

## **GROUNDWATER MONITORING REPORT OCTOBER 2009**

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### **COLLINS 14-20 TANK BATTERY**

On September 21, 2009, LT Environmental, Inc. (LTE) personnel were onsite, on behalf of Noble Energy, Inc., to conduct groundwater sampling at the Collins 14-20 tank battery (Site). Site history, assessment, and remediation activities have been described in preceding reports.

Depth to the static groundwater table measurements were collected from the monitoring wells and used to calculate well-specific purge volumes. These measurements are summarized in Table 1. A Site Map is presented on Figure 1. Six monitoring wells were sampled during this monitoring event (SB08, SB09, SB11, SB12, SB13, and SB14). Water levels ranged from 19.34 feet below top of casing (btoc) in SB13 to 21.03 feet btoc in SB08. Following purging, samples were collected and submitted following strict chain of custody protocol to Origins Laboratory, Inc. (Origins) of Denver, Colorado for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) by United States Environmental Protection Agency Method 8260B.

The Colorado Department of Public Health and Environment (CDPHE) has the Basic Standards for Groundwater in Colorado (WQCC Reg. 41) for BTEX of 5 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. All analytical results from the monitoring wells exhibit BTEX concentrations in compliance with WQCC Reg. 41. The laboratory analytical report is included in the Appendix.

The next quarterly groundwater sampling event is scheduled for December 2009. LTE will continue to conduct quarterly groundwater monitoring events with the goal of observing four consecutive quarters of analytical results in compliance with regulatory standards. Once this is achieved, a request for No Further Action will be drafted and submitted to the Colorado Oil and Gas Conservation Committee.

## TABLE

TABLE 1

GROUNDWATER ANALYTICAL DATA  
 COLLINS 14-20 TANK BATTERY  
 ADAMS COUNTY, COLORADO  
 NOBLE ENERGY, INC.

MONITORING WELL	DATE	DEPTH TO WATER (feet btoc)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYLBENZENE (ug/L)	TOTAL XYLENES (ug/L)
SB08	10/29/2008	22.56	<1.0	<1.0	<1.0	<3.0
	2/17/2009	22.49	<1.0	<1.0	<1.0	<3.0
	2/27/2009	22.71	<1.0	<1.0	<1.0	<3.0
	7/1/2009	22.63	<1.0	<1.0	<1.0	<3.0
	9/21/2009	21.03	<1.0	<1.0	<1.0	<3.0
SB09	11/5/2008	19.65	<1.0	<1.0	<1.0	<3.0
	2/17/2009	21.95	<1.0	<1.0	<1.0	<3.0
	2/27/2009	22.04	<1.0	<1.0	<1.0	<3.0
	7/1/2009	22.11	<1.0	<1.0	<1.0	<3.0
	9/21/2009	20.05	<1.0	<1.0	<1.0	<3.0
SB11	2/17/2009	20.70	<1.0	<1.0	<1.0	<3.0
	2/27/2009	21.07	<1.0	<1.0	<1.0	<3.0
	7/1/2009	20.98	1.36	<1.0	<1.0	<3.0
	9/21/2009	19.70	<1.0	<1.0	<1.0	<3.0
SB12	2/17/2009	20.45	<1.0	<1.0	1.32	<3.0
	2/27/2009	20.78	<1.0	<1.0	<1.0	<3.0
	7/1/2009	20.70	<1.0	<1.0	<1.0	<3.0
	9/21/2009	19.85	<1.0	<1.0	<1.0	<3.0
SB13	2/27/2009	21.27	2.18	16.3	182	1,037
	7/1/2009	21.31	<b>14.2</b>	66.4	218	1,517
	9/21/2009	19.34	1.92	7.67	<1.0	521
SB14	2/27/2009	19.71	<b>17.9</b>	486	240	<b>2,335</b>
	7/1/2009	20.77	2.5	<1.0	4.59	74.8
	9/21/2009	19.68	<1.0	<1.0	1.46	3.18
<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

