



Well: Goudy 1S-10HM (J)
 Site: Goudy
 Project: Marshall County, West Virginia.
 Design: rev9

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
1	6352.00	41.18	161.92	5827.10	-1473.52	941.99	0.00	0.00	1742.55	Survey @ 6352.00 MD 5827.10 TVD
2	6417.00	41.18	161.92	5876.02	-1514.21	955.28	0.00	0.00	1784.74	Proj. Begin 41.18° tangent
3	6811.06	41.18	161.92	6172.61	-1760.85	1035.80	0.00	0.00	2040.55	Begin 8°/100' build/turn
4	6991.47	50.00	178.00	6299.15	-1887.04	1056.75	8.00	58.35	2162.00	Begin 9°/100' build/turn
5	7424.81	89.00	178.35	6448.00	-2284.96	1069.26	9.00	0.56	2520.11	Begin 89.00° lateral
6	7629.77	89.00	178.35	6451.58	-2489.80	1075.15	0.00	0.00	2704.20	Begin 2°/100' turn
7	9068.74	89.00	149.57	6477.27	-3858.04	1468.50	2.00	-90.26	4098.43	Begin 89.00° lateral
8	19465.57	89.00	149.57	6659.16	-12821.22	6733.69	0.00	0.001	4481.93	PBHL/TD 19465.57 MD 6659.16 TVD

ANNOTATIONS SURVEYS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Annotation
207.00	0.22	211.84	207.00	-0.34	-0.21	0.20	MWD surveys
19416.00	89.31	149.24	6512.62	-12788.75	6710.63	14442.46	Survey @ 19416.00 MD 6512.62 TVD
19453.00	89.31	149.24	6513.07	-12820.54	6729.55	14479.40	Survey Proj. to 19453.00 MD 6513.07 TVD

Geodetic System: Universal Transverse Mercator (US Survey Feet)
 Datum: NAD83 West Virginia - HARN
 Ellipsoid: GRS 1980
 Zone: Zone 17N (84 W to 78 W)
 System Datum: Mean Sea Level
 Depth Reference: RKB=1242+26 @ 1268.00usft (Nabors B28)
 Northing Easting Latitude Longitude
 14431019.26 1688574.48 39.737018 -80.828695

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.68°

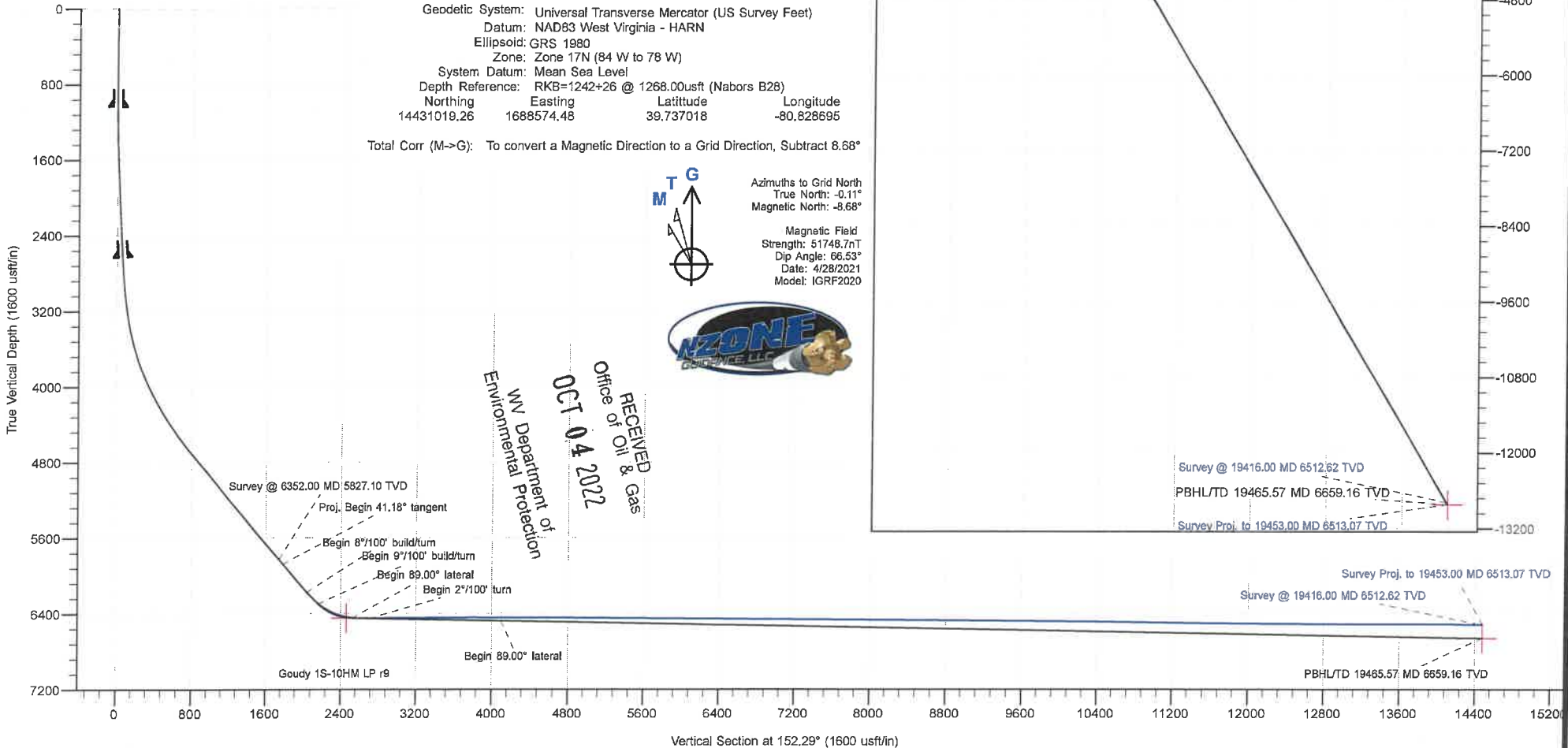


Azinuths to Grid North
 True North: -0.11°
 Magnetic North: -8.68°

Magnetic Field
 Strength: 51748.7nT
 Dip Angle: 66.53°
 Date: 4/28/2021
 Model: IGRF2020



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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Goudy 1S-10HM (J)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Site:	Goudy	MD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Well:	Goudy 1S-10HM (J)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

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	Goudy				
Site Position:		Northing:	14,430,942.40 usft	Latitude:	39.736807
From:	Lat/Long	Easting:	1,688,559.77 usft	Longitude:	-80.828748
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "		

Well	Goudy 1S-10HM (J)					
Well Position	+N/-S	0.00 usft	Northing:	14,431,019.26 usft	Latitude:	39.737018
	+E/-W	0.00 usft	Easting:	1,688,574.48 usft	Longitude:	-80.828695
Position Uncertainty	0.00 usft		Wellhead Elevation:	usft	Ground Level:	1,242.00 usft
Grid Convergence:	0.11 °					

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	4/28/2021	-8.57	66.53	51,748.72545501

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	152.29	

Survey Program	Date	6/19/2021			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
207.00	985.00	MWD surf (Original Hole)	MWD	MWD - Standard	
1,040.00	2,625.00	MWD int (Original Hole)	MWD	MWD - Standard	
2,667.00	6,352.00	MWD (Original Hole)	MWD	MWD - Standard	
6,409.00	19,416.00	MWD lat (Original Hole)	MWD	MWD - Standard	
19,453.00	19,453.00	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)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
207.00	0.22	211.84	207.00	-0.34	-0.21	0.20	0.11	0.11	0.00	0.00
MWD surveys										
237.00	0.26	222.82	237.00	-0.44	-0.29	0.25	0.20	0.13	36.60	
267.00	0.26	215.09	267.00	-0.54	-0.37	0.31	0.12	0.00	-25.77	
297.00	0.22	223.70	297.00	-0.64	-0.45	0.36	0.18	-0.13	28.70	

