# AP - <u>49</u>

# ANNUAL MONITORING REPORT

# **YEAR(S):** 2004



# Highlander Environmental Corp.

Midland, Texas

CERTIFIED MAIL RETURN RECEIPT NO. 7004 1160 0000 4840 9462

March 21, 2005

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

#### Re: 2004 Annual Summary of Monitor Well Sampling, Rice Operating Company, Justis Saltwater Disposal System (SWD) Well #H-2, Unit H, Section 2, T-26-S, R-37-E, Lea County, New Mexico NMOCD CASE #1R0423-01

Dear Mr. Price:

Highlander Environmental Corp. (Highlander) takes this opportunity to submit the 2004 Annual Monitor Well Sampling Report for the Rice Operating Company (ROC) Justis SWD Well #H-2 site located in the Justis Salt Water Disposal System.

#### Background

In January 2002, Rice had installed the three monitor wells to evaluate groundwater in the vicinity of the H-2 injection facility. Soil samples were collected during tank replacement and sample results prompted the placement of the monitor wells. Originally, two monitor wells, MW-1 and MW-2 showed elevated chloride levels. After several quarterly sampling events, MW-2 continued to show elevated chloride levels. As a result, Rice installed two additional monitor wells in February 2004.

#### **Monitor Well Sampling**

On March 11, June 28, September 23 and December 21, 2004, Highlander personnel traveled to the location for quarterly sampling. Prior to sampling, the wells were gauged for static water levels. All monitor well caps were opened and water level measurements were taken from the top of the casing. The measurements were taken to the nearest 0.01 feet.

Each well was purged using a portable submersible pump. Approximately three casing volumes of water were purged from each well prior to sampling. Between wells, the pump and associated tubing were decontaminated with a laboratory grade detergent and rinsed with deionized water. Cumulative water level measurements and purge volumes for the monitor wells are shown in Table 1.

Each well was inspected for the presence of phase-separated hydrocarbons (PSH). Groundwater samples were collected as soon as possible after the groundwater returned to its static level.

Groundwater samples were collected using clean disposable polyethylene bailers and disposable line. The samples were transferred into labeled and preserved containers provided by the laboratory. All of the samples were delivered under proper chain-of-custody control to Environmental Labs of Texas, Inc., Odessa, Texas. The groundwater samples were analyzed for major anions, by methods 310.1, 9253 and 375.4, cations by method 6010B, Total Dissolved Solids (TDS) by method 160.1 and Benzene, Toluene, Ethylbenzene, and Xylene (BTEX) by method EPA 8021B. Copies of the laboratory reports are enclosed in Appendix A. Cumulative analytical data is summarized in Table 2.

Water table maps were generated for all four quarterly sampling events, using the water level measurement data and are included as Figures 3-6. The general hydraulic gradient appears to be consistently towards the north-northwest.

#### **Sample Results**

Referring to Table 2, chloride concentrations from monitor wells MW-1, MW-3, MW-4 and MW-5 were all below the New Mexico Water Quality Control Commission (WQCC) standards of 250 mg/L during the last two quarters of 2004. Only MW-2 exceeded the WQCC standard for all four quarters. Benzene levels in all of the monitor wells have fluctuated between near or slightly above WQCC standards to below method detection limits for the past several quarterly sampling events.

Hydrographs representing fluctuations in groundwater levels and benzene concentration graphs were prepared for all of the monitoring wells and are included in Appendix B. The hydrographs of all monitor wells show a general decline in water levels in the past four quarters, although throughout this period there has been significant precipitation. Benzene levels have fluctuated up and down during this decline and do not show a distinct correlation between water level and benzene concentrations in MW-1 spiked in the first two quarters, but declined to below WQCC standards in the final two quarters. Chloride concentrations in the remaining monitor wells have remained at or below the WQCC standards, with the exception of the second quarter sample from MW-5, which was slightly above the standard (310 mg/L).

#### Conclusions

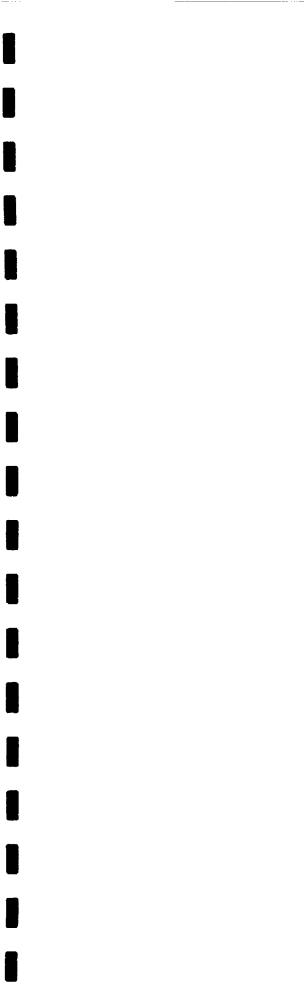
Hydrographs of the monitor wells are showing a distinct decline in water levels during 2004, at a time when significant precipitation has occurred in this region. The hydraulic gradient continues to trend towards the north-northwest, although the regional hydraulic gradient is towards the southeast. Both of these issues tend to indicate outside interference with the localized water table, possibly from irrigation wells located to the north of the site. Fluctuations in benzene levels cannot be correlated to water level fluctuations at this time. Benzene levels in MW-2 and MW-3 were slightly above the WQCC standard of 0.01 mg/L in 2004. Chloride levels have been consistently elevated in MW-2. Chloride concentrations in MW-1 spiked in the first two quarters, but declined to below WQCC standards in the final two quarters. Chloride concentrations in the remaining monitor wells have remained at or below the WQCC standards, with the exception of the second quarter sample from MW-5, which was slightly above the standard (310 mg/L).

NMOCD may soon expect a Corrective Action Plan (CAP) submission for this site by Highlander.

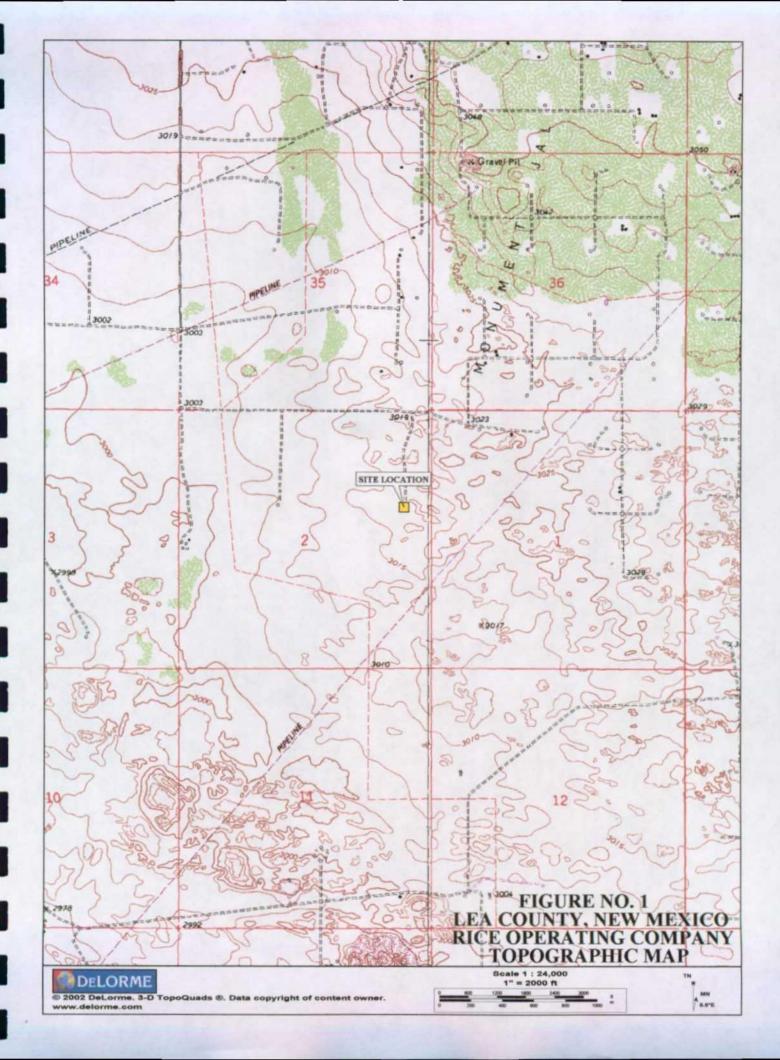
Respectfully Submitted, HIGHLANDER ENVIRONMENTAL CORP.

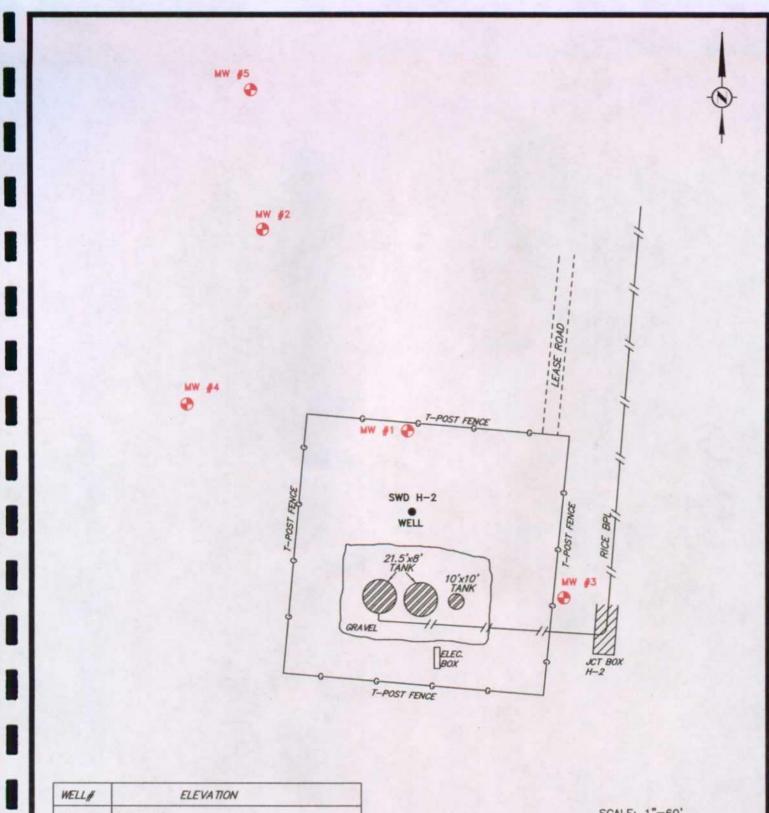
Timothy M. Reed, P.G. Vice President

cc: ROC, Chris Williams NMOCD, District I Office 1625 N. French Drive Hobbs, NM 88240

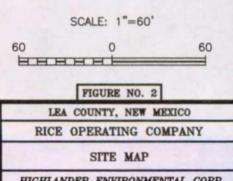


FIGURES



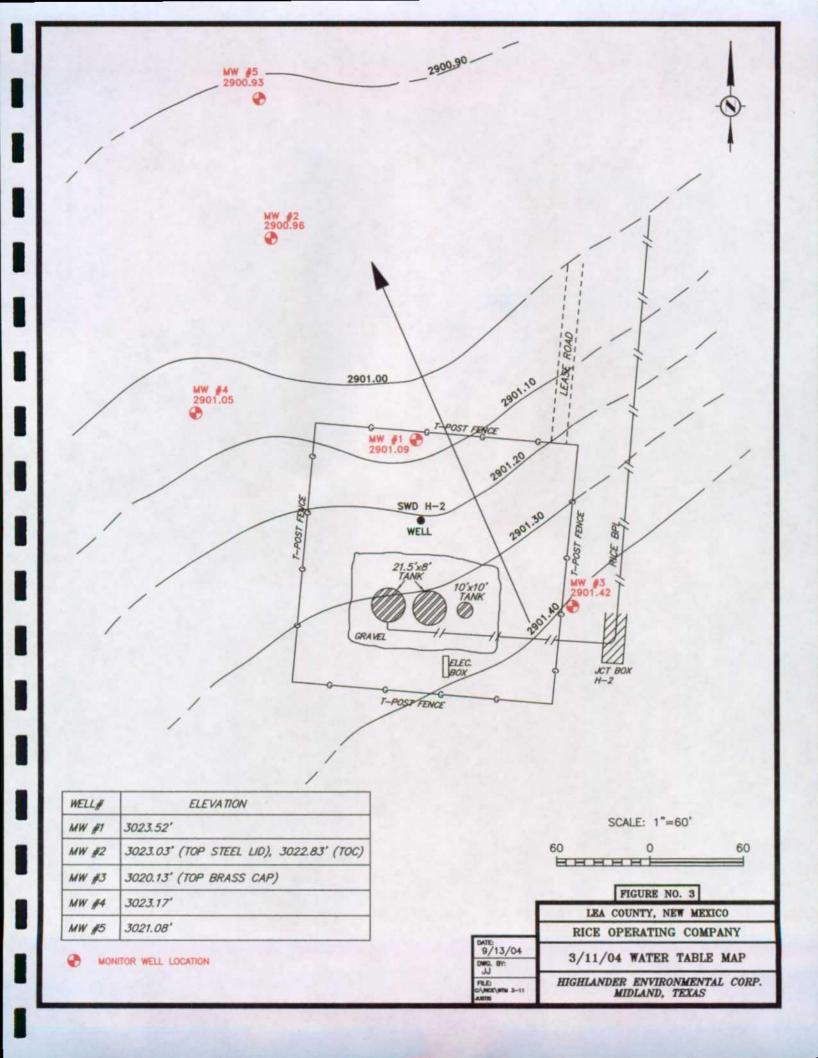


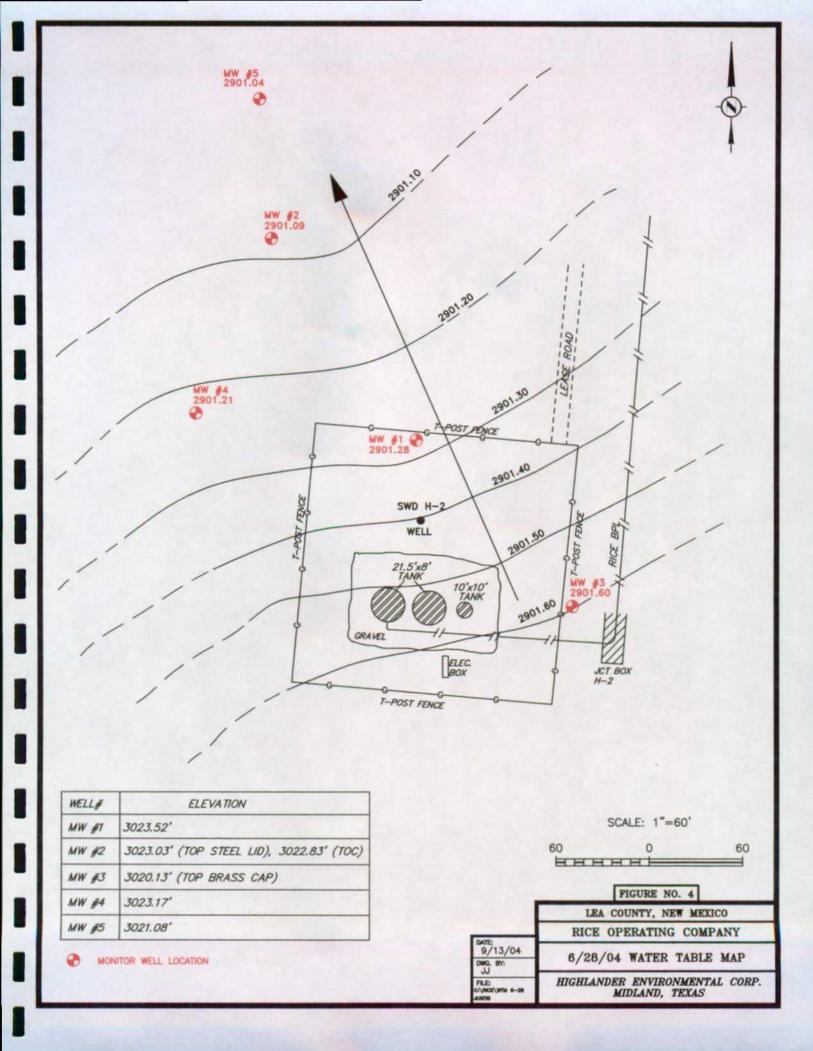
WELL#	ELEVATION
MW #1	3023.52'
MW #2	3023.03' (TOP STEEL LID), 3022.83' (TOC)
MW #3	3020.13' (TOP BRASS CAP)
MW #4	3023.17'
MW #5	3021.08'

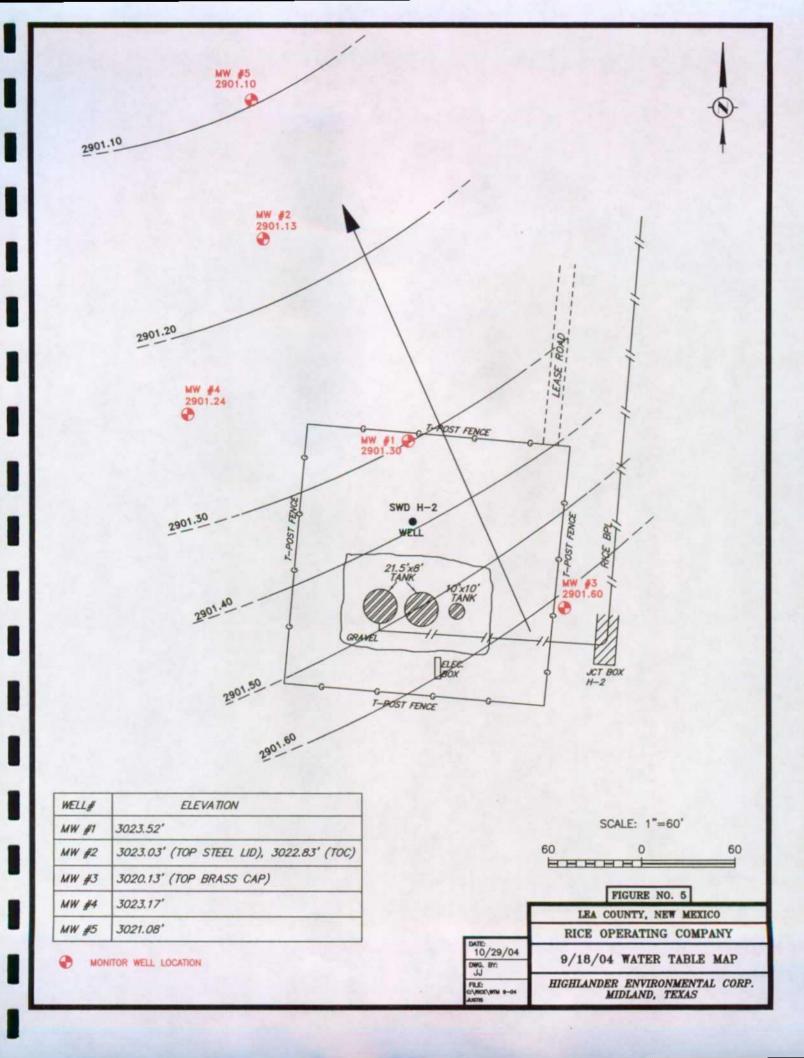


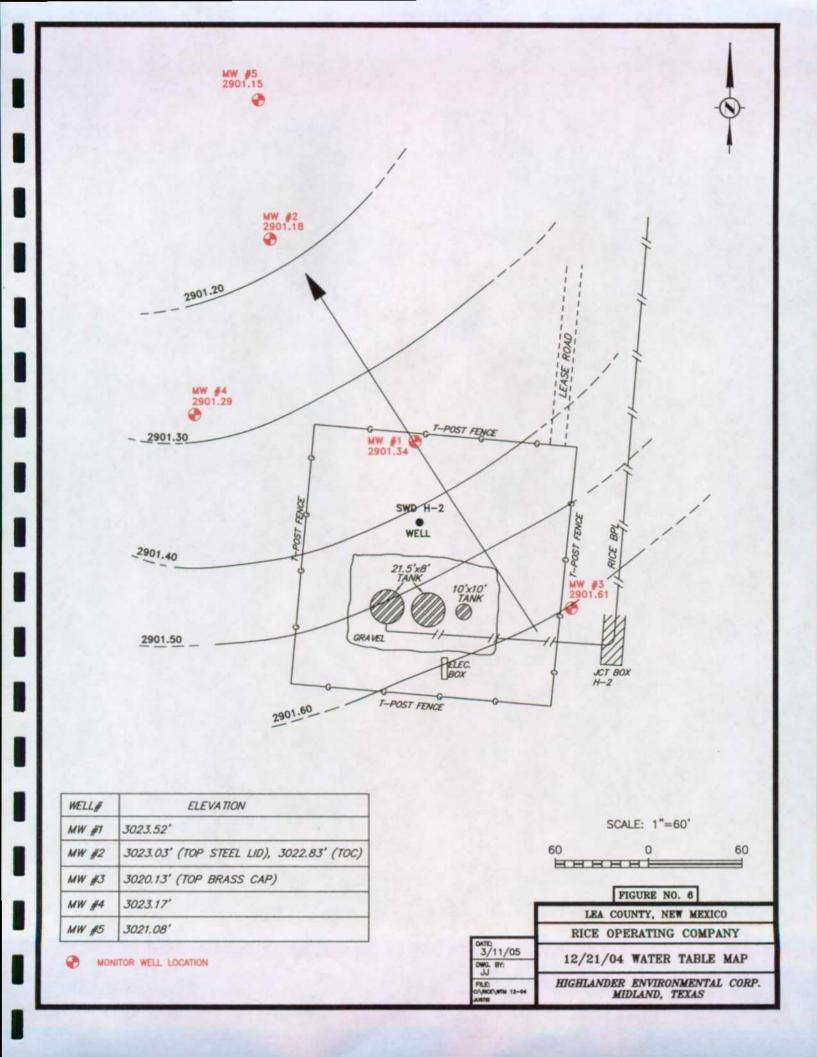
HIGHLANDER ENVIRONMENTAL CORP. MIDLAND, TEXAS

