



# Highlander Environmental Corp.

Midland, Texas

July 7, 2004

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

HOBBS  
1-RP-0018  
"



**RE: Assessment and Closure Report for the Pogo Producing Company, Livingston Ridge 19 Federal #1 Tank Battery, Located 660' FNL, 330 FWL, Section 19, Township 22 South, Range 32 East, Lea County, New Mexico**

Dear Mr. Johnson:

Highlander Environmental Corp. (Highlander) was contacted by Pogo Producing Company (Pogo) to assess a spill on the Livingston Ridge 19 Federal #1 Tank Battery located in Section 19, Township 22 South, Range 32 East, Lea County, New Mexico (Site). The State of New Mexico C-141 (Initial) is shown in Appendix A. The Site is shown in Figure 1.

## Background

According to the State of New Mexico C-141 report, the spill occurred on May 16, 2004 when the Love-Joy coupling on the water transfer pump broke, and ran the tanks over inside the facility dike. The spill released approximately 150 barrels of oil and water and 136 barrels was recovered by vacuum truck. The spill was contained inside facility dike. The spill area is shown on Figure 2.

## Groundwater and Regulatory

According to published data from "Geology and Groundwater Resources of Lea County, New Mexico", dated 1952, no water wells were reported in Township 22 South, Range 32 East. The New Mexico State Engineer Office database did show two wells in Section 14 and one in Section 19, Township 22 South, Range 32 East, with water levels of 340', 360' and 280', respectively. The well records are shown in Appendix B.

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.

### **Assessment**

On May 17, 2004, Highlander personnel installed a total of six (6) auger holes using a stainless steel, bucket-type hand auger to evaluate and delineate the extent of impacted soil. The location of the auger holes are shown in Figure 2. The spill was contained inside the facility dike, which measures 18' x 60' on the east end and 35' x 40' on the west end. Soil samples were collected at selected depth intervals for TPH evaluation by method 8015M, BTEX by method 8021B and chloride by method SW 846-9252. The soil sample results are shown in Table 1. The laboratory reports and chain of custody documentation are included in Appendix C.

### **Soil Sample Results**

Referring to Table 1, the hydrocarbon impact appeared to be shallow and limited to the areas around AH-2, AH-5 and AH-6. TPH concentrations exceeded the RRAL on the 0-0.5' samples at AH-2 and AH-6, and extended to 2.0'-2.5' at the AH-5 location. The 1.0'-1.5' samples from AH-2 and AH-6 and the 3.0'-3.5' sample from AH-5 were all well below the RRAL. Chloride concentrations appeared to be elevated primarily in the shallow soils. Deeper chloride concentrations decreased to what would appear to be background levels, with the exception of AH-4, which had a chloride concentration of 872 mg/kg at 2.0'-2.5'. On June 24, 2004, Highlander collected additional soil samples from the area of AH-4 to delineate the chloride impact. The soil samples at 4-4.5' and 5-5.5' did show a significant chloride decline with depth of 383 mg/kg and 170 mg/kg, respectively.

### **Site Remediation**

Based upon the results of sampling, on June 24, 2004, Highlander supervised the removal for the soils impacted above the RRAL. The areas of AH-2, AH-5 and AH-6 were excavated and the soils were transported to Sundance Services in Eunice, New Mexico for proper disposal. The areas of AH-2 and AH-5 were excavated to a depth of 1.0' below surface and AH-5 area was excavated to a depth of 3.0' below surface. The excavated areas were backfilled with clean fill material.

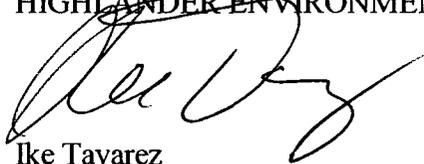
### **Conclusions and Recommendation**

The hydrocarbon impact detected appeared to be shallow and only found in the areas of AH-2, AH-5 and AH-6. The chloride concentrations were confined mainly to shallow surface soils and the majority of these soils were removed with hydrocarbon impacted soils. Chloride impact in the vicinity of AH-4 decreases dramatically with depth. Considering the limited area and the depth to groundwater, the chloride concentrations do not appear to be an environmental concern.



Based upon the work performed on this spill area, Pogo requests closure of this site. If you require any additional information or have any questions or comments concerning the assessment report, please call.

