

State of West Virginia  
Department of Environmental Protection - Office of Oil and Gas  
Well Operator's Report of Well Work

API 47-085-10110FH6A County Ritchie District Clay  
Quad Ellenboro 7.5' Pad Name PEN20HS Field/Pool Name Pennsboro  
Farm Name COKELEY, LAWRENCE & ANGELA Well Number PEN20CHS - Fracture  
Operator (as registered with the OOG) CNX Gas Company LLC  
Address P.O. Box 1248 City Jane Lew State WV Zip 26378

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top Hole Northing 4,353,187.02 m Easting 497,741.70 m  
Landing Point of Curve Northing 4,353,380.02 m Easting 498,251.42 m  
Bottom Hole Northing 4,351,461.15 m Easting 499,867.81 m

Elevation (ft) 1081' GL Type of Well  New  Existing Type of Report  Interim  Final  
Permit Type  Deviated  Horizontal  Horizontal 6A  Vertical Depth Type  Deep  Shallow  
Type of Operation  Convert  Deepen  Drill  Plug Back  Redrilling  Rework  Stimulate  
Well Type  Brine Disposal  CBM  Gas  Oil  Secondary Recovery  Solution Mining  Storage Other \_\_\_\_\_  
Type of Completion  Single  Multiple Fluids Produced  Brine  Gas  NGL  Oil Other \_\_\_\_\_  
Drilled with  Cable  Rotary

Drilled Media Surface hole  Air  Mud  Fresh Water Intermediate hole  Air  Mud  Fresh Water  Brine  
Production hole  Air  Mud  Fresh Water  Brine  
Mud Type(s) and Additive(s)  
Synthetic Oil Based.

Date Permit Issued 03/13/2017 Date drilling commenced 11/02/2014 Date drilling ceased 11/17/2014  
Date completion activities began 07/07/2017 Date completion activities ceased 7/19/2017  
Verbal plugging (Y/N) N Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 398' Open mine(s) (Y/N) depths N  
Salt water depth(s) ft None Noted for Offsets Void(s) encountered (Y/N) depths N  
Coal depth(s) ft N/A Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

RECEIVED  
Office of Oil and Gas  
JAN 8 2018  
WV Department of  
Environmental Protection

Reviewed by: AS

Reviewed

02/16/2018





API 47-085-10110FH6A Farm name COKELEY, LAWRENCE & ANGELA Well number PEN20CHS - Fracture

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number Of Perforations	Formation(s)
1	7/7/2017	14723	14871	40	Marcellus
2	7/8/2017	14533	14699	40	Marcellus
3	7/8/2017	14338	14494	40	Marcellus
4	7/8/2017	14143	14289	40	Marcellus
5	7/9/2017	13948	14084	40	Marcellus
6	7/9/2017	13753	13879	40	Marcellus
7	7/9/2017	13558	13674	40	Marcellus
8	7/9/2017	13363	13469	40	Marcellus
9	7/10/2017	13168	13264	40	Marcellus
10	7/10/2017	12973	13059	40	Marcellus
11	7/10/2017	12778	12854	40	Marcellus
12	7/11/2017	12583	12649	40	Marcellus
13	7/11/2017	12388	12444	40	Marcellus
14	7/11/2017	12193	12239	40	Marcellus
15	7/12/2017	11998	12034	40	Marcellus
16	7/12/2017	11803	11921	40	Marcellus
17	7/12/2017	11608	11764	40	Marcellus
18	7/12/2017	11413	11419	40	Marcellus
19	7/13/2017	11218	11214	40	Marcellus
20	7/13/2017	1023	11179	40	Marcellus
21	7/13/2017	10828	10984	40	Marcellus
22	7/13/2017	10633	10599	40	Marcellus
23	7/13/2017	10438	10394	40	Marcellus
24	7/14/2017	10243	10189	40	Marcellus
25	7/14/2017	10048	9984	40	Marcellus
26	7/14/2017	9853	9779	40	Marcellus
27	7/15/2017	9658	9833	40	Marcellus
28	7/15/2017	9463	9369	40	Marcellus
29	7/15/2017	9268	9164	40	Marcellus
30	7/15/2017	9073	8959	40	Marcellus
31	7/15/2017	8878	8754	40	Marcellus
32	7/16/2017	8549	8683	40	Marcellus
33	7/16/2017	8344	8488	40	Marcellus
34	7/16/2017	8139	8293	40	Marcellus
35	7/17/2017	7934	8098	40	Marcellus
36	7/18/2017	7729	7903	40	Marcellus
37	7/18/2017	7524	7708	40	Marcellus
38	7/18/2017	7319	7513	40	Marcellus

RECEIVED  
Office of Oil and Gas  
JAN 8 2018  
WV Department of  
Environmental Protection

02/16/2018

API 47-085-10110FH6A Farm name COKELEY, LAWRENCE & ANGELA Well number PEN20CHS - Fracture

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number Of Perforations	Formation(s)
39	7/18/2017	7114	7318	40	Marcellus
40	7/18/2017	7123	7289	40	Marcellus
41	7/19/2017	6704	6928	40	Marcellus
42	7/19/2017	6499	6733	40	Marcellus

RECEIVED  
Office of Oil and Gas  
JAN 8 2018  
WV Department of  
Environmental Protection

02/16/2018

API 47-085-10110FH6A Farm name COKELEY, LAWRENCE & ANGELA Well number PEN20CHS - Fracture RECEIVED Office of Oil and Gas

JAN 8 2018

STIMULATION INFORMATION PER STAGE

WV Department of Environmental Protection

Stage No.	Stimulations Date	Avg Pump Rate (BPM)	Avg Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Nitrogen / other (gals)
1	7/7/2017	90.3	8105	5489	3701	400468	8667	4541
2	7/8/2017	87.8	8011	4745	3398	399234	8358	4472
3	7/8/2017	88.1	7953	5459	3947	400467	8282	4458
4	7/8/2017	89.4	7720	4958	3990	400253	8292	4445
5	7/9/2017	86.7	7702	3406	4174	400150	8110	4439
6	7/9/2017	93.9	7570	4098	4749	400391	7974	4432
7	7/9/2017	94.2	7564	4625	3950	400221	8222	4447
8	7/9/2017	92.4	8022	2788	4334	402230	7231	4340
9	7/10/2017	90.5	7936	5718	3947	399969	7980	4372
10	7/10/2017	90.9	8071	5442	4007	400277	7960	4323
11	7/10/2017	89.7	7890	5582	3797	399963	8014	4453
12	7/11/2017	92.1	8186	5881	3900	400615	7903	4442
13	7/11/2017	93.4	8021	5430	4420	400958	7704	4389
14	7/11/2017	89.6	7678	5907	4820	399562	7546	4420
15	7/12/2017	84.3	7312	6054	4455	380601	9868	4535
16	7/12/2017	89.8	8197	5989	5018	350492	6998	4356
17	7/12/2017	90.0	7772	5315	4044	374529	7850	4499
18	7/12/2017	86.7	7359	5827	4033	399379	8877	4481
19	7/13/2017	86.6	7407	5610	3829	399796	8032	4418
20	7/13/2017	91.0	7513	5702	3891	399848	7998	4332
21	7/13/2017	93.7	7836	4519	4185	400319	7757	4294
22	7/13/2017	93.5	7704	5877	4371	401243	7854	4405
23	7/13/2017	91.3	7451	5386	3580	402196	7995	4570
24	7/14/2017	91.2	6922	4398	3911	402072	7547	4356
25	7/14/2017	87.0	7094	5884	3725	401954	6591	4228
26	7/14/2017	92.2	7470	4694	3965	400240	9156	4338
27	7/14/2017	92.4	7349	5627	4148	401637	7458	4293
28	7/15/2017	90.0	7148	5179	3955	402391	6432	4210
29	7/15/2017	88.1	7113	5851	3963	402286	6528	4220
30	7/15/2017	92.0	7289	5792		400468	7350	4170
31	7/15/2017	93.3	7205	4555	4227	401696	7358	4291
32	7/16/2017	88.3	7444	4839	3674	401854	7323	4280
33	7/16/2017	89.5	7231	6648	4044	404740	6534	4202
34	7/17/2017	92.7	7370	5501	4459	401299	7210	4271
35	7/17/2017	81.7	7707	6240	3887	226903	5498	4158
36	7/18/2017	90.3	7338	5574	4096	401828	8818	4520
37	7/18/2017	91.0	7120	6810	3857	401039	6500	4227
38	7/18/2017	88.3	6991	5488	3772	401433	6528	4213

02/16/2018

API 47-085-10110FH6A Farm name COKELEY, LAWRENCE & ANGELA Well number PEN20CHS - Fracture

STIMULATION INFORMATION PER STAGE

Stage No.	Stimulations Date	Avg Pump Rate (BPM)	Avg Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen / other (gals)
39	7/18/2017	88.8	6849	5759	3633	401253	7254	4260
40	7/19/2017	87.9	6704	6330	3738	401158	7164	4251
41	7/19/2017	91.2	6770	7365	3682	400462	6354	4257
42	7/19/2017	90.6	6542	5320	3386	400649	6576	4223

