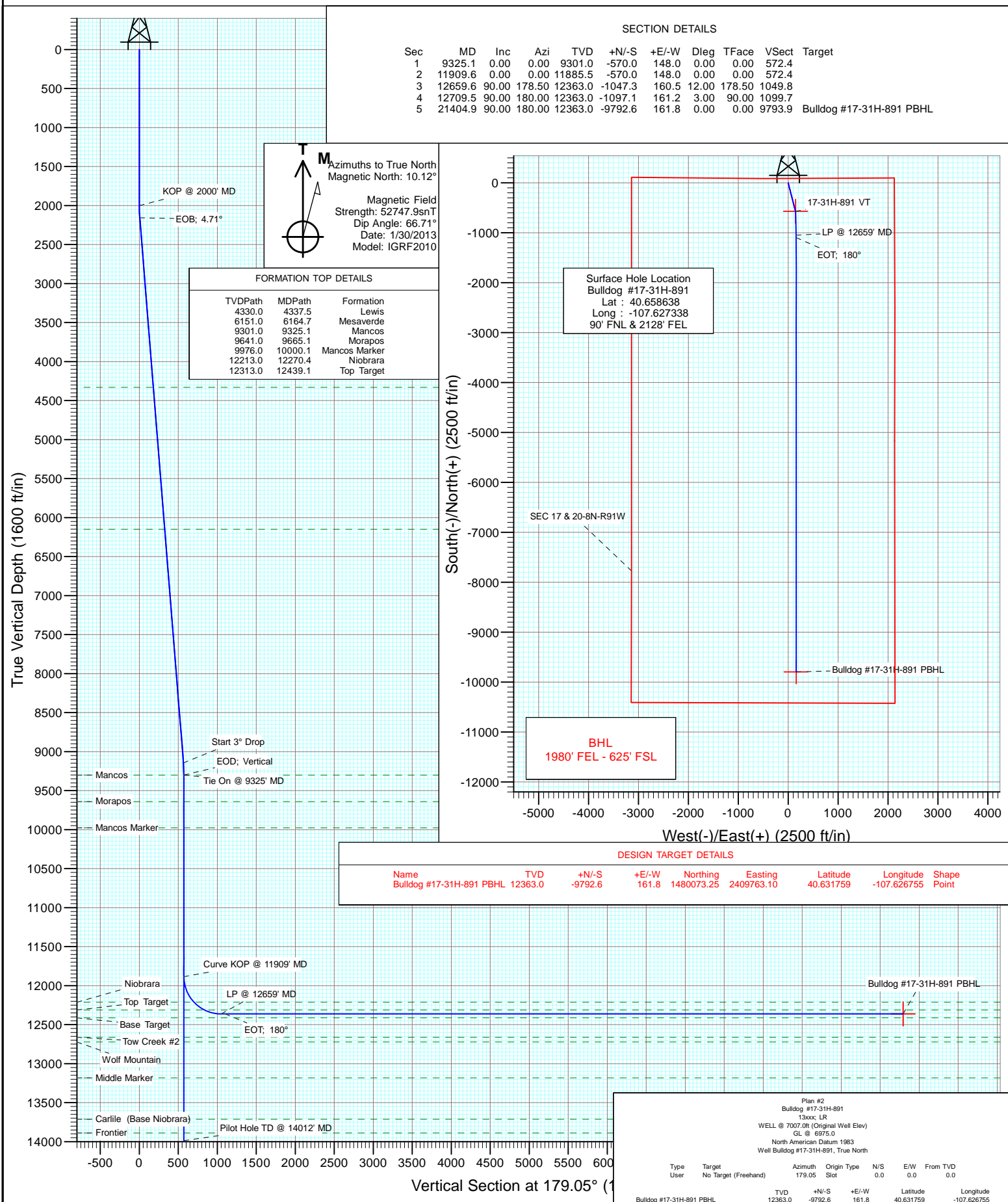




Project: Moffat County, CO
Site: SEC 17-T8N-R91W
Well: Bulldog #17-31H-891
Wellbore: Hz
Design: Plan #2



Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Bulldog #17-31H-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 #17-31H-891	Survey Calculation Method:	Minimum Curvature
Wellbore:	Pilot Hole		
Design:	Pilot Hole		

