



# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well Bulldog #30-21H 891
<b>Company:</b>	Axia Energy	<b>TVD Reference:</b>	WELL @ 6704.0ft (Original Well Elev)
<b>Project:</b>	Moffat County, CO	<b>MD Reference:</b>	WELL @ 6704.0ft (Original Well Elev)
<b>Site:</b>	SEC 30-T8N-R91W	<b>North Reference:</b>	True
<b>Well:</b>	Bulldog #30-21H 891	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	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 30-T8N-R91W			
Site Position:		Northing:	1,478,363.92 ft	Latitude:	40.626675
From:	Lat/Long	Easting:	2,403,814.61 ft	Longitude:	-107.648031
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.39 °

Well	Bulldog #30-21H 891					
Well Position	+N/-S	0.0 ft	Northing:	1,478,363.92 ft	Latitude:	40.626675
	+E/-W	0.0 ft	Easting:	2,403,814.61 ft	Longitude:	-107.648031
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	6,672.0 ft

Wellbore	HZ				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	4/1/2013	10.10	66.68	52,714

Design	Plan #2			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	9,376.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	185.79

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
9,376.0	0.00	0.00	9,269.0	-734.0	-873.0	0.00	0.00	0.00	0.00	
11,807.0	0.00	0.00	11,700.0	-734.0	-873.0	0.00	0.00	0.00	0.00	
12,743.2	93.62	180.50	12,271.9	-1,343.1	-878.3	10.00	10.00	0.00	180.50	
12,759.9	93.62	180.00	12,270.8	-1,359.7	-878.4	3.00	0.01	-3.01	-89.76	
20,070.2	93.62	180.00	11,809.0	-8,655.4	-878.3	0.00	0.00	0.00	0.00	Bulldog #30-21H 891

