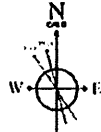


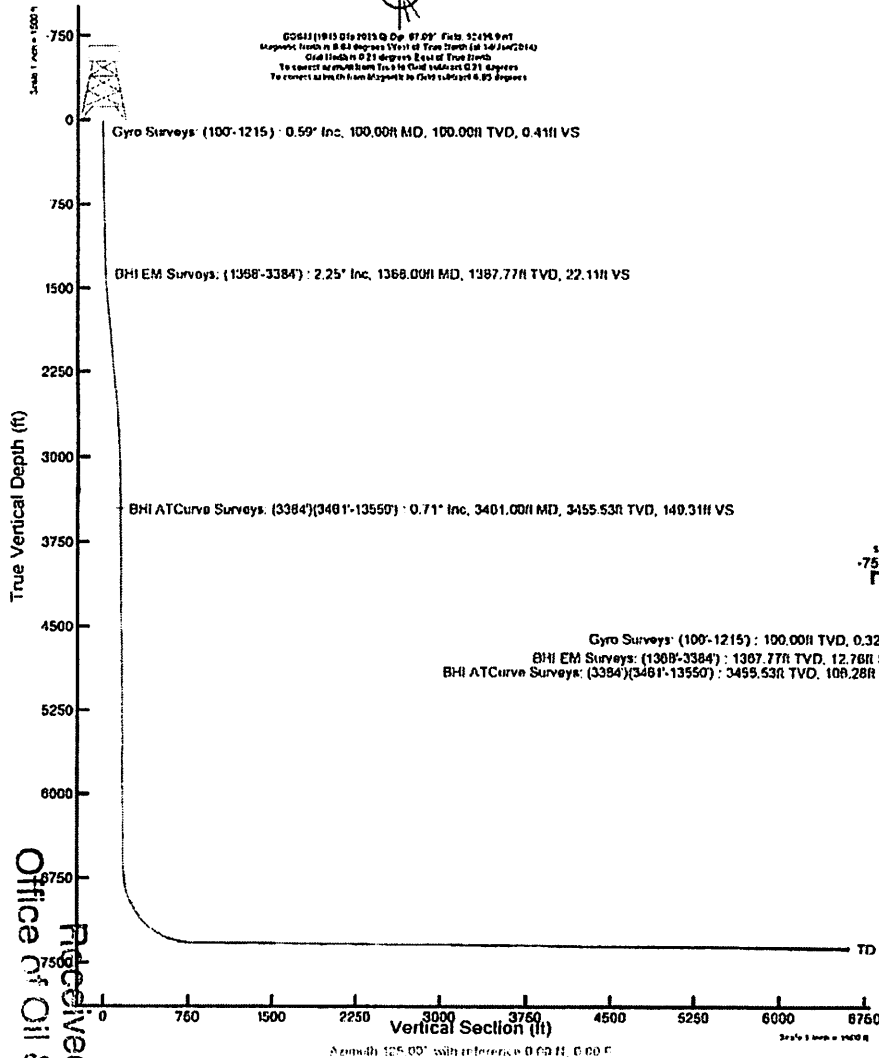
HG ENERGY

Location: Welzel County, WV
 Field: Welzel (UTM 17N NAD 27)
 Facility: Long 409 Pad

Slot: Slot #05
 Well: Long 409 S-5H
 Wellbore: Long 409 S-5H PWB



G0511 (10/15 Old 2015) D Op. 07.09' Feb. 02/19.9m
 Magnetic North is 8.63 degrees West of True North (at 10/14/2014)
 Grid North is 0.21 degrees East of True North
 To convert magnetic bearings to Grid North add 0.21 degrees
 To convert to South from Magnetic to Grid subtract 0.21 degrees



Location Information

Facility Name	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude		
Long 409 Pad	1731860.700	14374712.900	39°35'02.180" N	80°40'31.507" W		
Slot	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
Slot #05	-38.21	-84.53	1731796.200	14374674.700	39°35'01.604" N	80°40'32.423" W
DM 24 (RT) to Mud line (At Slot: Slot #05)						18ft
Mean Sea Level to Mud line (At Slot: Slot #05)						-1340ft
DM 24 (RT) to Mean Sea Level						1358ft

