

State of Colorado
Oil and Gas Conservation Commission



1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303) 894-2100 Fax 894-2109

#8126

FOR OGCC USE ONLY

Received
12/5/2013

SITE INVESTIGATION AND REMEDIATION WORKPLAN

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. Form 27 is intended to be used whenever possible. Additional documentation will be required when large volumes of soil and groundwater have been impacted or involve large facilities with multiple source areas. See Rule 910. Attach as many pages as needed to fully describe the proposed work.

OGCC Employee:

Spill Complaint
 Inspection NOAV

Tracking No: 2146079

CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

Spill or Release Plug & Abandon Central Facility Closure Site/Facility Closure Other (describe): NFA

GENERAL INFORMATION

OGCC Operator Number: 8960 Name of Operator: Bonanza Creek Energy Operating Company LLC Address: 410 17th Street, Suite 1400 City: Denver State: CO Zip: 80202		Contact Name and Telephone Name: Tom Peterson No: 720-440-6113 Fax: 720-279-2331	
API/Facility No: 05-123-37286 Facility Name: Antelope F-31 Pad Well Name: Antelope K-Q-31HNB Location (QtrQtr, Sec, Twp, Rng, Meridian): NWNW 31-T5N-R62W		County: Weld Facility Number: 429990 Well Number: Latitude: 40.36224 Longitude: -104.37071	

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc.): Oil

Site Conditions: Is location within a sensitive area (according to Rule 901e)? Y N If yes, attach evaluation. Groundwater < 20 ft.

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): Rangeland

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: Fine Sand

Potential receptors (water wells within 1/4 mi, surface waters, etc.): Surface water, wetlands, and buildings are greater than one mile from the site.
A water well is located approximately 1,200 feet southeast of the site.

Description of Impact (if previously provided, refer to that form or document):

Impacted Media (check):	Extent of Impact:	How Determined:
<input checked="" type="checkbox"/> Soils	80' N-S x 60' E-W x 1'-15' bgs	Soil samples were collected for laboratory analysis
<input type="checkbox"/> Vegetation		
<input type="checkbox"/> Groundwater	Not encountered	
<input type="checkbox"/> Surface water		

REMEDIATION WORKPLAN

Describe initial action taken (if previously provided, refer to that form or document):

The tank equalizing valve was shut between tanks 1 and 2 not allowing any oil to run over to the next tank as the first tank filled up. Approximately 100 bbls of oil were released within the lined tank battery containment berm as the well cycled on overnight. Upon discovery of the release, the equalizer valve was opened and a vacuum truck was used to recover approximately 97 bbls of standing oil from inside the lined tank battery containment berm. Approximately 3 bbls of oil may have breached the liner due to a hole discovered in the liner after the gravel was removed. The tank battery was dismantled and the petroleum hydrocarbon impacted soil was excavated to a maximum depths of 1 ft to 15 ft bgs.

Describe how source is to be removed:

On October 4 and 10, 2013, representative confirmation soil samples were collected from the base and sidewalls of the tank battery excavation and submitted for laboratory analysis of TPH and BTEX. Laboratory analytical results confirmed that TPH and BTEX concentrations were below COGCC allowable levels at the extent of the excavation. Approximately 1,150 cubic yards of impacted soil were removed from the excavation. Groundwater was not encountered in the excavation.

Describe how remediation of existing impacts is to be accomplished, including removal and disposal at an injection well or licensed facility, land treatment on site, removal of impacted groundwater, insitu bioremediation, burning of oily vegetation, etc.:

The impacted soil was transported to Waste Management's Buffalo Ridge landfill in Keenesburg, Colorado for disposal.



REMEDIATION WORKPLAN (CONT.)

OGCC Employee: R. Allison

Tracking Number: 2146079
Name of Operator: Bonanza Creek Energy Operating Company LLC
OGCC Operator No: 8960
Received Date: 12/5/2013
Well Name & No: Antelope F-31 Pad
Facility Name & No.: Antelope K-O-31HNB

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):
Groundwater was not encountered in the excavation.

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.
The site was restored to its pre-release grade. Bonanza Creek's production facility will be rebuilt at the site.

Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.
Is further site investigation required? Y N If yes, describe:
No further investigation is required at this site. Laboratory results for the excavation soil samples confirmed that TPH and BTEX concentrations were below COGCC allowable levels at the extent of the excavation. Based on the laboratory results, Bonanza Creek is requesting a No Further Action status for this site.

