



**Clean Up Corporation**

P.O. Box 1247 ☆ Ft. Morgan, Colorado 80701 ☆ (970) 867-9507 ☆ Fax (970) 542-0765



#3548

February 15, 2010

Mr. John Axelson  
Colorado Oil and Gas Conservation Commission  
9203 E. 155<sup>th</sup> Drive  
Brighton, Colorado 80602

Re: Amen No. 1  
Groundwater Monitoring Report  
CSW Section 19, Twn 5N, Range 67W  
API # 05-123-10593  
Weld County, Colorado

Dear Mr. Axelson;

On behalf of Petro-Canada Resources (USA) Inc. (Petro-Canada), Western Clean Up Corporation (Western) is pleased to present this groundwater monitoring report. This report provides a brief site history and a summary of groundwater monitoring data and conclusions. A site diagram is presented as Figure 1 in Attachment A.

#### **Background**

Corrosion induced a hole in a partially buried steel production fluid water tank causing a release of tank fluids to soil and shallow groundwater. Approximately 250 cubic yards of petroleum-impacted soil was excavated and stockpiled on site by Petro-Canada. The excavated soil was transported to Petro-Canada's landfarm in Weld County. The excavation remained open to facilitate removal of impacted groundwater via vacuum trucks. A Form 19 "Spill Report" and Form 27 "Site Investigation and Remediation Work Plan" were completed and submitted to the Colorado Oil and Gas Conservation Commission (COGCC).

On September 14, 2005 Western and Petro-Canada mobilized to the site and installed four (4) 1-inch diameter monitoring wells (MW-1 through MW-4). Western mobilized to the site on October 7, 2005 to collect groundwater samples. Per the approved work plan, Western conducted additional remediation activities. Petroleum-impacted soils were excavated from December 9, through 13, 2005. Approximately 460 cy were transported to Petro-Canada's landfarm in Weld County. Clean soil fill was imported to the site and used to backfill the excavation. Depth of groundwater ranged from 5 to 7 feet bgs in the excavations. Western installed two (2) 3-ft diameter recovery wells in December 2005, evacuated fluids via vacuum truck from these recovery wells, and disposed of the fluids to a Class V re-injection well operated by Conquest Disposal located at 22625 County Road 64 in Weld County. During excavation activities in December 2005 monitoring wells MW-2 through MW-4 were destroyed, but later re-installed. On February 9, 2006 Western installed three (3) 2-inch diameter monitoring wells (MW-5 through MW-7).

Amen #1  
Weld County, Colorado

In March 2006, Western installed a solar product skimmer system in recovery well RW-2. On various dates, Western has evacuated petroleum-impacted groundwater wells from RW-1 and RW-2, MW-5, MW-6, and MW-7, and transported the groundwater to Conquest Disposal.

#### **Groundwater Sampling**

Western mobilized to the site on February 1, 2010 to collect groundwater samples. A clean, disposable bailer was used to sample each monitoring well. Groundwater samples were collected in the appropriate sampling containers (40 ml VOA/VOC vials) and all samples were immediately labeled and stored in an iced cooler. Preservatives were used in all water samples to reduce degradation effects, and it was insured that bubbles or headspace were not present in the sample bottles. Groundwater samples were submitted for laboratory analysis for benzene, toluene, ethylbenzene and toluene (BTEX) using EPA Method 8260B. The samples were transported in an iced cooler under standard chain-of-custody procedures to Origins Laboratory in Denver, Colorado, and were received within QA/QC parameters.

#### **HYDROGEOLOGY**

The wells have not been surveyed. Groundwater is approximately 6 ft below ground surface and is estimated to flow in a south-southeasterly-west direction toward the Big Thompson River.

#### **FREE PHASE PRODUCT**

Liquid phase hydrocarbons were not detected in any of the monitoring wells during the monitoring event.

#### **GROUNDWATER ANALYTICAL RESULTS**

BTEX was either not measured above the laboratory detection limits or below COGCC standards in monitoring wells MW-2, MW-3, MW-5, MW-6, and MW-7. Figure 1 in Attachment A presents a groundwater analytical data map and Table 2 in Attachment B presents groundwater analytical data. Attachment C contains a copy of the laboratory analytical report.

#### **CONCLUSIONS**

The groundwater analytical data indicates that the site remedial efforts have been successful and that the dissolved groundwater plume has attenuated.

