

**#1944425**
Project #4350

GROUNDWATER MONITORING REPORT

APRIL 2009

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

On April 9, 2009, LT Environmental, Inc. (LTE) conducted groundwater sampling on behalf of Noble Energy, Inc. (Noble) at the Strong 1, P-21-2, 7, 8, 9, 10J, 16, 1JI, 2JI, 7JI Tank Battery (Site). This sampling event constitutes the sixth 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, MW03 and MW04) were installed surrounding the tank battery excavation on October 3, 2007. A Site Map is presented on Figure 1.

Depth to groundwater, which ranged from 9.65 feet below top of casing (btoc) in MW01 to 11.41 feet btoc in MW04, was used to calculate well-specific purge volumes. Following purging, groundwater samples were collected and preserved on ice. MW04 was unable to be purged due to a low water level. 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 MW03 did not exceed the laboratory method detection limit and were in compliance with the Colorado Department of Public Health and Environment Water Quality Control Commission Regulation 41 (WQCC Reg 41). Monitoring well MW04 exhibited a benzene concentration above WQCC Reg 41, at 55.7 micrograms per liter. Toluene, ethylbenzene, and total xylenes concentrations at MW04 were below the laboratory method detection limits and in compliance with WQCC Reg 41. 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 July 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		DEPTH TO				
WELL	DATE	WATER	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
		(feet btoc)	(ug/L)	(ug/L)	(ug/L)	(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
	1/6/2009	8.28	<1.0	<1.0	<1.0	<3.0
	4/9/2009	9.65	<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
	1/6/2009	8.53	<1.0	<1.0	<1.0	<3.0
	4/9/2009	9.91	<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
	1/6/2009	9.02	2.59	<1.0	6.71	21.36
	4/9/2009	10.42	<1.0	<1.0	<1.0	<3.0
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
	1/6/2009	9.86	<1.0	<1.0	<1.0	<3.0
	4/9/2009	11.41	55.7	<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

Bold indicates concentration exceeds the CGWQS Standard

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

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

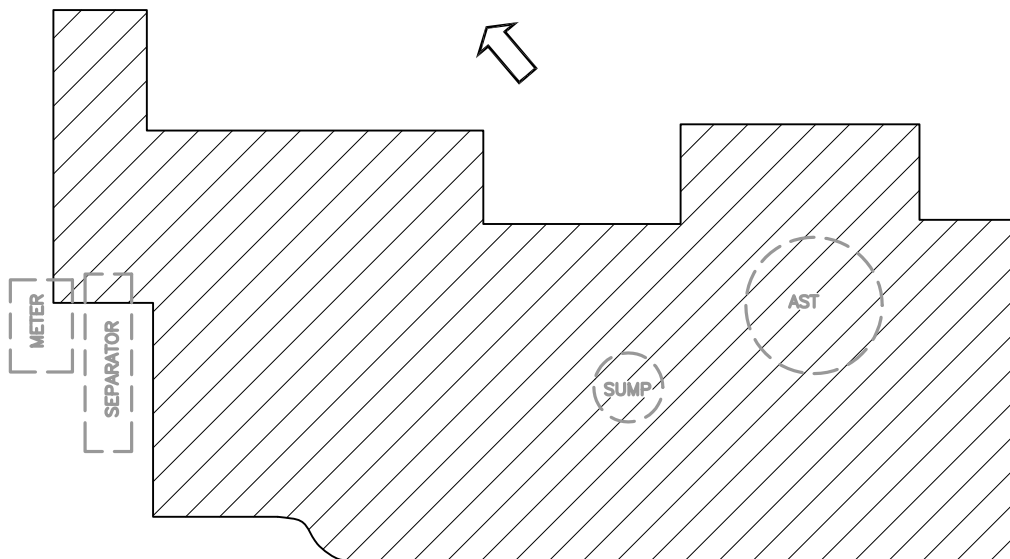
FIGURE



MW04

MW03

MW02



MW01

LEGEND

MW01



MONITORING WELL LOCATION



EXCAVATION AREA



ESTIMATED GROUNDWATER FLOW DIRECTION

SOURCE:
LTE SKETCH

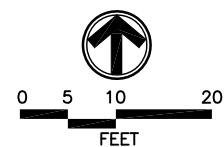


FIGURE 1
MONITORING WELL LOCATION MAP
STRONG 1, P21-2, 7, 8, 9, 10J, 16, 1JI, 2JI, 7JI
TANK BATTERY
WELD COUNTY, COLORADO
NOBLE ENERGY, INC.



NEP072203

APPENDIX
ANALYTICAL REPORT





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

April 13, 2009

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

Brian Dodek
Project Number: NEP0722
Project: Noble - Strong 1,P-21-2,7-8

Attached are the analytical results for Noble - Strong 1,P-21-2,7-8 received by Origins Laboratory, Inc. 4/9/2009 1:54:00PM. 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.

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

Brian Dodek
Project Number: NEP0722
Project: Noble – Strong
1,P-21-2,7-8

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Sampled	Date Received
MW-01	X904024-01	Water	4/9/2009 11:10:00AM	04/09/2009 13:54
MW-02	X904024-02	Water	4/9/2009 11:12:00AM	04/09/2009 13:54
MW-03	X904024-03	Water	4/9/2009 11:14:00AM	04/09/2009 13:54
MW-04	X904024-04	Water	4/9/2009 11:16:00AM	04/09/2009 13:54

Origins Laboratory, Inc.

