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**Terrace A's  
Groundwater Monitoring Report- Third Quarter 2019**

October 25, 2019

**Prepared By:**

Talon/LPE  
1811 East Mulberry Street  
Fort Collins, CO 80524

**Prepared For:**

Whiting Petroleum Corporation

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## 1 Introduction

Talon/LPE (Talon) was contracted by Whiting Petroleum Corporation (Whiting) to conduct groundwater monitoring in an area associated with a former pit identified west of the Terrace Gas Plant (Site) in Weld County, Colorado. The site is located at the northwest quarter of the northeast quarter of Section 18, Township 10 North, Range 58 West, 6th Principal Meridian. The Terrace Compressor tin horn pit (COGCC facility #100035 - Remediation #7392) is located approximately one-eighth (1/8) of a mile to the west of the former Terrace Gas Plant. The site is located at 40°50'44.22"N and 103°54'48.34"W. The Site Plan is shown on Figure 1 and the general site location is shown on Figure 2.

## 2 Objective

The primary objective of this document is to report on Site activities completed during the Third Quarter 2019, which included groundwater monitoring.

## 3 Regulatory Framework

The COGCC has regulatory jurisdiction over oil and natural gas industry operations in the State of Colorado. Section 900 of the COGCC Rules is for Exploration and Production Waste Management. More specifically, Section 910 details the Concentrations and Sampling for Soil and Groundwater rules. The regulatory limits for specific analytes in soil and groundwater are detailed in Table 910-1 and are summarized below.

Compound	COGCC Table 910-1 Groundwater Concentrations
Benzene	0.005 mg/L
Toluene	1.0 mg/L
Ethylbenzene	0.7 mg/L
Xylenes (total)	10 mg/L

## 4 Site Characteristics

### 4.1 Geography

The site is located in the Pawnee Grasslands in Weld County, which is the northeastern part of Colorado. The Grasslands are part of the Colorado Eastern Plains and are relatively flat with the exception of the Pawnee Creek which drains into the South Platte River.

### 4.2 Geologic Summary

Geology in this area consists of Oligocene age soils of the White River Group comprised of the Brule Formation and Chadron Formation. The Brule Formation consists of interbedded claystones, mudstones, and siltstones of grayish green color. Underlying the Brule Formation is the Chadron Formation comprised of sandstones, claystones, and conglomerates; color varies from yellowish-brown to olive-gray.

### 4.3 Groundwater

According to the Colorado Division of Water Resources Website, there are no water wells within 1,000-foot radius of the Site.

Depth to groundwater levels as measured on September 11, 2019, in the six (6) groundwater monitoring wells range from 42.54 (MW-5) to 56.20 (MW-4) feet below top of casing (Table 3), which are above-ground by approximately three (3) feet (ft). No wells had measurable amounts of phase-separated hydrocarbons (PSH) during the gauging and sampling activities. The groundwater gradient has been calculated to be approximately 0.055 feet/foot to the southeast as shown in Figure 4.

## 5 Groundwater Monitoring

On September 11, 2019, Talon personnel gauged all six (6) monitoring wells for depth to water (Table 3). The six (6) wells were purged of three (3) casing volumes, or until the wells became dry. The water levels were allowed to recover within the wells and groundwater samples were collected. The collected groundwater samples were submitted to Summit Scientific in Golden, Colorado (Summit) for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) via method SW8260. Purge water generated during sampling activities was placed into 55-gallon steel drums pending off-site disposal.

Table 1 in Attachment 2 summarizes the well completion and survey information, Table 2 summarizes the groundwater laboratory analytical results, and Table 3 includes well gauging data. A copy of the laboratory reports and chain of custody documentation is included in Attachment 3.

