

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

API 47-085-10111FH6A County Ritchie District Clay
Quad Ellenboro 7.5' Pad Name PEN20HS Field/Pool Name Pennsboro
Farm Name COKELEY, LAWRENCE & ANGELA Well Number PEN20DHS - 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 4,353,182.91 m Easting 497,746.27 m
Landing Point of Curve Northing 4,353,205.22 m Easting 498,110.93 m
Bottom Hole Northing 4,351,375.39 m Easting 499,701.68 m

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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 12/17/2014 Date drilling ceased 12/29/2014
Date completion activities began 07/22/2017 Date completion activities ceased 8/2/2017
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

Reviewed by: AS

Reviewed

02/16/2018

API 47-085-10111FH6A Farm name COKELEY, LAWRENCE Well number PEN20DHS - Fracture
& ANGELA

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement Circulate (Y/N) * Provide details to the right *
Conductor	26"	20"	65.8'	New	DH-36		
Surface	17 1/2"	13 3/8"	581.3'	New	J-55		Y
Coal							
Intermediate 1	12 3/8"	9 5/8"	5311.8'	New	HCK-55		Y
Intermediate 2							
Intermediate 3							
Production	8 3/4"	5 1/2"	14833.5'	New	P-110		N
Tubing	5 1/2"	2 3/8"	6553.8'	New	P-110 4.7# / 6553.8'		
Packer Type and Depth Set		None					

Comment Details *approved cement variance of 2% accelerator (S001) 0.2% Antifoam (D046) 0.125 lb/sk Polyester Flake (D130).

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor							
Surface	PJSM Cement	528 sks	15.60	1.20	633.6	25.8'	8
Coal							
Intermediate 1	Type 1 / Class A	987 sks / 318 sks	15.60	1.93 / 1.19	2833.33	25.8'	8
Intermediate 2							
Intermediate 3							
Production	Type 1 / Class A	480 sks / 1700 sks	14.8	1.62 / 1.37	3106.6	3000'	8
Tubing							

Drillers TD (ft) 6252' Loggers TD (ft) 6233'
 Deepest formation penetrated: Marcellus Plug back to (ft) _____
 Plug back procedure: _____
 Kick Off Depth (ft) 5208'

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Check all wireline logs run caliper density deviated/directional induction
 neutron resistivity gamma ray temperature sonic
 Well Cored Yes No Conventional Sidewall Were Cuttings Collected Yes No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING _____
Conductor - No centralizers used. Fresh Water - 5 centralizers used. Intermediate - 68 centralizers used (Bow spring centralizers on first two joints then every third joint to 100' from surface). Production - 252 centralizers used (rigid bow spring every joint to KOP, rigid bow spring every third joint from KOP to top of cement).

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS Plug And Perforation Shot Hole

WAS WELL COMPLETED OPEN HOLE Yes No DETAILS _____

WERE TRACERS USE Yes No TYPES OF TRACER(S) USED _____

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PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number Of Perforations	Formation(s)
					SEE ATTACHED

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Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

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Complete a separate record for each stimulation 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)
								See Attached

Please insert additional pages as applicable.

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PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number Of Perforations	Formation(s)
1	7/22/2017	14549	14704	40	Marcellus
2	7/23/2017	14549	14704	40	Marcellus
3	7/23/2017	14549	14704	40	Marcellus
4	7/23/2017	13973	14130	40	Marcellus
5	7/23/2017	13779	13936	40	Marcellus
6	7/24/2017	13585	13742	40	Marcellus
7	7/24/2017	13391	13548	40	Marcellus
8	7/24/2017	13197	13354	40	Marcellus
9	7/24/2017	13003	13160	40	Marcellus
10	7/25/2017	12809	12966	40	Marcellus
11	7/25/2017	12616	12773	40	Marcellus
12	7/25/2017	12423	12580	40	Marcellus
13	7/25/2017	12230	12387	40	Marcellus
14	7/26/2017	12037	12194	40	Marcellus
15	7/26/2017	11844	12001	40	Marcellus
16	7/26/2017	11651	11808	40	Marcellus
17	7/26/2017	11458	11615	40	Marcellus
18	7/27/2017	11265	11422	40	Marcellus
19	7/27/2017	11072	11229	40	Marcellus
20	7/27/2017	10879	11036	40	Marcellus
21	7/28/2017	10686	10843	40	Marcellus
22	7/28/2017	10493	10650	40	Marcellus
23	7/28/2017	10300	10457	40	Marcellus
24	7/28/2017	10107	10264	40	Marcellus
25	7/29/2017	9914	10071	40	Marcellus
26	7/29/2017	9721	9878	40	Marcellus
27	7/29/2017	9528	9685	40	Marcellus
28	7/29/2017	9335	9492	40	Marcellus
29	7/30/2017	9142	9299	40	Marcellus
30	7/30/2017	8949	9106	40	Marcellus
31	7/30/2017	8756	8913	40	Marcellus
32	7/31/2017	8563	8720	40	Marcellus
33	7/31/2017	8370	8527	40	Marcellus
34	7/31/2017	8177	8334	40	Marcellus
35	7/31/2017	7984	8141	40	Marcellus
36	7/31/2017	7791	7948	40	Marcellus
37	8/1/2017	7598	7755	40	Marcellus
38	8/1/2017	7405	7562	40	Marcellus

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PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number Of Perforations	Formation(s)
39	8/1/2017	7212	7369	40	Marcellus
40	8/1/2017	7019	7176	40	Marcellus
41	8/1/2017	6826	6983	40	Marcellus
42	8/2/2017	6633	6790	40	Marcellus

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API 47-085-10111FH6A Farm name COKELEY, LAWRENCE & ANGELA Well number PEN20DHS-1-1 Structure Office of Oil and Gas

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STIMULATION INFORMATION PER STAGE

Stage No.	Stimulations Date	Avg Pump Rate (BPM)	Avg Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	WV Department of Environmental Protection	Amount of	Amount of Nitrogen / other (gals)
						Amount of Proppant (lbs)	Amount of Water (bbls)	
1	7/22/2017	81.8	7904	6759	3085	399750	9582	4549
2	7/23/2017	86.0	7487	4910	3636	403275	8914	4497
3	7/23/2017	88.4	7755	5242	3780	402879	7161	4336
4	7/23/2017	87.1	7651	5804	3761	400502	7145	4297
5	7/23/2017	87.0	7552	5914	3952	401350	7637	4320
6	7/24/2017	87.4	7587	7587	3923	400870	8126	4327
7	7/24/2017	88.8	7668	6176	3918	402312	7087	4256
8	7/24/2017	92.1	7844	5852	3965	402007	7017	4241
9	7/24/2017	87.7	7523	5140	3930	401848	7448	4277
10	7/25/2017	89.4	7210	4470	3942	400750	7395	4267
11	7/25/2017	89.3	7327	5797	3739	401233	7048	4253
12	7/25/2017	92.5	7707	6025	4269	402134	6769	4244
13	7/25/2017	88.9	7506	6207	4389	400776	7147	4213
14	7/26/2017	92.1	7060	6392	4256	400729	7287	4232
15	7/26/2017	93.4	7703	6712	3929	400962	6566	4243
16	7/26/2017	89.1	7499	3550	4007	400748	7426	4242
17	7/27/2017	88.0	7345	4871	3913	400367	7415	4233
18	7/27/2017	89.5	7371	6089	4286	399967	6706	4240
19	7/27/2017	91.3	7529	5652	4160	400025	6499	4216
20	7/27/2017	90.0	7505	4599	4241	400946	7333	4240
21	7/28/2017	90.0	7307	3037	4182	400386	7141	4231
22	7/28/2017	94.0	7558	6430	3887	400214	6306	4209
23	7/28/2017	80.3	6490	5600		403665	6412	4230
24	7/29/2017	87.4	7445	4969	4014	400673	7167	4239
25	7/29/2017	92.9	7298	6315	4144	399995	6938	4226
26	7/29/2017	91.3	7889	5650	3893	400007	5889	4199
27	7/29/2017	91.6	7332	4048	4071	363634	6601	4167
28	7/30/2017	92.0	6767	5195	4486	399872	7217	4246
29	7/30/2017	91.7	7119	3809	3957	400003	7129	4230
30	7/30/2017	94.7	6920	6076	4143	400602	5809	3202
31	7/30/2017	92.8	6550	5360	4402	403193	7334	4619
32	7/31/2017	90.4	7284	5333	4044	400670	6697	3187
33	7/31/2017	94.9	7298	5746	3771	400564	5848	4050
34	7/31/2017	94.1	7371	5986	3772	400627	5879	3291
35	7/31/2017	94.2	7123	5368	3753	400746	5855	3272
36	7/31/2017	93.1	7200	6537	3740	399974	5934	3195
37	8/1/2017	92.9	6926	6902	3721	400468	5787	3198
38	8/1/2017	94.4	6679	7008	4174	401051	5739	3267