Should you have any questions about the changes or require any additional information, please feel free to contact me at (303) 562-6854.

Sincerely,



Nick Fischer  
Project/Chemical Engineer

C:  
File  
Rick Eggleston, Petro-Canada Resources (USA)

Amen #1  
Weld County, Colorado

Enc.

**Attachment A**

Figure 1 - Site Map / Groundwater Results Diagram

**Attachment B**

Table 1 - Groundwater Elevation Data

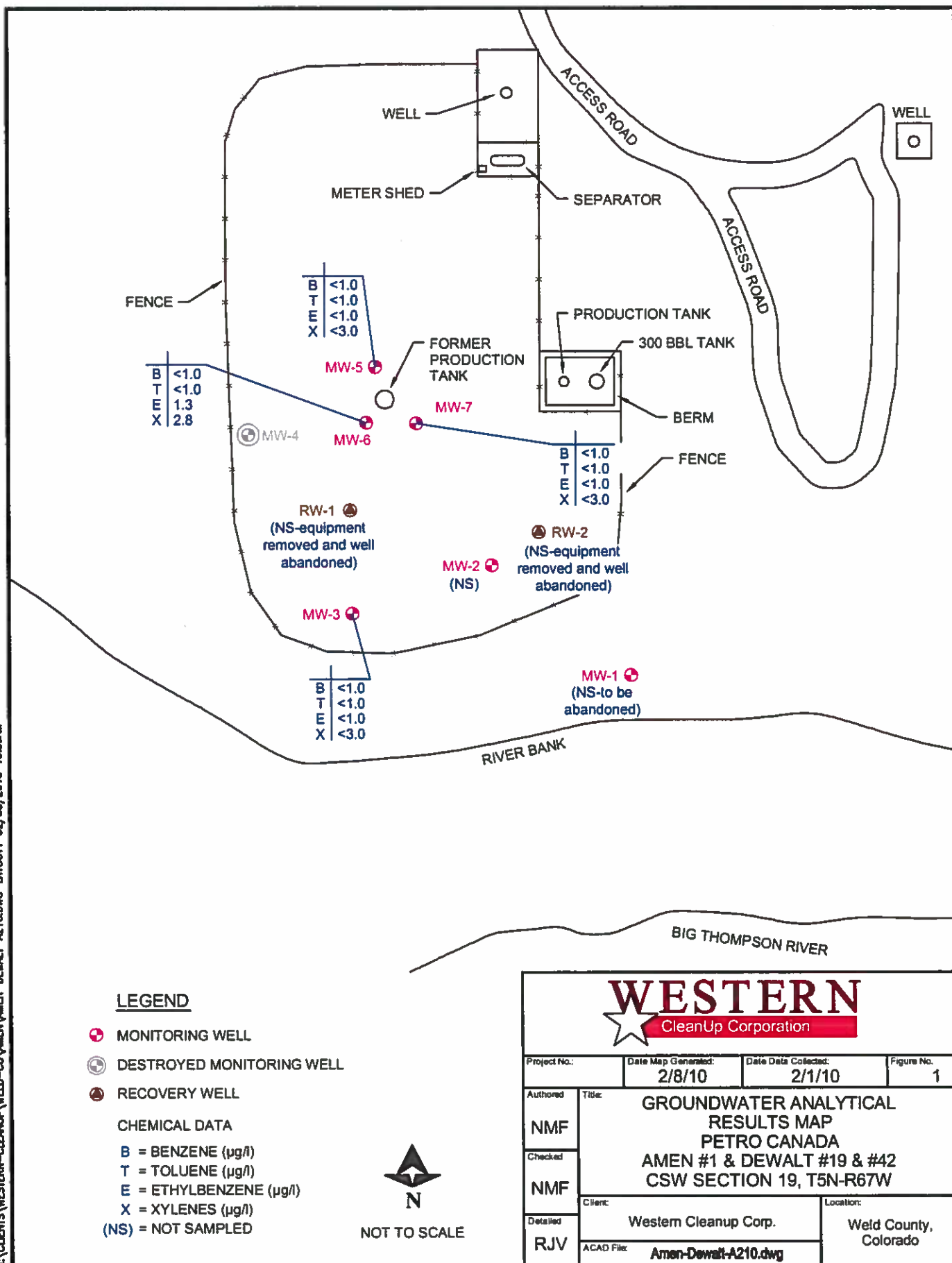
Table 2 - Groundwater Analytical Results

