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REPORTS

DATE:

2005



CERTIFIED MAIL
RETURN RECEIPT NO. 7099 3400 0017 1737 2565

February 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 I-1 Offsite Encroachment
T20S-R36E-Section 1, Unit Letter I
NMOCD CASE # 1R0336**

Mr. Price:

RICE Operating Company (ROC) has retained Trident Environmental to address potential environmental concerns at the above-referenced site. ROC would like to retract the earlier submitted work plan dated October 1, 2004, for consideration of the further actions proposed herein as a response to the concerns expressed in your email dated December 8, 2004, which reads in part, as follows:

"The Trident report dated October 01, 2004 included in ROC's plan, mentioned above, does not clearly point out how this site will be remediated and closed. It appears it is a stand alone plan not to be associated with any generic plan previously approved. Therefore, OCD has the following concerns:

1. *What TPH, BTEX and Chlorides levels will be used for delineation.*
2. *Please define most highly contaminated soils. What TPH and Chloride levels?*
3. *Please define unimpacted overburden. What TPH, BTEX and Chloride levels?*
4. *What will be the levels of TPH, BTEX and Chlorides for backfill material. Will these materials be leachable?*
5. *If only one liner is installed and it is at the bottom, what will prevent infiltration from seeping through the backfill and simply running off to the side into groundwater?*
6. *The plan mentions the surface will be contoured, reseeded with native vegetation and monitored for growth, implying this procedure will eliminate any ponding and promote evapotranspiration, thereby minimizing natural infiltration. The plan does not provide any evidence this will work or a plan for future monitoring. OCD understands this year along there has been enormous rainfall in the Hobbs/Monument area. Is this accounted for?*
7. *Upon completion of activities, the plan mentions that closure samples will be collected. Please provide a more detail explanation.*
8. *Will the plan delineate to groundwater if necessary?*

Please respond so OCD may properly evaluate this proposal."

BACKGROUND

The I-1 Line Leak site is located on State Land in township 20 south, range 36 east, section 1, unit letter I approximately 1 mile south of the intersection of County Road 322 and County Road 41 in Lea County, NM as shown on the attached Site Location Map. ROC has a Salt Water Disposal Easement (SWD-062) with the New Mexico State Land Office at this location. Land in the site area is primarily utilized for crude oil production and cattle ranching. Area crude oil production is operated by ChevronTexaco and Amerada Hess.

PREVIOUS WORK

The upgrade of the EME I-1 SWD facility was initiated in February 2002 in accordance with the revised Generic Closure Plan for Existing Pits and Below-Grade Redwood Tanks (last revision February 23, 2000). Excavation activities began in October 2002. Because of the existence of an active 10-inch diameter asbestos-concrete saltwater pipeline and an abandoned Conoco 4-inch steel pipeline (see site map) excavation work did not extend further southwest due to safety concerns and suspected encroachment from an offsite source in that area not associated with the redwood tanks. ROC submitted the EME SWD I-1 Tank and Pit Closure (Partial) Report on November 5, 2004. This report was designated as "partial" because it addressed just the tank and pit closure area and not other suspected offsite encroachment sources.

RECOMMENDATION FOR FURTHER ACTIONS

Due to the excavation, lining and backfilling of the source area below the former redwood tanks and the emergency overflow pit there no longer remains a threat of impact from the vadose zone in that portion of the site. However, during the excavation activities it was apparent that impacted soils in the southwest portion of the site were from a source *other than* the redwood tanks and/or emergency pit (offsite source and/or historic line leaks). Further northwest of the site along the 10-inch pipeline is another area suspected of possible impact from offsite encroachment. Recently, the 10-inch pipeline and junction box were relocated to the eastern portion of the site allowing for further actions, as recommended below, to address these areas.

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

A more complete delineation of the vadose zone in this area of the site and assessment of the potential for groundwater impact are necessary to assist ROC in selecting the appropriate soil and/or groundwater remedy. An environmental drilling firm will be mobilized on site to acquire subsurface soil samples for characterization of the lateral and vertical extent of hydrocarbon- and chloride-impacted soil. Samples will be collected with a split-spoon sampling tool in accordance with the procedures explained in QP-02, QP-03, and QP-07 (attached). Soil samples will be collected periodically (five feet intervals) 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

If the soil sampling conducted in Task 1 indicates groundwater impact from hydrocarbons and/or chlorides is likely, a minimum of one monitoring well will be installed at the location where impact is most suspected. If groundwater impact is confirmed above WQCC standards, additional monitoring wells may be installed to determine the 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.

