

51-01836
MND

HG ENERGY



Location: Marshall County, WV
Field: Marshall (NAD27 SP Northern Zone 4701)
Facility: MND1 Pad

Slot: Slot D
Well: MND1 DHS
Wellbore: MND1 DHS PWB

Plot reference wellpath is MND1 DHS PWB Rev-2 C.D.
Grid System: NAD27 / Lambert West Virginia SP, Northern Zone (4701), US feet
North Reference: Grid north
Scale: True distance
Depth are in feet
Created by: dlabat on 2018-08-24
Database: WPA_MPL_EasternUS_Dept

Location Information					
Facility Name	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude	
MND1 Pad	1642158 830	494181 810	39°50'59.203"N	80°46'28.371"W	
Slot	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Longitude
Slot D	5.89	26.77	1642185 600	494167 700	39°50'59.265"N 80°46'28.029"W

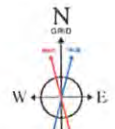
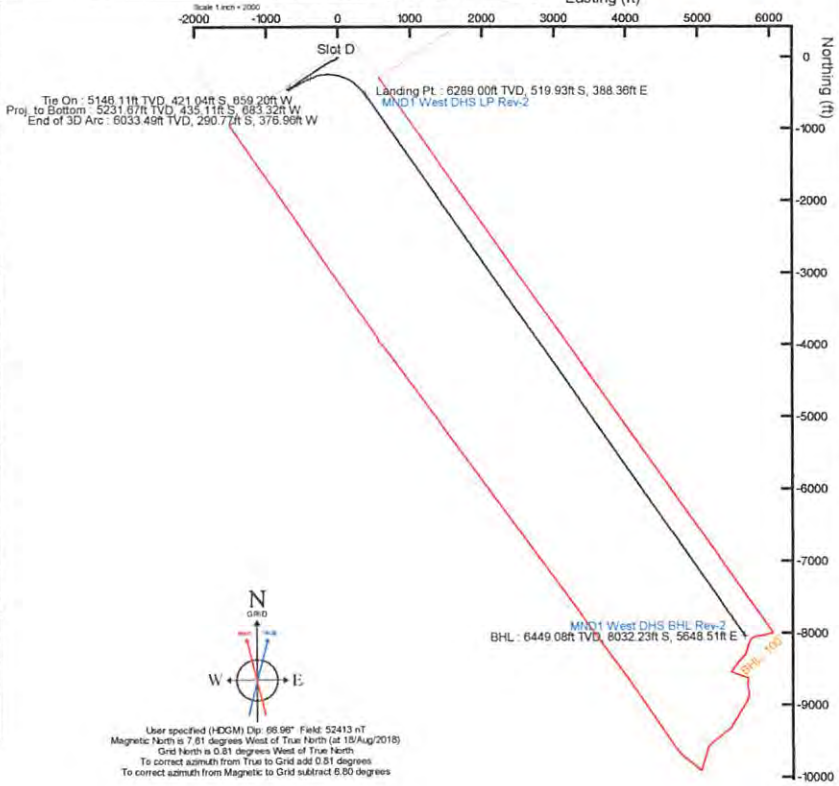
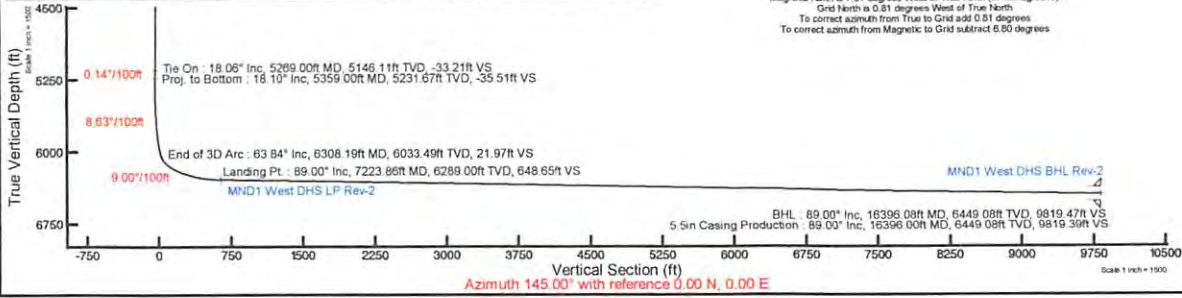
Comment: Surveys Recorded as FHS Top Hole
Patterson 347 (RKB) to Mud line (At Slot: Slot D) 25R
Mean Sea Level to Mud line (At Slot: Slot D) -1150R
Patterson 347 (RKB) to Mean Sea Level -1175R

Survey Program					
Start MD (ft)	End MD (ft)	Tool	Meas	Log Name/Comment	Wellbore
25.00	2442.00	89 4000 gys - north-south	89 4000 gys - north-south (Standard)	81_20ys_110_147_110P-2400	MND1 DHS AHS
2442.00	5398.00	0905 MND1 MD	0905 MND1 MD - 11050R	02_MND1 MD - 1105_0905 (02-03-17)	MND1 DHS AHS
5398.00	16396.00	89 4000 Casing	89 4000 Casing (Standard)	89_4000 Casing - 1105	MND1 DHS PWB

Targets							
Name	MD (ft)	TVD (ft)	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Longitude
MND1 West DHS LP Rev-2	7223.86	6289.00	-519.93	388.36	1642373.94	494147.80	39°50'54.181"W 80°46'22.305"W
MND1 West DHS BHL Rev-2	16396.08	6449.08	-8032.23	5648.51	1647633.60	494138.90	39°49'40.677"N 80°45'14.177"W

Hole and Casing Sections										
Name	Start MD (ft)	End MD (ft)	Interval (ft)	Start TVD (ft)	End TVD (ft)	Start Local N (ft)	Start Local E (ft)	End Local N (ft)	End Local E (ft)	Wellbore
25in Conductor	25.00	239.00	214.00	25.00	238.99	0.00	0.00	1.83	0.83	MND1 DHS AHS
17 5/8in Open Hole	239.00	1193.00	953.50	238.99	1161.34	1.83	0.83	-7.07	-18.19	MND1 DHS AHS
13 7/8in Casing Surface	25.00	1193.00	1167.00	25.00	1161.34	0.00	0.00	-7.07	-18.19	MND1 DHS AHS
12 25in Open Hole	1193.00	2621.00	1428.00	1161.34	2620.27	-7.07	-18.19	-20.98	-18.82	MND1 DHS AHS
9 5/8in Casing Intermediate	25.00	2378.00	2353.00	25.00	2377.27	0.00	0.00	-20.98	-18.82	MND1 DHS AHS
8 5/8in Open Hole	2621.00	16396.08	13775.08	2620.27	16395.08	-18.82	388.36	9.00	648.65	MND1 DHS PWB
5 1/2in Casing Production	25.00	16396.08	16371.00	25.00	16370.00	0.00	0.00	-8032.17	5648.48	MND1 DHS PWB

