

## **GROUNDWATER MONITORING REPORT/ NO FURTHER ACTION REQUEST March 2010**

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### **STATE 16-14I4**

On March 16, 2010, LT Environmental, Inc. (LTE) conducted groundwater sampling, on behalf of Noble Energy, Inc., at the State 16-14I4 Well Site (Site). This sampling event constitutes the fifth post remediation monitoring event at this Site. Site history, remediation activities, well installation, and performance monitoring have been described in preceding reports.

Groundwater level measurements were collected from the monitoring wells and are summarized in Table 1. Four wells were used to conduct groundwater sampling (MW-2, TB23, TB24, and TB25). Monitoring wells TB23, TB24, and TB25 were installed in February 2009 following source removal activities. Monitoring well MW02, a previously existing well, was the only well not destroyed during source removal activities. Figure 1 illustrates the Site layout and monitoring well locations.

Depth to groundwater, which ranged from 2.89 feet below top of casing (btoc) in TB23 to 3.64 feet btoc in TB24, was used to calculate well-specific purge volumes. Following purging, groundwater samples were collected and preserved on ice. Samples were then submitted under strict chain of custody protocol 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 the Colorado Department of Public Health and Environment – Water Quality Control Commission Regulation 41 for all samples. The laboratory analytical report is included in the Appendix.

As seen in the previously submitted *Remediation Summary Report* (December 2008), soil impacts have been removed to below the regulatory standard. This groundwater sampling event constitutes the fourth consecutive quarterly groundwater sampling event which has reported groundwater analytical results in compliance with WQCC Reg 41. As soil and groundwater have been remediated to achieve cleanup goals, LTE on behalf of Noble, respectfully requests that the Colorado Oil and Gas Conservation Commission grant a No Further Action condition for the State 16-14I4 Well Site.

**TABLE**

TABLE 1

GROUNDWATER ANALYTICAL DATA  
 STATE 16-1414 WELL SITE  
 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)
MW-2	2/15/2007	7.74	<b>180</b>	<1.0	1.9	60
	2/21/2007	7.67	<b>210</b>	<4.0	<4.0	53
	5/10/2007	5.80	<1.0	<2.0	<2.0	<6.0
	7/19/2007	7.53	<1.0	<2.0	<2.0	<6.0
	10/1/2007	5.10	<1.0	<2.0	<2.0	<4.0
	1/7/2008	3.15	<1.0	<2.0	<2.0	<4.0
	4/18/2008	5.85	<1.0	<2.0	<2.0	<2.0
	7/17/2008	7.68	<1.0	<1.0	<1.0	<3.0
	2/24/2009	5.10	<1.0	<1.0	<1.0	<3.0
	5/15/2009	6.20	<1.0	<1.0	<1.0	<3.0
	8/26/2009	6.18	<1.0	<1.0	<1.0	<3.0
	11/24/2009	3.28	<1.0	<1.0	<1.0	<3.0
	3/16/2010	--	--	--	--	--
TB23	2/24/2009	4.35	<1.0	<1.0	<1.0	<3.0
	5/15/2009	5.34	<1.0	<1.0	<1.0	<3.0
	8/26/2009	5.51	<1.0	<1.0	<1.0	<3.0
	11/24/2009	2.81	<1.0	<1.0	<1.0	<3.0
	3/16/2010	2.89	<1.0	<1.0	<1.0	<3.0
TB24	2/24/2009	5.59	<b>18.1</b>	<1.0	<1.0	<3.0
	5/15/2009	6.82	<1.0	<1.0	<1.0	<3.0
	8/26/2009	6.82	<1.0	<1.0	<1.0	<3.0
	11/24/2009	3.70	2.42	<1.0	<1.0	<3.0
	3/16/2010	3.64	<1.0	<1.0	<1.0	<3.0
TB25	2/24/2009	4.51	<1.0	<1.0	<1.0	<3.0
	5/15/2009	5.70	<1.0	<1.0	<1.0	<3.0
	8/26/2009	5.61	<1.0	<1.0	<1.0	<3.0
	11/24/2009	2.53	<1.0	<1.0	<1.0	<3.0
	3/16/2010	3.25	<1.0	<1.0	<1.0	<3.0
<b>CDPHE WQCC Reg 41</b>			<b>5.0</b>	<b>560</b>	<b>700</b>	<b>1,400</b>

