

# REPORTS





# Highlander Environmental Corp.

Midland, Texas

April 25, 2000

1R - 366

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

### RE: Assessment and Closure Report for the Spill located at the Pogo Shell State #3 Well, Lea County, New Mexico

Dear Ms. Williams,

Highlander Environmental Corp. (Highlander) was contacted by Pogo Producing Company (Pogo) to assess a spill, which occurred at the Pogo Shell State Lease Well #3 in Lea County, New Mexico. The Site is located in Section 36, Township 22 South, Range 32 East. According to published data, groundwater in the area of the Site is sparse and no water wells are located in Section 36, Township 22 South, Range 32 East, Located in Township 23 South, Range 32 East, the publish data indicated water wells are to the top of the Triassic at depths greater than 500 feet below surface In addition, the New Mexico Engineers Office has been contacted to confirm the groundwater depth at the Site.

A risk-based evaluation was performed for the Site in accordance with the New Mexico Oil Conservation Division (NMOCD) Guidelines for Remediation of Leaks, Spills and Releases, dated August 13, 1993. The guidelines require a risk-based evaluation of the site to determine recommended remediation action levels (RRAL) for benzene, toluene, ethylbenzene and xylene (collectively referred to as BTEX) and total petroleum hydrocarbons (TPH) in soil. The proposed RRAL for benzene was determined to be 10 parts per million (ppm) or milligrams per kilogram (mg/kg) and 50 ppm for total BTEX (sum of benzene, toluene, ethylbenzene and xylene). Based on the regional groundwater data, the proposed recommended remedial action level (RRAL) for TPH is 5,000 mg/kg.

#### Background

On November 28, 1999, the spill from a oil tank (tank overflow) occurred inside the dike of the tank battery. The spill area is confined inside the dike area. Approximately 65 barrels of oil was released on the surface and approximately 60.5 barrels was recovered with vacuum trucks. The impacted surface area measured approximately 40' x 75'. Pogo has removed approximately 8 cubic yards of impacted soil and disposed of properly.

#### Site Inspection and Assessment

On March 22, 2000, Highlander inspected the leak area. No visual impact was noted inside the tank battery dike. The area of the diked tank battery measured approximately 40' x 80'. Soil samples were collected using a stainless steel, bucket type hand auger. A total of six auger holes were installed to define the extent of the impact. The tank battery and sample locations are shown in Figure 1. Deeper soil samples could not be collected due to a dense caliche layer encountered at a depth of 2-3 feet below surface. Soil samples were collected from the spill area for evaluation of Total Petroleum Hydrocarbon (TPH) by method EPA 418.1, Benzene, Toluene, Ethylbenzene and Xylene (BTEX) by method SW 846-8020 and chloride by method SW 846-9252. Three sample locations were selected for BTEX evaluation based upon the highest TPH levels. The soil samples results are shown in Table 1. The laboratory reports and the chain of custody documentation are attached.

Sample	Depth	TPH	B	T	E	X	Total	Chloride
ID	(ft)				··· ·	a series de	BTEX	
#1	0-1	970	-	-	-	-	-	158
	1-2	ND	-	-	-	-	-	17.5
	2-3	ND	-	-	-	-	-	ND
#2	0-1	340	-	-	-	-	-	70
	1-2	ND	-	-	- ,	-	-	17.5
	2-3	ND	_	-	-	-	-	17.5
#3	0-1	14,000	1.4	32	22	73	128.4	52.5
	1-2	85	ND	ND	ND	ND	ND	26.3
	2-3	620	-	-				ND
#4	0-1	17,000	3.8	37	23	80	143.8	403
	1-2	6,800	0.480	11	9.2	44	64.68	ND
#5	0-1	14,000	-	-		-	-	123
	1-2	11,000	0.84	24	17	65	106.84	210
	2-3	7,500	0.180	8.4	7.3	33	48.88	ND
#6	0-1	5,800		-		-		473
	1-2	30	_	-	-		-	70
	2-3	45	-	-	-	-	-	ND

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# Table 1(concentration in mg/kg)

(-) Not Analyzed

(ND) Not Detected

Referring to Table 1, the areas of auger holes #1 and #2 did not exceed the RRAL for TPH. The areas of auger holes #3 and #6 only exceeded the RRAL for TPH of 5,000 mg/kg at a depth of 0-1' below surface. Deeper hydrocarbon impact was detected in the areas of auger holes #4 and #5. The TPH levels in #4 decreased with depth from 17,000 mg/kg at (0-1') to 6,800 mg/kg at (1'-2'). Sample location #5 showed a TPH of 14,000 mg/kg at (0-1') and decreased to 7,500 mg/kg at (2'-3') below surface. The soil samples from #4 and #5 were above the RRAL of 5,000 mg/kg and the vertical extents of the hydrocarbon impact was not defined.

The benzene concentrations detected in samples (#3, #4 and #5) did not exceed the RRAL of benzene of 10 mg/kg. However, the total BTEX concentrations exceeded the RRAL of 50 mg/kg. The soil sample #3 (0-1') detected a total BTEX of 128.4 mg/kg and the deeper sample (1'-2') was below the method detection limit. The soil sample #4 (0-1') showed detectable total BTEX levels of 143.8 mg/kg, which decreased to 64.68 mg/kg at (1'-2') below surface. The soil samples collected in #5 showed a BTEX of 106.84 mg/kg at (1'-2') which decreased below the RRAL of 50 mg/kg to 48.88 mg/kg at (2'-3') below surface.

The chloride evaluation showed detectable levels ranging from 17.5 mg/kg to 473 mg/kg. The deeper samples collected at 2-3' below surface showed levels below the method detection limit, except the area of sample #2 at 17.5 mg/kg. Based on the results, the chloride levels detected do not appear to be an environmental concern.

#### Conclusion

- 1. According to published data, the groundwater is sparse in the area of the Site and no water wells were located in Section 36, Township 22 South, Range 32 East. Publish data indicated water wells are located in Township 23 South, Range 32 East and encountered groundwater at depths greater than 500 feet below surface.
- 2. The Remediation of Leaks, Spills and Releases guidelines require a risk-based evaluation of the site to determine recommended remediation action levels (RRAL) for benzene, toluene, ethylbenzene and xylene (collectively referred to as BTEX) and total petroleum hydrocarbons (TPH) in soil. The proposed RRAL for benzene was determined to be 10 parts per million (ppm) or milligrams per kilogram (mg/kg) and 50 ppm for total BTEX (sum of benzene, toluene, ethylbenzene and xylene). Based on the regional groundwater data, the proposed recommended remedial action level (RRAL) for TPH is 5,000 mg/kg.
- 3. The spill area appears to be confined inside the tank battery dike. During the inspection, no visual impact was noted inside the active tank battery dike. The area inside the dike measured approximately 40' x 80'. The assessment showed the soils located in the north side (sample #1 and #2) of the tank battery were below the RRAL for TPH. The soil in the vicinity of west area (sample #3) and east area (sample #6) of the tanks showed a shallow impact to a depth of 0-1' below surface. Deeper hydrocarbon impact was noted in the south area (#4 and #5) of the tanks, showing a decreasing concentration with depth.

