

# **SITE INVESTIGATION REPORT**

## **OCOMA G35-16 HISTORICAL RELEASE**

COGCC SPILL TRACKING # 453293  
COGCC REMEDIATION # Not Assigned

Prepared for:



2115 117th Avenue  
Greeley, CO 80631

Prepared by:



6899 North Pecos Street, Unit C  
Denver, CO 80221

July 19, 2018

Mr. Jacob Evans  
Noble Energy Inc.  
2115 117th Avenue  
Greeley, CO 80631

Subject:       **2018 Site Investigation Report**  
                  ***Ocoma G35-16 Historical Release***  
                  Facility ID: 453293  
                  Spill/Release Point ID #: 453293  
                  Remediation Project #: Not Assigned  
                  SESE S35 T4N R65W  
                  Weld County, Colorado

Dear Mr. Evans:

Below please find a copy of the above referenced Site Investigation Report (Report) for the Ocoma G35-16 Historical Release site (Site) in Weld County, Colorado. The text below describes environmental sampling conducted at the Site on April 11, 2018 by Tasman Geosciences, Inc. (Tasman), on behalf of Noble Energy, Inc. (Noble).

## **Introduction**

The activities described below were performed in response to the discovery of impacted media beneath the Ocoma G35-16 produced water vessel during plugging and abandonment procedures on December 1, 2017. A Form 19 was submitted to the Colorado Oil and Gas Conservation Commission (COGCC) on December 1, 2017. The COGCC subsequently issued Spill/Release Point ID Number 453293 for this event.

## **Facility Background**

The Site is located within the city limits of Evans in Weld County, Colorado, as shown on Figure 1. The Site is surrounded by crop land, and the legal description is the southeast ¼ of the southeast ¼ of Section 35, Township 4 North, Range 65 West, of the 6<sup>th</sup> Principal Meridian. The Site is located on relatively flat terrain. The Site is approximately 8.5 miles southeast of the town of Gilcrest, Colorado and has coordinates of 40.262267°, -104.621272°.

Initial soil sampling activities were conducted at the Site on April 11, 2018. On April 20, 2018, based on laboratory analytical results, historic impacts were confirmed north of the produced water vessel location at the Site during plug and abandonment activities. The approximate release location is shown on Figure 2.

## Field Activities

After the produced water vessel was removed, petroleum hydrocarbon impacted soil was visually discovered. On April 11, 2018, Tasman drilled six (6) soil borings using direct push drilling techniques (BH01 - BH06). Soil samples were collected from the soil borings and field screened for volatile organic compounds (VOC) with a photoionization detector (PID). Soil samples exhibiting the highest headspace PID readings were submitted for laboratory analysis. Fourteen (14) soil samples were submitted to Summit Scientific Laboratory in Golden, Colorado (Summit) for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, and total petroleum hydrocarbons-gasoline range organics (TPH-GRO) using United States Environmental Protection Agency (USEPA) Method 8260B, as well as total petroleum hydrocarbons-diesel range organics (TPH-DRO) using USEPA Method 8015.

In addition, inorganic constituents were analyzed from soil boring BH04@0-4'. Sodium Adsorption Ratio (SAR) by USEPA Method 6020 / United States Department of Agriculture (USDA) Method 606(2,3A) and Specific Conductance (EC) and pH via American Public Health Association (APHA)/American Society for Testing and Materials (ASTM)/USEPA methods were analyzed at this boring. Soil boring BH04 was drilled in native material and soil samples collected at this location were used to evaluate inorganic constituents. Boring BH01 was drilled adjacent to the suspected release point however, soil at this location, from 0 to 4' bgs, consisted of non-native backfill material and was not used to evaluate inorganic constituents. Soil analytical data is summarized in Table 1, and the soil boring and soil sample laboratory analytical results are illustrated on Figure 2. The laboratory analytical report is included as Attachment A.

## Results

Laboratory analytical results for the 14 soil samples collected at the Site indicate petroleum hydrocarbons are present in soil above applicable COGCC Table 910-1 soil standards north of where the produced water vessel was removed. A TPH (GRO and DRO) concentration of 531 micrograms per kilogram (mg/kg) was detected at a depth of approximately 2 to 4 feet below ground surface in soil boring BH03 (Figure 2).

## Conclusions

Shallow soil impacts above applicable COGCC standards are present at the Site. Remediation activities will be implemented at the Site to address the petroleum hydrocarbons present in the area of soil boring BH03.