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Noelle E Doyle, Laboratory Manager

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1,P-21-2,7-8

X904024
page 1 of 1



originslaboratory.com

Client: LT
Address: 4600 W 60th Ave
Arvada CO
Telephone Number: ON FILE
E-Mail Address:
Project Manager: BDD
Project Name: Strong 1P-21-2,7-8
Project Number: NEP0722
Samples Collected by: TED

Sample ID - Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix			Analysis	Sample Instructions
				Unpreserved	HCl	HNO ₃	Other - ICE	Soil	Groundwater	Air - Summa Canister #		
MW01	4/9/09	1110	3		X	X	X					1
MW02	4/9/09	1112	1		X	X	X					2
MW03	4/9/09	1114	1		X	X	X					3
MW04	4/9/09	1116	1		X	X	X					4
												5
												6
												7
												8
												9
												10
Relinquished by: <u>DD</u>	Date: <u>4/9/09</u>	Time: <u>1255</u>	Time: <u>1255</u>	Received by: <u>[Signature]</u>	Date: <u>4/9/09</u>	Time: <u>1255</u>	Date: <u>4/9/09</u>	Time: <u>1255</u>	Temperature Upon Receipt: <u>3.9C</u>	Turn Around Time: <u>24-hr</u>	Standard: <u>72-hr</u>	

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Project: Noble – Strong
1,P-21-2,7-8

MW-01

X904024-01 (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	9D09001	04/09/2009	04/10/2009
Toluene	ND	0.00100	"	"	"	"	"
Ethylbenzene	ND	0.00100	"	"	"	"	"
o-Xylene	ND	0.00100	"	"	"	"	"
m,p-Xylene	ND	0.00200	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	101 %	70.3-123	"	"	"
Surrogate: Toluene-d8	103 %	75.9-123	"	"	"
Surrogate: 4-Bromofluorobenzene	104 %	83-123	"	"	"

Origins Laboratory, Inc.

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1,P-21-2,7-8

MW-02

X904024-02 (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	9D09001	04/09/2009	04/10/2009
Toluene	ND	0.00100	"	"	"	"	"
Ethylbenzene	ND	0.00100	"	"	"	"	"
o-Xylene	ND	0.00100	"	"	"	"	"
m,p-Xylene	ND	0.00200	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	97.0 %	70.3-123	"	"	"
Surrogate: Toluene-d8	102 %	75.9-123	"	"	"
Surrogate: 4-Bromofluorobenzene	103 %	83-123	"	"	"

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MW-03

X904024-03 (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	9D09001	04/09/2009	04/10/2009
Toluene	ND	0.00100	"	"	"	"	"
Ethylbenzene	ND	0.00100	"	"	"	"	"
o-Xylene	ND	0.00100	"	"	"	"	"
m,p-Xylene	ND	0.00200	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	103 %	70.3-123	"	"	"
Surrogate: Toluene-d8	93.4 %	75.9-123	"	"	"
Surrogate: 4-Bromofluorobenzene	98.7 %	83-123	"	"	"

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MW-04

X904024-04 (Water)

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.

BTEX by EPA 8260B

Benzene	0.0557	0.00100	mg/L	1	9D09001	04/09/2009	04/10/2009
Toluene	ND	0.00100	"	"	"	"	"
Ethylbenzene	ND	0.00100	"	"	"	"	"
o-Xylene	ND	0.00100	"	"	"	"	"
m,p-Xylene	ND	0.00200	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	96.7 %	70.3-123	"	"	"
Surrogate: Toluene-d8	93.8 %	75.9-123	"	"	"
Surrogate: 4-Bromofluorobenzene	100 %	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 9D09001 – EPA 5030B

Blank (9D09001-BLK1)

Prepared: 04/09/2009 Analyzed: 04/09/2009

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	62.9		ug/L	62.5		101	70.3-123			
Surrogate: Toluene-d8	66.0		"	62.5		106	75.9-123			
Surrogate: 4-Bromofluorobenzene	68.3		"	62.5		109	83-123			

LCS (9D09001-BS1)

Prepared: 04/09/2009 Analyzed: 04/09/2009

Benzene	0.05	0.001	mg/L	0.0500		93.8	64.2-124			
Toluene	0.05	0.001	"	0.0500		92.7	63.9-119			
Surrogate: 1,2-Dichloroethane-d4	64.5		ug/L	62.5		103	70.3-123			
Surrogate: Toluene-d8	64.6		"	62.5		103	75.9-123			
Surrogate: 4-Bromofluorobenzene	65.0		"	62.5		104	83-123			

Matrix Spike (9D09001-MS1)

Source: X904013-02

Prepared: 04/09/2009 Analyzed: 04/10/2009

Benzene	0.05	0.001	mg/L	0.0500	ND	103	64.2-124			
Toluene	0.05	0.001	"	0.0500	0.0008	89.2	63.9-119			
Surrogate: 1,2-Dichloroethane-d4	58.2		ug/L	62.5		93.1	70.3-123			
Surrogate: Toluene-d8	63.3		"	62.5		101	75.9-123			
Surrogate: 4-Bromofluorobenzene	62.5		"	62.5		100	83-123			

Matrix Spike Dup (9D09001-MSD1)

Source: X904013-02

Prepared: 04/09/2009 Analyzed: 04/10/2009

Benzene	0.05	0.001	mg/L	0.0500	ND	94.9	64.2-124	7.68	25	
Toluene	0.04	0.001	"	0.0500	0.0008	84.2	63.9-119	5.64	25	
Surrogate: 1,2-Dichloroethane-d4	58.8		ug/L	62.5		94.1	70.3-123			
Surrogate: Toluene-d8	61.9		"	62.5		99.1	75.9-123			
Surrogate: 4-Bromofluorobenzene	61.6		"	62.5		98.5	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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