



# Highlander Environmental Corp.

Midland, Texas

August 12, 2005

Mr. Larry Johnson  
Environmental Engineer Specialist  
Oil Conservation Division- District I  
1625 N. French Drive  
P. O. Box 1980  
Hobbs, New Mexico 88240

**Re: Closure Report for the Pogo Producing Company, Kelly State Abandoned Blow Down Pit, Located in Section 16, Township 23 South, Range 37 East, Lea County New Mexico.**

Dear Mr. Johnson:

As previously reported, Highlander Environmental Corp. (Highlander) was contacted by Pogo Producing Company (Pogo) to assess and close an abandoned pit located at the Kelly State Lease. The abandoned pit was located approximately 150' northwest of the Pogo/Kelly State Tank Battery. According to the Bureau of Land Management Map, the surface and land minerals are owned by the State of New Mexico (State Lands). The pit location is Unit letter M, Section 16, Township 23 South, Range 37 East, Lea County, New Mexico (Site). The Site is shown in Figure 1.

## Background

Pogo Producing Company recently acquired this lease and noted an abandoned pit, which had been inactive for a number of years. The pit measured 60' x 60' with a bottom depth of 3' to 4' below surface. An approximately 1' to 2' thickness of asphaltic soil was observed in the bottom of the pit. The berm material, around the pit, also appeared to be impacted with hydrocarbon. To properly close the pit, boreholes were installed to define the extent of the impact. A report and work plan titled, "Subsurface Investigation and Work Plan for the Pogo Producing Company, Abandoned Kelly State Blow Down Pit, Located in Section 16, Township 23 South, Range 37 East, Lea County New Mexico, was submitted to the New Mexico Oil Conservation Division (NMOCD) on July 29, 2004.

The work plan proposed to remove and dispose of impacted hydrocarbon material in and around the pit. In order to remove the highest detected chloride, the bottom was to be excavated to a depth 10.0' below pit bottom. All excavated material was to be transported to Sundance Services for disposal, and once the material was removed, the excavation would be backfilled for closure.

## Groundwater and Regulatory

According to the New Mexico State Engineer Office W.A.T.E.R.S. database, Average Depth to Water Report, a well located in Section 16, Township 23 South, Range 37 East, has an average

water level of 115.7

Pogo - 17891  
Facility - PPAC0603837139  
1910 N. Big Spring • Midland, Texas 79705  
Incident - n PAC0603837367  
Application - PPAC0603837471

• (432) 682-4559

• Fax (432) 682-3946

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 remedial 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). Based upon the depth to groundwater, the proposed RRAL for TPH is 5,000 mg/kg.

### **Pit Excavation**

Excavation of the pit began on April 12, 2004 and concluded on April 15, 2005. The excavation dimensions measured approximately 65' x 90' with depths varying from 7' to 12' below ground surface (bgs). Bottom hole and sidewall samples were collected on April 14 and 15, 2005.

All of the samples were collected in laboratory supplied containers and properly preserved during transport. Soil samples were submitted under chain-of-custody control and analyzed for Total Petroleum Hydrocarbons (TPH) by method SW 846 8015B, and Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) by EPA method 602/8021B, and chloride by method SW 846 9253. The soil sample results are summarized in Table 1. The pit excavation and sample locations are shown on Figure 2. The laboratory report and chain of custody are enclosed in Appendix A.

### **Soil Sampling Results**

None of the bottom hole or sidewall samples exceeded the RRAL for TPH or BTEX. All chloride concentrations were well below 1,000 mg/kg, ranging from 49.5 mg/kg to 716 mg/kg. The remaining chloride concentrations were 375 mg/kg or less. As such, the residual chloride in the subsurface should not pose any environmental concern. The excavation was backfilled with clean fill material and a total of 2380 yds<sup>3</sup> of excavated soil was hauled to Sundance Services for disposal.

### **Conclusions**

Based on the assessment, remediation, and confirmatory sampling performed, Pogo requests closure for this site. If you have any questions or comments on the closure report, please call me at (432) 682-4559.

Respectfully submitted,  
Highlander Environmental Corp.



Ike Tavarez, P.G.  
Project Manager/Geologist

cc: Don Riggs – Pogo Producing Company  
Pat Ellis – Pogo Producing Company





# NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

**BILL RICHARDSON**

Governor

**Joanna Prukop**

Cabinet Secretary

**Mark E. Fesmire, P.E.**

Director

**Oil Conservation Division**

February 6, 2006

Mr. Pat Ellis      EllisP@pogoproducing.com  
Pogo Producing Company  
300 N. Marienfield  
Midland, TX 79701-7340

Re:    Kelly State Abandon Blowdown Pit Closure Report  
      Site Location: Sec 16 – T23S - R37E  
      Closure Report Dated: August 12, 2005

Dear Mr. Ellis,

The New Mexico Oil Conservation Division (OCD) reviewed the above referenced report Submitted by your agent, Highlander Environmental Corp. (HEC). Based on information provided, the site requires no further action.

Please be advised that OCD approval does not relieve Pogo Producing Company of responsibility should operations result in pollution of surface water, ground water, or the environment. In addition, OCD approval does not relieve Pogo Producing Company of responsibility for compliance with any federal, state or local laws and/or regulations. If you have any questions or need assistance please call me at (505) 393-6161, x111 or e-mail [larry.johnson@state.nm.us](mailto:larry.johnson@state.nm.us)

Sincerely,

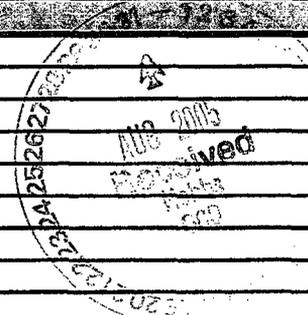
A handwritten signature in cursive script that reads "Larry Johnson".