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STIMULATION INFORMATION PER STAGE

Stage No.	Stimulations Date	Avg Pump Rate (BPM)	Avg Treatment Pressure (PSI)	Max Breakdown		Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of
				Pressure (PSI)	ISIP (PSI)			Nitrogen / other (gals)
39	8/1/2017	94.0	6384	4975	4082	400171	5585	3371
40	8/1/2017	91.5	7318	6010		368969	5577	3186
41	8/2/2017	89.5	6607	5950	3821	402224	5809	3225
42	8/2/2017	92.2	6543	6508	3913	399788	5840	3172

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PRODUCING FORMATION(S)	DEPTHS		
<u>MARCELLUS</u>	<u>6252'</u>	<u>TVD</u>	<u>14852'</u> MD

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump
 SHUT-IN PRESSURE Surface 734 psi Bottom Hole 2632 psi DURATION OF TEST .5 hrs
 OPEN FLOW Gas 4228.81 mcfpd Oil 72 bpd NGL N/A bpd Water 336 bpd GAS MEASURED BY Estimated Orifice Pilot

LITHOLOGY / FORMATION	TOP DEPTH IN FT TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY TYPE OF FLUID (FRESHWATER, BRINE, GAS, H2S, ETC)

SEE ATTACHED
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Please insert additional pages as applicable.

Drilling Contractor Nomac 78 Drilling
 Address 171 Locust Ave. Ext. City Mt. Morris State PA Zip 15349
 Logging Company Baker Hughes
 Address 400 Technology Drive City Canonsburg State PA Zip 15317
 Cementing Company Schlumberger
 Address 4600 J. Barry Ct., Suite 200 City Canonsburg State PA Zip 15317
 Stimulating Company U.S. Well Service
 Address 533 Industrial Park Drive City Jane Lew State WV Zip 26378

Please insert additional pages as applicable.

Completed by CNX Gas/WV Operations Company, LLC - Drilling and Completions Telephone 304-884-2000
 Signature [Signature] Title Adam Shutler - Completions Superintendent-Gas WV Date 12/24/17

API 47-085-10111FH6A Farm name COKELEY, LAWRENCE & ANGELA Well number PEN20DHS - 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				

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NOBLE ENERGY



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

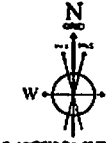
Slot: Slot D
 Well: PEN-20D-HS
 Wellbore: PEN-20D-HS PWB

Scale 1 inch = 1000 ft



Gyrodota MS Gyro <17-1/2> (100'-4042') : 0.28° Inc, 100.00R MD, 100.00R TVD, 0.05R VS

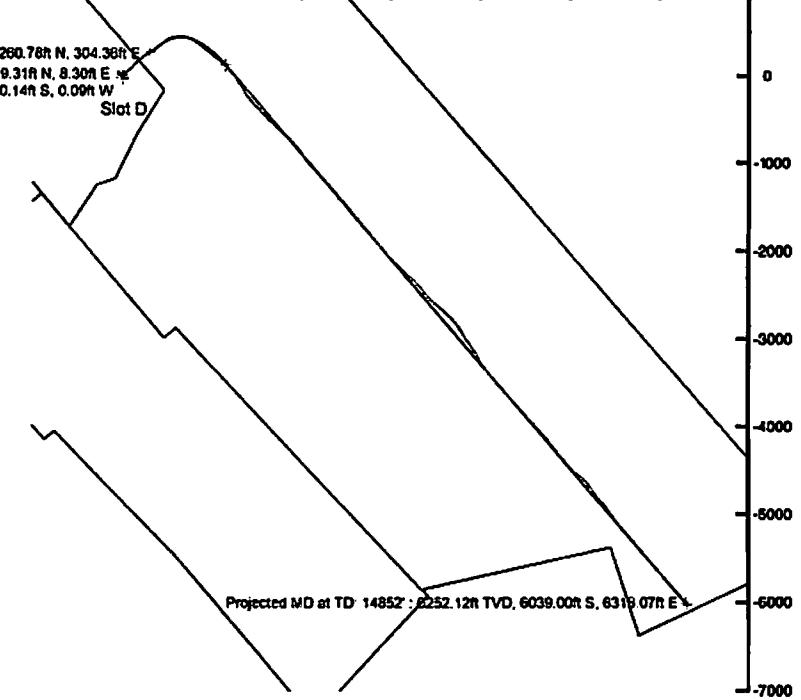
BHI wellbore wellbore in PEN-20D-HS PWB Slot D		Grid System: NAD83 (Lambert West Virginia SP, National Zone 4201) US feet		
True vertical depth and orientation to Nomac 78 (R2B)		Mud Reference: Grid north		
Measured depth are referenced to Nomac 78 (R2B)		Scale: True vertical		
Minimum 78 (R2B) to Mean Sea Level is 1029 feet		Datum: Mean Sea Level		
Mean Sea Level to Slot true (At Slot, Slot D) -1029 feet		Created by: jgibson on 05/20/15		
Description see in well information to East				
Location Information				
Facility Name	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
PEN-20 Pad	195205 000	302375 500	39°19'41.134"N	81°07'35.300"W
Slot	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)
Slot D	-40.82	44.01	1948249 810	302334 700
Nomac 78 (R2B) to Slot true (At Slot, Slot D)		200		
Mean Sea Level to Slot true (At Slot, Slot D)		-1029R		
Nomac 78 (R2B) to Mean Sea Level		1229R		



Use specified MAGD10 Dip: 65.78°; Prol. 03100 at Magnetic North is 7.53 degrees West of True North (at 12/16/2014). 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 8.58 degrees.