Deeper soil samples could not be collected due to a dense caliche layer encountered at a depth of 2-3' below surface. The impact appears to be shallow and may extend deeper in the areas (#4 and #5). However, due to the dense caliche encountered at these locations, the depth of impact may be limited to the top of the caliche layer. Based on the depth to groundwater, the shallow impact is not considered a threat the groundwater in this area.

4. The chloride evaluation showed detectable levels ranging from 17.5 mg/kg to 473 mg/kg. The deeper samples collected at 2-3' below surface showed levels below the method detection limit, except the area of sample #2 at 17.5 mg/kg. Based on the results, the chloride levels detected do not appear to be an environmental concern.

#### Recommendation

1. Based on the impact and depth to groundwater, Pogo Producing Company propose closure with natural attenuation for the spill area. The tank battery will continue to remain active and maintained. The impacted soil inside the dike will be worked to a depth of 2' below surface to enhance the reduction of the impact levels below the RRAL.

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

Very truly yours,

Ike Tavarez Project Manager/Geologist

cc: Don Riggs – Pogo Producing Co. Berrit Smith – Pogo Producing Co.









# **Case Narrative for: Highlander Environmental Corp**

Certificate of A <u>000</u>	Analysis Number: ) <u>30719</u>		
Report To:	Project Name:	Paga/Shall State #2	TD
Highlander Environmental Corp Ike Tavarez	<u>Site:</u> Site Address:	Fogoranen atale #3	
1910 N. Big Spring Street		Lea County	NM
Midland	PO Number:		
Texas	<u>State:</u>	Texas	
79705-	State Cert. No.:		
ph: (915) 682-4559 fax: (915) 682-3946	Date Reported:		

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

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

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

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

Tatosian Gina

4/6/00

Senior Project Manager

Date



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

# **Highlander Environmental Corp**

	· · · · · · · · · · · · · · · · · · ·	C	ertificate of	Analysis Number:			
			<u>00</u>	030719			
Report To:	Highlander Environr	nental Corp		Project Name:			]
	lke Tavarez			Site:	Pogo/Sheil State #3 Ti	3	
	1910 N. Big Spring S	Street		Site Address:	-		
	Midland				Lea County	NM	
	Texas			PO Number:			
	79705-			State:	Towas		
	ph: (915) 682-4559	fax: (915) 6	82-3946	State.	Texas		
Fax To:	Highlandor Environm	ontal Corn		State Cert. No.:			
	lke Tavarez	fax: (915) 6	82-3946	Date Reported:			
Cl	ient Sample ID	Lab Sample II	D Matrix	Date Collected	Date Received	COC ID	HOLD
#1 (0-1 ft)		00030719-01	Soil	3/22/00	3/25/00 10:00:00 AM		
#1 (1-2)		00030719-02	Soil	3/22/00	3/25/00 10:00:00 AM		
1 (2-3)		00030719-03	Soil	3/22/00	3/25/00 10:00:00 AM		
#2 (0-1)		00030719-04	Soil	3/22/00	3/25/00 10:00:00 AM		
#2 (1-2)		00030719-05	Soil	3/22/00	3/25/00 10:00:00 AM		
2 (2-3)		00030719-06	Soil	3/22/00	3/25/00 10:00:00 AM		
3 (0-1)		00030719-07	Soil	3/22/00	3/25/00 10:00:00 AM		
#3 (1-2)		00030719-08	Soil	3/22/00	3/25/00 10:00:00 AM		
<b>"3 (2-3</b> )		00030719-09	Soil	3/22/00	3/25/00 10:00:00 AM		
4 (0-1)		00030719-10	Soil	3/22/00	3/25/00 10:00:00 AM		
#4 (1-2)		00030719-11	Soil	3/22/00	3/25/00 10:00:00 AM		
#5 (0-1)		00030719-12	Soil	3/22/00	3/25/00 10:00:00 AM		ΠΠ
5 (1-2)	· · · · · · · · · · · · · · · · · · ·	00030719-13	Soil	3/22/00	3/25/00 10:00:00 AM		
5 (2-3)		00030719-14	Soil	3/22/00	3/25/00 10:00:00 AM	1	
#6 (0-1)		00030719-15	Soil	3/22/00	3/25/00 10:00:00 AM	-1	
6 (1-2)		00030719-16	Soil	3/22/00	3/25/00 10:00:00 AM	-	 _ 1
6 (2-3)		00030719-17	Soil	3/22/00	3/25/00 10:00:00 AM		ΞĒ

Junan Latasiai Tatosian, Gina Senior Project Manager

4/6/00

Date

Joel Grice Laboratory Director

Ted Yen Quality Assurance Officer



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

Client Sample ID #1 (	tient Sample ID #1 (0-1 ft)	Colle	Collected: 3/22/00			D: 0003	0719-01	
			Site:	Ρος	jo/Shell State #	3 ТВ		
Analyses/Method		Result	Rep.Limit		Dil. Factor QUA	L Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL				MCL	E325.	3 Units: m	g/Kg	
Chloride		158	10		1	03/30/00 10:15	CV	232408
TOTAL PETROLEUM	HYDROCAR	BONS		MCL	E418.	1 Units: m	g/Kg	
Petroleum Hydrocarbor	ns,TR	970	10		1	03/28/00 12:00	СВ	229618
Run ID/Seq #: EX	_000328B-229	518						
Prep Method	Prep Date		Prep Initials					
	03/28/2000 12	2:00						

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)D - Surrogate Recovery Unreportable due to Dilution

4.6.00 8 46 45 AM

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Client Sample ID #1 (1-2)	Collected: 3/22/00			SPL Sample ID: 00030719-02			
		Site:	Ρος	go/Shell State #3	ГВ		
Analyses/Method	Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL			MCL	E325.3	Units: mg	/Kg	
Chloride	17.5	10		1	03/30/00 10:15	CV	232411
TOTAL PETROLEUM HYDR	OCARBONS		MCL	E418.1	Units: mg	/Kg	
Petroleum Hydrocarbons,TR	ND	10		1	03/28/00 12:00	СВ	229619
Run ID/Seq #: EX_00032	3B-229619						
Prep Method Prep [	Date	Prep Initials					
03/28/	2000 12:00						

Qualifiers:

#### ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL) D - Surrogate Recovery Unreportable due to Dilution

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

Client Sample ID #1	Client Sample ID #1 (2-3)		Colle	ected:	3/22/00	SPL Sample I	D: 0003	0719-03
		_	Site:	Ρο	go/Shell State #3	ГВ		
Analyses/Method		Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL				MCL	E325.3	Units: mg	g/Kg	
Chloride		ND	10		1	03/30/00 10:15	CV	232412
TOTAL PETROLEUN		BONS		MCL	E418.1	Units: mg	g/Kg	
Petroleum Hydrocarb	ons,TR	ND	10		1	03/28/00 12:00	CB	229620
Run ID/Seq #: E	X_000328B-229	9620						
Prep Method	Prep Date		Prep Initials					
<u></u>	03/28/2000	12:00						
	03/28/2000	12:00						

