



## **GROUNDWATER MONITORING REPORT MARCH 2014**

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### **CHESNUT G 22-6 TANK BATTERY COGCC REMEDIATION #4316**

LT Environmental, Inc. (LTE), under the direction of Noble Energy, Inc. (Noble), conducted groundwater monitoring activities at the Chesnut G 22-6 Tank Battery (Site). The Site is located 0.48 miles south of County Road 44 and 0.07 miles east of County Road 43 in Weld County, Colorado. The legal site description is the southwest quarter of the northwest quarter of Section 22, Township 4 North, Range 65 West, 6<sup>th</sup> Principal Meridian. The Site Location Map is provided as Figure 1. Site history and remediation activities were described in preceding reports, including Phase I and Phase II of the remediation program involving excavation source removal and operation of an air sparging and soil vapor extraction (AS/SVE) system, respectively. Phase III of the remediation program includes subsurface injections of Chemically Oxygenated Granular Activated Carbon (COGAC<sup>TM</sup>), which is designed for in-situ biological remediation of petroleum hydrocarbon under aerobic conditions. This report details Phase III of the remediation program and the March 2014 groundwater monitoring event.

Soil borings MW01 through MW30 were completed as temporary monitoring wells on January 9 through February 18, 2009. LTE, under direction of Noble, replaced two destroyed monitoring wells (SB18R and SB19R) and installed two new monitoring wells (MW31 and MW32) on March 11, 2011. On March 4, 2013, LTE replaced destroyed monitoring well MW03 with MW03R.

#### **Remediation Activities**

Phase III of the remediation program was initiated in March 2014. On January 14 through 17, 2013, in accordance with the United States Environmental Protection Agency (EPA) Rule Authorization (File #CO50000-10209, November 26, 2013), subsurface carbon slurry injections were completed at 41 discrete locations at the Site. The injection locations are depicted on Figure 2. The injections occurred between 5 feet and 20 feet below ground surface with a total of 3,825 pounds of COGAC<sup>TM</sup> being injected into the impacted soil and groundwater. Phase III remediation goals are to remove groundwater impact to the point of compliance with applicable standards established in the Colorado Department of Public Health and Environment (CDPHE)-Water Quality Control Commission Regulation 41-The Basic Standards for Ground Water (WQCC Reg 41).

#### **Groundwater Monitoring Activities**

LTE personnel, under the direction of Noble, conducted groundwater monitoring activities on March 4, 2014, in eighteen monitoring wells. Prior to purging, depth to static groundwater was measured and recorded for calculating well-specific target purge volumes. During the March 2014 monitoring event, groundwater ranged from 13.20 feet below top of casing (btoc) in

monitoring well MW04 to 18.23 feet btoc in monitoring well MW08R. Monitoring well MW26 was dry and therefore not sampled. Following purging, samples were collected, placed on ice, and submitted with a complete chain of custody form to Origins Laboratory, Inc. of Denver, Colorado, for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by United States Environmental Protection Agency Method 8260C.

## **Hydrogeology**

Depth to groundwater measurements were used to calculate relative groundwater elevations. During the March 2014 monitoring event, groundwater was calculated to flow east with an average hydraulic gradient of 0.032 feet per foot. Relative groundwater elevations are presented on Figure 3 and summarized in Table 1.

## **Groundwater Analytical Results**

The CDPHE has established 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. Groundwater analytical results indicate MW05 exceeded the WQCC Reg 41 standard for benzene at a concentration of 49.8  $\mu\text{g/L}$ . All remaining monitoring wells sampled were in compliance with applicable WQCC Reg 41 standards. Groundwater analytical results are presented on Figure 4 and summarized in Table 1. The laboratory analytical report is attached.

## **Site Summary**

The remediation program has been successful in remediating 98% of the pre-remediation groundwater impacts. The Site is characterized with only one groundwater monitoring location in exceedance of the COGCC Table 910-1 benzene standard, compared to the 19 locations that were impacted prior to remedial activities. Monitoring well MW05 exhibited a decrease in dissolved-phase petroleum hydrocarbon impacts in the groundwater following Phase III of the remediation program. It is expected that the chemical and biological reactions will continue to decrease the BTEX concentrations in soil and groundwater.

LTE, under the direction of Noble, will continue to conduct quarterly groundwater monitoring with the goal of obtaining four consecutive quarters with laboratory groundwater analytical results in compliance with applicable WQCC Reg 41 standards. The next quarterly groundwater monitoring event is scheduled for June 2014.

