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North America Division

November 21, 2011

Mr. Robert Chesson  
Department Of Natural Resources  
Oil & Gas Conservation Commission  
1120 Lincoln St., Suite 801  
Denver CO 80203-2136

RE: Ground water monitoring report & closure request letter  
Frick 18-2, 8  
API 05-123-17647  
Sec. 18, T4N R64W  
Weld County, Colorado

Dear Mr. Chesson:

Please find attached the ground water monitoring report and closure request for the Frick 18-2, 8. Based on the site remedial activities and the attached laboratory analytical results, Noble Energy Inc. is requesting that the COGCC consider this location closed, requiring no further action.

Noble Energy Inc. would like to claim business confidentiality protection for the information submitted in this letter, the supporting materials attached and all previous and subsequent correspondence related to this matter. Please contact the Noble Energy Environmental Department at (970) 785-5000 if you have any questions or require additional information.

Sincerely,

A handwritten signature in blue ink that reads 'Todd Cullum'.

Todd Cullum  
Environmental Specialist

Attachments



November 4, 2011

Mr. Todd Cullum  
Environmental Specialist  
Noble Energy, Inc.  
804 Grand Avenue  
Platteville, Colorado 80651

**RE: Fourth Quarter 2011 Monitoring Report and No Further Action Request  
Frick 18-2 & 8 Tank Battery  
Weld County, Colorado**

Dear Mr. Cullum:

LT Environmental, Inc. (LTE), under the direction of Noble Energy, Inc. (Noble), conducted corrective actions at the Frick 18-2 & 8 Tank Battery (Site) located approximately 0.5 miles north of the intersection of County Road (CR) 44 and CR 51 in Weld County, Colorado (Figure 1). The remediation program for the Site involved two distinct phases. Phase I of the remediation program involved the design, installation, and operation and maintenance (O&M) of an air sparging/soil vapor extraction (AS/SVE) system. Phase I was successful in mitigating the majority of subsurface hydrocarbon impact. Following completion of Phase I, Noble initiated Phase II, which included an enhanced attenuation remedial technology.

Noble continues to conduct groundwater monitoring at the Site to evaluate the effectiveness of the remediation program in mitigating groundwater impact. This correspondence is the *Fourth Quarter 2011 Monitoring Report* and summarizes activities conducted at the Site from August through October 2011. Activities conducted during this reporting period included quarterly groundwater performance monitoring.

**Phase I Remediation System Description**

The AS/SVE system operated intermittently from August 8, 2008, to February 18, 2010. The AS system introduced ambient air into the subsurface water column to initiate dissolved hydrocarbon volatilization and to promote aerobic microbial decomposition of petroleum constituents. The SVE system volatilized petroleum constituents adsorbed onto soil particles and removed petroleum vapors released from the groundwater by the AS process. AS and SVE wells were connected to equipment for the AS/SVE system housed in a remediation equipment trailer which is illustrated on Figure 2. The *Remediation System Installation and Startup, and Pre-System Groundwater Sampling Results*, dated September 11, 2008, provided additional details of the Phase I remediation program.

Due to attainment of cleanup goals and mitigation of hydrocarbon impact, the AS/SVE system was decommissioned on February 16 and 18, 2011. The AS and SVE wells and aboveground piping were removed and disposed of with Northern Colorado Disposal. Remediation wells

were closed in accordance with the Colorado Division of Water Resources, Well Abandonment Procedures.

## **Phase II Remediation System Description**

Phase II of the remediation program included the application of a groundwater amendment to subsurface areas of the Site that continued to exhibit low-level dissolved hydrocarbon impact. Phase II was designed to both increase the attenuation rate of the plume and decrease the mass flux of hydrocarbons from the source to downgradient areas. The amendment consisted of BOS200<sup>®</sup> Trap & Treat carbon slurry (BOS200<sup>®</sup>), which is a mixture of granular activated carbon (GAC), petroleum consuming microbes, gypsum, and nutrients. The GAC initially adsorbs hydrocarbons in the soil and groundwater and immobilizes the impact. Following adsorption, contaminants are co-located with the bacteria, electron acceptors, and nutrients in the carbon matrix and are consumed by the bacteria via petroleum oxidation/sulfate reduction. As a result, the remaining hydrocarbon impact is reduced; thereby achieving cleanup goals.

Implementation of Phase II of the remediation program occurred from June 28 through July 2, 2010. Application of the groundwater amendment occurred at two distinct areas: the area near MW01, MW02, and SB02R(2), and the area near SB10R(2) (Figure 1). Installation of the groundwater amendment involved removing overburden to expose the alluvial aquifer, placing the amendment in the saturated soil and mixing the amendment with native material. The final dimensions of the first treatment area [MW01, MW02, and SB02R(2)] were approximately 25 feet by 25 feet by 10 feet below ground surface (bgs). The final dimensions of the second treatment area [SB10R(2)] were approximately 10 feet by 12 feet by 6 feet bgs.

On November 22, 2010, Phase II of the remediation program was extended. Application of the groundwater amendment continued at two areas. The first area began just south of MW01R, continued south to the MW02R location, and east to the fence, as depicted on Figure 1. The approximate area of treatment was approximately 20 feet by 15 feet by 13 feet bgs. The second treatment area was located at SB10R(2) and was approximately 20 feet by 20 feet by 12 feet bgs, as depicted on Figure 1. Approximately 160 cubic yards of impacted soil was removed from the treatment areas for disposal at the Buffalo Ridge Landfill. Three hundred pounds of BOS200<sup>®</sup> was applied before backfilling with clean structural fill from Varra Aggregates. During excavation activities, monitoring wells MW01R, SB02R(2), and SB10R(2) were destroyed and abandoned.

## **Groundwater Monitoring Procedures**

On October 7, 2011, six groundwater monitoring wells were sampled to determine the current plume extent. Prior to sampling, depth to groundwater in each monitoring well was measured and recorded to calculate appropriate purge volumes (Table 1). All groundwater monitoring wells were purged of three well casing volumes. Groundwater samples were then collected from the well points by advancing disposable 3/16-inch diameter polyethylene tubing below the water table inside 1-inch diameter polyvinyl chloride (PVC) casing. A peristaltic pump transported

groundwater to the surface for collection in 40-milliliter unpreserved vials, which were then placed on ice and delivered under chain-of-custody (COC) protocol to Origins Laboratory in Denver, Colorado for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by United States Environmental Protection Agency Method 8260C.

## **Hydrogeology**

During the October 2011 monitoring event, the depth to static groundwater ranged from 3.70 feet below top of casing (btoc) in SB09 to 6.70 feet btoc in MW02R (Table 1). The groundwater flow direction was to the east with an average hydraulic gradient of approximately 0.015 feet per foot.

## **Groundwater Analytical Results**

Six groundwater samples (MW02R, SB03, SB07, SB09, SB15, and SB16) were collected and analyzed for BTEX during the October 2011 monitoring event. The Colorado Department of Public Health and Environment-Water Quality Control Commission Regulation 41 (WQCC Reg 41) - Basic Standards for Ground Water established standards for BTEX compounds 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 BTEX compounds were not detected exceeding the WQCC Reg 41 standards in the six groundwater samples collected. Groundwater analytical results for the October 2011 monitoring event are illustrated on Figure 3 and summarized in Table 2. The laboratory analytical reports, laboratory quality assurance/quality control data, and COC documentation are provided as Attachment 1.

## **Summary and Conclusions**

Since implementation of the remediation program, BTEX concentrations in all monitoring wells have successfully decreased within compliance of the WQCC Reg 41. Performance monitoring data indicate that cleanup objectives were attained, representing successful remediation of the pre-remediation (August 2008) plume extent.

