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DEC 15 2015

WV GEOLOGICAL SURVEY
MORGANTOWN, WV

HG Energy, LLC
Harrison County, West Virginia
W.F Williams #131
W.F Williams #131

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

27 April, 2015





Company:	HG Energy, LLC	Local Co-ordinate Reference:	Well W.F Williams #131
Project:	Harrison County, West Virginia	TVD Reference:	Well @ 1181.0usft
Site:	W.F Williams #131	MD Reference:	Well @ 1181.0usft
Well:	W.F Williams #131	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

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	W.F Williams #131				
Site Position:		Northing:	14,261,918.59 usft	Latitude:	39° 16' 17.900 N
From:	Lat/Long	Easting:	1,782,516.31 usft	Longitude:	80° 29' 52.400 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.32 °

Well	W.F Williams #131					
Well Position	+N/-S	0.0 usft	Northing:	14,261,918.59 usft	Latitude:	39° 16' 17.900 N
	+E/-W	0.0 usft	Easting:	1,782,516.31 usft	Longitude:	80° 29' 52.400 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	1,173.0 usf	

Wellbore	Wellbore #1				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/31/2015	-8.70	66.68	52,155

Design	Wellbore #1				
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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	56.00

Survey Program	Date 4/27/2015				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
450.0	2,940.0	Survey #1 (Wellbore #1)	MWD default	MWD - Standard	

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	14,261,918.59	1,782,516.31	39° 16' 17.900 N	80° 29' 52.400 W
450.0	0.00	0.00	450.0	0.0	0.0	14,261,918.59	1,782,516.31	39° 16' 17.900 N	80° 29' 52.400 W
FIRST SURVEY @ 450' MD / 450' TVD									
526.0	1.10	96.57	526.0	-0.1	0.7	14,261,918.51	1,782,517.03	39° 16' 17.899 N	80° 29' 52.391 W
556.0	1.28	123.80	556.0	-0.3	1.3	14,261,918.29	1,782,517.60	39° 16' 17.897 N	80° 29' 52.384 W
586.0	1.50	107.10	586.0	-0.6	1.9	14,261,917.98	1,782,518.25	39° 16' 17.894 N	80° 29' 52.375 W
616.0	2.30	87.18	616.0	-0.7	2.9	14,261,917.90	1,782,519.23	39° 16' 17.893 N	80° 29' 52.363 W
646.0	3.31	72.99	645.9	-0.4	4.3	14,261,918.18	1,782,520.66	39° 16' 17.896 N	80° 29' 52.345 W
676.0	4.42	68.19	675.9	0.3	6.3	14,261,918.86	1,782,522.56	39° 16' 17.902 N	80° 29' 52.320 W
706.0	5.48	64.18	705.7	1.3	8.6	14,261,919.92	1,782,524.92	39° 16' 17.913 N	80° 29' 52.290 W
736.0	6.32	60.47	735.6	2.8	11.3	14,261,921.36	1,782,527.65	39° 16' 17.927 N	80° 29' 52.256 W
766.0	6.98	60.69	765.4	4.5	14.4	14,261,923.06	1,782,530.67	39° 16' 17.943 N	80° 29' 52.217 W