## Remarks

The discussion and conclusions contained in this report represent the professional opinions of Tasman Geosciences, Inc. These opinions are based on currently available information and are arrived at in accordance with currently accepted geologic and engineering practices.

Please contact me at (720) 431-1190 if you require additional information.

Sincerely,  
Tasman Geosciences, Inc.



Brandon Bruns, PE  
Project Manager

Attachments:

Table 1 – Soil Analytical Data

Figure 1 – Site Location Map

Figure 2 – Soil Boring Analytical Results Map

Attachment A – Laboratory Analytical Data Report

# TABLES

**TABLE 1**  
**SOIL ANALYTICAL DATA**  
**NOBLE ENERGY, INC. - Ocoma G35-16**

Soil Sample ID	Date	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	TPH-GRO (mg/kg)	TPH-DRO (mg/kg)	Naphthalene (mg/kg)
<b>COGCC Standard</b>		<b>0.17</b>	<b>85</b>	<b>100</b>	<b>175</b>	<b>500</b>		<b>23</b>
BH01@11.5-13'	04/11/18	0.058	<0.0050	0.19	2.1	24	<50	0.083
BH01@17.5-18'	04/11/18	<0.0020	<0.0050	<0.0050	<0.0050	<0.50	<50	<0.0010
BH02@14-15'	04/11/18	<0.0020	<0.0050	<0.0050	<0.0050	<0.50	<50	<0.0010
BH02@15-15.5'	04/11/18	<0.0020	<0.0050	<0.0050	<0.0050	<0.50	<50	<0.0010
BH02@17-18'	04/11/18	<0.0020	<0.0050	<0.0050	<0.0050	<0.50	<50	<0.0010
BH03@2-4'	04/11/18	<0.0020	<0.0050	0.0072	0.7	<b>61</b>	<b>470</b>	<0.0010
BH03@13.5-14.5'	04/11/18	0.099	<0.0050	0.068	0.27	14	<50	0.016
BH04@0-4'	04/11/18	<0.0020	<0.0050	<0.0050	<0.0050	<0.50	<50	<0.0010
BH04@16-18"	04/11/18	<0.0020	<0.0050	<0.0050	<0.0050	0.52	<50	<0.0010
BH05@0-4'	04/11/18	<0.0020	<0.0050	<0.0050	<0.0050	<0.50	<50	<0.0010
BH05@8-10'	04/11/18	<0.0020	<0.0050	<0.0050	<0.0050	<0.50	<50	<0.0010
BH06@8-10'	04/11/18	<0.0020	<0.0050	<0.0050	<0.0050	<0.50	<50	<0.0010
BH06@14-15.5'	04/11/18	<0.0020	<0.0050	0.018	0.041	<0.50	<50	<0.0010
BH06@18-19'	04/11/18	<0.0020	<0.0050	<0.0050	<0.0050	<0.50	<50	<0.0010

Soil Sample ID	Date	EC (mmhos/cm)	pH	SAR
		<b>4 or 2x BG</b>	<b>6-9</b>	<b>&lt;12</b>
BH04@0-4'	04/11/18	0.371	8.4	1.12