DATE: 4/30/04 DWG, BY: JJ FILE: clyrice,site wap austes











#### Table 1

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#### Rice Operating Co. Justis SWD #H-2 Sample Analysis

MW#	Sample Date	Total Depth (TOC) (feet)	Depth to Water (TOC) (feet)	Purge Volume (gallons)
MW-1	8/16/2002	137	116.20	66
	11/12/2002	144*	123.32	60
	2/13/2003	144*	122.95	70
	5/20/2003	144*	123.34	70
	9/16/2003	144*	122.94	70
	12/16/2003	144*	123.19	70
·····	3/11/2004	144*	122.43	70
	6/28/2004	144*	122.24	70
· · · · · · · · · · · · · · · · · · ·	9/23/2004	144*	122.22	70
	12/21/2004	144*	122.18	68
MW-2	8/16/2002	142	121.85	25
	11/12/2002	142	122.10	25
	2/13/2003	142	121.71	25
	5/20/2003	142	122.08	25
	9/16/2003	142	121.70	25
	12/16/2003	142	122.00	30
	3/11/2004	142	121.87	30
*	6/28/2004	142	121.74	30
	9/23/2004	142	121.70	25
	12/21/2004	142	121.65	10
MW-3	8/16/2003	133	118.68	20
······	11/12/2002	133	118.90	25
	2/13/2003	133	118.53	25
	5/20/2003	133	118.87	25
	9/16/2003	133	118.53	25
<u> </u>	12/16/2003	133	118.79	30
	3/11/2004	133	118.71	30
	6/28/2004	133	118.53	30
	9/23/2004	133	118.52	25
	12/21/2004	133	118.52	7
	3/11/2004	137	122.12	30
	6/28/2004	137	121.96	30
·····	9/23/2004	137	121.93	25
	12/21/2004	137	121.88	8
MW-5	3/11/2004	135	120.15	30
	6/28/2004	135	120.04	30
	9/23/2004	135	119.98	25
	12/21/2004	135	119.93	8

\* Denotes new TD measurement due to monitor well pipe extension

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#### Table 2 **Rice Operating Co.** Justis SWD #H-2 Sample Analysis (in mg/L)

	Sample					Ethyl	Total
MW#	Date	Chloride	TDS	Benzene	Toluene	Benzene	Xylenes
MW-1 (5")	3/1/2002	301	971	-			-
	6/10/2002	173	-	0.001	0.008	0.01	0.066
	8/16/2002	111	619	< 0.001	< 0.001	< 0.001	< 0.001
	11/12/2002	257	971	<0.001	0.001	<0.001	< 0.001
	2/13/2003	97.5	647	<0.001	< 0.001	< 0.001	<0.001
	5/20/2003	102	682	<0.001	< 0.001	<0.001	<0.001
	9/16/2003	594	1920	<0.001	<0.001	<0.001	<0.001
	12/16/2003	81.5	587	0.013	<0.001	<0.001	<0.001
	3/11/2004	727	2060	<0.001	< 0.001	<0.001	<0.001
	6/28/2004	1030	3230	0.0056	<0.001	< 0.001	<0.001
	9/23/2004	106	749	< 0.001	< 0.001	< 0.001	<0.001
	12/21/2004	93.1	858*	<0.001	<0.001	< 0.001	0.00108
MW-2	3/1/2002	700	1780	-	4	-	-
	5/23/2002	904	2710	<0.001	<0.001	< 0.001	<0.001
	8/16/2002	1040	3390	< 0.001	<0.001	<0.001	<0.001
	11/12/2002	1130	2600	0.002	0.003	<0.001	< 0.002
	2/13/2003	1110	2780	<0.001	<0.001	<0.001	< 0.001
	5/20/2003	1130	3600	<0.001	< 0.001	< 0.001	<0.001
	9/16/2003	1070	3540	<0.001	<0.001	<0.001	< 0.001
	12/16/2003	1230	2490	0.032	0.003	<0.001	< 0.001
	3/11/2004	1200	3660	<0.001	<0.001	< 0.001	<0.001
	6/28/2004	2570	6290	0.0112	<0.001	< 0.001	<0.001
	9/23/2004	1130	3760	<0.001	< 0.001	< 0.001	< 0.001
	12/21/2004	1150	2877*	0.0055	< 0.001	<0.001	< 0.001
MW-3	3/1/2002	37.2	561	-	-	-	-
	5/16/2002	35.4	570	< 0.001	< 0.001	< 0.001	<0.001
	8/16/2002	93.1	631	<0.001	<0.001	< 0.001	<0.001
	11/12/2002	97.5	688	0.030	0.014	0.002	0.003
	2/13/2003	102	666	<0.001	<0.001	<0.001	< 0.001
	5/20/2003	168	885	<0.001	<0.001	< 0.001	<0.001
	9/16/2003	204	568	< 0.001	<0.001	< 0.001	<0.001
	12/16/2003	40.8	517	0.013	<0.001	< 0.001	<0.001
	3/11/2004	65	666	<0.001	<0.001	<0.001	<0.001
	6/28/2004	124	735	0.0124	< 0.001	< 0.001	<0.001
	9/23/2004	115	703	0.00113	<0.001	< 0.001	<0.001
	12/21/2004	154	1057*	0.0127	<0.001	0.00144	<0.001

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NOTE: - denotes not analyzed

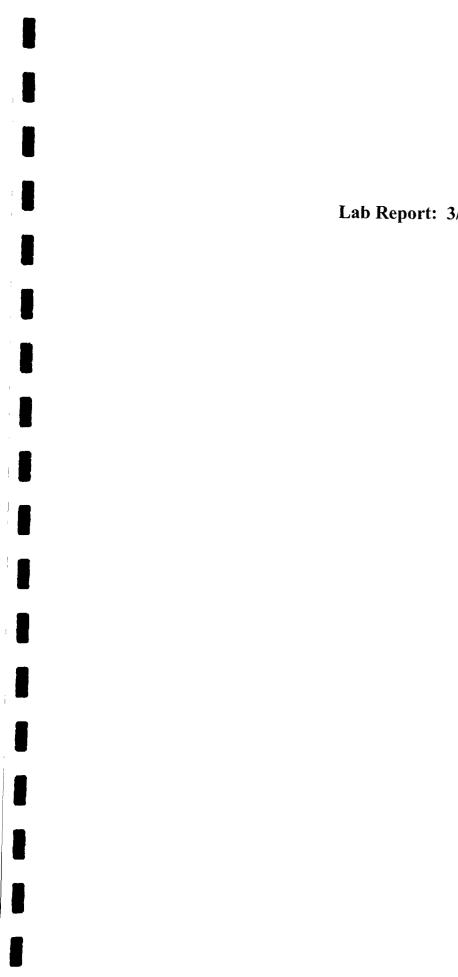
#### Table 2 Rice Operating Co. Justis SWD #H-2 Sample Analysis (in mg/L)

A STATE	Sample	cha, da	70.0	Persona	Toluene	Ethyl Benzene	Total Xylenes
MW#	Date	Chloride	TDS	Benzene	roiuene		Aylenes
MW-4	3/1/2002	-			-		
	6/10/2002	-		-	-	-	-
	8/16/2002	-		-	<u> </u>		-
	11/12/2002	-			-	• •	-
	2/13/2003	-				-	-
	5/20/2003				-	-	-
	9/16/2003						
	12/16/2003	-	-	-	-		-
	3/11/2004	35.4	610	< 0.001	<0.001	< 0.001	<0.001
	6/28/2004	57.6	596	0.00749	<0.001	<0.001	<0.001
	9/23/2004	53.2	648	<0.001	<0.001	<0.001	< 0.001
	12/21/2004	59.1	865*	0.00275	<0.001	< 0.001	<0.001
MW-5	3/1/2002	-	-	-	-	_	-
	5/23/2002	-	-		-		_
	8/16/2002	-	-	-	-	-	-
	11/12/2002	-	-	-	-	-	-
	2/13/2003	-	-	_	-	_	-
	5/20/2003	-	-	_	-	-	-
	9/16/2003	-	_	_		-	_
	12/16/2003	-	-	-	-	-	-
	3/11/2004	195	894	<0.001	<0.001	< 0.001	< 0.001
	6/28/2004	310	1130	0.0105	<0.001	0.00108	< 0.001
	9/23/2004	160	792	< 0.001	< 0.001	< 0.001	< 0.001
	12/21/2004	165	1072*	0.00292	< 0.001	< 0.001	< 0.001

NOTE: - denotes not analyzed

# APPENDIX A

Lab Analysis



Lab Report: 3/19/04



12600 West I-20 East - Odessa, Texas 79765

# Analytical Report

### Prepared for:

Ike Tavarez Highlander Environmental Corp. 1910 N. Big Spring St. Midland, TX 79705

Project: Rice/Justis SWD Well H-2 Project Number: 1863 Location: Lea County, NM

Lab Order Number: 4C12015

Report Date: 03/19/04

Highlander Environmental Corp.Project:Rice/Justis SWD Well H-2Fax: (432) 682-39461910 N. Big Spring St.Project Number:1863Reported:Midland TX, 79705Project Manager:Ike Tavarez03/19/04 14:15

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	4C12015-01	Water	03/11/04 10:15	03/12/04 17:20
MW-2	4C12015-02	Water	03/11/04 11:50	03/12/04 17:20
MW-3	4C12015-03	Water	03/11/04 11:15	03/12/04 17:20
MW-4	4C12015-04	Water	03/11/04 13:15	03/12/04 17:20
MW-5	4C12015-05	Water	03/11/04 12:45	03/12/04 17:20

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Project: Rice/Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

**Organics by GC** 

Fax: (432) 682-3946 Reported:

03/19/04 14:15

	]	Environm	ental La	b of T	exas				
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Note
MW-1 (4C12015-01)		·····			······				
Benzene	J [0.000757]	0.00100	mg/L	1	EC41830	03/16/04	03/16/04	EPA 8021B	
Toluene	ND	0.00100	n	**	n	"	n		
Ethylbenzene	ND	0.00100	*		۳	"		n	
Xylene (p/m)	ND	0.00100	17	"	"	N	**	41	
Xylene (0)	ND	0.00100			n	n	n		
Surrogate: a,a,a-Trifluorotoluene		114 %	80-1.	20	"	#	"	<i>n</i>	
Surrogate: 4-Bromofluorobenzene		84.5 %	80-12	20	"	"	"	**	
MW-2 (4C12015-02)									
Benzene	J [0.000864]	0.00100	mg/L	1	EC41830	03/16/04	03/16/04	EPA 8021B	
Toluene	ND	0.00100	n	*	n	"	*		
Ethylbenzene	ND	0.00100		*	"		n		
Xylene (p/m)	ND	0.00100	H	н	11	"	*	n	
Xylene (o)	ND	0.00100		n	n	n	n	n	
Surrogate: a,a,a-Trifluorotoluene	·	119%	80-12	20		"	"	п —	
Surrogate: 4-Bromofluorobenzene		85.0 %	80-12	20	"	"	"	"	
MW-3 (4C12015-03)									
Benzene	J [0.000960]	0.00100	mg/L	1	EC41830	03/16/04	03/16/04	EPA 8021B	
Toluene	ND	0.00100	"		*	*	•	n	
Ethylbenzene	ND	0.00100			n	n	*	**	
Xylene (p/m)	. ND	0.00100	Ħ	"	*	"		n	
Xylene (o)	ND	0.00100	n	n	10	n		*	
Surrogate: a,a,a-Trifluorotoluene		112 %	80-12	20 0		"	"	"	
Surrogate: 4-Bromofluorobenzene		80.0 %	80-12	?0	"	"	"	"	
MW-4 (4C12015-04)									
Benzene	ND	0.00100	mg/L	1	EC41830	03/16/04	03/16/04	EPA 8021B	
Foluene	ND	0.00100	*	"	"		n	**	
Ethylbenzene	. ND	0.00100	*		11	*	"	n	
Xylene (p/m)	ND	0.00100	n		*	11	n		
Xylene (o)	ND	0.00100	•		"	10		n	
Surrogate: a,a,a-Trifluorotoluene		116%	80-12	20	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		81.0 %	80-12	n	"	"	"	"	

Environmental Lab of Texas

The results in this report apply to the samples analyzed in accordance with the samples received in the laboratory.. This analytical report must be reproduced in its entirety, with written approval of Environmental Lab of Texas.

 $\mathcal{N}$ **Quality Assurance Review** 

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Project: Rice/Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

#### Fax: (432) 682-3946

**Reported:** 03/19/04 14:15

# Organics by GC

**Environmental Lab of Texas** 

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-5 (4C12015-05)									
Benzene	J [0.000868]	0.00100	mg/L	1	EC41830	03/16/04	03/16/04	EPA 8021B	j
Toluene	· ND	0.00100	n	n	"	"	"	"	
Ethylbenzene	ND	0.00100	"	н	"	"	"	n	
Xylene (p/m)	ND	0.00100	W	11	n	n	"	"	
Xylene (o)	ND	0.00100	"	**	n	**	n	n	
Surrogate: a,a,a-Trifluorotoluene		110%	80-1	120	,,	"	,,	"	
Surrogate: 4-Bromofluorobenzene		86.0 %	80-1	120	"	"	"	"	

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Quality Assurance Review

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Project: Rice/Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez Fax: (432) 682-3946 Reported:

03/19/04 14:15

#### General Chemistry Parameters by EPA / Standard Methods

**Environmental Lab of Texas** 

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Note
MW-1 (4C12015-01)								·	
Carbonate Alkalinity	ND	0.100	mg/L	1	EC41818	03/15/04	03/15/04	EPA 310.2M	
Bicarbonate Alkalinity	150 ND	2.00 0.100	*	"	n 11	"	11	n	
Hydroxide Alkalinity	ND 727		"	"	FC41820	07/15/04	02/15/04	DW 044 0242	
Chloride		5.00	,		EC41820	03/15/04	03/15/04	SW 846 9253	
Total Dissolved Solids	2060	5.00	n		EC41604	03/16/04	03/16/04	EPA 160.1	
Sulfate	227	2.50		5	EC41814	03/15/04	03/15/04	EPA 375.4	
MW-2 (4C12015-02)									
Carbonate Alkalinity	ND	0.100	mg/L	1	EC41818	03/15/04	03/15/04	EPA 310.2M	
Bicarbonate Alkalinity	134	2.00	n	n n			9 11	17	
Hydroxide Alkalinity	ND	0.100	,,						
Chloride	1200	5.00			EC41820	03/15/04	03/15/04	SW 846 9253	
Total Dissolved Solids	3660	5.00	11	n	EC41604	03/16/04	03/16/04	EPA 160.1	
Sulfate	164	1.25	n	2.5	EC41814	03/15/04	03/15/04	EPA 375.4	
MW-3 (4C12015-03)									
Carbonate Alkalinity	ND	0.100	mg/L	1	EC41818	03/15/04	03/15/04	EPA 310.2M	<u> </u>
Bicarbonate Alkalinity	160	2.00	17	n 11	*		19 79		
Hydroxide Alkalinity	ND	0.100	"					# 	
Chloride	65.0	5.00	"		EC41820	03/15/04	03/15/04	SW 846 9253	
Total Dissolved Solids	666	5.00		*	EC41604	03/16/04	03/16/04	EPA 160.1	
Sulfate	203	2.50	n	5	EC41814	03/15/04	03/15/04	EPA 375.4	
MW-4 (4C12015-04)									
Carbonate Alkalinity	ND	0.100	mg/L	1	EC41818	03/15/04	03/15/04	EPA 310.2M	
<b>Bicarbonate Alkalinity</b> Hydroxide Alkalinity	164 ND	2.00 0.100	"		n	n #	17	n	
Chloride	35.4	5.00	.,			03/15/04	03/15/04		
			n		EC41820			SW 846 9253	
Total Dissolved Solids Sulfate	610 174	5.00	"	5	EC41604	03/16/04	03/16/04	EPA 160.1	
Sullate	1/4	2.50		5	EC41814	03/15/04	03/15/04	EPA 375.4	
MW-5 (4C12015-05)									
Carbonate Alkalinity	ND	0.100	mg/L	1	EC41818	03/15/04	03/15/04	EPA 310.2M	
<b>Bicarbonate Alkalinity</b> Hydroxide Alkalinity	134 ND	2.00 0.100		<del>7</del> 11				n	
Chloride	ND 195	5.00	n	"	EC41930	02/15/04			
Total Dissolved Solids	894		11		EC41820	03/15/04	03/15/04 03/16/04	SW 846 9253	
		5.00			EC41604	03/16/04		EPA 160.1	
Sulfate	198	2.50	n	5	EC41814	03/15/04	03/15/04	EPA 375.4	

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Highlander Environmental Corp.Project: Rice/Justis SWD Well H-21910 N. Big Spring St.Project Number: 1863Midland TX, 79705Project Manager: Ike Tavarez

Fax: (432) 682-3946 Reported:

#### 03/19/04 14:15

#### General Chemistry Parameters by EPA / Standard Methods

Environmental Lab of Texas

nalyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Not
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Quality Assurance Review

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Project: Rice/Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

