



October 7, 2016

Mr. Ken Raymond  
Senior Environmental Health and Safety Specialist  
SandRidge Exploration and Production, LLC  
123 Robert S. Kerr Avenue  
Oklahoma City, Oklahoma 73102

**RE: Supplemental Environmental Site Investigation  
Former EE3 Production Facility – Hebron 3-12H (API #: 05-057-06498)  
Jackson County, Colorado**

Dear Mr. Raymond:

LT Environmental, Inc. (LTE), under the direction of SandRidge Exploration and Production, LLC (SandRidge), conducted a supplemental environmental site investigation (ESI) at the Hebron 3-12H location (Site), API #: 05-057-06498. This report includes a summary of previous work conducted at the Site, a discussion of the ESI's field activities, hydrogeological records, laboratory analytical results, and cost estimates for source removal remediation.

The Site is located approximately 1 mile west of State Highway 14 and 0.55 miles north of County Road 24 northeast of Coalmont, Colorado. The legal site description is the northeast quarter of the northeast quarter of Section 12, Township 7 North, Range 81 West, 6<sup>th</sup> Principal Meridian. The Site Location Map is provided as Figure 1 and the Site Map is provided as Figure 2.

### **Site History**

In May, 2016, Fremont Environmental, Inc. (Fremont) on behalf of the Colorado Oil and Gas Conservation Commission (COGCC), conducted an ESI at the Site. Fremont advanced a total of four soil borings (A through D) as part of the ESI. Soil samples were collected from three of the soil borings (B, C, and D). The laboratory analytical results indicated that total petroleum hydrocarbons (TPH) in soil samples C@7' and B@4', and benzene in soil sample C@7' were in exceedance of the applicable COGCC Table 910-1 allowable concentrations at 4,397 milligrams per kilogram (mg/kg), 2,170 mg/kg, and 0.43 mg/kg, respectively. Additionally, laboratory analytical results indicated that all of the soil samples exceeded the COGCC Table 910-1 allowable concentration of arsenic, ranging from 1.57 mg/kg (D) to 2.86 mg/kg (C). A complete summary of the ESI is discussed in the COGCC report titled *Soil Sampling Report, Former EE3/SandRidge LLC Locations* and dated June 8, 2016.

At the request of SandRidge, LTE reviewed the ESI data and determined that developing an appropriate remediation strategy would require additional subsurface investigation to adequately delineate the vertical and lateral extent of hydrocarbon impact at the Site.



## **Supplemental Environmental Site Investigation**

On September 7 and 8, 2016, LTE, under the direction of SandRidge, conducted a supplemental ESI to further delineate the hydrocarbon impact at the Site. Twelve soil borings were advanced with a truck mounted Geoprobe<sup>®</sup> using direct push drilling technology by Elite Drilling Services, LLC. (Elite) of Denver, Colorado. LTE observed the continuous soil samples for evidence of environmental impacts and screened the soils for volatile organic compounds (VOCs) with a photo ionizing detector (PID). The soil borings were advanced to a minimum of 5 feet below any evidence of environmental impacts including soil staining, odor, and elevated PID readings, or until refusal. The soil boring depths ranged from 8 feet to 15 feet below ground surface (bgs). LTE collected one soil sample from each of the soil borings for laboratory analysis from the interval with the highest PID reading, or demonstrated evidence of hydrocarbon impacts including staining or odor.

Three soil borings were advanced at the approximate locations where elevated soil TPH and/or benzene concentrations were observed during the initial ESI (SBB-R, SBC2, SBC-R, and SBD-R), to further delineate the vertical extent of hydrocarbon impacts. Soil borings SB01 through SB08 were drilled as step-out borings from the areas where hydrocarbon impacts were observed during the initial ESI to delineate the lateral extent of impact. The soil boring locations are provided on Figure 2. The soil boring lithologic logs are included as Attachment 1.

The soil samples from soil borings were collected in laboratory provided sample containers, placed on ice, and submitted, with a completed chain of custody form, to Summit Scientific (Summit), of Golden, Colorado, for analysis. The soil samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) and TPH – gasoline range organics (GRO) under the United States Environmental Protection Agency (EPA) method 8260 and TPH – diesel range organics (DRO) under EPA method 8015. At the request of the COGCC, soil sample SBC2@10' was analyzed for the full COGCC Table 910-1 analyte list, excluding boron.

### **Field Summary**

Field observations indicated hydrocarbon staining, odor, and elevated PID readings at soil borings SBB-R, SBC-R, SBC2, and SB05. No evidence of hydrocarbon impact was observed at the remaining soil borings. The evidence of hydrocarbon impacts ranged in depth from approximately 3 to 9 feet bgs at SBB-R, SBC-R, SBC2, and SB05 and the maximum VOCs concentrations ranged from 89.0 parts per million (ppm) at 6 feet bgs at SBC-R to 604.0 ppm at 3 feet bgs at SB05. The lithology of the impacted interval observed at soil borings within the limits of the former pit boundary consisted of clayey sand with traces of fibrous woody fragments throughout. Drilling refusal was encountered between 8 and 15 feet bgs and groundwater was not encountered in any of the soil borings.



## Soil Analytical Results

The COGCC Table 910-1 allowable concentrations for BTEX and TPH in soil are 0.17 mg/kg, 85 mg/kg, 100 mg/kg, 175 mg/kg, and 500 mg/kg, respectively. Soil samples SBB-R@3' and SB05@3' exceeded the COGCC Table 910-1 allowable concentration of TPH at 3,800 mg/kg and 2,040 mg/kg, respectively. All other soil sample analytical results were below the applicable COGCC Table 910-1 allowable concentrations. The soil sample analytical results are presented on Figure 3 and summarized in Table 1. The laboratory analytical report is attached.

Soil sample SBC2@10' was analyzed for the full COGCC Table 910-1 analyte list, excluding boron. Arsenic exceeded the COGCC Table 910-1 allowable concentration of 0.39 mg/kg at 1.13 mg/kg. All other analytes were below the applicable COGCC Table 910-1 allowable concentrations. The soil sample SBC2@10' full COGCC Table 910-1 analytical results are summarized in Table 2. The laboratory analytical report is attached.

## Discussion

The laboratory analytical results of the soil samples collected from soil borings B, C, and D by Freemont during the initial ESI had arsenic concentrations of 1.99 mg/kg, 2.86 mg/kg, and 1.57 mg/kg respectively. The laboratory analytical results of the soil sample collected from soil boring SBC2 during the supplemental ESI had an arsenic concentration of 1.13 mg/kg. SandRidge collected background soil samples from seven sites within the region. The highest background arsenic concentrations observed at each of these sites ranged from 0.677 mg/kg to 6.09 mg/kg, and averaged 3.46 mg/kg. The COGCC has reviewed the background arsenic concentrations, and based on frequently asked question #31 of the COGCC 2008 Rule Making, has determined that the maximum allowable arsenic concentration of the samples collected during the initial ESI is not to exceed 3.80 mg/kg or 10% above of the average of the highest background arsenic concentrations observed at each location. The highest arsenic concentration of the samples collected during the initial ESI was 2.86 mg/kg which is below the COGCC determined maximum allowable concentration of 3.80 mg/kg. Based on these data, LTE recommends that SandRidge request a decision of No Further Action for arsenic impact with the COGCC. A map of the regional arsenic data collected by SandRidge is presented on Figure 4.

The initial ESI identified three locations at the Site with elevated concentrations of benzene and/or TPH (soil borings B and C). The supplemental ESI identified elevated concentrations of TPH which exceeds COGCC Table 910-1 applicable standards in soil borings SBB-R and SB05. No hydrocarbon impact was identified in soil boring SBD-R which was drilled in a location representative of the initial ESI's soil boring D. The vertical extent of hydrocarbon impact was delineated to be approximately between 3 and 9 feet bgs. The approximate lateral extent of hydrocarbon impacts is 100 feet in a general north-south direction and 75 feet in a general east-west direction. Groundwater was not encountered during this investigation. The defined lateral extent of impact is provided on Figure 3.



Based on results of the initial and supplemental ESIs, the estimated volume of hydrocarbon impacted soil existing at the Site is approximately 1,700 cubic yards. TPH concentrations in the impacted area ranged from 431 mg/kg (D@3') to 4,397 mg/kg (C@7') during the initial ESI and 2,040 mg/kg (SB05@3') to 3,800 mg/kg (SBB-R@3') during the supplemental ESI.

### **Source Removal Excavation**

SandRidge will secure an earthworks contractor to excavate the delineated impact and transport it to a properly permitted landfill facility for final disposal. LTE will oversee the source removal excavation to observe for hydrocarbon impacts, including soil staining and/or odor, and screen the excavated soils for VOCs using a PID and a PetroFlag<sup>®</sup> kit (field test for heavy organics). LTE will determine the extent of impacts and direct the earthworks contractor to segregate the impacted soils from the clean soils based on these observations.

Upon completion of the source removal activities, LTE will collect confirmation soil samples from the sidewalls and floor of each excavation. These confirmation soil samples will be representative of the excavation and, in general, spaced at 30 foot centers. The confirmation soil samples will be collected in laboratory provided sample containers, placed on ice, and submitted to Summit, under chain of custody protocol, for BTEX and TPH-GRO analysis using EPA method 8260B, and TPH-DRO analysis using EPA method 8015. The soil samples will be completed under 24-hour turnaround times in order to expedite source removal activities. The source removal excavation will be backfilled with clean fill upon verification that the confirmation soil samples are within the COGCC Table 910-1 allowable concentrations.

LTE, on behalf of SandRidge, will draft a Remediation Summary Report to provide the details of the remediation activities and confirmation sampling analytical results. The report will include a text summary, data tables, figures, and laboratory reports. SandRidge will submit the Remediation Summary Report with a Form 4 Sundry Notice to the COGCC to request closure with LTE support.

LTE anticipates that excavation activities will begin within two weeks upon receiving notice to proceed from SandRidge, and require three 10-hour days to complete the field tasks listed above. The cost for source removal excavation based on a time and materials structure, is estimated to be \$166,602 (Table 3) and includes the following assumptions:

- A lump sum cost of \$5,000 for the excavation subcontractor to conduct source removal was assumed;
- A cost of \$57 per ton for transportation and disposal of the impacted materials was assumed;
- A lump sum cost of \$25,000 for imported backfill materials was assumed;
- Source removal excavation can be completed in three days;
- Eight confirmation soil samples will be required; and
- The source removal area has been completely delineated and no additional impacts will be discovered during excavation.