ug/L - micrograms per liter

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

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

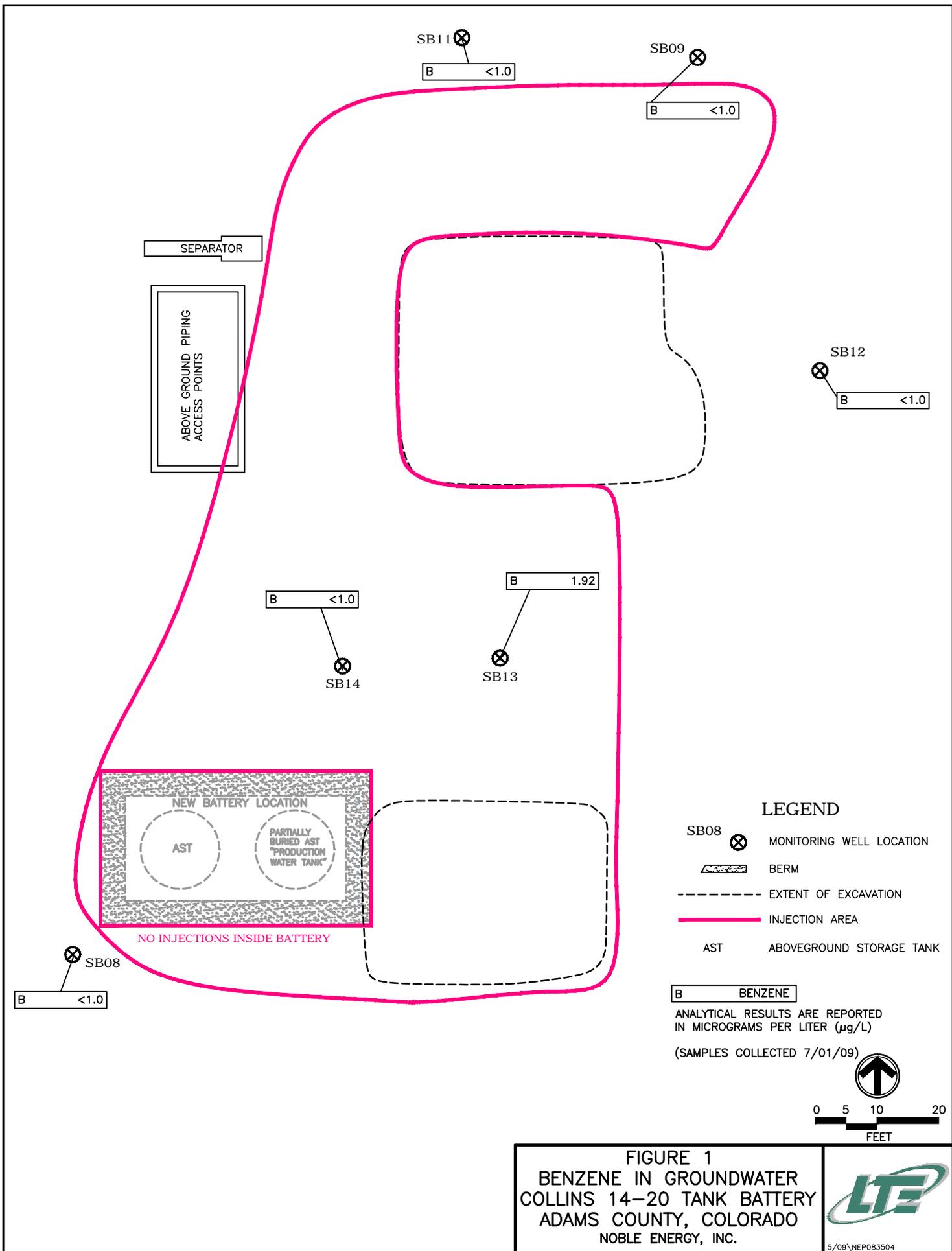
Benzene, toluene, ethylbenzene, and total xylenes analyzed by EPA Method 8260B

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

Commission Regulation 41 covering Basic Standards for Groundwater



**FIGURE**



**APPENDIX**  
**ANALYTICAL REPORT**



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September 25, 2009

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

Brian Dodek  
Project Number: NEP0835.05  
Project: Noble - Collins 14-20

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Attached are the analytical results for Noble - Collins 14-20 received by Origins Laboratory, Inc. 9/22/2009 8:00:00AM. Please let us know if you have any questions, or if we can help with anything at all.

A handwritten signature in black ink, appearing to read "Noelle E Doyle".

Noelle E Doyle  
Laboratory Manager

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. This laboratory report is intended solely for the above addressee and it is only to be used and or reproduced in its entirety.

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LT Environmental, Inc.  
4600 West 60th Avenue  
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Brian Dodek  
Project Number: NEP0835.05  
Project: Noble - Collins 14-20

### CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Sampled	Date Received
SB08	X909065-01	Water	9/21/2009 11:00:00AM	09/22/2009 08:00
SB09	X909065-02	Water	9/21/2009 11:10:00AM	09/22/2009 08:00
SB11	X909065-03	Water	9/21/2009 11:20:00AM	09/22/2009 08:00
SB12	X909065-04	Water	9/21/2009 11:30:00AM	09/22/2009 08:00
SB13	X909065-05	Water	9/21/2009 11:40:00AM	09/22/2009 08:00
SB14	X909065-06	Water	9/21/2009 11:50:00AM	09/22/2009 08:00

Origins Laboratory, Inc.

