

## **GROUNDWATER MONITORING REPORT APRIL 2010**

---

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

On April 9, 2010, 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). 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 Monitoring Well Location Map is presented on Figure 1.

Depth to groundwater, which ranged from 8.64 feet below top of casing (btoc) in MW01 to 10.25 feet btoc in MW04, was used to calculate well-specific purge volumes. Following purging procedures, groundwater samples were collected and 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 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 July 2010.

## TABLE

TABLE 1

**GROUNDWATER RESULTS**  
**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 (µg/L)	TOLUENE (µg/L)	ETHYLBENZENE (µg/L)	XYLENES (µg/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
	7/15/2009	8.53	<1.0	<1.0	<1.0	<3.0
	11/19/2009	7.26	<1.0	<1.0	<1.0	<3.0
	1/26/2010	8.00	<1.0	<1.0	<1.0	<3.0
	4/9/2010	8.64	<1.0	<1.0	<1.0	<1.0
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
	7/15/2009	8.70	<1.0	<1.0	<1.0	<3.0
	11/19/2009	7.49	<1.0	<1.0	<1.0	<3.0
	1/26/2010	8.16	<1.0	<1.0	<1.0	<3.0
	4/9/2010	8.83	<1.0	<1.0	<1.0	<1.0
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	<b>181</b>	<1.0	5.54	13.8
	10/31/2008	7.98	<b>5.44</b>	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
	7/15/2009	9.13	<1.0	<1.0	5.25	13.2
	11/19/2009	7.94	<1.0	<1.0	3.73	18.02
	1/26/2010	8.62	<1.0	<1.0	2.72	10.1
	4/9/2010	9.29	<1.0	<1.0	3.69	15.0
MW04	1/18/2008	9.90	<1.0	<1.0	<1.0	<2.0
	4/17/2008	11.13	<b>34.5</b>	5.81	<1.0	18.87
	7/18/2008	9.50	<b>6.94</b>	<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	<b>55.7</b>	<1.0	<1.0	<3.0
	7/15/2009	9.89	<b>13.9</b>	<1.0	<1.0	1.62
	11/19/2009	9.09	<1.0	<1.0	<1.0	1.16
	1/26/2010	9.52	<1.0	<1.0	<1.0	<3.0
	4/9/2010	10.25	<1.0	<1.0	<1.0	<1.0
<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

