



July 19, 2013

Mr. Chuck Cornell
Shell Exploration and Production Company
4582 South Ulster Street Parkway, Suite 1400
Denver, Colorado 80237

**RE: Second Quarter 2013 Groundwater Monitoring Report
WT Durham #4 Flowline Release
Remediation #4990
Moffat County, Colorado**

Dear Mr. Cornell:

LT Environmental, Inc. (LTE) has been contracted by Shell Exploration and Production Company (SEPCO) to conduct quarterly groundwater monitoring activities and to evaluate geochemical indicators to assess the potential for monitored natural attenuation (MNA) at the WT Durham #4 Flowline Release (Site).

Site history and remediation activities were outlined in the Form 27 - Site Investigation and Remediation Workplan (Remediation #4990) submitted to the Colorado Oil and Gas Conservation Commission (COGCC) on June 17, 2010. The Site Location Map is provided as Figure 1.

QUARTERLY GROUNDWATER MONITORING ACTIVITIES

Depth to Groundwater Measurements

Depth to groundwater was measured in monitoring wells MW01 through MW11 on June 12, 2013, and recorded to calculate potentiometric surfaces and purge volumes. During the second quarter 2013 sampling event, the static groundwater level generally decreased. The depths to static groundwater level ranged from 3.82 feet below top of casing (BTOC) in MW04 to 5.60 feet BTOC in MW09 (Table 1).

Calculating the difference in the top of casing and depth to groundwater, LTE determined the groundwater elevation in each monitoring well and generated a groundwater elevation and contour map (Figure 2). Based on the groundwater elevation map, groundwater flow during this monitoring event was generally to the north-northeast, toward Waddle Creek.

Groundwater Sampling Procedures

Each monitoring well was purged of a minimum of three well casing volumes or until dry prior to collection of groundwater samples. Groundwater samples were collected from each monitoring well utilizing disposable 1.6-inch diameter polyethylene bailers. Groundwater samples were collected in laboratory-prepared sample bottles, placed on ice, and delivered under



chain-of-custody (COC) protocol to Origins Laboratory (Origins) in Denver, Colorado. Samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) by United States Environmental Protection Agency (EPA) Method 8260C.

Additionally, monitoring wells MW02, MW06, and MW11 were sampled for geochemical indicators and analyzed for dissolved manganese and total iron by EPA Method 3005A/6010C and nitrate and sulfate by EPA Method 300.

The groundwater samples submitted for dissolved manganese analysis were collected by advancing disposable 3/16-inch diameter polyethylene tubing into groundwater within the 2-inch diameter polyvinyl chloride (PVC) well casing. A peristaltic pump was utilized to collect the groundwater samples. LTE filtered the manganese samples with a 0.45 micron cartridge-style filter prior to placement into the laboratory-prepared sample bottles.

Groundwater Analytical Results

The COGCC and the Colorado Department of Public Health and Environmental (CDPHE) Water Quality Control Commission (WQCC) have both established groundwater standards for BTEX of 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.

Eleven groundwater samples were collected and submitted to Origins for BTEX analysis during the June 2013 groundwater monitoring event. Groundwater analytical results indicated benzene exceeded the COGCC standard in one monitoring well (MW09) at a concentration of 41.7 $\mu\text{g/L}$. BTEX compounds were not detected above the laboratory method detection limits or were within compliance of COGCC standards in the ten remaining groundwater samples. Groundwater analytical results for the June 2013 monitoring event are depicted on Figure 3. Table 1 summarizes historical BTEX analytical data for all sampling events. The laboratory analytical report, laboratory quality assurance/quality control data, and COC documentation are attached.

MONITORED NATURAL ATTENUATION EVALUATION

LTE utilized groundwater quality parameters and geochemical indicators to determine if natural attenuation of petroleum hydrocarbon compounds is occurring at the Site and whether MNA remains an effective remedial method to achieve site cleanup goals.

Groundwater Quality Parameter Results

LTE personnel collected general water quality parameters during sampling activities to establish whether the appropriate site conditions existed for biodegradation of residual dissolved phase hydrocarbons. General water quality parameters included pH, temperature, conductivity, dissolved oxygen (DO), oxidation reduction potential (ORP), and total dissolved solids (TDS). General water quality parameters are summarized in Table 2.



Initial field screening results indicated pH readings are within a range for optimal biodegradation. Differences in temperature readings are attributable to seasonal groundwater fluctuations and ambient weather conditions.

The COGCC standard for TDS in groundwater should be less than 1.25 times the background concentration. The TDS concentrations observed in monitoring wells MW01 through MW11 ranged from 0.984 grams per liter (g/L) to 1.654 g/L. LTE believes the TDS concentrations observed at the Site are representative of background conditions.

DO concentrations have generally increased across the site indicating aerobic groundwater conditions currently exist onsite. The previous decrease observed in September 2012 and subsequent increase of DO concentrations indicate the interior of the plume has fluctuated between aerobic and anaerobic conditions. Even though the DO concentrations have fluctuated to some degree within the plume, the data indicates that oxygen is currently available and being utilized by microbes to degrade dissolved phase hydrocarbons within the plume.

Geochemical Indicators

In order to further evaluate secondary lines of evidence to detail subsurface biodegradation processes, LTE collected groundwater samples for geochemical indicators that included manganese, total iron (representative of ferrous iron), nitrate, and sulfate. In the absence or near absence of DO, microorganisms metabolize petroleum contaminants through the use of these alternate electron acceptors. General groundwater quality parameters indicate DO is available throughout the Site, establishing an aerobic environment. Geochemical data is summarized in Table 3.

As indicated in Table 3, monitoring wells MW02, MW06, and MW11 were sampled for these secondary electron acceptors in downgradient, in-plume, and upgradient locations, respectively. The data indicate that iron, manganese, and sulfate are available as electron acceptors.

Ferrous iron concentrations have not changed significantly from December 2012 to June 2013 and are similar to levels preceding those of September 2012. Analytical results for nitrate indicate that there is no significant presence of nitrate upgradient, in-plume, or downgradient. Manganese and sulfate concentrations have remained constant throughout historical groundwater monitoring activities. DO concentrations have generally increased indicating aerobic conditions at the site. Aerobic conditions appear to be the major means of MNA at this time.

SUMMARY AND CONCLUSIONS

On June 12, 2013, LTE conducted the second quarterly groundwater monitoring event. Groundwater elevations decreased in nine wells. Depth to water measurements ranged from 3.82 feet in MW04 to 5.60 feet in MW09. Groundwater elevations increased in monitoring well MW10. Based on the groundwater elevation data, groundwater generally flows to the north-northeast toward Waddle Creek.



The benzene concentration in monitoring well MW09 has increased to 41.7 µg/L from the December 2012 monitoring event. This exceeds the COGCC standard of 5 µg/L. Benzene concentrations in MW05 have continued to decrease since the June 2012 monitoring. BTEX concentrations in all other wells were observed to be below the COGCC Table 910-1 concentration levels.

LTE evaluated groundwater quality parameters and geochemical indicators to determine if biodegradation of dissolved phase hydrocarbon concentrations is occurring and whether MNA is an effective remedial method to achieve site cleanup goals. Based on general water quality data, the biodegradation of benzene in groundwater appears to be naturally occurring through both aerobic and anaerobic mechanisms; therefore MNA remains as the current remedial action occurring at the Site. LTE recommends continuing quarterly groundwater monitoring at the Site. The next sampling event is scheduled for September 2013.

