



COMPLIANCE / ENGINEERING / REMEDIATION

LT Environmental, Inc.

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July 12, 2013

Mr. Todd Cullum  
Base Construction Foreman  
Noble Energy, Inc.  
2115 117<sup>th</sup> Avenue  
Greeley, Colorado 80634

Mr. Jacob Evans  
Senior Environmental Specialist  
Noble Energy, Inc.  
1625 Broadway, Suite 2200  
Denver, Colorado 80202

**RE: Second Quarter 2013 Remediation and Monitoring Summary Report  
Chesnut G 22-6 Tank Battery  
Weld County, Colorado  
COGCC Tracking #1984181 & Remediation #4316**

Dear Mr. Cullum and Mr. Evans:

LT Environmental, Inc. (LTE), under the direction of Noble Energy, Inc (Noble), is conducting corrective actions at the Chesnut G 22-6 Tank Battery (Site) located approximately 0.5 miles south of the intersection of County Road (CR) 44 and CR 43 in Weld County, Colorado (Figure 1).

Site assessment results were previously discussed in the *LTE Environmental Site Assessment Results*, dated April 15, 2009. LTE, under the direction of Noble, is continuing groundwater monitoring at the Site to evaluate the previously identified groundwater impact. Phase I of the remediation program, which included source removal, was conducted in December 2008 and summarized in the *LTE Excavation Summary Report*, dated April 2009. LTE, as directed by Noble, has initiated Phase II of the remediation program, which includes an air sparging/soil vapor extraction (AS/SVE) remediation system to mitigate remaining groundwater impact. This report summarizes activities conducted at the Site from April 5, 2013, through July 9, 2013, including operation and maintenance (O&M) of the remediation system, shutdown of the remediation system, and quarterly groundwater monitoring.

### **Remediation System Description**

The AS system is designed to introduce ambient air into the subsurface water column for dissolved hydrocarbon volatilization and to promote aerobic microbial decomposition of petroleum constituents. The SVE system is designed to volatilize petroleum constituents

adsorbed onto soil particles and to remove petroleum vapors released from the groundwater by the AS system. AS and SVE wells are connected to a remediation equipment trailer housing the equipment for the AS/SVE systems (Figures 2 and 3). Additional details of the remediation system were provided in the *LTE Remediation System Installation, Startup, and Groundwater Sampling Results*, dated November 22, 2010.

### **Remediation System Operations and Maintenance**

Remediation system operations (Phase II remediation program) were initiated on August 24, 2010. The remediation system was shutdown on March 1, 2013, for static groundwater monitoring, but was restarted on March 25, 2013, due to the detection of residual groundwater hydrocarbon impact. The system was shutdown on April 22, 2013, for static groundwater monitoring. Table 1 provides a summary of system operations.

O&M activities conducted during the reporting period included:

- Completing routine weekly O&M checks to monitor and adjust system performance;
- Troubleshooting generator high temperature shutdowns; and
- Shutdown for static evaluation on April 22, 2013.

### **Soil Vapor Extraction Air Emissions**

No air sample was collected during this reporting period due to system downtime for static groundwater evaluations. As of February 12, 2013, approximately 853 pounds of volatile organic compounds (VOCs) have been removed by the SVE system. Air emission calculations through February 12, 2013, are provided in Table 2. The remediation system is compliant with Colorado Department of Public Health and Environment (CDPHE) air emission regulations.

### **Groundwater Sampling Procedures**

Eighteen groundwater monitoring wells (MW01R, MW02, MW03R, MW04, MW05, MW06, MW07, MW08R, MW09R, MW10, MW11, MW12, MW13, MW15, MW16R, MW17R, MW23R, and MW26) were sampled at the Site on June 18, 2013, to determine the current plume extent.

Prior to sampling each monitoring well, the depth to groundwater was measured and recorded for calculating purge volumes (Table 3). Each well was purged of three well casing volumes prior to collection of groundwater samples. Groundwater samples were collected from the well points by advancing disposable 3/16-inch diameter polyvinyl chloride (PVC) tubing inside the 1-inch and 2-inch diameter PVC well casings and extending the tubing to below the groundwater table. A peristaltic pump was utilized to collect the groundwater samples prior to placement into laboratory-prepared sample bottles. Groundwater samples were collected in 40-milliliter vials, placed on ice in a cooler, and delivered under strict chain of custody (COC) protocol to Origins. Samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) by United States Environmental Protection Agency (EPA) Method 8260C.

## Hydrogeology

During the June 2013 monitoring event, the depths to groundwater ranged from 5.35 feet below top of casing (btoc) in MW01R to 12.70 feet btoc in MW09R (Table 4). The groundwater flow direction was predominantly to the east-northeast with an average hydraulic gradient of approximately 0.057 feet per foot. A relative groundwater elevation map is provided as Figure 4.

## Groundwater Analytical Results

The CDPHE-Water Quality Control Commission has established Regulation 41-The Basic Standards for Ground Water (WQCC Reg 41) for BTEX at 5.0 micrograms per liter ( $\mu\text{g/L}$ ), 560  $\mu\text{g/L}$ , 700  $\mu\text{g/L}$ , and 1,400  $\mu\text{g/L}$ , respectively. Historical analytical results and analytical results for July 2013 are illustrated on Figure 5 and presented in Table 3. The laboratory analytical report, laboratory quality assurance/quality control data, and COC documentation are attached.

Eighteen groundwater samples were collected during the June 2013 monitoring event. Groundwater analytical results indicated benzene was detected exceeding the WQCC Reg 41 in monitoring wells MW04, MW10, MW12, and MW16R at concentrations of 27.7  $\mu\text{g/L}$ , 28.8  $\mu\text{g/L}$ , 19.8  $\mu\text{g/L}$  and 19.7  $\mu\text{g/L}$ , respectively. BTEX compounds were not detected exceeding regulatory standards in the remaining samples.

## Summary and Conclusions

Current data suggests a substantial decrease in BTEX since the AS/SVE system began operation with a decrease of approximately 85 percent in the benzene groundwater plume extent, as depicted on Figure 6. However, elevated concentrations of benzene are still present at the Site (Table 4). LTE, under the direction of Noble, will conduct groundwater monitoring in September 2013. The data indicate that Phase II of the remediation program is complete, and a final phase of static evaluation and potential enhancement of natural attenuation processes is in progress.

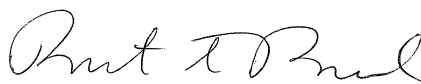
LTE appreciates the opportunity to provide environmental services to Noble. Please call us at 303-433-9788 if you have any questions or comments regarding this report.