**Notes:**

COGCC = Colorado Oil and Gas Conservation Commission

TPH-GRO = Total petroleum hydrocarbons - gasoline range organics

TPH-DRO = Total petroleum hydrocarbons - diesel range organics

mg/kg = Milligrams per kilogram

< = Analytical result is less than the indicated laboratory reporting limit

EC = Specific conductance

mmhos/cm = Millimhos per centimeter

BG = Background

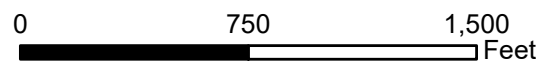
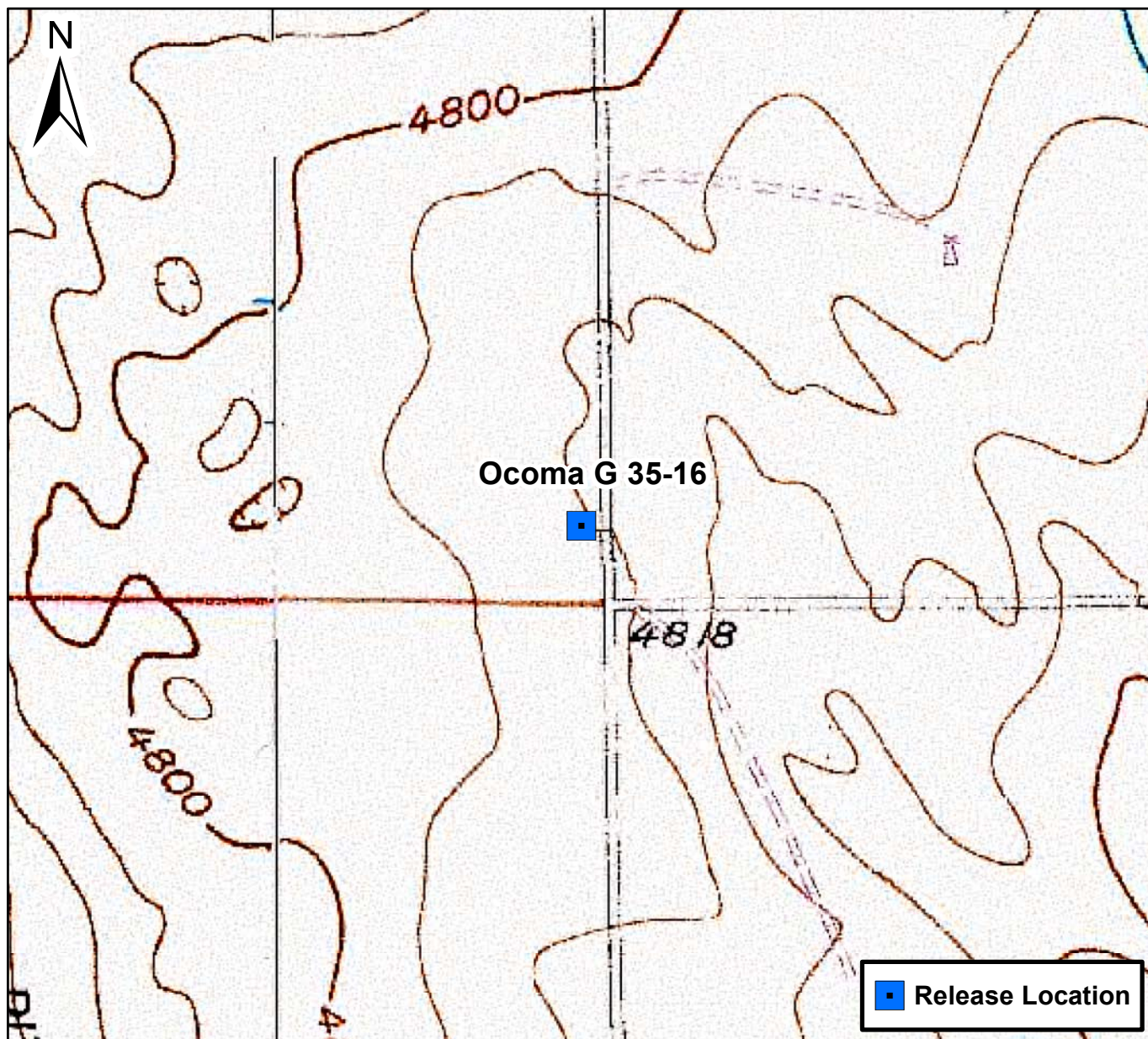
SAR = Sodium adsorption ratio