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL) D - Surrogate Recovery Unreportable due to Dilution

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

Client Sample ID #2 (0	0-1)		Coll	ected:	3/22/00	SPL Sample I	<b>D:</b> 0003	0719-04
			Site	: Poç	go/Shell State #3 *	тв		
Analyses/Method	Re	sult	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL				MCL	E325.3	Units: mg	g/Kg	
Chloride		70	10		1	03/30/00 10:15	CV	232413
TOTAL PETROLEUM	HYDROCARBON	IS		MCL	E418.1	Units: mg	g/Kg	
Petroleum Hydrocarbons	s,TR	340	10		1	03/28/00 12:00	CB	229621
Run ID/Seq #: EX_	000328B-229621							
Prep Method	Prep Date		Prep Initials					
	03/28/2000 12:00							

Qualifiers:

#### ND/U - Not Detected at the Reporting Limit

- B Analyte detected in the associated Method Blank
- \* Surrogate Recovery Outside Advisable COLImits

J - Estimated Value between MDL and PQL

----->MCL - Result Over Maximum Contamination Limit(MCL) D - Surrogate Recovery Unreportable due to Dilution

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Client Sample ID #2	lient Sample ID #2 (1-2)			Collected: 3/22/00			SPL Sample ID: 00030719-05	
			Site:	Ρο	o/Shell State #3	ГВ		
Analyses/Method	Res	ult	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL				MCL	E325.3	Units: mg	g/Kg	
Chloride	17	7.5	10		1	03/30/00 10:15	CV	232414
TOTAL PETROLEUM	HYDROCARBONS			MCL	E418.1	Units: mg	j/Kg	
Petroleum Hydrocarbor	is,TR N	ND DI	10		1	03/28/00 12:00	CB	229622
Run ID/Seq #: EX	_000328B-229622							
Prep Method	Prep Date		Prep Initials					
	03/28/2000 12:00							

Qualifiers:

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable OC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL) D - Surrogate Recovery Unreportable due to Dilution

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Client Sample ID #2	2 (2-3)		Colle	ected:	3/22/00	SPL Sample ID	<b>):</b> 0003	0719-06
			Site:	Ρο	go/Shell State #3	ТВ		
Analyses/Method	···	Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL				MCL	E325.3	Units: mg	g/Kg	
Chloride		17.5	10		1	03/30/00 10:15	CV	232415
TOTAL PETROLEUM	HYDROCAR	BONS		MCL	E418.1	Units: mg	g/Kg	
Petroleum Hydrocarbo	ons,TR	ND	10		1	03/28/00 12:00	СВ	229623
Run ID/Seq #: E	X_000328B-229	623			· · · · · · · · · · · · · · · · · · ·			
Prep Method	Prep Date		Prep Initials					
	02/00/2000 4	2.00						

03/28/2000 12:00

Qualifiers:

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B - Analyte detected in the associated Method Blank

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\* - Surrogate Recovery Outside Advisable CC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL) D - Surrogate Recovery Unreportable due to Dilution

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ND/U - Not Detected at the Reporting Limit



Client Sample ID #3 (0-1)	)		Colle	ected:	3/22/00	SPL Sample II	<b>D:</b> 000	30719-07
-			Site:	Ρος	go/Shell State #3	тв		
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	. Date Analyzed	Analysi	Seq. #
CHLORIDE, TOTAL				MCL	E325.3	Units: m	g/Kg	
Chloride	52.5		10		1	03/30/00 10:15	CV	232418
PURGEABLE AROMATIC	:S			MCL	SW8021B	Units: ug	/Kg	
Benzene	1400		1000		1000	04/05/00 9:42	CJ	237450
Ethylbenzene	22000		1000		1000	04/05/00 9:42	CJ	237450
Toluene	32000		1000		1000	04/05/00 9:42	CJ	237450
m,p-Xylene	48000		1000		1000	04/05/00 9:42	CJ	237450
o-Xylene	25000		1000		1000	04/05/00 9:42	CJ	237450
Xylenes, Total	73000		1000		1000	04/05/00 9:42	CJ	237450
Surr: 1,4-Difluorobenzene	e 126	%	59-127		1000	04/05/00 9:42	CJ	237450
Surr: 4-Bromofluorobenzo	ene 202	%	48-156		1000 *	04/05/00 9:42	CJ	237450
TOTAL PETROLEUM HY	DROCARBONS		·····	MCL	E418.1	Units: m	g/Kg	
Petroleum Hydrocarbons,Tf	२ 14000		200		20	03/28/00 12:00	СВ	229624
Run ID/Seq #: EX_000	0328B-229624							
Prep Method Pr	ep Date		Prep Initials					

03/28/2000 12:00

Qualifiers:

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Adv sable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL) D - Surrogate Recovery Unreportable due to Dilution

4/6/00 8.46 47 AM

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Client Sample ID #3 (1-2)			Col	lected:	3/22/00	SPL Sample II	<b>D:</b> 000:	30719-08
			Site	: Pog	go/Shell State #3	гв		
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL				MCL	E325.3	Units: m	g/Kg	
Chloride	26.3		10		1	03/30/00 10:15	CV	232419
PURGEABLE AROMATICS	u			MCL	SW8021B	Units: ug	/Kg	
Benzene	ND		1		1	04/05/00 4:29	CJ	237043
Ethylbenzene	ND		1		1	04/05/00 4:29	CJ	237043
Toluene	ND		1		1	04/05/00 4:29	CJ	237043
m,p-Xylene	ND		1		1	04/05/00 4:29	CJ	237043
o-Xylene	ND		1		1	04/05/00 4:29	CJ	237043
Xylenes, Total	ND	• •	1		1	04/05/00 4:29	CJ	237043
Surr: 1,4-Difluorobenzene	87.4	%	59-127		1	04/05/00 4:29	CJ	237043
Surr: 4-Bromofluorobenzene	104	%	48-156		1	04/05/00 4:29	CJ	237043
TOTAL PETROLEUM HYDROCA	RBONS			MCL	E418.1	Units: m	g/Kg	
Petroleum Hydrocarbons,TR	85		10		1	03/28/00 12:00	СВ	229625
Run ID/Seq #: EX_000328B-2	29625	-						

 Prep Method
 Prep Date
 Prep Initials

 03/28/2000 12:00

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL) D - Surrogate Recovery Unreportable due to Dilution