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<b>Project:</b>	Moffat County, CO	<b>MD Reference:</b>	WELL @ 6704.0ft (Original Well Elev)
<b>Site:</b>	SEC 30-T8N-R91W	<b>North Reference:</b>	True
<b>Well:</b>	Bulldog #30-21H 891	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	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
9,376.0	0.00	0.00	9,269.0	-734.0	-873.0	818.4	0.00	0.00	Tie On @ 9376' MD
9,400.0	0.00	0.00	9,293.1	-734.0	-873.0	818.4	0.00	0.00	
9,500.0	0.00	0.00	9,393.1	-734.0	-873.0	818.4	0.00	0.00	
9,600.0	0.00	0.00	9,493.1	-734.0	-873.0	818.4	0.00	0.00	
9,674.5	0.00	0.00	9,567.6	-734.0	-873.0	818.4	0.00	0.00	Morapos
9,700.0	0.00	0.00	9,593.1	-734.0	-873.0	818.4	0.00	0.00	
9,800.0	0.00	0.00	9,693.1	-734.0	-873.0	818.4	0.00	0.00	
9,900.0	0.00	0.00	9,793.1	-734.0	-873.0	818.4	0.00	0.00	
10,000.0	0.00	0.00	9,893.1	-734.0	-873.0	818.4	0.00	0.00	
10,009.5	0.00	0.00	9,902.6	-734.0	-873.0	818.4	0.00	0.00	Mancos Marker
10,100.0	0.00	0.00	9,993.1	-734.0	-873.0	818.4	0.00	0.00	
10,200.0	0.00	0.00	10,093.1	-734.0	-873.0	818.4	0.00	0.00	
10,300.0	0.00	0.00	10,193.1	-734.0	-873.0	818.4	0.00	0.00	
10,400.0	0.00	0.00	10,293.1	-734.0	-873.0	818.4	0.00	0.00	
10,500.0	0.00	0.00	10,393.1	-734.0	-873.0	818.4	0.00	0.00	
10,600.0	0.00	0.00	10,493.1	-734.0	-873.0	818.4	0.00	0.00	
10,700.0	0.00	0.00	10,593.1	-734.0	-873.0	818.4	0.00	0.00	
10,800.0	0.00	0.00	10,693.1	-734.0	-873.0	818.4	0.00	0.00	
10,900.0	0.00	0.00	10,793.1	-734.0	-873.0	818.4	0.00	0.00	
11,000.0	0.00	0.00	10,893.1	-734.0	-873.0	818.4	0.00	0.00	
11,100.0	0.00	0.00	10,993.1	-734.0	-873.0	818.4	0.00	0.00	
11,200.0	0.00	0.00	11,093.1	-734.0	-873.0	818.4	0.00	0.00	
11,300.0	0.00	0.00	11,193.1	-734.0	-873.0	818.4	0.00	0.00	
11,400.0	0.00	0.00	11,293.1	-734.0	-873.0	818.4	0.00	0.00	
11,500.0	0.00	0.00	11,393.1	-734.0	-873.0	818.4	0.00	0.00	
11,600.0	0.00	0.00	11,493.1	-734.0	-873.0	818.4	0.00	0.00	
11,700.0	0.00	0.00	11,593.1	-734.0	-873.0	818.4	0.00	0.00	
11,800.0	0.00	0.00	11,693.1	-734.0	-873.0	818.4	0.00	0.00	
11,807.0	0.00	0.00	11,700.0	-734.0	-873.0	818.4	0.00	0.00	Curve KOP @ 11807' MD
11,900.0	9.30	180.50	11,792.7	-741.5	-873.1	825.9	10.00	10.00	
12,000.0	19.30	180.50	11,889.4	-766.2	-873.3	850.5	10.00	10.00	
12,100.0	29.30	180.50	11,980.5	-807.3	-873.6	891.4	10.00	10.00	
12,200.0	39.30	180.50	12,063.0	-863.6	-874.1	947.4	10.00	10.00	
12,300.0	49.30	180.50	12,134.4	-933.3	-874.7	1,016.9	10.00	10.00	
12,307.9	50.09	180.50	12,139.6	-939.4	-874.8	1,022.9	10.03	10.03	Niobrara
12,400.0	59.30	180.50	12,192.7	-1,014.4	-875.4	1,097.6	10.00	10.00	
12,483.8	67.68	180.50	12,230.1	-1,089.4	-876.1	1,172.2	10.00	10.00	Top Target
12,500.0	69.30	180.50	12,236.0	-1,104.4	-876.2	1,187.3	9.98	9.98	
12,600.0	79.30	180.50	12,263.0	-1,200.6	-877.1	1,283.0	10.00	10.00	
12,700.0	89.30	180.50	12,273.0	-1,300.0	-877.9	1,382.0	10.00	10.00	
12,743.2	93.62	180.50	12,271.9	-1,343.1	-878.3	1,424.9	10.01	10.01	LP @ 12743' MD
12,759.9	93.62	180.00	12,270.8	-1,359.7	-878.4	1,441.5	3.00	0.01	EOT; 180° Az
12,800.0	93.62	180.00	12,268.3	-1,399.8	-878.4	1,481.3	0.00	0.00	
12,900.0	93.62	180.00	12,262.0	-1,499.6	-878.4	1,580.6	0.00	0.00	
13,000.0	93.62	180.00	12,255.6	-1,599.4	-878.4	1,679.9	0.00	0.00	
13,100.0	93.62	180.00	12,249.3	-1,699.2	-878.4	1,779.2	0.00	0.00	
13,200.0	93.62	180.00	12,243.0	-1,799.0	-878.4	1,878.5	0.00	0.00	
13,300.0	93.62	180.00	12,236.7	-1,898.8	-878.4	1,977.8	0.00	0.00	
13,400.0	93.62	180.00	12,230.4	-1,998.6	-878.4	2,077.1	0.00	0.00	
13,500.0	93.62	180.00	12,224.1	-2,098.4	-878.4	2,176.4	0.00	0.00	
13,600.0	93.62	180.00	12,217.7	-2,198.2	-878.4	2,275.7	0.00	0.00	
13,700.0	93.62	180.00	12,211.4	-2,298.0	-878.4	2,375.0	0.00	0.00	