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Well:	Goudy 1S-10HM (J)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
328.00	0.13	239.61	328.00	-0.70	-0.52	0.38	0.33	-0.29	51.32
358.00	0.04	31.49	358.00	-0.71	-0.55	0.37	0.55	-0.30	506.27
388.00	0.13	138.36	388.00	-0.73	-0.52	0.40	0.49	0.30	356.23
418.00	0.09	154.09	418.00	-0.77	-0.48	0.46	0.17	-0.13	52.43
448.00	0.13	126.14	448.00	-0.81	-0.45	0.51	0.22	0.13	-93.17
479.00	0.09	112.35	479.00	-0.84	-0.40	0.56	0.15	-0.13	-44.48
509.00	0.18	121.49	509.00	-0.88	-0.33	0.62	0.31	0.30	30.47
539.00	0.13	100.66	539.00	-0.91	-0.26	0.68	0.25	-0.17	-69.43
570.00	0.09	113.58	570.00	-0.92	-0.20	0.72	0.15	-0.13	41.68
599.00	0.04	346.05	599.00	-0.92	-0.19	0.73	0.41	-0.17	-439.76
629.00	0.09	209.47	629.00	-0.93	-0.20	0.73	0.41	0.17	-455.27
660.00	0.13	231.36	660.00	-0.98	-0.24	0.75	0.18	0.13	70.61
691.00	0.13	265.28	691.00	-1.00	-0.30	0.75	0.24	0.00	109.42
721.00	0.04	269.67	721.00	-1.00	-0.35	0.73	0.30	-0.30	14.63
751.00	0.09	241.46	751.00	-1.02	-0.38	0.72	0.19	0.17	-94.03
781.00	0.13	265.45	781.00	-1.03	-0.43	0.71	0.20	0.13	79.97
813.00	0.00	188.20	813.00	-1.03	-0.47	0.70	0.41	-0.41	0.00
845.00	0.13	274.42	845.00	-1.03	-0.50	0.68	0.41	0.41	0.00
876.00	0.18	261.32	876.00	-1.03	-0.59	0.64	0.20	0.16	-42.26
908.00	0.13	273.63	908.00	-1.04	-0.67	0.61	0.19	-0.16	38.47
939.00	0.13	261.85	939.00	-1.04	-0.74	0.58	0.09	0.00	-38.00
970.00	0.26	271.52	970.00	-1.05	-0.85	0.53	0.43	0.42	31.19
985.00	0.26	274.56	985.00	-1.04	-0.92	0.50	0.09	0.00	20.27
1,040.00	0.22	240.93	1,040.00	-1.08	-1.13	0.43	0.26	-0.07	-61.15
1,071.00	0.26	298.94	1,071.00	-1.08	-1.25	0.37	0.76	0.13	187.13
1,102.00	0.22	258.24	1,102.00	-1.06	-1.37	0.30	0.55	-0.13	-131.29
1,133.00	0.13	262.46	1,133.00	-1.07	-1.46	0.27	0.29	0.29	13.61
1,165.00	0.13	177.21	1,165.00	-1.11	-1.49	0.29	0.55	0.29	-266.41
1,195.00	0.22	115.23	1,195.00	-1.17	-1.44	0.37	0.55	0.30	-206.60
1,226.00	0.44	113.40	1,226.00	-1.25	-1.28	0.51	0.71	0.71	-5.90
1,257.00	0.83	121.84	1,256.99	-1.41	-0.98	0.79	1.29	1.26	27.23
1,289.00	1.27	116.30	1,288.99	-1.69	-0.46	1.28	1.41	1.26	-17.31
1,320.00	1.67	118.23	1,319.98	-2.06	0.24	1.93	1.30	1.29	6.23
1,351.00	1.93	120.61	1,350.96	-2.54	1.09	2.75	0.87	0.84	7.68
1,383.00	2.37	122.63	1,382.94	-3.17	2.11	3.79	1.40	1.38	6.31
1,415.00	2.77	124.56	1,414.91	-3.96	3.31	5.05	1.28	1.25	6.03
1,446.00	3.03	127.73	1,445.87	-4.89	4.57	6.45	0.99	0.84	10.23
1,493.00	3.47	125.35	1,492.79	-6.47	6.71	8.85	0.98	0.94	-5.06
1,540.00	3.12	116.65	1,539.71	-7.87	9.02	11.16	1.30	-0.74	-18.51
1,587.00	3.12	113.14	1,586.64	-8.94	11.34	13.19	0.41	0.00	-7.47
1,634.00	2.90	108.04	1,633.58	-9.82	13.64	15.03	0.74	-0.47	-10.85
1,681.00	2.86	104.08	1,680.52	-10.47	15.91	16.67	0.43	-0.09	-8.43
1,727.00	2.68	106.81	1,726.47	-11.06	18.05	18.19	0.49	-0.39	5.93
1,774.00	2.68	109.45	1,773.42	-11.74	20.14	19.76	0.26	0.00	5.62

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Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,821.00	2.81	112.70	1,820.36	-12.55	22.24	21.46	0.43	0.28	6.91
1,869.00	2.81	111.99	1,868.30	-13.45	24.42	23.26	0.07	0.00	-1.48
1,915.00	2.77	115.33	1,914.25	-14.35	26.47	25.01	0.36	-0.09	7.26
1,962.00	2.90	124.21	1,961.19	-15.50	28.48	26.96	0.97	0.28	18.89
2,009.00	3.30	126.76	2,008.12	-16.98	30.54	29.23	0.90	0.85	5.43
2,104.00	3.74	124.47	2,102.94	-20.37	35.29	34.44	0.49	0.46	-2.41
2,198.00	3.87	115.77	2,196.74	-23.48	40.67	39.70	0.63	0.14	-9.26
2,293.00	3.16	113.31	2,291.56	-25.91	45.96	44.31	0.76	-0.75	-2.59
2,387.00	2.59	117.71	2,385.44	-27.92	50.22	48.08	0.65	-0.61	4.68
2,480.00	2.68	130.36	2,478.34	-30.31	53.74	51.82	0.63	0.10	13.60
2,573.00	3.12	131.51	2,571.22	-33.40	57.29	56.21	0.48	0.47	1.24
2,625.00	3.69	129.13	2,623.13	-35.39	59.65	59.07	1.13	1.10	-4.58
2,667.00	4.22	129.84	2,665.03	-37.23	61.89	61.74	1.27	1.26	1.69
2,761.00	3.91	121.49	2,758.80	-41.12	67.27	67.69	0.71	-0.33	-8.88
2,856.00	4.22	133.88	2,853.56	-45.24	72.56	73.79	0.98	0.33	13.04
2,951.00	5.23	137.48	2,948.23	-50.85	78.00	81.29	1.11	1.06	3.79
3,045.00	6.06	137.57	3,041.78	-57.67	84.25	90.23	0.88	0.88	0.10
3,140.00	7.78	131.86	3,136.08	-65.66	92.42	101.11	1.95	1.81	-6.01
3,234.00	9.32	130.80	3,229.04	-74.88	102.92	114.15	1.65	1.64	-1.13
3,329.00	10.94	139.86	3,322.56	-86.80	114.56	130.12	2.39	1.71	9.54
3,423.00	12.13	143.46	3,414.66	-101.56	126.19	148.59	1.48	1.27	3.83
3,517.00	13.75	148.12	3,506.27	-118.98	137.97	169.49	2.05	1.72	4.96
3,612.00	16.66	154.71	3,597.94	-140.89	149.75	194.36	3.56	3.06	6.94
3,706.00	18.54	154.88	3,687.54	-166.60	161.85	222.76	2.00	2.00	0.18
3,800.00	20.48	155.94	3,776.14	-195.15	174.90	254.10	2.10	2.06	1.13
3,894.00	23.12	156.12	3,863.41	-227.05	189.08	288.93	2.81	2.81	0.19
3,988.00	25.75	154.27	3,948.98	-262.32	205.42	327.76	2.91	2.80	-1.97
4,082.00	26.63	151.28	4,033.33	-299.20	224.41	369.23	1.69	0.94	-3.18
4,176.00	27.25	149.17	4,117.13	-336.15	245.56	411.78	1.21	0.24	-2.24
4,271.00	28.43	149.70	4,201.14	-374.35	268.12	456.09	1.27	1.45	0.56
4,365.00	29.79	150.67	4,283.26	-414.03	290.85	501.79	1.53	1.45	1.03
4,460.00	33.53	147.94	4,364.11	-456.86	316.34	551.56	4.22	3.94	-2.87
4,553.00	34.41	149.67	4,441.24	-501.31	343.25	603.43	1.41	1.86	1.86
4,647.00	35.20	148.29	4,518.43	-547.29	370.90	656.99	1.19	2.08	-1.47
4,742.00	37.18	146.89	4,595.10	-594.63	400.98	712.89	2.26	2.08	-1.47
4,836.00	39.85	146.18	4,668.64	-643.45	433.26	771.12	2.88	2.84	-0.76
4,931.00	38.80	144.69	4,742.13	-693.03	467.41	830.89	1.49	-1.11	-1.57
5,025.00	41.31	145.57	4,814.07	-742.66	501.98	890.90	2.74	2.67	0.94
5,120.00	40.78	147.06	4,885.72	-794.56	536.58	952.94	1.17	-0.56	1.57
5,215.00	39.16	144.34	4,958.53	-844.98	570.94	1,013.55	2.51	-1.71	-2.86
5,310.00	40.39	143.72	5,031.54	-894.16	606.64	1,073.70	1.36	1.29	-0.65
5,404.00	40.47	144.95	5,103.10	-943.69	642.18	1,134.07	0.85	0.09	1.31
5,503.00	39.86	145.48	5,178.75	-996.13	678.61	1,197.44	0.71	-0.62	0.54

