

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

API 47-009-00226 County BROOKE District BUFFALO  
Quad BETHANY Pad Name WORTHLEY BRK PAD Field/Pool Name PANHANDLE FIELD WET  
Farm name KIMBERLY CARMAN WORTHLEY Well Number WORTHLEY BRK 201H  
Operator (as registered with the OOG) SWN PRODUCTION COMPANY, LLC  
Address PO BOX 12359 City SPRING State TX Zip 77391-2359

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4,451,759.14 Easting 537,847.04  
Landing Point of Curve Northing 4,451,745.25 Easting 537,288.41  
Bottom Hole Northing 4,453,297.92 Easting 536,833.55

Elevation (ft) 1156.51 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

Drilling 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)  
SOBM

Date permit issued 10/11/2017 Date drilling commenced 05/15/2018 Date drilling ceased 06/23/2018  
Date completion activities began 08/27/2018 Date completion activities ceased 10/19/2018  
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 183 Open mine(s) (Y/N) depths N  
Salt water depth(s) ft 800 Void(s) encountered (Y/N) depths N  
Coal depth(s) ft 329 Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

Reviewed by  
C. Hill 1-17-19

Reviewed by:  
SB 1-17-19

API 47-009 - 00226 Farm name KIMBERLY CARMAN WORTHLEY Well number WORTHLEY BRK 201H

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	36	30	126	NEW	PLS2/234.29#		Y
Surface	26	20	380	NEW	J-55/94#	249.8', 291.8'	Y, 28 BBLS
Coal	SEE SURFACE						
Intermediate 1	17.50	13.375	592	NEW	J-55/54.50#		Y, 25 BBLS
Intermediate 2	12.25	9.625	1739	NEW	J-55/36#		Y, 36 BBLS
Intermediate 3							
Production	8.75/8.50	5.5	12314	NEW	HCP-110/20#		Y, 32 BBLS
Tubing		2.375	6639	NEW	P-110/4.7#		N
Packer type and depth set							

Comment Details \_\_\_\_\_

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	CLASS A	GROUT TO SURFACE				SURFACE	24
Surface	CLASS A	792	15.60	1.19	942.48	SURFACE	8
Coal	SEE SURFACE						
Intermediate 1	CLASS A	586	15.60	1.20	703.2	SURFACE	8
Intermediate 2	CLASS A	705	15.60	1.19	838.95	SURFACE	8
Intermediate 3							
Production	CLASS A	2,274	15.60	1.19	2706.06	SURFACE	24
Tubing							

Drillers TD (ft) 12,314 Loggers TD (ft) 12,314  
 Deepest formation penetrated MARCELLUS Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 5,453

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 \_\_\_\_\_

SURFACE: 7 CENTRALIZERS - EVERY THIRD JOINT OF CASING  
 INTERMEDIATE: 24 CENTRALIZERS - EVERY THIRD JOINT OF CASING  
 PRODUCTION: 181 CENTRALIZERS - EVERY THIRD JOINT FROM SURFACE TO TOP OF CURVE, THEN EVERY JOINT UNTIL TD

WAS WELL COMPLETED AS SHOT HOLE  Yes  No DETAILS \_\_\_\_\_

WAS WELL COMPLETED OPEN HOLE?  Yes  No DETAILS \_\_\_\_\_

WERE TRACERS USED  Yes  No TYPE OF TRACER(S) USED \_\_\_\_\_

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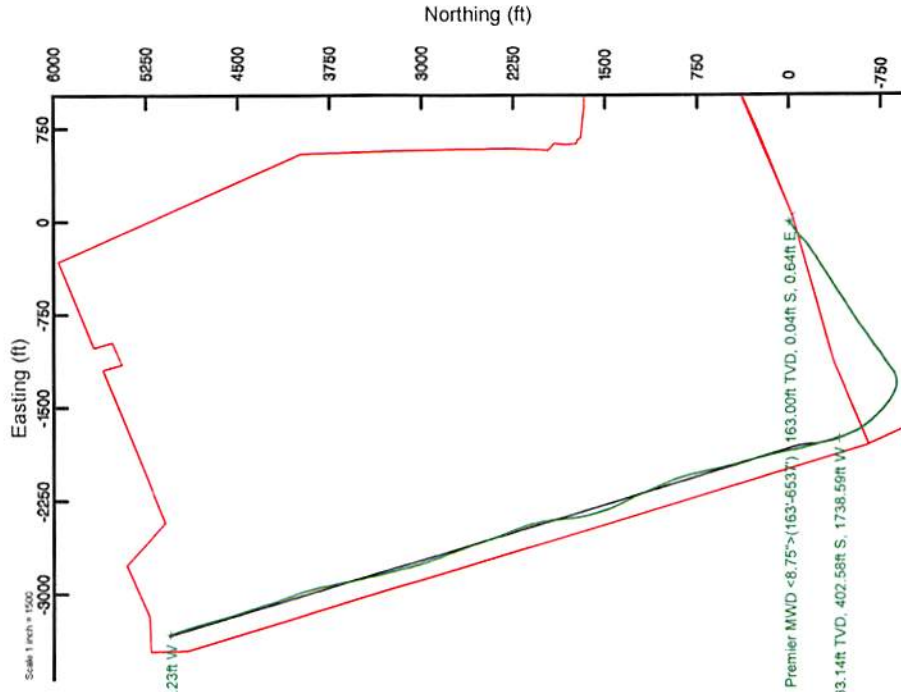
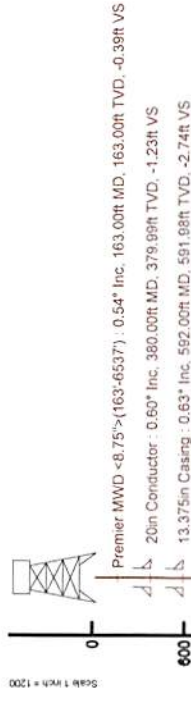
# SOUTHWESTERN ENERGY

Location: Brooke County, WV  
 Facility: Worthley BRK Pad  
 Slot: Slot #201H  
 Well: Worthley BRK 201H  
 Wellbore: Worthley BRK 201H PWB

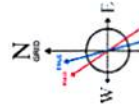
Plot reference wellbore is Worthley BRK 201H PWP Rev-A0	Grid System: NAD83 UTM Zone 17 North, US feet
True vertical depths are referenced to SDC 41 (RKB)	* s Wellbore was transformed from a different geoidic datum
Measured depths are referenced to SDC 41 (RKB)	North Reference: Grid north
SDC 41 (RKB) to Mean Sea Level: 1182.3 feet	Scale: True distance
Mean Sea Level to Ground level (At Slot, Slot #201H): -1156.3 feet	Depths are in feet
Coordinates are in feet referenced to Slot	Created by: Romsuz on 2018-07-02
	Database: VA, Pennsylvania



Location Information			
Facility Name	Grid East (US ft)	Grid North (US ft)	Longitude
Worthley BRK Pad	1764646.254	14605439.176	80°33'18.013"W
Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude
-60.41	1764535.912	14605479.842	40°12'55.014"N
Slot	Local N (ft)	Grid North (US ft)	Longitude
40.66	-60.41	14605479.842	80°33'16.789"W
Slot #201H	SDC 41 (RKB) to Ground level (At Slot, Slot #201H)		20ft
	Mean Sea Level to Ground level (At Slot, Slot #201H)		-1156.3ft
	SDC 41 (RKB) to Mean Sea Level		1182.3ft
<b>Comments</b>			
API: 47-009-00226-0000			
BH Job #: 9217345			
Rig: SDC 41			
Duration: 06/20/2018 - 06/21/2018			



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User specified Dip: 67.80° Field: 5/20/2019  
 Magnetic North is 8.37 degrees West of True North (at 6/20/2019)  
 To correct azimuth from True to Grid subtract 0.29 degrees  
 To correct azimuth from Magnetic to Grid subtract 8.66 degrees

BH AT Curve <math>\langle 8.5^\circ \rangle</math> (6619-12274) : 79.54° Inc, 6619.00ft MD, 5983.14ft TVD, 621.28ft VS  
 BH AT Curve <math>\langle 8.5^\circ \rangle</math> (6619-12274) : 5983.14ft TVD, 402.58ft S, 1738.58ft W  
 Premier MWD <math>\langle 8.75^\circ \rangle</math> (163-6537) : 163.00ft TVD, 0.04ft S, 0.64ft E



Scale 1 inch = 1200

Scale 1 inch = 1200



REFERENCE WELLPATH IDENTIFICATION			
Operator	SOUTHWESTERN ENERGY	Slot	Slot #201H
Area	Brooke County, WV	Well	Worthley BRK 201H
Field	Brooke	Wellbore	Worthley BRK 201H AWB
Facility	Worthley BRK Pad		

REPORT SETUP INFORMATION			
Projection System	NAD83 / UTM Zone 17 North, US feet	Software System	WellArchitect® 5.0
North Reference	Grid	User	Thomsuzc
Scale	0.999618	Report Generated	7/2/2018 at 9:27:32 AM
Convergence at slot	0.29° East	Database/Source file	WA_Pennsylvania/Worthley_BRK_201H_AWP_Proj_12314_MD.xml

