

AP - 27

STAGE 2 WORKPLANS

Date:

6 - 17 - 11



TETRA TECH

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June 17, 2011

Mr. Edward Hansen
New Mexico Energy, Minerals, & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 S. St. Francis Drive
Santa Fe, New Mexico 87505

Re: Project Status Report, Rice Operating Company, E-15 Release, BD SWD System, Unit D&E, Section 15, T-22-S, R-37-E, Lea County, New Mexico, NMOCD CASE #AP-027

Mr. Hansen:

Tetra Tech Inc. (Tetra Tech) submits the following Project Status Report for the Rice Operating Company (ROC), E-15 Release, located in the BD Salt Water Disposal System. ROC is the service provider (agent) for the BD Salt Water Disposal System and has no ownership of any portion of the pipeline, well or facility. The BD SWD system is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage ownership/usage basis.

Background

On March 29, 2000, a leak was discovered on the pipeline adjacent to the E-15 junction box. According to the form C-141 (Initial) filed with the NMOCD, the spill was due to a rupture in a steel dresser sleeve. An unknown volume of produced water was discharged with 300 barrels of fluid recovered. Regional groundwater information indicates that the depth to groundwater is approximately 75 feet below ground surface (bgs).



During March 2000, approximately 2,000 cubic yards of soil were excavated and transported offsite for disposal. The site was backfilled with clean soil and brought up to grade. Initial soil sampling indicated the site was impacted with chlorides. In order to delineate the site, between January 22, 2001 and February 11, 2005, six monitor wells, two recovery wells and six borings were installed at the site. Initial testing indicated the groundwater was impacted with chlorides.

On January 26, 2001, a Notice of Groundwater Impact was submitted to Mr. Wayne Price of the NMOCD in Santa Fe, New Mexico. A Stage 1/Stage 2 Abatement Plan was requested by the NMOCD and was submitted to the state on June 5, 2001. The abatement plan requested additional soil borings and monitor wells at the site to complete vertical and horizontal delineation.

To complete delineation and remediation of the vadose zone, in January 2002, the release area was excavated to dimensions of 140 feet x 160 feet x 35 feet below ground surface (bgs). Sidewall samples were collected and confirmed that TPH and BTEX RRAL's had been achieved and chloride concentrations were at or below 250 mg/Kg. A clay barrier compacted to a minimum of 12 inches was constructed at the bottom of the excavation and tested for density. A 20 mil high density polyethylene (HDPE) liner was placed on top of the clay barrier and brought up the sides of the excavation to the surface. The excavated soils were placed back into the excavation up to a depth of 5 feet bgs. A top liner of 20 mil HDPE was placed into the excavation at that point and the remainder of the excavation was backfilled with clean topsoil and contoured to match the surrounding surface.

In September 2006, the NMOCD requested further expansion of the abatement plan to address chloride impacts under Mr. Boyd's property. The amended Stage 1/Stage 2 plan was resubmitted in November 2006.

In 2005, a groundwater remediation system was installed at the site to address the chloride impacts to the groundwater. Due to low volumes, silting, and equipment problems, the system was discontinued in 2007. Several of the silted or dry monitor wells were permanently abandoned (MW-5, MW-6 and RW-2). Since 2005, the four active monitor wells (MW-1 through MW-4) have been sampled on a quarterly basis. On January 6, 2011, ROC submitted a work plan detailing the installation of three additional monitor wells at the site in order to further delineate groundwater quality and to determine if groundwater exists throughout the entire site. The work plan was approved via email by the NMOCD on February 17, 2011.



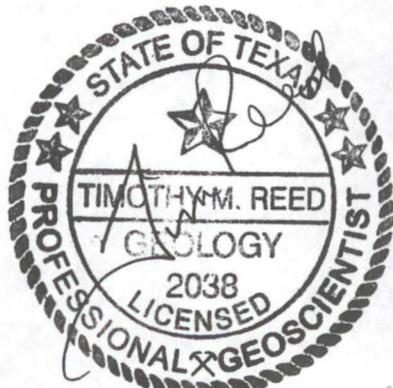
Monitor Well Installation

As approved, three monitor wells MW-6R, MW-7 and MW-8 were installed on March 21-22, 2011. The monitor well locations are shown on the attached Figure. The total depths of the monitor wells ranged from 86 feet to 95 feet below ground surface (bgs). Copies of the drilling and completion logs are included in Appendix A.