NOTES:

-- - not sampled; well destroyed

btoc - below top of casing

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

ug/L - micrograms per liter

< indicates result is less than the stated laboratory method detection limit

**BOLD** - indicates result is above the applicable standard

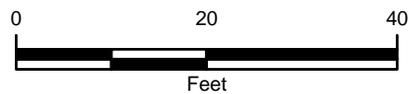
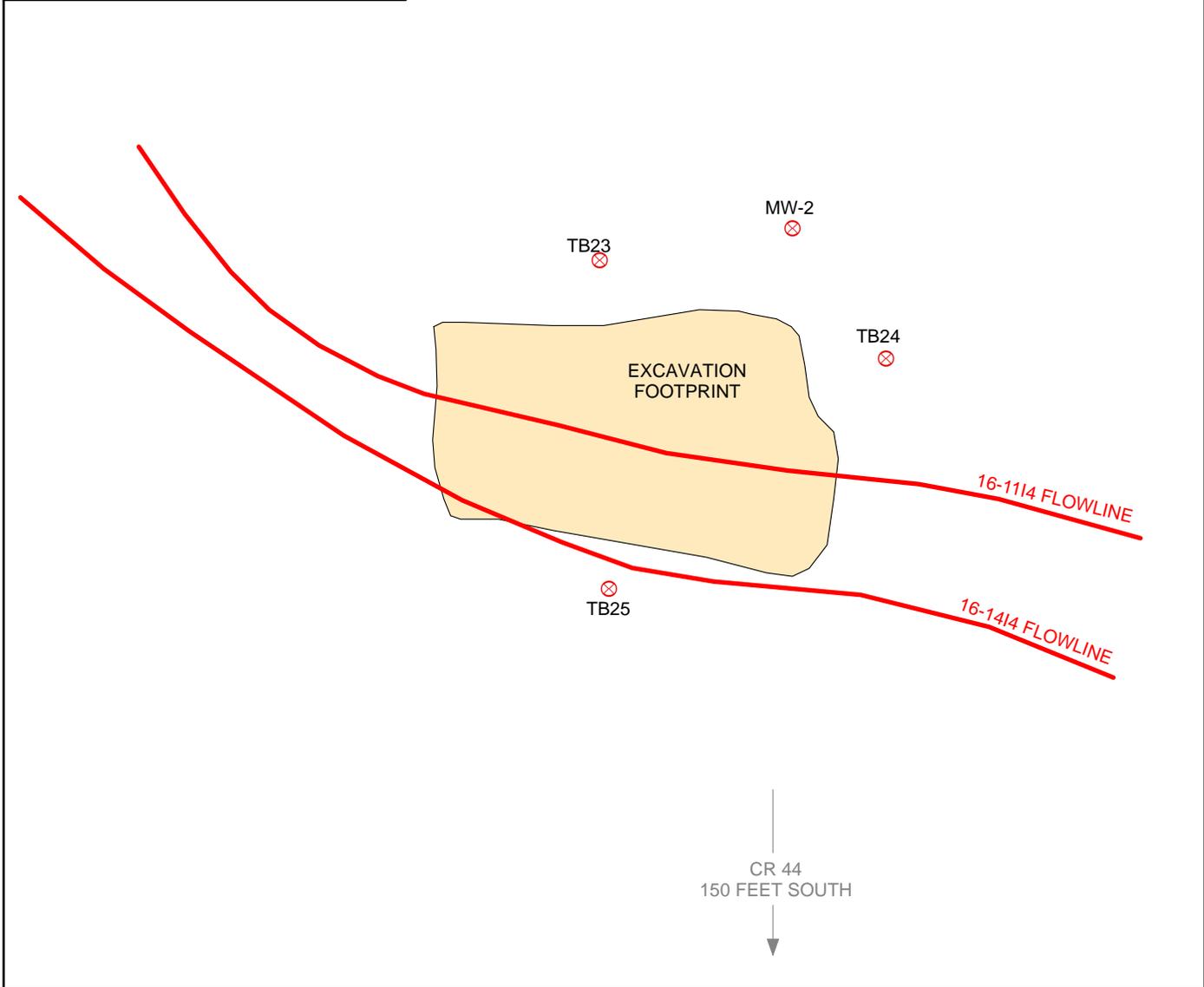
CDPHE WQCC R Commission Regulation 41 covering Basic Standards for Groundwater



