1R - 367

REPORTS

DATE:

2000

1267

Highlander Environmental Corp.

Midland, Texas

April 18, 2000

Ms. Donna Williams
Environmental Bureau
New Mexico Oil Conservation Division
1625 N. French Drive
P.O. Box 1980
Hobbs, New Mexico 88240

RE: Assessment Report/Workplan for Spill located at the Pogo Producing Company, S. J. Carr Tank Battery, Lea County, New Mexico

Dear Ms. Williams,

Highlander Environmental Corp. (Highlander) was contacted by Pogo Producing Company (Pogo) to assess a spill, which occurred at the Pogo S. J. Carr Tank Battery in Lea County, New Mexico. The Site is located in Section 10, Township 24 South, Range 37 East. Based on published data, the depth to groundwater in this area is greater than 50' below surface.

A risk-based evaluation was performed for the Site in accordance with the New Mexico Oil Conservation Division (NMOCD) Guidelines for Remediation of Leaks, Spills and Releases, dated August 13, 1993. The guidelines require a risk-based evaluation of the site to determine recommended remediation action levels (RRAL) for benzene, toluene, ethylbenzene and xylene (collectively referred to as BTEX) and total petroleum hydrocarbons (TPH) in soil. The proposed RRAL for benzene was determined to be 10 parts per million (ppm) or milligrams per kilogram (mg/kg) and 50 ppm for total BTEX (sum of benzene, toluene, ethylbenzene and xylene). An RRAL of 1,000 ppm for TPH is proposed for the Site.

Background

On January 29, 2000, a spill occurred at this facility and reportedly affected an area of approximately 30' x 130' inside the fenced battery. Approximately 20 barrels of oil and water were released on the surface and none was recovered.

Site Inspection and Assessment

On March 23, 2000, Highlander inspected the spill area, which measured approximately 30' x 150'. The spill area is confined inside the tank battery pad. A total of three hand augers borings were installed in the spill area to define the vertical extent of the impact. The spill area and sample locations are shown in Figure 1. Soil samples were collected to the top of a dense

caliche layer, which was encountered at a depth of 1.0' and 2.0' below surface. Soil samples were evaluated for Total Petroleum Hydrocarbon (TPH) by EPA 418.1, Benzene, Toluene, Ethylbenzene and Xylene (BTEX) by method SW 846-8020 and chloride by method SW846-9252. Table 1 shows the analytical results. The laboratory reports and chain of custody documentation are attached.

Table 1
(concentrations in mg/kg)

Sample ID	Depth (ft)	TPH	B	T	E	X	Total BTEX	Chloride
#1	0-0.5	7,600	0.087	1.0	1.9	4.7	7.687	105
	0.5-1.0	810	-	-	-	-	-	87
#2	0-0.5	8,100	1.6	22	17	39	79.6	3,330
	0.5-1.0	780	<0.005	0.010	0.100	0.290	0.40	298
	1.0-2.0	100	-	-	-	-	-	490
#3	0-0.5	11,000	6.1	60	46	106	218.1	52.5
	0.5-1.0	1,000	0.007	0.260	0.65	1.36	2.27	17.5

(-) Not Analyzed

Referring to Table 1, the soil samples from a depth of (0-0.5') exceeded the RRAL for TPH of 1,000 mg/kg ranging from 7,600 mg/kg to 11,000 mg/kg. The soil samples from borings #1, and #3 decrease with depth at (0.5'-1.0') and #2 at a depth of (1.0'-2.0'). The TPH levels were below or at the RRAL for TPH of 1,000 mg/kg at these depths.

The benzene levels detected in sample from borings (#1, #2 and #3) did not exceed the RRAL of benzene of 10 mg/kg. The total BTEX concentrations exceeded the RRAL of 50 mg/kg, in sample #2 (0-0.5') at 79.6 mg/kg and sample #3 (0-0.5') at 218.1 mg/kg. Samples from borings #2 (0.5'-1.0') and # 3 (0.5'-1.0') showed decreased total BTEX levels of 0.40 mg/kg and 2.27 mg/kg, respectively. These levels are below the RRAL for total BTEX.

