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REPORTS

DATE: 9 - 22 - 10



CERTIFIED MAIL RETURN RECIEPT NO. 7001 0320 0004 3736 6075

September 22, 2010

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

RE: CAP Report and Termination Request, Rice Operating Company, Blinebry Drinkard (BD) Saltwater Disposal System (SWD) K-4 Release, Unit K, Section 4, T-22-S, R-37-E, Lea County, New Mexico, NMOCD CASE #1R0459

Mr. Hansen:

Tetra Tech, Inc. (Tetra Tech) submits the following CAP and Termination Request for the Rice Operating Company (ROC), Blinebry Drinkard (BD) Salt Water Disposal (SWD) System K-4 Release, NMOCD Case #1R0459. ROC is the service provider (agent) for the BD SWD 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. The site is shown on Figures 1 and 2.

1.0 BACKGROUND and PREVIOUS WORK

On February 25, 2004, a leak was discovered, 34 feet east of the K-4 junction box. According to the form C-141 (Initial) filed with the New Mexico Oil Conservation Division (NMOCD), the spill was due to a rupture of a 4-inch PVC line. An estimated 1,040 barrels of produced water was discharged, with 1,000 barrels of fluid recovered.

Initial soil sampling performed in April 2004, indicated a residual subsurface chloride impact. On July 14, 2004, a hollow-stem auger unit was utilized to drill one soil boring at the release source. The soil boring was advanced to a depth of 80 feet below ground surface (bgs) with field chloride analysis performed on soil samples at five foot intervals. Results of field chloride testing and laboratory analysis indicated that chloride impacts extend to a depth of greater than 80 feet bgs. Upon completion of the soil boring, it was backfilled with bentonite and drill cuttings. Between October 12 and October 19, 2006, Highlander (Tetra Tech) personnel were onsite to oversee the installation of three monitor wells (MW1 through MW-3) located within, up and down

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gradient of the release area. See Figure 3 for well locations. Laboratory analytical results for the soil column in monitor well MW-1 indicate the soils were impacted with chlorides greater than 250 milligram per kilograms (mg/kg) to the vadose zone. In addition, the groundwater in monitor well MW-1 was found to have a chloride concentration of 1,040 mg/L.

On April 23, 2007, ROC submitted a Corrective Action Plan (CAP) for the site and NMOCD approved verbally on December 16, 2009 during the 4th quarterly meeting between NMOCD and ROC. The CAP addressed elevated levels of chlorides within the soils which includes placement of a barrier at three feet bgs and reseeding the disturbed area with native vegetation. In addition, the CAP proposed limited withdrawal of groundwater from MW-1 in order to attenuate the chlorides within the well.

During a meeting between the NMOCD, ROC, and Highlander on July 18, 2007, it was decided to replace the existing 2-inch monitor well at MW-1 with a 4-inch monitor well in order to increase the volume of groundwater withdrawal. Also, it was discussed that the soils barrier would be placed at four feet bgs. On August 7, 2007, monitor well MW-1 was re-drilled and reinstalled as a 4-inch well.

2.0 CORRECTIVE ACTION PLAN IMPLEMENTATION

As part of the Corrective Action Plan (CAP), ROC was onsite February 22 through March 5, 2010, to excavate chloride impacted soils from the K-4 release area. An area measuring 68 feet wide by 120 feet long by 4 feet deep was excavated. Two feet of topsoil was removed and stockpiled onsite. A topsoil composite sample was collected and analyzed by Cardinal Laboratory, with the resulting chloride concentration of <16 mg/Kg. The site was excavated further and twelve (12) cubic yards of soil were disposed of at the NMOCD approved Sundance facility, with the remaining soils stockpiled and blended onsite. An east side blended backfill composite and a west side blended backfill composite sample were also analyzed by Cardinal Laboratory resulting in chloride concentrations of 16 mg/Kg and 64 mg/Kg, respectively. Upon completion of the excavation, a 20-mil polvethylene liner was installed at 4 feet in order to impede further migration of the remaining chlorides within the soil. See Figure 4 for liner location and dimensions. The east and west blended backfill soils were placed over the 20-mil liner. Between March 8 and March 10, 2010, clean offsite soils were brought to the site to continue backfilling. Imported hay was blended with the existing excavated topsoil, placed over the site and brought up to surface grade. (See Appendix A - Laboratory Data for analysis on the imported clean soils, topsoil and blended excavated soils). Silt net fencing was placed around the site and on April 8, 2010, the site was reseeded with native vegetation. (See Appendix B - Site Photographs)