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5,597.00	39.99	145.83	5,250.84	-1,045.94	712.65	1,257.36	0.28	0.14	0.37
5,691.00	40.08	145.92	5,322.81	-1,095.99	746.57	1,317.45	0.11	0.10	0.10
5,786.00	40.08	144.16	5,395.50	-1,146.12	781.61	1,378.12	1.19	0.00	-1.85
5,881.00	39.11	147.94	5,468.72	-1,196.31	815.43	1,438.28	2.73	-1.02	3.98
5,974.00	39.24	151.19	5,540.82	-1,246.95	845.18	1,496.95	2.21	0.14	3.49
6,069.00	40.30	153.74	5,613.84	-1,300.84	873.25	1,557.71	2.05	1.12	2.68
6,163.00	41.09	156.99	5,685.12	-1,356.54	898.78	1,618.89	2.41	0.84	3.46
6,257.00	41.48	159.98	5,755.76	-1,414.23	921.52	1,680.54	2.14	0.41	3.18
6,352.00	41.18	161.92	5,827.10	-1,473.52	941.99	1,742.55	1.39	-0.32	2.04
6,409.00	41.14	161.71	5,870.02	-1,509.16	953.70	1,779.55	0.25	-0.07	-0.37
6,456.00	41.36	163.03	5,905.35	-1,538.70	963.09	1,810.06	1.91	0.47	2.81
6,503.00	41.23	162.50	5,940.67	-1,568.32	972.28	1,840.56	0.79	-0.28	-1.13
6,550.00	41.14	160.91	5,976.04	-1,597.70	981.99	1,871.09	2.24	-0.19	-3.38
6,598.00	41.14	159.81	6,012.19	-1,627.44	992.61	1,902.35	1.51	0.00	-2.29
6,645.00	41.10	162.68	6,047.60	-1,656.71	1,002.54	1,932.88	4.02	-0.09	6.11
6,692.00	41.23	163.95	6,082.98	-1,686.34	1,011.42	1,963.24	1.80	0.28	2.70
6,739.00	41.23	163.12	6,118.33	-1,716.04	1,020.20	1,993.63	1.16	0.00	-1.77
6,787.00	41.01	162.46	6,154.49	-1,746.20	1,029.54	2,024.66	1.01	-0.46	-1.38
6,834.00	42.69	164.48	6,189.50	-1,776.26	1,038.45	2,055.42	4.58	3.57	4.30
6,881.00	45.56	168.32	6,223.24	-1,808.05	1,046.12	2,087.13	8.34	6.11	8.17
6,928.00	48.39	171.53	6,255.31	-1,841.88	1,052.10	2,119.86	7.82	6.02	6.83
6,976.00	51.26	174.44	6,286.28	-1,878.27	1,056.56	2,154.15	7.56	5.98	6.06
7,023.00	55.86	174.88	6,314.19	-1,915.90	1,060.08	2,189.11	9.82	9.79	0.94
7,070.00	59.57	175.06	6,339.29	-1,955.48	1,063.56	2,225.76	7.90	7.89	0.38
7,117.00	63.59	175.76	6,361.65	-1,996.67	1,066.86	2,263.77	8.65	8.55	1.49
7,164.00	67.26	176.87	6,381.19	-2,039.32	1,069.60	2,302.80	8.10	7.81	2.36
7,211.00	70.97	179.16	6,397.95	-2,083.19	1,071.11	2,342.34	9.11	7.89	4.87
7,256.00	74.64	180.83	6,411.25	-2,126.17	1,071.11	2,380.39	8.89	8.16	3.71
7,303.00	77.38	180.30	6,422.61	-2,171.77	1,070.66	2,420.55	5.93	5.83	-1.13
7,350.00	80.12	179.73	6,431.78	-2,217.87	1,070.65	2,461.35	5.95	5.83	-1.21
7,397.00	83.08	179.16	6,438.64	-2,264.35	1,071.10	2,502.72	6.19	6.20	-1.21
7,445.00	85.42	178.94	6,443.45	-2,312.10	1,071.89	2,545.36	4.90	4.88	-0.46
7,492.00	88.20	178.14	6,446.07	-2,359.01	1,073.09	2,587.44	6.15	5.91	-1.70
7,539.00	90.23	178.14	6,446.71	-2,405.98	1,074.61	2,629.73	4.32	4.32	0.00
7,633.00	90.06	178.23	6,446.47	-2,499.93	1,077.59	2,714.29	0.26	-0.18	0.10
7,727.00	90.32	176.03	6,446.16	-2,593.81	1,082.30	2,799.59	2.36	0.28	-2.34
7,820.00	90.37	174.18	6,445.60	-2,686.46	1,090.23	2,885.31	1.99	0.05	-1.99
7,914.00	90.15	172.64	6,445.18	-2,779.84	1,101.02	2,972.99	1.65	-0.23	-1.64
8,008.00	90.32	172.11	6,444.79	-2,873.00	1,113.49	3,061.28	0.59	0.18	-0.56
8,103.00	90.54	168.98	6,444.08	-2,966.70	1,129.09	3,151.48	3.30	0.23	-3.29
8,197.00	90.23	168.45	6,443.45	-3,058.88	1,147.49	3,241.64	0.65	-0.33	-0.56
8,292.00	90.37	163.34	6,442.95	-3,150.98	1,170.63	3,333.94	5.38	0.15	-5.38
8,386.00	90.28	160.83	6,442.41	-3,240.42	1,199.54	3,426.57	2.67	-0.10	-2.67

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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Goudy 1S-10HM (J)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Site:	Goudy	MD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Well:	Goudy 1S-10HM (J)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,479.00	90.32	157.87	6,441.93	-3,327.43	1,232.34	3,518.85	3.18	0.04	-3.18
8,572.00	90.32	157.56	6,441.41	-3,413.48	1,267.60	3,611.43	0.33	0.00	-0.33
8,666.00	90.28	157.04	6,440.92	-3,500.20	1,303.88	3,705.07	0.55	-0.04	-0.55
8,761.00	90.37	154.83	6,440.38	-3,586.94	1,342.61	3,799.87	2.33	0.09	-2.33
8,856.00	90.32	156.37	6,439.80	-3,673.45	1,381.86	3,894.71	1.62	-0.05	1.62
8,950.00	89.79	153.38	6,439.71	-3,758.54	1,421.76	3,988.60	3.23	-0.56	-3.18
9,045.00	89.75	151.44	6,440.10	-3,842.74	1,465.76	4,083.59	2.04	-0.04	-2.04
9,140.00	89.84	151.31	6,440.44	-3,926.12	1,511.27	4,178.58	0.17	0.09	-0.14
9,234.00	89.84	149.72	6,440.70	-4,007.95	1,557.54	4,272.53	1.69	0.00	-1.69
9,328.00	89.79	150.60	6,441.00	-4,089.48	1,604.31	4,366.47	0.94	-0.05	0.94
9,423.00	89.75	150.43	6,441.38	-4,172.18	1,651.07	4,461.42	0.18	-0.04	-0.18
9,517.00	89.88	150.47	6,441.69	-4,253.95	1,697.43	4,555.37	0.14	0.14	0.04
9,611.00	89.70	149.81	6,442.03	-4,335.47	1,744.23	4,649.30	0.73	-0.19	-0.70
9,706.00	89.66	149.98	6,442.56	-4,417.65	1,791.88	4,744.22	0.18	-0.04	0.18
9,799.00	89.62	149.94	6,443.15	-4,498.16	1,838.43	4,837.14	0.06	-0.04	-0.04
9,894.00	89.66	150.47	6,443.74	-4,580.60	1,885.64	4,932.08	0.56	0.04	0.56
9,987.00	89.70	149.54	6,444.26	-4,661.14	1,932.13	5,025.00	1.00	0.04	-1.00
10,081.00	89.75	149.50	6,444.71	-4,742.15	1,979.81	5,118.89	0.07	0.05	-0.04
10,176.00	89.62	149.15	6,445.24	-4,823.86	2,028.27	5,213.76	0.39	-0.14	-0.37
10,271.00	89.53	149.19	6,445.94	-4,905.43	2,076.96	5,308.62	0.10	-0.09	0.04
10,365.00	89.57	149.24	6,446.68	-4,986.18	2,125.07	5,402.48	0.07	0.04	0.05
10,459.00	89.48	149.10	6,447.46	-5,066.90	2,173.24	5,496.34	0.18	-0.10	-0.15
10,554.00	89.48	149.41	6,448.32	-5,148.54	2,221.80	5,591.20	0.33	0.00	0.33
10,648.00	89.66	149.10	6,449.03	-5,229.33	2,269.86	5,685.06	0.38	0.19	-0.33
10,743.00	89.84	149.90	6,449.44	-5,311.18	2,318.07	5,779.95	0.86	0.19	0.84
10,837.00	89.66	149.32	6,449.85	-5,392.26	2,365.62	5,873.85	0.65	-0.19	-0.62
10,932.00	89.48	149.28	6,450.56	-5,473.95	2,414.12	5,968.71	0.19	-0.19	-0.04
11,026.00	89.70	149.68	6,451.24	-5,554.92	2,461.86	6,062.60	0.49	0.23	0.43
11,121.00	89.57	148.79	6,451.84	-5,636.55	2,510.45	6,157.46	0.95	0.14	-0.94
11,216.00	89.62	148.93	6,452.51	-5,717.86	2,559.58	6,252.29	0.16	0.05	0.15
11,311.00	89.66	148.79	6,453.11	-5,799.17	2,608.70	6,347.12	0.15	0.14	-0.15
11,405.00	89.79	148.75	6,453.56	-5,879.55	2,657.44	6,440.94	0.14	0.14	-0.04
11,500.00	89.75	148.71	6,453.94	-5,960.75	2,706.75	6,535.75	0.06	0.06	-0.04
11,594.00	89.75	149.63	6,454.35	-6,041.46	2,754.93	6,629.61	0.98	0.00	0.98
11,688.00	89.70	149.10	6,454.80	-6,122.34	2,802.82	6,723.49	0.00	-0.05	-0.56
11,783.00	89.84	148.53	6,455.18	-6,203.61	2,852.01	6,818.31	0.62	0.15	-0.60
11,878.00	89.84	149.54	6,455.45	-6,285.07	2,900.89	6,913.16	1.06	0.00	1.06
11,971.00	89.84	149.76	6,455.71	-6,365.33	2,947.88	7,006.06	0.24	0.00	0.24
12,066.00	89.84	150.43	6,455.98	-6,447.68	2,995.25	7,100.99	0.71	0.00	0.71
12,160.00	89.75	149.85	6,456.31	-6,529.20	3,042.05	7,194.92	0.62	-0.10	-0.62
12,254.00	89.84	149.90	6,456.65	-6,610.50	3,089.22	7,288.84	0.11	0.10	0.05
12,349.00	89.31	150.07	6,457.35	-6,692.76	3,136.74	7,383.76	0.59	-0.56	0.18
12,443.00	89.31	149.50	6,458.48	-6,773.98	3,184.05	7,477.66	0.61	0.00	-0.61
12,538.00	89.44	150.07	6,459.52	-6,856.07	3,231.85	7,572.56	0.62	0.14	0.60