#### 03/19/04 14:15

#### Total Metals by EPA / Standard Methods

#### **Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Note
MW-1 (4C12015-01)								···	
Calcium	158	1.00	mg/L	100	EC41905	03/16/04	03/19/04	EPA 6010B	
Magnesium	83.6	0.0100	Ħ	10	"	"	03/19/04	*	
Potassium	12.8	0.500	n	n	Ħ	n	*		
Sodium	198	1.00	"	100	**	"	03/19/04	Ħ	
MW-2 (4C12015-02)									
Calcium	332	1.00	mg/L	100	EC41905	03/16/04	03/19/04	EPA 6010B	
Magnesium	169	0.100	n	"	17	Π	"		
Potassium	15.2	0.500	n	10			03/19/04		
Sodium	182	1.00	n	100	n	14	03/19/04	n	
MW-3 (4C12015-03)									
Calcium	59.5	0.100	mg/L	10	EC41905	03/16/04	03/19/04	EPA 6010B	
Magnesium	30.1	0.0100	17	*	n	. *	-		
Potassium	10.1	0.500	•	"	Ħ			n	
Sodium	99.4	0.100	H	**	•	n	03/19/04		
MW-4 (4C12015-04)									
Calcium	50.5	0.100	mg/L	10	EC41905	03/16/04	03/19/04	EPA 6010B	
Magnesium	26.2	0.0100	n		*	*	03/19/04	*	
Potassium	10.6	0.0500	89	1	"		03/19/04	*	
Sodium	80.5	0.100	n	10	"		03/19/04	n	
MW-5 (4C12015-05)									
Calcium	83.0	0.100	mg/L	10	EC41905	03/16/04	03/19/04	EPA 6010B	
Magnesium	41.5	0.0100		n	"	*	n	**	
Potassium	8.43	0.500	*	11		n	*	n	
Sodium	99.0	0.100	"	17	*	n		n	

Environmental Lab of Texas

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QK Quality Assurance Review

Page 6 of 12

Project: Rice/Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported: 03/19/04 14:15

#### **Organics by GC - Quality Control**

**Environmental Lab of Texas** 

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EC41830 - EPA 5030C (GC)										
Blank (EC41830-BLK1)				Prepared	& Analyze	ed: 03/16/	04			
Benzene	ND	0.00100	mg/L	· . · · · · · · · · · · · · · · · · · ·						
Toluene	ND	0.00100	*							
Ethylbenzene	ND	0.00100	**							
Xylene (p/m)	ND	0.00100	"							
Xylene (o)	ND	0.00100	n							
Surrogate: a,a,a-Trifluorotoluene	23.4		ug/!	20.0	·····	117	80-120			······
Surrogate: 4-Bromofluorobenzene	16.7		"	20.0		83.5	80-120			
LCS (EC41830-BS1)				Prepared	& Analyze	ed: 03/16/	04			
Benzene	86.3		ug/l	100		86.3	80-120			
Toluene	87.4		-	100		87.4	80-120			
Ethylbenzene	87.6		**	100		87.6	80-120			
Xylene (p/m)	182		ti i	200		91.0	80-120			
Xylene (0)	92.3		n	100		92.3	80-120			
Surrogate: a,a,a-Trifluorotoluene	16.8		<i>n</i>	20.0		84.0	80-120			
Surrogate: 4-Bromofluorobenzene	16.7		"	20. <b>0</b>		83.5	80-120			
Calibration Check (EC41830-CCV1)				Prepared	& Analyze	d: 03/16/0	)4			
Benzene	89.6		ug/l	100		89.6	80-120			
Toluene	92.5		n	100		92.5	80-120			
Ethylbenzene	92.8		n	100		92.8	80-120			
Xylene (p/m)	190		"	200		95.0	80-120			
Xylene (0)	99.1		*	100		99.1	80-120			
Surrogate: a,a,a-Trifluorotoluene	19.7		"	20.0		98.5	80-120			·····
Surrogate: 4-Bromofluorobenzene	17.3		"	20.0		86.5	80-120			
Duplicate (EC41830-DUP1)	So	urce: 4C1201	2-03	Prepared:	03/16/04	Analyzed	: 03/18/04			
Benzene	0.0204	0.00100	mg/L		0.0250	·····		20.3	20	
Foluene	ND	0.00100	n		ND				20	
Ethylbenzene	0.00265	00100.0	"		0.00290			9.01	20	
Xylene (p/m)	0.00190	0.00100	**		0.00180			5.41	20	
Xylene (0)	ND	0.00100			ND				20	
Surrogate: a,a,a-Trifluorotoluene	21.6	~- <u></u>	ug/l	20.0		108	80-120			
Surrogate: 4-Bromofluorobenzene	16.5		"	20.0		82.5	80-120			

Environmental Lab of Texas

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and Quality Assurance Review

Page 7 of 12

Project: Rice/Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

# Fax: (432) 682-3946

**Reported:** 03/19/04 14:15

#### **Organics by GC - Quality Control**

#### **Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EC41830 - EPA 5030C (GC)				·····						
Matrix Spike (EC41830-MS1)	So	urce: 4C1201	2-05	Prepared:	03/16/04	Analyzed	: 03/18/04			
Benzene	88.6		ug/l	100	ND	88.6	80-120			
Toluene	89.6		Ħ	100	ND	89.6	80-120			
Ethylbenzene	93.4		n	100	ND	93.4	80-120			
Xylene (p/m)	184		n	200	ND	92.0	80-120			
Xylene (o)	94.1			100	ND	94.1	80-120			
Surrogate: a,a,a-Trifluorotoluene	22.5	·····		20.0		112	80-120			
Surrogate: 4-Bromofluorobenzene	18.8		"	20.0		94.0	80-120			

Environmental Lab of Texas

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 $\Delta$ Quality Assurance Review

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Highlander Environmental Corp.	Project: Rice/Justis SWD Well H-2													
1910 N. Big Spring St.			Reported:											
Midland TX, 79705		Project Mar	ager: Ik	e Tavarez					03/19/0					
General Chemi	General Chemistry Parameters by EPA / Standard Methods - Quality Control Environmental Lab of Texas													
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes				
Batch EC41604 - General Preparatio	n (WetCher	n)												
Blank (EC41604-BLK1)				Prepared	& Analyz	ed: 03/16/	04							
Total Dissolved Solids	ND	5.00	mg/L											
Duplicate (EC41604-DUP1)	So	urce: 4C1201	5-01	Prepared & Analyzed: 03/16/04										
Total Dissolved Solids	2060	5.00	mg/L	<u> </u>	2060		· • · • · • · • · • · • · • · • · • · •	0.00	20					
Batch EC41814 - General Preparatio	n (WetCher	n)												
Blank (EC41814-BLK1)				Prepared a	& Analyze	ed: 03/15/0	)4	· · · · ·						
Sulfate	ND	0.500	mg/L				·····							
Calibration Check (EC41814-CCV1)				Prepared a	& Analyze	:d: 03/15/(	)4							
Sulfate	48.0		mg/L	50.0		96.0	80-120							
Duplicate (EC41814-DUP1)	So	urce: 4C1201	5-01	Prepared &	& Analyze	:d: 03/15/(	)4							
Sulfate	222	2.50	mg/L		227			2.23	20					
Batch EC41818 - General Preparatio	n (WetChen	n)												
Blank (EC41818-BLK1)	<u> </u>			Prepared &	& Analyze	:d: 03/15/(	)4							
Carbonate Alkalinity	ND	0.100	mg/L											
Bicarbonate Alkalinity	ND	2.00												
lydroxide Alkalinity	ND	0.100	"											
Duplicate (EC41818-DUP1)	So	urce: 4C1201	5-01	Prepared &	& Analyze	d: 03/15/0	)4							
Carbonate Alkalinity	0.00	0.100	mg/L		0.00				20					
Bicarbonate Alkalinity	149	2.00	n		150			0.669	20					
	0.00	0.100	91		0.00				20					

Environmental Lab of Texas

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Quality Assurance Review

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12600 West I-20 East - Odessa, Texas 79705 - (432) 563-1800 - Fax (432) 563-1713

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Highlander Environmental Corp. Project: Rice/Justis SWD Well H-2										
1910 N. Big Spring St.		Project Nur	nber: 18	63					Repo	rted:
Midland TX, 79705	]	Project Man	ager: Ik	e Tavarez					03/22/0	4 16:12
General Chemi	stry Param	eters by	EPA /	Standar	d Meth	ods - Q	Quality	Ćontro	1	
	E	nvironm	ental l	Lab of T	exas					
· · · · · · · · · · · · · · · · · · ·		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch EC41818 - General Preparatio	n (WetChem)	)								
Reference (EC41818-SRM1)				Prepared	& Analyze	ed: 03/15/	04			
Carbonate Alkalinity	0.0496		mg/L	0.0500		99.2	80-200			
Batch EC41820 - General Preparatio	n (WetChem)	)								
Blank (EC41820-BLK1)				Prepared	& Analyze	ed: 03/15/	04			
Chloride	ND	5.00	mg/L							
Matrix Spike (EC41820-MS1)	Sour	-ce: 4C1201	5-01	Prepared a	& Analyze	ed: 03/15/0	04			
Chloride	1220	5.00	mg/L	500	727	98.6	80-120	· · · · · · · · · · · · · · · · · · ·		
Matrix Spike Dup (EC41820-MSD1)	Sour	-ce: 4C1201	5-01	Prepared a	& Analyze	ed: 03/15/0	04			
Chloride	1210	5.00	mg/L	500	727	96.6	80-120	0.823	20	

Prepared & Analyzed: 03/15/04

99.2

80-120

5000

Reference (EC41820-SRM1) Chloride 4960 mg/L

Environmental Lab of Texas

**Quality Assurance Review** 

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Page 10 of 12

Project: Rice/Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

Fax: (432) 682-3946

**Reported:** 03/19/04 14:15

#### Total Metals by EPA / Standard Methods - Quality Control

#### **Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EC41905 - General Preparatio	n (Metals)									
Blank (EC41905-BLK1)			_	Prepared:	03/16/04	Analyzed	1: 03/19/04			
Calcium	ND	0.0100	mg/L			·····	· · · · · · · · · · · · · · · · · · ·			
Magnesium	ND	0.00100	10							
Potassium	ND	0.0500	11							
Sodium	ND	0.0100	n							
Calibration Check (EC41905-CCV1)				Prepared:	03/16/04	Analyzed	I: 03/19/04			
Calcium	1.93		mg/L	2.00		96.5	85-115			
Magnesium	1.98		п	2.00		99.0	85-115			
Potassium	1.73		*	2.00		86.5	85-115			
Sodium	1.78		ņ	2.00		89.0	85-115			
Duplicate (EC41905-DUP1)	So	urce: 4C1201	5-01	Prepared:	03/16/04	Analyzed	l: 03/19/04			
Calcium	159	1.00	mg/L		158	<u> </u>	· · · · · · · · · · · · · · · · · · ·	0.631	20	
Magnesium	83.8	0.0100			83.6			0.239	20	
Potassium	12.9	0.500			12.8			0.778	20	
Sodium	202	1.00	н.		198			2.00	20	

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**Quality Assurance Review** 

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Highlar	nder Environmental Corp.	Project:	Rice/Justis SWD Well H-2	Fax: (432) 682-3946
1910 N	. Big Spring St.	Project Number:	1863	Reported:
Midlan	d TX, 79705	Project Manager:	Ike Tavarez	03/19/04 14:15
		Notes and De	finitions	
J	Detected but below the Reporting	Limit; therefore, result is an e	estimated concentration (CLP J-Flag).	
DET	Analyte DETECTED			
ND	Analyte NOT DETECTED at or above	ve the reporting limit		
NR	Not Reported			

Environmental Lab of Texas

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Sample results reported on a dry weight basis

Relative Percent Difference

dry RPD

Quality Assurance Review

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# Environmental Lab of Texas Variance / Corrective Action Report – Sample Log-In

Client: Highlander
Date/Time: 3-12-04 1720
Order #: 4C 12015
Initials:

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## Sample Receipt Checklist

Temperature of container/cooler?	Yes	No	3.0 C
Shipping container/cooler in good condition?	Yes	No	
Custody Seals intact on shipping container/cooler?	Yes	No	Netpresent
Custody Seals intact on sample bottles?	Yes	No	Not present
Chain of custody present?	Tes	No	
Sample Instructions complete on Chain of Custody?	Yes	No	
Chain of Custody signed when relinquished and received?	Yes	No	
Chain of custody agrees with sample label(s)	Yes	No	
Container labels legible and intact?	Yes	No	
Sample Matrix and properties same as on chain of custody?	Yes	No	
Samples in proper container/bottle?	Yes	No	
Samples properly preserved?	Yes	No	
Sample bottles intact?	Yes	No	
Preservations documented on Chain of Custody?	Yes	No	
Containers documented on Chain of Custody?	Yes	No	
Sufficient sample amount for indicated test?	Yes	No	
All samples received within sufficient hold time?	Yes	No	
VOC samples have zero headspace?	Yes	No	Not Applicable

Other observations:

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Contact Person: Regarding:	Variance Documentation: Date/Time:	_ Contacted by:
Corrective Action Taken:		
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Lab Report: 7/09/04



# **Analytical Report**

### **Prepared for:**

Ike Tavarez Highlander Environmental Corp. 1910 N. Big Spring St. Midland, TX 79705

Project: Rice/Justis SWD Well H-2 Project Number: 1863 Location: Lea County, NM

Lab Order Number: 4F28008

Report Date: 07/09/04

Highlander Environmental Corp.Project:Rice/Justis SWD Well H-2Fax: (432) 682-39461910 N. Big Spring St.Project Number:1863Reported:Midland TX, 79705Project Manager:Ike Tavarez07/09/04 10:50

#### ANALYTICAL REPORT FOR SAMPLES

Laboratory ID	Matrix	Date Sampled	Date Received
4F28008-01	Water	06/28/04 10:15	06/28/04 16:55
4F28008-02	Water	06/28/04 11:30	06/28/04 16:55
4F28008-03	Water	06/28/04 11:00	06/28/04 16:55
4F28008-04	Water	06/28/04 12:45	06/28/04 16:55
4F28008-05	Water	06/28/04 12:10	06/28/04 16:55
	4F28008-01 4F28008-02 4F28008-03 4F28008-04	4F28008-01 Water 4F28008-02 Water 4F28008-03 Water 4F28008-04 Water	4F28008-01 Water 06/28/04 10:15   4F28008-02 Water 06/28/04 11:30   4F28008-03 Water 06/28/04 11:00   4F28008-04 Water 06/28/04 12:45

Project: Rice/Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

**Reported:** 07/09/04 10:50

### Organics by GC

**Environmental Lab of Texas** 

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Note
MW-1 (4F28008-01) Water							······································	<u></u>	
Benzene	0.00560	0.00100	mg/L	1	EG40702	07/06/04	07/06/04	EPA 8021B	
Toluene	ND	0.00100		n	•	n	*		
Ethylbenzene	ND	0.00100	n			11	*		
Xylene (p/m)	ND	0.00100		•		۳	n	"	
Xylene (0)	ND	0.00100	*			n		-	
Surrogate: a,a,a-Trifluorotoluene	······································	116 %	80-1	120	11	"	"	"	
Surrogate: 4-Bromofluorobenzene		91.0 %	80-1	120	,,	"	"	**	
MW-2 (4F28008-02) Water									
Benzene	0.0112	0.00100	mg/L	1	EG40702	07/06/04	07/06/04	EPA 8021B	
Toluene	J [0.000625]	0.00100	•			n	n	•	
Ethylbenzene	J [0.000974]	0.00100				=	n		
Xylene (p/m)	J [0.000484]	0.00100			۳		n	-	
Xylene (o)	ND	0.00100		19		*	n	•	
Surrogate: a,a,a-Trifluorotoluene		115 %	80-1	20	#	"	17	n	
Surrogate: 4-Bromofluorobenzene		92.5 %	80-1	20	"	**	*	n	
MW-3 (4F28008-03) Water									
Benzene	0.0124	0.00100	mg/L	1	EG40702	07/06/04	07/06/04	EPA 8021B	
Toluene	J [0.000722]	0.00100	•	*				•	
Ethylbenzene	J [0.000950]	0.00100		-	n	•	n		
Xylene (p/m)	J [0.000468]	0.00100	n	-	11		"	*	
Xylene (0)	ND	0.00100	n	n	*		n	n	
Surrogate: a,a,a-Trifluorotoluene	····.	108 %	80-1	20	"	"	17	"	
Surrogate: 4-Bromofluorobenzene		94.0 %	80-1	20	"	"	"	"	
MW-4 (4F28008-04) Water						,			
Benzene	0.00749	0.00100	mg/L	1	EG40702	07/06/04	07/06/04	EPA 8021B	
Toluene	ND	0.00100	n	"	۳	"	*	**	
Ethylbenzene	J [0.000658]	0.00100		*	-		n	"	
Xylene (p/m)	J [0.000372]	0.00100	"	n			n		
Xylene (o)	ND	0.00100		*		•	n		
Surrogate: a,a,a-Trifluorotoluene		109 %	80-1	20	"	"	17	"	
Surrogate: 4-Bromofluorobenzene		80.0 %	80-1	20	"	14	"	"	

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Fax: (432) 682-3946 Project: Rice/Justis SWD Well H-2 Highlander Environmental Corp. Project Number: 1863 1910 N. Big Spring St. Reported: Midland TX, 79705 Project Manager: Ike Tavarez 07/09/04 10:50

### Organics by GC

**Environmental Lab of Texas** 

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-5 (4F28008-05) Water	<u></u>						<u> </u>	<u></u>	
Benzene	0.0105	0.00100	mg/L	I	EG40702	07/06/04	07/06/04	EPA 8021B	
Toluene	J [0.000654]	0.00100		n		77	*	H	J
Ethylbenzene	0.00108	0.00100	"	Ħ		n		n	
Xylene (p/m)	J [0.000281]	0.00100	n		"	*	в	*	J
Xylene (0)	ND	0.00100	Π	n	17	n	*	n	
Surrogate: a,a,a-Trifluorotoluene		108 %	80-12	0	н	"	"	#	
Surrogate: 4-Bromofluorobenzene		88.5 %	80-12	0	"	17	. ,,	"	

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Project: Rice/Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