**Attachment C**

Laboratory Data

# ATTACHMENT A

## Figures



## **ATTACHMENT B**

### **Tables**

**TABLE 1**  
**Groundwater Elevation Data**  
**Petro-Canada Amen #1 Well Site**  
**Weld County, Colorado**

Well	Date	TOC to Ground Level (feet)	Depth to Product (feet)	Depth to Water from TOC	Product Thickness (feet)	Ground Level to Ground Water Elevation
MW-1	10/7/05	2.2	ND	7.42	0.00	5.22
MW-1	12/10/05	2.2	ND	7.72	0.00	5.52
MW-1	3/9/06	2.2	ND	7.70	0.00	5.50
MW-1	6/10/06	2.2	ND	7.11	0.00	4.91
MW-1	2/22/07	2.2	ND	7.10	0.00	4.90
MW-1	6/18/07	2.2	ND	7.49	0.00	5.29
MW-1	9/11/07	2.2	ND	7.63	0.00	5.43
MW-1	1/9/08	2.2	ND	7.41	0.00	5.21
MW-1	5/12/08	2.2	ND	7.16	0.00	4.96
MW-1	8/14/08	2.2	ND	7.25	0.00	5.05
MW-1	10/6/09	2.2	ND	6.94	0.00	4.74
MW-2	10/7/05	.53	ND	7.02	0.00	6.49
MW-2	12/10/05	.53	ND	7.36	0.00	6.83
MW-2	3/9/06	covered				
MW-2	6/10/06	.83	ND	5.93	0.00	5.10
MW-2	2/22/07	.83	ND	5.89	0.00	5.06
MW-2	6/18/07	.83	ND	6.07	0.00	5.24
MW-2	9/11/07	.83	ND	6.23	0.00	5.40
MW-2	1/9/08	covered				
MW-2	5/12/08	.83	ND	6.27	0.00	5.44
MW-2	8/14/08	.83	ND	6.40	0.00	5.57
MW-2	10/6/09	.83	ND	6.11	0.00	5.28
MW-3	10/7/05	.71	ND	5.87	0.00	5.16
MW-3	12/10/05	.71	ND	6.14	0.00	5.43
MW-3	3/9/06	covered				
MW-3	6/10/06	.77	ND	6.56	0.00	5.79
MW-3	2/22/07	covered				
MW-3	6/18/07	covered				
MW-3	9/11/07	.77	ND	6.87	0.00	6.10
MW-3	1/9/08	.77	ND	6.67	0.00	5.90
MW-3	5/12/08	.77	ND	6.43	0.00	5.66
MW-3	8/14/08	.77	ND	6.53	0.00	5.76
MW-3	10/6/09	.77	ND	6.16	0.00	5.39
MW-4	10/7/05	.91	ND	6.48	0.00	5.57
MW-4	12/10/05	.91	ND	6.75	0.00	5.84
MW-4	3/9/06	destroyed				
MW-5	3/9/06	.46	ND	7.20	0.00	6.74
MW-5	6/10/06	0.4	ND	6.72	0.00	6.32
MW-5	2/22/07	0.4	ND	6.58	0.00	6.18
MW-5	6/18/07	0.4	ND	7.01	0.00	6.61
MW-5	9/11/07	0.4	ND	7.31	0.00	6.91
MW-5	1/9/08	0.4	ND	7.07	0.00	6.67
MW-5	5/12/08	0.4	ND	6.93	0.00	6.53
MW-5	8/14/08	0.3	ND	6.98	0.00	6.68
MW-5	10/6/09	0.3	ND	6.58	0.00	6.28
MW-5	2/1/10	0.3	ND	6.80	0.00	6.50
MW-6	3/9/06	1.1	ND	6.92	0.00	5.82

