

## **GROUNDWATER MONITORING REPORT OCTOBER 2009**

---

### **UPRC 9, 9K, 10K**

On August 25, 2009, LT Environmental, Inc. (LTE) conducted groundwater sampling on behalf of Noble Energy, Inc., at the UPRC 9, 9K, 10K Tank Battery (Site). This sampling event constitutes the second post remediation monitoring event at this Site. Site history and remediation activities, well installation, and performance monitoring have been described in the preceding reports.

Groundwater level measurements were collected from the monitoring wells and are summarized in Table 1. The monitoring wells (MW01, MW02, and MW03) were installed on April 14, 2009. A Site Map is presented on Figure 1.

Depth to groundwater, ranged from 2.01 feet below top of casing (btoc) in MW03 to 2.21 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 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, indicated BTEX concentrations are in compliance with 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 with 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  
UPRC 9, 9k, 10k TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY, INC.**

| MONITORING               |           | DEPTH TO             | BENZENE    | TOLUENE    | ETHYLBENZENE | TOTAL             |
|--------------------------|-----------|----------------------|------------|------------|--------------|-------------------|
| WELL                     | DATE      | WATER<br>(feet btoc) | (ug/L)     | (ug/L)     | (ug/L)       | XYLENES<br>(ug/L) |
| MW01                     | 4/28/2009 | 6.12                 | <1.0       | <1.0       | <1.0         | <3.0              |
|                          | 8/25/2009 | 2.21                 | <1.0       | <1.0       | <1.0         | <3.0              |
| MW02                     | 4/28/2009 | 6.52                 | <1.0       | <1.0       | <1.0         | <3.0              |
|                          | 8/25/2009 | 2.16                 | <1.0       | <1.0       | <1.0         | <3.0              |
| MW03                     | 4/28/2009 | 6.69                 | 2.70       | <1.0       | 108          | 519.19            |
|                          | 8/25/2009 | 2.01                 | <1.0       | <1.0       | <1.0         | <3.0              |
| <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

ug/L - micrograms per liter

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

Benzene, toluene, ethylbenzene, and xylenes 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