HIGHLANDER ENVIRONMENTAL CORP,

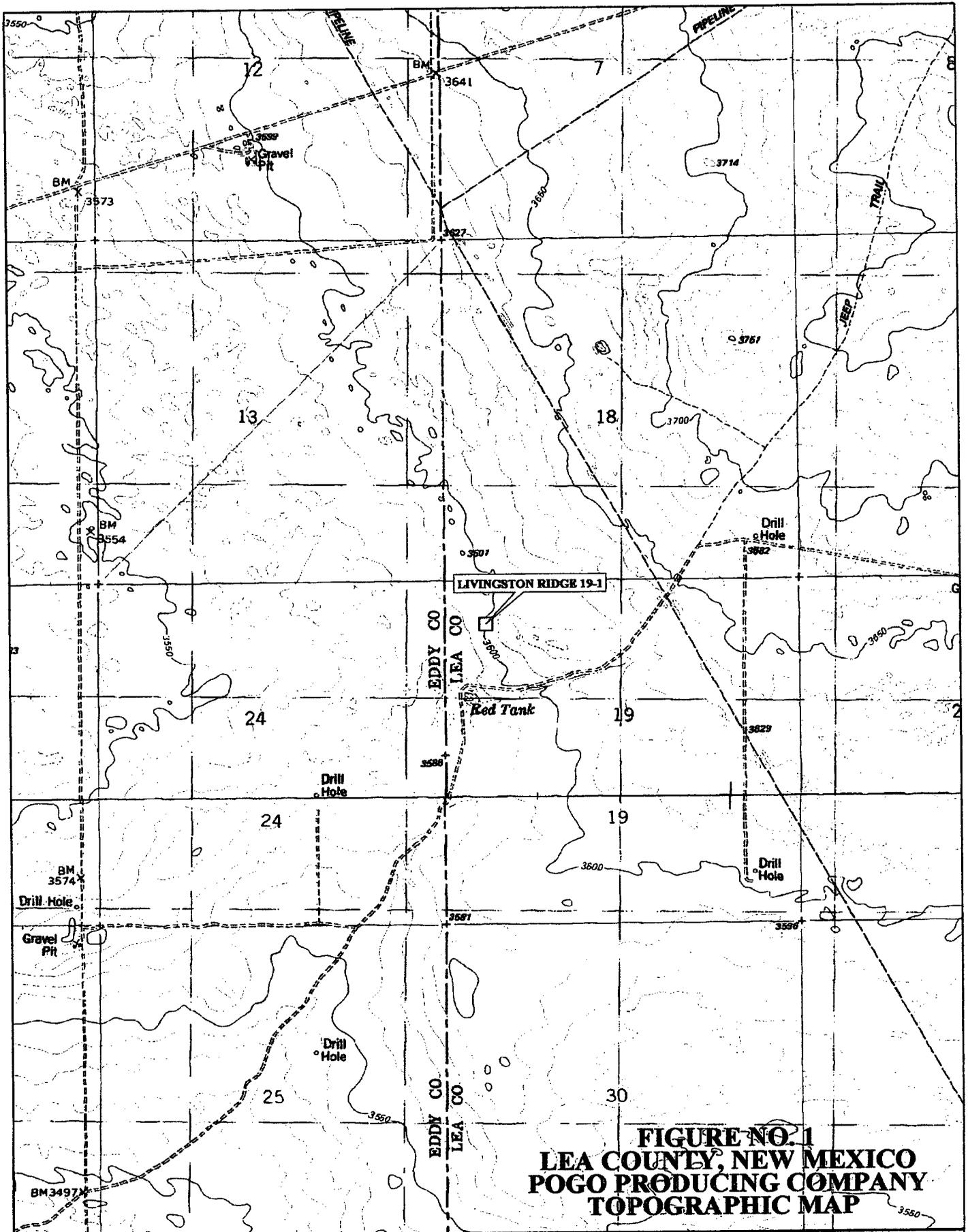


Ike Tavarez  
Project Manager/Geologist

cc: Don Riggs – Pogo Producing Company  
Barrett Smith – Pogo Producing Company

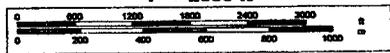


**FIGURES**

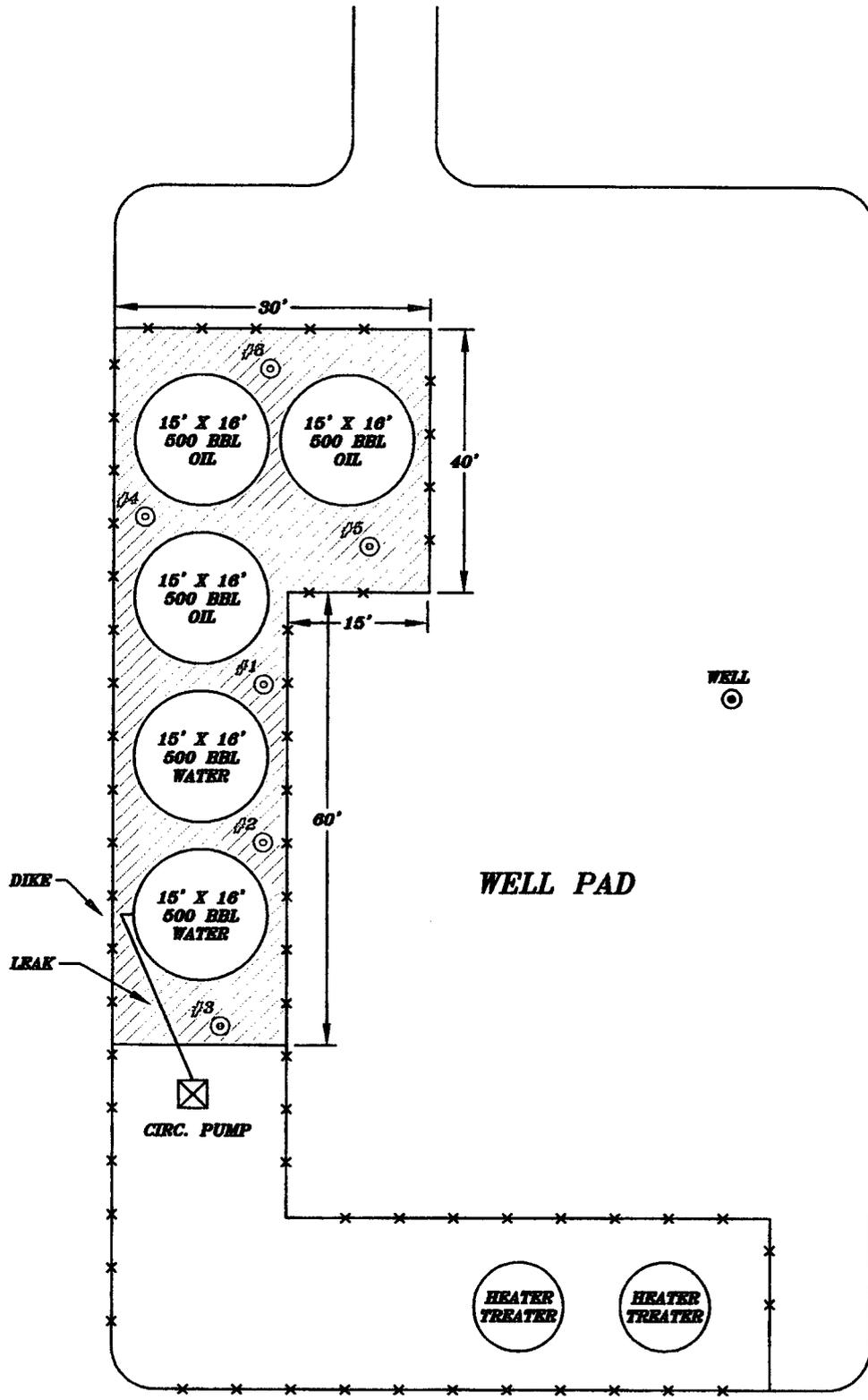


**FIGURE NO. 1**  
**LEA COUNTY, NEW MEXICO**  
**POGO PRODUCING COMPANY**  
**TOPOGRAPHIC MAP**

Scale 1 : 24,000  
 1" = 2000 ft



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 www.delorme.com



□ SPILL AREA  
⊙ AUGER HOLE LOCATION

NOT TO SCALE

DATE:  
6/3/04  
DRAWN BY:  
JJ  
FILE:  
04P0001772  
LIVINGSTON RIDGE

FIGURE NO. 2	
LEA COUNTY, NEW MEXICO	
POGO PRODUCING COMPANY	
LIVINGSTON RIDGE 19-1	
HIGHLANDER ENVIRONMENTAL CORP. MIDLAND, TEXAS	

**TABLE**

Table 1  
Pogo Producing Company  
Livingston Ridge 19-1, Tank Battery  
Lea County, New Mexico

Sample ID	Date Sampled	Sample Depth (ft)	TPH (mg/kg)			Benzene (mg/kg)	Toluene (mg/kg)	Ethlybenzene (mg/kg)	Xylene (mg/kg)	Chloride (mg/kg)
			C6-C12	C12-C35	Total					
#1	5/17/04	0-0.5	573	2,080	2,650	-	-	-	-	915
#1	5/17/04	1-1.5	-	-	-	-	-	-	-	255
#1	5/17/04	2-2.5	-	-	-	-	-	-	-	<20.0
#2	5/17/04	0-0.5	2,090	6,810	8,900	-	-	-	-	1,660
#2	5/17/04	1-1.5	<10.0	10.4	10.4	-	-	-	-	128
#2	5/17/04	2-2.5	-	-	-	-	-	-	-	<20.0
#3	5/17/04	0-0.5	1,080	3,720	4,800	-	-	-	-	851
#3	5/17/04	1-1.5	-	-	-	-	-	-	-	383
#3	5/17/04	2-2.5	-	-	-	-	-	-	-	70.9
#4	5/17/04	0-0.5	482	1,100	1,580	-	-	-	-	2,720
#4	5/17/04	1-1.5	-	-	-	-	-	-	-	744
#4	5/17/04	2-2.5	-	-	-	-	-	-	-	872
#4	6/24/04	4-4.5	-	-	-	-	-	-	-	383
#4	6/24/04	5-5.0	-	-	-	-	-	-	-	170
#5	5/17/04	0-0.5	2,600	8,020	10,600	1.41	9.26	5.79	23.38	1,110
#5	5/17/04	1-1.5	2,590	11,300	13,900	-	-	-	-	<20.0
#5	5/17/04	2-2.5	1,490	9,510	11,000	-	-	-	-	<20.0
#5	5/17/04	3-3.5	<10.0	17.0	17.0	-	-	-	-	<20.0
#6	5/17/04	0-0.5	8,070	13,400	21,500	12.5	66	31.9	98	3,870
#6	5/17/04	1-1.5	<10.0	29.1	29.1	-	-	-	-	<20.0
#6	5/17/04	2-2.5	-	-	-	-	-	-	-	106

(-) Not Analyzed

**APPDENDIX A**

**State of New Mexico  
Form C-141**

BARRETT

District I - (505) 393-6161  
P. O. Box 1980  
Hobbs, NM 88241-1980  
District II - (505) 748-1283  
811 South First  
Artesia, NM 88210  
District III - (505) 334-6178  
1000 Rio Brazos Road  
Aztec, NM 87410  
District IV - (505) 827-7131

State of New Mexico  
Energy Minerals and Natural Resources Department  
Oil Conservation Division  
2040 South Pacheco Street  
Santa Fe, New Mexico 87505  
(505) 827-7131

Form C-141  
Originated 2/13/97

Submit 2 copies to  
Appropriate District  
Office in accordance  
with Rule 116 on  
back side of form

Release Notification and Corrective Action

OPERATOR

Initial Report  Final Report

Name <i>Pogo Producing Co</i>		Contact <i>BARRETT Smith</i>
Address <i>P.O. Box 10340 Midland TX.</i>		Telephone No. <i>432-685-8100</i>
Facility Name <i>LIVINGSTON RIDGE 19-1 TANK BATTERY</i>		Facility Type <i>TANK BATTERY</i>
Surface Owner <i>BLM</i>	Mineral Owner <i>BLM</i>	Lease No. <i>90587</i>

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
<i>E</i>	<i>19</i>	<i>22S</i>	<i>32E</i>	<i>660</i>	<i>NL</i>	<i>330</i>	<i>WL</i>	<i>LEA</i>

NATURE OF RELEASE

Type of Release <i>oil &amp; water</i>	Volume of Release <i>150 BBLS</i>	Volume Recovered <i>136</i>
Source of Release <i>TANK RAN OVER.</i>	Date and Hour of Occurrence <i>5/16/04</i>	Date and Hour of Discovery <i>5/16/04 6:45AM</i>
Was Immediate Notice Given? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required	If YES, To Whom? <i>GARY WINK</i>	
By Whom? <i>CLAY OSBORN</i>	Date and Hour <i>5/16/04 8:15 AM</i>	
Was a Watercourse Reached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully (Attach Additional Sheets if Necessary)

*NO*

Describe Cause of Problem and Remedial Action Taken. (Attach Additional Sheets if Necessary) *Love-Jay Coupling on WATER TRANSFER PUMP BROKE & RAN TANKS OVER. Pulled WATER OUT OF TANKS. Pick up oil & debris in side FIRE WALL.*

Describe Area Affected and Cleanup Action Taken. (Attach Additional Sheets if Necessary) *Fluid INSIDE FIRE WALL. Pick up Free Fluid. will dig out & HAUL off contaminated soil & Replace with Clean soil.*

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature: <i>[Signature]</i>	<b>OIL CONSERVATION DIVISION</b>		
Printed Name: <i>CLAY OSBORN</i>	Approved by District Supervisor:		
Title: <i>FIELD FOREMAN</i>	Approval Date:	Expiration Date:	
Date: <i>5/16/04</i>	Phone: <i>432-631-0129</i>	Conditions of Approval:	Attached <input type="checkbox"/>

District I  
1625 N. French Dr., Hobbs, NM 88240  
District II  
1301 W. Grand Avenue, Artesia, NM 88210  
District III  
1000 Rio Brazos Road, Aztec, NM 87410  
District IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico  
Energy Minerals and Natural Resources  
Oil Conservation Division  
1220 South St. Francis Dr.  
Santa Fe, NM 87505

Form C-141  
Revised October 10, 2003

Submit 2 Copies to appropriate  
District Office in accordance  
with Rule 116 on back  
side of form

**Release Notification and Corrective Action**

**OPERATOR**

Initial Report  Final Report

Name of Company: Pogo Producing Company (Arch)	Contact: Barrett Smith
Address: 300 N. Marienfeld, suite 600, Midland, Texas 79702	Telephone No. 432-685-8100
Facility Name: Livingston Ridge 19 Federal #1	Facility Type: Tank Battery

Surface Owner: BLM	Mineral Owner: BLM	Lease No.: 90587
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**LOCATION OF RELEASE**

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
	19	22-S	32-E	660'	FNL	330'	FWL	Lea County

Latitude N 32° 22' 56.3" Longitude W 104° 43' 13.5"

**NATURE OF RELEASE**

Type of Release: Oil & Produced Water	Volume of Release: 150 BBLS	Volume Recovered: 136 BBLS
Source of Release: Tank ran over	Date and Hour of Occurrence: 5/16/04	Date and Hour of Discovery 5/16/04 6:45 am
Was Immediate Notice Given? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required	If YES, To Whom? Gary Wink	
By Whom? Clay Osborn	Date and Hour: 5/16/04 8:15 am	
Was a Watercourse Reached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.\*

N/A

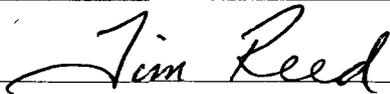
Describe Cause of Problem and Remedial Action Taken.\*

Love-joy coupling on the water transfer pump broke and tanks ran over. Pulled water out of tanks and pooled fluid inside firewall. Contacted Highlander Environmental to assess and remediate the site.