Final disposition of E&P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):
The impacted soil was transported to Waste Management's Buffalo Ridge landfill in Keenesburg, Colorado for disposal.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: 9/3/13 Date Site Investigation Completed: 10/10/13 Remediation Plan Submitted: 12/5/2013
Remediation Start Date: 9/3/13 Anticipated Completion Date: 12/1/13 Actual Completion Date: 12/1/2013

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Print Name: Tom Peterson
Signed: Tom Peterson Title: Environmental Specialist Date: 12/5/13

OGCC Approved: _____ Title: Northeast EPS Date: 12/18/2013



LEGEND

- SOIL SAMPLE
- ✗ RELEASE
- - - EXCAVATION EXTENT
- ◻ FORMER TANK

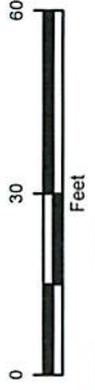


IMAGE COURTESY OF GOOGLE EARTH 2013

FIGURE 1
 EXCAVATION SITE MAP
 ANTELOPE K-O-31HNB
 NWNW SEC 31-T5N-R62W
 WELD COUNTY, COLORADO
 BONANZA CREEK ENERGY OPERATING COMPANY LLC





TABLE 1
SOIL SAMPLE ANALYTICAL DATA
ANTELOPE K-O-31HNB
BONANZA CREEK ENERGY OPERATING COMPANY LLC

SAMPLE ID	SAMPLE DATE	DEPTH (feet bgs)	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYL-BENZENE (mg/kg)	XYLENES (Total) (mg/kg)	TPH-GRO (mg/kg)	TPH (mg/kg)
P01@1'	10/4/2013	1	<0.0050	<0.0050	<0.0050	<0.0080	0.74	<50
P02@1'	10/4/2013	1	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	<50
P03@1'	10/4/2013	1	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	<50
P04@1'	10/4/2013	1	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	<50
N01@9'	10/4/2013	9	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	<50
N02@9'	10/4/2013	9	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	<50
N03@6'	10/4/2013	6	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	<50
E01@9'	10/4/2013	9	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	<50
E02@6'	10/4/2013	6	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	<50
S01@9'	10/4/2013	9	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	<50
S02@9'	10/4/2013	9	<0.0050	0.015	0.0077	0.070	1.2	<50
S03@6'	10/4/2013	6	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	<50
W01@9'	10/4/2013	9	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	<50
W02@6'	10/4/2013	6	2.0	21	1.5	59	7,900	9,030
B01@10'	10/4/2013	10	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	<50
B02@10'	10/4/2013	10	0.0036	0.013	0.011	0.22	2.8	<50
B03@10'	10/4/2013	10	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	<50
B04@6'	10/4/2013	6	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	<50
W03@8'	10/10/2013	8	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	<50
B05@15'	10/10/2013	15	<0.0050	<0.0050	<0.0050	<0.0050	<0.50	<50

Notes:
 bgs - below ground surface
 mg/kg - milligrams per kilogram
 TPH - Total Petroleum Hydrocarbons
 GRO - Gasoline Range Organics
 TEPH - Total Extractable Petroleum Hydrocarbons
 DRO - Diesel Range Organics
 ORO - Oil Range Organics
 < - less than laboratory reporting limit
 COGCC - Colorado Oil and Gas Conservation Commission
 Results noted in bold exceed COGCC allowable levels.

Summit Scientific

741 Corporate Circle – Suite J ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.374.5933 - fax

October 14, 2013

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

RE: BC - State Antelope K-O-31

Enclosed are the results of analyses for samples received by Summit Scientific on 10/10/13 17:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Joseph J Egry IV
Laboratory Director

This report shall not be reproduced, except in its entirety, without the written approval of Summit Scientific. Test results relate only to samples analyzed.

Summit Scientific is the sole authority for authorizing edits or modifications to this document. Unauthorized modification of this report is strictly prohibited.

S₂

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

Project: BC - State Antelope K-O-31

Project Number: 0345-13026
Project Manager: Justin Solomon

Reported:
10/14/13 12:25

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B05@15'	R310111-01	Soil	10/10/13 15:20	10/10/13 17:15
W03@8'	R310111-02	Soil	10/10/13 15:30	10/10/13 17:15

Summit Scientific

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.



