



Well: Old Crow N-19 HU RD (3HM) (slot E)
 Site: Old Crow Pad
 Project: Marshall County, West Virginia.
 Design: rev8
 Rig: Nabors X14

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
1	5237.00	40.85	3.63	4916.09	1019.51	69.43	0.00	0.00	893.35	Survey @ 5237.00 MD 4916.09 TVD
2	5437.00	40.85	3.63	5067.38	1150.06	77.71	0.00	0.00	1008.01	KOP Begin 2°/100' build/turn
3	5495.53	41.78	4.70	5111.33	1188.60	80.52	2.00	37.60	1041.70	Begin 41.78° tangent
4	7167.66	41.78	4.70	6358.21	2299.00	171.85	0.00	0.00	2008.02	Begin 8°/100' build/turn
5	7300.16	50.00	355.34	6450.46	2393.85	171.34	8.00	-42.64	2094.09	Begin 8°/100' build/turn
6	7772.17	91.00	329.72	6607.00	2801.12	29.58	10.00	-36.09	2523.00	Begin 91.00° lateral
7	21410.04	91.00	329.72	6369.00	14577.18	-6844.98	0.00	0.00	16104.28	PBHL/TD 21410.04 MD 6369.00 TVD

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
BHL Old Crow N-03 HM r8	6369.00	14577.18	-6844.98	14460725.72	1700161.69	39.81853200	-80.78722600	Point
- plan hits target center								
LP Old Crow N-03 HM 50 E r8	6607.00	2801.16	29.58	14448949.70	1707036.24	39.78614446	-80.76285450	Point
- plan misses target center by 0.01usft								

ANNOTATIONS SURVEYS

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSec	Annotation
180.50	1.14	157.68	180.49	-1.66	0.68	-1.79	MWD surveys
2960.50	1.14	219.65	2959.81	-0.86	-2.98	0.49	Tie in survey @ 2960.5 MD
21341.00	90.24	330.48	6431.07	14522.47	-6817.27	16042.98	Survey @ 21341.00 MD 6431.07 TVD
21400.00	90.24	330.48	6430.83	14573.81	-6846.34	16101.81	Survey proj. to 21400.00 MD 6430.83 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=1265+32.5 @ 1297.50usft (Nabors X14)

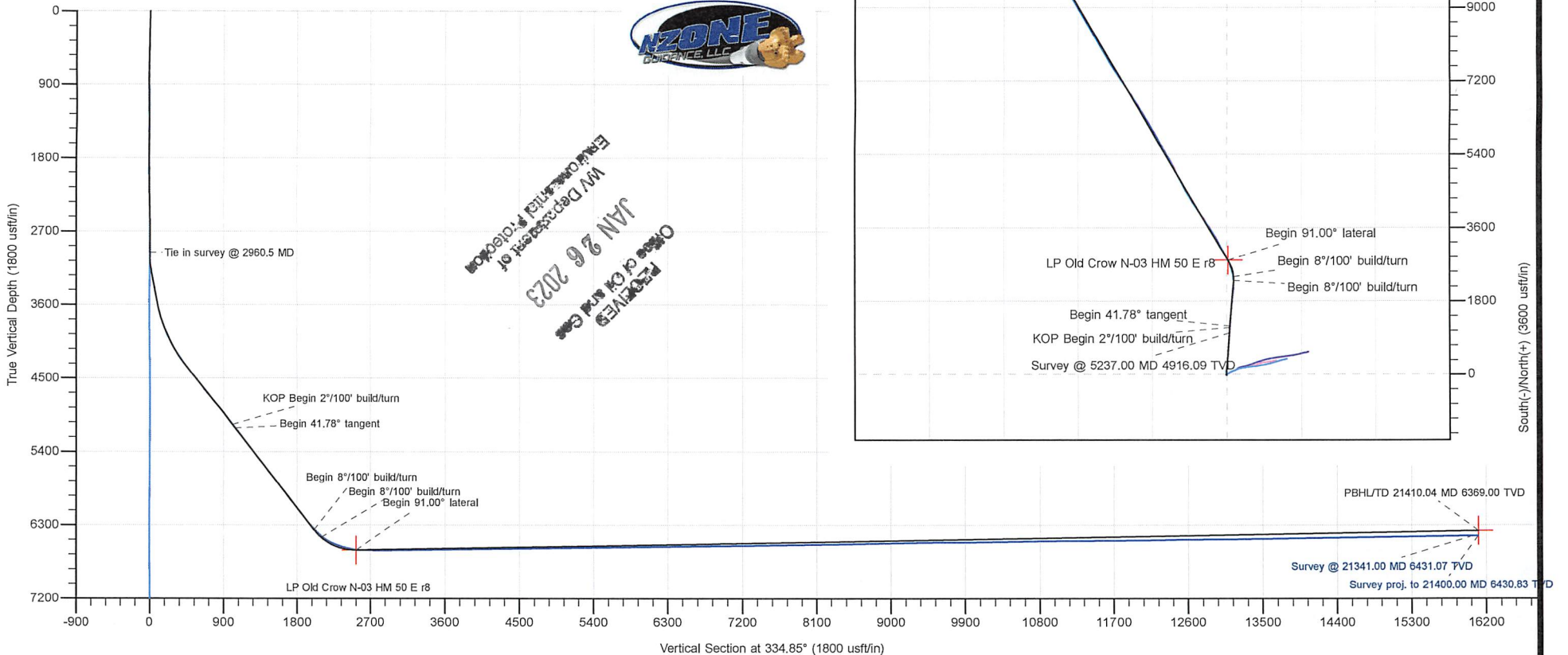
Northing	Easting	Latitude	Longitude
14446148.54	1707006.66	39.77845193	-80.76298617



Azimuths to Grid North
 True North: -0.15°
 Magnetic North: -8.78°

Magnetic Field
 Strength: 51681.2nT
 Dip Angle: 66.48°
 Date: 2/8/2022
 Model: IGRF2020

Total Corr (M->G): To convert a Magnetic Direction to a Grid Direction, Subtract 8.78°



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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Old Crow N-19 HU RD (3HM) (slot E)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1265+32.5 @ 1297.50usft (Nabors X14)
Site:	Old Crow Pad	MD Reference:	RKB=1265+32.5 @ 1297.50usft (Nabors X14)
Well:	Old Crow N-19 HU RD (3HM) (slot E)	North Reference:	Grid
Wellbore:	Sidetrack 03	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 03	Database:	DB_Feb1422LT

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	Old Crow Pad				
Site Position:		Northing:	14,446,179.89 usft	Latitude:	39.77853828
From:	Lat/Long	Easting:	1,706,970.33 usft	Longitude:	-80.76311519
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.15 °