Describe Area Affected and Cleanup Action Taken.\*

The spill was contained inside the firewall and measured approximately 18' x 60' on the east end and 35' x 40' on the west end. Highlander assessed the spill area and supervised the removal of 1'-3' of impacted soil from the spill area. This soil was taken to Sundance Services for disposal. The site was backfilled with clean soil.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature: 	<b>OIL CONSERVATION DIVISION</b>	
Printed Name: Tim Reed	Approved by District Supervisor:	
Title: VP, Highlander, Agent for Pogo Producing Company	Approval Date:	Expiration Date:
E-mail Address: treed@hec-enviro.com	Conditions of Approval:	Attached <input type="checkbox"/>
Date: 7/21/04	Phone: 432-682-4559	

**APPDENDIX B**

**Well Reports**

*New Mexico Office of the State Engineer*  
**Well Reports and Downloads**

Township: 22S Range: 32E Sections:

NAD27 X: Y: Zone: Search Radius:

County: Basin: Number: Suffix:

Owner Name: (First) (Last)  Non-Domestic  Domestic  All

Well / Surface Data Report

Avg Depth to Water Report

Water Column Report

Clear Form

WATERS Menu

Help

**AVERAGE DEPTH OF WATER REPORT 06/30/2004**

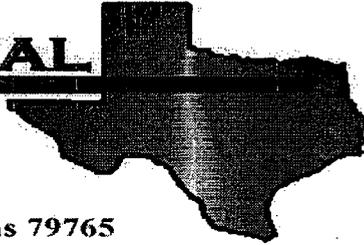
Bsn	Tws	Rng	Sec	Zone	X	Y	Wells	(Depth Water in Feet)		
								Min	Max	Avg
C	22S	32E	14				2	340	360	350
C	22S	32E	19				1	280	280	280

Record Count: 3

**APPDENDIX C**

**Analytical Results**

**E** NVIRONMENTAL  
LAB OF



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/Livingston Ridge 19-1

Project Number: 2172

Location: Lea Co. NM

Lab Order Number: 4E21001

Report Date: 06/01/04

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

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported:  
06/01/04 10:14

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
#1 (0-0.5)	4E21001-01	Soil	05/17/04 00:00	05/20/04 17:20
#2 (0-0.5)	4E21001-04	Soil	05/17/04 00:00	05/20/04 17:20
#2 (1-1.5)	4E21001-05	Soil	05/17/04 00:00	05/20/04 17:20
#3 (0-0.5)	4E21001-07	Soil	05/17/04 00:00	05/20/04 17:20
#4 (0-0.5)	4E21001-10	Soil	05/17/04 00:00	05/20/04 17:20
#5 (0-0.5)	4E21001-13	Soil	05/17/04 00:00	05/20/04 17:20
#5 (1-1.5)	4E21001-14	Soil	05/17/04 00:00	05/20/04 17:20
#5 (2-2.5)	4E21001-15	Soil	05/17/04 00:00	05/20/04 17:20
#5 (3-3.5)	4E21001-16	Soil	05/17/04 00:00	05/20/04 17:20
#6 (0-0.5)	4E21001-17	Soil	05/17/04 00:00	05/20/04 17:20
#6 (1-1.5)	4E21001-18	Soil	05/17/04 00:00	05/20/04 17:20

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

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavaréz

Fax: (432) 682-3946

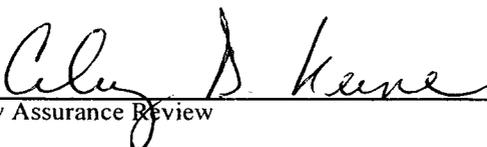
Reported:  
06/01/04 10:14

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

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>#1 (0-0.5) (4E21001-01) Soil</b>									
Gasoline Range Organics C6-C12	573	10.0	mg/kg dry	1	EE42101	05/21/04	05/22/04	EPA 8015M	
Diesel Range Organics >C12-C35	2080	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	2650	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		102 %	70-130		"	"	"	"	
Surrogate: 1-Chlorooctadecane		122 %	70-130		"	"	"	"	
<b>#2 (0-0.5) (4E21001-04) Soil</b>									
Gasoline Range Organics C6-C12	2090	10.0	mg/kg dry	1	EE42101	05/21/04	05/22/04	EPA 8015M	
Diesel Range Organics >C12-C35	6810	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	8900	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		103 %	70-130		"	"	"	"	
Surrogate: 1-Chlorooctadecane		128 %	70-130		"	"	"	"	
<b>#2 (1-1.5) (4E21001-05) Soil</b>									
Gasoline Range Organics C6-C12	ND	10.0	mg/kg dry	1	EE42503	05/25/04	05/25/04	EPA 8015M	
Diesel Range Organics >C12-C35	10.4	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	10.4	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		79.0 %	70-130		"	"	"	"	
Surrogate: 1-Chlorooctadecane		86.4 %	70-130		"	"	"	"	
<b>#3 (0-0.5) (4E21001-07) Soil</b>									
Gasoline Range Organics C6-C12	1080	10.0	mg/kg dry	1	EE42101	05/21/04	05/22/04	EPA 8015M	
Diesel Range Organics >C12-C35	3720	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	4800	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		110 %	70-130		"	"	"	"	
Surrogate: 1-Chlorooctadecane		125 %	70-130		"	"	"	"	

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.

  
Quality Assurance Review

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

Project: Pogo/Livingston Ridge 19-1  
 Project Number: 2172  
 Project Manager: Ike Tavarez

Fax: (432) 682-3946  
 Reported:  
 06/01/04 10:14

**Organics by GC  
 Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>#4 (0-0.5) (4E21001-10) Soil</b>									
Gasoline Range Organics C6-C12	482	10.0	mg/kg dry	1	EE42101	05/21/04	05/22/04	EPA 8015M	
Diesel Range Organics >C12-C35	1100	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	1580	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		115 %		70-130	"	"	"	"	
Surrogate: 1-Chlorooctadecane		110 %		70-130	"	"	"	"	

<b>#5 (0-0.5) (4E21001-13) Soil</b>									
Benzene	1.41	0.0250	mg/kg dry	25	EE42701	05/25/04	05/26/04	EPA 8021B	
Toluene	9.26	0.0250	"	"	"	"	"	"	
Ethylbenzene	5.79	0.0250	"	"	"	"	"	"	
Xylene (p/m)	16.0	0.0250	"	"	"	"	"	"	
Xylene (o)	7.38	0.0250	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		463 %		80-120	"	"	"	"	S-04
Surrogate: 4-Bromofluorobenzene		82.1 %		80-120	"	"	"	"	
Gasoline Range Organics C6-C12	2600	10.0	mg/kg dry	1	EE42101	05/21/04	05/22/04	EPA 8015M	
Diesel Range Organics >C12-C35	8020	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	10600	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		115 %		70-130	"	"	"	"	
Surrogate: 1-Chlorooctadecane		177 %		70-130	"	"	"	"	S-04

<b>#5 (1-1.5) (4E21001-14) Soil</b>									
Gasoline Range Organics C6-C12	2590	10.0	mg/kg dry	1	EE42503	05/25/04	05/25/04	EPA 8015M	
Diesel Range Organics >C12-C35	11300	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	13900	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		87.2 %		70-130	"	"	"	"	
Surrogate: 1-Chlorooctadecane		182 %		70-130	"	"	"	"	S-04

Environmental Lab of Texas

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*Ally D. Keene*  
 Quality Assurance Review

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

Project: Pogo/Livingston Ridge 19-1  
 Project Number: 2172  
 Project Manager: Ike Tavaraz

Fax: (432) 682-3946

Reported:  
 06/01/04 15:25

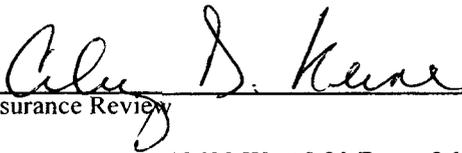
**Organics by GC**  
**Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>#5 (2-2.5) (4E21001-15) Soil</b>									
Gasoline Range Organics C6-C12	1490	10.0	mg/kg dry	1	EE42503	05/25/04	05/25/04	EPA 8015M	
Diesel Range Organics >C12-C35	9510	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	11000	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		104 %		70-130	"	"	"	"	
Surrogate: 1-Chlorooctadecane		171 %		70-130	"	"	"	"	S-04
<b>#5 (3-3.5) (4E21001-16) Soil</b>									
Gasoline Range Organics C6-C12	J [6.43]	10.0	mg/kg dry	1	EE42602	05/26/04	05/28/04	EPA 8015M	J
Diesel Range Organics >C12-C35	17.0	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	17.0	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		80.8 %		70-130	"	"	"	"	
Surrogate: 1-Chlorooctadecane		90.2 %		70-130	"	"	"	"	
<b>#6 (0-0.5) (4E21001-17) Soil</b>									
Benzene	12.5	0.100	mg/kg dry	100	EE42701	05/25/04	05/26/04	EPA 8021B	
Toluene	66.0	0.100	"	"	"	"	"	"	
Ethylbenzene	31.9	0.100	"	"	"	"	"	"	
Xylene (p/m)	69.4	0.100	"	"	"	"	"	"	
Xylene (o)	28.6	0.100	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		1000 %		80-120	"	"	"	"	S-04
Surrogate: 4-Bromofluorobenzene		115 %		80-120	"	"	"	"	
Gasoline Range Organics C6-C12	8070	50.0	mg/kg dry	5	EE42101	05/21/04	05/22/04	EPA 8015M	
Diesel Range Organics >C12-C35	13400	50.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	21500	50.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		25.6 %		70-130	"	"	"	"	S-06
Surrogate: 1-Chlorooctadecane		43.0 %		70-130	"	"	"	"	S-06