**TABLE 1**  
**Groundwater Elevation Data**  
**Petro-Canada Amen #1 Well Site**  
**Weld County, Colorado**

Well	Date	TOC to Ground Level (feet)	Depth to Product (feet)	Depth to Water from TOC	Product Thickness (feet)	Ground Level to Ground Water Elevation
MW-6	6/10/06	1.2	ND	6.80	0.00	5.60
MW-6	2/22/07	1.2	ND	6.78	0.00	5.58
MW-6	6/18/07	1.2	ND	7.05	0.00	5.85
MW-6	9/11/07	1.2	ND	7.37	0.00	6.17
MW-6	1/9/08	1.2	ND	7.10	0.00	5.90
MW-6	5/12/08	1.2	ND	6.90	0.00	5.70
MW-6	8/14/08	.8	ND	6.95	0.00	6.15
MW-6	10/6/09	.8	ND	6.56	0.00	5.76
MW-6	2/1/10	.8	ND	6.88	0.00	6.08
MW-7	3/9/06	.5	ND	6.84	0.00	6.34
MW-7	6/10/06	.5	ND	6.40	0.00	5.90
MW-7	2/22/07	.5	ND	6.35	0.00	5.85
MW-7	6/18/07	.5	ND	6.78	0.00	6.28
MW-7	9/11/07	.5	ND	7.05	0.00	6.55
MW-7	1/9/08	.5	ND	6.90	0.00	6.40
MW-7	5/12/08	.5	ND	6.73	0.00	6.23
MW-7	8/14/08	.3	ND	6.75	0.00	6.45
MW-7	10/6/09	.3	ND	6.32	0.00	6.02
MW-7	2/1/10	.3	ND	6.57	0.00	6.27
RW-1	6/10/06	4.0	ND	9.30	0.00	5.30
RW-1	2/22/07	4.0	ND	9.21	0.00	5.21
RW-1	6/18/07	4.0	ND	9.73	0.00	5.73
RW-2	6/10/06	2.2	ND	8.50	0.00	6.30
RW-2	2/22/07	2.2	ND	8.37	0.00	6.17
RW-2	6/18/07	2.2	ND	8.85	0.00	6.65

Notes

ND = Not Detected

NM = Not Measured



**TABLE 2**  
Groundwater Analytical Data  
Amen #1  
CSW Section 19 Twn 5N Range 67W  
Weld County, Colorado

Sample ID	Date	Benzene (µg/l)	Toluene (µg/l)	E-benzene (µg/l)	Xylenes (µg/l)
COGCC's Allowable Limits		5	1,000	680	10,000
MW-1	10/7/05	<1.0	<1.0	<1.0	<3.0
MW-1	3/9/06	<1.0	<1.0	<1.0	<3.0
MW-1	6/10/06	<1.0	<1.0	<1.0	<3.0
MW-1	9/21/06	<1.0	<1.0	<1.0	<3.0
MW-1	2/22/07	<1.0	<1.0	<1.0	<3.0
MW-1	6/18/07	<1.0	<1.0	<1.0	<3.0
MW-1	9/11/07	<1.0	<1.0	<1.0	<3.0
MW-1	1/9/08	<1.0	<1.0	<1.0	<3.0
MW-1	5/12/08	<1.0	<1.0	<1.0	<3.0
MW-1	8/14/08	<1.0	<1.0	<1.0	<3.0
MW-2	10/7/05	195	78.8	12.5	238
MW-2	3/9/06	Covered			
MW-2	6/10/06	<1.0	<1.0	<1.0	<3.0
MW-2	9/21/06	<1.0	<1.0	<1.0	<3.0
MW-2	2/22/07	3.6	44.5	8.8	33.3
MW-2	6/18/07	<1.0	<1.0	<1.0	<3.0
MW-2	9/11/07	<1.0	<1.0	<1.0	<3.0
MW-2	1/9/08	Covered			
MW-2	5/12/08	<1.0	<1.0	<1.0	<3.0
MW-2	8/14/08	<1.0	<1.0	<1.0	<3.0
MW-2	10/6/09	<1.0	<1.0	<1.0	<3.0
MW-2	2/1/10	<1.0	<1.0	<1.0	<3.0
MW-3	10/7/05	29.1	<1.0	<1.0	<3.0
MW-3	3/9/06	Covered			
MW-3	6/10/06	<1.0	<1.0	<1.0	<3.0
MW-3	9/21/06	<1.0	<1.0	<1.0	<3.0
MW-3	2/22/07	Covered			
MW-3	6/18/07	Covered			
MW-3	9/11/07	<1.0	<1.0	<1.0	<3.0
MW-3	1/9/08	<1.0	<1.0	<1.0	<3.0
MW-3	5/12/08	<1.0	<1.0	<1.0	<3.0
MW-3	8/14/08	<1.0	<1.0	<1.0	<3.0
MW-3	10/6/09	<1.0	<1.0	<1.0	<3.0
MW-4	10/7/05	<1.0	<1.0	<1.0	<3.0
MW-4	3/9/06	Covered			
MW-4	6/10/06	<1.0	<1.0	<1.0	<3.0
MW-4	9/21/06	Destroyed			
MW-5	3/9/06	271	1.4	248	1,020
MW-5	6/10/06	80.1	<1.0	140	374
MW-5	9/21/06	230	<1.0	190	360
MW-5	2/22/07	9.5	11.9	12.5	25.5
MW-5	6/18/07	260	<1.0	190	211
MW-5	9/11/07	3.9	<1.0	1.4	3.1
MW-5	1/9/08	<1.0	<1.0	<1.0	<3.0
MW-5	5/12/08	<1.0	<1.0	<1.0	<3.0
MW-5	8/14/08	<1.0	<1.0	<1.0	<3.0

