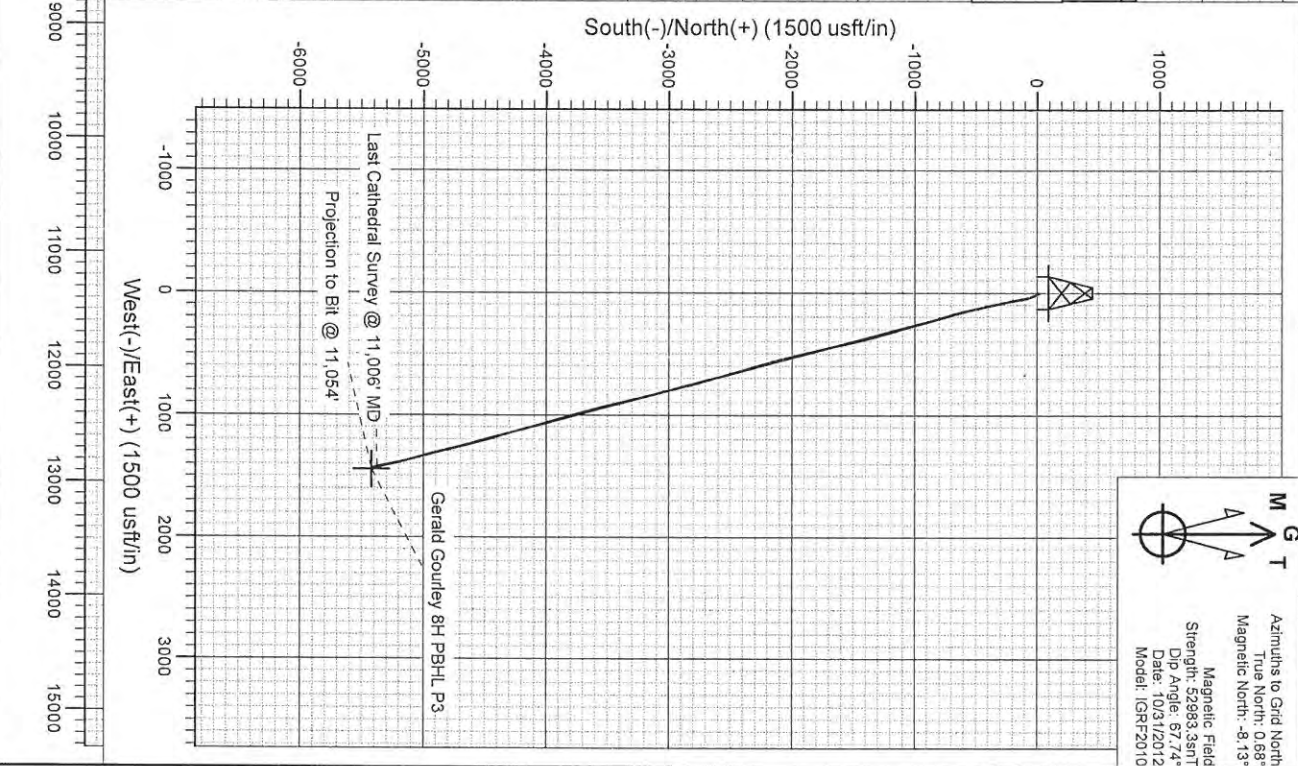