Fax: (432) 682-3946 **Reported:** 07/09/04 10:50

#### General Chemistry Parameters by EPA / Standard Methods

**Environmental Lab of Texas** 

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Note
MW-1 (4F28008-01) Water									
Carbonate Alkalinity	ND	0.100	mg/L	1	EG40614	06/30/04	06/30/04	EPA 310.2M	<u> </u>
Bicarbonate Alkalinity	157	2.00	Ħ	*		n		n	
Hydroxide Alkalinity	ND	0.100	"	'n	n	"	"	n	
Chloride	1030	5.00	n	7	EF43007	06/29/04	06/29/04	EPA 325.3M	
Total Dissolved Solids	3230	· 5.00		71	EG40612	07/01/04	07/02/04	EPA 160.1	
Sulfate	349	0.500	n	'n	EG40613	07/02/04	07/02/04	EPA 375.4	
MW-2 (4F28008-02) Water								,	
Carbonate Alkalinity	ND	0.100	mg/L	1	EG40614	06/30/04	06/30/04	EPA 310.2M	
Bicarbonate Alkalinity	132	2.00		'n			,	n	
Hydroxide Alkalinity	ND	0.100			n	*		'n	
Chloride	2570	5.00	t)	4	EF43007	06/29/04	06/29/04	EPA 325.3M	
Total Dissolved Solids	6290	5.00	."	'n	EG40612	07/01/04	07/02/04	EPA 160.1	
Sulfate	208	0.500		h	EG40613	07/02/04	07/02/04	EPA 375.4	
MW-3 (4F28008-03) Water									
Carbonate Alkalinity	ND	0.100	mg/L	1	EG40614	06/30/04	06/30/04	EPA 310.2M	
Bicarbonate Alkalinity	176	2.00		*	M	n		19	
Hydroxide Alkalinity	ND	0.100	**			H	n	by	
Chloride	124	5.00		'n	EF43007	06/29/04	06/29/04	EPA 325.3M	
Total Dissolved Solids	735	5.00		۳	EG40612	07/01/04	07/02/04	EPA 160.1	
Sulfate	295	0.500	n	'n	EG40613	07/02/04	07/02/04	EPA 375.4	
MW-4 (4F28008-04) Water									
Carbonate Alkalinity	ND	0.100	mg/L	1	EG40614	06/30/04	06/30/04	EPA 310.2M	-
Bicarbonate Alkalinity	183	2.00	n		Ŧ	"	۳	89	
Hydroxide Alkalinity	ND	0.100	11	*	n	"	*	'n	
Chloride	57.6	5.00	n	n	EF43007	06/29/04	06/29/04	EPA 325.3M	
Total Dissolved Solids	596	5.00	*		EG40612	07/01/04	07/02/04	EPA 160.1	
Sulfate	225	0.500	*	n	EG40613	07/02/04	07/02/04	EPA 375.4	

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Project: Rice/Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

07/09/04 10:50

#### **General Chemistry Parameters by EPA / Standard Methods**

**Environmental Lab of Texas** 

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-5 (4F28008-05) Water	<u> </u>								J
Carbonate Alkalinity	ND	0.100	mg/L	1	EG40614	06/30/04	06/30/04	EPA 310.2M	
Bicarbonate Alkalinity	145	2.00	*	"	n	n	r		
Hydroxide Alkalinity	ND	0.100	n	.,	n	n	11	<b>"</b> •	
Chloride	310	5.00	*		EF43007	06/29/04	06/29/04	EPA 325.3M	
Total Dissolved Solids	1130	5.00	*		EG40612	07/01/04	07/02/04	EPA 160.1	
Sulfate	238	0.500		"	EG40613	07/02/04	07/02/04	EPA 375.4	

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Project: Rice/Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

#### 07/09/04 10:50

#### **Total Metals by EPA / Standard Methods**

#### **Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Note
MW-1 (4F28008-01) Water									
Calcium	244	1.00	mg/L	100	EG40211	07/01/04	07/01/04	EPA 6010B	
Magnesium	137	0.100		n		n	п	•	
Potassium	17.8	0.500	H	10		n		*	
Sodium	316	1.00	"	100	*	*	13		
MW-2 (4F28008-02) Water									
Calcium	560	1.00	mg/L	100	EG40211	07/01/04	07/01/04	EPA 6010B	
Magnesium	294	0.100	n	•	H	*	*		
Potassium	33.6	0.500		10	n	*	*		
Sodium	559	1.00	n	100	**		• .	"	
MW-3 (4F28008-03) Water									
Calcium	127	1.00	mg/L	100	EG40211	07/01/04	07/01/04	EPA 6010B	
Magnesium	64.2	0.0100	"	10	n	٠	•	71	
Potassium	16.3	0.500	"	n	*	٠	n	n	
Sodium	172	1.00	"	100	Ħ		"	n	
MW-4 (4F28008-04) Water									
Calcium	57.8	0.100	mg/L	10	EG40211	07/01/04	07/01/04	EPA 6010B	
Magnesium	31.0	0.0100	n	17	"		"	*	
Potassium	7.19	0.500	n		n		"		
Sodium	92.8	0.100		**	"	n	n	**	
MW-5 (4F28008-05) Water									
Calcium	128	1.00	mg/L	100	EG40211	07/01/04	07/01/04	EPA 6010B	
Magnesium	60.8	0.0100	*	10	"	"	"	n	
Potassium	11.5	0.500	n	. "	"	n	*	*	
Sodium	122	1.00		100	"	n	n	"	

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Project: Rice/Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported: 07/09/04 10:50

#### **Organics by GC - Quality Control**

**Environmental Lab of Texas** 

A	n •	Reporting	<b>.</b> .	Spike	Source	A/757	%REC	DPO	RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch EG40702 - EPA 5030C (GC)								_		
Blank (EG40702-BLK1)				Prepared	& Analyze	ed: 07/06/	04	_		
Benzene	ND	0.00100	mg/L							
Toluene	ND	0.00100								
Ethylbenzene	ND	0.00100	**							
Xylene (p/m)	ND	0.00100	n							
Xylene (0)	ND	0.00100								
Surrogate: a,a,a-Trifluorotoluene	23.3		ug/l	20.0		116	80-120		·· <u></u>	
Surrogate: 4-Bromofluorobenzene	19.4		**	20.0		97.0	80-120			
LCS (EG40702-BS1)				Prepared	& Analyze	ed: 07/06/	04			
Benzene	94.2		ug/i	100		94.2	80-120			
Toluene	101			100		101	80-120			
Ethylbenzene	103		Ħ	100		103	80-120			
Xylene (p/m)	216		*	200		108	80-120			
Xylene (0)	101		n	100		101	80-120			
Surrogate: a,a,a-Trifluorotoluene	21.1			20.0		106	80-120			
Surrogate: 4-Bromofluorobenzene	18.6		"	20.0		93.0	80-120			
Calibration Check (EG40702-CCV1)				Prepared a	& Analyze	d: 07/06/0	)4			
Benzene	85.5		ug/l	100		85.5	80-120			
Toluene	93.4			100		93.4	80-120			
Ethylbenzene	87.9		"	100		87.9	80-120			
Xylene (p/m)	186		n	200		93.0	80-120			
Xylene (o)	87.1		-	100		87.1	80-120			
Surrogate: a,a,a-Trifluorotoluene	18.6			20.0	· <u>-</u>	93.0	80-120			
Surrogate: 4-Bromofluorobenzene	17.8		"	20.0		<b>89.0</b>	80-120			
Matrix Spike (EG40702-MS1)	So	urce: 4F2800	4-06	Prepared a	& Analyze	d: 07/06/(	)4			
Benzene	114		ug/l	100	ND	114	80-120			
Toluene	117		Ħ	100	ND	117	80-120			
Ethylbenzene	118		**	100	ND	118	80-120			
Xylene (p/m)	239		#	200	ND	120	80-120			
Kylene (o)	116		n	100	ND	116	80-120			
Surrogate: a,a,a-Trifluorotoluene	23.0		<i>n</i>	20.0			80-120			
Surrogate: 4-Bromofluorobenzene	22.0		"	20.0		110	80-120			

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Project: Rice/Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

Fax: (432) 682-3946 **Reported:** 07/09/04 10:50

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### **Organics by GC - Quality Control**

**Environmental Lab of Texas** 

Analyte	Result	Reporting Limit Un	Spike its Level		%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EG40702 - EPA 5030C (GC)									
Matrix Spike (EG40702-MS2)	So	urce: 4F28005-01	Prepare	d & Analyz	ed: 07/06/	04			
Benzene	112	ug	1 100	ND	112	80-120			
Toluene	114	•	100	ND	114	80-120			
Ethylbenzene	114		100	ND	114	80-120			
Xylene (p/m)	233	•	200	ND	116	80-120			
Xylene (o)	108	,	100	ND	108	80-120			
Surrogate: a,a,a-Trifluorotoluene	23.3		20.0		116	80-120			
Surrogate: 4-Bromofluorobenzene	19.6	,	20.0		98.0	80-120			
Matrix Spike Dup (EG40702-MSD1)	So	urce: 4F28004-06	Prepare	d & Analyz	ed: 07/06/	04			
Benzene	103	បខ្ល	1 100	ND	103	80-120	10.1	20	
Toluene	110	n	100	ND	110	80-120	6.17	20	
Ethylbenzene	106	п	100	ND	106	80-120	10.7	20	
Xylene (p/m)	216		200	ND	108	80-120	10.5	· 20	
Xylene (o)	102	-	100	ND	102	80-120	12.8	20	
Surrogate: a,a,a-Trifluorotoluene	22.5		20.0		112	80-120			
Surrogate: 4-Bromofluorobenzene	21.0	,	20.0		105	80-120			
Matrix Spike Dup (EG40702-MSD2)	So	urce: 4F28005-01	Prepare	d & Analyze	ed: 07/06/0	D4			
Benzene	112	ບg	1 100	ND	112	80-120	0.00	20	
Toluene	117		100	ND	117	80-120	2.60	20	
Ethylbenzene	116	n	100	ND	116	80-120	1.74	<b>20</b>	
Xylene (p/m)	235		200	ND	118	80-120	1.71	20	
Xylene (0)	114	10	100	ND	114	80-120	5.41	20	
Surrogate: a,a,a-Trifluorotoluene	23.0	n	20.0		115	80-120			
Surrogate: 4-Bromofluorobenzene	23.6		20.0		118	80-120			

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Project: Rice/Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

Fax: (432) 682-3946 **Reported:** 

07/09/04 10:50

#### General Chemistry Parameters by EPA / Standard Methods - Quality Control **Environmental Lab of Texas** Spike Source %REC RPD Reporting %REC RPD Level Result Limit Analyte Result Limit Units Limits Notes **Batch EF43007 - General Preparation (WetChem)** Blank (EF43007-BLK1) Prepared & Analyzed: 06/29/04 ND Chloride 5.00 mg/L Matrix Spike (EF43007-MS1) Prepared & Analyzed: 06/29/04 Source: 4F28008-03 Chloride 603 5.00 500 124 95.8 80-120 mg/L Matrix Spike Dup (EF43007-MSD1) Source: 4F28008-03 Prepared & Analyzed: 06/29/04 Chloride 5.00 500 124 97.6 80-120 1.48 20 612 mg/L Reference (EF43007-SRM1) Prepared & Analyzed: 06/29/04 Chloride 5320 5000 106 mg/L 80-120 **Batch EG40612 - Filtration Preparation** Prepared: 07/01/04 Analyzed: 07/02/04 Blank (EG40612-BLK1) **Total Dissolved Solids** ND 5.00 mg/L Prepared: 07/01/04 Analyzed: 07/02/04 Duplicate (EG40612-DUP1) Source: 4F30001-07 **Total Dissolved Solids** 567 5.00 mg/L 579 2.09 20 **Batch EG40613 - General Preparation (WetChem)** Blank (EG40613-BLK1) Prepared & Analyzed: 07/02/04 Sulfate ND 0.500 mg/L Calibration Check (EG40613-CCV1) Prepared & Analyzed: 07/02/04

50.0

mg/L

112

80-120

56.1

Environmental Lab of Texas

Sulfate

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Highlander Environmental Corp.		Pr	oject: Ri	ce/Justis SV	VD Well H	I-2			Fax: (432)	682-3946
1910 N. Big Spring St.		Project Nu	nber: 18	63					Repo	rted:
Midland TX, 79705		Project Man	ager: Ik	e Tavarez					07/09/0	4 10:50
General Cher	nistry Paran	neters by	EPA /	Standar	d Meth	ods - Q	uality	Contro	- <u>-</u>	<u> </u>
	H	Environm	ental ]	Lab of T	exas					
<u></u>		Reporting	. <u>.</u>	Spike	Source		%REC	··	RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch EG40613 - General Prepara	tion (WetChen	1)								
Duplicate (EG40613-DUP1)	Sou	irce: 4F2800	8-01	Prepared	& Analyze	ed: 07/02/0	)4			
Sulfate	350	0.500	mg/L		349			0.286	20	······································
Batch EG40614 - General Prepara	tion (WetChen	1)								
Blank (EG40614-BLK1)				Prepared	& Analyze	ed: 06/30/0	)4			
Carbonate Alkalinity	ND	0.100	mg/L							
Bicarbonate Alkalinity	ND	2.00	n							
Hydroxide Alkalinity	ND	0.100	*							
Duplicate (EG40614-DUP1)	Sor	nce: 4F3000	1-08	Prepared	& Analyze	.d. 06/30/0	14			

Bicarbonate Alkalinity 158 2.00 \* 186 16.3 20 Hydroxide Alkalinity 0.00 0.100 0.00 20 Reference (EG40614-SRM1) Prepared & Analyzed: 06/30/04 Carbonate Alkalinity 0.0575 mg/L 0.0500 115 80-120

mg/L

0.00

0.100

0.00

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Carbonate Alkalinity

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Project: Rice/Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

Fax: (432) 682-3946 **Reported:** 

07/09/04 10:50

#### Total Metals by EPA / Standard Methods - Quality Control

#### **Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EG40211 - General Preparatio	n (Metals)									
Blank (EG40211-BLK1)		· · · · · · · · · · · · · · · · · · ·	·	Prepared	& Analyza	ed: 07/01/0	04			
Calcium	ND	0.0100	mg/L							
Magnesium	ND	0.00100	n							
Potassium	ND	0.0500	n							
Sodium	ND	0.0100	P							
LCS (EG40211-BS1)				Prepared:	07/01/04	Analyzed	: 07/07/04			
Calcium	2.07	0.0100	mg/L	2.00		104	85-115			
Magnesium	2.03	0.00100	"	2.00		102	85-115			
Potassium	1.80	0.0500	-	2.00		90.0	85-115			
Sodium	1.92	0.0100		2.00		96.0	85-115			
LCS Dup (EG40211-BSD1)				Prepared:	07/01/04	Analyzed	: 07/07/04			
Calcium	2.02	0.0100	mg/L	2.00		101	85-115	2.44	20	
Magnesium	2.00	0.00100	۰.	2.00		100	85-115	1.49	20	
Potassium	1.72	0.0500	Ħ	2.00		86.0	85-115	4.55	20	
Sodium	1.89	0.0100	"	2.00		94.5	85-115	1.57	20	
Calibration Check (EG40211-CCV1)				Prepared a	& Analyze	:d: 07/01/0	)4			
Calcium	2.02		mg/L	2.00		101	85-115			
Magnesium	2.00		n	2.00		100	85-115			
Potassium	1.72			2.00		86.0	85-115			
Sodium	1.89		n	2.00		94.5	85-115			

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Highlan	nder Environmental Corp.	Project: Rice/Justis SWD Well H-2	Fax: (432) 682-3946
1910 N	. Big Spring St.	Project Number: 1863	Reported:
Midland	d TX, 79705	Project Manager: Ike Tavarez	07/09/04 10:50
		Notes and Definitions	
ì	Detected but below the Reporting	Limit; therefore, result is an estimated concentration (CLP J-Flag).	
DET	Analyte DETECTED		
ND	Analyte NOT DETECTED at or abo	ve the reporting limit	
NR	Not Reported		
dry	Sample results reported on a dry we	ight basis	
RPD	Relative Percent Difference		
LCS	Laboratory Control Spike		
MS	Matrix Spike		
Dup	Duplicate		

alandk Juli Report Approved By: Date: -09-0X

Raland K. Tuttle, QA Officer Celey D. Keene, Lab Director, Org. Tech Director Jeanne Mc Murrey, Inorg. Tech Director

James L. Hawkins, Chemist/Geologist Sara Molina, Chemist Sandra Biezugbe, Lab Tech.

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### Environmental Lab of Texas Variance / Corrective Action Report – Sample Log-In

Client: Highborder Envir Date/Time: <u>8/28/04</u>

, TVH

·

Order #: \_

Initials:

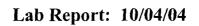
#### Sample Receipt Checklist

Temperature of container/cooler?	(Yes)	No	9°C C
Shipping container/cooler in good condition?	(es)	No	
Custody Seals intact on shipping container/cooler?	Xer	No	Not present
Custody Seals intact on sample bottles?	Yes	No	Not present
Chain of custody present?	(re)	No	
Sample Instructions complete on Chain of Custody?	Yes	No	
Chain of Custody signed when relinquished and received?	Yes	No	
Chain of custody agrees with sample label(s)	Yes	No	
Container labels legible and intact?	res	No	
Sample Matrix and properties same as on chain of custody?	<b>V</b> er	No	
Samples in proper container/bottle?	Pep	No	
Samples properly preserved?	YES	No	
Sample bottles intact?	C	No	
Preservations documented on Chain of Custody?	( P	No	
Containers documented on Chain of Custody?	Ver	No	
Sufficient sample amount for indicated test?	(e)	No	
All samples received within sufficient hold time?	(ez)	No	
VOC samples have zero headspace?	res	No	Not Applicable

Other observations:

Contact Person: Regarding:	Variance Documentation: Date/Time:	_ Contacted by:
Corrective Action Taken:		
- 		

PAGE: / OF: /	ANALYSIS REQUEST (Circle or Specify Method No.)	98	- Эн р Эн д 900 IX	5 P	60/624	(90) (	oqe amme Spe Alpha Beta PLM (Asbest	X	X	X		X			124 124 12 12 12 12 12 12 12 12 12 12 12 12 12	E SHIPPED BY: (Circle) BY: BY:	DELLYERED UPS CARD	HIGHLANDER CONTACT PERSON: Remute by:	The Turner of Authoritants	VOAS each
Custody Record		NTAL CURP.		Fax (432) 682-3946	TAUATEZ B PRESERVATIVE	CONTAI	NONE ICE HROG HITLESED (X NUMBEE OL HON	N	3 NX X	3 MX X	3 M X X	3 M X X			BY: (Signature) Date: Time:	BY: (Signature) Date: Time:	BY: (Signature) Date:	19 (Agriature) 1 1. O	(0-28-04 me. 1655-	AIF 3D-Solid REMARKS: 2-1 -Sudee 0-Other 1 -
and Chain of	- 1	E I	1910 N. Big Spring St Midland, Texas 79705		SITE MANAGER: LKC	Justis SUD well #H-2	L eq	MU-1	4-2	w - 3	1 - J	v - 5			Date: U.L. C. C. RECEIVED BY	RECEIVED	RECEIVED	145 OF 15 KIRECEIVED		ALTRUC T-Tetar A-
Analvsis Request	ACTINE AND	HIGHLAINDER	Nid Mid	(432) 682-4559	CLIENT NAME: RICE OPORTA FING		LAB I.D. DATE TIME RY NUMBER 17.7808 DATE TIME RY 17.7808	K MSI:0149519	NWX NOE:11 1 20	03 11:00 W X/4W	MWX MSH:21 / 40	05 V 12:10 N XNU			RELINGUISED BY: (SURPALIUM) DA	RELINQUISHED BY: (Surature) Do	RELINQUISHED BY: (Sugnature) Da	RECEIVING LABORATORY: EAUT VITY Non TH	ADDRESS: 0 2075 4 STATE: 7X COTT: 0 2075 4 STATE: 7X CONTACT: 0 2075 4	HEN REC





12600 West I-20 East - Odessa, Texas 79765

# Analytical Report

## Prepared for:

Ike Tavarez Highlander Environmental Corp. 1910 N. Big Spring St. Midland, TX 79705

Project: Rice/ Justis SWD Well H-2 Project Number: 1863 Location: None Given

Lab Order Number: 4I24017

Report Date: 10/04/04

Highlander Environmental Corp.Project: Rice/ Justis SWD Well H-2Fax: (432) 682-39461910 N. Big Spring St.Project Number: 1863Reported:Midland TX, 79705Project Manager: Ike Tavarez10/04/04 18:51

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	4124017-01	Water	09/23/04 11:25	09/24/04 15:50
MW-2	4124017-02	Water	09/23/04 11:55	09/24/04 15:50
MW-3	4124017-03	Water	09/23/04 10:30	09/24/04 15:50
MW-4	4124017-04	Water	09/23/04 12:35	09/24/04 15:50
MW-5	4124017-05	Water	09/23/04 13:00	09/24/04 15:50

