



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0450
fax: (304) 926-0452

Austin Caperton, Cabinet Secretary
www.dep.wv.gov

Monday, August 27, 2018
PERMIT MODIFICATION APPROVAL
Horizontal 6A / Fracture

HG ENERGY II APPALACHIA, LLC
5260 DUPONT ROAD

PARKERSBURG, WV 26101

Re: Permit Modification Approval for MND 1 DHS
47-051-01836-00-00

**WELL BORE PATH DIRECTION FROM TOP HOLE TO TANGENT POINT-THEN
CORRECT CURVE TO MAINTAIN PERMITTED PATH**

HG ENERGY II APPALACHIA, LLC

The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin
Chief

Operator's Well Number: MND 1 DHS
Farm Name: CONSOLIDATION COAL COMPANY/ MURRAY E
U.S. WELL NUMBER: 47-051-01836-00-00
Horizontal 6A Fracture
Date Modification Issued: August 27, 2018

Promoting a healthy environment.

08/31/2018

SURFACE HOLE LOCATION (SHL)

UTM 17 - NAD83
 N: 4411110.407
 E: 519307.925
 NAD27, WV NORTH
 N: 494139.648
 E: 1642175.083
 LAT/LON DATUM=NAD83
 LAT: 39.849794
 LON: -80.774299

APPROX. LANDING POINT

UTM 17 - NAD83
 N: 4410962.551
 E: 519431.917
 NAD27, WV NORTH
 N: 493647.654
 E: 1642573.851
 LAT/LON DATUM=NAD83
 LAT: 39.848459
 LON: -80.772854

BOTTOM HOLE LOCATION

UTM 17 - NAD83
 N: 4408700.850
 E: 521072.640
 NAD27, WV NORTH
 N: 486135.813
 E: 1647833.859
 LAT/LON DATUM=NAD83
 LAT: 39.828042
 LON: -80.753748

**WATER WELLS:
 NONE FOUND**

NOTES:

- There are no water wells or developed springs within 250' of proposed well.
- There are no existing buildings within 625' of proposed well.
- Proposed well is greater than 100' from perennial stream, wetland, pond, reservoir or lake.
- There are no native trout streams within 300' of proposed well.
- Proposed well is greater than 1000' from surface/groundwater intake or public water supply.
- It is not the purpose or intention of this plat to represent surveyed locations of the surface or mineral parcels depicted hereon. The location of the boundary lines, as shown, and based on record deed descriptions, field evidence found and/or tax map position, unless otherwise noted.

Wellstar Corporate Park III, Suite 101
 2000 Georgetown Drive
 Sewickley, PA 15143

P: 724-444-1100
 F: 724-444-1104
 www.pve-llc.com



Civil Engineering | Land Development | Structure Design
 Land Planning | Landscape Architecture | Environmental