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Client Sample ID #3 (	Client Sample ID #3 (2-3)			Collected: 3/22/00			SPL Sample ID: 00030719-09		
			Site:	Ρος	go/Shell State #3	ГВ			
Analyses/Method	R	esult	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #	
CHLORIDE, TOTAL				MCL	E325.3	Units: m	g/Kg		
Chloride		ND	10		1	03/30/00 10:15	CV	232420	
TOTAL PETROLEUM	HYDROCARBON	IS		MCL	E418.1	Units: m	g/Kg		
Petroleum Hydrocarbon	s,TR	620	10		1	03/28/00 12:00	СВ	229626	
Run ID/Seq #: EX	000328B-229626			_					
Prep Method	Prep Date		Prep Initials						
	03/28/2000 12:00								

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL) D - Surrogate Recovery Unreportable due to Dilution

4/6/00 8 46 47 AM

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Client Sample ID #4 (0-1)			Col	lected:	3/22/00		SPL Sample II	<b>D:</b> 000	030719-10
			Site	e: Pog	go/Shell State	#3 -	гв		-
Analyses/Method	Result		Rep.Limit		Dil. Factor Q	UAL	Date Analyzed	Analys	t Seq. #
CHLORIDE, TOTAL				MCL	E32	5.3	Units: m	g/Kg	
Chloride	403		10		1		03/30/00 10:15	CV	232421
PURGEABLE AROMATICS				MCL	SW802	1B	Units: ug	/Kg	
Benzene	3800		1000		1000		04/04/00 12:16	CJ	236155
Ethylbenzene	23000		1000		1000		04/04/00 12:16	CJ	236155
Toluene	37000		1000		1000		04/04/00 12:16	CJ	236155
m,p-Xylene	54000		1000		1000		04/04/00 12:16	CJ	236155
o-Xylene	26000		1000		1000		04/04/00 12:16	CJ	236155
Xylenes,Total	80000		1000		1000		04/04/00 12:16	CJ	236155
Surr: 1,4-Difluorobenzene	126	%	59-127		1000		04/04/00 12:16	CJ	236155
Surr: 4-Bromofluorobenzene	225	%	48-156		1000 *		04/04/00 12:16	CJ	236155
TOTAL PETROLEUM HYDROCA	RBONS			MCL	E418	B.1	Units: mg	g/Kg	
Petroleum Hydrocarbons,TR	17000		200		20		03/28/00 12:00	СВ	229628
Run ID/Seg #: EX 0003288-2	29628								

Prep Method

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

Qualifiers:

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\_\_\_\_ . ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

------>MCL - Result Over Maximum Contamination Limit(MCL) D - Surrogate Recovery Unreportable due to Dilution

4-6-00 8-46-48 AM

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Client Sample ID #4 (1-2)			Col	lected:	3/22/00	SPL Sample II	<b>):</b> 0003	30719-11
			Site	e: Pog	go/Shell State #3	тв		
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL				MCL.	E325.3	Units: m	g/Kg	
Chloride	ND		10		1	03/30/00 10:15	CV	232422
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	/Kg	
Benzene	480		250		500	04/05/00 11:51	CJ	237452
Ethylbenzene	11000		500		500	04/05/00 11:51	CJ	237452
Toluene	9200		500		500	04/05/00 11:51	CJ	237452
m,p-Xylene	29000		500		500	04/05/00 11:51	CJ	237452
o-Xylene	15000		500		500	04/05/00 11:51	CJ	237452
Xylenes, Total	44000		500		500	04/05/00 11:51	CJ	237452
Surr: 1,4-Difluorobenzene	117	%	59-127		500	04/05/00 11:51	CJ	237452
Surr: 4-Bromofluorobenzene	267	%	48-156		500 *	04/05/00 11:51	CJ	237452
TOTAL PETROLEUM HYDROCA	RBONS			MCL	E418.1	Units: mg	g/Kg	
Petroleum Hydrocarbons,TR	6800		100		10	03/28/00 12:00	СВ	229630
Bun ID/Seg #: EX 000328B-2	20630							****

Kun ID/ sey # Prep Method Prep Date Prep Initials 03/28/2000 12:00

Qualifiers:

- ND/U Not Detected at the Reporting Limit
- \_\_\_\_ B - Analyte detected in the associated Method Blank
- \* Surrogate Recovery Outside Advisable QC Limits
- J Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL) D - Surrogate Recovery Unreportable due to Dilution

4/6/00 8 46 48 AM

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Client Sample ID #5 (0-1)		Colle	ected:	3/22/00	SPL Sample ID: 00030719-12				
		Site:	Ρος	go/Shell State #3	ТВ				
Analyses/Method	Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #		
CHLORIDE, TOTAL			MCL	E325.3	Units: mg	g/Kg			
Chloride	123	10		1	03/30/00 10:15	CV	232425		
TOTAL PETROLEUM H	IYDROCARBONS		MCL	E418.1	Units: mg	g/Kg			
Petroleum Hydrocarbons	,TR 14000	500		50	03/30/00 0:00	G_T	232328		
Run ID/Seq #: EX_	000330C-232328								
Prep Method	Prep Date	Prep Initials							
<u> </u>	03/30/2000 0:00								

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL) D - Surrogate Recovery Unreportable due to Dilution

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4 5.00 8 45 48 AM

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Client Sample ID #5 (1-2)			Col	lected:	3/22/00	SPL Sample I	<b>D:</b> 0003	80719-13
			Site	: Poç	go/Shell State #3	ГВ		
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL				MCL	E325.3	Units: m	g/Kg	
Chloride	210		10		1	03/30/00 10:15	CV	232426
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	/Kg	
Benzene	840	-	500		500	04/05/00 9:14	CJ	237449
Ethylbenzene	17000		500		500	04/05/00 9:14	CJ	237449
Toluene	24000		500		500	04/05/00 9:14	CJ	237449
m,p-Xylene	45000		500		500	04/05/00 9:14	CJ	237449
o-Xylene	20000		500		500	04/05/00 9:14	CJ	237449
Xylenes, Total	65000		500		500	04/05/00 9:14	CJ	237449
Surr: 1,4-Difluorobenzene	124	%	59-127		500	04/05/00 9:14	CJ	237449
Surr: 4-Bromofluorobenzene	264	%	48-156		500 *	04/05/00 9:14	CJ	237449
TOTAL PETROLEUM HYDROCA	ARBONS			MCL	E418.1	Units: m	g/Kg	
Petroleum Hydrocarbons,TR	11000		500		50	03/30/00 0:00	G_T	232329

Prep Initials

Run ID/Seq #: EX\_000330C-232329

Prep Method Prep Date 03/30/2000 0:00

Qualifiers:

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- -----ND/U - Not Detected at the Reporting Limit
- B Analyte detected in the associated Method Blank
- \* Surrogate Recover, Outside Advisable OC Limits

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J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL) D - Surrogate Recovery Unreportable due to Dilution