True Vertical Depth (ft)

Scale 1 inch = 2000 ft
 Easting (ft)



BHI AT Curve <8-3/4> (5208)(5354'-14825') : 5282.71R TVD, 260.78R N, 304.38R E
 Scientific EM <12-1/4> (4042)(4166'-5208') : 4165.92R TVD, 9.31R N, 8.30R E
 Gyrodota MS Gyro <17-1/2> (100'-4042') : 100.00R TVD, 0.14R S, 0.00R W

API: 47-085-10111-0000
 Rig: Nomac 78
 BHI Job #: 6697359
 Duration: 12/20/2014 – 12/28/2014

Scientific EM <12-1/4> (4042)(4166'-5208') : 1.99° Inc, 4166.00R MD, 4165.92R TVD, -1.79R VS

BHI AT Curve <8-3/4> (5208)(5354'-14825') : 21.68° Inc, 5354.00R MD, 5282.71R TVD, -4.13R VS

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Projected MD at TD 14852' : 88.60° Inc, 14852.00R MD, 6252.12R TVD, 8697.32R VS

Vertical Section (ft)
 Azimuth 140.00° with reference 0.00 N, 0.00 E

Scale 1 inch = 1000 ft



Actual Wellpath Report
 PEN-20D-HIS AWP Proj: 14852'
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REFERENCE WELLPATH IDENTIFICATION	
Operator	NOBLE ENERGY
Area	Richie County, WV
Field	Richie
Facility	PEN-20 Pad
Slot	Slot D
Well	PEN-20D-HIS
Wellbore	PEN-20D-HIS AWB

REPORT SETUP INFORMATION	
Projection System	NAD27 / Lambert West Virginia SP, Northern Zone (4701), US feet
North Reference	Grid
Scale	0.999954
Convergence at slot	0.97° West
Software System	WellArchiect® 4.0.1
User	Gotfral
Report Generated	1/5/2015 at 9:48:25 AM
Database/Source file	WANorthEast/PEN-20D-HIS_AWB.xml

WELLPATH LOCATION						
	Local coordinates		Grid coordinates		Geographic coordinates	
	North [ft]	East [ft]	Easting [US ft]	Northing [US ft]	Latitude	Longitude
Slot Location	-40.82	44.01	1568249.81	305234.76	39°19'40.728"N	81°01'34.738"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
Horizontal Reference Pt	Slot
Vertical Reference Pt	Nomac 78 (RKB)
MD Reference Pt	Nomac 78 (RKB)
Field Vertical Reference	Mean Sea Level
	Nomac 78 (RKB) to Facility Vertical Datum
	Nomac 78 (RKB) to Mean Sea Level
	Nomac 78 (RKB) to Mud Line at Slot (Slot D)
	Section Origin
	Section Azimuth
	1055.00ft
	1055.00ft
	26.00ft
	N 0.00, E 0.00 ft
	140.00°

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Actual Wellpath Report
PEN-20D-HS AWP Proj: 14852



REFERENCE WELLPATH IDENTIFICATION

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

WELLPATH DATA (157 stations) + = interpolated/extrapolated station

MID	Inclination	Azimuth	TVD	Vert Sect	North	East	Grid East	Grid North	Latitude	Longitude	Close Dist	Close Dir	DLS
[ft]	[°]	[°]	[ft]	[ft]	[ft]	[ft]	[US ft]	[US ft]			[ft]	[°]	[ft/100ft]
2800.00	0.000	212.580	26.00	0.00	0.00	0.00	1568249.81	305234.76	39°19'40.728"N	81°01'34.738"W	0.00	0.000	0.00
2700.00	0.000	212.580	100.00	0.05	-0.14	-0.09	1568249.72	305234.62	39°19'40.727"N	81°01'34.739"W	0.17	212.580	0.35
2600.00	0.390	241.180	200.00	0.05	-0.50	-0.51	1568249.20	305234.26	39°19'40.723"N	81°01'34.744"W	0.71	225.798	0.20
2500.00	0.220	45.400	300.00	-0.03	-0.53	-0.67	1568249.14	305234.23	39°19'40.723"N	81°01'34.746"W	0.85	231.959	0.60
2400.00	0.120	62.780	400.00	-0.02	-0.34	-0.44	1568249.37	305234.42	39°19'40.724"N	81°01'34.743"W	0.56	232.192	0.11
2300.00	0.260	56.780	600.00	0.11	0.07	0.25	1568250.06	305234.83	39°19'40.729"N	81°01'34.734"W	0.26	74.579	0.02
2200.00	0.270	60.590	800.00	0.18	0.31	0.64	1568250.45	305235.07	39°19'40.731"N	81°01'34.729"W	0.71	64.556	0.02
2100.00	0.360	54.360	799.99	0.24	0.61	1.10	1568250.91	305235.37	39°19'40.734"N	81°01'34.724"W	1.26	61.167	0.10
2000.00	0.320	79.300	899.99	0.40	0.84	1.63	1568251.44	305235.60	39°19'40.737"N	81°01'34.717"W	1.84	62.717	0.15
1900.00	0.290	100.060	999.99	0.73	0.85	2.16	1568251.97	305235.61	39°19'40.737"N	81°01'34.710"W	2.32	68.944	0.11
1800.00	0.180	317.950	1099.99	0.88	0.94	2.49	1568252.30	305235.70	39°19'40.738"N	81°01'34.706"W	2.66	69.333	0.28
1700.00	0.470	33.080	1199.99	0.71	1.42	2.79	1568252.60	305236.18	39°19'40.742"N	81°01'34.702"W	3.13	63.141	0.29
1600.00	0.490	86.170	1299.98	0.85	1.79	3.45	1568253.26	305236.55	39°19'40.746"N	81°01'34.694"W	3.88	62.578	0.43
1500.00	0.280	76.350	1399.98	1.21	1.87	4.11	1568253.92	305236.63	39°19'40.747"N	81°01'34.686"W	4.52	65.488	0.22
1400.00	0.310	357.390	1499.98	1.10	2.20	4.33	1568254.14	305236.96	39°19'40.750"N	81°01'34.683"W	4.86	63.072	0.38
1300.00	0.380	345.510	1599.98	0.59	2.79	4.24	1568254.05	305237.55	39°19'40.756"N	81°01'34.684"W	5.08	56.621	0.10
1200.00	0.460	356.280	1699.98	-0.04	3.51	4.13	1568253.94	305238.27	39°19'40.763"N	81°01'34.686"W	5.42	49.603	0.11
1100.00	0.280	343.260	1899.97	-1.19	4.90	3.98	1568253.79	305239.66	39°19'40.777"N	81°01'34.688"W	6.31	39.085	0.17
1000.00	0.090	303.910	1999.97	-1.49	5.18	3.84	1568253.65	305239.94	39°19'40.780"N	81°01'34.690"W	6.45	36.592	0.22
900.00	0.130	293.300	2099.97	-1.67	5.26	3.67	1568253.48	305240.02	39°19'40.781"N	81°01'34.692"W	6.42	34.906	0.04
800.00	0.120	212.890	2199.97	-1.74	5.22	3.51	1568253.32	305239.98	39°19'40.780"N	81°01'34.694"W	6.29	33.927	0.16
700.00	0.130	197.860	2299.97	-1.65	5.03	3.42	1568253.23	305239.78	39°19'40.778"N	81°01'34.695"W	6.08	34.241	0.05
600.00	0.180	289.700	2399.97	-1.73	4.97	3.24	1568253.05	305239.73	39°19'40.778"N	81°01'34.697"W	5.93	33.081	0.23
500.00	0.230	260.250	2499.97	-1.96	4.99	2.89	1568252.70	305239.75	39°19'40.778"N	81°01'34.702"W	5.77	30.099	0.11
400.00	0.190	300.750	2599.97	-2.22	5.04	2.55	1568252.36	305239.80	39°19'40.778"N	81°01'34.706"W	5.65	26.853	0.15
300.00	0.180	338.810	2699.97	-2.53	5.27	2.35	1568252.16	305240.03	39°19'40.780"N	81°01'34.709"W	5.77	24.051	0.12
200.00	0.180	288.460	2799.97	-2.81	5.47	2.15	1568251.96	305240.23	39°19'40.782"N	81°01'34.711"W	5.87	21.437	0.13

