1R - 460

REPORTS

DATE:

4/25/2005

TRIDENT
ENVIRONMENTAL

CERTIFIED MAIL
RETURN RECIEPT NO. 7099 3400 0017 1737 2473

April 25, 2005

Mr.Wayne Price
New Mexico Energy, Minerals, & Natural Resources
Oil Conservation Division, Environmental Bureau
1220 S. St. Francis Drive
Santa Fe, New Mexico 87504

RE: **INVESTIGATION & CHARACTERIZATION PLAN**
EME A-12 Line Leak Site
T20S-R36E-Section 12, Unit Letter A

Mr. Price:

RICE Operating Company (ROC) has retained Trident Environmental to address potential environmental concerns at the above-referenced site. ROC is the service provider (operator) for the Eunice -Monument-Eumont (EME) SWD System and has no ownership of any portion of the pipeline, well, or facility. The System is owned by a consortium of oil producers, System Partners, who provide all operating capital on a percentage ownership/usage basis. Environmental projects of this magnitude require System Partner AFE approval and work begins as funds are received. In general, project funding is not forthcoming until NMOCD approves the work plan. Therefore, your timely review of this submission is requested.

For all environmental projects, ROC will choose a path forward that:

- protects public health,
- provides the greatest net environmental benefit,
- complies with NMOCD Rules, and
- is supported by good science.

Each site shall have three submissions or a combination of:

1. This Investigation and Characterization Plan (ICP) is a proposal for data gathering and site characterization and assessment.

2. Upon evaluating the data and results from this ICP, a recommended remedy will be submitted in a Corrective Action Plan (CAP).

3. Finally, after implementing the remedy, a closure report with final documentation will be submitted.

BACKGROUND

The A-12 Line Leak site is located at township 20 south, range 36 east, section 12, unit letter A approximately 3 miles west-southwest of Monument, NM as shown on the attached Site Location Map. According to the Lea County Tax Assessor's Office, the land is owned by Jimmie T. Cooper. Land in the site area is primarily utilized for crude oil production and cattle ranching. Area crude oil production is operated by Amerada Hess Corporation and Morgan Operating, Inc.

PREVIOUS WORK

On January 27, 2003, ROC was notified of an accidental discharge of approximately 25 barrels of produced water from an 8-inch A/C pipeline at a point located approximately 938 feet west of the A-12 junction box. Approximately 5 barrels of produced water were recovered and discharged to an EME SWD facility. The 8-inch A/C pipeline was replaced with a 13-foot length of 8-inch PVC pipe. The initial C-141 report was submitted by ROC on February 17, 2003, and approved by the NMOCD on March 7, 2003.

Initial sampling activities conducted on January 27, February 21, and March 6, 2003, indicated approximately 4,311 square feet of surface was impacted by the release based on chloride field tests and visual observations. On March 6, 2003, the upper 12-16 inches of impacted soils (228 cubic yards) were excavated and transported to the C&C Landfarm. ROC submitted a disclosure of potential groundwater impact on April 1, 2003. On July 14, 2004, a soil boring was performed and confirmed TPH and chloride impact to the vadose zone to a depth of 30 feet below ground surface.

RECOMMENDATION FOR FURTHER ACTIONS

The repair of the pipeline has minimized the threat of additional impact from the vadose zone, however further investigation and characterization of the site is necessary to delineate the vadose zone and evaluate the extent of groundwater impact by historical releases from the line leak. The additional assessment is also necessary to assist ROC in selecting the appropriate soil and/or groundwater remedy.

Task 1 *Evaluate Concentrations of Constituents of Concern in the Vadose Zone*

Subsurface soil samples for characterization of the lateral and vertical extent of hydrocarbon- and chloride-impacted soil will be collected in accordance with the procedures explained in QP-02, QP-03, and QP-07 (attached). Soil samples will be and field-tested for chloride content using the titration method. Soil samples submitted to the laboratory shall be analyzed for gas and diesel range organics (GRO and DRO) using EPA Method 8015 to determine TPH concentrations. Samples will also be collected for headspace analysis using an organic vapor meter (OVM), which will be calibrated to assume a benzene response factor. Samples with headspace readings or GRO levels above 100 ppm will also be analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) using EPA Method 8021B.

