

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

API 47-051-01979 County Marshall District Franklin
Quad Powhatan Point 7.5' Pad Name Bryan Field/Pool Name _____
Farm name CNX Land Resources, Inc. Well Number Bryan S-8HM
Operator (as registered with the OOG) Tug Hill Operating, LLC
Address 380 Southpointe Boulevard, Plaza II, Suite 200 City Canonsburg State PA Zip 15317

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4,402,893.78 Easting 519,126.94
Landing Point of Curve Northing 4,402,855.30 Easting 519,405.44
Bottom Hole Northing 4,401,126.44 Easting 520,397.00

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Elevation (ft) 1191.7' 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; Base oil, osmotic inhibitor, weighting agent, viscosifier, emulsifier, hardness buffer, fluid loss additive, LCM, Shale inhibitor, de-foamer, soaping agent, coagulant, flocculant; specific additives per WSSP and Permit.

Date permit issued 2/7/2018 Date drilling commenced 9/23/2018 Date drilling ceased 1/23/2019
Date completion activities began 1/26/2020 Date completion activities ceased 2/11/2020
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 831' Open mine(s) (Y/N) depths N
Salt water depth(s) ft 1595' Void(s) encountered (Y/N) depths N
Coal depth(s) ft 729-735', 824-830' Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed by:

API 47-051 - 01979 Farm name CNX Land Resources, Inc. Well number Bryan S-8HM

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"	120'	NEW	94.5#	N/A	Y
Surface	17 1/2"	13 3/8"	932'	NEW	54.5#	N/A	Y
Coal	17 1/2"	13 3/8"	932'	NEW	54.5#	N/A	Y
Intermediate 1	12 1/4"	9 5/8"	2,669'	NEW	36#	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8 3/4"	5 1/2"	13,680'	NEW	20#	N/A	Y
Tubing		2 3/8"	6,840'	NEW	4.7#	N/A	Y
Packer type and depth set							

Comment Details _____

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	A		15.6	1.19		0	8
Surface	A	1019	15.6	1.19	1219	0	8
Coal	A	1019	15.6	1.19	1219	0	8
Intermediate 1	A	896	15.6	1.19	1062	0	8
Intermediate 2							
Intermediate 3							
Production	A	3190	14.5	1.17	3746	0	8
Tubing							

Drillers TD (ft) 13,700' Loggers TD (ft) n/a
 Deepest formation penetrated Marcellus Plug back to (ft) n/a
 Plug back procedure n/a

Kick off depth (ft) 5,829'

Check all wireline logs run caliper density deviated/directional induction
 neutron resistivity gamma ray temperature sonic

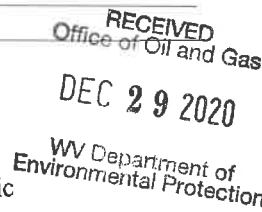
Well cored Yes No Conventional Sidewall Were cuttings collected Yes No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING 3 centralizers on surface casing at equal distance.
 Intermediate - 1 centralizer every other joint.
 Production - one centralizer every other joint in lateral, one centralizer every joint through curve, one centralizer every other joint to surface.

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 _____



Bryan S-8HM
PEFORATION RECORD

Stage No.	Perforation Date	Perforated from MD ft.	Perforated to MD. Ft.	Number of Perforations	Formation(s)
1	1/27/2020	13327	13487	48	Marcellus
2	1/27/2020	13153	13313	48	Marcellus
3	1/28/2020	12979	13139	48	Marcellus
4	1/28/2020	12805	12965	48	Marcellus
5	1/29/2020	12631	12791	48	Marcellus
6	1/29/2020	12457	12617	48	Marcellus
7	1/29/2020	12283	12443	48	Marcellus
8	1/30/2020	12109	12269	48	Marcellus
9	1/31/2020	11935	12095	48	Marcellus
10	1/31/2020	11761	11921	48	Marcellus
11	1/31/2020	11587	11747	48	Marcellus
12	2/1/2020	11413	11573	48	Marcellus
13	2/1/2020	11239	11399	48	Marcellus
14	2/2/2020	11065	11225	48	Marcellus
15	2/2/2020	10891	11051	48	Marcellus
16	2/3/2020	10717	10877	48	Marcellus
17	2/3/2020	10543	10703	48	Marcellus
18	2/3/2020	10369	10529	48	Marcellus
19	2/4/2020	10195	10355	48	Marcellus
20	2/4/2020	10021	10181	48	Marcellus
21	2/4/2020	9847	10007	48	Marcellus
22	2/5/2020	9673	9833	48	Marcellus
23	2/5/2020	9499	9659	48	Marcellus
24	2/6/2020	9325	9485	48	Marcellus
25	2/6/2020	9151	9311	48	Marcellus
26	2/7/2020	8977	9137	48	Marcellus
27	2/7/2020	8803	8963	48	Marcellus
28	2/7/2020	8629	8789	48	Marcellus
29	2/8/2020	8455	8615	48	Marcellus
30	2/8/2020	8281	8441	48	Marcellus
31	2/9/2020	8107	8267	48	Marcellus
32	2/9/2020	7933	8093	48	Marcellus
33	2/9/2020	7759	7919	48	Marcellus
34	2/10/2020	7585	7745	48	Marcellus
35	2/11/2020	7411	7571	48	Marcellus
36	2/11/2020	7237	7397	48	Marcellus
37	2/11/2020	7063	7223	48	Marcellus
38	2/11/2020	6889	7049	48	Marcellus

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STIMULATION INFORMATION PER STAGE

Stage No.	Ave. Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
1	89	7222	5180	3853	443950	8980	0
2	89.2	7422	5138	4759	442110	8802	0
3	89.2	7374	5223	4781	440620	8894	0
4	89	6990	5153	5203	444740	8435	0
5	88.7	7238	5232	5060	442920	8684	0
6	89.2	7065	5236	4825	441210	9189	0
7	89.5	7394	5005	5240	439780	8057	0
8	89	7088	5154	4904	442700	8531	0
9	89.2	7122	5029	4871	443900	8792	0
10	89	7268	5322	4787	448280	9239	0
11	89.4	7354	5291	5073	449390	8481	0
12	89.4	6964	5487	4701	444040	9257	0
13	89.6	7220	5638	4846	444410	8781	0
14	89.3	7403	5210	4851	441060	8620	0
15	89.2	6948	5267	5127	442970	8778	0
16	89	6745	5132	5107	441576	8268	0
17	89.5	6838	5240	4901	434494	8837	0
18	89.6	6746	4792	4452	435418	8824	0
19	89.3	6816	4792	4609	443760	8222	0
20	89.7	6621	5373	5139	440850	8661	0
21	89.6	6630	5263	4986	442860	8044	0
22	89.5	6402	5261	5081	444060	8581	0
23	89.5	6479	5599	4753	440810	8631	0
24	89.3	6513	5282	4694	447680	8546	0
25	89.3	6459	4900	4733	442130	8481	0
26	89.7	6560	4924	4892	442970	8104	0
27	89.4	6479	4933	4710	443430	8327	0
28	89.2	6515	5072	4644	441200	8404	0
29	89.2	6422	5012	5190	440000	7854	0
30	89.6	6495	5011	4991	442530	8465	0
31	89.7	6383	5071	4653	443470	8025	0
32	89.2	6399	5219	5166	445440	8428	0

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Stage No.	Ave. Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
33	89.2	6333	5468	5050	448710	8327	0
34	89.4	6336	4838	4655	446460	8180	0
35	89.6	6326	5355	4872	442500	8137	0
36	89.6	6375	5147	4578	450160	8212	0
37	89.3	6318	5139	4815	444710	8522	0
38	89.6	6303	5344	4632	437930	8060	0