Environmental Lab of Texas

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Quality Assurance Review



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

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported:  
06/01/04 10:14

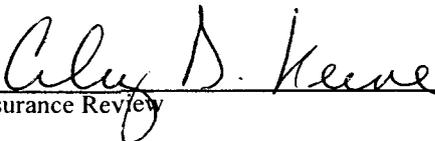
**Organics by GC**  
**Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>#6 (1-1.5) (4E21001-18) Soil</b>									
Gasoline Range Organics C6-C12	ND	10.0	mg/kg dry	1	EE42503	05/25/04	05/25/04	EPA 8015M	
Diesel Range Organics >C12-C35	29.1	10.0	"	"	"	"	"	"	
Total Hydrocarbon C6-C35	29.1	10.0	"	"	"	"	"	"	
Surrogate: 1-Chlorooctane		74.2 %	70-130		"	"	"	"	
Surrogate: 1-Chlorooctadecane		74.2 %	70-130		"	"	"	"	

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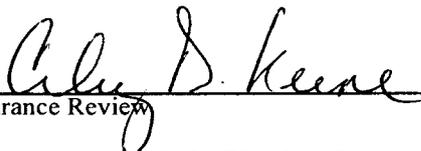
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06/01/04 10:14

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

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>#1 (0-0.5) (4E21001-01) Soil</b>									
Chloride	915	20.0	mg/kg Wet	2	EE42405	05/21/04	05/22/04	SW 846 9253	
% Solids	86.0		%	1	EE42402	05/21/04	05/21/04	% calculation	
<b>#2 (0-0.5) (4E21001-04) Soil</b>									
Chloride	1660	20.0	mg/kg Wet	2	EE42405	05/21/04	05/22/04	SW 846 9253	
% Solids	89.0		%	1	EE42402	05/21/04	05/21/04	% calculation	
<b>#2 (1-1.5) (4E21001-05) Soil</b>									
% Solids	98.0		%	1	EE42605	05/25/04	05/25/04	% calculation	
<b>#3 (0-0.5) (4E21001-07) Soil</b>									
Chloride	851	20.0	mg/kg Wet	2	EE42405	05/21/04	05/22/04	SW 846 9253	
% Solids	87.0		%	1	EE42402	05/21/04	05/21/04	% calculation	
<b>#4 (0-0.5) (4E21001-10) Soil</b>									
Chloride	2720	20.0	mg/kg Wet	2	EE42405	05/21/04	05/22/04	SW 846 9253	
% Solids	85.0		%	1	EE42402	05/21/04	05/21/04	% calculation	
<b>#5 (0-0.5) (4E21001-13) Soil</b>									
Chloride	1110	20.0	mg/kg Wet	2	EE42405	05/21/04	05/22/04	SW 846 9253	
% Solids	89.0		%	1	EE42402	05/21/04	05/21/04	% calculation	
<b>#5 (1-1.5) (4E21001-14) Soil</b>									
% Solids	97.0		%	1	EE42605	05/25/04	05/25/04	% calculation	

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Quality Assurance Review

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Midland TX, 79705

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavarez

Fax: (432) 682-3946

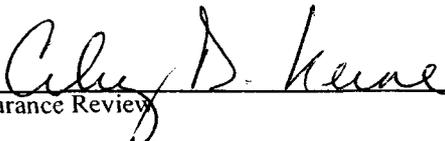
Reported:  
06/01/04 10:14

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

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>#5 (2-2.5) (4E21001-15) Soil</b>									
% Solids	97.0		%	1	EE42605	05/25/04	05/25/04	% calculation	
<b>#5 (3-3.5) (4E21001-16) Soil</b>									
% Solids	98.0		%	1	EE42803	05/28/04	05/28/04	% calculation	
<b>#6 (0-0.5) (4E21001-17) Soil</b>									
Chloride	3870	20.0 mg/kg Wet		2	EE42405	05/21/04	05/22/04	SW 846 9253	
% Solids	86.0		%	1	EE42402	05/21/04	05/21/04	% calculation	
<b>#6 (1-1.5) (4E21001-18) Soil</b>									
% Solids	97.0		%	1	EE42605	05/25/04	05/25/04	% calculation	

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Quality Assurance Review

Page 7 of 17

Highlander Environmental Corp.  
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Midland TX, 79705

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported:  
06/01/04 10:14

**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
<b>Batch EE42101 - Solvent Extraction (GC)</b>										
<b>Blank (EE42101-BLK1)</b> Prepared: 05/21/04 Analyzed: 05/22/04										
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	36.2		mg/kg	50.0		72.4	70-130			
Surrogate: 1-Chlorooctadecane	40.0		"	50.0		80.0	70-130			
<b>Blank (EE42101-BLK2)</b> Prepared: 05/21/04 Analyzed: 05/22/04										
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	38.6		mg/kg	50.0		77.2	70-130			
Surrogate: 1-Chlorooctadecane	37.8		"	50.0		75.6	70-130			
<b>LCS (EE42101-BS1)</b> Prepared: 05/21/04 Analyzed: 05/22/04										
Gasoline Range Organics C6-C12	408	10.0	mg/kg wet	500		81.6	75-125			
Diesel Range Organics >C12-C35	482	10.0	"	500		96.4	75-125			
Total Hydrocarbon C6-C35	890	10.0	"	1000		89.0	75-125			
Surrogate: 1-Chlorooctane	46.8		mg/kg	50.0		93.6	70-130			
Surrogate: 1-Chlorooctadecane	36.3		"	50.0		72.6	70-130			
<b>LCS (EE42101-BS2)</b> Prepared: 05/21/04 Analyzed: 05/22/04										
Gasoline Range Organics C6-C12	406	10.0	mg/kg wet	500		81.2	75-125			
Diesel Range Organics >C12-C35	478	10.0	"	500		95.6	75-125			
Total Hydrocarbon C6-C35	884	10.0	"	1000		88.4	75-125			
Surrogate: 1-Chlorooctane	48.8		mg/kg	50.0		97.6	70-130			
Surrogate: 1-Chlorooctadecane	36.2		"	50.0		72.4	70-130			
<b>LCS Dup (EE42101-BSD1)</b> Prepared: 05/21/04 Analyzed: 05/22/04										
Gasoline Range Organics C6-C12	408	10.0	mg/kg wet	500		81.6	75-125	0.00	20	
Diesel Range Organics >C12-C35	494	10.0	"	500		98.8	75-125	2.46	20	
Total Hydrocarbon C6-C35	902	10.0	"	1000		90.2	75-125	1.34	20	
Surrogate: 1-Chlorooctane	46.5		mg/kg	50.0		93.0	70-130			
Surrogate: 1-Chlorooctadecane	37.7		"	50.0		75.4	70-130			

Environmental Lab of Texas

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*Ally B. Kane*  
Quality Assurance Review

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

Project: Pogo/Livingston Ridge 19-1  
 Project Number: 2172  
 Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported:  
 06/01/04 10:14

**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 EE42101 - Solvent Extraction (GC)**

**Calibration Check (EE42101-CCV1)**

Prepared: 05/21/04 Analyzed: 05/22/04

Gasoline Range Organics C6-C12	420		mg/kg	500		84.0	80-120			
Diesel Range Organics >C12-C35	482		"	500		96.4	80-120			
Total Hydrocarbon C6-C35	902		"	1000		90.2	80-120			
Surrogate: 1-Chlorooctane	52.6		"	50.0		105	70-130			
Surrogate: 1-Chlorooctadecane	45.0		"	50.0		90.0	70-130			

**Matrix Spike (EE42101-MS2)**

Source: 4E21002-44

Prepared: 05/21/04 Analyzed: 05/22/04

Gasoline Range Organics C6-C12	467	10.0	mg/kg dry	532	ND	87.8	75-125			
Diesel Range Organics >C12-C35	532	10.0	"	532	ND	100	75-125			
Total Hydrocarbon C6-C35	999	10.0	"	1060	ND	94.2	75-125			
Surrogate: 1-Chlorooctane	59.0		mg/kg	50.0		118	70-130			
Surrogate: 1-Chlorooctadecane	46.4		"	50.0		92.8	70-130			

**Matrix Spike Dup (EE42101-MSD2)**

Source: 4E21002-44

Prepared: 05/21/04 Analyzed: 05/22/04

Gasoline Range Organics C6-C12	500	10.0	mg/kg dry	532	ND	94.0	75-125	6.83	20	
Diesel Range Organics >C12-C35	555	10.0	"	532	ND	104	75-125	4.23	20	
Total Hydrocarbon C6-C35	1060	10.0	"	1060	ND	100	75-125	5.93	20	
Surrogate: 1-Chlorooctane	62.2		mg/kg	50.0		124	70-130			
Surrogate: 1-Chlorooctadecane	47.9		"	50.0		95.8	70-130			

**Batch EE42503 - Solvent Extraction (GC)**

**Blank (EE42503-BLK1)**

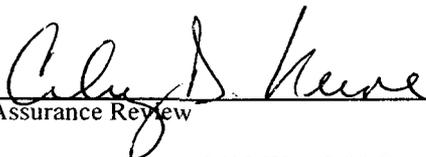
Prepared & Analyzed: 05/25/04

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	43.3		mg/kg	50.0		86.6	70-130			
Surrogate: 1-Chlorooctadecane	43.4		"	50.0		86.8	70-130			

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Quality Assurance Review



Page 9 of 17

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

Project: Pogo/Livingston Ridge 19-1  
 Project Number: 2172  
 Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported:  
 06/01/04 10:14

**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 EE42503 - Solvent Extraction (GC)**

**LCS (EE42503-BS1)**

Prepared & Analyzed: 05/25/04

Gasoline Range Organics C6-C12	417		mg/kg	500		83.4	75-125			
Diesel Range Organics >C12-C35	448		"	500		89.6	75-125			
Total Hydrocarbon C6-C35	865		"	1000		86.5	75-125			
Surrogate: 1-Chlorooctane	47.5		"	50.0		95.0	70-130			
Surrogate: 1-Chlorooctadecane	35.9		"	50.0		71.8	70-130			

**Calibration Check (EE42503-CCV1)**

Prepared: 05/25/04 Analyzed: 05/27/04

Gasoline Range Organics C6-C12	403		mg/kg	500		80.6	80-120			
Diesel Range Organics >C12-C35	479		"	500		95.8	80-120			
Total Hydrocarbon C6-C35	882		"	1000		88.2	80-120			
Surrogate: 1-Chlorooctane	55.9		"	50.0		112	70-130			
Surrogate: 1-Chlorooctadecane	43.7		"	50.0		87.4	70-130			