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 #17-31H-891					
Well Position	+N/-S	0.0 ft	Northing:	1,489,866.87 ft	Latitude:	40.658638
	+E/-W	0.0 ft	Easting:	2,409,836.24 ft	Longitude:	-107.627338
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	6,975.0 ft

Wellbore		Pilot Hole			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/23/2013	10.05	66.70	52,699

Design	Pilot Hole			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(ft)	(ft)	(ft)	(°)
	0.0	0.0	0.0	165.44

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
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,157.1	4.71	165.44	2,156.9	-6.2	1.6	3.00	3.00	0.00	165.44	
9,168.0	4.71	165.44	9,144.1	-563.8	146.4	0.00	0.00	0.00	0.00	
9,325.1	0.00	0.00	9,301.0	-570.0	148.0	3.00	-3.00	0.00	180.00	17-31H-891 VT
14,012.1	0.00	0.00	13,988.0	-570.0	148.0	0.00	0.00	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Bulldog #17-31H-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 #17-31H-891	Survey Calculation Method:	Minimum Curvature
Wellbore:	Pilot Hole		
Design:	Pilot Hole		

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
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	KOP @ 2000' MD
2,100.0	3.00	165.44	2,100.0	-2.5	0.7	2.6	3.00	3.00	
2,157.1	4.71	165.44	2,156.9	-6.2	1.6	6.5	3.00	3.00	EOB; 4.71°
2,200.0	4.71	165.44	2,199.7	-9.7	2.5	10.0	0.00	0.00	
2,300.0	4.71	165.44	2,299.3	-17.6	4.6	18.2	0.00	0.00	
2,400.0	4.71	165.44	2,399.0	-25.6	6.6	26.4	0.00	0.00	
2,500.0	4.71	165.44	2,498.7	-33.5	8.7	34.6	0.00	0.00	
2,600.0	4.71	165.44	2,598.3	-41.5	10.8	42.8	0.00	0.00	
2,700.0	4.71	165.44	2,698.0	-49.4	12.8	51.1	0.00	0.00	
2,800.0	4.71	165.44	2,797.6	-57.4	14.9	59.3	0.00	0.00	
2,900.0	4.71	165.44	2,897.3	-65.3	17.0	67.5	0.00	0.00	
3,000.0	4.71	165.44	2,997.0	-73.3	19.0	75.7	0.00	0.00	
3,100.0	4.71	165.44	3,096.6	-81.2	21.1	83.9	0.00	0.00	
3,200.0	4.71	165.44	3,196.3	-89.2	23.2	92.1	0.00	0.00	
3,300.0	4.71	165.44	3,296.0	-97.1	25.2	100.4	0.00	0.00	
3,400.0	4.71	165.44	3,395.6	-105.1	27.3	108.6	0.00	0.00	
3,500.0	4.71	165.44	3,495.3	-113.0	29.3	116.8	0.00	0.00	
3,600.0	4.71	165.44	3,594.9	-121.0	31.4	125.0	0.00	0.00	
3,700.0	4.71	165.44	3,694.6	-128.9	33.5	133.2	0.00	0.00	
3,800.0	4.71	165.44	3,794.3	-136.9	35.5	141.4	0.00	0.00	
3,900.0	4.71	165.44	3,893.9	-144.8	37.6	149.6	0.00	0.00	
4,000.0	4.71	165.44	3,993.6	-152.8	39.7	157.9	0.00	0.00	
4,100.0	4.71	165.44	4,093.3	-160.7	41.7	166.1	0.00	0.00	
4,200.0	4.71	165.44	4,192.9	-168.7	43.8	174.3	0.00	0.00	
4,300.0	4.71	165.44	4,292.6	-176.7	45.9	182.5	0.00	0.00	
4,337.5	4.71	165.44	4,330.0	-179.6	46.6	185.6	0.00	0.00	Lewis
4,400.0	4.71	165.44	4,392.2	-184.6	47.9	190.7	0.00	0.00	
4,500.0	4.71	165.44	4,491.9	-192.6	50.0	198.9	0.00	0.00	
4,600.0	4.71	165.44	4,591.6	-200.5	52.1	207.2	0.00	0.00	
4,700.0	4.71	165.44	4,691.2	-208.5	54.1	215.4	0.00	0.00	
4,800.0	4.71	165.44	4,790.9	-216.4	56.2	223.6	0.00	0.00	
4,900.0	4.71	165.44	4,890.6	-224.4	58.3	231.8	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Bulldog #17-31H-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 #17-31H-891	Survey Calculation Method:	Minimum Curvature
Wellbore:	Pilot Hole		
Design:	Pilot Hole		

