AP - 42

STAGE 1 & 2 WORKPLANS

DATE:

March 21, 2005

ARCADIS

Infrastructure, environment, buildings

Federal Express XH SAFA
Delivery Signature Required

AP 92

March 21, 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**
Eunice Monument Eumont (EME) SWD System, Jct M-16-1
Unit Letter M, Sec. 16, T20S, R37E, Lea County, NM
NMOCD CASE # 1R0427-93

Mr. Wayne Price:

RICE Operating Company (ROC) has retained ARCADIS G&M (ARCADIS) to address potential environmental concerns at the above-referenced site. 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 New Mexico Oil Conservation Division (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 the ICP, a recommended remedy will be submitted in a Corrective Action Plan (CAP); and

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

BACKGROUND & PREVIOUS WORK

Initial delineation was begun by ROC as part of the Junction Box Upgrade Program. Soil investigation at the M-16-1 junction box was begun in December 2001, with a back hoe by trenching to 12 feet below ground surface (bgs) in five locations. To further delineate depth of impact, a soil boring at the junction to 35 feet was completed. Soil samples were analyzed in the field for chlorides using field adapted Method 9253. The soil boring samples were additionally analyzed in the field for total petroleum hydrocarbons (TPH) using field-adapted Method 9253.

On January 9, 2002, a monitor well was installed southwest of the junction box M-16-1 (Figure 2). Water level was recorded at 22.60 feet below measuring point. The monitor well has been sampled quarterly since installation.

INVESTIGATION & CHARACTERIZATION PLAN

As discussed above, existing site data document groundwater quality. Therefore the work elements described below are designed to assist ROC in selecting an appropriate vadose zone remedy and, if necessary, a groundwater remedy.

Task 1 Collect Regional Hydrogeologic Data

The Ogallala Formation is the principal source of groundwater in the subject area. Depth to groundwater in Lea County ranges from approximately 12 feet bgs to approximately 300 feet bgs. The Ogallala consists of predominantly coarse fluvial conglomerate and sandstone and fine-grained eolian siltstone and clay. Where present in the subject area, the Ogallala unconformably overlies Triassic red-beds. The regional and site groundwater gradient is to the south/southeast.

Depth to groundwater at the subject site is approximately 23 feet bgs. Subsurface geology in the subject area consists of approximately 15 to 20 feet of loose, fine-grained, calcareous sand underlain by caliche to a depth of approximately 20 to 25 feet bgs. The caliche is underlain by fine-grained sand. The boring lithology log is included in Appendix A.

A one-half mile water well inventory will be performed. The water well inventory will include a review of water well records listed on the New Mexico State Engineer Office and United States Geological Survey (USGS) websites and windmills indicated on applicable USGS topographic maps and visual site observation. ROC will locate each well listed on the one-half mile well inventory and perform a well inspection to record water levels and to determine if each well can be sampled.

Task 2 Evaluate Concentrations of Constituents of Concern in Soil and Groundwater

Further delineation of the vertical and lateral extent of impact will be accomplished with soil borings. Soil samples will be collected at regular intervals, screened in the field using a PID and field tested for chlorides. Soil lithology and the presence of any observed staining or odor will be recorded. Soil samples will be submitted for laboratory analysis as confirmation of the field sampling.

Depth to groundwater at the site is approximately 23 feet bgs. If existing monitoring and water wells are present near the site, the well constructions are determined to be sufficient for representative sampling, and access to the wells can be obtained, ROC will include the wells in their sampling program and sample the existing wells in lieu of installing additional monitoring wells. Additional monitoring wells may be installed based on delineation results and the presence or absence of existing wells.

