



Well: Hudson S-12 HU (slot C)  
 Site: Hudson Alt North  
 Project: Marshall County, West Virginia  
 Design: rev13  
 Rig: Nabors X08

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
1	20235.00	89.17	150.05	11848.84	-6099.04	2443.05	0.00	0.000	6558.43	S/T Begin 3°/100' drop/turn (135L)
2	20265.00	88.53	149.41	11849.45	-6124.95	2458.17	3.00	-135.000	6588.31	Begin 3°/100' drop/turn (120L)
3	20295.00	88.08	148.63	11850.33	-6150.66	2473.60	3.00	-120.000	6618.14	Begin 3°/100' turn (90L)
4	20355.00	88.08	146.83	11852.34	-6201.36	2505.62	3.00	-90.000	6677.66	Begin 88.08° lateral
5	20475.00	88.08	146.83	11856.35	-6301.75	2571.23	0.00	0.000	6796.45	Begin 2°/100' build
6	20520.76	89.00	146.83	11857.51	-6340.05	2596.26	2.00	0.000	6841.76	Begin 89.00° lateral
7	20820.76	89.00	146.83	11862.75	-6591.13	2760.36	0.00	0.000	7138.86	Begin 2°/100' turn
8	20996.10	89.00	150.34	11865.82	-6740.72	2851.72	2.00	90.102	7313.13	Begin 89.00° lateral
9	24851.19	89.00	150.34	11933.39	-10090.19	4759.13	0.00	0.000	11156.22	PBHL/TD 24851.19 MD 11933.39 TVD

ANNOTATIONS SURVEYS ORIGINAL HOLE

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSect	Annotation
180.00	0.26	12.02	180.00	0.40	0.09	-0.33	MWD surveys
20839.00	88.91	149.26	11859.62	-6520.79	2747.11	7160.04	Survey Proj. to 20839.00 MD 11859.62 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=1346+33 @ 1379.00ft (Nabors X08)

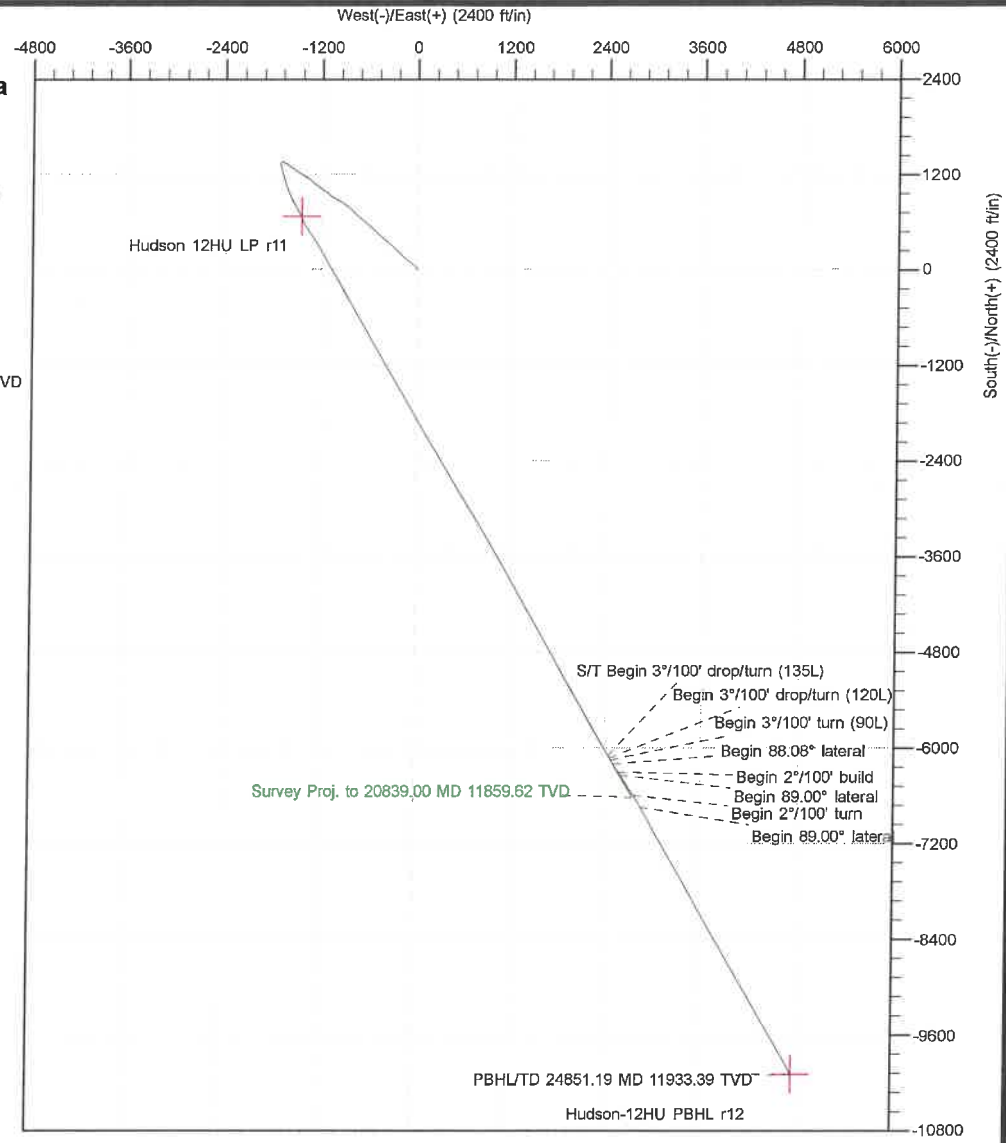
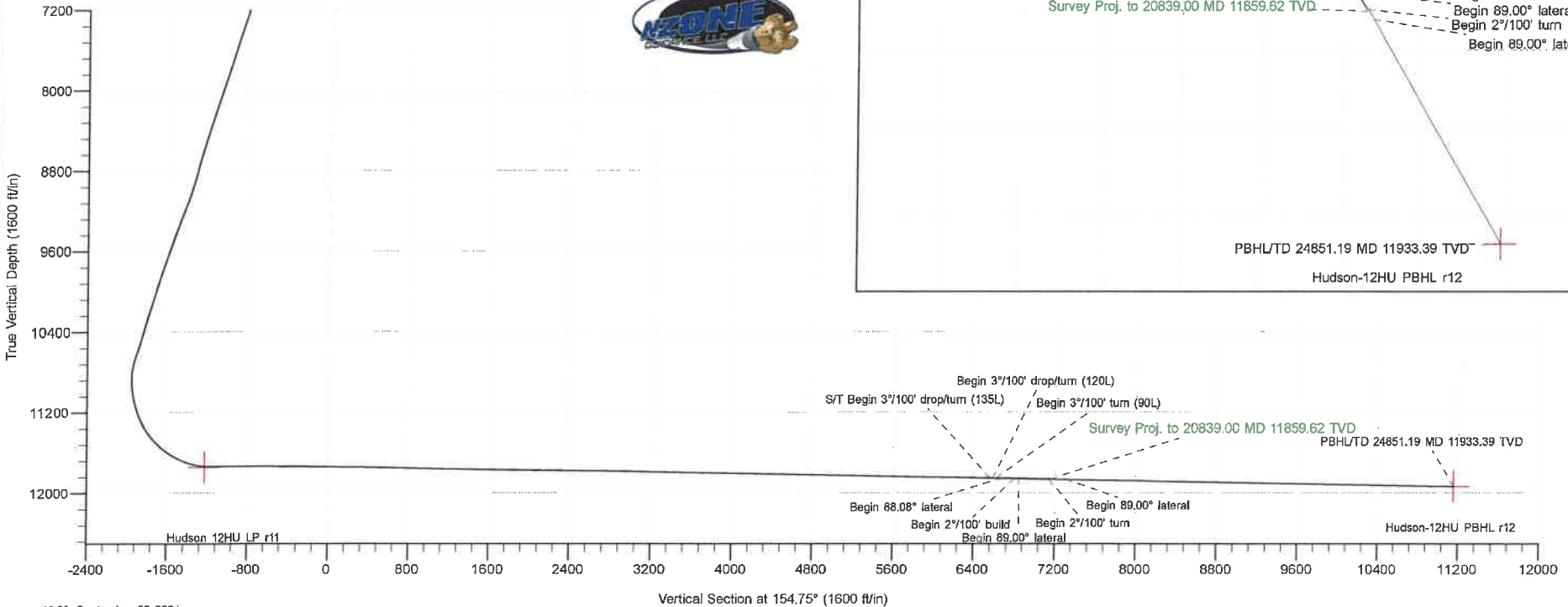
Northing	Easting	Latitude	Longitude
14464537.26	1732302.93	39.82873300	-80.67271100



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

Magnetic Field  
 Strength: 51740.3nT  
 Dip Angle: 66.54°  
 Date: 9/8/2021  
 Model: IGRF2020

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



<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Hudson S-12 HU (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Site:</b>	Hudson Alt North	<b>North Reference:</b>	Grid
<b>Well:</b>	Hudson S-12 HU (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 01		
<b>Design:</b>	rev13		

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

<b>Site</b>	Hudson Alt North				
<b>Site Position:</b>		<b>Northing:</b>	14,464,552.10 usft	<b>Latitude:</b>	39.82877400
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,732,278.45 usft	<b>Longitude:</b>	-80.67279800
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	13-3/16 "		

<b>Well</b>	Hudson S-12 HU (slot C)					
<b>Well Position</b>	<b>+N/-S</b>	0.00 ft	<b>Northing:</b>	14,464,537.26 usft	<b>Latitude:</b>	39.82873300
	<b>+E/-W</b>	0.00 ft	<b>Easting:</b>	1,732,302.93 usft	<b>Longitude:</b>	-80.67271100
<b>Position Uncertainty</b>	0.00 ft		<b>Wellhead Elevation:</b>	ft	<b>Ground Level:</b>	1,346.00 ft
<b>Grid Convergence:</b>	0.210 °					

<b>Wellbore</b>	Sidetrack 01				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2020	9/8/2021	-8.691	66.543	51,740.28711100

<b>Design</b>	rev13			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	20,235.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>
	0.00	0.00	0.00	154.75

<b>Plan Survey Tool Program</b>	<b>Date</b>	9/8/2021		
<b>Depth From (ft)</b>	<b>Depth To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>
1	20,235.00	24,851.13	rev13 (Sidetrack 01)	MWD
				MWD - Standard



Planning Report

<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Hudson S-12 HU (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Site:</b>	Hudson Alt North	<b>North Reference:</b>	Grid
<b>Well:</b>	Hudson S-12 HU (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 01		
<b>Design:</b>	rev13		

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
20,235.00	89.17	150.05	11,848.85	-6,099.04	2,443.05	0.00	0.00	0.00	0.000	
20,265.00	88.53	149.41	11,849.45	-6,124.95	2,458.17	3.00	-2.12	-2.12	-135.000	
20,295.00	88.08	148.63	11,850.33	-6,150.66	2,473.60	3.00	-1.50	-2.60	-120.000	
20,355.00	88.08	146.83	11,852.34	-6,201.36	2,505.62	3.00	0.00	-3.00	-90.000	
20,475.00	88.08	146.83	11,856.35	-6,301.75	2,571.23	0.00	0.00	0.00	0.000	
20,520.76	89.00	146.83	11,857.51	-6,340.05	2,596.26	2.00	2.00	0.00	0.000	
20,820.76	89.00	146.83	11,862.75	-6,591.13	2,760.36	0.00	0.00	0.00	0.000	
20,996.10	89.00	150.34	11,865.82	-6,740.72	2,851.72	2.00	0.00	2.00	90.102	
24,851.19	89.00	150.34	11,933.39	-10,090.19	4,759.13	0.00	0.00	0.00	0.000	Hudson-12HU PBHL I

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<b>Site:</b>	Hudson Alt North	<b>North Reference:</b>	Grid
<b>Well:</b>	Hudson S-12 HU (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 01		
<b>Design:</b>	rev13		