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BRYAN S-8HM

LITHOLOGY/FORMATION	TOP DEPTH IN FT/ Name TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID
Maxton	1908	1998	1909	1999	Sandstone
Big Lime	1998	2068	1999	2070	Limestone
Big Injun	2068	2352	2070	2355	Sandstone
Weir	2352	2547	2355	2551	Sandstone
Berea	2547	2892	2551	2897	Sandstone
Gordon	2892	2946	2897	2951	Sandstone
Fifty Foot	2946	3494	2951	3501	Sandstone
Speechley	3494	4931	3501	4965	Sandstone
Benson	4931	5286	4965	5334	Sandstone
Alexander	5286	5880	5334	5950	Siltstone
Rhinestreet	5880	6295	5950	6427	Black shale
Middlesex	6295	6372	6427	6544	Black shale
Geneseo/Burkett	6372	6396	6544	6585	Black shale
Tully	6396	6434	6585	6656	Limestone
Hamilton	6434	6481	6656	6775	Grey shale
Marcellus	6481	-	6775	-	Black shale

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Well: Bryan S-08HM (slot H)
 Site: Bryan Pad
 Project: Marshall County, West Virginia.
 Design: rev4
 Rig: Precision 110

Geodetic System: Universal Transverse Mercator (US Survey Feet)
 Datum: NAD83 West Virginia - HARN
 Ellipsoid: GRS 1990
 Zone: Zone 17N (84 W to 78 W)
 System Datum: Mean Sea Level
 Depth Reference: RKB=1191+28 @ 1219.00usft (Precision 110)

Northing 14445160.22 Easting 1703169.27 Latitude 39.77576483 Longitude -80.77665329

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.83°



Azimuths to Grid North
 True North: -0.14°
 Magnetic North: -8.83°

Magnetic Field
 Strength: 52000.4snT
 Dip Angle: 66.83°
 Date: 12/25/2018
 Model: IGRF2015

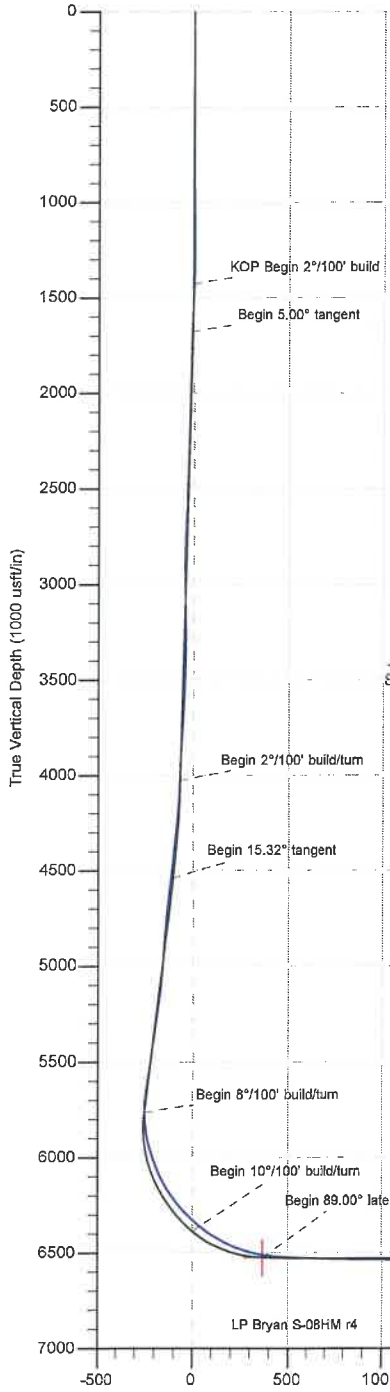
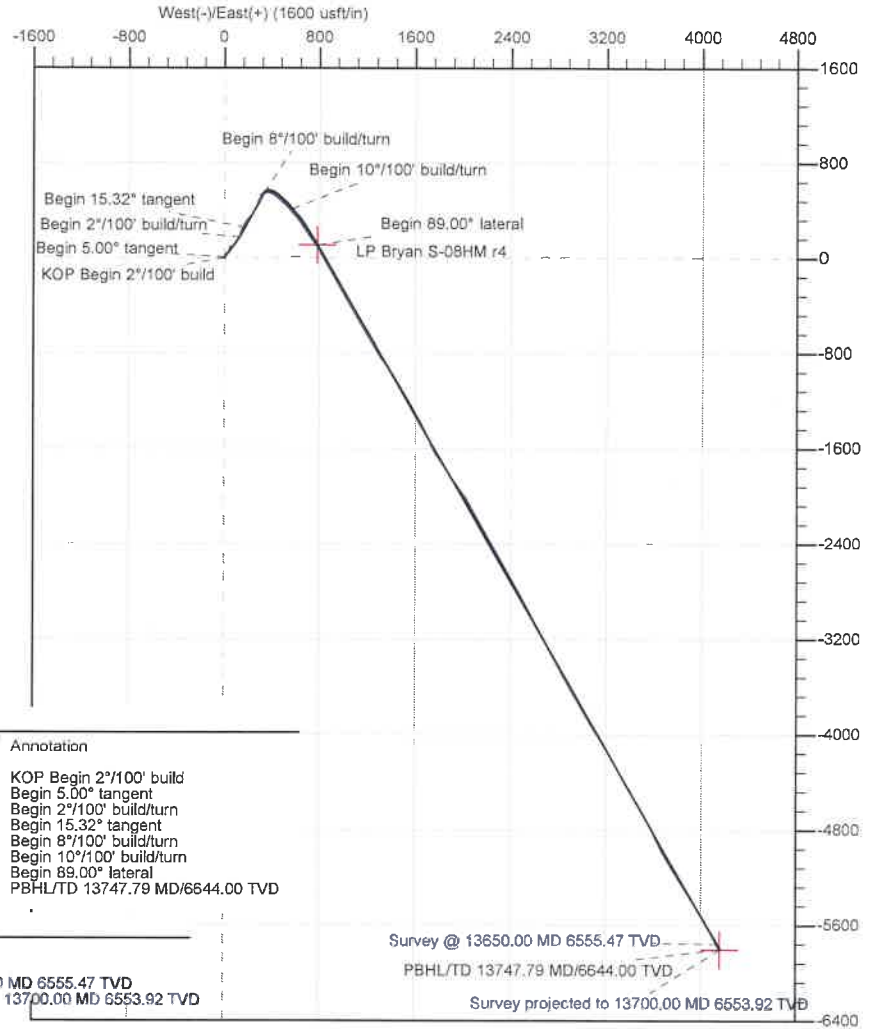


SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	VSec	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1428.00	0.00	0.00	1428.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 2°/100' build
3	1678.00	5.00	36.29	1677.68	8.79	6.45	2.00	36.29	-3.38	Begin 5.00° tangent
4	4037.30	5.00	36.29	4028.00	174.53	128.16	0.00	0.00	-67.09	Begin 2°/100' build/turn
5	4556.71	15.32	28.60	4538.59	253.24	174.53	2.00	-11.31	-104.01	Begin 15.32° tangent
6	5827.92	15.32	28.60	5764.62	548.18	335.31	0.00	0.00	-249.91	Begin 8°/100' build/turn
7	6537.30	50.00	139.33	6386.38	413.16	577.37	8.00	121.05	0.90	Begin 10°/100' build/turn
8	6939.78	89.00	150.26	6525.00	108.91	786.30	10.00	17.07	369.90	Begin 89.00° lateral
9	13747.79	89.00	150.26	6644.00	-5801.64	4162.72	0.00	0.00	7140.54	PBHL/TD 13747.79 MD/6644.00 TVD

ANNOTATIONS SURVEYS

MD	Inc	Azi	TVD	+N-S	+E-W	VSec	Annotation
280.00	0.47	109.50	280.00	-0.36	1.09	0.93	MWD surveys
13650.00	91.78	149.72	6555.47	-5755.18	4141.65	7090.50	Survey @ 13650.00 MD 6555.47 TVD
13700.00	91.78	149.72	6553.92	-5798.34	4166.84	7140.26	Survey projected to 13700.00 MD 6553.92 TVD



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Vertical Section at 144.34° (1000 usft/in)

