

**KNAUS 28-8**  
**FLOWLINE RELEASE**  
**API #: 05-123- 17596**  
**Spill/Release Point ID #: 445476**  
**Remediation Project #: 9767**

## **EXCAVATION AND SITE ASSESSMENT ACTIVITIES REPORT**

February 1, 2018



Image: Google 2016

**PREPARED ON BEHALF OF**

Noble Energy, Inc.  
2115 117<sup>th</sup> Avenue  
Greeley, CO 80631



**PREPARED BY**

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



February 1, 2018

Mr. Jacob Evans  
Noble Energy Inc.  
2115 117<sup>th</sup> Avenue  
Greeley, CO 80631

Subject:       **Excavation and Site Assessment Activities Report**  
                  ***Knaus 28-8 Flowline Release***  
                  API #: 05-123-17596  
                  Spill/Release Point ID #: 445476  
                  Remediation Project #: 9767  
                  SENE S28 T6N R66W  
                  Weld County, Colorado

Dear Mr. Evans:

Below please find a copy of the above referenced Excavation and Site Assessment Activities Report (Report) for the Knaus 28-8 Flowline Release site (Site) in Weld County, Colorado. The text below describes excavation, environmental assessment and associated soil and groundwater sampling activities conducted by Tasman Geosciences, Inc. (Tasman), on behalf of Noble Energy, Inc. (Noble), between April 11, 2016 and June 23, 2017.

## **Introduction**

The purpose of this document is to describe the assessment of petroleum hydrocarbon impacted soil and groundwater, removal of impacted soil, and subsequent soil and groundwater sampling activities at the Site. The activities described below were performed in response to the discovery of a flowline release near the Knaus 28-8 wellhead on April 12, 2016. The release was reported to the Colorado Oil and Gas Conservation Commission (COGCC) on April 13, 2016. The COGCC established Spill/Release Point ID Number 445476 for the project.

## **Facility Background**

The Site is located approximately four miles southwest of the town of Lucerne in Weld County, Colorado, as shown on Figure 1. The site is surrounded by crop land, and the legal description is the southeast ¼ of the northeast ¼ of Section 28, Township 6 North, Range 66 West, of the 6<sup>th</sup> Principal Meridian. The Site is approximately 465 feet west of the Weld County Road 31, and has coordinates of 40.461743°, -104.775176°.

As detailed on the initial COGCC Spill/Release Report (Form 19), during routine operation, fluids surfaced in an agricultural field near the Site's wellhead. Fluids appeared to come from the flowline that lead from the tank battery to the Knaus 28-8 wellhead. The flowline was shut in and standing fluids were removed. On April 11, 2016, excavation and subsurface soil sampling activities were

conducted by Tasman. The flowline was exposed and the release location was identified. The approximate release location and Site overview is illustrated on Figure 2. Based on laboratory analytical results and remaining soil impacts observed at the Site, additional Site assessment and excavation activities were conducted by Tasman between April 15 and May 26, 2016, and February 6 and 7, 2017 to fully delineate subsurface soil and groundwater impacts.

## **Flowline Release Response Activities**

Initial excavation activities were conducted at the Site on April 11, 2016. The purposes of the excavation activities were to identify the specific location of the flowline release and remove subsurface impacts surrounding the flowline release location for disposal. During pipeline exposure activities, surrounding soils were field screened for volatile organic compounds (VOC) using a photo-ionization detector (PID) and standard headspace soil screening techniques. These data were used to guide subsequent excavation activities and delineate impacted soil from clean backfill material.

Following identification of the release location along the flowline, the extent of the excavation area was extended to a total depth of approximately six (6) feet below ground surface (bgs). Groundwater was not encountered within the excavation. A total of approximately 40 cubic yards (yd<sup>3</sup>) of petroleum hydrocarbon impacted soil were removed from the Site for disposal, and the final excavation measured approximately 10 ft. by 25 ft. by 6 ft. bgs. Impacted soil was transported off-Site for disposal at the North Weld County Landfill in Ault, Colorado under signed Noble waste manifests. Clean soil was hauled to the Site for use as backfill.

During excavation activities, soil samples were collected from five (5) locations: SS01 at approximately six (6) feet bgs along the base of the excavation and SS02 through SS05 along the sidewalls of the excavation at approximately five feet bgs and field screened with a PID. Soil samples SS01 through SS05, with PID values ranging from between 310 and 730 parts per million (ppm), were retained for laboratory analyses. Soil samples were submitted to Summit Scientific Laboratory (Summit) in Golden, Colorado for laboratory analyses of benzene, toluene, ethylbenzene, and total xylenes (BTEX), naphthalene, and total petroleum hydrocarbons-gasoline range organics (TPH-GRO) using United States Environmental Protection Agency (USEPA) Method 8260B, as well as total petroleum hydrocarbons-diesel range organics (TPH-DRO) using USEPA Method 8015. Soil analytical data is summarized in Table 1, and the final excavation extent and soil sample locations are illustrated on Figure 3. The laboratory analytical report is included as Attachment A.

Laboratory analytical results for the five (5) soil samples collected during excavation activities indicated that vadose zone dissolved phase petroleum hydrocarbon soil impacts were present at the Site. All five (5) soil samples collected contained benzene, TPH-GRO, and TPH-DRO concentrations above the applicable COGCC Table 910-1 soil standards. Based on the results of field and laboratory data collected during Site excavation activities, additional Site assessment efforts including further delineation of soil and potential groundwater impacts were completed in November and May 2016. Details of Site assessment field activities are described below.

## **Site Assessment Activities**

Between April 15 and May 26, 2016, Tasman was retained to assess the extents of soil and groundwater impacts associated with the flow line release at the Site. Eight (8) boreholes were

installed using direct push drilling techniques and converted to temporary groundwater monitoring wells (BH01 – BH08). Soil boring locations are illustrated on Figure 4, and boring logs are included in Attachment D. During soil boring activities, soil samples were collected and field screened for VOCs using a PID and standard headspace sampling techniques. Soil samples from the depth interval exhibiting the highest PID reading above the water table were retained for laboratory analysis. Eight (8) soil samples were submitted to Summit for analysis of BTEX, naphthalene, and TPH-GRO using USEPA Method 8260B, as well as TPH-DRO using USEPA Method 8015. Soil analytical results are summarized in Table 1 and illustrated on Figure 4. The complete laboratory analytical report is included in Attachment B.

Following monitoring well installation and development activities of locations BH01 through BH08, Tasman conducted the first site wide quarterly groundwater sampling event June 21, 2016. Groundwater was encountered at depths of approximately 11.5 to 14 feet bgs., and a Light Non-Aqueous Phase Liquid (LNAPL) was detected in BH03 through BH05 and were subsequently not sampled. Groundwater samples were submitted to Summit for laboratory analysis of BTEX by USEPA Method 8260B. Groundwater analytical results are summarized in Table 2. The complete laboratory analytical report is included in Attachment C, and groundwater elevation data are summarized in Table 3. Laboratory analytical results for the groundwater samples collected June 21, 2016 indicate dissolved phase petroleum hydrocarbons were present in the area around the flowline release.

## **Excavation Activities**

To address petroleum hydrocarbon impacts to soil and groundwater, additional excavation activities were conducted at the Site on February 6, and 7, 2017. The purpose of excavation activities was to remove impacted material, and to introduce a groundwater treatment mixture into the impacted area. Based on the results of site assessment sampling, an area west and south of the Knaus 28-8 wellhead was excavated.

A photo-ionization detector was used to field screen excavated soil for the presence of volatile organic compounds (VOCs), and determine the extent of hydrocarbon impacts. Impacted soil was excavated and transported off Site for disposal at the North Weld County Landfill in Ault, Colorado. Groundwater and light non-aqueous phase liquid (LNAPL) were encountered in the excavation at approximately 13 ft. bgs, and additional soil was removed below the water table to approximately 14 to 15 ft. bgs. A total of approximately 430 cubic yards of material were removed from the Site for disposal at the North Weld County Landfill under Noble waste manifests, and the final excavation area measured approximately 30 ft. by 30 ft.

Eleven (11) confirmation soil samples (SS09 and SS11 through SS20) were collected from the sidewalls of the final excavation extent, at approximately 10 ft. bgs. Additional material could not be excavated do to safety concerns related to the proximity to the Knaus 28-8 wellhead. Soil samples were submitted to Summit Scientific in Golden, Colorado (Summit) for laboratory analyses of BTEX, naphthalene, and TPH-GRO using USEPA Method 8260B, as well as TPH-DRO using USEPA Method 8015. Soil analytical data is summarized in Table 1, and the final excavation extent and confirmation soil sample locations are illustrated on Figure 5. The complete laboratory analytical reports are included as Attachment A.



During excavation activities, groundwater and LNAPL collected in the base of the excavation, at a depth of approximately 13 ft. bgs. A vacuum truck was used to remove approximately 80 barrels of groundwater and LNAPL from the excavation on February 7, 2017. Fluid removed from the excavation was transported off Site for disposal at a licensed Republic Services facility under Noble waste manifests. Following the completion of vacuum truck operations, little or no LNAPL was noted within the excavation. Prior to backfilling, 88 pounds of activated carbon were applied to the groundwater at the base of the excavation, to address remaining petroleum hydrocarbon impacts to groundwater. The excavation was subsequently backfilled and compacted using the stockpiled overburden and imported clean fill material.

During excavation activities, monitoring wells BH02 through BH04, BH05, and BH06, were destroyed as a result of the soil excavation activities. Replacement monitoring wells BH02R, BH04R, BH05R, and BH06R and two additional compliance locations, BH09 and BH10, were installed at the Site on June 16, 2017 to assess and monitor groundwater impacts. Following monitoring well installation and development activities, Tasman conducted a site wide quarterly groundwater sampling event on June 23, 2017. Groundwater analytical data is summarized in Table 2, and locations are illustrated on Figure 5. The complete laboratory analytical reports are included in Attachment C.

## **Site Assessment and Excavation Results**

Laboratory analytical results for soil samples collected during the 2017 excavation activities, indicate that vadose zone petroleum hydrocarbon soil impacts are present in the area adjacent to the west side of the Knaus 28-8 wellhead. BTEX, naphthalene, and TPH concentrations were below COGCC soil standards and/ or laboratory detection limits in all soil samples collected from borings BH01 through BH10.

Laboratory analytical results for groundwater samples collected on June 23, 2017 indicate that dissolved phase petroleum hydrocarbon impacts are present in the vicinity of the February 2017 excavation extent at the Site. Specifically, groundwater samples collected from BH05R and BH07 contained benzene concentrations above the applicable COGCC Table 910-1 groundwater standard and BH03 contained approximately 0.2 ft. of LNAPL.

## **Site Assessment and Excavation Conclusions**

Based on field and laboratory data collected during Site assessment and excavation activities, vadose zone soil impacts are present adjacent to the Knaus 28-8 wellhead. Dissolved-phase groundwater impacts are also present at the Site. Quarterly groundwater sampling will continue at the Site to monitor groundwater conditions and natural attenuation of dissolved phase petroleum hydrocarbon impacts. Groundwater sampling activities will be conducted at monitoring wells BH01, BH02R, BH03, BH04R, BH05R, and BH06 through BH10. LNAPL recovery will be conducted in conjunction with the quarterly sampling events should it be encountered.

## 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 – Site Overview Map

Figure 3 – Excavation Analytical Results Map (April 11, 2016)

Figure 4 – Soil Boring Locations and Analytical Results Map (April 15 and May 26, 2016, and June 15, 2017)

Figure 5 – Excavation Analytical Results Map (February 6 and 7, 2017)

Figure 6 – Groundwater Analytical Results Map (June 23, 2017)

Attachment A – Excavation Laboratory Analytical Data Reports (April 11, 2016 and February 6 and 7, 2017)

Attachment B – Soil Boring Laboratory Analytical Data Reports (April 14 and May 26, 2016 and June 15, 2017)

Attachment C – Groundwater Laboratory Analytical Data Reports (June 21, 2016 and June 23, 2017)

Attachment D – Soil Boring Logs

## **TABLES**

**TABLE 1**  
**SOIL ANALYTICAL DATA**  
**NOBLE ENERGY, INC. - KNAUS 28-8**  
**FLOWLINE 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 Soil Standard (mg/kg)</b>		<b>0.17</b>	<b>85</b>	<b>100</b>	<b>175</b>	<b>500</b>		<b>23</b>
SS01@6'	04/11/16	16	140	37	320	7,600	12,000	10
SS02@5'	04/11/16	18	130	32	280	7,500	8,800	8.8
SS03@5'	04/11/16	2.9	23	6.1	58	2,300	1,300	2.6
SS04@5'	04/11/16	38	240	58	460	12,000	14,000	14
SS05@5'	04/11/16	26	170	38	310	8,600	7,000	7.3
SS09@10'	02/06/17	0.012	<0.0050	0.065	0.55	<50	190	0.13
SS011@10'	02/06/17	<0.0020	0.012	0.020	0.27	<50	210	0.11
SS012@10'	02/06/17	<0.0020	<0.0050	<0.0050	<0.010	<50	96	0.029
SS013@10'	02/06/17	0.0059	<0.0050	0.011	0.052	<50	70	0.030
SS014@10'	02/06/17	11	96	26	230	6,500	7,100	9.3
SS15@10'	02/06/17	<0.0020	<0.0050	<0.0050	0.012	<50	<50	<0.010
SS16@10'	02/06/17	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
SS17@10'	02/07/17	0.0052	0.0051	0.0069	0.068	<50	<50	<0.010
SS18@10'	02/07/17	0.0040	<0.0050	0.023	0.19	<50	<50	0.020
SS19@10'	02/07/17	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
SS20@10'	02/07/17	0.0039	<0.0050	<0.0050	0.020	<50	<50	<0.010
BH01@5-6'	04/15/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH02@2-4'	04/15/16	0.0088	0.0074	<0.0050	<0.010	<50	<50	<0.010
BH03@2-4'	04/15/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH04@2-4'	04/15/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH05@2-4'	04/15/16	0.0066	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH06@2-4'	04/15/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH07@2-4'	04/15/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH08@6-7'	05/26/16	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH09@0-2'	06/15/17	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010
BH10@4-6'	06/15/17	<0.0020	<0.0050	<0.0050	<0.010	<50	<50	<0.010

**Notes:**

COGCC = Colorado Oil and Gas Conservation Commission

TPH-GRO = Total petroleum hydrocarbons - gasoline range organics

TPH-DRO = Total petroleum hydrocarbons - diesel range organics

mg/kg = Milligrams per kilogram

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

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. - KNAUS 28-8**  
**FLOWLINE RELEASE**



Monitoring Well ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
COGCC Groundwater Standard (ug/L)		5	560	700	1,400
BH01	04/15/16	<1.0	<1.0	<1.0	<1.0
BH01	06/21/16	<1.0	<1.0	<1.0	<1.0
BH01	09/02/16	380	1.4	<1.0	340
BH01	12/20/16	32	<1.0	<1.0	1.3
BH01	06/23/17	<1.0	<1.0	<1.0	<2.0
BH02	04/15/16	5,300	3,900	130	1,200
BH02	06/21/16	7,300	1,500	97	2,300
BH02 <sup>1</sup>	09/12/16	9,700	3,800	<1.0	3,400
BH02	12/20/16	7,700	14	<1.0	1,000
BH02	02/07/17	Monitoring Well Destroyed Due to Excavation			
BH02R	06/23/17	<1.0	<1.0	<1.0	<2.0
BH03	04/15/16	Not Sampled - LNAPL Present			
BH03	06/21/16	Not Sampled - LNAPL Present			
BH03	09/02/16	Not Sampled - LNAPL Present			
BH03	12/20/16	Not Sampled - LNAPL Present			
BH03	06/23/17	Not Sampled - LNAPL Present			
BH04	04/15/16	1,700	2,600	130	1,200
BH04	06/21/16	Not Sampled - LNAPL Present			
BH04 <sup>1</sup>	09/02/16	14,000	12,000	240	5,600
BH04	12/20/16	Not Sampled - LNAPL Present			
BH04	02/07/17	Monitoring Well Destroyed Due to Excavation			
BH04R	06/23/17	<1.0	<1.0	<1.0	12
BH05	04/15/16	Not Sampled - LNAPL Present			
BH05	06/21/16	Not Sampled - LNAPL Present			
BH05	09/02/16	Not Sampled - LNAPL Present			
BH05	12/20/16	Not Sampled - LNAPL Present			
BH05	02/07/17	Monitoring Well Destroyed Due to Excavation			
BH05R	06/23/17	2,800	860	<1.0	1,000
BH06	04/15/16	<1.0	8.0	<1.0	<1.0
BH06	06/21/16	<1.0	<1.0	<1.0	<1.0
BH06	09/02/16	<1.0	1.4	<1.0	<1.0
BH06	12/20/16	3.1	<1.0	<1.0	6.7
BH06	02/07/17	Monitoring Well Destroyed Due to Excavation			
BH06R	06/23/17	1.9	<1.0	<1.0	<2.0
BH07	04/15/16	<1.0	<1.0	<1.0	<1.0
BH07	06/21/16	<1.0	<1.0	<1.0	<1.0
BH07	09/02/16	1,600	6.6	<1.0	200
BH07	12/20/16	9,000	24	<1.0	630
BH07	06/23/17	9,100	1.5	<1.0	260

**TABLE 2**  
**GROUNDWATER ANALYTICAL DATA**  
**NOBLE ENERGY, INC. - KNAUS 28-8**  
**FLOWLINE RELEASE**



Monitoring Well ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
COGCC Groundwater Standard (ug/L)		5	560	700	1,400
BH08	06/21/16	<1.0	<1.0	<1.0	<1.0
BH08	09/02/16	<1.0	1.4	<1.0	<1.0
BH08	12/20/16	<1.0	<1.0	<1.0	<1.0
BH08	06/23/17	<1.0	<1.0	<1.0	<2.0
BH09	06/23/17	<1.0	<1.0	<1.0	<2.0
BH10	06/23/17	<1.0	<1.0	<1.0	<2.0

**Notes:**

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**

<sup>1</sup> Sheen present on groundwater sample.

**TABLE 3**  
**GROUNDWATER ELEVATION DATA**  
**NOBLE ENERGY, INC. - KNAUS 28-8**  
**FLOWLINE 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)
BH01	04/15/16	4660.12	16.81	14.29	ND	ND	4645.83
BH01	06/21/16	4660.12	16.24	13.63	ND	ND	4646.49
BH01	07/08/16	4658.07 <sup>1</sup>	NM	10.71	ND	ND	4647.36
BH01	09/02/16	4658.07	14.18	9.24	ND	ND	4648.83
BH01	12/20/16	4660.19 <sup>4</sup>	16.30	14.03	ND	ND	4646.16
BH01	06/23/17	4660.13	16.33	14.35	ND	ND	4645.78
BH02	04/15/16	4660.56	17.71	17.13	ND	ND	4643.43
BH02	06/21/16	4660.56	17.71	13.99	ND	ND	4646.57
BH02	07/08/16	4660.56	NM	13.04	ND	ND	4647.52
BH02	09/02/16	Well Casing Damaged - Elevation Control Lost					
BH02 <sup>3</sup>	09/12/16	NS	14.69	8.98	ND	ND	NS
BH02	12/20/16	NS	17.58	14.20	ND	ND	NS
BH02	02/07/17	Well Destroyed During Excavation					
BH02R	06/23/17	4661.34	22.39	15.45	ND	ND	4645.89
BH03	04/15/16	4660.75	17.41	14.66	Trace	<0.01	4646.09
BH03	06/21/16	4660.75	17.41	16.42	13.54	2.88	4646.49
BH03	07/08/16	4660.75	NM	13.32	13.24	0.08	4647.49
BH03	09/02/16	4660.75	16.99	11.95	11.76	0.19	4648.94
BH03	12/20/16	4660.75	16.93	14.77	14.43	0.34	4646.24
BH03	06/23/17	4660.83	NM	15.07	14.84	0.23	4645.93
BH04	04/15/16	4659.97	17.24	14.47	ND	ND	4645.50
BH04	06/21/16	4659.97	17.24	14.76	13.12	1.64	4646.44
BH04	07/08/16	4659.97	NM	12.75	12.60	0.15	4647.33
BH04	09/02/16	4659.97	17.26	11.12	ND	ND	4648.85
BH04	12/20/16	4659.97	17.24	14.00	13.77	0.23	4646.14
BH04	02/07/17	Well Destroyed During Excavation					
BH04R	06/23/17	4661.01	21.83	15.21	ND	ND	4645.80
BH05	04/15/16	4661.14	17.11	15.06	Trace	<0.01	4646.08
BH05	06/21/16	4661.14	16.81	14.60	14.56	0.04	4646.57
BH05	07/08/16	4661.14	NM	13.74	13.72	0.02	4647.42
BH05	09/02/16	4661.14	16.88	12.29	12.28	0.01	4648.86
BH05	12/20/16	4661.14	17.22	15.29	14.83	0.46	4646.20
BH05	02/07/17	Well Destroyed During Excavation					
BH05R	06/23/17	4660.88	21.49	15.05	ND	ND	4645.83
BH06	04/15/16	4660.85	16.65	14.77	ND	ND	4646.08
BH06	06/21/16	4660.85	16.62	14.24	ND	ND	4646.61
BH06	07/08/16	4660.85	NM	13.39	ND	ND	4647.46
BH06	09/02/16	4660.85	16.78	11.92	ND	ND	4648.93
BH06	12/20/16	4660.85	16.81	14.61	ND	ND	4646.24
BH06	02/07/17	Well Destroyed During Excavation					

**TABLE 3**  
**GROUNDWATER ELEVATION DATA**  
**NOBLE ENERGY, INC. - KNAUS 28-8**  
**FLOWLINE 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)
BH06R	06/23/17	4660.56	19.43	14.62	ND	ND	4645.94
BH07	04/15/16	4660.84	17.20	14.90	ND	ND	4645.94
BH07	06/21/16	4660.84	16.91	14.38	ND	ND	4646.46
BH07	07/08/16	4660.84	NM	13.56	ND	ND	4647.28
BH07	09/02/16	4660.84	16.90	12.13	ND	ND	4648.71
BH07	12/20/16	4660.84	16.88	14.77	ND	ND	4646.07
BH07	06/23/17	4660.82	16.95	15.05	ND	ND	4645.77
BH08	06/21/16	4661.26	22.25	14.62	ND	ND	4646.64
BH08	07/08/16	4661.26	NM	13.71	ND	ND	4647.55
BH08	09/02/16	4658.51 <sup>2</sup>	19.50	9.28	ND	ND	4649.23
BH08	12/20/16	4661.45 <sup>5</sup>	22.44	14.98	ND	ND	4646.47
BH08	06/23/17	4661.26	22.43	15.32	ND	ND	4645.94
BH09	06/23/17	4660.51	21.60	14.76	ND	ND	4645.75
BH10	06/23/17	4660.28	19.65	14.43	ND	ND	4645.85

**Notes:**

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

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

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

LNAPL relative density was estimated to be approximately 0.75

<sup>1</sup> Approximately 2.05 ft of casing broken off of BH01 prior to gauging on 7/8/16. Top of casing elevation is estimated, not surveyed.

