AP - 27

STAGE 1 & 2 REPORTS

DATE:
June 8, 2001

RICE Operating

Junction Box E-15
Remediation Project

RECEIVED
JUN 0 8 2001
ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION

Whole Earth Environmental
19606 San Gabriel
Houston, Tx. 77084
(800) 854-4358
www.wholeearthonline.com

Site Profile

Location

The spill area is located within Section 15, T22S, Range 37E southeast of Eunice, New Mexico on fee land owned by Messrs. Irvin Boyd and Robert Cueto. The primary land use is that of grazing cattle. Significant oilfield development is present within the area and several oil wells, storage tanks, flow lines and ancillary structures are present on both landholdings. A 7.5' map is enclosed within this section to define the location (Exhibits 1 & 2).

The topography is unremarkable. There are no surface streams or catchments within one mile of the site.

Spill Discovery & Notification

On March 29, 2000 a leak of produced brine water was discovered and verbally reported to the Hobbs office of the NMOCD. This notice was followed up the next day with a Form C-141 (Exhibit 3) describing the cause of the leak as due to a rusted sleeve.

Containment

Rice Operating Company immediately recovered approximately 300 barrels of fluid and began excavation and disposal of the contaminated soils. The initial excavation and disposal effort resulted in approximately 2,000 cubic yards of contaminated being transported to the Sundance Parabo Facility. With the initial excavation at approximately 15' bgl, the site was contoured to insure that any potential contaminate migration would be to the center of the site.

Testing

Protocol

Soil and water sampling was conducted in accordance with the site investigation plan: PR-61, enclosed as Exhibit 4.

Soil Testing
In an effort to determine the vertical and lateral extent of contaminant migration, Claiborne Harrison Corp. drilled a series of six boreholes on July 14, 2000. A site map describing the location of these test holes is provided as Exhibit 5. The test holes were sampled extensively to determine the chloride concentrations within the remaining plume. The results of these tests are contained within Exhibit 6.

Water Testing
On January 22, 2001, Clairborn Harrison Corporation drilled and completed two water monitoring wells. The location of these wells is described within the attached survey, Exhibit 7). WW-1 was completed satisfactorily and sampled on January 23 in accordance with WEQP-28 and WEQP-77. WW-2 was successfully drilled, however the tight formation did not allow a sufficient volume of fluid to be pumped from the well bore to obtain meaningful test results.

Whole Earth Environmental was notified of the test results of WW-1 on January 25th and immediately notified Messrs. Price and Williams of the NMOCD telephonically that day and provided written notification and copies of the test results and associated chain of custody the next day (Exhibits 8-12).

Whole Earth Environmental re-sampled MW-2 on February 27, 2001. Mr. Buddy Hand of the Hobbs office of the NMOCD witnessed the re-sampling. The results of these analyses are provided in Exhibits 13-15.

Based on the results of the first two monitor well test results, two additional monitor wells were drilled, cased, and developed in early May. The two new monitor wells were sampled on May 23, 2001. The test results indicate that an additional plume source may lie up-gradient from the E-15 junction box leak (Exhibits 19, 19A & 19B). Additional investigation will be conducted to determine the source of this plume.

Site Geology
The boring logs from the six test holes and two monitoring wells (Exhibits 16A-H), reveal a red, sandy topsoil extending to a depth of approximately 5' bgl underlain by tan calichi to approximately 30' bgl atop a 40' dense sand layer. A 3' layer of indurated sandstone lies immediately above an 18' red bed clay layer.

Hydrology
The U.S.G.S. survey maps (Exhibits 1 & 2) indicate a general decline in elevation to the southeast. The civil survey (Exhibit 7) shows the elevation of MW-1 to be 3,403.4' at the top of the cement pad. The distance to ground water from the top of the pad is 73.2'. The elevation of MW-2 is 3403.1' at the top of the cement. The distance to groundwater is 77'. The gradient between the two water depths is .00928 ft. / ft.

Exhibit Index

1. U.S.G.S. topographical map

2. U.S.G.S. topographical map

3. N.M.O.C.D. Form C-141

4. Site Investigation Plan PR-61

5. Bore hole location schematic

6. Bore hole chloride concentrations

7. Basin Survey showing locations of monitor wells

8. January 26th, 2001 notification letter to Wayne Price

9. January 26th, 2001 notification letter to Chris Williams

10. Environmental Labs of Texas chain of custody document

11. Environmental Labs of Texas report of BTEX concentrations

12. Environmental Labs of Texas report of chloride concentrations

13. Environmental Labs of Texas chain of custody document

14. Environmental Labs of Texas report of BTEX concentrations

15. Environmental Labs of Texas report of chloride concentrations

16A. Well Report-Bore Hole # 1

16B. Well Report-Bore Hole # 2

16C. Well Report-Bore Hole # 3

16D. Well Report-Bore Hole # 4

16E. Well Report-Bore Hole # 5

16F. Well Report-Bore Hole # 6

16G. Well Report-Monitor Well # 1

16H. Well Report-Monitor Well # 2

16I. Boring Log Monitor Well # 3

16J. Boring Log Monitor Well # 4

17. Water well development procedure QP-28

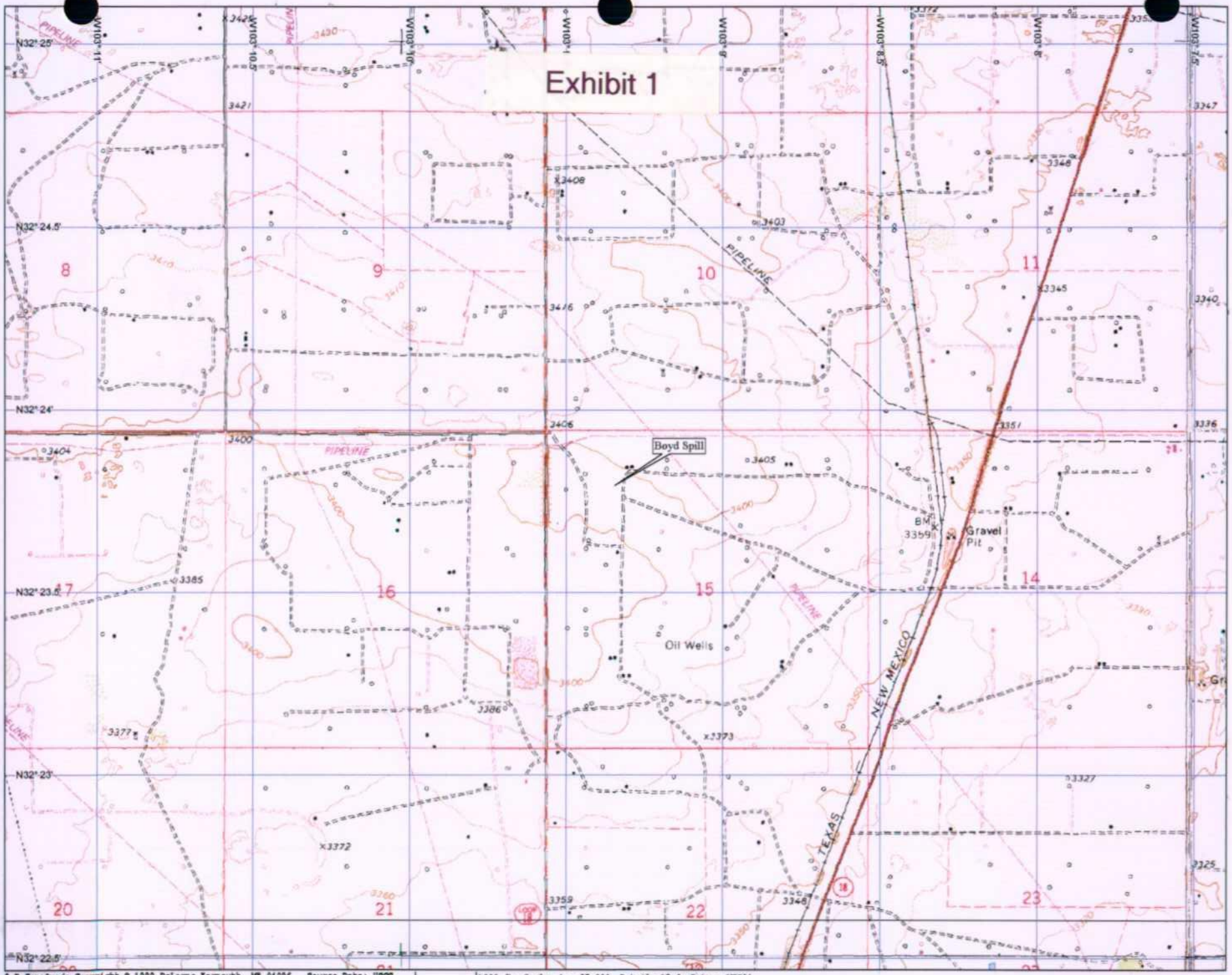
18. Water well sampling procedure QP-76(A)

19. Chain of Custody document for MW 3& 4

19A. Environmental Labs of Texas report of chloride concentrations

19B. Environmental Labs of Texas report of BTEX concentrations

Exhibit 1



3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS 1000 ft Scale: 1 : 25,000 Detail: 13-0 Datum: WGS84

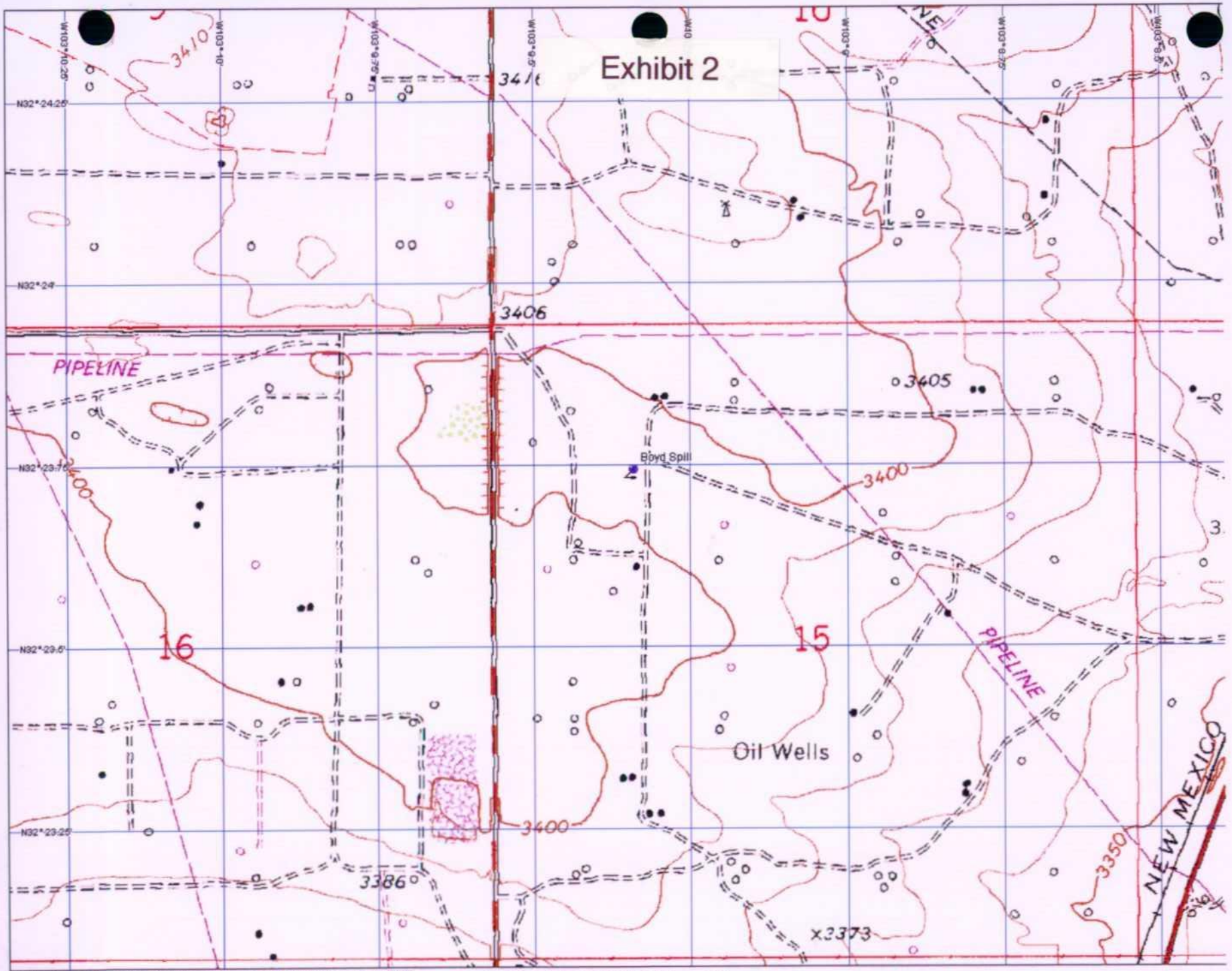


Exhibit 2
3410
3406
PIPELINE
3405
Boyd Spill
3400
16
15
PIPELINE
Oil Wells
3400
3386
3350
NEW MEXICO
x3373
N32°24'25"
N32°24'
N32°23'35"
N32°23'5"
N32°23'25"
3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS
350 ft Scale: 1 : 12,800 Detail: 14-0 Datum: WGS84

District I
P.O. Box 1980, Hobbs, NM 88241-1980
District II
811 South First, Artesia, NM 88210
District III
1000 Rio Brazos, Aztec, NM 87410
District IV
2040 South Pacheco, Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
2040 South Pacheco
Santa Fe, NM 87505
OPERATOR'S MONTHLY REPORT

Form C-141
Originated 2/13/97

Submit 2 copies to Appropriate District Office in accordance with Rule 116 on back side of form