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Bryan S-08HM (slot H)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1191+28 @ 1219.00usft (Precision 110)
Site:	Bryan Pad	MD Reference:	RKB=1191+28 @ 1219.00usft (Precision 110)
Well:	Bryan S-08HM (slot H)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Project	Marshall County, West Virginia.		
Map System:	Universal Transverse Mercator (US Survey Feet)	System Datum:	Mean Sea Level
Geo Datum:	NAD83 West Virginia - HARN		
Map Zone:	Zone 17N (84 W to 78 W)		

Site	Bryan Pad				
Site Position:		Northing:	14,445,110.80 usft	Latitude:	39.77562900
From:	Lat/Long	Easting:	1,703,181.57 usft	Longitude:	-80.77660992
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.14 °

Well	Bryan S-08HM (slot H)					
Well Position	+N/-S	0.00 usft	Northing:	14,445,160.23 usft	Latitude:	39.77576483
	+E/-W	0.00 usft	Easting:	1,703,169.27 usft	Longitude:	-80.77665329
Position Uncertainty	0.00 usft		Wellhead Elevation:	usft	Ground Level:	1,191.00 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/25/2018	-8.69	66.83	52,000.38263757

Design	Surveys Original Hole				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	144.34	

Survey Program	Date 1/28/2019				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
280.00	2,627.00	MWD surf (Original Hole)	MWD	MWD - Standard	
2,700.00	13,650.00	MWD lat (Original Hole)	MWD	MWD - Standard	
13,700.00	13,700.00	Projection (Original Hole)	MWD	MWD - Standard	

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Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	14,445,160.23	1,703,169.27	39.77576483	-80.77665329	
280.00	0.47	108.50	280.00	-0.36	1.09	14,445,159.86	1,703,170.35	39.77576382	-80.77664942	
MWD surveys										
337.00	0.27	77.40	337.00	-0.41	1.44	14,445,159.82	1,703,170.71	39.77576370	-80.77664816	
433.00	0.59	14.27	432.99	0.12	1.78	14,445,160.35	1,703,171.05	39.77576515	-80.77664694	
527.00	0.25	52.85	526.99	0.71	2.07	14,445,160.94	1,703,171.33	39.77576677	-80.77664593	
621.00	0.56	87.08	620.99	0.86	2.69	14,445,161.09	1,703,171.96	39.77576717	-80.77664371	
716.00	0.26	193.28	715.99	0.67	3.10	14,445,160.90	1,703,172.37	39.77576666	-80.77664224	
809.00	0.44	153.76	808.99	0.15	3.21	14,445,160.37	1,703,172.48	39.77576521	-80.77664185	
899.00	0.32	255.12	898.98	-0.23	3.12	14,445,160.00	1,703,172.39	39.77576419	-80.77664218	

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Site:	Bryan Pad	MD Reference:	RKB=1191+28 @ 1219.00usft (Precision 110)
Well:	Bryan S-08HM (slot H)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

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Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
932.00	0.37	98.06	931.98	-0.27	3.14	14,445,159.96	1,703,172.41	39.77576408	-80.77664212
989.00	0.60	149.99	988.98	-0.55	3.47	14,445,159.68	1,703,172.74	39.77576330	-80.77664094
1,079.00	0.91	124.99	1,078.97	-1.37	4.29	14,445,158.86	1,703,173.56	39.77576105	-80.77663803
1,168.00	0.91	135.52	1,167.96	-2.28	5.37	14,445,157.95	1,703,174.63	39.77575854	-80.77663421
1,258.00	0.93	110.39	1,257.95	-3.04	6.55	14,445,157.18	1,703,175.82	39.77575643	-80.77663000
1,348.00	0.96	313.28	1,347.95	-2.78	6.69	14,445,157.45	1,703,175.95	39.77575715	-80.77662951
1,438.00	2.47	321.85	1,437.90	-0.74	4.94	14,445,159.49	1,703,174.21	39.77576277	-80.77663571
1,527.00	2.49	336.38	1,526.82	2.54	2.98	14,445,162.77	1,703,172.25	39.77577179	-80.77664266
1,617.00	3.08	13.04	1,616.72	6.69	2.74	14,445,166.92	1,703,172.01	39.77578318	-80.77664347
1,707.00	4.10	23.48	1,706.55	12.00	4.57	14,445,172.22	1,703,173.84	39.77579775	-80.77663692
1,796.00	4.27	26.31	1,795.31	17.88	7.31	14,445,178.11	1,703,176.57	39.77581390	-80.77662713
1,886.00	4.67	42.09	1,885.04	23.61	11.25	14,445,183.83	1,703,180.51	39.77582959	-80.77661305
1,976.00	5.54	46.84	1,974.68	29.30	16.87	14,445,189.52	1,703,186.14	39.77584518	-80.77659298
2,065.00	6.68	46.03	2,063.17	35.83	23.73	14,445,196.06	1,703,193.00	39.77586307	-80.77656851
2,155.00	7.21	39.35	2,152.51	43.83	31.08	14,445,204.06	1,703,200.35	39.77588499	-80.77654228
2,244.00	5.88	32.07	2,240.93	52.01	37.04	14,445,212.24	1,703,206.31	39.77590742	-80.77652099
2,334.00	4.01	29.17	2,330.59	58.67	41.02	14,445,218.90	1,703,210.29	39.77592567	-80.77650676
2,424.00	3.26	33.22	2,420.41	63.56	43.96	14,445,223.78	1,703,213.23	39.77593908	-80.77649626
2,513.00	3.81	23.90	2,509.24	68.38	46.55	14,445,228.61	1,703,215.81	39.77595230	-80.77648702
2,603.00	4.11	19.85	2,599.03	74.15	48.85	14,445,234.37	1,703,218.12	39.77596812	-80.77647876
2,627.00	4.34	19.53	2,622.96	75.81	49.45	14,445,236.04	1,703,218.71	39.77597269	-80.77647663
2,707.00	4.53	18.69	2,702.72	81.66	51.47	14,445,241.88	1,703,220.74	39.77598873	-80.77646937
2,777.00	3.78	13.48	2,772.54	86.52	52.90	14,445,246.75	1,703,222.16	39.77600207	-80.77646426
2,866.00	1.44	357.60	2,861.44	90.49	53.53	14,445,250.72	1,703,222.80	39.77601297	-80.77646196
2,959.00	0.91	224.00	2,954.43	91.13	52.97	14,445,251.35	1,703,222.24	39.77601473	-80.77646395
3,050.00	2.21	190.08	3,045.40	88.88	52.16	14,445,249.11	1,703,221.43	39.77600856	-80.77646685
3,139.00	4.03	70.32	3,134.32	88.24	54.81	14,445,248.47	1,703,224.07	39.77600679	-80.77645744
3,229.00	7.54	58.35	3,223.85	92.41	62.81	14,445,252.63	1,703,232.08	39.77601818	-80.77642890
3,319.00	6.75	57.00	3,313.15	98.39	72.28	14,445,258.61	1,703,241.54	39.77603453	-80.77639517
3,408.00	6.65	37.27	3,401.56	105.34	79.79	14,445,265.56	1,703,249.05	39.77605357	-80.77636839
3,498.00	7.62	36.04	3,490.86	114.31	86.45	14,445,274.54	1,703,255.72	39.77607816	-80.77634458
3,588.00	8.74	35.88	3,579.94	124.67	93.97	14,445,284.90	1,703,263.24	39.77610658	-80.77631773
3,677.00	8.01	32.99	3,667.99	135.35	101.31	14,445,295.58	1,703,270.58	39.77613586	-80.77629151
3,767.00	8.24	32.08	3,757.09	146.08	108.15	14,445,306.31	1,703,277.42	39.77616526	-80.77626707
3,857.00	7.60	27.61	3,846.23	156.82	114.33	14,445,317.04	1,703,283.60	39.77619471	-80.77624497
3,946.00	7.05	34.98	3,934.51	166.51	120.19	14,445,326.73	1,703,289.46	39.77622128	-80.77622403
4,036.00	6.19	33.35	4,023.91	175.09	126.03	14,445,335.31	1,703,295.29	39.77624480	-80.77620319
4,125.00	7.33	30.29	4,112.29	184.00	131.53	14,445,344.22	1,703,300.79	39.77626924	-80.77618353
4,215.00	9.40	23.39	4,201.33	195.70	137.34	14,445,355.93	1,703,306.61	39.77630134	-80.77616273
4,305.00	10.65	18.58	4,289.95	210.33	142.91	14,445,370.56	1,703,312.18	39.77634148	-80.77614278
4,394.00	11.06	19.93	4,377.36	226.15	148.44	14,445,386.38	1,703,317.71	39.77638489	-80.77612296
4,484.00	11.76	28.00	4,465.59	242.37	155.69	14,445,402.59	1,703,324.96	39.77642937	-80.77609701
4,574.00	14.42	27.80	4,553.24	260.38	165.22	14,445,420.61	1,703,334.49	39.77647878	-80.77606292
4,663.00	16.97	28.51	4,638.92	281.60	176.59	14,445,441.83	1,703,345.86	39.77653698	-80.77602226
4,753.00	15.57	35.56	4,725.32	302.97	189.89	14,445,463.20	1,703,359.15	39.77659557	-80.77597475
4,842.00	13.81	36.55	4,811.40	321.22	203.16	14,445,481.45	1,703,372.43	39.77664561	-80.77592735
4,932.00	14.64	39.29	4,898.65	338.66	216.76	14,445,498.88	1,703,386.03	39.77669339	-80.77587879
5,022.00	14.64	37.45	4,985.72	356.49	230.88	14,445,516.71	1,703,400.15	39.77674226	-80.77582838
5,111.00	15.42	33.06	5,071.68	375.33	244.17	14,445,535.56	1,703,413.44	39.77679393	-80.77578090
5,201.00	15.96	26.15	5,158.34	396.47	256.16	14,445,556.70	1,703,425.42	39.77685189	-80.77573806
5,291.00	15.69	25.56	5,244.92	418.56	266.86	14,445,578.78	1,703,436.13	39.77691247	-80.77569977
5,380.00	15.15	25.74	5,330.72	439.89	277.10	14,445,600.12	1,703,446.37	39.77697099	-80.77566312
5,470.00	14.98	25.68	5,417.63	460.97	287.25	14,445,621.19	1,703,456.52	39.77702880	-80.77562681
5,560.00	15.60	25.25	5,504.44	482.39	297.45	14,445,642.62	1,703,466.72	39.77708758	-80.77559031
5,649.00	14.86	20.03	5,590.32	503.94	306.47	14,445,664.17	1,703,475.73	39.77714669	-80.77555803