&lt; 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

Commission Regulation 41 covering Basic Standards for Groundwater

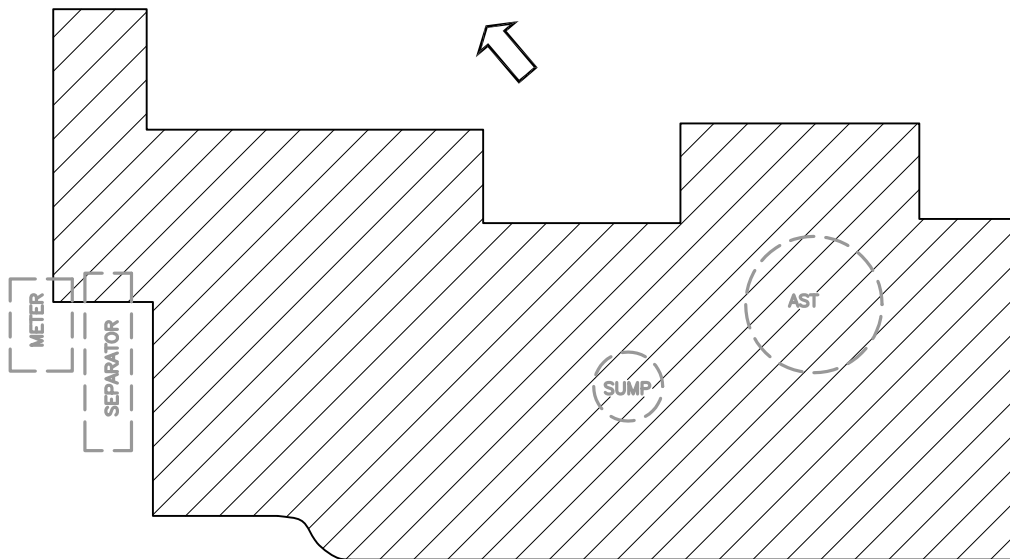


**FIGURE**

MW04

MW03

MW02



MW01

### LEGEND

MW01



MONITORING WELL LOCATION



EXCAVATION AREA



ESTIMATED GROUNDWATER FLOW DIRECTION

SOURCE:  
LTE SKETCH

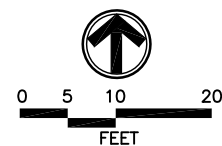


FIGURE 1  
MONITORING WELL LOCATION MAP  
STRONG 1, P21-2, 7, 8, 9, 10J, 16, 1JI, 2JI, 7JI  
TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY, INC.



NEP072203

**APPENDIX**  
**ANALYTICAL REPORT**

4/14/2010

LT Environmental, Inc.

Matthew Harrison

4600 West 60th Avenue

Arvada

CO

80003

Project Name- Noble - Strong  
1,P-21-2,7,8,9,10J,16,1Jl, 2Jl, 7Jl

Project Number- NEP0722

Attached are your analytical results for Noble - Strong 1,P-21-2,7,8,9,10J,16,1Jl, 2Jl, 7Jl received by Origins Laboratory, Inc. April 9, 2010 2:30 pm. This project is associated with Origins project number X004069-01 .

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



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

Matthew Harrison  
Project Number: NEP0722  
Project: Noble - Strong  
1P-21-2 7 8 9 10 11 16 111 211 711

## CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Sampled	Date Received
MW01	X004069-01	Water	4/9/2010 10:10:00AM	04/09/2010 14:30
MW02	X004069-02	Water	4/9/2010 10:20:00AM	04/09/2010 14:30
MW03	X004069-03	Water	4/9/2010 10:30:00AM	04/09/2010 14:30
MW04	X004069-04	Water	4/9/2010 10:40:00AM	04/09/2010 14:30

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, Laboratory Manager





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

Matthew Harrison  
Project Number: NEP0722  
Project: Noble - Strong  
1P-21-2.7.8.9.10.11.16.17.21.7.11

## MW01

4/9/2010 10:10:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	----------	----------	-------

Origins Laboratory, Inc.  
X004069-01 (Water)

### BTEX by EPA 8260B

Benzene	ND	1.00	ug/L	1	OD11001	04/11/2010	04/12/2010	
Toluene	ND	1.00	"	"	"	"	"	
Ethylbenzene	ND	1.00	"	"	"	"	"	
Xylenes, total	ND	1.00	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	102 %	73.5-130			"	"	"	
Surrogate: Toluene-d8	94.6 %	79.3-113			"	"	"	
Surrogate: 4-Bromofluorobenzene	97.5 %	81.5-117			"	"	"	

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, Laboratory Manager

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

Matthew Harrison  
Project Number: NEP0722  
Project: Noble - Strong  
1P-21-2.7.8.9.10.11.16.17.21.7.11

## MW02

4/9/2010 10:20:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	----------	----------	-------

Origins Laboratory, Inc.  
X004069-02 (Water)

### BTEX by EPA 8260B

Benzene	ND	1.00	ug/L	1	OD11001	04/11/2010	04/12/2010	
Toluene	ND	1.00	"	"	"	"	"	
Ethylbenzene	ND	1.00	"	"	"	"	"	
Xylenes, total	ND	1.00	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	99.3 %	73.5-130			"	"	"	
Surrogate: Toluene-d8	91.3 %	79.3-113			"	"	"	
Surrogate: 4-Bromofluorobenzene	96.7 %	81.5-117			"	"	"	

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, Laboratory Manager

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

Matthew Harrison  
Project Number: NEP0722  
Project: Noble - Strong  
1P-21-2.7.8.9.10.11.16.17.21.711

## MW03

4/9/2010 10:30:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	----------	----------	-------

Origins Laboratory, Inc.  
X004069-03 (Water)