## **Soil Shredding**

LTE will secure an earthworks contractor to excavate the delineated impact and treat the impacted material utilizing soil shredding and chemical oxidation remediation technology. LTE will oversee the source removal excavation to observe for hydrocarbon impacts, including soil staining and/or odor, and screen the excavated soils for VOCs using a PID and a PetroFlag® kit (field test for heavy organics). LTE will determine the extent of impacts and direct the earthworks contractor to segregate the impacted soils from the clean soils based on these observations.

Upon completion of the source removal activities, LTE will collect confirmation soil samples from the sidewalls and floor of each excavation. These confirmation soil samples will be representative of the excavation and, in general, spaced at 30 foot centers. The confirmation soil samples will be collected in laboratory provided sample containers, placed on ice, and submitted to Summit, under chain of custody protocol, for BTEX and TPH-GRO analysis using EPA method 8260B, and TPH-DRO analysis using EPA method 8015. The soil samples will be completed under 24-hour turnaround times in order to expedite source removal activities.

Soil treatment of the impacted material will be initiated as soon as possible, and conducted to efficiently treat all soil impacts. It is expected that soil treatment will be completed in approximately four working days. Soil will be treated by mechanical agitation, shredding, and ex-situ chemical oxidation. Shortly after impacted soils are mechanically shredded, soils are treated with concentrated hydrogen peroxide (3-7% typically), and windrowed onsite.

Following treatment, the soil will need to be allowed to sit for a minimum of 24 hours prior to confirmation soil sampling to ensure that chemical reactions were complete and equilibrium in soil is established. LTE, under the direction of SandRidge, will collect one 20-point composite confirmation soil sample representative of each approximately 100 cubic yard interval up to 500 cubic yards and one representative sample of each approximately 500 cubic yard interval thereafter. Each composite sample will be field screened using a PID to verify the reduction in VOCs prior to laboratory analysis. Following receipt of confirmation sampling results indicating compliance with cleanup goals, the treated soil will be backfilled in the excavation. Stockpiled topsoil or import topsoil will be utilized in the upper three feet.

LTE, on behalf of SandRidge, will draft a Remediation Summary Report to provide the details of the remediation activities and confirmation sampling analytical results. The report will include a text summary, data tables, figures, and laboratory reports. SandRidge will submit the Remediation Summary Report with a Form 4 Sundry Notice to the COGCC to request closure with LTE support.

LTE anticipates that excavation activities will begin within two weeks upon receiving notice to proceed from SandRidge, and require 4 10-hour days to complete the field tasks listed above. The cost for source removal excavation, soil shredding, and chemical oxidation treatment based on a unit rate price structure, is estimated to be \$58 per cubic yard, totaling \$99,491 and includes the following assumptions:



- 16 confirmation soil samples will be required;
- Soil shredding remediation activities will take four days;
- Soil shredding will be conducted in line with the remediation of the other sites; thereby reducing mobilization costs;
- Unlimited construction services will provide unit rate costs for remediation based on the cumulative amount of impacted materials observed at all four sites; and
- The source removal area has been completely delineated and no additional impacts will be discovered during excavation.

LTE appreciates the opportunity to provide environmental services to SandRidge. Please feel free to contact the undersigned at 303-433-9788 if you have any questions or comments regarding the proposed remediation activities program.

Sincerely,

LT ENVIRONMENTAL, INC.

Jess Alexander  
Project Environmental Scientist

Brett Forkner  
Project Environmental Scientist

#### Attachments

Figure 1	Site Location Map
Figure 2	Site Map
Figure 3	Soil Sample Analytical Results
Figure 4	Regional Background Arsenic Concentration Map
Table 1	Soil Sample Analytical Results
Table 2	Full COGCC Table 910-1 Analytical Results
Table 3	Source Removal Excavation Cost Estimate
Table 4	Soil Shredding Cost Estimate
Attachment 1	Soil Lithologic Boring Logs
Attachment 2	Laboratory Analytical Reports

## FIGURES

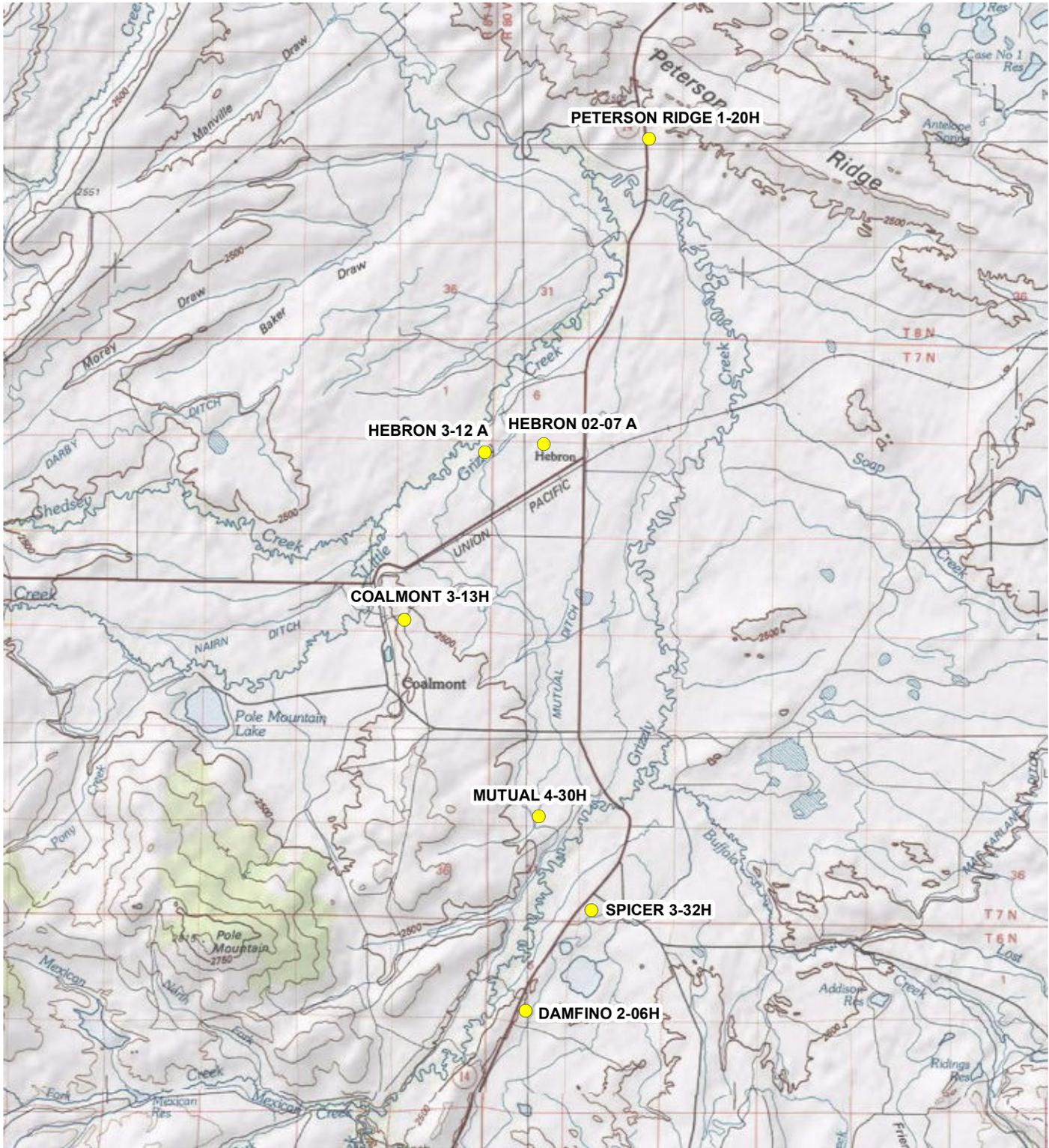


IMAGE COURTESY OF ESRI/USGS

**LEGEND**

● SITE LOCATION



**FIGURE 1**  
**SITE LOCATION MAP**  
**SANDRIDGE WELLSITES**  
**JACKSON COUNTY, COLORADO**  
**SANDRIDGE EXPLORATION AND PRODUCTION, LLC**





**LEGEND**

● SOIL BORING

IMAGE COURTESY OF ESRI

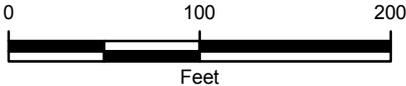


FIGURE 2  
 SITE MAP  
 HEBRON 3-12H  
 JACKSON COUNTY, COLORADO  
 SANDRIDGE EXPLORATION AND PRODUCTION, LLC



SAMPLE ID@DEPTH BELOW GROUND SURFACE IN FEET  
 SAMPLE DATE  
 AS: ARSENIC IN MILLIGRAMS PER KILOGRAM (mg/kg)  
 B: BENZENE (mg/kg)  
 T: TOLUENE (mg/kg)  
 E: ETHYLBENZENE (mg/kg)  
 X: TOTAL XYLENES (mg/kg)  
 TPH: TOTAL PETROLEUM HYDROCARBONS (mg/kg)  
 <: INDICATES RESULT IS LESS THAN THE LABORATORY REPORTING LIMIT  
**BOLD** INDICATES THE RESULT EXCEEDED THE APPLICABLE STANDARD

