1R - 220

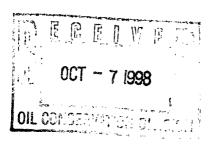
REPORTS

DATE:

1978-5

RICE Operating Company

122 West Taylor HOBBS, NEW MEXICO 88240 (505) 393-9174



October 6, 1998

Mr. Roger Anderson New Mexico Oil Conservation Division 2040 South Pacheco Santa Fe, New Mexico 87505

RE:

Groundwater Remediation Pipeline Leak, Junction L-31, ABO SWD System SE 1/4 of Section 31, T16S, R37E Lea County, New Mexico

Mr. Anderson:

Enclosed for your review is an unbound copy of the groundwater remediation operations performed in 1996, 1997, and 1998 at the above-referenced site. The work was conducted in accordance with recommendations from the New Mexico Oil Conservation Division and Rice Operating Company.

Background Information

Groundwater contamination was discovered at the site in September 1995 and groundwater recovery operations were initiated in October 1995. Remediation was accomplished by recovering groundwater from the former City of Lovington municipal water supply well (COL-6) using a submersible pump.

A subsurface investigation was performed in April 1996 to assess the extent of contamination (Subsurface Investigation Report, dated April 19, 1997). During the investigation three monitor wells (MW-1, MW-2, and MW-3) were installed. The three monitor wells were placed in a triangular configuration around the release location and orientated so that MW-1 is located upgradient and monitor wells MW-2 and MW-3 are located downgradient relative to regional ground water flow.

Groundwater Remediation Operations

Seven groundwater sampling events have been completed since the monitor wells were installed on April 17, 1996. A potentiometric surface map was constructed on the top of the water table from gauging data obtained during the sampling events. This data consistently shows that depth to the water table is approximately 77 feet below ground surface and the direction of groundwater flow is toward the east-southeast. Copies of the potentiometric surface maps and groundwater measurement tables are presented for each calendar year in Appendix A (1998), Appendix B (1997), and Appendix C (1998).

Monthly summaries of recovery system operations showing the volume recovered, pump rates, and monthly totals are presented for each calendar year in Appendices A, B, and C.

Sampling and Analytical Procedures

Prior to development and sampling, the monitor wells were gauged to obtain water level measurements. The wells were surge bailed to remove any fine granulated materials and then purged by manual bailing prior to collecting groundwater samples for laboratory analysis.

After purging, a water sample was obtained using a disposable bailer. The sample was placed into appropriate sample containers (typically a one-liter glass jar and two 40-milliliter sample vials) with zero headspace, labeled for sample identification, sealed with QA/QC seals, and preserved at 4° C in accordance with EPA Method 600/4-82-029. A chain-of-custody documenting the sample collection times and delivery time to the laboratory was completed for each event. The samples were transported to Cardinal Laboratories in Hobbs, New Mexico or shipped to Southern Petroleum Laboratories in Houston, Texas for analysis. The samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX), total dissolved solids (TDS), and chloride using EPA Methods SW 846-8260, 600/4-79-02-160.1, and 600/4-79-02-325.3, respectively.

All work associated with the groundwater monitoring events was performed by independent contractors. During at least one monitoring event per year the groundwater samples were analyzed for major cation and anion concentrations in addition to the above-listed constituents.

Analytical Results

BTEX concentrations in the water samples collected from MW-1, MW-3, MW-2 and COL-6 since April 17, 1996 have consistently recorded BTEX levels below method detection limits demonstrating that the dissolved hydrocarbon contamination has been successfully removed from the site.

TDS and Chloride levels in the water samples collected from the two downgradient monitor wells (MW-2 and MW-3) have consistently recorded levels below New Mexico Water Quality Control Commission (WQCC) human health standards for groundwater.

Since 1996, the well that most often contained TDS and chloride levels that exceeded WQCC standards (TDS < 1,000 ppm; Chloride < 250 ppm) was the upgradient well, MW-1. These results indicate that TDS and chloride levels near the WQCC standards represent background conditions at the site.

Analytical results from the groundwater samples obtained on February 14, 1998 and the samples collected on August 16, 1998 recorded concentrations below the WQCC standards in all of the wells with the exception of a TDS level of 1,091 ppm in MW-1 from February 14, 1998. The results of these two monitoring events are significant because groundwater recovery operations were shut-in during this time to allow the site reach equilibrium conditions. Typically if contamination is still present, an increase in contaminate levels is seen when pumping is stopped. In this instance, levels decreased in all four wells.

Summaries of the analytical results, copies of the laboratory reports, and chains-of-custody are presented for each calendar year in Appendices A, B, and C.

Conclusions

Based on the findings of these activities, Rice Operating has effectively delineated the extent of contamination and successfully remediated the groundwater to levels below background and near or below WQCC human health standards for groundwater.

Rice Operating Company requests that the NMOCD accept this document as a final report for the site and issue a letter requiring no further action.

Please contact me at the above listed number if you have any questions.

Sincerely,

F. Wesley Root

Projects Manager

Attachments:

Appendices A through C

cc. Mr. Chris Williams, NMOCD District I Supervisor, Hobbs Office

KH File

7. Wesley Root

APPENDIX A

1998 GROUNDWATER RECOVERY AND MONITORING OPERATIONS

Appendix A 1998 Groundwater Recovery and Monitoring Operations

A.1 Figures

February 14, 1998 Potentiometric Surface Map

August 16, 1998 Potentiometric Surface Map

A.2 Tables

Summary of Groundwater Measurements 1998

Summary of Water Sample Analytical Results 1998

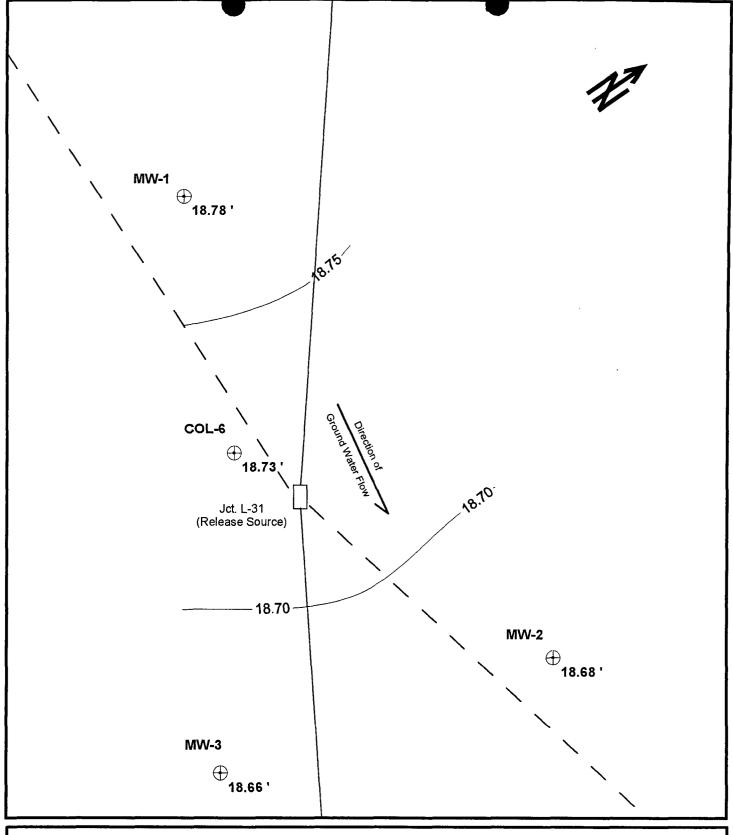
Summary of Recovery System Operations 1998

A.3 Analytical Results

February 14, 1998 Groundwater Monitoring Event
August 16, 1998 Groundwater Monitoring Event

APPENDIX A.1

FIGURES



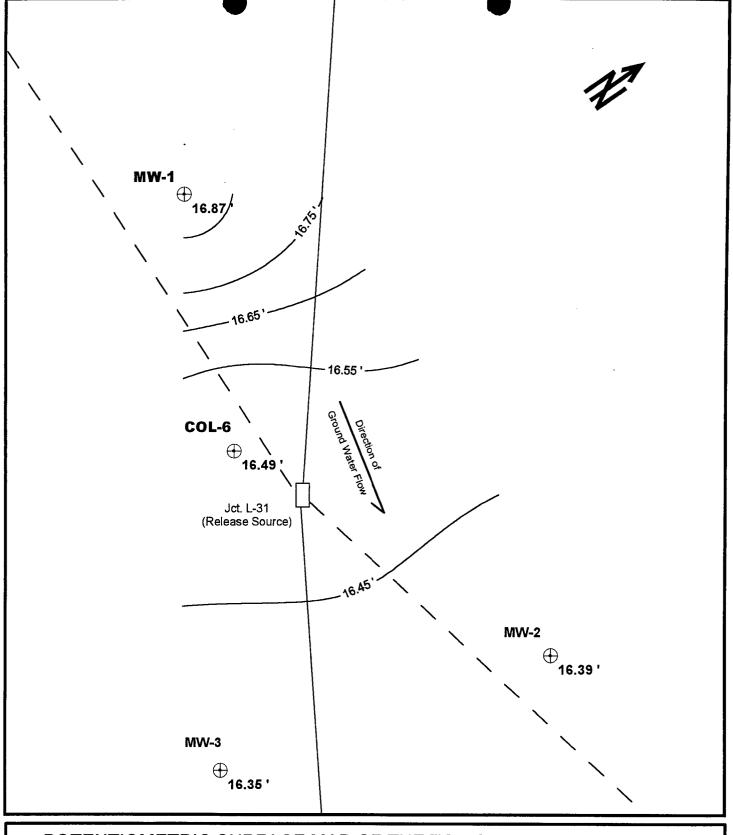
Jct. L-31 Release Site 31-T16S-R37E, Abo SWD System Lea County, New Mexico

> Rice Operating Company 122 W. Taylor Hobbs, NM 88240

Legend

Map Scale

0 feet 15 feet 30 feet



Jct. L-31 Release Site 31-T16S-R37E, Abo SWD System Lea County, New Mexico

> Rice Operating Company 122 W. Taylor Hobbs, NM 88240

Legend

Contour interval = 0.10 feet Constructed from gauging measurements obtained on 8/16/98 Relative BM = 100 feet, top of casing on MW-1

Rice Operating 4" AC pipeline

- — City of Lovington 6" AC pipeline

Map Scale

0 feet 15 feet 30 feet

APPENDIX A.2

TABLES

1998 SUMMARY OF GROUNDWATER MEASUREMENTS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Well	Date	Depth to	Water	Casing	Surface	LNAPL
Name	Gauged	Water*	Elevation**	Elevation**	Elevation**	Thickness
MW-1	02/14/98	81.22	18.78	100.00	97.6	0.00
MW-1	08/16/98	83.13	16.87	100.00	97.6	0.00
MW-2	02/14/98	81.15	18.68	99.83	97.2	0.00
MW-2	08/16/98	83.44	16.39	99.83	97.2	0.00
MW-3	02/14/98	81.27	18.66	99.93	97.4	0.00
MW-3	08/16/98	83.58	16.35	99.93	97.4	0.00
COL-6	02/14/98	81.58	18.73	100.31	97.6	0.00
COL-6	08/16/98	83.82	16.49	100.31	97.6	0.00

^{*} Well casings are marked to provide consistent reference points for gauging operations.

Correction equation for the water elevation suppression effect caused by the presence of LNAPLs.

Corrected water elevation = Elevation - (Depth to water - (Specific gravity * LNAPL thickness))

where specific gravity = 0.82 for crude oil.

COL-6 = City of Lovington Well No. 6. All measurements are in feet.

^{**} Calculated from survey plat performed by Rice Operating Company.

1998

SUMMARY OF WATER SAMPLE ANALYTICAL RESULTS BTEX, TDS, AND CHLORIDES JCT L-31 SPILL SITE, ABO SWD SYSTEM

Well Name NMWQCC	Date Sampled Standards	Benzene (ppm) 0.010	Toluene (ppm) 0.750	Ethylbenzene (ppm) 0.750	(ppm)	Total BTEX (ppm) N/A	TDS (mg/l) 1,000	Chloride (mg/l) 250
MW-1	02/14/98	<0.0020	<0.0020	<0.0020	<0.0060	<0.0060	1091	144
MW-1	08/16/98	<0.0020	<0.0020	<0.0020	<0.0060	<0.0060	573	94
MW-2	02/14/98	<0.0020	<0.0020	<0.0020	<0.0060	<0.0060	600	36
MW-2	08/16/98	<0.0020	<0.0020	<0.0020	<0.0060	<0.0060	418	76
MW-3	02/18/98	<0.0020	<0.0020	<0.0020	<0.0060	<0.0060	954	48
MW-3	08/16/98	<0.0020	<0.0020	<0.0020	<0.0060	<0.0060	317	42
COL-6	02/14/98	<0.0020	<0.0020	<0.0020	<0.0060	<0.0060	571	128
COL-6	08/16/98	<0.0020	<0.0020	<0.0020	<0.0060	<0.0060	442	69

Analysis was performed by Cardinal Laboratories in Hobbs. New Mexico.

Benzene, toluene, eythlbenzene, and xylene (BTEX); total dissolved solids (TDS), and chloride analyses were conducted using EPA Methods 8020, 160.1, and 352.3, respectively.

Results presented in bold print exceed NMWQCC human health standards for ground water.

COL-6 = City of Lovington Well No. 6.

All results are reported in milligrams per liter (mg/l); parts per million (ppm).

1998

SUMMARY OF WATER SAMPLE ANALYTICAL RESULTS WATER QUALITY DATA JCT L-31 SPILL SITE, ABO SWD SYSTEM

Well Name NMWQCC	Date Sampled Standards	Total Dissolved Solids (TDS) 1,000 mg/l	pH (S. U.) 6 to 9	Chloride (CI) 250 mg/l	Sodium (Na) N/A	Calcium (Ca) N/A	Magnesium (Mg) N/A	Potassium (K) N/A	Sulfate (SO4) 600 mg/l	Carbonate (CO3) N/A	Bicarbonate (HCO3)
MW-1	02/14/98	1,091	6.98	144	188.0	78.0	9.0	0.2	136.0	0	3 61
MW-1	08/16/98	573	N/A	94	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-2	02/14/98	600	N/A	36	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-2	08/16/98	418	N/A	76	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-3	02/14/98	954	N/A	48	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-3	08/16/98	317	N/A	42	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COL-6	02/14/98	571	7.48	128	87.0	80.0	15.0	0.3	83.0	0.0	224
COL-6	08/16/98	442	N/A	69	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Analysis was performed by Cardinal Laboratories in Hobbs, New Mexico.

COL-6 = City of Lovington Well No. 6.

All results are reported in milligrams per liter (mg/l): parts per million (ppm).

Results presented in bold print exceed NMWQCC human health standards for ground water.

1998

QUARTERLY SUMMARY OF RECOVERY SYSTEM OPERATIONS GROUNDWATER RECOVERY VOLUMES JCT L-31 SPILL SITE, ABO SWD SYSTEM

Date	Time	Volume	Avg Pump	Avg. Analyt	ical Result	Description
	Pumped (hours)	Recovered (gal)	Rate (GPM)	Chloride (ppm)	TDS (ppm)	
JAN 1998	744	446,400	10.0	N/A	N/A	
FEB 1998	192	115,200	10.0	128	571	Groundwater Monitoring Event
MAR 1998	0	0	0.0	N/A	N/A	
1ST QTR	936	561,600	10.0	128	571	
APR 1998	0	0	0.0	N/A	N/A	
MAY 1998	0	0	0.0	N/A	N/A	
JUN 1998	0	0	0.0	N/A	N/A	•
2ND QTR	0	0	0.0	N/A	N/A	
JUL 1998	0	0	0.0	N/A	N/A	
AUG 1998	0	0	0.0	69	442	Groundwater Monitoring Event
SEP 1998	0	0	0.0	N/A	N/A	_
3RD QTR	0	0	0.0	69	442	
OCT 1998	0	0	N/A	N/A	N/A	
NOV 1998	0	0	N/A	N/A	N/A	
DEC 1998	0	0	N/A	N/A	N/A	
4TH QTR	0	0	N/A	N/A	N/A	
1998			RATE & AN	ALYTICAL A	VERAGES	
TOTALS	936	561,600	10.0	99	507	

JANUARY 1998 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Grou	ndwater Re	ecovery Oper	ations	Analy	tical Resul	ts of Grou	ndwater Re	covered fr	om Pumpi	ng Well
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	100000000000000000000000000000000000000	Ethyl-	Xylene	Total
	Pumped	Recovered	Rate	Level	Level			benzene		BTEX
	(hours)	(gal)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
01/01/98	24	14,400	10	Ground v	vater reco	overed wit	h submer	sible pun	ib	
01/02/98	24	14,400	10	"	i.		"			
01/03/98	24	14,400	10	11			11			
01/04/98	24	14,400	10	"			11			
01/05/98	24	14,400	10	"			"			
01/06/98	24	14,400	10	"			"			
01/07/98	24	14,400	10	"			"			
01/08/98	24	14,400	10	",			**			
01/09/98	24	14,400	10	"			87			
01/10/98	24	14,400	10	"			u			
01/11/98	24	14,400	10	"			11			
01/12/98	24	14,400	10	"			"			
01/13/98	24	14,400	10	"			н			
01/14/98	24	14,400	10	"			"			
01/15/98	24	14,400	10	11			"			
01/16/98	24	14,400	10	11			11			
01/17/98	24	14,400	10	"			11			
01/18/98	24	14,400	10	11			11			
01/19/98	24	14,400	10	11			**			
01/20/98	24	14,400	10	"			"			
01/21/98	24	14,400	10	"			**			
01/22/98	24	14,400	10	"			"			
01/23/98	24	14,400	10	"			"			
01/24/98	24	14,400	10	".			"			
01/25/98	24	14,400	10	".			"			
01/26/98	24	14,400	10	"			"			
01/27/98	24	14,400	10				"			
01/28/98	24	14,400	10				"	į		
01/29/98	24	14,400	10	"			"			
01/30/98	24	14,400	10	[] 			" 	_:61	_	
01/31/98	24	14,400	10]			vered wit				
JAN 98		110 100	40			PRATE 8	*******			2116
TOTALS	744	446,400	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A

