

HG Energy, LLC

Harrison County, West Virginia

J.M. Fultz #147

J.M. Fultz #147

Wellbore #1

Design: Wellbore #1

HG Energy EOW Report

27 May, 2014

Environmental Protection
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33-05802

DDC
HG Energy EOW Report



Company: HG Energy, LLC	Local Co-ordinate Reference: Well J.M. Fultz #147
Project: Harrison County, West Virginia	TVD Reference: WELL @ 1289.0usft
Site: J.M. Fultz #147	MD Reference: WELL @ 1289.0usft
Well: J.M. Fultz #147	North Reference: Grid
Wellbore: Wellbore #1	Survey Calculation Method: Minimum Curvature
Design: Wellbore #1	Database: EDM 5000.1 Single User Db

Project Harrison 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 J.M. Fultz #147		
Site Position:	Northing: 14,261,536.22 usft	Latitude: 39° 16' 14.300 N
From: Lat/Long	Easting: 1,779,185.10 usft	Longitude: 80° 30' 34.800 W
Position Uncertainty: 0.0 usft	Slot Radius: 13-3/16 "	Grid Convergence: 0.31 °

Well J.M. Fultz #147		
Well Position +N/-S 0.0 usft	Northing: 14,261,536.22 usft	Latitude: 39° 16' 14.300 N
+E/-W 0.0 usft	Easting: 1,779,185.10 usft	Longitude: 80° 30' 34.800 W
Position Uncertainty 0.0 usft	Wellhead Elevation: 0.0 usft	Ground Level: 1,281.0 usft

Wellbore Wellbore #1					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	4/4/2014	-8.65	66.78	52,276

Design Wellbore #1				
Audit Notes:				
Version: 1.0	Phase: ACTUAL	Tie On Depth: 0.0		
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	113.00

Survey Program	Date 5/7/2014			
From (usft) 850.0	To (usft) 3,326.0	Survey (Wellbore) MWD (Wellbore #1)	Tool Name MWD default	Description MWD - Standard

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MD Reference: WELL @ 1289.0usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.0	0.00	
850.0	0.00	0.00	850.0	0.0	0.0	0.0	0.00	0.0	0.00	
FIRST MWD SURVEY @ 850' MD / 850' TVD										
863.0	1.40	108.40	863.0	-0.1	0.2	0.2	10.77	0.2	108.40	
893.0	1.60	109.50	893.0	-0.3	0.9	0.9	0.67	0.9	108.89	
923.0	2.30	109.10	923.0	-0.6	1.9	2.0	2.33	2.0	109.08	
953.0	3.60	112.50	952.9	-1.2	3.3	3.5	4.37	3.5	110.00	
983.0	4.80	116.10	982.8	-2.1	5.3	5.7	4.09	5.7	111.76	
1,013.0	5.70	118.80	1,012.7	-3.4	7.7	8.4	3.11	8.4	113.64	
1,043.0	6.70	119.20	1,042.5	-5.0	10.6	11.7	3.34	11.7	115.13	
1,073.0	7.60	118.40	1,072.3	-6.8	13.8	15.4	3.02	15.4	116.02	
1,103.0	8.40	117.40	1,102.0	-8.7	17.5	19.5	2.71	19.6	116.41	
1,133.0	9.50	118.10	1,131.7	-10.9	21.7	24.2	3.68	24.2	116.67	
1,163.0	10.60	119.10	1,161.2	-13.4	26.2	29.4	3.71	29.5	117.02	
1,193.0	11.90	120.80	1,190.6	-16.3	31.3	35.2	4.47	35.3	117.51	
1,223.0	12.70	120.60	1,219.9	-19.6	36.8	41.5	2.67	41.7	118.00	
1,253.0	12.90	118.00	1,249.2	-22.8	42.6	48.1	2.03	48.3	118.18	
1,283.0	13.40	115.90	1,278.4	-25.9	48.7	54.9	2.30	55.2	118.02	
1,313.0	14.20	114.40	1,307.5	-29.0	55.2	62.1	2.92	62.3	117.69	
1,343.0	15.50	114.30	1,336.5	-32.1	62.2	69.8	4.33	70.0	117.33	
1,373.0	16.80	114.70	1,365.3	-35.6	69.8	78.1	4.35	78.3	117.03	
1,403.0	18.50	115.60	1,393.9	-39.5	78.0	87.2	5.74	87.4	116.83	
1,433.0	19.70	117.10	1,422.3	-43.8	86.8	97.0	4.32	97.2	116.79	
1,463.0	20.60	117.10	1,450.4	-48.5	96.0	107.3	3.00	107.6	116.82	
1,493.0	20.80	117.20	1,478.5	-53.4	105.4	117.9	0.68	118.2	116.85	
1,523.0	20.90	116.30	1,506.5	-58.2	115.0	128.5	1.12	128.8	116.84	
1,553.0	21.30	114.70	1,534.5	-62.8	124.7	139.3	2.34	139.6	116.73	