WELLPATH LOCATION						
	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	40.68	-60.41	1764585.91	14605479.84	40°12'55.419"N	80°33'18.789"W
Facility Reference Pt			1764646.29	14605439.18	40°12'55.014"N	80°33'18.013"W
Field Reference Pt			0.00	0.00	0°00'00.000"	85°29'19.478"W

WELLPATH DATUM			
Calculation method	Minimum curvature	SDC 41 (RKB) to Facility Vertical Datum	1182.30ft
Horizontal Reference Pt	Slot	SDC 41 (RKB) to Mean Sea Level	1182.30ft
Vertical Reference Pt	SDC 41 (RKB)	SDC 41 (RKB) to Ground Level at Slot (Slot #201H)	26.00ft
MD Reference Pt	SDC 41 (RKB)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	326.59°

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Area	Brooke County, WV	Well	Worthley BRK 201H
Field	Brooke	Wellbore	Worthley BRK 201H AWB
Facility	Worthley BRK Pad		

WELLPATH DATA (149 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	93.540	0.00	0.00	0.00	0.00	1764585.91	14605479.84	40°12'55.419"N	80°33'18.789"W	0.00	0.000	0.00	0.00	0.00
26.00	0.000	93.540	26.00	0.00	0.00	0.00	1764585.91	14605479.84	40°12'55.419"N	80°33'18.789"W	0.00	0.000	0.00	0.00	0.00
163.00	0.540	93.540	163.00	-0.39	-0.04	0.64	1764586.56	14605479.80	40°12'55.419"N	80°33'18.781"W	0.65	93.540	0.39	0.39	68.28
223.00	0.460	83.650	223.00	-0.67	-0.03	1.17	1764587.08	14605479.81	40°12'55.419"N	80°33'18.774"W	1.17	91.507	0.20	-0.13	-16.48
314.00	0.330	83.470	313.99	-0.95	0.04	1.79	1764587.70	14605479.88	40°12'55.419"N	80°33'18.766"W	1.79	88.735	0.14	-0.14	-0.20
404.00	0.700	92.550	403.99	-1.39	0.04	2.60	1764588.51	14605479.89	40°12'55.419"N	80°33'18.756"W	2.60	89.017	0.42	0.41	10.09
497.00	0.570	114.070	496.98	-2.12	-0.17	3.59	1764589.50	14605479.67	40°12'55.417"N	80°33'18.743"W	3.59	92.705	0.29	-0.14	23.14
532.00	0.580	92.300	531.98	-2.37	-0.25	3.92	1764589.83	14605479.59	40°12'55.416"N	80°33'18.738"W	3.93	93.611	0.62	0.03	-62.20
620.00	0.660	93.600	619.98	-2.93	-0.30	4.87	1764590.78	14605479.54	40°12'55.416"N	80°33'18.726"W	4.88	93.490	0.09	0.09	1.48
711.00	0.580	203.830	710.97	-3.50	-0.75	5.21	1764591.12	14605479.09	40°12'55.411"N	80°33'18.722"W	5.26	98.208	1.12	-0.09	121.13
802.00	2.530	233.080	801.94	-3.87	-2.38	3.42	1764589.33	14605477.46	40°12'55.395"N	80°33'18.745"W	4.16	124.845	2.25	2.14	32.14
895.00	4.770	236.570	894.74	-4.00	-5.74	-1.45	1764584.46	14605474.10	40°12'55.362"N	80°33'18.808"W	5.92	194.178	2.42	2.41	3.75
987.00	7.330	240.030	986.22	-3.64	-10.78	-9.73	1764576.19	14605469.06	40°12'55.313"N	80°33'18.915"W	14.52	222.057	2.81	2.78	3.76
1080.00	9.370	236.950	1078.23	-3.24	-17.88	-21.22	1764564.70	14605461.97	40°12'55.243"N	80°33'19.064"W	27.74	229.882	2.24	2.19	-3.31
1173.00	10.740	236.240	1169.80	-3.25	-26.82	-34.77	1764551.16	14605453.03	40°12'55.156"N	80°33'19.239"W	43.91	232.350	1.48	1.47	-0.76
1266.00	10.460	235.870	1261.22	-3.41	-36.37	-48.96	1764536.97	14605443.48	40°12'55.062"N	80°33'19.422"W	60.99	233.390	0.31	-0.30	-0.40
1358.00	11.090	231.570	1351.59	-4.28	-46.56	-62.80	1764523.13	14605433.30	40°12'54.962"N	80°33'19.602"W	78.18	233.449	1.11	0.68	-4.67
1451.00	12.670	234.390	1442.60	-5.46	-58.06	-78.10	1764507.84	14605421.81	40°12'54.849"N	80°33'19.799"W	97.32	233.375	1.81	1.70	3.03
1544.00	12.060	234.610	1533.44	-6.19	-69.62	-94.31	1764491.63	14605410.25	40°12'54.736"N	80°33'20.009"W	117.23	233.565	0.66	-0.66	0.24
1636.00	11.390	232.880	1623.52	-7.11	-80.67	-109.39	1764476.56	14605399.20	40°12'54.627"N	80°33'20.204"W	135.92	233.593	0.82	-0.73	-1.88
1686.00	10.690	229.570	1672.60	-7.99	-86.66	-116.86	1764469.10	14605393.22	40°12'54.568"N	80°33'20.301"W	145.49	233.441	1.89	-1.40	-6.62
1791.00	10.000	224.270	1775.89	-11.13	-99.50	-130.64	1764455.32	14605380.38	40°12'54.442"N	80°33'20.479"W	164.22	232.705	1.12	-0.66	-5.05
1822.00	10.210	221.590	1806.41	-12.41	-103.48	-134.34	1764451.62	14605376.40	40°12'54.403"N	80°33'20.527"W	169.58	232.392	1.66	0.68	-8.65
1912.00	13.820	225.020	1894.43	-16.63	-117.05	-147.24	1764438.73	14605362.83	40°12'54.270"N	80°33'20.695"W	188.10	231.516	4.09	4.01	3.81
2003.00	18.280	229.710	1981.86	-20.53	-133.97	-165.83	1764420.15	14605345.92	40°12'54.103"N	80°33'20.935"W	213.18	231.065	5.10	4.90	5.15
2093.00	21.020	233.740	2066.62	-23.02	-152.65	-189.61	1764396.37	14605327.25	40°12'53.920"N	80°33'21.243"W	243.43	231.164	3.39	3.04	4.48
2184.00	22.180	236.080	2151.23	-23.98	-171.89	-217.03	1764368.97	14605308.02	40°12'53.731"N	80°33'21.598"W	276.86	231.620	1.59	1.27	2.57
2277.00	22.450	235.290	2237.26	-24.54	-191.80	-246.19	1764339.81	14605288.12	40°12'53.536"N	80°33'21.975"W	312.09	232.079	0.43	0.29	-0.85
2370.00	22.590	234.960	2323.17	-25.45	-212.17	-275.42	1764310.60	14605267.76	40°12'53.336"N	80°33'22.353"W	347.66	232.391	0.20	0.15	-0.35
2462.00	22.040	238.860	2408.28	-25.27	-231.24	-304.66	1764281.37	14605248.69	40°12'53.149"N	80°33'22.731"W	382.48	232.801	1.72	-0.60	4.24

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Field	Brooke	Wellbore	Worthley BRK 201H AWB
Facility	Worthley BRK Pad		