WV GEOLOGICAL SURVEY
MORGANTOWN, WV

Survey Report - Geographic

Company: HG Energy, LLC
Project: Harrison County, West Virginia
Site: W.F Williams #131
Well: W.F Williams #131
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well W.F Williams #131
TVD Reference: Well @ 1181.0usft
MD Reference: Well @ 1181.0usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
796.0	7.82	58.67	795.1	6.4	17.7	14,261,925.02	1,782,534.01	39° 16' 17.963 N	80° 29' 52.174 W
826.0	8.71	56.60	824.8	8.7	21.3	14,261,927.33	1,782,537.65	39° 16' 17.985 N	80° 29' 52.128 W
856.0	9.28	53.69	854.5	11.4	25.2	14,261,930.01	1,782,541.49	39° 16' 18.012 N	80° 29' 52.079 W
886.0	9.99	51.26	884.0	14.5	29.2	14,261,933.07	1,782,545.47	39° 16' 18.042 N	80° 29' 52.028 W
916.0	10.69	48.49	913.5	18.0	33.3	14,261,936.54	1,782,549.58	39° 16' 18.076 N	80° 29' 51.975 W
946.0	11.62	48.88	943.0	21.8	37.6	14,261,940.37	1,782,553.94	39° 16' 18.113 N	80° 29' 51.920 W
976.0	11.89	47.30	972.3	25.9	42.2	14,261,944.46	1,782,558.49	39° 16' 18.153 N	80° 29' 51.862 W
1,006.0	12.02	48.27	1,001.7	30.0	46.8	14,261,948.63	1,782,563.09	39° 16' 18.194 N	80° 29' 51.803 W
1,036.0	12.42	49.77	1,031.0	34.2	51.6	14,261,952.79	1,782,567.89	39° 16' 18.235 N	80° 29' 51.741 W
1,066.0	12.59	49.68	1,060.3	38.4	56.5	14,261,956.99	1,782,572.84	39° 16' 18.277 N	80° 29' 51.678 W
1,096.0	12.59	49.99	1,089.6	42.6	61.5	14,261,961.21	1,782,577.84	39° 16' 18.318 N	80° 29' 51.614 W
1,126.0	12.51	48.88	1,118.9	46.9	66.5	14,261,965.45	1,782,582.79	39° 16' 18.360 N	80° 29' 51.551 W
1,156.0	12.59	49.37	1,148.2	51.1	71.4	14,261,969.72	1,782,587.72	39° 16' 18.402 N	80° 29' 51.488 W
1,186.0	12.99	51.40	1,177.4	55.4	76.5	14,261,973.95	1,782,592.84	39° 16' 18.443 N	80° 29' 51.423 W
1,216.0	13.30	51.97	1,206.6	59.6	81.9	14,261,978.18	1,782,598.19	39° 16' 18.485 N	80° 29' 51.354 W
1,246.0	13.39	51.88	1,235.8	63.9	87.3	14,261,982.45	1,782,603.64	39° 16' 18.527 N	80° 29' 51.285 W
1,276.0	13.30	51.79	1,265.0	68.1	92.8	14,261,986.73	1,782,609.09	39° 16' 18.569 N	80° 29' 51.215 W
1,306.0	13.21	49.99	1,294.2	72.5	98.1	14,261,991.07	1,782,614.42	39° 16' 18.611 N	80° 29' 51.147 W
1,336.0	13.08	49.06	1,323.4	76.9	103.3	14,261,995.49	1,782,619.61	39° 16' 18.655 N	80° 29' 51.080 W
1,366.0	12.90	47.87	1,352.6	81.4	108.4	14,261,999.97	1,782,624.66	39° 16' 18.699 N	80° 29' 51.016 W
1,396.0	12.90	49.19	1,381.9	85.8	113.4	14,262,004.40	1,782,629.68	39° 16' 18.742 N	80° 29' 50.952 W
1,426.0	13.52	51.66	1,411.1	90.2	118.7	14,262,008.76	1,782,634.96	39° 16' 18.785 N	80° 29' 50.884 W
1,456.0	14.01	54.08	1,440.2	94.5	124.3	14,262,013.07	1,782,640.66	39° 16' 18.827 N	80° 29' 50.812 W
1,486.0	14.41	55.27	1,469.3	98.7	130.4	14,262,017.33	1,782,646.66	39° 16' 18.869 N	80° 29' 50.735 W
1,516.0	14.32	54.57	1,498.4	103.0	136.4	14,262,021.60	1,782,652.76	39° 16' 18.911 N	80° 29' 50.657 W
1,546.0	13.61	54.70	1,527.5	107.2	142.4	14,262,025.79	1,782,658.66	39° 16' 18.952 N	80° 29' 50.582 W