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 July 1, 2014

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Site: J.M. Fultz #147
Well: J.M. Fultz #147
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well J.M. Fultz #147
TVD Reference: WELL @ 1289.0usft
MD Reference: WELL @ 1289.0usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
1,583.0	21.80	113.60	1,562.4	-67.3	134.8	150.4	2.14	150.6	116.54
1,613.0	22.90	113.00	1,590.2	-71.8	145.2	161.8	3.74	162.0	116.32
1,643.0	23.70	112.80	1,617.7	-76.4	156.2	173.6	2.68	173.9	116.08
1,673.0	24.60	111.80	1,645.1	-81.1	167.5	185.9	3.30	186.1	115.83
1,703.0	25.60	111.90	1,672.3	-85.8	179.3	198.6	3.34	198.8	115.58
1,733.0	26.60	112.60	1,699.2	-90.8	191.6	211.8	3.49	212.0	115.37
1,763.0	27.30	113.00	1,726.0	-96.1	204.1	225.4	2.41	225.6	115.22
1,793.0	26.80	112.90	1,752.7	-101.4	216.7	239.1	1.67	239.2	115.09
1,823.0	26.00	111.50	1,779.5	-106.5	229.0	252.4	3.38	252.5	114.94
1,853.0	25.70	110.60	1,806.5	-111.2	241.2	265.5	1.65	265.6	114.74
1,883.0	25.90	110.90	1,833.6	-115.8	253.4	278.5	0.80	278.6	114.56
1,913.0	26.50	111.30	1,860.5	-120.6	265.8	291.8	2.08	291.8	114.40
1,943.0	27.30	112.10	1,887.2	-125.6	278.4	305.3	2.93	305.4	114.28
1,973.0	27.90	112.20	1,913.8	-130.8	291.3	319.2	2.01	319.3	114.19
2,003.0	28.00	112.50	1,940.3	-136.2	304.3	333.3	0.58	333.3	114.11
2,033.0	28.20	112.20	1,966.8	-141.5	317.3	347.4	0.82	347.5	114.04
2,063.0	28.00	111.30	1,993.2	-146.8	330.5	361.5	1.56	361.6	113.95
2,093.0	29.20	111.70	2,019.6	-152.0	343.8	375.9	4.05	375.9	113.86
2,123.0	30.20	111.30	2,045.6	-157.5	357.6	390.8	3.40	390.8	113.77
2,153.0	30.90	110.20	2,071.5	-162.9	371.9	406.0	2.99	406.0	113.65
2,183.0	31.10	109.60	2,097.2	-168.2	386.4	421.4	1.23	421.4	113.52
2,213.0	30.90	110.30	2,122.9	-173.4	401.0	436.8	1.37	436.9	113.39
2,243.0	29.90	111.50	2,148.8	-178.8	415.1	452.0	3.90	452.0	113.31
2,273.0	28.90	112.80	2,174.9	-184.4	428.8	466.7	3.95	466.7	113.27
2,303.0	28.10	113.00	2,201.3	-190.0	442.0	481.1	2.69	481.1	113.26
2,333.0	28.10	114.00	2,227.7	-195.6	454.9	495.2	1.57	495.2	113.26
2,363.0	27.90	113.90	2,254.2	-201.3	467.8	509.3	0.68	509.3	113.28