The chloride levels detected in the soil samples at (0-0.5') showed a range of 52.5 mg/kg to 3,330 mg/kg. Deeper samples showed a chloride level ranging from 17.5 mg/kg to 490 mg/kg, which decreased with depth.

Conclusions

1. The impact soil appears to be shallow and confined to the tank battery pad. Impacted soil exceeding the RRAL of TPH was found at a depth of 0-0.5' below surface. In addition, the total BTEX that exceeded the RRAL was also detected from 0-0.5' and decreased below the RRAL at 0.5-1.0' below surface. The chloride levels were detected in the shallow soils, which decreased with depth. The chloride levels detected do not appear to be an environmental concern.

Recommendations/Workplan

Several remedial options are being evaluated for the impacted soil at the Site. These options are listed below.

1. The impacted soil from 0-0.5' may be remediated onsite. The impacted soil will require some treatment and periodic maintenance to remediate to below 1,000 mg/kg TPH. The soil will be tilled to remediate these areas in place. Water and fertilizer will be added to the soil to enhance bio-remediation. On a monthly basis, the impacted soil will be tilled to a depth of 0.5' below surface until the TPH RRAL level has been achieved. Periodic soil samples will be obtained to evaluate remediation efforts. Once the soil RRAL levels are achieved, a closure report will be submitted to the NMOCD.

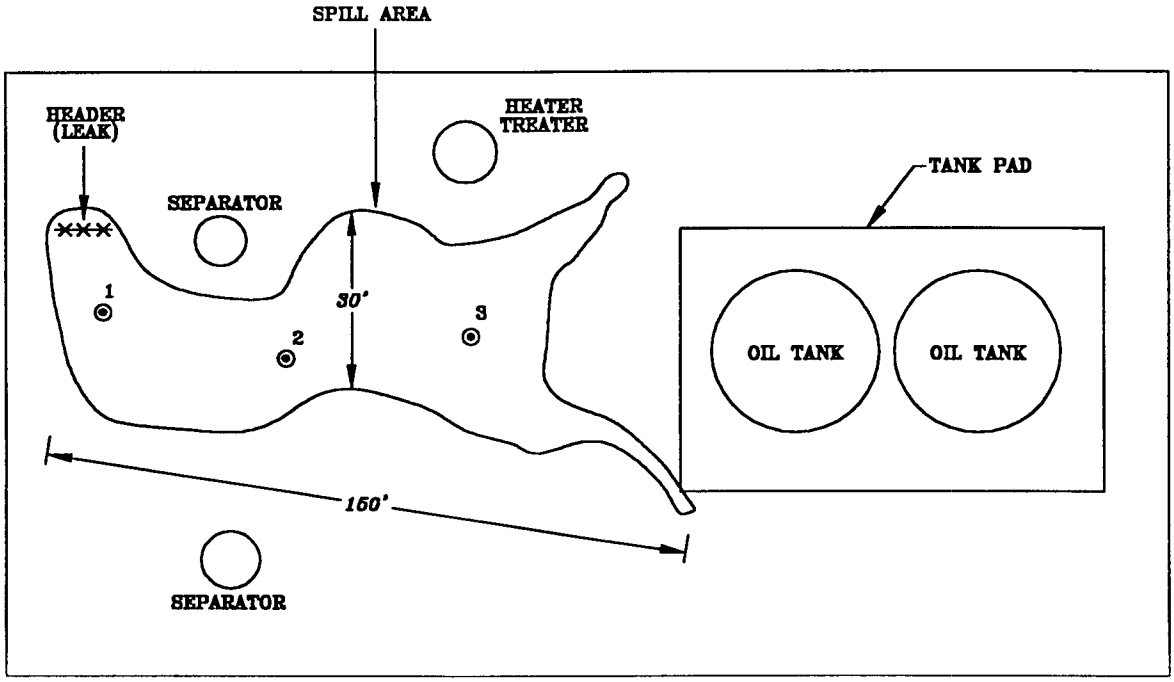
2. Depending on the volume of impacted soil, the impacted area will either be partially or all completely to a depth of 0-0.5' below surface and backfilled. If partially impacted soil is removed, clean backfill material will be placed in the excavated area and blended. The remaining area will be remediated as mentioned above. The excavated soil will be transported for proper disposal. Soil samples will be obtained to evaluate remediation efforts. Once the soil RRAL levels are achieved, a closure report will be submitted to the NMOCD.

