

SULLIVAN 3-1

Line Leak

Location ID: 323373

Spill/Release Point ID #: 451307

Remediation Project #: Not Assigned

SITE ASSESSMENT REPORT

February 9, 2018



Image: Google 2017

PREPARED ON BEHALF OF

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



PREPARED BY

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



February 9, 2018

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

Subject: **Site Assessment Report**
 Sullivan 3-1 Line Leak
 Location ID: 323373
 Spill/Release Point ID #: 451307
 Remediation Project #: Not Assigned
 SEW S3 T6N R66W 6PM
 Weld County, Colorado

Dear Mr. Evans:

Below please find a copy of the above referenced Site Assessment Report (Report) for the Sullivan 3-1 Line Leak site (Site) in Weld County, Colorado. The text below describes environmental assessment and associated soil and groundwater sampling activities conducted by Tasman Geosciences, Inc. (Tasman), on behalf of Noble Energy, Inc. (Noble), during January and February 2017.

Introduction

The purpose of this document is to describe the results of site assessment and soil and groundwater sampling activities at the Site. The activities described below were performed in response to the discovery of a suspected release at the Sullivan 3-1 separator back pressure line on June 29, 2017. The release was reported to the Colorado Oil and Gas Conservation Commission (COGCC) on June 30, 2017. The COGCC established Spill/Release Point ID No. 451307 for the project.

Facility Background

The Site is located approximately three (3) miles west of the town of Eaton in Weld County, Colorado, as shown on Figure 1. The legal description of the Site is the southeast ¼ of the northwest ¼ of Section 3, Township 6 North, Range 66 West, of the 6th Principal Meridian. The Site is approximately 1,850 ft. east of Weld County Road 31 and the spill release point has coordinates of 40.519461°, -104.767825°.

As reported on the initial Form 19, a release was discovered at the Site on June 29, 2017. The approximate release location is shown on Figure 2. As a result, site assessment activities were scheduled to determine the nature and extent of residual impacts.

Site Assessment Field Activities

During June 2017, an excavation was completed around the Sullivan 3-1 separator back pressure line to complete repairs. A total of 20 cubic yards of soil were hauled to North Weld Landfill in Ault, Colorado under signed Noble waste manifests. Between January 23 and 30, 2017, Tasman completed

site assessment activities to assess soil and groundwater impacts at the Site. Six (6) boreholes were installed using direct push drilling techniques and converted to groundwater monitoring wells (BH01 – BH06). Monitoring well locations are illustrated on Figure 2, and boring logs are included in Attachment A. During boring operations, soil samples were collected and field screened for the presence of volatile organic compounds (VOC) using a photoionization detector (PID) and standard headspace sampling techniques. Soil samples from the depth interval exhibiting the highest PID reading above the water table were retained for laboratory analysis. A total of six (6) 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. Soil analytical results are summarized in Table 1 and illustrated on Figure 3. The complete laboratory analytical reports are included in Attachment B.

During the site assessment, Tasman developed and collected groundwater samples from the six (6) monitoring wells installed at the Site. Groundwater was encountered at depths of approximately 5.5 to 6.5 ft. below ground surface (bgs). Light non-aqueous phase liquid (LNAPL) was not detected in any of the wells. Groundwater samples were collected from the six (6) wells and submitted to Summit for laboratory analysis of BTEX by USEPA Method 8260B. Groundwater analytical results are summarized in Table 2 and illustrated on Figure 5. The complete laboratory analytical reports are included in Attachment B. Groundwater elevation data is summarized in Table 3 and a potentiometric surface map is provided as Figure 4.

Results

Laboratory analytical results for soil samples collected during Site assessment activities indicate that vadose zone soil impacts are present at the Sullivan 3-1 location. Vadose zone benzene concentrations were in exceedance of COGCC Table 910-1 standards in BH06.

Laboratory analytical results for groundwater samples collected during Site assessment activities indicate that only monitoring well BH06 exhibited dissolved phase petroleum hydrocarbon impacts to groundwater above COGCC Table 910-1 standards.

Conclusions

Based on field and laboratory data collected during site assessment activities, soil and groundwater impacts above COGCC Table 910-1 standards are present at the site. Laboratory data for groundwater samples collected from the monitoring wells installed in the vicinity of well BH06 did not exhibit dissolved phase petroleum hydrocarbon impacts above COGCC Table 910-1 groundwater standards and point of compliance has been established.

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

Table 2 – Groundwater Analytical Data

Table 3 – Groundwater Elevation Data

Figure 1 – Site Location Map

Figure 2 – Site Overview Map

Figure 3 – Borehole Soil Analytical Results Map (1/23/18, 1/31/18)

Figure 4 – Groundwater Potentiometric Surface Contour Map (1/31/18)

Figure 5 – Groundwater Analytical Results Map (1/31/18)

Attachment A – Boring Logs

Attachment B – Laboratory Analytical Data Report

TABLES

TABLE 1
SOIL ANALYTICAL DATA
NOBLE ENERGY, INC. - SULLIVAN 3-1

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@10-12'	01/23/18	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH12@10-12'	01/23/18	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH03@2-4'	01/23/18	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH04@2-4'	01/23/18	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH05@0-2'	01/23/18	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH06@4-6'	01/23/18	0.41	0.0051	3.5	1.9	81	220	0.30

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

Soil standards referenced from COGCC Table 910-1

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

TABLE 2
GROUNDWATER ANALYTICAL DATA
NOBLE ENERGY, INC. - SULLIVAN 3-1

Monitoring Well ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
COGCC Standard		5	560	700	1,400
BH01	01/31/18	<1.0	<1.0	<1.0	<2.0
BH02	01/31/18	<1.0	<1.0	<1.0	<2.0
BH03	01/31/18	<1.0	<1.0	<1.0	<2.0
BH04	01/31/18	<1.0	<1.0	<1.0	<2.0
BH05	01/31/18	<1.0	<1.0	<1.0	<2.0
BH06	01/31/18	62	<1.0	5.0	7.3

COGCC = Colorado Oil and Gas Conservation Commission

µg/L = Micrograms per liter

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

Groundwater standards referenced from COGCC Table 910-1

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

TABLE 3
GROUNDWATER ELEVATION DATA
NOBLE ENERGY, INC. - SULLIVAN 3-1

Monitoring Well ID	Date	Top of Casing Elevation (ft. AMSL)	Total Depth (ft. BTOC)	Depth to Water (ft. BTOC)	Depth to LNAPL (ft. BTOC)	LNAPL Thickness (ft.)	Groundwater Elevation* (ft. AMSL)
BH01	01/31/18	4887.25	18.16	7.70	ND	ND	4879.55
BH02	01/31/18	4887.34	18.15	7.69	ND	ND	4879.65
BH03	01/31/18	4887.83	18.15	8.27	ND	ND	4879.56
BH04	01/31/18	4888.13	17.76	8.22	ND	ND	4879.91
BH05	01/31/18	4888.51	18.42	8.65	ND	ND	4879.86
BH06	01/31/18	4887.70	14.85	8.05	ND	ND	4879.65

