



Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Bulldog #17-21H-891
Company:	Axia Energy	TVD Reference:	WELL @ 7007.0ft (Original Well Elev)
Project:	Moffat County, CO	MD Reference:	WELL @ 7007.0ft (Original Well Elev)
Site:	SEC 17-T8N-R91W	North Reference:	True
Well:	Bulldog #17-21H-891	Survey Calculation Method:	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #2		

Project	Moffat County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site		SEC 17-T8N-R91W			
Site Position:		Northing:	1,489,855.99 ft	Latitude:	40.658607
From:	Lat/Long	Easting:	2,409,819.60 ft	Longitude:	-107.627397
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.37 °

Well	Bulldog #17-21H-891					
Well Position	+N/-S	0.0 ft	Northing:	1,489,855.98 ft	Latitude:	40.658607
	+E/-W	0.0 ft	Easting:	2,409,819.60 ft	Longitude:	-107.627397
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	6,975.0 ft

Wellbore	Hz				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	1/30/2013	10.12	66.71	52,748

Design	Plan #2			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	9,414.6
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(ft)	(ft)	(ft)	(°)
	0.0	0.0	0.0	186.69

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
9,414.6	0.00	0.00	9,301.0	-559.0	-1,143.2	0.00	0.00	0.00	0.00	
12,604.1	0.00	0.00	12,490.5	-559.0	-1,143.2	0.00	0.00	0.00	0.00	
13,354.1	90.00	180.50	12,968.0	-1,036.4	-1,147.3	12.00	12.00	0.00	180.50	
13,370.8	90.00	180.00	12,968.0	-1,053.1	-1,147.4	3.00	0.00	-3.00	-90.00	
22,094.2	90.00	180.00	12,968.0	-9,776.5	-1,147.4	0.00	0.00	0.00	0.00	Bulldog #17-21H-891