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 Well: J.M. Fultz #147
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well J.M. Fultz #147
 TVD Reference: WELL @ 1289.0usft
 MD Reference: WELL @ 1289.0usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM 5000.1 Single User Db

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
2,393.0	27.70	112.80	2,280.8	-206.9	480.6	523.3	1.84	523.3	113.29
2,423.0	26.80	111.10	2,307.4	-212.0	493.4	537.0	3.97	537.0	113.25
2,453.0	26.30	110.90	2,334.3	-216.8	505.9	550.4	1.69	550.4	113.20
2,483.0	26.20	111.70	2,361.2	-221.6	518.3	563.7	1.23	563.7	113.15
2,513.0	25.40	111.80	2,388.2	-226.5	530.4	576.7	2.67	576.7	113.12
2,543.0	25.50	112.40	2,415.3	-231.3	542.3	589.6	0.92	589.6	113.10
2,573.0	26.00	112.50	2,442.3	-236.3	554.4	602.6	1.67	602.6	113.08
2,603.0	27.00	112.80	2,469.1	-241.4	566.7	616.0	3.36	616.0	113.07
2,633.0	26.90	114.00	2,495.9	-246.8	579.2	629.6	1.84	629.6	113.08
2,663.0	27.70	116.30	2,522.5	-252.7	591.7	643.4	4.41	643.4	113.13
2,693.0	27.70	116.60	2,549.1	-258.9	604.1	657.3	0.46	657.3	113.20
2,723.0	27.20	115.40	2,575.7	-265.0	616.6	671.1	2.49	671.1	113.25
2,753.0	27.10	114.70	2,602.4	-270.8	629.0	684.8	1.12	684.8	113.29
2,783.0	28.50	113.70	2,629.0	-276.5	641.7	698.8	4.92	698.8	113.31
2,813.0	28.40	113.20	2,655.3	-282.2	654.8	713.0	0.86	713.1	113.31
2,843.0	28.90	112.50	2,681.7	-287.8	668.1	727.4	2.01	727.4	113.30
2,873.0	29.90	111.70	2,707.8	-293.3	681.7	742.2	3.58	742.2	113.28
2,903.0	29.70	111.00	2,733.8	-298.7	695.6	757.1	1.34	757.1	113.24
2,933.0	29.70	109.90	2,759.9	-303.9	709.6	771.9	1.82	771.9	113.19
2,963.0	28.90	108.40	2,786.1	-308.7	723.4	786.6	3.62	786.6	113.11
2,993.0	27.90	106.20	2,812.4	-313.0	737.0	800.7	4.82	800.7	113.01
3,023.0	26.80	105.10	2,839.1	-316.7	750.3	814.4	4.03	814.4	112.88
3,053.0	26.40	105.10	2,865.9	-320.2	763.3	827.7	1.33	827.7	112.76
3,083.0	26.00	105.80	2,892.8	-323.7	776.1	840.9	1.68	840.9	112.64
3,113.0	26.10	107.00	2,919.8	-327.5	788.7	853.9	1.79	854.0	112.55
3,128.0	26.00	107.00	2,933.3	-329.4	795.0	860.5	0.67	860.5	112.51
3,143.0	25.40	106.90	2,946.8	-331.3	801.2	867.0	4.01	867.0	112.46