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<b>Project:</b>	Moffat County, CO	<b>MD Reference:</b>	WELL @ 6704.0ft (Original Well Elev)
<b>Site:</b>	SEC 30-T8N-R91W	<b>North Reference:</b>	True
<b>Well:</b>	Bulldog #30-21H 891	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	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
13,800.0	93.62	180.00	12,205.1	-2,397.8	-878.4	2,474.3	0.00	0.00	
13,900.0	93.62	180.00	12,198.8	-2,497.6	-878.4	2,573.5	0.00	0.00	
14,000.0	93.62	180.00	12,192.5	-2,597.4	-878.4	2,672.8	0.00	0.00	
14,100.0	93.62	180.00	12,186.1	-2,697.2	-878.4	2,772.1	0.00	0.00	
14,200.0	93.62	180.00	12,179.8	-2,797.0	-878.4	2,871.4	0.00	0.00	
14,300.0	93.62	180.00	12,173.5	-2,896.8	-878.4	2,970.7	0.00	0.00	
14,400.0	93.62	180.00	12,167.2	-2,996.6	-878.4	3,070.0	0.00	0.00	
14,500.0	93.62	180.00	12,160.9	-3,096.4	-878.4	3,169.3	0.00	0.00	
14,600.0	93.62	180.00	12,154.6	-3,196.2	-878.4	3,268.6	0.00	0.00	
14,700.0	93.62	180.00	12,148.2	-3,296.0	-878.4	3,367.9	0.00	0.00	
14,800.0	93.62	180.00	12,141.9	-3,395.8	-878.4	3,467.2	0.00	0.00	
14,900.0	93.62	180.00	12,135.6	-3,495.6	-878.4	3,566.4	0.00	0.00	
15,000.0	93.62	180.00	12,129.3	-3,595.4	-878.4	3,665.7	0.00	0.00	
15,100.0	93.62	180.00	12,123.0	-3,695.2	-878.4	3,765.0	0.00	0.00	
15,200.0	93.62	180.00	12,116.7	-3,795.0	-878.4	3,864.3	0.00	0.00	
15,300.0	93.62	180.00	12,110.3	-3,894.8	-878.4	3,963.6	0.00	0.00	
15,400.0	93.62	180.00	12,104.0	-3,994.6	-878.4	4,062.9	0.00	0.00	
15,500.0	93.62	180.00	12,097.7	-4,094.4	-878.4	4,162.2	0.00	0.00	
15,600.0	93.62	180.00	12,091.4	-4,194.2	-878.4	4,261.5	0.00	0.00	
15,700.0	93.62	180.00	12,085.1	-4,294.0	-878.3	4,360.8	0.00	0.00	
15,800.0	93.62	180.00	12,078.8	-4,393.8	-878.3	4,460.1	0.00	0.00	
15,900.0	93.62	180.00	12,072.4	-4,493.6	-878.3	4,559.4	0.00	0.00	
16,000.0	93.62	180.00	12,066.1	-4,593.4	-878.3	4,658.6	0.00	0.00	
16,100.0	93.62	180.00	12,059.8	-4,693.2	-878.3	4,757.9	0.00	0.00	
16,200.0	93.62	180.00	12,053.5	-4,793.0	-878.3	4,857.2	0.00	0.00	
16,300.0	93.62	180.00	12,047.2	-4,892.8	-878.3	4,956.5	0.00	0.00	
16,400.0	93.62	180.00	12,040.9	-4,992.6	-878.3	5,055.8	0.00	0.00	
16,500.0	93.62	180.00	12,034.5	-5,092.4	-878.3	5,155.1	0.00	0.00	
16,600.0	93.62	180.00	12,028.2	-5,192.2	-878.3	5,254.4	0.00	0.00	
16,700.0	93.62	180.00	12,021.9	-5,292.0	-878.3	5,353.7	0.00	0.00	
16,800.0	93.62	180.00	12,015.6	-5,391.8	-878.3	5,453.0	0.00	0.00	
16,900.0	93.62	180.00	12,009.3	-5,491.6	-878.3	5,552.3	0.00	0.00	
17,000.0	93.62	180.00	12,002.9	-5,591.4	-878.3	5,651.5	0.00	0.00	
17,100.0	93.62	180.00	11,996.6	-5,691.2	-878.3	5,750.8	0.00	0.00	
17,200.0	93.62	180.00	11,990.3	-5,791.0	-878.3	5,850.1	0.00	0.00	
17,300.0	93.62	180.00	11,984.0	-5,890.8	-878.3	5,949.4	0.00	0.00	
17,400.0	93.62	180.00	11,977.7	-5,990.6	-878.3	6,048.7	0.00	0.00	
17,500.0	93.62	180.00	11,971.4	-6,090.4	-878.3	6,148.0	0.00	0.00	
17,600.0	93.62	180.00	11,965.0	-6,190.2	-878.3	6,247.3	0.00	0.00	
17,700.0	93.62	180.00	11,958.7	-6,290.0	-878.3	6,346.6	0.00	0.00	
17,800.0	93.62	180.00	11,952.4	-6,389.8	-878.3	6,445.9	0.00	0.00	
17,900.0	93.62	180.00	11,946.1	-6,489.6	-878.3	6,545.2	0.00	0.00	
18,000.0	93.62	180.00	11,939.8	-6,589.4	-878.3	6,644.5	0.00	0.00	
18,100.0	93.62	180.00	11,933.5	-6,689.2	-878.3	6,743.7	0.00	0.00	
18,200.0	93.62	180.00	11,927.1	-6,789.0	-878.3	6,843.0	0.00	0.00	
18,300.0	93.62	180.00	11,920.8	-6,888.8	-878.3	6,942.3	0.00	0.00	
18,400.0	93.62	180.00	11,914.5	-6,988.6	-878.3	7,041.6	0.00	0.00	
18,500.0	93.62	180.00	11,908.2	-7,088.4	-878.3	7,140.9	0.00	0.00	
18,600.0	93.62	180.00	11,901.9	-7,188.2	-878.3	7,240.2	0.00	0.00	
18,700.0	93.62	180.00	11,895.6	-7,288.0	-878.3	7,339.5	0.00	0.00	
18,800.0	93.62	180.00	11,889.2	-7,387.9	-878.3	7,438.8	0.00	0.00	
18,900.0	93.62	180.00	11,882.9	-7,487.7	-878.3	7,538.1	0.00	0.00	