Larry Johnson - Environmental Engineer

CC:    Wayne Price - Environmental Bureau Chief  
      Chris Williams - District I Supervisor  
      Paul Sheeley- Environmental Engineer

## SITE INFORMATION

General Site Information:	
Site:	Kelly State - Abandoned Blowdown Pit
Company:	Pogo Producing Company (Arch Petroleum)
Section, Township and Range:	Section 16, T23S, R37 E
Unit Letter:	M
Lease Number:	-
County:	Lea
GPS:	32° 18' 3.97", 103° 10' 19.69"
Surface Owner:	State Land
Mineral Owner:	State Land
Directions:	Eunice New Mexico intersection of 18 and 234, go 10.7 miles south near mile marker 21, turn left (east) into lease (gate), go 0.6 miles down lease road and turn left, go 0.5 miles to tank battery. Pit located SE of tank battery.



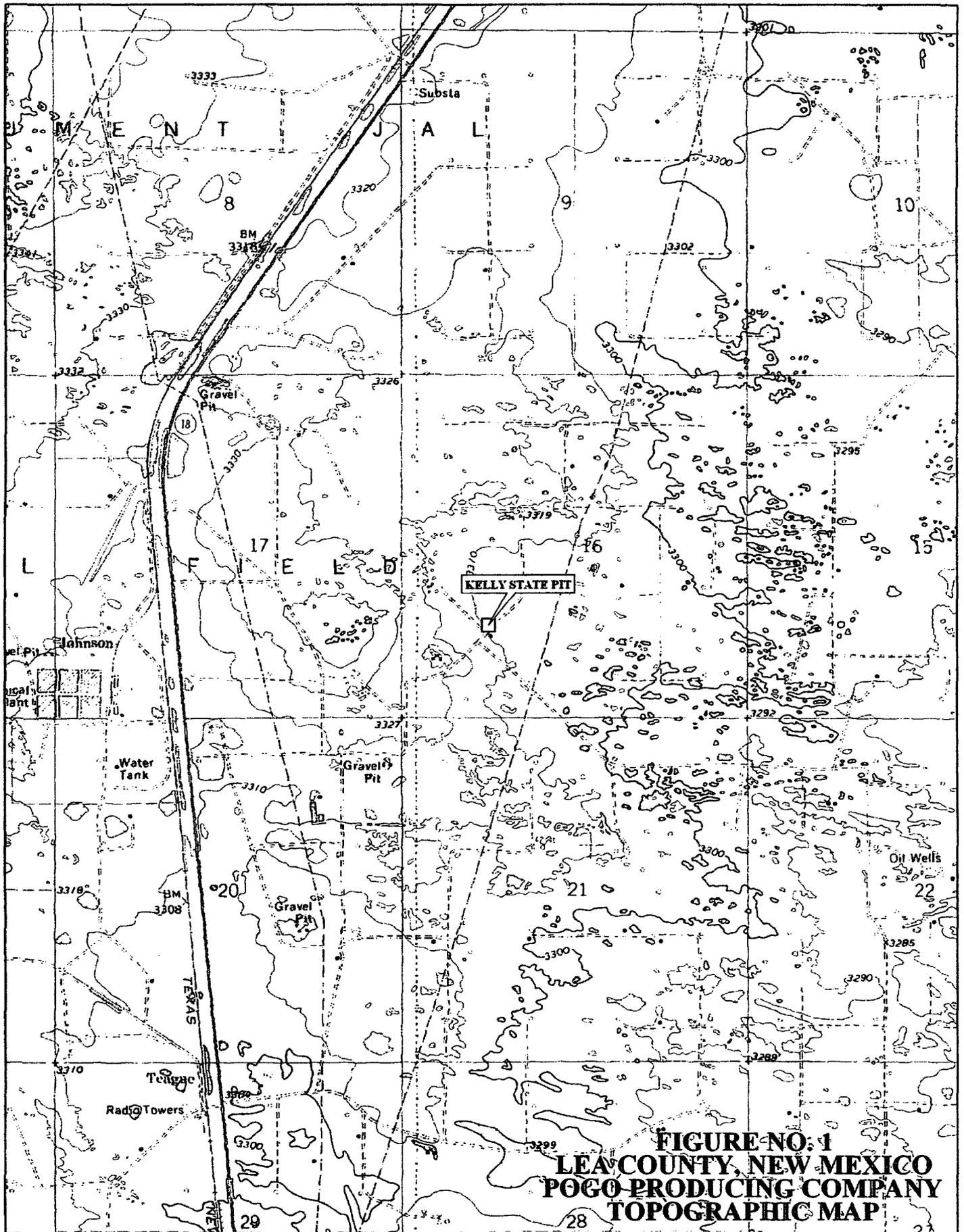
Release Data:	
Date Released:	abandoned pit inactive for a number of years
Type Release:	blowdown pit, impacted with produced water and oil
Source of Contamination:	blowdown pit
Fluid Released:	not known
Fluids Recovered:	-

Official Communication:			
Name:	Pat Ellis	Don Riggs	Ike Tavarez
Company:	Pogo Producing Company	Pogo Producing Company	Highlander Environmental Corp.
Address:	300 N. Marienfeld St.	5 Greenway Plaza, Suite 2700	1910 N. Big Spring
P.O. Box	Box 10340		
City:	Midland Texas, 79701-7340	Houston, Texas 77046	Midland, Texas
Phone number:	(432) 685-8100	(713) 297-5045	(432) 692- 4559
Email:	EllisP@pogoproducing.com	riggsd@pogoproducing.com	itavarez@hec-enviro.com

Ranking Criteria		
<b>Depth to Groundwater:</b>	<b>Ranking Score</b>	<b>Site Data</b>
<50 ft	20	
50-99 ft	10	
>100 ft.	0	Average Depth >100 BS
<b>Wellhead Protection:</b>	<b>Ranking Score</b>	<b>Site Data</b>
Water Source <1,000 ft., Private <200 ft.	20	None
Water Source >1,000 ft., Private >200 ft.	0	
<b>Surface Body of Water:</b>	<b>Ranking Score</b>	<b>Site Data</b>
<200 ft.	20	None
200 ft - 1,000 ft.	10	None
>1,000 ft.	0	
<b>Total Ranking Score:</b>	<b>0</b>	