The following concentrations of analytes will be used to delineate the lateral and vertical extent of impact to the vadose zone:

- 100 mg/kg TPH
- 100 ppm OVM, and/or 10 mg/kg benzene and 50 mg/kg BTEX
- 250 ppm chloride

Task 2 *Evaluate Concentrations of Constituents of Concern in the Groundwater*

One groundwater monitoring well shall be installed at the source of the leak to determine if groundwater has indeed been impacted by the identified release. If groundwater impact is confirmed, additional monitoring wells may be installed to determine the local groundwater gradient direction and lateral extent of groundwater impact. Groundwater samples will be collected in accordance with procedures explained in QP-04 and QP-05 (attached), and analyzed for BTEX, major ions, and total dissolved solids (TDS).

The information gathered from tasks 1 and 2 will be evaluated and utilized to design a soil and/or ground water remedy if needed. The remedy that offers the greatest environmental benefit while causing the least environmental impairment will be selected. Such recommendations and findings will be presented to NMOCD in a subsequent Corrective Action Plan (CAP). When evaluating any proposed remedy or investigative work, ROC will confirm that there is a reasonable relationship between the benefits created by the proposed remedy or assessment and the economic and social costs.

We appreciate the opportunity to work with you on this project. Please feel free to call me at 432-638-3106 or Kristin Farris Pope at 505-393-9174, if you have any questions.