Well	Old Crow N-19 HU RD (3HM) (slot E), Old Crow N-03 HM (N-19 HU RD slot E)					
Well Position	+N/-S	0.00 usft	Northing:	14,446,148.54 usft	Latitude:	39.77845193
	+E/-W	0.00 usft	Easting:	1,707,006.66 usft	Longitude:	-80.76298617
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	1,265.00 usft

Wellbore	Sidetrack 03				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	2/8/2022	-8.62	66.48	51,681.17636306

Design	Surveys Sidetrack 03				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	2,960.50
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00		334.85

Survey Program	Date	2/24/2022			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
180.50	970.50	MWD surf (Original Hole)	MWD	MWD - Standard	
970.50	2,811.50	MWD int (Original Hole)	MWD	MWD - Standard	
2,853.50	2,960.50	MWD (Original Hole)	MWD	MWD - Standard	
3,020.00	21,341.00	MWD ST3 (Sidetrack 03)	MWD	MWD - Standard	
21,400.00	21,400.00	Projection (Sidetrack 03)	MWD	MWD - Standard	

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	14,446,148.54	1,707,006.66	39.77845193	-80.76298617	
180.50	1.14	157.68	180.49	-1.66	0.68	14,446,146.88	1,707,007.34	39.77844736	-80.76298376	
MWD surveys										
211.50	1.23	156.98	211.48	-2.25	0.93	14,446,146.29	1,707,007.59	39.77844574	-80.76298288	
242.50	1.41	169.20	242.47	-2.93	1.13	14,446,145.61	1,707,007.79	39.77844387	-80.76298217	
272.50	1.01	170.16	272.47	-3.56	1.25	14,446,144.99	1,707,007.91	39.77844216	-80.76298177	
302.50	1.01	176.67	302.46	-4.08	1.31	14,446,144.46	1,707,007.97	39.77844071	-80.76298156	
331.50	1.01	170.25	331.46	-4.59	1.36	14,446,143.95	1,707,008.03	39.77843932	-80.76298136	



Survey Report - Geographic



Company: Tug Hill Operating LLC	Local Co-ordinate Reference: Well Old Crow N-19 HU RD (3HM) (slot E)
Project: Marshall County, West Virginia.	TVD Reference: RKB=1265+32.5 @ 1297.50usft (Nabors X14)
Site: Old Crow Pad	MD Reference: RKB=1265+32.5 @ 1297.50usft (Nabors X14)
Well: Old Crow N-19 HU RD (3HM) (slot E)	North Reference: Grid
Wellbore: Sidetrack 03	Survey Calculation Method: Minimum Curvature
Design: Surveys Sidetrack 03	Database: DB_Feb1422LT

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
361.50	0.83	175.09	361.45	-5.07	1.43	14,446,143.48	1,707,008.09	39.77843801	-80.76298114
391.50	0.88	170.34	391.45	-5.51	1.48	14,446,143.03	1,707,008.15	39.77843679	-80.76298094
421.50	0.75	162.69	421.45	-5.92	1.58	14,446,142.62	1,707,008.24	39.77843565	-80.76298060
452.50	0.75	168.41	452.44	-6.32	1.68	14,446,142.23	1,707,008.34	39.77843457	-80.76298024
482.50	0.88	183.61	482.44	-6.74	1.71	14,446,141.80	1,707,008.37	39.77843341	-80.76298016
512.50	1.01	175.35	512.44	-7.23	1.71	14,446,141.31	1,707,008.38	39.77843206	-80.76298014
542.50	1.05	187.74	542.43	-7.77	1.70	14,446,140.77	1,707,008.36	39.77843059	-80.76298020
571.50	0.97	186.60	571.43	-8.27	1.63	14,446,140.27	1,707,008.30	39.77842920	-80.76298043
601.50	1.05	196.97	601.42	-8.79	1.53	14,446,139.75	1,707,008.19	39.77842778	-80.76298082
630.50	1.05	183.79	630.42	-9.31	1.43	14,446,139.23	1,707,008.09	39.77842636	-80.76298117
661.50	1.01	175.70	661.41	-9.86	1.43	14,446,138.68	1,707,008.09	39.77842483	-80.76298117
691.50	1.14	197.50	691.41	-10.41	1.36	14,446,138.13	1,707,008.02	39.77842332	-80.76298142
721.50	1.10	185.90	721.40	-10.98	1.24	14,446,137.56	1,707,007.91	39.77842176	-80.76298185
751.50	1.14	195.21	751.40	-11.56	1.13	14,446,136.98	1,707,007.80	39.77842018	-80.76298224
781.50	1.19	201.54	781.39	-12.14	0.94	14,446,136.41	1,707,007.60	39.77841860	-80.76298293
812.50	1.36	208.66	812.38	-12.76	0.65	14,446,135.78	1,707,007.31	39.77841689	-80.76298399