Acceptable Soil RRAL <sup>2</sup> (mg/kg)		
Benzene	Total BTEX	TPH
10	50	5,000

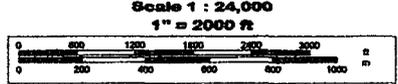
**FIGURES**

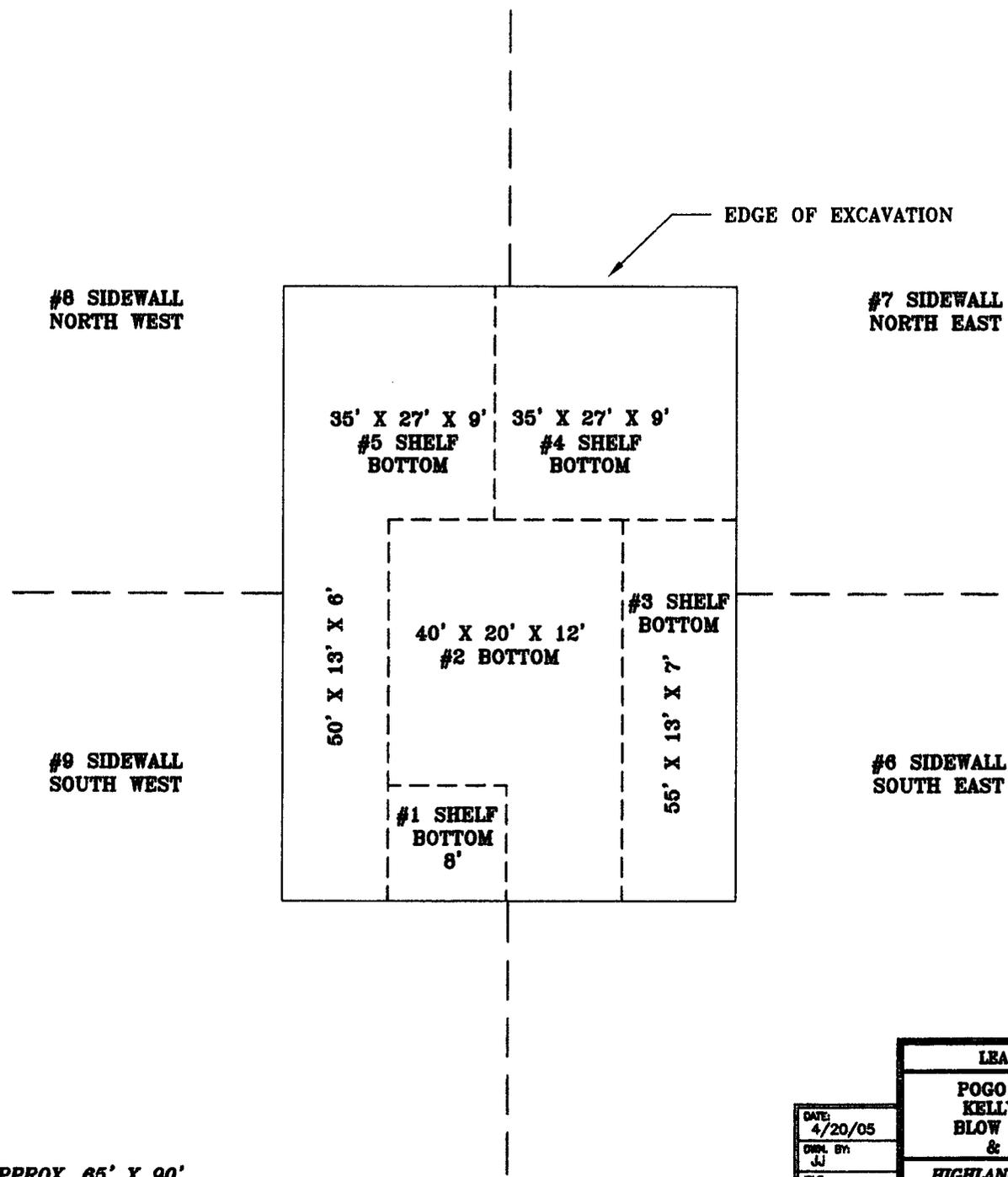


**FIGURE NO: 1  
LEA COUNTY, NEW MEXICO  
POGO-PRODUCING COMPANY  
TOPOGRAPHIC MAP**



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www.delorme.com





EDGE OF EXCAVATION

#8 SIDEWALL  
NORTH WEST

#7 SIDEWALL  
NORTH EAST

35' X 27' X 9'  
#5 SHELF  
BOTTOM

35' X 27' X 9'  
#4 SHELF  
BOTTOM

50' X 13' X 6'

40' X 20' X 12'  
#2 BOTTOM

#3 SHELF  
BOTTOM

55' X 13' X 7'

#9 SIDEWALL  
SOUTH WEST

#6 SIDEWALL  
SOUTH EAST

#1 SHELF  
BOTTOM  
8'

TOTAL EXCAVATED AREA APPROX. 65' X 90'

NOT TO SCALE

FIGURE NO. 2

LEA COUNTY, NEW MEXICO

POGO PRODUCING COMPANY  
KELLY STATE ABANDONED  
BLOW DOWN PIT EXCAVATION  
& SAMPLE LOCATIONS

HIGHLANDER ENVIRONMENTAL CORP.  
MIDLAND, TEXAS

DATE:	4/20/05
DRAWN BY:	JJ
FILE:	04/POGO/2100 KELLY STATE PIT 2

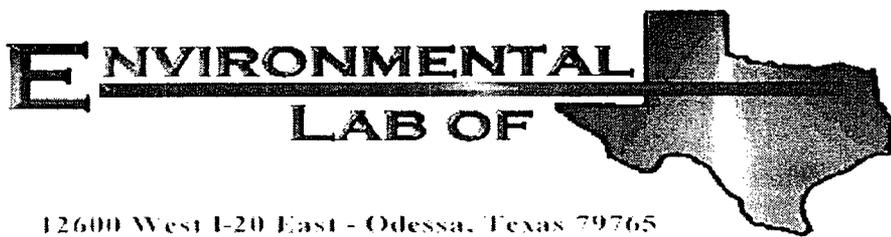
**TABLES**

**Table 1**  
**Pogo Producing Company**  
**Kelly State Abandon Pit**  
**Excavation Sample Results**  
**Lea County, New Mexico**