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Client Sample ID #5 (2-3)			Col	lected:	3/22/00	SPL Sample II	<b>D:</b> 000	30719-14
			Site	: Poç	go/Shell State #3	ТВ		
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL				MCL	E325.3	Units: m	g/Kg	
Chloride	ND		10		1	03/30/00 10:15	CV	232427
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	/Kg	
Benzene	180		100		200	04/05/00 11:20	CJ	23745
Ethylbenzene	7300		200		200	04/05/00 11:20	CJ	237451
Toluene	8400		200		200	04/05/00 11:20	CJ	237451
m,p-Xylene	22000		200	~~~~	200	04/05/00 11:20	CJ	237451
o-Xylene	11000		200	<b>~ I</b>	200	04/05/00 11:20	CJ	237451
Xylenes, Total	33000		200		200	04/05/00 11:20	CJ	23745
Surr: 1,4-Difluorobenzene	116	%	59-127		200	04/05/00 11:20	CJ	237451
Surr: 4-Bromofluorobenzene	331	%	48-156		200 *	04/05/00 11:20	CJ	237451
TOTAL PETROLEUM HYDROCA	RBONS			MCL	E418.1	Units: mg	g/Kg	
Petroleum Hydrocarbons,TR	7500		500		50	03/30/00 0:00	G_T	232331
Run ID/Seq #: EX_000330C-2	32331							

 Prep Method
 Prep Date
 Prep Initials

 03/30/2000 0:00
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Qualifiers:

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL) D - Surrogate Recovery Unreportable due to Dilution

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4.6 CC 8 46 49 AM



Client Sample ID #6 (		Colle	ected:	3/22/00	SPL Sample ID: 00030719-15			
			Site:					
Analyses/Method		Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL				MCL	E325.3	Units: mg	g/Kg	
Chloride		473	10		1	03/30/00 10:15	CV	232429
TOTAL PETROLEUM	HYDROCARB	ONS		MCL	E418.1	Units: mg	g/Kg	
Petroleum Hydrocarbon	is,TR	5800	500		50	03/30/00 0:00	G_T	232332
Run ID/Seq #: EX	_000330C-2323	32						
Prep Method	Prep Date		Prep Initials					
	03/30/2000 0:0	00						

Qualifiers:

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL) D - Surrogate Recovery Unreportable due to Dilution

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4/6.00 8 46 49 AM

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

Client Sample ID #6	Colle	ected:	3/22/00	SPL Sample ID: 00030719-16				
			Site:					
Analyses/Method		Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL				MCL	E325.3	Units: mg	ı/Kg	
Chloride		70	10		1	03/30/00 10:15	CV	232430
TOTAL PETROLEUM	HYDROCARBO	DNS		MCL	E418.1	Units: mg	/Kg	
Petroleum Hydrocarbor	ns,TR	30	10		1	03/30/00 0:00	G_T	232333
Run ID/Seq #: EX	_000330C-23233	3						
Prep Method	Prep Date		Prep Initials					
	03/30/2000 0:00	)						

Qualifiers:

#### ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

- \* Surrogate Recovery Outside Advisable QC Limits
- J Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL) D - Surrogate Recovery Unreportable due to Dilution

4 6.00 8 46 50 AM



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

Client Sample ID #6 (2-3)		Colle	ected:	3/22/00	SPL Sample ID: 00030719-17				
, , , , , , , , , , , , , , , , , , ,		Site:	Ρος	go/Shell State #3 1	ТВ				
Analyses/Method	Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #		
CHLORIDE, TOTAL		· · · · · · · · · · · · · · · · · · ·	MCL	E325.3	Units: mg	g/Kg			
Chloride	ND	10		1	03/30/00 10:15	CV	232431		
TOTAL PETROLEUM H	YDROCARBONS		MCL	E418.1	Units: mg	g/Kg			
Petroleum Hydrocarbons,	TR 45	10		1	03/30/00 0:00	G_T	232335		
Run ID/Seq #: EX_0	00330C-232335								
Prep Method	Prep Date	Prep Initials							
(	03/30/2000 0:00								

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recover, Outs de Adusable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL) D - Surrogate Recovery Unreportable due to Dilution

4.6/00 8 46 50 AM

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-Quality Control Documentation



## **Quality Control Report**

#### Highlander Environmental Corp

Analysis: Method:	Total Petro E418.1	oleum Hydro	ocarbons							Worl Lab I	Order: Batch ID:	00030719 R11339	
		Metho	d Blank				Sar	mples in	Analy	tical Bat	ch:		
RunID:	EX_000328E	-229605	Units:	mg/Kg			Lat	b Sampl	e ID		Client S	ample ID	
Analysis Date:	03/28/2000	12:00	Analyst:	СВ			000	030719-0	)1A		#1 (0-1 f	t)	
Preparation Dat	e: 03/28/2000	12:00	Prep By:	. N	Nethod		000	030719-0	)2A		#1 (1-2)		
•							000	030719-0	)3A		#1 (2-3)		
r				Desult	Den Line	1	000	030719-0	)4A		#2 (0-1)		
0.	A http://www.lukura.com			Result	Rep Limit	tj T	000	030719-0	)5A		#2 (1-2)		
Pe	troleum Hydrocan	oons, IR			10	5	000	030719-0	)6A		#2 (2-3)		
							000	030719-0	)7A		#3 (0-1)		
							000	030719-0	A80		#3 (1-2)		
							000	030719-0	)9A		#3 (2-3)		
							000	030719-1	IOA		#4 (0-1)		
							000	030719-1	1A		#4 (1-2)		
			<u> </u>	La	boratory	Control	Sample (I						
		RunID:		EX_00032	28B-229606	i Ui	nits: r	ng/Kg					
		Analysis	Date:	03/28/20	000 12:00	A	nalyst: (	СВ					
		Preparat	ion Date:	03/28/20	000 12:00	Pi	rep By:	Me	thod				
		[	Analy	te	r	Snike	Result	Perce	ent	Lower	Upper		
				<u> </u>		Added		Recov	very	Limit	Limit		
		Petroleum	Hydrocarbo	ons,TR		200	200		100	86	117		
			<u>Matrix</u>	Spike (M	<u>IS) / Matri</u>	x Spike_	Duplicate	(MSD)					
		Sample	e Spiked:	000307	719-01								
		RunID:		EX_000	328B-2296	32	Units:	mg/Kg					
		Analys	is Date:	03/28/2	2000 12:00	о.	Analyst:	СВ					
		Prepar	ation Date:	03/28/2	2000 12:00	0	Prep By:	Μ	lethod				
	Analyte		Sample	MS	MS Re	sult	MS %	MSD	MSD	Result	MSD %	RPD RPD Lo	w High
		l	Result	Added		I F	Recovery	Spike Added		1	Recovery	Limit   Lir	nit   Limit
					1				, .	- +			1