RAR140F.WB1

FEBRUARY 1998 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Groui	ndwater Ri	acovery Oper	ations	Analy	tical Resul	ts of Grou	ndwater Re	covered fi	om Pumpi	ng Well
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Toluene	Ethyl-	Xylene	Total
	Pumped	Recovered	Rate	Level	Level			benzene		BTEX
	(hours)	(gai)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
02/01/98	24	14,400	10	Ground v	vater reco	vered wit	h submer	sible pun	jb	
02/02/98	24	14,400	10	"			III 			
02/03/98	24	14,400	10	"				ļ		
02/04/98	24	14,400	10	"						
02/05/98	24	14,400	10	"			" 			
02/06/98	24	14,400	10	"			"		-	
02/07/98	24	14,400	10	"			"		ļ	
02/08/98	24	14,400		i .			h submer	•	•	
02/09/98	0	0	0	Recovery	y well shu	t-in for gr	oundwate	r monitori	ng event	
02/10/98	0	0	0	u u			"			
02/11/98	0	0	0	"			"			
02/12/98	0	0	0	11			"			
02/13/98	0	0	0	"			f1			
02/14/98	0	0	0	128	571	<0.001	<0.001	<0.001	<0.006	<0.006
02/15/98	0	0	0	Recovery	y well shu	t-in.				
02/16/98	0	0	0	"	"					
02/17/98	0	0	0	"	"			:		
02/18/98	0	0	0	"	"					
02/19/98	0	0	0	"	"					
02/20/98	0	0	0	"	"					
02/21/98	0	0	0	"	"					
02/22/98	0	0	0	11	"					
02/23/98	0	0	0	"	"					
02/24/98	0	0	0	11	"					
02/25/98	0	0	0	11	"					
02/26/98	0	0	0	11	"					
02/27/98	0	0	0	11	"					
02/28/98	0	0	0	Recovery	y well shu	t-in.				
FEB 98				AVERA			ANALY	 	******	
TOTALS	192	115,200	10	128	571	<0.001	<0.001	<0.001	<0.006	<0.006

MARCH 1998 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Grou	ndwater R	ecovery Oper	ations	Analytical Results of Groundwater Recovered from Pumping Well						
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Toluene	Ethyl-	Xylene	Total
	Pumped	Recovered	Rate	Level	Level	, ,		benzene		BTEX
00/04/00	(hours)	(gal)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
03/01/98	0	0	_	Recover	y well shu	t-In. I				
03/02/98	0	0	0	"						
03/03/98	0	0	0	" "	,					
03/04/98	0	0	0	" "						
03/05/98	0	0	0						i	
03/06/98	0	0	0							
03/07/98	0	0	0	"						
03/08/98	0	0	0	"	"					
03/09/98	0	0	0	"	"					
03/10/98	0	0	0	"	"					
03/11/98	0	0	0	"	11					
03/12/98	0	0	0	"	11					
03/13/98	0	0	0	"	"					
03/14/98	0	0	0	11	11 :					
03/15/98	0	0	0	11	"					
03/16/98	0	0	0	**	"					
03/17/98	0	0	0	11	"					
03/18/98	0	0	0	11	"					
03/19/98	0	0	0	"	11					
03/20/98	0	0	0	11	**					
03/21/98	0	0	0	"	"[
03/22/98	0	0	0	"	11					
03/23/98	0	0	0	II	*1					
03/24/98	0	0	0	"	"					
03/25/98	0	0	0	"	"					
03/26/98	0	0	0	11	"					
03/27/98	0	0	o	11	"					
03/28/98	0	0	0	"	11					
03/29/98	0	o	o	"	"					
03/30/98	0	o	0	"	"					
03/31/98	0	0	0	Recovery	well shut	-in.			,	
MAR 98						RATE &	ANALYT	ICAL RE	SULT	
TOTALS	0	0	0.0							N/A

APRIL 1998 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

	Groundwater Recovery Operations Analytical Results of Groundwater Recovered from Pumping Well											
Grou Date	ndwater Ri Time	ecovery Oper Volume	Avg Pump	Analy Chloride	tical Resul	ts of Grou	ndwater Re Toluene	Ethyl-	om Pumpi Xylene	ng Well Total		
Mare	Pumped	Recovered	Rate	Level	Level	Denterie	ividenc	benzene	VALEUE	BTEX		
	(hours)	(gal)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)		
04/02/98	0	0	0	Recover	y well shu	t-in.						
04/03/98	0	o	0	"	"							
04/04/98	0	o	0	"	"							
04/05/98	0	o	0	"	"							
04/06/98	0	0	0	"	"							
04/07/98	0	0	0	"	n							
04/08/98	0	0	0	"	"			:				
04/09/98	0	0	0	"	"							
04/10/98	0	0	0	11	"				,			
04/11/98	0	0	0	"	**							
04/12/98	0	0	0	"	11					}		
04/13/98	0	0	0	11	"							
04/14/98	0	0	0	11	11							
04/15/98	0	0	0	"	"							
04/16/98	0	0	0	"	Ħ							
04/17/98	0	0	0	"	#*				j			
04/18/98	0	이	0	"	"							
04/19/98	0	0	0	"	"							
04/20/98	이	이	0	"	"							
04/21/98	0	0	0	"	11'							
04/22/98	0	이	0	"	11							
04/23/98	0	0	0	**	"							
04/24/98	0	0	0		"	İ						
04/25/98	0	0	0	"	"							
04/26/98	0	0	0	"	"]	İ						
04/27/98	0	0	0		. "							
04/28/98	0	0	0	" "	".							
04/29/98	0	0	0	, " !	"[,						
04/30/98	0	0	0	Recovery					*****			
APR 98						RATE &						
TOTALS	0	0	0.0	N/A	NVA	WA	N/A	N/A	N/A	N/A		

MAY 1998 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Crow	ndwater Pr	acovery Oper	~~~~~~~~	Analytical Results of Groundwater Recovered from Pumping Well						
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Toluene	Ethyl-	Xylene	ng wen Total
	Pumped	Recovered	Rate	Level	Level			benzene	******	BTEX
	(hours)	(gal)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
05/01/98	0	0	0	Recover	y well shu	t-in.	-			
05/02/98	0	0	0		"		<u> </u>			
05/03/98	0	0	0	11	"					
05/04/98	0	0	0	11	"					
05/05/98	0	0	0	"	"					
05/06/98	0	0	0	"	"					
05/07/98	0	0	0	"	l II					
05/08/98	0	0	0	"	"					
05/09/98	0	0	0	11	"				•	
05/10/98	0	0	0	"	11					
05/11/98	0	0	0	"	"					
05/12/98	0	0	0	"	"					
05/13/98	0	0	0	11	"					
05/14/98	0	0	0	"	11					
05/15/98	0	0	0	11	11		·			
05/16/98	0	0	0	II	"					
05/17/98	0	0	0	"	**					
05/18/98	0	0	0	"	"					
05/19/98	0	0	0	"	**					
05/20/98	0	O	0	li .	"					
05/21/98	0	0	0	11	",					
05/22/98	0	0	0	"	"					
05/23/98	0	이	0							
05/24/98	0	0	0	"	"					
05/25/98	0	0	0	"	".					
05/26/98	0	0	0	",	"]					
05/27/98	0	0	0	" "	"					
05/28/98	0	0	0	"						
05/29/98	0	0	0	"						
05/30/98	0	0	0		"			İ		
05/31/98	0	0	0		well shut		***************************************	***************************************	***************************************	000000000000000000000000000000000000000
MAY 98	_		1	****************	SE PUMP					
TOTALS	0	0	0.0	N/A	N/A	N/A	N/A	N/A	WA	N/A

RAR140F.WB1

JUNE 1998 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Grou	ndwater Re	ecovery Oper	ations	Analytical Results of Groundwater Recovered from Pumping Well						
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Toluene	Ethyl-	Xylene	Total
	Pumped	Recovered	Rate	Level	Level			benzene		BTEX
00/04/00	(hours)	(gal)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
06/01/98	0	0	_	Recover	y well shu	t-ın. ı				
06/02/98	0	0	0	, ,						
06/03/98	0	0	0	"						
06/04/98	0	0	0	,,						
06/05/98	0	U	0	"	i			4		
06/06/98	0	0	0	,,	"					
06/07/98	0	0	0	11						
06/08/98	0	0	0	"	,,					
06/09/98	0	0	0	"						
06/10/98	0	0	0	11	11					
06/11/98 06/12/98	0	0	0	,,	",					
06/12/98	0	0	0	11	"					
06/13/98	0	0	0	#1						
06/15/98	0	0	0	"	,,					
06/16/98	0	0	0		"					
06/17/98	0	0	0	"	11					
06/17/08	0	ő	0	"	"					
06/19/98	0	0	0	11	"					
06/20/98	o	o	Ô	11	n					
06/21/98	ō	o	0	**	"					
06/22/98	0	ol	o	lt.	11					
06/23/98	o	o	0	11	"					
06/24/98	o	o	0	"	,,					
06/25/98	0	0	0	1)	u u					
06/26/98	0	0	0	11	n l					
06/27/98	0	0	0	"	"					j
06/28/98	0	0	o	"	"					į
06/29/98	0	0	o	"	"	ł				
06/30/98	0	0	o	Recovery	well shut	:-in.				
JUN 98					SE PUMP		ANALYT	CAL RES	SULTS	
TOTALS	0	0	0.0							N/A

JULY 1998 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

		SONOTI OSS	***************************************	Analytical Results of Groundwater Recovered from Pumping Well							
Date	Time	covery Oper Volume	Avg Pump	Chloride	TDS	Benzene	Toluene		Xylene	Total	
A4 14 144	Pumped	Recovered	Rate	Level	Level			benzene		BTEX	
	(hours)	(gal)	(GPM)	(mqq)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	
07/01/98	0	0	0	Recovery	well shu	t-in.					
07/02/98	0	0	0	**	"						
07/03/98	0	0	0	11	"						
07/04/98	0	0	0	"	"						
07/05/98	0	0	0	11	"						
07/06/98	0	0	0	**	"						
07/07/98	0	0	0	"	"			,	ļ		
07/08/98	0	0	0	**	"						
07/09/98	0	0	0	"	"				•		
07/10/98	0	0	0	"	"						
07/11/98	0	0	0	"	"						
07/12/98	0	0	0	*1	11						
07/13/98	0	0	0	**	"						
07/14/98	0	0	0	11	"						
07/15/98	0	0	0	"	"						
07/16/98	0	0	0	"							
07/17/98	0	0	0	**	"			'			
07/18/98	0	0	0	"							
07/19/98	0	0	0	" "	,,						
07/20/98	0	0	0	"	,,				•		
07/21/98	0	0	0	"	,,						
07/22/98	0	0	0	" "	"						
07/23/98	01	0	0	,,							
07/24/98	0	0	0		"						
07/25/98	0	0	0		11						
07/26/98	0	0	0	"	,,	'					
07/27/98	0	0	0	11	11						
07/28/98	0	0	0	"	**						
07/29/98	0	0	0	11	"	,					
07/30/98 07/31/98	0	0	•	Recovery	l Wallahii	l t₋in					
JUL 98		U	U				ANALYT	ICAL DE	RIII TO		
TOTALS	0	0	0.0	*******************	N/A	NA	*********			N/A	
UIALD	U	v	U,U	1012 in 1000	IX!IA	INDA	IW.A	IN//A	1,47,7-1	IN//A	

AUGUST 1998 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Grou	ndwater Ri	acovery Oper	JUIL-313	*****************	tical Resul		**********	covered fr	om Pumpi	na Well
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Toluene	Ethyl-	Xylene	Total
	Pumped	Recovered	Rate	Level	Level			benzene		BTEX
	(hours)	(gal)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
08/01/98	0	0	0	Recover	y well shu	t-in.				
08/02/98	0	0	0	11	"					
08/03/98	0	0	0	"	"		'			
08/04/98	0	0	0	11	"					
08/05/98	0	0	0	"	["					
08/06/98	0	0	0	"	"					
08/07/98	0	0	0	11	"					
08/08/98	0	0	0	"	"					
08/09/98	0	0	0	II II	"					
08/10/98	0	0	0	"	"					
08/11/98	0	0	0	"	["					
08/12/98	0	0	0	11	"					
08/13/98	0	0	0	"	**					
08/14/98	0	0	0	"	"'					
08/15/98	0	0	0	"						
08/16/98	0	0	0	_ 69			<0.001	<0.001	<0.006	<0.006
08/17/98	0	0	0	Recovery	y well shu	t-in.				
08/18/98	0	0	0	"	"					
08/19/98	0	0	0	"	"					
08/20/98	0	0	0	"	"					
08/21/98	0	0	0	"						
08/22/98	0	0	0	" "						
08/23/98	0	0	0	"]					
08/24/98	0	0	0	.,	".					
08/25/98	0	0	0	"	,					
08/26/98	0	0	0							
08/27/98	0	0	0	11	11					
08/28/98	0	U 0	0	11	,,,					
08/29/98	0	0	0		.,					
08/30/98 08/31/98	0	0	9	Pecoven	l / well shu	l t_in				
AUG 98	U	U	U		SE PUMP		ANALVI	IONI DE	SHI TC	
TOTALS	0	0	0.0	AVERA	************	<0.001	<0.001	<0.001	000000000000000000000000000000000000000	<0.006
IUIALO	v	•	V,V	9.5	444	70.001	>0.00 I	70.00	70.000	~~000

SEPTEMBER 1998 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Grou	ndwater Ri	ecovery Oper	·····	Analytical Results of Groundwater Recovered from Pumping Well								
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Toluene	Ethyl-	Xylene	Total		
	Pumped	Recovered	Rate	Level	Level			benzene		BTEX		
	(hours)	(gal)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)		
09/01/98	0	0	0	Recover	y well shu	t-in.						
09/02/98	0	0	0	11	"							
09/03/98	0	0	0	11	"							
09/04/98	0	0	0	"	"							
09/05/98	0	0	0	"	"			. 1		:		
09/06/98	0	0	0	"	"							
09/07/98	0	0	0	11	"							
09/08/98	0	0	0	"	"							
09/09/98	0	0	0	n	".							
09/10/98	0	0	0	11	"					;		
09/11/98	0	0	0	**	F 1							
09/12/98	0	0	0	11	II							
09/13/98	0	0	0	"	"							
09/14/98	0	0	0	11	It							
09/15/98	0	0	0	"	"							
09/16/98	0	0	0	"	11							
09/17/98	0	0	0	"	"							
09/18/98	0	0	0	"	н							
09/19/98	0	0	0	"	"							
09/20/98	0	0	0	"	11							
09/21/98	0	0	0	11	"							
09/22/98	0	0	0	Ħ	"							
09/23/98	0	0	0	11	"							
09/24/98	0	0	0	"	n							
09/25/98	0	0	0	11	11			İ				
09/26/98	0	0	0	"	"							
09/27/98	0	0	0	II .	11							
09/28/98	0	0	0	"	"							
09/29/98	0	0	0	"	11			:				
09/30/98	0	0	0	Recovery	well shu	t-in.						
SEP 98				AVERAC	SE PUMP	RATE &	ANALYT	CAL RES	BULTS			
TOTALS	0	0	0.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A		

RAR140F.WB1

APPENDIX A.3 ANALYTICAL RESULTS



PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR RICE OPERATING CO. ATTN: F. WESLEY ROOT 122 W. TAYLOR HOBBS, NM 88240 FAX TO: 505-397-1471

Receiving Date: 02/16/98

Reporting Date: 02/19/98

Project Owner: ABO SWD SYSTEM

Project Name: JCT L-31

Project Location: ABO SWD SYSTEM, LEA CO., NM

Sampling Date: 02/14/98

Sample Type: GROUNDWATER Sample Condition: COOL & INTACT

Sample Received By: BC

Analyzed By: BC

LAB NUMBER SA	MPLE ID	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE		02/18/98	02/18/98	02/18/98	02/18/98
H3461-1 MV	V-3	<0.002	<0.002	<0.002	<0.006
H3461-2 MV	V-2	<0.002	<0.002	<0.002	<0.006
H3461-3 CL	-6	<0.002	<0.002	<0.002	<0.006
H3461-4 MV	V-1	<0.002	<0.002	<0.002	<0.006
			2.400	0.400	0.004
Quality Control		0.106	0.108	0.102	0.304
True Value QC		0.100	0.100	0.100	0.300
% Accuracy		106	108	102	101
Relative Percent D	ifference	3.6	3.1	0	8.0

METHOD: EPA SW 846-8260

Chemist Cothe

Date





PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR RICE OPERATING CO. ATTN: F. WESLEY ROOT 122 W.TAYLOR HOBBS, NM 88240 FAX TO: 505-397-1471

Sampling Date: 02/14/98

Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT

Sample Received By: BC

Analyzed By: HM

Receiving Date: 02/16/98 Reporting Date: 02/19/98

Project Owner: ABO SWD SYSTEM

Project Name: JCT L-31

Project Location: ABO SWD SYSTEM, LEA CO., NM

TDS CI (mg/L) (mg/L)

ANALYSIS DATE:	02/18/98	02/16/98
H3461-1 MW-3	954	48
H3461-2 MW-2	600	36
Quality Control	NR_	472
True Value QC	NR	500
% Accuracy	NR	94.4
Relative Percent Difference	0.3	4.0

METHODO, FDA COOK TO CO	400.4	205.2
METHODS: EPA 600/4-79-02	160.1	325.3
, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		

Chemist Chemist

Date

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

ARDINAL LABORATORIES, INC.
2111 Beechwood, Abilene, TX 79603 101 East Marland, Hobbs, NM 88240

	(915) 673-7001 Fax (915)	673	-702	20	(505	5) 3	93-2	232	6 Fa	X ((505) 39:	3-2476					;				Pa	ge/_	_ of		
Company Name: 🥂	ice Operation Cor	200	vu															ANA	LYSIS	RE	QUES	ST				
Project Manager:	F. Wasley Root										9	PO#	:													
Address: 122 L	Nast TAYLOR							Con	npa	пу:	R	(OC					1	1								
City: Hobbs	State: NM Zip	: 8	85	40				Attn	: F	· Wa	2sl	ay Ros	+					1				1	} '	'	•	\ · \
Phone #: 505-3	93-9174							Add	res	s: ?	2	. W, TA	yLor				ļ				ļ	[. [
Fax#: 505-3	97-1471							City	:	Hob	h:	3					3				Ì			(
Project #:	Project Owner	: A.	30	5W	D 59	rste	n	Staf	e:	NN	1	Zip:	88540	<u> </u>			MNions]				
	ct L-31							Pho	ne	#: 5	0	5-393	-9174	,			1 ~			}		1			.`	
Project Location: A	1BO SWO: System, L	eA	Co.	. 1				Fax	_	_	5	- 397 -		20			CAtions		-	l		1			" ·	
FOR LAB USE ONLY					MA	TRIX	<u> </u>	4	PI	RES.	1	SAMPLI	NG	80	1	V	12				j		1			•
LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP	# CONTAINERS	GROUNDWATER	WASTEWATER	OIL	SLUDGE	OTHER:	ACID:	ICE / COOL	Old Ind.	DATE	TIME	BTEX 8	TD 5		Major CP	1 '								
NR 461-1	MW-3	G	3	V						V _	_	2-14-98	12:05	V	V.	V										
-2	MW-2	G	3	V						V	į	2-14-98	12:20	V	V	V										<u> </u>
-3	CL-6	G	3	V						V	_	2-14-98	12:45	V.	V		V			<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
-4	MW-1	G	3	<u> </u>	_ _	<u> </u>			\perp	V	_	2-14-78	12:53	V	V		V			<u> </u>	<u> </u>	<u> </u>	 	 	↓	<u> </u>
		1_		<u> </u>		-		_	_	_	4	 -	<u> </u>	 	<u> </u>	ļ	-	-		 ,	ļ	ļ	↓	 	 	
		 	-			+-					4		 	} -	 			┼			-	-	┼	├	 	
		╁	-	$\vdash +$	+	┼─	\vdash	-	\dashv		╁		 	├	├	╂	-	╂		-	-	┼	+		┼	-
		╂╌	\vdash	\vdash		+	\vdash		\dashv		+		 	1		1	+-	+	_	 	-	-	+	 	 	
		1			1	†				-	1			1	1	1	1	1	1		1	1	†	1	1	
analyses. All claims including thos service. In no event shall Cardinal	<u> 4116</u>	gee, inci nereund	l be duding to by C	eemed v without i erdnal,	valved u imitation	niese n , busin ess of v	nada ir ess ini vhethe	willin emupti	g and lone, k	receive	d by	Cardinal within or loss of profits	30 days after co incurred by clien	mpletion of it, its subsitions or othe Suit [] It: []	the application, makes,		o Addi	:	ferms and (00 days past and all costs Fax #:	due at the	rate of 24	1% per ann	rum from the		ore than ate of involc	e, .
Relinguished By:	Date:	:5	<u></u>	Rec	elve	d By	<u>/: (I</u>	ab	Sta	ff)			-													

Ellisates of Saccessors at Isling out of Or Teleton to all particular	o or services therein tool of	Particular, 10 gar a coro di minusia. Soci faranti la partici di ano	DOTO BIALLUCI GESCITA OF CARCIMISO.		
Sampler Relinquished:	216 98	Received By:	Phone Result Yes Fax Result: Yes	☐ No Additional Fax #: ☐ No	·
H. Sam	Time; : 50		REMARKS:		
Relinquished By:	Date:	Received By: (Lab Staff)	1		
)	Time:	Burest La Cook			
Delivered By: (Circle One)	-	Sample Condition CHECKED BY:	7		
Sampler UPS - Bus - Other:		Cool Mact (Initials) ☐ Yes ☐ Yes ☐ No ☐ No			

T Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.



PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR RICE OPERATING COMPANY ATTN: F. WESLEY ROOT 122 WEST TAYLOR HOBBS, NM 88240 FAX TO: (505) 397-1471

Receiving Date: 08/17/98

Reporting Date: 08/18/98
Project Number: NOT GIVEN

Project Name: ABO SPILL SITE

Project Location: ABO SWS SYSTEM, LEA CO. NM

Sampling Date: 08/16/98

Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT

Sample Received By: AH

Analyzed By: BC

LAB NO.	SAMPLE ID	BENZENE (mg/Kg)	TOLUENE (mg/Kg)	ETHYL BENZENE (mg/Kg)	TOTAL XYLENES (mg/Kg)
ANALYSIS I	DATE	08/17/98	08/17/98	08/17/98	08/17/98
H3795-1	MW-3	<0.002	<0.002	<0.002	<0.006
H3795-2	MW-2	<0.002	<0.002	<0.002	<0.006
H3795-3	MW-1	<0.002	<0.002	<0.002	<0.006
H3795-4	COL-6	<0.002	<0.002	<0.002	<0.006
Quality Cont	trol	0.092	0.090	0.088	0.270
True Value	JC	0.100	0.100	0.100	0.300
% Recovery		91.5	90.4	88.4	90.1
Relative Per	cent Difference	8.5	8.1	5.6	5.1

METHOD: EPA SW 846-8260

purely of koone

Data

)ate

ARDINAL LABORATORIES, INC.

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

2111 Beechwood, Abilene, TX 79603 101 East Marland, Hobbs, NM 88240 (915) 673-7001 Fax (915) 673-7020 (505) 393-2326 Fax (505) 393-2476

† Cardinal cannot accept verbal changes. Please fax written changes to 915-673-7020.

(915) 6/3-/001 Fax (915) 6/3-/020 (505)	393-2320 F AX (303) 393-2470									
Company Name: RICE Operating Company		ANALYSIS REQUEST								
Project Manager: F. Wesley Root	Manager: F. Wesley Root BILL TO PO#:									
Company Name: RICE Operating Company Project Manager: F. Wesley Root Address: 122 West Taylor	Company: ROC									
City: Hobbs State:NM Zip: 88240	Attn: F. Wesley Root									
Phone #: 505 - 393 - 9174	Address: 122 W, Taylor									
Fax#: 505-397-1471	City: Hobbs									
Project #: Project Owner: Abo SWD System										
Project Name: Ako Spill Sita	Phone #: 505-393-9/74									
Project Location: Abo SUS System, Les Co. NM	Fax #: 505-397-1471									
FOR LAB USE ONLY MATRIX	PRES. SAMPLING									
(G)RAB OR (C)OMP. # CONTAINERS GROUNDWATER WASTEWATER SOIL OIL	ACID: ICE / COOL OTHER: OTHER:	NTEX TDS Chlorid								
H3795- MW-3 G3V	V 8-16-78 7:10	VVV								
-2 MW-2 G 3 V	V 8-16-98 7:50	VVV								
-3 MW-1 G3V	V 8-K-98 8:30	VVV								
-9 COL-6 G3V	V 8-16-98 9:00	VVV								
	 									
										
	 	$ar{}$								
**LEASE NOTE: Uability and Damages. Cardnafe liability and clear's exclusive remedy for any claim arising whether based in contract or tort, shall be finited to the amount paid by the client for the anount paid										
Sampler Relinquished: Date: S116/98 Received By: Time: 7. Lules	Ex Result REMARKS									
Date: 9-17-78 Time: 7:50 CHECKED BY: (Lab Staff) Delivered By: (Circle One) Sampler - UPS - Bus - Other: Date: 9-17-78 Received By: (Lab Staff) Received By: (Lab Staff) CHECKED BY: (Initials) Sampler - UPS - Bus - Other:										

APPENDIX B

1997 GROUNDWATER RECOVERY
AND
MONITORING OPERATIONS

Appendix B 1997 Groundwater Recovery and Monitoring Operations

B.1 Figures

April 23, 1997 Potentiometric Surface Map

July 2, 1997 Potentiometric Surface Map

December 6, 1997 Potentiometric Surface Map

December 23, 1997 Potentiometric Surface Map

B.2 Tables

Summary of Groundwater Measurements 1997

Summary of Water Sample Analytical Results 1997

Summary of Recovery System Operations 1997

B.3 Analytical Results

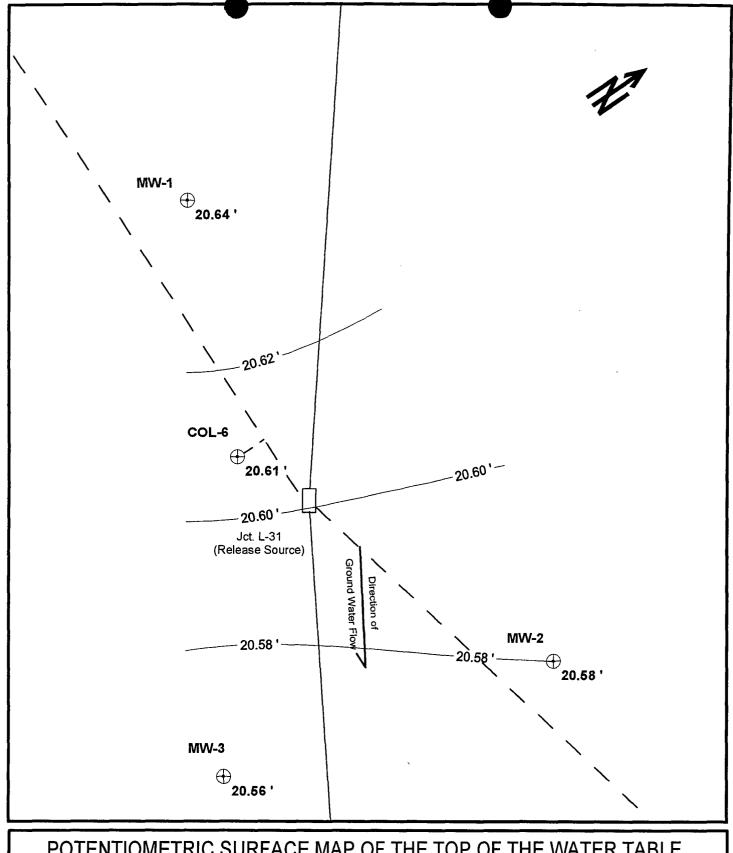
April 3, 1997 Groundwater Monitoring Event

July 2, 1997 Groundwater Monitoring Event

December 6, 1997 Groundwater Monitoring Event

APPENDIX B.1

FIGURES



Jct. L-31 Release Site 31-T16S-R37E, Abo SWD System Lea County, New Mexico

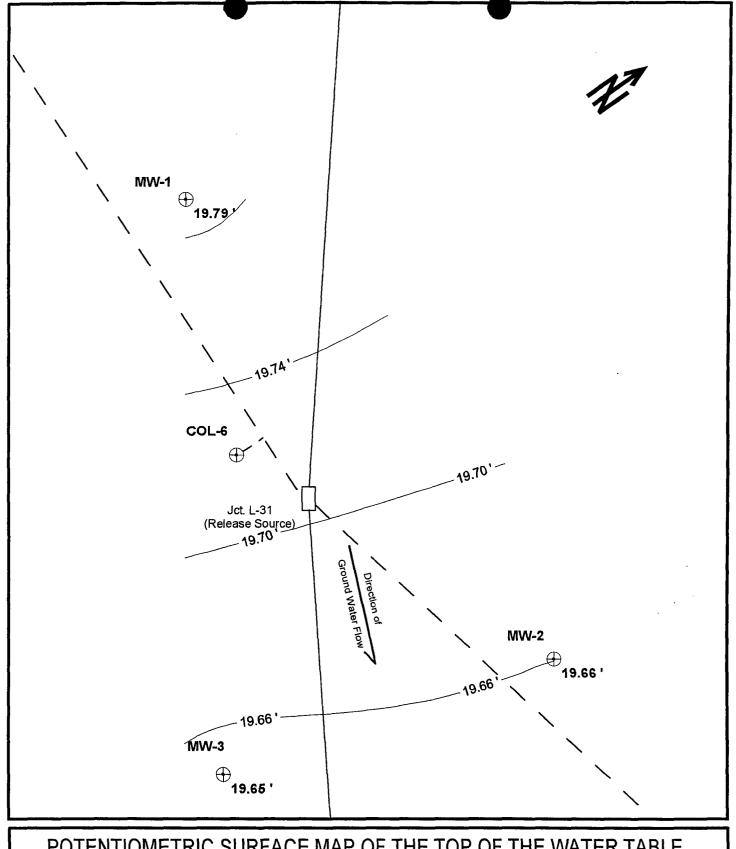
> Rice Operating Company 122 W. Taylor Hobbs, NM 88240

Legend

Contour interval = 0.02 feet Constructed from gauging measurements obtained on 4/23/97 Relative BM = 100 feet, top of casing on MW-1

Rice Operating 4" AC pipeline City of Lovington 6" AC pipeline

Map Scale



Jct. L-31 Release Site 31-T16S-R37E, Abo SWD System Lea County, New Mexico

> Rice Operating Company 122 W. Taylor Hobbs, NM 88240

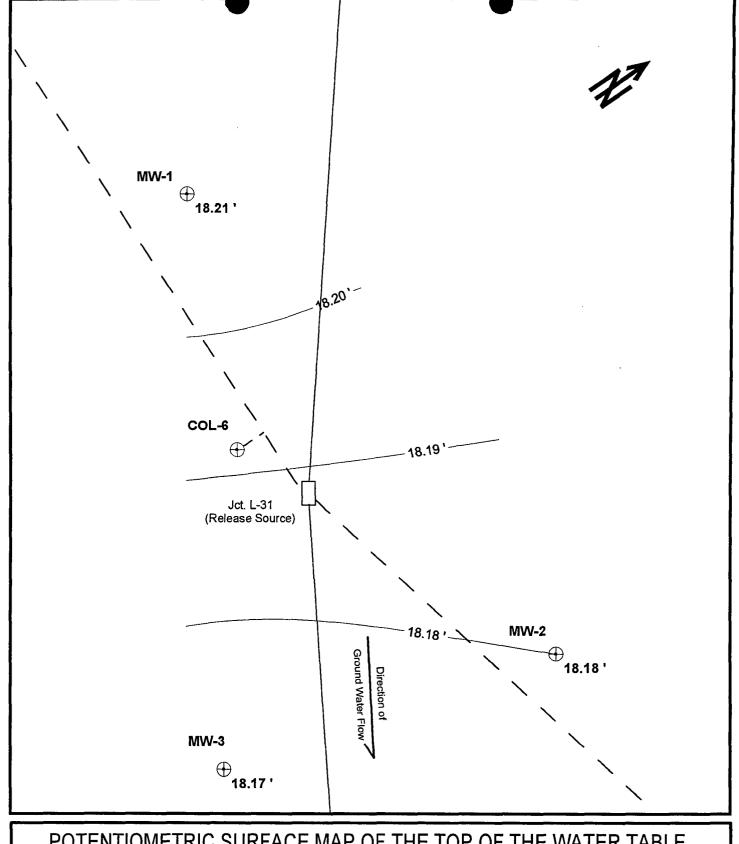
Legend

Contour interval = 0.04 feet Constructed from gauging measurements obtained on 7/02/97 Relative BM = 100 feet, top of casing on MW-1

Rice Operating 4" AC pipeline City of Lovington 6" AC pipeline

Map Scale

<u>30</u>,



Jct. L-31 Release Site 31-T16S-R37E, Abo SWD System Lea County, New Mexico

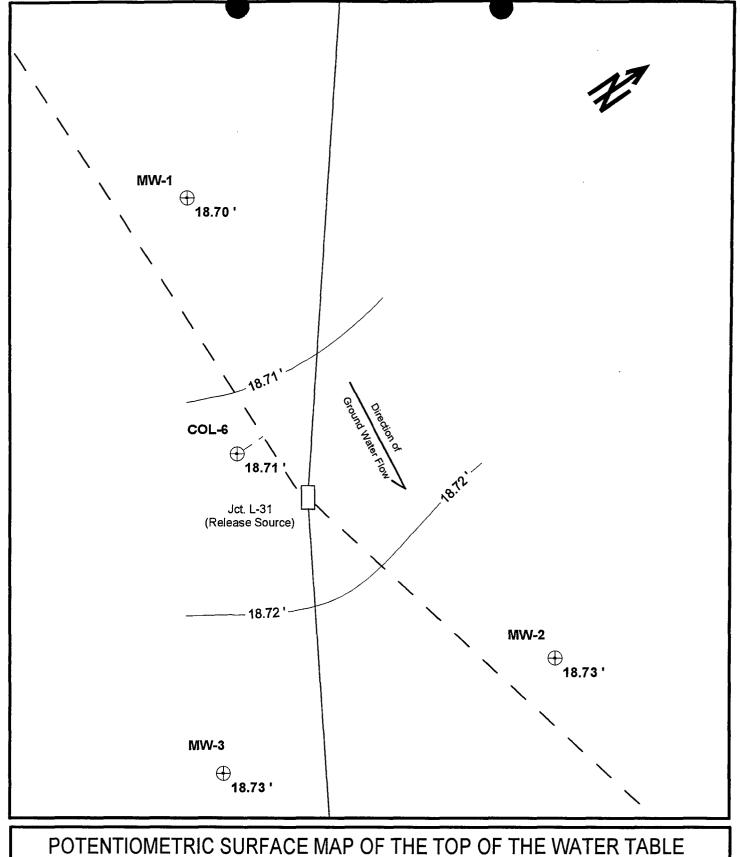
> Rice Operating Company 122 W. Taylor Hobbs, NM 88240

Legend

Contour interval = 0.01 feet Constructed from gauging measurements obtained on 12/06/97 Relative BM = 100 feet, top of casing on MW-1

Rice Operating 4" AC pipeline
 City of Lovington 6" AC pipeline

Map Scale



Jct. L-31 Release Site 31-T16S-R37E, Abo SWD System Lea County, New Mexico

> Rice Operating Company 122 W. Taylor Hobbs, NM 88240

Legend

Contour interval = 0.01 feet Constructed from gauging measurements obtained on 12/23/97 Relative BM = 100 feet, top of casing on MW-1

Rice Operating 4" AC pipeline

- — City of Lovington 6" AC pipeline

Map Scale <u>30</u>, APPENDIX B.2

TABLES

1997 SUMMARY OF GROUNDWATER MEASUREMENTS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Well	Date	Depth to	Water	Casing	Surface	LNAPL
Name	Gauged	Water*	Elevation**	Elevation**	Elevation**	Thickness
MW-1	04/23/97	79.36	20.64	100.00	97.6	0.00
MW-1	07/02/97	80.21	19.79	100.00	97.6	0.00
MW-1	12/06/97	81.79	18.21	100.00	97.6	0.00
MW-1	12/23/97	81.30	18.70	100.00	97.6	0.00
MW-2	04/23/97	79.25	20.58	99.83	97.2	0.00
MW-2	07/02/97	80.17	19.66	99.83	97.2	0.00
MW-2	12/06/97	81.65	18.18	99.83	97.2	0.00
MW-2	12/23/97	81.10	18.73	99.83	97.2	0.00
MW-3	04/23/97	79.37	20.56	99.93	97.4	0.00
MW-3	07/02/97	80.28	19.65	99.93	97.4	. 0.00
MW-3	12/06/97	81.76	18.17	99.93	97.4	0.00
MW-3	12/23/97	81.20	18.73	99.93	97.4	0.00
COL-6	04/23/97	79.70	20.61	100.31	97.6	0.00
COL-6	12/23/97	81.60	18.71	100.31	97.6	0.00

^{*} Well casings are marked to provide consistent reference points for gauging operations.

