

**FEATHER 31-15**  
**PRODUCED WATER TANK RELEASE**  
**API #: 05-123 -21075**  
**Spill/Release Point ID #: 444673**  
**Remediation Project #: Not Assigned**

## **EXCAVATION AND SITE ASSESSMENT REPORT**

March 31, 2017



Image: Google 2015

**PREPARED ON BEHALF OF**

Noble Energy, Inc.  
1600 Broadway  
Denver, CO 80202



**PREPARED BY**

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



March 31, 2017

Mr. Jacob Evans  
Noble Energy Inc.  
1600 Broadway  
Denver, CO 80202

Subject:       **Site Assessment Report**  
                  ***Feather 31-15 Produced Water Tank Release***  
                  Spill/Release Point ID: 444673  
                  NWNE S15 T2N R64W  
                  Weld County, Colorado

Dear Mr. Evans:

Below please find a copy of the above referenced Site Assessment Report (Report) for the Feather 31-15 Produced Water Tank Release site (Site) in Weld County, Colorado. The text below describes environmental remediation and associated confirmation sampling activities conducted between January 26, 2016 and January 24, 2017.

## **Introduction**

The purpose of this document is to describe the assessment activities, including soil and groundwater sampling, conducted at the Site. The activities described below were performed in response to a release discovered below the Feather 31-15 produced water tank.

## **Facility Background**

The Site is located approximately 2.07 miles north-northwest of Keenesburg in Weld County, Colorado (Figure 1). Surrounded by agricultural crop land, the Site legal description is the northwest 1/4 of the northeast 1/4 of Section 15, Township 2 north, Range 64 west, of the 6<sup>th</sup> Principal Meridian. The Site is located on relatively flat terrain that slopes gradually to the north-northeast. The Site is approximately 3,500 feet (ft.) east of County Road 55 and approximately 380 ft. north of the Feather 31-15 wellhead, and has coordinates of 40.145495°, -104.534330°.

As reported on the initial Form 19, a loss of produced water was detected at the Site, and production equipment was subsequently shut in.

## **Previous Field Activities**

### **Site Assessment – Soil**

On January 26, 2016, Tasman was retained to assess the soil and groundwater in an area adjacent to the Feather 31-15 produced water tank and produced water dump line. Nine boreholes and two groundwater monitoring wells were installed. Borehole and 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 volatile organic compounds (VOC) using a photoionization detector (PID) and standard headspace sampling techniques. Nine soil samples were submitted for laboratory analyses of benzene, toluene, ethylbenzene, and total xylenes (collectively referred to as BTEX), naphthalene, and total petroleum hydrocarbons-gasoline range organics (TPH-GRO) using

United States Environmental Protection Agency (USEPA) Method 8260B, and total petroleum hydrocarbons-diesel range organics (TPH-DRO) using USEPA Method 8015. Additionally, BH02@6 was analyzed for Sodium Adsorption Ratio (SAR) by USEPA Method 6020/United State Department of Agriculture (USDA) Method 60 6(2,3A) and Specific Conductance (EC) and pH via American Public Health Association (APHA)/American Society for Testing and Materials (ASTM)/USEPA methods.

## **Excavation Activities**

Excavation activities were conducted between March 2 and March 3, 2016. In order to guide the excavation and designate the appropriate removal of impacted material, soil samples were collected and field screened for volatile organic compounds (VOC) using a photoionization detector (PID) and standard headspace sampling techniques. A total of seven confirmation soil samples (SS01@16', SS02@16', SS03@16', SS04@16', SS05@16', SS06@16', and SS07@16') were retained during the excavation activities and submitted to Summit Scientific Laboratory in Golden, Colorado for laboratory analysis of BTEX, naphthalene, TPH-GRO using USEPA Method 8260B, and TPH-DRO using USEPA Method 8015. As summarized in Table 1 and illustrated on Figure 3, benzene and TPH were detected in samples SS01, SS02, SS04, SS05, SS06, and SS07 above Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1 soil standards. Approximately 600 cubic yards of impacted soil was removed during the excavation activities and transported to the Waste Management Buffalo Ridge landfill for disposal under signed waste manifests. Soil removal activities produced an excavation with final dimensions of approximately 38 ft. by 23 ft. by 20 ft. bgs, while 5-8 ft. of the overburden was surveyed with the PID during removal and retained as backfill. The excavation was backfilled with clean soil, and the immediate area was regraded to previous levels. Previously installed temporary monitoring wells were destroyed during the excavation activities.

Groundwater was encountered in the excavation at approximately 17 ft. Pooling of groundwater sufficient for collection with a bailer did not occur and a groundwater sample was not collected during excavation activities.

## **Site Assessment – Groundwater**

From August 28, 2016 through December 21, 2016, Tasman returned to site to advanced forty-three (43) additional boreholes, and subsequently install forty three monitoring wells to further delineate dissolved phase impacts to groundwater at the Site. 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 VOCs using a PID and standard headspace sampling techniques. A total of 43 soil samples were submitted for laboratory analyses of BTEX, naphthalene, and TPH-GRO using USEPA Method 8260B, and TPH-DRO using USEPA Method 8015. Soil sample locations and laboratory analytical results are illustrated on Figure 4.

On January 24, 2017, a site-wide groundwater sampling event was conducted. Samples were collected from all forty-four (44) monitoring well locations. Groundwater was encountered at depths of approximately 7-19 ft. below ground surface (bgs). Groundwater samples were submitted for laboratory analyses of BTEX by USEPA Method 8260B. Groundwater sample locations and laboratory analytical results are illustrated on Figure 5, and a groundwater potentiometric surface contour map is included as Figure 6.

## **Results**

Laboratory analytical results for soil samples collected from the 43 boreholes advanced during additional site assessment activities (August 28, 2016 through December 21, 2016) indicate that all soil samples contained analyte concentrations below the applicable COGCC Table 910-1 standards. These data are presented in Table 1 and illustrated on Figure 4.

Laboratory analytical results from the latest groundwater sampling event (January 24, 2017) indicate that groundwater impacts are present above the applicable COGCC Table 910-1 standards in sixteen monitoring well locations at the site. These include BH13, BH15, BH16, BH19, BH21 through BH27, BH30, BH31, BH33, BH36, and BH50. Groundwater analytical data is summarized in Table 2 and illustrated on Figure 5.

## Conclusions

Based on laboratory analytical data, groundwater impacted above applicable COGCC standards remains at the Site. Additional site assessment activities have established point of compliance for the dissolved phase impacts, and remediation strategies will be developed to address these impacts. These efforts may include the installation of an on-Site remediation system.

## 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

### Attached:

Table 1 – Soil Analytical Data

Table 2 – Groundwater Analytical Data

Table 3 – Groundwater Elevation Data

Figure 1 – Site Location Map

Figure 2 – Monitoring Well & Soil Boring Overview Figure

Figure 3 – Excavation Soil Analytical Results Figure (3/3/16)

Figure 4 – Soil Analytical Results Figure

Figure 5 – Groundwater Analytical Results Figure (01/24/17)

Figure 6 – Groundwater Potentiometric Surface Contour Map (01/24/17)

Attachment A – Boring Logs

Attachment B – Laboratory Analytical Data Reports

# **TABLES**

**TABLE 1**  
**SOIL ANALYTICAL DATA**  
**NOBLE ENERGY, INC. - FEATHER 31-15 PRODUCED WATER TANK RELEASE**

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@10-13	01/26/16	<0.0020	<0.0050	<0.0050	<0.010	<50	70	<0.010
BH02@6	01/26/16	0.14	0.37	<0.0050	430	9,000	2,200	12
BH03@17.5-20	01/26/16	0.17	0.63	0.14	2.2	<50	85	0.063
BH04@6-10	01/26/16	<0.0020	<0.0050	<0.0050	<0.010	<50	53	<0.010
BH05@10-12.5	01/26/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH06@6-10	01/26/16	<0.0020	<0.0050	<0.0050	<0.010	<50	68	<0.010
BH07@10-15	01/26/16	0.56	1.2	0.12	0.11	<50	<50	0.011
BH08@15-17.5	01/26/16	<0.0020	<0.0050	<0.0050	<0.010	<50	62	<0.010
BH09@5-10	01/26/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
SS01@16	03/02/16	0.29	0.21	0.082	2.4	<50	<50	0.049
SS02@16	03/02/16	0.31	0.72	0.094	1.6	<50	<50	0.032
SS03@16	03/03/16	0.13	0.47	0.13	2.0	<50	<50	0.034
SS04@16	03/03/16	0.19	0.56	0.095	1.5	<50	<50	0.042
SS05@16	03/03/16	0.65	2.4	0.31	5.2	710	<50	0.11
SS06@16	03/03/16	2.8	8.7	0.61	10	100	<50	0.20
SS07@16	03/03/16	4.2	16	3.2	53	560	<50	0.80
BH10@8'	08/25/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH11@8'	08/25/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH12@7'	08/25/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH13@8'	08/25/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH14@8'	08/25/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH15@7'	08/25/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH16@11'	08/25/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH17@6-7'	09/21/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH18@8-9'	09/21/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH19@6-7'	09/21/16	<0.0020	0.0060	<0.0050	0.013	<50	<50	<0.010
BH20@7-8'	09/21/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH21@4-6'	09/21/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH22@4-6'	09/21/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH23@6-7'	09/22/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH24@4-5'	09/22/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH25@4-6'	09/22/16	<0.0020	<0.0050	<0.0050	0.026	<50	<50	<0.010
BH26@4-6'	09/22/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH27@4-6'	09/22/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH28@2-4'	09/22/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH29@4-6'	09/22/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH30@4-6'	10/19/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH31@6-8'	10/19/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH32@4-6'	10/19/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH33@0-2'	10/25/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH34@0-2'	10/25/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH35@4-6'	10/25/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010

**TABLE 1**  
**SOIL ANALYTICAL DATA**  
**NOBLE ENERGY, INC. - FEATHER 31-15 PRODUCED WATER TANK RELEASE**

Soil Sample ID	Date	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	TPH-GRO (mg/kg)	TPH-DRO (mg/kg)	Naphthalene (mg/kg)
<b>COGCC Standard</b>		<b>0.17</b>	<b>85</b>	<b>100</b>	<b>175</b>	<b>500</b>		<b>23</b>
BH36@0-2'	10/25/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH37@0-2'	10/25/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH38@6-8'	10/25/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH39@4-6'	10/25/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH40@4-6'	10/26/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH41@0-2'	10/26/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH42@0-2'	10/26/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH43@4-6'	10/26/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH44@8-10'	10/26/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH45@0-4'	10/26/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH46@2-4'	12/21/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH47@4-6'	12/21/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH48@6-8'	12/21/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH49@4-6'	12/21/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH50@6-8'	12/21/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH51@4-6'	12/21/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH52@2-4'	12/22/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010

Soil Sample ID	Date	EC (mmhos/cm)	pH	SAR
		<b>4 or 2x BG</b>	<b>6-9</b>	<b>&lt;12</b>
BH02@6	01/26/16	1.70	7.02	11.1

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**

**TABLE 2**  
**GROUNDWATER ANALYTICAL DATA**  
**NOBLE ENERGY, INC. - FEATHER 31-15 PRODUCED WATER TANK RELEASE**

Monitoring Well ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
<b>COGCC Standard</b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>
BH03	01/28/16	<b>940</b>	<b>3,700</b>	430	<b>7,100</b>
BH03	09/01/16	Well Destroyed			
BH08	01/28/16	<1.0	1.1	<1.0	3.2
BH08	09/01/16	<1.0	<1.0	<1.0	<1.0
BH08	11/03/16	<1.0	<1.0	<1.0	<1.0
BH08	01/24/17	<1.0	<1.0	<1.0	<1.0
BH10	09/01/16	<1.0	<1.0	<1.0	<1.0
BH10	11/03/16	<1.0	<1.0	<1.0	<1.0
BH10	01/24/17	<1.0	<1.0	<1.0	<1.0
BH11	09/01/16	<1.0	<1.0	<1.0	18
BH11	11/03/16	<b>57</b>	70	24	260
BH11	01/24/17	<1.0	<1.0	<1.0	<1.0
BH12	09/01/16	<1.0	<1.0	<1.0	<1.0
BH12	11/03/16	<1.0	<1.0	<1.0	<1.0
BH12	01/24/17	<1.0	<1.0	<1.0	<1.0
BH13	09/01/16	<b>5,000</b>	<b>4,700</b>	<1.0	<b>16,000</b>
BH13	11/03/16	<b>4,800</b>	<b>2,900</b>	690	<b>15,000</b>
BH13	01/24/17	<b>3,000</b>	<b>610</b>	380	<b>13,000</b>
BH14	09/01/16	<1.0	<1.0	<1.0	<1.0
BH14	11/03/16	<1.0	<1.0	<1.0	<1.0
BH14	01/24/17	<1.0	<1.0	<1.0	<1.0
BH15	09/01/16	<b>4,300</b>	<b>8,000</b>	410	<b>7,900</b>
BH15	11/03/16	<b>2,300</b>	<b>4,700</b>	380	<b>6,500</b>
BH15	01/24/17	<b>8,400</b>	<b>2,800</b>	600	<b>10,000</b>
BH16	09/01/16	<b>32,000</b>	<b>51,000</b>	<b>1,100</b>	<b>34,000</b>
BH16	11/03/16	<b>22,000</b>	<b>34,000</b>	<b>1,500</b>	<b>23,000</b>
BH16	01/24/17	<b>21,000</b>	<b>31,000</b>	680	<b>29,000</b>
BH17	09/23/16	<1.0	<1.0	<1.0	<1.0
BH17	11/03/16	<1.0	<1.0	<1.0	<1.0
BH17	01/24/17	<1.0	<1.0	<1.0	<1.0
BH18	09/23/16	<1.0	<1.0	<1.0	<1.0
BH18	11/03/16	<1.0	<1.0	<1.0	<1.0
BH18	01/24/17	<1.0	<1.0	<1.0	<1.0
BH19	09/23/16	<b>1,000</b>	500	72	1,300
BH19	11/03/16	<b>8,000</b>	<b>3,700</b>	520	<b>9,100</b>
BH19	01/24/17	<b>5,400</b>	1.2	<1.0	<b>3,100</b>
BH20	09/23/16	<1.0	<1.0	<1.0	280
BH20	11/03/16	<1.0	<1.0	<1.0	<1.0
BH20	01/24/17	<1.0	<1.0	<1.0	<1.0
BH21	09/23/16	<b>2,400</b>	<b>2,800</b>	470	<b>1,500</b>
BH21	11/03/16	<b>5,000</b>	<b>12,000</b>	560	<b>9,600</b>
BH21	01/24/17	<b>2,900</b>	30	<1.0	<b>6,200</b>

**TABLE 2  
GROUNDWATER ANALYTICAL DATA  
NOBLE ENERGY, INC. - FEATHER 31-15 PRODUCED WATER TANK RELEASE**

Monitoring Well ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
<b>COGCC Standard</b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>
BH22	09/23/16	8,800	24,000	1,900	28,000
BH22	11/03/16	5,500	10,000	670	19,000
BH22	01/24/17	9,100	13,000	2,000	51,000
BH23	09/23/16	11,000	21,000	1,400	21,000
BH23	11/03/16	6,200	6,800	430	7,900
BH23	01/24/17	4,900	5,300	<1.0	11,000
BH24	09/23/16	13,000	5,200	500	4,200
BH24	11/03/16	12,000	1,900	650	2,400
BH24	01/24/17	6,300	47	<1.0	4,000
BH25	09/23/16	5,400	22,000	1,200	19,000
BH25	11/03/16	4,500	15,000	1,200	20,000
BH25	01/24/17	2,700	2,400	<1.0	16,000
BH26	09/23/16	3,900	8,100	890	13,000
BH26	11/03/16	3,700	3,000	780	13,000
BH26	01/24/17	3,300	210	<1.0	8,900
BH27	09/23/16	2,100	7,900	660	11,000
BH27	11/03/16	2,300	7,300	790	13,000
BH27	01/24/17	110	3	<1.0	190
BH28	09/23/16	<1.0	<1.0	<1.0	<1.0
BH28	11/03/16	<1.0	<1.0	<1.0	<1.0
BH28	01/24/17	<1.0	<1.0	<1.0	<1.0
BH29	09/23/16	<1.0	<1.0	<1.0	<1.0
BH29	11/03/16	<1.0	<1.0	<1.0	<1.0
BH29	01/24/17	<1.0	<1.0	<1.0	<1.0
BH30	10/25/16	4,300	24,000	1,100	18,000
BH30	11/03/16	3,900	18,000	1,100	19,000
BH30	01/24/17	2,200	11,000	670	12,000
BH31	10/25/16	4,100	2,700	170	3,900
BH31	11/03/16	3,700	3,700	250	4,800
BH31	01/24/17	1,300	<1.0	<1.0	2,100
BH32	10/25/16	<1.0	2.8	<1.0	2.7
BH32	11/03/16	<1.0	<1.0	<1.0	<1.0
BH32	01/24/17	<1.0	<1.0	<1.0	<1.0
BH33	10/25/16	11,000	17,000	790	12,000
BH33	11/03/16	10,000	18,000	870	15,000
BH33	01/24/17	<1.0	17	1.3	4,400
BH34	10/25/16	Not Sampled - Insufficient Water			
BH34	11/03/16	<1.0	<1.0	<1.0	<1.0
BH34	01/24/17	<1.0	<1.0	<1.0	<1.0
BH35	10/25/16	Not Sampled - Insufficient Water			
BH35	11/03/16	<1.0	<1.0	<1.0	<1.0
BH35	01/24/17	<1.0	<1.0	<1.0	<1.0
BH36	10/25/16	6,800	9,800	520	8,500
BH36	11/03/16	4,300	2,200	320	4,700
BH36	01/24/17	2,200	24	<1.0	150

**TABLE 2**  
**GROUNDWATER ANALYTICAL DATA**  
**NOBLE ENERGY, INC. - FEATHER 31-15 PRODUCED WATER TANK RELEASE**

Monitoring Well ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
<b>COGCC Standard</b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>
BH37	10/25/16	<b>4,700</b>	<b>4,800</b>	170	<b>4,300</b>
BH37	11/03/16	<b>4,900</b>	<b>3,200</b>	210	<b>4,400</b>
BH37	01/24/17	<1.0	<1.0	<1.0	<1.0
BH38	10/25/16	3.8	7.1	<1.0	12
BH38	11/03/16	<1.0	<1.0	<1.0	<1.0
BH38	01/24/17	<1.0	<1.0	<1.0	<1.0
BH39	11/03/16	<1.0	<1.0	<1.0	<1.0
BH39	01/24/17	<1.0	<1.0	<1.0	<1.0
BH40	11/03/16	<1.0	<1.0	<1.0	2.2
BH40	01/24/17	<1.0	<1.0	<1.0	<1.0
BH41	11/03/16	<1.0	<1.0	<1.0	<1.0
BH41	01/24/17	<1.0	<1.0	<1.0	<1.0
BH42	11/03/16	<1.0	<1.0	<1.0	<1.0
BH42	01/24/17	<1.0	<1.0	<1.0	<1.0
BH43	11/03/16	<1.0	1.2	<1.0	27
BH43	01/24/17	<1.0	<1.0	<1.0	<1.0
BH44	11/03/16	<b>4,200</b>	20	2.3	590
BH44	01/24/17	<1.0	<1.0	<1.0	<1.0
BH45	11/03/16	<1.0	9.3	<1.0	3.9
BH45	01/24/17	<1.0	<1.0	<1.0	<1.0
BH46	01/24/17	<1.0	<1.0	<1.0	<1.0
BH47	01/24/17	<1.0	<1.0	<1.0	<1.0
BH48	01/24/17	<1.0	<1.0	<1.0	<1.0
BH49	01/24/17	<1.0	<1.0	<1.0	<1.0
BH50	01/24/17	<b>1,600</b>	<b>3,400</b>	280	<b>5,100</b>
BH51	01/24/17	<1.0	<1.0	<1.0	<1.0
BH52	01/24/17	<1.0	<1.0	<1.0	<1.0

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. - FEATHER 31-15 PRODUCED WATER TANK RELEASE**

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)
BH03	01/28/16	NS	22.98	15.17	ND	ND	NS
BH03	09/01/16	Well Destroyed					
BH08	01/28/16	NS	24.95	13.15	ND	ND	NS
BH08	09/01/16	4960.47	22.60	6.16	ND	ND	4954.31
BH08	11/03/16	4960.47	22.57	6.79	ND	ND	4953.68
BH08	01/24/17	4960.47	22.63	7.21	ND	ND	4953.26
BH10	09/01/16	4964.48	21.98	10.36	ND	ND	4954.12
BH10	11/03/16	4964.48	21.95	10.98	ND	ND	4953.50
BH10	01/24/17	4964.48	22.03	11.37	ND	ND	4953.11
BH11	09/01/16	4960.77	16.86	6.73	ND	ND	4954.04
BH11	11/03/16	4960.77	18.32	7.29	ND	ND	4953.48
BH11	01/24/17	4960.77	17.93	7.72	ND	ND	4953.05
BH12	09/01/16	4960.63	18.90	7.05	ND	ND	4953.58
BH12	11/03/16	4960.63	18.81	7.71	ND	ND	4952.92
BH12	01/24/17	4960.63	18.70	8.15	ND	ND	4952.48
BH13	09/01/16	4963.84	21.95	10.92	ND	ND	4952.92
BH13	11/03/16	4963.84	21.62	11.54	ND	ND	4952.30
BH13	01/24/17	4963.84	21.17	11.94	ND	ND	4951.90
BH14	09/01/16	4960.84	19.50	8.60	ND	ND	4952.24
BH14	11/03/16	4960.84	19.39	9.22	ND	ND	4951.62
BH14	01/24/17	4960.84	19.10	9.57	ND	ND	4951.27
BH15	09/01/16	4961.83	21.04	10.90	ND	ND	4950.93
BH15	11/03/16	4961.83	22.32	11.39	ND	ND	4950.44
BH15	01/24/17	4961.83	22.32	11.67	ND	ND	4950.16
BH16	09/01/16	4960.67	19.54	8.85	ND	ND	4951.82
BH16	11/03/16	4960.67	19.50	9.44	ND	ND	4951.23
BH16	01/24/17	4960.67	19.55	9.77	ND	ND	4950.90
BH17	09/23/16	4961.27	18.52	8.53	ND	ND	4952.74
BH17	11/03/16	4961.27	18.26	8.97	ND	ND	4952.30
BH17	01/24/17	4961.27	17.72	9.36	ND	ND	4951.91
BH18	09/23/16	4962.91	21.43	11.30	ND	ND	4951.61
BH18	11/03/16	4962.91	22.26	11.72	ND	ND	4951.19
BH18	01/24/17	4962.91	22.33	12.06	ND	ND	4950.85
BH19	09/23/16	4961.23	18.11	9.11	ND	ND	4952.12
BH19	11/03/16	4961.23	18.59	9.53	ND	ND	4951.70
BH19	01/24/17	4961.23	18.58	9.87	ND	ND	4951.36
BH20	09/23/16	4959.06	19.43	8.72	ND	ND	4950.34
BH20	11/03/16	4959.06	19.34	9.05	ND	ND	4950.01
BH20	01/24/17	4959.06	19.14	9.29	ND	ND	4949.77
BH21	09/23/16	4960.89	21.22	14.49	ND	ND	4946.40
BH21	11/03/16	4960.89	21.22	12.18	ND	ND	4948.71
BH21	01/24/17	4960.89	21.20	12.27	ND	ND	4948.62

**TABLE 3**  
**GROUNDWATER ELEVATION DATA**  
**NOBLE ENERGY, INC. - FEATHER 31-15 PRODUCED WATER TANK RELEASE**

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)
BH22	09/23/16	4961.11	20.94	11.49	ND	ND	4949.62
BH22	11/03/16	4961.11	20.90	11.79	ND	ND	4949.32
BH22	01/24/17	4961.11	20.70	11.94	ND	ND	4949.17
BH23	09/23/16	4960.67	22.71	11.91	ND	ND	4948.76
BH23	11/03/16	4960.67	22.68	12.21	ND	ND	4948.46
BH23	01/24/17	4960.67	22.50	12.29	ND	ND	4948.38
BH24	09/23/16	4960.30	21.75	11.63	ND	ND	4948.67
BH24	11/03/16	4960.30	22.38	11.87	ND	ND	4948.43
BH24	01/24/17	4960.30	22.70	11.95	ND	ND	4948.35
BH25	09/23/16	4960.28	22.91	11.98	ND	ND	4948.30
BH25	11/03/16	4960.28	22.91	12.23	ND	ND	4948.05
BH25	01/24/17	4960.28	22.88	12.36	ND	ND	4947.92
BH26	09/23/16	4959.46	22.85	12.76	ND	ND	4946.70
BH26	11/03/16	4959.46	22.60	12.96	ND	ND	4946.50
BH26	01/24/17	4959.46	22.51	12.89	ND	ND	4946.57
BH27	09/23/16	4958.65	22.47	13.43	ND	ND	4945.22
BH27	11/03/16	4958.65	22.38	13.59	ND	ND	4945.06
BH27	01/24/17	4958.65	22.32	13.53	ND	ND	4945.12
BH28	09/23/16	4957.57	22.68	14.01	ND	ND	4943.56
BH28	11/03/16	4957.57	22.56	14.05	ND	ND	4943.52
BH28	01/24/17	4957.57	22.38	13.91	ND	ND	4943.66
BH29	09/23/16	4958.73	21.53	13.07	ND	ND	4945.66
BH29	11/03/16	4958.73	21.86	13.30	ND	ND	4945.43
BH29	01/24/17	4958.73	21.93	13.26	ND	ND	4945.47
BH30	11/03/16	4957.11	22.22	13.75	ND	ND	4943.36
BH30	01/24/17	4957.11	22.16	13.62	ND	ND	4943.49
BH31	11/03/16	4958.22	20.43	13.14	ND	ND	4945.08
BH31	01/24/17	4958.22	20.35	13.09	ND	ND	4945.13
BH32	11/03/16	4959.15	22.97	13.61	ND	ND	4945.54
BH32	01/24/17	4959.15	22.98	13.61	ND	ND	4945.54
BH33	11/03/16	4956.82	22.78	14.91	ND	ND	4941.91
BH33	01/24/17	4956.82	22.71	14.66	ND	ND	4942.16
BH34	11/03/16	4957.08	21.84	19.37	ND	ND	4937.71
BH34	01/24/17	4957.08	21.82	13.08	ND	ND	4944.00
BH35	11/03/16	4957.41	22.52	17.90	ND	ND	4939.51
BH35	01/24/17	4957.41	22.49	15.03	ND	ND	4942.38
BH36	11/03/16	4955.19	22.02	14.64	ND	ND	4940.55
BH36	01/24/17	4955.19	21.96	14.34	ND	ND	4940.85
BH37	11/03/16	4954.95	22.13	15.97	ND	ND	4938.98
BH37	01/24/17	4954.95	22.14	15.56	ND	ND	4939.39
BH38	11/03/16	4955.15	22.05	15.13	ND	ND	4940.02
BH38	01/24/17	4955.15	22.02	14.80	ND	ND	4940.35

**TABLE 3**  
**GROUNDWATER ELEVATION DATA**  
**NOBLE ENERGY, INC. - FEATHER 31-15 PRODUCED WATER TANK RELEASE**

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)
BH39	11/03/16	4955.83	22.46	14.25	ND	ND	4941.58
BH39	01/24/17	4955.83	22.42	13.98	ND	ND	4941.85
BH40	11/03/16	4960.60	21.72	11.08	ND	ND	4949.52
BH40	01/24/17	4960.60	21.43	11.24	ND	ND	4949.36
BH41	11/03/16	4959.08	21.13	11.14	ND	ND	4947.94
BH41	01/24/17	4959.08	20.94	11.27	ND	ND	4947.81
BH42	11/03/16	4959.24	22.18	12.44	ND	ND	4946.80
BH42	01/24/17	4959.24	22.07	12.25	ND	ND	4946.99
BH43	11/03/16	4959.74	21.72	11.53	ND	ND	4948.21
BH43	01/24/17	4959.74	21.26	11.64	ND	ND	4948.10
BH44	11/03/16	4955.00	21.68	17.75	ND	ND	4937.25
BH44	01/24/17	4955.00	21.64	17.29	ND	ND	4937.71
BH45	11/03/16	4954.87	22.21	21.08	ND	ND	4933.79
BH45	01/24/17	4954.87	22.19	17.14	ND	ND	4937.73
BH46	01/24/17	4955.31	22.25	15.64	ND	ND	4939.67
BH47	01/24/17	4954.60	22.25	18.91	ND	ND	4935.69
BH48	01/24/17	4954.71	22.30	18.58	ND	ND	4936.13
BH49	01/24/17	4954.51	22.22	18.39	ND	ND	4936.12
BH50	01/24/17	4955.18	22.26	16.87	ND	ND	4938.31
BH51	01/24/17	4955.85	22.10	19.59	ND	ND	4936.26
BH52	01/24/17	4955.46	22.31	19.45	ND	ND	4936.01

ft. = Feet

AMSL = Above mean sea level

BTOC = Below top of casing

LNAPL = Light non-aqueous phase liquid

ND = No LNAPL detected

NM = Not measured

NS = Not surveyed

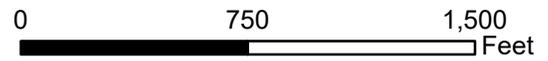
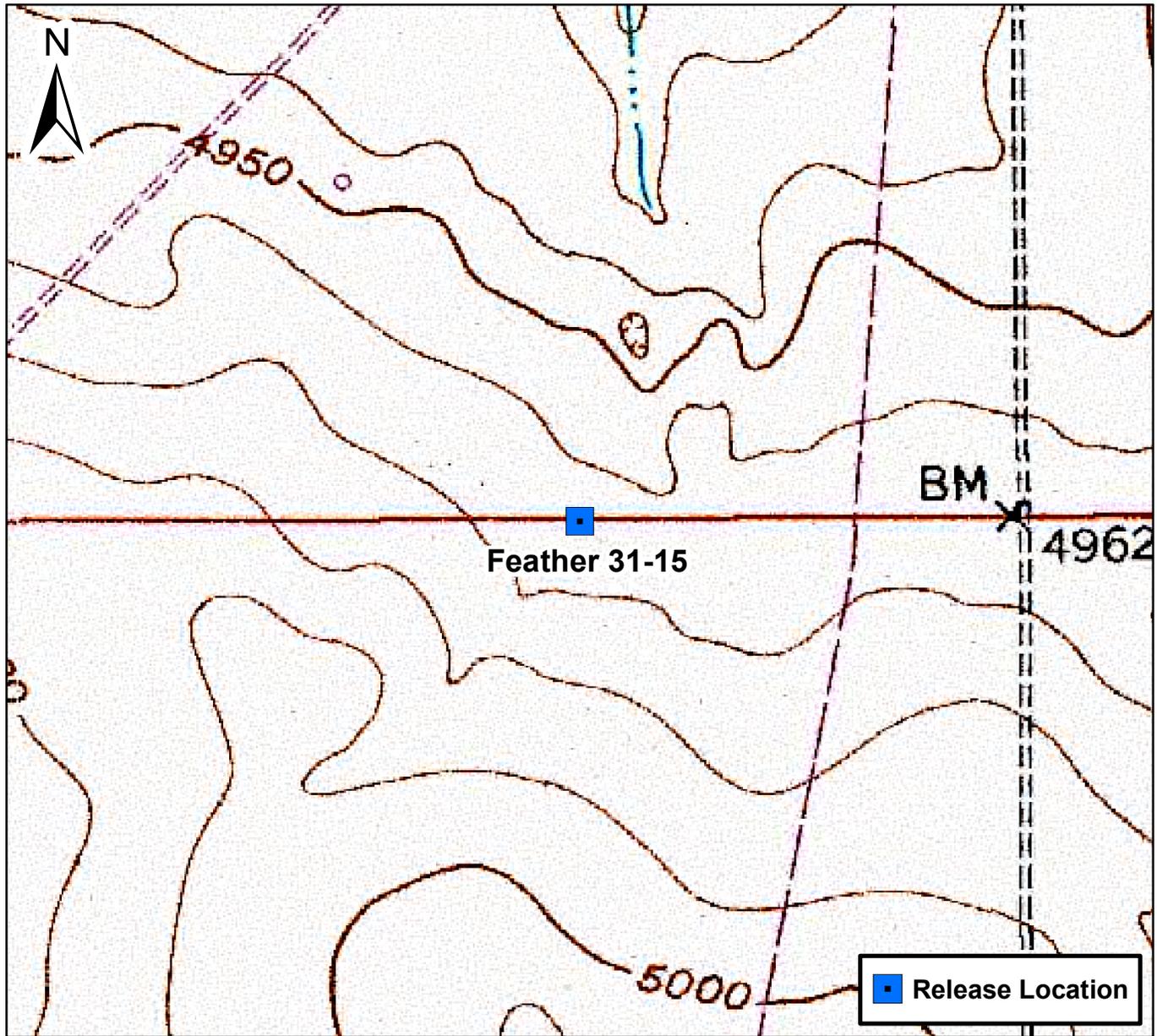
Monitoring wells MW-01 through MW-06 were destroyed during site excavations

\* 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 assumed to be approximately 0.75

# FIGURES



## Figure 1

Site Location Map  
 Feather 31-15  
 NWNE S15 T2N R64W  
 Weld County, Colorado





DATE:  
January 2017

DESIGNED BY:  
B. Bruns

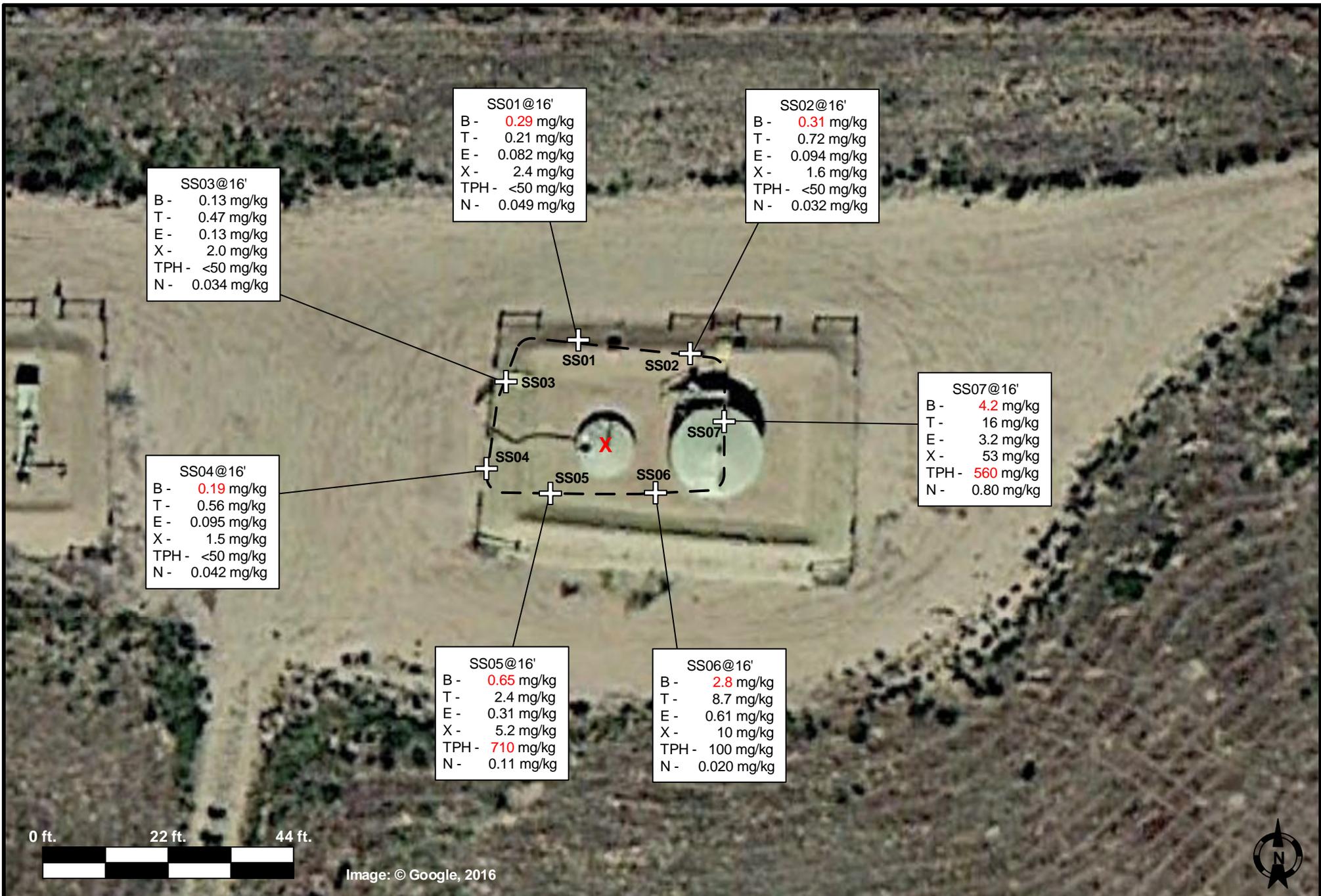
DRAWN BY:  
D. Arnold



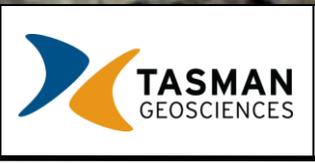
**Noble Energy - DJ Basin**  
**Feather 31-15**  
NWNE Section 15, Township 2 North, Range 64 West  
Weld County, Colorado

Monitoring Well & Soil Boring  
Overview Figure

Figure  
2



PROJECT NO:  
 DRAWN BY: ESS  
 DATE: 06/21/16



**Facility**  
 Feather 31-15,  
 Weld County, CO

**LEGEND:**

--- Approximate Excavation Extent

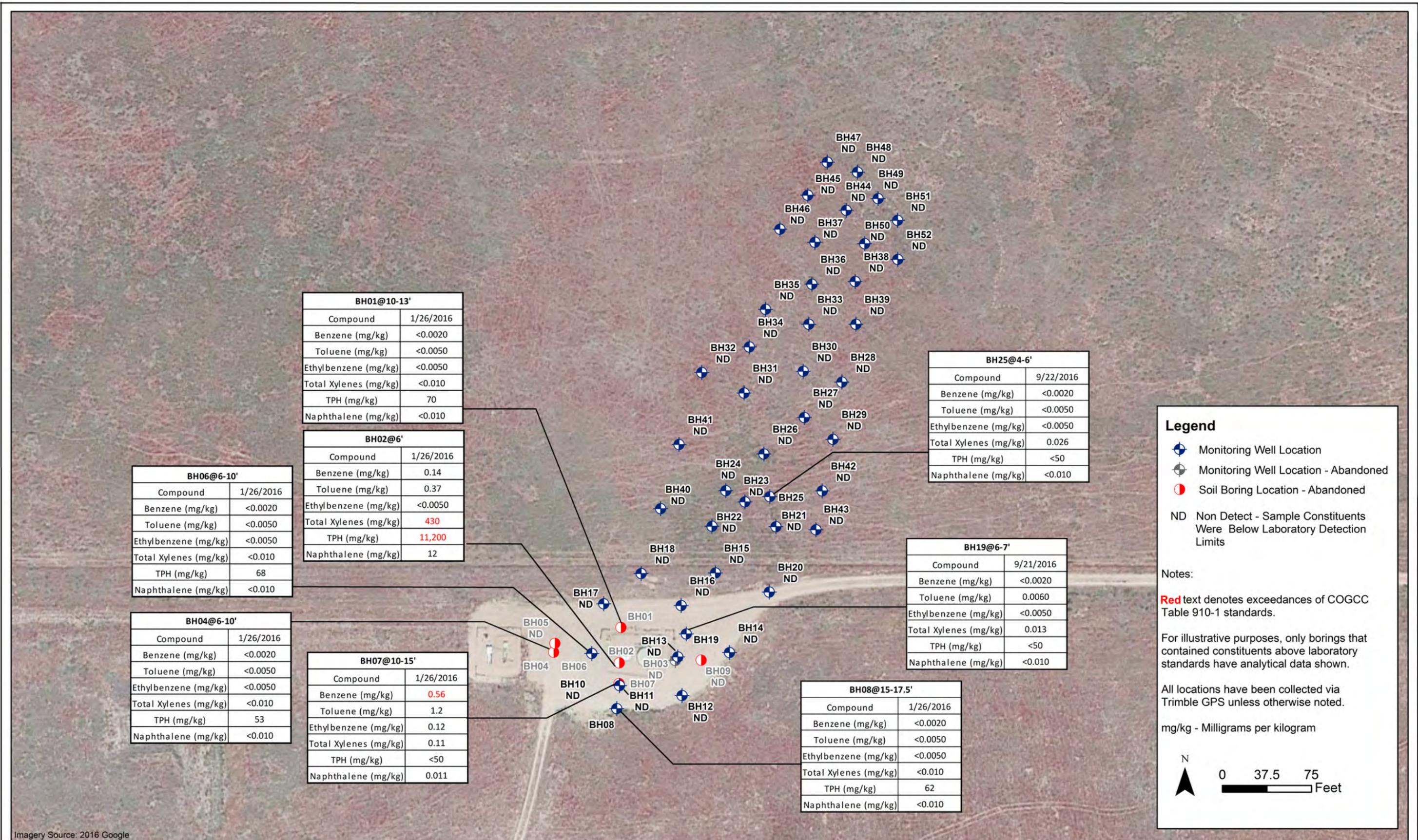
⊕ Excavation Soil Sample Location

X Approximate Area of Release

mg/kg Milligrams per Kilogram

B - Benzene  
 T - Toluene  
 E - Ethylbenzene  
 X - Total Xylenes  
 TPH - Total Petroleum Hydrocarbons  
 N - Naphthalene

Figure 3  
 Excavation Soil  
 Analytical Results Figure  
 (3/3/16)



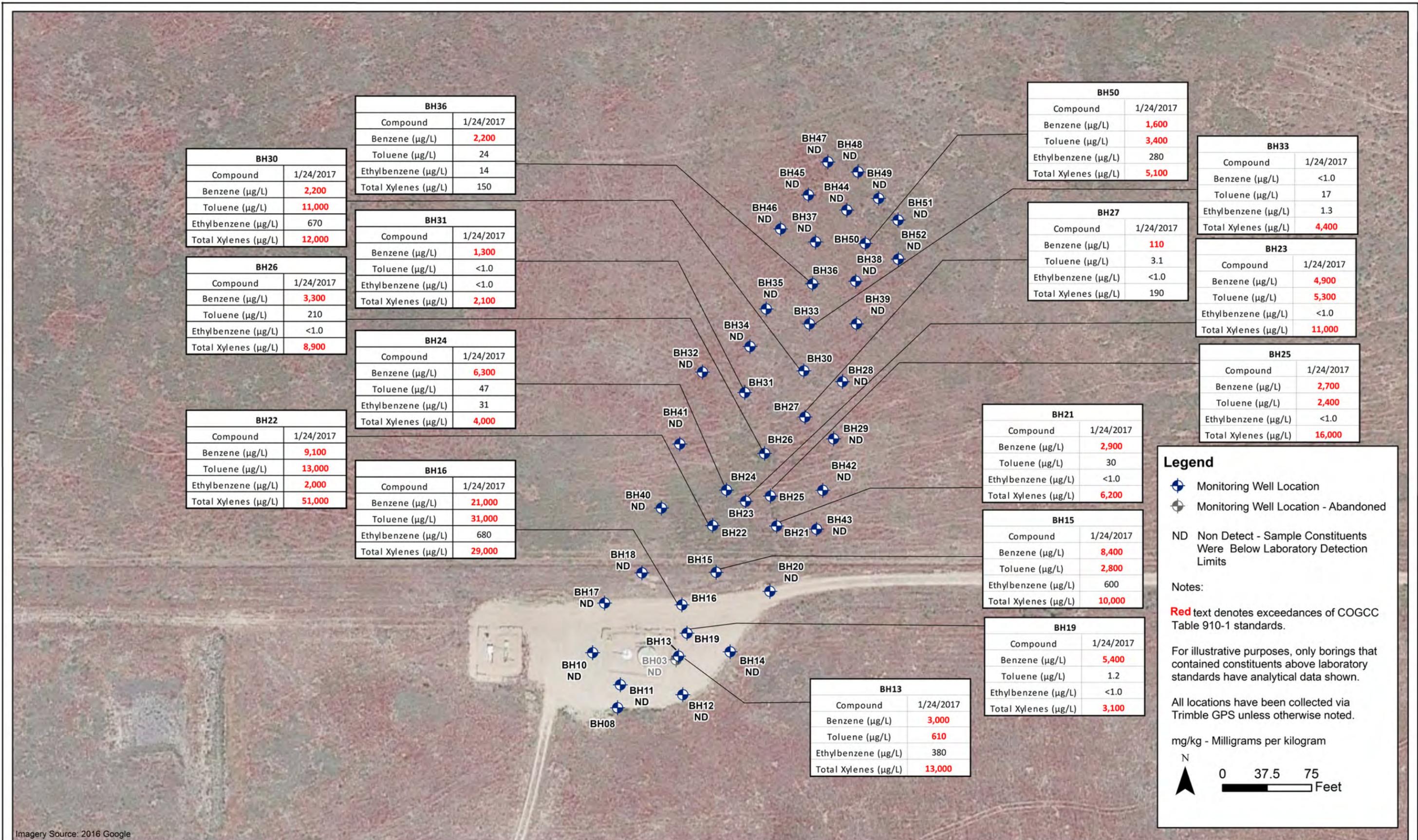
DATE: February 2017  
 DESIGNED BY: B. Bruns  
 DRAWN BY: D. Arnold



**Noble Energy - DJ Basin**  
**Feather 31-15**  
 NWNE Section 15, Township 2 North, Range 64 West  
 Weld County, Colorado

Soil Analytical Results  
 Figure

Figure  
 3



BH30	
Compound	1/24/2017
Benzene (µg/L)	2,200
Toluene (µg/L)	11,000
Ethylbenzene (µg/L)	670
Total Xylenes (µg/L)	12,000

BH36	
Compound	1/24/2017
Benzene (µg/L)	2,200
Toluene (µg/L)	24
Ethylbenzene (µg/L)	14
Total Xylenes (µg/L)	150

BH50	
Compound	1/24/2017
Benzene (µg/L)	1,600
Toluene (µg/L)	3,400
Ethylbenzene (µg/L)	280
Total Xylenes (µg/L)	5,100

BH33	
Compound	1/24/2017
Benzene (µg/L)	<1.0
Toluene (µg/L)	17
Ethylbenzene (µg/L)	1.3
Total Xylenes (µg/L)	4,400

BH26	
Compound	1/24/2017
Benzene (µg/L)	3,300
Toluene (µg/L)	210
Ethylbenzene (µg/L)	<1.0
Total Xylenes (µg/L)	8,900

BH31	
Compound	1/24/2017
Benzene (µg/L)	1,300
Toluene (µg/L)	<1.0
Ethylbenzene (µg/L)	<1.0
Total Xylenes (µg/L)	2,100

BH27	
Compound	1/24/2017
Benzene (µg/L)	110
Toluene (µg/L)	3.1
Ethylbenzene (µg/L)	<1.0
Total Xylenes (µg/L)	190

BH23	
Compound	1/24/2017
Benzene (µg/L)	4,900
Toluene (µg/L)	5,300
Ethylbenzene (µg/L)	<1.0
Total Xylenes (µg/L)	11,000

BH22	
Compound	1/24/2017
Benzene (µg/L)	9,100
Toluene (µg/L)	13,000
Ethylbenzene (µg/L)	2,000
Total Xylenes (µg/L)	51,000

BH24	
Compound	1/24/2017
Benzene (µg/L)	6,300
Toluene (µg/L)	47
Ethylbenzene (µg/L)	31
Total Xylenes (µg/L)	4,000

BH21	
Compound	1/24/2017
Benzene (µg/L)	2,900
Toluene (µg/L)	30
Ethylbenzene (µg/L)	<1.0
Total Xylenes (µg/L)	6,200

BH25	
Compound	1/24/2017
Benzene (µg/L)	2,700
Toluene (µg/L)	2,400
Ethylbenzene (µg/L)	<1.0
Total Xylenes (µg/L)	16,000

BH16	
Compound	1/24/2017
Benzene (µg/L)	21,000
Toluene (µg/L)	31,000
Ethylbenzene (µg/L)	680
Total Xylenes (µg/L)	29,000

BH15	
Compound	1/24/2017
Benzene (µg/L)	8,400
Toluene (µg/L)	2,800
Ethylbenzene (µg/L)	600
Total Xylenes (µg/L)	10,000

**Legend**

- Monitoring Well Location
- Monitoring Well Location - Abandoned
- ND Non Detect - Sample Constituents Were Below Laboratory Detection Limits

Notes:

Red text denotes exceedances of COGCC Table 910-1 standards.

