

## **GROUNDWATER MONITORING REPORT AUGUST 2010**

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### **PHILLIPS L30-6JI**

On August 4, 2010, LT Environmental, Inc. (LTE) conducted groundwater sampling on behalf of Noble Energy, Inc., at the Phillips L30-6JI Tank Battery (Site). This sampling event constitutes the fifth post remediation monitoring event at the Site. Site history, remediation activities, and groundwater monitoring results have been described in preceding reports.

Groundwater level measurements collected are summarized in Table 1. Monitoring wells SB06, SB08, SB10, SB12, and SB13 were installed on May 21, 2009, monitoring wells SB18 and SB19 were installed on May 26, 2009. Monitoring well SB06 was destroyed prior to the November 20, 2009 sampling event and was reinstalled January 15, 2010 as SB06R. Monitoring well SB08 could not be located and is assumed destroyed. Well locations, surface features, and current benzene concentrations are presented in Figure 1.

Depth to groundwater ranged from 1.23 feet below top of casing (btoc) in SB19 to 2.72 feet btoc in SB12 and was used to calculate well-specific purge volumes. Following purging, groundwater samples were 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.

Groundwater analytical results, 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 (WQCC Reg 41). The laboratory analytical report is included as an 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 November 2010.

**TABLE**

TABLE 1

GROUNDWATER ANALYTICAL DATA  
 PHILLIPS L30-6JI  
 WELD COUNTY, COLORADO  
 NOBLE ENERGY, INC.

MONITORING WELL	DATE	DEPTH TO WATER (feet btoc)	BENZENE (µg/l)	TOLUENE (µg/l)	ETHYLBENZENE (µg/l)	XYLENES (µg/l)
SB06	5/29/2009	3.53	<1.00	9.71	20.5	30.81
	8/4/2009	2.03	<b>33.7</b>	<1.00	33.4	231.6
	11/20/2009	----- Destroyed -----				
SB06R	2/18/2010	3.78	<1.00	<1.00	<1.00	<3.00
	5/19/2010	3.43	<1.00	<1.00	<1.00	<1.00
	8/4/2010	2.6	<1.00	<1.00	<1.00	<1.00
SB10	5/29/2009	2.77	<1.00	<1.00	<1.00	<3.00
	8/4/2009	2.37	2.35	<1.00	9.88	89.5
	11/20/2009	2.79	<1.00	<1.00	<1.00	<3.00
	2/18/2010	3.22	<1.00	<1.00	<1.00	<3.00
	5/19/2010	2.82	<1.00	<1.00	<1.00	<1.00
	8/4/2010	2.09	<1.00	<1.00	<1.00	<1.00
SB12	5/29/2009	3.46	<b>103</b>	281	69.2	861
	8/4/2009	2.75	<b>130</b>	31.4	15.3	174.6
	11/20/2009	3.47	3.71	62.3	12.8	115.4
	2/18/2010	3.93	3.29	<1.00	37.4	279.0
	5/19/2010	3.49	1.87	2.20	57.6	442
	8/4/2010	2.72	3.79	7.90	8.57	64
SB13	5/29/2009	3.1	<1.00	<1.00	<1.00	<3.00
	8/4/2009	2.39	<1.00	<1.00	<1.00	<3.00
	11/20/2009	3.11	<1.00	<1.00	<1.00	<3.00
	2/18/2010	3.60	<1.00	<1.00	<1.00	<3.00
	5/19/2010	3.19	<1.00	<1.00	<1.00	<1.00
	8/4/2010	2.35	<1.00	<1.00	<1.00	<1.00
SB18	5/29/2009	3.06	2.52	<1.00	<1.00	<3.00
	8/4/2009	2.4	<1.00	<1.00	<1.00	<3.00
	11/20/2009	3.10	<1.00	<1.00	<1.00	<3.00
	2/18/2010	3.55	<1.00	<1.00	<1.00	<3.00
	5/19/2010	3.14	<1.00	<1.00	<1.00	<1.00
	8/4/2010	2.34	<1.00	<1.00	<1.00	<1.00
SB19	5/29/2009	2.97	<b>17.1</b>	<1.00	<1.00	<3.00
	8/4/2009	2.34	<1.00	<1.00	<1.00	<3.00
	11/20/2009	2.02	<1.00	<1.00	<1.00	<3.00
	2/18/2010	2.51	<b>58.5</b>	<1.00	18.68	<3.00
	5/19/2010	2.06	<b>54.8</b>	<1.00	<1.00	67.1
	8/4/2010	1.23	<1.00	<1.00	<1.00	<1.00
<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