### BTEX by EPA 8260B

Benzene	ND	1.00	ug/L	1	OD11001	04/11/2010	04/12/2010
Toluene	ND	1.00	"	"	"	"	"
Ethylbenzene	3.69	1.00	"	"	"	"	"
Xylenes, total	15.0	1.00	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	102 %	73.5-130	"	"	"
Surrogate: Toluene-d8	89.2 %	79.3-113	"	"	"
Surrogate: 4-Bromofluorobenzene	96.6 %	81.5-117	"	"	"

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, Laboratory Manager

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

Matthew Harrison  
Project Number: NEP0722  
Project: Noble - Strong  
1P-21-2.7.8.9.10.11.16.1.11. 2.11. 7.11

**MW04**

**4/9/2010 10:40:00AM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	----------	----------	-------

Origins Laboratory, Inc.  
X004069-04 (Water)

**BTEX by EPA 8260B**

Benzene	ND	1.00	ug/L	1	OD11001	04/11/2010	04/12/2010	
Toluene	ND	1.00	"	"	"	"	"	
Ethylbenzene	ND	1.00	"	"	"	"	"	
Xylenes, total	ND	1.00	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	100 %	73.5-130			"	"	"	
Surrogate: Toluene-d8	92.6 %	79.3-113			"	"	"	
Surrogate: 4-Bromofluorobenzene	97.9 %	81.5-117			"	"	"	

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, Laboratory Manager

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

Matthew Harrison  
Project Number: NEP0722  
Project: Noble - Strong  
1P-21-27891011611L 21L 71L

## 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
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

### Batch OD11001 - EPA 5030B

#### Blank (OD11001-BLK1)

Prepared: 04/11/2010 Analyzed: 04/11/2010

Benzene	ND	1.00	ug/L
Toluene	ND	1.00	"
Ethylbenzene	ND	1.00	"
o-Xylene	ND	1.00	"
m,p-Xylene	ND	2.00	"

Surrogate: 1,2-Dichloroethane-d4	66.6	"	62.5	106	73.5-130
Surrogate: Toluene-d8	55.4	"	62.5	88.6	79.3-113
Surrogate: 4-Bromofluorobenzene	58.6	"	62.5	93.8	81.5-117

#### LCS (OD11001-BS1)

Prepared: 04/11/2010 Analyzed: 04/12/2010

Benzene	48.1	1.00	ug/L	50.0	96.2	77.3-128
Toluene	45.3	1.00	"	50.0	90.6	81.7-118

Surrogate: 1,2-Dichloroethane-d4	64.2	"	62.5	103	73.5-130
Surrogate: Toluene-d8	57.6	"	62.5	92.1	79.3-113
Surrogate: 4-Bromofluorobenzene	58.8	"	62.5	94.1	81.5-117

#### Matrix Spike (OD11001-MS1)

Source: X004076-01

Prepared: 04/11/2010 Analyzed: 04/12/2010

Benzene	49.9	1.00	ug/L	50.0	ND	99.8	74.5-132
Toluene	47.8	1.00	"	50.0	0.87	93.9	74.2-116

Surrogate: 1,2-Dichloroethane-d4	64.8	"	62.5	104	73.5-130
Surrogate: Toluene-d8	56.6	"	62.5	90.5	79.3-113
Surrogate: 4-Bromofluorobenzene	58.4	"	62.5	93.4	81.5-117

#### Matrix Spike Dup (OD11001-MSD1)

Source: X004076-01

Prepared: 04/11/2010 Analyzed: 04/12/2010

Benzene	48.6	1.00	ug/L	50.0	ND	97.1	74.5-132	2.72	13.1
Toluene	46.1	1.00	"	50.0	0.87	90.4	74.2-116	3.66	21.2

Surrogate: 1,2-Dichloroethane-d4	64.5	"	62.5	103	73.5-130
Surrogate: Toluene-d8	57.4	"	62.5	91.8	79.3-113
Surrogate: 4-Bromofluorobenzene	60.4	"	62.5	96.6	81.5-117

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, Laboratory Manager

LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

Matthew Harrison

Project Number: NEP0722

Project: Noble - Strong

1P-21-2.7.8.9.10.11.16.17.21.711

### Notes and Definitions

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

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, Laboratory Manager