On November 29, 2007, a pump test was performed on monitor well MW-1. Results indicate the well was able to pump 3 gallons per minute (gpm) for 40 minutes without pumping dry. Groundwater analytical results show the concentrations of chlorides decreased by approximately 300 mg/L (from 1,040 mg/L on November 13, 2006 to 736 mg/L on October 31, 2007). With the decrease in chlorides, it was decided that instead of installing a pump and operating it for 24 hours, 7 days a week, that periodically, the well will be pumped for several hours to enhance recovery. Beginning



in September 2009, the well was pumped periodically for several hours and weekly for the months of October and November. Total recovery of chloride impacted water was 2,575 gallons. The periodic pumping decreased the chloride concentrations in the well by 35 to 50%.

3.0 CONCLUSIONS

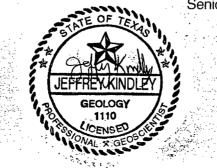
- 1. Since the installation of the three monitor wells in November 2006, there have been no BTEX constituents detected at or above the New Mexico Water Quality Control Commission (WQCC) standards.
- 2. As per the CAP, an area measuring 68 feet wide by 120 feet long by 4 feet deep was excavated and a 20-mil polyethylene liner was installed in order to impede further migration of chlorides within the soil. Upon completion of the liner the site was backfilled with blended and clean soils, and brought up to surface grade with excavated soils blended with hay. Silt net fencing was installed and the site was reseeded with native vegetation.
- 3. Approximately 2,575 gallons of chloride impacted groundwater were removed from monitor well MW-1. Periodic groundwater removal has decreased chloride concentrations by 35 to 50% in monitor well MW-1. The expanse of the chloride plume in MW-1 has remained relatively stable for the past 2 ½ years, and has not shown any affect on down gradient monitor well MW-2.

With the completion of the liner, as per the CAP, and with the decrease and relative stability of the chlorides in monitor well MW-1, and the lack of any BTEX in the onsite monitor wells since their installation in November 2006, ROC requests that the NMOCD terminate further activities at this site. Once approved, monitoring wells (MW-1, MW-2, and MW-3) will be plugged and abandoned using a cement grout with 1-3% bentonite. If you require any additional information of have any questions or comments concerning the termination request, please call me at (432) 682-4559 or Hack Conder of ROC at (575) 393-9174. Thank you for your attention to this matter.

Respectfully Submitted, Tetra Tech, Inc.