Joseph J Egry IV, Laboratory Director



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

Project: BC - State Antelope K-O-31

Project Number: 0345-13026
Project Manager: Justin Solomon

Reported:
10/14/13 12:25

B05@15'
R310111-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/10/13 15:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3101013	10/10/13	10/10/13 22:04	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/10/13 15:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl	94.9 %	30-150			"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/10/13 15:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	3101012	10/10/13	10/10/13 22:25	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: 10/10/13 15:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	95.1 %	23-173			"	"	"	"	
Surrogate: Toluene-d8	99.4 %	20-170			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	104 %	21-167			"	"	"	"	

Summit Scientific

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Joseph J Egry IV, Laboratory Director

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

Project: BC - State Antelope K-O-31

Project Number: 0345-13026
Project Manager: Justin Solomon

Reported:
10/14/13 12:25

W03@8'
R310111-02 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/10/13 15:30

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3101013	10/10/13	10/10/13 22:35	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/10/13 15:30

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl	87.4 %	30-150			"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/10/13 15:30

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	3101012	10/10/13	10/10/13 22:50	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: 10/10/13 15:30

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4	98.2 %	23-173			"	"	"	"	
Surrogate: Toluene-d8	101 %	20-170			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	103 %	21-167			"	"	"	"	

Summit Scientific

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Joseph J Egry IV, Laboratory Director

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

Project: BC - State Antelope K-O-31

Project Number: 0345-13026
Project Manager: Justin Solomon

Reported:
10/14/13 12:25

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 3101013 - EPA 3550A

Blank (3101013-BLK1)				Prepared: 10/10/13 Analyzed: 10/11/13							
C10-C28 (TEPH-DRO)	ND	50	mg/kg								
C28-C36 (TEPH-ORO)	ND	50	"								
LCS (3101013-BS1)				Prepared: 10/10/13 Analyzed: 10/11/13							
C10-C28 (TEPH-DRO)	479	50	mg/kg	501	95.7	73-134					
LCS Dup (3101013-BSD1)				Prepared: 10/10/13 Analyzed: 10/11/13							
C10-C28 (TEPH-DRO)	442	50	mg/kg	501	88.1	73-134	8.22	11			
Matrix Spike (3101013-MS1)				Source: R310106-01 Prepared: 10/10/13 Analyzed: 10/11/13							
C10-C28 (TEPH-DRO)	443	50	mg/kg	501	ND	88.4	50-148				
Matrix Spike Dup (3101013-MSD1)				Source: R310106-01 Prepared: 10/10/13 Analyzed: 10/11/13							
C10-C28 (TEPH-DRO)	441	50	mg/kg	501	ND	88.1	50-148	0.364	13		

Summit Scientific

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Joseph J Egry IV, Laboratory Director

S2

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

Project: BC - State Antelope K-O-31

Project Number: 0345-13026
Project Manager: Justin Solomon

Reported:
10/14/13 12:25

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 3101012 - EPA 5030 Soil MS

Blank (3101012-BLK1)

Prepared & Analyzed: 10/10/13

Benzene	ND	0.0020	mg/kg							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.0050	"							
Gasoline Range Hydrocarbons	ND	0.50	"							
Surrogate: 1,2-Dichloroethane-d4	0.0418		"	0.0397	105	23-173				
Surrogate: Toluene-d8	0.0394		"	0.0400	98.5	20-170				
Surrogate: 4-Bromofluorobenzene	0.0367		"	0.0400	91.7	21-167				

LCS (3101012-BS1)

Prepared & Analyzed: 10/10/13

Benzene	0.151	0.0020	mg/kg	0.150	100	58-130				
Toluene	0.150	0.0050	"	0.150	99.8	61-134				
Ethylbenzene	0.153	0.0050	"	0.150	102	74-139				
m,p-Xylene	0.301	0.010	"	0.300	100	73-137				
o-Xylene	0.151	0.0050	"	0.150	101	73-141				
Surrogate: 1,2-Dichloroethane-d4	0.0417		"	0.0397	105	23-173				
Surrogate: Toluene-d8	0.0401		"	0.0400	100	20-170				
Surrogate: 4-Bromofluorobenzene	0.0404		"	0.0400	101	21-167				

LCS Dup (3101012-BSD1)

Prepared: 10/10/13 Analyzed: 10/11/13

Benzene	0.144	0.0020	mg/kg	0.150	96.1	58-130	4.28	13		
Toluene	0.146	0.0050	"	0.150	97.5	61-134	2.41	16		
Ethylbenzene	0.154	0.0050	"	0.150	103	74-139	1.04	12		
m,p-Xylene	0.305	0.010	"	0.300	102	73-137	1.10	14		
o-Xylene	0.153	0.0050	"	0.150	102	73-141	1.27	12		
Surrogate: 1,2-Dichloroethane-d4	0.0399		"	0.0397	100	23-173				
Surrogate: Toluene-d8	0.0392		"	0.0400	98.1	20-170				
Surrogate: 4-Bromofluorobenzene	0.0406		"	0.0400	101	21-167				