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Site:	SEC 17-T8N-R91W	North Reference:	True
Well:	Bulldog #17-21H-891	Survey Calculation Method:	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #2		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
9,414.6	0.00	0.00	9,301.0	-559.0	-1,143.2	688.4	0.00	0.00	Tie On @ 9414' MD - Mancos
9,500.0	0.00	0.00	9,386.4	-559.0	-1,143.2	688.4	0.00	0.00	
9,600.0	0.00	0.00	9,486.4	-559.0	-1,143.2	688.4	0.00	0.00	
9,700.0	0.00	0.00	9,586.4	-559.0	-1,143.2	688.4	0.00	0.00	
9,754.6	0.00	0.00	9,641.0	-559.0	-1,143.2	688.4	0.00	0.00	Morapops
9,800.0	0.00	0.00	9,686.4	-559.0	-1,143.2	688.4	0.00	0.00	
9,900.0	0.00	0.00	9,786.4	-559.0	-1,143.2	688.4	0.00	0.00	
10,000.0	0.00	0.00	9,886.4	-559.0	-1,143.2	688.4	0.00	0.00	
10,089.6	0.00	0.00	9,976.0	-559.0	-1,143.2	688.4	0.00	0.00	Mancos Marker
10,100.0	0.00	0.00	9,986.4	-559.0	-1,143.2	688.4	0.00	0.00	
10,200.0	0.00	0.00	10,086.4	-559.0	-1,143.2	688.4	0.00	0.00	
10,300.0	0.00	0.00	10,186.4	-559.0	-1,143.2	688.4	0.00	0.00	
10,400.0	0.00	0.00	10,286.4	-559.0	-1,143.2	688.4	0.00	0.00	
10,500.0	0.00	0.00	10,386.4	-559.0	-1,143.2	688.4	0.00	0.00	
10,600.0	0.00	0.00	10,486.4	-559.0	-1,143.2	688.4	0.00	0.00	
10,700.0	0.00	0.00	10,586.4	-559.0	-1,143.2	688.4	0.00	0.00	
10,800.0	0.00	0.00	10,686.4	-559.0	-1,143.2	688.4	0.00	0.00	
10,900.0	0.00	0.00	10,786.4	-559.0	-1,143.2	688.4	0.00	0.00	
11,000.0	0.00	0.00	10,886.4	-559.0	-1,143.2	688.4	0.00	0.00	
11,100.0	0.00	0.00	10,986.4	-559.0	-1,143.2	688.4	0.00	0.00	
11,200.0	0.00	0.00	11,086.4	-559.0	-1,143.2	688.4	0.00	0.00	
11,300.0	0.00	0.00	11,186.4	-559.0	-1,143.2	688.4	0.00	0.00	
11,400.0	0.00	0.00	11,286.4	-559.0	-1,143.2	688.4	0.00	0.00	
11,500.0	0.00	0.00	11,386.4	-559.0	-1,143.2	688.4	0.00	0.00	
11,600.0	0.00	0.00	11,486.4	-559.0	-1,143.2	688.4	0.00	0.00	
11,700.0	0.00	0.00	11,586.4	-559.0	-1,143.2	688.4	0.00	0.00	
11,800.0	0.00	0.00	11,686.4	-559.0	-1,143.2	688.4	0.00	0.00	
11,900.0	0.00	0.00	11,786.4	-559.0	-1,143.2	688.4	0.00	0.00	
12,000.0	0.00	0.00	11,886.4	-559.0	-1,143.2	688.4	0.00	0.00	
12,100.0	0.00	0.00	11,986.4	-559.0	-1,143.2	688.4	0.00	0.00	
12,200.0	0.00	0.00	12,086.4	-559.0	-1,143.2	688.4	0.00	0.00	
12,300.0	0.00	0.00	12,186.4	-559.0	-1,143.2	688.4	0.00	0.00	
12,326.6	0.00	0.00	12,213.0	-559.0	-1,143.2	688.4	0.00	0.00	Niobrara
12,400.0	0.00	0.00	12,286.4	-559.0	-1,143.2	688.4	0.00	0.00	
12,500.0	0.00	0.00	12,386.4	-559.0	-1,143.2	688.4	0.00	0.00	
12,600.0	0.00	0.00	12,486.4	-559.0	-1,143.2	688.4	0.00	0.00	
12,604.1	0.00	0.00	12,490.5	-559.0	-1,143.2	688.4	0.00	0.00	Curve KOP @ 12604' MD
12,700.0	11.51	180.50	12,585.8	-568.6	-1,143.2	698.0	12.00	12.00	
12,780.6	21.18	180.50	12,663.0	-591.2	-1,143.4	720.5	12.00	12.00	Tow Creek #2
12,800.0	23.51	180.50	12,681.0	-598.6	-1,143.5	727.8	12.00	12.00	
12,846.9	29.14	180.50	12,723.0	-619.4	-1,143.7	748.5	12.00	12.00	Wolf Mountain
12,900.0	35.51	180.50	12,767.8	-647.8	-1,143.9	776.7	12.00	12.00	
13,000.0	47.51	180.50	12,842.6	-713.9	-1,144.5	842.5	12.00	12.00	
13,056.1	54.24	180.50	12,878.0	-757.5	-1,144.9	885.8	12.00	12.00	Top Target
13,100.0	59.51	180.50	12,902.0	-794.2	-1,145.2	922.3	12.00	12.00	
13,200.0	71.51	180.50	12,943.3	-885.0	-1,146.0	1,012.6	12.00	12.00	
13,300.0	83.51	180.50	12,964.9	-982.5	-1,146.9	1,109.5	12.00	12.00	
13,354.1	90.00	180.50	12,968.0	-1,036.4	-1,147.3	1,163.1	12.00	12.00	LP @ 13354' MD
13,370.8	90.00	180.00	12,968.0	-1,053.1	-1,147.4	1,179.7	3.00	0.00	EOT; 180°
13,400.0	90.00	180.00	12,968.0	-1,082.3	-1,147.4	1,208.7	0.00	0.00	
13,500.0	90.00	180.00	12,968.0	-1,182.3	-1,147.4	1,308.0	0.00	0.00	
13,600.0	90.00	180.00	12,968.0	-1,282.3	-1,147.4	1,407.4	0.00	0.00	