Path Forward

The up-gradient monitoring well (MW-1) has consistently exhibited chloride impact. As such, ROC believes that this site is a candidate for chloride mass removal. ROC proposes replacing the well with the highest chloride concentration (MW-2) with a 4 inch well and evaluate the existing site data to calculate a chloride mass for removal. If approved, the 4 inch well will be installed and ROC will submit an estimation of chloride mass. ROC will attempt to remove the chloride mass from this well. If the well fails to yield the appropriate volume of water, ROC will request to remove the mass from another recovery system located within the BD system.

If you have any questions, please contact me at (432) 682-4559, or Hack Conder of ROC at (575) 393-9174.



Respectfully Submitted,
Tetra Tech, Inc.

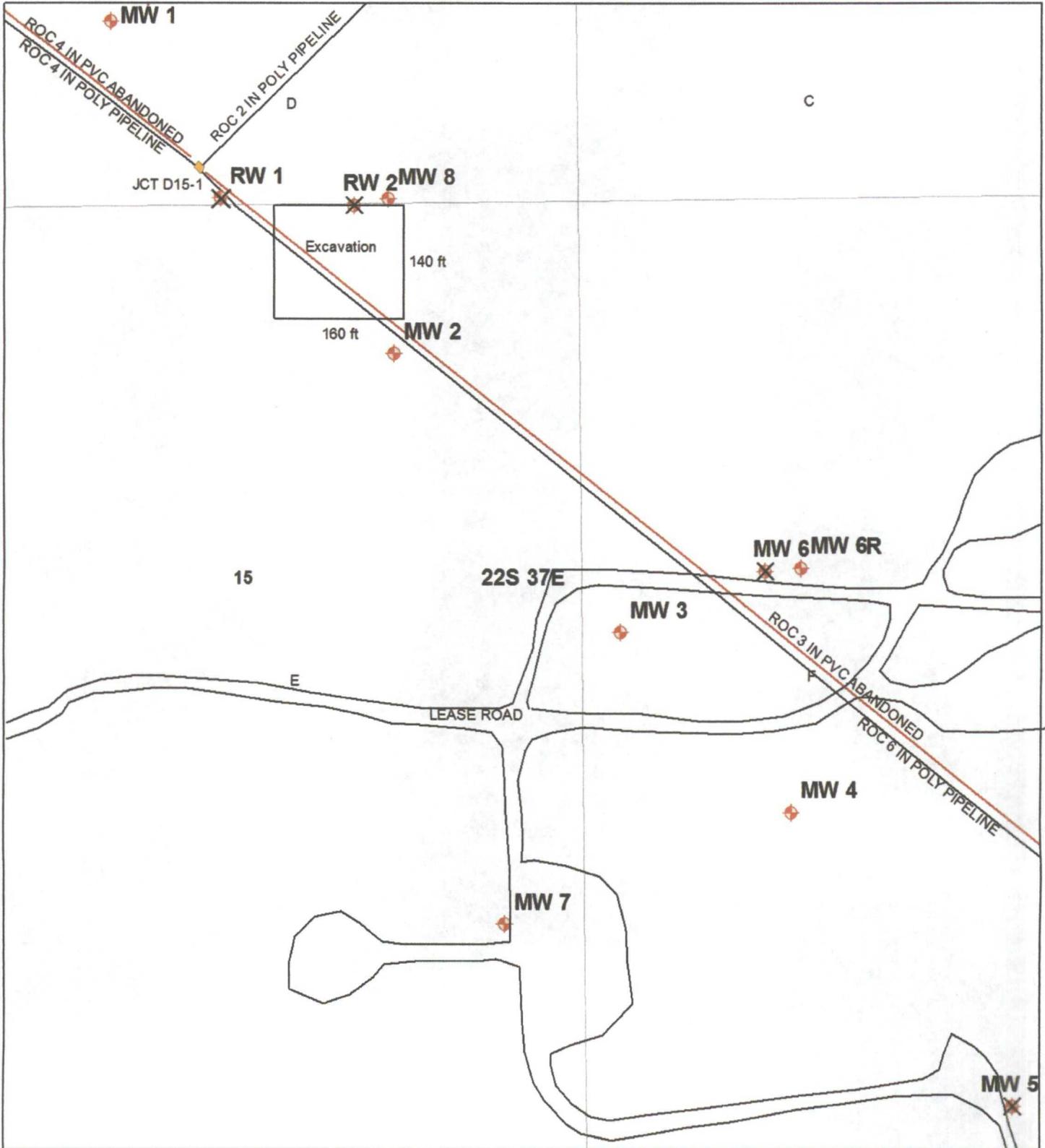


Tim Reed, P.G.
Senior Consultant

cc: Hack Conder -ROC
Enclosures: Figure, Photos, Drilling and Completion Logs