Summit Scientific

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Joseph J Egry IV, Laboratory Director

S₂

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

Project: BC - State Antelope K-O-31

Project Number: 0345-13026
Project Manager: Justin Solomon

Reported:
10/14/13 12:25

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 3101012 - EPA 5030 Soil MS

Matrix Spike (3101012-MS1)

Source: R310106-01

Prepared: 10/10/13

Analyzed: 10/11/13

Benzene	0.147	0.0020	mg/kg	0.150	ND	97.8	30-131		
Toluene	0.147	0.0050	"	0.150	ND	98.3	30-134		
Ethylbenzene	0.152	0.0050	"	0.150	ND	101	22-153		
m,p-Xylene	0.298	0.010	"	0.300	ND	99.3	10-159		
o-Xylene	0.152	0.0050	"	0.150	ND	101	31-151		
Surrogate: 1,2-Dichloroethane-d4	0.0409		"	0.0397		103	23-173		
Surrogate: Toluene-d8	0.0401		"	0.0400		100	20-170		
Surrogate: 4-Bromofluorobenzene	0.0397		"	0.0400		99.2	21-167		

Matrix Spike Dup (3101012-MSD1)

Source: R310106-01

Prepared: 10/10/13

Analyzed: 10/11/13

Benzene	0.147	0.0020	mg/kg	0.150	ND	98.3	30-131	0.428	34
Toluene	0.147	0.0050	"	0.150	ND	98.3	30-134	0.0204	30
Ethylbenzene	0.153	0.0050	"	0.150	ND	102	22-153	0.886	24
m,p-Xylene	0.301	0.010	"	0.300	ND	100	10-159	0.942	68
o-Xylene	0.153	0.0050	"	0.150	ND	102	31-151	0.828	38
Surrogate: 1,2-Dichloroethane-d4	0.0404		"	0.0397		102	23-173		
Surrogate: Toluene-d8	0.0394		"	0.0400		98.6	20-170		
Surrogate: 4-Bromofluorobenzene	0.0389		"	0.0400		97.4	21-167		

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Joseph J Egry IV, Laboratory Director

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

Project: BC - State Antelope K-O-31

Project Number: 0345-13026
Project Manager: Justin Solomon

Reported:
10/14/13 12:25

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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Joseph J Egry IV, Laboratory Director

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

October 06, 2013

Justin Solomon

LT Environmental, Inc.

4600 West 60th Avenue

Arvada, CO 80003

RE: BC - Antelope K-31 Bonanza Creek

Enclosed are the results of analyses for samples received by Summit Scientific on 10/04/13 15:30. 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', with a long, sweeping horizontal line extending to the right.

Ben Shrewsbury

President / Laboratory Manager

S₂

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

Project: BC - Antelope K-31 Bonanza Creek

Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
P01@1'	R310068-01	Soil	10/04/13 11:40	10/04/13 15:30
P02@1'	R310068-02	Soil	10/04/13 11:45	10/04/13 15:30
P03@1'	R310068-03	Soil	10/04/13 11:50	10/04/13 15:30
P04@1'	R310068-04	Soil	10/04/13 11:55	10/04/13 15:30
N01@9'	R310068-05	Soil	10/04/13 12:00	10/04/13 15:30
N02@9'	R310068-06	Soil	10/04/13 12:05	10/04/13 15:30
N03@6'	R310068-07	Soil	10/04/13 12:10	10/04/13 15:30
E01@9'	R310068-08	Soil	10/04/13 12:15	10/04/13 15:30
E02@6'	R310068-09	Soil	10/04/13 12:20	10/04/13 15:30
S01@9'	R310068-10	Soil	10/04/13 12:25	10/04/13 15:30
S02@9'	R310068-11	Soil	10/04/13 12:30	10/04/13 15:30
S03@6'	R310068-12	Soil	10/04/13 12:35	10/04/13 15:30
W01@9'	R310068-13	Soil	10/04/13 12:40	10/04/13 15:30
W02@6'	R310068-14	Soil	10/04/13 12:45	10/04/13 15:30
B01@10'	R310068-15	Soil	10/04/13 12:50	10/04/13 15:30
B02@10'	R310068-16	Soil	10/04/13 12:55	10/04/13 15:30
B03@10'	R310068-17	Soil	10/04/13 13:00	10/04/13 15:30
B04@6'-7"	R310068-18	Soil	10/04/13 13:05	10/04/13 15:30