Sincerely,

Gilbert J. Van Deventer

Gilbert J. Van Deventer, REM, PG, NMCS
Trident Environmental - Project Manager

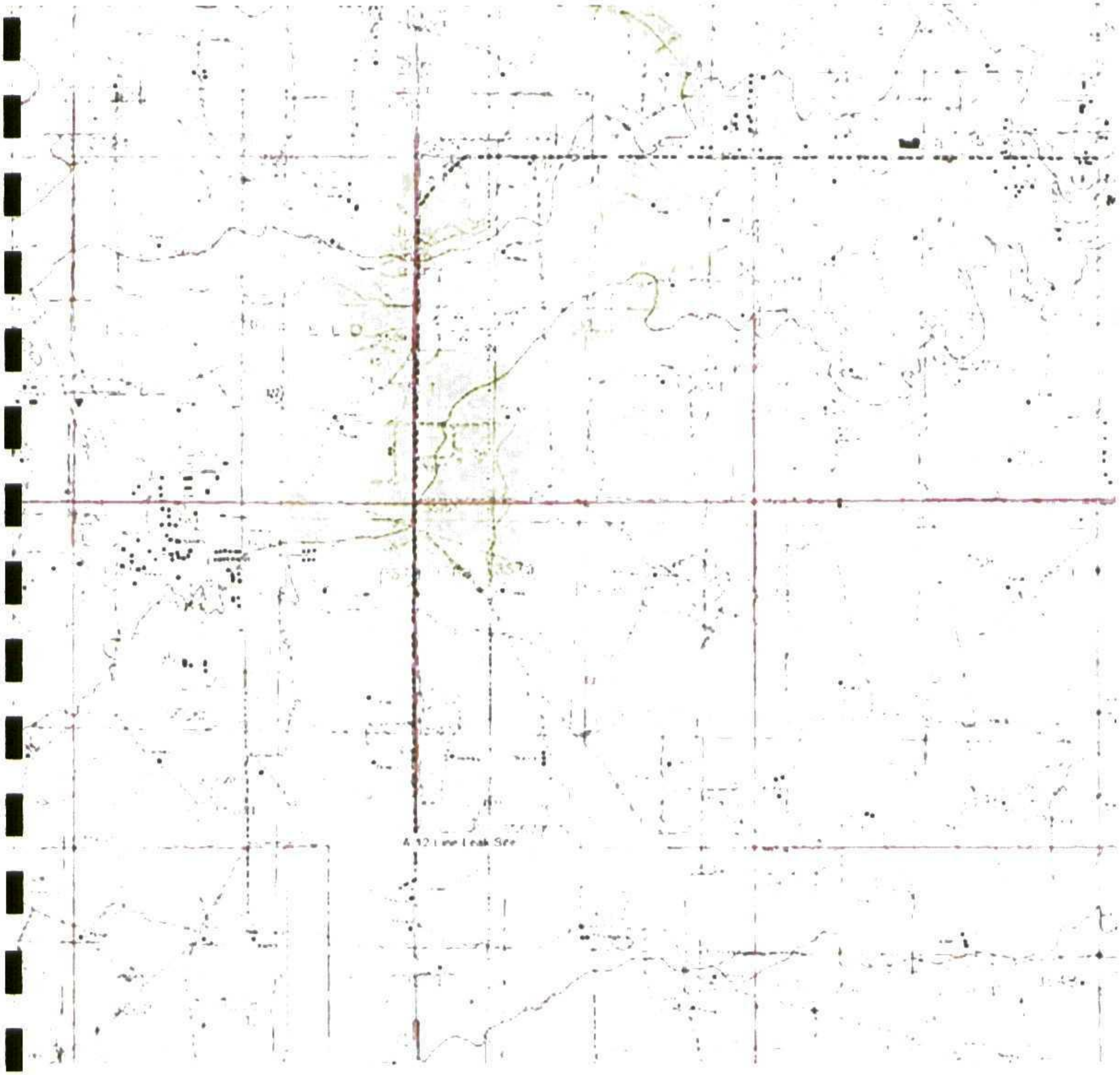
cc: CDH, KFP, file

enclosures: site location map, photos, and sampling procedures

Site Location Map

And

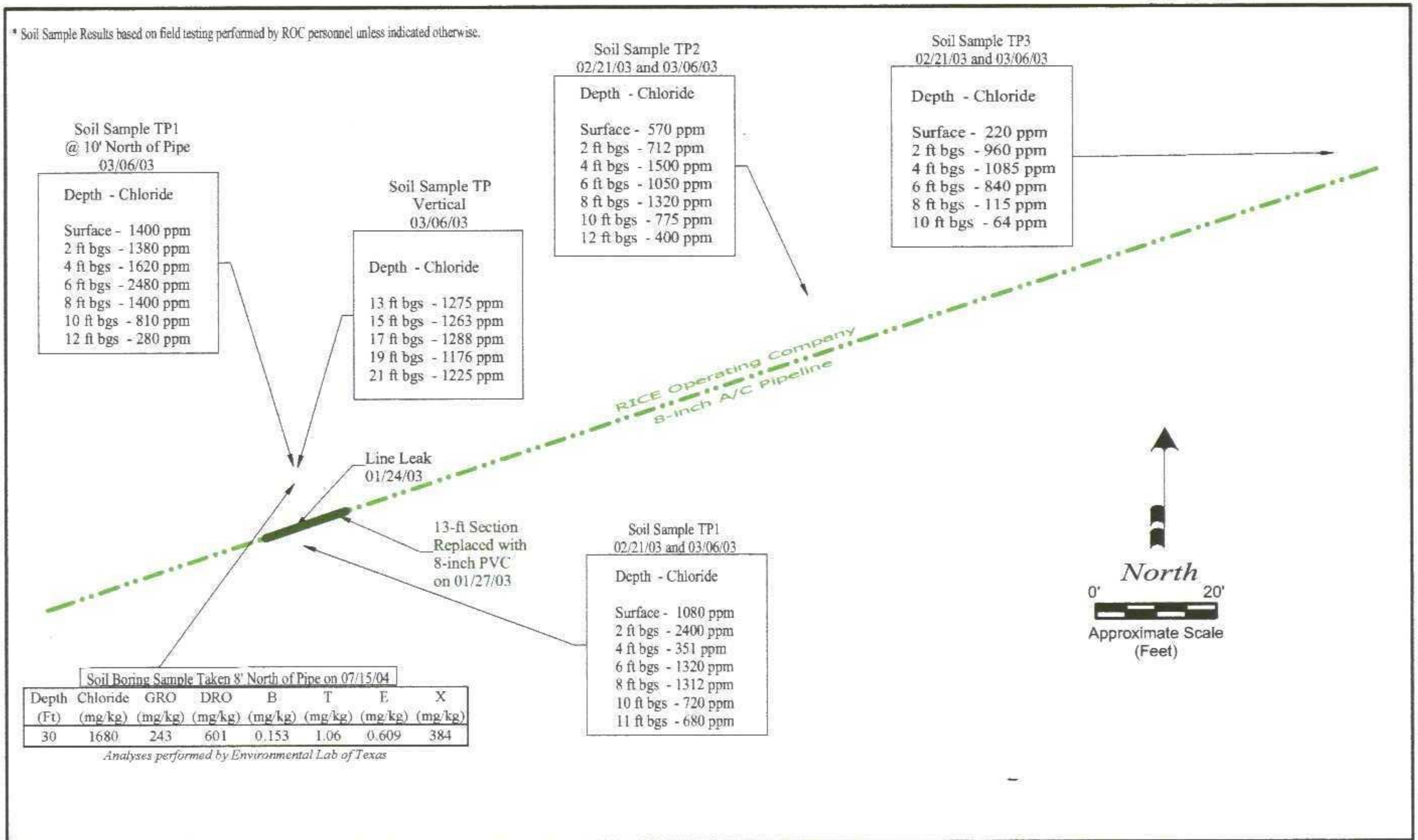
Site Map of Soil Sampling Results



SITE LOCATION MAP
EME A-12 Line Leak Site
T20S-R36E-Section 12A

Directions: From the junction of Hwy 322 and Hwy 8 in Monument proceed 2 miles west on Hwy 322 then 0.5 miles south. Turn left onto CR 41 (Maddox Rd) and continue 1.4 miles south. Turn right before tank battery and proceed west 500 feet to site.

* Soil Sample Results based on field testing performed by ROC personnel unless indicated otherwise.



Soil Sample TP1
@ 10' North of Pipe
03/06/03

Depth - Chloride

Surface - 1400 ppm
2 ft bgs - 1380 ppm
4 ft bgs - 1620 ppm
6 ft bgs - 2480 ppm
8 ft bgs - 1400 ppm
10 ft bgs - 810 ppm
12 ft bgs - 280 ppm

Soil Sample TP
Vertical
03/06/03

Depth - Chloride

13 ft bgs - 1275 ppm
15 ft bgs - 1263 ppm
17 ft bgs - 1288 ppm
19 ft bgs - 1176 ppm
21 ft bgs - 1225 ppm

Soil Sample TP2
02/21/03 and 03/06/03