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<b>Project:</b>	Moffat County, CO	<b>MD Reference:</b>	WELL @ 6704.0ft (Original Well Elev)
<b>Site:</b>	SEC 30-T8N-R91W	<b>North Reference:</b>	True
<b>Well:</b>	Bulldog #30-21H 891	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	HZ		
<b>Design:</b>	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
19,000.0	93.62	180.00	11,876.6	-7,587.5	-878.3	7,637.4	0.00	0.00	
19,100.0	93.62	180.00	11,870.3	-7,687.3	-878.3	7,736.6	0.00	0.00	
19,200.0	93.62	180.00	11,864.0	-7,787.1	-878.3	7,835.9	0.00	0.00	
19,300.0	93.62	180.00	11,857.7	-7,886.9	-878.3	7,935.2	0.00	0.00	
19,400.0	93.62	180.00	11,851.3	-7,986.7	-878.3	8,034.5	0.00	0.00	
19,500.0	93.62	180.00	11,845.0	-8,086.5	-878.3	8,133.8	0.00	0.00	
19,600.0	93.62	180.00	11,838.7	-8,186.3	-878.3	8,233.1	0.00	0.00	
19,700.0	93.62	180.00	11,832.4	-8,286.1	-878.3	8,332.4	0.00	0.00	
19,800.0	93.62	180.00	11,826.1	-8,385.9	-878.3	8,431.7	0.00	0.00	
19,900.0	93.62	180.00	11,819.7	-8,485.7	-878.3	8,531.0	0.00	0.00	
20,000.0	93.62	180.00	11,813.4	-8,585.5	-878.3	8,630.3	0.00	0.00	
20,070.2	93.62	180.00	11,809.0	-8,655.4	-878.3	8,699.9	0.00	0.00	PBHL @ 20070' 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 #30-21H 891 PE	0.00	0.00	11,809.0	-8,655.4	-878.3	1,469,732.30	2,402,726.93	40.602917	-107.651194
- plan hits target center									
- Point									

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,111.6	4,103.0	Lewis		-3.62	180.00
6,047.8	6,019.0	Mesaverde		-3.62	180.00
9,329.5	9,269.0	Mancos		-3.62	180.00
9,674.5	9,614.0	Morapos		-3.62	180.00
10,009.5	9,949.0	Mancos Marker		-3.62	180.00
12,307.9	12,199.0	Niobrara		-3.62	180.00
12,483.8	12,299.0	Top Target		-3.62	180.00

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
9,376.0	9,269.0	-734.0	-873.0	Tie On @ 9376' MD
11,807.0	11,700.0	-734.0	-873.0	Curve KOP @ 11807' MD
12,743.2	12,271.9	-1,343.1	-878.3	LP @ 12743' MD
12,759.9	12,270.8	-1,359.7	-878.4	EOT; 180° Az
20,070.2	11,809.0	-8,655.4	-878.3	PBHL @ 20070' MD