

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 6th 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.

A handwritten signature in blue ink that reads 'Brandon Bruns'.

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)
COGCC Standard		0.17	85	100	175	500		23
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	61	470	<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
		4 or 2x BG	6-9	<12
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

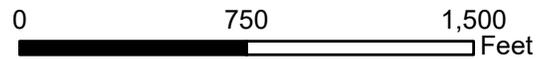
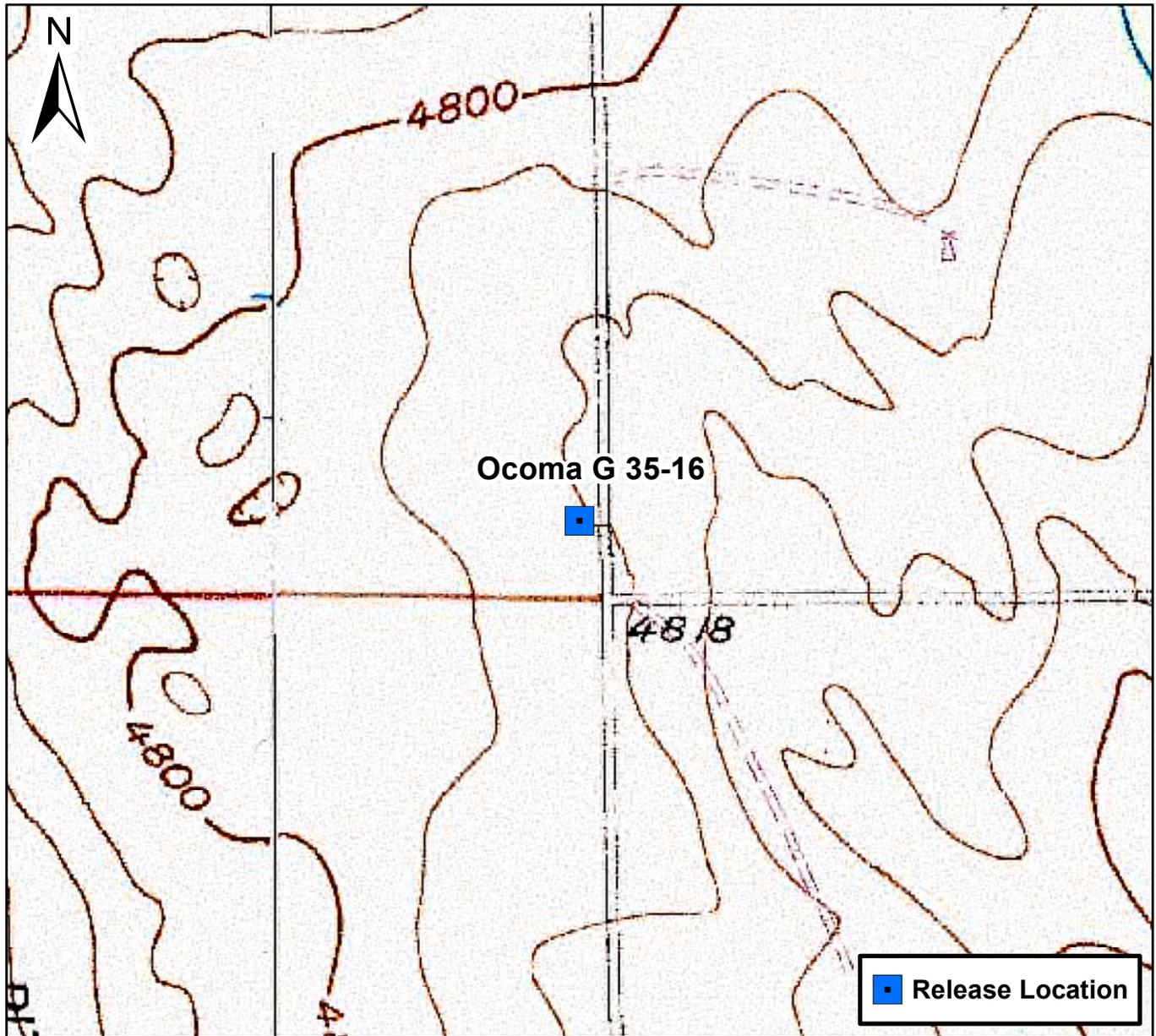
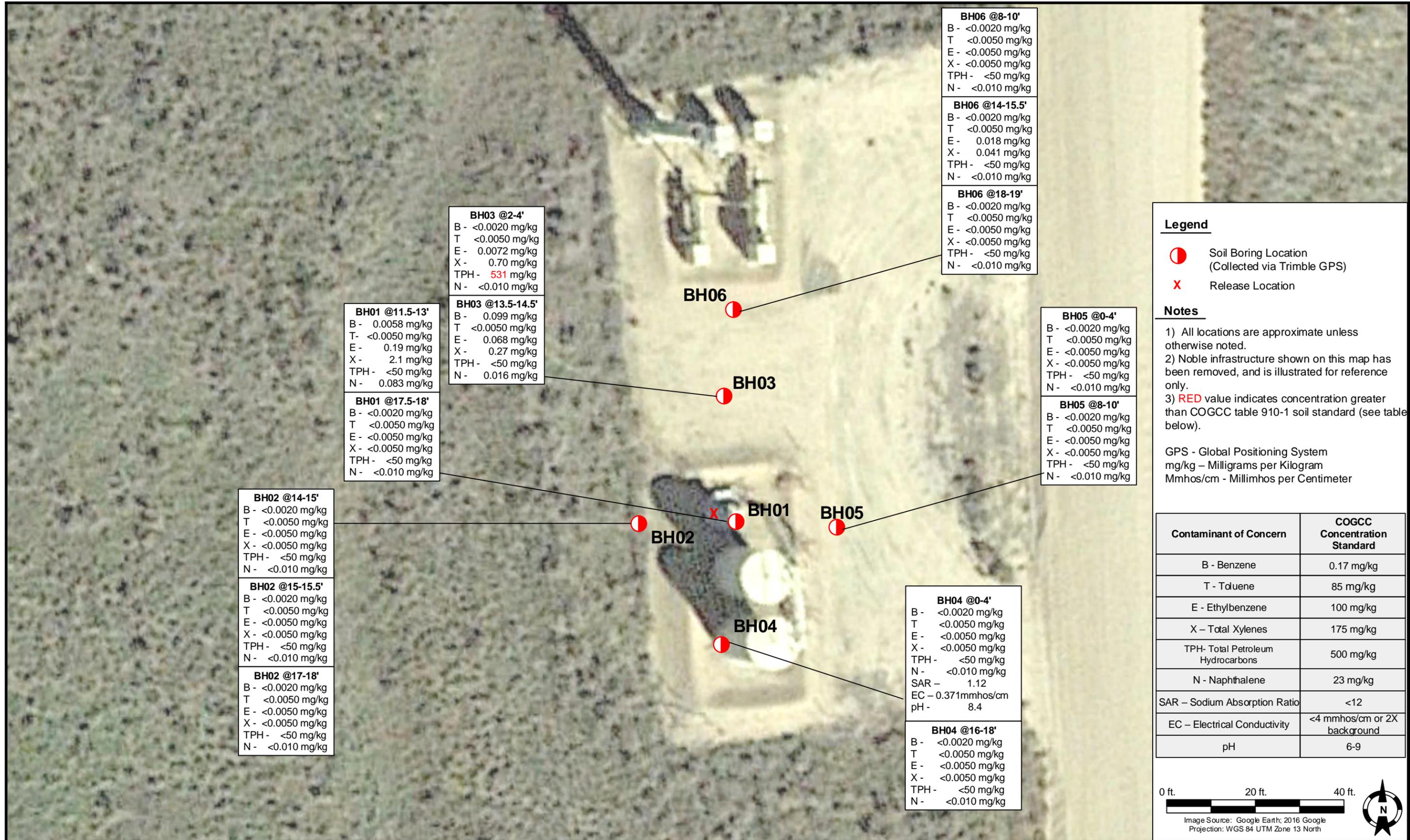


