The remediation regime consisted of excavating the contaminated soils and liner to a depth of approximately 10' below ground level and spreading the soils to a depth of approximately 6" at a location immediately adjacent to the pit site. Soil borings taken at the center of the pit indicate that the highest concentrations of hydrocarbons and sodium chlorides remain perched at distance of approximately 15'–22' below ground level, (5'-12' below existing pit depth).

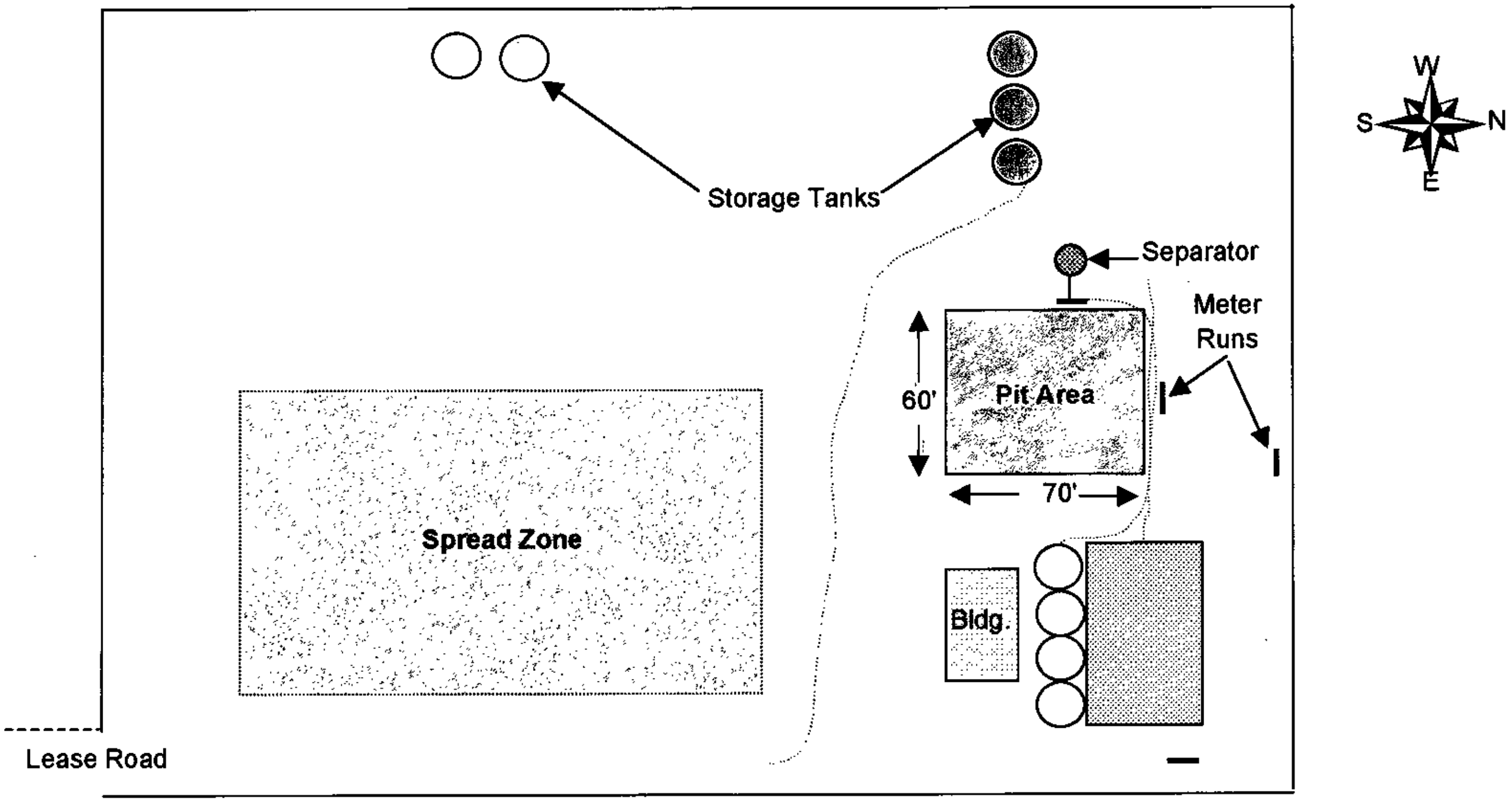
New composite samples taken on September 10th, 1999 indicate that the hydrocarbon contamination within the excavated soils has naturally degraded to concentrations under 1,000 ppm TPH. No BTEX results were provided on the July 1998 sampling however the

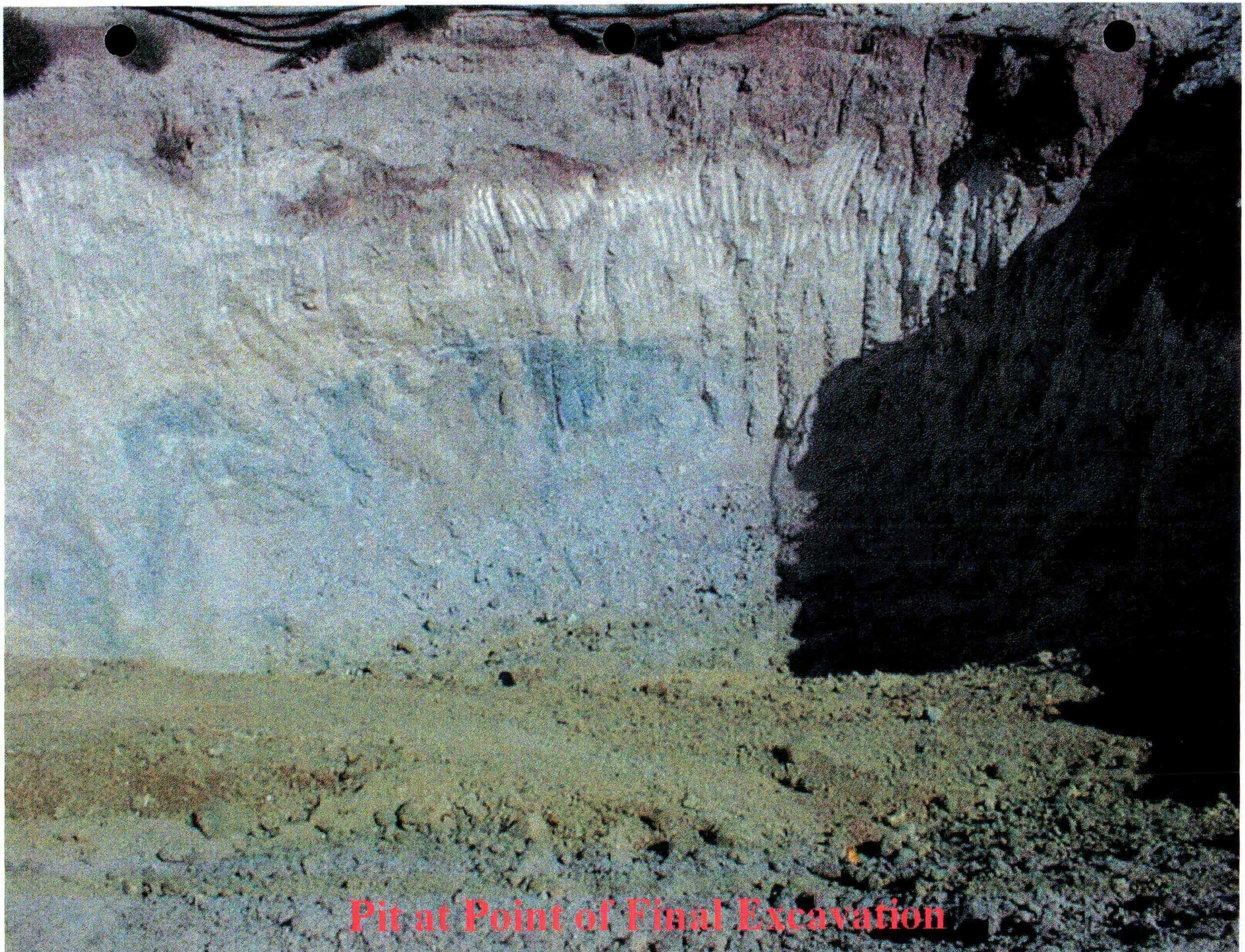
September 1999 sampling revealed no concentrations in excess of NMOCD guidelines. (Analytical reports are contained within the "Lab. Analytical" section of this proposal.).