RECEIVED  
Office of Oil and Gas  
JAN 8 2018  
WV Department of  
Environmental Protection





API 47-085-10110FH6A Farm name COKELEY, LAWRENCE & ANGELA Well number PEN20CHS - Fracture

LITHOLOGY / FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY TYPE OF FLUID (FRESHWATER,BRINE,GAS,H2S, ETC)
	DEPTH IN FT	DEPTH IN FT	DEPTH IN FT	DEPTH IN FT	
	TVD	TVD	MD	MD	
SHALE/SANDSTONE	0	1222			
SANDSTONE	1222	1346			
SHALE/SANDSTONE	1346	1506			
SANDSTONE	1506	1548			
SHALE/SANDSTONE	1548	1650			
MAXTON SAND	1650	1733			
SHALE/SANDSTONE	1733	1856			
BIG LIME	1856	1911			
BIG INJUN	1911	2046			
PRICE	2046	2318			
WEIR	2318	2357			
SHALE	2357	2637			
GORDON	2637	2654			
SHALE/SANDSTONE	2654	2834			
5TH SAND	2834	2846			
SHALE	2846	2989			
SANDSTONE	2989	3003			
SHALE/SANDSTONE	3003	3411			
BENSON	4838	4900			
SHALE	4900	5060			
ALEXANDER	5060	5128			
SHALE	5128	5638			
RHINESTREET	5638	5964			
CASHAQUA	5964	6056			
MIDDLESEX SHALE	6056	6085			
WEST RIVER	6085	6129			
BURKETT	6129	6172			
TULLY LIMESTONE	6172	6173			
HAMILTON SHALE	6173	6174			
MARCELLUS	6174	6233			
ONONDAGA	6233				

RECEIVED  
 Office of Oil and Gas  
 JAN 8 2018  
 WV Department of  
 Environmental Protection



# NOBLE ENERGY

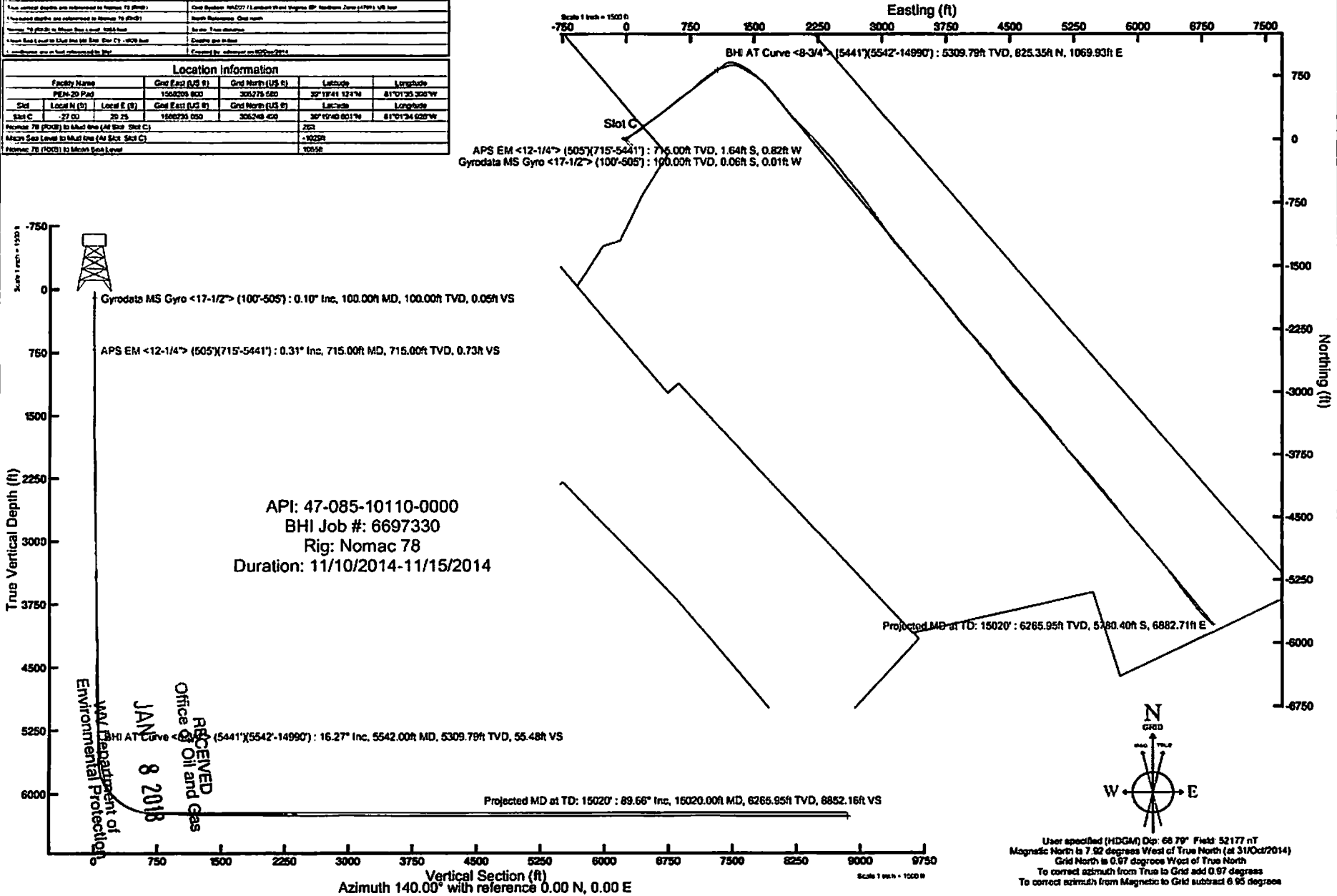


Location: Ritchie County, WV  
 Field: Ritchie  
 Facility: PEN-20 Pad

Slot: Slot C  
 Well: PEN-20C-HS  
 Wellbore: PEN-20C-HS PWB

* True vertical depths are referenced to Mean Sea Level (MSL)		Grid System: NAD83 / Lambert West Virginia SP. Horizontal Zone: (179) US In
* True vertical depths are referenced to Mean Sea Level (MSL)		North Reference: Grid north
* True vertical depths are referenced to Mean Sea Level (MSL)		Units: True distance
* True vertical depths are referenced to Mean Sea Level (MSL)		Display: grid lines
* True vertical depths are referenced to Mean Sea Level (MSL)		Created by: adhewar on 11/10/2014

Location Information					
Facility Name	Grid East (US S)	Grid North (US S)	Latitude	Longitude	
PEN-20 Pad	156278.820	303278.280	37° 17' 41.1217 N	81° 01' 25.3287 W	
Slot	Local E (ft)	Local N (ft)	Latitude	Longitude	
Slot C	-77.00	78.75	166278.820	306348.420	37° 17' 40.8017 N 81° 01' 24.6287 W
Project: 78 (1008) to Mid Line (At Slot: Slot C)			262		
Mean Sea Level to Mid Line (At Slot: Slot C)			-1022R		
Project: 78 (1008) to Mean Sea Level			1022R		



API: 47-085-10110-0000  
 BHI Job #: 6697330  
 Rig: Nomac 78  
 Duration: 11/10/2014-11/15/2014



User specified (HDGM) Dip: 68.79° Field: 52177 nT  
 Magnetic North is 7.92 degrees West of True North (at 31/Oct/2014)  
 Grid North is 0.97 degrees West of True North  
 To correct azimuth from True to Grid add 0.97 degrees  
 To correct azimuth from Magnetic to Grid subtract 6.95 degrees

RECEIVED  
 Office of Oil and Gas  
 JAN 8 2018  
 MA Management of  
 Environmental Protection



# Actual Wellpath Report

PEN-20C-HS AWP Proj: 15020'

Page 1 of 9



## REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY	Slot	Slot C
Area	Ritchie County, WV	Well	PEN-20C-HS
Field	Ritchie	Wellbore	PEN-20C-HS AWB
Facility	PEN-20 Pad		

## REPORT SETUP INFORMATION

Projection System	NAD27 / Lambert West Virginia SP, Northern Zone (4701), US feet	Software System	WellArchitect® 4.0.1
North Reference	Grid	User	Edsaryar
Scale	0.999954	Report Generated	02/Dec/2014 at 12:12
Convergence at slot	0.97° West	Database/Source file	WellArchitectEasternDB/PEN-20C-HS_AWB.xml

## WELLPATH LOCATION

	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	-27.09	29.25	1568235.05	305248.49	39°19'40.861"N	81°01'34.928"W
Facility Reference Pt			1568205.80	305275.58	39°19'41.124"N	81°01'35.306"W
Field Reference Pt			0.00	0.00	38°17'12.460"N	86°28'23.077"W

## WELLPATH DATUM

Calculation method	Minimum curvature	Nomac 78 (RKB) to Facility Vertical Datum	1055.00ft
Horizontal Reference Pt	Slot	Nomac 78 (RKB) to Mean Sea Level	1055.00ft
Vertical Reference Pt	Nomac 78 (RKB)	Nomac 78 (RKB) to Mud Line at Slot (Slot C)	26.00ft
MD Reference Pt	Nomac 78 (RKB)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	140.00°