Sincerely,

LT ENVIRONMENTAL, INC



Liz Houle, E.I.T.  
Staff Engineer

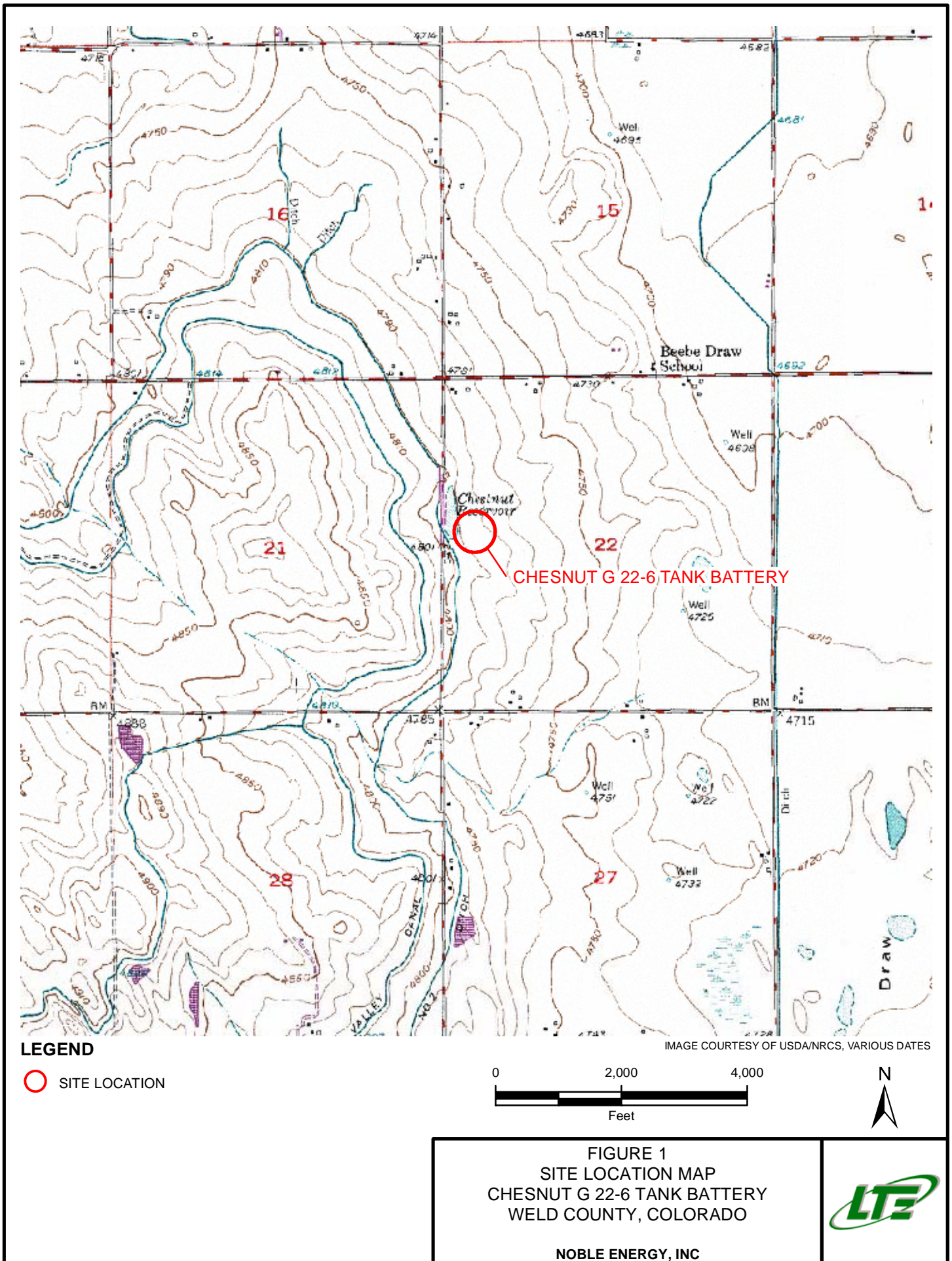


Rob Rebel, P.E.  
Project Manager

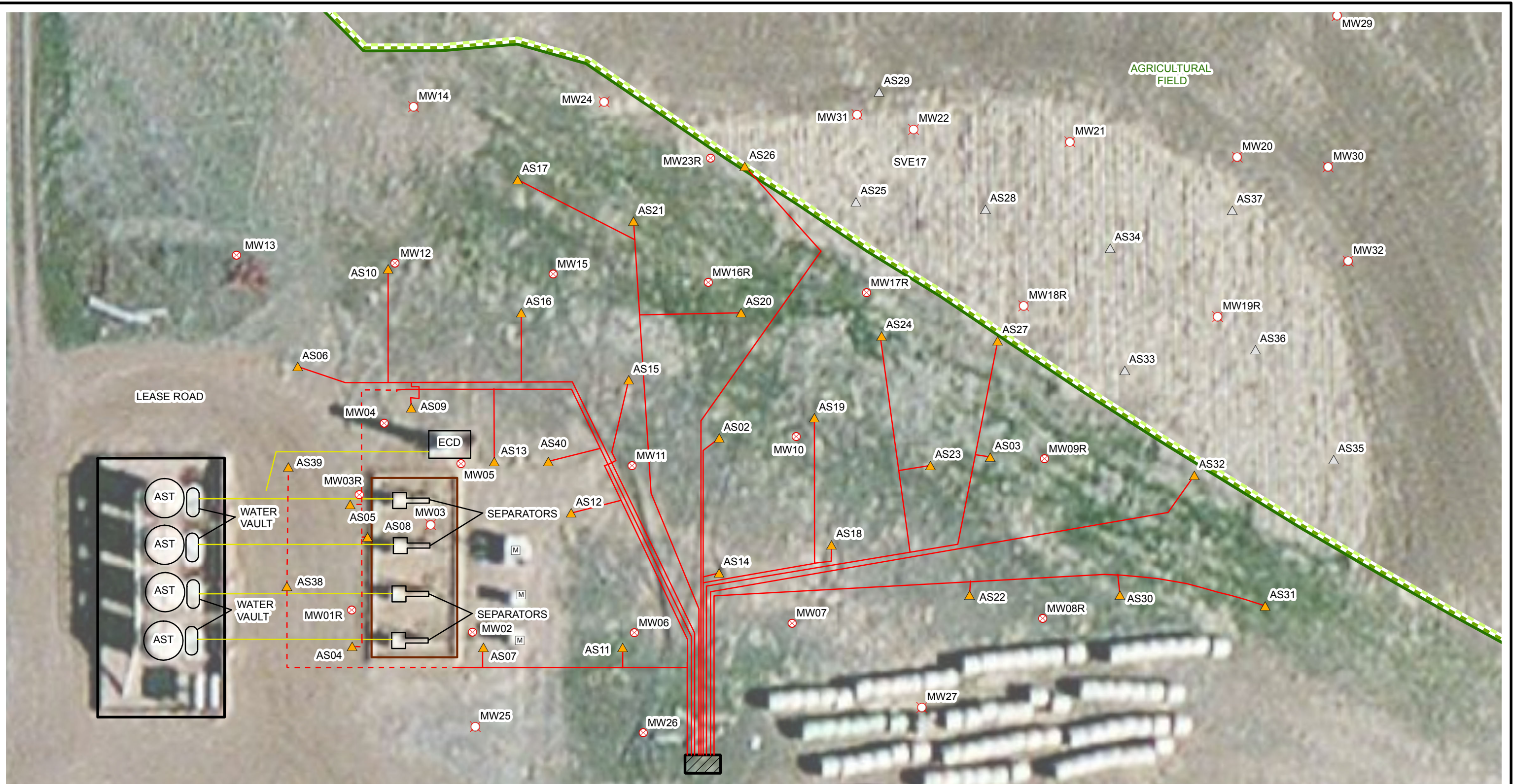
Attachments:

Figure 1	Site Location Map
Figure 2	Air Sparging System Layout
Figure 3	Soil Vapor Extraction System Layout
Figure 4	Relative Groundwater Elevation Map
Figure 5	Groundwater Analytical Results
Figure 6	Benzene Groundwater Analytical Results
Table 1	Remediation System Operations Summary
Table 2	Air Emissions Estimate Summary
Table 3	Groundwater Analytical Results
Attachment	Groundwater Laboratory Analytical Report

## FIGURES







**LEGEND**

- |   |                                     |       |                             |                               |                    |
|---|-------------------------------------|-------|-----------------------------|-------------------------------|--------------------|
| ▲ | EXISTING AIR SPARGING WELL          | —     | ABOVEGROUND PIPING          | ▨                             | REMEDATION TRAILER |
| △ | ABANDONED AIR SPARGING WELL         | - - - | BURIED PIPING               | □                             | METAL BERM         |
| ⊗ | MONITORING WELL                     | —     | UNDERGROUND UTILITY         | □                             | DIRT BERM          |
| ⊗ | ABANDONED/DESTROYED MONITORING WELL | —     | AGRICULTURAL FIELD BOUNDARY | AST: ABOVEGROUND STORAGE TANK |                    |
| ⊗ |                                     |       |                             | ECD: EMISSIONS CONTROL DEVICE |                    |
| ⊗ |                                     |       |                             |                               |                    |

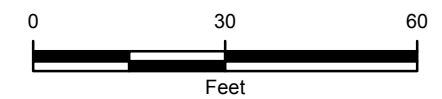


FIGURE 2  
AIR SPARGING SYSTEM LAYOUT  
CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO













NOBLE ENERGY, INC.







**LEGEND**

- |  |   |   |
|--|---|---|
|  EXISTING SOIL VAPOR EXTRACTION WELL  |  ABOVEGROUND PIPING          |  REMEDIATION TRAILER |
|  ABANDONED SOIL VAPOR EXTRACTION WELL |  BURIED PIPING               |  METAL BERM          |
|  MONITORING WELL                      |  UNDERGROUND UTILITY         |  DIRT BERM           |
|  ABANDONED/DESTROYED MONITORING WELL  |  AGRICULTURAL FIELD BOUNDARY | AST: ABOVEGROUND STORAGE TANK   |
|  METER HOUSE                          |   | ECD: EMISSIONS CONTROL DEVICE   |

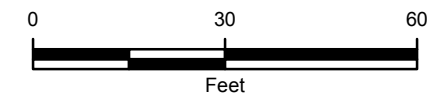


FIGURE 3  
SOIL VAPOR EXTRACTION SYSTEM LAYOUT  
CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO

NOBLE ENERGY, INC.







**LEGEND**

- |                                      |   |                               |
|--------------------------------------|---|-------------------------------|
| MONITORING WELL                      | UNDERGROUND UTILITY   | METAL BERM                    |
| ABANDONED/DESTROYED MONITORING WELL  | AGRICULTURAL FIELD BOUNDARY   | DIRT BERM                     |
| METER HOUSE                          | RELATIVE GROUNDWATER ELEVATION CONTOUR IN FEET<br>CONTOUR INTERVAL = 2 FEET<br>GRADIENT = 0.057 FEET/FOOT<br>NM: NOT MEASURED | AST: ABOVEGROUND STORAGE TANK |
| ESTIMATED GROUNDWATER FLOW DIRECTION |   | ECD: EMISSIONS CONTROL DEVICE |

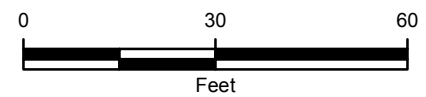


FIGURE 4  
RELATIVE GROUNDWATER ELEVATION MAP  
JUNE 18, 2013  
CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY, INC.







#### LEGEND

- MONITORING WELL
- ABANDONED/DESTROYED MONITORING WELL
- METER HOUSE
- UNDERGROUND UTILITY
- AGRICULTURAL FIELD BOUNDARY
- METAL BERM
- DIRT BERM
- AST: ABOVEGROUND STORAGE TANK
- ECD: EMISSIONS CONTROL DEVICE

SAMPLE ID  
SAMPLE DATE  
B: BENZENE IN MICROGRAMS PER LITER (µg/L)  
T: TOLUENE (µg/L)  
E: ETHYLBENZENE (µg/L)  
X: TOTAL XYLENES (µg/L)  
<: LESS THAN LABORATORY METHOD DETECTION LIMIT  
**BOLD INDICATES RESULT EQUALS OR EXCEEDS COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT - WATER QUALITY CONTROL COMMISSION REGULATION 41 COVERING BASIC STANDARDS FOR GROUND WATER**  
NS-DRY: NOT SAMPLED-DRY



FIGURE 5  
GROUNDWATER ANALYTICAL RESULTS  
JUNE 18, 2013  
CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY, INC.







LEGEND

- ⊗ MONITORING WELL
- ⊗ ABANDONED/DESTROYED MONITORING WELL
- Ⓜ METER HOUSE
- UNDERGROUND UTILITY
- AGRICULTURAL FIELD BOUNDARY
- 2009 PRE-AS/SVE SYSTEM BENZENE ISOCONCENTRATION CONTOUR (5 µg/L)
- - - DASHED WHERE INFERRED
- JUNE BENZENE ISOCONCENTRATION CONTOUR (5 µg/L)
- METAL BERM
- DIRT BERM

AST: ABOVEGROUND STORAGE TANK  
ECD: EMISSIONS CONTROL DEVICE

SAMPLE ID  
B: BENZENE IN MICROGRAMS PER LITER (µg/L)  
<: LESS THAN LABORATORY METHOD DETECTION LIMIT  
**BOLD** INDICATES RESULT EQUALS OR EXCEEDS COLORADO  
DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT - WATER  
QUALITY CONTROL COMMISSION REGULATION 41 COVERING  
BASIC STANDARDS FOR GROUND WATER  
NS-DRY: NOT SAMPLED-DRY

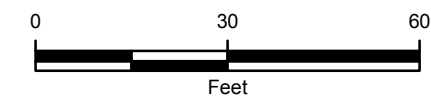


FIGURE 6  
BENZENE GROUNDWATER ANALYTICAL RESULTS  
JUNE 18, 2013  
CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY, INC.



## **TABLES**



TABLE 1

## REMEDIATION SYSTEM OPERATIONS SUMMARY

CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY INC.