Soil standards referenced from COGCC Table 910-1

**Highlighted results are equal to or exceed the COGCC Table 910-1 standard**

## FIGURES



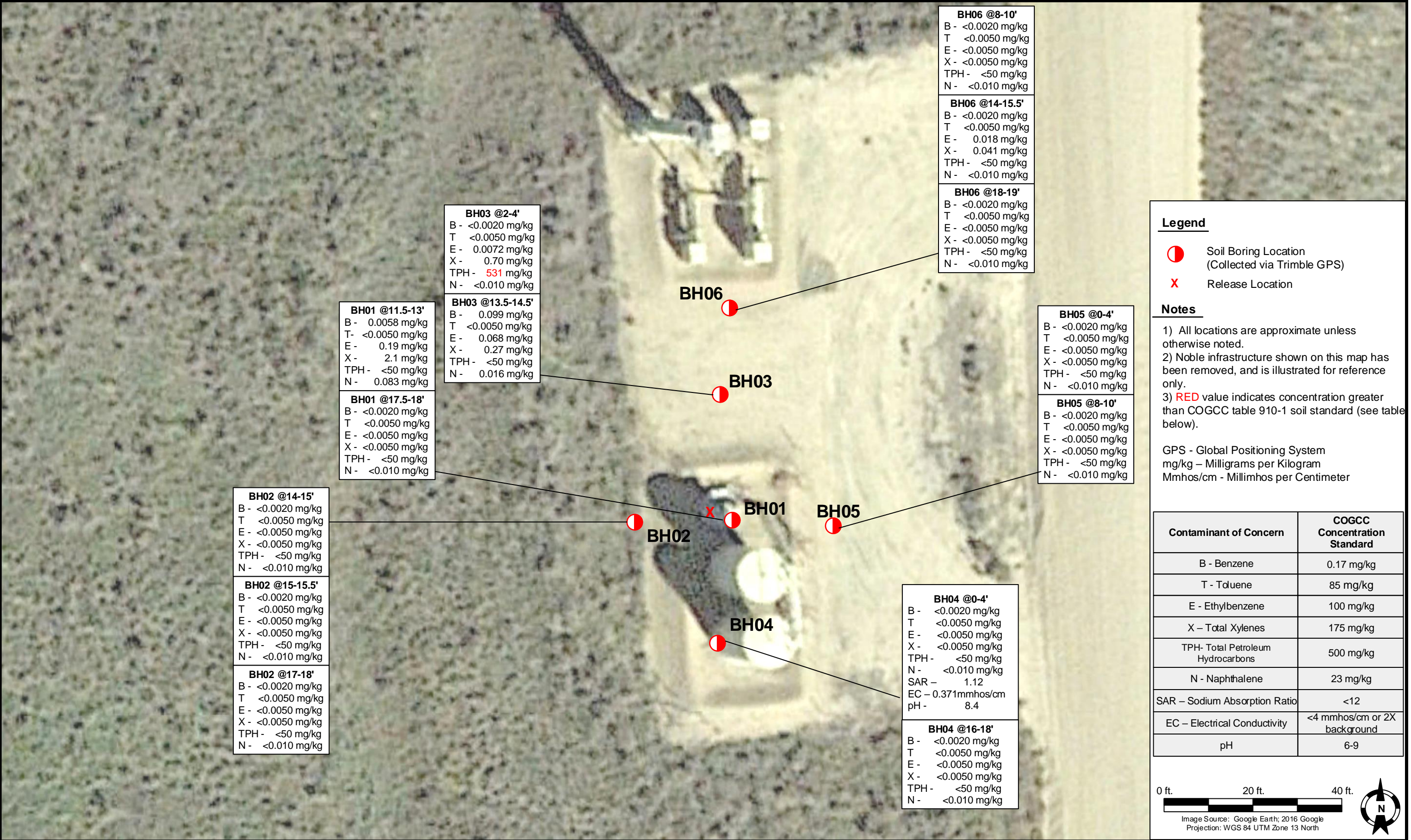


## Figure 1

Site Location Map  
 Ocoma G 35-16  
 Produced Water Vessel Release  
 SESE S35 T4N R65W  
 Weld County, Colorado









# **ATTACHMENT A**

## **LABORATORY ANALYTICAL DATA REPORT**

# Summit Scientific

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741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

April 20, 2018

Brandon Bruns  
Tasman Geosciences  
6899 Pecos St, Unit C  
Denver, CO 80221  
RE: Noble - Ocoma G35-16

Enclosed are the results of analyses for samples received by Summit Scientific on 04/12/18 10:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury For Ben Shrewsbury  
President / Laboratory Director



Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
04/20/18 13:49

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01@11.5-13'	1804229-01	Soil	04/11/18 10:00	04/12/18 10:00
BH01@17.5-18'	1804229-02	Soil	04/11/18 11:00	04/12/18 10:00
BH02@14-15'	1804229-03	Soil	04/11/18 11:30	04/12/18 10:00
BH02@15-15.5'	1804229-04	Soil	04/11/18 11:50	04/12/18 10:00
BH02@17-18'	1804229-05	Soil	04/11/18 12:05	04/12/18 10:00
BH03@2-4'	1804229-06	Soil	04/11/18 12:45	04/12/18 10:00
BH03@13.5-14.5'	1804229-07	Soil	04/11/18 13:05	04/12/18 10:00
BH04@0-4'	1804229-08	Soil	04/11/18 14:00	04/12/18 10:00
BH04@16-18'	1804229-09	Soil	04/11/18 14:25	04/12/18 10:00
BH05@0-4'	1804229-10	Soil	04/11/18 15:00	04/12/18 10:00
BH05@8-10'	1804229-11	Soil	04/11/18 15:15	04/12/18 10:00
BH06@8-10'	1804229-12	Soil	04/11/18 16:00	04/12/18 10:00
BH06@14-15.5'	1804229-13	Soil	04/11/18 16:10	04/12/18 10:00
BH06@18-19'	1804229-14	Soil	04/11/18 16:15	04/12/18 10:00