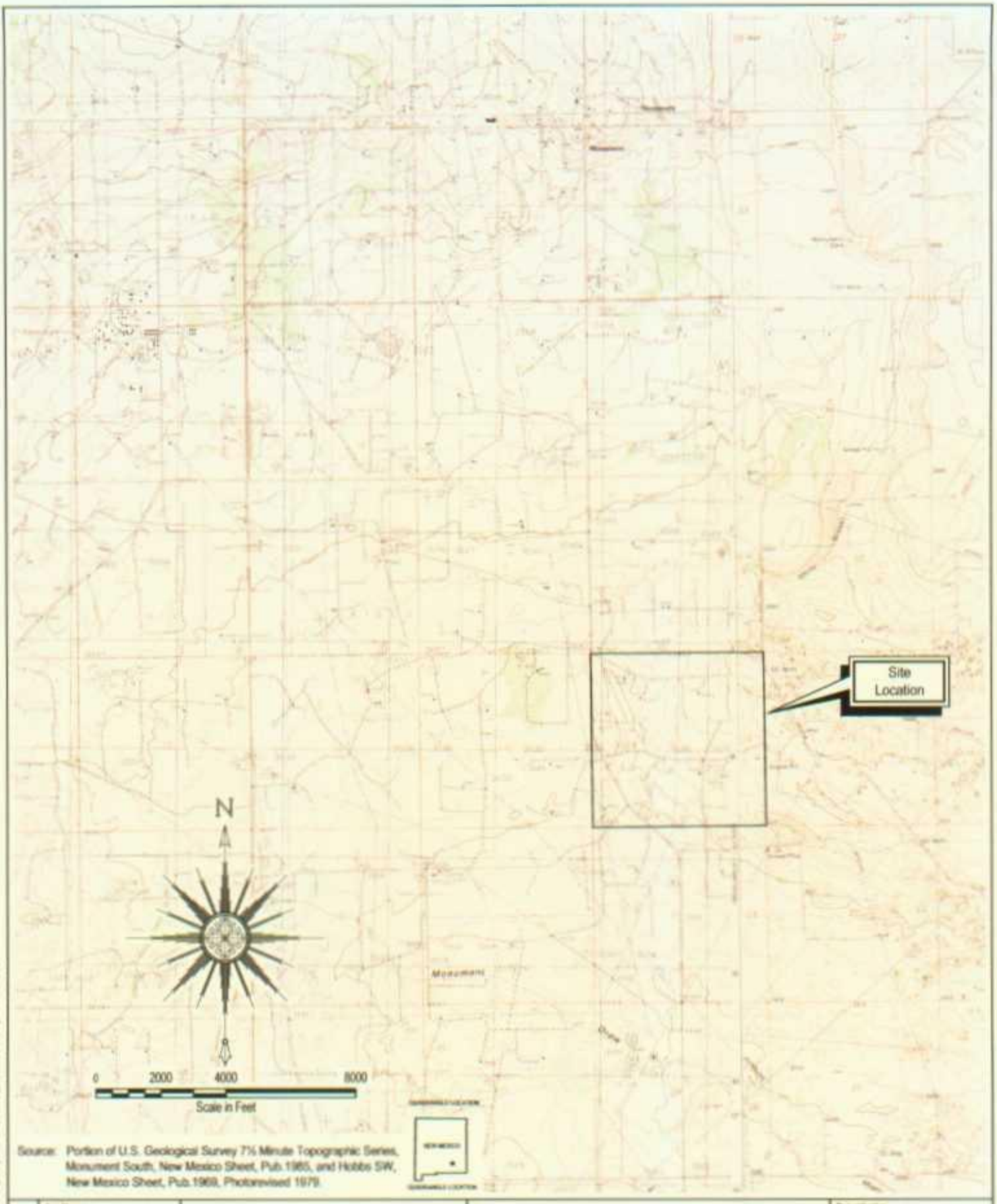
Task 3 Evaluate Flux from the Vadose Zone to Groundwater

The information gathered from tasks 1-3 will be evaluated and utilized to design a groundwater remedy if needed. The groundwater 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.

A report detailing the investigation activities and results will be submitted to the OCD. The report will include recommendations for further action if necessary or for closure of the site.

cc: CDH, KFP, file

enclosures



Source: Portion of U.S. Geological Survey 7½ Minute Topographic Series, Monument South, New Mexico Sheet, Pub.1985, and Hobbs SW, New Mexico Sheet, Pub.1969, Photorevised 1979.

Area Manager	A. Schmidt
Project Manager	S. Hall
Task Manager	D. Gaen
Technical Review	S. Tischer