Correction equation for the water elevation suppression effect caused by the presence of LNAPLs.

Corrected water elevation = Elevation - (Depth to water - (Specific gravity * LNAPL thickness))

where specific gravity = 0.82 for crude oil.

COL-6 = City of Lovington Well No. 6. All measurements are in feet.

^{**} Calculated from survey plat performed by Rice Operating Company.

SUMMARY OF WATER SAMPLE ANALYTICAL RESULTS BTEX, TDS, AND CHLORIDES JCT L-31 SPILL SITE, ABO SWD SYSTEM

Well Name	Date Sampled	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Xylenes (ppm)	Total BTEX (ppm)	TDS (mg/l)	Chloride (mg/l)
NMWQCC	Standards	0.010	0.750	0.750	0.620	N/A	1,000	250
MW-1	04/03/97	<0.0010	<0.0010	< 0.0010	<0.0030	<0.0030	1042	258
MW-1	07/02/97	<0.0010	< 0.0010	< 0.0010	< 0.0030	< 0.0030	1066	250
MW-1	12/06/97	<0.0020	< 0.0020	<0.0020	<0.0060	<0.0060	449	80
MW-2	04/03/97	0.0020	<0.0010	< 0.0010	< 0.0030	< 0.0030	617	92
MW-2	07/02/97	<0.0010	< 0.0010	< 0.0010	< 0.0030	< 0.0030	464	96
MW-2	12/06/97	<0.0020	< 0.0020	<0.0020	<0.0060	<0.0060	857	180
MW-3	04/03/97	0.5070	0.0020	0.0020	0.0090	0.5200	515	58
MW-3	07/02/97	<0.0010	<0.0010	< 0.0010	< 0.0030	< 0.0030	454	58
MW-3	12/06/97	<0.0020	< 0.0020	< 0.0020	< 0.0060	< 0.0030	364	48
MW-3 (SPL)	12/06/97	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	N/A	N/A
COL-6	04/03/97	0.0010	<0.0010	<0.0010	<0.0030	<0.0030	780	276
	07/02/97	<0.0010	<0.0010	<0.0010	< 0.0030	<0.0030	836	246
COL-6	12/06/97	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Analysis was performed by Cardinal Laboratories in Hobbs, New Mexico.

Samples labeled (SPL) were analyzed by Southern Petroleum Laboratories, Houston, Texas.

Benzene, toluene, eythlbenzene, and xylene (BTEX); total dissolved solids (TDS); and chloride analyses were conducted using EPA Methods 8020, 160.1, and 352.3, respectively.

Results presented in bold print exceed NMWQCC human health standards for ground water.

COL-6 = City of Lovington Well No. 6.

All results are reported in milligrams per liter (mg/l): parts per million (ppm).

SUMMARY OF WATER SAMPLE ANALYTICAL RESULTS WATER QUALITY DATA JCT L-31 SPILL SITE, ABO SWD SYSTEM

Well Name	Date Sampled	Total Dissolved Solids (TDS)	pH (S. U.)	Chloride (CI)	Sodium (Na)	Calcium (Ca)	Magnesium (Mg)	Potassium (K)	Sulfate (SO4)	Carbonate (CO3)	Bicarbonate (HCO3)
NMWQCC	Standards	1,000 mg/l	6 to 9	250 mg/l	N/A	N/A	N/A	N/A	600 mg/l	N/A	N/A
MW-1	04/03/97	1,042	7.44	258	250.0	83.0	25.0	0.6	***************************************		346
MVV-1	07/02/97	1,066	N/A	250	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MVV-1	12/06/97	449	N/A	80	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-2	04/03/97	617	7.25	92	52.0	64.0	24.0	0.1	87.0		
MW-2	07/02/97	464	N/A	96	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-2	12/06/97	857	N/A	180	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-3	04/03/97	515	7.36	58	63.0	69.0	18.0	<0.1	106.0		
MW-3	07/02/97	454	N/A	58	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-3	12/06/97	364	N/A	48	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COL-6	04/03/97	780	7.65	276	166.0	88.0	29.0	1.9	126.0	0.0	224
COL-6	07/02/97	836	N/A	246	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COL-6	12/06/97	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Analysis was performed by Cardinal Laboratories in Hobbs, New Mexico.

COL-6 = City of Lovington Well No. 6.

All results are reported in milligrams per liter (mg/l): parts per million (ppm).

Results presented in bold print exceed NMWQCC human health standards for ground water.

QUARTERLY SUMMARY OF RECOVERY SYSTEM OPERATIONS GROUNDWATER RECOVERY VOLUMES JCT L-31 SPILL SITE, ABO SWD SYSTEM

Date	Time Volume Avg Pump Av		Avg. Analy	tical Result	Description	
	Pumped (hours)	Recovered (gal)	Rate (GPM)	Chloride (ppm)	TDS (ppm)	
JAN 1997	744	1,026,720	23.0	244	806	
FEB 1997	672	927,360	23.0	220	694	
MAR 1997	744	1,026,720	23.0	172	669	
1ST QTR	2,160	2,980,800	23.0	212	723	
APR 1997	185	244,200	22.0	232	632	Groundwater Monitoring Event
MAY 1997	744	982,080	22.0	184	742	_
JUN 1997	672	887,040	22.0	N/A	N/A	
2ND QTR	1,601	2,113,320	22.0	208	687	
JUL 1997	518	683,760	22.0	211	772	Groundwater Monitoring Event
AUG 1997	744	982,080	22.0	168	685	-
SEP 1997	720	950,400	22.0	156	544	
3RD QTR	1,982	2,616,240	22.0	178	667	
OCT 1997	744	982,080	22.0	140	617	
NOV 1997	720	950,400	22.0	140	621	
DEC 1997	96	126,720	22.0	165	565	Groundwater Monitoring Event
4TH QTR	1,560	2,059,200	22.0	148.3	601.0	
1997			RATE & A	VALYTICAL A	VERAGES	
TOTALS	7,303	9,769,560	22,3	187	669	

JANUARY 1997 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Date Time Volume Recovered Rate Level Level Level Level Denzene Denzene Denzene Denzene Denzene Groune Denzene D	Grou	ındwater Ri	ecovery Opera	tions			Its of Grour		covered fro	m Pumpir	g Well
Chours Cyalj CoPM	******************************	00000000000000000000000000000000000000	Execution 0.000 (0.000		Chloride	TDS	Benzene	Taluene	Ethyl-	Xylene	Total
01/01/97		Pumped	Recovered	Rate	Level	Level			benzene		BTEX
01/01/97		(hours)	(gal)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
01/03/97	01/01/97	24		23	Ground w	ater rec	overed wit	h submers	sible pump		
01/103/97	01/02/97	24	33,120		**	l		<u> 11</u>	j		
01/05/97	01/03/97	24	33,120	23	"			"			
01/06/97	01/04/97	24	33,120		"			"		Ì	
01/07/97	01/05/97	24	33,120		17			[" 			
01/08/97	01/06/97	24	33,120		11			in I	<u>.</u>		
01/10/9/7	01/07/97	24	33,120	23	n:				·		
01/10/97	01/08/97	24	33,120	23	"]"			
01/11/97	01/09/97	24	33,120	23	"			"			
01/11/9/7	01/10/97	24	33,120		"			ļ"			
01/13/97	01/11/97	24	33,120	23	"			["		ļ	:
01/14/97	01/12/97	24	33,120	23	11			 "			
01/14/97	01/13/97	24	33,120		10			["		Į.	
01/15/97	01/14/97				"			i			
01/16/97	01/15/97	24	33,120	23	"			 "	İ		
01/18/97	01/16/97	24	33,120		"				İ		
01/19/97 24 33,120 23 " " " " "	01/17/97	24	33,120	23	"			["			
01/20/97 24 33,120 23 "	01/18/97	24	33,120		"]"			
01/21/97	01/19/97	24	33,120		11			1º			
01/21/97	01/20/97				11			[
01/23/97					"	1					
01/24/97					"	!		1			
01/25/97	1				".	İ		\" }			
01/26/97 24 33,120 23 " " " " " " 01/27/97 24 33,120 23 " " " " " " " " " " " 01/28/97 24 33,120 23 " " " " " " " " 01/30/97 24 33,120 23 244 806 N/A					"			["			
01/27/97 24 33,120 23 " " " " " 01/28/97 24 33,120 23 " " " " " " 01/29/97 24 33,120 23 " " " " N/A N/A <t< td=""><td></td><td></td><td></td><td></td><td>] "]</td><td></td><td></td><td> " ₁₁</td><td>}</td><td></td><td></td></t<>] "]			" ₁₁	}		
01/28/97 24 33,120 23 "					"	e:		ĺ			
01/29/97 24 33,120 23 " " " N/A N/A <td>1</td> <td></td> <td>1</td> <td></td> <td>[</td> <td></td> <td></td> <td> </td> <td></td> <td></td> <td></td>	1		1		[
01/30/97 24 33,120 23 244 806 N/A N	ľ				[",	1		,, ,,			į
01/31/97 24 33,120 23 Ground water recovered with submersible pump AVERAGE PUMP RATE & ANALYTICAL RESULT	1		1			906	NI/A	N/A	N/A	NI/A	NI/A
JAN 97 AVERAGE PUMP RATE & ANALYTICAL RESULT						l .	1		•		19/74
			33, I∠U	23							
TOTALS 744 1,026,720 23.0 244 806 N/A N/A N/A N/A N/A N		744	4 000 700	22 n				***********	*******************		N/A

FEBRUARY 1997 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Gro	undwater P	ecovery Opera	dions			Its of Grour		covered fro	m Pumnir	ın Well
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Toluene	Ethyl-	Xylene	Total
	Pumped	Recovered	Rate	Level	Level			benzene		BTEX
	(hours)	(gai)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
02/01/97	24	33,120	23	Ground w	ater rec	overed witl	h submers			
02/02/97	24	33,120	23	п			"		1	
02/03/97	24	33,120	23	"]"]	
02/04/97	24	33,120	23	יי			u .			
02/05/97	24	33,120	23	н			"			
02/06/97	24	33,120	23	"			"			
02/07/97	24	33,120	23	11			11			
02/08/97	24	33,120	23	11			П			
02/09/97	24	33,120	23	11			11			
02/10/97	24	33,120	23	11			11	.	i	
02/11/97	24	33,120	23	11			11			
02/12/97	24	33,120	23	11			"			
02/13/97	24	33,120	23	"			11			
02/14/97	24	33,120	23	"			"			
02/15/97	24	33,120	23	u l			11			
02/16/97	24	33,120	23	11						
02/17/97	24	33,120	23	"			11			
02/18/97	24	33,120	23	"			"			
02/19/97	24	33,120	23	11			"			
02/20/97	24	33,120	23							
02/21/97	24	33,120	23	"						
02/22/97	24	33,120	23	"			"			
02/23/97	24	33,120	23	"						
02/24/97	24	33,120	23]	"		ļ	
02/25/97	24	33,120	23	".]					j	
02/26/97	24	33,120	23	"		1	"			
02/27/97	24	33,120	23				"			
02/28/97	24	33,120	23	220	694	N/A	N/A	N/A	N/A	N/A
FEB 97						PRATE&				
TOTALS	672	927,360	23.0	220	694	N/A	N/A	N/A	N/A	N/A

MARCH 1997 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Gro	undwater R	ecovery Opera	tions	Analytical Results of Groundwater Recovered from Pumping Well						g Well
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Toluene	Ethyl-	Xylene	Total
	Pumped	Recovered	Rate	Level	Level			benzene		BTEX
	(hours)	(gal)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
03/01/97	24	33,120	23		ater rec	overed wit	h submers	sible pump		
03/02/97	24	33,120	23	"			"			
03/03/97	24	33,120	23	"			"			Ì
03/04/97	24	33,120	23	"		ļ	"			
03/05/97	24	33,120	23	"			11			
03/06/97	24	33,120	23	п			"			
03/07/97	24	33,120	23	11			"			
03/08/97	24	33,120	23	11			"			
03/09/97	24	33,120	23	"			"			
03/10/97	24	33,120	23	11			11			
03/11/97	24	33,120	23	11			11			
03/12/97	24	33,120	23	11		,	H	1		
03/13/97	24	33,120	23	"			11			
03/14/97	24	33,120	23	11			11			
03/15/97	24	33,120	23	"			"			
03/16/97	24	33,120	23	"			"			
03/17/97	24	33,120	23	111			"			
03/18/97	24	33,120	23	11			n			
03/19/97	24	33,120	23	"]			"			
03/20/97	24	33,120	23	"			"			
03/21/97	24	33,120	23	"			II .			
03/22/97	24	33,120	23	"	:		.11			
03/23/97	24	33,120	23	"	:					
03/24/97	24	33,120	23	"]						
03/25/97	24	33,120	23	"}						
03/26/97	24	33,120	23	"			H 			
03/27/97	24	33,120	23	"						1
03/28/97	24	33,120	23	"			11			
03/29/97	24	33,120	23	"]						
03/30/97	24	33,120	23	"			"	i		
03/31/97	24	33,120	23	172	669	N/A	N/A	_N/A	N/A	_N/A
MAR 97						P RATE &				
TOTALS	744	1,026,720	23.0	172	669	N/A	N/A	N/A	N/A	N/A

APRIL 1997 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

	Groundwater Recovery Operations					ilts of Groun				
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Toluene	Ethyl-	Xylene	Total
	Pumped	Recovered	Rate	Level	Level			benzene		BTEX
	(hours)	(gal)	(GPM)	(ppm)	(ppm)		(ppm)	(ppm)	(ppm)	(ppm)
04/01/97	8	10,890	23			overed wit				ı
04/02/97	0	0	0		•	ut-in for gro			T	
04/03/97	0	0	0	276		•	<0.001	<0.001	<0.003	<0.003
04/04/97	0	0	0	Recovery	well sh	ut-in.			Ì	
04/05/97	0	0	0	"		111		ĺ		
04/06/97	0	0	0	tf		"				
04/07/97	0	0	0	**		"			{	{
04/08/97	0	0	0	**		**				
04/09/97	0	0	0	"		"		}	ŀ	
04/10/97	0	0	0	11		"		,		
04/11/97	0	0	0	11		"		1		
04/12/97	0	0	0	"		ļn				
04/13/97	0	0	0	!!		n				
04/14/97	0	0	0	11		"		ļ	ļ	
04/15/97	0	0	0	tt		"				
04/16/97	0	0	0	tt		lu I				
04/17/97	0	0	0	**		"				
04/18/97	0	0	0	17]"	İ			
04/19/97	0	0	0	11		"				
04/20/97	0	0	0	11		111				
04/21/97	0	0	0	11		11]			
04/22/97	0	0	0	"]"				
04/23/97	9	11,550		Ground w	ater rec	overed with	n submers	sible pump		
04/24/97	24	31,680	22	н			II .			
04/25/97	24	31,680	22	"			#			
04/26/97	24	31,680	22	"			u .			
04/27/97	24	31,680	22	11			III			
04/28/97	24	31,680	22	n			III I			
04/29/97	24	31,680	22	"			"			
04/30/97	24	31,680	22	188	483	N/A	N/A	N/A	N/A	N/A
APR 97				AVERAC	EPUN	PRATE&	ANALYT	ICAL RES	ULT	
TOTALS	185	244,200	22.0	232	632	<0.001	<0.001	<0.001	<0.003	<0.003

MAY 1997 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Gro	undwater R	ecovery Opera	tions	Analytical Results of Groundwater Recovered from Pumping We						a Well
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Toluene	Ethyl-	Xylene	Total
	Pumped	Recovered	Rate	Level	Level			benzene		BTEX
	(hours)	(gai)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
05/01/97	24	31,680	22	Ground w	ater rec	overed wit	h submer	sible pump		***
05/02/97	24	31,680	22	"			"			
05/03/97	24	31,680	22	"			"			
05/04/97	24	31,680	22	"			"		[
05/05/97	24	31,680	22	"] 11			
05/06/97	24	31,680	22	"			" 			
05/07/97	24	31,680	22	н			11			
05/08/97	24	31,680	22	"			 "		ļ	
05/09/97	24	31,680	22	11		į	"			
05/10/97	24	31,680	22	"			II			
05/11/97	24	31,680	22	"]"			
05/12/97	24	31,680	22	11			"		İ	
05/13/97	24	31,680	22	["]			["			
05/14/97	24	31,680	22	11			["			
05/15/97	24	31,680	22				<u>"</u>			
05/16/97	24	31,680	22	"			" <u></u>			
05/17/97	24	31,680	22	"			 "			
05/18/97	24	31,680	22	"			<u>"</u>			
05/19/97	24	31,680	22	"			 In			
05/20/97	24	31,680	22	,			<u>"</u>			
05/21/97	24	31,680	22	<u>"</u> ,			 			
05/22/97	24	31,680	22 22	,,,			,,			
05/23/97	24	31,680		u			41			
05/24/97 05/25/97	24 24	31,680 31,680	22 22	,,			,,			
05/25/97	24 24	31,680	22	11			ıı			
05/26/97	24	31,680	22	,,			"			
05/27/97	24	31,680	22	184	742	N/A	N/A	N/A	N/A	N/A
05/29/97	24	31,680				overed with				19/74
05/30/97	24	31,680	22	Uloully W	100	Jvereu will 		 		
05/30/97	24	31,680	22	,,			11			
MAY 97	<u> </u>	0 1,000		AVEDAG	E DI INA	PRATE &	ANIALVT	ICAL DEC	Hall T	
TOTALS	744	982,080	22.0		*************					N/A
OLALO	1 444	JUZIUUU	2/2,0	104		IVIA	iu.A	IWA	IVIA	IN/A