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
5,000.0	4.71	165.44	4,990.2	-232.3	60.3	240.0	0.00	0.00	
5,100.0	4.71	165.44	5,089.9	-240.3	62.4	248.2	0.00	0.00	
5,200.0	4.71	165.44	5,189.5	-248.2	64.5	256.5	0.00	0.00	
5,300.0	4.71	165.44	5,289.2	-256.2	66.5	264.7	0.00	0.00	
5,400.0	4.71	165.44	5,388.9	-264.1	68.6	272.9	0.00	0.00	
5,500.0	4.71	165.44	5,488.5	-272.1	70.6	281.1	0.00	0.00	
5,600.0	4.71	165.44	5,588.2	-280.0	72.7	289.3	0.00	0.00	
5,700.0	4.71	165.44	5,687.8	-288.0	74.8	297.5	0.00	0.00	
5,800.0	4.71	165.44	5,787.5	-295.9	76.8	305.7	0.00	0.00	
5,900.0	4.71	165.44	5,887.2	-303.9	78.9	314.0	0.00	0.00	
6,000.0	4.71	165.44	5,986.8	-311.8	81.0	322.2	0.00	0.00	
6,100.0	4.71	165.44	6,086.5	-319.8	83.0	330.4	0.00	0.00	
6,164.7	4.71	165.44	6,151.0	-324.9	84.4	335.7	0.00	0.00	Mesaverde
6,200.0	4.71	165.44	6,186.2	-327.7	85.1	338.6	0.00	0.00	
6,300.0	4.71	165.44	6,285.8	-335.7	87.2	346.8	0.00	0.00	
6,400.0	4.71	165.44	6,385.5	-343.6	89.2	355.0	0.00	0.00	
6,500.0	4.71	165.44	6,485.1	-351.6	91.3	363.3	0.00	0.00	
6,600.0	4.71	165.44	6,584.8	-359.5	93.4	371.5	0.00	0.00	
6,700.0	4.71	165.44	6,684.5	-367.5	95.4	379.7	0.00	0.00	
6,800.0	4.71	165.44	6,784.1	-375.5	97.5	387.9	0.00	0.00	
6,900.0	4.71	165.44	6,883.8	-383.4	99.6	396.1	0.00	0.00	
7,000.0	4.71	165.44	6,983.5	-391.4	101.6	404.3	0.00	0.00	
7,100.0	4.71	165.44	7,083.1	-399.3	103.7	412.5	0.00	0.00	
7,200.0	4.71	165.44	7,182.8	-407.3	105.7	420.8	0.00	0.00	
7,300.0	4.71	165.44	7,282.4	-415.2	107.8	429.0	0.00	0.00	
7,400.0	4.71	165.44	7,382.1	-423.2	109.9	437.2	0.00	0.00	
7,500.0	4.71	165.44	7,481.8	-431.1	111.9	445.4	0.00	0.00	
7,600.0	4.71	165.44	7,581.4	-439.1	114.0	453.6	0.00	0.00	
7,700.0	4.71	165.44	7,681.1	-447.0	116.1	461.8	0.00	0.00	
7,800.0	4.71	165.44	7,780.7	-455.0	118.1	470.1	0.00	0.00	
7,900.0	4.71	165.44	7,880.4	-462.9	120.2	478.3	0.00	0.00	
8,000.0	4.71	165.44	7,980.1	-470.9	122.3	486.5	0.00	0.00	
8,100.0	4.71	165.44	8,079.7	-478.8	124.3	494.7	0.00	0.00	
8,200.0	4.71	165.44	8,179.4	-486.8	126.4	502.9	0.00	0.00	
8,300.0	4.71	165.44	8,279.1	-494.7	128.5	511.1	0.00	0.00	
8,400.0	4.71	165.44	8,378.7	-502.7	130.5	519.4	0.00	0.00	
8,500.0	4.71	165.44	8,478.4	-510.6	132.6	527.6	0.00	0.00	
8,600.0	4.71	165.44	8,578.0	-518.6	134.7	535.8	0.00	0.00	
8,700.0	4.71	165.44	8,677.7	-526.5	136.7	544.0	0.00	0.00	
8,800.0	4.71	165.44	8,777.4	-534.5	138.8	552.2	0.00	0.00	
8,900.0	4.71	165.44	8,877.0	-542.4	140.8	560.4	0.00	0.00	
9,000.0	4.71	165.44	8,976.7	-550.4	142.9	568.6	0.00	0.00	
9,100.0	4.71	165.44	9,076.4	-558.3	145.0	576.9	0.00	0.00	
9,168.0	4.71	165.44	9,144.1	-563.8	146.4	582.4	0.00	0.00	Start 3° Drop
9,200.0	3.75	165.44	9,176.0	-566.0	147.0	584.8	3.00	-3.00	
9,300.0	0.75	165.44	9,275.9	-569.8	148.0	588.7	3.00	-3.00	
9,325.1	0.00	0.00	9,301.0	-570.0	148.0	588.9	3.00	-3.00	EOD; Vertical - Mancos
9,400.0	0.00	0.00	9,375.9	-570.0	148.0	588.9	0.00	0.00	
9,500.0	0.00	0.00	9,475.9	-570.0	148.0	588.9	0.00	0.00	
9,600.0	0.00	0.00	9,575.9	-570.0	148.0	588.9	0.00	0.00	
9,665.1	0.00	0.00	9,641.0	-570.0	148.0	588.9	0.00	0.00	Morapos
9,700.0	0.00	0.00	9,675.9	-570.0	148.0	588.9	0.00	0.00	