Summit Scientific

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S₂

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

Project: BC - Antelope K-31 Bonanza Creek
Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

R310068.1
Summit Scientific

5:

741 Corporate Circle Suite 1 • Golden, Colorado 80401
303-777-9310 • 303-774-9333 Fax

Page 1 of 2

Client: LT Environmental
Address: 4600 W. 60th Ave.
City/State/Zip: Arvada, CO, 80003
Phone: 303-437-9788 Fax: 303-437-1832
Sample Name: Milk Uager
Project Manager: Justin Solomon
E-Mail: jsolomon@summit-sc.com
Project Name: Antelope K-31 Bonanza Creek
Project Number: 0345-13

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix			Analyze For:	Special Instructions		
				HCl	HNO ₃	Zone	Other (Specify)	Groundwater	Soil	Air - Continer Serial #			Other (Specify)	
101C1	10/4/13	11:46	1											
102C1		11:47	1											
103C1		11:50	1											
104C1		11:52	1											
101C4		11:50	1											
102C4		11:47	1											
103C4		11:50	1											
104C4		11:52	1											
101C7	10/4/13	11:57	1											

Received by: <u>Milk Uager</u>	Date Time: <u>10/4/13 11:57</u>	Received by:	Date Time:
Retransmitted by:	Date Time:	Retransmitted by:	Date Time:
Received in Lab by:	Date Time:	Received in Lab by:	Date Time:

Turn Around Time (Check)	72 Hours	<input type="checkbox"/>
Same Day	24 Hours	<input checked="" type="checkbox"/>
Standard	48 Hours	<input type="checkbox"/>

Sample Integrity:	Temperature Upon Receipt: <u>11°C</u>
Intact:	Yes No

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

Project: BC - Antelope K-31 Bonanza Creek
Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

R310001.2

Summit Scientific

711 Corporate Creek Suite 100 Golden, Colorado 80401
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Page 2 of 2

Client: Ki Environmental
Address: 4105 W. 16th Ave.
City/State/Zip: Arvada, CO, 80003
Phone: 303-433-4778 Fax:
Sample Name: 1/14/13
Project Manager: Justin Solomon
E-Mail: jsolomon@summit-sc.com
Project Name: Antelope K-31
Project Number: 0345

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative			Matrix			Analyze For	Special Instructions
				HCl	None	Other (Specify)	Soil	Air - Canister Serial #	Other (Specify)		
S2C1	10/4/13	030	1				X				
S2C6		045	1				X				
W01C9		045	1				X				
W02C6		045	1				X				
B21C6		045	1				X				
B22C10		045	1				X				
B23C10	10/4/13	045	1				X				
B04C17	10/4/13	045	1				X				
Relinquished by:	Date Time:	Received by:	Date Time:	Received by:	Date Time:	Received by:	Date Time:	Received by:	Date Time:	Received by:	Date Time:
<u>Justin Solomon</u>	<u>10/4/13</u>	<u>Justin Solomon</u>	<u>10/4/13 1530</u>	<u>Justin Solomon</u>	<u>10/4/13 1530</u>	<u>Justin Solomon</u>	<u>10/4/13 1530</u>	<u>Justin Solomon</u>	<u>10/4/13 1530</u>	<u>Justin Solomon</u>	<u>10/4/13 1530</u>
Relinquished by:	Date Time:	Received by:	Date Time:	Received by:	Date Time:	Received by:	Date Time:	Received by:	Date Time:	Received by:	Date Time:
Relinquished by:	Date Time:	Received by:	Date Time:	Received by:	Date Time:	Received by:	Date Time:	Received by:	Date Time:	Received by:	Date Time:

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

Project: BC - Antelope K-31 Bonanza Creek
Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

P01@1'
R310068-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/04/13 11:40

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3100418	10/04/13	10/04/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/04/13 11:40

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		99.8 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/04/13 11:40

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	3100417	10/04/13	10/04/13	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	0.0080	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	0.74	0.50	"	"	"	"	"	"	

Date Sampled: 10/04/13 11:40

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		109 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		96.3 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

Summit Scientific

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

Project: BC - Antelope K-31 Bonanza Creek

Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

P02@1'
R310068-02 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/04/13 11:45

