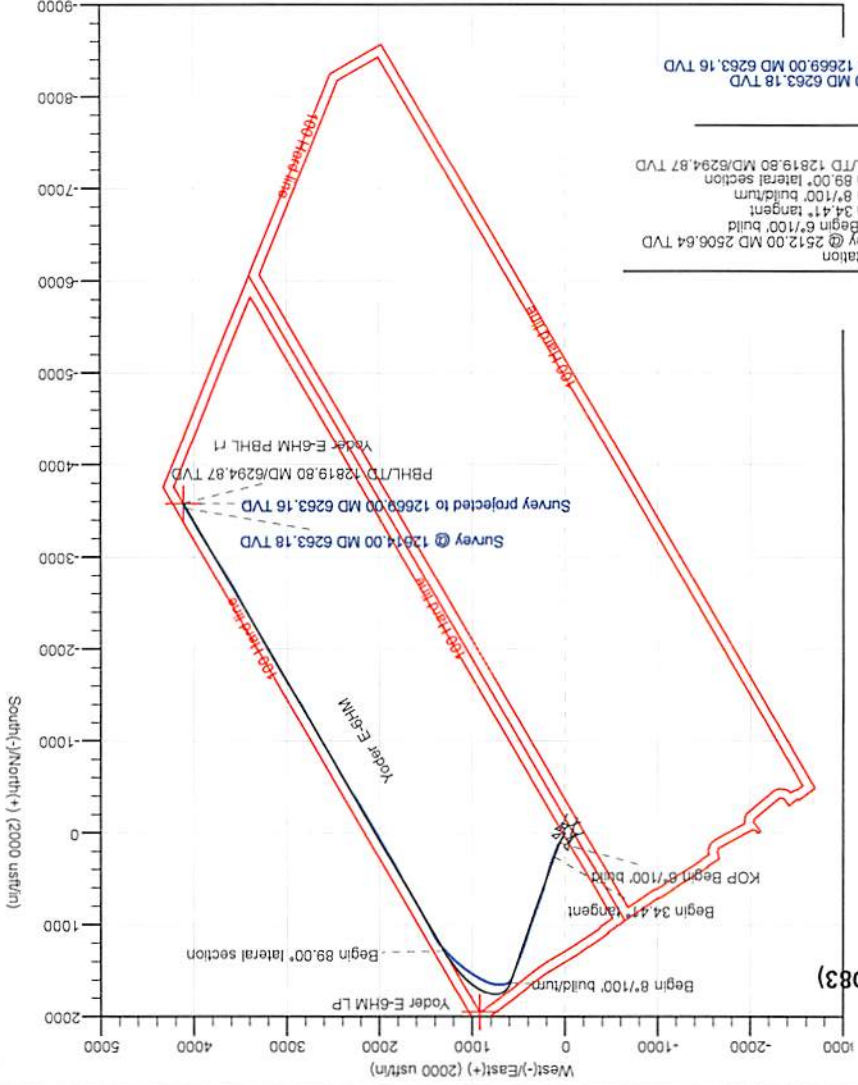
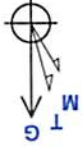




Azimuths to Grid North
 True North: -0.10°
 Magnetic North: -8.88°
 Magnetic Field
 Strength: 52257.45nT
 Dip Angle: 67.02°
 Date: 11/6/2016
 Model: IGRF2015



Tug Hill Operating LLC
 Well: Yoder E-6HM
 Site: Yoder
 Project: Wetzel County, West Virginia (UTM17 NAD83)
 Design: rev2

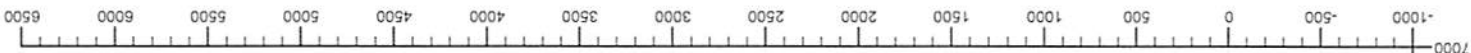


Surface Location: RKB=1083+26 @ 1109.00usft (Nabors B 28)
 NAD83 West Virginia - HARN
 Universal Transverse Mercator (US Survey Feet)
 Zone 17N (64 W to 78 W)
 Easting 14446833.91
 Northing 1685376.86
 Longitude -80.83956845
 To convert a Magnetic Direction to a Grid Direction, Subtract 8.88°

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/S	+E/W	Diag	Vsect	Annotation
1	2512.00	2.20	43.98	2506.64	101.92	55.88	0.00	-24.73	Survey @ 2512.00 MD 2506.64 TVD
2	2705.51	2.20	43.98	2700.00	107.27	61.04	0.00	-24.35	KOP Begin 87'100' build
3	3245.93	34.41	19.05	3208.54	263.25	119.64	6.00	-82.51	Begin 34.41' tangent
4	5809.28	34.41	19.05	5321.37	1632.49	592.35	0.00	-624.50	Begin 87'100' buildum
5	7194.80	89.00	149.98	6196.70	1268.00	1303.68	8.00	126.08	Begin 89.00' lateral section
6	12819.80	89.00	149.98	8294.87	-3581.67	4117.46	0.00	5457.27	PBHL/TD 12819.80 MD/6294.87 TVD
Yoder E-6HM LP									Yoder E-6HM PBHL 11

Vertical Section at 131.02° (1000 usft/m)



True Vertical Depth (1000 usft/m)

SEP 11 2018



Survey Report

WV Department of
Environmental Protection

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Yoder E-6HM
Project:	Wetzel County, West Virginia (UTM17 NAD83)	TVD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Site:	Yoder	MD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Well:	Yoder E-6HM	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Project	Wetzel County, West Virginia (UTM17 NAD83)		
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	Yoder				
Site Position:		Northing:	14,446,864.35 usft	Latitude:	39.78054955
From:	Lat/Long	Easting:	1,685,354.97 usft	Longitude:	-80.84004615
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.10 °