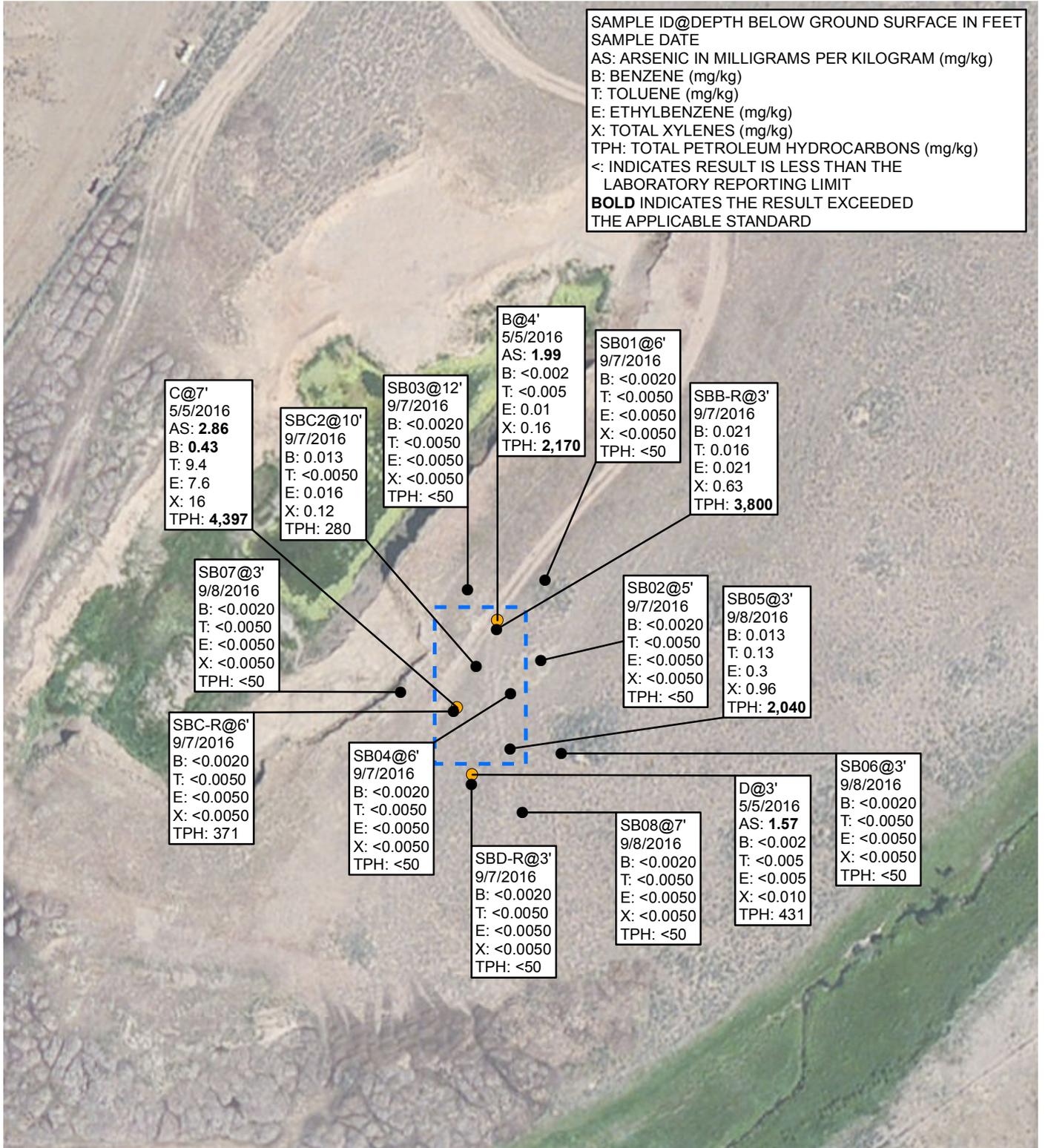
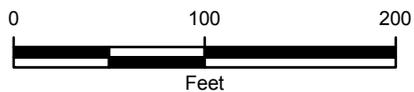


IMAGE COURTESY OF ESRI

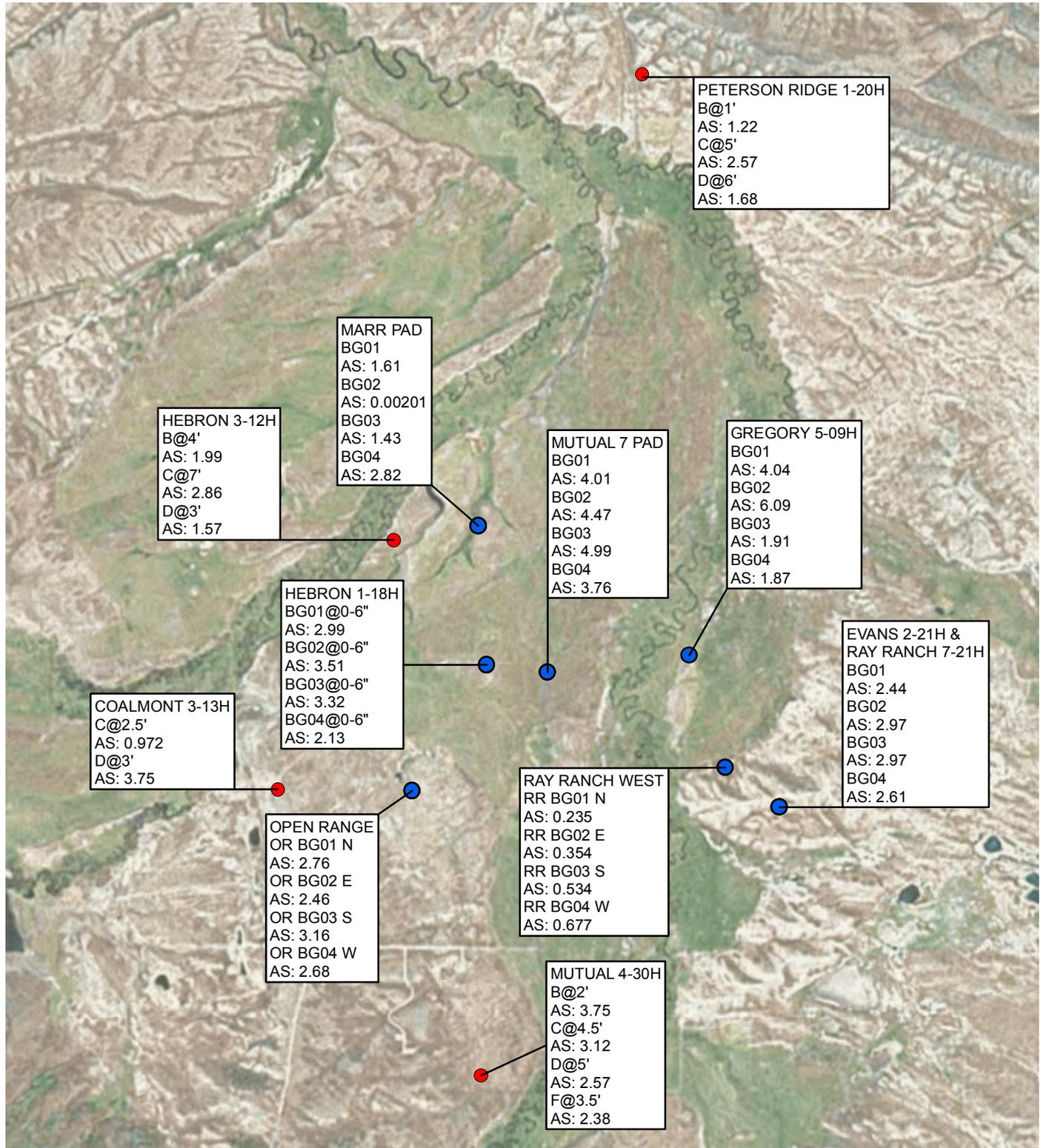
**LEGEND**

- SOIL BORING
- PREVIOUS COGCC SOIL SAMPLE
- EXTENT OF IMPACT



**FIGURE 3**  
 SOIL ANALYTICAL RESULTS  
 HEBRON 3-12H  
 JACKSON COUNTY, COLORADO  
 SANDRIDGE EXPLORATION AND PRODUCTION, LLC





**LEGEND**

- BACKGROUND ARSENIC SAMPLE (mg/kg)
- SANDRIDGE REMEDIATION SITE LOCATION

IMAGE COURTESY OF ESRI



**FIGURE 4**  
**ARSENIC SITE MAP**  
**JACKSON COUNTY, COLORADO**



**SANDRIDGE EXPLORATION AND PRODUCTION, LLC**

## TABLES

**TABLE 1  
SOIL ANALYTICAL RESULTS**

**HEBRON 3-12H  
JACKSON COUNTY, COLORADO  
SANDRIDGE EXPLORATION AND PRODUCTION, LLC**

<b>Sample ID</b>	<b>Date Sampled</b>	<b>Benzene (mg/kg)</b>	<b>Toluene (mg/kg)</b>	<b>Ethylbenzene (mg/kg)</b>	<b>Total Xylenes (mg/kg)</b>	<b>GRO (mg/kg)</b>	<b>DRO (mg/kg)</b>	<b>TPH (mg/kg)</b>
B@4'	5/5/2016	<0.002	<0.005	0.01	0.16	1,600	570	<b>2,170</b>
C@7'	5/5/2016	<b>0.43</b>	9.4	7.6	16	4,300	97	<b>4,397</b>
D@3'	5/5/2016	<0.002	<0.005	<0.005	<0.010	1	430	431
SBB-R@3'	9/7/2016	0.021	0.016	0.021	0.63	2,300	1,500	<b>3,800</b>
SBC-R@6'	9/7/2016	<0.0020	<0.0050	<0.0050	<0.0050	11	360	371
SBC2@10'	9/7/2016	0.013	<0.0050	0.016	0.12	20	260	280
SBD-R@3'	9/7/2016	<0.0020	<0.0050	<0.0050	<0.0050	<0.50	<50	<50
SB01@6'	9/7/2016	<0.0020	<0.0050	<0.0050	<0.0050	<0.50	<50	<50
<b>COGCC Table 910-1 Allowable Concentration</b>		<b>0.17</b>	<b>85</b>	<b>100</b>	<b>175</b>	<b>--</b>	<b>--</b>	<b>500</b>

