



## WELL INSTALLATION AND GROUNDWATER MONITORING REPORT MAY 2009

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### STATE 6-36

On May 18, 2009, LTE conducted groundwater sampling on behalf of Noble Energy, Inc. (Noble) at the State 6-36 Tank Battery (Site). This sampling event constitutes the third 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 (MW01, MW02, and MW03) were installed surrounding the tank battery excavation on October 29, 2008. A Site Map is presented as Figure 1.

Depth to groundwater, which ranged from 8.31 feet below top of casing (btoc) in MW03 to 8.80 feet btoc in MW02, 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 from the monitoring wells, presented in Table 1, indicate BTEX concentrations at sample locations MW01, MW02, and MW03 are in compliance with Colorado Department of Public Health and Environment – Water Quality Control Division Regulation 41 (WQCC Reg 41) and below laboratory method detection limits. The laboratory analytical report is included as an attachment.

LTE will continue to conduct quarterly groundwater monitoring events with the goal of observing four consecutive quarters with analytical results in compliance with WQCC Reg 41. The next quarterly groundwater sampling event is scheduled for August 2009.

**TABLE**



TABLE 1

GROUNDWATER ANALYTICAL DATA  
STATE 6-36 TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY, INC.

MONITORING		DEPTH TO	BENZENE	TOLUENE	ETHYLBENZENE	TOTAL
WELL	DATE	WATER (feet btoc)	(ug/L)	(ug/L)	(ug/L)	XYLENES (ug/L)
MW01	11/5/2008	9.53	<1.0	<1.0	<1.0	<3.0
	2/10/2009	8.48	<1.0	<1.0	<1.0	<3.0
	5/18/2009	8.32	<1.0	<1.0	<1.0	<3.0
MW02	11/5/2008	10.30	<1.0	<1.0	<1.0	<3.0
	2/10/2009	8.89	<1.0	<1.0	<1.0	<3.0
	5/18/2009	8.80	<1.0	<1.0	<1.0	<3.0
MW03	11/5/2008	8.96	<1.0	<1.0	<1.0	<3.0
	2/10/2009	8.24	<1.0	<1.0	<1.0	<3.0
	5/18/2009	8.31	<1.0	<1.0	<1.0	<3.0
CDPHE WQCC Reg 41			5.0	560	700	1,400

NOTES:

btoc - below top of casing

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

ug/L - micrograms per liter

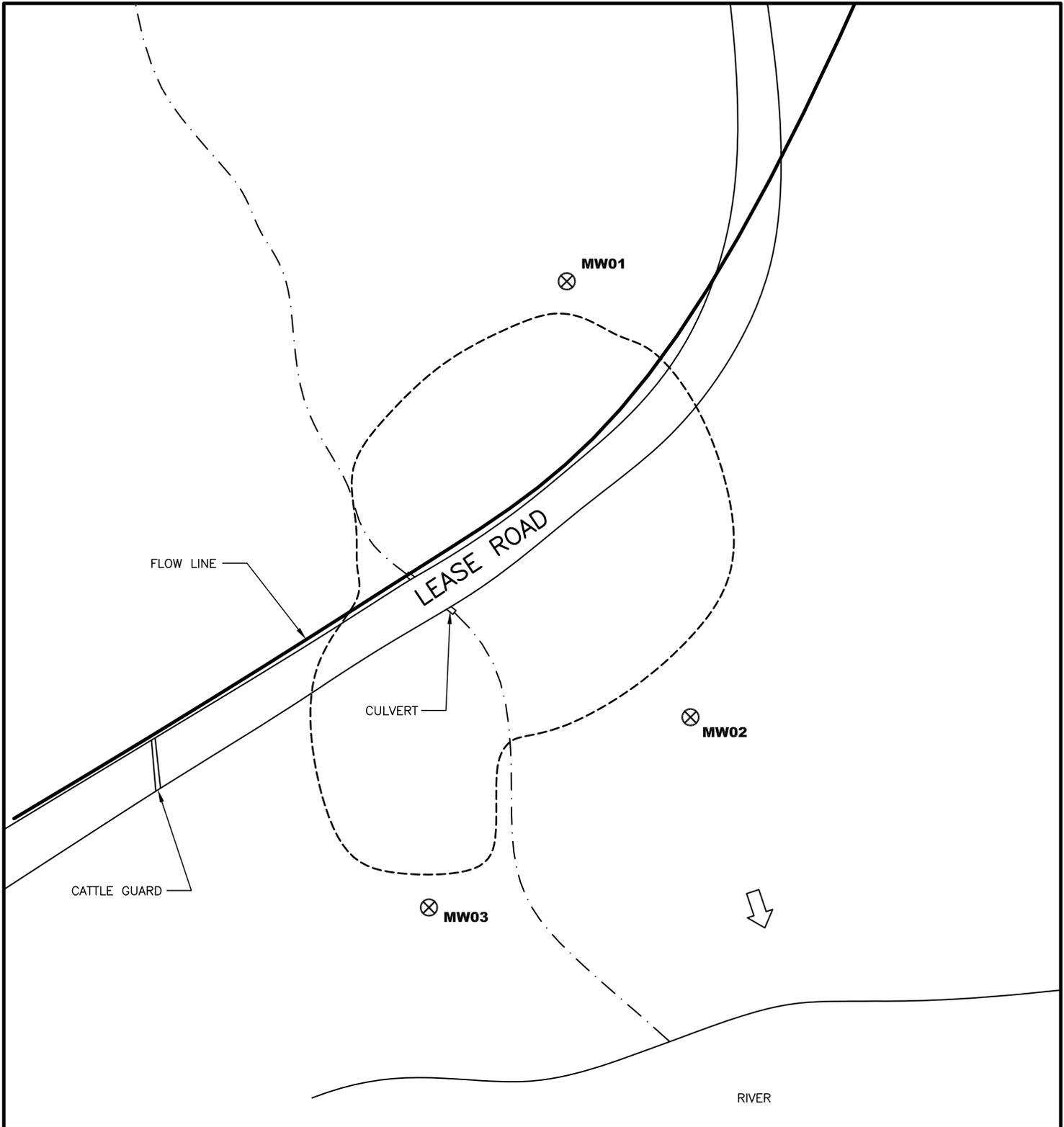
< indicates result is less than the stated laboratory method detection limit