Well	Yoder E-6HM					
Well Position	+N/-S	0.00 usft	Northing:	14,446,833.91 usft	Latitude:	39.78046584
	+E/-W	0.00 usft	Easting:	1,685,376.85 usft	Longitude:	-80.83996845
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	1,083.00 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	11/6/2016	-8.57	67.02	52,257.35999988

Design	Surveys Original Hole				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:		Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
		0.00	0.00	0.00	131.02

Survey Program	Date 2/5/2018				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
347.00	2,512.00	MWD (Original Hole)	MWD	MWD - Standard	
2,578.00	12,669.00	MWD lat (Original Hole)	MWD	MWD - Standard	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
347.00	0.27	21.95	347.00	0.76	0.31	-0.27	0.08	0.08	0.00	
MWD surveys										
438.00	0.69	5.60	438.00	1.50	0.44	-0.65	0.48	0.46	-17.97	
529.00	0.49	304.61	528.99	2.27	0.17	-1.36	0.68	-0.22	-67.02	
622.00	0.59	53.87	621.99	2.78	0.23	-1.65	0.95	0.11	117.48	
712.00	0.25	67.36	711.99	3.13	0.79	-1.46	0.39	-0.38	14.99	
743.00	0.44	45.01	742.99	3.24	0.93	-1.42	0.74	0.61	-72.10	
816.00	0.47	26.83	815.98	3.70	1.27	-1.47	0.20	0.04	-24.90	
907.00	0.15	35.22	906.98	4.13	1.50	-1.58	0.35	-0.35	9.22	

SEP 11 2018

WV Department of
Environmental Protection



Survey Report

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Yoder E-6HM
Project:	Wetzel County, West Virginia (UTM17 NAD83)	TVD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Site:	Yoder	MD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Well:	Yoder E-6HM	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,001.00	0.50	77.96	1,000.98	4.32	1.98	-1.34	0.43	0.37	45.47
1,095.00	0.56	46.28	1,094.98	4.72	2.71	-1.05	0.31	0.06	-33.70
1,190.00	1.65	58.26	1,189.96	5.76	4.21	-0.61	1.17	1.15	12.61
1,285.00	2.92	31.96	1,284.88	8.53	6.65	-0.58	1.70	1.34	-27.68
1,380.00	4.49	29.04	1,379.68	13.84	9.74	-1.73	1.66	1.65	-3.07
1,475.00	6.04	49.05	1,474.29	20.37	15.32	-1.81	2.51	1.63	21.06
1,569.00	5.65	9.49	1,567.83	28.17	19.82	-3.54	4.22	-0.41	-42.09
1,664.00	3.97	354.88	1,662.50	36.06	20.30	-8.36	2.18	-1.77	-15.38
1,758.00	3.78	45.75	1,756.31	41.47	22.23	-10.45	3.54	-0.20	54.12
1,851.00	5.48	37.32	1,849.00	47.14	27.12	-10.48	1.96	1.83	-9.06
1,946.00	7.41	25.85	1,943.40	56.26	32.54	-12.38	2.43	2.03	-12.07
2,040.00	7.17	31.25	2,036.64	66.73	38.22	-14.96	0.77	-0.26	5.74
2,134.00	7.54	26.19	2,129.87	77.28	43.99	-17.53	0.79	0.39	-5.38
2,227.00	6.41	33.89	2,222.18	87.07	49.58	-19.74	1.57	-1.22	8.28
2,322.00	3.64	14.33	2,316.82	94.39	53.28	-21.75	3.39	-2.92	-20.59
2,417.00	2.02	10.09	2,411.70	98.96	54.32	-23.97	1.72	-1.71	-4.46
2,512.00	2.20	43.98	2,506.64	101.92	55.88	-24.73	1.31	0.19	35.67
2,578.00	2.97	43.98	2,572.57	104.06	57.95	-24.58	1.17	1.17	0.00
2,680.00	3.84	48.44	2,674.39	108.23	62.34	-24.00	0.89	0.85	4.37
2,775.00	7.59	38.03	2,768.90	115.29	68.59	-23.92	4.08	3.95	-10.96
2,869.00	14.60	29.87	2,861.09	130.47	78.32	-26.54	7.62	7.46	-8.68
2,974.00	17.52	21.10	2,962.00	156.70	90.61	-34.48	3.61	2.78	-8.35
3,068.00	21.83	18.32	3,050.49	186.51	101.20	-46.05	4.69	4.59	-2.96
3,163.00	26.76	18.53	3,137.05	223.58	113.56	-61.06	5.19	5.19	0.22
3,258.00	32.18	20.54	3,219.73	267.58	129.24	-78.11	5.80	5.71	2.12
3,353.00	34.17	19.05	3,299.24	316.49	146.83	-96.94	2.26	2.09	-1.57
3,448.00	35.03	17.26	3,377.44	367.75	163.63	-117.91	1.40	0.91	-1.88
3,543.00	33.85	15.81	3,455.79	419.24	178.92	-140.16	1.51	-1.24	-1.53
3,637.00	34.65	15.72	3,533.49	470.16	193.30	-162.74	0.85	0.85	-0.10
3,732.00	34.93	15.23	3,611.51	522.40	207.76	-186.11	0.42	0.29	-0.52
3,827.00	34.27	17.14	3,689.71	574.20	222.79	-208.77	1.34	-0.69	2.01
3,921.00	33.68	19.50	3,767.66	624.06	239.29	-229.05	1.54	-0.63	2.51
4,016.00	34.40	19.68	3,846.39	674.16	257.12	-248.48	0.77	0.76	0.19
4,111.00	35.40	21.02	3,924.30	725.12	276.03	-267.65	1.33	1.05	1.41
4,206.00	34.11	19.84	4,002.35	775.86	294.94	-286.69	1.53	-1.36	-1.24
4,301.00	34.76	19.02	4,080.70	826.52	312.80	-306.46	0.84	0.68	-0.86
4,396.00	34.41	17.94	4,158.92	877.66	329.90	-327.13	0.74	-0.37	-1.14
4,490.00	34.29	18.09	4,236.52	928.10	346.30	-347.85	0.16	-0.13	0.16
4,585.00	35.38	19.30	4,314.50	979.50	363.70	-368.46	1.36	1.15	1.27
4,680.00	35.47	19.36	4,391.91	1,031.46	381.93	-388.81	0.10	0.09	0.06
4,774.00	34.38	18.12	4,468.98	1,082.41	399.23	-409.21	1.38	-1.16	-1.32
4,869.00	34.26	18.24	4,547.44	1,133.30	415.94	-430.00	0.15	-0.13	0.13
4,965.00	34.80	16.95	4,626.53	1,185.17	432.38	-451.63	0.95	0.56	-1.34