Depth - Chloride

Surface - 570 ppm
2 ft bgs - 712 ppm
4 ft bgs - 1500 ppm
6 ft bgs - 1050 ppm
8 ft bgs - 1320 ppm
10 ft bgs - 775 ppm
12 ft bgs - 400 ppm

Soil Sample TP3
02/21/03 and 03/06/03

Depth - Chloride

Surface - 220 ppm
2 ft bgs - 960 ppm
4 ft bgs - 1085 ppm
6 ft bgs - 840 ppm
8 ft bgs - 115 ppm
10 ft bgs - 64 ppm

Soil Sample TP1
02/21/03 and 03/06/03

Depth - Chloride

Surface - 1080 ppm
2 ft bgs - 2400 ppm
4 ft bgs - 351 ppm
6 ft bgs - 1320 ppm
8 ft bgs - 1312 ppm
10 ft bgs - 720 ppm
11 ft bgs - 680 ppm

Soil Boring Sample Taken 8' North of Pipe on 07/15/04

Depth (Ft)	Chloride (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	B (mg/kg)	T (mg/kg)	E (mg/kg)	X (mg/kg)
30	1680	243	601	0.153	1.06	0.609	384

Analyses performed by Environmental Lab of Texas

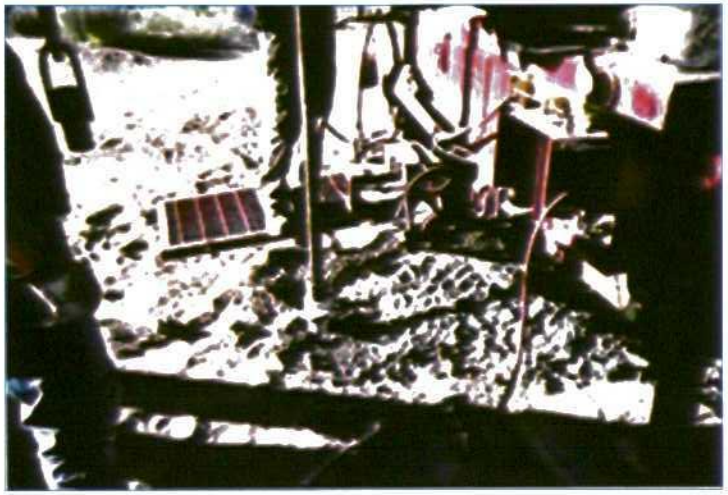
TRIDENT ENVIRONMENTAL

SITE NAME: EME A-12 LINE LEAK
DATE: APRIL 25, 2005
DRAWN BY: G. VAN DEVENTER
APPROXIMATE SCALE: 1 INCH = 20 FT

FIGURE 2
SITE MAP
SOIL SAMPLE RESULTS

Photodocumentation

Photos of EME A-12 Line Leak Site (T20S, R36E, Section 12, Unit Letter A)



View showing soil boring activities at
the A-12 line leak site (07/14/04).