**TABLE 2**  
**Groundwater Analytical Data**  
**Amen #1**  
**CSW Section 19 Twn 5N Range 67W**  
**Weld County, Colorado**

Sample ID	Date	Benzene (µg/l)	Toluene (µg/l)	E-benzene (µg/l)	Xylenes (µg/l)
MW-5	10/6/09	<1.0	<1.0	<1.0	<3.0
MW-5	2/1/10	<1.0	<1.0	<1.0	<3.0
MW-6	3/9/06	44	1.2	29.9	161
MW-6	6/10/06	142	<1.0	3.13	11
MW-6	9/21/06	30	<1.0	18	2.3
MW-6	2/22/07	20.4	<1.0	25.8	34.4
MW-6	6/18/07	1.1	<1.0	<1.0	2.0
MW-6	9/11/07	3.8	<1.0	1.7	3.3
MW-6	1/9/08	108	<1.0	115	99.6
MW-6	5/12/08	<1.0	<1.0	<1.0	<3.0
MW-6	8/14/08	3.7	<1.0	1.7	<3.0
MW-6	10/6/09	<1.0	<1.0	<1.0	<3.0
MW-6	2/1/10	<1.0	<1.0	1.3	2.8
MW-7	3/9/06	664	341	112	1,170
MW-7	6/10/06	65.0	1.4	96.8	73.6
MW-7	9/21/06	3.1	<1.0	2.5	2.5
MW-7	2/22/07	273	<1.0	294	137
MW-7	6/18/07	3.6	<1.0	2.7	5.5
MW-7	9/11/07	3.9	<1.0	1.4	3.1
MW-7	1/9/08	<1.0	<1.0	<1.0	<3.0
MW-7	5/12/08	<1.0	<1.0	<1.0	<3.0
MW-7	8/14/08	24.9	<1.0	23.4	18.6
MW-7	10/6/09	<1.0	<1.0	<1.0	<3.0
MW-7	2/1/10	<1.0	<1.0	<1.0	<3.0
RW-1	3/9/06	3.5	<1.0	1.8	<3.0
RW-1	6/10/06	5.3	<1.0	<1.0	<3.0
RW-1	9/21/06	<1.0	<1.0	<1.0	<3.0
RW-1	2/22/07	<1.0	<1.0	<1.0	<3.0
RW-1	6/18/07	<1.0	<1.0	<1.0	<3.0
RW-1	9/11/07	<1.0	<1.0	<1.0	<3.0
RW-1	1/9/08	<1.0	<1.0	<1.0	<3.0
RW-1	10/6/09	Equipment Removed and Excavation Backfilled			
RW-2	3/9/06	2.4	2.0	<1.0	<3.0
RW-2	6/10/06	10.0	<1.0	1.5	<3.0
RW-2	9/21/06	<1.0	<1.0	<1.0	<3.0
RW-2	2/22/07	<1.0	<1.0	<1.0	<3.0
RW-2	6/18/07	<1.0	<1.0	<1.0	<3.0
RW-2	9/11/07	<1.0	<1.0	<1.0	<3.0
RW-2	1/9/08	<1.0	<1.0	<1.0	<3.0
RW-2	10/6/09	Equipment Removed and Excavation Backfilled			
Big Thompson River	11/15/05	<1.0	<1.0	<1.0	<3.0
Big Thompson River	6/10/06	<1.0	<1.0	<1.0	<3.0
Big Thompson River	9/21/06	<1.0	<1.0	<1.0	<3.0

**Notes**

< = Less than the laboratory detection limit.