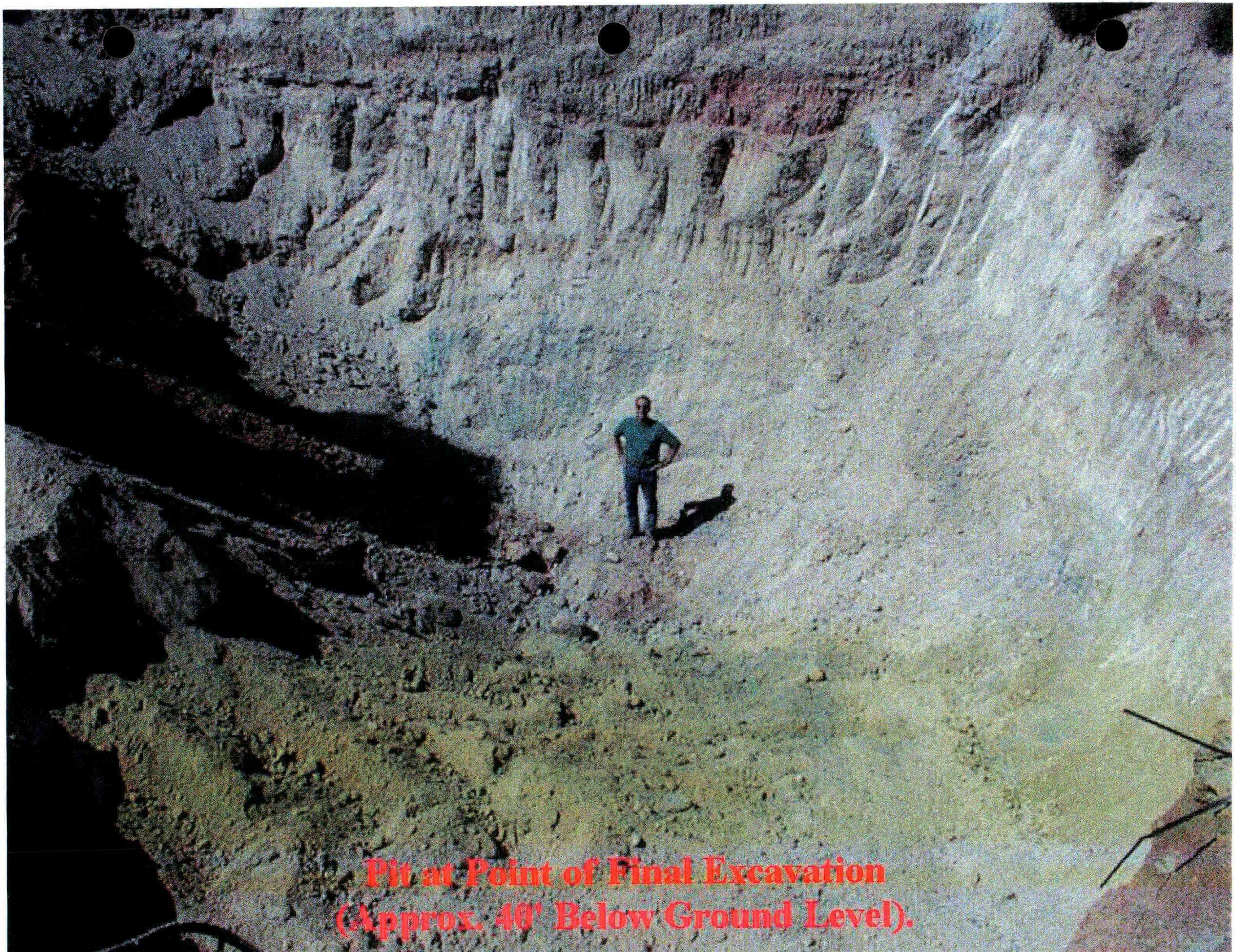
Topo USA 2.0 Copyright © 1999 DeLorme Yarmouth, ME 04096 Scale: 1 : 200,000 Detail: 10-0

Skelly Penrose Battery





Pit at Point of Final Excavation



Pit at Point of Final Excavation
(Approx. 40' Below Ground Level).

Detail of Bottom Liner Installation

Detail of Top Liner Installation

Final Spread Zone Contour

Final Pit Contour

Protocol

This section contains a copy of the remediation protocol employed on this project.

Remediation Protocol
Apache Corporation
Shelly Penrose Central Battery

1.0 Purpose

This protocol is to provide a detailed outline of the steps to be employed in the remediation of a spill area located south of Eunice, New Mexico.

2.0 Scope

This protocol is site specific for the Apache remediation project.