<sup>2</sup> Approximately 2.75 ft of casing broken off of BH08 prior to gauging on 9/2/16. Top of casing elevation is estimated, not surveyed.

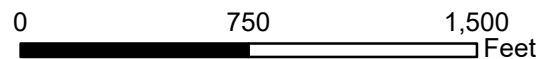
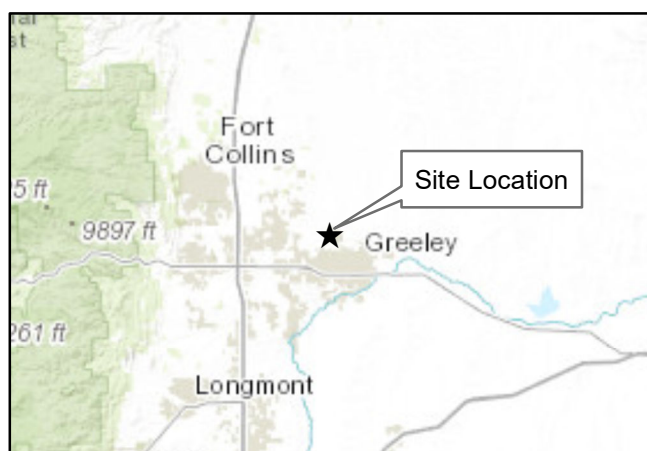
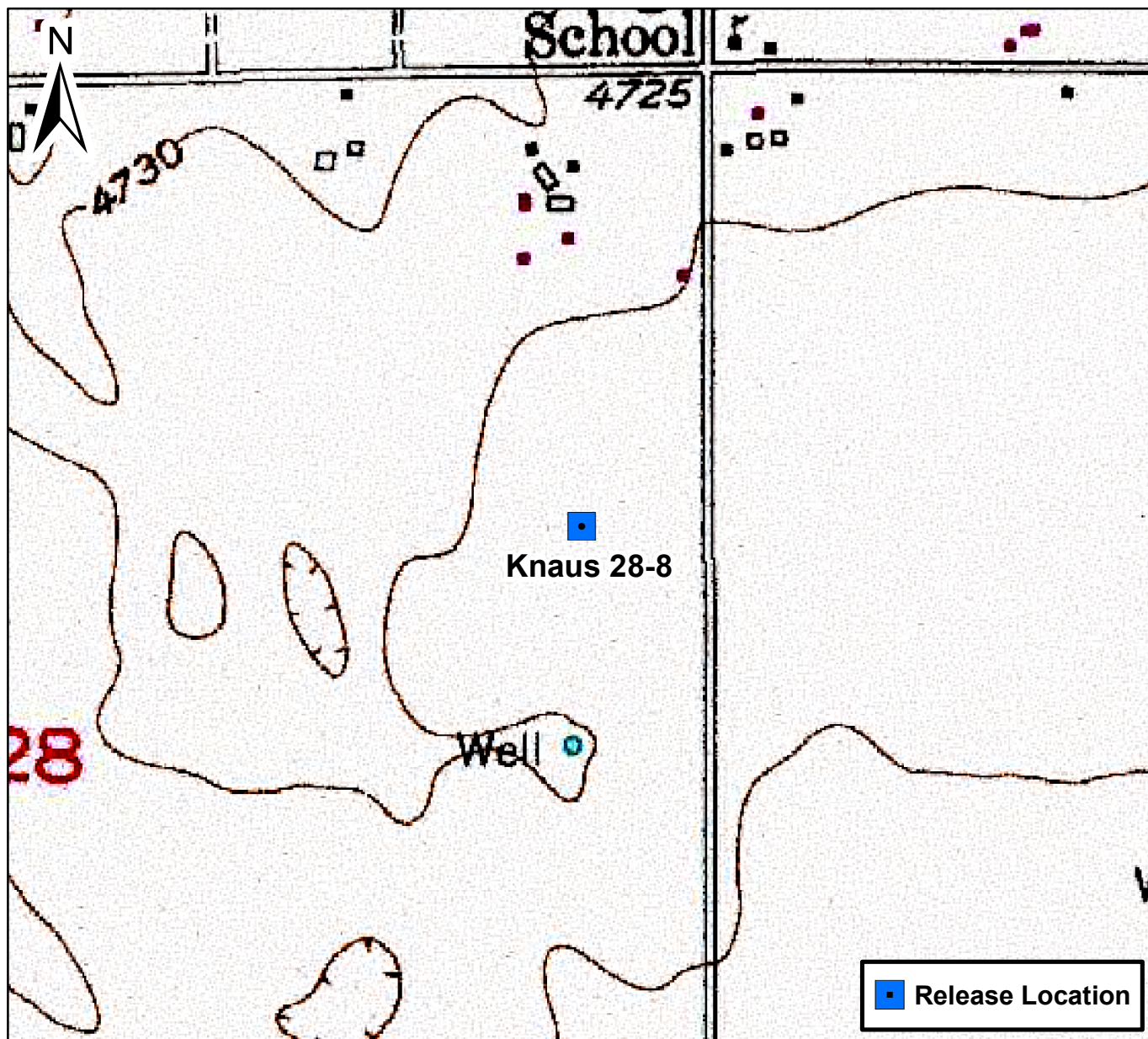
<sup>3</sup> Damaged casing cut off just below ground surface, repaired with new stick up casing after sampling.

<sup>4</sup> BH01 damaged, well repaired with approximately 2.12 ft of casing. Top of casing elevation is estimated, not surveyed.

<sup>5</sup> BH08 damaged, well repaired with approximately 2.94 ft of casing. Top of casing elevation is estimated, not surveyed.



## **FIGURES**




## Figure 1

Site Location Map  
Knaus 28-8  
Flowline Release  
SENE S28 T6N R66W  
Weld County, Colorado

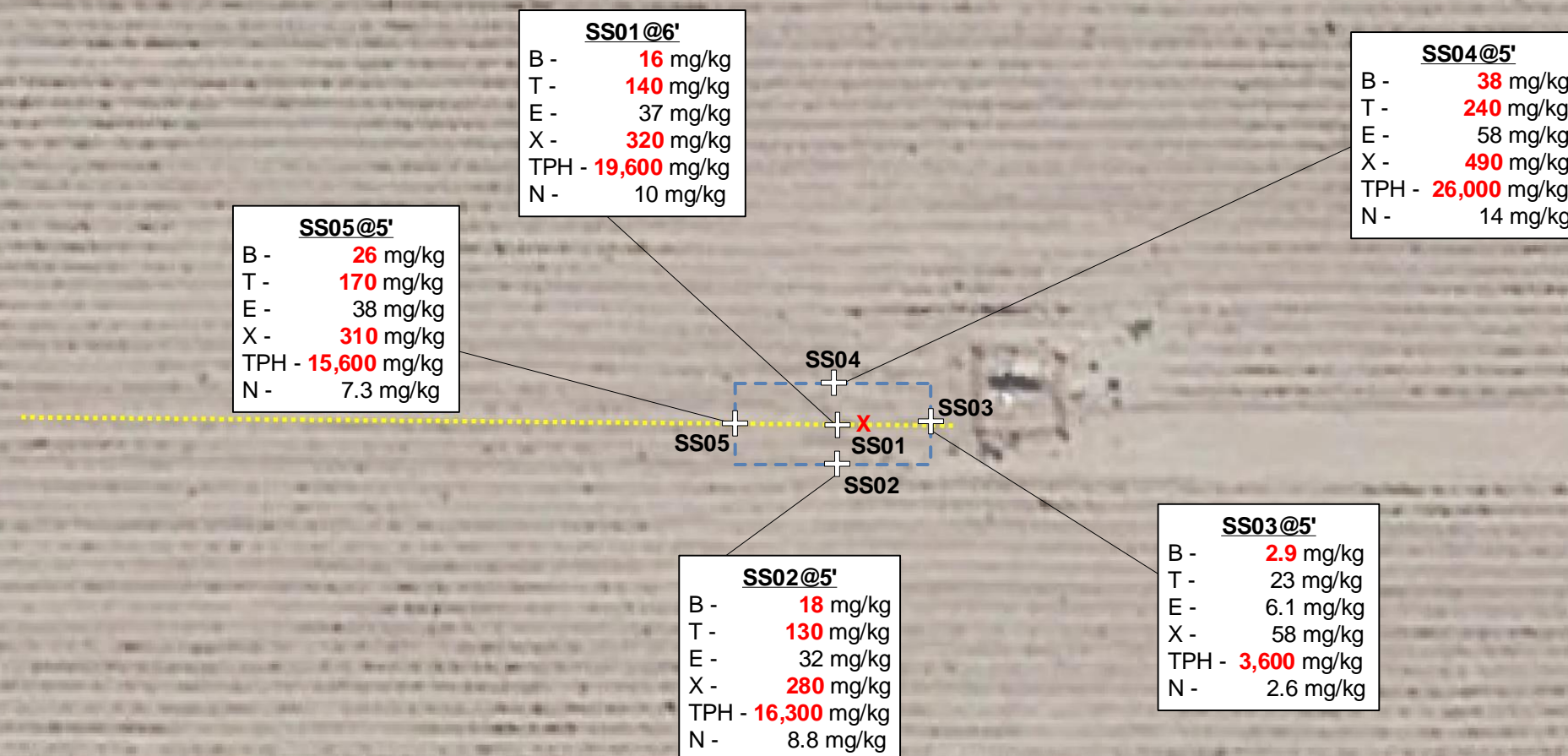






DATE: 01/29/2018	 <div>Tasman Geosciences, Inc. 6899 Pecos Street – Unit C Denver, CO 80221</div>	Noble Energy, Inc. – DJ Basin Knaus 28-8 Flowline Release SENE, Section 28, Township 6 North, Range 66 West Weld County, Colorado	Site Overview Map	FIGURE 2
DESIGNED BY: D. Arnold				
DRAWN BY: B. Fields				





#### Legend

- Excavation Extent - April 2016
- Noble Flowline  
(Collected via Trimble GPS)
- X Release Location
- + Excavation Soil Sample Location

#### Notes

- 1) All locations are approximate unless otherwise noted.
  - 2) Buried infrastructure has been spatially projected.
  - 3) RED value indicates concentration greater than COGCC table 910-1 soil standard (see table below).
- GPS – Global Positioning System  
mg/kg – Milligrams Per Kilogram

Contaminant of Concern	COGCC Soil Concentration Standard
B - Benzene	0.17 mg/kg
T - Toluene	85 mg/kg
E - Ethylbenzene	100 mg/kg
X – Total Xylenes	175 mg/kg
TPH- Total Petroleum Hydrocarbons	500 mg/kg
N - Naphthalene	23 mg/kg

0 ft. 20 ft. 40 ft.

Image Source: Google Earth; 2016 Google  
Projection: WGS 84 UTM Zone 13 North



DATE: 01/29/2018

DESIGNED BY: D. Arnold

DRAWN BY: B. Fields



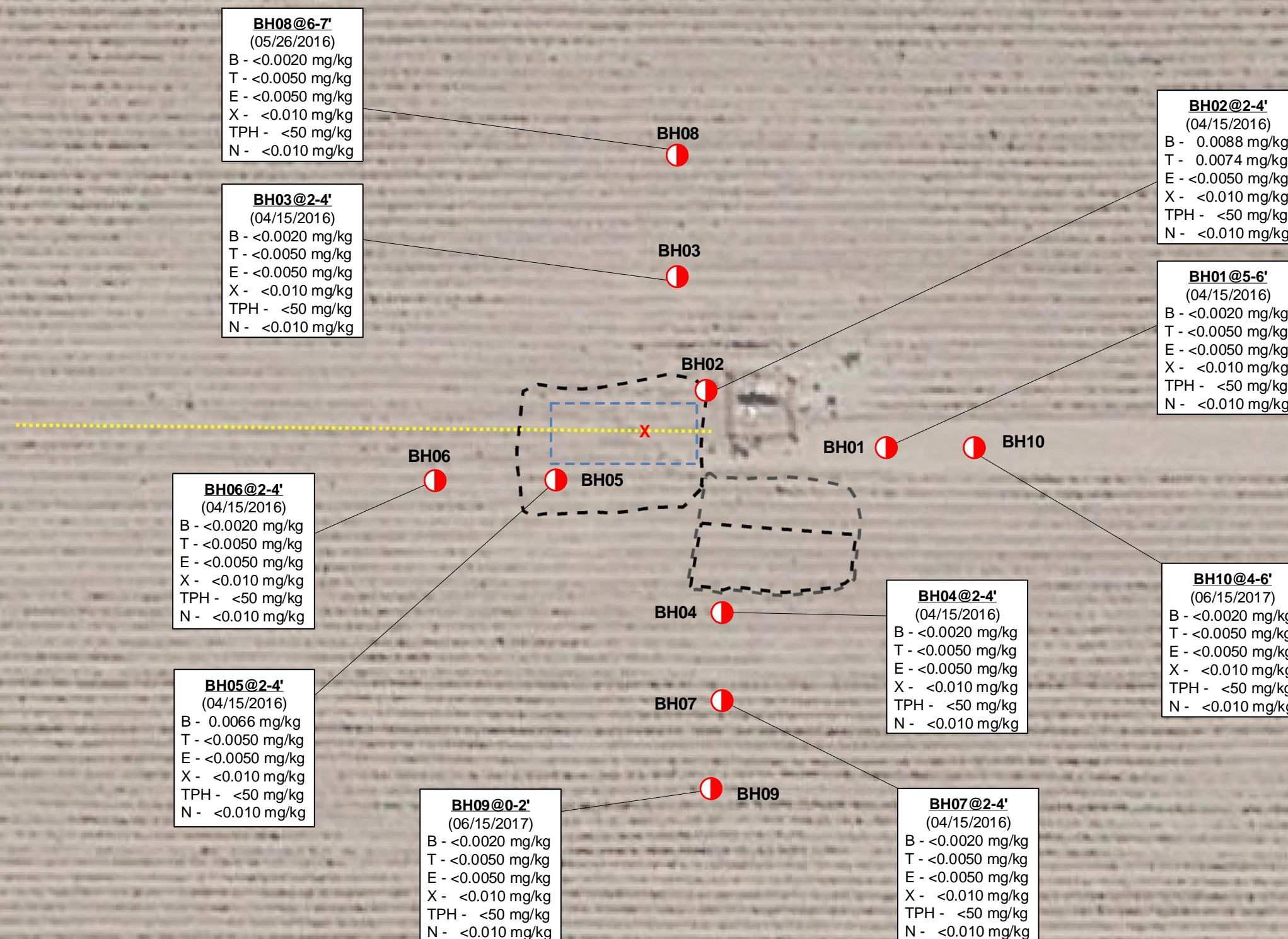
Tasman Geosciences, Inc.  
6899 Pecos Street – Unit C  
Denver, CO 80221

Noble Energy, Inc. – DJ Basin  
Knaus 28-8 Flowline Release  
SENE, Section 28, Township 6 North, Range 66 West  
Weld County, Colorado

Excavation Analytical  
Results Map  
(April 11, 2016)

FIGURE  
3





**Legend**

- Excavation Extent – April 2016
- Excavation Extent - February 2017 (Collected via Trimble GPS)
- Excavation Footprint Including Benching - February 2017 (Collected via Trimble GPS)
- Noble Flowline (Collected via Trimble GPS)
- Release Location
- Soil Boring Sample Location (Collected via Trimble GPS)

**Notes**

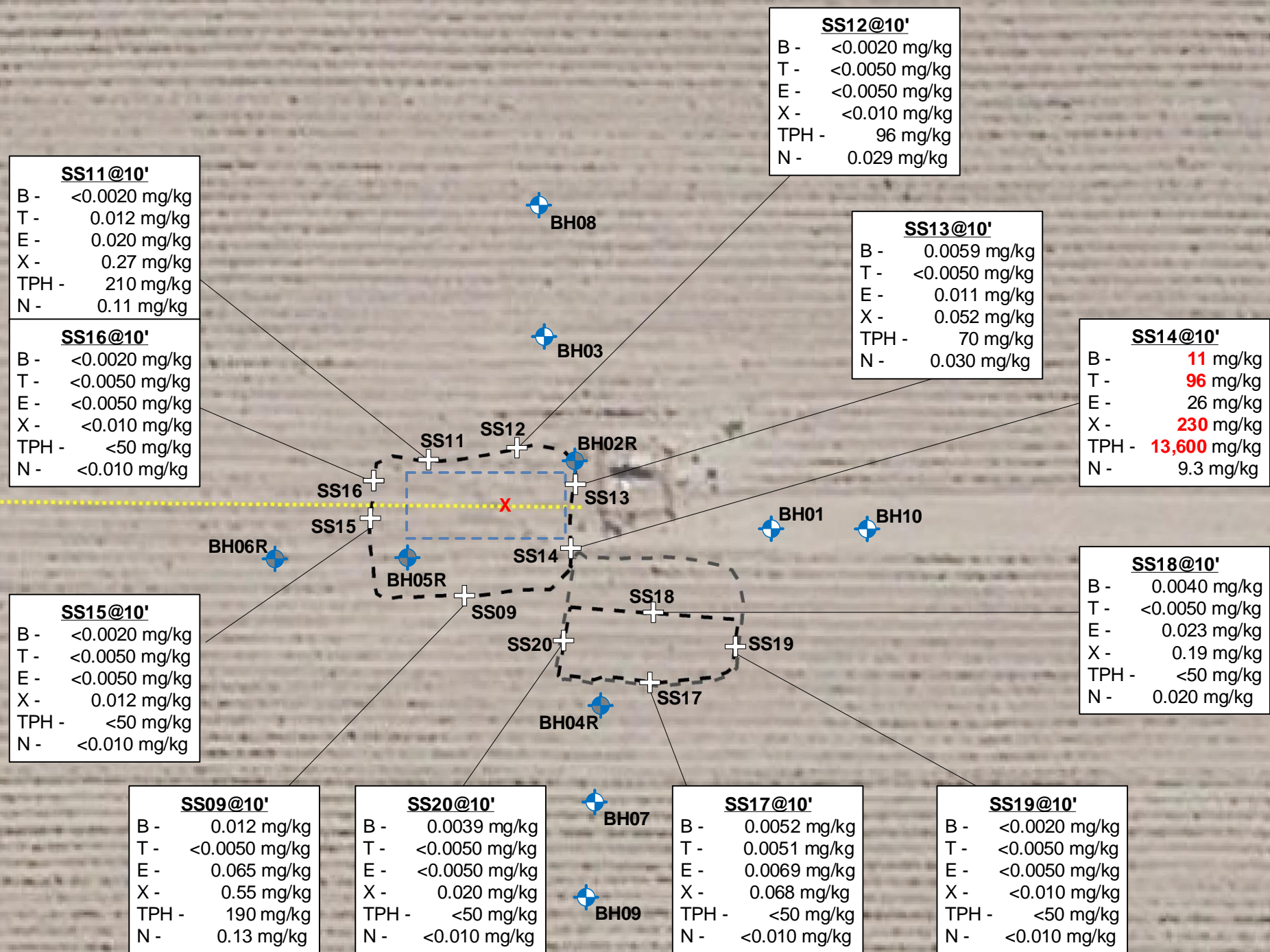
1) All locations are approximate unless otherwise noted.  
2) Buried infrastructure has been spatially projected.  
3) RED value indicates concentration greater than COGCC table 910-1 soil standard (see table below).  
GPS – Global Positioning System  
mg/kg – Milligrams Per Kilogram

Contaminant of Concern	COGCC Soil Concentration Standard
B - Benzene	0.17 mg/kg
T - Toluene	85 mg/kg
E - Ethylbenzene	100 mg/kg
X – Total Xylenes	175 mg/kg
TPH- Total Petroleum Hydrocarbons	500 mg/kg
N - Naphthalene	23 mg/kg

0 ft. 20 ft. 40 ft.