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



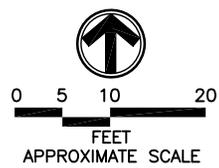
**FIGURE**





**LEGEND**

- MW01 ⊗ MONITORING WELL LOCATION
- EXTENT OF EXCAVATION
- · - · - · DRAINAGE
- ➡ ESTIMATED GROUNDWATER FLOW DIRECTION



**FIGURE 1**  
**MONITORING WELL LOCATION**  
**STATE 6-36 WELL SITE**  
**WELD COUNTY, CO**  
**NOBLE ENERGY, INC.**



**ATTACHMENT**  
**ANALYTICAL LABORATORY REPORT**





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303.433.1322 Phone 303.265.9645 Fax

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May 21, 2009

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

Brian Dodek  
Project Number: NEP0832  
Project: Noble – State 6–36

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Attached are the analytical results for Noble – State 6–36 received by Origins Laboratory, Inc. 5/18/2009 2:55:00PM. 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: NEP0832  
Project: Noble - State 6-36

**CROSS REFERENCE REPORT**

Sample ID	Laboratory ID	Matrix	Sampled	Date Received
MW01	X905072-01	Water	5/18/2009 12:40:00PM	05/18/2009 14:55
MW02	X905072-02	Water	5/18/2009 12:35:00PM	05/18/2009 14:55
MW03	X905072-03	Water	5/18/2009 12:30:00PM	05/18/2009 14:55

Origins Laboratory, Inc.

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Noelle E Doyle, Laboratory Manager



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**MW01**  
**X905072–01 (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	9E19004	05/19/2009	05/20/2009	
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>107 %</i>	<i>70.3–128</i>			"	"	"
<i>Surrogate: Toluene-d8</i>	<i>98.6 %</i>	<i>78.8–125</i>			"	"	"
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>102 %</i>	<i>75.5–131</i>			"	"	"

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**MW02**  
**X905072–02 (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	9E19004	05/19/2009	05/20/2009	
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>107 %</i>	<i>70.3–128</i>			<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>	<i>98.6 %</i>	<i>78.8–125</i>			<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>103 %</i>	<i>75.5–131</i>			<i>"</i>	<i>"</i>	<i>"</i>	

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**MW03**  
**X905072–03 (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	9E19004	05/19/2009	05/20/2009	
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>107 %</i>	<i>70.3–128</i>			"	"	"	
<i>Surrogate: Toluene-d8</i>	<i>97.8 %</i>	<i>78.8–125</i>			"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>104 %</i>	<i>75.5–131</i>			"	"	"	

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Noelle E Doyle, Laboratory Manager



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 Project: Noble – State 6–36

**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 9E19004 – EPA 5030B**

**Blank (9E19004–BLK1)**

Prepared: 05/19/2009 Analyzed: 05/19/2009

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>	<i>69.0</i>		<i>ug/L</i>	<i>62.5</i>		<i>110</i>	<i>70.3-128</i>			
<i>Surrogate: Toluene-d8</i>	<i>61.7</i>		<i>"</i>	<i>62.5</i>		<i>98.8</i>	<i>78.8-125</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>63.3</i>		<i>"</i>	<i>62.5</i>		<i>101</i>	<i>75.5-131</i>			