3.0 Preliminary

Prior to any field operations, Whole Earth Environmental shall conduct the following activities:

3.1 Client Review

3.1.1 Whole Earth shall meet with cognizant personnel within Apache to review this protocol and make any requested modifications or alterations.

3.1.2 Changes to this protocol will be documented and submitted for final review by Apache prior to the initiation of actual field work.

4.0 Safety

4.1 Prior to work on the site, Whole Earth shall obtain the location and phone numbers of the nearest emergency medical treatment facility. We will review all safety related issues with the appropriate Apache personnel, sub-contractors and exchange phone numbers.

4.2 A tailgate safety meeting shall be held and documented each day. All sub-contractors must attend and sign the daily log-in sheet.

4.3 Anyone allowed on to location must be wearing sleeved shirts, steel toed boots, and long pants. Each vehicle must be equipped with two way communication capabilities.

4.4 Prior to any excavation, New Mexico One Call will be notified. The One Call notification number will be included within the closure report. If lines are discovered within the area to be excavated they shall be marked with pin flags on either side of the line at maximum five foot intervals.

5.0 Remediation Procedure

5.1 All soils containing a TPH concentration >1,000 ppm, and all soils containing a benzene concentration>10ppm or a total BTEX concentration >50ppm will be excavated and placed immediately adjacent to the excavation. The side walls and bottom of the excavation will be field tested for TPH and BTEX concentrations in accordance with WEQP-06 and WEQP-19.

5.2 The Hobbs branch of the OCD will be notified to witness the final confirmation sampling of the side walls and bottom of the excavation. Samples will be collected in accordance with WEQP-77 and analyzed for TPH and BTEX.

5.3 The excavated soils will be mixed and blended with sub-strait materials to achieve a maximum concentration of 5,000 ppm TPH, 10 ppm benzene and 50 ppm total BTEX concentration. A confirmation composite sample will be collected and analyzed in accordance with 5.2 of this protocol.

6.0 Modeling

6.1 The bottom hole benzene concentrations and the depth to ground water will be determined and included within a VADSAT contaminant migration model. The modeled results should project that no benzene concentrations exceeding NMWQCC standards of 10 ppb shall be allowed to impact the ground water within a 100 year model span. Chlorides will be modeled on a concentration of 5,000 ppm and similarly modeled to indicate that no concentration exceeding 250 ppm will reach the water table within a 100 year span.

6.2 The modeled results will be submitted to the Sante Fe office of the NMOCD prior to any materials being re-deposited within the excavation.

7.0 Liner

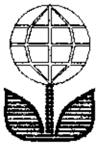
7.1 Upon approval by the NMOCD, Whole Earth will install a 20 mil polyethylene liner within the excavation. The liner will extend up the side walls to a point within 5' of the ground surface. The excavated soils will be replaced within the liner at concentrations not to exceed those described in paragraph 5.2 of this protocol.

7.2 An additional polyethylene top cover will be erected atop the excavation and overlapped with the bowl liner to insure that no surface water will infiltrate the main plume area. The top liner should be slightly domed to accommodate subsidence and to direct a drainage path away from the main plume. The top of the liner shall be at least 3' below ground level.

8.0 Closure Report

8.1 At the conclusion of the project, Whole Earth shall prepare a closure report which contains the following minimum information:

- Photographs of the location prior to remediation
- Photographs of the location at time of final closure
- Plat map showing sampling locations
- All pre-closure contaminant concentrations
- Contaminant concentrations at the conclusion of the project
- Copies of this protocol and all testing procedures
- Copies of each days tailgate safety meeting
- Copies of daily calibration logs for each instrument
- Independent split sample laboratory analyses
- Copies of the VADSAT contaminate migration model
- MSDS sheets of the liner



Procedures

This section contains copies of the detailed sample collection and field testing procedures used on this project.

QP-06 Rev. C

WHOLE EARTH ENVIRONMENTAL
QUALITY PROCEDURE

Procedure for Conducting Field TPH Analysis

Completed By: Approved By: Effective Date: 02/15/97

1.0 Purpose

To define the procedure to be used in conducting total percentage hydrocarbon testing in accordance with EPA Method 418.1 (modified) using the "MEGA" TPH Analyzer.

2.0 Scope

This procedure is to be used for field testing and on site remediation information.

3.0 Procedure

3.1 The G.A.C. "MEGA" TPH analyzer is an instrument that measures concentrations of aliphatic hydrocarbons by means of infra-red spectrometry. It is manufactured to our specifications and can accurately measure concentrations from two parts per million through 100,000 parts per million. The unit is factory calibrated however minor calibration adjustments may be made in the field. Quality Procedure 25 defines the field calibration methods to be employed.

3.2 Prior to taking the machine into the field, insert a 500 ppm and 5,000 ppm calibration standard into the sample port of the machine. Zero out the Range dial until the instrument records the exact standard reading.

3.3 Once in the field, insert a large and small cuvette filled with clean Freon 113 into the sample port of the machine. Use the range dial to zero in the reading. If the machine does not zero, do not attempt to adjust the span dial. Immediately implement Quality Procedure 25 .

3.4 Place a 100 g. weight standard on the field scale to insure accuracy. Zero out the scale as necessary.

3.5 Tare a clean 100 ml. sample vial with the Teflon cap removed. Add 10 g. (+/- .01 g), of sample soil into the vial taking care to remove rocks or vegetable matter from the sample to be tested. If the sample is wet, add up to 5 g. silica gel or anhydrous sodium sulfate to the sample after weighing.

3.6 Dispense 10 ml. Freon 113 into the sample vial.

3.7 Cap the vial and shake for five minutes.

3.8 Carefully decant the liquid contents of the vial into a filter/desiccant cartridge and affix the cartridge cap. Recap the sample vial and set aside.

3.9 Insert the metal tip of the pressure syringe into the cap opening and slowly pressurize. **WARNING: APPLY ONLY ENOUGH PRESSURE ON THE SYRINGE TO EFFECT FLOW THROUGH THE FILTERS. TOO MUCH PRESSURE MAY CAUSE THE CAP TO SEPARATE FROM THE BODY OF THE CARTRIDGE.** Once flow is established through the cartridge direct the flow into the 5 cm. cuvette until the cuvette is full. Reverse the pressure on the syringe and remove the syringe tip from the cartridge cap. Set the cartridge aside in vertical position.

3.10 The cuvette has two clear and two frosted sides. Hold the cuvette by the frosted sides and carefully insert into the sample port of the machine. Read the right hand digital read-out of the instrument. If the reading is less than 1,000 ppm. the results shall be recorded in the field Soil Analysis Report. If the result is higher than 1,000 ppm, continue with the dilution procedure.