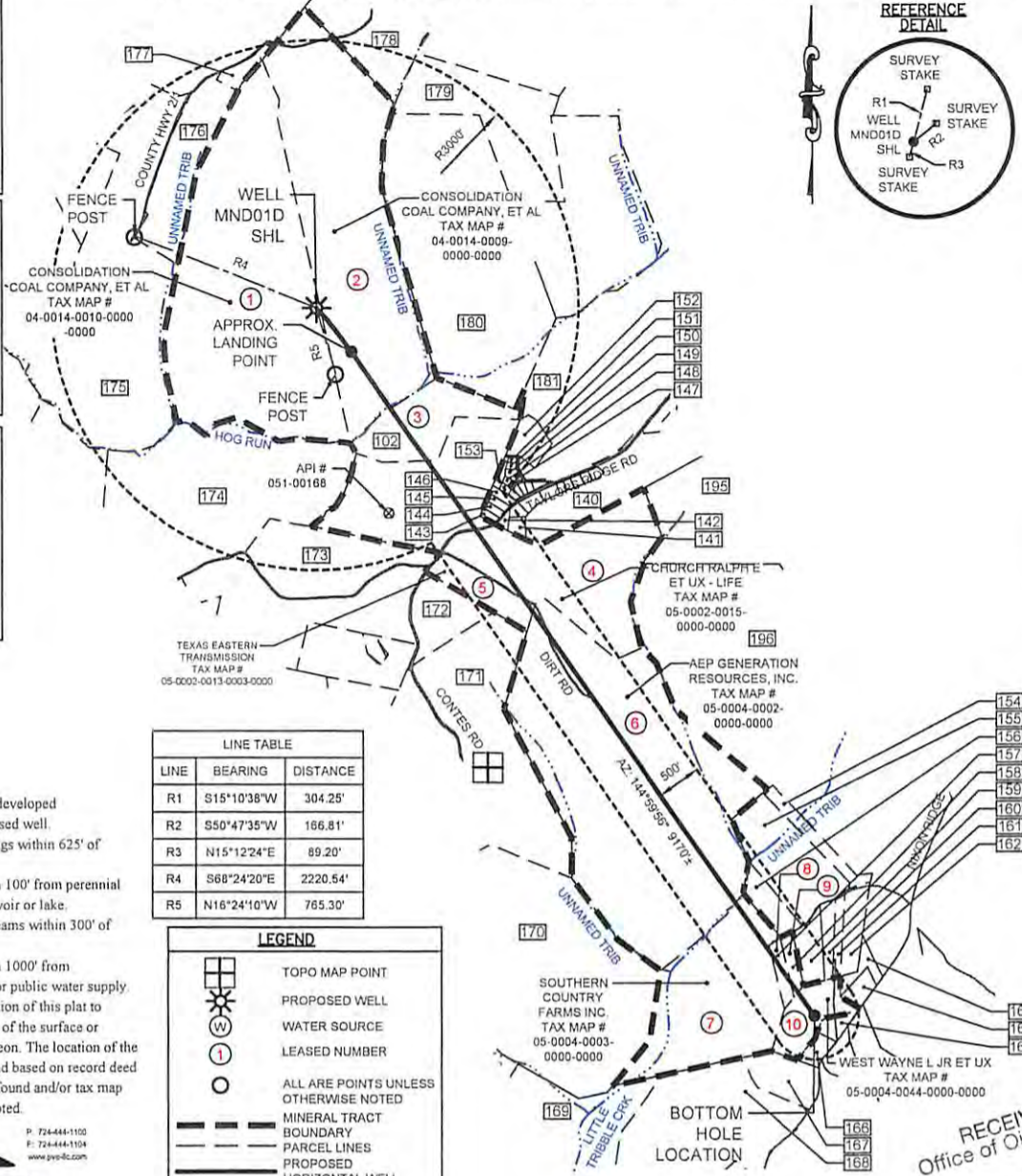
LINE TABLE

LINE	BEARING	DISTANCE
R1	S15°10'38"W	304.25'
R2	S50°47'35"W	166.81'
R3	N15°12'24"E	89.20'
R4	S68°24'20"E	2220.54'
R5	N16°24'10"W	785.30'

LEGEND

- TOPO MAP POINT
- PROPOSED WELL
- WATER SOURCE
- LEASED NUMBER
- ALL ARE POINTS UNLESS OTHERWISE NOTED
- MINERAL TRACT BOUNDARY
- PARCEL LINES
- PROPOSED HORIZONTAL WELL
- WELL REFERENCE
- STREAM/WATERWAY
- ROAD
- EXISTING GAS WELL

Well is located on topo map 9,183 feet south of Latitude: 39° 52' 30"

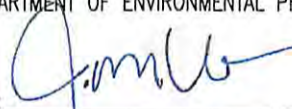


Well is located on topo map 6,823 feet west of Longitude: 80° 45' 00"

RECEIVED
 Office of Oil and Gas
 AUG 24 2018
 WV Department of
 Environmental Protection

FILE #: MND 01 DHS
 DRAWING #: MND 01 DHS
 SCALE: 1"=2000'
 MINIMUM DEGREE OF ACCURACY: 1/2500
 PROVEN SOURCE U.S.G.S. MONUMENT
 OF ELEVATION: H 138: 638.58'

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

SIGNED: 
 R.P.E.: 18766 L.L.S.: P.S. NO. _____

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS
 WVDEP
 OFFICE OF OIL & GAS
 601 57TH STREET
 CHARLESTON, WV 25304

Well Type: Oil Waste Disposal Production Deep
 Gas Liquid Injection Storage Shallow

WATERSHED: SHORT CREEK-OHIO RIVER ELEVATION: 1150.00'
 COUNTY/DISTRICT: MARSHALL / CLAY QUADRANGLE: POWHATAN POINT, W. VA./OHIO
 SURFACE OWNER: CONSOLIDATION COAL COMPANY/ MURRAY ENERGY ACREAGE: 126.99
 OIL & GAS ROYALTY OWNER: CNX GAS COMPANY, LLC, ET AL. ACREAGE: 126.99

DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE
 PLUG OFF OLD FORMATION PERFORATE NEW FORMATION PLUG AND ABANDON
 CLEAN OUT & REPLUG OTHER CHANGE (SPECIFY) _____

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 6,449' ± TMD: 15,818' ±
 WELL OPERATOR: HG ENERGY II APPALACHIA, LLC DESIGNATED AGENT: DIANE C. WHITE
 Address: 5260 DUPONT ROAD Address: 5260 DUPONT ROAD
 City PARKERSBURG State WV Zip Code 26101 City PARKERSBURG State WV Zip Code 26101



DATE: AUGUST 20, 2018
 OPERATOR'S WELL #: MND 01 DHS
 API WELL # 47 051
 STATE COUNTY PERMIT

08/31/2018

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.
True vertical depths are referenced to Patterson 347 (RKB)
Measured depths are referenced to Patterson 347 (RKB)
Patterson 347 (RKB) to Mean Sea Level: 1175 feet
Mean Sea Level to Mud line (At Slot: Slot D): -1150 feet
Coordinates are in feet referenced to Slot