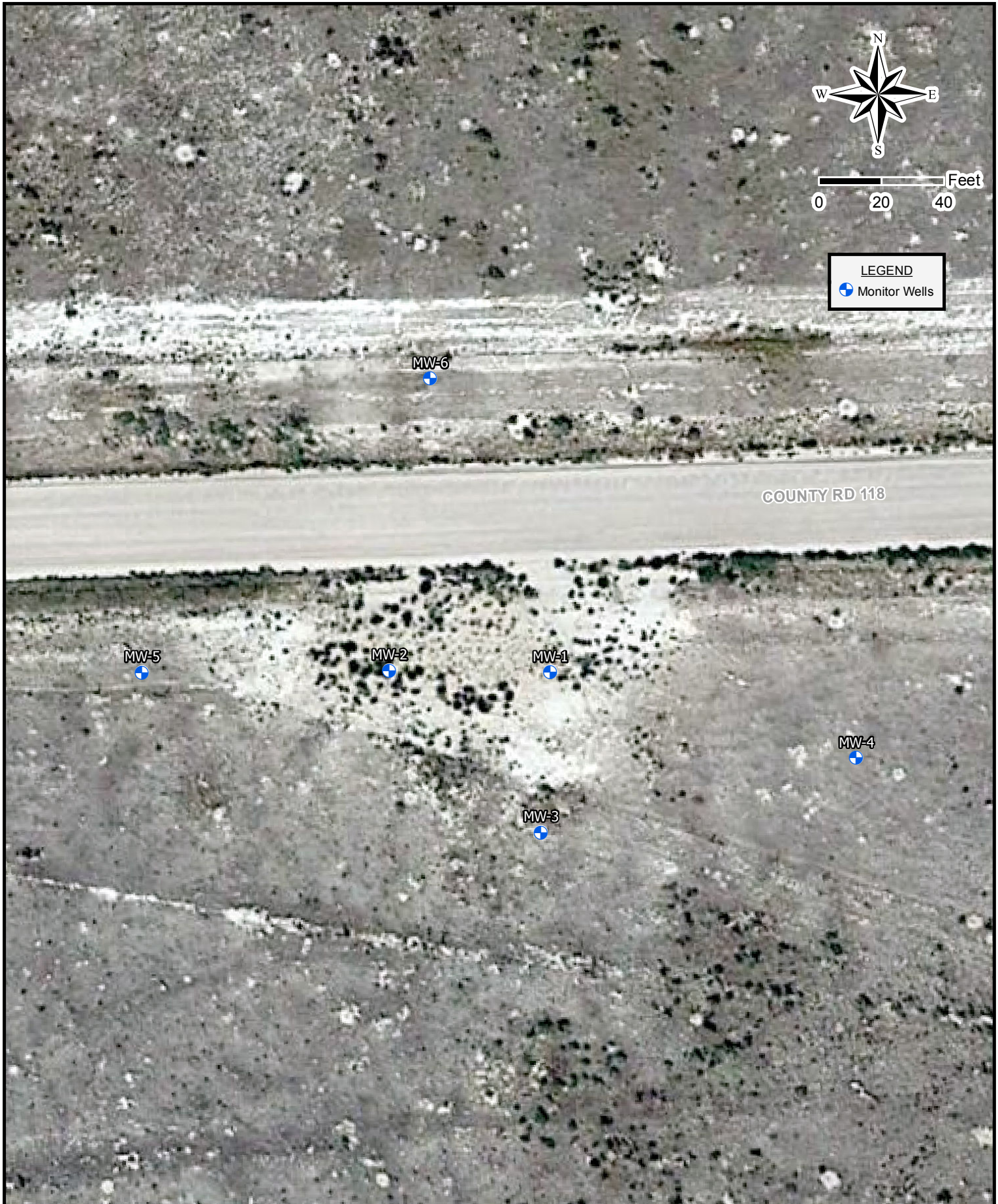
All groundwater sample analytical results for monitoring wells MW-1 through MW-6 (Figure 3) for BTEX were below COGCC Table 910-1 concentration levels or below laboratory detection limits (Table 2). Analytical results for MW-1 were below laboratory detection limits indicating the concentration levels have decreased from 2<sup>nd</sup> quarter 2019. Additionally there were noticeable analytical changes in MW-2 for BTEX. Analytical results for BTEX at MW-2 had increased from below laboratory detection limits during the Second Quarter 2019, to 0.0032 mg/L for Benzene, 0.014 mg/L for Toluene, 0.0021 mg/L Ethyl-Benzene, and 0.021 mg/L Xylenes. Analytical results for MW-2 are below COGCC Table 910-1 concentration levels, but above laboratory detection limits for the first time, indicating signs of impact within MW-2.

Talon personnel resampled MW-1 and MW-2 on September 19, 2019 to accurately assess this odd occurrence (Explanatory Case narrative in Lab report 1909250 Pg. 2, Attachment 4). Analytical results for MW-1 were below laboratory detection levels in Table 1. Analytical results for MW-2 corresponded with the results from the first report (1909137) and are therefore considered valid. Summit Scientific has confirmed that there was no sample switch in the lab or the field.