JUNE 1997 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Date Time Volume Recovered Rate Level Le	Gro	undwater R	ecovery Opera		Analyti	*	Its of Grour	ndwater Re	covered fro	m Pumpin	g Well
Control Cont		Time	Volume	Avg Pump	Chloride	TDS					
06/01/97		.							4		BTEX
06/02/97											(ppm)
06/03/97				(Ground w	ater rec	overed with	h submers	sible pump		
06/04/97		t .			"			11			
06/05/97		ž .			"			"			
06/06/97					"			"			
06/07/97	9		· ·		"			11			
06/08/97		1			н			11			
06/09/97					11			II			
06/10/97	•				11			11			
06/11/97		1			"			Ħ	. :		
06/12/97					"						
06/13/97					"						
06/14/97		1			11						
06/15/97					. "			11			
06/16/97								***			
06/17/97					" .						
06/18/97 24 31,680 22 " " " 06/19/97 24 31,680 22 " " " 06/20/97 24 31,680 22 " " 06/21/97 24 31,680 22 " " 06/22/97 24 31,680 22 " " 06/23/97 24 31,680 22 " " 06/24/97 24 31,680 22 " " 06/25/97 24 31,680 22 " " 06/26/97 24 31,680 22 " " 06/27/97 24 31,680 22 " " 06/28/97 24 31,680 22 " " 06/29/97 0 0 0 Recovery well shut-in for groundwater monitoring event 06/29/97 0 0 0 Necovery well shut-in for groundwater monitoring event 06/29/97 0 0 0 Necovery well shut-in for groundwater monitoring event 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 <t< td=""><td></td><td></td><td></td><td></td><td>"</td><td></td><td></td><td>"</td><td></td><td></td><td></td></t<>					"			"			
06/19/97 24 31,680 22 " " " " 06/20/97 24 31,680 22 " " " 06/21/97 24 31,680 22 " " " 06/22/97 24 31,680 22 " " 06/23/97 24 31,680 22 " " 06/24/97 24 31,680 22 " " 06/25/97 24 31,680 22 " " 06/26/97 24 31,680 22 " " 06/27/97 24 31,680 22 " " " 06/28/97 24 31,680 22 " " " 06/29/97 24 31,680 22 " " " 06/29/97 24 31,680 22 " " " 06/29/97 0 0 0 Recovery well shut-in for groundwater monitoring event 06/30/97 0 0 0 " 0 0 0 0 0<						i		"			
06/20/97 24 31,680 22 " " " " 06/21/97 24 31,680 22 " " " 06/22/97 24 31,680 22 " " 06/23/97 24 31,680 22 " " " 06/24/97 24 31,680 22 " " " 06/25/97 24 31,680 22 " " " 06/26/97 24 31,680 22 " " " 06/28/97 24 31,680 22 " " " 06/28/97 24 31,680 22 " " " 06/28/97 24 31,680 22 " " " 06/29/97 0 0 0 Recovery well shut-in for groundwater monitoring event " 06/30/97 0 0 " AVERAGE PUMP RATE & ANALYTICAL RESULT								"			
06/21/97 24 31,680 22 " " " " 06/22/97 24 31,680 22 " " " 06/23/97 24 31,680 22 " " " 06/24/97 24 31,680 22 " " " 06/25/97 24 31,680 22 " " " 06/26/97 24 31,680 22 " " " 06/28/97 24 31,680 22 " " " 06/28/97 24 31,680 22 " " " Recovery well shut-in for groundwater monitoring event " 06/29/97 0 0 0 " AVERAGE PUMP RATE & ANALYTICAL RESULT AVERSULT					"			"			
06/22/97 24 31,680 22 " " " 06/23/97 24 31,680 22 " " " 06/24/97 24 31,680 22 " " " 06/25/97 24 31,680 22 " " " 06/26/97 24 31,680 22 " " " 06/27/97 24 31,680 22 " " " 06/28/97 24 31,680 22 " " " " 06/29/97 0 0 0 Recovery well shut-in for groundwater monitoring event of " 06/30/97 0 0 " AVERAGE PUMP RATE & ANALYTICAL RESULT								"			
06/23/97 24 31,680 22 " " " 06/24/97 24 31,680 22 " " " 06/25/97 24 31,680 22 " " " 06/26/97 24 31,680 22 " " " 06/27/97 24 31,680 22 " " " 06/28/97 24 31,680 22 " " " " 06/29/97 0 0 Recovery well shut-in for groundwater monitoring event of " 06/30/97 0 0 " AVERAGE PUMP RATE & ANALYTICAL RESULT								"			
06/24/97 24 31,680 22 " " " 06/25/97 24 31,680 22 " " " 06/26/97 24 31,680 22 " " " 06/27/97 24 31,680 22 " " " 06/28/97 24 31,680 22 " " " " 06/29/97 0 0 0 Recovery well shut-in for groundwater monitoring event " 06/30/97 0 0 " " AVERAGE PUMP RATE & ANALYTICAL RESULT								<u>"</u>			
06/25/97 24 31,680 22 " " " 06/26/97 24 31,680 22 " " " 06/27/97 24 31,680 22 " " " 06/28/97 24 31,680 22 " " " " 06/29/97 0 0 0 Recovery well shut-in for groundwater monitoring event 06/30/97 0 0 " " WERAGE PUMP RATE & ANALYTICAL RESULT	9				"]			<u>"</u>			
06/26/97 24 31,680 22 " " " " " 06/27/97 24 31,680 22 " " " " " " " 06/28/97 24 31,680 22 " " " " " " 06/29/97 0 0 0 Recovery well shut-in for groundwater monitoring event 06/30/97 0 0 " " " AVERAGE PUMP RATE & ANALYTICAL RESULT			· .					<u>"</u>			
06/27/97 24 31,680 22 " " " 06/28/97 24 31,680 22 " " " " 06/29/97 0 0 0 Recovery well shut-in for groundwater monitoring event 06/30/97 0 0 " " " VERAGE PUMP RATE & ANALYTICAL RESULT							Ì	 			
06/28/97 24 31,680 22 " " " 06/29/97 0 0 0 Recovery well shut-in for groundwater monitoring event under the provided by the p	1	,			[]						
06/29/97 0 0 0 Recovery well shut-in for groundwater monitoring event 06/30/97 0 0 0 " " " " " USAN 97 AVERAGE PUMP RATE & ANALYTICAL RESULT		1									
06/30/97 0 0 0 " " " JUN 97 AVERAGE PUMP RATE & ANALYTICAL RESULT	ľ				" 	اماد المدد		··			
JUN 97 AVERAGE PUMP RATE & ANALYTICAL RESULT			ľ	1	Recovery \	weii snu I	it-in for gro I	unawater " I	monitoring	j event I	
		J	U	υj	AWEDAG	(mesidisina	O SE ATRESO	ANALVE	CAL DEG	11 T	
	TOTALS	672	887,040	22.0	NIA	N/A		ANALT I		N/A	N/A

JULY 1997 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Gro	undwater R	acovery Opera	tions	Analytical Results of Groundwater Recovered from Pumping Well							
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Toluene		Xylene	Total	
	Pumped	Recovered	Rate	Level	Level			benzene		BTEX	
	(hours)	(gal)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	
07/01/97	0	0	0			ut-in for gro	oundwater	r monitorin	g event		
07/02/97	0	0	0	246	•		<0.001	<0.001	<0.003	<0.003	
07/03/97	0	0	0	Recovery	well sh	ut-in					
07/04/97	0	0	0	"		"			Ì		
07/05/97	0	0	0	"		["			į į		
07/06/97	0	0	0	"		"					
07/07/97	0	0	0	11		"	}	1			
07/08/97	0	0	0	11	!]" 					
07/09/97	0	0	0	**)"					
07/10/97	14	18,480	22	Ground w	ater rec	overed witl	h submers	sible pump			
07/11/97	24	31,680	22	"			"				
07/12/97	24	31,680	22	"			"	į			
07/13/97	24	31,680	22	"			"				
07/14/97	24	31,680	22	"			n]			
07/15/97	24	31,680	22	"			"				
07/16/97	24	31,680	22	"			"				
07/17/97	24	31,680	22	"			"				
07/18/97	24	31,680	22	"			"				
07/19/97	24	31,680	22	" "			11]	
07/20/97	24	31,680	22				11				
07/21/97	24	31,680	22	"]			11				
07/22/97	24	31,680	22			:	[" 				
07/23/97	24	31,680	22	"							
07/24/97	24	31,680	22								
07/25/97	24	31,680	22	"]			II 				
07/26/97	24	31,680	22	"]							
07/27/97	24	31,680	22	"]	İ		" 			- 1	
07/28/97	24	31,680	22	"]							
07/29/97	24	31,680	22						\		
07/30/97	24	31,680	22	"							
07/31/97	24	31,680	22	176	707	N/A	N/A	N/A	N/A	N/A	
JUL 97						PRATE&		***************************************			
TOTALS	518	683,760	22.0	211	772	< 0.001	<0.001	<0.001	<0.003	<0.003	

AUGUST 1997 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Gro	undwater R	ecovery Opera	tions	Analytical Results of Groundwater Recovered from Pumping V						g Well
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Toluene	Ethyl-	Xylene	Total
	Pumped	Recovered	Rate	Level	Level			benzene		BTEX
	(hours)	(gal)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
08/01/97	24	31,680	22	Ground w	ater rec	overed witl	h submers	sible pump		
08/02/97	24	31,680	22	"			u			
08/03/97	24	31,680	22	"			11			
08/04/97	24	31,680	22	"			11			
08/05/97	24	31,680	22	"	!		F1			
08/06/97	24	31,680	22	"			п			!
08/07/97	24	31,680	22	"			II .			
08/08/97	24	31,680	22	"			"			
08/09/97	24	31,680	22	"	i		11	,		
08/10/97	24	31,680	22	"			n .			
08/11/97	24	31,680	22	"			н			
08/12/97	24	31,680	22	11			11			
08/13/97	24	31,680	22	"			11			
08/14/97	24	31,680	22	11			ti .			
08/15/97	24	31,680	22	"			H	i		
08/16/97	24	31,680	22	11			H			
08/17/97	24	31,680	22	"	ı		"			
08/18/97	24	31,680	22	"			11			
08/19/97	24	31,680	22	11			11			
08/20/97	24	31,680	22	"			"			
08/21/97	24	31,680	22	,,			п			
08/22/97	24	31,680	22	"			"			
08/23/97	24	31,680	22	"			"			
08/24/97	24	31,680	22	n			H 			
08/25/97	24	31,680	22	"			n 			,
08/26/97	24	31,680	22	"			"			
08/27/97	24	31,680	22	168	685		N/A	N/A	N/A	N/A
08/28/97	24	31,680		Ground wa	ater rec	overed with	ı submers	ible pump		
08/29/97	24	31,680	22	"]			" !		1	
08/30/97	24	31,680	22	"]						
08/31/97	24	31,680	22	"			!!	***************************************		
AUG 97						PIRATE&				
TOTALS	744	982,080	22.0	168	685	N/A	N/A	N/A	N/A	N/A

SEPTEMBER 1997 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Gro	ındwater R	ecovery Opera	tions		*************		dwater Re	covered fro	m Pumpin	g Well
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Taluene	Ethyl-	Xylene	Total
	Pumped	Recovered	Rate	Level	Level			benzene		BTEX
	(hours)	(gal)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
09/01/97	24	31,680	22	Ground wa	ater rec	overed wit	h submer	sible pump		
09/02/97	24	31,680	22	"			11			
09/03/97	24	31,680	22	"			#			
09/04/97	24	31,680	22	"	İ		"			
09/05/97	24	31,680	22	"			"			
09/06/97	24	31,680	22	11			"			
09/07/97	24	31,680	22	n l			"			
09/08/97	24	31,680	22	"			"			
09/09/97	24	31,680	22	"			"	·		
09/10/97	24	31,680	22	"			"	Į,		
09/11/97	24	31,680	22	"			"			
09/12/97	24	31,680	22	"			"			
09/13/97	24	31,680	22	"	i		11			
09/14/97	24	31,680	22	" }	İ		11			
09/15/97	24	31,680	22	"			["			
09/16/97	24	31,680	22	. "						
09/17/97	24	31,680	22							
09/18/97	24	31,680	22	"						
09/19/97	24	31,680	22				11			
09/20/97	24	31,680	22	"]			,,			
09/21/97	24	31,680	22				.,			
09/22/97	24	31,680	22				**			
09/23/97	24	31,680	22				,,	1		
09/24/97	24	31,680	22	"[,,			
09/25/97	24	31,680	22	[".]			11			
09/26/97	24	31,680	22	"			,,			
09/27/97	24	31,680	22	"]			"			
09/28/97	24	31,680	22	"	F 4 4	N1/A		 	N1/A	N1/A
09/29/97	24	31,680	22	156	544		N/A	N/A	N/A	N/A
09/30/97	24	31,680	22	Ground wa						
SEP 97								ICAL RES		
TOTALS	720	950,400	22.0	156	544	N/A	N/A	N/A	N/A	N/A

OCTOBER 1997 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

			JC1 L-31 S	***************************************	***************************************				***************************************	***************************************
Groi Date		ecovery Opera						covered fro		
uate	Time Pumped	Volume	Avg Pump Rate	Chloride Level	TDS	Benzene	Toluene	Ethyl-	Xylene	Total
	(hours)	Recovered (gal)	(GPM)	(ppm)	Level (ppm)	(ppm)	(ppm)	benzene (ppm)	(ppm)	BTEX (ppm)
10/01/97	24			Ground w						(hhm)
10/02/97	24	,	22	Oround W			30511161. 1	l	Ï	
10/03/97	24	,	22	"			 			
10/04/97	24	31,680	22	13						
10/05/97	24	31,680	22	11						
10/06/97	24	31,680	22	"			"			
10/07/97	24	31,680	22	U			II			ı
10/08/97	24	31,680	22	"			"			
10/09/97	24	31,680	22	п	İ		n			
10/10/97	24	31,680	22	"			"			
10/11/97	24	31,680	22	11			"			ı
10/12/97	24	31,680	22	11			11			
10/13/97	24	31,680	22	"			**			
10/14/97	24	31,680	22	п			ti			
10/15/97	24	31,680	22	"			**			
10/16/97	24	31,680	22	н			u		•	
10/17/97	24	31,680	22	"			"			
10/18/97	24	31,680	22	11			11	i		
10/19/97	24	31,680	22	"			"			
10/20/97	24	31,680	22	"			11			
10/21/97	24	31,680	22	"			n			
10/22/97	24	31,680	22	"			"			
10/23/97	24	31,680	22	"			II .			
10/24/97	24	31,680	22	"						
10/25/97	24	31,680	22	"	l		"			
10/26/97	24	31,680	22	"						
10/27/97	24	31,680	22	"	J					
10/28/97	24	31,680	22	".						
10/29/97	24	31,680	22			,,,	"	,,, ,	<u> </u>	
10/30/97	24	31,680	22	140	617	N/A	N/A	N/A	N/A	N/A
10/31/97	24	31,680	22	Ground wa						
OCT 97					*****************			ICAL RES		
TOTALS	744	982,080	22.0	140	617	N/A	N/A	N/A	N/A	N/A

NOVEMBER 1997 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Gro	undwater R	ecovery Opera	······································	Analyti		lts of Grour	idwater Re	covered fro	m Pumpir	a Well
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Toluene	Ethyl-	Xylene	Total
	Pumped	Recovered	Rate	Level	Level			benzene		BTEX
	(hours)	(gal)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
11/01/97	24	31,680	22	Ground w	ater rec	overed witl	h submers	sible pump		
11/02/97	24	31,680	22	11			**			
11/03/97	24	31,680	22	u,			11			
11/04/97	24	31,680	22	II			H			
11/05/97	24	31,680	22	"			**			
11/06/97	24	31,680	22	11.			11			
11/07/97	24	31,680	22	H	,	į	n			
11/08/97	24	31,680	22	"	i		"	,		
11/09/97	24	31,680	22	"			11			
11/10/97	24	31,680	22	"			II			
11/11/97	24	31,680	22	"			11			
11/12/97	24	31,680	22	11			11			
11/13/97	24	31,680	22	"			n			
11/14/97	24	31,680	22	11			11			
11/15/97	24	31,680	22	11			n			
11/16/97	24	31,680	22	"			"			
11/17/97	24	31,680	22	"			11			
11/18/97	24	31,680	22	"			"			
11/19/97	24	31,680	22	11			11			
11/20/97	24	31,680	22	"			"			
11/21/97	24	31,680	22	"			"			
11/22/97	24	31,680	22	"	i		"			
11/23/97	24	31,680	22	"			"			
11/24/97	24	31,680	22	"]			"			
11/25/97	24	31,680	22	140	621	N/A	N/A	N/A	N/A	N/A
11/26/97	24	31,680		Ground wa	ater rec	overed with	submers	ible pump		
11/27/97	24	31,680	22	"						
11/28/97	24	31,680	22	"]						
11/29/97	24	31,680	22	"]	ľ	1				
11/30/97	24	31,680	22	"			"			
NOV 97						PRATE&				
TOTALS	720	950,400	22.0	140	621	N/A	N/A	N/A	N/A	N/A

DECEMBER 1997 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

		ecovery Opera							covered fro		ig Well
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzei	ne	Toluene	Ethyl-	Xylene	Total
	Pumped	Recovered	Rate	Level	Level				benzene		BTEX
	(hours)	(gai)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
12/01/97	24	31,680	22	Ground w	ater rec	overed '	wit	h submers	sible pump		·
12/02/97	24	31,680	22	"	i			"		l	
12/03/97	24	31,680	22	"	1			"		ĺ	
12/04/97	24	31,680	22	"	ļ	ļ		!"		1	
12/05/97	0	0	0						monitorin		•
12/06/97	0	0	0	N/A	•		I/A	N/A	N/A	N/A	N/A
12/07/97	0	0	0	Recovery	well shu	ut-in					
12/08/97	0	0	0			"			:		
12/09/97	0	0	0	"					,		
12/10/97	0	0	0								1
12/11/97	0	0	0	"							
12/12/97	0	0	0			 					
12/13/97	0	0	0								
12/14/97	0	0	0	11		<u>"</u>					
12/15/97	0	0	0	"			ļ				
12/16/97	0	0	0	11							
12/17/97	0	0	0	"			1			l	
12/18/97	0	0	0								
12/19/97	0	0	0								
12/20/97	0	0	0	.,		44					
12/21/97	0	0	0	"							
12/22/97	0	0	0		505		[N./ A		
12/23/97	0	0	0	165	565	N.	I/A	N/A	N/A	N/A	N/A
12/24/97	0	0	0	" "		11	ł				
12/25/97 12/26/97	0	0	0	, ,		11					
12/27/97	0	0	0	,,		н					
12/27/97	0	0	0	"			Į				
12/29/97	0	0	0	11	İ	11	- 1				
12/29/97	0	0	0	11		н	l				
12/30/97	0	0	_ ~ [Recovery	well shi	ıt_in					
DEC 97	ال	U	U					A A I A I VOT	CAL RES	in to	
TOTALS	ac	120 720	22.0	AVERAL 165							RITE
I WITH LO	96	126,720	22,0	100	565	N	IA	N/A	N/A	N/A	N/A

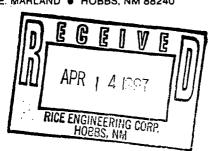
APPENDIX B.3 ANALYTICAL RESULTS





PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR RICE OPERATING CO. ATTN: WES ROOT 122 W. TAYLOR HOBBS, NM 88240 FAX TO:



Receiving Date: 04/03/97 Reporting Date: 04/07/97 Project Number: 129

Project Name: ABO SWD (E-TECH)
Project Location: LEA CO., NM

Sampling Date: 04/03/97

Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT

Sample Received By: AH

Analyzed By: BC

LAB NUMBER	R SAMPLE ID	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS D	ATE	04/05/97	04/05/97	04/05/97	04/05/97
H2896-8	MW-1	<0.001	<0.001	<0.001	<0.003
H2896-9	MW-2	0.002	<0.001	<0.001	<0.003
H2896-10	MW-3	0.507	0.002	0.002	0.009
H2896-11	C.W.	0.001	<0.001	<0.001	<0.003
Quality Contro	ol	0.107	0.105	0.110	0.331
True Value Qu		0.100	0.100	0.100	0.300
% Accuracy		107	105	110	110
	ent Difference	3.2	4.4	4.1	5.7

METHOD: EPA SW 846-8260

4/7/97

Date





PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR RICE OPERATING CO. ATTN: WES ROOT 122 W. TAYLOR HOBBS, NM 88240 FAX TO:

Receiving Date: 04/03/97 Reporting Date: 04/09/97 Project Number: 129

Project Name: ABO SWD (E-TECH)
Project Location: HOBBS, NM

Sampling Date: 04/03/97
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH

Analyzed By: AH/BC

		Na	Ca	Mg	K	Conductivity	T-Alkalinity
LAB NUMBER	SAMPLE ID	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(umhos/cm)	(mgCaCO3/L)
ANALYSIS DAT	E:	04/09/97	04/04/97	04/04/97	04/04/97	04/04/97	04/04/97
H2896-8	MW-1	250	83	25	0.6	1890	284
H2896-9	MW-2	52	64	24	0.1	850	152
H2896-10	MW-3	63	69	18	<0.1	773	192
H2896-11	C.W.	166	88	29	1.9	1581	184
Quality Control		NR	NR	NR	NR	1413	NR
True Value QC		NR	NR	NR	NR	1413	NR
% Accuracy		NR	NR	NR	NR	100	NR
Relative Percen	t Difference	NR	NR	NR	NR	0	NR
METHODS:		SM	3500-Ca-D	3500-Mg E	8049	120.1	310.1

		CI	SO4	CO3	HCO3	pН	TDS
		(mg/L)	(mg/L)	(mg/L)	(mg/L)	(s.u.)	(mg/L)
ANALYSIS D	ATE:	04/04/97	04/04/97	04/04/97	04/04/97	04/04/97	04/04/97
H2896-8	MW-1	258	200	0	346	7.44	1042
H2896-9	MW-2	92	87	0	185	7.25	617
H2896-10	MW-3	58	106	0	234	7.36	515
H2896-11	C.W.	276	126	0	224	7.65	780
Quality Contr	rol	480	105	NR	NR	7.00	NR
True Value Q	iC .	500	100	NR	NR	7.00	NR
% Accuracy		96.0	105	NR	NR	100	NR
Relative Perc	ent Difference	0	4.8	NR	NR	0	0.2
METHODS:		SM4500-CI-B	375.4	310.1	310.1	150.1	160.1

Gavle A. Potter, Chemist

04/10/91 Date CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

8

PHONE 915167-1-301 . 2111 BEECHWOOD . - 315.5 . 1303

PHONE :505) 393-2355 . 101 E MARLAND . ~CBBS, "M 38240

A ARDINAL LABORATORIES ANALYSIS REQUEST groins SHOILD 102 pM 501 BLEX 43-77 1445 1520 4-3-77/435 TIME 4-3-77 /500 SAMPLING Company. AICE Engineering DATE 4-3-77 PO * : ABHTO Attn: Wes But C ICE / COOF 7 State: U. M. BILL TO YCID: CITY: 16885 : ABHTO Address: Phone #: Brnder Fax # MATRIX CHE 7108 **MASTEWATER** 25: 78 7/0 I 3 7 COMP(C) OR CRAB(C) ٥ O 9 Ø SERVICES D. Sun 1+6 State:7 Sample I.D. 15/15 550-4813 5.40 - 491.3 500 W1W-3 MW-2 Company Name: E-TECH MW-I C-W-Bill 480 10. BX 19 CITY: MIGIAN (3/5) 1.7896-10 43896-5 43836-9 H 3896" L Project Manager: Fax #: (915) Project Location: LAB LD. # Project Name: Address: Phone #: Project #:

PLEASE NOTE: Liability and Damages. Cardinal's kat my and cears suchave remay to any claim arrang, included based in contact or tool. Shall be amount to a mount to an arrange and claims included to the amount to an arrange and arrange and arrange and arrange and arrange and arrange and arrange and arrange and arrange

Sampler Relinguished:	7 P. S. W. State	Received By:	Phone	768
Jally, Amid	Time:		RENL	Pax Resums;
Relnaulshed By:	10.5-P	Received By: (Lab Staff)		
	Time! 2c	14111 ALI		
Delivered By: (Circle One)		Sample Condition	CHECKED BY:	
UPS - Fed Ex - Bus - Other:		Yes Yes	(lordals)	



PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603

PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR RICE OPERATING CO. ATTN: WES ROOT 122 W. TAYLOR HOBBS, NM 88240 FAX TO:

Receiving Date: 07/02/97 Reporting Date: 07/08/97 Project Number: NOT GIVEN

Project Name: ABO

Project Location: HOBBS, NM

Sampling Date: 07/02/97

Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT

Sample Received By: BC Analyzed By: BC/AH

0.100

114

0.9

0.300

113

2.4

ETHYL TOTAL LAB NUMBER SAMPLE ID TDS CI BENZENE **TOLUENE** BENZENE XYLENES (mg/L) (mg/L) (mg/L) (mg/L) (mg/L) (mg/L) ANALYSIS DATE: 07/08/97 07/03/97 07/03/97 07/03/97 07/03/97 07/03/97 <0.001 H3038-1 250 < 0.001 <0.001 < 0.003 MW-1 1066 H3038-2 MW-2 464 <0.001 < 0.001 < 0.001 <0.003 96 H3038-3 MW-3 454 58 <0.001 <0.001 < 0.001 <0.003 H3038-4 CITY WELL 836 246 < 0.001 < 0.001 < 0.001 < 0.003 **Quality Control** NR 200 0.112 0.113 0.114 0.339

METHODS:

% Accuracy

True Value QC

Relative Percent Difference

TDS- EPA 600/4-79-020, 160.1; CI-EPA 600/4-79-020, 325.3 BTEX-EPA SW-846-8020

0.100

112

4.4

200

100

0

NR

NR

NR

Burgess J.A. Cooke. Ph. D.

Date

0.100

113

0.9



PHONE 9151673 7001 • 2111 BEECHWOOD • FBILENE 10 19603 PHONE 5051 393 2325 • 101 E MARLAND • HUSBS NM E8240

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

LABORATOR							1							:							Page		οſ
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LAB LD.#	Sample LD.	COMP(C) OR GRAB(G)	# CONTAINERS	GROUNDWATER	WASTEWATER						¥				72/	1	101					- 1	l
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H-3038-1	Mw.		4	7	-	-		-		-	V			4:45	1/	V	1						T
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-3	MW-3	B	4	1							1		7.2.97	5:45	1/		/						
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te in no event shall Cardinal be liable to tee or successors arising out of or related	any other cause wristsoffiver shall be deemed waived unles of recidental or consequental damages, lecturing, without to the performance of services nereunder by Cardinal, re	irritation 24	AUTHORS HTD	CU CIRILLI RELITATION	1. 1044 OF 5 28590 F	use, or i	2' 7'4 20 2' 7'4 20	01:12 170-1	red by co	ent ds s	LUCSOBANA	s.	· · · · · · · · · · · · · · · · · · ·				-1-1-1-						
ampler Relinquished: Date: 7-2-27 Received E			ed By	/ :							Phone Res	sult 🗀	Yes	□ No	ı Addi	tional I	ax #:						





PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR RICE OPERATING CO. ATTN: F. WESLEY ROOT 122 W.TAYLOR

HOBBS, NM 88240 FAX TO: 505-397-1471

Receiving Date: 12/08/97

Reporting Date: 12/11/97
Project Number: NOT GIVEN

Project Name: JCT. L-31

Project Location: ABO SYSTEM, LEA CO. NM

Sampling Date: 12/06/97

Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT

Sample Received By: BC

Analyzed By: AH

LAB NUMBER SAMPLE ID	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE	12/09/97	12/09/97	12/09/97	12/09/97
H3356-1 MW-2	<0.002	<0.002	<0.002	<0.006
H3356-2 MW-1	<0.002	<0.002	<0.002	<0.006
H3356-3 MW-3	<0.002	<0.002	<0.002	<0.006
Quality Control	0.104	0.096	0.093	0.288
True Value QC	0.100	0.100	0.100	0.300
% Accuracy	104	95.8	93.1	96.0
Relative Percent Difference	4.8	3.9	0.3	0.7

METHOD: EPA SW 846-8260, gc/ms

buy et of A. Carke

DEC 1 3 1997

Date





PHONE (505) 393-2326 · 101 E. MARLAND · HOBBS, NM 88240

ANALYTICAL RESULTS FOR RICE OPERATING CO. ATTN: F. WESLEY ROOT 122 W.TAYLOR HOBBS, NM 88240 FAX TO: 505-397-1471

Receiving Date: 12/08/97
Reporting Date: 12/11/97
Project Number: NOT GIVEN

Project Number: NOT GIVEN

Luyes La Cashe

Project Name: JCT. L-31

Project Location: ABO SYSTEM, LEA CO. NM

Sampling Date: 12/06/97

Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT

Sample Received By: BC

Analyzed By: AH

LAB NUMBE	R SAMPLE ID	TDS (mg/L)	CI (mg/L)
ANALYSIS D	ATE:	12/09/97	12/09/97
H3356-1	MW-2	857	180

7 11 11 12 7 C 1 C 1 C 1			1
H3356-1	MW-2	857	180
H3356-2	MW-1	449	80
H3356-3	MW-3	364	48
•			
Quality Contro		NR	500
True Value QC	,	NR	500
% Recovery		NR	100
Relative Perce	nt Difference	0.3	4.0

METHODS: EPA 600/4-79-02 160.1 325.3

<u>/</u>2 Date DECEIVED

DEC 1 3 1997

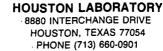
PICE OPERATING
HOBBS, NM

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 event 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 of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above-stated reasons or otherwise.

ARDINAL LABORATORIES, INC.

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

2111 Beechwood, Abilene, TX 79603 101 (915) 673-7001 Fax (915) 673-7020 (505		7 3356 Page 1 of 1
Company Name: RICE Operating Company	7	ANALYSIS REQUEST
Project Manager: F. Wesley Root	BILL TO PO#:	
Address: 122 West Taylor	Company: ROC	
City: Hobbs State: NM Zip: 88240	Attn: F. Wesley Root	
Phone #: 505 - 393 - 9174	Address: 122 W. Taylor	
Fax#: 505 - 397 - 1471	City: Hobbs	
Project #: Project Owner: ABO System	State: NM Zip: 88240	
Project Name: Jct. L-31	Phone #: 505-393-9/74	
Project Location: ABO System, Lea Co. NM	Fax#: 505-397-1471	
FOR LAB USE ONLY MATRIX	PRES. SAMPLING	
(G)RAB OR (C)OMP. # CONTAINERS GROUNDWATER WASTEWATER SOIL OIL	STUDGE OTHER: ACID: OTHER: OTHER:	BIEX TDS Chloride
H3556-1 MW-2 62V		VVV
-1 MW-1 G 2 V	V 12-6-97 18:00 V	1 V V
3 MW-3 6 2 V		VVV
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PLEASE NOTE: Unbilly and Damages. Cardinal's Rebilly and obert's exclusive remoty for any claim arising whether analyses. At claims including those for negligance and any other cause whatsoever shall be deemed waived unless m service. In no event shall Cardinal be lable for includintal or consequental damages, including without limitation, busine affiliates or suppressors arising out of or related to the performance of services hereunder by Cardinal, regardess of w	tde in writing and received by Cardinal within 30 days after complets se interruptions, loss of use, or loss of profits incurred by client, its s	tion of the applicable 30 days past due at the rate of 24% per armum from the original date of involce, subsidiaries, and all costs of colections, including attorney's fees,
Sampler Relinquished: Date: 97 Received By:	Phone Result Fax Result: REMARKS:	t □ Yes □ No Additional Fax #:
Relinquished By: Date Received By: Time: 3 500 FM BUWELL	Id Looks	•
Delivered By: (Circle One) Sample Corl Cool Intac Sampler - UPS - Bus - Other: No □	t (Initials) Yes	·





December 19, 1997

Mr. F. Wesley Root RICE OPERATING COMPANY 122 West Taylor Hobbs, NM 88240

The following report contains analytical results for samples received at Southern Petroleum Laboratories (SPL) on December 10, 1997. The samples were assigned to Certificate of Analysis No.(s) 9712600 and analyzed for all parameters as listed on the chain of custody.

Any data flag or quality control exception associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s).

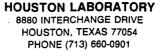
If you have any questions or comments pertaining to this data report, please do not hesitate to contact me. Please reference the above Certificate of Analysis No. during any inquiries.

Again, SPL is pleased to be of service to you. We anticipate working with you in fulfilling all your current and future analytical needs.

Southern Petroleum Laboratories

Electa Brown

Client Services Representative





Southern Petroleum Laboratories, Inc.

Certificate of Analysis Number: 97-12-600

Approved for Release by:

Electa Brown, Client Services Representative

Greg Grandits Laboratory Director

Idelis Williams Quality Assurance Officer

The attached analytical data package may not be reproduced except in full without the express written approval of this laboratory.



HOUSTON LABORATORY

8880 INTERCHANGE DRIVE HOUSTON, TEXAS 77054 PHONE (713) 660-0901

Certificate of Analysis No. H9-9712600-07

Rice Operating Company

122 West Taylor Hobbs, NM 88240

ATTN: F. Wesley Root

DATE: 12/19/97

PROJECT: Hobbs SWD System

SITE: West Co Road Lea Co, NM

SAMPLED BY: Rice Operating

SAMPLE ID: MW-3

PROJECT NO:

MATRIX: WATER

DATE SAMPLED: 12/06/97

DATE RECEIVED: 12/10/97

ANALYTICAL I	DATA		
PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	μg/L
TOLUENE	ND	1.0 P	μg/L
ETHYLBENZENE	ND	1.0 P	μg/L
TOTAL XYLENE	ND	1.0 P	μg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		μg/L
Surrogate	% Recovery		
1,4-Difluorobenzene	93		
4-Bromofluorobenzene	97		
Method 8020A ***			
Analyzed by: VHZ			
Date: 12/12/97			

ND - Not detected.

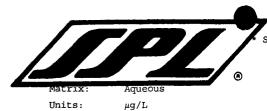
(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.

***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

QUALITY CONTROL DOCUMENTATION



SPL BATCH QUALITY CONTROL REPORT ** METHOD 8020/602

HOUSTON LABORATORY 8880 INTERCHANGE DRIVE

HOUSTON, TEXAS 77054 PHONE (713) 660-0901

Batch Id: VARD971212120700

LABORATORY CONTROL SAMPLE

S P I K E C O M P O U N D S	Method Blank Result <2>	Spike Added <3>	Blank Result <1>	Spike Recovery	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50	53	106	61 - 119
Toluene	ND	50	55	110	65 - 125
EthylBenzene	ND	50	53	106	70 - 118
O Xylene	ND	50	52	104	72 - 117
M & P Xylene	ND	100	110	110	72 - 116

MATRIX SPIKES

S P I K E C O M P O U N D S	Sample Results	Spike Added	Matrix	Spike	Matrix Dupli	Spike cate	MS/MSD Relative %		Limits(***) (Advisory)
5	<2>	<3>	Result	Recovery	Result	Recovery	Difference	RPD Max.	Recovery Range
BENZENE TOLUENE ETHYLBENZENE O XYLENE M & P XYLENE	ND ND ND ND ND	20 20 20 20 40	19 19 19 19 38	95.0 95.0 95.0	17 18 18 18 36	90.0 90.0 90.0	11.1 5.41 5.41 5.41 5.41	21 20 19 18	32 - 164 38 - 159 52 - 142 53 - 143 53 - 144

Analyst: VHZ

Sequence Date: 12/13/97

SPL ID of sample spiked: 9712274-06A

Sample File ID: D L7332.TX0

Method Blank File ID:

Blank Spike File ID: D L7374.TX0

Matrix Spike File ID: D_L7329.TX0

Matrix Spike Duplicate File ID: D_L7330.TX0

* = Values Outside QC Range. « = Data outside Method Specification limits.