FIGURES

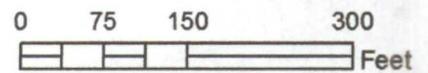
Monitor Well Locations



BD E-15 LEAK

Legals: UL E SEC 15
T-22-S R-37-E

Case #: AP 27



Drawing date: 4/4/11
Drafted by: T. Grieco & L. Weinheimer

PHOTOGRAPHS

**BD E-15 leak
Unit E, Section 15, T-22-S, R-37-E**



Drilling well 6R, facing north



Inserting the casing, facing north



Inserting the silica sand pack



Adding the bentonite seal



Adding the concrete to seal the monument



Completed MW-6R



Drilling well #7, facing south-east



Inserting the casing, facing south-east



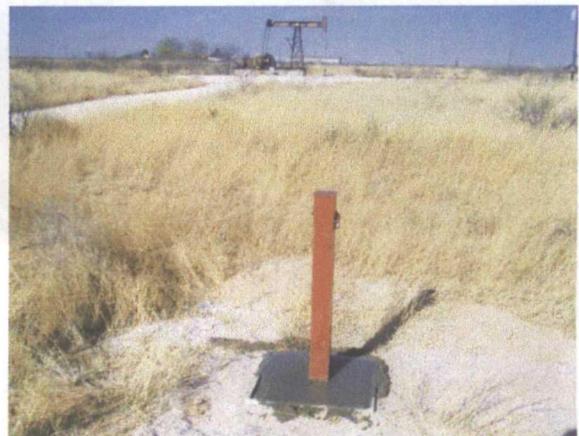
Adding the silica sand pack



Temporary well completed 3-22-11



Set the permanent well monument with concrete
3-25-11



Completed MW-7



Drilling MW-8, facing north



Inserting the casing



Adding the silica sand pack



Temporary well completed 3-21-11



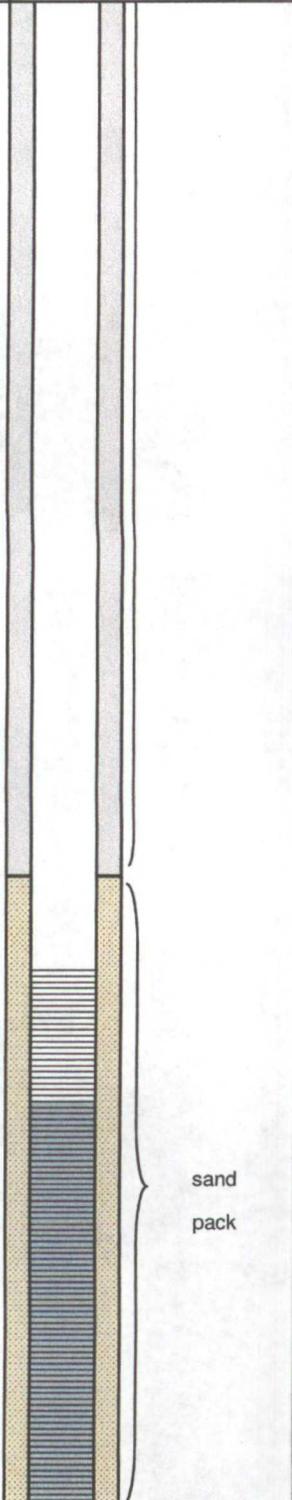
Concreting the permanent well in 3-25-11