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.*

2291

Page 1 of 2

Project Number:

[www.s2scientific.com](http://www.s2scientific.com)

ouice

1804229.2

Page 2 of 2

Project Number:

[www.s2scientific.com](http://www.s2scientific.com)

on 12

1804229

## Sample Receipt Checklist

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

Client: Noble TasmanClient Project ID: Ocoma G35-16Shipped Via: P.U.

Airbill #: \_\_\_\_\_

(UPS, FedEx, Hand Delivered, Pick-up, etc.)

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

Temp (°C)	<u>1</u>
-----------	----------

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.	<u>✓</u>			
Were all samples received intact <sup>(1)</sup> ?	<u>✓</u>			
Was adequate sample volume provided <sup>(1)</sup> ?	<u>✓</u>			
If custody seals are present, are they intact <sup>(1)</sup> ?			<u>✓</u>	
Are short holding time analytes or samples due within 48 hours present?			<u>✓</u>	
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	<u>✓</u>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<u>✓</u>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<u>✓</u>			
Is the COC properly relinquished by the client with date and time recorded <sup>(1)</sup> ?	<u>✓</u>			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.			<u>✓</u>	
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ? Note the type of preservative in the Comments column – HCL, H2SO4, NaOH, HNO3, etc.			<u>✓</u>	
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ? Record the pH in Comments.			<u>✓</u>	
If dissolved metals are requested, were samples field filtered?			<u>✓</u>	

Additional Comments (if any):  
  
  
<sup>(1)</sup> If NO, then contact the client before proceeding with analysis and note in case narrative.Muri  
Custodian Printed Name or InitialsLA 4-12-18  
Signature of Custodian11:00

Date/Time





Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
04/20/18 13:49

**BH01@11.5-13'**  
**1804229-01 (Soil)**

**Summit Scientific**

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

Date Sampled: **04/11/18 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>0.0058</b>	0.0020	mg/kg	1	1804098	04/16/18	04/17/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>0.19</b>	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>2.1</b>	0.0050	"	"	"	"	"	"	
<b>Naphthalene</b>	<b>0.083</b>	0.010	"	"	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>24</b>	0.50	"	"	"	"	"	"	

Date Sampled: **04/11/18 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		121 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.8 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		122 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **04/11/18 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1804096	04/16/18	04/18/18	EPA 8015M	

Date Sampled: **04/11/18 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		96.7 %	30-150		"	"	"	"	

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/20/18 13:49

**BH01@17.5-18'**  
**1804229-02 (Soil)**

### Summit Scientific

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

Date Sampled: **04/11/18 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1804098	04/16/18	04/17/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **04/11/18 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		114 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		95.3 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **04/11/18 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1804096	04/16/18	04/18/18	EPA 8015M	

Date Sampled: **04/11/18 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		93.8 %	30-150		"	"	"	"	

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/20/18 13:49

**BH02@14-15'**  
**1804229-03 (Soil)**

### Summit Scientific

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

Date Sampled: **04/11/18 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1804098	04/16/18	04/17/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **04/11/18 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		110 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		95.5 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **04/11/18 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1804096	04/16/18	04/18/18	EPA 8015M	

Date Sampled: **04/11/18 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		90.9 %	30-150		"	"	"	"	

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
04/20/18 13:49

**BH02@15-15.5'**  
**1804229-04 (Soil)**

**Summit Scientific**

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

Date Sampled: **04/11/18 11:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1804098	04/16/18	04/17/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **04/11/18 11:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		112 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		95.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **04/11/18 11:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1804096	04/16/18	04/18/18	EPA 8015M	

Date Sampled: **04/11/18 11:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		91.0 %	30-150		"	"	"	"	

