AP - 67

STAGE 1 & 2 REPORTS

DATE:

April 29, 2005

Investigation and Characterization Plan
EME D-1 Junction Box and Line Leak Site
T20S, R36E, Section 1, Unit Letter D
Lea County, New Mexico

APRIL 29, 2005

Prepared For:
RICE Operating Company
122 West Taylor
Hobbs, New Mexico 88240

Prepared By:
TRIDENT
ENVIRONMENTAL
P O Box 7624
Midland, Texas 79708

TRIDENT
ENVIRONMENTAL

CERTIFIED MAIL
RETURN RECIEPT NO. 7099 3400 0017 1737 2466

April 29, 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 D-1 Junction Box and Line Leak Site
T20S-R36E-Section 1, Unit Letter D
NMOCD CASE # Not Yet Assigned

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.

Task 1 *Collect Regional Hydrogeologic Data*

Due to the presence of other potential sources for soil and groundwater impact in the area ROC has determined that an expanded data search for existing water wells in the area must be made to define the regional gradient pattern in order to determine the proper downgradient direction. Also, this data search is necessary to establish background water quality conditions, particularly chloride and total dissolved solids (TDS) concentrations. A site visit and well access is necessary to verify the existence of the area water wells and to acquire current data (depth to groundwater, chloride and TDS concentrations) from them. A regional groundwater gradient map and chloride/TDS concentration map will be constructed after compiling the necessary data.

Task 2 *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 3 *Evaluate Concentrations of Constituents of Concern in the Groundwater*

Additional monitoring wells may be installed to determine the local groundwater gradient direction and 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 Deerter

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

BACKGROUND

The D-1 junction box site and line leak is located on state-owned land in township 20 south, range 36 east, section 1, unit letter D approximately 3 miles west-southwest of Monument, NM as shown on the attached Site Location Map. The land is primarily utilized for crude oil and gas production and cattle ranching. According to production data records from the NMOCD Online database, Amerada Hess Corporation and Dynegy Midstream Services are active in crude oil and gas production in the area. According to the State Land Office Data Search website, grazing and agriculture rights for section D, unit letter 1 are assigned to James R. Byrd under permit no. G0-2087-0000. The same database indicates many subsurface pipelines are in the area based on the numerous right-of-way permits for El Paso Natural Gas Company, Versado Gas Processors LLC, Rice Operating Company, Public Service Company of New Mexico, Southwestern Public Service Company, Transwestern Pipeline Company, Highlands Gathering and Processing Company, EOTT Energy Pipeline LP, GPM Gas Company (Duke Energy Field Services), and Climax Chemical Company.

PREVIOUS WORK

As part of the Junction Box Upgrade Program, subsurface soil samples were collected during the removal of the D-1 junction box between October 1, 2004 and October 7, 2004, by excavation with a backhoe and field-tested for chloride and hydrocarbon levels. This investigation indicated chloride impact to the vadose zone, however no indication of hydrocarbon impact was evident based on field screening with a photoionization detector (all readings were less than 0.1 ppm). Results of the soil sampling are depicted in Figure 2. On October 25, 2004, the site experienced an accidental discharge of approximately 205 barrels (bbls) of produced water from the 4" pipeline suspended over the excavation. Approximately 180 bbls of produced water was recovered from within the excavation where the release was contained. Also, a temporary 4" poly line was installed to bypass the former junction box area. ROC submitted a letter and C-141 Initial Report to the NMOCD office in Hobbs with a description of the remedial actions taken on October 27, 2004. On November 19, 2004, the site experienced another leak from the pipeline approximately 52 feet north of the junction box where the temporary poly line was coupled to the existing 4" PVC line. The volume of this release was approximately 335 bbls and 280 bbls were recovered. On December 9, 2004, ROC submitted notification to the NMOCD office in Hobbs documenting the further actions taken, which included the installation of a monitoring well located within a few feet south of the former junction box on December 8, 2004, to further assess if groundwater was impacted with chlorides. The monitoring well (MW-1) has been sampled and analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), major ions, and total dissolved solids (TDS) on a quarterly basis since that date. On January 5, 2005, ROC notified the NMOCD office in Santa Fe that groundwater impact was confirmed based on laboratory results of groundwater samples analyzed from the on site monitoring well.

A summary of the historical groundwater sampling results is presented in Table 1. The laboratory analytical report and chain of custody documentation for the most recent groundwater sampling event conducted on February 9, 2005 is included in the appendices.