**Blank (9E19004–BLK2)**

Prepared: 05/19/2009 Analyzed: 05/19/2009

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>	<i>69.8</i>		<i>ug/L</i>	<i>62.5</i>		<i>112</i>	<i>70.3-128</i>			
<i>Surrogate: Toluene-d8</i>	<i>59.8</i>		<i>"</i>	<i>62.5</i>		<i>95.7</i>	<i>78.8-125</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>63.1</i>		<i>"</i>	<i>62.5</i>		<i>101</i>	<i>75.5-131</i>			

**LCS (9E19004–BS1)**

Prepared: 05/19/2009 Analyzed: 05/19/2009

Benzene	0.05	0.001	mg/L	0.0500		109	75.3-134			
Toluene	0.06	0.001	"	0.0500		126	73.2-130			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>69.4</i>		<i>ug/L</i>	<i>62.5</i>		<i>111</i>	<i>70.3-128</i>			
<i>Surrogate: Toluene-d8</i>	<i>58.9</i>		<i>"</i>	<i>62.5</i>		<i>94.3</i>	<i>78.8-125</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>62.4</i>		<i>"</i>	<i>62.5</i>		<i>99.9</i>	<i>75.5-131</i>			

**LCS (9E19004–BS2)**

Prepared: 05/19/2009 Analyzed: 05/19/2009

Benzene	0.05	0.001	mg/L	0.0500		108	75.3-134			
Toluene	0.06	0.001	"	0.0500		127	73.2-130			

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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
<b>Batch 9E19004 – EPA 5030B</b>										
<b>LCS (9E19004–BS2)</b>					Prepared: 05/19/2009 Analyzed: 05/19/2009					
Surrogate: 1,2–Dichloroethane–d4	69.3		ug/L	62.5		111	70.3–128			
Surrogate: Toluene–d8	59.6		"	62.5		95.4	78.8–125			
Surrogate: 4–Bromofluorobenzene	64.5		"	62.5		103	75.5–131			
<b>Matrix Spike (9E19004–MS1)</b>					<b>Source: X905069–04</b>		Prepared: 05/19/2009 Analyzed: 05/19/2009			
Benzene	0.05	0.001	mg/L	0.0500	0.0007	108	75.3–134			
Toluene	0.05	0.001	"	0.0500	0.01	82.1	73.2–130			
Surrogate: 1,2–Dichloroethane–d4	69.5		ug/L	62.5		111	70.3–128			
Surrogate: Toluene–d8	58.3		"	62.5		93.3	78.8–125			
Surrogate: 4–Bromofluorobenzene	64.5		"	62.5		103	75.5–131			
<b>Matrix Spike (9E19004–MS2)</b>					<b>Source: X905069–05</b>		Prepared: 05/19/2009 Analyzed: 05/19/2009			
Benzene	0.05	0.001	mg/L	0.0500	ND	110	75.3–134			
Toluene	0.05	0.001	"	0.0500	0.01	76.2	73.2–130			
Surrogate: 1,2–Dichloroethane–d4	70.2		ug/L	62.5		112	70.3–128			
Surrogate: Toluene–d8	58.5		"	62.5		93.6	78.8–125			
Surrogate: 4–Bromofluorobenzene	63.8		"	62.5		102	75.5–131			
<b>Matrix Spike Dup (9E19004–MSD1)</b>					<b>Source: X905069–04</b>		Prepared: 05/19/2009 Analyzed: 05/19/2009			
Benzene	0.06	0.001	mg/L	0.0500	0.0007	109	75.3–134	1.15	25	
Toluene	0.06	0.001	"	0.0500	0.01	86.4	73.2–130	3.97	25	
Surrogate: 1,2–Dichloroethane–d4	68.7		ug/L	62.5		110	70.3–128			
Surrogate: Toluene–d8	59.2		"	62.5		94.7	78.8–125			
Surrogate: 4–Bromofluorobenzene	65.2		"	62.5		104	75.5–131			
<b>Matrix Spike Dup (9E19004–MSD2)</b>					<b>Source: X905069–05</b>		Prepared: 05/19/2009 Analyzed: 05/19/2009			
Benzene	0.06	0.001	mg/L	0.0500	ND	111	75.3–134	1.11	25	
Toluene	0.06	0.001	"	0.0500	0.01	88.8	73.2–130	11.9	25	
Surrogate: 1,2–Dichloroethane–d4	70.3		ug/L	62.5		112	70.3–128			

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Project: Noble – State 6–36

**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 9E19004 – EPA 5030B**

**Matrix Spike Dup (9E19004–MSD2)**

Source: X905069–05

Prepared: 05/19/2009 Analyzed: 05/19/2009

Surrogate: Toluene-d8	58.7		ug/L	62.5		93.9	78.8–125			
Surrogate: 4–Bromofluorobenzene	65.5		"	62.5		105	75.5–131			

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### Notes and Definitions

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

Origins Laboratory, Inc.

A handwritten signature in black ink, appearing to read "Noelle E Doyle", is written over a horizontal line.

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Noelle E Doyle, Laboratory Manager