

1R - 426-124

**REPORTS**

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October 11, 2010

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

RE: **Background Characterization Report  
BD Jct. P-30 (1R0426-124)  
T21S-R37E-Section 30, Unit Letter P, Lea County, New Mexico**

Mr. Hansen:

As agent for Rice Operating Company (ROC), and in response to your email request on August 18, 2010, Trident Environmental is submitting this *Background Characterization Report* for the above-referenced site. Based on the characterization of background concentrations for chlorides and total dissolved solids (TDS), as described in more detail below, we have determined that groundwater at the site is representative of background conditions and therefore has not been impacted by the former junction box. However, ROC will develop a *Corrective Action Plan* to address the vadose zone and mitigate the potential for migration of chlorides and TDS from the vadose zone to groundwater. The CAP will include plans to excavate the affected area, install a liner, and re-establish vegetation.

*Chloride and TDS Background Characterization*

The most recent data (1990 – 1995) from the New Mexico Water and Infrastructure Data System (NMWAIDS) were used to determine the range of chloride concentrations within an approximate 5 mile radius of the site. Only chloride data is available; therefore, TDS concentrations were directly correlated to chloride levels using a conservative factor of 3. This data set resulted in 29 wells within all of T21S-R36E, T21S-R37E, T22S-R36E, and T22S-R37E. The mean ( $\mu$ ) and standard deviation ( $\sigma$ ) were calculated from the data set from which an upper limit for background chloride concentration was conservatively estimated by adding two standard deviations to the mean ( $\mu + 2 \sigma$ ). Table 1 below summarizes the available data set and calculation results.

**Table 1**  
**Summary of Background Chloride Concentrations**

*Data obtained from NMWAIDS (Years: 1990-1995; Chlorides: 0 mg/L – 1,000 mg/L)*

S	T	R	Formation	Date	Chlorides	
					(mg/L)	Location (qtr/qtr)
23	21S	36E	OGALLALA	10/05/95	63	21S.36E.23.232311
1	21S	37E	OAL	10/04/95	174	21S.37E.01.242422
3	21S	37E	OAL	11/15/95	22	21S.37E.03.31221
4	21S	37E	OAL	10/03/95	174	21S.37E.04.412442
12	21S	37E	OAL	10/04/95	484	21S.37E.12.34341
13	21S	37E	OAL	06/21/90	75	21S.37E.13.13434
14	21S	37E	OAL	10/04/95	396	21S.37E.14.12410
26	21S	37E	OAL	11/15/95	128	21S.37E.26.32322
31	21S	37E	OAL	10/05/95	73	21S.37E.31.13311
36	21S	37E	OAL	10/04/95	288	21S.37E.36.34432
2	22S	36E	OGALLALA	10/06/95	476	22S.36E.02.442441
9	22S	36E	OGALLALA	10/17/95	268	22S.36E.09.341221
25	22S	36E	OGALLALA	10/11/95	44	22S.36E.25.43433A
35	22S	36E	OGALLALA	10/06/95	25	22S.36E.35.313224
5	22S	37E	OAL	10/05/95	54	22S.37E.05.21213
5	22S	37E	OGALLALA	10/04/95	128	22S.37E.05.341434
9	22S	37E	OGALLALA	10/05/95	456	22S.37E.09.313331
11	22S	37E	OAL	10/03/95	500	22S.37E.11.322414
13	22S	37E	null	10/03/95	376	22S.37E.13.22111
15	22S	37E	OGALLALA	10/05/95	262	22S.37E.15.333343
21	22S	37E	OAL	10/11/95	348	22S.37E.21.44223
25	22S	37E	OAL	10/04/95	180	22S.37E.25.123332
26	22S	37E	OAL	10/03/95	362	22S.37E.26.21231
28	22S	37E	OAL	10/04/95	120	22S.37E.28.31243
34	22S	37E	OAL	10/04/95	490	22S.37E.34.121344
36	22S	37E	null	10/04/95	314	22S.37E.36.14311

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*Mean ( $\mu$ ) = 249.6 mg/L*  
*Standard Deviation ( $\sigma$ ) = 160.3 mg/L*  
*Mean + 2 SD =  $\mu + 2\sigma$  = 570.2 mg/L*

The chloride concentrations in Table 1 are also depicted in Figure 2. Based on the regional chloride concentration data in Table 1 above, a conservative upper limit for background chloride concentration is 570 mg/L. Since TDS data is not available an upper limit for background TDS was conservatively estimated at three times the chloride level (3 x 570.2 = 1,711 mg/L).