Well Profile Data							
Design Comment	MD (ft)	Inc (°)	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	VS (ft)
Tie On	5269.00	18.06	239.920	5146.11	-421.04	-659.20	0.14
Proj. to Bottom	5359.00	18.100	239.550	5231.67	-435.11	-683.32	0.14
End of 3D Arc	6308.19	63.836	62.967	6033.49	-290.77	-376.96	8.63
Landing Pt.	7223.86	89.000	145.000	6289.00	-519.93	388.36	9.00
BHL	16396.08	89.000	145.000	6449.08	-8032.23	5648.51	0.00



User specified (HDGM) Dip: 65.96° Field: 52413 nT
 Magnetic North is 7.81 degrees West of True North (at 18/Aug/2018)
 Grid North is 0.81 degrees West of True North
 To correct azimuth from True to Grid add 0.81 degrees
 To correct azimuth from Magnetic to Grid subtract 6.80 degrees

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REFERENCE WELLPATH IDENTIFICATION

Operator	HG ENERGY	Slot	Slot D
Area	Marshall County, WV	Well	MND1 DHS
Field	Marshall (NAD27 SP Northern Zone 4701)	Wellbore	MND1 DHS PWB
Facility	MND1 Pad		

REPORT SETUP INFORMATION

Projection System	NAD27 / Lambert West Virginia SP, Northern Zone (4701), US feet	Software System	WellArchitect® 5.1
North Reference	Grid	User	Delaset
Scale	0.999948	Report Generated	24/Aug/2018 at 15:28
Convergence at slot	0.81° West	Database/Source file	WA_MPL_EasternUS_Defn/MND1_DHS_PWP_Rev-C.0.xml

WELLPATH LOCATION

	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	5.89	26.77	1642185.60	494167.70	39°50'59.265"N	80°46'28.029"W
Facility Reference Pt			1642158.83	494161.81	39°50'59.203"N	80°46'28.371"W
Field Reference Pt			1695580.20	532946.00	39°57'29.416"N	80°35'09.466"W

WELLPATH DATUM

Calculation method	Minimum curvature	Patterson 347 (RKB) to Facility Vertical Datum	25.00ft
Horizontal Reference Pt	Slot	Patterson 347 (RKB) to Mean Sea Level	1175.00ft
Vertical Reference Pt	Patterson 347 (RKB)	Patterson 347 (RKB) to Mud Line at Slot (Slot D)	25.00ft
MD Reference Pt	Patterson 347 (RKB)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	145.00°

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REFERENCE WELLPATH IDENTIFICATION				
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Field	Marshall (NAD27 SP Northern Zone 4701)	Wellbore	MND1 DHS PWB	
Facility	MND1 Pad			

WELLPATH DATA (171 stations) † = interpolated/extrapolated station															
MD	Inclination	Azimuth	TVD	Vert Sect	North	East	Grid East	Grid North	Latitude	Longitude	Closure Dist	Closure Dir	DLS	Build Rate	Turn Rate
[ft]	[°]	[°]	[ft]	[ft]	[ft]	[ft]	[US ft]	[US ft]			[ft]	[°]	[°/100ft]	[°/100ft]	[°/100ft]
0.00†	0.000	346.000	0.00	0.00	0.00	0.00	1642185.60	494167.70	39°50'59.265"N	80°46'28.029"W	0.00	0.000	0.00	0.00	0.00
25.00	0.000	346.000	25.00	0.00	0.00	0.00	1642185.60	494167.70	39°50'59.265"N	80°46'28.029"W	0.00	0.000	0.00	0.00	0.00
112.00	0.540	346.000	112.00	-0.38	0.40	-0.10	1642185.50	494168.10	39°50'59.269"N	80°46'28.030"W	0.41	346.000	0.62	0.62	-18.09
212.00	1.080	47.200	211.99	-0.95	1.50	0.48	1642186.08	494169.20	39°50'59.279"N	80°46'28.023"W	1.57	17.737	0.95	0.54	61.20
312.00	0.680	44.700	311.98	-1.18	2.56	1.59	1642187.19	494170.26	39°50'59.290"N	80°46'28.009"W	3.01	31.824	0.40	-0.40	-2.50
412.00	0.640	61.500	411.97	-1.23	3.25	2.50	1642188.10	494170.95	39°50'59.297"N	80°46'27.997"W	4.09	37.554	0.20	-0.04	16.80
