AP - 43

STAGE 1 & 2 WORKPLANS

DATE: MARCH 1, 2005

ARCADIS
Infrastructure, environment, buildings

Federal Express XH SAFA
Delivery Signature Required

AP-93

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 A-20
Unit Letter A, Sec. 20, T20S, R37E, Lea County, NM
NMOCD CASE # 1R0427-89

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 Junction A-20 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 A-20 junction box was started in October 2001 with a back hoe by trenching to 12 feet below ground surface (bgs) in three locations. To further delineate depth of impact, a soil boring at the junction to 23 feet was completed. Soil samples were analyzed in the field for chlorides using field-adapted Method 9253. A notice of soil impact, dated November 21, 2001, was submitted to NMOCD by ROC summarizing the findings from the 2001 investigation.

During the trenching task in October 2001, groundwater was observed to contain what appears to be phase separated total petroleum hydrocarbons (TPH). A notice of groundwater impact, dated January 29, 2002, was submitted to NMOCD by ROC discussing the findings.

On February 28, 2002 a monitor well was installed southeast of the junction box A-20 (Figure 2). Water level was 24.53 feet bgs. The review of the laboratory results shows that chloride is the primary constituent of concern. The monitor well has been sampled quarterly since installation. Water samples are tested for total dissolved solids (TDS), anions and cations.

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 25 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. Boring lithology logs are 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, selected based on PID readings and visual observation, will be submitted for laboratory analysis as confirmation of the field sampling. Samples with the highest PID reading and samples observed to be impacted based on PID readings and visual observation will be submitted.

If soil analytical results indicate that chloride and/or BTEX concentrations exceed New Mexico Water Quality Control Commission standards, additional soil borings may be continued as warranted by the results of the investigation.

Depth to groundwater at the site is approximately 25 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.

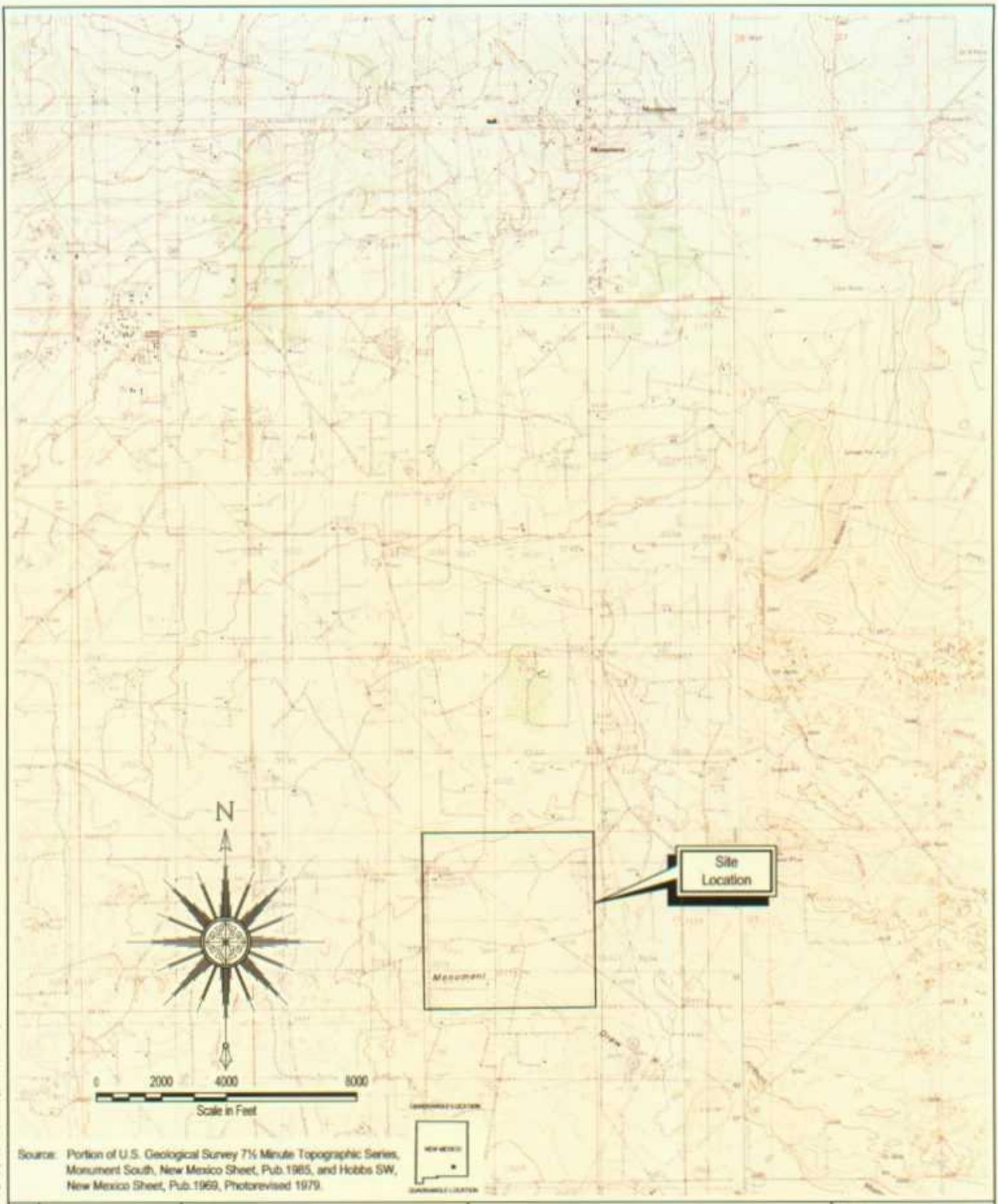
Task 3 Evaluate Flux from the Vadose Zone to Groundwater