Project: Rice/ Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

Fax: (432) 682-3946 Reported:

10/04/04 18:51

### Organics by GC

**Environmental Lab of Texas** 

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Not
MW-1 (4124017-01) Water		<u></u>	- <u></u>				~~~~ <u>~</u>	<u> </u>	
Benzene	ND	0.00100	mg/L	1	EJ40413	09/30/04	10/04/04	EPA 8021B	
Toluene	ND	0.00100	"	H	n	•			
Ethylbenzene	ND	0.00100	•		n	"	*		
Xylene (p/m)	ND	0.00100		H	*	"			
Xylene (0)	ND	0.00100	*	n		•	•	-	
Surrogate: a,a,a-Trifluorotoluene	· ··· ··· ··· ··· ··· ················	88.3 %	80-1	20	"	n	"	"	
Surrogate: 4-Bromofluorobenzene		86.5 %	80-1	20	n	"	"	"	
MW-2 (4124017-02) Water									
Benzene	ND	0.00100	mg/L	1	EJ40413	09/30/04	10/01/04	EPA 8021B	
Toluene	ND	0.00100			*			-	
Ethylbenzene	ND	0.00100	*	*		**	•		
Xylene (p/m)	ND	0.00100	-		*		n	•	
Xylene (o)	ND	0.00100			Ħ	۳			
Surrogate: a,a,a-Trifluorotoluene	·····	81.5 %	80-1	20	"	"	"	n – – – – – – – – – – – – – – – – – – –	
Surrogate: 4-Bromofluorobenzene		81.6%	80-1	20	"	"	"	17	
MW-3 (4124017-03) Water									
Benzene	0.00113	0.00100	mg/L	1	EJ40413	09/30/04	10/01/04	EPA 8021B	
Toluene	ND	0.00100		Ħ	n	*	n	•	
Ethylbenzene	ND	0.00100	Ħ	**	n	*	n		
Xylene (p/m)	ND	0.00100	n	**	"	H	n	Ħ	
Xylene (0)	ND	0.00100	"		*	"	"		
Surrogate: a,a,a-Trifluorotoluene		87.3 %	80-1.	20	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		80.5 %	80-1.	20	"	**	"	"	
MW-4 (4124017-04) Water									
Benzene	ND	0.00100	mg/L	1	EJ40413	09/30/04	10/04/04	EPA 8021B	<del></del>
Toluene	ND	0.00100	۳					-	
Ethylbenzene	ND	0.00100		*	•		*	"	
Xylene (p/m)	ND	0.00100	n	*	Β.		n	*	
Xylene (o)	ND	0.00100	n		-	n	*	n	
Surrogate: a,a,a-Trifluorotoluene		89.1 %	80-12	20	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		92.5 %	80-12	20	"	"	"	"	

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Project: Rice/ Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

Fax: (432) 682-3946 **Reported:** 

10/04/04 18:51

## Organics by GC

**Environmental Lab of Texas** 

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-5 (4124017-05) Water									
Benzene	ND	0.00100	mg/L	1	EJ40413	09/30/04	10/04/04	EPA 8021B	
Toluene	ND	0.00100			Ħ	π	"	-	
Ethylbenzene	ND	0.00100	•			*	7	×	
Xylene (p/m)	ND	0.00100				Ħ			
Xylene (o)	ND	0.00100					•	*	
Surrogate: a,a,a-Trifluorotoluene	· · · · · · · · · · · ·	87.2 %	80-12	20	M	#	n	71	
Surrogate: 4-Bromofluorobenzene		87. <b>4 %</b>	80-12	20	"	*	17	n	

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Project: Rice/ Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

#### General Chemistry Parameters by EPA / Standard Methods

**Environmental Lab of Texas** 

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Note
MW-1 (4124017-01) Water	<u></u>			··· ·· ··				·····	
Carbonate Alkalinity	ND	0.100	mg/L	1	EI42806	09/24/04	09/24/04	EPA 310.2M	
Bicarbonate Alkalinity	174	2.00	•	n		H	n	n	
Hydroxide Alkalinity	ND	0.100				w	*		
Chloride	106	5.00		*	EI42801	09/28/04	09/28/04	EPA 325.3M	
Total Dissolved Solids	749	5.00	P		EJ40417	09/29/04	09/30/04	EPA 160.1	
Sulfate	175	1.25	n	2.5	EI42706	09/27/04	09/27/04	EPA 375.4	
MW-2 (4I24017-02) Water									
Carbonate Alkalinity	ND	0.100	mg/L	1	E142806	09/24/04	09/24/04	EPA 310.2M	
Bicarbonate Alkalinity	130	2.00	n	"	۳	•	-	•	
Hydroxide Alkalinity	ND	0.100		*		*			
Chloride	1130	5.00	*	n	E142801	09/28/04	09/28/04	EPA 325.3M	
Total Dissolved Solids	3760	5.00	۳		EJ40417	09/29/04	09/30/04	EPA 160.1	
Sulfate	198	2.50		5	EI42706	09/27/04	09/27/04	EPA 375.4	
MW-3 (4124017-03) Water									
Carbonate Alkalinity	ND	0.100	mg/L	1	EJ42806	09/24/04	09/24/04	EPA 310.2M	
Bicarbonate Alkalinity	153	2.00	•	=		n		*	
Hydroxide Alkalinity	ND	0.100				*		"	
Chloride	115	5.00	•		EI42801	09/28/04	09/28/04	EPA 325.3M	
Total Dissolved Solids	703	5.00			EJ40417	09/29/04	09/30/04	EPA 160.1	
Sulfate	242	2.50		5	E142706	09/27/04	09/27/04	EPA 375.4	
MW-4 (4124017-04) Water									
Carbonate Alkalinity	ND	0.100	mg/L	1	E142806	09/24/04	09/24/04	EPA 310.2M	
Bicarbonate Alkalinity	162	2.00		"		n	"		
Hydroxide Alkalinity	ND	0.100			•	•	n	19	
Chloride	53.2	5.00	Ħ	n	EI42801	09/28/04	09/28/04	EPA 325.3M	
Total Dissolved Solids	648	5.00			EJ40417	09/29/04	09/30/04	EPA 160.1	
Sulfate	180	1.25	*	2.5	EI42706	09/27/04	09/27/04	EPA 375.4	

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#### Project: Rice/ Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

#### General Chemistry Parameters by EPA / Standard Methods

**Environmental Lab of Texas** 

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-5 (4124017-05) Water								<u></u>	
Carbonate Alkalinity	ND	0.100	mg/L	1	EI42806	09/24/04	09/24/04	EPA 310.2M	
Bicarbonate Alkalinity	146	2.00	"		•			*	
Hydroxide Alkalinity	ND	0.100	n	•		×	*	**	
Chloride	160	5.00	•		EI42801	09/28/04	09/28/04	EPA 325.3M	
Total Dissolved Solids	792	5.00			EJ40417	09/29/04	09/30/04	EPA 160.1	
Sulfate	224	2.50		5	EI42706	09/27/04	09/27/04	EPA 375.4	

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Project: Rice/ Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

#### Total Metals by EPA / Standard Methods

**Environmental Lab of Texas** 

A 1	<b>P</b> •	Reporting	<b>T T</b> . *•						
Analyte	Result	Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Not
MW-1 (4124017-01) Water					_				
Calcium	75.5	0.200	mg/L	20	EJ40408	09/30/04	09/30/04	EPA 6010B	
Magnesium	31.8	0.0100		10		-			
Potassium	6.51	0.500				M	n	*	
Sodium	83.3	0.200		20	10	•	-		
MW-2 (4124017-02) Water									
Calcium	336	1.00	mg/L	100	EJ40408	09/30/04	09/30/04	EPA 6010B	
Magnesium	168	0.100		"			n	*	
Potassium	14.9	0.500		10		•	*	"	
Sodium	174	1.00	•	100	W			•	
MW-3 (4I24017-03) Water									
Calcium	58.1	0.100	mg/L	10	EJ40408	09/30/04	09/30/04	EPA 6010B	
Magnesium	29.4	0.0100	•	-	*		*	"	
Potassium	6.26	0.500		•			19	-	
Sodium	104	1.00	•	100			*		
MW-4 (4124017-04) Water									
Calcium	52.0	0.100	mg/L	10	EJ40408	09/30/04	09/30/04	EPA 6010B	
Magnesium	28.1	0.0100		-	-			•	
Potassium	6.66	0.500		Ħ	"	n	"	"	
Sodium	86.3	0.200	**	20	•		•	"	
MW-5 (4124017-05) Water									
Calcium	69.0	0.200	mg/L	20	EJ40408	09/30/04	09/30/04	EPA 6010B	
Magnesium	37.2	0.0100	W	10	*	Ħ	N	**	
Potassium	7.16	0.500	n		*		"		
Sodium	85.7	0.200	*	20	*	-	*		

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Project: Rice/ Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported: 10/04/04 18:51

#### **Organics by GC - Quality Control**

**Environmental Lab of Texas** 

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EJ40413 - EPA 5030C (GC)										
Blank (EJ40413-BLK1)	<u></u>			Prepared	& Analyze	ed: 09/30/0	04		<u> </u>	
Benzene	ND	0.00100	mg/L							
Toluene	ND	0.00100	*							
Ethylbenzene	ND	0.00100	n							
Xylene (p/m)	ND	0.00100								
Xylene (o)	ND	0.00100	n							
Surrogate: a,a,a-Trifluorotoluene	91.8		ug/l	100		91.8	80-120		<u> </u>	
Surrogate: 4-Bromofluorobenzene	80.5		"	100		80.5	80-120			
LCS (EJ40413-BS1)				Prepared	& Analyze	d: 09/30/0	)4			
Benzene	101		ug/l	100		101	80-120			
Toluene	102			100		102	80-120			
Ethylbenzene	91.2		Ħ	100		91.2	80-120			
Xylene (p/m)	201			200		100	80-120			
Xylene (0)	94.0		"	100		94.0	80-120			
Surrogate: a,a,a-Trifluorotoluene	<u> </u>			100		114	80-120			
Surrogate: 4-Bromofluorobenzene	111		"	100		Ш	80-120			
Calibration Check (EJ40413-CCV1)				Prepared:	09/30/04	Analyzed	: 10/04/04			
Benzene	98.7		ug/l	100		98.7	80-120			
Toluene	90.4			100		90.4	80-120			
Ethylbenzene	82.8		*	100		82.8	80-120			
Xylene (p/m)	182		*	200		91.0	80-120			
Xylene (0)	86.6			100		86.6	80-120			
Surrogate: a,a,a-Trifluorotoluene	m	<u> </u>	n	100		$-m^{-}$	80-120			
Surrogate: 4-Bromofluorobenzene	110		"	100		110	80-120			
Matrix Spike (EJ40413-MS1)	So	urce: 4129005	5-04	Prepared:	09/30/04	Analyzed	: 10/04/04			
Benzene	89.7		ug/l	100	ND	89.7	80-120			
Toluene	90.5			100	ND	90.5	80-120			
Ethylbenzene	87.6			100	ND	87.6	80-120			
Xylene (p/m)	196			200	ND	98.0	80-120			
Xylene (o)	95.7		n	100	ND	95.7	80-120			
Surrogate: a,a,a-Trifluorotoluene	104		<i>n</i>	100		104	80-120	· · · · · · · · · · · · · · · · · · ·	<u> </u>	
Surrogate: 4-Bromofluorobenzene	119		"	100		119	80-120			

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Project: Rice/ Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

Fax: (432) 682-3946 Reported:

#### 10/04/04 18:51

#### **Organics by GC - Quality Control**

**Environmental Lab of Texas** 

		Reporting		Spike So	Source	Source		%REC		RPD	
Analyte	Result	Limit U	Jnits	Level	Result	%REC	Limits	RPD	Limit	Notes	
Batch EJ40413 - EPA 5030C (GC)											
Matrix Spike Dup (EJ40413-MSD1)	Sour		4	Prepared:	09/30/04	Analyzed	: 10/04/04				
Benzene	89.7		ug/l	100	ND	89.7	80-120	0.00	20	<u></u>	
Toluene	90.5			100	ND	90.5	80-120	0.00	20		
Ethylbenzene	87.6			100	ND	87.6	80-120	0.00	20		
Xylene (p/m)	196		Ħ	200	ND	98.0	80-120	0.00	20		
Xylene (0)	95.7		۳.	100	ND	95.7	80-120	0.00	20		
Surrogate: a,a,a-Trifluorotoluene	104		<i>"</i>	100		104	80-120				
Surrogate: 4-Bromofluorobenzene	119		n	100		119	80-120				

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Highlander Environmental Corp.		•	Fax: (432) 682-3946								
1910 N. Big Spring St.		Project Nu	nber: 18	63					Reported:		
Midland TX, 79705		Project Man	ager: Ik	e Tavarez					10/04/04 18:51		
General Chemis	stry Parai	neters by	EPA /	Standar	rd Meth	ods - Q	)uality	Contro	ol		
	]	Environm	ental l	Lab of T	exas						
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch EI42706 - General Preparation	(WetChem	 1)									
Blank (EI42706-BLK1)	42706-BLK1)						04				
Sulfate	ND	0.500	mg/L								
Calibration Check (EI42706-CCV1)				Prepared	& Analyze						
Sulfate	48.8		mg/L	50.0	<u> </u>	97.6	80-120				
Duplicate (EI42706-DUP1)	So	Source: 4124017-01 Prepared & Analyzed: 09/27/04									
Sulfate	172	1.25	mg/L		175			1.73	20		
Batch EI42801 - General Preparation	(WetChem	)									
Blank (EI42801-BLK1)				Prepared	& Analyze	ed: 09/28/	04				
Chloride	ND	5.00	mg/L								
Matrix Spike (EI42801-MS1)	So	urce: 4I2401	7-01	Prepared	& Analyze	:d: 09/28/	04				
Chloride	354	5.00	mg/L	250	106	99.2	90-110				
Matrix Spike Dup (EI42801-MSD1)	So	urce: 412401'	7-01	Prepared a	& Analyze	ed: 09/28/	04				
Chloride	359	5.00	mg/L	250	106	101	90-110	1.40	20		
Reference (EI42801-SRM1)				Prepared & Analyzed: 09/28/04							
Chloride	4960		mg/L	5000		99.2	80-120				
Batch EI42806 - General Preparation	(WetChem	)									
Blank (EI42806-BLK1)				Prepared	& Analyze	:d: 09/24/0	04				
Carbonate Alkalinity	ND	0.100	mg/L					<u> </u>			
Bicarbonate Alkalinity	ND	2.00									

ND

0.100

Environmental Lab of Texas

Hydroxide Alkalinity

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Highlander Environmental Corp.Project: Rice/ Justis SWD Well H-2Fax: (432) 682-39461910 N. Big Spring St.Project Number: 1863Reported:Midland TX, 79705Project Manager: Ike Tavarez10/04/04 18:51

#### General Chemistry Parameters by EPA / Standard Methods - Quality Control

#### **Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EI42806 - General Preparation (	(WetChem	ı)			<u>.</u>					
Duplicate (EI42806-DUP1)	So	urce: 4I2401	7-01	Prepared	& Analyz	ed: 09/24/	04			
Carbonate Alkalinity	0.00	0.100	mg/L		0.00	• • • • • • • • • • • • • • • • • • •			20	
Bicarbonate Alkalinity	173	2.00			174			0.576	20	
Hydroxide Alkalinity	0.00	0.100			0.00				20	
Reference (EI42806-SRM1)				Prepared of	& Analyze	ed: 09/24/	04			
Carbonate Alkalinity	0.0501	···	mg/L	0.0500		100	80-120			
Batch EJ40417 - Filtration Preparation	n									
Blank (EJ40417-BLK1)				Prepared:	09/29/04	Analyzed	: 09/30/04			
Total Dissolved Solids	ND	5.00	mg/L							
Duplicate (EJ40417-DUP1)	So	urce: 412401	7-01	Prepared:	09/29/04	Analyzed	: 09/30/04			
Total Dissolved Solids	675	5.00	mg/L		749			10.4	20	

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The results in this report apply to the samples analyzed in accordance with the samples received in the laboratory. This analytical report must be reproduced in its entirety, with written approval of Environmental Lab of Texas. Page 10 of 12

Project: Rice/ Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez

#### Total Metals by EPA / Standard Methods - Quality Control

**Environmental Lab of Texas** 

		Reporting		Spike	Source		%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch EJ40408 - 6010B/No Digestion										
Blank (EJ40408-BLK1)		<b></b>		Prepared	& Analyze	ed: 09/30/	04			
Calcium	ND	0.0100	mg/L					· · · · · ·		·····
Magnesium	ND	0.00100	"							
Potassium	ND	0.0500								
Sodium	ND	0.0100	'n							
Calibration Check (EJ40408-CCV1)				Prepared	& Analyze	ed: 09/30/0	04			
Calcium	2.08		mg/L	2.00		104	85-115			
Magnesium	2.17			2.00		108	85-115			
Potassium	1.78		"	2.00		89.0	85-115			
Sodium	1.79		•	2.00		89.5	85-115			
Duplicate (EJ40408-DUP1)	So	urce: 4I2100	5-01	Prepared	& Analyze	ed: 09/30/0	04			
Calcium	31.3	0.100	mg/L		35.6			12.9	20	
Magnesium	11.8	0.0100			13.6			14.2	20	
Potassium	13.5	0.500	*		15.7			15.1	20	
Sodium	117	1.00			114			2.60	20	•

Environmental Lab of Texas

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1910 N.	der Environmental Corp. Big Spring St. 1 TX, 79705	Project: Rice/ Justis SWD Well H-2 Project Number: 1863 Project Manager: Ike Tavarez	Fax: (432) 682-3944 Reported: 10/04/04 18:51
	·····	Notes and Definitions	
DET	Analyte DETECTED		
ND	Analyte NOT DETECTED at or abo	we the reporting limit	
NR	Not Reported		
đry	Sample results reported on a dry we	ight basis	
RPD	Relative Percent Difference		
LCS	Laboratory Control Spike		
MS	Matrix Spike	· ·	
Dup	Duplicate		

Lalandk Jul 10-04-04 Report Approved By: Date:

Raland K. Tuttle, Lab Manager Celey D. Keene, Lab Director, Org. Tech Director Peggy Allen, QA Officer

Jeanne Mc Murrey, Inorg. Tech Director James L. Hawkins, Chemist/Geologist Sandra Biezugbe, Lab Tech.

This material is intended only for the use of the individual (s) or entity to whom it is addressed, and may contain information that is privileged and confidential.

If you have received this material in error, please notify us immediately at 432-563-1800.