**TABLE 1 (CONTINUED)**  
**SOIL ANALYTICAL RESULTS**

**HEBRON 3-12H**  
**JACKSON COUNTY, COLORADO**  
**SANDRIDGE EXPLORATION AND PRODUCTION, LLC**

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)
SB02@5'	9/7/2016	<0.0020	<0.0050	<0.0050	<0.0050	<0.50	<50	<50
SB03@12'	9/7/2016	<0.0020	<0.0050	<0.0050	<0.0050	<0.50	<50	<50
SB04@6'	9/7/2016	<0.0020	<0.0050	<0.0050	<0.0050	<0.50	<50	<50
SB05@3'	9/8/2016	0.013	0.13	0.30	0.96	40	2,000	<b>2,040</b>
SB06@3'	9/8/2016	<0.0020	<0.0050	<0.0050	<0.0050	<0.50	<50	<50
SB07@3'	9/8/2016	<0.0020	<0.0050	<0.0050	<0.0050	<0.50	<50	<50
SB08@7'	9/8/2016	<0.0020	<0.0050	<0.0050	<0.0050	<0.50	<50	<50
<b>COGCC Table 910-1 Allowable Concentration</b>		<b>0.17</b>	<b>85</b>	<b>100</b>	<b>175</b>	<b>--</b>	<b>--</b>	<b>500</b>

**Notes:**

COGCC - Colorado Oil and Gas Conservation Commission

DRO - diesel range organics analyzed by EPA Method 8015

GRO - gasoline range organics analyzed by EPA Method 8260

mg/kg - milligrams per kilogram

TPH - total petroleum hydrocarbons is the sum of GRO and DRO

-- - not applicable

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

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

**Bold** indicates the result exceeds the applicable standard

**TABLE 2**  
**COGCC FULL TABLE 910 SOIL ANALYTICAL RESULTS**

**HEBRON 3-12H**  
**JACKSON COUNTY, COLORADO**  
**SANDRIDGE EXPLORATION AND PRODUCTION, LLC**

Parameter	COGCC Table 910-1 Allowable Levels	Units	SBC2@10'
Sample Date			9/7/2016
Benzene	0.17	mg/kg	0.013
Toluene	85	mg/kg	<0.0050
Ethylbenzene	100	mg/kg	0.016
Total Xylenes	175	mg/kg	0.12
TPH-DRO	--	mg/kg	20
TPH-GRO	--	mg/kg	260
TPH Total	500	mg/kg	280
Arsenic	0.39	mg/kg	<b>1.13</b>
Barium	15,000	mg/kg	2,130
Cadmium	70	mg/kg	0.562
Chromium (III)	120,000	mg/kg	21.6
Chromium (VI)	23	mg/kg	<0.300
Copper	3,100	mg/kg	23.3
Lead	400	mg/kg	11.5
Mercury	23	mg/kg	<0.0605
Nickel	1,600	mg/kg	18.2
Selenium	390	mg/kg	0.652
Silver	390	mg/kg	0.131
Zinc	23,000	mg/kg	58.3
Acenaphthene	1,000	mg/kg	<0.0500
Anthracene	1,000	mg/kg	<0.0500
Benzo (A) anthracene	0.22	mg/kg	0.0737
Benzo (B) fluoranthene	0.22	mg/kg	0.0804
Benzo (K) fluoranthene	2.2	mg/kg	<0.0500
Benzo (A) pyrene	0.022	mg/kg	<0.0500
Chrysene	22	mg/kg	0.177
Dibenzo (A,H) anthracene	0.022	mg/kg	<0.0500
Fluoranthene	1,000	mg/kg	0.182
Fluorene	1,000	mg/kg	0.697
Indeno (1,2,3,C,D) pyrene	0.22	mg/kg	<0.0500
Naphthalene	23	mg/kg	1.49
Pyrene	1,000	mg/kg	0.323

**TABLE 2 (continued)**  
**COGCC FULL TABLE 910 ANALYTICAL RESULTS**

**HEBRON 3-12H**  
**JACKSON COUNTY, COLORADO**  
**SANDRIDGE EXPLORATION AND PRODUCTION, LLC**

Parameter	COGCC Table 910-1 Allowable Levels	Units	SBC2@10'
EC	4	mmhos/cm	2.76
pH	6 - 9	SU	8.44
SAR	12	unitless	3.17

**NOTES:**

**BOLD** - indicates result exceeds the COGCC Table 910-1 Allowable Level

bgs - below ground surface

COGCC - Colorado Oil and Gas Conservation Commission

DRO - diesel range organics

EC - electrical conductivity

GRO - gasoline range organics

mg/kg - milligrams per kilogram

mmhos/cm - millimhos per centimeter

SAR - sodium adsorption ratio

SU - standard units

TPH - total petroleum hydrocarbons

-- - not analyzed/no standard

< - less than the stated analytical reporting limit

Arsenic concentration exceeded the COGCC Table 910-1 allowable level, but is within 20% of the most elevated background concentration.

**TABLE 3**  
**COST ESTIMATE**  
**SOURCE REMOVAL EXCAVATION**  
**HEBRON 3-12H**  
**JACKSON COUNTY, COLORADO**  
**SANDRIDGE EXPLORATION AND PRODUCTION, LLC**

LABOR	Principal	Project Scientist I	Staff II Geologist/Eng.	GIS Specialist	Admin/ Clerical
TASK 1: Project Management	2	6		2	0.5
TASK 2: Excavation		3	38		
TASK 3: Reporting	2	10	2	2	0.5
TOTAL HOURS	4	19	40	4	1
RATE (\$)	\$140	\$110	\$83	\$72	\$55
LABOR COST	\$560	\$2,090	\$3,320	\$288	\$55

**LABOR SUBTOTAL** **\$6,313**

SUBCONTRACTOR	QTY.	COST/UNIT	UNIT TOTAL
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**SandRidge Excavation Contractor**

**TASK 2: Excavation**

Transportation and Disposal	2,210	Tons	\$57.00 /ton		\$125,970
Contractor	1	Lump Sum	\$5,000.00 /each		\$5,000
Import Backfill Material	1	Lump Sum	\$25,000.00 /each		\$25,000

**Summit Scientific**

<b>TASK 2: Confirmation Soil Samples (Rush Turnaround)</b>	BTEX/GRO	8	\$140.00 /sample		\$1,120
	DRO	8	\$160.00 /sample		\$1,280

**SUBCONTRACTOR SUBTOTAL** **\$158,610**

OTHER DIRECT COSTS (ODCs)	QTY.	COST/UNIT	UNIT TOTAL
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**TASK 2: Supplemental ESI Soil Borings**

Truck	4	\$110.00 /day		\$440
Organic Vapor Meter	3	\$50.00 /day		\$150
Trimble GPS	3	\$60.00 /day		\$180
LTE Per Diem	4	\$160.00 /day		\$640
Misc. Field Supplies	3	\$23.00 /day		\$69
PetroFlag	10	\$20.00 /each		\$200

**ODC SUBTOTAL** **\$1,679**

**PROJECT TOTAL** **\$166,602**

**TABLE 4**  
**COST ESTIMATE**  
**EXCAVATION, SOIL SHREDDING, BACKFILL**  
**HEBRON 3-12H**  
**JACKSON COUNTY, COLORADO**  
**SANDRIDGE EXPLORATION AND PRODUCTION, LLC**

LABOR	Principal	Project Scientist I	Staff II Geologist/Eng.	GIS Specialist	Admin/ Clerical
TASK 1: Project Management	2	6			0.5
TASK 2: Excavation, Soil Shredding, Backfill			48		
TASK 3: Reporting	2	10	4	4	0.5
TOTAL HOURS	4	16	52	4	1
RATE (\$)	\$140	\$110	\$83	\$72	\$55
LABOR COST	\$560	\$1,760	\$4,316	\$288	\$55

**LABOR SUBTOTAL**

**\$6,979**

SUBCONTRACTOR	QTY.	COST/UNIT	UNIT TOTAL
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**Unlimited Construction**

**TASK 2: Excavation, Soil Shredding, Backfill**

	Soil Shredding	1,700	Yards	\$45.00 /yard	\$76,500
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**Summit Scientific**

**TASK 2: Confirmation Soil Samples (Rush Turnaround)**

	BTEX/GRO	8		\$140.00 /sample	\$1,120
	DRO	8		\$160.00 /sample	\$1,280

**TASK 2: Soil Shredding Confirmation Soil Samples (Rush Turnaround)**

	BTEX/GRO	8		\$140.00 /sample	\$1,120
	DRO	8		\$160.00 /sample	\$1,280

**SUBCONTRACTOR SUBTOTAL**

**\$89,430**

OTHER DIRECT COSTS (ODCs)	QTY.	COST/UNIT	UNIT TOTAL
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**TASK 2: Excavation, Soil Shredding, Backfill**

	Truck	5		\$110.00 /day	\$550
	Organic Vapor Meter	4		\$50.00 /day	\$200
	Trimble GPS	4		\$60.00 /day	\$240
	LTE Per Diem	5		\$160.00 /day	\$800
	Misc. Field Supplies	4		\$23.00 /day	\$92
	PetroFlag	10		\$20.00 /each	\$200

**ODC SUBTOTAL**

**\$2,082**

**PROJECT TOTAL**

**\$98,491**

**PROJECT TOTAL PER YARD**

**\$58**

**ATTACHMENT 1**  
**SOIL LITHOLOGIC BORING LOGS**









Compliance • Engineering • Remediation  
**LT Environmental, Inc.**  
 4600 W. 60th Avenue  
 Arvada, Colorado 80003

**BORING LOG/MONITORING WELL COMPLETION DIAGRAM**

**PROJECT NAME:** Hebron 3-12H  
**PROJECT NO:** 065816007 **LOGGED BY:** Jeremy Pike  
**BORING/WELL ID:** SBC2 **SAMPLE METHOD:** Continuous  
**COMPLETION DATE:** 09/07/2016 **DRILL METHOD:** Direct Push  
**TD (ft bgs):** 15' **DRILLED BY:** Elite Drilling  
**DTW (ft bgs):** Not encountered **DETECTOR:** MineRAE 3000  
**SCREEN SLOT:** NA **FILTER PACK:** NA  
**CASING LENGTH:** NA **ANNULUS SEAL:** NA  
**SCREEN LENGTH:** NA **SURFACE SEAL:** NA