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. If the evaluation demonstrates that residual constituents pose no threat to groundwater quality, only a surface restoration plan will be proposed. 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.

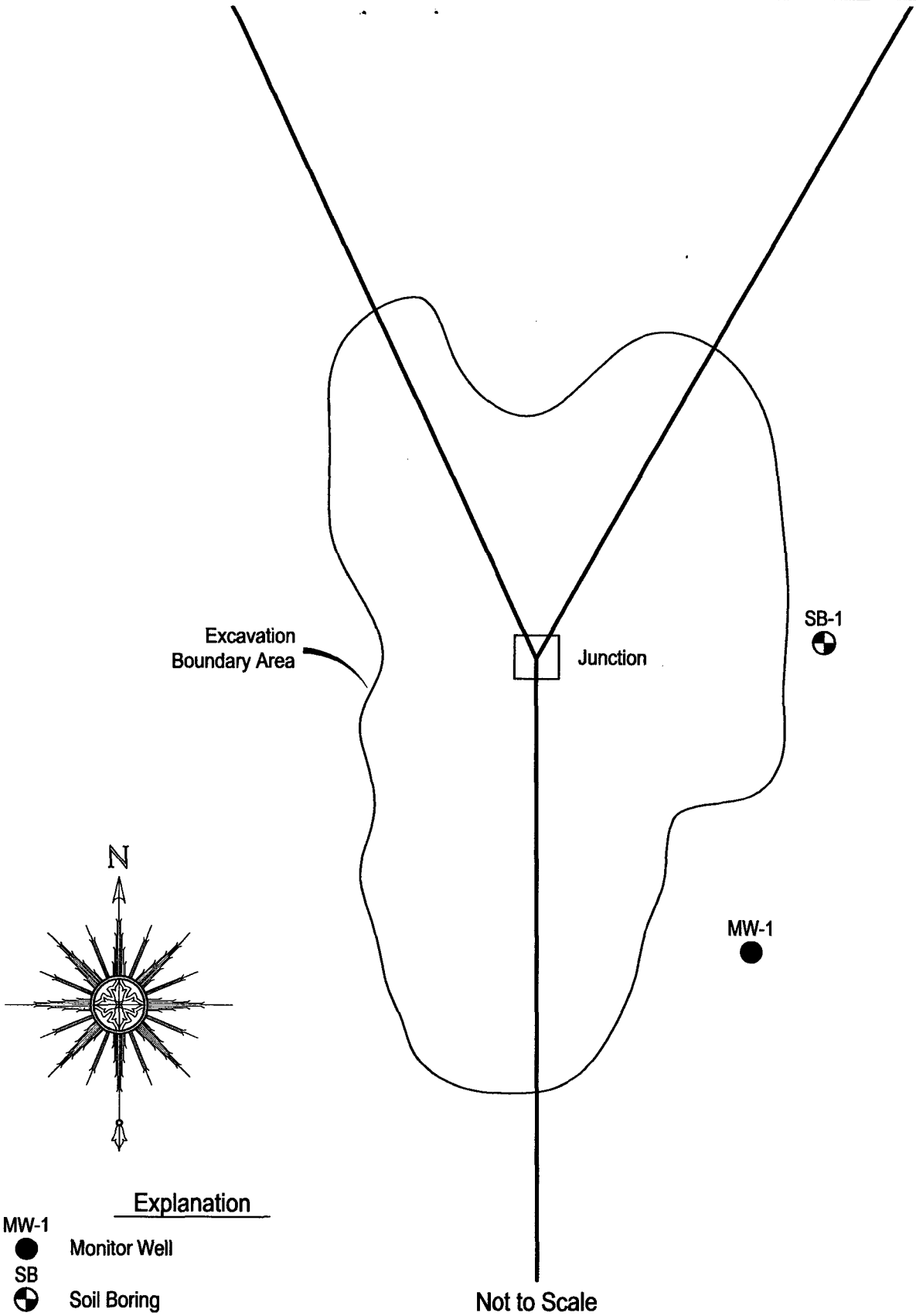
cc: CDH, KFP, file

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. 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 A-20 Eunice Monument Eumont (EME) SWD System Site Location Map Unit 'A' Lea County, New Mexico	Project Number: MT000857.0001 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 A-20 Eunice Monument Eumont (EME) SWD System **Trench, Boring and Monitor Well Locations Unit 'A'** Lea County, New Mexico	Project Number: MT000857.0001 Drawing Date: 21 March 2005 Figure: 2

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31-014-00712

DRILLING LOG	Site Name/Location					Logged by: DEA
RICE *Operating Company* 122 West Taylor Hobbs, New Mexico 88240 Phone: (505) 393-9174 Fax: (505) 397-1471	**Jct. Box A-20** **20-T20S-R37E** **EME** **SWD System** **Lea County, NM**	Well No.: MW1	Date Drilled: 2/28/02	Driller: Eades		Construction: Sand and bentonite above screen.