1,576.0	12.81	57.08	1,556.7	111.1	148.0	14,262,029.64	1,782,664.33	39° 16' 18.990 N	80° 29' 50.509 W
1,606.0	12.42	58.67	1,586.0	114.5	153.6	14,262,033.13	1,782,669.88	39° 16' 19.024 N	80° 29' 50.438 W
1,636.0	12.28	57.48	1,615.3	117.9	159.0	14,262,036.52	1,782,675.33	39° 16' 19.057 N	80° 29' 50.369 W
1,666.0	12.20	57.17	1,644.6	121.4	164.4	14,262,039.95	1,782,680.68	39° 16' 19.091 N	80° 29' 50.301 W
1,696.0	12.28	56.60	1,673.9	124.8	169.7	14,262,043.43	1,782,686.01	39° 16' 19.125 N	80° 29' 50.233 W
1,726.0	12.51	55.76	1,703.2	128.4	175.0	14,262,047.01	1,782,691.36	39° 16' 19.160 N	80° 29' 50.164 W
1,756.0	12.20	53.47	1,732.5	132.1	180.3	14,262,050.73	1,782,696.59	39° 16' 19.197 N	80° 29' 50.097 W
1,786.0	12.02	54.39	1,761.9	135.8	185.4	14,262,054.43	1,782,701.68	39° 16' 19.233 N	80° 29' 50.032 W
1,816.0	12.51	57.17	1,791.2	139.4	190.6	14,262,058.01	1,782,706.95	39° 16' 19.268 N	80° 29' 49.965 W
1,846.0	12.90	58.80	1,820.4	142.9	196.2	14,262,061.51	1,782,712.54	39° 16' 19.302 N	80° 29' 49.894 W
1,876.0	12.99	58.18	1,849.7	146.4	202.0	14,262,065.02	1,782,718.27	39° 16' 19.337 N	80° 29' 49.821 W
1,906.0	12.99	58.09	1,878.9	150.0	207.7	14,262,068.58	1,782,724.00	39° 16' 19.372 N	80° 29' 49.748 W
1,936.0	13.08	57.08	1,908.1	153.6	213.4	14,262,072.21	1,782,729.71	39° 16' 19.407 N	80° 29' 49.675 W
1,966.0	12.81	56.07	1,937.4	157.3	219.0	14,262,075.91	1,782,735.32	39° 16' 19.443 N	80° 29' 49.603 W
1,996.0	12.51	55.67	1,966.6	161.0	224.5	14,262,079.60	1,782,740.76	39° 16' 19.480 N	80° 29' 49.534 W
2,026.0	12.28	54.79	1,995.9	164.7	229.7	14,262,083.27	1,782,746.05	39° 16' 19.516 N	80° 29' 49.466 W
2,056.0	12.20	54.70	2,025.3	168.4	234.9	14,262,086.94	1,782,751.24	39° 16' 19.552 N	80° 29' 49.400 W
2,086.0	12.02	54.39	2,054.6	172.0	240.1	14,262,090.59	1,782,756.37	39° 16' 19.587 N	80° 29' 49.334 W
2,116.0	11.71	54.00	2,084.0	175.6	245.1	14,262,094.20	1,782,761.37	39° 16' 19.623 N	80° 29' 49.270 W
2,146.0	11.49	52.50	2,113.3	179.2	249.9	14,262,097.81	1,782,766.21	39° 16' 19.658 N	80° 29' 49.209 W
2,176.0	11.71	53.29	2,142.7	182.9	254.7	14,262,101.45	1,782,771.02	39° 16' 19.694 N	80° 29' 49.147 W
2,206.0	12.11	53.86	2,172.1	186.5	259.7	14,262,105.12	1,782,776.00	39° 16' 19.730 N	80° 29' 49.083 W
2,236.0	12.02	53.60	2,201.4	190.2	264.7	14,262,108.83	1,782,781.06	39° 16' 19.766 N	80° 29' 49.019 W
2,266.0	11.89	52.98	2,230.8	194.0	269.7	14,262,112.55	1,782,786.04	39° 16' 19.803 N	80° 29' 48.955 W
2,296.0	11.71	51.00	2,260.1	197.7	274.6	14,262,116.33	1,782,790.87	39° 16' 19.840 N	80° 29' 48.894 W
2,326.0	11.80	51.66	2,289.5	201.6	279.3	14,262,120.14	1,782,795.64	39° 16' 19.877 N	80° 29' 48.833 W
2,356.0	12.20	52.76	2,318.8	205.4	284.3	14,262,123.97	1,782,800.57	39° 16' 19.915 N	80° 29' 48.770 W
2,386.0	12.51	55.19	2,348.2	209.1	289.5	14,262,127.74	1,782,805.76	39° 16' 19.952 N	80° 29' 48.703 W
2,416.0	12.68	56.68	2,377.4	212.8	294.9	14,262,131.40	1,782,811.18	39° 16' 19.988 N	80° 29' 48.634 W