SEP 11 2018



Survey Report

WV Department of
Environmental Protection



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Yoder E-6HM
Project:	Wetzel County, West Virginia (UTM17 NAD83)	TVD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Site:	Yoder	MD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Well:	Yoder E-6HM	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,060.00	35.24	17.33	4,704.33	1,237.27	448.45	-473.70	0.52	0.46	0.40
5,152.00	34.85	22.32	4,779.67	1,286.93	466.34	-492.80	3.14	-0.42	5.42
5,247.00	34.56	21.07	4,857.77	1,337.19	486.34	-510.69	0.81	-0.31	-1.32
5,341.00	33.03	18.93	4,935.89	1,386.30	504.23	-529.43	2.06	-1.63	-2.28
5,435.00	33.06	18.90	5,014.68	1,434.79	520.85	-548.71	0.04	0.03	-0.03
5,529.00	34.10	22.68	5,093.00	1,483.37	539.32	-566.66	2.48	1.11	4.02
5,623.00	33.30	21.54	5,171.21	1,531.68	558.95	-583.56	1.08	-0.85	-1.21
5,737.00	30.55	19.25	5,267.96	1,588.16	580.00	-604.75	2.64	-2.41	-2.01
5,832.00	26.02	47.64	5,351.97	1,625.18	603.48	-611.33	14.80	-4.77	29.88
5,927.00	22.51	74.01	5,438.82	1,644.29	636.46	-598.99	11.88	-3.69	27.76
6,021.00	25.01	90.09	5,524.93	1,649.22	673.67	-574.15	7.36	2.66	17.11
6,116.00	25.85	89.04	5,610.73	1,649.54	714.46	-543.58	1.00	0.88	-1.11
6,211.00	32.84	94.66	5,693.50	1,647.79	760.91	-507.39	7.90	7.36	5.92
6,305.00	38.95	107.05	5,769.72	1,637.03	814.69	-459.75	10.07	6.50	13.18
6,400.00	42.86	115.67	5,841.56	1,614.25	872.42	-401.24	7.22	4.12	9.07
6,495.00	46.95	122.43	5,908.87	1,581.61	930.90	-335.70	6.61	4.31	7.12
6,589.00	50.29	122.87	5,971.00	1,543.56	990.28	-265.93	3.57	3.55	0.47
6,684.00	54.33	124.28	6,029.08	1,501.97	1,052.88	-191.40	4.41	4.25	1.48
6,779.00	62.15	128.76	6,079.06	1,453.85	1,117.64	-110.96	9.15	8.23	4.72
6,874.00	67.91	132.89	6,119.16	1,397.53	1,182.71	-24.90	7.23	6.06	4.35
6,968.00	73.27	135.00	6,150.39	1,336.02	1,246.50	63.60	6.08	5.70	2.24
7,063.00	78.86	139.05	6,173.27	1,268.57	1,309.29	155.24	7.19	5.88	4.26
7,156.00	84.44	144.32	6,186.78	1,196.41	1,366.27	245.59	8.21	6.00	5.67
7,250.00	87.65	154.25	6,193.28	1,115.89	1,414.08	334.51	11.08	3.41	10.56
7,345.00	87.08	151.61	6,197.64	1,031.40	1,457.27	422.55	2.84	-0.60	-2.78
7,440.00	85.41	150.21	6,203.87	948.56	1,503.35	511.69	2.29	-1.76	-1.47
7,535.00	88.13	151.61	6,209.22	865.69	1,549.46	600.86	3.22	2.86	1.47
7,630.00	86.90	150.38	6,213.34	782.69	1,595.48	690.06	1.83	-1.29	-1.29
7,725.00	89.45	150.12	6,216.36	700.26	1,642.59	779.71	2.70	2.68	-0.27
7,820.00	90.46	149.77	6,216.44	618.03	1,690.17	869.57	1.13	1.06	-0.37
7,914.00	89.98	150.21	6,216.08	536.63	1,737.18	958.47	0.69	-0.51	0.47
8,009.00	88.40	150.91	6,217.42	453.91	1,783.87	1,047.98	1.82	-1.66	0.74
8,103.00	88.48	151.09	6,219.98	371.73	1,829.42	1,136.29	0.21	0.09	0.19
8,197.00	89.27	151.00	6,221.82	289.49	1,874.92	1,224.59	0.85	0.84	-0.10
8,292.00	90.02	151.09	6,222.41	206.37	1,920.91	1,313.85	0.80	0.79	0.09
8,387.00	89.41	149.68	6,222.89	123.78	1,967.86	1,403.47	1.62	-0.64	-1.48
8,482.00	90.42	148.80	6,223.03	42.15	2,016.44	1,493.70	1.41	1.06	-0.93
8,577.00	88.53	149.33	6,223.90	-39.33	2,065.27	1,584.02	2.07	-1.99	0.56
8,671.00	89.19	149.94	6,225.77	-120.42	2,112.78	1,673.08	0.96	0.70	0.65
8,766.00	89.98	150.56	6,226.46	-202.89	2,159.92	1,762.78	1.06	0.83	0.65
8,861.00	88.35	149.51	6,227.84	-285.18	2,207.36	1,852.58	2.04	-1.72	-1.11
8,956.00	88.31	148.89	6,230.61	-366.75	2,255.99	1,942.80	0.65	-0.04	-0.65
9,051.00	88.97	148.89	6,232.86	-448.06	2,305.06	2,033.19	0.69	0.69	0.00