Sample ID	Sample Depth (ft)	Date Sampled	TPH (mg/kg)			Benzene (mg/kg)	Toluene (mg/kg)	Ethlybenzene (mg/kg)	Xylene (mg/kg)	Chloride (mg/kg)
			C6-C12	C12-C35	Total					
#1 bottom shelf	8.0	4/14/2005	<25.0	188	<b>188</b>	<0.025	<0.025	<0.025	<0.025	716
#2 bottom	12.0	4/14/2005	17.9	149	<b>167</b>	<0.025	<0.025	<0.025	<0.025	373
#3 bottom shelf	7.0	4/15/2005	<25.0	29.9	<b>29.9</b>	<0.025	<0.025	<0.025	<0.025	199
#4 bottom shelf	9.0	4/15/2005	241	1,400	<b>1,640</b>	<0.025	<0.025	<b>0.0808</b>	<b>0.4739</b>	274
#5 bottom shelf	9.0	4/15/2005	782	3,660	<b>4,440</b>	<0.025	<b>0.0435</b>	<b>0.160</b>	<b>0.887</b>	375
#6 sidewall	composite	4/15/2005	<25.0	99.9	<b>99.9</b>	<0.025	<0.025	<0.025	<0.025	90.7
#7 sidewall	composite	4/15/2005	<25.0	310	<b>310</b>	<0.025	<0.025	<0.025	<0.025	49.5
#8 sidewall	composite	4/15/2005	<25.0	<25.0	<25.0	<0.025	<0.025	<0.025	<0.025	105
#9 sidewall	composite	4/15/2005	196	1,620	<b>1,820</b>	<0.025	<0.025	<0.025	<0.025	84.9

(<25.0 and <0.025) - Analyte not detected at or above the reporting limit  
(NA): Not Analyzed

**APPENDIX A**



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: Pogo/ Kelly State Pit

Project Number: 2159

Location: Lea County, NM

Lab Order Number: 5D15015

Report Date: 04/20/05

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

Project: Pogo/ Kelly State Pit  
Project Number: 2159  
Project Manager: Ike Tavaréz

Fax: (432) 682-3946  
Reported:  
04/20/05 12:32

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Composite #1 (8.0') Shelf	5D15015-01	Soil	04/14/05 12:00	04/15/05 16:50
Composite #2 (12.0') Bottom	5D15015-02	Soil	04/14/05 12:30	04/15/05 16:50
Composite #3 (7.0') Shelf	5D15015-03	Soil	04/15/05 13:00	04/15/05 16:50
Composite #4 (9.0') Shelf	5D15015-04	Soil	04/15/05 13:05	04/15/05 16:50
Composite #5 (9.0') Shelf	5D15015-05	Soil	04/15/05 13:10	04/15/05 16:50
Composite #6 Side Wall	5D15015-06	Soil	04/15/05 13:15	04/15/05 16:50
Composite #7 Side Wall	5D15015-07	Soil	04/15/05 13:20	04/15/05 16:50
Composite #8 Side Wall	5D15015-08	Soil	04/15/05 13:25	04/15/05 16:50
Composite #9 Side Wall	5D15015-09	Soil	04/15/05 13:30	04/15/05 16:50

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Fax: (432) 682-3946  
Reported:  
04/20/05 12:32

**Organics by GC**  
**Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Composite #1 (8.0') Shelf (5D15015-01) Soil</b>									
Benzene	ND	0.0250	mg/kg dry	25	ED51911	04/19/05	04/19/05	EPA 8021B	
Toluene	ND	0.0250	"	"	"	"	"	"	
Ethylbenzene	ND	0.0250	"	"	"	"	"	"	
Xylene (p/m)	ND	0.0250	"	"	"	"	"	"	
Xylene (o)	ND	0.0250	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		114 %	80-120		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		105 %	80-120		"	"	"	"	
Gasoline Range Organics C6-C12	ND	10.0	mg/kg dry	1	ED51904	04/18/05	04/18/05	EPA 8015M	
<b>Diesel Range Organics &gt;C12-C35</b>	<b>188</b>	10.0	"	"	"	"	"	"	
<b>Total Hydrocarbon C6-C35</b>	<b>188</b>	10.0	"	"	"	"	"	"	
<i>Surrogate: 1-Chlorooctane</i>		90.8 %	70-130		"	"	"	"	
<i>Surrogate: 1-Chlorooctadecane</i>		93.2 %	70-130		"	"	"	"	
<b>Composite #2 (12.0') Bottom (5D15015-02) Soil</b>									
Benzene	ND	0.0250	mg/kg dry	25	ED51911	04/19/05	04/19/05	EPA 8021B	
Toluene	ND	0.0250	"	"	"	"	"	"	
Ethylbenzene	ND	0.0250	"	"	"	"	"	"	
Xylene (p/m)	ND	0.0250	"	"	"	"	"	"	
Xylene (o)	ND	0.0250	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		105 %	80-120		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		86.4 %	80-120		"	"	"	"	
Gasoline Range Organics C6-C12	17.9	10.0	mg/kg dry	1	ED51904	04/18/05	04/18/05	EPA 8015M	
<b>Diesel Range Organics &gt;C12-C35</b>	<b>149</b>	10.0	"	"	"	"	"	"	
<b>Total Hydrocarbon C6-C35</b>	<b>167</b>	10.0	"	"	"	"	"	"	
<i>Surrogate: 1-Chlorooctane</i>		81.4 %	70-130		"	"	"	"	
<i>Surrogate: 1-Chlorooctadecane</i>		81.8 %	70-130		"	"	"	"	
<b>Composite #3 (7.0') Shelf (5D15015-03) Soil</b>									
Benzene	ND	0.0250	mg/kg dry	25	ED51911	04/19/05	04/19/05	EPA 8021B	
Toluene	ND	0.0250	"	"	"	"	"	"	
Ethylbenzene	ND	0.0250	"	"	"	"	"	"	
Xylene (p/m)	ND	0.0250	"	"	"	"	"	"	
Xylene (o)	ND	0.0250	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		113 %	80-120		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		90.6 %	80-120		"	"	"	"	
Gasoline Range Organics C6-C12	ND	10.0	mg/kg dry	1	ED51904	04/18/05	04/18/05	EPA 8015M	
<b>Diesel Range Organics &gt;C12-C35</b>	<b>29.9</b>	10.0	"	"	"	"	"	"	
<b>Total Hydrocarbon C6-C35</b>	<b>29.9</b>	10.0	"	"	"	"	"	"	