Exhibit 3

Release Notification and Corrective Action

OPERATOR X Initial Report Final Report

Name	Contact
Rice Operating Company	John L. Moody Jr.
Address	**Telephone No.**
122 West Taylor Hobbs, NM 88240	505-393-9174
Facility Name	**Facility Type**
B.D. SWD	PRODUCED WATER PIPELINE

Surface Owner	Mineral Owner	Lease No.
IRVIN BOYD & ROBERT CUETO		

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South line	Feet from the	East/West Line	County
E &D	15	T22S	R37E					LEA

NATURE OF RELEASE

Type of Release	Volume of Release	Volume Recovered
Production Water	UNKOWN	300BBLS
Source of Release	**Date and Hour of Occurrence**	**Date and Hour of Discovery**
PIPELINE	1:00PM 3-29-00	SAME
Was Immediate Notice Given?	**If YES, To Whom?**	
X YES No Not Required	SLYVIA	
By Whom?	**Date and Hour**	
JOHN L. MOODY	3:55 3-29-00	
Was a Watercourse Reached?	**If YES, Volume Impacting the Watercourse.**	
☐ Yes ☒ No		

If a Watercourse was Impacted, Describe Fully. (Attach Additional Sheets If Necessary)

N/A

Describe Cause of Problem and Remedial Action Taken. (Attach Additional Sheets If Necessary)

STEEL DRESSER SLEEVE RUSTED OUT, TAKE DRESSER SLEEVE OUT AND REPLACE WITH JOINT OF PVC PIPE

Describe Area Affected and Cleanup Action Taken. (Attach Additional Sheets If Necessary)

Area affected: 1512 SQUARE FEET IN UNIT LTR. "D". 10,450 SQUARE FEET IN UNIT LTR."E". IRVIN BOYD IS THE SURFACE OWNER IN UNIT LTR. "E" AND HE WANTS ALL IMPACTED SOIL DUG OUT AND REPLACED WITH CLEAN AND WE HAVE STARTED HAULING 3-30-00. WE WILL DO THE SAME FOR ROBERT CUETO IN UNIT LTR. "D"

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature:	OIL CONSERVATION DIVISION	
Printed Name: John L. Moody Jr.	Approved by District Supervisor:	
Title: Regulatory Compliance Coordinator	Approval Date:	Expiration Date:
Date3-30-00 Phone: 505-393-9174	Conditions of Approval:	Attached ☐

Exhibit 4

PR-61

Site Investigation Plan
Rice Operating Company
Junction Box 15

1.0 Purpose

This plan is to be used to determine the vertical extent of contamination adjacent to Rice Operating Company's Junction Box E-15.

2.0 Scope

This plan is site specific for the Rice Operating investigation project.

3.0 Preliminary

Prior to any field operations, Whole Earth Environmental shall conduct the following activities:

3.1 Client Review

3.1.1 Whole Earth shall meet with cognizant personnel within Rice to review this protocol and make any requested modifications or alterations.

3.1.2 Changes to this protocol will be documented and submitted for final review by Client prior to the initiation of actual field work.

4.0 Safety

4.1 Prior to work on the site, Whole Earth shall obtain the location and phone numbers of the nearest emergency medical treatment facility. We will review all safety related issues with the appropriate Client personnel, sub-contractors and exchange phone numbers.

4.2 A tailgate safety meeting shall be held and documented each day. All sub-contractors must attend and sign the daily log-in sheet.

4.3 Anyone allowed on to location must be wearing sleeved shirts, steel toed boots, and long pants. Each vehicle must be equipped with two way communication capabilities.

4.4 Prior to any excavation, New Mexico One Call will be notified. The One Call notification number will be included within the closure report. If lines are discovered within the area to be excavated they shall be marked with pin flags on either side of the line at maximum five foot intervals.

5.0 Coring

5.1 A delineation hole will be cored at the southeast corner of the surface stain area. A log will be kept by the coring company outlining soil morphology.

6.0 Soil Sampling

6.1 Soil samples will be obtained in accordance with WEQP-77 at the ground surface and at each 10' depth interval.

7.0 Soil Analysis

7.1 The soil samples obtained under 6.1 of this plan will be transported to a laboratory and tested for the presence of DRO-GRO TPH, BTEX and chlorides.

8.0 Water Sampling

8.1 The coring rig will drill to a minimum depth of 15' below the upper interface layer of the water table.

8.2 The well will be left uncased but developed by pumping fluid from the well bore until a minimum turbidity is found but a minimum of twenty gallons of fluid from the well bore shall be drawn.

8.3 All bailed fluids shall be collected by the coring company and disposed of at an approved disposal facility.

8.4 The open well bore shall be protected to insure that no foreign matter may enter the bore while a water analysis is conducted.

8.5 A water sample shall be collected in accordance with WEQP-76 and transported to a laboratory for the analysis of BTEX and chlorides.

9.0 Investigation Report

9.1 Whole Earth will provide an investigation report containing the following minimum information:

- Photographs of the location of the test boring
- Photographs of the entire spill area
- Copies of this protocol and all testing procedures
- Independent laboratory analyses and associated chains of custody
- Driller's Log

Rice Operating

Test Boring Locations

Exhibit 5

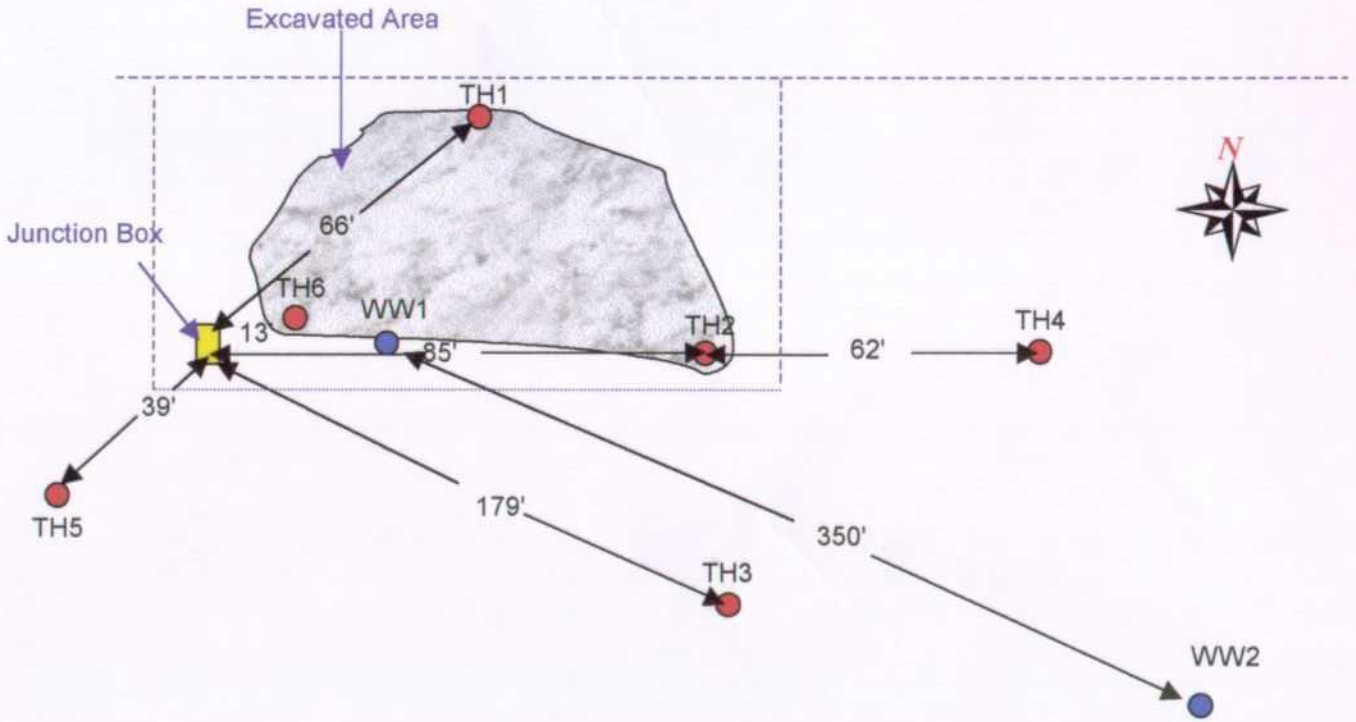


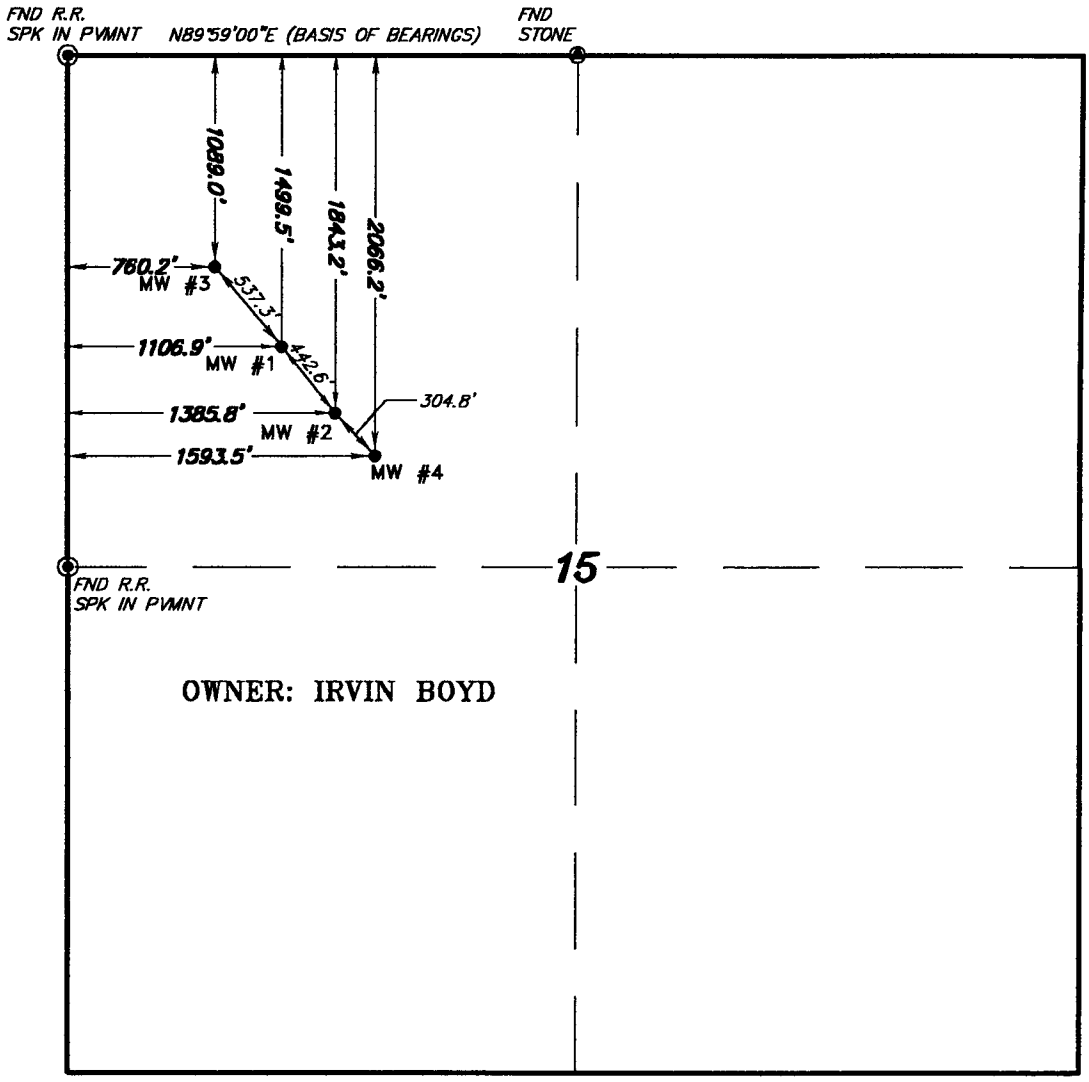
Exhibit 6

Rice Operating Company
Junction Box E-15
Site Dileneation Sampling

Depth (Feet Below Ground Level)	Chloride Concentration in mg / kg					
	Bore # 1	Bore # 2	Bore # 3	Bore # 4	Bore # 5	Bore # 6
5			200	1,800	800	2,000
10	3,100	2,900	100	1,300	700	2,000
15	3,700	3,000	50	1,500	1,000	1,900
20	2,900	2,100	50	900	500	1,700
25	2,100	1,500	50	300	400	
30		1,200	50	450	300	1,500
35	3,900	1,400	50	150	500	1,300
40	2,800	2,600	50	200	400	1,500
45	2,300	1,000	100	100	400	1,200
50	2,300	1,000	50	50	300	1,000
55	3,100	1,200	50	50	300	1,000
60	1,700	1,100	100	50	200	1,000
65		1,800				
70		1,600				

SECTION 15, TOWNSHIP 22 SOUTH, RANGE 37 EAST, N.M.P.M.,
LEA COUNTY, **NEW MEXICO.**

Exhibit 7



WELL	GRND ELEV.	PAD ELEV.	NORTHING	EASTING	LATITUDE	LONGITUDE
MW #1	3398.3'	3398.6'	N509436.578	E904771.875	N32°23'42.0"	W103°09'21.2"
MW #2	3398.4'	3398.9'	N509096.706	E905055.281	N32°23'38.6"	W103°09'17.9"
MW #3	3397.6'	3397.8'	N509842.177	E904419.441	N32°23'46.1"	W103°09'25.2"
MW #4	3397.9'	3398.6'	N508876.745	E905266.429	N32°23'36.4"	W103°09'15.5"

ALL COORDINATES ARE BASED ON NMSPCE (NAD83)

I HEREBY CERTIFY THAT THIS PLAT WAS PREPARED FROM FIELD NOTES OF AN ACTUAL SURVEY AND MEETS OR EXCEEDS ALL REQUIREMENTS FOR LAND SURVEYS AS SPECIFIED BY THIS STATE.