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Actual Wellpath Report

PEN-20D-HIS AWP Proj: 14852'
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REFERENCE WELLPATH IDENTIFICATION		Slot	Slot D
Operator	NOBLE ENERGY	Well	PEN-20D-HIS
Area	Ritchie County, WV	Wellbore	PEN-20D-HIS AWB
Field	Ritchie		
Facility	PEN-20 Pad		

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Chasre Dist [ft]	Chasre Dir [°]	DLS [1/1000]
2900.00	0.140	330.240	2899.97	-3.06	5.62	1.94	1568251.75	305240.38	39°19'40.784"N	81°01'34.714"W	5.95	19.007	0.12
3000.00	0.250	319.510	2999.97	-3.40	5.90	1.73	1568251.54	305240.65	39°19'40.787"N	81°01'34.717"W	6.15	16.397	0.12
3100.00	0.270	48.680	3099.97	-3.62	6.22	1.77	1568251.58	305240.98	39°19'40.790"N	81°01'34.716"W	6.46	15.893	0.37
3200.00	0.230	24.330	3199.97	-3.72	6.56	2.03	1568251.84	305241.31	39°19'40.793"N	81°01'34.713"W	6.86	17.204	0.11
3300.00	0.280	73.940	3299.96	-3.70	6.81	2.35	1568252.16	305241.57	39°19'40.796"N	81°01'34.709"W	7.20	19.029	0.22
3400.00	0.340	110.450	3399.96	-3.35	6.77	2.86	1568252.67	305241.53	39°19'40.795"N	81°01'34.703"W	7.35	22.903	0.20
3500.00	0.390	107.950	3499.96	-2.80	6.56	3.46	1568253.27	305241.32	39°19'40.793"N	81°01'34.695"W	7.42	27.818	0.05
3600.00	0.390	101.770	3599.96	-2.24	6.39	4.12	1568253.93	305241.12	39°19'40.792"N	81°01'34.687"W	7.60	32.818	0.04
3700.00	0.340	60.740	3699.96	-1.92	6.46	4.71	1568254.52	305241.22	39°19'40.793"N	81°01'34.679"W	8.00	36.091	0.26
3800.00	0.370	47.350	3799.96	-1.88	6.80	5.17	1568254.98	305241.56	39°19'40.796"N	81°01'34.673"W	8.54	37.287	0.08
3900.00	0.440	65.250	3899.95	-1.79	7.15	5.73	1568255.54	305241.91	39°19'40.800"N	81°01'34.666"W	9.16	38.718	0.17
4000.00	0.360	41.690	3999.95	-1.74	7.54	6.29	1568256.10	305242.30	39°19'40.804"N	81°01'34.659"W	9.82	39.814	0.18
4042.00	0.290	31.690	4041.95	-1.79	7.73	6.43	1568256.24	305242.49	39°19'40.805"N	81°01'34.657"W	10.06	39.753	0.21
4106.00	1.990	52.540	4165.92	-1.79	9.31	8.30	1568258.11	305244.07	39°19'40.821"N	81°01'34.634"W	12.47	41.740	1.39
4261.00	7.270	53.930	4260.58	-1.31	13.85	14.48	1568264.29	305248.61	39°19'40.867"N	81°01'34.556"W	20.04	46.261	5.56
4356.00	14.340	50.990	4353.84	-0.69	24.81	28.49	1568278.30	305259.57	39°19'40.978"N	81°01'34.380"W	37.78	48.953	7.46
4450.00	21.990	52.060	4443.08	0.14	42.99	51.45	1568301.26	305277.74	39°19'41.161"N	81°01'34.092"W	67.05	50.124	8.15
4545.00	21.880	49.250	4531.42	0.56	65.12	78.48	1568328.29	305299.88	39°19'41.385"N	81°01'33.753"W	101.98	50.314	1.38
4640.00	20.720	45.790	4620.15	-0.90	88.05	103.53	1568353.34	305322.80	39°19'41.615"N	81°01'33.439"W	135.91	49.621	1.39
4735.00	21.190	42.410	4708.87	-4.40	112.44	127.16	1568376.96	305347.20	39°19'41.861"N	81°01'33.144"W	169.74	48.514	1.37
4830.00	20.620	42.560	4797.61	-8.83	137.44	150.05	1568399.85	305372.19	39°19'42.111"N	81°01'32.858"W	203.48	47.512	0.60
4925.00	21.610	45.890	4886.24	-12.25	161.94	173.93	1568423.71	305396.69	39°19'42.357"N	81°01'32.560"W	237.65	47.044	1.64
5020.00	22.750	50.880	4974.21	-13.23	185.71	200.74	1568450.54	305420.46	39°19'42.597"N	81°01'32.224"W	273.47	47.228	2.32
5114.00	22.820	53.810	5069.88	-11.74	207.94	229.56	1568479.36	305442.69	39°19'42.821"N	81°01'31.862"W	309.73	47.823	1.21
5208.00	22.760	56.520	5147.51	-8.46	228.74	259.43	1568509.23	305463.48	39°19'43.052"N	81°01'31.486"W	345.87	48.598	1.12
5354.00	21.680	52.390	5282.71	-4.13	260.78	304.36	1568534.15	305495.52	39°19'43.356"N	81°01'30.921"W	400.80	49.410	1.30
5449.00	26.090	57.950	5369.56	-0.51	282.58	335.98	1568558.78	305517.33	39°19'43.577"N	81°01'30.524"W	439.02	49.914	5.21
5544.00	27.120	55.640	5454.50	4.51	305.89	371.57	1568621.36	305540.64	39°19'43.813"N	81°01'30.076"W	481.28	50.537	1.54
5639.00	29.710	54.720	5538.05	8.58	331.71	408.67	1568658.46	305566.46	39°19'44.075"N	81°01'29.610"W	526.35	50.934	2.76
5733.00	31.690	55.840	5618.88	13.01	359.03	448.12	1568697.90	305593.78	39°19'44.351"N	81°01'29.113"W	574.21	51.298	2.19

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REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY
Area	Richie County, WV
Field	Richie
Facility	PEN-20 Pad