**Matrix Spike (EE42503-MS1)**

Source: 4E25003-02

Prepared: 05/25/04 Analyzed: 05/26/04

Gasoline Range Organics C6-C12	469	10.0	mg/kg dry	556	ND	84.4	75-125			
Diesel Range Organics >C12-C35	522	10.0	"	556	ND	93.9	75-125			
Total Hydrocarbon C6-C35	991	10.0	"	1110	ND	89.3	75-125			
Surrogate: 1-Chlorooctane	57.1		mg/kg	50.0		114	70-130			
Surrogate: 1-Chlorooctadecane	40.8		"	50.0		81.6	70-130			

**Matrix Spike Dup (EE42503-MSD1)**

Source: 4E25003-02

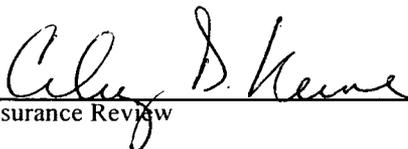
Prepared: 05/25/04 Analyzed: 05/26/04

Gasoline Range Organics C6-C12	512	10.0	mg/kg dry	556	ND	92.1	75-125	8.77	20	
Diesel Range Organics >C12-C35	539	10.0	"	556	ND	96.9	75-125	3.20	20	
Total Hydrocarbon C6-C35	1050	10.0	"	1110	ND	94.6	75-125	5.78	20	
Surrogate: 1-Chlorooctane	59.9		mg/kg	50.0		120	70-130			
Surrogate: 1-Chlorooctadecane	43.1		"	50.0		86.2	70-130			

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Highlander Environmental Corp.  
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 Midland TX, 79705

Project: Pogo/Livingston Ridge 19-1  
 Project Number: 2172  
 Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported:  
 06/01/04 10:14

**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 EE42602 - Solvent Extraction (GC)**

**Blank (EE42602-BLK1)**

Prepared & Analyzed: 05/26/04

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	41.2		mg/kg	50.0		82.4	70-130			
Surrogate: 1-Chlorooctadecane	36.1		"	50.0		72.2	70-130			

**Blank (EE42602-BLK2)**

Prepared: 05/26/04 Analyzed: 05/27/04

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	36.8		mg/kg	50.0		73.6	70-130			
Surrogate: 1-Chlorooctadecane	35.2		"	50.0		70.4	70-130			

**LCS (EE42602-BS1)**

Prepared: 05/26/04 Analyzed: 05/27/04

Gasoline Range Organics C6-C12	417	10.0	mg/kg wet	500		83.4	75-125			
Diesel Range Organics >C12-C35	493	10.0	"	500		98.6	75-125			
Total Hydrocarbon C6-C35	910	10.0	"	1000		91.0	75-125			
Surrogate: 1-Chlorooctane	41.3		mg/kg	50.0		82.6	70-130			
Surrogate: 1-Chlorooctadecane	35.7		"	50.0		71.4	70-130			

**LCS (EE42602-BS2)**

Prepared: 05/26/04 Analyzed: 05/27/04

Gasoline Range Organics C6-C12	422	10.0	mg/kg wet	500		84.4	75-125			
Diesel Range Organics >C12-C35	513	10.0	"	500		103	75-125			
Total Hydrocarbon C6-C35	935	10.0	"	1000		93.5	75-125			
Surrogate: 1-Chlorooctane	41.0		mg/kg	50.0		82.0	70-130			
Surrogate: 1-Chlorooctadecane	35.7		"	50.0		71.4	70-130			

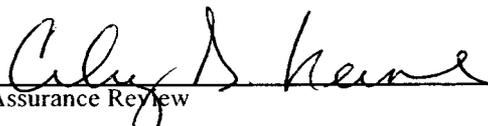
**Calibration Check (EE42602-CCV1)**

Prepared: 05/26/04 Analyzed: 05/28/04

Gasoline Range Organics C6-C12	455		mg/kg	500		91.0	80-120			
Diesel Range Organics >C12-C35	488		"	500		97.6	80-120			
Total Hydrocarbon C6-C35	943		"	1000		94.3	80-120			
Surrogate: 1-Chlorooctane	56.7		"	50.0		113	70-130			
Surrogate: 1-Chlorooctadecane	43.4		"	50.0		86.8	70-130			

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 Cheryl D. Keene  
 Quality Assurance Review

Highlander Environmental Corp.  
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Midland TX, 79705

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported:  
06/01/04 10:14

**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 EE42602 - Solvent Extraction (GC)**

**Calibration Check (EE42602-CCV2)**

Prepared: 05/26/04 Analyzed: 05/27/04

Gasoline Range Organics C6-C12	463		mg/kg	500		92.6	80-120			
Diesel Range Organics >C12-C35	499		"	500		99.8	80-120			
Total Hydrocarbon C6-C35	962		"	1000		96.2	80-120			
Surrogate: 1-Chlorooctane	57.4		"	50.0		115	70-130			
Surrogate: 1-Chlorooctadecane	48.9		"	50.0		97.8	70-130			

**Matrix Spike (EE42602-MS1)**

Source: 4E25009-12

Prepared: 05/26/04 Analyzed: 05/27/04

Gasoline Range Organics C6-C12	478	10.0	mg/kg dry	549	14.0	84.5	75-125			
Diesel Range Organics >C12-C35	583	10.0	"	549	134	81.8	75-125			
Total Hydrocarbon C6-C35	1060	10.0	"	1100	148	82.9	75-125			
Surrogate: 1-Chlorooctane	54.6		mg/kg	50.0		109	70-130			
Surrogate: 1-Chlorooctadecane	40.8		"	50.0		81.6	70-130			

**Matrix Spike (EE42602-MS2)**

Source: 4E25010-11

Prepared: 05/26/04 Analyzed: 05/27/04

Gasoline Range Organics C6-C12	451	10.0	mg/kg dry	515	ND	87.6	75-125			
Diesel Range Organics >C12-C35	506	10.0	"	515	ND	98.3	75-125			
Total Hydrocarbon C6-C35	957	10.0	"	1030	ND	92.9	75-125			
Surrogate: 1-Chlorooctane	54.1		mg/kg	50.0		108	70-130			
Surrogate: 1-Chlorooctadecane	50.7		"	50.0		101	70-130			

**Matrix Spike Dup (EE42602-MSD1)**

Source: 4E25009-12

Prepared: 05/26/04 Analyzed: 05/27/04

Gasoline Range Organics C6-C12	458	10.0	mg/kg dry	549	14.0	80.9	75-125	4.27	20	
Diesel Range Organics >C12-C35	579	10.0	"	549	134	81.1	75-125	0.688	20	
Total Hydrocarbon C6-C35	1040	10.0	"	1100	148	81.1	75-125	1.90	20	
Surrogate: 1-Chlorooctane	54.6		mg/kg	50.0		109	70-130			
Surrogate: 1-Chlorooctadecane	40.8		"	50.0		81.6	70-130			

**Matrix Spike Dup (EE42602-MSD2)**

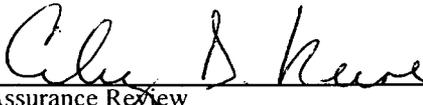
Source: 4E25010-11

Prepared: 05/26/04 Analyzed: 05/27/04

Gasoline Range Organics C6-C12	462	10.0	mg/kg dry	515	ND	89.7	75-125	2.41	20	
Diesel Range Organics >C12-C35	531	10.0	"	515	ND	103	75-125	4.82	20	
Total Hydrocarbon C6-C35	993	10.0	"	1030	ND	96.4	75-125	3.69	20	
Surrogate: 1-Chlorooctane	53.5		mg/kg	50.0		107	70-130			
Surrogate: 1-Chlorooctadecane	51.9		"	50.0		104	70-130			

Environmental Lab of Texas

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Quality Assurance Review

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

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported:  
06/01/04 10:14

**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 EE42701 - EPA 5030C (GC)**

**Blank (EE42701-BLK1)**

Prepared & Analyzed: 05/25/04

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	102		ug/kg	100		102	80-120			
Surrogate: 4-Bromofluorobenzene	104		"	100		104	80-120			

**LCS (EE42701-BS1)**

Prepared & Analyzed: 05/25/04

Benzene	89.2		ug/kg	100		89.2	80-120			
Toluene	86.9		"	100		86.9	80-120			
Ethylbenzene	86.3		"	100		86.3	80-120			
Xylene (p/m)	170		"	200		85.0	80-120			
Xylene (o)	85.6		"	100		85.6	80-120			
Surrogate: a,a,a-Trifluorotoluene	106		"	100		106	80-120			
Surrogate: 4-Bromofluorobenzene	110		"	100		110	80-120			

**Calibration Check (EE42701-CCV1)**

Prepared: 05/25/04 Analyzed: 05/26/04

Benzene	84.9		ug/kg	100		84.9	80-120			
Toluene	82.9		"	100		82.9	80-120			
Ethylbenzene	82.4		"	100		82.4	80-120			
Xylene (p/m)	163		"	200		81.5	80-120			
Xylene (o)	81.9		"	100		81.9	80-120			
Surrogate: a,a,a-Trifluorotoluene	103		"	100		103	80-120			
Surrogate: 4-Bromofluorobenzene	99.8		"	100		99.8	80-120			

**Matrix Spike (EE42701-MS1)**

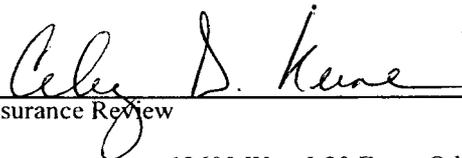
Source: 4E21010-04

Prepared: 05/25/04 Analyzed: 05/26/04

Benzene	87.4		ug/kg	100	ND	87.4	80-120			
Toluene	86.1		"	100	ND	86.1	80-120			
Ethylbenzene	88.0		"	100	ND	88.0	80-120			
Xylene (p/m)	175		"	200	ND	87.5	80-120			
Xylene (o)	85.0		"	100	ND	85.0	80-120			
Surrogate: a,a,a-Trifluorotoluene	110		"	100		110	80-120			
Surrogate: 4-Bromofluorobenzene	107		"	100		107	80-120			

