

## **GROUNDWATER MONITORING REPORT OCTOBER 2010**

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### **UPRC 9, 9K, 10K TANK BATTERY**

On September 20, 2010, LT Environmental, Inc. (LTE) conducted groundwater sampling on behalf of Noble Energy, Inc. (Noble), at the UPRC 9, 9K, 10K Tank Battery (Site). Based upon persistent elevated levels of dissolved benzene observed following the fourth quarter 2009 sampling event, a groundwater polishing amendment was applied to saturated soils at the Site. Following the polishing remediation, the September 2010 sampling event was conducted and constitutes the second post remediation performance monitoring event at the Site. Site history, assessment, and prior remediation activities have been described in preceding reports. A Site Map is presented as Figure 1.

During the September 20, 2010 monitoring event, the depth to groundwater ranged from 8.22 feet below top of casing (btoc) in MW02-R to 8.76 feet btoc in MW03, and was used to calculate well-specific purge volumes. Samples were collected and submitted to Origins Laboratory, Inc. of Denver, Colorado for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by United States Environmental Protection Agency Method 8260B.

Analytical results from the monitoring wells, presented in Table 1 indicate BTEX concentrations are in compliance with Colorado Department of Public Health and Environmental-Water Quality Control Commission Regulation 41 (WQCC Reg 41). The laboratory analytical report is included in the Appendix.

LTE will continue to conduct quarterly groundwater monitoring events with the goal of observing four consecutive quarters of analytical results in compliance with applicable regulatory standards. The next quarterly groundwater sampling event is scheduled for December 2010.

**TABLE**

TABLE 1

GROUNDWATER ANALYTICAL DATA  
 UPRC 9, 9k, 10k TANK BATTERY  
 WELD COUNTY, COLORADO  
 NOBLE ENERGY, INC.

MONITORING WELL	DATE	DEPTH TO WATER (feet btoc)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYLBENZENE (ug/L)	TOTAL XYLENES (ug/L)
MW01	4/28/2009	6.12	<1.0	<1.0	<1.0	<3.0
	8/25/2009	2.21	<1.0	<1.0	<1.0	<3.0
	11/19/2009	7.50	<1.0	<1.0	<1.0	<3.0
	2/16/2010	4.89	<1.0	<1.0	<1.0	<3.0
	6/15/2010	5.52	<1.0	<1.0	<1.0	<1.0
	9/20/2010	8.42	<1.0	<1.0	<1.0	<1.0
MW02	4/28/2009	6.52	<1.0	<1.0	<1.0	<3.0
	8/25/2009	2.16	<1.0	<1.0	<1.0	<3.0
	11/19/2009	7.74	<b>29.1</b>	<1.0	<1.0	<3.0
	2/16/2010	5.06	<b>65.2</b>	<1.0	<1.0	<3.0
MW02R	6/15/2010	5.58	<b>40.0</b>	<1.0	<1.0	<1.0
	9/20/2010	8.22	<1.0	<1.0	<1.0	<1.0
MW03	4/28/2009	6.69	2.70	<1.0	108	519.19
	8/25/2009	2.01	<1.0	<1.0	<1.0	<3.0
	11/19/2009	8.03	1.12	<1.0	24.3	23.5
	2/16/2010	5.15	<1.0	<1.0	<1.0	<3.0
	6/15/2010	6.25	<1.0	<1.0	1.9	<1.0
	9/20/2010	8.76	1.40	<1.0	2.87	<1.0
<b>CDPHE WQCC Reg 41</b>			<b>5.0</b>	<b>560</b>	<b>700</b>	<b>1,400</b>