If you require any additional information or have any questions or comments concerning the assessment/workplan, please call.

Very truly yours,

Ike Tavarez
Project Manager/Geologist

cc: Don Riggs - Pogo Producing Co.
Rex Jasper - Pogo Producing Co.



LEGEND

◉ SAMPLE LOCATION

NOT TO SCALE

FIGURE NO. 1

LEA COUNTY, NEW MEXICO

POGO PRODUCING COMPANY

S.J. CARR TANK BATTERY

HIGHLANDER ENVIRONMENTAL CORP.
MIDLAND, TEXAS

DATE: 04/7/00
DWN. BY: JDA
FILE: G:\POGO\CARR

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

Case Narrative for:

Highlander Environmental Corp

Certificate of Analysis Number:

00030718

Report To:		Project Name:	Pogo/SJ Carr TB	
Highlander Environmental Corp		Site:	Pogo/SJ Carr TB	
Ike Tavarez		Site Address:		
1910 N. Big Spring Street			Lea County	NM
Midland		PO Number:		
Texas		State:	Texas	
79705-		State Cert. No.:		
ph: (915) 682-4559	fax: (915) 682-3946	Date Reported:		

Any data flags or quality control exceptions associated with this report will be footnoted in the analytical result page(s) or the quality control summary page(s).

Please do not hesitate to contact us if you have any questions or comments pertaining to this data report. Please reference the above Certificate of Analysis Number.

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

This report shall not be reproduced except in full, without the written approval of the laboratory. The reported results are only representative of the samples submitted for testing.

Tatsuan, Sina
Senior Project Manager

4/4/00
Date

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

Highlander Environmental Corp

Certificate of Analysis Number:

00030718

Report To:	Highlander Environmental Corp Ike Tavarez 1910 N. Big Spring Street Midland Texas 79705- ph: (915) 682-4559 fax: (915) 682-3946	**Project Name:**	Pogo/SJ Carr TB
		Site:	Pogo/SJ Carr TB
		Site Address:	
			Lea County NM
		PO Number:	
		State:	Texas
		State Cert. No.:	
Fax To:	*Highlander Environmental Corp* *Ike Tavarez fax: (915) 682-3946*	**Date Reported:**	

Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COC ID	HOLD
#1 (0-0.5)	00030718-01	Soil	3/23/00	3/25/00 10:00:00 AM		☐
#1 (0.5-1.0 ft)	00030718-02	Soil	3/23/00	3/25/00 10:00:00 AM		☐
#2 (0-0.5 ft)	00030718-03	Soil	3/23/00	3/25/00 10:00:00 AM		☐
#2 (0.5-1.0 ft)	00030718-04	Soil	3/23/00	3/25/00 10:00:00 AM		☐
#2 (1.0-2.0 ft)	00030718-05	Soil	3/23/00	3/25/00 10:00:00 AM		☐
#3 (0-0.5 ft)	00030718-06	Soil	3/23/00	3/25/00 10:00:00 AM		☐
#3 (0.5-1.0 ft)	00030718-07	Soil	3/23/00	3/25/00 10:00:00 AM		☐