Environmental Lab of Texas

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Quality Assurance Review

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

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavaraz

Fax: (432) 682-3946

Reported:  
06/01/04 10:14

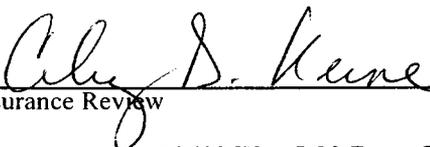
**Organics by GC - Quality Control**  
**Environmental Lab of Texas**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch EE42701 - EPA 5030C (GC)</b>										
<b>Matrix Spike Dup (EE42701-MSD1)</b>										
		<b>Source: 4E21010-04</b>			<b>Prepared: 05/25/04</b>		<b>Analyzed: 05/26/04</b>			
Benzene	80.3		ug/kg	100	ND	80.3	80-120	8.47	20	
Toluene	80.3		"	100	ND	80.3	80-120	6.97	20	
Ethylbenzene	82.1		"	100	ND	82.1	80-120	6.94	20	
Xylene (p/m)	163		"	200	ND	81.5	80-120	7.10	20	
Xylene (o)	82.0		"	100	ND	82.0	80-120	3.59	20	
Surrogate: a,a,a-Trifluorotoluene	92.3		"	100		92.3	80-120			
Surrogate: 4-Bromofluorobenzene	97.0		"	100		97.0	80-120			

Environmental Lab of Texas

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Quality Assurance Review



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

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavaréz

Fax: (432) 682-3946

Reported:  
06/01/04 10:14

**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 EE42402 - General Preparation (Prep)**

**Blank (EE42402-BLK1)** Prepared & Analyzed: 05/21/04

% Solids 100 %

**Duplicate (EE42402-DUP1)** Source: 4E21001-01 Prepared & Analyzed: 05/21/04

% Solids 86.0 % 86.0 0.00 20

**Batch EE42405 - Water Extraction**

**Blank (EE42405-BLK1)** Prepared: 05/21/04 Analyzed: 05/22/04

Chloride ND 20.0 mg/kg Wet

**Matrix Spike (EE42405-MS1)** Source: 4E20002-42 Prepared: 05/21/04 Analyzed: 05/22/04

Chloride 1360 20.0 mg/kg Wet 500 936 84.8 80-120

**Matrix Spike Dup (EE42405-MSD1)** Source: 4E20002-42 Prepared: 05/21/04 Analyzed: 05/22/04

Chloride 1380 20.0 mg/kg Wet 500 936 88.8 80-120 1.46 20

**Reference (EE42405-SRM1)** Prepared: 05/21/04 Analyzed: 05/22/04

Chloride 5000 mg/kg 5000 100 80-120

**Batch EE42605 - General Preparation (Prep)**

**Blank (EE42605-BLK1)** Prepared & Analyzed: 05/25/04

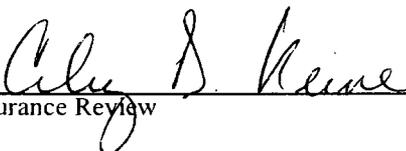
% Solids 100 %

**Duplicate (EE42605-DUP1)** Source: 4E24004-01 Prepared & Analyzed: 05/25/04

% Solids 70.0 % 71.0 1.42 20

Environmental Lab of Texas

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Quality Assurance Review

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

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported:  
06/01/04 10:14

**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
<b>Batch EE42803 - General Preparation (Prep)</b>										
<b>Blank (EE42803-BLK1)</b> Prepared & Analyzed: 05/28/04										
% Solids	100		%							
<b>Duplicate (EE42803-DUP1)</b> Source: 4E21001-16 Prepared & Analyzed: 05/28/04										
% Solids	98.0		%		98.0			0.00	20	

Environmental Lab of Texas

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Quality Assurance Review

Page 16 of 17

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

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavaraz

Fax: (432) 682-3946

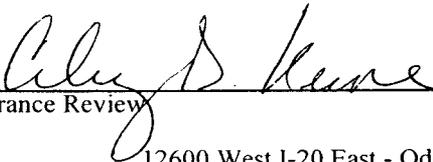
Reported:  
06/01/04 10:14

### Notes and Definitions

- S-06 The recovery of this surrogate is outside control limits due to sample dilution required from high analyte concentration and/or matrix interference's.
- S-04 The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
- 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

Environmental Lab of Texas

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Quality Assurance Review

Page 17 of 17

# Analysis Request and Chain of Custody Record

PAGE: 1 OF: 2

## HIGHLANDER ENVIRONMENTAL CORP.

1910 N. Big Spring St.  
Midland, Texas 79705

(915) 682-4559

Fax (915) 682-3948

CLIENT NAME: Pogo Producing Co SITE MANAGER: IKE TAVARIZ

PROJECT NO.: 2172 PROJECT NAME: Pogo/Livingston Ridge 19-1

LAB I.D. NUMBER: DATE: TIME: MATRIX: COMP: GRAB: Lea co. NM. SAMPLE IDENTIFICATION

ANALYSIS REQUEST  
(Circle or Specify Method No.)

LAB I.D. NUMBER	DATE	TIME	MATRIX	COMP.	GRAB	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	FILTERED (Y/N)	PRESERVATIVE METHOD				HTEX 8020/803	MTBE 8080/808	TPH 418.1 8015 MOD.	PAH 8270	TCRRA Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Metals Ag As Ba Cd Cr Pd Hg Se	TCLP Volatiles	TCLP Semi Volatiles	PCI	GC-MS Vol. 8240/8280/824	GC-MS Suml. Vol. 8270/825	PCB's 8080/808	Pest. 808/808	BOD, TSS, pH, TDS, Chloride	Gamma Spec.	Alpha Beta (Air)	PLM (Asbestos)	Other			
									HCL	HNOS	ICE	NONE																					
41E2001	5/17/04					#1 (0-0.5')	1								X																		X
02						#1 (1-1.5')	1																										
03						#1 (2-2.5')	1																										
04						#2 (0-0.5')	1								X																		X
05						#2 (1-1.5')	1								X																		
06						#2 (2-2.5')	1																										
07						#3 (0-0.5')	1								X																		X
08						#3 (1-1.5')	1																										
09						#3 (2-2.5')	1																										
10						#4 (0-0.5')	1								X																		X

RELINQUISHED BY: (Signature) [Signature] Date: 5/20/04 Time: 5:20 RECEIVED BY: (Signature) [Signature] Date: \_\_\_\_\_ Time: \_\_\_\_\_ SAMPLED BY: (Print & Sign) IKE TAVARIZ Date: \_\_\_\_\_ Time: \_\_\_\_\_

RELINQUISHED BY: (Signature) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ RECEIVED BY: (Signature) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ SAMPLE SHIPPED BY: (Signature) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ FEDEX \_\_\_\_\_ BUS \_\_\_\_\_ AIRBILL # \_\_\_\_\_ HAND DELIVERED \_\_\_\_\_ UPS \_\_\_\_\_ OTHER: \_\_\_\_\_

RELINQUISHED BY: (Signature) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ RECEIVED BY: (Signature) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ HIGHLANDER CONTACT PERSON: IKE TAVARIZ Results by: \_\_\_\_\_

RECEIVING LABORATORY: Evans Lab TX RECEIVED BY: (Signature) [Signature] ADDRESS: \_\_\_\_\_ CITY: \_\_\_\_\_ STATE: \_\_\_\_\_ ZIP: \_\_\_\_\_ CONTACT: \_\_\_\_\_ PHONE: \_\_\_\_\_ DATE: 5-20-04 TIME: 1720 REMARKS: Rec. 3°C RUSH Charges Authorised: Yes No

SAMPLE CONDITION WHEN RECEIVED: MATRIX: W-Water A-Air SD-Solid S-Soil SL-Sludge O-Other

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.

# Analysis Request and Chain of Custody Record

PAGE: 2 OF 2

## HIGHLANDER ENVIRONMENTAL CORP.

1910 N. Big Spring St.  
Midland, Texas 79705

(915) 682-4559

Fax (915) 682-3946

ANALYSIS REQUEST  
(Circle or Specify Method No.)

CLIENT NAME: Pogo Producing Co.

SITE MANAGER: 1/KE Towner

PROJECT NO.: 2172

PROJECT NAME: Pogo/Livingston Ridge 19-1

LAB I.D. NUMBER  
E21001

DATE

TIME

MATRIX  
COMP.  
GRAB

SAMPLE IDENTIFICATION

NUMBER OF CONTAINERS

FILTERED (Y/N)

HCL

HNOS

ICE

NONE

PRESERVATIVE METHOD

BTEX 8020/808

APRIS 8090/808 GIBX

TPH 818.1 8015 MOD

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. 8240/8280/824

GC-MS Semi. Vol. 8270/825

PCB's 8080/808

Pest. 808/808

BOD, TSS, pH, TDS, Chloride

Gamma Spec.

Alpha Beta (Air)

PLM (Asbestos)

Chloride

11 5/17/04

S

#4 (1-1.5')

1

X

12

S

#4 (2-2.5')

1

Y

13

S

#5 (0-0.5')

1

Y

14

S

#5 (1-1.5')

1

Y

15

S

#5 (2-2.5')

1

Y

16

S

#5 (3-3.5')

1

Y

17

S

#6 (0-0.5')

1

Y

18

S

#6 (1-1.5')

1

Y

19

S

#6 (2-2.5')

1

Y

RELINQUISHED BY: (Signature)

Date: 5/20/04  
Time: 5:20

RECEIVED BY: (Signature)

Date: \_\_\_\_\_  
Time: \_\_\_\_\_

SAMPLED BY: (Print & Sign)

Date: \_\_\_\_\_  
Time: \_\_\_\_\_

RELINQUISHED BY: (Signature)

Date: \_\_\_\_\_  
Time: \_\_\_\_\_

RECEIVED BY: (Signature)

Date: \_\_\_\_\_  
Time: \_\_\_\_\_

SAMPLE SHIPPED BY: (Circle)

FEDEX

BUS

AIRBILL # \_\_\_\_\_

HAND DELIVERED

UPS

OTHER: \_\_\_\_\_

RELINQUISHED BY: (Signature)

Date: \_\_\_\_\_  
Time: \_\_\_\_\_

RECEIVED BY: (Signature)

Date: \_\_\_\_\_  
Time: \_\_\_\_\_

HIGHLANDER CONTACT PERSON:

Results by:

RECEIVING LABORATORY:

Enviro. Lab. TX.

