



Well: Hudson S-11 HU (slot B)
 Site: Hudson Alt North
 Project: Marshall County, West Virginia NAD83 UTM 17N
 Design: rev9
 Rig: Nabors X08

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
1	11161.00	27.11	285.52	10544.91	1273.12	-2821.93	0.00	0.000-2113.46		Survey @ 11161.00 MD 10544.91 TVD
2	11400.00	27.11	285.52	10757.65	1302.44	-2926.82	0.00	0.000-2174.98		KOP Begin 8°/100' drop/turn
3	11444.71	23.54	286.17	10798.06	1307.67	-2945.22	8.00	176.495-2185.85		Begin 23.54° tangent
4	11467.03	23.54	286.17	10818.52	1310.16	-2953.78	0.00	0.000-2190.96		Begin 8°/100' build/turn
5	12789.33	89.00	150.00	11703.00	595.65	-2843.73	8.00	-133.975-1479.05		Begin 89.00° lateral
6	25638.98	89.00	150.00	11927.75	-10531.30	3579.20	0.00	0.00011122.90		PBHL/TD 25638.98 MD 11927.75 TVD

ANNOTATIONS SURVEYS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Annotation
180.00	0.97	355.23	179.99	1.52	-0.13	-1.48	MWD surveys
25572.00	90.07	152.20	11912.60-10487.83	3553.93	11073.61		Survey @ 25572.00 MD 11912.60 TVD
25630.00	90.07	152.20	11912.53-10539.13	3580.98	11130.89		Survey Proj. to 25630.00 MD 11912.53 TVD

Geodetic System: Universal Transverse Mercator (US Survey Feet)
 Datum: NAD83 West Virginia - HARN
 Ellipsoid: GRS 1980
 Zone: Zone 17N (64 W to 78 W)

System Datum: Mean Sea Level
 Depth Reference: RKB=1346+33 @ 1379.00ft (Nabors X08)

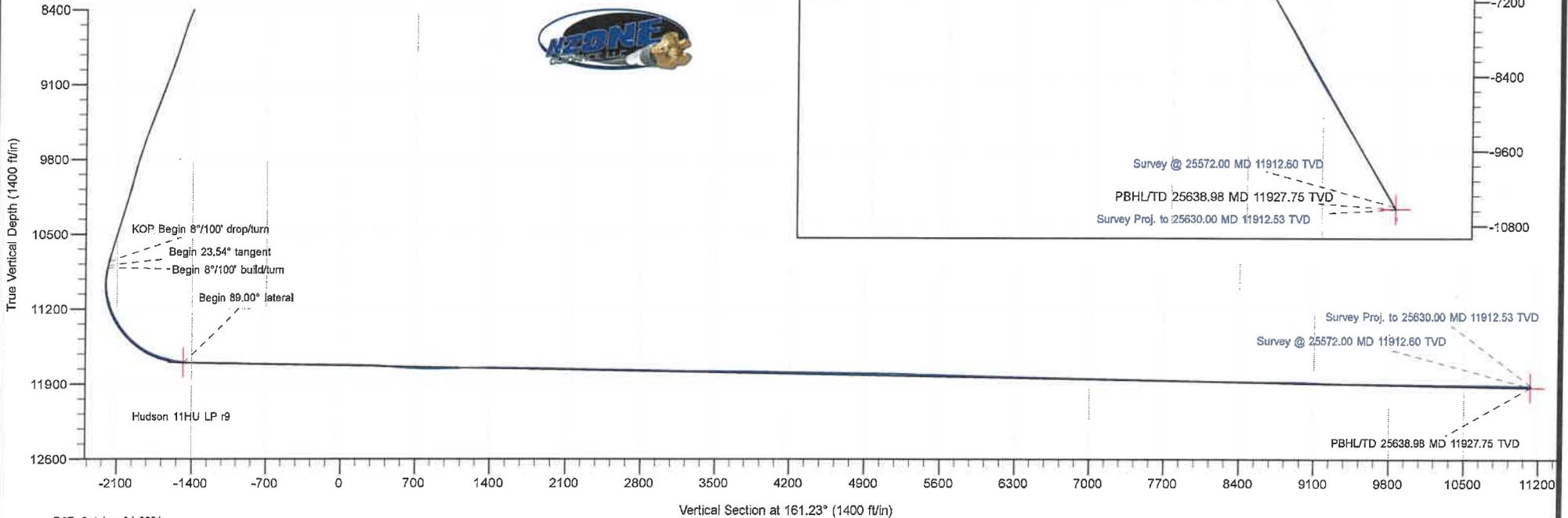
Northing	Easting	Latitude	Longitude
14464525.236	1732302.133	39.82870000	-80.67271400

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.901°



Azimuths to Grid North
 True North: -0.21°
 Magnetic North: -8.90°

Magnetic Field
 Strength: 51735.9nT
 Dip Angle: 66.54°
 Date: 9/20/2021
 Model: IGRF2020



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Hudson S-11 HU (slot B)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Site:	Hudson Alt North	MD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Well:	Hudson S-11 HU (slot B)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Project	Marshall County, West Virginia NAD83 UTM 17N		
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	Hudson Alt North				
Site Position:		Northing:	14,464,552.095 usft	Latitude:	39.82877400
From:	Lat/Long	Easting:	1,732,278.451 usft	Longitude:	-80.67279800
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "		

Well	Hudson S-11 HU (slot B)					
Well Position	+N/-S	0.00 ft	Northing:	14,464,525.236 usft	Latitude:	39.82870000
	+E/-W	0.00 ft	Easting:	1,732,302.133 usft	Longitude:	-80.67271400
Position Uncertainty	0.00 ft		Wellhead Elevation:	ft	Ground Level:	1,346.00 ft
Grid Convergence:	0.210 °					

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	9/20/2021	-8.691	66.540	51,736.85341056

Design	Surveys Original Hole				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	161.23	

Survey Program	Date	10/24/2021			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
180.00	914.00	MWD surf (Original Hole)	MWD	MWD - Standard	
950.00	2,825.00	MWD int (Original Hole)	MWD	MWD - Standard	
2,870.00	11,161.00	MWD int2 (Original Hole)	MWD	MWD - Standard	
11,273.00	25,572.00	MWD (Original Hole)	MWD	MWD - Standard	
25,630.00	25,630.00	Projection (Original Hole)	MWD	MWD - Standard	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
180.00	0.97	355.23	179.99	1.52	-0.13	-1.48	0.54	0.54	0.00	
MWD surveys										
211.00	0.92	20.54	210.99	2.01	-0.06	-1.93	1.34	-0.16	81.65	
242.00	0.97	24.15	241.98	2.49	0.13	-2.31	0.25	0.16	11.65	
272.00	1.01	358.57	271.98	2.98	0.23	-2.75	1.47	0.13	-85.27	

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Site:	Hudson Alt North	MD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Well:	Hudson S-11 HU (slot B)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
303.00	1.14	9.64	302.97	3.56	0.28	-3.28	0.79	0.42	35.71
334.00	1.01	3.23	333.97	4.14	0.34	-3.81	0.57	-0.42	-20.68
385.00	0.66	358.92	384.96	4.88	0.36	-4.50	0.70	-0.69	-8.45
424.00	0.83	184.55	423.96	4.82	0.34	-4.46	3.82	0.44	-447.10
455.00	2.29	184.81	454.95	3.98	0.27	-3.68	4.71	4.71	0.84
485.00	2.72	184.64	484.92	2.67	0.16	-2.48	1.43	1.43	-0.57
516.00	1.41	180.50	515.90	1.56	0.10	-1.44	4.25	-4.23	-13.35
547.00	0.62	214.57	546.89	1.04	0.00	-0.98	3.10	-2.55	109.90
578.00	0.31	241.06	577.89	0.86	-0.17	-0.87	1.19	-1.00	85.45
608.00	0.53	216.19	607.89	0.71	-0.32	-0.78	0.94	0.73	-82.90
639.00	0.57	253.28	638.89	0.55	-0.56	-0.70	1.14	0.13	119.65
670.00	0.40	214.17	669.89	0.42	-0.77	-0.64	1.17	-0.55	-126.16
700.00	0.57	232.89	699.89	0.24	-0.94	-0.53	0.77	0.57	62.40
731.00	0.70	249.15	730.89	0.08	-1.24	-0.47	0.71	0.42	52.45
763.00	0.31	281.23	762.89	0.03	-1.51	-0.51	1.46	-1.22	100.25
794.00	0.92	274.55	793.88	0.06	-1.84	-0.65	1.98	1.97	-21.55
825.00	0.66	303.02	824.88	0.18	-2.24	-0.89	1.49	-0.84	91.84
857.00	0.83	274.64	856.88	0.30	-2.62	-1.13	1.25	0.53	-88.69
888.00	0.88	300.21	887.88	0.44	-3.05	-1.39	1.23	0.16	82.48
914.00	0.79	323.77	913.87	0.68	-3.33	-1.72	1.35	-0.35	90.62
950.00	0.79	275.08	949.87	0.90	-3.73	-2.05	1.81	0.00	-135.25
981.00	0.83	282.81	980.87	0.97	-4.16	-2.26	0.38	0.13	24.94
1,012.00	0.35	315.86	1,011.86	1.09	-4.44	-2.46	1.84	-1.55	106.61
1,043.00	0.83	293.88	1,042.86	1.25	-4.71	-2.70	1.68	1.55	-70.90
1,074.00	0.75	340.47	1,073.86	1.53	-4.99	-3.05	2.03	-0.26	150.29
1,091.00	0.35	332.29	1,090.86	1.68	-5.05	-3.22	2.39	-2.35	-48.12
1,169.00	0.83	325.17	1,168.86	2.36	-5.48	-3.99	0.62	0.62	-9.13
1,263.00	1.19	329.04	1,262.84	3.75	-6.37	-5.60	0.39	0.38	4.12
1,357.00	1.14	339.59	1,356.82	5.46	-7.20	-7.49	0.23	-0.05	11.22
1,450.00	1.49	308.39	1,449.80	7.08	-8.47	-9.43	0.84	0.38	-33.55
1,544.00	1.98	308.30	1,543.75	8.85	-10.70	-11.82	0.52	0.52	-0.10
1,639.00	1.85	303.38	1,638.70	10.71	-13.27	-14.41	0.22	-0.14	-5.18
1,734.00	2.72	294.50	1,733.63	12.49	-16.60	-17.17	0.99	0.92	-9.35
1,828.00	4.61	293.62	1,827.43	14.93	-22.10	-21.24	2.01	2.01	-0.94
1,922.00	5.19	287.56	1,921.09	17.72	-29.61	-26.31	0.83	0.62	-6.45
2,016.00	4.75	290.63	2,014.73	20.38	-37.31	-31.30	0.55	-0.47	3.27
2,111.00	4.39	290.10	2,109.43	23.01	-44.40	-36.08	0.38	-0.38	-0.56
2,205.00	4.48	290.63	2,203.15	25.54	-51.22	-40.86	0.11	0.10	0.56
2,299.00	4.39	292.57	2,296.87	28.22	-57.97	-45.37	0.19	-0.10	2.06
2,393.00	3.91	286.33	2,390.62	30.50	-64.37	-49.59	0.70	-0.51	-6.64
2,487.00	3.30	297.22	2,484.44	32.64	-69.85	-53.38	0.97	-0.65	11.59
2,581.00	3.60	292.39	2,578.27	35.00	-74.99	-57.27	0.44	0.32	-5.14
2,676.00	4.57	293.71	2,673.02	37.66	-81.21	-61.78	1.03	1.02	1.39
2,771.00	5.19	297.05	2,767.68	41.13	-88.50	-67.42	0.72	0.65	3.52