Date	AS Hours	SVE Hours	Generator Hours	System Status Upon Arrival (On/Off)	Notes
8/24/2010	38.9	40.0	47.0	Startup	
9/8/2010	396.4	397.5	404.6	On	
9/27/2010	773.6	782.9	840.0	Off	AS high pressure alarm and SVE VFD fault
9/30/2010	849.4	858.7	916.4	On	
10/21/2010	1350.5	1359.8	1410.1	On	AS outlet pressure gauge broken
11/10/2010	1828.4	1837.8	1885.6	On	AS04 flow controls broken
12/1/2010	2198.1	2231	2361.6	On	
12/2/2010	2223.8	2256.7	2387.4	On	Troubleshooting pressure problems with AS cycles
12/3/2010	2247.0	2280.0	2410.6	On	
12/17/2010	2582.7	2615.7	2746.3	On	
12/20/2010	2614.9	2647.9	2818.3	Off	
12/30/2010	2721.3	2879.0	3049.5	Startup	
1/12/2011	3012.2	3143.5	3362.1	On	
1/17/2011	3129.8	3217.8	3479.7	On	Repair SVE manifold
1/25/2011	3318.8	3406.4	3664.4	On	
2/2/2011	3511.5	3699.1	3862	On	
2/14/2011	3529.8	3617.4	3881.1	Off	System down since 2/10/2011 due to cold weather
2/18/2011	3545.0	3712.4	3976.2	On	AS system down due to high pressure alarm
2/25/2011	3660.7	3879.5	4143.3	On	
3/3/2011	3798.7	4020.8	4284.3	On	Valve adjustments
3/4/2011	3819.5	4042.1	4305.9	On	Repair wellheads and apply CLR to problem wells
3/11/2011	3988.7	4211.3	4475.1	On	
3/18/2011	4155.4	4377.9	4641.4	On	
3/24/2011	4297.4	4520.0	4783.8	On	Clean crank case breather; adjust overhead clearances
3/28/2011	-	-	-	On	Troubleshooting modem
3/31/2011	4465.2	4687.9	4951.7	On	Change spark plugs
4/7/2011	4628.6	4851.7	5115.5	On	
4/8/2011	4655.0	4878.0	-	On	Grease and oil AS and SVE blowers
4/14/2011	476.7	5019.7	5283.9	On	Valve adjustments
4/18/2011	4919.3	5142.3	5406.6	On	
4/26/2011	5083.7	5306.7	5570.4	On	
4/29/2011	5157.9	5381.0	5645.2	On	Install new pressure gauges
5/4/2011	-	-	-	On - SVE Down	SVE system down due to aux #2 alarm
5/6/2011	-	-	-	On - SVE Down	SVE system down due to aux #2 alarm; troubleshooting SVE
5/9/2011	-	-	-	Off	Troubleshooting; change spark plugs
5/12/2011	-	-	-	Off	Troubleshooting
5/17/2011	-	-	-	Off	Troubleshooting
5/19/2011	5321.1	5536.6	5809.5	Off	Troubleshooting - anti-seize compound causing spark plugs to short out
5/20/2011	5346.1	5536.6	5834.5	On - SVE Down	SVE system down due to aux #2 alarm
5/25/2011	5360.1	5536.6	5848.6	On - SVE Down	SVE system down due to aux #2 alarm
5/27/2011	5405.0	5536.6	5893.8	On - SVE Down	SVE system down due to aux #2 alarm
6/1/2011	-	-	-	On - SVE Down	Troubleshooting SVE
6/2/2011	5547.6	5538.0	6037.1	On - SVE Down	SVE system down due to aux #2 alarm
6/3/2011	5549.3	5539.7	6060.8	On - SVE Down	Troubleshooting SVE
6/9/2011	5689.9	5543.7	6201.4	On - SVE Down	SVE system down due to aux #2 alarm
6/21/2011	-	-	-	On - SVE Down	Fixed SVE shutdowns by replacing PLC card
6/23/2011	6023.0	5589.4	6534.8	On	
6/28/2011	6099.5	5666.0	6611.4	Off	High engine temperature alarm
7/1/2011	6135.0	5702.5	6650.0	Off	High LEL/remote emergency stop alarm
7/6/2011	6153.8	5792.5	6740.2	On	
7/14/2011	6292.9	5937.7	6885.5	On	
7/19/2011	6372.3	6011.1	6958.9	Off	High engine temperature alarm
7/28/2011	6462.9	6101.8	7049.6	On	
8/3/2011	-	-	-	Off	High engine temperature alarm
8/5/2011	-	-	-	Off	Troubleshooting generator
8/8/2011	-	-	-	Off	Troubleshooting generator
8/12/2011	-	-	-	Off	Troubleshooting generator
8/16/2011	-	-	-	Off	Troubleshooting generator
8/17/2011	6532.9	6172.0	7120.3	Off	Replaced diaphragm in carburetor
8/23/2011	6629.8	6268.9	7217.4	On	Generator did not restart
8/31/2011	-	-	7233.6	Off	Troubleshooting generator
9/14/2011	6646.3	6285.6	7234.3	Off	Troubleshooting generator

TABLE 1

## REMEDIATION SYSTEM OPERATIONS SUMMARY

**CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY INC.**

Date	AS Hours	SVE Hours	Generator Hours	System Status Upon Arrival (On/Off)	Notes
9/27/2011	6734.5	6374	7386	Off	Troubleshooting generator
10/5/2011	6759.5	6398.9	7450	Off	High engine temperature alarm
10/10/2011	6880.3	6519.8	7570.9	On	
10/21/2011	7141.1	6780.6	7831.7	On	High engine temperature alarm
10/28/2011	7217.1	6856.8	7907.8	Off	
11/3/2011	7357.3	6997	8048.2	On	
11/14/2011	7523.9	7163.7	8241.2	Off	Off to repair leaking gasket found on 11/11/11
11/18/2011	7617.7	7257.6	8335.1	On	
11/21/2011	7687.5	7327.9	8405.4	On	
11/23/2011	7712.6	7353	8451.3	On	
12/15/2011	7723.1	7363.7	8544.3	Off	
12/29/2011	7724.7	7365.3	8682.3	Off	Troubleshooting generator
1/5/2012	7729.0	7369.3	8819.8	Off	Troubleshooting generator
1/12/2012	7898.1	7538.5	8989.0	On	Changed oil; adjusted flows
1/18/2012	7915.1	7555.5	9106.9	Off	
1/24/2012	7921.1	7561.8	9115.0	Off	
1/26/2012	7957.6	7598.1	9156.7	Off	
1/30/2012	7995.5	7636.3	9195.4	Off	
2/10/2012	8257.5	7898.8	9457.9	On	
2/15/2012	8374.7	8015.6	9574.6	On	Replaced torn head gasket; adjusted flows
2/22/2012	-	-	9666.9	On	Emptied knockout tank
2/27/2012	8663.6	8304.1	9786.6	On	Changed alternator belt
3/6/2012	8807.4	8447.9	10007.5	Off	High engine temperature alarm
3/7/2012	8808.3	8448.9	10008.5	Off	High engine temperature alarm
3/14/2012	-	-	-	Off	Removed radiator for cleaning
3/15/2012	-	-	-	Off	Reinstalled radiator
3/22/2012	9049.7	8690.3	10250.0	On	Changed oil; changed air filter; adjusted flows
3/27/2012	9165.2	8805.8	10365.5	On	
4/6/2012	-	9048.6	10608.2	On	Changed spark plugs; cleaned crankcase breather; greased SVE; adjusted flows
4/10/2012	9500.4	9141	10700.7	On	
4/19/2012	9719.1	9359.8	10919.4	On	Changed oil; greased AS blower
4/23/2012	-	-	-		Completed oil reservoir wiring
4/24/2012	9814.8	9455.6	11015.3	Off	High engine temperature alarm; changed AS oil
4/30/2012	9816.2	9457	11016.5	Off	
5/8/2012	9910.2	9551	11110.7	Off	High engine temperature alarm
5/17/2012	10125.6	9766.5	11326.2	On	Stack sample collected
5/25/2012	10241.1	9881.9	11442.5	Off	High LEL/remote Emergency stop alarm; changed oil
5/31/2012	-	-	-	Off	High engine temperature alarm; changed spark plugs; changed SVE oil; cleaned crankcase breather
6/4/2012	-	-	-	Off	Knockout tank high-level alarm; high engine temperature alarm - set timer
6/5/2012	-	-	-	Off	High engine temperature alarm
6/12/2012	-	-	11562.6	Off	High engine temperature alarm
6/13/2012	10285.0	9926	11563.2	Off	High LEL/remote E stop alarm
6/19/2012	10286.3	9927.3	11564.6	Off	High engine temperature alarm
6/27/2012	-	-	11643	Off	High engine temperature alarm, installed fan
7/2/2012	10365.1	1006.2	11763	Off	Generator on, AS/SVE down due to tripped breaker
7/10/2012	10397.5	10038.6	11795.8	Off	High LEL/remote E stop alarm
7/25/2012	-	-	-	Off	High LEL/remote E stop alarm, troubleshooting
7/27/2012	10397.0	10039	11796	Off	Troubleshooting generator; recalibrated LEL, changed spark plugs
7/30/2012	-	-	-		Removed radiator for cleaning
8/3/2012	10430.0	10071	11829	Off	
8/6/2012	10477.0	10119	11877.1	Off	Changed oil, cleaned crankcase, adjusted flows
8/14/2012	-	-	-	Off	High LEL/remote E stop alarm; left system off
8/20/2012	10558.7	10200.2	11958.9	Off	Fixed gas leak, stack sample, adjusted flows
8/23/2012	-	-	-	Off	High LEL/remote E stop alarm
8/27/2012	10579.6	10247.8	12009.5	Off	High LEL/remote E stop alarm
9/6/2012	10644.1	10341.2	12105.4	Off	High LEL/remote E stop alarm, changed generator air filter
9/13/2012	10686.4	10403.5	12169.9	Off	High LEL/remote E stop alarm, changed spark plugs
9/18/2012	10743.2	10515.2	12286.7	On	Changed oil, cleaned crankcase breather, flows
9/20/2012	10767.8	10561.8	-	On	Flows
9/25/2012	10783.7	10577.8	12457.5	On	Generator on, AS/SVE down due to tripped breaker
9/27/2012	-	-	-	Off	High LEL/remote E stop alarm; replaced stolen battery
10/1/2012	-	-	-	Off	High LEL/remote E stop alarm; adjusted EMIT



TABLE 1

## REMEDIATION SYSTEM OPERATIONS SUMMARY

CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY INC.