Targets

Interval	MD (ft)	TVD (ft)	Local N (ft)	Local E (ft)	Grid East (US ft)	Grid North (US ft)	Latitude	Longitude
Long 409 S-5H LP	7300.00	218.06	1020.31	1732879.10	14374692.70	39°35'01.432" N	80°40'18.903" W	
Long 409 S-5H LP Rev 1	7737.71	2318.06	188.14	1063.68	1732879.10	39°35'03.702" N	80°40'18.903" W	
Long 409 S-5H PWB Rev 1	13554.35	7368.88	-3249.04	548.10	1732879.10	14371527.90	39°34'50.412" N	80°39'17.745" W
Long 409 S-5H PWB	7402.50	-3147.04	2533.10	1732879.10	14371527.90	39°34'50.412" N	80°39'17.745" W	

Well Profile Data

Design Comment	MD (ft)	Inc (")	Az (°)	TVD (ft)	Local N (ft)	Local E (ft)	DLS (*/100ft)	VS (ft)
Tie On	7437.00	61.920	117.050	7238.22	344.02	837.89	0.18	489.04
Projection	7462.00	84.210	117.050	7249.54	333.88	857.74	0.18	511.11
End of 3D Arc	7476.72	62.843	117.873	7258.11	327.81	869.43	10.55	524.17
LP	7737.71	89.500	125.000	7318.00	186.14	1093.08	10.55	774.71
PBHL	13568.35	89.500	125.000	7368.88	-3148.04	5859.10	0.00	G005.13

Plot reference wellpath is Long 409 S-5H PWB Rev-D.0

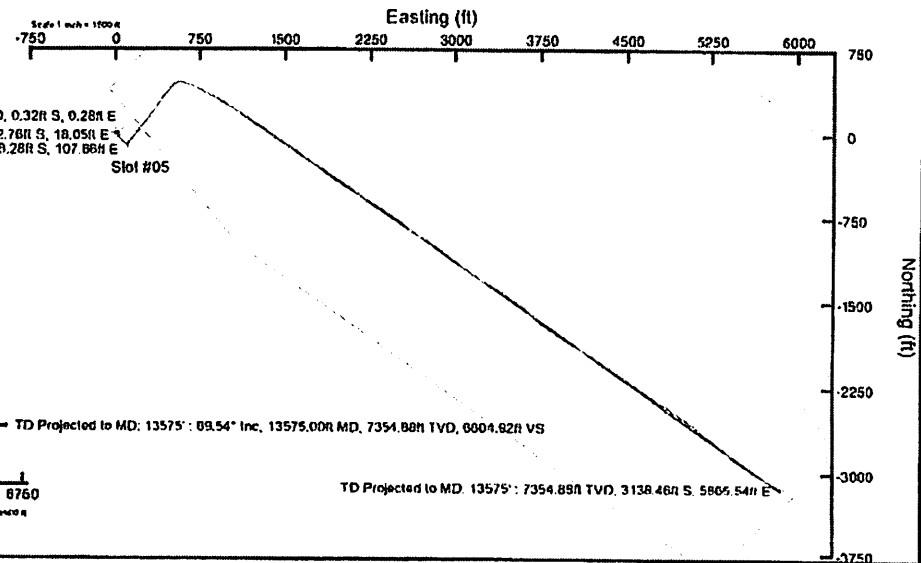
True vertical depths are referenced to DM 24 (RT) Grid System: NAD27 / UTM Zone 17 North, US feet

Measured depths are referenced to DM 24 (RT) North Reference: Grid north

DM 24 (RT) to Mean Sea Level: 1358 feet Scale: True distance

Mean Sea Level to Mud line (At Slot: Slot #05): -1340 feet Depths are in feet

Coordinates are in feet referenced to Slot Created by: frinjst on 20/Jan/2014



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Actual Wellpath Report

Long 409 S-5H AWP Proj: 13575

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REFERENCE WELLPATH IDENTIFICATION			
Operator	HG ENERGY	Slot	Slot #05
Area	Wetzel County, WY	Well	Long 409 S-5H
Field	Wetzel (UTM 17N NAD 27)	Wellbore	Long 409 S-5H (AWB)
Facility	Long 409 Pad		