RECEIVED  
 Office of Oil and Gas  
 JAN 8 2018  
 WV Department of  
 Environmental Protection



# Actual Wellpath Report

PEN-20C-HS AWP Proj: 15020'  
Page 2 of 9



REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY	Slot	Slot C
Area	Ritchie County, WV	Well	PEN-20C-HS
Field	Ritchie	Wellbore	PEN-20C-HS AWB
Facility	PEN-20 Pad		

**WELLPATH DATA (160 stations) † = interpolated/extrapolated station**

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]
0.00†	0.000	185.040	0.00	0.00	0.00	0.00	1568235.05	305248.49	39°19'40.861"N	81°01'34.928"W	0.00	0.000	0.00	0.00	0.00
26.00	0.000	185.040	26.00	0.00	0.00	0.00	1568235.05	305248.49	39°19'40.861"N	81°01'34.928"W	0.00	0.000	0.00	0.00	0.00
100.00	0.100	185.040	100.00	0.05	-0.06	-0.01	1568235.04	305248.43	39°19'40.861"N	81°01'34.928"W	0.06	185.040	0.14	0.14	0.00
200.00	0.140	219.580	200.00	0.13	-0.25	-0.09	1568234.96	305248.24	39°19'40.859"N	81°01'34.929"W	0.26	200.382	0.08	0.04	34.54
300.00	0.090	268.520	300.00	0.10	-0.34	-0.25	1568234.80	305248.15	39°19'40.858"N	81°01'34.931"W	0.42	215.928	0.11	-0.05	48.94
400.00	0.200	227.400	400.00	0.06	-0.46	-0.45	1568234.60	305248.03	39°19'40.857"N	81°01'34.934"W	0.65	224.547	0.14	0.11	-41.12
500.00	0.160	169.600	500.00	0.19	-0.72	-0.56	1568234.49	305247.77	39°19'40.854"N	81°01'34.935"W	0.91	217.872	0.18	-0.04	-57.80
505.00	0.220	180.000	505.00	0.20	-0.73	-0.56	1568234.49	305247.76	39°19'40.854"N	81°01'34.935"W	0.92	217.181	1.38	1.20	208.00
715.00	0.310	207.540	715.00	0.73	-1.64	-0.82	1568234.23	305246.85	39°19'40.845"N	81°01'34.938"W	1.83	206.534	0.07	0.04	13.11
811.00	0.640	264.620	810.99	0.52	-1.92	-1.47	1568233.58	305246.57	39°19'40.842"N	81°01'34.947"W	2.42	217.480	0.56	0.34	59.46
907.00	0.900	281.410	906.99	-0.37	-1.82	-2.75	1568232.30	305246.67	39°19'40.843"N	81°01'34.963"W	3.30	236.431	0.36	0.27	17.49
1002.00	0.070	94.490	1001.98	-0.91	-1.68	-3.42	1568231.63	305246.81	39°19'40.844"N	81°01'34.972"W	3.81	243.845	1.02	-0.87	182.19
1098.00	0.690	85.980	1097.98	-0.53	-1.64	-2.78	1568232.27	305246.85	39°19'40.844"N	81°01'34.963"W	3.23	239.452	0.65	0.65	-8.86
1194.00	2.480	73.250	1193.94	0.63	-1.00	-0.22	1568234.83	305247.49	39°19'40.851"N	81°01'34.931"W	1.03	192.285	1.89	1.86	-13.26
1289.00	4.090	55.970	1288.78	1.79	1.48	4.56	1568239.61	305249.97	39°19'40.877"N	81°01'34.871"W	4.79	71.960	1.97	1.69	-18.19
1385.00	4.770	45.440	1384.50	1.83	6.20	10.24	1568245.29	305254.69	39°19'40.924"N	81°01'34.799"W	11.97	58.800	1.10	0.71	-10.97
1481.00	5.550	51.540	1480.11	1.64	11.89	16.72	1568251.77	305260.38	39°19'40.981"N	81°01'34.718"W	20.51	54.581	0.99	0.81	6.35
1576.00	9.330	48.800	1574.29	1.60	19.82	26.11	1568261.16	305268.31	39°19'41.061"N	81°01'34.600"W	32.78	52.799	4.00	3.98	-2.88
1672.00	12.250	51.780	1668.58	1.75	31.25	39.97	1568275.02	305279.74	39°19'41.177"N	81°01'34.427"W	50.74	51.981	3.10	3.04	3.10
1768.00	14.980	58.220	1761.88	3.84	44.09	58.53	1568293.57	305292.58	39°19'41.307"N	81°01'34.193"W	73.27	53.008	3.25	2.84	6.71
1863.00	17.860	59.590	1853.00	8.03	57.93	81.53	1568316.58	305306.42	39°19'41.447"N	81°01'33.904"W	100.02	54.604	3.06	3.03	1.44
1959.00	21.730	59.270	1943.31	13.35	74.47	109.51	1568344.56	305322.96	39°19'41.616"N	81°01'33.551"W	132.44	55.783	4.03	4.03	-0.33
2054.00	22.600	56.670	2031.29	18.30	93.49	139.88	1568374.93	305341.97	39°19'41.809"N	81°01'33.169"W	168.25	56.244	1.38	0.92	-2.74
2150.00	22.420	53.610	2119.98	21.59	114.49	170.03	1568405.08	305362.97	39°19'42.021"N	81°01'32.790"W	204.98	56.047	1.23	-0.19	-3.19
2246.00	20.430	47.900	2209.35	22.13	136.58	197.21	1568432.25	305385.07	39°19'42.244"N	81°01'32.449"W	239.89	55.294	3.00	-2.07	-5.95
2341.00	19.920	43.980	2298.52	19.83	159.35	220.75	1568455.79	305407.83	39°19'42.473"N	81°01'32.154"W	272.25	54.177	1.52	-0.54	-4.13
2437.00	18.490	45.100	2389.18	16.81	181.86	242.89	1568477.93	305430.34	39°19'42.699"N	81°01'31.877"W	303.43	53.176	1.54	-1.49	1.17
2533.00	16.730	49.140	2480.68	15.30	201.65	264.13	1568499.16	305450.13	39°19'42.898"N	81°01'31.611"W	332.30	52.640	2.23	-1.83	4.21
2627.00	17.470	49.570	2570.53	15.24	219.46	285.26	1568520.29	305467.94	39°19'43.078"N	81°01'31.346"W	359.91	52.427	0.91	0.79	1.52
2723.00	17.570	49.900	2662.09	16.09	237.35	307.90	1568542.93	305485.83	39°19'43.258"N	81°01'31.062"W	388.76	52.372	0.70	0.05	2.31

RECEIVED  
 WV Department of  
 Environmental Protection  
 8 2018  
 Oil and Gas



# Actual Wellpath Report

Page 3 of 9  
PEN-20C-HS AWP Proj: 15020



## REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY
Area	Ritchie County, WV
Field	Ritchie
Facility	PEN-20 Pad
	Wellbore
	Well
	Slot C