		Well Depth: 35'	Boring Depth: 35'	Well Material: PVC		
		Casing Length: 20	Boring Diameter: 4.75"	Casing Size: 2"		
		Screen Length: 15'	Drilling Method: Air Rotary	Slot Size: N/A		

DEPTH	SUBSURFACE LITHOLOGY	SAMPLE TYPE	TEST (ppm)	REMARKS	Boring
0	Ground surface		Cl		
1	Topsoil				cuttings
2	Caliche				
3					
4					
5					
6					
7					
8					
9					
10					
11					
12	Sandy brown clay				
13					
14					
15					
16					
17					
18	Sand			TPH odor	
19				"	
20				"	
21				"	
22				"	
23				"	
24					
25					
26					
27					
28					
29					
30					
31	Sandy brown clay				
32					
33					
34					
35					

Atkins Engineering Associates, Inc. 2904 W. 2nd St., Roswell, NM 88202-3156	LOG OF BORING Rice A-20 TH (Page 1 of 1)
Rice Operating Co. 122 W. Taylor Hobbs, New Mexico 88240 Contact: Donnie Anderson Job#: RICENGI.AIR.01	Date : 10-04-01 Drill Start : 1300 Drill End : 1330 Boring Location : S. Monument 4.5 mi & W 0.5 mi Site Location : South Monument Auger Type : Hollow Stem Logged By : Mort Bates

Depth in Feet	GRAPHIC	USCS	Samples	DESCRIPTION	Lab	
0				Sand, tan, loose, dry		
5		SP				
10				Sand, tan, loose, damp		Bentonite
15		SP				
20						
				Total depth 23'		
25						

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