## FIGURES

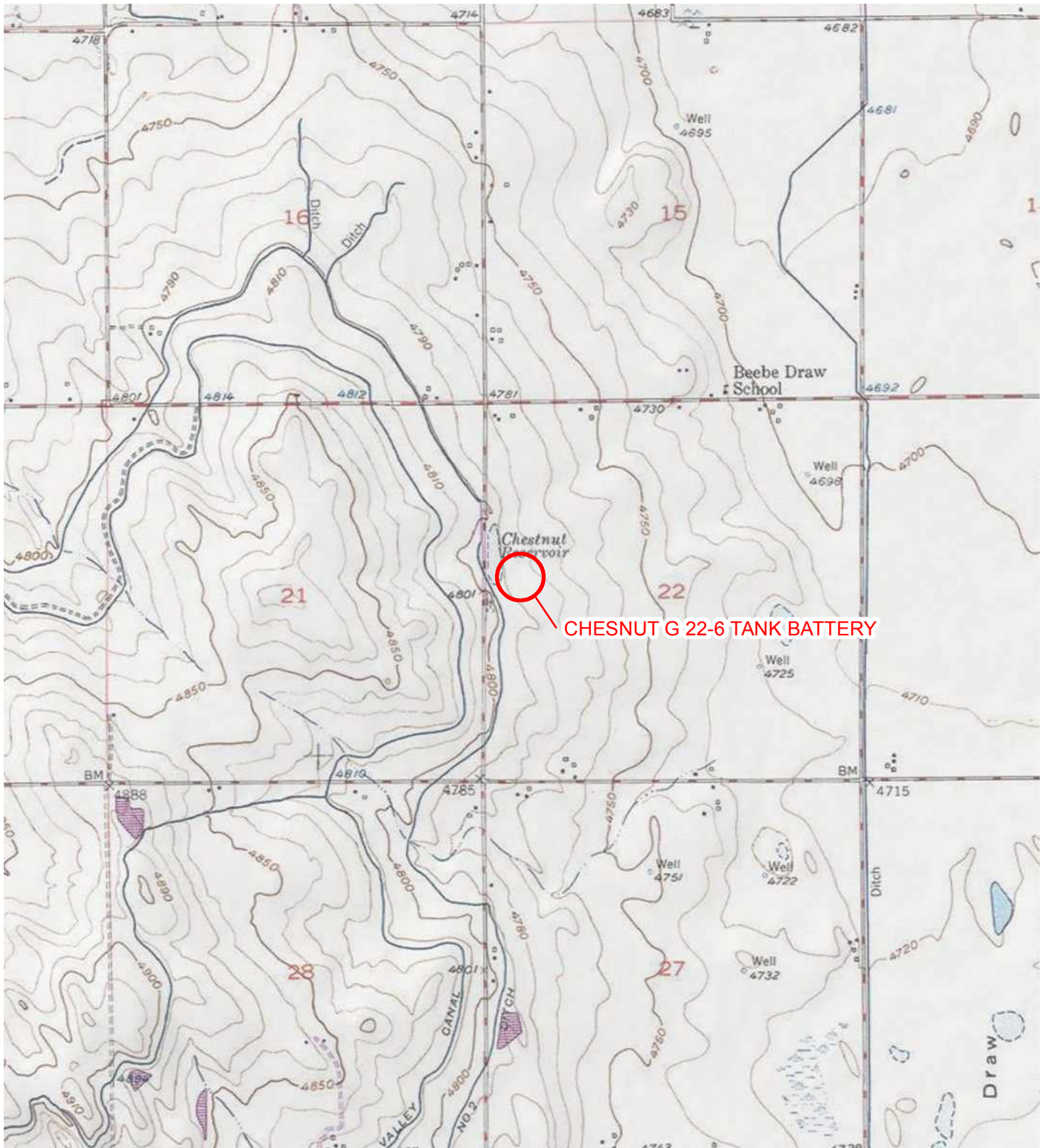
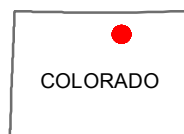
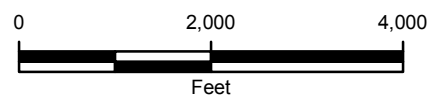


IMAGE COURTESY OF ESRI/USGS

# LEGEND

○ SITE LOCATION



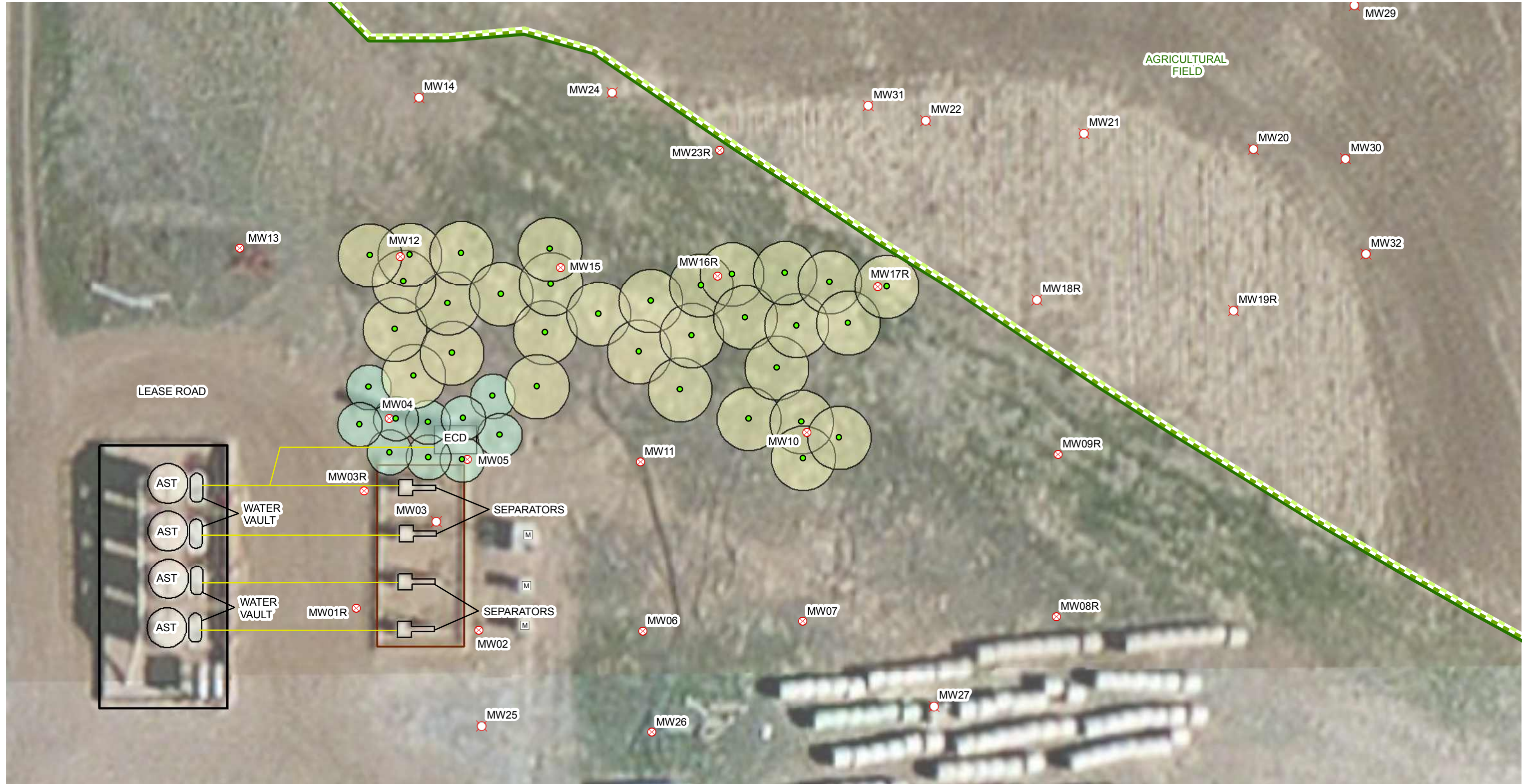
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FIGURE 1  
SITE LOCATION MAP  
CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO

NOBLE ENERGY, INC.