ft. = Feet

AMSL = Above mean sea level

BTOC = Below top of casing

LNAPL = Light non-aqueous phase liquid

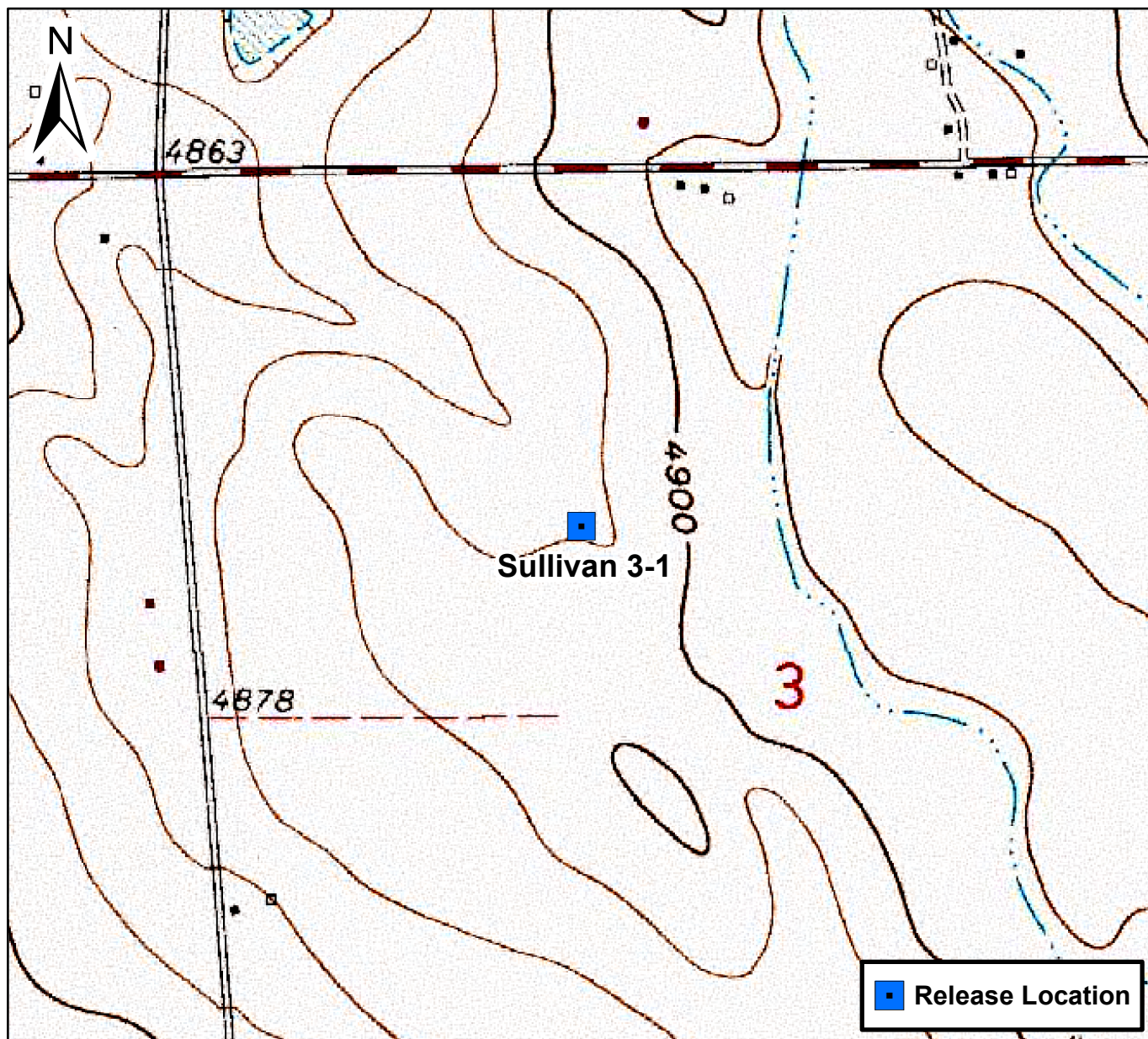
ND = No LNAPL detected

* Groundwater elevation was corrected for product thickness (when present) using the following calculation:

Groundwater elevation = (TOC Elevation - Measured Depth to Water)+(LNAPL Thickness in Well x LNAPL Relative Density)

LNAPL relative density was estimated to be approximately 0.75

FIGURES



0 750 1,500 Feet

Figure 1

Site Location Map

Sullivan 3-1

SEW S3 T6N R66W

Weld County, Colorado





DATE:	2/08/2018
DESIGNED BY:	JW
DRAWN BY:	JW



TASMAN
GEOSCIENCES

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

Noble Energy, Inc. – DJ Basin
Sullivan 3-1
SENW, Section 3, Township 6 North, Range 66 West
Weld County, Colorado

Site Overview Map

FIGURE
2



DATE:	2/08/2018
DESIGNED BY:	JW
DRAWN BY:	JW



TASMAN
GEOSCIENCES

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

Noble Energy, Inc. – DJ Basin
Sullivan 3-1
SENW, Section 3, Township 6 North, Range 66 West
Weld County, Colorado

Borehole Soil Analytical
Results Map
(01/23/18, 01/31/18)

FIGURE
3





DATE:	2/08/2018
DESIGNED BY:	JW
DRAWN BY:	JW



TASMAN
GEOSCIENCES

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

Noble Energy, Inc. – DJ Basin
Sullivan 3-1
SENW, Section 3, Township 6 North, Range 66 West
Weld County, Colorado

Groundwater Analytical
Results Map
(01/31/18)

FIGURE
5

ATTACHMENT A

BORING LOGS



6899 Pecos Street, Unit C
Denver, Colorado 80221

CLIENT: Noble Energy, Inc.

LOGGED BY: Jacob Whritenour

PROJECT MANAGER: Brandon Bruns

DRILLING CONTRACTOR: Tasman Geosciences

DRILLING EQUIPMENT: Powerprobe

DRILL BIT SIZE (INCHES): 2.25"

DATE STARTED - COMPLETED: 1/23/18 - 1/23/18

TOTAL WELL DEPTH (FT. BGS): 16

DEPTH TO WATER (FT. BGS): 12.5

Sullivan 3-1

BORING / WELL ID: BH01

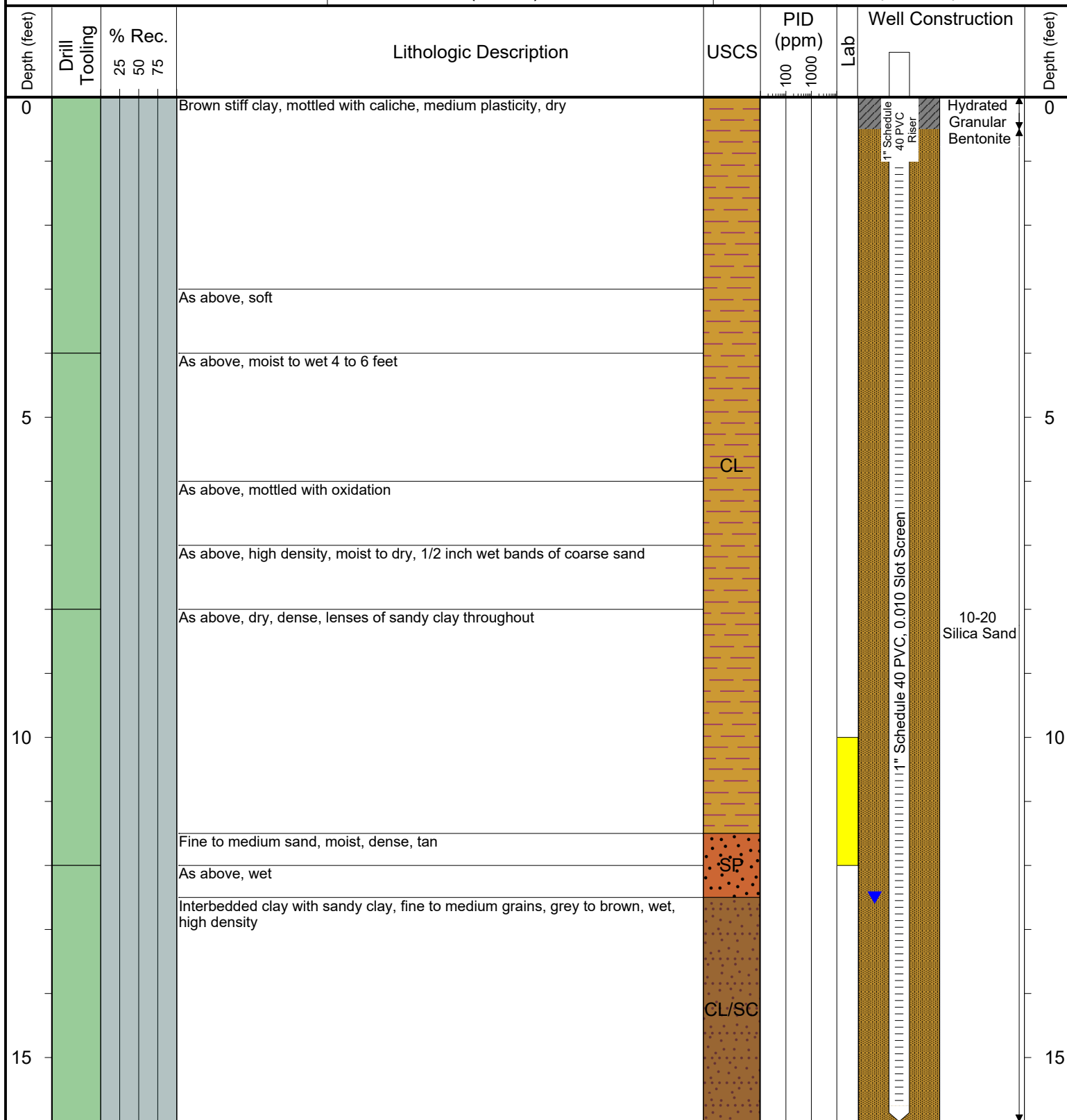
LOCATION: Weld County, CO

LATITUDE (WGS84): 40.519493069475

LONGITUDE (WGS84): -104.76786518309

CASING ELEVATION (FT. AMSL): 4887.25

GROUND ELEVATION (FT. AMSL): 4884.84



Drilling / Sample Method:

Macro-Core

Expendable Well Tip

Hand Auger

HydroPunch Groundwater Sampler

Laboratory Sample Types:

Geotechnical Lab

Analytical Chemistry Lab

Geotechnical & Analytical Chemistry Lab



6899 Pecos Street, Unit C
Denver, Colorado 80221

CLIENT: Noble Energy, Inc.