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 Design: Wellbore #1

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MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
3,173.0	25.50	106.60	2,973.9	-335.0	813.6	879.8	0.54	879.8	112.38
3,203.0	25.50	107.60	3,000.9	-338.8	825.9	892.6	1.44	892.7	112.30
3,233.0	25.00	107.80	3,028.1	-342.7	838.1	905.4	1.69	905.4	112.24
3,263.0	24.40	107.30	3,055.3	-346.5	850.0	917.8	2.12	917.9	112.17
3,271.0	24.20	107.30	3,062.6	-347.4	853.2	921.1	2.50	921.2	112.16
3,326.0	24.20	107.30	3,112.8	-354.1	874.7	943.6	0.00	943.7	112.04

TD @ 3326' MD / 3113' TVD

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
850.0	850.0	0.0	0.0	FIRST MWD SURVEY @ 850' MD / 850' TVD
3,326.0	3,112.8	-354.1	874.7	TD @ 3326' MD / 3113' TVD

Checked By: _____ Approved By: _____ Date: _____

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J.M. Fultz #147
 Harrison County, West Virginia
 Q140358 & AM-140316
 Design #1

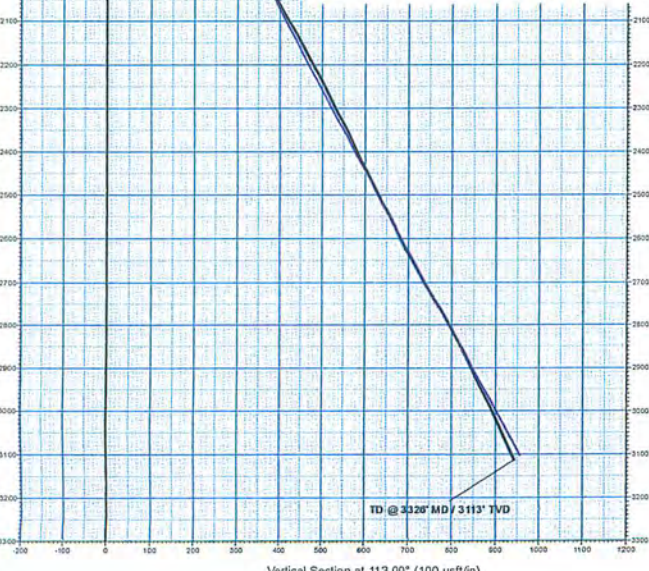
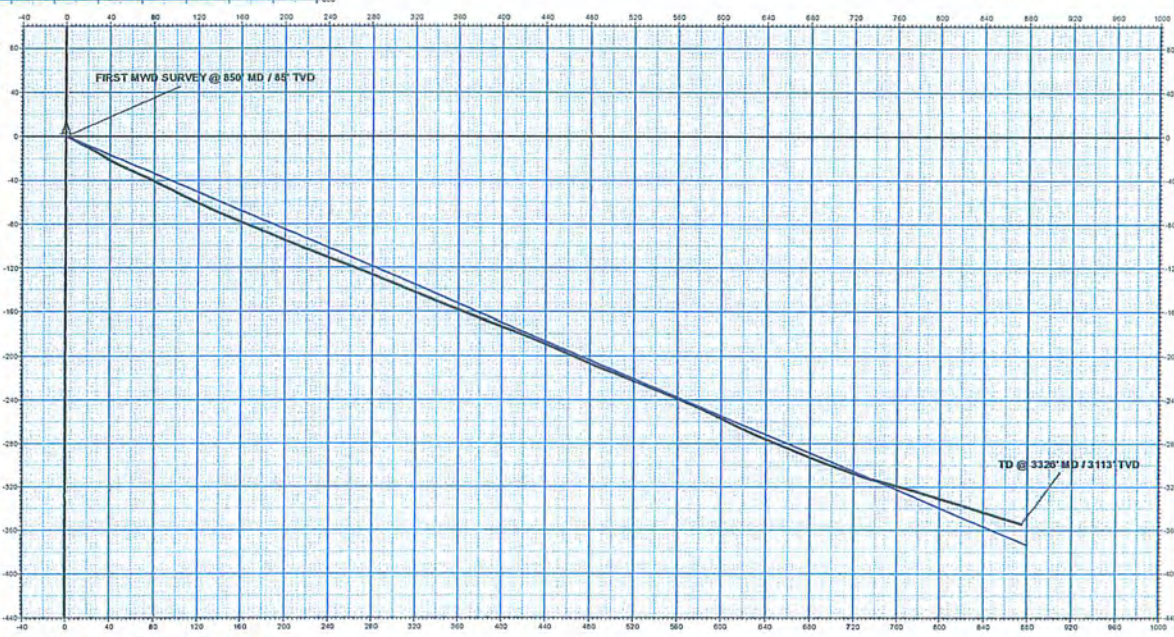
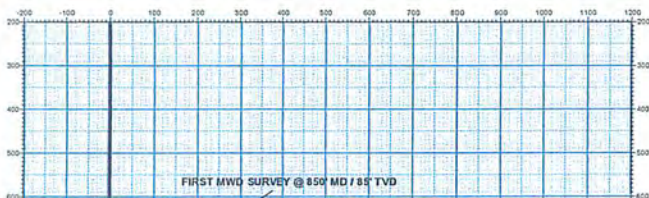
Company Name: HG Energy, LLC
 J.M. Fultz #147
 Harrison County, West Virginia
 Rig: Decker #9
 Created By: James Dawson
 Date: 4/10/2014

