



## GROUNDWATER MONITORING REPORT OCTOBER 2014

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### KARCH BLUE DD 30-3J FLOW LINE COGCC REMEDIATION #8110

LT Environmental, Inc. (LTE), under the direction of Noble Energy, Inc. (Noble), conducted groundwater monitoring activities at the Karch Blue DD 30-3J Flow Line (Site). The Site is located along the east side of County Road 57 approximately 3.0 miles north-northwest of Interstate 76 in Weld County, Colorado. The legal site description is the east half of the southwest quarter of Section 30, Township 3 North, Range 63 West, 6<sup>th</sup> Principal Meridian. The Site Location Map is included as Figure 1. The Site is divided into two distinct areas referred to as the North Excavation and the South Excavation. The Site Map depicting both North and South excavations is provided as Figure 2.

LTE, under the direction of Noble, advanced a total of 23 soil borings on August 23 and September 25 and 26, 2013. Soil borings MW01 through MW11 (located in the North Excavation) and MW01 through MW12 (located in the South Excavation) were completed as temporary groundwater monitoring wells. Per the Colorado Oil and Gas Conservation Commission document number 2142108, LTE, under the direction of Noble, has discontinued groundwater monitoring in the North Excavation.

On October 22, 2014, under the direction of Noble, LTE personnel conducted groundwater monitoring activities in 12 monitoring wells (MW01 through MW12) in the South Excavation. Prior to purging, depth to groundwater was measured and recorded for calculating well-specific target purge volumes and relative groundwater elevations. Depth to groundwater ranged from 4.50 feet below top of casing (btoc) in monitoring well MW02 to 5.60 feet btoc in monitoring well MW10. During the October 2014 monitoring event, groundwater in the South Excavation was calculated to flow northeast with an average hydraulic gradient of 0.003 feet per foot. Relative groundwater elevations are presented on Figure 3 and summarized in Table 1. Following purging, groundwater samples were collected, placed on ice, then submitted with a complete chain of custody form to Origins Laboratory, Inc. of Denver, Colorado, for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by United States Environmental Protection Agency Method 8260C.

The Colorado Department of Public Health and Environment-Water Quality Control Commission has established Regulation 41-The Basic Standards for Ground Water (WQCC Reg 41) for BTEX at 5.0 micrograms per liter ( $\mu\text{g/L}$ ), 560  $\mu\text{g/L}$ , 700  $\mu\text{g/L}$ , and 1,400  $\mu\text{g/L}$ , respectively. Laboratory groundwater analytical results indicated that monitoring well MW04 exceeded the WQCC Reg 41 standard for benzene at a concentration of 39.8  $\mu\text{g/L}$ . All other analytical results were in compliance with applicable WQCC Reg 41 standards. Groundwater analytical results are presented on Figure 4 and summarized in Table 1. The laboratory analytical report is attached.

LTE, under the direction of Noble, will continue to conduct quarterly groundwater monitoring in the South Excavation with the goal of obtaining four consecutive quarters with analytical results in compliance with applicable WQCC Reg 41 standards. The next quarterly groundwater monitoring event is scheduled for January 2015.