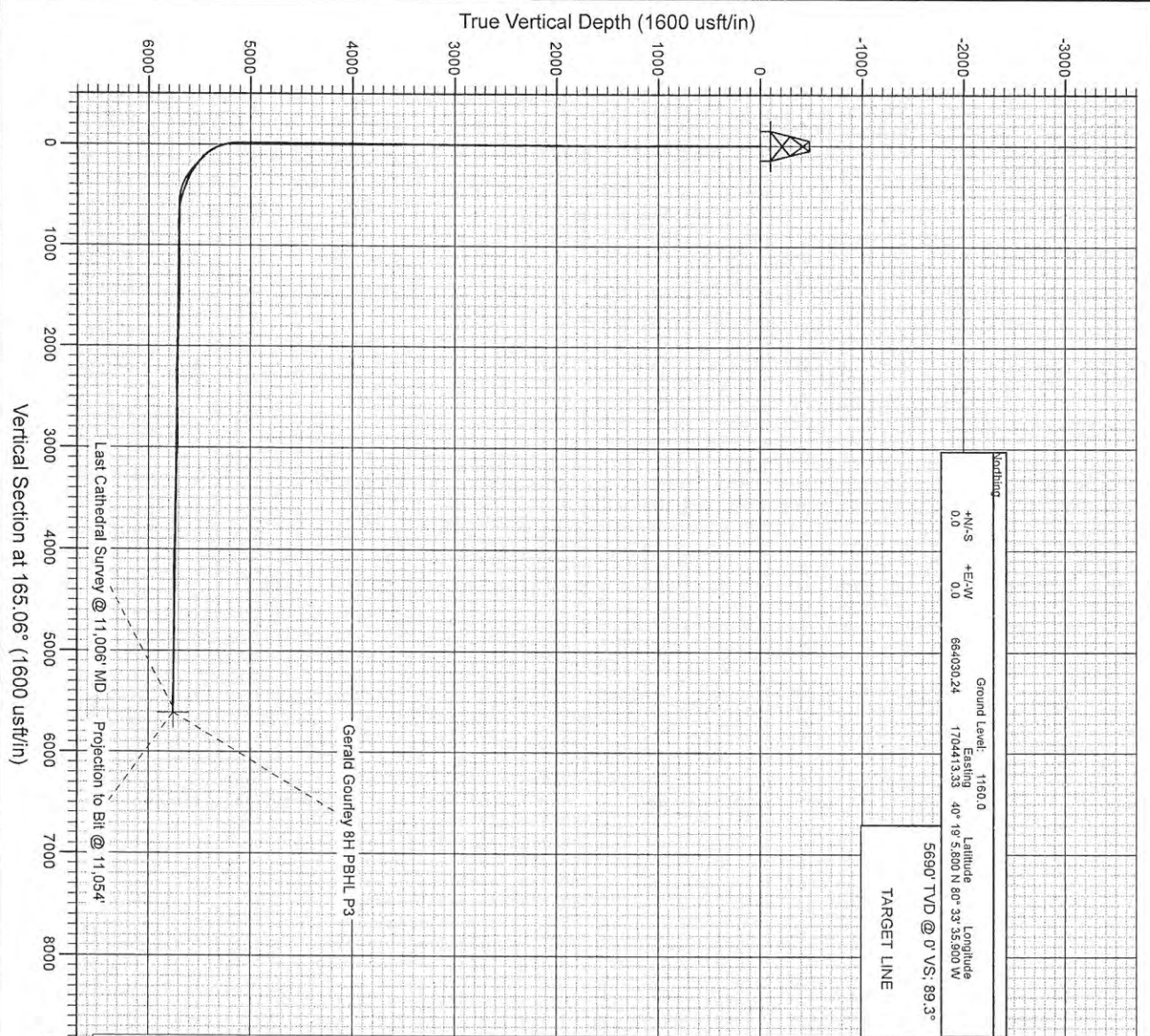




