

MALLARD EXPLORATION

**WELD COUNTY, COLORADO (NAD 83)
NW NW SEC. 33 T9N R60W 6th P.M.
GOLDEN CASCADE FED 33-13HC**

ORIGINAL WELLBORE

03 May, 2018

Plan: PROPOSAL #1



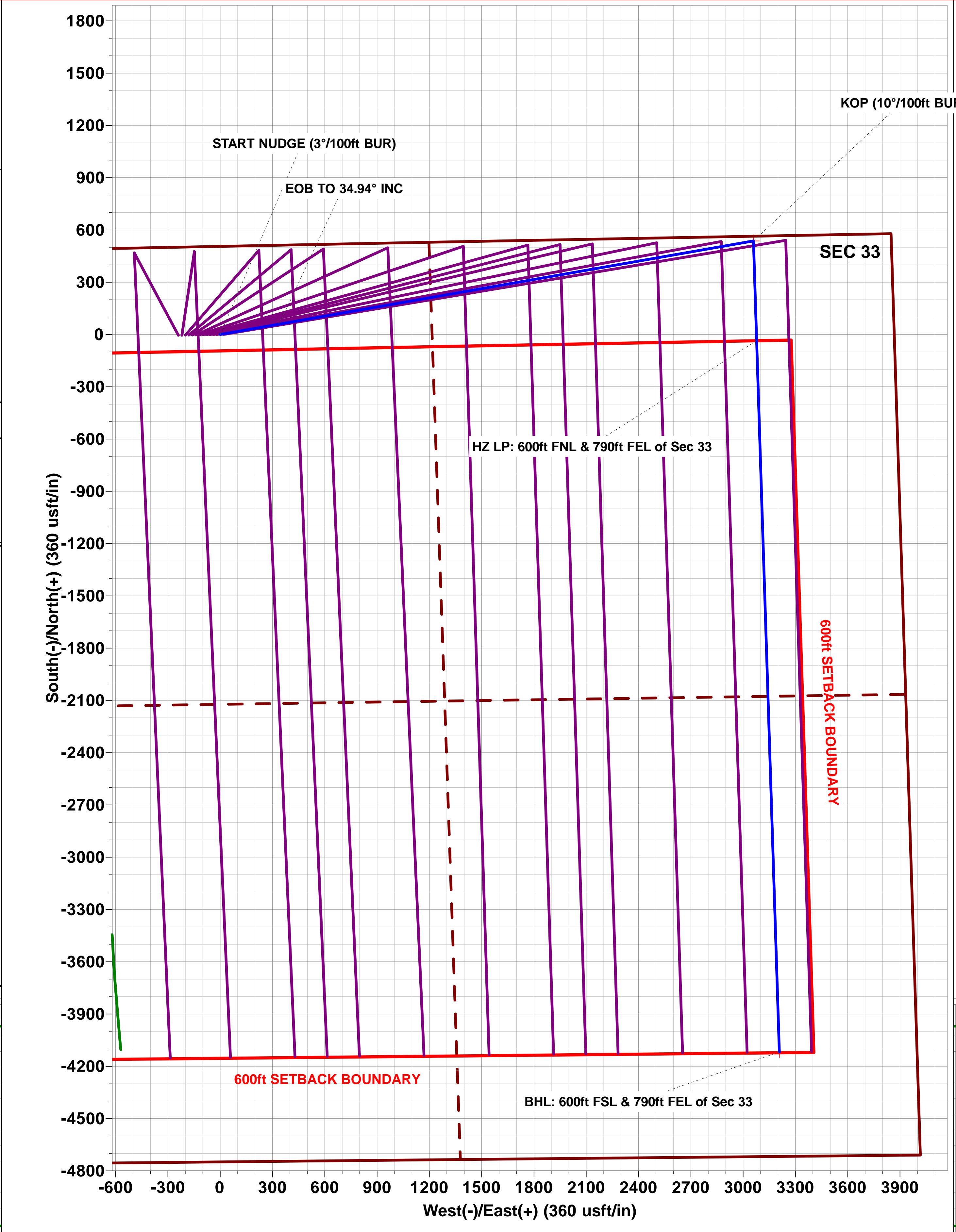