Image Source: Google Earth; 2016 Google  
Projection: WGS 84 UTM Zone 13 North





DATE: 01/29/2018

DESIGNED BY: D. Arnold

DRAWN BY: B. Fields



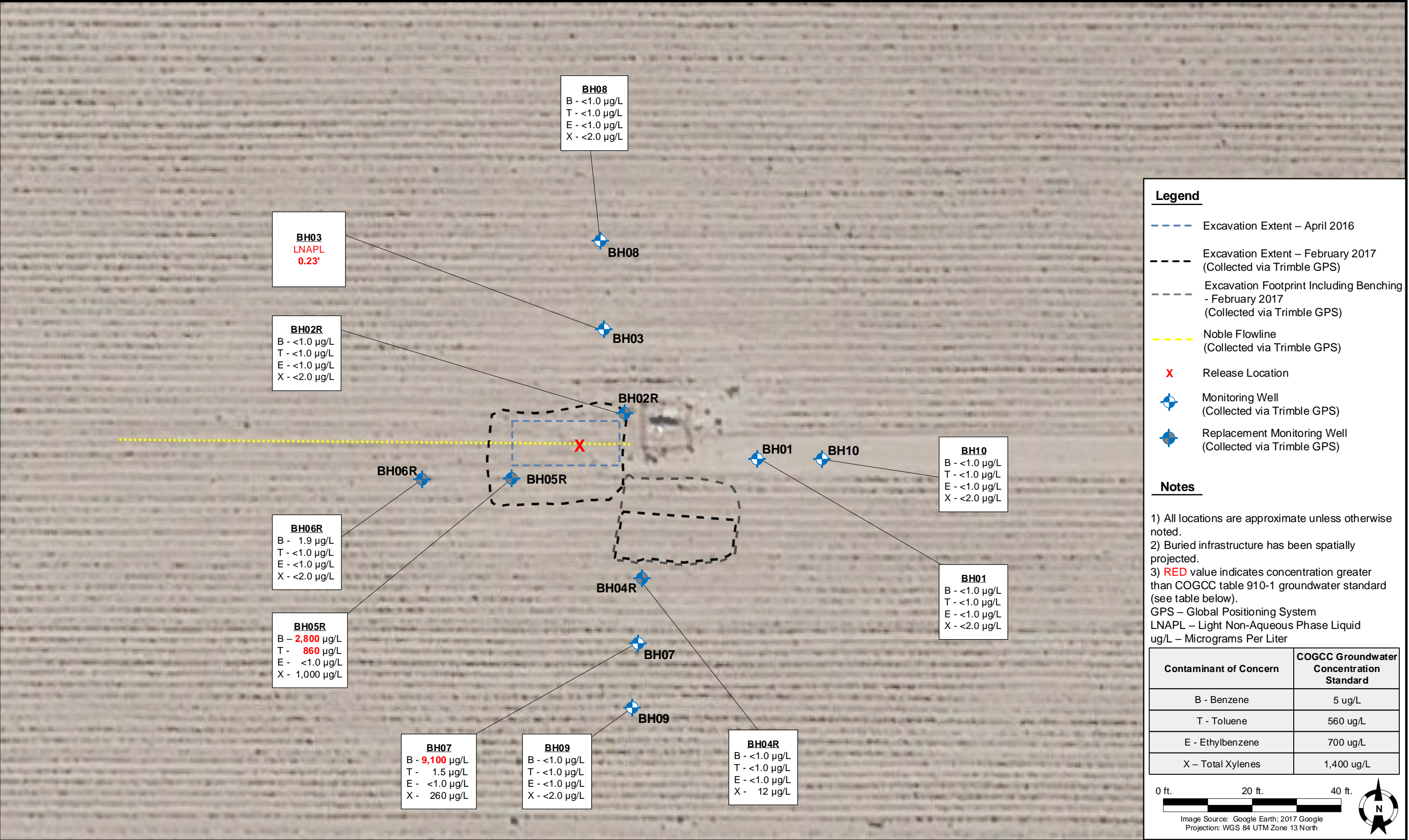
Tasman Geosciences, Inc.  
6899 Pecos Street - Unit C  
Denver, CO 80221

Noble Energy, Inc. - DJ Basin  
Knaus 28-8 Flowline Release  
SENE, Section 28, Township 6 North, Range 66 West  
Weld County, Colorado

Excavation Analytical  
Results Map  
(February 6 and 7, 2017)

FIGURE  
5





# **ATTACHMENT A**

**EXCAVATION LABORATORY ANALYTICAL DATA REPORTS  
(APRIL 11, 2016 AND FEBRUARY 6 AND 7, 2017)**



# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

April 12, 2016

Brandon Bruns  
Tasman Geosciences  
6899 Pecos Street  
Denver, CO 80221  
RE: Knaus 28-8

Enclosed are the results of analyses for samples received by Summit Scientific on 04/11/16 17:30. 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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/12/16 06:48

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS01@6	1604071-01	Soil	04/11/16 14:25	04/11/16 17:30
SS02@5	1604071-02	Soil	04/11/16 14:28	04/11/16 17:30
SS03@5	1604071-03	Soil	04/11/16 14:31	04/11/16 17:30
SS04@5	1604071-04	Soil	04/11/16 14:34	04/11/16 17:30
SS05@5	1604071-05	Soil	04/11/16 14:37	04/11/16 17:30

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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/12/16 06:48

Summit Scientific 1604071

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

Page 1 of 1

Client: Noble/Tasman  
Address:  
City/State/Zip:  
Phone: Fax:  
Sampler Name: Brad Margvar

Project Manager: Brandon Bruns, Invoice: Tacob Evans  
E-Mail: \_\_\_\_\_  
Project Name: Knaus 28-8  
Project Number: \_\_\_\_\_

				Preservative		Matrix				Analyze For:										
Sample Description	Date Sampled	Time Sampled	Number of Containers	HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	8260 BTEX	8260B GBTEXN	8015 DRO	pH, EC, SAR					Special Instructions
SS0106	4/11/16	1425	1			X			X				X	X						
SS0205	4/11/16	1428	1			X			X				X	X						
SS0305	4/11/16	1431	1			X			X				X	X						
SS0405	4/11/16	1434	1			X			X				X	X						
SS0505	4/11/16	1437	1			X			X				X	X						
Relinquished by: [Signature]	Date/Time: 4/11/16 1700	Received by: [Signature]	Date/Time: 4/11/16 1700					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"/>				Notes:  on ice								
Relinquished by: [Signature]	Date/Time: 4/11/16 1730	Received by: [Signature]	Date/Time: 4-11-16 1930					Sample Integrity: Temperature Upon Receipt: 56°C Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>												

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



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
04/12/16 06:48

SS01@6  
1604071-01 (Soil)

### Summit Scientific

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 04/11/16 14:25

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	12000	50	mg/kg	1	1604113	04/11/16	04/11/16	8015M	

Date Sampled: 04/11/16 14:25

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		196 %	30-150		"	"	"	"	S-02

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

Date Sampled: 04/11/16 14:25

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	10	1.0	mg/kg	100	1604112	04/11/16	04/11/16	EPA 8260B	
Benzene	16	0.20	"	"	"	"	"	"	
Toluene	140	0.50	"	"	"	"	"	"	E
Ethylbenzene	37	0.50	"	"	"	"	"	"	
Xylenes (total)	320	1.0	"	"	"	"	"	"	E
Gasoline Range Hydrocarbons	7600	50	"	"	"	"	"	"	

Date Sampled: 04/11/16 14:25

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		101 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		144 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		134 %	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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
04/12/16 06:48

SS02@5  
1604071-02 (Soil)

### Summit Scientific

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 04/11/16 14:28

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	8800	50	mg/kg	1	1604113	04/11/16	04/11/16	8015M	

Date Sampled: 04/11/16 14:28

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		137 %	30-150		"	"	"	"	

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

Date Sampled: 04/11/16 14:28

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	8.8	1.0	mg/kg	100	1604112	04/11/16	04/11/16	EPA 8260B	
Benzene	18	0.20	"	"	"	"	"	"	
Toluene	130	0.50	"	"	"	"	"	"	E
Ethylbenzene	32	0.50	"	"	"	"	"	"	
Xylenes (total)	280	1.0	"	"	"	"	"	"	E
Gasoline Range Hydrocarbons	7500	50	"	"	"	"	"	"	

Date Sampled: 04/11/16 14:28

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		104 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		141 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		134 %	21-167		"	"	"	"	

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
04/12/16 06:48

**SS03@5**  
**1604071-03 (Soil)**

### Summit Scientific

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **04/11/16 14:31**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>C10-C28 (DRO)</b>	<b>1300</b>	50	mg/kg	1	1604113	04/11/16	04/11/16	8015M	

Date Sampled: **04/11/16 14:31**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: o-Terphenyl</i>		119 %	30-150		"	"	"	"	

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

Date Sampled: **04/11/16 14:31**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Naphthalene</b>	<b>2.6</b>	1.0	mg/kg	100	1604112	04/11/16	04/11/16	EPA 8260B	
<b>Benzene</b>	<b>2.9</b>	0.20	"	"	"	"	"	"	
<b>Toluene</b>	<b>23</b>	0.50	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>6.1</b>	0.50	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>58</b>	1.0	"	"	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>2300</b>	50	"	"	"	"	"	"	

Date Sampled: **04/11/16 14:31**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		99.2 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		119 %	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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
04/12/16 06:48

**SS04@5**  
**1604071-04 (Soil)**

### Summit Scientific

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **04/11/16 14:34**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>C10-C28 (DRO)</b>	<b>14000</b>	50	mg/kg	1	1604113	04/11/16	04/11/16	8015M	

Date Sampled: **04/11/16 14:34**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: o-Terphenyl</i>		225 %	30-150		"	"	"	"	S-02

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

Date Sampled: **04/11/16 14:34**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Naphthalene</b>	<b>14</b>	1.0	mg/kg	100	1604112	04/11/16	04/11/16	EPA 8260B	
<b>Benzene</b>	<b>38</b>	0.20	"	"	"	"	"	"	
<b>Toluene</b>	<b>240</b>	0.50	"	"	"	"	"	"	E
<b>Ethylbenzene</b>	<b>58</b>	0.50	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>490</b>	1.0	"	"	"	"	"	"	E
<b>Gasoline Range Hydrocarbons</b>	<b>12000</b>	50	"	"	"	"	"	"	E

Date Sampled: **04/11/16 14:34**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		100 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		161 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		139 %	21-167		"	"	"	"	

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
04/12/16 06:48

**SS05@5**  
**1604071-05 (Soil)**

### Summit Scientific

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **04/11/16 14:37**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>C10-C28 (DRO)</b>	<b>7000</b>	50	mg/kg	1	1604113	04/11/16	04/12/16	8015M	

Date Sampled: **04/11/16 14:37**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: o-Terphenyl</i>		162 %	30-150		"	"	"	"	S-02

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

Date Sampled: **04/11/16 14:37**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Naphthalene</b>	<b>7.3</b>	1.0	mg/kg	100	1604112	04/11/16	04/11/16	EPA 8260B	
<b>Benzene</b>	<b>26</b>	0.20	"	"	"	"	"	"	
<b>Toluene</b>	<b>170</b>	0.50	"	"	"	"	"	"	E
<b>Ethylbenzene</b>	<b>38</b>	0.50	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>310</b>	1.0	"	"	"	"	"	"	E
<b>Gasoline Range Hydrocarbons</b>	<b>8600</b>	50	"	"	"	"	"	"	

Date Sampled: **04/11/16 14:37**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		99.4 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		148 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		134 %	21-167		"	"	"	"	

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/12/16 06:48

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

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

**Batch 1604113 - EPA 3550A**

**Blank (1604113-BLK1)**

Prepared: 04/11/16 Analyzed: 04/12/16

C10-C28 (DRO) ND 50 mg/kg

Surrogate: o-Terphenyl 13.4 " 12.5 107 30-150

**LCS (1604113-BS1)**

Prepared: 04/11/16 Analyzed: 04/12/16

C10-C28 (DRO) 492 50 mg/kg 499 98.6 73-134

Surrogate: o-Terphenyl 13.6 " 12.5 109 30-150

**Matrix Spike (1604113-MS1)**

Source: 1604069-01

Prepared: 04/11/16 Analyzed: 04/12/16

C10-C28 (DRO) 462 50 mg/kg 489 31.1 88.1 50-148

Surrogate: o-Terphenyl 12.5 " 12.3 102 30-150

**Matrix Spike Dup (1604113-MSD1)**

Source: 1604069-01

Prepared: 04/11/16 Analyzed: 04/12/16

C10-C28 (DRO) 450 50 mg/kg 482 31.1 87.0 50-148 2.70 13

Surrogate: o-Terphenyl 12.5 " 12.1 104 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: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
04/12/16 06:48

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

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

**Batch 1604112 - EPA 5030 Soil MS**

**Blank (1604112-BLK1)**

Prepared: 04/11/16 Analyzed: 04/12/16

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	0.0386		"	0.0400		96.5	23-173			
Surrogate: Toluene-d8	0.0421		"	0.0400		105	20-170			
Surrogate: 4-Bromofluorobenzene	0.0438		"	0.0400		109	21-167			

**LCS (1604112-BS1)**

Prepared: 04/11/16 Analyzed: 04/12/16

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.0964	0.0020	"	0.100		96.4	58-130			
Toluene	0.0959	0.0050	"	0.100		95.9	61-134			
Ethylbenzene	0.106	0.0050	"	0.0992		107	74-139			
m,p-Xylene	0.220	0.010	"	0.200		110	73-137			
o-Xylene	0.103	0.0050	"	0.0980		105	73-141			
Surrogate: 1,2-Dichloroethane-d4	0.0374		"	0.0400		93.4	23-173			
Surrogate: Toluene-d8	0.0422		"	0.0400		106	20-170			
Surrogate: 4-Bromofluorobenzene	0.0421		"	0.0400		105	21-167			

**Matrix Spike (1604112-MS1)**

Source: 1604069-01

Prepared: 04/11/16 Analyzed: 04/12/16

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.0922	0.0020	"	0.0963	ND	95.7	30-131			
Toluene	0.0930	0.0050	"	0.0963	ND	96.5	30-134			
Ethylbenzene	0.100	0.0050	"	0.0956	ND	105	22-153			
m,p-Xylene	0.207	0.010	"	0.192	ND	108	10-159			
o-Xylene	0.0983	0.0050	"	0.0944	ND	104	31-151			
Surrogate: 1,2-Dichloroethane-d4	0.0401		"	0.0385		104	23-173			
Surrogate: Toluene-d8	0.0402		"	0.0385		104	20-170			
Surrogate: 4-Bromofluorobenzene	0.0442		"	0.0385		115	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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
04/12/16 06:48

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

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

**Batch 1604112 - EPA 5030 Soil MS**

Matrix Spike Dup (1604112-MSD1)		Source: 1604069-01			Prepared: 04/11/16		Analyzed: 04/12/16			
Naphthalene	ND	0.010	mg/kg		ND		10-158			42
Benzene	0.0963	0.0020	"	0.0980	ND	98.2	30-131	4.35		34
Toluene	0.0961	0.0050	"	0.0980	ND	98.1	30-134	3.32		30
Ethylbenzene	0.102	0.0050	"	0.0973	ND	104	22-153	1.49		24
m,p-Xylene	0.212	0.010	"	0.196	ND	108	10-159	2.07		68
o-Xylene	0.0980	0.0050	"	0.0961	ND	102	31-151	0.300		38
Surrogate: 1,2-Dichloroethane-d4		0.0400	"	0.0392		102	23-173			
Surrogate: Toluene-d8		0.0409	"	0.0392		104	20-170			
Surrogate: 4-Bromofluorobenzene		0.0436	"	0.0392		111	21-167			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/12/16 06:48

### Notes and Definitions

S-02      The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample extract.

E          The concentration indicated for this analyte is an estimated value above the calibration range of the instrument.

DET       Analyte DETECTED

ND       Analyte NOT DETECTED at or above the reporting limit

NR       Not Reported

dry       Sample results reported on a dry weight basis

RPD       Relative Percent Difference

# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

February 07, 2017

Brandon Bruns  
Tasman Geosciences  
6899 Pecos Street  
Denver, CO 80221  
RE: Knaus 28-8

Enclosed are the results of analyses for samples received by Summit Scientific on 02/06/17 17:20. 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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
02/07/17 06:23

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS09@10'	1702045-01	Soil	02/06/17 13:15	02/06/17 17:20
SS11@10'	1702045-02	Soil	02/06/17 13:28	02/06/17 17:20
SS12@10'	1702045-03	Soil	02/06/17 13:31	02/06/17 17:20
SS13@10'	1702045-04	Soil	02/06/17 13:42	02/06/17 17:20
SS14@10'	1702045-05	Soil	02/06/17 14:00	02/06/17 17:20
SS15@10'	1702045-06	Soil	02/06/17 15:00	02/06/17 17:20
SS16@10'	1702045-07	Soil	02/06/17 15:08	02/06/17 17:20

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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
02/07/17 06:23

## Summit Scientific 17 02 04/5

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

Page 1 of 1

Client: Noble/Tasman  
Address: -  
City/State/Zip: -  
Phone: 303-487-1228 Fax: -  
Sampler Name: C8

Project Manager: Brandon Bruns, Invoice: Jacob Evans  
E-Mail: Bbruns@tasman-geo.com  
Project Name: K445 28-8  
Project Number: -

				Preservative		Matrix		Analyze For:									
Sample Description	Date Sampled	Time Sampled	Number of Containers	HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	8260 BTEX	8260B GBTEXN	8015 DRO	pH, EC, SAR		Special Instructions
SS 09 @ 10"	2/6/17	1315	1		X				X			X	X	X			
SS 11 @ 10"	2/6/17	1328	1		X				X			X	X	X			
SS 12 @ 10"	2/6/17	1331	1		X				X			X	X	X			
SS 13 @ 10"	2/6/17	1342	1		X				X			X	X	X			
SS 14 @ 10"	2/6/17	1400	1		X				X			X	X	X			
SS 15 @ 10"	2/6/17	1500	1		X				X			X	X	X			
SS 16 @ 10"	2/6/17	1508	1		X				X			X	X	X			
Relinquished by: [Signature] Date/Time: 2/6/17 1700				Received by: [Signature] Date/Time: 2/6/17 1700				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"/>								Notes:  on ice	
Relinquished by: [Signature] Date/Time: 2/6/17 1720				Received by: _____ Date/Time: _____				Sample Integrity: 8.1°C Temperature Upon Receipt: Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>									
Relinquished by: _____ Date/Time: _____				Received in Lab by: _____ Date/Time: _____													

[www.s2scientific.com](http://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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
02/07/17 06:23

#### Sample Receipt Checklist

S2 Work Order: 1702045

Client: Noble/Tasman

Client Project ID: Knaus 28-8

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>8.1</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

MSA  
Signature or Initials of Custodian

2/6/17 1720  
Date/Time



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
02/07/17 06:23

**SS09@10'**  
**1702045-01 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **02/06/17 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>C10-C28 (DRO)</b>	<b>190</b>	50	mg/kg	1	1702063	02/06/17	02/06/17	8015M	

Date Sampled: **02/06/17 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: o-Terphenyl</i>		91.9 %	30-150		"	"	"	"	

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

Date Sampled: **02/06/17 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Naphthalene</b>	<b>0.13</b>	0.010	mg/kg	1	1702062	02/06/17	02/06/17	EPA 8260B	
<b>Benzene</b>	<b>0.012</b>	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>0.065</b>	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.55</b>	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **02/06/17 13:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		108 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		97.6 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		111 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
02/07/17 06:23

SS11@10'  
1702045-02 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 02/06/17 13:28

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	210	50	mg/kg	1	1702063	02/06/17	02/06/17	8015M	

Date Sampled: 02/06/17 13:28

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

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: 02/06/17 13:28

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	0.11	0.010	mg/kg	1	1702062	02/06/17	02/06/17	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	0.012	0.0050	"	"	"	"	"	"	
Ethylbenzene	0.020	0.0050	"	"	"	"	"	"	
Xylenes (total)	0.27	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: 02/06/17 13:28

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		110 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.0 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
02/07/17 06:23

SS12@10'  
1702045-03 (Soil)

### Summit Scientific

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 02/06/17 13:31

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	96	50	mg/kg	1	1702063	02/06/17	02/06/17	8015M	

Date Sampled: 02/06/17 13:31

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

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

Date Sampled: 02/06/17 13:31

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	0.029	0.010	mg/kg	1	1702062	02/06/17	02/06/17	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: 02/06/17 13:31

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		110 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		95.8 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.8 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
02/07/17 06:23

**SS13@10'**  
**1702045-04 (Soil)**

### Summit Scientific

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **02/06/17 13:42**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>C10-C28 (DRO)</b>	<b>70</b>	50	mg/kg	1	1702063	02/06/17	02/06/17	8015M	

Date Sampled: **02/06/17 13:42**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: o-Terphenyl</i>		89.4 %	30-150		"	"	"	"	

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

Date Sampled: **02/06/17 13:42**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Naphthalene</b>	<b>0.030</b>	0.010	mg/kg	1	1702062	02/06/17	02/06/17	EPA 8260B	
<b>Benzene</b>	<b>0.0059</b>	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>0.011</b>	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.052</b>	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **02/06/17 13:42**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		107 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		96.5 %	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: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
02/07/17 06:23

**SS14@10'**  
**1702045-05 (Soil)**

### Summit Scientific

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **02/06/17 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>C10-C28 (DRO)</b>	<b>7100</b>	50	mg/kg	1	1702063	02/06/17	02/06/17	8015M	

Date Sampled: **02/06/17 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: o-Terphenyl</i>		177 %	30-150		"	"	"	"	

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

Date Sampled: **02/06/17 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Naphthalene</b>	<b>9.3</b>	1.0	mg/kg	100	1702062	02/06/17	02/07/17	EPA 8260B	
<b>Benzene</b>	<b>11</b>	0.20	"	"	"	"	"	"	
<b>Toluene</b>	<b>96</b>	0.50	"	"	"	"	"	"	E
<b>Ethylbenzene</b>	<b>26</b>	0.50	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>230</b>	1.0	"	"	"	"	"	"	
<b>Gasoline Range Hydrocarbons</b>	<b>6500</b>	5000	"	"	"	"	"	"	

Date Sampled: **02/06/17 14:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		104 %	23-173		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		113 %	20-170		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		141 %	21-167		"	"	"	"	

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
02/07/17 06:23

**SS15@10'**  
**1702045-06 (Soil)**

### Summit Scientific

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **02/06/17 15:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1702063	02/06/17	02/06/17	8015M	

Date Sampled: **02/06/17 15:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		86.1 %	30-150		"	"	"	"	

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

Date Sampled: **02/06/17 15:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1702062	02/06/17	02/06/17	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.012</b>	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **02/06/17 15:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		105 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		96.0 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		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: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
02/07/17 06:23

**SS16@10'**  
**1702045-07 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **02/06/17 15:08**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1702063	02/06/17	02/06/17	8015M	

Date Sampled: **02/06/17 15:08**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		87.9 %	30-150		"	"	"	"	

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

Date Sampled: **02/06/17 15:08**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1702062	02/06/17	02/06/17	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: **02/06/17 15:08**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		94.0 %	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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
02/07/17 06:23

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

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

**Batch 1702063 - EPA 3550A**

**Blank (1702063-BLK1)**

Prepared & Analyzed: 02/06/17

C10-C28 (DRO)	ND	50	mg/kg							
Surrogate: o-Terphenyl	12.0		"	12.5		95.7	30-150			

**LCS (1702063-BS1)**

Prepared & Analyzed: 02/06/17

C10-C28 (DRO)	491	50	mg/kg	499		98.4	73-134			
Surrogate: o-Terphenyl	12.5		"	12.5		100	30-150			

**Matrix Spike (1702063-MS1)**

Source: 1702045-01

Prepared & Analyzed: 02/06/17

C10-C28 (DRO)	642	50	mg/kg	499	185	91.5	50-148			
Surrogate: o-Terphenyl	12.8		"	12.5		103	30-150			

**Matrix Spike Dup (1702063-MSD1)**

Source: 1702045-01

Prepared & Analyzed: 02/06/17

C10-C28 (DRO)	618	50	mg/kg	499	185	86.7	50-148	3.78	20	
Surrogate: o-Terphenyl	12.4		"	12.5		99.4	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: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
02/07/17 06:23

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

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

**Batch 1702062 - EPA 5030 Soil MS**

**Blank (1702062-BLK1)**

Prepared & Analyzed: 02/06/17

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	0.0417		"	0.0400		104	23-173			
Surrogate: Toluene-d8	0.0382		"	0.0400		95.5	20-170			
Surrogate: 4-Bromofluorobenzene	0.0392		"	0.0400		98.0	21-167			