Cathedral Energy Services

Planning Report

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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 #17-31H-891	Survey Calculation Method:	Minimum Curvature
Wellbore:	Pilot Hole		
Design:	Pilot Hole		

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
9,800.0	0.00	0.00	9,775.9	-570.0	148.0	588.9	0.00	0.00	
9,900.0	0.00	0.00	9,875.9	-570.0	148.0	588.9	0.00	0.00	
10,000.0	0.00	0.00	9,975.9	-570.0	148.0	588.9	0.00	0.00	
10,000.1	0.00	0.00	9,976.0	-570.0	148.0	588.9	0.00	0.00	Mancos Marker
10,100.0	0.00	0.00	10,075.9	-570.0	148.0	588.9	0.00	0.00	
10,200.0	0.00	0.00	10,175.9	-570.0	148.0	588.9	0.00	0.00	
10,300.0	0.00	0.00	10,275.9	-570.0	148.0	588.9	0.00	0.00	
10,400.0	0.00	0.00	10,375.9	-570.0	148.0	588.9	0.00	0.00	
10,500.0	0.00	0.00	10,475.9	-570.0	148.0	588.9	0.00	0.00	
10,600.0	0.00	0.00	10,575.9	-570.0	148.0	588.9	0.00	0.00	
10,700.0	0.00	0.00	10,675.9	-570.0	148.0	588.9	0.00	0.00	
10,800.0	0.00	0.00	10,775.9	-570.0	148.0	588.9	0.00	0.00	
10,900.0	0.00	0.00	10,875.9	-570.0	148.0	588.9	0.00	0.00	
11,000.0	0.00	0.00	10,975.9	-570.0	148.0	588.9	0.00	0.00	
11,100.0	0.00	0.00	11,075.9	-570.0	148.0	588.9	0.00	0.00	
11,200.0	0.00	0.00	11,175.9	-570.0	148.0	588.9	0.00	0.00	
11,300.0	0.00	0.00	11,275.9	-570.0	148.0	588.9	0.00	0.00	
11,400.0	0.00	0.00	11,375.9	-570.0	148.0	588.9	0.00	0.00	
11,500.0	0.00	0.00	11,475.9	-570.0	148.0	588.9	0.00	0.00	
11,600.0	0.00	0.00	11,575.9	-570.0	148.0	588.9	0.00	0.00	
11,700.0	0.00	0.00	11,675.9	-570.0	148.0	588.9	0.00	0.00	
11,800.0	0.00	0.00	11,775.9	-570.0	148.0	588.9	0.00	0.00	
11,900.0	0.00	0.00	11,875.9	-570.0	148.0	588.9	0.00	0.00	
12,000.0	0.00	0.00	11,975.9	-570.0	148.0	588.9	0.00	0.00	
12,100.0	0.00	0.00	12,075.9	-570.0	148.0	588.9	0.00	0.00	
12,200.0	0.00	0.00	12,175.9	-570.0	148.0	588.9	0.00	0.00	
12,237.1	0.00	0.00	12,213.0	-570.0	148.0	588.9	0.00	0.00	Niobrara
12,300.0	0.00	0.00	12,275.9	-570.0	148.0	588.9	0.00	0.00	
12,337.1	0.00	0.00	12,313.0	-570.0	148.0	588.9	0.00	0.00	Top Target
12,400.0	0.00	0.00	12,375.9	-570.0	148.0	588.9	0.00	0.00	
12,437.1	0.00	0.00	12,413.0	-570.0	148.0	588.9	0.00	0.00	Base Target
12,500.0	0.00	0.00	12,475.9	-570.0	148.0	588.9	0.00	0.00	
12,600.0	0.00	0.00	12,575.9	-570.0	148.0	588.9	0.00	0.00	
12,687.1	0.00	0.00	12,663.0	-570.0	148.0	588.9	0.00	0.00	Tow Creek #2