Date	AS Hours	SVE Hours	Generator Hours	System Status Upon Arrival (On/Off)	Notes
10/2/2012	10807.6	10601.8	12483.1	On	
10/4/2012	-	-	-	On	
10/10/2012	-	-	-	Off	Changed spark plugs, troubleshooting generator
10/16/2012	10842.0	10636.0	-	Off	Surepoint Group on site to troubleshoot generator; determined on head was bad
10/18/2012	-	-	-	On	Surepoint Group on site to replace bad head
10/22/2012	10842.9	10756.9	12653.3	On	Changed oil, changed spark plugs, cleaned crankcase breather, unable to restart
10/23/2012	-	-	-	On	Adjusted flows
11/1/2012	11079.2	10993.3	12890	On	Adjusted flows
11/6/2012	11202.9	11117.0	13013.6	On	
11/9/2012	11274.2	11188.2	13084.9	On	Greased SVE; adjusted flows
11/13/2012	-	-	-	Off	
11/15/2012	-	-	-	Off	Need new oil cap
					Replaced oil cap; changed spark plugs
11/19/2012	11384.0	11298.0	13148.6	Off	Troubleshooting generator wiring; changed oil; cleaned crankcase breather; installed new temperature gauge
11/20/2012	-	-	-	On	
11/26/2012	-	-	13195.1	Off	Stack sample
12/4/2012	-	-	13435	On	High temperature alarm
12/6/2012	-	-	-	On	Adjusted flows
12/11/2012	11747.2	11661.3	13558.3	On	
12/17/2012	11856.9	11770.3	13668.1	Off	
12/28/2012	12116.1	12029.5	14000.9	On	Low oil pressure alarm, high knock-out tank alarm
12/31/2012	12189.1	12102.4	14074.4	On	Changed oil, cleaned crankcase breather
1/3/2013	-	-	-	On	
1/7/2013	12357.0	12271.0	14169	On	
1/10/2013	-	-	14218.6	Off	High engine temperature alarm; changed spark plugs; cleaned crankcase breather;
1/14/2013	12500.7	12414.2	14312.7	On	
1/18/2013	12549.2	12462.7	14361.2	Off	High engine temperature; replaced spark plugs; changed generator oil and adjusted overhead valve clearances; cleaned crankcase breather; adjusted flows
1/22/2013	12550	12463.5	14362.1	Off	High engine temperature
1/30/2013	-	-	-	Off	Dead battery
2/6/2013	12600	12515	14413	Off	Troubleshoot thermostat
2/8/2013	12646	12560	14459	On	
2/12/2013	-	-	-	Off	High engine temperature alarm; repaired wire near oil pressure gauge that wore through casing; replaced AS inlet filter; collected stack sample
2/13/2013	-	-	14486.4	On	
2/19/2013	12747.8	12661.8	14560.9	Off	High engine temperature alarm; replaced generator air filter; replaced spark plugs; adjusted flows
2/22/2013	12818	12732	14631.3	On	
2/26/2013	12915.2	12829.3	14728.5	On	
3/1/2013	12985.7	12899.8	14798.9	On	
3/25/2013	-	-	-	Off	Shutdown for static evaluation
3/29/2013	13035.1	12949.2	14848	Off	Restarted system
4/2/2013	13035.8	12949.9	14849.7	Off	High engine temperature alarm
4/4/2013	13060.7	12974.8	14874.5	Off	High engine temperature alarm
4/11/2013	13082.8	12996.9	14896.9	On	High engine temperature alarm
4/15/2013	13178.5	13092.6	14992.6	On	
4/19/2013	13271.6	13185.8	15085.8	On	Replaced leaking valve cover gasket
4/22/2013	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown system and moved trailer
Operational % Since Startup	57%	57%	65%		
Operational % in Quarter	33%	33%	33%		

## NOTES:

AS - air sparging  
aux - auxiliary  
CLR - calcium, lime, rust remover  
LEL - lower explosive limit  
PLC - programmable logic controller  
SVE - soil vapor extraction  
VFD - variable frequency drive  
- Indicates no reading was collected  
% - percent

TABLE 2

## AIR EMISSIONS ESTIMATE SUMMARY

CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY INC.

Sample Information and Lab Analysis								
Date	Total Flow (cf)	Delta Flow (cf)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	TVPH (µg/L)	PID (ppm)
9/8/2010	2,574,000	2,574,000	0.087	0.048	0.021	0.311	7.44	4.9
9/22/2010	4,464,000	1,890,000	0.039	0.048	0.0074	0.098	7.7	0.6
10/21/2010	10,342,320	5,878,320	2.0	0.015	2.7	5.4	1.2	0
2/25/2011	28,484,160	18,141,840	0.049	0.055	0.065	0.35	450	93.3
6/2/2011	41,918,010	13,433,850	0.330	0.047	0.026	1.38	370	54.1
8/17/2011	46,863,210	4,945,200	0.0008	0.0077	0.0011	0.0105	1.6	0.9
11/14/2011	54,003,450	7,140,240	0.387	0.1675	0.118	0.169	10.55	1.5
2/15/2012	61,159,410	7,155,960	0.229	1.850	0.289	2.065	3.010	8.9
5/17/2012	74,816,430	13,657,020	0.0068	0.055	0.0098	0.127	20.0	0
8/20/2012	78,199,290	3,382,860	0.120	0.109	0.0461	0.159	14.800	1.2
11/20/2012	83,909,610	5,710,320	0.00577	0.0117	0.0082	0.04619	2.520	3.8
2/12/2013	98,783,910	14,874,300	0.00318	0.0193	0.00795	0.2204	4.470	NM

Emission Calculations						
Date	Flow Rate (cfm)	Benzene (lb/hr)	Toluene (lb/hr)	Ethylbenzene (lb/hr)	Total Xylenes (lb/hr)	TVPH (lb/hr)
9/8/2010	120	0.0000	0.0000	0.0000	0.0001	0.0033
9/22/2010	120	0.0000	0.0000	0.0000	0.0000	0.0035
10/21/2010	140	0.0010	0.0000	0.0014	0.0028	0.0006
2/25/2011	120	0.0000	0.0000	0.0000	0.0002	0.2020
6/2/2011	135	0.0002	0.0000	0.0000	0.0007	0.1868
8/17/2011	130	0.0000	0.0000	0.0000	0.0000	0.0008
11/14/2011	120	0.0002	0.0001	0.0001	0.0001	0.0047
2/15/2012	140	0.0001	0.0010	0.0002	0.0011	0.0016
5/17/2012	130	0.0000	0.0000	0.0000	0.0001	0.0097
8/20/2012	130	0.0001	0.0001	0.0000	0.0001	0.0072
11/20/2012	120	0.0000	0.0000	0.0000	0.0000	0.0011
2/12/2013	150	0.0000	0.0000	0.0000	0.0001	0.0025

Tons Emitted Over Total Operating Time								
Date	Total Operational Hours	Delta Hours	Benzene (lbs)	Toluene (lbs)	Ethylbenzene (lbs)	Total Xylenes (lbs)	TVPH (lbs)	TVPH (tons)
9/8/2010	397.5	357.5	0.01	0.01	0.00	0.05	1.19	0.00
9/22/2010	660.0	262.5	0.00	0.01	0.00	0.01	0.91	0.00
10/21/2010	1,359.8	699.8	0.73	0.01	0.99	1.98	0.44	0.00
2/25/2011	3,879.5	2,519.7	0.05	0.06	0.07	0.40	508.89	0.25
6/2/2011	5,538.0	1,658.5	0.28	0.04	0.02	1.16	309.84	0.15
8/17/2011	6,172.0	634.0	0.00	0.00	0.00	0.00	0.49	0.00
11/14/2011	7,163.7	991.7	0.17	0.07	0.05	0.08	4.70	0.00
2/15/2012	8,015.6	851.9	0.10	0.83	0.13	0.92	1.34	0.00
5/17/2012	9,766.5	1,750.9	0.01	0.05	0.01	0.11	17.03	0.01
8/20/2012	10,200.2	433.7	0.03	0.02	0.01	0.03	3.12	0.00
11/20/2012	10,993.3	793.1	0.00	0.00	0.00	0.02	0.90	0.00
2/12/2013	12,646.0	1,652.7	0.00	0.02	0.01	0.20	4.14	0.00
		Sum	1.39	1.11	1.30	4.95	852.99	0.43

## NOTES:

cf - cubic feet

µg/L - micrograms per liter

TVPH - total volatile petroleum hydrocarbons

PID - photo-ionization detector

ppm - parts per million

cfm - cubic feet per minute

lb/hr - pounds per hour

lbs - pounds

NM - not measured

Italicized values are reported as one half the detection limit for a non-detected result.

TABLE 3

## GROUNDWATER ANALYTICAL RESULTS

CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY, INC.

Well ID	Date	Depth to Water/<Product> (feet btoc)	Relative Groundwater Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW01	1/13/2009	15.11	NM	26,400	8,320	536	8,800
	3/5/2010	14.60	NM	26,100	6,270	666	11,090
	9/20/2010	NM	NM	Could Not Locate Well			
MW01R	12/2/2010	8.68	88.25	5,600	161	37.1	1,550
	3/14/2011	15.33	81.60	1,010	<1.00	<1.00	12.8
	6/2/2011	9.89	87.04	1,080	<1.0	13.5	1,400
	9/12/2011	2.96	93.97	1,560	<1.0	84.5	1,510
	12/9/2011	7.80	89.13	427	<1.0	34.5	945
	3/22/2012	13.50	83.43	<1.0	4.17	<1.0	<1.0
	6/8/2012	4.56	92.37	5.8	<1	<1	19.3
	9/18/2012	4.04	92.89	7.1	<1.0	3.1	100
	12/3/2012	6.53	90.40	<1.0	<1.0	<1.0	<1.0
	3/22/2013	13.78	83.15	<1.0	<1.0	<1.0	2.89
	6/18/2013	5.35	91.58	<1.0	<1.0	<1.0	<1.0
MW02	1/13/2009	15.12	83.02	3,460	1,420	199	6,120
	3/5/2010	15.95	82.19	857	3.61	151	1,448.61
	9/20/2010	6.00	92.14	338	<1.0	104	2,256.14
	12/2/2010	10.04	88.10	125	<1.0	147	1,590
	3/14/2011	16.40	81.74	37.4	<1.00	22.0	266
	6/2/2011	13.02	85.12	<1.0	<1.0	<1.0	<3.0
	9/12/2011	5.38	92.76	4.9	<1.0	2.4	9.5
	12/9/2011	10.00	88.14	<1.0	<1.0	2.17	20.4
	3/22/2012	16.19	81.95	1	2.36	9.88	47.2
	6/8/2012	7.45	90.69	<1	<1	<1	<1
	9/18/2012	6.97	91.17	<1.0	<1.0	<1.0	2.1
	12/3/2012	8.49	89.65	<1.0	<1.0	<1.0	<1.0
	3/18/2013	15.99	82.15	<1.0	<1.0	14.8	60.3
	6/18/2013	7.62	90.52	<1.0	<1.0	<1.0	<1.0
MW03	1/13/2009	15.06	NM	11,700	7,860	195	5,950
				Destroyed			
MW03R	3/18/2013	17.72	NM	<2.0	<2.0	1.98	27.5
	6/18/2013	10.33	87.92	<1.0	<1.0	<1.0	<1.0
MW04	1/13/2009	13.13	84.15	19,700	7,460	555	9,990
	3/5/2010	15.71 *sheen	81.57	Sample not collected			
	9/20/2010	3.70	93.58	563	<10.0	<10.0	6,027
	12/2/2010	9.33	87.95	664	42	19.1	4,710
	3/14/2011	14.94	82.34	713	<10.0	113	6,510
	6/2/2011	9.10	88.18	233	<1.0	31.8	457
	9/12/2011	3.40	93.88	23.8	<1.0	6.8	124
	12/9/2011	9.60	87.68	57.2	<1.0	3.62	90.3
	3/22/2012	14.21	83.07	295	5.33	5.99	53.7
	6/8/2012	4.57	92.40	14.3	<1	<1	14.4
	9/18/2012	3.32	93.96	3.5	<1.0	1.3	59.0
	12/3/2012	8.80	88.48	<1.0	<1.0	<1.0	<1.0



TABLE 3 (CONTINUED)

## GROUNDWATER ANALYTICAL RESULTS

CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY, INC.