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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Goudy 1S-10HM (J)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Site:	Goudy	MD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Well:	Goudy 1S-10HM (J)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,632.00	89.53	149.41	6,460.37	-6,937.26	3,279.22	7,666.46	0.71	0.10	-0.70
12,727.00	89.48	149.94	6,461.19	-7,019.25	3,327.18	7,761.36	0.56	-0.05	0.56
12,821.00	89.48	150.16	6,462.04	-7,100.70	3,374.11	7,855.29	0.23	0.00	0.23
12,915.00	89.40	149.90	6,462.96	-7,182.13	3,421.06	7,949.21	0.29	-0.09	-0.28
13,010.00	89.44	149.85	6,463.92	-7,264.29	3,468.74	8,044.12	0.07	0.04	-0.05
13,105.00	89.40	150.56	6,464.88	-7,346.73	3,515.94	8,139.05	0.75	-0.04	0.75
13,199.00	89.44	150.56	6,465.83	-7,428.58	3,562.14	8,233.00	0.04	0.04	0.00
13,293.00	89.44	150.60	6,466.75	-7,510.46	3,608.31	8,326.96	0.04	0.00	0.04
13,388.00	89.57	149.63	6,467.57	-7,592.82	3,655.65	8,421.88	1.03	0.14	-1.02
13,482.00	89.44	148.97	6,468.38	-7,673.64	3,703.64	8,515.75	0.72	-0.14	-0.70
13,576.00	89.35	149.28	6,469.38	-7,754.32	3,751.87	8,609.60	0.34	-0.10	0.33
13,671.00	89.40	149.50	6,470.41	-7,836.08	3,800.24	8,704.48	0.24	0.05	0.23
13,765.00	89.35	148.57	6,471.44	-7,916.67	3,848.60	8,798.32	0.99	-0.05	-0.99
13,860.00	89.62	148.53	6,472.29	-7,997.71	3,898.17	8,893.11	0.29	0.28	-0.04
13,955.00	89.66	148.62	6,472.89	-8,078.78	3,947.70	8,987.91	0.10	0.04	0.09
14,049.00	89.62	148.79	6,473.48	-8,159.10	3,996.52	9,081.72	0.19	-0.04	0.18
14,144.00	89.66	149.41	6,474.08	-8,240.61	4,045.31	9,176.57	0.65	0.04	0.65
14,239.00	89.57	149.19	6,474.72	-8,322.30	4,093.81	9,271.44	0.25	-0.09	-0.23
14,333.00	89.57	148.97	6,475.42	-8,402.94	4,142.11	9,365.29	0.23	0.00	-0.23
14,428.00	89.57	149.28	6,476.13	-8,484.47	4,190.86	9,460.14	0.33	0.00	0.33
14,523.00	89.66	149.19	6,476.77	-8,566.10	4,239.45	9,555.01	0.13	0.09	-0.09
14,617.00	89.66	149.32	6,477.33	-8,646.89	4,287.51	9,648.87	0.14	0.00	0.14
14,712.00	89.31	148.71	6,478.18	-8,728.33	4,336.41	9,743.71	0.74	-0.37	-0.64
14,807.00	89.35	149.68	6,479.30	-8,809.92	4,385.06	9,838.57	1.02	0.04	1.02
14,902.00	89.66	150.65	6,480.12	-8,892.32	4,432.32	9,933.50	1.07	0.33	1.02
14,996.00	89.53	149.98	6,480.78	-8,973.98	4,478.87	10,027.44	0.73	-0.14	-0.71
15,091.00	89.35	149.50	6,481.71	-9,056.04	4,526.74	10,122.34	0.54	-0.19	-0.51
15,186.00	89.66	149.41	6,482.53	-9,137.85	4,575.02	10,217.22	0.34	0.33	-0.09
15,281.00	89.62	150.43	6,483.13	-9,220.05	4,622.63	10,312.14	1.07	-0.04	1.07
15,376.00	89.66	150.25	6,483.72	-9,302.60	4,669.64	10,407.08	0.19	0.33	-0.19
15,470.00	89.35	150.34	6,484.54	-9,384.25	4,716.22	10,501.02	0.34	-0.33	0.10
15,564.00	89.35	151.17	6,485.60	-9,466.26	4,762.14	10,594.98	0.88	0.00	0.88
15,659.00	88.86	149.24	6,487.09	-9,548.69	4,809.34	10,689.90	2.10	-0.52	-2.03
15,754.00	89.13	150.07	6,488.75	-9,630.66	4,857.32	10,784.78	0.92	0.33	0.87
15,849.00	89.17	149.76	6,490.16	-9,712.85	4,904.94	10,879.69	0.33	0.04	-0.33
15,944.00	89.13	150.65	6,491.57	-9,795.29	4,952.14	10,974.62	0.28	-0.04	0.94
16,038.00	89.22	150.56	6,492.92	-9,877.18	4,998.27	11,068.57	0.14	0.10	-0.10
16,132.00	89.26	148.84	6,494.17	-9,958.32	5,045.69	11,162.46	1.83	0.04	-1.83
16,227.00	89.35	149.50	6,495.32	-10,039.89	5,094.37	11,257.31	0.70	0.09	0.69
16,321.00	89.35	149.32	6,496.39	-10,120.81	5,142.21	11,351.18	0.19	0.00	-0.19
16,416.00	89.09	149.37	6,497.68	-10,202.52	5,190.64	11,446.05	0.28	-0.27	0.05
16,510.00	89.48	149.50	6,498.86	-10,283.46	5,238.44	11,539.93	0.44	0.41	0.14
16,604.00	89.35	148.97	6,499.82	-10,364.22	5,286.52	11,633.79	0.58	-0.14	-0.56

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Site:	Goudy	MD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Well:	Goudy 1S-10HM (J)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
16,698.00	89.62	149.06	6,500.66	-10,444.81	5,334.91	11,727.63	0.30	0.29	0.10
16,791.00	89.62	149.10	6,501.28	-10,524.59	5,382.69	11,820.48	0.04	0.00	0.04
16,885.00	89.57	149.76	6,501.94	-10,605.52	5,430.50	11,914.36	0.70	-0.05	0.70
16,979.00	89.66	149.37	6,502.57	-10,686.56	5,478.12	12,008.25	0.43	0.10	-0.41
17,074.00	89.48	149.32	6,503.29	-10,768.29	5,526.55	12,103.13	0.20	-0.19	-0.05
17,168.00	89.44	149.32	6,504.17	-10,849.13	5,574.51	12,197.00	0.04	-0.04	0.00
17,263.00	89.53	148.97	6,505.03	-10,930.68	5,623.23	12,291.85	0.38	0.09	-0.37
17,357.00	89.70	148.40	6,505.66	-11,010.98	5,672.09	12,385.66	0.63	0.18	-0.61
17,452.00	89.66	149.10	6,506.19	-11,092.20	5,721.37	12,480.48	0.74	-0.04	0.74
17,547.00	89.75	148.66	6,506.68	-11,173.52	5,770.47	12,575.31	0.47	0.09	-0.46
17,641.00	89.62	149.81	6,507.19	-11,254.29	5,818.55	12,669.17	1.23	-0.14	1.22
17,736.00	89.62	150.12	6,507.82	-11,336.53	5,866.10	12,764.09	0.33	0.00	0.33
17,830.00	90.01	150.78	6,508.13	-11,418.30	5,912.46	12,858.04	0.82	0.41	0.70
17,924.00	89.70	150.07	6,508.37	-11,500.06	5,958.85	12,951.99	0.82	-0.33	-0.76
18,019.00	89.79	150.20	6,508.79	-11,582.44	6,006.16	13,046.92	0.17	0.09	0.14
18,113.00	89.70	150.51	6,509.21	-11,664.14	6,052.65	13,140.87	0.34	-0.10	0.33
18,207.00	89.88	149.81	6,509.55	-11,745.67	6,099.42	13,234.80	0.77	0.19	-0.74
18,302.00	89.84	149.28	6,509.78	-11,827.56	6,147.57	13,329.69	0.56	-0.04	-0.56
18,396.00	90.15	149.85	6,509.79	-11,908.61	6,195.19	13,423.58	0.69	0.33	0.61
18,491.00	90.32	150.43	6,509.40	-11,991.00	6,242.49	13,518.52	0.64	0.18	0.61
18,585.00	90.01	150.20	6,509.13	-12,072.66	6,289.04	13,612.46	0.41	-0.33	-0.24
18,680.00	90.15	149.98	6,509.00	-12,155.01	6,336.41	13,707.39	0.27	0.15	-0.23
18,775.00	89.88	149.50	6,508.97	-12,237.06	6,384.28	13,802.29	0.58	-0.28	-0.51
18,869.00	89.97	149.19	6,509.10	-12,317.93	6,432.21	13,896.17	0.34	0.10	-0.33
18,963.00	90.01	149.37	6,509.11	-12,398.74	6,480.23	13,990.04	0.20	0.04	0.19
19,058.00	89.53	149.41	6,509.49	-12,480.50	6,528.60	14,084.92	0.51	-0.51	0.04
19,153.00	89.40	149.10	6,510.38	-12,562.14	6,577.17	14,179.78	0.35	-0.14	-0.33
19,248.00	89.79	149.81	6,511.05	-12,643.96	6,625.44	14,274.66	0.85	0.41	0.75
19,342.00	89.35	149.50	6,511.76	-12,725.07	6,672.93	14,368.56	0.57	-0.47	-0.33
19,416.00	89.31	149.24	6,512.62	-12,788.75	6,710.63	14,442.46	0.36	-0.05	-0.35
Survey @ 19416.00 MD 6512.62 TVD									
19,453.00	89.31	149.24	6,513.07	-12,820.54	6,729.55	14,479.40	0.00		0.00
Survey Proj. to 19453.00 MD 6513.07 TVD									

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Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
207.00	207.00	-0.34	-0.21	MWD surveys
19,416.00	6,512.62	-12,788.75	6,710.63	Survey @ 19416.00 MD 6512.62 TVD