Project: Brooke County, WV
 Site: Gerald Gourley
 Well: Gerald Gourley BRK 8H
 Wellbore: HZ
 Design: FINAL



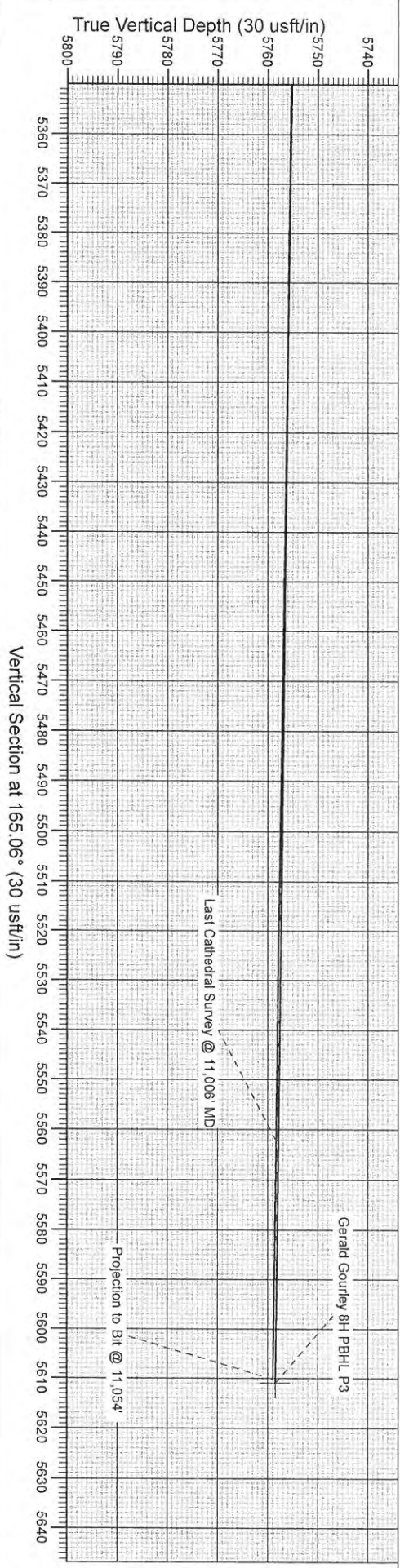
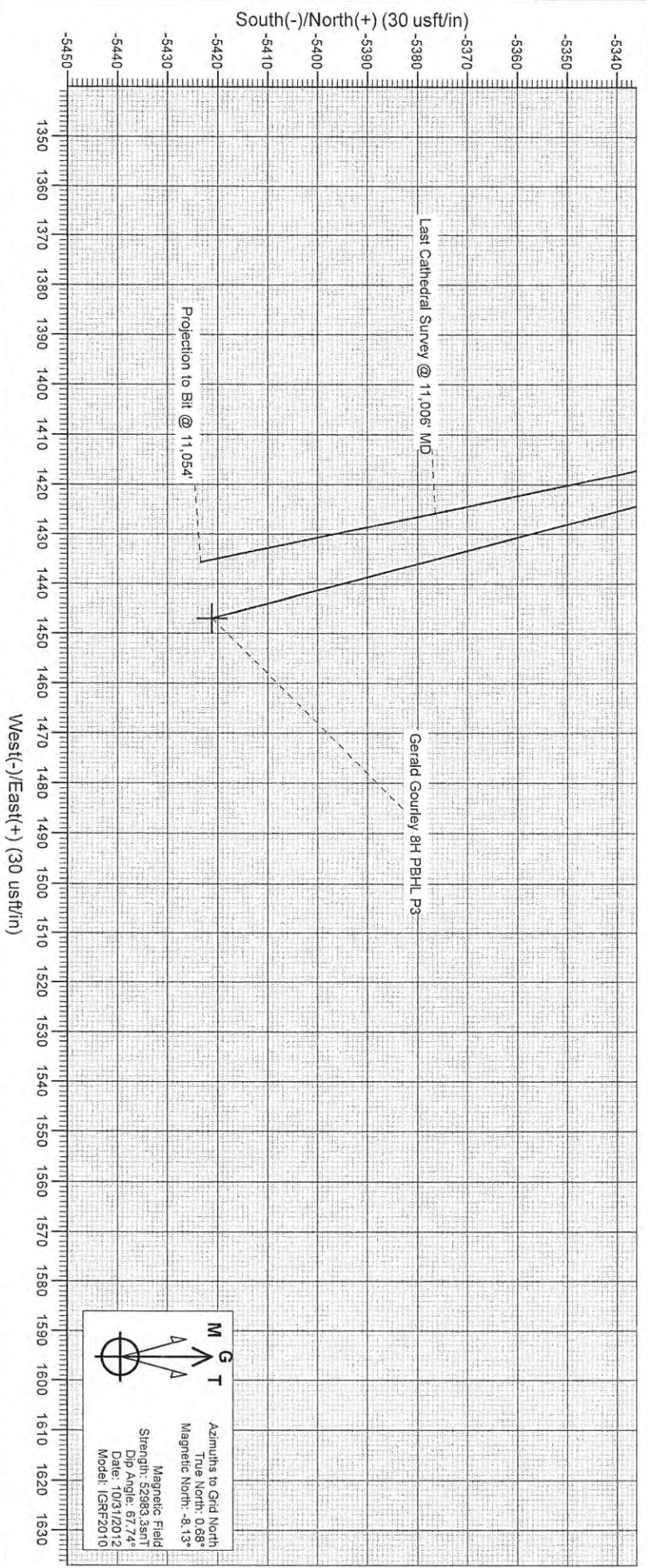
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WV GEOLOGICAL SURVEY
 MORGANTOWN, WV