Limitations

No investigation is infallible. Some uncertainty will always exist concerning the presence or absence of potential contaminants at a particular property, irrespective of the rigor of the investigation. Accordingly, LTE does not warrant that contaminants, other than those identified in this report, do not exist at the subject property or may not exist there in the future.

LTE believes that it has performed the services summarized in this report in a manner consistent with the level of care and skill ordinarily exercised by members of the environmental profession practicing at the same time and under similar conditions in the area of the project.

Sincerely,

LT ENVIRONMENTAL, INC.

A handwritten signature in black ink, appearing to read 'Jake Janicek'.

Jake Janicek, CISEC
Project Environmental Scientist

A handwritten signature in black ink, appearing to read 'Rob Fishburn'.

Rob Fishburn, P.G.
Senior Hydrogeologist



Attachments:

Figure 1- Site Location Map

Figure 2 - Groundwater Elevation Map

Figure 3 – Groundwater Analytical Results

Table 1 - Groundwater Analytical Results

Table 2 - General Water Quality Results

Table 3 - Geochemical Results

Attachment 1 - Laboratory Analytical Report

FIGURES



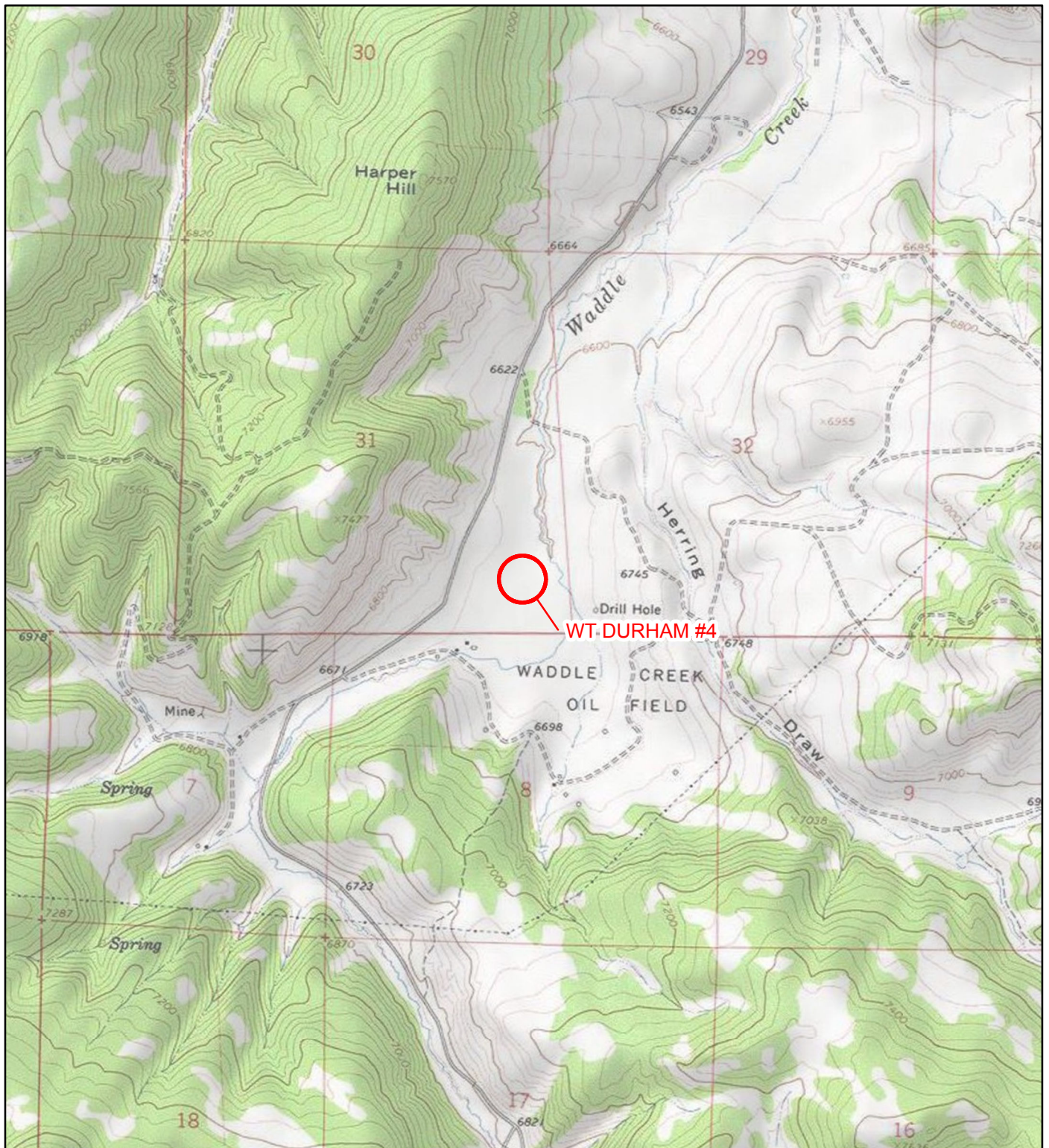


IMAGE COURTESY OF ESRI/BING MAPS

LEGEND

 SITE LOCATION

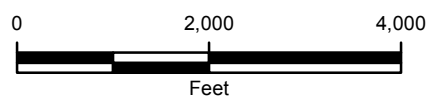


FIGURE 1
 SITE LOCATION MAP
 WT DURHAM #4 FLOWLINE RELEASE
 SESE SEC 31 T5N R90W 6PM
 MOFFAT COUNTY, COLORADO
 SHELL EXPLORATION AND PRODUCTION COMPANY





LEGEND

⊗ MONITORING WELL WITH RELATIVE GROUNDWATER ELEVATION IN FEET

✗ RELEASE

↑ ESTIMATED GROUNDWATER FLOW DIRECTION

— RELATIVE GROUNDWATER ELEVATION CONTOUR
CONTOUR INTERVAL = 0.5 FEET
GROUNDWATER ELEVATIONS
WERE MEASURED ON JUNE 12, 2013

