

GROUNDWATER MONITORING REPORT

NOVEMBER 2008

STRONG 1, P-21-2, 7, 8, 9, 10J, 16, 1JI, 2JI, 7JI TANK BATTERY

On October 31, 2008, LT Environmental, Inc. (LTE) conducted groundwater sampling, on behalf of Noble Energy, Inc., at the Strong 1, P-21-2, 7, 8, 9, 10J, 16, 1JI, 2JI, 7JI Tank Battery. This sampling event constitutes the fourth post remediation monitoring event at this site. Site history and remediation activities were described in the preceding remediation and groundwater monitoring reports.

Groundwater level measurements were collected from the monitoring wells and are summarized in Table 1. Monitoring wells (MW01, MW02, MW03 and MW04) were installed surrounding the tank battery excavation on January 11, 2008. A Monitoring Well Location Map is presented as Figure 1.

Depth to groundwater, which ranged from 7.06 feet below top of casing (btoc) in MW01 to 9.04 feet btoc in MW04, 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.

Groundwater analytical results indicate BTEX concentrations at monitoring wells MW01, MW02, and MW04 did not exceed the Colorado Groundwater Quality Standards (CGWQS). Monitoring well MW03 exhibited a benzene concentration of 5.44 micrograms per liter ($\mu\text{g/L}$), exceeding the CGWQS standard of 5.0 $\mu\text{g/L}$. Monitoring well MW03 also exhibited toluene, ethylbenzene and total xylenes concentrations above the laboratory detection limits but below the CGWQS. Monitoring well MW04 exhibited a total xylenes concentration above the laboratory detection limit but below the CGWQS. MW01 and MW02 did not exceed the laboratory method detection limits. Analytical results are summarized in Table 1. The laboratory analytical report is attached 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 January 2009.



TABLE



TABLE 1

GROUNDWATER ANALYTICAL DATA
 STRONG 1, P-21-2, 7, 8, 9, 10J, 16, 1JI, 2JI, 7JI TANK BATTERY
 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)
MW01	1/18/2008	8.19	<1.0	<1.0	<1.0	<2.0
	4/17/2008	9.37	<1.0	<1.0	<1.0	<2.0
	7/18/2008	8.11	<1.0	<1.0	<1.0	<3.0
	10/31/2008	7.06	<1.0	<1.0	<1.0	<3.0
MW02	1/18/2008	8.50	<1.0	<1.0	<1.0	<2.0
	4/17/2008	9.61	<1.0	<1.0	<1.0	<2.0
	7/18/2008	8.29	<1.0	<1.0	<1.0	<3.0
	10/31/2008	7.40	<1.0	<1.0	<1.0	<3.0
MW03	1/18/2008	8.95	<1.0	<1.0	29.3	65.52
	4/17/2008	10.12	<1.0	5.55	<1.0	37.8
	7/18/2008	8.70	181	<1.0	5.54	13.8
	10/31/2008	7.98	5.44	1.29	9.24	35.91
MW04	1/18/2008	9.90	<1.0	<1.0	<1.0	<2.0
	4/17/2008	11.13	34.5	5.81	<1.0	18.87
	7/18/2008	9.50	6.94	<1.0	<1.0	<3.0
	10/31/2008	9.04	<1.0	<1.0	<1.0	2.10
CGWQS			5.0	1,000	700	1,400

NOTES:

btoc - below top of casing

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

Bold indicates concentration exceeds the CGWQS Standard

ug/L - micrograms per liter

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

CGWQS - Colorado Groundwater Quality Standards



FIGURE

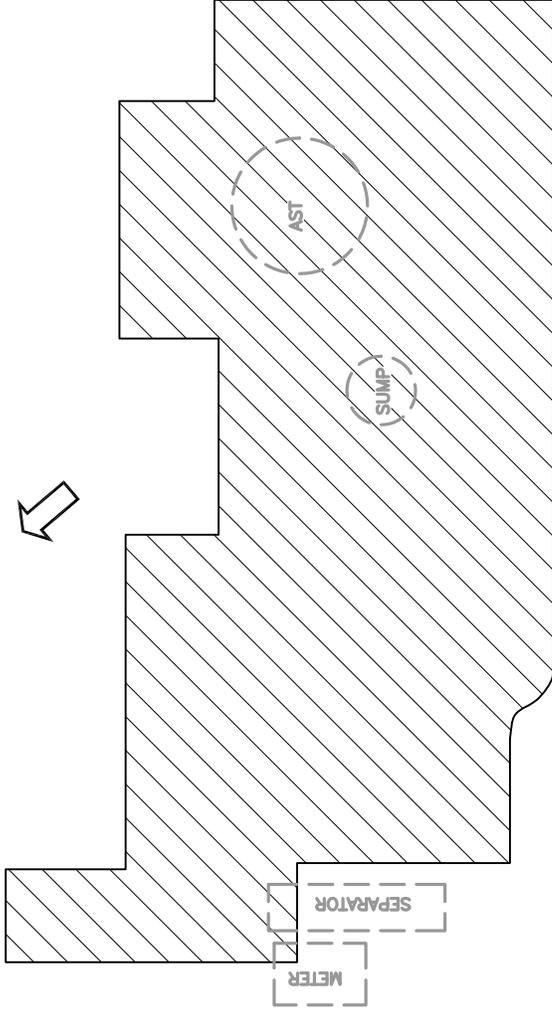


MW04

MW03

MW02

MW01



LEGEND

MW01 ○ PROPOSED MONITORING WELL LOCATION

▨ EXCAVATION AREA

⇐ ESTIMATED GROUNDWATER FLOW DIRECTION

SOURCE:
LTE SKETCH



NEP072203

FIGURE 1
MONITORING WELL LOCATION MAP
STRONG 1, P21-2, 7, 8, 9, 10J, 16, 1Jl, 2Jl, 7Jl
TANK BATTERY
WELD COUNTY, COLORADO
NOBLE ENERGY, INC.

