

MALLARD EXPLORATION

WELD COUNTY, COLORADO (NAD 83)

NW SW SEC. 32 T9N R60W 6th P.M.

CB4

ORIGINAL WELLBORE

08 November, 2018

Plan: PROPOSAL #1





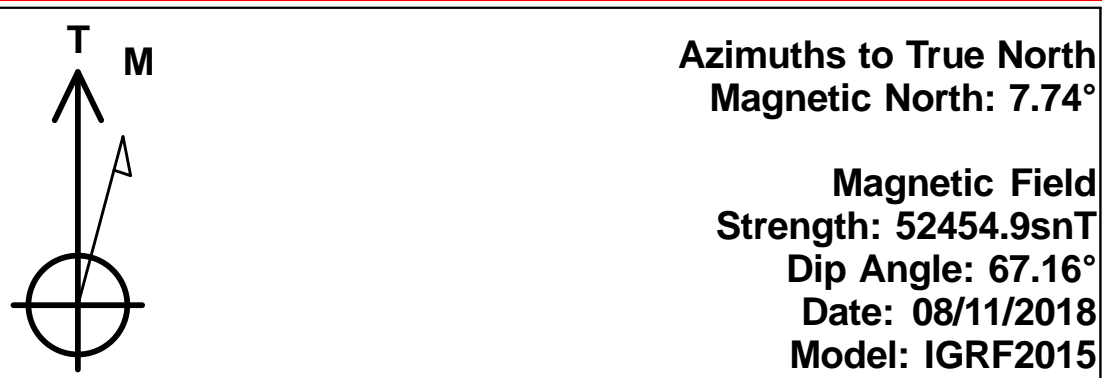
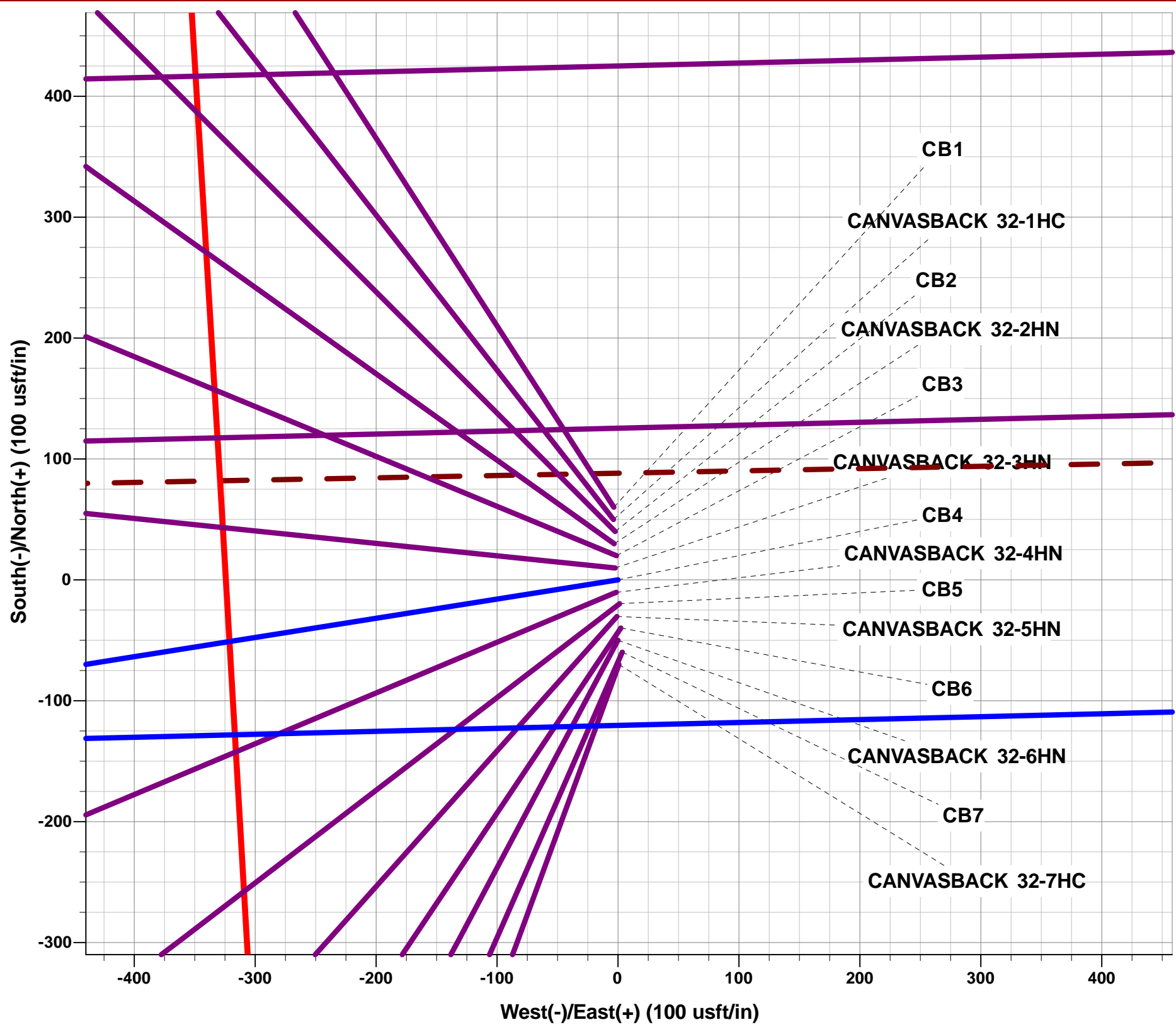
Project: WELD COUNTY, COLORADO (NAD 83)
Site: NW SW SEC. 32 T9N R60W 6th P.M.
Well: CB4
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #1

