

Project: Garfield County
Site: NWNW Sec19 T5S R96W Chevron C19 596
Well: Berry 19-21D
Wellbore: DD
Design: Final

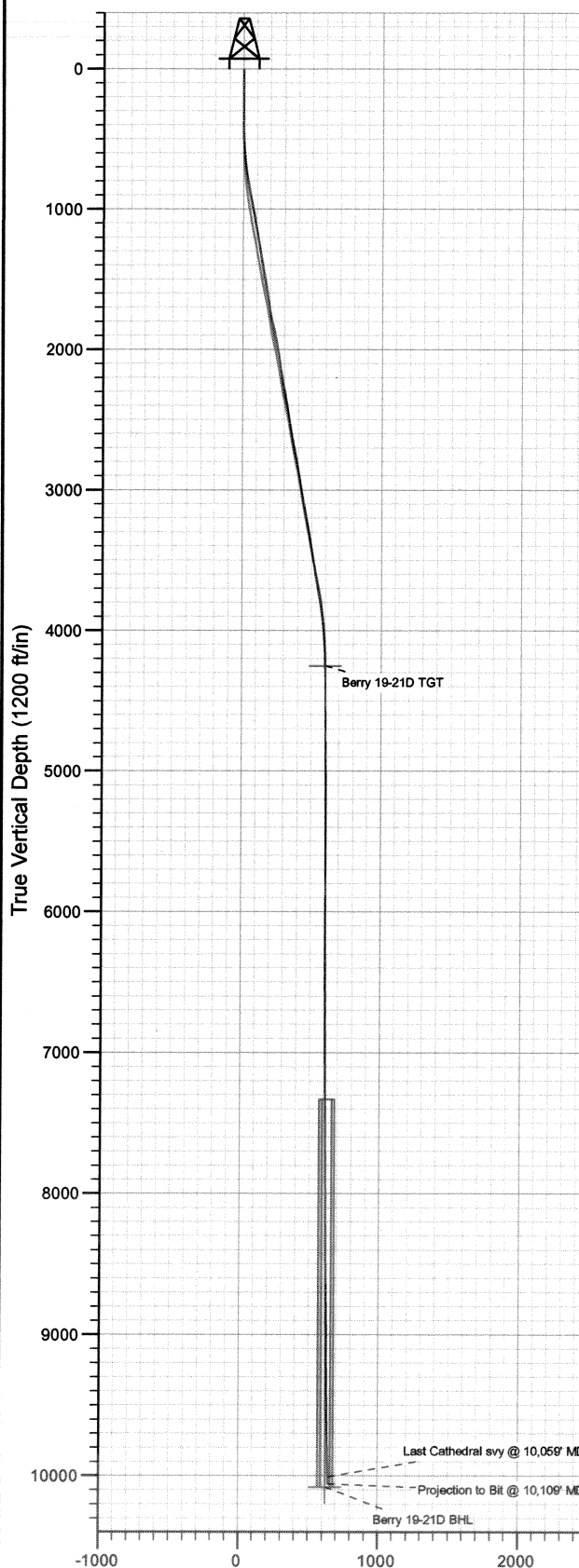
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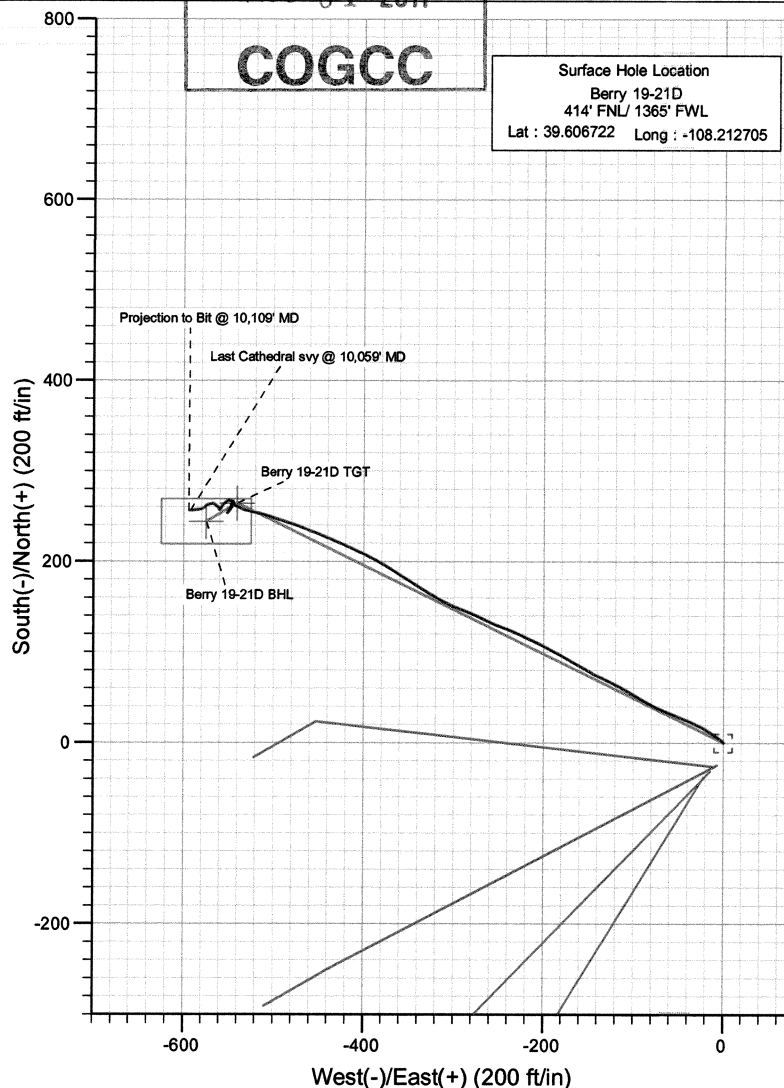
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Surface Hole Location
Berry 19-21D
414' FNL/ 1365' FWL
Lat : 39.606722 Long : -108.212705