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Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
2,825.00	5.27	297.66	2,821.45	43.39	-92.87	-70.97	0.18	0.15	1.13
2,870.00	5.36	298.45	2,866.26	45.35	-96.55	-74.01	0.26	0.20	1.76
2,968.00	6.11	295.03	2,963.77	49.74	-105.30	-80.98	0.84	0.77	-3.49
3,062.00	7.03	294.94	3,057.15	54.28	-115.05	-88.42	0.98	0.98	-0.10
3,157.00	7.82	300.83	3,151.35	60.05	-125.87	-97.36	1.15	0.83	6.20
3,250.00	9.23	301.88	3,243.32	67.23	-137.64	-107.94	1.53	1.52	1.13
3,343.00	10.81	307.15	3,334.91	76.44	-150.93	-120.94	1.96	1.70	5.67
3,437.00	12.74	310.93	3,426.92	88.55	-165.78	-137.19	2.21	2.05	4.02
3,532.00	14.33	312.60	3,519.28	103.37	-182.35	-156.55	1.72	1.67	1.76
3,625.00	16.04	311.90	3,609.03	119.75	-200.39	-177.86	1.85	1.84	-0.75
3,719.00	18.85	315.50	3,698.70	139.25	-220.70	-202.86	3.20	2.99	3.83
3,813.00	21.36	315.86	3,786.97	162.37	-243.27	-232.02	2.67	2.67	0.38
3,907.00	21.67	313.04	3,874.42	186.50	-267.88	-262.78	1.15	0.33	-3.00
4,002.00	22.63	309.79	3,962.41	210.17	-294.74	-293.84	1.64	1.01	-3.42
4,096.00	24.04	307.33	4,048.72	233.36	-323.87	-325.16	1.82	1.50	-2.62
4,190.00	22.90	303.64	4,134.95	255.10	-354.32	-355.55	1.98	-1.21	-3.93
4,284.00	19.12	296.34	4,222.70	272.07	-383.36	-380.96	4.88	-4.02	-7.77
4,378.00	18.02	293.27	4,311.81	284.65	-410.51	-401.60	1.57	-1.17	-3.27
4,472.00	17.18	290.37	4,401.41	295.23	-436.89	-420.10	1.29	-0.89	-3.09
4,519.00	16.88	290.28	4,446.35	300.01	-449.79	-428.78	0.64	-0.64	-0.19
4,566.00	17.93	290.46	4,491.19	304.90	-462.97	-437.66	2.24	2.23	0.38
4,613.00	19.20	291.42	4,535.75	310.25	-476.95	-447.22	2.78	2.70	2.04
4,660.00	19.78	291.75	4,580.05	316.02	-491.53	-457.37	1.26	1.23	0.70
4,710.00	20.43	292.13	4,627.01	322.45	-507.47	-468.59	1.33	1.30	0.76
4,755.00	21.27	292.39	4,669.06	328.51	-522.29	-479.10	1.88	1.87	0.58
4,849.00	20.57	295.38	4,756.87	342.09	-552.98	-501.82	1.36	-0.74	3.18
4,943.00	20.79	296.96	4,844.81	356.73	-582.77	-525.27	0.64	0.23	1.68
5,036.00	21.67	296.34	4,931.50	371.83	-612.87	-549.26	0.98	0.95	-0.67
5,130.00	21.01	293.53	5,019.05	386.26	-643.87	-572.89	1.29	-0.70	-2.99
5,223.00	20.70	291.95	5,105.96	399.06	-674.40	-594.84	0.69	-0.33	-1.70
5,317.00	21.09	293.97	5,193.78	412.14	-705.26	-617.15	0.87	0.41	2.15
5,412.00	22.90	293.97	5,281.86	426.59	-737.77	-641.30	1.91	1.91	0.00
5,506.00	22.81	293.53	5,368.48	441.30	-771.19	-665.97	0.21	-0.10	-0.47
5,600.00	22.41	296.08	5,455.26	456.45	-803.99	-690.87	1.13	-0.43	2.71
5,695.00	21.36	295.64	5,543.41	471.90	-835.86	-715.75	1.12	-1.11	-0.46
5,792.00	20.70	292.92	5,633.95	486.22	-867.57	-739.52	1.21	-0.68	-2.80
5,886.00	19.86	293.88	5,722.13	499.15	-897.47	-761.39	0.96	-0.89	1.02
5,979.00	20.48	296.08	5,809.42	512.70	-926.53	-783.56	1.05	0.67	2.37
6,073.00	21.05	295.73	5,897.32	527.26	-956.51	-806.99	0.62	0.61	-0.37
6,167.00	21.18	297.22	5,985.01	542.35	-986.82	-831.04	0.59	0.14	1.59
6,261.00	21.67	296.70	6,072.51	557.92	-1,017.42	-855.62	0.56	0.52	-0.55
6,356.00	20.35	294.06	6,161.19	572.54	-1,048.18	-879.36	1.71	-1.39	-2.78
6,450.00	20.26	293.44	6,249.35	585.67	-1,078.04	-901.41	0.25	-0.10	-0.66

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Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
6,497.00	19.34	293.62	6,293.57	592.03	-1,092.63	-912.12	1.96	-1.96	0.38
6,544.00	17.23	291.60	6,338.20	597.71	-1,106.24	-921.88	4.69	-4.49	-4.30
6,591.00	15.16	290.37	6,383.33	602.41	-1,118.47	-930.27	4.46	-4.40	-2.62
6,638.00	13.49	289.23	6,428.87	606.36	-1,129.41	-937.52	3.60	-3.55	-2.43
6,685.00	12.17	288.35	6,474.69	609.72	-1,139.29	-943.88	2.84	-2.81	-1.87
6,733.00	12.52	288.70	6,521.58	612.98	-1,149.02	-950.10	0.75	0.73	0.73
6,780.00	11.47	292.13	6,567.56	616.38	-1,158.17	-956.26	2.70	-2.23	7.30
6,827.00	11.47	292.21	6,613.62	619.90	-1,166.83	-962.39	0.03	0.00	0.17
6,921.00	11.51	292.13	6,705.74	626.97	-1,184.17	-974.66	0.05	0.04	-0.09
7,016.00	11.56	291.51	6,798.82	634.03	-1,201.81	-987.02	0.14	0.05	-0.65
7,106.00	12.52	292.30	6,886.84	641.04	-1,219.22	-999.26	1.08	1.07	0.88
7,201.00	13.05	294.15	6,979.48	649.33	-1,238.53	-1,013.32	0.70	0.56	1.95
7,295.00	13.84	294.39	7,070.90	658.32	-1,258.46	-1,028.24	0.84	0.84	0.26
7,389.00	16.00	291.51	7,161.73	667.71	-1,280.75	-1,044.31	2.43	2.30	-3.06
7,451.00	17.97	290.37	7,221.02	674.18	-1,297.67	-1,055.87	3.22	3.18	-1.84
7,482.00	19.07	289.40	7,250.42	677.52	-1,306.93	-1,062.02	3.68	3.55	-3.13
7,577.00	21.80	288.08	7,339.43	688.15	-1,338.34	-1,082.20	2.91	2.87	-1.39
7,672.00	21.53	288.79	7,427.72	699.24	-1,371.62	-1,103.40	0.40	-0.28	0.75
7,765.00	23.42	292.83	7,513.66	711.91	-1,404.81	-1,126.08	2.62	2.03	4.34
7,859.00	22.06	291.60	7,600.35	725.66	-1,438.44	-1,149.92	1.53	-1.45	-1.31
7,953.00	21.58	292.92	7,687.62	738.89	-1,470.78	-1,172.85	0.73	-0.51	1.40
8,079.00	25.00	291.77	7,803.33	757.80	-1,516.86	-1,205.57	2.74	2.71	-0.91
8,142.00	25.88	291.86	7,860.22	767.85	-1,541.98	-1,223.18	1.40	1.40	0.14
8,236.00	26.98	291.42	7,944.40	783.28	-1,580.88	-1,250.30	1.19	1.17	-0.47
8,330.00	27.82	289.93	8,027.85	798.54	-1,621.35	-1,277.78	1.15	0.89	-1.59
8,425.00	28.39	289.84	8,111.65	813.76	-1,663.43	-1,305.73	0.60	0.60	-0.09
8,519.00	27.51	290.63	8,194.68	829.00	-1,704.77	-1,333.45	1.02	-0.94	0.84
8,613.00	28.34	292.57	8,277.74	845.21	-1,745.69	-1,361.97	1.31	0.88	2.06
8,707.00	28.08	293.97	8,360.58	862.76	-1,786.51	-1,391.72	0.76	-0.28	1.49
8,802.00	28.87	293.53	8,444.08	881.00	-1,827.97	-1,422.33	0.86	0.83	-0.46
8,896.00	28.13	292.92	8,526.69	898.69	-1,869.19	-1,452.34	0.85	-0.79	-0.65
8,989.00	26.76	290.46	8,609.23	914.55	-1,909.00	-1,480.17	1.91	-1.47	-2.65
9,083.00	24.61	292.65	8,693.93	929.49	-1,946.89	-1,506.51	2.50	-2.29	2.33
9,177.00	23.38	295.73	8,779.81	945.12	-1,981.76	-1,532.53	1.87	-1.31	3.28
9,241.00	24.48	296.52	8,838.31	956.56	-2,005.06	-1,550.85	1.79	1.72	1.23
9,270.00	25.27	296.70	8,864.62	962.02	-2,015.97	-1,559.54	2.74	2.72	0.62
9,364.00	26.10	295.11	8,949.33	979.81	-2,052.62	-1,588.17	1.15	0.88	-1.69
9,458.00	27.82	294.50	9,033.11	997.68	-2,091.31	-1,617.54	1.85	1.83	-0.65
9,551.00	29.18	294.24	9,114.84	1,015.99	-2,131.73	-1,647.88	1.47	1.46	-0.28
9,646.00	28.87	294.67	9,197.91	1,035.07	-2,173.68	-1,679.45	0.39	-0.33	0.45
9,740.00	28.83	293.80	9,280.24	1,053.69	-2,215.04	-1,710.39	0.45	-0.04	-0.93
9,834.00	28.78	295.91	9,362.61	1,072.72	-2,256.13	-1,741.63	1.08	-0.05	2.24
9,928.00	28.70	297.66	9,445.04	1,093.09	-2,296.48	-1,773.89	0.90	-0.09	1.86

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Hudson S-11 HU (slot B)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Site:	Hudson Alt North	MD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Well:	Hudson S-11 HU (slot B)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
10,023.00	27.73	294.24	9,528.75	1,112.75	-2,336.84	-1,805.50	1.98	-1.02	-3.60
10,107.00	26.81	295.29	9,603.42	1,128.87	-2,371.79	-1,832.00	1.24	-1.10	1.25
10,201.00	27.38	292.48	9,687.10	1,146.19	-2,410.93	-1,861.00	1.49	0.61	-2.99
10,294.00	26.94	289.84	9,769.85	1,161.52	-2,450.51	-1,888.25	1.38	-0.47	-2.84
10,388.00	24.79	286.41	9,854.44	1,174.32	-2,489.45	-1,912.89	2.79	-2.29	-3.65
10,482.00	24.79	286.33	9,939.77	1,185.42	-2,527.26	-1,935.58	0.04	0.00	-0.09
10,574.00	23.73	286.15	10,023.65	1,196.00	-2,563.56	-1,957.27	1.15	-1.15	-0.20
10,671.00	26.63	288.08	10,111.42	1,208.17	-2,602.98	-1,981.48	3.11	2.99	1.99
10,765.00	27.47	286.15	10,195.14	1,220.74	-2,643.83	-2,006.53	1.29	0.89	-2.05
10,859.00	28.83	287.91	10,278.02	1,233.74	-2,686.22	-2,032.48	1.70	1.45	1.87
10,954.00	28.04	286.06	10,361.56	1,246.97	-2,729.48	-2,058.91	1.25	-0.83	-1.95
11,048.00	27.69	285.62	10,444.66	1,258.96	-2,771.74	-2,083.87	0.43	-0.37	-0.47
11,141.00	27.38	285.89	10,527.13	1,270.63	-2,813.12	-2,108.24	0.36	-0.33	0.29
11,161.00	27.11	285.62	10,544.91	1,273.12	-2,821.93	-2,113.42	1.48	-1.35	-1.35
11,273.00	27.03	286.76	10,644.64	1,287.33	-2,870.88	-2,142.63	0.47	-0.07	1.02
11,369.00	25.93	286.50	10,730.57	1,299.58	-2,911.89	-2,167.43	1.15	-1.15	-0.27
11,416.00	24.62	283.51	10,773.07	1,304.79	-2,931.27	-2,178.59	3.89	-2.79	-6.36
11,463.00	23.08	278.15	10,816.06	1,308.38	-2,949.91	-2,187.99	5.65	-3.28	-11.40
11,510.00	22.11	271.56	10,859.46	1,309.93	-2,967.87	-2,195.23	5.77	-2.06	-14.02
11,558.00	20.75	264.53	10,904.15	1,309.36	-2,985.37	-2,200.33	6.05	-2.83	-14.65
11,603.00	19.43	256.88	10,946.41	1,306.90	-3,000.60	-2,202.90	6.53	-2.93	-17.00
11,651.00	20.44	245.28	10,991.56	1,301.58	-3,015.99	-2,202.82	8.49	2.10	-24.17
11,682.00	19.08	235.61	11,020.74	1,296.46	-3,025.10	-2,200.89	11.41	-4.39	-31.19
11,713.00	17.80	222.34	11,050.16	1,290.09	-3,032.47	-2,197.24	14.12	-4.13	-42.81
11,745.00	17.49	208.98	11,080.67	1,282.26	-3,038.10	-2,191.64	12.67	-0.97	-41.75
11,792.00	17.80	200.37	11,125.46	1,269.35	-3,044.02	-2,181.32	5.59	0.66	-18.32
11,839.00	21.27	192.90	11,169.76	1,254.30	-3,048.43	-2,168.48	9.08	7.38	-15.89
11,886.00	23.69	186.57	11,213.19	1,236.60	-3,051.41	-2,152.69	7.28	5.15	-13.47
11,933.00	26.02	179.98	11,255.84	1,216.91	-3,052.49	-2,134.39	7.69	4.96	-14.02
11,980.00	29.19	174.88	11,297.49	1,195.17	-3,051.46	-2,113.48	8.41	6.74	-10.85
12,028.00	32.48	171.54	11,338.70	1,170.76	-3,048.52	-2,089.42	7.72	6.85	-6.96
12,075.00	35.87	172.15	11,377.58	1,144.63	-3,044.78	-2,063.47	7.25	7.21	1.30
12,122.00	38.73	169.69	11,414.97	1,116.51	-3,040.27	-2,035.40	6.86	6.09	-5.23
12,169.00	42.24	166.79	11,450.71	1,086.66	-3,034.02	-2,005.12	8.47	7.47	-6.17
12,216.00	46.02	164.60	11,484.44	1,054.96	-3,025.92	-1,972.51	8.67	8.04	-4.66
12,263.00	49.98	163.19	11,515.89	1,021.42	-3,016.22	-1,937.62	8.72	8.43	-3.00
12,311.00	53.58	161.87	11,545.58	985.46	-3,004.89	-1,899.93	7.80	7.50	-2.75
12,358.00	57.19	161.17	11,572.27	948.78	-2,992.63	-1,861.26	7.78	7.68	-1.49
12,405.00	62.15	160.55	11,596.00	910.47	-2,979.33	-1,820.70	10.61	10.55	-1.32
12,452.00	66.02	159.15	11,616.54	870.79	-2,964.76	-1,778.45	8.66	8.23	-2.98
12,499.00	69.05	157.48	11,634.50	830.44	-2,948.71	-1,735.08	7.23	6.45	-3.55
12,546.00	72.62	155.19	11,649.93	789.79	-2,930.88	-1,690.86	8.88	7.60	-4.87
12,593.00	74.68	153.70	11,663.16	749.11	-2,911.43	-1,646.08	5.34	4.38	-3.17
12,640.00	75.43	153.08	11,675.28	708.51	-2,891.09	-1,601.10	2.04	1.60	-1.32

