

GROUNDWATER MONITORING REPORT JANUARY 2010

PHILLIPS L30-6JI

On November 20, 2009, 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 second post remediation monitoring event at this Site. Site history, remediation activities, and groundwater monitoring results have been described in preceding reports.

Groundwater level measurements were collected from the monitoring wells and 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. A Site Map is presented on Figure 1. Monitoring well SB06 was not located during this sampling event. It is assumed SB06 is destroyed.

Depth to groundwater, which ranged from 2.02 feet below top of casing (btoc) in SB19 to 3.47 feet btoc in SB12, was used to calculate well-specific purge volumes. Following purging, groundwater samples were collected and preserved on ice. Samples were 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.

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 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 February 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 (ug/L)	TOLUENE (ug/L)	ETHYLBENZENE (ug/L)	XYLENES (ug/L)
SB06	5/29/2009	3.53	<1.0	9.71	20.5	30.81
	8/4/2009	2.03	33.7	<1.00	33.4	231.6
	11/20/2009	----- Destroyed -----				
SB10	5/29/2009	2.77	<1.0	<1.0	<1.0	<3.0
	8/4/2009	2.37	2.35	<1.00	9.88	89.5
	11/20/2009	2.79	<1.00	<1.0	<1.0	<3.0
SB12	5/29/2009	3.46	103	281	69.2	861
	8/4/2009	2.75	130	31.4	15.3	174.6
	11/20/2009	3.47	3.71	62.3	12.8	115.4
SB13	5/29/2009	3.1	<1.0	<1.0	<1.0	<3.0
	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
SB18	5/29/2009	3.06	2.52	<1.0	<1.0	<3.0
	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
SB19	5/29/2009	2.97	17.1	<1.0	<1.0	<3.0
	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
CDPHE WQCC Reg 41			5.0	560	700	1,400

NOTES:

btoc - below top of casing

ug/L - micrograms per liter

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



LEGEND

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

GROUNDWATER SAMPLES WERE
COLLECTED ON NOVEMBER 20, 2009

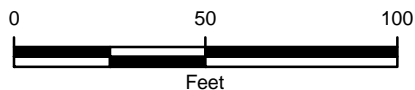


FIGURE 1
BENZENE CONCENTRATION IN GROUNDWATER
PHILLIPS L30-6JI
SEC30 - 3N - 66W
WELD COUNTY, COLORADO
NOBLE ENERGY, INC.



APPENDIX
ANALYTICAL REPORT



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

November 29, 2009

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

Brian Dodek
Project Number: NEP0909
Project: Noble – Phillips L30-6JI

Attached are the analytical results for Noble – Phillips L30-6JI received by Origins Laboratory, Inc. 11/20/2009 4:27:00PM. Please let us know if you have any questions, or if we can help with anything at all.

Noelle E Doyle
Laboratory Manager

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

Brian Dodek
Project Number: NEP0909
Project: Noble – Phillips L30-6JI

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Sampled	Date Received
SB12	X911087-01	Water	11/20/2009 12:40:00PM	11/20/2009 16:27
SB13	X911087-02	Water	11/20/2009 12:25:00PM	11/20/2009 16:27
SB18	X911087-03	Water	11/20/2009 12:50:00PM	11/20/2009 16:27
SB19	X911087-04	Water	11/20/2009 12:15:00PM	11/20/2009 16:27
SB10	X911087-05	Water	11/20/2009 1:00:00PM	11/20/2009 16:27

Origins Laboratory, Inc.

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Noelle E Doyle, Laboratory Manager

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

Brian Dodek
Project Number: NEP0909
Project: Noble - Phillips L30-6J1

originslaboratory.com

Client: LT Environmental
Address: 4600 W. 60th Ave
Arvada CO 80003
Telephone Number: 303-433-9785
E-Mail Address: b.dodek@ltenv.com

Project Manager: Brian Dodek
Project Name: Phillips GW Sampling
Project Number: NEP0909
Samples Collected by: Devon Gartin

page 1 of 1

Sample ID - Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix			Analysis	Sample Instructions
				Unpreserved	HCl	HNO ₃	Other -	Groundwater	Soil	Air - Summa Canister #		
SB12	11/20/09	1240	3	X	X			X			BTEX/PAH	1
SB13		1235	1	X	X			X				2
SB16		1250	1	X	X			X				3
SB19		1215	1	X	X			X				4
SB10		1300	1	X	X			X				5
												6
												7
												8
												9
												10

Relinquished by: Devon Gartin Date: 11/20/09 Time: 1627
Received by: [Signature] Date: 11/20/09 Time: 1627

Turn Around Time: Same Day ☐ 24-hr ☒ 48-hr ☐ 72-hr ☐ Standard ☐

Temperature Upon Receipt: _____

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Origins Laboratory, Inc.