512.00	0.420	48.300	511.97	-1.21	3.76	3.26	1642188.86	494171.46	39°50'59.302"N	80°46'27.987"W	4.97	40.954	0.25	-0.22	-13.20
612.00	1.510	240.200	611.96	-1.37	3.35	2.39	1642187.99	494171.04	39°50'59.298"N	80°46'27.999"W	4.11	35.546	1.92	1.09	-168.10
712.00	2.520	242.300	711.89	-1.77	1.67	-0.70	1642184.90	494169.37	39°50'59.281"N	80°46'28.038"W	1.81	337.244	1.01	1.01	2.10
812.00	3.700	245.900	811.75	-2.66	-0.67	-5.59	1642190.01	494167.03	39°50'59.257"N	80°46'28.100"W	5.63	293.155	1.20	1.18	3.60
912.00	4.130	248.500	911.51	-4.11	-3.31	-11.89	1642173.71	494164.39	39°50'59.230"N	80°46'28.180"W	12.34	254.447	0.47	0.43	2.80
1012.00	1.800	248.400	1011.37	-5.31	-5.21	-16.70	1642168.90	494162.49	39°50'59.211"N	80°46'28.242"W	17.49	252.683	2.33	-2.33	-0.10
1112.00	0.810	181.800	1111.35	-5.11	-6.49	-18.18	1642167.42	494161.21	39°50'59.198"N	80°46'28.260"W	19.31	250.352	1.65	-0.99	-66.60
1212.00	0.890	179.300	1211.34	-3.90	-7.97	-18.19	1642167.41	494159.73	39°50'59.183"N	80°46'28.260"W	19.87	246.332	0.09	0.08	-2.50
1312.00	0.350	215.000	1311.33	-3.16	-9.00	-18.36	1642167.24	494158.70	39°50'59.173"N	80°46'28.262"W	20.45	243.883	0.64	-0.54	35.70
1412.00	0.520	170.200	1411.33	-2.64	-9.70	-18.46	1642167.14	494158.00	39°50'59.166"N	80°46'28.263"W	20.85	242.280	0.37	0.17	-44.80
1512.00	0.570	180.200	1511.32	-1.83	-10.64	-18.38	1642167.22	494157.06	39°50'59.157"N	80°46'28.262"W	21.24	239.930	0.11	0.05	10.00
1612.00	0.730	176.300	1611.32	-0.87	-11.78	-18.34	1642167.26	494156.92	39°50'59.146"N	80°46'28.262"W	21.80	237.299	0.17	0.16	-3.90
1712.00	0.840	178.800	1711.31	0.28	-13.14	-18.29	1642167.31	494154.56	39°50'59.132"N	80°46'28.261"W	22.52	234.290	0.12	0.11	2.50
1812.00	0.670	190.500	1811.30	1.30	-14.45	-18.38	1642167.22	494153.25	39°50'59.119"N	80°46'28.262"W	23.38	231.818	0.23	-0.17	11.70
1912.00	0.600	205.200	1911.29	1.97	-15.50	-18.71	1642166.89	494152.20	39°50'59.109"N	80°46'28.266"W	24.30	230.354	0.18	-0.07	14.70
2012.00	0.540	194.200	2011.29	2.54	-16.43	-19.05	1642166.56	494151.27	39°50'59.100"N	80°46'28.270"W	25.15	229.214	0.12	-0.06	-11.00
2112.00	0.590	170.500	2111.28	3.31	-17.40	-19.08	1642166.52	494150.30	39°50'59.090"N	80°46'28.270"W	25.82	227.637	0.24	0.05	-23.70
2212.00	0.620	169.700	2211.28	4.26	-18.44	-18.89	1642166.71	494149.26	39°50'59.080"N	80°46'28.267"W	26.40	225.703	0.03	0.03	-0.80
2312.00	0.560	188.400	2311.27	5.11	-19.45	-18.87	1642166.73	494148.25	39°50'59.070"N	80°46'28.267"W	27.10	224.128	0.20	-0.06	18.70
2412.00	0.390	205.900	2411.27	5.63	-20.23	-19.09	1642166.52	494147.47	39°50'59.062"N	80°46'28.270"W	27.82	223.327	0.23	-0.18	17.50
2462.00	0.090	233.300	2461.27	5.71	-20.41	-19.19	1642166.41	494147.29	39°50'59.060"N	80°46'28.271"W	28.01	223.239	0.61	-0.58	54.80
2642.00	0.400	100.530	2641.27	6.16	-20.61	-18.69	1642166.92	494147.10	39°50'59.058"N	80°46'28.284"W	27.82	222.201	0.26	0.17	-73.76
2737.00	1.910	244.680	2736.25	6.13	-21.34	-19.79	1642165.81	494146.36	39°50'59.051"N	80°46'28.278"W	29.11	222.837	2.36	1.59	151.74
2832.00	4.900	243.420	2831.07	5.27	-23.84	-24.85	1642160.75	494143.86	39°50'59.026"N	80°46'28.343"W	34.43	226.193	3.15	3.15	-1.33