Project: Brooke County, WV
 Site: Gerald Gourley
 Well: Gerald Gourley BRK 8H
 Wellbore: HZ
 Design: FINAL



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WV GEOLOGICAL SURVEY
 MORGANTOWN, WV

Cathedral Energy Services
Survey Report

Company:	Chesapeake Energy Corp	Local Co-ordinate Reference:	Well Gerald Gourley BRK 8H
Project:	Brooke County, WV	TVD Reference:	WELL @ 1178.0usft (Original Well Elev)
Site:	Gerald Gourley	MD Reference:	WELL @ 1178.0usft (Original Well Elev)
Well:	Gerald Gourley BRK 8H	North Reference:	Grid
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	HZ	Database:	USA EDM 5000 Multi Users DB

Project	Brooke County, WV		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	West Virginia North 4701		Using geodetic scale factor

Site	Gerald Gourley				
Site Position:		Northing:	664,030.25 usft	Latitude:	40° 19' 5.800 N
From:	Lat/Long	Easting:	1,704,413.33 usft	Longitude:	80° 33' 35.900 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	-0.68 °

Well	Gerald Gourley BRK 8H					
Well Position	+N-S	0.0 usft	Northing:	664,030.24 usft	Latitude:	40° 19' 5.800 N
	+E-W	0.0 usft	Easting:	1,704,413.33 usft	Longitude:	80° 33' 35.900 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	1,160.0 usft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/31/2012	-8.81	67.74	52,983

Design	HZ				
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	165.06	

Survey Program	Date	11/18/2012			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	5,060.0	Gyro (HZ)	MWD	Geolink MWD	
5,120.0	11,054.0	Survey #2 (HZ)	MWD	Geolink MWD	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00		
100.0	0.16	22.03	100.0	0.1	0.1	-0.1	0.16	0.16		
200.0	0.18	52.02	200.0	0.4	0.2	-0.3	0.09	0.02		
300.0	0.16	285.96	300.0	0.5	0.2	-0.4	0.30	-0.02		
400.0	0.11	204.75	400.0	0.4	0.0	-0.4	0.18	-0.05		
500.0	0.16	124.64	500.0	0.3	0.1	-0.2	0.18	0.05		
600.0	0.27	130.58	600.0	0.0	0.4	0.1	0.11	0.11		
700.0	0.28	135.20	700.0	-0.3	0.8	0.5	0.02	0.01		
800.0	0.35	130.30	800.0	-0.7	1.2	0.9	0.07	0.07		
900.0	0.31	108.92	900.0	-0.9	1.7	1.3	0.13	-0.04		
1,000.0	0.13	90.32	1,000.0	-1.0	2.0	1.5	0.19	-0.18		
1,100.0	0.28	156.82	1,100.0	-1.3	2.2	1.8	0.26	0.15		