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

SB12

X911087-01 (Water)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

BTEX by EPA 8260B

Benzene	0.00371	0.00100	mg/L	1	9K23004	11/23/2009	11/23/2009
Toluene	0.0623	0.00100	"	"	"	"	"
Ethylbenzene	0.0128	0.00100	"	"	"	"	"
o-Xylene	0.0322	0.00100	"	"	"	"	"
m,p-Xylene	0.0832	0.00200	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	121 %	85.7-134	"	"	"
Surrogate: Toluene-d8	84.9 %	81.4-121	"	"	"
Surrogate: 4-Bromofluorobenzene	108 %	74.7-127	"	"	"

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SB13

X911087-02 (Water)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

BTEX by EPA 8260B

Benzene	ND	0.00100	mg/L	1	9K23004	11/23/2009	11/23/2009
Toluene	ND	0.00100	"	"	"	"	"
Ethylbenzene	ND	0.00100	"	"	"	"	"
o-Xylene	ND	0.00100	"	"	"	"	"
m,p-Xylene	ND	0.00200	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	118 %	85.7-134	"	"	"
Surrogate: Toluene-d8	85.6 %	81.4-121	"	"	"
Surrogate: 4-Bromofluorobenzene	118 %	74.7-127	"	"	"

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SB18

X911087-03 (Water)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

BTEX by EPA 8260B

Benzene	ND	0.00100	mg/L	1	9K23004	11/23/2009	11/23/2009
Toluene	ND	0.00100	"	"	"	"	"
Ethylbenzene	ND	0.00100	"	"	"	"	"
o-Xylene	ND	0.00100	"	"	"	"	"
m,p-Xylene	ND	0.00200	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	118 %	85.7-134	"	"	"
Surrogate: Toluene-d8	83.8 %	81.4-121	"	"	"
Surrogate: 4-Bromofluorobenzene	114 %	74.7-127	"	"	"

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SB19

X911087-04 (Water)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

BTEX by EPA 8260B

Benzene	ND	0.00100	mg/L	1	9K23004	11/23/2009	11/23/2009
Toluene	ND	0.00100	"	"	"	"	"
Ethylbenzene	ND	0.00100	"	"	"	"	"
o-Xylene	ND	0.00100	"	"	"	"	"
m,p-Xylene	ND	0.00200	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	123 %	85.7-134	"	"	"
Surrogate: Toluene-d8	82.8 %	81.4-121	"	"	"
Surrogate: 4-Bromofluorobenzene	114 %	74.7-127	"	"	"

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SB10

X911087-05 (Water)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

BTEX by EPA 8260B

Benzene	ND	0.00100	mg/L	1	9K23004	11/23/2009	11/23/2009
Toluene	ND	0.00100	"	"	"	"	"
Ethylbenzene	ND	0.00100	"	"	"	"	"
o-Xylene	ND	0.00100	"	"	"	"	"
m,p-Xylene	ND	0.00200	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	117 %	85.7-134	"	"	"
Surrogate: Toluene-d8	83.3 %	81.4-121	"	"	"
Surrogate: 4-Bromofluorobenzene	115 %	74.7-127	"	"	"

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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 9K23004 – EPA 5030B

Blank (9K23004–BLK1)

Prepared: 11/23/2009 Analyzed: 11/23/2009

Benzene	ND	0.001	mg/L							
Toluene	ND	0.001	"							
Ethylbenzene	ND	0.001	"							
o-Xylene	ND	0.001	"							
m,p-Xylene	ND	0.002	"							
Surrogate: 1,2-Dichloroethane-d4	70.9		ug/L	62.5		113	85.7-134			
Surrogate: Toluene-d8	56.0		"	62.5		89.6	81.4-121			
Surrogate: 4-Bromofluorobenzene	69.6		"	62.5		111	74.7-127			

LCS (9K23004–BS1)

Prepared: 11/23/2009 Analyzed: 11/23/2009

Benzene	0.04	0.001	mg/L	0.0500		79.7	74.9-126			
Toluene	0.04	0.001	"	0.0500		81.5	73.3-128			
Surrogate: 1,2-Dichloroethane-d4	70.3		ug/L	62.5		113	85.7-134			
Surrogate: Toluene-d8	54.7		"	62.5		87.5	81.4-121			
Surrogate: 4-Bromofluorobenzene	69.5		"	62.5		111	74.7-127			

Matrix Spike (9K23004–MS1)

Source: X911088-01

Prepared: 11/23/2009 Analyzed: 11/23/2009

Benzene	0.04	0.001	mg/L	0.0500	ND	78.8	78.1-132			
Toluene	0.04	0.001	"	0.0500	ND	79.8	71.7-124			
Surrogate: 1,2-Dichloroethane-d4	74.0		ug/L	62.5		118	85.7-134			
Surrogate: Toluene-d8	54.1		"	62.5		86.6	81.4-121			
Surrogate: 4-Bromofluorobenzene	70.4		"	62.5		113	74.7-127			

Matrix Spike Dup (9K23004–MSD1)

Source: X911088-01

Prepared: 11/23/2009 Analyzed: 11/23/2009

Benzene	0.04	0.001	mg/L	0.0500	ND	77.9	78.1-132	1.10	24.8	QM-07
Toluene	0.04	0.001	"	0.0500	ND	77.0	71.7-124	3.55	25	
Surrogate: 1,2-Dichloroethane-d4	72.5		ug/L	62.5		116	85.7-134			
Surrogate: Toluene-d8	53.1		"	62.5		85.0	81.4-121			
Surrogate: 4-Bromofluorobenzene	69.6		"	62.5		111	74.7-127			

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Notes and Definitions

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

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