HP
Survey Report - Geographic



Company: HG Energy, LLC
Project: Harrison County, West Virginia
Site: W.F Williams #131
Well: W.F Williams #131
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well W.F Williams #131
TVD Reference: Well @ 1181.0usft
MD Reference: Well @ 1181.0usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,446.0	12.59	57.79	2,406.7	216.4	300.4	14,262,134.95	1,782,816.70	39° 16' 20.023 N	80° 29' 48.564 W
2,476.0	12.02	57.96	2,436.0	219.8	305.8	14,262,138.35	1,782,822.11	39° 16' 20.056 N	80° 29' 48.495 W
2,506.0	11.49	58.27	2,465.4	223.0	311.0	14,262,141.58	1,782,827.30	39° 16' 20.088 N	80° 29' 48.428 W
2,536.0	11.40	58.09	2,494.8	226.1	316.1	14,262,144.72	1,782,832.36	39° 16' 20.118 N	80° 29' 48.364 W
2,566.0	11.18	57.70	2,524.2	229.3	321.0	14,262,147.84	1,782,837.34	39° 16' 20.149 N	80° 29' 48.300 W
2,596.0	11.09	57.48	2,553.6	232.4	325.9	14,262,150.95	1,782,842.23	39° 16' 20.179 N	80° 29' 48.238 W
2,626.0	10.61	56.86	2,583.1	235.4	330.7	14,262,154.01	1,782,846.97	39° 16' 20.209 N	80° 29' 48.177 W
2,656.0	10.12	56.77	2,612.6	238.4	335.2	14,262,156.96	1,782,851.49	39° 16' 20.238 N	80° 29' 48.120 W
2,686.0	9.41	57.30	2,642.2	241.1	339.5	14,262,159.73	1,782,855.76	39° 16' 20.266 N	80° 29' 48.065 W
2,716.0	8.71	56.77	2,671.8	243.7	343.4	14,262,162.30	1,782,859.72	39° 16' 20.291 N	80° 29' 48.014 W
2,746.0	8.22	56.20	2,701.5	246.1	347.1	14,262,164.74	1,782,863.41	39° 16' 20.315 N	80° 29' 47.967 W
2,776.0	7.82	57.08	2,731.2	248.5	350.6	14,262,167.04	1,782,866.90	39° 16' 20.337 N	80° 29' 47.923 W
2,806.0	7.20	55.58	2,760.9	250.6	353.9	14,262,169.21	1,782,870.17	39° 16' 20.359 N	80° 29' 47.881 W
2,836.0	6.89	55.10	2,790.7	252.7	356.9	14,262,171.31	1,782,873.19	39° 16' 20.379 N	80° 29' 47.842 W
2,866.0	6.50	56.20	2,820.5	254.7	359.8	14,262,173.28	1,782,876.08	39° 16' 20.398 N	80° 29' 47.806 W
2,940.0	6.50	56.20	2,894.0	259.4	366.7	14,262,177.94	1,782,883.04	39° 16' 20.444 N	80° 29' 47.717 W

TD @ 2940' MD / 2894' TVD

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
450.0	450.0	0.0	0.0	FIRST SURVEY @ 450' MD / 450' TVD
2,940.0	2,894.0	259.4	366.7	TD @ 2940' MD / 2894' TVD

Checked By: _____ Approved By: _____ Date: _____

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Wellbore #1

Survey: Survey #1

HG Energy EOW Report

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 MD Reference: Well @ 1181.0usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM Compass