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REFERENCE WELLPATH IDENTIFICATION			
Operator	HG ENERGY	Slot	Slot D
Area	Marshall County, WV	Well	MND1 DHS
Field	Marshall (NAD27 SP Northern Zone 4701)	Wellbore	MND1 DHS PWB
Facility	MND1 Pad		

WELLPATH DATA (171 stations) † = interpolated/extrapolated station															
MD [m]	Inclination [°]	Azimuth [°]	TVD [m]	Vert Sect [m]	North [m]	East [m]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [m]	Closure Dir [°]	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]
2927.00	8.520	245.460	2925.41	3.40	-28.58	-34.88	1642150.72	494139.12	39°50'58.977"N	80°46'28.471"W	45.09	230.676	3.82	3.81	2.15
3022.00	11.890	249.230	3018.89	-0.28	-34.97	-50.44	1642135.16	494132.73	39°50'58.912"N	80°46'28.669"W	61.38	235.266	3.61	3.55	3.97
3117.00	16.040	248.510	3111.06	-5.76	-43.25	-71.81	1642113.79	494124.45	39°50'58.827"N	80°46'28.941"W	83.83	238.939	4.37	4.37	-0.76
3212.00	18.900	245.440	3201.68	-11.61	-54.46	-98.03	1642087.58	494113.24	39°50'58.713"N	80°46'29.275"W	112.14	240.945	3.16	3.01	-3.23
3307.00	20.940	239.720	3291.00	-15.80	-69.42	-126.69	1642058.92	494098.29	39°50'58.561"N	80°46'29.640"W	144.46	241.279	2.97	2.15	-6.02
3402.00	20.790	237.500	3379.77	-17.93	-87.04	-155.57	1642030.04	494080.67	39°50'58.383"N	80°46'30.007"W	178.26	240.774	0.85	-0.16	-2.34
3496.00	20.040	237.350	3467.86	-19.32	-104.69	-183.20	1642002.41	494063.02	39°50'58.204"N	80°46'30.358"W	211.00	240.254	0.80	-0.80	-0.16
3591.00	19.320	236.640	3557.31	-20.44	-122.11	-210.03	1641975.58	494045.59	39°50'58.028"N	80°46'30.699"W	242.95	239.826	0.80	-0.76	-0.75
3686.00	18.860	236.170	3647.09	-21.20	-139.30	-235.91	1641949.70	494028.40	39°50'57.855"N	80°46'31.028"W	273.97	239.438	0.51	-0.48	-0.49
3781.00	18.140	236.310	3737.18	-21.85	-156.06	-260.97	1641924.65	494011.65	39°50'57.686"N	80°46'31.346"W	304.07	239.121	0.76	-0.76	0.15
3877.00	18.310	236.220	3828.36	-22.52	-172.73	-285.94	1641899.68	493994.98	39°50'57.518"N	80°46'31.663"W	334.06	238.865	0.18	0.18	-0.09
3972.00	18.210	236.860	3918.58	-23.31	-189.14	-310.77	1641874.85	493978.57	39°50'57.352"N	80°46'31.978"W	363.80	238.674	0.24	-0.11	0.67
4067.00	18.070	236.120	4008.86	-24.08	-205.47	-335.43	1641850.19	493962.24	39°50'57.187"N	80°46'32.291"W	393.36	238.510	0.28	-0.15	-0.78
4162.00	18.460	236.300	4099.07	-24.71	-222.03	-360.18	1641825.44	493945.68	39°50'57.020"N	80°46'32.606"W	423.11	238.349	0.41	0.41	0.19
4257.00	18.710	236.960	4189.12	-25.58	-238.68	-385.46	1641800.16	493929.03	39°50'56.852"N	80°46'32.927"W	453.38	238.234	0.34	0.26	0.69
4352.00	18.930	237.520	4279.04	-26.77	-255.26	-411.23	1641774.39	493912.45	39°50'56.685"N	80°46'33.254"W	484.02	238.171	0.30	0.23	0.59
4447.00	18.940	237.170	4368.90	-28.04	-271.90	-437.19	1641748.44	493895.82	39°50'56.516"N	80°46'33.584"W	514.84	238.122	0.12	0.01	-0.37
4541.00	19.360	236.790	4457.70	-29.10	-288.70	-463.04	1641722.58	493879.01	39°50'56.347"N	80°46'33.912"W	545.67	238.057	0.47	0.45	-0.40
4637.00	19.510	235.590	4548.23	-29.76	-306.48	-489.58	1641696.04	493861.24	39°50'56.167"N	80°46'34.249"W	577.60	237.954	0.44	0.16	-1.25
4731.00	19.250	235.590	4638.90	-30.08	-324.10	-515.32	1641670.31	493843.61	39°50'55.990"N	80°46'34.576"W	608.76	237.833	0.28	-0.28	0.00
4826.00	19.090	235.300	4726.63	-30.33	-341.80	-541.01	1641644.62	493825.92	39°50'55.811"N	80°46'34.902"W	639.93	237.716	0.20	-0.17	-0.31
4921.00	18.970	234.420	4816.44	-30.25	-359.62	-566.34	1641619.29	493808.10	39°50'55.631"N	80°46'35.223"W	670.87	237.585	0.33	-0.13	-0.93
5016.00	19.190	234.020	4906.22	-29.83	-377.78	-591.53	1641594.10	493789.94	39°50'55.448"N	80°46'35.543"W	701.87	237.436	0.27	0.23	-0.42
5111.00	18.760	236.130	4996.06	-29.86	-395.47	-616.85	1641568.78	493772.25	39°50'55.270"N	80°46'35.864"W	732.73	237.336	0.85	-0.45	2.22
5206.00	18.030	240.180	5086.21	-31.49	-411.29	-642.29	1641543.34	493756.43	39°50'55.110"N	80°46'36.188"W	762.69	237.366	1.55	-0.77	4.28
5269.00	18.060	239.920	5146.11	-33.21	-421.04	-659.20	1641526.44	493746.69	39°50'55.012"N	80°46'36.403"W	782.19	237.433	0.14	0.05	-0.41
5359.00	18.100	239.550	5231.67	-35.51	-435.11	-683.32	1641502.31	493732.61	39°50'54.869"N	80°46'36.709"W	810.10	237.513	0.14	0.04	-0.41
5369.00†	17.236	239.393	5241.19	-35.75	-436.65	-685.94	1641489.70	493731.07	39°50'54.853"N	80°46'36.743"W	813.13	237.520	8.63	-8.62	-1.57
5469.00†	8.636	236.148	5338.56	-37.04	-448.40	-704.96	1641480.68	493719.32	39°50'54.735"N	80°46'36.984"W	835.49	237.541	8.63	-8.60	-3.24
5569.00†	0.963	149.755	5438.18	-36.35	-453.32	-710.79	1641474.85	493714.40	39°50'54.685"N	80°46'37.058"W	843.04	237.471	8.63	-7.67	-86.39

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REFERENCE WELLPATH IDENTIFICATION			
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Field	Marshall (NAD27 SP Northern Zone 4701)	Wellbore	MND1 DHS PWB
Facility	MND1 Pad		