**HOLE DIAMETER:** 2.25"  
**WELL DIAMETER:** NA  
**CASING TYPE:** NA  
**SCREEN TYPE:** NA

PID (ppm)	Staining	Moisture Content	Sample ID	Recovery (ft/ft)	Depth (ft)	USCS	USCS Graphic	Lithology Description	Well Construction
1.20		Moist			0	SM		SILTY SAND - 0.0' - 4.0' - light brown, little clay, trace fine gravel, moist, no odor, no staining	
0.60				4/4					
0.70									
1.00		Moist			5	SC		CLAYEY SAND - 4.0' - 11.0' - brown, fine grained, moist, hydrocarbon odor, gray hydrocarbon staining from 9' to 11' bgs	
37.00				3/4					
40.00									
54.00									
395.00			SBC2 @10'	2.5/4	10	GW		GRAVEL - 11.0' - 14.5' - fine to coarse grained, some medium grained sand, moist, no odor, no staining	
42.20		Moist							
12.00									
37.00				1/3					
30.40		Moist							
					15	SC		CLAYEY SAND - 14.5' - 15.0' - light brown, fine grained, moist, no odor, no staining	









Compliance • Engineering • Remediation  
**LT Environmental, Inc.**  
 4600 W. 60th Avenue  
 Arvada, Colorado 80003

**BORING LOG/MONITORING WELL COMPLETION DIAGRAM**

**PROJECT NAME:** Hebron 3-12H  
**PROJECT NO:** 065816007 **LOGGED BY:** Jeremy Pike  
**BORING/WELL ID:** SB03 **SAMPLE METHOD:** Continuous  
**COMPLETION DATE:** 09/07/2016 **DRILL METHOD:** Direct Push  
**TD (ft bgs):** 12' **DRILLED BY:** Elite Drilling  
**DTW (ft bgs):** Not encountered **DETECTOR:** MineRAE 3000  
**SCREEN SLOT:** NA **FILTER PACK:** NA  
**CASING LENGTH:** NA **ANNULUS SEAL:** NA  
**SCREEN LENGTH:** NA **SURFACE SEAL:** NA

**HOLE DIAMETER:** 2.25"  
**WELL DIAMETER:** NA  
**CASING TYPE:** NA  
**SCREEN TYPE:** NA

PID (ppm)	Staining	Moisture Content	Sample ID	Recovery (ft/ft)	Depth (ft)	USCS	USCS Graphic	Lithology Description	Well Construction
		Moist			0	SM		SILTY SAND - 0.0' - 7.0' - light brown, fine grained, little clay, trace fine gravel, moist, no odor, no staining	
0.20				4/4					
0.20									
0.20									
0.20					5				
0.20				3/4					
0.20									
0.50		Moist				SP		SAND - 7.0' - 12.0' - brown, medium grained, some fine gravel, moist, no odor, no staining, refusal at 12' bgs	
0.70									
0.50									
0.50				2.5/4	10				
0.50									
1.10			SB03 @12'						











**ATTACHMENT 2**  
**LABORATORY ANALYTICAL REPORTS**



# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

October 07, 2016

Jess Alexander  
LT Environmental, Inc.  
4600 West 60th Avenue  
Arvada, CO 80003  
RE: Hebron 3-12H

Enclosed are the results of analyses for samples received by Summit Scientific on 09/09/16 16:40. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Paul Shrewsbury  
President



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

Project: Hebron 3-12H

Project Number: 065816007  
Project Manager: Jess Alexander

**Reported:**  
10/07/16 18:05

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SBB-R@3'	1609057-01	Soil	09/07/16 13:20	09/09/16 16:40
SBC-R@6'	1609057-02	Soil	09/07/16 13:40	09/09/16 16:40
SBC2@10'	1609057-03	Soil	09/07/16 14:20	09/09/16 16:40
SB01@6'	1609057-04	Soil	09/07/16 15:00	09/09/16 16:40
SB02@5'	1609057-05	Soil	09/07/16 15:30	09/09/16 16:40
SB03@12'	1609057-06	Soil	09/07/16 16:00	09/09/16 16:40
SB04@6'	1609057-07	Soil	09/07/16 16:30	09/09/16 16:40
SBD@3'	1609057-08	Soil	09/07/16 16:50	09/09/16 16:40
SB05@3'	1609057-09	Soil	09/08/16 10:10	09/09/16 16:40
SB06@3'	1609057-10	Soil	09/08/16 10:50	09/09/16 16:40
SB07@3'	1609057-11	Soil	09/08/16 11:20	09/09/16 16:40
SB08@7'	1609057-12	Soil	09/08/16 11:40	09/09/16 16:40

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.*



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

Project: Hebron 3-12H

Project Number: 065816007  
Project Manager: Jess Alexander

Reported:  
10/07/16 18:05

# Summit Scientific 1609057.1

741 Corporate Circle Suite I • Golden, Colorado 80401  
303-277-9310 • 303-374-5933 Fax

Page 1 of 2

Client: LT ENVIRONMENTAL

Address: 6900 W. 60th Ave

City/State/Zip: ARVADA, CO 80003

Phone: 303-433-3888 Fax:

Sampler Name: JEREMY PINK

Project Manager: JESS ALEXANDER / BRETT FORKNER

E-Mail: JALEXANDER@LTENV.COM / BFORKNER@LTENV.COM

Project Name: HEBRON 3-12H

Project Number: 065816007

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix		Analyze For:				Special Instructions	
				HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	GBTEX 8240	TPH - DEP 8015		FUEL COLLE 2103
SBB-R @ 3'	9/7/16	1320	1			X					X	X			
SBC-R @ 6'	9/7/16	1340	1			X					X	X			
SBC2 @ 10'	9/7/16	1420	2			X					X	X			ONLY RUN FULL PIP ON SBC2 @ 10'
S801 @ 6'	9/7/16	1500	1			X					X	X			
S802 @ 5'	9/7/16	1530	1			X					X	X			
S803 @ 12'	9/7/16	1600	1			X					X	X			
S804 @ 6'	9/7/16	1630	1			X					X	X			
<del>S805 @ 3'</del>	<del>9/7/16</del>	<del>1650</del>	<del>1</del>			<del>X</del>					<del>X</del>	<del>X</del>			
S805 @ 3'	9/8/16	1010	1			X					X	X			
S806 @ 3'	9/8/16	1050	1			X					X	X			
Relinquished by:	Date/Time:	Received by:	Date/Time:	Turn Around Time (Check)				Notes:							
<i>Jeremy Pink</i>	9/9/16 1640	<i>Jeremy Pink</i>	9/12/16 1640	Same Day <input type="checkbox"/> 72 Hours <input type="checkbox"/>				Standard <input checked="" type="checkbox"/>							
Relinquished by:	Date/Time:	Received by:	Date/Time:	48 Hours <input type="checkbox"/>											
Relinquished by:	Date/Time:	Received in Lab by:	Date/Time:	Sample Integrity:											
				Temperature Upon Receipt: 53°C											
				Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				on ice.							

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Summit Scientific

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

Project: Hebron 3-12H

Project Number: 065816007  
Project Manager: Jess Alexander

Reported:  
10/07/16 18:05

# Summit Scientific

1609057.2

741 Corporate Circle Suite 1 • Golden, Colorado 80401  
303-277-9310 • 303-374-5933 Fax

Page 2 of 2

Client: LT ENVIRONMENTAL  
Address: \_\_\_\_\_  
City/State/Zip: \_\_\_\_\_  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
Sampler Name: JEREMY AIRE

Project Manager: \_\_\_\_\_  
E-Mail: \_\_\_\_\_  
Project Name: HEBRON 3-12H  
Project Number: 065816007

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix			Analyze For:				Special Instructions	
				HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	CBTEX B260	TPH-D20 Soils	ARSENIC		LEAD
S607 @ 3'	9/9/16	1120	1			X						X	X			
S608 @ 7'	9/8/16	1140	1			X		X				X	X			
<del>S601</del>	<del>9/8/16</del>	<del>0720</del>	<del>1</del>			X						X	X			
<del>S602</del>	<del>9/8/16</del>	<del>0915</del>	<del>1</del>			X		X				X	X			
<del>S603</del>	<del>9/8/16</del>	<del>0925</del>	<del>1</del>			X		X				X	X			
<del>S604</del>	<del>9/9/16</del>	<del>0955</del>	<del>1</del>			X		X				X	X			
Relinquished by: <u>Jeremy A</u> Date/Time: <u>9/12/16 1640</u>				Received by: <u>[Signature]</u> Date/Time: <u>9/19/16 1640</u>				Turn Around Time (Check)				Notes:				
								Same Day <input type="checkbox"/>				72 Hours <input type="checkbox"/>				
								24 Hours <input type="checkbox"/>				Standard <input checked="" type="checkbox"/>				
								48 Hours <input type="checkbox"/>								
Relinquished by:				Received in Lab by:				Sample Integrity:				Temperature Upon Receipt: <u>5.3°C</u>				
								Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				mice				

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

Project: Hebron 3-12H

Project Number: 065816007  
Project Manager: Jess Alexander

Reported:  
10/07/16 18:05

**Sample Receipt Checklist**

S2 Work Order: 1609057

Client: LTE Client Project ID: Hebron 3-12H

Shipped Via: HD Airbill #: \_\_\_\_\_  
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Matrix (check all that apply):  Air  Soil/Solid  Water  Other: \_\_\_\_\_  
(Describe)

Cooler ID					
Temp (°C)	<u>5.3°C</u>				

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature just above 0°C to ≤ 6°C <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
NOTE: If samples are delivered the same day of sampling, this requirement is waived provided that there is evidence that cooling has begun.				
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"/>	
If custody seals are present, are they intact <sup>(1)</sup> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is a chain-of-custody (COC) form 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 w/ date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water – is there headspace present? <b>If yes, contact client and note in narrative.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect				
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Record the pH in Comments.				
If dissolved metals are requested, were samples field filtered?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Additional Comments (if any):				

<sup>(1)</sup> If NO, then contact the client before proceeding with analysis and note in case narrative.