WELLPATH DATA (149 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]
2555.00	22.610	239.250	2494.31	-23.75	-249.40	-334.96	1764251.08	14605230.53	40°12'52.971"N	80°33'23.123"W	417.61	233.329	0.63	0.61	0.42
2648.00	23.600	234.970	2579.86	-23.45	-269.23	-365.57	1764220.48	14605210.71	40°12'52.777"N	80°33'23.519"W	454.01	233.629	2.10	1.06	-4.60
2741.00	22.800	237.200	2665.34	-23.78	-289.68	-395.96	1764190.10	14605190.27	40°12'52.576"N	80°33'23.912"W	490.61	233.811	1.28	-0.86	2.40
2833.00	23.120	237.290	2750.05	-23.37	-309.10	-426.14	1764159.93	14605170.86	40°12'52.386"N	80°33'24.302"W	526.44	234.045	0.35	0.35	0.10
2926.00	21.640	235.600	2836.04	-23.45	-328.65	-455.66	1764130.43	14605151.32	40°12'52.194"N	80°33'24.684"W	561.81	234.198	1.74	-1.59	-1.82
3019.00	20.490	240.040	2922.83	-22.76	-346.47	-483.91	1764102.19	14605133.50	40°12'52.019"N	80°33'25.049"W	595.16	234.398	2.11	-1.24	4.77
3112.00	20.750	239.720	3009.87	-20.88	-362.91	-512.24	1764073.87	14605117.07	40°12'51.858"N	80°33'25.415"W	627.77	234.684	0.30	0.28	-0.34
3204.00	21.910	237.450	3095.57	-19.74	-380.36	-540.78	1764045.34	14605099.63	40°12'51.687"N	80°33'25.784"W	661.15	234.879	1.55	1.26	-2.47
3294.00	22.680	233.990	3178.85	-20.27	-399.60	-568.98	1764017.16	14605080.40	40°12'51.498"N	80°33'26.149"W	695.28	234.919	1.69	0.86	-3.84
3383.00	21.320	234.610	3261.37	-21.61	-419.06	-596.05	1763990.09	14605060.95	40°12'51.307"N	80°33'26.499"W	728.61	234.890	1.55	-1.53	0.70
3476.00	19.870	237.810	3348.42	-21.86	-437.27	-623.21	1763962.94	14605042.74	40°12'51.129"N	80°33'26.850"W	761.31	234.945	1.97	-1.56	3.44
3569.00	19.490	235.210	3435.99	-21.89	-454.54	-649.32	1763936.84	14605025.48	40°12'50.959"N	80°33'27.188"W	792.61	235.007	1.03	-0.41	-2.80
3661.00	20.750	235.790	3522.38	-22.49	-472.46	-675.41	1763910.77	14605007.56	40°12'50.784"N	80°33'27.525"W	824.25	235.026	1.39	1.37	0.63
3754.00	20.190	235.920	3609.50	-22.91	-490.72	-702.32	1763883.86	14604989.31	40°12'50.605"N	80°33'27.874"W	856.77	235.058	0.60	-0.60	0.14
3847.00	20.520	236.710	3696.70	-23.06	-508.66	-729.24	1763856.95	14604971.38	40°12'50.429"N	80°33'28.222"W	889.11	235.104	0.46	0.35	0.85
3939.00	22.300	237.390	3782.34	-22.79	-526.92	-757.43	1763828.78	14604953.13	40°12'50.250"N	80°33'28.586"W	922.68	235.175	1.95	1.93	0.74
4032.00	21.280	236.300	3868.70	-22.62	-545.79	-786.33	1763799.88	14604934.26	40°12'50.064"N	80°33'28.960"W	957.18	235.236	1.18	-1.10	-1.17
4125.00	21.550	235.310	3955.28	-23.09	-564.87	-814.41	1763771.81	14604915.19	40°12'49.877"N	80°33'29.323"W	991.14	235.255	0.49	0.29	-1.06
4218.00	22.690	232.980	4041.43	-24.60	-585.39	-842.78	1763743.46	14604894.67	40°12'49.676"N	80°33'29.690"W	1026.14	235.216	1.55	1.23	-2.51
4310.00	22.120	231.720	4126.49	-27.19	-606.81	-870.55	1763715.70	14604873.27	40°12'49.466"N	80°33'30.049"W	1061.16	235.122	0.81	-0.62	-1.37
4403.00	22.830	233.780	4212.42	-29.56	-628.32	-898.85	1763687.41	14604851.77	40°12'49.254"N	80°33'30.415"W	1096.68	235.045	1.14	0.76	2.22
4496.00	22.740	237.720	4298.17	-30.09	-648.58	-928.60	1763657.67	14604831.51	40°12'49.056"N	80°33'30.800"W	1132.68	235.068	1.64	-0.10	4.24
4589.00	20.600	235.690	4384.60	-29.99	-667.40	-957.31	1763628.97	14604812.70	40°12'48.871"N	80°33'31.172"W	1167.00	235.117	2.44	-2.30	-2.18
4682.00	19.970	234.090	4471.83	-30.94	-685.94	-983.69	1763602.60	14604794.17	40°12'48.689"N	80°33'31.513"W	1199.23	235.111	0.90	-0.68	-1.72
4775.00	19.920	231.730	4559.25	-32.98	-705.07	-1008.99	1763577.31	14604775.05	40°12'48.501"N	80°33'31.840"W	1230.93	235.055	0.87	-0.05	-2.54
4868.00	21.490	231.180	4646.24	-35.93	-725.56	-1034.70	1763551.60	14604754.56	40°12'48.300"N	80°33'32.173"W	1263.74	234.961	1.70	1.69	-0.59
4960.00	22.730	235.860	4731.48	-37.74	-746.10	-1062.55	1763523.77	14604734.03	40°12'48.099"N	80°33'32.533"W	1298.34	234.924	2.34	1.35	5.09
5053.00	22.790	237.870	4817.24	-37.57	-765.76	-1092.67	1763493.66	14604714.37	40°12'47.906"N	80°33'32.923"W	1334.29	234.977	0.84	0.06	2.16
5146.00	21.920	235.950	4903.25	-37.36	-785.06	-1122.31	1763464.03	14604695.08	40°12'47.716"N	80°33'33.306"W	1369.64	235.027	1.22	-0.94	-2.06
5239.00	21.880	234.070	4989.54	-38.32	-804.95	-1150.72	1763435.63	14604675.20	40°12'47.521"N	80°33'33.673"W	1404.32	235.027	0.76	-0.04	-2.02

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# Actual Wellpath Report

Worthley BRK 201H AWP Proj: 12314'MD  
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REFERENCE WELLPATH IDENTIFICATION			
Operator	SOUTHWESTERN ENERGY	Slot	Slot #201H
Area	Brooke County, WV	Well	Worthley BRK 201H
Field	Brooke	Wellbore	Worthley BRK 201H AWB
Facility	Worthley BRK Pad		

WELLPATH DATA (149 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]	
5331.00	23.120	231.490	5074.54	-40.68	-826.26	-1178.74	1763407.62	14604653.90	40°12'47.312"N	80°33'34.036"W	1439.49	234.971	1.72	1.35	-2.80	
5424.00	22.210	233.520	5160.36	-43.24	-848.08	-1207.16	1763379.21	14604632.09	40°12'47.098"N	80°33'34.404"W	1475.29	234.910	1.29	-0.98	2.18	
5470.00	21.410	241.810	5203.08	-42.94	-857.22	-1221.56	1763364.82	14604622.95	40°12'47.008"N	80°33'34.590"W	1492.32	234.941	6.91	-1.74	18.02	
5517.00	21.510	249.820	5246.83	-40.19	-864.24	-1237.21	1763349.18	14604615.93	40°12'46.940"N	80°33'34.792"W	1509.17	235.064	6.23	0.21	17.04	
5563.00	22.280	256.030	5289.51	-35.36	-869.26	-1253.59	1763332.80	14604610.92	40°12'46.891"N	80°33'35.003"W	1525.48	235.262	5.30	1.67	13.50	
5609.00	23.420	260.240	5331.91	-28.79	-872.91	-1271.06	1763315.34	14604607.26	40°12'46.856"N	80°33'35.229"W	1541.94	235.520	4.33	2.48	9.15	
5656.00	24.650	266.090	5374.84	-20.21	-875.17	-1290.05	1763296.36	14604605.01	40°12'46.834"N	80°33'35.474"W	1558.89	235.847	5.70	2.62	12.45	
5702.00	25.530	273.820	5416.51	-9.49	-875.16	-1309.52	1763276.90	14604605.02	40°12'46.835"N	80°33'35.725"W	1575.04	236.245	7.37	1.91	16.80	
5749.00	26.000	281.860	5458.85	3.96	-872.37	-1329.71	1763256.71	14604607.81	40°12'46.864"N	80°33'35.985"W	1590.33	236.733	7.50	1.00	17.11	
5795.00	26.930	289.390	5500.04	19.43	-866.83	-1349.41	1763237.02	14604613.34	40°12'46.920"N	80°33'36.238"W	1603.84	237.284	7.57	2.02	16.37	
5841.00	28.630	294.980	5540.74	37.12	-858.72	-1369.23	1763217.21	14604621.45	40°12'47.001"N	80°33'36.493"W	1616.23	237.906	6.76	3.70	12.15	
5888.00	31.450	297.140	5581.43	57.39	-848.37	-1390.35	1763196.09	14604631.80	40°12'47.104"N	80°33'36.765"W	1628.75	238.609	6.43	6.00	4.60	
5934.00	34.220	300.830	5620.08	79.49	-836.26	-1412.15	1763174.31	14604643.90	40°12'47.225"N	80°33'37.045"W	1641.19	239.366	7.43	6.02	8.02	
5981.00	36.050	304.220	5658.52	104.19	-821.71	-1434.93	1763151.53	14604658.45	40°12'47.370"N	80°33'37.338"W	1653.55	240.203	5.69	3.89	7.21	
6027.00	38.560	307.930	5695.11	130.30	-805.28	-1457.44	1763129.03	14604674.87	40°12'47.533"N	80°33'37.627"W	1665.11	241.078	7.32	5.46	8.07	
6073.00	40.780	310.210	5730.51	158.30	-786.77	-1480.22	1763106.26	14604693.38	40°12'47.717"N	80°33'37.919"W	1676.33	242.009	5.77	4.83	4.96	
6119.00	43.960	312.730	5764.50	188.22	-766.23	-1503.43	1763083.06	14604713.91	40°12'47.921"N	80°33'38.217"W	1687.43	242.994	7.84	6.91	5.48	
6166.00	46.620	313.320	5797.56	220.69	-743.44	-1527.85	1763058.65	14604736.69	40°12'48.148"N	80°33'38.530"W	1699.12	244.053	5.73	5.66	1.26	
6212.00	50.490	315.730	5828.00	254.40	-719.25	-1552.41	1763034.10	14604760.87	40°12'48.388"N	80°33'38.846"W	1710.93	245.141	9.28	8.41	5.24	
6259.00	55.610	317.350	5856.25	291.37	-691.98	-1578.22	1763008.30	14604788.12	40°12'48.659"N	80°33'39.176"W	1723.26	246.325	11.24	10.89	3.45	
6305.00	60.460	319.130	5880.60	329.97	-662.87	-1604.19	1762982.34	14604817.22	40°12'48.948"N	80°33'39.509"W	1735.75	247.549	11.04	10.54	3.87	
6351.00	64.300	323.220	5901.92	370.53	-631.12	-1629.71	1762956.83	14604848.96	40°12'49.263"N	80°33'39.836"W	1747.65	248.831	11.48	8.35	8.89	
6398.00	66.640	327.370	5921.44	413.26	-595.97	-1654.03	1762932.51	14604884.10	40°12'49.611"N	80°33'40.148"W	1758.13	250.185	9.45	4.98	8.83	
6444.00	69.750	332.330	5938.54	455.88	-559.05	-1675.46	1762911.10	14604921.00	40°12'49.977"N	80°33'40.421"W	1766.26	251.548	12.08	6.76	10.78	
6490.00	72.580	335.570	5953.39	499.05	-519.94	-1694.56	1762892.00	14604960.10	40°12'50.364"N	80°33'40.665"W	1772.53	252.942	9.07	6.15	7.04	
6537.00	76.320	338.460	5965.99	543.56	-478.27	-1712.23	1762874.34	14605001.76	40°12'50.777"N	80°33'40.890"W	1777.77	254.394	9.92	7.96	6.15	
6619.00	79.540	343.100	5983.14	621.26	-402.58	-1738.59	1762847.99	14605077.42	40°12'51.526"N	80°33'41.225"W	1784.59	256.963	6.78	3.93	5.66	
6712.00	83.550	344.980	5996.82	709.00	-314.15	-1763.87	1762822.72	14605165.81	40°12'52.401"N	80°33'41.545"W	1791.63	259.901	4.75	4.31	2.02	
6805.00	85.320	344.380	6005.83	796.98	-224.88	-1788.33	1762798.27	14605255.04	40°12'53.285"N	80°33'41.855"W	1802.41	262.833	2.01	1.90	-0.65	
6897.00	87.600	345.560	6011.51	884.11	-136.21	-1812.14	1762774.47	14605343.69	40°12'54.162"N	80°33'42.156"W	1817.25	265.701	2.79	2.48	1.28	