**LCS (1702062-BS1)**

Prepared & Analyzed: 02/06/17

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.0843	0.0020	"	0.100		84.3	58-130			
Toluene	0.0887	0.0050	"	0.100		88.7	61-134			
Ethylbenzene	0.0877	0.0050	"	0.0992		88.4	74-139			
m,p-Xylene	0.158	0.010	"	0.200		79.1	73-137			
o-Xylene	0.0835	0.0050	"	0.0980		85.2	73-141			
Surrogate: 1,2-Dichloroethane-d4	0.0388		"	0.0400		97.1	23-173			
Surrogate: Toluene-d8	0.0452		"	0.0400		113	20-170			
Surrogate: 4-Bromofluorobenzene	0.0410		"	0.0400		102	21-167			

**Matrix Spike (1702062-MS1)**

Source: 1702045-01

Prepared & Analyzed: 02/06/17

Naphthalene	0.0741	0.010	mg/kg		0.127		10-158			
Benzene	0.104	0.0020	"	0.100	0.0125	91.7	30-131			
Toluene	0.102	0.0050	"	0.100	ND	102	30-134			
Ethylbenzene	0.140	0.0050	"	0.0992	0.0650	75.1	22-153			
m,p-Xylene	0.409	0.010	"	0.200	0.497	NR	10-159			QM-07
o-Xylene	0.135	0.0050	"	0.0980	0.0524	84.7	31-151			
Surrogate: 1,2-Dichloroethane-d4	0.0402		"	0.0400		100	23-173			
Surrogate: Toluene-d8	0.0432		"	0.0400		108	20-170			
Surrogate: 4-Bromofluorobenzene	0.0419		"	0.0400		105	21-167			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
02/07/17 06:23

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

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

**Batch 1702062 - EPA 5030 Soil MS**

Matrix Spike Dup (1702062-MSD1)			Source: 1702045-01		Prepared & Analyzed: 02/06/17					
Naphthalene	0.0910	0.010	mg/kg		0.127		10-158	20.5	42	
Benzene	0.111	0.0020	"	0.100	0.0125	98.1	30-131	5.98	34	
Toluene	0.109	0.0050	"	0.100	ND	109	30-134	6.50	30	
Ethylbenzene	0.157	0.0050	"	0.0992	0.0650	92.4	22-153	11.6	24	
m,p-Xylene	0.456	0.010	"	0.200	0.497	NR	10-159	10.8	68	QM-07
o-Xylene	0.153	0.0050	"	0.0980	0.0524	103	31-151	12.5	38	
Surrogate: 1,2-Dichloroethane-d4	0.0419		"	0.0400		105	23-173			
Surrogate: Toluene-d8	0.0417		"	0.0400		104	20-170			
Surrogate: 4-Bromofluorobenzene	0.0431		"	0.0400		108	21-167			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
02/07/17 06:23

### 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.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument.
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

February 08, 2017

Brandon Bruns  
Tasman Geosciences  
6899 Pecos Street  
Denver, CO 80221  
RE: Knaus 28-8

Enclosed are the results of analyses for samples received by Summit Scientific on 02/07/17 17:30. 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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
02/08/17 06:42

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS17@10'	1702051-01	Soil	02/07/17 11:05	02/07/17 17:30
SS18@10'	1702051-02	Soil	02/07/17 11:10	02/07/17 17:30
SS19@10'	1702051-03	Soil	02/07/17 11:15	02/07/17 17:30
SS20@10'	1702051-04	Soil	02/07/17 11:20	02/07/17 17:30

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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
02/08/17 06:42

Summit Scientific 17020 ~~50~~  
51

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

Page 1 of 1

Client: Noble/Tasman  
Address: -  
City/State/Zip: -  
Phone: 303-487-1228 Fax: -  
Sampler Name: 302

Project Manager: Brandon Bruns, Invoice: Jacob Evans  
E-Mail: Bbruns@tasman-geo.com  
Project Name: Kn445 28-8  
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	8260B GBTEXN	8015 DRO	pH, EC, SAR	
SS7 @ 10"	2/7/17	1105	1		X		X				X	X		
SS8 @ 10"	2/7/17	1110	1		X		X				X	X		
SS9 @ 10"	2/7/17	1115	1		X		X				X	X		
SS20 @ 10"	2/7/17	1120	1		X		X				X	X		
Relinquished by: 	Date/Time: 2/7/17 1700	Received by:  2/7/17	Date/Time: 1700	Turn Around Time (Check) Same Day <input checked="" type="checkbox"/> 72 Hours 24 Hours Standard <input type="checkbox"/> 48 Hours <input type="checkbox"/>				Notes:  on ice						
Relinquished by:  2/7/17	Date/Time: 1730	Received by:	Date/Time:	Sample Integrity: Temperature Upon Receipt: 4.5°C Intact: Yes No										
Relinquished by:	Date/Time:	Received in Lab by:	Date/Time:											

[www.s2scientific.com](http://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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
02/08/17 06:42

### Sample Receipt Checklist

S2 Work Order: 5722051

Client: Noble/Tasman

Client Project ID: Knaus 28-8

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>4.5</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, H <sub>2</sub> SO <sub>4</sub> , NaOH, HNO <sub>3</sub> , 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

2/7/17 1730  
Date/Time





Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
02/08/17 06:42

**SS17@10'**  
**1702051-01 (Soil)**

### Summit Scientific

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **02/07/17 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1702078	02/07/17	02/08/17	8015M	

Date Sampled: **02/07/17 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		97.9 %	30-150		"	"	"	"	

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

Date Sampled: **02/07/17 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1702077	02/07/17	02/07/17	EPA 8260B	
<b>Benzene</b>	<b>0.0052</b>	0.0020	"	"	"	"	"	"	
<b>Toluene</b>	<b>0.0051</b>	0.0050	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>0.0069</b>	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.068</b>	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **02/07/17 11:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		105 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		96.5 %	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: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
02/08/17 06:42

**SS18@10'**  
**1702051-02 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **02/07/17 11:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1702078	02/07/17	02/08/17	8015M	

Date Sampled: **02/07/17 11:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		97.4 %	30-150		"	"	"	"	

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

Date Sampled: **02/07/17 11:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	<b>0.020</b>	0.010	mg/kg	1	1702077	02/07/17	02/07/17	EPA 8260B	
Benzene	<b>0.0040</b>	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	<b>0.023</b>	0.0050	"	"	"	"	"	"	
Xylenes (total)	<b>0.19</b>	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **02/07/17 11:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		106 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		99.8 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
02/08/17 06:42

SS19@10'  
1702051-03 (Soil)

### Summit Scientific

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: 02/07/17 11:15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1702078	02/07/17	02/08/17	8015M	

Date Sampled: 02/07/17 11:15

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

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

Date Sampled: 02/07/17 11:15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1702077	02/07/17	02/07/17	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: 02/07/17 11:15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		109 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		95.1 %	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: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
02/08/17 06:42

**SS20@10'**  
**1702051-04 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **02/07/17 11:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1702078	02/07/17	02/08/17	8015M	

Date Sampled: **02/07/17 11:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		97.1 %	30-150		"	"	"	"	

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

Date Sampled: **02/07/17 11:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1702077	02/07/17	02/07/17	EPA 8260B	
<b>Benzene</b>	<b>0.0039</b>	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>0.020</b>	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **02/07/17 11:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		106 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		94.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
02/08/17 06:42

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

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

**Batch 1702078 - EPA 3550A**

**Blank (1702078-BLK1)**

Prepared & Analyzed: 02/07/17

C10-C28 (DRO) ND 50 mg/kg

Surrogate: o-Terphenyl 12.0 " 12.5 96.1 30-150

**LCS (1702078-BS1)**

Prepared & Analyzed: 02/07/17

C10-C28 (DRO) 505 50 mg/kg 499 101 73-134

Surrogate: o-Terphenyl 12.2 " 12.5 97.4 30-150

**Matrix Spike (1702078-MS1)**

Source: 1702048-01

Prepared & Analyzed: 02/07/17

C10-C28 (DRO) 402 50 mg/kg 499 53.0 69.9 50-148

Surrogate: o-Terphenyl 7.78 " 12.5 62.2 30-150

**Matrix Spike Dup (1702078-MSD1)**

Source: 1702048-01

Prepared & Analyzed: 02/07/17

C10-C28 (DRO) 526 50 mg/kg 499 53.0 94.9 50-148 26.8 20 QR-02

Surrogate: o-Terphenyl 10.5 " 12.5 83.8 30-150

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.





Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
02/08/17 06:42

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

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

**Batch 1702077 - EPA 5030 Soil MS**

**Blank (1702077-BLK1)**

Prepared & Analyzed: 02/07/17

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	0.0397		"	0.0400		99.3	23-173			
Surrogate: Toluene-d8	0.0400		"	0.0400		100	20-170			
Surrogate: 4-Bromofluorobenzene	0.0379		"	0.0400		94.6	21-167			

**LCS (1702077-BS1)**

Prepared & Analyzed: 02/07/17

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.0915	0.0020	"	0.100		91.5	58-130			
Toluene	0.0993	0.0050	"	0.100		99.3	61-134			
Ethylbenzene	0.112	0.0050	"	0.0992		113	74-139			
m,p-Xylene	0.222	0.010	"	0.200		111	73-137			
o-Xylene	0.111	0.0050	"	0.0980		113	73-141			
Surrogate: 1,2-Dichloroethane-d4	0.0403		"	0.0400		101	23-173			
Surrogate: Toluene-d8	0.0392		"	0.0400		98.0	20-170			
Surrogate: 4-Bromofluorobenzene	0.0396		"	0.0400		99.0	21-167			

**Matrix Spike (1702077-MS1)**

Source: 1702048-01

Prepared & Analyzed: 02/07/17

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.0931	0.0020	"	0.100	ND	93.1	30-131			
Toluene	0.105	0.0050	"	0.100	ND	105	30-134			
Ethylbenzene	0.112	0.0050	"	0.0992	ND	113	22-153			
m,p-Xylene	0.229	0.010	"	0.200	ND	115	10-159			
o-Xylene	0.114	0.0050	"	0.0980	ND	116	31-151			
Surrogate: 1,2-Dichloroethane-d4	0.0428		"	0.0400		107	23-173			
Surrogate: Toluene-d8	0.0404		"	0.0400		101	20-170			
Surrogate: 4-Bromofluorobenzene	0.0387		"	0.0400		96.8	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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
02/08/17 06:42

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

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

**Batch 1702077 - EPA 5030 Soil MS**

Matrix Spike Dup (1702077-MSD1)		Source: 1702048-01			Prepared & Analyzed: 02/07/17					
Naphthalene	ND	0.010	mg/kg		ND		10-158		42	
Benzene	0.0932	0.0020	"	0.100	ND	93.2	30-131	0.129	34	
Toluene	0.104	0.0050	"	0.100	ND	104	30-134	1.26	30	
Ethylbenzene	0.114	0.0050	"	0.0992	ND	115	22-153	1.96	24	
m,p-Xylene	0.232	0.010	"	0.200	ND	116	10-159	1.05	68	
o-Xylene	0.117	0.0050	"	0.0980	ND	119	31-151	2.94	38	
Surrogate: 1,2-Dichloroethane-d4		0.0423	"	0.0400		106	23-173			
Surrogate: Toluene-d8		0.0390	"	0.0400		97.5	20-170			
Surrogate: 4-Bromofluorobenzene		0.0397	"	0.0400		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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
02/08/17 06:42

### Notes and Definitions

QR-02	The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.
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

# **ATTACHMENT B**

**SOIL BORING LABORATORY ANALYTICAL DATA REPORTS  
(APRIL 14 AND MAY 26, 2016 AND JUNE 15, 2017)**

# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

April 17, 2016

Brandon Bruns  
Tasman Geosciences  
6899 Pecos Street  
Denver, CO 80221  
RE: Knaus 28-8

Enclosed are the results of analyses for samples received by Summit Scientific on 04/15/16 17:45. 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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/17/16 12:55

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1604111-01	Water	04/15/16 13:20	04/15/16 17:45
BH02	1604111-02	Water	04/15/16 13:30	04/15/16 17:45
BH04	1604111-03	Water	04/15/16 13:32	04/15/16 17:45
BH06	1604111-04	Water	04/15/16 13:35	04/15/16 17:45
BH07	1604111-05	Water	04/15/16 13:25	04/15/16 17:45
BH01@5-6'	1604111-06	Soil	04/15/16 10:00	04/15/16 17:45
BH02@2-4'	1604111-07	Soil	04/15/16 10:15	04/15/16 17:45
BH03@2-4'	1604111-08	Soil	04/15/16 10:35	04/15/16 17:45
BH04@2-4'	1604111-09	Soil	04/15/16 10:55	04/15/16 17:45
BH05@2-4'	1604111-10	Soil	04/15/16 11:15	04/15/16 17:45
BH06@2-4'	1604111-11	Soil	04/15/16 11:55	04/15/16 17:45
BH07@2-4'	1604111-12	Soil	04/15/16 12:30	04/15/16 17:45

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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
04/17/16 12:55

# Summit Scientific 1604111.1

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

Page 1 of 2

Client: Noble/Tasman

Address: \_\_\_\_\_

City/State/Zip: \_\_\_\_\_

Phone: 970 470 9042 Fax: \_\_\_\_\_

Sampler Name: R Irvin J. Whisker

Project Manager: Brandon Bruns, Invoice: Jacob Evans

E-Mail: Bbruns@tasman-geo.com

Project Name: Knaus 28-8

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	8260B GBTEXN	8015 DRO	pH, EC, SAR			
BH01	4/15/16	1320	3	X				X					X					
BH02	4/15/16	1330	2	X				X					X					
BH04	4/15/16	1332	3	X				X					X					
BH06	4/15/16	1335	3	X				X					X					
BH07	4/15/16	1325	3	X				X					X					
BH08 5-6'	4/15/16	1000	1			X		X					X	X				
BH02@2-4'	4/15/16	1015	1			X		X					X	X				
BH03@2-4'	4/15/16	1035	1			X		X					X	X				
BH04@2-4'	4/15/16	1055	1			X		X					X	X				
BH05@2-4'	4/15/16	1115	1			X		X					X	X				

Relinquished by: <u>[Signature]</u>	Date/Time: <u>4/15/16 1700</u>	Received by: <u>[Signature]</u>	Date/Time: <u>4/15/16 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"/>	Notes: <u>On ice</u>
Relinquished by: <u>[Signature]</u>	Date/Time: <u>4/15/16 1750</u>	Received by: <u>[Signature]</u>	Date/Time: <u>4-15-16 1750</u>	Sample Integrity: Temperature Upon Receipt: <u>38°C</u> Intact: Yes <input type="checkbox"/> No <input type="checkbox"/>	
Relinquished by: _____	Date/Time: _____	Received in Lab by: _____	Date/Time: _____		

[www.s2scientific.com](http://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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
04/17/16 12:55

# Summit Scientific 1604111.2

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

Page 2 of 2

Client: Noble/Tasman

Address: \_\_\_\_\_

City/State/Zip: \_\_\_\_\_

Phone: 970 470 9042 Fax: \_\_\_\_\_

Sampler Name: E. Irvin J. Whittaker

Project Manager: Brandon Bruns, Invoice: Jacob Evans

E-Mail: bbruns@tasman-geo.com

Project Name: Knaus 28-8

Project Number: \_\_\_\_\_

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative			Matrix			Analyze For:					Special Instructions															
				HCl	HNO <sub>3</sub>	None	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	8260 BTEX	8260B GBTEXN	8015 DRO	pH, EC, SAR																
BH0602-4'	4/15/16	1155	1		X		X					X	X																	
BH0702-4'	4/15/16	1230	1		X		X					X	X																	
Relinquished by: <u>[Signature]</u> Date/Time: <u>4/15/16 1700</u>				Received by: <u>[Signature]</u> Date/Time: <u>4/15/16 1700</u>				Turn Around Time (Check)				Notes:																		
Relinquished by: <u>[Signature]</u> Date/Time: <u>4/15/16 1750</u>				Received by: <u>[Signature]</u> Date/Time: <u>4-15-16 1750</u>				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"/>				2nir																		
Relinquished by: _____ Date/Time: _____				Received in Lab by: _____ Date/Time: _____				Sample Integrity:																						
								Temperature Upon Receipt: <u>38°C</u>																						
								Intact: <input checked="" type="radio"/> Yes <input type="radio"/> No																						

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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: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
04/17/16 12:55

**BH01**  
**1604111-01 (Water)**

**Summit Scientific**

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

Date Sampled: **04/15/16 13:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1604169	04/15/16	04/15/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/15/16 13:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		97.3 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		103 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		109 %	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: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
04/17/16 12:55

**BH02**  
**1604111-02 (Water)**

**Summit Scientific**

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

Date Sampled: **04/15/16 13:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<b>Benzene</b>	<b>5300</b>	100		ug/l	100	1604169	04/15/16	04/15/16	EPA 8260B	
<b>Toluene</b>	<b>3900</b>	100		"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>130</b>	1.0		"	1	"	"	04/15/16	"	
<b>Xylenes (total)</b>	<b>1200</b>	1.0		"	"	"	"	"	"	

Date Sampled: **04/15/16 13:30**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<i>Surrogate: 1,2-Dichloroethane-d4</i>		106 %		37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		104 %		45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		106 %		45-146		"	"	"	"	

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
04/17/16 12:55

**BH04**  
**1604111-03 (Water)**

**Summit Scientific**

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

Date Sampled: **04/15/16 13:32**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>1700</b>	100	ug/l	100	1604169	04/15/16	04/15/16	EPA 8260B	
<b>Toluene</b>	<b>2600</b>	100	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>130</b>	1.0	"	1	"	"	04/15/16	"	
<b>Xylenes (total)</b>	<b>1200</b>	1.0	"	"	"	"	"	"	

Date Sampled: **04/15/16 13:32**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		104 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		104 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		108 %	45-146		"	"	"	"	

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
04/17/16 12:55

**BH06**  
**1604111-04 (Water)**

**Summit Scientific**

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

Date Sampled: **04/15/16 13:35**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1604169	04/15/16	04/15/16	EPA 8260B	
<b>Toluene</b>	<b>8.0</b>	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	1.0		"	"	"	"	"	"	

Date Sampled: **04/15/16 13:35**

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

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
04/17/16 12:55

**BH07**  
**1604111-05 (Water)**

**Summit Scientific**

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

Date Sampled: **04/15/16 13:25**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	1.0	ug/l	1	1604169	04/15/16	04/15/16	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	

Date Sampled: **04/15/16 13:25**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		94.8 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		104 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		108 %	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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
04/17/16 12:55

**BH01@5-6'**  
**1604111-06 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **04/15/16 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1604158	04/15/16	04/16/16	8015M	

Date Sampled: **04/15/16 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		99.0 %	30-150		"	"	"	"	

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

Date Sampled: **04/15/16 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1604156	04/15/16	04/15/16	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: **04/15/16 10:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		109 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.6 %	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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
04/17/16 12:55

**BH02@2-4'**  
**1604111-07 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **04/15/16 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1604158	04/15/16	04/16/16	8015M	

Date Sampled: **04/15/16 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		98.5 %	30-150		"	"	"	"	

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

Date Sampled: **04/15/16 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1604156	04/15/16	04/15/16	EPA 8260B	
<b>Benzene</b>	<b>0.0088</b>	0.0020	"	"	"	"	"	"	
<b>Toluene</b>	<b>0.0074</b>	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **04/15/16 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		111 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.8 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.5 %	21-167		"	"	"	"	

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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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
04/17/16 12:55

**BH03@2-4'**  
**1604111-08 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **04/15/16 10:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1604158	04/15/16	04/16/16	8015M	

Date Sampled: **04/15/16 10:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		103 %	30-150		"	"	"	"	

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

Date Sampled: **04/15/16 10:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1604156	04/15/16	04/15/16	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: **04/15/16 10:35**

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		97.7 %	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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
04/17/16 12:55

**BH04@2-4'**  
**1604111-09 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **04/15/16 10:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1604158	04/15/16	04/16/16	8015M	

Date Sampled: **04/15/16 10:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		99.7 %	30-150		"	"	"	"	

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

Date Sampled: **04/15/16 10:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1604156	04/15/16	04/15/16	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: **04/15/16 10:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		109 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		96.8 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.3 %	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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
04/17/16 12:55

**BH05@2-4'**  
**1604111-10 (Soil)**

### Summit Scientific

#### Extractable Petroleum Hydrocarbons by 8015

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

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1604158	04/15/16	04/16/16	8015M	

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

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		98.8 %	30-150		"	"	"	"	

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

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

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1604156	04/15/16	04/15/16	EPA 8260B	
<b>Benzene</b>	<b>0.0066</b>	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

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

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.8 %	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: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
04/17/16 12:55

**BH06@2-4'**  
**1604111-11 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **04/15/16 11:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1604158	04/15/16	04/16/16	8015M	

Date Sampled: **04/15/16 11:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		99.0 %	30-150		"	"	"	"	

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

Date Sampled: **04/15/16 11:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1604156	04/15/16	04/15/16	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: **04/15/16 11:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		106 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		97.0 %	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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
04/17/16 12:55

**BH07@2-4'**  
**1604111-12 (Soil)**

### Summit Scientific

#### Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **04/15/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1604158	04/15/16	04/16/16	8015M	

Date Sampled: **04/15/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		98.3 %	30-150		"	"	"	"	

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

Date Sampled: **04/15/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1604156	04/15/16	04/16/16	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: **04/15/16 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		104 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		94.7 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/17/16 12:55

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

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

**Batch 1604158 - EPA 3550A**

**Blank (1604158-BLK1)**

Prepared & Analyzed: 04/15/16

C10-C28 (DRO) ND 50 mg/kg

Surrogate: o-Terphenyl 13.7 " 12.5 110 30-150

**LCS (1604158-BS1)**

Prepared & Analyzed: 04/15/16

C10-C28 (DRO) 557 50 mg/kg 499 112 73-134

Surrogate: o-Terphenyl 13.1 " 12.5 105 30-150

**Matrix Spike (1604158-MS1)**

Source: 1604099-04

Prepared & Analyzed: 04/15/16

C10-C28 (DRO) 467 50 mg/kg 499 27.1 88.2 50-148

Surrogate: o-Terphenyl 12.3 " 12.5 98.4 30-150

**Matrix Spike Dup (1604158-MSD1)**

Source: 1604099-04

Prepared & Analyzed: 04/15/16

C10-C28 (DRO) 490 50 mg/kg 499 27.1 92.8 50-148 4.86 13

Surrogate: o-Terphenyl 12.9 " 12.5 103 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: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
04/17/16 12:55