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Well:	Bulldog #17-21H-891	Survey Calculation Method:	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #2		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
13,700.0	90.00	180.00	12,968.0	-1,382.3	-1,147.4	1,506.7	0.00	0.00	
13,800.0	90.00	180.00	12,968.0	-1,482.3	-1,147.4	1,606.0	0.00	0.00	
13,900.0	90.00	180.00	12,968.0	-1,582.3	-1,147.4	1,705.3	0.00	0.00	
14,000.0	90.00	180.00	12,968.0	-1,682.3	-1,147.4	1,804.6	0.00	0.00	
14,100.0	90.00	180.00	12,968.0	-1,782.3	-1,147.4	1,903.9	0.00	0.00	
14,200.0	90.00	180.00	12,968.0	-1,882.3	-1,147.4	2,003.3	0.00	0.00	
14,300.0	90.00	180.00	12,968.0	-1,982.3	-1,147.4	2,102.6	0.00	0.00	
14,400.0	90.00	180.00	12,968.0	-2,082.3	-1,147.4	2,201.9	0.00	0.00	
14,500.0	90.00	180.00	12,968.0	-2,182.3	-1,147.4	2,301.2	0.00	0.00	
14,600.0	90.00	180.00	12,968.0	-2,282.3	-1,147.4	2,400.5	0.00	0.00	
14,700.0	90.00	180.00	12,968.0	-2,382.3	-1,147.4	2,499.9	0.00	0.00	
14,800.0	90.00	180.00	12,968.0	-2,482.3	-1,147.4	2,599.2	0.00	0.00	
14,900.0	90.00	180.00	12,968.0	-2,582.3	-1,147.4	2,698.5	0.00	0.00	
15,000.0	90.00	180.00	12,968.0	-2,682.3	-1,147.4	2,797.8	0.00	0.00	
15,100.0	90.00	180.00	12,968.0	-2,782.3	-1,147.4	2,897.1	0.00	0.00	
15,200.0	90.00	180.00	12,968.0	-2,882.3	-1,147.4	2,996.4	0.00	0.00	
15,300.0	90.00	180.00	12,968.0	-2,982.3	-1,147.4	3,095.8	0.00	0.00	
15,400.0	90.00	180.00	12,968.0	-3,082.3	-1,147.4	3,195.1	0.00	0.00	
15,500.0	90.00	180.00	12,968.0	-3,182.3	-1,147.4	3,294.4	0.00	0.00	
15,600.0	90.00	180.00	12,968.0	-3,282.3	-1,147.4	3,393.7	0.00	0.00	
15,700.0	90.00	180.00	12,968.0	-3,382.3	-1,147.4	3,493.0	0.00	0.00	
15,800.0	90.00	180.00	12,968.0	-3,482.3	-1,147.4	3,592.4	0.00	0.00	
15,900.0	90.00	180.00	12,968.0	-3,582.3	-1,147.4	3,691.7	0.00	0.00	
16,000.0	90.00	180.00	12,968.0	-3,682.3	-1,147.4	3,791.0	0.00	0.00	
16,100.0	90.00	180.00	12,968.0	-3,782.3	-1,147.4	3,890.3	0.00	0.00	
16,200.0	90.00	180.00	12,968.0	-3,882.3	-1,147.4	3,989.6	0.00	0.00	
16,300.0	90.00	180.00	12,968.0	-3,982.3	-1,147.4	4,088.9	0.00	0.00	
16,400.0	90.00	180.00	12,968.0	-4,082.3	-1,147.4	4,188.3	0.00	0.00	
16,500.0	90.00	180.00	12,968.0	-4,182.3	-1,147.4	4,287.6	0.00	0.00	
16,600.0	90.00	180.00	12,968.0	-4,282.3	-1,147.4	4,386.9	0.00	0.00	
16,700.0	90.00	180.00	12,968.0	-4,382.3	-1,147.4	4,486.2	0.00	0.00	
16,800.0	90.00	180.00	12,968.0	-4,482.3	-1,147.4	4,585.5	0.00	0.00	
16,900.0	90.00	180.00	12,968.0	-4,582.3	-1,147.4	4,684.9	0.00	0.00	
17,000.0	90.00	180.00	12,968.0	-4,682.3	-1,147.4	4,784.2	0.00	0.00	
17,100.0	90.00	180.00	12,968.0	-4,782.3	-1,147.4	4,883.5	0.00	0.00	
17,200.0	90.00	180.00	12,968.0	-4,882.3	-1,147.4	4,982.8	0.00	0.00	
17,300.0	90.00	180.00	12,968.0	-4,982.3	-1,147.4	5,082.1	0.00	0.00	
17,400.0	90.00	180.00	12,968.0	-5,082.3	-1,147.4	5,181.4	0.00	0.00	
17,500.0	90.00	180.00	12,968.0	-5,182.3	-1,147.4	5,280.8	0.00	0.00	
17,600.0	90.00	180.00	12,968.0	-5,282.3	-1,147.4	5,380.1	0.00	0.00	
17,700.0	90.00	180.00	12,968.0	-5,382.3	-1,147.4	5,479.4	0.00	0.00	
17,800.0	90.00	180.00	12,968.0	-5,482.3	-1,147.4	5,578.7	0.00	0.00	
17,900.0	90.00	180.00	12,968.0	-5,582.3	-1,147.4	5,678.0	0.00	0.00	
18,000.0	90.00	180.00	12,968.0	-5,682.3	-1,147.4	5,777.4	0.00	0.00	
18,100.0	90.00	180.00	12,968.0	-5,782.3	-1,147.4	5,876.7	0.00	0.00	
18,200.0	90.00	180.00	12,968.0	-5,882.3	-1,147.4	5,976.0	0.00	0.00	
18,300.0	90.00	180.00	12,968.0	-5,982.3	-1,147.4	6,075.3	0.00	0.00	
18,400.0	90.00	180.00	12,968.0	-6,082.3	-1,147.4	6,174.6	0.00	0.00	
18,500.0	90.00	180.00	12,968.0	-6,182.3	-1,147.4	6,274.0	0.00	0.00	
18,600.0	90.00	180.00	12,968.0	-6,282.3	-1,147.4	6,373.3	0.00	0.00	
18,700.0	90.00	180.00	12,968.0	-6,382.3	-1,147.4	6,472.6	0.00	0.00	
18,800.0	90.00	180.00	12,968.0	-6,482.3	-1,147.4	6,571.9	0.00	0.00	