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# Actual Wellpath Report

Worthley BRK 201H AWP Proj: 12314'MD  
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REFERENCE WELLPATH IDENTIFICATION			
Operator	SOUTHWESTERN ENERGY	Slot	Slot #201H
Area	Brooke County, WV	Well	Worthley BRK 201H
Field	Brooke	Wellbore	Worthley BRK 201H AWB
Facility	Worthley BRK Pad		

WELLPATH DATA (149 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]
6990.00	90.460	348.650	6013.09	971.18	-45.59	-1832.88	1762753.73	14605434.27	40°12'55.059"N	80°33'42.418"W	1833.45	268.575	4.53	3.08	3.32
7083.00	90.490	348.510	6012.32	1057.41	45.57	-1851.30	1762735.33	14605525.39	40°12'55.960"N	80°33'42.649"W	1851.86	271.410	0.15	0.03	-0.15
7175.00	90.370	348.010	6011.63	1142.91	135.64	-1870.02	1762716.61	14605615.43	40°12'56.851"N	80°33'42.885"W	1874.93	274.149	0.56	-0.13	-0.54
7268.00	90.430	345.500	6010.98	1230.20	226.16	-1891.32	1762695.32	14605705.91	40°12'57.747"N	80°33'43.154"W	1904.80	276.819	2.70	0.06	-2.70
7361.00	90.520	344.070	6010.21	1318.54	315.89	-1915.73	1762670.92	14605795.61	40°12'58.635"N	80°33'43.463"W	1941.60	279.363	1.54	0.10	-1.54
7453.00	90.520	344.810	6009.37	1406.11	404.52	-1940.41	1762646.25	14605884.20	40°12'59.512"N	80°33'43.775"W	1982.12	281.776	0.80	0.00	0.80
7546.00	90.460	346.740	6008.58	1493.94	494.66	-1963.26	1762623.41	14605974.31	40°13'00.404"N	80°33'44.064"W	2024.61	284.142	2.08	-0.06	2.08
7639.00	91.260	348.380	6007.18	1580.76	585.46	-1983.29	1762603.39	14606065.08	40°13'01.302"N	80°33'44.316"W	2067.90	286.446	1.96	0.86	1.76
7731.00	91.380	348.050	6005.06	1666.27	675.50	-2002.07	1762584.61	14606155.08	40°13'02.193"N	80°33'44.553"W	2112.96	288.644	0.38	0.13	-0.36
7824.00	91.290	346.290	6002.89	1753.30	766.15	-2022.72	1762563.97	14606245.69	40°13'03.089"N	80°33'44.813"W	2162.95	290.745	1.89	-0.10	-1.89
7916.00	91.260	344.360	6000.85	1840.40	855.12	-2046.02	1762540.68	14606334.63	40°13'03.970"N	80°33'45.108"W	2217.52	292.682	2.10	-0.03	-2.10
8009.00	91.290	338.810	5998.78	1930.18	943.30	-2075.38	1762511.33	14606422.78	40°13'04.842"N	80°33'45.481"W	2279.69	294.443	5.97	0.03	-5.97
8102.00	91.350	336.370	5996.63	2021.44	1029.25	-2110.82	1762475.90	14606508.69	40°13'05.694"N	80°33'45.932"W	2348.38	295.994	2.62	0.06	-2.62
8194.00	91.320	337.440	5994.49	2111.93	1113.85	-2146.90	1762439.84	14606593.26	40°13'06.531"N	80°33'46.392"W	2418.64	297.421	1.16	-0.03	1.16
8287.00	91.390	337.250	5992.29	2203.27	1199.65	-2182.71	1762404.04	14606679.03	40°13'07.381"N	80°33'46.848"W	2490.66	298.794	0.22	0.08	-0.20
8380.00	91.320	333.670	5990.09	2295.11	1284.21	-2221.32	1762365.45	14606763.56	40°13'08.218"N	80°33'47.340"W	2565.82	300.034	3.85	-0.08	-3.85
8472.00	91.350	334.200	5987.95	2386.33	1366.83	-2261.73	1762325.05	14606846.15	40°13'09.037"N	80°33'47.856"W	2642.66	301.146	0.58	0.03	0.58
8565.00	91.260	338.640	5985.83	2477.92	1452.02	-2298.91	1762287.88	14606931.31	40°13'09.880"N	80°33'48.330"W	2719.08	302.277	4.77	-0.10	4.77
8657.00	91.260	342.470	5983.80	2567.17	1538.74	-2329.53	1762257.28	14607017.99	40°13'10.739"N	80°33'48.719"W	2791.85	303.446	4.16	0.00	4.16
8750.00	91.290	345.680	5981.73	2655.83	1628.14	-2355.04	1762231.78	14607107.35	40°13'11.624"N	80°33'49.042"W	2863.04	304.658	3.45	0.03	3.45
8843.00	90.550	350.320	5980.24	2742.38	1719.07	-2374.36	1762212.46	14607198.25	40°13'12.523"N	80°33'49.286"W	2931.35	305.905	5.05	-0.80	4.99
8935.00	90.800	354.740	5979.16	2825.09	1810.26	-2386.32	1762200.51	14607289.40	40°13'13.425"N	80°33'49.434"W	2995.25	307.184	4.81	0.27	4.80
9028.00	90.920	354.210	5977.76	2907.28	1902.81	-2395.27	1762191.56	14607381.93	40°13'14.340"N	80°33'49.544"W	3059.09	308.464	0.58	0.13	-0.57
9121.00	90.800	350.430	5976.36	2991.03	1994.95	-2407.70	1762179.14	14607474.03	40°13'15.251"N	80°33'49.698"W	3126.79	309.644	4.07	-0.13	-4.06
9214.00	91.630	344.730	5974.39	3077.80	2085.72	-2427.69	1762159.16	14607564.76	40°13'16.149"N	80°33'49.950"W	3200.61	310.667	6.19	0.89	-6.13
9306.00	90.430	341.360	5972.74	3166.01	2173.69	-2454.51	1762132.35	14607652.70	40°13'17.019"N	80°33'50.290"W	3278.65	311.528	3.89	-1.30	-3.66
9399.00	90.460	337.620	5972.01	3256.64	2260.78	-2487.08	1762099.78	14607739.75	40°13'17.882"N	80°33'50.705"W	3361.06	312.271	4.02	0.03	-4.02
9492.00	90.400	338.820	5971.32	3347.73	2347.13	-2521.59	1762065.29	14607826.07	40°13'18.737"N	80°33'51.144"W	3444.92	312.948	1.29	-0.06	1.29
9584.00	90.430	341.720	5970.65	3437.11	2433.72	-2552.64	1762034.25	14607912.63	40°13'19.594"N	80°33'51.539"W	3526.90	313.634	3.15	0.03	3.15
9677.00	90.400	342.080	5969.98	3526.80	2522.12	-2581.54	1762005.37	14608000.99	40°13'20.469"N	80°33'51.906"W	3609.07	314.333	0.39	-0.03	0.39

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# Actual Wellpath Report

Worthley BRK 201H AWP Proj: 12314'MD  
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## REFERENCE WELLPATH IDENTIFICATION