## FIGURES

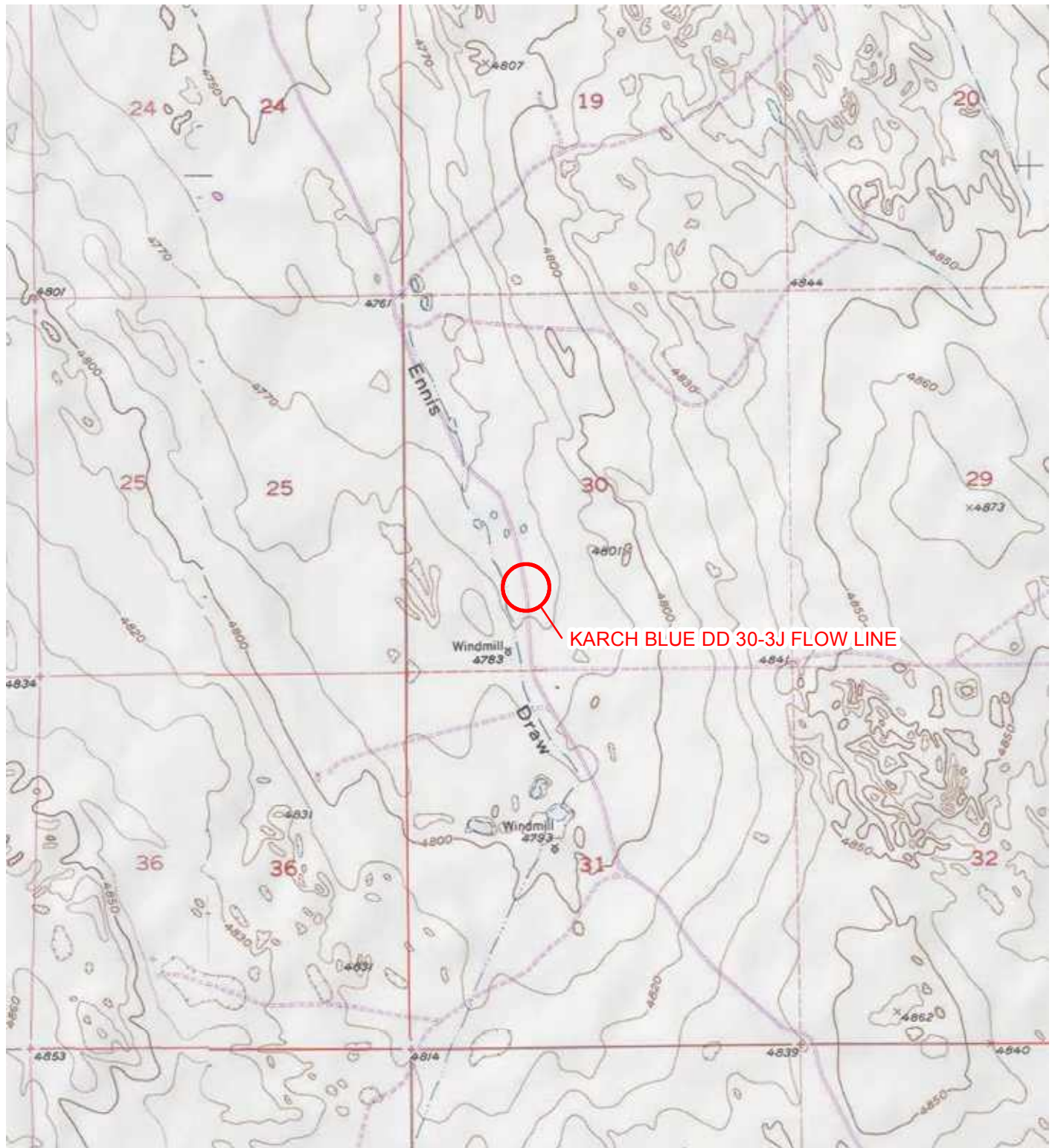


IMAGE COURTESY OF ESRI/USGS

# LEGEND

○ SITE LOCATION

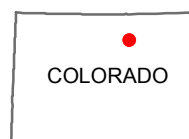
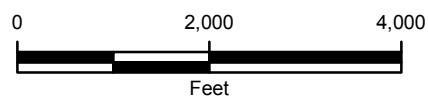


FIGURE 1  
SITE LOCATION MAP  
KARCH BLUE DD 30-3J FLOW LINE  
WELD COUNTY, COLORADO

NOBLE ENERGY, INC.





IMAGE COURTESY OF ESRI

# LEGEND

○ SITE LOCATION

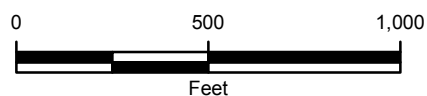


FIGURE 2  
SITE MAP  
KARCH BLUE DD 30-3J FLOW LINE  
WELD COUNTY, COLORADO

NOBLE ENERGY, INC.





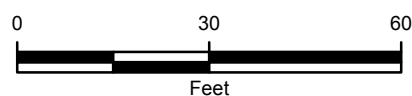


\*MONITORING WELL MW10 WAS NOT USED TO GENERATE RELATIVE GROUNDWATER ELEVATION CONTOURS FOR THIS SAMPLING EVENT.

IMAGE COURTESY OF ESRI

## LEGEND

- MONITORING WELL
- CALCULATED GROUNDWATER FLOW DIRECTION
- RELATIVE GROUNDWATER ELEVATION CONTOUR
- CONTOUR INTERVAL = 0.10 FEET
- GRADIENT = 0.003 FEET/FOOT
- UNDERGROUND UTILITIES
- EXCAVATION EXTENT



**FIGURE 3**  
**RELATIVE GROUNDWATER ELEVATION MAP - SOUTH**  
**KARCH BLUE DD 30-3J FLOW LINE**  
**OCTOBER 22, 2014**  
**WELD COUNTY, COLORADO**  
**NOBLE ENERGY, INC.**