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = [(<1> - <2>) / <3>] x 100

LCS % Recovery = (<1> / <3>) x 100

Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100

(**) = Source: SPL-Houston Historical Data (1st Q '97)

(***) = Source: SPL-Houston Historical Data (1st Q '97)

SAMPLES IN BATCH (SPL ID):

9712600-04A 9712600-05A 9712600-06A 9712600-07A 9712274-01A 9712274-02A 9712274-07A 9712334-01A 9712334-03A 9712336-02A 9712336-04A 9712336-01A 9712336-05A 9712336-03A 9712405-01A 9712405-03A 9712274-06A 9712600-01A 9712600-02A 9712600-03A

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

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									+					CT/DT	1	<u> </u>	<u> </u>			ANAL	YSIS	REQ	JEST:				6	OTHE		REMARK	
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GONGULTANT CONTACT		•							Į			YS 0+M			ERS		23	SBOKS	102	ē.	D/29 C	23 35	6 2	X C X	ASSTC	COPPOSAMITY				
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MW-7	12-6-97	/2/33		V	V								v	V	1	400														
MW-6	12-6-97	14,30		V	V								V	4	/	40m	V													
MW-5	12-6-97	14:40		V	V						_		v	v	١.	40ml		_												A D D Z
MW-3	12-6-97	14:50		V	4	_		 -		\bigsqcup	_		V	4	1	40 m						_			<u> </u>	<u> </u>				
MW-Z	12-6-97	1	ļ	V	V					\downarrow	_		V	1	1	40 gal			-		_		 	-	 	↓	↓_	<u> </u>	 	
IWW	12-6-97	16;20	-	V	V	-				$\left\{ -\right\}$			V	V	1	40m	V	-	-	-	_	-	-	┼-	┼-	┼-	┼-	-	-	
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SPL Houston Environmental Laboratory

Sample Login Checklist

Da	te: 12 10 17 Time	. (100		
SP	L Sample ID:			
	971240	D		
			Yes	<u>No</u>
1	Chain-of-Custody (COC) form is pro-	esent.	/	
2	COC is properly completed.		. /	
3	If no, Non-Conformance Worksheet	has been completed.		
4	Custody seals are present on the shi	pping container.		
5	If yes, custody seals are intact.			
6	All samples are tagged or labeled.		/	
7	If no, Non-Conformance Worksheet	has been completed.		· · · · · · · · · · · · · · · · · · ·
8	Sample containers arrived intact			
9	Temperature of samples upon arriva	l:	[9	C
10	Method of sample delivery to SPL:	SPL Delivery		
		Client Delivery		
		FedEx Delivery (airbill #)	328360	7585
		Other:		
11	Method of sample disposal:	SPL Disposal		
		HOLD		
		Return to Client		

Name:		Date:
	Uning	(2/10 (97)

APPENDIX C

1996 GROUNDWATER RECOVERY AND MONITORING OPERATIONS

Appendix C 1996 Groundwater Recovery and Monitoring Operations

C.1 Figures

April 17, 1996 Potentiometric Surface Map

May 6, 1996 Potentiometric Surface Map

September 19, 1996 Potentiometric Surface Map

October 3, 1996 Potentiometric Surface Map

October 16, 1996 Potentiometric Surface Map

November 25, 1996 Potentiometric Surface Map

C.2 Tables

Summary of Groundwater Measurements 1996

Summary of Water Sample Analytical Results 1996

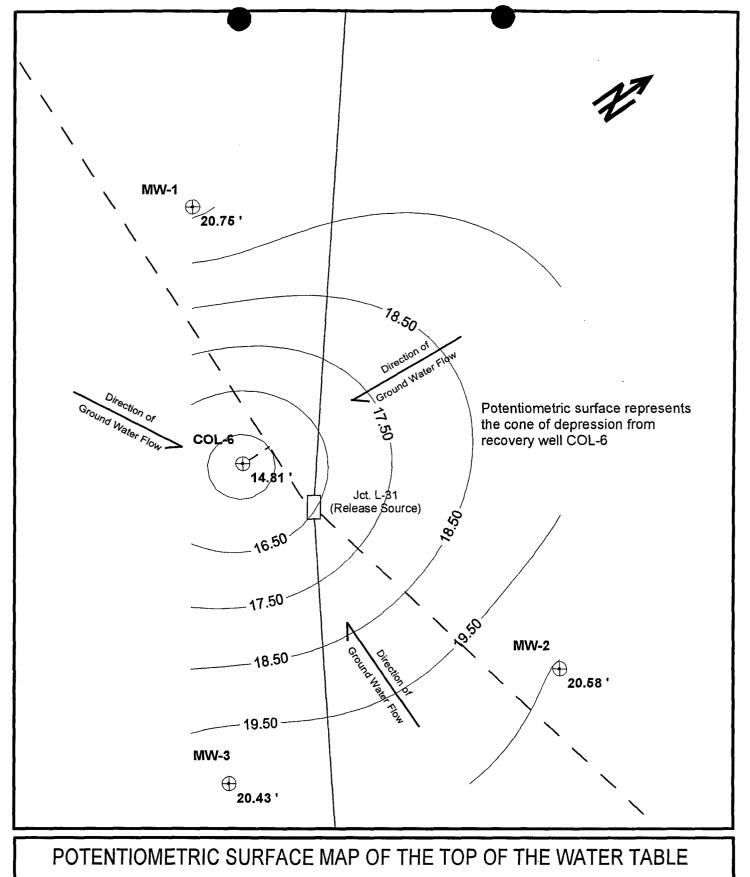
Summary of Recovery System Operations 1996

C.3 Analytical Results

April 17, 1996 Groundwater Monitoring Event
November 25, 1996 Groundwater Monitoring Event

APPENDIX C.1

FIGURES



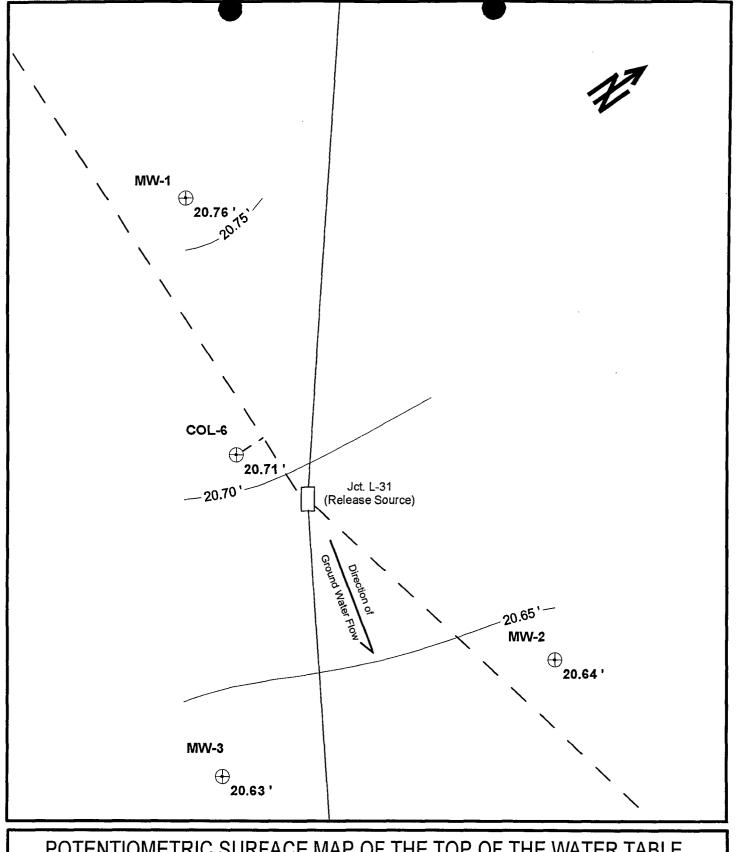
Jct. L-31 Release Site 31-T16S-R37E, Abo SWD System Lea County, New Mexico

> Rice Operating Company 122 W. Taylor Hobbs, NM 88240

Legend

Contour interval = 1.0 feet Constructed from gauging measurements obtained on 4/17/96 Relative BM = 100 feet, top of casing on MW-1 Rice Operating 4" AC pipeline
City of Lovington 6" AC pipeline

Map Scale <u>30</u>,



Jct. L-31 Release Site 31-T16S-R37E, Abo SWD System Lea County, New Mexico

> Rice Operating Company 122 W. Taylor Hobbs, NM 88240

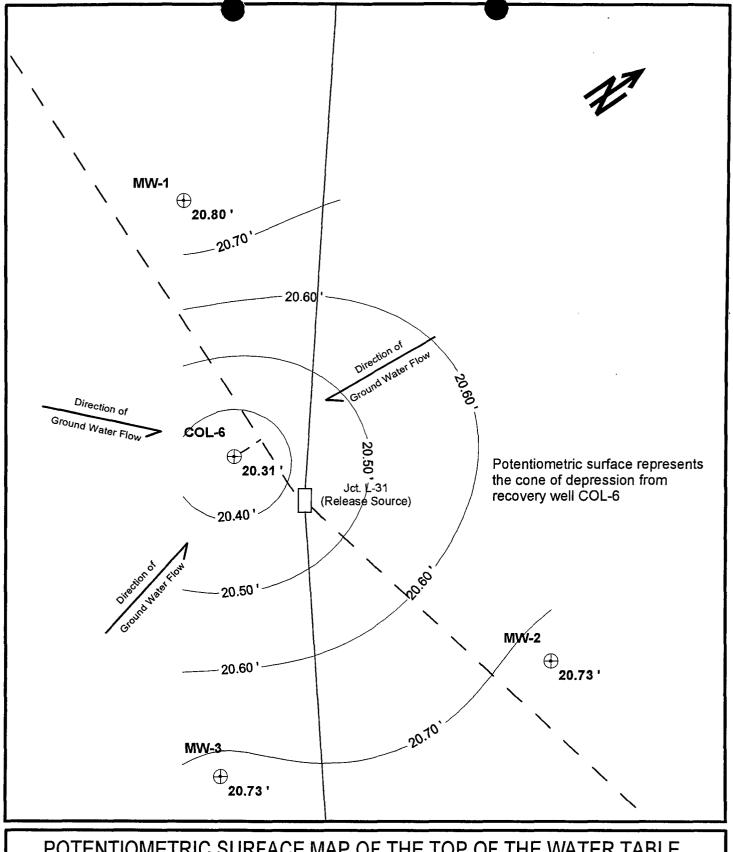
Legend

Contour interval = 0.05 feet Constructed from gauging measurements obtained on 5/06/96 Relative BM = 100 feet, top of casing on MW-1

Rice Operating 4" AC pipeline
City of Lovington 6" AC pipeline

Map Scale

30 '



Jct. L-31 Release Site 31-T16S-R37E, Abo SWD System Lea County, New Mexico

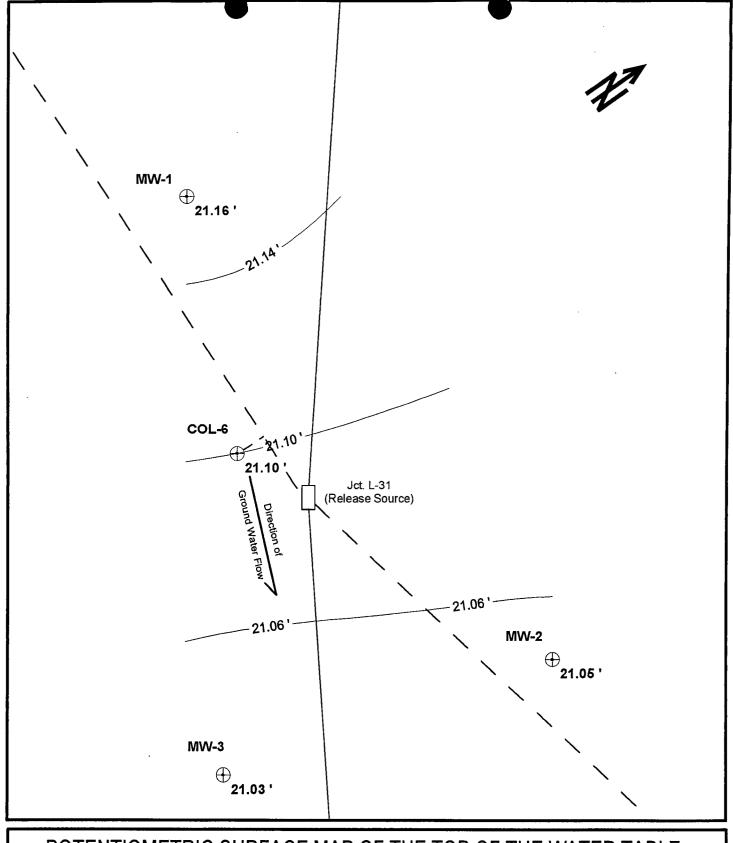
> Rice Operating Company 122 W. Taylor Hobbs, NM 88240

Legend

Contour interval =0.10 feet Constructed from gauging measurements obtained on 9/19/96 Relative BM = 100 feet, top of casing on MW-1

Rice Operating 4" AC pipeline
City of Lovington 6" AC pipeline

Map Scale <u>3</u>0,



Jct. L-31 Release Site 31-T16S-R37E, Abo SWD System Lea County, New Mexico

> Rice Operating Company 122 W. Taylor Hobbs, NM 88240

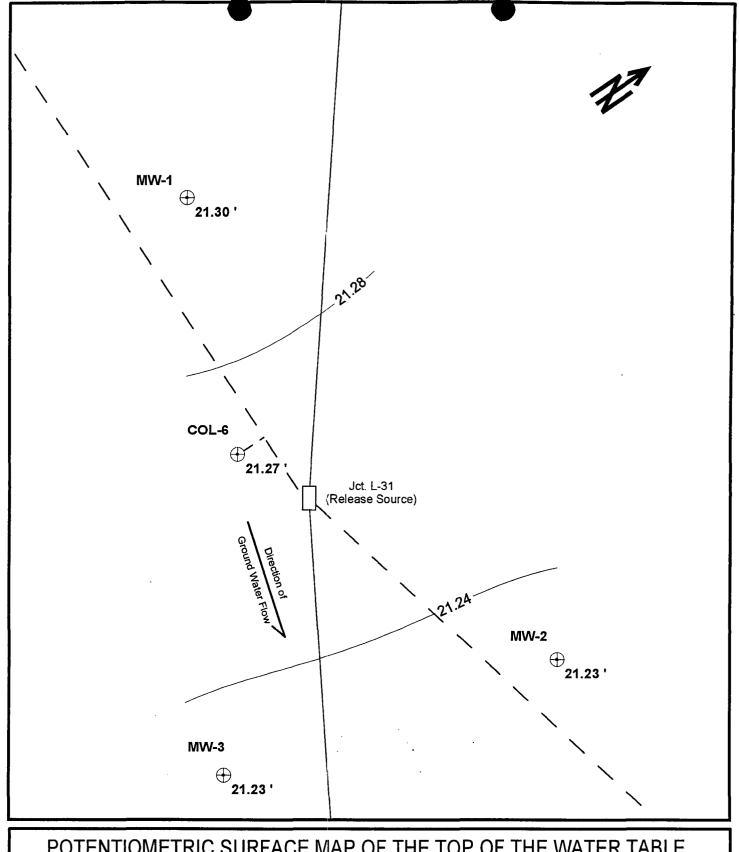
Legend

Contour interval =0.04 feet Constructed from gauging measurements obtained on 10/3/96 Relative BM = 100 feet, top of casing on MW-1

Rice Operating 4" AC pipeline

- City of Lovington 6" AC pipeline

Map Scale <u>30</u> '



Jct. L-31 Release Site 31-T16S-R37E, Abo SWD System Lea County, New Mexico

> Rice Operating Company 122 W. Taylor Hobbs, NM 88240

Legend

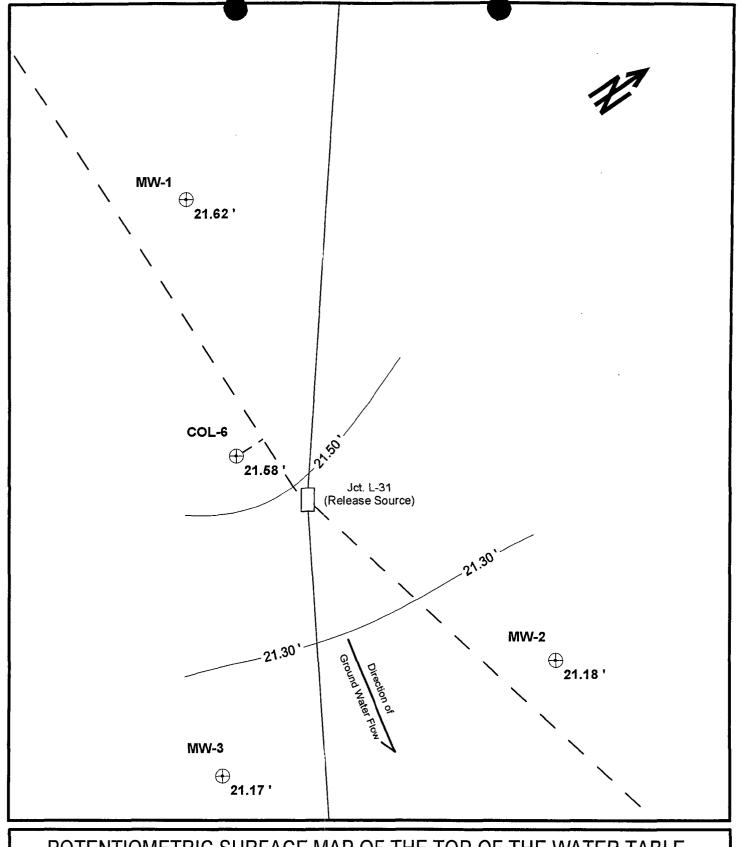
Contour interval =0.04 feet Constructed from gauging measurements obtained on 10/16/96 Relative BM = 100 feet, top of casing on MW-1

Rice Operating 4" AC pipeline

City of Lovington 6" AC pipeline

Map Scale 15

30 .



Jct. L-31 Release Site 31-T16S-R37E, Abo SWD System Lea County, New Mexico

> Rice Operating Company 122 W. Taylor Hobbs, NM 88240

Legend

Contour interval = 0.20 feet Constructed from gauging measurements obtained on 11/25/96 Relative BM = 100 feet, top of casing on MW-1

Rice Operating 4" AC pipelineCity of Lovington 6" AC pipeline

Map Scale

<u> 30</u> ,

APPENDIX C.2

TABLES

1996 SUMMARY OF GROUNDWATER MEASUREMENTS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Well	Date	Depth to	Water	Casing	Surface	LNAPL
Name	Gauged	Water*	Elevation**	Elevation**	Elevation**	Thickness
MW-1	04/17/96	79.25	20.75	100.00	97.6	0.00
MW-1	05/06/96	79.24	20.76	100.00	97.6	0.00
MW-1	09/19/96	79.20	20.80	100.00	97.6	0.00
MW-1	10/03/96	78.84	21.16	100.00	97.6	0.00
MW-1	10/16/96	78.70	21.30	100.00	97.6	0.00
MW-1	11/25/96	78.38	21.62	100.00	97.6	0.00
MW-2	04/17/96	79.14	20.69	99.83	97.2	0.00
MW-2	05/06/96	79.19	20.64	99.83	97.2	0.00
MW-2	09/19/96	79.10	20.73	99.83	97.2	0.00
MW-2	10/03/96	78.78	21.05	99.83	97.2	0.00
MW-2	10/16/96	78.60	21.23	99.83	97.2	0.00
MW-2	11/25/96	78.65	21.18	99.83	97.2	0.00
MW-3	04/17/96	79.32	20.61	99.93	97.4	0.00
MW-3	05/06/96	79.30	20.63	99.93	97.4	0.00
MW-3	09/19/96	79.20	20.73	99.93	97.4	0.00
MW-3	10/03/96	78.90	21.03	99.93	97.4	0.00
MW-3	10/16/96	78.70	21.23	99.93	97.4	0.00
MW-3	11/25/96	78.76	21.17	99.93	97.4	0.00
COL-6	04/02/96	85.50	14.81	100.31	97.6	0.00
COL-6	04/17/96	79.67	20.64	100.31	97.6	0.00
COL-6	05/06/96	79.60	20.71	100.31	97.6	0.00
COL-6	09/19/96	80.00	20.31	100.31	97.6	0.00
COL-6	10/03/96	79.21	21.10	100.31	97.6	0.00
COL-6	10/16/96	79.04	21.27	100.31	97.6	0.00
COL-6	11/25/96	78.73	21.58	100.31	97.6	0.00

Well casings are marked to provide consistent reference points for gauging operations.