Operator	SOUTHWESTERN ENERGY	Slot	Slot #201H
Area	Brooke County, WV	Well	Worthley BRK 201H
Field	Brooke	Wellbore	Worthley BRK 201H AWB
Facility	Worthley BRK Pad		

## WELLPATH DATA (149 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]
9770.00	90.520	339.670	5969.23	3616.92	2609.98	-2612.00	1761974.91	14608088.81	40°13'21.338"N	80°33'52.293"W	3692.50	314.978	2.59	0.13	-2.59
9863.00	90.550	341.060	5968.36	3707.24	2697.56	-2643.25	1761943.68	14608176.37	40°13'22.205"N	80°33'52.690"W	3776.72	315.583	1.49	0.03	1.49
9955.00	90.430	339.190	5967.57	3796.68	2784.07	-2674.53	1761912.41	14608262.85	40°13'23.062"N	80°33'53.088"W	3860.59	316.150	2.04	-0.13	-2.03
10048.00	90.460	338.450	5966.85	3887.56	2870.79	-2708.12	1761878.83	14608349.53	40°13'23.920"N	80°33'53.515"W	3946.56	316.670	0.80	0.03	-0.80
10141.00	90.370	343.050	5966.18	3977.71	2958.56	-2738.78	1761848.19	14608437.27	40°13'24.789"N	80°33'53.905"W	4031.62	317.209	4.95	-0.10	4.95
10234.00	90.460	343.490	5965.50	4066.79	3047.62	-2765.55	1761821.43	14608526.30	40°13'25.671"N	80°33'54.245"W	4115.37	317.778	0.48	0.10	0.47
10327.00	90.430	344.650	5964.78	4155.49	3137.05	-2791.07	1761795.91	14608615.69	40°13'26.555"N	80°33'54.568"W	4198.95	318.340	1.25	-0.03	1.25
10419.00	90.460	345.350	5964.07	4242.78	3225.91	-2814.88	1761772.11	14608704.51	40°13'27.435"N	80°33'54.869"W	4281.36	318.893	0.76	0.03	0.76
10512.00	90.430	346.610	5963.34	4330.50	3316.14	-2837.41	1761749.59	14608794.70	40°13'28.327"N	80°33'55.154"W	4364.36	319.448	1.36	-0.03	1.35
10605.00	90.340	347.530	5962.72	4417.62	3406.77	-2858.22	1761728.79	14608885.31	40°13'29.224"N	80°33'55.417"W	4446.97	320.004	0.99	-0.10	0.99
10698.00	90.400	347.930	5962.12	4504.36	3497.65	-2877.98	1761709.03	14608976.15	40°13'30.123"N	80°33'55.666"W	4529.50	320.551	0.43	0.06	0.43
10791.00	90.830	348.400	5961.12	4590.84	3588.67	-2897.06	1761689.97	14609067.13	40°13'31.023"N	80°33'55.906"W	4612.10	321.087	0.68	0.46	0.51
10883.00	90.830	349.240	5959.79	4675.99	3678.91	-2914.89	1761672.14	14609157.34	40°13'31.916"N	80°33'56.130"W	4693.72	321.609	0.91	0.00	0.91
10976.00	90.710	348.050	5958.54	4762.18	3770.08	-2933.20	1761653.84	14609248.47	40°13'32.818"N	80°33'56.360"W	4776.73	322.116	1.29	-0.13	-1.28
11069.00	90.800	346.680	5957.31	4849.12	3860.82	-2953.54	1761633.51	14609339.18	40°13'33.716"N	80°33'56.617"W	4861.00	322.584	1.48	0.10	-1.47
11161.00	90.650	343.880	5956.15	4936.25	3949.78	-2976.91	1761610.14	14609428.11	40°13'34.596"N	80°33'56.913"W	4945.99	322.995	3.05	-0.16	-3.04
11254.00	90.740	339.690	5955.02	5025.98	4038.10	-3005.98	1761581.09	14609516.39	40°13'35.470"N	80°33'57.282"W	5034.09	323.336	4.51	0.10	-4.51
11347.00	90.740	340.460	5953.82	5116.40	4125.52	-3037.67	1761549.41	14609603.78	40°13'36.335"N	80°33'57.685"W	5123.22	323.635	0.83	0.00	0.83
11439.00	90.680	341.470	5952.68	5205.52	4212.48	-3067.67	1761519.42	14609690.70	40°13'37.196"N	80°33'58.066"W	5211.10	323.937	1.10	-0.07	1.10
11532.00	90.770	343.250	5951.50	5295.01	4301.10	-3095.85	1761491.25	14609779.29	40°13'38.073"N	80°33'58.424"W	5299.41	324.254	1.92	0.10	1.91
11625.00	90.680	341.840	5950.33	5384.41	4389.81	-3123.74	1761463.37	14609867.96	40°13'38.951"N	80°33'58.778"W	5387.78	324.565	1.52	-0.10	-1.52
11718.00	90.550	340.950	5949.33	5474.32	4477.94	-3153.41	1761433.71	14609956.06	40°13'39.823"N	80°33'59.155"W	5476.86	324.846	0.97	-0.14	-0.96
11810.00	90.430	343.700	5948.54	5562.86	4565.59	-3181.34	1761405.80	14610043.67	40°13'40.691"N	80°33'59.509"W	5564.66	325.131	2.99	-0.13	2.99
11903.00	90.310	344.300	5947.94	5651.60	4654.98	-3206.97	1761380.17	14610133.03	40°13'41.576"N	80°33'59.834"W	5652.74	325.436	0.66	-0.13	0.65
11996.00	90.370	345.310	5947.39	5739.93	4744.73	-3231.35	1761355.81	14610222.75	40°13'42.464"N	80°34'00.143"W	5740.56	325.744	1.09	0.06	1.09
12089.00	90.310	343.540	5946.84	5828.46	4834.31	-3256.32	1761330.85	14610312.29	40°13'43.350"N	80°34'00.459"W	5828.73	326.036	1.90	-0.06	-1.90
12181.00	90.340	341.940	5946.31	5916.83	4922.16	-3283.61	1761303.56	14610400.11	40°13'44.219"N	80°34'00.805"W	5916.90	326.292	1.74	0.03	-1.74
12274.00	90.370	341.670	5945.74	6006.56	5010.51	-3312.65	1761274.53	14610488.42	40°13'45.094"N	80°34'01.174"W	6006.57	326.530	0.29	0.03	-0.29
12314.00	90.370	341.670	5945.48	6045.19	5048.48	-3325.23	1761261.96	14610526.38	40°13'45.470"N	80°34'01.334"W	6045.19	326.629	0.00	0.00	0.00

## HOLE & CASING SECTIONS - Ref Wellbore: Worthley BRK 201H AWB Ref Wellpath: Worthley BRK 201H AWP Proj: 12314'MD

String/Diameter	Start MD [ft]	End MD [ft]	Interval [ft]	Start TVD [ft]	End TVD [ft]	Start N/S [ft]	Start E/W [ft]	End N/S [ft]	End E/W [ft]
20in Conductor	26.00	380.00	354.00	26.00	379.99	0.00	0.00	0.05	2.32



<b>HOLE &amp; CASING SECTIONS - Ref Wellbore: Worthley BRK 201H AWB Ref Wellpath: Worthley BRK 201H AWP Proj: 12314'MD</b>									
String/Diameter	Start MD [ft]	End MD [ft]	Interval [ft]	Start TVD [ft]	End TVD [ft]	Start N/S [ft]	Start E/W [ft]	End N/S [ft]	End E/W [ft]
17.5in Open Hole	380.00	592.00	212.00	379.99	591.98	0.05	2.32	-0.28	4.56
13.375in Casing	26.00	592.00	566.00	26.00	591.98	0.00	0.00	-0.28	4.56
12.25in Open Hole	592.00	1758.00	1166.00	591.98	1743.40	-0.28	4.56	-95.42	-126.53
9.625in Casing	26.00	1758.00	1732.00	26.00	1743.40	0.00	0.00	-95.42	-126.53
8.75in Open Hole	1758.00	6625.00	4867.00	1743.40	5984.22	-95.42	-126.53	-396.93	-1740.30
8.5in Open Hole	6625.00	12314.00	5689.00	5984.22	5945.48	-396.93	-1740.30	5048.48	-3325.23

<b>TARGETS</b>									
Name	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape	
Worthley BRK 201H BHL Rev-2	5957.71	5059.28	-3336.85	1761250.35	14610537.18	40°13'45.577"N	80°34'01.483"W	point	
Worthley BRK 201H LP Rev-3	6013.00	-24.20	-1815.60	1762771.01	14605455.65	40°12'55.269"N	80°33'42.194"W	point	

<b>WELLPATH COMPOSITION - Ref Wellbore: Worthley BRK 201H AWB Ref Wellpath: Worthley BRK 201H AWP Proj: 12314'MD</b>				
Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
26.00	6537.00	OWSG MWD rev2 - Standard	01_Premier MWD <8.75">(163'-6537')	Worthley BRK 201H AWB
6537.00	12274.00	BHI AutoTrak Curve (Short)	02_BH AT Curve <8.5">(6619'-12274')	Worthley BRK 201H AWB
12274.00	12314.00	Blind Drilling (std)	Projection to bit	Worthley BRK 201H AWB