844.50	1.19	202.95	844.38	-13.40	0.34	14,446,135.14	1,707,007.00	39.77841514	-80.76298510
875.50	1.27	195.56	875.37	-14.03	0.12	14,446,134.52	1,707,006.78	39.77841341	-80.76298588
907.50	1.41	200.05	907.36	-14.74	-0.11	14,446,133.81	1,707,006.55	39.77841146	-80.76298671
938.50	1.54	197.06	938.35	-15.49	-0.36	14,446,133.05	1,707,006.30	39.77840939	-80.76298762
970.50	1.45	206.46	970.34	-16.27	-0.67	14,446,132.28	1,707,005.99	39.77840726	-80.76298871
1,017.50	1.58	219.47	1,017.32	-17.30	-1.35	14,446,131.24	1,707,005.31	39.77840443	-80.76299113
1,065.50	1.36	232.92	1,065.31	-18.15	-2.22	14,446,130.39	1,707,004.44	39.77840209	-80.76299426
1,112.50	0.88	269.92	1,112.30	-18.49	-3.03	14,446,130.05	1,707,003.63	39.77840117	-80.76299713
1,159.50	0.97	312.90	1,159.29	-18.22	-3.68	14,446,130.32	1,707,002.98	39.77840192	-80.76299945
1,206.50	1.32	281.43	1,206.28	-17.84	-4.50	14,446,130.70	1,707,002.16	39.77840297	-80.76300023
1,252.50	1.27	296.64	1,252.27	-17.51	-5.48	14,446,131.03	1,707,001.18	39.77840389	-80.76300584
1,299.50	1.27	308.15	1,299.26	-16.95	-6.35	14,446,131.59	1,707,000.31	39.77840542	-80.76300895
1,346.50	1.41	320.37	1,346.25	-16.19	-7.13	14,446,132.36	1,706,999.53	39.77840753	-80.76301171
1,393.50	0.75	342.78	1,393.24	-15.45	-7.59	14,446,133.10	1,706,999.07	39.77840957	-80.76301334
1,440.50	0.88	351.31	1,440.23	-14.80	-7.74	14,446,133.75	1,706,998.92	39.77841135	-80.76301385
1,487.50	0.62	7.03	1,487.23	-14.19	-7.76	14,446,134.35	1,706,998.90	39.77841303	-80.76301393
1,535.50	0.48	23.91	1,535.23	-13.75	-7.65	14,446,134.80	1,706,999.01	39.77841424	-80.76301352
1,582.50	0.31	63.55	1,582.23	-13.51	-7.45	14,446,135.03	1,706,999.21	39.77841489	-80.76301283
1,630.50	0.18	349.90	1,630.23	-13.38	-7.35	14,446,135.17	1,706,999.31	39.77841525	-80.76301246
1,677.50	0.09	49.14	1,677.23	-13.28	-7.34	14,446,135.26	1,706,999.33	39.77841551	-80.76301241
1,723.50	0.31	356.67	1,723.23	-13.13	-7.32	14,446,135.41	1,706,999.35	39.77841592	-80.76301233
1,770.50	0.48	11.70	1,770.23	-12.81	-7.28	14,446,135.73	1,706,999.38	39.77841680	-80.76301222
1,821.50	1.14	5.90	1,821.22	-12.10	-7.19	14,446,136.44	1,706,999.47	39.77841876	-80.76301187
1,868.50	1.41	35.51	1,868.21	-11.16	-6.80	14,446,137.38	1,706,999.86	39.77842133	-80.76301049
1,914.50	2.02	57.14	1,914.19	-10.26	-5.79	14,446,138.28	1,707,000.87	39.77842379	-80.76300689
1,961.50	2.33	60.92	1,961.15	-9.35	-4.26	14,446,139.19	1,707,002.40	39.77842629	-80.76300143
2,009.50	1.63	75.59	2,009.13	-8.70	-2.75	14,446,139.84	1,707,003.91	39.77842805	-80.76299604
2,056.50	0.79	86.93	2,056.11	-8.52	-1.78	14,446,140.02	1,707,004.88	39.77842855	-80.76299258
2,104.50	0.09	81.13	2,104.11	-8.50	-1.41	14,446,140.04	1,707,005.25	39.77842861	-80.76299127
2,151.50	1.19	275.28	2,151.11	-8.45	-1.86	14,446,140.10	1,707,004.80	39.77842875	-80.76299287
2,198.50	1.67	292.86	2,198.10	-8.14	-2.98	14,446,140.41	1,707,003.68	39.77842961	-80.76299685
2,245.50	2.64	300.24	2,245.06	-7.32	-4.54	14,446,141.22	1,707,002.12	39.77843185	-80.76300241
2,294.50	2.94	305.69	2,294.00	-6.02	-6.54	14,446,142.52	1,707,000.12	39.77843544	-80.76300950
2,341.50	2.15	321.60	2,340.96	-4.63	-8.07	14,446,143.91	1,706,998.60	39.77843928	-80.76301492
2,388.50	1.10	334.34	2,387.94	-3.53	-8.81	14,446,145.01	1,706,997.85	39.77844230	-80.76301756
2,435.50	0.97	344.19	2,434.93	-2.74	-9.11	14,446,145.80	1,706,997.55	39.77844447	-80.76301863
2,482.50	0.75	5.19	2,481.93	-2.05	-9.19	14,446,146.49	1,706,997.47	39.77844636	-80.76301891
2,529.50	1.14	16.09	2,528.92	-1.30	-9.04	14,446,147.25	1,706,997.63	39.77844844	-80.76301834
2,576.50	1.23	57.66	2,575.91	-0.58	-8.48	14,446,147.96	1,706,998.18	39.77845041	-80.76301636