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WV GEOLOGICAL SURVEY
MORGANTOWN, WV

Cathedral Energy Services

Survey Report

Company:	Chesapeake Energy Corp	Local Co-ordinate Reference:	Well Gerald Gourley BRK 8H
Project:	Brooke County, WV	TVD Reference:	WELL @ 1178.0usft (Original Well Elev)
Site:	Gerald Gourley	MD Reference:	WELL @ 1178.0usft (Original Well Elev)
Well:	Gerald Gourley BRK 8H	North Reference:	Grid
Wellbore:	HZ	Survey Calculation Method:	Minimum Curvature
Design:	HZ	Database:	USA EDM 5000 Multi Users DB

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
1,200.0	0.15	98.91	1,200.0	-1.5	2.5	2.1	0.24	-0.13	
1,300.0	0.11	116.41	1,300.0	-1.6	2.7	2.2	0.06	-0.04	
1,400.0	0.31	141.32	1,400.0	-1.8	2.9	2.5	0.22	0.20	
1,500.0	0.29	123.09	1,500.0	-2.2	3.3	2.9	0.10	-0.02	
1,600.0	0.02	6.55	1,600.0	-2.3	3.5	3.1	0.30	-0.27	
1,700.0	0.14	76.52	1,700.0	-2.2	3.6	3.1	0.13	0.12	
1,800.0	0.21	37.93	1,800.0	-2.1	3.9	3.0	0.13	0.07	
1,900.0	0.20	337.07	1,900.0	-1.8	3.9	2.7	0.21	-0.01	
2,000.0	0.31	41.98	2,000.0	-1.4	4.0	2.4	0.29	0.11	
2,100.0	0.32	357.82	2,100.0	-0.9	4.2	2.0	0.24	0.01	
2,200.0	0.43	19.76	2,200.0	-0.3	4.3	1.4	0.18	0.11	
2,300.0	0.29	346.90	2,300.0	0.3	4.4	0.8	0.24	-0.14	
2,400.0	0.47	5.79	2,400.0	1.0	4.4	0.2	0.22	0.18	
2,500.0	0.31	349.60	2,500.0	1.6	4.4	-0.5	0.19	-0.16	
2,600.0	0.38	341.02	2,600.0	2.2	4.2	-1.1	0.09	0.07	
2,700.0	0.19	27.17	2,700.0	2.7	4.2	-1.5	0.28	-0.19	
2,800.0	0.43	359.75	2,800.0	3.2	4.3	-2.0	0.28	0.24	
2,900.0	0.21	5.13	2,900.0	3.8	4.3	-2.5	0.22	-0.22	
3,000.0	0.49	359.74	3,000.0	4.4	4.3	-3.1	0.28	0.28	
3,100.0	0.34	359.39	3,100.0	5.1	4.3	-3.8	0.15	-0.15	
3,200.0	0.67	0.19	3,200.0	6.0	4.3	-4.7	0.33	0.33	
3,300.0	0.47	6.20	3,300.0	7.0	4.3	-5.6	0.21	-0.20	
3,400.0	0.64	9.57	3,399.9	7.9	4.5	-6.5	0.17	0.17	
3,500.0	0.62	14.24	3,499.9	9.0	4.7	-7.5	0.06	-0.02	
3,600.0	0.51	20.57	3,599.9	9.9	5.0	-8.3	0.13	-0.11	
3,700.0	0.46	21.22	3,699.9	10.7	5.3	-9.0	0.05	-0.05	
3,800.0	0.49	20.40	3,799.9	11.5	5.6	-9.7	0.03	0.03	
3,900.0	0.28	11.50	3,899.9	12.2	5.8	-10.3	0.22	-0.21	
4,000.0	0.36	2.50	3,999.9	12.7	5.8	-10.8	0.09	0.08	
4,100.0	0.45	353.38	4,099.9	13.4	5.8	-11.5	0.11	0.09	
4,200.0	0.54	345.59	4,199.9	14.3	5.6	-12.3	0.11	0.09	
4,300.0	0.30	340.60	4,299.9	15.0	5.4	-13.1	0.24	-0.24	
4,400.0	0.34	344.33	4,399.9	15.5	5.3	-13.6	0.05	0.04	
4,500.0	0.35	341.70	4,499.9	16.1	5.1	-14.2	0.02	0.01	
4,600.0	0.26	305.41	4,599.9	16.5	4.8	-14.7	0.21	-0.09	
4,700.0	0.34	336.10	4,699.9	16.9	4.5	-15.2	0.18	0.08	
4,800.0	0.55	343.84	4,799.9	17.6	4.3	-15.9	0.22	0.21	
4,900.0	0.21	340.17	4,899.9	18.3	4.1	-16.6	0.34	-0.34	
5,000.0	0.29	342.94	4,999.9	18.7	3.9	-17.0	0.08	0.08	
5,060.0	0.43	346.20	5,059.9	19.0	3.8	-17.4	0.24	0.23	Last Gyro Survey @ 5060' MD
5,120.0	1.20	149.50	5,119.9	18.7	4.1	-17.0	2.69	1.28	
5,151.0	4.20	151.60	5,150.9	17.4	4.8	-15.6	9.68	9.68	
5,182.0	7.10	155.40	5,181.7	14.7	6.1	-12.6	9.43	9.35	
5,214.0	9.80	156.80	5,213.4	10.4	8.0	-8.0	8.46	8.44	
5,244.0	12.60	155.40	5,242.8	5.1	10.4	-2.2	9.38	9.33	
5,276.0	16.50	153.50	5,273.7	-2.2	13.9	5.7	12.28	12.19	
5,307.0	20.50	153.70	5,303.1	-11.0	18.2	15.3	12.90	12.90	
5,339.0	25.10	155.70	5,332.6	-22.2	23.5	27.5	14.58	14.38	
5,370.0	29.00	158.20	5,360.2	-35.2	29.0	41.5	13.10	12.58	
5,402.0	33.30	160.70	5,387.6	-50.7	34.8	57.9	14.03	13.44	
5,434.0	37.30	165.20	5,413.7	-68.4	40.2	76.4	14.90	12.50	
5,465.0	42.00	169.20	5,437.6	-87.6	44.5	96.2	17.25	15.16	
5,497.0	46.20	170.30	5,460.6	-109.5	48.5	118.3	13.34	13.13	