NEW MEXICO 7977 REGISTERED PROFESSIONAL LAND SURVEYOR

GARY L. JONES N.M. P.S. No. 7977
TEXAS P.L.S. No. 5034

1000 0 1000 2000 FEET

BASIN SURVEYS P.O. BOX 1786 – HOBBS, NEW MEXICO

WHOLE EARTH ENVIROMENTAL, INC.

REF: MONITOR WELLS BD SITE – Jct. Box E–15

MONITOR WELLS LOCATED IN

SECTION 15, TOWNSHIP 22 SOUTH, RANGE 37 EAST,

N.M.P.M., LEA COUNTY, NEW MEXICO.

W.O. Number: 1522	Drawn By: **K. GOAD**		
Date: 05–30–2001	Disk: KJG CD#3 – RC1522A.DWG	Survey Date: 05–29–2001	Sheet 1 of 1 Sheets

Exhibit 8

January 26, 2001

Mr. Wayne Price
NMOCD Office
1220 South St. Francis Dr.
Sante Fe, New Mexico 88505

Re: Notice of Groundwater Impact: UL D&E, Sec 15, T22S, R37E
BD SWD System Operated by Rice Operating System

Dear Mr. Price:

On January 22nd Whole Earth Environmental, Inc. witnessed the drilling and completion of two water monitoring wells situated adjacent to a spill area defined as UL D&E Sec 15, T22S, Range 37E, Junction Box E-15. A 7.5 minute map specifying the location is included within this transmittal.

On January 23rd Whole Earth Environmental, Inc. collected water samples from the two wells and transported them to Environmental Labs of Texas for the analysis of BTEX and chlorides. The enclosed analytical results indicate that the chloride concentrations within MW-1 exceed NMWQCC standards. The analytical results for MW-2 should not be considered reliable or accurate as we were unable to bail sufficient fluids from within the wellbore to develop the well.

These analytical results were received by Whole Earth Environmental, Inc. on the morning of January 25. Mr. Olson was notified of these results by e-mail that afternoon.

We are presently working to provide you and Chris Williams a Stage 2 Abatement Plan by March 31st, 2001.

Sincerely,

Mike Griffin
President
Whole Earth Environmental, Inc.

Cc: Carolyn Haynes / Rice Operating System

Enclosure: 7.5' map
ELT Analysis
Chain of Custody

Exhibit 9

January 26, 2001

Mr. Chris Williams
NMOCD Hobbs Office
1625 North French Drive
Hobbs, New Mexico 88240

Re: Notice of Groundwater Impact: UL D&E, Sec 15, T22S, R37E
BD SWD System Operated by Rice Operating System

Dear Mr. Williams:

On January 22nd Whole Earth Environmental, Inc. witnessed the drilling and completion of two water monitoring wells situated adjacent to a spill area defined as UL D&E Sec 15, T22S, Range 37E, Junction Box E-15. A 7.5 minute map specifying the location is included within this transmittal.

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These analytical results were received by Whole Earth Environmental, Inc. on the morning of January 25. You were notified of these results telephonically that afternoon. My efforts to reach you by e-mail at cwilliams@state.nm.us.ocd/ were unsuccessful.

We are presently working to provide you and Wayne Price a Stage 2 Abatement Plan by March 31st, 2001.

Sincerely,

Mike Griffin
President
Whole Earth Environmental, Inc.

Cc: Carolyn Haynes / Rice Operating System

Enclosure: 7.5' map
ELT Analysis
Chain of Custody

Environmental Lab of Texas, Inc.

West I-20 East
, Texas 79763

Phone: 915-663-1800
Fax: 915-663-1713

Exhibit 10

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: M. Griffin
Company Name: Whole Earth Environmental
Company Address: 19606 San Gabriel
City/State/Zip: Houston, Tx. 77084
Telephone No: (800) 854-4358 Fax No: (281) 646-8996
Sampler Signature: M. Griffin

Project Name: JB-15
Project #:
Project Loc: Eunice, NM
PO #:

(lab use only)	FIELD CODE	Date Sampled	Time Sampled	No. of Containers	Preservative: Ice	HNO_3	HCl	NaOH	H_2SO_4	None	Other (Specify)	Matrix: Water	Sludge	Soil	Other (specify):	Analyze For: TCLP: TOTAL: TDS / CL / SAR / EC	TPH 418.1	TPH TX 1005/1006	TPH 8015M GRO/DRO	Metals: As Ag Ba Cd Cr Pb Hg Se	Volatiles	Semivolatiles	BTEX 8021B/5030	Chlorides					RUSH TAT (Pre-Schedule)	Standard TAT
1987	MW-1	1-23-01	3:20	2	✓		✓					✓											✓							
1	MW-1	✓	3:20	1	✓							✓												✓						
1989	MW-2	✓	3:50	2	✓		✓					✓											✓							
1	MW-2	✓	3:50	1	✓							✓												✓						

Special Instructions:

Sample Containers Intact? (Y) N
Temperature Upon Receipt: 4°C
Laboratory Comments:

Relinquished by:	Date	Time	Received by:	Date	Time
M. Griffin	1-24-01	8:25			
Relinquished by:	Date	Time	Received by ELOT: Armanda Lara	Date 1-24-01	Time 9:20 A.M.

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL
ATTN: MR. MIKE GRIFFIN
19606 SAN GABRIEL
HOUSTON, TEXAS 77084
FAX: 281-646-8996

Exhibit 11

Sample Type: Water
Sample Condition: Intact/ Iced/ HCl/ -1 deg.
Project #: None Given
Project Name: JB-15
Project Location: Eunice, N.M.

Sampling Date: 01/23/01
Receiving Date: 01/24/01
Analysis Date: 01/24/01

ELT#	FIELD CODE	BENZENE mg/L	TOLUENE mg/L	ETHYLBENZENE mg/L	m,p-XYLENE mg/L	o-XYLENE mg/L
36787	MW-1	<0.001	<0.001	<0.001	<0.001	<0.001
36788	MW-2	<0.001	<0.001	<0.001	<0.001	<0.001
%IA		104	103	105	107	108
%EA		93	92	95	96	97
BLANK		<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: EPA SW 846-8021B ,5030

Raland K. Tuttle

1-25-01
Date

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL
ATTN: MR. MIKE GRIFFIN
19606 SAN GABRIEL
HOUSTON, TEXAS 77084
FAX: 281-646-8996

Exhibit 12

Sample Type: Water
Sample Condition: Intact/ Iced/ -1 deg. C
Project #: None Given
Project Name: JB-15
Project Location: Eunice, N.M.

Sampling Date: 01/23/01
Receiving Date: 01/24/01
Analysis Date: 01/24/01

ELT#	FIELD CODE	Chloride mg/L
36787	MW-1	19675
36788	MW-2	780

QUALITY CONTROL	5140
TRUE VALUE	5000
% INSTRUMENT ACCURACY	103
BLANK	<10

METHODS: EPA 325.3

Raland K. Tuttle

1-25-01
Date

292.

nvironmental Lab of Texas, Inc.

12600 West I-20 East Odessa, Texas 79763
(915) 563-1800 FAX (915) 563-1713

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Manager: [illegible]

Phone #: (800) 854-4358
FAX #: (281) 646-8996

y Name & Address: hole Earth Environ...

#: -15

Project Name:

Location: Eunice, NM

Sampler Signature: M. [signature]

# (USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	OTHER	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	OTHER	SAMPLING: DATE	TIME	BTEX 8020/5030	TPH 418.1	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	TDS	RCI	Chlorides	DRO/GRO
96	MW-2	2		✓					✓		✓			2-27	10:04	✓								✓	✓
	**	1		X							X			2-27										✓	

Relinquished by:	Date:	Time:	Received by:
[signature]	02-28-01 ~~3-1-01~~	1320	Jeanne McMurry
Relinquished by:	Date:	Time:	Received by:
Relinquished by:	Date:	Time:	Received by Laboratory:

REMARKS: Rec 3.5°C

* Called Mike 02-27-01 @ 1340 cannot run Cl^- on preserved HCl sample

** add 4oz H_2O as per Mike 02-27-01 1400

*** No 8015 GRO/DRO as per Mike 02-27-01 @ 1410

Exhibit 13

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL, INC.
ATTN: MR. MIKE GRIFFIN
19606 SAN GABRIEL
HOUSTON, TEXAS 77084
FAX: 281-646-8996

Exhibit 14

Sample Type: Water
Sample Condition: Intact/ Iced/ HCl/ 3.5 deg. C
Project #. E-15
Project Name: None Given
Project Location: Eunice, N.M.

Sampling Date: 02/27/01
Receiving Date: 02/28/01
Analysis Date: 02/28/01

ELT#	FIELD CODE	BENZENE mg/L	TOLUENE mg/L	ETHYLBENZENE mg/L	m,p-XYLENE mg/L	o-XYLENE mg/L
37796	MW-2	<0.001	<0.001	<0.001	<0.001	<0.001
%IA		86	93	96	93	96
%EA		87	88	91	88	91
BLANK		<0.001	<0.001	<0.001	<0.001	<0.001

METHODS: EPA SW 846-8021B ,5030

Raland K. Tuttle

3-01-01
Date

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL, INC.
ATTN: MR. MIKE GRIFFIN
19606 SAN GABRIEL
HOUSTON, TEXAS 77084
FAX: 281-646-8996

Exhibit 15

Sample Type: Water
Sample Condition: Intact/ Iced/ 3.5 deg. C
Project #: E-15
Project Name: None Given
Project Location: Eunice, N.M.

Sampling Date: 02/27/01
Receiving Date: 02/28/01
Analysis Date: 03/01/01

ELT#	FIELD CODE	Chloride mg/L
37796	MW-2	886

QUALITY CONTROL	5052
TRUE VALUE	5000
% INSTRUMENT ACCURACY	101
BLANK	<10

METHODS: EPA SW 846-9253

Raland K. Tuttle

3-01-01
Date

Exhibit 16A

Send original copy by certified mail to: TDLR, P

ATTENTION OWNER: Confidentiality Privilege Notice on reverse side of Well Owner's copy (pink)

State of Texas
WELL REPORT

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
512-463-7880

1) OWNER: Rice Operating Co. (Name) ADDRESS: 122 W. Taylor (Street or RFD) Hobbs (City) NM (State) 88240 (Zip)

2) ADDRESS OF WELL'S LOCATION: County Lea; 3 S. on Hwy. 207 (Street, RFD or other) Eunice (City) NM (State) 88231 (Zip); Long. ____ Lat. ____ GRID # ____

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☒ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☒ Environmental Soil Boring ☐ Domestic ☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5) N

6) WELL LOG:
Date Drilling: Started 7/14/00 Completed 7/14/00

DIAMETER OF HOLE	Dia., (in.)	From (ft.)	To (ft.)
	6	Surface	65

7) DRILLING METHOD (Check): ☒ Air Rotary ☐ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☐ Other ____ ☐ Driven

From (ft.)	To (ft.)	Description and color of formation material
		SB-1
0	5	Sand - Red
5	30	Caliche - Tan
30	65	Sand - Red/Brown

8) Borehole Completion (Check): ☐ Open Hole ☐ Straight Wall ☐ Underreamed ☐ Gravel Packed ☐ Other ____
If Gravel Packed give interval from ____ ft to ____ ft

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc Perf., Slotted, etc Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing	Gage Screen

(Use reverse side of Well Owner's copy, if necessary)

9) CEMENTING DATA
Cemented from ____ ft. to ____ ft. No. of sacks used ____
Bentonite from 0 ft to 65 ft. No. of sacks used 13
Method used Chips
Cemented by Harrison & Cooper, Inc.
Distance to septic system field lines or other concentrated contamination ____ ft
Method of verification of above distance ____

13) ☐ Well plugged within 48 hours

Casing left in well. From (ft.)	Casing left in well. To (ft.)	Cement/bentonite placed in well: From (ft.)	Cement/bentonite placed in well: To (ft.)	Sacks used:

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed
☐ Specified Steel Sleeve Installed
☐ Pitless Adapter Used
☐ Approved Alternative Procedure Used

14) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other: ____
Depth to pump bowls, cylinder, jet, etc., ____ ft.

15) WELL TESTS:
Type test ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: ____ gpm with ____ ft. drawdown after ____ hrs

11) WATER LEVEL
Static level N/A ft. below land surface Date 7/14/00
Artesian Flow ____ gpm. Date ____

16) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? Fresh Depth of strata N/A
Was chemical analysis made? ☐ Yes ☒ No

12) PACKERS: Type ____ Depth ____

I certify that I drilled this well (or the well was drilled under my direct supervision) and that each and all of the statements herein are true and correct. I understand that failure to complete items 1 thru 16 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Claiborne Harrison (Type or Print) WELL DRILLER'S LICENSE NO. WD-1271

ADDRESS 7202 66th St. (Street or RFD) Lubbock (City) TX (State) 79407 (Zip)

(Signed) ____ (Licensed Well Driller) (Signed) ____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available

Exhibit 16B

Send original copy by certified mail to: TDLR, P.O.