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Old Crow N-19 HU RD (3HM) (slot E)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1265+32.5 @ 1297.50usft (Nabors X14)
Site:	Old Crow Pad	MD Reference:	RKB=1265+32.5 @ 1297.50usft (Nabors X14)
Well:	Old Crow N-19 HU RD (3HM) (slot E)	North Reference:	Grid
Wellbore:	Sidetrack 03	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 03	Database:	DB_Feb1422LT

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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,623.50	1.27	56.26	2,622.90	-0.02	-7.62	14,446,148.52	1,706,999.04	39.77845194	-80.76301330
2,670.50	1.45	64.08	2,669.89	0.53	-6.65	14,446,149.07	1,707,000.01	39.77845344	-80.76300984
2,717.50	1.71	68.56	2,716.87	1.05	-5.47	14,446,149.59	1,707,001.20	39.77845485	-80.76300561
2,764.50	1.89	88.60	2,763.84	1.32	-4.04	14,446,149.86	1,707,002.62	39.77845559	-80.76300053
2,811.50	0.88	123.49	2,810.83	1.14	-2.96	14,446,149.68	1,707,003.70	39.77845509	-80.76299670
2,853.50	0.83	158.74	2,852.83	0.68	-2.58	14,446,149.22	1,707,004.08	39.77845382	-80.76299536
2,960.50	1.14	219.65	2,959.81	-0.86	-2.98	14,446,147.68	1,707,003.68	39.77844959	-80.76299679
Tie in survey @ 2960.5 MD									
3,020.00	0.69	252.78	3,019.31	-1.42	-3.70	14,446,147.12	1,707,002.96	39.77844805	-80.76299936
3,038.00	0.76	306.30	3,037.30	-1.38	-3.90	14,446,147.16	1,707,002.76	39.77844816	-80.76300007
3,069.00	2.63	354.19	3,068.29	-0.56	-4.14	14,446,147.99	1,707,002.52	39.77845044	-80.76300090
3,101.00	7.11	358.51	3,100.17	2.16	-4.26	14,446,150.70	1,707,002.40	39.77845788	-80.76300133
3,132.00	12.04	4.65	3,130.73	7.30	-4.05	14,446,155.84	1,707,002.61	39.77847201	-80.76300052
3,164.00	12.47	0.04	3,162.00	14.08	-3.78	14,446,162.62	1,707,002.88	39.77849063	-80.76299949
3,211.00	9.66	358.83	3,208.12	23.10	-3.86	14,446,171.64	1,707,002.81	39.77851540	-80.76299968
3,258.00	12.24	358.11	3,254.26	32.02	-4.10	14,446,180.57	1,707,002.56	39.77853991	-80.76300046
3,305.00	11.88	356.35	3,300.22	41.83	-4.57	14,446,190.37	1,707,002.09	39.77856685	-80.76300205
3,352.00	11.70	353.78	3,346.23	51.40	-5.40	14,446,199.94	1,707,001.27	39.77859312	-80.76300490
3,399.00	11.33	351.35	3,392.29	60.70	-6.61	14,446,209.24	1,707,000.05	39.77861867	-80.76300912
3,446.00	11.11	3.22	3,438.39	69.79	-7.05	14,446,218.33	1,706,999.61	39.77864363	-80.76301060
3,493.00	11.28	2.80	3,484.50	78.90	-6.57	14,446,227.44	1,707,000.09	39.77866865	-80.76300881
3,541.00	12.21	2.16	3,531.49	88.66	-6.15	14,446,237.20	1,707,000.51	39.77869546	-80.76300722
3,588.00	12.83	3.28	3,577.38	98.84	-5.66	14,446,247.38	1,707,001.00	39.77872340	-80.76300539
3,636.00	13.51	8.30	3,624.12	109.70	-4.55	14,446,258.25	1,707,002.11	39.77875324	-80.76300133
3,683.00	16.28	9.73	3,669.53	121.63	-2.64	14,446,270.17	1,707,004.02	39.77878599	-80.76299443
3,731.00	19.33	7.86	3,715.23	136.14	-0.42	14,446,284.68	1,707,006.24	39.77882580	-80.76298638
3,778.00	20.78	7.54	3,759.38	152.11	1.74	14,446,300.65	1,707,008.40	39.77886965	-80.76297854
3,824.00	21.70	6.15	3,802.25	168.65	3.72	14,446,317.20	1,707,010.38	39.77891507	-80.76297133
3,871.00	22.43	4.41	3,845.81	186.23	5.34	14,446,334.77	1,707,012.00	39.77896334	-80.76296540
3,919.00	23.92	2.95	3,889.94	205.08	6.55	14,446,353.62	1,707,013.21	39.77901510	-80.76296093
3,966.00	25.80	3.88	3,932.58	224.80	7.73	14,446,373.35	1,707,014.39	39.77906925	-80.76295654
4,013.00	27.37	4.28	3,974.61	245.78	9.23	14,446,394.33	1,707,015.89	39.77912686	-80.76295101
4,060.00	29.15	4.10	4,016.00	267.98	10.85	14,446,416.52	1,707,017.52	39.77918779	-80.76294502
4,108.00	30.93	6.10	4,057.56	291.91	13.00	14,446,440.45	1,707,019.66	39.77925349	-80.76293715
4,155.00	32.48	6.93	4,097.54	316.45	15.81	14,446,464.99	1,707,022.47	39.77932086	-80.76292693
4,203.00	33.26	7.00	4,137.86	342.30	18.97	14,446,490.85	1,707,025.63	39.77939186	-80.76291544
4,250.00	34.41	6.72	4,176.90	368.29	22.09	14,446,516.83	1,707,028.75	39.77946319	-80.76290407
4,297.00	36.13	5.59	4,215.27	395.27	24.99	14,446,543.81	1,707,031.66	39.77953726	-80.76289348
4,344.00	37.99	5.80	4,252.77	423.45	27.81	14,446,571.99	1,707,034.47	39.77961464	-80.76288321
4,391.00	39.55	5.25	4,289.42	452.74	30.64	14,446,601.29	1,707,037.30	39.77969507	-80.76287286
4,485.00	42.31	4.06	4,360.43	514.12	35.62	14,446,662.66	1,707,042.28	39.77986358	-80.76285455
4,579.00	41.93	3.03	4,430.15	577.04	39.52	14,446,725.58	1,707,046.18	39.78003635	-80.76284008
4,673.00	41.87	3.85	4,500.12	639.70	43.28	14,446,788.24	1,707,049.95	39.78020841	-80.76282608
4,767.00	41.86	6.93	4,570.13	702.14	49.17	14,446,850.68	1,707,055.84	39.78037985	-80.76280453
4,861.00	42.49	4.77	4,639.80	764.92	55.60	14,446,913.46	1,707,062.26	39.78055220	-80.76278107
4,955.00	42.85	3.36	4,708.91	828.46	60.11	14,446,977.01	1,707,066.77	39.78072668	-80.76276440
5,049.00	43.47	3.20	4,777.48	892.66	63.79	14,447,041.20	1,707,070.45	39.78090295	-80.76275070
5,143.00	42.83	1.69	4,846.06	956.88	66.54	14,447,105.42	1,707,073.20	39.78107931	-80.76274032
5,237.00	40.85	3.63	4,916.09	1,019.51	69.43	14,447,168.05	1,707,076.09	39.78125128	-80.76272944
5,341.00	42.02	4.58	4,994.06	1,088.15	74.36	14,447,236.70	1,707,081.02	39.78143976	-80.76271124
5,436.00	40.84	3.61	5,065.29	1,150.85	78.86	14,447,299.39	1,707,085.52	39.78161191	-80.76269465
5,530.00	40.70	3.09	5,136.48	1,212.13	82.44	14,447,360.67	1,707,089.11	39.78178018	-80.76268130
5,624.00	41.49	3.70	5,207.32	1,273.81	86.10	14,447,422.35	1,707,092.77	39.78194953	-80.76266769
5,717.00	42.11	4.23	5,276.65	1,335.65	90.39	14,447,484.19	1,707,097.05	39.78211933	-80.76265184
5,811.00	41.14	6.25	5,346.91	1,397.82	96.08	14,447,546.36	1,707,102.75	39.78229003	-80.76263099



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Old Crow N-19 HU RD (3HM) (slot E)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1265+32.5 @ 1297.50usft (Nabors X14)
Site:	Old Crow Pad	MD Reference:	RKB=1265+32.5 @ 1297.50usft (Nabors X14)
Well:	Old Crow N-19 HU RD (3HM) (slot E)	North Reference:	Grid
Wellbore:	Sidetrack 03	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 03	Database:	DB_Feb1422LT