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Noelle E Doyle, Laboratory Manager



LT Environmental, Inc.

4600 West 60th Avenue

Arvada CO 80003

Brian Dodek

Project Number: NEP0835.05

Project: Noble - Collins 14-20

X909065 page 1 of 1

originslaboratory.com



Client: \_\_\_\_\_  
 Address: LT ENV.  
 Telephone Number: \_\_\_\_\_  
 E-Mail Address: \_\_\_\_\_

Project Manager: Brian Dodek  
 Project Name: Collins 14-20  
 Project Number: NEP0835  
 Samples Collected by: Mr. Harrison

Sample ID - Description	Date Sampled	Time Sampled	Number of Containers	Preservative			Matrix		Analysis		Sample Instructions	
				Unpreserved	HCl	HNO <sub>3</sub>	Other -	Groundwater	Soil	Air - Summa Canister #		Other -
SB08	9-21-09	1100		X							X	1
SB09		1110										2
SB11		1120										3
SB12		1130										4
SB13		1140										5
SB14		1150										6
												7
												8
												9
												10
Relinquished by: <u>M.H.</u>	Date: <u>9/22/09</u>	Time: <u>1800</u>	Received by: _____	Date: _____	Time: _____	Temperature Upon Receipt: _____						
Relinquished by: _____	Date: _____	Time: _____	Received by: <u>[Signature]</u>	Date: <u>9/22/09</u>	Time: <u>8:00</u>	Turn Around Time:		Same Day	24-hr	48-hr	72-hr	
											X	

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**SB08**  
**X909065–01 (Water)**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

**Origins Laboratory, Inc.**

**BTEX by EPA 8260B**

Benzene	ND	0.00100	mg/L	1	9123001	09/23/2009	09/23/2009	
Toluene	ND	0.00100	"	"	"	"	"	
Ethylbenzene	ND	0.00100	"	"	"	"	"	
o-Xylene	ND	0.00100	"	"	"	"	"	
m,p-Xylene	ND	0.00200	"	"	"	"	"	

<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>109 %</i>	<i>85.7–134</i>			<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>	<i>92.6 %</i>	<i>81.4–121</i>			<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>115 %</i>	<i>74.7–127</i>			<i>"</i>	<i>"</i>	<i>"</i>	

Origins Laboratory, Inc.

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**SB09**  
**X909065-02 (Water)**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

**Origins Laboratory, Inc.**

**BTEX by EPA 8260B**

Benzene	ND	0.00100	mg/L	1	9123001	09/23/2009	09/23/2009	
Toluene	ND	0.00100	"	"	"	"	"	
Ethylbenzene	ND	0.00100	"	"	"	"	"	
o-Xylene	ND	0.00100	"	"	"	"	"	
m,p-Xylene	ND	0.00200	"	"	"	"	"	

<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>108 %</i>	<i>85.7-134</i>			<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>	<i>92.4 %</i>	<i>81.4-121</i>			<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>115 %</i>	<i>74.7-127</i>			<i>"</i>	<i>"</i>	<i>"</i>	

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**SB11**  
**X909065–03 (Water)**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

**Origins Laboratory, Inc.**

**BTEX by EPA 8260B**

Benzene	ND	0.00100	mg/L	1	9123001	09/23/2009	09/23/2009	
Toluene	ND	0.00100	"	"	"	"	"	
Ethylbenzene	ND	0.00100	"	"	"	"	"	
o-Xylene	ND	0.00100	"	"	"	"	"	
m,p-Xylene	ND	0.00200	"	"	"	"	"	

<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>109 %</i>	<i>85.7–134</i>			<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: Toluene-d8</i>	<i>91.9 %</i>	<i>81.4–121</i>			<i>"</i>	<i>"</i>	<i>"</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>112 %</i>	<i>74.7–127</i>			<i>"</i>	<i>"</i>	<i>"</i>	

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**SB12**  
**X909065–04 (Water)**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

**Origins Laboratory, Inc.**

**BTEX by EPA 8260B**

Benzene	ND	0.00100	mg/L	1	9123001	09/23/2009	09/24/2009	
Toluene	ND	0.00100	"	"	"	"	"	
Ethylbenzene	ND	0.00100	"	"	"	"	"	
o-Xylene	ND	0.00100	"	"	"	"	"	
m,p-Xylene	ND	0.00200	"	"	"	"	"	