ATTENTION OWNER: *Confidentiality Privilege Notice on reverse side of Well Owner's copy (pink)*

State of Texas
WELL REPORT

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
512-463-7880

1) OWNER: Rice Operating Co. (Name) ADDRESS: 122 W. Taylor (Street or RFD) Hobbs (City) NM (State) 88240 (Zip)

2) ADDRESS OF WELL'S LOCATION: County Lea — 3 S. on Hwy. 207 (Street, RFD or other) Eunice (City) NM (State) 88231 (Zip) Long. ____ Lat. ____ GRID # ____

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☒ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☒ Environmental Soil Boring ☐ Domestic ☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5)

6) WELL LOG:
Date Drilling Started 7/14/00 Completed 7/14/00

DIAMETER OF HOLE		
Dia. (in.)	From (ft.)	To (ft.)
6	Surface	70

7) DRILLING METHOD (Check): ☐ Driven ☒ Air Rotary ☐ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☐ Other

N

From (ft.)	To (ft.)	Description and color of formation material
		SB-2
0	5	Sand - Red
5	30	Caliche - Tan
30	70	Sand - Red/Brown

8) Borehole Completion (Check): ☐ Open Hole ☐ Straight Wall ☐ Underreamed ☐ Gravel Packed ☐ Other
If Gravel Packed give interval from ____ ft. to ____ ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc Perf., Slotted, etc Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casting Screen

(Use reverse side of Well Owner's copy, if necessary)

13) ☐ Well plugged within 48 hours.

Casing left in well. From (ft)	Casing left in well. To (ft)	Cement/bentonite placed in well: From (ft)	Cement/bentonite placed in well: To (ft)	Sacks used:

9) CEMENTING DATA
Cemented from ____ ft. to ____ ft. No. of sacks used ____
Bentonite from 0 ft. to 70 ft. No. of sacks used 14
Method used Chips
Cemented by Harrison & Cooper, Inc.
Distance to septic system field lines or other concentrated contamination ____ ft
Method of verification of above distance ____

14) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other: ____
Depth to pump bowls, cylinder, jet, etc. ____ ft.

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed
☐ Specified Steel Sleeve Installed
☐ Pitless Adapter Used
☐ Approved Alternative Procedure Used

15) WELL TESTS:
Type test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: ____ gpm with ____ ft. drawdown after ____ hrs.

11) WATER LEVEL
Static level N/A ft. below land surface Date 7/14/00
Artesian Flow ____ gpm. Date ____

16) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? Fresh Depth of strata N/A
Was chemical analysis made? ☐ Yes ☒ No

12) PACKERS: Type ____ Depth ____

I certify that I drilled this well (or the well was drilled under my direct supervision) and that each and all of the statements herein are true and correct. I understand that failure to complete items 1 thru 16 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Claiborne Harrison (Type or Print) WELL DRILLER'S LICENSE NO. WD-1271

ADDRESS 7202 66th St. (Street or RFD) Lubbock (City) TX (State) 79407 (Zip)

(Signed) ____ (Licensed Well Driller) (Signed) ____ (Registered Driller)

Please attach electric log, chemical analysis, and other pertinent information, if available.

Exhibit 16C

Send original copy by certified mail to: TDLR, P.O.

ATTENTION OWNER: *Confidentiality Privilege Notice on reverse side of Well Owner's copy (pink)*

State of Texas
WELL REPORT

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
512-463-7880

1) OWNER: Rice Operating Co. (Name) ADDRESS: 122 W. Taylor (Street or RFD) Hobbs (City) NM (State) 88240 (Zip)

2) ADDRESS OF WELL'S LOCATION: County Lea — 3 S. on Hwy. 207 (Street, RFD or other) — Eunice (City) — NM (State) — 88231 (Zip) — Long. — Lat — GRID #

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☒ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☒ Environmental Soil Boring ☐ Domestic ☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5)

6) WELL LOG:
Date Drilling: Started 7/14/00 Completed 7/14/00

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
6	Surface	60

7) DRILLING METHOD (Check): ☐ Driven ☒ Air Rotary ☐ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☐ Other

N

From (ft.)	To (ft.)	Description and color of formation material
		SB-3
0	5	Sand - Red
5	30	Caliche - Tan
30	60	Sand - Red/Brown

8) Borehole Completion (Check): ☐ Open Hole ☐ Straight Wall ☐ Underreamed ☐ Gravel Packed ☐ Other
If Gravel Packed give interval from ____ ft to ____ ft

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc Perf., Slotted, etc Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing	Gage Screen

(Use reverse side of Well Owner's copy, if necessary)

9) CEMENTING DATA
Cemented from ____ ft. to ____ ft. No. of sacks used ____
Bentonite from 0 ft. to 60 ft. No. of sacks used 12
Method used Chips
Cemented by Harrison & Cooper, Inc.
Distance to septic system field lines or other concentrated contamination ____ ft
Method of verification of above distance ____

13) ☐ Well plugged within 48 hours

Casing left in well: From (ft)	To (ft)	Cement/bentonite placed in well: From (ft)	To (ft)	Sacks used:

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed
☐ Specified Steel Sleeve Installed
☐ Pitless Adapter Used
☐ Approved Alternative Procedure Used

14) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other
Depth to pump bowls, cylinder, jet, etc., ____ ft

15) WELL TESTS:
Type test ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: ____ gpm with ____ ft. drawdown after ____ hrs

11) WATER LEVEL
Static level N/A ft. below land surface Date 7/14/00
Artesian Flow ____ gpm. Date ____

16) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? Fresh Depth of strata N/A
Was chemical analysis made? ☐ Yes ☒ No

12) PACKERS: Type Depth

I certify that I drilled this well (or the well was drilled under my direct supervision) and that each and all of the statements herein are true and correct. I understand that failure to complete items 1 thru 16 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Claiborne Harrison (Type or Print) WELL DRILLER'S LICENSE NO. WD-1271

ADDRESS 7202 66th St. (Street or RFD) Lubbock (City) TX (State) 79407 (Zip)

(Signed) ____ (Licensed Well Driller) (Signed) ____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

TDLR FORM 001WWD (4/98) *Copies to TDLR, DRILLER, and WELL OWNER* Form provided by Forms On-A-Disk, Inc. Dallas, Texas • (214) 340-9429

Exhibit 16D

Send original copy by certified mail to: TDLR, P.C

ATTENTION OWNER: *Confidentiality Privilege Notice on reverse side of Well Owner's copy (pink)*

State of Texas
WELL REPORT

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
512-463-7880

1) OWNER (Name) Rice Operating Co. ADDRESS (Street or RFD) 122 W. Taylor (City) Hobbs (State) NM (Zip) 88240

2) ADDRESS OF WELL'S LOCATION: County Lea (Street, RFD or other) 3 S. on Hwy. 207 (City) Eunice (State) NM (Zip) 88231 Long. ____ Lat. ____ GRID # ____

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☒ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☒ Environmental Soil Boring ☐ Domestic ☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5) N

6) WELL LOG:
Date Drilling: Started 7/14/00 Completed 7/14/00

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
6	Surface	60

7) DRILLING METHOD (Check): ☐ Driven ☒ Air Rotary ☐ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☐ Other ____

From (ft.)	To (ft.)	Description and color of formation material
		SB-4
0	5	Sand - Red
5	30	Caliche - Tan
30	60	Sand - Red/Brown

(Use reverse side of Well Owner's copy, if necessary)

8) Borehole Completion (Check): ☐ Open Hole ☐ Straight Wall ☐ Underreamed ☐ Gravel Packed ☐ Other ____
If Gravel Packed give interval from ____ ft. to ____ ft

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc Perf., Slotted, etc Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing	Gage Screen

9) CEMENTING DATA
Cemented from ____ ft. to ____ ft. No. of sacks used ____
Bentonite from 0 ft. to 60 ft. No. of sacks used 12
Method used Chips
Cemented by Harrison & Cooper, Inc.
Distance to septic system field lines or other concentrated contamination ____ ft
Method of verification of above distance ____

13) ☐ Well plugged within 48 hours

Casing left in well: From (ft)	Casing left in well: To (ft)	Cement/bentonite placed in well: From (ft)	Cement/bentonite placed in well: To (ft)	Sacks used:

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed
☐ Specified Steel Sleeve Installed
☐ Pitless Adapter Used
☐ Approved Alternative Procedure Used

14) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other ____
Depth to pump bowls, cylinder, jet, etc., ____ ft

11) WATER LEVEL
Static level N/A ft. below land surface Date 7/14/00
Artesian Flow ____ gpm. Date ____

15) WELL TESTS:
Type test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: ____ gpm with ____ ft. drawdown after ____ hrs

12) PACKERS: Type ____ Depth ____

16) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? Fresh Depth of strata N/A
Was chemical analysis made? ☐ Yes ☒ No

I certify that I drilled this well (or the well was drilled under my direct supervision) and that each and all of the statements herein are true and correct. I understand that failure to complete items 1 thru 16 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Claiborne Harrison (Type or Print) WELL DRILLER'S LICENSE NO. WD-1271

ADDRESS 7202 66th St (Street or RFD) Lubbock (City) TX (State) 79407 (Zip)

(Signed) ____ (Licensed Well Driller) (Signed) ____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available

Form provided by Forms On-A-Disk, Inc.
Dallas, Texas - (214) 340-9429

Exhibit 16E

Send original copy by certified mail to: TDLR, P.O

ATTENTION OWNER: *Confidentiality Privilege Notice on reverse side of Well Owner's copy (pink)*

State of Texas
WELL REPORT

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
512-463-7880

1) OWNER (Name): Rice Operating Co. ADDRESS (Street or RFD): 122 W. Taylor (City): Hobbs (State): NM (Zip): 88240

2) ADDRESS OF WELL'S LOCATION: County: Lea (Street, RFD or other): 3 S. on Hwy. 207 (City): Eunice (State): NM (Zip): 88231 Long. ____ Lat. ____ GRID # ____

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☒ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☒ Environmental Soil Boring ☐ Domestic ☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5)

6) WELL LOG:
Date Drilling: Started 7/14/00 Completed 7/14/00

DIAMETER OF HOLE		
Dia. (in.)	From (ft.)	To (ft.)
6	Surface	60

7) DRILLING METHOD (Check): ☐ Driven ☒ Air Rotary ☐ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☐ Other ____

N

From (ft.)	To (ft.)	Description and color of formation material
		SB-5
0	5	Sand - Red
5	30	Caliche - Tan
30	60	Sand - Red/Brown

(Use reverse side of Well Owner's copy, if necessary)

8) Borehole Completion (Check): ☐ Open Hole ☐ Straight Wall ☐ Underreamed ☐ Gravel Packed ☐ Other ____
If Gravel Packed give interval from ____ ft. to ____ ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc Perf., Slotted, etc Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing	Gage Screen

9) CEMENTING DATA
Cemented from ____ ft. to ____ ft. No. of sacks used ____
Bentonite from 0 ft. to 60 ft. No. of sacks used 12
Method used Chips
Cemented by Harrison & Cooper, Inc.
Distance to septic system field lines or other concentrated contamination ____ ft.
Method of verification of above distance ____

13) ☐ Well plugged within 48 hours.

Casing left in well: From (ft)	Casing left in well: To (ft)	Cement/bentonite placed in well: From (ft)	Cement/bentonite placed in well: To (ft)	Sacks used:

14) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other: ____
Depth to pump bowls, cylinder, jet, etc.. ____ ft.

15) WELL TESTS:
Type test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: ____ gpm with ____ ft. drawdown after ____ hrs

16) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? Fresh Depth of strata N/A
Was chemical analysis made? ☐ Yes ☒ No

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed
☐ Specified Steel Sleeve Installed
☐ Pitless Adapter Used
☐ Approved Alternative Procedure Used

11) WATER LEVEL
Static level N/A ft. below land surface Date 7/14/00
Artesian Flow ____ gpm. Date ____

12) PACKERS: Type ____ Depth ____

I certify that I drilled this well (or the well was drilled under my direct supervision) and that each and all of the statements herein are true and correct. I understand that failure to complete items 1 thru 16 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME (Type or Print): Claiborne Harrison WELL DRILLER'S LICENSE NO. WD-1271

ADDRESS (Street or RFD): 7202 66th St (City): Lubbock (State): TX (Zip): 79407

(Signed) ____ (Licensed Well Driller) (Signed) ____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available

TDLR FORM 001WWD (4/98) Copies to TDLR, DRILLER, and WELL OWNER

Form provided by Forms On-A-Disk, Inc.
Dallas, Texas • (214) 340-9429

Exhibit 16F

Send original copy by certified mail to: TDLR, P.O. Box

ATTENTION OWNER: *Confidentiality Privilege Notice on reverse side of Well Owner's copy (pink)*

State of Texas
WELL REPORT

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
512-463-7880

1) OWNER: Rice Operating Co. (Name) ADDRESS: 122 W. Taylor (Street or RFD) Hobbs (City) NM (State) 88240 (Zip)

2) ADDRESS OF WELL'S LOCATION: County Lea; 3 S. on Hwy. 207 (Street, RFD or other); Eunice (City); NM (State); 88231 (Zip); Long. ____ Lat. ____ GRID # ____

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☒ Plugging

4) PROPOSED USE (Check): ☐ Monitor ☒ Environmental Soil Boring ☐ Domestic ☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell

If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5)

6) WELL LOG:

Date Drilling: Started 7/14/00 Completed 7/14/00

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
6	Surface	60

7) DRILLING METHOD (Check): ☒ Air Rotary ☐ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☐ Other ____ ☐ Driven

N

From (ft.)	To (ft.)	Description and color of formation material
		SB-6
0	5	Sand - Red
5	30	Caliche - Tan
30	60	Sand - Red/Brown

8) Borehole Completion (Check): ☐ Open Hole ☐ Straight Wall ☐ Underreamed ☐ Gravel Packed ☐ Other ____

If Gravel Packed give interval from ____ ft. to ____ ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc Perf., Slotted, etc Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen

(Use reverse side of Well Owner's copy, if necessary)

13) ☐ Well plugged within 48 hours

Casing left in well: From (ft)	To (ft)	Cement/bentonite placed in well: From (ft)	To (ft)	Sacks used:

9) CEMENTING DATA

Cemented from ____ ft. to ____ ft. No. of sacks used ____

Bentonite from 0 ft. to 60 ft. No. of sacks used 12

Method used Chips

Cemented by Harrison & Cooper, Inc.