PROJECT DETAILS: Harrison County, West Virginia
 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



HG Energy

Azimuths to Grid North
 Correction: -8.96°
 Magnetic Field Strength: 52276.1snT
 Dip Angle: 66.78°
 Date: 4/4/2014
 Model: IGRF2010



Vertical Section at 113.00° (100 usf/in)

WELL DETAILS: J.M. Fultz #147						
Ground Level:						1281.0
+N-S	+E-W	Northing	Easting	Latitude	Longitude	
0.0	0.0	14281536.22	1779185.10	$39^\circ 10' 14.300\text{ N}$	$80^\circ 30' 34.800\text{ W}$	

DESIGN TARGET DETAILS							
Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
Target J.M. Fultz #147 - plan hits target center	2925.0	-336.0	0.0	0.0	0.0	$39^\circ 10' 10.935\text{ N}$	$80^\circ 30' 24.754\text{ W}$

ANNOTATIONS									
MD	Inc	Azi	TVD	+N-S	+E-W	Vsect	Departure	Annotation	
850.0	0.00	0.00	850.0	0.0	0.0	0.0	0.0	FIRST MWD SURVEY @ 850' MD / 85' TVD	
3328.0	24.20	107.30	3112.8	-354.1	874.7	943.6	945.2	TD @ 3328' MD / 3113' TVD	

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06/27/2017

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J.M. Fultz #147
 Harrison County, West Virginia
 Q140358 & AM-140316
 Design #1

Company Name: HG Energy, LLC
 J.M. Fultz #147
 Harrison County, West Virginia
 Rig: Decker #9
 Created By: James Dawson
 Date: 4/10/2014

PROJECT DETAILS: Harrison County, West Virginia
 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