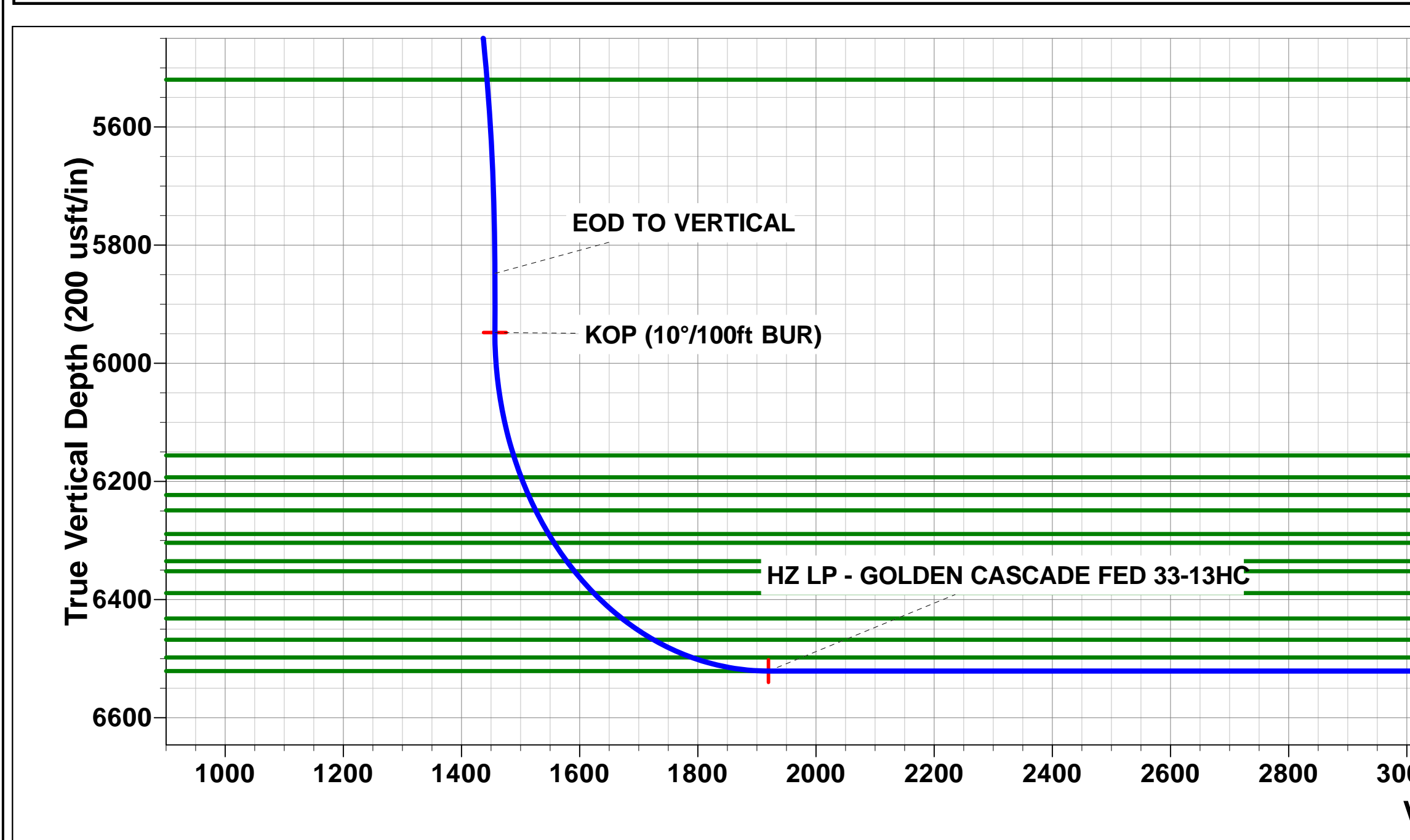
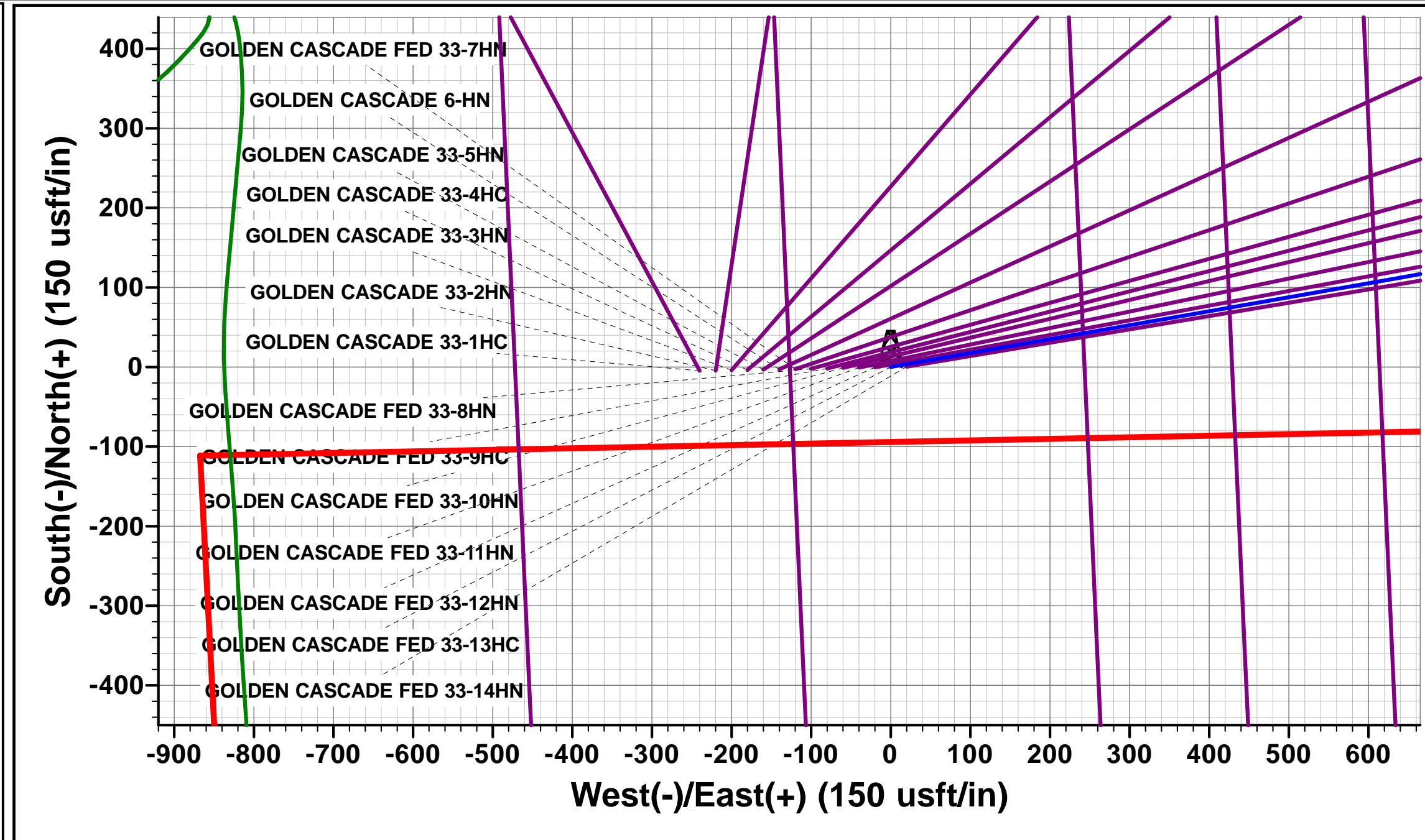
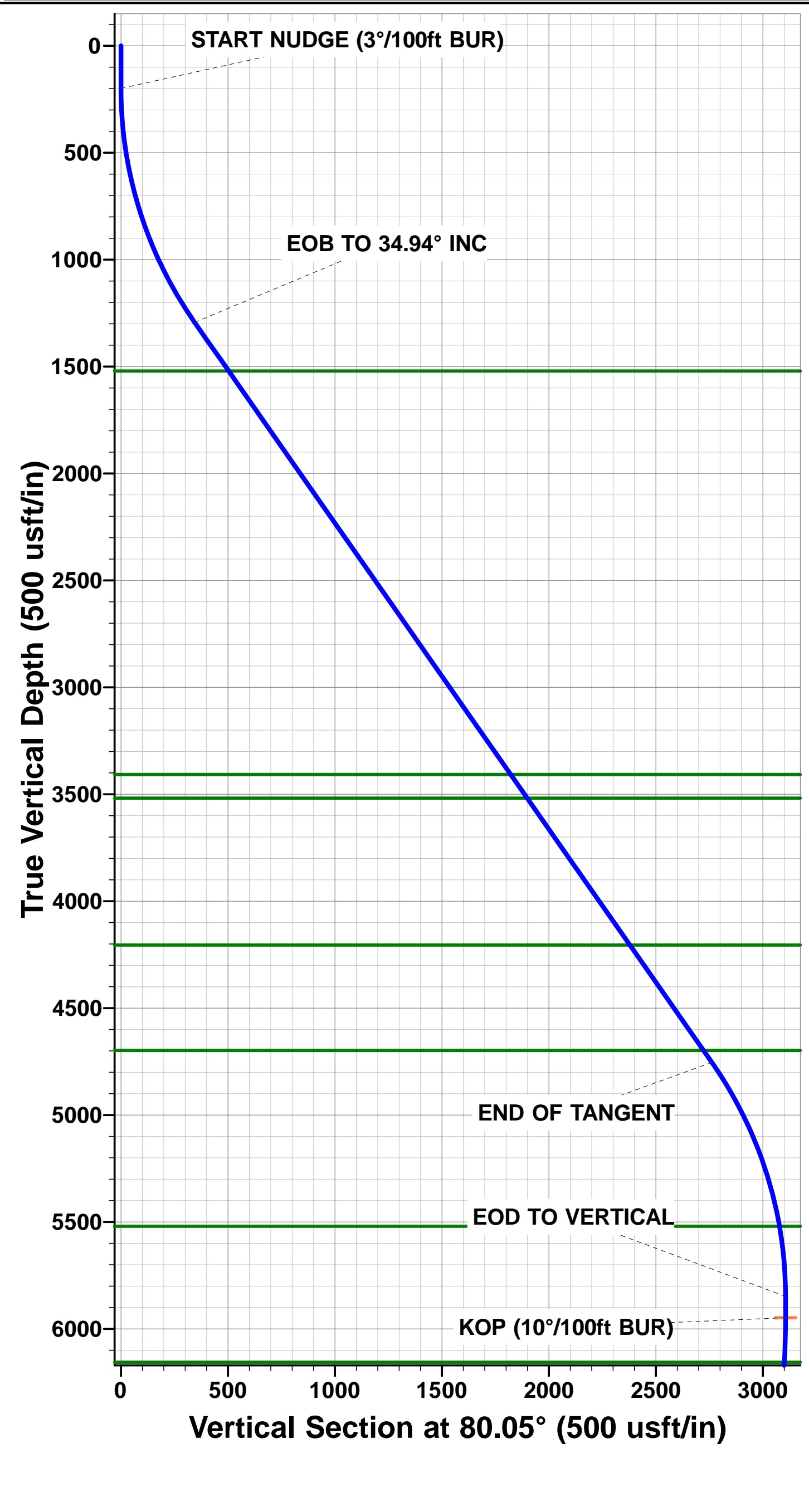