Distance to septic system field lines or other concentrated contamination ____ ft.

Method of verification of above distance ____

14) TYPE PUMP:

☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other ____

Depth to pump bowls, cylinder, jet, etc. ____ ft.

15) WELL TESTS:

Type test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated

Yield: ____ gpm with ____ ft. drawdown after ____ hrs

10) SURFACE COMPLETION

☐ Specified Surface Slab Installed
☐ Specified Steel Sleeve Installed
☐ Pitless Adapter Used
☐ Approved Alternative Procedure Used

11) WATER LEVEL

Static level N/A ft. below land surface Date 7/14/00

Artesian Flow ____ gpm. Date ____

16) WATER QUALITY:

Did you knowingly penetrate any strata which contained undesirable constituents?

☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"

Type of water? Fresh Depth of strata N/A

Was chemical analysis made? ☐ Yes ☒ No

12) PACKERS:

Type	Depth

I certify that I drilled this well (or the well was drilled under my direct supervision) and that each and all of the statements herein are true and correct. I understand that failure to complete items 1 thru 16 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Claiborne Harrison (Type or Print) WELL DRILLER'S LICENSE NO. WD-1271

ADDRESS 7202 66th St. (Street or RFD) Lubbock (City) TX (State) 79407 (Zip)

(Signed) ____ (Licensed Well Driller)

(Signed) ____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available

Form provided by Forms On-A-Disk, Inc. Dallas, Texas - (214) 340-9429

Exhibit 16G

Send original copy by certified mail to: TDLR, P.O.

ATTENTION OWNER: *Confidentiality Privilege Notice on reverse side of Well Owner's copy (pink)*

State of Texas
WELL REPORT

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
512-463-7880

1) OWNER: Rice Operating Co. (Name) ADDRESS: 122 W. Taylor (Street or RFD) Hobbs (City) NM (State) 88240 (Zip)

2) ADDRESS OF WELL'S LOCATION: County Lea; 3 S. on Hwy. 207 (Street, RFD or other); Eunice (City); NM (State); 88231 (Zip); Long. ; Lat. ; GRID #

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic ☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5) N

6) WELL LOG:
Date Drilling: Started 1/22/01 Completed 1/22/01

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
5	Surface	99

7) DRILLING METHOD (Check): ☐ Driven ☒ Air Rotary ☐ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☐ Other

From (ft.)	To (ft.)	Description and color of formation material
		MW-1
0	5	Sand - Red
5	30	Caliche - Tan
30	78	Sand - Red/Brown
78	81	Sandstone - Tan
81	97	Clay - Red
97	99	Clayey Gravel - Tan

(Use reverse side of Well Owner's copy, if necessary)

8) Borehole Completion (Check): ☐ Open Hole ☐ Straight Wall ☐ Underreamed ☒ Gravel Packed ☐ Other 16/30 Filter Sand
If Gravel Packed give interval from 60 ft. to 99 ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc Perf., Slotted, etc Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing	Gage Screen
2	N	PVC Solid	0	65		
2	N	PVC Slotted	65	85		0.010

9) CEMENTING DATA
Cemented from 0 ft. to 3 ft. No. of sacks used 5
Bentonite from 3 ft. to 60 ft. No. of sacks used 14
Method used Slurry
Cemented by Harrison & Cooper, Inc.
Distance to septic system field lines or other concentrated contamination ____ ft.
Method of verification of above distance

13) ☐ Well plugged within 48 hours

Casing left in well From (ft.)	Casing left in well To (ft.)	Cement/bentonite placed in well From (ft.)	Cement/bentonite placed in well To (ft.)	Sacks used

10) SURFACE COMPLETION
☒ Specified Surface Slab Installed
☐ Specified Steel Sleeve Installed
☐ Pitless Adapter Used
☐ Approved Alternative Procedure Used

14) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other
Depth to pump bowls, cylinder, jet, etc. ft.

15) WELL TESTS:
Type test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield. gpm with ft. drawdown after hrs.

11) WATER LEVEL
Static level 78 ft. below land surface Date 1/22/01
Artesian Flow gpm Date

16) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☒ Yes ☐ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? Fresh Depth of strata 78'
Was chemical analysis made? ☐ Yes ☒ No

12) PACKERS: Type Depth

I certify that I drilled this well (or the well was drilled under my direct supervision) and that each and all of the statements herein are true and correct. I understand that failure to complete items 1 thru 16 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Claiborne Harrison (Type or Print) WELL DRILLER'S LICENSE NO. WD-1271

ADDRESS 7202 66th St. (Street or RFD) Lubbock (City) TX (State) 79407 (Zip)

(Signed) (Licensed Well Driller) (Signed) (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available

TDLR FORM 001WWD (4/98) *Copies to TDLR, DRILLER, and WELL OWNER*

Form provided by Forms On-A-Disk, Inc.
Dallas, Texas • (214) 340-9429

Exhibit 16H

Send original copy by certified mail to: TDLR, P.O. I

ATTENTION OWNER: *Confidentiality Privilege Notice on reverse side of Well Owner's copy (pink)*

State of Texas
WELL REPORT

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
512-463-7880

1) OWNER: Rice Operating Co. (Name) ADDRESS: 122 W. Taylor (Street or RFD) Hobbs (City) NM (State) 88240 (Zip)

2) ADDRESS OF WELL'S LOCATION: County Lea — 3 S. on Hwy. 207 (Street, RFD or other) — Eunice (City) — NM (State) — 88231 (Zip) — Long. ____ Lat. ____ GRID # ____

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic ☐ Industrial ☐ Irrigation ☐ Injection ☐ Public Supply ☐ De-watering ☐ Testwell
If Public Supply well, were plans submitted to the TNRCC? ☐ Yes ☐ No

5)

6) WELL LOG:
Date Drilling
Started 1/22/01
Completed 1/22/01

DIAMETER OF HOLE

Dia.. (in.)	From (ft.)	To (ft.)
5	Surface	99

7) DRILLING METHOD (Check): ☐ Driven ☒ Air Rotary ☐ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☐ Other ____

N

From (ft.)	To (ft.)	Description and color of formation material
		MW-2
0	5	Sand - Red
5	30	Caliche - Tan
30	78	Sand - Red/Brown
78	79	Sandstone - Tan
79	97	Clay - Red
97	99	Clayey Gravel - Tan

8) Borehole Completion (Check): ☐ Open Hole ☐ Straight Wall ☐ Underreamed ☒ Gravel Packed ☐ Other 16/30 Filter Sand
If Gravel Packed give interval from 70 ft. to 99 ft

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc Perf., Slotted, etc Screen Mfg., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
2	N	PVC Solid	0	76	
2	N	PVC Slotted	76	97	0.010

(Use reverse side of Well Owner's copy, if necessary)

13) ☐ Well plugged within 48 hours

Casing left in well: From (ft)	To (ft)	Cement/bentonite placed in well: From (ft)	To (ft)	Sacks used.

9) CEMENTING DATA
Cemented from 0 ft. to 3 ft. No. of sacks used 5
Bentonite from 3 ft. to 70 ft. No. of sacks used 11
Method used Slurry
Cemented by Harrison & Cooper, Inc.
Distance to septic system field lines or other concentrated contamination ____ ft
Method of verification of above distance ____

14) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other ____
Depth to pump bowls, cylinder, jet, etc., ____ ft.

10) SURFACE COMPLETION
☒ Specified Surface Slab Installed
☐ Specified Steel Sleeve Installed
☐ Pitless Adapter Used
☐ Approved Alternative Procedure Used

15) WELL TESTS:
Type test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: ____ gpm with ____ ft drawdown after ____ hrs

11) WATER LEVEL
Static level N/A ft below land surface Date 1/22/01
Artesian Flow ____ gpm. Date ____

16) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
☐ Yes ☒ No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? Fresh Depth of strata N/A
Was chemical analysis made? ☐ Yes ☒ No

12) PACKERS: Type ____ Depth ____

I certify that I drilled this well (or the well was drilled under my direct supervision) and that each and all of the statements herein are true and correct. I understand that failure to complete items 1 thru 16 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Claiborne Harrison (Type or Print) WELL DRILLER'S LICENSE NO. WD-1271

ADDRESS 7202 66th St. (Street or RFD) Lubbock (City) TX (State) 79407 (Zip)

(Signed) ____ (Licensed Well Driller) (Signed) ____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

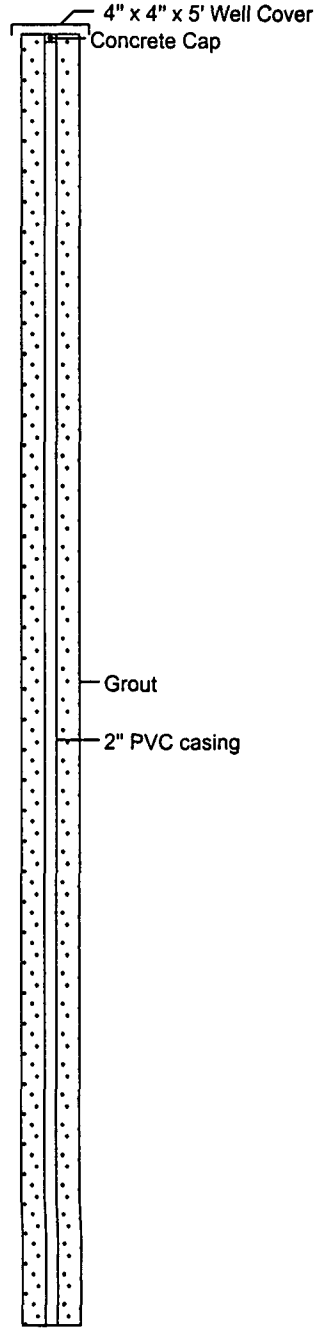
Exhibit 16I

Atkins Engineering Associates, Inc. 2904 W. 2nd St., Roswell, NM 88202-3156	LOG OF BORING Rice Operating MW-3 (Page 1 of 2)

Whole Earth Environmental 19606 San Gabriel Houston, TX 77084			
Contact: Mike Griffin			
Job#: EUNICEG.MWD.01			
Date	: 05-08 & 05-09-01	Site Location	: SE Eunice, NM
Drill Start	: a.m.		: Sec. 15, T22S, R37E
Drill End	: 12:00	Auger Type	: Hollow Stem
Boring Location	: 3¼ mi SE of Eunice & ½ mi E	Logged By	: Mort Bates

Depth in Feet	GRAPHIC	USCS	Samples	DESCRIPTION	Lab	PID ppm-v
0		SP		Sand, reddish tan, loose, dry		
5		SM		Sand w/ caliche, tan, loose, dry		
10						
15						
20						
25		SM		Silty sand w/ caliche, reddish, tan, loose, dry		
30						
35						
40				Caliche, tan, hard, dry		
45						
50		SM		Sand w/ caliche, tan, firm, dry		
55						

Well: MW-3

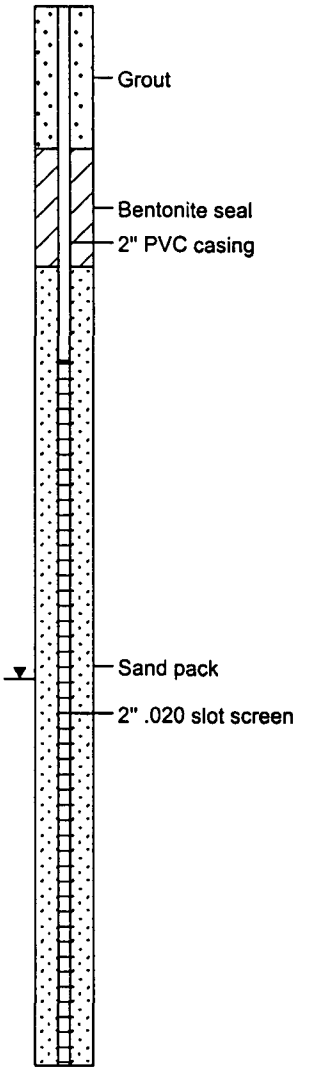


05-14-2001 C:\MTECH46\EUNICEGMWD01\mw-3.bor

Atkins Engineering Associates, Inc. 2904 W. 2nd St., Roswell, NM 88202-3156	LOG OF BORING Rice Operating MW-3 (Page 2 of 2)

Whole Earth Environmental 19606 San Gabriel Houston, TX 77084	Date	: 05-08 & 05-09-01	Site Location : SE Eunice, NM
	Drill Start	: a.m.	: Sec. 15, T22S, R37E
	Drill End	: 12:00	Auger Type : Hollow Stem
Contact: Mike Griffin	Boring Location	: 3¼ mi SE of Eunice & ½ mi E	Logged By : Mort Bates
Job#: EUNICEG.MWD.01			

Depth in Feet	GRAPHIC	USCS	Samples	DESCRIPTION	Lab	PID ppm-v
55		SM		Sand w/ caliche, tan, firm, dry		
60						
65						
70						
75		SS		Sandstone, tan, hard, dry		
80		SP		Sand, tan, soft, moist		
		SS		Broken sandstone, tan, firm, moist		
85		SP		Sand, tan, soft, wet		
90						
95						
100				TD 100' WL 83.55'		
105						
110						