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

4/6/00 8:46:53 AM



## **Quality Control Report**

#### Highlander Environmental Corp

nalysis: Method:	Total Petro E418.1	oleum Hydro	ocarbons							Worl Lab I	(Order: Batch ID:	0003 R115	0719 516	
		Method	l Blank				S	amples	in Ana	lytical Bat	ch:			
unID:	EX_0003300	2-232321	Units:	mg/Kg	3		L	ab Sam	ple ID		Client S	ample II	D	
Analysis Date:	03/30/2000	0:00	Analyst:	GТ			00	030719	9-12A		#5 (0-1)		-	
Preparation Date	e: 03/30/2000	0:00	Prep By:	-	Method		00	0030719	9-13A		#5 (1-2)			
							00	0030719	9-14A		#5 (2-3)			
•				<b>D</b> II	Destin		00	0030719	9-15A		#6 (0-1)			
Bet			ļ.	Result			00	0030719	9-16A		#6 (1-2)			
Pet	roleum Hyorocar	oons, i R			<u></u>	01	00	030719	9-17A		#6 (2-3)			
<b>)</b>				<u>L</u> ;	aboratory	Contro	ol Sample	(LCS)						
		Run(D)		FX 0003	300-23232	2	l Inite:	ma/Ka						
		Analysis I	Date:	03/30/2	000 20202	-	Analyst	GT						
-		Prenarati	on Date:	03/30/2			Pren Bv	<u> </u>	/ethod					
		ricparati	on Date.	00/00/2	000 0.00		1 100 09.		nourou					
ł			Analyte	e		Spike	Result	Per	cent	Lower	Upper			
-						Addeo	1	Rec	overy	Limit	Limit			
		Petroleum H	lydrocarbo	ns,TR		20	00 19	0	95	86	117			
					4									
			Matrix S	Spike (I	MS) / Matr	ix Spik	e Duplicat	e (MSD	<u>))</u>					
		Sample	Sniked	00030	710-16									
		BunD	орікец.	EX 00	0330C-2323	38	Unite	ma/K	a					
		Analysis	nate.	03/30/	2000 0.00		Analyst <sup>.</sup>	GT	9					
		Prepara	tion Date:	03/30/	2000 0:00		Prep By:	0_1	Method	t				
·,	Analyte		Sample Result	MS Spike	MS Re	esult	MS % Recovery	MSD Spike	MSI	D Result	MSD % Recovery	RPD I	RPD Limit	Low High Limit Limit
1				Added				Adde	a					
Petroleum Hydro	carbons,TR		30	20	oj	220	97.	5 20	00	240	102	5.00	8	72 119

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

4/6/00 8 46.53 AM



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#### **Quality Control Report**

#### **Highlander Environmental Corp**

Analysis: Method:	Purgeable SW8021B	Aromatics							Work Lab B	Order: Batch ID:	0003 R11(	10719 682		
<u></u>		Metho	d Blank	<b></b>		Sa	mples in	Analy	ical Bat	ch:				
RuniD	HP R 0004	03A-235199	Linite:	ua/Ka								_		
Apolymia Data	• 04/03/2004	0 20.50	Analust:			<u>Lat</u>	5 Sample			Client Sa #4 (0-1)	ample l	D		
Analysis Dale	. 04/03/200	0 20:59	Analyst:	CJ		000	507 19-1	UA		#4 (0-1)				
1														
,				<u> </u>										
		Analyte		Result Re	ep Limit									
	Ethylbenzene			ND	1.0									
	Toluene			ND	1.0									
-	m,p-Xylene				1.0									
_	Xvlenes.Total			ND	1.0									
	Surr: 1,4-Difluoro	benzene		94.1	59-127									
<b>5</b> 1	Surr: 4-Bromoflue	probenzene		98.1	48-156									
				Labo	ratory Contro	l Sample (l	<u>.CS)</u>							
		RunID:		HP_R_0004(	03A-235487	Units: u	ug/Kg							
-		Analysis	Date:	04/04/2000	8:19	Analyst: (	CJ							
•		[	Analyte	ə Ə	Spike	Result	Perce	nt L	ower	Upper				
					Addec	1	Recov	ery	Limit	Limit				
		Benzene		·····		50 48	5	95	60	116				
		Ethylbenze	ne			50 48		95	68	127				
		Toluene			5	50 47		94	64	122				
		m,p-Xylene	•		10	0 94	•	94	68	129				
		o-Xylene			5	50 47	'	94	68	127				
		Xylenes,To	otal		15	50 141	1	94	68	129				
		· <u> </u>												
							(1105)							
			<u>Matrix S</u>	<u>špike (MS)</u>	/ Matrix Spike	e Duplicate	(MSD)							
		Sample	e Spiked:	00030881	1-07									
		Sample RunID:	e Spiked:	00030881 HP_R_000	I-07 403A-235195	Units:	ug/Kg							
l		Sample RunID: Analys	e <b>Spiked:</b> : is Date:	00030881 HP_R_000 04/03/200	1 <b>-07</b> 1 <b>403A-235195</b> )0 18:49	Units: Analyst:	<b>ug/Kg</b> CJ							
		Sample RunID: Analys	e Spiked: : is Date:	00030881 HP_R_000 04/03/200	1-07 403A-235195 00 18:49	Units: Analyst:	<b>ug/Kg</b> CJ							
5 8		Sample RunID: Analys	e Spiked: : is Date:	00030881 HP_R_000 04/03/20(	<b>I-07</b> 403A-235195 )0 18:49	Units: Analyst:	ug/Kg CJ							
	Analyte	Sample RunID: Analys	e Spiked: is Date: Sample	00030881 HP_R_000 04/03/20(	I-07 403A-235195 00 18:49 MS Result	Units: Analyst: MS %	ug/Kg CJ MSD	MSD	Result	MSD %	RPD	RPD L	ow ∐H	ligh
	Analyte	Sample RunID: Analys	e Spiked: is Date: Sample Result	00030881 HP_R_000 04/03/200 MS Spike	H-07 403A-235195 00 18:49 MS Result	Units: Analyst: MS % Recovery	ug/Kg CJ MSD Spike	MSD	Result	MSD % Recovery	RPD	RPD Lo Limit Li	ow ∏H mit   L	ligh .imit
	Analyte	Sample RunID: Analys	e Spiked: is Date: Sample Result	00030881 HP_R_000 04/03/20( MS Spike Added	H-07 403A-235195 00 18:49 MS Result	Units: Analyst: MS % Recovery	ug/Kg CJ MSD Spike Added	MSD	Result	MSD % Recovery	RPD	RPD Lo Limit Li	ow H mit L	ligh .imit
Benzene	Analyte	Sample RunID: Analys	e Spiked: is Date: Sample Result ND	00030881 HP_R_000 04/03/20( MS Spike Added 20	I-07 403A-235195 00 18:49 MS Result 15	Units: Analyst: MS % Recovery 77.1	ug/Kg CJ MSD Spike Added 20	MSD	Result 14	MSD % Recovery 70.8	RPD 8.58	RPD Lo Limit Li 	ow H mit L 35	ligh .imit 139
Benzene Ethylbenzene	Analyte	Sample RunID: Analys	e Spiked: is Date: Sample Result ND	00030881 HP_R_000 04/03/200 MS Spike Added 20 20	I-07 403A-235195 00 18:49 MS Result 15 15	Units: Analyst: MS % Recovery 77.1 76.0	ug/Kg CJ MSD Spike Added 20 20	MSD	Result 14 14	MSD % Recovery 70.8 71.0	RPD 8.58 6.78	RPD Lu Limit Li 34 35	ow F mit L 35 31	ligh -imit 139 137
Benzene Ethylbenzene Toluene	Analyte	Sample RunID: Analys	e Spiked: is Date: Sample Result ND ND	00030881 HP_R_000 04/03/200 MS Spike Added 20 20 20	I-07 403A-235195 00 18:49 MS Result 15 15 16	Units: Analyst: MS % Recovery 77.1 76.0 78.0	ug/Kg CJ MSD Spike Added 20 20 20	MSD I	Result 14 14 14	MSD % Recovery 70.8 71.0 71.5	8.58 6.78 8.72	RPD Limit 34 35 28	ow   F mit   L 35 31 31	ligh _imit 139 137 137
Benzene Ethylbenzene Toluene m.p-Xylene	Analyte	Sample RunID: Analys	e Spiked: is Date: Sample Result ND ND	00030881 HP_R_000 04/03/200 MS Spike Added 20 20 20 40	I-07 403A-235195 00 18:49 MS Result 15 16 30	Units: Analyst: MS % Recovery 77.1 76.0 78.0 75.4	ug/Kg CJ MSD Spike Added 20 20 20 40	MSD I	Result 14 14 14 28	MSD % Recovery 70.8 71.0 71.5 70.7	8.58 6.78 8.72 6.41	RPD Li Limit Li 34 35 28 38	ow H mit L 35 31 31 19	ligh .imit 139 137 137 144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