Environmental Lab of Texas

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12600 West I-20 East - Odessa, Texas 79705 - (432) 563-1800 - Fax (432) 563-1713

Page 12 of 12

### Environmental Lab of Texas Variance / Corrective Action Report – Sample Log-In

Client: <u>Highlander Env.</u>
Date/Time: 09-24-0401620
Order #: 4 I Z4017

JMM

Initials:

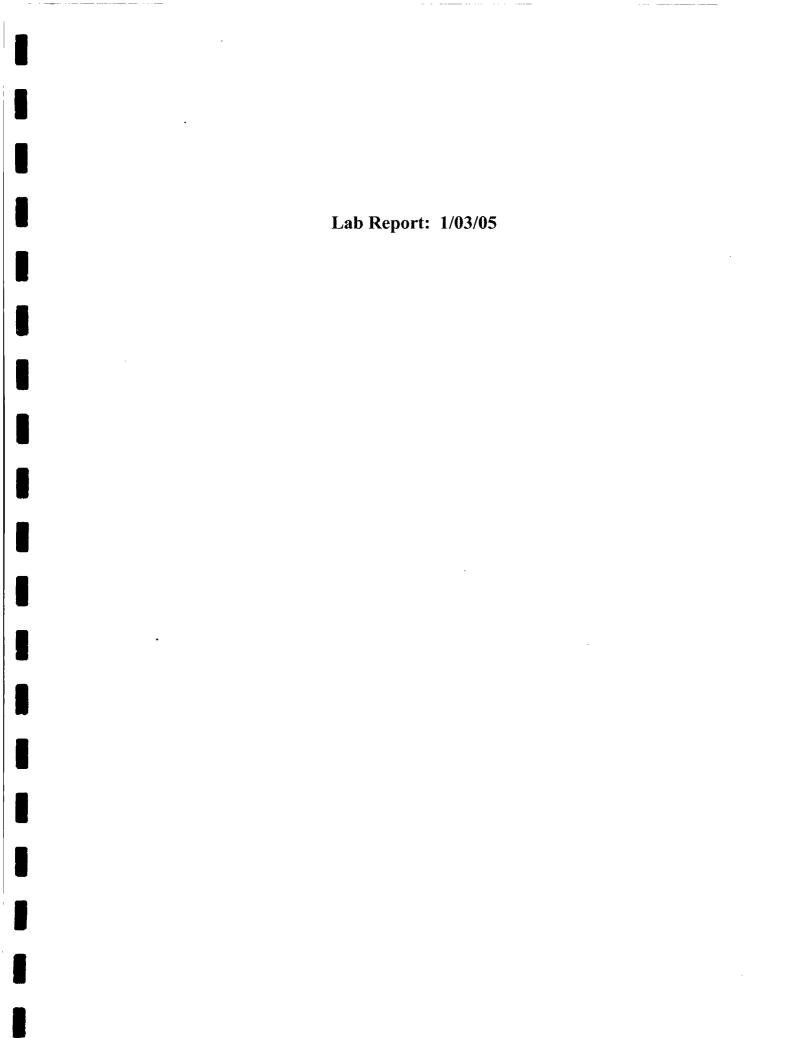
Sample Receipt Checklist

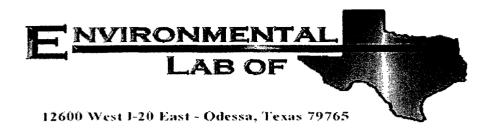
Sample Receipt	UNCCR	ist.	
Temperature of container/cooler?	(Yes)	No	2.5 C
Shipping container/cooler in good condition?	Yes	No	
Custody Seals intact on shipping container/cooler?	Yes	No	(Not present)
Custody Seals intact on sample bottles?	Yes	No	Not present
Chain of custody present?	Tes	No	
Sample Instructions complete on Chain of Custody?	Tes	No	
Chain of Custody signed when relinquished and received?	res	No	
Chain of custody agrees with sample label(s)	Ves	No	
Container labels legible and intact?	Tes	No	
Sample Matrix and properties same as on chain of custody?	(Yes)	No	
Samples in proper container/bottle?	tes	No	
Samples properly preserved?	Tes	No	
Sample bottles intact?	Yes	No	
Preservations documented on Chain of Custody?	(res)	No	
Containers documented on Chain of Custody?	(Yes)	No	
Sufficient sample amount for indicated test?	(Yes)	No	
All samples received within sufficient hold time?	(Tes)	No	
VOC samples have zero headspace?	Yes	) No	Not Applicable

Other observations:

Contact Person: Regarding:	Variance Documentation: Date/Time:	_ Contacted by:
Corrective Action Taken:		· · · · · · · · · · · · · · · · · · ·
		· · · · · · · · · · · · · · · · · · ·

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Analysis Request		DIGULAIVDER		(432) 682-4559	CLIENT NAME: PICE	PROJECT NO.: 1863	ديا	123104 11:25 W	U-25:11 49/52/	1/23/04/10:30 W	9/22/64/12:35-W	00:1 HOIEZ/6						By (supplied	RELEASONSHED BY: (Same ture)	RELINQUISHED BY: (Signature)	ORY	ADDRESS: CITT: <u>0 d()50</u> STATE: <u>  X</u> CONTACT: PHONE:	XIII M
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## **Analytical Report**

**Prepared for:** 

lke Tavarez Highlander Environmental Corp. 1910 N. Big Spring St. Midland, TX 79705

Project: Rice/ Justis H-2 Project Number: 1863 Location: Lea County, NM

Lab Order Number: 4L22020

Report Date: 01/03/05

Highlander Environmental Corp.	Project:	Rice/ Justis H-2	Fax: (432) 682-3946
1910 N. Big Spring St.	Project Number:	1863	Reported:
Midland TX, 79705	Project Manager:	lke Tavarez	01/03/05 17:54

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	4L22020-01	Water	12/21/04 12:40	12/22/04 15:13
MW-2	4L22020-02	Water	12/21/04 14:25	12/22/04 15:13
MW-3	4L22020-03	Water	12/21/04 11:40	12/22/04 15:13
MW-4	4L22020-04	Water	12/21/04 13:50	12/22/04 15:13
MW-5	4L22020-05	Water	12/21/04 13:20	12/22/04 15:13

Highlander Environmental Corp. 1910 N. Big Spring St.			roject: Rice imber: 1863		2			Fax: (432) Repor	
Midland TX, 79705		Project Ma	nager: 1ke 1	Гаvатеz				01/03/05	17:54
		Or	ganics by	GC					
		Environn	nental La	b of Te	xas				
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	No
MW-1 (4L22020-01) Water									
Benzene	ND	0.00100	mg/L	1	EL43007	12/29/04	12/30/04	EPA 8021B	
Toluene	ND	0.00100	-		*	•	•	"	
Ethylbenzene	ND	0.00100	-	•	•		-		
Xylene (p/m)	0.00108	0.00100	•	•	-	•	•	•	
Xylene (0)	ND	0.00100		-		-	•	17	
Surrogate: a,a,a-Trifluorotoluene		83.5 %	80-12	?0	"	"	"	7	
Surrogate: 4-Bromofluorobenzene		88.1 %	80-12	?0	"	*	"	~	
MW-2 (41.22020-02) Water									
Benzene	0.00550	0.00100	mg/L	1	EL43007	12/29/04	12/30/04	EPA 8021B	
Toluene	ND	0.00100	•	-		•	-		
Ethylbenzene	ND	0.00100	-	-	-	-		*	
Xylene (p/m)	ND	0.00100	-	-	"			*	
Xylene (0)	ND	0.00100	•	٠	-	-		•	
Surrogate: a,a,a-Trifluorotoluene		98.0 %	80-12	20	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		106 %	80-12	20	"	*	n	"	
MW-3 (4L22020-03) Water									
Benzene	0.0127	0.00100	mg/L	1	EL43007	12/29/04	12/30/04	EPA 8021B	
Toluene	ND	0.00100	*	-		•	H	*	
Ethylbenzene	0.00144	0.00100	-		•		•	-	
Xylene (p/m)	ND	0.00100	-	"	•	*	•	*	
Xylene (o)	ND	0.00100	-	H			n		
Surrogate: a,a,a-Trifluorotoluene		100 %	80-12		"	"	"		
Surrogate: 4-Bromofluorobenzene		98.9 %	80-12	0	7	"	"	"	
MW-4 (4L22020-04) Water									
Benzene	0.00275	0 00100	mg/L	1	EL43007	12/29/04	12/30/04	EPA 8021B	
Toluene	ND	0.00100		-	•		-	-	
Ethylbenzene	ND	0.00100	-			•	•		
Xylene (p/m)	ND	0.00100	-		-				
Xylene (o)	ND	0.00100	*	*	•		•	<b>.</b>	
Surrogate: a,a,a-Trifluorotoluene		95.8 %	80-12		*	-	-	"	
Surrogate: 4-Bromofluorobenzene		107 %	80-12	0	~		"	"	

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Highlander Environmental Corp.	Project:	Rice/ Justis H-2	Fax: (432) 682-3946
1910 N. Big Spring St.	Project Number:	1863	Reported:
Midland TX, 79705	Project Manager:	Ike Tavarez	01/03/05 17:54

#### Organics by GC

#### **Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-5 (4L22020-05) Water								*****	
Benzene	0.00292	0.00100	mg/L	1	EL43007	12/29/04	12/30/04	EPA 8021B	
Toluene	ND	0.00100	•	-			-	•	
Ethylbenzene	ND	0.00100	•	•	-	-	-	-	
Xylene (p/m)	ND	0.00100		-			-		
Xylene (o)	ND	0.00100		-	-	-		-	
Surrogate: a,a,a-Trifluorotoluene		97.5 %	80-12	?0		*	'n	17	
Surrogate: 4-Bromofluorobenzene		101 %	80-12	20		"	"	"	

Environmental Lab of Texas

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#### Project: Rice/ Justis H-2 Project Number: 1863 Project Manager: Ike Tavarez

Fax: (432) 682-3946 Reported:

01/03/05 17:54

#### General Chemistry Parameters by EPA / Standard Methods

Environmental Lab of Texas

		Reporting							
Analyte	Result	Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Note
MW-1 (4L22020-01) Water									
Total Alkalinity	172	2.00	mg/L	3	EL42911	12/29/04	12/29/04	EPA 310.2M	
Chloride	93.1	5.00		~	EL42908	12/29/04	12/29/04	EPA 325.3M	
Total Dissolved Solids	3450	5.00	mg/kg	•	EL42801	12/27/04	12/28/04	EPA 160.1	
Sulfate	215	2.50	mg/L	5	EL42909	12/29/04	12/29/04	EPA 375.4	
MW-2 (41.22020-02) Water									
Total Alkalinity	136	2.00	mg/L	1	EL42911	12/29/04	12/29/04	EPA 310.2M	
Chloride	1150	5.00	•	•	EL42908	12/29/04	12/29/04	EPA 325.3M	
Total Dissolved Solids	5630	5.00	mg/kg	•	EL42801	12/27/04	12/28/04	EPA 160.1	
Sulfate	210	2.50	mg/L	5	EL42909	12/29/04	12/29/04	EPA 375.4	
MW-3 (41,22020-03) Water									
Total Alkalinity	154	2.00	mg/L	1	EL42911	12/29/04	12/29/04	EPA 310.2M	
Chloride	154	5.00	-	м	EL42908	12/29/04	12/29/04	EPA 325.3M	
Total Dissolved Solids	3470	5.00	mg/kg	-	EL42801	12/27/04	12/28/04	EPA 160.1	
Sulfate	272	2.50	mg/L	5	EL42909	12/29/04	12/29/04	EPA 375.4	
MW-4 (4L22020-04) Water									
Total Alkalinity	167	2.00	mg/L	1	EL42911	12/29/04	12/29/04	EPA 310.2M	
Chloride	59.1	5.00	-	•	EL42908	12/29/04	12/29/04	EPA 325.3M	
Total Dissolved Solids	3300	5.00	mg/kg	-	EL42801	12/27/04	12/28/04	EPA 160.1	
Sulfate	210	2.50	mg/L	5	EL42909	12/29/04	12/29/04	EPA 375.4	
MW-5 (41.22020-05) Water									_
Total Alkalinity	148	2.00	mg/L	1	EL42911	12/29/04	12/29/04	EPA 310.2M	
Chloride	165	5.00	-	-	EL42908	12/29/04	12/29/04	EPA 325.3M	
Total Dissolved Solids	3470	5.00	mg/kg	-	EL42801	12/27/04	12/28/04	EPA 160.1	
Sulfate	224	2.50	mg/L	5	EL42909	12/29/04	12/29/04	EPA 375.4	

Environmental Lab of Texas

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Highlander Environmental Corp.		Р	roject: Rie	ce/ Justis H-	2			Fax: (432) 6	582-3946
1910 N. Big Spring St.			umber: 18					Report	
Midland TX, 79705		Project Ma	inager: Ike	e lavarez				01/03/05	17:54
	Tota	l Metals by Environn				ls			
Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	No
MW-1 (4L22020-01) Water									
Calcium	187	1.00	mg/L	100	EA50301	12/29/04	12/30/04	EPA 6010B	
Magnesium	56.6	0.100		-	•		•		
Potassium	7.90	0.500		10	•		•		
Sodium	126	1.00	-	100	•	*	-		
MW-2 (4L22020-02) Water									
Calcium	. 741	1.00	mg/L	100	EA50301	12/29/04	12/30/04	EPA 6010B	
Magnesium	309	0.100	-	*	-	-	-	*	
Potassium	18.3	0.500	-	10	•	•	-		
Sodium	313	1.00	•	100	-	-	-		
MW-3 (4L22020-03) Water							_		
Całcium	207	1.00	mg/L	100	EA50301	12/29/04	12/30/04	EPA 6010B	
Magnesium	65.5	0.100	-	•	-	•	79		
Potassium	10.6	0.500	n	10	•	•	-		
Sodium	194	1.00		100	-	•	-	*	
MW-4 (4L22020-04) Water									
Calcium	195	1.00	mg/L	100	EA50301	12/29/04	12/30/04	EPA 6010B	
Magnesium	60.5	0.100	-	*	•	-	•	-	
Potassium	8.74	0.500		10	-	•	-	-	
Sodium	165	1.00	-	100	-	-		*	
MW-5 (4L22020-05) Water									
Calcium	251	1.00	mg/L	100	EA50301	12/29/04	12/30/04	EPA 6010B	
Magnesium	82.4	0.100	-		•	-	-	-	
Potassium	10.4	0.500	-	10	-	•	n	-	
Sodium	191	1.00	-	100	n		-	*	

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Environmental Lab of Texas

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Highlander Environmental Corp.		P	roject: Ri	ce/ Justis H-2	!				Fax: (432)	682-394
1910 N. Big Spring St.		Project Nu	mber: 18	63					Repo	rted:
Midland TX, 79705		Project Ma	nager: Ik	e Tavarez					01/03/0	5 17:54
	0	rganics by	GC - (	Juality Co	ontrol					
		Environm	ental I	Lab of Te	kas					
Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EL43007 - EPA 5030C (GC)										
Blank (EL43007-BLK1)				Prepared: 1	2/29/04 A	nalyzed: 12	2/30/04		•	
Benzene	ND	0.00100	mg/L							
Toluene	ND	0.00100	-							
Ethylbenzene	ND	0.00100	-							
Xylene (p/m)	ND	0.00100	-							
Xylene (0)	ND	0.00100	-							
Surrogate: a,a,a-Trifluorotoluene	90.9		ug/l	100		90.9	80-120			
Surrogale: 4-Bromofluorobenzene	80.2		"	100		80.2	80-120			
LCS (EL43007-BS1)				Prepared: 1	2/29/04 A	nalyzed: 12	/30/04			
Benzene	87.9		ug/l	100		87.9	80-120			
Toluene	88.5		'n	100		88.5	80-120			
Ethylbenzene	97.5		•	100		97.5	80-120			
Xylene (p/m)	219		-	200		110	80-120			
Xylene (0)	111			100		111	80-120			
Surrogate: a,a,a-Trifluorotoluene	109		"	100		109	80-120			
Surrogale: 4-Bromofluorobenzene	119		"	100		119	80-120			
Calibration Check (EL43007-CCV1)				Prepared: 1	2/29/04 A	nalyzed: 12	/30/04			
Benzene	87.8		ug/l	100		87.8	80-120			
Toluene	89.0		-	100		89.0	80-120			
Ethylbenzene	95.3		"	100		95.3	80-120			
Xylene (p/m)	213			200		106	80-120			
Kylene (0)	104		•	100		104	80-120			
Surrogate: a,a,a-Trifluorotoluene	113		"	100		113	80-120			
Surrogate: 4-Bromofluorobenzene	116		"	100		116	80-120			
Matrix Spike (EL43007-MS1)	Sou	rce: 4L22009-	05	Prepared: 1	2/29/04 A	nalyzeđ: 12	/30/04			
Зепле	88.6		ug/l	100	ND	88.6	80-120			
Foluene	85.4		-	100	ND	85.4	80-120			
Êthylbenzene	87.9		-	100	ND	87.9	80-120			
Kylene (p/m)	186		-	200	ND	93.0	80-120			
(o)	94.2		-	100	ND	94.2	80-120			
Surrogate: a,a,a-Trifluorotoluene	107		"	100		107	80-120			

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Highlander Environmental Corp.	Project:	Rice/ Justis H-2	Fax: (432) 682-3946
1910 N. Big Spring St.	Project Number:	1863	Reported:
Midland TX, 79705	Project Manager:	lke Tavarez	01/03/05 17:54

### **Organics by GC - Quality Control**

**Environmental Lab of Texas** 

		Reporting		Spike	Source		%REC		RPD	
Anabyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

#### Batch EL43007 - EPA 5030C (GC)

Matrix Spike Dup (EL43007-MSD1)	Source: 4]	Prepared: 1						
Benzene	92.9	ug/l	100	ND	92.9	80-120	4.74	20
Toluene	86.0	•	100	ND	86.0	80-120	0.700	20
Ethylbenzene	87.2	-	100	ND	87.2	80-120	0,800	20
Xylene (p/m)	164		200	ND	82.0	80-120	12.6	20
Xylene (0)	86.7	-	100	ND	86.7	80-120	8.29	20
Surrogale: a,a,a-Trifluorotoluene	112	#	100		112	80-120		
Surrogate: 4-Bromofluorobenzene	117	"	100		117	80-120		

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Highlander Environmental Corp.		Рг	oject: Ri	ce/ Justis H-2	1				Fax: (432)	682-3946			
1910 N. Big Spring St.		Project Nu	•						Reported:				
Midland TX, 79705	Project Manager: Ike Tavarez								01/03/05 17:54				
General Cl	hemistry Para	meters by	EPA /	Standard	Method	s - Qua	lity Con	trol					
		Environm	ental I	Lab of Te	kas					_			
		Reporting		Spike	Source		%REC		RPD				
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes			
Batch EL42801 - 413.1													
Blank (EL42801-BLK1)				Prepared: 1	2/27/04 Ai	alyzed: 12	/28/04						
Total Dissolved Solids	ND	5.00	mg/kg										
Duplicate (EL42801-DUP1)	Sour	ce: 4L22019-	01	Prepared: 1	2/27/04 Ar	alyzed: 12	/28/04						
Total Dissolved Solids	2480	5.00	mg/kg		2620		······	5.49	20				
Blank (EL42908-BLK1)			~	Prepared &	Anałyzed:	12/29/04							
Chloride	ND	5.00	mg/L	Flepaled &	Analyzeu.	12/29/04							
			-			10/00/04							
M. A. S. C. S (F1 43009 34C1)	<b>C</b>	41 31010				1////////							
Matrix Spike (EL42908-MS1)		ce: 4L21010-		Prepared &			80.120						
Matrix Spike (EL42908-MS1) Chloride	<b>Sour</b> 390	<b>ce: 41.21010-</b> 5.00	01 mg/L	Prepared & 250	155	94.0	80-120						
Chloride Matrix Spike Dup (EL42908-MSD1)	390 Sour	5.00 ce: 41.21010-	mg/L 01	250 Prepared &	155 Analyzed:	94.0 12/29/04							
Chloride	390	5.00	mg/L	250	155	94.0	80-120 80-120	1.02	20				
Chloride Matrix Spike Dup (EL42908-MSD1)	390 Sour	5.00 ce: 41.21010-	mg/L 01	250 Prepared &	155 Analyzed: 155	94.0 12/29/04 95.6		1.02	20				
Chloride Matrix Spike Dup (EL42908-MSD1) Chloride	390 Sour	5.00 ce: 41.21010-	mg/L 01	250 Prepared & 250	155 Analyzed: 155	94.0 12/29/04 95.6		1.02	20				
Chloride Matrix Spike Dup (EL42908-MSD1) Chloride Reference (EL42908-SRM1)	390 Sour 394 4960	5.00 ce: 41.21010-	mg/L 01 mg/L	250 Prepared & 250 Prepared &	155 Analyzed: 155	94.0 12/29/04 95.6 12/29/04	80-120	1.02	20				
Chloride Matrix Spike Dup (EL42908-MSD1) Chloride Reference (EL42908-SRM1) Chloride	390 Sour 394 4960	5.00 ce: 41.21010-	mg/L 01 mg/L	250 Prepared & 250 Prepared &	155 Analyzed: 155 Analyzed:	94.0 12/29/04 95.6 12/29/04 99.2	80-120	1.02	20				
Chloride Matrix Spike Dup (EL42908-MSD1) Chloride Reference (EL42908-SRM1) Chloride Batch EL42909 - General Preparation (V Blank (EL42909-BLK1)	390 Sour 394 4960	5.00 ce: 41.21010-	mg/L 01 mg/L	250 Prepared & 250 Prepared & 5000	155 Analyzed: 155 Analyzed:	94.0 12/29/04 95.6 12/29/04 99.2	80-120	1.02	20				
Chloride Matrix Spike Dup (EL42908-MSD1) Chloride Reference (EL42908-SRM1) Chloride Batch EL42909 - General Preparation (N	390 Sour 394 4960 WetChem)	5.00 ce: 41.21010- 5.00	mg/L 01 mg/L mg/L	250 Prepared & 250 Prepared & 5000	155 Analyzed: 155 Analyzed: Analyzed:	94.0 12/29/04 95.6 12/29/04 99.2 12/29/04	80-120	1.02	20				