MD	Inchation	Azimuth	TVD	Vert Seet	North	East	Grid East	Grid East	Grid North	Latitude	Longitude	Closure Dir	Closure Dir	DLS
[ft]	[ft]	[°]	[ft]	[ft]	[ft]	[ft]	[US ft]	[US ft]	[US ft]			[ft]	[ft]	
5828.00	33.960	5698.74	12.73	384.91	492.53	1568782.32	305619.65	305619.65	305639.50	30°19'44.614"N	81°01'28.554"W	625.09	53.992	118.578
5923.00	39.950	74.890	5774.71	40.79	404.76	1568795.61	305639.50	305639.50	305639.50	30°19'44.819"N	81°01'27.880"W	679.52	53.441	115.241
6018.00	40.750	77.110	5847.11	67.76	419.62	1568855.28	305654.36	305654.36	305654.36	30°19'44.976"N	81°01'27.124"W	736.69	55.277	113.931
6113.00	43.320	88.940	5917.78	102.43	427.16	1568918.20	305661.90	305661.90	305661.90	30°19'45.061"N	81°01'26.325"W	793.25	57.419	112.667
6211.00	46.470	109.630	5987.57	154.50	415.78	1568985.65	305650.52	305650.52	305650.52	30°19'44.660"N	81°01'25.464"W	845.21	60.533	112.448
6306.00	51.390	125.210	6050.18	220.37	382.67	1569048.67	305617.42	305617.42	305617.42	30°19'44.644"N	81°01'24.655"W	885.82	64.405	112.210
6397.00	54.010	127.870	6105.33	290.76	339.56	1569106.79	305574.31	305574.31	305574.31	30°19'44.227"N	81°01'23.906"W	921.84	68.386	112.000
6491.00	60.570	127.720	6156.09	368.03	291.12	1569169.26	305525.87	305525.87	305525.87	30°19'43.759"N	81°01'23.101"W	964.48	72.432	111.787
6586.00	70.580	129.190	6221.11	452.52	237.94	1569237.33	305472.69	305472.69	305472.69	30°19'43.245"N	81°01'22.223"W	1015.83	76.454	111.574
6681.00	77.910	129.190	6271.11	542.13	180.78	1569308.61	305415.53	305415.53	305415.53	30°19'42.692"N	81°01'21.304"W	1074.17	80.311	111.361
6776.00	86.330	131.320	6234.12	634.79	120.01	1569380.34	305354.77	305354.77	305354.77	30°19'42.104"N	81°01'20.378"W	1136.94	83.941	111.148
6871.00	89.570	138.220	6237.52	729.26	1197.93	1569444.88	305287.96	305287.96	305287.96	30°19'41.455"N	81°01'19.507"W	1199.11	87.457	110.935
6966.00	89.540	144.840	6238.26	824.17	-21.14	1569506.75	305215.62	305215.62	305215.62	30°19'40.730"N	81°01'18.739"W	1257.17	90.963	110.722
7062.00	148.370	6239.01	6239.01	-101.27	1309.83	1569559.57	305131.49	305131.49	305131.49	30°19'39.942"N	81°01'18.050"W	1313.73	94.421	110.509
7157.00	150.020	6238.60	6238.60	-182.86	1358.47	1569608.22	305051.90	305051.90	305051.90	30°19'39.149"N	81°01'17.413"W	1370.73	97.666	110.296
7255.00	143.390	6236.07	6236.07	-264.70	1412.22	1569661.96	304970.07	304970.07	304970.07	30°19'38.349"N	81°01'16.712"W	1436.81	100.616	110.083
7349.00	136.730	6234.76	6234.76	-336.72	1472.52	1569722.26	304898.05	304898.05	304898.05	30°19'37.647"N	81°01'15.929"W	1510.53	102.880	109.870
7445.00	130.270	6235.79	6235.79	-406.35	1538.60	1569788.34	304828.43	304828.43	304828.43	30°19'36.970"N	81°01'15.073"W	1591.36	104.794	109.657
7540.00	135.890	6237.17	6237.17	-474.78	1604.49	1569854.23	304760.01	304760.01	304760.01	30°19'36.305"N	81°01'14.220"W	1673.26	106.484	109.444
7635.00	134.120	6238.52	6238.52	-541.95	1671.65	1569921.38	304692.84	304692.84	304692.84	30°19'35.652"N	81°01'13.351"W	1757.31	107.963	109.231
7731.00	134.310	6239.88	6239.88	-608.89	1740.45	1569990.18	304625.90	304625.90	304625.90	30°19'35.002"N	81°01'12.462"W	1843.88	109.282	109.018
7826.00	133.130	6241.34	6241.34	-674.53	1809.10	1570058.82	304560.26	304560.26	304560.26	30°19'34.365"N	81°01'11.574"W	1930.76	110.448	108.805
7922.00	135.200	6242.88	6242.88	-741.41	1877.95	1570127.67	304493.39	304493.39	304493.39	30°19'33.716"N	81°01'10.684"W	2019.01	111.544	108.592
8017.00	139.380	6243.92	6243.92	-811.19	1942.37	1570192.09	304423.60	304423.60	304423.60	30°19'33.037"N	81°01'09.849"W	2104.96	112.667	108.379
8113.00	147.430	1965.69	6245.16	-888.20	1999.55	1570249.26	304346.60	304346.60	304346.60	30°19'32.286"N	81°01'09.105"W	2187.94	113.951	108.166
8208.00	145.520	2060.07	6245.88	-967.39	2052.01	1570301.72	304267.42	304267.42	304267.42	30°19'31.512"N	81°01'08.420"W	2268.61	115.241	107.953
8304.00	136.570	2155.96	6245.64	-1041.96	2112.31	1570362.02	304192.85	304192.85	304192.85	30°19'30.785"N	81°01'07.637"W	2355.32	116.256	107.740
8400.00	137.210	2251.81	6245.21	-1112.05	2177.91	1570427.62	304122.77	304122.77	304122.77	30°19'30.103"N	81°01'06.787"W	2445.39	117.049	107.527
8495.00	139.140	2346.76	6244.37	-1182.83	2241.26	1570490.96	304051.98	304051.98	304051.98	30°19'29.414"N	81°01'05.966"W	2534.23	117.833	107.314
8591.00	138.730	2442.74	6244.11	-1255.21	2304.32	1570554.02	303979.61	303979.61	303979.61	30°19'28.710"N	81°01'05.148"W	2624.02	118.578	107.101

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REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY
Area	Richie County, WV
Field	Richie
Facility	PCN-20 Pad

WELLPATH DATA (157 stations)