SECTION

*MW09 NOT USED TO GENERATE
GROUNDWATER ELEVATION CONTOURS

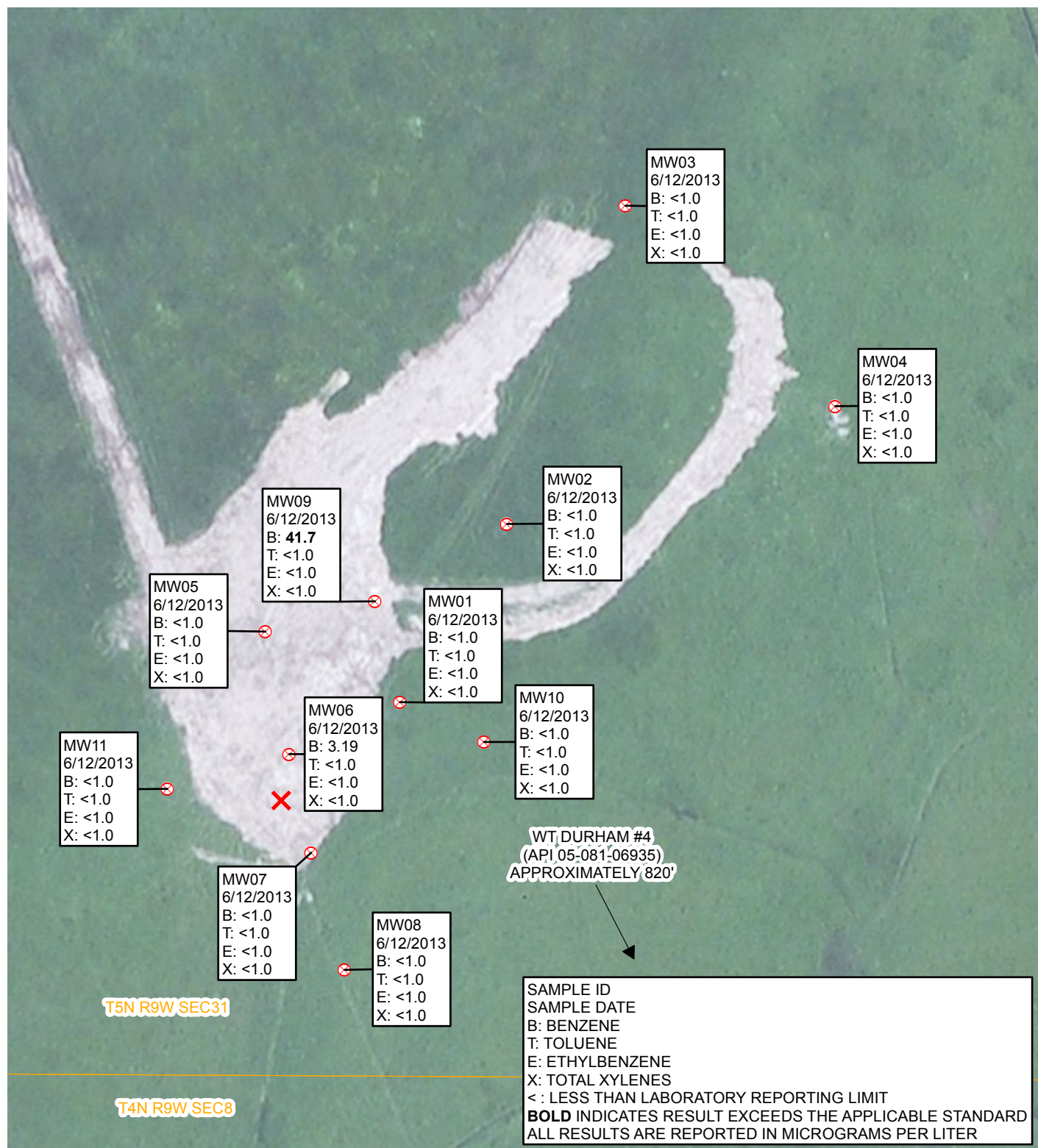
0 80 160
Feet



FIGURE 2
GROUNDWATER ELEVATION MAP
WT DURHAM #4 (API 05-081-06935)
SESE SEC 31 T5N R90W 6PM
MOFFAT COUNTY, COLORADO

SHELL EXPLORATION AND PRODUCTION COMPANY





LEGEND

MONITORING WELL

RELEASE

SECTION

0 80 160
Feet



FIGURE 3
GROUNDWATER ANALYTICAL RESULTS
 WT DURHAM #4 (API 05-081-06935)
 SESE SEC 31 T5N R90W 6PM
 MOFFAT COUNTY, COLORADO
 SHELL EXPLORATION AND PRODUCTION COMPANY



TABLES

TABLE 1
GROUNDWATER ANALYTICAL RESULTS
WT DURHAM #4 FLOWLINE RELEASE
MOFFAT COUNTY, COLORADO
SHELL EXPLORATION AND PRODUCTION COMPANY

Well ID	Date	Depth to Water (ft btoc)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW01	5/4/10	3.52	3.1	<2	<2	<2
	7/14/10	4.21	9	<1	<1	<3
	9/16/10	9.15	10.1	<1	<1	<3
	12/28/10	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM
	5/3/11	2.25	<1	<1	<1	<3
	8/24/11	5.15	<1	<1	<1	<3
	11/23/11	NM	NM	NM	NM	NM
	3/29/12	3.72	<1.0	<1.0	<1.0	<1.0
	6/27/12	5.96	<1.0	<1.0	<1.0	<1.0
	9/19/12	7.43	<1.0	<1.0	<1.0	<1.0
	12/12/12	4.70	<1.0	<1.0	<1.0	<1.0
	3/27/13	NM	NM	NM	NM	NM
	6/12/13	5.20	<1.0	<1.0	<1.0	<1.0
MW02	5/4/10	2.86	<2	<2	<2	<2
	7/14/10	3.65	<1	<1	<1	<3
	9/16/10	9.81	<1	<1	<1	<3
	12/28/10	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM
	5/3/11	3.00	<1	<1	<1	<3
	8/24/11	4.82	<1	<1	<1	<3
	11/23/11	NM	NM	NM	NM	NM
	3/29/12	2.97	<1.0	<1.0	<1.0	<1.0
	6/27/12	5.78	<1.0	<1.0	<1.0	<1.0
	9/19/12	6.89	<1.0	<1.0	<1.0	<1.0
	12/12/12	3.65	<1.0	<1.0	<1.0	<1.0
	3/27/13	NM	NM	NM	NM	NM
	6/12/13	4.72	<1.0	<1.0	<1.0	<1.0
MW03	5/4/10	3.30	<2	2	<2	3.3
	7/14/10	3.66	<1	<1	<1	<3
	9/16/10	9.81	<1	<1	<1	<3
	12/28/10	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM
	5/3/11	3.05	<1	<1	<1	<3
	8/24/11	5.54	<1	<1	<1	<3
	11/23/11	NM	NM	NM	NM	NM
	3/29/12	3.37	<1.0	<1.0	<1.0	<1.0
	6/27/12	6.52	<1.0	<1.0	<1.0	<1.0
	9/19/12	8.70	<1.0	<1.0	<1.0	<1.0
	12/12/12	NM	NM	NM	NM	NM
	3/27/13	NM	NM	NM	NM	NM
	6/12/13	4.50	<1.0	<1.0	<1.0	<1.0



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GROUNDWATER ANALYTICAL RESULTS
WT DURHAM #4 FLOWLINE RELEASE
MOFFAT COUNTY, COLORADO
SHELL EXPLORATION AND PRODUCTION COMPANY