Planned 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	0.26	12.02	180.00	0.40	0.09	-0.32	0.14	0.14	0.00
211.00	0.40	34.08	211.00	0.56	0.16	-0.44	0.60	0.45	71.16
242.00	0.35	51.57	242.00	0.71	0.30	-0.51	0.40	-0.16	56.42
272.00	0.35	38.91	272.00	0.83	0.42	-0.57	0.26	0.00	-42.20
303.00	0.31	42.08	303.00	0.97	0.54	-0.65	0.14	-0.13	10.23
334.00	0.35	31.71	334.00	1.11	0.65	-0.73	0.23	0.13	-33.45
364.00	0.44	10.88	364.00	1.30	0.72	-0.87	0.56	0.30	-69.43
394.00	0.57	27.57	393.99	1.55	0.81	-1.06	0.65	0.43	55.63
425.00	0.57	28.89	424.99	1.82	0.95	-1.24	0.04	0.00	4.26
456.00	0.66	22.47	455.99	2.12	1.10	-1.45	0.37	0.29	-20.71
486.00	0.61	28.71	485.99	2.42	1.24	-1.66	0.28	-0.17	20.80
517.00	0.70	35.13	516.99	2.72	1.43	-1.85	0.37	0.29	20.71
548.00	0.57	27.31	547.99	3.01	1.61	-2.04	0.50	-0.42	-25.23
578.00	0.66	12.06	577.98	3.31	1.71	-2.27	0.62	0.30	-50.83
609.00	0.62	18.87	608.98	3.65	1.80	-2.53	0.28	-0.13	21.97
640.00	0.79	16.00	639.98	4.01	1.92	-2.81	0.56	0.55	-9.26
671.00	0.88	7.54	670.98	4.45	2.01	-3.17	0.49	0.29	-27.29
701.00	1.05	14.92	700.97	4.95	2.11	-3.58	0.70	0.57	24.60
732.00	0.88	25.64	731.97	5.44	2.28	-3.94	0.80	-0.55	34.58
764.00	1.23	24.41	763.96	5.97	2.53	-4.32	1.10	1.09	-3.84
795.00	1.32	27.49	794.95	6.59	2.83	-4.75	0.36	0.29	9.94
805.00	1.36	28.63	804.95	6.80	2.94	-4.89	0.48	0.40	11.40
815.00	1.19	22.65	814.95	7.00	3.04	-5.03	2.16	-1.70	-59.80
856.00	0.83	31.35	855.94	7.64	3.36	-5.48	0.95	-0.88	21.22
909.00	0.48	35.48	908.94	8.15	3.69	-5.80	0.67	-0.66	7.79
951.00	0.35	42.60	950.94	8.39	3.88	-5.93	0.33	-0.31	16.95
982.00	0.40	28.72	981.94	8.55	3.99	-6.03	0.33	0.16	-44.77
1,013.00	0.48	35.92	1,012.94	8.75	4.12	-6.16	0.31	0.26	23.23
1,075.00	0.48	33.81	1,074.93	9.18	4.42	-6.42	0.03	0.00	-3.40
1,169.00	0.57	14.57	1,168.93	9.96	4.75	-6.98	0.21	0.10	-20.47
1,263.00	0.70	355.14	1,262.93	10.98	4.82	-7.88	0.27	0.14	-20.67
1,357.00	0.48	279.29	1,356.92	11.62	4.39	-8.64	0.79	-0.23	-80.69
1,450.00	0.70	272.35	1,449.92	11.71	3.43	-9.12	0.25	0.24	-7.46
1,545.00	0.92	268.83	1,544.91	11.71	2.09	-9.70	0.24	0.23	-3.71
1,640.00	1.23	289.58	1,639.89	12.04	0.37	-10.73	0.52	0.33	21.84
1,734.00	1.76	311.46	1,733.86	13.33	-1.66	-12.77	0.82	0.56	23.28
1,828.00	3.03	321.39	1,827.77	16.23	-4.30	-16.51	1.42	1.35	10.56
1,922.00	4.57	329.04	1,921.57	21.38	-7.77	-22.66	1.72	1.64	8.14
2,016.00	5.27	329.39	2,015.22	28.31	-11.90	-30.68	0.75	0.74	0.37
2,111.00	6.02	321.92	2,109.76	35.99	-17.19	-39.88	1.10	0.79	-7.86
2,205.00	6.55	318.05	2,203.19	43.86	-23.82	-49.82	0.72	0.56	-4.12
2,299.00	7.08	310.85	2,296.53	51.63	-31.78	-60.26	1.07	0.56	-7.66
2,394.00	7.43	304.43	2,390.77	58.93	-41.28	-70.91	0.93	0.37	-6.76
2,487.00	7.25	303.02	2,483.01	65.53	-51.16	-81.09	0.27	-0.19	-1.52
2,582.00	6.86	302.23	2,577.29	71.82	-60.98	-90.98	0.42	-0.41	-0.83
2,676.00	5.93	306.19	2,670.71	77.69	-69.65	-99.98	1.09	-0.99	4.21
2,771.00	4.66	307.42	2,765.30	82.93	-76.68	-107.71	1.34	-1.34	1.29
2,820.00	4.13	307.51	2,814.15	85.21	-79.66	-111.05	1.08	-1.08	0.18
2,959.00	4.44	304.52	2,952.77	91.31	-88.06	-120.15	0.27	0.22	-2.15
3,053.00	6.11	306.01	3,046.36	96.31	-95.11	-127.68	1.78	1.78	1.59
3,150.00	7.65	310.23	3,142.66	103.52	-104.21	-138.08	1.67	1.59	4.35
3,244.00	8.96	312.96	3,235.68	112.55	-114.35	-150.57	1.46	1.39	2.90
3,337.00	9.40	314.19	3,327.48	122.78	-125.09	-164.41	0.52	0.47	1.32



Planning Report

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<b>Well:</b>	Hudson S-12 HU (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 01		
<b>Design:</b>	rev13		

Planned 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)
3,431.00	9.62	314.45	3,420.19	133.63	-136.20	-178.96	0.24	0.23	0.28
3,525.00	9.80	313.83	3,512.85	144.67	-147.58	-193.80	0.22	0.19	-0.66
3,619.00	9.84	313.31	3,605.47	155.72	-159.20	-208.75	0.10	0.04	-0.55
3,713.00	9.93	312.34	3,698.07	166.69	-171.03	-223.72	0.20	0.10	-1.03
3,807.00	10.20	311.64	3,790.63	177.68	-183.24	-238.87	0.32	0.29	-0.74
3,901.00	10.20	310.50	3,883.14	188.61	-195.79	-254.11	0.21	0.00	-1.21
3,995.00	10.15	310.58	3,975.66	199.40	-208.41	-269.26	0.06	-0.05	0.09
4,090.00	9.89	312.16	4,069.21	210.33	-220.82	-284.43	0.40	-0.27	1.66
4,184.00	9.84	313.04	4,161.82	221.23	-232.67	-299.34	0.17	-0.05	0.94
4,278.00	9.58	314.54	4,254.48	232.19	-244.12	-314.15	0.39	-0.28	1.60
4,372.00	9.89	316.91	4,347.12	243.58	-255.21	-329.17	0.54	0.33	2.52
4,466.00	9.80	314.36	4,439.74	255.06	-266.44	-344.35	0.47	-0.10	-2.71
4,560.00	10.15	313.40	4,532.32	266.35	-278.18	-359.57	0.41	0.37	-1.02
4,654.00	9.67	314.89	4,624.92	277.61	-289.79	-374.71	0.58	-0.51	1.59
4,749.00	10.94	315.15	4,718.38	289.63	-301.80	-390.70	1.34	1.34	0.27
4,843.00	11.43	311.99	4,810.60	302.19	-315.01	-407.70	0.83	0.52	-3.36
4,937.00	11.03	309.35	4,902.80	314.12	-328.89	-424.41	0.69	-0.43	-2.81
5,030.00	9.84	310.58	4,994.26	324.93	-341.81	-439.70	1.30	-1.28	1.32
5,124.00	10.06	312.08	5,086.84	335.66	-354.00	-454.60	0.36	0.23	1.60
5,217.00	9.49	311.20	5,178.49	346.15	-365.80	-469.12	0.63	-0.61	-0.95
5,311.00	10.02	308.56	5,271.14	356.35	-378.02	-483.57	0.74	0.56	-2.81
5,405.00	11.12	309.00	5,363.54	367.16	-391.46	-499.07	1.17	1.17	0.47
5,499.00	11.65	311.46	5,455.89	379.15	-405.62	-515.95	0.76	0.56	2.62
5,594.00	10.63	312.25	5,548.90	391.39	-419.29	-532.86	1.09	-1.07	0.83
5,689.00	9.45	312.78	5,642.44	402.58	-431.50	-548.19	1.25	-1.24	0.56
5,783.00	9.32	312.96	5,735.18	413.01	-442.74	-562.41	0.14	-0.14	0.19
5,877.00	10.68	313.57	5,827.75	424.20	-454.62	-577.60	1.45	1.45	0.65
5,970.00	11.07	310.32	5,919.08	435.91	-467.67	-593.77	0.78	0.42	-3.49
6,063.00	10.37	305.92	6,010.46	446.60	-481.26	-609.23	1.16	-0.75	-4.73
6,158.00	9.80	306.63	6,103.99	456.44	-494.67	-623.85	0.61	-0.60	0.75
6,252.00	9.36	312.52	6,196.68	466.38	-506.72	-637.98	1.14	-0.47	6.27
6,346.00	10.15	316.74	6,289.33	477.58	-518.04	-652.93	1.13	0.84	4.49
6,440.00	9.84	314.54	6,381.90	489.24	-529.44	-668.35	0.52	-0.33	-2.34
6,535.00	9.45	311.11	6,475.56	500.07	-541.10	-683.11	0.73	-0.41	-3.61
6,629.00	10.55	310.67	6,568.13	510.75	-553.44	-698.04	1.17	1.17	-0.47
6,692.00	10.20	310.06	6,630.10	518.10	-562.08	-708.37	0.58	-0.56	-0.97
6,787.00	8.83	308.21	6,723.79	528.02	-574.25	-722.54	1.48	-1.44	-1.95
6,881.00	9.01	307.33	6,816.65	538.95	-585.77	-735.53	0.24	0.19	-0.94
6,929.00	10.06	319.11	6,863.99	542.40	-591.51	-742.90	4.60	2.19	24.54
7,023.00	10.33	312.69	6,956.51	554.32	-603.08	-758.62	1.24	0.29	-6.83
7,117.00	12.09	310.67	7,048.71	566.45	-616.74	-775.42	1.92	1.87	-2.15
7,212.00	15.07	313.48	7,141.05	581.43	-633.25	-796.02	3.21	3.14	2.96
7,259.00	17.36	313.31	7,186.18	590.45	-642.79	-808.24	4.87	4.87	-0.36
7,306.00	17.75	313.22	7,230.99	600.16	-653.11	-821.43	0.83	0.83	-0.19
7,400.00	19.12	310.41	7,320.16	619.96	-675.28	-848.79	1.74	1.46	-2.99
7,493.00	19.16	308.83	7,408.02	639.40	-698.76	-876.39	0.56	0.04	-1.70
7,588.00	18.46	309.62	7,497.95	658.77	-722.49	-904.03	0.78	-0.74	0.83
7,682.00	18.63	311.37	7,587.07	678.18	-745.22	-931.29	0.62	0.18	1.86
7,776.00	17.71	312.78	7,676.38	697.82	-766.99	-958.33	1.08	-0.98	1.50
7,870.00	19.03	313.75	7,765.59	718.12	-788.55	-985.89	1.44	1.40	1.03
7,964.00	20.83	314.63	7,853.96	740.47	-811.52	-1,015.90	1.94	1.91	0.94
8,059.00	20.52	312.52	7,942.84	763.59	-835.81	-1,047.17	0.85	-0.33	-2.22
8,152.00	20.26	309.97	8,030.01	784.95	-860.16	-1,076.88	1.00	-0.28	-2.74
8,246.00	20.52	306.80	8,118.13	805.27	-885.83	-1,106.21	1.21	0.28	-3.37



Planning Report

<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Hudson S-12 HU (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Site:</b>	Hudson Alt North	<b>North Reference:</b>	Grid
<b>Well:</b>	Hudson S-12 HU (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 01		
<b>Design:</b>	rev13		