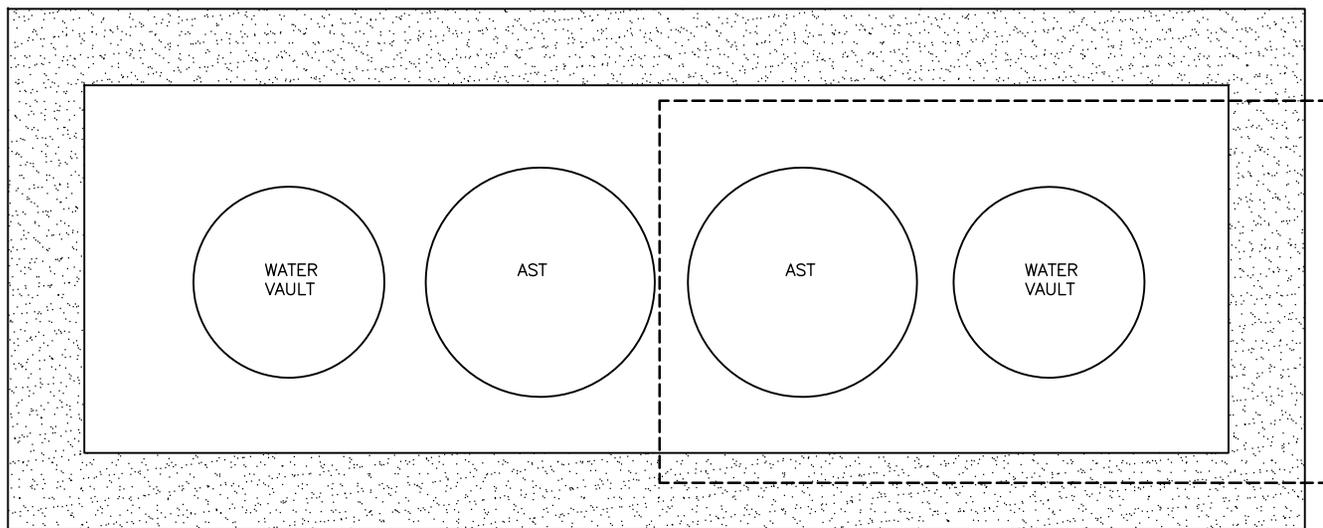


**FIGURE**

IRRIGATION DITCH

MW03

MW02

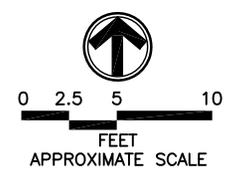


FORMER  
AST

MW01

**LEGEND**

- MW01 ⊗ MONITORING WELL LOCATION
-  BERM
- - - - - EXTENT OF EXCAVATION
-  ESTIMATED GROUNDWATER FLOW DIRECTION
- AST ABOVEGROUND STORAGE TANK



LEASE ROAD

**FIGURE 1**  
**MONITORING WELL LOCATIONS MAP**  
 UPRC 9-9K, 10K  
 WELD COUNTY, CO  
 NOBLE ENERGY, INC.



**APPENDIX**  
**ANALYTICAL REPORT**



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

---

September 01, 2009

---

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

Brian Dodek  
Project Number: NEP0904  
Project: Noble - UPRC 9, 9k- 10k

---

Attached are the analytical results for Noble - UPRC 9, 9k- 10k received by Origins Laboratory, Inc. 8/25/2009 4:00:00PM. 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.

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



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

Brian Dodek  
Project Number: NEP0904  
Project: Noble - UPRC 9, 9k- 10k

CROSS REFERENCE REPORT

| Sample ID | Laboratory ID | Matrix | Sampled             | Date Received    |
|-----------|---------------|--------|---------------------|------------------|
| MW01      | X908091-01    | Water  | 8/25/2009 1:40:00PM | 08/25/2009 16:00 |
| MW02      | X908091-02    | Water  | 8/25/2009 1:45:00PM | 08/25/2009 16:00 |
| MW03      | X908091-03    | Water  | 8/25/2009 1:50:00PM | 08/25/2009 16:00 |

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



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



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

Brian Dodek  
 Project Number: NEP0904  
 Project: Noble – UPRC 9, 9k- 10k

**MW01**  
**X908091-01 (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 | 9H26001 | 08/26/2009 | 08/26/2009 |  |
| Toluene      | ND | 0.00100 | "    | " | "       | "          | "          |  |
| Ethylbenzene | ND | 0.00100 | "    | " | "       | "          | "          |  |
| o-Xylene     | ND | 0.00100 | "    | " | "       | "          | "          |  |
| m,p-Xylene   | ND | 0.00200 | "    | " | "       | "          | "          |  |

|                                  |        |          |  |  |   |   |   |
|----------------------------------|--------|----------|--|--|---|---|---|
| Surrogate: 1,2-Dichloroethane-d4 | 113 %  | 85.7-134 |  |  | " | " | " |
| Surrogate: Toluene-d8            | 92.1 % | 81.4-121 |  |  | " | " | " |
| Surrogate: 4-Bromofluorobenzene  | 115 %  | 74.7-127 |  |  | " | " | " |

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

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



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

Brian Dodek  
 Project Number: NEP0904  
 Project: Noble – UPRC 9, 9k- 10k

**MW02**  
**X908091-02 (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 | 9H26001 | 08/26/2009 | 08/26/2009 |  |
| 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>108 %</i>  | <i>85.7-134</i> |  |  | " | " | " |             |
| <i>Surrogate: Toluene-d8</i>            | <i>95.5 %</i> | <i>81.4-121</i> |  |  | " | " | " |             |
| <i>Surrogate: 4-Bromofluorobenzene</i>  | <i>191 %</i>  | <i>74.7-127</i> |  |  | " | " | " | <i>S-GC</i> |

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

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



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

Brian Dodek  
 Project Number: NEP0904  
 Project: Noble – UPRC 9, 9k- 10k

**MW03**  
**X908091-03 (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 | 9H26001 | 08/26/2009 | 08/26/2009 |
| 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>113 %</i>  | <i>85.7-134</i> |  |  | <i>"</i> | <i>"</i> | <i>"</i> |
| <i>Surrogate: Toluene-d8</i>            | <i>91.1 %</i> | <i>81.4-121</i> |  |  | <i>"</i> | <i>"</i> | <i>"</i> |
| <i>Surrogate: 4-Bromofluorobenzene</i>  | <i>109 %</i>  | <i>74.7-127</i> |  |  | <i>"</i> | <i>"</i> | <i>"</i> |