The October 2011 groundwater monitoring event constitutes the fourth consecutive quarterly monitoring event in which groundwater analytical results have been in compliance with WQCC Reg 41. As soil and groundwater have been remediated to achieve cleanup goals, LTE under the direction of Noble, requests that the Colorado Oil and Gas Conservation Commission grant a No Further Action status for the Frick 18-2 & 8 Tank Battery.

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.



Rob Rebel, P.E.  
Project Manager



Steve Kahn, P.E.  
Senior Engineer

Attachments (6):

Figure 1 - Site Map

Figure 2 - AS/SVE System Layout

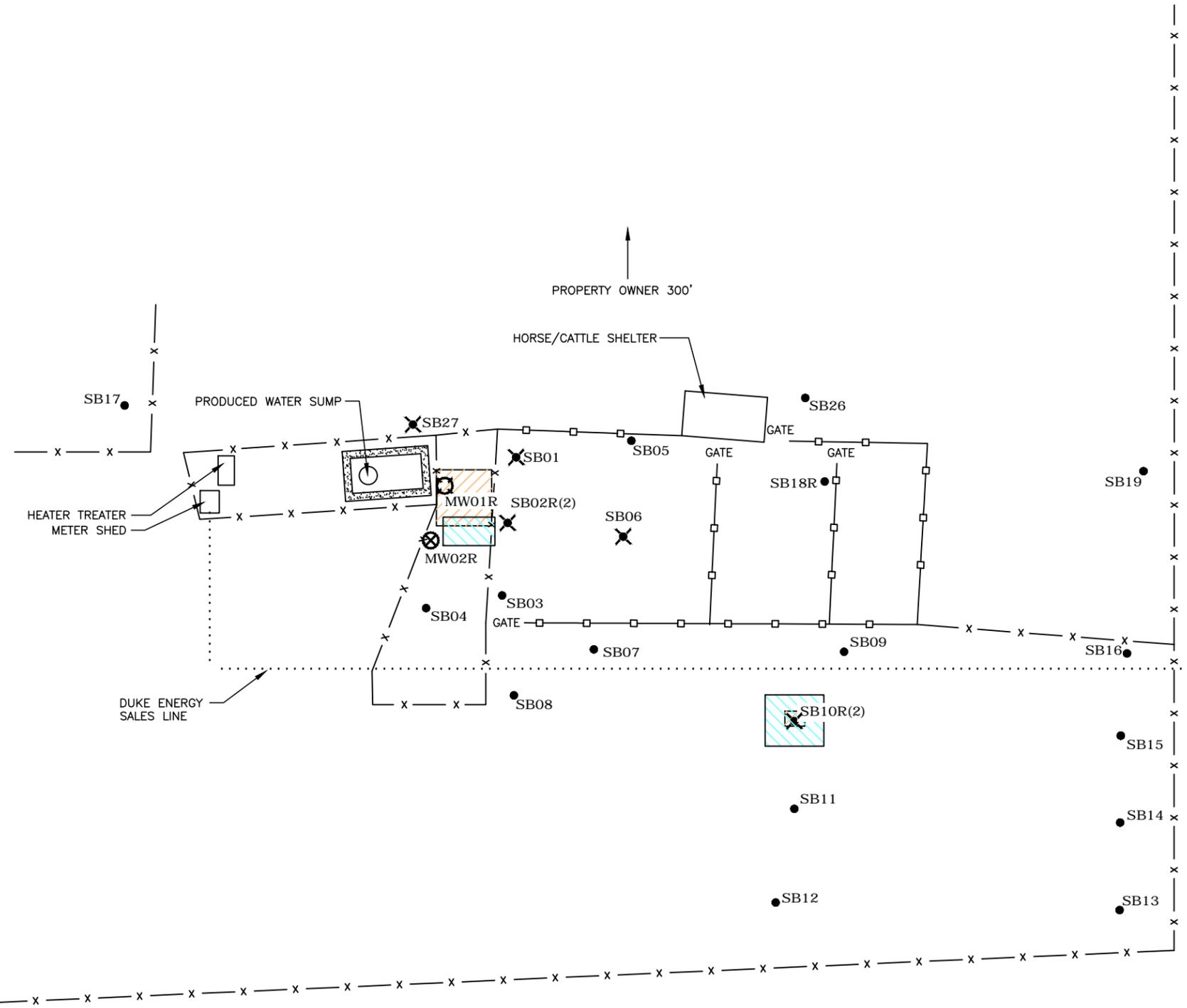
Figure 3 - Groundwater Analytical Results – October 7, 2011

Table 1 - Groundwater Elevation Summary

Table 2 - Groundwater Analytical Results

Attachment 1 - Laboratory Analytical Report

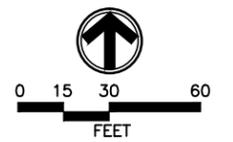
## **FIGURES**



→  
DROP OFF  
5'-6'

**LEGEND**

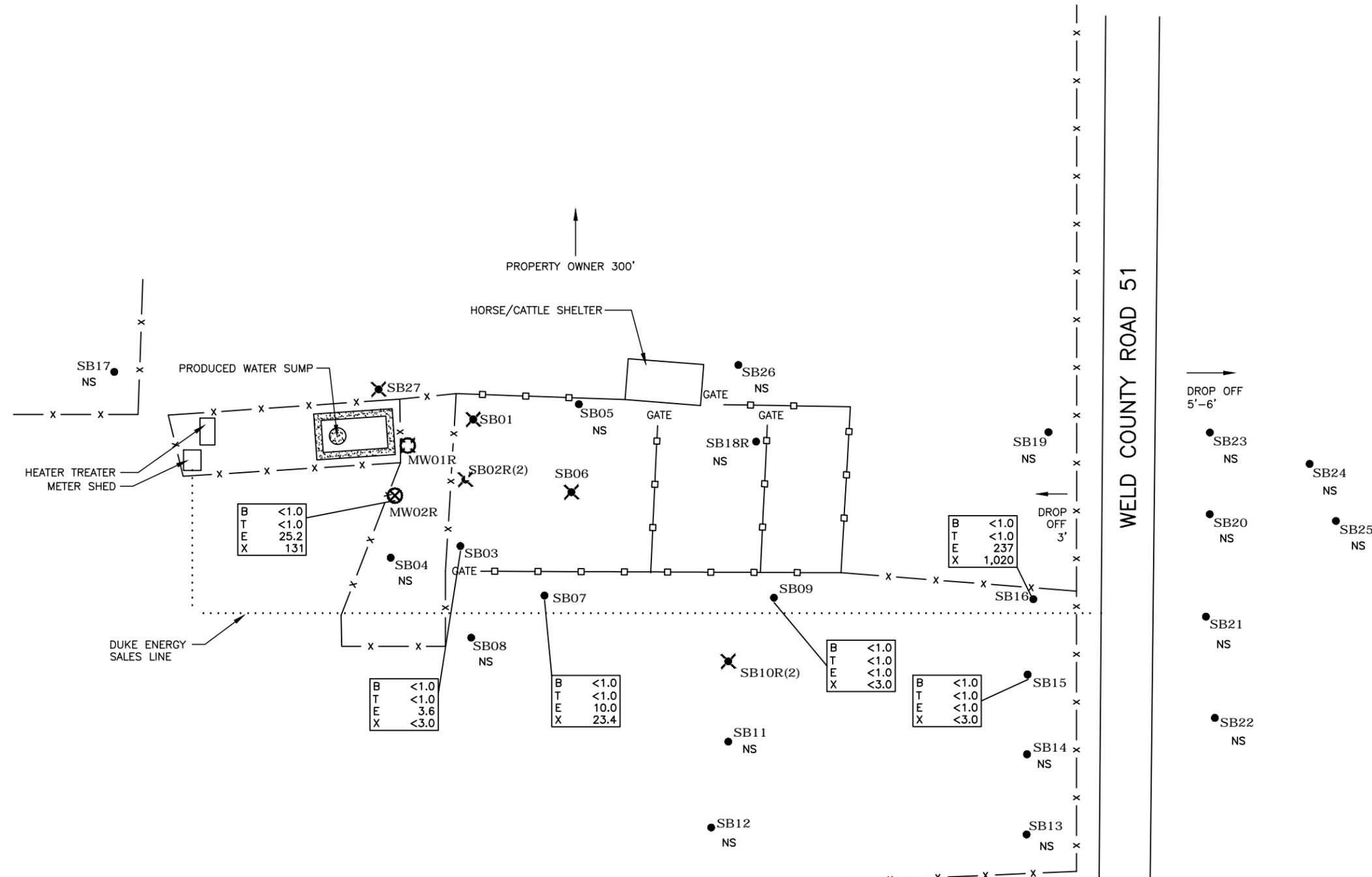
- ⊗ MONITORING WELL
- ⊘ DESTROYED MONITORING WELL
- SOIL BORING/TEMPORARY MONITORING WELL
- ⊗ DESTROYED SOIL BORING/TEMPORARY MONITORING WELL
- METAL PIPE FENCE
- x— BARBED WIRE FENCE
- ▨ TREATMENT AREA (6/28/10 - 7/2/10)
- ▨ TREATMENT AREA (11/22/10)
- ▨ BERM