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Hudson S-11 HU (slot B)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Site:	Hudson Alt North	MD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Well:	Hudson S-11 HU (slot B)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
12,687.00	78.24	153.08	11,685.98	667.71	-2,870.37	-1,555.80	5.98	5.98	0.00
12,734.00	81.80	152.91	11,694.12	626.48	-2,849.35	-1,509.99	7.58	7.57	-0.36
12,781.00	85.10	151.85	11,699.49	585.11	-2,827.71	-1,463.86	7.37	7.02	-2.26
12,828.00	87.56	150.97	11,702.49	543.93	-2,805.27	-1,417.65	5.56	5.23	-1.87
12,875.00	89.23	152.03	11,703.81	502.64	-2,782.85	-1,371.35	4.21	3.55	2.26
12,970.00	89.49	152.38	11,704.87	418.61	-2,738.55	-1,277.53	0.46	0.27	0.37
13,065.00	89.54	150.80	11,705.68	335.06	-2,693.36	-1,183.88	1.66	0.05	-1.66
13,159.00	89.27	150.01	11,706.65	253.33	-2,646.94	-1,091.56	0.89	-0.29	-0.84
13,222.00	89.43	150.18	11,707.37	198.72	-2,615.53	-1,029.75	0.37	0.25	0.27
13,316.00	89.43	149.30	11,708.30	117.53	-2,568.16	-937.64	0.94	0.00	-0.94
13,411.00	88.99	148.95	11,709.61	36.00	-2,519.42	-844.76	0.59	-0.46	-0.37
13,506.00	89.08	148.95	11,711.21	-45.38	-2,470.42	-751.95	0.09	0.09	0.00
13,600.00	88.99	148.42	11,712.79	-125.67	-2,421.57	-660.20	0.57	-0.10	-0.56
13,694.00	89.08	148.07	11,714.38	-205.59	-2,372.11	-568.62	0.38	0.10	-0.37
13,788.00	89.16	147.90	11,715.82	-285.28	-2,322.28	-477.13	0.20	0.09	-0.18
13,882.00	89.25	149.13	11,717.13	-365.43	-2,273.20	-385.45	1.31	0.10	1.31
13,976.00	89.16	149.48	11,718.43	-446.26	-2,225.22	-293.48	0.38	-0.10	0.37
14,071.00	89.16	149.30	11,719.82	-528.01	-2,176.85	-200.52	0.19	0.00	-0.19
14,165.00	89.08	150.01	11,721.27	-609.12	-2,129.36	-108.44	0.76	-0.09	0.76
14,259.00	89.08	151.59	11,722.78	-691.16	-2,083.51	-16.01	1.68	0.00	1.68
14,352.00	89.25	151.24	11,724.13	-772.82	-2,039.02	75.62	0.42	0.18	-0.38
14,447.00	89.25	151.41	11,725.37	-856.16	-1,993.44	169.20	0.18	0.00	0.18
14,541.00	88.55	152.12	11,727.18	-938.96	-1,948.98	261.90	1.06	-0.74	0.76
14,635.00	86.70	156.33	11,731.08	-1,023.51	-1,908.15	355.09	4.89	-1.97	4.48
14,733.00	85.56	159.15	11,737.69	-1,113.99	-1,871.11	452.68	3.10	-1.16	2.88
14,764.00	85.56	159.15	11,740.09	-1,142.87	-1,860.11	483.56	0.00	0.00	0.00
14,794.00	85.56	158.97	11,742.41	-1,170.81	-1,849.42	513.45	0.60	0.00	-0.60
14,825.00	85.56	158.80	11,744.81	-1,199.64	-1,838.29	544.33	0.55	0.00	-0.55
14,857.00	85.56	158.62	11,747.29	-1,229.36	-1,826.70	576.21	0.56	0.00	-0.56
14,973.00	88.26	156.86	11,753.54	-1,336.55	-1,782.83	691.81	2.78	2.33	-1.52
15,012.00	89.23	156.51	11,754.40	-1,372.35	-1,767.40	730.67	2.64	2.49	-0.90
15,067.00	88.22	154.58	11,755.62	-1,422.41	-1,744.64	785.39	3.96	-1.84	-3.51
15,101.00	89.19	152.64	11,756.39	-1,452.85	-1,729.53	819.08	6.38	2.85	-5.71
15,129.00	89.67	151.50	11,756.67	-1,477.59	-1,716.41	846.72	4.42	1.71	-4.07
15,161.00	90.55	149.83	11,756.61	-1,505.48	-1,700.74	878.17	5.90	2.75	-5.22
15,192.00	90.99	147.98	11,756.19	-1,532.03	-1,684.73	908.45	6.13	1.42	-5.97
15,223.00	91.21	146.93	11,755.60	-1,558.15	-1,668.06	938.56	3.46	0.71	-3.39
15,255.00	91.30	147.37	11,754.89	-1,585.03	-1,650.70	969.59	1.40	0.28	1.38
15,286.00	91.30	147.37	11,754.19	-1,611.13	-1,633.99	999.68	0.00	0.00	0.00
15,317.00	91.38	147.46	11,753.47	-1,637.24	-1,617.30	1,029.77	0.39	0.26	0.29
15,349.00	91.43	147.37	11,752.68	-1,664.20	-1,600.07	1,060.84	0.32	0.16	-0.28
15,444.00	91.34	146.84	11,750.39	-1,743.94	-1,548.49	1,152.94	0.57	-0.09	-0.56
15,539.00	91.21	146.84	11,748.27	-1,823.45	-1,496.54	1,244.94	0.14	-0.14	0.00

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Hudson S-11 HU (slot B)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Site:	Hudson Alt North	MD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Well:	Hudson S-11 HU (slot B)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
15,633.00	90.07	147.02	11,747.22	-1,902.22	-1,445.25	1,336.02	1.23	-1.21	0.19
15,727.00	90.29	147.19	11,746.93	-1,981.15	-1,394.20	1,427.17	0.30	0.23	0.18
15,820.00	89.01	146.31	11,747.49	-2,058.92	-1,343.21	1,517.21	1.67	-1.38	-0.95
15,915.00	88.84	143.85	11,749.28	-2,136.79	-1,288.85	1,608.44	2.60	-0.18	-2.59
16,010.00	88.70	145.52	11,751.32	-2,214.29	-1,233.95	1,699.48	1.76	-0.15	1.76
16,104.00	89.27	147.37	11,752.98	-2,292.61	-1,182.00	1,790.35	2.06	0.61	1.97
16,199.00	89.85	148.69	11,753.71	-2,373.20	-1,131.70	1,882.84	1.52	0.61	1.39
16,292.00	87.82	149.48	11,755.80	-2,452.96	-1,083.93	1,973.73	2.34	-2.18	0.85
16,386.00	88.04	149.57	11,759.00	-2,533.92	-1,036.29	2,065.72	0.25	0.23	0.10
16,481.00	89.45	150.01	11,761.08	-2,616.00	-988.50	2,158.81	1.55	1.48	0.46
16,576.00	88.70	150.09	11,762.61	-2,698.30	-941.08	2,251.99	0.79	-0.79	0.08
16,670.00	88.75	150.18	11,764.70	-2,779.80	-894.28	2,344.21	0.11	0.05	0.10
16,765.00	89.01	150.18	11,766.56	-2,862.21	-847.05	2,437.43	0.27	0.27	0.00
16,859.00	89.14	150.89	11,768.08	-2,944.04	-800.82	2,529.79	0.77	0.14	0.76
16,954.00	89.41	150.80	11,769.28	-3,026.99	-754.54	2,623.22	0.30	0.28	-0.09
17,047.00	89.80	151.15	11,769.92	-3,108.31	-709.42	2,714.73	0.56	0.42	0.38
17,140.00	89.19	150.18	11,770.74	-3,189.38	-663.86	2,806.15	1.23	-0.66	-1.04
17,234.00	89.49	151.15	11,771.82	-3,271.32	-617.81	2,898.55	1.08	0.32	1.03
17,329.00	88.48	150.97	11,773.51	-3,354.44	-571.85	2,992.04	1.08	-1.06	-0.19
17,422.00	88.57	149.74	11,775.90	-3,435.24	-525.87	3,083.34	1.33	0.10	-1.32
17,516.00	88.44	149.65	11,778.35	-3,516.37	-478.45	3,175.41	0.17	-0.14	-0.10
17,610.00	89.76	149.92	11,779.83	-3,597.59	-431.15	3,267.53	1.43	1.40	0.29
17,704.00	89.93	149.92	11,780.08	-3,678.93	-384.04	3,359.70	0.18	0.18	0.00
17,799.00	89.45	149.22	11,780.60	-3,760.84	-335.92	3,452.74	0.89	-0.51	-0.74
17,893.00	89.54	149.74	11,781.43	-3,841.81	-288.19	3,544.77	0.56	0.10	0.55
17,987.00	90.02	149.92	11,781.79	-3,923.08	-240.95	3,636.91	0.55	0.51	0.19
18,081.00	89.19	149.57	11,782.44	-4,004.27	-193.59	3,729.02	0.96	-0.88	-0.37
18,175.00	89.19	149.83	11,783.76	-4,085.42	-146.17	3,821.12	0.28	0.00	0.28
18,269.00	89.67	150.18	11,784.70	-4,166.83	-99.18	3,913.32	0.63	0.51	0.37
18,363.00	88.53	150.01	11,786.18	-4,248.30	-52.32	4,005.53	1.23	-1.21	-0.18
18,457.00	89.19	150.01	11,788.05	-4,329.70	-5.34	4,097.72	0.70	0.70	0.00
18,552.00	89.58	149.92	11,789.07	-4,411.94	42.20	4,190.88	0.42	0.41	-0.09
18,646.00	88.84	149.48	11,790.36	-4,493.09	89.62	4,282.98	0.92	-0.79	-0.47
18,740.00	88.70	147.98	11,792.38	-4,573.41	138.40	4,374.72	1.60	-0.15	-1.60
18,833.00	89.63	150.01	11,793.73	-4,653.11	186.30	4,465.60	2.40	1.00	2.18
18,927.00	89.89	150.09	11,794.13	-4,734.56	233.23	4,557.81	0.29	0.28	0.09
19,020.00	89.23	149.92	11,794.84	-4,815.10	279.72	4,649.03	0.73	-0.71	-0.18
19,114.00	89.41	149.65	11,795.96	-4,896.32	327.02	4,741.15	0.35	0.19	-0.29
19,209.00	89.36	149.65	11,796.98	-4,978.30	375.02	4,834.21	0.05	-0.05	0.00
19,303.00	89.93	150.53	11,797.56	-5,059.78	421.89	4,926.44	1.12	0.61	0.94
19,397.00	88.92	150.36	11,798.50	-5,141.54	468.26	5,018.77	1.09	-1.07	-0.18
19,492.00	88.40	149.65	11,800.73	-5,223.79	515.74	5,111.93	0.93	-0.55	-0.75
19,586.00	89.01	150.09	11,802.85	-5,305.07	562.91	5,204.06	0.80	0.65	0.47