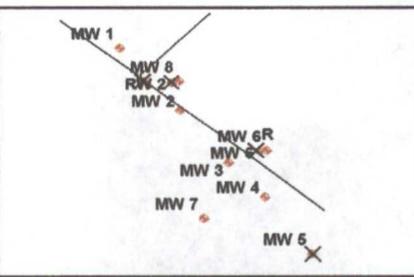
Completed MW-8

**APPENDIX A
DRILLING AND COMPLETION LOGS**

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
45 ft						
50 ft						
55 ft						
60 ft						
65 ft						
70 ft						
75 ft						
80 ft						
85 ft						
90 ft						
95 ft						



Logger: Jordan Woodfin
Driller: Harrison & Cooper, Inc.
Drilling Method: Air rotary
Start Date: 3/21/2011
End Date: 3/21/2011



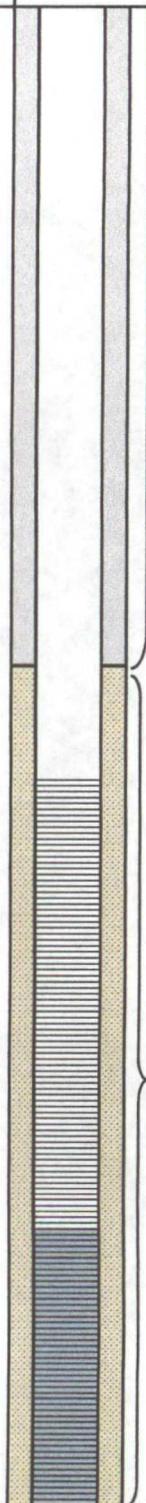
Project Name: BD E-15 leak
Well ID: MW-7
Project Consultant: Tetra Tech

Comments: No samples taken for this well. Located 926 ft south of the center of the former excavation.
DRAFTED BY: L. Weinheimer
 TD = 86 ft GW = 79 ft

Location: UL/E sec. 15 T22S R37E
Lat: 32°23'35.112"N **County:** LEA
Long: 103°9'19.665"W **State:** NM

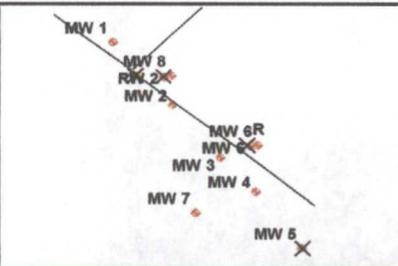
Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction	
5 ft				NO SAMPLES TAKEN		2 in PVC	
10 ft							
15 ft							
20 ft							
25 ft							
30 ft							bentonite seal
35 ft							
40 ft							

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
45 ft						
50 ft						
55 ft						
60 ft						
65 ft						
70 ft						
75 ft						
80 ft						
85 ft						
86 ft						



sand
pack

Logger: Jordan Woodfin
Driller: Harrison & Cooper, Inc.
Drilling Method: Air rotary
Start Date: 3/22/2011
End Date: 3/22/2011



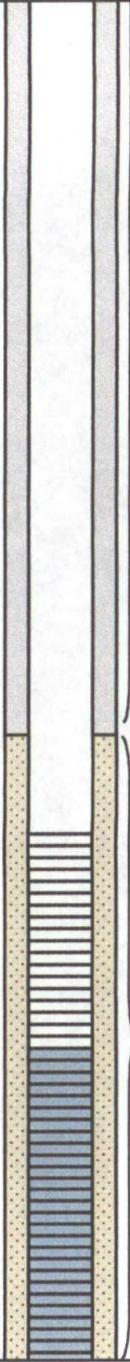
Project Name: BD E-15 leak
Well ID: MW-8
Project Consultant: Tetra Tech