Jeffrey Kindley, P.G. Senior Environmental Geologist

cc: ROC- Hack Conder



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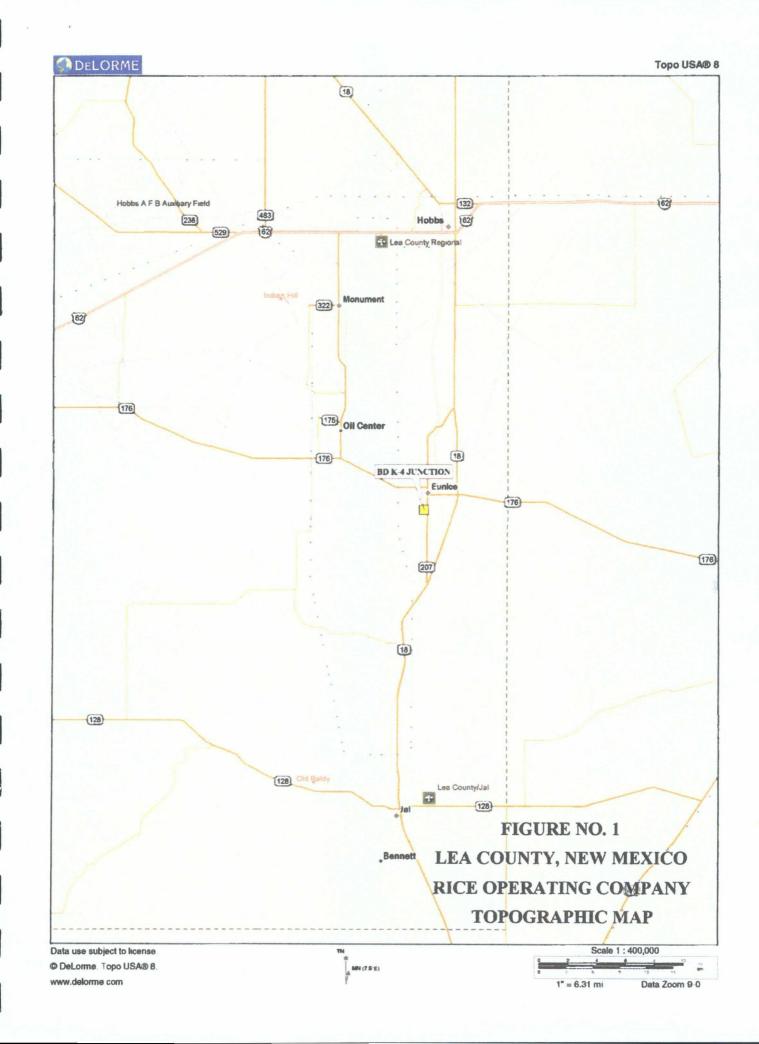
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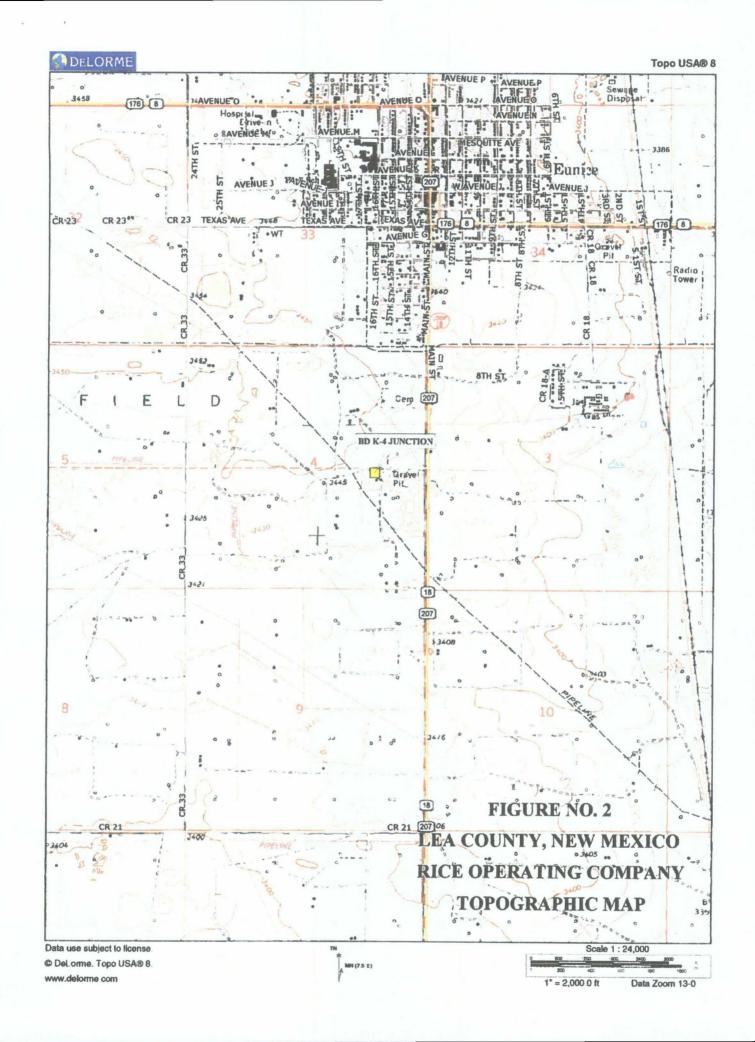
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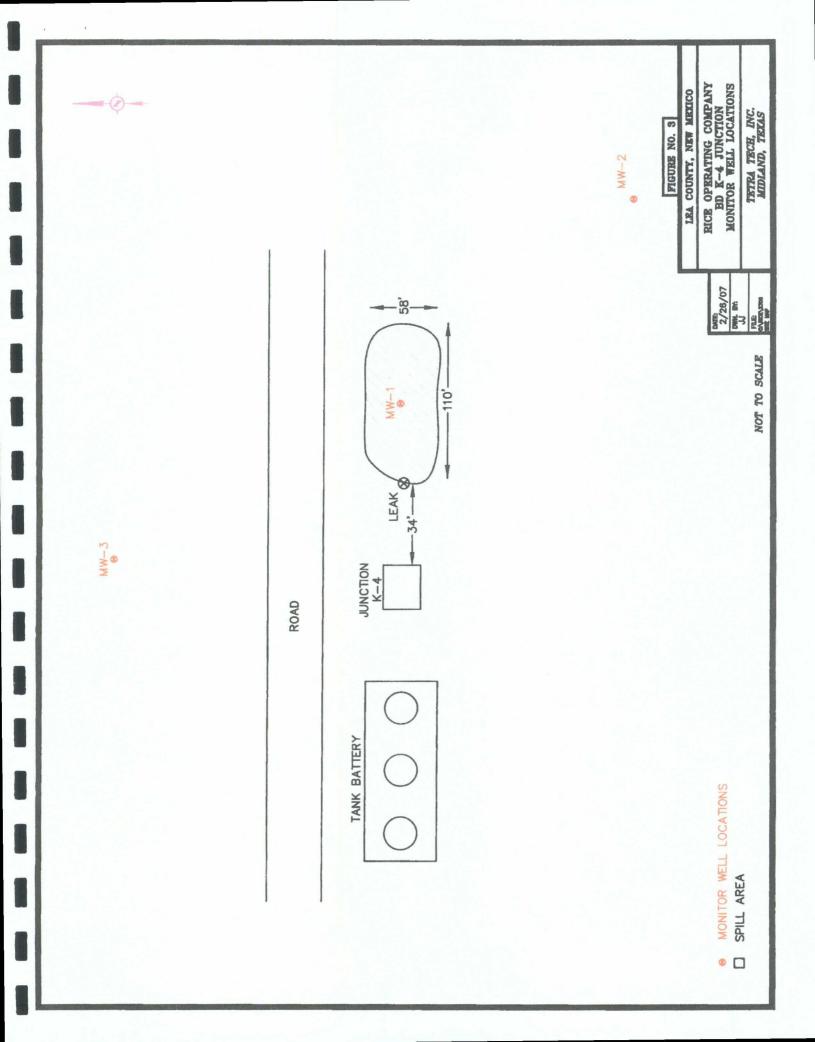
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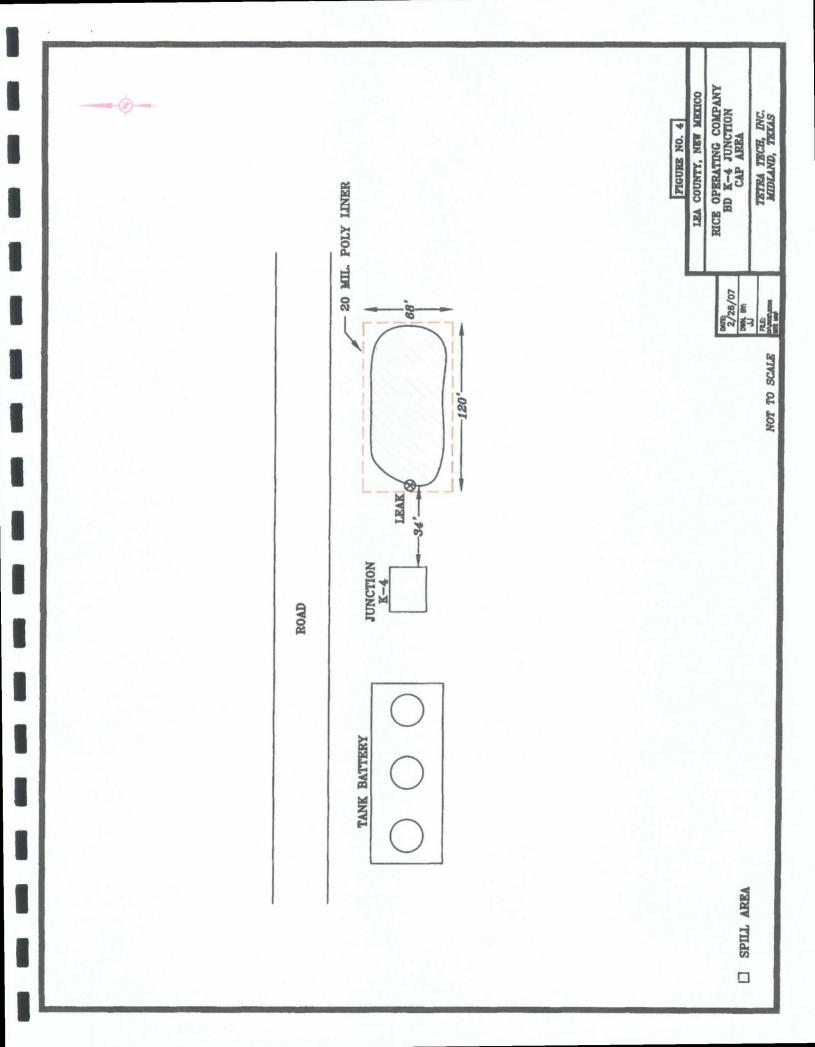
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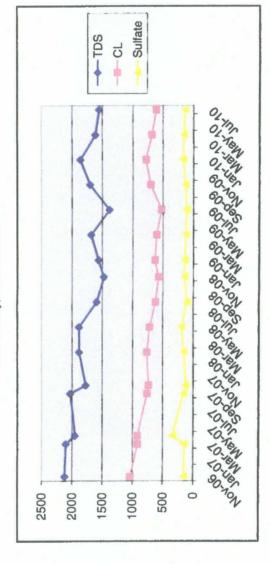
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						}	Table 1						
					Ric	e Oper B	BD K-4	Rice Operating Company BD K-4					
					Lee	a Count	ty, Nei	Lea County, New Mexico					
MW	Depth to	Total	Well	Volume	Sample	Ū	TDS	Benzene	Toluene	Ci [TDS Benzene Toluene Ethyl Benzene Total Xylenes Sulfate	Total Xylenes	Sulfate	Comments
	Water	Depth	Volume	Purged	Date	_							
-	85.02	93.63	1.40	5	11/13/06	1040 2120	2120	<0.001	<0.001	<0.001	<0.001	152	Clear no odor
-	84.99	93.62	1.40	9	03/08/07	916	2100	<0.001	<0.001	<0.001	<0.001	148	Clear no odor
	84.96	93.62	1.40	6	04/23/07	917	1950	<0.001	<0.001	<0.001	<0.001	339	Clear no odor