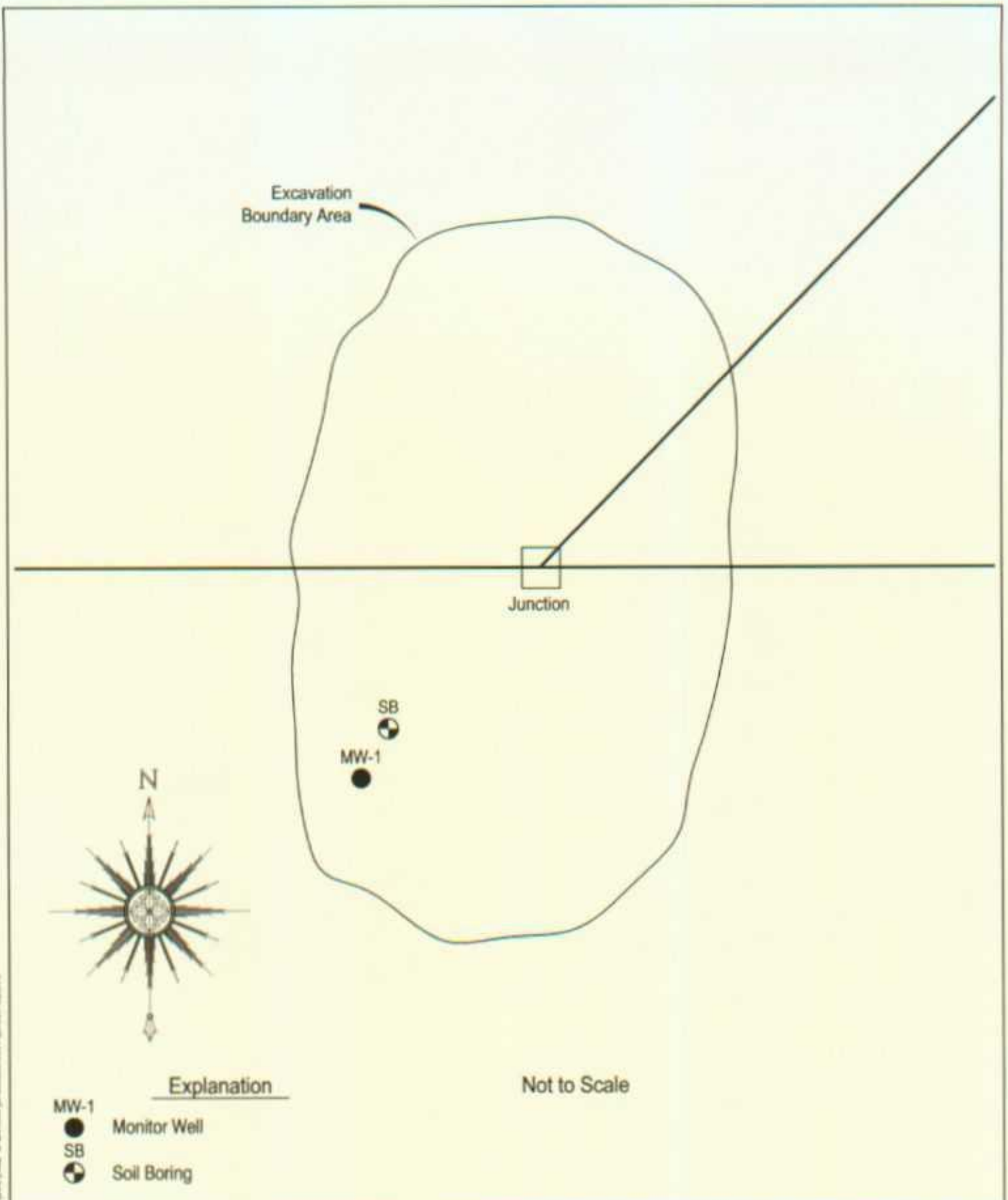
ARCADIS
1004 North Big Spring Street
Suite 300
Midland, TX 79701-3383
Tel: 432-687-5400 Fax: 432-687-5401
www.arcadis-us.com

Rice Operating Company
Junction M-16-1 Eunice Monument Eumont (EME) SWD System

Site Location Map
Unit 'M'