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REFERENCE WELLPATH IDENTIFICATION			
Operator	SOUTHWESTERN ENERGY	Slot	Slot #201H
Area	Brooke County, WV	Well	Worthley BRK 201H
Field	Brooke	Wellbore	Worthley BRK 201H AWB
Facility	Worthley BRK Pad		

COMMENTS
<p>Wellpath general comments            API: 47-009-00226-0000            BH Job #: 9217345            Rig: SDC 41            Duration: 06/20/2018 - 06/21/2018</p>

# Hydraulic Fracturing Fluid Product Component Information Disclosure



Job Start Date:	8/27/2018
Job End Date:	9/18/2018
State:	West Virginia
County:	Brooke
API Number:	47-009-00226-00-00
Operator Name:	Southwestern Energy
Well Name and Number:	Worthley BRK 201H
Latitude:	40.21539402
Longitude:	-80.55521917
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	5,982
Total Base Water Volume (gal):	7,871,386
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	Southwestern Energy	Carrier/Base Fluid	Water	7732-18-5	100.00000	84.27545	
Sand	U.S. Well Services, LLC	Proppant	Crystalline Silica, quartz	14808-60-7	100.00000	14.24117	
HCL Acid (12.6%-17.5%)	U.S. Well Services, LLC	Bulk Acid	Water	7732-18-5	87.40000	1.12646	
			Hydrogen Chloride	7647-01-0	17.50000	0.26190	
WFRA-2000	U.S. Well Services, LLC	Friction Reducer	Water	7732-18-5	60.00000	0.03890	
			2-Propenoic acid, polymer with 2 propenamide	9003-06-9	30.00000	0.01945	
			Hydrated light distillate (petroleum)	64742-47-8	30.00000	0.01595	
BIOC11139A	Champion	Anti-Bacterial Agent	Benzyl-(C12-C16 Alkyl)-Dimethyl-Ammonium Chloride	68424-85-1	30.00000	0.00711	
			Glutaraldehyde	111-30-8	10.00000	0.00237	
			Ethanol	64-17-5	5.00000	0.00093	

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FSTI-IC-001	FSTI	Iron Control Additive				
			Acetic acid	64-19-7	60.00000	0.00307
			Citric Acid	77-92-9	40.00000	0.00234
SCAL16486A	Nalco Champion	Scale Inhibitor				
			Ethylene Glycol	107-21-1	30.00000	0.00178
			Amine Triphosphate	Proprietary	30.00000	0.00159
Econo-CI200	Economy Polymers & Chemicals	Acid Corrosion Inhibitors				
			Methanol	67-56-1	80.00000	0.00125
			Fatty acid	Proprietary	10.00000	0.00021
LT FLUSH SYSTEM I	J.S. Well Services, LLC	Other				
			Mineral oil, petroleum distillates, hrdotreated light naphthenic	64742-53-6	100.00000	0.00010

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.

\* 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)

**WORTHLEY BRK 201H**  
**ATTACHMENT 1**  
**PERF REPORT**

STAGE NUM	Perf Date	Perf Top MD	Perf Bottom MD	# SHOTS PER STG
1	8/26/2018	12,228	12,130	36
2	8/27/2018	12,097	11,988	42
3	8/28/2018	11,955	11,848	42
4	8/29/2018	11,815	11,708	42
5	8/30/2018	11,675	11,568	42
6	8/31/2018	11,535	11,428	42
7	9/2/2018	11,395	11,288	42
8	9/2/2018	11,255	11,148	42
9	9/2/2018	11,115	11,008	42
10	9/3/2018	10,975	10,868	42
11	9/3/2018	10,835	10,728	42
12	9/4/2018	10,695	10,588	42
13	9/4/2018	10,555	10,448	42
14	9/6/2018	10,415	10,308	42
15	9/6/2018	10,275	10,168	42
16	9/8/2018	10,135	10,028	42
17	9/8/2018	9,995	9,888	42
18	9/9/2018	9,855	9,748	42
19	9/9/2018	9,715	9,608	42
20	9/9/2018	9,575	9,468	42
21	9/10/2018	9,435	9,328	42
22	9/10/2018	9,295	9,188	42
23	9/11/2018	9,155	9,048	42
24	9/11/2018	9,015	8,905	42
25	9/12/2018	8,875	8,768	42
26	9/12/2018	8,735	8,628	42
27	9/13/2018	8,595	8,488	42
28	9/13/2018	8,452	8,348	42
29	9/13/2018	8,315	8,213	42
30	9/14/2018	8,175	8,068	42
31	9/14/2018	8,035	7,928	42
32	9/16/2018	7,895	7,788	42
33	9/16/2018	7,755	7,648	42
34	9/16/2018	7,615	7,508	42
35	9/17/2018	7,475	7,368	42
36	9/17/2018	7,335	7,228	42
37	9/17/2018	7,195	7,088	42
38	9/18/2018	7,055	6,946	42
39	9/18/2018	6,915	6,808	42
40	9/18/2018	6,770	6,648	84



**WORTHLEY BRK 201H  
ATTACHMENT 2  
STIM REPORT**

STAGE NUM	Stim Date	Ave Pump Rate Ave (BPM)	Ave Treatment	Max Breakdown	ISIP (PSI)	Amount of Proppant (lbs)	Amount of water bbls	Amount of nitrogen/othe
1	8/27/2018	88.8	7,282	7,387	3,566	259,140	5,790	0
2	8/28/2018	86.9	7,369	6,265	3,416	279,560	6,523	0
3	8/28/2018	90.1	7,431	5,540	4,554	279,750	5,108	0
4	8/30/2018	90.3	7,514	6,543	4,353	280,890	5,177	0
5	8/31/2018	90.2	7,139	5,987	4,468	261,360	4,946	0
6	8/31/2018	85.6	7,327	5,250	4,998	282,640	5,208	0
7	9/2/2018	90.2	7,365	5,511	4,935	282,720	5,388	0
8	9/2/2018	90.4	7,350	5,264	4,344	274,920	5,470	0
9	9/3/2018	88.7	7,337	5,320	4,612	276,520	5,124	0
10	9/3/2018	90.3	7,203	5,373	4,268	280,180	5,790	0
11	9/4/2018	90.2	7,384	5,368	4,647	279,040	4,847	0
12	9/4/2018	87.3	7,167	5,356	4,749	283,720	4,823	0
13	9/5/2018	89.9	7,196	5,452	4,398	276,370	4,655	0
14	9/6/2018	89.6	7,340	5,440	4,646	276,320	4,455	0
15	9/7/2018	90.4	6,987	5,363	4,564	280,700	4,635	0
16	9/8/2018	90.5	7,420	4,689	4,722	279,340	4,888	0
17	9/8/2018	89.2	7,242	5,723	4,588	288,460	4,722	0
18	9/9/2018	90.7	7,417	5,476	4,534	280,380	4,420	0
19	9/9/2018	87.5	7,467	5,498	4,941	273,430	4,192	0
20	9/10/2018	86.2	7,403	5,365	4,456	280,070	5,011	0
21	9/10/2018	85.6	7,297	5,364	4,509	271,360	3,907	0
22	9/11/2018	85.8	7,084	5,718	4,727	276,800	4,347	0
23	9/11/2018	86.1	7,405	5,608	4,367	261,640	4,176	0
24	9/12/2018	84.9	7,120	5,727	4,518	285,560	4,141	0
25	9/12/2018	86	6,749	5,269	5,269	273,800	4,590	0
26	9/12/2018	86.8	7,312	5,677	4,472	278,900	4,082	0
27	9/13/2018	89.6	6,690	5,869	4,559	279,520	4,262	0
28	9/13/2018	88	7,155	5,499	4,300	286,840	4,260	0
29	9/14/2018	86.7	7,158	4,608	4,404	281,360	4,079	0
30	9/14/2018	90.4	6,944	4,658	4,318	278,540	4,670	0
31	9/15/2018	86.3	7,159	5,223	4,264	287,800	4,191	0
32	9/16/2018	87.9	6,822	5,667	4,413	282,540	4,138	0
33	9/16/2018	88.5	6,957	5,785	4,565	280,900	5,535	0
34	9/17/2018	88.4	7,051	5,956	4,191	278,440	3,926	0
35	9/17/2018	89.2	7,023	5,531	4,345	282,000	4,425	0
36	9/17/2018	86.6	6,766	5,884	4,409	253,700	3,846	0
37	9/18/2018	88.1	7,400	5,782	6,896	254,480	4,552	0
38	9/18/2018	88	6,423	5,570	4,875	287,000	3,936	0
39	9/18/2018	90.1	6,690	5,352	4,266	279,020	4,025	0
40	9/18/2018	76.8	7,417	5,829	3,699	277,620	8,023	0