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: 2491ft FSL & 631ft FWL of Sec 32
450.00	450.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2°/100ft BUR)
1045.62	1050.00	12.00	260.98	-9.81	-61.83	-61.80	62.60	EOB TO 12° INC
4723.70	4810.25	12.00	260.98	-132.32	-833.97	-833.54	844.40	END OF TANGENT
5319.33	5410.25	0.00	0.00	-142.13	-895.80	-895.33	907.01	EOD TO VERTICAL
5791.04	5881.96	0.00	0.00	-142.13	-895.80	-895.33	907.01	KOP (10°/100ft BUR)
6364.00	6781.97	90.00	88.61	-128.23	-323.01	-322.59	1479.97	HZ LP: 2366ft FSL & 301ft FWL of Sec 32
6364.00	11482.33	90.00	88.61	-14.18	4375.97	4376.00	6180.33	BHL: 2432ft FSL & 300ft FEL of Sec 32

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP - CB4	5791.04	-142.13	-895.80	40.705113	-104.126898
HZ LP - CB4	6364.00	-128.23	-323.01	40.705151	-104.124832
BHL - CB4	6364.00	-14.18	4375.97	40.705463	-104.107884



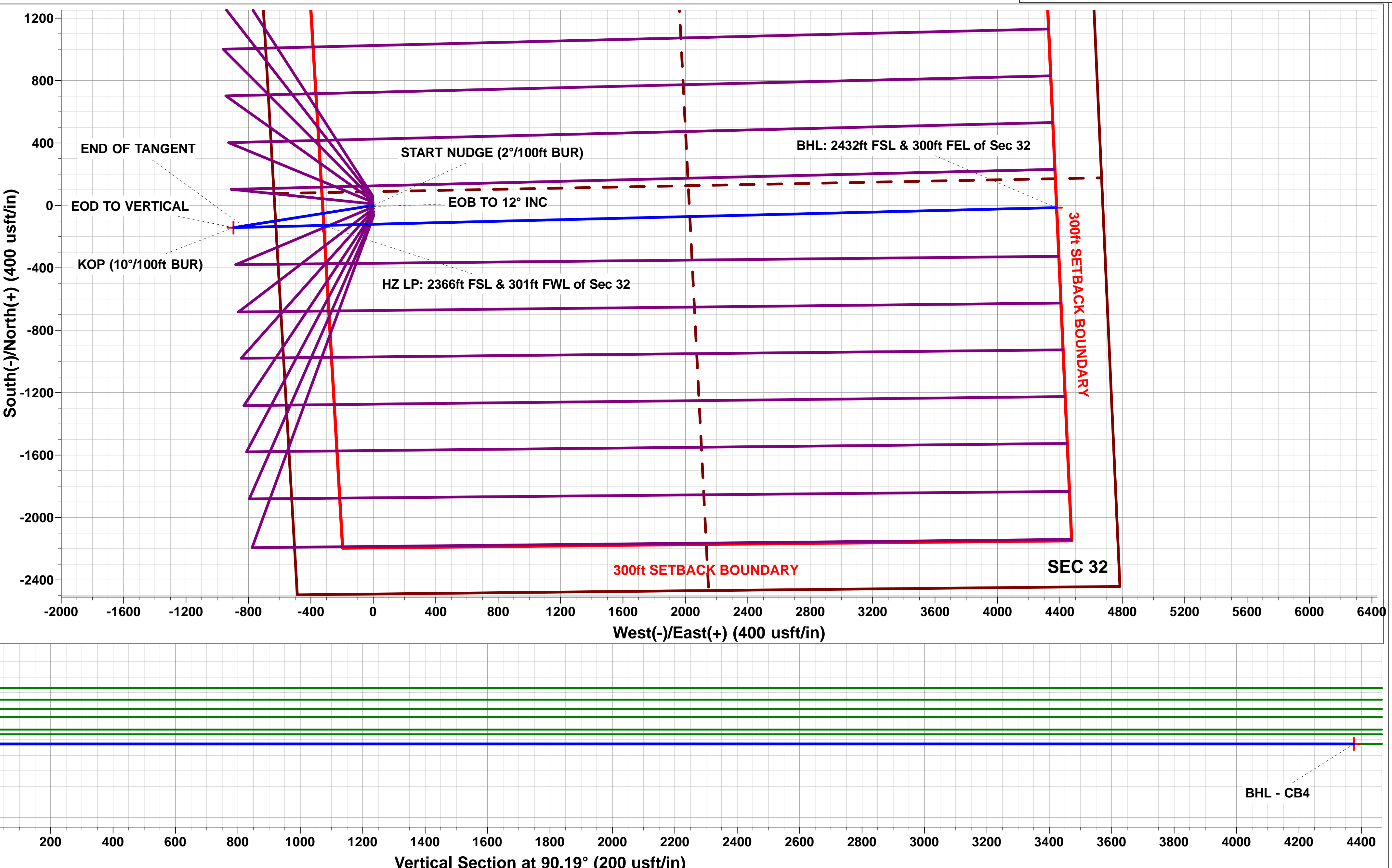
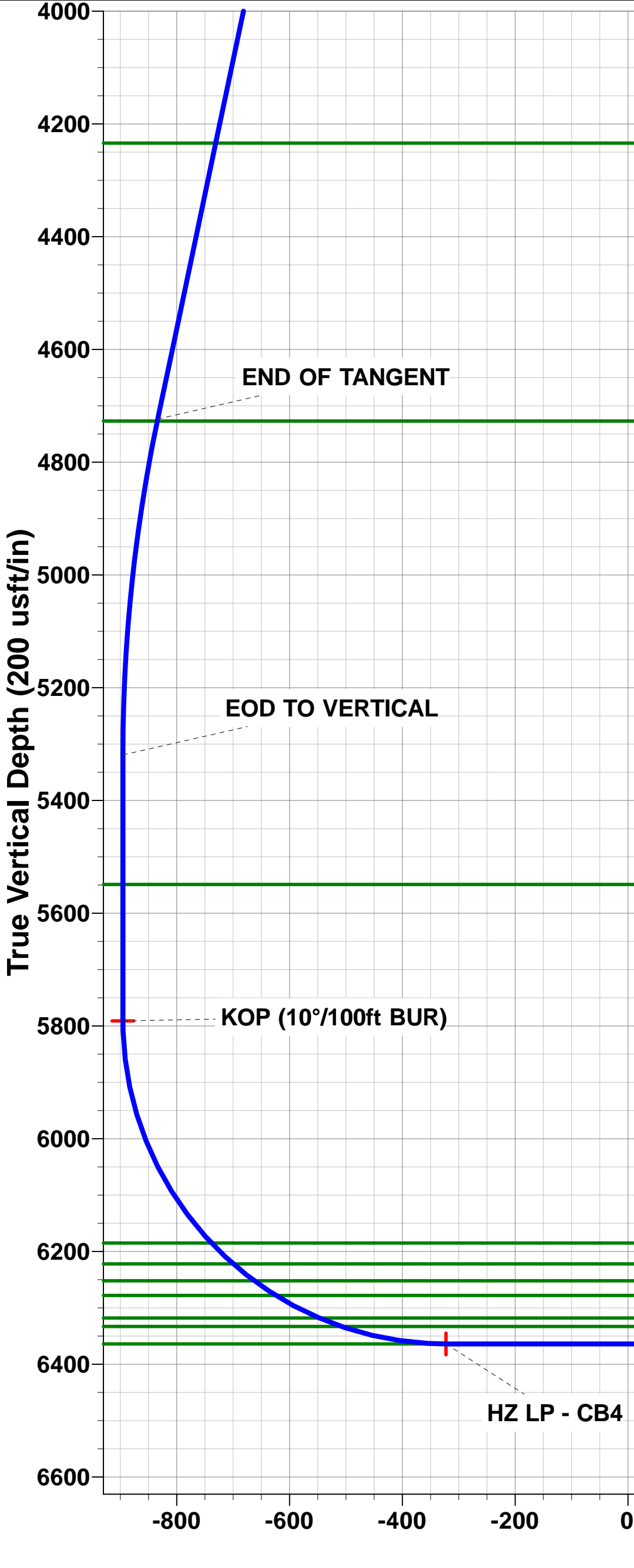
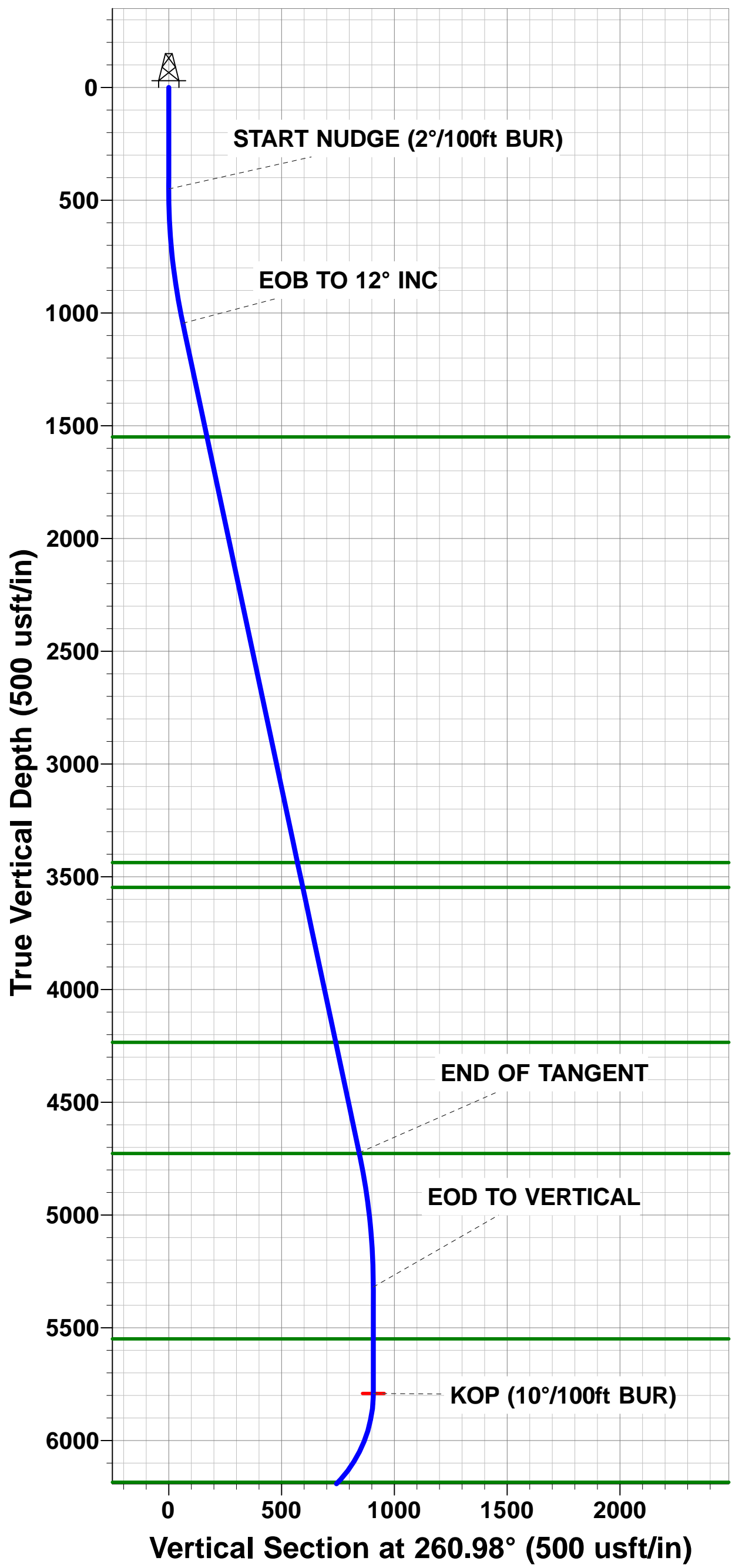
Azimuths to True North
Magnetic North: 7.74°
Magnetic Field
Strength: 52454.9snT
Dip Angle: 67.16°
Date: 08/11/2018
Model: IGRF2015