LOGGED BY: Jacob Whritenour

PROJECT MANAGER: Brandon Bruns

DRILLING CONTRACTOR: Tasman Geosciences

DRILLING EQUIPMENT: Powerprobe

DRILL BIT SIZE (INCHES): 2.25"

DATE STARTED - COMPLETED: 1/23/18 - 1/23/18

TOTAL WELL DEPTH (FT. BGS): 18

DEPTH TO WATER (FT. BGS): 12.5

Sullivan 3-1

BORING / WELL ID: BH02

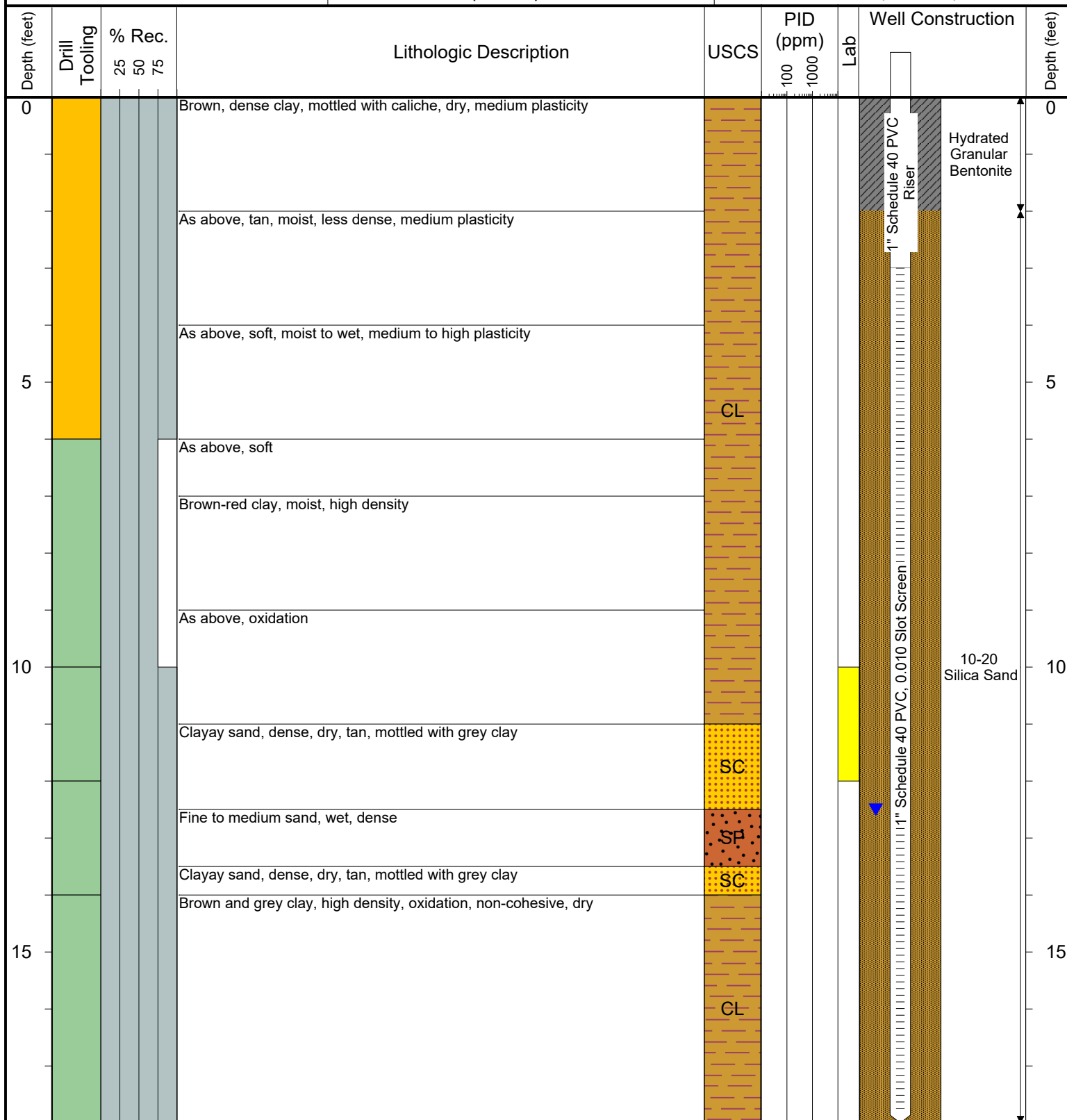
LOCATION: Weld County, CO

LATITUDE (WGS84): 40.51949248657

LONGITUDE (WGS84): -104.76780122496

CASING ELEVATION (FT. AMSL): 4887.34

GROUND ELEVATION (FT. AMSL): 4885.05



Drilling / Sample Method:

Macro-Core

Expendable Well Tip

Hand Auger

HydroPunch Groundwater Sampler

Laboratory Sample Types:

Geotechnical Lab

Analytical Chemistry Lab

Geotechnical & Analytical Chemistry Lab



6899 Pecos Street, Unit C
Denver, Colorado 80221

CLIENT: Noble Energy, Inc.

LOGGED BY: Jacob Whritenour

PROJECT MANAGER: Brandon Bruns

DRILLING CONTRACTOR: Tasman Geosciences

DRILLING EQUIPMENT: Powerprobe

DRILL BIT SIZE (INCHES): 2.25"