# LEGEND

- |                                       |                               |                               |
|---------------------------------------|-------------------------------|-------------------------------|
| ● COGAC™ INJECTION LOCATION           | ▬ AGRICULTURAL FIELD BOUNDARY | ○ 7 FOOT RADIUS OF INFLUENCE  |
| ⊗ MONITORING WELL                     | ▬ METAL BERM                  | ○ 10 FOOT RADIUS OF INFLUENCE |
| ⊗ ABANDONED/DESTROYED MONITORING WELL | ▬ DIRT BERM                   |                               |
| Ⓜ METER HOUSE                         | AST: ABOVEGROUND STORAGE TANK |                               |
| — UNDERGROUND UTILITY                 | ECD: EMISSIONS CONTROL DEVICE |                               |

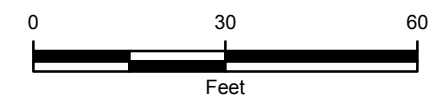


FIGURE 2  
COGAC™ INJECTION LOCATION MAP  
CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO

NOBLE ENERGY, INC.







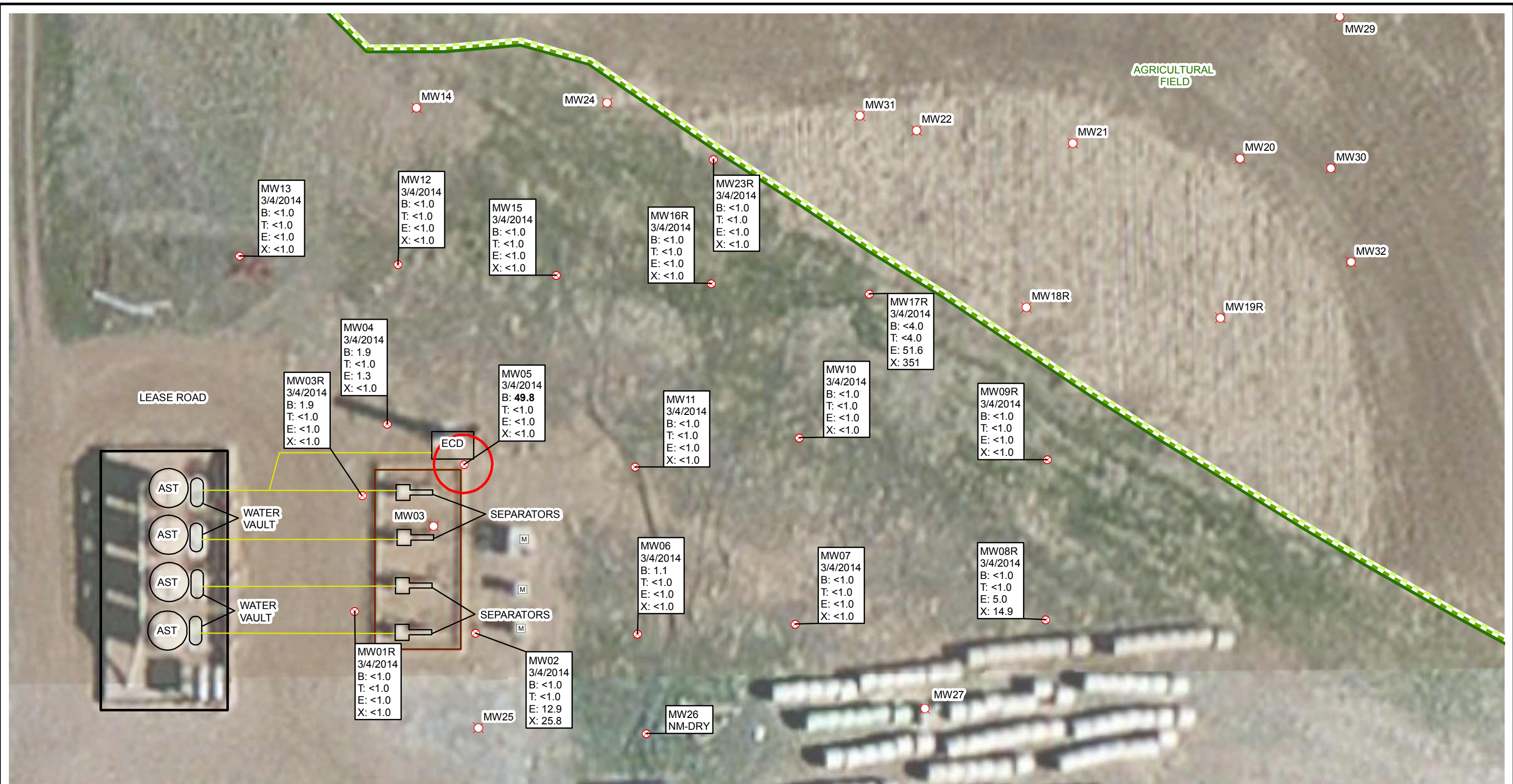
**LEGEND**

- |                                       |   |                               |
|---------------------------------------|---|-------------------------------|
| 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 = 0.032 FEET/FOOT<br>NM: NOT MEASURED | AST: ABOVEGROUND STORAGE TANK |
| CALCULATED GROUNDWATER FLOW DIRECTION |   | ECD: EMISSION CONTROL DEVICE  |

FIGURE 3  
RELATIVE GROUNDWATER ELEVATION MAP  
MARCH 4, 2014  
CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY, INC.