Figure 1

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





BH06 @8-10'
 B - <0.0020 mg/kg
 T - <0.0050 mg/kg
 E - <0.0050 mg/kg
 X - <0.0050 mg/kg
 TPH - <50 mg/kg
 N - <0.010 mg/kg

BH06 @14-15.5'
 B - <0.0020 mg/kg
 T - <0.0050 mg/kg
 E - 0.018 mg/kg
 X - 0.041 mg/kg
 TPH - <50 mg/kg
 N - <0.010 mg/kg

BH06 @18-19'
 B - <0.0020 mg/kg
 T - <0.0050 mg/kg
 E - <0.0050 mg/kg
 X - <0.0050 mg/kg
 TPH - <50 mg/kg
 N - <0.010 mg/kg

BH03 @2-4'
 B - <0.0020 mg/kg
 T - <0.0050 mg/kg
 E - 0.0072 mg/kg
 X - 0.70 mg/kg
 TPH - 531 mg/kg
 N - <0.010 mg/kg

BH03 @13.5-14.5'
 B - 0.099 mg/kg
 T - <0.0050 mg/kg
 E - 0.068 mg/kg
 X - 0.27 mg/kg
 TPH - <50 mg/kg
 N - 0.016 mg/kg

BH01 @11.5-13'
 B - 0.0058 mg/kg
 T - <0.0050 mg/kg
 E - 0.19 mg/kg
 X - 2.1 mg/kg
 TPH - <50 mg/kg
 N - 0.083 mg/kg

BH01 @17.5-18'
 B - <0.0020 mg/kg
 T - <0.0050 mg/kg
 E - <0.0050 mg/kg
 X - <0.0050 mg/kg
 TPH - <50 mg/kg
 N - <0.010 mg/kg

BH05 @0-4'
 B - <0.0020 mg/kg
 T - <0.0050 mg/kg
 E - <0.0050 mg/kg
 X - <0.0050 mg/kg
 TPH - <50 mg/kg
 N - <0.010 mg/kg

BH05 @8-10'
 B - <0.0020 mg/kg
 T - <0.0050 mg/kg
 E - <0.0050 mg/kg
 X - <0.0050 mg/kg
 TPH - <50 mg/kg
 N - <0.010 mg/kg

BH02 @14-15'
 B - <0.0020 mg/kg
 T - <0.0050 mg/kg
 E - <0.0050 mg/kg
 X - <0.0050 mg/kg
 TPH - <50 mg/kg
 N - <0.010 mg/kg

BH02 @15-15.5'
 B - <0.0020 mg/kg
 T - <0.0050 mg/kg
 E - <0.0050 mg/kg
 X - <0.0050 mg/kg
 TPH - <50 mg/kg
 N - <0.010 mg/kg

BH02 @17-18'
 B - <0.0020 mg/kg
 T - <0.0050 mg/kg
 E - <0.0050 mg/kg
 X - <0.0050 mg/kg
 TPH - <50 mg/kg
 N - <0.010 mg/kg

BH04 @0-4'
 B - <0.0020 mg/kg
 T - <0.0050 mg/kg
 E - <0.0050 mg/kg
 X - <0.0050 mg/kg
 TPH - <50 mg/kg
 N - <0.010 mg/kg
 SAR - 1.12
 EC - 0.371mmhos/cm
 pH - 8.4

BH04 @16-18'
 B - <0.0020 mg/kg
 T - <0.0050 mg/kg
 E - <0.0050 mg/kg
 X - <0.0050 mg/kg
 TPH - <50 mg/kg
 N - <0.010 mg/kg

Legend

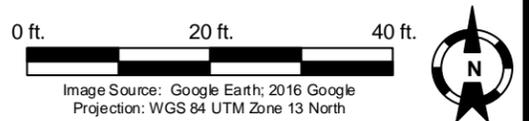
- Soil Boring Location (Collected via Trimble GPS)
- Release Location

Notes

- All locations are approximate unless otherwise noted.
- Noble infrastructure shown on this map has been removed, and is illustrated for reference only.
- RED value indicates concentration greater than COGCC table 910-1 soil standard (see table below).

GPS - Global Positioning System
 mg/kg – Milligrams per Kilogram
 Mmhos/cm - Millimhos per Centimeter

Contaminant of Concern	COGCC Concentration Standard
B - Benzene	0.17 mg/kg
T - Toluene	85 mg/kg
E - Ethylbenzene	100 mg/kg
X - Total Xylenes	175 mg/kg
TPH- Total Petroleum Hydrocarbons	500 mg/kg
N - Naphthalene	23 mg/kg
SAR - Sodium Absorption Ratio	<12
EC - Electrical Conductivity	<4 mmhos/cm or 2X background
pH	6-9



DATE: 04/23/2018
 DESIGNED BY: DA
 DRAWN BY: DA

Tasman Geosciences, Inc.
 6899 Pecos Street – Unit C
 Denver, CO 80221

Noble Energy, Inc. – DJ Basin
Ocoma G35-16 Historic Release
 SESE, Section 35, Township 4 North, Range 65 West
 Weld County, Colorado

Soil Boring Analytical Results
 Map

FIGURE
 2

ATTACHMENT A

LABORATORY ANALYTICAL DATA REPORT

Summit Scientific

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,



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 Bruns

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.