REPORT SETUP INFORMATION			
Projection System	NAD27 / UTM Zone 17 North, US feet	Software System	WellArchitect® 4.0.1
North Reference	Grid	User	Frisjest
Scale	0.99961	Report Generated	20/Jan/2014 at 11:05
Convergence at slot	0.21° East	Database/Source file	WA_EasternUS/Long_409_S-5H_AWB.xml

	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	-38.21	-64.53	1731796.20	14374674.70	39°35'01.804"N	80°40'32.423"W
Facility Reference Pt			1731860.70	14374712.90	39°35'02.180"N	80°40'31.597"W
Field Reference Pt			1731860.70	14374712.90	39°35'02.180"N	80°40'31.597"W

WELLPATH DATUM			
Calculation method	Minimum curvature	DM 24 (RT) to Facility Vertical Datum	18.00ft
Horizontal Reference Pt	Slot	DM 24 (RT) to Mean Sea Level	1358.00ft
Vertical Reference Pt	DM 24 (RT)	DM 24 (RT) to Mud Line at Slot (Slot #05)	18.00ft
MD Reference Pt	DM 24 (RT)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	125.00°

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Actual Wellpath Report

Long 409 S-5H AWP Proj: 13575

REFERENCE WELLPATH IDENTIFICATION		Slot #05
Operator	HG ENERGY	Long 409 S-5H
Area	Wetzel County, WV	Well
Field	Wetzel (UTM 17N NAD 27)	Wellbore
Facility	Long 409 Prod	