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Highlander Environmental Corp.		Рт	oject: Ri	ce/ Justis H-2	2				Fax: (432)	682-3946		
1910 N. Big Spring St.		Project Nu	•						Reported:			
Midland TX, 79705		Project Mai	nager: Ik	e Tavarez					01/03/05 17:54			
General (	Chemistry Para	meters by	EPA /	Standard	l Methoo	ls - Qua	lity Con	trol				
		Environm	ental I	Lab of Te	xas							
		Reporting		Spike	Source		%REC		rpd			
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes		
Batch EL42909 - General Preparation Duplicate (EL42909-DUP1)	· · · · · · · · · · · · · · · · · · ·		01	Prepared &	Analyzed:	12/29/04		<i></i>				
Sulfate	96.6	1.00	mg/L		99.8			3.26	20			
Batch EL42911 - General Preparation	(WetChem)						•					
Blank (EL42911-BLK1)				Prepared &	Analyzed:	12/29/04						
Fotal Alkalinity	ND	2.00	mg/L									
Duplicate (EL42911-DUP1)	Sour	ce: 4L22020-	01	Prepared &	Analyzed:	12/29/04						
Fotal Alkalinity	173	2.00	mg/L		172			0.580	20			
Reference (EL42911-SRMI)				Prepared &	Analyzed:	12/29/04						
Carbonate Alkalinity	0.0501		mg/L	0.0500		100	80-120	· · · · · ·				

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Highlander Environmental Corp.	Project:	Rice/ Justis H-2	Fax: (432) 682-3946
1910 N. Big Spring St.	Project Number:	1863	Reported:
Midland TX, 79705	Project Manager:	Ike Tavarez	01/03/05 17:54

#### Total Metals by EPA / Standard Methods - Quality Control

		Environm	ental l	Lab of Te	xas					
Алајује	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch EA50301 - 6010B/No Digestion										
Blank (EA50301-BLK1)				Prepared:	12/29/04 A	nalyzed: 12	/30/04			
Calcium	ND	0.0100	mg/L							
Magnesium	ND	0.00100								
Potassium	ND	0.0500	•							
Sodium	ND	0.0100	-							
Calibration Check (EA50301-CCV1)				Prepared: 1	12/29/04 Ai	nalyzed: 12	/30/04			
Calcium	1.98		mg/L	2.00		99.0	85-115			
Magnesium	2.28		•	2.00		114	85-115			
Potassium	2.05		•	2.00		102	85-115			
Sodium	1.86			2.00		93.0	85-115			
Duplicate (EA50301-DUP1)	Sou	rce: 4L22019-	01	Prepared: 1	2/29/04 Ai	nalyzed: 12	/30/04			
Calcium	496	1.00	mg/L		381			26.2	20	QR-
Magnesium	168	0.100	•		143			<b>16.1</b>	20	
Potassium	17.1	0.500	•		14.4			₹7.1	20	
Sodium	555	1.00			477			15.1	20	

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Highlande	er Environmental Corp.	Project: Rice/ Justis H-2	Fax: (432) 682-3946
1910 N. B	big Spring St.	Project Number: 1863	Reported:
Midland ]	FX, 79705	Project Manager: Ike Tavarez	01/03/05 17:54
		Notes and Definitions	
QR-02		ntrol limits; however, both percent recoveries were acceptable. Sample re nt recoveries and completeness of QC data.	esults for the QC
DET	Analyte DETECTED		
ND	Analyte NOT DETECTED at or above th	he reporting limit	
NR	Not Reported		
dry	Sample results reported on a dry weight	basis	
RPD	Relative Percent Difference		
LCS	Laboratory Control Spike		
MS	Matrix Spike		
Dup	Duplicate		

Report Approved By:

Raland K June Date: 1/3/2005

Raland K. Tuttle, Lab Manager Celey D. Keene, Lab Director, Org. Tech Director Peggy Allen, QA Officer Jeanne Mc Murrey, Inorg. Tech Director James L. Hawkins, Chemist/Geologist Sandra Sanchez, Lab Tech.

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est and Chain of Custody Record	HIGHLAINDER ENVIRUINMENTAL CURF.   1910 N. Big Spring St. 8   2) 682-4559 Midland, Texas 79705 Fax (432) 682-3946	TITE MANADERS. STITE MANADERS. ANA DESCRIPTIVE BEI PRESSERVATIVE MON	809, 309 (N/)	LVHI 685.0   LLH 418   LLH 418   HLES 8050/   HUXX 8050/ 100   HUX 100	1 MW-1 3 1 1	Mu-Z 3 1 1	X - X - X	Mw.4 1 X	Mr-5 3 1 Y				Data: 202 201 HECCENED BY: (Signature) Data: 340 H	RECENTED BY: (Repreture)	RECEIVED/AT: (SUENSITY ) Deter	1000 - 1000 AVALATING ANTACE PERSON	The 122/14 me 15:13	4-ALT SD-Sould SL-Slodge D-Other
Request	HIGHLAIVDE. 191 Mi	ico Douti-	PROVECT NO.: 1563 PROPECT	CBAB KATRIX KATRIX		======================================	shild 11:40 W	~ ~ ~ / / / / / / / / d	2/21/02 1:20 m			$\left  \right $	RELINGINATION BY (Signature)	RELINQUISHED HY: (Stank Kure)	RELINQUISHED BY: (Signature)	RECEIVING LABORATORY: ECT	STATE: PHONE	gandir Condition They reczived:

.

## Environmental Lab of Texas Variance / Corrective Action Report – Sample Log-In

Client: <u>Highlender Enviro</u>	-
Date/Time: 12/22/01 15:15	
Order #: 4622020	
initials: JLH	

### Sample Receipt Checklist

Temperature of container/cooler?	Kes	No	-0,5 C
Shipping container/cooler in good condition?	Xes>	No	
Custody Seals intact on shipping container/cooler?	Yes	No	Not present
Custody Seals intact on sample bottles?	Yes	No	Not present
Chain of custody present?	CY08	No	
Sample Instructions complete on Chain of Custody?	(Yes)	No	
Chain of Custody signed when relinquished and received?	res	No	
Chain of custody agrees with sample label(s)	(Yes)	No	
Container labels legible and intact?	(Yes)	No	
Sample Matrix and properties same as on chain of custody?	Yes	No	
Samples in proper container/bottle?	(Yes)	No	
Samples properly preserved?	Yes	No	
Sample bottles intact?	(YES )	No	
Preservations documented on Chain of Custody?	Yes	No	
Containers documented on Chain of Custody?	(res)	No	
Sufficient sample amount for indicated test?	(Tes)	No	
All samples received within sufficient hold time?	(Yes	No	
VOC samples have zero headspace?	(Yes)	No	Not Applicable

Other observations:

## Variance Documentation:

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Contact Person: Regarding:	Date/Time:	Contacted by:
Corrective Action Taken:		· · · · · · · · · · · · · · · · · · ·
•		

					·
l.		Sampl	e 4122020		
TempC =	0.0			pH ≐	0.0
TDS =	3450.0			COND =	0.0
HARD =	0.0			DENS =	0.0
x-cor =	0.0			y-cor =	0.0
Units = r	ng/L			rock =	0.0
				% mag/l	
-	mg/L	mmole/L	•	•	L
Na+	126.0	5.4804	5.4804		
K +	7.9	0.2020			
Ca++	187.0	4.6657	9.3313		
Mg++	56.6	2.3281	4.6561		
Cl-	93.1	2.6260			
SO4	215.0	2.2382	4.4764		
HCO3-	172.0	2.8189	2.8189		
CO3	0.0	0.0000	0.000		
SiO2	0.0	0.0000	0.0000		
Li+	0.0	0.0000	0.0000		
Sr++	0.0	0.0000	0.0000		
Ba++	0.0	0.0000	0.000		
Fe++	0.0	0.0000	0.000		
NO3-	0.0	0.0000	0.0000		
F-	0.0	0.0000	0.000		
Br-	0.0	0.0000	0.0000		
В	0.0	0.0000	0.000	0.0	
LANGELIER		0.00 Analytical	checks ar	IONIC STR	
Sum catio	ins =	19.6699		Sum anion BALANCE	s = 9.9213 = 32.94 %
TDS calc Entered T	= DS - TDS(d		-	TDS(180) Entered	mg/L calc = 770 mg/L TDS - TDS(180) diff= 77.7
TDS(enter	ed)/Cond r		0.00		ge = 0.55 to 0.75
TDS(calc)		=			ge = 0.55 to 0.75
	-	ations =			ge = 90 - 110
Meas. Den	sity =	Entered an 0.0000	nd calcula		ty nsity = 1.0008
		Entered a			
Meas. har	dness=	0.0 mg/l	CaCO3	Calc. har	dness= 700.0 mg/L CaCO
			Element		
Na - Cl	=		neq/L	Usually p	
Ca - SO4	=	4.855 r		Usually p	
		3.56 5	6	Usually _	
K/(Na + K	() =				
K/(Na + K Mg/(Mg+Ca		33.29	6	Usually _	40%
Mg/(Mg+Ca	) =	Carbo	onate/bica	arbonate a	tрН = 0
Mg/(Mg+Ca Meas HCO3	•) =	Carbo 172.0 r	onate/bica ng/L	arbonate a Meas CO3	t pH = 0 = 0.0 mg/L
Mg/(Mg+Ca	•) =	Carbo 172.0 r	onate/bica ng/L	arbonate a	t pH = 0 = 0.0 mg/L

Sample 4L22020-02 0.0 empC = 0.0 рH = TDS 0.0 COND = 0.0 = HARD = 0.0 0.0 DENS = x-cor = 0.0 **y-cor** = 0.0 0.0 Units = mg/L rock = mmole/L meq/L % meq/L mg/L 313.0 13.6140 17.8 Na+ 13.6140 K + 18.3 0.4680 0.4680 0.6 741.0 18.4880 36.9760 48.3 Ca++ 309.0 25.4195 33.2 Mg++ 12.7098 ct-1150.0 83.1 32.4373 32.4373 so4--210.0 2.1861 4.3723 11.2 HCO3-136.0 2.2289 2.2289 5.7 co3--0.0 0.0000 0.0000 0.0 sio2 0.0 0.0000 0.0000 0.0 Li+ 0.0 0.0000 0.0 0.0000 Sr++ 0.0 0.0000 0.0000 0.0 0.0 0.0000 0.0000 0.0 Ba++ 0.0 Fe++ 0.0000 0.0000 0.0 NO3-0.0 0.0000 0.0000 0.0 F -0.0 0.0000 0.0000 0.0 Br-0.0 0.0000 0.0000 0.0 в 0.0 0.0000 0.0000 0.0 LANGELIER INDEX 0.00 IONIC STRENGTH= 0.0911 Analytical checks and comparisons Sum cations 76.4776 Sum anions 39.0385 BALANCE 32.41 % = TDS entered = 0 mg/L TDS(180) calc = TDS calc = 2877 mg/L 2808 mg/L Entered TDS - TDS(calc) diff= 0.0 % Entered TDS - TDS(180) diff= 0.0 % Conductivity = 0 umbo TDS(entered)/Cond ratio = 0.55 to 0.75 = 0.00 Usual range TDS(calc)/Cond = 0.00 Usual range = 0.55 to 0.75 Conductivity/Sum-cations = 0 = 90 - 110 Usual range Entered and calculated density Meas. Density = 0.0000 Calc. Density = 1.0028 Entered and calculated hardness Meas. hardness= 0.0 mg/L CaCO3 Calc. hardness= 3122.5 mg/L CaCO3 Element ratios Na - Cl %-18.823 meq/L Usually positive = Ca - SO4 Usually positive = 32.604 meg/L Usually \_ 20% K/(Na + K) 3.32 = % Mg/(Mg+Ca) 40.74 % Usually \_ 40% = Carbonate/bicarbonate at pH = 0 Meas HCO3 136.0 mg/L Meas CO3 Ξ 0.0 mg/L = Calc HCO3 Calc CO3 0.0 mg/L 0.0 mg/L = Ξ

Sample 4L22020-03 0.0 0.0 TempC = pН = 3470.0 0.0 TDS COND = Ξ HARD 0.0 DENS = 0.0 = 0.0 0.0 y-cor = х-сог = rock = 0.0 Units = mg/L meq/L % meq/L mmole/L mg/L 34.5 Na+ 194.0 8.4381 8.4381 0.2711 1.1 К + 10.6 0.2711 Ca++ 207.0 5.1647 10.3293 42.3 65.5 5.3883 22.1 Mg++ 2.6941 154.0 4.3438 4.3438 34.7 Cl-S04--272.0 2.8316 5.6631 45.2 HCO3-154.0 2.5239 2.5239 20.1 C03--0.0 0.0000 0.0000 0.0 Si02 0.0 0.0000 0.0000 0.0 Li+ 0.0 0.0000 0.0000 0.0 0.0000 0.0 0.0 Sr++ 0.0000 Ba++ 0.0 0.0000 0.0000 0.0 Fe++ 0.0 0.0000 0.0000 0.0 N03-0.0 0.0000 0.0 0.0000 0.0000 0.0 0.0 0.0000 F -0.0 0.0000 0.0000 0.0 Br-0.0000 B 0.0 0.0000 0.0 LANGELIER INDEX 0.00 IONIC STRENGTH= 0.0292 Analytical checks and comparisons Sum cations = 24.4268 Sum anions = 12.5308 BALANCE 32.19 % Ξ 3470 mg/l TDS entered = 1057 mg/L TDS(180) calc = TDS calc = 979 mg/L Entered TDS - TDS(calc) diff= 69.5 % Entered TDS - TDS(180) diff= 71.8 % Conductivity = 0 umho TDS(entered)/Cond ratio = 0.00 Usual range = 0.55 to 0.75 TDS(calc)/Cond = 0.00 Usual range = 0.55 to 0.75 Conductivity/Sum-cations = 0 Usual range = 90 - 110 Entered and calculated density Meas. Density = 0.0000 Calc. Density = 1.0010 Entered and calculated hardness Meas. hardness= 0.0 mg/L CaCO3 Calc. hardness= 786.6 mg/L CaCO3 Element ratios Na - Cl Usually positive 4.094 meg/L z Ca - SO4 = 4.666 meq/L Usually positive K/(Na + K)3.11 % Usually \_ 20% Ξ Usually = 40%Mg/(Mg+Ca) 34.28 Ξ %

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	Carbonate/bicarbonate at pH = 0									
Meas HCO3	=	154.0	mg/L	Meas CO3	=	0.0	mg/L			
Calc HCO3	=	0.0	mg/L	Calc CO3	=	0.0	mg/L			

Sample 4L22020-04 0.0 рН = 0.0 TempC = 0.0 TDS = 3300.0 COND = 0.0 DENS = 0.0 HARD = 0.0 0.0 y-cor = x-cor = 0.0 Units = mg/L rock = mmole/L meq/L % meq/L mg/L 7.1767 32.5 165.0 7.1767 Na+ 1.0 0.2235 κ + 8.7 0.2235 9.7305 44.0 195.0 4.8653 Ca++ 4.9770 22.5 Mg++ 60.5 2.4885 19.0 59.1 1.6670 cl-1.6670 49.8 SO4 - -210.0 2.1861 4.3723 HCO3-167.0 2.7370 2.7370 31.2 C03--0.0 0.0000 0.0000 0.0 0.0 0.0000 0.0000 0.0 Si02 0.0 0.0000 .0.0000 0.0 Li+ 0.0 0.0 0.0000 0.0000 Sr++ 0.0 0.0000 0.0000 0.0 Ba++ 0.0000 0.0 Fe++ 0.0 0.0000 N03-0.0 0.0000 0.0000 0.0 0.0000 0.0 F-0.0 0.0000 0.0 0.0000 0.0000 0.0 Br-0.0000 0.0000 0.0 В 0.0 LANGELIER INDEX 0.00 IONIC STRENGTH= 0.0250 Analytical checks and comparisons Sum cations = 22.1077 Sum anions ₽ 8.7762 BALANCE = 43.17 % TDS entered = 3300 mg/L TDS(180) calc = 780 mg/L TDS calc = 865 mg/L Entered TDS - TDS(calc) diff= 73.8 % Entered TDS - TDS(180) diff= 76.3 % Conductivity = 0 umho TDS(entered)/Cond ratio = 0.00 Usual range = 0.55 to 0.75 = 0.00 Usual range = 0.55 to 0.75 TDS(calc)/Cond = 90 - 110 Conductivity/Sum-cations = 0 Usual range Entered and calculated density 0.0000 Calc. Density = 1.0009 Meas. Density = Entered and calculated hardness 0.0 mg/L CaCO3 Calc. hardness= 736.0 mg/L CaCO3 Meas. hardness= Element ratios Na - Cl 5.510 meq/L Usually positive Ξ Ca - SO4 Usually positive = 5.358 meq/L Usually \_ 20% K/(Na + K) 3.02 % = Usually \_ 40% 33.84 % Mg/(Mg+Ca) = Carbonate/bicarbonate at pH = 0 Meas HCO3 167.0 mg/L Meas CO3 = 0.0 mg/L = Calc CO3 0.0 mg/L Calc HCO3 0.0 mg/L Ξ =