Gina Tatosian 4/4/00

Tatosian, Gina — Date
Senior Project Manager

Joel Grice
Laboratory Director

Ted Yen
Quality Assurance Officer

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

Client Sample ID: #1 (0-0.5) **Collected: 3/23/00** **SPL Sample ID: 00030718-01**

Site: Pogo/SJ Carr TB

Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL				**MCL**	**E325.3**		**Units: mg/Kg**		
Chloride	105		10		1		03/30/00 10:15	CV	232393
PURGEABLE AROMATICS				**MCL**	**SW8020A**		**Units: ug/Kg**		
Benzene	87		5		5		03/28/00 23:17	FB	230023
Ethylbenzene	1900		5		5		03/28/00 23:17	FB	230023
Toluene	1000		5		5		03/28/00 23:17	FB	230023
m,p-Xylene	2900		5		5		03/28/00 23:17	FB	230023
o-Xylene	1800		5		5		03/28/00 23:17	FB	230023
Xylenes,Total	4700		5		5		03/28/00 23:17	FB	230023
Surr: 1,4-Difluorobenzene	93.5	%	59-127		5		03/28/00 23:17	FB	230023
Surr: 4-Bromofluorobenzene	117	%	48-156		5		03/28/00 23:17	FB	230023
TOTAL PETROLEUM HYDROCARBONS				**MCL**	**E418.1**		**Units: mg/Kg**		
Petroleum Hydrocarbons,TR	7600		100		10		03/28/00 12:00	CB	229611

Run ID/Seq #: EX_000328B-229611

Prep Method	Prep Date	Prep Initials
	03/28/2000 12:00	

Qualifiers:

ND/U - Not Detected at the Reporting Limit
B - Analyte detected in the associated Method Blank
* - Surrogate Recovery Outside Advisable QC Limits
J - Estimated Value between MDL and PQL
>MCL - Result Over Maximum Contamination Limit(MCL)
D - Surrogate Recovery Unreportable due to Dilution

4/4/00 9:37:08 AM

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

Client Sample ID: #1 (0.5-1.0 ft) **Collected: 3/23/00** **SPL Sample ID: 00030718-02**

Site: Pogo/SJ Carr TB

Analyses/Method	Result	Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL			**MCL**	**E325.3**		**Units: mg/Kg**		
Chloride	87.6	10		1		03/30/00 10:15	CV	232396
TOTAL PETROLEUM HYDROCARBONS			**MCL**	**E418.1**		**Units: mg/Kg**		
Petroleum Hydrocarbons,TR	810	10		1		03/28/00 12:00	CB	229612

Run ID/Seq #: EX_000328B-229612

Prep Method	Prep Date	Prep Initials
	03/28/2000 12:00	

Qualifiers:

ND/U - Not Detected at the Reporting Limit
B - Analyte detected in the associated Method Blank
* - Surrogate Recovery Outside Advisable QC Limits
J - Estimated Value between MDL and PQL
>MCL - Result Over Maximum Contamination Limit(MCL)
D - Surrogate Recovery Unreportable due to Dilution

4/4/00 9:37:08 AM

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

Client Sample ID: #2 (0-0.5 ft) **Collected: 3/23/00** **SPL Sample ID: 00030718-03**

Site: Pogo/SJ Carr TB

Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL				**MCL**	**E325.3**		**Units: mg/Kg**		
Chloride	3330		50		5		03/30/00 10:15	CV	232398
PURGEABLE AROMATICS				**MCL**	**SW8020A**		**Units: ug/Kg**		
Benzene	1600		100		100		03/29/00 0:12	FB	230024
Ethylbenzene	17000		100		100		03/29/00 0:12	FB	230024
Toluene	22000		100		100		03/29/00 0:12	FB	230024
m,p-Xylene	26000		100		100		03/29/00 0:12	FB	230024
o-Xylene	13000		100		100		03/29/00 0:12	FB	230024
Xylenes,Total	39000		100		100		03/29/00 0:12	FB	230024
Surr: 1,4-Difluorobenzene	104	%	59-127		100		03/29/00 0:12	FB	230024
Surr: 4-Bromofluorobenzene	122	%	48-156		100		03/29/00 0:12	FB	230024
TOTAL PETROLEUM HYDROCARBONS				**MCL**	**E418.1**		**Units: mg/Kg**		
Petroleum Hydrocarbons,TR	8100		200		20		03/28/00 12:00	CB	229613