APPENDIX
ANALYTICAL REPORT





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303.433.1322 Phone 303.265.9645 Fax

November 04, 2008

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

Brian Dodek
Project Number: NEP0722
Project: Strong Tank Battery

Attached are the analytical results for Strong Tank Battery received by Origins Laboratory, Inc. 10/31/2008 3:54:00PM. 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", is written in a cursive style.

Laboratory Manager
Noelle E Doyle

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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Arvada CO 80003

Brian Dodek
Project Number: NEP0722
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CROSS REFERENCE REPORT

Laboratory ID	Sample ID	Matrix	Sampled	Date Received
MW01	X810105-01	Water	10/31/2008 10:40:00AM	10/31/2008 15:54
MW02	X810105-02	Water	10/31/2008 10:55:00AM	10/31/2008 15:54
MW03	X810105-03	Water	10/31/2008 11:10:00AM	10/31/2008 15:54
MW04	X810105-04	Water	10/31/2008 11:25:00AM	10/31/2008 15:54

Origins Laboratory, Inc.

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Noelle E Doyle, Laboratory Manager

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LT Environmental, Inc.
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Brian Dodek
 Project Number: NEP0722
 Project: Strong Tank Battery

MW01
X810105-01 (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	8K03001	11/03/2008	11/03/2008	
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>107 %</i>	<i>70.3-123</i>			"	"	"	
<i>Surrogate: Toluene-d8</i>	<i>90.7 %</i>	<i>75.9-123</i>			"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>108 %</i>	<i>83-123</i>			"	"	"	

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MW02
X810105-02 (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	8K03001	11/03/2008	11/03/2008	
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>103 %</i>	<i>70.3-123</i>			"	"	"
<i>Surrogate: Toluene-d8</i>	<i>89.8 %</i>	<i>75.9-123</i>			"	"	"
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>105 %</i>	<i>83-123</i>			"	"	"

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MW03
X810105-03 (Water)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

BTEX by EPA 8260B

Benzene	0.00544	0.00100	mg/L	1	8K03001	11/03/2008	11/03/2008
Toluene	0.00129	0.00100	"	"	"	"	"
Ethylbenzene	0.00924	0.00100	"	"	"	"	"
o-Xylene	0.00211	0.00100	"	"	"	"	"
m,p-Xylene	0.0338	0.00200	"	"	"	"	"

<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>105 %</i>	<i>70.3-123</i>			"	"	"
<i>Surrogate: Toluene-d8</i>	<i>87.3 %</i>	<i>75.9-123</i>			"	"	"
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>109 %</i>	<i>83-123</i>			"	"	"

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MW04
X810105-04 (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	8K03001	11/03/2008	11/03/2008	
Toluene	ND	0.00100	"	"	"	"	"	
Ethylbenzene	ND	0.00100	"	"	"	"	"	
o-Xylene	0.00210	0.00100	"	"	"	"	"	
m,p-Xylene	ND	0.00200	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	104 %	70.3-123			"	"	"	
Surrogate: Toluene-d8	88.5 %	75.9-123			"	"	"	
Surrogate: 4-Bromofluorobenzene	106 %	83-123			"	"	"	

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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 8K03001 – EPA 5030B

Blank (8K03001–BLK1)

Prepared: 11/03/2008 Analyzed: 11/03/2008

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	67.0		ug/L	62.5		107	70.3-123			
Surrogate: Toluene-d8	55.9		"	62.5		89.4	75.9-123			
Surrogate: 4-Bromofluorobenzene	67.2		"	62.5		107	83-123			

LCS (8K03001–BS1)

Prepared: 11/03/2008 Analyzed: 11/03/2008

Benzene	0.05	0.001	mg/L	0.0500		101	64.2-124			
Toluene	0.05	0.001	"	0.0500		94.5	63.9-119			
Surrogate: 1,2-Dichloroethane-d4	68.4		ug/L	62.5		109	70.3-123			
Surrogate: Toluene-d8	55.0		"	62.5		88.0	75.9-123			
Surrogate: 4-Bromofluorobenzene	65.6		"	62.5		105	83-123			

Matrix Spike (8K03001–MS1)

Source: X810104-02

Prepared: 11/03/2008 Analyzed: 11/03/2008

Benzene	0.05	0.001	mg/L	0.0500	ND	102	64.2-124			
Toluene	0.05	0.001	"	0.0500	0.0007	96.0	63.9-119			
Surrogate: 1,2-Dichloroethane-d4	68.0		ug/L	62.5		109	70.3-123			
Surrogate: Toluene-d8	56.2		"	62.5		90.0	75.9-123			
Surrogate: 4-Bromofluorobenzene	66.8		"	62.5		107	83-123			

Matrix Spike Dup (8K03001–MSD1)

Source: X810104-02

Prepared: 11/03/2008 Analyzed: 11/03/2008

Benzene	0.05	0.001	mg/L	0.0500	ND	100	64.2-124	1.49	25	
Toluene	0.05	0.001	"	0.0500	0.0007	93.7	63.9-119	2.43	25	
Surrogate: 1,2-Dichloroethane-d4	68.5		ug/L	62.5		110	70.3-123			
Surrogate: Toluene-d8	56.2		"	62.5		89.9	75.9-123			
Surrogate: 4-Bromofluorobenzene	66.1		"	62.5		106	83-123			

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Notes and Definitions

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

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