ID	Inclination	Azimuth	TVD	Ven Sect	North	East	Grid East	Grid North	Latitude	Longitude	Closure Dist	Closure Dir	DLS
8866.00	89.880	6244.33	2537.71	-1326.51	2267.10	2302.10	1570616.80	303908.31	39°1928.015°N	81°0104.334°W	2713.45	119.266	0.20
8782.00	89.699	6244.69	2633.69	-1398.69	2430.39	1570680.09	303836.13	303764.13	39°1927.313°N	81°0103.514°W	2804.13	119.920	0.49
8877.00	89.609	6245.28	2728.68	-1470.70	2492.36	1570742.05	303764.13	303764.13	39°1926.611°N	81°0102.710°W	2893.93	120.544	0.67
8972.00	89.669	6245.89	2823.67	-1542.83	2554.18	1570803.86	303692.00	303692.00	39°1925.909°N	81°0101.908°W	2983.98	121.134	0.42
9068.00	89.540	6246.57	2919.67	-1615.99	2616.53	1570866.01	303618.85	303618.85	39°1925.196°N	81°0101.101°W	3025.16	121.702	0.93
9163.00	89.910	6247.02	3014.66	-1689.48	2676.53	1570926.21	303545.36	303545.36	39°1924.480°N	81°0100.319°W	3165.15	122.261	1.29
9259.00	90.150	6246.97	3110.61	-1764.78	2736.07	1570985.75	303470.06	303470.06	39°1923.746°N	81°0059.546°W	3255.85	122.822	0.89
9354.00	90.220	6246.66	3205.56	-1839.55	2794.67	1571044.35	303395.29	303395.29	39°1923.017°N	81°0058.784°W	3345.77	123.354	0.37
9450.00	90.180	6246.33	3301.51	-1915.10	2853.90	1571103.58	303319.75	303319.75	39°1922.280°N	81°0058.014°W	3436.91	123.863	0.35
9546.00	90.090	6246.10	3397.48	-1990.10	2913.83	1571163.50	303244.75	303244.75	39°1921.549°N	81°0057.236°W	3528.58	124.333	1.45
9642.00	89.720	6246.26	3493.43	-2062.23	2977.15	1571226.82	303172.63	303172.63	39°1920.847°N	81°0056.415°W	3621.63	124.710	4.10
9737.00	89.570	6246.85	3588.09	-2129.67	3044.04	1571293.70	303105.19	303105.19	39°1920.191°N	81°0055.549°W	3715.06	124.977	3.21
9833.00	89.450	6247.57	3683.53	-2196.16	3113.28	1571362.95	303038.71	303038.71	39°1919.546°N	81°0054.654°W	3809.94	125.200	0.26
9928.00	89.820	6248.08	3778.06	-2262.48	3181.30	1571430.96	302972.39	302972.39	39°1918.902°N	81°0053.774°W	3903.78	125.420	0.71
10023.00	90.120	6248.13	3872.64	-2329.23	3248.89	1571498.55	302905.64	302905.64	39°1918.253°N	81°0052.900°W	3997.58	125.638	0.34
10118.00	90.030	6248.00	3967.48	-2398.48	3313.90	1571563.55	302836.39	302836.39	39°1917.580°N	81°0052.058°W	4090.80	125.896	4.44
10214.00	89.450	6248.44	4063.46	-2472.59	3374.90	1571624.55	302762.29	302762.29	39°1916.858°N	81°0051.266°W	4183.74	126.228	3.43
10310.00	89.350	6249.44	4159.40	-2545.30	3437.51	1571687.16	302689.58	302689.58	39°1916.150°N	81°0050.454°W	4277.27	126.518	6.02
10405.00	89.290	6250.57	4253.66	-2610.20	3506.81	1571756.45	302624.69	302624.69	39°1915.520°N	81°0049.559°W	4371.69	126.661	6.86
10501.00	89.880	6251.27	4348.48	-2673.21	3579.22	1571828.86	302561.68	302561.68	39°1914.909°N	81°0048.624°W	4467.31	126.755	2.51
10597.00	91.050	6250.49	4443.63	-2737.97	3650.09	1571899.22	302496.93	302496.93	39°1914.281°N	81°0047.708°W	4562.85	126.874	1.30
10692.00	90.030	6249.59	4538.41	-2807.40	3714.79	1571964.42	302427.50	302427.50	39°1913.606°N	81°0046.870°W	4656.30	127.080	9.28
10788.00	90.220	6249.38	4634.05	-2885.62	3770.35	1572019.98	302349.28	302349.28	39°1912.842°N	81°0046.147°W	4747.88	127.428	6.69
10883.00	89.820	6249.35	4728.15	-2966.06	3820.89	1572070.51	302268.84	302268.84	39°1912.055°N	81°0045.487°W	4837.01	127.821	0.43
10979.00	89.660	6249.79	4823.47	-3046.37	3873.48	1572123.10	302188.54	302188.54	39°1911.270°N	81°0044.800°W	4927.90	128.184	2.36
11074.00	89.600	6250.40	4918.00	-3124.87	3926.98	1572176.60	302110.04	302110.04	39°1910.504°N	81°0044.103°W	5018.56	128.511	0.17
11169.00	89.510	6251.14	5011.66	-3206.59	3975.29	1572224.91	302028.33	302028.33	39°1909.704°N	81°0043.471°W	5107.36	128.891	7.59
11265.00	92.650	6249.33	5106.06	-3289.86	4022.92	1572272.54	301945.06	301945.06	39°1908.889°N	81°0042.847°W	5196.84	129.276	6.65
11361.00	90.180	6246.96	5201.58	-3344.75	4077.37	1572326.99	301866.06	301866.06	39°1908.117°N	81°0042.137°W	5289.06	129.565	4.94
11456.00	90.090	6246.73	5296.45	-3444.75	4134.51	1572384.12	301790.17	301790.17	39°1907.377°N	81°0041.394°W	5381.50	129.800	0.80

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Actual Wellpath Report
 PEN-20D-HS AWP Proj: 14852
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REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY
Area	Richie County, WV
Field	Richie
Facility	PEN-20 Pad

WELLPATH DATA (157 stations)		MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vent Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°(from)]	DLS
1552.00	89.880	140.380	5392.41	-3519.89	4194.25	172744.86	157423.86	4256.32	157250.93	301643.13	39°19'05.44"N	81°00'40.61"W	5475.52	130.004	2.37
1167.00	89.970	138.020	5487.39	-3591.80	4256.32	172505.93	157505.93	4256.32	157505.93	301643.13	39°19'05.44"N	81°00'39.81"W	5569.32	130.160	2.49
11743.00	89.820	137.080	6247.06	-3662.64	4321.11	1572570.72	1572570.72	4321.11	1572570.72	301572.30	39°19'05.55"N	81°00'38.97"W	5664.53	130.285	0.99
11839.00	89.630	137.560	6247.52	-3733.21	4386.19	1572635.79	1572635.79	4386.19	1572635.79	301501.73	39°19'04.56"N	81°00'38.13"W	5759.82	130.402	0.54
11934.00	89.510	138.870	5774.14	-3804.04	4449.49	1572699.09	1572699.09	4449.49	1572699.09	301430.90	39°19'03.87"N	81°00'37.31"W	5853.95	130.528	1.38
12030.00	89.660	140.650	5870.14	-3877.32	4511.50	1572761.10	1572761.10	4511.50	1572761.10	301357.63	39°19'03.16"N	81°00'36.50"W	5948.72	130.677	1.86
12121.00	89.690	137.030	6250.08	-4019.92	4638.51	1572888.10	1572888.10	4638.51	1572888.10	301215.03	39°19'01.77"N	81°00'34.85"W	6134.04	130.914	0.79
12216.00	89.660	139.600	6250.62	-4090.86	4701.68	1572951.27	1572951.27	4701.68	1572951.27	301144.09	39°19'01.08"N	81°00'34.04"W	6232.25	131.026	2.71
12412.00	90.000	139.280	6250.91	-4163.79	4764.10	1573013.69	1573013.69	4764.10	1573013.69	301071.16	39°19'00.37"N	81°00'33.23"W	6327.23	131.153	0.49
12508.00	89.820	144.410	6251.06	-4239.26	4823.39	1573072.97	1573072.97	4823.39	1573072.97	300995.70	39°18'59.64"N	81°00'32.46"W	6421.56	131.312	5.35
12604.00	90.220	142.210	6251.03	-4316.23	4880.75	1573120.32	1573120.32	4880.75	1573120.32	300918.73	39°18'58.88"N	81°00'31.71"W	6515.49	131.488	2.33
12700.00	90.430	141.060	6250.48	-4391.50	4940.33	1573189.90	1573189.90	4940.33	1573189.90	300843.47	39°18'58.15"N	81°00'30.94"W	6610.00	131.634	1.22
12795.00	90.250	137.480	6249.92	-4463.48	5002.31	1573251.88	1573251.88	5002.31	1573251.88	300771.49	39°18'57.54"N	81°00'30.13"W	6704.16	131.742	3.77
12891.00	90.460	128.140	6249.78	-4528.64	5072.65	1573322.22	1573322.22	5072.65	1573322.22	300706.33	39°18'56.82"N	81°00'29.22"W	6800.03	131.757	9.73
12986.00	90.030	132.560	6248.91	-4590.14	5145.03	1573390.60	1573390.60	5145.03	1573390.60	300644.84	39°18'56.26"N	81°00'28.29"W	6894.98	131.738	4.67
13082.00	90.180	146.760	6248.74	-4660.95	5209.67	1573459.23	1573459.23	5209.67	1573459.23	300574.03	39°18'54.78"N	81°00'27.45"W	6990.36	131.818	10.52
13177.00	90.520	146.760	6248.16	-4738.47	5264.54	1573514.10	1573514.10	5264.54	1573514.10	300496.51	39°18'54.78"N	81°00'26.74"W	7082.97	131.990	4.33
13273.00	90.340	137.280	6247.44	-4814.05	5323.55	1573573.10	1573573.10	5323.55	1573573.10	300420.94	39°18'54.04"N	81°00'25.97"W	7177.41	132.123	9.88
13368.00	91.720	140.900	6245.73	-4885.82	5385.74	1573635.29	1573635.29	5385.74	1573635.29	300349.17	39°18'53.44"N	81°00'25.16"W	7271.69	132.214	4.08
13463.00	90.310	147.290	6244.04	-4962.72	5441.41	1573690.96	1573690.96	5441.41	1573690.96	300272.28	39°18'52.59"N	81°00'24.44"W	7364.61	132.306	6.89
13559.00	89.880	145.900	6243.88	-5042.86	5494.26	1573743.81	1573743.81	5494.26	1573743.81	300192.14	39°18'51.81"N	81°00'23.75"W	7457.70	132.447	1.52
13655.00	89.880	139.610	6244.08	-5119.24	5552.34	1573801.88	1573801.88	5552.34	1573801.88	300115.76	39°18'51.06"N	81°00'22.99"W	7552.16	132.676	6.55
13750.00	89.380	138.860	6244.70	-5191.19	5614.37	1573863.91	1573863.91	5614.37	1573863.91	300043.82	39°18'50.364"N	81°00'22.195"W	7646.54	132.757	0.95
13845.00	89.380	141.900	6245.73	-5264.36	5674.94	1573924.47	1573924.47	5674.94	1573924.47	299970.65	39°18'49.651"N	81°00'21.409"W	7740.69	132.851	3.20
13940.00	89.600	140.600	6246.57	-5338.49	5734.34	1573983.87	1573983.87	5734.34	1573983.87	299896.53	39°18'48.928"N	81°00'20.637"W	7834.67	132.953	1.29
14036.00	89.690	140.160	6247.17	-5412.48	5795.50	1574045.03	1574045.03	5795.50	1574045.03	299822.54	39°18'48.207"N	81°00'19.844"W	7929.86	133.043	0.56
14131.00	90.090	141.400	6247.35	-5486.08	5855.56	1574105.09	1574105.09	5855.56	1574105.09	299748.94	39°18'47.490"N	81°00'19.064"W	8024.01	133.134	1.37
14227.00	90.000	139.830	6247.27	-5560.27	5916.48	1574166.00	1574166.00	5916.48	1574166.00	299674.75	39°18'46.766"N	81°00'18.273"W	8119.19	133.222	1.64
14323.00	90.030	141.250	6247.25	-5634.39	5977.49	1574227.01	1574227.01	5977.49	1574227.01	299600.64	39°18'46.044"N	81°00'17.481"W	8214.42	133.308	1.48