LEGEND

- |  |                                     |  |            |
|--|-------------------------------------|--|------------|
|  | MONITORING WELL                     |  | METAL BERM |
|  | ABANDONED/DESTROYED MONITORING WELL |  | DIRT BERM  |
|  | METER HOUSE                         | AST: ABOVEGROUND STORAGE TANK                        |            |
|  | UNDERGROUND UTILITY                 | ECD: EMISSIONS CONTROL DEVICE                        |            |
|  | AGRICULTURAL FIELD BOUNDARY         |  |            |
|  |                                     | MARCH 2014 BENZENE ISOCONCENTRATION CONTOUR (5 µg/L) |            |

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 EXCEEDS APPLICABLE STANDARD**

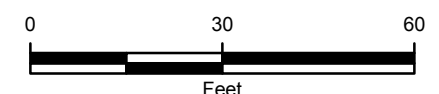


FIGURE 4  
GROUNDWATER ANALYTICAL RESULTS  
MARCH 4, 2014  
CHESNUT G 22-6 TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY, INC.



## TABLE



TABLE 1

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

Monitoring Well	Date	Depth to Water/<LNAPL> (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	<b>26,400</b>	<b>8,320</b>	536	<b>8,800</b>
	3/5/2010	14.60	NM	<b>26,100</b>	<b>6,270</b>	666	<b>11,090</b>
	9/20/2010	NM	NM	Could not locate monitoring well			
MW01R	12/2/2010	8.68	88.25	<b>5,600</b>	161	37.1	<b>1,550</b>
	3/14/2011	15.33	81.60	<b>1,010</b>	<1.00	<1.00	12.8
	6/2/2011	9.89	87.04	<b>1,080</b>	<1.0	13.5	<b>1,400</b>
	9/12/2011	2.96	93.97	<b>1,560</b>	<1.0	84.5	<b>1,510</b>
	12/9/2011	7.80	89.13	<b>427</b>	<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	<b>5.8</b>	<1	<1	19.3
	9/18/2012	4.04	92.89	<b>7.1</b>	<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
	9/17/2013	1.60	95.33	<1.0	<1.0	<1.0	<1.0
	12/11/2013	8.41	88.52	<1.0	<1.0	1.12	4.16
	3/4/2014	13.79	83.14	<1.0	<1.0	<1.0	<1.0
MW02	1/13/2009	15.12	83.02	<b>3,460</b>	<b>1,420</b>	199	<b>6,120</b>
	3/5/2010	15.95	82.19	<b>857</b>	3.61	151	<b>1,448.61</b>
	9/20/2010	6.00	92.14	<b>338</b>	<1.0	104	<b>2,256.14</b>
	12/2/2010	10.04	88.10	<b>125</b>	<1.0	147	<b>1,590</b>
	3/14/2011	16.40	81.74	<b>37.4</b>	<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
	9/17/2013	3.46	94.68	<1.0	<1.0	<1.0	<1.0
	12/11/2013	10.39	87.75	<1.0	<1.0	<1.0	<1.0
	3/4/2014	16.18	81.96	<1.0	<1.0	12.9	25.8
MW03	1/13/2009	15.06	NM	<b>11,700</b>	<b>7,860</b>	195	<b>5,950</b>
	3/5/2010				Monitoring well 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
	9/17/2013	5.84	92.41	1.2	<1.0	<1.0	<1.0
	12/11/2013	12.71	85.54	<1.0	<1.0	<1.0	<1.0
	3/4/2014	17.72	80.53	1.9	<1.0	<1.0	<1.0

TABLE 1 (Continued)

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

Monitoring Well	Date	Depth to Water/<LNAPL> (feet btoc)	Relative Groundwater Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW04	1/13/2009	13.13	84.15	<b>19,700</b>	<b>7,460</b>	555	<b>9,990</b>
	3/5/2010	15.71	81.57		Not sampled - Sheen on water		
	9/20/2010	3.70	93.58	<b>563</b>	<10.0	<10.0	<b>6,027</b>
	12/2/2010	9.33	87.95	<b>664</b>	42	19.1	<b>4,710</b>
	3/14/2011	14.94	82.34	<b>713</b>	<10.0	113	<b>6,510</b>
	6/2/2011	9.10	88.18	<b>233</b>	<1.0	31.8	457
	9/12/2011	3.40	93.88	<b>23.8</b>	<1.0	6.8	124
	12/9/2011	9.60	87.68	<b>57.2</b>	<1.0	3.62	90.3
	3/22/2012	14.21	83.07	<b>295</b>	5.33	5.99	53.7
	6/8/2012	4.57	92.71	<b>14.3</b>	<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
	3/18/2013	13.83	83.45	<b>10.2</b>	<1.0	1.49	6.27
	6/18/2013	5.54	91.74	<b>27.7</b>	<1.0	<1.0	<1.0
	9/17/2013	1.07	96.21	1.39	<1.0	1.27	3.68
	12/11/2013	8.69	88.59	1.26	<1.0	<1.0	<1.0
	3/4/2014	13.20	84.08	1.9	<1.0	1.3	<1.0
MW05	1/13/2009	14.58	82.39	<b>15,500</b>	<b>14,900</b>	412	<b>6,860</b>
	3/5/2010	16.06	80.91		Not sampled - Sheen on water		
	9/20/2010	6.60	90.37	<b>12,700</b>	<b>1,500</b>	522	<b>8,190</b>
	12/2/2010	10.48	86.49	<b>14,700</b>	185	122	<b>5,650</b>
	3/14/2011	16.16	80.81	<b>67.9</b>	<1.00	<1.00	112
	6/2/2011	13.25	83.72	<b>143</b>	<1.0	<1.0	13.0
	9/12/2011	5.96	91.01	<b>5,050</b>	22.5	59.1	<b>2,680</b>
	12/9/2011	10.70	86.27	<b>8,790</b>	10.6	<10.0	659
	3/22/2012	NM	NM		Not Sampled - Dry		
	6/8/2012	8.36	88.61	<b>337</b>	<1	<1	4.4
	9/18/2012	7.68	89.29	<b>1,249</b>	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
	9/17/2013	4.21	92.76	<b>7.97</b>	<1.0	<1.0	2.27
	12/11/2013	10.70	86.27	<b>155</b>	<1.0	<1.0	6.04
	3/4/2014	15.92	81.05	<b>49.8</b>	<1.0	<1.0	<1.0
MW06	2/19/2009	17.24	80.10	<b>305</b>	15.8	167	<b>2,476</b>
	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
	9/17/2013	4.23	93.11	<1.0	<1.0	<1.0	<1.0
	12/11/2013	11.36	85.98	<1.0	<1.0	<1.0	<1.0
	3/4/2014	16.94	80.40	1.1	<1.0	<1.0	<1.0