**FIGURE**

	CR 46	
CR 44		
CR 53		CR 55

AREA OF INTEREST



**LEGEND**

-  MONITORING WELL
-  FLOWLINE
-  EXCAVATION FOOTPRINT

**FIGURE 1**  
**MONITORING WELL LOCATION MAP**  
**STATE 16-1414**  
**WELD COUNTY, COLORADO**

**NOBLE ENERGY, INC.**



**APPENDIX**  
**ANALYTICAL LABORATORY REPORT**

3/19/2010

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

Project Name- Noble - State 16-1114

Project Number- NEP 0701

Attached are your analytical results for Noble - State 16-1114 received by Origins Laboratory, Inc. March 16, 2010 3:48 pm. This project is associated with Origins project number X003113-01 .

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: NEP 0701  
Project: Noble - State 16-1114

**CROSS REFERENCE REPORT**

Sample ID	Laboratory ID	Matrix	Sampled	Date Received
TB23	X003113-01	Water	3/16/2010 1:05:00PM	03/16/2010 15:48
TB24	X003113-02	Water	3/16/2010 12:45:00PM	03/16/2010 15:48
TB25	X003113-03	Water	3/16/2010 12:05:00PM	03/16/2010 15:48

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

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

Matthew Harrison  
 Project Number: NEP 0701  
 Project: Noble - State 16-1114

www.originslaboratory.com

page 1 of 1

3003113

Client: LT Env.  
 Address: 4600 W 60th Ave, Arvada, CO 80005  
 Telephone Number: 303-433-9788  
 Email Address: mharrison@henv.com

Project Manager: M. Harrison  
 Project Name: State 16-1474  
 Project Number: NEP0701  
 Samples Collected By: Danny Burns

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 Canister #			Other	
TB 23	3-16-10	13:05	2	X	X	X	X	X	X				1	
TB 24	3-16-10	12:45	2	X	X	X	X	X	X				2	
TB 25	3-16-10	12:05	2	X	X	X	X	X	X				3	
													4	
													5	
													6	
													7	
													8	
													9	
													10	

Relinquished By: [Signature] Date: 3/16/10 Time: 15:48  
 Relinquished By: [Signature] Date: 3/16/10 Time: 14:48

Turnaround Time: Same Day  24 Hr   
 48 Hr  72 Hr   
 Standard

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

Origins Laboratory, Inc.

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**TB23**

3/16/2010 1:05:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X003113-01 (Water)

**BTEX by EPA 8260B**

Benzene	ND	1.00	ug/L	1	OC18001	03/18/2010	03/18/2010	
Toluene	ND	1.00	"	"	"	"	"	
Ethylbenzene	ND	1.00	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	
Xylenes, total	ND	1.00	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	102 %	73.5-130			"	"	"	
Surrogate: Toluene-d8	94.9 %	79.3-113			"	"	"	
Surrogate: 4-Bromofluorobenzene	98.0 %	81.5-117			"	"	"	

Origins Laboratory, Inc.