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3100418	10/04/13	10/04/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/04/13 11:45

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		89.3 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/04/13 11:45

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	3100417	10/04/13	10/04/13	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: 10/04/13 11:45

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		111 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

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

Project: BC - Antelope K-31 Bonanza Creek
Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

P03@1'
R310068-03 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/04/13 11:50

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3100418	10/04/13	10/04/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/04/13 11:50

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		85.5 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/04/13 11:50

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	3100417	10/04/13	10/04/13	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: 10/04/13 11:50

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		112 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		94.4 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		105 %	21-167		"	"	"	"	

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

Project: BC - Antelope K-31 Bonanza Creek
Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

P04@1'
R310068-04 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/04/13 11:55

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3100418	10/04/13	10/05/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/04/13 11:55

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		96.4 %	30-150	"	"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/04/13 11:55

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	3100417	10/04/13	10/04/13	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: 10/04/13 11:55

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		112 %	23-173	"	"	"	"	"	
Surrogate: Toluene-d8		96.1 %	20-170	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167	"	"	"	"	"	

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

Project: BC - Antelope K-31 Bonanza Creek

Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

N01@9'
R310068-05 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/04/13 12:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3100418	10/04/13	10/05/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		86.2 %	30-150	"	"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/04/13 12:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	3100417	10/04/13	10/04/13	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		114 %	23-173	"	"	"	"	"	
Surrogate: Toluene-d8		99.0 %	20-170	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167	"	"	"	"	"	

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

Project: BC - Antelope K-31 Bonanza Creek

Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

N02@9'
R310068-06 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/04/13 12:05

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3100418	10/04/13	10/05/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:05

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		98.4 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/04/13 12:05

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	3100417	10/04/13	10/04/13	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:05

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		110 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		91.1 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		105 %	21-167		"	"	"	"	

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

Project: BC - Antelope K-31 Bonanza Creek
Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

N03@6'
R310068-07 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/04/13 12:10

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3100418	10/04/13	10/05/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:10

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		95.4 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/04/13 12:10

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	3100417	10/04/13	10/04/13	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:10

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		111 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.4 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

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

Project: BC - Antelope K-31 Bonanza Creek
Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

E01@9'
R310068-08 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/04/13 12:15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3100418	10/04/13	10/05/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		97.9 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/04/13 12:15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	3100417	10/04/13	10/04/13	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		112 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.4 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

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

Project: BC - Antelope K-31 Bonanza Creek

Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

E02@6'
R310068-09 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/04/13 12:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3100418	10/04/13	10/05/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		87.4 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/04/13 12:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	3100417	10/04/13	10/04/13	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		111 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		95.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

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LT Environmental, Inc. 4600 West 60th Avenue Arvada CO, 80003	Project: BC - Antelope K-31 Bonanza Creek Project Number: 0345-13 Project Manager: Justin Solomon	Reported: 10/06/13 16:23
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S01@9'
R310068-10 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/04/13 12:25

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3100418	10/04/13	10/05/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:25

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		97.1 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/04/13 12:25

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	3100417	10/04/13	10/04/13	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:25

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		115 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.5 %	21-167		"	"	"	"	

Summit Scientific

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S₂

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

Project: BC - Antelope K-31 Bonanza Creek
Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

S02@9'
R310068-11 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/04/13 12:30

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3100418	10/04/13	10/05/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:30

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		88.6 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/04/13 12:30

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	3100417	10/04/13	10/04/13	EPA 8260B	
Toluene	0.015	0.0050	"	"	"	"	"	"	
Ethylbenzene	0.0077	0.0050	"	"	"	"	"	"	
Xylenes (total)	0.070	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	1.2	0.50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:30

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		103 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.4 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.8 %	21-167		"	"	"	"	

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

Project: BC - Antelope K-31 Bonanza Creek
Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

S03@6'
R310068-12 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/04/13 12:35

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3100418	10/04/13	10/05/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:35

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		86.1 %	30-150	"	"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/04/13 12:35

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	3100417	10/04/13	10/04/13	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:35

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		111 %	23-173	"	"	"	"	"	
Surrogate: Toluene-d8		98.9 %	20-170	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.5 %	21-167	"	"	"	"	"	

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

Project: BC - Antelope K-31 Bonanza Creek
Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

W01@9'
R310068-13 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/04/13 12:40

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3100418	10/04/13	10/05/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:40

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		97.5 %	30-150	"	"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/04/13 12:40