05-14-2001 C:\MTECH46\EUNICEGMWD01\mw-3.bor

Exhibit 16J

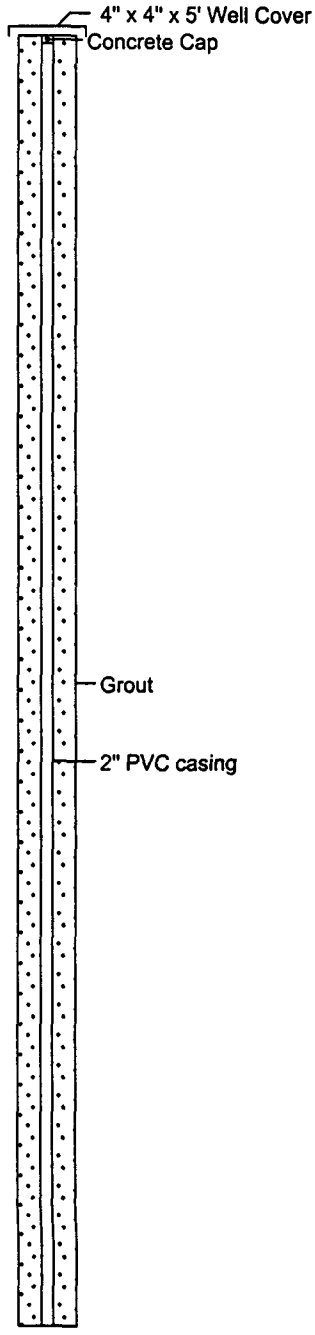
Atkins Engineering Associates, Inc. 2904 W. 2nd St., Roswell, NM 88202-3156	LOG OF BORING Rice Operating MW-4 (Page 1 of 2)

Whole Earth Environmental
19606 San Gabriel
Houston, TX 77084
Contact: Mike Griffin
Job#: EUNICEG.MWD.01

Date	: 05-11-01	Site Location	: SE Eunice, NM
Drill Start/End	: 0900/1500		: Sec. 15, T22S, R37E
Boring Location	: 3 mi. S. Eunice &	Auger Type	: Hollow Stem
	: 1/4 mi. East	Logged By	: Mort Bates

Depth in Feet	GRAPHIC	USCS	Samples	DESCRIPTION	Lab	PID ppm-v
0		SP		Sand, red, loose, dry		
5		SM		Sand w/ caliche, tan, loose, dry		
10				Caliche, tan, hard, dry		
15						
20						
25						
30		SM		Sand w/ caliche, yellow, loose, dry		
35		SP		Sand, tan, loose, dry		
40		SP		Sand, tan, loose, dry		
45						
50		SP		Sand, reddish tan, loose, dry		
55						

Well: MW-4



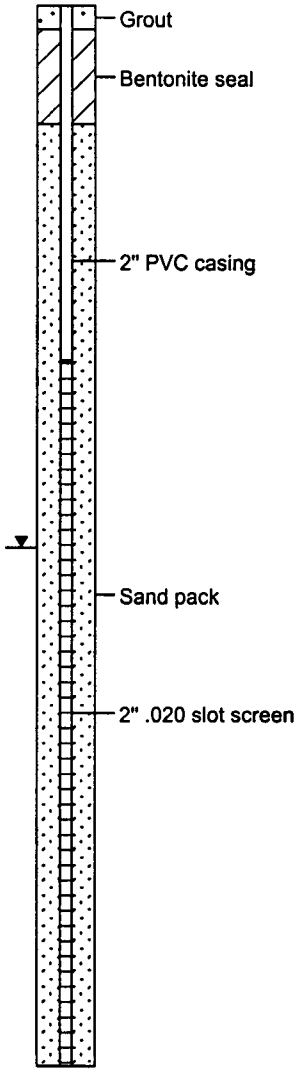
05-14-2001 C:\MTECH46\EUNICEGMWD01\mw-4.bor

Atkins Engineering Associates, Inc. 2904 W. 2nd St., Roswell, NM 88202-3156	LOG OF BORING Rice Operating MW-4 (Page 2 of 2)

Whole Earth Environmental 19606 San Gabriel Houston, TX 77084	Date	: 05-11-01	Site Location : SE Eunice, NM
	Drill Start/End	: 0900/1500	: Sec. 15, T22S, R37E
	Boring Location	: 3 mi. S. Eunice & : 1/4 mi. East	Auger Type : Hollow Stem
			Logged By : Mort Bates
Contact: Mike Griffin			
Job#: EUNICEG.MWD.01			

Depth in Feet	GRAPHIC	USCS	Samples	DESCRIPTION	Lab	PID ppm-v
55				Sand, reddish tan, loose, dry		
60		SP				
65				Sand, tan, loose, damp		
70		SP				
75						
		SP		Sand, tan, soft, wet		
80				Sand, reddish, tan, soft, wet		
		SP				
85						
				Sandy clay, red, tight, moist		
90		CL				
95						
100				TD 100' WL 78'		
105						
110						

Well: MW-4



05-14-2001 C:\MTECH46\EUNICEGMWD01\mw-4.bor

Exhibit 17

QP-28

WHOLE EARTH ENVIRONMENTAL
QUALITY PROCEDURE

Procedure for Developing Cased Water Monitoring Wells

Completed By:	Approved By:	Effective Date: / /

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 Preliminary

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 and subsequently reported within the driller's boring log report.

3.3 All equipment used to measure the static water level will be decontaminated after each use by means of Alconox, 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 removing a minimum of three well casing volumes by using a 2" decontaminated submersible pump or dedicated one liter Teflon bailer.

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 an Alconox-water mixture, pumping an Alconox-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 60 gallon portable tank and then pumped into a permanent storage tank to be later disposed of in an appropriate manner.

6.0 Records

6.1 Whole Earth 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.

Exhibit 18

QP-76 (Rev. A)

WHOLE EARTH ENVIRONMENTAL
QUALITY PROCEDURE

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

Completed By: Approved By: Effective Date: / /

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	clear 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 site schematics. Place pre-labeled jar(s) next to the well. Remove the bolts from the well cover and place the cover with the bolts nearby. Remove the plastic cap from the well bore by first lifting the metal lever and then unscrewing the entire assembly.

5.2 The well may be equipped with an individual 1 liter bailing tube. If so, use the tube to bail a volume of water from the well bore equal to 10 liters for each 5' of well bore in the water table. (This assumes a 2" dia. well bore).

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 collection 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. Client, Project and sample name.
B. Signed copy of the original Chain of Custody Form including data on 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

Environmental Lab of Texas, Inc.

12600 West I-20 East
Odessa, Texas 79763
Phone: 915-563-1800
Fax: 915-563-1713

Exhibit 19

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Griffin
Company Name: Whole Earth Environ.
Company Address: 19606 San Gabriel
City/State/Zip: Houston, Tx. 77084
Telephone No: 800-854-4358
Fax No:
Sampler Signature: M. Griffin

Project Name: E-15
Project #:
Project Loc: Eunice, NM
PO #:

LAB # (lab use only)	FIELD CODE	Date Sampled	Time Sampled	No. of Containers	Preservative: Ice	HNO3	HCl	NaOH	H2SO4	None	Other (Specify)	Matrix: Water	Sludge	Soil	Other (specify)	Analyze For: TCLP / TOTAL: TDS / Cl / SAR / EC	TPH 418.1	TPH TX 1005/1006	TPH 8015M GRO/DRO	Metals: As Ag Ba Cd Cr Pb Hg Se	Volatiles	Semivolatiles	BTEX 8021B/5030	Chlorides	RUSH TAT (Pre-Schedule)	Standard TAT
40425	MW-3	5-23	3:45	1	✓	✓						✓											✓	✓		
1				1	✓							✓														
40426	MW-4	"	2:20	1	✓	✓						✓											✓			
1		"		1	✓							✓												✓		

Special Instructions:

Sample Containers Intact? (Y) N
Temperature Upon Receipt: 1.5 °C
Laboratory Comments:

Relinquished by:	Date	Time	Received by	Date	Time
M. Griffin	5-24-01	3:00			
Relinquished by:	Date	Time	Received by ELOT	Date	Time
			Joanne McMurrey	5-24-01	1500

Jun 01 01 12:12p

p.4

Exhibit 19A

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL
ATTN: MR. MIKE GRIFFIN
19606 SAN GABRIEL
HOUSTON, TEXAS 77084
FAX: 281-646-8996

Sample Type: Water
Sample Condition: Intact/Iced/ 1.5 deg C
Project #: None Given
Project Name: E-15
Project Location: Eunice, N.M.

Sampling Date: 05/23/01
Receiving Date: 05/24/01
Analysis Date: 05/29/01

ELT#	FIELD CODE	Chloride mg/L
40425	MW-3	1312
40426	MW-4	674
	QUALITY CONTROL	5140
	TRUE VALUE	5000
	% INSTRUMENT ACCURACY	103
	BLANK	<10

Methods: EPA SW 846-9253

Raland K. Tuttle

5-29-01
Date

ENVIRONMENTAL LAB OF , INC.

Exhibit 19B

"Don't Treat Your Soil Like Dirt!"

WHOLE EARTH ENVIRONMENTAL INC.
ATTN: MR. MIKE GRIFFIN
19606 SAN GABRIEL
HOUSTON, TEXAS 77084
FAX: 281-646-8996

Sample Type: Water
Sample Condition: Intact/ Iced/ HCl/ 1.5 deg. C
Project #: None Given
Project Name: E-15
Project Location: Eunice, N.M.

Sampling Date: 05/23/01
Receiving Date: 05/24/01
Analysis Date: 05/24/01

ELT#	FIELD CODE	BENZENE mg/L	TOLUENE mg/L	ETHYLBENZENE mg/L	m,p-XYLENE mg/L	o-XYLENE mg/L
40425	MW-3	<0.001	<0.001	<0.001	<0.001	<0.001
40426	MW-4	<0.001	<0.001	<0.001	<0.001	<0.001
QUALITY CONTROL		0.094	0.093	0.096	0.191	0.099
TRUE VALUE		0.100	0.100	0.100	0.200	0.100
% INSTRUMENT ACCURACY		94	93	96	96	99
SPIKED AMOUNT		0.100	0.100	0.100	0.200	0.100
ORIGINAL SAMPLE		<0.001	<0.001	<0.001	<0.001	<0.001
SPIKE		0.096	0.094	0.098	0.193	0.100
SPIKE DUP		0.088	0.088	0.091	0.178	0.093
% EXTRACTION ACCURACY		96	94	98	96	100
BLANK		<0.001	<0.001	<0.001	<0.001	<0.001
RPD		9	6	7	8	7

METHODS: EPA SW 846-8021B ,5030

Raland K. Tuttle

5-29-01
Date

Abatement Plan

Current Site Status

The site has been fenced with four-strand barbed wire perimeter and contoured to direct any storm water run-off to the excavated area. An open excavation having the approximate dimensions of 60' X 60' X 15' remains at the center of the site. The corroded connection leading to the spill event has been repaired.

Extensive soil borings and surface testing have been employed to determine the vertical and lateral extent of soil contamination. Additional investigations included thedrilling, casing development and testing of four monitor wells. The enclosed plat map (Exhibit 7) provides an accurate, surveyed location for each such monitor well.

Abatement Options (Soil)

The site has no significant hydrocarbon contamination. The sole criteria contaminant is chlorides. The American Petroleum Association guideline, "Remediation of Salt-Affected Soils at Oil and Gas Production Facilities", (publication no. 4663, dated October 1997), lists eight potential remediation alternatives and provides a decision tree to arrive at the option most appropriate to an individual site. The following is a brief discussion of each of these options.

Natural Remediation

Under this scenario, the site would slowly revert to background concentrations through simple dilution. In some cases, halophytic (salt tolerant) plants such as rye grass may be sown at the surface to promote the movement of salt into a biotic system. The plants will eventually be harvested, grazed or allowed to simply die out and blow away resulting over time in slightly lower soil salt concentrations through the process of dilution.

This option is deemed inappropriate due to several factors. Testing has shown that the contaminant plume extends up to 70' below ground surface. Natural attenuation relies primarily on rainfall as the driver to move the salt from the various lenses. A comparison of the precipitation / pan evaporation tables enclosed as Exhibits 19 & 20 shows the area to have a negative 88" per year precipitation / evaporation ratio. Natural attenuation of this site will result in a slow but constant capillary migration of the salts both to the ground surface and the water table.

In-Situ Chemical Amendments
Under this scenario, the soils would be treated with either a solid amendment such as gypsum or liquid amendments such as calcium nitrate or potassium sulfate. The process works on the basis of ion exchange in which the electrical bond between the sodium chloride molecule and the soil platelets is broken, allowing the release of the salt into solution.

The process requires significant amounts of water. Exhibit 21 calculates the amount of calcium nitrate and water needed to achieve a target electrical conductivity (EC) result of <9mmhos/cm to be 390 barrels in solution with 1,470 barrels of water. Using a minimum 3:1 flush ratio, this method will require the injection, collection and disposal of a minimum of 7,440 barrels of brine water from a depth of 75' BGS.

Land Spreading
This treatment method requires that the soils be spread evenly over an area large enough to decrease the contaminant concentration to an acceptable level. We estimate that the site contains approximately 12-15,000 cubic yards of contaminated soils having an average chloride concentration of 1,200 ppm. Assuming an acceptance standard of 250 ppm, it will be necessary to dilute the soils at a 4.8:1 to achieve acceptance standards. This will require the addition of between 58,000–72,000 cubic yards of dilution material. Spread over a six-inch lift, the resulting spread zone will be between 87-127 acres.

This option will necessarily require excavation to a depth of 75' BGS and that replacement soils be obtained to refill the excavation.

Road Spreading
The New Mexico OCD generally does not allow salt contaminated soils to be used as road spread material. Assuming only 12,000 cubic yards of contaminated soils to be involved and further assuming the standard width of a lease road to be 40', it would require a length of almost three miles of distance to spread the soils to an average depth of 6".

This option will necessarily require excavation to a depth of 75' BGS and that replacement soils be obtained to refill the excavation.

Disposal in Landfill
This option is simply to excavate the contaminant plume and transport it to a commercial facility for disposal. Some of the contaminated materials may be mixed and diluted with replacement soils before being re-deposited within the excavation.

The main disadvantage to this method is the cost-estimated to be at least $25.00 per excavated cubic yard. Nothing will be done to remediate the contamination, it will simply be moved somewhere else.