TABLE 1 (Continued)

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

Monitoring Well	Date	Depth to Water/<LNAPL> (feet btoc)	Relative Groundwater Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW07	2/19/2009	19.18	75.41	3.99	7.09	64.1	288.67
	3/5/2010	15.93	78.66	<b>5.47</b>	<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 monitoring 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
	9/17/2013	3.62	90.97	<1.0	<1.0	<1.0	<1.0
	12/11/2013	10.54	84.05	<1.0	<1.0	<1.0	<1.0
	3/4/2014	16.08	78.51	<1.0	<1.0	<1.0	<1.0
MW08	2/19/2009	18.03	NM	<b>34.3</b>	<b>2,000</b>	202	<b>4,213</b>
MW08R	9/20/2010	10.90	83.61	1.21	<1.0	118	657.4
	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
	9/17/2013	7.41	87.10	<1.0	<1.0	1.65	4.80
	12/11/2013	12.78	81.73	<1.0	<1.0	<1.0	<1.0
	3/4/2014	18.23	76.28	<1.0	<1.0	5.0	14.9
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	81.4	<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
	9/17/2013	7.32	86.42	<1.0	<1.0	<1.0	<1.0
	12/11/2013	12.50	81.24	<1.0	<1.0	<1.0	<1.0
	3/4/2014	17.36	76.38	<1.0	<1.0	<1.0	<1.0

TABLE 1 (Continued)

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

Monitoring Well	Date	Depth to Water/<LNAPL> (feet btoc)	Relative Groundwater Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
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
	9/17/2013	4.09	90.08	<1.0	<1.0	<1.0	<1.0
	12/11/2013	10.78	83.39	<1.0	<1.0	<1.0	<1.0
	3/4/2014	15.95	78.22	<1.0	<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
	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
	9/17/2013	4.61	91.55	<1.0	<1.0	<1.0	<1.0
	12/11/2013	11.42	84.74	<1.0	<1.0	<1.0	<1.0
	3/4/2014	16.35	79.81	<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
	9/17/2013	2.40	94.36	1.13	<1.0	<1.0	<1.0
	12/11/2013	10.07	86.69	<1.0	<1.0	<1.0	<1.0
	3/4/2014	14.35	82.41	<1.0	<1.0	<1.0	<1.0



TABLE 1 (Continued)

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

Monitoring Well	Date	Depth to Water/<LNAPL> (feet btoc)	Relative Groundwater Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
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
	9/17/2013	2.48	95.97	<1.0	<1.0	<1.0	<1.0
	12/11/2013	10.68	87.77	<1.0	<1.0	<1.0	<1.0
	3/4/2014	14.81	83.64	<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	Monitoring well 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
	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
	9/17/2013	1.02	92.48	<b>7.73</b>	<1.0	9.72	21.9
	12/11/2013	10.16	83.34	<1.0	<1.0	<1.0	<1.0
	3/4/2014	14.58	78.92	<1.0	<1.0	<1.0	<1.0
MW16	2/19/2009	15.25	NM	<b>1,060</b>	16.2	156	37.5
MW16R	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
	9/17/2013	3.37	NM	<1.0	<1.0	<1.0	<1.0
	12/11/2013	10.48	NM	<1.0	<1.0	<1.0	<1.0
	3/4/2014	14.80	NM	<1.0	<1.0	<1.0	<1.0

TABLE 1 (Continued)

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

Monitoring Well	Date	Depth to Water/<LNAPL> (feet btoc)	Relative Groundwater Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW17	2/19/2009	15.93 <15.91>	NM	<b>3,680</b>	<b>9,940</b>	<b>775</b>	1,075
MW17R	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
	9/17/2013	4.61	88.30	3.26	<1.0	40.7	145
	12/11/2013	11.03	81.88	<4.0	<4.0	106	769
	3/4/2014	15.31	77.60	<4.0	<4.0	51.6	351
MW18	2/19/2009	16.22	NM	<b>1,410</b>	80.9	51.0	229.6
MW18R	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	2/25/2009	16.67	NM	<b>329</b>	<1.0	1.45	6.65
MW19R	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
				Monitoring well destroyed			
MW21	2/25/2009	16.87	NM	2.00	<1.0	<1.0	11.9
				Monitoring well destroyed			
MW22	2/25/2009	16.70	NM	<b>8.70</b>	40.7	3.78	22.65
				Monitoring well destroyed			
MW23	2/25/2009	15.25	NM	<b>32.9</b>	5.29	9.01	38.36
MW23R	3/22/2012	16.20	NM	<1.0	2.33	<1.0	<1.0
	6/8/2012	9.38	NM	<1	<1	<1	<1
	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
	9/17/2013	4.33	NM	<1.0	<1.0	<1.0	<1.0
	12/11/2013	11.26	NM	<1.0	<1.0	<1.0	<1.0
	3/4/2014	15.31	NM	<1.0	<1.0	<1.0	<1.0
MW24	2/25/2009	14.87	NM	1.02	<1.0	<1.0	<3.0
				Monitoring well destroyed			
MW25	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
				Monitoring well destroyed			