Run ID/Seq #: EX_000328B-229613

Prep Method	Prep Date	Prep Initials
	03/28/2000 12:00	

Qualifiers:
ND/U - Not Detected at the Reporting Limit
B - Analyte detected in the associated Method Blank
* - Surrogate Recovery Outside Advisable QC Limits
J - Estimated Value between MDL and PQL
>MCL - Result Over Maximum Contamination Limit(MCL)
D - Surrogate Recovery Unreportable due to Dilution

4/4/00 9:37:09 AM

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

Client Sample ID: #2 (0.5-1.0 ft) **Collected: 3/23/00** **SPL Sample ID: 00030718-04**

Site: Pogo/SJ Carr TB

Analyses/Method	Result	Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL			**MCL**	**E325.3**		**Units: mg/Kg**		
Chloride	298	10		1		03/30/00 10:15	CV	232399
TOTAL PETROLEUM HYDROCARBONS			**MCL**	**E418.1**		**Units: mg/Kg**		
Petroleum Hydrocarbons,TR	780	10		1		03/28/00 12:00	CB	229614

Run ID/Seq #: EX_000328B-229614

Prep Method	Prep Date	Prep Initials
	03/28/2000 12:00	

Qualifiers:

ND/U - Not Detected at the Reporting Limit
B - Analyte detected in the associated Method Blank
* - Surrogate Recovery Outside Advisable QC Limits
J - Estimated Value between MDL and PQL
>MCL - Result Over Maximum Contamination Limit(MCL)
D - Surrogate Recovery Unreportable due to Dilution

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

Client Sample ID: #2 (1.0-2.0 ft) **Collected:** 3/23/00 **SPL Sample ID:** 00030718-05

Site: Pogo/SJ Carr TB

Analyses/Method	Result	Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL			**MCL**	**E325.3**		**Units: mg/Kg**		
Chloride	490	10		1		03/30/00 10:15	CV	232401
TOTAL PETROLEUM HYDROCARBONS			**MCL**	**E418.1**		**Units: mg/Kg**		
Petroleum Hydrocarbons,TR	100	10		1		03/28/00 12:00	CB	229615

Run ID/Seq #: EX_000328B-229615

Prep Method	Prep Date	Prep Initials
	03/28/2000 12:00	

Qualifiers:

ND/U - Not Detected at the Reporting Limit
B - Analyte detected in the associated Method Blank
* - Surrogate Recovery Outside Advisable QC Limits
J - Estimated Value between MDL and PQL
>MCL - Result Over Maximum Contamination Limit(MCL)
D - Surrogate Recovery Unreportable due to Dilution

4/4/00 9:37:09 AM

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

Client Sample ID: #3 (0-0.5 ft) **Collected: 3/23/00** **SPL Sample ID: 00030718-06**

Site: Pogo/SJ Carr TB

Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL				**MCL**	**E325.3**		**Units: mg/Kg**		
Chloride	52.5		10		1		03/30/00 10:15	CV	232403
PURGEABLE AROMATICS				**MCL**	**SW8020A**		**Units: ug/Kg**		
Benzene	6100		500		500		03/29/00 0:40	FB	230025
Ethylbenzene	46000		500		500		03/29/00 0:40	FB	230025
Toluene	60000		500		500		03/29/00 0:40	FB	230025
m,p-Xylene	66000		500		500		03/29/00 0:40	FB	230025
o-Xylene	40000		500		500		03/29/00 0:40	FB	230025
Xylenes,Total	106000		500		500		03/29/00 0:40	FB	230025
Surr: 1,4-Difluorobenzene	98.2	%	59-127		500		03/29/00 0:40	FB	230025
Surr: 4-Bromofluorobenzene	125	%	48-156		500		03/29/00 0:40	FB	230025
TOTAL PETROLEUM HYDROCARBONS				**MCL**	**E418.1**		**Units: mg/Kg**		
Petroleum Hydrocarbons,TR	11000		10		1		03/28/00 12:00	CB	229616

