

## **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		DEPTH TO	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
WELL	DATE	WATER (feet btoc)	(µg/l)	(µg/l)	(µg/l)	(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

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



**FIGURE**

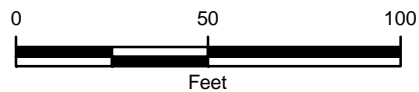


IMAGE COURTESY OF GOOGLE EARTH, 2009

# 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

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

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

## 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.



*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,



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

# ORIGINS

LABORATORY, INC

www.originslaboratory.com

X008015

page 1 of 1

Client:

L.T. Environmental

Address:

7600 W 60th Ave

Telephone Number:

(303) 433-9788

Email Address:

l.t.environmental@gmail.com

Project Manager:

Scott Harrison

Project Name:

Phillips L30-GSI

Project Number:

NELP0909

Samples Collected By:

J. Ragon

Fax: 303.265.9645

Phone: 303.433.1322

Denver, CO 80211

1725 Elk Place

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analyst	Sample Instructions	
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil				
									Air Summa Canister #	Other			
SB10	8/4	1110	3	X				X			Blex	1	
SB12	8/4	1120	3	X				X				2	
SB13	8/4	1150	3	X				X				3	
SB18	8/4	1130	3	X				X				4	
SB19	8/4	1140	3	X				X				5	
SD06R	8/4	1200	3	X				X				6	
												7	
												8	
												9	
												10	

Relinquished By:	Date:	Time:	Received By:	Date:	Time:	Turnaround Time:
	[Signature]	8/4	14:35	[Signature]	8/4/10	14:35

**Origins Laboratory, Inc.**

Noelle E Doyle,

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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.  
X008015-01 (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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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

Matthew Harrison  
Project Number: NEP0909  
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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LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada CO 80003

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

## 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	"	"	"

Origins Laboratory, Inc.



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



Noelle E Doyle,

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

Matthew Harrison  
Project Number: NEP0909  
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.



Noelle E Doyle,

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

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

## SB06-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

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Project Number: NEP0909  
Project: Noble - Phillips L30-6Jl

## 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	"

Surrogate: 1,2-Dichloroethane-d4	61.4	ug/L	62.5	98.2	73.5-130
Surrogate: Toluene-d8	62.2	"	62.5	99.4	79.3-113
Surrogate: 4-Bromofluorobenzene	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

Surrogate: 1,2-Dichloroethane-d4	60.6	ug/L	62.5	97.0	73.5-130
Surrogate: Toluene-d8	63.0	"	62.5	101	79.3-113
Surrogate: 4-Bromofluorobenzene	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

Surrogate: 1,2-Dichloroethane-d4	61.3	ug/L	62.5	98.1	73.5-130
Surrogate: Toluene-d8	63.4	"	62.5	101	79.3-113
Surrogate: 4-Bromofluorobenzene	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

Surrogate: 1,2-Dichloroethane-d4	61.5	ug/L	62.5	98.4	73.5-130
Surrogate: Toluene-d8	62.9	"	62.5	101	79.3-113
Surrogate: 4-Bromofluorobenzene	65.7	"	62.5	105	81.5-117

Origins Laboratory, Inc.



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Noelle E Doyle,



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

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

### Notes and Definitions

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

Origins Laboratory, Inc.



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