Vertical Section at 293.00° (1200 ft/in)



Azimuths to True North
Magnetic North: 10.59°

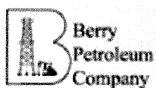
Magnetic Field
Strength: 52359.6nT
Dip Angle: 65.82°
Date: 6/24/2010
Model: IGRF2010

Bottom Hole Location
Berry 19-21D
166' FNL/ 790' FWL
Lat : 39.607392
Long : -108.214746

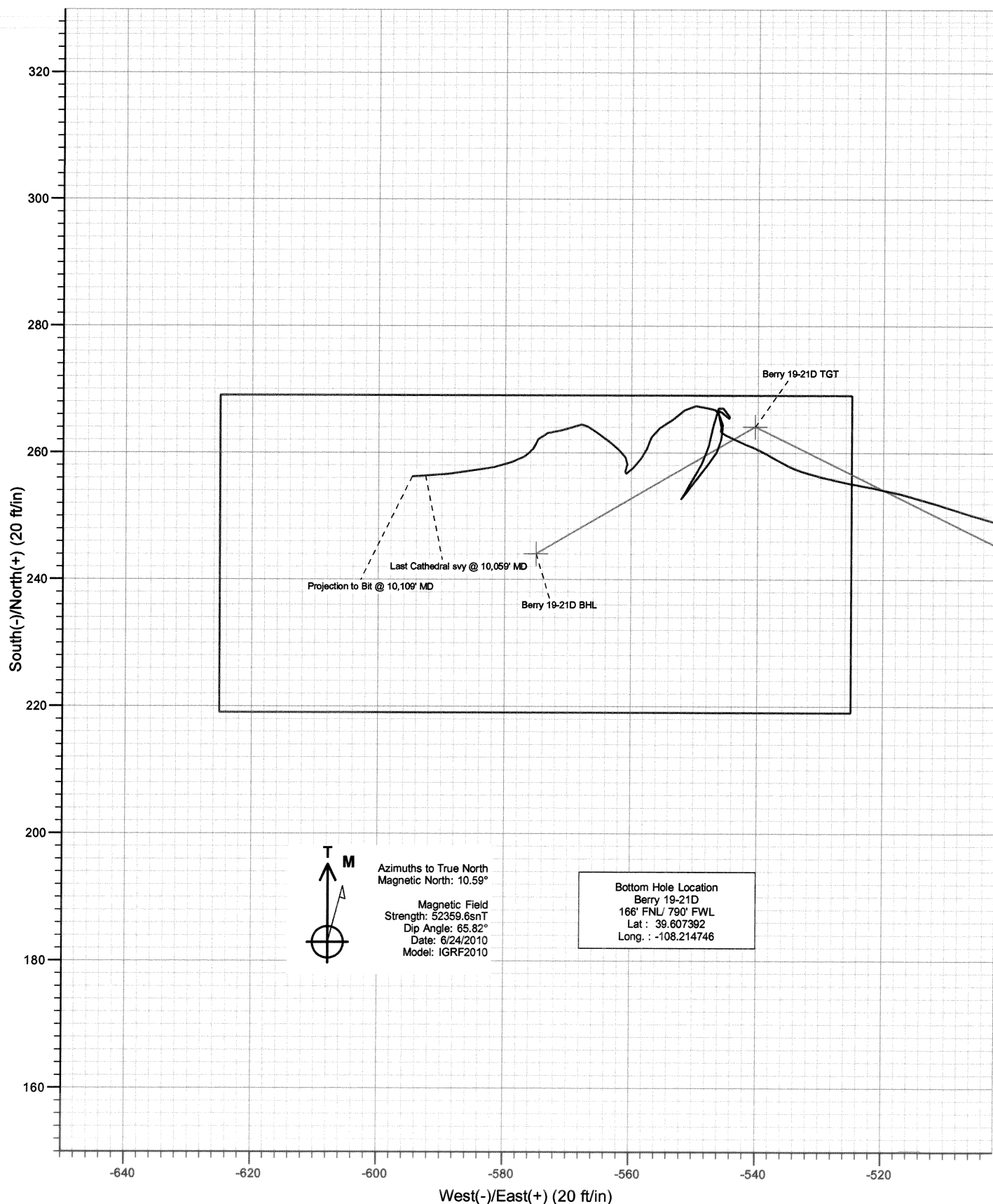
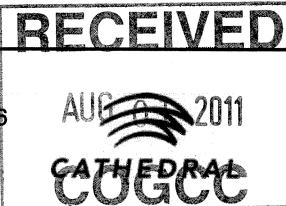
DESIGN DETAILS: DD

105270; BH
KBE @ 8553.0ft (Patterson 302)

Target	Azimuth	Origin	N/S	E/W	From TVD
Berry 19-21D BHL	293.00	Slot	0.0	0.0	0.0



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Design: Final



Cathedral Energy Services

Survey Report

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Company:	Berry Petroleum Company (NAD 83)	Local Co-ordinate Reference:	Well Berry 19-21D
Project:	Garfield County	TVD Reference:	KBE @ 8553.0ft (Patterson 302)
Site:	NWNW Sec19 T5S R96W Chevron C19 596	MD Reference:	KBE @ 8553.0ft (Patterson 302)
Well:	Berry 19-21D	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	Database:	EDM 5000.1 US Multi Users DB

Project	Garfield County		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site		NWNW Sec19 T5S R96W Chevron C19 596			
Site Position:		Northing:	1,657,278.89 ft	Latitude:	39.606690
From:	Lat/Long	Easting:	2,235,804.36 ft	Longitude:	-108.212673
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.71 °

Well	Berry 19-21D					
Well Position	+N/-S	0.0 ft	Northing:	1,657,290.80 ft	Latitude:	39.606722
	+E/-W	0.0 ft	Easting:	2,235,795.69 ft	Longitude:	-108.212705
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	8,538.0 ft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/24/2010	10.59	65.82	52,360

Design	DD				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(ft)	(ft)	(ft)	(°)	
	0.0	0.0	0.0	293.00	

Survey Program	Date	7/15/2010			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
167.0	10,109.0	Survey #1 (DD)	MWD	Geolink MWD	