-	86.06	97.70	7.60	6	09/14/07	760	2028	<0.001	<0.001	<0.001	<0.003	159	Clear no odor
-	86.06	97.70	7.60	20	10/31/07	736	1770	<0.002	<0.002	<0.002	<0.006	124	Clear no odor
-	85.93	98.60	8.20	30	02/15/08	760	1880	<0.002	<0.002	<0.002	<0.006	157	Clear no odor
-	85.73	98.60	8.40	30	05/05/08	720	1880	<0.002	<0.002	<0.002	<0.006	195	Clear no odor
-	85.81	98.60	8.30	30	08/11/08	620	1590	<0.001	<0.001	<0.001	<0.003	106	Clear no odor
-	85.65	98.60	8.40	30	11/13/08	570	1470	<0.001	<0.001	<0.001	<0.003	148	Clear no odor
-	85.64	98.60	8.30	30	01/21/09	630	1560	<0.001	<0.001	<0.001	<0.003	143	Clear no odor
-	85.61	98.40	8.30	30	04/22/09	600	1680	<0.001	<0.001	<0.001	<0.003	123	Clear no odor
-	85.48	98.40	8.40	30	07/20/09	520	1380	<0.001	<0.001	100 [.] 0>	<0.003	113	Clear no odor
	85.49	98.40	8.40	30	10/13/09	700	1700	<0.001	<0.001	<0.001	<0.003	131	Clear no odor
-	85.32	98.41	8.50	30	01/19/10	780	1860	<0.001	<0.001	<0.001	<0.003	173	Clear no odor
Ŧ	85.31	98.41	8.50	30	04/15/10	680	1610	<0.001	<0.001	<0.001	<0.003	155	Clear no odor
+	85.23	98.41	8.60	30	07/20/10	610	1550	<0.001	<0.001	<0.001	<0.003	143	Clear no odor