Well ID	Date	Depth to Water (ft btoc)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW04	5/4/10	2.69	<2	2.4	<2	<2
	7/14/10	3.16	1.12	1.71	<1	<3
	9/16/10	9.83	<1	<1	<1	<3
	12/28/10	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM
	5/3/11	2.97	<1	<1	<1	<3
	8/24/11	4.32	<1	1	<1	<3
	11/23/11	NM	NM	NM	NM	NM
	3/29/12	2.50	<1.0	<1.0	<1.0	<1.0
	6/27/12	4.59	<1.0	<1.0	<1.0	<1.0
	9/19/12	6.19	<1.0	<1.0	<1.0	<1.0
	12/12/12	2.84	<1.0	<1.0	<1.0	<1.0
	3/27/13	NM	NM	NM	NM	NM
	6/12/13	3.82	<1.0	<1.0	<1.0	<1.0
MW05	7/14/10	2.70	<1	<1	<1	<3
	9/16/10	10.01	<1	<1	<1	<3
	12/28/10	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM
	5/3/11	3.24	<1	<1	<1	<3
	8/24/11	4.09	26.1	<1	<1	<3
	11/23/11	NM	NM	NM	NM	NM
	3/29/12	2.54	22.2	<1.0	<1.0	<1.0
	6/27/12	5.23	30	<1.0	<1.0	<1.0
	9/19/12	6.01	14.5	<1.0	<1.0	<1.0
	12/12/12	3.00	2.51	<1.0	<1.0	<1.0
	3/27/13	NM	NM	NM	NM	NM
	6/12/13	3.95	<1.0	<1.0	<1.0	<1.0
MW06	7/14/10	3.61	1,520	78.1	88.1	198.1
	9/16/10	9.96	354	<1	44.4	16.3
	12/28/10	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM
	5/3/11	2.88	651	<1	10.7	12.2
	8/24/11	4.71	475	1.5	1.6	3
	11/23/11	NM	NM	NM	NM	NM
	3/29/12	3.35	92.9	<1.0	<1.0	<1.0
	6/27/12	5.58	109	<1.0	7.49	12.4
	9/19/12	6.73	1.83	<1.0	<1.0	1.73
	12/12/12	3.87	6.4	<1.0	<1.0	<1.0
	3/27/13	NM	NM	NM	NM	NM
	6/12/13	4.65	3.19	<1.0	<1.0	<1.0



TABLE 1
GROUNDWATER ANALYTICAL RESULTS
WT DURHAM #4 FLOWLINE RELEASE
MOFFAT COUNTY, COLORADO
SHELL EXPLORATION AND PRODUCTION COMPANY

Well ID	Date	Depth to Water (ft btoc)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW07	7/14/10	3.99	58.7	<1	1.52	8.16
	9/16/10	9.73	<1	<1	<1	<3
	12/28/10	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM
	5/3/11	2.97	280	<1	4.4	11.6
	8/24/11	4.89	<1	<1	<1	<3
	11/23/11	NM	NM	NM	NM	NM
	3/29/12	3.66	<1.0	<1.0	<1.0	<1.0
	6/27/12	5.71	<1.0	<1.0	<1.0	<1.0
	9/19/12	6.97	<1.0	<1.0	<1.0	<1.0
	12/12/12	4.25	<1.0	<1.0	<1.0	<1.0
	3/27/13	NM	NM	NM	NM	NM
	6/12/13	4.90	<1.0	<1.0	<1.0	<1.0
MW08	9/16/10	10.13	<1	<1	<1	<3
	12/28/10	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM
	5/2/11	2.84	<1	<1	<1	<3
	8/24/11	5.00	<1	<1	<1	<3
	11/23/11	NM	NM	NM	NM	NM
	3/29/12	3.86	<1.0	<1.0	<1.0	<1.0
	6/27/12	5.70	<1.0	<1.0	<1.0	<1.0
	9/19/12	7.04	<1.0	<1.0	<1.0	<1.0
	12/12/12	4.22	<1.0	<1.0	<1.0	<1.0
	3/27/13	NM	NM	NM	NM	NM
MW09	9/16/10	10.30	<1	<1	<1	<3
	12/28/10	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM
	5/3/11	3.10	<1	<1	<1	<3
	8/24/11	4.43	<1	<1	<1	<3
	11/23/11	NM	NM	NM	NM	NM
	3/29/12	2.90	2.03	<1.0	<1.0	<1.0
	6/27/12	5.60	1.88	<1.0	<1.0	<1.0
	9/19/12	6.68	3.81	<1.0	<1.0	<1.0
	12/12/12	3.60	2.20	<1.0	<1.0	<1.0
	3/27/13	NM	NM	NM	NM	NM
	6/12/13	5.60	41.7	<1.0	<1.0	<1.0



TABLE 1
GROUNDWATER ANALYTICAL RESULTS
WT DURHAM #4 FLOWLINE RELEASE
MOFFAT COUNTY, COLORADO
SHELL EXPLORATION AND PRODUCTION COMPANY

Well ID	Date	Depth to Water (ft btoc)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW10	9/16/10	9.93	<1	<1	<1	<3
	12/28/10	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM
	5/3/11	3.22	<1	<1	<1	<3
	8/24/11	5.10	<1	<1	<1	<3
	11/23/11	NM	NM	NM	NM	NM
	3/29/12	3.70	<1.0	<1.0	<1.0	<1.0
	6/27/12	5.85	<1.0	<1.0	<1.0	<1.0
	9/19/12	7.55	<1.0	<1.0	<1.0	<1.0
	12/12/12	5.00	<1.0	<1.0	<1.0	<1.0
	3/27/13	NM	NM	NM	NM	NM
	6/12/13	4.50	<1.0	<1.0	<1.0	<1.0
MW11	9/16/10	10.05	<1	<1	<1	<3
	12/28/10	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM
	5/3/11	3.07	<1	<1	<1	<3
	8/24/11	5.41	<1	<1	<1	<3
	11/23/11	NM	NM	NM	NM	NM
	3/29/12	3.91	<1.0	<1.0	<1.0	<1.0
	6/27/12	6.53	<1.0	<1.0	<1.0	<1.0
	9/19/12	7.40	<1.0	<1.0	<1.0	<1.0
	12/12/12	4.45	<1.0	<1.0	<1.0	<1.0
	3/27/13	NM	NM	NM	NM	NM
	6/12/13	5.45	<1.0	<1.0	<1.0	<1.0
GW01	5/11/10	-	1,370	1,730	72.3	752
GW02	5/18/10	-	332	319	12.8	258
CDPHE WQCC Reg 41			5	560	700	1,400

NOTES:

ft btoc - feet below top of well casing

µg/L - micrograms per liter

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

BOLD - indicates result exceeds the applicable standard

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

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

Water Quality Control Commission Regulation 41 covering The Basic Standards

for Ground Water

NM - Not Monitored due to frozen groundwater



TABLE 2
GENERAL WATER QUALITY RESULTS
WT DURHAM #4 FLOWLINE RELEASE
MOFFAT COUNTY, COLORADO
SHELL EXPLORATION AND PRODUCTION COMPANY