For illustrative purposes, only borings that contained constituents above laboratory standards have analytical data shown.

All locations have been collected via Trimble GPS unless otherwise noted.

mg/kg - Milligrams per kilogram

N

0 37.5 75 Feet

BH13	
Compound	1/24/2017
Benzene (µg/L)	3,000
Toluene (µg/L)	610
Ethylbenzene (µg/L)	380
Total Xylenes (µg/L)	13,000

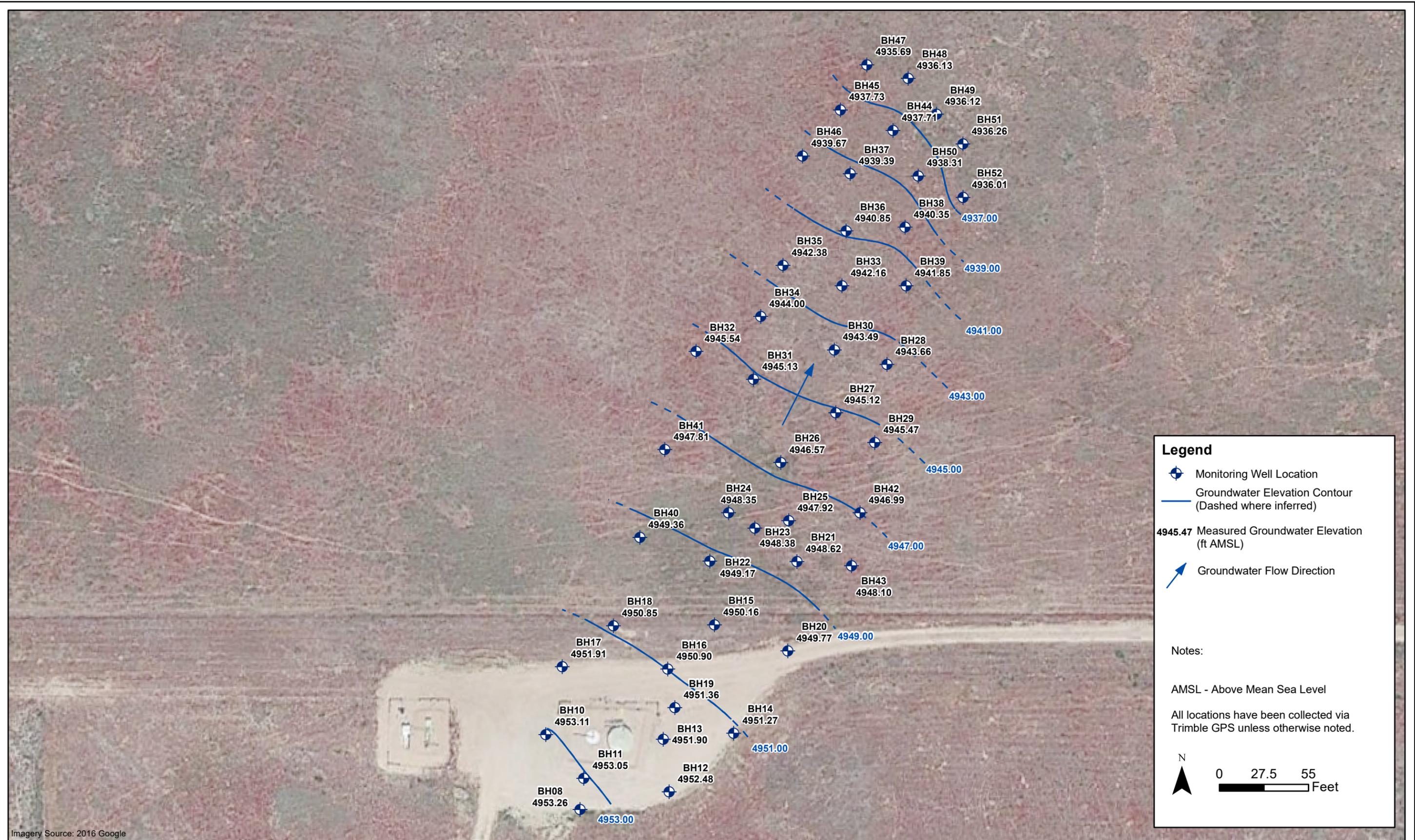
DATE: February 2017  
 DESIGNED BY: B. Bruns  
 DRAWN BY: D. Arnold



**Noble Energy - DJ Basin**  
**Feather 31-15**  
 NWNE Section 15, Township 2 North, Range 64 West  
 Weld County, Colorado

Groundwater Analytical Results  
 Figure  
 (01/24/17)

Figure  
 4



Imagery Source: 2016 Google

DATE:  
February 2017

DESIGNED BY:  
B. Bruns

DRAWN BY:  
D. Arnold



**Noble Energy - DJ Basin**  
**Feather 31-15**  
NWNE Section 15, Township 2 North, Range 64 West  
Weld County, Colorado

Groundwater Elevation  
Contour Figure  
(01/24/17)

Figure  
5

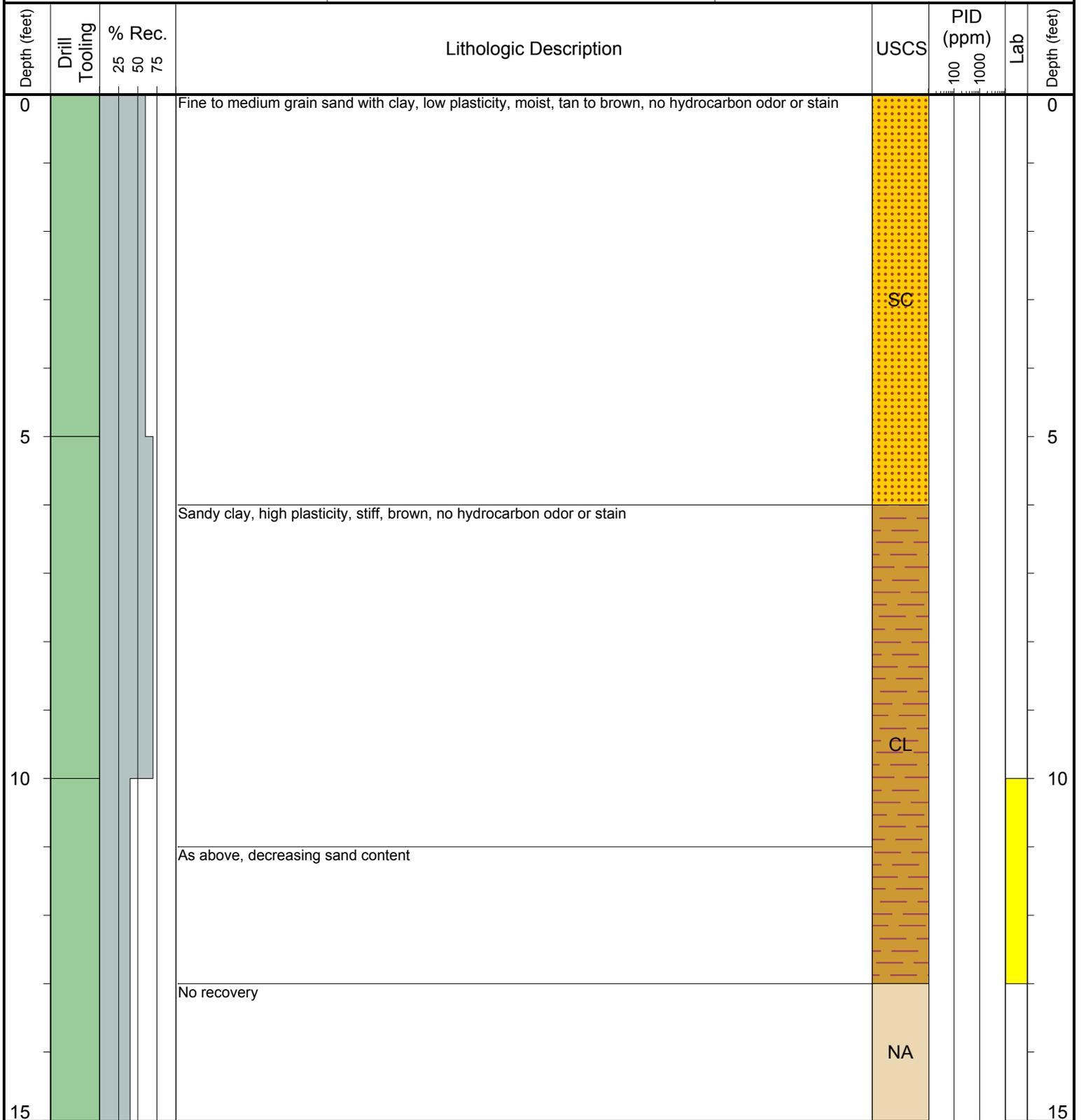
# **ATTACHMENT A**

## **BORING LOGS**



6899 Pecos Street, Unit C  
Denver, Colorado 80221

CLIENT: Noble Energy	<b>Feather 31-15</b>
LOGGED BY: Brad Marquart	
PROJECT MANAGER: Brandon Bruns	<b>BORING / WELL ID: BH01</b>
DRILLING CONTRACTOR: Site Services	
DRILLING EQUIPMENT: Geoprobe	LOCATION: Weld County, Colorado
DRILL BIT SIZE (INCHES): 2.375	LATITUDE (DECIMAL DEGREES): 40.145568
DATE STARTED - COMPLETED: 01/26/16 - 01/26/16	LONGITUDE (DECIMAL DEGREES): -104.53433
TOTAL WELL DEPTH (FT. BGS): 15	CASING ELEVATION (FT. AMSL): Not Installed
DEPTH TO WATER (FT. BGS): Not Detected ▼	GROUND ELEVATION (FT. AMSL): Not Measured



**Drilling / Sample Method:**

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- HydroPunch Groundwater Sampler

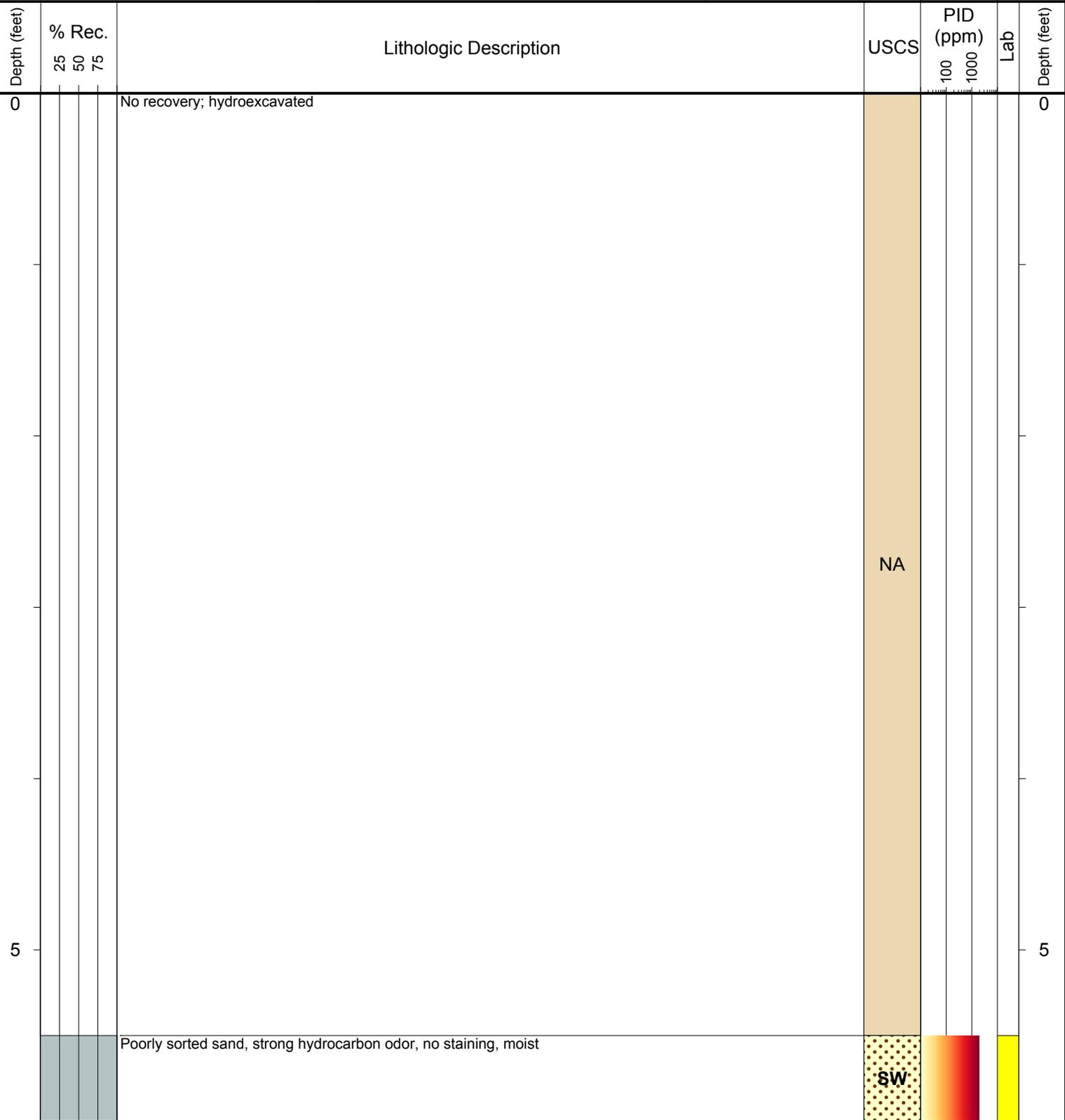
**Laboratory Sample Types:**

- Geotechnical Lab
- Analytical Chemistry Lab
- Geotechnical & Analytical Chemistry Lab



6899 Pecos Street, Unit C  
Denver, Colorado 80221

CLIENT: Noble Energy	<b>Feather 31-15</b>
LOGGED BY: Brad Marquart	
PROJECT MANAGER: Brandon Bruns	<b>BORING / WELL ID: BH02</b>
DRILLING CONTRACTOR: NA	
DRILLING EQUIPMENT: Hydroexcavated	LOCATION: Weld County, Colorado
DRILL BIT SIZE (INCHES): NA	LATITUDE (DECIMAL DEGREES): 40.145489
DATE STARTED - COMPLETED: 01/26/16 - 01/26/16	LONGITUDE (DECIMAL DEGREES): -104.53434
TOTAL WELL DEPTH (FT. BGS): 6	CASING ELEVATION (FT. AMSL): Not Installed
DEPTH TO WATER (FT. BGS): Not Detected ▼	GROUND ELEVATION (FT. AMSL): Not Measured



**Drilling / Sample Method:**

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- HydroPunch Groundwater Sampler

**Laboratory Sample Types:**

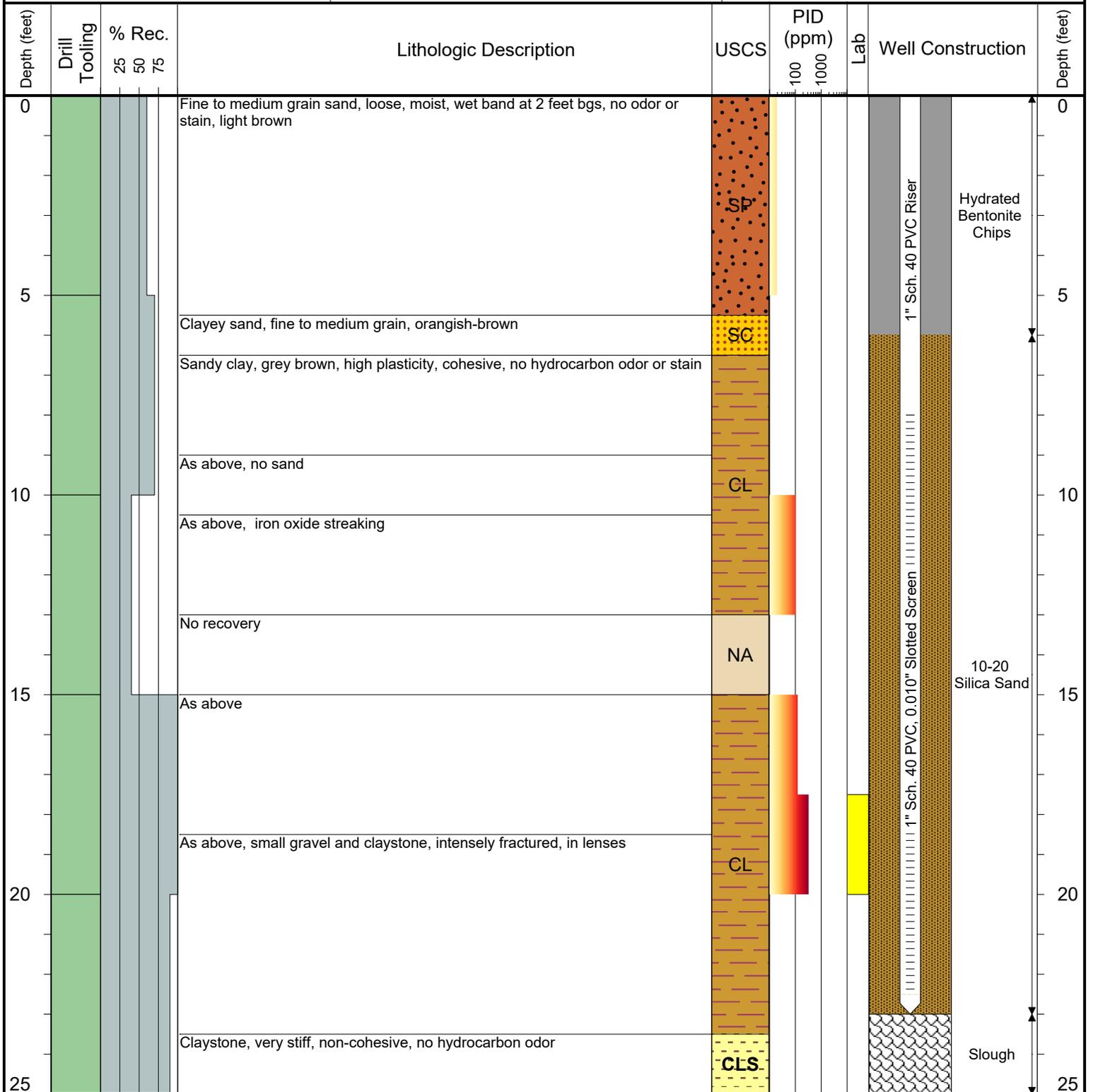
- Geotechnical Lab
- Analytical Chemistry Lab
- Geotechnical & Analytical Chemistry Lab



6899 Pecos Street, Unit C  
Denver, Colorado 80221

CLIENT: Noble Energy, Inc.  
 LOGGED BY: Brad Marquart  
 PROJECT MANAGER: Brandon Bruns, P.E.  
 DRILLING CONTRACTOR: Site Services  
 DRILLING EQUIPMENT: Geoprobe  
 DRILL BIT SIZE (INCHES): 2.375  
 DATE STARTED - COMPLETED: 1/26/2016  
 TOTAL WELL DEPTH (FT. BGS): 25  
 DEPTH TO WATER (FT. BGS): Not Measured

**Feather 31-15**  
**BORING / WELL ID: BH03**  
 LOCATION: Weld County, Colorado  
 LATITUDE (DECIMAL DEGREES): 40.145496  
 LONGITUDE (DECIMAL DEGREES): -104.534168  
 CASING ELEVATION (FT. AMSL): Not Measured  
 GROUND ELEVATION (FT. AMSL): Not Measured



**Drilling / Sample Method:**

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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

LOGGED BY: Brad Marquart

PROJECT MANAGER: Brandon Bruns

DRILLING CONTRACTOR: Site Services

DRILLING EQUIPMENT: Geoprobe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 01/26/16 - 01/26/16

TOTAL WELL DEPTH (FT. BGS): 15

DEPTH TO WATER (FT. BGS): Not Detected

Feather 31-15

BORING / WELL ID: BH04

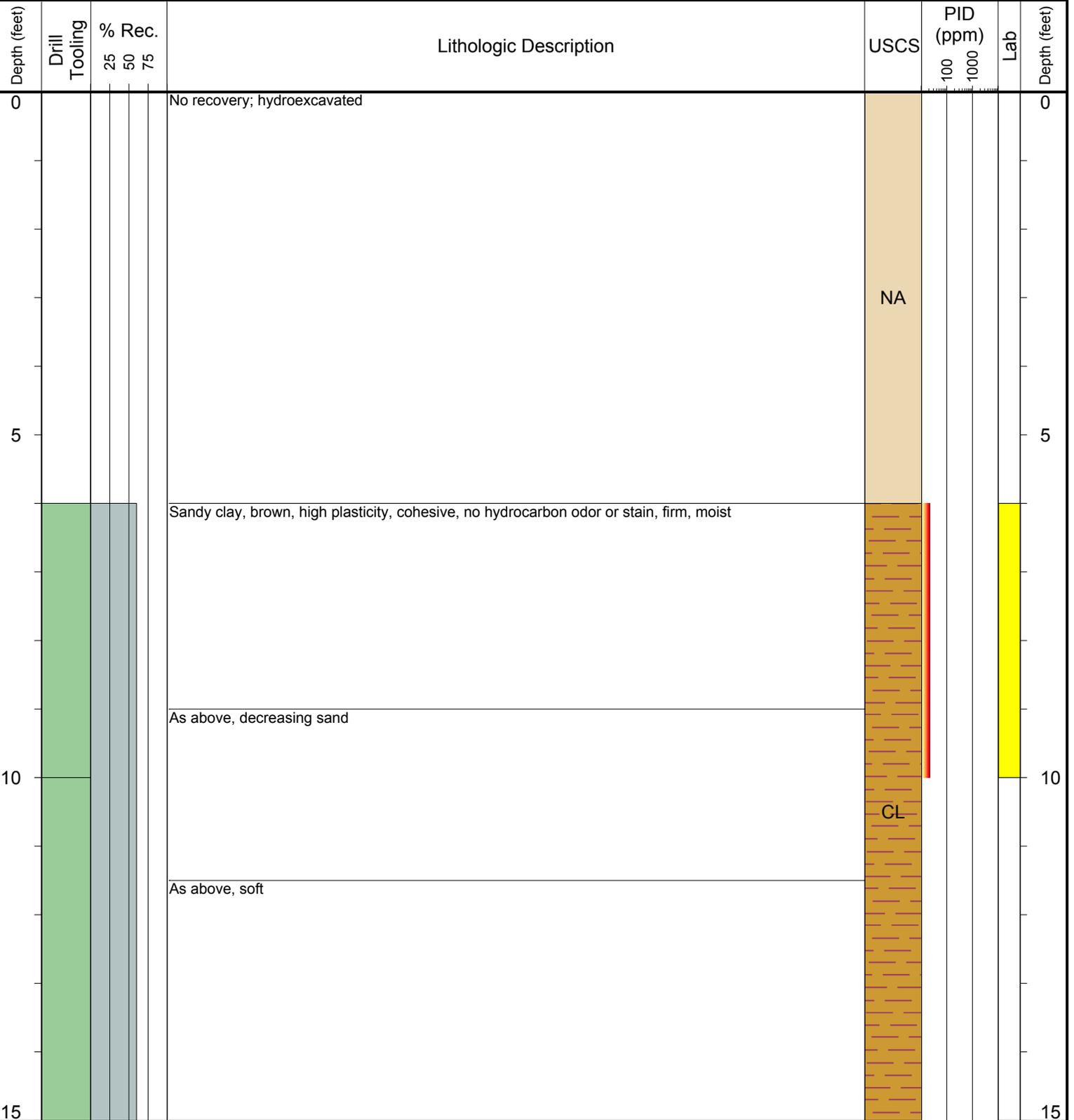
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.145514

LONGITUDE (DECIMAL DEGREES): -104.534538

CASING ELEVATION (FT. AMSL): Not Installed

GROUND ELEVATION (FT. AMSL): Not Measured



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- HydroPunch Groundwater Sampler

Laboratory Sample Types:

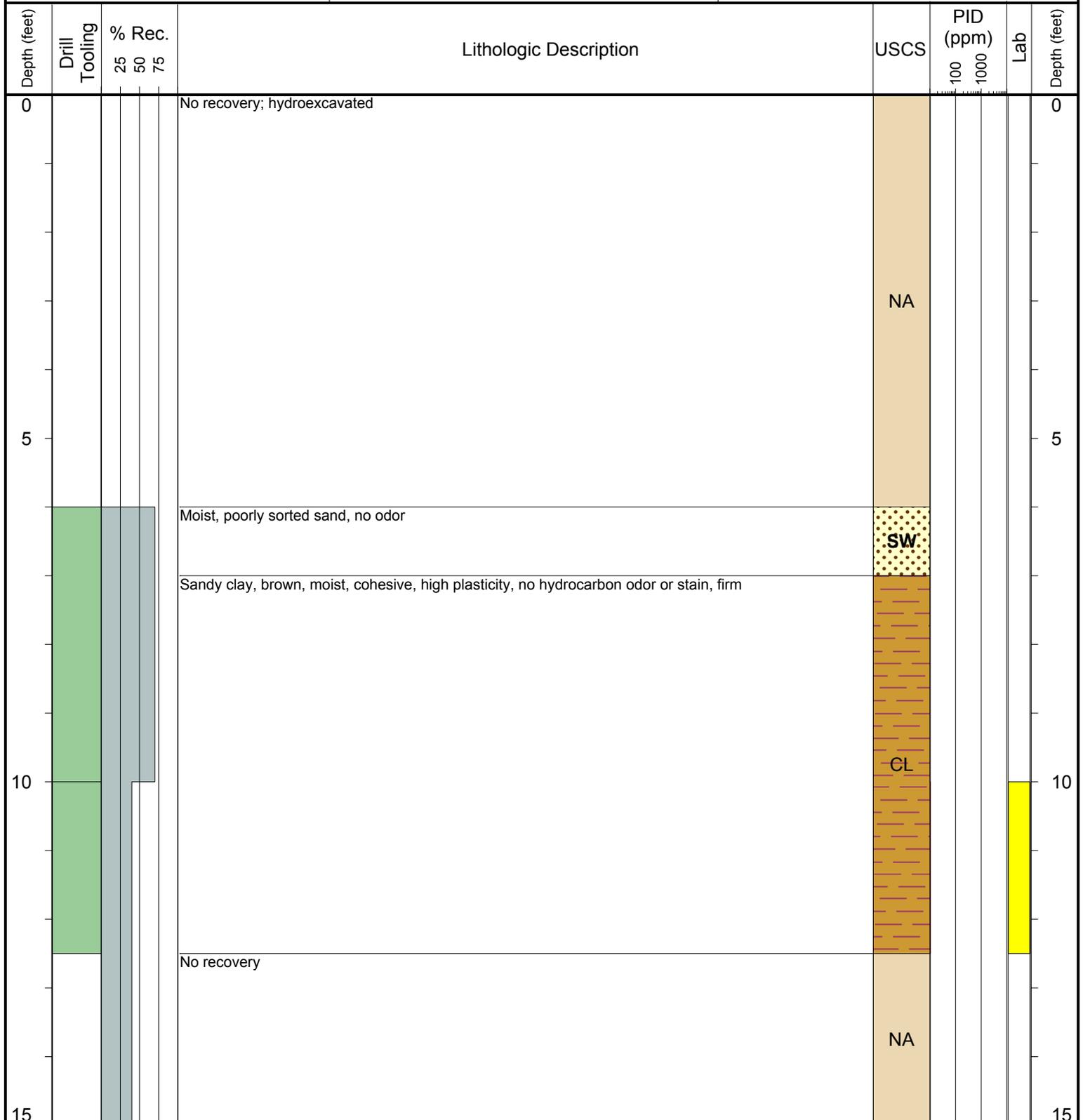
- Geotechnical Lab
- Analytical Chemistry Lab
- Geotechnical & Analytical Chemistry Lab



6899 Pecos Street, Unit C  
Denver, Colorado 80221

CLIENT: Noble Energy  
 LOGGED BY: Brad Marquart  
 PROJECT MANAGER: Brandon Bruns  
 DRILLING CONTRACTOR: Site Services  
 DRILLING EQUIPMENT: Geoprobe  
 DRILL BIT SIZE (INCHES): 2.375  
 DATE STARTED - COMPLETED: 01/26/16 - 01/26/16  
 TOTAL WELL DEPTH (FT. BGS): 15  
 DEPTH TO WATER (FT. BGS): Not Detected

**Feather 31-15**  
**BORING / WELL ID: BH05**  
 LOCATION: Weld County, Colorado  
 LATITUDE (DECIMAL DEGREES): 40.145534  
 LONGITUDE (DECIMAL DEGREES): -104.534534  
 CASING ELEVATION (FT. AMSL): Not Installed  
 GROUND ELEVATION (FT. AMSL): Not Measured



**Drilling / Sample Method:**

- Macro-Core
- Perforated Injection Tool
- Geotechnical Lab
- Geotechnical & Analytical Chemistry Lab
- Expendable Well Tip
- HydroPunch Groundwater Sampler
- Analytical Chemistry Lab



6899 Pecos Street, Unit C  
Denver, Colorado 80221

CLIENT: Noble Energy

LOGGED BY: Brad Marquart

PROJECT MANAGER: Brandon Bruns

DRILLING CONTRACTOR: Site Services

DRILLING EQUIPMENT: Geoprobe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 01/26/16 - 01/26/16

TOTAL WELL DEPTH (FT. BGS): 15

DEPTH TO WATER (FT. BGS): Not Detected

Feather 31-15

BORING / WELL ID: BH06

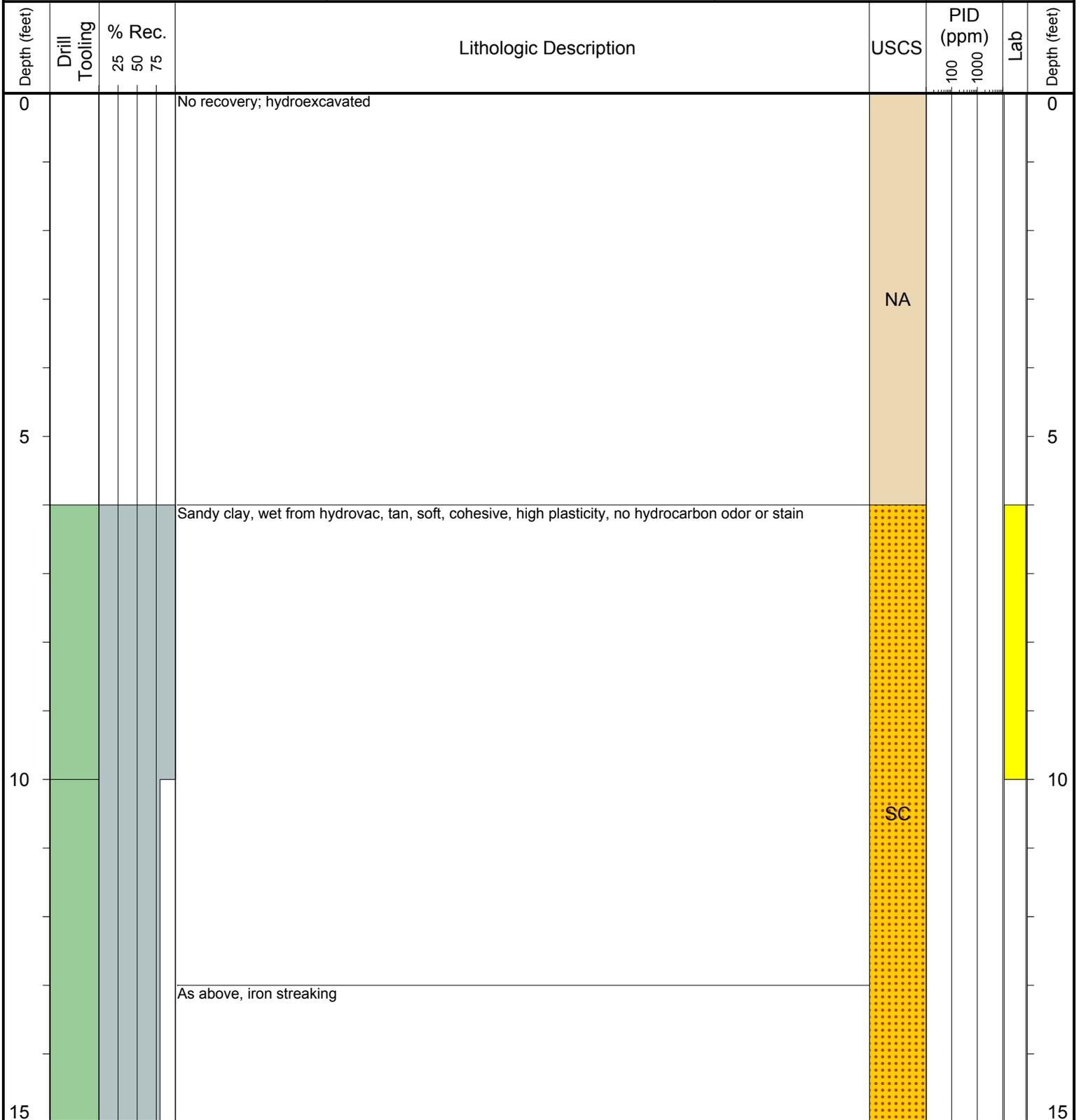
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.145512

LONGITUDE (DECIMAL DEGREES): -104.534425

CASING ELEVATION (FT. AMSL): Not Installed

GROUND ELEVATION (FT. AMSL): Not Measured



**Drilling / Sample Method:**

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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

LOGGED BY: Brad Marquart

PROJECT MANAGER: Brandon Bruns

DRILLING CONTRACTOR: Site Services

DRILLING EQUIPMENT: Geoprobe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 01/26/16 - 01/26/16

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): Not Detected

Feather 31-15

BORING / WELL ID: BH07

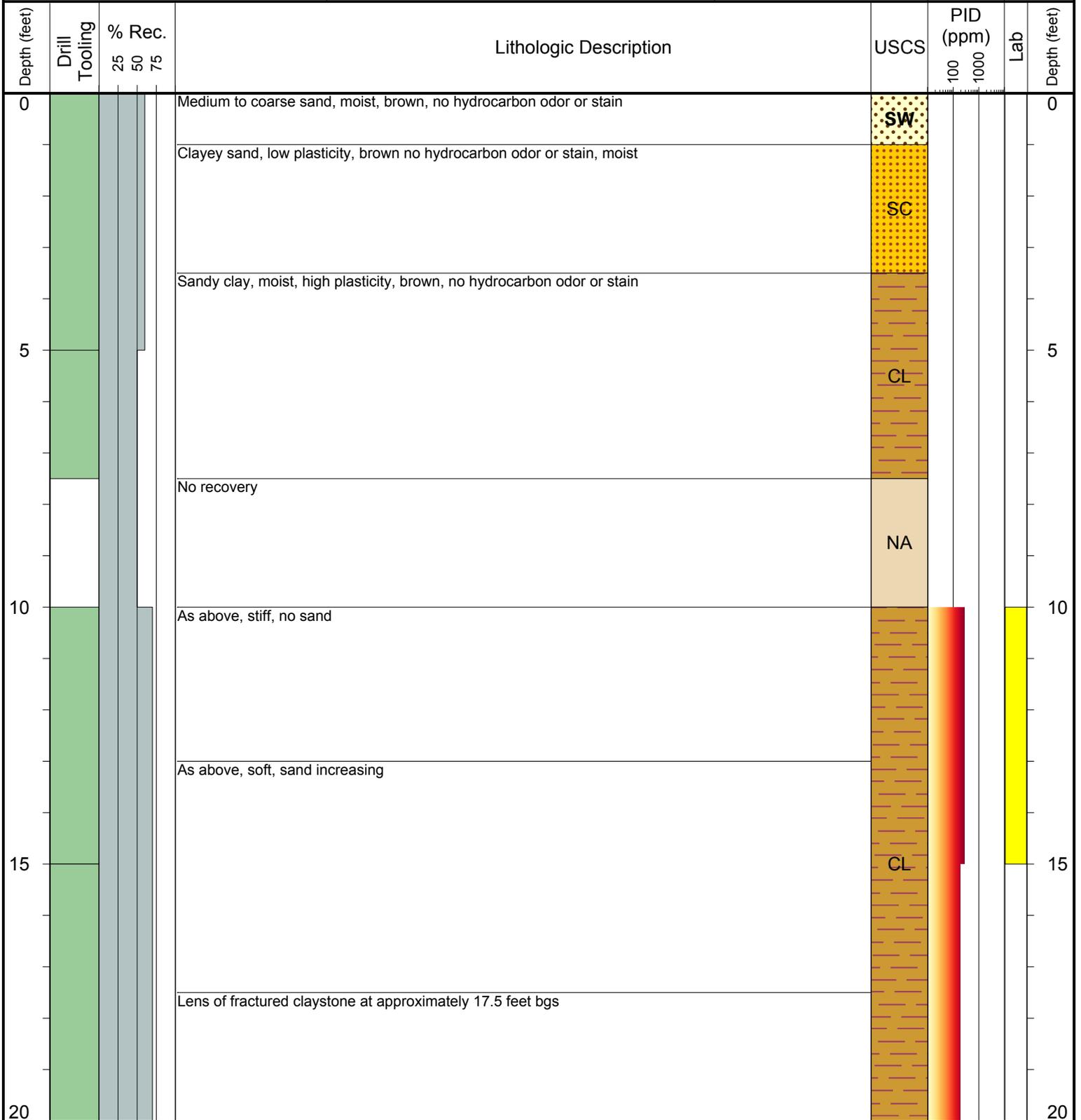
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14544

LONGITUDE (DECIMAL DEGREES): -104.534341

CASING ELEVATION (FT. AMSL): Not Installed

GROUND ELEVATION (FT. AMSL): Not Measured



Drilling / Sample Method:

- Macro-Core
- Perforated Injection Tool
- Expendable Well Tip
- HydroPunch Groundwater Sampler

Laboratory Sample Types:

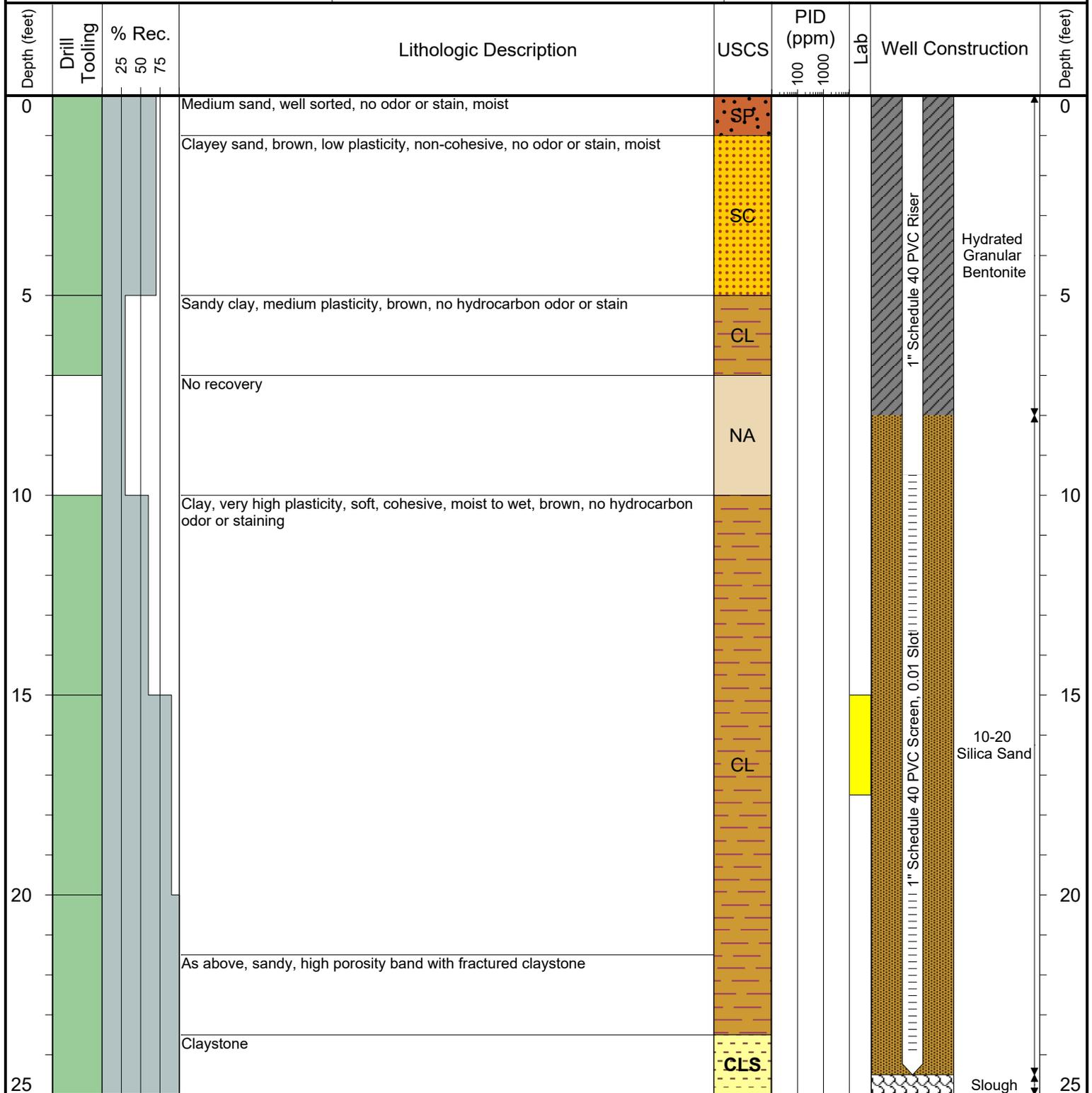
- Geotechnical Lab
- Analytical Chemistry Lab
- Geotechnical & Analytical Chemistry Lab



6899 Pecos Street, Unit C  
Denver, Colorado 80221

CLIENT: Noble Energy  
 LOGGED BY: Brad Marquart  
 PROJECT MANAGER: Brandon Bruns, P.E.  
 DRILLING CONTRACTOR: Site Services Drilling  
 DRILLING EQUIPMENT: Geoprobe  
 DRILL BIT SIZE (INCHES): 2.375  
 DATE STARTED - COMPLETED: 1/26/16  
 TOTAL WELL DEPTH (FT. BGS): 25  
 DEPTH TO WATER (FT. BGS): Not Measured

**Feather 31-15**  
**BORING / WELL ID: BH08**  
 LOCATION: Weld County, Colorado  
 LATITUDE (DECIMAL DEGREES): 40.145383  
 LONGITUDE (DECIMAL DEGREES): -104.534348  
 CASING ELEVATION (FT. AMSL): Not Surveyed  
 GROUND ELEVATION (FT. AMSL): Not Surveyed



**Drilling / Sample Method:**  
 Macro-Core (Green)  
 Expendable Well Tip (Dark Green)  
 Perforated Injection Tool (Yellow)  
 HydroPunch Groundwater Sampler (Blue)

**Laboratory Sample Types:**  
 Geotechnical Lab (Purple)  
 Analytical Chemistry Lab (Yellow)  
 Geotechnical & Analytical Chemistry Lab (Blue/Yellow)



6899 Pecos Street, Unit C  
Denver, Colorado 80221

CLIENT: Noble Energy

LOGGED BY: Brad Marquart

PROJECT MANAGER: Brandon Bruns

DRILLING CONTRACTOR: Site Services

DRILLING EQUIPMENT: Geoprobe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 01/26/16 - 01/26/16

TOTAL WELL DEPTH (FT. BGS): 25

DEPTH TO WATER (FT. BGS): Not Detected

Feather 31-15

BORING / WELL ID: BH09

LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.145493

LONGITUDE (DECIMAL DEGREES): -104.534097

CASING ELEVATION (FT. AMSL): Not Installed

GROUND ELEVATION (FT. AMSL): Not Measured

Depth (feet)	Drill Tooling	% Rec.			Lithologic Description	USCS	PID (ppm)		Lab	Depth (feet)
		25	50	75			100	1000		
0	Green	Grey	Grey	Grey	Fine to medium grain sand, poorly sorted, tan to brown, no hydrocarbon odor or stain, moist	SW			Yellow	0
As above, wet from 2.5 to 3 feet bgs, then moist again					5					
5	Green	Grey	Grey	Grey	Clayey sand, fine to medium grain, poorly sorted, low plasticity, non-cohesive	SC			Yellow	5
Sandy clay					10					
10	Green	Grey	Grey	Grey	Clay, soft, cohesive, brown, high plasticity, moist, no hydrocarbon odor or stain	CL			Yellow	10
No recovery					15					
15	Green	Grey	Grey	Grey	As above, stiff	NA			Yellow	15
					20					
20	Green	Grey	Grey	Grey	As above, lens of fractured claystone at approximately 21.5 feet bgs	CL			Yellow	20
					25					
25					Claystone, very stiff	CLS				25

Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Eric Siegel, P.G.