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	3100417	10/04/13	10/04/13	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:40

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		116 %	23-173	"	"	"	"	"	
Surrogate: Toluene-d8		98.5 %	20-170	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.3 %	21-167	"	"	"	"	"	

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

Project: BC - Antelope K-31 Bonanza Creek
Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

W02@6'
R310068-14 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/04/13 12:45

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	8500	50	mg/kg	1	3100418	10/04/13	10/05/13	8015M	
C28-C36 (TEPH-ORO)	530	50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:45

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		257 %	30-150	"	"	"	"	"	S-02

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/04/13 12:45

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	2.0	0.020	mg/kg	10	3100417	10/04/13	10/04/13	EPA 8260B	
Toluene	21	0.050	"	"	"	"	"	"	E
Ethylbenzene	1.5	0.050	"	"	"	"	"	"	
Xylenes (total)	59	0.050	"	"	"	"	10/05/13	"	E
Gasoline Range Hydrocarbons	7900	5.0	"	"	"	"	10/04/13	"	E

Date Sampled: 10/04/13 12:45

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		102 %	23-173	"	"	"	10/05/13	"	
Surrogate: Toluene-d8		787 %	20-170	"	"	"	"	"	S-02
Surrogate: 4-Bromofluorobenzene		504 %	21-167	"	"	"	"	"	S-02

Summit Scientific

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

Project: BC - Antelope K-31 Bonanza Creek
Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

B01@10'
R310068-15 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/04/13 12:50

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3100418	10/04/13	10/05/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:50

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		100 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/04/13 12:50

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	3100417	10/04/13	10/04/13	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:50

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		111 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.2 %	21-167		"	"	"	"	

Summit Scientific

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

Project: BC - Antelope K-31 Bonanza Creek
Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

B02@10'
R310068-16 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/04/13 12:55

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3100418	10/04/13	10/05/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:55

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		89.8 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/04/13 12:55

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	0.0036	0.0020	mg/kg	1	3100417	10/04/13	10/04/13	EPA 8260B	
Toluene	0.013	0.0050	"	"	"	"	"	"	
Ethylbenzene	0.011	0.0050	"	"	"	"	"	"	
Xylenes (total)	0.22	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	2.8	0.50	"	"	"	"	"	"	

Date Sampled: 10/04/13 12:55

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		117 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

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

Project: BC - Antelope K-31 Bonanza Creek
Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

B03@10'
R310068-17 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/04/13 13:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3100418	10/04/13	10/05/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/04/13 13:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		96.0 %	30-150	"	"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/04/13 13:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	3100417	10/04/13	10/04/13	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: 10/04/13 13:00

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		42.3 %	23-173	"	"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		92.0 %	21-167	"	"	"	"	"	

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

Project: BC - Antelope K-31 Bonanza Creek

Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

B04@6'-7"
R310068-18 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 10/04/13 13:05

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3100418	10/04/13	10/05/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: 10/04/13 13:05

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		93.5 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 10/04/13 13:05

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	3100417	10/04/13	10/04/13	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: 10/04/13 13:05

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		113 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.1 %	21-167		"	"	"	"	

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

Project: BC - Antelope K-31 Bonanza Creek

Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

Extractable Petroleum Hydrocarbons by 8015 - Quality Control
Summit Scientific

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

Batch 3100418 - EPA 3550A

Blank (3100418-BLK1)

Prepared & Analyzed: 10/04/13

C10-C28 (TEPH-DRO)	ND	50	mg/kg						
C28-C36 (TEPH-ORO)	ND	50	"						

LCS (3100418-BS1)

Prepared & Analyzed: 10/04/13

C10-C28 (TEPH-DRO)	411	50	mg/kg	501	82.0	73-134			
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LCS Dup (3100418-BSD1)

Prepared & Analyzed: 10/04/13

C10-C28 (TEPH-DRO)	483	50	mg/kg	501	96.4	73-134	16.2	11	
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Matrix Spike (3100418-MS1)

Source: R310067-01

Prepared & Analyzed: 10/04/13

C10-C28 (TEPH-DRO)	444	50	mg/kg	501	16.5	85.4	50-148		
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Matrix Spike Dup (3100418-MSD1)

Source: R310067-01

Prepared & Analyzed: 10/04/13

C10-C28 (TEPH-DRO)	443	50	mg/kg	501	16.5	85.1	50-148	0.325	13
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LT Environmental, Inc.
4600 West 60th Avenue
Arvada CO, 80003