NOTES:

btoc - below top of casing

ug/L - micrograms per liter

< - indicates result is less than the stated laboratory reporting limit

**BOLD** - indicates result exceeds the regulatory standard.

Benzene, toluene, ethylbenzene, and xylenes analyzed by EPA Method 8260B

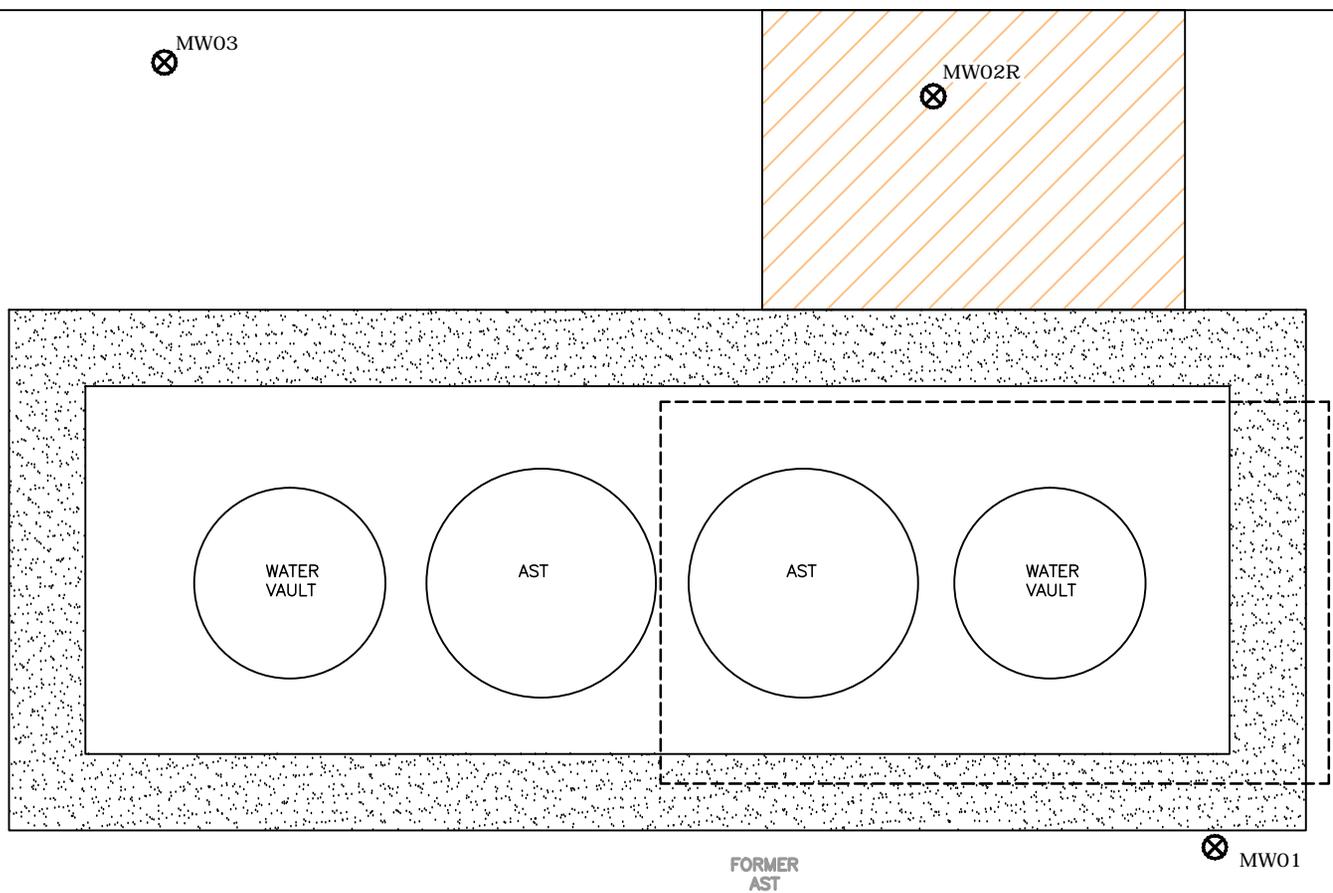
CDPHE WQCC Reg 41 - Colorado Department of Public Health and Environment - Water Quality Control