View facing north showing the
A-12 line leak site (04/25/05).

View facing south showing the
A-12 line leak site (04/25/05).

View facing east showing the
A-12 line leak site (04/25/05).

Photos of EME A-12 Line leak and Line Leak Site (T20S, R36E, Section 1, Unit Letter D)

RICE *Operating Company*
Quality Procedures

QP-02: Procedure for Obtaining Soil Samples for Transportation to a Lab

QP-03: Sampling and Testing Protocol for Chloride Titration

QP-04: Development of Cased Water-Monitoring Wells

QP-05: Procedure for Obtaining Water Samples (Cased Wells)

QP-07: Sampling and Testing Protocol for VOC in Soil

Rice Operating Company

Quality Procedure

Procedure for Obtaining Soil Samples for Transportation to a Laboratory

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.

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.

Rice Operating Company

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Rice Operating Company

QUALITY PROCEDURE

Sampling and Testing Protocol
Chloride Titration Using .282 Normal
Silver Nitrate Solution

1.0 Purpose

This procedure is to be used to determine the concentration of chloride in soil.

2.0 Scope

This procedure is to be used as the standard field measurement for soil chloride concentrations.

3.0 Sample Collection and Preparation

3.1 Collect at least 80 grams 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 for 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).

3.2 The soil sample(s) shall be immediately inserted into a one-quart or larger polyethylene freezer bag. Care should be taken to insure that no cross-contamination occurs between the soil sample and the collection tools or sample processing equipment.

3.3 The sealed sample bag should be massaged to break up any clods.

4.0 Sample Preparation

4.1 Tare a clean glass vial having a minimum 40 ml capacity. Add at least 10 grams of the soil sample and record the weight.

4.2 Add at least 10 grams of reverse osmosis water to the soil sample and shake for 20 seconds.

4.3 Allow the sample to set for a period of 5 minutes or until the separation of soil and water.

4.4 Carefully pour the free liquid extract from the sample through a paper filter into a clean plastic cup if necessary.

5.0 Titration Procedure

5.1 Using a graduated pipette, remove 10 ml extract and dispense into a clean plastic cup.

5.2 Add 2-3 drops potassium chromate (K_2CrO_4) to mixture.

5.3 If the sample contains any sulfides (hydrogen or iron sulfides are common to oilfield soil samples) add 2-3 drops of hydrogen peroxide (H_2O_2) to mixture.

5.4 Using a 1 ml pipette, carefully add .282 normal silver nitrate (one drop at a time) to the sample while constantly agitating it. Stop adding silver nitrate when the solution begins to change from yellow to red. Be consistent with endpoint recognition.

5.5 Record the ml of silver nitrate used.

6.0 Calculation

To obtain the chloride concentration, insert measured data into the following formula:

$$\frac{.282 \text{ X } 35.450 \text{ X ml } AgNO_3}{\text{ml water extract}} \quad \text{X} \quad \frac{\text{grams of water in mixture}}{\text{grams of soil in mixture}}$$

Using Step 5.0, determine the chloride concentration of the RO water used to mix with the soil sample. Record this concentration and subtract it from the formula results to find the net chloride in the soil sample.

Record all results on the delineation form.

Rice Operating Company

Quality Procedure
Development of Cased Water-Monitoring Wells

1.0 Purpose

This procedure outlines the methods to be employed to develop cased monitoring wells.

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 Sample Collection and Preparation

3.1 Prior to development, the static water level and height of the water column within the well casing will be measured with the use of an electric D.C. probe or a steel engineer's tape and water sensitive paste.

3.2 All measurements will be recorded within a field log notebook.

3.3 All equipment used to measure the static water level will be decontaminated after each use by means of Liquinox, a phosphate free laboratory detergent, and water to reduce the possibility of cross-contamination. The volume of water in each well casing will be calculated.

4.0 Purging

4.1 Wells will be purged by using a 2" decontaminated submersible pump or dedicated one liter Teflon bailer. Wells should be purged until the pH and conductivity are stabilized and the turbidity has been reduced to the greatest extent possible.

4.2 If a submersible is used the pump will be decontaminated prior to use by scrubbing the outside surface of tubing and wiring with a Liquinox water mixture, pumping a Liquinox-water mixture through the pump, and a final flush with fresh water.

5.0 Water Disposal

5.1 All purge and decontamination water will be temporarily stored within a portable tank to be later disposed of in an appropriate manner.