## WELLPATH DATA (160 stations)

MD	Inclination	Azimuth	TVD	Vert Sect	North	East	Grid East	Grid North	Latitude	Longitude	Closure Dist	Closure Dir	DLS	Build Rate	Turn Rate
[ft]	[°]	[°]	[ft]	[ft]	[ft]	[ft]	[US ft]	[US ft]			[ft]	[°]	[%/100ft]	[%/100ft]	[%/100ft]
2818.00	18.110	51.580	2752.53	17.19	255.18	330.85	1568565.89	305503.65	39°19'43.438"N	81°01'30.774"W	417.83	52.358	0.73	0.62	-1.27
2913.00	18.620	55.270	2842.69	18.99	272.99	354.89	1568589.92	305521.47	39°19'43.619"N	81°01'30.472"W	447.74	52.431	1.34	0.54	3.88
3009.00	20.140	55.530	2933.25	21.99	291.08	381.11	1568616.14	305539.55	39°19'43.802"N	81°01'29.142"W	479.55	52.629	1.59	0.73	0.27
3105.00	20.840	53.690	3023.18	24.68	310.54	408.49	1568643.53	305559.02	39°19'43.999"N	81°01'29.798"W	513.13	52.757	0.99	0.73	-1.92
3200.00	21.610	51.250	3111.74	26.15	331.50	435.76	1568670.79	305579.98	39°19'44.210"N	81°01'29.456"W	547.52	52.738	1.23	0.81	-2.57
3295.00	20.940	50.640	3200.26	26.72	353.22	462.52	1568697.55	305601.69	39°19'44.429"N	81°01'29.120"W	581.97	52.632	0.74	-0.71	-0.64
3391.00	20.810	49.090	3289.96	26.65	375.26	488.68	1568723.70	305623.74	39°19'44.652"N	81°01'28.792"W	616.14	52.479	0.59	-0.14	-1.61
3486.00	20.090	49.700	3378.97	26.29	396.87	513.87	1568748.90	305645.34	39°19'44.869"N	81°01'28.476"W	649.29	52.321	0.79	-0.76	0.64
3582.00	19.110	50.610	3469.41	26.37	417.51	538.59	1568773.62	305665.98	39°19'45.077"N	81°01'28.166"W	681.47	52.218	1.07	-1.02	0.95
3677.00	18.120	52.060	3559.44	27.07	436.46	562.26	1568797.29	305684.93	39°19'45.269"N	81°01'27.869"W	711.78	52.180	1.15	-1.04	1.53
3773.00	17.710	50.580	3650.79	27.75	454.91	585.32	1568820.34	305703.38	39°19'45.455"N	81°01'27.579"W	741.31	52.146	0.64	-0.43	-1.54
3868.00	18.670	50.200	3741.04	27.95	473.82	608.16	1568843.18	305722.29	39°19'45.646"N	81°01'27.293"W	770.95	52.078	1.02	1.01	-0.40
3964.00	19.940	56.480	3831.65	29.85	492.70	633.62	1568868.64	305741.16	39°19'45.836"N	81°01'26.973"W	802.63	52.132	2.53	1.32	6.54
4060.00	21.350	57.770	3921.48	34.07	511.06	662.05	1568897.07	305759.52	39°19'46.023"N	81°01'26.615"W	836.35	52.334	1.54	1.47	1.34
4155.00	21.690	55.840	4009.86	38.19	530.14	691.21	1568926.22	305778.60	39°19'46.216"N	81°01'26.248"W	871.10	52.513	0.83	0.36	-2.03
4251.00	22.000	53.250	4098.97	41.01	550.86	720.29	1568955.31	305799.32	39°19'46.426"N	81°01'25.883"W	906.79	52.592	1.05	0.32	-2.70
4347.00	21.440	51.570	4188.15	42.51	572.52	748.45	1568983.46	305820.98	39°19'46.645"N	81°01'25.529"W	942.31	52.586	0.87	-0.58	-1.75
4442.00	21.510	50.480	4276.56	43.14	594.40	775.48	1569010.49	305842.86	39°19'46.865"N	81°01'25.190"W	977.08	52.530	0.43	0.07	-1.15
4538.00	20.400	44.640	4366.22	41.72	617.50	800.82	1569035.83	305865.97	39°19'47.098"N	81°01'24.872"W	1011.25	52.364	2.46	-1.16	-6.08
4644.00	21.400	43.240	4455.90	38.10	642.17	824.57	1569059.58	305890.63	39°19'47.346"N	81°01'24.575"W	1045.13	52.089	1.16	1.04	-1.46
4730.00	22.480	49.290	4544.96	35.81	666.90	850.49	1569085.50	305915.36	39°19'47.594"N	81°01'24.251"W	1080.78	51.899	2.61	1.12	6.30
4826.00	22.820	49.820	4633.55	35.52	690.88	878.62	1569113.63	305939.34	39°19'47.836"N	81°01'23.898"W	1117.72	51.821	0.41	0.35	0.55
4921.00	21.130	50.080	4721.65	35.49	713.76	905.83	1569140.84	305962.22	39°19'48.067"N	81°01'23.557"W	1153.25	51.763	1.78	-1.78	0.27
5017.00	20.150	50.210	4811.48	35.57	735.45	931.81	1569166.81	305983.90	39°19'48.285"N	81°01'23.231"W	1187.08	51.717	1.02	-1.02	0.14
5112.00	19.510	55.440	4900.86	37.13	754.92	957.45	1569192.45	306003.37	39°19'48.482"N	81°01'22.909"W	1219.27	51.745	1.98	-0.67	5.51
5207.00	18.840	57.140	4990.59	40.55	772.24	983.40	1569218.40	306020.69	39°19'48.658"N	81°01'22.583"W	1250.37	51.858	0.92	-0.71	1.79
5302.00	18.270	56.840	5080.65	44.23	788.71	1008.75	1569243.75	306037.16	39°19'48.825"N	81°01'22.264"W	1280.48	51.979	0.61	-0.60	-0.32
5398.00	17.440	59.820	5171.98	48.50	804.25	1033.92	1569268.92	306052.70	39°19'48.982"N	81°01'21.947"W	1309.89	52.122	1.16	-0.66	3.10
5449.00	17.020	58.550	5213.02	50.55	810.81	1044.92	1569279.92	306059.26	39°19'49.049"N	81°01'21.808"W	1322.60	52.190	1.69	-1.44	-2.95
5549.00	16.270	61.170	5309.79	55.48	825.35	1069.93	1569304.93	306073.80	39°19'49.197"N	81°01'21.493"W	1351.27	52.353	1.05	-0.74	2.59

MATH  
 RECEIVED  
 8/10/2012  
 Environmental Protection  
 Department



# Actual Wellpath Report

PEN-20C-HS AWP Proj: 15020'

Page 4 of 9



REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY	Slot	Slot C
Area	Ritchie County, WV	Well	PEN-20C-HS
Field	Ritchie	Wellbore	PEN-20C-HS AWB
Facility	PEN-20 Pad		

## WELLPATH DATA (160 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]
5636.00	19.020	70.690	5399.38	63.45	836.77	1095.93	1569330.93	306085.22	39°19'49.314"N	81°01'21.165"W	1378.85	52.637	4.23	2.93	10.13
5730.00	19.700	71.040	5488.06	74.55	846.98	1125.37	1569360.37	306095.43	39°19'49.420"N	81°01'20.792"W	1408.48	53.034	0.73	0.72	0.37
5826.00	19.210	68.470	5578.58	85.36	858.03	1155.36	1569390.36	306106.48	39°19'49.534"N	81°01'20.413"W	1439.13	53.401	1.03	-0.51	-2.68
5920.00	22.740	70.600	5666.34	96.66	869.75	1186.90	1569421.89	306118.19	39°19'49.655"N	81°01'20.014"W	1471.46	53.766	3.84	3.76	2.27
6015.00	22.280	76.820	5754.12	111.25	879.95	1221.75	1569456.75	306128.40	39°19'49.762"N	81°01'19.573"W	1505.66	54.237	2.55	-0.48	6.55
6110.00	24.660	94.340	5841.36	133.25	882.56	1259.10	1569494.09	306131.01	39°19'49.794"N	81°01'19.098"W	1537.61	54.972	7.73	2.51	18.44
6205.00	32.690	112.750	5924.80	170.04	871.10	1302.68	1569537.67	306119.55	39°19'49.688"N	81°01'18.541"W	1567.10	56.229	12.48	8.45	19.38
6303.00	43.810	118.860	6001.67	225.40	844.40	1356.98	1569591.97	306092.85	39°19'49.433"N	81°01'17.845"W	1598.25	58.107	11.97	11.35	6.23
6395.00	50.180	120.270	6064.39	288.43	811.19	1415.45	1569650.43	306059.64	39°19'49.115"N	81°01'17.094"W	1631.41	60.183	7.01	6.92	1.53
6489.00	59.440	121.790	6118.50	361.01	771.58	1481.17	1569716.15	306020.03	39°19'48.734"N	81°01'16.249"W	1670.09	62.484	9.94	9.85	1.62
6584.00	64.890	124.580	6162.85	441.40	725.58	1551.41	1569786.39	305974.04	39°19'48.292"N	81°01'15.345"W	1712.70	64.935	6.30	5.74	2.94
6679.00	71.060	132.070	6198.50	527.55	670.95	1620.33	1569855.30	305919.40	39°19'47.763"N	81°01'14.456"W	1753.75	67.506	9.77	6.49	7.88
6773.00	80.340	140.010	6221.73	618.25	605.42	1683.34	1569918.31	305853.88	39°19'47.126"N	81°01'13.641"W	1788.90	70.219	12.82	9.87	8.45
6869.00	85.870	141.160	6233.25	713.51	531.82	1743.82	1569978.79	305780.28	39°19'46.409"N	81°01'12.855"W	1823.11	73.040	5.88	5.76	1.20
6964.00	88.920	142.180	6237.57	808.36	457.38	1802.67	1570037.63	305705.85	39°19'45.683"N	81°01'12.090"W	1859.79	75.763	3.38	3.21	1.07
7060.00	88.980	142.060	6239.33	904.28	381.62	1861.60	1570096.56	305630.09	39°19'44.944"N	81°01'11.324"W	1900.32	78.415	0.14	0.06	-0.13
7155.00	88.430	138.870	6241.48	999.24	308.38	1922.05	1570157.01	305556.85	39°19'44.231"N	81°01'10.539"W	1946.63	80.885	3.41	-0.58	-3.36
7251.00	89.260	137.280	6243.41	1095.16	236.97	1986.18	1570221.13	305485.45	39°19'43.536"N	81°01'09.708"W	2000.27	83.196	1.87	0.86	-1.66
7347.00	89.660	135.780	6244.32	1190.98	167.31	2052.22	1570287.17	305415.79	39°19'42.858"N	81°01'08.853"W	2059.03	85.339	1.62	0.42	-1.56
7442.00	90.150	137.560	6244.47	1285.81	98.20	2117.41	1570352.36	305346.69	39°19'42.186"N	81°01'08.008"W	2119.68	87.345	1.94	0.52	1.87
7538.00	89.600	136.240	6244.68	1381.67	28.11	2183.00	1570417.94	305276.60	39°19'41.505"N	81°01'07.159"W	2183.18	89.262	1.49	-0.57	-1.37
7633.00	89.820	137.750	6245.16	1476.54	-41.36	2247.79	1570482.73	305207.13	39°19'40.829"N	81°01'06.319"W	2248.17	91.054	1.61	0.23	1.59
7729.00	89.940	138.740	6245.36	1572.49	-112.97	2311.72	1570546.66	305135.52	39°19'40.132"N	81°01'05.491"W	2314.48	92.798	1.04	0.12	1.03
7824.00	89.780	135.690	6245.60	1667.37	-182.69	2376.24	1570611.18	305065.81	39°19'39.454"N	81°01'04.655"W	2383.25	94.396	3.21	-0.17	-3.21
7920.00	89.540	141.410	6246.17	1763.29	-254.61	2439.76	1570674.70	304993.89	39°19'38.754"N	81°01'03.831"W	2453.01	95.958	5.96	-0.25	5.96
8015.00	89.200	143.220	6247.21	1858.21	-329.78	2497.83	1570732.76	304918.72	39°19'38.020"N	81°01'03.076"W	2519.51	97.521	1.94	-0.36	1.91
8111.00	89.410	143.280	6248.38	1954.04	-406.70	2555.27	1570790.20	304841.81	39°19'37.270"N	81°01'02.329"W	2587.43	99.043	0.23	0.22	0.06
8206.00	89.260	140.050	6249.48	2048.99	-481.20	2614.18	1570849.11	304767.31	39°19'36.543"N	81°01'01.563"W	2658.10	100.430	3.40	-0.16	-3.40
8302.00	89.910	140.010	6250.17	2144.98	-554.77	2675.85	1570910.77	304693.74	39°19'35.827"N	81°01'00.763"W	2732.75	101.713	0.68	0.68	-0.04
8398.00	89.380	141.650	6250.77	2240.97	-629.19	2736.64	1570971.40	304619.33	39°19'35.101"N	81°00'59.975"W	2807.88	102.949	1.80	-0.55	1.71