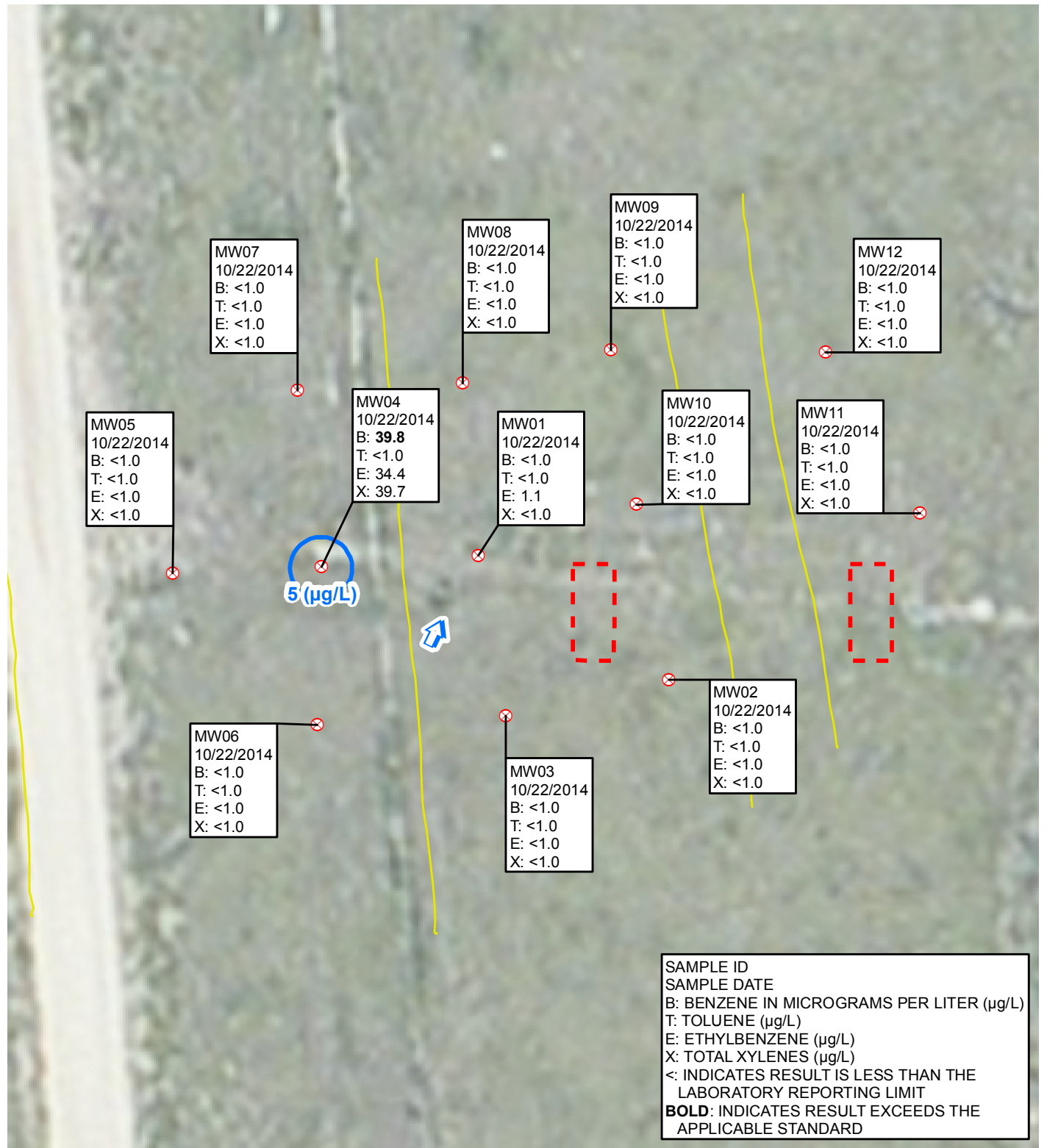
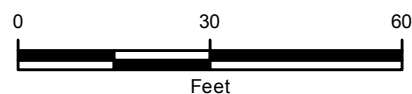


IMAGE COURTESY OF ESRI

## LEGEND

- MONITORING WELL
- CALCULATED GROUNDWATER FLOW DIRECTION
- UNDERGROUND UTILITIES
- BENZENE ISOCONCENTRATION CONTOUR
- EXCAVATION EXTENT



**FIGURE 4**  
**GROUNDWATER ANALYTICAL RESULTS - SOUTH**  
**KARCH BLUE DD 30-3J FLOW LINE**  
**WELD COUNTY, COLORADO**

**NOBLE ENERGY, INC.**



## **TABLES**



TABLE 1

**GROUNDWATER ANALYTICAL RESULTS**  
**KARCH BLUE DD 30-3J FLOW LINE - SOUTH**  
**WELD COUNTY, COLORADO**  
**NOBLE ENERGY, INC.**