Mindy Nlach  
Custodian Printed Name

[Signature]  
Signature or Initials of Custodian

9/9/16 16:40  
Date/Time

[Signature]



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

Project: Hebron 3-12H  
Project Number: 065816007  
Project Manager: Jess Alexander

**Reported:**  
10/07/16 18:05

**SBB-R@3'**  
**1609057-01 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/07/16 13:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>C10-C28 (DRO)</b>	<b>1500</b>	50	mg/kg	1	1609076	09/12/16	09/12/16	8015M	

Date Sampled: **09/07/16 13:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: o-Terphenyl</i>		236 %	30-150		"	"	"	"	S-02

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **09/07/16 13:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>0.021</b>	0.0020	mg/kg	1	1609075	09/12/16	09/13/16	EPA 8260B	
<b>Toluene</b>	<b>0.016</b>	0.0050	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>0.021</b>	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.63</b>	0.0050	"	"	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>2300</b>	50	"	100	"	"	09/13/16	"	

Date Sampled: **09/07/16 13:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		127 %	23-173		"	"	09/13/16	"	
<i>Surrogate: Toluene-d8</i>		90.8 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		166 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Hebron 3-12H  
Project Number: 065816007  
Project Manager: Jess Alexander

Reported:  
10/07/16 18:05

**SBC-R@6'**  
**1609057-02 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/07/16 13:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>C10-C28 (DRO)</b>	<b>360</b>	50	mg/kg	1	1609076	09/12/16	09/12/16	8015M	

Date Sampled: **09/07/16 13:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: o-Terphenyl</i>		99.3 %	30-150		"	"	"	"	

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **09/07/16 13:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1609075	09/12/16	09/12/16	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>11</b>	0.50	"	"	"	"	"	"	

Date Sampled: **09/07/16 13:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		106 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		97.9 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		107 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Hebron 3-12H  
Project Number: 065816007  
Project Manager: Jess Alexander

**Reported:**  
10/07/16 18:05

**SBC2@10'**  
**1609057-03 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/07/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>C10-C28 (DRO)</b>	<b>260</b>	50	mg/kg	1	1609076	09/12/16	09/12/16	8015M	

Date Sampled: **09/07/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: o-Terphenyl</i>		103 %	30-150		"	"	"	"	

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **09/07/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>0.013</b>	0.0020	mg/kg	1	1609075	09/12/16	09/13/16	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>0.016</b>	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.12</b>	0.0050	"	"	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>20</b>	0.50	"	"	"	"	"	"	

Date Sampled: **09/07/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		117 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		87.2 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		122 %	21-167		"	"	"	"	

**Semivolatile Organic Compounds by EPA Method 8270D SIM**

Date Sampled: **09/07/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	ND	0.0500	mg/kg	10	1609091	09/12/16	09/16/16	EPA 8270D SIM	R-01
Anthracene	ND	0.0500	"	"	"	"	"	"	R-01
<b>Benzo (a) anthracene</b>	<b>0.0737</b>	0.0500	"	"	"	"	"	"	R-01

Summit Scientific

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

Project: Hebron 3-12H

Project Number: 065816007  
Project Manager: Jess Alexander

Reported:  
10/07/16 18:05

**SBC2@10'**  
**1609057-03 (Soil)**

**Summit Scientific**

**Semivolatile Organic Compounds by EPA Method 8270D SIM**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzo (b) fluoranthene	0.0804	0.0500	mg/kg	10	1609091	09/12/16	09/16/16	EPA 8270D SIM	R-01
Benzo (k) fluoranthene	ND	0.0500	"	"	"	"	"	"	R-01
Benzo (a) pyrene	ND	0.0500	"	"	"	"	"	"	R-01
Chrysene	0.177	0.0500	"	"	"	"	"	"	R-01
Dibenz (a,h) anthracene	ND	0.0500	"	"	"	"	"	"	R-01
Fluoranthene	0.182	0.0500	"	"	"	"	"	"	R-01
Fluorene	0.697	0.0500	"	"	"	"	"	"	R-01
Indeno (1,2,3-cd) pyrene	ND	0.0500	"	"	"	"	"	"	R-01
Naphthalene	1.49	0.0500	"	"	"	"	"	"	R-01
Pyrene	0.323	0.0500	"	"	"	"	"	"	R-01

Date Sampled: **09/07/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10		181 %	30-150		"	"	"	"	R-01, S-02
Surrogate: Fluoranthene-d10		164 %	30-150		"	"	"	"	R-01, S-02

**Total Metals by EPA Method 6020 - Dry Weight Basis**

Date Sampled: **09/07/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	1.13	0.242	mg/kg dry	1	1609070	09/12/16	09/12/16	EPA 6020A	
Barium	2130	0.484	"	"	"	"	"	"	
Cadmium	0.562	0.121	"	"	"	"	"	"	
Chromium	21.6	0.605	"	"	"	"	"	"	
Copper	23.3	0.605	"	"	"	"	"	"	
Lead	11.5	0.242	"	"	"	"	"	"	
Nickel	18.2	0.121	"	"	"	"	"	"	
Selenium	0.652	0.484	"	"	"	"	"	"	
Silver	0.131	0.121	"	"	"	"	"	"	
Zinc	58.3	12.1	"	"	"	"	"	"	

Summit Scientific

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

Project: Hebron 3-12H  
Project Number: 065816007  
Project Manager: Jess Alexander

**Reported:**  
10/07/16 18:05

**SBC2@10'**  
**1609057-03 (Soil)**

**Summit Scientific**

**Total Mercury by EPA Method 7471**

Date Sampled: **09/07/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Mercury	ND	0.0605	mg/kg dry	1	1609087	09/13/16	09/13/16	EPA 7471	

**Hexavalent Chromium by EPA 7196**

Date Sampled: **09/07/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	0.300	mg/kg dry	1	1609094	09/14/16	09/15/16	EPA 7196	

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

Date Sampled: **09/07/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Calcium</b>	<b>5860</b>	9.91	mg/kg dry	1	1609081	09/13/16	09/16/16	EPA 6020/Mod. USDA60 6(2, 3A)	
<b>Magnesium</b>	<b>1020</b>	4.96	"	"	"	"	"	"	
<b>Sodium</b>	<b>1000</b>	4.96	"	"	"	"	"	"	
<b>Sodium Adsorption Ratio</b>	<b>3.17</b>		units	"	1609116	09/16/16	09/16/16	"	

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **09/07/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>pH</b>	<b>8.44</b>	0.100	pH Units	1	1609092	09/13/16	09/13/16	EPA 9045	
<b>% Solids</b>	<b>82.7</b>		%	"	1609071	09/12/16	09/13/16	% calculation	
<b>Specific Conductance (EC)</b>	<b>2.76</b>	0.0100	mmhos/cm	"	1609093	09/13/16	09/13/16	SM 2510B	

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

Project: Hebron 3-12H  
Project Number: 065816007  
Project Manager: Jess Alexander

**Reported:**  
10/07/16 18:05

**SB01@6'**  
**1609057-04 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/07/16 15:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609076	09/12/16	09/12/16	8015M	

Date Sampled: **09/07/16 15:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		95.6 %	30-150		"	"	"	"	

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **09/07/16 15:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1609075	09/12/16	09/12/16	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **09/07/16 15:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		109 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		93.7 %	21-167		"	"	"	"	

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

Project: Hebron 3-12H  
Project Number: 065816007  
Project Manager: Jess Alexander

**Reported:**  
10/07/16 18:05

**SB02@5'**  
**1609057-05 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/07/16 15:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609076	09/12/16	09/12/16	8015M	

Date Sampled: **09/07/16 15:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		96.6 %	30-150		"	"	"	"	

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **09/07/16 15:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1609075	09/12/16	09/12/16	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **09/07/16 15:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.4 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.8 %	21-167		"	"	"	"	

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

Project: Hebron 3-12H

Project Number: 065816007  
Project Manager: Jess Alexander

**Reported:**  
10/07/16 18:05

**SB03@12'**  
**1609057-06 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/07/16 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609076	09/12/16	09/12/16	8015M	

Date Sampled: **09/07/16 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		95.9 %	30-150		"	"	"	"	

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **09/07/16 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1609075	09/12/16	09/12/16	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **09/07/16 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		103 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.9 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.6 %	21-167		"	"	"	"	

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4600 West 60th Avenue  
Arvada CO, 80003

Project: Hebron 3-12H  
Project Number: 065816007  
Project Manager: Jess Alexander

**Reported:**  
10/07/16 18:05

**SB04@6'**  
**1609057-07 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/07/16 16:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609076	09/12/16	09/12/16	8015M	

Date Sampled: **09/07/16 16:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		94.5 %	30-150		"	"	"	"	

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **09/07/16 16:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1609075	09/12/16	09/12/16	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **09/07/16 16:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		106 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.4 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.1 %	21-167		"	"	"	"	

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

Project: Hebron 3-12H  
Project Number: 065816007  
Project Manager: Jess Alexander

**Reported:**  
10/07/16 18:05

**SBD@3'**  
**1609057-08 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/07/16 16:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609076	09/12/16	09/12/16	8015M	

Date Sampled: **09/07/16 16:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		95.9 %	30-150		"	"	"	"	

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **09/07/16 16:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1609075	09/12/16	09/12/16	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **09/07/16 16:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		110 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.3 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.6 %	21-167		"	"	"	"	

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

Project: Hebron 3-12H  
Project Number: 065816007  
Project Manager: Jess Alexander

**Reported:**  
10/07/16 18:05

**SB05@3'**  
**1609057-09 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/08/16 10:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>C10-C28 (DRO)</b>	<b>2000</b>	50	mg/kg	1	1609076	09/12/16	09/12/16	8015M	

Date Sampled: **09/08/16 10:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: o-Terphenyl</i>		214 %	30-150		"	"	"	"	S-02

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **09/08/16 10:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>0.013</b>	0.0020	mg/kg	1	1609075	09/12/16	09/13/16	EPA 8260B	
<b>Toluene</b>	<b>0.13</b>	0.0050	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>0.30</b>	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.96</b>	0.0050	"	"	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>40</b>	0.50	"	"	"	"	"	"	

Date Sampled: **09/08/16 10:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		107 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		95.0 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		142 %	21-167		"	"	"	"	

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

Project: Hebron 3-12H  
Project Number: 065816007  
Project Manager: Jess Alexander

**Reported:**  
10/07/16 18:05

**SB06@3'**  
**1609057-10 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/08/16 10:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609076	09/12/16	09/12/16	8015M	

Date Sampled: **09/08/16 10:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		96.5 %	30-150		"	"	"	"	

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **09/08/16 10:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1609075	09/12/16	09/12/16	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **09/08/16 10:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.5 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		93.7 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Hebron 3-12H  
Project Number: 065816007  
Project Manager: Jess Alexander