Office of Oil and Gas

JAN 8 2018



# Actual Wellpath Report

PEN-20C-HS AWP Proj: 15020'

Page 5 of 9



## REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY	Slot	Slot C
Area	Ritchie County, WV	Well	PEN-20C-HS
Field	Ritchie	Wellbore	PEN-20C-HS AWB
Facility	PEN-20 Pad		

## WELLPATH DATA (160 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]
8493.00	90.280	144.340	6251.05	2335.83	-705.05	2793.65	1571028.57	304543.47	39°19'34.361"N	81°00'59.232"W	2881.25	104.164	2.99	0.95	2.83
8589.00	89.570	145.870	6251.18	2431.44	-783.79	2848.57	1571083.48	304464.74	39°19'33.592"N	81°00'58.516"W	2954.43	105.384	1.76	-0.74	1.59
8684.00	90.220	143.120	6251.35	2526.14	-861.12	2903.74	1571138.65	304387.42	39°19'32.837"N	81°00'57.797"W	3028.73	106.518	2.97	0.68	-2.89
8780.00	89.660	143.750	6251.45	2621.97	-938.22	2960.93	1571195.84	304310.31	39°19'32.085"N	81°00'57.053"W	3106.02	107.582	0.88	-0.58	0.66
8875.00	89.170	146.340	6252.42	2716.59	-1016.07	3015.35	1571250.26	304232.47	39°19'31.325"N	81°00'56.344"W	3181.94	108.622	2.77	-0.52	2.73
8970.00	90.860	149.670	6252.40	2810.64	-1096.63	3065.68	1571300.58	304151.92	39°19'30.537"N	81°00'55.686"W	3255.91	109.683	3.93	1.78	3.51
9066.00	90.740	145.190	6251.05	2905.80	-1177.50	3117.34	1571352.24	304071.05	39°19'29.746"N	81°00'55.012"W	3332.31	110.693	4.67	-0.13	-4.67
9161.00	89.940	139.610	6250.49	3000.68	-1252.74	3175.28	1571410.17	303995.81	39°19'29.013"N	81°00'54.258"W	3413.46	111.531	5.93	-0.84	-5.87
9257.00	89.140	136.960	6251.26	3096.62	-1324.39	3239.15	1571474.04	303924.17	39°19'28.315"N	81°00'53.430"W	3499.44	112.238	2.88	-0.83	-2.76
9353.00	89.200	141.210	6252.65	3192.58	-1396.91	3302.00	1571536.89	303851.65	39°19'27.609"N	81°00'52.615"W	3585.33	112.931	4.43	0.06	4.43
9448.00	90.310	139.500	6253.06	3287.57	-1470.06	3362.61	1571597.50	303778.50	39°19'26.896"N	81°00'51.828"W	3669.91	113.614	2.15	1.17	-1.80
9544.00	89.880	137.420	6252.90	3383.53	-1541.91	3426.27	1571661.16	303706.66	39°19'26.197"N	81°00'51.003"W	3757.23	114.229	2.21	-0.45	-2.17
9639.00	89.600	139.600	6253.33	3478.49	-1613.06	3489.20	1571724.08	303635.50	39°19'25.504"N	81°00'50.187"W	3844.02	114.811	2.31	-0.29	2.29
9735.00	89.690	140.070	6253.93	3574.49	-1686.42	3551.12	1571786.00	303562.15	39°19'24.789"N	81°00'49.384"W	3931.22	115.403	0.50	0.09	0.49
9830.00	89.630	141.460	6254.49	3669.48	-1760.00	3611.20	1571846.08	303488.57	39°19'24.072"N	81°00'48.603"W	4017.26	115.983	1.46	-0.06	1.46
9926.00	89.450	139.460	6255.26	3765.47	-1834.03	3672.31	1571907.19	303414.55	39°19'23.351"N	81°00'47.810"W	4104.82	116.539	2.09	-0.19	-2.08
10021.00	89.570	142.610	6256.07	3860.44	-1907.88	3732.05	1571966.92	303340.70	39°19'22.631"N	81°00'47.034"W	4191.44	117.077	3.32	0.13	3.32
10117.00	89.630	143.810	6256.74	3956.28	-1984.76	3789.54	1572024.40	303263.82	39°19'21.881"N	81°00'46.286"W	4277.83	117.643	1.25	0.06	1.25
10212.00	89.630	143.450	6257.36	4051.09	-2061.25	3845.87	1572080.74	303187.33	39°19'21.134"N	81°00'45.553"W	4363.42	118.190	0.38	0.00	-0.38
10308.00	89.940	142.940	6257.72	4146.94	-2138.12	3903.38	1572138.24	303110.47	39°19'20.384"N	81°00'44.805"W	4450.61	118.712	0.62	0.32	-0.53
10403.00	90.460	138.040	6257.39	4241.91	-2211.39	3963.80	1572198.66	303037.21	39°19'19.670"N	81°00'44.021"W	4538.94	119.157	5.19	0.55	-5.16
10499.00	89.570	136.560	6257.36	4337.80	-2281.94	4028.90	1572263.76	302966.66	39°19'18.984"N	81°00'43.177"W	4630.26	119.527	1.80	-0.93	-1.54
10595.00	89.910	138.880	6257.80	4433.71	-2352.96	4093.48	1572328.34	302895.64	39°19'18.293"N	81°00'42.341"W	4721.55	119.891	2.44	0.35	2.42
10690.00	89.970	138.840	6257.90	4528.69	-2424.50	4155.98	1572390.83	302824.10	39°19'17.596"N	81°00'41.530"W	4811.49	120.258	0.08	0.06	-0.04
10786.00	89.630	136.970	6258.23	4624.62	-2495.74	4220.33	1572455.18	302752.87	39°19'16.903"N	81°00'40.696"W	4903.05	120.598	1.98	-0.35	-1.95
10881.00	90.000	144.000	6258.54	4719.56	-2568.98	4280.74	1572515.59	302679.63	39°19'16.189"N	81°00'39.912"W	4992.44	120.969	7.41	0.39	7.40
10977.00	90.180	147.670	6258.39	4815.05	-2648.40	4334.64	1572569.49	302600.22	39°19'15.413"N	81°00'39.209"W	5079.68	121.424	3.83	0.19	3.82
11072.00	90.150	145.390	6258.11	4909.42	-2727.64	4387.03	1572621.87	302520.98	39°19'14.639"N	81°00'38.526"W	5165.86	121.871	2.40	-0.03	-2.40
11167.00	89.480	142.630	6258.42	5004.18	-2804.50	4442.85	1572677.69	302444.13	39°19'13.889"N	81°00'37.799"W	5253.97	122.262	2.99	-0.71	-2.91
11263.00	89.850	143.220	6258.98	5100.05	-2881.00	4500.73	1572735.56	302367.54	39°19'13.141"N	81°00'37.046"W	5343.89	122.625	0.73	0.39	0.61