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.*

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

Project: Pogo/ Kelly State Pit  
Project Number: 2159  
Project Manager: Ike Tavarez

Fax: (432) 682-3946  
Reported:  
04/20/05 12:32

**Organics by GC**  
**Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Composite #3 (7.0') Shelf (5D15015-03) Soil</b>									
Surrogate: 1-Chlorooctane		86.6 %	70-130		ED51904	04/18/05	04/18/05	EPA 8015M	
Surrogate: 1-Chlorooctadecane		88.6 %	70-130		"	"	"	"	
<b>Composite #4 (9.0') Shelf (5D15015-04) Soil</b>									
Benzene	ND	0.0250	mg/kg dry	25	ED51911	04/19/05	04/19/05	EPA 8021B	
Toluene	J [0.0165]	0.0250	"	"	"	"	"	"	J
Ethylbenzene	0.0808	0.0250	"	"	"	"	"	"	
Xylene (p/m)	0.379	0.0250	"	"	"	"	"	"	
Xylene (o)	0.0949	0.0250	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		117 %	80-120		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	80-120		"	"	"	"	
Gasoline Range Organics C6-C12	241	10.0	mg/kg dry	1	ED51904	04/18/05	04/19/05	EPA 8015M	
Diesel Range Organics >C12-C35	1400	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	1640	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		96.8 %	70-130		"	"	"	"	
Surrogate: 1-Chlorooctadecane		97.2 %	70-130		"	"	"	"	
<b>Composite #5 (9.0') Shelf (5D15015-05) Soil</b>									
Benzene	ND	0.0250	mg/kg dry	25	ED51911	04/19/05	04/19/05	EPA 8021B	
Toluene	0.0435	0.0250	"	"	"	"	"	"	
Ethylbenzene	0.160	0.0250	"	"	"	"	"	"	
Xylene (p/m)	0.721	0.0250	"	"	"	"	"	"	
Xylene (o)	0.166	0.0250	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		117 %	80-120		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		111 %	80-120		"	"	"	"	
Gasoline Range Organics C6-C12	782	10.0	mg/kg dry	1	ED51904	04/18/05	04/19/05	EPA 8015M	
Diesel Range Organics >C12-C35	3660	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	4440	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		92.4 %	70-130		"	"	"	"	
Surrogate: 1-Chlorooctadecane		88.2 %	70-130		"	"	"	"	

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

Project: Pogo/ Kelly State Pit  
Project Number: 2159  
Project Manager: Ike Tavarez

Fax: (432) 682-3946  
Reported:  
04/20/05 12:32

**Organics by GC**  
**Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Composite #6 Side Wall (5D15015-06) Soil</b>									
Benzene	ND	0.0250	mg/kg dry	25	ED51911	04/19/05	04/19/05	EPA 8021B	
Toluene	ND	0.0250	"	"	"	"	"	"	
Ethylbenzene	ND	0.0250	"	"	"	"	"	"	
Xylene (p/m)	ND	0.0250	"	"	"	"	"	"	
Xylene (o)	ND	0.0250	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		112 %	80-120		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		105 %	80-120		"	"	"	"	
Gasoline Range Organics C6-C12	ND	10.0	mg/kg dry	1	ED51904	04/18/05	04/19/05	EPA 8015M	
<b>Diesel Range Organics &gt;C12-C35</b>	<b>99.9</b>	10.0	"	"	"	"	"	"	
<b>Total Hydrocarbon C6-C35</b>	<b>99.9</b>	10.0	"	"	"	"	"	"	
<i>Surrogate: 1-Chlorooctane</i>		91.4 %	70-130		"	"	"	"	
<i>Surrogate: 1-Chlorooctadecane</i>		92.4 %	70-130		"	"	"	"	
<b>Composite #7 Side Wall (5D15015-07) Soil</b>									
Benzene	ND	0.0250	mg/kg dry	25	ED51911	04/19/05	04/19/05	EPA 8021B	
Toluene	ND	0.0250	"	"	"	"	"	"	
Ethylbenzene	ND	0.0250	"	"	"	"	"	"	
Xylene (p/m)	ND	0.0250	"	"	"	"	"	"	
Xylene (o)	ND	0.0250	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		110 %	80-120		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		94.5 %	80-120		"	"	"	"	
Gasoline Range Organics C6-C12	ND	10.0	mg/kg dry	1	ED51905	04/18/05	04/19/05	EPA 8015M	
<b>Diesel Range Organics &gt;C12-C35</b>	<b>310</b>	10.0	"	"	"	"	"	"	
<b>Total Hydrocarbon C6-C35</b>	<b>310</b>	10.0	"	"	"	"	"	"	
<i>Surrogate: 1-Chlorooctane</i>		85.8 %	70-130		"	"	"	"	
<i>Surrogate: 1-Chlorooctadecane</i>		89.8 %	70-130		"	"	"	"	
<b>Composite #8 Side Wall (5D15015-08) Soil</b>									
Benzene	ND	0.0250	mg/kg dry	25	ED51911	04/19/05	04/19/05	EPA 8021B	
Toluene	ND	0.0250	"	"	"	"	"	"	
Ethylbenzene	ND	0.0250	"	"	"	"	"	"	
Xylene (p/m)	ND	0.0250	"	"	"	"	"	"	
Xylene (o)	ND	0.0250	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		112 %	80-120		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		95.0 %	80-120		"	"	"	"	
Gasoline Range Organics C6-C12	ND	10.0	mg/kg dry	1	ED51905	04/18/05	04/19/05	EPA 8015M	
Diesel Range Organics >C12-C35	ND	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	ND	10.0	"	"	"	"	"	"	

Environmental Lab of Texas

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

Project: Pogo/ Kelly State Pit  
 Project Number: 2159  
 Project Manager: Ike Tavaréz