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Matthew Harrison  
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**TB24**

3/16/2010 12:45:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X003113-02 (Water)

**BTEX by EPA 8260B**

Benzene	ND	1.00	ug/L	1	OC18001	03/18/2010	03/18/2010	
Toluene	ND	1.00	"	"	"	"	"	
Ethylbenzene	ND	1.00	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	
Xylenes, total	ND	1.00	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	107 %	73.5-130			"	"	"	
Surrogate: Toluene-d8	97.5 %	79.3-113			"	"	"	
Surrogate: 4-Bromofluorobenzene	97.3 %	81.5-117			"	"	"	

Origins Laboratory, Inc.



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**TB25**

3/16/2010 12:05:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
 X003113-03 (Water)

**BTEX by EPA 8260B**

Benzene	ND	1.00	ug/L	1	OC18001	03/18/2010	03/18/2010	
Toluene	ND	1.00	"	"	"	"	"	
Ethylbenzene	ND	1.00	"	"	"	"	"	
o-Xylene	ND	1.00	"	"	"	"	"	
m,p-Xylene	ND	2.00	"	"	"	"	"	
Xylenes, total	ND	1.00	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	104 %	73.5-130			"	"	"	
Surrogate: Toluene-d8	93.9 %	79.3-113			"	"	"	
Surrogate: 4-Bromofluorobenzene	97.6 %	81.5-117			"	"	"	

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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
<b>Batch OC18001 - EPA 5030B</b>										
<b>Blank (OC18001-BLK1)</b>					Prepared: 03/18/2010 Analyzed: 03/18/2010					
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	"							
<i>Surrogate: 1,2-Dichloroethane-d4</i>	65.0		"	62.5		104	73.5-130			
<i>Surrogate: Toluene-d8</i>	61.5		"	62.5		98.4	79.3-113			
<i>Surrogate: 4-Bromofluorobenzene</i>	60.9		"	62.5		97.5	81.5-117			
<b>LCS (OC18001-BS1)</b>					Prepared: 03/18/2010 Analyzed: 03/18/2010					
Benzene	53.6	1.00	ug/L	50.0		107	77.3-128			
Toluene	52.0	1.00	"	50.0		104	81.7-118			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	64.8		"	62.5		104	73.5-130			
<i>Surrogate: Toluene-d8</i>	62.0		"	62.5		99.2	79.3-113			
<i>Surrogate: 4-Bromofluorobenzene</i>	59.4		"	62.5		95.0	81.5-117			
<b>Matrix Spike (OC18001-MS1)</b>					Source: X003113-01		Prepared: 03/18/2010 Analyzed: 03/18/2010			
Benzene	51.7	1.00	ug/L	50.0	ND	103	74.5-132			
Toluene	48.6	1.00	"	50.0	0.44	96.2	74.2-116			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	63.4		"	62.5		101	73.5-130			
<i>Surrogate: Toluene-d8</i>	60.8		"	62.5		97.2	79.3-113			
<i>Surrogate: 4-Bromofluorobenzene</i>	59.4		"	62.5		95.1	81.5-117			
<b>Matrix Spike Dup (OC18001-MSD1)</b>					Source: X003113-01		Prepared: 03/18/2010 Analyzed: 03/18/2010			
Benzene	51.9	1.00	ug/L	50.0	ND	104	74.5-132	0.367	13.1	
Toluene	47.1	1.00	"	50.0	0.44	93.2	74.2-116	3.12	21.2	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	63.3		"	62.5		101	73.5-130			
<i>Surrogate: Toluene-d8</i>	60.3		"	62.5		96.5	79.3-113			
<i>Surrogate: 4-Bromofluorobenzene</i>	60.6		"	62.5		96.9	81.5-117			

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Matthew Harrison  
Project Number: NEP 0701  
Project: Noble - State 16-1114

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**Notes and Definitions**

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

Origins Laboratory, Inc.



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Noelle E Doyle, Laboratory Manager