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sct [ft]	North [ft]	East [ft]	Grid East [U.S. ft]	Grid North [U.S. ft]	Longitude	Change Dist [ft]	Change Dir [°]	R.S. [ft/100ft]
0.00	0.00	0.00	0.00	0.00	0.00	0.00	1731796.20	14374674.70	80°40'32.423°W	0.00	0.000	0.00
18.00	0.00	138.500	18.00	0.00	0.00	0.00	1731796.20	14374674.70	80°40'32.423°W	0.00	0.000	0.00
100.00	0.550	138.500	100.00	0.41	-0.32	0.28	1731796.48	14374674.38	80°40'32.419°W	0.42	138.500	0.72
200.00	0.560	85.900	199.59	1.29	-0.67	1.11	1731797.31	14374674.03	80°40'32.409°W	1.29	121.015	0.51
300.00	0.390	147.300	299.99	1.98	-0.92	1.78	1731797.98	14374673.78	80°40'32.408°W	2.00	112.225	0.51
400.00	1.000	119.100	399.98	3.17	-1.63	2.73	1731798.92	14374673.07	80°40'32.388°W	3.18	120.864	0.66
500.00	0.750	76.600	499.97	4.47	-1.90	4.11	1731800.32	14374672.89	80°40'32.370°W	4.51	114.731	0.68
600.00	0.980	160.100	599.96	5.60	-2.55	5.65	1731801.25	14374672.15	80°40'32.358°W	5.66	116.817	1.16
700.00	1.190	123.000	699.95	7.34	-3.92	6.21	1731802.41	14374670.28	80°40'32.314°W	7.35	122.268	0.72
800.00	0.940	108.800	799.93	9.17	-4.75	7.86	1731804.06	14374669.95	80°40'32.323°W	9.19	121.159	0.16
900.00	0.690	127.500	899.92	10.56	-5.38	9.12	1731805.31	14374669.32	80°40'32.307°W	10.59	120.569	0.16
1000.00	1.140	136.700	999.90	12.10	-6.60	10.40	1731806.59	14374668.10	80°40'32.286°W	12.32	122.419	0.67
1100.00	1.530	117.800	1098.87	14.76	-8.07	12.37	1731808.57	14374666.63	80°40'32.265°W	14.77	123.124	0.50
1200.00	1.310	118.000	1198.84	17.21	-9.23	14.55	1731810.75	14374665.48	80°40'32.237°W	17.21	122.175	0.21
1215.00	1.240	130.600	1218.84	17.55	-9.41	14.83	1731811.02	14374665.29	80°40'32.234°W	17.56	122.408	1.92
1300.00	2.250	159.170	1367.77	22.11	-12.76	18.05	1731814.24	14374661.91	80°40'32.193°W	22.11	125.265	0.68
1400.00	3.330	139.770	1428.69	25.01	-15.06	20.01	1731816.20	14374659.65	80°40'32.168°W	25.01	126.967	1.74
1494.00	4.590	146.500	1492.54	29.14	-18.56	22.28	1731818.77	14374656.15	80°40'32.135°W	29.23	129.415	2.13
1557.00	5.506	149.170	1556.29	34.32	-23.31	25.57	1731821.76	14374651.38	80°40'32.097°W	34.61	132.178	1.47
1619.00	5.870	148.240	1617.99	39.92	-28.55	28.74	1731824.93	14374646.16	80°40'32.057°W	40.51	131.807	0.54
1682.00	5.720	149.020	1680.67	45.72	-31.96	32.04	1731828.23	14374640.76	80°40'32.015°W	46.69	136.663	0.20
1745.00	5.020	149.010	1744.34	51.65	-39.52	35.38	1731831.57	14374635.19	80°40'31.973°W	53.05	138.165	0.31
1809.00	5.670	150.180	1807.02	57.42	-44.99	38.59	1731834.77	14374629.23	80°40'31.932°W	59.27	139.179	0.19
1872.00	5.140	146.710	1869.74	62.83	-50.03	41.68	1731837.86	14374624.69	80°40'31.897°W	65.11	140.206	0.93
1935.00	5.190	145.850	1932.49	68.12	-54.75	44.82	1731841.01	14374619.97	80°40'31.855°W	70.76	141.055	0.15
1998.00	5.100	145.370	1994.23	73.41	-59.41	48.01	1731844.20	14374615.31	80°40'31.812°W	76.39	141.855	0.16
2061.00	5.110	138.650	2057.93	78.76	-63.82	51.46	1731847.64	14374610.91	80°40'31.769°W	82.52	140.857	0.50
2124.00	5.010	135.240	2120.74	84.19	-67.88	55.25	1731851.43	14374606.85	80°40'31.720°W	87.52	140.175	1.12
2187.00	4.530	128.970	2181.52	89.39	-71.40	59.12	1731855.30	14374603.12	80°40'31.671°W	92.70	139.213	0.69
2250.00	4.210	128.990	2246.32	94.45	-74.60	63.07	1731859.25	14374600.13	80°40'31.621°W	97.69	139.786	0.27
2313.00	4.980	128.280	2309.09	99.76	-77.92	67.23	1731863.40	14374596.81	80°40'31.568°W	102.91	139.213	0.44
2376.00	5.110	124.250	2371.85	105.30	-81.19	71.69	1731867.87	14374593.54	80°40'31.511°W	108.32	138.536	0.69
2439.00	5.200	123.570	2434.59	110.96	-84.35	76.39	1731872.56	14374590.38	80°40'31.451°W	113.80	137.816	0.18
2502.00	4.350	117.710	2497.37	116.18	-87.01	80.88	1731877.05	14374587.11	80°40'31.391°W	118.82	137.100	1.53
2565.00	4.120	123.880	2561.20	120.89	-89.45	84.94	1731881.11	14374583.28	80°40'31.342°W	123.38	136.182	0.80
2629.00	4.100	119.250	2624.01	125.39	-91.82	88.79	1731884.95	14374582.02	80°40'31.294°W	127.72	135.961	0.53
2693.00	3.630	121.210	2686.89	129.62	-93.95	92.46	1731888.62	14374580.79	80°40'31.246°W	131.81	135.159	0.77
2757.00	3.350	120.270	2749.77	133.51	-95.95	95.82	1731891.99	14374578.79	80°40'31.203°W	135.61	134.018	0.23
2821.00	2.310	122.310	2811.69	136.77	-97.63	98.51	1731894.77	14374577.11	80°40'31.168°W	141.26	134.716	1.61
2885.00	2.100	122.310	2874.61	139.30	-99.07	100.69	1731896.65	14374575.67	80°40'31.141°W	145.25	134.555	0.72
2949.00	1.860	126.410	2937.60	141.31	-100.28	102.30	1731898.46	14374574.46	80°40'31.121°W	149.48	134.429	0.86
3013.00	1.890	126.410	3000.59	142.74	-101.21	103.38	1731899.54	14374573.53	80°40'31.107°W	154.83	134.392	0.89
3077.00	1.000	145.610	3061.57	143.86	-102.12	104.11	1731900.27	14374572.62	80°40'31.098°W	160.59	134.418	0.25
3141.00	1.010	130.660	3122.56	144.88	-102.99	104.88	1731901.01	14374571.75	80°40'31.088°W	166.99	134.479	0.44
3196.00	0.810	149.100	3190.56	145.94	-103.73	105.53	1731901.69	14374571.01	80°40'31.080°W	173.97	134.508	0.56