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 8/25/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 7

Feather 31-15

BORING / WELL ID: BH10

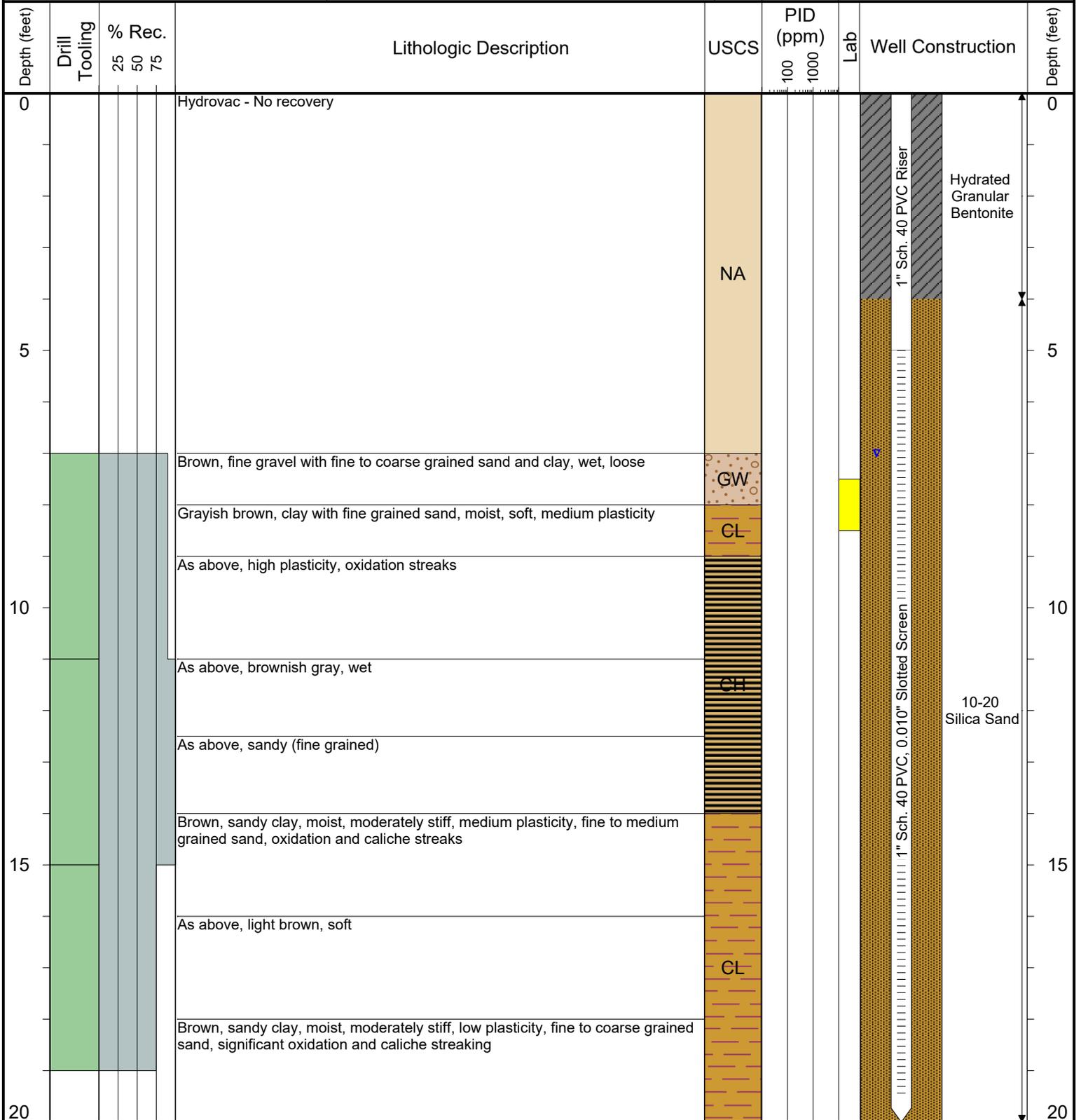
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14551031289

LONGITUDE (DECIMAL DEGREES): -104.53442269

CASING ELEVATION (FT. AMSL): 4964.48

GROUND ELEVATION (FT. AMSL): 4961.4



**Drilling / Sample Method:**

- Macro-Core
- Perforated Injection Tool
- HydroPunch Groundwater Sampler
- Expendable Well Tip

**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: Eric Siegel, P.G.

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 8/25/2016

TOTAL WELL DEPTH (FT. BGS): 19

DEPTH TO WATER (FT. BGS): 6.5

Feather 31-15

BORING / WELL ID: BH11

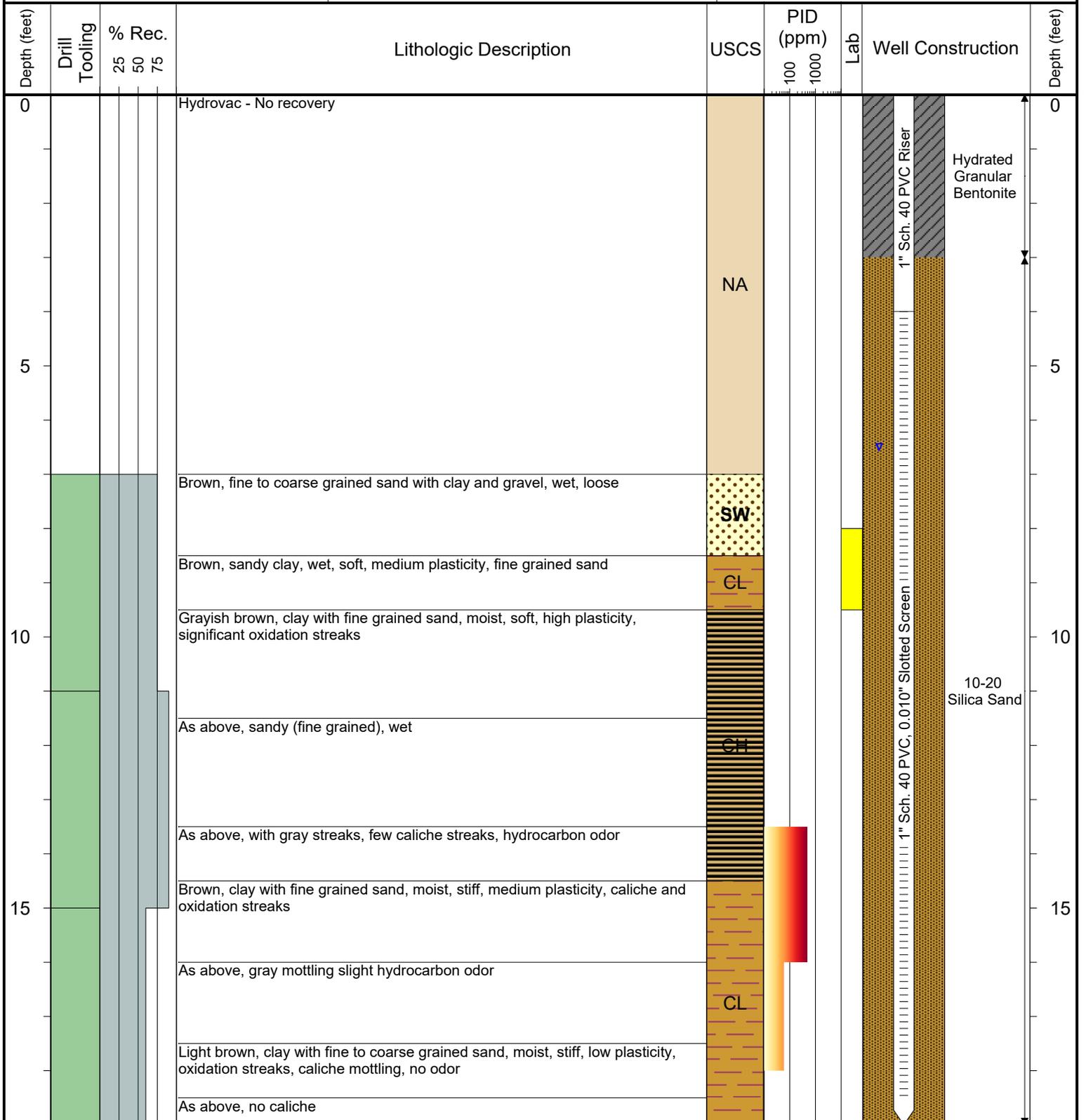
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14543572437

LONGITUDE (DECIMAL DEGREES): -104.53433963

CASING ELEVATION (FT. AMSL): 4960.77

GROUND ELEVATION (FT. AMSL): 4960.86



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Eric Siegel, P.G.

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 8/25/2016

TOTAL WELL DEPTH (FT. BGS): 19

DEPTH TO WATER (FT. BGS): 7

Feather 31-15

BORING / WELL ID: BH12

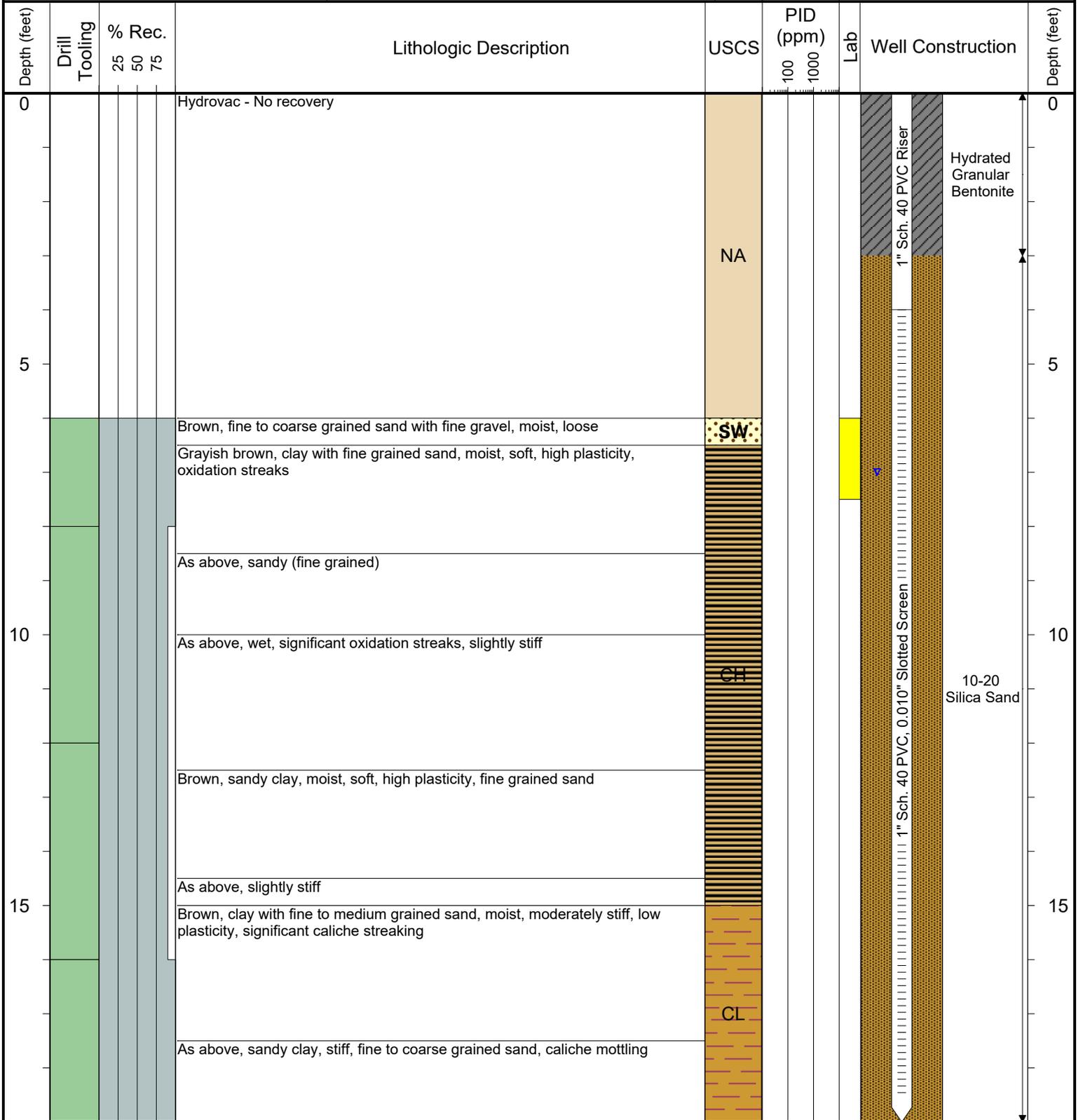
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14541216420

LONGITUDE (DECIMAL DEGREES): -104.53415146

CASING ELEVATION (FT. AMSL): 4960.63

GROUND ELEVATION (FT. AMSL): 4960.77



Drilling / Sample Method:

- Macro-Core
- Perforated Injection Tool
- Expendable Well Tip
- HydroPunch Groundwater Sampler

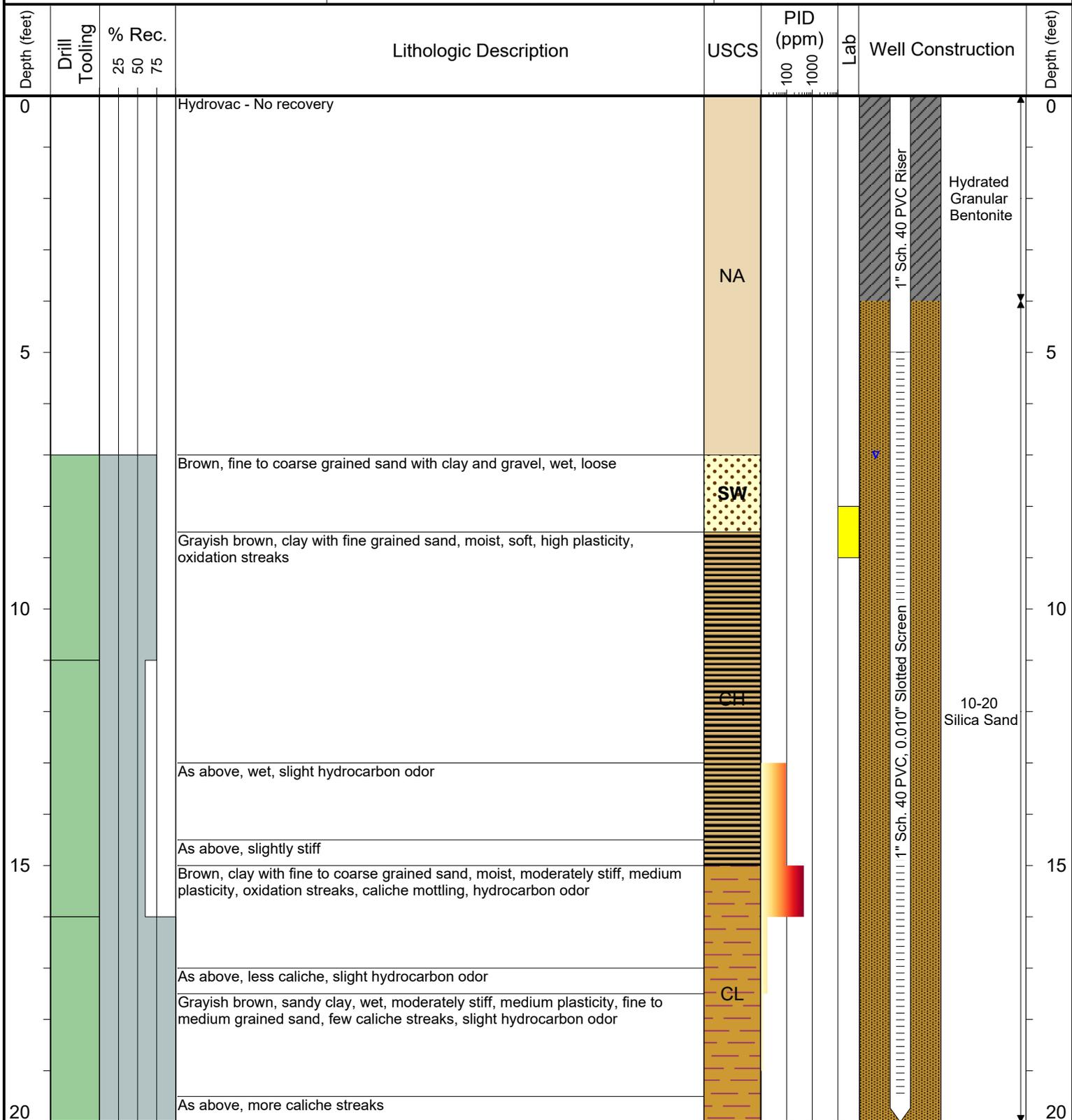
Laboratory Sample Types:

- Geotechnical Lab
- Analytical Chemistry Lab
- Geotechnical & Analytical Chemistry Lab



6899 Pecos Street, Unit C  
Denver, Colorado 80221

CLIENT: Noble Energy, Inc.	<b>Feather 31-15</b>
LOGGED BY: Eric Siegel, P.G.	
PROJECT MANAGER: Brandon Bruns, P.E.	<b>BORING / WELL ID: BH13</b>
DRILLING CONTRACTOR: Tasman Geosciences, Inc.	
DRILLING EQUIPMENT: AMS Power Probe	LOCATION: Weld County, Colorado
DRILL BIT SIZE (INCHES): 2.375	LATITUDE (DECIMAL DEGREES): Not Measured
DATE STARTED - COMPLETED: 8/25/2016	LONGITUDE (DECIMAL DEGREES): Not Measured
TOTAL WELL DEPTH (FT. BGS): 20	CASING ELEVATION (FT. AMSL): 4963.84
DEPTH TO WATER (FT. BGS): 7	GROUND ELEVATION (FT. AMSL): 4961.02



**Drilling / Sample Method:**

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- HydroPunch Groundwater Sampler

**Laboratory Sample Types:**

- Geotechnical Lab
- Analytical Chemistry Lab
- Geotechnical & Analytical Chemistry Lab



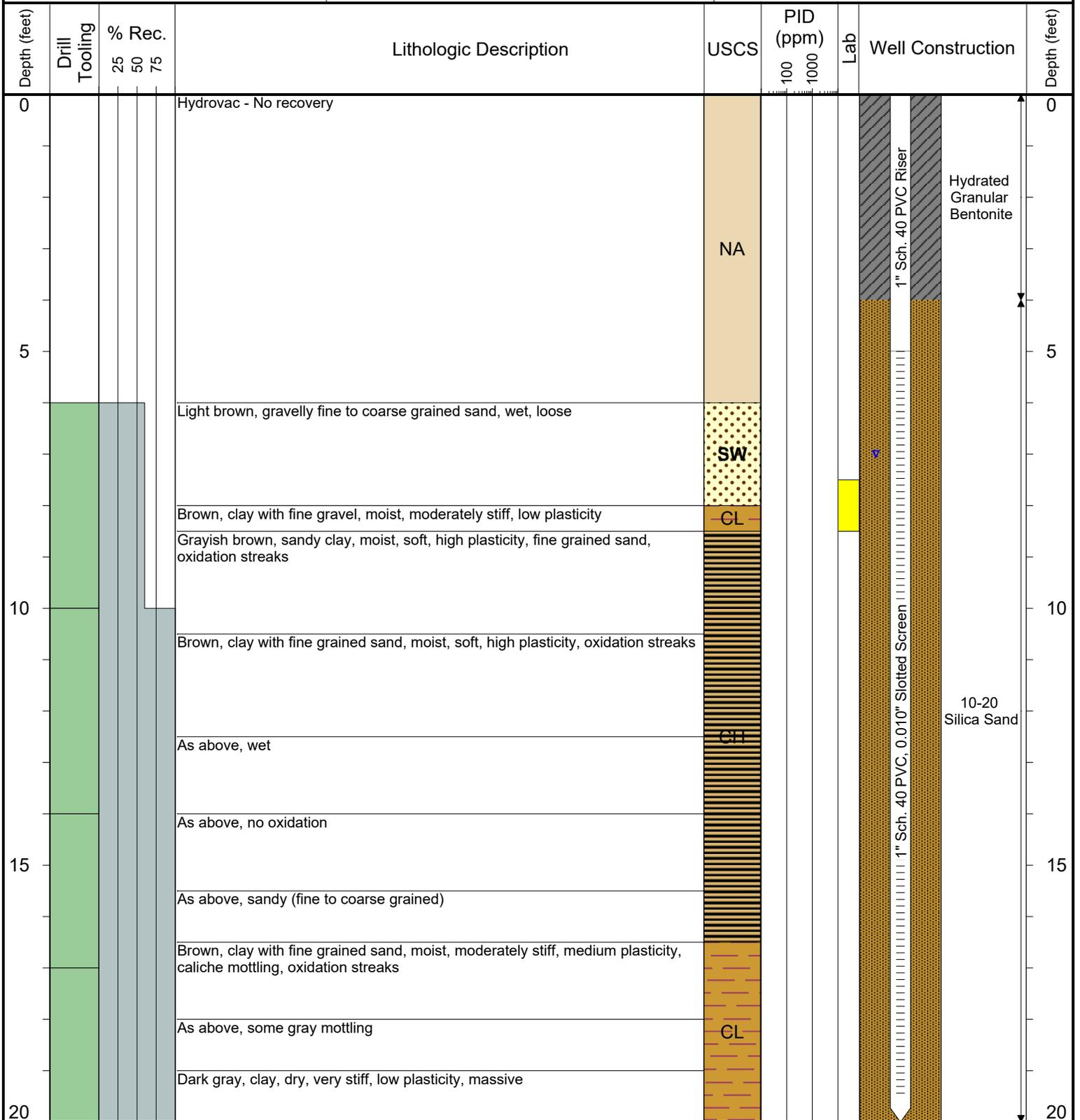
6899 Pecos Street, Unit C  
Denver, Colorado 80221

CLIENT: Noble Energy, Inc.  
 LOGGED BY: Eric Siegel, P.G.  
 PROJECT MANAGER: Brandon Bruns, P.E.  
 DRILLING CONTRACTOR: Tasman Geosciences, Inc.  
 DRILLING EQUIPMENT: AMS Power Probe  
 DRILL BIT SIZE (INCHES): 2.375  
 DATE STARTED - COMPLETED: 8/25/2016  
 TOTAL WELL DEPTH (FT. BGS): 20  
 DEPTH TO WATER (FT. BGS): 7

Feather 31-15

BORING / WELL ID: BH14

LOCATION: Weld County, Colorado  
 LATITUDE (DECIMAL DEGREES): Not Measured  
 LONGITUDE (DECIMAL DEGREES): Not Measured  
 CASING ELEVATION (FT. AMSL): 4960.84  
 GROUND ELEVATION (FT. AMSL): 4961.03



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Eric Siegel, P.G.

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 8/25/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 7.5

Feather 31-15

BORING / WELL ID: BH15

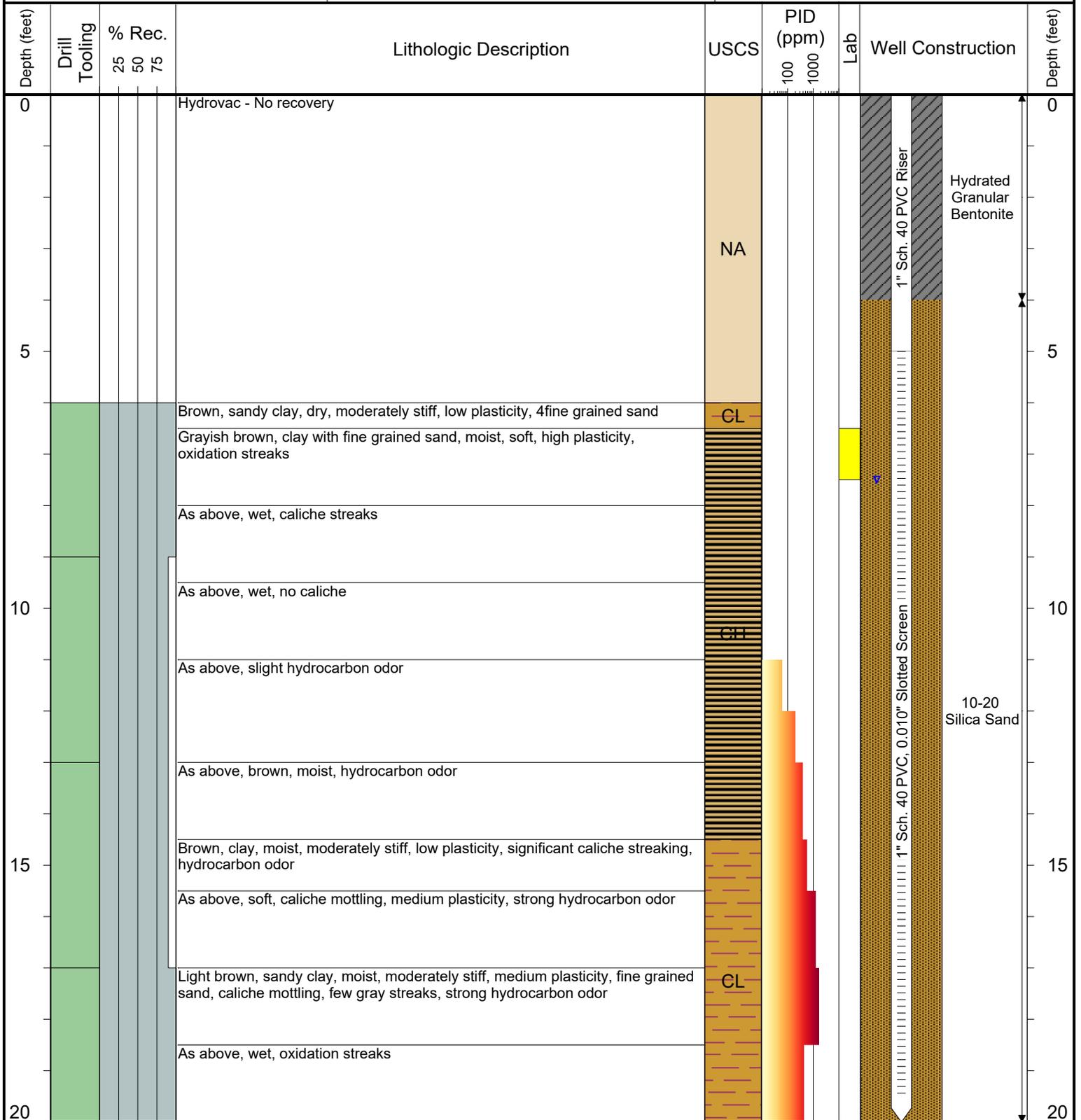
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): Not Measured

LONGITUDE (DECIMAL DEGREES): Not Measured

CASING ELEVATION (FT. AMSL): 4961.83

GROUND ELEVATION (FT. AMSL): 4959.07



Drilling / Sample Method:

- Macro-Core
- Perforated Injection Tool
- Expendable Well Tip
- 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: Eric Siegel, P.G.

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 8/25/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 7.5

Feather 31-15

BORING / WELL ID: BH16

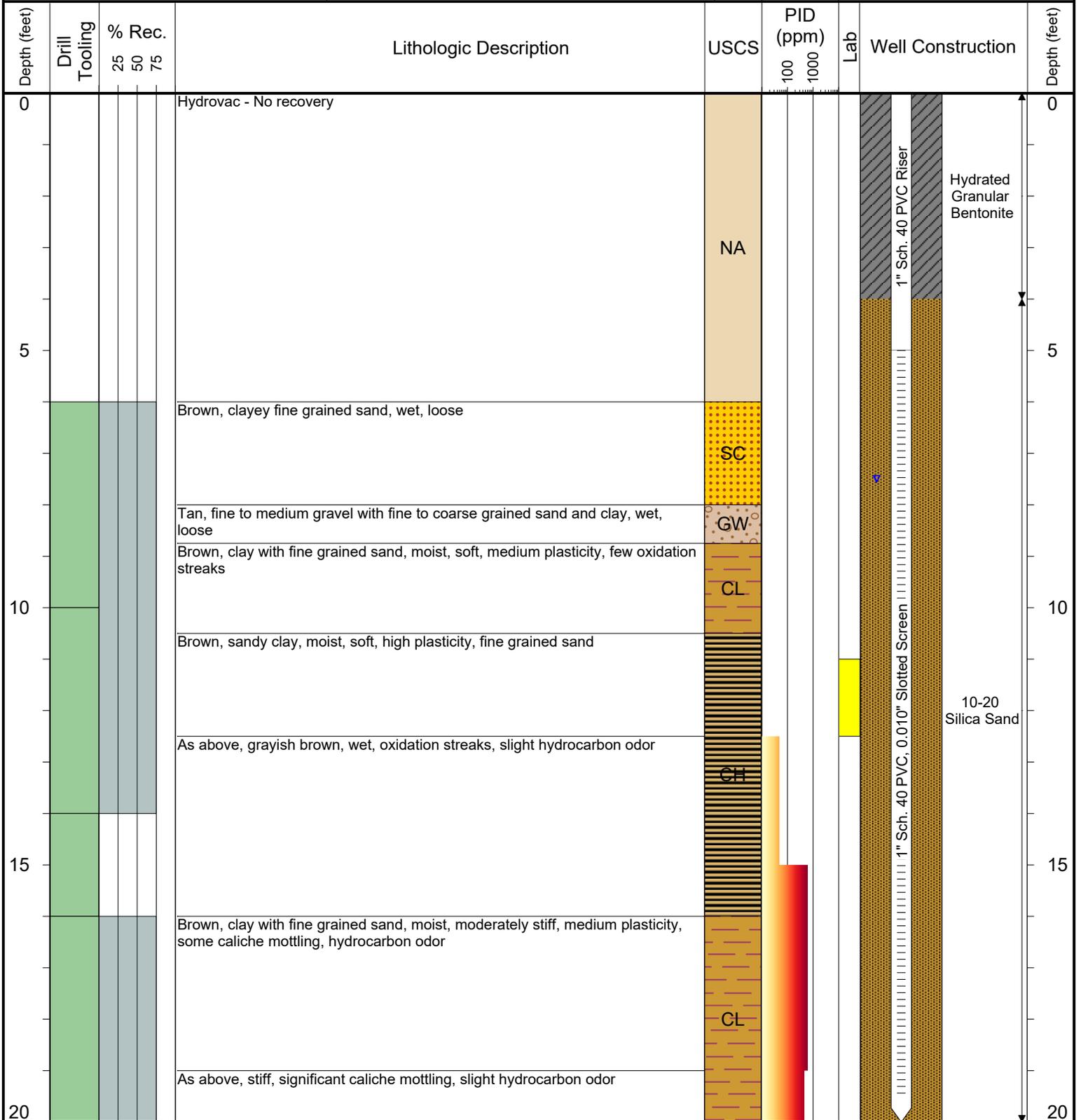
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): Not Measured

LONGITUDE (DECIMAL DEGREES): Not Measured

CASING ELEVATION (FT. AMSL): 4960.67

GROUND ELEVATION (FT. AMSL): 4960.81



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 9/21/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 6.5

Feather 31-15

BORING / WELL ID: BH17

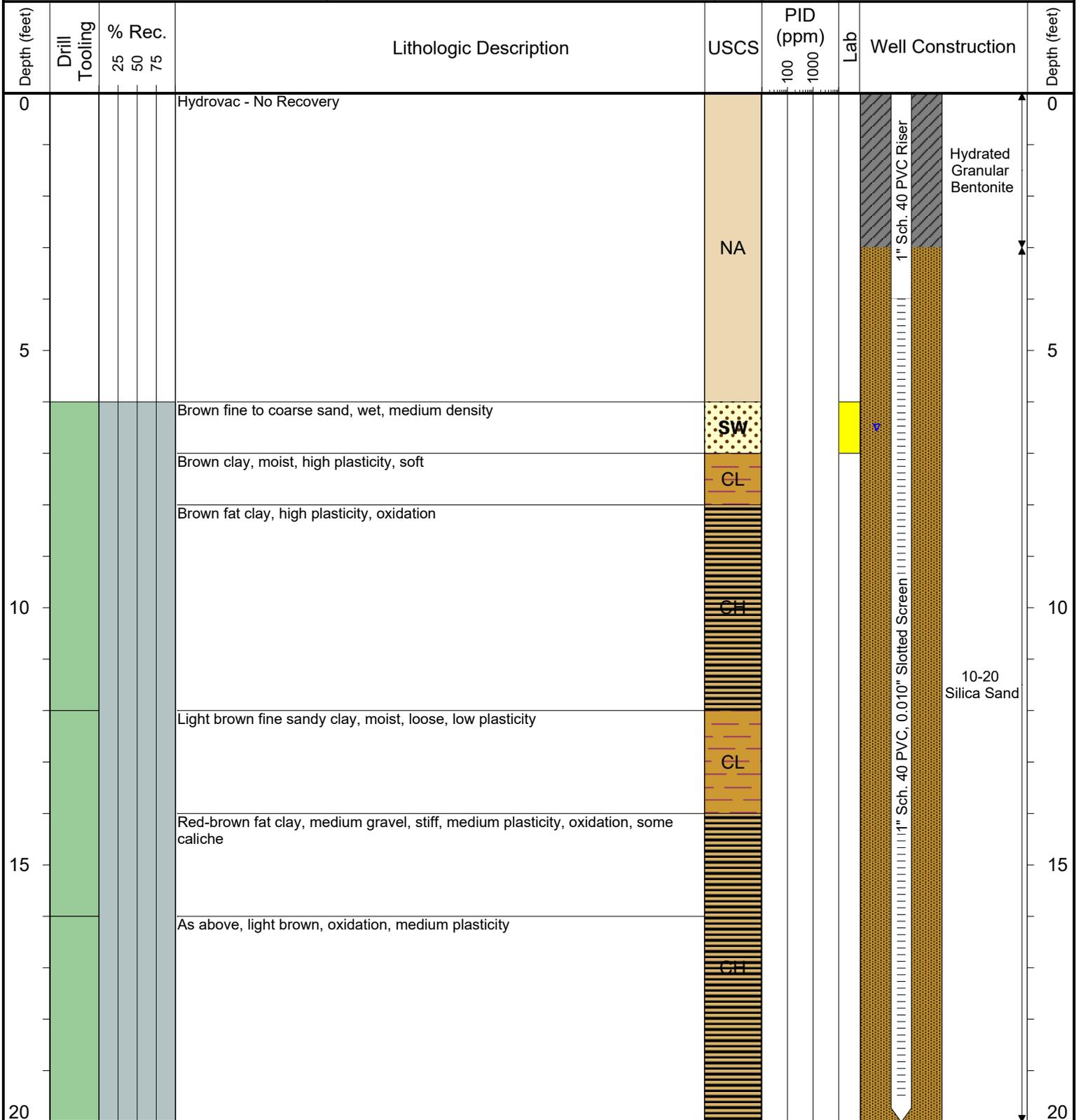
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14562467694

LONGITUDE (DECIMAL DEGREES): -104.53438597

CASING ELEVATION (FT. AMSL): 4961.27

GROUND ELEVATION (FT. AMSL): 4961.37



**Drilling / Sample Method:**

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 9/21/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 7.5

Feather 31-15

BORING / WELL ID: BH18

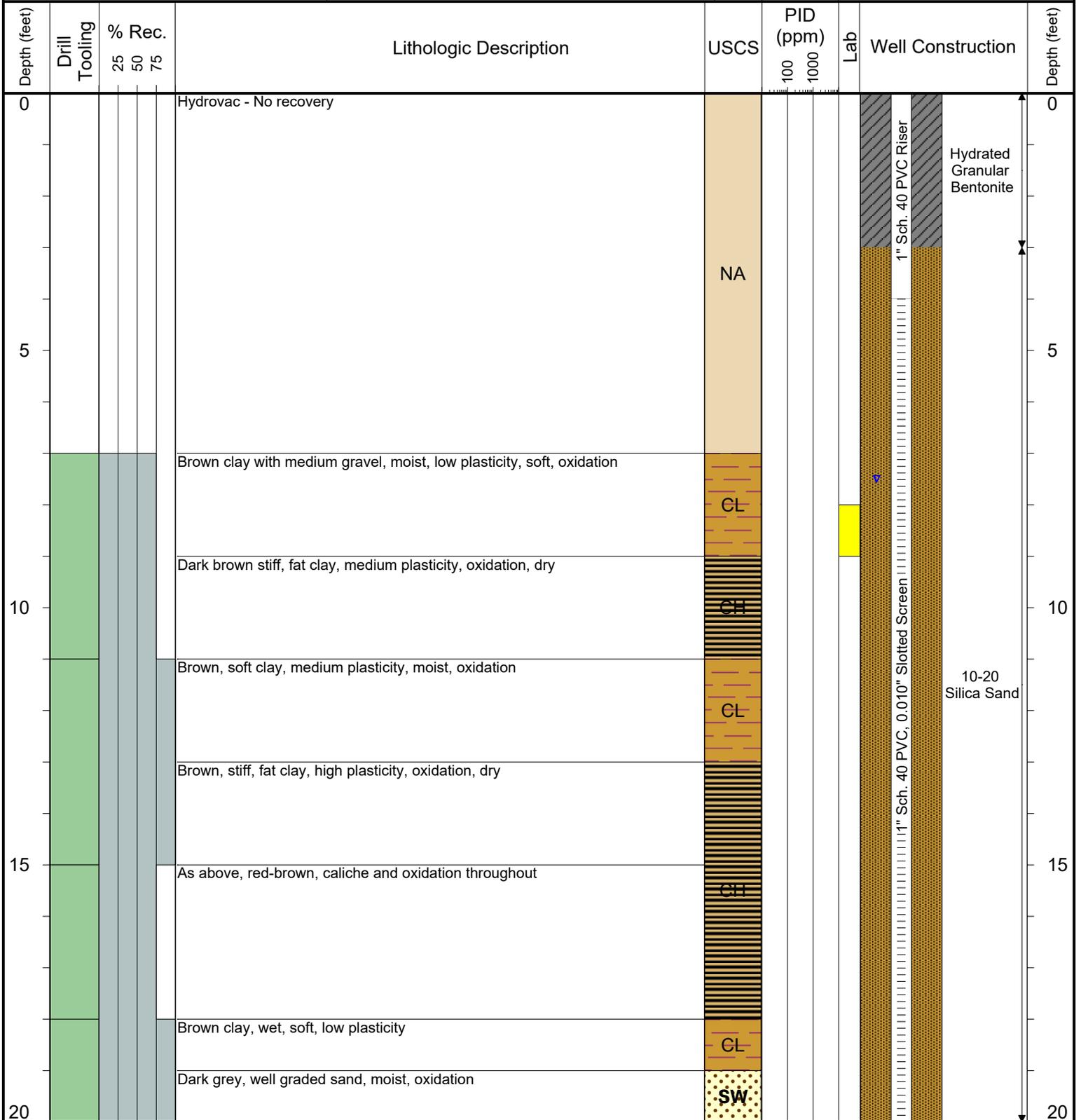
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14569389056

LONGITUDE (DECIMAL DEGREES): -104.53427263

CASING ELEVATION (FT. AMSL): 4962.91

GROUND ELEVATION (FT. AMSL): 4960.41



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- HydroPunch Groundwater Sampler

Laboratory Sample Types:

- Geotechnical Lab
- Analytical Chemistry Lab
- Geotechnical & Analytical Chemistry Lab



