



SUMP PULL SAMPLING REPORT AUGUST 2013

ROADIFER 12-13B TANK BATTERY

On July 24, 2013, LT Environmental (LTE), under the direction on Noble Energy, Inc. (Noble), in accordance with Colorado Oil and Gas Conservation Commission (COGCC) Rule 905 b(4), conducted sump pull sampling activities at the Roadifer 12-13B Tank Battery (Site). The sump is being replaced as part of typical equipment maintenance activities. A site location map is included as Figure 1.

LTE personnel were on site to field screen soil, collect a confirmation soil sample from the sump sidewall, and collect a groundwater sample from the base of the sump pit. One soil sample was collected from the sidewall at 4 feet below ground surface (bgs) (Figure 2). Groundwater was encountered at approximately 4.5 feet bgs, and therefore no base sample was collected. The sump sidewalls were field screened with a photo-ionization detector (PID). The PID readings ranged from 3.2 parts per million (ppm) in SS01@2' to 61.7 ppm in SS02@4'. The soil sample was submitted under proper chain of custody protocol to Summit Scientific (Summit) of Golden, Colorado, for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, and total petroleum hydrocarbons (TPH) as gasoline range organics by United States Environmental Protection Agency (EPA) Method 8260B, TPH as diesel range organics by EPA Method 8015, electrical conductivity (EC) by Standard Method 2510B, pH by EPA Method 9045, and sodium adsorption ratio (SAR) by calculation.

A grab groundwater sample (PH01) was collected from the base of the sump pit. The sample was submitted to Summit for analysis of BTEX by EPA Method 8260B.

The COGCC cleanup standards for BTEX in soil are 0.17 milligrams per kilogram (mg/kg), 85 mg/kg, 100 mg/kg, and 175 mg/kg, respectively. The COGCC cleanup standards for naphthalene and TPH in soil are 23 mg/kg and 500 mg/kg, respectively. The COGCC standards for EC, pH, and SAR are 4 millimhos per centimeter, 6 to 9 standard units, and 12, respectively. Soil analytical results indicate that the confirmation sidewall sample was compliant with COGCC standards. The soil analytical results are summarized in Table 2, and the laboratory analytical report is attached.

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. Groundwater analytical results, summarized in Table 1, indicate the sample was in compliance with WQCC Reg 41. The laboratory analytical report is attached.

Assessment work conducted at the Site and presented in this report indicates compliance with State standards. The tank battery remains on site, and the facility is still active. Upon site closure, reclamation will be conducted in order to achieve a final reclamation status for the site. No further actions are currently planned for the site.