Commission Regulation 41 covering Basic Standards for Groundwater



**FIGURE**

IRRIGATION DITCH



LEGEND

- MW01 ⊗ MONITORING WELL LOCATION
-  BERM
- - - - - EXTENT OF EXCAVATION
-  ESTIMATED GROUNDWATER FLOW DIRECTION
- AST ABOVEGROUND STORAGE TANK
-  GROUNDWATER AMENDMENT APPLICATION AREA

LEASE ROAD

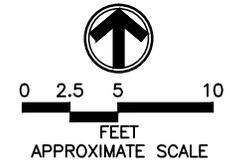


FIGURE 1  
MONITORING WELL LOCATIONS MAP  
UPRC 9-9K, 10K  
WELD COUNTY, CO  
NOBLE ENERGY, INC.



**APPENDIX A**  
**ANALYTICAL REPORTS**

09/23/2010

LT Environmental, Inc.

Matthew Harrison

4600 West 60th Avenue

Arvada

CO

80003

Project Name- Noble - UPRC 9, 9k- 10k

Project Number- NEP0904

Attached are your analytical results for Noble - UPRC 9, 9k- 10k received by Origins Laboratory, Inc. September 20, 2010 5:50 pm. This project is associated with Origins project number X009120-01 .

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.

Thank you for selecting Origins for your analytical needs. Please contact us with any questions concerning this report, or if we can help with anything at all.

Origins Laboratory, Inc.

303.433.1322

o-squad@oelabinc.com



LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Matthew Harrison  
Project Number: NEP0904  
Project: Noble - UPRC 9, 9k- 10k

**CROSS REFERENCE REPORT**

Sample ID	Laboratory ID	Matrix	Sampled	Date Received
MW01	X009120-01	Water	9/20/2010 4:30:00PM	09/20/2010 17:50
MW02R	X009120-02	Water	9/20/2010 4:45:00PM	09/20/2010 17:50
MW03	X009120-03	Water	9/20/2010 4:55:00PM	09/20/2010 17:50

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.

LT Environmental, Inc.  
 4600 West 60th Avenue  
 Arvada CO 80003

Matthew Harrison  
 Project Number: NEP0904  
 Project: Noble - UPRC 9, 9K- 10k

www.originslaboratory.com

page 1 of 1

X009120

Client: LT Environmental, Inc.  
 Address: 4600 W 60th Avenue  
 Telephone Number: 303.433.9788  
 Email Address: mharrison@ltenv.com

Project Manager: Matt Harrison  
 Project Name: UPRC 9, 9K, 10K  
 Project Number: NEP0904  
 Samples Collected By: GC/PS

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis	Sample Instructions	
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	Air Summa #			Other
MW001	09/20/10	1630	2 X	X				X				1	
MW002R	09/20/10	1645	2 X	X				X				2	Lab Alkan
MW003	09/20/10	1655	2 X	X				X				3	Lab Alkan
												4	
												5	
												6	
												7	
												8	
												9	
												10	
Relinquished By: [Signature]	Date: 9/20/10	Time: 1750		Received By: [Signature]	Date: 09/20/10	Time: 1750		Turnaround Time: Same Day <input type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> 72 Hr <input checked="" type="checkbox"/> Standard <input type="checkbox"/>					

1725 Elk Place | Denver, CO 80211 | Phone: 303.433.1322 | Fax: 303.265.9645

Origins Laboratory, Inc.

[Signature]

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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Matthew Harrison  
Project Number: NEP0904  
Project: Noble - UPRC 9, 9k- 10k

**MW01**

9/20/2010 4:30:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X009120-01 (Water)

**BTEX by EPA 8260B**

Benzene	ND	1.00	ug/L	1	0121003	09/21/2010	09/22/2010	
Toluene	ND	1.00	"	"	"	"	"	
Ethylbenzene	ND	1.00	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	102 %	73.5-130			"	"	"	
Surrogate: Toluene-d8	105 %	79.3-113			"	"	"	
Surrogate: 4-Bromofluorobenzene	95.8 %	81.5-117			"	"	"	

Origins Laboratory, Inc.