RECOMMENDATION FOR FURTHER ACTIONS

The upgrade of the D-1 junction box and pipeline replacement 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 D-1 junction box and line leak or other off site sources. The additional assessment is also necessary to assist ROC in selecting the appropriate soil and/or groundwater remedy.

cc: CDH, KFP, file

enclosures: site location map, map of soil sample results, table and graph of groundwater sampling results, and sampling procedures

Site Location Map

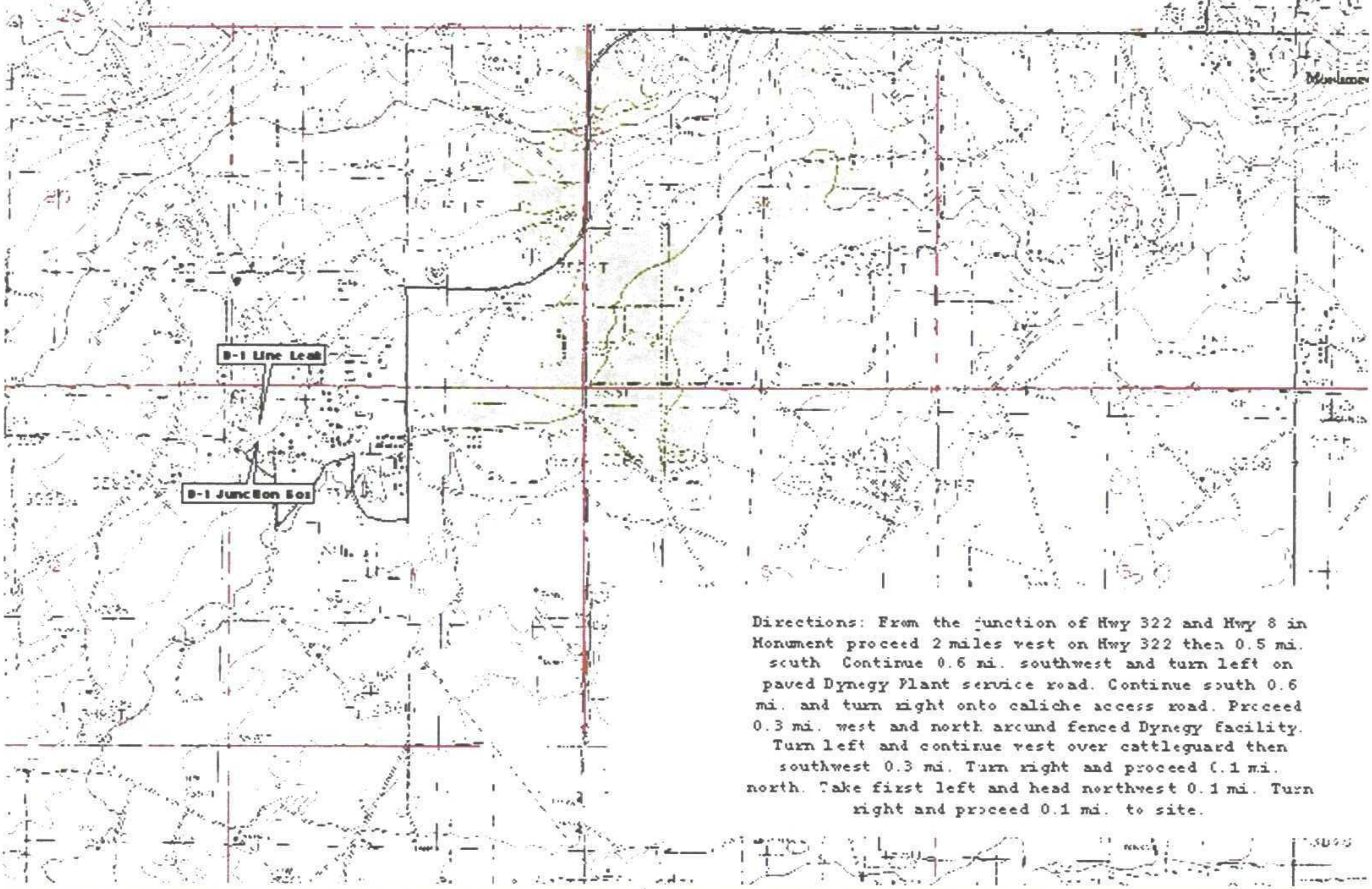
And

Site Map of Soil Sampling Results

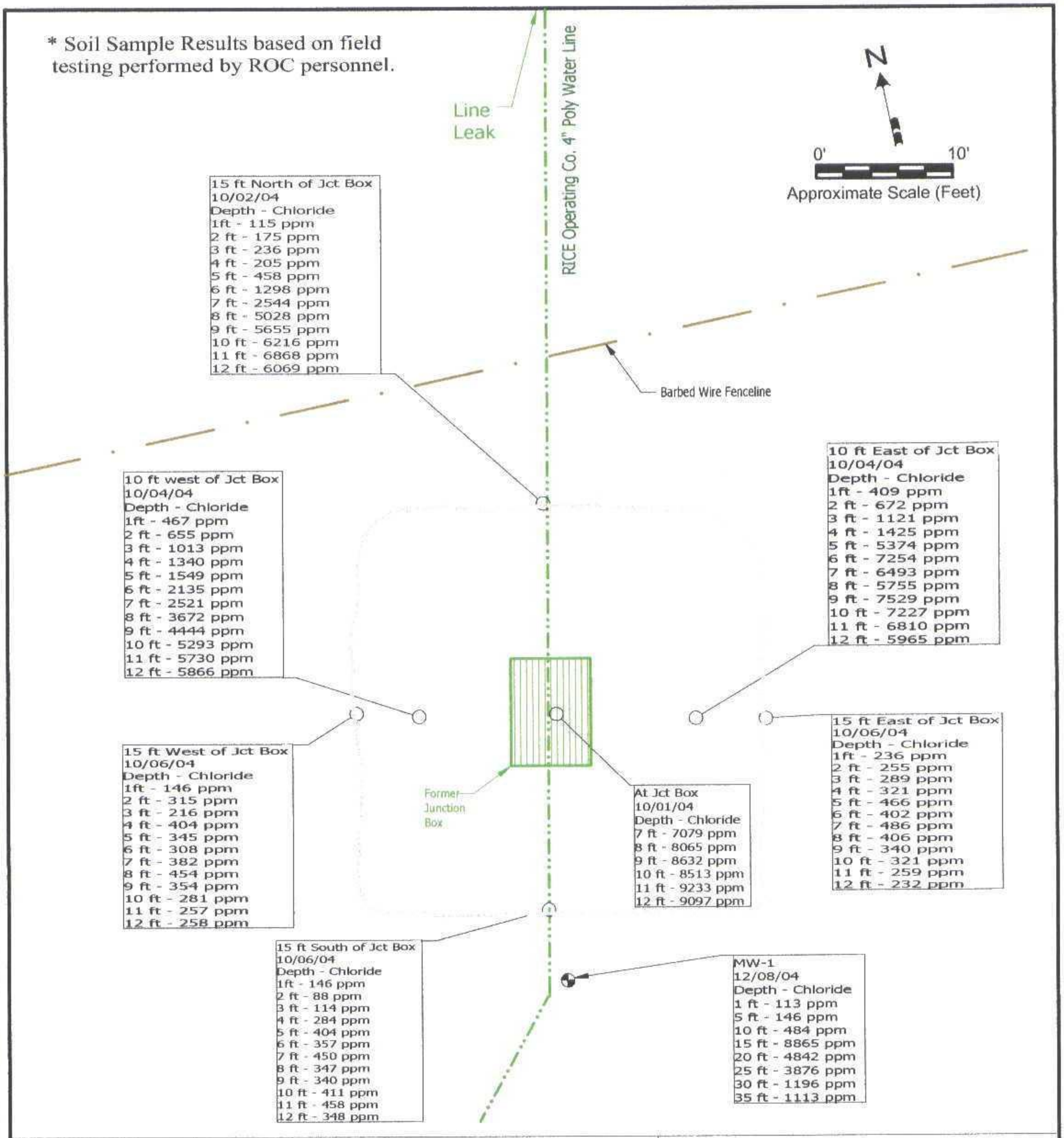
SITE LOCATION MAP

EME D-1 Junction Box & Line Leak Site

T20S-R36E-Section 1D



Directions: From the junction of Hwy 322 and Hwy 8 in Monument proceed 2 miles west on Hwy 322 then 0.5 mi. south Continue 0.6 mi. southwest and turn left on paved Dynegy Plant service road. Continue south 0.6 mi. and turn right onto caliche access road. Proceed 0.3 mi. west and north around fenced Dynegy facility. Turn left and continue west over cattleguard then southwest 0.3 mi. Turn right and proceed 0.1 mi. north. Take first left and head northwest 0.1 mi. Turn right and proceed 0.1 mi. to site.