FIGURES

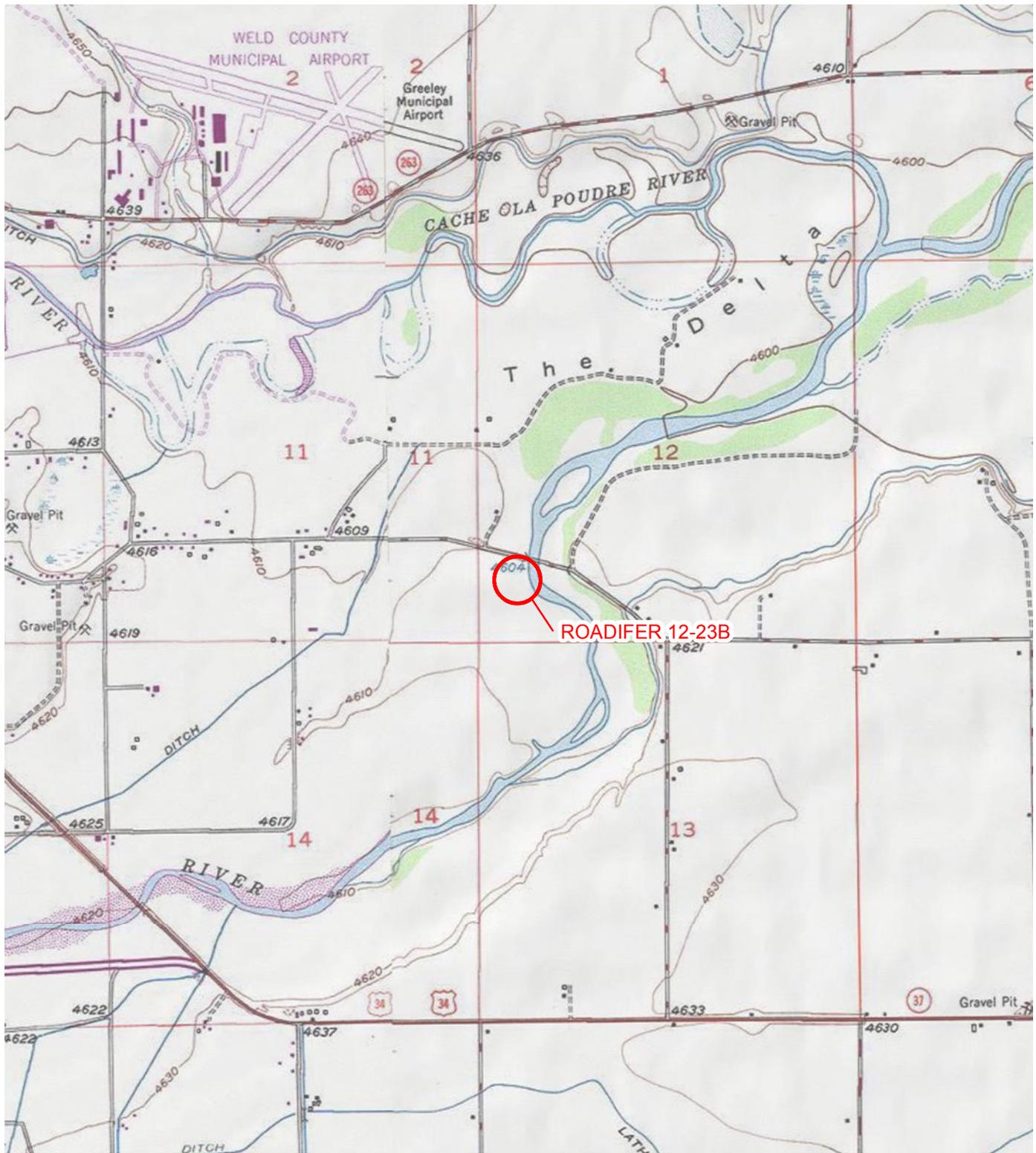


IMAGE COURTESY OF ESRI/USGS

LEGEND

 SITE LOCATION

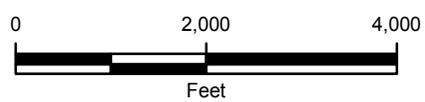


FIGURE 1
 SITE LOCATION MAP
 ROADIFER 12-23B
 WELD COUNTY, COLORADO



NOBLE ENERGY, INC

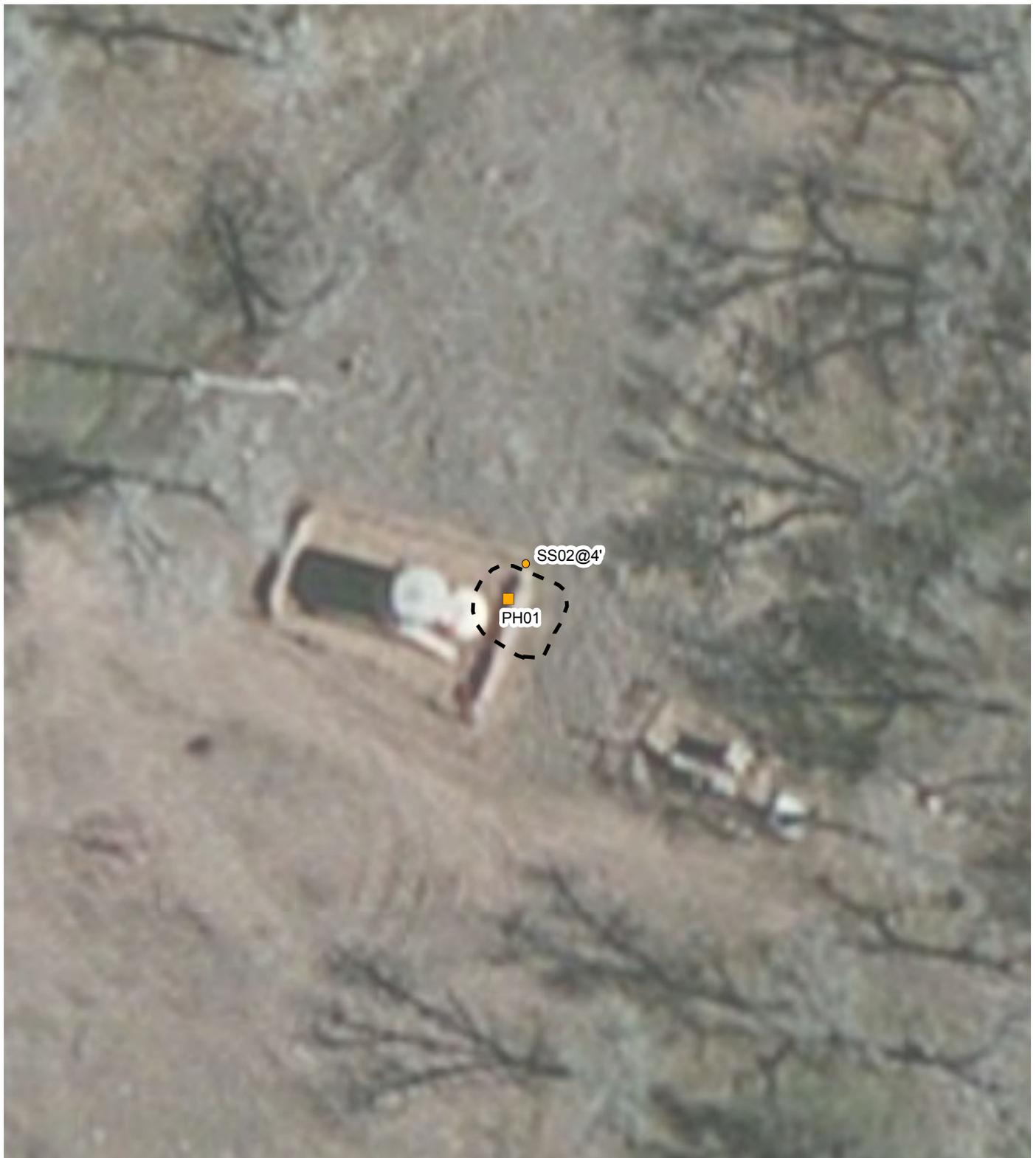


IMAGE COURTESY OF ESRI/BING MAPS

LEGEND

- SOIL SAMPLE
- POT HOLE SAMPLE
- OLD SUMP EXTENT

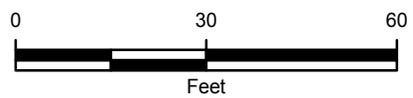


FIGURE 2
SITE MAP
ROADIFER 12-23B
WELD COUNTY, COLORADO

NOBLE ENERGY, INC



TABLES

TABLE 1

**GROUNDWATER ANALYTICAL RESULTS
ROADIFER 12-13B SUMP PULL
WELD COUNTY, COLORADO
NOBLE ENERGY, INC.**

Sample ID	Date Sampled	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
PH01	7/24/2013	<1.0	<1.0	<1.0	<1.0
CDPHE WQCC Reg 41		5.0	560	700	1,400

Notes:

µg/L - micrograms per liter

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

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

CDPHE WQCC Reg 41 - Colorado Department of Public Health and Environmental-Water
Quality Control Commission Regulation 41 covering The Basic Standards for Ground Water

TABLE 2
SOIL ANALYTICAL RESULTS
ROADIFER 12-13B SUMP PULL
WELD COUNTY, COLORADO
NOBLE ENERGY, INC.