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**MW02R**

9/20/2010 4:45:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X009120-02 (Water)

**BTEX by EPA 8260B**

Benzene	ND	1.00	ug/L	1	0121003	09/21/2010	09/22/2010	
Toluene	ND	1.00	"	"	"	"	"	
Ethylbenzene	ND	1.00	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	101 %	73.5-130			"	"	"	
Surrogate: Toluene-d8	105 %	79.3-113			"	"	"	
Surrogate: 4-Bromofluorobenzene	95.5 %	81.5-117			"	"	"	

Origins Laboratory, Inc.



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Project: Noble - UPRC 9, 9k- 10k

**MW03**

9/20/2010 4:55:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X009120-03 (Water)

**BTEX by EPA 8260B**

Benzene	1.40	1.00	ug/L	1	0121003	09/21/2010	09/22/2010	
Toluene	ND	1.00	"	"	"	"	"	
Ethylbenzene	2.87	1.00	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	102 %	73.5-130			"	"	"	
Surrogate: Toluene-d8	103 %	79.3-113			"	"	"	
Surrogate: 4-Bromofluorobenzene	96.4 %	81.5-117			"	"	"	

Origins Laboratory, Inc.



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**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 OI21003 - EPA 5030B**

**Blank (OI21003-BLK1)**

Prepared: 09/21/2010 Analyzed: 09/22/2010

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

<i>Surrogate: 1,2-Dichloroethane-d4</i>	64.5		"	62.5		103	73.5-130			
<i>Surrogate: Toluene-d8</i>	65.1		"	62.5		104	79.3-113			
<i>Surrogate: 4-Bromofluorobenzene</i>	59.5		"	62.5		95.3	81.5-117			

**LCS (OI21003-BS1)**

Prepared: 09/21/2010 Analyzed: 09/22/2010

Benzene	38.9	1.00	ug/L	50.0		77.7	77.3-128			
Toluene	46.3	1.00	"	50.0		92.6	81.7-118			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	65.2		"	62.5		104	73.5-130			
<i>Surrogate: Toluene-d8</i>	65.6		"	62.5		105	79.3-113			
<i>Surrogate: 4-Bromofluorobenzene</i>	60.4		"	62.5		96.7	81.5-117			

**Matrix Spike (OI21003-MS1)**

Source: X009119-01

Prepared: 09/21/2010 Analyzed: 09/22/2010

Benzene	41.6	1.00	ug/L	50.0	ND	83.2	74.5-132			
Toluene	49.2	1.00	"	50.0	ND	98.5	74.2-116			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	65.8		"	62.5		105	73.5-130			
<i>Surrogate: Toluene-d8</i>	65.4		"	62.5		105	79.3-113			
<i>Surrogate: 4-Bromofluorobenzene</i>	60.3		"	62.5		96.4	81.5-117			

**Matrix Spike Dup (OI21003-MSD1)**

Source: X009119-01

Prepared: 09/21/2010 Analyzed: 09/22/2010

Benzene	44.6	1.00	ug/L	50.0	ND	89.2	74.5-132	6.98	13.1	
Toluene	52.2	1.00	"	50.0	ND	104	74.2-116	5.86	21.2	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	66.0		"	62.5		106	73.5-130			
<i>Surrogate: Toluene-d8</i>	65.0		"	62.5		104	79.3-113			
<i>Surrogate: 4-Bromofluorobenzene</i>	60.7		"	62.5		97.2	81.5-117			

Origins Laboratory, Inc.



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Matthew Harrison  
Project Number: NEP0904  
Project: Noble - UPRC 9, 9k- 10k

**Notes and Definitions**

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

Origins Laboratory, Inc.



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