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WV GEOLOGICAL SURVEY
MORGANTOWN, WV

Cathedral Energy Services

Survey Report

Company: Chesapeake Energy Corp
Project: Brooke County, WV
Site: Gerald Gourley
Well: Gerald Gourley BRK 8H
Wellbore: HZ
Design: HZ

Local Co-ordinate Reference: Well Gerald Gourley BRK 8H
TVD Reference: WELL @ 1178.0usft (Original Well Elev)
MD Reference: WELL @ 1178.0usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: USA EDM 5000 Multi Users DB

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
5,528.0	49.00	169.80	5,481.5	-132.1	52.5	141.1	9.11	9.03	
5,560.0	50.80	168.70	5,502.1	-156.1	57.0	165.6	6.21	5.63	
5,591.0	52.80	167.90	5,521.3	-180.0	62.0	189.9	6.76	6.45	
5,622.0	54.30	167.00	5,539.7	-204.3	67.4	214.8	5.37	4.84	
5,654.0	56.30	166.70	5,557.9	-229.9	73.4	241.1	6.30	6.25	
5,686.0	59.30	166.30	5,574.9	-256.3	79.7	268.2	9.43	9.38	
5,717.0	61.80	166.30	5,590.2	-282.5	86.1	295.1	8.06	8.06	
5,748.0	64.50	167.00	5,604.2	-309.4	92.5	322.8	8.94	8.71	
5,779.0	67.20	167.90	5,616.9	-337.0	98.6	351.0	9.10	8.71	
5,811.0	69.40	168.20	5,628.7	-366.1	104.8	380.7	6.93	6.88	
5,843.0	71.20	168.40	5,639.5	-395.6	110.9	410.8	5.66	5.63	
5,874.0	72.00	168.80	5,649.3	-424.4	116.7	440.2	2.86	2.58	
5,904.0	72.20	168.60	5,658.5	-452.4	122.3	468.7	0.92	0.67	
5,936.0	71.50	167.80	5,668.5	-482.2	128.5	499.0	3.23	-2.19	
5,968.0	73.30	167.10	5,678.1	-512.0	135.1	529.5	6.00	5.63	
6,000.0	75.90	167.00	5,686.6	-542.0	142.0	560.3	8.13	8.13	
6,031.0	78.80	167.20	5,693.4	-571.5	148.8	590.5	9.38	9.35	
6,062.0	83.00	166.60	5,698.3	-601.3	155.7	621.1	13.68	13.55	
6,094.0	88.00	165.60	5,700.8	-632.3	163.4	653.0	15.93	15.63	
6,189.0	88.40	163.60	5,703.8	-723.8	188.6	748.0	2.15	0.42	
6,312.0	91.20	163.30	5,704.2	-841.7	223.6	870.9	2.29	2.28	
6,438.0	91.20	163.50	5,701.6	-962.4	259.6	996.8	0.16	0.00	
6,564.0	90.60	163.60	5,699.6	-1,083.2	295.3	1,122.8	0.48	-0.48	