Monitoring Well	Date	Depth to Water (feet btoc)	Relative Groundwater Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW01	10/15/2013	4.30	90.54	1.08	1.21	43.8	60.9
	1/30/2014	4.95	89.89	<1.0	<1.0	9.22	<1.0
	4/30/2014	3.90	90.94	<1.0	<1.0	6.4	<1.0
	7/25/2014	4.18	90.66	<1.0	<1.0	<1.0	<1.0
	10/22/2014	4.75	90.09	<1.0	<1.0	1.1	<1.0
MW02	10/15/2013	4.05	90.55	<1.0	<1.0	<1.0	<1.0
	1/30/2014	4.62	89.98	<1.0	<1.0	<1.0	<1.0
	4/30/2014	3.65	90.95	<1.0	<1.0	<1.0	<1.0
	7/25/2014	3.96	90.64	<1.0	<1.0	<1.0	<1.0
	10/22/2014	4.50	90.10	<1.0	<1.0	<1.0	<1.0
MW03	10/15/2013	4.45	90.49	<1.0	<1.0	<1.0	<1.0
	1/30/2014	5.00	89.94	<1.0	<1.0	<1.0	<1.0
	4/30/2014	4.02	90.92	<1.0	<1.0	<1.0	<1.0
	7/25/2014	4.32	90.62	<1.0	<1.0	<1.0	<1.0
	10/22/2014	4.90	90.04	<1.0	<1.0	<1.0	<1.0
MW04	10/15/2013	4.56	90.50	<b>177</b>	1.53	159	240
	1/30/2014	5.12	89.94	<b>101</b>	<1.0	81.2	44.7
	4/30/2014	4.18	90.88	<b>102</b>	<1.0	64.6	108
	7/25/2014	4.51	90.55	<b>48.9</b>	<1.0	78.0	67.8
	10/22/2014	4.97	90.09	<b>39.8</b>	<1.0	34.4	39.7
MW05	10/15/2013	4.83	90.37	<1.0	<1.0	<1.0	<1.0
	1/30/2014	5.40	89.80	<1.0	<1.0	<1.0	<1.0
	4/30/2014	4.43	90.77	<1.0	<1.0	<1.0	<1.0
	7/25/2014	4.79	90.41	<1.0	<1.0	<1.0	<1.0
	10/22/2014	5.15	90.05	<1.0	<1.0	<1.0	<1.0
MW06	10/15/2013	4.91	90.30	<1.0	1.02	<1.0	<1.0
	1/30/2014	5.26	89.95	<1.0	<1.0	<1.0	<1.0
	4/30/2014	4.45	90.76	<1.0	<1.0	<1.0	<1.0
	7/25/2014	4.78	90.43	<1.0	<1.0	<1.0	<1.0
	10/22/2014	4.95	90.26	<1.0	<1.0	<1.0	<1.0
MW07	10/15/2013	5.02	90.06	<1.0	<1.0	<1.0	<1.0
	1/30/2014	5.35	89.73	<1.0	<1.0	<1.0	<1.0
	4/30/2014	4.61	90.47	2.6	<1.0	2.0	<1.0
	7/25/2014	4.67	90.41	<1.0	<1.0	<1.0	<1.0
	10/22/2014	5.15	89.93	<1.0	<1.0	<1.0	<1.0

TABLE 1 (Continued)

**GROUNDWATER ANALYTICAL RESULTS**  
**KARCH BLUE DD 30-3J FLOW LINE - SOUTH**  
**WELD COUNTY, COLORADO**  
**NOBLE ENERGY, INC.**