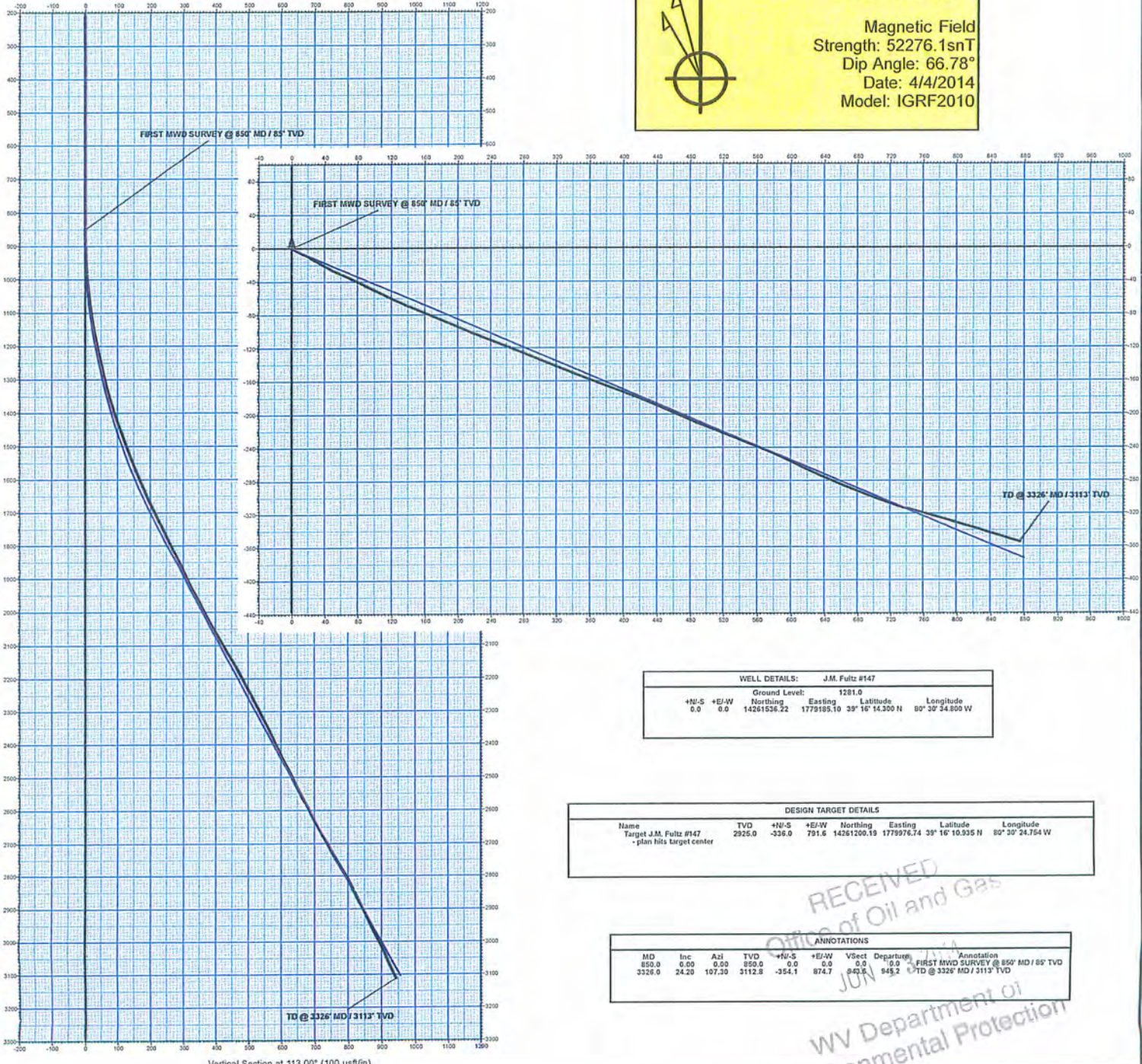


HG Energy

Azimuths to Grid North

Correction: -8.96°

Magnetic Field
 Strength: 52276.1snT
 Dip Angle: 66.78°
 Date: 4/4/2014
 Model: IGRF2010



Vertical Section at 113.00° (100 usft/in)

WELL DETAILS: J.M. Fultz #147

Ground Level:	1281.0
+N/-S	0.0
+E/-W	0.0
Northing	14261536.22
Easting	1779185.10
Latitude	39° 16' 14.300 N
Longitude	80° 30' 34.800 W

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Target J.M. Fultz #147 - plan hills target center	2925.0	-336.0	791.6	14261200.19	1779976.74	39° 16' 10.935 N	80° 30' 24.764 W

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Departure	Annotation
850.0	0.00	0.00	850.0	0.0	0.0	0.0	0.0	FIRST MWD SURVEY @ 850' MD / 85' TVD
3326.0	24.20	197.30	3112.8	-354.1	874.7	840.8	945.2	TD @ 3326' MD / 3113' TVD

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