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Operator	Area	Field	Facility
NOBLE ENERGY	Richie County, WV	Richie	PEN-20 Pad
Slot	Well	Wellbore	
Slot D	PEN-20D-HIS	PEN-20D-HIS AWB	

WELLPATH DATA (157 stations)

MID [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 [1/100ft]
14419.00	89.630	139.150	6247.53	8254.44	-5708.14	6038.93	1574288.45	299526.89	39°18'45.325"N	81°00'16.684"W	8309.73	133.387	2.23
14514.00	89.630	138.660	6248.15	8349.42	-5779.57	6101.56	1574351.08	299455.47	39°18'44.630"N	81°00'15.872"W	8404.31	133.448	0.83
14610.00	89.570	139.060	6248.82	8445.39	-5851.70	6164.91	1574414.42	299383.34	39°18'43.928"N	81°00'15.051"W	8499.91	133.507	0.73
14705.00	89.380	140.600	6249.69	8540.38	-5924.29	6226.18	1574475.70	299310.76	39°18'43.220"N	81°00'14.256"W	8594.33	133.577	1.63
14801.00	88.950	141.710	6251.09	8636.35	-5999.05	6286.39	1574535.90	299236.00	39°18'42.497"N	81°00'13.474"W	8689.49	133.660	1.24
14825.00	88.800	141.540	6251.56	8660.34	-6017.86	6301.29	1574550.79	299217.19	39°18'42.308"N	81°00'13.280"W	8713.26	133.682	0.94
14852.00	88.800	141.540	6252.12	8687.32	-6039.00	6318.07	1574567.58	299196.05	39°18'42.102"N	81°00'13.062"W	8740.00	133.706	0.00

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PEN-20D-HS AWP Proj: 14852

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REFERENCE WELLPATH IDENTIFICATION

Operator	NOBLE ENERGY
Area	Richie County, WV
Field	Richie
Facility	PEN-20 Pad
Slot	Wellbore
Slot D	PEN-20D-HS

Name	MD [ft]	TD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
PEN-20D-HS LP Rev-3	6235.00	115.01	1151.50	6297.33	1574546.84	299217.48	39°19'42.058"N	81°07'20.111"W	point
PEN-20D-HS BH, Rev-3	6262.72	-6017.57	-1.09	1568248.72	305204.18	39°19'40.426"N	81°00'13.331"W	point	
PEN-20 ALT Vertices	6948.00	-30.58	-1.09	1568248.72	305204.18	39°19'40.426"N	81°01'34.745"W	polygon	
PEN-20 Cokely Tract 1	6948.00	-30.58	-1.09	1568248.72	305204.18	39°19'40.426"N	81°01'34.745"W	polygon	
PEN-20 Cokely Tract 2	6948.00	-30.58	-1.09	1568248.72	305204.18	39°19'40.426"N	81°01'34.745"W	polygon	
PEN-20 LL	6948.00	-30.58	-1.09	1568248.72	305204.18	39°19'40.426"N	81°01'34.745"W	polygon	
PEN-20 Parcel 3.12-1.2	6948.00	-30.58	-1.09	1568248.72	305204.18	39°19'40.426"N	81°01'34.745"W	polygon	

Start MID [ft]	End MID [ft]	Positional Uncertainty Model	Log Name/Comment
26.00	4042.00	Generic gyro - northseeking (Standard)	01 Gyrodina MS Gyro <17-1/2"> (100'-4042')
4042.00	5208.00	ISCVSA MWD, Rev. 2 (Standard)	02 Scientific EM1 <12-1/4"> (4042')(4166'-5208')
5208.00	14825.00	NavTrak (AT Curve Short Spaced)	03 BH1 AT Curve <8-3/4"> (5208')(5354'-14825')
14825.00	14852.00	Blind Drilling (std)	Projection to bit

WELLPATH COMPOSITION - Ref Wellbore: PEN-20D-HS AWP Proj: 14852

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Actual Wellpath Report
PEN-20D-IIS AWP Proj: 14852'
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REFERENCE WELLPATH IDENTIFICATION			
Operator	NOBLE ENERGY	Slot	Slot D
Area	Ritchie County, WV	Well	PEN-20D-IIS
Field	Ritchie	Wellbore	PEN-20D-IIS AWB
Facility	PEN-20 Pad		

COMMENTS

Wellpath general comments
API: 47-085-10111-0000
Rig: Nomac 78
BHH Job #: 6697359
Duration: 12/20/2014 - 12/28/2014
Gyrodatta MS Gyro <17-1/2"> (100'-4042')
Scientific EM <12-1/4"> (4042'x4166'-5208')
BHH AT Curve <8-3/4"> (5208'x5354'-14825')
Projected MD at TD: 14852'

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Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	7/22/2017
Job End Date:	8/2/2017
State:	West Virginia
County:	Ritchie
API Number:	47-085-10111-00-00
Operator Name:	CONSOL Energy Inc.
Well Name and Number:	PEN20DHS
Latitude:	39.32798000
Longitude:	-81.02632000
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,252
Total Base Water Volume (gal):	12,415,284
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	85.04463	None
Sand	JPP	Proppant					
			Crystalline Silica in the form of Quartz	14808-60-7	99.90000	13.59331	None
HCL Acid (7.5%)	JPP	Acidizing					
			Hydrochloric Acid	7647-01-0	7.50000	0.09533	None
Unislick CST	JPP	Friction Reducer					
			copolymer of 2-propenamide	Proprietary	30.00000	0.01434	None
			Petroleum Distillate	64742-47-8	20.00000	0.00956	None
			Alcohols, C12-16, ethoxylated	68551-12-2	2.00000	0.00096	None
			Oleic Acid Diethanolamide	93-83-4	2.00000	0.00096	None
			Ammonium chloride ((NH4)Cl)	12125-02-9	1.00000	0.00048	None
K-Bac 1020	JPP	Biocide					
			Polyethylene glycol	25322-68-3	50.00000	0.00834	None
			Water	7732-18-5	30.00000	0.00500	None
			2,2-Dibromo-3-nitropropionamide	10222-01-2	21.00000	0.00350	None
Scale-Hib A	JPP	Scale Inhibitor					