Monitoring Well	Date	Depth to Water (feet btoc)	Relative Groundwater Elevation (feet)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
MW08	10/15/2013	4.66	90.32	<1.0	<1.0	<1.0	<1.0
	1/30/2014	5.20	89.78	<1.0	<1.0	<1.0	<1.0
	4/30/2014	4.25	90.73	<1.0	<1.0	<1.0	<1.0
	7/25/2014	4.66	90.32	<1.0	<1.0	<1.0	<1.0
	10/22/2014	4.91	90.07	<1.0	<1.0	<1.0	<1.0
MW09	10/15/2013	4.29	90.33	<1.0	<1.0	<1.0	<1.0
	1/30/2014	4.85	89.77	<1.0	<1.0	<1.0	<1.0
	4/30/2014	3.90	90.72	<1.0	<1.0	<1.0	<1.0
	7/25/2014	4.39	90.23	<1.0	<1.0	<1.0	<1.0
	10/22/2014	4.65	89.97	<1.0	<1.0	<1.0	<1.0
MW10	10/15/2013	4.30	90.32	<1.0	<1.0	<1.0	<1.0
	1/30/2014	4.75	89.87	<1.0	<1.0	<1.0	<1.0
	4/30/2014	3.85	90.77	<1.0	<1.0	<1.0	<1.0
	7/25/2014	4.23	90.39	<1.0	<1.0	<1.0	<1.0
	10/22/2014	5.60	89.02	<1.0	<1.0	<1.0	<1.0
MW11	10/15/2013	4.57	90.26	<1.0	<1.0	<1.0	<1.0
	1/30/2014	4.95	89.88	<1.0	<1.0	<1.0	<1.0
	4/30/2014	4.15	90.68	<1.0	<1.0	<1.0	<1.0
	7/25/2014	4.51	90.32	<1.0	<1.0	<1.0	<1.0
	10/22/2014	4.91	89.92	<1.0	<1.0	<1.0	<1.0
MW12	10/15/2013	4.60	90.46	<1.0	<1.0	<1.0	<1.0
	1/30/2014	5.15	89.91	<1.0	<1.0	<1.0	<1.0
	4/30/2014	4.20	90.86	<1.0	<1.0	<1.0	<1.0
	7/25/2014	4.72	90.34	<1.0	<1.0	<1.0	<1.0
	10/22/2014	5.07	89.99	<1.0	<1.0	<1.0	<1.0
<b>CDPHE WQCC Reg 41</b>				<b>5.0</b>	<b>560</b>	<b>700</b>	<b>1,400</b>

**NOTES:**

btoc - below top of casing

µg/L - micrograms per liter

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

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

**BOLD** indicates result exceeds the applicable standard

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

Regulation 41-The Basic Standards for Ground Water

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



October 28, 2014

LT Environmental, Inc.

Chris Roy

4600 West 60th Avenue

Arvada

CO 80003

**Project Name - Noble - Karch Blue DD 30-3J  
(South)**

**Project Number - 008313054**

Attached are your analytical results for Noble - Karch Blue DD 30-3J (South) received by Origins Laboratory, Inc. October 23, 2014. This project is associated with Origins project number X410258-01.

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 Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

**CROSS REFERENCE REPORT**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW01	X410258-01	Water	October 22, 2014 11:00	10/23/2014 10:45
MW02	X410258-02	Water	October 22, 2014 11:10	10/23/2014 10:45
MW03	X410258-03	Water	October 22, 2014 10:50	10/23/2014 10:45
MW05	X410258-04	Water	October 22, 2014 12:20	10/23/2014 10:45
MW06	X410258-05	Water	October 22, 2014 10:40	10/23/2014 10:45
MW07	X410258-06	Water	October 22, 2014 12:00	10/23/2014 10:45
MW08	X410258-07	Water	October 22, 2014 11:50	10/23/2014 10:45
MW09	X410258-08	Water	October 22, 2014 11:40	10/23/2014 10:45
MW10	X410258-09	Water	October 22, 2014 11:30	10/23/2014 10:45
MW11	X410258-10	Water	October 22, 2014 11:10	10/23/2014 10:45

Origins Laboratory, Inc.



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



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

Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

## CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW12	X410258-11	Water	October 22, 2014 11:20	10/23/2014 10:45
MW04	X410258-12	Water	October 22, 2014 12:10	10/23/2014 10:45

Origins Laboratory, Inc.



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

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

Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

www.originslaboratory.com

X410258

ORIGINS  
LABORATORY, INC

page 1 of 2

Client: LT Environmental Project Manager/Send Report To: Noble Team  
Address: \_\_\_\_\_ Email Address: \_\_\_\_\_  
Project Name/Number: Karch Blue DD 30-3J (South)  
Telephone Number: \_\_\_\_\_ Samples Collected By: K. Rabida

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

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis/Method	Sample Instructions
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	Air Summa Canister #		
MW01	10/22/14	11:00	3	X				X			BTEX	1
MW02	10/22/14	11:10	3	X				X				2
MW03	10/22/14	10:50	3	X				X				3
MW05	10/22/14	12:20	3	X				X				4
MW06	10/22/14	10:40	3	X				X				5
MW07	10/22/14	12:00	3	X				X				6
MW08	10/22/14	11:50	3	X				X				7
MW09	10/22/14	11:40	3	X				X				8
MW10	10/22/14	11:30	3	X				X				9
MW11	10/22/14	11:10	3	X				X				10
Relinquished By: <u>[Signature]</u>	Date: <u>10/23/14</u>	Time: <u>10:45</u>		Received By: <u>[Signature]</u>				Time: _____			Date: _____	Turnaround Time: <input type="checkbox"/> Same Day <input type="checkbox"/> 24 Hr <input type="checkbox"/> 48 Hr <input type="checkbox"/> 72 Hr <input checked="" type="checkbox"/> Standard
Relinquished By: _____	Date: _____	Time: _____		Received By: _____				Time: _____			Date: <u>10/23/14</u>	<u>5.2</u>

Date Results Needed:

Comments:

Origins Laboratory, Inc.