DATE STARTED - COMPLETED: 1/23/18 - 1/23/18

TOTAL WELL DEPTH (FT. BGS): 16

DEPTH TO WATER (FT. BGS): 10.5

Sullivan 3-1

BORING / WELL ID: BH03

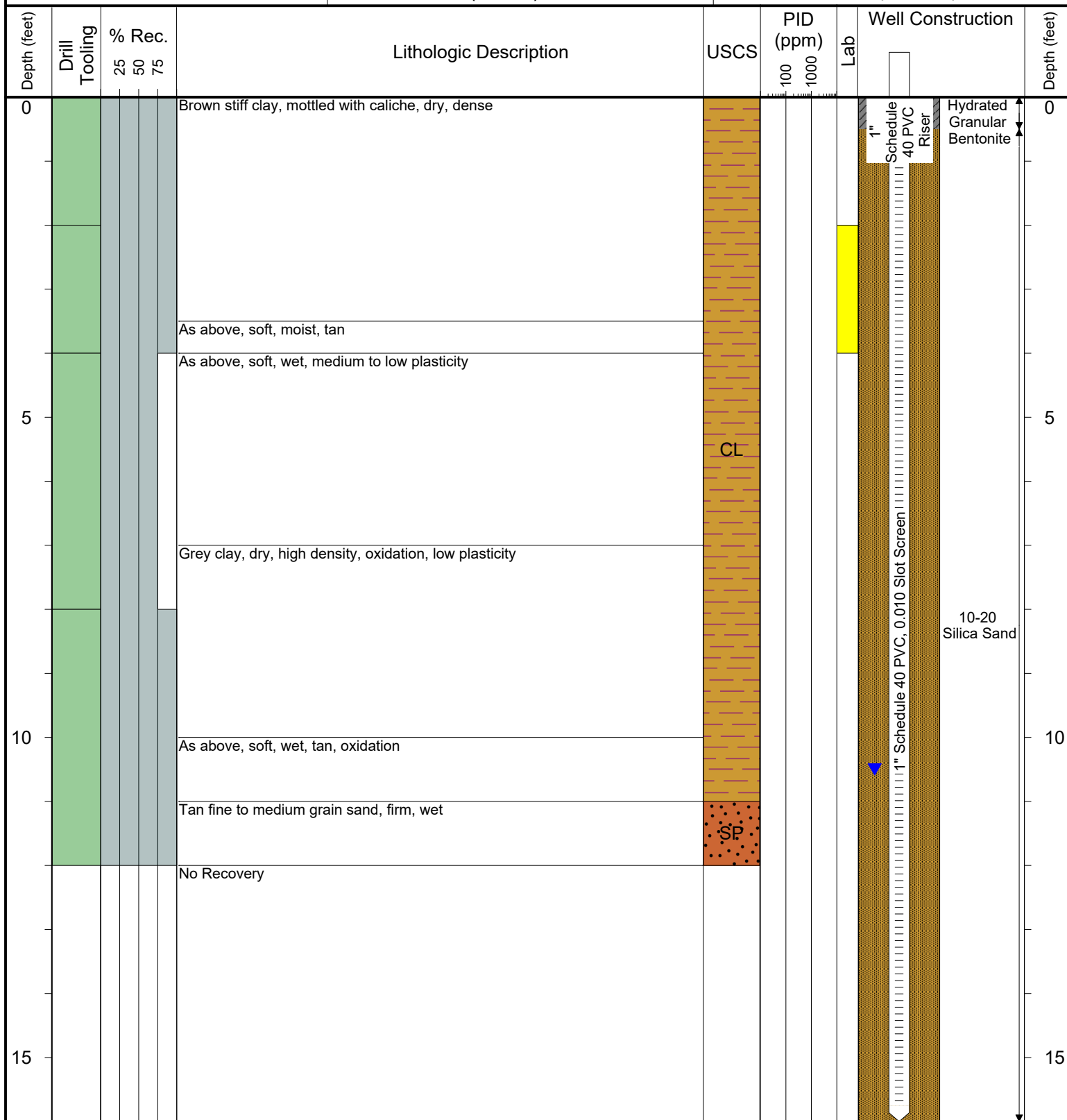
LOCATION: Weld County, CO

LATITUDE (WGS84): 40.519463887099

LONGITUDE (WGS84): -104.76787922883

CASING ELEVATION (FT. AMSL): 4887.83

GROUND ELEVATION (FT. AMSL): 4885.12



Drilling / Sample Method:

Macro-Core

Expendable Well Tip

Hand Auger

HydroPunch Groundwater Sampler

Laboratory Sample Types:

Geotechnical Lab

Analytical Chemistry Lab

Geotechnical & Analytical Chemistry Lab



6899 Pecos Street, Unit C
Denver, Colorado 80221

CLIENT: Noble Energy, Inc.

LOGGED BY: Jacob Whritenour

PROJECT MANAGER: Brandon Bruns

DRILLING CONTRACTOR: Tasman Geosciences

DRILLING EQUIPMENT: Powerprobe

DRILL BIT SIZE (INCHES): 2.25"

DATE STARTED - COMPLETED: 1/23/18 - 1/23/18

TOTAL WELL DEPTH (FT. BGS): 16

DEPTH TO WATER (FT. BGS): 9

Sullivan 3-1

BORING / WELL ID: BH04

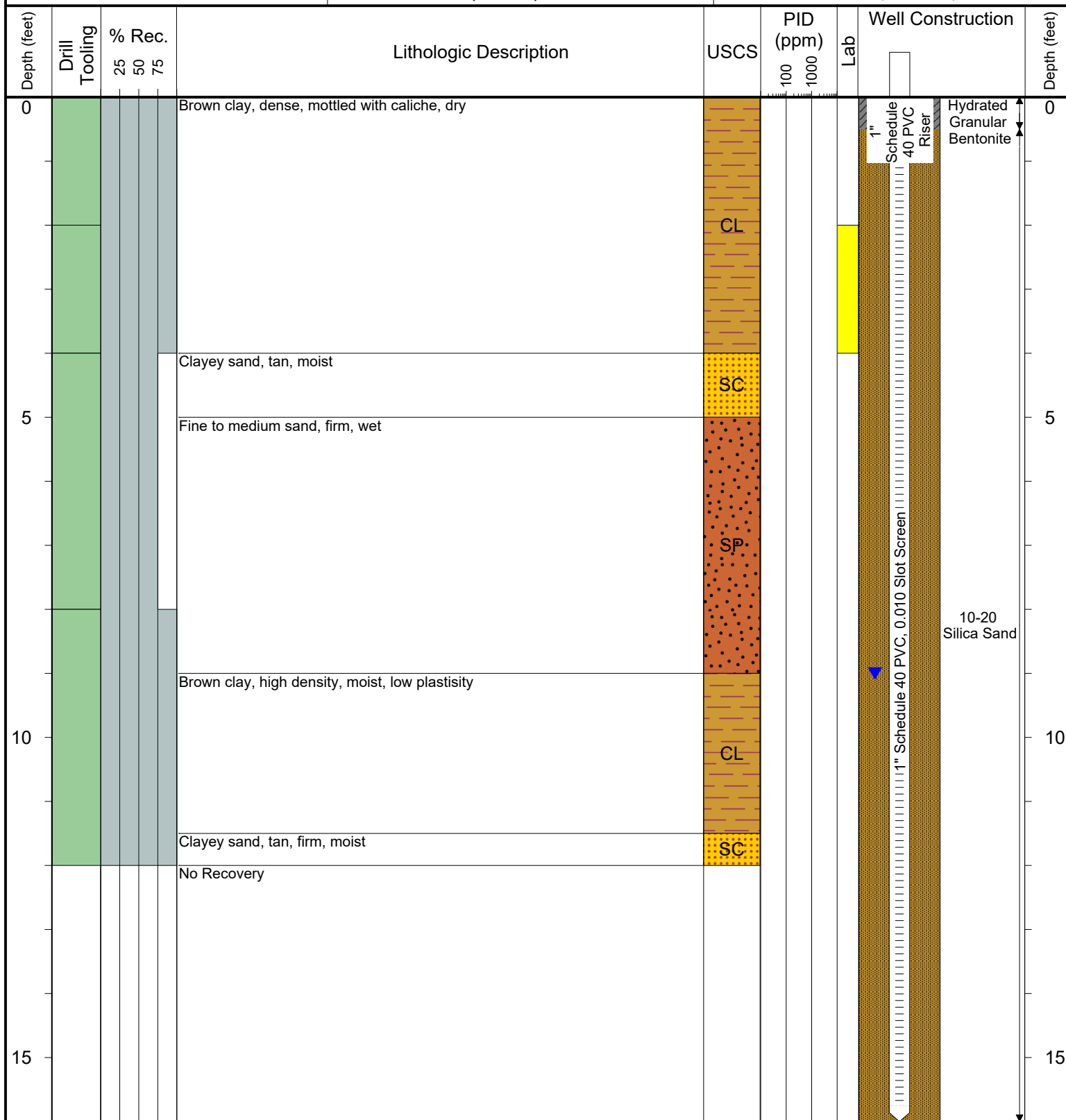
LOCATION: Weld County, CO

LATITUDE (WGS84): 40.51947023162

LONGITUDE (WGS84): -104.76777971764

CASING ELEVATION (FT. AMSL): 4888.13

GROUND ELEVATION (FT. AMSL): 4885.63



Drilling / Sample Method:

Macro-Core

Expendable Well Tip

Hand Auger

HydroPunch Groundwater Sampler

Laboratory Sample Types:

Geotechnical Lab

Analytical Chemistry Lab

Geotechnical & Analytical Chemistry Lab



6899 Pecos Street, Unit C
Denver, Colorado 80221

CLIENT: Noble Energy, Inc.