Comments: No samples taken of this well. Located 190 ft east of the center of the former excavation site.
DRAFTED BY: L. Weinheimer
 TD = 90 ft GW = 79 ft

Location: UL/D sec. 15 T22S R37E
Lat: 32°23'43.861"N **County:** LEA
Long: 103°9'21.286"W **State:** NM

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction	
5 ft						2 in PVC	
10 ft							
15 ft							
20 ft							
25 ft							
30 ft							
35 ft							
40 ft							
							bentonite seal

Depth (feet)	chloride field tests	LAB	PID	Description	Lithology	Well Construction
45 ft						
50 ft						
55 ft						
60 ft						
65 ft						
70 ft						
75 ft						
80 ft						
85 ft						
90 ft						



sand pack

Client:	Rice Operating	Well Description:	Schematic Drawing of Well Construction for Monitoring Well
Project Name:			
Location:	BD E-15 Leak		

Depth (feet)	Comments:	Material Descriptions:		
0.0	Borehole Diameter - 5"	Cement, 0'-2', 6 bags		
2.0				
	Surface Completion - 4"x4" Steel Upright w/ 2'x2' Concrete Pad	2" SCH 40 PVC Casing		
			Bentonite, 2'-72', 10 bags Riser, +3'-75'	
72.0				8/16 Sand, 72'-95', 7 bags, Screen 0.010, 75'- 95'
75.0				
95.0				
95.0				

Harrison & Cooper, Inc. P.O. Box 96 Wolfforth, Texas 79382	MW-6R	22-Mar-11
	Monitoring Well	

Client:	Rice Operating	Well Description:	Schematic Drawing of Well Construction for Monitoring Well
Project Name:			
Location:	BD E-15 Leak		

Depth (feet)	Comments:	Material Descriptions:		
0.0	Borehole Diameter - 5"	Cement, 0'-2', 7 bags		
2.0				
	Surface Completion - 4"x4" Steel Upright w/ 2'x2' Concrete Pad	2" SCH 40 PVC Casing		
			Bentonite, 2'-63', 11 bags Riser, +3'-66'	
63.0				8/16 Sand, 63'-86', 8 bags, Screen 0.010, 66'- 86'
66.0				
86.0				
86.0				