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Bryan S-08HM (slot H)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1191+28 @ 1219.00usft (Precision 110)
Site:	Bryan Pad	MD Reference:	RKB=1191+28 @ 1219.00usft (Precision 110)
Well:	Bryan S-08HM (slot H)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,722.00	15.00	19.50	5,660.85	521.64	312.83	14,445,681.87	1,703,482.09	39.77719525	-80.77553524
5,767.00	14.30	31.70	5,704.40	531.86	317.69	14,445,692.09	1,703,486.96	39.77722329	-80.77551783
5,812.00	15.70	49.80	5,747.89	540.52	325.27	14,445,700.75	1,703,494.53	39.77724703	-80.77549079
5,856.00	16.70	67.90	5,790.17	546.75	335.68	14,445,706.98	1,703,504.95	39.77726405	-80.77545368
5,901.00	15.91	73.96	5,833.36	550.89	347.60	14,445,711.11	1,703,516.86	39.77727533	-80.77541122
5,946.00	17.58	86.79	5,876.47	552.97	360.32	14,445,713.20	1,703,529.58	39.77728097	-80.77536594
5,991.00	18.64	100.15	5,919.26	552.08	374.19	14,445,712.31	1,703,543.45	39.77727844	-80.77531658
6,036.00	19.34	110.26	5,961.82	548.24	388.26	14,445,708.46	1,703,557.53	39.77726777	-80.77526652
6,081.00	20.66	114.22	6,004.11	542.40	402.49	14,445,702.63	1,703,571.76	39.77725164	-80.77521592
6,126.00	22.77	119.84	6,045.92	534.81	417.29	14,445,695.03	1,703,586.55	39.77723069	-80.77516332
6,170.00	25.67	124.94	6,086.04	525.11	432.49	14,445,685.34	1,703,601.76	39.77720396	-80.77510930
6,215.00	28.97	126.70	6,126.02	513.01	449.22	14,445,673.24	1,703,618.49	39.77717061	-80.77504985
6,260.00	31.65	129.16	6,164.87	499.04	467.12	14,445,659.27	1,703,636.39	39.77713212	-80.77498628
6,305.00	34.73	132.67	6,202.52	482.89	485.71	14,445,643.12	1,703,654.97	39.77708764	-80.77492028
6,350.00	38.42	135.13	6,238.66	464.29	505.00	14,445,624.51	1,703,674.27	39.77703642	-80.77485176
6,395.00	43.16	135.13	6,272.72	443.46	525.74	14,445,603.68	1,703,695.00	39.77697907	-80.77477815
6,440.00	46.15	135.22	6,304.72	421.03	548.03	14,445,581.25	1,703,717.30	39.77691732	-80.77469900
6,485.00	49.14	136.80	6,335.04	397.10	571.12	14,445,557.32	1,703,740.38	39.77685144	-80.77461706
6,529.00	52.00	139.62	6,362.99	371.75	593.74	14,445,531.98	1,703,763.01	39.77678169	-80.77453674
6,574.00	54.07	142.96	6,390.05	343.70	616.21	14,445,503.92	1,703,785.48	39.77670448	-80.77445703
6,619.00	57.85	143.75	6,415.23	313.78	638.46	14,445,474.01	1,703,807.72	39.77662217	-80.77437811
6,664.00	61.67	146.03	6,437.90	281.98	660.80	14,445,442.20	1,703,830.07	39.77653467	-80.77429888
6,709.00	66.29	146.74	6,457.63	248.31	683.18	14,445,408.53	1,703,852.44	39.77644205	-80.77421954
6,754.00	70.11	146.03	6,474.34	213.52	706.31	14,445,373.75	1,703,875.57	39.77634636	-80.77413753
6,799.00	73.32	145.86	6,488.46	178.13	730.23	14,445,338.35	1,703,899.50	39.77624899	-80.77405270
6,843.00	76.13	146.03	6,500.05	142.96	754.00	14,445,303.19	1,703,923.26	39.77615226	-80.77396843
6,888.00	79.12	147.44	6,509.69	106.22	778.10	14,445,266.44	1,703,947.37	39.77605117	-80.77388297
6,933.00	83.16	149.11	6,516.62	68.40	801.47	14,445,228.63	1,703,970.74	39.77594716	-80.77380013
6,978.00	86.64	150.16	6,520.62	29.74	824.13	14,445,189.96	1,703,993.39	39.77584081	-80.77371985
7,068.00	88.66	150.08	6,524.31	-48.23	868.92	14,445,112.00	1,704,038.19	39.77562638	-80.77356111
7,158.00	87.80	150.20	6,527.09	-126.24	913.71	14,445,033.98	1,704,082.98	39.77541182	-80.77340241
7,247.00	89.93	150.34	6,528.85	-203.51	957.83	14,444,956.72	1,704,127.10	39.77519933	-80.77324606
7,337.00	89.85	150.08	6,529.03	-281.62	1,002.55	14,444,878.61	1,704,171.81	39.77498451	-80.77308762
7,427.00	90.20	149.46	6,528.99	-359.38	1,047.86	14,444,800.85	1,704,217.13	39.77477064	-80.77292705
7,516.00	89.85	150.69	6,528.95	-436.51	1,092.26	14,444,723.72	1,704,261.52	39.77455851	-80.77276973
7,606.00	90.20	151.22	6,528.91	-515.19	1,135.95	14,444,645.04	1,704,305.22	39.77434212	-80.77261493
7,696.00	90.29	151.22	6,528.52	-594.07	1,179.28	14,444,566.15	1,704,348.55	39.77412519	-80.77246143
7,785.00	90.86	150.87	6,527.63	-671.94	1,222.37	14,444,488.28	1,704,391.63	39.77391103	-80.77230880
7,875.00	89.32	148.67	6,527.49	-749.70	1,267.68	14,444,410.53	1,704,436.94	39.77369718	-80.77214825
7,965.00	89.01	147.62	6,528.80	-826.13	1,315.17	14,444,334.09	1,704,484.44	39.77348694	-80.77197991
8,055.00	88.92	147.26	6,530.43	-901.98	1,363.60	14,444,258.25	1,704,532.86	39.77327832	-80.77180824
8,144.00	88.97	148.76	6,532.07	-977.44	1,410.74	14,444,182.78	1,704,580.00	39.77307073	-80.77164115
8,234.00	89.19	148.67	6,533.51	-1,054.35	1,457.47	14,444,105.88	1,704,626.73	39.77285920	-80.77147554
8,324.00	89.54	148.67	6,534.51	-1,131.22	1,504.26	14,444,029.01	1,704,673.53	39.77264776	-80.77130970
8,413.00	89.05	149.72	6,535.60	-1,207.66	1,549.84	14,443,952.57	1,704,719.10	39.77243752	-80.77114819
8,503.00	87.96	150.25	6,537.95	-1,285.56	1,594.84	14,443,874.67	1,704,764.11	39.77222327	-80.77098873
8,592.00	88.22	153.42	6,540.92	-1,363.97	1,636.82	14,443,796.26	1,704,806.09	39.77200764	-80.77084004
8,682.00	88.66	152.80	6,543.37	-1,444.21	1,677.51	14,443,716.02	1,704,846.78	39.77178700	-80.77069596
8,772.00	91.43	154.03	6,543.30	-1,524.68	1,717.78	14,443,635.55	1,704,887.05	39.77156571	-80.77055337
8,861.00	88.57	150.78	6,543.30	-1,603.54	1,759.00	14,443,556.69	1,704,928.27	39.77134885	-80.77040740
8,951.00	89.10	147.26	6,545.13	-1,680.67	1,805.31	14,443,479.56	1,704,974.58	39.77113670	-80.77024329
9,041.00	90.37	149.90	6,545.54	-1,757.46	1,852.22	14,443,402.76	1,705,021.49	39.77092547	-80.77007704
9,131.00	90.46	148.93	6,544.89	-1,834.94	1,898.01	14,443,325.29	1,705,067.28	39.77071238	-80.76991478
9,220.00	90.02	144.98	6,544.52	-1,909.53	1,946.54	14,443,250.70	1,705,115.80	39.77050720	-80.76974278
9,310.00	91.16	143.31	6,543.59	-1,982.47	1,999.25	14,443,177.76	1,705,168.51	39.77030652	-80.76955586