Jefe Pellegrini

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 Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

www.originslaboratory.com

X410258

**ORIGINS**  
LABORATORY, INC

page 2 of 2

Client: LT Environmental Project Manager/Send Report To: Noble Team  
Address: \_\_\_\_\_ Email Address: \_\_\_\_\_  
Telephone Number: \_\_\_\_\_ Project Name/Number: Karch Blue DD 30-3J (South)  
Samples Collected By: K. Rabida

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

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis/Method	Sample Instructions
				Unpreserved	HCl	HNO <sub>3</sub>	Other	Groundwater	Soil	Air Summa Canister #		
MW1Z	10/22/14	11:20	3	X				X			BTEX	1
MW04	10/22/14	12:10	3	X				X			BTEX	2
												3
												4
												5
												6
												7
												8
												9
												10
Relinquished By: <u>[Signature]</u>	Date: 10/23/14	Time: 0:45		Received By: <u>[Signature]</u>	Date: 10/23/14	Time: 10:15		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"/> 5.2				
Relinquished By: <u>[Signature]</u>	Date: 10/23/14	Time: 0:45		Received By: <u>[Signature]</u>	Date: 10/23/14	Time: 10:15						

Date Results Needed:

Comments:

Origins Laboratory, Inc.

*Jefe Pellegrini*

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 Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

Origins Laboratory

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

### Sample Receipt Checklist

Origins Work Order: X410258

Client: LTE

Client Project ID: Karch Blue DD 30-3J (South)

Checklist Completed by: Jeff Smith

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

Date/time completed: 10/23/14

Airbill #: N/A

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

Cooler Number/Temperature: 1 / 5.2 °C 1 /     °C 1 /     °C (Describe)     °C

Thermometer ID: T003

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present <sup>(1)</sup> ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is a chain-of-custody (COC) present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client with date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water – is there headspace (> ¼ inch bubble) present? <b>If yes, contact client and note in narrative.</b>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are samples preserved that require preservation and was it checked <sup>(1)</sup> ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity)/pH < 2 for samples preserved with HNO <sub>3</sub> , HCL, H <sub>2</sub> SO <sub>4</sub> / (pH > 10 for samples preserved with NaAsO <sub>2</sub> +NaOH, ZnAc+NaOH)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Additional Comments (if any):				

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

Reviewed by (Project Manager) [Signature]

10-23-14  
Date/Time Reviewed

Origins Laboratory, Inc.

[Signature]

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 Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

**MW01**

**10/22/2014 11:00:00AM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X410258-01 (Water)**

**BTEX by EPA 8260C**

Benzene	ND	1.0	ug/L	1	4J24012	10/24/2014	10/26/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	1.1	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	103 %	87.3-113			"	"	"
Surrogate: Toluene-d8	100 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	99.9 %	88.6-111			"	"	"

Origins Laboratory, Inc.



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

Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

**MW02**

**10/22/2014 11:10:00AM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X410258-02 (Water)**

**BTEX by EPA 8260C**

Benzene	ND	1.0	ug/L	1	4J24012	10/24/2014	10/26/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	105 %	87.3-113			"	"	"
Surrogate: Toluene-d8	98.8 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	101 %	88.6-111			"	"	"

Origins Laboratory, Inc.



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4600 West 60th Avenue  
Arvada CO 80003

Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

**MW03**

**10/22/2014 10:50:00AM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X410258-03 (Water)**

**BTEX by EPA 8260C**

Benzene	ND	1.0	ug/L	1	4J24012	10/24/2014	10/26/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	104 %	87.3-113			"	"	"
Surrogate: Toluene-d8	100 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	99.7 %	88.6-111			"	"	"

Origins Laboratory, Inc.



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Arvada CO 80003

Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

MW05

10/22/2014 12:20:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X410258-04 (Water)

BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	4J24012	10/24/2014	10/26/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

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

Origins Laboratory, Inc.