6,689.0	91.00	163.50	5,697.9	-1,203.1	330.7	1,247.7	0.33	0.32	
6,815.0	90.90	165.50	5,695.8	-1,324.5	364.4	1,373.7	1.59	-0.08	
6,942.0	87.40	166.90	5,697.7	-1,447.8	394.6	1,500.6	2.97	-2.76	
7,068.0	88.50	167.00	5,702.2	-1,570.5	423.1	1,626.5	0.88	0.87	
7,192.0	89.30	167.20	5,704.6	-1,691.3	450.8	1,750.4	0.67	0.65	
7,319.0	87.70	167.20	5,707.9	-1,815.1	478.9	1,877.2	1.26	-1.26	
7,443.0	87.10	165.90	5,713.5	-1,935.6	507.7	2,001.1	1.15	-0.48	
7,571.0	87.40	166.20	5,719.6	-2,059.7	538.5	2,128.9	0.33	0.23	
7,695.0	88.40	163.90	5,724.2	-2,179.4	570.5	2,252.8	2.02	0.81	
7,820.0	91.70	163.40	5,724.1	-2,299.3	605.7	2,377.7	2.67	2.64	
7,948.0	92.20	164.10	5,719.7	-2,422.1	641.5	2,505.6	0.67	0.39	
8,073.0	90.80	163.70	5,716.5	-2,542.2	676.1	2,630.6	1.16	-1.12	
8,197.0	89.60	163.70	5,716.0	-2,661.2	710.9	2,754.5	0.97	-0.97	
8,324.0	90.30	164.20	5,716.1	-2,783.2	746.0	2,881.5	0.68	0.55	
8,451.0	87.00	166.40	5,719.1	-2,906.0	778.2	3,008.4	3.12	-2.60	
8,578.0	88.20	166.60	5,724.4	-3,029.4	807.9	3,135.3	0.96	0.94	
8,703.0	88.70	166.40	5,727.8	-3,150.9	837.0	3,260.2	0.43	0.40	
8,829.0	87.90	165.40	5,731.6	-3,273.1	867.7	3,386.1	1.02	-0.63	
8,954.0	88.60	165.60	5,735.4	-3,394.0	899.0	3,511.1	0.58	0.56	
9,081.0	89.30	165.80	5,737.7	-3,517.1	930.4	3,638.0	0.57	0.55	
9,208.0	90.00	166.10	5,738.5	-3,640.3	961.2	3,765.0	0.60	0.55	
9,333.0	87.60	163.80	5,741.1	-3,760.9	993.6	3,890.0	2.66	-1.92	
9,459.0	88.60	164.20	5,745.3	-3,882.0	1,028.3	4,015.9	0.85	0.79	
9,586.0	89.00	163.90	5,747.9	-4,004.1	1,063.2	4,142.8	0.39	0.31	
9,711.0	89.40	163.60	5,749.7	-4,124.1	1,098.2	4,267.8	0.40	0.32	
9,837.0	89.90	164.00	5,750.5	-4,245.0	1,133.4	4,393.7	0.51	0.40	
9,962.0	90.70	163.60	5,749.8	-4,365.1	1,168.2	4,518.7	0.72	0.64	
10,089.0	91.50	163.80	5,747.4	-4,487.0	1,203.9	4,645.6	0.65	0.63	
10,214.0	88.20	165.60	5,747.7	-4,607.5	1,236.9	4,770.6	3.01	-2.64	
10,340.0	88.60	165.30	5,751.2	-4,729.4	1,268.5	4,896.6	0.40	0.32	