WV Department of Environmental Protection



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Bryan S-08HM (slot H)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1191+28 @ 1219.00usft (Precision 110)
Site:	Bryan Pad	MD Reference:	RKB=1191+28 @ 1219.00usft (Precision 110)
Well:	Bryan S-08HM (slot H)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,399.00	93.54	150.30	6,539.94	-2,056.83	2,047.90	14,443,103.40	1,705,217.17	39.77010196	-80.76938338
9,489.00	91.47	151.66	6,536.01	-2,135.44	2,091.52	14,443,024.78	1,705,260.78	39.76988574	-80.76922888
9,579.00	91.82	151.13	6,533.42	-2,214.43	2,134.59	14,442,945.80	1,705,303.85	39.76966853	-80.76907633
9,668.00	89.58	151.57	6,532.33	-2,292.52	2,177.25	14,442,867.71	1,705,346.52	39.76945376	-80.76892520
9,758.00	88.26	150.87	6,534.03	-2,371.39	2,220.57	14,442,788.84	1,705,389.84	39.76923687	-80.76877176
9,848.00	88.75	150.52	6,536.38	-2,449.84	2,264.61	14,442,710.39	1,705,433.88	39.76902109	-80.76861576
9,938.00	89.41	150.52	6,537.82	-2,528.18	2,308.90	14,442,632.05	1,705,478.16	39.76880564	-80.76845888
10,027.00	90.46	150.34	6,537.93	-2,605.58	2,352.82	14,442,554.64	1,705,522.08	39.76859275	-80.76830329
10,117.00	90.29	150.43	6,537.34	-2,683.83	2,397.29	14,442,476.40	1,705,566.56	39.76837756	-80.76814574
10,207.00	89.89	151.31	6,537.20	-2,762.44	2,441.10	14,442,397.78	1,705,610.37	39.76816135	-80.76799055
10,296.00	89.01	151.75	6,538.05	-2,840.67	2,483.52	14,442,319.55	1,705,652.79	39.76794620	-80.76784030
10,386.00	89.71	152.10	6,539.05	-2,920.08	2,525.88	14,442,240.15	1,705,695.14	39.76772783	-80.76769031
10,476.00	88.26	151.66	6,540.65	-2,999.44	2,568.29	14,442,160.79	1,705,737.55	39.76750958	-80.76754011
10,565.00	89.19	151.83	6,542.63	-3,077.82	2,610.41	14,442,082.41	1,705,779.68	39.76729404	-80.76739094
10,655.00	90.29	151.04	6,543.04	-3,156.86	2,653.44	14,442,003.37	1,705,822.71	39.76707666	-80.76723853
10,744.00	88.09	151.04	6,544.30	-3,234.72	2,696.53	14,441,925.51	1,705,865.79	39.76686253	-80.76708592
10,834.00	89.19	151.48	6,546.43	-3,313.61	2,739.79	14,441,846.62	1,705,909.06	39.76664557	-80.76693269
10,924.00	90.11	151.39	6,546.98	-3,392.65	2,782.82	14,441,767.58	1,705,952.09	39.76642819	-80.76678029
11,014.00	91.16	151.66	6,545.98	-3,471.75	2,825.73	14,441,688.47	1,705,995.00	39.76621064	-80.76662833
11,103.00	89.45	150.08	6,545.51	-3,549.49	2,869.05	14,441,610.74	1,706,038.32	39.76599684	-80.76647489
11,193.00	90.55	150.16	6,545.51	-3,627.53	2,913.89	14,441,532.70	1,706,083.15	39.76578221	-80.76631806
11,283.00	89.10	150.25	6,545.79	-3,705.63	2,958.61	14,441,454.60	1,706,127.87	39.76556741	-80.76615764
11,372.00	89.71	150.25	6,546.71	-3,782.89	3,002.77	14,441,377.34	1,706,172.03	39.76535490	-80.76600121
11,462.00	89.98	149.20	6,546.95	-3,860.62	3,048.14	14,441,299.61	1,706,217.41	39.76514112	-80.76584047
11,551.00	87.91	149.29	6,548.59	-3,937.08	3,093.64	14,441,223.14	1,706,262.91	39.76493079	-80.76567926
11,641.00	88.75	149.46	6,551.21	-4,014.49	3,139.47	14,441,145.73	1,706,308.74	39.76471787	-80.76551690
11,731.00	89.58	149.55	6,552.53	-4,092.04	3,185.14	14,441,068.19	1,706,354.40	39.76450459	-80.76535512
11,821.00	90.46	149.72	6,552.49	-4,169.69	3,230.63	14,440,990.54	1,706,399.90	39.76429100	-80.76519395
11,910.00	90.81	150.43	6,551.51	-4,246.82	3,275.03	14,440,913.41	1,706,444.29	39.76407886	-80.76503668
12,000.00	88.66	150.08	6,551.92	-4,324.95	3,319.68	14,440,835.27	1,706,488.94	39.76386396	-80.76487852
12,090.00	89.76	150.43	6,553.17	-4,403.09	3,364.32	14,440,757.14	1,706,533.59	39.76364906	-80.76472037
12,179.00	90.64	150.52	6,552.85	-4,480.53	3,408.18	14,440,679.70	1,706,577.45	39.76343607	-80.76456503
12,269.00	88.00	150.52	6,553.92	-4,558.86	3,452.47	14,440,601.36	1,706,621.73	39.76322062	-80.76440818
12,359.00	90.02	150.43	6,555.48	-4,637.16	3,496.81	14,440,523.07	1,706,666.08	39.76300527	-80.76425111
12,448.00	90.73	150.52	6,554.89	-4,714.60	3,540.67	14,440,445.62	1,706,709.93	39.76279228	-80.76409577
12,538.00	89.54	150.69	6,554.68	-4,793.01	3,584.84	14,440,367.21	1,706,754.11	39.76257662	-80.76393932
12,628.00	90.02	152.36	6,555.03	-4,872.12	3,627.75	14,440,288.10	1,706,797.02	39.76235906	-80.76378737
12,717.00	90.86	152.89	6,554.35	-4,951.15	3,668.67	14,440,209.07	1,706,837.94	39.76214172	-80.76364250
12,807.00	89.58	150.78	6,554.00	-5,030.49	3,711.15	14,440,129.74	1,706,880.41	39.76192353	-80.76349209
12,896.00	89.76	149.46	6,554.51	-5,107.65	3,755.49	14,440,052.57	1,706,924.75	39.76171129	-80.76333505
12,986.00	90.02	148.67	6,554.68	-5,184.85	3,801.75	14,439,975.38	1,706,971.02	39.76149895	-80.76317114
13,076.00	89.23	149.11	6,555.27	-5,261.90	3,848.25	14,439,898.32	1,707,017.52	39.76128700	-80.76300640
13,166.00	89.98	149.11	6,555.89	-5,339.14	3,894.45	14,439,821.09	1,707,063.72	39.76107457	-80.76284272
13,255.00	90.73	148.67	6,555.34	-5,415.33	3,940.44	14,439,744.89	1,707,109.70	39.76086497	-80.76267981
13,345.00	88.53	149.11	6,555.92	-5,492.38	3,986.94	14,439,667.84	1,707,156.20	39.76065304	-80.76251508
13,434.00	89.27	149.46	6,557.63	-5,568.88	4,032.39	14,439,591.34	1,707,201.65	39.76044261	-80.76235408
13,524.00	90.51	149.64	6,557.81	-5,646.47	4,077.99	14,439,513.76	1,707,247.26	39.76022921	-80.76219252
13,614.00	91.25	149.64	6,556.42	-5,724.12	4,123.48	14,439,436.11	1,707,292.74	39.76001564	-80.76203140
13,650.00	91.78	149.72	6,555.47	-5,755.18	4,141.65	14,439,405.04	1,707,310.91	39.75993019	-80.76196705
Survey @ 13650.00 MD 6555.47 TVD									
13,700.00	91.78	149.72	6,553.92	-5,798.34	4,166.84	14,439,361.89	1,707,336.11	39.75981148	-80.76187779
Survey projected to 13700.00 MD 6553.92 TVD									