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Hudson S-11 HU (slot B)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Site:	Hudson Alt North	MD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Well:	Hudson S-11 HU (slot B)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
19,680.00	88.13	150.18	11,805.20	-5,386.56	609.70	5,296.28	0.94	-0.94	0.10
19,773.00	88.75	150.45	11,807.73	-5,467.33	655.74	5,387.56	0.73	0.67	0.29
19,867.00	88.40	152.12	11,810.07	-5,549.74	700.89	5,480.12	1.81	-0.37	1.78
19,961.00	88.13	151.59	11,812.91	-5,632.59	745.21	5,572.82	0.63	-0.29	-0.56
20,055.00	88.40	152.12	11,815.76	-5,715.43	789.53	5,665.52	0.63	0.29	0.56
20,150.00	88.75	150.80	11,818.12	-5,798.86	834.90	5,759.11	1.44	0.37	-1.39
20,244.00	88.00	149.74	11,820.79	-5,880.45	881.50	5,851.36	1.38	-0.80	-1.13
20,338.00	88.35	149.83	11,823.78	-5,961.64	928.78	5,943.44	0.38	0.37	0.10
20,432.00	88.66	150.01	11,826.23	-6,042.95	975.87	6,035.58	0.38	0.33	0.19
20,527.00	88.79	149.13	11,828.35	-6,124.85	1,023.98	6,128.60	0.94	0.14	-0.93
20,621.00	88.88	147.81	11,830.26	-6,204.95	1,073.12	6,220.26	1.41	0.10	-1.40
20,715.00	88.53	146.67	11,832.38	-6,283.98	1,123.97	6,311.44	1.27	-0.37	-1.21
20,810.00	88.26	148.16	11,835.04	-6,363.99	1,175.12	6,403.66	1.59	-0.28	1.57
20,904.00	88.88	148.42	11,837.39	-6,443.93	1,224.51	6,495.24	0.72	0.66	0.28
20,998.00	88.18	150.27	11,839.80	-6,524.77	1,272.42	6,587.19	2.10	-0.74	1.97
21,092.00	88.57	150.62	11,842.47	-6,606.50	1,318.77	6,679.49	0.56	0.41	0.37
21,186.00	88.62	150.45	11,844.77	-6,688.32	1,364.99	6,771.83	0.19	0.05	-0.18
21,280.00	88.66	150.45	11,847.00	-6,770.07	1,411.34	6,864.15	0.04	0.04	0.00
21,374.00	89.19	150.45	11,848.76	-6,851.83	1,457.69	6,956.47	0.56	0.56	0.00
21,469.00	89.36	150.80	11,849.97	-6,934.61	1,504.28	7,049.84	0.41	0.18	0.37
21,562.00	88.75	149.39	11,851.50	-7,015.21	1,550.64	7,141.08	1.65	-0.66	-1.52
21,657.00	88.92	150.01	11,853.43	-7,097.21	1,598.56	7,234.14	0.68	0.18	0.65
21,751.00	89.54	150.45	11,854.70	-7,178.80	1,645.23	7,326.40	0.81	0.66	0.47
21,845.00	88.57	150.09	11,856.25	-7,260.42	1,691.84	7,418.67	1.10	-1.03	-0.38
21,939.00	89.23	150.45	11,858.05	-7,342.03	1,738.44	7,510.94	0.80	0.70	0.38
22,033.00	89.80	150.71	11,858.85	-7,423.90	1,784.62	7,603.32	0.67	0.61	0.28
22,127.00	88.48	150.01	11,860.26	-7,505.59	1,831.10	7,695.62	1.59	-1.40	-0.74
22,222.00	88.40	150.01	11,862.84	-7,587.84	1,878.57	7,788.77	0.08	-0.08	0.00
22,316.00	88.92	150.45	11,865.04	-7,669.41	1,925.23	7,881.02	0.72	0.55	0.47
22,410.00	88.70	150.71	11,866.99	-7,751.27	1,971.39	7,973.38	0.36	-0.23	0.28
22,505.00	88.70	150.71	11,869.15	-7,834.11	2,017.85	8,066.76	0.00	0.00	0.00
22,599.00	88.84	151.15	11,871.17	-7,916.25	2,063.52	8,159.22	0.49	0.15	0.47
22,693.00	89.10	151.68	11,872.86	-7,998.77	2,108.48	8,251.83	0.63	0.28	0.56
22,787.00	89.10	150.97	11,874.33	-8,081.23	2,153.58	8,344.42	0.76	0.00	-0.76
22,880.00	89.32	151.68	11,875.62	-8,162.82	2,198.20	8,436.02	0.80	0.24	0.76
22,975.00	89.23	149.57	11,876.82	-8,245.59	2,244.80	8,529.38	2.22	-0.09	-2.22
23,068.00	89.80	149.92	11,877.60	-8,325.92	2,291.65	8,620.52	0.72	0.61	0.38
23,162.00	89.63	148.95	11,878.07	-8,406.86	2,339.45	8,712.53	1.05	-0.18	-1.03
23,255.00	90.24	149.13	11,878.18	-8,486.61	2,387.29	8,803.43	0.68	0.66	0.19
23,349.00	89.27	149.30	11,878.58	-8,567.36	2,435.40	8,895.37	1.05	-1.03	0.18
23,443.00	87.78	149.30	11,881.00	-8,648.16	2,483.38	8,987.31	1.59	-1.59	0.00
23,537.00	87.87	149.57	11,884.57	-8,729.04	2,531.14	9,079.26	0.30	0.10	0.29
23,631.00	88.13	149.74	11,887.85	-8,810.11	2,578.60	9,171.29	0.33	0.28	0.18
23,725.00	88.84	149.83	11,890.33	-8,891.31	2,625.89	9,263.39	0.76	0.76	0.10

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Hudson S-11 HU (slot B)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Site:	Hudson Alt North	MD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Well:	Hudson S-11 HU (slot B)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
23,820.00	89.10	149.74	11,892.04	-8,973.39	2,673.69	9,356.48	0.29	0.27	-0.09
23,913.00	89.85	150.36	11,892.89	-9,053.97	2,720.12	9,447.71	1.05	0.81	0.67
24,007.00	89.19	150.27	11,893.68	-9,135.63	2,766.67	9,540.01	0.71	-0.70	-0.10
24,101.00	88.53	149.83	11,895.55	-9,217.06	2,813.59	9,632.21	0.84	-0.70	-0.47
24,195.00	88.92	149.30	11,897.64	-9,298.09	2,861.19	9,724.24	0.70	0.41	-0.56
24,289.00	89.63	149.65	11,898.83	-9,379.05	2,908.93	9,816.26	0.84	0.76	0.37
24,384.00	89.27	149.30	11,899.74	-9,460.88	2,957.18	9,909.27	0.53	-0.38	-0.37
24,477.00	89.85	148.86	11,900.46	-9,540.66	3,004.97	10,000.18	0.78	0.62	-0.47
24,571.00	89.54	149.39	11,900.96	-9,621.34	3,053.21	10,092.09	0.65	-0.33	0.56
24,665.00	89.41	149.48	11,901.82	-9,702.28	3,101.00	10,184.10	0.17	-0.14	0.10
24,761.00	89.19	149.65	11,902.99	-9,785.04	3,149.63	10,278.11	0.29	-0.23	0.18
24,854.00	89.14	149.30	11,904.35	-9,865.14	3,196.86	10,369.15	0.38	-0.05	-0.38
24,949.00	89.63	149.13	11,905.37	-9,946.75	3,245.48	10,462.06	0.55	0.52	-0.18
25,043.00	89.01	149.13	11,906.48	-10,027.43	3,293.71	10,553.97	0.66	-0.66	0.00
25,136.00	89.58	149.22	11,907.63	-10,107.29	3,341.36	10,644.91	0.62	0.61	0.10
25,231.00	89.01	149.65	11,908.80	-10,189.08	3,389.66	10,737.90	0.75	-0.60	0.45
25,326.00	89.49	150.36	11,910.04	-10,271.35	3,437.15	10,831.07	0.90	0.51	0.75
25,420.00	89.05	151.41	11,911.24	-10,353.46	3,482.88	10,923.53	1.21	-0.47	1.12
25,515.00	89.54	152.56	11,912.41	-10,437.32	3,527.50	11,017.29	1.32	0.52	1.21
25,572.00	90.07	152.20	11,912.60	-10,487.83	3,553.93	11,073.61	1.12	0.93	-0.63
Survey @ 25572.00 MD 11912.60 TVD									
25,630.00	90.07	152.20	11,912.53	-10,539.13	3,580.98	11,130.89	0.00	0.00	0.00
Survey Proj. to 25630.00 MD 11912.53 TVD									

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
180.00	179.99	1.52	-0.13	MWD surveys
25,572.00	11,912.60	-10,487.83	3,553.93	Survey @ 25572.00 MD 11912.60 TVD
25,630.00	11,912.53	-10,539.13	3,580.98	Survey Proj. to 25630.00 MD 11912.53 TVD

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Hudson S-11 HU (slot B)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Site:	Hudson Alt North	MD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Well:	Hudson S-11 HU (slot B)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Project	Marshall County, West Virginia NAD83 UTM 17N		
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	Hudson Alt North				
Site Position:		Northing:	14,464,552.095 usft	Latitude:	39.82877400
From:	Lat/Long	Easting:	1,732,278.451 usft	Longitude:	-80.67279800
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.210 °

Well	Hudson S-11 HU (slot B)					
Well Position	+N/-S	0.00 ft	Northing:	14,464,525.236 usft	Latitude:	39.82870000
	+E/-W	0.00 ft	Easting:	1,732,302.133 usft	Longitude:	-80.67271400
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	1,346.00 ft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	9/20/2021	-8.691	66.540	51,736.85341056

Design	Surveys Original Hole				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	161.23	

Survey Program	Date	10/24/2021			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
180.00	914.00	MWD surf (Original Hole)	MWD	MWD - Standard	
950.00	2,825.00	MWD int (Original Hole)	MWD	MWD - Standard	
2,870.00	11,161.00	MWD int2 (Original Hole)	MWD	MWD - Standard	
11,273.00	25,572.00	MWD (Original Hole)	MWD	MWD - Standard	
25,630.00	25,630.00	Projection (Original Hole)	MWD	MWD - Standard	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	14,464,525.236	1,732,302.133	39.82870000	-80.67271400	
180.00	0.97	355.23	179.99	1.52	-0.13	14,464,526.754	1,732,302.006	39.82870417	-80.67271443	
MWD surveys										
211.00	0.92	20.54	210.99	2.01	-0.06	14,464,527.249	1,732,302.072	39.82870553	-80.67271419	
242.00	0.97	24.15	241.98	2.49	0.13	14,464,527.721	1,732,302.266	39.82870683	-80.67271349	
272.00	1.01	358.57	271.98	2.98	0.23	14,464,528.217	1,732,302.364	39.82870819	-80.67271314	
303.00	1.14	9.64	302.97	3.56	0.28	14,464,528.795	1,732,302.409	39.82870977	-80.67271297	