Well Name:           Worthley BRK 201H

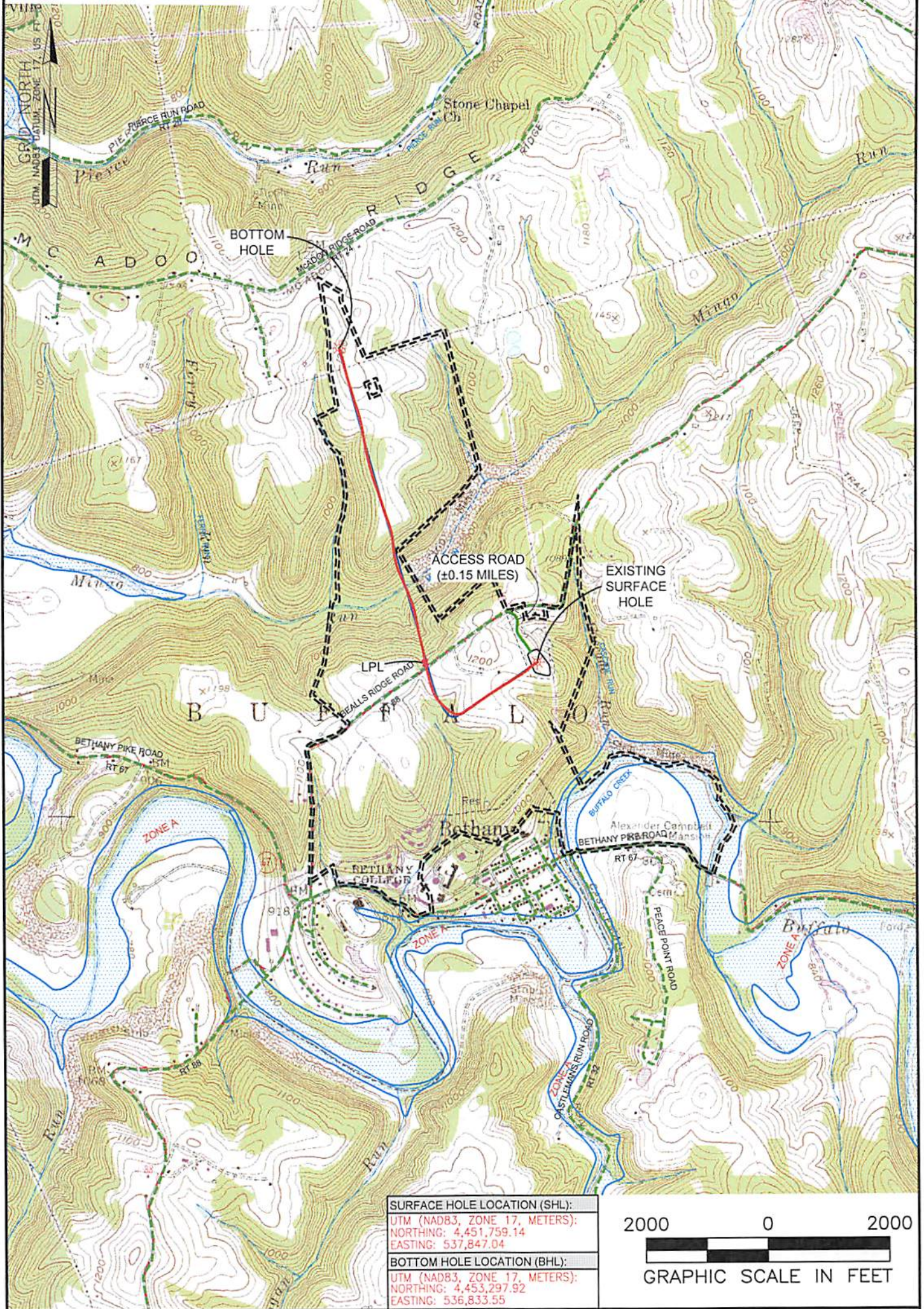
LITHOLOGY/FORMATION	TOP DEPTH, MD (FT)	TOP DEPTH, TVD (FT)	BOTTOM DEPTH, MD (FT)	BOTTOM DEPTH, TVD (FT)	QUANTITY AND TYPE OF FLUID
Base of Fresh Water	0.00	0.00	183.00	183.00	
Top of Salt Water	800.00	800.00	NA	NA	
Pittsburgh Coal	329.00	329.00	482.00	482.00	
Pottsville (ss)	482.00	482.00	784.00	784.00	
Raven Cliff (ss)	784.00	784.00	1182.00	1182.00	
Maxton (ss)	1182.00	1182.00	1510.00	1510.00	
Big Injun (ss)	1510.00	1510.00	5431.00	5430.00	
Rhinestreet (shale)	5431.00	5430.00	5698.00	5682.00	
Cashaqua (shale)	5698.00	5682.00	5762.00	5737.00	
Middlesex (shale)	5762.00	5737.00	6177.00	5805.00	
Burket (shale)	6177.00	5805.00	6198.00	5819.00	
Tully (ls)	6198.00	5819.00	6287.00	5871.00	
Mahantango (shale)	6287.00	5871.00	6653.00	5988.00	
Marcellus (shale)	6653.00	5988.00	NA	NA	Gas

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# ELK LAKE SERVICES, LLC

280 Indian Springs Road,  
Suite 123 Indiana, PA 15701  
Phone: (724) 463-7303



<b>SURFACE HOLE LOCATION (SHL):</b>
UTM (NAD83, ZONE 17, METERS):
NORTHING: 4,451,759.14
EASTING: 537,847.04
<b>BOTTOM HOLE LOCATION (BHL):</b>
UTM (NAD83, ZONE 17, METERS):
NORTHING: 4,453,297.92
EASTING: 536,833.55



**NOTES ON SURVEY**

1. SURFACE AND ROYALTY OWNER INFORMATION AND THEIR BOUNDARIES SHOWN HEREON WERE PLOTTED FROM DEEDS AND/OR TAX PARCEL MAPS PROVIDED BY CLIENT AND/OR FIELD LOCATIONS.
2. THIS PLAT DOES NOT REPRESENT A BOUNDARY SURVEY OF THE PARCELS SHOWN HEREON.
3. ALL INSETS ARE GRID NORTH UNLESS OTHERWISE DEPICTED.

**LEGEND:**

- PROPOSED SURFACE HOLE / BOTTOM HOLE
- ✱ EXISTING / PRODUCING WELLHEAD
- ✱ LPL LANDING POINT LOCATION
- FLOOD PLAN
- ACCESS ROAD
- - - PUBLIC ROAD
- ACCESS ROAD TO PREV. SITE
- - - LEASE BOUNDARY
- EXISTING PATH
- PROPOSED PATH

<b>WELL OPERATOR:</b> SWN PRODUCTION COMPANY, LLC
<b>ADDRESS:</b> 1300 FORT PIERPONT DR STE 201, MORGANTOWN, WV 26508
<b>SURFACE OWNER:</b> KIMBERLY CARMAN WORTHLEY

<b>WELL (FARM) NAME:</b> WORTHLEY BRK	<b>WELL #</b> 201H	<b>SERIAL #</b> XXXX
<b>COUNTY</b> BROOKE COUNTY - 9	<b>DISTRICT:</b> BUFFALO	
<b>USGS 7 1/2 QUADRANGLE MAP NAME</b> BETHANY, WV		



**LEGEND:**  
 ○ PROPOSED SURFACE HOLE / BOTTOM HOLE  
 \* EXISTING / PRODUCING WELLHEAD  
 \* LANDING POINT LOCATION  
 \* EXISTING WATER WELL  
 \* EXISTING SPRING  
 --- PROPOSED PATH  
 --- EXISTING PATH  
 - - - - - LEASE BOUNDARY  
 - - - - - DRILLING UNIT  
 - - - - - SURVEYED BOUNDARY

**REVISIONS:**  
 DATE: 01-09-2019  
 FILE NO: 17-02  
 DRAWN BY: JMB  
 SCALE: 1" = 2000'  
 DRAWING NO: 1  
 WELL LOCATION PLAT 1

WELL OPERATOR: SWN PRODUCTION COMPANY, LLC  
 ADDRESS: 1300 FORT PIERPONT DR STE 201  
 CITY: MORGANTOWN STATE: WV ZIP CODE: 26508  
 DESIGNATED AGENT: BRITANY WOODY  
 CITY: MORGANTOWN STATE: WV ZIP CODE: 26508

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

WELL TYPE: OIL  WASTE DISPOSAL  PRODUCTION  DEEP  GAS  LIQUID INJECTION  STORAGE  SHALLOW

WATERSHED: UPPER OHIO SOUTH  
 DISTRICT: BUFFALO  
 COUNTY: BROOKE COUNTY  
 SURFACE OWNER: KIMBERLY CARMAN WORTHLEY  
 OIL & GAS ROYALTY OWNER: COXALAK CORP, A NEWARK CORP, & KIMBERLY T. CARMAN AND KIMBERLY T. WORTHLEY, A MARSHED WOMAN DEALING IN HER S&P

WVDE OFFICE OF OIL & GAS  
 601 57TH STREET  
 CHARLESTON, WV 25034

MINIMUM DEGREE OF ACCURACY: 1/200  
 PROVEN SURVEY SOURCE OF GRADE GPS  
 ELEVATION: (NAVD 88, US FT)