SEP 11 2018

WV Department of
Environmental Protection



Survey Report

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Yoder E-6HM
Project:	Wetzel County, West Virginia (UTM17 NAD83)	TVD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Site:	Yoder	MD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Well:	Yoder E-6HM	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,146.00	89.63	149.33	6,234.02	-529.58	2,353.83	2,123.49	0.83	0.69	0.46
9,239.00	90.59	149.68	6,233.85	-609.71	2,401.02	2,211.69	1.10	1.03	0.38
9,334.00	89.14	150.12	6,234.07	-691.90	2,448.66	2,301.58	1.60	-1.53	0.46
9,429.00	89.98	151.00	6,234.80	-774.63	2,495.35	2,391.10	1.28	0.88	0.93
9,523.00	88.70	149.59	6,235.88	-856.27	2,541.93	2,479.82	2.03	-1.36	-1.50
9,618.00	89.76	149.51	6,237.16	-938.15	2,590.07	2,569.89	1.12	1.12	-0.08
9,712.00	87.69	149.94	6,239.25	-1,019.31	2,637.44	2,658.89	2.25	-2.20	0.46
9,807.00	88.26	149.94	6,242.61	-1,101.48	2,685.00	2,748.71	0.60	0.60	0.00
9,902.00	89.10	150.38	6,244.79	-1,183.86	2,732.26	2,838.43	1.00	0.88	0.46
9,995.00	89.71	150.91	6,245.76	-1,264.92	2,777.84	2,926.02	0.87	0.66	0.57
10,090.00	90.64	151.18	6,245.47	-1,348.04	2,823.83	3,015.28	1.02	0.98	0.28
10,185.00	90.42	149.15	6,244.59	-1,430.44	2,871.09	3,105.01	2.15	-0.23	-2.14
10,279.00	88.62	148.89	6,245.38	-1,511.02	2,919.47	3,194.41	1.93	-1.91	-0.28
10,373.00	89.32	148.71	6,247.07	-1,591.42	2,968.16	3,283.90	0.77	0.74	-0.19
10,467.00	90.29	148.54	6,247.39	-1,671.67	3,017.10	3,373.50	1.05	1.03	-0.18
10,562.00	89.01	149.59	6,247.97	-1,753.15	3,065.93	3,463.82	1.74	-1.35	1.11
10,657.00	89.98	149.94	6,248.81	-1,835.22	3,113.77	3,553.78	1.09	1.02	0.37
10,752.00	87.91	150.21	6,250.56	-1,917.54	3,161.15	3,643.55	2.20	-2.18	0.28
10,846.00	88.26	150.74	6,253.70	-1,999.29	3,207.45	3,732.13	0.68	0.37	0.56
10,940.00	91.47	150.47	6,253.92	-2,081.17	3,253.58	3,820.68	3.43	3.41	-0.29
11,033.00	89.49	150.82	6,253.14	-2,162.23	3,299.16	3,908.27	2.16	-2.13	0.38
11,128.00	90.02	150.38	6,253.55	-2,244.99	3,345.80	3,997.78	0.73	0.56	-0.46
11,222.00	90.73	150.30	6,252.93	-2,326.67	3,392.31	4,086.48	0.76	0.76	-0.09
11,316.00	89.27	150.91	6,252.93	-2,408.57	3,438.45	4,175.04	1.68	-1.55	0.65
11,411.00	90.24	151.61	6,253.34	-2,491.86	3,484.13	4,264.17	1.26	1.02	0.74
11,506.00	89.01	150.12	6,253.96	-2,574.84	3,530.38	4,353.52	2.03	-1.29	-1.57
11,601.00	89.98	151.61	6,254.80	-2,657.81	3,576.63	4,442.88	1.87	1.02	1.57
11,696.00	88.31	150.74	6,256.21	-2,741.03	3,622.42	4,532.04	1.98	-1.76	-0.92
11,791.00	89.32	147.75	6,258.18	-2,822.64	3,670.99	4,622.25	3.32	1.06	-3.15
11,886.00	89.14	147.92	6,259.45	-2,903.05	3,721.56	4,713.18	0.26	-0.19	0.18
11,980.00	89.54	148.36	6,260.54	-2,982.88	3,771.17	4,803.01	0.63	0.43	0.47
12,075.00	90.86	149.07	6,260.21	-3,064.07	3,820.50	4,893.51	1.58	1.39	0.75
12,170.00	89.49	149.59	6,259.92	-3,145.77	3,868.96	4,983.70	1.54	-1.44	0.55
12,265.00	89.63	149.59	6,260.65	-3,227.70	3,917.05	5,073.75	0.15	0.15	0.00
12,357.00	90.59	149.86	6,260.47	-3,307.15	3,963.43	5,160.89	1.08	1.04	0.29
12,451.00	88.53	149.33	6,261.19	-3,388.22	4,011.00	5,249.98	2.26	-2.19	-0.56
12,546.00	89.45	150.03	6,262.86	-3,470.21	4,058.95	5,339.97	1.22	0.97	0.74
12,614.00	90.02	149.94	6,263.18	-3,529.09	4,092.96	5,404.28	0.85	0.84	-0.13
Survey @ 12614.00 MD 6263.18 TVD									
12,669.00	90.02	149.94	6,263.16	-3,576.69	4,120.51	5,456.31	0.00	0.00	0.00
Survey projected to 12669.00 MD 6263.16 TVD									