## 6 Conclusions & Recommendations

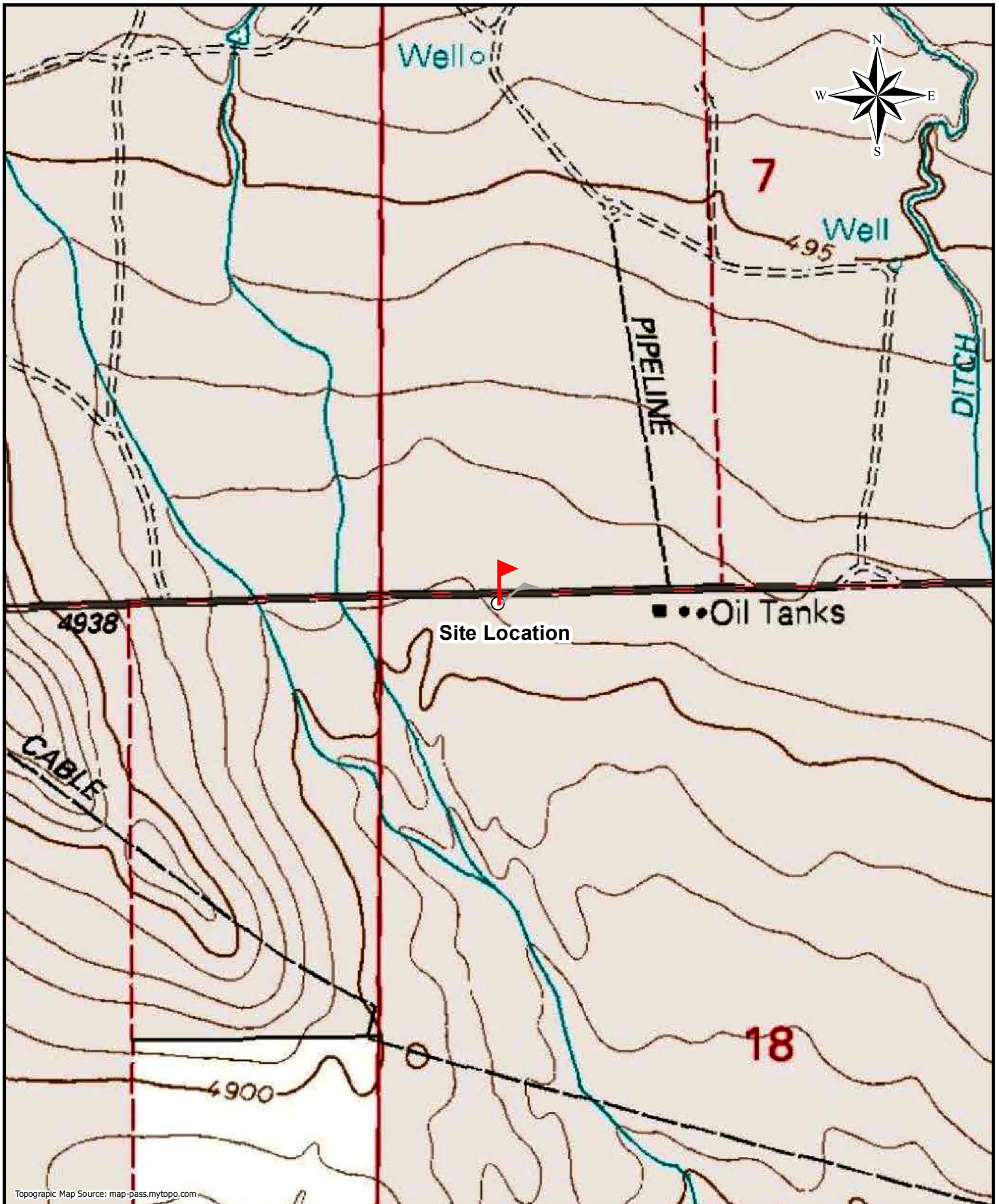
During Third Quarter 2019, Talon collected groundwater samples from all six (6) monitoring wells. All groundwater sample analytical results for Monitoring wells 1-6 (Figure 3) for BTEX were below COGCC Table 910-1 concentration levels (Table 2). Talon will continue quarterly monitoring at the Site. The next groundwater sampling event is anticipated to occur in December 2019.

**Attachment 1**  
**Figures**



Drafted: 10/9/2019  
1 in = 40 ft  
Drafted By: JAI

Whiting Oil and Gas Corporation  
Terrace Pit  
Weld County, CO  
Figure 1 - Site Plan