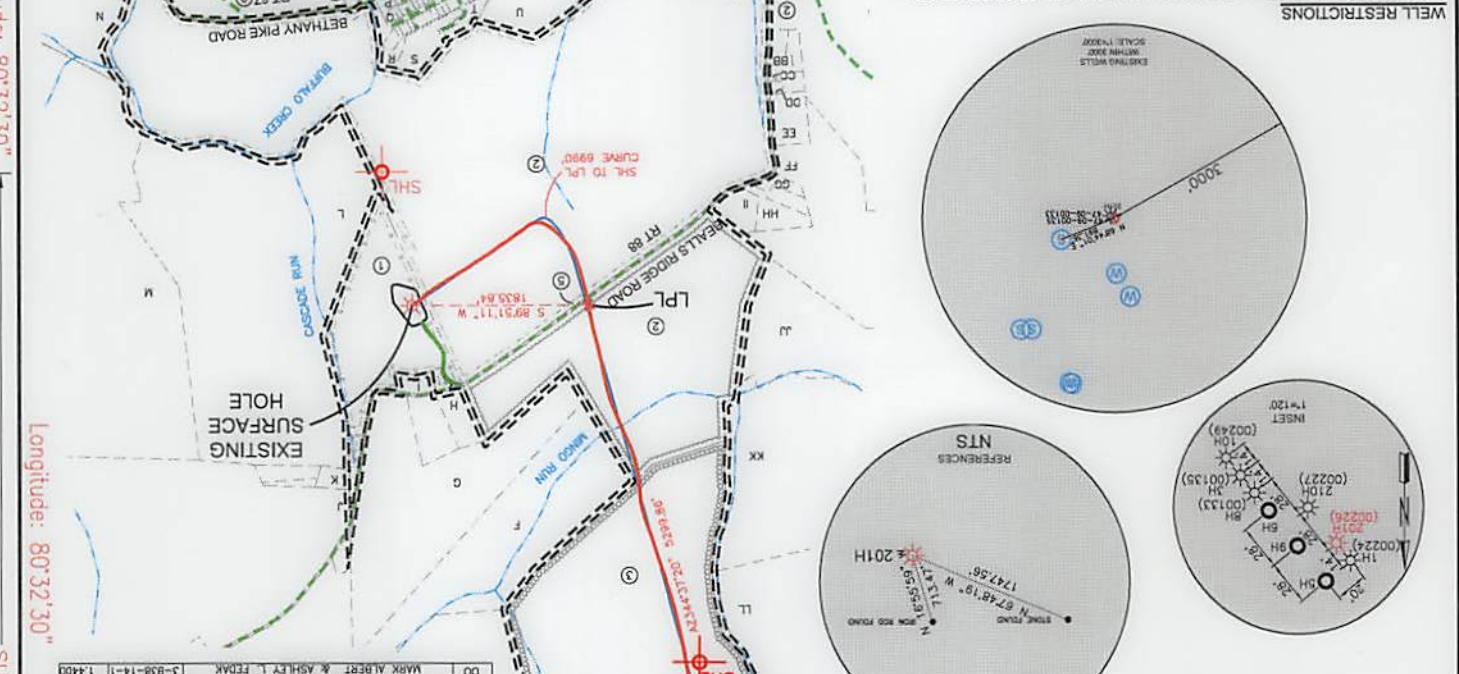
WORTHLEY BRK 2014  
 OPERATOR'S WELL #: 47  
 STATE COUNTY PERMIT  
 STATE COUNTY PERMIT

WEST VIRGINIA PROFESSIONAL SURVEYOR  
 STATE OF WEST VIRGINIA  
 No. 2164  
 JEFFREY ALAN HORNEMAN  
 LICENSED

COMPANY: SWN Production Company, LLC

**WELL RESTRICTIONS:**  
 1. NO OCCUPIED DWELLINGS > 2500 SQ FT, WITHIN 625 FEET OF CENTER OF PAD.  
 2. NO AGRICULTURE BUILDINGS > 2500 SQ FT, WITHIN 625 FEET OF CENTER OF PAD.  
 3. WATER WELLS OR DEVELOPED SPRINGS ARE WITHIN 981 FEET OF PROPOSED WELL.  
 4. PERMANENT STREAMS, LAKES, PONDS, OR RESERVOIRS ARE WITHIN THE LIMITS OF DISTURBANCE.  
 5. NO NATURAL PRODUCING THOUT STRATA WITHIN 300 FEET OF LIMITS OF DISTURBANCE.  
 6. NO GROUND INTAKE OR PUBLIC WATER SUPPLY WITHIN 1000 FEET OF WELL PAD, LIMITS OF DISTURBANCE, E & S CONTROLS OR PUBLIC WATER SUPPLY.

**NOTES ON SURVEY:**  
 1. SURFACE AND ROYALTY OWNER INFORMATION AND THEIR BOUNDARIES SHOWN HEREON WERE PLOTTED FROM DEEDS AND/OR TAX PARCEL MAPS PROVIDED BY CLIENT AND/OR FIELD LOCATIONS.  
 2. THIS PLAT DOES NOT REPRESENT A BOUNDARY SURVEY OF THE PARCELS SHOWN HEREON.  
 3. ALL INSETS ARE GRID NORTH UNLESS OTHERWISE DESIGNATED.  
 4. WELLBORE PARCELS ARE DESIGNATED WITH UNIQUE LINE TYPES.  
 5. 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 REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.



TRACT	SURFACE OWNER (S) / ROYALTY OWNER (R)	TAX PARCEL ACRES
1	KIMBERLY CARMAN WORTHLEY (S) COXALAK CORP, A NEWARK CORP, & KIMBERLY T. CARMAN AND KIMBERLY T. WORTHLEY, A MARSHED WOMAN DEALING IN HER S&P (R) <td>40.00</td>	40.00
2	BETHANY COLLEGE	1.828
3	MARK A. & GEORGINA M. FEDAK	142.87
4	MARK A. & GEORGINA M. FEDAK	18.74
5	WEST VIRGINIA DEPARTMENT OF HIGHWAYS	3.39

TRACT	ADJOINING OWNERS TABLE	TAX PARCEL ACRES
A	MARK A. & GEORGINA M. FEDAK	12.200
B	MARK A. & GEORGINA M. FEDAK	14.500
C	MARK A. & GEORGINA M. FEDAK	12.200
D	MARK A. & GEORGINA M. FEDAK	14.500
E	SPORSMAN FARMERS ASSN	107.000
F	JEFFREY W. HENSLEY	63.100
G	JEFFREY W. HENSLEY	63.100
H	CHARLES F. & DONNA BROWN	4.180
I	CARLSON WORTHLEY SERVICES, LLC	1.900
J	MARK WEAYER OWEN & VIRGINIA BEALL KREUTZ	249.000
K	LANCE M. ELSON	1.818
L	KIMBERLY CARMAN WORTHLEY	136.000
M	MARK WEAYER OWEN & VIRGINIA BEALL KREUTZ	188.400
N	TRUST OF GENE CHARLES VALENTINE	478.400
O	JAMES & KATHLEEN REEDMAN	0.800
P	JAMES & KATHLEEN REEDMAN	0.800
Q	BARBARA L. CHAMBERS	0.370
R	BETHANY COLLEGE	0.700
S	BETHANY COLLEGE	4.000
T	BETHANY COLLEGE	2.100
U	TRANS C. & GEORGINA B. STRUBB	18.000
V	BETHANY COLLEGE	29.499
W	GEORGE SOMMERS JR	0.200
X	GEORGE SOMMERS JR	0.200
Y	WILLIAM HEINS MITCHELL	1.150
Z	DONALD STEVEN MITCHELL	0.190
AA	JOHN HEINS HURT	3.000
BB	DANNY M. & SANDRA L. HOLLADAY	2.818
CC	DENNIS & DORRETTLE RISCHLITZ	0.170
DD	DENNIS & DORRETTLE RISCHLITZ	0.170
EE	ROBERT & PATRICIA WEST & SARA WEST	0.270
FF	ALLEN JOHNSON & CHARLES WAREEN ETAL	84.000
GG	DAVID G. OWENS & LINDA WALTERS	1.800
HH	DAVID G. OWENS & LINDA WALTERS	7.000
II	DAVID G. OWENS & LINDA WALTERS	3.700
JJ	STAVANAGGI INDUSTRIES INC	109.390
KK	STAVANAGGI INDUSTRIES INC	215.800
LL	JOHN H. JR & STEPHANIE PRODELCHS & KEVIN RAY	103.830
MM	JOHN H. JR & STEPHANIE PRODELCHS & KEVIN RAY	20.260
NN	ROBERT P. & TERESA E. GLOVER	2.970
OO	MARK ALBERT & ASHLEY L. FEDAK	1.440

**ELK LAKE SERVICES, LLC**  
 280 Indian Springs Road,  
 Suite 123 Indiana, PA 15701  
 Phone: (724) 463-7303

UTM (NAD83, ZONE 17, METERS):  
 SURFACE HOLE LOCATION (SHL): EASTING: 537,847.04 NORTHING: 4,451,759.14  
 LANDING POINT (LPL): EASTING: 537,888.41 NORTHING: 4,451,745.25  
 BOTTOM HOLE LOCATION (BHL): EASTING: 537,833.55 NORTHING: 4,453,297.92  
 SURFACE HOLE LOCATION (SHL): EASTING: 537,830.24 NORTHING: 4,451,629.59  
 LANDING POINT (LPL): EASTING: 537,830.24 NORTHING: 4,451,759.14  
 BOTTOM HOLE LOCATION (BHL): EASTING: 536,830.19 NORTHING: 4,453,300.64  
 SURFACE HOLE LOCATION (SHL): EASTING: 536,830.19 NORTHING: 4,451,629.59

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Latitude: 40°15'00" Longitude: 80°32'30"  
 SURFACE HOLE 3785' BOTTOM HOLE 7085'