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Hudson S-11 HU (slot B)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Site:	Hudson Alt North	MD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Well:	Hudson S-11 HU (slot B)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
334.00	1.01	3.23	333.97	4.14	0.34	14,464,529.371	1,732,302.476	39.82871136	-80.67271273	
385.00	0.66	358.92	384.96	4.88	0.36	14,464,530.114	1,732,302.495	39.82871339	-80.67271265	
424.00	0.83	184.55	423.96	4.82	0.34	14,464,530.057	1,732,302.469	39.82871324	-80.67271274	
455.00	2.29	184.81	454.95	3.98	0.27	14,464,529.216	1,732,302.399	39.82871093	-80.67271300	
485.00	2.72	184.64	484.92	2.67	0.16	14,464,527.909	1,732,302.291	39.82870734	-80.67271340	
516.00	1.41	180.50	515.90	1.56	0.10	14,464,526.795	1,732,302.228	39.82870428	-80.67271364	
547.00	0.62	214.57	546.89	1.04	0.00	14,464,526.275	1,732,302.130	39.82870286	-80.67271400	
578.00	0.31	241.06	577.89	0.86	-0.17	14,464,526.096	1,732,301.961	39.82870237	-80.67271460	
608.00	0.53	216.19	607.89	0.71	-0.32	14,464,525.945	1,732,301.808	39.82870195	-80.67271515	
639.00	0.57	253.28	638.89	0.55	-0.56	14,464,525.785	1,732,301.576	39.82870152	-80.67271598	
670.00	0.40	214.17	669.89	0.42	-0.77	14,464,525.651	1,732,301.368	39.82870115	-80.67271672	
700.00	0.57	232.89	699.89	0.24	-0.94	14,464,525.474	1,732,301.190	39.82870067	-80.67271736	
731.00	0.70	249.15	730.89	0.08	-1.24	14,464,525.314	1,732,300.890	39.82870023	-80.67271843	
763.00	0.31	281.23	762.89	0.03	-1.51	14,464,525.261	1,732,300.622	39.82870009	-80.67271938	
794.00	0.92	274.55	793.88	0.06	-1.84	14,464,525.297	1,732,300.292	39.82870019	-80.67272056	
825.00	0.66	303.02	824.88	0.18	-2.24	14,464,525.414	1,732,299.894	39.82870051	-80.67272197	
857.00	0.83	274.64	856.88	0.30	-2.62	14,464,525.534	1,732,299.509	39.82870085	-80.67272334	
888.00	0.88	300.21	887.88	0.44	-3.05	14,464,525.672	1,732,299.079	39.82870123	-80.67272487	
914.00	0.79	323.77	913.87	0.68	-3.33	14,464,525.917	1,732,298.801	39.82870190	-80.67272586	
950.00	0.79	275.08	949.87	0.90	-3.73	14,464,526.139	1,732,298.407	39.82870252	-80.67272726	
981.00	0.83	282.81	980.87	0.97	-4.16	14,464,526.207	1,732,297.975	39.82870271	-80.67272880	
1,012.00	0.35	315.86	1,011.86	1.09	-4.44	14,464,526.325	1,732,297.690	39.82870304	-80.67272981	
1,043.00	0.83	293.88	1,042.86	1.25	-4.71	14,464,526.484	1,732,297.419	39.82870348	-80.67273078	
1,074.00	0.75	340.47	1,073.86	1.53	-4.99	14,464,526.766	1,732,297.146	39.82870425	-80.67273174	
1,091.00	0.35	332.29	1,090.86	1.68	-5.05	14,464,526.917	1,732,297.084	39.82870467	-80.67273196	
1,169.00	0.83	325.17	1,168.86	2.36	-5.48	14,464,527.592	1,732,296.651	39.82870653	-80.67273350	
1,263.00	1.19	329.04	1,262.84	3.75	-6.37	14,464,528.988	1,732,295.760	39.82871037	-80.67273665	
1,357.00	1.14	339.59	1,356.82	5.46	-7.20	14,464,530.701	1,732,294.932	39.82871508	-80.67273958	
1,450.00	1.49	308.39	1,449.80	7.08	-8.47	14,464,532.319	1,732,293.661	39.82871954	-80.67274408	
1,544.00	1.98	308.30	1,543.75	8.85	-10.70	14,464,534.084	1,732,291.429	39.82872441	-80.67275201	
1,639.00	1.85	303.38	1,638.70	10.71	-13.27	14,464,535.945	1,732,288.860	39.82872954	-80.67276114	
1,734.00	2.72	294.50	1,733.63	12.49	-16.60	14,464,537.724	1,732,285.529	39.82873446	-80.67277298	
1,828.00	4.61	293.62	1,827.43	14.93	-22.10	14,464,540.162	1,732,280.038	39.82874121	-80.67279251	
1,922.00	5.19	287.56	1,921.09	17.72	-29.61	14,464,542.959	1,732,272.523	39.82874897	-80.67281924	
2,016.00	4.75	290.63	2,014.73	20.38	-37.31	14,464,545.613	1,732,264.827	39.82875634	-80.67284661	
2,111.00	4.39	290.10	2,109.43	23.01	-44.40	14,464,548.248	1,732,257.732	39.82876364	-80.67287185	
2,205.00	4.48	290.63	2,203.15	25.54	-51.22	14,464,550.778	1,732,250.917	39.82877066	-80.67289609	
2,299.00	4.39	292.57	2,296.87	28.22	-57.97	14,464,553.452	1,732,244.159	39.82877807	-80.67292013	
2,393.00	3.91	286.33	2,390.62	30.50	-64.37	14,464,555.734	1,732,237.762	39.82878440	-80.67294288	
2,487.00	3.30	297.22	2,484.44	32.64	-69.85	14,464,557.873	1,732,232.280	39.82879033	-80.67296238	
2,581.00	3.60	292.39	2,578.27	35.00	-74.99	14,464,560.234	1,732,227.145	39.82879687	-80.67298064	
2,676.00	4.57	293.71	2,673.02	37.66	-81.21	14,464,562.892	1,732,220.922	39.82880423	-80.67300277	
2,771.00	5.19	297.05	2,767.68	41.13	-88.50	14,464,566.368	1,732,213.630	39.82881385	-80.67302870	
2,825.00	5.27	297.66	2,821.45	43.39	-92.87	14,464,568.630	1,732,209.259	39.82882011	-80.67304424	
2,870.00	5.36	298.45	2,866.26	45.35	-96.55	14,464,570.591	1,732,205.580	39.82882553	-80.67305731	
2,968.00	6.11	295.03	2,963.77	49.74	-105.30	14,464,574.978	1,732,196.830	39.82883766	-80.67308842	
3,062.00	7.03	294.94	3,057.15	54.28	-115.05	14,464,579.520	1,732,187.081	39.82885023	-80.67312309	
3,157.00	7.82	300.83	3,151.35	60.05	-125.87	14,464,585.284	1,732,176.260	39.82886617	-80.67316156	
3,250.00	9.23	301.88	3,243.32	67.23	-137.64	14,464,592.466	1,732,164.493	39.82888601	-80.67320338	
3,343.00	10.81	307.15	3,334.91	76.44	-150.93	14,464,601.673	1,732,151.207	39.82891143	-80.67325058	
3,437.00	12.74	310.93	3,426.92	88.55	-165.78	14,464,613.788	1,732,136.349	39.82894485	-80.67330334	
3,532.00	14.33	312.60	3,519.28	103.37	-182.35	14,464,628.609	1,732,119.780	39.82898572	-80.67336217	
3,625.00	16.04	311.90	3,609.03	119.75	-200.39	14,464,644.981	1,732,101.744	39.82903086	-80.67342620	
3,719.00	18.85	315.50	3,698.70	139.25	-220.70	14,464,664.489	1,732,081.429	39.82908464	-80.67349830	

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Hudson S-11 HU (slot B)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Site:	Hudson Alt North	MD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Well:	Hudson S-11 HU (slot B)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
3,813.00	21.36	315.86	3,786.97	162.37	-243.27	14,464,687.609	1,732,058.861	39.82914836	-80.67357839	
3,907.00	21.67	313.04	3,874.42	186.50	-267.88	14,464,711.740	1,732,034.254	39.82921487	-80.67366572	
4,002.00	22.63	309.79	3,962.41	210.17	-294.74	14,464,735.409	1,732,007.389	39.82928014	-80.67376110	
4,096.00	24.04	307.33	4,048.72	233.36	-323.87	14,464,758.595	1,731,978.266	39.82934411	-80.67386453	
4,190.00	22.90	303.64	4,134.95	255.10	-354.32	14,464,780.339	1,731,947.813	39.82940413	-80.67397272	
4,284.00	19.12	296.34	4,222.70	272.07	-383.36	14,464,797.310	1,731,918.775	39.82945102	-80.67407593	
4,378.00	18.02	293.27	4,311.81	284.65	-410.51	14,464,809.885	1,731,891.620	39.82948583	-80.67417249	
4,472.00	17.18	290.37	4,401.41	295.23	-436.89	14,464,820.462	1,731,865.248	39.82951514	-80.67426628	
4,519.00	16.88	290.28	4,446.35	300.01	-449.79	14,464,825.243	1,731,852.340	39.82952840	-80.67431220	
4,566.00	17.93	290.46	4,491.19	304.90	-462.97	14,464,830.137	1,731,839.161	39.82954197	-80.67435908	
4,613.00	19.20	291.42	4,535.75	310.25	-476.95	14,464,835.489	1,731,825.188	39.82955681	-80.67440878	
4,660.00	19.78	291.75	4,580.05	316.02	-491.53	14,464,841.258	1,731,810.607	39.82957280	-80.67446064	
4,710.00	20.43	292.13	4,627.01	322.45	-507.47	14,464,847.681	1,731,794.665	39.82959059	-80.67451734	
4,755.00	21.27	292.39	4,669.06	328.51	-522.29	14,464,853.748	1,731,779.842	39.82960741	-80.67457006	
4,849.00	20.57	295.38	4,756.87	342.09	-552.98	14,464,867.321	1,731,749.157	39.82964499	-80.67467918	
4,943.00	20.79	296.96	4,844.81	356.73	-582.77	14,464,881.963	1,731,719.368	39.82968549	-80.67478510	
5,036.00	21.67	296.34	4,931.50	371.83	-612.87	14,464,897.064	1,731,689.268	39.82972727	-80.67489211	
5,130.00	21.01	293.53	5,019.05	386.26	-643.87	14,464,911.493	1,731,658.264	39.82976720	-80.67500236	
5,223.00	20.70	291.95	5,105.96	399.06	-674.40	14,464,924.293	1,731,627.733	39.82980265	-80.67511094	
5,317.00	21.09	293.97	5,193.78	412.14	-705.26	14,464,937.374	1,731,596.870	39.82983889	-80.67522070	
5,412.00	22.90	293.97	5,281.86	426.59	-737.77	14,464,951.828	1,731,564.360	39.82987890	-80.67533631	
5,506.00	22.81	293.53	5,368.48	441.30	-771.19	14,464,966.532	1,731,530.942	39.82991962	-80.67545515	
5,600.00	22.41	296.08	5,455.26	456.45	-803.99	14,464,981.684	1,731,498.142	39.82996156	-80.67557179	
5,695.00	21.36	295.64	5,543.41	471.90	-835.86	14,464,997.131	1,731,466.280	39.83000430	-80.67568508	
5,792.00	20.70	292.92	5,633.95	486.22	-867.57	14,465,011.452	1,731,434.563	39.83004394	-80.67579787	
5,886.00	19.86	293.88	5,722.13	499.15	-897.47	14,465,024.386	1,731,404.661	39.83007976	-80.67590421	
5,979.00	20.48	296.08	5,809.42	512.70	-926.53	14,465,037.934	1,731,375.602	39.83011725	-80.67600754	
6,073.00	21.05	295.73	5,897.32	527.26	-956.51	14,465,052.492	1,731,345.624	39.83015753	-80.67611413	
6,167.00	21.18	297.22	5,985.01	542.35	-986.82	14,465,067.588	1,731,315.316	39.83019929	-80.67622189	
6,261.00	21.67	296.70	6,072.51	557.92	-1,017.42	14,465,083.154	1,731,284.710	39.83024234	-80.67633070	
6,356.00	20.35	294.06	6,161.19	572.54	-1,048.18	14,465,097.770	1,731,253.956	39.83028278	-80.67644006	
6,450.00	20.26	293.44	6,249.35	585.67	-1,078.04	14,465,110.908	1,731,224.099	39.83031916	-80.67654624	
6,497.00	19.34	293.62	6,293.57	592.03	-1,092.63	14,465,117.263	1,731,209.502	39.83033676	-80.67659815	
6,544.00	17.23	291.60	6,338.20	597.71	-1,106.24	14,465,122.945	1,731,195.898	39.83035250	-80.67664653	
6,591.00	15.16	290.37	6,383.33	602.41	-1,118.47	14,465,127.647	1,731,183.663	39.83036553	-80.67669005	
6,638.00	13.49	289.23	6,428.87	606.36	-1,129.41	14,465,131.592	1,731,172.725	39.83037647	-80.67672896	
6,685.00	12.17	288.35	6,474.69	609.72	-1,139.29	14,465,134.957	1,731,162.846	39.83038581	-80.67676411	
6,733.00	12.52	288.70	6,521.58	612.98	-1,149.02	14,465,138.218	1,731,153.116	39.83039486	-80.67679872	
6,780.00	11.47	292.13	6,567.56	616.38	-1,158.17	14,465,141.612	1,731,143.961	39.83040428	-80.67683129	
6,827.00	11.47	292.21	6,613.62	619.90	-1,166.83	14,465,145.139	1,731,135.306	39.83041405	-80.67686207	
6,921.00	11.51	292.13	6,705.74	626.97	-1,184.17	14,465,152.204	1,731,117.966	39.83043362	-80.67692374	
7,016.00	11.56	291.51	6,798.82	634.03	-1,201.81	14,465,159.265	1,731,100.330	39.83045319	-80.67698647	
7,106.00	12.52	292.30	6,886.84	641.04	-1,219.22	14,465,166.273	1,731,082.915	39.83047261	-80.67704841	
7,201.00	13.05	294.15	6,979.48	649.33	-1,238.53	14,465,174.569	1,731,063.601	39.83049558	-80.67711710	
7,295.00	13.84	294.39	7,070.90	658.32	-1,258.46	14,465,183.554	1,731,043.677	39.83052045	-80.67718795	
7,389.00	16.00	291.51	7,161.73	667.71	-1,280.75	14,465,192.948	1,731,021.382	39.83054647	-80.67726725	
7,451.00	17.97	290.37	7,221.02	674.18	-1,297.67	14,465,199.410	1,731,004.465	39.83056439	-80.67732742	
7,482.00	19.07	289.40	7,250.42	677.52	-1,306.93	14,465,202.757	1,730,995.205	39.83057367	-80.67736036	
7,577.00	21.80	288.08	7,339.43	688.15	-1,338.34	14,465,213.389	1,730,963.792	39.83060318	-80.67747212	
7,672.00	21.53	288.79	7,427.72	699.24	-1,371.62	14,465,224.478	1,730,930.520	39.83063396	-80.67759049	
7,765.00	23.42	292.83	7,513.66	711.91	-1,404.81	14,465,237.148	1,730,897.325	39.83066908	-80.67770856	
7,859.00	22.06	291.60	7,600.35	725.66	-1,438.44	14,465,250.895	1,730,863.693	39.83070717	-80.67782818	
7,953.00	21.58	292.92	7,687.62	738.89	-1,470.78	14,465,264.125	1,730,831.358	39.83074382	-80.67794319	
8,079.00	25.00	291.77	7,803.33	757.80	-1,516.86	14,465,283.030	1,730,785.276	39.83079619	-80.67810708	

