

HG Energy LLC

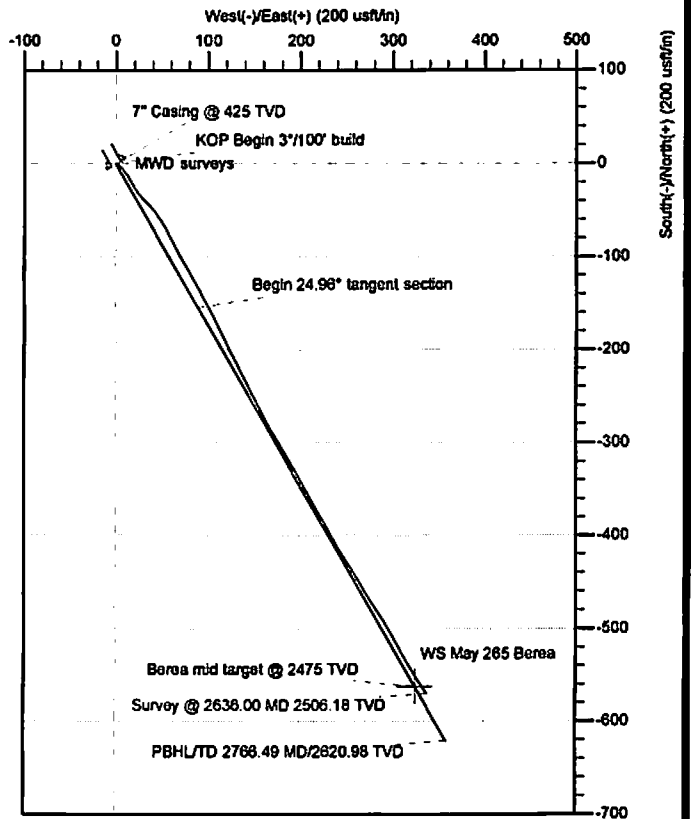
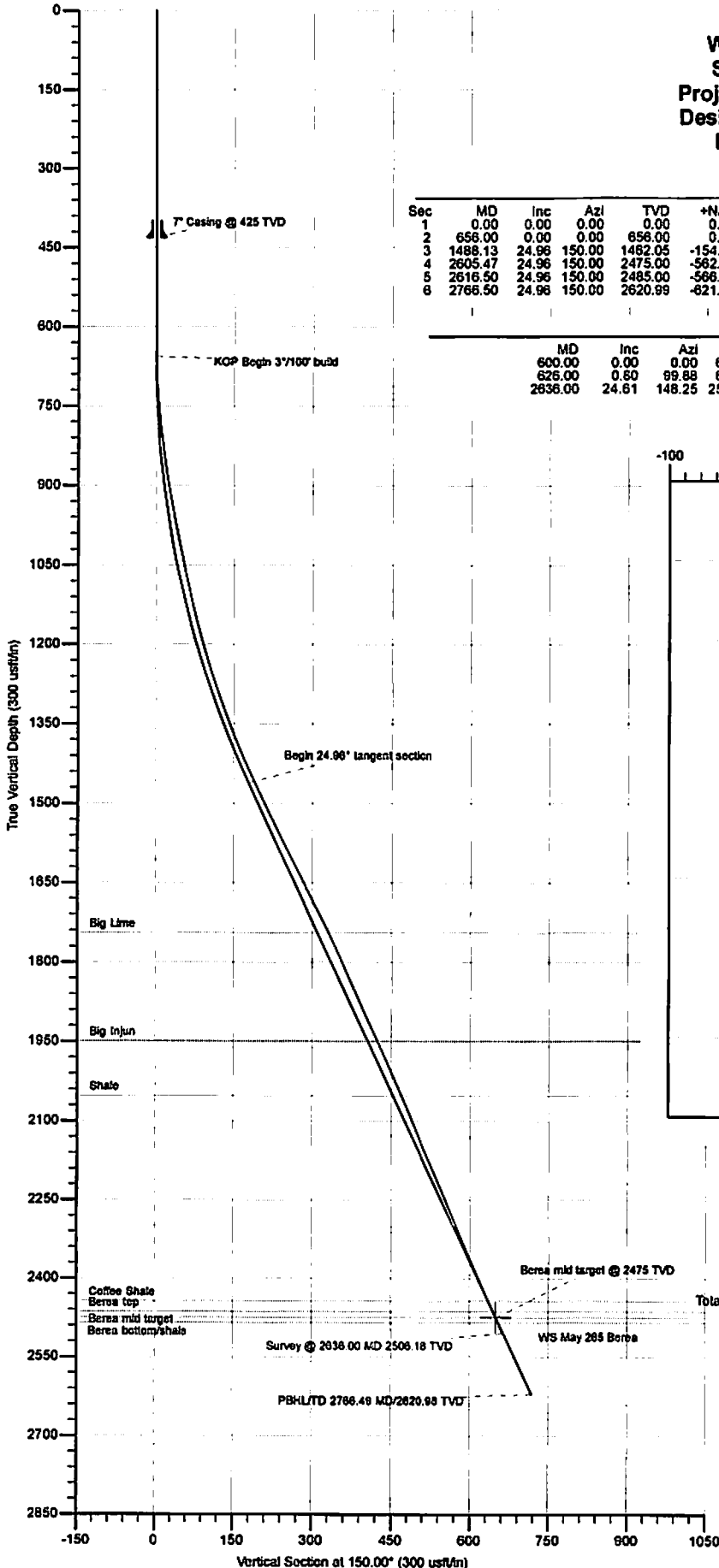
Well: W.S. May No. 265
 Site: W.S. May
 Project: Lincoln County, West Virginia
 Design: plan3
 Rig: Noah Horn 294

Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	656.00	0.00	0.00	656.00	0.00	0.00	0.00	0.00	0.00	KOP Begin 3°/100' build
3	1488.13	24.96	150.00	1482.05	-154.53	89.22	3.00	150.00	178.43	Begin 24.96° tangent section
4	2605.47	24.96	150.00	2475.00	-562.92	325.00	0.00	0.00	650.00	Berea mid target @ 2475 TVD
5	2616.50	24.96	150.00	2485.00	-566.95	327.33	0.00	0.00	654.86	
6	2766.50	24.96	150.00	2620.99	-621.77	356.96	0.00	0.00	717.96	PBHLTD 2766.49 MD/2620.98 TVD

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSect	Annotation
600.00	0.00	0.00	600.00	0.00	0.00	0.00	Assume vertical to 600 MD
626.00	0.80	99.88	626.00	-0.03	0.18	0.12	MWD surveys
2636.00	24.61	148.25	2506.18	-570.55	337.60	662.92	Survey @ 2636.00 MD 2506.18 TVD



Geodetic System: Universal Transverse Mercator
 Datum: NAD83 West Virginia - HARN
 Ellipsoid: GRS 1980
 Zone: Zone 17N (84 W to 78 W)

System Datum: Mean Sea Level
 Depth Reference: RKB=937+6 @ 993.00usft (Noah Horn 294)

Northing: 4232249.00 Easting: 416390.00 Latitude: 38° 14' 3.6738 N Longitude: 81° 57' 19.2409 W

Total Correction (M→T): To convert a Magnetic Direction to a True Direction, Subtract 8.3°

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
1745.00	1800.24	Big Lime
1949.00	2025.26	Big Injun
2052.00	2138.88	Shale
2444.00	2571.27	Coffee Shale
2484.00	2593.33	Berea top
2475.00	2605.47	Berea mid target
2485.00	2616.50	Berea bottom/shale



Azimuths to Grid North
 True North: 0.59°
 Magnetic North: -7.78°

Magnetic Field
 Strength: 51592.7nT
 Dip Angle: 65.70°
 Date: 6/15/2017
 Model: HDGM



PRODIRECTIONAL

01/05/2018

Survey Report

Company: HG Energy LLC	Local Co-ordinate Reference: Well W.S. May No. 265
Project: Lincoln County, West Virginia	TVD Reference: RKB=987+6 @ 993.00usft (Noah Horn 294)
Site: W.S. May	MD Reference: RKB=987+6 @ 993.00usft (Noah Horn 294)
Well: W.S. May No. 265	North Reference: Grid
Wellbore: Original Hole	Survey Calculation Method: Minimum Curvature
Design: Surveys Original Hole	Database: DB_Jul2216dt_v14

Project Lincoln County, West Virginia		
Map System: Universal Transverse Mercator	System Datum:	Mean Sea Level
Geo Datum: NAD83 West Virginia - HARN		
Map Zone: Zone 17N (84 W to 78 W)		

Site W.S. May					
Site Position:		Northing:	4,232,249.00 m	Latitude:	38° 14' 3.6738 N
From: Map		Easting:	416,390.00 m	Longitude:	81° 57' 19.2409 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.59 "

Well W.S. May No. 265						
Well Position	+N/-S	0.00 usft	Northing:	4,232,249.00 m	Latitude:	38° 14' 3.6738 N
	+E/-W	0.00 usft	Easting:	416,390.00 m	Longitude:	81° 57' 19.2409 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	987.00 usft

Wellbore Original Hole					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	8/15/2017	-8.35	65.70	51,592.70000000