In-Situ Soil Washing
This method was generally described in the Chemical Amendments section of this report. A variant of this method is to erect a tile and drain system in which the area is constantly flooded with fresh water later sent to disposal.

Ex-Situ Soil Washing
Soil washing requires that the plume be excavated and transported to a mobile treatment plant. The soil will then be crushed and subjected to a series of chemical treatments, rinses and drying stations.

Again, the main disadvantage is cost. Due to its' high porosity, calichi is exceedingly difficult to wash.

Encapsulation
There are two main variants to this method. The first is to mix water and a binding agent such as fly ash, lye or cement into the contaminant plume to produce a non-leachable amalgam. This amalgam would be left in place. The second is to construct an impermeable outside barrier such as clay or plastic to prevent contaminant migration.

Our protocol is based upon yet another variant of this technique. Using a risk based corrective action (RBCA) approach to the project, we propose to excavate and encapsulate the bulk of the contaminant plume within an impermeable, high-density polyethylene liner. A similar top liner will be installed and overlapped with the lower liner at a minimum depth of 5' BGS. A secondary clay liner will be installed below the polyethylene liner to insure a near zero vertical infiltration rate.

The liners serve as a vertical transmissivity barrier to the percolation of rainwater through the vadose zone. With no vertical driver, the portion of the plume lying beneath the liner will tend to remain hydrologically inactive. VADSAT modeling (Exhibits 22 & 23) indicates that the remaining plume will not pose a future threat to the environment. The detailed closure protocol, PR-62 is enclosed as Exhibit 24.

Abatement Option (Water)

The contaminant plume lies immediately adjacent to a water disposal line managed by Rice Operating Company. A windmill, temporary storage tank and ancillary equipment will be erected at the present site of MW-1. The waters underlying the site will be

pumped out and transported through existing lines to SWDW-N18. NMOCD Salt Water Disposal Order Form D-184 is included as Exhibit 25. The recovery well will be tested for chloride concentrations each quarter and will remain in service until such concentrations meet NMWQCC standards for a period of four consecutive quarters.

Abatement Plan
Exhibit Index

19. Central Southwest USA Normal Annual Total Precipitation Map

20. Western USA Mean Annual Class A Pan Evaporation Map

21. Loading Calculations Worksheet

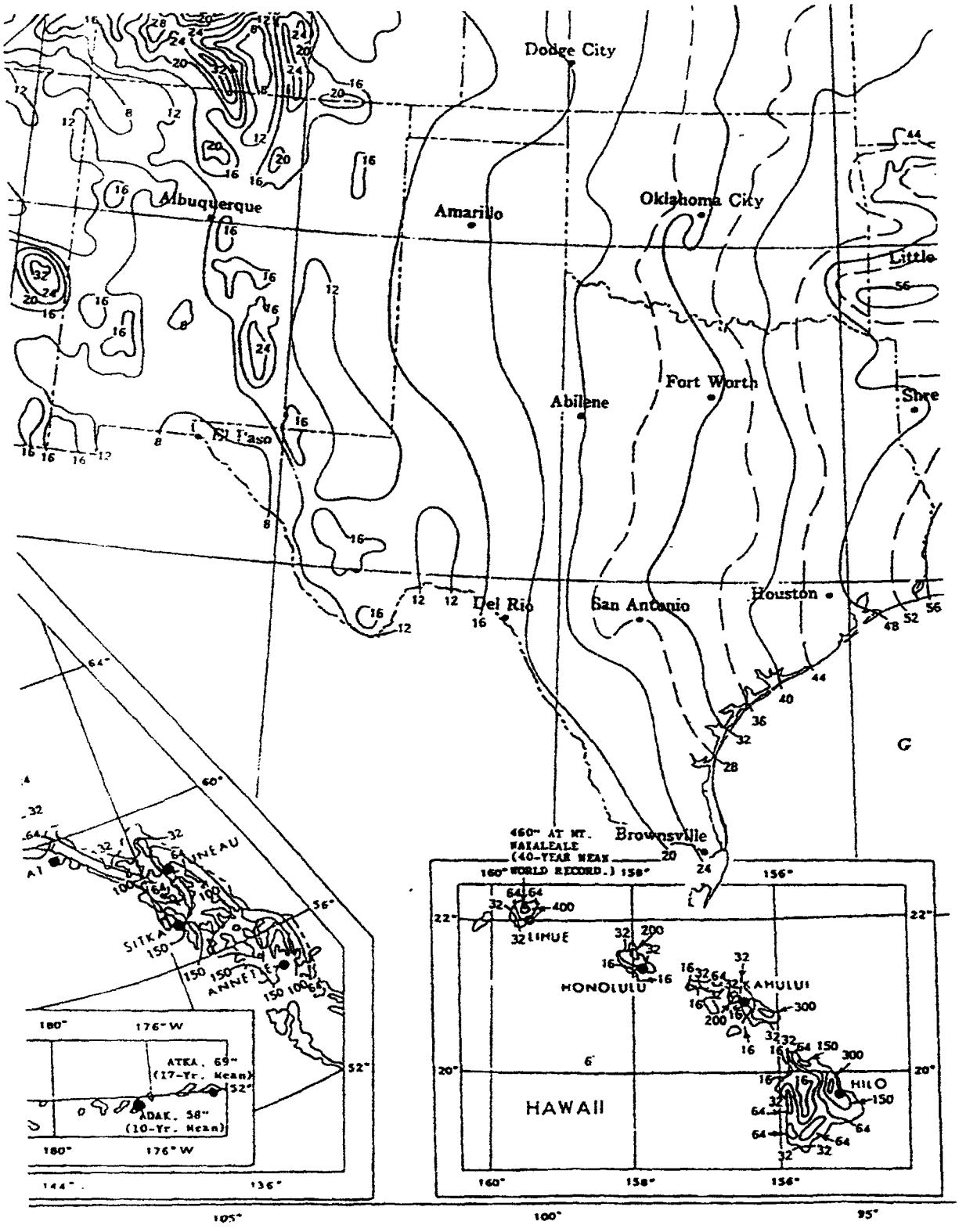
22. NaCl Migration Model Data

23. VADSAT Concentration vs. Time Probability Model

24. PR-62 Spill Remediation Protocol

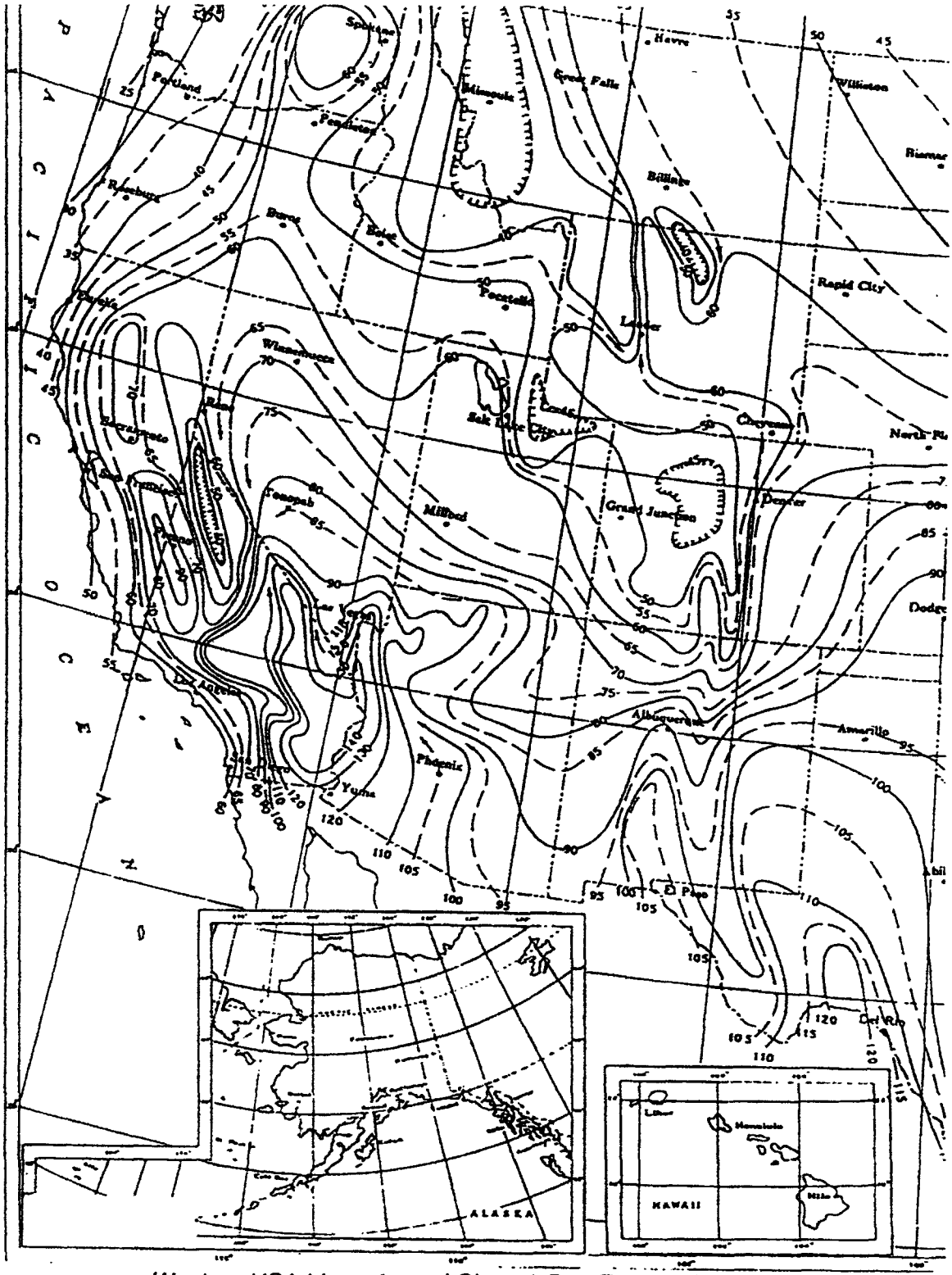
25. NMOCD Salt Water Disposal Order Form SWD-184

Exhibit 19



Central Southwest USA Normal Annual Total Precipitation Map

Exhibit 20



Western USA Mean Annual Class A Pan Evaporation Map

Exhibit 21

Rice Operating Company
J.B. E-15
Loading Calculations Worksheet

Contamination Zone Dimensions	E-15
Length	90
Width	60
Depth	75
Yd^3	15,000
Surface Acres	0.1240
Sq. Ft.	

Analytical Data	E-15
% Moisture Soil Sample	5
Solids pH (7.9)	7
Solids Electrical Conductivity (E.C.)(38.3)	38.3
Solids Cation Exchange Capacity (C.E.C.)(20.1)	20.1
Solids Exchangeable Sodium Percentage (E.S.P.)(28.6)	28.6
Sodium Adsorption Ratio (41.4)	54

Optional Values	E-15
Background E.C. (1)	1
Target E.C. (8)	9
Target S.A.R. (<12)	12
Sample Solids TPH%	0
Background TPH% (.1)	0.1
Disking Depth, (") (6)	6
Max. Spread Depth (") (1)	6

Limiting Parameters (L.P.)	E-15
Contaminant Concentration in Soil	0.00000
Background Concentration	0.00000
Target Concentration	0.00000

Wet / Dry Volume Calculations	E-15
Wet Yd^3 Solids	15,000
Dry Yd^3 Solids	14,286

Dilution Option Calculations	E-15
Additional Soils Required E.C. (Yd^3)	52,321
Additional Soils Required L.P. (Yd^3)	N / A
Acres Required for Spreading	64.8
Yd^3 to be Landspread	66,586

Gypsum Loading Calculations	E-15	Tons
Lbs. Gypsum Required	50,230	#REF!
Lbs. Sulfur Required	8,860	#REF!
Acres Required for Spreading	18.5950	
Barrels of water Required	#N/A	

$CaNO^3$ Loading Calculations	E-15
Barrels Calcium Nitrate @ 13,500 meq / L	390.0
Bbls. of Water Required	1,470
No. of Applications Required	N / A

Recommended Fertilizer Amendments	E-15
Lbs. of Nitrogen	N / A
Lbs. of Phosporus	N / A
Lbs. of Potassium	N / A
!!!OR!!!	E-15
Lbs. Ammonium Sulfate	N / A
Lbs. Concentrated Super Phosphate	N / A
Lbs. Muriate of Potash	N / A

$\frac{m}{day} \cdot \frac{day}{24 hr} \cdot \frac{hr}{60 m} \cdot \frac{m}{60 sec} = \frac{m}{s}$

$\frac{cm}{yr} \cdot \frac{yr}{365 day} \cdot \frac{inch}{2.54 cm} \cdot \frac{ft}{12 inch} = \frac{ft}{day}$

$2.9 \text{ cm/yr} = .00026 \text{ ft/day}$

Exhibit 22

Modeling Data Entry
Rice Operating Co.
Junction Box E-15
NaCl Migration Model

Control Data	Entry	U / M
Deterministic	Yes	
Final Time	73,000	Days
Time Interval	365	Days
Monte Carlo	No	
Low Permeability Layer Below Contamination	No	

Source Data		
Waste Zone Thickness	30	meters
Waste Zone Area	500	sq. meters
Ratio of Length to Width	00:00.0	
Soil Thickness Above Waste Zone	5	meter
Initial Total Concentration in Waste	2,600	ppm

Chemical Data	
NaCl	Yes

Unsaturated Zone		
Soil Database	Clay	
Hydraulic Conductivity	0.00011	meters/day
Hydrological Database	Bedded Sedimentary	
Unsaturated Zone Thickness	8	meter
Soil Database	Clay	
van Genuchten n	1.09	(Default)
Residual Water Content	0.011	
Unsaturated Zone Dispersivity	0	Internally