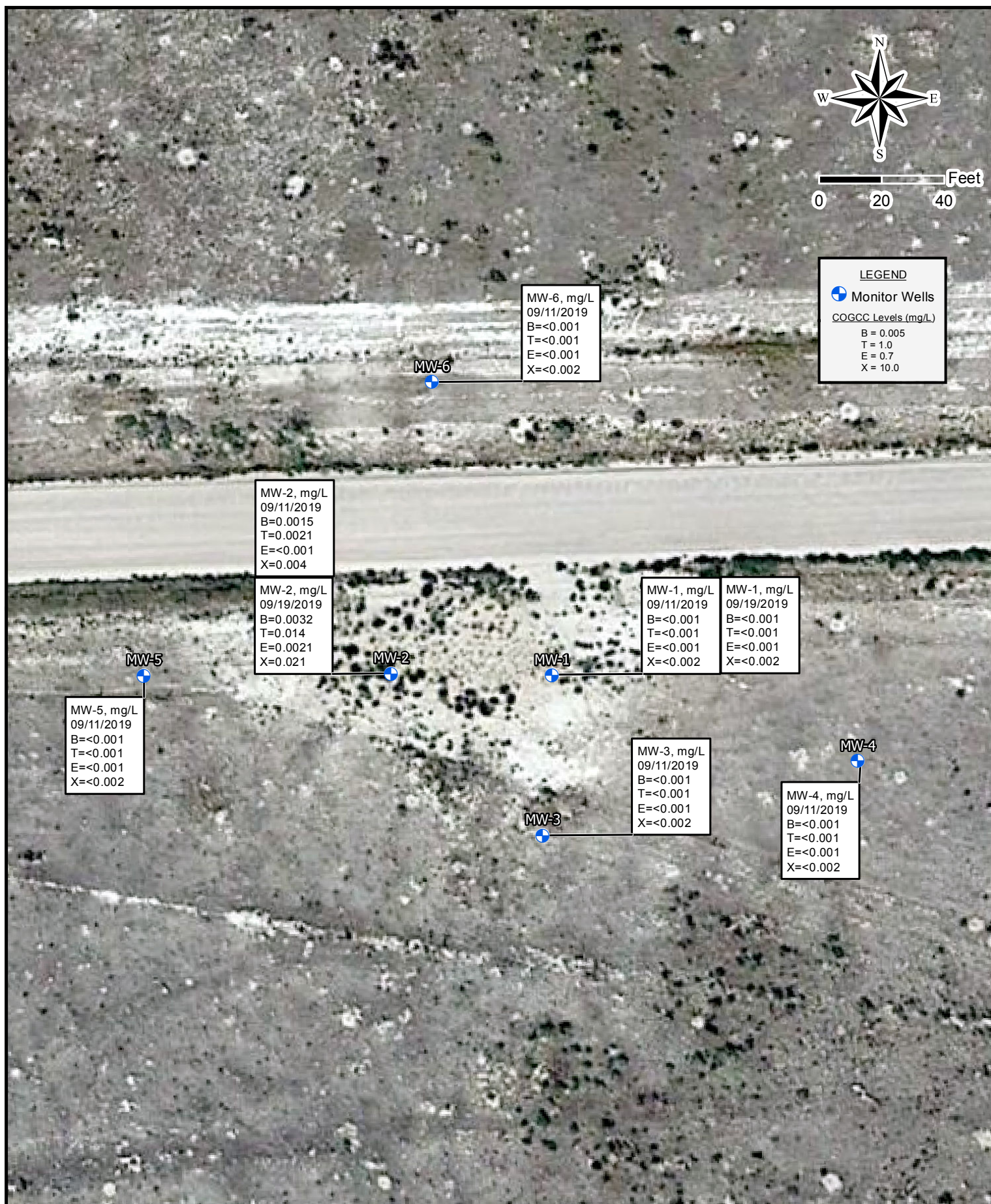


Topographic Map Source: map-pass.mytopo.com



Drafted: 10/9/2019  
1 in = 800 ft  
Drafted By: JAI

Whiting Oil and Gas Corporation  
Terrace Pit  
Weld County, CO  
Figure 2 - Topographic Map



Drafted: 10/23/2019  
1 in = 40 ft  
Drafted By: JAI

Whiting Oil and Gas Corporation  
Terrace Pit  
Weld County, CO  
Figure 3 - Groundwater Concentration Map (09/11&19/2019)



Drafted: 10/9/2019  
1 in = 40 ft  
Drafted By: JAI

Whiting Oil and Gas Corporation  
Terrace Pit  
Weld County, CO  
Figure 4 - Groundwater Gradient Map (09/11/2019)

## **Attachment 2 Tables**



**Table 1 - Well Information**

**Whiting Oil and Gas Corporation  
Terrace Pit  
Weld County, Colorado**

<b>Well ID</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Ground Surface Elevation (ft amsl)</b>	<b>TOC Elevation (ft amsl)</b>	<b>Screen Interval (ft bgs)</b>	<b>Total Depth (ft)</b>
MW-1	40.845630	-103.913390	4909.4	4912.7	44-74	77.25
MW-2	40.845633	-103.913576	4909.6	4912.7	45-65	67.07
MW-3	40.845490	-103.913404	4909.1	4912.5	40-60	59.97
MW-4	40.845503	-103.913036	4910.3	4913.1	35-60	60.00
MW-5	40.845633	-103.913913	4909.0	4912.1	35-60	60.00
MW-6	40.845960	-103.913495	4910.1	4913.2	35-60	60.00

TOC - Top of Casing  
ft bgs - Feet Below Ground Surface  
ft amsl - Feet Above Mean Sea Level



**Table 2 - Groundwater Analytical Data**

**Whiting Oil and Gas Corporation  
Terrace Pit  
Weld County, Colorado**

Sample ID	Lab ID	Date	Concentration (mg/L)			
			Benzene	Toluene	Ethyl-Benzene	Xylenes
COGCC Table 910-1 Concentration Levels			0.005	1	0.7	10
MW-1	1904027.01	03/29/19	1.000	2.400	0.140	1.800
	1906081-01	06/06/19	2.000	4.900	0.520	5.900
	1909137-01	09/11/19	<0.001	<0.001	<0.001	<0.002
	1909250-01	09/19/19	<0.001	<0.001	<0.001	<0.002
MW-2	1904027.02	03/29/19	<0.001	<0.001	<0.001	<0.002
	1906081-02	06/06/19	<0.001	<0.001	<0.001	<0.002
	1909137-02	09/11/19	0.0015	0.0021	<0.001	0.004
	1909250-02	09/19/19	0.0032	0.014	0.0021	0.021
MW-3	1904027.01	03/29/19	<0.001	<0.001	<0.001	<0.002
	1906081-03	06/06/19	<0.001	<0.001	<0.001	<0.002
	1909137-03	09/11/19	<0.001	<0.001	<0.001	<0.002
MW-4	1904027.04	03/29/19	<0.001	<0.001	<0.001	<0.002
	1906081-04	06/06/19	<0.001	<0.001	<0.001	<0.002
	1909137-04	09/11/19	<0.001	<0.001	<0.001	<0.002
MW-5	1904027.05	03/29/19	<0.001	<0.001	<0.001	<0.002
	1906081-5	06/06/19	<0.001	<0.001	<0.001	<0.002
	1909137-05	09/11/19	<0.001	<0.001	<0.001	<0.002
MW-6	1904027.06	03/29/19	<0.001	<0.001	<0.001	<0.002
	1906081-06	06/06/19	<0.001	<0.001	<0.001	<0.002
	1909137-06	09/11/19	<0.001	<0.001	<0.001	<0.002