# **ATTACHMENT C**

## **Laboratory Report**



4640 Pecos Street | Unit C | Denver, Colorado 80211  
303.433.1322 Phone 303.265.9645 Fax

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February 05, 2010

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Western Clean Up Corporation  
P.O Box 1247  
Fort Morgan CO 80701

Ron Greene  
Project Number: [none]  
Project: Amen #1 - Petro-Canada

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Attached are the analytical results for Amen #1 - Petro-Canada received by Origins Laboratory, Inc. 2/1/2010 6:00:00PM. Please let us know if you have any questions, or if we can help with anything at all.

Laboratory Manager  
Noelle E Doyle

The analytical results in the following report were analyzed under the guidelines of EPA Methods specified in SW-846. The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. This laboratory report is intended solely for the above addressee and it is only to be used and or reproduced in its entirety.

4640 Pecos Street | Unit C  
Denver, Colorado 80211  
303.433.1322 | Laboratory  
303.265.9645 | Fax



Western Clean Up Corporation  
P.O Box 1247  
Fort Morgan CO 80701

Ron Greene  
Project Number: [none]  
Project: Amen #1 - Petro-Canada

#### CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Sampled	Date Received
MW-3	X002003-01	Water	2/1/2010 11:36:00AM	02/01/2010 18:00
MW-5	X002003-02	Water	2/1/2010 11:52:00AM	02/01/2010 18:00
MW-6	X002003-03	Water	2/1/2010 12:15:00PM	02/01/2010 18:00
MW-7	X002003-04	Water	2/1/2010 12:32:00PM	02/01/2010 18:00

Origins Laboratory, Inc.

*The results in this report apply to the samples analyzed  
in accordance with the chain of custody document. This  
analytical report must be reproduced in its entirety.*

Noelle E Doyle, Laboratory Manager

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Denver, Colorado 80211  
303.433.1322 | Laboratory  
303.265.9645 | Fax



Western Clean Up Corporation  
P.O Box 1247  
Fort Morgan CO 80701

Ron Greene  
Project Number: [none]  
Project: Amen #1 - Petro-Canada



Client: Western Clean Up Corp  
Address: P.O. Box 1247  
Telephone Number:  
Email Address:

Project Manager: Ron Greene / Nick Fisher  
Project Name: Petro-Canada  
Project Number: Amen #01  
Samples Collected By: Nick Fisher

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative					Matrix				Sample Instructions
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	As Sampled	Other		
MW-3	3/1	11:36		x				7					1
MW-5	1	11:52											2
MW-6	1	12:15											3
MW-7	7	12:32											4
													5
													6
													7
													8
													9
													10
Relinquished By: Nick Fisher	Date: 3/1/10	Time: 6:00 PM	Received By:	Date:	Time:	Relinquished By:	Date:	Time:	Turnaround Time: Same Day <input type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input checked="" type="checkbox"/> Standard				
Relinquished By:	Date:	Time:	Received By:	Date:	Time:	Relinquished By:	Date:	Time:					

Origins Laboratory, Inc.

Noelle E Doyle

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Noelle E Doyle, Laboratory Manager

4640 Pecos Street | Unit C  
Denver, Colorado 80211  
303.433.1322 | Laboratory  
303.265.9645 | Fax



Western Clean Up Corporation  
P.O Box 1247  
Fort Morgan CO 80701

Ron Greene  
Project Number: [none]  
Project: Amen #1 - Petro-Canada

MW-3  
X002003-01 (Water)  
2/1/2010 11:36:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.