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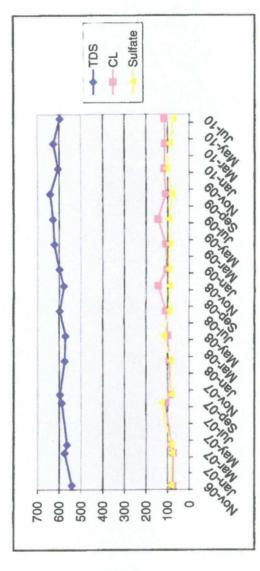
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			ate Comments		R Clear no odor		T	T		T									2 Clear no odor	
			es Sulfa	40			130	82.7	86.6	117	94	93.7	95.4	8.68	95.4	78.9	105	91.2	74.2	
			Total Xylene			<0.001	<0.003	<0.006	<0.006	<0.006	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	
			Toluene Ethyl Benzene Total Xylenes Sulfate	100.01	000	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
			Toluene		000	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
	Rice Operating Company BD K-4	Lea County, New Mexico	CI TDS Benzene	100.01		<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Table 2	BD K-4	nty, Ne	TDS	EAD			588	596	574	570	596	578	598	621	628	641	605	625	596	
	se Ope	a Cou	ō	7	75.3	83.5	₽ ₽	8	8	10	108	144	104	108	144	108	116	112	116	
	Ĭ	Le	Sample	11/12/06	03/08/07	04/23/07	09/14/07	10/31/07	02/15/08	05/05/08	08/11/08	11/13/08	01/21/09	04/22/09	07/20/09	10/13/09	01/19/10	04/15/10	07/20/10	
			Volume	Purgea		7	7	9	9	9	9	9	9	9	9	9	9	9	9	
			Well		1.70	1.70	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	
			Total		94.08	94.08	94.08	94.08	94.05	94.05	94.05	94.05	93.98	93.98	93.98	93.98	93.67	93.67	93.67	_
			Depth to	Water 83.35	83.28	83.25	83.12	83.11	82.97	82.81	82.86	82.75	82.77	82.69	82.61	82.58	82.40	82.37	82.32	
			λ M	~		~	2	2	~	~	~	~	~	~	~	~	~	~	~	