Run ID/Seq #: EX_000328B-229616

Prep Method	Prep Date	Prep Initials
	03/28/2000 12:00	

Qualifiers:

ND/U - Not Detected at the Reporting Limit
B - Analyte detected in the associated Method Blank
* - Surrogate Recovery Outside Advisable QC Limits
J - Estimated Value between MDL and PQL
>MCL - Result Over Maximum Contamination Limit(MCL)
D - Surrogate Recovery Unreportable due to Dilution

4/4/00 9:37 AM

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

Client Sample ID: #3 (0.5-1.0 ft) **Collected:** 3/23/00 **SPL Sample ID:** 00030718-07

Site: Pogo/SJ Carr TB

Analyses/Method	Result	Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL			**MCL**	**E325.3**		**Units: mg/Kg**		
Chloride	17.5	10		1		03/30/00 10:15	CV	232407
TOTAL PETROLEUM HYDROCARBONS			**MCL**	**E418.1**		**Units: mg/Kg**		
Petroleum Hydrocarbons,TR	1000	10		1		03/28/00 12:00	CB	229617

Run ID/Seq #: EX_000328B-229617

Prep Method	Prep Date	Prep Initials
	03/28/2000 12:00	

Qualifiers:

ND/U - Not Detected at the Reporting Limit
B - Analyte detected in the associated Method Blank
* - Surrogate Recovery Outside Advisable QC Limits
J - Estimated Value between MDL and PQL
>MCL - Result Over Maximum Contamination Limit(MCL)
D - Surrogate Recovery Unreportable due to Dilution

4/4/00 9:37:10 AM

Quality Control Documentation

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

Quality Control Report

Highlander Environmental Corp

Pogo/SJ Carr TB

Analysis: Total Petroleum Hydrocarbons
Method: E418.1
WorkOrder: 00030718
Lab Batch ID: R11339

Method Blank

RunID: EX_000328B-229605 **Units:** mg/Kg
Analysis Date: 03/28/2000 12:00 **Analyst:** CB
Preparation Date: 03/28/2000 12:00 **Prep By:** Method

Analyte	Result	Rep Limit
Petroleum Hydrocarbons,TR	ND	10

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030718-01A	#1 (0-0.5)
00030718-02A	#1 (0.5-1.0 ft)
00030718-03A	#2 (0-0.5 ft)
00030718-04A	#2 (0.5-1.0 ft)
00030718-05A	#2 (1.0-2.0 ft)
00030718-06A	#3 (0-0.5 ft)
00030718-07A	#3 (0.5-1.0 ft)

Laboratory Control Sample (LCS)

RunID: EX_000328B-229606 **Units:** mg/Kg
Analysis Date: 03/28/2000 12:00 **Analyst:** CB
Preparation Date: 03/28/2000 12:00 **Prep By:** Method

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Petroleum Hydrocarbons,TR	200	200	100	86	117

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 00030719-01
RunID: EX_000328B-229632 **Units:** mg/Kg
Analysis Date: 03/28/2000 12:00 **Analyst:** CB
Preparation Date: 03/28/2000 12:00 **Prep By:** Method

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Petroleum Hydrocarbons,TR	970	200	1200	103	200	1200	103	0	8	72	119

Qualifiers:

ND/U - Not Detected at the Reporting Limit
B - Analyte detected in the associated Method Blank
J - Estimated value between MDL and PQL
* - Recovery Outside Advisable QC Limits
D - Recovery Unreportable due to Dilution