4.0 Dilution Procedure

4.1 When initial readings are greater than 1,000 ppm using the 5 cm. cuvette, pour the contents of the 5 cm. cuvette into a 1 cm. cuvette. Insert the 1. cm cuvette into the metal holder and insert into the test port of the instrument.

4.1 Read the left hand digital read-out of the machine. If the results are less than 10,000 ppm, record the results into the field Soil Analysis Report. If greater than 10,000 ppm, continue the dilution process. **Concentrations >10,000 ppm are to be used for field screen purposes only.**

4.2 Pour the contents of the small cuvette into a graduated glass pipette. Add 10 ml. pure Freon 113 into the pipette. Shake the contents and pour into the 1cm. cuvette. Repeat step 4.2. adding two zeros to the end of the displayed number. If the reported result is greater than 100,000 ppm. the accuracy of further readings through additional dilutions is extremely questionable. **Do not use for reporting purposes.**

4.4 **Pour all sample Freon into the recycling container.**

5.0 Split Samples

5.1 Each tenth test sample shall be a split sample. Decant approximately one half of the extraction solvent through a filter cartridge and insert into the instrument to obtain a concentration reading. Clean and rinse the cuvette and decant the remainder of the fluid to obtain a second concentration reading from the same sample. If the second reading varies by more than 1% from the original, it will be necessary to completely recalibrate the instrument.

QP-19

WHOLE EARTH ENVIRONMENTAL
QUALITY PROCEDURE

Sampling and Testing Protocol
BTEX Speciation in Soil

Completed By: Approved By: Effective Date: / /

1.0 Purpose

This procedure is to be used to determine the concentrations of Benzene, Toluene, Ethyl-Benzene and Xylene (BTEX) in soils.

2.0 Scope

This procedure is to be used as the standard field measurement for soil BTEX concentrations. It is not to be used as a substitute for full spectrographic speciation of organic compounds.

3.0 Procedure

3.1 Sample Collection and Preparation

3.1.1 Collect at least 500 g. of soil from the sample collection point. Take care to insure that the sample is representative of the general background to include visible concentrations of hydrocarbons and soil types. If necessary, prepare a composite sample of soils obtained at several points in the sample area. Take care to insure that no loose vegetation, rocks or liquids are included in the sample(s).

3.1.2 The soil sample(s) shall be immediately inserted into a one quart or larger polyethylene freezer bag and sealed. When sealed, the bag should contain a nearly equal space between the soil sample and trapped air.

3.1.3 The sealed samples shall be allowed to set for a minimum of five minutes at a minimum temperature of 70^{0}F.

3.1.4 The sealed sample bag should be massaged to break up any clods, and to provide the soil sample with as much exposed surface area as practically possible.

3.2 Sampling Procedure

3.2.1 The instrument to be used in conducting VOC concentration testing shall be a Photovac Ion-chromatograph with BTEX Module. Prior to use the instrument shall be zeroed out in accordance with QP-55.

3.2.2 Carefully open one end of the collection bag and insert the probe tip into the bag taking care that the probe tip not touch the soil sample or the side walls of the bag. If VOC analysis was conducted on the sample prior to BTEX analysis, care should be taken to insure that a sufficient air volume exists in the bag to provide accurate results. **If the available air space within the bag is insufficient to run a full analysis, the sample shall be discarded.**

3.2.3 Set the instrument to retain the highest result reading value. Record the reading onto the Field Analytical Report Form and additionally enter the location code into the instrument data logger.

4.0 After testing, the soil samples shall be returned to the sampling location, and the bags collected for off-site disposal. **IN NO CASE SHALL THE SAME BAG BE USED TWICE. EACH SAMPLE CONTAINER MUST BE DISCARDED AFTER EACH USE.**

QP-77

WHOLE EARTH ENVIRONMENTAL
QUALITY PROCEDURE

Procedure for Obtaining Soil Samples for Transportation to a Laboratory

Completed By: Approved By: Effective Date: / /

1.0 Purpose

This procedure outlines the methods to be employed when obtaining soil samples to be taken to a laboratory for analysis.

2.0 Scope

This procedure is to be used when collecting soil samples intended for ultimate transfer to a testing laboratory.

3.0 Preliminary

3.1 Obtain sterile sampling containers from the testing laboratory designated to conduct analyses of the soil. The shipment should include a Certificate of Compliance from the manufacturer of the collection bottle or vial and a Serial Number for the lot of containers. Retain this Certificate for future documentation purposes.

3.2 If collecting TPH, BTEX, RCRA 8 metals, cation / anions or O&G, the sample jar may be a clear 4 oz. container with Teflon lid. If collecting PAH's, use an amber 4 oz. container with Teflon lid.

4.0 Chain of Custody

4.1 Prepare a Sample Plan. The plan will list the number, location and designation of each planned sample and the individual tests to be performed on the sample. The sampler will check the list against the available inventory of appropriate sample collection bottles to insure against shortage.

4.2 Transfer the data to the Laboratory Chain of Custody Form. Complete all sections of the form except those that relate to the time of delivery of the samples to the laboratory.

4.3 Pre-label the sample collection jars. Include all requested information except time of collection. (Use a fine point Sharpie to insure that the ink remains on the label). Affix the labels to the jars.

5.0 Sampling Procedure

5.1 Go to the sampling point with the sample container. If not analyzing for ions or metals, use a trowel to obtain the soil. Do not touch the soil with your bare hands. Use new latex gloves with each sample to help minimize any cross-contamination.

5.2 Pack the soil tightly into the container leaving the top slightly domed. Screw the lid down tightly. Enter the time of collection onto the sample collection jar label.

5.3 Place the sample directly on ice for transport to the laboratory.

5.4 Complete the Chain of Custody form to include the collection times for each sample. Deliver all samples to the laboratory.

6.0 Documentation

6.1 The testing laboratory shall provide the following minimum information:

A. Client, Project and sample name.
B. Signed copy of the original Chain of Custody Form including data on the time the sample was received by the lab.
C. Results of the requested analyses
D. Test Methods employed
E. Quality Control methods and results

Laboratory Analytical

This section contains copies of the chain of custody and analytical results of testing for this project.

The test results of January 12th were witnessed by Gary Wink of the Hobbs OCD. The test results of January 14 were witnessed and split sampled by Donna Williams of the Hobbs OCD office. A copy of the NMOCD results run by Traceanalysis Corporation are included within this summary.

The final backfill sampling was not witnessed by the OCD however Ms. Williams was invited to participate forty-eight hours prior to the event.