**FIGURE 1**  
**SITE MAP**  
 FRICK 18-2 & 8 TANK BATTERY  
 WELD COUNTY, COLORADO  
 NOBLE ENERGY, INC.







**LEGEND**

- ⊗ MONITORING WELL
- ⊖ DESTROYED MONITORING WELL
- SOIL BORING/TEMPORARY MONITORING WELL
- ⊗ DESTROYED SOIL BORING/TEMPORARY MONITORING WELL
- METAL PIPE FENCE
- x BARBED WIRE FENCE
- ▨ BERM

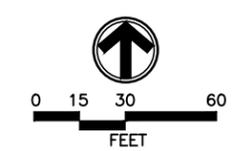
(SAMPLE DATE)

B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	TOTAL XYLENES

ANALYTICAL RESULTS ARE REPORTED IN MICROGRAMS PER LITER (µg/L)

NS NOT SAMPLED

< INDICATES CONCENTRATION IS LESS THAN STATED METHOD DETECTION LIMIT



**FIGURE 3**  
**GROUNDWATER ANALYTICAL RESULTS**  
**OCTOBER 7, 2011**  
**FRICK 18-2 & 8 TANK BATTERY**  
**WELD COUNTY, COLORADO**  
**NOBLE ENERGY, INC.**



## **TABLES**

**TABLE 1**  
**GROUNDWATER ELEVATION SUMMARY**  
**FRICK 18-2 & 8 TANK BATTERY**  
**WELD COUNTY, COLORADO**  
**NOBLE ENERGY, INC.**

Well ID	Date	Total Depth (ft)	Depth to Water (ft)	TOC Elevation (ft)	Groundwater Elevation (relative ft)
MW01	10/11/05	17.78	8.80	96.33	87.53
	01/20/06	17.78	8.23	96.33	88.10
	03/28/07	17.78	7.63	96.33	88.70
	08/05/08	17.78	6.27	96.33	90.06
	11/14/08	17.78	4.32	96.33	92.01
	11/24/08	17.78	3.49	96.33	92.84
	02/24/09	17.78	3.31	96.33	93.02
	05/26/09	17.78	0.70	96.33	95.63
	08/31/09	17.78	3.75	96.33	92.58
	12/29/09	17.78	2.22	96.33	94.11
03/11/10	17.78	1.43	96.33	94.90	
MW01R	07/28/10	10.03	5.46	NM	NM
	11/22/10	Destroyed			
MW02	10/11/05	18.39	9.68	96.83	87.15
	01/20/06	18.39	8.78	96.83	88.05
	03/28/07	18.39	7.95	96.83	88.88
	08/05/08	18.39	6.51	96.83	90.32
	11/24/08	18.39	3.78	96.83	93.05
	02/24/09	18.39	3.31	96.83	93.52
	05/26/09	18.34	1.00	96.83	95.83
	08/31/09	18.34	4.10	96.83	92.73
	12/29/09	18.34	1.84	96.83	94.99
	03/11/10	18.34	1.50	96.83	95.33
MW02R	07/28/10	12.04	5.87	NM	NM
	01/19/11	12.04	6.25	NM	NM
	04/05/11	12.04	6.09	NM	NM
	07/05/11	12.04	5.75	NM	NM
	10/07/11	12.04	6.70	NM	NM
SB01	10/11/05	14.98	8.72	95.82	87.10
SB02	10/11/05	12.68	9.24	96.06	86.82
	01/20/06	12.68	8.35	96.06	87.71
	03/28/07	12.68	7.62	96.06	88.44
SB02R	02/24/09	12.72	3.15	NM	NM
	05/26/09	12.72	0.75	NM	NM
	08/31/09	12.72	4.06	NM	NM
	12/29/09	12.72	0.00	NM	NM
	03/11/10	12.72	1.37	NM	NM
SB02R(2)	07/28/10	10.14	5.20	NM	NM
	11/22/10	Destroyed			
SB03	10/11/05	15.01	9.50	96.06	86.56
	01/20/06	15.01	8.45	96.06	87.61
	03/28/07	15.01	7.64	96.06	88.42
	08/05/08	15.01	6.34	96.06	89.72
	11/24/08	15.01	3.44	96.06	92.62
	02/24/09	15.01	3.05	96.06	93.01
	05/26/09	15.01	0.85	96.06	95.21
	08/31/09	15.01	3.58	96.06	92.48
	12/29/09	15.01	1.90	96.06	94.16
	03/11/10	15.01	1.15	96.06	94.91
	07/28/10	14.89	3.40	96.06	92.66
	01/19/11	14.89	3.71	96.06	92.35
	04/05/11	14.89	3.51	96.06	92.55
	07/05/11	14.89	3.32	96.06	92.74
	10/07/11	14.89	4.25	96.06	91.81

TABLE 1 (CONTINUED)

GROUNDWATER ELEVATION SUMMARY  
 FRICK 18-2 & 8 TANK BATTERY  
 WELD COUNTY, COLORADO  
 NOBLE ENERGY, INC.