mg/L -milligrams per liter

< - Analytical result is less than the reporting limit

COGCC - Colorado Oil and Gas Conservation Commission

NS - Not Sampled

PSH - Phase-Separated Hydrocarbons



**Table 3 - Gauging Data**

**Whiting Oil and Gas Corporation  
Terrace A  
Weld County, Colorado**

Well ID	Top of Casing Elevation (ft amsl)	Date Gauged	Depth to Product (ft btoc)	DTW (ft btoc)	Total Depth (ft)	Product Thickness (ft)	Potentiometric Surface Elevation (ft)
MW-1	4912.7	3/29/2019	NA	52.69	77.15	0.00	4860.01
	4912.7	6/6/2019	NA	52.45	77.15	0.00	4860.25
	4912.7	9/11/2019	NA	52.02	77.15	0.00	4860.68
MW-2	4912.7	3/29/2019	NA	47.17	67.12	0.00	4865.53
	4912.7	6/6/2019	NA	46.91	67.12	0.00	4865.79
	4912.7	9/11/2019	NA	45.50	67.12	0.00	4867.2
MW-3	4912.5	3/29/2019	NA	52.52	59.90	0.00	4859.98
	4912.5	6/6/2019	NA	52.62	59.90	0.00	4859.88
	4912.5	9/11/2019	NA	51.55	60.00	0.00	4860.95
MW-4	4913.1	3/29/2019	NA	56.82	62.20	0.00	4856.28
	4913.1	6/6/2019	NA	56.78	62.20	0.00	4856.32
	4913.1	9/11/2019	NA	56.20	62.22	0.00	4856.90
MW-5	4912.1	3/29/2019	NA	44.71	62.22	0.00	4867.39
	4912.1	6/6/2019	NA	43.80	62.22	0.00	4868.30
	4912.1	9/11/2019	NA	42.54	62.22	0.00	4869.56
MW-6	4913.2	3/29/2019	NA	46.35	62.38	0.00	4866.85
	4913.2	6/6/2019	NA	46.30	62.38	0.00	4866.90
	4913.2	9/11/2019	NA	44.61	62.28	0.00	4868.59

NA - Not Applicable

DTW - Depth to Water

ft btoc - Feet Below Top of Casing

ft amsl - Feet Above Mean Sea Level

**Attachment 3**  
**Analytical Report**

# Summit Scientific

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

September 18, 2019

Jennifer Galles

Talon/LPE

1811 East Mulberry

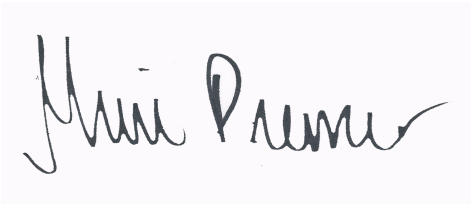
Fort Collins, CO 80525

RE: Terrace 3QGWM2019

Work Order # 1909137

Enclosed are the results of analyses for samples received by Summit Scientific on 09/11/19 15:45. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink on a light blue background. The signature is written in a cursive style and appears to read "Muri Premier".

Muri Premier For Ben Shrewsbury

Laboratory Manager



Talon/LPE  
1811 East Mulberry  
Fort Collins CO, 80525

Project: Terrace 3QGWM2019

Project Number: 701530.22.13  
Project Manager: Jennifer Galles

**Reported:**  
09/18/19 15:21

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	1909137-01	Water	09/11/19 11:45	09/11/19 15:45
MW-2	1909137-02	Water	09/11/19 11:50	09/11/19 15:45
MW-3	1909137-03	Water	09/11/19 11:55	09/11/19 15:45
MW-4	1909137-04	Water	09/11/19 12:00	09/11/19 15:45
MW-5	1909137-05	Water	09/11/19 12:05	09/11/19 15:45
MW-6	1909137-06	Water	09/11/19 12:10	09/11/19 15:45

Summit Scientific

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# Summit Scientific

1909137

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

Page 1 of 1

Client: Talon/LPE -Bill to Whiting  
Address: 1811 East Mulberry  
City/State/Zip: Fort Collins, CO 80524  
Phone: 970-818-5330 Fax:   
Sampler Name: Levi Kirk & Alex Lae

Project Manager: Jennifer Galles  
E-Mail: jgalles@talonlpe.com & jleverton@talonlpe.com  
Project Name: Terrace 3QGWM2019  
Project Number: 701530.022.13

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)	BTEX												
MW-1	9/11/2019	11:45	3	x				x					x											
MW-2	9/11/2019	11:50	3	x				x					x											
MW-3	9/11/2019	11:55	3	x				x					x											
MW-4	9/11/2019	12:00	3	x				x					x											
MW-5	9/11/2019	12:05	3	x				x					x											
MW-6	9/11/2019	12:10	3	x				x					x											
Relinquished by: <u>Ben Broadbent</u> 1545 9/11/19				Date/Time: <u>09/11/19 1545</u>				Received by: <u>[Signature]</u>				Date/Time: <u>09/11/19 1545</u>				Turn Around Time (Check)								
Relinquished by:				Date/Time:				Received by:				Date/Time:				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:				Date/Time:				Received in Lab by:				Date/Time:				Sample Integrity: Temperature Upon Receipt: <u>3.7</u> Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>								

## Sample Receipt Checklist

1909137

S2 Work Order \_\_\_\_\_

Client: TALON/LPEClient Project ID: TEPRACE 3QGW M209Shipped Via: H.D./P.U./FedEx/UPS/USPS/Other Airbill #: \_\_\_\_\_
☐ ☒ ☐ ☐ ☐
Matrix (check all that apply): ☐ Air ☐ Soil/Solid ☒ Water ☐ Other: \_\_\_\_\_  
(Describe)

Temp (°C)	3.7
-----------	-----

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C <sup>(1)</sup> ? NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If custody seals are present, are they intact <sup>(1)</sup> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Are samples with holding times due within 48 hours sample 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? If yes, contact client and note in narrative.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ? Note the type of preservative in the Comments column – HCl, H <sub>2</sub> SO <sub>4</sub> , NaOH, HNO <sub>3</sub> , ect	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	HCl
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ? Record the pH in Comments.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
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.Custodian Printed Name or Initials RESignature of Custodian [Signature]Date/Time 09/11/19 1632