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL
ATTN: MR. MIKE GRIFFIN
19606 SAN GABRIEL
HOUSTON, TEXAS 77084
FAX: 1-281-646-8996

Sample Type: Soil
Sample Condition: Intact/Iced
Project #: Apache Eunice Pit Bottom Retest
Project Name: None Given
Project Location: Eunice

Sampling Date: 01/12/00
Receiving Date: 01/13/00
Analysis Date: 01/13/00

ELT#	FIELD CODE	GRO C6-C10 mg/kg	DRO >C10-C28 mg/kg
22754	AB	<10	20
	% IA	86	86
	%EA	96	85
	BLANK	<10	<10

Methods: EPA SW 846-8015M GRO/DRO

Raland K Tuttle

1-14-00
Date

ENVIRONMENTAL
LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL
ATTN: MR. MIKE GRIFFIN
19606 SAN GABRIEL
HOUSTON, TEXAS 77084
FAX: 1-281-646-8996

SampleType: Soil
Sample Condition: Intact/ Iced
Project #: Apache Eunice Pit Bottom Retest
Project Name: None Given
Project Location: Eunice

Sampling Date: 01/12/00
Receiving Date: 01/13/00
Analysis Date: 01/13/00

ELT#	FIELD CODE/ DATE	BENZENE mg/kg	TOLUENE mg/kg	ETHYLBENZENE mg/kg	m,p-XYLENE mg/kg	o-XYLENE mg/kg
22754	AB	<0.100	<0.100	<0.100	<0.100	<0.100
% IA		94	90	88	90	88
% EA		102	98	96	98	96
BLANK		<0.100	<0.100	<0.100	<0.100	<0.100

METHODS: SW 846-8021B,5030

Raland K. Tuttle

1-14-00
Date

ENVIRONMENTAL
LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL
ATTN: MR. MIKE GRIFFIN
19606 SAN GABRIEL
HOUSTON, TEXAS 77084
FAX: 1-281-646-8996

Sample Type: Soil
Sample Condition: Intact/Iced
Project #: Apache Eunice Pit Bottom Retest
Project Name: None Given
Project Location: Eunice

Sampling Date: 01/12/00
Receiving Date: 01/13/00
Analysis Date: 01/19/00

ELT#	FIELD CODE	Chloride mg/kg
22754	AB	780

QUALITY CONTROL	5140
TRUE VALUE	5000
% PRECISION	103
BLANK	<10

Methods: EPA SW 846-9052

Raland K Tuttle

1-20-00
Date

En[illegible]onmental Lab of Texas, Inc. 12600 West I-2[illegible]t Odessa, Texas 79763
(915) 563-[illegible] FAX (915) 563-1713

CHAIN-OF-CUSTODY RECORD AND ANALYSIS R[illegible]EST

Project Manager: M. Griffin
Phone #: (800) 854-4358
FAX #: (28) 646-8996
Company Name & Address: 19606 San Gabriel Houston Tx. 77084
Project #: Apache Eunice Pit Bottom Retest
Project Name :
Project Location: Eunice
Sampler Signature:

ANALYSIS REQUEST

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX WATER	SOIL	AIR	SLUDGE	OTHER	PRESERVATIVE METHOD HCL	HNO3	ICE	NONE	OTHER	SAMPLING DATE	TIME	BTEX 8020/5030	TPH ~~418.1~~ DRO/GRO	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI	Chloride
22754	AB	1			✓						✓			1-12-00	2:30	✓	✓							✓

Relinquished by:	Date:	Times:	Received by:
	1-13-00	0950	
			Received by Laboratory:

REMARKS

*Chloride requested 1-19-00 by M. Griffin

ENVIRONMENTAL
LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL
ATTN: MR. MIKE GRIFFIN
19606 SAN GABRIEL
HOUSTON, TEXAS 77084
FAX: 1-281-646-8996

Sample Type: Soil
Sample Condition: Intact/Iced
Project #: Apache Eunice
Project Name: None Given
Project Location: None Given

Sampling Date: 01/14/00
Receiving Date: 01/16/00
Analysis Date: 01/19/00

		GRO	DRO
		C6-C10	>C10-C28
ELT#	FIELD CODE	mg/kg	mg/kg
22857	Apache Split	<10	42
	% IA	96	83
	%EA	102	MI
	BLANK	<10	<10

MI = matrix interference

Methods: EPA SW 846-8015M GRO/DRO

Raland K Tuttle

1-20-00
Date

ENVIRONMENTAL
LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL
ATTN: MR. MIKE GRIFFIN
19606 SAN GABRIEL
HOUSTON, TEXAS 77084
FAX: 1-281-646-8996

SampleType: Soil
Sample Condition: Intact/ Iced
Project #: Apache Eunice
Project Name: None Given
Project Location: None Given

Sampling Date: 01/14/00
Receiving Date: 01/16/00
Analysis Date: 01/18 & 01/19/00

ELT#	FIELD CODE/ DATE	BENZENE mg/kg	TOLUENE mg/kg	ETHYLBENZENE mg/kg	m,p-XYLENE mg/kg	o-XYLENE mg/kg
22857	Apache Split	<0.100	0.116	<0.100	0.137	<0.100

% IA	94	91	89	91	88
% EA	94	89	87	88	87
BLANK	<0.100	<0.100	<0.100	<0.100	<0.100

METHODS: SW 846-8021B,5030

Raland K Tuttle
Raland K. Tuttle

1-20-00
Date

ENVIRONMENTAL
LAB OF , INC.
"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL
ATTN: MR. MIKE GRIFFIN
19606 SAN GABRIEL
HOUSTON, TEXAS 77084
FAX: 1-281-646-8996

Sample Type: Soil
Sample Condition: Intact/Iced
Project #: Apache Eunice
Project Name: None Given
Project Location: None Given

Sampling Date: 01/14/00
Receiving Date: 01/16/00
Analysis Date: 01/19/00

ELT#	FIELD CODE	Chloride mg/kg
22857	Apache Split	975

QUALITY CONTROL	5140
TRUE VALUE	5000
% PRECISION	103
BLANK	<10

Methods: EPA SW 846-9052

Raland K Tuttle
Raland K Tuttle

1-20-00
Date

12600 West I-20 East Odessa, Texas 79763
(915) 563-[illegible] FAX (915) 563-1713

CHAIN-OF-CUSTODY RECORD AND ANALYSIS [illegible]ST

Project Manager: M. Griffin
Phone #: (800) 854-4358
FAX #: (281) 646-8996
Company Name & Address: Whole Earth Environ
Project #: Apache Eunice
Project Name :
Project Location:
Sampler Signature:

ANALYSIS REQUEST

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX					PRESERVATIVE METHOD					SAMPLING										
				WATER	SOIL	AIR	SLUDGE	OTHER	HCL	HNO3	ICE	NONE	OTHER	DATE	TIME	BTEX 8020/5030	~~TPH 418.1~~ DRO-GRO	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI	Chlorides
22857	Apache Split	1	4oz		✓						✓			1-14	10:35	✓	✓							✓

Relinquished by:	Date:	Time:	Received by:
	1-15-99		
	1-16-00	1600	
			Received by Laboratory:

REMARKS

Analytical Results Report

Sample Number: 138794
Description: 0114001330

Param	Flag	Result	Dilution	Analytical Method	Date Prepared	Date Analyzed	Analyst	Prep Batch #	QC Batch #	RDL
BTEX (mg/Kg)										
Benzene		<0.05	50	S 8021B	1/19/00	1/19/00	RC	PB00340	QC00449	0.001
Toluene		<0.05	50	S 8021B	1/19/00	1/19/00	RC	PB00340	QC00449	0.001
Ethylbenzene		<0.05	50	S 8021B	1/19/00	1/19/00	RC	PB00340	QC00449	0.001
M,P,O-Xylene		<0.05	50	S 8021B	1/19/00	1/19/00	RC	PB00340	QC00449	0.001
Total BTEX		<0.05	50	S 8021B	1/19/00	1/19/00	RC	PB00340	QC00449	0.001
Surrogate (mg/Kg)		**Result**	**Dilution**	**Spike Amount**	**% Rec.**	**% Rec. Limit**	**Analyst**	**Prep Batch #**	**QC Batch #**	
TFT		4.97	50	0.1	99	72 - 128	RC	PB00340	QC00449	
4-BFB		5.1	50	0.1	102	72 - 128	RC	PB00340	QC00449	
Ion Chromatography (IC) (mg/Kg)										
CL		3400	1	E 300.0	1/17/00	1/19/00	JS	PB00338	QC00445	0.5
TPH DRO (mg/Kg)										
DRO	*	134	1	Mod. 8015B	1/17/00	1/17/00	MF	PB00299	QC00413	50
TPH GRO (mg/Kg)										
GRO		<5	1	8015B	1/19/00	1/19/00	RC	PB00341	QC00450	0.1

* DRO - Hydrocarbons present past C28.

ENVIRONMENTAL
LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL
ATTN: MR. MIKE GRIFFIN
19606 SAN GABRIEL
HOUSTON, TEXAS 77084
FAX: 1-281-646-8996

SampleType: Soil
Sample Condition: Intact/ Iced
Project #: Apache / B-52
Project Name: None Given
Project Location: Eunice, N.M.

Sampling Date: 03/06/00
Receiving Date: 03/08/00
Analysis Date: 03/09/00

ELT#	FIELD CODE	BENZENE mg/kg	TOLUENE mg/kg	ETHYLBENZENE mg/kg	m,p-XYLENE mg/kg	o-XYLENE mg/kg
24056	1st 3' Lift	<0.100	<0.100	<0.100	0.104	<0.100
24057	2nd 3' Lift	<0.100	<0.100	<0.100	0.123	<0.100
24058	3rd 3' Lift	<0.100	<0.100	<0.100	<0.100	<0.100
24059	4th	<0.100	<0.100	<0.100	<0.100	<0.100
24060	5th	<0.100	<0.100	<0.100	<0.100	<0.100
24061	6th	<0.100	<0.100	<0.100	<0.100	<0.100
24062	7th	<0.100	<0.100	<0.100	<0.100	<0.100
24063	8th	<0.100	<0.100	<0.100	<0.100	<0.100
24064	9th	<0.100	<0.100	<0.100	<0.100	<0.100
24065	10th	<0.100	<0.100	<0.100	<0.100	<0.100
24066	11th	<0.100	<0.100	<0.100	<0.100	<0.100
	% IA	101	98	95	96	94
	% EA	98	94	90	91	92
	BLANK	<0.100	<0.100	<0.100	<0.100	<0.100

METHODS: SW 846-8021B,5030

Raland K. Tuttle

3-10-00
Date

ENVIRONMENTAL
LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL
ATTN: MR. MIKE GRIFFIN
19606 SAN GABRIEL
HOUSTON, TEXAS 77084
FAX: 1-281-646-8996

Sample Type: Soil
Sample Condition: Intact/Iced
Project #: Apache / B-52
Project Name: None Given
Project Location: Eunice, NM

Sampling Date: 03/06/00
Receiving Date: 03/08/00
Analysis Date: 03/09/00

ELT#	FIELD CODE	GRO C6-C10 mg/kg	DRO >C10-C28 mg/kg
24056	1st 3' Lift	<10	826
24057	2nd 3' Lift	<10	1046
24058	3rd 3' Lift	<10	674
24059	4th	<10	401
24060	5th	<10	590
24061	6th	<10	634
24062	7th	<10	137
24063	8th	<10	417
24064	9th	<10	393
24065	10th	<10	450
24066	11th	<10	618
	% IA	96	101
	%EA	92	97
	BLANK	<10	<10

Methods: EPA SW 846-8015M GRO/DRO

Raland K. Tuttle

3-10-00
Date

Environmental Lab of Texas, Inc.

12600 West I-20 East Odessa, Texas 79763
(915) 563-1800 FAX (915) 563-1713

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Mike G

Phone #:

FAX #:

Company Name & Address: Whole Earth

Project #: APACHE / B-52

Project Name :

Project Location: Eunice

Sampler Signature:

ANALYSIS REQUEST

				MATRIX					PRESERVATIVE METHOD					SAMPLING									
LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	WATER	SOIL	AIR	SLUDGE	OTHER	HCL	HNO3	ICE	NONE	OTHER	DATE	TIME	BTEX 8020/5030	TPH 8015 DRO/GRO	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI
24056	1st 3' Lift	1												3/6	200	✓	✓						
24057	2nd 3' Lift	1													230	✓	✓						
24058	3rd 3' Lift	1													240	✓	✓						
24059	4th	1													300	✓	✓						
24060	5th	1													315	✓	✓						
24061	6th	1													330	✓	✓						
24062	7th	1													3:35	✓	✓						
24063	8th	1													4:00	✓	✓						
24064	9th	1													4:30	✓	✓						
24065	10th	1													4:45	✓	✓						
24066	11th														5:00	✓	✓						

