

GROUNDWATER MONITORING REPORT OCTOBER 2009

STRONG 21-15JI

On August 24, 2009, LT Environmental, Inc. (LTE) conducted groundwater sampling on behalf of Noble Energy, Inc. (Noble) at the Strong 21-15JI Tank Battery (Site). This sampling event constitutes the third post-remediation monitoring event at the 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 (MW01, MW02, and MW03) were installed on January 30, 2009. A Site Map is presented on Figure 1.

Depth to groundwater, which ranged from 3.55 feet below top of casing (btoc) in MW03 to 3.64 feet btoc in MW01, was used to calculate well-specific purge volumes. Following purging, groundwater samples were collected and preserved on ice. Samples were submitted under a 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 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 WQCC Reg 41. The next quarterly groundwater sampling event is scheduled for November 2009.

TABLE

TABLE 1

**GROUNDWATER ANALYTICAL DATA
STRONG 21-15JI TANK BATTERY
WELD COUNTY, COLORADO
NOBLE ENERGY, INC.**

MONITORING		DEPTH TO	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
WELL	DATE	WATER (feet btoc)	(ug/L)	(ug/L)	(ug/L)	(ug/L)
MW01	2/6/2009	9.84	<1.0	<1.0	<1.0	<3.0
	5/13/2009	10.33	<1.0	<1.0	<1.0	<3.0
	8/24/2009	3.64	<1.0	<1.0	<1.0	<3.0
MW02	2/6/2009	9.40	<1.0	<1.0	<1.0	<3.0
	5/13/2009	9.92	<1.0	<1.0	<1.0	<3.0
	8/24/2009	3.60	<1.0	<1.0	<1.0	<3.0
MW03	2/6/2009	9.39	<1.0	<1.0	<1.0	<3.0
	5/13/2009	9.91	<1.0	<1.0	<1.0	<3.0
	8/24/2009	3.55	<1.0	<1.0	<1.0	<3.0
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

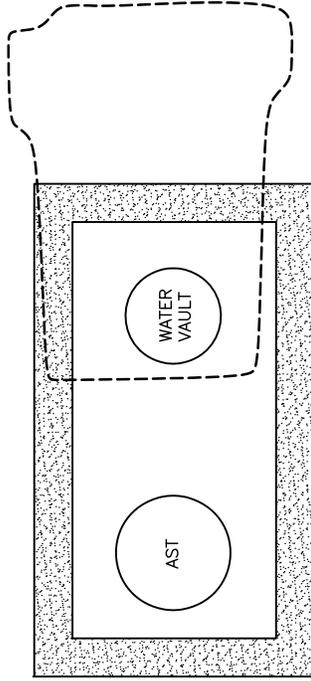
CDPHE WQCC Reg 41 - Colorado Department of Public Health and Environment - Water Quality Control

Commission Regulation 41 covering Basic Standards for Groundwater

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



FIGURE



MMW01 ⊗

⊗ MMW03
M M

SEPARATOR

⊗ MMW02

○ FLARE

LEGEND

- MMW01 ⊗ MONITORING WELL LOCATION
- M METER HOUSE
- BERM
- - - - - EXTENT OF EXCAVATION
- ESTIMATED GROUNDWATER FLOW DIRECTION
- AST ABOVEGROUND STORAGE TANK



0 5 10 20
FEET
APPROXIMATE SCALE

FIGURE 1
SITE MAP
STRONG 21-15 JI
WELD COUNTY, CO
NOBLE ENERGY, INC.



NEP083302

APPENDIX
ANALYTICAL REPORT



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

October 09, 2009

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

Brian Dodek
Project Number: NEP0833
Project: Noble - Strong 21-15Jl,23

Attached are the analytical results for Noble - Strong 21-15Jl,23 received by Origins Laboratory, Inc. 8/24/2009 2:05:00PM. Please let us know if you have any questions, or if we can help with anything at all.

A handwritten signature in black ink, appearing to read "Noelle E Doyle".

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.

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LT Environmental, Inc.
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Brian Dodek
Project Number: NEP0833
Project: Noble - Strong 21-15J1,23

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Sampled	Date Received
MW-01	X908080-01	Water	8/24/2009 11:25:00AM	08/24/2009 14:05
MW-02	X908080-02	Water	8/24/2009 11:30:00AM	08/24/2009 14:05
MW-03	X908080-03	Water	8/24/2009 11:35:00AM	08/24/2009 14:05

Origins Laboratory, Inc.