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
167.0	0.30	100.60	167.0	-0.1	0.4	-0.4	0.18	0.18	
258.0	0.20	38.50	258.0	0.0	0.8	-0.7	0.30	-0.11	
348.0	0.10	323.20	348.0	0.2	0.8	-0.7	0.22	-0.11	
439.0	1.20	313.30	439.0	0.9	0.1	0.3	1.21	1.21	
530.0	2.70	310.00	529.9	2.9	-2.3	3.2	1.65	1.65	
622.0	5.80	303.40	621.7	6.9	-7.8	9.9	3.41	3.37	
713.0	8.00	303.10	712.0	12.9	-16.9	20.6	2.42	2.42	
808.0	9.60	295.90	805.9	19.9	-29.6	35.1	2.04	1.68	
902.0	10.50	291.70	898.4	26.5	-44.6	51.4	1.23	0.96	
996.0	11.00	293.00	990.8	33.2	-60.8	69.0	0.59	0.53	
1,091.0	10.60	294.50	1,084.1	40.4	-77.1	86.8	0.51	-0.42	
1,186.0	10.50	301.00	1,177.5	48.5	-92.5	104.1	1.26	-0.11	

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Well: Berry 19-21D
Wellbore: DD
Design: DD

Local Co-ordinate Reference: Well Berry 19-21D
TVD Reference: KBE @ 8553.0ft (Patterson 302)
MD Reference: KBE @ 8553.0ft (Patterson 302)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 US Multi Users DB

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
1,281.0	11.00	299.70	1,270.8	57.4	-107.8	121.7	0.58	0.53	
1,378.0	9.20	297.00	1,366.3	65.5	-122.7	138.6	1.92	-1.86	
1,470.0	9.10	293.40	1,457.2	71.7	-136.0	153.2	0.63	-0.11	
1,566.0	9.40	299.50	1,551.9	78.6	-149.8	168.6	1.07	0.31	
1,661.0	9.50	300.40	1,645.6	86.4	-163.3	184.1	0.19	0.11	
1,757.0	10.20	298.40	1,740.2	94.5	-177.6	200.4	0.81	0.73	
1,851.0	11.50	299.20	1,832.5	103.0	-193.1	218.0	1.39	1.38	
1,946.0	11.60	295.30	1,925.6	111.7	-210.0	236.9	0.83	0.11	
2,040.0	10.60	294.40	2,017.9	119.3	-226.4	255.0	1.08	-1.06	
2,110.0	9.00	293.10	2,086.8	124.1	-237.3	266.9	2.31	-2.29	
2,205.0	8.70	289.20	2,180.7	129.4	-250.9	281.5	0.71	-0.32	
2,299.0	9.20	296.60	2,273.6	135.1	-264.4	296.1	1.33	0.53	
2,394.0	10.20	295.00	2,367.2	142.0	-278.8	312.1	1.09	1.05	
2,489.0	9.40	288.90	2,460.8	148.1	-293.7	328.3	1.38	-0.84	
2,583.0	9.30	295.90	2,553.6	153.9	-307.8	343.5	1.21	-0.11	
2,677.0	10.50	300.90	2,646.2	161.6	-322.0	359.6	1.57	1.28	
2,772.0	10.90	302.90	2,739.5	171.0	-337.0	377.0	0.57	0.42	
2,867.0	10.60	302.10	2,832.8	180.5	-351.9	394.5	0.35	-0.32	