WELLPATH DATA (171 stations) † = interpolated/extrapolated station															
MD (ft)	Inclination (°)	Azimuth (°)	TVD (ft)	Vert Sect (ft)	North (ft)	East (ft)	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude	Closure Dist (ft)	Closure Dir (°)	DLS (ft/100ft)	Build Rate (ft/100ft)	Turn Rate (ft/100ft)
5659.00†	8.728	68.774	5537.78	-33.70	-451.30	-703.28	1641482.36	493716.43	39°50'54.706"N	80°46'36.952"W	835.62	237.311	8.63	7.76	-80.98
5769.00†	17.330	65.579	5635.12	-29.15	-442.38	-682.60	1641503.03	493725.35	39°50'54.797"N	80°46'36.699"W	813.41	237.054	8.63	8.60	-3.19
5869.00†	25.950	64.472	5727.98	-22.81	-426.76	-649.23	1641536.40	493740.96	39°50'54.956"N	80°46'36.274"W	776.94	236.682	8.63	8.62	-1.11
5969.00†	34.575	63.891	5814.27	-14.80	-404.80	-603.93	1641581.71	493762.92	39°50'55.180"N	80°46'35.697"W	727.04	236.167	8.63	8.62	-0.58
6069.00†	43.201	63.519	5892.04	-5.33	-377.00	-547.71	1641637.92	493790.72	39°50'55.462"N	80°46'34.981"W	664.91	235.459	8.63	8.63	-0.37
6169.00†	51.829	63.251	5959.51	5.40	-343.98	-481.84	1641703.78	493823.74	39°50'55.798"N	80°46'34.143"W	592.03	234.477	8.63	8.63	-0.27
6269.00†	60.455	63.040	6015.18	17.15	-306.50	-407.83	1641777.79	493861.22	39°50'56.179"N	80°46'33.201"W	510.16	233.074	8.63	8.63	-0.21
6308.19	63.836	62.967	6033.49	21.97	-290.77	-376.96	1641808.66	493876.94	39°50'56.338"N	80°46'32.808"W	476.07	232.355	8.63	8.63	-0.19
6369.00†	64.215	69.041	6060.14	32.40	-268.56	-327.05	1641858.57	493899.15	39°50'56.565"N	80°46'32.172"W	423.19	230.609	9.00	0.62	9.99
6469.00†	65.376	78.907	6102.81	61.81	-243.66	-240.22	1641945.39	493924.05	39°50'56.823"N	80°46'31.064"W	342.17	224.593	9.00	1.16	9.87
6569.00†	67.166	88.544	6143.13	105.78	-233.72	-149.37	1642038.24	493933.99	39°50'56.934"N	80°46'29.901"W	277.38	212.582	9.00	1.79	9.64
6669.00†	69.519	97.894	6180.10	163.24	-239.00	-56.71	1642128.89	493928.72	39°50'56.895"N	80°46'28.712"W	245.63	193.349	9.00	2.35	9.35
6769.00†	72.354	106.933	6212.82	232.78	-259.35	35.45	1642221.05	493908.37	39°50'56.707"N	80°46'27.527"W	261.76	172.216	9.00	2.84	9.04
6869.00†	75.586	116.674	6240.48	312.68	-294.28	124.86	1642310.46	493873.44	39°50'56.374"N	80°46'26.374"W	319.67	157.008	9.00	3.23	8.74
6969.00†	79.133	124.154	6262.40	400.97	-342.93	209.32	1642394.91	493824.79	39°50'55.905"N	80°46'25.283"W	401.76	146.601	9.00	3.55	8.48
7069.00†	82.905	132.429	6278.03	495.48	-404.10	286.74	1642472.32	493763.63	39°50'55.312"N	80°46'24.279"W	495.49	144.642	9.00	3.77	8.27
7169.00†	86.820	140.567	6287.00	593.88	-476.28	355.21	1642540.79	493691.45	39°50'54.608"N	80°46'23.388"W	594.15	143.284	9.00	3.92	8.14
7223.86	89.000	145.000	6289.00†	648.65	-519.93	388.36	1642573.94	493647.80	39°50'54.181"N	80°46'22.955"W	648.96	143.242	9.00	3.97	8.08
7269.00†	89.000	145.000	6289.79	693.78	-556.90	414.24	1642599.82	493610.83	39°50'53.820"N	80°46'22.617"W	694.07	143.356	0.00	0.00	0.00
7369.00†	89.000	145.000	6291.63	793.77	-638.80	471.59	1642657.17	493528.94	39°50'53.018"N	80°46'21.867"W	794.02	143.563	0.00	0.00	0.00
7469.00†	89.000	145.000	6293.28	893.75	-720.70	528.94	1642714.51	493447.04	39°50'52.217"N	80°46'21.117"W	893.97	143.724	0.00	0.00	0.00
7569.00†	89.000	145.000	6295.02	993.74	-802.60	586.29	1642771.86	493365.14	39°50'51.416"N	80°46'20.367"W	993.94	143.852	0.00	0.00	0.00
7669.00†	89.000	145.000	6296.77	1093.72	-884.51	643.64	1642829.20	493283.24	39°50'50.614"N	80°46'19.617"W	1093.90	143.957	0.00	0.00	0.00
7769.00†	89.000	145.000	6298.51	1193.71	-966.41	700.99	1642886.55	493201.34	39°50'49.813"N	80°46'18.866"W	1193.87	144.045	0.00	0.00	0.00
7869.00†	89.000	145.000	6300.26	1293.69	-1048.31	758.34	1642943.90	493119.44	39°50'49.012"N	80°46'18.116"W	1293.84	144.118	0.00	0.00	0.00
7969.00†	89.000	145.000	6302.00	1393.68	-1130.22	815.69	1643001.24	493037.55	39°50'48.210"N	80°46'17.366"W	1393.82	144.182	0.00	0.00	0.00
8069.00†	89.000	145.000	6303.75	1493.66	-1212.12	873.03	1643058.59	492955.65	39°50'47.409"N	80°46'16.616"W	1493.79	144.237	0.00	0.00	0.00
8169.00†	89.000	145.000	6305.49	1593.65	-1294.02	930.38	1643115.93	492873.75	39°50'46.608"N	80°46'15.866"W	1593.77	144.284	0.00	0.00	0.00
8269.00†	89.000	145.000	6307.24	1693.63	-1375.92	987.73	1643173.28	492791.85	39°50'45.806"N	80°46'15.116"W	1693.75	144.327	0.00	0.00	0.00
8369.00†	89.000	145.000	6308.99	1793.62	-1457.83	1045.08	1643230.62	492709.95	39°50'45.005"N	80°46'14.366"W	1793.73	144.364	0.00	0.00	0.00

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REFERENCE WELLPATH IDENTIFICATION					
Operator	HG ENERGY			Slot	Slot D
Area	Marshall County, WV			Well	MND1 DHS
Field	Marshall (NAD27 SP Northern Zone 4701)			Wellbore	MND1 DHS PWB
Facility	MND1 Pad				