Talon/LPE  
1811 East Mulberry  
Fort Collins CO, 80525

Project: Terrace 3QGWM2019

Project Number: 701530.22.13  
Project Manager: Jennifer Galles

**Reported:**  
09/18/19 15:21

**MW-1**  
**1909137-01 (Water)**

**Summit Scientific**

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

Date Sampled: **09/11/19 11:45**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	1.0	ug/l	1	1909192	09/13/19	09/14/19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **09/11/19 11:45**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		93.6 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		86.0 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	21-167		"	"	"	"	

Summit Scientific

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Talon/LPE  
1811 East Mulberry  
Fort Collins CO, 80525

Project: Terrace 3QGWM2019

Project Number: 701530.22.13  
Project Manager: Jennifer Galles

**Reported:**  
09/18/19 15:21

**MW-2**  
**1909137-02 (Water)**

**Summit Scientific**

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

Date Sampled: **09/11/19 11:50**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<b>Benzene</b>	<b>1.5</b>	1.0		ug/l	1	1909192	09/13/19	09/14/19	EPA 8260B	
<b>Toluene</b>	<b>2.1</b>	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>4.0</b>	2.0		"	"	"	"	"	"	

Date Sampled: **09/11/19 11:50**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		75.4 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		94.7 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %		21-167		"	"	"	"	

Summit Scientific

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Talon/LPE  
1811 East Mulberry  
Fort Collins CO, 80525

Project: Terrace 3QGWM2019  
Project Number: 701530.22.13  
Project Manager: Jennifer Galles

**Reported:**  
09/18/19 15:21

**MW-3**  
**1909137-03 (Water)**

**Summit Scientific**

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

Date Sampled: **09/11/19 11:55**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	1.0	ug/l	1	1909192	09/13/19	09/14/19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **09/11/19 11:55**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		78.8 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		94.7 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		105 %	21-167		"	"	"	"	

Summit Scientific

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Talon/LPE  
1811 East Mulberry  
Fort Collins CO, 80525

Project: Terrace 3QGWM2019

Project Number: 701530.22.13  
Project Manager: Jennifer Galles

**Reported:**  
09/18/19 15:21

**MW-4**  
**1909137-04 (Water)**

**Summit Scientific**

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

Date Sampled: **09/11/19 12:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	1.0	ug/l	1	1909192	09/13/19	09/14/19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **09/11/19 12:00**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		78.4 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		93.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.8 %	21-167		"	"	"	"	

Summit Scientific

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Talon/LPE  
1811 East Mulberry  
Fort Collins CO, 80525

Project: Terrace 3QGWM2019  
Project Number: 701530.22.13  
Project Manager: Jennifer Galles

**Reported:**  
09/18/19 15:21

**MW-5**  
**1909137-05 (Water)**

**Summit Scientific**

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

Date Sampled: **09/11/19 12:05**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	1.0	ug/l	1	1909192	09/13/19	09/14/19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **09/11/19 12:05**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		78.5 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		93.1 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	21-167		"	"	"	"	

Summit Scientific

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Talon/LPE  
1811 East Mulberry  
Fort Collins CO, 80525

Project: Terrace 3QGWM2019

Project Number: 701530.22.13  
Project Manager: Jennifer Galles

**Reported:**  
09/18/19 15:21

**MW-6**  
**1909137-06 (Water)**

**Summit Scientific**

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

Date Sampled: **09/11/19 12:10**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	1.0	ug/l	1	1909192	09/13/19	09/14/19	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **09/11/19 12:10**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		80.1 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		93.7 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

Summit Scientific

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Talon/LPE  
1811 East Mulberry  
Fort Collins CO, 80525

Project: Terrace 3QGWM2019

Project Number: 701530.22.13

Project Manager: Jennifer Galles

**Reported:**  
09/18/19 15:21

## Volatile Organic Compounds by EPA Method 8260B - Quality Control

### Summit Scientific

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

#### Batch 1909192 - EPA 5030 Water MS

##### Blank (1909192-BLK1)

Prepared: 09/13/19 Analyzed: 09/14/19

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	12.0		"	13.3		89.6	23-173			
Surrogate: Toluene-d8	11.9		"	13.3		89.4	20-170			
Surrogate: 4-Bromofluorobenzene	13.1		"	13.3		98.0	21-167			

##### LCS (1909192-BS1)

Prepared: 09/13/19 Analyzed: 09/14/19

Benzene	27.0	1.0	ug/l	33.3		80.9	51-132			
Toluene	29.8	1.0	"	33.3		89.4	51-138			
Ethylbenzene	30.1	1.0	"	33.3		90.4	58-146			
m,p-Xylene	55.2	2.0	"	66.7		82.8	57-144			
o-Xylene	27.4	1.0	"	33.3		82.4	53-146			
Surrogate: 1,2-Dichloroethane-d4	9.90		"	13.3		74.3	23-173			
Surrogate: Toluene-d8	13.6		"	13.3		102	20-170			
Surrogate: 4-Bromofluorobenzene	13.2		"	13.3		98.9	21-167			