TABLE 1 (Continued)

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

Monitoring Well	Date	Depth to Water/<LNAPL> (feet btoc)	Relative Groundwater Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW26	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
	9/17/2013	2.20	93.96	<1.0	<1.0	<1.0	<1.0
	12/11/2013	9.49	86.67	<1.0	<1.0	<1.0	<1.0
	3/4/2014	NM	NM	Not Sampled - Dry			
MW27	2/25/2009	19.98	NM	<1.0	<1.0	<1.0	<3.0
				Monitoring well destroyed			
MW28	2/25/2009	15.82	NM	<1.0	<1.0	<1.0	<3.0
				Monitoring well destroyed			
MW29	2/25/2009	16.77	NM	<1.0	<1.0	<1.0	<3.0
				Monitoring well destroyed			
MW30	2/25/2009	16.86	NM	<1.0	<1.0	<1.0	<3.0
				Monitoring well destroyed			
MW31	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
	9/12/2011			Monitoring well destroyed			
MW32	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
	2/28/2012	NM	NM	Abandoned per COGCC approval			
<b>CDPHE WQCC Reg 41</b>				<b>5.0</b>	<b>560</b>	<b>700</b>	<b>1,400</b>

**NOTES:**

btoc - below top of casing

µg/L - micrograms per liter

LNAPL - light non-aqueous phase liquid

NM - not measured

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

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

**BOLD** indicates result exceeds applicable standard

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

Regulation 41-The Basic Standards for Ground Water

COGCC - Colorado Oil and Gas Conservation Commission

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



March 07, 2014

LT Environmental, Inc.

Charles Greeson

4600 West 60th Avenue

Arvada

CO 80003

Project Name - Noble - Chestnut G 22-6

Project Number - NEP0839

Attached are your analytical results for Noble - Chestnut G 22-6 received by Origins Laboratory, Inc. March 04, 2014. This project is associated with Origins project number X403029-01.

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

Charles Greeson  
Project Number: NEP0839  
Project: Noble - Chestnut G 22-6

### CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW01R	X403029-01	Water	March 4, 2014 12:55	03/04/2014 15:40
MW02	X403029-02	Water	March 4, 2014 14:23	03/04/2014 15:40
MW03	X403029-03	Water	March 4, 2014 12:45	03/04/2014 15:40
MW04	X403029-04	Water	March 4, 2014 12:45	03/04/2014 15:40
MW05	X403029-05	Water	March 4, 2014 14:00	03/04/2014 15:40
MW06	X403029-06	Water	March 4, 2014 14:30	03/04/2014 15:40
MW07	X403029-07	Water	March 4, 2014 14:23	03/04/2014 15:40
MW08R	X403029-08	Water	March 4, 2014 13:45	03/04/2014 15:40
MW09R	X403029-09	Water	March 4, 2014 13:35	03/04/2014 15:40
MW10	X403029-10	Water	March 4, 2014 13:45	03/04/2014 15:40
MW11	X403029-11	Water	March 4, 2014 13:35	03/04/2014 15:40
MW12	X403029-12	Water	March 4, 2014 13:10	03/04/2014 15:40
MW13	X403029-13	Water	March 4, 2014 14:15	03/04/2014 15:40
MW15	X403029-14	Water	March 4, 2014 13:05	03/04/2014 15:40

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

Charles Greeson  
Project Number: NEP0839  
Project: Noble - Chestnut G 22-6

### CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW16R	X403029-15	Water	March 4, 2014 14:05	03/04/2014 15:40
MW17R	X403029-16	Water	March 4, 2014 13:25	03/04/2014 15:40
MW23R	X403029-17	Water	March 4, 2014 14:15	03/04/2014 15:40

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 Doyle Mathis, President

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

Charles Greeson  
Project Number: NEP0839  
Project: Noble - Chestnut G 22-6

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X403029

ORIGINS  
LABORATORY, INC

page 1 of 2

Client: LTE Project Manager/Send Report To: Charles Greeson  
Address: \_\_\_\_\_ Email Address: Greeson@Ltenv.com  
Telephone Number: \_\_\_\_\_ Project Name/Number: NEP0839 Chestnut 622-6  
Samples Collected By: Jason Evans, Lisa  
David Steinback

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis/Method	Sample Instructions
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	Air Summa #		
MW01R	3/14/14	1255	3	X				X			BT-EX	Lab filter 1
MW02		1423	3									2
MW03		1245	3									3
MW04		1245	3									4
MW05		1400	1									5
MW06		1430	3									6
MW07		1423	3									7
MW08R		1345	3									8
MW09R		1335	3									9
MW10		1345	3									10
Relinquished By:	Date: 2-21-14	Time: 2:41	Received By:	Date:	Time:	Turnaround Time:						
Relinquished By:	Date:	Time:	Received By:	Date: 3/4/14	Time: 15:40	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"/>						

Notes: Results Needed:

Origins Laboratory, Inc.

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Noelle Doyle Mathis, President



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

Charles Greeson  
Project Number: NEP0839  
Project: Noble - Chestnut G 22-6

Origins Laboratory

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

## Sample Receipt Checklist

Origins Work Order: 4103029

Client: LTE

Client Project ID: Chestnut G22-6

Checklist Completed by: Jesse Smith

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

Date/time completed: 3/2/12 16:12

Airbill #: NA

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

Cooler Number/Temperature: 10.9 °C /    °C /    °C /    °C

Thermometer ID: 1002

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 (> ¼ 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 NaAsO <sub>2</sub> +NaOH, ZnAc+NaOH)		<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): [Signature]

Date/Time Reviewed: 3/2/12

Origins Laboratory, Inc.