Graph 2 Rice Operating Company MW-2 BD K-4 Lea County, New Mexico



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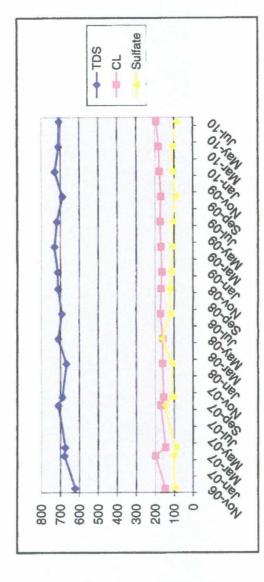
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	te Comments	Clear no odor	Clear no odor		Clear no odor			Clear no odor	1	Clear no odor	Clear no odor	1	[1	Clear no odor	1	T	
	Sulfat	97.6	103	92.1	151	106	110	166	117	124	116	108	107	94.1	108	108	89.5	
	Total Xylenes	<0.001	<0.001	<0.001	<0.003	<0.006	<0.006	<0.006	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	
	TDS Benzene Toluene Ethyl Benzene Total Xylenes Sulfate	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
	Toluene E	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0,001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Table 3 Rice Operating Company BD K-4 Lea County, New Mexico	Benzene	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Table 3 erating C BD K-4 nty, Nev	TDS	622	678	674	710	689	668	710	691	711	713	730	718	688	729	708	706	
e Ope	ច	148	199	145	170	156	160	160	172	168	164	168	172	168	176	180	192	
Ric Lei	Sample Date	11/13/06	03/08/07	04/23/07	09/14/07	10/31/07	02/15/08	05/05/08	08/11/08	11/13/08	01/21/09	04/22/09	07/20/09	10/13/09	01/19/10	04/15/10	07/20/10	
	Volume Purged	2	5	6	6	6	6	6	6	6	6	6	9	9	6	6	9	
	Volume	1.30	1.30	1.30	1.30	1.30	1.30	1.40	1.30	1.40	1.30	1.40	1.40	1.40	1.40	1.50	1.50	
	Total Depth	94.60	94.50	94.50	94.50	94.50	94.35	94.35	94.35	94.35	94.20	94.20	94.20	94.20	94.58	94.58	94.58	
	Depth to Water	86.45	86.41	86.35	86.23	86.19	86.09	85.89	85.94	85.84	85.84	85.76	85.64	85.63	85.52	85.46	85.38	
	MW	ო	ო	ო	ო	ო	ო	ო	ო	ო	ო	ო	က	ო	m	m	ო	

Graph 3 Rice Operating Company MW-3 BD K-4 Lea County, New Mexico



APPENDIX A LABORATORY DATA

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ANALYTICAL RESULTS FOR RICE OPERATING COMPANY ATTN: HACK CONDER 122 WEST TAYLOR HOBBS, NM 88240 FAX TO: (575) 397-1471

Receiving Date: 02/25/10 Reporting Date: 02/26/10 Project Owner: NOT GIVEN Project Name: BD K-4 22137 Project Location: NOT GIVEN

Analysis Date: 02/26/10 Sampling Date: 02/25/10 Sample Type: SOIL Sample Condition: COOL & INTACT Sample Received By: JH Analyzed By: HM

	CI
LAB NO. SAMPLE ID	(mg/kg)
H19344-1 EAST SIDE BLENDED BACKFILL 8 PT.	16
COMP.	
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Quality Control	51
True Value QC	50
% Recovery	10
Relative Percent Difference	2.