Survey	MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	NIS (usft)	EW (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
	450.0	0.00	0.00	450.0	0.0	0.0	0.0	0.00	0.0	0.00
FIRST SURVEY @ 450' MD / 450' TVD										
	526.0	1.10	96.57	526.0	-0.1	0.7	0.6	1.45	0.7	96.57
	556.0	1.28	123.80	556.0	-0.3	1.3	0.9	1.96	1.3	103.22
	586.0	1.50	107.10	586.0	-0.6	1.9	1.3	1.53	2.0	107.29
	616.0	2.30	87.18	616.0	-0.7	2.9	2.0	3.42	3.0	103.31
	646.0	3.31	72.99	645.9	-0.4	4.3	3.4	4.06	4.4	95.35
	676.0	4.42	68.19	675.9	0.3	6.3	5.3	3.85	6.3	87.48
	706.0	5.48	64.18	705.7	1.3	8.6	7.9	3.71	8.7	81.23
	736.0	6.32	60.47	735.6	2.8	11.3	10.9	3.07	11.7	76.29
	766.0	6.98	60.69	765.4	4.5	14.4	14.4	2.20	15.0	72.71
	796.0	7.82	58.67	795.1	6.4	17.7	18.3	2.93	18.8	70.04
	826.0	8.71	56.60	824.8	8.7	21.3	22.6	3.13	23.1	67.73
	856.0	9.28	53.69	854.5	11.4	25.2	27.3	2.43	27.7	65.61
	886.0	9.99	51.26	884.0	14.5	29.2	32.3	2.73	32.6	63.59
	916.0	10.69	48.49	913.5	18.0	33.3	37.6	2.86	37.8	61.65
	946.0	11.62	48.88	943.0	21.8	37.6	43.4	3.11	43.5	59.94
	976.0	11.89	47.30	972.3	26.9	42.2	49.4	1.40	49.5	58.48
	1,006.0	12.02	48.27	1,001.7	30.0	46.8	55.6	0.80	55.6	57.29
	1,036.0	12.42	49.77	1,031.0	34.2	51.6	61.9	1.70	61.9	56.45
	1,066.0	12.59	49.68	1,060.3	38.4	56.5	68.3	0.57	68.3	55.81
	1,096.0	12.59	49.99	1,089.6	42.6	61.5	74.8	0.23	74.9	55.29
	1,126.0	12.51	48.88	1,118.9	46.9	66.5	81.3	0.85	81.3	54.82
	1,156.0	12.59	49.37	1,148.2	51.1	71.4	87.8	0.44	87.8	54.40
	1,186.0	12.99	51.40	1,177.4	55.4	76.5	94.4	2.01	94.5	54.12
	1,216.0	13.30	51.97	1,206.6	59.6	81.9	101.2	1.12	101.3	53.96

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DEC 15 2015



Company: HG Energy, LLC
Project: Harrison County, West Virginia
Site: W.F Williams #131
Well: W.F Williams #131
Wellbore: Wellbore #1
Design: Wellbore #1

WV GEOLOGICAL SURVEY
MORGANTOWN, WV

Local Co-ordinate Reference: Well W.F Williams #131
TVD Reference: Well @ 1181.0usft
MD Reference: Well @ 1181.0usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM Compass

Survey	MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	NIS (usft)	EW (usft)	V. Sec (usft)	Dleg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
	1,246.0	13.39	51.88	1,235.8	63.9	87.3	108.1	0.31	108.2	53.83
	1,276.0	13.30	51.79	1,265.0	68.1	92.8	115.0	0.31	115.1	53.71
	1,306.0	13.21	49.99	1,294.2	72.5	98.1	121.9	1.41	122.0	53.55
	1,336.0	13.08	49.06	1,323.4	76.9	103.3	128.6	0.83	128.8	53.33
	1,366.0	12.90	47.87	1,352.6	81.4	108.4	135.3	1.07	135.5	53.09
	1,396.0	12.90	49.19	1,381.9	85.8	113.4	142.0	0.98	142.2	52.88
	1,426.0	13.52	51.66	1,411.1	90.2	118.7	148.8	2.79	149.0	52.77
	1,456.0	14.01	54.08	1,440.2	94.5	124.3	155.9	2.52	156.2	52.77
	1,486.0	14.41	55.27	1,469.3	98.7	130.4	163.3	1.65	163.5	52.86
	1,516.0	14.32	54.57	1,498.4	103.0	136.4	170.7	0.65	171.0	52.95
	1,546.0	13.61	54.70	1,527.5	107.2	142.4	178.0	2.37	178.2	53.02
	1,576.0	12.81	57.08	1,556.7	111.1	148.0	184.8	3.22	185.1	53.12
	1,606.0	12.42	58.67	1,586.0	114.5	153.6	191.4	1.74	191.6	53.28
	1,636.0	12.28	57.48	1,615.3	117.9	159.0	197.8	0.97	198.0	53.44
	1,666.0	12.20	57.17	1,644.6	121.4	164.4	204.1	0.35	204.3	53.56
	1,696.0	12.28	56.60	1,673.9	124.8	169.7	210.5	0.48	210.7	53.66
	1,726.0	12.51	55.76	1,703.2	128.4	175.0	216.9	0.97	217.1	53.73
	1,756.0	12.20	53.47	1,732.5	132.1	180.3	223.4	1.93	223.5	53.76
	1,786.0	12.02	54.39	1,761.9	135.8	185.4	229.6	0.88	229.8	53.76
	1,816.0	12.51	57.17	1,791.2	139.4	190.6	236.0	2.56	236.2	53.82
	1,846.0	12.90	58.80	1,820.4	142.9	196.2	242.6	1.77	242.8	53.93
	1,876.0	12.99	58.18	1,849.7	146.4	202.0	249.3	0.55	249.5	54.06
	1,906.0	12.99	58.09	1,878.9	150.0	207.7	256.1	0.07	256.2	54.16
	1,936.0	13.08	57.08	1,908.1	153.6	213.4	262.8	0.82	262.9	54.25
	1,966.0	12.81	56.07	1,937.4	157.3	219.0	269.5	1.17	269.7	54.31
	1,996.0	12.51	55.67	1,966.6	161.0	224.5	276.1	1.04	276.2	54.35
	2,026.0	12.28	54.79	1,995.9	164.7	229.7	282.6	0.99	282.7	54.37