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
04/20/18 13:49

**BH02@17-18'**  
**1804229-05 (Soil)**

**Summit Scientific**

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

Date Sampled: **04/11/18 12:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1804098	04/16/18	04/17/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **04/11/18 12:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		114 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		95.9 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.0 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **04/11/18 12:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1804096	04/16/18	04/18/18	EPA 8015M	

Date Sampled: **04/11/18 12:05**

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

Summit Scientific

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/20/18 13:49

**BH03@2-4'**  
**1804229-06 (Soil)**

### Summit Scientific

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

Date Sampled: **04/11/18 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1804098	04/16/18	04/17/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>0.0072</b>	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.70</b>	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>61</b>	0.50	"	"	"	"	"	"	

Date Sampled: **04/11/18 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		122 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		93.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		176 %	21-167		"	"	"	"	S-02

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **04/11/18 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>C10-C28 (DRO)</b>	<b>470</b>	50	mg/kg	1	1804096	04/16/18	04/18/18	EPA 8015M	

Date Sampled: **04/11/18 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		105 %	30-150		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/20/18 13:49

**BH03@13.5-14.5'**  
**1804229-07 (Soil)**

### Summit Scientific

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

Date Sampled: **04/11/18 13:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>0.099</b>	0.0020	mg/kg	1	1804098	04/16/18	04/17/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>0.068</b>	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.27</b>	0.0050	"	"	"	"	"	"	
<b>Naphthalene</b>	<b>0.016</b>	0.010	"	"	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>14</b>	0.50	"	"	"	"	"	"	

Date Sampled: **04/11/18 13:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		113 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		98.9 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		112 %	21-167		"	"	"	"	

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **04/11/18 13:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1804096	04/16/18	04/18/18	EPA 8015M	

Date Sampled: **04/11/18 13:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: o-Terphenyl</i>		92.6 %	30-150		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/20/18 13:49

**BH04@0-4'**  
**1804229-08 (Soil)**

### Summit Scientific

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

Date Sampled: **04/11/18 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1804098	04/16/18	04/17/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **04/11/18 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		113 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		95.9 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **04/11/18 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1804096	04/16/18	04/18/18	EPA 8015M	

Date Sampled: **04/11/18 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		90.1 %	30-150		"	"	"	"	

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

Date Sampled: **04/11/18 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	2250	2.50	mg/kg dry	1	1804057	04/18/18	04/20/18	EPA 6020B	
Magnesium	280	1.00	"	"	"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/20/18 13:49

**BH04@0-4'**  
**1804229-08 (Soil)**

**Summit Scientific**

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

Sodium	211	5.00 mg/kg dry	1	1804057	04/18/18	04/20/18	EPA 6020B
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**Calculated Analysis**

Date Sampled: **04/11/18 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	1.12	0.100	units	1	1804077	04/14/18	04/14/18	Calculation	

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

Date Sampled: **04/11/18 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.371	0.0100	mmhos/cm	1	1804177	04/19/18	04/19/18	EPA 120.1	
% Solids	82.0		%	"	1804155	04/18/18	04/20/18	Calculation	
pH	8.4		pH Units	"	1804176	04/18/18	04/18/18	EPA 9045D	

Summit Scientific

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/20/18 13:49

**BH04@16-18'**  
**1804229-09 (Soil)**

### Summit Scientific

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

Date Sampled: **04/11/18 14:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1804098	04/16/18	04/17/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>0.52</b>	<b>0.50</b>	"	"	"	"	"	"	

Date Sampled: **04/11/18 14:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		112 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		93.3 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		108 %	21-167		"	"	"	"	

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **04/11/18 14:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1804096	04/16/18	04/18/18	EPA 8015M	

Date Sampled: **04/11/18 14:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: o-Terphenyl</i>		92.0 %	30-150		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/20/18 13:49

**BH05@0-4'**  
**1804229-10 (Soil)**

### Summit Scientific

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

Date Sampled: **04/11/18 15:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1804098	04/16/18	04/17/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **04/11/18 15:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		112 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		94.7 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.5 %	21-167		"	"	"	"	

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **04/11/18 15:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1804096	04/16/18	04/18/18	EPA 8015M	

Date Sampled: **04/11/18 15:00**

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

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
04/20/18 13:49

**BH05@8-10'**  
**1804229-11 (Soil)**

**Summit Scientific**

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

Date Sampled: **04/11/18 15:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1804098	04/16/18	04/17/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **04/11/18 15:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		113 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		94.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.9 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **04/11/18 15:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1804096	04/16/18	04/18/18	EPA 8015M	