WELLPATH DATA (171 stations) † = interpolated/extrapolated station															
MD	Inclination	Azimuth	TVD	Vert Sect	North	East	Grid East	Grid North	Latitude	Longitude	Closure Dist	Closure Dir	DLS	Build Rate	Turn Rate
[ft]	[°]	[°]	[ft]	[ft]	[ft]	[ft]	[US ft]	[US ft]			[ft]	[°]	["/100ft]	["/100ft]	["/100ft]
8459.00†	89.000	145.000	6310.73	1893.60	-1539.73	1102.43	1643287.97	492628.05	39°50'44.204"N	80°46'13.616"W	1893.70	144.398	0.00	0.00	0.00
8569.00†	89.000	145.000	6312.48	1993.58	-1621.63	1159.78	1643345.32	492546.15	39°50'43.402"N	80°46'12.866"W	1993.68	144.428	0.00	0.00	0.00
8669.00†	89.000	145.000	6314.22	2093.57	-1703.54	1217.13	1643402.66	492464.26	39°50'42.601"N	80°46'12.116"W	2093.66	144.455	0.00	0.00	0.00
8769.00†	89.000	145.000	6315.97	2193.55	-1785.44	1274.47	1643460.01	492382.36	39°50'41.800"N	80°46'11.366"W	2193.64	144.480	0.00	0.00	0.00
8869.00†	89.000	145.000	6317.71	2293.54	-1867.34	1331.82	1643517.35	492300.46	39°50'40.998"N	80°46'10.616"W	2293.63	144.503	0.00	0.00	0.00
8969.00†	89.000	145.000	6319.46	2393.52	-1949.24	1389.17	1643574.70	492218.56	39°50'40.197"N	80°46'09.866"W	2393.61	144.524	0.00	0.00	0.00
9069.00†	89.000	145.000	6321.20	2493.51	-2031.15	1446.52	1643632.04	492136.66	39°50'39.396"N	80°46'09.116"W	2493.59	144.543	0.00	0.00	0.00
9169.00†	89.000	145.000	6322.95	2593.49	-2113.05	1503.87	1643689.39	492054.76	39°50'38.594"N	80°46'08.366"W	2593.57	144.560	0.00	0.00	0.00
9269.00†	89.000	145.000	6324.69	2693.48	-2194.95	1561.22	1643746.73	491972.87	39°50'37.793"N	80°46'07.616"W	2693.55	144.577	0.00	0.00	0.00
9369.00†	89.000	145.000	6326.44	2793.46	-2276.86	1618.57	1643804.08	491890.97	39°50'36.992"N	80°46'06.866"W	2793.53	144.592	0.00	0.00	0.00
9469.00†	89.000	145.000	6328.18	2893.45	-2358.76	1675.92	1643861.43	491809.07	39°50'36.190"N	80°46'06.116"W	2893.52	144.606	0.00	0.00	0.00
9569.00†	89.000	145.000	6329.93	2993.43	-2440.66	1733.26	1643918.77	491727.17	39°50'35.388"N	80°46'05.366"W	2993.50	144.619	0.00	0.00	0.00
9669.00†	89.000	145.000	6331.67	3093.42	-2522.56	1790.61	1643976.12	491645.27	39°50'34.588"N	80°46'04.616"W	3093.48	144.631	0.00	0.00	0.00
9769.00†	89.000	145.000	6333.42	3193.40	-2604.47	1847.96	1644033.46	491563.37	39°50'33.786"N	80°46'03.866"W	3193.46	144.643	0.00	0.00	0.00
9869.00†	89.000	145.000	6335.16	3293.39	-2686.37	1905.31	1644090.81	491481.47	39°50'32.985"N	80°46'03.116"W	3293.45	144.654	0.00	0.00	0.00
9969.00†	89.000	145.000	6336.91	3393.37	-2768.27	1962.66	1644148.15	491399.58	39°50'32.184"N	80°46'02.366"W	3393.43	144.664	0.00	0.00	0.00
10069.00†	89.000	145.000	6338.65	3493.36	-2850.18	2020.01	1644205.50	491317.68	39°50'31.382"N	80°46'01.616"W	3493.41	144.674	0.00	0.00	0.00
10169.00†	89.000	145.000	6340.40	3593.34	-2932.08	2077.36	1644262.85	491235.78	39°50'30.581"N	80°46'00.866"W	3593.40	144.683	0.00	0.00	0.00
10269.00†	89.000	145.000	6342.14	3693.33	-3013.98	2134.71	1644320.19	491153.88	39°50'29.780"N	80°46'00.116"W	3693.38	144.691	0.00	0.00	0.00
10369.00†	89.000	145.000	6343.88	3793.31	-3095.88	2192.05	1644377.54	491071.98	39°50'28.978"N	80°46'59.366"W	3793.36	144.699	0.00	0.00	0.00
10469.00†	89.000	145.000	6345.64	3893.30	-3177.79	2249.40	1644434.88	490990.08	39°50'28.177"N	80°46'58.616"W	3893.35	144.707	0.00	0.00	0.00
10569.00†	89.000	145.000	6347.38	3993.28	-3259.69	2306.75	1644492.23	490908.18	39°50'27.375"N	80°46'57.866"W	3993.33	144.714	0.00	0.00	0.00
10669.00†	89.000	145.000	6349.13	4093.26	-3341.59	2364.10	1644549.57	490826.29	39°50'26.574"N	80°46'57.116"W	4093.31	144.721	0.00	0.00	0.00
10769.00†	89.000	145.000	6350.87	4193.25	-3423.50	2421.45	1644606.92	490744.39	39°50'25.773"N	80°46'56.366"W	4193.30	144.728	0.00	0.00	0.00
10869.00†	89.000	145.000	6352.62	4293.23	-3505.40	2478.80	1644664.26	490662.49	39°50'24.971"N	80°46'55.616"W	4293.28	144.734	0.00	0.00	0.00
10969.00†	89.000	145.000	6354.36	4393.22	-3587.30	2536.15	1644721.61	490580.59	39°50'24.170"N	80°46'54.866"W	4393.26	144.740	0.00	0.00	0.00
11069.00†	89.000	145.000	6356.11	4493.20	-3669.20	2593.50	1644778.96	490498.69	39°50'23.369"N	80°46'54.116"W	4493.25	144.746	0.00	0.00	0.00
11169.00†	89.000	145.000	6357.85	4593.19	-3751.11	2650.84	1644836.30	490416.79	39°50'22.567"N	80°46'53.366"W	4593.23	144.752	0.00	0.00	0.00
11269.00†	89.000	145.000	6359.60	4693.17	-3833.01	2708.19	1644893.65	490334.90	39°50'21.766"N	80°46'52.616"W	4693.22	144.757	0.00	0.00	0.00
11369.00†	89.000	145.000	6361.34	4793.16	-3914.91	2765.54	1644950.99	490253.00	39°50'20.965"N	80°46'51.866"W	4793.20	144.762	0.00	0.00	0.00

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REFERENCE WELLPATH IDENTIFICATION			
Operator	HG ENERGY	Slot	Slot D
Area	Marshall County, WV	Well	MND1 DHS
Field	Marshall (NAD27 SP Northern Zone 4701)	Wellbore	MND1 DHS PWB
Facility	MND1 Pad		