Planned 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)
8,341.00	20.52	303.38	8,207.10	824.41	-913.07	-1,135.14	1.26	0.00	-3.60
8,435.00	20.79	302.23	8,295.06	842.37	-940.94	-1,163.27	0.52	0.29	-1.22
8,530.00	20.61	301.18	8,383.93	860.02	-969.50	-1,191.42	0.43	-0.19	-1.11
8,624.00	20.43	299.60	8,471.96	876.68	-997.92	-1,218.62	0.62	-0.19	-1.68
8,718.00	19.95	301.09	8,560.19	893.07	-1,025.92	-1,245.38	0.75	-0.51	1.59
8,813.00	19.69	301.97	8,649.56	909.91	-1,053.38	-1,272.33	0.42	-0.27	0.93
8,907.00	15.69	302.32	8,739.10	925.10	-1,077.56	-1,296.38	4.26	-4.26	0.37
9,000.00	16.26	307.59	8,828.51	939.76	-1,098.51	-1,318.58	1.67	0.61	5.67
9,094.00	18.72	311.02	8,918.16	957.70	-1,120.32	-1,344.10	2.84	2.62	3.65
9,188.00	19.42	308.65	9,007.00	977.36	-1,143.91	-1,371.95	1.11	0.74	-2.52
9,281.00	22.37	307.68	9,093.88	997.84	-1,169.99	-1,401.60	3.19	3.17	-1.04
9,375.00	23.34	305.66	9,180.50	1,019.63	-1,199.28	-1,433.80	1.33	1.03	-2.15
9,469.00	24.70	303.82	9,266.36	1,041.41	-1,230.73	-1,466.92	1.65	1.45	-1.96
9,562.00	22.94	302.85	9,351.43	1,062.06	-1,262.10	-1,498.98	1.94	-1.89	-1.04
9,657.00	20.08	309.97	9,439.82	1,082.59	-1,290.16	-1,529.52	4.07	-3.01	7.49
9,751.00	20.13	312.25	9,528.09	1,103.83	-1,314.50	-1,559.11	0.84	0.05	2.43
9,845.00	21.01	310.50	9,616.10	1,125.65	-1,339.29	-1,589.42	1.14	0.94	-1.86
9,939.00	21.18	305.22	9,703.81	1,146.39	-1,365.98	-1,619.56	2.03	0.18	-5.62
10,033.00	21.45	301.79	9,791.38	1,165.24	-1,394.46	-1,648.76	1.36	0.29	-3.65
10,127.00	21.05	302.67	9,878.99	1,183.40	-1,423.28	-1,677.49	0.54	-0.43	0.94
10,223.00	20.00	304.25	9,968.90	1,201.95	-1,451.36	-1,706.24	1.24	-1.09	1.65
10,316.00	18.90	301.27	10,056.59	1,218.72	-1,477.39	-1,732.51	1.59	-1.18	-3.20
10,410.00	20.30	304.52	10,145.15	1,235.87	-1,503.84	-1,759.30	1.89	1.49	3.46
10,505.00	19.69	307.68	10,234.42	1,254.99	-1,530.08	-1,787.79	1.31	-0.64	3.33
10,599.00	18.72	305.75	10,323.19	1,273.48	-1,554.86	-1,815.09	1.23	-1.03	-2.05
10,693.00	17.80	303.20	10,412.46	1,290.16	-1,579.12	-1,840.52	1.30	-0.98	-2.71
10,786.00	19.38	303.64	10,500.60	1,306.49	-1,603.86	-1,865.85	1.71	1.70	0.47
10,852.00	20.52	305.75	10,562.64	1,319.32	-1,622.37	-1,885.34	2.04	1.73	3.20
10,911.00	21.48	307.64	10,617.72	1,331.96	-1,639.32	-1,904.01	1.99	1.63	3.20
11,004.00	18.91	304.33	10,705.00	1,350.86	-1,665.25	-1,932.16	3.02	-2.76	-3.56
11,051.00	16.26	291.51	10,749.82	1,357.57	-1,677.67	-1,943.53	9.95	-5.64	-27.28
11,099.00	13.43	275.16	10,796.23	1,360.54	-1,689.48	-1,951.25	10.48	-5.90	-34.06
11,146.00	11.89	256.61	10,842.11	1,359.91	-1,699.63	-1,955.01	9.20	-3.28	-39.47
11,193.00	10.96	237.83	10,888.19	1,356.41	-1,708.12	-1,955.47	8.12	-1.98	-39.96
11,240.00	10.56	218.49	10,934.38	1,350.65	-1,714.59	-1,953.03	7.69	-0.85	-41.15
11,286.00	10.52	197.20	10,979.62	1,343.34	-1,718.46	-1,948.06	8.42	-0.09	-46.28
11,333.00	11.18	183.89	11,025.79	1,334.69	-1,720.03	-1,940.91	5.50	1.40	-28.32
11,382.00	12.46	174.60	11,073.75	1,324.69	-1,719.86	-1,931.79	4.67	2.61	-18.96
11,429.00	14.27	168.82	11,119.48	1,313.96	-1,718.26	-1,921.40	4.78	3.85	-12.30
11,476.00	16.97	164.33	11,164.74	1,301.67	-1,715.28	-1,909.02	6.29	5.74	-9.55
11,523.00	19.89	164.37	11,209.32	1,287.36	-1,711.27	-1,894.37	6.21	6.21	0.09
11,571.00	23.20	163.18	11,253.96	1,270.45	-1,706.34	-1,876.96	6.96	6.90	-2.48
11,618.00	26.34	162.96	11,296.64	1,251.61	-1,700.60	-1,857.48	6.68	6.68	-0.47
11,665.00	30.40	162.79	11,337.98	1,230.27	-1,694.02	-1,835.37	8.64	8.64	-0.36
11,712.00	34.07	163.76	11,377.73	1,206.27	-1,686.82	-1,810.59	7.89	7.81	2.06
11,759.00	37.38	164.46	11,415.88	1,179.87	-1,679.32	-1,783.52	7.10	7.04	1.49
11,806.00	40.79	166.05	11,452.36	1,151.22	-1,671.79	-1,754.39	7.56	7.26	3.38
11,854.00	43.88	163.45	11,487.84	1,120.05	-1,663.27	-1,722.56	7.40	6.44	-5.42
11,901.00	46.84	161.91	11,520.86	1,088.13	-1,653.30	-1,689.44	6.72	6.30	-3.28
11,948.00	49.67	160.50	11,552.15	1,054.94	-1,642.00	-1,654.60	6.42	6.02	-3.00
11,995.00	52.50	159.31	11,581.67	1,020.60	-1,629.43	-1,618.18	6.34	6.02	-2.53
12,042.00	55.94	157.67	11,609.15	985.14	-1,615.44	-1,580.14	7.85	7.32	-3.49
12,089.00	60.01	155.78	11,634.07	948.55	-1,599.69	-1,540.33	9.31	8.66	-4.02
12,137.00	63.99	154.33	11,656.60	910.14	-1,581.81	-1,497.96	8.71	8.29	-3.02

<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Hudson S-12 HU (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Site:</b>	Hudson Alt North	<b>North Reference:</b>	Grid
<b>Well:</b>	Hudson S-12 HU (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 01		
<b>Design:</b>	rev13		

**Planned 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)
12,184.00	67.17	153.40	11,676.03	871.73	-1,562.95	-1,455.18	7.00	6.77	-1.98
12,231.00	70.35	152.56	11,693.06	832.71	-1,543.05	-1,411.40	6.97	6.77	-1.79
12,278.00	73.27	151.51	11,707.73	793.28	-1,522.11	-1,366.80	6.57	6.21	-2.23
12,325.00	77.33	152.83	11,719.65	753.08	-1,500.90	-1,321.39	9.06	8.64	2.81
12,372.00	81.71	154.41	11,728.20	711.69	-1,480.37	-1,275.20	9.89	9.32	3.36
12,419.00	86.48	155.91	11,733.03	669.27	-1,460.74	-1,228.47	10.63	10.15	3.19
12,466.00	90.41	156.84	11,734.31	626.24	-1,441.92	-1,181.51	8.59	8.36	1.98
12,513.00	91.38	151.73	11,733.57	583.91	-1,421.54	-1,134.54	11.07	2.06	-10.87
12,607.00	90.41	145.64	11,732.10	503.65	-1,372.71	-1,041.12	6.56	-1.03	-6.48
12,701.00	90.28	146.26	11,731.54	425.77	-1,320.08	-948.23	0.67	-0.14	0.66
12,796.00	89.75	148.60	11,731.51	345.72	-1,268.94	-854.01	2.53	-0.56	2.46
12,890.00	90.06	148.91	11,731.67	265.35	-1,220.18	-760.52	0.47	0.33	0.33
12,985.00	89.62	148.60	11,731.93	184.13	-1,170.91	-666.04	0.57	-0.46	-0.33
13,079.00	89.57	150.58	11,732.60	103.07	-1,123.33	-572.43	2.11	-0.05	2.11
13,174.00	89.44	150.58	11,733.42	20.32	-1,076.67	-477.68	0.14	-0.14	0.00
13,268.00	89.31	150.98	11,734.44	-61.71	-1,030.78	-383.91	0.45	-0.14	0.43
13,362.00	89.53	150.49	11,735.40	-143.71	-984.83	-290.15	0.57	0.23	-0.52
13,456.00	89.31	150.62	11,736.35	-225.56	-938.63	-196.41	0.27	-0.23	0.14
13,550.00	89.40	150.45	11,737.41	-307.40	-892.39	-102.67	0.20	0.10	-0.18
13,645.00	89.35	150.10	11,738.44	-389.89	-845.29	-7.96	0.37	-0.05	-0.37
13,739.00	89.17	150.01	11,739.66	-471.34	-798.37	85.72	0.21	-0.19	-0.10
13,833.00	89.17	150.32	11,741.02	-552.87	-751.61	179.40	0.33	0.00	0.33
13,926.00	89.17	150.01	11,742.37	-633.54	-705.35	272.10	0.33	0.00	-0.33
14,020.00	88.95	150.58	11,743.91	-715.17	-658.77	365.80	0.65	-0.23	0.61
14,115.00	89.09	150.10	11,745.53	-797.71	-611.77	460.51	0.53	0.15	-0.51
14,209.00	88.78	150.84	11,747.28	-879.49	-565.45	554.23	0.85	-0.33	0.79
14,304.00	89.00	149.26	11,749.12	-961.78	-518.03	648.89	1.68	0.23	-1.66
14,397.00	88.60	149.43	11,751.07	-1,041.77	-470.62	741.45	0.47	-0.43	0.18
14,492.00	88.91	149.13	11,753.13	-1,123.42	-422.10	836.00	0.45	0.33	-0.32
14,590.00	88.78	150.18	11,755.11	-1,207.97	-372.60	933.59	1.08	-0.13	1.07
14,682.00	88.78	149.79	11,757.07	-1,287.62	-326.59	1,025.25	0.42	0.00	-0.42
14,777.00	88.69	150.40	11,759.16	-1,369.95	-279.24	1,119.91	0.65	-0.09	0.64
14,871.00	88.86	150.18	11,761.17	-1,451.57	-232.67	1,213.61	0.30	0.18	-0.23
14,965.00	89.00	150.23	11,762.93	-1,533.13	-185.97	1,307.30	0.16	0.15	0.05
15,058.00	89.09	151.33	11,764.48	-1,614.28	-140.57	1,400.06	1.19	0.10	1.18
15,152.00	89.44	150.58	11,765.68	-1,696.46	-94.94	1,493.84	0.88	0.37	-0.80
15,247.00	89.35	150.80	11,766.69	-1,779.29	-48.44	1,588.60	0.25	-0.09	0.23
15,342.00	89.48	150.89	11,767.66	-1,862.25	-2.16	1,683.38	0.17	0.14	0.09
15,436.00	89.22	149.43	11,768.72	-1,943.78	44.61	1,777.07	1.58	-0.28	-1.55
15,530.00	89.17	148.99	11,770.04	-2,024.52	92.72	1,870.62	0.47	-0.05	-0.47
15,624.00	89.00	149.52	11,771.55	-2,105.30	140.77	1,964.17	0.59	-0.18	0.56
15,719.00	89.35	148.33	11,772.91	-2,186.66	189.80	2,058.67	1.31	0.37	-1.25
15,813.00	89.31	149.57	11,774.01	-2,267.18	238.28	2,152.18	1.32	-0.04	1.32
15,907.00	89.13	149.70	11,775.29	-2,348.28	285.79	2,245.80	0.24	-0.19	0.14
16,001.00	89.40	149.04	11,776.50	-2,429.16	333.68	2,339.38	0.76	0.29	-0.70
16,095.00	89.62	149.43	11,777.30	-2,509.92	381.76	2,432.94	0.48	0.23	0.41
16,189.00	89.35	149.74	11,778.15	-2,590.98	429.35	2,526.55	0.44	-0.29	0.33
16,284.00	89.48	148.77	11,779.12	-2,672.63	477.91	2,621.11	1.03	0.14	-1.02
16,379.00	89.13	149.21	11,780.27	-2,754.04	526.85	2,715.62	0.59	-0.37	0.46
16,473.00	89.22	148.73	11,781.62	-2,834.58	575.30	2,809.14	0.52	0.10	-0.51
16,568.00	89.31	149.70	11,782.84	-2,916.19	623.92	2,903.69	1.03	0.09	1.02
16,661.00	89.48	149.17	11,783.82	-2,996.26	671.21	2,996.28	0.60	0.18	-0.57
16,756.00	88.78	148.33	11,785.27	-3,077.47	720.48	3,090.75	1.15	-0.74	-0.88
16,850.00	88.82	149.39	11,787.23	-3,157.90	769.08	3,184.23	1.13	0.04	1.13



Planning Report

<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Hudson S-12 HU (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Site:</b>	Hudson Alt North	<b>North Reference:</b>	Grid
<b>Well:</b>	Hudson S-12 HU (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 01		
<b>Design:</b>	rev13		