 WV Department of
 Environmental Protection

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Goudy 1S-10HM (J)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Site:	Goudy	MD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Well:	Goudy 1S-10HM (J)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

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	Goudy				
Site Position:		Northing:	14,430,942.40 usft	Latitude:	39.736807
From:	Lat/Long	Easting:	1,688,559.77 usft	Longitude:	-80.828748
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.11 °

Well	Goudy 1S-10HM (J)					
Well Position	+N/-S	0.00 usft	Northing:	14,431,019.26 usft	Latitude:	39.737018
	+E/-W	0.00 usft	Easting:	1,688,574.48 usft	Longitude:	-80.828695
Position Uncertainty	0.00 usft		Wellhead Elevation:	usft	Ground Level:	1,242.00 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	4/28/2021	-8.57	66.53	51,748.72545501

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	152.29	

Survey Program	Date	6/19/2021			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
207.00	985.00	MWD surf (Original Hole)	MWD	MWD - Standard	
1,040.00	2,625.00	MWD int (Original Hole)	MWD	MWD - Standard	
2,667.00	6,352.00	MWD (Original Hole)	MWD	MWD - Standard	
6,409.00	19,416.00	MWD lat (Original Hole)	MWD	MWD - Standard	
19,453.00	19,453.00	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	14,431,019.26	1,688,574.48	39.737018	-80.828695	
207.00	0.22	211.84	207.00	-0.34	-0.21	14,431,018.92	1,688,574.27	39.737017	-80.828695	
MWD surveys										
237.00	0.26	222.82	237.00	-0.44	-0.29	14,431,018.82	1,688,574.19	39.737017	-80.828696	
267.00	0.26	215.09	267.00	-0.54	-0.37	14,431,018.72	1,688,574.10	39.737016	-80.828696	
297.00	0.22	223.70	297.00	-0.64	-0.45	14,431,018.62	1,688,574.03	39.737016	-80.828696	
328.00	0.13	239.61	328.00	-0.70	-0.52	14,431,018.56	1,688,573.95	39.737016	-80.828697	
358.00	0.04	31.49	358.00	-0.71	-0.55	14,431,018.55	1,688,573.93	39.737016	-80.828697	

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Goudy 1S-10HM (J)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Site:	Goudy	MD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Well:	Goudy 1S-10HM (J)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
388.00	0.13	138.36	388.00	-0.73	-0.52	14,431,018.54	1,688,573.96	39.737016	-80.828697
418.00	0.09	154.09	418.00	-0.77	-0.48	14,431,018.49	1,688,573.99	39.737016	-80.828696
448.00	0.13	126.14	448.00	-0.81	-0.45	14,431,018.45	1,688,574.03	39.737016	-80.828696
479.00	0.09	112.35	479.00	-0.84	-0.40	14,431,018.42	1,688,574.08	39.737016	-80.828696
509.00	0.18	121.49	509.00	-0.88	-0.33	14,431,018.38	1,688,574.14	39.737016	-80.828696
539.00	0.13	100.66	539.00	-0.91	-0.26	14,431,018.35	1,688,574.22	39.737015	-80.828696
570.00	0.09	113.58	570.00	-0.92	-0.20	14,431,018.34	1,688,574.27	39.737015	-80.828695
599.00	0.04	346.05	599.00	-0.92	-0.19	14,431,018.34	1,688,574.29	39.737015	-80.828695
629.00	0.09	209.47	629.00	-0.93	-0.20	14,431,018.33	1,688,574.28	39.737015	-80.828695
660.00	0.13	231.36	660.00	-0.98	-0.24	14,431,018.28	1,688,574.24	39.737015	-80.828696
691.00	0.13	265.28	691.00	-1.00	-0.30	14,431,018.26	1,688,574.18	39.737015	-80.828696
721.00	0.04	269.67	721.00	-1.00	-0.35	14,431,018.26	1,688,574.13	39.737015	-80.828696
751.00	0.09	241.46	751.00	-1.02	-0.38	14,431,018.25	1,688,574.10	39.737015	-80.828696
781.00	0.13	265.45	781.00	-1.03	-0.43	14,431,018.23	1,688,574.04	39.737015	-80.828696
813.00	0.00	188.20	813.00	-1.03	-0.47	14,431,018.23	1,688,574.01	39.737015	-80.828696
845.00	0.13	274.42	845.00	-1.03	-0.50	14,431,018.23	1,688,573.97	39.737015	-80.828696
876.00	0.18	261.32	876.00	-1.03	-0.59	14,431,018.23	1,688,573.89	39.737015	-80.828697
908.00	0.13	273.63	908.00	-1.04	-0.67	14,431,018.22	1,688,573.80	39.737015	-80.828697
939.00	0.13	261.85	939.00	-1.04	-0.74	14,431,018.22	1,688,573.73	39.737015	-80.828697
970.00	0.26	271.52	970.00	-1.05	-0.85	14,431,018.22	1,688,573.63	39.737015	-80.828698
985.00	0.26	274.56	985.00	-1.04	-0.92	14,431,018.22	1,688,573.56	39.737015	-80.828698
1,040.00	0.22	240.93	1,040.00	-1.08	-1.13	14,431,018.18	1,688,573.34	39.737015	-80.828699
1,071.00	0.26	298.94	1,071.00	-1.08	-1.25	14,431,018.18	1,688,573.23	39.737015	-80.828699
1,102.00	0.22	258.24	1,102.00	-1.06	-1.37	14,431,018.20	1,688,573.11	39.737015	-80.828700
1,133.00	0.13	262.46	1,133.00	-1.07	-1.46	14,431,018.19	1,688,573.02	39.737015	-80.828700
1,165.00	0.13	177.21	1,165.00	-1.11	-1.49	14,431,018.15	1,688,572.98	39.737015	-80.828700
1,195.00	0.22	115.23	1,195.00	-1.17	-1.44	14,431,018.09	1,688,573.04	39.737015	-80.828700
1,226.00	0.44	113.40	1,226.00	-1.25	-1.28	14,431,018.02	1,688,573.20	39.737015	-80.828699
1,257.00	0.83	121.84	1,256.99	-1.41	-0.98	14,431,017.85	1,688,573.50	39.737014	-80.828698
1,289.00	1.27	116.30	1,288.99	-1.69	-0.46	14,431,017.57	1,688,574.01	39.737013	-80.828696
1,320.00	1.67	118.23	1,319.98	-2.06	0.24	14,431,017.20	1,688,574.72	39.737012	-80.828694
1,351.00	1.93	120.61	1,350.96	-2.54	1.09	14,431,016.73	1,688,575.57	39.737011	-80.828691
1,383.00	2.37	122.63	1,382.94	-3.17	2.11	14,431,016.09	1,688,576.59	39.737009	-80.828687
1,415.00	2.77	124.56	1,414.91	-3.96	3.31	14,431,015.30	1,688,577.78	39.737007	-80.828683
1,446.00	3.03	127.73	1,445.87	-4.89	4.57	14,431,014.37	1,688,579.05	39.737005	-80.828678
1,493.00	3.47	125.35	1,492.79	-6.47	6.71	14,431,012.79	1,688,581.19	39.737000	-80.828671
1,540.00	3.12	116.65	1,539.71	-7.87	9.02	14,431,011.39	1,688,583.49	39.736996	-80.828663
1,587.00	3.12	113.14	1,586.64	-8.94	11.34	14,431,010.32	1,688,585.81	39.736993	-80.828654
1,634.00	2.90	108.04	1,633.58	-9.82	13.64	14,431,009.45	1,688,588.12	39.736991	-80.828646
1,681.00	2.86	104.08	1,680.52	-10.47	15.91	14,431,008.79	1,688,590.39	39.736989	-80.828638
1,727.00	2.68	106.81	1,726.47	-11.06	18.05	14,431,008.20	1,688,592.53	39.736988	-80.828631
1,774.00	2.68	109.45	1,773.42	-11.74	20.14	14,431,007.52	1,688,594.62	39.736986	-80.828623
1,821.00	2.81	112.70	1,820.36	-12.55	22.24	14,431,006.71	1,688,596.72	39.736983	-80.828616
1,869.00	2.81	111.99	1,868.30	-13.45	24.42	14,431,005.81	1,688,598.89	39.736981	-80.828608
1,915.00	2.77	115.33	1,914.25	-14.35	26.47	14,431,004.92	1,688,600.99	39.736978	-80.828601
1,962.00	2.90	124.21	1,961.19	-15.50	28.48	14,431,003.76	1,688,602.95	39.736975	-80.828594
2,009.00	3.30	126.76	2,008.12	-16.98	30.54	14,431,002.28	1,688,605.02	39.736971	-80.828586
2,104.00	3.74	124.47	2,102.94	-20.37	35.29	14,430,998.89	1,688,609.77	39.736962	-80.828569
2,198.00	3.87	115.77	2,196.74	-23.48	40.67	14,430,995.78	1,688,615.15	39.736953	-80.828550
2,293.00	3.16	113.31	2,291.56	-25.91	45.96	14,430,993.35	1,688,620.44	39.736947	-80.828531
2,387.00	2.59	117.71	2,385.44	-27.92	50.22	14,430,991.34	1,688,624.70	39.736941	-80.828516
2,480.00	2.68	130.36	2,478.34	-30.31	53.74	14,430,988.95	1,688,628.22	39.736934	-80.828504
2,573.00	3.12	131.51	2,571.22	-33.40	57.29	14,430,985.87	1,688,631.77	39.736926	-80.828491
2,625.00	3.69	129.13	2,623.13	-35.39	59.65	14,430,983.87	1,688,634.13	39.736920	-80.828483
2,667.00	4.22	129.84	2,665.03	-37.23	61.89	14,430,982.03	1,688,636.36	39.736915	-80.828475