Project: WELD COUNTY, COLORADO (NAD 83)
Site: NW NW SEC. 33 T9N R60W 6th P.M.
Well: GOLDEN CASCADE FED 33-13HC
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #1

ANNOTATIONS										
TVD	MD	Inc	Azi	+N/-S	+E/-W	VSect	Dep	Annotation		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	SHL: 506ft FNL & 1472ft FWL of Sec 33		
200.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDDGE (3°/100ft BUR)		
1293.81	1364.66	34.94	80.05	59.49	339.07	161.44	344.25	EOB TO 34.94° INC		
4754.23	5585.96	34.94	80.05	477.31	2720.29	1295.22	2761.85	END OF TANGENT		
5848.04	6750.62	0.00	0.00	536.80	3059.36	1456.66	3106.10	EOD TO VERTICAL		
5948.04	6850.62	0.00	0.00	536.80	3059.36	1456.66	3106.10	KOP (10°/100ft BUR)		
6521.00	7750.62	90.00	178.18	-35.87	3077.56	1919.61	3679.05	HZ LP: 600ft FNL & 790ft FEL of Sec 33		
6521.00	11834.27	90.00	178.17	-4117.45	3207.56	5219.37	7762.70	BHL: 600ft FSL & 790ft FEL of Sec 33		

PROPOSED LOCAL COORDINATES:
SHL: 506ft FNL & 1472ft FWL Sec 33
HZ LP: 600ft FNL & 790ft FEL Sec 33
BHL: 600ft FSL & 790ft FEL of Sec 33

WELLBORE TARGET DETAILS (LAT/LONG)					
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP - GOLDEN CASCADE FED 33-13HC	5948.04	536.80	3059.36	40.713342	-104.090829
HZ LP - GOLDEN CASCADE FED 33-13HC	6521.00	-35.87	3077.56	40.711770	-104.090764
BHL - GOLDEN CASCADE FED 33-13HC	6521.00	-4117.45	3207.56	40.700567	-104.090297



Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well GOLDEN CASCADE FED 33-13HC
Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4966.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4966.00usft (Original Well Elev)
Site:	NW NW SEC. 33 T9N R60W 6th P.M.	North Reference:	True
Well:	GOLDEN CASCADE FED 33-13HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

Project	WELD COUNTY, COLORADO (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site	NW NW SEC. 33 T9N R60W 6th P.M.				
Site Position:		Northing:	1,505,224.82 usft	Latitude:	40.711856
From:	Lat/Long	Easting:	3,387,347.64 usft	Longitude:	-104.102731
Position Uncertainty:	0.00 usft	Slot Radius:	1.10000ft	Grid Convergence:	0.90 °

Well	GOLDEN CASCADE FED 33-13HC					
Well Position	+N/-S	4.73 usft	Northing:	1,505,233.34 usft	Latitude:	40.711869
	+E/-W	240.08 usft	Easting:	3,387,587.61 usft	Longitude:	-104.101865
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	4,946.00 usft

Wellbore	ORIGINAL WELLBORE				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	03/05/2018	7.78	67.18	52,520

Design	PROPOSAL #1			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	6,521.00	0.00	0.00	142.08

Plan Sections											
MD (usft)	Inc (°)	Azi (°)	Vertical Depth	SS (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100usf)	Turn Rate (°/100usf)	TFO (°)	Target
0.00	0.00	0.00	0.00	-4,966.00	0.00	0.00	0.00	0.00	0.00	0.00	
200.00	0.00	0.00	200.00	-4,766.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,364.66	34.94	80.05	1,293.81	-3,672.19	59.49	339.07	3.00	3.00	0.00	80.05	
5,585.96	34.94	80.05	4,754.23	-211.77	477.31	2,720.29	0.00	0.00	0.00	0.00	
6,750.62	0.00	0.00	5,848.04	882.04	536.80	3,059.36	3.00	-3.00	0.00	180.00	
6,850.62	0.00	0.00	5,948.04	982.04	536.80	3,059.36	0.00	0.00	0.00	0.00	KOP - GOLDEN CA
7,750.62	90.00	178.18	6,521.00	1,555.00	-35.87	3,077.56	10.00	10.00	19.80	178.18	HZ LP - GOLDEN C
11,834.27	90.00	178.17	6,521.00	1,555.00	-4,117.45	3,207.56	0.00	0.00	0.00	-86.24	BHL - GOLDEN CA

Planning Report



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Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4966.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4966.00usft (Original Well Elev)
Site:	NW NW SEC. 33 T9N R60W 6th P.M.	North Reference:	True
Well:	GOLDEN CASCADE FED 33-13HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