WV Department of Environmental Protection



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Bryan S-08HM (slot H)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1191+28 @ 1219.00usft (Precision 110)
Site:	Bryan Pad	MD Reference:	RKB=1191+28 @ 1219.00usft (Precision 110)
Well:	Bryan S-08HM (slot H)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
280.00	280.00	-0.36	1.09	MWD surveys
13,650.00	6,555.47	-5,755.18	4,141.65	Survey @ 13650.00 MD 6555.47 TVD
13,700.00	6,553.92	-5,798.34	4,166.84	Survey projected to 13700.00 MD 6553.92 TVD

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Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	1/26/2020
Job End Date:	2/11/2020
State:	West Virginia
County:	Marshall
API Number:	47-051-01979-00-00
Operator Name:	Tug Hill Operating, LLC
Well Name and Number:	Bryan S 8HM
Latitude:	39.77570000
Longitude:	-80.77660000
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,555
Total Base Water Volume (gal):	13,922,172
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
Produced Mixture	Halliburton	Base Fluid					
			Water	7732-18-5	100.00000	87.10415	Density = 8.34
Ingredients	Listed Above	Listed Above					
			Water	7732-18-5	100.00000	0.18994	

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MC MX 8-4743	MultiChem	Additive					
				Listed Below			
FDP-S1296-17	Halliburton	Acid Corrosion Inhibitor					
				Listed Below			
Sand-Premium White-30/50	Halliburton	Proppant					
				Listed Below			
HYDROCHLORIC ACID, 22 BAUME	Halliburton	Solvent					
				Listed Below			
Sand-Premium White-40/70	Halliburton	Proppant					
				Listed Below			
LEGEND(TM) LD-7750W	MultiChem	Scale Control					
				Listed Below			
Sand-Common White-100 Mesh, SSA-2	Halliburton	Proppant					
				Listed Below			
LD-2950	MultiChem	Friction Reducer					
				Listed Below			
OilPerm A	Halliburton	Non-ionic Surfactant					

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				Listed Below			
Items above are Trade Names with the exception of Base Water . Items below are the individual ingredients.							
			Crystalline silica, quartz	14808-60-7	100.00000	12.62946	
			Complex Amine Compound	Proprietary	60.00000	0.06151	
			Hydrochloric acid	7647-01-0	30.00000	0.03638	
			Hydrotreated light petroleum distillate	64742-47-8	30.00000	0.03076	
			Sodium nitrate	7631-99-4	60.00000	0.02073	
			Methanol	67-56-1	100.00000	0.00562	
			Ethoxylated alcohols	Proprietary	1.00000	0.00103	
			Poly(oxy-1,2-ethanediyl), alpha-tridecyl-omega-hydroxy-, branched	69011-36-5	1.00000	0.00103	
			Adipic acid	124-04-9	1.00000	0.00103	
			Sodium chloride	7647-14-5	5.00000	0.00043	
			Phosphoric Acid Salt	Proprietary	5.00000	0.00043	
			Ethanol	64-17-5	60.00000	0.00027	
			Oxyalkylated nonyl phenolic resin	Proprietary	30.00000	0.00014	
			Heavy aromatic petroleum naphtha	64742-94-5	30.00000	0.00014	
			Modified thiourea polymer	Proprietary	30.00000	0.00013	
			Mixture of dimer and trimer fatty acids of indefinite composition derived from tall oil	61790-12-3	30.00000	0.00013	
			Oxyalkylated phenolic resin	Proprietary	10.00000	0.00005	
			Poly(oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched	127087-87-0	5.00000	0.00002	
			Naphthalene	91-20-3	5.00000	0.00002	
			Hexadecene	629-73-2	5.00000	0.00002	

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			Propargyl alcohol	107-19-7	5.00000	0.00002	
			Ethoxylated alcohols	Proprietary	5.00000	0.00002	
			Formaldehyde	50-00-0	0.10000	0.00001	
			1,2,4 Trimethylbenzene	95-63-6	1.00000	0.00000	

* Total Water Volume sources may include various types of water including fresh water, produced water, and recycled water

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

*** If you are calculating a percentage of total ingredients do not add the water volume below the green line to the water volume above the green line

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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**BRYAN LEASE
WELL S-8HM
437.454± ACRES**

ASDRILLED LEG
PERMITTED LEG

(TH) 7,547' (BH) 3,396'

TOP HOLE LATITUDE: 39°47'30"
BOTTOM HOLE LATITUDE: 39°47'30"

S-11HM (051-02022)
S-8HM (051-01979)
S-9HM (051-01980)
S-10HM (051-02076)
N-4HM (051-02076)
N-1HM (051-01340)
N-2HM (051-01999)
N-3HM (051-02000)
N-7HM (051-01978)
N-8HM (051-01977)
N-5HM (051-02077)
N-14HM (051-02031)
N-13HM (051-02030)
N-12HM (051-02025)