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Noelle E Doyle, Laboratory Manager

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MW-01
X908080-01 (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	9H25001	08/25/2009	08/25/2009	
Toluene	ND	0.00100	"	"	"	"	"	
Ethylbenzene	ND	0.00100	"	"	"	"	"	
o-Xylene	ND	0.00100	"	"	"	"	"	
m,p-Xylene	ND	0.00200	"	"	"	"	"	

<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>101 %</i>	<i>85.7-134</i>			"	"	"	
<i>Surrogate: Toluene-d8</i>	<i>103 %</i>	<i>81.4-121</i>			"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>99.0 %</i>	<i>74.7-127</i>			"	"	"	

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MW-02
X908080-02 (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	9H25001	08/25/2009	08/25/2009	
Toluene	ND	0.00100	"	"	"	"	"	
Ethylbenzene	ND	0.00100	"	"	"	"	"	
o-Xylene	ND	0.00100	"	"	"	"	"	
m,p-Xylene	ND	0.00200	"	"	"	"	"	

<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>101 %</i>	<i>85.7-134</i>			<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>	<i>103 %</i>	<i>81.4-121</i>			<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>98.4 %</i>	<i>74.7-127</i>			<i>"</i>	<i>"</i>	<i>"</i>	

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LT Environmental, Inc.
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MW-03
X908080-03 (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	9H25001	08/25/2009	08/25/2009	
Toluene	ND	0.00100	"	"	"	"	"	
Ethylbenzene	ND	0.00100	"	"	"	"	"	
o-Xylene	ND	0.00100	"	"	"	"	"	
m,p-Xylene	ND	0.00200	"	"	"	"	"	

<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>102 %</i>	<i>85.7-134</i>			"	"	"	
<i>Surrogate: Toluene-d8</i>	<i>107 %</i>	<i>81.4-121</i>			"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>99.8 %</i>	<i>74.7-127</i>			"	"	"	

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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 9H25001 – EPA 5030B

Blank (9H25001–BLK1)

Prepared: 08/25/2009 Analyzed: 08/25/2009

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	"							

<i>Surrogate: 1,2-Dichloroethane-d4</i>	60.7		ug/L	62.5		97.1	85.7-134			
<i>Surrogate: Toluene-d8</i>	65.4		"	62.5		105	81.4-121			
<i>Surrogate: 4-Bromofluorobenzene</i>	60.4		"	62.5		96.7	74.7-127			

LCS (9H25001–BS1)

Prepared: 08/25/2009 Analyzed: 08/25/2009

Benzene	0.06	0.001	mg/L	0.0500		114	74.9-126			
Toluene	0.06	0.001	"	0.0500		121	73.3-128			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	61.8		ug/L	62.5		98.9	85.7-134			
<i>Surrogate: Toluene-d8</i>	63.6		"	62.5		102	81.4-121			
<i>Surrogate: 4-Bromofluorobenzene</i>	61.1		"	62.5		97.8	74.7-127			

Matrix Spike (9H25001–MS1)

Source: X908075-02

Prepared: 08/25/2009 Analyzed: 08/25/2009

Benzene	0.05	0.001	mg/L	0.0500	ND	100	78.1-132			
Toluene	0.06	0.001	"	0.0500	ND	122	71.7-124			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	41.6		ug/L	62.5		66.5	85.7-134			S-GC
<i>Surrogate: Toluene-d8</i>	75.8		"	62.5		121	81.4-121			
<i>Surrogate: 4-Bromofluorobenzene</i>	59.5		"	62.5		95.1	74.7-127			

Matrix Spike Dup (9H25001–MSD1)

Source: X908075-02

Prepared: 08/25/2009 Analyzed: 08/25/2009

Benzene	0.05	0.001	mg/L	0.0500	ND	106	78.1-132	5.75	24.8	
Toluene	0.06	0.001	"	0.0500	ND	130	71.7-124	6.41	25	QM-07
<i>Surrogate: 1,2-Dichloroethane-d4</i>	42.8		ug/L	62.5		68.4	85.7-134			S-GC
<i>Surrogate: Toluene-d8</i>	77.0		"	62.5		123	81.4-121			S-GC
<i>Surrogate: 4-Bromofluorobenzene</i>	58.2		"	62.5		93.1	74.7-127			

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Notes and Definitions

- S-GC Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.
- 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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