Well ID	Date	Total Depth (ft)	Depth to Water (ft)	TOC Elevation (ft)	Groundwater Elevation (relative ft)
SB04	10/11/05	12.86	10.04	97.26	87.22
SB05	10/11/05	12.09	8.18	94.48	86.30
SB06	10/11/05	12.27	8.56	94.71	86.15
	01/20/06	12.27	7.60	94.71	87.11
	03/28/07	12.27	6.94	94.71	87.77
SB07	10/11/05	12.30	8.86	94.98	86.12
	01/20/06	12.30	7.85	94.98	87.13
	03/28/07	12.30	7.18	94.98	87.80
	02/24/09	12.30	2.63	94.98	92.35
	05/26/09	12.30	0.55	94.98	94.43
	08/31/09	12.30	3.07	94.98	91.91
	12/29/09	12.30	1.50	94.98	93.48
	03/11/10	12.30	0.73	94.98	94.25
	07/28/10	11.78	3.01	NM	NM
	01/19/11	11.78	3.27	NM	NM
	04/05/11	11.78	3.31	NM	NM
	07/05/11	11.78	3.03	NM	NM
	10/07/11	11.78	3.85	NM	NM
SB08	01/20/06	12.18	7.79	NM	NM
SB09	05/28/09	15.04	0.10	NM	NM
	08/31/09	15.04	2.78	NM	NM
	12/29/09	15.04	1.20	NM	NM
	03/11/10	15.04	0.40	NM	NM
	07/28/10	14.81	2.96	NM	NM
	01/19/11	14.81	3.02	NM	NM
	04/05/11	14.81	2.96	NM	NM
	07/05/11	14.81	2.28	NM	NM
	10/07/11	14.81	3.70	NM	NM
SB10R	05/28/09	13.68	0.30	NM	NM
	08/31/09	13.68	1.63	NM	NM
	12/29/09	13.68	0.82	NM	NM
	03/17/10	13.68	0.10	NM	NM
SB10R(2)	07/28/10	10.13	2.96	NM	NM
	11/22/10				
SB11	10/11/05	11.95	7.80	92.87	85.07
	01/20/06	11.95	6.66	92.87	86.21
	03/28/07	11.95	6.06	92.87	86.81
	08/05/08	11.95	4.75	92.87	88.12
	11/24/08	11.95	1.89	92.87	90.98
SB12	10/11/05	11.68	8.23	93.04	84.81
	01/20/06	11.68	6.86	93.04	86.18
	03/28/07	11.68	6.13	93.04	86.91
SB13	10/11/05	11.79	10.23	92.27	82.04
	01/20/06	11.79	9.35	92.27	82.92
	03/28/07	11.79	8.59	92.27	83.86
SB14	10/11/05	12.11	9.95	92.63	82.68
	01/20/06	12.11	9.01	92.63	83.62
	03/28/07	12.11	8.83	92.63	83.80
	08/05/08	12.11	6.07	92.63	86.56

TABLE 1 (CONTINUED)

GROUNDWATER ELEVATION SUMMARY  
 FRICK 18-2 & 8 TANK BATTERY  
 WELD COUNTY, COLORADO  
 NOBLE ENERGY, INC.

Well ID	Date	Total Depth (ft)	Depth to Water (ft)	TOC Elevation (ft)	Groundwater Elevation (relative ft)
SB15	10/11/05	12.01	10.05	92.80	82.75
	01/20/06	12.01	9.11	92.80	83.69
	03/28/07	12.01	8.95	92.80	83.85
	08/05/08	12.01	7.51	92.80	85.29
	11/24/08	12.01	5.29	92.80	87.51
	02/24/09	12.01	4.41	92.80	88.39
	05/26/09	12.01	0.90	92.80	91.90
	08/31/09	12.01	4.50	92.80	88.30
	12/29/09	12.01	3.08	92.80	89.72
	03/11/10	12.01	1.66	92.80	91.14
	07/28/10	8.81	4.69	92.80	88.11
	01/19/11	8.81	5.01	92.80	87.79
	04/05/11	8.81	4.56	92.80	88.24
	07/05/11	8.81	4.56	92.80	88.24
10/07/11	8.81	5.02	92.80	87.78	
SB16	10/11/05	12.06	9.27	92.21	82.94
	01/20/06	12.06	8.38	92.21	83.83
	03/28/07	12.06	8.26	92.21	83.95
	08/05/08	12.06	6.96	92.21	85.25
	11/14/08	12.06	5.62	92.21	86.59
	11/24/08	12.06	4.81	92.21	87.40
	02/24/09	12.06	3.92	92.21	88.29
	08/31/09	12.06	4.00	92.21	88.21
	12/29/09	12.06	2.49	92.21	89.72
	03/17/10	12.06	2.30	92.21	89.91
	07/28/10	12.04	4.24	92.21	87.97
	01/19/11	12.04	4.37	92.21	87.84
	04/05/11	12.04	3.90	92.21	88.31
	07/05/11	12.04	4.00	92.21	88.21
10/07/11	12.04	5.57	92.21	86.64	
SB17	10/11/05	14.56	11.02	101.25	90.23
SB18	10/11/05	12.00	8.66	93.63	84.97
	01/20/06	12.00	7.72	93.63	85.91
SB18R	02/24/09	12.86	3.22	NM	NM
	05/28/09	12.86	0.74	NM	NM
SB19	10/11/05	12.08	9.23	92.37	83.14
	01/20/06	12.08	8.39	92.37	83.98
	03/28/07	12.08	8.27	92.37	84.10
SB20	10/11/05	13.27	11.54	93.31	81.77
	01/20/06	13.27	8.65	93.31	84.66
	03/28/07	13.27	10.37	93.31	82.94
	08/05/08	13.27	9.38	93.31	83.93
	11/24/08	13.27	7.18	93.31	86.13
	02/24/09	13.30	6.26	93.31	87.05
05/26/09	13.30	3.00	93.31	90.31	
SB21	10/11/05	13.90	9.91	91.36	81.45
	01/20/06	13.90	7.89	91.36	83.47
	03/28/07	13.90	9.60	91.36	81.76
	11/24/08	13.90	5.13	91.36	86.23

**TABLE 1 (CONTINUED)**

**GROUNDWATER ELEVATION SUMMARY  
FRICK 18-2 & 8 TANK BATTERY  
WELD COUNTY, COLORADO  
NOBLE ENERGY, INC.**

<b>Well ID</b>	<b>Date</b>	<b>Total Depth (ft)</b>	<b>Depth to Water (ft)</b>	<b>TOC Elevation (ft)</b>	<b>Groundwater Elevation (relative ft)</b>
SB22	10/11/05	13.93	9.31	90.57	81.26
SB23	10/11/05	13.70	8.40	89.98	81.58
	01/20/06	13.70	7.15	89.98	82.83
	03/28/07	13.70	8.88	89.98	81.10
	11/24/08	13.70	4.19	89.98	85.79
SB24	10/11/05	13.69	8.00	88.90	80.90
	01/20/06	13.69	6.65	88.90	82.25
	03/28/07	13.69	8.58	88.90	80.32
	11/24/08	13.69	3.72	88.90	85.18
SB25	10/11/05	13.77	7.90	88.48	80.58
	11/24/08	13.77	3.58	88.48	84.90
SB26	10/11/05	11.94	8.91	93.85	84.94
SB27	02/24/09	13.35	3.81	NM	NM
	05/26/09	13.35	1.53	NM	NM
	08/31/09	13.35	4.88	NM	NM
	01/07/10	13.35	3.20	NM	NM
	03/11/10	13.35	1.76	NM	NM

**Notes:**

ft - feet

NM - Not measured

TOC - top of casing

All depths measured from the north side of the top of the casing

TABLE 2

**GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS**  
**FRICK 18-2 & 8 TANK BATTERY**  
**WELD COUNTY, COLORADO**  
**NOBLE ENERGY, INC**