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Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Goudy 1S-10HM (J)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Site:	Goudy	MD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Well:	Goudy 1S-10HM (J)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,761.00	3.91	121.49	2,758.80	-41.12	67.27	14,430,978.14	1,688,641.75	39.736905	-80.828456
2,856.00	4.22	133.88	2,853.56	-45.24	72.56	14,430,974.02	1,688,647.03	39.736893	-80.828437
2,951.00	5.23	137.48	2,948.23	-50.85	78.00	14,430,968.41	1,688,652.48	39.736878	-80.828418
3,045.00	6.06	137.57	3,041.78	-57.67	84.25	14,430,961.59	1,688,658.72	39.736859	-80.828395
3,140.00	7.78	131.86	3,136.08	-65.66	92.42	14,430,953.60	1,688,666.89	39.736837	-80.828366
3,234.00	9.32	130.80	3,229.04	-74.88	102.92	14,430,944.38	1,688,677.40	39.736812	-80.828329
3,329.00	10.94	139.86	3,322.56	-86.80	114.56	14,430,932.46	1,688,689.03	39.736779	-80.828288
3,423.00	12.13	143.46	3,414.66	-101.56	126.19	14,430,917.70	1,688,700.66	39.736738	-80.828247
3,517.00	13.75	148.12	3,506.27	-118.98	137.97	14,430,900.28	1,688,712.44	39.736690	-80.828205
3,612.00	16.66	154.71	3,597.94	-140.89	149.75	14,430,878.37	1,688,724.23	39.736630	-80.828163
3,706.00	18.54	154.88	3,687.54	-166.60	161.85	14,430,852.66	1,688,736.33	39.736560	-80.828120
3,800.00	20.48	155.94	3,776.14	-195.15	174.90	14,430,824.11	1,688,749.38	39.736481	-80.828074
3,894.00	23.12	156.12	3,863.41	-227.05	189.08	14,430,792.21	1,688,763.56	39.736393	-80.828024
3,988.00	25.75	154.27	3,948.98	-262.32	205.42	14,430,756.94	1,688,779.90	39.736296	-80.827966
4,082.00	26.63	151.28	4,033.33	-299.20	224.41	14,430,720.06	1,688,798.88	39.736195	-80.827898
4,176.00	27.25	149.17	4,117.13	-336.15	245.56	14,430,683.11	1,688,820.04	39.736094	-80.827824
4,271.00	28.43	149.70	4,201.14	-374.35	268.12	14,430,644.91	1,688,842.59	39.735988	-80.827744
4,365.00	29.79	150.67	4,283.26	-414.03	290.85	14,430,605.23	1,688,865.32	39.735879	-80.827663
4,460.00	33.53	147.94	4,364.11	-456.86	316.34	14,430,562.40	1,688,890.82	39.735762	-80.827573
4,553.00	34.41	149.67	4,441.24	-501.31	343.25	14,430,517.95	1,688,917.72	39.735639	-80.827477
4,647.00	35.20	148.29	4,518.43	-547.29	370.90	14,430,471.97	1,688,945.38	39.735513	-80.827379
4,742.00	37.18	146.89	4,595.10	-594.63	400.98	14,430,424.63	1,688,975.45	39.735383	-80.827272
4,836.00	39.85	146.18	4,668.64	-643.45	433.26	14,430,375.81	1,689,007.74	39.735249	-80.827158
4,931.00	38.80	144.69	4,742.13	-693.03	467.41	14,430,326.23	1,689,041.88	39.735112	-80.827037
5,025.00	41.31	145.57	4,814.07	-742.66	501.98	14,430,276.60	1,689,076.45	39.734976	-80.826914
5,120.00	40.78	147.06	4,885.72	-794.56	536.58	14,430,224.70	1,689,111.05	39.734833	-80.826791
5,215.00	39.16	144.34	4,958.53	-844.98	570.94	14,430,174.28	1,689,145.41	39.734694	-80.826670
5,310.00	40.39	143.72	5,031.54	-894.16	606.64	14,430,125.10	1,689,181.12	39.734559	-80.826543
5,404.00	40.47	144.95	5,103.10	-943.69	642.18	14,430,075.57	1,689,216.66	39.734423	-80.826417
5,503.00	39.86	145.48	5,178.75	-996.13	678.61	14,430,023.13	1,689,253.09	39.734279	-80.826288
5,597.00	39.99	145.83	5,250.84	-1,045.94	712.65	14,429,973.32	1,689,287.12	39.734142	-80.826167
5,691.00	40.08	145.92	5,322.81	-1,095.99	746.57	14,429,923.27	1,689,321.04	39.734004	-80.826047
5,786.00	40.08	144.16	5,395.50	-1,146.12	781.61	14,429,873.14	1,689,356.09	39.733866	-80.825922
5,881.00	39.11	147.94	5,468.72	-1,196.31	815.43	14,429,822.95	1,689,389.91	39.733728	-80.825802
5,974.00	39.24	151.19	5,540.82	-1,246.95	845.18	14,429,772.31	1,689,419.66	39.733589	-80.825697
6,069.00	40.30	153.74	5,613.84	-1,300.84	873.25	14,429,718.42	1,689,447.73	39.733441	-80.825597
6,163.00	41.09	156.99	5,685.12	-1,356.54	898.78	14,429,662.72	1,689,473.26	39.733288	-80.825507
6,257.00	41.48	159.98	5,755.76	-1,414.23	921.52	14,429,605.03	1,689,495.99	39.733129	-80.825427
6,352.00	41.18	161.92	5,827.10	-1,473.52	941.99	14,429,545.74	1,689,516.47	39.732966	-80.825354
6,409.00	41.14	161.71	5,870.02	-1,509.16	953.70	14,429,510.10	1,689,528.19	39.732868	-80.825313
6,456.00	41.36	163.03	5,905.35	-1,538.70	963.09	14,429,480.56	1,689,537.56	39.732787	-80.825280
6,503.00	41.23	162.50	5,940.67	-1,568.32	972.28	14,429,450.94	1,689,546.75	39.732706	-80.825247
6,550.00	41.14	160.91	5,976.04	-1,597.70	981.99	14,429,421.56	1,689,556.47	39.732606	-80.825213
6,598.00	41.14	159.81	6,012.19	-1,627.44	992.61	14,429,391.82	1,689,567.08	39.732543	-80.825175
6,645.00	41.10	162.68	6,047.60	-1,656.71	1,002.54	14,429,362.56	1,689,577.02	39.732463	-80.825140
6,692.00	41.23	163.95	6,082.98	-1,686.34	1,011.42	14,429,332.92	1,689,585.90	39.732381	-80.825109
6,739.00	41.23	163.12	6,118.33	-1,716.04	1,020.20	14,429,303.22	1,689,594.68	39.732300	-80.825078
6,787.00	41.01	162.46	6,154.49	-1,746.20	1,029.54	14,429,273.06	1,689,604.02	39.732217	-80.825045
6,834.00	42.69	164.48	6,189.50	-1,776.26	1,038.45	14,429,243.00	1,689,612.93	39.732134	-80.825013
6,881.00	45.56	168.32	6,223.24	-1,808.05	1,046.12	14,429,211.21	1,689,620.59	39.732047	-80.824986
6,928.00	48.39	171.53	6,255.31	-1,841.88	1,052.10	14,429,177.39	1,689,626.58	39.731954	-80.824965
6,976.00	51.26	174.44	6,286.28	-1,878.27	1,056.56	14,429,140.99	1,689,631.04	39.731854	-80.824949
7,023.00	55.86	174.88	6,314.19	-1,915.90	1,060.08	14,429,103.36	1,689,634.55	39.731751	-80.824937
7,070.00	59.57	175.06	6,339.29	-1,955.48	1,063.56	14,429,063.78	1,689,638.03	39.731642	-80.824925
7,117.00	63.59	175.76	6,361.65	-1,996.67	1,066.86	14,429,022.59	1,689,641.34	39.731529	-80.824914