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4600 West 60th Avenue  
Arvada CO 80003

Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

**MW06**  
**10/22/2014 10:40:00AM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X410258-05 (Water)**

**BTEX by EPA 8260C**

Benzene	ND	1.0	ug/L	1	4J24012	10/24/2014	10/26/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	102 %	87.3-113			"	"	"
Surrogate: Toluene-d8	99.7 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	100 %	88.6-111			"	"	"

Origins Laboratory, Inc.



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4600 West 60th Avenue  
Arvada CO 80003

Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

MW07

10/22/2014 12:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X410258-06 (Water)

BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	4J24012	10/24/2014	10/26/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	104 %	87.3-113			"	"	"
Surrogate: Toluene-d8	100 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	99.4 %	88.6-111			"	"	"

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Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

MW08

10/22/2014 11:50:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X410258-07 (Water)

BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	4J24012	10/24/2014	10/26/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	103 %	87.3-113			"	"	"
Surrogate: Toluene-d8	98.9 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	100 %	88.6-111			"	"	"

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4600 West 60th Avenue  
Arvada CO 80003

Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

**MW09**

**10/22/2014 11:40:00AM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X410258-08 (Water)**

**BTEX by EPA 8260C**

Benzene	ND	1.0	ug/L	1	4J24012	10/24/2014	10/26/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	103 %	87.3-113			"	"	"
Surrogate: Toluene-d8	97.9 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	100 %	88.6-111			"	"	"

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Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

MW10  
10/22/2014 11:30:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X410258-09 (Water)

## BTEX by EPA 8260C

Benzene	ND	1.0	ug/L	1	4J24012	10/24/2014	10/26/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	102 %	87.3-113			"	"	"
Surrogate: Toluene-d8	99.5 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	99.4 %	88.6-111			"	"	"

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LT Environmental, Inc.  
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Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

**MW11****10/22/2014 11:10:00AM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X410258-10 (Water)****BTEX by EPA 8260C**

Benzene	ND	1.0	ug/L	1	4J24012	10/24/2014	10/26/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	102 %	87.3-113			"	"	"
Surrogate: Toluene-d8	99.4 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	99.0 %	88.6-111			"	"	"

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4600 West 60th Avenue  
Arvada CO 80003

Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

MW12  
10/22/2014 11:20:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.  
X410258-11 (Water)

**BTEX by EPA 8260C**

Benzene	ND	1.0	ug/L	1	4J24012	10/24/2014	10/26/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	ND	1.0	"	"	"	"	"
Xylenes, total	ND	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	103 %	87.3-113			"	"	"
Surrogate: Toluene-d8	99.1 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	98.7 %	88.6-111			"	"	"

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4600 West 60th Avenue  
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Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

**MW04**

**10/22/2014 12:10:00PM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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**Origins Laboratory, Inc.**  
**X410258-12 (Water)**

**BTEX by EPA 8260C**

Benzene	39.8	1.0	ug/L	1	4J24012	10/24/2014	10/26/2014
Toluene	ND	1.0	"	"	"	"	"
Ethylbenzene	34.4	1.0	"	"	"	"	"
Xylenes, total	39.7	1.0	"	"	"	"	"

Surrogate: 1,2-Dichloroethane-d4	102 %	87.3-113			"	"	"
Surrogate: Toluene-d8	99.3 %	90.9-108			"	"	"
Surrogate: 4-Bromofluorobenzene	99.4 %	88.6-111			"	"	"

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

Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

**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 4J24012 - EPA 5030B (Water)**

**Blank (4J24012-BLK1)**

Prepared: 10/24/2014 Analyzed: 10/24/2014

Benzene	ND	1.0	ug/L							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes, total	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	54		"	62.5	86.2	87.3-113				S-GC
Surrogate: Toluene-d8	66		"	62.5	105	90.9-108				
Surrogate: 4-Bromofluorobenzene	63		"	62.5	100	88.6-111				

Origins Laboratory, Inc.



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

Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

**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 4J24012 - EPA 5030B (Water)**

**Blank (4J24012-BLK2)**

Prepared: 10/24/2014 Analyzed: 10/27/2014

Benzene	ND	1.0	ug/L							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes, total	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	70		"	62.5	112		87.3-113			
Surrogate: Toluene-d8	64		"	62.5	102		90.9-108			
Surrogate: 4-Bromofluorobenzene	61		"	62.5	97.9		88.6-111			

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

Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

**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 4J24012 - EPA 5030B (Water)**

**LCS (4J24012-BS1)**

Prepared: 10/24/2014 Analyzed: 10/24/2014

Benzene	55.2	1.0	ug/L	50.0	110	75-126
Toluene	55.2	1.0	"	50.0	110	78.7-126
Ethylbenzene	55.4	1.0	"	50.0	111	81-130
m,p-Xylene	111	2.0	"	100	111	77.2-133
o-Xylene	55.6	1.0	"	50.0	111	77.9-126
Surrogate: 1,2-Dichloroethane-d4	61		"	62.5	97.0	87.3-113
Surrogate: Toluene-d8	62		"	62.5	99.8	90.9-108
Surrogate: 4-Bromofluorobenzene	61		"	62.5	97.7	88.6-111