METHOD: Standard Methods4500-CI'BNote: Analysis performed on a 1:4 w:v aqueous extract.

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<u>J26(</u>10 Date

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PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyses All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within thirty (30) days after completion of the applicable service. In no ovent shall Cardinal be liable for incidental or consequential damages, including, without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above-stated reasons or otherwise. Results relate only to the camples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.

- of	ANALYSIS REQUEST															Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the tabe of 24% per annum from the original date of invelce. and all costs of collections, including attarney's foos.			~	wes @ riceswatcom, bbakene riceswatcom		
	BILL TO	P.O.#:	Company:	Attn:	Address:	City:	State: Zip:	Phone #:		PRESERV SAMPLING 300 300 300 300 300 300 300 300 300 30	отнея Асір/ви отнея Асір/ви Атт Атт	V 2-35-10 12:5004				1, shail be limited to the amount paid by ared by Cantinal within 30 days after co i use, or locs of profit incurred by client	ctairin is based upon ony of the above stated reasons or otherwise.	REMARKS:	La hard Emai	ion CHECKED BY: K; DW es	\mathbf{t}	575-399-2476.
ARDINAL LABORATORIES 101 East Marland, Hobbs, NM 88240 (575) 393-2326 Fax (575) 393-2476		HACK CONDEND		State:	393-9174 Fax#: 397-1471	Project Owner:	BO K-4 22/37	a de a de la companya	Bruce Buker	MATRU	<u>+ СОИТ</u>	BACKFILL & BLENDARD CI				PLEASE MOTE: LIABLIA, and Demagen. Cordual's labely and cleart's orchedre comody for any clean affeing whether based in contract analyses. All claims including those for negoporce and any obser cause whistoover stall be doemed worked unless mado in werey sin servers. In no event aball Curdnal to belot for incidental or consequental stambges, including without limitation, business interruptions, reverses or conserverses.	BY: BY:	Jaker ine: 22 pm	3y: Date: Received By:	: (Circle One) - Bus - Other:	2 2	1 Cardinal cannot accept verbal changes. Please fax written changes to 575-39
N. N	Company Name:	Project Manager:	Address: /	City: H	Phone #: 39	Project #:	Project Name:	Project Location:	Sampler Name:	FOR LAB USE ONLY Lab I.D.			a series a s		544 - Per gerupakan manjug art	PLEASE NOTE: LIADIA SI analyses. All claims includu serves. In no event shall Ci	Sampler Reling	Bruce B	Relinquished B	Delivered Bv: Sampler- UPS		† Carainai

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ANALYTICAL RESULTS FOR RICE OPERATING COMPANY ATTN: HACK CONDER 122 WEST TAYLOR HOBBS, NM 88240 FAX TO: (575) 397-1471

Receiving Date: 03/05/10 Reporting Date: 03/05/10 Project Owner: NOT GIVEN Project Name: BD K-4 22/37 Project Location: NOT GIVEN Analysis Date: 03/05/10 Sampling Date: 03/04/10 Sample Type: SOIL Sample Condition: COOL & INTACT Sample Received By: JH Analyzed By: HM

LAB NO.		(ma/ka)
	WEST SIDE BLENDED BACKFILL	(mg/kg)
	B PT. COMP.	04
	BPI. COMP.	
an an a marana an		
		an - Marine Balandar (1997), 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997
Quality Contro	1	500
True Value QC		500
% Recovery		100
Relative Perce	ent Difference	2.0

METHOD: Standard Methods Note: Analysis performed on a 1:4 w:v aqueous extract.

4500-CI'B

H19384 Rice

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising, whether based in contract or tort, shall be limited to the amount paid by client for analyse: All claims, including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within thirty (30) days after completion of the applicable service. In no event shall Cardinal be liable for incidential or consequential damages, including, whether such daim is based upon any of use, or loss of profils incurred by client, its subsidiaries affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such daim is based upon any of the above-stated reasons or otherwise. Result relate only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.