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

TRIDENT
ENVIRONMENTAL

Site: EME D-1 Junction Box

Sampling Dates: October & December, 2004

Author: GJV

Approximate Scale: 1 inch = 10 feet

FIGURE 2

SOIL SAMPLE RESULTS

D-1 JUNCTION BOX

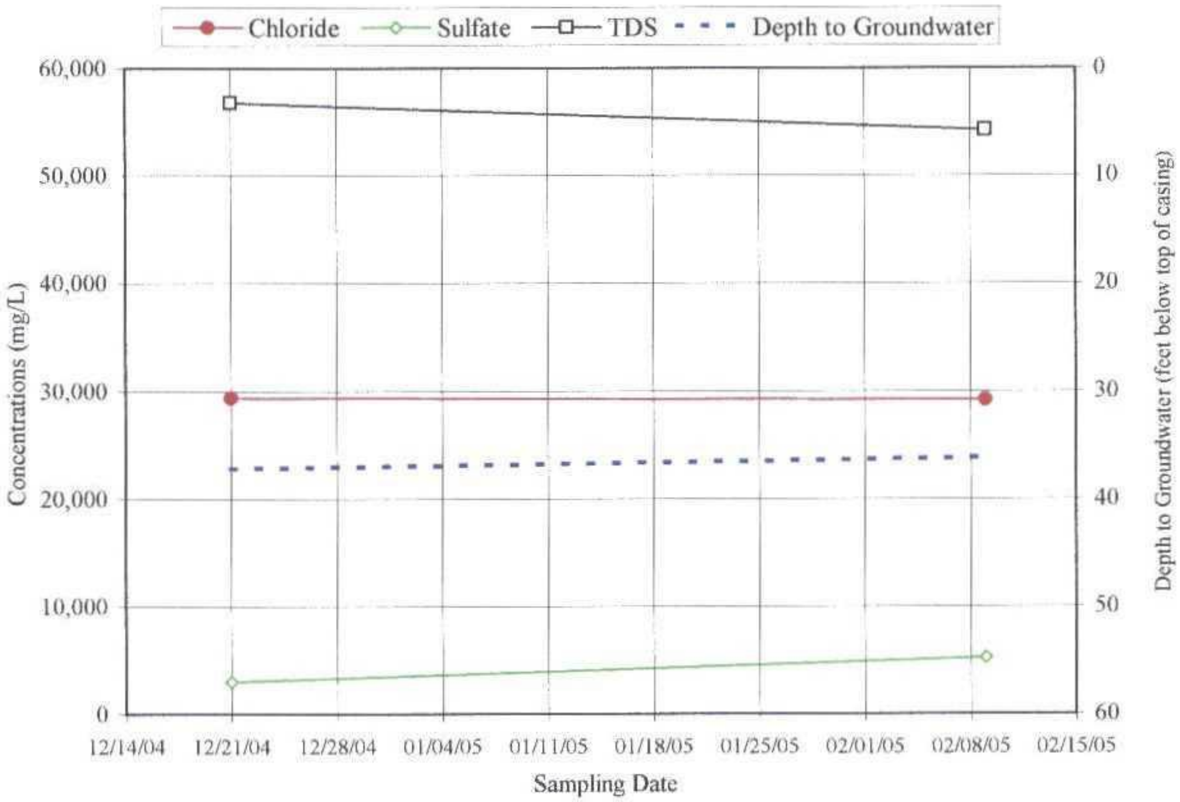
Table and Graph of Groundwater Sampling Results

Table 1
Summary of Groundwater Sampling Results
EME D-1 Junction Box Site

Monitoring Well	Sample Date	Depth to Groundwater (feet BTOC)	Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)
MW-1	12/21/04	37.20	**29,400**	**3,000**	**56,800**	<0.001	<0.001	<0.001	<0.001
	02/09/05	36.20	**29,200**	**5,220**	**54,200**	<0.001	<0.001	<0.001	<0.001
WQCC Standards			250	600	1000	0.01	0.75	0.75	0.62

Total Dissolved Soilds (TDS), chloride, sulfate, and BTEX concentrations listed in milligrams per liter (mg/L)
Analyses performed by Environmental Lab of Texas (Odessa TX) or Cardinal Laboratories (Hobbs NM).
Values in boldface type indicate concentrations exceed New Mexico Water Quality Commission (WQCC) standards.

Figure 1
Chloride, Sulfate, TDS, and Depth to Groundwater Values Versus Time Graph (MW-1)



Photodocumentation

Photos of EME d-1 Junction Box and Line Leak Site (T20S, R36E, Section 1, Unit Letter D)

View facing east showing excavation at the D-1 junction box with monitoring well MW-1 adjacent to south side.

View facing northeast showing north and east walls of excavation and 4-inch PVC pipeline.

View facing southwest showing south and west walls and floor of excavation.

View facing south showing area of line leak located approximately 150 feet north of D-1 junction box.

View facing north showing area of line leak located near the southwest corner of an EOTT tank battery and approx. 50 feet east of lined pond on Dynegy plant property.

View facing northwest showing lined pond on Dynegy plant property located ~150 ft northwest of D-1 junction box. Abandoned Climax Chemical Plant in background.

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.

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:

$$\frac{.282 \text{ X } 35{,}450 \text{ X ml } AgNO_3}{\text{ml water extract}} \quad \text{X} \quad \frac{\text{grams of water in mixture}}{\text{grams of soil in mixture}}$$

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.**