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WV GEOLOGICAL SURVEY
MORGANTOWN, WV

Cathedral Energy Services

Survey Report

Company: Chesapeake Energy Corp	Local Co-ordinate Reference: Well Gerald Gourley BRK 8H
Project: Brooke County, WV	TVD Reference: WELL @ 1178.0usft (Original Well Elev)
Site: Gerald Gourley	MD Reference: WELL @ 1178.0usft (Original Well Elev)
Well: Gerald Gourley BRK 8H	North Reference: Grid
Wellbore: HZ	Survey Calculation Method: Minimum Curvature
Design: HZ	Database: USA EDM 5000 Multi Users DB

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Formations / Comments
10,466.0	89.20	165.70	5,753.6	-4,851.4	1,300.0	5,022.5	0.57	0.48	
10,592.0	89.80	165.60	5,754.7	-4,973.4	1,331.3	5,148.5	0.48	0.48	
10,717.0	90.10	165.80	5,754.8	-5,094.6	1,362.1	5,273.5	0.29	0.24	
10,844.0	88.90	167.50	5,755.9	-5,218.1	1,391.5	5,400.5	1.64	-0.94	
10,968.0	89.30	167.90	5,757.9	-5,339.3	1,417.9	5,524.3	0.46	0.32	
11,006.0	89.30	168.20	5,758.4	-5,376.5	1,425.7	5,562.3	0.79	0.00	Last Cathedral Survey @ 11,006' MD Projection to Bit @ 11,054'
11,054.0	89.30	168.20	5,758.9	-5,423.4	1,435.6	5,610.2	0.00	0.00	

Target Name	- hit/miss target	- Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Gerald Gourley 8H PBHI			0.00	0.00	5,758.5	-5,421.2	1,447.0	658,609.00	1,705,860.33	40° 18' 12.400 N	80° 33' 16.400 W
- actual wellpath misses target center by 11.7usft at 11054.0usft MD (5758.9 TVD, -5423.4 N, 1435.6 E)											
- Point											
Gerald Gourley 8H PBHI			0.00	0.00	5,728.5	-5,421.2	1,447.0	658,609.00	1,705,860.33	40° 18' 12.400 N	80° 33' 16.400 W
- actual wellpath misses target center by 32.6usft at 11053.7usft MD (5758.9 TVD, -5423.2 N, 1435.5 E)											
- Point											

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,060.0	5,059.9	19.0	3.8	Last Gyro Survey @ 5060' MD
11,006.0	5,758.4	-5,376.5	1,425.7	Last Cathedral Survey @ 11,006' MD
11,054.0	5,758.9	-5,423.4	1,435.6	Projection to Bit @ 11,054'

Checked By: _____ Approved By: _____ Date: _____

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