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

Quality Control Report

Highlander Environmental Corp

Pogo/SJ Carr TB

Analysis: Purgeable Aromatics
Method: SW8020A
WorkOrder: 00030718
Lab Batch ID: R11366

Method Blank

RunID: HP_O_000328B-230021 **Units:** ug/Kg
Analysis Date: 03/28/2000 21:26 **Analyst:** FB

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030718-01A	#1 (0-0.5)
00030718-03A	#2 (0-0.5 ft)
00030718-06A	#3 (0-0.5 ft)

Analyte	Result	Rep Limit
Benzene	ND	1.0
Ethylbenzene	ND	1.0
Toluene	ND	1.0
m,p-Xylene	ND	1.0
o-Xylene	ND	1.0
Xylenes,Total	ND	1.0
Surr: 1,4-Difluorobenzene	97.1	59-127
Surr: 4-Bromofluorobenzene	94.7	48-156

Laboratory Control Sample (LCS)

RunID: HP_O_000328B-230018 **Units:** ug/Kg
Analysis Date: 03/28/2000 20:02 **Analyst:** FB

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	51	101	60	116
Ethylbenzene	50	48	96	68	127
Toluene	50	49	98	64	122
m,p-Xylene	100	100	100	68	129
o-Xylene	50	50	100	68	127
Xylenes,Total	150	150	100	68	129

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 0003454-05B
RunID: HP_O_000328B-230019 **Units:** ug/Kg
Analysis Date: 03/28/2000 20:30 **Analyst:** FB

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	27	136	20	28	139	1.84	34	35	139
Ethylbenzene	ND	20	25	124	20	25	125	0.941	35	31	137
Toluene	ND	20	27	133	20	27	133	0.287	28	31	137
m,p-Xylene	ND	40	52	131	40	55	138	5.28	38	19	144
o-Xylene	ND	20	25	127	20	27	136	6.59	57	25	139

Qualifiers:

ND/U - Not Detected at the Reporting Limit
B - Analyte detected in the associated Method Blank
J - Estimated value between MDL and PQL
* - Recovery Outside Advisable QC Limits
D - Recovery Unreportable due to Dilution

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

Quality Control Report

Highlander Environmental Corp

Pogo/SJ Carr TB

Analysis: Purgeable Aromatics
Method: SW8020A
WorkOrder: 00030718
Lab Batch ID: R11366

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 0003454-05B
RunID: HP_O_000328B-230019 Units: ug/Kg
Analysis Date: 03/28/2000 20:30 Analyst: FB

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Xylenes,Total	ND	60	77	128	60	82	137	6.29	38	19	144

Qualifiers:

ND/U - Not Detected at the Reporting Limit
B - Analyte detected in the associated Method Blank
J - Estimated value between MDL and PQL
* - Recovery Outside Advisable QC Limits
D - Recovery Unreportable due to Dilution

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

Quality Control Report

Highlander Environmental Corp

Pogo/SJ Carr TB

Analysis: Chloride, Total
Method: E325.3
WorkOrder: 00030718
Lab Batch ID: R11518

Method Blank

RunID: WET_000330Q-232382 **Units:** mg/Kg
Analysis Date: 03/30/2000 10:15 **Analyst:** CV

Analyte	Result	Rep Limit
Chloride	ND	10

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00030718-01A	#1 (0-0.5)
00030718-02A	#1 (0.5-1.0 ft)
00030718-03A	#2 (0-0.5 ft)
00030718-04A	#2 (0.5-1.0 ft)
00030718-05A	#2 (1.0-2.0 ft)
00030718-06A	#3 (0-0.5 ft)
00030718-07A	#3 (0.5-1.0 ft)

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Sample Spiked: 00030717-01
RunID: WET_000330Q-232386 Units: mg/Kg
Analysis Date: 03/30/2000 10:15 Analyst: CV

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Chloride	18	500	525	102	500	508	98.1	3.51	20	91.8	115

Qualifiers:

ND/U - Not Detected at the Reporting Limit
B - Analyte detected in the associated Method Blank
J - Estimated value between MDL and PQL
* - Recovery Outside Advisable QC Limits
D - Recovery Unreportable due to Dilution

Chain of Custody

And

Sample Receipt Checklist

00030918

Analysis Request and Chain of Custody Record

HIGHLANDER ENVIRONMENTAL CORP.