**BTEX by EPA 8260B**

Benzene	ND	1.00	ug/L	1	0802002	02/02/2010	02/02/2010	
Toluene	ND	1.00	"	"	"	"	"	
Ethylbenzene	ND	1.00	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	96.6 %	76.8-127	"	"	"	"	"	
Surrogate: Toluene-d8	93.5 %	71.4-123	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene	93.4 %	87.6-133	"	"	"	"	"	

Origins Laboratory, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Noelle E Doyle, Laboratory Manager

4640 Pecos Street | Unit C  
Denver, Colorado 80211  
303.433.1322 | Laboratory  
303.265.9645 | Fax



Western Clean Up Corporation  
P.O Box 1247  
Fort Morgan CO 80701

Ron Greene  
Project Number: [none]  
Project: Amen #1 - Petro-Canada

MW-5  
X002003-02 (Water)  
2/1/2010 11:52:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.

**BTEX by EPA 8260B**

Benzene	ND	1.00	ug/L	1	0802002	02/02/2010	02/02/2010	
Toluene	ND	1.00	"	"	"	"	"	
Ethylbenzene	ND	1.00	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	97.3 %	76.8-127	"	"	"	"	"	
Surrogate: Toluene-d8	90.1 %	71.4-123	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene	94.4 %	87.6-133	"	"	"	"	"	

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Noelle E Doyle, Laboratory Manager



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Western Clean Up Corporation  
P.O Box 1247  
Fort Morgan CO 80701

Ron Greene  
Project Number: [none]  
Project: Amen #1 - Petro-Canada

**MW-6**  
**X002003-03 (Water)**  
**2/1/2010 12:15:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.

**BTEX by EPA 8260B**

Benzene	ND	1.00	ug/L	1	0802002	02/02/2010	02/02/2010	
Toluene	ND	1.00	"	"	"	"	"	
Ethylbenzene	1.33	1.00	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	
m,p-Xylene	2.78	2.00	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	95.6 %	76.8-127	"	"	"	"	"	
Surrogate: Toluene-d8	93.1 %	71.4-123	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene	96.5 %	87.6-133	"	"	"	"	"	

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Ron Greene  
Project Number: [none]  
Project: Amen #1 - Petro-Canada

**MW-7**  
**X002003-04 (Water)**  
**2/1/2010 12:32:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**

**BTEX by EPA 8260B**

Benzene	ND	1.00	ug/L	1	0802002	02/02/2010	02/02/2010	
Toluene	ND	1.00	"	"	"	"	"	
Ethylbenzene	ND	1.00	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	92.8 %	76.8-127						
Surrogate: Toluene-d8	97.5 %	71.4-123						
Surrogate: 4-Bromofluorobenzene	97.6 %	87.6-133						

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Ron Greene  
 Project Number: [none]  
 Project: Amen #1 - Petro-Canada

**Volatile Organic Compounds by EPA Method 8260B - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 0B02002 - EPA 5030B**

**Blank (0B02002-BLK1)**

Prepared: 02/02/2010 Analyzed: 02/02/2010

Benzene	ND	1.00	ug/L							
Toluene	ND	1.00	"							
Ethylbenzene	ND	1.00	"							
o-Xylene	ND	1.00	"							
m,p-Xylene	ND	2.00	"							
Surrogate: 1,2-Dichloroethane-d4	57.9		"	62.5		92.6	76.8-127			
Surrogate: Toluene-d8	58.9		"	62.5		94.2	71.4-123			
Surrogate: 4-Bromofluorobenzene	60.3		"	62.5		96.4	87.6-133			

**Blank (0B02002-BLK2)**

Prepared: 02/02/2010 Analyzed: 02/02/2010

Benzene	ND	1.00	ug/L							
Toluene	ND	1.00	"							
Ethylbenzene	ND	1.00	"							
o-Xylene	ND	1.00	"							
m,p-Xylene	ND	2.00	"							
Surrogate: 1,2-Dichloroethane-d4	59.1		"	62.5		94.5	76.8-127			
Surrogate: Toluene-d8	59.7		"	62.5		95.5	71.4-123			
Surrogate: 4-Bromofluorobenzene	60.0		"	62.5		96.0	87.6-133			

**LCS (0B02002-BS1)**

Prepared: 02/02/2010 Analyzed: 02/02/2010

Benzene	53.3	1.00	ug/L	50.0		107	79.3-122			
Toluene	49.2	1.00	"	50.0		98.5	73.4-130			
Surrogate: 1,2-Dichloroethane-d4	57.4		"	62.5		91.8	76.8-127			
Surrogate: Toluene-d8	60.1		"	62.5		96.2	71.4-123			
Surrogate: 4-Bromofluorobenzene	61.1		"	62.5		97.7	87.6-133			