Fax: (432) 682-3946  
 Reported:  
 04/20/05 12:32

**Organics by GC**  
**Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Composite #8 Side Wall (5D15015-08) Soil</b>									
<i>Surrogate: 1-Chlorooctane</i>		81.2 %	70-130		ED51905	04 18 05	04 19 05	EPA 8015M	
<i>Surrogate: 1-Chlorooctadecane</i>		83.2 %	70-130		"	"	"	"	
<b>Composite #9 Side Wall (5D15015-09) Soil</b>									
Benzene	ND	0.0250	mg/kg dry	25	ED51911	04/19/05	04/19/05	EPA 8021B	
Toluene	ND	0.0250	"	"	"	"	"	"	
Ethylbenzene	ND	0.0250	"	"	"	"	"	"	
Xylene (p/m)	ND	0.0250	"	"	"	"	"	"	
Xylene (o)	ND	0.0250	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		118 %	80-120		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		84.9 %	80-120		"	"	"	"	
<b>Gasoline Range Organics C6-C12</b>	<b>196</b>	10.0	mg/kg dry	1	ED51905	04/18/05	04/19/05	EPA 8015M	
<b>Diesel Range Organics &gt;C12-C35</b>	<b>1620</b>	10.0	"	"	"	"	"	"	
<b>Total Hydrocarbon C6-C35</b>	<b>1820</b>	10.0	"	"	"	"	"	"	
<i>Surrogate: 1-Chlorooctane</i>		87.6 %	70-130		"	"	"	"	
<i>Surrogate: 1-Chlorooctadecane</i>		96.4 %	70-130		"	"	"	"	

Highlander Environmental Corp.  
1910 N. Big Spring St.  
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Project: Pogo/ Kelly State Pit  
Project Number: 2159  
Project Manager: Ike Tavarez

Fax: (432) 682-3946  
Reported:  
04/20/05 12:32

**General Chemistry Parameters by EPA / Standard Methods  
Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Composite #1 (8.0') Shelf (5D15015-01) Soil</b>									
Chloride	716	50.0	mg/kg	100	ED52011	04/18/05	04/18/05	EPA 300.0	
% Moisture	11.0	0.1	%	1	ED51907	04/18/05	04/19/05	% calculation	
<b>Composite #2 (12.0') Bottom (5D15015-02) Soil</b>									
Chloride	373	20.0	mg/kg	40	ED52011	04/18/05	04/18/05	EPA 300.0	
% Moisture	8.9	0.1	%	1	ED51907	04/18/05	04/19/05	% calculation	
<b>Composite #3 (7.0') Shelf (5D15015-03) Soil</b>									
Chloride	199	10.0	mg/kg	20	ED52011	04/18/05	04/18/05	EPA 300.0	
% Moisture	10.3	0.1	%	1	ED51907	04/18/05	04/19/05	% calculation	
<b>Composite #4 (9.0') Shelf (5D15015-04) Soil</b>									
Chloride	274	10.0	mg/kg	20	ED52011	04/18/05	04/18/05	EPA 300.0	
% Moisture	9.6	0.1	%	1	ED51907	04/18/05	04/19/05	% calculation	
<b>Composite #5 (9.0') Shelf (5D15015-05) Soil</b>									
Chloride	375	10.0	mg/kg	20	ED52011	04/18/05	04/18/05	EPA 300.0	
% Moisture	7.4	0.1	%	1	ED51907	04/18/05	04/19/05	% calculation	
<b>Composite #6 Side Wall (5D15015-06) Soil</b>									
Chloride	90.7	10.0	mg/kg	20	ED52013	04/19/05	04/19/05	EPA 300.0	
% Moisture	7.8	0.1	%	1	ED51907	04/18/05	04/19/05	% calculation	
<b>Composite #7 Side Wall (5D15015-07) Soil</b>									
Chloride	49.5	5.00	mg/kg	10	ED52013	04/19/05	04/19/05	EPA 300.0	
% Moisture	8.9	0.1	%	1	ED51907	04/18/05	04/19/05	% calculation	
<b>Composite #8 Side Wall (5D15015-08) Soil</b>									
Chloride	105	5.00	mg/kg	10	ED52013	04/19/05	04/19/05	EPA 300.0	
% Moisture	5.7	0.1	%	1	ED51907	04/18/05	04/19/05	% calculation	

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

Project: Pogo/ Kelly State Pit  
Project Number: 2159  
Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported:  
04/20/05 12:32

**General Chemistry Parameters by EPA / Standard Methods**  
**Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Composite #9 Side Wall (5D15015-09) Soil</b>									
Chloride	84.9	5.00	mg/kg	10	ED52013	04/19/05	04/19/05	EPA 300.0	
% Moisture	5.3	0.1	%	1	ED51907	04/18/05	04/19/05	% calculation	

Highlander Environmental Corp.  
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Reported:  
04/20/05 12:32

**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
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**Batch ED51904 - Solvent Extraction (GC)**

**Blank (ED51904-BLK1)**

Prepared & Analyzed: 04/18/05

Gasoline Range Organics C6-C12	ND	10.0	mg/kg wet							
Diesel Range Organics >C12-C35	ND	10.0	"							
Total Hydrocarbon C6-C35	ND	10.0	"							
Surrogate: 1-Chlorooctane	37.8		mg/kg	50.0		75.6	70-130			
Surrogate: 1-Chlorooctadecane	36.0		"	50.0		72.0	70-130			

**LCS (ED51904-BS1)**

Prepared & Analyzed: 04/18/05

Gasoline Range Organics C6-C12	431	10.0	mg/kg wet	500		86.2	75-125			
Diesel Range Organics >C12-C35	537	10.0	"	500		107	75-125			
Total Hydrocarbon C6-C35	968	10.0	"	1000		96.8	75-125			
Surrogate: 1-Chlorooctane	46.1		mg/kg	50.0		92.2	70-130			
Surrogate: 1-Chlorooctadecane	40.7		"	50.0		81.4	70-130			