Date Sampled: **04/11/18 15:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		87.5 %	30-150		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
04/20/18 13:49

**BH06@8-10'**  
**1804229-12 (Soil)**

**Summit Scientific**

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

Date Sampled: **04/11/18 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1804098	04/16/18	04/17/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **04/11/18 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		113 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		94.0 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **04/11/18 16:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1804096	04/16/18	04/18/18	EPA 8015M	

Date Sampled: **04/11/18 16:00**

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

Summit Scientific

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
04/20/18 13:49

**BH06@14-15.5'**  
**1804229-13 (Soil)**

**Summit Scientific**

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

Date Sampled: **04/11/18 16:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1804098	04/16/18	04/17/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>0.018</b>	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.041</b>	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **04/11/18 16:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		116 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.5 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		113 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **04/11/18 16:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1804096	04/16/18	04/18/18	EPA 8015M	

Date Sampled: **04/11/18 16:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		91.6 %	30-150		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
04/20/18 13:49

**BH06@18-19'**  
**1804229-14 (Soil)**

**Summit Scientific**

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

Date Sampled: **04/11/18 16:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1804098	04/16/18	04/17/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **04/11/18 16:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		113 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.2 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **04/11/18 16:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1804096	04/16/18	04/18/18	EPA 8015M	

Date Sampled: **04/11/18 16:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		92.7 %	30-150		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
04/20/18 13:49

## 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 1804098 - EPA 5030 Soil MS

##### Blank (1804098-BLK1)

Prepared: 04/16/18 Analyzed: 04/17/18

Benzene	ND	0.0020	mg/kg							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.0050	"							
Naphthalene	ND	0.010	"							
Gasoline Range Hydrocarbons	ND	0.50	"							
Surrogate: 1,2-Dichloroethane-d4	0.0433		"	0.0396	109	23-173				
Surrogate: Toluene-d8	0.0386		"	0.0400	96.6	20-170				
Surrogate: 4-Bromofluorobenzene	0.0411		"	0.0400	103	21-167				

##### LCS (1804098-BS1)

Prepared: 04/16/18 Analyzed: 04/17/18

Benzene	0.0758	0.0020	mg/kg	0.100	75.8	61-139				
Toluene	0.0898	0.0050	"	0.100	89.8	64-132				
Ethylbenzene	0.105	0.0050	"	0.100	105	68.7-135				
m,p-Xylene	0.204	0.010	"	0.200	102	70.4-129				
o-Xylene	0.101	0.0050	"	0.100	101	66.9-126				
Naphthalene	ND	0.010	"			67.8-151				
Surrogate: 1,2-Dichloroethane-d4	0.0428		"	0.0396	108	23-173				
Surrogate: Toluene-d8	0.0386		"	0.0400	96.4	20-170				
Surrogate: 4-Bromofluorobenzene	0.0388		"	0.0400	96.9	21-167				

##### Matrix Spike (1804098-MS1)

Source: 1804042-01

Prepared: 04/16/18 Analyzed: 04/17/18

Benzene	0.136	0.0020	mg/kg	0.100	0.0486	87.5	42.9-137			
Toluene	0.433	0.0050	"	0.100	0.301	132	42.6-130			QM-07
Ethylbenzene	0.338	0.0050	"	0.100	0.213	124	39-133			
m,p-Xylene	0.396	0.010	"	0.200	0.165	115	34.7-134			
o-Xylene	0.239	0.0050	"	0.100	0.126	113	41.3-126			
Naphthalene	0.0482	0.010	"		0.0540		26.4-144			
Surrogate: 1,2-Dichloroethane-d4	0.0521		"	0.0396	132	23-173				
Surrogate: Toluene-d8	0.0379		"	0.0400	94.7	20-170				
Surrogate: 4-Bromofluorobenzene	0.0431		"	0.0400	108	21-167				