**LCS (0B02002-BS2)**

Prepared: 02/02/2010 Analyzed: 02/02/2010

Benzene	51.5	1.00	ug/L	50.0		103	79.3-122			
Toluene	46.9	1.00	"	50.0		93.8	73.4-130			

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Ron Greene  
 Project Number: [none]  
 Project: Amen #1 - Petro-Canada

**Volatile Organic Compounds by EPA Method 8260B - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 0802002 - EPA 5030B</b>										
<b>LCS (0802002-BS2)</b>					Prepared: 02/02/2010 Analyzed: 02/02/2010					
Surrogate: 1,2-Dichloroethane-d4	59.3		ug/L	62.5		94.9	76.8-127			
Surrogate: Toluene-d8	59.1		"	62.5		94.6	71.4-123			
Surrogate: 4-Bromofluorobenzene	58.6		"	62.5		93.8	87.6-133			
<b>Matrix Spike (0802002-MS1)</b>					Source: X002003-01		Prepared: 02/02/2010 Analyzed: 02/02/2010			
Benzene	51.6	1.00	ug/L	50.0	ND	103	80.2-129			
Toluene	47.3	1.00	"	50.0	0.47	93.7	74.8-126			
Surrogate: 1,2-Dichloroethane-d4	61.6		"	62.5		98.6	76.8-127			
Surrogate: Toluene-d8	58.8		"	62.5		94.0	71.4-123			
Surrogate: 4-Bromofluorobenzene	58.7		"	62.5		93.9	87.6-133			
<b>Matrix Spike (0802002-MS2)</b>					Source: X002003-02		Prepared: 02/02/2010 Analyzed: 02/02/2010			
Benzene	54.3	1.00	ug/L	50.0	0.43	108	80.2-129			
Toluene	48.4	1.00	"	50.0	ND	96.8	74.8-126			
Surrogate: 1,2-Dichloroethane-d4	59.3		"	62.5		94.8	76.8-127			
Surrogate: Toluene-d8	58.9		"	62.5		94.2	71.4-123			
Surrogate: 4-Bromofluorobenzene	61.3		"	62.5		98.0	87.6-133			
<b>Matrix Spike Dup (0802002-MSD1)</b>					Source: X002003-01		Prepared: 02/02/2010 Analyzed: 02/02/2010			
Benzene	52.1	1.00	ug/L	50.0	ND	104	80.2-129	1.02	18.7	
Toluene	47.5	1.00	"	50.0	0.47	94.1	74.8-126	0.422	21.9	
Surrogate: 1,2-Dichloroethane-d4	60.4		"	62.5		96.6	76.8-127			
Surrogate: Toluene-d8	59.6		"	62.5		95.4	71.4-123			
Surrogate: 4-Bromofluorobenzene	61.0		"	62.5		97.6	87.6-133			
<b>Matrix Spike Dup (0802002-MSD2)</b>					Source: X002003-02		Prepared: 02/02/2010 Analyzed: 02/02/2010			
Benzene	52.4	1.00	ug/L	50.0	0.43	104	80.2-129	3.60	18.7	
Toluene	48.1	1.00	"	50.0	ND	96.3	74.8-126	0.559	21.9	
Surrogate: 1,2-Dichloroethane-d4	57.2		"	62.5		91.6	76.8-127			

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Ron Greene  
Project Number: [none]  
Project: Amen #1 - Petro-Canada

**Volatile Organic Compounds by EPA Method 8260B - Quality Control**  
**Origins Laboratory, Inc.**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 0B02002 - EPA 5030B**

**Matrix Spike Dup (0B02002-MSD2)**

**Source: X002003-02**

**Prepared: 02/02/2010 Analyzed: 02/02/2010**

Surrogate: Toluene-d8	59.7		ug/L	62.5	95.5	71.4-123
Surrogate: 4-Bromofluorobenzene	62.3		"	62.5	99.7	87.6-133

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Ron Greene  
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Project: Amen #1 – Petro-Canada

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### Notes and Definitions

ND Analyte NOT DETECTED at or above the reporting limit  
RPD Relative Percent Difference

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A handwritten signature in black ink, appearing to read "Noelle E Doyle", is written over a horizontal line.

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Noelle E Doyle, Laboratory Manager