Planned 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)
16,943.00	89.17	148.38	11,788.87	-3,237.51	817.13	3,276.73	1.15	0.38	-1.09
17,037.00	89.13	149.08	11,790.26	-3,317.85	865.92	3,370.20	0.75	-0.04	0.74
17,131.00	89.00	148.68	11,791.79	-3,398.31	914.50	3,463.69	0.45	-0.14	-0.43
17,225.00	88.95	150.32	11,793.48	-3,479.29	962.20	3,557.28	1.75	-0.05	1.74
17,319.00	88.69	150.67	11,795.41	-3,561.08	1,008.48	3,651.00	0.46	-0.28	0.37
17,413.00	89.13	151.51	11,797.20	-3,643.35	1,053.92	3,744.79	1.01	0.47	0.89
17,507.00	89.17	151.15	11,798.59	-3,725.81	1,099.01	3,838.62	0.39	0.04	-0.38
17,601.00	88.95	151.06	11,800.14	-3,808.10	1,144.42	3,932.41	0.25	-0.23	-0.10
17,696.00	89.00	150.40	11,801.84	-3,890.96	1,190.86	4,027.16	0.70	0.05	-0.69
17,790.00	88.69	150.93	11,803.73	-3,972.89	1,236.91	4,120.91	0.65	-0.33	0.56
17,884.00	88.86	150.58	11,805.74	-4,054.89	1,282.82	4,214.66	0.41	0.18	-0.37
17,978.00	88.73	150.93	11,807.72	-4,136.89	1,328.73	4,308.41	0.40	-0.14	0.37
18,072.00	88.69	150.62	11,809.83	-4,218.90	1,374.61	4,402.16	0.33	-0.04	-0.33
18,166.00	88.73	150.18	11,811.95	-4,300.61	1,421.03	4,495.86	0.47	0.04	-0.47
18,260.00	88.91	149.70	11,813.88	-4,381.95	1,468.11	4,589.51	0.55	0.19	-0.51
18,355.00	88.64	150.49	11,815.92	-4,464.28	1,515.46	4,684.18	0.88	-0.28	0.83
18,449.00	88.86	149.92	11,817.97	-4,545.84	1,562.16	4,777.86	0.65	0.23	-0.61
18,543.00	88.73	150.27	11,819.94	-4,627.30	1,609.01	4,871.53	0.40	-0.14	0.37
18,636.00	88.78	150.45	11,821.96	-4,708.11	1,654.99	4,964.23	0.20	0.05	0.19
18,730.00	89.04	151.33	11,823.75	-4,790.23	1,700.72	5,058.00	0.98	0.28	0.94
18,823.00	89.26	151.20	11,825.13	-4,871.76	1,745.42	5,150.82	0.27	0.24	-0.14
18,917.00	88.69	151.02	11,826.81	-4,954.05	1,790.83	5,244.61	0.64	-0.61	-0.19
19,011.00	88.95	150.40	11,828.75	-5,036.02	1,836.81	5,338.36	0.72	0.28	-0.66
19,106.00	88.91	150.49	11,830.52	-5,118.64	1,883.66	5,433.08	0.10	-0.04	0.09
19,200.00	89.00	150.54	11,832.24	-5,200.45	1,929.92	5,526.80	0.11	0.10	0.05
19,295.00	89.09	151.06	11,833.82	-5,283.37	1,976.26	5,621.57	0.56	0.09	0.55
19,389.00	89.04	150.67	11,835.35	-5,365.46	2,022.02	5,715.34	0.42	-0.05	-0.41
19,483.00	89.17	150.67	11,836.82	-5,447.40	2,068.05	5,809.09	0.14	0.14	0.00
19,576.00	88.86	151.77	11,838.42	-5,528.90	2,112.82	5,901.90	1.23	-0.33	1.18
19,670.00	89.17	150.71	11,840.04	-5,611.29	2,158.04	5,995.70	1.17	0.33	-1.13
19,764.00	88.91	150.01	11,841.61	-5,692.98	2,204.52	6,089.41	0.79	-0.28	-0.74
19,858.00	89.22	149.21	11,843.15	-5,774.06	2,252.07	6,183.02	0.91	0.33	-0.85
19,953.00	89.17	148.95	11,844.48	-5,855.55	2,300.88	6,277.55	0.28	-0.05	-0.27
20,047.00	89.00	150.14	11,845.98	-5,936.57	2,348.52	6,371.15	1.28	-0.18	1.27
20,141.00	89.17	149.52	11,847.48	-6,017.82	2,395.75	6,464.79	0.68	0.18	-0.66
20,235.00	89.17	150.05	11,848.85	-6,099.04	2,443.05	6,558.43	0.56	0.00	0.56
<b>S/T Begin 3°/100' drop/turn (135L)</b>									
20,265.00	88.53	149.41	11,849.45	-6,124.95	2,458.17	6,588.31	3.00	-2.12	-2.12
<b>Begin 3°/100' drop/turn (120L)</b>									
20,295.00	88.08	148.63	11,850.33	-6,150.66	2,473.60	6,618.14	3.00	-1.50	-2.60
<b>Begin 3°/100' turn (90L)</b>									
20,300.00	88.08	148.48	11,850.50	-6,154.92	2,476.21	6,623.11	3.00	0.00	-3.00
20,355.00	88.08	146.83	11,852.34	-6,201.36	2,505.62	6,677.66	3.00	0.00	-3.00
<b>Begin 88.08° lateral</b>									
20,400.00	88.08	146.83	11,853.84	-6,239.01	2,530.22	6,722.20	0.00	0.00	0.00
20,475.00	88.08	146.83	11,856.35	-6,301.75	2,571.23	6,796.45	0.00	0.00	0.00
<b>Begin 2°/100' build</b>									
20,500.00	88.58	146.83	11,857.07	-6,322.67	2,584.90	6,821.20	2.00	2.00	0.00
20,520.76	89.00	146.83	11,857.51	-6,340.05	2,596.26	6,841.76	2.00	2.00	0.00
<b>Begin 89.00° lateral</b>									
20,600.00	89.00	146.83	11,858.90	-6,406.36	2,639.60	6,920.23	0.00	0.00	0.00
20,700.00	89.00	146.83	11,860.64	-6,490.06	2,694.30	7,019.26	0.00	0.00	0.00
20,800.00	89.00	146.83	11,862.39	-6,573.75	2,749.00	7,118.29	0.00	0.00	0.00





Planning Report

<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Hudson S-12 HU (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Site:</b>	Hudson Alt North	<b>North Reference:</b>	Grid
<b>Well:</b>	Hudson S-12 HU (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 01		
<b>Design:</b>	rev13		

Planned 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)	
20,820.76	89.00	146.83	11,862.75	-6,591.13	2,760.36	7,138.86	0.00	0.00	0.00	
<b>Begin 2°/100' turn</b>										
20,900.00	89.00	148.42	11,864.13	-6,658.04	2,802.78	7,217.47	2.00	0.00	2.00	
20,996.10	89.00	150.34	11,865.82	-6,740.72	2,851.72	7,313.13	2.00	0.00	2.00	
<b>Begin 89.00° lateral</b>										
21,000.00	89.00	150.34	11,865.88	-6,744.11	2,853.65	7,317.01	0.00	0.00	0.00	
21,100.00	89.00	150.34	11,867.64	-6,831.00	2,903.13	7,416.70	0.00	0.00	0.00	
21,200.00	89.00	150.34	11,869.39	-6,917.88	2,952.60	7,516.39	0.00	0.00	0.00	
21,300.00	89.00	150.34	11,871.14	-7,004.76	3,002.08	7,616.08	0.00	0.00	0.00	
21,400.00	89.00	150.34	11,872.90	-7,091.65	3,051.56	7,715.77	0.00	0.00	0.00	
21,500.00	89.00	150.34	11,874.65	-7,178.53	3,101.04	7,815.46	0.00	0.00	0.00	
21,600.00	89.00	150.34	11,876.40	-7,265.42	3,150.52	7,915.15	0.00	0.00	0.00	
21,700.00	89.00	150.34	11,878.15	-7,352.30	3,199.99	8,014.84	0.00	0.00	0.00	
21,800.00	89.00	150.34	11,879.91	-7,439.19	3,249.47	8,114.53	0.00	0.00	0.00	
21,900.00	89.00	150.34	11,881.66	-7,526.07	3,298.95	8,214.21	0.00	0.00	0.00	
22,000.00	89.00	150.34	11,883.41	-7,612.95	3,348.43	8,313.90	0.00	0.00	0.00	
22,100.00	89.00	150.34	11,885.17	-7,699.84	3,397.90	8,413.59	0.00	0.00	0.00	
22,200.00	89.00	150.34	11,886.92	-7,786.72	3,447.38	8,513.28	0.00	0.00	0.00	
22,300.00	89.00	150.34	11,888.67	-7,873.61	3,496.86	8,612.97	0.00	0.00	0.00	
22,400.00	89.00	150.34	11,890.42	-7,960.49	3,546.34	8,712.66	0.00	0.00	0.00	
22,500.00	89.00	150.34	11,892.18	-8,047.38	3,595.82	8,812.35	0.00	0.00	0.00	
22,600.00	89.00	150.34	11,893.93	-8,134.26	3,645.29	8,912.04	0.00	0.00	0.00	
22,700.00	89.00	150.34	11,895.68	-8,221.14	3,694.77	9,011.72	0.00	0.00	0.00	
22,800.00	89.00	150.34	11,897.44	-8,308.03	3,744.25	9,111.41	0.00	0.00	0.00	
22,900.00	89.00	150.34	11,899.19	-8,394.91	3,793.73	9,211.10	0.00	0.00	0.00	
23,000.00	89.00	150.34	11,900.94	-8,481.80	3,843.21	9,310.79	0.00	0.00	0.00	
23,100.00	89.00	150.34	11,902.69	-8,568.68	3,892.68	9,410.48	0.00	0.00	0.00	
23,200.00	89.00	150.34	11,904.45	-8,655.56	3,942.16	9,510.17	0.00	0.00	0.00	
23,300.00	89.00	150.34	11,906.20	-8,742.45	3,991.64	9,609.86	0.00	0.00	0.00	
23,400.00	89.00	150.34	11,907.95	-8,829.33	4,041.12	9,709.55	0.00	0.00	0.00	
23,500.00	89.00	150.34	11,909.71	-8,916.22	4,090.59	9,809.24	0.00	0.00	0.00	
23,600.00	89.00	150.34	11,911.46	-9,003.10	4,140.07	9,908.92	0.00	0.00	0.00	
23,700.00	89.00	150.34	11,913.21	-9,089.99	4,189.55	10,008.61	0.00	0.00	0.00	
23,800.00	89.00	150.34	11,914.96	-9,176.87	4,239.03	10,108.30	0.00	0.00	0.00	
23,900.00	89.00	150.34	11,916.72	-9,263.75	4,288.51	10,207.99	0.00	0.00	0.00	
24,000.00	89.00	150.34	11,918.47	-9,350.64	4,337.98	10,307.68	0.00	0.00	0.00	
24,100.00	89.00	150.34	11,920.22	-9,437.52	4,387.46	10,407.37	0.00	0.00	0.00	
24,200.00	89.00	150.34	11,921.98	-9,524.41	4,436.94	10,507.06	0.00	0.00	0.00	
24,300.00	89.00	150.34	11,923.73	-9,611.29	4,486.42	10,606.75	0.00	0.00	0.00	
24,400.00	89.00	150.34	11,925.48	-9,698.18	4,535.89	10,706.43	0.00	0.00	0.00	
24,500.00	89.00	150.34	11,927.23	-9,785.06	4,585.37	10,806.12	0.00	0.00	0.00	
24,600.00	89.00	150.34	11,928.99	-9,871.94	4,634.85	10,905.81	0.00	0.00	0.00	
24,700.00	89.00	150.34	11,930.74	-9,958.83	4,684.33	11,005.50	0.00	0.00	0.00	
24,800.00	89.00	150.34	11,932.49	-10,045.71	4,733.81	11,105.19	0.00	0.00	0.00	
24,851.19	89.00	150.34	11,933.39	-10,090.19	4,759.13	11,156.22	0.00	0.00	0.00	
<b>PBHL/TD 24851.19 MD 11933.39 TVD</b>										

<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Hudson S-12 HU (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Site:</b>	Hudson Alt North	<b>North Reference:</b>	Grid
<b>Well:</b>	Hudson S-12 HU (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 01		
<b>Design:</b>	rev13		

**Design Targets**
**Target Name**

- hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Hudson 12HU LP r11 - plan misses target center by 11.83ft at 12418.01ft MD (11732.97 TVD, 670.17 N, -1461.15 E) - Point	0.00	0.00	11,741.00	674.56	-1,453.65	14,465,211.82	1,730,849.29	39.83059998	-80.67787999
Hudson-12HU PBHL r12 - plan hits target center - Point	0.00	0.00	11,933.39	-10,090.19	4,759.13	14,454,447.09	1,737,062.05	39.80097400	-80.65589800

**Casing Points**

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
24,853.10		20" Casing	20	24

**Plan Annotations**

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
20,235.00	11,848.85	-6,099.04	2,443.05	S/T Begin 3°/100' drop/turn (135L)
20,265.00	11,849.45	-6,124.95	2,458.17	Begin 3°/100' drop/turn (120L)
20,295.00	11,850.33	-6,150.66	2,473.60	Begin 3°/100' turn (90L)
20,355.00	11,852.34	-6,201.36	2,505.62	Begin 88.08° lateral
20,475.00	11,856.35	-6,301.75	2,571.23	Begin 2°/100' build
20,520.76	11,857.51	-6,340.05	2,596.26	Begin 89.00° lateral
20,820.76	11,862.75	-6,591.13	2,760.36	Begin 2°/100' turn
20,996.10	11,865.82	-6,740.72	2,851.72	Begin 89.00° lateral
24,851.19	11,933.39	-10,090.19	4,759.13	PBHL/TD 24851.19 MD 11933.39 TVD