µg/l - micrograms per liter

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

**Bold** - indicates concentration exceeds the CDPHE WQCC Reg 41 standard

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

Commission Regulation 41 covering Basic Standards for Groundwater

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



**FIGURE**

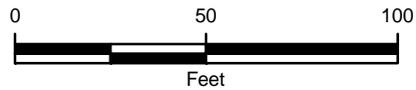


IMAGE COURTESY OF GOOGLE EARTH, 2009

**LEGEND**

- PRODUCTION WELLHEAD
- ⊗ MONITORING WELL
- PERMEABLE REACTIVE BARRIER (PRB)
- EXCAVATION EXTENT

GROUNDWATER SAMPLES WERE COLLECTED ON AUGUST 4, 2010



**FIGURE 1**  
**BENZENE CONCENTRATION IN GROUNDWATER**  
**PHILLIPS L30-6JI**  
**SEC30 - 3N - 66W**  
**WELD COUNTY, COLORADO**  
**NOBLE ENERGY, INC.**



**APPENDIX**  
**ANALYTICAL REPORT**

08/09/2010

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

Project Name- Noble - Phillips L30-6JI

Project Number- NEP0909

Attached are your analytical results for Noble - Phillips L30-6JI received by Origins Laboratory, Inc. August 4, 2010 2:35 pm. This project is associated with Origins project number X008015-01 .

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: NEPO909  
Project: Noble - Phillips L30-6JI

## CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Sampled	Date Received
SB10	X008015-01	Water	8/4/2010 11:10:00AM	08/04/2010 14:35
SB12	X008015-02	Water	8/4/2010 11:20:00AM	08/04/2010 14:35
SB13	X008015-03	Water	8/4/2010 11:50:00AM	08/04/2010 14:35
SB18	X008015-04	Water	8/4/2010 11:30:00AM	08/04/2010 14:35
SB19	X008015-05	Water	8/4/2010 11:40:00AM	08/04/2010 14:35
SB06-R	X008015-06	Water	8/4/2010 12:00:00PM	08/04/2010 14:35

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.*



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

Matthew Harrison  
Project Number: NEP0909  
Project: Noble - Phillips L30-6JI

**SB10**

8/4/2010 11:10:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
XO08015-01 (Water)

**BTEX by EPA 8260B**

Benzene	ND	0.00100	mg/L	1	OH05001	08/09/2010	08/09/2010	
Toluene	ND	0.00100	"	"	"	"	"	
Ethylbenzene	ND	0.00100	"	"	"	"	"	
Xylenes, total	ND	0.00100	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	98.6 %	73.5-130			"	"	"	
Surrogate: Toluene-d8	99.3 %	79.3-113			"	"	"	
Surrogate: 4-Bromofluorobenzene	105 %	81.5-117			"	"	"	

Origins Laboratory, Inc.



Noelle E Doyle,

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Project: Noble - Phillips L30-6JI

**SB12**

8/4/2010 11:20:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X008015-02 (Water)

**BTEX by EPA 8260B**

Benzene	0.00379	0.00100	mg/L	1	OH05001	08/09/2010	08/09/2010	
Toluene	0.00790	0.00100	"	"	"	"	"	
Ethylbenzene	0.00857	0.00100	"	"	"	"	"	
Xylenes, total	0.0640	0.00100	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	94.3 %	73.5-130			"	"	"	
Surrogate: Toluene-d8	100 %	79.3-113			"	"	"	
Surrogate: 4-Bromofluorobenzene	107 %	81.5-117			"	"	"	

Origins Laboratory, Inc.



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Noelle E Doyle,

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4600 West 60th Avenue  
Arvada CO 80003

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Project: Noble - Phillips L30-6JI

**SB13**

8/4/2010 11:50:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X008015-03 (Water)

**BTEX by EPA 8260B**

Benzene	ND	0.00100	mg/L	1	OH05001	08/09/2010	08/09/2010	
Toluene	ND	0.00100	"	"	"	"	"	
Ethylbenzene	ND	0.00100	"	"	"	"	"	
Xylenes, total	ND	0.00100	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	93.6 %	73.5-130			"	"	"	
Surrogate: Toluene-d8	101 %	79.3-113			"	"	"	
Surrogate: 4-Bromofluorobenzene	108 %	81.5-117			"	"	"	

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Project: Noble - Phillips L30-6JI

**SB18**

8/4/2010 11:30:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X008015-04 (Water)

**BTEX by EPA 8260B**

Benzene	ND	0.00100	mg/L	1	OH05001	08/09/2010	08/09/2010	
Toluene	ND	0.00100	"	"	"	"	"	
Ethylbenzene	ND	0.00100	"	"	"	"	"	
Xylenes, total	ND	0.00100	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	97.3 %	73.5-130			"	"	"	
Surrogate: Toluene-d8	99.5 %	79.3-113			"	"	"	
Surrogate: 4-Bromofluorobenzene	107 %	81.5-117			"	"	"	

Origins Laboratory, Inc.