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

Brian Dodek  
 Project Number: NEP0904  
 Project: Noble – UPRC 9, 9k– 10k

**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 9H26001 – EPA 5030B**

**Blank (9H26001–BLK1)**

Prepared: 08/26/2009 Analyzed: 08/26/2009

|              |    |       |      |  |  |  |  |  |  |  |
|--------------|----|-------|------|--|--|--|--|--|--|--|
| 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 | 70.3 |  | ug/L | 62.5 |  | 112  | 85.7-134 |  |  |  |
| Surrogate: Toluene-d8            | 59.4 |  | "    | 62.5 |  | 95.0 | 81.4-121 |  |  |  |
| Surrogate: 4-Bromofluorobenzene  | 72.0 |  | "    | 62.5 |  | 115  | 74.7-127 |  |  |  |

**LCS (9H26001–BS1)**

Prepared: 08/26/2009 Analyzed: 08/26/2009

|                                  |      |       |      |        |  |      |          |  |  |  |
|----------------------------------|------|-------|------|--------|--|------|----------|--|--|--|
| Benzene                          | 0.04 | 0.001 | mg/L | 0.0500 |  | 87.3 | 74.9-126 |  |  |  |
| Toluene                          | 0.05 | 0.001 | "    | 0.0500 |  | 90.5 | 73.3-128 |  |  |  |
| Surrogate: 1,2-Dichloroethane-d4 | 68.6 |       | ug/L | 62.5   |  | 110  | 85.7-134 |  |  |  |
| Surrogate: Toluene-d8            | 56.9 |       | "    | 62.5   |  | 91.0 | 81.4-121 |  |  |  |
| Surrogate: 4-Bromofluorobenzene  | 70.8 |       | "    | 62.5   |  | 113  | 74.7-127 |  |  |  |

**Matrix Spike (9H26001–MS1)**

Source: X908090-01

Prepared: 08/26/2009 Analyzed: 08/26/2009

|                                  |      |       |      |        |    |      |          |  |  |  |
|----------------------------------|------|-------|------|--------|----|------|----------|--|--|--|
| Benzene                          | 0.05 | 0.001 | mg/L | 0.0500 | ND | 92.6 | 78.1-132 |  |  |  |
| Toluene                          | 0.05 | 0.001 | "    | 0.0500 | ND | 95.2 | 71.7-124 |  |  |  |
| Surrogate: 1,2-Dichloroethane-d4 | 70.9 |       | ug/L | 62.5   |    | 113  | 85.7-134 |  |  |  |
| Surrogate: Toluene-d8            | 56.0 |       | "    | 62.5   |    | 89.6 | 81.4-121 |  |  |  |
| Surrogate: 4-Bromofluorobenzene  | 71.3 |       | "    | 62.5   |    | 114  | 74.7-127 |  |  |  |

**Matrix Spike Dup (9H26001–MSD1)**

Source: X908090-01

Prepared: 08/26/2009 Analyzed: 08/26/2009

|                                  |      |       |      |        |    |      |          |      |      |  |
|----------------------------------|------|-------|------|--------|----|------|----------|------|------|--|
| Benzene                          | 0.04 | 0.001 | mg/L | 0.0500 | ND | 87.7 | 78.1-132 | 5.44 | 24.8 |  |
| Toluene                          | 0.04 | 0.001 | "    | 0.0500 | ND | 89.9 | 71.7-124 | 5.68 | 25   |  |
| Surrogate: 1,2-Dichloroethane-d4 | 70.0 |       | ug/L | 62.5   |    | 112  | 85.7-134 |      |      |  |
| Surrogate: Toluene-d8            | 57.3 |       | "    | 62.5   |    | 91.7 | 81.4-121 |      |      |  |
| Surrogate: 4-Bromofluorobenzene  | 72.2 |       | "    | 62.5   |    | 115  | 74.7-127 |      |      |  |

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.*



---

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

Brian Dodek  
Project Number: NEP0904  
Project: Noble – UPRC 9, 9k- 10k

---

### Notes and Definitions

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