##### Matrix Spike (1909192-MS1)

Source: 1909130-01

Prepared: 09/13/19 Analyzed: 09/14/19

Benzene	26.8	1.0	ug/l	33.3	ND	80.4	34-141			
Toluene	30.1	1.0	"	33.3	ND	90.2	27-151			
Ethylbenzene	31.0	1.0	"	33.3	ND	93.1	29-160			
m,p-Xylene	57.3	2.0	"	66.7	ND	85.9	20-166			
o-Xylene	28.7	1.0	"	33.3	ND	86.0	33-159			
Surrogate: 1,2-Dichloroethane-d4	9.85		"	13.3		73.9	23-173			
Surrogate: Toluene-d8	13.7		"	13.3		103	20-170			
Surrogate: 4-Bromofluorobenzene	12.9		"	13.3		96.7	21-167			

Summit Scientific

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Talon/LPE  
1811 East Mulberry  
Fort Collins CO, 80525

Project: Terrace 3QGWM2019

Project Number: 701530.22.13

Project Manager: Jennifer Galles

**Reported:**  
09/18/19 15:21

## Volatile Organic Compounds by EPA Method 8260B - Quality Control

### Summit Scientific

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

#### Batch 1909192 - EPA 5030 Water MS

Matrix Spike Dup (1909192-MSD1)	Source: 1909130-01			Prepared: 09/13/19 Analyzed: 09/14/19						
Benzene	28.2	1.0	ug/l	33.3	ND	84.6	34-141	5.06	30	
Toluene	33.0	1.0	"	33.3	ND	98.9	27-151	9.14	30	
Ethylbenzene	31.6	1.0	"	33.3	ND	94.8	29-160	1.82	30	
m,p-Xylene	61.1	2.0	"	66.7	ND	91.6	20-166	6.42	30	
o-Xylene	30.7	1.0	"	33.3	ND	92.1	33-159	6.81	30	
Surrogate: 1,2-Dichloroethane-d4	11.4		"	13.3		85.7	23-173			
Surrogate: Toluene-d8	15.1		"	13.3		113	20-170			
Surrogate: 4-Bromofluorobenzene	13.9		"	13.3		104	21-167			

Summit Scientific

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Fort Collins CO, 80525

Project: Terrace 3QGWM2019

Project Number: 701530.22.13  
Project Manager: Jennifer Galles

**Reported:**  
09/18/19 15:21

### 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

---

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

September 26, 2019

Jennifer Galles

Talon/LPE

1811 East Mulberry

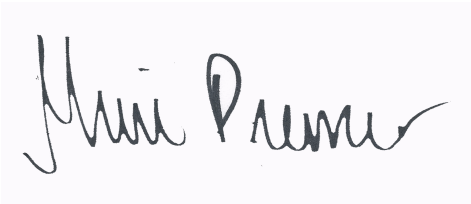
Fort Collins, CO 80525

RE: Terrace 3QGWM2019

Work Order # 1909250

Enclosed are the results of analyses for samples received by Summit Scientific on 09/20/19 09:10. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink on a light blue background. The signature is cursive and reads "Muri Premer".

Muri Premer For Ben Shrewsbury

Laboratory Manager



Talon/LPE  
1811 East Mulberry  
Fort Collins CO, 80525

Project: Terrace 3QGWM2019

Project Number: 701530.22.13  
Project Manager: Jennifer Galles

**Reported:**  
09/26/19 14:26

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW01	1909250-01	Water	09/19/19 08:30	09/20/19 09:10
MW02	1909250-02	Water	09/19/19 08:35	09/20/19 09:10

### CASE NARRATIVE

Sample results from lab project 1909137 for MW01 and MW02 did not correspond with historical data. The samples MW01 and MW02 in this report are from the same wells, resampled. the results in this report match the results in the first report 1909137 and are therefore considered valid. The lab has confirmed that there was no sample switch in the lab or the field.

Summit Scientific

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# Summit Scientific

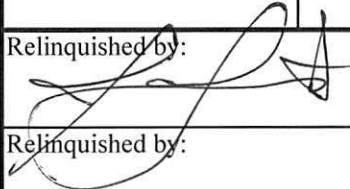

1909250

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

Page 1 of 1

Client: Talon/LPE  
Address: 1811 East Mulberry  
City/State/Zip: Fort Collins, CO 80524  
Phone: 970-818-5330 Fax:  
Sampler Name: JL/ LK

Project Manager: Jennifer Galles  
E-Mail: jgalles@talonlpe.com and jleverton@talonlpe.com  
Project Name: Terrace 3rd Quarter Ground Water Monitoring  
Project Number: 701530.022.13

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)	BTEX														
MW 01	9/19/2019	8:30:00	3	x				x					x													
MW02	9/19/2019	8:35:00	3	x				x					x													
Relinquished by: 				Date/Time: 9.20.19 9:10				Received by:  9.20.19 9:10				Date/Time:				Turn Around Time (Check)										
Relinquished by:				Date/Time:				Received by:				Date/Time:				Same Day <input type="checkbox"/> 72 Hours <input type="checkbox"/>										
Relinquished by:				Date/Time:				Received by:				Date/Time:				24 Hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/>										
Relinquished by:				Date/Time:				Received in Lab by:				Date/Time:				48 Hours <input type="checkbox"/>										
Relinquished by:				Date/Time:				Received in Lab by:				Date/Time:				Sample Integrity:										
Relinquished by:				Date/Time:				Received in Lab by:				Date/Time:				Temperature Upon Receipt: 4.1										
Relinquished by:				Date/Time:				Received in Lab by:				Date/Time:				Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>										

1909250

## Sample Receipt Checklist

S2 Work Order \_\_\_\_\_

Client: Talon/LPE

Client Project ID: Terrace 3rd Quarter

Shipped Via: H.D./P.U./FedEx/UPS/USPS/Other \_\_\_\_\_ Airbill #: Groundwater Monitoring

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

Temp (°C)	4.1
-----------	-----

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C <sup>(1)</sup> ? NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	On Ice
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 samples with holding times due within 48 hours sample due within 48 hours present?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" 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? If yes, contact client and note in narrative.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ? Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	HCl
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ? Record the pH in Comments.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
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.				