WELLPATH DATA (171 stations) † = Interpolated/extrapolated station															
MD (m)	Inclination (°)	Azimuth (°)	TVD (m)	Vert Sect (m)	North (m)	East (m)	Grid East (US m)	Grid North (US m)	Latitude	Longitude	Closure Dist (m)	Closure Dir (°)	DLS r/(100m)	Build Rate r/(100m)	Turn Rate r/(100m)
11459.00†	89.000	145.000	6363.09	4893.14	-3995.82	2822.89	1645008.34	490171.10	39°50'20.163"N	80°45'51.118"W	4893.18	144.767	0.00	0.00	0.00
11569.00†	89.000	145.000	6364.83	4993.13	-4078.72	2880.24	1645065.68	490089.20	39°50'19.362"N	80°45'50.368"W	4993.17	144.772	0.00	0.00	0.00
11669.00†	89.000	145.000	6366.58	5093.11	-4160.62	2937.59	1645123.03	490007.30	39°50'18.560"N	80°45'49.618"W	5093.15	144.776	0.00	0.00	0.00
11769.00†	89.000	145.000	6368.32	5193.10	-4242.52	2994.94	1645180.38	489925.40	39°50'17.759"N	80°45'48.868"W	5193.14	144.780	0.00	0.00	0.00
11868.00†	89.000	145.000	6370.07	5293.08	-4324.43	3052.28	1645237.72	489843.50	39°50'16.958"N	80°45'48.119"W	5293.12	144.785	0.00	0.00	0.00
11969.00†	89.000	145.000	6371.81	5393.07	-4406.33	3109.63	1645295.07	489761.61	39°50'16.156"N	80°45'47.369"W	5393.10	144.789	0.00	0.00	0.00
12069.00†	89.000	145.000	6373.56	5493.05	-4488.23	3166.98	1645352.41	489679.71	39°50'15.355"N	80°45'46.619"W	5493.09	144.792	0.00	0.00	0.00
12169.00†	89.000	145.000	6375.30	5593.04	-4570.14	3224.33	1645409.76	489597.81	39°50'14.553"N	80°45'45.869"W	5593.07	144.796	0.00	0.00	0.00
12269.00†	89.000	145.000	6377.05	5693.02	-4652.04	3281.68	1645467.10	489515.91	39°50'13.752"N	80°45'45.119"W	5693.06	144.800	0.00	0.00	0.00
12369.00†	89.000	145.000	6378.80	5793.01	-4733.94	3339.03	1645524.45	489434.01	39°50'12.951"N	80°45'44.369"W	5793.04	144.803	0.00	0.00	0.00
12469.00†	89.000	145.000	6380.54	5892.99	-4815.84	3396.38	1645581.79	489352.11	39°50'12.149"N	80°45'43.620"W	5893.02	144.807	0.00	0.00	0.00
12569.00†	89.000	145.000	6382.29	5992.98	-4897.75	3453.73	1645639.14	489270.22	39°50'11.348"N	80°45'42.870"W	5993.01	144.810	0.00	0.00	0.00
12669.00†	89.000	145.000	6384.03	6092.96	-4979.65	3511.07	1645696.49	489188.32	39°50'10.547"N	80°45'42.120"W	6092.99	144.813	0.00	0.00	0.00
12769.00†	89.000	145.000	6385.78	6192.94	-5061.55	3568.42	1645753.83	489106.42	39°50'09.745"N	80°45'41.370"W	6192.98	144.816	0.00	0.00	0.00
12869.00†	89.000	145.000	6387.52	6292.93	-5143.46	3625.77	1645811.18	489024.52	39°50'08.944"N	80°45'40.620"W	6292.96	144.819	0.00	0.00	0.00
12969.00†	89.000	145.000	6389.27	6392.91	-5225.36	3683.12	1645868.52	488942.62	39°50'08.142"N	80°45'39.871"W	6392.95	144.822	0.00	0.00	0.00
13069.00†	89.000	145.000	6391.01	6492.90	-5307.26	3740.47	1645925.87	488860.72	39°50'07.341"N	80°45'39.121"W	6492.93	144.824	0.00	0.00	0.00
13169.00†	89.000	145.000	6392.76	6592.88	-5389.16	3797.82	1645983.21	488778.82	39°50'06.540"N	80°45'38.371"W	6592.91	144.827	0.00	0.00	0.00
13269.00†	89.000	145.000	6394.50	6692.87	-5471.07	3855.17	1646040.56	488696.93	39°50'05.738"N	80°45'37.621"W	6692.90	144.830	0.00	0.00	0.00
13369.00†	89.000	145.000	6396.25	6792.85	-5552.97	3912.52	1646097.91	488615.03	39°50'04.937"N	80°45'36.871"W	6792.88	144.832	0.00	0.00	0.00
13469.00†	89.000	145.000	6397.99	6892.84	-5634.87	3969.86	1646155.25	488533.13	39°50'04.135"N	80°45'36.122"W	6892.87	144.835	0.00	0.00	0.00
13569.00†	89.000	145.000	6399.74	6992.82	-5716.78	4027.21	1646212.60	488451.23	39°50'03.334"N	80°45'35.372"W	6992.85	144.837	0.00	0.00	0.00
13669.00†	89.000	145.000	6401.48	7092.81	-5798.68	4084.56	1646269.94	488369.33	39°50'02.533"N	80°45'34.622"W	7092.84	144.839	0.00	0.00	0.00
13769.00†	89.000	145.000	6403.23	7192.79	-5880.58	4141.91	1646327.29	488287.43	39°50'01.731"N	80°45'33.872"W	7192.82	144.842	0.00	0.00	0.00
13869.00†	89.000	145.000	6404.97	7292.78	-5962.48	4199.26	1646384.63	488205.54	39°50'00.930"N	80°45'33.123"W	7292.80	144.844	0.00	0.00	0.00
13969.00†	89.000	145.000	6406.72	7392.76	-6044.39	4256.61	1646441.98	488123.64	39°50'00.128"N	80°45'32.373"W	7392.79	144.846	0.00	0.00	0.00
14069.00†	89.000	145.000	6408.46	7492.75	-6126.29	4313.96	1646499.33	488041.74	39°49'59.327"N	80°45'31.623"W	7492.77	144.848	0.00	0.00	0.00
14169.00†	89.000	145.000	6410.21	7592.73	-6208.19	4371.31	1646556.67	487959.84	39°49'58.526"N	80°45'30.873"W	7592.76	144.850	0.00	0.00	0.00
14269.00†	89.000	145.000	6411.95	7692.72	-6290.10	4428.65	1646614.02	487877.94	39°49'57.724"N	80°45'30.124"W	7692.74	144.852	0.00	0.00	0.00
14369.00†	89.000	145.000	6413.70	7792.70	-6372.00	4486.00	1646671.36	487796.04	39°49'56.923"N	80°45'29.374"W	7792.73	144.854	0.00	0.00	0.00

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REFERENCE WELLPATH IDENTIFICATION			
Operator	HG ENERGY	Slot	Slot D
Area	Marshall County, WV	Well	MND1 DHS
Field	Marshall (NAD27 SP Northern Zone 4701)	Wellbore	MND1 DHS PWB
Facility	MND1 Pad		