6.0 Records

6.1 Rice Operating Company will record the amount of water removed from the well during development procedures. The purge volume will be reported to the appropriate regulatory authority when filing the closure report.

Rice Operating Company

Quality Procedure

Procedure for Obtaining Water Samples (Cased Wells)
Using One Liter Bailer

1.0 Purpose

This procedure outlines the methods to be employed in obtaining water samples from cased monitoring wells.

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 water. 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 The following table shall be used to select the appropriate sampling container, preservative method and holding times for the various elements and compounds to be analyzed.

Compound to be Analyzed	Sample Container Size	Sample Container Description	Cap Requirements	Preservative	Maximum Hold Time
BTEX	40 ml	VOA Container	Teflon Lined	HCI	7 days
TPH	1 liter	clear glass	Teflon Lined	HCI	28 days
PAH	1 liter	amber glass	Teflon Lined	Ice	7 days
Cation/Anion	1 liter	clear glass	Teflon Lined	None	48 Hrs
Metals	1 liter	HD polyethylene	Any Plastic	Ice/HNO_3	28 Days
TDS	300 ml	clear glass	Any Plastic	Ice	7 Days

4.0 Chain of Custody

4.1 Prepare a Sample Plan. The plan will list the well identification and the individual tests to be performed at that location. 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 Bailing Procedure

5.1 Identify the well from the sites schematics. Place pre-labeled jar(s) next to the well. Remove the plastic cap from the well bore by first lifting the metal lever and then unscrewing the entire assembly.

5.2 Using a dedicated one liter Teflon bailer, purge a minimum of three well volumes. Place the water in storage container for transport to a ROC disposal facility.

5.3 Take care to insure that the bailing device and string do not become cross-contaminated. A clean pair of rubber gloves should be used when handling either the retrieval string or bailer. The retrieval string should not be allowed to come into contact with the ground.

6.0 Sampling Procedure

6.1 Once the well has been bailed in accordance with 5.2 of this procedure, a sample may be decanted into the appropriate sample collection jar directly from the bailer. The collection jar should be filled to the brim. Once the jar is sealed, turn the jar over to detect any bubbles that may be present. Add additional water to remove all bubbles from the sample container.

6.2 Note the time of collection on the sample jar with a fine Sharpie.

6.3 Place the sample directly on ice for transport to the laboratory. The preceding table shows the maximum hold times between collection and testing for the various analyses.

6.4 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. Project and sample name.
B. Signed copy of the original Chain of Custody Form including 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

Calculation for Determining the Minimum Bailing Volume for Monitor Wells

Formula V= ($\pi r^2 h$)

2" well [V/231=gal] X 3 = Purge Volume

V=Volume
π=pi
r=inside radius of the well bore
h=maximum height of well bore in water table

Example:

π	r^2	h(in)	V(cu.in)	V(gal)	X 3 Volumes	Actual
3.1416	1	180	565.488	2.448	7.34 gal	>10 gal

Rice Operating Company

QUALITY PROCEDURE

Sampling and Testing Protocol for VOC in Soil

1.0 Purpose

This procedure is to be used to determine the concentrations of Volatile Organic Compounds in soils.

2.0 Scope

This procedure is to be used as the standard field measurement for soil VOC 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. Record the sample name and the time that the sample was collected on the Field Analytical Report Form.

3.1.3 The sealed samples shall be allowed to set for a minimum of five minutes at a temperature of between 10-15 Celsius, (59-77^{0}F). The sample temperatures may be adjusted by cooling the sample in ice, or by heating the sample within a generally controlled environment such as the inside of a vehicle. The samples should not be placed directly on heated surfaces or placed in direct heat sources such as lamps or heater vents.

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 an Environmental Instruments 13471 OVM / Datalogger or a similar PID-type instrument. (Device will be identified on VOC Field Test Report Form.) Prior to use, the instrument shall be zeroed-out in accordance with the appropriate maintenance and calibration procedure outlined in the instrument operation manual. The PID device will be calibrated each day it's used.

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 sidewalls of the bag.

3.2.3 Set the instrument to retain the highest result reading value. Record the reading onto the Field Test Report Form.

3.2.4 If the instrument provides a reading exceeding 100 ppm, proceed to conduct BTEX Speciation in accordance with **QP-02 and QP-06. If the reading is 100 ppm or less, NMOCD BTEX guideline has been met and no further testing for BTEX is necessary. File the Field Test Report Form in the project file.**

4.0 Clean-up

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.**