**Reported:**  
10/07/16 18:05

**SB07@3'**  
**1609057-11 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/08/16 11:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609076	09/12/16	09/13/16	8015M	

Date Sampled: **09/08/16 11:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		94.7 %	30-150		"	"	"	"	

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **09/08/16 11:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1609075	09/12/16	09/12/16	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **09/08/16 11:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		108 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.7 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.8 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Hebron 3-12H  
Project Number: 065816007  
Project Manager: Jess Alexander

Reported:  
10/07/16 18:05

**SB08@7'**  
**1609057-12 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/08/16 11:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609076	09/12/16	09/13/16	8015M	

Date Sampled: **09/08/16 11:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		95.6 %	30-150		"	"	"	"	

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **09/08/16 11:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1609075	09/12/16	09/12/16	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **09/08/16 11:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		106 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.6 %	21-167		"	"	"	"	

Summit Scientific

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

Project: Hebron 3-12H

Project Number: 065816007  
Project Manager: Jess Alexander

**Reported:**  
10/07/16 18:05

**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 1609076 - EPA 3550A**

**Blank (1609076-BLK1)**

Prepared & Analyzed: 09/12/16

C10-C28 (DRO)	ND	50	mg/kg								
<i>Surrogate: o-Terphenyl</i>	11.9		"	12.5		94.9	30-150				

**LCS (1609076-BS1)**

Prepared & Analyzed: 09/12/16

C10-C28 (DRO)	459	50	mg/kg	499		91.9	73-134				
<i>Surrogate: o-Terphenyl</i>	15.4		"	12.5		123	30-150				

**Matrix Spike (1609076-MS1)**

Source: 1609057-01

Prepared & Analyzed: 09/12/16

C10-C28 (DRO)	2040	50	mg/kg	462	1500	116	50-148				
<i>Surrogate: o-Terphenyl</i>	27.9		"	11.6		241	30-150				S-02

**Matrix Spike Dup (1609076-MSD1)**

Source: 1609057-01

Prepared & Analyzed: 09/12/16

C10-C28 (DRO)	2010	50	mg/kg	462	1500	109	50-148	1.45	20		
<i>Surrogate: o-Terphenyl</i>	33.5		"	11.6		289	30-150				S-02

Summit Scientific

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

Project: Hebron 3-12H  
Project Number: 065816007  
Project Manager: Jess Alexander

Reported:  
10/07/16 18:05

**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 1609075 - EPA 5030 Soil MS**

**Blank (1609075-BLK1)**

Prepared & Analyzed: 09/12/16

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>0.0399</i>		<i>"</i>	<i>0.0400</i>		<i>99.8</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0383</i>		<i>"</i>	<i>0.0400</i>		<i>95.8</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0373</i>		<i>"</i>	<i>0.0400</i>		<i>93.2</i>	<i>21-167</i>			

**LCS (1609075-BS1)**

Prepared & Analyzed: 09/12/16

Benzene	0.0766	0.0020	mg/kg	0.100		76.6	58-130			
Toluene	0.0836	0.0050	"	0.100		83.6	61-134			
Ethylbenzene	0.0958	0.0050	"	0.0992		96.6	74-139			
m,p-Xylene	0.196	0.010	"	0.200		98.2	73-137			
o-Xylene	0.106	0.0050	"	0.0980		108	73-141			
Xylenes (total)	0.302	0.0050	"				30-150			
Gasoline Range Hydrocarbons	1.82	0.50	"				30-150			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0404</i>		<i>"</i>	<i>0.0400</i>		<i>101</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0384</i>		<i>"</i>	<i>0.0400</i>		<i>95.9</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0384</i>		<i>"</i>	<i>0.0400</i>		<i>95.9</i>	<i>21-167</i>			

**Matrix Spike (1609075-MS1)**

Source: 1609057-02

Prepared & Analyzed: 09/12/16

Benzene	0.0736	0.0020	mg/kg	0.0943	ND	78.0	30-131			
Toluene	0.0810	0.0050	"	0.0943	ND	85.9	30-134			
Ethylbenzene	0.0888	0.0050	"	0.0936	ND	94.8	22-153			
m,p-Xylene	0.182	0.010	"	0.188	ND	96.6	10-159			
o-Xylene	0.0995	0.0050	"	0.0925	ND	108	31-151			
Xylenes (total)	0.281	0.0050	"		ND		30-150			
Gasoline Range Hydrocarbons	14.9	0.50	"		10.6		30-150			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0427</i>		<i>"</i>	<i>0.0377</i>		<i>113</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0354</i>		<i>"</i>	<i>0.0377</i>		<i>93.9</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0394</i>		<i>"</i>	<i>0.0377</i>		<i>104</i>	<i>21-167</i>			

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

Project: Hebron 3-12H

Project Number: 065816007  
Project Manager: Jess Alexander

Reported:  
10/07/16 18:05

**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 1609075 - EPA 5030 Soil MS**

<b>Matrix Spike Dup (1609075-MSD1)</b>	<b>Source: 1609057-02</b>			<b>Prepared &amp; Analyzed: 09/12/16</b>						
Benzene	0.0777	0.0020	mg/kg	0.0984	ND	78.9	30-131	5.46	34	
Toluene	0.0854	0.0050	"	0.0984	ND	86.7	30-134	5.25	30	
Ethylbenzene	0.0930	0.0050	"	0.0976	ND	95.3	22-153	4.72	24	
m,p-Xylene	0.191	0.010	"	0.196	ND	97.0	10-159	4.66	68	
o-Xylene	0.102	0.0050	"	0.0965	ND	106	31-151	2.40	38	
Xylenes (total)	0.293	0.0050	"		ND		30-150	3.87	20	
Gasoline Range Hydrocarbons	11.5	0.50	"		10.6		30-150	25.5	20	QM-07
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0434</i>		<i>"</i>	<i>0.0394</i>		<i>110</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0377</i>		<i>"</i>	<i>0.0394</i>		<i>95.8</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0419</i>		<i>"</i>	<i>0.0394</i>		<i>106</i>	<i>21-167</i>			

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Arvada CO, 80003

Project: Hebron 3-12H  
Project Number: 065816007  
Project Manager: Jess Alexander

Reported:  
10/07/16 18:05

**Semivolatile Organic Compounds by EPA Method 8270D SIM - Quality Control**  
**Summit Scientific**

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

**Batch 1609091 - EPA 5030 Soil MS**

**Blank (1609091-BLK1)**

Prepared: 09/12/16 Analyzed: 09/13/16

Acenaphthene	ND	0.00500	mg/kg							
Anthracene	ND	0.00500	"							
Benzo (a) anthracene	ND	0.00500	"							
Benzo (b) fluoranthene	ND	0.00500	"							
Benzo (k) fluoranthene	ND	0.00500	"							
Benzo (a) pyrene	ND	0.00500	"							
Chrysene	ND	0.00500	"							
Dibenz (a,h) anthracene	ND	0.00500	"							
Fluoranthene	ND	0.00500	"							
Fluorene	ND	0.00500	"							
Indeno (1,2,3-cd) pyrene	ND	0.00500	"							
Naphthalene	ND	0.00500	"							
Pyrene	ND	0.00500	"							
<i>Surrogate: 2-Methylnaphthalene-d10</i>	0.0272		"	0.0333		81.5	30-150			
<i>Surrogate: Fluoranthene-d10</i>	0.0302		"	0.0333		90.6	30-150			

**LCS (1609091-BS1)**

Prepared: 09/12/16 Analyzed: 09/13/16

Acenaphthene	0.0282	0.00500	mg/kg	0.0333		84.7	48-131			
Anthracene	0.0306	0.00500	"	0.0333		91.7	48-135			
Benzo (a) anthracene	0.0320	0.00500	"	0.0333		96.0	37-142			
Benzo (b) fluoranthene	0.0331	0.00500	"	0.0333		99.2	35-139			
Benzo (k) fluoranthene	0.0332	0.00500	"	0.0333		99.6	30-139			
Benzo (a) pyrene	0.0303	0.00500	"	0.0333		91.0	41-132			
Chrysene	0.0301	0.00500	"	0.0333		90.3	30-136			
Dibenz (a,h) anthracene	0.0290	0.00500	"	0.0333		87.1	24-127			
Fluoranthene	0.0327	0.00500	"	0.0333		98.0	50-139			
Fluorene	0.0306	0.00500	"	0.0333		91.9	50-130			
Indeno (1,2,3-cd) pyrene	0.0290	0.00500	"	0.0333		87.0	26-139			
Naphthalene	0.0277	0.00500	"	0.0333		83.2	40-135			
Pyrene	0.0293	0.00500	"	0.0333		88.0	39-141			
<i>Surrogate: 2-Methylnaphthalene-d10</i>	0.0294		"	0.0333		88.2	50-150			
<i>Surrogate: Fluoranthene-d10</i>	0.0316		"	0.0333		94.7	50-150			

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Project: Hebron 3-12H

Project Number: 065816007  
Project Manager: Jess Alexander

Reported:  
10/07/16 18:05

**Semivolatile Organic Compounds by EPA Method 8270D SIM - Quality Control**  
**Summit Scientific**

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

**Batch 1609091 - EPA 5030 Soil MS**

<b>Duplicate (1609091-DUP1)</b>	<b>Source: 1608267-01</b>			Prepared: 09/12/16		Analyzed: 09/13/16	
Acenaphthene	ND	0.00500	mg/kg		ND		200
Anthracene	ND	0.00500	"		ND		200
Benzo (a) anthracene	ND	0.00500	"		ND		200
Benzo (b) fluoranthene	ND	0.00500	"		ND		200
Benzo (k) fluoranthene	0.0120	0.00500	"		0.00734	48.4	200
Benzo (a) pyrene	ND	0.00500	"		ND		200
Chrysene	0.0322	0.00500	"		0.0229	33.9	200
Dibenz (a,h) anthracene	ND	0.00500	"		ND		200
Fluoranthene	ND	0.00500	"		0.00258		200
Fluorene	0.0373	0.00500	"		0.0277	29.4	200
Indeno (1,2,3-cd) pyrene	ND	0.00500	"		ND		200
Naphthalene	0.0277	0.00500	"		ND		200
Pyrene	0.0288	0.00500	"		0.0200	35.7	200
<i>Surrogate: 2-Methylnaphthalene-d10</i>	<i>0.0317</i>		"	<i>0.0333</i>		<i>95.2 30-150</i>	
<i>Surrogate: Fluoranthene-d10</i>	<i>0.0341</i>		"	<i>0.0333</i>		<i>102 30-150</i>	