1910 N. Big Spring St.
Midland, Texas 79705

(915) 682-4559 Fax (915) 682-3946

PAGE: 1 OF: 1

CLIENT NAME: Pogo Producing Co. SITE MANAGER: IKE Tavarez

PROJECT NO.: 1468 PROJECT NAME: Pogo / S.J. Carr TB. Lea County NM.

LAB I.D. NUMBER	DATE	TIME	MATRIX	COMP.	GRAB	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	FILTERED (Y/N)	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	BTEX 8020/602	MTBE 8020/602	8015 MOD. TX1005 (TPH) 418.1	PAH 8270	RCRA Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Metals Ag As Ba Cd Cr Pd Hg Se	TCLP Volatiles	TCLP Semi Volatiles	RCI	GC/MS Vol. 8240/8260/624	GC/MS Semi. Vol. 8270/625	PCB's 8080/608	Pest. 808/608	BOD, TSS, pH, TDS, Chloride	Gamma Spec.	Alpha Beta (Air)	PLM (Asbestos)	Chloride	
	3/23/00		S		G	#1 (0-0.5')	1				I		X		X															X	
			S		G	#1 (0.5-1.0')	1				I				X															X	
			S		G	#2 (0-0.5')	1				I		X		X															X	
			S		G	#2 (0.5-1.0')	1				I				X															X	
			S		G	#2 (1.0-2.0')	1				I				X															X	
			S		G	#3 (0-0.5')	1				I		X		X															X	
			S		G	#3 (0.5'-1.0')	1				I				X															X	

RELINQUISHED BY: (Signature) Date: 3/24/00 Time: 9:00 — RECEIVED BY: (Signature) Date: Time:

SAMPLED BY: (Print & Sign) IKE Tavarez Date: Time:

RELINQUISHED BY: (Signature) Date: Time: — RECEIVED BY: (Signature) Date: Time:

SAMPLE SHIPPED BY: (Circle) FEDEX BUS SL AIRBILL # HAND DELIVERED UPS OTHER:

RELINQUISHED BY: (Signature) SPL. Date: Time: — RECEIVED BY: (Signature) Date: Time:

RECEIVING LABORATORY: ADDRESS: CITY: STATE: ZIP: CONTACT: PHONE:

RECEIVED BY: (Signature) DATE: 3/25/00 TIME:

HIGHLANDER CONTACT PERSON: IKE Tavarez

Results by:

RUSH Charges Authorized: Yes No

SAMPLE CONDITION WHEN RECEIVED:

MATRIX: W-Water A-Air SD-Solid S-Soil SL-Sludge O-Other

REMARKS:

Please Fill out all copies - Laboratory retains yellow copy - Return original copy to Highlander Environmental Corp. - Project Manager retains pink copy - Accounting receives Gold copy.

PHOTOGRAPHIC DOCUMENTATION
POGO - SPILL ASSESSMENT - LEA COUNTY
S. J. Carr Tank Battery

1. View of S. J. Carr Tank Battery.

2. Southeast view of spill area.

PHOTOGRAPHIC DOCUMENTATION
POGO – SPILL ASSESSMENT - LEA COUNTY
S. J. Carr Tank Battery

3. East view of spill area.

4. East view of spill area.

PHOTOGRAPHIC DOCUMENTATION
POGO - SPILL ASSESSMENT - LEA COUNTY
S. J. Carr Tank Battery

5. West view of spill area

6. West view of spill area