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	150.00

Survey Program Date 8/31/2017					
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
600.00	2,636.00	MWD (Original Hole)	MWD	OWSG 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	
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	
Assume vertical to 600 MD										
626.00	0.80	99.88	626.00	-0.03	0.18	0.12	3.08	3.08	0.00	
MWD surveys										
656.00	1.28	115.70	655.99	-0.21	0.69	0.53	1.85	1.60	52.73	
686.00	2.67	124.75	685.98	-0.76	1.56	1.44	4.73	4.63	30.17	
716.00	3.87	131.61	715.93	-1.83	2.89	3.03	4.20	4.00	22.87	
746.00	4.92	134.88	745.84	-3.41	4.56	5.23	3.60	3.50	10.90	
776.00	5.95	135.32	775.70	-5.42	6.57	7.98	3.44	3.43	1.47	

Survey Report

Company:	HG Energy LLC	Local Co-ordinate Reference:	Well W.S. May No. 265
Project:	Lincoln County, West Virginia	TVD Reference:	RKB=987+6 @ 993.00usft (Noah Horn 294)
Site:	W.S. May	MD Reference:	RKB=987+6 @ 993.00usft (Noah Horn 294)
Well:	W.S. May No. 265	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)	
806.00	6.76	139.98	805.52	-7.88	8.80	11.22	3.20	2.70	15.53	
836.00	7.91	142.03	835.27	-10.86	11.20	15.00	3.93	3.83	6.83	
866.00	8.57	147.78	864.96	-14.38	13.66	19.28	3.52	2.20	19.17	
896.00	9.52	150.78	894.59	-18.43	16.07	24.00	3.53	3.17	10.00	
926.00	10.20	149.33	924.15	-22.88	18.63	29.13	2.41	2.27	-4.83	
956.00	10.96	146.55	953.64	-27.55	21.56	34.64	3.05	2.53	-9.27	
986.00	11.67	142.87	983.05	-32.35	24.96	40.49	3.37	2.37	-12.27	
1,016.00	12.02	138.78	1,012.42	-37.11	28.85	46.57	3.03	1.17	-13.63	
1,046.00	12.54	135.87	1,041.73	-41.80	33.18	52.79	2.69	1.73	-9.70	
1,076.00	13.40	136.58	1,070.96	-46.66	37.84	59.33	2.92	2.87	2.37	
1,106.00	13.93	139.88	1,100.11	-51.95	42.55	66.27	3.14	1.77	11.00	
1,136.00	14.23	144.08	1,129.21	-57.70	47.04	73.49	3.55	1.00	14.00	
1,166.00	14.60	148.09	1,158.27	-63.89	51.21	80.94	3.55	1.23	13.37	
1,196.00	15.31	152.70	1,187.25	-70.62	55.02	88.67	4.62	2.37	15.37	
1,226.00	16.28	153.56	1,216.12	-77.91	58.71	96.83	3.33	3.23	2.87	
1,256.00	17.51	153.45	1,244.83	-85.71	62.60	105.53	4.10	4.10	-0.37	
1,286.00	18.61	151.85	1,273.35	-93.97	66.87	114.82	4.02	3.67	-5.33	
1,316.00	19.64	150.26	1,301.69	-102.57	71.63	124.64	3.85	3.43	-5.30	
1,346.00	20.40	149.68	1,329.88	-111.46	76.78	134.91	2.62	2.53	-1.93	
1,376.00	21.34	149.83	1,357.91	-120.69	82.16	145.60	3.14	3.13	0.50	
1,406.00	22.37	150.99	1,385.75	-130.40	87.67	156.77	3.72	3.43	3.87	
1,436.00	23.44	152.15	1,413.39	-140.67	93.23	168.44	3.67	3.57	3.87	
1,466.00	24.54	152.75	1,440.80	-151.49	98.87	180.62	3.76	3.67	2.00	
1,496.00	25.44	152.86	1,467.99	-162.76	104.66	193.28	3.00	3.00	0.37	
1,526.00	25.59	153.80	1,495.06	-174.31	110.46	206.18	1.44	0.50	3.13	
1,556.00	26.48	153.94	1,522.02	-186.13	116.26	219.32	2.97	2.97	0.47	
1,586.00	26.42	153.59	1,548.88	-198.11	122.16	232.65	0.56	-0.20	-1.17	
1,616.00	26.69	152.63	1,575.71	-210.08	128.23	246.05	1.69	0.90	-3.20	
1,646.00	26.85	152.83	1,602.50	-222.09	134.42	259.54	0.61	0.53	0.67	
1,676.00	26.91	153.07	1,629.26	-234.17	140.59	273.09	0.41	0.20	0.80	
1,706.00	27.13	153.11	1,655.98	-246.32	146.76	286.70	0.74	0.73	0.13	
1,736.00	26.74	152.35	1,682.73	-258.40	152.98	300.27	1.73	-1.30	-2.53	
1,766.00	26.90	151.65	1,709.50	-270.35	159.34	313.80	1.18	0.53	-2.33	
1,796.00	26.05	150.55	1,736.35	-282.06	165.80	327.17	3.27	-2.83	-3.67	
1,826.00	25.50	149.84	1,763.37	-293.38	172.28	340.21	2.10	-1.83	-2.37	
1,856.00	24.09	148.61	1,790.60	-304.19	178.72	352.79	5.00	-4.70	-4.10	
1,886.00	23.72	148.55	1,818.03	-314.56	185.05	364.95	1.24	-1.23	-0.20	
1,916.00	23.72	148.89	1,845.49	-324.88	191.32	377.01	0.46	0.00	1.13	
1,946.00	23.97	150.55	1,872.93	-335.35	197.43	389.14	2.39	0.83	5.53	
1,976.00	24.17	150.64	1,900.33	-346.01	203.44	401.37	0.68	0.67	0.30	
2,006.00	24.26	150.92	1,927.69	-356.75	209.45	413.68	0.49	0.30	0.93	
2,036.00	24.43	150.69	1,955.02	-367.54	215.48	426.04	0.65	0.57	-0.77	
2,066.00	23.47	149.94	1,982.44	-378.12	221.51	438.22	3.36	-3.20	-2.50	