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Survey	MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	EW (usft)	V. Sec (usft)	Dleg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
	2,056.0	12.20	54.70	2,025.3	168.4	234.9	288.9	0.27	289.0	54.37
	2,086.0	12.02	54.39	2,054.6	172.0	240.1	295.2	0.64	295.3	54.38
	2,116.0	11.71	54.00	2,084.0	175.6	245.1	301.4	1.07	301.5	54.37
	2,146.0	11.49	52.50	2,113.3	179.2	249.9	307.4	1.24	307.5	54.35
	2,176.0	11.71	53.29	2,142.7	182.9	254.7	313.4	0.90	313.6	54.32
	2,206.0	12.11	53.86	2,172.1	186.5	259.7	319.6	1.39	319.7	54.31
	2,236.0	12.02	53.60	2,201.4	190.2	264.7	325.9	0.35	326.0	54.30
	2,266.0	11.89	52.98	2,230.8	194.0	269.7	332.1	0.61	332.2	54.28
	2,296.0	11.71	51.00	2,260.1	197.7	274.6	338.2	1.48	338.4	54.24
	2,326.0	11.80	51.66	2,289.5	201.6	279.3	344.3	0.54	344.5	54.19
	2,356.0	12.20	52.76	2,318.8	205.4	284.3	350.5	1.54	350.7	54.15
	2,386.0	12.51	55.19	2,348.2	209.1	289.5	356.9	2.02	357.1	54.15
	2,416.0	12.68	56.68	2,377.4	212.8	294.9	363.5	1.22	363.6	54.18
	2,446.0	12.59	57.79	2,406.7	216.4	300.4	370.0	0.86	370.2	54.24
	2,476.0	12.02	57.96	2,436.0	219.8	305.8	376.4	1.90	376.6	54.30
	2,506.0	11.49	58.27	2,465.4	223.0	311.0	382.5	1.78	382.7	54.36
	2,536.0	11.40	58.09	2,494.8	226.1	316.1	388.5	0.32	388.6	54.42
	2,566.0	11.18	57.70	2,524.2	229.3	321.0	394.3	0.78	394.5	54.47
	2,596.0	11.09	57.48	2,553.6	232.4	325.9	400.1	0.33	400.3	54.51
	2,626.0	10.61	56.86	2,583.1	235.4	330.7	405.8	1.65	405.9	54.55
	2,656.0	10.12	56.77	2,612.6	238.4	335.2	411.2	1.63	411.3	54.58
	2,686.0	9.41	57.30	2,642.2	241.1	339.5	416.3	2.39	416.4	54.61
	2,716.0	8.71	56.77	2,671.8	243.7	343.4	421.0	2.35	421.1	54.64
	2,746.0	8.22	56.20	2,701.5	246.1	347.1	425.4	1.66	425.5	54.66
	2,776.0	7.82	57.08	2,731.2	248.5	350.6	429.6	1.39	429.7	54.68
	2,806.0	7.20	55.58	2,760.9	250.6	353.9	433.5	2.17	433.6	54.69
	2,836.0	6.89	55.10	2,790.7	252.7	356.9	437.2	1.05	437.3	54.70

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Survey	MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Closure Distance (usft)	Closure Azimuth (°)
	2,866.0		6.50	2,820.5	254.7	359.8	440.7	1.37	440.8	54.70
	2,940.0		6.50	2,894.0	259.4	366.7	449.1	0.00	449.2	54.73
TD @ 2940' MD / 2894' TVD										

Survey Annotations	Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N-S (usft)	+E/W (usft)	Comment
	450.0	450.0	0.0	0.0	FIRST SURVEY @ 450' MD / 450' TVD
	2,940.0	2,894.0	259.4	366.7	TD @ 2940' MD / 2894' TVD

Checked By: _____ Approved By: _____ Date: _____

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