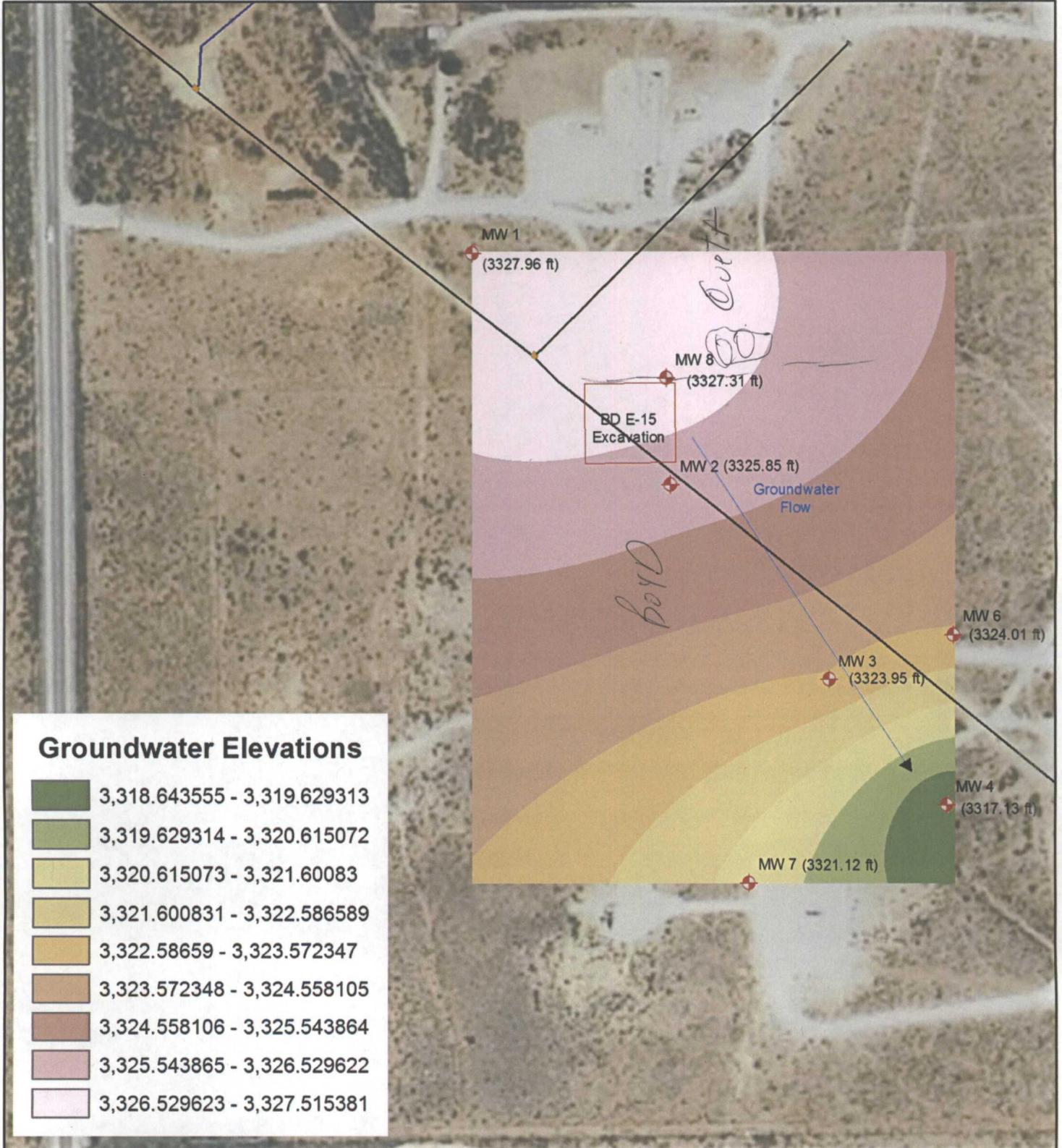
Harrison & Cooper, Inc. P.O. Box 96 Wolfforth, Texas 79382	MW-7	21-Mar-11
	Monitoring Well	

Client:	Rice Operating	Well Description:	Schematic Drawing of Well Construction for Monitoring Well
Project Name:			
Location:	BD E-15 Leak		

Depth (feet)	Comments:	Material Descriptions:		
0.0	Borehole Diameter - 5"	Cement, 0'-2', 7 bags		
2.0				
	Surface Completion - 4"x4" Steel Upright w/ 2'x2' Concrete Pad	2" SCH 40 PVC Casing		
			Bentonite, 2'-67', 12 bags Riser, +3'-70'	
67.0				8/16 Sand, 67'-90', 8 bags, Screen 0.010, 70'- 90'
70.0				
90.0				
90.0				

Harrison & Cooper, Inc. P.O. Box 96 Wolfforth, Texas 79382	MW-8	22-Mar-11
	Monitoring Well	