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Actual Wellpath Report

Long 409 S-5H AWP Proj: 13575

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Operator: IUG ENERGY

Area: Wetzel County, WV

Field: Wetzel (UTM 17N NAD 27)

Facility: Long 409 Pad

Slot #05

Long 409 S-5H

Well: Long 409 S-5H (AWH)

Slot

Well

Wellbore

WELLPATH DATA (228 Stations)

Table with columns: Station ID, Elevation, Azimuth, TVD, Vert Sect, North, East, Grid East, Grid North, Longitude, and DLS. It contains 228 rows of well path data.

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Actual Wellpath Report

Long 409 S-5H AWP Proj: 13575
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REFERENCE WELLPATH IDENTIFICATION

Operator	JIG ENERGY	Slot #05
Area	Wetzel County, WV	Long 409 S-5H
Field	Wetzel (UTM 17N NAD 27)	Well
Facility	Long 409 Pad	Wellbore

WELLPATH DATA (228 Stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	VertStc [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude [US ft]	Longitude [ft]	Course Dist [ft]	Closure Err [ft]	DLS [1/100ft]
13501.00	89.156	121.146	2354.25	6531.12	-3160.52	5802.01	1737595.94	14371575.40	39°34'30.648"N	80°39'18.471"W	6576.49	118.119	0.14
13550.00	89.546	120.766	2151.68	6579.99	-3125.70	5844.05	1737637.95	14371550.23	39°34'30.698"N	80°39'17.916"W	6627.43	118.140	0.92
13575.00	89.540	120.700	2151.88	6604.92	-3138.46	5863.54	1737659.44	14371537.47	39°34'30.571"N	80°39'17.623"W	6652.41	118.150	0.03

TARGETS

Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Slope
Long 409 S-5H 1 P		7100.09	219.09	1050.31	17332846.10	14374893.70	39°35'03.932"N	80°40'18.995"W	point
Long 409 S-5H 1 P-Rev-1		7318.09	196.14	1083.08	17328278.85	14371870.76	39°35'03.701"N	80°40'18.581"W	point
Long 409 S-5H PBH1-Rev-1		7308.88	-3148.04	5859.10	1737653.00	14371827.90	39°34'30.476"N	80°39'17.745"W	point
Long 409 S-5H PBH1		7402.50	-3148.04	5859.10	1737653.00	14371827.90	39°34'30.476"N	80°39'17.745"W	point

WELLPATH COMPOSITION - Ref Wellbore: Long 409 S-5H (AWB) - Ref Wellpath: Long 409 S-5H AWP Proj: 13575

Start MD [ft]	End MD [ft]	Position Uncertainty (Model)	Log Name/Comment	Wellbore
18.00	1215.00	Generic gyra - non-tracking (Standard)	01 - Gyra Surveys <17-1/4" > (109-1215)	Long 409 S-5H (AWB)
1215.00	3384.00	ISCWVA MWD, Rev. 2 (Standard)	02 - UBH0 Svcs <12-1/4" > (1215)(1368-3384) Proj: 13540	Long 409 S-5H (AWB)
3384.00	13550.00	NavTrak (MagCor)	03 - BH1-A (Curve R 1/2" Section (13381)(3461)-13550)	Long 409 S-5H (AWB)
13550.00	13575.00	Blind Drilling (std)	Projection in bit	Long 409 S-5H (AWB)

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Actual Wellpath Report
 Long 409 S-511 AWP Proj: 13575
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REFERENCE WELL IDENTIFICATION	
Operator	HG ENERGY
Area	Wetzel County, WV
Field	Wetzel (UTM 17N NAD 27)
Facility	Long 409 Pad
Slot	Slot #05
Well	Long 409 S-511
Wellbore	Long 409 S-511 (AWP)

COMMENTS
 Wellpath general comments
 Gyo Surveys. (100-1215)
 BHH EMI Surveys. (1368-3384)
 BHH ATCurve Surveys. (3384)(3401-13550)
 TD Projected to MD. 13575'

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