Project: BC - Antelope K-31 Bonanza Creek
Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

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		

Batch 3100417 - EPA 5030 Soil MS

Blank (3100417-BLK1)

Prepared & Analyzed: 10/04/13

Benzene	ND	0.0020	mg/kg						
Toluene	ND	0.0050	"						
Ethylbenzene	ND	0.0050	"						
Xylenes (total)	ND	0.0050	"						
Gasoline Range Hydrocarbons	ND	0.50	"						
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0430</i>		"	<i>0.0397</i>	<i>108</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0386</i>		"	<i>0.0400</i>	<i>96.5</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0412</i>		"	<i>0.0400</i>	<i>103</i>	<i>21-167</i>			

LCS (3100417-BS1)

Prepared & Analyzed: 10/04/13

Benzene	0.0834	0.0020	mg/kg	0.100	83.4	58-130			
Toluene	0.0978	0.0050	"	0.100	97.8	61-134			
Ethylbenzene	0.115	0.0050	"	0.100	115	74-139			
m,p-Xylene	0.220	0.010	"	0.200	110	73-137			
o-Xylene	0.115	0.0050	"	0.100	115	73-141			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0429</i>		"	<i>0.0397</i>	<i>108</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0383</i>		"	<i>0.0400</i>	<i>95.8</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0403</i>		"	<i>0.0400</i>	<i>101</i>	<i>21-167</i>			

LCS Dup (3100417-BSD1)

Prepared & Analyzed: 10/04/13

Benzene	0.0871	0.0020	mg/kg	0.100	87.1	58-130	4.33	13	
Toluene	0.101	0.0050	"	0.100	101	61-134	3.14	16	
Ethylbenzene	0.117	0.0050	"	0.100	117	74-139	1.81	12	
m,p-Xylene	0.223	0.010	"	0.200	112	73-137	1.52	14	
o-Xylene	0.117	0.0050	"	0.100	117	73-141	1.55	12	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0428</i>		"	<i>0.0397</i>	<i>108</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0389</i>		"	<i>0.0400</i>	<i>97.3</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0402</i>		"	<i>0.0400</i>	<i>100</i>	<i>21-167</i>			

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

Project: BC - Antelope K-31 Bonanza Creek
Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

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 3100417 - EPA 5030 Soil MS

Matrix Spike (3100417-MS1)		Source: R310067-01			Prepared & Analyzed: 10/04/13							
Benzene	0.0872	0.0020	mg/kg	0.100	ND	87.2	30-131					
Toluene	0.102	0.0050	"	0.100	ND	102	30-134					
Ethylbenzene	0.118	0.0050	"	0.100	ND	118	22-153					
m,p-Xylene	0.224	0.010	"	0.200	ND	112	10-159					
o-Xylene	0.117	0.0050	"	0.100	ND	117	31-151					
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0446</i>		"	<i>0.0397</i>		<i>112</i>	<i>23-173</i>					
<i>Surrogate: Toluene-d8</i>	<i>0.0394</i>		"	<i>0.0400</i>		<i>98.4</i>	<i>20-170</i>					
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0403</i>		"	<i>0.0400</i>		<i>101</i>	<i>21-167</i>					
Matrix Spike Dup (3100417-MSD1)		Source: R310067-01			Prepared & Analyzed: 10/04/13							
Benzene	0.0852	0.0020	mg/kg	0.100	ND	85.2	30-131	2.33		34		
Toluene	0.0998	0.0050	"	0.100	ND	99.8	30-134	1.76		30		
Ethylbenzene	0.118	0.0050	"	0.100	ND	118	22-153	0.356		24		
m,p-Xylene	0.225	0.010	"	0.200	ND	113	10-159	0.441		68		
o-Xylene	0.117	0.0050	"	0.100	ND	117	31-151	0.615		38		
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0440</i>		"	<i>0.0397</i>		<i>111</i>	<i>23-173</i>					
<i>Surrogate: Toluene-d8</i>	<i>0.0389</i>		"	<i>0.0400</i>		<i>97.2</i>	<i>20-170</i>					
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0405</i>		"	<i>0.0400</i>		<i>101</i>	<i>21-167</i>					

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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.



S₂

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

Project: BC - Antelope K-31 Bonanza Creek

Project Number: 0345-13
Project Manager: Justin Solomon

Reported:
10/06/13 16:23

Notes and Definitions

- S-02 The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample extract.
- E The concentration indicated for this analyte is an estimated value above the calibration range of the instrument.
- 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

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