Well ID	Date	Depth to Water/<Product> (feet btoc)	Relative Groundwater Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW04	3/18/2013	13.83	83.45	10.2	<1.0	1.49	6.27
	6/18/2013	5.54	91.74	27.7	<1.0	<1.0	<1.0
MW05	1/13/2009	14.58	82.39	15,500	14,900	412	6,860
	3/5/2010	16.06 * sheen	80.91	Sample not collected			
	9/20/2010	6.60	90.37	12,700	1,500	522	8,190
	12/2/2010	10.48	86.49	14,700	185	122	5,650
	3/14/2011	16.16	80.81	67.9	<1.00	<1.00	112
	6/2/2011	13.25	83.72	143	<1.0	<1.0	13.0
	9/12/2011	5.96	91.01	5,050	22.5	59.1	2,680
	12/9/2011	10.70	86.27	8,790	10.6	<10.0	659
	3/22/2012	NM	NM	Not Sampled - Dry			
	6/8/2012	8.36	88.61	337	<1	<1	4.4
	9/18/2012	7.68	89.29	1,249	1.1	3.8	59.3
	12/3/2012	10.08	86.89	<1.0	<1.0	<1.0	<1.0
	3/18/2013	16.25	80.72	<1.3	<1.3	<1.3	<4.0
	6/18/2013	9.58	87.39	2.44	<1.0	<1.0	1.88
MW06	2/19/2009	17.24	79.73	305	15.8	167	2,476
	3/5/2010	16.47	80.87	1.27	<1.0	8.77	9.60
	9/20/2010	6.95	90.39	<1.0	<1.0	3.51	13.0
	12/2/2010	11.01	86.33	<1.0	<1.0	28.8	205
	3/14/2011	16.91	80.43	<1.00	<1.00	42.8	317
	6/2/2011	14.30	83.04	<1.0	<1.0	2.1	4.9
	9/12/2011	6.51	90.83	<1.0	<1.0	<1.0	<3.0
	12/9/2011	10.80	86.54	<1.0	<1.0	<1.0	<3.0
	3/22/2012	17.08	80.26	<1.0	<1.0	1.46	4.9
	6/8/2012	9.22	88.12	<1	<1	<1	<1
	9/18/2012	8.21	89.13	<1.0	<1.0	<1.0	<1.0
	12/3/2012	9.50	87.84	<1.0	<1.0	<1.0	<1.0
	3/18/2013	16.70	80.64	<1.0	<1.0	2.84	8.79
	6/18/2013	8.89	88.45	<1.0	<1.0	<1.0	<1.0
MW07	2/19/2009	19.18	75.41	3.99	7.09	64.1	288.67
	3/5/2010	15.93	78.66	5.47	<1.0	4.11	55.02
	9/20/2010	7.35	87.24	<1.0	<1.0	<1.0	<3.0
	12/2/2010	10.32	84.27	<1.0	<1.0	<1.0	<1.0
	3/14/2011	16.12	78.47	<1.00	<1.00	<1.00	<3.00
	6/2/2011	14.59	80.00	<1.0	<1.0	<1.0	<3.0
	9/12/2011	6.25	88.34	<1.0	<1.0	<1.0	<3.0
	12/9/2011	NM	NM	Could Not Locate Well			
	3/22/2012	16.42	78.17	<1.0	<1.0	<1.0	<1.0
	6/8/2012	8.65	85.94	<1	<1	<1	<1
	9/18/2012	8.12	86.47	<1.0	<1.0	<1.0	<1.0
	12/3/2012	9.14	85.45	<1.0	<1.0	<1.0	<1.0
	3/18/2013	16.13	78.46	<1.0	<1.0	<1.0	<3.0
	6/18/2013	8.72	85.87	<1.0	<1.0	<1.0	<1.0
MW08	2/19/2009	18.03	NM	34.3	2,000	202	4,213
MW08R	9/20/2010	10.90	83.61	1.21	<1.0	118	657.4

TABLE 3 (CONTINUED)

## GROUNDWATER ANALYTICAL RESULTS

CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY, INC.

Well ID	Date	Depth to Water/<Product> (feet btoc)	Relative Groundwater Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW08R	12/2/2010	12.94	81.57	<1.0	<1.0	<1.0	119
	3/14/2011	18.61	75.90	<1.00	<1.00	<1.00	1,070
	6/2/2011	17.80	76.71	<1.0	<1.0	207	587
	9/12/2011	9.66	84.85	<1.0	<1.0	44.6	241
	12/9/2011	12.67	81.84	<1.0	<1.0	9.99	68.6
	3/22/2012	18.67	75.84	<1.0	8.37	16.3	109
	6/8/2012	11.99	82.52	<1	<1	1.7	26.1
	9/18/2012	11.34	83.17	<1.0	<1.0	1.5	4.5
	12/3/2012	11.88	82.63	<1.0	<1.0	2.65	20.2
	3/22/2013	18.68	75.83	<1.0	<1.0	8.47	103
	6/18/2013	12.10	82.41	<1.0	<1.0	1.98	6.85
MW09	2/19/2009	18.96	NM	<b>1,250</b>	23.0	19.0	25.28
MW09R	9/20/2010	10.75	82.99	<b>3,350</b>	<1.0	368	<b>1,891.7</b>
	12/2/2010	12.79	80.95	<b>10.2</b>	<10.0	85.2	392
	3/14/2011	17.67	76.07	<b>422</b>	<1.0	200	644
	6/2/2011	17.02	76.72	<b>902</b>	<1.0	303	<b>1,490</b>
	9/12/2011	9.57	84.17	1.1	<1.0	128	609
	12/9/2011	12.50	81.24	1.79	<1.0	13.7	28.5
	3/22/2012	17.81	75.93	1.64	8	14.5	43.4
	6/8/2012	12.34	81.40	<1	<1	5.9	8.9
	9/18/2012	11.43	82.31	<1.0	<1.0	<1.0	<1.0
	12/3/2012	12.00	81.74	<1.0	<1.0	<1.0	<1.0
	3/22/2013	17.92	75.82	<1.0	<1.0	<1.0	<1.0
	6/18/2013	12.70	81.04	<1.0	<1.0	12.7	16
MW10	2/19/2009	17.34	76.83	<b>10,300</b>	374	412	<b>2,435</b>
	3/5/2010	16.46	77.71	<b>9,790</b>	581	452	<b>3,707</b>
	9/20/2010	7.70	86.47	<b>4,130</b>	50.0	434	<b>4,280</b>
	12/2/2010	10.83	83.34	<b>1,560</b>	<10.0	33.5	1,100
	3/14/2011	12.25	81.92	<b>1,070</b>	<1.00	12.6	476
	6/2/2011	12.35	81.82	<1.0	<1.0	<1.0	<3.0
	9/12/2011	7.01	87.16	<b>310</b>	<1.0	107	250
	12/9/2011	10.62	83.55	<b>243</b>	<1.0	53.2	279
	3/22/2012	16.37	77.80	<b>30.3</b>	1.75	<1.0	<1.0
	6/8/2012	9.60	84.57	<b>18.2</b>	<1	<1	<1
	9/18/2012	8.78	85.39	<1.0	<1.0	<1.0	<1.0
	12/3/2012	10.02	84.15	<1.0	<1.0	<1.0	<1.0
	3/18/2013	16.30	77.87	<1.0	<1.0	<1.0	<3.0
	6/18/2013	10.34	83.83	<b>28.8</b>	<1.0	<1.0	<1.0
MW11	2/19/2009	17.67	78.49	<b>6,130</b>	48.5	43.4	818.6
	3/5/2010	16.38	79.78	<b>10,500</b>	<1.0	10.1	497
	9/20/2010	7.20	88.96	<b>2,670</b>	<1.0	<1.0	235.88
	12/2/2010	11.55	84.61	<b>835</b>	<10.0	<10.0	57.1
	3/14/2011	16.27	79.89	<b>180</b>	<1.00	<1.00	<3.00
	6/2/2011	13.82	82.34	<1.0	<1.0	<1.0	<3.0
	9/12/2011	7.11	89.05	<1.0	<1.0	<1.0	<3.0

TABLE 3 (CONTINUED)

## GROUNDWATER ANALYTICAL RESULTS

CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY, INC.