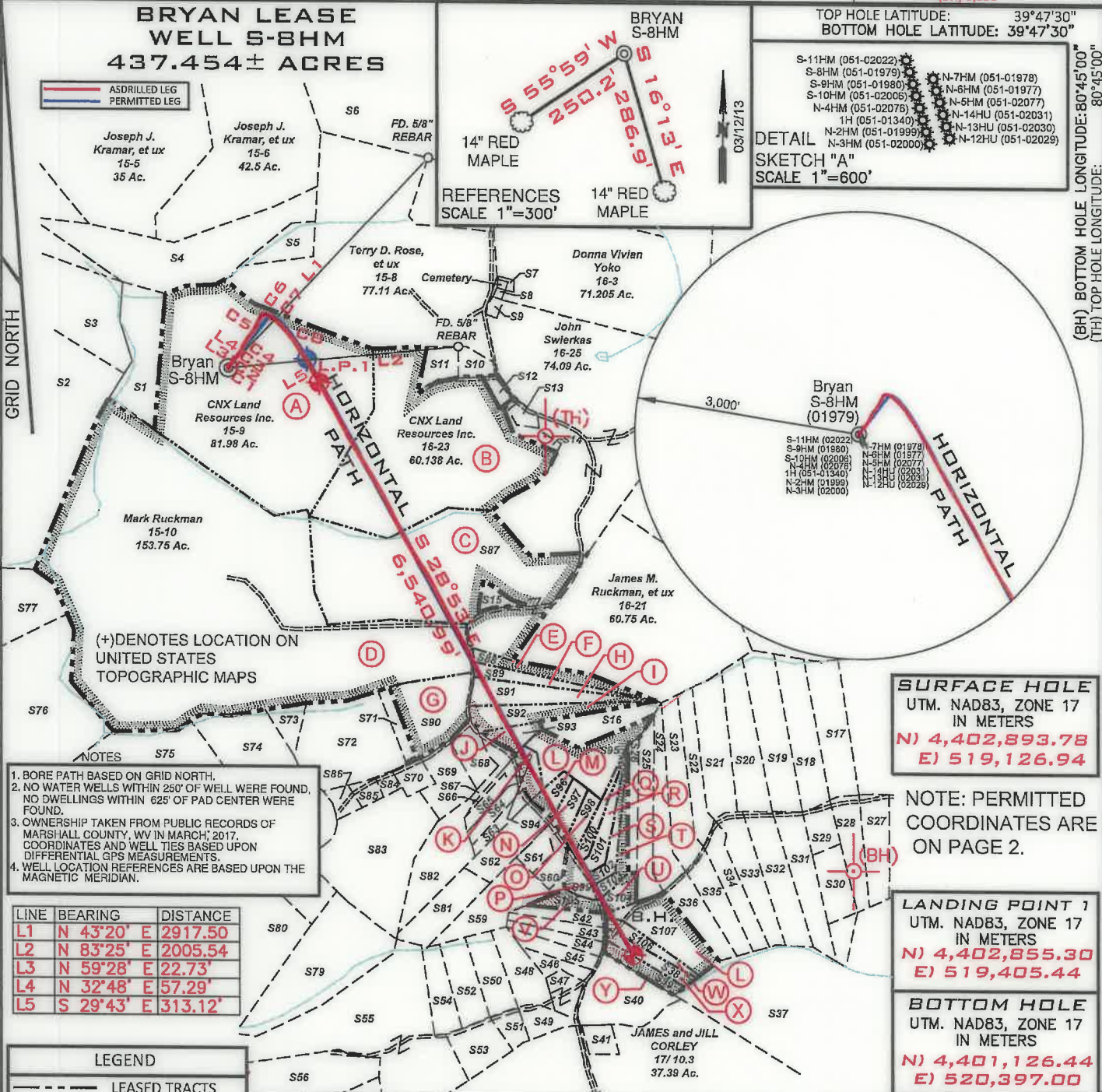
DETAIL
SKETCH "A"
SCALE 1"=600'

(BH) BOTTOM HOLE LONGITUDE: 80°45'00"
(TH) TOP HOLE LONGITUDE: 80°45'00"

(TH) 5,812'

(BH) 11,619'

GRID NORTH



(+) DENOTES LOCATION ON UNITED STATES TOPOGRAPHIC MAPS

- NOTES
- BORE PATH BASED ON GRID NORTH.
 - NO WATER WELLS WITHIN 250' OF WELL WERE FOUND. NO DWELLINGS WITHIN 625' OF PAD CENTER WERE FOUND.
 - OWNERSHIP TAKEN FROM PUBLIC RECORDS OF MARSHALL COUNTY, WV IN MARCH, 2017. COORDINATES AND WELL TIES BASED UPON DIFFERENTIAL GPS MEASUREMENTS.
 - WELL LOCATION REFERENCES ARE BASED UPON THE MAGNETIC MERIDIAN.

LINE	BEARING	DISTANCE
L1	N 43°20' E	2917.50
L2	N 83°25' E	2005.54
L3	N 59°28' E	22.73'
L4	N 32°48' E	57.29'
L5	S 29°43' E	313.12'

LEGEND

- LEASED TRACTS
- SURFACE TRACTS
- UNIT BOUNDARY
- (A) LEASE # (SEE 6A1 FORM)

NUMBER	CHORD DIRECTION	CHORD LENGTH	RADIUS	ARC LENGTH	NUMBER	CHORD DIRECTION	CHORD LENGTH	RADIUS	ARC LENGTH
C1	N 34°28' E	42.99'	62.21'	43.90'	C1	N 27°18' E	195.75'	1083.82'	196.01'
C2	N 30°53' E	58.50'	114.81'	59.16'	C2	N 77°53' E	72.47'	61.36'	77.53'
C3	N 39°06' E	47.01'	209.54'	47.11'	C3	S 53°19' E	143.84'	373.25'	144.74'
C4	N 30°54' E	199.12'	548.76'	200.23'	C4	S 36°49' E	408.65'	1405.24'	408.09'

SURFACE HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,402,893.78
E) 519,126.94

NOTE: PERMITTED
COORDINATES ARE
ON PAGE 2.

LANDING POINT 1
UTM. NAD83, ZONE 17
IN METERS
N) 4,402,855.30
E) 519,405.44

BOTTOM HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,401,126.44
E) 520,397.00

FILE NUMBER _____

DRAWING NUMBER BRYAN_WP_S-8HM

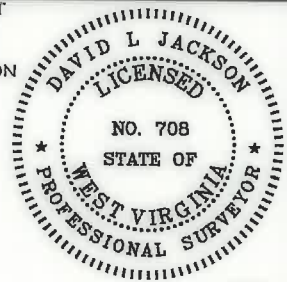
SCALE 1" = 1500'

MINIMUM DEGREE OF ACCURACY 1/200

PROVEN SOURCE OF ELEVATION SUBMETER MAPPING GRADE GPS

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 RULES ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION

David L Jackson



JACKSON SURVEYING INC.
P.O. Box 1450
Clarksburg, WV 26302
304-623-5851

WVDEP
OFFICE OF OIL & GAS
601 57TH STREET, SE
CHARLESTON, WV 25304

DATE: AUGUST 25, 2020

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X

OPERATORS WELL NO. BRYAN S-8HM
API WELL NO. 47-051-01979
STATE COUNTY PERMIT

LOCATION ELEVATION 1191.7' WATERSHED (HUC 10) Fish Creek
DISTRICT Franklin COUNTY Marshall
QUADRANGLE Powhatan Point 7.5' LEASE NUMBER _____ SEE WW-6A1 Form

SURFACE OWNER CNX LAND RESOURCES, INC. ACREAGE 81.98
OIL & GAS ROYALTY OWNER MICHAEL R. BRYAN - SEE WW 6A1 LEASE ACREAGE 81.98
PROPOSED WORK: DRILL ___ CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE ___ PLUG OFF OLD FORMATION ___
PERFORATE NEW FORMATION ___ OTHER PHYSICAL CHANGE (SPECIFY) ASDRILLED