RECEIVED BY: (Signature)

Rebecca J...

1/KE Towner

RUSH Charges Authorized:

Yes  No

ADDRESS:

CITY:

STATE:

ZIP:

CONTACT:

PHONE:

DATE:

5-20-04

TIME:

1720

SAMPLE CONDITION WHEN RECEIVED:

MATRIX:

W-Water

A-Air

SD-Solid

S-Soil

SL-Sludge

O-Other

REMARKS: Run (2) BTEX w/ highest TPH - (0-0.5')

Run deep sample, if TPH exceeds 5,000 mail/cg.

rec 3°C.

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

Client: Highlander

Date/Time: 5-20-04 17:20

Order #: 4E21001-0

Initials: CDK

**Sample Receipt Checklist**

Temperature of container/cooler?	<input checked="" type="checkbox"/> Yes	No	3 C
Shipping container/cooler in good condition?	<input checked="" type="checkbox"/> Yes	No	
Custody Seals intact on shipping container/cooler?	Yes	No	<u>Not present</u>
Custody Seals intact on sample bottles?	Yes	No	<u>Not present</u>
Chain of custody present?	<input checked="" type="checkbox"/> Yes	No	
Sample Instructions complete on Chain of Custody?	<input checked="" type="checkbox"/> Yes	No	
Chain of Custody signed when relinquished and received?	<input checked="" type="checkbox"/> Yes	No	
Chain of custody agrees with sample label(s)	<input checked="" type="checkbox"/> Yes	No	
Container labels legible and intact?	<input checked="" type="checkbox"/> Yes	No	
Sample Matrix and properties same as on chain of custody?	<input checked="" type="checkbox"/> Yes	No	
Samples in proper container/bottle?	<input checked="" type="checkbox"/> Yes	No	
Samples properly preserved?	<input checked="" type="checkbox"/> Yes	No	
Sample bottles intact?	<input checked="" type="checkbox"/> Yes	No	
Preservations documented on Chain of Custody?	<input checked="" type="checkbox"/> Yes	No	
Containers documented on Chain of Custody?	Yes	<input checked="" type="checkbox"/> No	4oz glass
Sufficient sample amount for indicated test?	<input checked="" type="checkbox"/> Yes	No	
All samples received within sufficient hold time?	<input checked="" type="checkbox"/> Yes	No	
VOC samples have zero headspace?	Yes	<input checked="" type="checkbox"/> No	Not Applicable

Other observations:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Variance Documentation:**

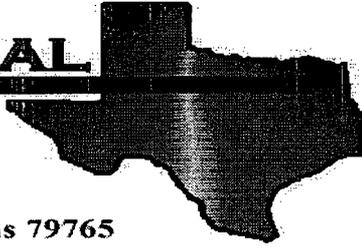
Contact Person: - \_\_\_\_\_ Date/Time: \_\_\_\_\_ Contacted by: \_\_\_\_\_  
 Regarding: \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

Corrective Action Taken:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**E** NVIRONMENTAL  
LAB OF



12600 West I-20 East - Odessa, Texas 79765

## Analytical Report

**Prepared for:**

Ike Tavaréz

Highlander Environmental Corp.

1910 N. Big Spring St.

Midland, TX 79705

Project: Pogo/Livingston Ridge 19-1

Project Number: 2172

Location: Lea Co., NM

Lab Order Number: 4F02007

Report Date: 06/04/04

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

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavaréz

Fax: (432) 682-3946

Reported:  
06/04/04 16:06

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
#1 (1-1.5')	4F02007-01	Soil	05/17/04 00:00	05/20/04 17:20
#1 (2-2.5')	4F02007-02	Soil	05/17/04 00:00	05/20/04 17:20
#2 (1-1.5')	4F02007-03	Soil	05/17/04 00:00	05/20/04 17:20
#2 (2-2.5')	4F02007-04	Soil	05/17/04 00:00	05/20/04 17:20
#3 (1-1.5')	4F02007-05	Soil	05/17/04 00:00	05/20/04 17:20
#3 (2-2.5')	4F02007-06	Soil	05/17/04 00:00	05/20/04 17:20
#4 (1-1.5')	4F02007-07	Soil	05/17/04 00:00	05/20/04 17:20
#4 (2-2.5')	4F02007-08	Soil	05/17/04 00:00	05/20/04 17:20
#5 (1-1.5')	4F02007-09	Soil	05/17/04 00:00	05/20/04 17:20
#5 (2-2.5')	4F02007-10	Soil	05/17/04 00:00	05/20/04 17:20
#5 (3-3.5')	4F02007-11	Soil	05/17/04 00:00	05/20/04 17:20
#6 (1-1.5')	4F02007-12	Soil	05/17/04 00:00	05/20/04 17:20
#6 (2-2.5')	4F02007-13	Soil	05/17/04 00:00	05/20/04 17:20

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

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavaréz

Fax: (432) 682-3946

Reported:  
06/04/04 16:06

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

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>#1 (1-1.5') (4F02007-01) Soil</b>									
Chloride	255	20.0	mg/kg Wet	2	EF40412	06/02/04	06/03/04	SW 846 9253	
<b>#1 (2-2.5') (4F02007-02) Soil</b>									
Chloride	ND	20.0	mg/kg Wet	2	EF40412	06/02/04	06/03/04	SW 846 9253	
<b>#2 (1-1.5') (4F02007-03) Soil</b>									
Chloride	128	20.0	mg/kg Wet	2	EF40412	06/02/04	06/03/04	SW 846 9253	
<b>#2 (2-2.5') (4F02007-04) Soil</b>									
Chloride	ND	20.0	mg/kg Wet	2	EF40412	06/02/04	06/03/04	SW 846 9253	
<b>#3 (1-1.5') (4F02007-05) Soil</b>									
Chloride	383	20.0	mg/kg Wet	2	EF40412	06/02/04	06/03/04	SW 846 9253	
<b>#3 (2-2.5') (4F02007-06) Soil</b>									
Chloride	70.9	20.0	mg/kg Wet	2	EF40412	06/02/04	06/03/04	SW 846 9253	
<b>#4 (1-1.5') (4F02007-07) Soil</b>									
Chloride	744	20.0	mg/kg Wet	2	EF40412	06/02/04	06/03/04	SW 846 9253	
<b>#4 (2-2.5') (4F02007-08) Soil</b>									
Chloride	872	20.0	mg/kg Wet	2	EF40412	06/02/04	06/03/04	SW 846 9253	
<b>#5 (1-1.5') (4F02007-09) Soil</b>									
Chloride	ND	20.0	mg/kg Wet	2	EF40412	06/02/04	06/03/04	SW 846 9253	

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.*

  
Quality Assurance Review

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

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported:  
06/04/04 14:06

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

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>#5 (2-2.5') (4F02007-10) Soil</b>									
Chloride	ND	20.0 mg/kg Wet		2	EF40412	06/02/04	06/03/04	SW 846 9253	
<b>#5 (3-3.5') (4F02007-11) Soil</b>									
Chloride	ND	20.0 mg/kg Wet		2	EF40412	06/02/04	06/03/04	SW 846 9253	
<b>#6 (1-1.5') (4F02007-12) Soil</b>									
Chloride	ND	20.0 mg/kg Wet		2	EF40412	06/02/04	06/03/04	SW 846 9253	
<b>#6 (2-2.5') (4F02007-13) Soil</b>									
Chloride	106	20.0 mg/kg Wet		2	EF40412	06/02/04	06/03/04	SW 846 9253	

Environmental Lab of Texas

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Quality Assurance Review

Page 3 of 5

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

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported:  
06/04/04 14:06

**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 EF40412 - Water Extraction**

**Blank (EF40412-BLK1)**

Prepared: 06/02/04 Analyzed: 06/03/04

Chloride ND 20.0 mg/kg Wet

**Matrix Spike (EF40412-MS1)**

Source: 4F02007-01

Prepared: 06/02/04 Analyzed: 06/03/04

Chloride 755 20.0 mg/kg Wet 500 255 100 80-120

**Matrix Spike Dup (EF40412-MSD1)**

Source: 4F02007-01

Prepared: 06/02/04 Analyzed: 06/03/04

Chloride 766 20.0 mg/kg Wet 500 255 102 80-120 1.45 20

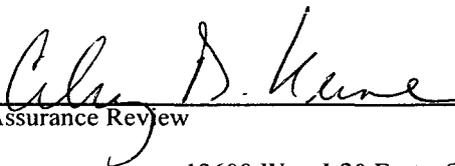
**Reference (EF40412-SRM1)**

Prepared & Analyzed: 06/03/04

Chloride 5000 mg/kg 5000 100 80-120

Environmental Lab of Texas

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Quality Assurance Review

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

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported:  
06/04/04 14:06

### Notes and Definitions

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

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.*

  
Quality Assurance Review

Page 5 of 5



COPY

Analysis Request and Chain of Custody Record

PAGE: 2 OF 2

HIGHLANDER ENVIRONMENTAL CORP.

1910 N. Big Spring St.  
Midland, Texas 79705

(915) 682-4559

Fax (915) 682-3946

ANALYSIS REQUEST  
(Circle or Specify Method No.)