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Hudson S-11 HU (slot B)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Site:	Hudson Alt North	MD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Well:	Hudson S-11 HU (slot B)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
8,142.00	25.88	291.86	7,860.22	767.85	-1,541.98	14,465,293.087	1,730,760.152	39.83082406	-80.67819645	
8,236.00	26.98	291.42	7,944.40	783.28	-1,580.88	14,465,308.513	1,730,721.261	39.83086681	-80.67833478	
8,330.00	27.82	289.93	8,027.85	798.54	-1,621.35	14,465,323.777	1,730,680.789	39.83090913	-80.67847874	
8,425.00	28.39	289.84	8,111.65	813.76	-1,663.43	14,465,338.999	1,730,638.704	39.83095135	-80.67862845	
8,519.00	27.51	290.63	8,194.68	829.00	-1,704.77	14,465,354.233	1,730,597.365	39.83099359	-80.67877550	
8,613.00	28.34	292.57	8,277.74	845.21	-1,745.69	14,465,370.445	1,730,556.444	39.83103852	-80.67892106	
8,707.00	28.08	293.97	8,360.58	862.76	-1,786.51	14,465,387.997	1,730,515.626	39.83108712	-80.67906622	
8,802.00	28.87	293.53	8,444.08	881.00	-1,827.97	14,465,406.236	1,730,474.168	39.83113762	-80.67921366	
8,896.00	28.13	292.92	8,526.69	898.69	-1,869.19	14,465,423.926	1,730,432.952	39.83118660	-80.67936025	
8,989.00	26.76	290.46	8,609.23	914.55	-1,909.00	14,465,439.784	1,730,393.140	39.83123054	-80.67950185	
9,083.00	24.61	292.65	8,693.93	929.49	-1,946.89	14,465,454.720	1,730,355.245	39.83127194	-80.67963664	
9,177.00	23.38	295.73	8,779.81	945.12	-1,981.76	14,465,470.356	1,730,320.377	39.83131522	-80.67976064	
9,241.00	24.48	296.52	8,838.31	956.56	-2,005.06	14,465,481.790	1,730,297.072	39.83134685	-80.67984351	
9,270.00	25.27	296.70	8,864.62	962.02	-2,015.97	14,465,487.254	1,730,286.166	39.83136196	-80.67988229	
9,364.00	26.10	295.11	8,949.33	979.81	-2,052.62	14,465,505.044	1,730,249.518	39.83141117	-80.68001260	
9,458.00	27.82	294.50	9,033.11	997.68	-2,091.31	14,465,522.916	1,730,210.832	39.83146063	-80.68015017	
9,551.00	29.18	294.24	9,114.84	1,015.99	-2,131.73	14,465,541.224	1,730,170.411	39.83151131	-80.68029392	
9,646.00	28.87	294.67	9,197.91	1,035.07	-2,173.68	14,465,560.305	1,730,128.453	39.83156412	-80.68044313	
9,740.00	28.83	293.80	9,280.24	1,053.69	-2,215.04	14,465,578.922	1,730,087.094	39.83161566	-80.68059021	
9,834.00	28.78	295.91	9,362.61	1,072.72	-2,256.13	14,465,597.956	1,730,046.003	39.83166833	-80.68073633	
9,928.00	28.70	297.66	9,445.04	1,093.09	-2,296.48	14,465,618.322	1,730,005.658	39.83172465	-80.68087978	
10,023.00	27.73	294.24	9,528.75	1,112.75	-2,336.84	14,465,637.987	1,729,965.297	39.83177905	-80.68102330	
10,107.00	26.81	295.29	9,603.42	1,128.87	-2,371.79	14,465,654.104	1,729,930.349	39.83182366	-80.68114758	
10,201.00	27.38	292.48	9,687.10	1,146.19	-2,410.93	14,465,671.425	1,729,891.208	39.83187161	-80.68128678	
10,294.00	26.94	289.84	9,769.85	1,161.52	-2,450.51	14,465,686.753	1,729,851.630	39.83191409	-80.68142756	
10,388.00	24.79	286.41	9,854.44	1,174.32	-2,489.45	14,465,699.549	1,729,812.689	39.83194961	-80.68156611	
10,482.00	24.79	286.33	9,939.77	1,185.42	-2,527.26	14,465,710.657	1,729,774.873	39.83198049	-80.68170067	
10,574.00	23.73	286.15	10,023.65	1,196.00	-2,563.56	14,465,721.230	1,729,738.582	39.83200988	-80.68182980	
10,671.00	26.63	288.08	10,111.42	1,208.17	-2,602.98	14,465,733.408	1,729,699.160	39.83204371	-80.68197007	
10,765.00	27.47	286.15	10,195.14	1,220.74	-2,643.83	14,465,745.977	1,729,658.307	39.83207862	-80.68211543	
10,859.00	28.83	287.91	10,278.02	1,233.74	-2,686.22	14,465,758.978	1,729,615.914	39.83211474	-80.68226627	
10,954.00	28.04	286.06	10,361.56	1,246.97	-2,729.48	14,465,772.199	1,729,572.659	39.83215147	-80.68242018	
11,048.00	27.69	285.62	10,444.66	1,258.96	-2,771.74	14,465,784.192	1,729,530.394	39.83218482	-80.68257058	
11,141.00	27.38	285.89	10,527.13	1,270.63	-2,813.12	14,465,795.865	1,729,489.016	39.83221728	-80.68271782	
11,161.00	27.11	285.62	10,544.91	1,273.12	-2,821.93	14,465,798.351	1,729,480.204	39.83222419	-80.68274917	
11,273.00	27.03	286.76	10,644.64	1,287.33	-2,870.88	14,465,812.561	1,729,431.259	39.83226369	-80.68292334	
11,369.00	25.93	286.50	10,730.57	1,299.58	-2,911.89	14,465,824.813	1,729,390.245	39.83229774	-80.68306927	
11,416.00	24.62	283.51	10,773.07	1,304.79	-2,931.27	14,465,830.019	1,729,370.872	39.83231222	-80.68313822	
11,463.00	23.08	278.15	10,816.06	1,308.38	-2,949.91	14,465,833.613	1,729,352.230	39.83232227	-80.68320457	
11,510.00	22.11	271.56	10,859.46	1,309.93	-2,967.87	14,465,835.160	1,729,334.266	39.83232670	-80.68326854	
11,558.00	20.75	264.53	10,904.15	1,309.36	-2,985.37	14,465,834.595	1,729,316.768	39.83232532	-80.68333088	
11,603.00	19.43	256.88	10,946.41	1,306.90	-3,000.60	14,465,832.136	1,729,301.540	39.83231871	-80.68338515	
11,651.00	20.44	245.28	10,991.56	1,301.58	-3,015.99	14,465,826.817	1,729,286.145	39.83230425	-80.68344006	
11,682.00	19.08	235.61	11,020.74	1,296.46	-3,025.10	14,465,821.689	1,729,277.044	39.83229026	-80.68347254	
11,713.00	17.80	222.34	11,050.16	1,290.09	-3,032.47	14,465,815.322	1,729,269.668	39.83227284	-80.68349889	
11,745.00	17.49	208.98	11,080.67	1,282.26	-3,038.10	14,465,807.497	1,729,264.041	39.83225141	-80.68351904	
11,792.00	17.80	200.37	11,125.46	1,269.35	-3,044.02	14,465,794.582	1,729,258.118	39.83221600	-80.68354030	
11,839.00	21.27	192.90	11,169.76	1,254.30	-3,048.43	14,465,779.531	1,729,253.712	39.83217471	-80.68355618	
11,886.00	23.69	186.57	11,213.19	1,236.60	-3,051.41	14,465,761.836	1,729,250.728	39.83212614	-80.68356703	
11,933.00	26.02	179.98	11,255.84	1,216.91	-3,052.49	14,465,742.140	1,729,249.650	39.83207206	-80.68357112	
11,980.00	29.19	174.88	11,297.49	1,195.17	-3,051.46	14,465,720.407	1,729,250.677	39.83201237	-80.68356774	
12,028.00	32.48	171.54	11,338.70	1,170.76	-3,048.52	14,465,695.992	1,729,253.619	39.83194529	-80.68355756	
12,075.00	35.87	172.15	11,377.58	1,144.63	-3,044.78	14,465,669.862	1,729,257.357	39.83187350	-80.68354458	
12,122.00	38.73	169.69	11,414.97	1,116.51	-3,040.27	14,465,641.748	1,729,261.871	39.83179625	-80.68352886	