Survey Report



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Yoder E-6HM
Project:	Wetzel County, West Virginia (UTM17 NAD83)	TVD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Site:	Yoder	MD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Well:	Yoder E-6HM	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
347.00	347.00	0.76	0.31	MWD surveys	
12,614.00	6,263.18	-3,529.09	4,092.96	Survey @ 12614.00 MD 6263.18 TVD	
12,669.00	6,263.16	-3,576.69	4,120.51	Survey projected to 12669.00 MD 6263.16 TVD	

RECEIVED
Office of Oil and Gas
SEP 11 2018
WV Department of
Environmental Protection

SEP 11 2018



Survey Report - Geographic



WV Department of
Environmental Protection

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Yoder E-6HM
Project:	Wetzel County, West Virginia (UTM17 NAD83)	TVD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Site:	Yoder	MD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Well:	Yoder E-6HM	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Project	Wetzel County, West Virginia (UTM17 NAD83)		
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	Yoder				
Site Position:		Northing:	14,446,864.35 usft	Latitude:	39.78054955
From:	Lat/Long	Easting:	1,685,354.97 usft	Longitude:	-80.84004615
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.10 °

Well	Yoder E-6HM					
Well Position	+N/-S	0.00 usft	Northing:	14,446,833.91 usft	Latitude:	39.78046584
	+E/-W	0.00 usft	Easting:	1,685,376.85 usft	Longitude:	-80.83996845
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	1,083.00 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	11/6/2016	-8.57	67.02	52,257.35999988

Design	Surveys Original Hole				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	131.02	

Survey Program	Date	2/5/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
347.00	2,512.00	MWD (Original Hole)	MWD	MWD - Standard	
2,578.00	12,669.00	MWD lat (Original Hole)	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	14,446,833.91	1,685,376.85	39.78046584	-80.83996845
	347.00	0.27	21.95	347.00	0.76	0.31	14,446,834.67	1,685,377.16	39.78046792	-80.83996736
MWD surveys										
	438.00	0.69	5.60	438.00	1.50	0.44	14,446,835.41	1,685,377.29	39.78046997	-80.83996688
	529.00	0.49	304.61	528.99	2.27	0.17	14,446,836.18	1,685,377.03	39.78047207	-80.83996782
	622.00	0.59	53.87	621.99	2.78	0.23	14,446,836.69	1,685,377.09	39.78047347	-80.83996761
	712.00	0.25	67.36	711.99	3.13	0.79	14,446,837.04	1,685,377.64	39.78047442	-80.83996563
	743.00	0.44	45.01	742.99	3.24	0.93	14,446,837.15	1,685,377.79	39.78047472	-80.83996511
	816.00	0.47	26.83	815.98	3.70	1.27	14,446,837.61	1,685,378.12	39.78047600	-80.83996392
	907.00	0.15	35.22	906.98	4.13	1.50	14,446,838.04	1,685,378.36	39.78047718	-80.83996307
	1,001.00	0.50	77.96	1,000.98	4.32	1.98	14,446,838.23	1,685,378.83	39.78047769	-80.83996139