Correction equation for the water elevation suppression effect caused by the presence of LNAPLs.

Corrected water elevation = Elevation - (Depth to water - (Specific gravity * LNAPL thickness))

where specific gravity = 0.82 for crude oil

COL-6 = City of Lovington Well No. 6. All measurements are in feet.

^{**} Calculated from survey plat performed by Rice Operating Company.

1996

SUMMARY OF WATER SAMPLE ANALYTICAL RESULTS BTEX, TDS, AND CHLORIDES JCT L-31 SPILL SITE, ABO SWD SYSTEM

Well Name	Date Sampled	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Xylenes (ppm)	Total BTEX (ppm)	TDS (mg/l)	Chloride (mg/l)	
NMWQCC	Standards	0.010	0.750	0.750	0.620	N/A	1,000	250	
MW-1	04/17/96	<0.0010	<0.0010	< 0.0010	< 0.0030	< 0.0030	865	250	
MW-1	11/25/96	<0.0010	<0.0010	< 0.0010	< 0.0030	< 0.0030	782	94	
MW-2	04/17/96	<0.0010	< 0.0010	< 0.0010	< 0.0030	< 0.0030	394	46	
MW-2	11/25/96	0.0013	< 0.0010	< 0.0010	< 0.0030	< 0.0030	408	52	
MW-3	04/17/96	<0.0010	< 0.0010	< 0.0010	< 0.0030	< 0.0030	389	52	
MW-3	11/25/96	<0.0010	< 0.0010	< 0.0010	< 0.0030	< 0.0030	424	52	
COL-6	03/22/96	<0.0010	< 0.0010	< 0.0010	< 0.0030	<0.0030	863	282	
COL-6	04/19/96	<0.0010	< 0.0010	< 0.0010	< 0.0030	< 0.0030	1205	530	
COL-6	11/25/96	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Analysis was performed by Cardinal Laboratories in Hobbs, New Mexico.

Samples labeled (SPL) were analyzed by Southern Petroleum Laboratories, Houston, Texas.

Benzene, toluene, eythlbenzene, and xylene (BTEX); total dissolved solids (TDS); and chloride analyses were conducted using EPA Methods 8020, 160.1, and 352.3, respectively.

Results presented in bold print exceed NMWQCC human health standards for ground water.

COL-6 = City of Lovington Well No. 6.

All results are reported in milligrams per liter (mg/l): parts per million (ppm).

1996 SUMMARY OF WATER SAMPLE ANALYTICAL RESULTS WATER QUALITY DATA JCT L-31 SPILL SITE, ABO SWD SYSTEM

Well Name NMWQCC	Date Sampled Standards	Total Dissolved Solids (TDS) 1,000 mg/l	pH (S. U.) 6 to 9	Chloride (CI) 250 mg/l	Sodium (Na) N/A	Calcium (Ca) N/A	Sulfate (SO4) 600 mg/l	Potassium (K) N/A	Magnesium (Mg) N/A	Carbonate (CO3) N/A	Bicarbonate (HCO3)
MW-1	04/17/96	865	7.88	250	223.9	57.9	123.4	N/A	12.0	0	200
MVV-1	11/25/96	782	N/A	94	190.0	37.6	217.0	0.8	16.0	0	268
MW-2	04/17/96	394	7.96	46	35.4	71.7	57.4	N/A	16.1	0.0	
MW-2	11/25/96	408	N/A	52	26.8	66.4	90.8	0.5	25.8		l .
MW-3	04/17/96	389	7.87	52	31.5	76.1	54.3	N/A	16.4	0.0	140
MW-3	11/25/96	424	N/A	52	34.1	69.6	90.8	0.6	17.5	0.0	205
COL-6	04/17/96	1,231	N/A	545	N/A	N/A	N/A	N/A	N/A	N/A	N/A
COL-6	11/25/96	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Analysis was performed by Cardinal Laboratories in Hobbs, New Mexico.

COL-6 # City of Lavington Well No. 6.

All results are reported in milligrams per liter (mg/l): parts per million (ppm).

Results presented in bold print exceed NMWQCC human health standards for ground water.

1996

QUARTERLY SUMMARY OF RECOVERY SYSTEM OPERATIONS GROUNDWATER RECOVERY VOLUMES JCT L-31 SPILL SITE, ABO SWD SYSTEM

Date	Time	Volume	Avg Pump	Avg. Analy	tical Result	Description
	Pumped	Recovered	Rate	Chloride	TDS	
	(hours)	(gal)	(GPM)	(ppm)	(ppm)	
JAN 1996	744	1,087,200	24.4	572	936	
FEB 1996	696	1,252,800	30.0	369	990	ł
MAR 1996	584	1,051,200	30.0	359	916	
1ST QTR	2,024	3,391,200	27.9	433	948	
APR 1996	240	432,000	30.0	521	1,134	Groundwater Monitoring Event
MAY 1996	200	360,000	30.0	549	1,127	
JUN 1996	240	432,000	30.0	451	1,178	
2ND QTR	680	1,224,000	30.0	507	1,146	
JUL 1996	248	446,400	30.0	358	1,116	
AUG 1996	248	446,400	30.0	360	904	
SEP 1996	128	230,400	30.0	356	952	
3RD QTR	624	1,123,200	30.0	358	991	·
OCT 1996	0	0	0.0	N/A	N/A	
NOV 1996	384	460,800	20.0	N/A	N/A	Groundwater Monitoring Event
DEC 1996	744	892,800	20.0	N/A	N/A	
4TH QTR	1,128	1,353,600	20.0	N/A	N/A	
1996			RATE & A	NALYTICAL A	VERAGES	
TOTALS	4,456	7,092,000	26.5	433	1,028	

JANUARY 1996

SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Grou	ndwater Re	covery Opera	ions	Analyt	ical Rest	ilts of Grou		Analytical Results of Groundwater Recovered from				
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Toluene	Ethyl-	Xylene	Total		
	Pumped	Recovered	Rate	Level	Level			benzene		BTEX		
	(hours)	(gal)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)		
01/01/96	24	33,120	23	Ground w	ater rec	overed wit	h submers	sible pump				
01/02/96	24	33,120	23	11			"					
01/03/96	24	33,120	23	N/A	N/A	<0.001	ł		<0.002	<0.002		
01/04/96	24	33,120	23	1655			N/A	N/A	N/A	N/A		
01/05/96	24	33,120	23	Ground w	ater rec	overed wit	h submers	sible pump				
01/06/96	24	33,120	23	**			"					
01/07/96	24	33,120	23	"			["			,		
01/08/96	24	33,120	23	11			"					
01/09/96	24	33,120	23	**			11					
01/10/96	24	33,120	23	17			"					
01/11/96	24	33,120	23	"			111	•				
01/12/96	24	33,120	23	442		•	N/A	N/A	N/A	N/A		
01/13/96	24	33,120	· ·	Ground w	ater rec	overed wit	h submers	sible pump		:		
01/14/96	24	33,120	23	"			[" 					
01/15/96	24	33,120	23	. "]"					
01/16/96	24	33,120	23	11,			"					
01/17/96	24	33,120	23	414		N/A	N/A	N/A	N/A	N/A		
01/18/96	24	33,120	23	404	959	N/A	N/A	N/A	N/A	N/A		
01/19/96	24	33,120	23	388			N/A	N/A	N/A	N/A		
01/20/96	24	33,120	23	Ground w	ater rec	overed wit	h submers	sible pump				
01/21/96	24	33,120	23	"]"		1			
01/22/96	24	33,120	23				["					
01/23/96	24	33,120	23				" _{••}					
01/24/96	24	33,120	23	"			 					
01/25/96	24	33,120	23	240	000	NI/A	N/A	N/A	N/A	N/A		
01/26/96	24	43,200	30	348		ļ	1	1	i i	IN/A		
01/27/96	24	43,200	30 30	Ground W	ater rec I	overed Wit	n Submen _"	sible pump I				
01/28/96 01/29/96	24	43,200	30	"			,,					
01/29/96	24 24	43,200	30	350	971	N/A	N/A	N/A	N/A	N/A		
01/30/96	24 24	43,200 43,200	-	-		l		sible pump		1317		
JAN 96		43,200	30	Ground W				CAL RESU				
TOTALS	744	1,087,200	24	572						<0.002		

FEBRUARY 1996 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Grou	indwater Re	ecovery Opera	tions	Analyt	ical Resi	ilts of Grou	ndwater Re	covered fro		
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Toluene	Ethyl-	Xylene	Total
	Pumped	Recovered	Rate	Level	Level			benzene		BTEX
	(hours)	(gal)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
02/01/96	24	43,200		Ground w	ater rec	overed wit	h submers	sible pump		
02/02/96	24	43,200	30	"			"			
02/03/96	24	43,200	30	*1			"			
02/04/96	24	43,200	30	"			"			
02/05/96	24	43,200	30	"			"			
02/06/96	24	43,200	30			1	N/A	N/A	N/A	N/A
02/07/96	24	43,200			ater rec	overed wit	h submers	sible pump		,
02/08/96	24	43,200	30				"			
02/09/96	24		30	"			11			
02/10/96	24	43,200	30	"			''' 			
02/11/96	24	43,200	30	"			" 			
02/12/96	24	43,200	30	"			" 			
02/13/96	24	43,200	30	"			<u>"</u>			
02/14/96	24	43,200	30	"						
02/15/96	24	43,200	30	".			"			
02/16/96	24	43,200	30	"			",			
02/17/96	24	43,200	30	".			" _" ,			
02/18/96	24	43,200	30	"			'' 			
02/19/96	24	43,200	30	i			`` 			
02/20/96	24	43,200	30	".			<u> </u> "			
02/21/96	24	43,200	30		001	NI/A	NI/A	NI/A	N1/A	N1/A
02/22/96	24	43,200	30	368	921	N/A	N/A	N/A	N/A N/A	N/A N/A
02/23/96	24	43,200	30	365			N/A	N/A		IWA
02/24/96	24	43,200		Grouna W	ater rec I	overea Wit I	n submers I::	sible pump I		
02/25/96	24	43,200	30	11			11			
02/26/96	24	43,200	30							
02/27/96	24	43,200	30				,,			
02/28/96	24	43,200	30				"			
02/29/96 FEB 96	24	43,200	30		n.) Medace	ANIAL VIII	L CALRESU) loca reconstruction	
	888	4 050 000	ga.	000					•	NIA
TOTALS	696	1,252,800	30	369	990	N/A	N/A	N/A	N/A	N/A

TABLE 6: MARCH 1996 SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Grot	ındwater Re	ecovery Opera						covered fro		
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Toluene	Ethyl-	Xylene	Total
	Pumped	Recovered	Rate	Level	Level			benzene		BTEX
	(hours)	(gal)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
03/01/96	24	43,200		Ground wa	ater rec	overed wit	h submers	sible pump		
03/02/96	24	43,200	30	"					·	
03/03/96	24	43,200	30	"			["			
03/04/96	24	43,200	30	"			["	ŀ		
03/05/96	24	43,200	30	"	1		 " 			
03/06/96	24	43,200	30	410	996		N/A	N/A	N/A	N/A
03/07/96	24	43,200	30	Ground wa	ater rec	overed wit	h submers	sible pump		
03/08/96	24	43,200	30	"				· ·		
03/09/96	24	43,200	30] "]]"			
03/10/96	24	43,200	30	"			" 			
03/11/96	24	43,200	30	"			" 			
03/12/96	24	43,200	30	"]			l" 	!		
03/13/96	24	43,200	30	"			" 			
03/14/96	24	43,200	30	["[(<u>"</u>		1	
03/15/96	24	43,200	30	"			<u>"</u>			
03/16/96	24	43,200	30				" 			
03/17/96	24	43,200	30	"	,]"			
03/18/96	24	43,200	30] "]]" 			
03/19/96	24	43,200	30	"			<u> </u> "			
03/20/96	24	43,200	30	["]			l".			
03/21/96	24	43,200	30	000	200	10.004	10.004	10.004	<0.003	<0.003
03/22/96	8	14,400	30	282	863		1			<0.003
03/23/96	8	14,400	30	Ground wa	ater rec	overea Wit I	n submer: !"	inie briub		
03/24/96	8	14,400	30							
03/25/96	8	14,400	30 30	[[,,	[
03/26/96	8	14,400	•] "]] ,,			
03/27/96	8	14,400	30	,,,						
03/28/96	8	14,400	30 30	384	890	N/A	N/A	N/A	N/A	N/A
03/29/96	8	14,400		Ground wa			1		i	18/7
03/30/96	8	14,400 14,400	30		ater 160	oveten Mir	" 	 ainie haitib		
03/31/96 MAR 96	8	14,400	30		٨	VEDACE	ANIAL VIEL	CAL RESU	i T	
	584	4 054 000	30	359						<0.003
TOTALS	204	1,051,200		003	210	~0.001	70.001	70,001	~~.000	

APRIL 1996

SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Groi	andwater R	ecovery Opera	tions	Analyt	ical Resu	ilts of Grou	ndwater Re	covered fro	ım Pumping	Well		
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Toluene	Ethyl:	Xylene	Total		
	Pumped	Recovered	Rate	Level	Level			benzene		BTEX		
	(hours)	(gal)	(GPM)	(ppm)		(ppm)	(ppm)	(ppm)	(ppm)	(ppm)		
04/01/96	8	14,400	30			,		sible pump				
04/02/96	8	14,400	30	470			N/A	N/A	N/A	N/A		
04/03/96	8	14,400	30	,		N/A	N/A	N/A	N/A	N/A		
04/04/96	8	14,400	30		Ground water recovered with submersible pump							
04/05/96	8	14,400	30				 ''					
04/06/96	8	14,400	30	1			"					
04/07/96	8	14,400	30				"		Ì	,		
04/08/96	8	14,400	30	11			"	,				
04/09/96	8	14,400	30	"			"					
04/10/96	8	14,400	30	458	1175	N/A	N/A	N/A	N/A	N/A		
04/11/96	8	14,400	30	476	1228	N/A	N/A	N/A	N/A	N/A		
04/12/96	8	14,400	30			N/A	N/A	N/A	N/A	N/A		
04/13/96	8	14,400	30	Ground w	ater rec	overed wit	ḥ submers	sible pump				
04/14/96	8	14,400	30	U			"		[
04/15/96	8	14,400	30	480	844	N/A	N/A	N/A	N/A	N/A		
04/16/96	8	14,400	30	Ground w		. •						
04/17/96	8	14,400	30	545	1231	N/A	N/A	N/A	N/A	N/A		
04/18/96	8	14,400	30		1168	N/A	N/A	N/A	N/A	N/A		
04/19/96	8	14,400	30				•	•	<0.003	<0.003		
04/20/96	8	14,400	30	Ground w	ater rec	overed wit	h submers	sible pump	,			
04/21/96	8	14,400	30	н		1	"					
04/22/96	8	14,400	30		1153	N/A	N/A	N/A	N/A	N/A		
04/23/96	8	14,400	30		1214	N/A	N/A	N/A	N/A	N/A		
04/24/96	8	14,400	30		1098	N/A	N/A	N/A	N/A	N/A		
04/25/96	8	14,400	30		1047	N/A	N/A	N/A	N/A	N/A		
04/26/96	8	14,400	30				N/A	N/A	N/A	N/A		
04/27/96	8	14,400	30		ater rec	overed wit	h submers	sible pump				
04/28/96	8	14,400	30				["	1				
04/29/96	8	i '	30	1			N/A	N/A	N/A	N/A		
04/30/96	8	14,400	30	Ground w						~~~		
APR 96								CAL RESU				
TOTALS	240	432,000	30	521	1134	< 0.001	< 0.001	< 0.001	<0.003	< 0.003		

MAY 1996

SUMMARY OF RECOVERY SYSTEM OPERATIONS WATER VOLUME, CHLORIDE, TDS, AND BTEX ANALYSIS JCT L-31 SPILL SITE, ABO SWD SYSTEM

Grou	indwater Re	ecovery Opera	tions	Analyt		ilts of Grou				
Date	Time	Volume	Avg Pump	Chloride	TDS	Benzene	Toluene	Ethyl-	Xylene	Total
	Pumped	Recovered	Rate	Level	Level			benzene		BTEX
	(hours)	(gal)	(GPM)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
05/01/96	8	14,400	30	,			N/A	N/A	N/A	N/A
05/02/96	0	0	0	Recovery	well shu	ut-in for gro	ound wate	r gauging	event	
05/03/96	0	0	0	"			"			
05/04/96	0	0	0	"			III			
05/05/96	0	0	0	["1		Í	["			
05/06/96	0	0	0			W-2, MW-	• `	1		
05/07/96	0	0	0		1139	•	N/A	N/A	N/A	N/A
05/08/96	8	14,400		Ground w						
05/09/96	8	14,400	30		1123	1	N/A	N/A	N/A	N/A
05/10/96	8	14,400		Ground w	ater rec	overed wit	h submers	sible pump		
05/11/96	8	14,400	30] "]			<u> "</u>		ļ	
05/12/96	8	14,400	30				" 			
05/13/96	8	14,400	30] "]			<u> </u> "			
05/14/96	8	14,400	30	"] '' 			
05/15/96	8	14,400	30	["]]" 			
05/16/96	8	14,400	30	"	4070		"			NI/A
05/17/96	8	14,400	30	480		•	N/A	N/A	N/A	N/A
05/18/96	8	14,400	30	Ground w	ater rec	overed wit I	n submer: !	sible pump I		
05/19/96	8	14,400	30	"			["			
05/20/96	8	14,400	30	,			<u>"</u>		į	
05/21/96	8	14,400	30				,,			
05/22/96	8	14,400	30	[",						
05/23/96	8	14,400	30	470	1072	N/A	N/A	N/A	N/A	N/A
05/24/96	8	14,400	30 30	Ground w	,	•		1	1	14/7
05/25/96	8	14,400	30 30	Ground W	aterrec I	overeu Wil I	n submen h	l Pinie hauth		
05/26/96	8	14,400	30				,,			
05/27/96	8	14,400	30] "			 ,,			
05/28/96	8	14,400	30				 	İ	ľ	
05/29/96	8	14,400	30		1080	N/A	N/A	N/A	N/A	N/A
05/30/96	8	14,400	30	560		1		1		IN/A
05/31/96	8	14,400	30	Ground w		VERAGE				
MAY 96	000	200 000	90	240				WA N/A	N/A	N/A
TOTALS	200	360,000	30	549	1127	N/A	N/A	IW.A	INIA	