<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Hudson S-12 HU (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Site:</b>	Hudson Alt North	<b>North Reference:</b>	Grid
<b>Well:</b>	Hudson S-12 HU (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 01		
<b>Design:</b>	rev13		

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

<b>Site</b>	Hudson Alt North				
<b>Site Position:</b>		<b>Northing:</b>	14,464,552.10 usft	<b>Latitude:</b>	39.82877400
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,732,278.45 usft	<b>Longitude:</b>	-80.67279800
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	13-3/16 "		

<b>Well</b>	Hudson S-12 HU (slot C)					
<b>Well Position</b>	+N/-S	0.00 ft	<b>Northing:</b>	14,464,537.26 usft	<b>Latitude:</b>	39.82873300
	+E/-W	0.00 ft	<b>Easting:</b>	1,732,302.93 usft	<b>Longitude:</b>	-80.67271100
<b>Position Uncertainty</b>	0.00 ft		<b>Wellhead Elevation:</b>	ft	<b>Ground Level:</b>	1,346.00 ft
<b>Grid Convergence:</b>						

<b>Wellbore</b>	Sidetrack 01				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2020	9/8/2021	-8.691	66.543	51,740.28711100

<b>Design</b>	rev13			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	20,235.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>
	0.00	0.00	0.00	154.75

Plan Survey Tool Program		Date			
Depth From (ft)	Depth To (ft)	Survey (Wellbore)	Tool Name	Remarks	
1	20,235.00	24,851.13	rev13 (Sidetrack 01)		



Planning Report - Geographic

<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Hudson S-12 HU (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Site:</b>	Hudson Alt North	<b>North Reference:</b>	Grid
<b>Well:</b>	Hudson S-12 HU (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 01		
<b>Design:</b>	rev13		

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
20,235.00	89.17	150.05	11,848.85	-6,099.04	2,443.05	0.00	0.00	0.00	0.000	
20,265.00	88.53	149.41	11,849.45	-6,124.95	2,458.17	3.00	-2.12	-2.12	-135.000	
20,295.00	88.08	148.63	11,850.33	-6,150.66	2,473.60	3.00	-1.50	-2.60	-120.000	
20,355.00	88.08	146.83	11,852.34	-6,201.36	2,505.62	3.00	0.00	-3.00	-90.000	
20,475.00	88.08	146.83	11,856.35	-6,301.75	2,571.23	0.00	0.00	0.00	0.000	
20,520.76	89.00	146.83	11,857.51	-6,340.05	2,596.26	2.00	2.00	0.00	0.000	
20,820.76	89.00	146.83	11,862.75	-6,591.13	2,760.36	0.00	0.00	0.00	0.000	
20,996.10	89.00	150.34	11,865.82	-6,740.72	2,851.72	2.00	0.00	2.00	90.102	
24,851.19	89.00	150.34	11,933.39	-10,090.19	4,759.13	0.00	0.00	0.00	0.000	Hudson-12HU PBHL I



Planning Report - Geographic

<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Hudson S-12 HU (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Site:</b>	Hudson Alt North	<b>North Reference:</b>	Grid
<b>Well:</b>	Hudson S-12 HU (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 01		
<b>Design:</b>	rev13		

Planned 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	14,464,537.26	1,732,302.93	39.82873300	-80.67271100
180.00	0.26	12.02	180.00	0.40	0.09	14,464,537.66	1,732,303.02	39.82873410	-80.67271069
211.00	0.40	34.08	211.00	0.56	0.16	14,464,537.82	1,732,303.09	39.82873453	-80.67271042
242.00	0.35	51.57	242.00	0.71	0.30	14,464,537.97	1,732,303.23	39.82873494	-80.67270994
272.00	0.35	38.91	272.00	0.83	0.42	14,464,538.09	1,732,303.35	39.82873529	-80.67270948
303.00	0.31	42.08	303.00	0.97	0.54	14,464,538.23	1,732,303.47	39.82873566	-80.67270906
334.00	0.35	31.71	334.00	1.11	0.65	14,464,538.37	1,732,303.58	39.82873605	-80.67270868
364.00	0.44	10.88	364.00	1.30	0.72	14,464,538.56	1,732,303.65	39.82873658	-80.67270843
394.00	0.57	27.57	393.99	1.55	0.81	14,464,538.81	1,732,303.74	39.82873725	-80.67270811
425.00	0.57	28.89	424.99	1.82	0.95	14,464,539.08	1,732,303.88	39.82873799	-80.67270758
456.00	0.66	22.47	455.99	2.12	1.10	14,464,539.38	1,732,304.03	39.82873882	-80.67270707
486.00	0.61	28.71	485.99	2.42	1.24	14,464,539.68	1,732,304.17	39.82873964	-80.67270656
517.00	0.70	35.13	516.99	2.72	1.43	14,464,539.98	1,732,304.36	39.82874046	-80.67270588
548.00	0.57	27.31	547.99	3.01	1.61	14,464,540.27	1,732,304.54	39.82874126	-80.67270524
578.00	0.66	12.06	577.98	3.31	1.71	14,464,540.57	1,732,304.64	39.82874209	-80.67270486
609.00	0.62	18.87	608.98	3.65	1.80	14,464,540.91	1,732,304.73	39.82874300	-80.67270453
640.00	0.79	16.00	639.98	4.01	1.92	14,464,541.27	1,732,304.85	39.82874400	-80.67270413
671.00	0.88	7.54	670.98	4.45	2.01	14,464,541.71	1,732,304.94	39.82874521	-80.67270380
701.00	1.05	14.92	700.97	4.95	2.11	14,464,542.21	1,732,305.04	39.82874657	-80.67270343
732.00	0.88	25.64	731.97	5.44	2.28	14,464,542.69	1,732,305.21	39.82874791	-80.67270280
764.00	1.23	24.41	763.96	5.97	2.53	14,464,543.23	1,732,305.46	39.82874937	-80.67270191
795.00	1.32	27.49	794.95	6.59	2.83	14,464,543.85	1,732,305.76	39.82875107	-80.67270082
805.00	1.36	28.63	804.95	6.80	2.94	14,464,544.06	1,732,305.87	39.82875164	-80.67270043
815.00	1.19	22.65	814.95	7.00	3.04	14,464,544.26	1,732,305.97	39.82875219	-80.67270008
856.00	0.83	31.35	855.94	7.64	3.36	14,464,544.90	1,732,306.29	39.82875396	-80.67269894
909.00	0.48	35.48	908.94	8.15	3.69	14,464,545.41	1,732,306.62	39.82875535	-80.67269776
951.00	0.35	42.60	950.94	8.39	3.88	14,464,545.65	1,732,306.81	39.82875600	-80.67269708
982.00	0.40	28.72	981.94	8.55	3.99	14,464,545.81	1,732,306.92	39.82875645	-80.67269667
1,013.00	0.48	35.92	1,012.94	8.75	4.12	14,464,546.01	1,732,307.05	39.82875700	-80.67269621
1,075.00	0.48	33.81	1,074.93	9.18	4.42	14,464,546.44	1,732,307.35	39.82875817	-80.67269515
1,169.00	0.57	14.57	1,168.93	9.96	4.75	14,464,547.22	1,732,307.68	39.82876031	-80.67269394
1,263.00	0.70	355.14	1,262.93	10.98	4.82	14,464,548.24	1,732,307.75	39.82876312	-80.67269368
1,357.00	0.48	279.29	1,356.92	11.62	4.39	14,464,548.88	1,732,307.32	39.82876487	-80.67269523
1,450.00	0.70	272.35	1,449.92	11.71	3.43	14,464,548.97	1,732,306.36	39.82876512	-80.67269862
1,545.00	0.92	268.83	1,544.91	11.71	2.09	14,464,548.97	1,732,305.02	39.82876515	-80.67270340
1,640.00	1.23	289.58	1,639.89	12.04	0.37	14,464,549.30	1,732,303.30	39.82876606	-80.67270953
1,734.00	1.76	311.46	1,733.86	13.33	-1.66	14,464,550.59	1,732,301.27	39.82876964	-80.67271675
1,828.00	3.03	321.39	1,827.77	16.23	-4.30	14,464,553.49	1,732,298.63	39.82877762	-80.67272609
1,922.00	4.57	329.04	1,921.57	21.38	-7.77	14,464,558.64	1,732,295.16	39.82879181	-80.67273841
2,016.00	5.27	329.39	2,015.22	28.31	-11.90	14,464,565.57	1,732,291.03	39.82881087	-80.67275301
2,111.00	6.02	321.92	2,109.76	35.99	-17.19	14,464,573.25	1,732,285.74	39.82883201	-80.67277177
2,205.00	6.55	318.05	2,203.19	43.86	-23.82	14,464,581.11	1,732,279.11	39.82885368	-80.67279526
2,299.00	7.08	310.85	2,296.53	51.63	-31.78	14,464,588.89	1,732,271.15	39.82887511	-80.67282353
2,394.00	7.43	304.43	2,390.77	58.93	-41.28	14,464,596.19	1,732,261.65	39.82889526	-80.67285726
2,487.00	7.25	303.02	2,483.01	65.53	-51.16	14,464,602.79	1,732,251.77	39.82891348	-80.67289236
2,582.00	6.86	302.23	2,577.29	71.82	-60.98	14,464,609.08	1,732,241.95	39.82893086	-80.67292728
2,676.00	5.93	306.19	2,670.71	77.69	-69.65	14,464,614.94	1,732,233.28	39.82894704	-80.67295808
2,771.00	4.66	307.42	2,765.30	82.93	-76.68	14,464,620.19	1,732,226.25	39.82896151	-80.67298303
2,820.00	4.13	307.51	2,814.15	85.21	-79.66	14,464,622.47	1,732,223.27	39.82896781	-80.67299362
2,959.00	4.44	304.52	2,952.77	91.31	-88.06	14,464,628.57	1,732,214.87	39.82898464	-80.67302347
3,053.00	6.11	306.01	3,046.36	96.31	-95.11	14,464,633.57	1,732,207.82	39.82899845	-80.67304850
3,150.00	7.65	310.23	3,142.66	103.52	-104.21	14,464,640.78	1,732,198.72	39.82901833	-80.67308084
3,244.00	8.96	312.96	3,235.68	112.55	-114.35	14,464,649.81	1,732,188.58	39.82904323	-80.67311682
3,337.00	9.40	314.19	3,327.48	122.78	-125.09	14,464,660.04	1,732,177.84	39.82907143	-80.67315496
3,431.00	9.62	314.45	3,420.19	133.63	-136.20	14,464,670.89	1,732,166.73	39.82910134	-80.67319439