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
1550.00	1565.64	Pierre Shale Top
3437.00	3494.80	Richard Sandstone
3547.00	3607.26	Parkman Sandstone
4234.00	4309.61	Sussex Sandstone
4727.00	4813.62	Shannon Sandstone
5549.00	5639.92	TeePee Buttes
6185.00	6316.36	Sharon Springs
6222.00	6369.75	Niobrara Top
6252.00	6417.61	Niobrara A Chalk
6278.00	6463.98	Niobrara A Chalk Base
6318.00	6550.81	Niobrara B1 Chalk Top
6333.00	6592.63	Niobrara B1 Chalk Base
6364.00	6781.97	Niobrara B2 Chalk Top (Target)

PROPOSED LOCAL COORDINATES:

SHL: 2491ft FSL & 631ft FWL of Sec 32
HZ LP: 2366ft FSL & 301ft FWL of Sec 32
BHL: 2432ft FSL & 300ft FEL of Sec 32



Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CB4
Company:	MALLARD EXPLORATION	TVD Reference:	KB 20' @ 4952.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 20' @ 4952.00usft (Original Well Elev)
Site:	NW SW SEC. 32 T9N R60W 6th P.M.	North Reference:	True
Well:	CB4	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 SW SEC. 32 T9N R60W 6th P.M.		
Site Position:		Northing:	1,503,686.24 usft
From:	Lat/Long	Easting:	3,381,532.92 usft
Position Uncertainty:	0.00 usft	Slot Radius:	1.10000ft
		Latitude:	40.707883
		Longitude:	-104.123789
		Grid Convergence:	0.89 °

Well	CB4		
Well Position	+N/-S	-867.12 usft	Northing: 1,502,819.76 usfi
	+E/-W	33.83 usft	Easting: 3,381,580.20 usfi
Position Uncertainty	0.00 usft	Wellhead Elevation:	usfi
		Latitude:	40.705503
		Longitude:	-104.123667
		Ground Level:	4,932.00 usft