Well ID	Date	pH	Temp (C°)	Conductivity (µ-S)	DO (mg/L)	ORP (mV)	TDS (g/L)
MW01	9/16/10	6.93	13.30	2,331	2.80	-49.6	1.515
	12/28/10	NM	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM	NM
	5/2/11	7.43	4.65	1,100	2.23	199.5	1.169
	8/24/11	6.73	13.40	3,724	2.02	228	3.243
	11/23/11	NM	NM	NM	NM	NM	NM
	3/28/12	7.35	2.58	2,403	2.17	-64.9	1.559
	6/27/12	7.32	10.13	1,553	1.27	-39.4	1.010
	9/19/12	7.24	12.21	1,111	0.85	-295.1	0.722
	12/12/12	7.93	6.37	386	2.31	59.2	0.389
	3/27/13	NM	NM	NM	NM	NM	NM
	6/12/13	7.27	10.10	1,358	4.01	-55.7	1.235
MW02	9/16/10	7.17	12.48	2,126	2.04	-89.4	2.4
	12/28/10	NM	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM	NM
	5/3/11	7.27	5.05	1,396	3.37	198.6	1.190
	8/24/11	6.76	12.64	3,500	1.85	226.8	2.971
	11/23/11	NM	NM	NM	NM	NM	NM
	3/28/12	7.19	2.93	2,333	3.42	-59.4	1.517
	6/27/12	7.23	9.36	1,476	3.01	-60.5	0.960
	9/19/12	7	11	1,052	2	-195	1
	12/12/12	8	6	370	3	-21	0
	3/27/13	NM	NM	NM	NM	NM	NM
	6/12/13	7.16	9.20	1,318	4.49	-75.5	1.224
MW03	9/16/10	6.42	13.88	3,341	2.41	-84.8	2.171
	12/28/10	NM	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM	NM
	5/2/11	7.35	4.80	1,251	3.01	199.3	1.324
	8/24/11	6.75	11.91	1,313	2.56	227.4	1.144
	11/23/11	NM	NM	NM	NM	NM	NM
	3/28/12	7.31	2.13	3,176	3.07	-54.1	2.067
	6/27/12	7.27	9.04	1,958	3.28	-78.9	1.274
	9/19/12	7.15	11.85	876	3.80	-72.1	0.881
	12/12/12	NM	NM	NM	NM	NM	NM
	3/27/13	NM	NM	NM	NM	NM	NM
	6/12/13	7.32	11.04	1,869	4.33	-56.8	1.654
MW04	9/16/10	6.55	12.75	2,058	2.17	-75.5	1.338
	12/28/10	NM	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM	NM
	5/2/11	7.35	5.45	1,042	2.49	199.1	1.081
	8/24/11	6.86	12.11	932	6.86	227.2	0.805
	11/23/11	NM	NM	NM	NM	NM	NM
	3/28/12	7.36	3.76	1,886	2.48	-38.8	1.226
	6/27/12	7.40	9.67	1,311	3.36	-38.1	0.853
	9/19/12	7.30	12.57	958	3.29	-147.0	0.623
	12/12/12	7.87	6.91	316	2.94	18.3	0.314
	3/27/13	NM	NM	NM	NM	NM	NM
	6/12/13	7.33	8.90	1,048	4.08	-65.0	0.984



TABLE 2
GENERAL WATER QUALITY RESULTS
WT DURHAM #4 FLOWLINE RELEASE
MOFFAT COUNTY, COLORADO
SHELL EXPLORATION AND PRODUCTION COMPANY

Well ID	Date	pH	Temp (C°)	Conductivity (µ-S)	DO (mg/L)	ORP (mV)	TDS (g/L)
MW05	9/16/10	6.56	15.70	2,581	1.56	-107.5	1.677
	12/28/10	NM	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM	NM
	5/2/11	7.17	5.25	1,371	2.64	199.1	1.430
	8/24/11	6.71	17.17	3,011	4.21	228.1	3.061
	11/23/11	NM	NM	NM	NM	NM	NM
	3/28/12	7.30	3.49	2,552	2.56	-81.9	1.659
	6/27/12	7.24	12.74	1,674	1.62	-96.4	1.088
	9/19/12	7.12	14.67	1,154	0.83	-241.9	0.750
	12/12/12	7.77	6.22	375	3.91	-73.1	0.381
	3/27/13	NM	NM	NM	NM	NM	NM
	6/12/13	7.16	10.37	1,333	3.30	-99.6	1.202
MW06	9/16/10	7.15	16.79	2,711	1.38	-102.3	2.4
	12/28/10	NM	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM	NM
	5/3/11	7.19	5.88	1,436	2.47	199.0	1.213
	8/24/11	6.72	16.94	3,071	4.03	228.0	3.073
	11/23/11	NM	NM	NM	NM	NM	NM
	3/28/12	7.33	3.49	2,340	2.53	-70.1	1.519
	6/27/12	7.27	14.21	1,618	2.03	-79.3	1.051
	9/19/12	7.19	15.92	1,155	0.30	-275.6	0.751
	12/12/12	7.78	7.19	403	2.37	-69.0	0.396
	3/27/13	NM	NM	NM	NM	NM	NM
	6/12/13	7.26	10.89	1,407	5.04	-83.5	1.249
MW07	9/16/10	6.42	13.22	2,456	1.34	-53.5	1.596
	12/28/10	NM	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM	NM
	5/2/11	7.30	4.81	1,134	2.72	199.4	1.210
	8/24/11	6.74	13.80	3,813	1.94	228.3	3.153
	11/23/11	NM	NM	NM	NM	NM	NM
	3/28/12	7.40	2.74	2,386	2.71	-26.8	1.551
	6/27/12	7.43	10.17	1,534	1.77	-5.8	0.998
	9/19/12	7.30	12.24	1,081	0.72	-259.1	0.702
	12/12/12	8.07	6.07	368	1.36	-11.5	0.375
	3/27/12	NM	NM	NM	NM	NM	NM
	6/12/13	7.30	9.76	1,329	2.70	-26.6	1.218
MW08	9/16/10	6.53	13.28	1,916	2.40	6.9	1.246
	12/28/10	NM	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM	NM
	5/2/11	7.22	5.16	977	3.15	198.5	1.022
	8/24/11	6.78	13.35	3,158	2.02	228.6	2.638
	11/23/11	NM	NM	NM	NM	NM	NM
	3/28/12	7.48	3.11	2,027	3.05	4.4	1.318
	6/27/12	7.45	10.14	1,226	1.73	27.0	0.797
	9/19/12	7.30	11.94	908	2.58	-196.2	0.591
	12/12/12	8.02	6.92	298	2.69	31.7	0.295
	3/27/13	NM	NM	NM	NM	NM	NM
	6/12/13	7.46	9.92	1,077	4.01	4.5	0.988



TABLE 2
GENERAL WATER QUALITY RESULTS
WT DURHAM #4 FLOWLINE RELEASE
MOFFAT COUNTY, COLORADO
SHELL EXPLORATION AND PRODUCTION COMPANY

Well ID	Date	pH	Temp (C°)	Conductivity (µ-S)	DO (mg/L)	ORP (mV)	TDS (g/L)
MW09	9/16/10	6.50	14.55	2,566	3.26	-49.0	1.668
	12/28/10	NM	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM	NM
	5/2/11	7.14	4.88	1,361	2.97	200.4	1.437
	8/24/11	6.68	14.79	4,140	2.32	227.6	3.339
	11/23/11	NM	NM	NM	NM	NM	NM
	3/28/12	7.13	2.77	2,543	2.92	-37.8	1.653
	6/27/12	7.13	11.23	1,683	2.45	-67.8	1.092
	9/19/12	7.14	13.16	1,199	2.55	-177.5	0.780
	12/12/12	7.74	6.24	416	2.65	-48.9	0.421
	3/27/13	NM	NM	NM	NM	NM	NM
	6/12/13	6.98	11.00	1,543	4.46	-72.8	1.368
MW10	9/16/10	6.56	12.85	2,017	1.90	38.6	1.311
	12/28/10	NM	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM	NM
	5/2/11	7.53	5.01	995	2.17	197.8	1.061
	8/24/11	6.73	13.48	3,485	2.92	228.1	2.908
	11/23/11	NM	NM	NM	NM	NM	NM
	3/28/12	7.43	2.71	2,176	2.51	-13.1	1.414
	6/27/12	7.38	10.06	1,337	2.32	-1.7	0.870
	9/19/12	7.13	11.93	970	1.40	-216	0.633
	12/12/12	8.12	6.35	310	4.63	20	0.312
	3/27/13	NM	NM	NM	NM	NM	NM
	6/12/13	7.44	9.42	1,159	3.32	-1.1	1.072
MW11	9/16/10	6.99	13.29	2,488	2.2	7.3	1.618
	12/28/10	NM	NM	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM	NM	NM
	5/3/11	7.46	4.84	1,382	2.74	198.4	1.169
	8/24/11	6.72	14.46	3,313	2.23	229	3.262
	11/23/11	NM	NM	NM	NM	NM	NM
	3/28/12	7.42	2.77	2,215	2.86	11.5	1.440
	6/27/12	7.38	10.84	1,605	1.60	-43.3	1.044
	9/19/12	7.20	11.87	1,116	1.83	-200.5	0.725
	12/12/12	7.96	6.21	354	2.34	-8.8	0.358
	3/27/13	NM	NM	NM	NM	NM	NM
	6/12/13	7.58	10.87	1,356	3.79	-26.6	1.204
CDPHE WQCC Reg 41		NA	NA	NA	NA	NA	<1.25 x background