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			Ethylene Glycol	107-21-1	30.00000	0.00358	None
			Triethanolamine Tri(Phosphate Ester), Sodium Salt	68171-29-9	30.00000	0.00358	None
Unihib G	UPP	Acid inhibitor					
			Butyl diglycol	112-34-5	75.00000	0.00075	None
			Alcohols, C10-16, ethoxylated	68002-97-1	50.00000	0.00050	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
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					
			Petroleum Distillate	64742-47-8	20.00000	0.00956	
			Polyethylene glycol	25322-68-3	50.00000	0.00834	
			Water	7732-18-5	30.00000	0.00500	
			Ethylene Glycol	107-21-1	30.00000	0.00358	
			Oleic Acid Diethanolamide	93-83-4	2.00000	0.00096	
			Alcohols, C12-16, ethoxylated	68551-12-2	2.00000	0.00096	
			Alcohols, C10-16, ethoxylated	68002-97-1	50.00000	0.00050	
			Ammonium chloride ((NH4)Cl)	12125-02-9	1.00000	0.00048	
			Methanol	67-56-1	5.00000	0.00005	
			Thiourea	62-56-6	1.00000	0.00001	
			Formaldehyde	50-00-0	1.00000	0.00001	

* 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)

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BHL is located on topo map 7,853' feet south of Latitude: 39° 20' 00"
 SHL is located on topo map 1,922' feet south of Latitude: 39° 20' 00"

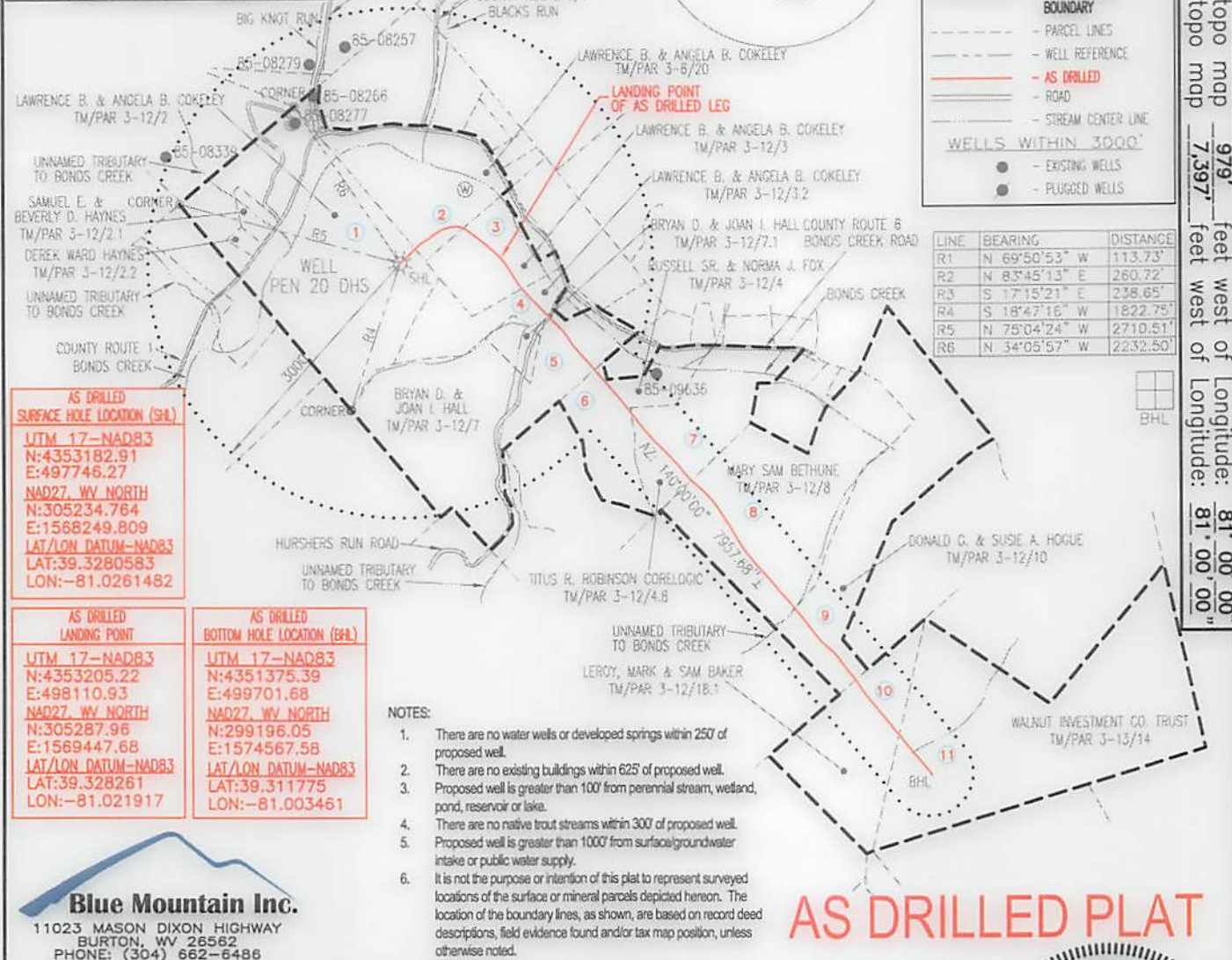
TRACT	LESSOR
1	LAWRENCE B. & ANGELA COKELEY
2	LAWRENCE B. & ANGELA COKELEY
3	LAWRENCE B. & ANGELA COKELEY ET AL
4	PHILLIP A. & REBECCA LOFTY
5	PHILLIP A. & REBECCA LOFTY
6	ARTHUR D. HALL ET AL
7	ARTHUR D. HALL ET AL
8	KIEDAISCH & SUMMERS ET AL
9	DONALD G. & SUSIE A. HOGUE
10	DONZIL LEROY BAKER ET AL
11	WALNUT INVESTMENT COMPANY ET AL

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



AS DRILLED SURFACE HOLE LOCATION (SHL)

UTM 17-NAD83
 N:4353182.91
 E:497746.27
 NAD27_WV NORTH
 N:305234.764
 E:1568249.809
 LAT/LON DATUM-NAD83
 LAT:39.3280583
 LON:-81.0261482

AS DRILLED LANDING POINT

UTM 17-NAD83
 N:4353205.22
 E:498110.93
 NAD27_WV NORTH
 N:305287.96
 E:1569447.68
 LAT/LON DATUM-NAD83
 LAT:39.328261
 LON:-81.021917

AS DRILLED BOTTOM HOLE LOCATION (BHL)

UTM 17-NAD83
 N:4351375.39
 E:499701.68
 NAD27_WV NORTH
 N:299196.05
 E:1574567.58
 LAT/LON DATUM-NAD83
 LAT:39.311775
 LON:-81.003461

- 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.

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

AS DRILLED PLAT

FILE #: PEN 20 DHS-AS DRILLED
 DRAWING #: PEN 20 DHS-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 DHS-AS DRILLED
 API WELL #: 47 85 10111
 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: 746.709±

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: 6,252'± TMD: 14,852'±
 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