**Calibration Check (ED51904-CCV1)**

Prepared & Analyzed: 04/18/05

Gasoline Range Organics C6-C12	430		mg/kg	500		86.0	80-120			
Diesel Range Organics >C12-C35	547		"	500		109	80-120			
Total Hydrocarbon C6-C35	977		"	1000		97.7	80-120			
Surrogate: 1-Chlorooctane	55.8		"	50.0		112	70-130			
Surrogate: 1-Chlorooctadecane	64.7		"	50.0		129	70-130			

**Matrix Spike (ED51904-MS1)**

Source: 5D15005-03

Prepared & Analyzed: 04/18/05

Gasoline Range Organics C6-C12	511	10.0	mg/kg dry	543	ND	94.1	75-125			
Diesel Range Organics >C12-C35	520	10.0	"	543	23.1	91.5	75-125			
Total Hydrocarbon C6-C35	1050	10.0	"	1090	23.1	92.4	75-125			
Surrogate: 1-Chlorooctane	47.5		mg/kg	50.0		95.0	70-130			
Surrogate: 1-Chlorooctadecane	42.7		"	50.0		85.4	70-130			

**Matrix Spike Dup (ED51904-MSD1)**

Source: 5D15005-03

Prepared & Analyzed: 04/18/05

Gasoline Range Organics C6-C12	476	10.0	mg/kg dry	543	ND	87.7	75-125	7.09	20	
Diesel Range Organics >C12-C35	569	10.0	"	543	23.1	101	75-125	9.00	20	
Total Hydrocarbon C6-C35	1040	10.0	"	1090	23.1	93.3	75-125	0.966	20	
Surrogate: 1-Chlorooctane	49.0		mg/kg	50.0		98.0	70-130			
Surrogate: 1-Chlorooctadecane	43.8		"	50.0		87.6	70-130			

Environmental Lab of Texas

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

Project: Pogo/ Kelly State Pit  
Project Number: 2159  
Project Manager: Ike Tavaraz

Fax: (432) 682-3946  
Reported:  
04/20/05 12:32

**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
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**Batch ED51905 - Solvent Extraction (GC)**

<b>Blank (ED51905-BLK1)</b>										
										Prepared & Analyzed: 04/18/05
Gasoline Range Organics C6-C12	ND	10.0	mg/kg wet							
Diesel Range Organics >C12-C35	ND	10.0	"							
Total Hydrocarbon C6-C35	ND	10.0	"							
Surrogate: 1-Chlorooctane	37.7		mg/kg	50.0		75.4	70-130			
Surrogate: 1-Chlorooctadecane	36.8		"	50.0		73.6	70-130			

<b>LCS (ED51905-BS1)</b>										
										Prepared & Analyzed: 04/18/05
Gasoline Range Organics C6-C12	381	10.0	mg/kg wet	500		76.2	75-125			
Diesel Range Organics >C12-C35	462	10.0	"	500		92.4	75-125			
Total Hydrocarbon C6-C35	843	10.0	"	1000		84.3	75-125			
Surrogate: 1-Chlorooctane	41.3		mg/kg	50.0		82.6	70-130			
Surrogate: 1-Chlorooctadecane	36.0		"	50.0		72.0	70-130			

<b>Calibration Check (ED51905-CCV1)</b>										
										Prepared & Analyzed: 04/18/05
Gasoline Range Organics C6-C12	457		mg/kg	500		91.4	80-120			
Diesel Range Organics >C12-C35	446		"	500		89.2	80-120			
Total Hydrocarbon C6-C35	903		"	1000		90.3	80-120			
Surrogate: 1-Chlorooctane	62.8		"	50.0		126	70-130			
Surrogate: 1-Chlorooctadecane	64.6		"	50.0		129	70-130			

<b>Matrix Spike (ED51905-MS1)</b>										
										Source: 5D15015-08
										Prepared: 04/18/05 Analyzed: 04/19/05
Gasoline Range Organics C6-C12	551	10.0	mg/kg dry	530	ND	100	75-125			
Diesel Range Organics >C12-C35	579	10.0	"	530	ND	109	75-125			
Total Hydrocarbon C6-C35	1110	10.0	"	1060	ND	105	75-125			
Surrogate: 1-Chlorooctane	53.0		mg/kg	50.0		106	70-130			
Surrogate: 1-Chlorooctadecane	44.9		"	50.0		89.8	70-130			

<b>Matrix Spike Dup (ED51905-MSD1)</b>										
										Source: 5D15015-08
										Prepared: 04/18/05 Analyzed: 04/19/05
Gasoline Range Organics C6-C12	511	10.0	mg/kg dry	530	ND	96.4	75-125	3.84	20	
Diesel Range Organics >C12-C35	541	10.0	"	530	ND	102	75-125	6.79	20	
Total Hydrocarbon C6-C35	1050	10.0	"	1060	ND	99.1	75-125	5.56	20	
Surrogate: 1-Chlorooctane	53.6		mg/kg	50.0		107	70-130			
Surrogate: 1-Chlorooctadecane	45.4		"	50.0		90.8	70-130			

Highlander Environmental Corp.  
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Project Manager: Ike Tavaraz

Fax: (432) 682-3946

Reported:  
04/20/05 12:32

**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
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**Batch ED51911 - EPA 5030C (GC)**

**Blank (ED51911-BLK1)**

Prepared & Analyzed: 04/19/05

Benzene	ND	0.0250	mg/kg wet							
Toluene	ND	0.0250	"							
Ethylbenzene	ND	0.0250	"							
Xylene (p/m)	ND	0.0250	"							
Xylene (o)	ND	0.0250	"							
Surrogate: a,a,a-Trifluorotoluene	110		ug/kg	100		110	80-120			
Surrogate: 4-Bromofluorobenzene	111		"	100		111	80-120			

**LCS (ED51911-BS1)**

Prepared & Analyzed: 04/19/05

Benzene	101		ug/kg	100		101	80-120			
Toluene	106		"	100		106	80-120			
Ethylbenzene	110		"	100		110	80-120			
Xylene (p/m)	239		"	200		120	80-120			
Xylene (o)	116		"	100		116	80-120			
Surrogate: a,a,a-Trifluorotoluene	112		"	100		112	80-120			
Surrogate: 4-Bromofluorobenzene	116		"	100		116	80-120			