CLIENT NAME: *Pogo Producing Co.*

SITE MANAGER: *KE Tunney*

PROJECT NO.: *2172*

PROJECT NAME: *Pogo/Livingston Ridge 19-1*

SAMPLE IDENTIFICATION

LAB I.D. NUMBER	DATE	TIME	MATRIX	COMP.	GRAB	NUMBER OF CONTAINERS	FILTERED (Y/N)	PRESERVATIVE METHOD				BTEX 8020/808	MPHE 8020/808 (TEX)	TPH 8015 MOD	PAH 8270	TCR 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. 8240/8260/824	GC/MS Semi. Vol. 8270/825	PCB's 8080/808	Pest. 808/808	BOD, TSS, pH, TDS, Chloride	Gamma Spec.	Alpha Beta (Air)	PILM (Asbestos)	<i>Other</i>				
								HCL	HNOS	ICE	NONE																						
<i>E21001</i>																																	
<i>07</i>	<i>11/5/17/04</i>		<i>S</i>			<i>1</i>																											
<i>08</i>	<i>12</i>		<i>S</i>			<i>1</i>																											
<i>13</i>			<i>S</i>			<i>1</i>																											
<i>09</i>	<i>14</i>		<i>S</i>			<i>1</i>																											
<i>10</i>	<i>15</i>		<i>S</i>			<i>1</i>																											
<i>11</i>	<i>16</i>		<i>S</i>			<i>1</i>																											
<i>17</i>			<i>S</i>			<i>1</i>																											
<i>12</i>	<i>18</i>		<i>S</i>			<i>1</i>																											
<i>19</i>	<i>19</i>		<i>S</i>			<i>1</i>																											

RELINQUISHED BY: (Signature) *[Signature]* Date: *5/20/04* Time: *5:20*

RECEIVED BY: (Signature) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

SAMPLED BY: (Signature) *KE Tunney* Date: \_\_\_\_\_ Time: \_\_\_\_\_

RELINQUISHED BY: (Signature) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

RECEIVED BY: (Signature) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

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

RELINQUISHED BY: (Signature) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

RECEIVED BY: (Signature) \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

HIGHLANDER CONTACT PERSON: *KE Tunney* Results by: \_\_\_\_\_

RECEIVING LABORATORY: *Enviro. Lab TX* ADDRESS: \_\_\_\_\_ CITY: \_\_\_\_\_ STATE: \_\_\_\_\_ ZIP: \_\_\_\_\_ CONTACT: \_\_\_\_\_ PHONE: \_\_\_\_\_

RECEIVED BY: (Signature) *Richard J...* DATE: *5-20-04* TIME: *1720*

RUSH Charges Authorized: Yes  No

SAMPLE CONDITION WHEN RECEIVED: MATRIX:  W-Water  A-Air  SD-Solid  SL-Sludge  O-Other *MC 3°C*

REMARKS: *Run (2) BTEX w/ highest TPH - (0-0.5') 1-7-6 Run deep sample, if TPH exceeds 5,000 mallyg.*

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.

---

**Highlander Environmental Corp.**

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Midland, Texas

**FAX**

**DATE:** 6-2-04  
**TO:** Jeanne  
**WITH:** Environmental Lab of Texas  
**FAX:** 1-(432) 563-1713

---

**FROM:** Ike Tavarez  
**WITH:** Highlander Environmental Corp,  
Midland, Texas

**PAGES:**  
(including Fax cover)

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**Description:**

1. Pogo Producing Company - Livingston Ridge 19-, Lea County, New Mexico  
Order # 4E 21001

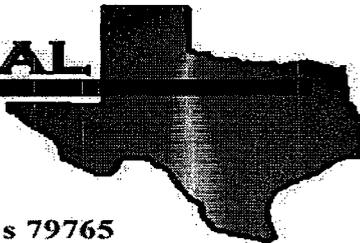
**Request additional analyses:**

**Chlorides:**

- #1 (1-1.5)
- #1 (2-2.5)
- #2 (1-1.5)
- #2 (2-2.5)
- #3 (1-1.5)
- #3 (2-2.5)
- #4 (1-1.5)
- #4 (2-2.5)
- #5 (1-1.5)
- #5 (2-2.5)
- #5 (3-3.5)
- #6 (1-1.5)
- #6 (2-2.5)

Please call me if you have any questions. Thanks

**E** NVIRONMENTAL  
LAB OF



12600 West I-20 East - Odessa, Texas 79765

## Analytical Report

**Prepared for:**

Ike Tavaréz

Highlander Environmental Corp.

1910 N. Big Spring St.

Midland, TX 79705

Project: Pogo/Livingston Ridge 19-1

Project Number: 2172

Location: Lea County, NM

Lab Order Number: 4F28007

Report Date: 07/02/04

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

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported:  
07/02/04 09:54

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
#4 (4-4.5')	4F28007-01	Soil	06/24/04 00:00	06/28/04 16:55
#4 (5-5.5')	4F28007-02	Soil	06/24/04 00:00	06/28/04 16:55

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

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported:  
07/02/04 09:54

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

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>#4 (4-4.5') (4F28007-01) Soil</b>									
Chloride	383	20.0 mg/kg Wet		2	EF43008	06/29/04	06/29/04	SW 846 9253	
<b>#4 (5-5.5') (4F28007-02) Soil</b>									
Chloride	170	20.0 mg/kg Wet		2	EF43008	06/29/04	06/29/04	SW 846 9253	

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

Project: Pogo/Livingston Ridge 19-1  
 Project Number: 2172  
 Project Manager: Ike Tavaraz

Fax: (432) 682-3946

Reported:  
 07/02/04 09:54

**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
<b>Batch EF43008 - Water Extraction</b>										
<b>Blank (EF43008-BLK1)</b>										
Prepared & Analyzed: 06/29/04										
Chloride	ND	20.0	mg/kg Wet							
<b>Matrix Spike (EF43008-MS1)</b>										
Source: 4F28001-06 Prepared & Analyzed: 06/29/04										
Chloride	851	20.0	mg/kg Wet	500	383	93.6	80-120			
<b>Matrix Spike Dup (EF43008-MSD1)</b>										
Source: 4F28001-06 Prepared & Analyzed: 06/29/04										
Chloride	830	20.0	mg/kg Wet	500	383	89.4	80-120	2.50	20	
<b>Reference (EF43008-SRM1)</b>										
Prepared & Analyzed: 06/29/04										
Chloride	5210		mg/kg	5000		104	80-120			

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

Project: Pogo/Livingston Ridge 19-1  
Project Number: 2172  
Project Manager: Ike Tavarez

Fax: (432) 682-3946

Reported:  
07/02/04 09:54

### Notes and Definitions

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:

7-02-04

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

Environmental Lab of Texas

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Page 4 of 4

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

Client: Highlander Environmental

Date/Time: 6/28/04 1655

Order #: \_\_\_\_\_

Initials: JCH

### Sample Receipt Checklist

Temperature of container/cooler?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	40C C
Shipping container/cooler in good condition?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Custody Seals intact on shipping container/cooler?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	Not present
Custody Seals intact on sample bottles?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	Not present
Chain of custody present?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Sample Instructions complete on Chain of Custody?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Chain of Custody signed when relinquished and received?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Chain of custody agrees with sample label(s)	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Container labels legible and intact?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Sample Matrix and properties same as on chain of custody?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Samples in proper container/bottle?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Samples properly preserved?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Sample bottles intact?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Preservations documented on Chain of Custody?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Containers documented on Chain of Custody?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
Sufficient sample amount for indicated test?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
All samples received within sufficient hold time?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	
VOC samples have zero headspace?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	Not Applicable

Other observations:

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### Variance Documentation:

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

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Corrective Action Taken:

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# Analysis Request and Chain of Custody Record

## HIGHLANDER ENVIRONMENTAL CORP.

1910 N. Big Spring St.  
Midland, Texas 79705

(432) 682-4559

Fax (432) 682-3946

PAGE: 1 OF: 1

### ANALYSIS REQUEST (Circle or Specify Method No.)

CLIENT NAME: <i>Pogo Producing Co</i>			SITE MANAGER: <i>IKE Tawara</i>			NUMBER OF CONTAINERS	PRESERVATIVE METHOD				BTEX 8020/808	MTBE 8080/808	TPH 418.1 8015 MOD. TX1005	PAH 8370	PCRA Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	RCI	GC/MS Vol. 8240/8280/824	GC/MS Semi. Vol. 8270/825	PCB's 8080/808	Pest. 808/808	BOD, TSS, pH, TDS, Chloride	Gamma Spec.	Alpha Beta (Air)	PLM (Asbestos)	<i>X</i>
PROJECT NO.: <i>2172</i>	PROJECT NAME: <i>Pogo / Livingston + Ridge #1</i>		NUMBER FILTERED (Y/N)	HCL	HNOS		ICE	NONE																				
LAB I.D. NUMBER <i>4F280071</i>	DATE	TIME	MATRIX	COMP.	GRAB	SAMPLE IDENTIFICATION																						
<i>01</i>	<i>6/24/04</i>	<i>4</i>	<i>4</i>			<i>#4 (4-4.5')</i>																						
<i>02</i>	<i>6/24/04</i>	<i>5</i>	<i>4</i>			<i>#4 (5-5.5')</i>																						

RELINQUISHED BY: (Signature) <i>[Signature]</i>	Date: <i>6/28/04</i> Time: <i>4:55</i>	RECEIVED BY: (Signature) <i>[Signature]</i>	Date: _____ Time: _____	SAMPLED BY: (Print & Sign) <i>IKE Tawara</i>	Date: _____ Time: _____
RELINQUISHED BY: (Signature) _____	Date: _____ Time: _____	RECEIVED BY: (Signature) _____	Date: _____ Time: _____	SAMPLE SHIPPED BY: (Circle) FEDEX <input type="checkbox"/> BUS <input type="checkbox"/> HAND DELIVERED <input type="checkbox"/> UPS <input type="checkbox"/>	AIRBILL # _____ OTHER: _____
RELINQUISHED BY: (Signature) _____	Date: _____ Time: _____	RECEIVED BY: (Signature) _____	Date: _____ Time: _____	HIGHLANDER CONTACT PERSON: <i>IKE Tawara</i>	Results by: RUSH Charges Authorized: Yes <input type="checkbox"/> No <input type="checkbox"/>
RECEIVING LABORATORY: <i>ELT</i>	ADDRESS: _____	RECEIVED BY: (Signature) <i>[Signature]</i>	DATE: <i>6-28-04</i> TIME: <i>1655</i>	REMARKS: <i>Rec 4°C. 4oz Glass</i>	
CITY: _____ STATE: _____ ZIP: _____	CONTACT: _____ PHONE: _____				

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.