Wellbore	ORIGINAL WELLBORE				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	08/11/2018	7.74	67.16	52,455

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 (°)
	6,364.00	0.00	0.00	90.19

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	-4,952.00	0.00	0.00	0.00	0.00	0.00	0.00	
450.00	0.00	0.00	450.00	-4,502.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,050.00	12.00	260.98	1,045.62	-3,906.38	-9.81	-61.83	2.00	2.00	0.00	260.98	
4,810.25	12.00	260.98	4,723.70	-228.30	-132.32	-833.97	0.00	0.00	0.00	0.00	
5,410.25	0.00	0.00	5,319.33	367.33	-142.13	-895.80	2.00	-2.00	0.00	180.00	
5,881.96	0.00	0.00	5,791.04	839.04	-142.13	-895.80	0.00	0.00	0.00	0.00	KOP - CB4
6,781.97	90.00	88.61	6,364.00	1,412.00	-128.23	-323.01	10.00	10.00	9.85	88.61	HZ LP - CB4
11,482.33	90.00	88.61	6,364.00	1,412.00	-14.18	4,375.97	0.00	0.00	0.00	0.00	BHL - CB4

Planning Report



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Site:	NW SW SEC. 32 T9N R60W 6th P.M.	North Reference:	True
Well:	CB4	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: 2491ft FSL & 631ft FWL of Sec 32										
0.00	0.00	0.00	0.00	4,952.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	4,852.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	4,752.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	4,652.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	4,552.00	0.00	0.00	0.00	0.00	0.00	0.00
START NUDGE (2°/100ft BUR)										
450.00	0.00	0.00	450.00	4,502.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	1.00	260.98	500.00	4,452.00	-0.07	-0.43	-0.43	2.00	2.00	0.00
600.00	3.00	260.98	599.93	4,352.07	-0.62	-3.88	-3.88	2.00	2.00	0.00
700.00	5.00	260.98	699.68	4,252.32	-1.71	-10.77	-10.76	2.00	2.00	0.00
800.00	7.00	260.98	799.13	4,152.87	-3.35	-21.09	-21.08	2.00	2.00	0.00
900.00	9.00	260.98	898.15	4,053.85	-5.53	-34.83	-34.82	2.00	2.00	0.00
1,000.00	11.00	260.98	996.63	3,955.37	-8.25	-51.96	-51.96	2.00	2.00	0.00
EOB TO 12° INC										
1,050.00	12.00	260.98	1,045.62	3,906.38	-9.81	-61.83	-61.80	2.00	2.00	0.00
1,100.00	12.00	260.98	1,094.53	3,857.47	-11.44	-72.10	-72.06	0.00	0.00	0.00
1,200.00	12.00	260.98	1,192.35	3,759.65	-14.70	-92.63	-92.58	0.00	0.00	0.00
1,300.00	12.00	260.98	1,290.16	3,661.84	-17.96	-113.16	-113.11	0.00	0.00	0.00
1,400.00	12.00	260.98	1,387.97	3,564.03	-21.21	-133.70	-133.63	0.00	0.00	0.00
1,500.00	12.00	260.98	1,485.79	3,466.21	-24.47	-154.23	-154.15	0.00	0.00	0.00
Pierre Shale Top										
1,565.64	12.00	260.98	1,550.00	3,402.00	-26.61	-167.71	-167.63	0.00	0.00	0.00
1,600.00	12.00	260.98	1,583.60	3,368.40	-27.73	-174.77	-174.68	0.00	0.00	0.00
1,700.00	12.00	260.98	1,681.42	3,270.58	-30.99	-195.30	-195.20	0.00	0.00	0.00
1,800.00	12.00	260.98	1,779.23	3,172.77	-34.25	-215.84	-215.72	0.00	0.00	0.00
1,900.00	12.00	260.98	1,877.05	3,074.95	-37.50	-236.37	-236.25	0.00	0.00	0.00
2,000.00	12.00	260.98	1,974.86	2,977.14	-40.76	-256.91	-256.77	0.00	0.00	0.00
2,100.00	12.00	260.98	2,072.68	2,879.32	-44.02	-277.44	-277.30	0.00	0.00	0.00
2,200.00	12.00	260.98	2,170.49	2,781.51	-47.28	-297.97	-297.82	0.00	0.00	0.00
2,300.00	12.00	260.98	2,268.31	2,683.69	-50.54	-318.51	-318.34	0.00	0.00	0.00
2,400.00	12.00	260.98	2,366.12	2,585.88	-53.79	-339.04	-338.87	0.00	0.00	0.00
2,500.00	12.00	260.98	2,463.94	2,488.06	-57.05	-359.58	-359.39	0.00	0.00	0.00
2,600.00	12.00	260.98	2,561.75	2,390.25	-60.31	-380.11	-379.91	0.00	0.00	0.00
2,700.00	12.00	260.98	2,659.57	2,292.43	-63.57	-400.65	-400.44	0.00	0.00	0.00
2,800.00	12.00	260.98	2,757.38	2,194.62	-66.83	-421.18	-420.96	0.00	0.00	0.00
2,900.00	12.00	260.98	2,855.20	2,096.80	-70.08	-441.71	-441.48	0.00	0.00	0.00
3,000.00	12.00	260.98	2,953.01	1,998.99	-73.34	-462.25	-462.01	0.00	0.00	0.00
3,100.00	12.00	260.98	3,050.83	1,901.17	-76.60	-482.78	-482.53	0.00	0.00	0.00
3,200.00	12.00	260.98	3,148.64	1,803.36	-79.86	-503.32	-503.06	0.00	0.00	0.00
3,300.00	12.00	260.98	3,246.46	1,705.54	-83.12	-523.85	-523.58	0.00	0.00	0.00
3,400.00	12.00	260.98	3,344.27	1,607.73	-86.37	-544.39	-544.10	0.00	0.00	0.00
Richard Sandstone										
3,494.80	12.00	260.98	3,437.00	1,515.00	-89.46	-563.85	-563.56	0.00	0.00	0.00
3,500.00	12.00	260.98	3,442.08	1,509.92	-89.63	-564.92	-564.63	0.00	0.00	0.00
3,600.00	12.00	260.98	3,539.90	1,412.10	-92.89	-585.45	-585.15	0.00	0.00	0.00
Parkman Sandstone										
3,607.26	12.00	260.98	3,547.00	1,405.00	-93.13	-586.94	-586.64	0.00	0.00	0.00
3,700.00	12.00	260.98	3,637.71	1,314.29	-96.15	-605.99	-605.67	0.00	0.00	0.00
3,800.00	12.00	260.98	3,735.53	1,216.47	-99.41	-626.52	-626.20	0.00	0.00	0.00
3,900.00	12.00	260.98	3,833.34	1,118.66	-102.66	-647.06	-646.72	0.00	0.00	0.00
4,000.00	12.00	260.98	3,931.16	1,020.84	-105.92	-667.59	-667.24	0.00	0.00	0.00
4,100.00	12.00	260.98	4,028.97	923.03	-109.18	-688.13	-687.77	0.00	0.00	0.00