**Figure 2**  
**Regional Distribution of Chloride Concentrations**

*Data obtained from NMWAIDS (Years: 1990-1995; Chlorides: 0 mg/L – 1,000 mg/L)*

		R36E					R37E					
T21S									174	22		174
												484
											396	75
				63								185
									400			
T22S							P-30				128	374
							73					288
									54			
					476				128			
											456	500
				268							262	376
											348	
											362	180
											120	
										490		314
				25								

Values in red type indicate chloride concentrations in (mg/L)

As shown in Table 2 below, five quarters of groundwater data at the site monitoring well (MW-1) indicate chloride and TDS levels well below the upper limit of background concentrations for the regional area. In addition, the average chloride and TDS concentrations in MW-1 are only marginally above the WQCC standard of 250 mg/L and 1,000 mg/L, respectively. Therefore, it has been concluded that chloride and TDS concentrations at the site are representative of background conditions, and the site has not been impacted by the former junction box.

**Table 2**  
**Summary of Site Chloride and TDS Concentrations**

Monitoring Well	Sample Date	Depth to Groundwater (feet BTOC)	Chloride (mg/L)	TDS (mg/L)
MW-1	07/27/09	97.89	392	1,180
	10/16/09	97.86	364	1,130
	01/25/10	97.82	324	957
	04/22/10	97.77	280	811
	07/22/10	97.76	370	1,030
Mean ( $\mu$ ) =			346	1,022

Chloride and TDS Background Characterization

The United States Geological Survey National Water Information System (USGS NWIS), New Mexico Water Rights Reporting System (NM WRRS), and NM WAIDS, databases were reviewed to identify water wells within a mile of the site with historical chloride concentration data as summarized in Table 3 below. A site location map with these wells identified is shown in Figure 1.

**Table 3**  
**Summary of Chloride Concentrations within One-Mile Radius**

Water Well or Sample ID	Distance from BD Jct P-30	S	T	R	Sample Date	TD (ft bgs)	Chloride (mg/L)
MW-1	0 ft	30	21S	37E	07/22/10	113	370
10155	2,500 ft NW	30	21S	37E	10/18/84	125	106
8849	3,800 ft SSW	31	21S	37E	07/09/90	115	95
9387	4,200 ft NE	29	21S	37E	07/09/90	130	400
12349	5,000 ft SE	32	21S	37E	10/26/65	115	140

Chloride concentrations in each well identified in Table 3 above and in Figure 1 are representative of background conditions. The nearest water well is located approximately 2,500 ft northwest of the site and is not a concern due to its upgradient location. The closest downgradient well from the site is located almost a mile (5,000 ft) southeast and is not a concern due to its long distance from the site. The remaining wells can not be affected by any activity at the site due to their distant cross-gradient locations and the prevailing southeast trending groundwater gradient direction.



BD Jct. P-30 Site  
 T21S - R37E - Section 30, Unit P  
**RICE** *Operating Company*

FIGURE 1  
 SITE LOCATION MAP

Conclusions and Recommendations

Based on the regional characterization of background concentrations for chlorides and TDS, we have determined that groundwater at the site is representative of background conditions and therefore has not been impacted by the former junction box. However, ROC will develop a *Corrective Action Plan* to address the vadose zone and mitigate the potential for migration of chlorides from the vadose zone to groundwater. The CAP will include plans to excavate the affected area, install a liner, and re-establish vegetation.

ROC is the service provider (agent) for the Blinebry Drinkard (BD) Salt Water Disposal System and has no ownership of any portion of the pipelines, wells, or facilities. The BD System is owned by a consortium of oil producers, System Parties, who provide all operating capital on a percentage ownership/usage basis. Environmental remediation projects of this magnitude require System Parties AFE approval and work begins as funds are received.

If you have any questions please call Hack Conder at 575-393-9174.

Sincerely,



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

cc: Hack Conder (Rice Operating Co., Hobbs NM)