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

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

**Batch 1604156 - EPA 5030 Soil MS**

**Blank (1604156-BLK1)**

Prepared & Analyzed: 04/15/16

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	0.0397		"	0.0400		99.3	23-173			
Surrogate: Toluene-d8	0.0386		"	0.0400		96.4	20-170			
Surrogate: 4-Bromofluorobenzene	0.0410		"	0.0400		102	21-167			

**LCS (1604156-BS1)**

Prepared & Analyzed: 04/15/16

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.0971	0.0020	"	0.100		97.1	58-130			
Toluene	0.106	0.0050	"	0.100		106	61-134			
Ethylbenzene	0.114	0.0050	"	0.0992		115	74-139			
m,p-Xylene	0.218	0.010	"	0.200		109	73-137			
o-Xylene	0.106	0.0050	"	0.0980		108	73-141			
Surrogate: 1,2-Dichloroethane-d4	0.0382		"	0.0400		95.4	23-173			
Surrogate: Toluene-d8	0.0408		"	0.0400		102	20-170			
Surrogate: 4-Bromofluorobenzene	0.0399		"	0.0400		99.8	21-167			

**Matrix Spike (1604156-MS1)**

Source: 1604099-04

Prepared & Analyzed: 04/15/16

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.0998	0.0020	"	0.0978	ND	102	30-131			
Toluene	0.108	0.0050	"	0.0978	ND	111	30-134			
Ethylbenzene	0.119	0.0050	"	0.0971	ND	123	22-153			
m,p-Xylene	0.227	0.010	"	0.195	ND	116	10-159			
o-Xylene	0.111	0.0050	"	0.0959	ND	116	31-151			
Surrogate: 1,2-Dichloroethane-d4	0.0403		"	0.0391		103	23-173			
Surrogate: Toluene-d8	0.0390		"	0.0391		99.7	20-170			
Surrogate: 4-Bromofluorobenzene	0.0396		"	0.0391		101	21-167			

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
04/17/16 12:55

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

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

**Batch 1604156 - EPA 5030 Soil MS**

Matrix Spike Dup (1604156-MSD1)				Source: 1604099-04		Prepared & Analyzed: 04/15/16				
Naphthalene	ND	0.010	mg/kg		ND		10-158		42	
Benzene	0.102	0.0020	"	0.0996	ND	103	30-131	2.51	34	
Toluene	0.112	0.0050	"	0.0996	ND	113	30-134	3.60	30	
Ethylbenzene	0.127	0.0050	"	0.0988	ND	128	22-153	6.19	24	
m,p-Xylene	0.242	0.010	"	0.199	ND	122	10-159	6.54	68	
o-Xylene	0.118	0.0050	"	0.0976	ND	120	31-151	5.85	38	
Surrogate: 1,2-Dichloroethane-d4	0.0408		"	0.0398		102	23-173			
Surrogate: Toluene-d8	0.0388		"	0.0398		97.5	20-170			
Surrogate: 4-Bromofluorobenzene	0.0410		"	0.0398		103	21-167			

**Batch 1604169 - EPA 5030 Water MS**

Blank (1604169-BLK1)				Prepared: 04/15/16 Analyzed: 04/16/16						
Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	1.0	"							
Surrogate: 1,2-Dichloroethane-d4	12.6		"	13.3		94.7	37-154			
Surrogate: Toluene-d8	14.0		"	13.3		105	45-149			
Surrogate: 4-Bromofluorobenzene	13.9		"	13.3		104	45-146			
LCS (1604169-BS1)				Prepared: 04/15/16 Analyzed: 04/16/16						
Benzene	33.4	1.0	ug/l	33.3		100	51-132			
Toluene	32.6	1.0	"	33.3		97.8	51-138			
Ethylbenzene	35.0	1.0	"	33.1		106	58-146			
m,p-Xylene	72.7	2.0	"	66.5		109	57-144			
o-Xylene	33.2	1.0	"	32.7		102	53-146			
Surrogate: 1,2-Dichloroethane-d4	13.1		"	13.3		98.0	37-154			
Surrogate: Toluene-d8	14.1		"	13.3		106	45-149			
Surrogate: 4-Bromofluorobenzene	14.4		"	13.3		108	45-146			

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
04/17/16 12:55

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

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

**Batch 1604169 - EPA 5030 Water MS**

Matrix Spike (1604169-MS1)		Source: 1604108-01			Prepared: 04/15/16		Analyzed: 04/16/16			
Benzene	33.6	1.0	ug/l	33.3	ND	101	34-141			
Toluene	32.2	1.0	"	33.3	ND	96.6	27-151			
Ethylbenzene	58.2	1.0	"	33.1	23.2	106	29-160			
m,p-Xylene	301	2.0	"	66.5	237	97.4	20-166			
o-Xylene	55.6	1.0	"	32.7	22.0	103	33-159			
Surrogate: 1,2-Dichloroethane-d4	13.2		"	13.3		98.8	37-154			
Surrogate: Toluene-d8	13.1		"	13.3		98.2	45-149			
Surrogate: 4-Bromofluorobenzene	14.9		"	13.3		112	45-146			
Matrix Spike Dup (1604169-MSD1)		Source: 1604108-01			Prepared: 04/15/16		Analyzed: 04/16/16			
Benzene	33.6	1.0	ug/l	33.3	ND	101	34-141	0.208	32	
Toluene	32.1	1.0	"	33.3	ND	96.4	27-151	0.218	25	
Ethylbenzene	52.4	1.0	"	33.1	23.2	88.2	29-160	10.5	50	
m,p-Xylene	247	2.0	"	66.5	237	15.3	20-166	19.9	36	QM-07
o-Xylene	50.0	1.0	"	32.7	22.0	85.7	33-159	10.6	26	
Surrogate: 1,2-Dichloroethane-d4	16.1		"	13.3		121	37-154			
Surrogate: Toluene-d8	13.6		"	13.3		102	45-149			
Surrogate: 4-Bromofluorobenzene	15.6		"	13.3		117	45-146			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
04/17/16 12:55

### 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

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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

June 02, 2016

Brandon Bruns  
Tasman Geosciences  
6899 Pecos Street  
Denver, CO 80221  
RE: Knaus 28-8

Enclosed are the results of analyses for samples received by Summit Scientific on 05/26/16 15:27. 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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
06/02/16 12:06

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH08@6-7'	1605251-01	Soil	05/26/16 09:05	05/26/16 15:27

## Summit Scientific

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

1605251  
Page 1 of 1

Client: Noble/Tasman

Address:

City/State/Zip:

Phone:

Fax:

Sampler Name: Eric Siegel

Project Manager: Brandon Bruns, Invoice: Jacob Evans

E-Mail:

Project Name: Knaus 28-8

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)	8280 BTEX	8280B GBTEXN	8015 DRO		pH, EC, SAR	
BH08@6-7'	5/26/16	905	1			X			X				X	X			
Relinquished by: S. A. Aisl		Date/Time: 5/26/16		Received by: [Signature]		Date/Time: 5-26-16 15:27		Turn Around Time (Check)					Notes:				
Relinquished by: [Signature]		Date/Time: 5-26-16 17:40		Received by:		Date/Time:		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:		Received in Lab by:		Date/Time:		Sample Integrity:									
								Temperature Upon Receipt: 5.7									
								Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>									

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Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
06/02/16 12:06

**BH08@6-7'**  
**1605251-01 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **05/26/16 09:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1605302	05/31/16	05/31/16	8015M	

Date Sampled: **05/26/16 09:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		110 %	30-150		"	"	"	"	

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

Date Sampled: **05/26/16 09:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1605308	05/31/16	05/31/16	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: **05/26/16 09:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		118 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.6 %	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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
06/02/16 12:06

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

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

**Batch 1605302 - EPA 3550A**

**Blank (1605302-BLK1)**

Prepared & Analyzed: 05/31/16

C10-C28 (DRO)	ND	50	mg/kg							
Surrogate: o-Terphenyl	13.8		"	12.5		111	30-150			

**LCS (1605302-BS1)**

Prepared & Analyzed: 05/31/16

C10-C28 (DRO)	582	50	mg/kg	499		117	73-134			
Surrogate: o-Terphenyl	13.5		"	12.5		108	30-150			

**Matrix Spike (1605302-MS1)**

Source: 1605251-01

Prepared & Analyzed: 05/31/16

C10-C28 (DRO)	580	50	mg/kg	454	ND	128	50-148			
Surrogate: o-Terphenyl	13.0		"	11.4		114	30-150			

**Matrix Spike Dup (1605302-MSD1)**

Source: 1605251-01

Prepared & Analyzed: 05/31/16

C10-C28 (DRO)	531	50	mg/kg	453	ND	117	50-148	8.75	13	
Surrogate: o-Terphenyl	12.8		"	11.3		113	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: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
06/02/16 12:06

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

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

**Batch 1605308 - EPA 5030 Soil MS**

**Blank (1605308-BLK1)**

Prepared & Analyzed: 05/31/16

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	0.0420		"	0.0400		105	23-173			
Surrogate: Toluene-d8	0.0387		"	0.0400		96.7	20-170			
Surrogate: 4-Bromofluorobenzene	0.0425		"	0.0400		106	21-167			

**LCS (1605308-BS1)**

Prepared & Analyzed: 05/31/16

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.0907	0.0020	"	0.100		90.7	58-130			
Toluene	0.0943	0.0050	"	0.100		94.3	61-134			
Ethylbenzene	0.0860	0.0050	"	0.0992		86.6	74-139			
m,p-Xylene	0.162	0.010	"	0.200		81.3	73-137			
o-Xylene	0.0780	0.0050	"	0.0980		79.6	73-141			
Surrogate: 1,2-Dichloroethane-d4	0.0363		"	0.0400		90.8	23-173			
Surrogate: Toluene-d8	0.0497		"	0.0400		124	20-170			
Surrogate: 4-Bromofluorobenzene	0.0418		"	0.0400		104	21-167			

**Matrix Spike (1605308-MS1)**

Source: 1605252-01

Prepared & Analyzed: 05/31/16

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.108	0.0020	"	0.100	ND	108	30-131			
Toluene	0.116	0.0050	"	0.100	ND	116	30-134			
Ethylbenzene	0.112	0.0050	"	0.0992	ND	113	22-153			
m,p-Xylene	0.214	0.010	"	0.200	ND	107	10-159			
o-Xylene	0.103	0.0050	"	0.0980	ND	105	31-151			
Surrogate: 1,2-Dichloroethane-d4	0.0415		"	0.0400		104	23-173			
Surrogate: Toluene-d8	0.0472		"	0.0400		118	20-170			
Surrogate: 4-Bromofluorobenzene	0.0417		"	0.0400		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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
06/02/16 12:06

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

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

**Batch 1605308 - EPA 5030 Soil MS**

Matrix Spike Dup (1605308-MSD1)		Source: 1605252-01			Prepared & Analyzed: 05/31/16					
Naphthalene	ND	0.010	mg/kg		ND		10-158		42	
Benzene	0.120	0.0020	"	0.100	ND	120	30-131	10.3	34	
Toluene	0.127	0.0050	"	0.100	ND	127	30-134	9.16	30	
Ethylbenzene	0.138	0.0050	"	0.0992	ND	139	22-153	21.1	24	
m,p-Xylene	0.262	0.010	"	0.200	ND	131	10-159	20.2	68	
o-Xylene	0.126	0.0050	"	0.0980	ND	129	31-151	20.3	38	
Surrogate: 1,2-Dichloroethane-d4	0.0449		"	0.0400		112	23-173			
Surrogate: Toluene-d8	0.0426		"	0.0400		106	20-170			
Surrogate: 4-Bromofluorobenzene	0.0407		"	0.0400		102	21-167			

Summit Scientific

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
06/02/16 12:06

### 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

*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.*

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

# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

June 22, 2017

Brandon Bruns  
Tasman Geosciences  
6899 Pecos Street  
Denver, CO 80221  
RE: Knaus 28-8

Enclosed are the results of analyses for samples received by Summit Scientific on 06/16/17 10:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to be '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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
06/22/17 15:17

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH09@0-2'	1706168-01	Soil	06/15/17 14:07	06/16/17 10:00
BH10@4-6'	1706168-02	Soil	06/15/17 15:30	06/16/17 10:00

Summit Scientific

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
06/22/17 15:17

## Summit Scientific

1706168

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

Page 1 of 1

Client: Noble/Tasman

Address: \_\_\_\_\_

City/State/Zip: —

Phone: 303-487-1228 Fax: -

Sampler Name: G3

Project Manager: Brandon Bruns, Invoice: Jacob Evans

E-Mail: Bbruns@tasman-geo.com

Project Name: Knaws 28-8

Project Number: 7

[illegible]

[www.s2scientific.com](http://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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
06/22/17 15:17

### Sample Receipt Checklist

S2 Work Order: 1706168

Client: Noble/Tasman

Client Project ID: Knaus 28-8

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>4.7</u>				

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<u>once</u>
NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.				
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If custody seals are present, are they intact <sup>(1)</sup> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water – is there headspace present? <b>if yes, contact client and note in narrative.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ? Record the pH in Comments.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Additional Comments (if any):				
<sup>(1)</sup> If NO, then contact the client before proceeding with analysis and note in case narrative.				

Nakita  
Custodian Printed Name

[Signature]  
Signature or Initials of Custodian

6/16/17 104  
Date/Time



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Brunns

Reported:  
06/22/17 15:17

**BH09@0-2'**  
**1706168-01 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **06/15/17 14:07**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1706198	06/19/17	06/20/17	8015M	

Date Sampled: **06/15/17 14:07**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		121 %	30-150		"	"	"	"	

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

Date Sampled: **06/15/17 14:07**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1706199	06/19/17	06/20/17	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: **06/15/17 14:07**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		111 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.1 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
06/22/17 15:17

**BH10@4-6'**  
**1706168-02 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **06/15/17 15:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1706198	06/19/17	06/20/17	8015M	

Date Sampled: **06/15/17 15:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		118 %	30-150		"	"	"	"	

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

Date Sampled: **06/15/17 15:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1706199	06/19/17	06/20/17	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: **06/15/17 15:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		116 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.2 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
06/22/17 15:17

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

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

**Batch 1706198 - EPA 3550A**

**Blank (1706198-BLK1)**

Prepared: 06/19/17 Analyzed: 06/20/17

C10-C28 (DRO) ND 50 mg/kg

Surrogate: o-Terphenyl 15.0 " 12.5 120 30-150

**LCS (1706198-BS1)**

Prepared: 06/19/17 Analyzed: 06/20/17

C10-C28 (DRO) 544 50 mg/kg 499 109 73-134

Surrogate: o-Terphenyl 15.0 " 12.5 120 30-150

**Matrix Spike (1706198-MS1)**

**Source: 1706162-01**

Prepared: 06/19/17 Analyzed: 06/20/17

C10-C28 (DRO) 546 50 mg/kg 499 26.8 104 50-148

Surrogate: o-Terphenyl 14.6 " 12.5 117 30-150

**Matrix Spike Dup (1706198-MSD1)**

**Source: 1706162-01**

Prepared: 06/19/17 Analyzed: 06/20/17

C10-C28 (DRO) 527 50 mg/kg 499 26.8 100 50-148 3.59 20

Surrogate: o-Terphenyl 13.8 " 12.5 111 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: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
06/22/17 15:17

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

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

**Batch 1706199 - EPA 5030 Soil MS**

**Blank (1706199-BLK1)**

Prepared: 06/19/17 Analyzed: 06/20/17

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	0.0437		"	0.0400		109	23-173			
Surrogate: Toluene-d8	0.0397		"	0.0400		99.2	20-170			
Surrogate: 4-Bromofluorobenzene	0.0401		"	0.0400		100	21-167			

**LCS (1706199-BS1)**

Prepared: 06/19/17 Analyzed: 06/20/17

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.0879	0.0020	"	0.100		87.9	58-130			
Toluene	0.0923	0.0050	"	0.100		92.3	61-134			
Ethylbenzene	0.0917	0.0050	"	0.0992		92.4	74-139			
m,p-Xylene	0.178	0.010	"	0.200		89.3	73-137			
o-Xylene	0.0926	0.0050	"	0.0980		94.5	73-141			
Surrogate: 1,2-Dichloroethane-d4	0.0445		"	0.0400		111	23-173			
Surrogate: Toluene-d8	0.0400		"	0.0400		100	20-170			
Surrogate: 4-Bromofluorobenzene	0.0412		"	0.0400		103	21-167			

**Matrix Spike (1706199-MS1)**

Source: 1706162-01

Prepared: 06/19/17 Analyzed: 06/20/17

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.0776	0.0020	"	0.100	ND	77.6	30-131			
Toluene	0.0811	0.0050	"	0.100	ND	81.1	30-134			
Ethylbenzene	0.0796	0.0050	"	0.0992	ND	80.2	22-153			
m,p-Xylene	0.155	0.010	"	0.200	ND	77.4	10-159			
o-Xylene	0.0803	0.0050	"	0.0980	ND	81.9	31-151			
Surrogate: 1,2-Dichloroethane-d4	0.0442		"	0.0400		111	23-173			
Surrogate: Toluene-d8	0.0404		"	0.0400		101	20-170			
Surrogate: 4-Bromofluorobenzene	0.0414		"	0.0400		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: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
06/22/17 15:17

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

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

**Batch 1706199 - EPA 5030 Soil MS**

Matrix Spike Dup (1706199-MSD1)		Source: 1706162-01			Prepared: 06/19/17		Analyzed: 06/20/17			
Naphthalene	ND	0.010	mg/kg		ND		10-158			42
Benzene	0.0764	0.0020	"	0.100	ND	76.4	30-131	1.56		34
Toluene	0.0793	0.0050	"	0.100	ND	79.3	30-134	2.25		30
Ethylbenzene	0.0769	0.0050	"	0.0992	ND	77.5	22-153	3.45		24
m,p-Xylene	0.150	0.010	"	0.200	ND	75.3	10-159	2.83		68
o-Xylene	0.0780	0.0050	"	0.0980	ND	79.6	31-151	2.92		38
Surrogate: 1,2-Dichloroethane-d4		0.0451	"	0.0400		113	23-173			
Surrogate: Toluene-d8		0.0401	"	0.0400		100	20-170			
Surrogate: 4-Bromofluorobenzene		0.0417	"	0.0400		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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
06/22/17 15:17

### 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

# **ATTACHMENT C**

**GROUNDWATER LABORATORY ANALYTICAL DATA REPORTS  
(JUNE 21, 2016 AND JUNE 23, 2017)**

# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

June 29, 2017

Brandon Bruns  
Tasman Geosciences  
6899 Pecos Street  
Denver, CO 80221  
RE: Knaus 28-8

Enclosed are the results of analyses for samples received by Summit Scientific on 06/23/17 17:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to be '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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
06/29/17 15:30

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1706249-01	Water	06/23/17 12:45	06/23/17 17:30
BH02R	1706249-02	Water	06/23/17 12:07	06/23/17 17:30
BH04R	1706249-03	Water	06/23/17 12:25	06/23/17 17:30
BH05R	1706249-04	Water	06/23/17 12:15	06/23/17 17:30
BH06R	1706249-05	Water	06/23/17 12:05	06/23/17 17:30
BH07	1706249-06	Water	06/23/17 12:40	06/23/17 17:30
BH08	1706249-07	Water	06/23/17 11:51	06/23/17 17:30
BH09	1706249-08	Water	06/23/17 12:27	06/23/17 17:30
BH10	1706249-09	Water	06/23/17 12:40	06/23/17 17:30

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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
06/29/17 15:30

# Summit Scientific

1706249


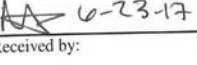
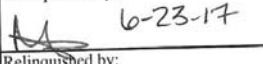
741 Corporate Circle Suite 1 ♦ Golden, Colorado 80401  
303-277-9310 ♦ 303-374-5933 Fax

Page 1 of 1

Client: Noble/Tasman  
Address: \_\_\_\_\_  
City/State/Zip: \_\_\_\_\_  
Phone: 303-487-1228 Fax: \_\_\_\_\_  
Sampler Name: GB + JW

Project Manager: Brandon Bruns, Invoice: Jacob Evans  
E-Mail: Bbruns@tasman-geo.com  
Project Name: Knaus 28-8  
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	8260B GBTEXN	8015 DRO	pH, EC, SAR					
BH01	6/23/17	1245	3			X		X					X							
BH02R		1207				X		X					X							
BH04R		1225				X		X					X							
BH05R		1215				X		X					X							
BH06R		1205				X		X					X							
BH07		1240				X		X					X							
BH08		1151				X		X					X							
BH09		1227				X		X					X							
BH10	✓	1240	✓			X		X					X							

Relinquished by: 	Date/Time: 6/23/17 17:30	Received by: 	Date/Time: 6-23-17 17:30	Turn Around Time (Check) Same Day <input type="checkbox"/> 72 Hours <input type="checkbox"/> 24 Hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/> 48 Hours <input type="checkbox"/>	Notes: 0.1 u
Relinquished by: 	Date/Time: 6-23-17 18:00	Received by:	Date/Time:	Sample Integrity: Temperature Upon Receipt: 4.2	
Relinquished by:	Date/Time:	Received in Lab by:	Date/Time:	Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

[www.s2scientific.com](http://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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
06/29/17 15:30

# Sample Receipt Checklist

S2 Work Order: 1706249

Client: NOBLE TASMAN Client Project ID: KNAUS 28-8

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

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

Cooler ID					
Temp (°C)	4.2				

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C <sup>(1)</sup> ?	<input checked="" type="checkbox"/>			OK
NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.				
Were all samples received intact <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.				