<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>101 %</i>	<i>85.7–134</i>			<i>"</i>	<i>"</i>	<i>"</i>
<i>Surrogate: Toluene-d8</i>	<i>103 %</i>	<i>81.4–121</i>			<i>"</i>	<i>"</i>	<i>"</i>
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>90.8 %</i>	<i>74.7–127</i>			<i>"</i>	<i>"</i>	<i>"</i>

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**SB13**  
**X909065–05 (Water)**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

**Origins Laboratory, Inc.**

**BTEX by EPA 8260B**

Benzene	<b>0.00192</b>	0.00100	mg/L	1	9123001	09/23/2009	09/24/2009	
Toluene	<b>0.00767</b>	0.00100	"	"	"	"	"	
Ethylbenzene	ND	0.00100	"	"	"	"	"	
o-Xylene	<b>0.166</b>	0.00100	"	"	"	"	"	
m,p-Xylene	<b>0.355</b>	0.00200	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	91.9 %	85.7–134			"	"	"	
Surrogate: Toluene-d8	121 %	81.4–121			"	"	"	
Surrogate: 4-Bromofluorobenzene	99.2 %	74.7–127			"	"	"	

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**SB14**  
**X909065–06 (Water)**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Notes
		Limit							

**Origins Laboratory, Inc.**

**BTEX by EPA 8260B**

Benzene	ND	0.00100	mg/L	1	9123001	09/23/2009	09/23/2009	
Toluene	ND	0.00100	"	"	"	"	"	
Ethylbenzene	<b>0.00146</b>	0.00100	"	"	"	"	"	
o-Xylene	<b>0.00110</b>	0.00100	"	"	"	"	"	
m,p-Xylene	<b>0.00208</b>	0.00200	"	"	"	"	"	

Surrogate: 1,2-Dichloroethane-d4	112 %	85.7–134			"	"	"
Surrogate: Toluene-d8	91.9 %	81.4–121			"	"	"
Surrogate: 4-Bromofluorobenzene	116 %	74.7–127			"	"	"

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**Volatile Organic Compounds by EPA Method 8260B – 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 9I23001 – EPA 5030B**

**Blank (9I23001-BLK1)**

Prepared: 09/23/2009 Analyzed: 09/23/2009

Benzene	ND	0.001	mg/L							
Toluene	ND	0.001	"							
Ethylbenzene	ND	0.001	"							
o-Xylene	ND	0.001	"							
m,p-Xylene	ND	0.002	"							

<i>Surrogate: 1,2-Dichloroethane-d4</i>	64.4		ug/L	62.5		103	85.7-134			
<i>Surrogate: Toluene-d8</i>	59.8		"	62.5		95.7	81.4-121			
<i>Surrogate: 4-Bromofluorobenzene</i>	69.6		"	62.5		111	74.7-127			

**LCS (9I23001-BS1)**

Prepared: 09/23/2009 Analyzed: 09/23/2009

Benzene	0.06	0.001	mg/L	0.0500		124	74.9-126			
Toluene	0.06	0.001	"	0.0500		118	73.3-128			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	65.5		ug/L	62.5		105	85.7-134			
<i>Surrogate: Toluene-d8</i>	59.7		"	62.5		95.5	81.4-121			
<i>Surrogate: 4-Bromofluorobenzene</i>	68.3		"	62.5		109	74.7-127			

**Matrix Spike (9I23001-MS1)**

Source: X909065-01

Prepared: 09/23/2009 Analyzed: 09/23/2009

Benzene	0.06	0.001	mg/L	0.0500	ND	118	78.1-132			
Toluene	0.05	0.001	"	0.0500	ND	109	71.7-124			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	66.9		ug/L	62.5		107	85.7-134			
<i>Surrogate: Toluene-d8</i>	59.0		"	62.5		94.4	81.4-121			
<i>Surrogate: 4-Bromofluorobenzene</i>	68.4		"	62.5		109	74.7-127			

**Matrix Spike Dup (9I23001-MSD1)**

Source: X909065-01

Prepared: 09/23/2009 Analyzed: 09/23/2009

Benzene	0.06	0.001	mg/L	0.0500	ND	119	78.1-132	0.524	24.8	
Toluene	0.05	0.001	"	0.0500	ND	108	71.7-124	1.12	25	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	66.6		ug/L	62.5		107	85.7-134			
<i>Surrogate: Toluene-d8</i>	59.0		"	62.5		94.4	81.4-121			
<i>Surrogate: 4-Bromofluorobenzene</i>	68.5		"	62.5		110	74.7-127			

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Brian Dodek  
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### Notes and Definitions

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

Origins Laboratory, Inc.

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