Survey Report

Company:	HG Energy LLC	Local Co-ordinate Reference:	Well W.S. May No. 265
Project:	Lincoln County, West Virginia	TVD Reference:	RKB=987+6 @ 993.00usft (Noah Horn 294)
Site:	W.S. May	MD Reference:	RKB=987+6 @ 993.00usft (Noah Horn 294)
Well:	W.S. May No. 265	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)	
2,096.00	23.82	150.85	2,009.92	-388.58	227.45	450.25	1.69	1.17	3.03	
2,126.00	24.48	152.02	2,037.29	-399.36	233.32	462.52	2.72	2.20	3.90	
2,156.00	23.46	149.92	2,064.70	-410.02	239.23	474.70	4.43	-3.40	-7.00	
2,186.00	22.31	147.82	2,092.34	-420.01	245.26	486.37	4.70	-3.63	-7.00	
2,216.00	22.47	147.13	2,120.08	-429.64	251.40	497.78	1.03	0.53	-2.30	
2,246.00	22.96	148.43	2,147.75	-439.44	257.57	509.36	2.34	1.63	4.33	
2,276.00	23.23	149.03	2,175.35	-449.50	263.68	521.12	1.19	0.90	2.00	
2,306.00	23.20	148.67	2,202.92	-459.62	269.80	532.95	0.48	-0.10	-1.20	
2,336.00	23.06	146.78	2,230.51	-469.59	276.09	544.72	2.52	-0.47	-6.30	
2,366.00	22.66	146.66	2,258.15	-479.33	282.49	556.35	1.34	-1.33	-0.40	
2,396.00	22.52	147.68	2,285.85	-489.01	288.73	567.86	1.39	-0.47	3.40	
2,426.00	22.36	148.98	2,313.58	-498.76	294.75	579.31	1.74	-0.53	4.33	
2,456.00	22.45	151.02	2,341.32	-508.66	300.46	590.74	2.61	0.30	6.80	
2,486.00	22.88	151.50	2,369.00	-518.80	306.02	602.30	1.56	1.43	1.60	
2,516.00	23.88	151.35	2,396.54	-529.25	311.72	614.20	3.34	3.33	-0.50	
2,546.00	23.89	148.84	2,423.97	-539.78	317.77	626.35	3.39	0.03	-8.37	
2,576.00	23.44	146.17	2,451.45	-549.93	324.24	638.37	3.87	-1.50	-8.90	
2,606.00	24.34	146.86	2,478.88	-560.07	330.94	650.50	3.14	3.00	2.30	
2,636.00	24.61	148.25	2,506.18	-570.55	337.60	662.92	2.12	0.90	4.63	
Survey @ 2636.00 MD 2506.18 TVD										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			Comment
		+N/-S (usft)	+E/-W (usft)		
600.00	600.00	0.00	0.00		Assume vertical to 600 MD
626.00	626.00	-0.03	0.18		MWD surveys
2,636.00	2,506.18	-570.55	337.60		Survey @ 2636.00 MD 2506.18 TVD