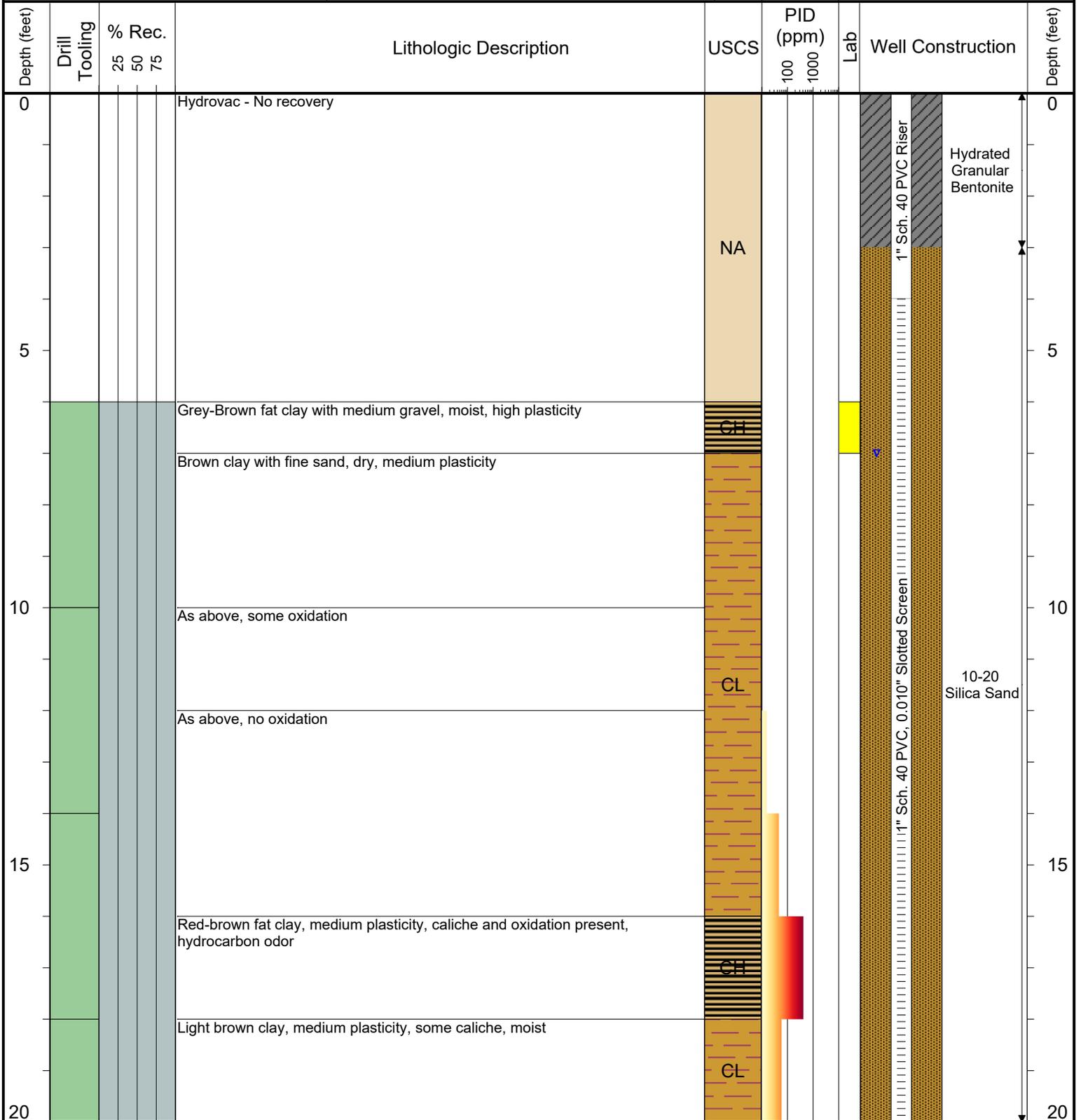
6899 Pecos Street, Unit C  
Denver, Colorado 80221

CLIENT: Noble Energy, Inc.  
 LOGGED BY: Graham Besecke  
 PROJECT MANAGER: Brandon Bruns, P.E.  
 DRILLING CONTRACTOR: Tasman Geosciences, Inc.  
 DRILLING EQUIPMENT: AMS Power Probe  
 DRILL BIT SIZE (INCHES): 2.375  
 DATE STARTED - COMPLETED: 9/21/2016  
 TOTAL WELL DEPTH (FT. BGS): 20  
 DEPTH TO WATER (FT. BGS): 7

Feather 31-15

BORING / WELL ID: BH19

LOCATION: Weld County, Colorado  
 LATITUDE (DECIMAL DEGREES): 40.14555417411  
 LONGITUDE (DECIMAL DEGREES): -104.53413772  
 CASING ELEVATION (FT. AMSL): 4961.23  
 GROUND ELEVATION (FT. AMSL): 4961.56



Drilling / Sample Method:

- Macro-Core
- Perforated Injection Tool
- Expendable Well Tip
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 9/21/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 7

Feather 31-15

BORING / WELL ID: BH20

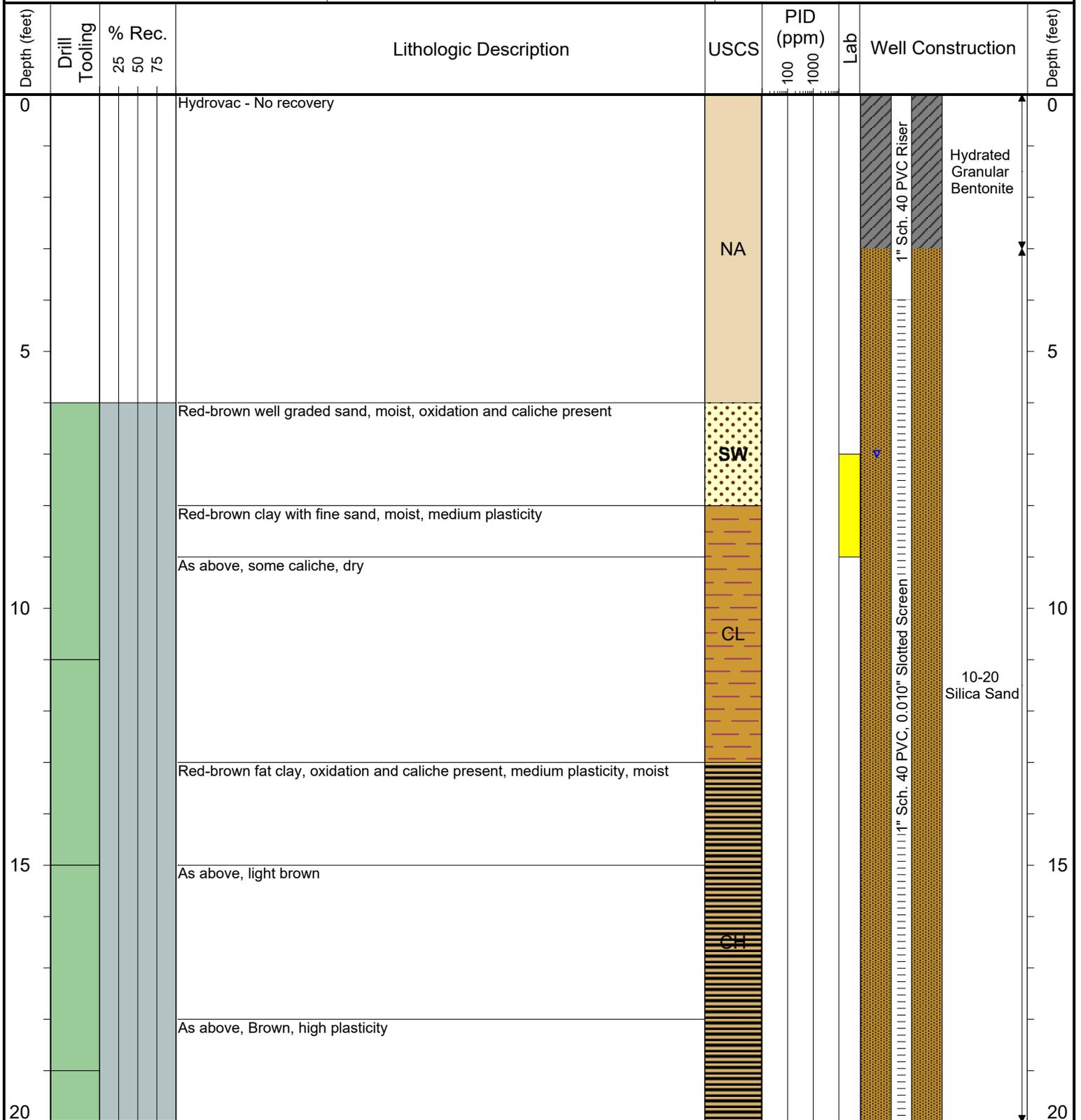
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14564958726

LONGITUDE (DECIMAL DEGREES): -104.53388742

CASING ELEVATION (FT. AMSL): 4959.06

GROUND ELEVATION (FT. AMSL): 4959.32



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 9/21/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 7

Feather 31-15

BORING / WELL ID: BH21

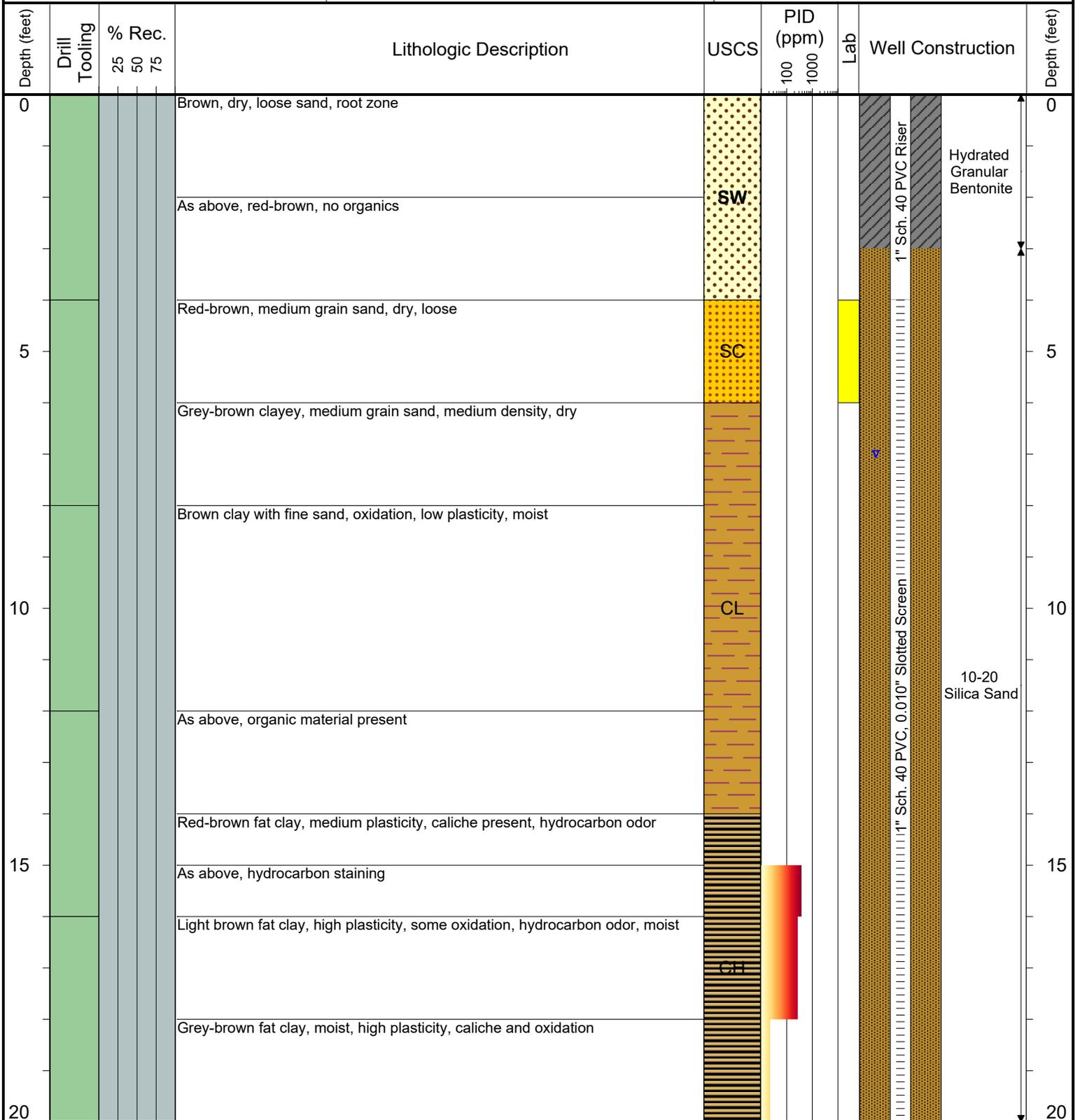
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14580049638

LONGITUDE (DECIMAL DEGREES): -104.53386606

CASING ELEVATION (FT. AMSL): 4960.89

GROUND ELEVATION (FT. AMSL): 4957.8



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 9/21/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 6

Feather 31-15

BORING / WELL ID: BH22

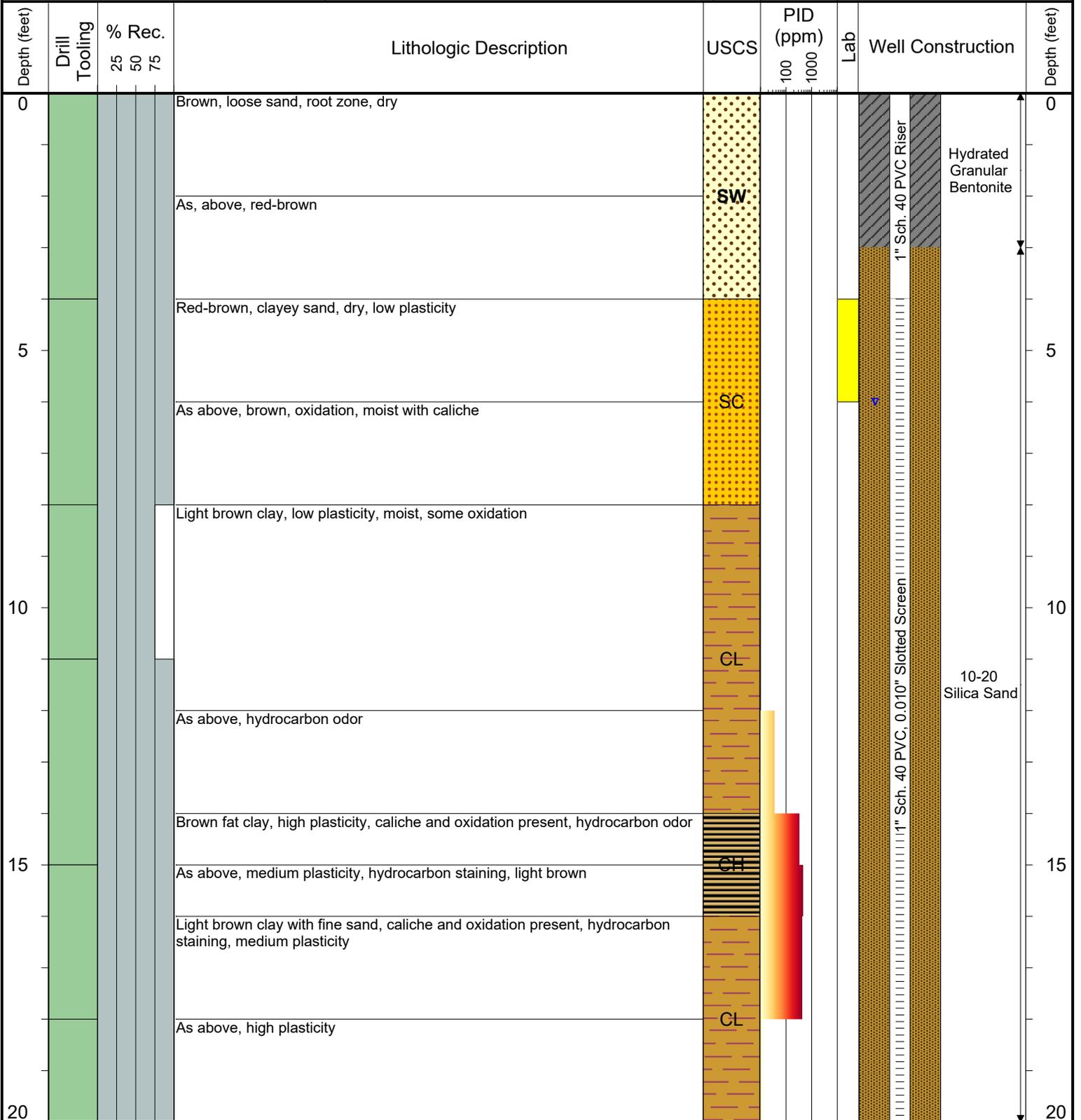
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14580218776

LONGITUDE (DECIMAL DEGREES): -104.53405850

CASING ELEVATION (FT. AMSL): 4961.11

GROUND ELEVATION (FT. AMSL): 4957.91



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 9/22/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 7

Feather 31-15

BORING / WELL ID: BH23

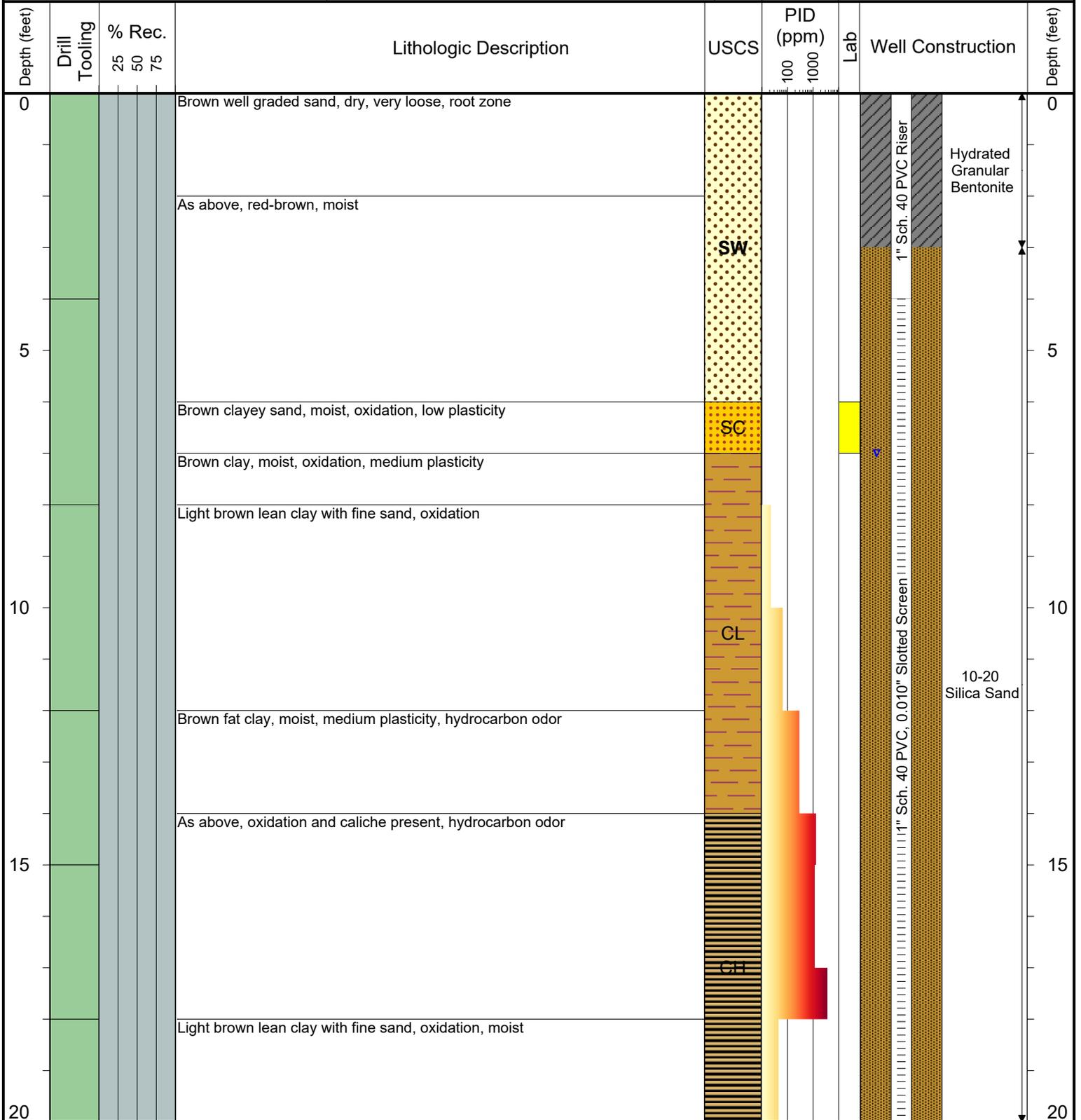
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14585808071

LONGITUDE (DECIMAL DEGREES): -104.53395896

CASING ELEVATION (FT. AMSL): 4960.67

GROUND ELEVATION (FT. AMSL): 4957.6



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 9/22/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 7

Feather 31-15

BORING / WELL ID: BH24

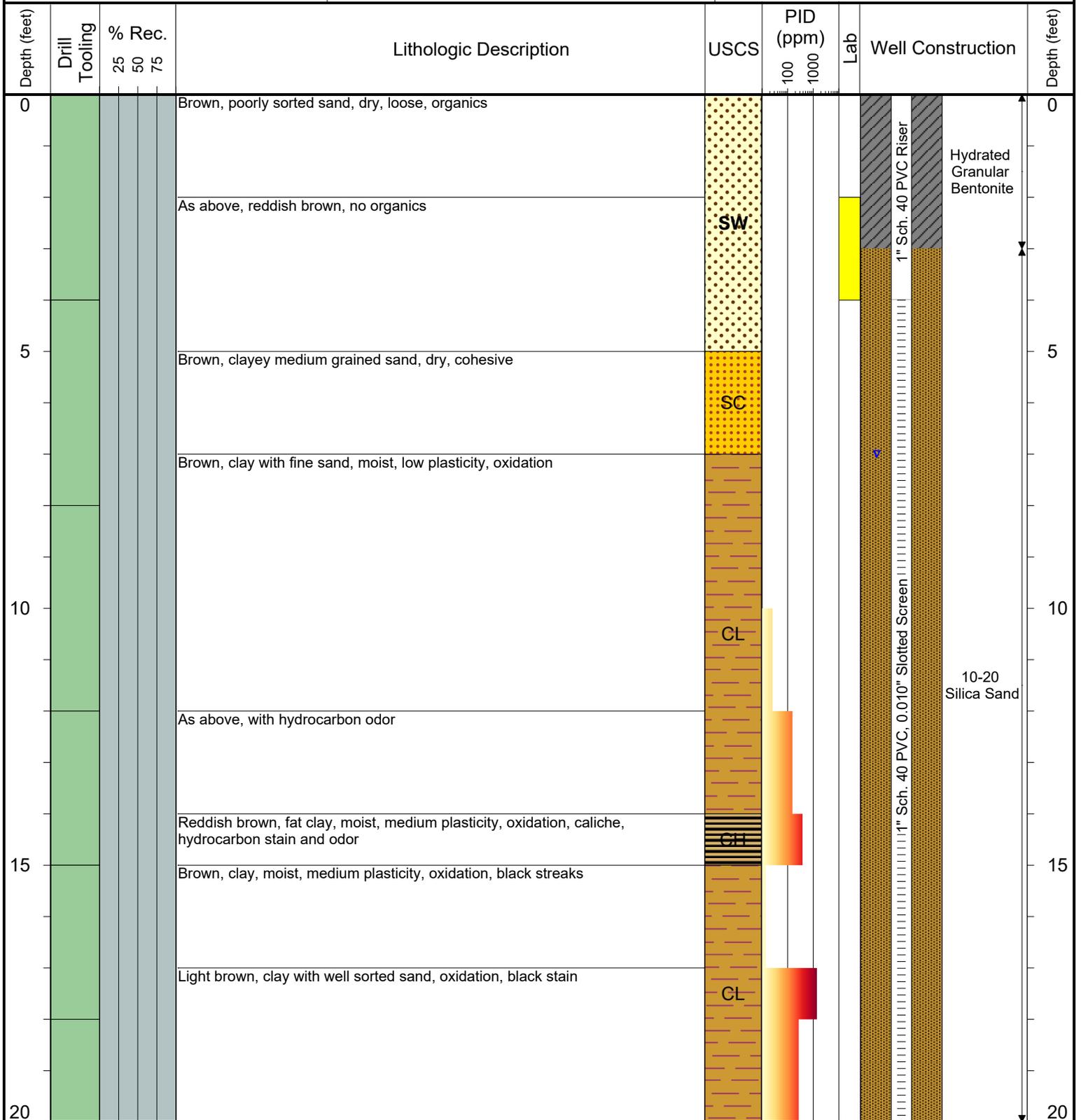
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14588391307

LONGITUDE (DECIMAL DEGREES): -104.53401667

CASING ELEVATION (FT. AMSL): 4960.3

GROUND ELEVATION (FT. AMSL): 4957.43



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 9/22/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 8

Feather 31-15

BORING / WELL ID: BH25

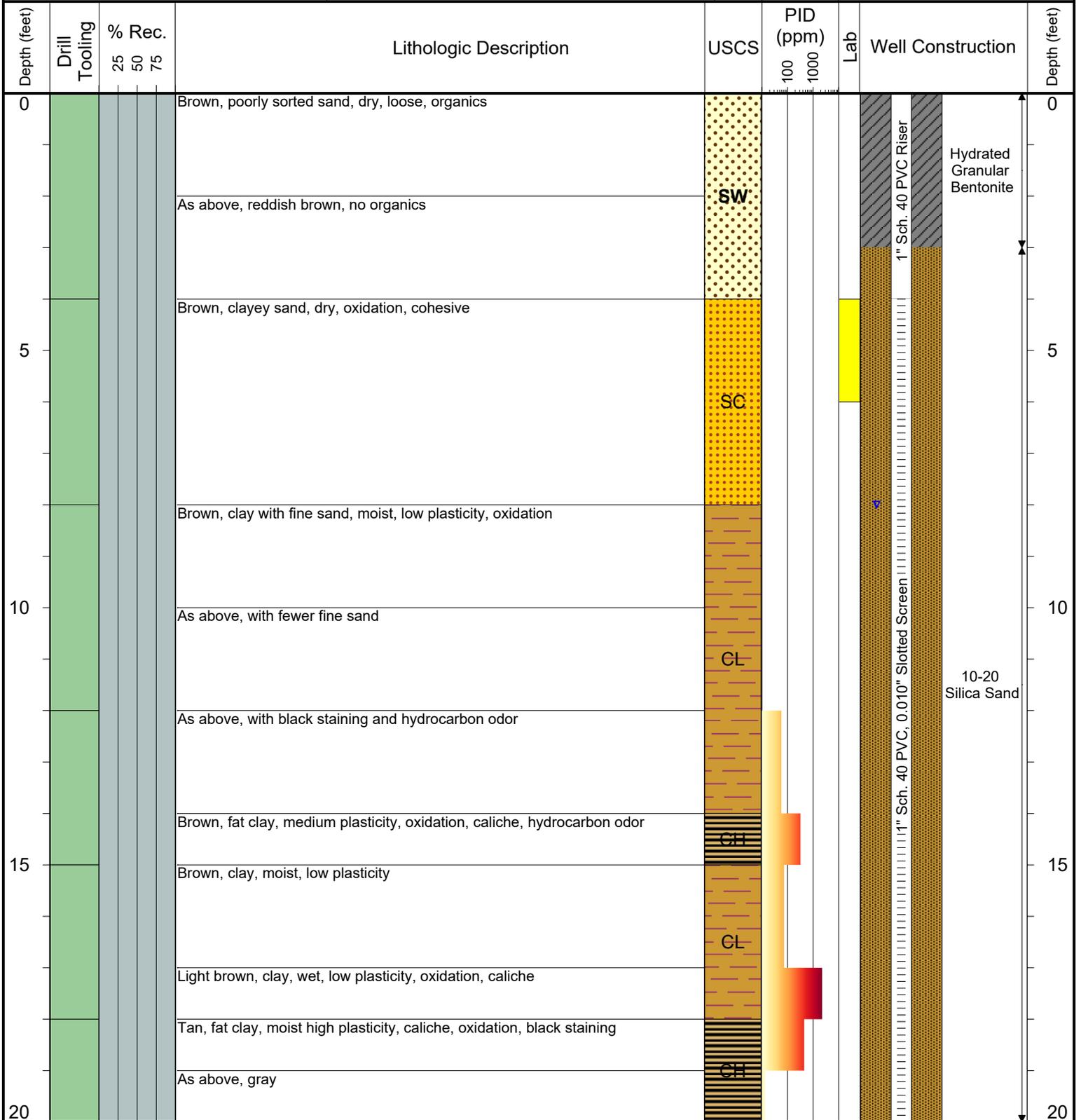
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14586988584

LONGITUDE (DECIMAL DEGREES): -104.53388407

CASING ELEVATION (FT. AMSL): 4960.28

GROUND ELEVATION (FT. AMSL): 4957.16



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 9/22/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 7

Feather 31-15

BORING / WELL ID: BH26

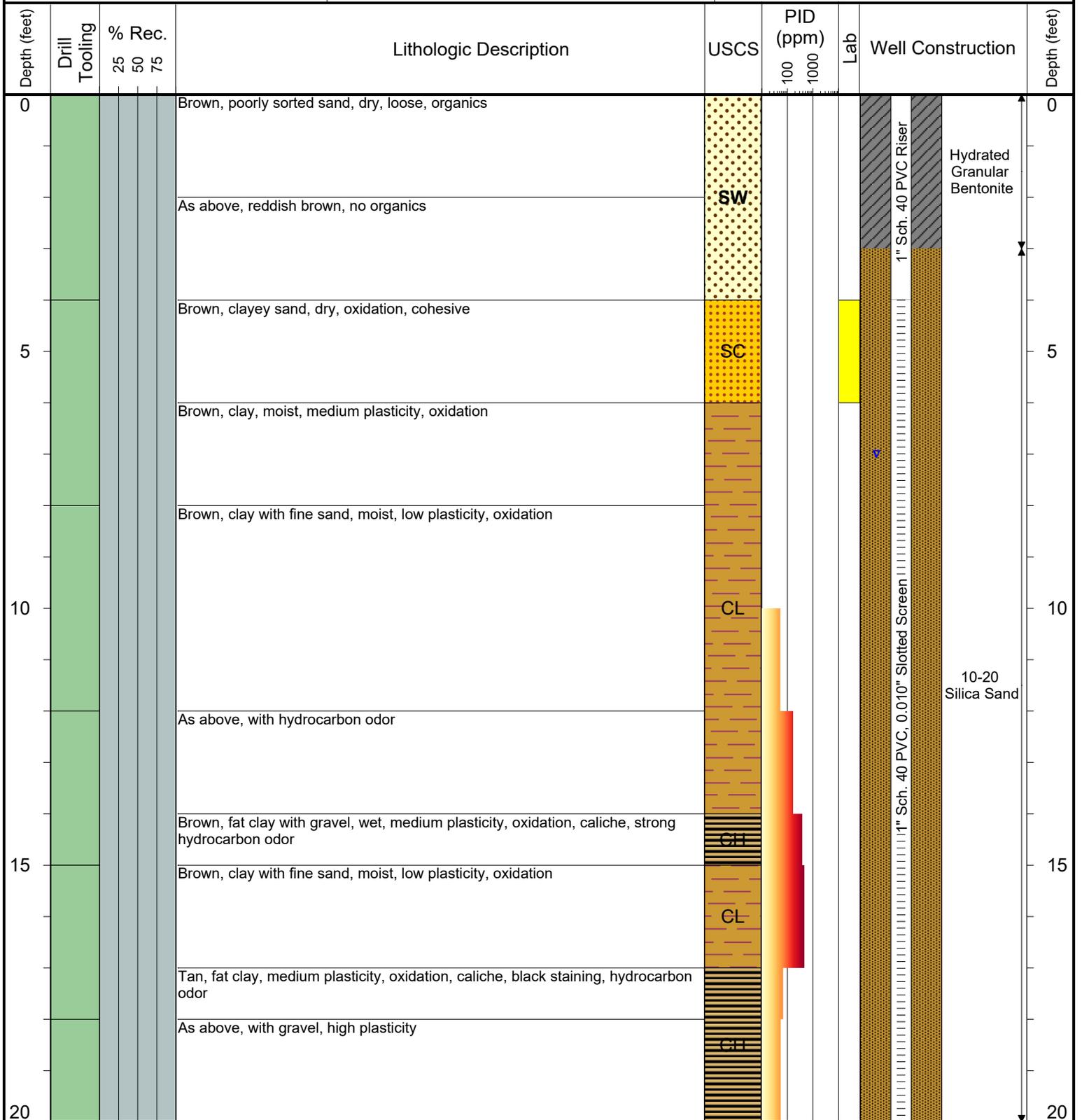
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14596819711

LONGITUDE (DECIMAL DEGREES): -104.53390119

CASING ELEVATION (FT. AMSL): 4959.46

GROUND ELEVATION (FT. AMSL): 4956.31



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 9/22/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 6

Feather 31-15

BORING / WELL ID: BH27

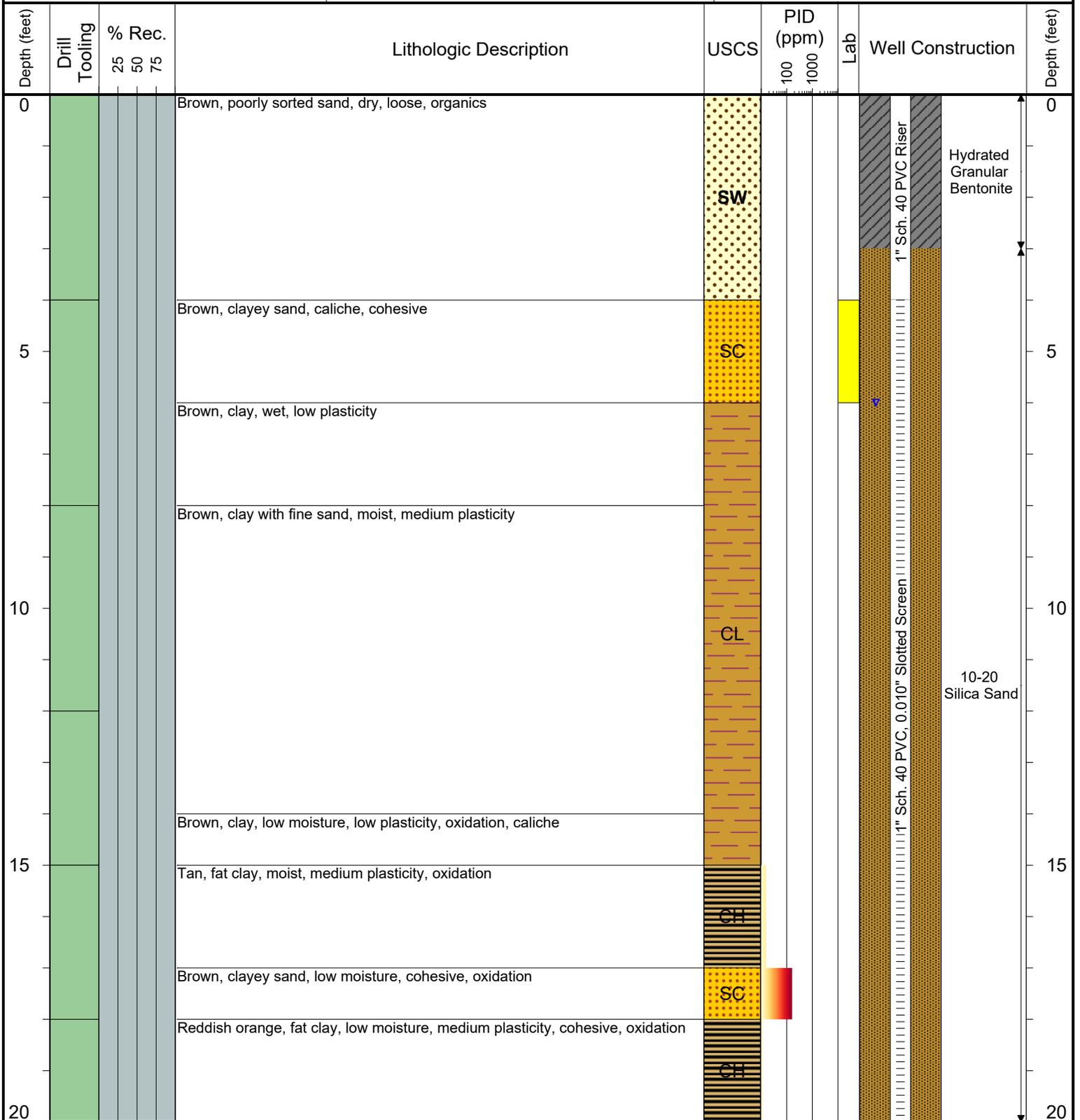
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14605175525

LONGITUDE (DECIMAL DEGREES): -104.53377893

CASING ELEVATION (FT. AMSL): 4958.65

GROUND ELEVATION (FT. AMSL): 4955.61



**Drilling / Sample Method:**

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 9/22/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 7

Feather 31-15

BORING / WELL ID: BH28

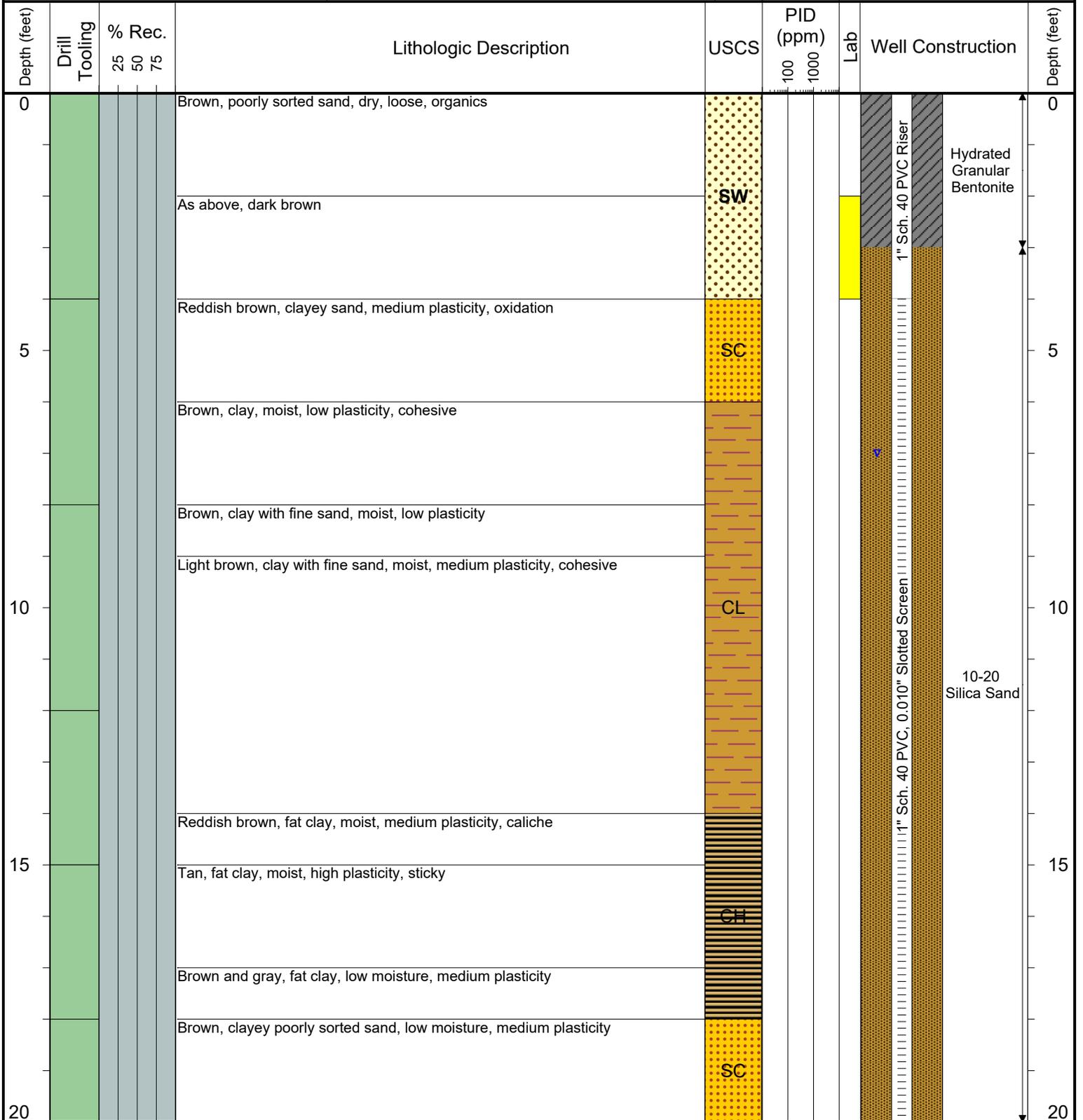
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14613297089

LONGITUDE (DECIMAL DEGREES): -104.53366538

CASING ELEVATION (FT. AMSL): 4957.57

GROUND ELEVATION (FT. AMSL): 4954.42



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 9/22/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 7

Feather 31-15

BORING / WELL ID: BH29

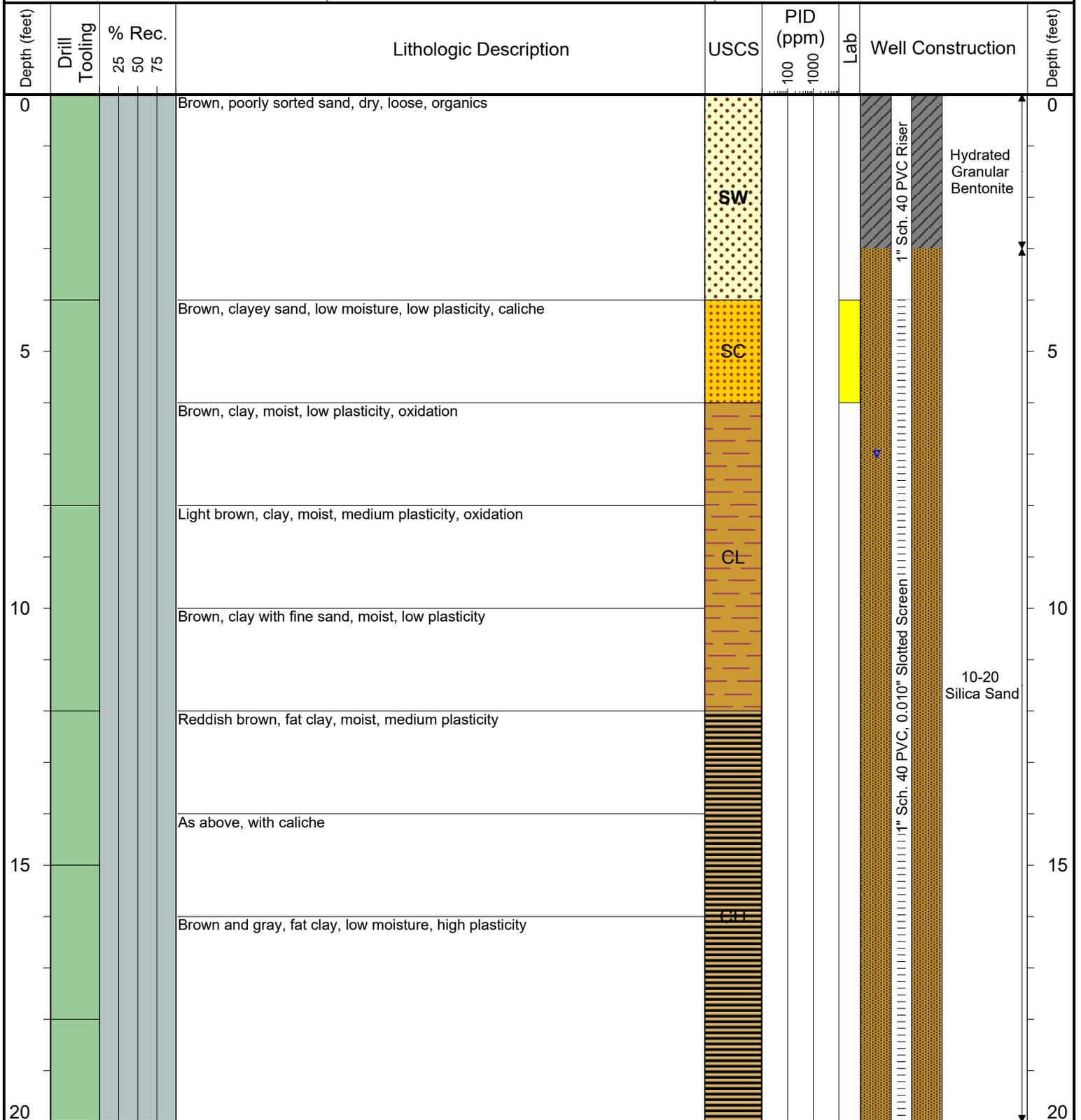
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14600100231