4/6/00 8.46 53 AM



#### **Quality Control Report**

#### Highlander Environmental Corp

nalysis: Method:	Purgeable SW8021B	e Aromatics	Wor Lab	000 R11	30719 682							
		<u>Matrix</u>	c Spike (M	S) / Matrix Spik	e Duplicate	e (MSD)						
		Sample Spiked: RunID: Analysis Date:	000300 HP_R_( 04/03/2	381 <b>-07</b> 000403A-235195 2000 18:49	Units: Analyst:	ug/Kg CJ						
	Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Xylenes,Total		1	ID 60	45	75.0	60	42	70.0	6.90	38	19	144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

nk D - Recovery Unreportable due to Dilution

B - Analyte detected in the associated Method Blank

J - Estimated value between MDL and PQL

4/6/00 8 46 54 AM



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

#### **Quality Control Report**

#### **Highlander Environmental Corp**

Analysis: Method:	Purgeable SW8021B	Aromatics						Worl Lab I	ROrder: Batch ID:	R117	63		
		Metho	d Blank			Sai	mples in A	nalytical Bat	tch:				
RuniD:	HP_R_0004	04A-236808	Units:	ug/Kg		Lat	o Samole II	ם	Client S	ampie IC	)		
nalysis Date:	: 04/04/2000	0 16:49	Analyst:	CJ		000	30719-07A		#3 (0-1)		-		
•			•			000	030719-08A		#3 (1-2)				
						000	)30719-11A		#4 (1-2)				
Г					<u> </u>	000	)30719-13A	L .	#5 (1-2)				
	<u>م</u>	nalyte		Result F	Rep Limit	000	)30719-14A		#5 (2-3)				
	Benzene			ND ND	0.50				. ,				
Aethod: RuniD: unalysis Date:	Foluene			ND	1.0	••"							
	n,p-Xylene			ND	1.0								
	D-Xylene			ND	1.0								
	Surr: 1,4-Difluoro	benzene		91.2	59-127								
C	Surr: 4-Bromofluc	orobenzene		94.4	48-156								
<u></u>	. <u> </u>			Lab	oratory Contro	ol Sample (L	<u>.CS)</u>		- <u></u>				
		RunID:		HP_R_0004	104A-236807	Units: u	ıg/Kg						
		Analysis	Date:	04/04/200	0 15:55	Analyst: C	CJ						
			Analy	te	Spike	Result	Percent	Lower	Upper				
			Analy	te	Spike Adde	e Result	Percent Recovery	Lower Limit	Upper Limit				
		Benzene	Analy	te	Spike Adde	e Result d 50 43	Percent Recovery	Lower Limit	Upper Limit 116				
		Benzene Ethylbenze	Analy	te	Spike Adde	e Result d 50 43 50 42	Percent Recovery 8	Lower Limit 5 60 4 68	Upper Limit 116 127				
		Benzene Ethylbenze Toluene	Analy	te	Spike Adde	e Result d 50 43 50 42 50 43	Percent Recovery 8	Lower Limit 5 60 4 68 6 64	Upper Limit 116 127 122				
		Benzene Ethylbenze Toluene m.p-Xylene	Analy ne	te	Spike Adde	e Result d 50 43 50 42 50 43 00 84	Percent Recovery 8 8 8 8 8 8 8 8	Lower Limit 5 60 44 68 66 64 44 68	Upper Limit 116 127 122 129				
		Benzene Ethylbenze Toluene m.p-Xylene o-Xylene	Analy ne	te	Spike Adde	Result 50 43 50 42 50 43 50 43 00 84 50 42	Percent Recovery 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Lower Limit 5 60 4 68 6 64 4 68 4 68	Upper Limit 116 127 122 129 127				
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	Analyte	Benzene Ethylbenzer Toluene m.p-Xylene o-Xylene Xylenes,To Sample RunID: Analysi	Analy ne tal tal Spiked: s Date: Sample Result	te Spike (MS 0004004 HP_R_000 04/04/20 MS Spike Added	Spike Adde	Result d 50 43 50 43 50 43 50 43 50 43 50 43 50 42 50 126 ce Duplicate Units: Analyst: MS % Recovery	Percent Recovery 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 9 8 9 8	Lower Limit 5 60 4 68 6 64 4 68 4 68 4 68	Upper Limit 116 127 122 129 127 129	RPD F	RPD [ L imit ] L	ow	High
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Benzene Ethylbenzene	Analyte	Benzene Ethylbenzer Toluene m.p-Xylene o-Xylene Xylenes,To Sample RunID: Analysi	Analy ne tal tal Spiked: 's Date: Sample Result	te <u>Spike (MS</u> 0004004 HP_R_000 04/04/20 MS Spike Added 6 20 D 20	Spike Adde	Result 50 43 50 43 50 43 50 43 50 43 50 42 50 126 Ce Duplicate Units: Analyst: MS % Recovery 54.0 74.0	Percent Recovery 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Lower Limit 5 60 4 68 6 64 4 68 4 68 4 68 4 68 4 68 5 68 5 64 5 68 5 64 5 68 5 64 5 68 5 60 5 60 5 60 5 60 5 60 5 60 5 60 5 60	Upper Limit 116 127 122 129 127 129 127 129 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	RPD [ 8.87 5.76	RPD L imit L 34	ow 1 imit 351	High Lim
<u>Benzene</u> Ithylbenzene	Analyte	Benzene Ethylbenzer Toluene m.p-Xylene o-Xylene Xylenes,To Sample RunID: Analysi	Analy ne tal tal Spiked: 's Date: Sample Result 6. NI	te Spike (MS 0004004 HP_R_000 04/04/20 MS Spike Added 6 20 D 20 D 20	Spike Adde	Result d 50 43 50 43 50 43 50 43 50 42 50 43 50 42 50 126 ce Duplicate Units: Analyst: MS % Recovery 54.0 74.0 76.4	Percent Recovery 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Lower Limit 55 60 44 68 56 64 44 68 44 68 44 68 50 Result 18 16 17	Upper Limit 116 127 122 129 127 129 127 129 8 8 8 9 8 8 9 9 7 8.4 8 1.9	RPD F 8.87 5.76 6.99	RPD L imit L 34 35 28	ow   imit   35  31  31	High Lim
3enzene Ithylbenzene Ithylbenzene In.pXylene	Analyte	Benzene Ethylbenzer Toluene m.p-Xylene o-Xylene Xylenes,To Sample RunID: Analysi	Analy ne tal tal Sample Result 6.1 NI NI 1.1	te Spike (MS 0004004 HP_R_000 04/04/20 MS Spike Added 6 20 2 20 2 20 4 40	Spike Adde	Result d 50 43 50 43 50 43 50 43 50 42 50 126 ce Duplicate Units: Analyst: MS % Recovery 54.0 74.0 76.4 74.0	Percent Recovery 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Lower Limit 55 60 44 68 56 64 44 68 44 68 44 68 44 68 50 Result 18 16 17 33	Upper Limit 116 127 129 129 127 129 129 59.0 78.4 81.9 78.7	RPD [ 8.87 5.76 6.99 6.09	RPD   L imit   L 34 35 28 38	ow imit 351 31 19	High Lim 13 13 13