Well ID	Date	Depth to Water/<Product> (feet btoc)	Relative Groundwater Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW11	12/9/2011	11.31	84.85	<1.0	<1.0	<1.0	<3.0
	3/22/2012	16.85	79.31	<1.0	2	<1.0	<1.0
	6/8/2012	9.76	86.40	<1	<1	<1	<1
	9/18/2012	8.87	87.29	<1.0	<1.0	<1.0	<1.0
	12/3/2012	10.78	85.38	<1.0	<1.0	<1.0	<1.0
	3/18/2013	16.98	79.18	<1.0	<1.0	<1.0	<3.0
	6/18/2013	10.55	85.61	<1.0	<1.0	<1.0	<1.0
MW12	2/19/2009	14.81	81.95	<b>1,970</b>	257	138	423
	3/5/2010	14.63	82.13	<b>465</b>	24.5	42.7	199.9
	9/20/2010	4.10	92.66	<b>9.92</b>	<1.0	<1.0	171.07
	12/2/2010	13.41	83.35	<1.0	<1.0	<1.0	<1.0
	3/14/2011	14.91	81.85	2.35	<1.00	13.5	250
	6/2/2011	10.42	86.34	<1.0	<1.0	<1.0	<3.0
	9/12/2011	3.47	93.29	<b>58.7</b>	<1.0	<1.0	6.4
	12/9/2011	10.35	86.41	<1.0	<1.0	<1.0	<3.0
	3/22/2012	15.25	81.51	<1.0	2	1.4	4.98
	6/8/2012	5.76	91.00	<b>12.8</b>	<1	3.7	13.7
	9/18/2012	4.41	92.35	<1.0	<1.0	<1.0	1.4
	12/3/2012	10.34	86.42	<1.0	<1.0	<1.0	<1.0
	3/18/2013	15.33	81.43	<1.0	<1.0	1.41	<3.0
	6/18/2013	8.31	88.45	<b>19.8</b>	<1.0	<1.0	<1.0
MW13	2/19/2009	15.13	83.32	<1.0	<1.0	<1.0	<3.0
	3/5/2010	15.11	83.34	<1.0	<1.0	<1.0	<3.0
	9/20/2010	3.80	94.65	<1.0	<1.0	<1.0	<3.0
	12/2/2010	10.60	87.85	<1.0	<1.0	<1.0	<1.0
	3/14/2011	15.21	83.24	<1.00	<1.00	<1.00	<3.00
	6/2/2011	7.41	91.04	<1.0	<1.0	<1.0	<3.0
	9/12/2011	2.94	95.51	<1.0	<1.0	<1.0	<3.0
	12/9/2011	11.04	87.41	<1.0	<1.0	<1.0	<3.0
	3/22/2012	15.73	82.72	<1.0	1.87	<1.0	<1.0
	6/8/2012	5.01	93.44	<1	<1	<1	<1
	9/18/2012	3.77	94.68	<1.0	<1.0	<1.0	<1.0
	12/3/2012	10.90	87.55	<1.0	<1.0	<1.0	<1.0
	3/18/2013	15.76	82.69	<1.0	<1.0	<1.0	<3.0
	6/18/2013	7.36	91.09	<1.0	<1.0	<1.0	<1.0
MW14	2/19/2009	14.32	NM	<1.0	<1.0	<1.0	<3.0
	3/5/2012	NM	NM	Destroyed			
MW15	2/19/2009	14.95	78.55	<b>2,490</b>	<b>3,380</b>	150	<b>1,732</b>
	3/5/2010	13.00	80.50	<b>998</b>	<b>1,890</b>	141	<b>2,026</b>
	9/20/2010	2.80	90.70	<b>107</b>	<1.0	<1.0	417.3
	12/2/2010	8.24	85.26	<b>133</b>	<1.0	<1.0	470
	3/14/2011	12.96	80.54	<b>181</b>	<1.00	135	<b>1,580</b>
	6/2/2011	7.44	86.06	<b>35.4</b>	<1.0	15.6	308
	9/12/2011	2.44	91.06	<b>15.2</b>	<1.0	29.1	249
	12/9/2011	10.30	83.20	<1.0	<1.0	<1.0	<3.0



TABLE 3 (CONTINUED)

## GROUNDWATER ANALYTICAL RESULTS

CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY, INC.

Well ID	Date	Depth to Water/<Product> (feet btoc)	Relative Groundwater Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW15	3/22/2012	15.31	78.19	<1.0	2.09	<1.0	<1.0
	6/8/2012	5.40	88.10	<1	<1	<1	<1
	9/18/2012	6.38	87.12	<1.0	<1.0	<1.0	<1.0
	12/3/2012	10.06	83.44	<1.0	<1.0	<1.0	<1.0
	3/18/2013	13.81	79.69	<b>36.9</b>	<1.0	60.5	84.6
	6/18/2013	9.20	84.30	<1.0	<1.0	<1.0	<1.0
MW16 MW16R	2/19/2009	15.25	NM	<b>1,060</b>	16.2	156	37.5
	3/22/2012	15.58	NM	<1.0	<1.0	<1.0	<1.0
	6/8/2012	8.59	NM	1.1	<1	4.2	<1
	9/18/2012	6.78	NM	3.1	<1.0	2.8	<1.0
	12/3/2012	10.71	NM	<1.0	<1.0	<1.0	<1.0
	3/19/2013	15.91	NM	2.52	<1.0	<1.0	<3.0
	6/18/2013	10.81	NM	<b>19.7</b>	<1.0	<1.0	<1.0
MW17 MW17R	2/19/2009	15.93 <15.91>	NM	<b>3,680</b>	<b>9,940</b>	<b>775</b>	1,075
	9/20/2010	7.92	84.99	<1.0	<1.0	46.1	256.31
	12/2/2010	11.10	81.81	3.10	<1.0	112	570
	3/14/2011	15.62	77.29	<b>9.19</b>	<1.00	52.6	470
	6/2/2011	13.53	79.38	3.4	<1.0	16.5	448
	9/12/2011	6.93	85.98	<1.0	<1.0	45.1	275
	12/9/2011	11.11	81.80	<b>9.28</b>	<1.0	141	1,090
	3/22/2012	15.89	77.02	<b>5.4</b>	2.59	85.3	616
	6/8/2012	10.44	82.47	4.1	<1	117	668
	9/18/2012	9.07	83.84	<b>5.2</b>	<1.0	95.1	522
	12/3/2012	10.98	81.93	<b>24.8</b>	<1.0	97.5	684
	3/22/2013	16.16	76.75	<b>51.4</b>	<1.0	158	<b>1,460</b>
	6/18/2013	11.84	81.07	3.23	<1.0	82.1	474
	Abandoned per COGCC approval						
MW18 MW18R	2/19/2009	16.22	NM	<b>1,410</b>	80.9	51.0	229.6
	3/14/2011	16.25	75.85	<1.00	<1.00	<1.00	<3.00
	6/2/2011	15.24	76.86	<1.0	<1.0	<1.0	<3.0
	9/12/2011	8.76	83.34	<1.0	<1.0	<1.0	<3.0
	2/28/2012	NM	NM	Abandoned per COGCC approval			
MW19 MW19R	2/25/2009	16.67	NM	<b>329</b>	<1.0	1.45	6.65
	3/14/2011	17.44	74.27	<1.00	<1.00	<1.00	<3.00
	6/2/2011	16.96	74.75	<1.0	<1.0	<1.0	<3.0
	9/12/2011	10.61	81.10	<1.0	<1.0	<1.0	<3.0
	2/28/2012	NM	NM	Abandoned per COGCC approval			
MW20	2/25/2009	17.55	NM	2.13	2.34	16.0	3.27
Destroyed							
MW21	2/25/2009	16.87	NM	2.00	<1.0	<1.0	11.9
Destroyed							
MW22	2/25/2009	16.70	NM	<b>8.70</b>	40.7	3.78	22.65
Destroyed							
MW23 MW23R	2/25/2009	15.25	NM	<b>32.9</b>	5.29	9.01	38.36
	3/22/2012	16.20	NM	<1.0	2.33	<1.0	<1.0
	6/8/2012	9.38	NM	<1	<1	<1	<1

TABLE 3 (CONTINUED)

## GROUNDWATER ANALYTICAL RESULTS

CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY, INC.

Well ID	Date	Depth to Water/<Product> (feet btoc)	Relative Groundwater Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW23R	9/18/2012	7.33	NM	<1.0	<1.0	<1.0	1.3
	12/3/2012	11.88	NM	<1.0	<1.0	<1.0	<1.0
	3/19/2013	16.67	NM	<1.0	<1.0	<1.0	<3.0
	6/18/2013	11.73	NM	<1.0	<1.0	<1.0	<1.0
MW24	2/25/2009	14.87	NM	1.02	<1.0	<1.0	<3.0
MW25	Destroyed						
	2/25/2009	18.20	NM	<1.0	<1.0	<1.0	4.01
	3/5/2010	17.46	NM	<1.0	<1.0	<1.0	<3.0
MW26	Destroyed						
	2/25/2009	18.02	78.14	<1.0	<1.0	<1.0	<3.0
	3/5/2010	17.36	78.80	<1.0	<1.0	<1.0	<3.0
	9/20/2010	5.10	91.06	<1.0	<1.0	<1.0	<3.0
	12/2/2010	8.78	87.38	<1.0	<1.0	<1.0	<1.0
	3/14/2011	15.63	80.53	<1.00	<1.00	<1.00	<3.00
	6/2/2011	11.67	84.49	<1.0	<1.0	<1.0	<3.0
	9/12/2011	4.02	92.14	<1.0	<1.0	<1.0	<3.0
	12/9/2011	NM	NM	<1.0	<1.0	<1.0	<3.0
	3/22/2012	NM	NM	Not Sampled - Dry			
	6/8/2012	5.99	90.17	<1	<1	<1	<1
	9/18/2012	5.69	90.47	<1.0	<1.0	<1.0	<1.0
	12/3/2012	7.26	88.90	<1.0	<1.0	<1.0	<1.0
	3/18/2013	NM	NM	Not Sampled - Dry			
	6/18/2013	5.91	90.25	<1.0	<1.0	<1.0	<1.0
MW27	2/25/2009	19.98	NM	<1.0	<1.0	<1.0	<3.0
MW28	Destroyed						
	2/25/2009	15.82	NM	<1.0	<1.0	<1.0	<3.0
MW29	Destroyed						
	2/25/2009	16.77	NM	<1.0	<1.0	<1.0	<3.0
MW30	Destroyed						
	2/25/2009	16.86	NM	<1.0	<1.0	<1.0	<3.0
MW31	Destroyed						
	3/14/2011	14.83	76.86	<1.00	<1.00	<1.00	<3.00
	6/2/2011	11.11	80.58	<1.0	<1.0	<1.0	<3.0
MW32	Destroyed						
	3/14/2011	18.47	72.41	<1.00	<1.00	<1.00	<3.00
	6/2/2011	18.27	72.61	<1.0	<1.0	<1.0	<3.0
	9/12/2011	12.92	77.96	<1.0	<1.0	<1.0	<3.0
MW32	Abandoned per COGCC approval						
	2/28/2012	NM	NM				
CDPHE WQCC Reg 41				5.0	560	700	1,400

**NOTES:**

btoc - below top of casing

µg/L - micrograms per liter

NM - not measured

&lt; indicates result is less than the stated laboratory reporting limit

**Bold** indicates concentration exceeds CDPHE WQCC Reg 41.

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

Commission Regulation 41 covering The Basic Standards for Ground Water

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

COGCC - Colorado Oil and Gas Conservation Commission

**ATTACHMENT**

**GROUNDWATER LABORATORY ANALYTICAL REPORT**



June 21, 2013

LT Environmental, Inc.