Sample ID	Sample Date	Volatile Organic Compounds (µg/L)			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
MW01	10/11/05	<b>1,200</b>	4.2	150	562
	01/20/06	<b>1,700</b>	<20	39	337
	03/28/07	<b>1,200</b>	<20.0	27	260
	08/05/08	<b>7,770</b>	111	97.6	812.2
	11/14/08	<b>9,450</b>	129	272	<b>2,858</b>
	11/24/08	<b>9,210</b>	56.8	50.1	<b>2,573</b>
	02/24/09	<b>6,130</b>	23.9	65.7	571.7
	05/26/09	<b>9,680</b>	56.1	633	1,027
	08/31/09	<b>7,000</b>	2.53	163	763.84
	12/29/09	<b>919</b>	<1.0	5.64	35.26
	03/11/10	<b>3,820</b>	11.3	150	459.8
MW01R	07/28/10	<b>114</b>	25.8	43.5	241
	11/22/10	Destroyed			
MW02	10/11/05	<b>390</b>	<1.0	15	285
	01/20/06	<1.0	<1.0	<1.0	<3.0
	03/28/07	1.5	<2.0	<2.0	7.2
	08/05/08	<b>53.8</b>	<1.0	66.7	381.7
	11/24/08	2.15	<1.0	<1.0	8.1
	02/24/09	<b>88.5</b>	<1.0	100	655.6
	05/26/09	<b>65</b>	<1.0	171	1,736.7
	08/31/09	<b>6.81</b>	<1.0	<1.0	2.72
	12/29/09	1.28	<1.0	1.62	14.6
	03/11/10	<b>7.78</b>	<1.0	28.3	203
MW02R	07/28/10	2.38	1.99	130	207
	01/19/11	3.03	1.56	112	514
	04/05/11	<1.00	<1.00	51.8	222
	07/05/11	1.2	<1.0	24.3	98.3
	10/07/11	<1.0	<1.0	25.2	131
SB01	06/16/05	< 1.0	< 1.0	< 1.0	<3.0
SB02	06/16/05	<b>48</b>	39.8	508	<b>7,160</b>
	10/11/05	3.6	<1.0	170	<b>7,078</b>
	01/20/06	<1.0	<1.0	190	586
	03/28/07	1.2	<2.0	49	38
	08/05/08	Destroyed			
SB02R	02/24/09	<b>30.4</b>	1.91	48.9	266.54
	05/26/09	<b>32.1</b>	<1.0	6.7	48.5
	08/31/09	<b>183</b>	<1.0	383	<b>3,055</b>
	12/29/09	2.23	<1.0	<1.0	24.41
	03/11/10	<b>97.6</b>	<1.0	58.5	87.6
SB02R(2)	07/28/10	<b>5.17</b>	<1.0	44.8	122
	11/22/10	Destroyed			
SB03	06/16/05	<b>630</b>	892	182	<b>2,070</b>
	10/11/05	<b>4,800</b>	280	280	<b>2,150</b>
	01/20/06	<b>2,400</b>	38	170	960
	03/28/07	<b>350</b>	<20.0	230	1,300
	08/05/08	< 1.0	< 1.0	< 1.0	3.41
	11/24/08	<1.0	<1.0	<1.0	<3.0
	02/24/09	<1.0	<1.0	26.6	178
	05/26/09	<1.0	<1.0	16.9	86.4
	08/31/09	<1.0	<1.0	8.75	9.01
	12/29/09	<1.0	<1.0	13.2	52
	03/11/10	<1.0	<1.0	34.3	110
	07/28/10	<1.0	<1.0	8.06	21.7
	01/19/11	2.32	1.53	33.7	60.9
	04/05/11	<1.00	<1.00	5.54	12.2
07/05/11	<1.0	<1.0	3.3	8.7	
	10/07/11	<1.0	<1.0	3.6	<3.0
SB04	06/16/05	4.8	31.7	46.0	62.6
SB05	06/16/05	< 1.0	2.9	3.5	41.8

TABLE 2

**GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS**  
**FRICK 18-2 & 8 TANK BATTERY**  
**WELD COUNTY, COLORADO**  
**NOBLE ENERGY, INC**

Sample ID	Sample Date	Volatile Organic Compounds (µg/L)			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
SB06	06/16/05	<b>9.1</b>	80.3	106	881
	10/11/05	2.9	<1.0	47	221
	01/20/06	<1.0	<1.0	16	61.5
	03/28/07	<1.0	<2.0	<2.0	<6.0
SB07	06/16/05	<b>7,120</b>	<b>3,090</b>	433	<b>4,610</b>
	10/11/05	<b>6,400</b>	200	510	1,000
	01/20/06	<b>3,300</b>	1.2	230	<b>1,698</b>
	03/28/07	<b>2,100</b>	<100.0	210	<b>1,800</b>
	02/24/09	<1.0	<1.0	10.4	76.7
	05/26/09	<1.0	<1.0	<1.0	5.12
	08/31/09	<1.0	<1.0	9.48	63.8
	12/29/09	<1.0	<1.0	56.2	462.08
	03/11/10	<1.0	<1.0	135	517.82
	07/28/10	1.86	2.99	79.2	381
	01/19/11	2.13	1.02	33.1	194
	04/05/11	<1.00	<1.00	10.4	52.9
	07/05/11	1.2	<1.0	39.1	114
10/07/11	<1.0	<1.0	10	23.4	
SB08	06/16/05	<b>69.0</b>	80.4	15.5	175
	01/20/06	<1.0	<1.0	<1.0	<3.0
	03/28/07	<1.0	<2.0	<2.0	<6.0
SB09	06/16/05	<b>11.1</b>	7.1	2.4	27.8
	01/20/06	<b>1,800</b>	<1.0	130	1,016
	03/28/07	<b>68</b>	<2.0	25	200
	02/24/09	<b>59</b>	<1.0	<1.0	<3.0
	05/28/09	<1.0	<1.0	<1.0	<3.0
	08/31/09	<1.0	<1.0	<1.0	<3.0
	12/29/09	<1.0	<1.0	<1.0	<3.0
	03/11/10	<1.0	<1.0	<1.0	<3.0
	07/28/10	<1.0	<1.0	<1.0	<1.0
	01/19/11	<1.00	<1.00	<1.00	<1.00
	04/05/11	<1.00	<1.00	<1.00	<3.00
	07/05/11	<1.0	<1.0	<1.0	<3.0
10/07/11	<1.0	<1.0	<1.0	<3.0	
SB10	06/16/05	<b>3,260</b>	<b>1,180</b>	211	<b>2,910</b>
	10/11/05	<b>1,900</b>	450	230	<b>2,030</b>
	01/20/06	<b>1,900</b>	150	170	1,350
	03/28/07	<b>1,600</b>	<20.0	190	<b>1,756</b>
	08/05/08	<b>40.6</b>	<1.0	33.0	68.1
	11/24/08	Destroyed			
SB10R	02/24/09	<b>213</b>	<1.0	124	662
	05/28/09	<b>47.6</b>	<1.0	23	102
	08/31/09	<b>17.3</b>	<1.0	2.68	5.36
	12/29/09	<b>12.1</b>	<1.0	57.7	392
	03/17/10	<b>8.86</b>	<1.0	76.3	299
SB10R(2)	07/28/10	<b>20.1</b>	1.05	173	215
	11/22/10	Destroyed			
SB11	06/17/05	<b>17.6</b>	57.4	185	590
	10/14/05	1.8	<1.0	92	240
	01/20/06	<1.0	<1.0	15	34
	03/28/07	<1.0	<2.0	7.9	12
	08/05/08	<1.0	<1.0	<1.0	<3.0
	11/24/08	<1.0	<1.0	<1.0	<3.0
SB12	06/17/05	<b>15.1</b>	28.7	10.2	103
	10/11/05	1.1	<1.0	<1.0	2.1
	01/20/06	<1.0	<1.0	<1.0	<3.0
	03/28/07	<1.0	<2.0	<2.0	<6.0

TABLE 2

**GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS**  
**FRICK 18-2 & 8 TANK BATTERY**  
**WELD COUNTY, COLORADO**  
**NOBLE ENERGY, INC**