Sample ID	Date Sampled	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	TPH (mg/kg)	Naphthalene (mg/kg)	EC (mmhos/cm)	pH	SAR
SS02@4'	7/24/2013	<0.0050	<0.0050	<0.0050	<0.010	21	<50	<50.50	21	0.237	7.93	0.940
COGCC Table 910-1 Standard		0.17	85	100	175	--	--	500	23	4	6 to 9	12

Notes:

mg/kg - milligrams per kilogram

mmhos/cm - millimhos per centimeter

NA - not analyzed

EC - electrical conductivity

SAR - sodium adsorption ratio

GRO - gasoline range organics

DRO - diesel range organics

TPH - total petroleum hydrocarbons

TPH is the sum of GRO and DRO

COGCC - Colorado Oil and Gas Conservation Commission

-- - not applicable

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

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

DRO analyzed by EPA Modified Method 8015

ATTACHMENT

LABORATORY ANALYTICAL REPORT

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

August 27, 2013

Rob Rebel

LT Environmental, Inc.

4600 West 60th Avenue

Arvada, CO 80003

RE: NEP - Roadifer 12-13B

Enclosed are the results of analyses for samples received by Summit Scientific on 07/24/13 17:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to be 'BS' or similar initials, with a long, sweeping horizontal line extending to the right.

Ben Shrewsbury For Joseph J Egry IV
Laboratory Director



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

Project: NEP - Roadifer 12-13B

Project Number: 0083
Project Manager: Rob Rebel

Reported:
08/27/13 11:58

SS02@4'
R307206-02 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 07/24/13 00:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	3072419	07/24/13	07/25/13	8015M	

Date Sampled: 07/24/13 00:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		79.7 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 07/24/13 00:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.0050	mg/kg	1	3072418	07/24/13	07/24/13	EPA 8260B	
Benzene	ND	0.0050	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	21	0.50	"	"	"	"	"	"	

Date Sampled: 07/24/13 00:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		104 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis

Date Sampled: 07/24/13 00:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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Summit Scientific

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

Project: NEP - Roadifer 12-13B

Project Number: 0083
Project Manager: Rob Rebel

Reported:
08/27/13 11:58

SS02@4'
R307206-02 (Soil)

Summit Scientific

Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	125	11.9	mg/kg dry	1	3072501	07/25/13	07/25/13	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	113	5.97	"	"	"	"	"	"	
Sodium	60.5	5.97	"	"	"	"	"	"	

Date Sampled: 07/24/13 00:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	0.940		units	"	3072510	07/25/13	07/25/13	"	

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: 07/24/13 00:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.237	0.00100	mmhos/cm	1	3072420	07/24/13	07/24/13	SM 2510B	

Date Sampled: 07/24/13 00:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	7.93	0.100	pH Units	"	3072421	"	07/24/13	EPA 9045	

Date Sampled: 07/24/13 00:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	83.8		%	"	3072504	07/25/13	07/25/13	% calculation	

Summit Scientific

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

Project: NEP - Roadifer 12-13B

Project Number: 0083
Project Manager: Rob Rebel

Reported:
08/27/13 11:58

Extractable Petroleum Hydrocarbons by 8015 - Quality Control
Summit Scientific

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

Batch 3072419 - EPA 3550A

Blank (3072419-BLK1)

Prepared: 07/24/13 Analyzed: 07/25/13

C10-C28 (DRO) ND 50 mg/kg

LCS (3072419-BS1)

Prepared: 07/24/13 Analyzed: 07/25/13

C10-C28 (DRO) 510 50 mg/kg 501 102 73-134

LCS Dup (3072419-BSD1)

Prepared: 07/24/13 Analyzed: 07/25/13

C10-C28 (DRO) 491 50 mg/kg 501 98.1 73-134 3.64 11

Matrix Spike (3072419-MS1)