MP

Custodian Printed Name or Initials

*Muri Premer*

Signature of Custodian

9/20/19

Date/Time



Talon/LPE  
1811 East Mulberry  
Fort Collins CO, 80525

Project: Terrace 3QGWM2019

Project Number: 701530.22.13

Project Manager: Jennifer Galles

**Reported:**  
09/26/19 14:26

**MW01**  
**1909250-01 (Water)**

**Summit Scientific**

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

Date Sampled: **09/19/19 08:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1909321	09/24/19	09/25/19	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **09/19/19 08:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		90.0 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		91.6 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %		21-167		"	"	"	"	

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1811 East Mulberry  
Fort Collins CO, 80525

Project: Terrace 3QGWM2019  
Project Number: 701530.22.13  
Project Manager: Jennifer Galles

**Reported:**  
09/26/19 14:26

**MW02**  
**1909250-02 (Water)**

**Summit Scientific**

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

Date Sampled: **09/19/19 08:35**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<b>Benzene</b>	<b>3.2</b>	1.0		ug/l	1	1909321	09/24/19	09/25/19	EPA 8260B	
<b>Toluene</b>	<b>14</b>	1.0		"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>2.1</b>	1.0		"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>21</b>	2.0		"	"	"	"	"	"	

Date Sampled: **09/19/19 08:35**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		116 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		99.2 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.9 %		21-167		"	"	"	"	

Summit Scientific

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Project Number: 701530.22.13

Project Manager: Jennifer Galles

**Reported:**  
09/26/19 14:26

## Volatile Organic Compounds by EPA Method 8260B - Quality Control

### Summit Scientific

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

#### Batch 1909321 - EPA 5030 Water MS

##### Blank (1909321-BLK1)

Prepared & Analyzed: 09/24/19

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	14.8		"	13.3		111	23-173			
Surrogate: Toluene-d8	13.1		"	13.3		98.6	20-170			
Surrogate: 4-Bromofluorobenzene	13.0		"	13.3		97.4	21-167			

##### LCS (1909321-BS1)

Prepared & Analyzed: 09/24/19

Benzene	33.1	1.0	ug/l	33.3		99.3	51-132			
Toluene	34.6	1.0	"	33.3		104	51-138			
Ethylbenzene	34.7	1.0	"	33.3		104	58-146			
m,p-Xylene	65.4	2.0	"	66.7		98.0	57-144			
o-Xylene	33.4	1.0	"	33.3		100	53-146			
Surrogate: 1,2-Dichloroethane-d4	12.5		"	13.3		93.8	23-173			
Surrogate: Toluene-d8	15.1		"	13.3		113	20-170			
Surrogate: 4-Bromofluorobenzene	11.7		"	13.3		87.8	21-167			

##### Matrix Spike (1909321-MS1)

Source: 1909250-01

Prepared: 09/24/19 Analyzed: 09/25/19

Benzene	35.2	1.0	ug/l	33.3	ND	106	34-141			
Toluene	36.9	1.0	"	33.3	ND	111	27-151			
Ethylbenzene	37.4	1.0	"	33.3	ND	112	29-160			
m,p-Xylene	70.0	2.0	"	66.7	ND	105	20-166			
o-Xylene	36.0	1.0	"	33.3	ND	108	33-159			
Surrogate: 1,2-Dichloroethane-d4	13.5		"	13.3		101	23-173			
Surrogate: Toluene-d8	14.2		"	13.3		106	20-170			
Surrogate: 4-Bromofluorobenzene	12.2		"	13.3		91.7	21-167			

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## Volatile Organic Compounds by EPA Method 8260B - Quality Control

### Summit Scientific

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

#### Batch 1909321 - EPA 5030 Water MS

Matrix Spike Dup (1909321-MSD1)	Source: 1909250-01			Prepared: 09/24/19 Analyzed: 09/25/19						
Benzene	37.3	1.0	ug/l	33.3	ND	112	34-141	5.74	30	
Toluene	38.8	1.0	"	33.3	ND	116	27-151	5.02	30	
Ethylbenzene	39.8	1.0	"	33.3	ND	119	29-160	6.17	30	
m,p-Xylene	73.4	2.0	"	66.7	ND	110	20-166	4.74	30	
o-Xylene	38.4	1.0	"	33.3	ND	115	33-159	6.34	30	
Surrogate: 1,2-Dichloroethane-d4	13.7		"	13.3		103	23-173			
Surrogate: Toluene-d8	13.7		"	13.3		103	20-170			
Surrogate: 4-Bromofluorobenzene	12.5		"	13.3		93.8	21-167			

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Fort Collins CO, 80525

Project: Terrace 3QGWM2019

Project Number: 701530.22.13  
Project Manager: Jennifer Galles

**Reported:**  
09/26/19 14:26

### 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