Sample ID	Sample Date	Volatile Organic Compounds (µg/L)			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
SB13	06/17/05	<b>9.2</b>	17.3	6.1	65.4
	10/11/05	2.4	<1.0	<1.0	4.6
	01/20/06	<1.0	<1.0	<1.0	<3.0
	03/28/07	<1.0	<2.0	<2.0	<6.0
SB14	06/17/05	<b>7.5</b>	15.4	7.0	66.3
	10/11/05	<b>17</b>	<1.0	54	150
	01/20/06	1.0	<1.0	5.3	5.6
	03/28/07	<1.0	<2.0	<2.0	<6.0
	08/05/08	<1.0	<1.0	<1.0	<3.0
SB15	06/17/05	<b>21.4</b>	19.0	35.0	812
	10/11/05	<b>14</b>	<1.0	15	110
	01/20/06	<1.0	<1.0	5.4	<3.0
	03/28/07	2.9	<2.0	61.0	101.7
	08/05/08	<1.0	<1.0	<1.0	<3.0
	11/24/08	<1.0	<1.0	<1.0	<3.0
	02/24/09	<1.0	<1.0	2.15	2.73
	05/26/09	<1.0	<1.0	<1.0	<3.0
	08/31/09	<1.0	<1.0	<1.0	<3.0
	12/29/09	<1.0	<1.0	<1.0	<3.0
	03/11/10	<1.0	<1.0	<1.0	<3.0
	07/28/10	<1.0	<1.0	<1.0	<1.0
	01/19/11	2.00	<1.00	<1.00	2.07
	04/05/11	<1.00	<1.00	<1.00	<3.00
07/05/11	<1.0	<1.0	<1.0	<3.0	
10/07/11	<1.0	<1.0	<1.0	<3.0	
SB16	06/17/05	<b>7,630</b>	<b>8,210</b>	463	<b>6,770</b>
	10/11/05	<b>5,400</b>	<b>4,600</b>	470	<b>5,280</b>
	01/20/06	<b>4,300</b>	<b>4,300</b>	290	<b>3,530</b>
	03/28/07	<b>2,600</b>	<b>4,400</b>	400	<b>5,860</b>
	08/05/08	<b>933</b>	86.7	395	<b>3,831</b>
	11/14/08	<1.0	<1.0	3.31	4.75
	11/24/08	<b>727</b>	45.9	562	<b>6,906</b>
	02/24/09	<b>196</b>	13.4	453	<b>5,093</b>
	08/31/09	4.1	<1.0	111	694
	12/29/09	<1.0	<1.0	55.3	391
	03/17/10	<1.0	<1.0	2.33	14.9
	07/28/10	<1.0	1.27	93.7	168
	01/19/11	2.30	1.40	145	994
	04/05/11	<1.00	<1.00	13.6	95.5
07/05/11	<1.0	<1.0	41.0	223	
10/07/11	<1.0	<1.0	237	1,020	
SB17	06/27/05	< 1.0	< 1.0	< 1.0	< 3.0
SB18	06/17/05	1,060	190	6.2	870
	10/11/05	<b>1,000</b>	18	290	<b>2,778</b>
	01/20/06	<b>41</b>	50	35	700
	03/28/07			Destroyed	
SB18R	02/24/09	<1.0	<1.0	103	428.05
	05/28/09	<1.0	<1.0	8.16	27.6
SB19	06/17/05	<b>29.9</b>	51.3	9.6	109
	10/11/05	<1.0	<1.0	<1.0	<3.0
	01/20/06	<1.0	<1.0	<1.0	<3.0
	03/28/07	<1.0	<2.0	<2.0	<6.0

TABLE 2

**GROUNDWATER ANALYTICAL RESULTS - VOLATILE ORGANIC COMPOUNDS**  
**FRICK 18-2 & 8 TANK BATTERY**  
**WELD COUNTY, COLORADO**  
**NOBLE ENERGY, INC**

Sample ID	Sample Date	Volatile Organic Compounds (µg/L)			
		Benzene	Toluene	Ethylbenzene	Total Xylenes
SB20	07/18/05	<b>5,640</b>	< 10	321	<b>4,780</b>
	10/11/05	<b>2,800</b>	2.0	260	<b>2,500</b>
	01/20/06	< <b>50</b>	<50	<1.0	2.8
	03/28/07	<b>140</b>	<2.0	21	130
	08/05/08	<b>25.3</b>	<1.0	28.9	200.46
	11/24/08	2.74	<1.0	<1.0	7.98
	02/24/09	1.12	<1.0	4.26	20.0
	05/26/09	<1.0	<1.0	<1.0	<3.0
SB21	07/18/05	<b>209</b>	< 1.0	1.9	22.3
	10/11/05	<b>11</b>	< 1.0	<1.0	<3.0
	01/20/06	<1.0	<1.0	<1.0	<3.0
	03/28/07	<1.0	<2.0	<2.0	<6.0
	11/24/08	<1.0	<1.0	11.8	49.5
SB22	07/18/05	< 1.0	< 1.0	< 1.0	3.2
SB23	07/18/05	<b>13.2</b>	< 1.0	1.5	22.8
	10/11/05	<1.0	< 1.0	<1.0	<3.0
	01/20/06	1.0	<1.0	<1.0	<3.0
	03/28/07	<1.0	<2.0	<2.0	<6.0
	11/24/08	<1.0	<1.0	<1.0	<3.0
SB24	07/18/05	<b>21.0</b>	< 1.0	2.7	38.9
	10/11/05	<1.0	<1.0	<1.0	<3.0
	01/20/06	<1.0	< 1.0	<1.0	<3.0
	03/28/07	<1.0	<2.0	<2.0	<6.0
	11/24/08	<1.0	<1.0	<1.0	<3.0
SB25	07/18/05	< 1.0	< 1.0	< 1.0	7
	11/24/08	<1.0	<1.0	<1.0	<3.0
SB26	07/18/05	1.8	4.7	51.4	648
SB27	02/24/09	<b>24.7</b>	494	91.9	1,077
	05/26/09	<b>11.1</b>	188	<1.0	421.9
	08/31/09	<b>90.5</b>	300	18.6	348.4
	01/07/10	3.64	144	17.3	311.3
	03/11/10	2.44	12.0	11.4	92.7
Water Well	06/17/05	< 1.0	< 1.0	< 1.0	< 3.0
	10/11/05	< 1.0	< 1.0	< 1.0	< 3.0
	01/20/06	< 1.0	< 1.0	< 1.0	< 3.0
	03/28/07	<1.0	<2.0	<2.0	<6.0
<b>CDPHE-WQCC Regulation 41 Groundwater Standards</b>		<b>5.0</b>	<b>560</b>	<b>700</b>	<b>1,400</b>

**Notes:**

ug/L - micrograms per liter

&lt; indicates analytical result is less than the laboratory detection limit

**Bold** indicates concentration exceeds CDPHE-WQCC Regulation 41 Groundwater Standards

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

Analysis by Environmental Protection Agency Method 8260B or 8260C

**ATTACHMENT 1**  
**LABORATORY ANALYTICAL REPORT**



October 12, 2011

LT Environmental, Inc.

Steve Kahn

4600 West 60th Avenue

Arvada CO 80003

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**Project Name - Noble - Frick 18-2&8**

**Project Number - NEP0505.01**

Attached are you analytical results for Noble - Frick 18-2&8 received by Origins Laboratory, Inc. October 07, 2011. This project is associated with Origins project number X110038-01.

The analytical results in the following report were analyzed under the guidelines of EPA Methods specified in SW-846. The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody.

Thank you for selecting Origins for your analytical needs. Please contact us with any questions concerning this report, or if we can help with anything at all.