Source: R307201-02

Prepared: 07/24/13 Analyzed: 07/25/13

C10-C28 (DRO) 506 50 mg/kg 501 ND 101 50-148

Matrix Spike Dup (3072419-MSD1)

Source: R307201-02

Prepared: 07/24/13 Analyzed: 07/25/13

C10-C28 (DRO) 477 50 mg/kg 501 ND 95.2 50-148 5.93 13

Summit Scientific

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

Project: NEP - Roadifer 12-13B

Project Number: 0083
Project Manager: Rob Rebel

Reported:
08/27/13 11:58

Volatile Organic Compounds by EPA Method 8260B - Quality Control
Summit Scientific

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

Batch 3072418 - EPA 5030 Soil MS

Blank (3072418-BLK1)

Prepared & Analyzed: 07/24/13

Naphthalene	ND	0.0050	mg/kg							
Benzene	ND	0.0050	"							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.010	"							
Gasoline Range Hydrocarbons	ND	0.50	"							
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0437</i>		<i>"</i>	<i>0.0397</i>		<i>110</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0399</i>		<i>"</i>	<i>0.0400</i>		<i>99.8</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0416</i>		<i>"</i>	<i>0.0400</i>		<i>104</i>	<i>21-167</i>			

LCS (3072418-BS1)

Prepared & Analyzed: 07/24/13

Naphthalene	ND	0.0050	mg/kg				66-138			
Benzene	0.105	0.0050	"	0.100		105	58-130			
Toluene	0.107	0.0050	"	0.100		107	61-134			
Ethylbenzene	0.134	0.0050	"	0.100		134	74-139			
m,p-Xylene	0.251	0.010	"	0.200		126	73-137			
o-Xylene	0.127	0.0050	"	0.100		127	73-141			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0452</i>		<i>"</i>	<i>0.0397</i>		<i>114</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0376</i>		<i>"</i>	<i>0.0400</i>		<i>94.0</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0422</i>		<i>"</i>	<i>0.0400</i>		<i>105</i>	<i>21-167</i>			

LCS Dup (3072418-BSD1)

Prepared & Analyzed: 07/24/13

Naphthalene	ND	0.0050	mg/kg				66-138		12	
Benzene	0.102	0.0050	"	0.100		102	58-130	2.29	13	
Toluene	0.116	0.0050	"	0.100		116	61-134	8.16	16	
Ethylbenzene	0.131	0.0050	"	0.100		131	74-139	2.28	12	
m,p-Xylene	0.249	0.010	"	0.200		125	73-137	0.887	14	
o-Xylene	0.126	0.0050	"	0.100		126	73-141	0.998	12	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0443</i>		<i>"</i>	<i>0.0397</i>		<i>112</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0399</i>		<i>"</i>	<i>0.0400</i>		<i>99.8</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0419</i>		<i>"</i>	<i>0.0400</i>		<i>105</i>	<i>21-167</i>			

Summit Scientific

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

Project: NEP - Roadifer 12-13B

Project Number: 0083
Project Manager: Rob Rebel

Reported:
08/27/13 11:58

Volatile Organic Compounds by EPA Method 8260B - Quality Control
Summit Scientific

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

Batch 3072418 - EPA 5030 Soil MS

Matrix Spike (3072418-MS1)

Source: R307201-02

Prepared & Analyzed: 07/24/13

Naphthalene	ND	0.0050	mg/kg		ND		10-158			
Benzene	0.103	0.0050	"	0.100	0.00	103	30-131			
Toluene	0.103	0.0050	"	0.100	0.00	103	30-134			
Ethylbenzene	0.132	0.0050	"	0.100	0.00	132	22-153			
m,p-Xylene	0.248	0.010	"	0.200	0.00	124	10-159			
o-Xylene	0.125	0.0050	"	0.100	0.00	125	31-151			
Surrogate: 1,2-Dichloroethane-d4	0.0449		"	0.0397		113	23-173			
Surrogate: Toluene-d8	0.0353		"	0.0400		88.4	20-170			
Surrogate: 4-Bromofluorobenzene	0.0424		"	0.0400		106	21-167			