Planned Survey										
MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
SHL: 506ft FNL & 1472ft FWL of Sec 33										
0.00	0.00	0.00	0.00	4,966.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	4,866.00	0.00	0.00	0.00	0.00	0.00	0.00
START NUDGE (3°/100ft BUR)										
200.00	0.00	0.00	200.00	4,766.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	3.00	80.05	299.95	4,666.05	0.45	2.58	1.23	3.00	3.00	0.00
400.00	6.00	80.05	399.63	4,566.37	1.81	10.30	4.91	3.00	3.00	0.00
500.00	9.00	80.05	498.77	4,467.23	4.06	23.16	11.03	3.00	3.00	0.00
600.00	12.00	80.05	597.08	4,368.92	7.21	41.11	19.57	3.00	3.00	0.00
700.00	15.00	80.05	694.31	4,271.69	11.25	64.10	30.52	3.00	3.00	0.00
800.00	18.00	80.05	790.18	4,175.82	16.15	92.07	43.84	3.00	3.00	0.00
900.00	21.00	80.05	884.43	4,081.57	21.92	124.94	59.49	3.00	3.00	0.00
1,000.00	24.00	80.05	976.81	3,989.19	28.54	162.63	77.43	3.00	3.00	0.00
1,100.00	27.00	80.05	1,067.06	3,898.94	35.97	205.03	97.62	3.00	3.00	0.00
1,200.00	30.00	80.05	1,154.93	3,811.07	44.22	252.02	120.00	3.00	3.00	0.00
1,300.00	33.00	80.05	1,240.18	3,725.82	53.25	303.48	144.50	3.00	3.00	0.00
EOB TO 34.94° INC										
1,364.66	34.94	80.05	1,293.81	3,672.19	59.49	339.07	161.44	3.00	3.00	0.00
1,400.00	34.94	80.05	1,322.78	3,643.22	62.99	359.00	170.93	0.00	0.00	0.00
1,500.00	34.94	80.05	1,404.75	3,561.25	72.89	415.41	197.79	0.00	0.00	0.00
1,600.00	34.94	80.05	1,486.73	3,479.27	82.79	471.82	224.65	0.00	0.00	0.00
Pierre Shale Top										
1,641.81	34.94	80.05	1,521.00	3,445.00	86.92	495.40	235.88	0.00	0.00	0.00
1,700.00	34.94	80.05	1,568.70	3,397.30	92.68	528.23	251.51	0.00	0.00	0.00
1,800.00	34.94	80.05	1,650.68	3,315.32	102.58	584.64	278.37	0.00	0.00	0.00
1,900.00	34.94	80.05	1,732.65	3,233.35	112.48	641.05	305.22	0.00	0.00	0.00
2,000.00	34.94	80.05	1,814.63	3,151.37	122.38	697.46	332.08	0.00	0.00	0.00
2,100.00	34.94	80.05	1,896.60	3,069.40	132.27	753.87	358.94	0.00	0.00	0.00
2,200.00	34.94	80.05	1,978.58	2,987.42	142.17	810.28	385.80	0.00	0.00	0.00
2,300.00	34.94	80.05	2,060.55	2,905.45	152.07	866.69	412.66	0.00	0.00	0.00
2,400.00	34.94	80.05	2,142.53	2,823.47	161.97	923.10	439.52	0.00	0.00	0.00
2,500.00	34.94	80.05	2,224.51	2,741.49	171.87	979.51	466.37	0.00	0.00	0.00
2,600.00	34.94	80.05	2,306.48	2,659.52	181.76	1,035.92	493.23	0.00	0.00	0.00
2,700.00	34.94	80.05	2,388.46	2,577.54	191.66	1,092.33	520.09	0.00	0.00	0.00
2,800.00	34.94	80.05	2,470.43	2,495.57	201.56	1,148.74	546.95	0.00	0.00	0.00
2,900.00	34.94	80.05	2,552.41	2,413.59	211.46	1,205.15	573.81	0.00	0.00	0.00
3,000.00	34.94	80.05	2,634.38	2,331.62	221.35	1,261.56	600.67	0.00	0.00	0.00
3,100.00	34.94	80.05	2,716.36	2,249.64	231.25	1,317.97	627.53	0.00	0.00	0.00
3,200.00	34.94	80.05	2,798.33	2,167.67	241.15	1,374.38	654.38	0.00	0.00	0.00
3,300.00	34.94	80.05	2,880.31	2,085.69	251.05	1,430.79	681.24	0.00	0.00	0.00
3,400.00	34.94	80.05	2,962.28	2,003.72	260.95	1,487.20	708.10	0.00	0.00	0.00
3,500.00	34.94	80.05	3,044.26	1,921.74	270.84	1,543.61	734.96	0.00	0.00	0.00
3,600.00	34.94	80.05	3,126.23	1,839.77	280.74	1,600.02	761.82	0.00	0.00	0.00
3,700.00	34.94	80.05	3,208.21	1,757.79	290.64	1,656.43	788.68	0.00	0.00	0.00
3,800.00	34.94	80.05	3,290.18	1,675.82	300.54	1,712.84	815.54	0.00	0.00	0.00
3,900.00	34.94	80.05	3,372.16	1,593.84	310.43	1,769.25	842.39	0.00	0.00	0.00
Richard Sandstone										
3,943.72	34.94	80.05	3,408.00	1,558.00	314.76	1,793.91	854.14	0.00	0.00	0.00
4,000.00	34.94	80.05	3,454.14	1,511.86	320.33	1,825.66	869.25	0.00	0.00	0.00
Parkman Sandstone										
4,077.91	34.94	80.05	3,518.00	1,448.00	328.04	1,869.60	890.18	0.00	0.00	0.00
4,100.00	34.94	80.05	3,536.11	1,429.89	330.23	1,882.07	896.11	0.00	0.00	0.00
4,200.00	34.94	80.05	3,618.09	1,347.91	340.13	1,938.48	922.97	0.00	0.00	0.00

Planning Report



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Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4966.00usft (Original Well Elev)
Site:	NW NW SEC. 33 T9N R60W 6th P.M.	North Reference:	True
Well:	GOLDEN CASCADE FED 33-13HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