WELLPATH DATA (171 stations) † = interpolated/extrapolated station															
MD (ft)	Inclination (°)	Azimuth (°)	TVD (ft)	Vert Sect (ft)	North (ft)	East (ft)	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude	Closure Dist (ft)	Closure Dir (°)	DLS ("/100ft)	Build Rate ("/100ft)	Turn Rate ("/100ft)
14469.00†	89.000	145.000	6415.45	7892.69	-6453.90	4543.35	1646728.71	487714.14	39°49'56.121"N	80°45'28.624"W	7892.71	144.856	0.00	0.00	0.00
14569.00†	89.000	145.000	6417.19	7992.67	-6535.80	4600.70	1646786.05	487632.25	39°49'55.320"N	80°45'27.874"W	7992.70	144.857	0.00	0.00	0.00
14669.00†	89.000	145.000	6418.94	8092.66	-6617.71	4658.05	1646843.40	487550.35	39°49'54.518"N	80°45'27.125"W	8092.68	144.859	0.00	0.00	0.00
14769.00†	89.000	145.000	6420.68	8192.64	-6699.61	4715.40	1646900.74	487468.45	39°49'53.717"N	80°45'26.375"W	8192.66	144.861	0.00	0.00	0.00
14869.00†	89.000	145.000	6422.43	8292.63	-6781.51	4772.75	1646958.09	487386.55	39°49'52.916"N	80°45'25.625"W	8292.65	144.863	0.00	0.00	0.00
14969.00†	89.000	145.000	6424.17	8392.61	-6863.42	4830.10	1647015.44	487304.65	39°49'52.114"N	80°45'24.876"W	8392.63	144.864	0.00	0.00	0.00
15069.00†	89.000	145.000	6425.92	8492.59	-6945.32	4887.44	1647072.78	487222.75	39°49'51.313"N	80°45'24.126"W	8492.62	144.866	0.00	0.00	0.00
15169.00†	89.000	145.000	6427.66	8592.58	-7027.22	4944.79	1647130.13	487140.86	39°49'50.511"N	80°45'23.376"W	8592.60	144.867	0.00	0.00	0.00
15269.00†	89.000	145.000	6429.41	8692.56	-7109.12	5002.14	1647187.47	487058.96	39°49'49.710"N	80°45'22.627"W	8692.59	144.869	0.00	0.00	0.00
15369.00†	89.000	145.000	6431.15	8792.55	-7191.03	5059.49	1647244.82	486977.06	39°49'48.909"N	80°45'21.877"W	8792.57	144.870	0.00	0.00	0.00
15469.00†	89.000	145.000	6432.90	8892.53	-7272.93	5116.84	1647302.16	486895.16	39°49'48.107"N	80°45'21.127"W	8892.56	144.872	0.00	0.00	0.00
15569.00†	89.000	145.000	6434.64	8992.52	-7354.83	5174.19	1647359.51	486813.26	39°49'47.306"N	80°45'20.377"W	8992.54	144.873	0.00	0.00	0.00
15669.00†	89.000	145.000	6436.39	9092.50	-7436.74	5231.54	1647416.86	486731.36	39°49'46.504"N	80°45'19.628"W	9092.53	144.875	0.00	0.00	0.00
15769.00†	89.000	145.000	6438.13	9192.49	-7518.64	5288.88	1647474.20	486649.46	39°49'45.703"N	80°45'18.878"W	9192.51	144.876	0.00	0.00	0.00
15869.00†	89.000	145.000	6439.88	9292.47	-7600.54	5346.23	1647531.55	486567.57	39°49'44.901"N	80°45'18.128"W	9292.49	144.877	0.00	0.00	0.00
15969.00†	89.000	145.000	6441.62	9392.46	-7682.44	5403.58	1647588.89	486485.67	39°49'44.100"N	80°45'17.379"W	9392.48	144.879	0.00	0.00	0.00
16069.00†	89.000	145.000	6443.37	9492.44	-7764.35	5460.93	1647646.24	486403.77	39°49'43.299"N	80°45'16.629"W	9492.46	144.880	0.00	0.00	0.00
16169.00†	89.000	145.000	6445.11	9592.43	-7846.25	5518.28	1647703.58	486321.87	39°49'42.497"N	80°45'15.880"W	9592.45	144.881	0.00	0.00	0.00
16269.00†	89.000	145.000	6446.86	9692.41	-7928.15	5575.63	1647760.93	486239.97	39°49'41.696"N	80°45'15.130"W	9692.43	144.882	0.00	0.00	0.00
16369.00†	89.000	145.000	6448.60	9792.40	-8010.06	5632.98	1647818.27	486158.07	39°49'40.894"N	80°45'14.380"W	9792.42	144.884	0.00	0.00	0.00
16396.08	89.000	145.000	6449.08†	9819.47	-8032.23	5648.51	1647833.80	486135.90	39°49'40.677"N	80°45'14.177"W	9819.49	144.884	0.00	0.00	0.00

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REFERENCE WELLPATH IDENTIFICATION			
Operator	HG ENERGY	Slot	Slot D
Area	Marshall County, WV	Well	MND1 DHS
Field	Marshall (NAD27 SP Northern Zone 4701)	Wellbore	MND1 DHS PWB
Facility	MND1 Pad		

HOLE & CASING SECTIONS - Ref Wellbore: MND1 DHS PWB Ref Wellpath: MND1 DHS PWP Rev-C.0										
String/Diameter	Start MD [ft]	End MD [ft]	Interval [ft]	Start TVD [ft]	End TVD [ft]	Start N/S [ft]	Start E/W [ft]	End N/S [ft]	End E/W [ft]	
20in Conductor	25.00	239.00	214.00	25.00	238.99	0.00	0.00	1.83	0.83	
17.5in Open Hole	239.00	1152.00	913.00	238.99	1151.34	1.83	0.83	-7.07	-18.19	
13.375in Casing Surface	25.00	1152.00	1127.00	25.00	1151.34	0.00	0.00	-7.07	-18.19	
12.25in Open Hole	1152.00	2621.00	1469.00	1151.34	2620.27	-7.07	-18.19	-20.58	-18.82	
9.625in Casing Intermediate	25.00	2578.00	2553.00	25.00	2577.27	0.00	0.00	-20.53	-19.03	
8.5in Open Hole	2621.00	16396.08	13775.08	2620.27	N/A	-20.58	-18.82	N/A	N/A	
5.5in Casing Production	25.00	16396.00	16371.00	25.00	6449.08	0.00	0.00	-8032.17	5648.46	

TARGETS										
Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape	
1) MND1 West DHS LP Rev-2	7223.86	6289.00	-519.93	388.36	1642573.94	493647.80	39°50'54.181"N	80°46'22.955"W	point	
2) MND1 West DHS BHL Rev-2	16396.08	6449.08	-8032.23	5648.51	1647833.80	486135.90	39°49'40.677"N	80°45'14.177"W	point	

SURVEY PROGRAM - Ref Wellbore: MND1 DHS PWB Ref Wellpath: MND1 DHS PWP Rev-C.0					
Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore	
25.00	2462.00	BHI Generic gyro - northseeking (Standard)	01_Gyro <12-1/4"> (100'-2450')	MND1 DHS AWB	
2462.00	5269.00	OWSG MWD rev2 + HRGM	02_WFD EM <8-1/2"> (2450')(2630'-5257')	MND1 DHS AWB	
5269.00	16396.08	BHI AutoTrak Curve (Short)	BH AT Curve <8-1/2">	MND1 DHS PWB	

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