2,961.0	10.60	301.40	2,925.2	189.6	-366.6	411.6	0.14	0.00	
3,056.0	10.80	302.20	3,018.6	198.9	-381.6	429.0	0.26	0.21	
3,151.0	10.70	295.00	3,111.9	207.3	-397.2	446.6	1.42	-0.11	
3,244.0	10.00	294.30	3,203.4	214.3	-412.3	463.3	0.76	-0.75	
3,339.0	9.20	294.30	3,297.1	220.8	-426.8	479.1	0.84	-0.84	
3,433.0	9.20	291.80	3,389.9	226.7	-440.6	494.2	0.43	0.00	
3,528.0	10.20	291.30	3,483.5	232.6	-455.5	510.2	1.06	1.05	
3,623.0	9.30	292.00	3,577.1	238.5	-470.4	526.2	0.96	-0.95	
3,718.0	9.70	288.10	3,670.8	243.9	-485.2	541.9	0.80	0.42	
3,813.0	8.70	286.10	3,764.6	248.4	-499.7	557.0	1.10	-1.05	
3,907.0	7.00	287.40	3,857.7	252.0	-512.0	569.8	1.82	-1.81	
4,002.0	5.40	279.90	3,952.2	254.5	-521.9	579.9	1.88	-1.68	
4,097.0	4.40	283.30	4,046.8	256.2	-529.9	587.8	1.10	-1.05	
4,190.0	2.90	297.60	4,139.6	258.1	-535.4	593.7	1.87	-1.61	
4,286.0	1.90	299.80	4,235.6	260.0	-538.9	597.7	1.05	-1.04	
4,381.0	0.60	285.10	4,330.5	260.9	-540.8	599.7	1.40	-1.37	
4,476.0	0.90	293.90	4,425.5	261.3	-542.0	601.0	0.34	0.32	
4,571.0	1.00	294.80	4,520.5	262.0	-543.4	602.6	0.11	0.11	
4,665.0	1.30	297.80	4,614.5	262.8	-545.1	604.4	0.33	0.32	
4,760.0	0.20	54.40	4,709.5	263.4	-545.9	605.4	1.47	-1.16	
4,855.0	0.60	359.00	4,804.5	264.0	-545.8	605.5	0.54	0.42	
4,950.0	1.00	340.30	4,899.5	265.3	-546.1	606.3	0.50	0.42	
5,044.0	0.80	2.70	4,993.5	266.7	-546.3	607.1	0.43	-0.21	
5,139.0	1.40	150.00	5,088.5	266.4	-545.7	606.4	2.23	0.63	
5,235.0	0.70	88.70	5,184.4	265.4	-544.5	604.9	1.28	-0.73	
5,319.0	0.80	305.30	5,268.4	265.7	-544.5	605.0	1.70	0.12	
5,423.0	1.10	335.70	5,372.4	267.1	-545.5	606.5	0.55	0.29	
5,518.0	1.10	203.30	5,467.4	267.0	-546.2	607.1	2.12	0.00	
5,613.0	2.20	192.90	5,562.4	264.4	-547.0	606.8	1.20	1.16	
5,708.0	2.00	193.20	5,657.3	261.0	-547.8	606.2	0.21	-0.21	
5,803.0	1.60	211.10	5,752.3	258.3	-548.8	606.1	0.72	-0.42	
5,898.0	1.60	209.20	5,847.2	256.0	-550.2	606.5	0.06	0.00	
5,993.0	1.50	210.30	5,942.2	253.8	-551.4	606.8	0.11	-0.11	
6,088.0	0.10	235.90	6,037.2	252.6	-552.1	607.0	1.48	-1.47	
6,184.0	1.80	39.40	6,133.2	253.8	-551.3	606.6	1.98	1.77	