[Signature]

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

Charles Greeson  
Project Number: NEP0839  
Project: Noble - Chestnut G 22-6

MW01R

3/4/2014 12:55:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X403029-01 (Water)

### BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	4C06007	03/06/2014	03/07/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	116 %	87.3-113	"	"	"	S-07
Surrogate: Toluene-d8	99.3 %	90.9-108	"	"	"	"
Surrogate: 4-Bromofluorobenzene	97.2 %	88.6-111	"	"	"	"

Origins Laboratory, Inc.



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Noelle Doyle Mathis, President

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

Charles Greeson  
Project Number: NEP0839  
Project: Noble - Chestnut G 22-6

MW02

3/4/2014 2:23:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X403029-02 (Water)

### BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	4C06007	03/06/2014	03/06/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	12.9	1.0	"	"	"	"	"
Xylenes, total	25.8	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	103 %	87.3-113			"	"	"
Surrogate: Toluene-d8	102 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	99.6 %	88.6-111			"	"	"

Origins Laboratory, Inc.



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Noelle Doyle Mathis, President

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

Charles Greeson  
Project Number: NEP0839  
Project: Noble - Chestnut G 22-6

MW03  
3/4/2014 12:45:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X403029-03 (Water)

## BTEX by EPA 8260C

Benzene	1.9	1.0	ug/L	1	4C06007	03/06/2014	03/07/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	102 %	87.3-113			"	"	03/06/2014
Surrogate: Toluene-d8	94.6 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	101 %	88.6-111			"	"	"

Origins Laboratory, Inc.



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Noelle Doyle Mathis, President

LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

Charles Greeson

Project Number: NEP0839

Project: Noble - Chestnut G 22-6

MW04

3/4/2014 12:45:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X403029-04 (Water)

## BTEX by EPA 8260C

Benzene	1.9	1.0	ug/L	1	4C06007	03/06/2014	03/06/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	1.3	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

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

105 % 87.3-113  
99.4 % 90.9-108  
100 % 88.6-111

" "  
" "  
" "

Origins Laboratory, Inc.



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Noelle Doyle Mathis, President

LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

Charles Greeson

Project Number: NEP0839

Project: Noble - Chestnut G 22-6

MW05

3/4/2014 2:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X403029-05 (Water)

## BTEX by EPA 8260C

Benzene	49.8	1.0	ug/L	1	4C06007	03/06/2014	03/06/2014
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 %  
96.2 %  
98.7 %

87.3-113  
90.9-108  
88.6-111

"  
"  
"

Origins Laboratory, Inc.



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Noelle Doyle Mathis, President



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

Charles Greeson  
Project Number: NEP0839  
Project: Noble - Chestnut G 22-6

MW06

3/4/2014 2:30:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X403029-06 (Water)

### BTEX by EPA 8260C

Benzene	1.1	1.0	ug/L	1	4C06007	03/06/2014	03/06/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	104 %	87.3-113			"	"	"
Surrogate: Toluene-d8	101 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	97.3 %	88.6-111			"	"	"

Origins Laboratory, Inc.



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

Charles Greeson  
Project Number: NEP0839  
Project: Noble - Chestnut G 22-6

MW07

3/4/2014 2:23:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X403029-07 (Water)

### BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	4C06007	03/06/2014	03/06/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

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

104 % 87.3-113  
101 % 90.9-108  
96.6 % 88.6-111

" " "  
" " "  
" " "

Origins Laboratory, Inc.



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Noelle Doyle Mathis, President

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

Charles Greeson  
Project Number: NEP0839  
Project: Noble - Chestnut G 22-6

MW08R

3/4/2014 1:45:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X403029-08 (Water)

### BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	4C06007	03/06/2014	03/06/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	5.0	1.0	"	"	"	"	"
Xylenes, total	14.9	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	104 %	87.3-113	"	"	"
Surrogate: Toluene-d8	99.4 %	90.9-108	"	"	"
Surrogate: 4-Bromofluorobenzene	99.9 %	88.6-111	"	"	"

Origins Laboratory, Inc.



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

Charles Greeson  
Project Number: NEP0839  
Project: Noble - Chestnut G 22-6

MW09R

3/4/2014 1:35:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X403029-09 (Water)

## BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	4C06007	03/06/2014	03/06/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

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

104 % 87.3-113  
99.9 % 90.9-108  
97.2 % 88.6-111

" " "  
" " "  
" " "

Origins Laboratory, Inc.



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Noelle Doyle Mathis, President

LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

Charles Greeson

Project Number: NEP0839

Project: Noble - Chestnut G 22-6

MW10

3/4/2014 1:45:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X403029-10 (Water)

## BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	4C06007	03/06/2014	03/06/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4

104 % 87.3-113

" " "

Surrogate: Toluene-d8

101 % 90.9-108

" " "

Surrogate: 4-Bromofluorobenzene

97.2 % 88.6-111

" " "

Origins Laboratory, Inc.



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Noelle Doyle Mathis, President



LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

Charles Greeson

Project Number: NEP0839

Project: Noble - Chestnut G 22-6

MW11

3/4/2014 1:35:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X403029-11 (Water)

## BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	4C06007	03/06/2014	03/06/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4

105 % 87.3-113

"

"

"

Surrogate: Toluene-d8

101 % 90.9-108

"

"

"

Surrogate: 4-Bromofluorobenzene

96.7 % 88.6-111

"

"

"

Origins Laboratory, Inc.



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Noelle Doyle Mathis, President

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

Charles Greeson  
Project Number: NEP0839  
Project: Noble - Chestnut G 22-6

MW12  
3/4/2014 1:10:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X403029-12 (Water)

### BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	4C06007	03/06/2014	03/06/2014
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 % 87.3-113  
101 % 90.9-108  
97.7 % 88.6-111

" " "  
" " "  
" " "

Origins Laboratory, Inc.