NOTES:

C° - degrees celcius

µ-S - micro siemens

DO - dissolved oxygen

mg/L - milligrams per liter

ORP - oxygen reduction potential

mV - milli volts

TDS - total dissolved solids

g/L - grams per liter

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

Control Commission Regulation 41 covering The Basic Standards for Ground Water

NA - Not Applicable

NM - Not Monitored due to frozen groundwater



TABLE 3
GEOCHEMICAL RESULTS
WT DURHAM #4 FLOWLINE RELEASE
MOFFAT COUNTY, COLORADO
SHELL EXPLORATION AND PRODUCTION COMPANY

Well ID	Date	Manganese (µg/l)	Total Iron (µg/l)	Nitrate (mg/L)	Sulfate (mg/L)
MW02	9/16/10	356	3,310	<0.05	292
	12/28/10	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM
	5/3/11	360	2,190	<0.05	316
	8/24/11	409	1,070	<0.05	347
	11/23/11	NM	NM	NM	NM
	3/29/12	390	1,600	<0.23	400
	6/27/12	370	13,000	<0.23	340
	9/19/12	490	96,300	0.174	332
	12/12/12	458	1,220	0.3	388
	3/27/13	NM	NM	NM	NM
	6/12/13	382	2,970	0.101	359
MW06	9/16/10	829	3,560	<0.05	465
	12/28/10	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM
	5/3/11	942	644	<0.05	384
	8/24/11	926	1,590	0.185	411
	11/23/11	NM	NM	NM	NM
	3/29/12	840	2,500	<0.23	350
	6/27/12	840	2,100	<0.23	323
	9/19/12	786	175,000	0.18	349
	12/12/12	757	2,250	0.226	340
	3/27/13	NM	NM	NM	NM
	6/12/13	1,030	1,880	0.0886	407
MW11	9/16/10	317	<200	0.119	376
	12/28/10	NM	NM	NM	NM
	2/15/11	NM	NM	NM	NM
	5/3/11	171	<200	<0.05	259
	8/24/11	277	<200	0.193	292
	11/23/11	NM	NM	NM	NM
	3/29/12	120	650	<0.23	290
	6/27/12	440	130	<0.23	371
	9/19/12	760	82,700	0.189	365
	12/12/12	127	337	0.246	318
	3/27/13	NM	NM	NM	NM
	6/12/13	218	103	<0.100	332

NOTES:

µg/L - micrograms per liter

mg/L - milligrams per liter

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

NM - Not Monitored due to frozen groundwater



ATTACHMENT 1
LABORATORY ANALYTICAL REPORT





June 20, 2013

LT Environmental, Inc.

Chris Shephard

4600 West 60th Avenue

Arvada CO 80003

Project Name - WT Durham #4

Project Number - MS1007

Attached are you analytical results for WT Durham #4 received by Origins Laboratory, Inc. June 13, 2013. This project is associated with Origins project number X306070-01.

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

Chris Shephard
Project Number: MS1007
Project: WT Durham #4

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW01	X306070-01	Water	June 12, 2013 13:50	06/13/2013 09:45
MW02	X306070-02	Water	June 12, 2013 15:00	06/13/2013 09:45
MW03	X306070-03	Water	June 12, 2013 14:10	06/13/2013 09:45
MW04	X306070-04	Water	June 12, 2013 14:20	06/13/2013 09:45
MW05	X306070-05	Water	June 12, 2013 14:50	06/13/2013 09:45
MW06	X306070-06	Water	June 12, 2013 15:10	06/13/2013 09:45
MW07	X306070-07	Water	June 12, 2013 14:30	06/13/2013 09:45
MW08	X306070-08	Water	June 12, 2013 14:40	06/13/2013 09:45
MW09	X306070-09	Water	June 12, 2013 15:30	06/13/2013 09:45
MW10	X306070-10	Water	June 12, 2013 14:00	06/13/2013 09:45
MW11	X306070-11	Water	June 12, 2013 15:20	06/13/2013 09:45

Origins Laboratory, Inc.



Noelle E Doyle, President

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

LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

Chris Shephard

Project Number: MS1007

Project: WT Durham #4

ORIGINS
LABORATORY, INC

1306070

1/42

1725 Elk Place, Denver, CO 80211

Laboratory # - 303.433.1322

Client: LT Environmental, Inc. Project: WT Durham #4		Project Manager: Chris Shephard Project Number: MS1007						
Number	Sample Identification	Matrix	Sample Date	Sample Time	Sampled By	Container	Qty	Analyses
01-001	MW01	Water	6-12-13	1350	RZ/DH	01_40mL Amber VOA Vial - HCL	3	BTEX by EPA 8260C
02-001	MW02	Water	6-12-13	1500	RZ/DH	01_40mL Amber VOA Vial - HCL	3	Nitrate by 353.2/300.0 Iron Total EPA 6010B Manganese Dissolved EPA BTEX by EPA 8260C
03-001	MW03	Water	6-12-13	1410	RZ/DH	01_40mL Amber VOA Vial - HCL	3	BTEX by EPA 8260C
04-001	MW04	Water	6-12-13	1420	RZ/DH	01_40mL Amber VOA Vial - HCL	3	BTEX by EPA 8260C
05-001	MW05	Water	6-12-13	1450	RZ/DH	01_40mL Amber VOA Vial - HCL	3	BTEX by EPA 8260C
06-001	MW06	Water	6-12-13	1510	RZ/DH	01_40mL Amber VOA Vial - HCL	6	Nitrate by 353.2/300.0 Iron Total EPA 6010B Manganese Dissolved EPA BTEX by EPA 8260C
07-001	MW07	Water	6-12-13	1430	RZ/DH	01_40mL Amber VOA Vial - HCL	3	BTEX by EPA 8260C
08-001	MW08	Water	6-12-13	1440	RZ/DH	01_40mL Amber VOA Vial - HCL	3	BTEX by EPA 8260C

Temperature on Receipt:

Turn Around Time:

Same Day ☐ 72-hr ☐
24-hr ☐ Standard ☐

6/13/13 9:45

Date / Time

Relinquished By

6/13/13 9:45

Date / Time

Received By

6/13/13 16:55

Date / Time

Origins Laboratory, Inc.