12,700.0	0.00	0.00	12,675.9	-570.0	148.0	588.9	0.00	0.00	
12,747.1	0.00	0.00	12,723.0	-570.0	148.0	588.9	0.00	0.00	Wolf Mountain
12,800.0	0.00	0.00	12,775.9	-570.0	148.0	588.9	0.00	0.00	
12,900.0	0.00	0.00	12,875.9	-570.0	148.0	588.9	0.00	0.00	
13,000.0	0.00	0.00	12,975.9	-570.0	148.0	588.9	0.00	0.00	
13,100.0	0.00	0.00	13,075.9	-570.0	148.0	588.9	0.00	0.00	
13,200.0	0.00	0.00	13,175.9	-570.0	148.0	588.9	0.00	0.00	
13,207.1	0.00	0.00	13,183.0	-570.0	148.0	588.9	0.00	0.00	Middle Marker
13,300.0	0.00	0.00	13,275.9	-570.0	148.0	588.9	0.00	0.00	
13,400.0	0.00	0.00	13,375.9	-570.0	148.0	588.9	0.00	0.00	
13,500.0	0.00	0.00	13,475.9	-570.0	148.0	588.9	0.00	0.00	
13,600.0	0.00	0.00	13,575.9	-570.0	148.0	588.9	0.00	0.00	
13,700.0	0.00	0.00	13,675.9	-570.0	148.0	588.9	0.00	0.00	
13,737.1	0.00	0.00	13,713.0	-570.0	148.0	588.9	0.00	0.00	Carlile (Base Niobrara)
13,800.0	0.00	0.00	13,775.9	-570.0	148.0	588.9	0.00	0.00	
13,900.0	0.00	0.00	13,875.9	-570.0	148.0	588.9	0.00	0.00	
13,912.1	0.00	0.00	13,888.0	-570.0	148.0	588.9	0.00	0.00	Frontier
14,000.0	0.00	0.00	13,975.9	-570.0	148.0	588.9	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Bulldog #17-31H-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 #17-31H-891	Survey Calculation Method:	Minimum Curvature
Wellbore:	Pilot Hole		
Design:	Pilot Hole		

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
14,012.1	0.00	0.00	13,988.0	-570.0	148.0	588.9	0.00	0.00	PBHL @ 14012' MD

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
17-31H-891 VT - plan hits target center - Point	0.00	0.00	9,301.0	-570.0	148.0	1,489,293.49	2,409,970.52	40.657073	-107.626805

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,337.5	4,330.0	Lewis			
6,164.7	6,151.0	Mesaverde			
9,325.1	9,301.0	Mancos			
9,665.1	9,641.0	Morapos			
10,000.1	9,976.0	Mancos Marker			
12,237.1	12,213.0	Niobrara			
12,337.1	12,313.0	Top Target			
12,437.1	12,413.0	Base Target			
12,687.1	12,663.0	Tow Creek #2			
12,747.1	12,723.0	Wolf Mountain			
13,207.1	13,183.0	Middle Marker			
13,737.1	13,713.0	Carlile (Base Niobrara)			
13,912.1	13,888.0	Frontier			

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
2,000.0	2,000.0	0.0	0.0	KOP @ 2000' MD
2,157.1	2,156.9	-6.2	1.6	EOB; 4.71°
9,168.0	9,144.1	-563.8	146.4	Start 3° Drop
9,325.1	9,301.0	-570.0	148.0	EOD; Vertical
14,012.1	13,988.0	-570.0	148.0	PBHL @ 14012' MD