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Arvada CO 80003

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Project: Noble - Phillips L30-6JI

**SB19**

8/4/2010 11:40:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X008015-05 (Water)

**BTEX by EPA 8260B**

Benzene	ND	0.00100	mg/L	1	OH05001	08/09/2010	08/09/2010	
Toluene	ND	0.00100	"	"	"	"	"	
Ethylbenzene	ND	0.00100	"	"	"	"	"	
Xylenes, total	ND	0.00100	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	98.4 %	73.5-130			"	"	"	
Surrogate: Toluene-d8	99.9 %	79.3-113			"	"	"	
Surrogate: 4-Bromofluorobenzene	108 %	81.5-117			"	"	"	

Origins Laboratory, Inc.



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Arvada CO 80003

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Project: Noble - Phillips L30-6JI

**SBO6-R**

8/4/2010 12:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X008015-06 (Water)

**BTEX by EPA 8260B**

Benzene	ND	0.00100	mg/L	1	OH05001	08/09/2010	08/09/2010	
Toluene	ND	0.00100	"	"	"	"	"	
Ethylbenzene	ND	0.00100	"	"	"	"	"	
Xylenes, total	ND	0.00100	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	99.8 %	73.5-130			"	"	"	
Surrogate: Toluene-d8	101 %	79.3-113			"	"	"	
Surrogate: 4-Bromofluorobenzene	106 %	81.5-117			"	"	"	

Origins Laboratory, Inc.



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 Arvada CO 80003

Matthew Harrison  
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 Project: Noble - Phillips L30-6JI

**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 OH05001 - EPA 5030B**

**Blank (OH05001-BLK1)**

Prepared: 08/09/2010 Analyzed: 08/09/2010

Benzene	ND	0.001	mg/L							
Toluene	ND	0.001	"							
Ethylbenzene	ND	0.001	"							
m,p-Xylene	ND	0.002	"							
o-Xylene	ND	0.001	"							
<i>Surrogate: 1,2-Dichloroethane-d4</i>	61.4		ug/L	62.5		98.2	73.5-130			
<i>Surrogate: Toluene-d8</i>	62.2		"	62.5		99.4	79.3-113			
<i>Surrogate: 4-Bromofluorobenzene</i>	66.6		"	62.5		107	81.5-117			

**LCS (OH05001-BS1)**

Prepared: 08/09/2010 Analyzed: 08/09/2010

Benzene	0.02	0.001	mg/L	0.0250		99.6	77.3-128			
Toluene	0.02	0.001	"	0.0250		97.6	81.7-118			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	60.6		ug/L	62.5		97.0	73.5-130			
<i>Surrogate: Toluene-d8</i>	63.0		"	62.5		101	79.3-113			
<i>Surrogate: 4-Bromofluorobenzene</i>	64.5		"	62.5		103	81.5-117			

**Matrix Spike (OH05001-MS1)**

Source: X008015-01

Prepared: 08/09/2010 Analyzed: 08/09/2010

Benzene	0.02	0.001	mg/L	0.0250	ND	96.4	74.5-132			
Toluene	0.02	0.001	"	0.0250	ND	94.6	74.2-116			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	61.3		ug/L	62.5		98.1	73.5-130			
<i>Surrogate: Toluene-d8</i>	63.4		"	62.5		101	79.3-113			
<i>Surrogate: 4-Bromofluorobenzene</i>	64.5		"	62.5		103	81.5-117			

**Matrix Spike Dup (OH05001-MSD1)**

Source: X008015-01

Prepared: 08/09/2010 Analyzed: 08/09/2010

Benzene	0.03	0.001	mg/L	0.0250	ND	102	74.5-132	5.41	13.1	
Toluene	0.02	0.001	"	0.0250	ND	99.2	74.2-116	4.83	21.2	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	61.5		ug/L	62.5		98.4	73.5-130			
<i>Surrogate: Toluene-d8</i>	62.9		"	62.5		101	79.3-113			
<i>Surrogate: 4-Bromofluorobenzene</i>	65.7		"	62.5		105	81.5-117			

Origins Laboratory, Inc.



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Arvada CO 80003

Matthew Harrison  
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Project: Noble - Phillips L30-6JI

**Notes and Definitions**

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

Origins Laboratory, Inc.



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\_\_\_\_\_  
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