Summit Scientific

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/20/18 13:49

**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 1804098 - EPA 5030 Soil MS**

Matrix Spike Dup (1804098-MSD1)		Source: 1804042-01			Prepared: 04/16/18		Analyzed: 04/17/18			
Benzene	0.117	0.0020	mg/kg	0.100	0.0486	68.2	42.9-137	15.3	17.9	QM-07
Toluene	0.359	0.0050	"	0.100	0.301	58.4	42.6-130	18.6	11.9	
Ethylbenzene	0.316	0.0050	"	0.100	0.213	103	39-133	6.52	30	
m,p-Xylene	0.370	0.010	"	0.200	0.165	102	34.7-134	6.76	30	
o-Xylene	0.232	0.0050	"	0.100	0.126	106	41.3-126	3.17	30	
Naphthalene	0.0603	0.010	"		0.0540		26.4-144	22.3	30	
Surrogate: 1,2-Dichloroethane-d4		0.0519	"	0.0396		131	23-173			
Surrogate: Toluene-d8		0.0383	"	0.0400		95.7	20-170			
Surrogate: 4-Bromofluorobenzene		0.0471	"	0.0400		118	21-167			

Summit Scientific

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/20/18 13:49

**Extractable Petroleum Hydrocarbons by 8015 - Quality Control**  
**Summit Scientific**

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

**Batch 1804096 - EPA 3550A**

**Blank (1804096-BLK1)**

Prepared & Analyzed: 04/16/18

C10-C28 (DRO) ND 50 mg/kg

**LCS (1804096-BS1)**

Prepared & Analyzed: 04/16/18

C10-C28 (DRO) 431 50 mg/kg 500 86.2 81.4-129

**Matrix Spike (1804096-MS1)**

**Source: 1804042-01**

Prepared & Analyzed: 04/16/18

C10-C28 (DRO) 455 50 mg/kg 500 17.3 87.5 77.8-133

**Matrix Spike Dup (1804096-MSD1)**

**Source: 1804042-01**

Prepared & Analyzed: 04/16/18

C10-C28 (DRO) 437 50 mg/kg 500 17.3 83.9 77.8-133 4.06 8.48

Summit Scientific

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
04/20/18 13:49

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

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

**Batch 1804057 - General Preparation**

**Blank (1804057-BLK1)**

Prepared: 04/18/18 Analyzed: 04/19/18

Calcium	ND	2.50	mg/kg wet
Magnesium	ND	1.00	"
Sodium	ND	5.00	"

**LCS (1804057-BS1)**

Prepared: 04/18/18 Analyzed: 04/19/18

Calcium	968	2.50	mg/kg wet	1000	96.8	70-130
Magnesium	926	1.00	"	1000	92.6	70-130
Sodium	958	5.00	"	1000	95.8	70-130

**Duplicate (1804057-DUP1)**

Source: 1804201-01

Prepared: 04/18/18 Analyzed: 04/19/18

Calcium	2090	2.50	mg/kg dry	2090	0.375	20
Magnesium	210	1.00	"	203	3.75	20
Sodium	339	5.00	"	342	0.867	20

**Matrix Spike (1804057-MS1)**

Source: 1804201-01

Prepared: 04/18/18 Analyzed: 04/19/18

Calcium	3190	2.50	mg/kg dry	1160	2090	94.4	70-130
Magnesium	1420	1.00	"	1160	203	105	70-130
Sodium	1510	5.00	"	1160	342	101	70-130

**Matrix Spike Dup (1804057-MSD1)**

Source: 1804201-01

Prepared: 04/18/18 Analyzed: 04/19/18

Calcium	3550	2.50	mg/kg dry	1160	2090	126	70-130	10.9	25
Magnesium	1400	1.00	"	1160	203	104	70-130	1.15	25
Sodium	1470	5.00	"	1160	342	97.4	70-130	2.53	25

Summit Scientific

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
04/20/18 13:49

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

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

**Batch 1804155 - General Preparation**

**Duplicate (1804155-DUP1)**      **Source: 1804201-01**      Prepared: 04/18/18      Analyzed: 04/20/18

% Solids	86.3		%		86.4			0.116	20	
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**Batch 1804176 - General Preparation**

**Duplicate (1804176-DUP1)**      **Source: 1804201-01**      Prepared & Analyzed: 04/18/18

pH	9.1		pH Units		9.0			0.331	20	
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**Batch 1804177 - General Preparation**

**Duplicate (1804177-DUP1)**      **Source: 1804201-01**      Prepared & Analyzed: 04/19/18

Specific Conductance (EC)	0.473	0.0100	mmhos/cm		0.473			0.0528	20	
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Summit Scientific

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Tasman Geosciences  
6899 Pecos St, Unit C  
Denver CO, 80221

Project: Noble - Ocoma G35-16

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/20/18 13:49

### 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.
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