SEP 11 2018



Survey Report - Geographic

WV Department of
Environmental Protection

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Yoder E-6HM
Project:	Wetzel County, West Virginia (UTM17 NAD83)	TVD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Site:	Yoder	MD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Well:	Yoder E-6HM	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,095.00	0.56	46.28	1,094.98	4.72	2.71	14,446,838.63	1,685,379.56	39.78047879	-80.83995878
1,190.00	1.65	58.26	1,189.96	5.76	4.21	14,446,839.67	1,685,381.06	39.78048164	-80.83995344
1,285.00	2.92	31.96	1,284.88	8.53	6.65	14,446,842.45	1,685,383.51	39.78048925	-80.83994472
1,380.00	4.49	29.04	1,379.68	13.84	9.74	14,446,847.75	1,685,386.59	39.78050380	-80.83993370
1,475.00	6.04	49.05	1,474.29	20.37	15.32	14,446,854.28	1,685,392.17	39.78052170	-80.83991379
1,569.00	5.65	9.49	1,567.83	28.17	19.82	14,446,862.09	1,685,396.67	39.78054312	-80.83989773
1,664.00	3.97	354.88	1,662.50	36.06	20.30	14,446,869.98	1,685,397.15	39.78056478	-80.83989598
1,758.00	3.78	45.75	1,756.31	41.47	22.23	14,446,875.38	1,685,399.08	39.78057961	-80.83988907
1,851.00	5.48	37.32	1,849.00	47.14	27.12	14,446,881.05	1,685,403.97	39.78059517	-80.83987164
1,946.00	7.41	25.85	1,943.40	56.26	32.54	14,446,890.17	1,685,409.39	39.78062019	-80.83985228
2,040.00	7.17	31.25	2,036.64	66.73	38.22	14,446,900.64	1,685,415.08	39.78064892	-80.83983197
2,134.00	7.54	26.19	2,129.87	77.28	43.99	14,446,911.19	1,685,420.84	39.78067786	-80.83981139
2,227.00	6.41	33.89	2,222.18	87.07	49.58	14,446,920.98	1,685,426.43	39.78070470	-80.83979143
2,322.00	3.64	14.33	2,316.82	94.39	53.28	14,446,928.30	1,685,430.14	39.78072481	-80.83977820
2,417.00	2.02	10.09	2,411.70	98.96	54.32	14,446,932.87	1,685,431.18	39.78073735	-80.83977447
2,512.00	2.20	43.98	2,506.64	101.92	55.88	14,446,935.83	1,685,432.73	39.78074548	-80.83976891
2,578.00	2.97	43.98	2,572.57	104.06	57.95	14,446,937.98	1,685,434.80	39.78075135	-80.83976153
2,680.00	3.84	48.44	2,674.39	108.23	62.34	14,446,942.14	1,685,439.19	39.78076277	-80.83974588
2,775.00	7.59	38.03	2,768.90	115.29	68.59	14,446,949.20	1,685,445.44	39.78078211	-80.83972359
2,869.00	14.60	29.87	2,861.09	130.47	78.32	14,446,964.38	1,685,455.18	39.78082376	-80.83968884
2,974.00	17.52	21.10	2,962.00	156.70	90.61	14,446,990.61	1,685,467.46	39.78089574	-80.83964494
3,068.00	21.83	18.32	3,050.49	186.51	101.20	14,447,020.42	1,685,478.05	39.78097754	-80.83960705
3,163.00	26.76	18.53	3,137.05	223.58	113.56	14,447,057.49	1,685,490.41	39.78107929	-80.83956283
3,258.00	32.18	20.54	3,219.73	267.58	129.24	14,447,101.49	1,685,506.10	39.78120005	-80.83950672
3,353.00	34.17	19.05	3,299.24	316.49	146.83	14,447,150.40	1,685,523.68	39.78133429	-80.83944382
3,448.00	35.03	17.26	3,377.44	367.75	163.63	14,447,201.66	1,685,540.48	39.78147497	-80.83938370
3,543.00	33.85	15.81	3,455.79	419.24	178.92	14,447,253.16	1,685,555.78	39.78161633	-80.83932891
3,637.00	34.65	15.72	3,533.49	470.16	193.30	14,447,304.07	1,685,570.15	39.78175608	-80.83927742
3,732.00	34.93	15.23	3,611.51	522.40	207.76	14,447,356.31	1,685,584.61	39.78189947	-80.83922561
3,827.00	34.27	17.14	3,689.71	574.20	222.79	14,447,408.11	1,685,599.64	39.78204166	-80.83917179
3,921.00	33.68	19.50	3,767.66	624.06	239.29	14,447,457.97	1,685,616.14	39.78217851	-80.83911274
4,016.00	34.40	19.68	3,846.39	674.16	257.12	14,447,508.07	1,685,633.97	39.78231601	-80.83904895
4,111.00	35.40	21.02	3,924.30	725.12	276.03	14,447,559.03	1,685,652.88	39.78245586	-80.83898132
4,206.00	34.11	19.84	4,002.35	775.86	294.94	14,447,609.77	1,685,671.79	39.78259512	-80.83891368
4,301.00	34.76	19.02	4,080.70	826.52	312.80	14,447,660.43	1,685,689.66	39.78273416	-80.83884976
4,396.00	34.41	17.94	4,158.92	877.66	329.90	14,447,711.57	1,685,706.75	39.78287453	-80.83878859
4,490.00	34.29	18.09	4,236.52	928.10	346.30	14,447,762.01	1,685,723.16	39.78301296	-80.83872988
4,585.00	35.38	19.30	4,314.50	979.50	363.70	14,447,813.41	1,685,740.56	39.78315403	-80.83866761
4,680.00	35.47	19.36	4,391.91	1,031.46	381.93	14,447,865.37	1,685,758.78	39.78329664	-80.83860240
4,774.00	34.38	18.12	4,468.98	1,082.41	399.23	14,447,916.33	1,685,776.08	39.78343649	-80.83854051
4,869.00	34.26	18.24	4,547.44	1,133.30	415.94	14,447,967.22	1,685,792.79	39.78357617	-80.83848069
4,965.00	34.80	16.95	4,626.53	1,185.17	432.38	14,448,019.08	1,685,809.24	39.78371853	-80.83842182
5,060.00	35.24	17.33	4,704.33	1,237.27	448.45	14,448,071.18	1,685,825.30	39.78386152	-80.83836430
5,152.00	34.85	22.32	4,779.67	1,286.93	466.34	14,448,120.84	1,685,843.20	39.78399782	-80.83830029
5,247.00	34.56	21.07	4,857.77	1,337.19	486.34	14,448,171.10	1,685,863.19	39.78413574	-80.83822879
5,341.00	33.03	18.93	4,935.89	1,386.30	504.23	14,448,220.21	1,685,881.09	39.78427054	-80.83816476
5,435.00	33.06	18.90	5,014.68	1,434.79	520.85	14,448,268.70	1,685,897.71	39.78440362	-80.83810530
5,529.00	34.10	22.68	5,093.00	1,483.37	539.32	14,448,317.28	1,685,916.17	39.78453693	-80.83803925
5,623.00	33.30	21.54	5,171.21	1,531.68	558.95	14,448,365.60	1,685,935.81	39.78466952	-80.83796905
5,737.00	30.55	19.25	5,267.96	1,588.16	580.00	14,448,422.07	1,685,956.85	39.78482451	-80.83789377
5,832.00	26.02	47.64	5,351.97	1,625.18	603.48	14,448,459.09	1,685,980.33	39.78492606	-80.83780997
5,927.00	22.51	74.01	5,438.82	1,644.29	636.46	14,448,478.20	1,686,013.32	39.78497839	-80.83769243
6,021.00	25.01	90.09	5,524.93	1,649.22	673.67	14,448,483.13	1,686,050.53	39.78499174	-80.83755993
6,116.00	25.85	89.04	5,610.73	1,649.54	714.46	14,448,483.45	1,686,091.32	39.78499241	-80.83741473
6,211.00	32.84	94.66	5,693.50	1,647.79	760.91	14,448,481.70	1,686,137.77	39.78498737	-80.83724940