Rob Rebel

4600 West 60th Avenue

Arvada CO 80003

Project Name - Noble - Chestnut

Project Number - NEP0901

Attached are you analytical results for Noble - Chestnut received by Origins Laboratory, Inc. June 18, 2013. This project is associated with Origins project number X306108-01.

The analytical results in the following report were analyzed under the guidelines of EPA Methods. These methods are identified as follows; "SW" are defined in SW-846, "EPA" are defined in 40CFR part 136 and "SM" are defined in the most current revision of Standard Methods For the Examination of Water and Wastewater.

The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. As such, this report shall not be reproduced except in full, without the written approval of Origin's laboratory.

Unless otherwise noted, the analytical results for all soil samples are reported on a wet weight basis. All analytical analyses were performed under NELAP guidelines unless noted by a data qualifier.

Any holding time exceedances, deviations from the method specifications or deviations from Origins Laboratory's Standard Operating Procedures are outlined in the case narrative.

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



1725 Elk Place, Denver, CO 80211 | Phone: 303.433.1322 | Fax: 303.265.9645



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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

### CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW01R	X306108-01	Water	June 18, 2013 12:45	06/18/2013 17:08
MW02	X306108-02	Water	June 18, 2013 12:40	06/18/2013 17:08
MW04	X306108-03	Water	June 18, 2013 12:30	06/18/2013 17:08
MW05	X306108-04	Water	June 18, 2013 12:25	06/18/2013 17:08
MW06	X306108-05	Water	June 18, 2013 12:15	06/18/2013 17:08
MW07	X306108-06	Water	June 18, 2013 14:30	06/18/2013 17:08
MW08R	X306108-07	Water	June 18, 2013 14:10	06/18/2013 17:08
MW09R	X306108-08	Water	June 18, 2013 14:05	06/18/2013 17:08
MW10	X306108-09	Water	June 18, 2013 12:20	06/18/2013 17:08
MW11	X306108-10	Water	June 18, 2013 12:10	06/18/2013 17:08
MW12	X306108-11	Water	June 18, 2013 11:55	06/18/2013 17:08
MW13	X306108-12	Water	June 18, 2013 11:50	06/18/2013 17:08
MW15	X306108-13	Water	June 18, 2013 14:00	06/18/2013 17:08
MW16R	X306108-14	Water	June 18, 2013 12:05	06/18/2013 17:08

Origins Laboratory, Inc.



Noelle E Doyle, President

*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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

### CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW17R	X306108-15	Water	June 18, 2013 14:10	06/18/2013 17:08
MW23R	X306108-16	Water	June 18, 2013 12:00	06/18/2013 17:08
MW26	X306108-17	Water	June 18, 2013 14:35	06/18/2013 17:08
MW03R	X306108-18	Water	June 18, 2013 12:35	06/18/2013 17:08

Origins Laboratory, Inc.



Noelle E Doyle, President

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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

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page 1 of 2

X306108

ORIGINS  
LABORATORY, INC

Project Manager: Rob Rebel  
Project Name: Chestnut  
Project Number: NEP0901  
Samples Collected By: D. B. B.

Client: LTG  
Address:  
Telephone Number: 303 433 9788  
Email Address: nelson@ltg.com

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis	Sample Instructions	
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	Air Summa #			
MW01R	1245	6/18/13	3	X								1	
MW02	1246											2	
MW04	1230											3	
MW05	1225											4	
MW06	1215											5	
MW07	1430											6	
MW08R	1410											7	
MW09R	1405											8	
MW10	1220											9	
MW11	1210											10	
Relinquished By:	Date:	Time:										Turnaround Time: Same Day <input type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> 72 Hr <input type="checkbox"/> Standard <input checked="" type="checkbox"/>	
Relinquished By:	Date:	Time:										Date: 6/18/13 Time: 17:08	

Date Results Needed

1725 Elk Place | Denver, CO 80211 | Phone: 303.433.1322 | Fax: 303.265.9645

Origins Laboratory, Inc.

*Noelle E Doyle*

Noelle E Doyle, President

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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

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page 2 of 2

X306108

**ORIGINS**  
LABORATORY, INC

Project Manager: Rob Rebel  
Project Name: Chestnut  
Project Number: NEP0901  
Samples Collected By: D. Baker

Client: LTG  
Address:  
Telephone Number: 303 433 9788  
Email Address: rebel@ltenv.com

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix				Analysis	Sample Instructions	
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	Air Summa Canister #	Other			
MW12	1155	6/18/13	3	X				X						1
MW13	1150		1											2
MW15	1400		1											3
MW16R	1205		1											4
MW17R	1410		1											5
MW23R	1200		1											6
MW26	1435		1											7
MW32R	1235		1											8
														9
														10
Relinquished By: [Signature]	Date: 6/18/13	Time: 1708		Received By: [Signature]				Received By: [Signature]				Date: 6/18/13	Time: 1708	Turnaround Time: Same Day <input type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> 72 Hr <input type="checkbox"/> Standard <input type="checkbox"/>
Relinquished By: [Signature]	Date:	Time:		Received By:				Received By:				Date:	Time:	

Date Results Needed

1725 Elk Place | Denver, CO 80211 | Phone: 303.433.1322 | Fax: 303.265.9645

Origins Laboratory, Inc.

*Noelle E Doyle*

Noelle E Doyle, President

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LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

Rob Rebel

Project Number: NEP0901

Project: Noble - Chestnut

Origins Laboratory

F-012207-01-R1  
Effective Date: 01/09/12

## Sample Receipt Checklist

Origins Work Order: X306108

Client: LT

Client Project ID: Chestnut

Checklist Completed by: Jesse Smith

Shipped Via: H/D  
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Date/time completed: 6/18/13 17:26

Airbill #:

Matrix(s) Received: (Check all that apply): Soil/Solid ☒ Water ☐ Other: ☐ (Describe)

Cooler Number/Temperature: 17.9 °C 1 °C 1 °C 1 °C

Thermometer ID: 2002

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C <sup>(1)</sup> ?		<input checked="" type="checkbox"/>		<u>Sampled Same Day</u>
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)</sup> ?		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace (> 1/4 inch bubble) present? If yes, contact client and note in narrative.		<input checked="" type="checkbox"/>		
Are samples preserved that require preservation and was it checked <sup>(1)</sup> ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity) (pH < 2 for samples preserved with HNO <sub>3</sub> , HCL, H <sub>2</sub> SO <sub>4</sub> ) / (pH > 10 for samples preserved with Na <sub>2</sub> AsO <sub>2</sub> +NaOH, ZnAc+NaOH)	<u>6/18/13</u>	<input checked="" type="checkbox"/>		<u>Samples will be analyzed within 7 Days of collection</u>
Additional Comments (if any):				

<sup>(1)</sup>If NO, then contact the client before proceeding with analysis and note date/time and person contacted as well as the corrective action to in the additional comments (above) and the case narrative.

Reviewed by (Project Manager)

06-26-13 944  
Date/Time Reviewed

Origins Laboratory, Inc.

Noelle E Doyle, President

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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

MW01R

6/18/2013 12:45:00PM

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.  
X306108-01 (Water)

### BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F19007	06/19/2013	06/20/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	107 %	84-121	"	"	"
Surrogate: Toluene-d8	101 %	85-115	"	"	"
Surrogate: 4-Bromofluorobenzene	99.6 %	84-114	"	"	"

Origins Laboratory, Inc.



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Noelle E Doyle, President

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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

MW02

6/18/2013 12:40:00PM

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.  
X306108-02 (Water)

### BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F19007	06/19/2013	06/20/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	104 %	84-121	"	"	"
Surrogate: Toluene-d8	101 %	85-115	"	"	"
Surrogate: 4-Bromofluorobenzene	98.8 %	84-114	"	"	"

Origins Laboratory, Inc.



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Noelle E Doyle, President

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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

MW04

6/18/2013 12:30:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X306108-03 (Water)

## BTEX by EPA 8260C

Benzene	27.7	1.0	ug/L	1	3F19007	06/19/2013	06/20/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	104 %	84-121			"	"	"
Surrogate: Toluene-d8	100 %	85-115			"	"	"
Surrogate: 4-Bromofluorobenzene	101 %	84-114			"	"	"

Origins Laboratory, Inc.



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Noelle E Doyle, President



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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

MW05

6/18/2013 12:25:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X306108-04 (Water)

### BTEX by EPA 8260C

Benzene	2.44	1.0	ug/L	1	3F19007	06/19/2013	06/20/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	1.88	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	108 %	84-121			"	"	"
Surrogate: Toluene-d8	101 %	85-115			"	"	"
Surrogate: 4-Bromofluorobenzene	99.0 %	84-114			"	"	"

Origins Laboratory, Inc.



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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

MW06

6/18/2013 12:15:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X306108-05 (Water)

### BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F19007	06/19/2013	06/20/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	106 %	84-121	"	"	"
Surrogate: Toluene-d8	102 %	85-115	"	"	"
Surrogate: 4-Bromofluorobenzene	99.3 %	84-114	"	"	"

Origins Laboratory, Inc.



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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

MW07  
6/18/2013 2:30:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X306108-06 (Water)

## BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F19007	06/19/2013	06/20/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	107 %	84-121			"	"	"
Surrogate: Toluene-d8	102 %	85-115			"	"	"
Surrogate: 4-Bromofluorobenzene	99.2 %	84-114			"	"	"

Origins Laboratory, Inc.



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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

MW08R

6/18/2013 2:10:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X306108-07 (Water)

### BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F19007	06/19/2013	06/20/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	1.98	1.0	"	"	"	"	"
Xylenes, total	6.85	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	98.5 %	84-121			"	"	"
Surrogate: Toluene-d8	102 %	85-115			"	"	"
Surrogate: 4-Bromofluorobenzene	99.4 %	84-114			"	"	"

Origins Laboratory, Inc.



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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

MW09R

6/18/2013 2:05:00PM

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.  
X306108-08 (Water)

### BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F19007	06/19/2013	06/20/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	12.7	1.0	"	"	"	"	"
Xylenes, total	16	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	106 %	84-121	"	"	"
Surrogate: Toluene-d8	102 %	85-115	"	"	"
Surrogate: 4-Bromofluorobenzene	99.5 %	84-114	"	"	"

Origins Laboratory, Inc.