Origins Laboratory, Inc.  
303.433.1322  
o-squad@oelabinc.com



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

Project Number: NEP0505.01  
Project Name: Noble - Frick 18-2&8

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW02R	X110038-01	Water	October 7, 2011 13:00	10/07/2011 17:00
SB03	X110038-02	Water	October 7, 2011 13:20	10/07/2011 17:00
SB07	X110038-03	Water	October 7, 2011 13:40	10/07/2011 17:00
SB09	X110038-04	Water	October 7, 2011 14:00	10/07/2011 17:00
SB15	X110038-05	Water	October 7, 2011 14:20	10/07/2011 17:00
SB16	X110038-06	Water	October 7, 2011 14:40	10/07/2011 17:00

Origins Laboratory, Inc.



*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Noelle E Doyle, President

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

Project Number: NEP0505.01  
 Project Name: Noble - Frick 18-2&8

www.originslaboratory.com

X110038

page 1 of 1

**ORIGINS**  
 LABORATORY, INC

Client: VTE  
 Address: \_\_\_\_\_  
 Telephone Number: \_\_\_\_\_  
 Email Address: \_\_\_\_\_

Project Manager: S Kuhn  
 Project Name: Frick 18-2+8  
 Project Number: NEP0505  
 Samples Collected By: S Sun

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative					Matrix				Analysis	Sample Instructions	Turnaround Time: Same Day <input type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> 72 Hr <input checked="" type="checkbox"/> Standard <input type="checkbox"/>					
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	Air Canister #	Other									
MW00R	10-7-11	1300		X					X						Filter Sample 1 →	Date: 10-7-11 Time: 1700 Relinquished By: <u>[Signature]</u>				
S003		1320		X					X								Date: 10-7-11 Time: 1700 Relinquished By: <u>[Signature]</u>			
S007		1340		X					X									Date: 10-7-11 Time: 1700 Relinquished By: <u>[Signature]</u>		
S009		1400		X					X										Date: 10-7-11 Time: 1700 Relinquished By: <u>[Signature]</u>	
S015		1420		X					X											Date: 10-7-11 Time: 1700 Relinquished By: <u>[Signature]</u>
S016		1440		X					X											

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

Origins Laboratory, Inc.

Noelle E Doyle, President

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

Project Number: NEP0505.01  
 Project Name: Noble - Frick 18-2&8

Origins Laboratory

F-012207-01  
 Effective Date: 01/22/07

**Sample Receipt Checklist**

Origins Work Order: X110038  
 Client: LT Client Project ID: NOBLE-FRICK  
 Shipped Via: Fed-Ex Airbill #: NA  
(UPS, FedEx, Hand Delivered, Pick-up, etc.)  
 Matrix (Check all that apply):  Soil/Solid  Water  Other: \_\_\_\_\_  
(Describe)

Cooler ID	<u>NA</u>				
Temp (°C)	<u>NA</u>				

Thermometer ID: NA

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature just above 0°C to ≤ 6°C <sup>(1)?</sup> NOTE: If samples are delivered within 5 hours of sampling, this requirement is waived-provided that there is evidence that cooling has begun.			X	
Were all samples received intact <sup>(1)?</sup>	X			
Was adequate sample volume provided <sup>(1)?</sup>	X			
If custody seals are present, are they intact <sup>(1)?</sup>			X	
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)?</sup>		Y		
Is a chain-of-custody (COC) present and filled out completely <sup>(1)?</sup>	X			
Does the COC agree with the number and type of sample bottles received <sup>(1)?</sup>	X			
Do the sample IDs on the bottle labels match the COC <sup>(1)?</sup>	X			
Is the COC properly relinquished by the client with date and time recorded <sup>(1)?</sup>	X			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.		X		
Are samples preserved that require preservation (excluding cooling) <sup>(1)?</sup> Note the type of preservation in the Comments column (e.g., HCl).		X		
Additional Comments (if any):				

<sup>(1)</sup>If NO, then contact the client before proceeding with analysis and note in the case narrative.

Ross Harts Signature or Initials of Custodian 10/17/11 17:15  
 Custodian Printed Name Date/Time

Origins Laboratory, Inc.



Noelle E Doyle, President

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

Project Number: NEP0505.01  
 Project Name: Noble - Frick 18-2&8

MW02R  
 10/7/2011 1:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
 X110038-01 (Water)

**BTEX by EPA 8260C**

Benzene	ND	1.0	ug/L	1	1J10004	10/10/2011	10/10/2011	
Toluene	ND	1.0	"	"	"	"	"	
Ethylbenzene	25.2	1.0	"	"	"	"	"	
Xylenes, total	131	3.0	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	114 %	70-130			"	"	"	
Surrogate: Toluene-d8	101 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	94.3 %	70-130			"	"	"	

Origins Laboratory, Inc.



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Noelle E Doyle, President

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

Project Number: NEP0505.01  
 Project Name: Noble - Frick 18-2&8

SB03

10/7/2011 1:20:00PM

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

Origins Laboratory, Inc.  
 X110038-02 (Water)

**BTEX by EPA 8260C**

Benzene	ND	1.0	ug/L	1	1J10004	10/10/2011	10/10/2011	
Toluene	ND	1.0	"	"	"	"	"	
Ethylbenzene	3.6	1.0	"	"	"	"	"	
Xylenes, total	ND	3.0	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	112 %	70-130			"	"	"	
Surrogate: Toluene-d8	102 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	93.7 %	70-130			"	"	"	

Origins Laboratory, Inc.



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Noelle E Doyle, President

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

Project Number: NEP0505.01  
 Project Name: Noble - Frick 18-2&8

SB07

10/7/2011 1:40:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
 X110038-03 (Water)

**BTEX by EPA 8260C**

Benzene	ND	1.0	ug/L	1	1J10004	10/10/2011	10/10/2011	
Toluene	ND	1.0	"	"	"	"	"	
Ethylbenzene	10.0	1.0	"	"	"	"	"	
Xylenes, total	23.4	3.0	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	112 %	70-130			"	"	"	
Surrogate: Toluene-d8	101 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	91.4 %	70-130			"	"	"	

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

Project Number: NEP0505.01  
 Project Name: Noble - Frick 18-2&8

SB09

10/7/2011 2:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
 X110038-04 (Water)

**BTEX by EPA 8260C**

Benzene	ND	1.0	ug/L	1	1J10004	10/10/2011	10/10/2011	
Toluene	ND	1.0	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	
Xylenes, total	ND	3.0	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	111 %	70-130			"	"	"	
Surrogate: Toluene-d8	99.8 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	94.0 %	70-130			"	"	"	

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

Project Number: NEP0505.01  
Project Name: Noble - Frick 18-2&8

SB15  
10/7/2011 2:20:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
X110038-05 (Water)

**BTEX by EPA 8260C**

Benzene	ND	1.0	ug/L	1	1J10004	10/10/2011	10/10/2011	
Toluene	ND	1.0	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	
Xylenes, total	ND	3.0	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	113 %	70-130			"	"	"	
Surrogate: Toluene-d8	101 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	95.5 %	70-130			"	"	"	

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

Project Number: NEP0505.01  
Project Name: Noble - Frick 18-2&8

SB16  
10/7/2011 2:40:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X110038-06 (Water)

**BTEX by EPA 8260C**

Benzene	ND	1.0	ug/L	1	1J10004	10/10/2011	10/11/2011	
Toluene	ND	1.0	"	"	"	"	"	
Ethylbenzene	237	10.0	"	10	"	"	10/10/2011	
Xylenes, total	1020	30.0	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	109 %	70-130			"	"	"	
Surrogate: Toluene-d8	98.0 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	97.0 %	70-130			"	"	"	

Origins Laboratory, Inc.