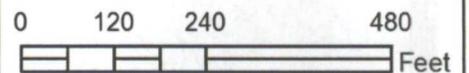
Site Specific Potentiometric Map



BD E-15 leak

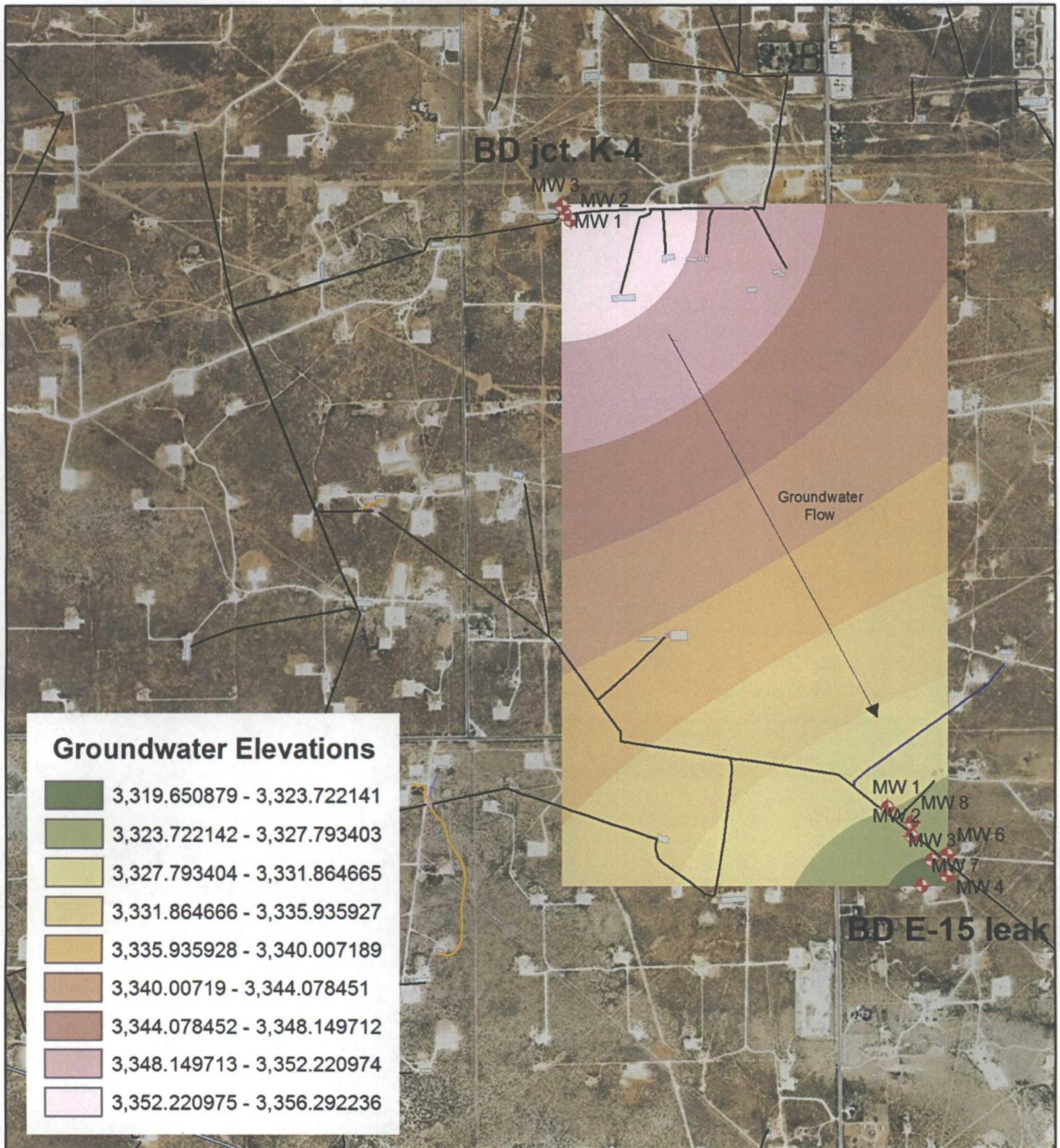
Legals: UL/E sec. 15
T22S R37E

Case #: AP-027



Drawing date: 7-15-11
Drafted by: L. Weinheimer

Regional Area Potentiometric Map



Groundwater Elevations

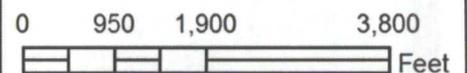
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	3,331.864666 - 3,335.935927
	3,335.935928 - 3,340.007189
	3,340.00719 - 3,344.078451
	3,344.078452 - 3,348.149712
	3,348.149713 - 3,352.220974
	3,352.220975 - 3,356.292236



BD E-15 leak

Legals: UL/E sec. 15
T22S R37E

Case #: AP-027



Drawing date: 7-15-11
Drafted by: L. Weinheimer