TARGET FORMATION Marcellus ESTIMATED DEPTH TVD: 6,554' TMD: 13,700'
PLUG & ABANDON ___ CLEAN OUT & REPLUG ___

WELL OPERATOR TUG HILL OPERATING, LLC DESIGNATED AGENT DIANNA STAMPER CT CORPORATION SYSTEM
ADDRESS 1320 SOUTH UNIVERSITY DRIVE, SUITE 500 FORT WORTH, TX 76107 ADDRESS 5400 D BIG TYLER ROAD CHARLESTON, WV 25313

COUNTY NAME
PERMIT

**BRYAN LEASE
WELL S-8HM
437.454± ACRES**

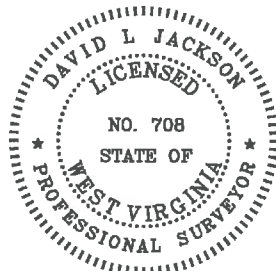
SURFACE HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,402,893.64
E) 519,127.03

LANDING POINT 1
UTM. NAD83, ZONE 17
IN METERS
N) 4,402,926.83
E) 519,366.67

BOTTOM HOLE
UTM. NAD83, ZONE 17
IN METERS
N) 4,401,125.30
E) 520,395.83

GRID NORTH

Number	TAX MAP -PARCEL	ADJOINER OWNER	ACRES	Number	TAX MAP -PARCEL	ADJOINER OWNER	ACRES
S1	15-13	CNX Land Resources Inc.	11.0	S55	18-13	Southern Country Farms Inc.	24.724
S2	15-12	John David Petrock Et Ux	150.23	S56	18-59	Southern Country Farms Inc.	15.79
S3	15-14	John David Petrock Et Ux	25.0	S57	18-30	Jon Schmidt Et Al	5.46
S4	15-6.1	Joseph J. Kramer Et Ux	39.40	S58	18-13.10	Carl Berg	10.88
S5	15-7	Terry D. Rose Et Ux	4.5	S59	18-13.1	Betty Tagg Est.	9.248
S6	10-15	Paul Andrew & Debra A. Rine	120.805	S60	18-41	Cory A. Holt	2.308
S7	16-3.1	Dennis Jackson Et Ux	0.27	S61	18-40	Cory A. Holt	2.237
S8	16-2	Fredonia Christian Church	0.19	S62	18-14	Michael S. Fincham & Kezia M. Winters	6.386
S9	16-1	Fredonia Christian Church	0.50	S63	18-45	Michael S. Fincham & Kezia M. Winters	2.07
S10	16-23.1	Ray E. Minor Et Ux	2.0	S64	18-46	Dale W. & Patricia Gardner	2.030
S11	16-23.4	Michael R. & Brenda K. Bryan	3.0	S65	18-47	Robert Pelley II & Susan Briggs	2.010
S12	16-23.3	Greg & Christina Riddle	1.0	S66	18-13.5	Wesley Bryan	1.023
S13	16-24	Alan M. Beyser Et Ux	1.083	S67	18-36	Ruth Mulligan Est.	2.030
S14	16-23.2	Alan M. Beyser Et Ux	1.726	S68	18-15.2	Edward Burge	4.171
S15	16-22.1	Heather A. Burgy	1.465	S69	18-15.1	Jason Blair	5.948
S16	18-13.2	Steven Berisford	6.023	S70	18-12	William Wayne Et Ux	2.27
S17	16-15.1	Glen A. Gunto	10.17	S71	18-11.2	Edward Lee Burge Jr.	2.0
S18	17-15	Glen A. Gunto	10.22	S72	18-11.1	Edward Lee Burge Jr.	18.0
S19	18-13	Southern Country Farms Inc.	11.415	S73	18-15	Edward Lee Burge Jr.	2.495
S20	18-13.9	Roy & Renee Butler	9.603	S74	18-15.4	Edward Lee Burge Jr.	22.34
S21	18-13.4	Renee D. Streight	9.938	S75	18-15.3	Charles Yeater	26.44
S22	18-13.12	Charles A. & Mary Nice	5.969	S76	18-4	Olan & Patricia Rutan	65.89
S23	18-13	Southern Country Farms Inc.	8.037	S77	15-11	Diana Henry Hayes & Carol Henry	65.59
S24	18-60	Christopher M. Previtara	6.297	S78	18-6	Charles Yeater	26.0
S25	18-53.1	Christopher M. Previtara	6.283	S79	18-16	Charles Yeater	17.768
S26	18-13.11	Linda L. Moore	3.156	S80	18-7	Charles Yeater	24.22
S27	17-1.6	Lola M. Slaughter	6.347	S81	18-17	Michael S. Fincham & Kezia M. Winters	6.555
S28	17-1.5	Donnie R. & Lola M. Slaughter	5.607	S82	18-13.3	Robert Closterman	9.813
S29	17-1.2	Donnie R. & Lola M. Slaughter	5.073	S83	18-15.5	Darrell & Teresa Boley	23.547
S30	17-1.3	Jody & Michelle Anderson	5.0	S84	18-10	David & Nancy Anderson	0.907
S31	17-1.1	Donnie R. & Lola M. Slaughter	8.078	S85	18-10.2	David Anderson Et Ux	1.377
S32	17-1.4	Donnie R. & Lola M. Slaughter	8.844	S86	18-10.1	David Anderson Et Ux	1.65
S33	17-14	Southern Country Farms Inc.	7.314	S87	16-22	James M. Ruckman et ux	54.605
S34	17-13	Roy E. & Renee Butler	5.433	S88	18-56	William O' Hara	3.965
S35	17-1.7	Roy E. & Renee Butler	5.22	S89	18-55	William O' Hara	3.202
S36	17-1	Southern Country Farms Inc.	5.030	S90	18-11	Benjamin Robinson	12.883
S37	17-2	Phyllis Flouhouse Trust & Belle Yoho	104.08	S91	18-28	Dotson Harrison	6.36
S38	18-35	Mary Anderson	2.635	S92	18-28.1	Carol Helmick	5.696
S39	18-42	Roger Howard Hall Jr.	2.383	S93	18-50	Steven Berisford	2.170
S40	18-19	Roger White Jr.	10.0	S94	18-49	Tanner Butler	2.023
S41	17-10.4	Ron Murrin Et Al	2.01	S95	18-13	Southern Country Farms, Inc.	11.054
S42	18-43	Roy Butler	2.532	S96	18-37	John W. Wetzel	2.064
S43	18-51	Roger Hall	2.505	S97	18-38	Marlon R. Conner	2.231
S44	18-52	Roger Hall	2.536	S98	18-39	Marlon R. Conner	2.001
S45	18-61	Roger White Jr.	2.984	S99	18-25	Charles & Maria Rayl	2.133
S46	18-57	Marvin D. Roberts	2.228	S100	18-27.1	Marlon R. Conner	2.003
S47	18-18	Linda Coen	3.0	S101	18-27.2	Linda L. Moore	3.009
S48	18-13.7	Victor W. Woods Jr. & Jessica L. Woods	5.255	S102	18-27	Linda L. Moore	2.447
S49	18-48	Marvin Dean Roberts Et Al	2.920	S103	18-26	Linda L. Moore	2.624
S50	18-13.6	Glenn Eugene Whisler Et Ux	5.384	S104	18-53	Christopher M. Previtara	2.00
S51	18-13.14	Glenn & Sandra Whisler	2.116	S105	18-44	Renee Streight	2.532
S52	18-13.13	Glenn E. & Sandra K. Whisler	5.59	S106	18-58	Kevin W. Roberts	2.435
S53	18-33	Glenn & Sandra Whisler	5.343	S107	18-13	Southern Country Farms, Inc.	8.743
S54	18-34	Jodi A. & Gary A. Hall	5.002				



P.S. 708 *David L Jackson*



**TUG HILL
OPERATING**

OPERATOR'S
WELL #: Bryan S-8HM
DISTRICT: Franklin
COUNTY: Marshall
STATE: WV
API #: 47-051-01979

WELL PLAT
PAGE 2 OF 2
DATE: 08/25/2020