Planning Report



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Well:	CB4	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)
4,200.00	12.00	260.98	4,126.79	825.21	-112.44	-708.66	-708.29	0.00	0.00	0.00
4,300.00	12.00	260.98	4,224.60	727.40	-115.70	-729.19	-728.82	0.00	0.00	0.00
Sussex Sandstone										
4,309.61	12.00	260.98	4,234.00	718.00	-116.01	-731.17	-730.79	0.00	0.00	0.00
4,400.00	12.00	260.98	4,322.42	629.58	-118.95	-749.73	-749.34	0.00	0.00	0.00
4,500.00	12.00	260.98	4,420.23	531.77	-122.21	-770.26	-769.86	0.00	0.00	0.00
4,600.00	12.00	260.98	4,518.05	433.95	-125.47	-790.80	-790.39	0.00	0.00	0.00
4,700.00	12.00	260.98	4,615.86	336.14	-128.73	-811.33	-810.91	0.00	0.00	0.00
4,800.00	12.00	260.98	4,713.68	238.32	-131.99	-831.87	-831.43	0.00	0.00	0.00
END OF TANGENT										
4,810.25	12.00	260.98	4,723.70	228.30	-132.32	-833.97	-833.54	0.00	0.00	0.00
Shannon Sandstone										
4,813.62	11.93	260.98	4,727.00	225.00	-132.43	-834.66	-834.23	2.00	-2.00	0.00
4,900.00	10.21	260.98	4,811.77	140.23	-135.03	-851.04	-850.60	2.00	-2.00	0.00
5,000.00	8.21	260.98	4,910.48	41.52	-137.53	-866.84	-866.39	2.00	-2.00	0.00
5,100.00	6.21	260.98	5,009.68	-57.68	-139.50	-879.22	-878.77	2.00	-2.00	0.00
5,200.00	4.21	260.98	5,109.26	-157.26	-140.92	-888.18	-887.72	2.00	-2.00	0.00
5,300.00	2.21	260.98	5,209.10	-257.10	-141.80	-893.70	-893.24	2.00	-2.00	0.00
5,400.00	0.21	260.98	5,309.08	-357.08	-142.13	-895.78	-895.32	2.00	-2.00	0.00
EOD TO VERTICAL										
5,410.25	0.00	0.00	5,319.33	-367.33	-142.13	-895.80	-895.33	2.00	-2.00	0.00
5,500.00	0.00	0.00	5,409.08	-457.08	-142.13	-895.80	-895.33	0.00	0.00	0.00
5,600.00	0.00	0.00	5,509.08	-557.08	-142.13	-895.80	-895.33	0.00	0.00	0.00
TeePee Buttes										
5,639.92	0.00	0.00	5,549.00	-597.00	-142.13	-895.80	-895.33	0.00	0.00	0.00
5,700.00	0.00	0.00	5,609.08	-657.08	-142.13	-895.80	-895.33	0.00	0.00	0.00
5,800.00	0.00	0.00	5,709.08	-757.08	-142.13	-895.80	-895.33	0.00	0.00	0.00
KOP (10°/100ft BUR)										
5,881.96	0.00	0.00	5,791.04	-839.04	-142.13	-895.80	-895.33	0.00	0.00	0.00
5,900.00	1.80	88.61	5,809.07	-857.07	-142.12	-895.52	-895.05	10.00	10.00	0.00
6,000.00	11.80	88.61	5,908.24	-956.24	-141.84	-883.69	-883.22	10.00	10.00	0.00
6,100.00	21.80	88.61	6,003.85	-1,051.85	-141.14	-854.82	-854.36	10.00	10.00	0.00
6,200.00	31.80	88.61	6,092.99	-1,140.99	-140.04	-809.80	-809.34	10.00	10.00	0.00
6,300.00	41.80	88.61	6,172.96	-1,220.96	-138.59	-749.99	-749.54	10.00	10.00	0.00
Sharon Springs										
6,316.36	43.44	88.61	6,185.00	-1,233.00	-138.32	-738.91	-738.46	10.00	10.00	0.00
Niobrara Top										
6,369.75	48.78	88.61	6,222.00	-1,270.00	-137.39	-700.46	-700.02	10.00	10.00	0.00