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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,905.00	41.32	6.34	5,417.61	1,459.40	102.88	14,447,607.94	1,707,109.54	39.78245909	-80.76260623
5,999.00	42.11	5.11	5,487.78	1,521.63	109.11	14,447,670.18	1,707,115.77	39.78262996	-80.76258346
6,093.00	41.85	4.05	5,557.66	1,584.31	114.13	14,447,732.85	1,707,120.80	39.78280204	-80.76256499
6,187.00	41.63	2.91	5,627.80	1,646.77	117.93	14,447,795.31	1,707,124.59	39.78297355	-80.76255087
6,282.00	41.93	4.49	5,698.64	1,709.93	122.02	14,447,858.47	1,707,128.68	39.78314697	-80.76253573
6,374.00	41.85	6.43	5,767.13	1,771.07	127.86	14,447,919.61	1,707,134.53	39.78331485	-80.76251435
6,468.00	42.37	6.95	5,836.87	1,833.67	135.21	14,447,982.22	1,707,141.87	39.78348672	-80.76248762
6,562.00	41.05	5.46	5,907.04	1,895.85	141.98	14,448,044.39	1,707,148.64	39.78365741	-80.76246293
6,657.00	41.71	4.67	5,978.32	1,958.40	147.52	14,448,106.94	1,707,154.18	39.78382916	-80.76244262
6,751.00	42.42	6.25	6,048.11	2,021.09	153.52	14,448,169.63	1,707,160.18	39.78400127	-80.76242068
6,845.00	42.86	5.11	6,117.26	2,084.45	159.82	14,448,232.99	1,707,166.48	39.78417523	-80.76239766
6,939.00	41.49	3.70	6,186.92	2,147.36	164.67	14,448,295.91	1,707,171.34	39.78434798	-80.76237977
7,034.00	41.49	3.88	6,258.08	2,210.16	168.83	14,448,358.71	1,707,175.50	39.78452042	-80.76236437
7,128.00	42.02	1.94	6,328.21	2,272.68	172.01	14,448,421.22	1,707,178.67	39.78469207	-80.76235249
7,175.00	44.79	358.16	6,362.36	2,304.96	172.01	14,448,453.50	1,707,178.67	39.78478072	-80.76235218
7,222.00	47.47	356.41	6,394.93	2,338.80	170.39	14,448,487.34	1,707,177.05	39.78487366	-80.76235761
7,269.00	50.37	354.21	6,425.81	2,374.10	167.48	14,448,522.64	1,707,174.14	39.78497063	-80.76236764
7,315.00	54.15	351.75	6,453.96	2,410.19	163.01	14,448,558.73	1,707,169.68	39.78506977	-80.76238319
7,362.00	58.15	349.29	6,480.14	2,448.67	156.57	14,448,597.21	1,707,163.23	39.78517551	-80.76240577
7,410.00	62.68	346.74	6,503.84	2,489.48	147.88	14,448,638.02	1,707,154.55	39.78528765	-80.76243630
7,457.00	66.15	343.66	6,524.13	2,530.45	137.04	14,448,678.99	1,707,143.70	39.78540024	-80.76247451
7,504.00	68.88	341.38	6,542.11	2,571.86	123.99	14,448,720.40	1,707,130.65	39.78551407	-80.76252057
7,551.00	71.25	339.53	6,558.13	2,613.49	109.21	14,448,762.03	1,707,115.87	39.78562850	-80.76257281
7,598.00	73.49	338.39	6,572.37	2,655.29	93.12	14,448,803.84	1,707,099.79	39.78574342	-80.76262966
7,645.00	75.38	337.25	6,584.98	2,697.22	76.03	14,448,845.76	1,707,082.69	39.78585867	-80.76269011
7,692.00	78.90	335.58	6,595.44	2,739.20	57.70	14,448,887.74	1,707,064.36	39.78597411	-80.76275498
7,739.00	82.64	333.99	6,602.98	2,781.16	37.93	14,448,929.70	1,707,044.60	39.78608948	-80.76282493
7,786.00	84.84	333.47	6,608.10	2,823.05	17.26	14,448,971.59	1,707,023.92	39.78620468	-80.76289814
7,833.00	89.01	332.15	6,610.62	2,864.79	-4.18	14,449,013.33	1,707,002.48	39.78631945	-80.76297407
7,880.00	90.37	331.36	6,610.88	2,906.19	-26.42	14,449,054.73	1,706,980.24	39.78643332	-80.76305285
7,974.00	89.89	331.53	6,610.66	2,988.76	-71.36	14,449,137.30	1,706,935.31	39.78666039	-80.76321202
7,997.00	90.02	331.71	6,610.68	3,008.99	-82.29	14,449,157.53	1,706,924.37	39.78671604	-80.76325074
8,091.00	89.89	331.36	6,610.76	3,091.63	-127.09	14,449,240.17	1,706,879.57	39.78694331	-80.76340945
8,184.00	89.63	330.83	6,611.15	3,173.04	-172.04	14,449,321.58	1,706,834.62	39.78716722	-80.76356870
8,278.00	90.24	330.48	6,611.25	3,254.98	-218.11	14,449,403.52	1,706,788.55	39.78739257	-80.76373191
8,372.00	90.81	330.57	6,610.39	3,336.81	-264.36	14,449,485.35	1,706,742.30	39.78761764	-80.76389578
8,466.00	90.81	329.95	6,609.06	3,418.42	-310.98	14,449,566.96	1,706,695.68	39.78784210	-80.76406099
8,561.00	91.30	329.16	6,607.31	3,500.30	-359.11	14,449,648.85	1,706,647.55	39.78806733	-80.76423155
8,655.00	91.38	328.46	6,605.11	3,580.69	-407.78	14,449,729.24	1,706,598.88	39.78828845	-80.76440404
8,749.00	91.12	327.93	6,603.06	3,660.56	-457.31	14,449,809.10	1,706,549.35	39.78850814	-80.76457960
8,843.00	90.73	326.87	6,601.55	3,739.74	-507.95	14,449,888.28	1,706,498.72	39.78872596	-80.76475912
8,938.00	90.37	326.79	6,600.63	3,819.26	-559.92	14,449,967.80	1,706,446.74	39.78894470	-80.76494339
9,033.00	90.29	326.70	6,600.09	3,898.70	-612.01	14,450,047.24	1,706,394.65	39.78916325	-80.76512810
9,127.00	90.33	327.40	6,599.58	3,977.58	-663.14	14,450,126.12	1,706,343.52	39.78938024	-80.76530936
9,222.00	90.81	327.75	6,598.63	4,057.76	-714.08	14,450,206.30	1,706,292.59	39.78960081	-80.76548994
9,316.00	90.99	328.63	6,597.16	4,137.63	-763.62	14,450,286.17	1,706,243.04	39.78982051	-80.76566555
9,411.00	90.55	328.90	6,595.88	4,218.85	-812.88	14,450,367.39	1,706,193.79	39.79004392	-80.76584014
9,505.00	90.64	329.60	6,594.90	4,299.63	-860.93	14,450,448.17	1,706,145.73	39.79026611	-80.76601048
9,599.00	91.21	329.60	6,593.39	4,380.70	-908.49	14,450,529.24	1,706,098.17	39.79048908	-80.76617903
9,691.00	91.47	329.51	6,591.24	4,459.99	-955.10	14,450,608.53	1,706,051.56	39.79070717	-80.76634420
9,785.00	91.38	331.53	6,588.90	4,541.79	-1,001.34	14,450,690.33	1,706,005.32	39.79093215	-80.76650806
9,878.00	90.42	330.74	6,587.44	4,623.22	-1,046.23	14,450,771.77	1,705,960.43	39.79115611	-80.76666711
9,973.00	90.64	331.71	6,586.56	4,706.49	-1,091.96	14,450,855.03	1,705,914.70	39.79138510	-80.76682912
10,067.00	91.03	333.38	6,585.19	4,789.89	-1,135.29	14,450,938.43	1,705,871.37	39.79161446	-80.76698261
10,161.00	90.46	332.41	6,583.97	4,873.56	-1,178.12	14,451,022.10	1,705,828.55	39.79184454	-80.76713429