LONGITUDE (DECIMAL DEGREES): -104.53369308

CASING ELEVATION (FT. AMSL): 4958.73

GROUND ELEVATION (FT. AMSL): 4955.65



**Drilling / Sample Method:**

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 10/19/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 14

Feather 31-15

BORING / WELL ID: BH30

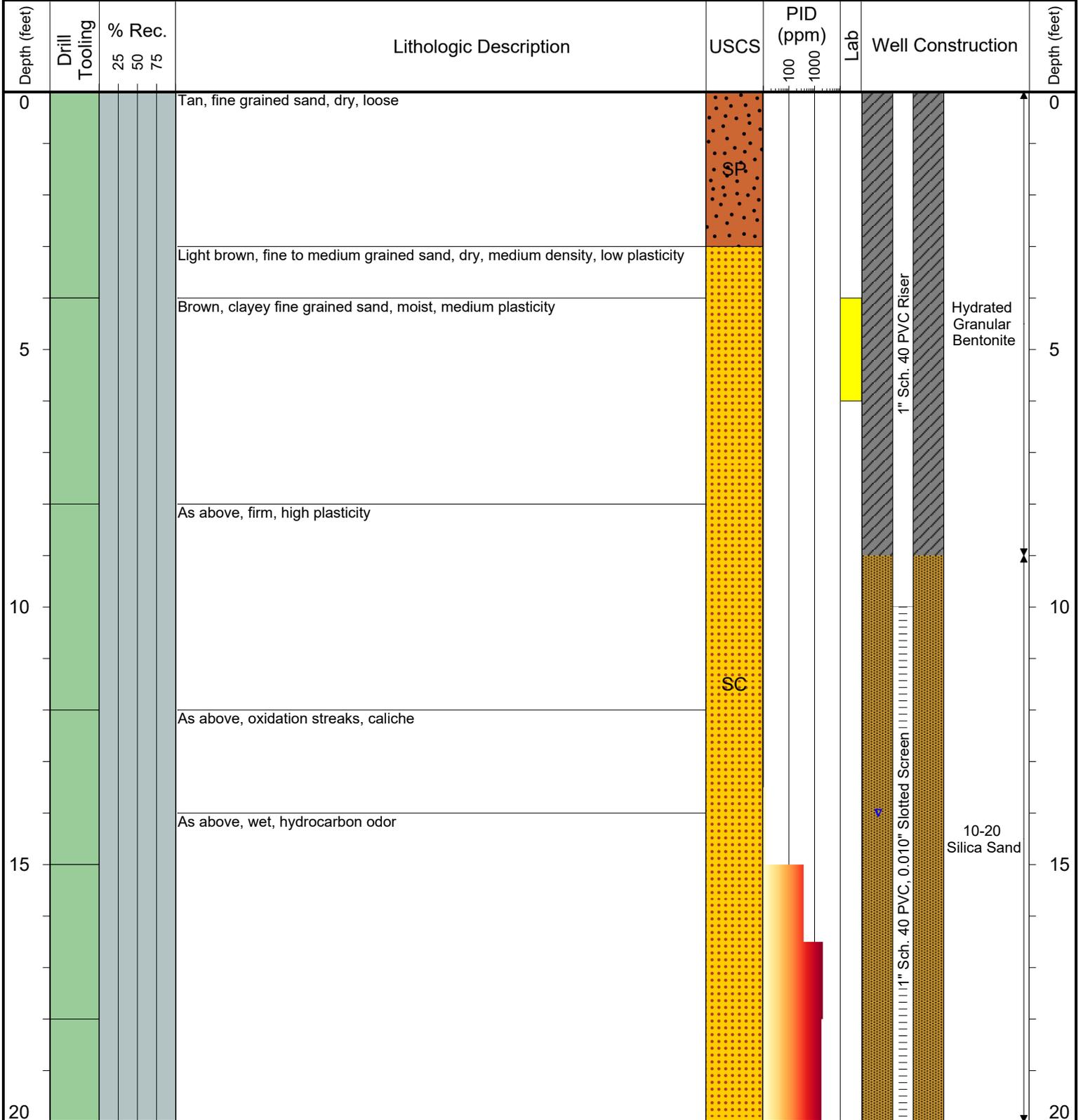
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14615854289

LONGITUDE (DECIMAL DEGREES): -104.53378137

CASING ELEVATION (FT. AMSL): 4957.11

GROUND ELEVATION (FT. AMSL): 4954.87



**Drilling / Sample Method:**

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 10/19/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 14

Feather 31-15

BORING / WELL ID: BH31

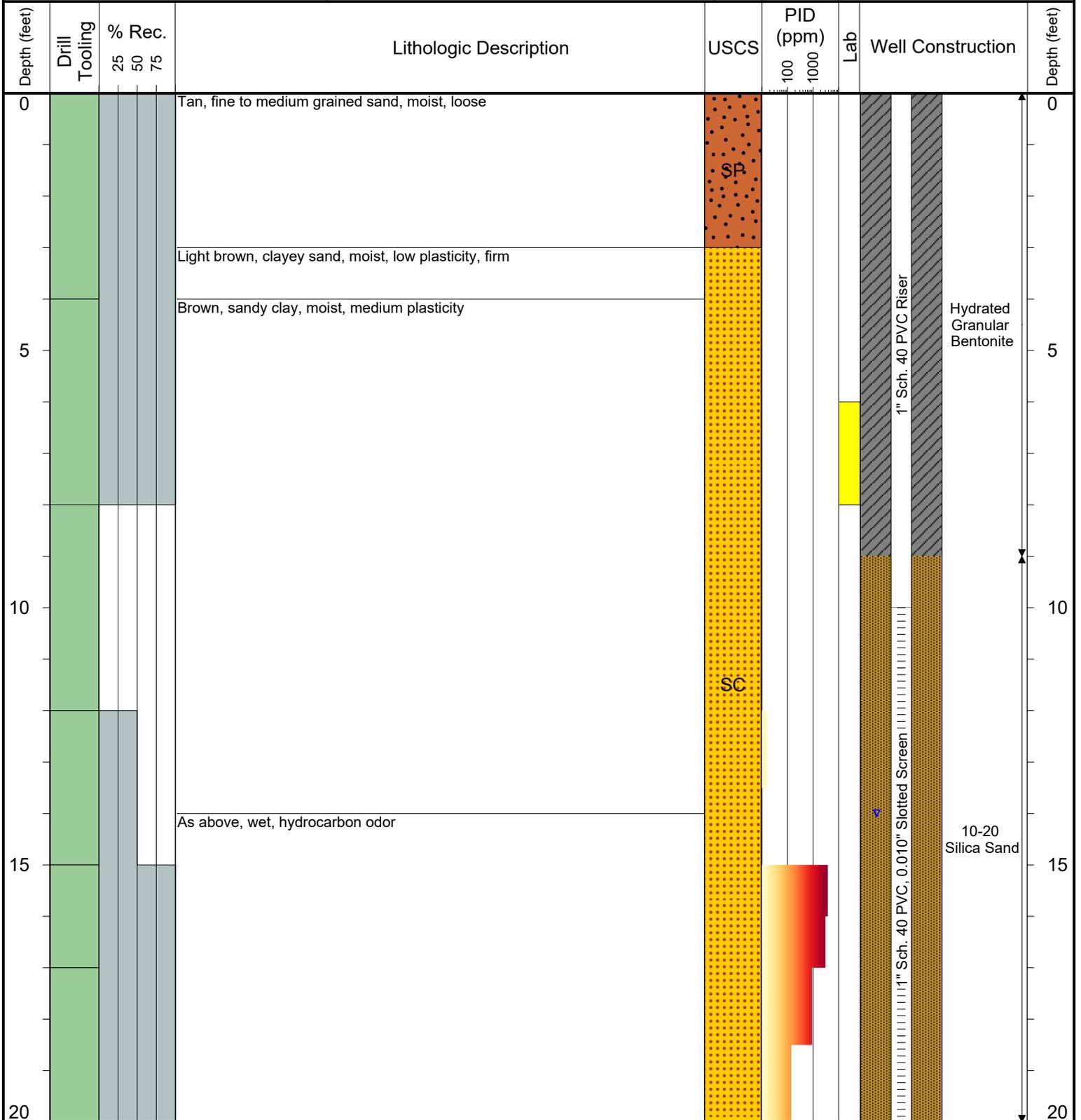
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14610898356

LONGITUDE (DECIMAL DEGREES): -104.53395996

CASING ELEVATION (FT. AMSL): 4958.22

GROUND ELEVATION (FT. AMSL): 4954.43



**Drilling / Sample Method:**

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 10/19/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 14

Feather 31-15

BORING / WELL ID: BH32

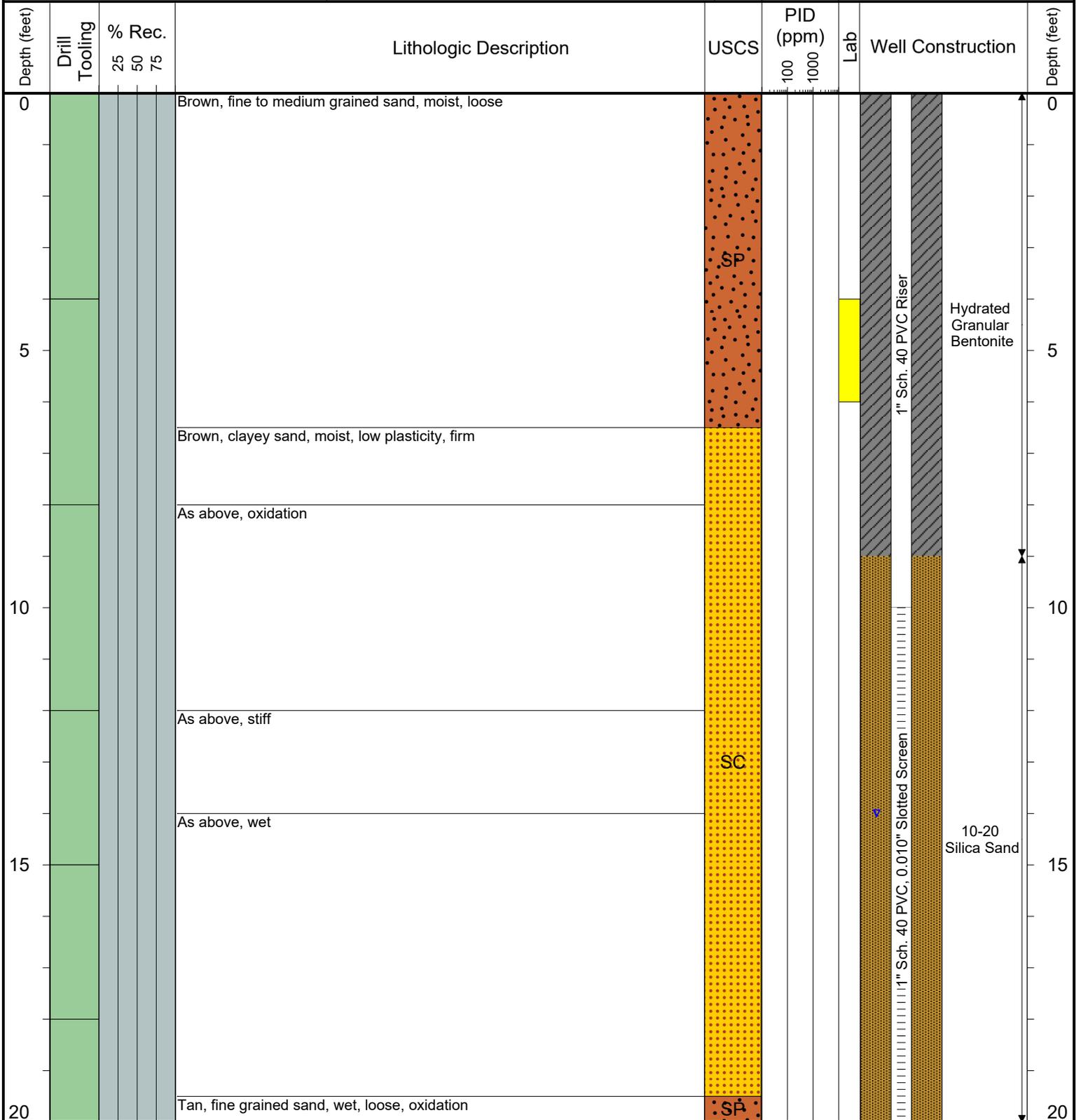
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14615676801

LONGITUDE (DECIMAL DEGREES): -104.53408693

CASING ELEVATION (FT. AMSL): 4959.15

GROUND ELEVATION (FT. AMSL): 4955.72



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 10/25/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 9

Feather 31-15

BORING / WELL ID: BH33

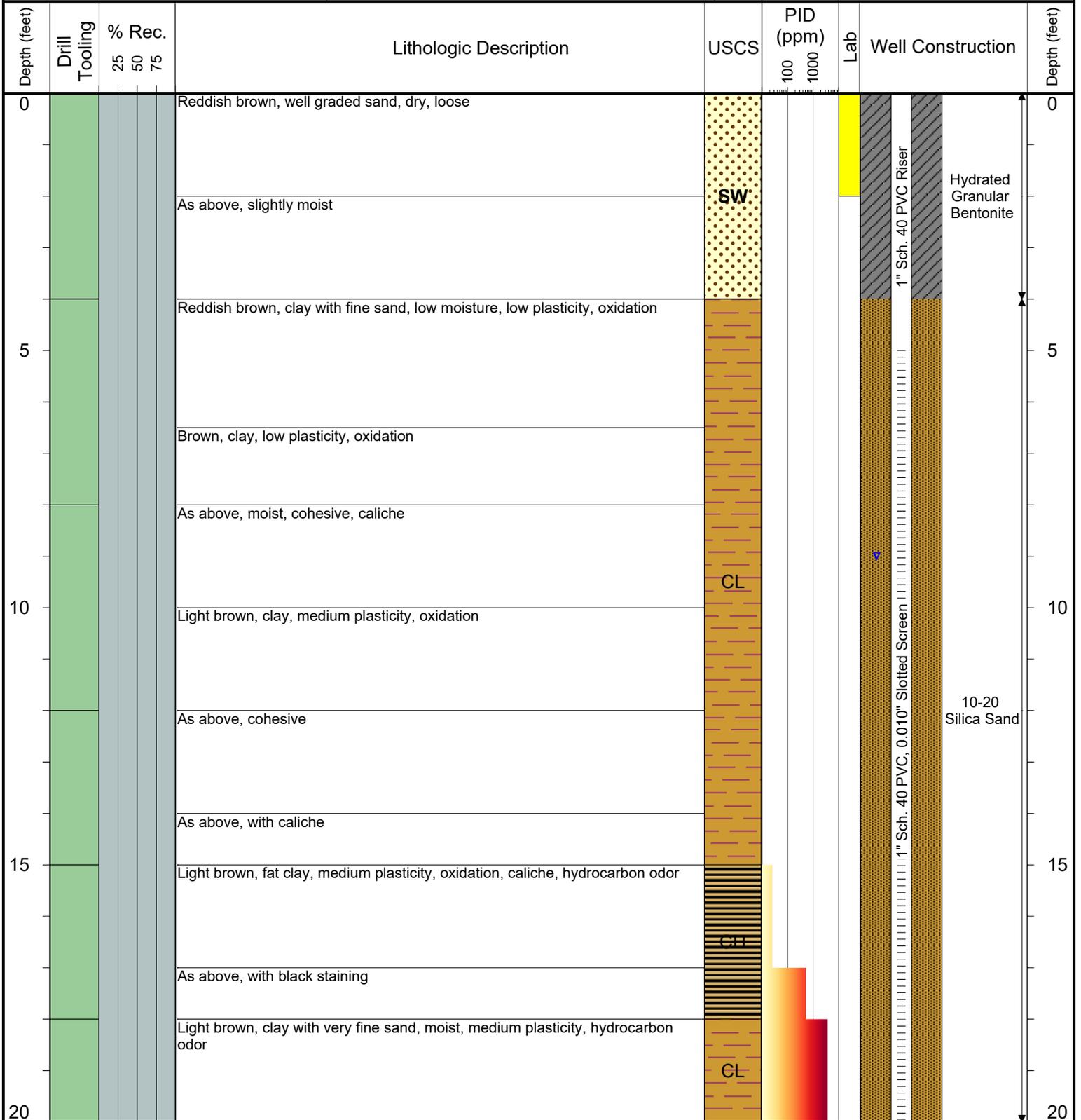
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14626668627

LONGITUDE (DECIMAL DEGREES): -104.53376384

CASING ELEVATION (FT. AMSL): 4956.82

GROUND ELEVATION (FT. AMSL): 4953.82



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 10/25/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 8

Feather 31-15

BORING / WELL ID: BH34

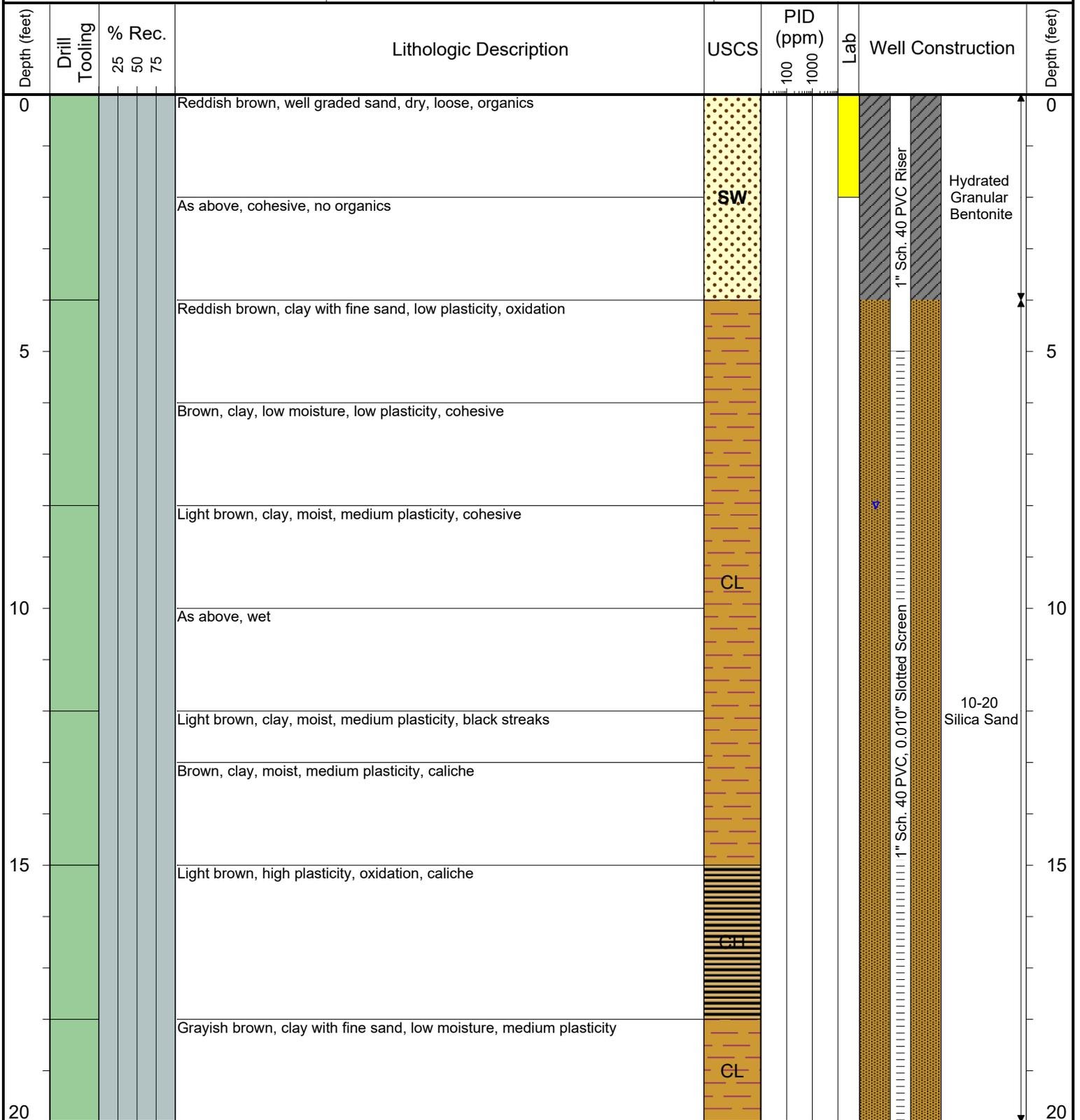
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): Not Measured

LONGITUDE (DECIMAL DEGREES): Not Measured

CASING ELEVATION (FT. AMSL): 4957.08

GROUND ELEVATION (FT. AMSL): 4954.88



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- HydroPunch Groundwater Sampler

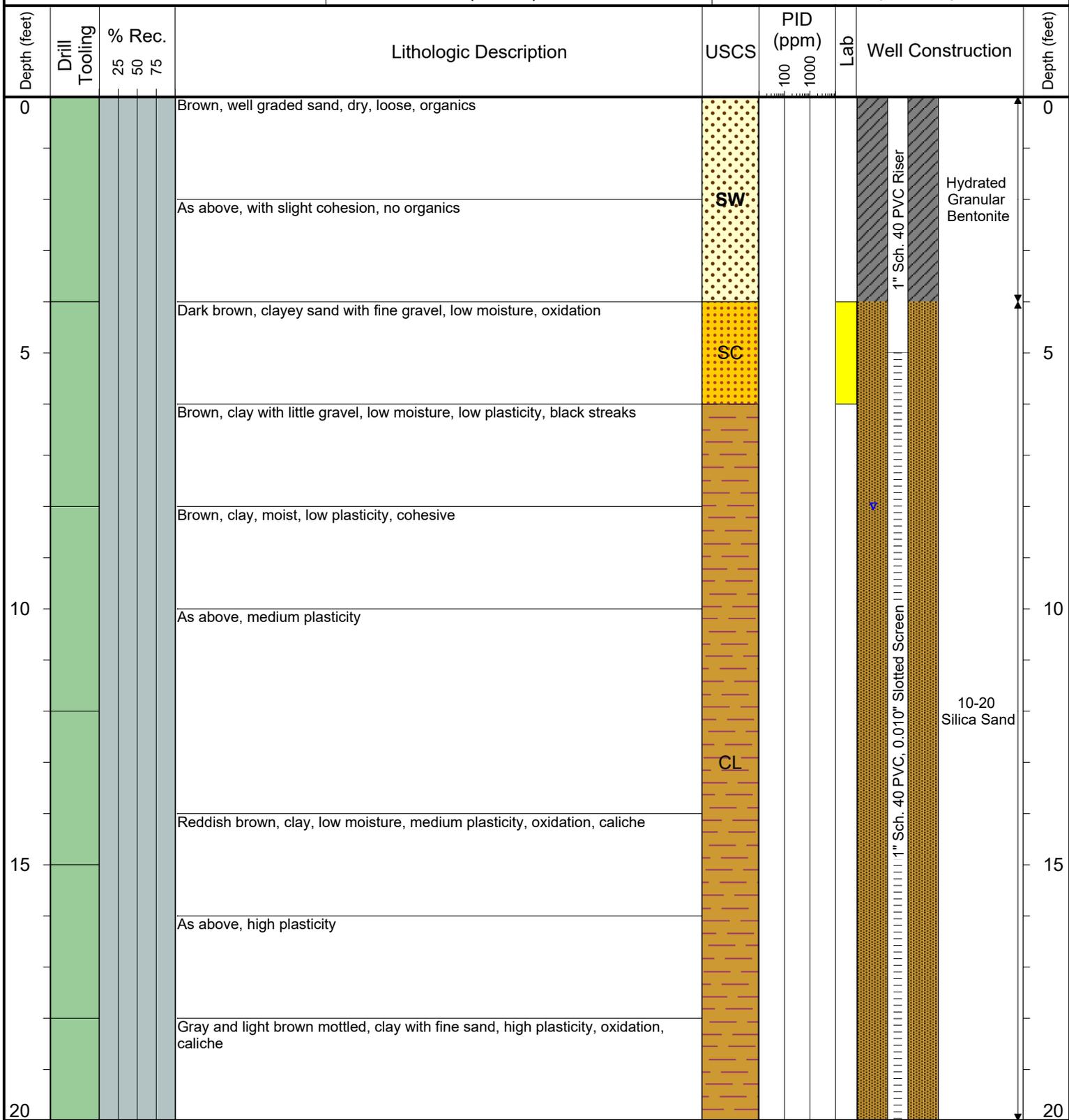
Laboratory Sample Types:

- Geotechnical Lab
- Analytical Chemistry Lab
- Geotechnical & Analytical Chemistry Lab



6899 Pecos Street, Unit C  
Denver, Colorado 80221

CLIENT: Noble Energy, Inc.	<b>Feather 31-15</b>
LOGGED BY: Graham Besecke	
PROJECT MANAGER: Brandon Bruns, P.E.	<b>BORING / WELL ID: BH35</b>
DRILLING CONTRACTOR: Tasman Geosciences, Inc.	
DRILLING EQUIPMENT: AMS Power Probe	LOCATION: Weld County, Colorado
DRILL BIT SIZE (INCHES): 2.375	LATITUDE (DECIMAL DEGREES): 40.14630168384
DATE STARTED - COMPLETED: 10/25/2016	LONGITUDE (DECIMAL DEGREES): -104.53389380
TOTAL WELL DEPTH (FT. BGS): 20	CASING ELEVATION (FT. AMSL): 4957.41
DEPTH TO WATER (FT. BGS): 8	GROUND ELEVATION (FT. AMSL): 4954.07



**Drilling / Sample Method:**

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 10/25/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 10

Feather 31-15

BORING / WELL ID: BH36

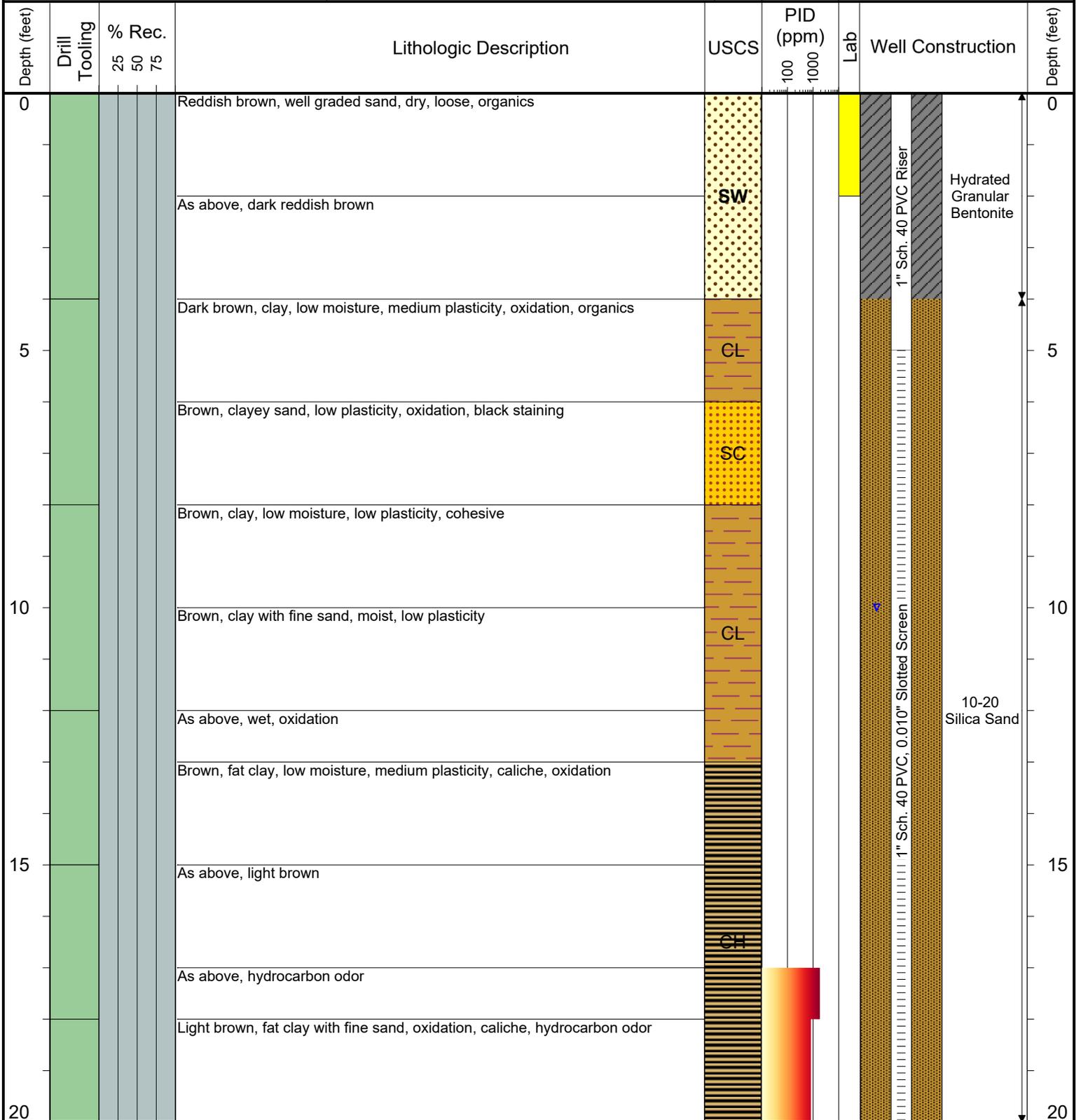
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14635916079

LONGITUDE (DECIMAL DEGREES): -104.53375386

CASING ELEVATION (FT. AMSL): 4955.19

GROUND ELEVATION (FT. AMSL): 4952.8



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- HydroPunch Groundwater Sampler

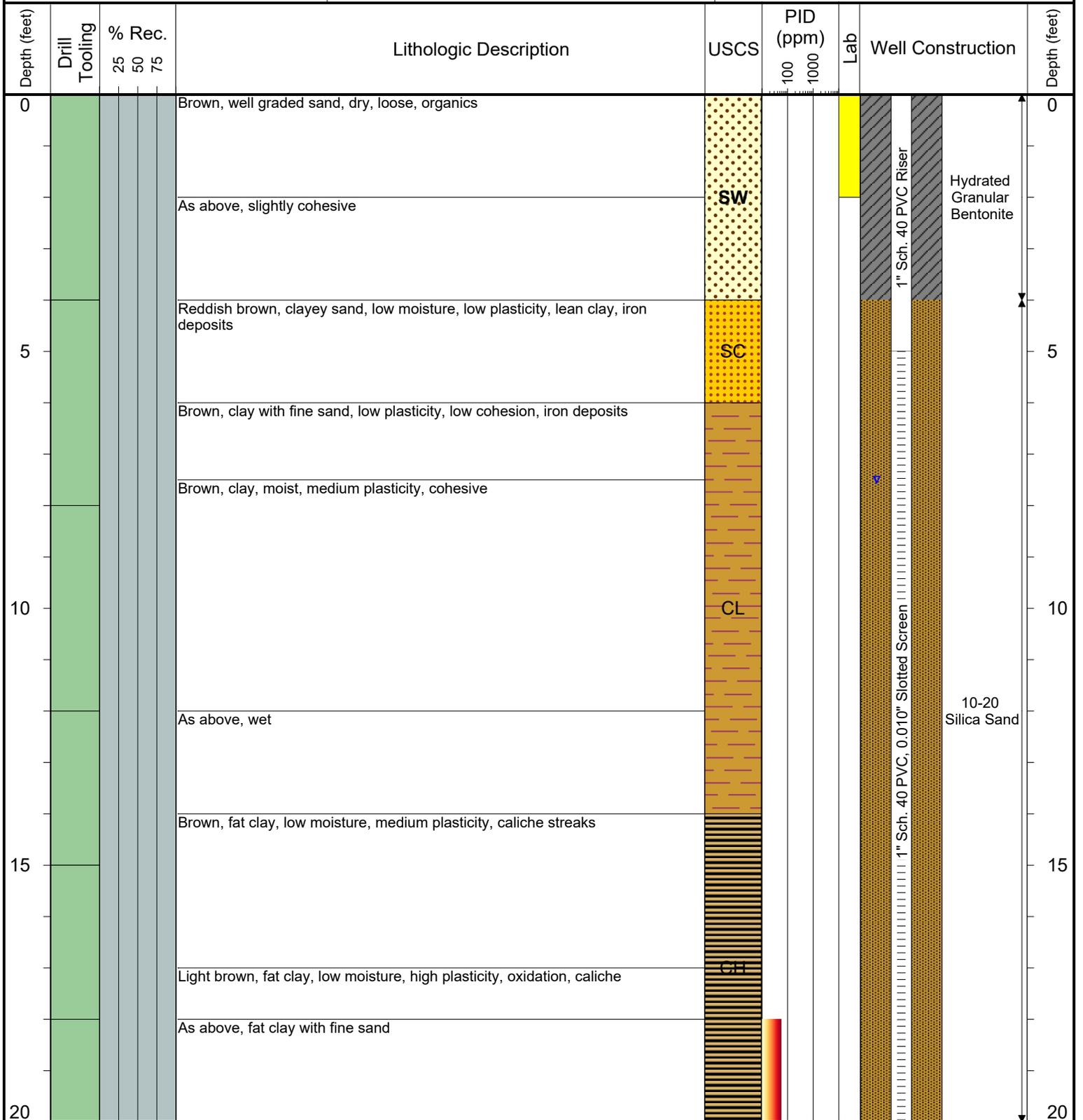
Laboratory Sample Types:

- Geotechnical Lab
- Analytical Chemistry Lab
- Geotechnical & Analytical Chemistry Lab



6899 Pecos Street, Unit C  
Denver, Colorado 80221

CLIENT: Noble Energy, Inc.	<b>Feather 31-15</b>
LOGGED BY: Graham Besecke	
PROJECT MANAGER: Brandon Bruns, P.E.	<b>BORING / WELL ID: BH37</b>
DRILLING CONTRACTOR: Tasman Geosciences, Inc.	
DRILLING EQUIPMENT: AMS Power Probe	LOCATION: Weld County, Colorado
DRILL BIT SIZE (INCHES): 2.375	LATITUDE (DECIMAL DEGREES): 40.14645596800
DATE STARTED - COMPLETED: 10/25/2016	LONGITUDE (DECIMAL DEGREES): -104.53374423
TOTAL WELL DEPTH (FT. BGS): 20	CASING ELEVATION (FT. AMSL): 4954.95
DEPTH TO WATER (FT. BGS): 7.5	GROUND ELEVATION (FT. AMSL): 4952.42



<b>Drilling / Sample Method:</b>		<b>Laboratory Sample Types:</b>	
Macro-Core	Perforated Injection Tool	Geotechnical Lab	Geotechnical & Analytical Chemistry Lab
Expendable Well Tip	HydroPunch Groundwater Sampler	Analytical Chemistry Lab	



6899 Pecos Street, Unit C  
Denver, Colorado 80221

CLIENT: Noble Energy, Inc.

LOGGED BY: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 10/25/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 8.5

Feather 31-15

BORING / WELL ID: BH38

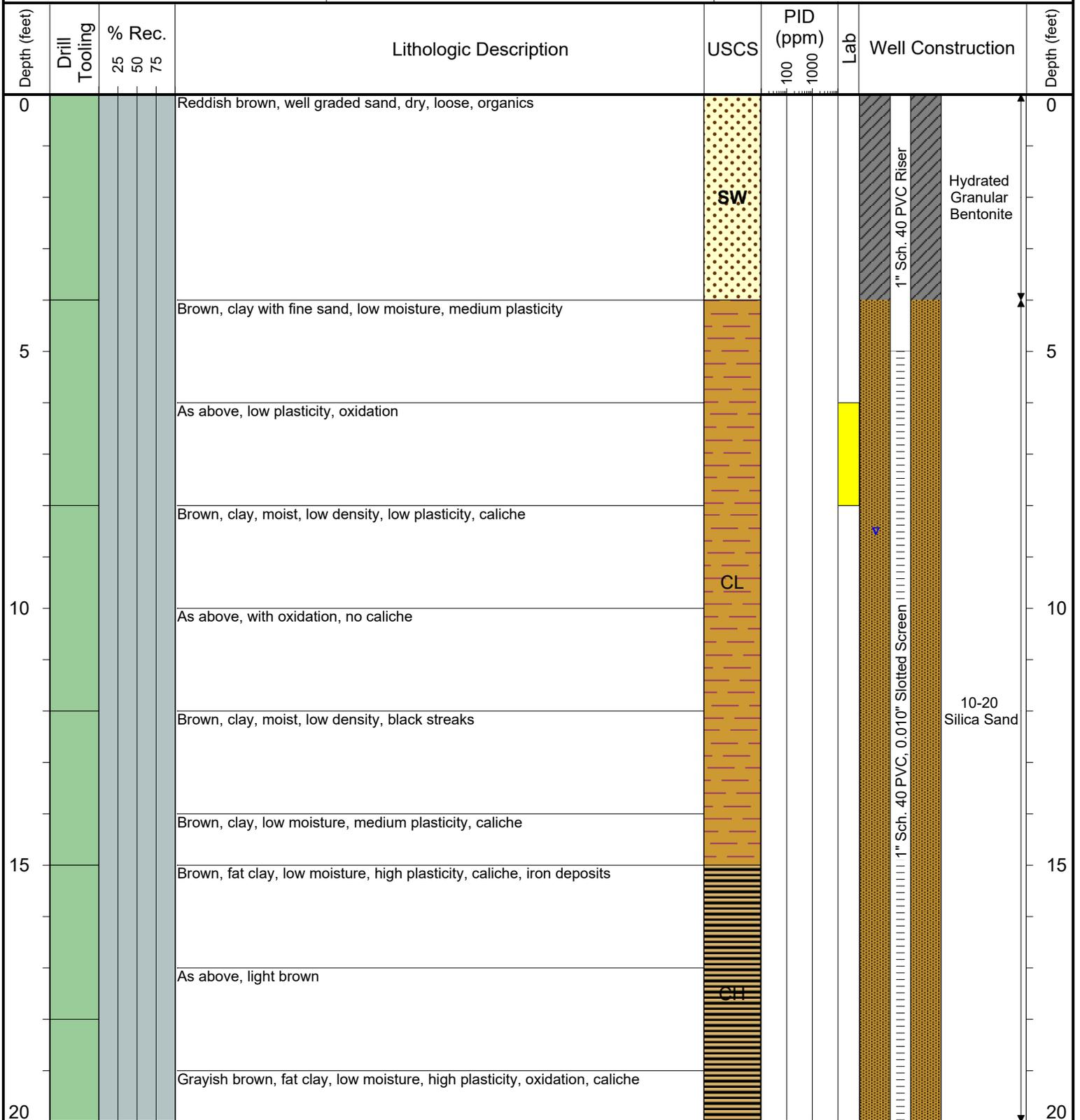
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14636474617

LONGITUDE (DECIMAL DEGREES): -104.53362370

CASING ELEVATION (FT. AMSL): 4955.15

GROUND ELEVATION (FT. AMSL): 4952.74



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 10/25/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 8

Feather 31-15

BORING / WELL ID: BH39

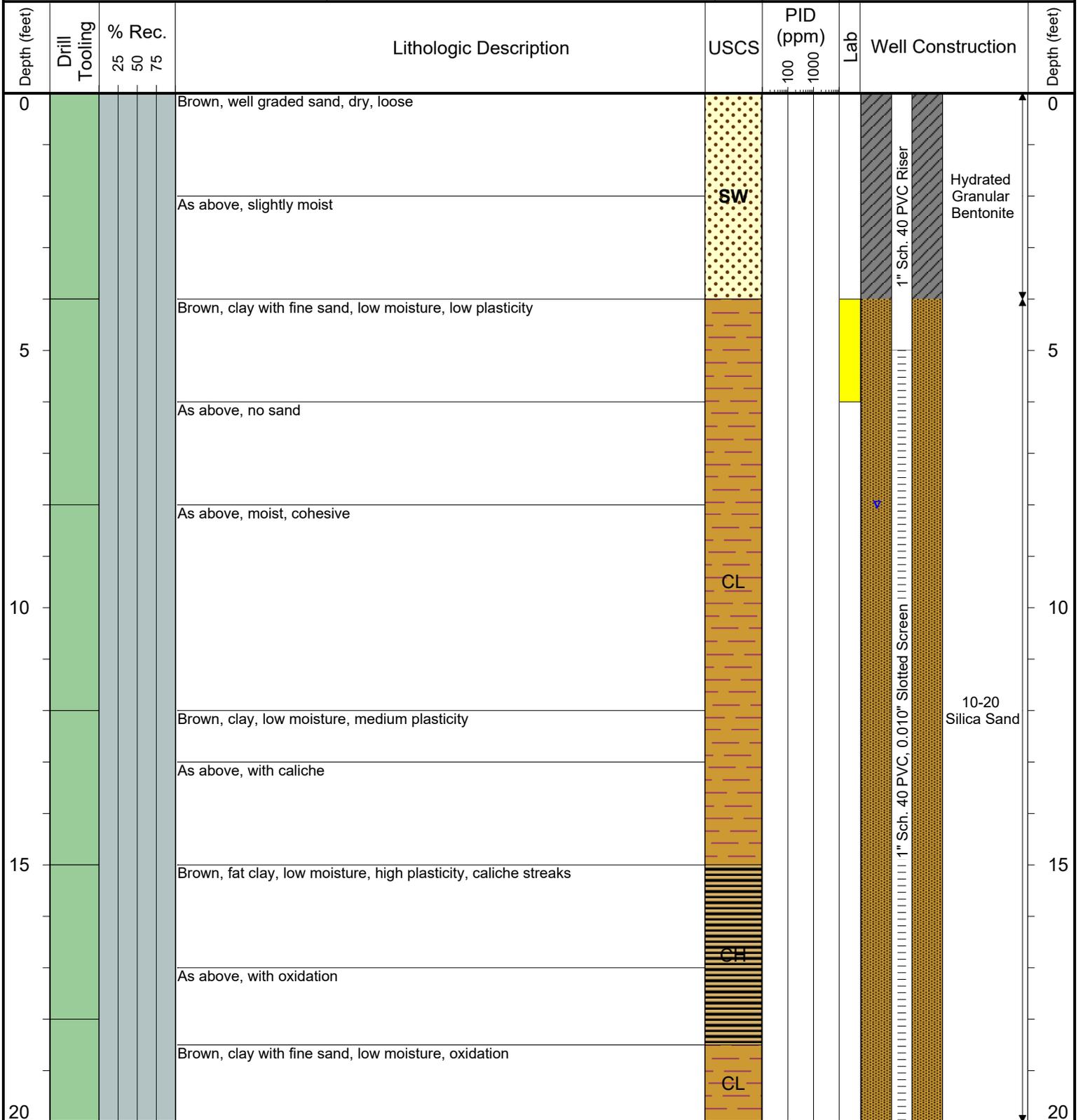
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14626620511

LONGITUDE (DECIMAL DEGREES): -104.53362213

CASING ELEVATION (FT. AMSL): 4955.83

GROUND ELEVATION (FT. AMSL): 4953



**Drilling / Sample Method:**

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 10/26/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 7