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Company:	Axia Energy	TVD Reference:	WELL @ 7007.0ft (Original Well Elev)
Project:	Moffat County, CO	MD Reference:	WELL @ 7007.0ft (Original Well Elev)
Site:	SEC 17-T8N-R91W	North Reference:	True
Well:	Bulldog #17-21H-891	Survey Calculation Method:	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #2		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
18,900.0	90.00	180.00	12,968.0	-6,582.3	-1,147.4	6,671.2	0.00	0.00	
19,000.0	90.00	180.00	12,968.0	-6,682.3	-1,147.4	6,770.5	0.00	0.00	
19,100.0	90.00	180.00	12,968.0	-6,782.3	-1,147.4	6,869.9	0.00	0.00	
19,200.0	90.00	180.00	12,968.0	-6,882.3	-1,147.4	6,969.2	0.00	0.00	
19,300.0	90.00	180.00	12,968.0	-6,982.3	-1,147.4	7,068.5	0.00	0.00	
19,400.0	90.00	180.00	12,968.0	-7,082.3	-1,147.4	7,167.8	0.00	0.00	
19,500.0	90.00	180.00	12,968.0	-7,182.3	-1,147.4	7,267.1	0.00	0.00	
19,600.0	90.00	180.00	12,968.0	-7,282.3	-1,147.4	7,366.5	0.00	0.00	
19,700.0	90.00	180.00	12,968.0	-7,382.3	-1,147.4	7,465.8	0.00	0.00	
19,800.0	90.00	180.00	12,968.0	-7,482.3	-1,147.4	7,565.1	0.00	0.00	
19,900.0	90.00	180.00	12,968.0	-7,582.3	-1,147.4	7,664.4	0.00	0.00	
20,000.0	90.00	180.00	12,968.0	-7,682.3	-1,147.4	7,763.7	0.00	0.00	
20,100.0	90.00	180.00	12,968.0	-7,782.3	-1,147.4	7,863.0	0.00	0.00	
20,200.0	90.00	180.00	12,968.0	-7,882.3	-1,147.4	7,962.4	0.00	0.00	
20,300.0	90.00	180.00	12,968.0	-7,982.3	-1,147.4	8,061.7	0.00	0.00	
20,400.0	90.00	180.00	12,968.0	-8,082.3	-1,147.4	8,161.0	0.00	0.00	
20,500.0	90.00	180.00	12,968.0	-8,182.3	-1,147.4	8,260.3	0.00	0.00	
20,600.0	90.00	180.00	12,968.0	-8,282.3	-1,147.4	8,359.6	0.00	0.00	
20,700.0	90.00	180.00	12,968.0	-8,382.3	-1,147.4	8,459.0	0.00	0.00	
20,800.0	90.00	180.00	12,968.0	-8,482.3	-1,147.4	8,558.3	0.00	0.00	
20,900.0	90.00	180.00	12,968.0	-8,582.3	-1,147.4	8,657.6	0.00	0.00	
21,000.0	90.00	180.00	12,968.0	-8,682.3	-1,147.4	8,756.9	0.00	0.00	
21,100.0	90.00	180.00	12,968.0	-8,782.3	-1,147.4	8,856.2	0.00	0.00	
21,200.0	90.00	180.00	12,968.0	-8,882.3	-1,147.4	8,955.5	0.00	0.00	
21,300.0	90.00	180.00	12,968.0	-8,982.3	-1,147.4	9,054.9	0.00	0.00	
21,400.0	90.00	180.00	12,968.0	-9,082.3	-1,147.4	9,154.2	0.00	0.00	
21,500.0	90.00	180.00	12,968.0	-9,182.3	-1,147.4	9,253.5	0.00	0.00	
21,600.0	90.00	180.00	12,968.0	-9,282.3	-1,147.4	9,352.8	0.00	0.00	
21,700.0	90.00	180.00	12,968.0	-9,382.3	-1,147.4	9,452.1	0.00	0.00	
21,800.0	90.00	180.00	12,968.0	-9,482.3	-1,147.4	9,551.5	0.00	0.00	
21,900.0	90.00	180.00	12,968.0	-9,582.3	-1,147.4	9,650.8	0.00	0.00	
22,000.0	90.00	180.00	12,968.0	-9,682.3	-1,147.4	9,750.1	0.00	0.00	
22,094.2	90.00	180.00	12,968.0	-9,776.5	-1,147.4	9,843.6	0.00	0.00	PBHL @ 22094' MD