Address: 123 J. Tay Ic. Company Name: Rice Operating Co. Project Manager: HAck Corocher Address: 123 J. Tay Ic. City: Hobbs State: AM Zip: 98.34 Phone #: 393-9174 Fax #: 397-147/ Phone #: 393-9174 Fax #: 597-147/ Phone #: 500 K-4 22/37 Fax #: 597-147/ Phone #: 500 K-4 22/37 Fax #: 597-147/ Phone #: 500 K-4 22/37 Fax #: 500 K-4 22/37 Fax #: 500 K-4 200 K-147/ Phone #: 500 K-4 22/37 Fax #: 500 K-4 200 K-4 20	есhwood, Abilene, TX 79603 3-7001 FAX (325)673-7020 3-7001 FAX (325)673-7020 P.O. #: P.O. #: Address: Address: Company: Company: Address: State: S		CHAIN-OF-CUSTODY AND ANALYSIS REQUES	IALYSIS REQUES
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aany Name: Rice Operating Co. et Manager: HACK Corocler Bes: 123 W Taylor Bes: 123 W Taylor Bes: 393-9174 Faxt: 397-1471 et 8: 200000000000000000000000000000000000	M M M M		ANALYSIS	
Ct Manager: HACK Correlet Hebbs 20 Taylor Hebbs State: MM Zip: 863 e#: 393-9174 Fax#: 397-1471 e#: 393-9174 Fax#: 397-1471 et#: Project Owner: ct Name: BD X-4 22/37 ct Location: Brwee BAKer a use ontr a use ontr Brwee Blenclech C 1 mms BACKFII Bpt. Cerrip. C 1	ОПL RX SLUDGE Attri: Attri: RX Attri: RX <	AMPLING ATE TIME		
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ANALYTICAL RESULTS FOR RICE OPERATING COMPANY ATTN: HACK CONDER 122 W. TAYLOR HOBBS, NM 88240

Receiving Date: 03/05/10 Reporting Date: 03/05/10 Project Number: NOT GIVEN Project Name: BD K-4 22/37 Project Location: BD K-4 22/37 Sampling Date: 03/04/10 Sample Type: SOIL Sample Condition: COOL & INTACT Sample Received By: JH Analyzed By: AB/HM

GRO DRO (C₅-C₁₀) (>C₁₀-C₂₈) CI* (mg/kg) (mg/kg) (mg/kg)

LAB NUMBER SAMPLE ID

ANALYSIS DATE	03/05/10	03/05/10	03/05/10
H19386-1 8PT. IMPORTED SOIL COMP.	<10.0	<10.0	< 16
Quality Control	501	574	500
True Value QC	500	500	500
% Recovery	100	115	100
Relative Percent Difference	1.7	1.1	2.0

METHODS: TPH GRO & DRO: EPA SW-846 8015 M; CI[°]: Std. Methods 4500-CI[°]B *Analysis performed on a 1:4 w:v aqueous extract.

Reported on wet weight.

ene Chemis

Date

H19386 TCL RICE

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ANALYTICAL RESULTS FOR RICE OPERATING COMPANY ATTN: HACK CONDER 122 WEST TAYLOR HOBBS, NM 88240 FAX TO: (575) 397-1471

Receiving Date: 03/05/10 Reporting Date: 03/05/10 Project Owner: NOT GIVEN Project Name: BD K-4 22/37 Project Location: NOT GIVEN Analysis Date: 03/05/10 Sampling Date: 03/04/10 Sample Type: SOIL Sample Condition: COOL & INTACT Sample Received By: JH Analyzed By: HM

	CI
LAB NO. SAMPLE ID	(mg/kg)
H19385-1 8 PT. TOP SOIL COMP.	< 16
	nan na an fair ann an Anna an A
***************************************	,
Quality Control	500
True Value QC	500
% Recovery	100
Relative Percent Difference	2.0

METHOD: Standard Methods Note: Analysis performed on a 1:4 w:v aqueous extract.

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4500-CI'B

H19385 Rice

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APPENDIX B SITE PHOTOGRAPHS

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Excavating BD K-4 leak to 4' bgs



Placement of the liner in excavation



Backfilling the site with clean topsoil



Overview of site being backfilled



Seeding the site with native vegetation



Tilling the seed into the soil