Planned Survey										
MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,300.00	34.94	80.05	3,700.06	1,265.94	350.03	1,994.89	949.83	0.00	0.00	0.00
4,400.00	34.94	80.05	3,782.04	1,183.96	359.92	2,051.30	976.69	0.00	0.00	0.00
4,500.00	34.94	80.05	3,864.01	1,101.99	369.82	2,107.71	1,003.54	0.00	0.00	0.00
4,600.00	34.94	80.05	3,945.99	1,020.01	379.72	2,164.12	1,030.40	0.00	0.00	0.00
4,700.00	34.94	80.05	4,027.96	938.04	389.62	2,220.53	1,057.26	0.00	0.00	0.00
4,800.00	34.94	80.05	4,109.94	856.06	399.51	2,276.94	1,084.12	0.00	0.00	0.00
4,900.00	34.94	80.05	4,191.91	774.09	409.41	2,333.35	1,110.98	0.00	0.00	0.00
Sussex Sandstone										
4,915.96	34.94	80.05	4,205.00	761.00	410.99	2,342.35	1,115.27	0.00	0.00	0.00
5,000.00	34.94	80.05	4,273.89	692.11	419.31	2,389.75	1,137.84	0.00	0.00	0.00
5,100.00	34.94	80.05	4,355.86	610.14	429.21	2,446.16	1,164.70	0.00	0.00	0.00
5,200.00	34.94	80.05	4,437.84	528.16	439.11	2,502.57	1,191.55	0.00	0.00	0.00
5,300.00	34.94	80.05	4,519.82	446.18	449.00	2,558.98	1,218.41	0.00	0.00	0.00
5,400.00	34.94	80.05	4,601.79	364.21	458.90	2,615.39	1,245.27	0.00	0.00	0.00
5,500.00	34.94	80.05	4,683.77	282.23	468.80	2,671.80	1,272.13	0.00	0.00	0.00
Shannon Sandstone										
5,517.36	34.94	80.05	4,698.00	268.00	470.52	2,681.60	1,276.79	0.00	0.00	0.00
END OF TANGENT										
5,585.96	34.94	80.05	4,754.23	211.77	477.31	2,720.29	1,295.22	0.00	0.00	0.00
5,600.00	34.52	80.05	4,765.77	200.23	478.69	2,728.17	1,298.97	3.00	-3.00	0.00
5,700.00	31.52	80.05	4,849.61	116.39	488.11	2,781.84	1,324.52	3.00	-3.00	0.00
5,800.00	28.52	80.05	4,936.19	29.81	496.75	2,831.11	1,347.98	3.00	-3.00	0.00
5,900.00	25.52	80.05	5,025.26	-59.26	504.60	2,875.85	1,369.28	3.00	-3.00	0.00
6,000.00	22.52	80.05	5,116.59	-150.59	511.63	2,915.93	1,388.37	3.00	-3.00	0.00
6,100.00	19.52	80.05	5,209.93	-243.93	517.83	2,951.26	1,405.19	3.00	-3.00	0.00
6,200.00	16.52	80.05	5,305.01	-339.01	523.18	2,981.72	1,419.69	3.00	-3.00	0.00
6,300.00	13.52	80.05	5,401.59	-435.59	527.66	3,007.24	1,431.84	3.00	-3.00	0.00
6,400.00	10.52	80.05	5,499.38	-533.38	531.25	3,027.75	1,441.61	3.00	-3.00	0.00
TeePee Buttes										
6,420.95	9.89	80.05	5,520.00	-554.00	531.89	3,031.40	1,443.35	3.00	-3.00	0.00
6,500.00	7.52	80.05	5,598.14	-632.14	533.96	3,043.19	1,448.96	3.00	-3.00	0.00
6,600.00	4.52	80.05	5,697.57	-731.57	535.77	3,053.51	1,453.87	3.00	-3.00	0.00
6,700.00	1.52	80.05	5,797.42	-831.42	536.68	3,058.70	1,456.34	3.00	-3.00	0.00
EOD TO VERTICAL										
6,750.62	0.00	0.00	5,848.04	-882.04	536.80	3,059.36	1,456.66	3.00	-3.00	0.00
6,800.00	0.00	0.00	5,897.42	-931.42	536.80	3,059.36	1,456.66	0.00	0.00	0.00
KOP (10°/100ft BUR)										
6,850.62	0.00	0.00	5,948.04	-982.04	536.80	3,059.36	1,456.66	0.00	0.00	0.00
6,900.00	4.94	178.18	5,997.36	-1,031.36	534.67	3,059.43	1,458.38	10.00	10.00	0.00
7,000.00	14.94	178.18	6,095.73	-1,129.73	517.45	3,059.97	1,472.30	10.00	10.00	0.00
Sharon Springs										
7,063.44	21.28	178.18	6,156.00	-1,190.00	497.75	3,060.60	1,488.23	10.00	10.00	0.00
7,100.00	24.94	178.18	6,189.62	-1,223.62	483.41	3,061.06	1,499.82	10.00	10.00	0.00
Niobrara Top										
7,103.74	25.31	178.18	6,193.00	-1,227.00	481.82	3,061.11	1,501.10	10.00	10.00	0.00
Niobrara A Chalk										
7,137.41	28.68	178.18	6,223.00	-1,257.00	466.55	3,061.59	1,513.45	10.00	10.00	0.00
Niobrara A Chalk Base										
7,167.49	31.69	178.18	6,249.00	-1,283.00	451.43	3,062.07	1,525.67	10.00	10.00	0.00
7,200.00	34.94	178.18	6,276.17	-1,310.17	433.59	3,062.64	1,540.09	10.00	10.00	0.00
Niobrara B1 Chalk Top										
7,215.81	36.52	178.18	6,289.00	-1,323.00	424.36	3,062.93	1,547.55	10.00	10.00	0.00