Planning Report - Geographic

<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Hudson S-12 HU (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Site:</b>	Hudson Alt North	<b>North Reference:</b>	Grid
<b>Well:</b>	Hudson S-12 HU (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 01		
<b>Design:</b>	rev13		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
3,525.00	9.80	313.83	3,512.85	144.67	-147.58	14,464,681.93	1,732,155.35	39.82913178	-80.67323478
3,619.00	9.84	313.31	3,605.47	155.72	-159.20	14,464,692.98	1,732,143.73	39.82916224	-80.67327601
3,713.00	9.93	312.34	3,698.07	166.69	-171.03	14,464,703.95	1,732,131.90	39.82919248	-80.67331802
3,807.00	10.20	311.64	3,790.63	177.68	-183.24	14,464,714.93	1,732,119.69	39.82922278	-80.67336137
3,901.00	10.20	310.50	3,883.14	188.61	-195.79	14,464,725.87	1,732,107.14	39.82925294	-80.67340592
3,995.00	10.15	310.58	3,975.66	199.40	-208.41	14,464,736.66	1,732,094.52	39.82928270	-80.67345073
4,090.00	9.89	312.16	4,069.21	210.33	-220.82	14,464,747.58	1,732,082.11	39.82931282	-80.67349478
4,184.00	9.84	313.04	4,161.82	221.23	-232.67	14,464,758.48	1,732,070.26	39.82934287	-80.67353686
4,278.00	9.58	314.54	4,254.48	232.19	-244.12	14,464,769.45	1,732,058.81	39.82937311	-80.67357748
4,372.00	9.89	316.91	4,347.12	243.58	-255.21	14,464,780.83	1,732,047.72	39.82940448	-80.67361684
4,466.00	9.80	314.36	4,439.74	255.06	-266.44	14,464,792.32	1,732,036.49	39.82943614	-80.67365670
4,560.00	10.15	313.40	4,532.32	266.35	-278.18	14,464,803.61	1,732,024.75	39.82946725	-80.67369837
4,654.00	9.67	314.89	4,624.92	277.61	-289.79	14,464,814.87	1,732,013.14	39.82949829	-80.67373958
4,749.00	10.94	315.15	4,718.38	289.63	-301.80	14,464,826.89	1,732,001.13	39.82953143	-80.67378220
4,843.00	11.43	311.99	4,810.60	302.19	-315.01	14,464,839.45	1,731,987.92	39.82956604	-80.67382910
4,937.00	11.03	309.35	4,902.80	314.12	-328.89	14,464,851.38	1,731,974.04	39.82959895	-80.67387837
5,030.00	9.84	310.58	4,994.26	324.93	-341.81	14,464,862.19	1,731,961.12	39.82962877	-80.67392424
5,124.00	10.06	312.08	5,086.84	335.66	-354.00	14,464,872.92	1,731,948.93	39.82965835	-80.67396753
5,217.00	9.49	311.20	5,178.49	346.15	-365.80	14,464,883.41	1,731,937.13	39.82968728	-80.67400942
5,311.00	10.02	308.56	5,271.14	356.35	-378.02	14,464,893.61	1,731,924.91	39.82971542	-80.67405283
5,405.00	11.12	309.00	5,363.54	367.16	-391.46	14,464,904.42	1,731,911.47	39.82974522	-80.67410056
5,499.00	11.65	311.46	5,455.69	379.15	-405.62	14,464,916.40	1,731,897.31	39.82977829	-80.67415083
5,594.00	10.63	312.25	5,548.90	391.39	-419.29	14,464,928.65	1,731,883.64	39.82981205	-80.67419938
5,689.00	9.45	312.78	5,642.44	402.58	-431.50	14,464,939.83	1,731,871.43	39.82984289	-80.67424272
5,783.00	9.32	312.96	5,735.18	413.01	-442.74	14,464,950.26	1,731,860.19	39.82987164	-80.67428260
5,877.00	10.68	313.57	5,827.75	424.20	-454.62	14,464,961.45	1,731,848.31	39.82990250	-80.67432478
5,970.00	11.07	310.32	5,919.08	435.91	-467.67	14,464,973.17	1,731,835.26	39.82993480	-80.67437112
6,063.00	10.37	305.92	6,010.46	446.60	-481.26	14,464,983.86	1,731,821.67	39.82996429	-80.67441937
6,158.00	9.80	306.63	6,103.99	456.44	-494.67	14,464,993.70	1,731,808.26	39.82999145	-80.67446702
6,252.00	9.36	312.52	6,196.68	466.38	-506.72	14,465,003.64	1,731,796.21	39.83001887	-80.67450982
6,346.00	10.15	316.74	6,289.33	477.58	-518.04	14,465,014.84	1,731,784.90	39.83004973	-80.67454997
6,440.00	9.84	314.54	6,381.90	489.24	-529.44	14,465,026.50	1,731,773.49	39.83008188	-80.67459042
6,535.00	9.45	311.11	6,475.56	500.07	-541.10	14,465,037.32	1,731,761.83	39.83011172	-80.67463182
6,629.00	10.55	310.67	6,568.13	510.75	-553.44	14,465,048.01	1,731,749.49	39.83014118	-80.67467564
6,692.00	10.20	310.06	6,630.10	518.10	-562.08	14,465,055.36	1,731,740.85	39.83016144	-80.67470634
6,787.00	8.83	308.21	6,723.79	528.02	-574.25	14,465,065.28	1,731,728.68	39.83018882	-80.67474955
6,881.00	9.01	307.33	6,816.65	536.95	-585.77	14,465,074.21	1,731,717.16	39.83021345	-80.67479047
6,929.00	10.06	319.11	6,863.99	542.40	-591.51	14,465,079.65	1,731,711.42	39.83022847	-80.67481083
7,023.00	10.33	312.69	6,956.51	554.32	-603.08	14,465,091.58	1,731,699.85	39.83026132	-80.67485188
7,117.00	12.09	310.67	7,048.71	566.45	-616.74	14,465,103.71	1,731,686.19	39.83029477	-80.67490039
7,212.00	15.07	313.48	7,141.05	581.43	-633.25	14,465,118.69	1,731,669.68	39.83033609	-80.67495901
7,259.00	17.36	313.31	7,186.18	590.45	-642.79	14,465,127.71	1,731,660.14	39.83036094	-80.67499286
7,306.00	17.75	313.22	7,230.99	600.16	-653.11	14,465,137.42	1,731,649.82	39.83038773	-80.67502950
7,400.00	19.12	310.41	7,320.16	619.96	-675.28	14,465,157.22	1,731,627.66	39.83044231	-80.67510820
7,493.00	19.16	308.83	7,408.02	639.40	-698.76	14,465,176.66	1,731,604.17	39.83049594	-80.67519160
7,588.00	18.46	309.62	7,497.95	658.77	-722.49	14,465,196.03	1,731,580.44	39.83054936	-80.67527588
7,682.00	18.63	311.37	7,587.07	678.18	-745.22	14,465,215.44	1,731,557.71	39.83060290	-80.67535659
7,776.00	17.71	312.78	7,676.38	697.82	-766.99	14,465,235.07	1,731,535.95	39.83065704	-80.67543386
7,870.00	19.03	313.75	7,765.59	718.12	-788.55	14,465,255.38	1,731,514.38	39.83071302	-80.67551041
7,964.00	20.83	314.63	7,853.96	740.47	-811.52	14,465,277.72	1,731,491.42	39.83077460	-80.67559192
8,059.00	20.52	312.52	7,942.84	763.59	-835.81	14,465,300.84	1,731,467.12	39.83083834	-80.67567815
8,152.00	20.26	309.97	8,030.01	784.95	-860.16	14,465,322.20	1,731,442.77	39.83089724	-80.67576463
8,246.00	20.52	306.80	8,118.13	805.27	-885.83	14,465,342.53	1,731,417.10	39.83095331	-80.67585578
8,341.00	20.52	303.38	8,207.10	824.41	-913.07	14,465,361.66	1,731,389.86	39.83100613	-80.67595256
8,435.00	20.79	302.23	8,295.06	842.37	-940.94	14,465,379.62	1,731,362.00	39.83105574	-80.67605159



Planning Report - Geographic

<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Hudson S-12 HU (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Site:</b>	Hudson Alt North	<b>North Reference:</b>	Grid
<b>Well:</b>	Hudson S-12 HU (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 01		
<b>Design:</b>	rev13		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
8,530.00	20.61	301.18	8,383.93	860.02	-969.50	14,465,397.27	1,731,333.43	39.83110449	-80.67615312
8,624.00	20.43	299.60	8,471.96	876.68	-997.92	14,465,413.94	1,731,305.01	39.83115055	-80.67625413
8,718.00	19.95	301.09	8,560.19	893.07	-1,025.92	14,465,430.33	1,731,277.01	39.83119582	-80.67635365
8,813.00	19.69	301.97	8,649.56	909.91	-1,053.38	14,465,447.17	1,731,249.56	39.83124235	-80.67645123
8,907.00	15.69	302.32	8,739.10	925.10	-1,077.56	14,465,462.36	1,731,225.37	39.83128429	-80.67653718
9,000.00	16.26	307.59	8,828.51	939.76	-1,098.51	14,465,477.02	1,731,204.43	39.83132478	-80.67661160
9,094.00	18.72	311.02	8,918.16	957.70	-1,120.32	14,465,494.95	1,731,182.61	39.83137424	-80.67668906
9,188.00	19.42	308.65	9,007.00	977.36	-1,143.91	14,465,514.61	1,731,159.03	39.83142847	-80.67677282
9,281.00	22.37	307.68	9,093.88	997.84	-1,169.99	14,465,535.09	1,731,132.94	39.83148496	-80.67686548
9,375.00	23.34	305.66	9,180.50	1,019.63	-1,199.28	14,465,556.88	1,731,103.65	39.83154509	-80.67696952
9,469.00	24.70	303.82	9,266.36	1,041.41	-1,230.73	14,465,578.67	1,731,072.21	39.83160524	-80.67708125
9,562.00	22.94	302.85	9,351.43	1,062.06	-1,262.10	14,465,599.32	1,731,040.83	39.83166225	-80.67719273
9,657.00	20.08	309.97	9,439.82	1,082.59	-1,290.16	14,465,619.84	1,731,012.77	39.83171890	-80.67729243
9,751.00	20.13	312.25	9,528.09	1,103.83	-1,314.50	14,465,641.09	1,730,988.43	39.83177748	-80.67737885
9,845.00	21.01	310.50	9,616.10	1,125.65	-1,339.29	14,465,662.91	1,730,963.64	39.83183765	-80.67746687
9,939.00	21.18	305.22	9,703.81	1,146.39	-1,365.98	14,465,683.65	1,730,936.96	39.83189487	-80.67756166
10,033.00	21.45	301.79	9,791.38	1,165.24	-1,394.46	14,465,702.49	1,730,908.47	39.83194691	-80.67766288
10,127.00	21.05	302.67	9,878.99	1,183.40	-1,423.28	14,465,720.66	1,730,879.65	39.83199709	-80.67776530
10,223.00	20.00	304.25	9,968.90	1,201.95	-1,451.36	14,465,739.21	1,730,851.57	39.83204830	-80.67786510
10,316.00	18.90	301.27	10,056.59	1,218.72	-1,477.39	14,465,755.98	1,730,825.55	39.83209461	-80.67795757
10,410.00	20.30	304.52	10,145.15	1,235.87	-1,503.84	14,465,773.12	1,730,799.10	39.83214195	-80.67805157
10,505.00	19.69	307.68	10,234.42	1,254.99	-1,530.08	14,465,792.24	1,730,772.85	39.83219473	-80.67814481
10,599.00	18.72	305.75	10,323.19	1,273.48	-1,554.86	14,465,810.74	1,730,748.08	39.83224576	-80.67823282
10,693.00	17.80	303.20	10,412.46	1,290.16	-1,579.12	14,465,827.42	1,730,723.81	39.83229181	-80.67831904
10,786.00	19.38	303.64	10,500.60	1,306.49	-1,603.86	14,465,843.75	1,730,699.07	39.83233690	-80.67840697
10,852.00	20.52	305.75	10,562.64	1,319.32	-1,622.37	14,465,856.58	1,730,680.56	39.83237231	-80.67847272
10,911.00	21.48	307.64	10,617.72	1,331.96	-1,639.32	14,465,869.21	1,730,663.62	39.83240718	-80.67853292
11,004.00	18.91	304.33	10,705.00	1,350.86	-1,665.25	14,465,888.12	1,730,637.68	39.83245935	-80.67862505
11,051.00	16.26	291.51	10,749.82	1,357.57	-1,677.67	14,465,894.83	1,730,625.27	39.83247790	-80.67866920
11,099.00	13.43	275.16	10,796.23	1,360.54	-1,689.48	14,465,897.79	1,730,613.46	39.83248617	-80.67871123
11,146.00	11.89	256.61	10,842.11	1,359.91	-1,699.63	14,465,897.16	1,730,603.30	39.83248453	-80.67874740
11,193.00	10.96	237.83	10,888.19	1,356.41	-1,708.12	14,465,893.66	1,730,594.81	39.83247500	-80.67877770
11,240.00	10.56	218.49	10,934.38	1,350.65	-1,714.59	14,465,887.91	1,730,588.34	39.83245927	-80.67880080
11,286.00	10.52	197.20	10,979.62	1,343.34	-1,718.46	14,465,880.60	1,730,584.48	39.83243922	-80.67881467
11,333.00	11.18	183.89	11,025.79	1,334.69	-1,720.03	14,465,871.95	1,730,582.90	39.83241549	-80.67882040
11,382.00	12.46	174.60	11,073.75	1,324.69	-1,719.86	14,465,861.95	1,730,583.07	39.83238802	-80.67881991
11,429.00	14.27	168.82	11,119.48	1,313.96	-1,718.26	14,465,851.22	1,730,584.68	39.83235853	-80.67881434
11,476.00	16.97	164.33	11,164.74	1,301.67	-1,715.28	14,465,838.93	1,730,587.65	39.83232475	-80.67880390
11,523.00	19.89	164.37	11,209.32	1,287.36	-1,711.27	14,465,824.62	1,730,591.66	39.83228543	-80.67878981
11,571.00	23.20	163.18	11,253.96	1,270.45	-1,706.34	14,465,807.70	1,730,596.60	39.83223892	-80.67877244
11,618.00	26.34	162.96	11,296.64	1,251.61	-1,700.60	14,465,788.87	1,730,602.33	39.83218713	-80.67875225
11,665.00	30.40	162.79	11,337.98	1,230.27	-1,694.02	14,465,767.53	1,730,608.91	39.83212847	-80.67872909
11,712.00	34.07	163.76	11,377.73	1,206.27	-1,686.82	14,465,743.52	1,730,616.11	39.83206247	-80.67870375
11,759.00	37.38	164.46	11,415.88	1,179.87	-1,679.32	14,465,717.13	1,730,623.62	39.83198992	-80.67867735
11,806.00	40.79	166.05	11,452.36	1,151.22	-1,671.79	14,465,688.48	1,730,631.14	39.83191115	-80.67865091
11,854.00	43.88	163.45	11,487.84	1,120.05	-1,663.27	14,465,657.30	1,730,639.66	39.83182546	-80.67862095
11,901.00	46.84	161.91	11,520.86	1,088.13	-1,653.30	14,465,625.39	1,730,649.63	39.83173771	-80.67858587
11,948.00	49.67	160.50	11,552.15	1,054.94	-1,642.00	14,465,592.20	1,730,660.94	39.83164645	-80.67854602
11,995.00	52.50	159.31	11,581.67	1,020.60	-1,629.43	14,465,557.86	1,730,673.51	39.83155204	-80.67850169
12,042.00	55.94	157.67	11,609.15	985.14	-1,615.44	14,465,522.40	1,730,687.49	39.83145451	-80.67845231
12,089.00	60.01	155.78	11,634.07	948.55	-1,599.69	14,465,485.81	1,730,703.25	39.83135387	-80.67839666
12,137.00	63.99	154.33	11,656.60	910.14	-1,581.81	14,465,447.40	1,730,721.13	39.83124820	-80.67833347
12,184.00	67.17	153.40	11,676.03	871.73	-1,562.95	14,465,408.98	1,730,739.98	39.83114253	-80.67826681
12,231.00	70.35	152.56	11,693.06	832.71	-1,543.05	14,465,369.96	1,730,759.88	39.83103518	-80.67819642
12,278.00	73.27	151.51	11,707.73	793.28	-1,522.11	14,465,330.53	1,730,780.82	39.83092668	-80.67812234