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
Bulldog #17-21H-891 PE	0.00	0.00	12,968.0	-9,776.5	-1,147.4	1,480,109.81	2,408,437.98	40.631772	-107.631531
- plan hits target center									
- Point									

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Bulldog #17-21H-891
Company:	Axia Energy	TVD Reference:	WELL @ 7007.0ft (Original Well Elev)
Project:	Moffat County, CO	MD Reference:	WELL @ 7007.0ft (Original Well Elev)
Site:	SEC 17-T8N-R91W	North Reference:	True
Well:	Bulldog #17-21H-891	Survey Calculation Method:	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #2		

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
4,364.9	4,330.0	Lewis				
6,216.1	6,151.0	Mesaverde				
9,414.6	9,301.0	Mancos				
9,754.6	9,641.0	Morapos				
10,089.6	9,976.0	Mancos Marker				
12,326.6	12,213.0	Niobrara				
12,780.6	12,663.0	Tow Creek #2				
12,846.9	12,723.0	Wolf Mountain				
13,056.1	12,878.0	Top Target				

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
9,414.6	9,301.0	-559.0	-1,143.2	Tie On @ 9414' MD	
12,604.1	12,490.5	-559.0	-1,143.2	Curve KOP @ 12604' MD	
13,354.1	12,968.0	-1,036.4	-1,147.3	LP @ 13354' MD	
13,370.8	12,968.0	-1,053.1	-1,147.4	EOT; 180°	
22,094.2	12,968.0	-9,776.5	-1,147.4	PBHL @ 22094' MD	