Summit Scientific

229.1

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

Page 1 of 2

Client: Noble/ Tasman
Address:
City/State/Zip:
Phone: 720-616-8383 Fax:
Sampler Name: J Whritenour

Project Manager: Brandon Bruns, Invoice: Jacob Evans
E-Mail: bbruns@tasman-geo.com
Project Name: Ocoma G 35-16
Project Number:

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix			Analyze For:				Special Instructions								
				HCl	HNO ₃	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)												
BH01@11.5-13'	4/11/18	1000	1			X			X			8260 CBTEX N											
BH01@17.5-18'		1100	1																				
BH02@14-15'		1130	1																				
BH02@15-15.5'		1150	1																				
BH02@17-18'		1205	1																				
BH03@1-4'		1245	1																				
BH03@13.5-14.5'		1305	1																				
BH04@0-4'		1400	1																				
BH04@16-18'		1425	1																				
BH05@0-4'		1500	1																				
Relinquished by: 				Date/Time: 4/11/18 10:00				Received by: 				Date/Time: 4-11-18 10:00				Turn Around Time (Check)				Notes:			
												Same Day <input type="checkbox"/>				72 Hours <input type="checkbox"/>				ouice			
												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: .1							
																Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>							

Summit Scientific

1804229.2

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

Page 2 of 2

Client: Noble/ Tasman
Address:
City/State/Zip:
Phone: 720-616-8383 Fax:
Sampler Name: J Whritenour

Project Manager: Brandon Bruns, Invoice: Jacob Evans
E-Mail: bbruns@tasman-geo.com
Project Name: OCOMA 635-16
Project Number:

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix				Analyze For:				Special Instructions		
				HCl	HNO ₃	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)							
BH05C 8-10'	4/11/18	1515	1			X			X			8260687EXU						
BH06C 8-10'		1600	1			X			X									
BH06C 14-15.5'		1610	1			X			X									
BH06C BH06C 18-19'		1615	1			X			X				8015 D120					
Relinquished by:	Date/Time:	Received by:	Date/Time:	Turn Around Time (Check)				Notes:										
	4/11/18 10:00		4-11-18 10:00	Same Day	<input type="checkbox"/>	72 Hours	<input type="checkbox"/>	24 Hours	<input type="checkbox"/>	Standard	<input checked="" type="checkbox"/>	on ice						
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: .1														
				Intact: Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>											

1804229

Sample Receipt Checklist

S2 Work Order: _____

Client: Noble Tasman Client Project ID: Ocoma G35-16

Shipped Via: P.U. Airbill #: _____
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Matrix (check all that apply): Air 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 ⁽¹⁾ ? 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 ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If custody seals are present, are they intact ⁽¹⁾ ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Are short holding time analytes or samples 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 ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<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 type="checkbox"/>	<input checked="" type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ? Note the type of preservative in the Comments column – HCL, H2SO4, NaOH, HNO3, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ? 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):				

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

Muri
Custodian Printed Name or Initials

LA 4-12-18
Signature of Custodian

11:00
Date/Time



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

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
Benzene	0.0058	0.0020	mg/kg	1	1804098	04/16/18	04/17/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	0.19	0.0050	"	"	"	"	"	"	
Xylenes (total)	2.1	0.0050	"	"	"	"	"	"	
Naphthalene	0.083	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	24	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		"	"	"	"	

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.



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

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		"	"	"	"	

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.



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

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		"	"	"	"	

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.



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

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		"	"	"	"	

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.



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

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

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.



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

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	"	"	"	"	"	"	
Ethylbenzene	0.0072	0.0050	"	"	"	"	"	"	
Xylenes (total)	0.70	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	61	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
C10-C28 (DRO)	470	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

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.



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

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
Benzene	0.099	0.0020	mg/kg	1	1804098	04/16/18	04/17/18	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	0.068	0.0050	"	"	"	"	"	"	
Xylenes (total)	0.27	0.0050	"	"	"	"	"	"	
Naphthalene	0.016	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	14	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

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.



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

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

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.



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

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

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.



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

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	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	0.52	0.50	"	"	"	"	"	"	

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

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.



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

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		"	"	"	"	

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.



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

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

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.



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

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

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.



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

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	"	"	"	"	"	"	
Ethylbenzene	0.018	0.0050	"	"	"	"	"	"	
Xylenes (total)	0.041	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		"	"	"	"	

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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

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 Brunns

Reported:
04/20/18 13:49

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Summit Scientific

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

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				

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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

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 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	
Toluene	0.359	0.0050	"	0.100	0.301	58.4	42.6-130	18.6	11.9	QM-07
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	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0519</i>		<i>"</i>	<i>0.0396</i>		<i>131</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0383</i>		<i>"</i>	<i>0.0400</i>		<i>95.7</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0471</i>		<i>"</i>	<i>0.0400</i>		<i>118</i>	<i>21-167</i>			

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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:
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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 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

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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	Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

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 Bruns

Reported:
04/20/18 13:49

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 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

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

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

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