Murip  
Custodian Printed Name

MB 6-23-17  
Signature or Initials of Custodian

18:00  
Date/Time





Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
06/29/17 15:30

**BH01**  
**1706249-01 (Water)**

**Summit Scientific**

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

Date Sampled: **06/23/17 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1706256	06/26/17	06/29/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **06/23/17 12:45**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		97.1 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		98.5 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		92.0 %	45-146		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
06/29/17 15:30

**BH02R**  
**1706249-02 (Water)**

**Summit Scientific**

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

Date Sampled: **06/23/17 12:07**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1706256	06/26/17	06/29/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **06/23/17 12:07**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		97.7 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		97.3 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.0 %	45-146		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
06/29/17 15:30

**BH04R**  
**1706249-03 (Water)**

**Summit Scientific**

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

Date Sampled: **06/23/17 12:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1706256	06/26/17	06/29/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>12</b>	2.0	"	"	"	"	"	"	

Date Sampled: **06/23/17 12:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		95.3 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		97.4 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		99.5 %	45-146		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
06/29/17 15:30

**BH05R**  
**1706249-04 (Water)**

**Summit Scientific**

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

Date Sampled: **06/23/17 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>2800</b>	100	ug/l	100	1706256	06/26/17	06/28/17	EPA 8260B	
<b>Toluene</b>	<b>860</b>	100	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	1	"	"	"	"	
<b>Xylenes (total)</b>	<b>1000</b>	200	"	100	"	"	"	"	

Date Sampled: **06/23/17 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		103 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		98.6 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.1 %	45-146		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
06/29/17 15:30

**BH06R**  
**1706249-05 (Water)**

**Summit Scientific**

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

Date Sampled: **06/23/17 12:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>1.9</b>	1.0	ug/l	1	1706256	06/26/17	06/28/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **06/23/17 12:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		90.3 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		98.8 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		98.0 %	45-146		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
06/29/17 15:30

**BH07**  
**1706249-06 (Water)**

**Summit Scientific**

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

Date Sampled: **06/23/17 12:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>9100</b>	100	ug/l	100	1706256	06/26/17	06/28/17	EPA 8260B	
<b>Toluene</b>	<b>1.5</b>	1.0	"	1	"	"	06/29/17	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>260</b>	2.0	"	"	"	"	"	"	

Date Sampled: **06/23/17 12:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		93.0 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		101 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.7 %	45-146		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
06/29/17 15:30

**BH08**  
**1706249-07 (Water)**

**Summit Scientific**

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

Date Sampled: **06/23/17 11:51**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1706256	06/26/17	06/28/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	06/29/17	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **06/23/17 11:51**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		93.5 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		97.6 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.3 %	45-146		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
06/29/17 15:30

**BH09**  
**1706249-08 (Water)**

**Summit Scientific**

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

Date Sampled: **06/23/17 12:27**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1706256	06/26/17	06/29/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **06/23/17 12:27**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		93.2 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		96.5 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.8 %	45-146		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
06/29/17 15:30

**BH10**  
**1706249-09 (Water)**

**Summit Scientific**

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

Date Sampled: **06/23/17 12:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1706256	06/26/17	06/29/17	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **06/23/17 12:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		97.0 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		99.5 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.0 %	45-146		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8  
Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
06/29/17 15:30

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

### Summit Scientific

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

#### Batch 1706256 - EPA 5030 Water MS

##### Blank (1706256-BLK1)

Prepared & Analyzed: 06/28/17

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	12.3		"	13.3		92.3	37-154			
Surrogate: Toluene-d8	13.4		"	13.3		100	45-149			
Surrogate: 4-Bromofluorobenzene	12.6		"	13.3		94.2	45-146			

##### LCS (1706256-BS1)

Prepared & Analyzed: 06/28/17

Benzene	29.0	1.0	ug/l	33.3		87.1	51-132			
Toluene	34.2	1.0	"	33.3		102	51-138			
Ethylbenzene	37.2	1.0	"	33.1		112	58-146			
m,p-Xylene	72.6	2.0	"	66.5		109	57-144			
o-Xylene	35.5	1.0	"	32.7		109	53-146			
Surrogate: 1,2-Dichloroethane-d4	12.9		"	13.3		96.5	37-154			
Surrogate: Toluene-d8	13.1		"	13.3		98.4	45-149			
Surrogate: 4-Bromofluorobenzene	12.7		"	13.3		95.3	45-146			

##### Matrix Spike (1706256-MS1)

Source: 1706236-01

Prepared & Analyzed: 06/28/17

Benzene	29.4	1.0	ug/l	33.3	ND	88.1	34-141			
Toluene	34.6	1.0	"	33.3	ND	104	27-151			
Ethylbenzene	38.1	1.0	"	33.1	ND	115	29-160			
m,p-Xylene	73.1	2.0	"	66.5	ND	110	20-166			
o-Xylene	36.6	1.0	"	32.7	ND	112	33-159			
Surrogate: 1,2-Dichloroethane-d4	13.1		"	13.3		98.4	37-154			
Surrogate: Toluene-d8	13.2		"	13.3		99.2	45-149			
Surrogate: 4-Bromofluorobenzene	12.9		"	13.3		96.6	45-146			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
06/29/17 15:30

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

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

**Batch 1706256 - EPA 5030 Water MS**

Matrix Spike Dup (1706256-MSD1)	Source: 1706236-01			Prepared & Analyzed: 06/28/17						
Benzene	28.6	1.0	ug/l	33.3	ND	85.9	34-141	2.52	32	
Toluene	33.8	1.0	"	33.3	ND	102	27-151	2.13	25	
Ethylbenzene	37.4	1.0	"	33.1	ND	113	29-160	1.99	50	
m,p-Xylene	72.4	2.0	"	66.5	ND	109	20-166	0.990	36	
o-Xylene	36.6	1.0	"	32.7	ND	112	33-159	0.109	26	
Surrogate: 1,2-Dichloroethane-d4	13.4		"	13.3		100	37-154			
Surrogate: Toluene-d8	13.1		"	13.3		98.0	45-149			
Surrogate: 4-Bromofluorobenzene	12.9		"	13.3		96.9	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: Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
06/29/17 15:30

### 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

# **ATTACHMENT D**

## **SOIL BORING LOGS**



6899 Pecos Street, Unit C  
Denver, Colorado 80221

CLIENT: Noble Energy, Inc.

LOGGED BY: Jake Whritenour

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Site Services Drilling

DRILLING EQUIPMENT: Geoprobe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 4/15/16

TOTAL BORING DEPTH (FT. BGS): 15

DEPTH TO WATER (FT. BGS): 11.1

Knaus 28-8

BORING / WELL ID: BH01

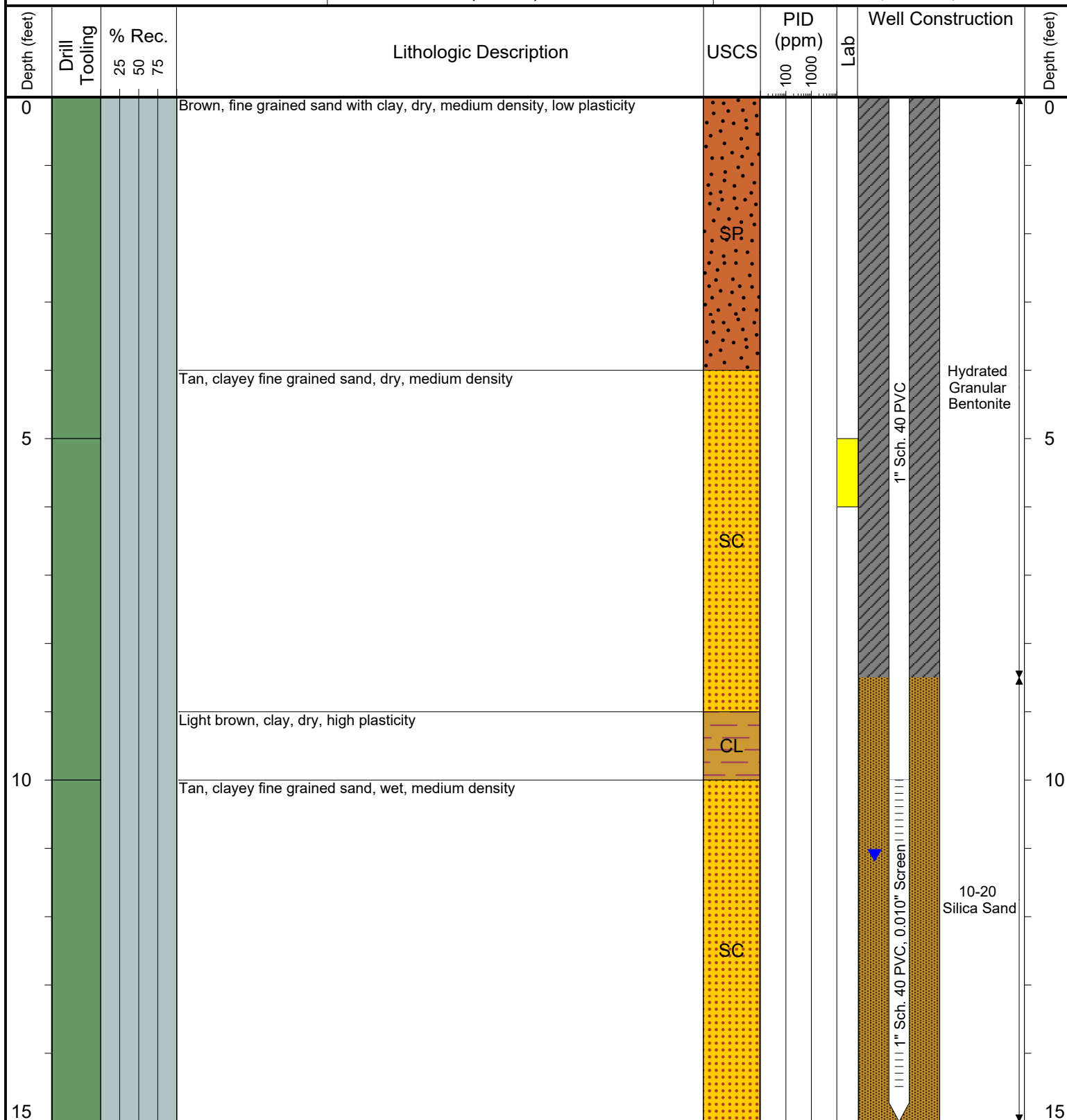
LOCATION: Weld County, CO

LATITUDE (DEGREES): 40.461734230184

LONGITUDE (DEGREES): -104.77506443425

CASING ELEVATION (FT. AMSL): 4660.12

GROUND ELEVATION (FT. AMSL): 4657.59



Drilling / Sample Method:

Macro-Core  
 CME Continuous Core

Split Spoon  
 Hollow Stem Auger

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: Jake Whritenour

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Site Services Drilling

DRILLING EQUIPMENT: Geoprobe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 4/15/16

TOTAL BORING DEPTH (FT. BGS): 15

DEPTH TO WATER (FT. BGS): 11.17

Knaus 28-8

BORING / WELL ID: BH02

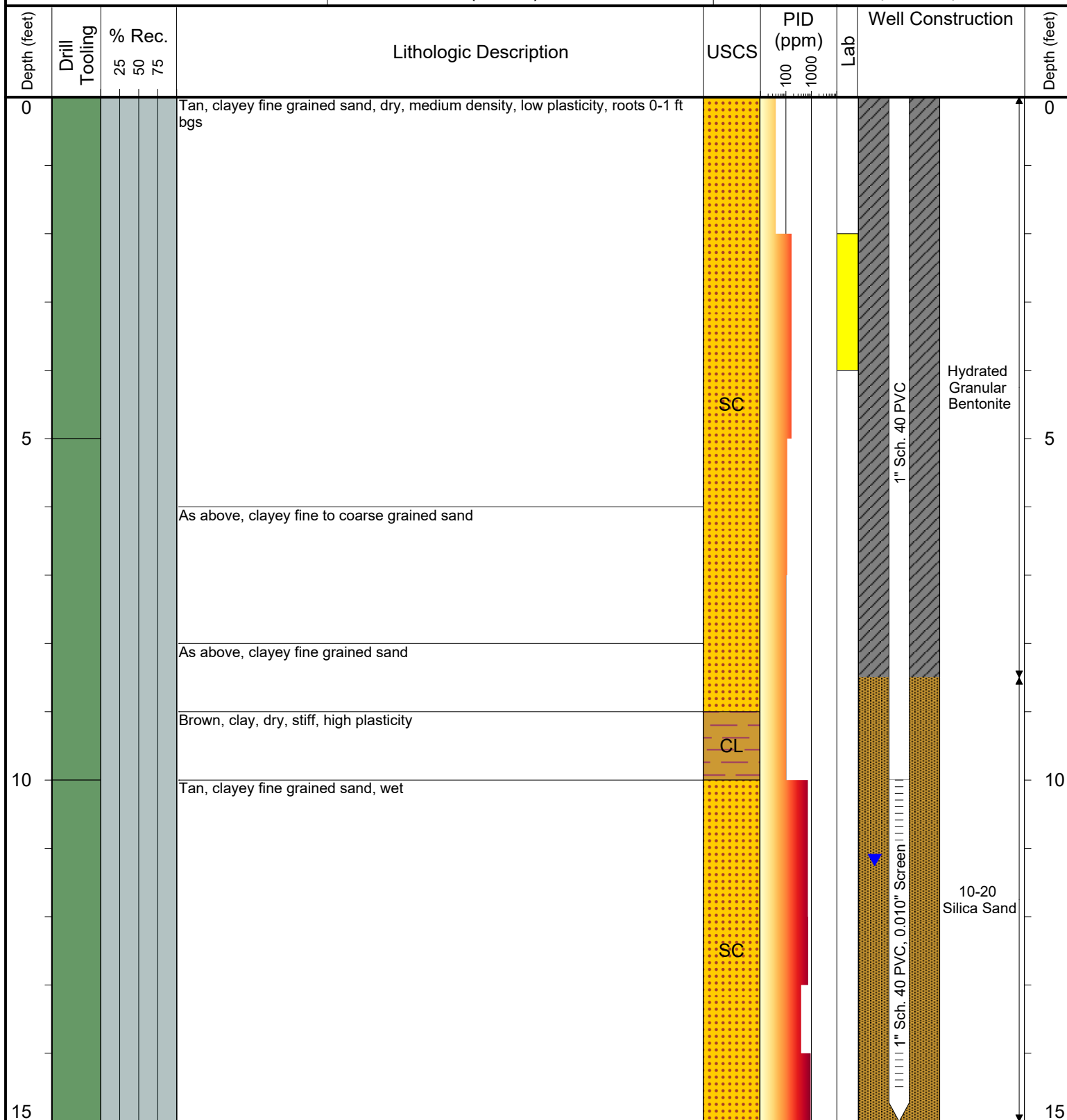
LOCATION: Weld County, CO

LATITUDE (DEGREES): 40.461773673727

LONGITUDE (DEGREES): -104.77518326851

CASING ELEVATION (FT. AMSL): 4660.56

GROUND ELEVATION (FT. AMSL): 4657.74



Drilling / Sample Method:

Macro-Core  
CME Continuous Core

Split Spoon  
Hollow Stem Auger

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: Jake Whritenour

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Site Services Drilling

DRILLING EQUIPMENT: Geoprobe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 4/15/16

TOTAL BORING DEPTH (FT. BGS): 15

DEPTH TO WATER (FT. BGS): 13.54

Knaus 28-8

BORING / WELL ID: BH03

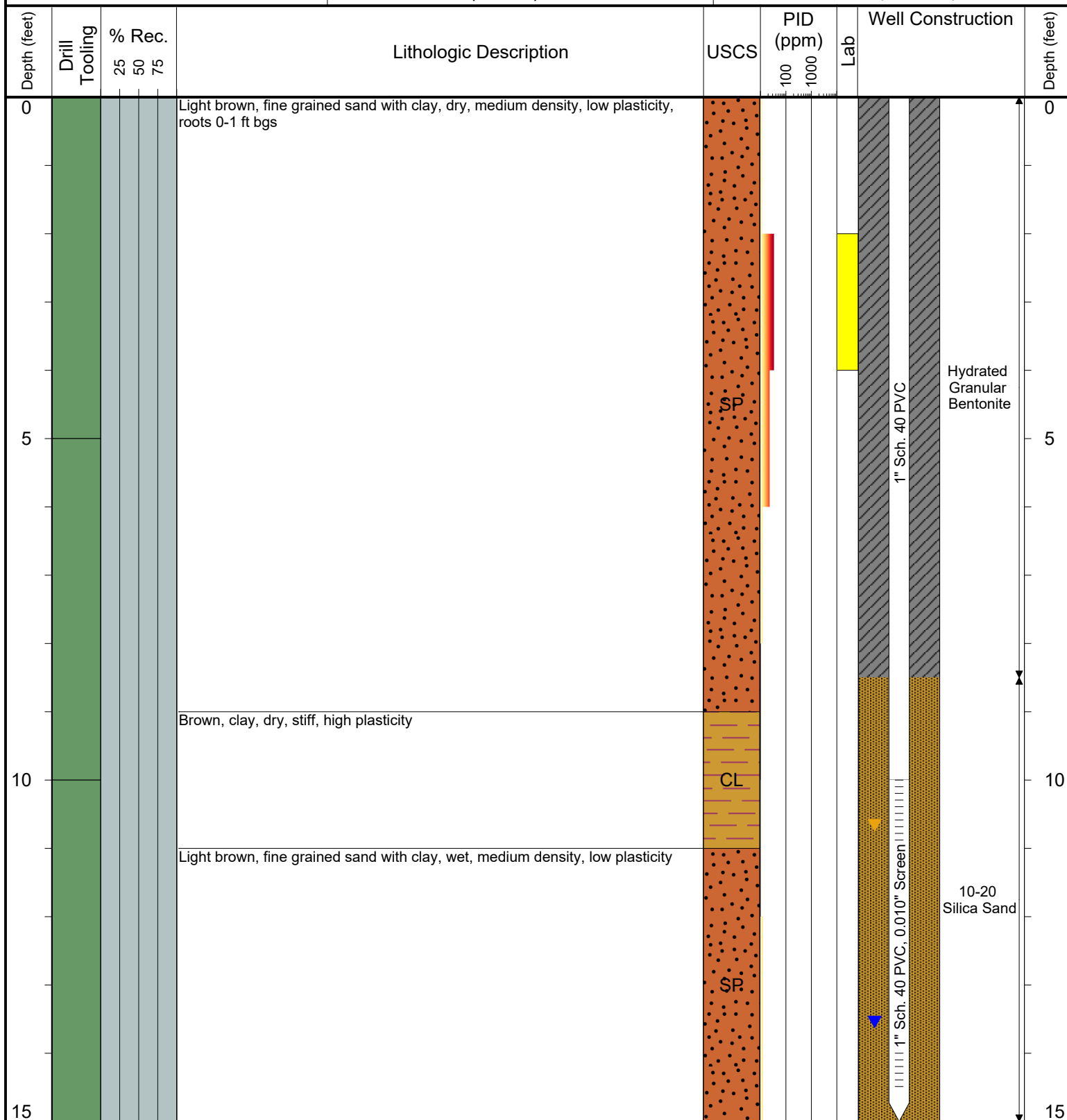
LOCATION: Weld County, CO

LATITUDE (DEGREES): 40.461813738253

LONGITUDE (DEGREES): -104.77518803808

CASING ELEVATION (FT. AMSL): 4660.75

GROUND ELEVATION (FT. AMSL): 4657.87



Drilling / Sample Method:

Macro-Core  
 CME Continuous Core

Split Spoon  
 Hollow Stem Auger

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: Jake Whritenour

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Site Services Drilling

DRILLING EQUIPMENT: Geoprobe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 4/15/16

TOTAL BORING DEPTH (FT. BGS): 15

DEPTH TO WATER (FT. BGS): 12.41

Knaus 28-8

BORING / WELL ID: BH04

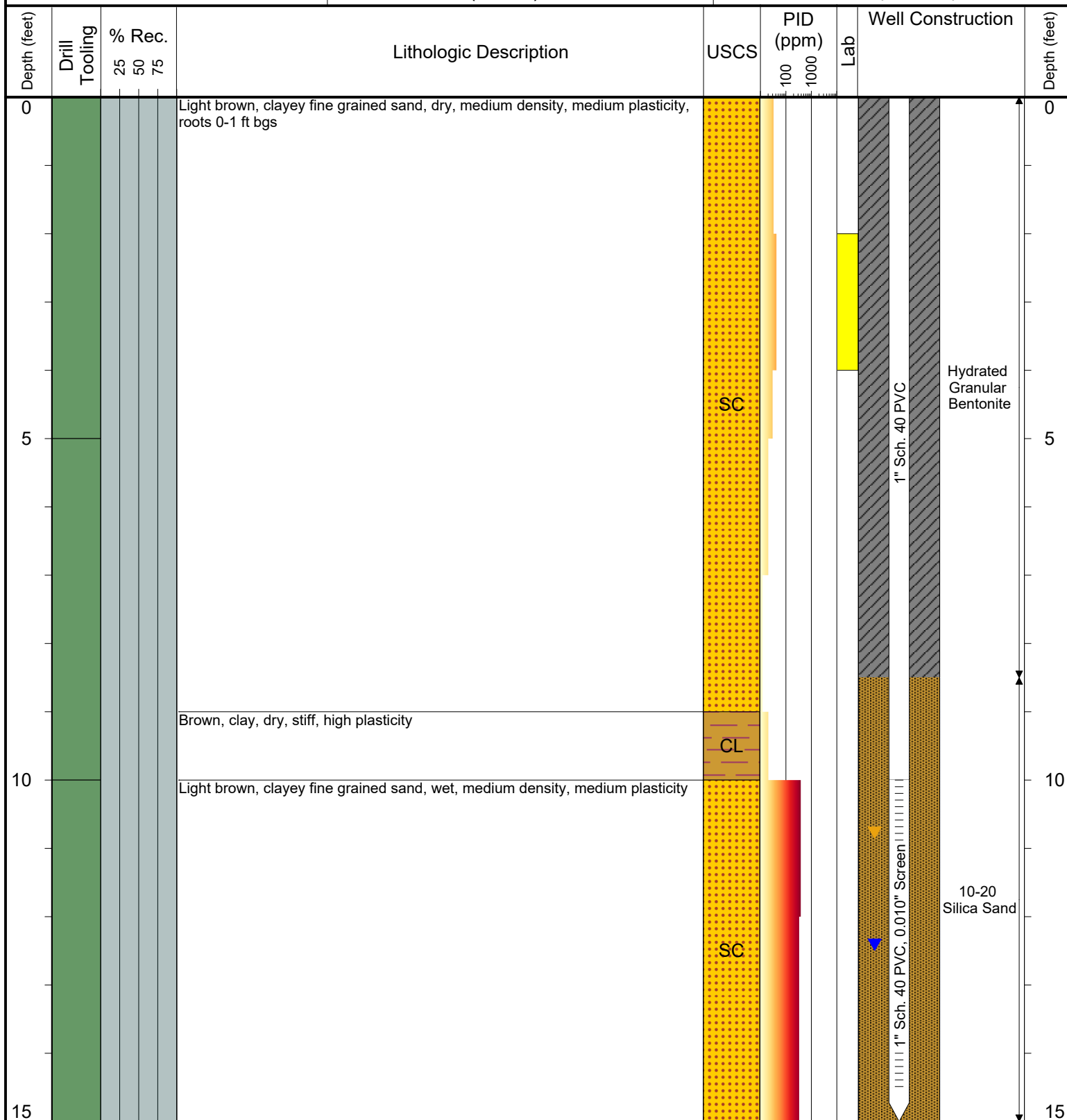
LOCATION: Weld County, CO

LATITUDE (DEGREES): 40.461675009572

LONGITUDE (DEGREES): -104.77517180375

CASING ELEVATION (FT. AMSL): 4659.97

GROUND ELEVATION (FT. AMSL): 4657.62



Drilling / Sample Method:

Macro-Core  
CME Continuous Core

Split Spoon  
Hollow Stem Auger

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: Jake Whritenour

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Site Services Drilling

DRILLING EQUIPMENT: Geoprobe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 4/15/16

TOTAL BORING DEPTH (FT. BGS): 15

DEPTH TO WATER (FT. BGS): 11.43

Knaus 28-8

BORING / WELL ID: BH05

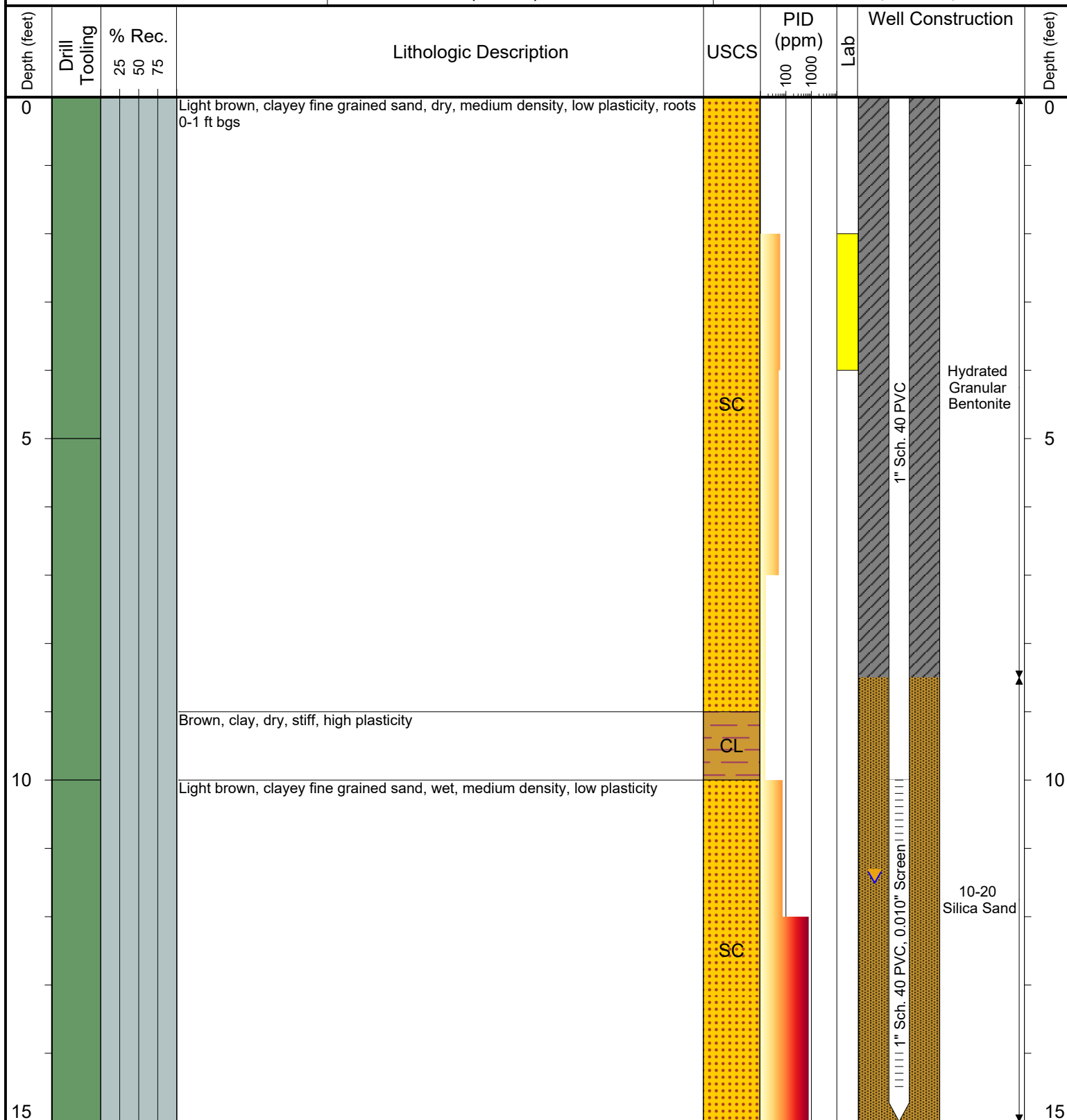
LOCATION: Weld County, CO

LATITUDE (DEGREES): 40.461730664917

LONGITUDE (DEGREES): -104.77527293341

CASING ELEVATION (FT. AMSL): 4661.14

GROUND ELEVATION (FT. AMSL): 4657.97



Drilling / Sample Method:

Macro-Core  
CME Continuous Core

Split Spoon  
Hollow Stem Auger

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: Jake Whritenour

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Site Services Drilling

DRILLING EQUIPMENT: Geoprobe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 4/15/16

TOTAL BORING DEPTH (FT. BGS): 15

DEPTH TO WATER (FT. BGS): 11.44

Knaus 28-8

BORING / WELL ID: BH06

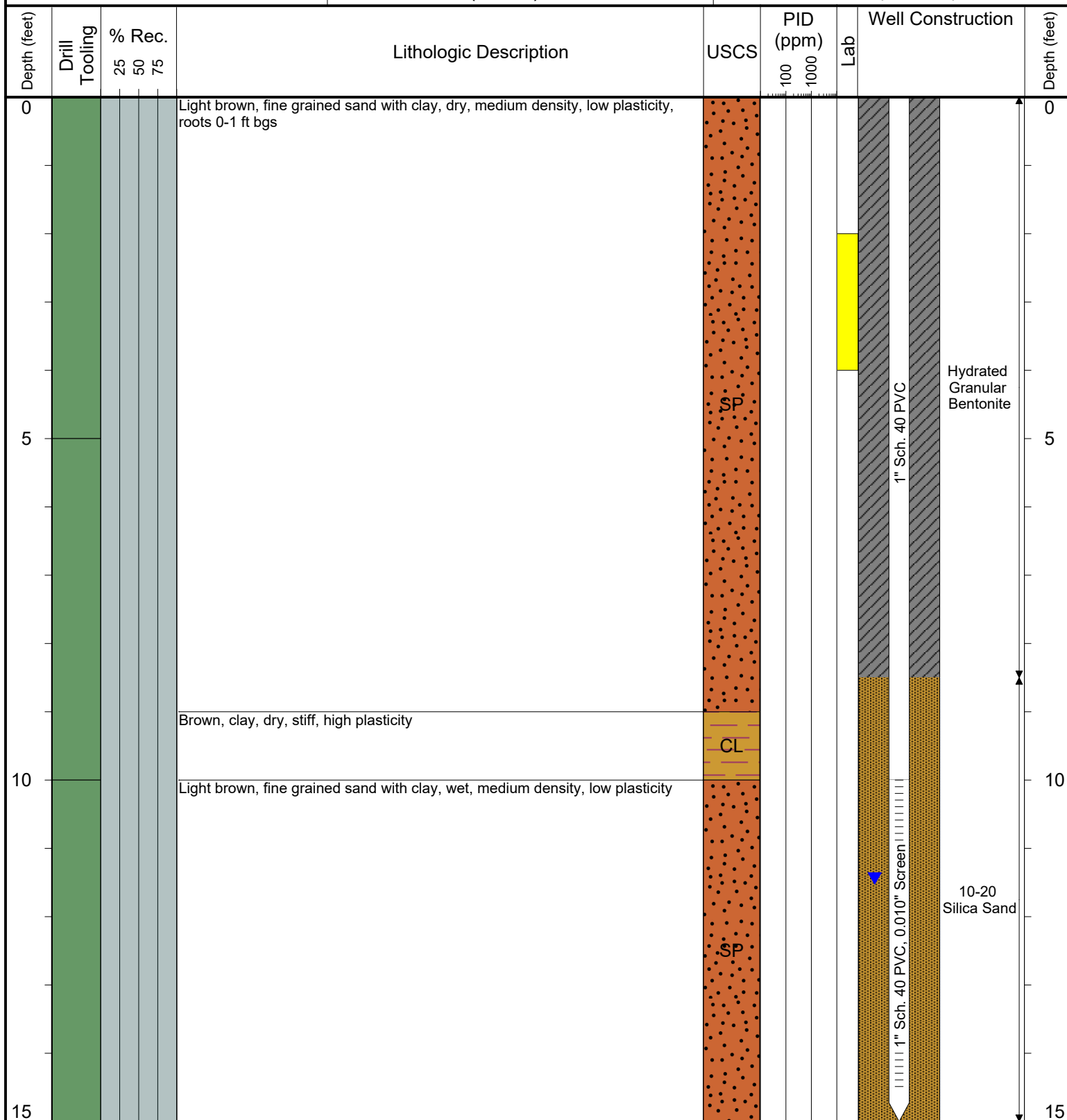
LOCATION: Weld County, CO

LATITUDE (DEGREES): 40.461730714864

LONGITUDE (DEGREES): -104.77534591589

CASING ELEVATION (FT. AMSL): 4660.85

GROUND ELEVATION (FT. AMSL): 4658.05



Drilling / Sample Method:

Macro-Core  
 CME Continuous Core

Split Spoon  
 Hollow Stem Auger

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: Jake Whritenour

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Site Services Drilling

DRILLING EQUIPMENT: Geoprobe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 4/15/16

TOTAL BORING DEPTH (FT. BGS): 15

DEPTH TO WATER (FT. BGS): 11.14

Knaus 28-8

BORING / WELL ID: BH07

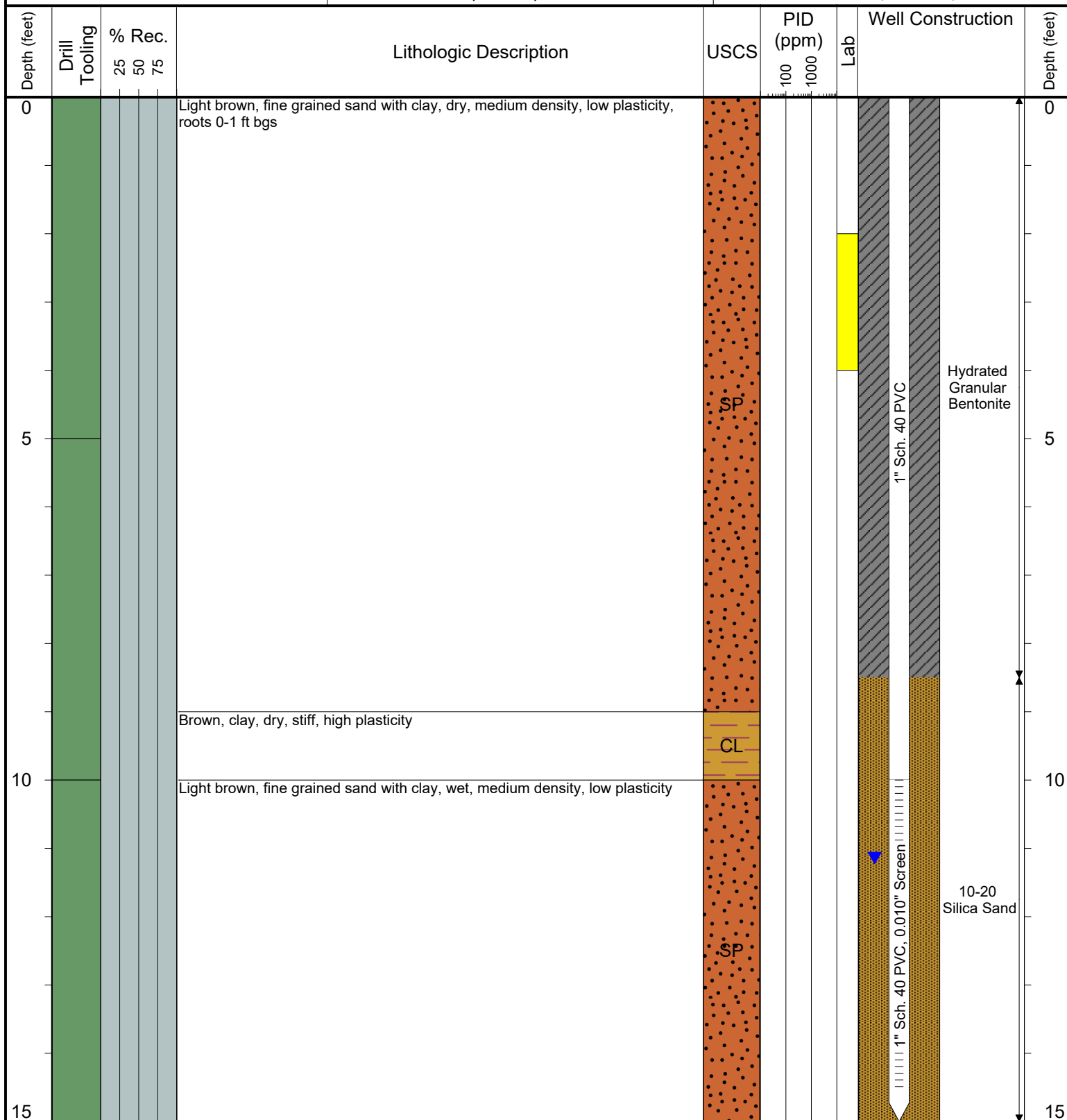
LOCATION: Weld County, CO

LATITUDE (DEGREES): 40.461620170455

LONGITUDE (DEGREES): -104.77516091178

CASING ELEVATION (FT. AMSL): 4660.84

GROUND ELEVATION (FT. AMSL): 4657.6



Drilling / Sample Method:

Macro-Core  
 CME Continuous Core

Split Spoon  
 Hollow Stem Auger

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: Site Services Drilling

DRILLING EQUIPMENT: Geoprobe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 5/26/16

TOTAL BORING DEPTH (FT. BGS): 20

DEPTH TO WATER (FT. BGS): 11.3

Knaus 28-8

BORING / WELL ID: BH08

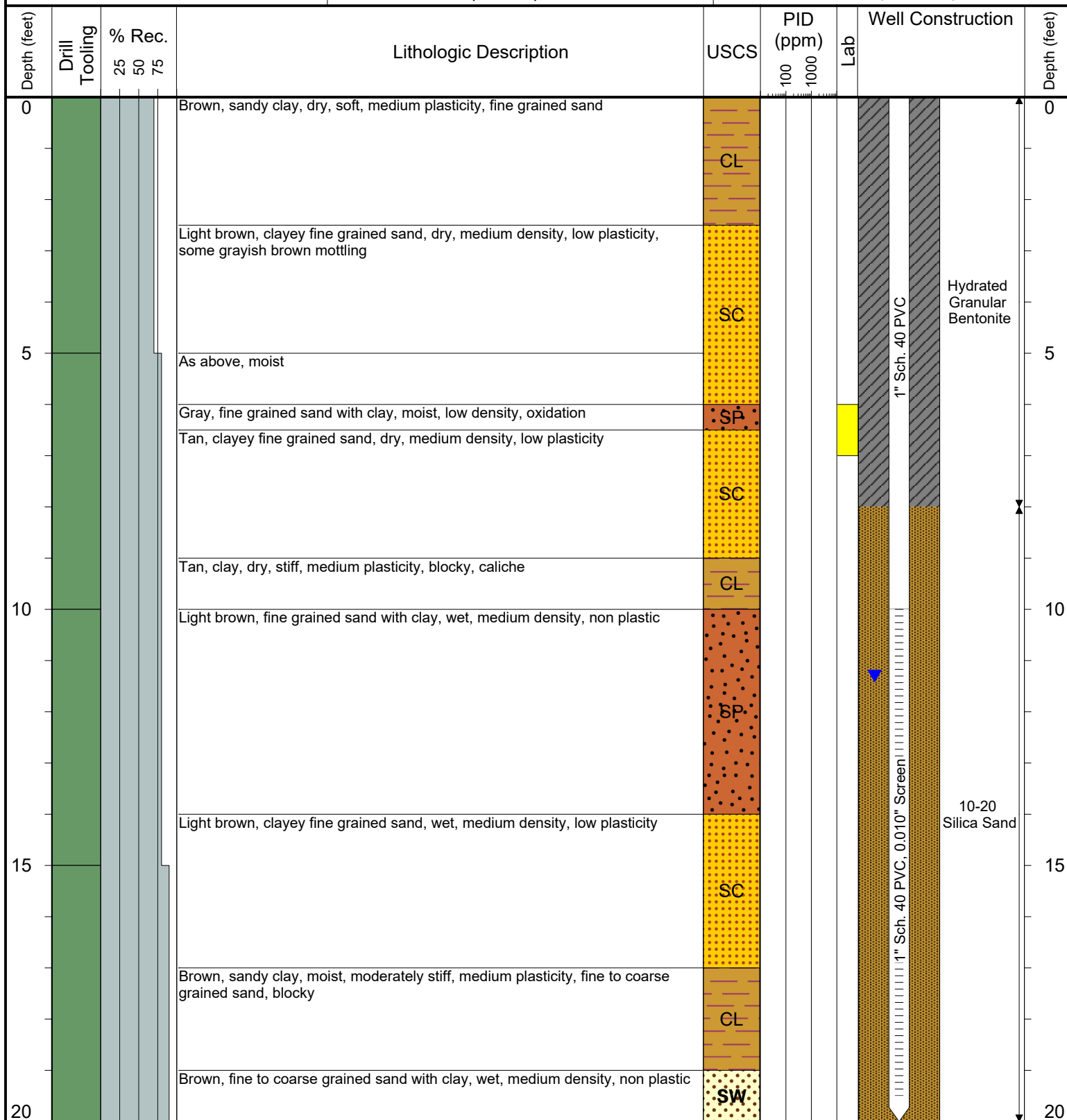
LOCATION: Weld County, CO

LATITUDE (DEGREES): 40.461868955763

LONGITUDE (DEGREES): -104.77519004811

CASING ELEVATION (FT. AMSL): 4661.26

GROUND ELEVATION (FT. AMSL): 4657.94



Drilling / Sample Method:

Macro-Core  
 CME Continuous Core

Split Spoon  
 Hollow Stem Auger

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 Basecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 6/16/17

TOTAL BORING DEPTH (FT. BGS): 18

DEPTH TO WATER (FT. BGS): 11

Knaus 28-8

BORING / WELL ID: BH02R

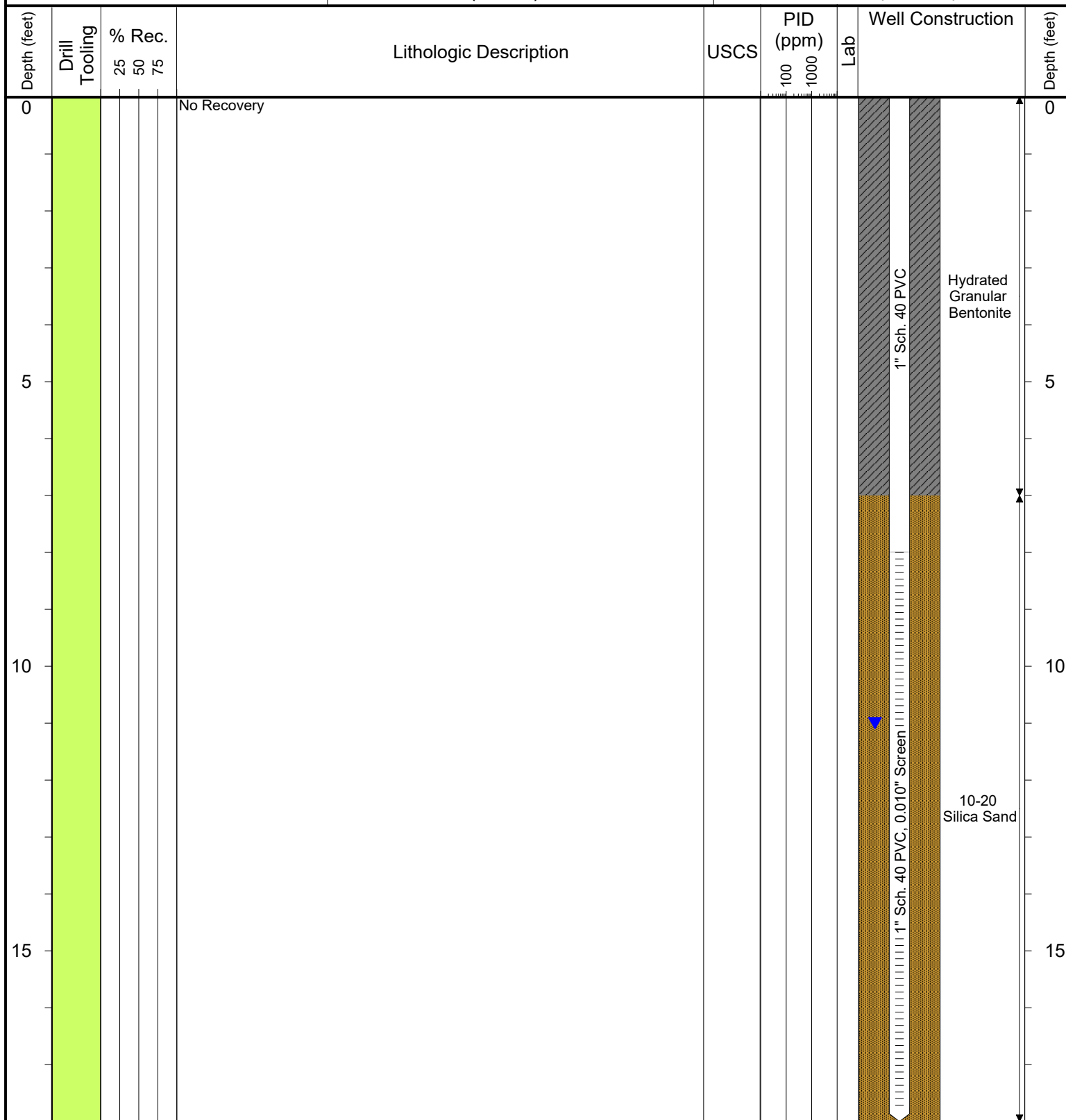
LOCATION: Weld County, CO

LATITUDE (DEGREES): 40.461768905927

LONGITUDE (DEGREES): -104.77518199968

CASING ELEVATION (FT. AMSL): 4661.34

GROUND ELEVATION (FT. AMSL): 4657.63



Drilling / Sample Method:

Macro-Core  
CME Continuous Core

None Used  
Hollow Stem Auger

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 Basecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 6/16/17

TOTAL BORING DEPTH (FT. BGS): 18

DEPTH TO WATER (FT. BGS): 11

Knaus 28-8

BORING / WELL ID: BH04R

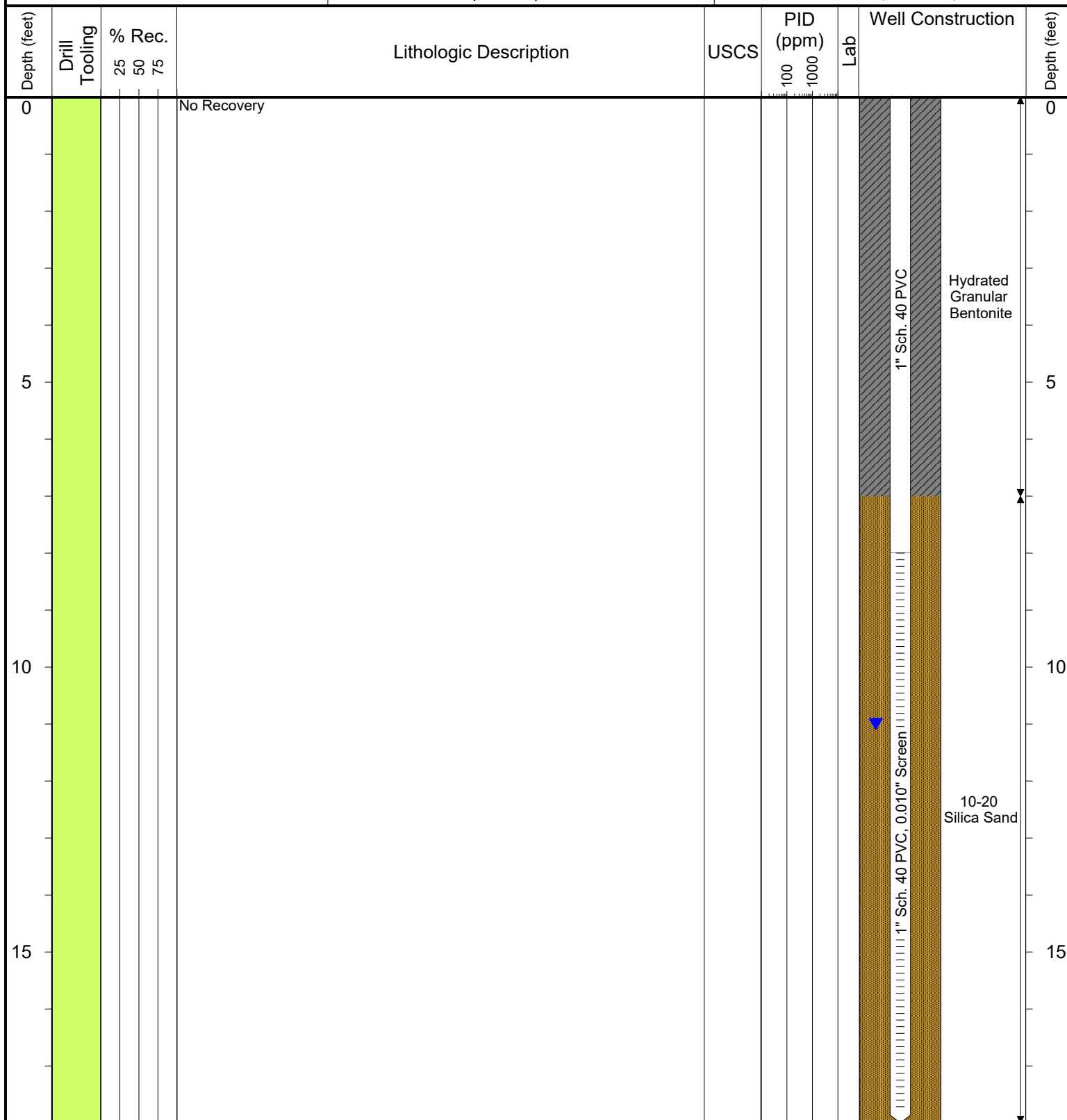
LOCATION: Weld County, CO

LATITUDE (DEGREES): 40.461666371941

LONGITUDE (DEGREES): -104.77516821182

CASING ELEVATION (FT. AMSL): 4661.01

GROUND ELEVATION (FT. AMSL): 4657.67



Drilling / Sample Method:

Macro-Core  
CME Continuous Core

None Used  
Hollow Stem Auger

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 Basecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 6/16/17

TOTAL BORING DEPTH (FT. BGS): 18

DEPTH TO WATER (FT. BGS): 11

Knaus 28-8

BORING / WELL ID: BH05R

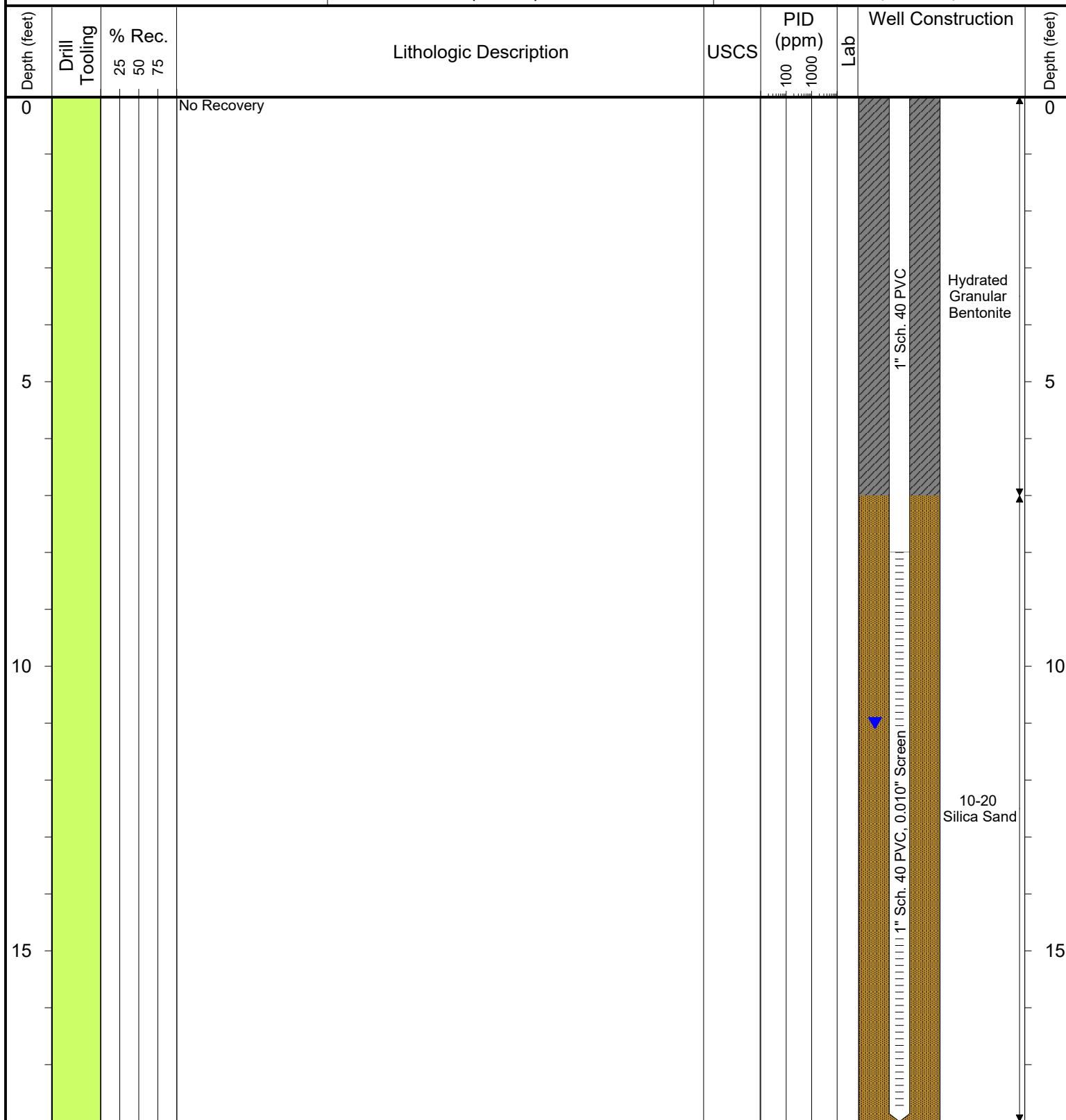
LOCATION: Weld County, CO

LATITUDE (DEGREES): 40.46172792218

LONGITUDE (DEGREES): -104.77527202548

CASING ELEVATION (FT. AMSL): 4660.88

GROUND ELEVATION (FT. AMSL): 4657.52



Drilling / Sample Method:

Macro-Core  
CME Continuous Core

None Used  
Hollow Stem Auger

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 Basecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 6/16/17

TOTAL BORING DEPTH (FT. BGS): 18

DEPTH TO WATER (FT. BGS): 11

Knaus 28-8

BORING / WELL ID: BH06R

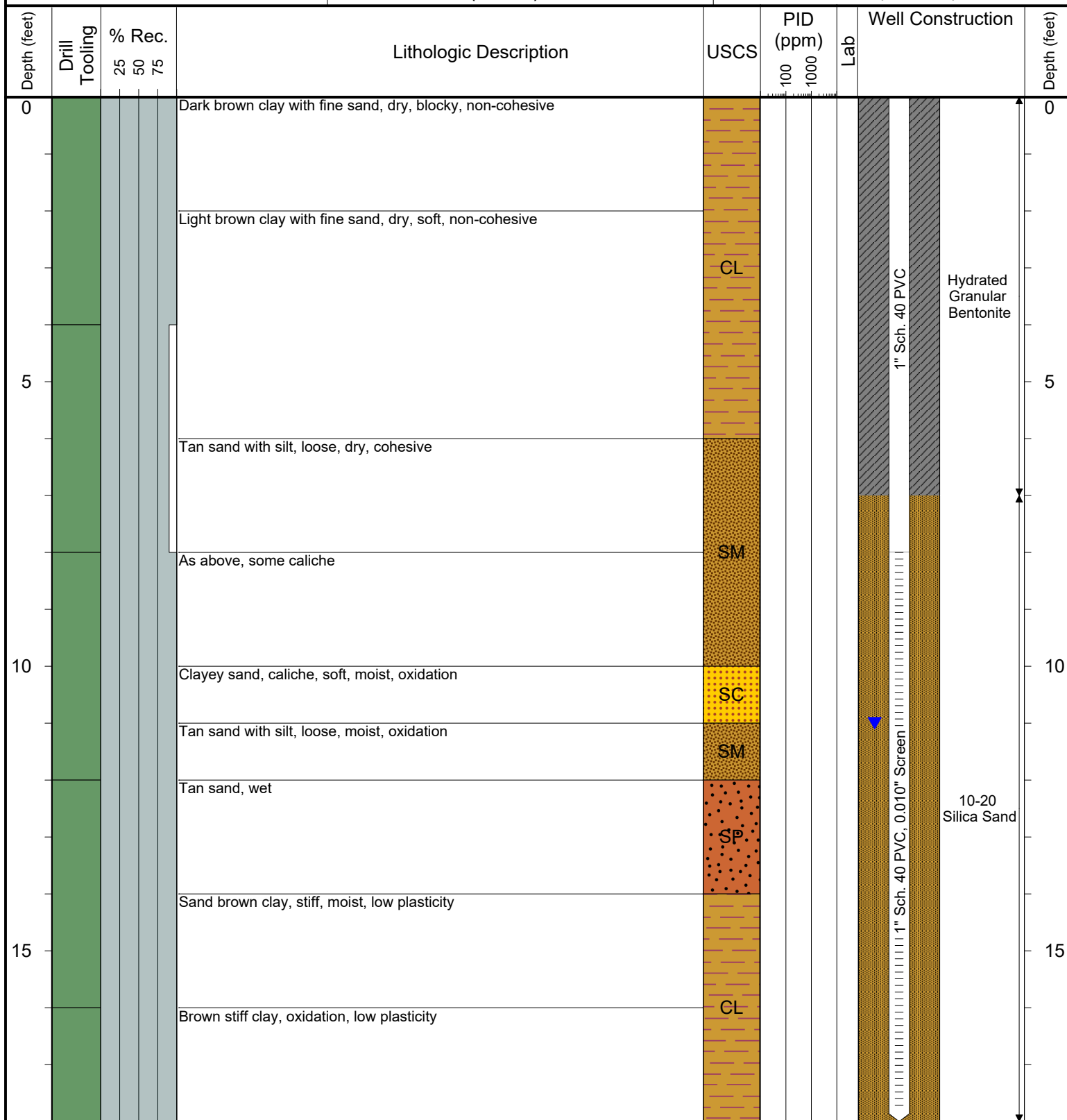
LOCATION: Weld County, CO

LATITUDE (DEGREES): 40.4617282526

LONGITUDE (DEGREES): -104.77534456013

CASING ELEVATION (FT. AMSL): 4660.56

GROUND ELEVATION (FT. AMSL): 4657.86



Drilling / Sample Method:

Macro-Core

CME Continuous Core

None Used

Hollow Stem Auger

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 Basecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 6/16/17

TOTAL BORING DEPTH (FT. BGS): 18

DEPTH TO WATER (FT. BGS): 11

Knaus 28-8

BORING / WELL ID: BH09

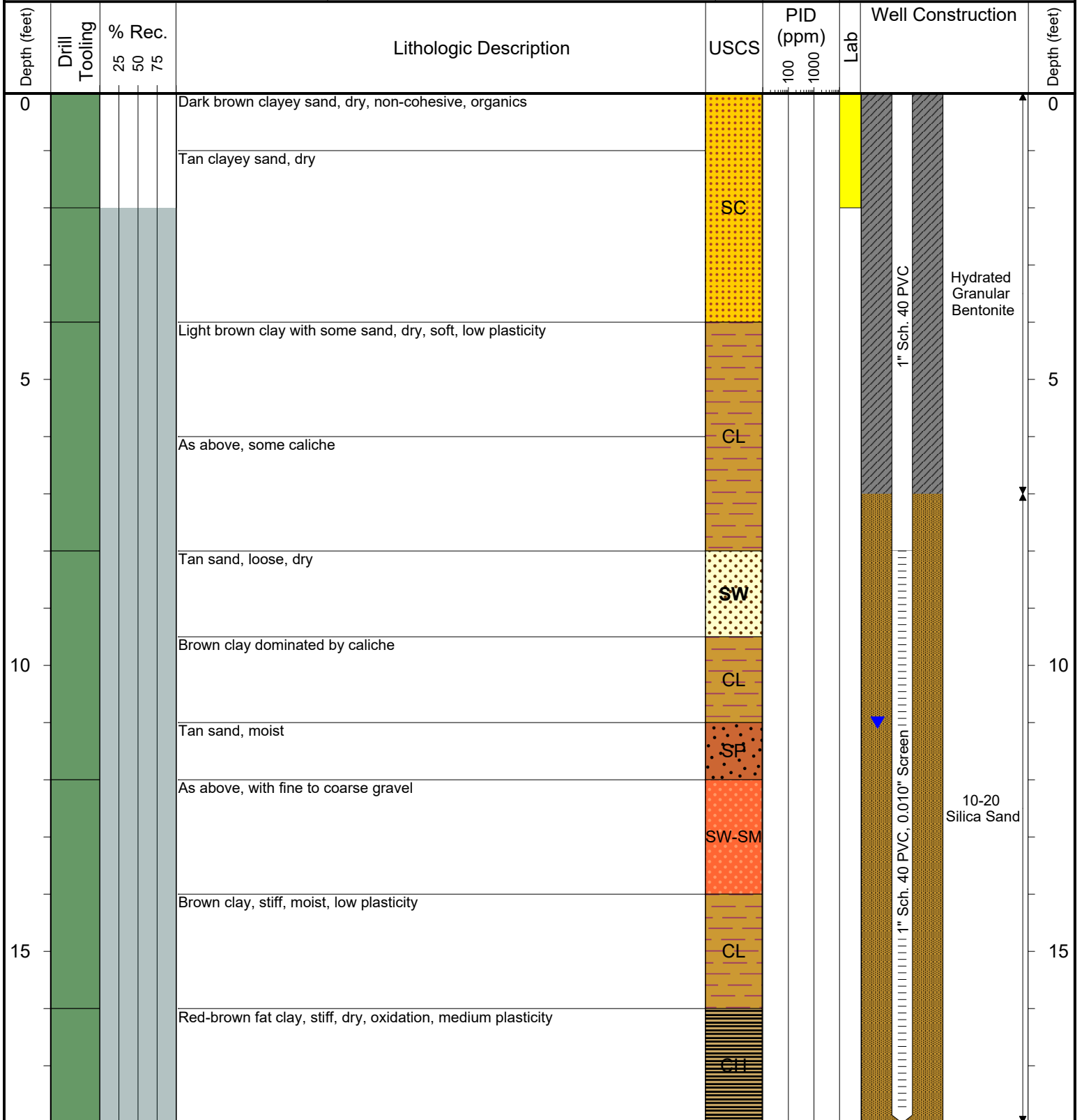
LOCATION: Weld County, CO

LATITUDE (DEGREES): 40.461586997123

LONGITUDE (DEGREES): -104.77517493264

CASING ELEVATION (FT. AMSL): 4660.51

GROUND ELEVATION (FT. AMSL): 4657.53



Drilling / Sample Method:

Macro-Core

CME Continuous Core

None Used

Hollow Stem Auger

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 Basecke

PROJECT MANAGER: Brandon Bruns, P.E.

DRILLING CONTRACTOR: Tasman Geosciences, Inc.

DRILLING EQUIPMENT: Power Probe

DRILL BIT SIZE (INCHES): 2.375

DATE STARTED - COMPLETED: 6/16/17

TOTAL BORING DEPTH (FT. BGS): 18

DEPTH TO WATER (FT. BGS): 11

Knaus 28-8

BORING / WELL ID: BH10

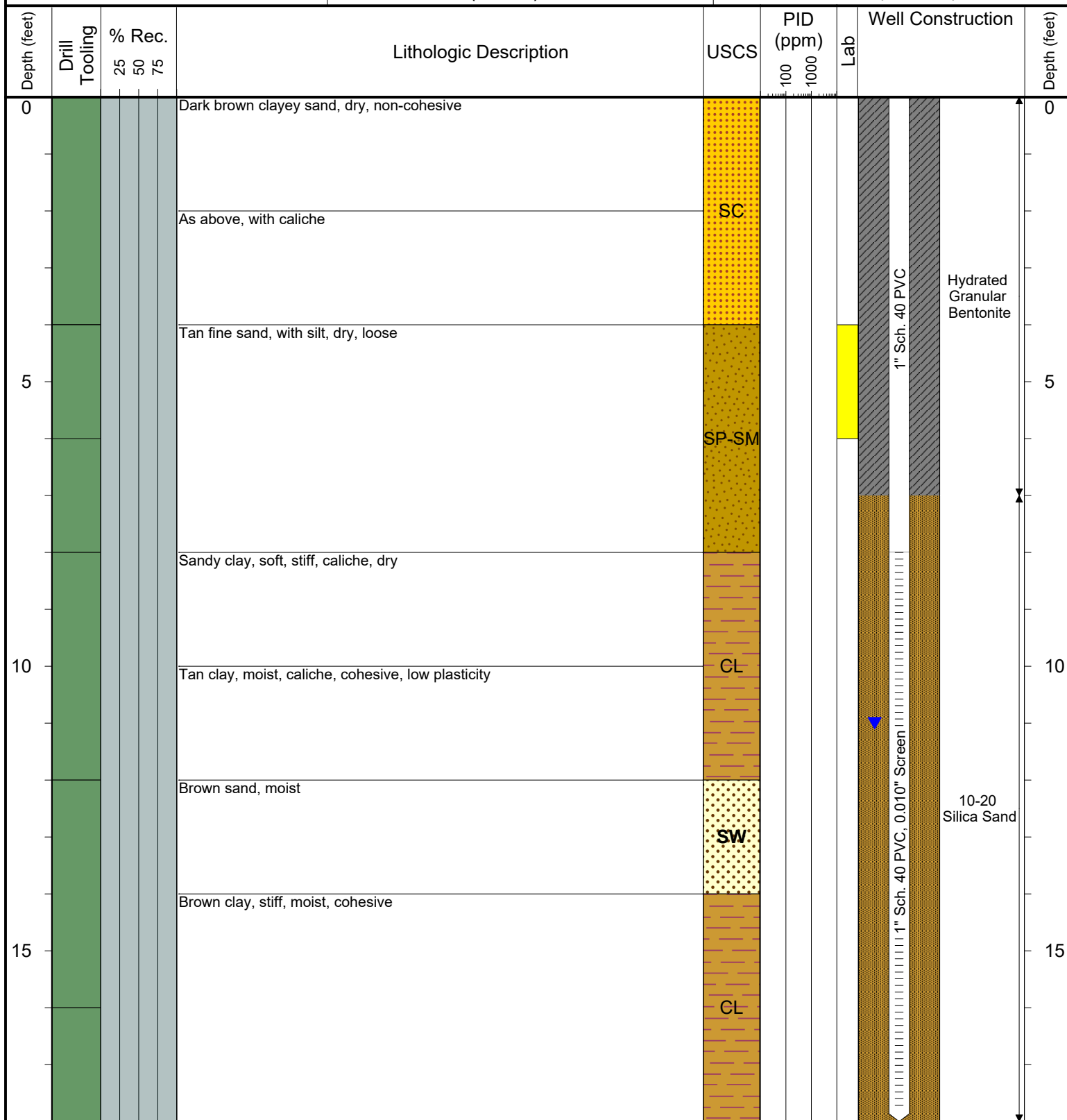
LOCATION: Weld County, CO

LATITUDE (DEGREES): 40.461740609305

LONGITUDE (DEGREES): -104.77502176291

CASING ELEVATION (FT. AMSL): 4660.28

GROUND ELEVATION (FT. AMSL): 4657.48



Drilling / Sample Method:

Macro-Core  
CME Continuous Core

None Used  
Hollow Stem Auger

Laboratory Sample Types:

Geotechnical Lab  
Analytical Chemistry Lab  
Geotechnical & Analytical Chemistry Lab