LOGGED BY: Jacob Whritenour

PROJECT MANAGER: Brandon Bruns

DRILLING CONTRACTOR: Tasman Geosciences

DRILLING EQUIPMENT: Powerprobe

DRILL BIT SIZE (INCHES): 2.25"

DATE STARTED - COMPLETED: 1/23/18 - 1/23/18

TOTAL WELL DEPTH (FT. BGS): 16

DEPTH TO WATER (FT. BGS): 4

Sullivan 3-1

BORING / WELL ID: BH05

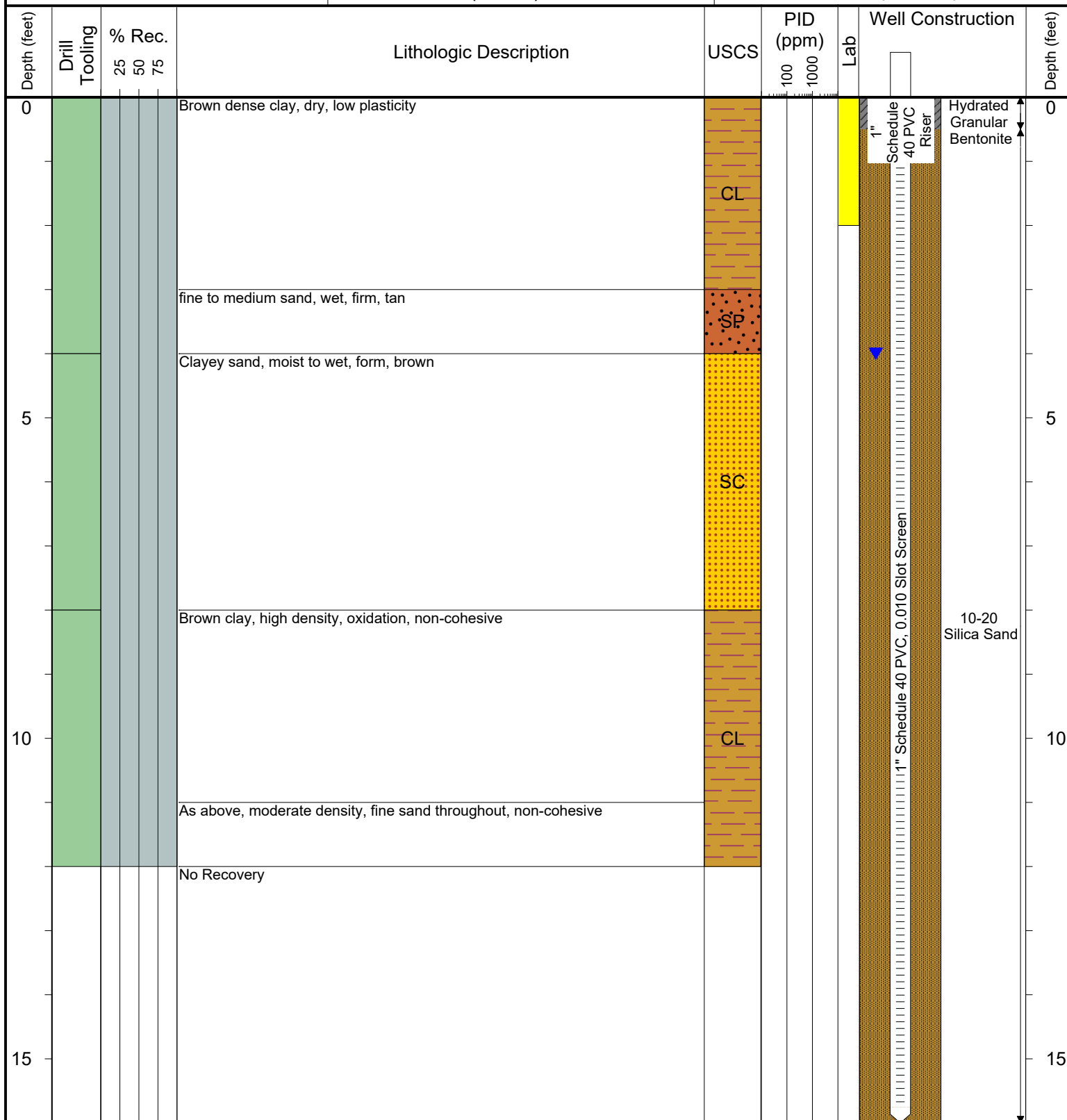
LOCATION: Weld County, CO

LATITUDE (WGS84): 40.519388457525

LONGITUDE (WGS84): -104.76785136312

CASING ELEVATION (FT. AMSL): 4888.51

GROUND ELEVATION (FT. AMSL): 4885.66



Drilling / Sample Method:

Macro-Core

Expendable Well Tip

Hand Auger

HydroPunch Groundwater Sampler

Laboratory Sample Types:

Geotechnical Lab

Analytical Chemistry Lab

Geotechnical & Analytical Chemistry Lab



6899 Pecos Street, Unit C
Denver, Colorado 80221

CLIENT: Noble Energy, Inc.

LOGGED BY: Jacob Whritenour

PROJECT MANAGER: Brandon Bruns

DRILLING CONTRACTOR: Tasman Geosciences

DRILLING EQUIPMENT: Powerprobe

DRILL BIT SIZE (INCHES): 2.25"

DATE STARTED - COMPLETED: 1/30/18 - 1/30/18

TOTAL WELL DEPTH (FT. BGS): 13

DEPTH TO WATER (FT. BGS): 12

Sullivan 3-1

BORING / WELL ID: BH06

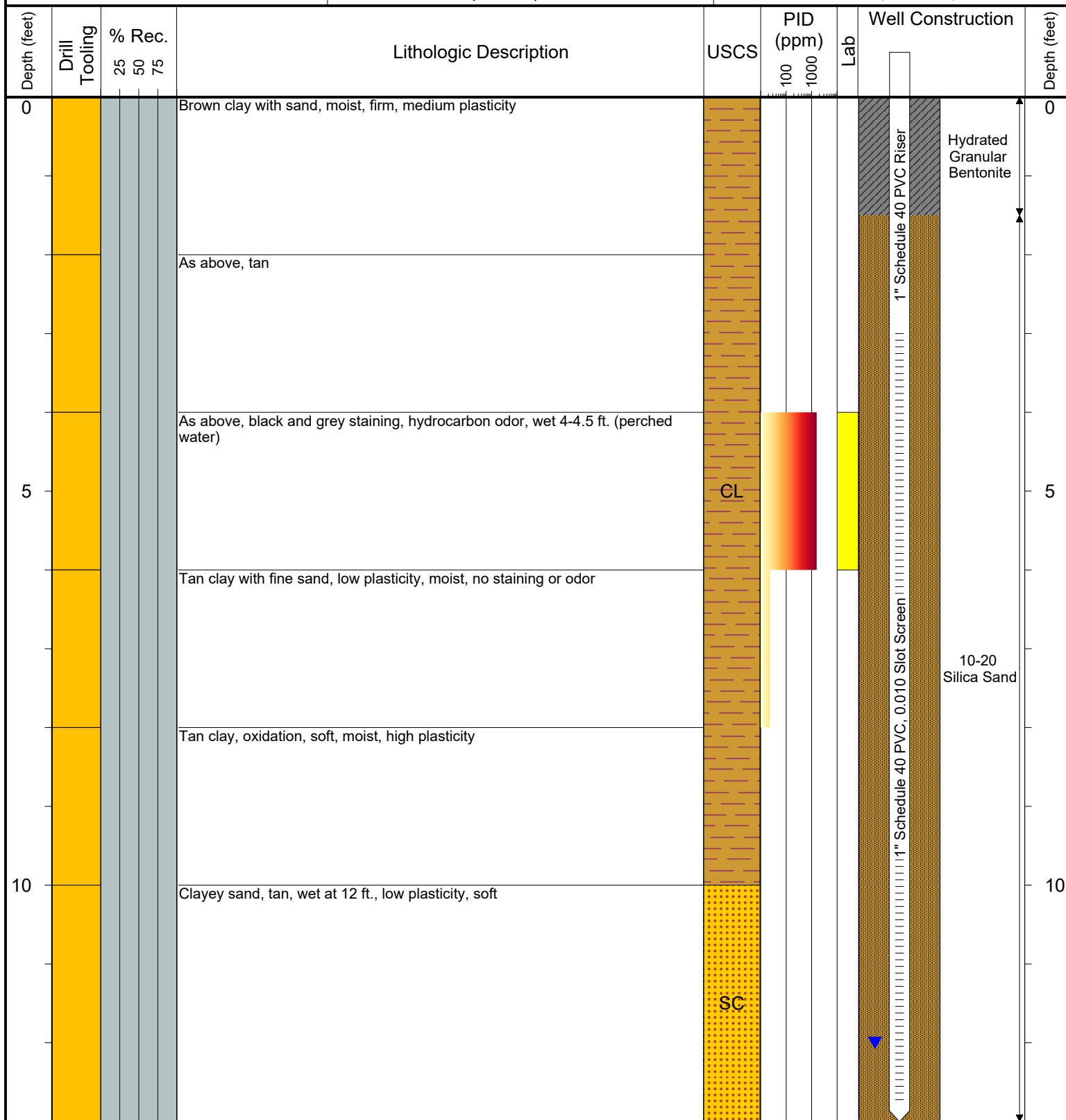
LOCATION: Weld County, CO

LATITUDE (WGS84): 40.519466016841

LONGITUDE (WGS84): -104.76784154164

CASING ELEVATION (FT. AMSL): 4887.7

GROUND ELEVATION (FT. AMSL): 4885.91



Drilling / Sample Method:

Macro-Core

Expendable Well Tip

Hand Auger

HydroPunch Groundwater Sampler

Laboratory Sample Types:

Geotechnical Lab

Analytical Chemistry Lab

Geotechnical & Analytical Chemistry Lab

ATTACHMENT B

LABORATORY ANALYTICAL DATA REPORTS

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

January 29, 2018

Brandon Bruns
Tasman Geosciences
6899 Pecos Street
Denver, CO 80221
RE: Noble - Sullivan 3-1

Enclosed are the results of analyses for samples received by Summit Scientific on 01/23/18 15:50. 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
President



Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/29/18 08:10

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01@10-12'	1801238-01	Soil	01/23/18 10:00	01/23/18 15:50
BH02@10-12'	1801238-02	Soil	01/23/18 11:00	01/23/18 15:50
BH03@2-4'	1801238-03	Soil	01/23/18 12:45	01/23/18 15:50
BH04@2-4'	1801238-04	Soil	01/23/18 13:15	01/23/18 15:50
BH05@0-2'	1801238-05	Soil	01/23/18 14:15	01/23/18 15:50

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/29/18 08:10

Summit Scientific

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

1701238

Client: Noble / Tasman Page 1 of 1
Address: _____
City/State/Zip: _____
Phone: 720-466-8383 Fax: -
Sampler Name: J. Whitener
Project Manager: Brandon Bruns, FAVORITE: J. Evans
E-Mail: bbruns@tasman-geo.com
Project Name: Sullivan 3-1
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)	8260 GBTXN	8015 DRO												
BH01@10-12'	4/27	1000	1			X						X	X												
BH02@10-12'		1100	1			X																			
BH03@2-4'		1245	1			X																			
BH04@2-4'		1315	1			X																			
BH05@0-2'		1415	1			X																			
Relinquished by: _____	Date/Time: _____	Received by: _____	Date/Time: _____	Turn Around Time (Check)										Notes:											
				Same Day <input type="checkbox"/> 72 Hours <input type="checkbox"/>																					
				24 Hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/>																					
				48 Hours <input type="checkbox"/>																					
Relinquished by: _____	Date/Time: _____	Received by: _____	Date/Time: _____	Sample Integrity:																					
				Temperature Upon Receipt: <u>1.9°C</u>																					
				Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No										<u>on ice</u>											

www.s2scientific.com

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/29/18 08:10

Sample Receipt Checklist

S2 Work Order: 1801238

Client: Noble/Tasman

Client Project ID: Sullivan 3-1

Shipped Via: Hand

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

Airbill #:

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

(Describe)

Cooler ID					
Temp (°C)	<u>1.9</u>				

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature just above 0°C to ≤ 6°C ⁽¹⁾ ?				
NOTE: If samples are delivered the same day of sampling, this requirement is waived provided that there is evidence that cooling has begun.	✓			
Were all samples received intact ⁽¹⁾ ?	✓			
Was adequate sample volume provided ⁽¹⁾ ?	✓			
If custody seals are present, are they intact ⁽¹⁾ ?			✓	
Are short holding time analytes or samples with HTs due within 48 hours present?			✓	
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	✓			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	✓			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	✓			
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	✓			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.			✓	
Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ?			✓	
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect			✓	
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ?			✓	
Record the pH in Comments.			✓	
If dissolved metals are requested, were samples field filtered?			✓	
Additional Comments (if any):				
⁽¹⁾ If NO, then contact the client before proceeding with analysis and note in case narrative.				

Nakita
Custodian Printed Name

[Signature]
Signature or Initials of Custodian

1/23/18 1600
Date/Time



Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/29/18 08:10

BH01@10-12'
1801238-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **01/23/18 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1801253	01/24/18	01/25/18	8015M	

Date Sampled: **01/23/18 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		87.6 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/23/18 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1801267	01/25/18	01/26/18	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **01/23/18 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		103 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.7 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Brunns

Reported:
01/29/18 08:10

BH02@10-12'
1801238-02 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **01/23/18 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1801253	01/24/18	01/25/18	8015M	

Date Sampled: **01/23/18 11:00**

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

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/23/18 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1801267	01/25/18	01/26/18	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **01/23/18 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		103 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.8 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/29/18 08:10

BH03@2-4'
1801238-03 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **01/23/18 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1801253	01/24/18	01/25/18	8015M	

Date Sampled: **01/23/18 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		90.0 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/23/18 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1801267	01/25/18	01/26/18	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **01/23/18 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		104 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.8 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/29/18 08:10

BH04@2-4'
1801238-04 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **01/23/18 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1801253	01/24/18	01/25/18	8015M	

Date Sampled: **01/23/18 13:15**

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

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/23/18 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1801267	01/25/18	01/26/18	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **01/23/18 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		104 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.3 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/29/18 08:10

BH05@0-2'
1801238-05 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **01/23/18 14:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1801253	01/24/18	01/25/18	8015M	

Date Sampled: **01/23/18 14:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		89.9 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/23/18 14:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1801267	01/25/18	01/26/18	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **01/23/18 14:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		106 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/29/18 08:10

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 1801253 - EPA 3550A

Blank (1801253-BLK1)

Prepared: 01/24/18 Analyzed: 01/25/18

C10-C28 (DRO) ND 50 mg/kg

Surrogate: o-Terphenyl 12.0 " 12.5 96.4 30-150

LCS (1801253-BS1)

Prepared: 01/24/18 Analyzed: 01/25/18

C10-C28 (DRO) 522 50 mg/kg 499 105 73-134

Surrogate: o-Terphenyl 10.0 " 12.5 80.3 30-150

Matrix Spike (1801253-MS1)

Source: 1801238-01

Prepared: 01/24/18 Analyzed: 01/25/18

C10-C28 (DRO) 529 50 mg/kg 499 8.33 104 50-148

Surrogate: o-Terphenyl 11.6 " 12.5 92.5 30-150

Matrix Spike Dup (1801253-MSD1)

Source: 1801238-01

Prepared: 01/24/18 Analyzed: 01/25/18

C10-C28 (DRO) 579 50 mg/kg 499 8.33 114 50-148 9.00 20

Surrogate: o-Terphenyl 13.2 " 12.5 105 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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/29/18 08:10

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 1801267 - EPA 5030 Soil MS

Blank (1801267-BLK1)

Prepared: 01/25/18 Analyzed: 01/26/18

Naphthalene	ND	0.010	mg/kg							
Benzene	ND	0.0020	"							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.010	"							
Gasoline Range Hydrocarbons	ND	50	"							
Surrogate: 1,2-Dichloroethane-d4	0.0407		"	0.0400		102	23-173			
Surrogate: Toluene-d8	0.0404		"	0.0400		101	20-170			
Surrogate: 4-Bromofluorobenzene	0.0410		"	0.0400		103	21-167			

LCS (1801267-BS1)