Relinquished by:	Date:	Time:	Received by:
M. Griffin	3-8-00	8:22	J. McMurrey
Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date:	Time:	Received by Laboratory:

REMARKS Left message w/ Mike 3/8/00

WESTERN
ENVIRONMENTAL
CONSULTANTS

P.O. Box 1816
, New Mexico 88241

Phone (505) 392-5021
Fax (505) 397-2597

SOIL ANALYSIS REPORT

DATE : 7-24-98
CLIENT: Apache Corp.
SUPERVISOR: A. Hodge
Sample Matrix: Soil

FACILITY: Skelly Penrose Central Battery
Test Method: EPA 418.1
Order No. Don Baucham
SAMPLE RECEIVED: Intact on site

	TPH		DEPTH	LOCATION
SAMPLE NO. 1:	9,410	PPM	10'	Surface of Pit Bottom
SAMPLE NO. 2:	18,570	PPM	15'-17'	Center of Pit
SAMPLE NO. 3:	9,987	PPM	20'-22'	Center of Pit
SAMPLE NO. 4:	178	PPM	25'-27'	Center of Pit
SAMPLE NO. 5:	104	PPM	30'-32'	Center of Pit
SAMPLE NO. 6:	81	PPM	35'-37'	Center of Pit
SAMPLE NO. 7:	16	PPM	40'-42'	Center of Pit
SAMPLE NO. 8:	11,045	PPM	4"-6"	Composite of stockpiled soils
SAMPLE NO. 9:		PPM		
SAMPLE NO. 10:		PPM		

COMMENTS: These samples were taken using a Hollow Stem Auger and split spoon to sample. These samples were taken to define the vertical impact of Total Petroleum Hydrocarbons at the central battery pit. Sample # 7 was split and sent to a third party lab to confirm TPH and BTEX levels. Sample # 8 was a composite sample taken from the stockpiled soils that have been placed on plastic at the central battery.

WESTERN
ENVIRONMENTAL
CONSULTANTS

.O. Box 1816
New Mexico 88241

Phone (505) 392-5021
Fax (505) 397-2597

SOIL ANALYSIS REPORT

DATE : 7-24-98
CLIENT: Apache Corp.
SUPERVISOR: A. Hodge
Sample Matrix: Soil

FACILITY: Skelly Penrose Central Battery
Test Method: EPA 325.3
Order No. Don Baucham
SAMPLE RECEIVED: Intact on site

	CL		DEPTH	LOCATION
SAMPLE NO. 1:	2,000	PPM	10'	Surface of Pit Bottom
SAMPLE NO. 2:	12,000	PPM	15'-17'	Center of Pit
SAMPLE NO. 3:	7,500	PPM	20'-22'	Center of Pit
SAMPLE NO. 4:	2,800	PPM	25'-27'	Center of Pit
SAMPLE NO. 5:	1,000	PPM	30'-32'	Center of Pit
SAMPLE NO. 6:	<500	PPM	35'-37'	Center of Pit
SAMPLE NO. 7:	<500	PPM	40'-42'	Center of Pit
SAMPLE NO. 8:		PPM		
SAMPLE NO. 9:		PPM		
SAMPLE NO. 10:		PPM		

COMMENTS: These samples were taken using a Hollow Stem Auger and split spoon to sample. These samples were taken to define the vertical impact of chlorides at the central battery pit. Sample # 7 was split and sent to a third party lab to confirm CL levels.

Modeling

This section contains the results of VADSAT modeling performed on this project.

The model uses conservative values for soil types and is based on a sodium chloride concentration of 3,400 ppm extending from the pit bottom to the vadose zone.

Modeling Data Entry
Apache Corporation
Skelly Penrose Central Battery
Emergency Brine Storage Impoundment
NaCl Migration Model

Control Data	Entry	U / M
Deterministic	Yes	
Monte Carlo	No	
Low Permeability Layer Below Contamination	No	

Source Data		
Waste Zone Thickness	3	meters
Waste Zone Area	533	sq. meters
Ratio of Length to Width	01:01.5	
Soil Thickness Above Waste Zone	3	meter
Initial Total Concentration in Waste	3400	ppm