JAN 8 2018

WV Department of Environmental Protection

02/Dec/2014

**Actual Wellpath Report**  
PEN-20C-HS AWP Proj: 15020'  
Page 6 of 9



REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY	Slot	Slot C
Area	Ritchie County, WV	Well	PEN-20C-HS
Field	Ritchie	Wellbore	PEN-20C-HS AWB
Facility	PEN-20 Pad		

**WELLPATH DATA (160 stations)**

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]
11359.00	90.550	138.300	6258.65	5196.01	-2955.42	4561.43	1572796.27	302293.21	39°19'12.417"N	81°00'36.258"W	5435.18	122.940	5.18	0.73	-5.12
11454.00	90.000	137.660	6258.19	5290.95	-3025.99	4625.03	1572859.85	302222.64	39°19'11.730"N	81°00'35.434"W	5526.98	123.195	0.89	-0.58	-0.67
11550.00	90.030	135.890	6258.16	5386.80	-3095.94	4690.77	1572925.60	302152.70	39°19'11.050"N	81°00'34.583"W	5620.34	123.425	1.84	0.03	-1.84
11645.00	90.520	138.300	6257.71	5481.67	-3165.52	4755.44	1572990.26	302083.12	39°19'10.373"N	81°00'33.745"W	5712.68	123.650	2.59	0.52	2.54
11741.00	90.120	137.410	6257.17	5577.60	-3236.70	4819.85	1573054.67	302011.95	39°19'09.680"N	81°00'32.910"W	5805.79	123.883	1.02	-0.42	-0.93
11837.00	90.120	138.380	6256.97	5673.53	-3307.92	4884.22	1573119.04	301940.73	39°19'08.987"N	81°00'32.076"W	5898.98	124.108	1.01	0.00	1.01
11932.00	90.220	140.890	6256.69	5768.52	-3380.30	4945.74	1573180.56	301868.35	39°19'08.282"N	81°00'31.278"W	5990.56	124.352	2.64	0.11	2.64
12028.00	89.820	143.650	6256.66	5864.44	-3456.22	5004.48	1573239.29	301792.44	39°19'07.541"N	81°00'30.515"W	6081.96	124.630	2.91	-0.42	2.88
12123.00	89.230	143.680	6257.44	5959.24	-3532.74	5060.77	1573295.58	301715.92	39°19'06.794"N	81°00'29.782"W	6171.84	124.918	0.62	-0.62	0.03
12231.00	89.880	142.430	6258.28	6067.08	-3619.05	5125.68	1573360.48	301629.61	39°19'05.952"N	81°00'28.938"W	6274.56	125.225	1.30	0.60	-1.16
12314.00	90.000	139.890	6258.37	6150.05	-3683.70	5177.73	1573412.53	301564.97	39°19'05.322"N	81°00'28.262"W	6354.41	125.430	3.06	0.14	-3.06
12410.00	90.550	140.360	6257.91	6246.05	-3757.37	5239.27	1573474.07	301491.30	39°19'04.604"N	81°00'27.463"W	6447.31	125.646	0.75	0.57	0.49
12506.00	89.850	137.260	6257.57	6342.02	-3829.60	5302.49	1573537.28	301419.07	39°19'03.901"N	81°00'26.644"W	6540.81	125.838	3.31	-0.73	-3.23
12602.00	90.180	138.470	6257.55	6437.95	-3900.79	5366.89	1573601.68	301347.88	39°19'03.208"N	81°00'25.809"W	6634.73	126.011	1.31	0.34	1.26
12698.00	89.970	139.920	6257.42	6533.94	-3973.46	5429.62	1573664.41	301275.22	39°19'02.500"N	81°00'24.996"W	6728.24	126.197	1.53	-0.22	1.51
12793.00	89.380	140.120	6257.96	6628.94	-4046.25	5490.66	1573725.45	301202.43	39°19'01.791"N	81°00'24.204"W	6820.52	126.388	0.66	-0.62	0.21
12889.00	89.780	141.060	6258.67	6724.93	-4120.42	5551.60	1573786.39	301128.27	39°19'01.068"N	81°00'23.412"W	6913.62	126.583	1.06	0.42	0.98
12984.00	90.400	140.810	6258.52	6819.91	-4194.18	5611.47	1573846.26	301054.51	39°19'00.349"N	81°00'22.635"W	7005.70	126.776	0.70	0.65	-0.26
13080.00	91.050	142.960	6257.30	6915.85	-4269.70	5670.72	1573905.50	300978.99	39°18'59.613"N	81°00'21.865"W	7098.41	126.977	2.34	0.68	2.24
13175.00	90.370	142.780	6256.12	7010.72	-4345.43	5728.06	1573962.84	300903.26	39°18'58.874"N	81°00'21.120"W	7189.82	127.185	0.74	-0.72	-0.19
13271.00	90.310	143.950	6255.55	7106.55	-4422.47	5785.34	1574020.12	300826.23	39°18'58.122"N	81°00'20.374"W	7282.06	127.395	1.22	-0.06	1.22
13366.00	89.750	143.660	6255.50	7201.34	-4499.13	5841.44	1574076.21	300749.57	39°18'57.374"N	81°00'19.644"W	7373.24	127.604	0.66	-0.59	-0.31
13461.00	89.850	142.350	6255.84	7296.21	-4575.01	5898.61	1574133.38	300673.70	39°18'56.633"N	81°00'18.901"W	7464.87	127.797	1.38	0.11	-1.38
13557.00	89.510	139.560	6256.37	7392.18	-4649.56	5959.07	1574193.84	300599.16	39°18'55.907"N	81°00'18.116"W	7558.37	127.963	2.93	-0.35	-2.91
13653.00	89.140	141.230	6257.50	7488.17	-4723.51	6020.27	1574255.03	300525.20	39°18'55.186"N	81°00'17.322"W	7652.13	128.118	1.78	-0.39	1.74
13747.00	89.140	140.550	6258.91	7582.15	-4796.44	6079.56	1574314.31	300452.28	39°18'54.475"N	81°00'16.552"W	7743.83	128.272	0.72	0.00	-0.72
13843.00	89.260	140.240	6260.25	7678.14	-4870.40	6140.75	1574375.51	300378.33	39°18'53.754"N	81°00'15.758"W	7837.70	128.419	0.35	0.13	-0.32
13938.00	89.110	138.910	6261.61	7773.12	-4942.71	6202.34	1574437.10	300306.02	39°18'53.050"N	81°00'14.959"W	7930.92	128.552	1.41	-0.16	-1.40
14034.00	89.480	138.750	6262.79	7869.10	-5014.97	6265.54	1574500.29	300233.76	39°18'52.346"N	81°00'14.140"W	8025.39	128.674	0.42	0.39	-0.17
14129.00	90.090	144.710	6263.14	7964.01	-5089.52	6324.35	1574559.10	300159.22	39°18'51.619"N	81°00'13.375"W	8117.92	128.825	6.31	0.64	6.27





# Actual Wellpath Report

PEN-20C-HS AWP Proj: 15020'

Page 7 of 9



## REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY	Slot	Slot C
Area	Ritchie County, WV	Well	PEN-20C-HS
Field	Ritchie	Wellbore	PEN-20C-HS AWB
Facility	PEN-20 Pad		

## WELLPATH DATA (160 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]
14225.00	89.510	144.490	6263.48	8059.70	-5167.77	6379.96	1574614.70	300080.97	39°18'50.855"N	81°00'12.651"W	8210.34	129.007	0.65	-0.60	-0.23
14321.00	89.880	146.080	6263.99	8155.29	-5246.68	6434.63	1574669.37	300002.06	39°18'50.085"N	81°00'11.939"W	8302.53	129.193	1.70	0.39	1.66
14417.00	89.660	143.820	6264.38	8250.92	-5325.26	6489.76	1574724.49	299923.48	39°18'49.317"N	81°00'11.221"W	8394.96	129.371	2.37	-0.23	-2.35
14512.00	90.150	141.660	6264.53	8345.81	-5400.87	6547.27	1574782.00	299847.88	39°18'48.579"N	81°00'10.473"W	8487.41	129.519	2.33	0.52	-2.27
14608.00	89.480	140.710	6264.84	8441.78	-5475.67	6607.44	1574842.17	299773.09	39°18'47.850"N	81°00'09.692"W	8581.44	129.649	1.21	-0.70	-0.99
14703.00	90.120	142.810	6265.17	8536.73	-5550.28	6666.24	1574900.97	299698.48	39°18'47.123"N	81°00'08.928"W	8674.35	129.781	2.31	0.67	2.21
14799.00	90.120	141.560	6264.97	8632.66	-5626.11	6725.09	1574959.82	299622.65	39°18'46.383"N	81°00'08.163"W	8768.13	129.915	1.30	0.00	-1.30
14894.00	89.630	134.480	6265.18	8727.54	-5696.69	6788.60	1575023.32	299552.07	39°18'45.696"N	81°00'07.341"W	8862.13	130.002	7.47	-0.52	-7.45
14990.00	89.660	129.910	6265.78	8822.63	-5761.15	6859.70	1575094.42	299487.62	39°18'45.071"N	81°00'06.422"W	8958.03	130.025	4.76	0.03	-4.76
15020.00	89.660	129.910	6265.95	8852.16	-5780.40	6882.71	1575117.43	299468.37	39°18'44.884"N	81°00'06.126"W	8988.03	130.025	0.00	0.00	0.00