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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Goudy 1S-10HM (J)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Site:	Goudy	MD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Well:	Goudy 1S-10HM (J)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
7,164.00	67.26	176.87	6,381.19	-2,039.32	1,069.60	14,428,979.94	1,689,644.08	39.731412	-80.824904
7,211.00	70.97	179.16	6,397.95	-2,083.19	1,071.11	14,428,936.07	1,689,645.59	39.731291	-80.824899
7,256.00	74.64	180.83	6,411.25	-2,126.17	1,071.11	14,428,893.09	1,689,645.58	39.731173	-80.824899
7,303.00	77.38	180.30	6,422.61	-2,171.77	1,070.66	14,428,847.49	1,689,645.14	39.731048	-80.824901
7,350.00	80.12	179.73	6,431.78	-2,217.87	1,070.65	14,428,801.40	1,689,645.12	39.730921	-80.824902
7,397.00	83.08	179.16	6,438.64	-2,264.35	1,071.10	14,428,754.91	1,689,645.58	39.730794	-80.824900
7,445.00	85.42	178.94	6,443.45	-2,312.10	1,071.89	14,428,707.16	1,689,646.37	39.730663	-80.824898
7,492.00	88.20	178.14	6,446.07	-2,359.01	1,073.09	14,428,660.25	1,689,647.56	39.730534	-80.824894
7,539.00	90.23	178.14	6,446.71	-2,405.98	1,074.61	14,428,613.28	1,689,649.09	39.730405	-80.824889
7,633.00	90.06	178.23	6,446.47	-2,499.93	1,077.59	14,428,519.33	1,689,652.07	39.730147	-80.824879
7,727.00	90.32	176.03	6,446.16	-2,593.81	1,082.30	14,428,425.46	1,689,656.77	39.729889	-80.824863
7,820.00	90.37	174.18	6,445.60	-2,686.46	1,090.23	14,428,332.80	1,689,664.71	39.729634	-80.824835
7,914.00	90.15	172.64	6,445.18	-2,779.84	1,101.02	14,428,239.42	1,689,675.49	39.729378	-80.824798
8,008.00	90.32	172.11	6,444.79	-2,873.00	1,113.49	14,428,146.26	1,689,687.97	39.729122	-80.824754
8,103.00	90.54	168.98	6,444.08	-2,966.70	1,129.09	14,428,052.56	1,689,703.57	39.728865	-80.824699
8,197.00	90.23	168.45	6,443.45	-3,058.88	1,147.49	14,427,960.38	1,689,721.97	39.728611	-80.824634
8,292.00	90.37	163.34	6,442.95	-3,150.98	1,170.63	14,427,868.28	1,689,745.11	39.728358	-80.824553
8,386.00	90.28	160.83	6,442.41	-3,240.42	1,199.54	14,427,778.84	1,689,774.02	39.728112	-80.824450
8,479.00	90.32	157.87	6,441.93	-3,327.43	1,232.34	14,427,691.83	1,689,806.81	39.727873	-80.824334
8,572.00	90.32	157.56	6,441.41	-3,413.48	1,267.60	14,427,605.78	1,689,842.08	39.727637	-80.824209
8,666.00	90.28	157.04	6,440.92	-3,500.20	1,303.88	14,427,519.06	1,689,878.35	39.727398	-80.824081
8,761.00	90.37	154.83	6,440.38	-3,586.94	1,342.61	14,427,432.32	1,689,917.09	39.727160	-80.823944
8,856.00	90.32	156.37	6,439.80	-3,673.45	1,381.86	14,427,345.81	1,689,956.33	39.726922	-80.823805
8,950.00	89.79	153.38	6,439.71	-3,758.54	1,421.76	14,427,260.72	1,689,996.24	39.726688	-80.823664
9,045.00	89.75	151.44	6,440.10	-3,842.74	1,465.76	14,427,176.53	1,690,040.24	39.726457	-80.823508
9,140.00	89.84	151.31	6,440.44	-3,926.12	1,511.27	14,427,093.14	1,690,085.75	39.726228	-80.823346
9,234.00	89.84	149.72	6,440.70	-4,007.95	1,557.54	14,427,011.32	1,690,132.01	39.726003	-80.823182
9,328.00	89.79	150.60	6,441.00	-4,089.48	1,604.31	14,426,929.78	1,690,178.78	39.725778	-80.823017
9,423.00	89.75	150.43	6,441.38	-4,172.18	1,651.07	14,426,847.08	1,690,225.54	39.725551	-80.822851
9,517.00	89.88	150.47	6,441.69	-4,253.95	1,697.43	14,426,765.31	1,690,271.90	39.725326	-80.822687
9,611.00	89.70	149.81	6,442.03	-4,335.47	1,744.23	14,426,683.79	1,690,318.70	39.725102	-80.822521
9,706.00	89.66	149.98	6,442.56	-4,417.65	1,791.88	14,426,601.61	1,690,366.35	39.724876	-80.822352
9,799.00	89.62	149.94	6,443.15	-4,498.16	1,838.43	14,426,521.10	1,690,412.91	39.724655	-80.822187
9,894.00	89.66	150.47	6,443.74	-4,580.60	1,885.64	14,426,438.66	1,690,460.11	39.724428	-80.822020
9,987.00	89.70	149.54	6,444.26	-4,661.14	1,932.13	14,426,358.12	1,690,506.60	39.724207	-80.821855
10,081.00	89.75	149.50	6,444.71	-4,742.15	1,979.81	14,426,277.11	1,690,554.28	39.723984	-80.821686
10,176.00	89.62	149.15	6,445.24	-4,823.86	2,028.27	14,426,195.40	1,690,602.75	39.723759	-80.821514
10,271.00	89.53	149.19	6,445.94	-4,905.43	2,076.96	14,426,113.83	1,690,651.43	39.723535	-80.821341
10,365.00	89.57	149.24	6,446.68	-4,986.18	2,125.07	14,426,033.08	1,690,699.54	39.723313	-80.821171
10,459.00	89.48	149.10	6,447.46	-5,066.90	2,173.24	14,425,952.36	1,690,747.72	39.723091	-80.821000
10,554.00	89.48	149.41	6,448.32	-5,148.54	2,221.80	14,425,870.72	1,690,796.28	39.722867	-80.820828
10,648.00	89.66	149.10	6,449.03	-5,229.33	2,269.86	14,425,789.93	1,690,844.33	39.722644	-80.820658
10,743.00	89.84	149.90	6,449.44	-5,311.18	2,318.07	14,425,708.08	1,690,892.55	39.722421	-80.820487
10,837.00	89.66	149.32	6,449.85	-5,392.26	2,366.62	14,425,627.00	1,690,940.10	39.722197	-80.820318
10,932.00	89.48	149.28	6,450.56	-5,473.95	2,414.12	14,425,545.31	1,690,988.60	39.721972	-80.820146
11,026.00	89.70	149.68	6,451.24	-5,554.92	2,461.86	14,425,464.34	1,691,036.34	39.721749	-80.819977
11,121.00	89.57	148.79	6,451.84	-5,636.55	2,510.45	14,425,382.71	1,691,084.93	39.721525	-80.819805
11,216.00	89.62	148.93	6,452.51	-5,717.86	2,559.58	14,425,301.40	1,691,134.05	39.721301	-80.819631
11,311.00	89.66	148.79	6,453.11	-5,799.17	2,608.70	14,425,220.09	1,691,183.18	39.721078	-80.819457
11,405.00	89.79	148.75	6,453.56	-5,879.55	2,657.44	14,425,139.71	1,691,231.92	39.720857	-80.819284
11,500.00	89.75	148.71	6,453.94	-5,960.75	2,706.75	14,425,058.52	1,691,281.23	39.720633	-80.819109
11,594.00	89.75	149.63	6,454.35	-6,041.46	2,754.93	14,424,977.80	1,691,329.40	39.720411	-80.818938
11,688.00	89.70	149.10	6,454.80	-6,122.34	2,802.82	14,424,896.92	1,691,377.30	39.720189	-80.818769
11,783.00	89.84	148.53	6,455.18	-6,203.61	2,852.01	14,424,815.65	1,691,426.49	39.719966	-80.818594
11,878.00	89.84	149.54	6,455.45	-6,285.07	2,900.89	14,424,734.19	1,691,475.37	39.719742	-80.818421

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WV Department of Environmental Protection