**Calibration Check (ED51911-CCV1)**

Prepared: 04/19/05 Analyzed: 04/20/05

Benzene	99.5		ug/kg	100		99.5	80-120			
Toluene	101		"	100		101	80-120			
Ethylbenzene	94.1		"	100		94.1	80-120			
Xylene (p/m)	209		"	200		104	80-120			
Xylene (o)	102		"	100		102	80-120			
Surrogate: a,a,a-Trifluorotoluene	116		"	100		116	80-120			
Surrogate: 4-Bromofluorobenzene	99.7		"	100		99.7	80-120			

**Matrix Spike (ED51911-MS1)**

Source: 5D19001-04

Prepared & Analyzed: 04/19/05

Benzene	95.0		ug/kg	100	ND	95.0	80-120			
Toluene	96.2		"	100	ND	96.2	80-120			
Ethylbenzene	94.2		"	100	ND	94.2	80-120			
Xylene (p/m)	210		"	200	ND	105	80-120			
Xylene (o)	99.9		"	100	ND	99.9	80-120			
Surrogate: a,a,a-Trifluorotoluene	110		"	100		110	80-120			
Surrogate: 4-Bromofluorobenzene	108		"	100		108	80-120			

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

Project: Pogo/ Kelly State Pit  
 Project Number: 2159  
 Project Manager: Ike Tavaréz

Fax: (432) 682-3946

Reported:  
 04/20/05 12:32

**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
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**Batch ED51911 - EPA 5030C (GC)**

**Matrix Spike Dup (ED51911-MSD1)**

Source: 5D19001-04

Prepared & Analyzed: 04/19/05

Benzene	104		ug/kg	100	ND	104	80-120	9.05	20	
Toluene	110		"	100	ND	110	80-120	13.4	20	
Ethylbenzene	110		"	100	ND	110	80-120	15.5	20	
Xylene (p/m)	238		"	200	ND	119	80-120	12.5	20	
Xylene (o)	116		"	100	ND	116	80-120	14.9	20	
Surrogate: <i>a,a</i> -Trifluorotoluene	117		"	100		117	80-120			
Surrogate: 4-Bromofluorobenzene	113		"	100		113	80-120			

Highlander Environmental Corp. 1910 N. Big Spring St Midland TX, 79705	Project: Pogo/ Kelly State Pit Project Number: 2159 Project Manager: Ike Tavaraz	Fax: (432) 682-3946  Reported: 04/20/05 12:32
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**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
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**Batch ED51907 - General Preparation (Prep)**

<b>Blank (ED51907-BLK1)</b>				Prepared: 04/18/05 Analyzed: 04/19/05						
% Moisture	ND	0.1	%							
<b>Duplicate (ED51907-DUP1)</b>				Prepared: 04/18/05 Analyzed: 04/19/05						
<b>Source: 5D15005-01</b>										
% Moisture	10.7	0.1	%		10.2			4.78	20	

**Batch ED52011 - Water Extraction**

<b>Blank (ED52011-BLK1)</b>				Prepared & Analyzed: 04/18/05						
Chloride	ND	0.500	mg/kg							
<b>LCS (ED52011-BS1)</b>				Prepared & Analyzed: 04/18/05						
Chloride	10.7		mg/L	10.0		107	80-120			
<b>Calibration Check (ED52011-CCV1)</b>				Prepared & Analyzed: 04/18/05						
Chloride	10.9		mg/L	10.0		109	80-120			
<b>Duplicate (ED52011-DUP1)</b>				Prepared & Analyzed: 04/18/05						
<b>Source: 5D14016-05</b>										
Chloride	30.8	5.00	mg/kg		35.9			15.5	20	

**Batch ED52013 - Water Extraction**

<b>Blank (ED52013-BLK1)</b>				Prepared & Analyzed: 04/19/05						
Chloride	ND	0.500	mg/kg							
<b>LCS (ED52013-BS1)</b>				Prepared & Analyzed: 04/19/05						
Chloride	10.8		mg/L	10.0		108	80-120			



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Fax: (432) 682-3946

Reported:  
04/20/05 12:32

### Notes and Definitions

J Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the 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 Tuttle*

Date:

4/20/2005

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



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

Client: Highlander Env.

Date/Time: 04-15-05 @ 1650

Order #: 5 D15015

Initials: JMM

### Sample Receipt Checklist

Temperature of container/cooler?	<input checked="" type="radio"/> Yes	No	4.0	C
Shipping container/cooler in good condition?	<input checked="" type="radio"/> Yes	No		
Custody Seals intact on shipping container/cooler?	<input checked="" type="radio"/> Yes	No	Not present	
Custody Seals intact on sample bottles?	<input checked="" type="radio"/> Yes	No	Not present	
Chain of custody present?	<input checked="" type="radio"/> Yes	No		
Sample Instructions complete on Chain of Custody?	<input checked="" type="radio"/> Yes	No		
Chain of Custody signed when relinquished and received?	<input checked="" type="radio"/> Yes	No		
Chain of custody agrees with sample label(s)	<input checked="" type="radio"/> Yes	No		
Container labels legible and intact?	<input checked="" type="radio"/> Yes	No		
Sample Matrix and properties same as on chain of custody?	<input checked="" type="radio"/> Yes	No		
Samples in proper container/bottle?	<input checked="" type="radio"/> Yes	No		
Samples properly preserved?	<input checked="" type="radio"/> Yes	No		
Sample bottles intact?	<input checked="" type="radio"/> Yes	No		
Preservations documented on Chain of Custody?	<input checked="" type="radio"/> Yes	No		
Containers documented on Chain of Custody?	<input checked="" type="radio"/> Yes	No		
Sufficient sample amount for indicated test?	<input checked="" type="radio"/> Yes	No		
All samples received within sufficient hold time?	<input checked="" type="radio"/> Yes	No		
VOC samples have zero headspace?	<input checked="" type="radio"/> Yes	No	Not Applicable	

Other observations:

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#### Variance Documentation:

Contact Person: - \_\_\_\_\_ Date/Time: \_\_\_\_\_ Contacted by: \_\_\_\_\_  
Regarding: \_\_\_\_\_

Corrective Action Taken:

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