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Hudson S-11 HU (slot B)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Site:	Hudson Alt North	MD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Well:	Hudson S-11 HU (slot B)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
12,169.00	42.24	166.79	11,450.71	1,086.66	-3,034.02	14,465,611.891	1,729,268.115	39.83171419	-80.68350699	
12,216.00	46.02	164.60	11,484.44	1,054.96	-3,025.92	14,465,580.195	1,729,276.219	39.83162707	-80.68347852	
12,263.00	49.98	163.19	11,515.89	1,021.42	-3,016.22	14,465,546.650	1,729,285.918	39.83153485	-80.68344440	
12,311.00	53.58	161.87	11,545.58	985.46	-3,004.89	14,465,510.690	1,729,297.247	39.83143598	-80.68340450	
12,358.00	57.19	161.17	11,572.27	948.78	-2,992.63	14,465,474.012	1,729,309.510	39.83133514	-80.68336128	
12,405.00	62.15	160.55	11,596.00	910.47	-2,979.33	14,465,435.701	1,729,322.812	39.83122980	-80.68331438	
12,452.00	66.02	159.15	11,616.54	870.79	-2,964.76	14,465,396.027	1,729,337.379	39.83112070	-80.68326299	
12,499.00	69.05	157.48	11,634.50	830.44	-2,948.71	14,465,355.677	1,729,353.432	39.83100974	-80.68320632	
12,546.00	72.62	155.19	11,649.93	789.79	-2,930.88	14,465,315.029	1,729,371.256	39.83089793	-80.68314335	
12,593.00	74.68	153.70	11,663.16	749.11	-2,911.43	14,465,274.346	1,729,390.712	39.83078602	-80.68307456	
12,640.00	75.43	153.08	11,675.28	708.51	-2,891.09	14,465,233.747	1,729,411.052	39.83067433	-80.68300262	
12,687.00	78.24	153.08	11,685.98	667.71	-2,870.37	14,465,192.945	1,729,431.770	39.83056208	-80.68292934	
12,734.00	81.80	152.91	11,694.12	626.48	-2,849.35	14,465,151.710	1,729,452.785	39.83044863	-80.68285501	
12,781.00	85.10	151.85	11,699.49	585.11	-2,827.71	14,465,110.345	1,729,474.430	39.83033482	-80.68277843	
12,828.00	87.56	150.97	11,702.49	543.93	-2,805.27	14,465,069.165	1,729,496.874	39.83022151	-80.68269901	
12,875.00	89.23	152.03	11,703.81	502.64	-2,782.85	14,465,027.879	1,729,519.290	39.83010791	-80.68261969	
12,970.00	89.49	152.38	11,704.87	418.61	-2,738.55	14,464,943.845	1,729,563.586	39.82987671	-80.68246297	
13,065.00	89.54	150.80	11,705.68	335.06	-2,693.36	14,464,860.292	1,729,608.782	39.82964681	-80.68230304	
13,159.00	89.27	150.01	11,706.65	253.33	-2,646.94	14,464,778.561	1,729,655.203	39.82942190	-80.68213873	
13,222.00	89.43	150.18	11,707.37	198.72	-2,615.53	14,464,723.953	1,729,686.610	39.82927163	-80.68202756	
13,316.00	89.43	149.30	11,708.30	117.53	-2,568.16	14,464,642.766	1,729,733.976	39.82904821	-80.68185987	
13,411.00	88.99	148.95	11,709.61	36.00	-2,519.42	14,464,561.236	1,729,782.722	39.82882383	-80.68168728	
13,506.00	89.08	148.95	11,711.21	-45.38	-2,470.42	14,464,479.860	1,729,831.714	39.82859988	-80.68151381	
13,600.00	88.99	148.42	11,712.79	-125.67	-2,421.57	14,464,399.565	1,729,880.563	39.82837889	-80.68134084	
13,694.00	89.08	148.07	11,714.38	-205.59	-2,372.11	14,464,319.648	1,729,930.027	39.82815894	-80.68116567	
13,788.00	89.16	147.90	11,715.82	-285.28	-2,322.28	14,464,239.954	1,729,979.854	39.82793959	-80.68098921	
13,882.00	89.25	149.13	11,717.13	-365.43	-2,273.20	14,464,159.803	1,730,028.942	39.82771899	-80.68081538	
13,976.00	89.16	149.48	11,718.43	-446.26	-2,225.22	14,464,078.981	1,730,076.922	39.82749657	-80.68064552	
14,071.00	89.16	149.30	11,719.82	-528.01	-2,176.85	14,463,997.227	1,730,125.289	39.82727158	-80.68047428	
14,165.00	89.08	150.01	11,721.27	-609.12	-2,129.36	14,463,916.116	1,730,172.773	39.82704836	-80.68030619	
14,259.00	89.08	151.59	11,722.78	-691.16	-2,083.51	14,463,834.075	1,730,218.624	39.82682261	-80.68014392	
14,352.00	89.25	151.24	11,724.13	-772.82	-2,039.02	14,463,752.419	1,730,263.116	39.82659793	-80.67998650	
14,447.00	89.25	151.41	11,725.37	-856.16	-1,993.44	14,463,669.078	1,730,308.697	39.82636860	-80.67982521	
14,541.00	88.55	152.12	11,727.18	-938.96	-1,948.98	14,463,586.279	1,730,353.159	39.82614078	-80.67966791	
14,635.00	86.70	156.33	11,731.08	-1,023.51	-1,908.15	14,463,501.728	1,730,393.989	39.82590818	-80.67952356	
14,733.00	85.56	159.15	11,737.69	-1,113.99	-1,871.11	14,463,411.250	1,730,431.025	39.82565935	-80.67939280	
14,764.00	85.56	159.15	11,740.09	-1,142.87	-1,860.11	14,463,382.367	1,730,442.026	39.82557992	-80.67935399	
14,794.00	85.56	158.97	11,742.41	-1,170.81	-1,849.42	14,463,354.432	1,730,452.715	39.82550310	-80.67931628	
14,825.00	85.56	158.80	11,744.81	-1,199.64	-1,838.29	14,463,325.601	1,730,463.849	39.82542381	-80.67927699	
14,857.00	85.56	158.62	11,747.29	-1,229.36	-1,826.70	14,463,295.874	1,730,475.433	39.82534206	-80.67923611	
14,973.00	88.26	156.86	11,753.54	-1,336.55	-1,782.83	14,463,188.690	1,730,519.307	39.82504728	-80.67908121	
15,012.00	89.23	156.51	11,754.40	-1,372.35	-1,767.40	14,463,152.884	1,730,534.739	39.82494879	-80.67902671	
15,067.00	88.22	154.58	11,755.62	-1,422.41	-1,744.64	14,463,102.834	1,730,557.501	39.82481112	-80.67894628	
15,101.00	89.19	152.64	11,756.39	-1,452.85	-1,729.53	14,463,072.387	1,730,572.608	39.82472735	-80.67889286	
15,129.00	89.67	151.50	11,756.67	-1,477.59	-1,716.41	14,463,047.650	1,730,585.722	39.82465929	-80.67884647	
15,161.00	90.55	149.83	11,756.61	-1,505.48	-1,700.74	14,463,019.754	1,730,601.399	39.82458253	-80.67879099	
15,192.00	90.99	147.98	11,756.19	-1,532.03	-1,684.73	14,462,993.212	1,730,617.407	39.82450948	-80.67873432	
15,223.00	91.21	146.93	11,755.60	-1,558.15	-1,668.06	14,462,967.086	1,730,634.080	39.82443757	-80.67867527	
15,255.00	91.30	147.37	11,754.89	-1,585.03	-1,650.70	14,462,940.209	1,730,651.434	39.82436359	-80.67861380	
15,286.00	91.30	147.37	11,754.19	-1,611.13	-1,633.99	14,462,914.109	1,730,668.145	39.82429174	-80.67855462	
15,317.00	91.38	147.46	11,753.47	-1,637.24	-1,617.30	14,462,887.996	1,730,684.836	39.82421987	-80.67849551	
15,349.00	91.43	147.37	11,752.68	-1,664.20	-1,600.07	14,462,861.041	1,730,702.064	39.82414567	-80.67843449	
15,444.00	91.34	146.84	11,750.39	-1,743.94	-1,548.49	14,462,781.296	1,730,753.643	39.82392616	-80.67825181	
15,539.00	91.21	146.84	11,748.27	-1,823.45	-1,496.54	14,462,701.787	1,730,805.593	39.82370730	-80.67806780	

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Hudson S-11 HU (slot B)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Site:	Hudson Alt North	MD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Well:	Hudson S-11 HU (slot B)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
15,633.00	90.07	147.02	11,747.22	-1,902.22	-1,445.25	14,462,623.021	1,730,856.882	39.82349048	-80.67788615	
15,727.00	90.29	147.19	11,746.93	-1,981.15	-1,394.20	14,462,544.093	1,730,907.933	39.82327322	-80.67770534	
15,820.00	89.01	146.31	11,747.49	-2,058.92	-1,343.21	14,462,466.322	1,730,958.921	39.82305914	-80.67752474	
15,915.00	88.84	143.85	11,749.28	-2,136.79	-1,288.85	14,462,388.447	1,731,013.288	39.82284474	-80.67733211	
16,010.00	88.70	145.52	11,751.32	-2,214.29	-1,233.95	14,462,310.949	1,731,068.190	39.82263137	-80.67713757	
16,104.00	89.27	147.37	11,752.98	-2,292.61	-1,182.00	14,462,232.629	1,731,120.137	39.82241577	-80.67695357	
16,199.00	89.85	148.69	11,753.71	-2,373.20	-1,131.70	14,462,152.043	1,731,170.434	39.82219396	-80.67677547	
16,292.00	87.82	149.48	11,755.60	-2,452.96	-1,083.93	14,462,072.277	1,731,218.202	39.82197443	-80.67660637	
16,386.00	88.04	149.57	11,759.00	-2,533.92	-1,036.29	14,461,991.316	1,731,265.844	39.82175162	-80.67643774	
16,481.00	89.45	150.01	11,761.08	-2,616.00	-988.50	14,461,909.241	1,731,313.632	39.82152575	-80.67626860	
16,576.00	88.70	150.09	11,762.61	-2,698.30	-941.08	14,461,826.938	1,731,361.053	39.82129926	-80.67610077	
16,670.00	88.75	150.18	11,764.70	-2,779.80	-894.28	14,461,745.442	1,731,407.850	39.82107498	-80.67593516	
16,765.00	89.01	150.18	11,766.56	-2,862.21	-847.05	14,461,663.037	1,731,455.082	39.82084821	-80.67576801	
16,859.00	89.14	150.89	11,768.08	-2,944.04	-800.82	14,461,581.206	1,731,501.313	39.82062302	-80.67560441	
16,954.00	89.41	150.80	11,769.28	-3,026.99	-754.54	14,461,498.249	1,731,547.591	39.82039474	-80.67544067	
17,047.00	89.80	151.15	11,769.92	-3,108.31	-709.42	14,461,416.932	1,731,592.713	39.82017097	-80.67528103	
17,140.00	89.19	150.18	11,770.74	-3,189.38	-663.86	14,461,335.862	1,731,638.272	39.81994788	-80.67511982	
17,234.00	89.49	151.15	11,771.82	-3,271.32	-617.81	14,461,253.922	1,731,684.320	39.81972240	-80.67495688	
17,329.00	88.48	150.97	11,773.51	-3,354.44	-571.85	14,461,170.799	1,731,730.282	39.81949367	-80.67479427	
17,422.00	88.57	149.74	11,775.90	-3,435.24	-525.87	14,461,090.001	1,731,776.266	39.81927131	-80.67463155	
17,516.00	88.44	149.65	11,778.35	-3,516.37	-478.45	14,461,008.874	1,731,823.682	39.81904805	-80.67446374	
17,610.00	89.76	149.92	11,779.83	-3,597.59	-431.15	14,460,927.656	1,731,870.981	39.81882453	-80.67429635	
17,704.00	89.93	149.92	11,780.08	-3,678.93	-384.04	14,460,846.316	1,731,918.094	39.81860068	-80.67412961	
17,799.00	89.45	149.22	11,780.60	-3,760.84	-335.92	14,460,764.404	1,731,966.209	39.81837525	-80.67395933	
17,893.00	89.54	149.74	11,781.43	-3,841.81	-288.19	14,460,683.432	1,732,013.943	39.81815240	-80.67379038	
17,987.00	90.02	149.92	11,781.79	-3,923.08	-240.95	14,460,602.166	1,732,061.184	39.81792876	-80.67362320	
18,081.00	89.19	149.57	11,782.44	-4,004.27	-193.59	14,460,520.973	1,732,108.544	39.81770530	-80.67345559	
18,175.00	89.19	149.83	11,783.76	-4,085.42	-146.17	14,460,439.822	1,732,155.965	39.81748197	-80.67328777	
18,269.00	89.67	150.18	11,784.70	-4,166.83	-99.18	14,460,358.416	1,732,202.955	39.81725794	-80.67312148	
18,363.00	88.53	150.01	11,786.18	-4,248.30	-52.32	14,460,276.943	1,732,249.814	39.81703373	-80.67295567	
18,457.00	89.19	150.01	11,788.05	-4,329.70	-5.34	14,460,195.545	1,732,296.790	39.81680972	-80.67278944	
18,552.00	89.58	149.92	11,789.07	-4,411.94	42.20	14,460,113.307	1,732,344.337	39.81658339	-80.67262118	
18,646.00	88.84	149.48	11,790.36	-4,493.09	89.62	14,460,032.156	1,732,391.758	39.81636006	-80.67245336	
18,740.00	88.70	147.98	11,792.38	-4,573.41	138.40	14,459,951.833	1,732,440.537	39.81613898	-80.67228070	
18,833.00	89.63	150.01	11,793.73	-4,653.11	186.30	14,459,872.134	1,732,488.435	39.81591963	-80.67211117	
18,927.00	89.89	150.09	11,794.13	-4,734.56	233.23	14,459,790.687	1,732,535.363	39.81569548	-80.67194511	
19,020.00	89.23	149.92	11,794.84	-4,815.10	279.72	14,459,710.146	1,732,581.854	39.81547383	-80.67178060	
19,114.00	89.41	149.65	11,795.96	-4,896.32	327.02	14,459,628.923	1,732,629.156	39.81525029	-80.67161321	
19,209.00	89.36	149.65	11,796.98	-4,978.30	375.02	14,459,546.947	1,732,677.155	39.81502468	-80.67144335	
19,303.00	89.93	150.53	11,797.56	-5,059.78	421.89	14,459,465.470	1,732,724.025	39.81480046	-80.67127751	
19,397.00	88.92	150.36	11,798.50	-5,141.54	468.26	14,459,383.706	1,732,770.388	39.81457545	-80.67111347	
19,492.00	88.40	149.65	11,800.73	-5,223.79	515.74	14,459,301.453	1,732,817.868	39.81434908	-80.67094547	
19,586.00	89.01	150.09	11,802.85	-5,305.07	562.91	14,459,220.175	1,732,865.040	39.81412539	-80.67077855	
19,680.00	88.13	150.18	11,805.20	-5,386.56	609.70	14,459,138.684	1,732,911.833	39.81390113	-80.67061299	
19,773.00	88.75	150.45	11,807.73	-5,467.33	655.74	14,459,057.920	1,732,957.872	39.81367887	-80.67045010	
19,867.00	88.40	152.12	11,810.07	-5,549.74	700.89	14,458,975.509	1,733,003.019	39.81345209	-80.67029041	
19,961.00	88.13	151.59	11,812.91	-5,632.59	745.21	14,458,892.662	1,733,047.338	39.81322412	-80.67013367	
20,055.00	88.40	152.12	11,815.76	-5,715.43	789.53	14,458,809.816	1,733,091.658	39.81299616	-80.66997693	
20,150.00	88.75	150.80	11,818.12	-5,798.86	834.90	14,458,726.388	1,733,137.031	39.81276659	-80.66981646	
20,244.00	88.00	149.74	11,820.79	-5,880.45	881.50	14,458,644.795	1,733,183.627	39.81254204	-80.66965160	
20,338.00	88.35	149.83	11,823.78	-5,961.64	928.78	14,458,563.607	1,733,230.908	39.81231860	-80.66948430	
20,432.00	88.66	150.01	11,826.23	-6,042.95	975.87	14,458,482.295	1,733,278.005	39.81209482	-80.66931766	
20,527.00	88.79	149.13	11,828.35	-6,124.85	1,023.98	14,458,400.402	1,733,326.109	39.81186944	-80.66914744	
20,621.00	88.88	147.81	11,830.26	-6,204.95	1,073.12	14,458,320.298	1,733,375.254	39.81164895	-80.66897349	