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Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1265+32.5 @ 1297.50usft (Nabors X14)
Site:	Old Crow Pad	MD Reference:	RKB=1265+32.5 @ 1297.50usft (Nabors X14)
Well:	Old Crow N-19 HU RD (3HM) (slot E)	North Reference:	Grid
Wellbore:	Sidetrack 03	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 03	Database:	DB_Feb1422LT

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,255.00	89.71	332.41	6,583.83	4,956.87	-1,221.65	14,451,105.41	1,705,785.01	39.79207386	-80.76728850
10,350.00	89.71	331.27	6,584.31	5,040.62	-1,266.48	14,451,189.16	1,705,740.18	39.79230397	-80.76744733
10,444.00	90.73	331.09	6,583.95	5,122.98	-1,311.80	14,451,271.52	1,705,694.87	39.79253046	-80.76760788
10,539.00	91.47	332.59	6,582.12	5,206.71	-1,356.62	14,451,355.25	1,705,650.04	39.79276074	-80.76776668
10,632.00	91.52	332.24	6,579.70	5,289.11	-1,399.67	14,451,437.65	1,705,606.99	39.79298734	-80.76791918
10,726.00	91.12	330.48	6,577.53	5,371.59	-1,444.71	14,451,520.13	1,705,561.95	39.79321416	-80.76807877
10,820.00	91.03	330.48	6,575.77	5,453.37	-1,491.02	14,451,601.91	1,705,515.64	39.79343908	-80.76824287
10,913.00	90.42	329.42	6,574.59	5,533.86	-1,537.58	14,451,682.40	1,705,469.08	39.79366047	-80.76840791
11,007.00	90.46	331.01	6,573.87	5,615.44	-1,584.28	14,451,763.98	1,705,422.39	39.79388483	-80.76857338
11,100.00	90.73	331.62	6,572.90	5,697.02	-1,628.91	14,451,845.56	1,705,377.75	39.79410919	-80.76873154
11,195.00	90.59	331.71	6,571.81	5,780.63	-1,674.00	14,451,929.17	1,705,332.66	39.79433913	-80.76889128
11,289.00	90.37	329.51	6,571.02	5,862.53	-1,720.13	14,452,011.07	1,705,286.54	39.79456437	-80.76905475
11,383.00	90.55	329.16	6,570.27	5,943.38	-1,768.07	14,452,091.92	1,705,238.60	39.79478675	-80.76922467
11,477.00	91.52	328.90	6,568.57	6,023.96	-1,816.43	14,452,172.50	1,705,190.23	39.79500840	-80.76939611
11,571.00	91.08	328.72	6,566.44	6,104.35	-1,865.10	14,452,252.90	1,705,141.57	39.79522952	-80.76956864
11,665.00	90.20	328.28	6,565.39	6,184.50	-1,914.21	14,452,333.04	1,705,092.45	39.79544996	-80.76974275
11,759.00	90.15	328.54	6,565.10	6,264.57	-1,963.45	14,452,413.11	1,705,043.21	39.79567020	-80.76991732
11,854.00	90.64	328.54	6,564.44	6,345.60	-2,013.03	14,452,494.14	1,704,993.63	39.79589309	-80.77009309
11,948.00	90.86	328.02	6,563.21	6,425.55	-2,062.45	14,452,574.09	1,704,944.22	39.79611301	-80.77026829
12,041.00	90.46	327.84	6,562.14	6,504.36	-2,111.82	14,452,652.90	1,704,894.84	39.79632977	-80.77044336
12,135.00	90.86	329.60	6,561.06	6,584.68	-2,160.82	14,452,733.22	1,704,846.04	39.79655071	-80.77061637
12,230.00	91.08	329.60	6,559.45	6,666.61	-2,208.69	14,452,815.15	1,704,797.97	39.79677605	-80.77078675
12,324.00	91.78	328.10	6,557.10	6,747.03	-2,257.30	14,452,895.57	1,704,749.37	39.79699724	-80.77095907
12,418.00	90.99	328.46	6,554.83	6,826.96	-2,306.70	14,452,975.51	1,704,699.96	39.79721711	-80.77113424
12,513.00	90.37	327.31	6,553.71	6,907.42	-2,357.20	14,453,055.96	1,704,649.46	39.79743842	-80.77131330
12,606.00	90.73	327.93	6,552.81	6,985.96	-2,407.00	14,453,134.50	1,704,599.66	39.79765445	-80.77148990
12,700.00	90.86	327.05	6,551.51	7,065.22	-2,457.52	14,453,213.76	1,704,549.14	39.79787247	-80.77166902
12,795.00	90.42	326.61	6,550.45	7,144.73	-2,509.49	14,453,293.27	1,704,497.17	39.79809121	-80.77185334
12,889.00	90.55	327.14	6,549.65	7,223.45	-2,560.86	14,453,371.99	1,704,445.80	39.79830775	-80.77203550
12,983.00	90.55	327.75	6,548.75	7,302.68	-2,611.44	14,453,451.22	1,704,395.22	39.79852568	-80.77221486
13,077.00	90.77	327.93	6,547.67	7,382.25	-2,661.47	14,453,530.79	1,704,345.19	39.79874456	-80.77239227
13,171.00	90.73	327.23	6,546.44	7,461.59	-2,711.86	14,453,610.13	1,704,294.80	39.79896280	-80.77257096
13,265.00	90.77	328.28	6,545.21	7,541.09	-2,762.01	14,453,689.63	1,704,244.65	39.79918147	-80.77274878
13,360.00	90.42	329.77	6,544.22	7,622.53	-2,810.90	14,453,771.07	1,704,195.77	39.79940548	-80.77292211
13,454.00	90.20	330.04	6,543.71	7,703.86	-2,858.03	14,453,852.40	1,704,148.63	39.79962915	-80.77308919
13,548.00	91.16	330.92	6,542.59	7,785.65	-2,904.34	14,453,934.19	1,704,102.32	39.79985409	-80.77325334
13,642.00	90.81	330.57	6,540.98	7,867.65	-2,950.27	14,454,016.19	1,704,056.39	39.80007960	-80.77341613
13,736.00	91.34	330.65	6,539.22	7,949.53	-2,996.40	14,454,098.08	1,704,010.27	39.80030480	-80.77357961
13,830.00	92.40	331.09	6,536.15	8,031.60	-3,042.13	14,454,180.14	1,703,964.53	39.80053050	-80.77374170
13,925.00	91.78	329.86	6,532.68	8,114.21	-3,088.91	14,454,262.75	1,703,917.75	39.80075768	-80.77390753
14,020.00	90.77	329.86	6,530.57	8,196.34	-3,136.60	14,454,344.88	1,703,870.06	39.80098357	-80.77407658
14,113.00	91.12	330.48	6,529.04	8,277.01	-3,182.86	14,454,425.55	1,703,823.81	39.80120543	-80.77424054
14,208.00	90.37	329.34	6,527.80	8,359.20	-3,230.48	14,454,507.74	1,703,776.18	39.80143147	-80.77440937
14,302.00	90.55	329.69	6,527.05	8,440.20	-3,278.17	14,454,588.74	1,703,728.50	39.80165425	-80.77457842
14,395.00	91.69	329.34	6,525.23	8,520.33	-3,325.34	14,454,668.87	1,703,681.33	39.80187463	-80.77474565
14,489.00	91.03	328.37	6,523.00	8,600.75	-3,373.94	14,454,749.29	1,703,632.72	39.80209584	-80.77491798
14,583.00	91.21	327.67	6,521.16	8,680.47	-3,423.71	14,454,829.01	1,703,582.95	39.80231511	-80.77509449
14,678.00	90.86	329.60	6,519.44	8,761.57	-3,473.15	14,454,910.11	1,703,533.51	39.80253817	-80.77526978
14,773.00	90.59	330.30	6,518.24	8,843.79	-3,520.72	14,454,992.34	1,703,485.94	39.80276431	-80.77543842
14,867.00	90.90	330.74	6,517.02	8,925.62	-3,566.97	14,455,074.16	1,703,439.69	39.80298933	-80.77560238
14,962.00	89.71	329.86	6,516.51	9,008.13	-3,614.04	14,455,156.68	1,703,392.62	39.80321627	-80.77576922
15,056.00	89.93	330.30	6,516.81	9,089.61	-3,660.93	14,455,238.15	1,703,345.74	39.80344033	-80.77593544
15,150.00	90.68	330.83	6,516.31	9,171.47	-3,707.12	14,455,320.01	1,703,299.54	39.80366547	-80.77609919
15,244.00	91.03	330.57	6,514.91	9,253.43	-3,753.12	14,455,401.98	1,703,253.55	39.80389089	-80.77626223
15,338.00	90.73	330.83	6,513.46	9,335.40	-3,799.11	14,455,483.94	1,703,207.55	39.80411630	-80.77642528