6,400.00	51.80	88.61	6,241.33	-1,289.33	-136.83	-677.20	-676.75	10.00	10.00	0.00
Niobrara A Chalk										
6,417.61	53.56	88.61	6,252.00	-1,300.00	-136.49	-663.20	-662.76	10.00	10.00	0.00
Niobrara A Chalk Base										
6,463.98	58.20	88.61	6,278.00	-1,326.00	-135.56	-624.84	-624.39	10.00	10.00	0.00
6,500.00	61.80	88.61	6,296.01	-1,344.01	-134.80	-593.65	-593.21	10.00	10.00	0.00
Niobrara B1 Chalk Top										
6,550.81	66.88	88.61	6,318.00	-1,366.00	-133.69	-547.88	-547.44	10.00	10.00	0.00
Niobrara B1 Chalk Base										
6,592.63	71.07	88.61	6,333.00	-1,381.00	-132.74	-508.86	-508.43	10.00	10.00	0.00
6,600.00	71.80	88.61	6,335.35	-1,383.35	-132.57	-501.88	-501.45	10.00	10.00	0.00
6,700.00	81.80	88.61	6,358.15	-1,406.15	-130.22	-404.67	-404.25	10.00	10.00	0.00
HZ LP: 2366ft FSL & 301ft FWL of Sec 32 - Niobrara B2 Chalk Top (Target)										
6,781.97	90.00	88.61	6,364.00	-1,412.00	-128.23	-323.01	-322.59	10.00	10.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CB4
Company:	MALLARD EXPLORATION	TVD Reference:	KB 20' @ 4952.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 20' @ 4952.00usft (Original Well Elev)
Site:	NW SW SEC. 32 T9N R60W 6th P.M.	North Reference:	True
Well:	CB4	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)
6,800.00	90.00	88.61	6,364.00	-1,412.00	-127.80	-304.98	-304.57	0.00	0.00	0.00
6,900.00	90.00	88.61	6,364.00	-1,412.00	-125.37	-205.01	-204.60	0.00	0.00	0.00
7,000.00	90.00	88.61	6,364.00	-1,412.00	-122.95	-105.04	-104.64	0.00	0.00	0.00
7,100.00	90.00	88.61	6,364.00	-1,412.00	-120.52	-5.07	-4.68	0.00	0.00	0.00
7,200.00	90.00	88.61	6,364.00	-1,412.00	-118.10	94.90	95.28	0.00	0.00	0.00
7,300.00	90.00	88.61	6,364.00	-1,412.00	-115.67	194.87	195.25	0.00	0.00	0.00
7,400.00	90.00	88.61	6,364.00	-1,412.00	-113.25	294.84	295.21	0.00	0.00	0.00
7,500.00	90.00	88.61	6,364.00	-1,412.00	-110.82	394.81	395.17	0.00	0.00	0.00
7,600.00	90.00	88.61	6,364.00	-1,412.00	-108.40	494.78	495.13	0.00	0.00	0.00
7,700.00	90.00	88.61	6,364.00	-1,412.00	-105.97	594.75	595.09	0.00	0.00	0.00
7,800.00	90.00	88.61	6,364.00	-1,412.00	-103.54	694.72	695.06	0.00	0.00	0.00
7,900.00	90.00	88.61	6,364.00	-1,412.00	-101.12	794.69	795.02	0.00	0.00	0.00
8,000.00	90.00	88.61	6,364.00	-1,412.00	-98.69	894.67	894.98	0.00	0.00	0.00
8,100.00	90.00	88.61	6,364.00	-1,412.00	-96.27	994.64	994.94	0.00	0.00	0.00
8,200.00	90.00	88.61	6,364.00	-1,412.00	-93.84	1,094.61	1,094.90	0.00	0.00	0.00
8,300.00	90.00	88.61	6,364.00	-1,412.00	-91.42	1,194.58	1,194.87	0.00	0.00	0.00
8,400.00	90.00	88.61	6,364.00	-1,412.00	-88.99	1,294.55	1,294.83	0.00	0.00	0.00
8,500.00	90.00	88.61	6,364.00	-1,412.00	-86.57	1,394.52	1,394.79	0.00	0.00	0.00