Noelle E Doyle, President

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

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

Chris Shephard
Project Number: MS1007
Project: WT Durham #4

ORIGINS
LABORATORY, INC

X306070 2012

1725 Elk Place, Denver, CO 80211
Laboratory # - 303.433.1322

Client: LT Environmental, Inc. Project: WT Durham #4		Project Manager: Chris Shephard Project Number: MS1007		Analyses				
Number	Sample Identification	Matrix	Sample Date	Sample Time	Sampled By	Container	Qty	Analyses
09-001	MMW09	Water	6-12-13	1530	RZ/DH	01_40mL Amber VOA Vial - HCL	3	BTEX by EPA 8260C
10-001	MMW10	Water	6-12-13	1400	RZ/DH	01_40mL Amber VOA Vial - HCL	3	BTEX by EPA 8260C
11-001	MMW11	Water	6-12-13	1520	RZ/DH	01_40mL Amber VOA Vial - HCL	6	Nitrate by 353.2/300.0 Iron Total EPA 6010B Manganese Dissolved EPA 8260C BTEX by EPA 8260C

Relinquished By: Dea's Date / Time: 6-12-13 16:55

Relinquished By: FeedEx Date / Time: 6-12-13 16:55

Relinquished By: FeedEx Date / Time: 6-13-13 9:45

Relinquished By: FeedEx Date / Time: 6-13-13 9:45

Temperature on Receipt: ☐ 72-hr ☐ Standard

Turn Around Time: ☐ Same Day ☐ 24-hr ☐ 48-hr

Origins Laboratory, Inc.

Noelle E Doyle

Noelle E Doyle, President

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

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

Chris Shephard
Project Number: MS1007
Project: WT Durham #4

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: X306070

Client: LTE

Client Project ID: WT Durham #4

Checklist Completed by: Jeff Smith

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

Date/time completed: 6/13/13 10:06

Airbill #: NA

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

Cooler Number/Temperature: 14.8 °C / 1 °C / 1 °C / 1 °C

Thermometer ID: 1000

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C ⁽¹⁾ ?	X			
Is there ice present (document if blue ice is used)	X			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		X		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		X		
Were all samples received intact ⁽¹⁾ ?	X			
Was adequate sample volume provided ⁽¹⁾ ?	X			
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?	X			Nitrate
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?		X		No TAT Provided
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	X			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	X			
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	X			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.	X			MW03(C)
Are samples preserved that require preservation and was it checked ⁽¹⁾ ? (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 ₃ , HCL, H ₂ SO ₄) / (pH >10 for samples preserved with NaAsO ₂ +NaOH, ZnAc+NaOH)	X			HCL
Additional Comments (if any):				

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

Reviewed by (Project Manager)

06-20-13 1155
Date/Time Reviewed

Origins Laboratory, Inc.

Noelle E Doyle, President

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

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

Chris Shephard
Project Number: MS1007
Project: WT Durham #4

MW01

6/12/2013 1:50:00PM

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.
X306070-01 (Water)

BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F15004	06/15/2013	06/15/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	104 %	84-121	"	"	"
Surrogate: Toluene-d8	99.7 %	85-115	"	"	"
Surrogate: 4-Bromofluorobenzene	99.2 %	84-114	"	"	"

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

Chris Shephard

Project Number: MS1007

Project: WT Durham #4

MW02

6/12/2013 3:00:00PM

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

GEL Laboratories, LLC
X306070-02 (Water)

Anions by EPA300.0

Nitrate	0.101	0.100	mg/L	1	1308094		06/14/2013	
Sulfate	359	20.0	"	50	"	"	"	"

BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F15004	06/15/2013	06/15/2013	
Toluene	ND	1.0	"	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	101 %	84-121			"	"	"	
Surrogate: Toluene-d8	97.9 %	85-115			"	"	"	
Surrogate: 4-Bromofluorobenzene	98.0 %	84-114			"	"	"	

Metals by SW846 3005A/6010C

Iron	2970	100	ug/L	1	1308425	06/18/2013	06/19/2013	
Manganese	382	10.0	"	"	"	"	"	

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

Chris Shephard
Project Number: MS1007
Project: WT Durham #4

MW03

6/12/2013 2:10:00PM

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.
X306070-03 (Water)

BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F15004	06/15/2013	06/15/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	102 %	84-121	"	"	"
Surrogate: Toluene-d8	100 %	85-115	"	"	"
Surrogate: 4-Bromofluorobenzene	99.2 %	84-114	"	"	"

Origins Laboratory, Inc.



Noelle E Doyle, President

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

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

Chris Shephard
Project Number: MS1007
Project: WT Durham #4

MW04

6/12/2013 2:20:00PM

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.
X306070-04 (Water)

BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F15004	06/15/2013	06/15/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	103 %	84-121	"	"	"
Surrogate: Toluene-d8	99.1 %	85-115	"	"	"
Surrogate: 4-Bromofluorobenzene	98.9 %	84-114	"	"	"

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

Chris Shephard
Project Number: MS1007
Project: WT Durham #4

MW05

6/12/2013 2:50:00PM

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.
X306070-05 (Water)

BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F15004	06/15/2013	06/15/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

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

101 % 84-121
97.9 % 85-115
97.7 % 84-114

" " "
" " "
" " "

Origins Laboratory, Inc.



Noelle E Doyle, President

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

Chris Shephard
Project Number: MS1007
Project: WT Durham #4

MW06
6/12/2013 3:10:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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GEL Laboratories, LLC
X306070-06 (Water)

Anions by EPA300.0

Nitrate	0.0886	0.100	mg/L	1	1308094		06/14/2013	J
Sulfate	407	20.0	"	50	"	"	"	

BTEX by EPA 8260C

Benzene	3.19	1.0	ug/L	1	3F15004	06/15/2013	06/15/2013	
Toluene	ND	1.0	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	
Xylenes, total	ND	1.0	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	104 %	84-121			"	"	"	
Surrogate: Toluene-d8	98.6 %	85-115			"	"	"	
Surrogate: 4-Bromofluorobenzene	98.8 %	84-114			"	"	"	

Metals by SW846 3005A/6010C

Iron	1880	100	ug/L	1	1308425	06/18/2013	06/19/2013	
Manganese	1030	10.0	"	"	"	"	"	

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

Chris Shephard
Project Number: MS1007
Project: WT Durham #4

MW07

6/12/2013 2:30:00PM

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.
X306070-07 (Water)

BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F15004	06/15/2013	06/15/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	101 %	84-121	"	"	"
Surrogate: Toluene-d8	98.7 %	85-115	"	"	"
Surrogate: 4-Bromofluorobenzene	96.7 %	84-114	"	"	"

Origins Laboratory, Inc.



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

Chris Shephard
Project Number: MS1007
Project: WT Durham #4

MW08

6/12/2013 2:40:00PM

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

Origins Laboratory, Inc.
X306070-08 (Water)

BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F15004	06/15/2013	06/15/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	98.0 %	84-121	"	"	"
Surrogate: Toluene-d8	97.5 %	85-115	"	"	"
Surrogate: 4-Bromofluorobenzene	97.2 %	84-114	"	"	"

Origins Laboratory, Inc.