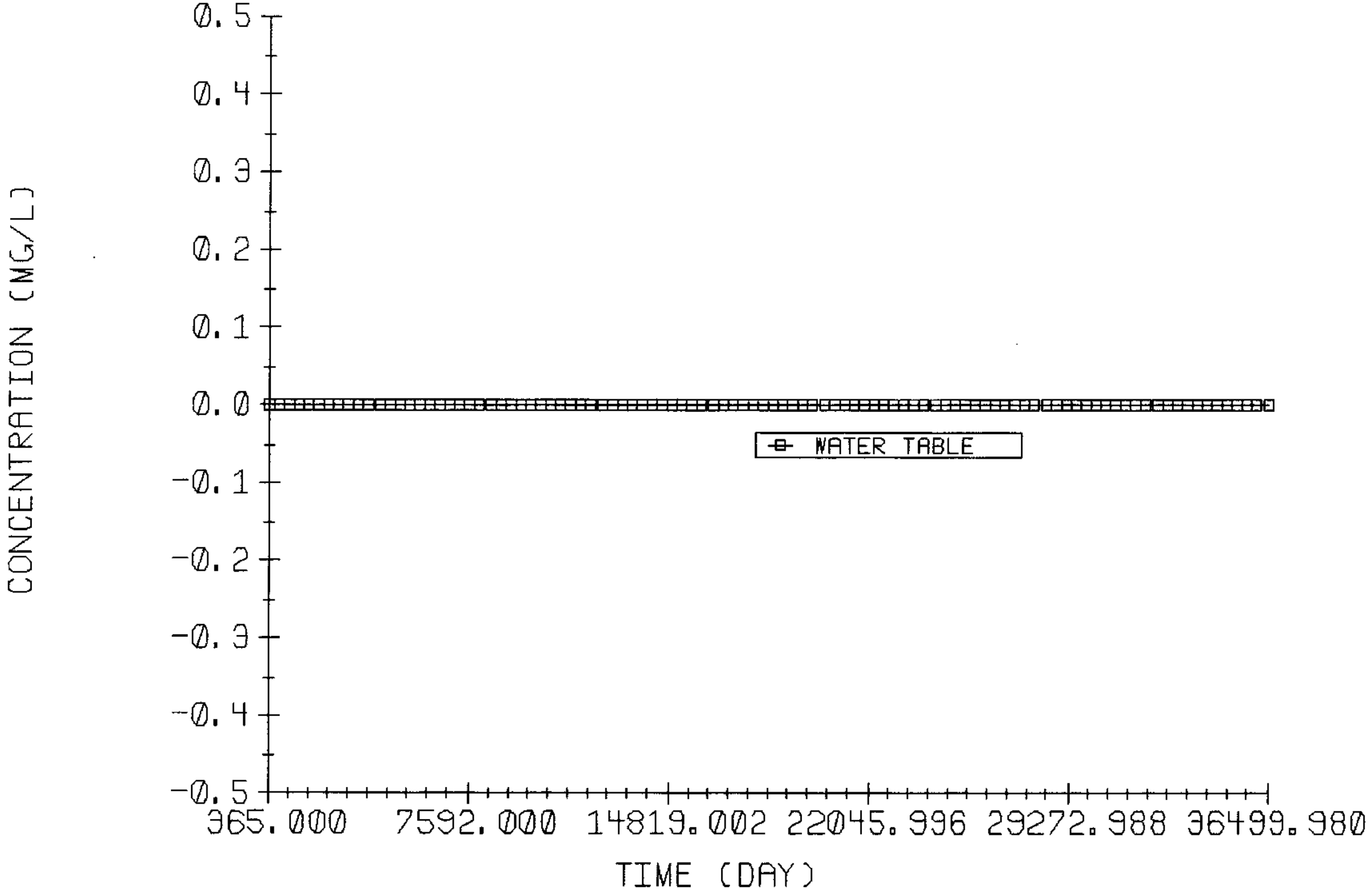
Chemical Data	
NaCl	Yes

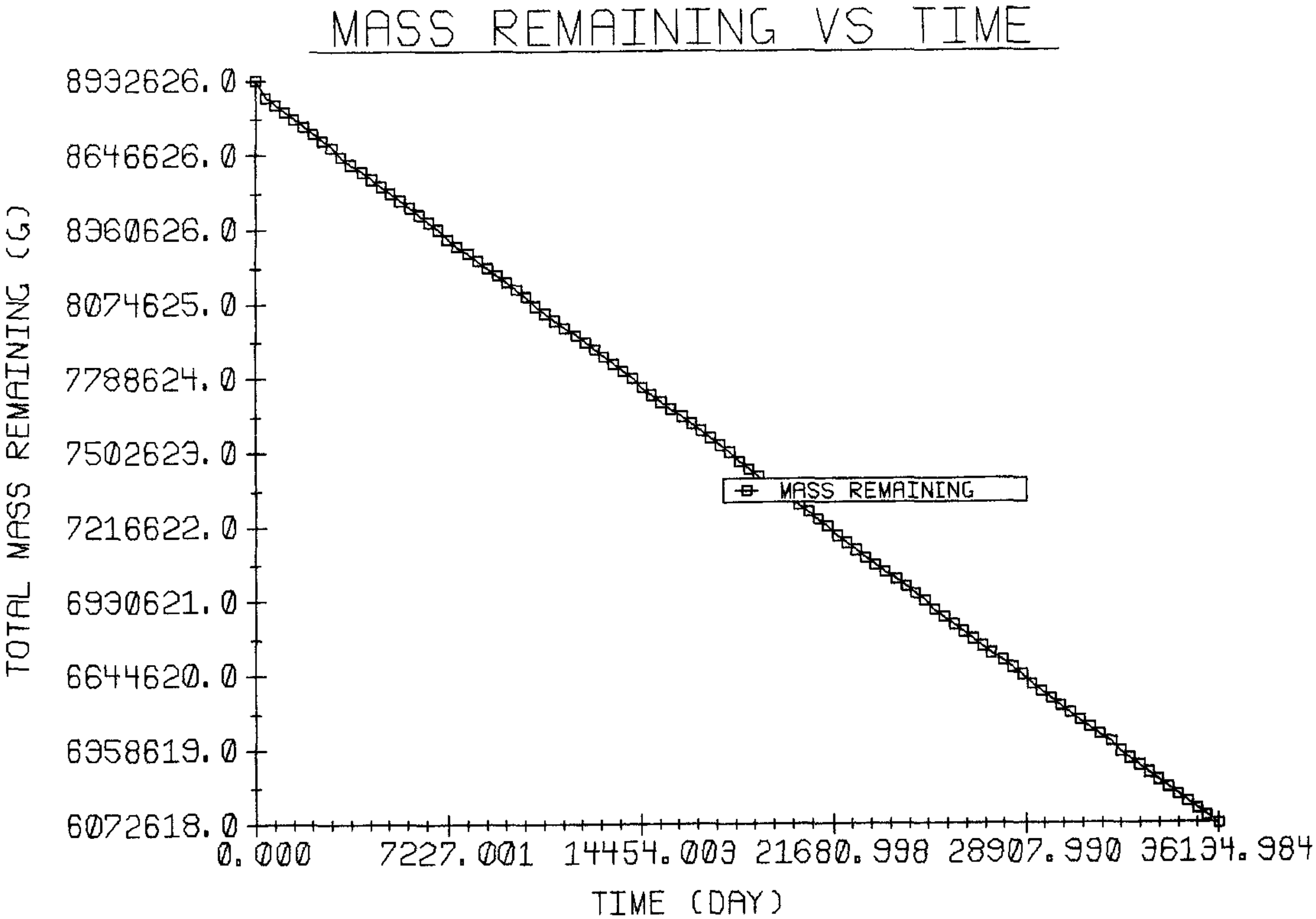
Unsaturated Zone		
Organic Carbon Fraction	0	
Soil Database	Sandy Clay	
Hydrological Database	Sedimentary	
Unsaturated Zone Thickness	9.23	meter
Soil Database	Sandy Clay	
van Genuchten n	1.09	(Default)
Residual Water Content	0.01	
Unsaturated Zone Dispersivity	0	**Internally**

Saturated Zone		
Aquifer Porosity	0.2	(Default)
Longitudinal Dispersivity	0	**Internally**
Ratio of Long. / Trans. Dispersivities	3	
Ratio of Trans. / Vert. Dispersivities	87	
Hydrological Database	Sedimentary	
Aquifer Thickness	10	meters
Aquifer Gradient	0.023	
Saturated Hydraulic Conductivity	0.13	meters / day

Net Infiltration Rate	0.00001	ft. / day

CONCENTRATION VS. TIME




MASS REMAINING VS TIME
TOTAL MASS REMAINING (G)
8932626.0
8646626.0
8360626.0
8074625.0
7788624.0
7502623.0
7216622.0
6930621.0
6644620.0
6358619.0
6072618.0
0.000
7227.001
14454.003
21680.998
28907.990
36134.984
TIME (DAY)
MASS REMAINING