Planning Report - Geographic

<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Hudson S-12 HU (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Site:</b>	Hudson Alt North	<b>North Reference:</b>	Grid
<b>Well:</b>	Hudson S-12 HU (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 01		
<b>Design:</b>	rev13		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
12,325.00	77.33	152.83	11,719.65	753.08	-1,500.90	14,465,290.34	1,730,802.03	39.83081609	-80.67804730
12,372.00	81.71	154.41	11,728.20	711.69	-1,480.37	14,465,248.94	1,730,822.56	39.83070221	-80.67797472
12,419.00	86.48	155.91	11,733.03	669.27	-1,460.74	14,465,206.53	1,730,842.19	39.83058554	-80.67790534
12,466.00	90.41	156.84	11,734.31	626.24	-1,441.92	14,465,163.49	1,730,861.01	39.83046716	-80.67783884
12,513.00	91.38	151.73	11,733.57	583.91	-1,421.54	14,465,121.17	1,730,881.40	39.83035073	-80.67776678
12,607.00	90.41	145.64	11,732.10	503.65	-1,372.71	14,465,040.91	1,730,930.22	39.83012984	-80.67759389
12,701.00	90.28	146.26	11,731.54	425.77	-1,320.08	14,464,963.03	1,730,982.85	39.82991544	-80.67740743
12,796.00	89.75	148.60	11,731.51	345.72	-1,268.94	14,464,882.98	1,731,033.99	39.82969508	-80.67722631
12,890.00	90.06	148.91	11,731.67	265.35	-1,220.18	14,464,802.61	1,731,082.75	39.82947390	-80.67705367
12,985.00	89.62	148.60	11,731.93	184.13	-1,170.91	14,464,721.39	1,731,132.03	39.82925036	-80.67687920
13,079.00	89.57	150.58	11,732.60	103.07	-1,123.33	14,464,640.33	1,731,179.60	39.82902727	-80.67671078
13,174.00	89.44	150.58	11,733.42	20.32	-1,076.67	14,464,557.58	1,731,226.27	39.82879957	-80.67654564
13,268.00	89.31	150.98	11,734.44	-61.71	-1,030.78	14,464,475.55	1,731,272.15	39.82857383	-80.67638327
13,362.00	89.53	150.49	11,735.40	-143.71	-984.83	14,464,393.55	1,731,318.10	39.82834819	-80.67622066
13,456.00	89.31	150.62	11,736.35	-225.56	-938.63	14,464,311.70	1,731,364.31	39.82812294	-80.67605714
13,550.00	89.40	150.45	11,737.41	-307.40	-892.39	14,464,229.86	1,731,410.54	39.82789774	-80.67589351
13,645.00	89.35	150.10	11,738.44	-389.89	-845.29	14,464,147.37	1,731,457.64	39.82767072	-80.67572681
13,739.00	89.17	150.01	11,739.66	-471.34	-798.37	14,464,065.92	1,731,504.56	39.82744659	-80.67556075
13,833.00	89.17	150.32	11,741.02	-552.87	-751.61	14,463,984.39	1,731,551.32	39.82722222	-80.67539526
13,926.00	89.17	150.01	11,742.37	-633.54	-705.35	14,463,903.73	1,731,597.58	39.82700023	-80.67523152
14,020.00	88.95	150.58	11,743.91	-715.17	-658.77	14,463,822.09	1,731,644.16	39.82677558	-80.67506669
14,115.00	89.09	150.10	11,745.53	-797.71	-611.77	14,463,739.55	1,731,691.16	39.82654843	-80.67490035
14,209.00	88.78	150.84	11,747.28	-879.49	-565.45	14,463,657.77	1,731,737.48	39.82632340	-80.67473642
14,304.00	89.00	149.26	11,749.12	-961.78	-518.03	14,463,575.48	1,731,784.90	39.82609692	-80.67456860
14,397.00	88.60	149.43	11,751.07	-1,041.77	-470.62	14,463,495.49	1,731,832.31	39.82587679	-80.67440078
14,492.00	88.91	149.13	11,753.13	-1,123.42	-422.10	14,463,413.84	1,731,880.83	39.82565208	-80.67422904
14,590.00	88.78	150.18	11,755.11	-1,207.97	-372.60	14,463,329.29	1,731,930.33	39.82541937	-80.67405383
14,682.00	88.78	149.79	11,757.07	-1,287.62	-326.59	14,463,249.64	1,731,976.34	39.82520019	-80.67389099
14,777.00	88.69	150.40	11,759.16	-1,369.95	-279.24	14,463,167.31	1,732,023.69	39.82497362	-80.67372341
14,871.00	88.86	150.18	11,761.17	-1,451.57	-232.67	14,463,085.69	1,732,070.26	39.82474899	-80.67355858
14,965.00	89.00	150.23	11,762.93	-1,533.13	-185.97	14,463,004.13	1,732,116.97	39.82452454	-80.67339332
15,058.00	89.09	151.33	11,764.48	-1,614.28	-140.57	14,462,922.98	1,732,162.36	39.82430122	-80.67323270
15,152.00	89.44	150.58	11,765.68	-1,696.46	-94.94	14,462,840.81	1,732,207.99	39.82407511	-80.67307125
15,247.00	89.35	150.80	11,766.69	-1,779.29	-48.44	14,462,757.97	1,732,254.49	39.82384716	-80.67290670
15,342.00	89.48	150.89	11,767.66	-1,862.25	-2.16	14,462,675.01	1,732,300.77	39.82361887	-80.67274295
15,436.00	89.22	149.43	11,768.72	-1,943.78	44.61	14,462,593.48	1,732,347.54	39.82339450	-80.67257745
15,530.00	89.17	148.99	11,770.04	-2,024.52	92.72	14,462,512.74	1,732,395.65	39.82317228	-80.67240714
15,624.00	89.00	149.52	11,771.55	-2,105.30	140.77	14,462,431.96	1,732,443.70	39.82294996	-80.67223707
15,719.00	89.35	148.33	11,772.91	-2,186.66	189.80	14,462,350.61	1,732,492.73	39.82272604	-80.67206352
15,813.00	89.31	149.57	11,774.01	-2,267.18	238.28	14,462,270.08	1,732,541.21	39.82250442	-80.67189191
15,907.00	89.13	149.70	11,775.29	-2,348.28	285.79	14,462,188.99	1,732,588.72	39.82228123	-80.67172375
16,001.00	89.40	149.04	11,776.50	-2,429.16	333.68	14,462,108.11	1,732,636.61	39.82205863	-80.67155425
16,095.00	89.62	149.43	11,777.30	-2,509.92	381.76	14,462,027.34	1,732,684.69	39.82183634	-80.67138407
16,189.00	89.35	149.74	11,778.15	-2,590.98	429.35	14,461,946.28	1,732,732.28	39.82161325	-80.67121565
16,284.00	89.48	148.77	11,779.12	-2,672.63	477.91	14,461,864.64	1,732,780.84	39.82138855	-80.67104377
16,379.00	89.13	149.21	11,780.27	-2,754.04	526.85	14,461,783.22	1,732,829.78	39.82116447	-80.67087054
16,473.00	89.22	148.73	11,781.62	-2,834.58	575.30	14,461,702.68	1,732,878.23	39.82094280	-80.67069904
16,568.00	89.31	149.70	11,782.84	-2,916.19	623.92	14,461,621.08	1,732,926.85	39.82071820	-80.67052696
16,661.00	89.48	149.17	11,783.82	-2,996.26	671.21	14,461,541.00	1,732,974.14	39.82049782	-80.67035960
16,756.00	88.78	148.33	11,785.27	-3,077.47	720.48	14,461,459.80	1,733,023.41	39.82027431	-80.67018517
16,850.00	88.82	149.39	11,787.23	-3,157.90	769.08	14,461,379.36	1,733,072.01	39.82005292	-80.67001314
16,943.00	89.17	148.38	11,788.87	-3,237.51	817.13	14,461,299.75	1,733,120.06	39.81983382	-80.66984306
17,037.00	89.13	149.08	11,790.26	-3,317.85	865.92	14,461,219.42	1,733,168.85	39.81961270	-80.66967037
17,131.00	89.00	148.68	11,791.79	-3,398.31	914.50	14,461,138.96	1,733,217.43	39.81939125	-80.66949844
17,225.00	88.95	150.32	11,793.48	-3,479.29	962.20	14,461,057.98	1,733,265.12	39.81916838	-80.66932963