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Noelle Doyle Mathis, President

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

Charles Greeson  
Project Number: NEP0839  
Project: Noble - Chestnut G 22-6

MW13  
3/4/2014 2:15:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X403029-13 (Water)

## BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	4C06007	03/06/2014	03/06/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

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

105 % 87.3-113  
101 % 90.9-108  
97.6 % 88.6-111

" " "  
" " "  
" " "

Origins Laboratory, Inc.



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Noelle Doyle Mathis, President

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

Charles Greeson  
Project Number: NEP0839  
Project: Noble - Chestnut G 22-6

MW15

3/4/2014 1:05:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X403029-14 (Water)

### BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	4C06007	03/06/2014	03/06/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	105 %	87.3-113	"	"	"
Surrogate: Toluene-d8	101 %	90.9-108	"	"	"
Surrogate: 4-Bromofluorobenzene	96.9 %	88.6-111	"	"	"

Origins Laboratory, Inc.



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

Charles Greeson  
Project Number: NEP0839  
Project: Noble - Chestnut G 22-6

MW16R

3/4/2014 2:05:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X403029-15 (Water)

## BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	4C06007	03/06/2014	03/06/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

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

105 %  
99.3 %  
97.5 %

87.3-113  
90.9-108  
88.6-111

"  
"  
"

Origins Laboratory, Inc.



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Noelle Doyle Mathis, President



LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

Charles Greeson

Project Number: NEP0839

Project: Noble - Chestnut G 22-6

MW17R

3/4/2014 1:25:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X403029-16 (Water)

## BTEX by EPA 8260C

Benzene	ND	4.0	ug/L	4	4C06007	03/06/2014	03/06/2014
Toluene	ND	4.0	"	"	"	"	"
Ethylbenzene	51.6	4.0	"	"	"	"	"
Xylenes, total	351	4.0	"	"	"	"	"

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

104 %  
99.3 %  
96.9 %

87.3-113  
90.9-108  
88.6-111

"  
"  
"

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 Doyle Mathis, President

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

Charles Greeson  
Project Number: NEP0839  
Project: Noble - Chestnut G 22-6

MW23R

3/4/2014 2:15:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X403029-17 (Water)

### BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	4C06007	03/06/2014	03/06/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	100 %	87.3-113	"	"	"
Surrogate: Toluene-d8	98.2 %	90.9-108	"	"	"
Surrogate: 4-Bromofluorobenzene	103 %	88.6-111	"	"	"

Origins Laboratory, Inc.



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Noelle Doyle Mathis, President

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

Charles Greeson  
Project Number: NEP0839  
Project: Noble - Chestnut G 22-6

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 4C06007 - EPA 5030B (Water)

Blank (4C06007-BLK1)

Prepared: 03/06/2014 Analyzed: 03/06/2014

Benzene	ND	1.0	ug/L							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes, total	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	65		"	62.5	104		87.3-113			
Surrogate: Toluene-d8	62		"	62.5	99.5		90.9-108			
Surrogate: 4-Bromofluorobenzene	62		"	62.5	99.2		88.6-111			

Origins Laboratory, Inc.



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Noelle Doyle Mathis, President

LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

Charles Greeson

Project Number: NEP0839

Project: Noble - Chestnut G 22-6

## 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 4C06007 - EPA 5030B (Water)

LCS (4C06007-BS1)

Prepared: 03/06/2014 Analyzed: 03/06/2014

Benzene	53.7	1.0	ug/L	50.0	107	75-126				
Toluene	50.8	1.0	"	50.0	102	78.7-126				
Ethylbenzene	58.6	1.0	"	50.0	117	81-130				
m,p-Xylene	114	2.0	"	100	114	77.2-133				
o-Xylene	54.4	1.0	"	50.0	109	77.9-126				
Surrogate: 1,2-Dichloroethane-d4	58		"	62.5	92.8	87.3-113				
Surrogate: Toluene-d8	58		"	62.5	93.4	90.9-108				
Surrogate: 4-Bromofluorobenzene	62		"	62.5	99.8	88.6-111				

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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 4C06007 - EPA 5030B (Water)

Matrix Spike (4C06007-MS1)		Source: X403029-01			Prepared: 03/06/2014 Analyzed: 03/06/2014					
Benzene	57.7	1.0	ug/L	50.0	ND	115	74-130			
Toluene	58.8	1.0	"	50.0	ND	118	73-131			
Ethylbenzene	69.9	1.0	"	50.0	ND	140	76-132			J-02
m,p-Xylene	140	2.0	"	100	ND	140	69-139			J-02
o-Xylene	59.4	1.0	"	50.0	ND	119	74-131			
Surrogate: 1,2-Dichloroethane-d4	54		"	62.5		86.3	87.3-113			
Surrogate: Toluene-d8	64		"	62.5		103	90.9-108			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.6	88.6-111			

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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 4C06007 - EPA 5030B (Water)

Matrix Spike Dup (4C06007-MSD1)		Source: X403029-01			Prepared: 03/06/2014 Analyzed: 03/06/2014					
Benzene	54.9	1.0	ug/L	50.0	ND	110	74-130	4.97	20	
Toluene	54.1	1.0	"	50.0	ND	108	73-131	8.34	20	
Ethylbenzene	66.5	1.0	"	50.0	ND	133	76-132	4.99	20	J-02
m,p-Xylene	135	2.0	"	100	ND	135	69-139	3.92	20	
o-Xylene	56.8	1.0	"	50.0	ND	114	74-131	4.61	20	
Surrogate: 1,2-Dichloroethane-d4	58		"	62.5		92.1	87.3-113			
Surrogate: Toluene-d8	63		"	62.5		100	90.9-108			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		97.9	88.6-111			

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### Notes and Definitions

S-07 High surrogate in sample, however sample is non-detect. High surrogate indicates result values are biased high.

J-02 Reported value failed to meet established quality control criteria for the precision accuracy.

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

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