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

Chris Shephard
Project Number: MS1007
Project: WT Durham #4

MW09
6/12/2013 3:30:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X306070-09 (Water)

BTEX by EPA 8260C

Benzene	41.7	1.0	ug/L	1	3F15004	06/15/2013	06/15/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	102 %	84-121			"	"	"
Surrogate: Toluene-d8	99.2 %	85-115			"	"	"
Surrogate: 4-Bromofluorobenzene	98.8 %	84-114			"	"	"

Origins Laboratory, Inc.



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

Chris Shephard
Project Number: MS1007
Project: WT Durham #4

MW10
6/12/2013 2:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
X306070-10 (Water)

BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F15004	06/15/2013	06/15/2013
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	99.9 %	84-121	"	"	"
Surrogate: Toluene-d8	99.8 %	85-115	"	"	"
Surrogate: 4-Bromofluorobenzene	97.8 %	84-114	"	"	"

Origins Laboratory, Inc.



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

Chris Shephard
Project Number: MS1007
Project: WT Durham #4

MW11
6/12/2013 3:20:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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GEL Laboratories, LLC
X306070-11 (Water)

Anions by EPA300.0

Nitrate	ND	0.100	mg/L	1	1308094		06/14/2013	U
Sulfate	332	20.0	"	50	"	"	"	

BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	3F15004	06/15/2013	06/15/2013	
Toluene	ND	1.0	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	
Xylenes, total	ND	1.0	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	103 %	84-121			"	"	"	
Surrogate: Toluene-d8	99.8 %	85-115			"	"	"	
Surrogate: 4-Bromofluorobenzene	100 %	84-114			"	"	"	

Metals by SW846 3005A/6010C

Iron	103	100	ug/L	1	1308425	06/18/2013	06/19/2013	
Manganese	218	10.0	"	"	"	"	"	

Origins Laboratory, Inc.



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

Chris Shephard
Project Number: MS1007
Project: WT Durham #4

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 3F15004 - EPA 5030B (Water)

Blank (3F15004-BLK1)

Prepared: 06/15/2013 Analyzed: 06/15/2013

Benzene	ND	1.0	ug/L							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes, total	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	63		"	62.5	102		84-121			
Surrogate: Toluene-d8	62		"	62.5	99.8		85-115			
Surrogate: 4-Bromofluorobenzene	61		"	62.5	98.2		84-114			

Origins Laboratory, Inc.



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

Chris Shephard
Project Number: MS1007
Project: WT Durham #4

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 3F15004 - EPA 5030B (Water)										
LCS (3F15004-BS1)					Prepared: 06/15/2013 Analyzed: 06/15/2013					
Benzene	94.4	1.0	ug/L	100		94.4	74-130			
Toluene	86.3	1.0	"	100		86.3	76-128			
Ethylbenzene	92.1	1.0	"	100		92.1	78-130			
m,p-Xylene	177	2.0	"	200		88.5	75-134			
o-Xylene	94.3	1.0	"	100		94.3	76-129			
Surrogate: 1,2-Dichloroethane-d4	61		"	62.5		98.4	84-121			
Surrogate: Toluene-d8	62		"	62.5		98.6	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	84-114			

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LT Environmental, Inc.

4600 West 60th Avenue

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Chris Shephard

Project Number: MS1007

Project: WT Durham #4

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 3F15004 - EPA 5030B (Water)

Matrix Spike (3F15004-MS1)		Source: X306070-11			Prepared: 06/15/2013 Analyzed: 06/15/2013					
Benzene	103	1.0	ug/L	100	ND	103	74-130			
Toluene	94.5	1.0	"	100	0.3	94.2	73-131			
Ethylbenzene	103	1.0	"	100	ND	103	76-132			
m,p-Xylene	195	2.0	"	200	ND	97.3	69-139			
o-Xylene	101	1.0	"	100	ND	101	74-131			
Surrogate: 1,2-Dichloroethane-d4	62		"	62.5		99.7	84-121			
Surrogate: Toluene-d8	62		"	62.5		99.1	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	84-114			

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

Chris Shephard
Project Number: MS1007
Project: WT Durham #4

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 3F15004 - EPA 5030B (Water)

Matrix Spike Dup (3F15004-MSD1)		Source: X306070-11			Prepared: 06/15/2013 Analyzed: 06/15/2013					
Benzene	97.9	1.0	ug/L	100	ND	97.9	74-130	4.64	20	
Toluene	90.6	1.0	"	100	0.3	90.4	73-131	4.13	20	
Ethylbenzene	98.4	1.0	"	100	ND	98.4	76-132	4.76	20	
m,p-Xylene	188	2.0	"	200	ND	93.9	69-139	3.52	20	
o-Xylene	98.8	1.0	"	100	ND	98.8	74-131	1.72	20	
Surrogate: 1,2-Dichloroethane-d4	61		"	62.5		97.8	84-121			
Surrogate: Toluene-d8	62		"	62.5		98.9	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	84-114			

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Chris Shephard
Project Number: MS1007
Project: WT Durham #4

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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Anions by EPA300.0 - Quality Control
GEL Laboratories, LLC

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1308094 -

BLANK (1202892425-BLK)

Prepared: Analyzed: 06/14/2013

Nitrate	ND	0.033	mg/L		0		-			U
Sulfate	ND	0.133	"		0		-			U

DUP (1202892426 D)

Source: X306070-11

Prepared: Analyzed: 06/14/2013

Nitrate	ND	0.033	mg/L		<0.033		0-20	0.00	20	U
Sulfate	335	6.65	"		332		0-20	0.673	20	

PS (1202892427 S)

Source: X306070-11

Prepared: Analyzed: 06/14/2013

Nitrate	2.48	0.033	mg/L	2.50	<0.033	99.1	90-110			
Sulfate	834	6.65	"	10.0	332	100	90-110			

LCS (1202892428-BKS)

Prepared: Analyzed: 06/14/2013

Sulfate	9.62	0.133	mg/L	10.0	0	96.2	90-110			
Nitrate	2.36	0.033	"	2.50	0	94.2	90-110			

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

Chris Shephard
Project Number: MS1007
Project: WT Durham #4

Metals by SW846 3005A/6010C - Quality Control
GEL Laboratories, LLC

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1308425 - SW846 3005A										
BLANK (1202893299-BLK)					Prepared: 06/18/2013 Analyzed: 06/19/2013					
Iron	ND	30.0	ug/L		0		-			U
Manganese	ND	2.00	"		0		-			U
LCS (1202893300-BKS)					Prepared: 06/18/2013 Analyzed: 06/19/2013					
Iron	5220	30.0	ug/L	5000	0	104	80-120			
Manganese	502	2.00	"	500	0	100	80-120			
DUP (1202893301 D)					Source: X306070-02		Prepared: 06/18/2013 Analyzed: 06/19/2013			
Iron	2950	30.0	ug/L		2970		0-20	0.865	20	
Manganese	441	2.00	"		442		0-20	0.233	20	
MS (1202893302 S)					Source: X306070-02		Prepared: 06/18/2013 Analyzed: 06/19/2013			
Iron	7940	30.0	ug/L	5000	2970	99.3	75-125			
Manganese	917	2.00	"	500	442	95.1	75-125			
FLTB (327624007-BLK)					Prepared: 06/18/2013 Analyzed: 06/19/2013					
Manganese	ND	2.00	ug/L		0		-			U

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

Chris Shephard
Project Number: MS1007
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Notes and Definitions

U Result not detected above the detection limit

J Greater than the detection limit but less than the reporting limit

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

Origins Laboratory, Inc.



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