Planning Report - Geographic

<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Hudson S-12 HU (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Site:</b>	Hudson Alt North	<b>North Reference:</b>	Grid
<b>Well:</b>	Hudson S-12 HU (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 01		
<b>Design:</b>	rev13		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
17,319.00	88.69	150.67	11,795.41	-3,561.08	1,008.48	14,460,976.19	1,733,311.41	39.81894329	-80.66916587	
17,413.00	89.13	151.51	11,797.20	-3,643.35	1,053.92	14,460,893.92	1,733,356.84	39.81871690	-80.66900515	
17,507.00	89.17	151.15	11,798.59	-3,725.81	1,099.01	14,460,811.45	1,733,401.94	39.81848997	-80.66884564	
17,601.00	88.95	151.06	11,800.14	-3,808.10	1,144.42	14,460,729.17	1,733,447.35	39.81826353	-80.66868499	
17,696.00	89.00	150.40	11,801.84	-3,890.96	1,190.86	14,460,646.31	1,733,493.79	39.81803551	-80.66852070	
17,790.00	88.69	150.93	11,803.73	-3,972.89	1,236.91	14,460,564.38	1,733,539.83	39.81781005	-80.66835781	
17,884.00	88.86	150.58	11,805.74	-4,054.89	1,282.82	14,460,482.38	1,733,585.75	39.81758439	-80.66819538	
17,978.00	88.73	150.93	11,807.72	-4,136.89	1,328.73	14,460,400.38	1,733,631.66	39.81735873	-80.66803296	
18,072.00	88.69	150.62	11,809.83	-4,218.90	1,374.61	14,460,318.37	1,733,677.54	39.81713303	-80.66787064	
18,166.00	88.73	150.18	11,811.95	-4,300.61	1,421.03	14,460,236.66	1,733,723.96	39.81690816	-80.66770642	
18,260.00	88.91	149.70	11,813.88	-4,381.95	1,468.11	14,460,155.32	1,733,771.04	39.81668431	-80.66753985	
18,355.00	88.64	150.49	11,815.92	-4,464.28	1,515.46	14,460,072.98	1,733,818.39	39.81645772	-80.66737231	
18,449.00	88.86	149.92	11,817.97	-4,545.84	1,562.16	14,459,991.43	1,733,865.08	39.81623328	-80.66720709	
18,543.00	88.73	150.27	11,819.94	-4,627.30	1,609.01	14,459,909.96	1,733,911.94	39.81600907	-80.66704131	
18,638.00	88.78	150.45	11,821.96	-4,708.11	1,654.99	14,459,829.15	1,733,957.92	39.81578668	-80.66687863	
18,730.00	89.04	151.33	11,823.75	-4,790.23	1,700.72	14,459,747.04	1,734,003.64	39.81556071	-80.66671690	
18,823.00	89.26	151.20	11,825.13	-4,871.76	1,745.42	14,459,665.50	1,734,048.35	39.81533633	-80.66655878	
18,917.00	88.69	151.02	11,826.81	-4,954.05	1,790.83	14,459,583.22	1,734,093.75	39.81510989	-80.66639817	
19,011.00	88.95	150.40	11,828.75	-5,036.02	1,836.81	14,459,501.25	1,734,139.73	39.81488432	-80.66623553	
19,106.00	88.91	150.49	11,830.52	-5,118.64	1,883.66	14,459,418.63	1,734,186.58	39.81466694	-80.66606979	
19,200.00	89.00	150.54	11,832.24	-5,200.45	1,929.92	14,459,336.82	1,734,232.84	39.81443179	-80.66590614	
19,295.00	89.09	151.06	11,833.82	-5,283.37	1,976.26	14,459,253.90	1,734,279.18	39.81420361	-80.66574222	
19,389.00	89.04	150.67	11,835.35	-5,365.46	2,022.02	14,459,171.81	1,734,324.94	39.81397768	-80.66558036	
19,483.00	89.17	150.67	11,836.82	-5,447.40	2,068.05	14,459,089.86	1,734,370.98	39.81375218	-80.66541750	
19,576.00	88.86	151.77	11,838.42	-5,528.90	2,112.82	14,459,008.37	1,734,415.75	39.81352791	-80.66525917	
19,670.00	89.17	150.71	11,840.04	-5,611.29	2,158.04	14,458,925.98	1,734,460.97	39.81330118	-80.66509924	
19,764.00	88.91	150.01	11,841.61	-5,692.98	2,204.52	14,458,844.29	1,734,507.45	39.81307637	-80.66493481	
19,858.00	89.22	149.21	11,843.15	-5,774.06	2,252.07	14,458,763.21	1,734,554.99	39.81285324	-80.66476658	
19,953.00	89.17	148.95	11,844.48	-5,855.55	2,300.88	14,458,681.72	1,734,603.80	39.81262894	-80.66459385	
20,047.00	89.00	150.14	11,845.98	-5,936.57	2,348.52	14,458,600.71	1,734,651.44	39.81240595	-80.66442530	
20,141.00	89.17	149.52	11,847.48	-6,017.82	2,395.75	14,458,519.45	1,734,698.68	39.81218232	-80.66425818	
20,235.00	89.17	150.05	11,848.85	-6,099.04	2,443.05	14,458,438.23	1,734,745.98	39.81195878	-80.66409083	
<b>S/T Begin 3°/100' drop/turn (135L)</b>										
20,265.00	88.53	149.41	11,849.45	-6,124.95	2,458.17	14,458,412.32	1,734,761.10	39.81188749	-80.66403734	
<b>Begin 3°/100' drop/turn (120L)</b>										
20,295.00	88.08	148.63	11,850.33	-6,150.66	2,473.60	14,458,386.61	1,734,776.53	39.81181672	-80.66398273	
<b>Begin 3°/100' turn (90L)</b>										
20,300.00	88.08	148.48	11,850.50	-6,154.92	2,476.21	14,458,382.35	1,734,779.14	39.81180499	-80.66397350	
20,355.00	88.08	146.83	11,852.34	-6,201.36	2,505.62	14,458,335.91	1,734,808.54	39.81167715	-80.66386941	
<b>Begin 88.08° lateral</b>										
20,400.00	88.08	146.83	11,853.84	-6,239.01	2,530.22	14,458,298.26	1,734,833.15	39.81157350	-80.66378229	
20,475.00	88.08	146.83	11,856.35	-6,301.75	2,571.23	14,458,235.52	1,734,874.16	39.81140077	-80.66363710	
<b>Begin 2°/100' build</b>										
20,500.00	88.58	146.83	11,857.07	-6,322.67	2,584.90	14,458,214.60	1,734,887.83	39.81134318	-80.66358870	
20,520.76	89.00	146.83	11,857.51	-6,340.05	2,596.26	14,458,197.22	1,734,899.18	39.81129535	-80.66354850	
<b>Begin 89.00° lateral</b>										
20,600.00	89.00	146.83	11,858.90	-6,406.36	2,639.60	14,458,130.91	1,734,942.53	39.81111277	-80.66339504	
20,700.00	89.00	146.83	11,860.64	-6,490.06	2,694.30	14,458,047.21	1,734,997.23	39.81088236	-80.66320138	
20,800.00	89.00	146.83	11,862.39	-6,573.75	2,749.00	14,457,963.52	1,735,051.93	39.81065195	-80.66300772	
20,820.76	89.00	146.83	11,862.75	-6,591.13	2,760.36	14,457,946.14	1,735,063.28	39.81060412	-80.66296751	
<b>Begin 2°/100' turn</b>										
20,900.00	89.00	148.42	11,864.13	-6,658.04	2,802.78	14,457,879.23	1,735,105.70	39.81041993	-80.66281735	
20,996.10	89.00	150.34	11,865.82	-6,740.72	2,851.72	14,457,796.55	1,735,154.64	39.81019235	-80.66264419	
<b>Begin 89.00° lateral</b>										



Planning Report - Geographic

<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Hudson S-12 HU (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Site:</b>	Hudson Alt North	<b>North Reference:</b>	Grid
<b>Well:</b>	Hudson S-12 HU (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 01		
<b>Design:</b>	rev13		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
21,000.00	89.00	150.34	11,865.88	-6,744.11	2,853.65	14,457,793.16	1,735,156.57	39.81018303	-80.66263737	
21,100.00	89.00	150.34	11,867.64	-6,831.00	2,903.13	14,457,706.28	1,735,206.05	39.80994391	-80.66246235	
21,200.00	89.00	150.34	11,869.39	-6,917.88	2,952.60	14,457,619.39	1,735,255.53	39.80970480	-80.66228733	
21,300.00	89.00	150.34	11,871.14	-7,004.76	3,002.08	14,457,532.51	1,735,305.01	39.80946568	-80.66211232	
21,400.00	89.00	150.34	11,872.90	-7,091.65	3,051.56	14,457,445.62	1,735,354.48	39.80922656	-80.66193731	
21,500.00	89.00	150.34	11,874.65	-7,178.53	3,101.04	14,457,358.74	1,735,403.96	39.80898745	-80.66176229	
21,600.00	89.00	150.34	11,876.40	-7,265.42	3,150.52	14,457,271.86	1,735,453.44	39.80874833	-80.66158728	
21,700.00	89.00	150.34	11,878.15	-7,352.30	3,199.99	14,457,184.97	1,735,502.92	39.80850921	-80.66141227	
21,800.00	89.00	150.34	11,879.91	-7,439.19	3,249.47	14,457,098.09	1,735,552.40	39.80827009	-80.66123727	
21,900.00	89.00	150.34	11,881.66	-7,526.07	3,298.95	14,457,011.20	1,735,601.87	39.80803097	-80.66106226	
22,000.00	89.00	150.34	11,883.41	-7,612.95	3,348.43	14,456,924.32	1,735,651.35	39.80779185	-80.66088725	
22,100.00	89.00	150.34	11,885.17	-7,699.84	3,397.90	14,456,837.44	1,735,700.83	39.80755273	-80.66071225	
22,200.00	89.00	150.34	11,886.92	-7,786.72	3,447.38	14,456,750.55	1,735,750.31	39.80731361	-80.66053724	
22,300.00	89.00	150.34	11,888.67	-7,873.61	3,496.86	14,456,663.67	1,735,799.78	39.80707450	-80.66036224	
22,400.00	89.00	150.34	11,890.42	-7,960.49	3,546.34	14,456,576.78	1,735,849.26	39.80683537	-80.66018724	
22,500.00	89.00	150.34	11,892.18	-8,047.38	3,595.82	14,456,489.90	1,735,898.74	39.80659625	-80.66001224	
22,600.00	89.00	150.34	11,893.93	-8,134.26	3,645.29	14,456,403.02	1,735,948.22	39.80635713	-80.65983724	
22,700.00	89.00	150.34	11,895.68	-8,221.14	3,694.77	14,456,316.13	1,735,997.69	39.80611801	-80.65966224	
22,800.00	89.00	150.34	11,897.44	-8,308.03	3,744.25	14,456,229.25	1,736,047.17	39.80587889	-80.65948725	
22,900.00	89.00	150.34	11,899.19	-8,394.91	3,793.73	14,456,142.36	1,736,096.65	39.80563977	-80.65931225	
23,000.00	89.00	150.34	11,900.94	-8,481.80	3,843.21	14,456,055.48	1,736,146.13	39.80540065	-80.65913726	
23,100.00	89.00	150.34	11,902.69	-8,568.68	3,892.68	14,455,968.60	1,736,195.61	39.80516153	-80.65896226	
23,200.00	89.00	150.34	11,904.45	-8,655.56	3,942.16	14,455,881.71	1,736,245.08	39.80492240	-80.65878727	
23,300.00	89.00	150.34	11,906.20	-8,742.45	3,991.64	14,455,794.83	1,736,294.56	39.80468328	-80.65861228	
23,400.00	89.00	150.34	11,907.95	-8,829.33	4,041.12	14,455,707.94	1,736,344.04	39.80444416	-80.65843729	
23,500.00	89.00	150.34	11,909.71	-8,916.22	4,090.59	14,455,621.06	1,736,393.52	39.80420504	-80.65826230	
23,600.00	89.00	150.34	11,911.46	-9,003.10	4,140.07	14,455,534.17	1,736,442.99	39.80396591	-80.65808732	
23,700.00	89.00	150.34	11,913.21	-9,089.99	4,189.55	14,455,447.29	1,736,492.47	39.80372679	-80.65791233	
23,800.00	89.00	150.34	11,914.96	-9,176.87	4,239.03	14,455,360.41	1,736,541.95	39.80348767	-80.65773735	
23,900.00	89.00	150.34	11,916.72	-9,263.75	4,288.51	14,455,273.52	1,736,591.43	39.80324854	-80.65756236	
24,000.00	89.00	150.34	11,918.47	-9,350.64	4,337.98	14,455,186.64	1,736,640.90	39.80300942	-80.65738738	
24,100.00	89.00	150.34	11,920.22	-9,437.52	4,387.46	14,455,099.75	1,736,690.38	39.80277029	-80.65721240	
24,200.00	89.00	150.34	11,921.98	-9,524.41	4,436.94	14,455,012.87	1,736,739.86	39.80253117	-80.65703742	
24,300.00	89.00	150.34	11,923.73	-9,611.29	4,486.42	14,454,925.99	1,736,789.34	39.80229204	-80.65686244	
24,400.00	89.00	150.34	11,925.48	-9,698.18	4,535.89	14,454,839.10	1,736,838.82	39.80205292	-80.65668747	
24,500.00	89.00	150.34	11,927.23	-9,785.06	4,585.37	14,454,752.22	1,736,888.29	39.80181379	-80.65651249	
24,600.00	89.00	150.34	11,928.99	-9,871.94	4,634.85	14,454,665.33	1,736,937.77	39.80157467	-80.65633752	
24,700.00	89.00	150.34	11,930.74	-9,958.83	4,684.33	14,454,578.45	1,736,987.25	39.80133554	-80.65616254	
24,800.00	89.00	150.34	11,932.49	-10,045.71	4,733.81	14,454,491.57	1,737,036.73	39.80109641	-80.65598757	
24,851.19	89.00	150.34	11,933.39	-10,090.19	4,759.13	14,454,447.09	1,737,062.05	39.80097400	-80.65589800	

PBHL/TD 24851.19 MD 11933.39 TVD

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
Hudson 12HU LP r11	0.00	0.00	11,741.00	674.56	-1,453.65	14,465,211.82	1,730,849.29	39.83059998	-80.67787999	
- plan misses target center by 11.83ft at 12418.01ft MD (11732.97 TVD, 670.17 N, -1461.15 E)										
- Point										
Hudson-12HU PBHL r12	0.00	0.00	11,933.39	-10,090.19	4,759.13	14,454,447.09	1,737,062.05	39.80097400	-80.65589800	
- plan hits target center										
- Point										



Planning Report - Geographic

<b>Database:</b>	DB_Dec2220_v16	<b>Local Co-ordinate Reference:</b>	Well Hudson S-12 HU (slot C)
<b>Company:</b>	Tug Hill Operating LLC	<b>TVD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Project:</b>	Marshall County, West Virginia	<b>MD Reference:</b>	RKB=1346+33 @ 1379.00ft (Nabors X08)
<b>Site:</b>	Hudson Alt North	<b>North Reference:</b>	Grid
<b>Well:</b>	Hudson S-12 HU (slot C)	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Sidetrack 01		
<b>Design:</b>	rev13		

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
24,853.10		20" Casing	20	24	

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
20,235.00	11,848.85	-6,099.04	2,443.05	S/T Begin 3°/100' drop/turn (135L)	
20,265.00	11,849.45	-6,124.95	2,458.17	Begin 3°/100' drop/turn (120L)	
20,295.00	11,850.33	-6,150.66	2,473.60	Begin 3°/100' turn (90L)	
20,355.00	11,852.34	-6,201.36	2,505.62	Begin 88.08° lateral	
20,475.00	11,856.35	-6,301.75	2,571.23	Begin 2°/100' build	
20,520.76	11,857.51	-6,340.05	2,596.26	Begin 89.00° lateral	
20,820.76	11,862.75	-6,591.13	2,760.36	Begin 2°/100' turn	
20,996.10	11,865.82	-6,740.72	2,851.72	Begin 89.00° lateral	
24,851.19	11,933.39	-10,090.19	4,759.13	PBHL/TD 24851.19 MD 11933.39 TVD	