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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

MW10

6/18/2013 12:20:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X306108-09 (Water)

## BTEX by EPA 8260C

Benzene	28.8	1.0	ug/L	1	3F19007	06/19/2013	06/20/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	103 %	84-121			"	"	"
Surrogate: Toluene-d8	101 %	85-115			"	"	"
Surrogate: 4-Bromofluorobenzene	98.4 %	84-114			"	"	"

Origins Laboratory, Inc.



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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

MW11

6/18/2013 12:10:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X306108-10 (Water)

## BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F19007	06/19/2013	06/20/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4  
Surrogate: Toluene-d8  
Surrogate: 4-Bromofluorobenzene

102 % 84-121  
102 % 85-115  
98.6 % 84-114

" " "  
" " "  
" " "

Origins Laboratory, Inc.



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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

MW12

6/18/2013 11:55:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X306108-11 (Water)

## BTEX by EPA 8260C

Benzene	19.8	1.0	ug/L	1	3F19007	06/19/2013	06/20/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	102 %	84-121			"	"	"
Surrogate: Toluene-d8	102 %	85-115			"	"	"
Surrogate: 4-Bromofluorobenzene	98.9 %	84-114			"	"	"

Origins Laboratory, Inc.



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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

MW13

6/18/2013 11:50:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X306108-12 (Water)

## BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F19007	06/19/2013	06/20/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4  
Surrogate: Toluene-d8  
Surrogate: 4-Bromofluorobenzene

103 % 84-121  
102 % 85-115  
98.3 % 84-114

" " "  
" " "  
" " "

Origins Laboratory, Inc.



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Noelle E Doyle, President

LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

Rob Rebel

Project Number: NEP0901

Project: Noble - Chestnut

MW15

6/18/2013 2:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X306108-13 (Water)

## BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F19007	06/19/2013	06/20/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4

102 % 84-121

" " "

Surrogate: Toluene-d8

103 % 85-115

" " "

Surrogate: 4-Bromofluorobenzene

98.5 % 84-114

" " "

Origins Laboratory, Inc.



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Noelle E Doyle, President

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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

**MW16R****6/18/2013 12:05:00PM**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

**Origins Laboratory, Inc.**  
**X306108-14 (Water)****BTEX by EPA 8260C**

Benzene	19.7	1.0	ug/L	1	3F19007	06/19/2013	06/20/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	103 %	84-121	"	"	"
Surrogate: Toluene-d8	102 %	85-115	"	"	"
Surrogate: 4-Bromofluorobenzene	98.8 %	84-114	"	"	"

Origins Laboratory, Inc.



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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

MW17R

6/18/2013 2:10:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X306108-15 (Water)

## BTEX by EPA 8260C

Benzene	3.23	1.0	ug/L	1	3F19007	06/19/2013	06/20/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	82.1	1.0	"	"	"	"	"
Xylenes, total	474	10.0	"	10	"	"	"

Surrogate: 1,2-Dichloroethane-d4	101 %	84-121			"	"	"
Surrogate: Toluene-d8	104 %	85-115			"	"	"
Surrogate: 4-Bromofluorobenzene	100 %	84-114			"	"	"

Origins Laboratory, Inc.



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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

MW23R

6/18/2013 12:00:00PM

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.  
X306108-16 (Water)

### BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F19007	06/19/2013	06/20/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	96.4 %	84-121	"	"	06/20/2013
Surrogate: Toluene-d8	102 %	85-115	"	"	"
Surrogate: 4-Bromofluorobenzene	97.3 %	84-114	"	"	"

Origins Laboratory, Inc.



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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

MW26  
6/18/2013 2:35:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X306108-17 (Water)

## BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F19007	06/19/2013	06/20/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	98.0 %	84-121	"	"	"
Surrogate: Toluene-d8	103 %	85-115	"	"	"
Surrogate: 4-Bromofluorobenzene	99.1 %	84-114	"	"	"

Origins Laboratory, Inc.



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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

MW03R

6/18/2013 12:35:00PM

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.  
X306108-18 (Water)

### BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F19007	06/19/2013	06/20/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	96.5 %	84-121	"	"	"
Surrogate: Toluene-d8	102 %	85-115	"	"	"
Surrogate: 4-Bromofluorobenzene	98.1 %	84-114	"	"	"

Origins Laboratory, Inc.



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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

Volatile Organic Compounds by GC/MS SW846 8260C - 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 3F19007 - EPA 5030B (Water)

Blank (3F19007-BLK1)

Prepared: 06/19/2013 Analyzed: 06/19/2013

Benzene	ND	1.0	ug/L							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes, total	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	67		"	62.5	108		84-121			
Surrogate: Toluene-d8	63		"	62.5	100		85-115			
Surrogate: 4-Bromofluorobenzene	61		"	62.5	98.0		84-114			

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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

Volatile Organic Compounds by GC/MS SW846 8260C - 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 3F19007 - EPA 5030B (Water)

Blank (3F19007-BLK2)

Prepared: 06/19/2013 Analyzed: 06/19/2013

Benzene	ND	1.0	ug/L							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes, total	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	69		"	62.5	110		84-121			
Surrogate: Toluene-d8	64		"	62.5	102		85-115			
Surrogate: 4-Bromofluorobenzene	62		"	62.5	99.7		84-114			

Origins Laboratory, Inc.



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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

Volatile Organic Compounds by GC/MS SW846 8260C - 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 3F19007 - EPA 5030B (Water)

LCS (3F19007-BS1)

Prepared: 06/19/2013 Analyzed: 06/19/2013

Benzene	50.6	1.0	ug/L	50.0		101	74-130			
Toluene	46.0	1.0	"	50.0		92.0	76-128			
Ethylbenzene	48.2	1.0	"	50.0		96.5	78-130			
m,p-Xylene	91.7	2.0	"	100		91.7	75-134			
o-Xylene	48.4	1.0	"	50.0		96.8	76-129			
Surrogate: 1,2-Dichloroethane-d4	64		"	62.5		102	84-121			
Surrogate: Toluene-d8	62		"	62.5		100	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	84-114			

Origins Laboratory, Inc.



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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

Volatile Organic Compounds by GC/MS SW846 8260C - 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 3F19007 - EPA 5030B (Water)

LCS (3F19007-BS2)

Prepared: 06/19/2013 Analyzed: 06/19/2013

Benzene	49.8	1.0	ug/L	50.0		99.5	74-130			
Toluene	45.5	1.0	"	50.0		90.9	76-128			
Ethylbenzene	47.4	1.0	"	50.0		94.9	78-130			
m,p-Xylene	90.8	2.0	"	100		90.8	75-134			
o-Xylene	48.1	1.0	"	50.0		96.1	76-129			
Surrogate: 1,2-Dichloroethane-d4	64		"	62.5		102	84-121			
Surrogate: Toluene-d8	64		"	62.5		102	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	84-114			

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Noelle E Doyle, President

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

Rob Rebel  
Project Number: NEP0901  
Project: Noble - Chestnut

Volatile Organic Compounds by GC/MS SW846 8260C - 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 3F19007 - EPA 5030B (Water)

Matrix Spike (3F19007-MS1)		Source: X306092-04			Prepared: 06/19/2013 Analyzed: 06/19/2013					
Benzene	48.7	1.0	ug/L	50.0	ND	97.4	74-130			
Toluene	44.2	1.0	"	50.0	0.4	87.7	73-131			
Ethylbenzene	46.6	1.0	"	50.0	0.5	92.2	76-132			
m,p-Xylene	87.8	2.0	"	100	1.6	86.2	69-139			
o-Xylene	46.9	1.0	"	50.0	0.5	92.9	74-131			
Surrogate: 1,2-Dichloroethane-d4	65		"	62.5		104	84-121			
Surrogate: Toluene-d8	63		"	62.5		100	85-115			
Surrogate: 4-Bromofluorobenzene	64		"	62.5		102	84-114			

Origins Laboratory, Inc.



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Noelle E Doyle, President

LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

Rob Rebel

Project Number: NEP0901

Project: Noble - Chestnut

## Volatile Organic Compounds by GC/MS SW846 8260C - 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 3F19007 - EPA 5030B (Water)

Matrix Spike (3F19007-MS2)		Source: X306111-01			Prepared: 06/19/2013 Analyzed: 06/19/2013					
Benzene	48.3	1.0	ug/L	50.0	ND	96.5	74-130			
Toluene	44.5	1.0	"	50.0	ND	89.0	73-131			
Ethylbenzene	46.0	1.0	"	50.0	ND	92.0	76-132			
m,p-Xylene	87.6	2.0	"	100	ND	87.6	69-139			
o-Xylene	46.1	1.0	"	50.0	ND	92.1	74-131			
Surrogate: 1,2-Dichloroethane-d4	66		"	62.5		106	84-121			
Surrogate: Toluene-d8	64		"	62.5		102	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	84-114			

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## Volatile Organic Compounds by GC/MS SW846 8260C - 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 3F19007 - EPA 5030B (Water)

Matrix Spike Dup (3F19007-MSD1)		Source: X306092-04			Prepared: 06/19/2013 Analyzed: 06/19/2013					
Benzene	46.9	1.0	ug/L	50.0	ND	93.9	74-130	3.70	20	
Toluene	42.5	1.0	"	50.0	0.4	84.3	73-131	3.94	20	
Ethylbenzene	44.8	1.0	"	50.0	0.5	88.5	76-132	3.98	20	
m,p-Xylene	84.9	2.0	"	100	1.6	83.4	69-139	3.36	20	
o-Xylene	44.9	1.0	"	50.0	0.5	88.7	74-131	4.49	20	
Surrogate: 1,2-Dichloroethane-d4	64		"	62.5		103	84-121			
Surrogate: Toluene-d8	63		"	62.5		100	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	84-114			

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Volatile Organic Compounds by GC/MS SW846 8260C - 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 3F19007 - EPA 5030B (Water)

Matrix Spike Dup (3F19007-MSD2)		Source: X306111-01			Prepared: 06/19/2013 Analyzed: 06/19/2013					
Benzene	51.6	1.0	ug/L	50.0	ND	103	74-130	6.73	20	
Toluene	47.6	1.0	"	50.0	ND	95.1	73-131	6.67	20	
Ethylbenzene	50.0	1.0	"	50.0	ND	99.9	76-132	8.25	20	
m,p-Xylene	95.1	2.0	"	100	ND	95.1	69-139	8.23	20	
o-Xylene	49.1	1.0	"	50.0	ND	98.2	74-131	6.39	20	
Surrogate: 1,2-Dichloroethane-d4	65		"	62.5		104	84-121			
Surrogate: Toluene-d8	62		"	62.5		100	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	84-114			

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### Notes and Definitions

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

Origins Laboratory, Inc.



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Noelle E Doyle, President