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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Old Crow N-19 HU RD (3HM) (slot E)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1265+32.5 @ 1297.50usft (Nabors X14)
Site:	Old Crow Pad	MD Reference:	RKB=1265+32.5 @ 1297.50usft (Nabors X14)
Well:	Old Crow N-19 HU RD (3HM) (slot E)	North Reference:	Grid
Wellbore:	Sidetrack 03	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 03	Database:	DB_Feb1422LT

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
15,432.00	91.08	330.57	6,511.98	9,417.36	-3,845.11	14,455,565.90	1,703,161.55	39.80494171	-80.77658832
15,526.00	90.59	329.77	6,510.61	9,498.90	-3,891.86	14,455,647.44	1,703,114.80	39.80456395	-80.77675407
15,621.00	90.55	329.95	6,509.66	9,581.05	-3,939.56	14,455,729.59	1,703,067.10	39.80479189	-80.77692317
15,715.00	90.99	329.69	6,508.40	9,662.30	-3,986.81	14,455,810.84	1,703,019.85	39.80501535	-80.77709070
15,809.00	91.56	330.21	6,506.31	9,743.65	-4,033.87	14,455,892.19	1,702,972.79	39.80523906	-80.77725754
15,903.00	91.60	330.13	6,503.72	9,825.16	-4,080.61	14,455,973.70	1,702,926.05	39.80546324	-80.77742324
15,998.00	91.43	331.18	6,501.20	9,907.94	-4,127.15	14,456,056.48	1,702,879.51	39.80569089	-80.77758822
16,091.00	90.86	331.88	6,499.35	9,989.68	-4,171.47	14,456,138.22	1,702,835.19	39.80591567	-80.77774532
16,185.00	90.81	331.97	6,497.98	10,072.61	-4,215.71	14,456,221.15	1,702,790.95	39.80614372	-80.77790209
16,280.00	90.24	330.65	6,497.11	10,155.94	-4,261.31	14,456,304.48	1,702,745.35	39.80637288	-80.77806374
16,374.00	90.46	332.24	6,496.53	10,238.50	-4,306.24	14,456,387.04	1,702,700.42	39.80659992	-80.77822299
16,468.00	89.54	332.32	6,496.53	10,321.71	-4,349.97	14,456,470.25	1,702,656.70	39.80682873	-80.77837794
16,562.00	89.98	331.80	6,496.92	10,404.75	-4,394.01	14,456,553.29	1,702,612.65	39.80705709	-80.77853404
16,657.00	91.25	331.88	6,495.90	10,488.50	-4,438.84	14,456,637.04	1,702,567.82	39.80728739	-80.77869293
16,751.00	91.08	329.77	6,493.99	10,570.55	-4,484.65	14,456,719.10	1,702,522.01	39.80751304	-80.77885533
16,845.00	90.73	330.13	6,492.51	10,651.91	-4,531.71	14,456,800.45	1,702,474.95	39.80773678	-80.77902220
16,939.00	89.71	328.63	6,492.15	10,732.80	-4,579.59	14,456,881.34	1,702,427.07	39.80795925	-80.77919197
17,032.00	89.93	328.28	6,492.44	10,812.05	-4,628.24	14,456,960.60	1,702,378.42	39.80817724	-80.77936452
17,127.00	90.29	328.63	6,492.26	10,893.02	-4,677.95	14,457,041.56	1,702,328.72	39.80839992	-80.77954078
17,221.00	90.29	327.49	6,491.78	10,972.78	-4,727.67	14,457,121.32	1,702,278.99	39.80861931	-80.77971715
17,315.00	90.73	328.02	6,490.95	11,052.28	-4,777.82	14,457,200.82	1,702,228.84	39.80883798	-80.77989504
17,408.00	91.12	327.84	6,489.44	11,131.08	-4,827.20	14,457,279.62	1,702,179.47	39.80905471	-80.78007015
17,502.00	91.25	328.54	6,487.50	11,210.94	-4,876.73	14,457,359.48	1,702,129.93	39.80927437	-80.78024585
17,596.00	90.81	329.16	6,485.81	11,291.38	-4,925.35	14,457,439.92	1,702,081.31	39.80949559	-80.78041826
17,690.00	91.25	329.77	6,484.12	11,372.33	-4,973.10	14,457,520.87	1,702,033.56	39.80971822	-80.78058759
17,785.00	90.59	330.74	6,482.59	11,454.80	-5,020.22	14,457,603.34	1,701,986.44	39.80994502	-80.78075468
17,879.00	90.59	330.13	6,481.63	11,536.55	-5,066.60	14,457,685.10	1,701,940.06	39.81016986	-80.78091911
17,973.00	90.99	329.34	6,480.33	11,617.73	-5,113.97	14,457,766.28	1,701,892.69	39.81039312	-80.78108709
18,066.00	90.20	328.54	6,479.37	11,697.39	-5,161.95	14,457,845.94	1,701,844.71	39.81061221	-80.78125725
18,159.00	90.11	329.60	6,479.11	11,777.17	-5,209.75	14,457,925.71	1,701,796.91	39.81083161	-80.78142677
18,253.00	91.16	330.30	6,478.07	11,858.53	-5,256.82	14,458,007.07	1,701,749.84	39.81105536	-80.78159366
18,346.00	90.51	330.83	6,476.72	11,939.51	-5,302.52	14,458,088.05	1,701,704.14	39.81127807	-80.78175569
18,440.00	90.73	330.39	6,475.70	12,021.41	-5,348.65	14,458,169.95	1,701,658.02	39.81150329	-80.78191924
18,534.00	89.32	329.60	6,475.66	12,102.81	-5,395.65	14,458,251.35	1,701,611.01	39.81172715	-80.78208592
18,628.00	90.15	329.86	6,476.09	12,183.99	-5,443.03	14,458,332.53	1,701,563.63	39.81195042	-80.78225394
18,722.00	92.57	329.25	6,473.86	12,265.00	-5,490.20	14,458,413.54	1,701,516.02	39.81217321	-80.78242279
18,814.00	91.78	328.46	6,470.37	12,343.68	-5,538.65	14,458,492.22	1,701,468.47	39.81238961	-80.78259143
18,908.00	91.08	329.60	6,468.02	12,424.25	-5,586.55	14,458,572.80	1,701,420.11	39.81261120	-80.78276293
19,002.00	90.15	329.34	6,467.02	12,505.22	-5,634.30	14,458,653.76	1,701,372.36	39.81283386	-80.78293226
19,095.00	90.77	329.42	6,466.27	12,585.25	-5,681.66	14,458,733.79	1,701,325.00	39.81305396	-80.78310024
19,189.00	90.95	329.16	6,464.86	12,666.05	-5,729.66	14,458,814.60	1,701,277.00	39.81327620	-80.78327048
19,283.00	91.38	329.07	6,462.95	12,746.71	-5,777.91	14,458,895.25	1,701,228.76	39.81349802	-80.78344157
19,378.00	90.73	329.07	6,461.20	12,828.18	-5,826.73	14,458,976.73	1,701,179.94	39.81372210	-80.78361473
19,472.00	91.38	329.51	6,459.47	12,908.99	-5,874.72	14,459,057.53	1,701,131.94	39.81394432	-80.78378495
19,566.00	90.29	328.72	6,458.10	12,989.65	-5,922.97	14,459,138.19	1,701,083.69	39.81416616	-80.78395607
19,660.00	90.55	330.30	6,457.41	13,070.65	-5,970.66	14,459,219.19	1,701,036.00	39.81438891	-80.78412521
19,755.00	90.95	329.16	6,456.16	13,152.68	-6,018.54	14,459,301.23	1,700,988.12	39.81461453	-80.78429502
19,849.00	90.02	328.37	6,455.37	13,233.05	-6,067.28	14,459,381.60	1,700,939.38	39.81483557	-80.78446790
19,942.00	90.33	329.51	6,455.08	13,312.72	-6,115.26	14,459,461.26	1,700,891.40	39.81505467	-80.78463809
20,036.00	91.30	330.30	6,453.75	13,394.04	-6,162.39	14,459,542.58	1,700,844.27	39.81527830	-80.78480522
20,130.00	91.30	330.21	6,451.62	13,475.63	-6,209.02	14,459,624.17	1,700,797.64	39.81550269	-80.78497057
20,224.00	91.87	329.42	6,449.02	13,556.85	-6,256.26	14,459,705.40	1,700,750.40	39.81572606	-80.78513812
20,318.00	91.38	329.60	6,446.35	13,637.82	-6,303.94	14,459,786.36	1,700,702.72	39.81594873	-80.78530721
20,412.00	90.15	329.69	6,445.09	13,718.93	-6,351.44	14,459,867.47	1,700,655.23	39.81617178	-80.78547566
20,506.00	90.68	329.77	6,444.41	13,800.11	-6,398.82	14,459,948.65	1,700,607.84	39.81639504	-80.78564371