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

Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

**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 4J24012 - EPA 5030B (Water)**

**LCS (4J24012-BS2)**

Prepared: 10/24/2014 Analyzed: 10/27/2014

Benzene	47.2	1.0	ug/L	50.0		94.4	75-126			
Toluene	47.7	1.0	"	50.0		95.4	78.7-126			
Ethylbenzene	49.1	1.0	"	50.0		98.3	81-130			
m,p-Xylene	98.4	2.0	"	100		98.4	77.2-133			
o-Xylene	49.3	1.0	"	50.0		98.7	77.9-126			
Surrogate: 1,2-Dichloroethane-d4	65		"	62.5		104	87.3-113			
Surrogate: Toluene-d8	64		"	62.5		103	90.9-108			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		98.5	88.6-111			

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

Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

**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 4J24012 - EPA 5030B (Water)**

Matrix Spike (4J24012-MS1)		Source: X410250-01			Prepared: 10/24/2014 Analyzed: 10/24/2014					
Benzene	57.5	1.0	ug/L	50.0	ND	115	74-130			
Toluene	59.0	1.0	"	50.0	ND	118	73-131			
Ethylbenzene	60.2	1.0	"	50.0	ND	120	76-132			
m,p-Xylene	119	2.0	"	100	ND	119	69-139			
o-Xylene	57.7	1.0	"	50.0	ND	115	74-131			
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		95.5	87.3-113			
Surrogate: Toluene-d8	63		"	62.5		101	90.9-108			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	88.6-111			

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Arvada CO 80003

Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

**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 4J24012 - EPA 5030B (Water)**

Matrix Spike (4J24012-MS2)		Source: X410258-02			Prepared: 10/24/2014 Analyzed: 10/27/2014					
Benzene	59.8	1.0	ug/L	50.0	ND	120	74-130			
Toluene	60.8	1.0	"	50.0	ND	122	73-131			
Ethylbenzene	63.4	1.0	"	50.0	ND	127	76-132			
m,p-Xylene	128	2.0	"	100	ND	128	69-139			
o-Xylene	64.4	1.0	"	50.0	ND	129	74-131			
Surrogate: 1,2-Dichloroethane-d4	62		"	62.5		99.6	87.3-113			
Surrogate: Toluene-d8	63		"	62.5		102	90.9-108			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.0	88.6-111			

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4600 West 60th Avenue  
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Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

**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 4J24012 - EPA 5030B (Water)**

Matrix Spike Dup (4J24012-MSD1)		Source: X410250-01			Prepared: 10/24/2014 Analyzed: 10/24/2014					
Benzene	53.9	1.0	ug/L	50.0	ND	108	74-130	6.51	20	
Toluene	54.7	1.0	"	50.0	ND	109	73-131	7.44	20	
Ethylbenzene	56.1	1.0	"	50.0	ND	112	76-132	7.19	20	
m,p-Xylene	112	2.0	"	100	ND	112	69-139	6.23	20	
o-Xylene	54.2	1.0	"	50.0	ND	108	74-131	6.27	20	
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		96.3	87.3-113			
Surrogate: Toluene-d8	63		"	62.5		101	90.9-108			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	88.6-111			

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Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

**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 4J24012 - EPA 5030B (Water)**

Matrix Spike Dup (4J24012-MSD2)		Source: X410258-02			Prepared: 10/24/2014 Analyzed: 10/27/2014					
Benzene	60.2	1.0	ug/L	50.0	ND	120	74-130	0.666	20	
Toluene	61.7	1.0	"	50.0	ND	123	73-131	1.40	20	
Ethylbenzene	61.7	1.0	"	50.0	ND	123	76-132	2.76	20	
m,p-Xylene	123	2.0	"	100	ND	123	69-139	3.50	20	
o-Xylene	62.9	1.0	"	50.0	ND	126	74-131	2.22	20	
Surrogate: 1,2-Dichloroethane-d4	63		"	62.5		101	87.3-113			
Surrogate: Toluene-d8	64		"	62.5		102	90.9-108			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		96.9	88.6-111			

Origins Laboratory, Inc.



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

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

Chris Roy  
Project Number: 008313054  
Project: Noble - Karch Blue DD 30-3J (South)

### Notes and Definitions

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

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

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Jen Pellegrini For Noelle Doyle Mathis, President