SEP 11 2018



Survey Report - Geographic



WV Department of
Environmental Protection

Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Yoder E-6HM
Project:	Wetzel County, West Virginia (UTM17 NAD83)	TVD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Site:	Yoder	MD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Well:	Yoder E-6HM	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,305.00	38.95	107.05	5,769.72	1,637.03	814.69	14,448,470.94	1,686,191.54	39.78495756	-80.83705806
6,400.00	42.86	115.67	5,841.56	1,614.25	872.42	14,448,448.16	1,686,249.28	39.78489471	-80.83685268
6,495.00	46.95	122.43	5,908.87	1,581.61	930.90	14,448,415.52	1,686,307.76	39.78480477	-80.83664474
6,589.00	50.29	122.87	5,971.00	1,543.56	990.28	14,448,377.47	1,686,367.13	39.78469997	-80.83643363
6,684.00	54.33	124.28	6,029.08	1,501.97	1,052.88	14,448,335.88	1,686,429.74	39.78458545	-80.83621106
6,779.00	62.15	128.76	6,079.06	1,453.85	1,117.64	14,448,287.76	1,686,494.49	39.78445297	-80.83598085
6,874.00	67.91	132.89	6,119.16	1,397.53	1,182.71	14,448,231.45	1,686,559.57	39.78429799	-80.83574958
6,968.00	73.27	135.00	6,150.39	1,336.02	1,246.50	14,448,169.93	1,686,623.36	39.78412872	-80.83552293
7,063.00	78.86	139.05	6,173.27	1,268.57	1,309.29	14,448,102.48	1,686,686.14	39.78394318	-80.83529988
7,156.00	84.44	144.32	6,186.78	1,196.41	1,366.27	14,448,030.32	1,686,743.12	39.78374472	-80.83509753
7,250.00	87.65	154.25	6,193.28	1,115.89	1,414.08	14,447,949.81	1,686,790.94	39.78352336	-80.83492785
7,345.00	87.08	151.61	6,197.64	1,031.40	1,457.27	14,447,865.31	1,686,834.12	39.78329109	-80.83477469
7,440.00	85.41	150.21	6,203.87	948.56	1,503.35	14,447,782.48	1,686,880.21	39.78306337	-80.83461120
7,535.00	88.13	151.61	6,209.22	865.69	1,549.46	14,447,699.60	1,686,926.31	39.78283554	-80.83444763
7,630.00	86.90	150.38	6,213.34	782.69	1,595.48	14,447,616.60	1,686,972.33	39.78260735	-80.83428437
7,725.00	89.45	150.12	6,216.36	700.26	1,642.59	14,447,534.17	1,687,019.44	39.78238073	-80.83411721
7,820.00	90.46	149.77	6,216.44	618.03	1,690.17	14,447,451.94	1,687,067.02	39.78215468	-80.83394840
7,914.00	89.98	150.21	6,216.08	536.63	1,737.18	14,447,370.54	1,687,114.04	39.78193090	-80.83378160
8,009.00	88.40	150.91	6,217.42	453.91	1,783.87	14,447,287.82	1,687,160.72	39.78170348	-80.83361596
8,103.00	88.48	151.09	6,219.98	371.73	1,829.42	14,447,205.64	1,687,206.28	39.78147755	-80.83345435
8,197.00	89.27	151.00	6,221.82	289.49	1,874.92	14,447,123.41	1,687,251.78	39.78125148	-80.83329295
8,292.00	90.02	151.09	6,222.41	206.37	1,920.91	14,447,040.28	1,687,297.77	39.78102297	-80.83312980
8,387.00	89.41	149.68	6,222.89	123.78	1,967.86	14,446,957.70	1,687,344.71	39.78079592	-80.83296326
8,482.00	90.42	148.80	6,223.03	42.15	2,016.44	14,446,876.06	1,687,393.30	39.78057148	-80.83279086
8,577.00	88.53	149.33	6,223.90	-39.33	2,065.27	14,446,794.58	1,687,442.13	39.78034747	-80.83261759
8,671.00	89.19	149.94	6,225.77	-120.42	2,112.78	14,446,713.50	1,687,489.64	39.78012453	-80.83244903
8,766.00	89.98	150.56	6,226.46	-202.89	2,159.92	14,446,631.02	1,687,536.78	39.77989779	-80.83228180
8,861.00	88.35	149.51	6,227.84	-285.18	2,207.36	14,446,548.73	1,687,584.22	39.77967156	-80.83211348
8,956.00	88.31	148.89	6,230.61	-366.75	2,255.99	14,446,467.17	1,687,632.84	39.77944730	-80.83194096
9,051.00	88.97	148.89	6,232.86	-448.06	2,305.06	14,446,385.85	1,687,681.91	39.77922374	-80.83176685
9,146.00	89.63	149.33	6,234.02	-529.58	2,353.83	14,446,304.33	1,687,730.68	39.77899961	-80.83159381
9,239.00	90.59	149.68	6,233.85	-609.71	2,401.02	14,446,224.20	1,687,777.87	39.77877930	-80.83142637
9,334.00	89.14	150.12	6,234.07	-691.90	2,448.66	14,446,142.01	1,687,825.52	39.77855334	-80.83125735
9,429.00	89.98	151.00	6,234.80	-774.63	2,495.35	14,446,059.28	1,687,872.21	39.77832591	-80.83109172
9,523.00	88.70	149.59	6,235.88	-856.27	2,541.93	14,445,977.65	1,687,918.78	39.77810146	-80.83092649
9,618.00	89.76	149.51	6,237.16	-938.15	2,590.07	14,445,895.76	1,687,966.92	39.77787632	-80.83075570
9,712.00	87.69	149.94	6,239.25	-1,019.31	2,637.44	14,445,814.60	1,688,014.30	39.77765320	-80.83058762
9,807.00	88.26	149.94	6,242.61	-1,101.48	2,685.00	14,445,732.43	1,688,061.85	39.77742729	-80.83041891
9,902.00	89.10	150.38	6,244.79	-1,183.86	2,732.26	14,445,650.05	1,688,109.11	39.77720080	-80.83025127
9,995.00	89.71	150.91	6,245.76	-1,264.92	2,777.84	14,445,569.00	1,688,154.70	39.77697797	-80.83008956
10,090.00	90.64	151.18	6,245.47	-1,348.04	2,823.83	14,445,485.87	1,688,200.69	39.77674944	-80.82992643
10,185.00	90.42	149.15	6,244.59	-1,430.44	2,871.09	14,445,403.47	1,688,247.95	39.77652290	-80.82975879
10,279.00	88.62	148.89	6,245.38	-1,511.02	2,919.47	14,445,322.89	1,688,296.33	39.77630134	-80.82958714
10,373.00	89.32	148.71	6,247.07	-1,591.42	2,968.16	14,445,242.50	1,688,345.02	39.77608031	-80.82941440
10,467.00	90.29	148.54	6,247.39	-1,671.67	3,017.10	14,445,162.24	1,688,393.95	39.77585965	-80.82924076
10,562.00	89.01	149.59	6,247.97	-1,753.15	3,065.93	14,445,080.76	1,688,442.79	39.77563563	-80.82906751
10,657.00	89.98	149.94	6,248.81	-1,835.22	3,113.77	14,444,998.69	1,688,490.62	39.77540998	-80.82889781
10,752.00	87.91	150.21	6,250.56	-1,917.54	3,161.15	14,444,916.37	1,688,538.00	39.77518367	-80.82872974
10,846.00	88.26	150.74	6,253.70	-1,999.29	3,207.45	14,444,834.63	1,688,584.30	39.77495892	-80.82856552
10,940.00	91.47	150.47	6,253.92	-2,081.17	3,253.58	14,444,752.74	1,688,630.43	39.77473379	-80.82840189
11,033.00	89.49	150.82	6,253.14	-2,162.23	3,299.16	14,444,671.69	1,688,676.02	39.77451096	-80.82824019
11,128.00	90.02	150.38	6,253.55	-2,244.99	3,345.80	14,444,588.92	1,688,722.65	39.77428342	-80.82807478
11,222.00	90.73	150.30	6,252.93	-2,326.67	3,392.31	14,444,507.24	1,688,769.17	39.77405886	-80.82790979
11,316.00	89.27	150.91	6,252.93	-2,408.57	3,438.45	14,444,425.35	1,688,815.31	39.77383370	-80.82774615
11,411.00	90.24	151.61	6,253.34	-2,491.86	3,484.13	14,444,342.05	1,688,860.98	39.77360471	-80.82758415