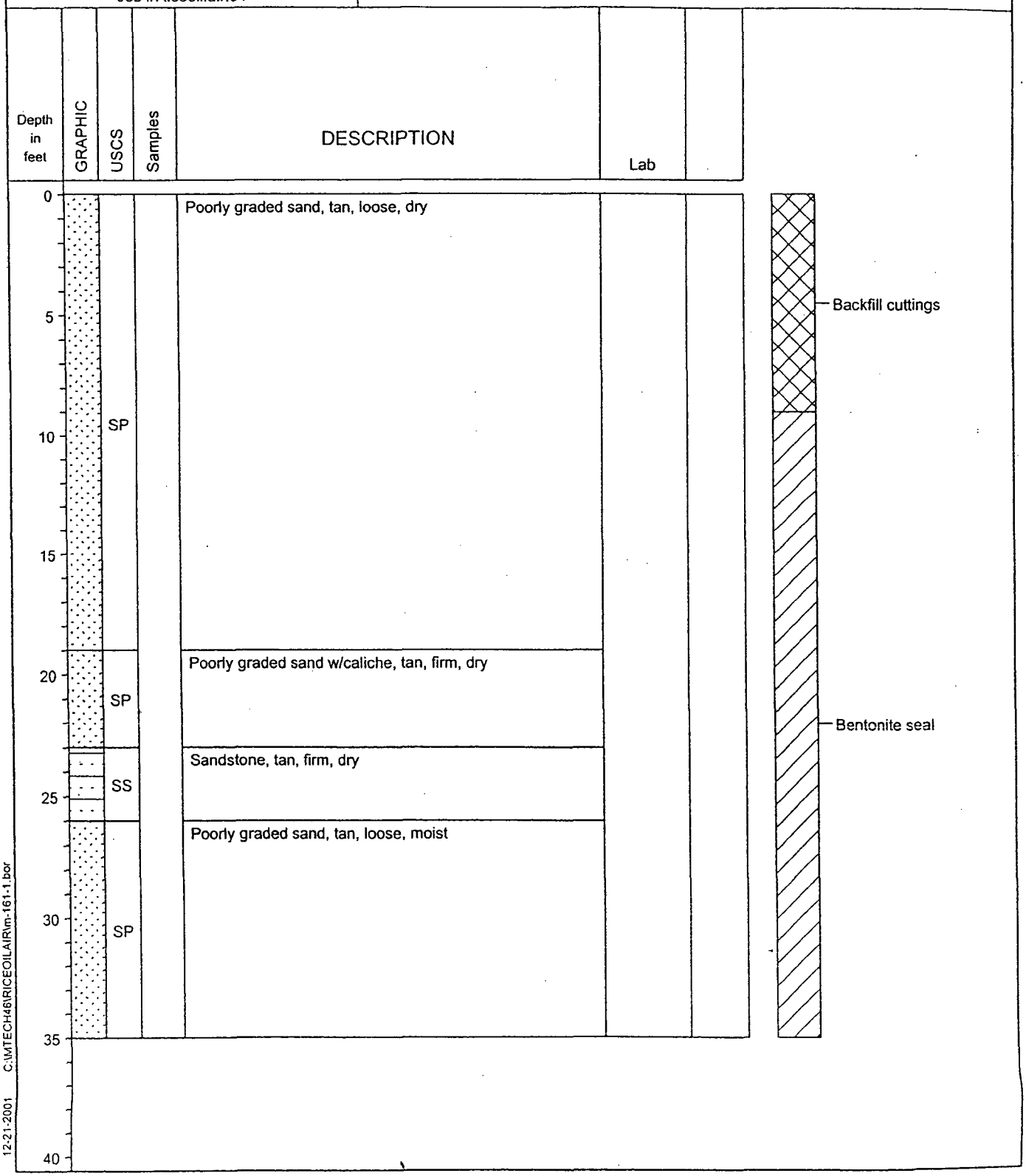
Lea County, New Mexico

Project Number	MT000856.0001
Drawing Date	21 March 2005
Figure	1



Area Manager: A. Schmidt Project Manager: S. Hall Task Manager: D. Gann Technical Review: S. Tischer	ARCADIS 1004 North Big Spring Street Suite 300 Midland, TX 79701-3383 Tel: 432-687-5400 Fax: 432-687-5401 www.arcadis-us.com	Rice Operating Company Junction M-16-1 Eunice Monument Eumont (EME) SWD System Trench, Boring and Monitor Well Locations Unit 'M' Lea County, New Mexico	Project Number: MT000856.0001 Drawing Date: 21 March 2005 Figure: 2

Atkins Engineering Associates, Inc. 2904 W. 2nd St., Roswell, NM 88202-3156	LOG OF BORING Rice M-16~1 TH1 (Page 1 of 1)
Rice Operating Company 122 West Taylor Hobbs, New Mexico 88240 Contact: Donnie Anderson Job #Riceoil.air.01	Date : 12-20-01 Drill Start : 830 Drill End : 0955 Site Location : 4 mi. South of Monument, NM Auger Type : Hollow Stem Logged By : Mort Bates Boring Location : South side of pit



12-21-2001 C:\MTECH46\RICEOIL.AIR\m-161-1.bor

Price, Wayne

From: Price, Wayne
Sent: Wednesday, December 08, 2004 10:22 AM
To: Carolyn Doran Haynes (E-mail)
Cc: Kristin Farris Pope (E-mail); Sheeley, Paul; Johnson, Larry
Subject: Groundwater Investigation and Remediation Plans Required for OCD approval by March 15, 2005

Dear Ms. Haynes:

Please provide for OCD approval by *March 15, 2005* groundwater investigation and remediation plans for the following sites:

EME M-16-1	OCD Case # 1R0427-93
EME K-33-1	OCD Case # 1R0427-92
EME E-5	OCD Case # 1R0427-91
EME N-5	OCD Case # 1R0427-90
EME A-20	OCD Case # 1R0427-89
EME K-6	OCD Case # 1R0427-88
BD-17	OCD Case# 1R0426-14

The plans shall include the following at a minimum.

1. Installation of a minimum of two additional monitor wells to properly delineate and define the groundwater conditions on and off the site.

2. A site sampling plan for constituents of concern.

3. The plan shall also include remediation techniques to reduce any vadose contamination that has not already been addressed, and groundwater contamination on and off the site.

4. An area map marking the approximate location and with directions on how to get to the site.

5. A site plot plan showing all significant features.

6. Photos of the site, including any photos available during the original work performed at the site.

7. A summary of all work performed and findings as of to date.

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us