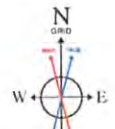
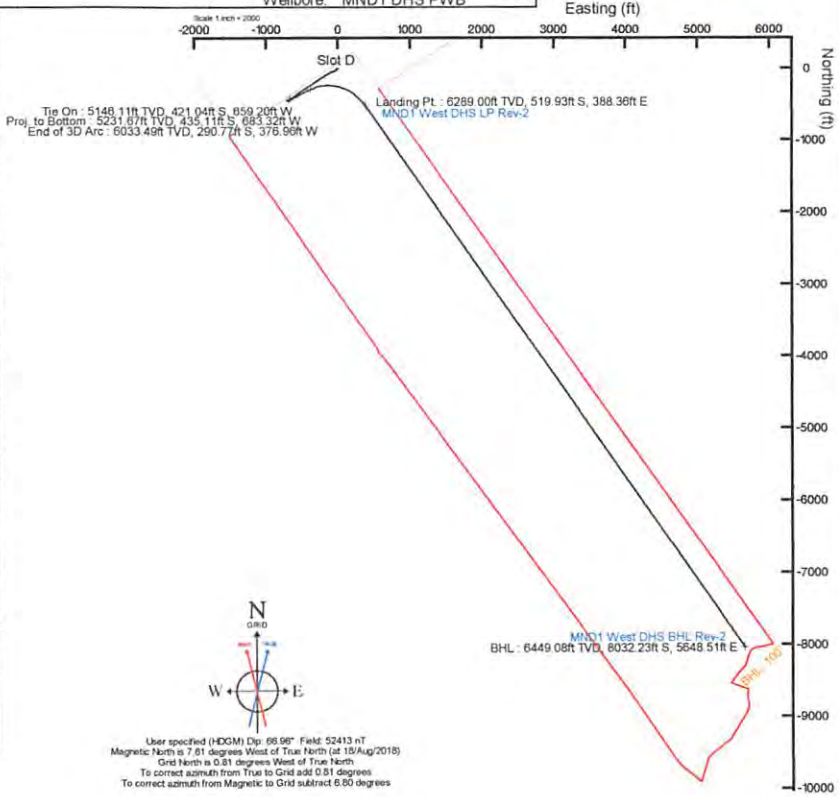
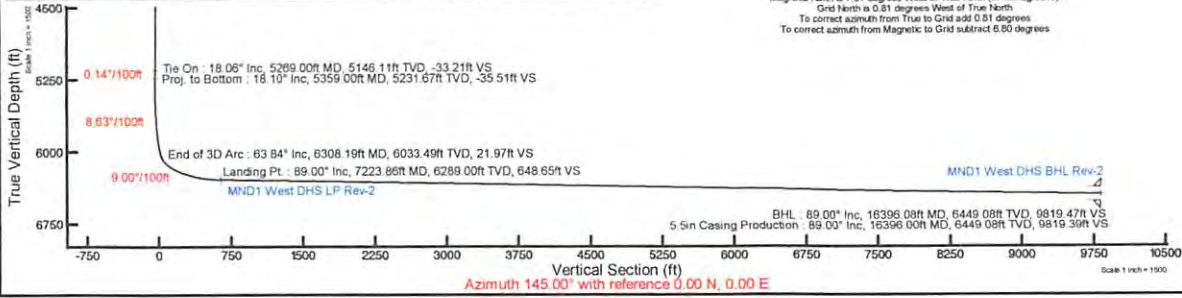
Location Information					
Facility Name	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude	
MND1 Pad	1642158 830	494181 810	39°50'59.203"N	80°46'28.371"W	
Slot	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Longitude
Slot D	5.89	26.77	1642185 600	494167 700	39°50'59.265"N 80°46'28.029"W
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	2442.01	89 4000 gys - north-south	89 4000 gys - north-south (Standard)	81_20ys_110_147_110P_2400	MND1 DHS AHS
2442.01	5398.00	0905 MND1 MD	0905 MND1 MD - 11050R	02_MND1 MD - 1105_0905 (02/03/2017)	MND1 DHS AHS
5398.00	16396.00	89 4000 Case	89 4000 Case (Standard)	89_4000 Case - 1105R	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"N 80°46'22.305"W
MND1 West DHS BHL Rev-2	16396.08	6449.08	-8032.23	5648.51	1647633.60	494135.90	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	16370.08	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

Planned Wellpath Report

MND1 DHS PWP Rev-C.0

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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°

SI-01836
mod

Planned Wellpath Report

MND1 DHS PWP Rev-C.0

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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]
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

08/31/2018

Planned Wellpath Report

MND1 DHS PWP Rev-C.0

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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			
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 (ft/100ft)	Build Rate (ft/100ft)	Turn Rate (°/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 [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]
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°46'00.366"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°45'59.616"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°45'58.866"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°45'58.116"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°45'57.366"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°45'56.616"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°45'55.866"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°45'55.116"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°45'54.366"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°45'53.616"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°45'52.866"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 (°/100m)	Build Rate (°/100m)	Turn Rate (°/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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