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B - Analyte detected in the associated Method Blank D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

4/6/00 8 46 54 AM



#### **Quality Control Report**

#### **Highlander Environmental Corp**

Method:	Purgeable Are SW8021B					(1100)	wor Lab	KOrder: Batch ID:	000 R11	30719 763		
		<u>Matrix</u> Sample Spiked: RunID:	000400 HP_R_0	<u>S) / Matrix Spik</u> 41-05 00404A-236824	Units:	ug/Kg						
j	Analyte	Sample	MS	MS Result			MSD Result	MSD %	RPD	RPD	Low	High
		Result	Spike Added	ine ricourt	Recovery	Spike Added		Recovery		Limit	Limit	Limit
Xylenes, Total		1.4	60	46	74.3	60	50	81.0	8.58	38	19	144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

- \* Recovery Outside Advisable QC Limits
- B Analyte detected in the associated Method Blank

J - Estimated value between MDL and PQL

D - Recovery Unreportable due to Dilution

4/6/00 8 46 54 AM



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

# **Quality Control Report**

# Highlander Environmental Corp

Analysis: Method:	Chloride, Total E325.3						Worl Lab	kOrder: Batch ID:	00030719 R11518A	•	
	<u>M</u> e	thod Blank	·		Sa	mples in	Analytical Ba	tch:			
RunID:	WET_000330Q-23241	6 Units:	mg/Kg		La	b Sampl	<u>e ID</u>	<u>Client Sa</u>	mple ID		
analysis Date:	03/30/2000 10:15	Analyst:	CV		00	030719-0	)1A	#1 (0-1 ft)	)		
					00	030719-0	2A	#1 (1-2)			
					00	030719-0	3A	#1 (2-3)			
ſ	Analyte		Result	Rep Limit	00	030719-0	14A	#2 (0-1)			
C	Chloride		ND	10	00	030719-0	15A 16A	#2 (1-2) #2 (2-3)			
					00	030719-0	07A	#2 (2-3) #3 (0-1)			
					00	030719-0	8A	#3 (1-2)			
					00	030719-0	9A	#3 (2-3)			
					00	030719-1	0A	#4 (0-1)			
	Sa Ru An:	<u>Matrix</u> nple Spiked: nID: alysis Date:	Spike (MS) / Matrix Spike Duj 00030719-01 WET_000330Q-232409 Uni 03/30/2000 10:15 Ana			e (MSD) mg/Kg CV					
	Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD RPD Limit	Low Limit	High Limi
Chloride	· · · · · · · · · · · · · · · · · · ·	160	500	648	98.1	500	648	98.1	0 20	91.8	115
Qualifiers:	ND/U - Not Detect	ed at the Repo	ting Limit		* - Recover	Quiteide	Advisable OC I	imits			

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#### **Quality Control Report**

#### **Highlander Environmental Corp**

nalysis:	Chloride, Total			WorkOrder:	00030719
Method:	E325.3			Lab Batch ID:	R11518B
	Metho	d Blank	Samples in Analytic	al Batch:	
luniD:	WET_000330Q-232416	Units: mg/Kg	Lab Sample ID	Client Sa	imple ID
Analysis Date:	03/30/2000 10:15	Analyst: CV	00030719-11A	#4 (1-2)	
			00030719-12A	#5 (0-1)	
			00030719-13A	#5 (1-2)	
•		Desuit Des Limit	00030719-14A	#5 (2-3)	
-	Analyte		00030719-15A	#6 (0-1)	
			00030719-16A	#6 (1-2)	
			00030719-17A	#6 (2-3)	

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

Sample Spiked: RunID: Analysis Date:

d: 00030719-11 WET\_000330Q-232423 03/30/2000 10:15

Units: mg/Kg Analyst: CV

	Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Chloride		ND	500	508	102	500	508	102	0	20	91.8	115

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

4/6/00 8:46.55 AM

Chain of Custody And Sample Receipt Checklist

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# Highlander Environmental Corp.

Midland, Texas

March 24, 2000

Southern Petroleum Lab

# Re: Pogo Producing Company, Shell State # 3 (Job # 1439), Laboratory Analysis Request

Please run the analysis requested on the chain of custody. In addition, not included on the COC, run BTEX analysis on the two highest TPH results from samples #1 thru #6 (0-1'). Please call or fax the analysis on the TPH analysis to determine if additional analysis will be performed the deeper samples.

Please call if you have questions.

Sincerely, Highlander Environmental)Corp Ike Tavarez

Project Manager

1910 N. Big Spring



# PHOTOGRAPHIC DOCUMENTATION POGO - SPILL ASSESSMENT - LEA COUNTY Shell State #3 Tank Battery



1. View of Shell State #3 Tank Battery



2. View of Shell State #3 Tank Battery

# PHOTOGRAPHIC DOCUMENTATION POGO – SPILL ASSESSMENT - LEA COUNTY Shell State #3 Tank Battery



3. View of spill area and sample locations (auger holes #1 and #2)



4. View of spill area and sample location (auger hole #3)

# PHOTOGRAPHIC DOCUMENTATION POGO - SPILL ASSESSMENT - LEA COUNTY Shell State #3 Tank Battery



5. View of spill area and sample locations (auger holes #4 and #5)



6. View of spill area and sample location (auger hole #6)