Survey Report - Geographic



Company:	Tug Hill Operating LLC	Local Co-ordinate Reference:	Well Yoder E-6HM
Project:	Wetzel County, West Virginia (UTM17 NAD83)	TVD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Site:	Yoder	MD Reference:	RKB=1083+26 @ 1109.00usft (Nabors B 28)
Well:	Yoder E-6HM	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	DB_Jul2216dt_v14

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
11,506.00	89.01	150.12	6,253.96	-2,574.84	3,530.38	14,444,259.08	1,688,907.23	39.77337660	-80.82742012	
11,601.00	89.98	151.61	6,254.80	-2,657.81	3,576.63	14,444,176.10	1,688,953.48	39.77314848	-80.82725608	
11,696.00	88.31	150.74	6,256.21	-2,741.03	3,622.42	14,444,092.89	1,688,999.28	39.77291970	-80.82709367	
11,791.00	89.32	147.75	6,258.18	-2,822.64	3,670.99	14,444,011.27	1,689,047.84	39.77269532	-80.82692139	
11,886.00	89.14	147.92	6,259.45	-2,903.05	3,721.56	14,443,930.86	1,689,098.41	39.77247421	-80.82674197	
11,980.00	89.54	148.36	6,260.54	-2,982.88	3,771.17	14,443,851.03	1,689,148.02	39.77225471	-80.82656594	
12,075.00	90.86	149.07	6,260.21	-3,064.07	3,820.50	14,443,769.85	1,689,197.36	39.77203149	-80.82639094	
12,170.00	89.49	149.59	6,259.92	-3,145.77	3,868.96	14,443,688.14	1,689,245.81	39.77180684	-80.82621904	
12,265.00	89.63	149.59	6,260.65	-3,227.70	3,917.05	14,443,606.21	1,689,293.90	39.77158158	-80.82604847	
12,357.00	90.59	149.86	6,260.47	-3,307.15	3,963.43	14,443,526.76	1,689,340.28	39.77136314	-80.82588396	
12,451.00	88.53	149.33	6,261.19	-3,388.22	4,011.00	14,443,445.69	1,689,387.85	39.77114026	-80.82571522	
12,546.00	89.45	150.03	6,262.86	-3,470.21	4,058.95	14,443,363.70	1,689,435.80	39.77091483	-80.82554514	
12,614.00	90.02	149.94	6,263.18	-3,529.09	4,092.96	14,443,304.82	1,689,469.82	39.77075294	-80.82542449	
Survey @ 12614.00 MD 6263.18 TVD										
12,669.00	90.02	149.94	6,263.16	-3,576.69	4,120.51	14,443,257.22	1,689,497.37	39.77062207	-80.82532677	
Survey projected to 12669.00 MD 6263.16 TVD										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
347.00	347.00	0.76	0.31	MWD surveys	
12,614.00	6,263.18	-3,529.09	4,092.96	Survey @ 12614.00 MD 6263.18 TVD	
12,669.00	6,263.16	-3,576.69	4,120.51	Survey projected to 12669.00 MD 6263.16 TVD	

RECEIVED
Office of Oil and Gas

SEP 11 2018

WV Department of
Environmental Protection