Prepared: 01/25/18 Analyzed: 01/26/18

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.116	0.0020	"	0.100		116	58-130			
Toluene	0.125	0.0050	"	0.100		125	61-134			
Ethylbenzene	0.133	0.0050	"	0.0992		134	74-139			
m,p-Xylene	0.260	0.010	"	0.200		130	73-137			
o-Xylene	0.126	0.0050	"	0.0980		128	73-141			
Surrogate: 1,2-Dichloroethane-d4	0.0440		"	0.0400		110	23-173			
Surrogate: Toluene-d8	0.0406		"	0.0400		101	20-170			
Surrogate: 4-Bromofluorobenzene	0.0402		"	0.0400		100	21-167			

Matrix Spike (1801267-MS1)

Source: 1801257-01

Prepared: 01/25/18 Analyzed: 01/26/18

Naphthalene	0.0424	0.010	mg/kg		0.0435		10-158			
Benzene	0.118	0.0020	"	0.100	ND	118	30-131			
Toluene	0.149	0.0050	"	0.100	0.0362	113	30-134			
Ethylbenzene	0.142	0.0050	"	0.0992	0.00945	134	22-153			
m,p-Xylene	0.305	0.010	"	0.200	0.0527	126	10-159			
o-Xylene	0.149	0.0050	"	0.0980	0.0255	126	31-151			
Surrogate: 1,2-Dichloroethane-d4	0.0411		"	0.0400		103	23-173			
Surrogate: Toluene-d8	0.0395		"	0.0400		98.8	20-170			
Surrogate: 4-Bromofluorobenzene	0.0392		"	0.0400		98.0	21-167			

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/29/18 08:10

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 1801267 - EPA 5030 Soil MS

Matrix Spike Dup (1801267-MSD1)	Source: 1801257-01			Prepared: 01/25/18		Analyzed: 01/26/18				
Naphthalene	0.0547	0.010	mg/kg		0.0435		10-158	25.3	42	
Benzene	0.115	0.0020	"	0.100	ND	115	30-131	2.58	34	
Toluene	0.161	0.0050	"	0.100	0.0362	124	30-134	7.32	30	
Ethylbenzene	0.147	0.0050	"	0.0992	0.00945	138	22-153	2.93	24	
m,p-Xylene	0.322	0.010	"	0.200	0.0527	135	10-159	5.35	68	
o-Xylene	0.157	0.0050	"	0.0980	0.0255	134	31-151	5.30	38	
Surrogate: 1,2-Dichloroethane-d4	0.0403		"	0.0400		101	23-173			
Surrogate: Toluene-d8	0.0392		"	0.0400		97.9	20-170			
Surrogate: 4-Bromofluorobenzene	0.0409		"	0.0400		102	21-167			

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
01/29/18 08:10

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

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

February 06, 2018

Brandon Bruns
Tasman Geosciences
6899 Pecos Street
Denver, CO 80221
RE: Noble - Sullivan 3-1

Enclosed are the results of analyses for samples received by Summit Scientific on 01/30/18 16:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to be 'P. Shrewsbury', written in a cursive style.

Paul Shrewsbury For Ben Shrewsbury
Laboratory Manager



Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
02/06/18 07:47

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH06@4-6'	1801324-01	Soil	01/30/18 12:45	01/30/18 16:30

Summit Scientific



A handwritten signature in black ink, appearing to be 'MSM'.

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.

1801324

Page 1 of 1

Project Manager:	Brandon Bruns, Invoice: Jacob Evans (Noble)
E-Mail:	bbruns@tasman-geo.com
Project Name:	Sullivan 3-1
Project Number:	—

				Preservative				Matrix				Analyze For:								Special Instructions
Sample Description	Date Sampled	Time Sampled	Number of Containers	HCl	HNO ₃	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	8260 BTEX	8260B GBTEXN	8015 DRO	pH, EC, SAR					
BH06 @ 4-6'	1/30/18	1245	X			X			X				X	X						
Relinquished by:  Date/Time: 1/30/18 @ 10:30				Received by:  1-30-18				Date/Time: 11:30				Turn Around Time (Check) 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"/>								Notes:
Relinquished by:				Received by:				Date/Time:				Sample Integrity: Temperature Upon Receipt: 2.7 Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>								
Relinquished by:				Received in Lab by:				Date/Time:												

Sample Receipt Checklist

S2 Work Order: 1801324

Client: Noble / Tasman Client Project ID: Sullivan 3-1

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

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

Cooler ID					
Temp (°C)	27				

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

Additional Comments (if any):

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

Murip.
Custodian Printed Name

KA 1-30-18
Signature or Initials of Custodian

17:00
Date/Time



Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Brunns

Reported:
02/06/18 07:47

BH06@4-6'
1801324-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **01/30/18 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	220	50	mg/kg	1	1801323	01/31/18	02/01/18	8015M	

Date Sampled: **01/30/18 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: o-Terphenyl</i>		111 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/30/18 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	0.30	0.010	mg/kg	1	1801330	01/31/18	02/01/18	EPA 8260B	
Benzene	0.41	0.0020	"	"	"	"	"	"	
Toluene	0.0051	0.0050	"	"	"	"	"	"	
Ethylbenzene	3.5	0.50	"	100	"	"	02/01/18	"	
Xylenes (total)	1.9	0.010	"	1	"	"	02/01/18	"	
Gasoline Range Hydrocarbons	81	50	"	"	"	"	"	"	

Date Sampled: **01/30/18 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		109 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		96.8 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		10500 %	21-167		"	"	02/01/18	"	S-02

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
02/06/18 07:47

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 1801323 - EPA 3550A

Blank (1801323-BLK1)

Prepared & Analyzed: 01/31/18

C10-C28 (DRO) ND 50 mg/kg

Surrogate: o-Terphenyl 9.31 " 12.5 74.5 30-150

LCS (1801323-BS1)

Prepared & Analyzed: 01/31/18

C10-C28 (DRO) 602 50 mg/kg 499 121 73-134

Surrogate: o-Terphenyl 15.2 " 12.5 121 30-150

Matrix Spike (1801323-MS1)

Source: 1801323-01

Prepared & Analyzed: 01/31/18

C10-C28 (DRO) 573 50 mg/kg 499 16.0 112 50-148

Surrogate: o-Terphenyl 12.1 " 12.5 96.8 30-150

Matrix Spike Dup (1801323-MSD1)

Source: 1801323-01

Prepared & Analyzed: 01/31/18

C10-C28 (DRO) 568 50 mg/kg 499 16.0 111 50-148 0.877 20

Surrogate: o-Terphenyl 16.0 " 12.5 128 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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
02/06/18 07:47

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 1801330 - EPA 5030 Soil MS

Blank (1801330-BLK1)

Prepared & Analyzed: 01/31/18

Naphthalene	ND	0.010	mg/kg							
Benzene	ND	0.0020	"							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.010	"							
Gasoline Range Hydrocarbons	ND	50	"							
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0355</i>		<i>"</i>	<i>0.0400</i>		<i>88.7</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0389</i>		<i>"</i>	<i>0.0400</i>		<i>97.4</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0341</i>		<i>"</i>	<i>0.0400</i>		<i>85.3</i>	<i>21-167</i>			

LCS (1801330-BS1)

Prepared & Analyzed: 01/31/18

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.0926	0.0020	"	0.100		92.6	58-130			
Toluene	0.102	0.0050	"	0.100		102	61-134			
Ethylbenzene	0.108	0.0050	"	0.0992		109	74-139			
m,p-Xylene	0.212	0.010	"	0.200		106	73-137			
o-Xylene	0.103	0.0050	"	0.0980		105	73-141			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0355</i>		<i>"</i>	<i>0.0400</i>		<i>88.7</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0389</i>		<i>"</i>	<i>0.0400</i>		<i>97.4</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0362</i>		<i>"</i>	<i>0.0400</i>		<i>90.6</i>	<i>21-167</i>			

Matrix Spike (1801330-MS1)

Source: 1801323-01

Prepared & Analyzed: 01/31/18

Naphthalene	ND	0.010	mg/kg		0.00693		10-158			
Benzene	0.0922	0.0020	"	0.100	ND	92.2	30-131			
Toluene	0.0992	0.0050	"	0.100	ND	99.2	30-134			
Ethylbenzene	0.107	0.0050	"	0.0992	ND	108	22-153			
m,p-Xylene	0.212	0.010	"	0.200	ND	106	10-159			
o-Xylene	0.103	0.0050	"	0.0980	ND	105	31-151			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0355</i>		<i>"</i>	<i>0.0400</i>		<i>88.8</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0384</i>		<i>"</i>	<i>0.0400</i>		<i>95.9</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0356</i>		<i>"</i>	<i>0.0400</i>		<i>89.0</i>	<i>21-167</i>			