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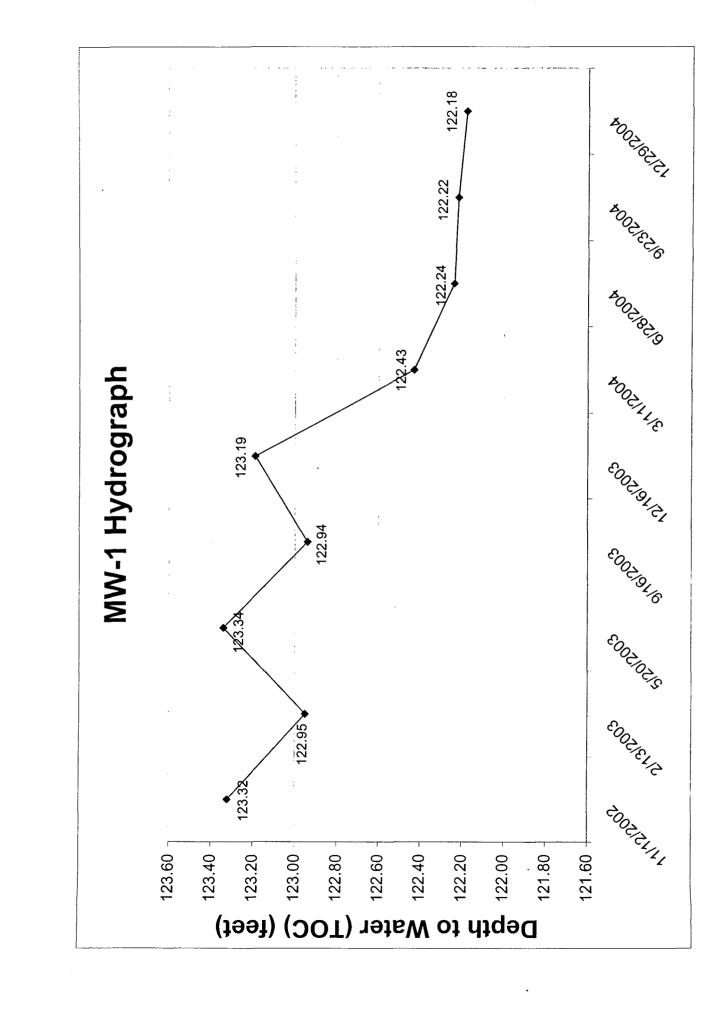
		Sample	e 4L22020-			~ ~			
TempC =	0.0			рH	=	0.0			
TDS =	3470.0			COND		0.0			
HARD =	0.0			DENS		0.0			
x-cor =	0.0			у-сог		0.0			
Units =	mg/L			rock	=	0.0			
		•		e					
	mg/L	mmole/L			eq/L				
Na+	191.0	8.3076	8.3076						
■K +	10.4	0.2660	0.2660						
Ca++	251.0	6.2625	12.5249						
Mg++	82.4	3.3893	6.7785						
	165.0	4.6540	4.6540						
\$04	224.0	2.3319	4.6638						
HCO3-	148.0	2.4256	2.4256 0.0000						
C03	0.0	0.0000	0.0000						
SiO2	0.0 0.0	0.0000	0.0000						
	0.0	0.0000	0.0000						
Sr++	0.0	0.0000	0.0000						
Ba++ Fe++	0.0	0.0000	0.0000						
N03-	0.0	0.0000	0.0000						
F-	0.0	0.0000	0.0000						
Br-	0.0	0.0000	0.0000						
B	0.0	0.0000	0.0000						
	R INDEX	0.00		IONIC	STRENG	[H=	0.0318		
	Ar	nalytical	checks an	d comp	parisons	5			
Sum cati	ons =	27.8771		Sum ar	nions	=	11.7434		
				BALANC	Έ	=	40.72 %		
				. 70					
		DS entere		470	mg/l		007	mg / l	
TDS calc	= TDS - TDS(ca	1072 mg/L			180) cal			mg/L iff= 71	13%
Entered	103 - 103(0		- 07.1 /0	Lince	CG 105	15	5(100) 0		
-		Conduc	ctivity =	0 ur	nho				
TDS(ente	red)/Cond ra					= 0	.55 to 0	.75	
TDS(calc							.55 to 0		
	vity/Sum-ca	tions =					0 - 110		
-									
	ł	Entered ar	nd calcula	ted de	ensity				
Meas. De	nsity =	0.0000 ·		Calc.	. Densi	ty =	1.00	211	
	I		nd calcula						_
Meas. ha	rdness=	0.0 mg/l	. CaCO3	Calc.	hardne	ss=	966.0 1	ng/L Cat	CO3
			Element r						
Na - Cl	=		•		ly posi ly posi				
Ca - SO4			•		ly posi ly _ 20				
K/(Na +			% %		ly = 20. ly _ 40				
Mg/(Mg+C	a) -	J].[[	v	Joudi	·/ = 40				
-		Carbo	onate/bica	rbonat	te at p	H =	0		
Meas HCO	3 =		ng/L	Meas		=		mg/L	
Calc HCO			ng/L	Calc	CO3	=	0.0	mg/L	
-									

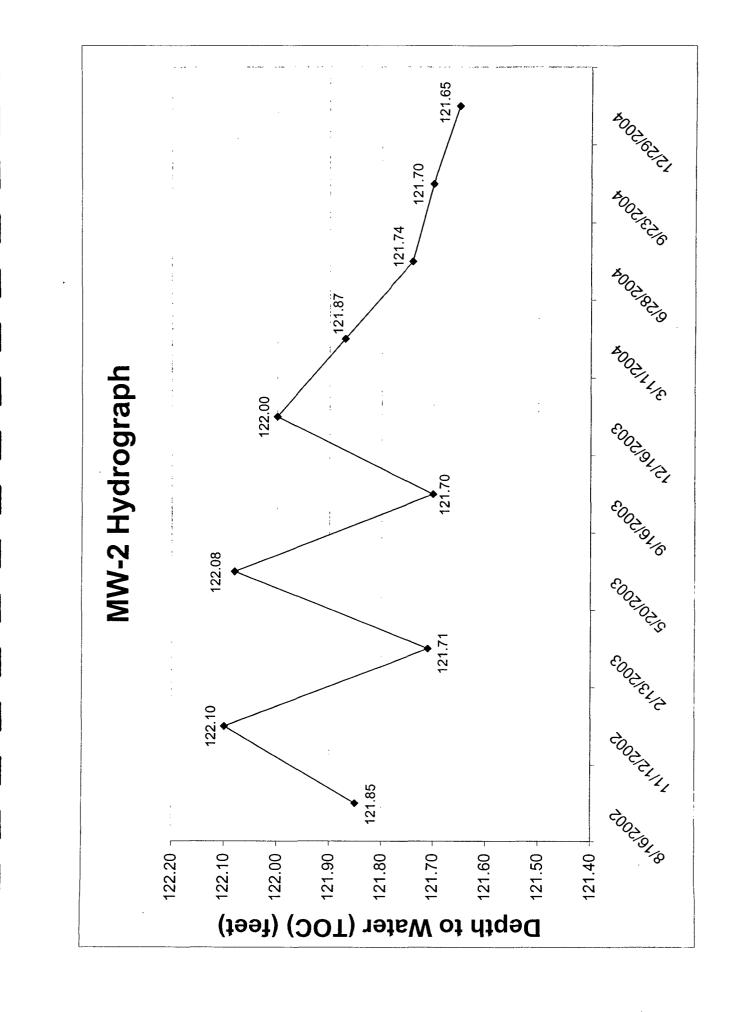
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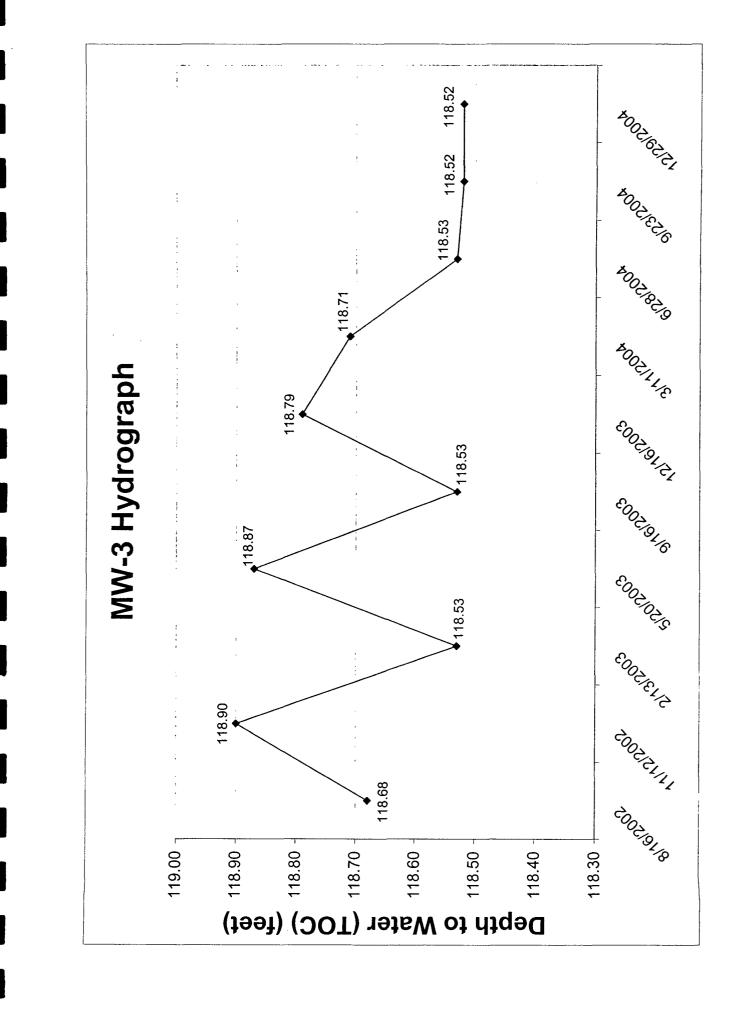
# **APPENDIX B**

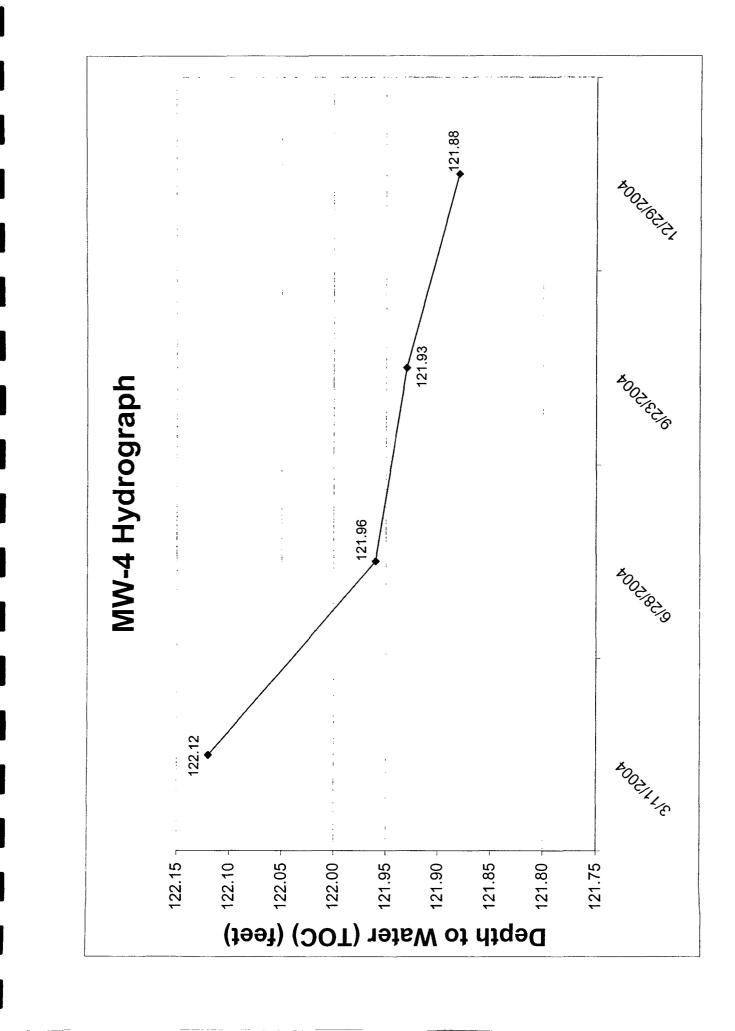
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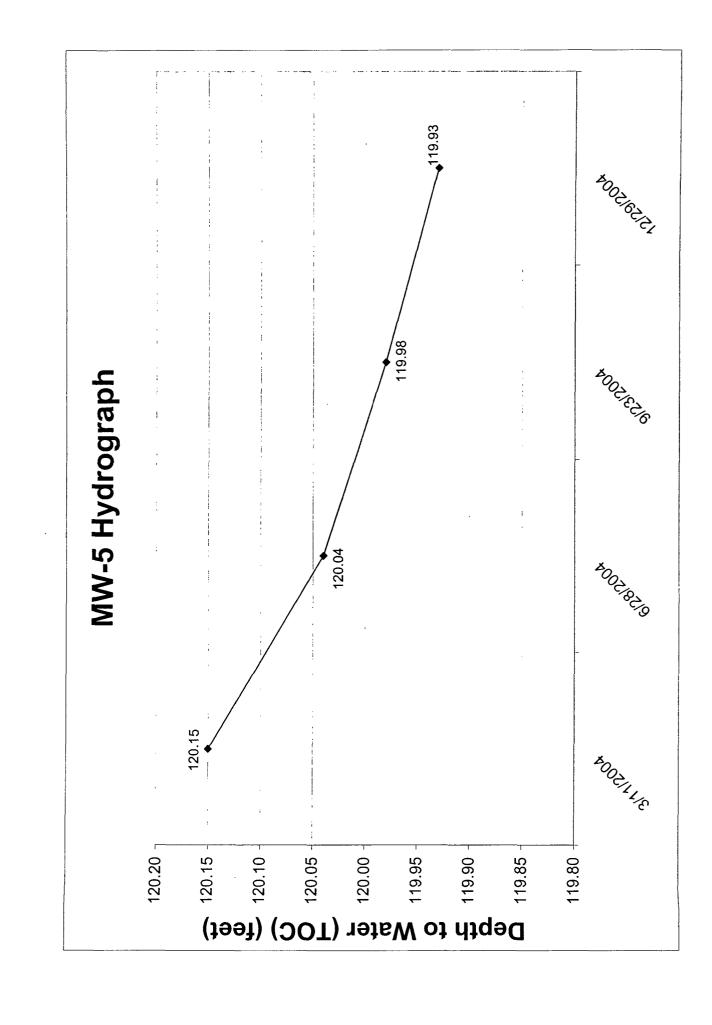
# Hydrographs

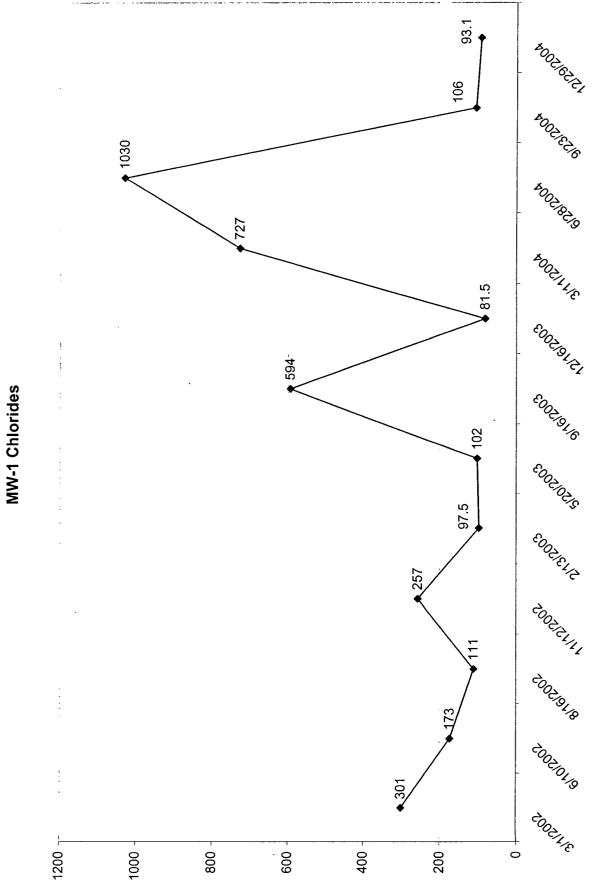




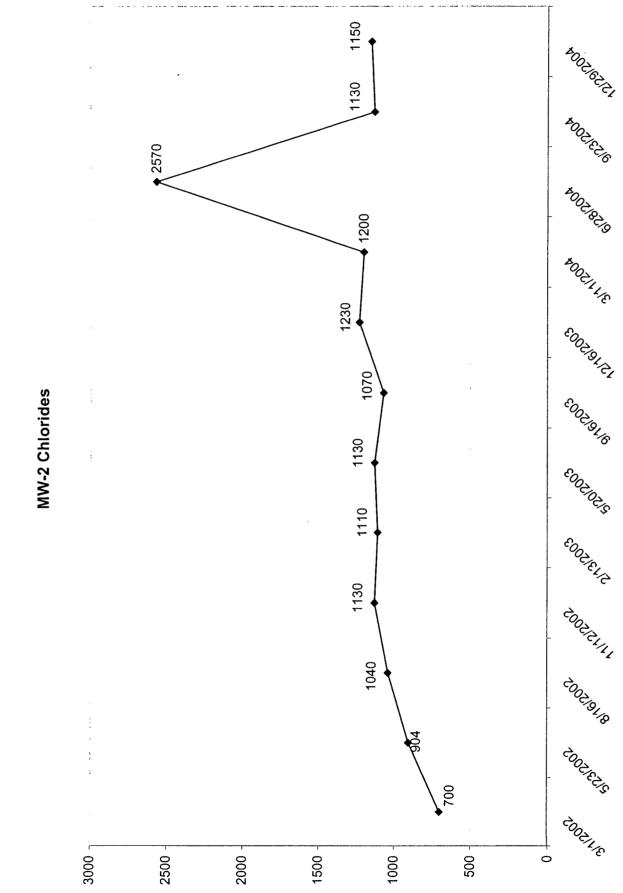




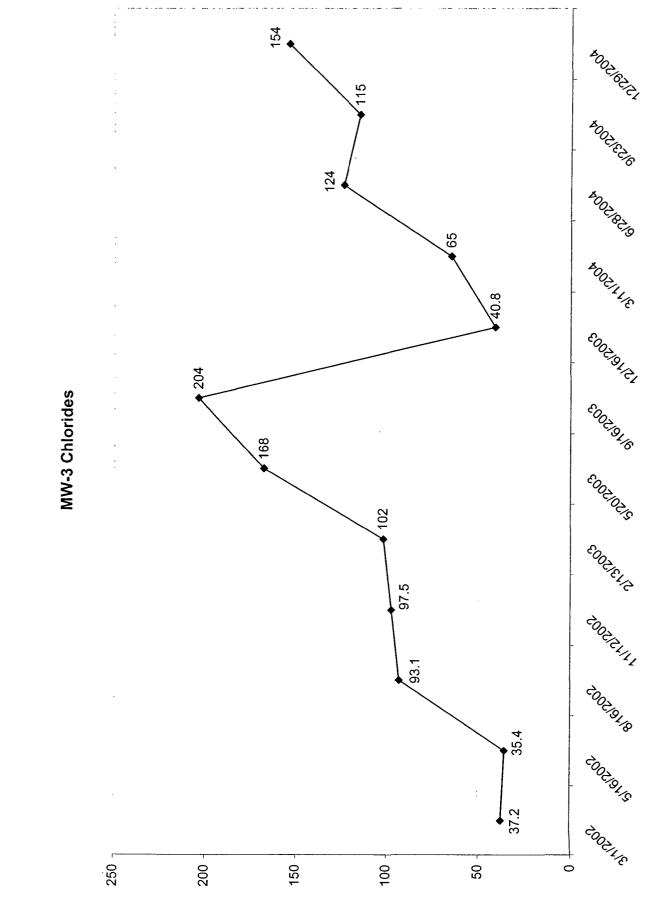




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