ROC is the service provider (operator) for the 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.

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,

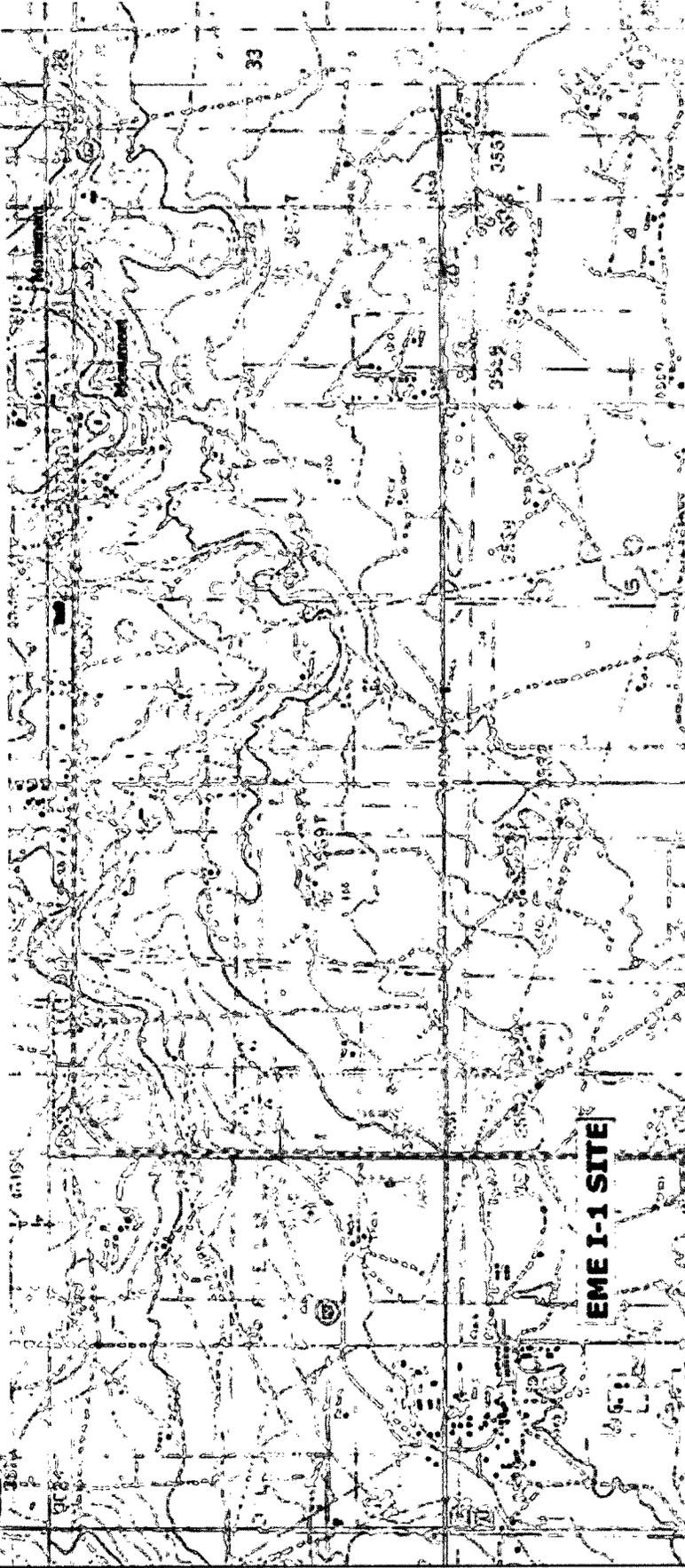


Gilbert J. Van Deventer, REM, PG, NMCS
Trident Environmental - Project Manager

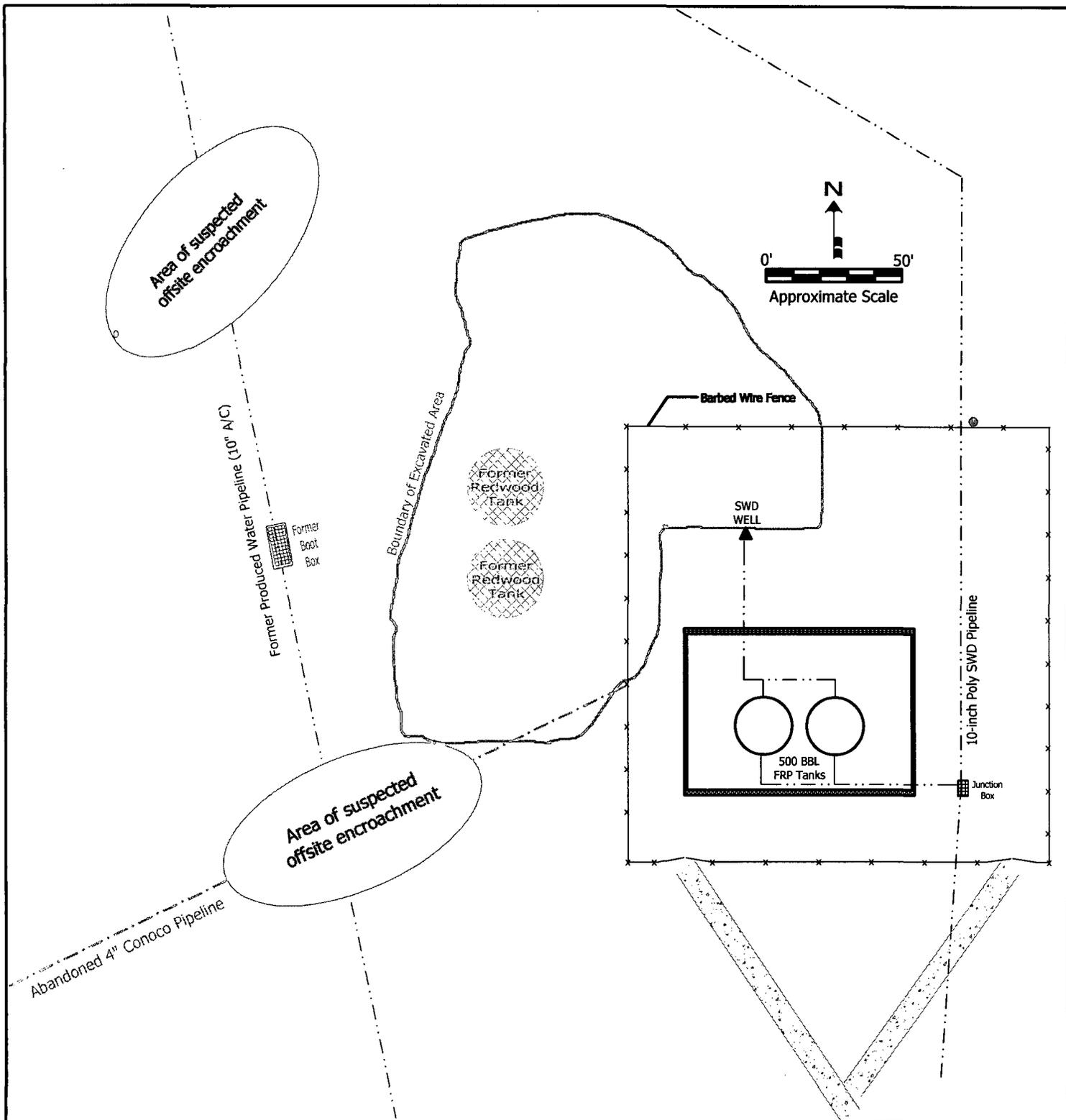
cc: CDH, KFP, file

enclosures: site location map, site map, and sampling procedures

SITE LOCATION MAP
EME I-1 SITE
T20S-R36E-Section II



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 1.1 miles south. Turn right onto caliche lease road and proceed west 0.1 miles. Turn right at next caliche road and continue 0.1 miles north to site.



Client: Rice Operating Company

Date: February 25, 2005

Author: GJV

Approximate Scale: 1 inch = 50 feet

SITE MAP

**EME I-1 SWD
OFFSITE ENCROACHMENT**

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.

5.0 Sampling Procedure

- 5.1. Do not touch the soil with your bare hands. Use new latex gloves with each sample to help minimize any cross-contamination.
- 5.2. Go to the sampling point with the sample container. If not analyzing for ions or metals, use a trowel to obtain the soil.
- 5.3. 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.
- 5.4. Place the sample directly on ice for transport to the laboratory if required.
- 5.5. 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. 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

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:

$$\frac{.282 \times 35,450 \times \text{ml AgNO}_3}{\text{ml water extract}} \times \frac{\text{grams of water in mixture}}{\text{grams of soil in mixture}}$$

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	HCl	7 days
TPH	1 liter	clear glass	Teflon Lined	HCl	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 $[V/2.31 = \text{gal}] \times 3 = \text{Purge Volume}$

V=Volume

$\pi = \text{pi}$

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, (59-77⁰ 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.**