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
02/06/18 07:47

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 1801330 - EPA 5030 Soil MS

Matrix Spike Dup (1801330-MSD1)	Source: 1801323-01			Prepared & Analyzed: 01/31/18						
Naphthalene	ND	0.010	mg/kg		0.00693		10-158		42	
Benzene	0.0926	0.0020	"	0.100	ND	92.6	30-131	0.422	34	
Toluene	0.101	0.0050	"	0.100	ND	101	30-134	1.68	30	
Ethylbenzene	0.107	0.0050	"	0.0992	ND	108	22-153	0.224	24	
m,p-Xylene	0.209	0.010	"	0.200	ND	105	10-159	1.24	68	
o-Xylene	0.102	0.0050	"	0.0980	ND	104	31-151	0.556	38	
Surrogate: 1,2-Dichloroethane-d4	0.0358		"	0.0400		89.6	23-173			
Surrogate: Toluene-d8	0.0383		"	0.0400		95.8	20-170			
Surrogate: 4-Bromofluorobenzene	0.0352		"	0.0400		87.9	21-167			

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
02/06/18 07:47

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.
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

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

February 06, 2018

Brandon Bruns
Tasman Geosciences
6899 Pecos Street
Denver, CO 80221
RE: Noble - Sullivan 3-1

Enclosed are the results of analyses for samples received by Summit Scientific on 01/31/18 16:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to be 'P. Shrewsbury', written in a cursive style.

Paul Shrewsbury For Ben Shrewsbury
Laboratory Manager



Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
02/06/18 08:23

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1801343-01	Water	01/31/18 11:35	01/31/18 16:30
BH02	1801343-02	Water	01/31/18 11:30	01/31/18 16:30
BH03	1801343-03	Water	01/31/18 11:25	01/31/18 16:30
BH04	1801343-04	Water	01/31/18 11:15	01/31/18 16:30
BH05	1801343-05	Water	01/31/18 11:10	01/31/18 16:30
BH06	1801343-06	Water	01/31/18 11:40	01/31/18 16:30

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.

1801343

Page 1 of 1

Project Manager:	Brandon Bruns, Invoice: Jacob Evans (Noble)
E-Mail:	bbruns@tasman-geo.com
Project Name:	Sullivan 3-1
Project Number:	—

				Preservative				Matrix				Analyze For:								
Sample Description	Date Sampled	Time Sampled	Number of Containers	HCl	HNO ₃	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	8260 BTEX	8260B GBTEXN	8015 DRO	pH, EC, SAR					Special Instructions
BH01	1/31/18	1135	3	X				X				X								
BH02	I	1130	I	I				I				I								
BH03	I	1125	I	I				I				I								
BH04	I	1115	I	I				I				I								
BH05	I	1110	I	I				I				I								
BH06	I	1140	I	I				I				I								
Relinquished by: 	Date/Time: 1/31/18 @ 1630	Received by: 1/31/18	Date/Time: 1630	Turn Around Time (Check) Same Day 24 Hours 48 Hours				<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>				Notes: on ice								
Relinquished by:	Date/Time:	Received by:	Date/Time:	Sample Integrity: Temperature Upon Receipt: 0.5°C				Intact: Yes No												
Relinquished by:	Date/Time:	Received in Lab by:	Date/Time:																	

1801343

Sample Receipt Checklist

S2 Work Order: _____

Client: Noble/TasmanClient Project ID: Sullivan 3-1Shipped Via: P/U
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Airbill #: _____

Matrix (check all that apply): Air Soil/Solid ✓ Water Other: _____
(Describe)

Cooler ID					
Temp (°C)	0.5				

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

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

Custodian Printed Name: NakitaSignature or Initials of Custodian: [Signature]Date/Time: 1/31/18 1700



Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: Noble - Sullivan 3-1
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
02/06/18 08:23

BH01
1801343-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/31/18 11:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1802011	02/02/18	02/02/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **01/31/18 11:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		103 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		102 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	45-146		"	"	"	"	

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
02/06/18 08:23

BH02
1801343-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/31/18 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1802011	02/02/18	02/02/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **01/31/18 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		109 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		100 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	45-146		"	"	"	"	

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
02/06/18 08:23

BH03
1801343-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/31/18 11:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1802011	02/02/18	02/02/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **01/31/18 11:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		109 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		101 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		105 %	45-146		"	"	"	"	

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
02/06/18 08:23

BH04
1801343-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/31/18 11:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1802011	02/02/18	02/02/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **01/31/18 11:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		105 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		95.6 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	45-146		"	"	"	"	

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
02/06/18 08:23

BH05
1801343-05 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/31/18 11:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1802011	02/02/18	02/02/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **01/31/18 11:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		105 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		95.5 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	45-146		"	"	"	"	

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1
Project Number: [none]
Project Manager: Brandon Brunns

Reported:
02/06/18 08:23

BH06
1801343-06 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **01/31/18 11:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	62	1.0	ug/l	1	1802011	02/02/18	02/02/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	5.0	1.0	"	"	"	"	"	"	
Xylenes (total)	7.3	2.0	"	"	"	"	"	"	

Date Sampled: **01/31/18 11:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		111 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		96.8 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	45-146		"	"	"	"	

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
02/06/18 08:23

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 1802011 - EPA 5030 Water MS

Blank (1802011-BLK1)

Prepared & Analyzed: 02/01/18

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	12.6		"	13.3		94.7	37-154			
Surrogate: Toluene-d8	13.0		"	13.3		97.6	45-149			
Surrogate: 4-Bromofluorobenzene	13.8		"	13.3		104	45-146			

LCS (1802011-BS1)

Prepared & Analyzed: 02/01/18

Benzene	36.1	1.0	ug/l	33.3		108	51-132			
Toluene	37.6	1.0	"	33.3		113	51-138			
Ethylbenzene	40.1	1.0	"	33.1		121	58-146			
m,p-Xylene	78.5	2.0	"	66.5		118	57-144			
o-Xylene	37.9	1.0	"	32.7		116	53-146			
Surrogate: 1,2-Dichloroethane-d4	13.8		"	13.3		103	37-154			
Surrogate: Toluene-d8	13.4		"	13.3		100	45-149			
Surrogate: 4-Bromofluorobenzene	13.8		"	13.3		104	45-146			

Matrix Spike (1802011-MS1)

Source: 1801322-01

Prepared & Analyzed: 02/01/18

Benzene	38.0	1.0	ug/l	33.3	ND	114	34-141			
Toluene	39.8	1.0	"	33.3	ND	120	27-151			
Ethylbenzene	42.6	1.0	"	33.1	ND	129	29-160			
m,p-Xylene	83.6	2.0	"	66.5	ND	126	20-166			
o-Xylene	40.7	1.0	"	32.7	ND	124	33-159			
Surrogate: 1,2-Dichloroethane-d4	14.2		"	13.3		106	37-154			
Surrogate: Toluene-d8	13.4		"	13.3		100	45-149			
Surrogate: 4-Bromofluorobenzene	13.9		"	13.3		104	45-146			

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
02/06/18 08:23

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 1802011 - EPA 5030 Water MS

Matrix Spike Dup (1802011-MSD1)	Source: 1801322-01			Prepared & Analyzed: 02/01/18						
Benzene	38.0	1.0	ug/l	33.3	ND	114	34-141	0.105	32	
Toluene	39.6	1.0	"	33.3	ND	119	27-151	0.604	25	
Ethylbenzene	43.6	1.0	"	33.1	ND	132	29-160	2.28	50	
m,p-Xylene	84.3	2.0	"	66.5	ND	127	20-166	0.822	36	
o-Xylene	41.2	1.0	"	32.7	ND	126	33-159	1.34	26	
Surrogate: 1,2-Dichloroethane-d4	13.8		"	13.3		104	37-154			
Surrogate: Toluene-d8	13.3		"	13.3		99.8	45-149			
Surrogate: 4-Bromofluorobenzene	13.8		"	13.3		103	45-146			

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 Street
Denver CO, 80221

Project: Noble - Sullivan 3-1

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
02/06/18 08:23

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