Planning Report



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Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4966.00usft (Original Well Elev)
Site:	NW NW SEC. 33 T9N R60W 6th P.M.	North Reference:	True
Well:	GOLDEN CASCADE FED 33-13HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

Planned Survey

MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
Niobrara B1 Chalk Base										
7,234.71	38.41	178.18	6,304.00	-1,338.00	412.87	3,063.30	1,556.84	10.00	10.00	0.00
Niobrara B2 Chalk Top										
7,275.45	42.48	178.18	6,335.00	-1,369.00	386.46	3,064.14	1,578.19	10.00	10.00	0.00
Niobrara B2 Chalk Base										
7,298.95	44.83	178.18	6,352.00	-1,386.00	370.25	3,064.65	1,591.30	10.00	10.00	0.00
7,300.00	44.94	178.18	6,352.74	-1,386.74	369.51	3,064.68	1,591.90	10.00	10.00	0.00
Niobrara C Chalk Top										
7,353.82	50.32	178.18	6,389.00	-1,423.00	329.78	3,065.94	1,624.01	10.00	10.00	0.00
7,400.00	54.94	178.18	6,417.02	-1,451.02	293.11	3,067.10	1,653.66	10.00	10.00	0.00
Niobrara C Chalk Base										
7,426.99	57.64	178.18	6,432.00	-1,466.00	270.68	3,067.82	1,671.79	10.00	10.00	0.00
7,500.00	64.94	178.18	6,467.05	-1,501.05	206.72	3,069.85	1,723.50	10.00	10.00	0.00
Niobrara D Chalk Top										
7,502.24	65.16	178.18	6,468.00	-1,502.00	204.68	3,069.91	1,725.14	10.00	10.00	0.00
Ft. Hays										
7,587.73	73.71	178.18	6,498.00	-1,532.00	124.76	3,072.45	1,789.76	10.00	10.00	0.00
7,600.00	74.94	178.18	6,501.31	-1,535.31	112.95	3,072.83	1,799.30	10.00	10.00	0.00
7,700.00	84.94	178.18	6,518.76	-1,552.76	14.66	3,075.95	1,878.76	10.00	10.00	0.00
HZ LP: 600ft FNL & 790ft FEL of Sec 33 - Codell (Target)										
7,750.62	90.00	178.18	6,521.00	-1,555.00	-35.87	3,077.56	1,919.61	10.00	10.00	0.00
7,800.00	90.00	178.18	6,521.00	-1,555.00	-85.22	3,079.13	1,959.50	0.00	0.00	0.00
7,900.00	90.00	178.18	6,521.00	-1,555.00	-185.17	3,082.30	2,040.30	0.00	0.00	0.00
8,000.00	90.00	178.18	6,521.00	-1,555.00	-285.12	3,085.48	2,121.10	0.00	0.00	0.00
8,100.00	90.00	178.18	6,521.00	-1,555.00	-385.07	3,088.66	2,201.90	0.00	0.00	0.00
8,200.00	90.00	178.18	6,521.00	-1,555.00	-485.02	3,091.83	2,282.70	0.00	0.00	0.00
8,300.00	90.00	178.18	6,521.00	-1,555.00	-584.97	3,095.01	2,363.51	0.00	0.00	0.00
8,400.00	90.00	178.18	6,521.00	-1,555.00	-684.92	3,098.19	2,444.31	0.00	0.00	0.00
8,500.00	90.00	178.18	6,521.00	-1,555.00	-784.87	3,101.37	2,525.11	0.00	0.00	0.00
8,600.00	90.00	178.18	6,521.00	-1,555.00	-884.82	3,104.55	2,605.91	0.00	0.00	0.00
8,700.00	90.00	178.18	6,521.00	-1,555.00	-984.77	3,107.73	2,686.71	0.00	0.00	0.00
8,800.00	90.00	178.18	6,521.00	-1,555.00	-1,084.71	3,110.91	2,767.51	0.00	0.00	0.00
8,900.00	90.00	178.18	6,521.00	-1,555.00	-1,184.66	3,114.09	2,848.32	0.00	0.00	0.00
9,000.00	90.00	178.18	6,521.00	-1,555.00	-1,284.61	3,117.27	2,929.12	0.00	0.00	0.00
9,100.00	90.00	178.18	6,521.00	-1,555.00	-1,384.56	3,120.45	3,009.92	0.00	0.00	0.00
9,200.00	90.00	178.18	6,521.00	-1,555.00	-1,484.51	3,123.63	3,090.72	0.00	0.00	0.00
9,300.00	90.00	178.18	6,521.00	-1,555.00	-1,584.46	3,126.81	3,171.53	0.00	0.00	0.00
9,400.00	90.00	178.18	6,521.00	-1,555.00	-1,684.41	3,129.99	3,252.33	0.00	0.00	0.00
9,500.00	90.00	178.18	6,521.00	-1,555.00	-1,784.36	3,133.17	3,333.13	0.00	0.00	0.00
9,600.00	90.00	178.18	6,521.00	-1,555.00	-1,884.31	3,136.36	3,413.94	0.00	0.00	0.00
9,700.00	90.00	178.18	6,521.00	-1,555.00	-1,984.26	3,139.54	3,494.74	0.00	0.00	0.00
9,800.00	90.00	178.18	6,521.00	-1,555.00	-2,084.21	3,142.72	3,575.55	0.00	0.00	0.00
9,900.00	90.00	178.18	6,521.00	-1,555.00	-2,184.16	3,145.91	3,656.35	0.00	0.00	0.00
10,000.00	90.00	178.18	6,521.00	-1,555.00	-2,284.11	3,149.09	3,737.15	0.00	0.00	0.00
10,100.00	90.00	178.18	6,521.00	-1,555.00	-2,384.06	3,152.28	3,817.96	0.00	0.00	0.00
10,200.00	90.00	178.17	6,521.00	-1,555.00	-2,484.01	3,155.46	3,898.76	0.00	0.00	0.00
10,300.00	90.00	178.17	6,521.00	-1,555.00	-2,583.96	3,158.65	3,979.57	0.00	0.00	0.00
10,400.00	90.00	178.17	6,521.00	-1,555.00	-2,683.90	3,161.83	4,060.37	0.00	0.00	0.00
10,500.00	90.00	178.17	6,521.00	-1,555.00	-2,783.85	3,165.02	4,141.18	0.00	0.00	0.00
10,600.00	90.00	178.17	6,521.00	-1,555.00	-2,883.80	3,168.20	4,221.99	0.00	0.00	0.00
10,700.00	90.00	178.17	6,521.00	-1,555.00	-2,983.75	3,171.39	4,302.79	0.00	0.00	0.00
10,800.00	90.00	178.17	6,521.00	-1,555.00	-3,083.70	3,174.58	4,383.60	0.00	0.00	0.00
10,900.00	90.00	178.17	6,521.00	-1,555.00	-3,183.65	3,177.76	4,464.41	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well GOLDEN CASCADE FED 33-13HC
Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4966.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4966.00usft (Original Well Elev)
Site:	NW NW SEC. 33 T9N R60W 6th P.M.	North Reference:	True
Well:	GOLDEN CASCADE FED 33-13HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