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Goudy 1S-10HM (J)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Site:	Goudy	MD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Well:	Goudy 1S-10HM (J)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
11,971.00	89.84	149.76	6,455.71	-6,365.33	2,947.88	14,424,653.94	1,691,522.36	39.719521	-80.818255
12,066.00	89.84	150.43	6,455.98	-6,447.68	2,995.25	14,424,571.59	1,691,569.72	39.719294	-80.818087
12,160.00	89.75	149.85	6,456.31	-6,529.20	3,042.05	14,424,490.07	1,691,616.52	39.719070	-80.817921
12,254.00	89.84	149.90	6,456.65	-6,610.50	3,089.22	14,424,408.76	1,691,663.70	39.718847	-80.817754
12,349.00	89.31	150.07	6,457.35	-6,692.76	3,136.74	14,424,326.50	1,691,711.22	39.718621	-80.817585
12,443.00	89.31	149.50	6,458.48	-6,773.98	3,184.05	14,424,245.28	1,691,758.52	39.718397	-80.817418
12,538.00	89.44	150.07	6,459.52	-6,856.07	3,231.85	14,424,163.19	1,691,806.33	39.718172	-80.817248
12,632.00	89.53	149.41	6,460.37	-6,937.26	3,279.22	14,424,082.00	1,691,853.69	39.717948	-80.817080
12,727.00	89.48	149.94	6,461.19	-7,019.25	3,327.18	14,424,000.01	1,691,901.66	39.717723	-80.816910
12,821.00	89.48	150.16	6,462.04	-7,100.70	3,374.11	14,423,918.56	1,691,948.59	39.717499	-80.816744
12,915.00	89.40	149.90	6,462.96	-7,182.13	3,421.06	14,423,837.14	1,691,995.54	39.717275	-80.816578
13,010.00	89.44	149.85	6,463.92	-7,264.29	3,468.74	14,423,754.97	1,692,043.22	39.717049	-80.816409
13,105.00	89.40	150.56	6,464.88	-7,346.73	3,515.94	14,423,672.53	1,692,090.42	39.716822	-80.816242
13,199.00	89.44	150.56	6,465.83	-7,428.58	3,562.14	14,423,590.68	1,692,136.62	39.716597	-80.816078
13,293.00	89.44	150.60	6,466.75	-7,510.46	3,608.31	14,423,508.80	1,692,182.79	39.716372	-80.815914
13,388.00	89.57	149.63	6,467.57	-7,592.82	3,655.65	14,423,426.44	1,692,230.12	39.716146	-80.815747
13,482.00	89.44	148.97	6,468.38	-7,673.64	3,703.64	14,423,345.62	1,692,278.11	39.715924	-80.815576
13,576.00	89.35	149.28	6,469.38	-7,754.32	3,751.87	14,423,264.94	1,692,326.35	39.715702	-80.815406
13,671.00	89.40	149.50	6,470.41	-7,836.08	3,800.24	14,423,183.18	1,692,374.72	39.715477	-80.815234
13,765.00	89.35	148.57	6,471.44	-7,916.67	3,848.60	14,423,102.59	1,692,423.08	39.715255	-80.815063
13,860.00	89.62	148.53	6,472.29	-7,997.71	3,898.17	14,423,021.55	1,692,472.64	39.715032	-80.814887
13,955.00	89.66	148.62	6,472.89	-8,078.78	3,947.70	14,422,940.48	1,692,522.17	39.714810	-80.814712
14,049.00	89.62	148.79	6,473.48	-8,159.10	3,996.52	14,422,860.16	1,692,571.00	39.714589	-80.814539
14,144.00	89.66	149.41	6,474.08	-8,240.61	4,045.31	14,422,778.65	1,692,619.79	39.714365	-80.814366
14,239.00	89.57	149.19	6,474.72	-8,322.30	4,093.81	14,422,696.96	1,692,668.29	39.714140	-80.814194
14,333.00	89.57	148.97	6,475.42	-8,402.94	4,142.11	14,422,616.32	1,692,716.59	39.713918	-80.814023
14,428.00	89.57	149.28	6,476.13	-8,484.47	4,190.86	14,422,534.79	1,692,765.34	39.713694	-80.813850
14,523.00	89.66	149.19	6,476.77	-8,566.10	4,239.45	14,422,453.16	1,692,813.93	39.713470	-80.813678
14,617.00	89.66	149.32	6,477.33	-8,646.89	4,287.51	14,422,372.37	1,692,861.98	39.713247	-80.813507
14,712.00	89.31	148.71	6,478.18	-8,728.33	4,336.41	14,422,290.93	1,692,910.89	39.713024	-80.813334
14,807.00	89.35	149.68	6,479.30	-8,809.92	4,385.06	14,422,209.34	1,692,959.53	39.712799	-80.813162
14,902.00	89.66	150.65	6,480.12	-8,892.32	4,432.32	14,422,126.94	1,693,006.79	39.712573	-80.812994
14,996.00	89.53	149.98	6,480.78	-8,973.98	4,478.87	14,422,045.28	1,693,053.35	39.712348	-80.812829
15,091.00	89.35	149.50	6,481.71	-9,056.04	4,526.74	14,421,963.22	1,693,101.22	39.712122	-80.812660
15,186.00	89.66	149.41	6,482.53	-9,137.85	4,575.02	14,421,881.41	1,693,149.49	39.711897	-80.812489
15,281.00	89.62	150.43	6,483.13	-9,220.05	4,622.63	14,421,799.21	1,693,197.11	39.711671	-80.812320
15,376.00	89.66	150.25	6,483.72	-9,302.60	4,669.64	14,421,716.66	1,693,244.12	39.711444	-80.812153
15,470.00	89.35	150.34	6,484.54	-9,384.25	4,716.22	14,421,635.01	1,693,290.70	39.711220	-80.811988
15,564.00	89.35	151.17	6,485.60	-9,466.26	4,762.14	14,421,553.00	1,693,336.62	39.710994	-80.811826
15,659.00	88.86	149.24	6,487.09	-9,548.69	4,809.34	14,421,470.57	1,693,383.81	39.710788	-80.811659
15,754.00	89.13	150.07	6,488.75	-9,630.66	4,857.32	14,421,388.60	1,693,431.89	39.710542	-80.811489
15,849.00	89.17	149.76	6,490.16	-9,712.85	4,904.94	14,421,306.41	1,693,479.42	39.710316	-80.811320
15,944.00	89.13	150.65	6,491.57	-9,795.29	4,952.14	14,421,223.98	1,693,526.62	39.710090	-80.811153
16,038.00	89.22	150.56	6,492.92	-9,877.18	4,998.27	14,421,142.09	1,693,572.75	39.709865	-80.810989
16,132.00	89.26	148.84	6,494.17	-9,958.32	5,045.69	14,421,060.94	1,693,620.17	39.709640	-80.810821
16,227.00	89.35	149.50	6,495.32	-10,039.89	5,094.37	14,420,979.37	1,693,668.85	39.709417	-80.810649
16,321.00	89.35	149.32	6,496.39	-10,120.81	5,142.21	14,420,898.45	1,693,716.68	39.709195	-80.810479
16,416.00	89.09	149.37	6,497.68	-10,202.52	5,190.64	14,420,816.74	1,693,765.12	39.708970	-80.810308
16,510.00	89.48	149.50	6,498.86	-10,283.46	5,238.44	14,420,735.81	1,693,812.91	39.708747	-80.810138
16,604.00	89.35	148.97	6,499.82	-10,364.22	5,286.52	14,420,655.04	1,693,860.99	39.708525	-80.809968
16,698.00	89.62	149.06	6,500.66	-10,444.81	5,334.91	14,420,574.46	1,693,909.38	39.708304	-80.809796
16,791.00	89.62	149.10	6,501.28	-10,524.59	5,382.69	14,420,494.67	1,693,957.17	39.708084	-80.809627
16,885.00	89.57	149.76	6,501.94	-10,605.52	5,430.50	14,420,413.74	1,694,004.98	39.707862	-80.809458
16,979.00	89.66	149.37	6,502.57	-10,686.56	5,478.12	14,420,332.70	1,694,052.59	39.707639	-80.809289
17,074.00	89.48	149.32	6,503.29	-10,768.29	5,526.55	14,420,250.97	1,694,101.03	39.707414	-80.809117

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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Goudy 1S-10HM (J)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Site:	Goudy	MD Reference:	RKB=1242+26 @ 1268.00usft (Nabors B28)
Well:	Goudy 1S-10HM (J)	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Dec2220_v16

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
17,168.00	89.44	149.32	6,504.17	-10,849.13	5,574.51	14,420,170.14	1,694,148.99	39.707192	-80.808948
17,263.00	89.53	148.97	6,505.03	-10,930.68	5,623.23	14,420,088.58	1,694,197.71	39.706968	-80.808775
17,357.00	89.70	148.40	6,505.66	-11,010.98	5,672.09	14,420,008.28	1,694,246.56	39.706747	-80.808602
17,452.00	89.66	149.10	6,506.19	-11,092.20	5,721.37	14,419,927.07	1,694,295.85	39.706524	-80.808427
17,547.00	89.75	148.66	6,506.68	-11,173.52	5,770.47	14,419,845.74	1,694,344.94	39.706300	-80.808253
17,641.00	89.62	149.81	6,507.19	-11,254.29	5,818.55	14,419,764.97	1,694,393.03	39.706078	-80.808083
17,736.00	89.62	150.12	6,507.82	-11,336.53	5,866.10	14,419,682.73	1,694,440.57	39.705852	-80.807915
17,830.00	90.01	150.78	6,508.13	-11,418.30	5,912.46	14,419,600.96	1,694,486.93	39.705627	-80.807750
17,924.00	89.70	150.07	6,508.37	-11,500.06	5,958.85	14,419,519.20	1,694,533.33	39.705402	-80.807586
18,019.00	89.79	150.20	6,508.79	-11,582.44	6,006.16	14,419,436.82	1,694,580.63	39.705176	-80.807418
18,113.00	89.70	150.51	6,509.21	-11,664.14	6,052.65	14,419,355.13	1,694,627.13	39.704951	-80.807254
18,207.00	89.88	149.81	6,509.55	-11,745.67	6,099.42	14,419,273.59	1,694,673.90	39.704727	-80.807088
18,302.00	89.84	149.28	6,509.78	-11,827.56	6,147.57	14,419,191.70	1,694,722.05	39.704501	-80.806917
18,396.00	90.15	149.85	6,509.79	-11,908.61	6,195.19	14,419,110.65	1,694,769.67	39.704279	-80.806749
18,491.00	90.32	150.43	6,509.40	-11,991.00	6,242.49	14,419,028.26	1,694,816.97	39.704052	-80.806581
18,585.00	90.01	150.20	6,509.13	-12,072.66	6,289.04	14,418,946.60	1,694,863.52	39.703828	-80.806416
18,680.00	90.15	149.98	6,509.00	-12,155.01	6,336.41	14,418,864.25	1,694,910.89	39.703601	-80.806249
18,775.00	89.88	149.50	6,508.97	-12,237.06	6,384.28	14,418,782.20	1,694,958.76	39.703375	-80.806079
18,869.00	89.97	149.19	6,509.10	-12,317.93	6,432.21	14,418,701.33	1,695,006.69	39.703153	-80.805909
18,963.00	90.01	149.37	6,509.11	-12,398.74	6,480.23	14,418,620.52	1,695,054.71	39.702931	-80.805739
19,058.00	89.53	149.41	6,509.49	-12,480.50	6,528.60	14,418,538.76	1,695,103.08	39.702706	-80.805568
19,153.00	89.40	149.10	6,510.38	-12,562.14	6,577.17	14,418,457.12	1,695,151.64	39.702482	-80.805396
19,248.00	89.79	149.81	6,511.05	-12,643.96	6,625.44	14,418,375.31	1,695,199.92	39.702257	-80.805225
19,342.00	89.35	149.50	6,511.76	-12,725.07	6,672.93	14,418,294.19	1,695,247.41	39.702034	-80.805056
19,416.00	89.31	149.24	6,512.62	-12,788.75	6,710.63	14,418,230.52	1,695,285.11	39.701858	-80.804923
Survey @ 19416.00 MD 6512.62 TVD									
19,453.00	89.31	149.24	6,513.07	-12,820.54	6,729.55	14,418,198.72	1,695,304.03	39.701771	-80.804856
Survey Proj. to 19453.00 MD 6513.07 TVD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
207.00	207.00	-0.34	-0.21	MWD surveys
19,416.00	6,512.62	-12,788.75	6,710.63	Survey @ 19416.00 MD 6512.62 TVD
19,453.00	6,513.07	-12,820.54	6,729.55	Survey Proj. to 19453.00 MD 6513.07 TVD

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