RECEIVED  
 Office of Oil and Gas  
 JAN 8 2018  
 WV Department of  
 Environmental Protection



# Actual Wellpath Report

PEN-20C-HS AWP Proj: 15020'  
Page 8 of 9



REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY	Slot	Slot C
Area	Ritchie County, WV	Well	PEN-20C-HS
Field	Ritchie	Wellbore	PEN-20C-HS AWB
Facility	PEN-20 Pad		

TARGETS									
Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
PEN-20C-HS LP Plat		6168.00	465.00	1645.00	1569879.97	305713.47	39°19'45.732"N	81°01'14.098"W	point
PEN-20C-HS BHL Rev-3		6225.00	-5764.47	6872.15	1575106.87	299484.30	39°18'45.040"N	81°00'06.263"W	point
PEN-20C-HS LP Rev-3		6225.00	537.38	1732.49	1569967.46	305785.84	39°19'46.462"N	81°01'13.001"W	point
PEN-20 ALT Vertices		6948.00	-44.31	13.67	1568248.72	305204.18	39°19'40.426"N	81°01'34.745"W	polygon
PEN-20 Cokely Tract 1		6948.00	-44.31	13.67	1568248.72	305204.18	39°19'40.426"N	81°01'34.745"W	polygon
PEN-20 Cokely Tract 2		6948.00	-44.31	13.67	1568248.72	305204.18	39°19'40.426"N	81°01'34.745"W	polygon
PEN-20 LL		6948.00	-44.31	13.67	1568248.72	305204.18	39°19'40.426"N	81°01'34.745"W	polygon
PEN-20 Parcel 3.12-1.2		6948.00	-44.31	13.67	1568248.72	305204.18	39°19'40.426"N	81°01'34.745"W	polygon

WELLPATH COMPOSITION - Ref Wellbore: PEN-20C-HS AWB    Ref Wellpath: PEN-20C-HS AWP Proj: 15020'				
Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
26.00	505.00	Generic gyro - northseeking (Standard)	01_Gyrodata MS Gyro <17-1/2"> (100'-505')	PEN-20C-HS AWB
505.00	5441.00	ISCWSA MWD, Rev. 2 (Standard)	02_APS EM <12-1/4"> (505')(715'-5441') Proj:5515'	PEN-20C-HS AWB
5441.00	14990.00	NaviTrak (AT Curve Short Spaced)	03_BHI AT Curve <8-3/4"> (5441')(5542'-14990')	PEN-20C-HS AWB
14990.00	15020.00	Blind Drilling (std)	Projection to bit	PEN-20C-HS AWB

RECEIVED  
Office of Oil and Gas

JAN 8 2018

WV Department of  
Environmental Protection

02/Dec/2014



**Actual Wellpath Report**  
 PEN-20C-HS AWP Proj: 15020'  
 Page 9 of 9



**REFERENCE WELLPATH IDENTIFICATION**

Operator	NOBLE ENERGY	Slot	Slot C
Area	Ritchie County, WV	Well	PEN-20C-HS
Field	Ritchie	Wellbore	PEN-20C-HS AWB
Facility	PEN-20 Pad		

**COMMENTS**

Wellpath general comments  
 API: 47-085-10110-0000  
 BHI Job #: 6697330  
 Rig: Nomac 78  
 Duration: 11/10/2014-11/15/2014  
 Gyrodata MS Gyro <17-1/2"> (100'-505')  
 APS EM <12-1/4"> (505')(715'-5441')  
 BHI AT Curve <8-3/4"> (5441')(5542'-14990')  
 Projected MD at TD: 15020'

RECEIVED  
 Office of Oil and Gas  
 JAN 8 2018  
 WV Department of  
 Environmental Protection

02/16/2018

# Hydraulic Fracturing Fluid Product Component Information Disclosure



Job Start Date:	7/7/2017
Job End Date:	7/19/2017
State:	West Virginia
County:	Ritchie
API Number:	47-085-10110-00-00
Operator Name:	CONSOL Energy Inc.
Well Name and Number:	PEN20CHS
Latitude:	39.32802000
Longitude:	-81.02637000
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,266
Total Base Water Volume (gal):	13,762,686
Total Base Non Water Volume:	0

## Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Consol	Carrier/Base Fluid					
			Water	7732-18-5	100.00000	86.32068	None
Sand	UPP	Proppant					
			Crystalline Silica in the form of Quartz	14808-60-7	99.90000	12.32468	None
HCL Acid (7.5%)	UPP	Acidizing					
			Hydrochloric Acid	7647-01-0	7.50000	0.08889	None
Unislick ST50	UPP	Friction reducer					
			Petroleum distillates, hydrotreated light	64742-47-8	30.00000	0.01966	None
			Ammonium acetate	631-61-8	13.00000	0.00852	None
			Alcohols, ethoxylated	68002-97-1	5.00000	0.00328	None
			Alcohols, ethoxylated	68551-12-2	5.00000	0.00328	None
			Alcohols, ethoxylated	68439-50-9	5.00000	0.00328	None
K-Bac 1020	UPP	Biocide					
			Polyethylene glycol	25322-68-3	50.00000	0.01040	None
			Water	7732-18-5	30.00000	0.00624	None
			2,2-Dibromo-3-nitripropionamide	10222-01-2	21.00000	0.00437	None

RECEIVED  
Office of Oil and Gas

JAN 8 2018

WV Department of Environmental Protection

HCL Acid (15%)	UPP	Acidizing					
			Hydrochloric Acid	7647-01-0	15.00000	0.00894	None
Scale Inhibitor E	UPP	Scale Inhibitor					
			Copolymer of Maleic and Acrylic Acid	52255-49-9	20.00000	0.00195	None
			Hexamethylene Triamine Penta (Methylene Phosphonic Acid)	34690-00-1	5.00000	0.00049	None
			DETA phosphonate	15827-60-8	5.00000	0.00049	None
Unihib G	UPP	Acid inhibitor					
			Butyl diglycol	112-34-5	75.00000	0.00068	None
			Alcohols, C10-16, ethoxylated	68002-97-1	50.00000	0.00046	None
			Methanol	67-56-1	5.00000	0.00005	None
			Formaldehyde	50-00-0	1.00000	0.00001	None
			Thiourea	62-56-6	1.00000	0.00001	None
WGA-7	UPP	Viscosifier					
			Distillates (petroleum), hydrotreated light	64742-47-8	55.00000	0.00026	None
			Guar Gum	9000-30-0	55.00000	0.00026	None
AP Breaker	UPP	Gel breaker					
			Ammonium peroxydisulfate	7727-54-0	100.00000	0.00002	None
			Sulfuric acid	7664-93-9	0.50000	0.00000	None
Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.							
Other Chemical(s)	Listed Above	See Trade Name(s) List					
			Polyethylene glycol	25322-68-3	50.00000	0.01040	
			Ammonium acetate	631-61-8	13.00000	0.00852	
			Water	7732-18-5	30.00000	0.00624	
			Alcohols, ethoxylated	68551-12-2	5.00000	0.00328	
			Alcohols, ethoxylated	68002-97-1	5.00000	0.00328	
			Alcohols, ethoxylated	68439-50-9	5.00000	0.00328	
			Hexamethylene Triamine Penta (Methylene Phosphonic Acid)	34690-00-1	5.00000	0.00049	
			DETA phosphonate	15827-60-8	5.00000	0.00049	
			Alcohols, C10-16, ethoxylated	68002-97-1	50.00000	0.00046	
			Distillates (petroleum), hydrotreated light	64742-47-8	55.00000	0.00026	
			Methanol	67-56-1	5.00000	0.00005	
			Formaldehyde	50-00-0	1.00000	0.00001	
			Thiourea	62-56-6	1.00000	0.00001	
			Sulfuric acid	7664-93-9	0.50000	0.00000	

\* Total Water Volume sources may include fresh water, produced water, and/or recycled water

\*\* Information is based on the maximum potential for concentration and thus the total may be over 100%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided.

Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

RECEIVED  
Office of Oil and Gas

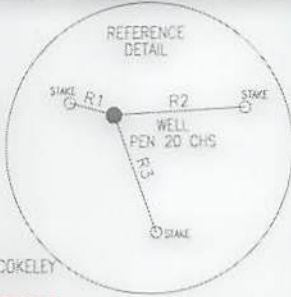
JAN 8 2018

WV Department of  
Environmental Protection

BHL is located on topo map 7,571' feet south of Latitude: 39° 20' 00"  
 SHL is located on topo map 1,908' feet south of Latitude: 39° 20' 00"

BHL is located on topo map 434' feet west of Longitude: 81° 00' 00"  
 SHL is located on topo map 7,412' feet west of Longitude: 81° 00' 00"

AS DRILLED SURFACE HOLE LOCATION (SHL)	AS DRILLED LANDING POINT	AS DRILLED BOTTOM HOLE LOCATION (BHL)
UTM 17-NAD83 N:4353187.02 E:497741.70 NAD27_WV NORTH N:305248.493 E:1568235.047 LAT/LON DATUM-NAD83 LAT:39.3280953 LON:-81.0262012	UTM 17-NAD83 N:4353380.02 E:498251.42 NAD27_WV NORTH N:305853.88 E:1569918.31 LAT/LON DATUM-NAD83 LAT:39.329836 LON:-81.020289	UTM 17-NAD83 N:4351461.15 E:499867.81 NAD27_WV NORTH N:299468.37 E:1575117.43 LAT/LON DATUM-NAD83 LAT:39.312547 LON:-81.001533

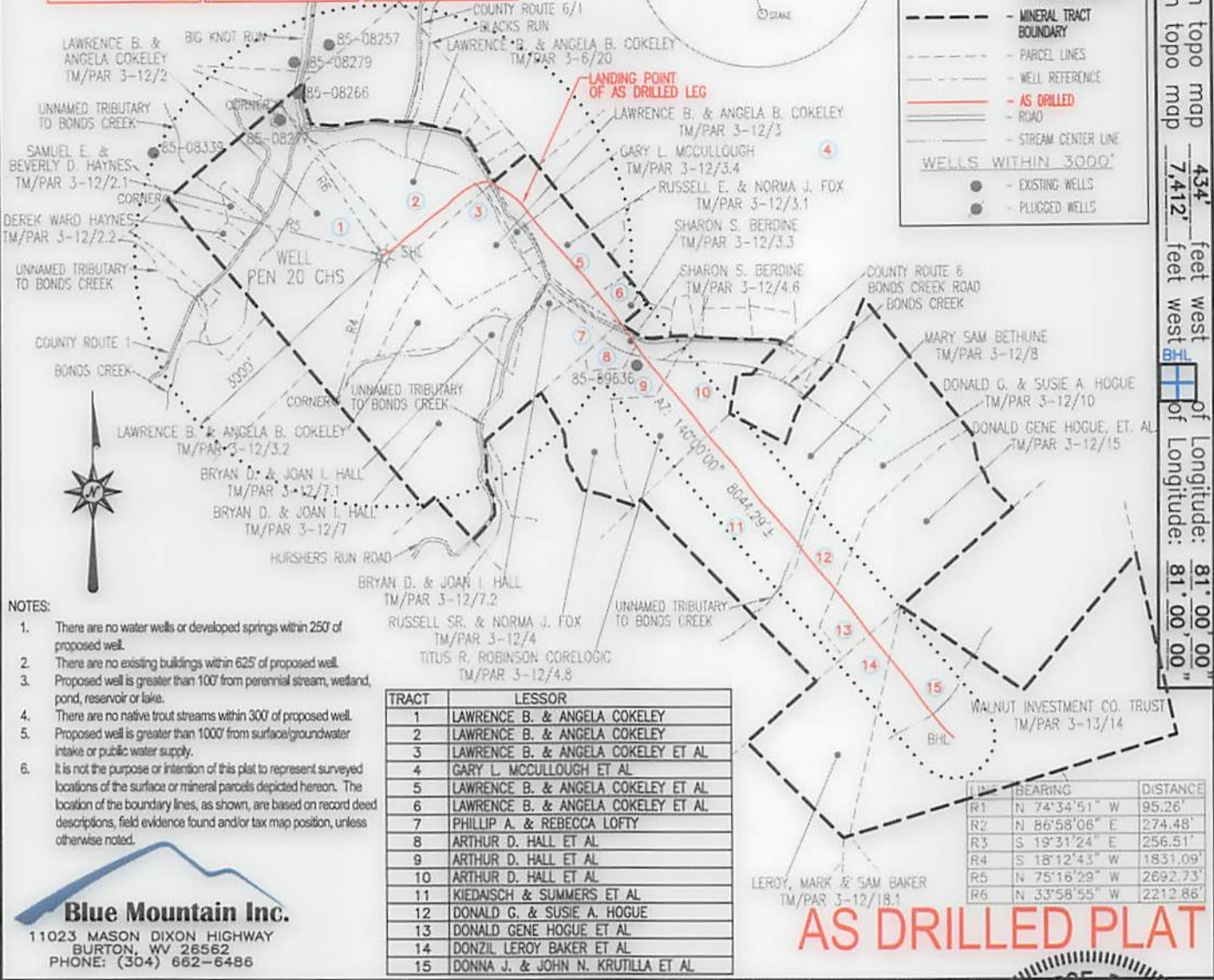


**LEGEND**

- TOPO MAP POINT
- WELL
- ALL ARE POINTS UNLESS OTHERWISE NOTED
- WATER SOURCE
- LEASE NUMBER BASED ON ATTACHED WW-641
- MINERAL TRACT BOUNDARY
- PARCEL LINES
- WELL REFERENCE
- AS DRILLED
- ROAD
- STREAM CENTER LINE

**WELLS WITHIN 3000'**

- EXISTING WELLS
- PLUGGED WELLS



- NOTES:**
- There are no water wells or developed springs within 250' of proposed well.
  - There are no existing buildings within 625' of proposed well.
  - Proposed well is greater than 100' from perennial stream, wetland, pond, reservoir or lake.
  - There are no native trout streams within 300' of proposed well.
  - Proposed well is greater than 1000' from surface/groundwater intake or public water supply.
  - It is not the purpose or intention of this plat to represent surveyed locations of the surface or mineral parcels depicted hereon. The location of the boundary lines, as shown, are based on record deed descriptions, field evidence found and/or tax map position, unless otherwise noted.

TRACT	LESSOR
1	LAWRENCE B. & ANGELA COKELEY
2	LAWRENCE B. & ANGELA COKELEY
3	LAWRENCE B. & ANGELA COKELEY ET AL
4	GARY L. MCCULLOUGH ET AL
5	LAWRENCE B. & ANGELA COKELEY ET AL
6	LAWRENCE B. & ANGELA COKELEY ET AL
7	PHILLIP A. & REBECCA LOFTY
8	ARTHUR D. HALL ET AL
9	ARTHUR D. HALL ET AL
10	ARTHUR D. HALL ET AL
11	KIEDAISCH & SUMMERS ET AL
12	DONALD G. & SUSIE A. HOGUE
13	DONALD GENE HOGUE ET AL
14	DONZIL LEROY BAKER ET AL
15	DONNA J. & JOHN N. KRUTILLA ET AL

LINE	BEARING	DISTANCE
R1	N 74°34'51" W	95.26'
R2	N 86°58'06" E	274.48'
R3	S 19°31'24" E	256.51'
R4	S 18°12'43" W	1831.09'
R5	N 75°16'29" W	2692.73'
R6	N 33°58'55" W	2212.86'

**Blue Mountain Inc.**  
 11023 MASON DIXON HIGHWAY  
 BURTON, WV 26562  
 PHONE: (304) 662-6486

**AS DRILLED PLAT**

FILE #: PEN 20 CHS-AS DRILLED  
 DRAWING #: PEN 20 CHS-AS DRILLED  
 SCALE: 1" = 2000'  
 MINIMUM DEGREE OF ACCURACY: 1/2500  
 PROVEN SOURCE OF ELEVATION: U.S.G.S. MONUMENT THOMAS 1498.81'

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

Signed: *George D. Six*  
 R.P.E.: \_\_\_\_\_ L.L.S.: P.S. No. 2000

**GEORGE D. SIX**  
 LICENSED  
 No. 2000  
 STATE OF WEST VIRGINIA  
 PROFESSIONAL SURVEYOR

PLACE SEAL HERE

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS WVDEP  
 OFFICE OF OIL & GAS  
 601 57TH STREET  
 CHARLESTON, WV 25304



DATE: NOVEMBER 2, 2017  
 OPERATOR'S WELL #: PEN 20 CHS-AS DRILLED  
 API WELL #: 47 85 10110  
 STATE COUNTY PERMIT

Well Type:  Oil  Waste Disposal  Production  Deep  
 Gas  Liquid Injection  Storage  Shallow

WATERSHED: NORTH FORK HUGHES RIVER ELEVATION: 1081'±  
 COUNTY/DISTRICT: RITCHIE / CLAY QUADRANGLE: ELLENBORO, WV 7.5'  
 SURFACE OWNER: LAWRENCE & ANGELA COKELEY ACREAGE: 126.17±  
 OIL & GAS ROYALTY OWNER: LAWRENCE B. & ANGELA COKELEY ACREAGE: 849.317±

DRILL  CONVERT  DRILL DEEPER  REDRILL  FRACTURE OR STIMULATE   
 PLUG OFF OLD FORMATION  PERFORATE NEW FORMATION  PLUG & ABANDON   
 CLEAN OUT & REPLUG  OTHER CHANGE  (SPECIFY): AS DRILLED

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 6,266'± TMD: 15,020'±  
 WELL OPERATOR CNX GAS COMPANY LLC DESIGNATED AGENT CHRIS TURNER  
 Address 1000 CONSOL ENERGY DRIVE Address 1 DOMINION DR.  
 City CANONSBURG State PA Zip Code 15317 City JANE LEW State WV Zip Code 26378

02/16/2018