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Hudson S-11 HU (slot B)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Site:	Hudson Alt North	MD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Well:	Hudson S-11 HU (slot B)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
20,715.00	88.53	146.67	11,832.38	-6,283.98	1,123.97	14,458,241.271	1,733,426.106	39.81143141	-80.66879345	
20,810.00	88.26	148.16	11,835.04	-6,363.99	1,175.12	14,458,161.259	1,733,477.246	39.81121116	-80.66861240	
20,904.00	88.88	148.42	11,837.39	-6,443.93	1,224.51	14,458,081.317	1,733,526.639	39.81099111	-80.66843757	
20,998.00	88.18	150.27	11,839.80	-6,524.77	1,272.42	14,458,000.484	1,733,574.548	39.81076864	-80.66826803	
21,092.00	88.57	150.62	11,842.47	-6,606.50	1,318.77	14,457,918.748	1,733,620.896	39.81054370	-80.66810407	
21,186.00	88.62	150.45	11,844.77	-6,688.32	1,364.99	14,457,836.931	1,733,667.120	39.81031854	-80.66794056	
21,280.00	88.66	150.45	11,847.00	-6,770.07	1,411.34	14,457,755.182	1,733,713.466	39.81009357	-80.66777660	
21,374.00	89.19	150.45	11,848.76	-6,851.83	1,457.69	14,457,673.424	1,733,759.816	39.80986857	-80.66761264	
21,469.00	89.36	150.80	11,849.97	-6,934.61	1,504.28	14,457,590.645	1,733,806.412	39.80964076	-80.66744781	
21,562.00	88.75	149.39	11,851.50	-7,015.21	1,550.64	14,457,510.041	1,733,852.771	39.80941893	-80.66728380	
21,657.00	88.92	150.01	11,853.43	-7,097.21	1,598.56	14,457,428.036	1,733,900.691	39.80919323	-80.66711425	
21,751.00	89.54	150.45	11,854.70	-7,178.80	1,645.23	14,457,346.450	1,733,947.359	39.80896870	-80.66694916	
21,845.00	88.57	150.09	11,856.25	-7,260.42	1,691.84	14,457,264.835	1,733,993.967	39.80874409	-80.66678427	
21,939.00	89.23	150.45	11,858.05	-7,342.03	1,738.44	14,457,183.224	1,734,040.574	39.80851949	-80.66661940	
22,033.00	89.80	150.71	11,858.85	-7,423.90	1,784.62	14,457,101.349	1,734,086.746	39.80829417	-80.66645608	
22,127.00	88.48	150.01	11,860.26	-7,505.59	1,831.10	14,457,019.661	1,734,133.227	39.80806936	-80.66629166	
22,222.00	88.40	150.01	11,862.84	-7,587.84	1,878.57	14,456,937.411	1,734,180.695	39.80784300	-80.66612373	
22,316.00	88.92	150.45	11,865.04	-7,669.41	1,925.23	14,456,855.839	1,734,227.354	39.80761850	-80.66595867	
22,410.00	88.70	150.71	11,866.99	-7,751.27	1,971.39	14,456,773.979	1,734,273.518	39.80739322	-80.66579538	
22,505.00	88.70	150.71	11,869.15	-7,834.11	2,017.85	14,456,691.146	1,734,319.982	39.80716527	-80.66563103	
22,599.00	88.84	151.15	11,871.17	-7,916.25	2,063.52	14,456,609.007	1,734,366.644	39.80693922	-80.66546954	
22,693.00	89.10	151.68	11,872.86	-7,998.77	2,108.48	14,456,526.479	1,734,410.612	39.80671212	-80.66531052	
22,787.00	89.10	150.97	11,874.33	-8,081.23	2,153.58	14,456,444.018	1,734,455.711	39.80648520	-80.66515103	
22,880.00	89.32	151.68	11,875.62	-8,162.82	2,198.20	14,456,362.433	1,734,500.332	39.80626069	-80.66499324	
22,975.00	89.23	149.57	11,876.82	-8,245.59	2,244.80	14,456,279.658	1,734,546.925	39.80603289	-80.66482844	
23,068.00	89.80	149.92	11,877.60	-8,325.92	2,291.65	14,456,199.329	1,734,593.781	39.80581181	-80.66466267	
23,162.00	89.63	148.95	11,878.07	-8,406.86	2,339.45	14,456,118.392	1,734,641.580	39.80558904	-80.66449356	
23,255.00	90.24	149.13	11,878.18	-8,486.61	2,387.29	14,456,038.643	1,734,689.423	39.80536954	-80.66432427	
23,349.00	89.27	149.30	11,878.58	-8,567.36	2,435.40	14,455,957.890	1,734,737.532	39.80514728	-80.66415405	
23,443.00	87.78	149.30	11,881.00	-8,648.16	2,483.38	14,455,877.093	1,734,785.506	39.80492490	-80.66398431	
23,537.00	87.87	149.57	11,884.57	-8,729.04	2,531.14	14,455,796.213	1,734,833.272	39.80470229	-80.66381532	
23,631.00	88.13	149.74	11,887.85	-8,810.11	2,578.60	14,455,715.141	1,734,880.732	39.80447915	-80.66364742	
23,725.00	88.84	149.83	11,890.33	-8,891.31	2,625.89	14,455,633.940	1,734,928.020	39.80425567	-80.66348013	
23,820.00	89.10	149.74	11,892.04	-8,973.39	2,673.69	14,455,551.860	1,734,975.821	39.80402976	-80.66331103	
23,913.00	89.85	150.36	11,892.89	-9,053.97	2,720.12	14,455,471.284	1,735,022.248	39.80380800	-80.66314681	
24,007.00	89.19	150.27	11,893.68	-9,135.63	2,766.67	14,455,389.624	1,735,068.798	39.80358326	-80.66298216	
24,101.00	88.53	149.83	11,895.55	-9,217.06	2,813.59	14,455,308.193	1,735,115.717	39.80335915	-80.66281620	
24,195.00	88.92	149.30	11,897.64	-9,298.09	2,861.19	14,455,227.167	1,735,163.321	39.80313614	-80.66264779	
24,289.00	89.63	149.65	11,898.83	-9,379.05	2,908.93	14,455,146.202	1,735,211.061	39.80291330	-80.66247889	
24,384.00	89.27	149.30	11,899.74	-9,460.88	2,957.18	14,455,064.372	1,735,259.310	39.80268807	-80.66230820	
24,477.00	89.85	148.86	11,900.46	-9,540.66	3,004.97	14,454,984.592	1,735,307.096	39.80246848	-80.66213914	
24,571.00	89.54	149.39	11,900.96	-9,621.34	3,053.21	14,454,903.914	1,735,355.332	39.80224642	-80.66196847	
24,665.00	89.41	149.48	11,901.82	-9,702.28	3,101.00	14,454,822.979	1,735,403.131	39.80202366	-80.66179938	
24,761.00	89.19	149.65	11,902.99	-9,785.04	3,149.63	14,454,740.214	1,735,451.757	39.80179586	-80.66162736	
24,854.00	89.14	149.30	11,904.35	-9,865.14	3,196.86	14,454,660.112	1,735,498.988	39.80157539	-80.66146028	
24,949.00	89.63	149.13	11,905.37	-9,946.75	3,245.48	14,454,578.503	1,735,547.607	39.80135077	-80.66128827	
25,043.00	89.01	149.13	11,906.48	-10,027.43	3,293.71	14,454,497.826	1,735,595.834	39.80112871	-80.66111765	
25,136.00	89.58	149.22	11,907.63	-10,107.29	3,341.36	14,454,417.970	1,735,643.485	39.80090891	-80.66094907	
25,231.00	89.01	149.65	11,908.80	-10,189.08	3,389.66	14,454,336.177	1,735,691.790	39.80068378	-80.66077819	
25,326.00	89.49	150.36	11,910.04	-10,271.35	3,437.15	14,454,253.908	1,735,739.278	39.80045736	-80.66061022	
25,420.00	89.05	151.41	11,911.24	-10,353.46	3,482.88	14,454,171.794	1,735,785.011	39.80023138	-80.66044851	
25,515.00	89.54	152.56	11,912.41	-10,437.32	3,527.50	14,454,087.934	1,735,829.628	39.80000061	-80.66029079	
25,572.00	90.07	152.20	11,912.60	-10,487.83	3,553.93	14,454,037.430	1,735,856.053	39.79988164	-80.66019739	

Survey @ 25572.00 MD 11912.60 TVD

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Hudson S-11 HU (slot B)
Project:	Marshall County, West Virginia NAD83 UTM 17N	TVD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Site:	Hudson Alt North	MD Reference:	RKB=1346+33 @ 1379.00ft (Nabors X08)
Well:	Hudson S-11 HU (slot B)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
25,630.00	90.07	152.20	11,912.53	-10,539.13	3,580.98	14,453,986.124	1,735,883.104	39.79972046	-80.66010177
Survey Proj. to 25630.00 MD 11912.53 TVD									

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
180.00	179.99	1.52	-0.13	MWD surveys
25,572.00	11,912.60	-10,487.83	3,553.93	Survey @ 25572.00 MD 11912.60 TVD
25,630.00	11,912.53	-10,539.13	3,580.98	Survey Proj. to 25630.00 MD 11912.53 TVD