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 4600 West 60th Avenue  
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Project Number: NEP0505.01  
 Project Name: Noble - Frick 18-2&8

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
Batch 1J10004 - EPA 5030B										
Blank (1J10004-BLK1) <span style="float: right;">Prepared: 10/10/2011 Analyzed: 10/10/2011</span>										
Benzene	ND	1.0	ug/L							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes, total	ND	3.0	"							
Surrogate: 1,2-Dichloroethane-d4	72		"	62.5		116	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	60		"	62.5		96.5	70-130			

Origins Laboratory, Inc.



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Project Number: NEP0505.01  
 Project Name: Noble - Frick 18-2&8

**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
<b>Batch 1J10004 - EPA 5030B</b>										
<b>Blank (1J10004-BLK2)</b>										
					Prepared: 10/10/2011 Analyzed: 10/10/2011					
Benzene	ND	1.0	ug/L							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes, total	ND	3.0	"							
Surrogate: 1,2-Dichloroethane-d4	72		"	62.5		115	70-130			
Surrogate: Toluene-d8	62		"	62.5		99.8	70-130			
Surrogate: 4-Bromofluorobenzene	60		"	62.5		95.5	70-130			

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Project Number: NEP0505.01  
 Project Name: Noble - Frick 18-2&8

**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
<b>Batch 1J10004 - EPA 5030B</b>										
<b>LCS (1J10004-BS1)</b>					Prepared: 10/10/2011 Analyzed: 10/10/2011					
Benzene	48.7	1.0	ug/L	50.0		97.3	70-130			
Toluene	51.7	1.0	"	50.0		103	70-130			
Ethylbenzene	50.1	1.0	"	50.0		100	70-130			
m,p-Xylene	102	2.0	"	100		102	70-130			
o-Xylene	50.9	1.0	"	50.0		102	70-130			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>71</i>		<i>"</i>	<i>62.5</i>		<i>113</i>	<i>70-130</i>			
<i>Surrogate: Toluene-d8</i>	<i>63</i>		<i>"</i>	<i>62.5</i>		<i>101</i>	<i>70-130</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>61</i>		<i>"</i>	<i>62.5</i>		<i>97.8</i>	<i>70-130</i>			

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Project Number: NEP0505.01  
 Project Name: Noble - Frick 18-2&8

**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
<b>Batch 1J10004 - EPA 5030B</b>										
<b>LCS (1J10004-BS2)</b>					Prepared: 10/10/2011 Analyzed: 10/10/2011					
Benzene	56.2	1.0	ug/L	50.0		112	70-130			
Toluene	60.2	1.0	"	50.0		120	70-130			
Ethylbenzene	57.7	1.0	"	50.0		115	70-130			
m,p-Xylene	116	2.0	"	100		116	70-130			
o-Xylene	56.3	1.0	"	50.0		113	70-130			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>74</i>		<i>"</i>	<i>62.5</i>		<i>119</i>	<i>70-130</i>			
<i>Surrogate: Toluene-d8</i>	<i>65</i>		<i>"</i>	<i>62.5</i>		<i>104</i>	<i>70-130</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>60</i>		<i>"</i>	<i>62.5</i>		<i>95.6</i>	<i>70-130</i>			

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 Project Name: Noble - Frick 18-2&8

**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
<b>Batch 1J10004 - EPA 5030B</b>										
<b>Matrix Spike (1J10004-MS1)</b>			<b>Source: X110008-04</b>			<b>Prepared: 10/10/2011 Analyzed: 10/10/2011</b>				
Benzene	47.8	1.0	ug/L	50.0	ND	95.7	70-130			
Toluene	50.0	1.0	"	50.0	ND	100	70-130			
Ethylbenzene	48.6	1.0	"	50.0	ND	97.2	70-130			
m,p-Xylene	99.4	2.0	"	100	ND	99.4	70-130			
o-Xylene	49.4	1.0	"	50.0	ND	98.8	70-130			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>72</i>		<i>"</i>	<i>62.5</i>		<i>115</i>	<i>70-130</i>			
<i>Surrogate: Toluene-d8</i>	<i>64</i>		<i>"</i>	<i>62.5</i>		<i>102</i>	<i>70-130</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>60</i>		<i>"</i>	<i>62.5</i>		<i>96.0</i>	<i>70-130</i>			

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Project Number: NEP0505.01  
 Project Name: Noble - Frick 18-2&8

**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 1J10004 - EPA 5030B

Matrix Spike (1J10004-MS2)	Source: X110003-04			Prepared: 10/10/2011 Analyzed: 10/10/2011						
Benzene	47.6	1.0	ug/L	50.0	0.6	94.1	70-130			
Toluene	49.5	1.0	"	50.0	ND	99.0	70-130			
Ethylbenzene	46.3	1.0	"	50.0	ND	92.6	70-130			
m,p-Xylene	94.0	2.0	"	100	ND	94.0	70-130			
o-Xylene	46.0	1.0	"	50.0	ND	92.1	70-130			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>74</i>		<i>"</i>	<i>62.5</i>		<i>118</i>	<i>70-130</i>			
<i>Surrogate: Toluene-d8</i>	<i>64</i>		<i>"</i>	<i>62.5</i>		<i>103</i>	<i>70-130</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>60</i>		<i>"</i>	<i>62.5</i>		<i>95.6</i>	<i>70-130</i>			

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 Project Name: Noble - Frick 18-2&8

**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 1J10004 - EPA 5030B

Matrix Spike Dup (1J10004-MSD1)	Source: X110008-04			Prepared: 10/10/2011 Analyzed: 10/10/2011						
Benzene	47.4	1.0	ug/L	50.0	ND	94.9	70-130	0.819	20	
Toluene	49.4	1.0	"	50.0	ND	98.9	70-130	1.23	20	
Ethylbenzene	47.9	1.0	"	50.0	ND	95.9	70-130	1.35	20	
m,p-Xylene	98.1	2.0	"	100	ND	98.1	70-130	1.31	20	
o-Xylene	49.5	1.0	"	50.0	ND	99.0	70-130	0.202	20	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>71</i>		<i>"</i>	<i>62.5</i>		<i>114</i>	<i>70-130</i>			
<i>Surrogate: Toluene-d8</i>	<i>64</i>		<i>"</i>	<i>62.5</i>		<i>102</i>	<i>70-130</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>60</i>		<i>"</i>	<i>62.5</i>		<i>96.3</i>	<i>70-130</i>			

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Project Number: NEP0505.01  
 Project Name: Noble - Frick 18-2&8

**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 1J10004 - EPA 5030B

Matrix Spike Dup (1J10004-MSD2)	Source: X110003-04			Prepared: 10/10/2011 Analyzed: 10/10/2011						
Benzene	54.8	1.0	ug/L	50.0	0.6	108	70-130	13.9	20	
Toluene	57.1	1.0	"	50.0	ND	114	70-130	14.3	20	
Ethylbenzene	54.9	1.0	"	50.0	ND	110	70-130	16.9	20	
m,p-Xylene	112	2.0	"	100	ND	112	70-130	17.6	20	
o-Xylene	54.4	1.0	"	50.0	ND	109	70-130	16.7	20	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>72</i>		<i>"</i>	<i>62.5</i>		<i>115</i>	<i>70-130</i>			
<i>Surrogate: Toluene-d8</i>	<i>63</i>		<i>"</i>	<i>62.5</i>		<i>101</i>	<i>70-130</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>60</i>		<i>"</i>	<i>62.5</i>		<i>95.6</i>	<i>70-130</i>			

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Arvada CO 80003

Project Number: NEP0505.01  
Project Name: Noble - Frick 18-2&8

**Notes and Definitions**

ND Analyte NOT DETECTED at or above the reporting limit  
RPD Relative Percent Difference

Origins Laboratory, Inc.



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