Matrix Spike Dup (3072418-MSD1)

Source: R307201-02

Prepared: 07/24/13 Analyzed: 07/25/13

Naphthalene	ND	0.0050	mg/kg		ND		10-158			42
Benzene	0.106	0.0050	"	0.100	0.00	106	30-131	2.21		34
Toluene	0.114	0.0050	"	0.100	0.00	114	30-134	10.1		30
Ethylbenzene	0.128	0.0050	"	0.100	0.00	128	22-153	2.47		24
m,p-Xylene	0.242	0.010	"	0.200	0.00	121	10-159	2.29		68
o-Xylene	0.123	0.0050	"	0.100	0.00	123	31-151	1.26		38
Surrogate: 1,2-Dichloroethane-d4	0.0466		"	0.0397		117	23-173			
Surrogate: Toluene-d8	0.0390		"	0.0400		97.5	20-170			
Surrogate: 4-Bromofluorobenzene	0.0418		"	0.0400		104	21-167			

Summit Scientific

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4600 West 60th Avenue
Arvada CO, 80003

Project: NEP - Roadifer 12-13B

Project Number: 0083
Project Manager: Rob Rebel

Reported:
08/27/13 11:58

Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis - Quality Control
Summit Scientific

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

Batch 3072501 - General Preparation

Blank (3072501-BLK1)

Prepared & Analyzed: 07/25/13

Calcium	ND	10.0	mg/kg wet							
Magnesium	ND	5.00	"							
Sodium	ND	5.00	"							

LCS (3072501-BS1)

Prepared & Analyzed: 07/25/13

Calcium	438	10.0	mg/kg wet	401	109	80-120				
Magnesium	228	5.00	"	201	113	80-120				
Sodium	592	5.00	"	502	118	80-120				

Matrix Spike (3072501-MS1)

Source: R307206-02

Prepared & Analyzed: 07/25/13

Calcium	592	11.9	mg/kg dry	465	125	100	75-125			
Magnesium	337	5.97	"	233	113	96.2	75-125			
Sodium	722	5.97	"	581	60.5	114	75-125			

Matrix Spike Dup (3072501-MSD1)

Source: R307206-02

Prepared & Analyzed: 07/25/13

Calcium	555	11.9	mg/kg dry	463	125	92.9	75-125	6.46	25	
Magnesium	307	5.97	"	232	113	83.7	75-125	9.31	25	
Sodium	743	5.97	"	579	60.5	118	75-125	2.75	25	

Summit Scientific

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LT Environmental, Inc.
 4600 West 60th Avenue
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Project: NEP - Roadifer 12-13B

Project Number: 0083
 Project Manager: Rob Rebel

Reported:
 08/27/13 11:58

Physical Parameters by APHA/ASTM/EPA Methods - Quality Control
Summit Scientific

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

Batch 3072420 - General Preparation

Duplicate (3072420-DUP1)		Source: R307206-02			Prepared & Analyzed: 07/24/13					
Specific Conductance (EC)	0.258	0.00100	mmhos/cm		0.237			8.42	20	

Batch 3072421 - General Preparation

Duplicate (3072421-DUP1)		Source: R307206-02			Prepared & Analyzed: 07/24/13					
pH	7.82	0.100	pH Units		7.93			1.40	20	

Batch 3072504 - General Preparation

Duplicate (3072504-DUP1)		Source: R307206-02			Prepared & Analyzed: 07/25/13					
% Solids	82.1		%		83.8			2.05	20	

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

Project: NEP - Roadifer 12-13B

Project Number: 0083
Project Manager: Rob Rebel

Reported:
08/27/13 11:58

Notes and Definitions

DET Analyte DETECTED
ND Analyte NOT DETECTED at or above the reporting limit
NR Not Reported
dry Sample results reported on a dry weight basis
RPD Relative Percent Difference

Summit Scientific

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