<b>Matrix Spike (1609091-MS1)</b>	<b>Source: 1608267-02</b>			Prepared: 09/12/16		Analyzed: 09/13/16	
Acenaphthene	ND	0.00500	mg/kg	0.0333	ND	27-140	QM-07
Anthracene	0.0909	0.00500	"	0.0333	ND	273 23-144	QM-07
Benzo (a) anthracene	0.0359	0.00500	"	0.0333	ND	108 12-168	
Benzo (b) fluoranthene	0.0431	0.00500	"	0.0333	0.00506	114 10-170	
Benzo (k) fluoranthene	0.0377	0.00500	"	0.0333	ND	113 11-150	
Benzo (a) pyrene	0.0316	0.00500	"	0.0333	ND	94.7 11-162	
Chrysene	0.0550	0.00500	"	0.0333	0.0215	101 10-167	
Dibenz (a,h) anthracene	0.0194	0.00500	"	0.0333	ND	58.1 10-128	
Fluoranthene	0.0452	0.00500	"	0.0333	ND	136 18-157	
Fluorene	0.0216	0.00500	"	0.0333	0.00172	59.6 37-133	
Indeno (1,2,3-cd) pyrene	0.0190	0.00500	"	0.0333	ND	57.1 10-161	
Naphthalene	ND	0.00500	"	0.0333	ND	10-157	QM-07
Pyrene	0.107	0.00500	"	0.0333	0.130	NR 10-166	QM-07
<i>Surrogate: 2-Methylnaphthalene-d10</i>	<i>0.0298</i>		"	<i>0.0333</i>		<i>89.5 50-150</i>	
<i>Surrogate: Fluoranthene-d10</i>	<i>0.0360</i>		"	<i>0.0333</i>		<i>108 50-150</i>	

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LT Environmental, Inc.  
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Arvada CO, 80003

Project: Hebron 3-12H  
Project Number: 065816007  
Project Manager: Jess Alexander

Reported:  
10/07/16 18:05

**Total Metals by EPA Method 6020 - Dry Weight Basis - Quality Control**  
**Summit Scientific**

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

**Batch 1609070 - EPA 3050B**

**Blank (1609070-BLK1)**

Prepared & Analyzed: 09/12/16

Arsenic	ND	0.200	mg/kg wet							
Barium	ND	0.400	"							
Cadmium	ND	0.100	"							
Chromium	ND	0.500	"							
Copper	ND	0.500	"							
Lead	ND	0.200	"							
Nickel	ND	0.100	"							
Selenium	ND	0.400	"							
Silver	ND	0.100	"							
Zinc	ND	10.0	"							

**LCS (1609070-BS1)**

Prepared & Analyzed: 09/12/16

Arsenic	44.2	0.200	mg/kg wet	52.8	83.7	82.6-117
Barium	88.0	0.400	"	91.2	96.5	72.8-127
Cadmium	48.1	0.100	"	48.8	98.6	80.3-120
Chromium	23.8	0.500	"	25.3	94.1	74.7-125
Copper	88.0	0.500	"	84.8	104	85.4-115
Lead	43.0	0.200	"	43.2	99.5	81.1-119
Nickel	115	0.100	"	114	101	88-112
Selenium	34.0	0.400	"	32.2	106	73.7-127
Silver	29.7	0.100	"	29.4	101	69.8-130
Zinc	82.8	10.0	"	81.2	102	77.8-122

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 Arvada CO, 80003

Project: Hebron 3-12H  
 Project Number: 065816007  
 Project Manager: Jess Alexander

**Reported:**  
 10/07/16 18:05

**Total Mercury by EPA Method 7471 - Quality Control**  
**Summit Scientific**

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

**Batch 1609087 - EPA 7471A**

<b>Blank (1609087-BLK1)</b>			Prepared & Analyzed: 09/13/16								
Mercury	ND	0.0500	mg/kg wet								
<b>LCS (1609087-BS1)</b>			Prepared & Analyzed: 09/13/16								
Mercury	0.502	0.0500	mg/kg wet	0.500		100	80-120				
<b>Duplicate (1609087-DUP1)</b>			<b>Source: 1608267-01</b>		Prepared & Analyzed: 09/13/16						
Mercury	0.0480	0.0627	mg/kg dry		0.0451				6.33	20	
<b>Matrix Spike (1609087-MS1)</b>			<b>Source: 1608267-01</b>		Prepared & Analyzed: 09/13/16						
Mercury	0.572	0.0541	mg/kg dry	0.541	0.0451	97.5	80-120				
<b>Matrix Spike Dup (1609087-MSD1)</b>			<b>Source: 1608267-01</b>		Prepared & Analyzed: 09/13/16						
Mercury	0.533	0.0490	mg/kg dry	0.490	0.0451	99.6	80-120		7.03	20	

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Project: Hebron 3-12H  
Project Number: 065816007  
Project Manager: Jess Alexander

**Reported:**  
10/07/16 18:05

**Hexavalent Chromium by EPA 7196 - Quality Control**  
**Summit Scientific**

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

**Batch 1609094 - 3060A\_Mod**

<b>Blank (1609094-BLK1)</b>		Prepared: 09/14/16 Analyzed: 09/15/16								
Chromium, Hexavalent	ND	0.300	mg/kg wet							
<b>LCS (1609094-BS1)</b>		Prepared: 09/14/16 Analyzed: 09/15/16								
Chromium, Hexavalent	19.2	0.300	mg/kg wet	19.9		96.1	85-115			
<b>Duplicate (1609094-DUP1)</b>		<b>Source: 1609057-03</b>			Prepared: 09/14/16 Analyzed: 09/15/16					
Chromium, Hexavalent	ND	0.300	mg/kg dry		ND				20	
<b>Matrix Spike (1609094-MS1)</b>		<b>Source: 1609057-03</b>			Prepared: 09/14/16 Analyzed: 09/15/16					
Chromium, Hexavalent	ND	0.300	mg/kg dry	24.1	ND		85-115			QM-07
<b>Post Spike (1609094-PS1)</b>		<b>Source: 1609057-03</b>			Prepared: 09/14/16 Analyzed: 09/15/16					
Chromium, Hexavalent	0.199		mg/kg	0.498	0.00	39.9	85-115			QM-07

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Arvada CO, 80003

Project: Hebron 3-12H  
Project Number: 065816007  
Project Manager: Jess Alexander

Reported:  
10/07/16 18:05

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

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

**Batch 1609081 - General Preparation**

**Blank (1609081-BLK1)**

Prepared: 09/13/16 Analyzed: 09/15/16

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

**LCS (1609081-BS1)**

Prepared: 09/13/16 Analyzed: 09/15/16

Calcium	547	10.0	mg/kg wet			82.9-118			
Magnesium	588	5.00	"			77.1-123			
Sodium	584	5.00	"			71-129			

**Duplicate (1609081-DUP1)**

Source: 1608267-01

Prepared: 09/13/16 Analyzed: 09/15/16

Calcium	4280	10.6	mg/kg dry	4090			4.56	200	
Magnesium	748	5.32	"	719			3.91	200	
Sodium	2050	5.32	"	1970			4.14	200	

**Matrix Spike (1609081-MS1)**

Source: 1608267-01

Prepared: 09/13/16 Analyzed: 09/15/16

Calcium	4820	10.6	mg/kg dry	4090			75-125		
Magnesium	1360	5.32	"	719			75-125		
Sodium	2630	5.32	"	1970			75-125		

**Matrix Spike Dup (1609081-MSD1)**

Source: 1608267-01

Prepared: 09/13/16 Analyzed: 09/15/16

Calcium	4570	10.6	mg/kg dry	4090			75-125	5.26	25
Magnesium	1250	5.32	"	719			75-125	8.17	25
Sodium	2480	5.32	"	1970			75-125	5.68	25

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Arvada CO, 80003

Project: Hebron 3-12H  
Project Number: 065816007  
Project Manager: Jess Alexander

**Reported:**  
10/07/16 18:05

**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 1609071 - General Preparation**

<b>Duplicate (1609071-DUP1)</b>		<b>Source: 1608267-01</b>			Prepared: 09/12/16 Analyzed: 09/13/16						
% Solids	79.4		%		79.7			0.377	20		
<b>Duplicate (1609071-DUP2)</b>		<b>Source: 1608267-01</b>			Prepared: 09/12/16 Analyzed: 09/13/16						
% Solids	79.4		%		79.7			0.377	20		

**Batch 1609092 - General Preparation**

<b>LCS (1609092-BS1)</b>					Prepared & Analyzed: 09/13/16						
pH	7.98	0.100	pH Units	8.00	99.8	95-105					
<b>Duplicate (1609092-DUP1)</b>		<b>Source: 1609057-03</b>			Prepared & Analyzed: 09/13/16						
pH	8.31	0.100	pH Units	8.44	1.55	20					

**Batch 1609093 - General Preparation**

<b>Blank (1609093-BLK1)</b>					Prepared & Analyzed: 09/13/16						
Specific Conductance (EC)	ND	0.0100	mmhos/cm								
<b>LCS (1609093-BS1)</b>					Prepared & Analyzed: 09/13/16						
Specific Conductance (EC)	0.504	0.0100	mmhos/cm	0.500	101	90-110					
<b>Duplicate (1609093-DUP1)</b>		<b>Source: 1609057-03</b>			Prepared & Analyzed: 09/13/16						
Specific Conductance (EC)	2.52	0.0100	mmhos/cm	2.76	9.24	20					

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4600 West 60th Avenue  
Arvada CO, 80003

Project: Hebron 3-12H

Project Number: 065816007  
Project Manager: Jess Alexander

**Reported:**  
10/07/16 18:05

### 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.
- R-01 The Reporting Limit for this analyte has been raised to account for matrix interference.
- QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
- 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