Feather 31-15

BORING / WELL ID: BH40

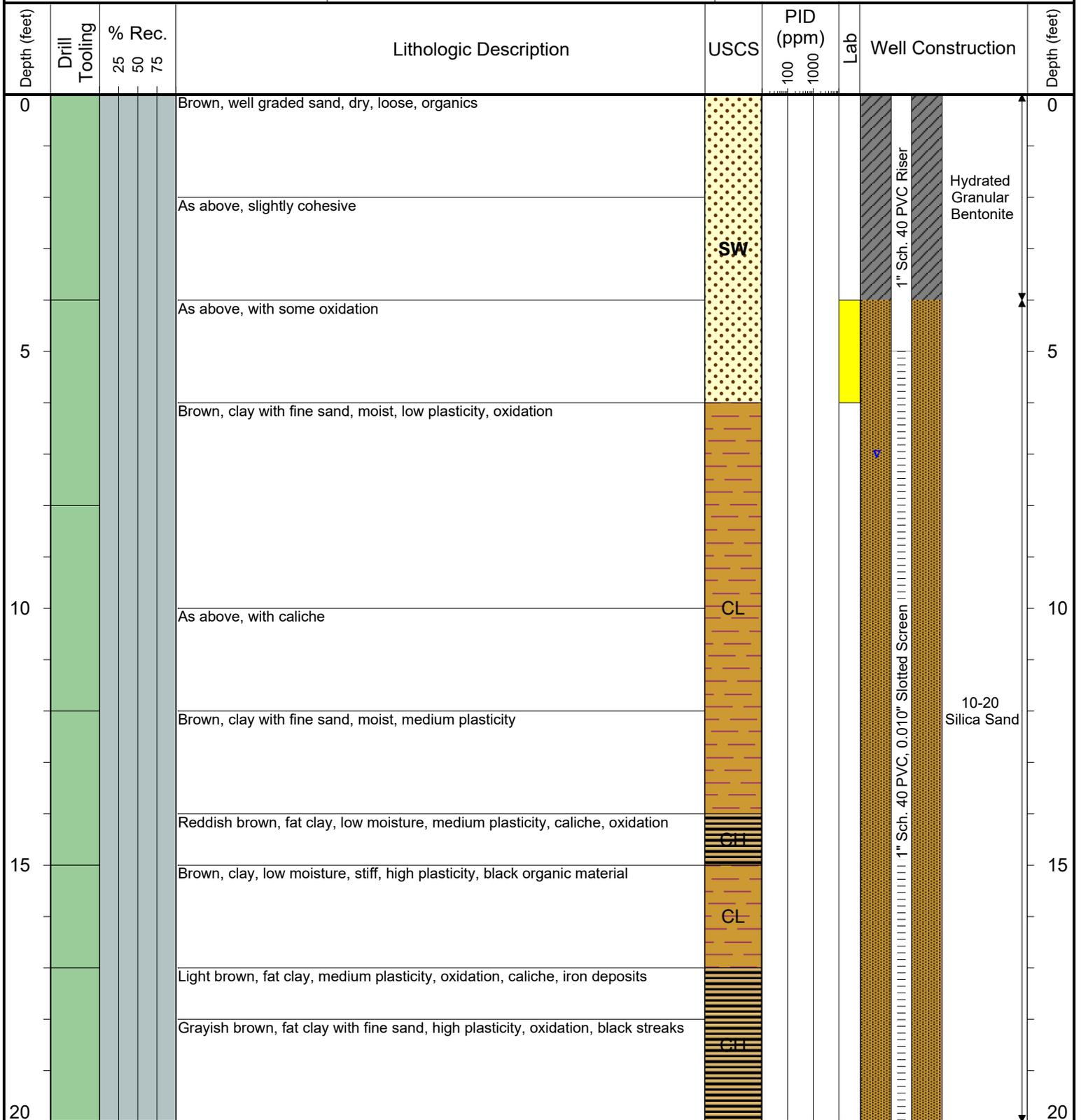
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14584322316

LONGITUDE (DECIMAL DEGREES): -104.53421308

CASING ELEVATION (FT. AMSL): 4960.6

GROUND ELEVATION (FT. AMSL): 4957.96



Drilling / Sample Method:

- Macro-Core
- Perforated Injection Tool
- Expendable Well Tip
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 10/26/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 7

Feather 31-15

BORING / WELL ID: BH41

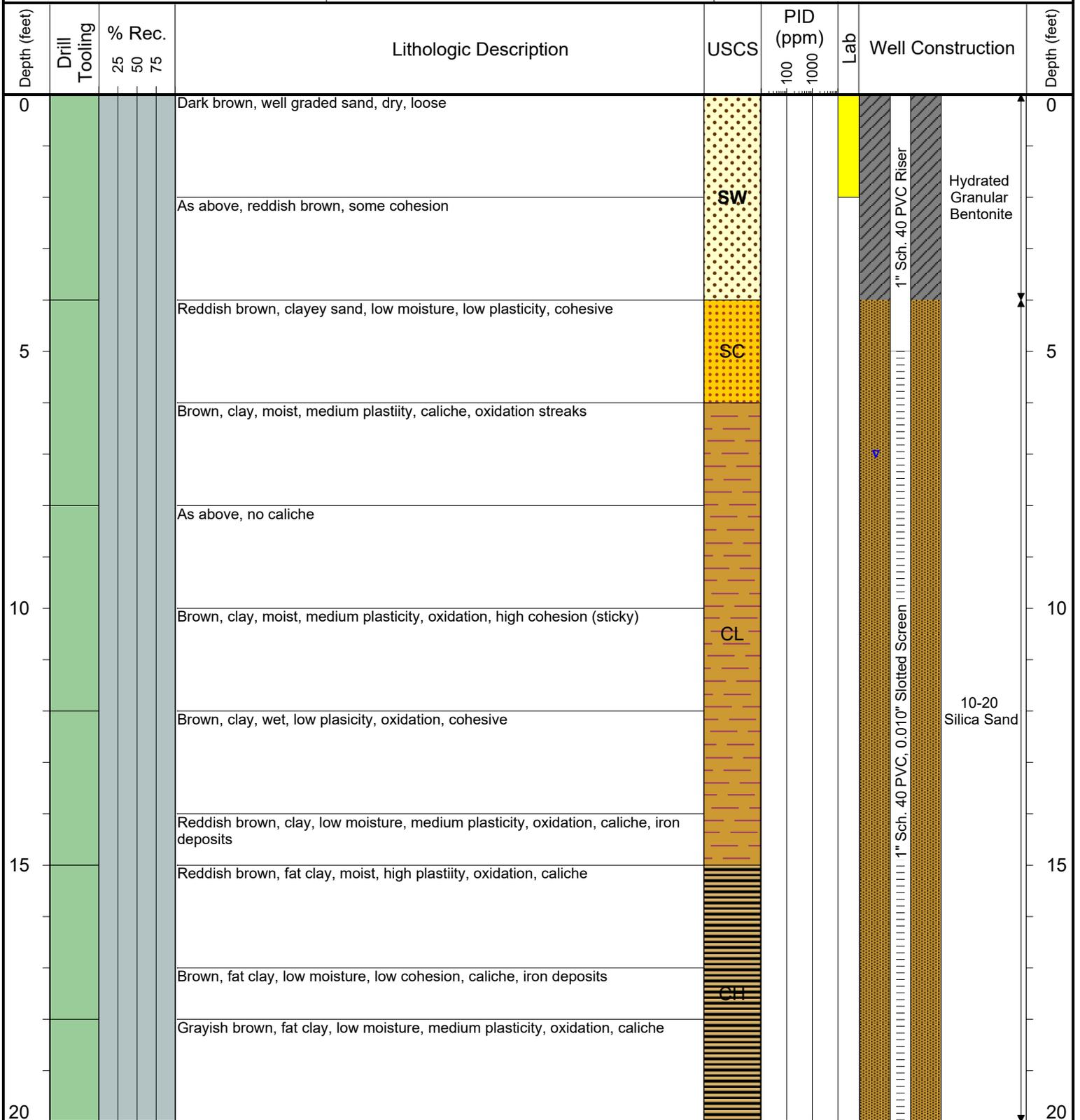
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14599104253

LONGITUDE (DECIMAL DEGREES): -104.53415657

CASING ELEVATION (FT. AMSL): 4959.08

GROUND ELEVATION (FT. AMSL): 4956.93



**Drilling / Sample Method:**

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 10/26/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 7

Feather 31-15

BORING / WELL ID: BH42

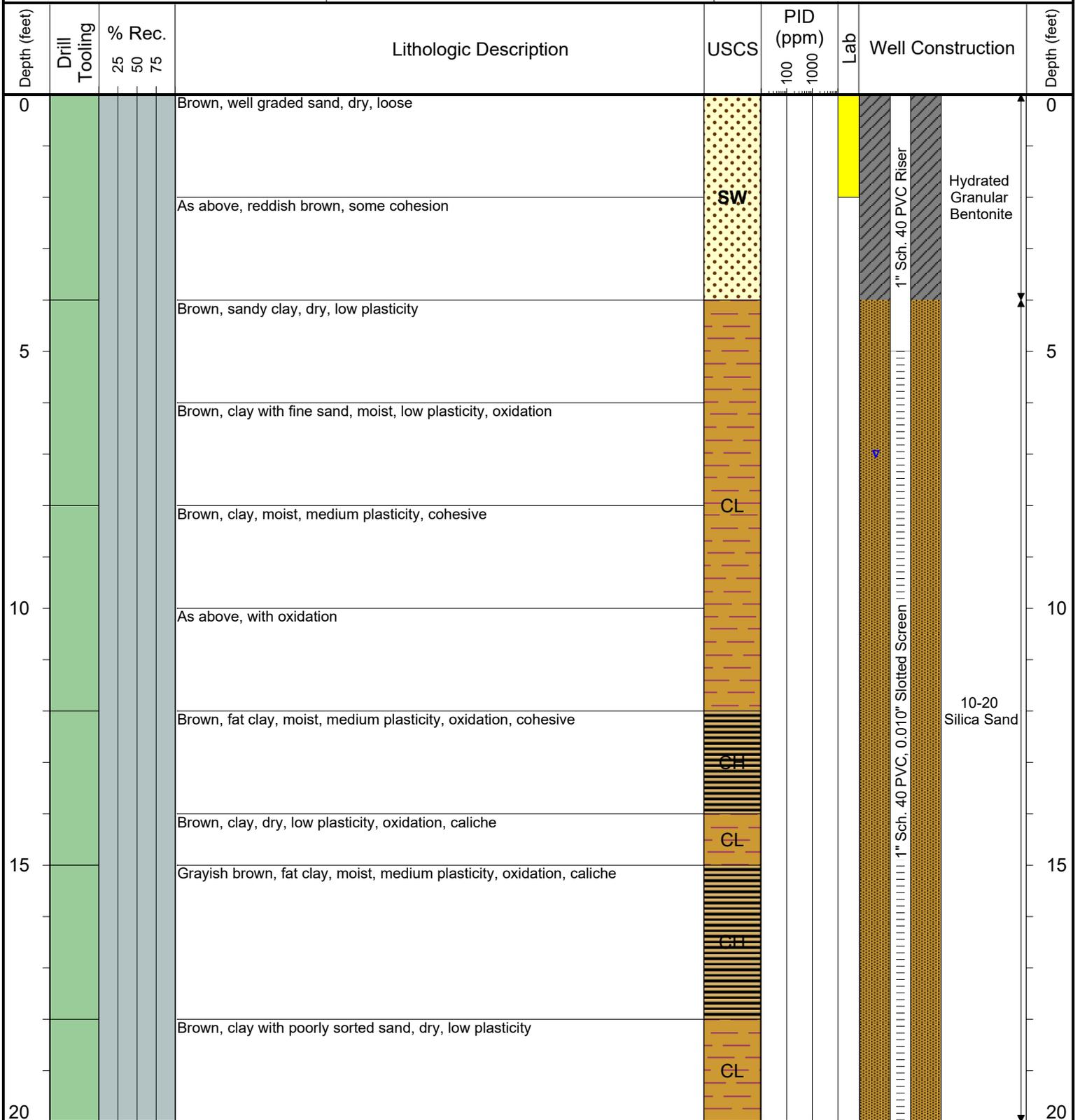
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14588238056

LONGITUDE (DECIMAL DEGREES): -104.53372624

CASING ELEVATION (FT. AMSL): 4959.24

GROUND ELEVATION (FT. AMSL): 4956.64



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 10/26/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 7.5

Feather 31-15

BORING / WELL ID: BH43

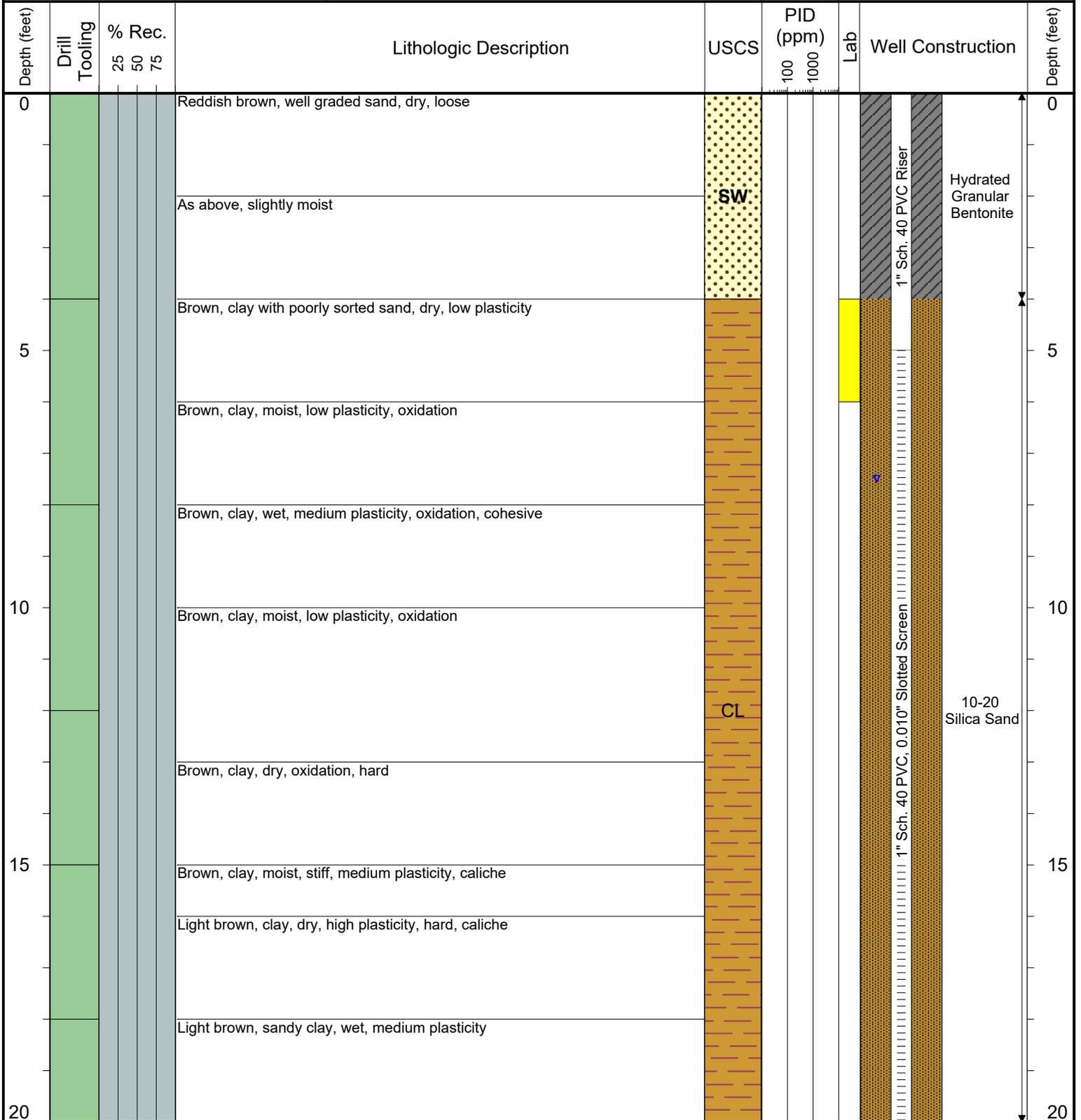
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14579281602

LONGITUDE (DECIMAL DEGREES): -104.53374572

CASING ELEVATION (FT. AMSL): 4959.74

GROUND ELEVATION (FT. AMSL): 4957.51



**Drilling / Sample Method:**

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 10/26/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 10

Feather 31-15

BORING / WELL ID: BH44

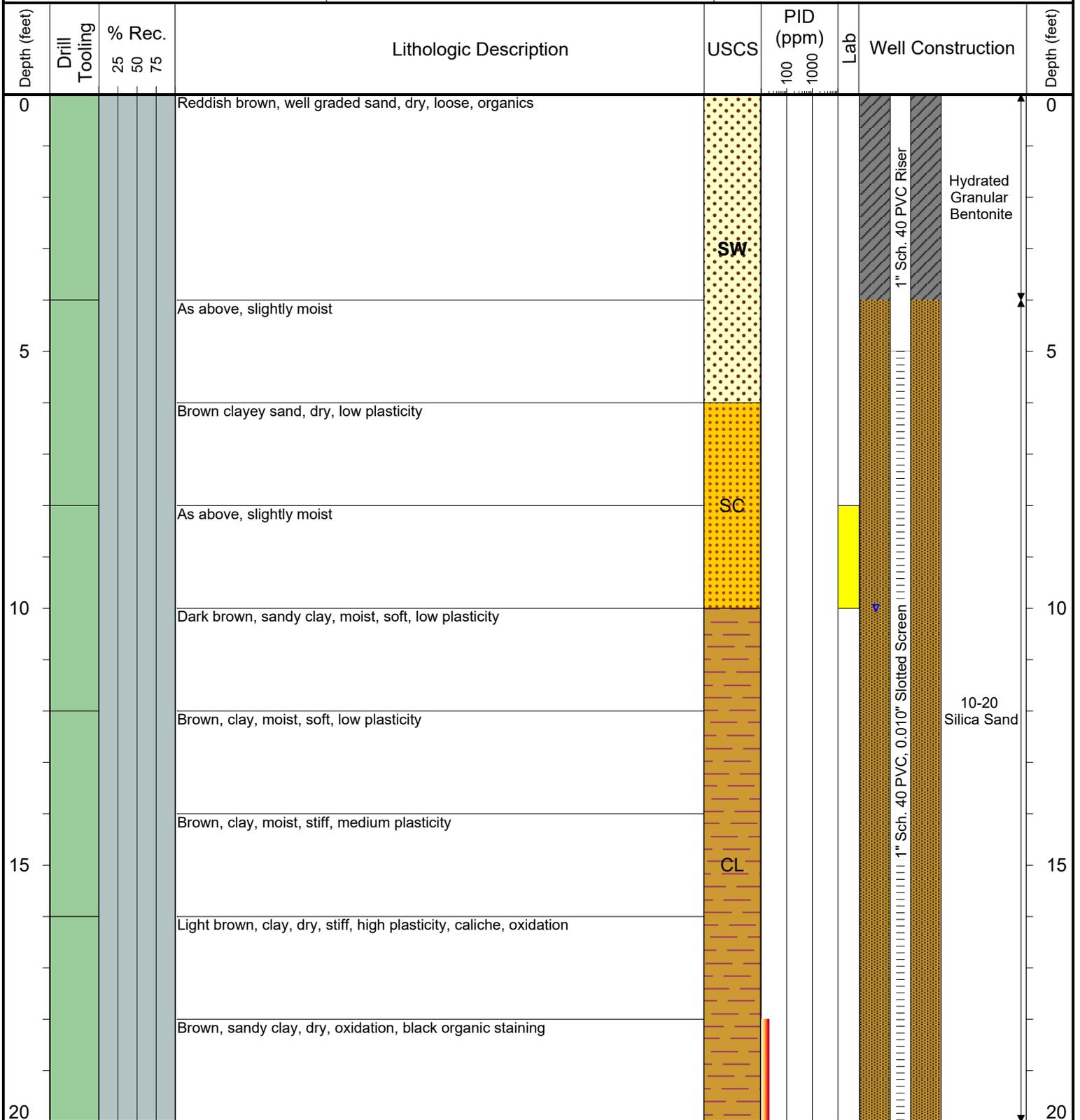
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14652913535

LONGITUDE (DECIMAL DEGREES): -104.53364928

CASING ELEVATION (FT. AMSL): 4955

GROUND ELEVATION (FT. AMSL): 4952.2



**Drilling / Sample Method:**

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- HydroPunch Groundwater Sampler

**Laboratory Sample Types:**

- Geotechnical Lab
- Analytical Chemistry Lab
- Geotechnical & Analytical Chemistry Lab



6899 Pecos Street, Unit C  
Denver, Colorado 80221

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LOGGED BY: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 10/26/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 10

Feather 31-15

BORING / WELL ID: BH45

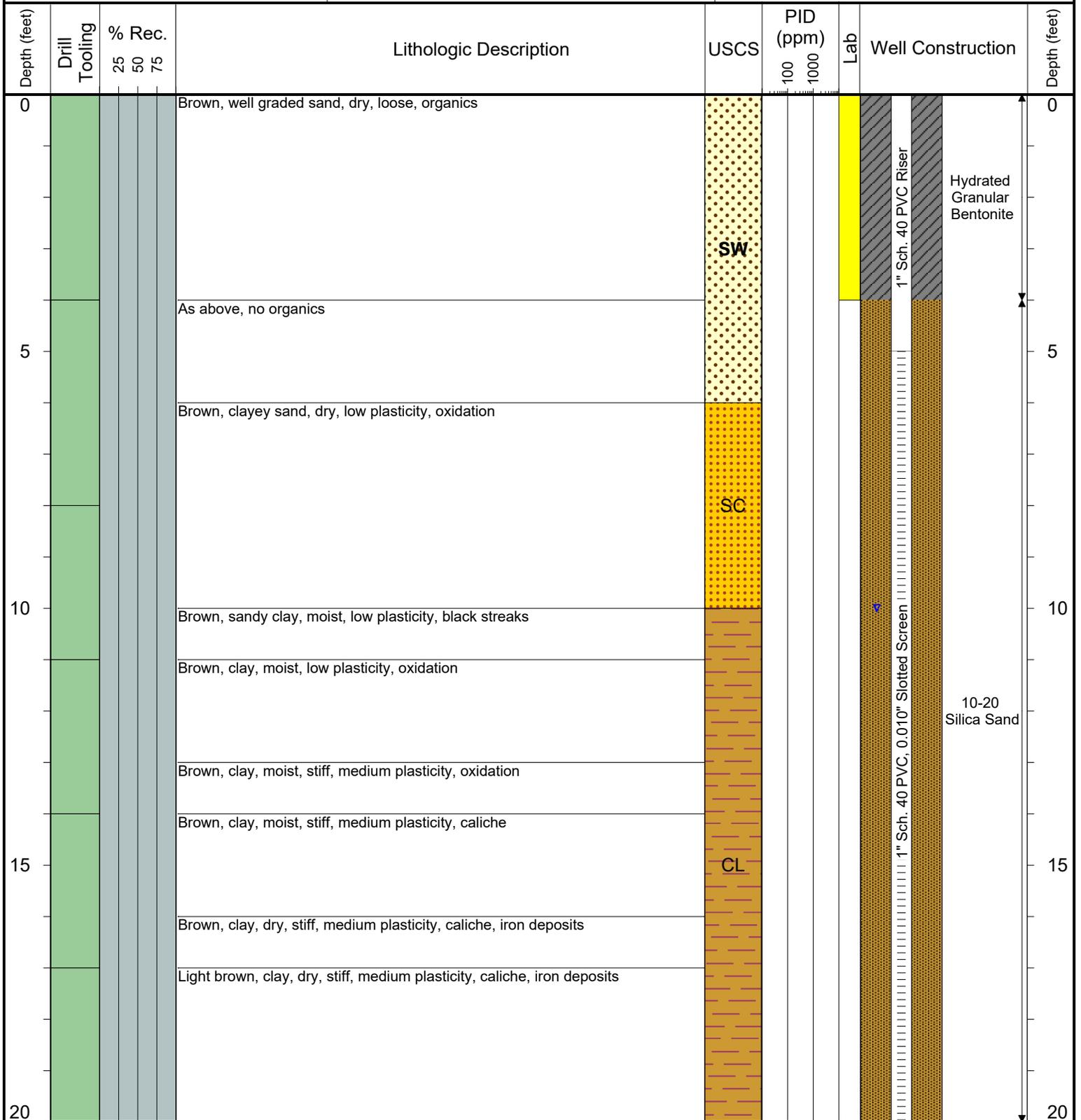
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14656439514

LONGITUDE (DECIMAL DEGREES): -104.53376503

CASING ELEVATION (FT. AMSL): 4954.87

GROUND ELEVATION (FT. AMSL): 4951.94



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 12/21/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 9

Feather 31-15

BORING / WELL ID: BH46

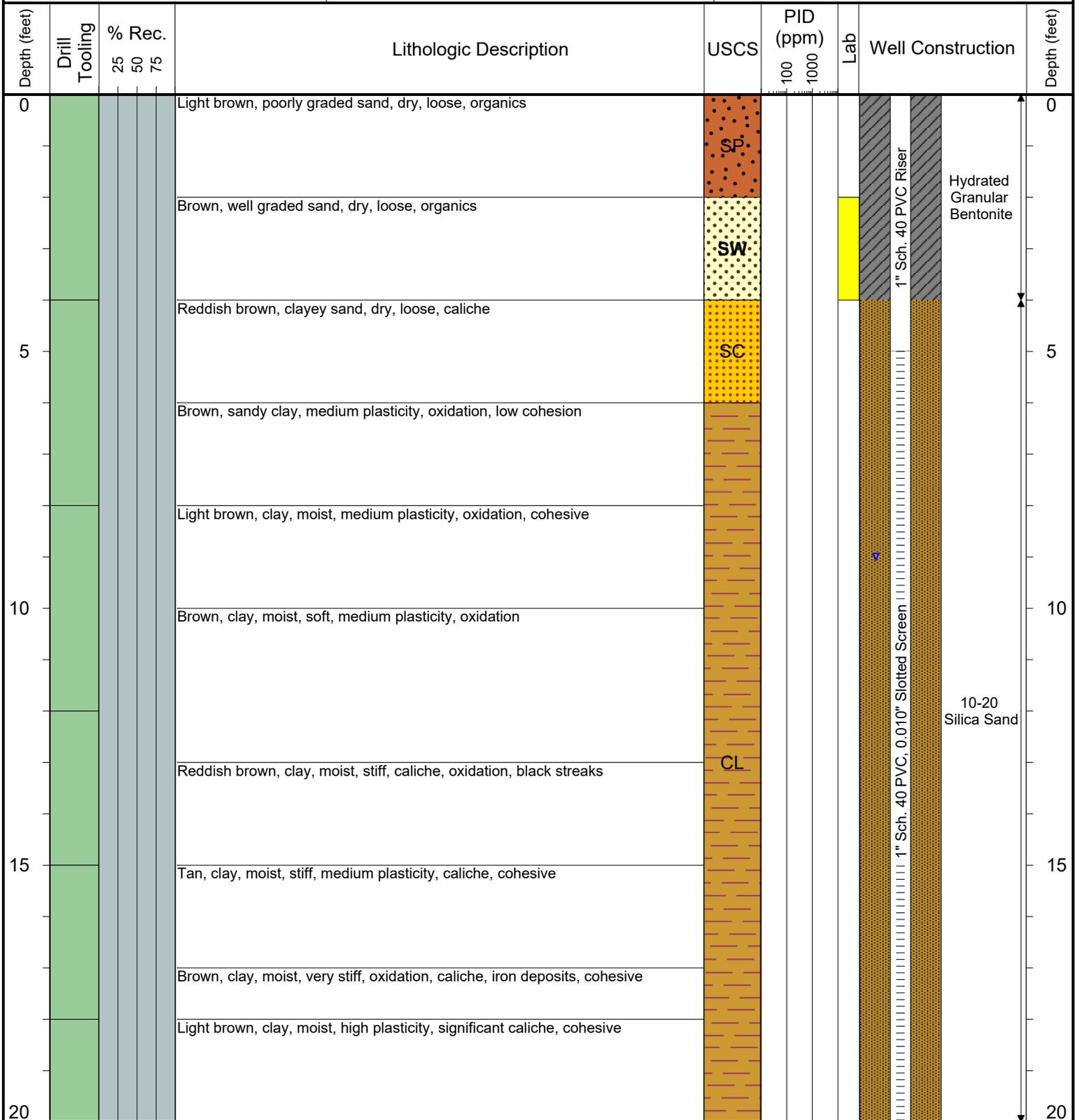
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14648652986

LONGITUDE (DECIMAL DEGREES): -104.53384930

CASING ELEVATION (FT. AMSL): 4955.31

GROUND ELEVATION (FT. AMSL): 4952.69



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 12/21/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 11

Feather 31-15

BORING / WELL ID: BH47

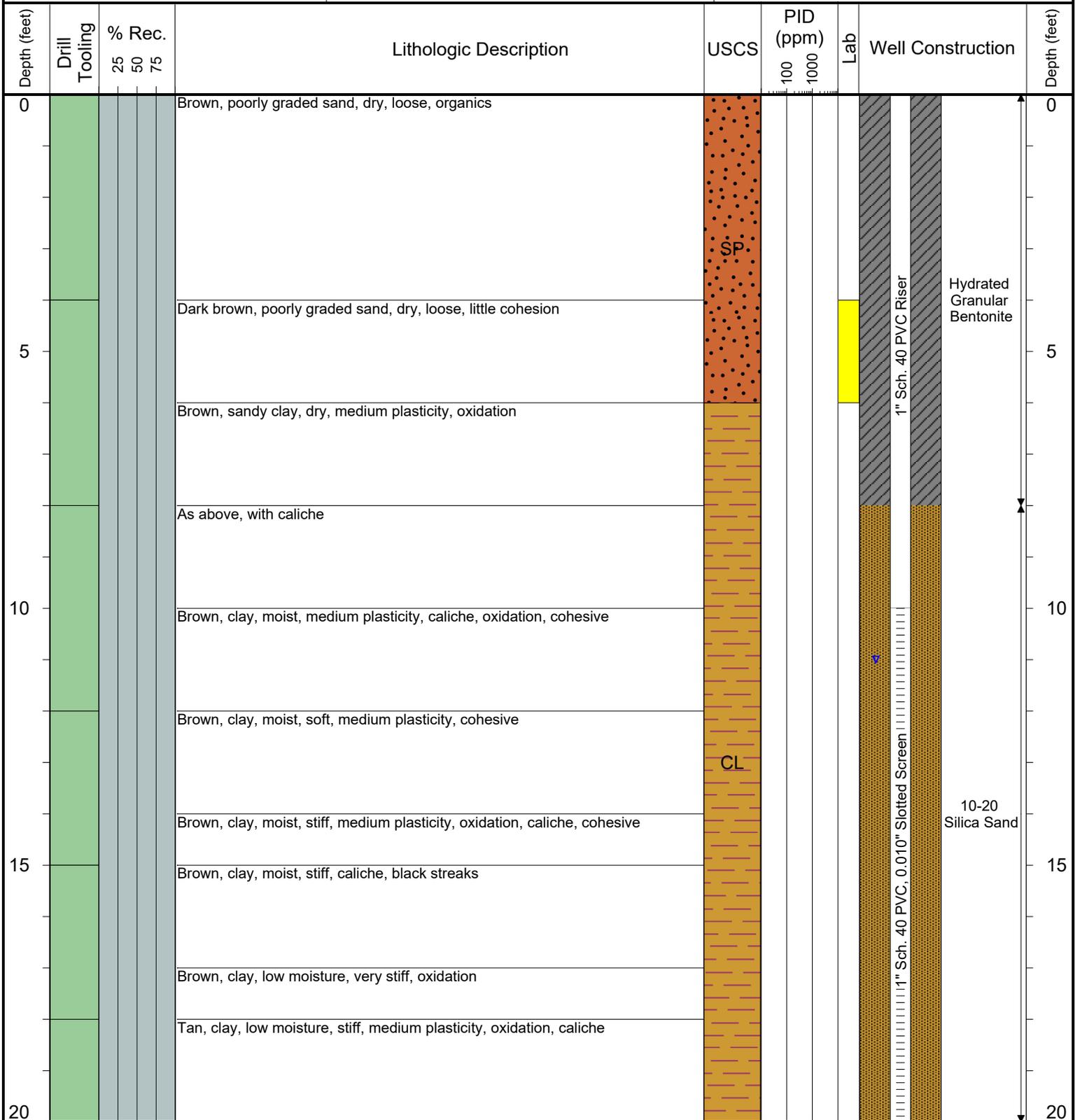
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14664030100

LONGITUDE (DECIMAL DEGREES): -104.53370584

CASING ELEVATION (FT. AMSL): 4954.6

GROUND ELEVATION (FT. AMSL): 4951.86



Drilling / Sample Method:

- Macro-Core
- Perforated Injection Tool
- Expendable Well Tip
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 12/21/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 11

Feather 31-15

BORING / WELL ID: BH48

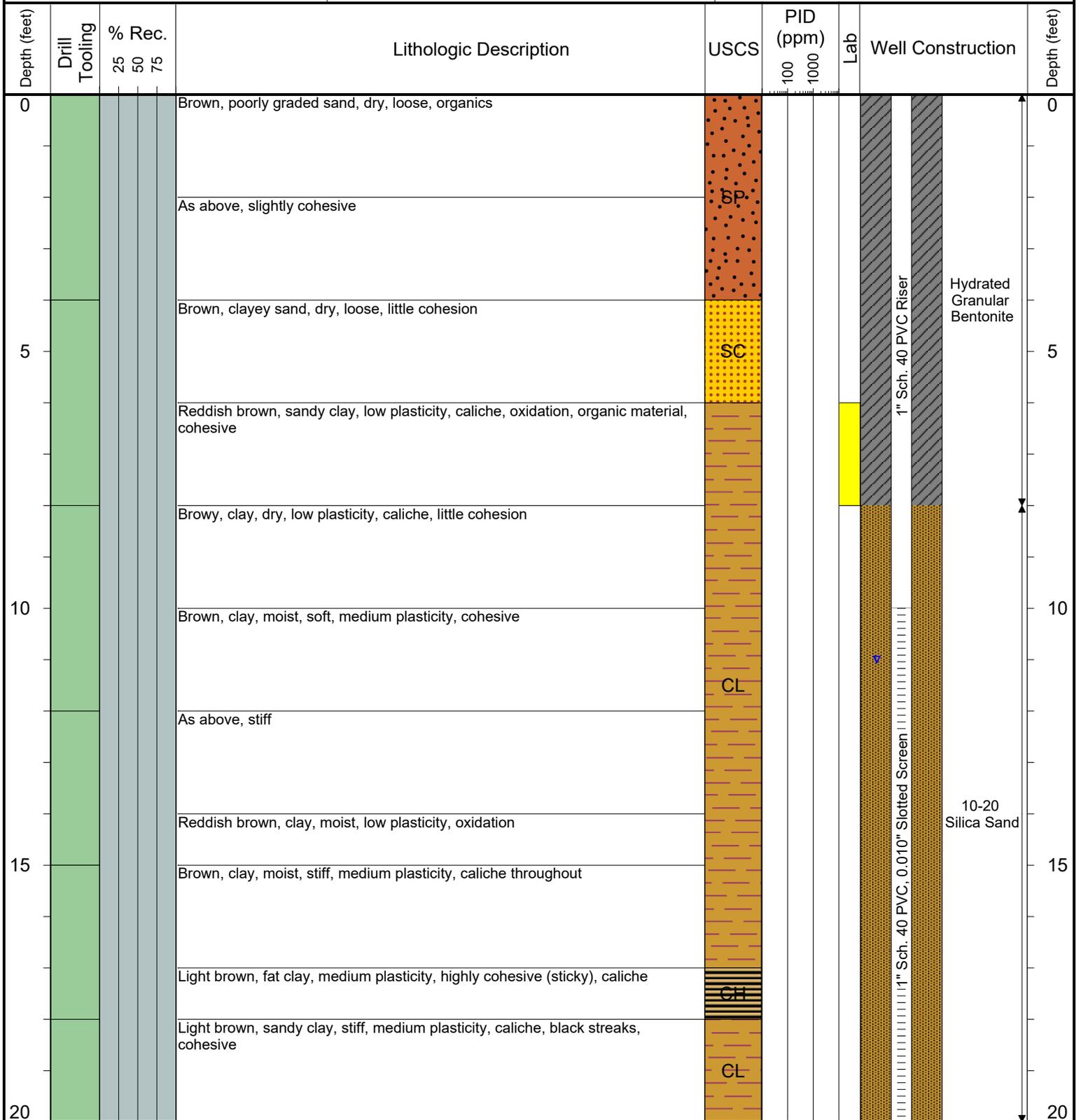
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14661700066

LONGITUDE (DECIMAL DEGREES): -104.53361500

CASING ELEVATION (FT. AMSL): 4954.71

GROUND ELEVATION (FT. AMSL): 4952.09



**Drilling / Sample Method:**

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 12/21/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 10

Feather 31-15

BORING / WELL ID: BH49

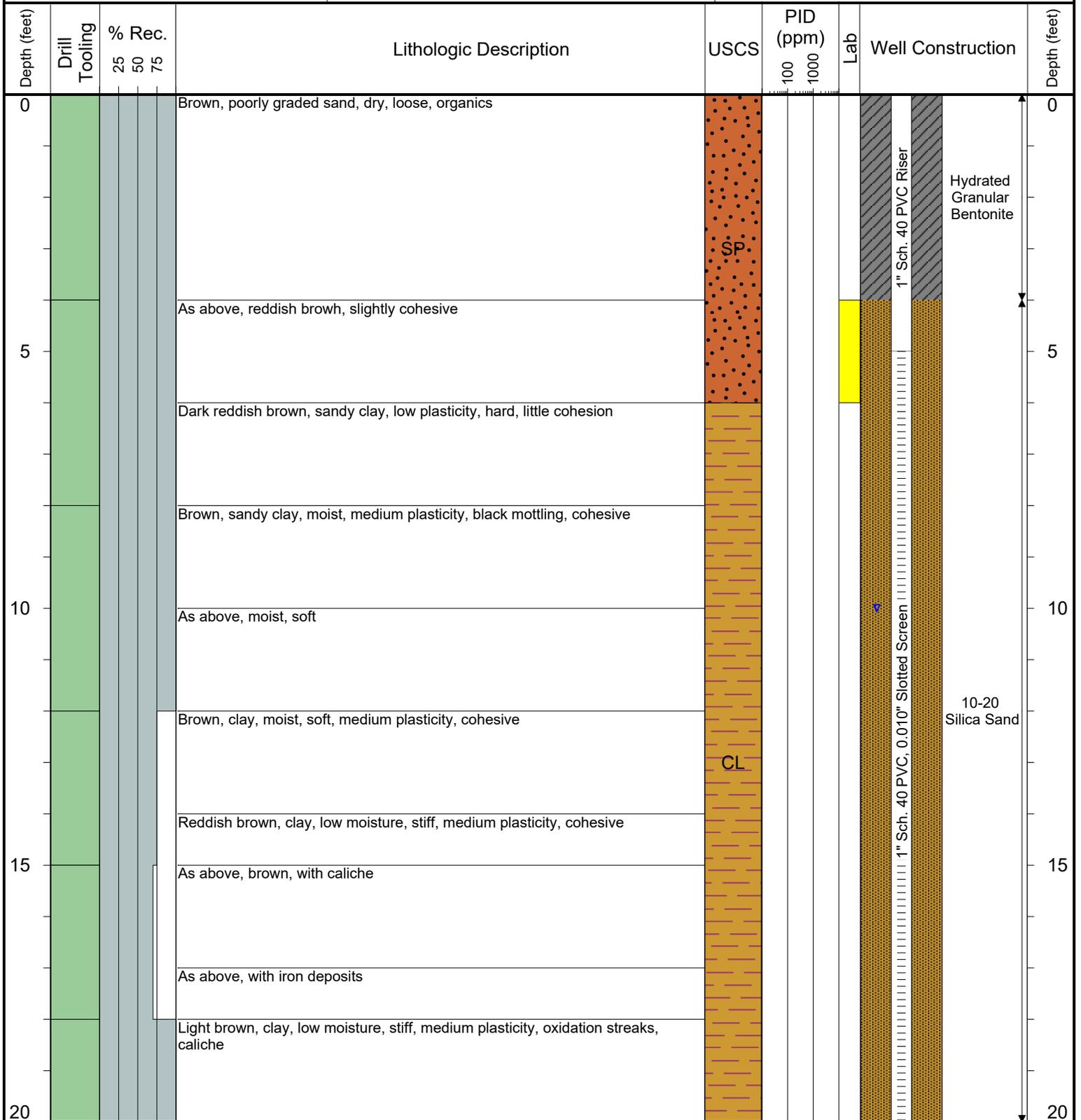
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14655582239

LONGITUDE (DECIMAL DEGREES): -104.53355333

CASING ELEVATION (FT. AMSL): 4954.51

GROUND ELEVATION (FT. AMSL): 4952.17



Drilling / Sample Method:

- Macro-Core
- Perforated Injection Tool
- Expendable Well Tip
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 12/21/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 9

Feather 31-15

BORING / WELL ID: BH50

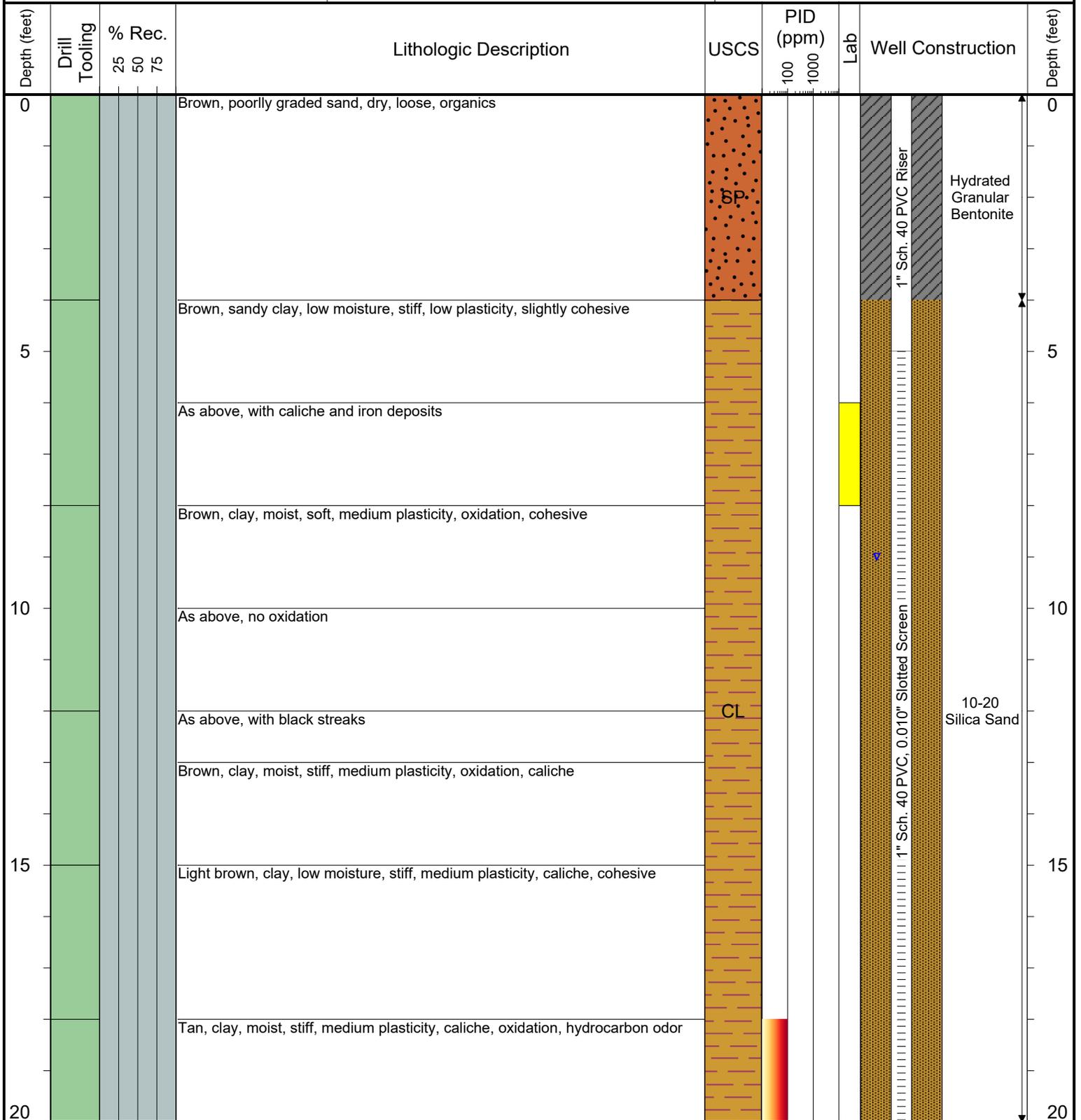
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14645197182

LONGITUDE (DECIMAL DEGREES): -104.53359423

CASING ELEVATION (FT. AMSL): 4955.18

GROUND ELEVATION (FT. AMSL): 4952.27



**Drilling / Sample Method:**

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 12/21/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 11.5