Planned Survey										
MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
11,000.00	90.00	178.17	6,521.00	-1,555.00	-3,283.60	3,180.95	4,545.21	0.00	0.00	0.00
11,100.00	90.00	178.17	6,521.00	-1,555.00	-3,383.55	3,184.14	4,626.02	0.00	0.00	0.00
11,200.00	90.00	178.17	6,521.00	-1,555.00	-3,483.50	3,187.33	4,706.83	0.00	0.00	0.00
11,300.00	90.00	178.17	6,521.00	-1,555.00	-3,583.45	3,190.52	4,787.63	0.00	0.00	0.00
11,400.00	90.00	178.17	6,521.00	-1,555.00	-3,683.40	3,193.70	4,868.44	0.00	0.00	0.00
11,500.00	90.00	178.17	6,521.00	-1,555.00	-3,783.35	3,196.89	4,949.25	0.00	0.00	0.00
11,600.00	90.00	178.17	6,521.00	-1,555.00	-3,883.29	3,200.08	5,030.06	0.00	0.00	0.00
11,700.00	90.00	178.17	6,521.00	-1,555.00	-3,983.24	3,203.27	5,110.86	0.00	0.00	0.00
11,800.00	90.00	178.17	6,521.00	-1,555.00	-4,083.19	3,206.46	5,191.67	0.00	0.00	0.00
BHL: 600ft FSL & 790ft FEL of Sec 33										
11,834.27	90.00	178.17	6,521.00	-1,555.00	-4,117.45	3,207.56	5,219.37	0.00	0.00	0.00

Formations						
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,641.81	1,521.00	Pierre Shale Top				
3,943.72	3,408.00	Richard Sandstone				
4,077.91	3,518.00	Parkman Sandstone				
4,915.96	4,205.00	Sussex Sandstone				
5,517.36	4,698.00	Shannon Sandstone				
6,420.95	5,520.00	TeePee Buttes				
7,063.44	6,156.00	Sharon Springs				
7,103.74	6,193.00	Niobrara Top				
7,137.41	6,223.00	Niobrara A Chalk				
7,167.49	6,249.00	Niobrara A Chalk Base				
7,215.81	6,289.00	Niobrara B1 Chalk Top				
7,234.71	6,304.00	Niobrara B1 Chalk Base				
7,275.45	6,335.00	Niobrara B2 Chalk Top				
7,298.95	6,352.00	Niobrara B2 Chalk Base				
7,353.82	6,389.00	Niobrara C Chalk Top				
7,426.99	6,432.00	Niobrara C Chalk Base				
7,502.24	6,468.00	Niobrara D Chalk Top				
7,587.73	6,498.00	Ft. Hays				
7,750.62	6,521.00	Codell (Target)				

Plan Annotations					
MD (usft)	TVD (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
0.00	0.00	0.00	0.00	SHL: 506ft FNL & 1472ft FWL of Sec 33	
200.00	200.00	0.00	0.00	START NUDGE (3°/100ft BUR)	
1,364.66	1,293.81	59.49	339.07	EOB TO 34.94° INC	
5,585.96	4,754.23	477.31	2,720.29	END OF TANGENT	
6,750.62	5,848.04	536.80	3,059.36	EOD TO VERTICAL	
6,850.62	5,948.04	536.80	3,059.36	KOP (10°/100ft BUR)	
7,750.62	6,521.00	-35.87	3,077.56	HZ LP: 600ft FNL & 790ft FEL of Sec 33	
11,834.27	6,521.00	-4,117.45	3,207.56	BHL: 600ft FSL & 790ft FEL of Sec 33	