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Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Old Crow N-19 HU RD (3HM) (slot E)
Project:	Marshall County, West Virginia.	TVD Reference:	RKB=1265+32.5 @ 1297.50usft (Nabors X14)
Site:	Old Crow Pad	MD Reference:	RKB=1265+32.5 @ 1297.50usft (Nabors X14)
Well:	Old Crow N-19 HU RD (3HM) (slot E)	North Reference:	Grid
Wellbore:	Sidetrack 03	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Sidetrack 03	Database:	DB_Feb1422LT

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
20,601.00	91.56	330.39	6,442.56	13,882.43	-6,446.19	14,460,030.97	1,700,560.47	39.81662143	-80.78581172
20,695.00	90.11	328.28	6,441.19	13,963.27	-6,494.13	14,460,111.81	1,700,512.54	39.81684375	-80.78598173
20,789.00	90.64	328.81	6,440.57	14,043.45	-6,543.18	14,460,192.00	1,700,463.49	39.81706428	-80.78615573
20,883.00	91.34	330.04	6,438.95	14,124.37	-6,590.98	14,460,272.91	1,700,415.68	39.81728681	-80.78632530
20,978.00	90.95	331.09	6,437.05	14,207.09	-6,637.66	14,460,355.63	1,700,369.00	39.81751428	-80.78649082
21,072.00	90.90	330.48	6,435.53	14,289.12	-6,683.53	14,460,437.66	1,700,323.13	39.81773986	-80.78665349
21,167.00	91.56	330.04	6,433.49	14,371.59	-6,730.65	14,460,520.13	1,700,276.01	39.81796665	-80.78682059
21,261.00	90.64	330.04	6,431.69	14,453.01	-6,777.58	14,460,601.55	1,700,229.08	39.81819057	-80.78698704
21,341.00	90.24	330.48	6,431.07	14,522.47	-6,817.27	14,460,671.01	1,700,189.40	39.81838158	-80.78712778
Survey @ 21341.00 MD 6431.07 TVD									
21,400.00	90.24	330.48	6,430.83	14,573.81	-6,846.34	14,460,722.36	1,700,160.33	39.81852277	-80.78723088
Survey proj. to 21400.00 MD 6430.83 TVD									

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
180.50	180.49	-1.66	0.68	MWD surveys	
2,960.50	2,959.81	-0.86	-2.98	Tie in survey @ 2960.5 MD	
21,341.00	6,431.07	14,522.47	-6,817.27	Survey @ 21341.00 MD 6431.07 TVD	
21,400.00	6,430.83	14,573.81	-6,846.34	Survey proj. to 21400.00 MD 6430.83 TVD	