Saturated Zone		
Aquifer Porosity	0.2	(Default)
Longitudinal Dispersivity	0	Internally
Ratio of Long. / Trans. Dispersivities	1	
Ratio of Trans. / Vert. Dispersivities	87	
Hydrological Database	Bedded Sedimentary	
Aquifer Thickness	10	meters
Aquifer Gradient	0.00928	
Saturated Hydraulic Conductivity	0.13	meters / day

Net Infiltration Rate	0.00001	ft. / day

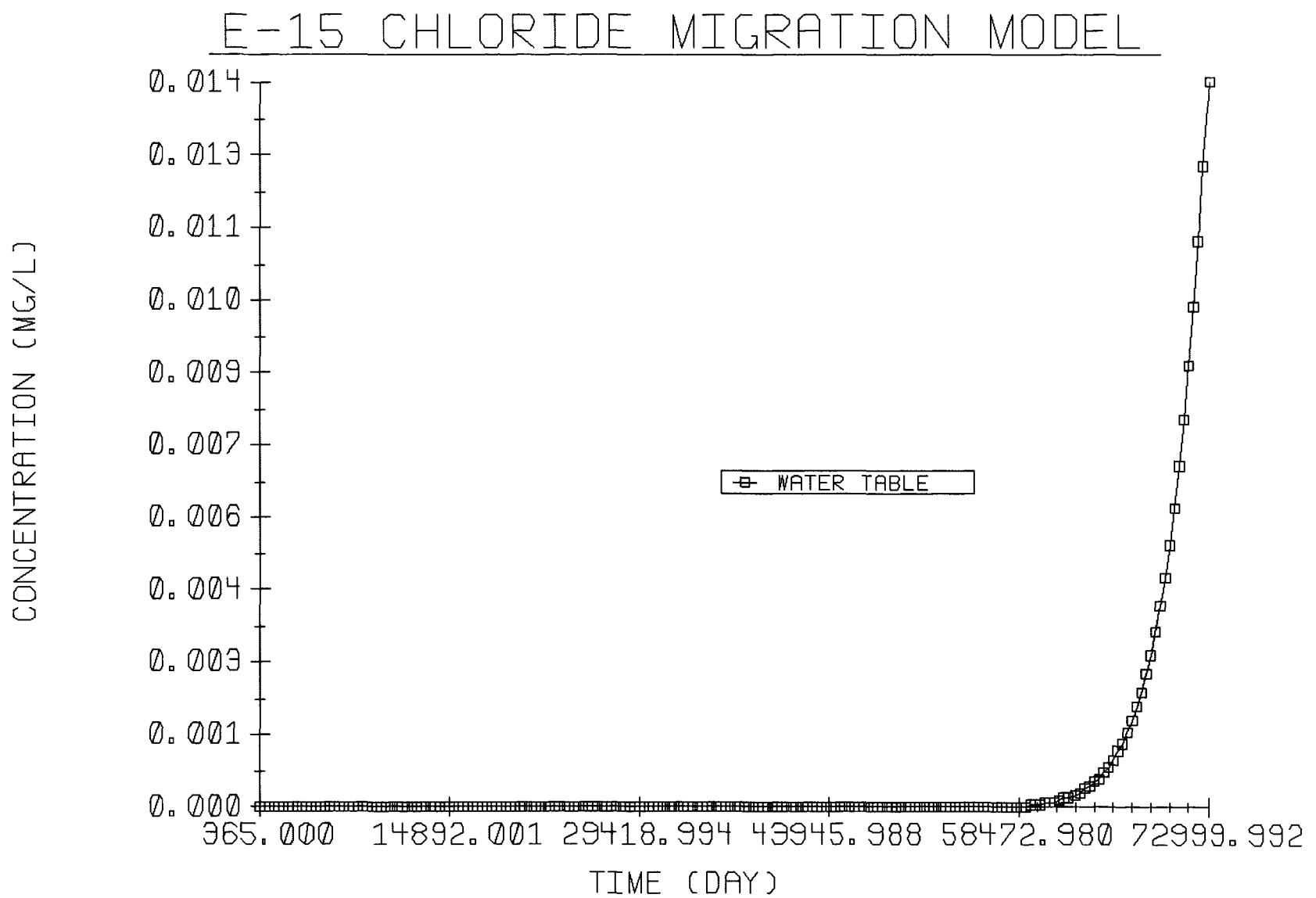

E-15 CHLORIDE MIGRATION MODEL
CONCENTRATION (MG/L)
0.014
0.013
0.011
0.010
0.009
0.007
0.006
0.004
0.003
0.001
0.000
WATER TABLE
365.000
14892.001
29418.994
43945.988
58472.980
72999.992
TIME (DAY)

Exhibit 23

Exhibit 24

PR-62

Spill Remediation Protocol
Rice Operating Co.
Junction Box E-15

1.0 Purpose

This protocol is provide a detailed outline of the steps to be employed in the remediation and final closure of a spill area adjacent to Rice Operating Co. Junction Box E-15.

2.0 Scope

This protocol is site specific.

3.0 Preliminary

Prior to any field operations, Whole Earth Environmental shall conduct the following activities:

3.1 Client Review

3.1.1 Whole Earth shall meet with cognizant personnel within Rice Operating Co. (ROC) to review this protocol and make any requested modifications or alterations prior to submittal to the State of New Mexico Oil Conservation Division.

3.1.2 Changes to this protocol will be documented and submitted for final review by ROC prior to submittal to the Oil Conservation Division.

3.2 Oil Conservation Division Review

3.2.1 Upon client approval, this protocol and associated modeling results will be submitted to the New Mexico Oil Conservation Division for review and comment. Recommended changes will be reviewed by the client prior to implementation.

3.2.2 Any recommended changes effecting costs will require a revised quotation to be issued to the client for approval prior to the commencement of any on-site remediation activity.

4.0 Safety

4.1 Prior to work on the site, Whole Earth shall obtain the location and phone numbers of the nearest emergency medical treatment facility. We will review all safety related issues with the appropriate ROC personnel, sub-contractors and exchange phone numbers.

4.2 A tailgate safety meeting shall be held and documented each day. All sub-contractors must attend and sign the daily log-in sheet.

4.3 Anyone allowed on to location must be wearing sleeved shirts, steel toed boots, and long pants. Each vehicle must be equipped with two way communication capabilities.

4.4 Prior to any excavation, the area shall be surveyed with a line finder. If lines are discovered within the area to be excavated they shall be marked with pin flags on either side of the line at maximum five foot intervals.

5.0 Excavation & Remediation

5.1 The site shall be excavated to a minimum depth of 35' BGS. All materials will be deposited immediately adjacent to the excavation.

5.2 Each of the four side-walls and bottom will be will be tested on a minimum five point composite basis for the presence and concentrations of TPH, BTEX and chlorides. The Hobbs office of the NMOCD will be alerted a minimum of twenty-four hours in advance of any sampling event. Soil samples will be collected in accordance with WEQP-77 and transported to a lab for analysis.

5.3 The sidewalls of the site shall meet the following criteria contaminant concentrations:

Benzene:	10 ppm
BTEX:	50 ppm
TPH:	100 ppm
Chlorides:	250 ppm

5.4 The bottom of the excavation must meet the benzene, BTEX, and TPH requirements specified in 5.3 and have a maximum chloride concentration of 2,000 ppm.

6.0 Clay Liner

Upon reaching a minimum depth of 35'BGS and achieving the closure standards specified within 5.4, a clay liner will be installed and compacted to a minimum depth of 12". The liner will meet or exceed 95% of a Proctor Test ASTM D-698 with a permeability (hydraulic conductivity) equal to or less than $1X10^{-7}$ cm/sec for containment / isolation of impact.

7.0 Lower Polyethylene Liner

Upon installation of the clay liner, a 20 mil polyethylene liner will be constructed to cover the contour of the excavation up to surface level. The previously excavated soils will be re-deposited within the liner to a depth no less than 5' BGL.

8.0 Upper Liner

A 20 mil high density polyethylene top liner will be installed above the excavated area and overlapped with the lower liner to prevent surface drainage into to the containment area. The surface will be covered with a minimum of 5' of fresh topsoil and contoured to match the surrounding elevations.

9.0 Recovery & Monitoring Wells

9.1 At the completion of the surface remediation portion of the project, a recovery well will be installed at the location of the existing MW-1. The recovery well will be a minimum 4" diameter and drilled at least 10' into the water table. A windmill will be erected over the well and all pumped fluids diverted to disposal well N-18.

9.2 Delineation wells will be drilled down gradient of the plume to determine the lateral extent of contamination.

10. Monitoring

10.1 The recovery well and each monitoring well will be sampled on quarterly basis for the presence and concentrations of chlorides. Final site closure will occur after the recovery well and all monitoring wells meet NMWQCC standards for a period of four consecutive quarters.

11.0 Documentation & Reporting

11.1 At the conclusion of the pit remediation project, Whole Earth will prepare a closure report to include the following information:

- A plat map of the location showing the exact location of the pit, the dimensions prior to excavation and the actual excavated dimensions.
- Photographs of the site prior to excavation, at the point of maximum excavation, liner installation details, and after final closure
- Design and construction details of the drawdown and monitoring wells.
- Design and construction details of the windmill and ancillary piping.
- Laboratory analytical results of the sidewalls and bottom of the excavation
- MSDS of the polyethylene liners
- Proctor and density tests of the clay liner.

SUBJECT: SALT WATER DISPOSAL WELL ORDER NO. SWD-134

THE APPLICATION O. AGUA, INC. FOR A SALT WATER DISPOSAL WELL.

EXHIBIT 25

N-18

ADMINISTRATIVE ORDER
OF THE OIL CONSERVATION COMMISSION

Under the provisions of Rule 701 (C) Agua, Inc. made application to the New Mexico Oil Conservation Commission on June 13, 1977 for permission to complete for salt water disposal its Blinebry-Drinkard SWD System Well No. 18 located in Unit N of Section 18, Township 22 South, Range 37 East, NMPM, Lea County, New Mexico.

The Secretary-Director finds:

1. That application has been duly filed under the provisions of Rule 701 (C) of the Commission Rules and Regulations;

2. That satisfactory information has been provided that all offset operators and surface owners have been duly notified; and

3. That the applicant has presented satisfactory evidence that all requirements prescribed in Rule 701 (C) will be met.

4. That no objections have been received within the waiting period prescribed by said rule.

IT IS THEREFORE ORDERED:

That the applicant herein, Agua, Inc. is hereby authorized to complete its Blinebry-Drinkard SWD System Well No. 18 located in Unit N of Section 18, Township 22 South, Range 37 East, NMPM, Lea County, New Mexico, in such a manner as to permit the injection of salt water for disposal purposes into the San Andres formation at approximately 4000 feet to approximately 5000 feet through 5½ inch plastic lined tubing set in an oil column extending from approximately 4000 feet to the surface.

IT IS FURTHER ORDERED:

That the operator shall take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

That the casing-tubing annulus shall be equipped with a pressure gauge at the surface or left open to the atmosphere to facilitate detection of leakage in the casing or tubing;

That injection pressures shall be limited to 800 pounds per square inch asmeasured at the surface.

That the operator shall notify the supervisor of the Commission's Hobbs District Office before injection is commenced through said well.

That the operator shall immediately notify the supervisor of the Commission's Hobbs District Office of the failure of the tubing or casing in said well or the leakage of water from or around said well and shall take such steps as may be timely or necessary to correct such failure or leakage.

PROVIDED FURTHER:

That jurisdiction of this cause is hereby retained by the Commission for such further order or orders as may seen necessary or convenient for the prevention of waste and/or protection of correlative rights; upon failure of applicant to comply with any requirement of this order after notice and hearing, the Commission may terminate the authority hereby granted in the interest of conservation. That applicant shall submit monthly reports of the disposal operation in accordance with Rule 704 and 1120 of the Commission Rules and Regulations.

APPROVED at Santa Fe, New Mexico, on this 13th day of July, 1977.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JOE D. RAMEY
Secretary-Director

S E A L

N-18
pg 2

RICE *Operating Company*

122 West Taylor • Hobbs, New Mexico 88240
Phone: (505)393-9174 • Fax: (505) 397-1471

June 5, 2001

Mr. Robert Cueto
P. O. Box 56
Eunice, NM 88231

Dear Mr. Cueto:

Enclosed please find the results of the groundwater analysis for the new monitor well and updated copies of the information submitted to the NMOCD for the accidental discharge site Jct. E-15 of the Blinebry Drinkard SWD System. Rice Operating Company (ROC) has submitted Stage I and Stage II, developed by Whole Earth Environmental, Inc. to the NMOCD for remediation plans at this site.

As events develop, you will be informed of progress. ROC appreciates your patience in the remediation at this site. If you have any observations, questions or concerns, please do not hesitate to call me at the above phone number.

Thank you,

RICE OPERATING COMPANY

Carolyn Doran Haynes

Carolyn Doran Haynes
Operations Engineer

Enclosures

cc: LBG, Whole Earth, NMOCD, file

RICE *Operating Company*

122 West Taylor • Hobbs, New Mexico 88240
Phone: (505)393-9174 • Fax: (505) 397-1471

June 5, 2001

Mr. Irvin Boyd
P. O. Box 121
Eunice, NM 88231

Dear Mr. Boyd:

Enclosed please find the results of the groundwater analysis for the new monitor well and updated copies of the information submitted to the NMOCD for the accidental discharge site Jct. E-15 of the Blinebry Drinkard SWD System. Rice Operating Company (ROC) has submitted Stage I and Stage II, developed by Whole Earth Environmental, Inc. to the NMOCD for remediation plans at this site.

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Thank you,

RICE OPERATING COMPANY

Carolyn Doran Haynes

Carolyn Doran Haynes
Operations Engineer

Enclosures

cc: LBG, Whole Earth, NMOCD, file