Feather 31-15

BORING / WELL ID: BH51

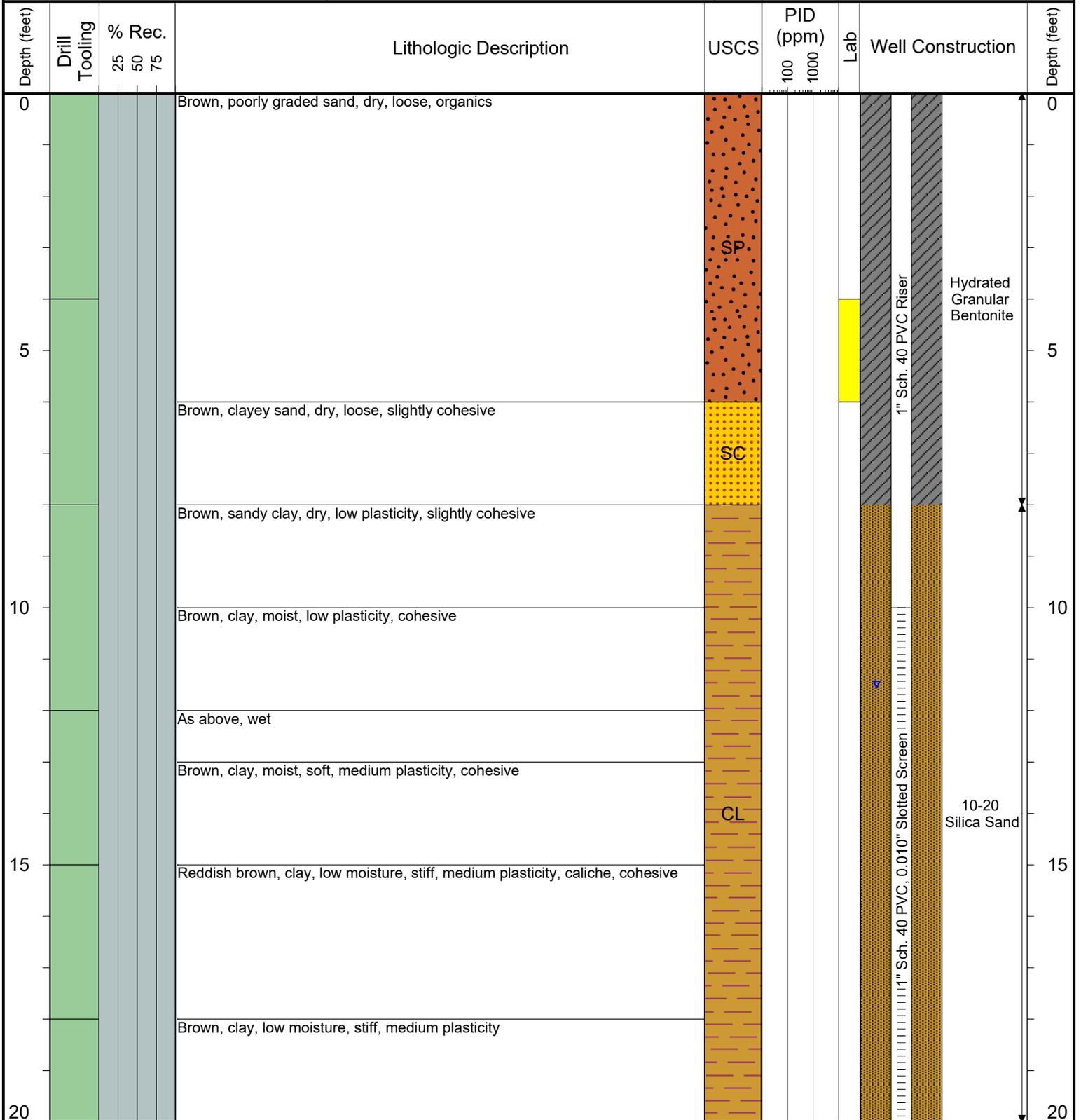
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14650539478

LONGITUDE (DECIMAL DEGREES): -104.53349494

CASING ELEVATION (FT. AMSL): 4955.85

GROUND ELEVATION (FT. AMSL): 4953.02



Drilling / Sample Method:

- Macro-Core
- Perforated Injection Tool
- Expendable Well Tip
- 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: Graham Besecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: AMS Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 12/22/2016

TOTAL WELL DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 10

Feather 31-15

BORING / WELL ID: BH52

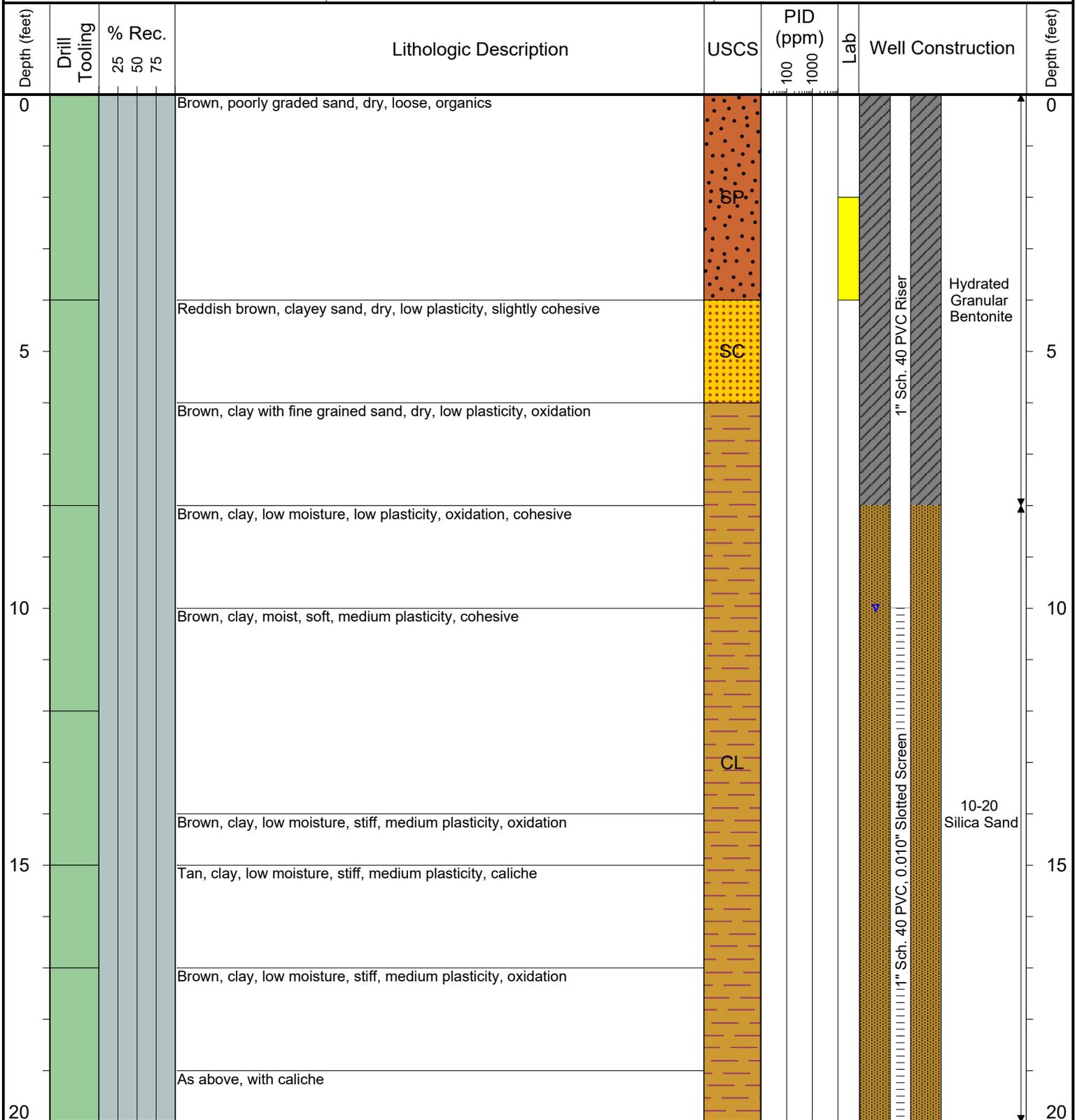
LOCATION: Weld County, Colorado

LATITUDE (DECIMAL DEGREES): 40.14641537064

LONGITUDE (DECIMAL DEGREES): -104.53349486

CASING ELEVATION (FT. AMSL): 4955.46

GROUND ELEVATION (FT. AMSL): 4952.96



Drilling / Sample Method:

- Macro-Core
- Expendable Well Tip
- Perforated Injection Tool
- 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

February 03, 2016

Brandon Bruns  
Tasman Geosciences  
6899 Pecos Street  
Denver, CO 80221  
RE: Feather 31-15

Enclosed are the results of analyses for samples received by Summit Scientific on 01/28/16 18:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Paul Shrewsbury  
President



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
02/03/16 08:37

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH03	1601242-01	Water	01/28/16 11:30	01/28/16 18:00
BH08	1601242-02	Water	01/28/16 11:30	01/28/16 18:00

---

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 Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
02/03/16 08:37

# Summit Scientific

1601242

741 Corporate Circle Suite 1 • Golden, Colorado 80401  
303-277-9310 • 303-277-9531 Fax

Client: Note Address: \_\_\_\_\_  
 City/State/Zip: \_\_\_\_\_ Project Manager: Brandon Bruns  
 Phone: 970 470 4042 Fax: \_\_\_\_\_ E-Mail: \_\_\_\_\_  
 Sampler Name: R. Irma Project Name: Feather 31-15  
 Project Number: \_\_\_\_\_ Page 1 of 1

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative			Matrix			Analyze For:			Special Instructions
				FICI	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)		
BH03	1/28/16	1130	3	X									
BH03	1/28/16	1130	3	X									
Relinquished by: <u>[Signature]</u>	Date/Time: <u>1/28/16</u>	Received by: <u>[Signature]</u>	Date/Time: <u>1/28/16</u>	Turn Around Time (Check)			Notes:						
Relinquished by: <u>[Signature]</u>	Date/Time: <u>1/28/16</u>	Received by: <u>[Signature]</u>	Date/Time: <u>1800</u>	Same Day	<input type="checkbox"/>	72 Hours	<input type="checkbox"/>	- On ice					
				24 Hours	<input type="checkbox"/>	Standard	<input checked="" type="checkbox"/>						
Relinquished by: <u>[Signature]</u>	Date/Time: <u>1/28/16</u>	Received in Lab by:	Date/Time: <u>1830</u>	Sample Integrity:									
				Temperature Upon Receipt: <u>3.4°C</u>									
				Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No									

www.summitscientific.com



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
02/03/16 08:37

**BH03**  
**1601242-01 (Water)**

**Summit Scientific**

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

Date Sampled: **01/28/16 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>940</b>	100	ug/l	100	1601280	02/01/16	02/01/16	EPA 8260B	
<b>Toluene</b>	<b>3700</b>	100	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>430</b>	100	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>7100</b>	100	"	"	"	"	"	"	

Date Sampled: **01/28/16 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		99.5 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		100 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		96.4 %	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
02/03/16 08:37

**BH08**  
**1601242-02 (Water)**

**Summit Scientific**

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

Date Sampled: **01/28/16 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1601280	02/01/16	02/01/16	EPA 8260B	
<b>Toluene</b>	<b>1.1</b>	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>3.2</b>	1.0	"	"	"	"	"	"	

Date Sampled: **01/28/16 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		93.8 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		97.2 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		101 %	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
02/03/16 08:37

### 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 1601280 - EPA 5030 Water MS

##### Blank (1601280-BLK1)

Prepared & Analyzed: 01/30/16

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	13.6		"	13.3		102	37-154			
Surrogate: Toluene-d8	13.1		"	13.3		98.0	45-149			
Surrogate: 4-Bromofluorobenzene	13.0		"	13.3		97.4	45-146			

##### LCS (1601280-BS1)

Prepared & Analyzed: 01/30/16

Benzene	40.9	1.0	ug/l	33.3		123	51-132			
Toluene	40.5	1.0	"	33.3		122	51-138			
Ethylbenzene	42.3	1.0	"	33.1		128	58-146			
m,p-Xylene	79.1	2.0	"	66.5		119	57-144			
o-Xylene	39.0	1.0	"	32.8		119	53-146			
Surrogate: 1,2-Dichloroethane-d4	13.8		"	13.3		104	37-154			
Surrogate: Toluene-d8	13.3		"	13.3		100	45-149			
Surrogate: 4-Bromofluorobenzene	13.2		"	13.3		99.3	45-146			

##### Matrix Spike (1601280-MS1)

Source: 1601233-02

Prepared & Analyzed: 01/30/16

Benzene	44.1	1.0	ug/l	33.3	3.58	122	34-141			
Toluene	44.2	1.0	"	33.3	4.16	120	27-151			
Ethylbenzene	43.2	1.0	"	33.1	ND	131	29-160			
m,p-Xylene	80.9	2.0	"	66.5	ND	122	20-166			
o-Xylene	40.2	1.0	"	32.8	ND	123	33-159			
Surrogate: 1,2-Dichloroethane-d4	13.9		"	13.3		104	37-154			
Surrogate: Toluene-d8	13.2		"	13.3		99.0	45-149			
Surrogate: 4-Bromofluorobenzene	13.5		"	13.3		101	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
02/03/16 08:37

**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 1601280 - EPA 5030 Water MS**

<b>Matrix Spike Dup (1601280-MSD1)</b>	<b>Source: 1601233-02</b>			<b>Prepared &amp; Analyzed: 01/30/16</b>						
Benzene	43.8	1.0	ug/l	33.3	3.58	121	34-141	0.751	32	
Toluene	44.5	1.0	"	33.3	4.16	121	27-151	0.631	25	
Ethylbenzene	44.4	1.0	"	33.1	ND	134	29-160	2.76	50	
m,p-Xylene	83.6	2.0	"	66.5	ND	126	20-166	3.34	36	
o-Xylene	40.8	1.0	"	32.8	ND	124	33-159	1.43	26	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>13.6</i>		<i>"</i>	<i>13.3</i>		<i>102</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>13.2</i>		<i>"</i>	<i>13.3</i>		<i>98.7</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>13.2</i>		<i>"</i>	<i>13.3</i>		<i>98.9</i>	<i>45-146</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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
02/03/16 08:37

### 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

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# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

August 31, 2016

Brandon Bruns  
Tasman Geosciences  
6899 Pecos Street  
Denver, CO 80221  
RE: Feather 31-15

Enclosed are the results of analyses for samples received by Summit Scientific on 08/25/16 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', written in a cursive style.

Paul Shrewsbury  
President



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
08/31/16 13:13

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH16@11'	1608208-01	Soil	08/25/16 09:35	08/25/16 15:50
BH10@8'	1608208-02	Soil	08/25/16 10:20	08/25/16 15:50
BH11@08'	1608208-03	Soil	08/25/16 11:00	08/25/16 15:50
BH12@7'	1608208-04	Soil	08/25/16 11:45	08/25/16 15:50
BH13@8'	1608208-05	Soil	08/25/16 12:30	08/25/16 15:50
BH14@8'	1608208-06	Soil	08/25/16 13:20	08/25/16 15:50
BH15@7'	1608208-07	Soil	08/25/16 14:25	08/25/16 15:50

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
08/31/16 13:13

# Summit Scientific

1608208

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

Client: Noble Energy/Tasman Project Manager: Brandon Bruns Invoice: Jacob Evans Page 1 of 1  
Address: \_\_\_\_\_ E-Mail: \_\_\_\_\_  
City/State/Zip: \_\_\_\_\_  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
Sampler Name: Eric Siegel Project Name: Feather 31-15 Project Number: \_\_\_\_\_

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative			Matrix		Analysis Requested			Special Instructions
					HCl	HNO3	None	Other (Specify)	Groundwater	Soil	Air-Canister #	Other (Specify)	
1	BH09E 11'	8/25/16	4:35	1			X				X	X	
2	BH10E 5'		10:20	1			X				X	X	
3	BH11E 11'		11:00	1			X				X	X	
4	BH12E 7'		11:45	1			X				X	X	
5	BH13E 8'		12:30	1			X				X	X	
6	BH14E 5'		13:20	1			X				X	X	
7	BH15E 7'	✓	14:25	1			X				X	X	
8													
9													
10													

Relinquished by: <u>E.A. And</u> Date/Time: <u>8/25/16 15:50</u>	Received by: <u>[Signature]</u> Date/Time: <u>8/25/16 15:50</u>	Turn Around Time (Check) Same Day _____ 72 hours _____ 24 hours _____ Standard <input checked="" type="checkbox"/> 48 hours _____ Sample Integrity: Temperature Upon Receipt: <u>-3.2°C</u> Intact: <input checked="" type="radio"/> Yes <input type="radio"/> No	Notes: <u>on ice</u>
Relinquished by: <u>[Signature]</u> Date/Time: <u>8/25/16 1745</u>	Received by: <u>[Signature]</u> Date/Time: <u>8-25-16 1745</u>		
Relinquished by: _____ Date/Time: _____	Received by: _____ Date/Time: _____		

www.s2scientific.com



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
08/31/16 13:13

**Sample Receipt Checklist**

S2 Work Order: 1608208

Client: Noble Energy/Tasman Client Project ID: Feather 31-15

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

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

Cooler ID					
Temp (°C)	- 3.2				

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature just above 0°C to ≤ 6°C <sup>(1)</sup> ?		✓		
NOTE: If samples are delivered the same day of sampling, this requirement is waived provided that there is evidence that cooling has begun.				
Were all samples received intact <sup>(1)</sup> ?	✓			
Was adequate sample volume provided <sup>(1)</sup> ?	✓			
If custody seals are present, are they intact <sup>(1)</sup> ?			✓	
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 <sup>(1)</sup> ?	✓			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	✓			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	✗	✓		
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	✓			BH11@11' on COC, on Jar BH11@8'
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.			✓	
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ?			✓	
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect				
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ?			✓	
Record the pH in Comments.				
If dissolved metals are requested, were samples field filtered?			✓	
Additional Comments (if any):				

<sup>(1)</sup> 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

8/29/16 1600  
Date/Time

[Signature]



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
08/31/16 13:13

**BH16@11'**  
**1608208-01 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **08/25/16 09:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1608287	08/29/16	08/30/16	8015M	

Date Sampled: **08/25/16 09:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		94.1 %	30-150		"	"	"	"	

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

Date Sampled: **08/25/16 09:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1608286	08/29/16	08/30/16	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: **08/25/16 09:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		117 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.3 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.5 %	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
08/31/16 13:13

**BH10@8'**  
**1608208-02 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **08/25/16 10:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1608287	08/29/16	08/30/16	8015M	

Date Sampled: **08/25/16 10:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		94.4 %	30-150		"	"	"	"	

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

Date Sampled: **08/25/16 10:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1608286	08/29/16	08/30/16	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: **08/25/16 10:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		110 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		96.4 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.6 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
08/31/16 13:13

**BH11@08'**  
**1608208-03 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **08/25/16 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1608287	08/29/16	08/30/16	8015M	

Date Sampled: **08/25/16 11:00**

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

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

Date Sampled: **08/25/16 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1608286	08/29/16	08/30/16	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: **08/25/16 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		112 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.9 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.2 %	21-167		"	"	"	"	

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
08/31/16 13:13

**BH12@7'**  
**1608208-04 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **08/25/16 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1608287	08/29/16	08/30/16	8015M	

Date Sampled: **08/25/16 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		94.2 %	30-150		"	"	"	"	

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

Date Sampled: **08/25/16 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1608286	08/29/16	08/30/16	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: **08/25/16 11:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		120 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.7 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.8 %	21-167		"	"	"	"	

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
08/31/16 13:13

**BH13@8'**  
**1608208-05 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **08/25/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1608287	08/29/16	08/30/16	8015M	

Date Sampled: **08/25/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		96.8 %	30-150		"	"	"	"	

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

Date Sampled: **08/25/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1608286	08/29/16	08/30/16	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: **08/25/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		117 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.1 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.2 %	21-167		"	"	"	"	

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
08/31/16 13:13

**BH14@8'**  
**1608208-06 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **08/25/16 13:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1608287	08/29/16	08/30/16	8015M	

Date Sampled: **08/25/16 13:20**

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

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

Date Sampled: **08/25/16 13:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1608286	08/29/16	08/30/16	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: **08/25/16 13:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		116 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		96.8 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.7 %	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
08/31/16 13:13

**BH15@7'**  
**1608208-07 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **08/25/16 14:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1608287	08/29/16	08/30/16	8015M	

Date Sampled: **08/25/16 14:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		94.4 %	30-150		"	"	"	"	

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

Date Sampled: **08/25/16 14:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1608286	08/29/16	08/30/16	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: **08/25/16 14:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		124 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.5 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.2 %	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
08/31/16 13:13

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

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

**Batch 1608287 - EPA 3550A**

**Blank (1608287-BLK1)**

Prepared & Analyzed: 08/29/16

C10-C28 (DRO)	ND	50	mg/kg							
Surrogate: <i>o</i> -Terphenyl	12.6		"	12.5		101	30-150			

**LCS (1608287-BS1)**

Prepared & Analyzed: 08/29/16

C10-C28 (DRO)	449	50	mg/kg	499		90.0	73-134			
Surrogate: <i>o</i> -Terphenyl	12.8		"	12.5		102	30-150			

**Matrix Spike (1608287-MS1)**

Source: 1608231-03

Prepared & Analyzed: 08/29/16

C10-C28 (DRO)	472	50	mg/kg	484	8.94	95.5	50-148			
Surrogate: <i>o</i> -Terphenyl	12.3		"	12.1		101	30-150			

**Matrix Spike Dup (1608287-MSD1)**

Source: 1608231-03

Prepared & Analyzed: 08/29/16

C10-C28 (DRO)	425	50	mg/kg	461	8.94	90.1	50-148	10.5	20	
Surrogate: <i>o</i> -Terphenyl	11.7		"	11.6		101	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
08/31/16 13:13

**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 1608286 - EPA 5030 Soil MS**

**Blank (1608286-BLK1)**

Prepared: 08/29/16 Analyzed: 08/30/16

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>0.0379</i>		<i>"</i>	<i>0.0400</i>		<i>94.6</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0383</i>		<i>"</i>	<i>0.0400</i>		<i>95.8</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0384</i>		<i>"</i>	<i>0.0400</i>		<i>96.0</i>	<i>21-167</i>			

**LCS (1608286-BS1)**

Prepared: 08/29/16 Analyzed: 08/30/16

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.0769	0.0020	"	0.100		76.9	58-130			
Toluene	0.0843	0.0050	"	0.100		84.3	61-134			
Ethylbenzene	0.0955	0.0050	"	0.0992		96.3	74-139			
m,p-Xylene	0.194	0.010	"	0.200		97.0	73-137			
o-Xylene	0.105	0.0050	"	0.0980		107	73-141			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0409</i>		<i>"</i>	<i>0.0400</i>		<i>102</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0371</i>		<i>"</i>	<i>0.0400</i>		<i>92.8</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0385</i>		<i>"</i>	<i>0.0400</i>		<i>96.2</i>	<i>21-167</i>			

**Matrix Spike (1608286-MS1)**

Source: 1608231-03

Prepared: 08/29/16 Analyzed: 08/30/16

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.0718	0.0020	"	0.0899	0.0495	24.8	24-131			
Toluene	0.0771	0.0050	"	0.0899	ND	85.7	30-134			
Ethylbenzene	0.0833	0.0050	"	0.0892	ND	93.3	22-153			
m,p-Xylene	0.173	0.010	"	0.179	0.0146	88.5	10-159			
o-Xylene	0.0944	0.0050	"	0.0881	0.00349	103	31-151			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0429</i>		<i>"</i>	<i>0.0360</i>		<i>119</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0345</i>		<i>"</i>	<i>0.0360</i>		<i>95.9</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0354</i>		<i>"</i>	<i>0.0360</i>		<i>98.6</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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
08/31/16 13:13

**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 1608286 - EPA 5030 Soil MS**

**Matrix Spike Dup (1608286-MSD1)**

Source: 1608231-03

Prepared: 08/29/16

Analyzed: 08/30/16

Naphthalene	ND	0.010	mg/kg		ND		10-158		42	
Benzene	0.0758	0.0020	"	0.0951	0.0495	27.7	24-131	5.39	34	
Toluene	0.0824	0.0050	"	0.0951	ND	86.7	30-134	6.73	30	
Ethylbenzene	0.0903	0.0050	"	0.0943	ND	95.8	22-153	8.16	24	
m,p-Xylene	0.187	0.010	"	0.190	0.0146	90.9	10-159	7.56	68	
o-Xylene	0.101	0.0050	"	0.0932	0.00349	104	31-151	6.60	38	
Surrogate: 1,2-Dichloroethane-d4	0.0439		"	0.0380		115	23-173			
Surrogate: Toluene-d8	0.0360		"	0.0380		94.7	20-170			
Surrogate: 4-Bromofluorobenzene	0.0367		"	0.0380		96.4	21-167			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
08/31/16 13:13

### 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

September 22, 2016

Brandon Bruns  
Tasman Geosciences  
6899 Pecos Street  
Denver, CO 80221  
RE: Feather 31-15

Enclosed are the results of analyses for samples received by Summit Scientific on 09/21/16 17:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Paul Shrewsbury  
President



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
09/22/16 06:16

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH17@6'-7'	1609128-01	Soil	09/21/16 10:20	09/21/16 17:30
BH18@8'-9'	1609128-02	Soil	09/21/16 10:45	09/21/16 17:30
BH19@6'-7'	1609128-03	Soil	09/21/16 12:00	09/21/16 17:30
BH20@7'-8'	1609128-04	Soil	09/21/16 12:45	09/21/16 17:30
BH21@4'-6'	1609128-05	Soil	09/21/16 14:05	09/21/16 17:30
BH22@4'-6'	1609128-06	Soil	09/21/16 15:00	09/21/16 17:30

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
09/22/16 06:16

1609128

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

Client: Noble/Tasman Page 1 of 1  
 Address: \_\_\_\_\_  
 City/State/Zip: \_\_\_\_\_ Project Manager: Brandon Bruns, Invoice: Jacob Evans  
 Phone: 303-487-1228 Fax: \_\_\_\_\_ E-Mail: BBruns@tasman-geo.com  
 Sampler Name: Graham Baselet Project Name: Feather 31-15  
 Project Number: \_\_\_\_\_

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative			Matrix		Analyze For:				Special Instructions		
				HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	8260 BTEX		8260 GBTEXN	8015 DROGRO
BH17@6'-7'	9-21-16	1020	1			X									
BH18@8'-9'	9-21-16	1045	1			X									
BH19@6'-7'	9-21-16	1200	1			X									
BH20@7'-8'	9-21-16	1245	1			X									
BH21@4'-6'	9-21-16	1405	1			X									
BH22@4'-6'	9-21-16	1500	1			X									

Relinquished by: <u>[Signature]</u> Date/Time: <u>9-21-16 1700</u>	Received by: <u>[Signature]</u> Date/Time: <u>9/21/16 1700</u>	Turn Around Time (Check) Same Day <input checked="" type="checkbox"/> 72 Hours <input type="checkbox"/> 24 Hours <input type="checkbox"/> Standard <input type="checkbox"/> 48 Hours <input type="checkbox"/>  Sample Integrity: Temperature Upon Receipt: <u>4.9C</u> Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Notes:  <u>on ice</u>
Relinquished by: <u>[Signature]</u> Date/Time: <u>9/21/16 1730</u>	Received by: <u>[Signature]</u> Date/Time: <u>9-21-16 1730</u>		
Relinquished by: _____ Date/Time: _____	Received in Lab by: _____ Date/Time: _____		

www.summitscientific.com



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
09/22/16 06:16

**Sample Receipt Checklist**

S2 Work Order: 1609128  
Client: Noble/Tasman Client Project ID: Feather 31-15  
Shipped 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)	49				

Thermometer ID: 61857155-K

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

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

Nakitz  
Custodian Printed Name

[Signature]  
Signature or Initials of Custodian

1/21/16 1730  
Date/Time

[Signature]



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
09/22/16 06:16

**BH17@6'-7'**  
**1609128-01 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/21/16 10:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609165	09/21/16	09/21/16	8015M	

Date Sampled: **09/21/16 10:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		92.2 %	30-150		"	"	"	"	

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

Date Sampled: **09/21/16 10:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1609164	09/21/16	09/21/16	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: **09/21/16 10:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		113 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.8 %	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
09/22/16 06:16

**BH18@8'-9'**  
**1609128-02 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/21/16 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609165	09/21/16	09/21/16	8015M	

Date Sampled: **09/21/16 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		91.7 %	30-150		"	"	"	"	

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

Date Sampled: **09/21/16 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1609164	09/21/16	09/21/16	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: **09/21/16 10:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		111 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.9 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.2 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
09/22/16 06:16

**BH19@6'-7'**  
**1609128-03 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/21/16 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609165	09/21/16	09/21/16	8015M	

Date Sampled: **09/21/16 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		92.4 %	30-150		"	"	"	"	

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

Date Sampled: **09/21/16 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1609164	09/21/16	09/21/16	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
<b>Toluene</b>	<b>0.0060</b>	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.013</b>	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **09/21/16 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		106 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.7 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
09/22/16 06:16

**BH20@7'-8'**  
**1609128-04 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/21/16 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609165	09/21/16	09/21/16	8015M	

Date Sampled: **09/21/16 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		92.1 %	30-150		"	"	"	"	

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

Date Sampled: **09/21/16 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1609164	09/21/16	09/21/16	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: **09/21/16 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.3 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
09/22/16 06:16

**BH21@4'-6'**  
**1609128-05 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/21/16 14:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609165	09/21/16	09/21/16	8015M	

Date Sampled: **09/21/16 14:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		90.7 %	30-150		"	"	"	"	

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

Date Sampled: **09/21/16 14:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1609164	09/21/16	09/21/16	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: **09/21/16 14:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		110 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.3 %	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
09/22/16 06:16

**BH22@4'-6'**  
**1609128-06 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/21/16 15:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609165	09/21/16	09/21/16	8015M	

Date Sampled: **09/21/16 15:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		89.6 %	30-150		"	"	"	"	

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

Date Sampled: **09/21/16 15:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1609164	09/21/16	09/21/16	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: **09/21/16 15:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		117 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
09/22/16 06:16

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

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

**Batch 1609165 - EPA 3550A**

**Blank (1609165-BLK1)**

Prepared & Analyzed: 09/21/16

C10-C28 (DRO)	ND	50	mg/kg							
Surrogate: <i>o</i> -Terphenyl	20.1		"	12.5		161	30-150			S-07

**LCS (1609165-BS1)**

Prepared & Analyzed: 09/21/16

C10-C28 (DRO)	464	50	mg/kg	499		93.1	73-134			
Surrogate: <i>o</i> -Terphenyl	12.2		"	12.5		97.6	30-150			

**Matrix Spike (1609165-MS1)**

Source: 1609128-01

Prepared & Analyzed: 09/21/16

C10-C28 (DRO)	414	50	mg/kg	447	9.16	90.6	50-148			
Surrogate: <i>o</i> -Terphenyl	10.6		"	11.2		94.9	30-150			

**Matrix Spike Dup (1609165-MSD1)**

Source: 1609128-01

Prepared & Analyzed: 09/21/16

C10-C28 (DRO)	417	50	mg/kg	447	9.16	91.2	50-148	0.658	20	
Surrogate: <i>o</i> -Terphenyl	10.7		"	11.2		95.2	30-150			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
09/22/16 06:16

**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 1609164 - EPA 5030 Soil MS**

**Blank (1609164-BLK1)**

Prepared & Analyzed: 09/21/16

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>0.0403</i>		<i>"</i>	<i>0.0400</i>		<i>101</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0396</i>		<i>"</i>	<i>0.0400</i>		<i>99.1</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0387</i>		<i>"</i>	<i>0.0400</i>		<i>96.8</i>	<i>21-167</i>			

**LCS (1609164-BS1)**

Prepared & Analyzed: 09/21/16

Naphthalene	0.0131	0.010	mg/kg				66-138			
Benzene	0.129	0.0020	"	0.100		129	58-130			
Toluene	0.127	0.0050	"	0.100		127	61-134			
Ethylbenzene	0.136	0.0050	"	0.0992		137	74-139			
m,p-Xylene	0.266	0.010	"	0.200		133	73-137			
o-Xylene	0.138	0.0050	"	0.0980		141	73-141			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0417</i>		<i>"</i>	<i>0.0400</i>		<i>104</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0404</i>		<i>"</i>	<i>0.0400</i>		<i>101</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0398</i>		<i>"</i>	<i>0.0400</i>		<i>99.4</i>	<i>21-167</i>			

**Matrix Spike (1609164-MS1)**

Source: 1609128-01

Prepared & Analyzed: 09/21/16

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.113	0.0020	"	0.0879	ND	129	30-131			
Toluene	0.114	0.0050	"	0.0879	ND	130	30-134			
Ethylbenzene	0.125	0.0050	"	0.0872	ND	143	22-153			
m,p-Xylene	0.238	0.010	"	0.175	ND	136	10-159			
o-Xylene	0.123	0.0050	"	0.0861	ND	143	31-151			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0385</i>		<i>"</i>	<i>0.0351</i>		<i>110</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0351</i>		<i>"</i>	<i>0.0351</i>		<i>99.8</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0351</i>		<i>"</i>	<i>0.0351</i>		<i>99.9</i>	<i>21-167</i>			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
09/22/16 06:16

**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 1609164 - EPA 5030 Soil MS**

<b>Matrix Spike Dup (1609164-MSD1)</b>	<b>Source: 1609128-01</b>			<b>Prepared &amp; Analyzed: 09/21/16</b>						
Naphthalene	ND	0.010	mg/kg	ND	ND	130	10-158		42	
Benzene	0.111	0.0020	"	0.0856	ND	130	30-131	1.72	34	
Toluene	0.113	0.0050	"	0.0856	ND	133	30-134	0.497	30	
Ethylbenzene	0.123	0.0050	"	0.0849	ND	145	22-153	1.19	24	
m,p-Xylene	0.237	0.010	"	0.171	ND	139	10-159	0.707	68	
o-Xylene	0.122	0.0050	"	0.0839	ND	146	31-151	0.887	38	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0381</i>		<i>"</i>	<i>0.0342</i>		<i>111</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0344</i>		<i>"</i>	<i>0.0342</i>		<i>100</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0346</i>		<i>"</i>	<i>0.0342</i>		<i>101</i>	<i>21-167</i>			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
09/22/16 06:16

### Notes and Definitions

- S-07 The surrogate recovery was outside acceptance limits indicating a potential high bias. The sample did not exhibit concentrations above reporting level for analytes represented by this surrogate. Data quality is not affected.
- 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

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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

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741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

September 23, 2016

Brandon Bruns  
Tasman Geosciences  
6899 Pecos Street  
Denver, CO 80221  
RE: Feather 31-15

Enclosed are the results of analyses for samples received by Summit Scientific on 09/22/16 17:25. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Paul Shrewsbury  
President



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
09/23/16 07:05

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH23@6'-7'	1609138-01	Soil	09/22/16 11:00	09/22/16 17:25
BH24@4'-5'	1609138-02	Soil	09/22/16 11:35	09/22/16 17:25
BH25@4'-6'	1609138-03	Soil	09/22/16 12:10	09/22/16 17:25
BH26@4'-6'	1609138-04	Soil	09/22/16 13:00	09/22/16 17:25
BH27@4'-6'	1609138-05	Soil	09/22/16 14:20	09/22/16 17:25
BH28@2'-4'	1609138-06	Soil	09/22/16 15:05	09/22/16 17:25
BH29@4'-6'	1609138-07	Soil	09/22/16 15:43	09/22/16 17:25

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
09/23/16 07:05

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

1609138

Client: Noble/Tasman Page 1 of 1  
Address: -  
City/State/Zip: - Project Manager: Brandon Bruns, Invoice: Jacob Evans  
Phone: 303-487-1228 Fax: - E-Mail: B.Brunns@tasman-geo.com  
Sampler Name: Graham Baselee Project Name: Feather 31-15  
Project Number: -

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix			Analyze For:				Special Instructions	
				HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	8260 BTEX	8260 GBTEXN	8015 DRO		pH, EC, SAR
BH23@6-7	9-22-16	1100	1			X										
BH24@4-5	9-22-16	1135	1			X										
BH25@4-6	9-22-16	1210	1			X										
BH26@4-6	9-22-16	1300	1			X										
BH27@4-6	9-22-16	1420	1			X										
BH28@2-4	9-22-16	1505	1			X										
BH29@4-6	9-22-16	1543	1			X										
Relinquished by: <u>[Signature]</u> Date/Time: <u>9-22-16 1700</u>				Received by: <u>[Signature]</u> Date/Time: <u>9/22/16 1700</u>				Turn Around Time (Check)				Notes				
Relinquished by: <u>[Signature]</u> Date/Time: <u>9/22/16 1725</u>				Received by: <u>[Signature]</u> Date/Time: <u>9/22/16 1700</u>				Same Day <input checked="" type="checkbox"/> 72 Hours <input type="checkbox"/>				on ice				
Relinquished by: <u>[Signature]</u> Date/Time: <u>9/22/16 1725</u>				Received in Lab by: <u>[Signature]</u> Date/Time: <u>9/22/16 1700</u>				24 Hours <input type="checkbox"/> 48 Hours <input type="checkbox"/>								
Relinquished by: <u>[Signature]</u> Date/Time: <u>9/22/16 1725</u>				Received in Lab by: <u>[Signature]</u> Date/Time: <u>9/22/16 1700</u>				Sample Integrity: Temperature Upon Receipt: <u>4.4°C</u>								
Relinquished by: <u>[Signature]</u> Date/Time: <u>9/22/16 1725</u>				Received in Lab by: <u>[Signature]</u> Date/Time: <u>9/22/16 1700</u>				Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No								

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
09/23/16 07:05

**Sample Receipt Checklist**

S2 Work Order: 1609138  
 Client: Noble/Tasman Client Project ID: Feather 31-15  
 Shipped Via: P/U Airbill #: \_\_\_\_\_  
 (UPS, FedEx, Hand Delivered, Pick-up, etc.)  
 Matrix (check all that apply):  Air  Soil/Solid  Water  Other: \_\_\_\_\_  
 (Describe)

Cooler ID					
Temp (°C)	<u>4.4</u>				

Thermometer ID: 61857155-K

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

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

Nakita  
Custodian Printed Name

[Signature]  
Signature or Initials of Custodian

9/22/16 1725  
Date/Time

[Signature]



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
09/23/16 07:05

**BH23@6'-7'**  
**1609138-01 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/22/16 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609174	09/22/16	09/22/16	8015M	

Date Sampled: **09/22/16 11:00**

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

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

Date Sampled: **09/22/16 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1609173	09/22/16	09/22/16	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: **09/22/16 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		101 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
09/23/16 07:05

**BH24@4'-5'**  
**1609138-02 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/22/16 11:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609174	09/22/16	09/23/16	8015M	

Date Sampled: **09/22/16 11:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		91.3 %	30-150		"	"	"	"	

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

Date Sampled: **09/22/16 11:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1609173	09/22/16	09/22/16	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: **09/22/16 11:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		105 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
09/23/16 07:05

**BH25@4'-6'**  
**1609138-03 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/22/16 12:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609174	09/22/16	09/23/16	8015M	

Date Sampled: **09/22/16 12:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		89.2 %	30-150		"	"	"	"	

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

Date Sampled: **09/22/16 12:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1609173	09/22/16	09/22/16	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.026</b>	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **09/22/16 12:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		105 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.2 %	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
09/23/16 07:05

**BH26@4'-6'**  
**1609138-04 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/22/16 13:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609174	09/22/16	09/23/16	8015M	

Date Sampled: **09/22/16 13:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		87.3 %	30-150		"	"	"	"	

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

Date Sampled: **09/22/16 13:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1609173	09/22/16	09/22/16	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: **09/22/16 13:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		109 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.9 %	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
09/23/16 07:05

**BH27@4'-6'**  
**1609138-05 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/22/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609174	09/22/16	09/23/16	8015M	

Date Sampled: **09/22/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		92.4 %	30-150		"	"	"	"	

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

Date Sampled: **09/22/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1609173	09/22/16	09/22/16	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: **09/22/16 14:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		110 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		103 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
09/23/16 07:05

**BH28@2'-4'**  
**1609138-06 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/22/16 15:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609174	09/22/16	09/23/16	8015M	

Date Sampled: **09/22/16 15:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		89.6 %	30-150		"	"	"	"	

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

Date Sampled: **09/22/16 15:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1609173	09/22/16	09/22/16	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: **09/22/16 15:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		103 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.3 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
09/23/16 07:05

**BH29@4'-6'**  
**1609138-07 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **09/22/16 15:43**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1609174	09/22/16	09/23/16	8015M	

Date Sampled: **09/22/16 15:43**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		89.5 %	30-150		"	"	"	"	

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

Date Sampled: **09/22/16 15:43**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1609173	09/22/16	09/23/16	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: **09/22/16 15:43**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		106 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
09/23/16 07:05

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

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

**Batch 1609174 - EPA 3550A**

**Blank (1609174-BLK1)**

Prepared & Analyzed: 09/22/16

C10-C28 (DRO)	ND	50	mg/kg							
<i>Surrogate: o-Terphenyl</i>	<i>11.1</i>		"	<i>12.5</i>		<i>89.0</i>	<i>30-150</i>			

**LCS (1609174-BS1)**

Prepared & Analyzed: 09/22/16

C10-C28 (DRO)	515	50	mg/kg	499		103	73-134			
<i>Surrogate: o-Terphenyl</i>	<i>11.7</i>		"	<i>12.5</i>		<i>93.5</i>	<i>30-150</i>			

**Matrix Spike (1609174-MS1)**

Source: 1609137-01

Prepared & Analyzed: 09/22/16

C10-C28 (DRO)	464	50	mg/kg	499	10.3	91.0	50-148			
<i>Surrogate: o-Terphenyl</i>	<i>11.5</i>		"	<i>12.5</i>		<i>91.9</i>	<i>30-150</i>			

**Matrix Spike Dup (1609174-MSD1)**

Source: 1609137-01

Prepared & Analyzed: 09/22/16

C10-C28 (DRO)	475	50	mg/kg	499	10.3	93.2	50-148	2.30	20	
<i>Surrogate: o-Terphenyl</i>	<i>11.7</i>		"	<i>12.5</i>		<i>93.8</i>	<i>30-150</i>			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
09/23/16 07:05

**Volatile Organic Compounds by EPA Method 8260B - Quality Control**  
**Summit Scientific**

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

**Batch 1609173 - EPA 5030 Soil MS**

**Blank (1609173-BLK1)**

Prepared & Analyzed: 09/22/16

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>0.0390</i>		<i>"</i>	<i>0.0400</i>		<i>97.5</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0398</i>		<i>"</i>	<i>0.0400</i>		<i>99.5</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0408</i>		<i>"</i>	<i>0.0400</i>		<i>102</i>	<i>21-167</i>			

**LCS (1609173-BS1)**

Prepared & Analyzed: 09/22/16

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.0981	0.0020	"	0.100		98.1	58-130			
Toluene	0.104	0.0050	"	0.100		104	61-134			
Ethylbenzene	0.118	0.0050	"	0.0992		119	74-139			
m,p-Xylene	0.230	0.010	"	0.200		115	73-137			
o-Xylene	0.126	0.0050	"	0.0980		129	73-141			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0397</i>		<i>"</i>	<i>0.0400</i>		<i>99.2</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0381</i>		<i>"</i>	<i>0.0400</i>		<i>95.3</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0400</i>		<i>"</i>	<i>0.0400</i>		<i>99.9</i>	<i>21-167</i>			

**Matrix Spike (1609173-MS1)**

Source: 1609137-01

Prepared & Analyzed: 09/22/16

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.0984	0.0020	"	0.100	ND	98.4	30-131			
Toluene	0.106	0.0050	"	0.100	ND	106	30-134			
Ethylbenzene	0.116	0.0050	"	0.0992	ND	117	22-153			
m,p-Xylene	0.228	0.010	"	0.200	ND	114	10-159			
o-Xylene	0.126	0.0050	"	0.0980	ND	129	31-151			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0406</i>		<i>"</i>	<i>0.0400</i>		<i>101</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0393</i>		<i>"</i>	<i>0.0400</i>		<i>98.2</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0404</i>		<i>"</i>	<i>0.0400</i>		<i>101</i>	<i>21-167</i>			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
09/23/16 07:05

**Volatile Organic Compounds by EPA Method 8260B - Quality Control**  
**Summit Scientific**

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

**Batch 1609173 - EPA 5030 Soil MS**

<b>Matrix Spike Dup (1609173-MSD1)</b>	<b>Source: 1609137-01</b>			<b>Prepared &amp; Analyzed: 09/22/16</b>						
Naphthalene	ND	0.010	mg/kg	ND	ND	10-158			42	
Benzene	0.0988	0.0020	"	0.100	ND	98.8	30-131	0.456	34	
Toluene	0.104	0.0050	"	0.100	ND	104	30-134	2.02	30	
Ethylbenzene	0.115	0.0050	"	0.0992	ND	116	22-153	1.19	24	
m,p-Xylene	0.227	0.010	"	0.200	ND	114	10-159	0.303	68	
o-Xylene	0.126	0.0050	"	0.0980	ND	128	31-151	0.381	38	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0421</i>		<i>"</i>	<i>0.0400</i>		<i>105</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>0.0390</i>		<i>"</i>	<i>0.0400</i>		<i>97.4</i>	<i>21-167</i>			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
09/23/16 07:05