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Cathedral Energy Services

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Project:	Garfield County	TVD Reference:	KBE @ 8553.0ft (Patterson 302)
Site:	NWNW Sec19 T5S R96W Chevron C19 596	MD Reference:	KBE @ 8553.0ft (Patterson 302)
Well:	Berry 19-21D	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	Database:	EDM 5000.1 US Multi Users DB

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
6,279.0	1.80	35.20	6,228.1	256.1	-549.4	605.8	0.14	0.00	
6,372.0	1.40	41.40	6,321.1	258.2	-547.9	605.2	0.47	-0.43	
6,467.0	1.50	28.30	6,416.1	260.1	-546.5	604.7	0.36	0.11	
6,562.0	1.10	6.10	6,511.0	262.1	-545.8	604.9	0.67	-0.42	
6,657.0	0.60	10.00	6,606.0	263.5	-545.6	605.2	0.53	-0.53	
6,751.0	0.50	357.20	6,700.0	264.4	-545.6	605.5	0.17	-0.11	
6,846.0	1.10	332.00	6,795.0	265.7	-546.0	606.4	0.72	0.63	
6,941.0	0.20	312.20	6,890.0	266.6	-546.6	607.3	0.96	-0.95	
7,036.0	0.20	312.00	6,985.0	266.8	-546.8	607.6	0.00	0.00	
7,130.0	0.60	276.60	7,079.0	267.0	-547.4	608.2	0.48	0.43	
7,223.0	0.60	284.10	7,172.0	267.1	-548.4	609.2	0.08	0.00	
7,319.0	1.20	278.00	7,268.0	267.4	-549.9	610.6	0.63	0.62	
7,408.0	1.50	226.60	7,357.0	266.7	-551.6	612.0	1.35	0.34	
7,503.0	1.50	234.40	7,451.9	265.2	-553.5	613.1	0.21	0.00	
7,597.0	1.40	242.00	7,545.9	263.9	-555.6	614.5	0.23	-0.11	
7,692.0	1.20	195.10	7,640.9	262.4	-556.8	615.1	1.11	-0.21	
7,787.0	1.10	209.20	7,735.8	260.6	-557.5	615.1	0.31	-0.11	
7,882.0	1.10	214.00	7,830.8	259.1	-558.5	615.3	0.10	0.00	
7,976.0	1.20	225.40	7,924.8	257.6	-559.7	615.9	0.27	0.11	
8,071.0	0.60	239.60	8,019.8	256.7	-560.8	616.6	0.67	-0.63	
8,166.0	0.80	24.40	8,114.8	257.0	-561.0	616.8	1.41	0.21	
8,261.0	0.70	4.60	8,209.8	258.2	-560.7	617.0	0.29	-0.11	
8,356.0	0.70	326.10	8,304.8	259.3	-561.0	617.7	0.49	0.00	
8,451.0	1.10	316.30	8,399.8	260.4	-561.9	619.0	0.45	0.42	
8,546.0	1.30	304.80	8,494.8	261.7	-563.4	620.9	0.33	0.21	
8,641.0	1.60	307.10	8,589.7	263.1	-565.4	623.2	0.32	0.32	
8,736.0	0.70	291.70	8,684.7	264.1	-567.0	625.1	0.99	-0.95	
8,831.0	0.20	293.50	8,779.7	264.4	-567.7	625.8	0.53	-0.53	
8,926.0	0.20	260.60	8,874.7	264.5	-568.0	626.1	0.12	0.00	
9,021.0	0.60	252.50	8,969.7	264.3	-568.6	626.7	0.42	0.42	
9,115.0	0.70	252.60	9,063.7	264.0	-569.6	627.5	0.11	0.11	
9,210.0	1.20	256.10	9,158.7	263.5	-571.1	628.7	0.53	0.53	
9,304.0	1.50	260.60	9,252.6	263.1	-573.3	630.5	0.34	0.32	
9,398.0	1.00	200.60	9,346.6	262.1	-574.8	631.5	1.41	-0.53	
9,493.0	1.10	214.20	9,441.6	260.6	-575.6	631.7	0.28	0.11	
9,587.0	1.10	242.00	9,535.6	259.4	-576.9	632.4	0.56	0.00	
9,681.0	1.60	249.60	9,629.6	258.6	-579.0	634.0	0.56	0.53	
9,776.0	2.10	256.50	9,724.5	257.7	-581.9	636.3	0.58	0.53	
9,964.0	2.20	266.20	9,912.4	256.6	-588.8	642.3	0.20	0.05	
10,059.0	2.40	266.00	10,007.3	256.4	-592.6	645.7	0.21	0.21	Last Cathedral svy @ 10,059' MD
10,109.0	2.40	266.00	10,057.3	256.2	-594.7	647.6	0.00	0.00	Projection to Bit @ 10,109' MD

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North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 US Multi Users DB

Targets

Target Name

- hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Berry 19-21D TGT	0.00	0.00	4,250.0	264.1	-540.4	1,657,570.92	2,235,263.37	39.607447	-108.214623
- survey misses target center by 4.1ft at 4300.5ft MD (4250.1 TVD, 260.2 N, -539.3 E)									
- Point									
Berry 19-21D BHL	0.00	0.00	10,080.0	244.1	-575.1	1,657,551.93	2,235,228.17	39.607392	-108.214746
- survey misses target center by 32.4ft at 10109.0ft MD (10057.3 TVD, 256.2 N, -594.7 E)									
- Rectangle (sides W50.0 H100.0 D0.0)									

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	+E/-W (ft)	Comment
10,059.0	10,007.3	256.4	-592.6	Last Cathedral svy @ 10,059' MD
10,109.0	10,057.3	256.2	-594.7	Projection to Bit @ 10,109' MD

Checked By: _____ Approved By: _____ Date: _____