### 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

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# Summit Scientific

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741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

October 26, 2016

Brandon Bruns  
Tasman Geosciences  
6899 Pecos Street  
Denver, CO 80221  
RE: Feather 31-15

Enclosed are the results of analyses for samples received by Summit Scientific on 10/19/16 17:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

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

Paul Shrewsbury  
President



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
10/26/16 16:05

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH30@4-6'	1610154-01	Soil	10/19/16 12:15	10/19/16 17:00
BH31@6-8'	1610154-02	Soil	10/19/16 13:50	10/19/16 17:00
BH32@4-6'	1610154-03	Soil	10/19/16 14:50	10/19/16 17:00

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
10/26/16 16:05

**Sample Receipt Checklist**

S2 Work Order: 1610154  
 Client: Noble/Tasman Client Project ID: Feather 31-15  
 Shipped 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)	<u>7.4</u>				

Thermometer ID: 61857155-K

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

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

Nakita  
Custodian Printed Name

MB  
Signature or Initials of Custodian

10/19/16 17:40  
Date/Time



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
10/26/16 16:05

**BH30@4-6'**  
**1610154-01 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **10/19/16 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610211	10/20/16	10/21/16	8015M	

Date Sampled: **10/19/16 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		94.1 %	30-150		"	"	"	"	

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

Date Sampled: **10/19/16 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610214	10/20/16	10/20/16	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: **10/19/16 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		116 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.9 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
10/26/16 16:05

**BH31@6-8'**  
**1610154-02 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **10/19/16 13:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610211	10/20/16	10/21/16	8015M	

Date Sampled: **10/19/16 13:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		93.5 %	30-150		"	"	"	"	

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

Date Sampled: **10/19/16 13:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610214	10/20/16	10/21/16	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: **10/19/16 13:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		109 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
10/26/16 16:05

**BH32@4-6'**  
**1610154-03 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **10/19/16 14:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610211	10/20/16	10/21/16	8015M	

Date Sampled: **10/19/16 14:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		93.2 %	30-150		"	"	"	"	

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

Date Sampled: **10/19/16 14:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610214	10/20/16	10/21/16	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: **10/19/16 14:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		96.8 %	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
10/26/16 16:05

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

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

**Batch 1610211 - EPA 3550A**

**Blank (1610211-BLK1)**

Prepared & Analyzed: 10/20/16

C10-C28 (DRO)	ND	50	mg/kg								
<i>Surrogate: o-Terphenyl</i>	12.0		"	12.5		95.8	30-150				

**LCS (1610211-BS1)**

Prepared & Analyzed: 10/20/16

C10-C28 (DRO)	453	50	mg/kg	499		90.9	73-134				
<i>Surrogate: o-Terphenyl</i>	12.6		"	12.5		101	30-150				

**Matrix Spike (1610211-MS1)**

Source: 1610150-01

Prepared & Analyzed: 10/20/16

C10-C28 (DRO)	504	50	mg/kg	497	46.8	92.0	50-148				
<i>Surrogate: o-Terphenyl</i>	12.2		"	12.5		97.7	30-150				

**Matrix Spike Dup (1610211-MSD1)**

Source: 1610150-01

Prepared & Analyzed: 10/20/16

C10-C28 (DRO)	524	50	mg/kg	498	46.8	95.8	50-148	3.89	20		
<i>Surrogate: o-Terphenyl</i>	12.2		"	12.5		97.9	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 Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
10/26/16 16:05

**Volatile Organic Compounds by EPA Method 8260B - Quality Control**  
**Summit Scientific**

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

**Batch 1610214 - EPA 5030 Soil MS**

**Blank (1610214-BLK1)**

Prepared & Analyzed: 10/20/16

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>0.0438</i>		<i>"</i>	<i>0.0400</i>		<i>109</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0388</i>		<i>"</i>	<i>0.0400</i>		<i>97.0</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0418</i>		<i>"</i>	<i>0.0400</i>		<i>105</i>	<i>21-167</i>			

**LCS (1610214-BS1)**

Prepared & Analyzed: 10/20/16

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.0750	0.0020	"	0.100		75.0	58-130			
Toluene	0.0802	0.0050	"	0.100		80.2	61-134			
Ethylbenzene	0.0660	0.0050	"	0.0992		66.6	50-139			
m,p-Xylene	0.119	0.010	"	0.200		59.5	5-137			
o-Xylene	0.0619	0.0050	"	0.0980		63.2	50-141			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0363</i>		<i>"</i>	<i>0.0400</i>		<i>90.7</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0514</i>		<i>"</i>	<i>0.0400</i>		<i>129</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0431</i>		<i>"</i>	<i>0.0400</i>		<i>108</i>	<i>21-167</i>			

**Matrix Spike (1610214-MS1)**

Source: 1610154-01

Prepared & Analyzed: 10/20/16

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.0881	0.0020	"	0.0996	ND	88.5	30-131			
Toluene	0.0915	0.0050	"	0.0996	ND	91.8	30-134			
Ethylbenzene	0.0851	0.0050	"	0.0988	ND	86.1	22-153			
m,p-Xylene	0.152	0.010	"	0.199	ND	76.2	10-159			
o-Xylene	0.0792	0.0050	"	0.0976	ND	81.2	31-151			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0407</i>		<i>"</i>	<i>0.0398</i>		<i>102</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0455</i>		<i>"</i>	<i>0.0398</i>		<i>114</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0416</i>		<i>"</i>	<i>0.0398</i>		<i>104</i>	<i>21-167</i>			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
10/26/16 16:05

**Volatile Organic Compounds by EPA Method 8260B - Quality Control**  
**Summit Scientific**

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

**Batch 1610214 - EPA 5030 Soil MS**

<b>Matrix Spike Dup (1610214-MSD1)</b>	<b>Source: 1610154-01</b>			<b>Prepared &amp; Analyzed: 10/20/16</b>						
Naphthalene	ND	0.010	mg/kg	ND	ND	101	30-131	12.2	42	
Benzene	0.0996	0.0020	"	0.0990	ND	108	30-134	15.8	30	
Toluene	0.107	0.0050	"	0.0990	ND	110	22-153	24.1	24	QM-07
Ethylbenzene	0.108	0.0050	"	0.0982	ND	98.6	10-159	24.9	68	
m,p-Xylene	0.195	0.010	"	0.198	ND	106	31-151	25.7	38	
o-Xylene	0.103	0.0050	"	0.0970	ND					
Surrogate: 1,2-Dichloroethane-d4	0.0405		"	0.0396		102	23-173			
Surrogate: Toluene-d8	0.0422		"	0.0396		107	20-170			
Surrogate: 4-Bromofluorobenzene	0.0401		"	0.0396		101	21-167			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
10/26/16 16:05

### Notes and Definitions

- 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

# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

October 29, 2016

Brandon Bruns  
Tasman Geosciences  
6899 Pecos Street  
Denver, CO 80221  
RE: Feather 31-15

Enclosed are the results of analyses for samples received by Summit Scientific on 10/25/16 18:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'Ben Shrewsbury', with a long, sweeping horizontal line extending to the right.

Ben Shrewsbury  
Laboratory Manager



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
10/29/16 17:34

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH33@0-2'	1610204-01	Soil	10/25/16 10:30	10/25/16 18:00
BH34@0-2'	1610204-02	Soil	10/25/16 11:00	10/25/16 18:00
BH35@4-6'	1610204-03	Soil	10/25/16 11:40	10/25/16 18:00
BH36@0-2'	1610204-04	Soil	10/25/16 12:25	10/25/16 18:00
BH37@0-2'	1610204-05	Soil	10/25/16 13:15	10/25/16 18:00
BH38@6-8'	1610204-06	Soil	10/25/16 14:14	10/25/16 18:00
BH39@4-6'	1610204-07	Soil	10/25/16 15:07	10/25/16 18:00
BH32	1610204-08	Water	10/25/16 14:35	10/25/16 18:00
BH36	1610204-09	Water	10/25/16 14:55	10/25/16 18:00
BH33	1610204-10	Water	10/25/16 14:50	10/25/16 18:00
BH30	1610204-11	Water	10/25/16 14:45	10/25/16 18:00
BH31	1610204-12	Water	10/25/16 14:40	10/25/16 18:00
BH37	1610204-13	Water	10/25/16 15:05	10/25/16 18:00
BH38	1610204-14	Water	10/25/16 15:35	10/25/16 18:00

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
10/29/16 17:34

# Summit Scientific 1610204.1

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

Client: Noble / Tasman Page 1 of 2  
Address: -  
City/State/Zip: -  
Phone: 303-487-1225 Fax: -  
Sampler Name: CB + JW  
Project Manager: Brandon Bruns  
E-Mail: B.Brun@tasman-geo.com  
Project Name: Feather 31-15  
Project Number: -

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative			Matrix		Analyze For:			Special Instructions		
				HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)		8260 GSTEAN	8015 TPH-DRD
BH33 @ 0-2'	10-25-16	10:30	1			X								
BH34 @ 0-2'	10-25-16	11:00	1			X								Groundwater = sameday turnaround
BH35 @ 4-6'	10-25-16	11:40	1			X								
BH36 @ 0-2'	10-25-16	12:25	1			X								Soil = standard turnaround
BH37 @ 0-2'	10-25-16	13:15	1			X								
BH38 @ 6-8'	10-25-16	14:14	1			X								
BH39 @ 4-6'	10-25-16	15:07	1			X								
BH32	10-25-16	14:35	3	X										
BH36	10-25-16	14:55	3	X										
BH33	10-25-16	14:50	3	X										
Relinquished by: <u>[Signature]</u>		Date/Time: <u>10-25-16 1700</u>	Received by: <u>[Signature]</u>		Date/Time: <u>10/25/16 1700</u>	Turn Around Time (Check)			Notes:					
Relinquished by: <u>[Signature]</u>		Date/Time: <u>10/25/16 1700</u>	Received by:		Date/Time:	Same Day <input checked="" type="checkbox"/>	72 Hours <input type="checkbox"/>	24 Hours <input type="checkbox"/>	Standard <input checked="" type="checkbox"/>	48 Hours <input type="checkbox"/>	on ice			
Relinquished by:		Date/Time:	Received in Lab by:		Date/Time:	Sample Integrity:								
						Temperature Upon Receipt: <u>1.0°C</u>								
						Intact: (Yes) <input type="checkbox"/> (No) <input type="checkbox"/>								

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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
10/29/16 17:34

# Summit Scientific 1610204-2

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

Page 2 of 2

Client: Noble / Tasman  
Address: \_\_\_\_\_  
City/State/Zip: \_\_\_\_\_  
Phone: 323-487-1220 Fax: \_\_\_\_\_  
Sampler Name: GB + JW

Project Manager: Brandon Bruns  
E-Mail: ABrun5@tasman-geo.com  
Project Name: Feather 31-15  
Project Number: \_\_\_\_\_

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative			Matrix			Analyze For:				Special Instructions		
				HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)					
BH30	10-25-16	1445	3	X												
BH31	10-25-16	1440	3	X												
BH37	10-25-16	1505	3	X												
BH38	10-25-16	1535	3	X												
Relinquished by: _____	Date/Time: _____	Received by: _____	Date/Time: _____	Turn Around Time (Check)				Notes:								
	10-25-16 1700	MB	10/25/16 1700	Same Day	<input checked="" type="checkbox"/>	72 Hours	<input type="checkbox"/>	1.0°C on ice								
Relinquished by: _____	Date/Time: _____	Received by: _____	Date/Time: _____	24 Hours	<input type="checkbox"/>	Standard	<input type="checkbox"/>									
	10/25/16 1730			48 Hours	<input type="checkbox"/>											
Relinquished by: _____	Date/Time: _____	Received in Lab by: _____	Date/Time: _____	Sample Integrity:												
				Temperature Upon Receipt:	1.0°C											
				Intact:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No										

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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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
10/29/16 17:34

**Sample Receipt Checklist**

S2 Work Order: 10204  
 Client: Nobel Tasman Client Project ID: Feather 31-15  
 Shipped Via: PIU (UPS, FedEx, Hand Delivered, Pick-up, etc.) Airbill #: \_\_\_\_\_  
 Matrix (check all that apply):  Air  Soil/Solid  Water  Other: \_\_\_\_\_ (Describe)

Cooler ID					
Temp (°C)	1.0				

Thermometer ID: 61857155-K

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

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

Makita  
Custodian Printed Name

[Signature]  
Signature or initials of Custodian

10/25/16 1730  
Date/Time

[Signature]



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15  
Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
10/29/16 17:34

**BH33@0-2'**  
**1610204-01 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **10/25/16 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610278	10/26/16	10/26/16	8015M	

Date Sampled: **10/25/16 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		93.4 %	30-150		"	"	"	"	

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

Date Sampled: **10/25/16 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610277	10/26/16	10/27/16	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: **10/25/16 10:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		114 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
10/29/16 17:34

**BH34@0-2'**  
**1610204-02 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **10/25/16 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610278	10/26/16	10/26/16	8015M	

Date Sampled: **10/25/16 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		96.3 %	30-150		"	"	"	"	

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

Date Sampled: **10/25/16 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610277	10/26/16	10/27/16	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: **10/25/16 11:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		114 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.9 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
10/29/16 17:34

**BH35@4-6'**  
**1610204-03 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **10/25/16 11:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610278	10/26/16	10/26/16	8015M	

Date Sampled: **10/25/16 11:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		90.4 %	30-150		"	"	"	"	

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

Date Sampled: **10/25/16 11:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610277	10/26/16	10/27/16	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: **10/25/16 11:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		112 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		96.3 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		106 %	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
10/29/16 17:34

**BH36@0-2'**  
**1610204-04 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **10/25/16 12:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610278	10/26/16	10/26/16	8015M	

Date Sampled: **10/25/16 12:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		95.7 %	30-150		"	"	"	"	

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

Date Sampled: **10/25/16 12:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610277	10/26/16	10/27/16	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: **10/25/16 12:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		119 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		102 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
10/29/16 17:34

**BH37@0-2'**  
**1610204-05 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **10/25/16 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610278	10/26/16	10/26/16	8015M	

Date Sampled: **10/25/16 13:15**

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

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

Date Sampled: **10/25/16 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610277	10/26/16	10/27/16	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: **10/25/16 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		111 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		96.7 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		102 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
10/29/16 17:34

**BH38@6-8'**  
**1610204-06 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **10/25/16 14:14**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610278	10/26/16	10/26/16	8015M	

Date Sampled: **10/25/16 14:14**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		89.8 %	30-150		"	"	"	"	

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

Date Sampled: **10/25/16 14:14**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610277	10/26/16	10/27/16	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: **10/25/16 14:14**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		112 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.1 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
10/29/16 17:34

**BH39@4-6'**  
**1610204-07 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **10/25/16 15:07**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610278	10/26/16	10/26/16	8015M	

Date Sampled: **10/25/16 15:07**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		90.8 %	30-150		"	"	"	"	

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

Date Sampled: **10/25/16 15:07**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610277	10/26/16	10/27/16	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: **10/25/16 15:07**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		114 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.3 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
10/29/16 17:34

**BH32**  
**1610204-08 (Water)**

**Summit Scientific**

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

Date Sampled: **10/25/16 14:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1610274	10/25/16	10/25/16	EPA 8260B	
<b>Toluene</b>	<b>2.8</b>	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>2.7</b>	1.0	"	"	"	"	"	"	

Date Sampled: **10/25/16 14:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		115 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		98.3 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		101 %	45-146		"	"	"	"	

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
10/29/16 17:34

**BH36**  
**1610204-09 (Water)**

**Summit Scientific**

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

Date Sampled: **10/25/16 14:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>6800</b>	100	ug/l	100	1610274	10/25/16	10/25/16	EPA 8260B	
<b>Toluene</b>	<b>9800</b>	100	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>520</b>	100	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>8500</b>	100	"	"	"	"	"	"	

Date Sampled: **10/25/16 14:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		112 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		99.1 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		102 %	45-146		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
10/29/16 17:34

**BH33**  
**1610204-10 (Water)**

**Summit Scientific**

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

Date Sampled: **10/25/16 14:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>11000</b>	100	ug/l	100	1610274	10/25/16	10/25/16	EPA 8260B	
<b>Toluene</b>	<b>17000</b>	100	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>790</b>	100	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>12000</b>	100	"	"	"	"	"	"	

Date Sampled: **10/25/16 14:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		113 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		101 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		101 %	45-146		"	"	"	"	

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6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
10/29/16 17:34

**BH30**  
**1610204-11 (Water)**

**Summit Scientific**

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

Date Sampled: **10/25/16 14:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>4300</b>	100	ug/l	100	1610274	10/25/16	10/25/16	EPA 8260B	
<b>Toluene</b>	<b>24000</b>	100	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>1100</b>	100	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>18000</b>	100	"	"	"	"	"	"	

Date Sampled: **10/25/16 14:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		111 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		99.2 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		99.7 %	45-146		"	"	"	"	

Summit Scientific

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6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
10/29/16 17:34

**BH31**  
**1610204-12 (Water)**

**Summit Scientific**

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

Date Sampled: **10/25/16 14:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>4100</b>	100	ug/l	100	1610274	10/25/16	10/25/16	EPA 8260B	
<b>Toluene</b>	<b>2700</b>	100	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>170</b>	1.0	"	1	"	"	10/25/16	"	
<b>Xylenes (total)</b>	<b>3900</b>	100	"	100	"	"	10/25/16	"	

Date Sampled: **10/25/16 14:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		99.3 %	37-154		"	"	10/25/16	"	
<i>Surrogate: Toluene-d8</i>		105 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		95.8 %	45-146		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
10/29/16 17:34

**BH37**  
**1610204-13 (Water)**

**Summit Scientific**

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

Date Sampled: **10/25/16 15:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>4700</b>	100	ug/l	100	1610274	10/25/16	10/25/16	EPA 8260B	
<b>Toluene</b>	<b>4800</b>	100	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>170</b>	1.0	"	1	"	"	10/25/16	"	
<b>Xylenes (total)</b>	<b>4300</b>	100	"	100	"	"	10/25/16	"	

Date Sampled: **10/25/16 15:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		95.9 %	37-154		"	"	10/25/16	"	
<i>Surrogate: Toluene-d8</i>		100 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		98.9 %	45-146		"	"	"	"	

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
10/29/16 17:34

**BH38**  
**1610204-14 (Water)**

**Summit Scientific**

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

Date Sampled: **10/25/16 15:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>3.8</b>	1.0	ug/l	1	1610274	10/25/16	10/25/16	EPA 8260B	
<b>Toluene</b>	<b>7.1</b>	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>12</b>	1.0	"	"	"	"	"	"	

Date Sampled: **10/25/16 15:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		113 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		97.0 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		104 %	45-146		"	"	"	"	

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
10/29/16 17:34

**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 1610278 - EPA 3550A**

**Blank (1610278-BLK1)**

Prepared & Analyzed: 10/26/16

C10-C28 (DRO)	ND	50	mg/kg								
<i>Surrogate: o-Terphenyl</i>	<i>11.5</i>		"	<i>12.5</i>		<i>91.9</i>	<i>30-150</i>				

**LCS (1610278-BS1)**

Prepared & Analyzed: 10/26/16

C10-C28 (DRO)	459	50	mg/kg	499		92.0	73-134				
<i>Surrogate: o-Terphenyl</i>	<i>12.0</i>		"	<i>12.5</i>		<i>95.8</i>	<i>30-150</i>				

**Matrix Spike (1610278-MS1)**

Source: 1610199-01

Prepared & Analyzed: 10/26/16

C10-C28 (DRO)	414	50	mg/kg	497	10.4	81.2	50-148				
<i>Surrogate: o-Terphenyl</i>	<i>11.6</i>		"	<i>12.5</i>		<i>93.1</i>	<i>30-150</i>				

**Matrix Spike Dup (1610278-MSD1)**

Source: 1610199-01

Prepared & Analyzed: 10/26/16

C10-C28 (DRO)	403	50	mg/kg	493	10.4	79.6	50-148	2.64	20		
<i>Surrogate: o-Terphenyl</i>	<i>11.6</i>		"	<i>12.4</i>		<i>94.0</i>	<i>30-150</i>				

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
10/29/16 17:34

**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 1610274 - EPA 5030 Water MS**

**Blank (1610274-BLK1)**

Prepared: 10/25/16 Analyzed: 10/26/16

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	15.6		"	13.3		117	37-154			
Surrogate: Toluene-d8	12.9		"	13.3		97.1	45-149			
Surrogate: 4-Bromofluorobenzene	13.4		"	13.3		101	45-146			

**LCS (1610274-BS1)**

Prepared: 10/25/16 Analyzed: 10/26/16

Benzene	31.1	1.0	ug/l	33.3		93.2	51-132			
Toluene	33.2	1.0	"	33.3		99.6	51-138			
Ethylbenzene	28.6	1.0	"	33.1		86.5	58-146			
m,p-Xylene	51.6	2.0	"	66.5		77.5	57-144			
o-Xylene	26.9	1.0	"	32.7		82.4	53-146			
Surrogate: 1,2-Dichloroethane-d4	13.7		"	13.3		102	37-154			
Surrogate: Toluene-d8	16.0		"	13.3		120	45-149			
Surrogate: 4-Bromofluorobenzene	14.1		"	13.3		106	45-146			

**Matrix Spike (1610274-MS1)**

Source: 1610204-08

Prepared: 10/25/16 Analyzed: 10/26/16

Benzene	35.3	1.0	ug/l	33.3	ND	106	34-141			
Toluene	36.2	1.0	"	33.3	2.75	100	27-151			
Ethylbenzene	34.6	1.0	"	33.1	ND	105	29-160			
m,p-Xylene	62.6	2.0	"	66.5	2.70	90.1	20-166			
o-Xylene	32.7	1.0	"	32.7	ND	100	33-159			
Surrogate: 1,2-Dichloroethane-d4	15.0		"	13.3		113	37-154			
Surrogate: Toluene-d8	14.4		"	13.3		108	45-149			
Surrogate: 4-Bromofluorobenzene	13.8		"	13.3		103	45-146			

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
10/29/16 17:34

**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 1610274 - EPA 5030 Water MS**

Matrix Spike Dup (1610274-MSD1)	Source: 1610204-08			Prepared: 10/25/16		Analyzed: 10/26/16				
Benzene	38.5	1.0	ug/l	33.3	ND	116	34-141	8.76	32	
Toluene	39.6	1.0	"	33.3	2.75	111	27-151	9.01	25	
Ethylbenzene	40.3	1.0	"	33.1	ND	122	29-160	15.3	50	
m,p-Xylene	73.0	2.0	"	66.5	2.70	106	20-166	15.3	36	
o-Xylene	38.4	1.0	"	32.7	ND	118	33-159	16.3	26	
Surrogate: 1,2-Dichloroethane-d4	15.3		"	13.3		115	37-154			
Surrogate: Toluene-d8	13.7		"	13.3		103	45-149			
Surrogate: 4-Bromofluorobenzene	13.5		"	13.3		101	45-146			

**Batch 1610277 - EPA 5030 Soil MS**

Blank (1610277-BLK1)	Prepared & Analyzed: 10/26/16									
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	0.0439		"	0.0400		110	23-173			
Surrogate: Toluene-d8	0.0406		"	0.0400		101	20-170			
Surrogate: 4-Bromofluorobenzene	0.0413		"	0.0400		103	21-167			

LCS (1610277-BS1)	Prepared & Analyzed: 10/26/16									
Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.101	0.0020	"	0.100		101	58-130			
Toluene	0.111	0.0050	"	0.100		111	61-134			
Ethylbenzene	0.110	0.0050	"	0.0992		111	74-139			
m,p-Xylene	0.199	0.010	"	0.200		99.5	73-137			
o-Xylene	0.104	0.0050	"	0.0980		106	73-141			
Surrogate: 1,2-Dichloroethane-d4	0.0403		"	0.0400		101	23-173			
Surrogate: Toluene-d8	0.0432		"	0.0400		108	20-170			
Surrogate: 4-Bromofluorobenzene	0.0401		"	0.0400		100	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
10/29/16 17:34

**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 1610277 - EPA 5030 Soil MS**

**Matrix Spike (1610277-MS1)**

Source: 1610199-01

Prepared & Analyzed: 10/26/16

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.108	0.0020	"	0.0994	ND	108	30-131			
Toluene	0.118	0.0050	"	0.0994	ND	119	30-134			
Ethylbenzene	0.125	0.0050	"	0.0986	ND	126	22-153			
m,p-Xylene	0.225	0.010	"	0.198	ND	113	10-159			
o-Xylene	0.118	0.0050	"	0.0974	ND	121	31-151			
Surrogate: 1,2-Dichloroethane-d4	0.0438		"	0.0398		110	23-173			
Surrogate: Toluene-d8	0.0409		"	0.0398		103	20-170			
Surrogate: 4-Bromofluorobenzene	0.0410		"	0.0398		103	21-167			

**Matrix Spike Dup (1610277-MSD1)**

Source: 1610199-01

Prepared & Analyzed: 10/26/16

Naphthalene	ND	0.010	mg/kg		ND		10-158		42	
Benzene	0.111	0.0020	"	0.100	ND	111	30-131	2.76	34	
Toluene	0.121	0.0050	"	0.100	ND	121	30-134	2.65	30	
Ethylbenzene	0.131	0.0050	"	0.0992	ND	132	22-153	4.97	24	
m,p-Xylene	0.236	0.010	"	0.200	ND	118	10-159	4.80	68	
o-Xylene	0.124	0.0050	"	0.0980	ND	126	31-151	4.56	38	
Surrogate: 1,2-Dichloroethane-d4	0.0450		"	0.0400		112	23-173			
Surrogate: Toluene-d8	0.0404		"	0.0400		101	20-170			
Surrogate: 4-Bromofluorobenzene	0.0415		"	0.0400		104	21-167			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
10/29/16 17:34

### 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

November 04, 2016

Brandon Bruns  
Tasman Geosciences  
6899 Pecos Street  
Denver, CO 80221  
RE: Feather 31-15

Enclosed are the results of analyses for samples received by Summit Scientific on 10/27/16 10:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'Ben Shrewsbury', with a long, sweeping horizontal line extending to the right.

Ben Shrewsbury  
Laboratory Manager



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
11/04/16 12:01

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH40@4-6'	1610231-01	Soil	10/26/16 12:00	10/27/16 10:30
BH41@0-2'	1610231-02	Soil	10/26/16 12:30	10/27/16 10:30
BH42@0-2'	1610231-03	Soil	10/26/16 13:25	10/27/16 10:30
BH43@4-6'	1610231-04	Soil	10/26/16 14:10	10/27/16 10:30
BH44@8-10'	1610231-05	Soil	10/26/16 15:18	10/27/16 10:30
BH45@0-4'	1610231-06	Soil	10/26/16 15:50	10/27/16 10:30

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.*





Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
11/04/16 12:01

**Sample Receipt Checklist**

S2 Work Order: 11e10231

Client: Noble (Tasman) Client Project ID: Feather 31-15

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

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

Cooler ID					
Temp (°C)	<u>4.6</u>				

Thermometer ID: 61857155-K

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

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

Nakita  
Custodian Printed Name

[Signature]  
Signature or Initials of Custodian

10/27/16 11:20  
Date/Time

[Signature]



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
11/04/16 12:01

**BH40@4-6'**  
**1610231-01 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **10/26/16 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610317	10/28/16	10/28/16	8015M	

Date Sampled: **10/26/16 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		89.8 %	30-150		"	"	"	"	

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

Date Sampled: **10/26/16 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610315	10/28/16	10/28/16	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: **10/26/16 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		117 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		103 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.9 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
11/04/16 12:01

**BH41@0-2'**  
**1610231-02 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **10/26/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610317	10/28/16	10/28/16	8015M	

Date Sampled: **10/26/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		90.2 %	30-150		"	"	"	"	

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

Date Sampled: **10/26/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610315	10/28/16	10/28/16	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: **10/26/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		112 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		91.6 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
11/04/16 12:01

**BH42@0-2'**  
**1610231-03 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **10/26/16 13:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610317	10/28/16	10/28/16	8015M	

Date Sampled: **10/26/16 13:25**

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

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

Date Sampled: **10/26/16 13:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610315	10/28/16	10/29/16	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: **10/26/16 13:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		110 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		102 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.0 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
11/04/16 12:01

**BH43@4-6'**  
**1610231-04 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **10/26/16 14:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610317	10/28/16	10/28/16	8015M	

Date Sampled: **10/26/16 14:10**

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

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

Date Sampled: **10/26/16 14:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610315	10/28/16	10/29/16	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: **10/26/16 14:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		112 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		102 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
11/04/16 12:01

**BH44@8-10'**  
**1610231-05 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **10/26/16 15:18**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610317	10/28/16	10/28/16	8015M	

Date Sampled: **10/26/16 15:18**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		90.5 %	30-150		"	"	"	"	

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

Date Sampled: **10/26/16 15:18**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610315	10/28/16	10/29/16	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: **10/26/16 15:18**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		118 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.7 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
11/04/16 12:01

**BH45@0-4'**  
**1610231-06 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **10/26/16 15:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1610317	10/28/16	10/28/16	8015M	

Date Sampled: **10/26/16 15:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		90.6 %	30-150		"	"	"	"	

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

Date Sampled: **10/26/16 15:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1610315	10/28/16	10/29/16	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: **10/26/16 15:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		117 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		103 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		92.5 %	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
11/04/16 12:01

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

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

**Batch 1610317 - EPA 3550A**

**Blank (1610317-BLK1)**

Prepared & Analyzed: 10/28/16

C10-C28 (DRO)	ND	50	mg/kg							
<i>Surrogate: o-Terphenyl</i>	11.4		"	12.5		91.3	30-150			

**LCS (1610317-BS1)**

Prepared & Analyzed: 10/28/16

C10-C28 (DRO)	495	50	mg/kg	499		99.2	73-134			
<i>Surrogate: o-Terphenyl</i>	11.9		"	12.5		95.1	30-150			

**Matrix Spike (1610317-MS1)**

Source: 1610231-01

Prepared & Analyzed: 10/28/16

C10-C28 (DRO)	477	50	mg/kg	497	8.52	94.3	50-148			
<i>Surrogate: o-Terphenyl</i>	12.5		"	12.5		100	30-150			

**Matrix Spike Dup (1610317-MSD1)**

Source: 1610231-01

Prepared & Analyzed: 10/28/16

C10-C28 (DRO)	486	50	mg/kg	496	8.52	96.3	50-148	1.89	20	
<i>Surrogate: o-Terphenyl</i>	12.6		"	12.4		101	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
11/04/16 12:01

**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 1610315 - EPA 5030 Soil MS**

**Blank (1610315-BLK1)**

Prepared & Analyzed: 10/28/16

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>0.0465</i>		<i>"</i>	<i>0.0400</i>		<i>116</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0416</i>		<i>"</i>	<i>0.0400</i>		<i>104</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0390</i>		<i>"</i>	<i>0.0400</i>		<i>97.6</i>	<i>21-167</i>			

**LCS (1610315-BS1)**

Prepared & Analyzed: 10/28/16

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.0748	0.0020	"	0.100		74.8	58-130			
Toluene	0.0812	0.0050	"	0.100		81.2	61-134			
Ethylbenzene	0.104	0.0050	"	0.0992		105	74-139			
m,p-Xylene	0.195	0.010	"	0.200		97.9	73-137			
o-Xylene	0.0983	0.0050	"	0.0980		100	73-141			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0457</i>		<i>"</i>	<i>0.0400</i>		<i>114</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0396</i>		<i>"</i>	<i>0.0400</i>		<i>99.0</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0387</i>		<i>"</i>	<i>0.0400</i>		<i>96.8</i>	<i>21-167</i>			

**Matrix Spike (1610315-MS1)**

Source: 1610231-01

Prepared & Analyzed: 10/28/16

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.0755	0.0020	"	0.100	ND	75.5	30-131			
Toluene	0.0828	0.0050	"	0.100	ND	82.8	30-134			
Ethylbenzene	0.105	0.0050	"	0.0992	ND	105	22-153			
m,p-Xylene	0.198	0.010	"	0.200	ND	99.0	10-159			
o-Xylene	0.0992	0.0050	"	0.0980	ND	101	31-151			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0466</i>		<i>"</i>	<i>0.0400</i>		<i>117</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0396</i>		<i>"</i>	<i>0.0400</i>		<i>99.1</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0388</i>		<i>"</i>	<i>0.0400</i>		<i>97.0</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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
11/04/16 12:01

**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 1610315 - EPA 5030 Soil MS**

<b>Matrix Spike Dup (1610315-MSD1)</b>	<b>Source: 1610231-01</b>			<b>Prepared &amp; Analyzed: 10/28/16</b>						
Naphthalene	ND	0.010	mg/kg	ND	ND		10-158		42	
Benzene	0.0891	0.0020	"	0.0992	ND	89.8	30-131	16.4	34	
Toluene	0.0834	0.0050	"	0.0992	ND	84.0	30-134	0.642	30	
Ethylbenzene	0.105	0.0050	"	0.0984	ND	107	22-153	0.345	24	
m,p-Xylene	0.197	0.010	"	0.198	ND	99.7	10-159	0.101	68	
o-Xylene	0.0997	0.0050	"	0.0972	ND	103	31-151	0.465	38	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0479</i>		<i>"</i>	<i>0.0397</i>		<i>121</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0401</i>		<i>"</i>	<i>0.0397</i>		<i>101</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0379</i>		<i>"</i>	<i>0.0397</i>		<i>95.5</i>	<i>21-167</i>			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
11/04/16 12:01

### 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

December 29, 2016

Brandon Bruns  
Tasman Geosciences  
6899 Pecos Street  
Denver, CO 80221  
RE: Feather 31-15

Enclosed are the results of analyses for samples received by Summit Scientific on 12/22/16 09:30. 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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
12/29/16 10:04

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH46@2-4'	1612180-01	Soil	12/21/16 09:52	12/22/16 09:30
BH47@4-6'	1612180-02	Soil	12/21/16 11:10	12/22/16 09:30
BH48@6-8'	1612180-03	Soil	12/21/16 11:58	12/22/16 09:30
BH49@4-6'	1612180-04	Soil	12/21/16 13:12	12/22/16 09:30
BH50@6-8'	1612180-05	Soil	12/21/16 13:45	12/22/16 09:30
BH51@4-6'	1612180-06	Soil	12/21/16 14:45	12/22/16 09:30

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
12/29/16 10:04

# Summit Scientific

1612180

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

Page 1 of 1

Client: <u>Noble/Tasman</u>	Project Manager: <u>Brandon Bruns, Invoice: Jacob Evans</u>
Address: <u>-</u>	E-Mail: <u>Bbruns@tasman-geo.com</u>
City/State/Zip: <u>-</u>	Project Name: <u>Feather 31-15</u>
Phone: <u>-</u> Fax: <u>-</u>	Project Number: <u>-</u>
Sampler Name: <u>GB</u>	

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix				Analyze For:				Special Instructions
				HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	8260 BTEX	8260B GBTEXN	8015 DRD	PH, EC, SAR	
BH46@2-4	12/21/16	0952	1		X											
BH47@4-6	12/21/16	1110	1		X											
BH48@6-8	12/21/16	1158	1		X											
BH49@4-6	12/21/16	1312	1		X											
BH50@6-8	12/21/16	1345	1		X											
BH51@4-6	12/21/16	1445	1	X												

Relinquished by: <u>[Signature]</u> Date/Time: <u>12/21/16 9:30</u>	Received by: <u>[Signature]</u> Date/Time: <u>12/21/16 9:30</u>	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:  <u>on ice</u>
Relinquished by: <u>[Signature]</u> Date/Time: <u>12/22/16 10:30</u>	Received by: <u>[Signature]</u> Date/Time: <u>12/22/16 10:00</u>	Sample Integrity: Temperature Upon Receipt: <u>1.8°C</u>	
Relinquished by: _____ Date/Time: _____	Received in Lab by: _____ Date/Time: _____	Intact: Yes <input type="checkbox"/> No <input type="checkbox"/>	

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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
12/29/16 10:04

**Sample Receipt Checklist**

S2 Work Order: 1612180  
 Client: Noble/Tasman Client Project ID: Feather 31-15  
 Shipped Via: P/U Airbill #: \_\_\_\_\_  
 (UPS, FedEx, Hand Delivered, Pick-up, etc.)  
 Matrix (check all that apply):  Air  Soil/Solid  Water  Other: \_\_\_\_\_  
 (Describe)

Cooler ID				
Temp (°C)	<u>1.8</u>			

Thermometer ID: 61857155-K

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

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

Nakita  
Custodian Printed Name

[Signature]  
Signature or Initials of Custodian

12/27/16 10:30  
Date/Time



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
12/29/16 10:04

**BH46@2-4'**  
**1612180-01 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **12/21/16 09:52**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1612254	12/23/16	12/25/16	8015M	

Date Sampled: **12/21/16 09:52**

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

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

Date Sampled: **12/21/16 09:52**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1612273	12/27/16	12/27/16	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: **12/21/16 09:52**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		89.9 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		105 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		106 %	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
12/29/16 10:04

**BH47@4-6'**  
**1612180-02 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **12/21/16 11:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1612254	12/23/16	12/25/16	8015M	

Date Sampled: **12/21/16 11:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		97.7 %	30-150		"	"	"	"	

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

Date Sampled: **12/21/16 11:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1612273	12/27/16	12/27/16	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: **12/21/16 11:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		94.0 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		105 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
12/29/16 10:04

**BH48@6-8'**  
**1612180-03 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **12/21/16 11:58**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1612254	12/23/16	12/25/16	8015M	

Date Sampled: **12/21/16 11:58**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		97.7 %	30-150		"	"	"	"	

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

Date Sampled: **12/21/16 11:58**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1612273	12/27/16	12/27/16	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: **12/21/16 11:58**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		93.3 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		102 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		106 %	21-167		"	"	"	"	

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
12/29/16 10:04

**BH49@4-6'**  
**1612180-04 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **12/21/16 13:12**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1612254	12/23/16	12/25/16	8015M	

Date Sampled: **12/21/16 13:12**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		96.2 %	30-150		"	"	"	"	

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

Date Sampled: **12/21/16 13:12**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1612273	12/27/16	12/27/16	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: **12/21/16 13:12**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		91.5 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		102 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		108 %	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
12/29/16 10:04

**BH50@6-8'**  
**1612180-05 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **12/21/16 13:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1612254	12/23/16	12/25/16	8015M	

Date Sampled: **12/21/16 13:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: o-Terphenyl</i>		96.8 %	30-150		"	"	"	"	

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

Date Sampled: **12/21/16 13:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1612273	12/27/16	12/27/16	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: **12/21/16 13:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		93.4 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		103 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		108 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
12/29/16 10:04

**BH51@4-6'**  
**1612180-06 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **12/21/16 14:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1612254	12/23/16	12/25/16	8015M	

Date Sampled: **12/21/16 14:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		96.4 %	30-150		"	"	"	"	

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

Date Sampled: **12/21/16 14:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1612273	12/27/16	12/27/16	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: **12/21/16 14:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		92.6 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
12/29/16 10:04

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

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

**Batch 1612254 - EPA 3550A**

**Blank (1612254-BLK1)**

Prepared: 12/23/16 Analyzed: 12/25/16

C10-C28 (DRO)	ND	50	mg/kg							
Surrogate: <i>o</i> -Terphenyl	11.9		"	12.5		95.5	30-150			

**LCS (1612254-BS1)**

Prepared: 12/23/16 Analyzed: 12/25/16

C10-C28 (DRO)	466	50	mg/kg	499		93.4	73-134			
Surrogate: <i>o</i> -Terphenyl	12.4		"	12.5		99.4	30-150			

**Matrix Spike (1612254-MS1)**

Source: 1612176-01

Prepared: 12/23/16 Analyzed: 12/25/16

C10-C28 (DRO)	444	50	mg/kg	499	11.2	86.8	50-148			
Surrogate: <i>o</i> -Terphenyl	12.4		"	12.5		99.2	30-150			

**Matrix Spike Dup (1612254-MSD1)**

Source: 1612176-01

Prepared: 12/23/16 Analyzed: 12/25/16

C10-C28 (DRO)	453	50	mg/kg	498	11.2	88.8	50-148	2.04	20	
Surrogate: <i>o</i> -Terphenyl	12.8		"	12.5		102	30-150			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
12/29/16 10:04

### 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

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741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

December 29, 2016

Brandon Bruns  
Tasman Geosciences  
6899 Pecos Street  
Denver, CO 80221  
RE: Feather 31-15

Enclosed are the results of analyses for samples received by Summit Scientific on 12/22/16 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 read 'P. Shrewsbury', written in a cursive style.

Paul Shrewsbury  
President



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
12/29/16 10:08

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH52@2-4'	1612184-01	Soil	12/22/16 10:22	12/22/16 16:30

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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: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
12/29/16 10:08

# Summit Scientific

1612184

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

Page 1 of 1

Client: Noble/Tasman	Project Manager: Brandon Bruns, Invoice: Jacob Evans
Address: -	E-Mail: bbruns@tasman-geo.com
City/State/Zip: -	Project Name: Feather 31-15
Phone: - Fax: -	Project Number: -
Sampler Name: GB	

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative			Matrix			Analyze For:				Special Instructions		
				HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	8260 BTEX	8260B GBTEXN		8015 DRO	PH, EC, SAR
BH 52 @ 2-4'	12/22/16	1022	1			X						X	X			
Relinquished by:	Date/Time: 12/22/16 1630	Received by:	Date/Time: 12/22/16 1630	Turn Around Time (Check)				Notes:								
				Same Day <input type="checkbox"/>				72 Hours <input checked="" type="checkbox"/>								
				24 Hours <input type="checkbox"/>				Standard <input type="checkbox"/>								
				48 Hours <input type="checkbox"/>												
Relinquished by:	Date/Time: 12/22/16 1700	Received by:	Date/Time: 12/22/16 1700	Sample Integrity:				Temperature Upon Receipt: 4.4°C								
				Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>												

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Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
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**Sample Receipt Checklist**

S2 Work Order: 1612184  
 Client: Noble/Tarman Client Project ID: Feather 31-15  
 Shipped Via: PIV Airbill #: \_\_\_\_\_  
 (UPS, FedEx, Hand Delivered, Pick-up, etc.)  
 Matrix (check all that apply):  Air  Soil/Solid  Water  Other: \_\_\_\_\_  
 (Describe)

Cooler ID					
Temp (°C)	4.4				

Thermometer ID: 61857155-K

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

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

Nakita  
Custodian Printed Name

[Signature]  
Signature or Initials of Custodian

12/22/16 1700  
Date/Time

[Signature]



Tasman Geosciences  
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Denver CO, 80221

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**Reported:**  
12/29/16 10:08

**BH52@2-4'**  
**1612184-01 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **12/22/16 10:22**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1612254	12/23/16	12/25/16	8015M	

Date Sampled: **12/22/16 10:22**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		96.1 %	30-150		"	"	"	"	

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

Date Sampled: **12/22/16 10:22**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1612273	12/27/16	12/27/16	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: **12/22/16 10:22**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		94.3 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		102 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

Summit Scientific

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Denver CO, 80221

Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
12/29/16 10:08

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

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

**Batch 1612254 - EPA 3550A**

**Blank (1612254-BLK1)**

Prepared: 12/23/16 Analyzed: 12/25/16

C10-C28 (DRO)	ND	50	mg/kg								
<i>Surrogate: o-Terphenyl</i>	11.9		"	12.5		95.5	30-150				

**LCS (1612254-BS1)**

Prepared: 12/23/16 Analyzed: 12/25/16

C10-C28 (DRO)	466	50	mg/kg	499		93.4	73-134				
<i>Surrogate: o-Terphenyl</i>	12.4		"	12.5		99.4	30-150				

**Matrix Spike (1612254-MS1)**

Source: 1612176-01

Prepared: 12/23/16 Analyzed: 12/25/16

C10-C28 (DRO)	444	50	mg/kg	499	11.2	86.8	50-148				
<i>Surrogate: o-Terphenyl</i>	12.4		"	12.5		99.2	30-150				

**Matrix Spike Dup (1612254-MSD1)**

Source: 1612176-01

Prepared: 12/23/16 Analyzed: 12/25/16

C10-C28 (DRO)	453	50	mg/kg	498	11.2	88.8	50-148	2.04		20	
<i>Surrogate: o-Terphenyl</i>	12.8		"	12.5		102	30-150				

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Project: Feather 31-15

Project Number: [none]  
Project Manager: Brandon Bruns

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12/29/16 10:08

### 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