8,600.00	90.00	88.61	6,364.00	-1,412.00	-84.14	1,494.49	1,494.75	0.00	0.00	0.00
8,700.00	90.00	88.61	6,364.00	-1,412.00	-81.72	1,594.46	1,594.72	0.00	0.00	0.00
8,800.00	90.00	88.61	6,364.00	-1,412.00	-79.29	1,694.43	1,694.68	0.00	0.00	0.00
8,900.00	90.00	88.61	6,364.00	-1,412.00	-76.87	1,794.40	1,794.64	0.00	0.00	0.00
9,000.00	90.00	88.61	6,364.00	-1,412.00	-74.44	1,894.37	1,894.60	0.00	0.00	0.00
9,100.00	90.00	88.61	6,364.00	-1,412.00	-72.02	1,994.34	1,994.56	0.00	0.00	0.00
9,200.00	90.00	88.61	6,364.00	-1,412.00	-69.59	2,094.31	2,094.53	0.00	0.00	0.00
9,300.00	90.00	88.61	6,364.00	-1,412.00	-67.17	2,194.28	2,194.49	0.00	0.00	0.00
9,400.00	90.00	88.61	6,364.00	-1,412.00	-64.74	2,294.25	2,294.45	0.00	0.00	0.00
9,500.00	90.00	88.61	6,364.00	-1,412.00	-62.32	2,394.22	2,394.41	0.00	0.00	0.00
9,600.00	90.00	88.61	6,364.00	-1,412.00	-59.89	2,494.19	2,494.38	0.00	0.00	0.00
9,700.00	90.00	88.61	6,364.00	-1,412.00	-57.46	2,594.17	2,594.34	0.00	0.00	0.00
9,800.00	90.00	88.61	6,364.00	-1,412.00	-55.04	2,694.14	2,694.30	0.00	0.00	0.00
9,900.00	90.00	88.61	6,364.00	-1,412.00	-52.61	2,794.11	2,794.26	0.00	0.00	0.00
10,000.00	90.00	88.61	6,364.00	-1,412.00	-50.19	2,894.08	2,894.22	0.00	0.00	0.00
10,100.00	90.00	88.61	6,364.00	-1,412.00	-47.76	2,994.05	2,994.19	0.00	0.00	0.00
10,200.00	90.00	88.61	6,364.00	-1,412.00	-45.34	3,094.02	3,094.15	0.00	0.00	0.00
10,300.00	90.00	88.61	6,364.00	-1,412.00	-42.91	3,193.99	3,194.11	0.00	0.00	0.00
10,400.00	90.00	88.61	6,364.00	-1,412.00	-40.49	3,293.96	3,294.07	0.00	0.00	0.00
10,500.00	90.00	88.61	6,364.00	-1,412.00	-38.06	3,393.93	3,394.04	0.00	0.00	0.00
10,600.00	90.00	88.61	6,364.00	-1,412.00	-35.64	3,493.90	3,494.00	0.00	0.00	0.00
10,700.00	90.00	88.61	6,364.00	-1,412.00	-33.21	3,593.87	3,593.96	0.00	0.00	0.00
10,800.00	90.00	88.61	6,363.99	-1,411.99	-30.79	3,693.84	3,693.92	0.00	0.00	0.00
10,900.00	90.00	88.61	6,363.99	-1,411.99	-28.36	3,793.81	3,793.88	0.00	0.00	0.00
11,000.00	90.00	88.61	6,363.99	-1,411.99	-25.94	3,893.78	3,893.85	0.00	0.00	0.00
11,100.00	90.00	88.61	6,363.99	-1,411.99	-23.51	3,993.75	3,993.81	0.00	0.00	0.00
11,200.00	90.00	88.61	6,363.99	-1,411.99	-21.09	4,093.72	4,093.77	0.00	0.00	0.00
11,300.00	90.00	88.61	6,363.99	-1,411.99	-18.66	4,193.69	4,193.73	0.00	0.00	0.00
11,400.00	90.00	88.61	6,363.99	-1,411.99	-16.24	4,293.67	4,293.70	0.00	0.00	0.00
BHL: 2432ft FSL & 300ft FEL of Sec 32										
11,482.33	90.00	88.61	6,364.00	-1,412.00	-14.18	4,375.97	4,376.00	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well CB4
Company:	MALLARD EXPLORATION	TVD Reference:	KB 20' @ 4952.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 20' @ 4952.00usft (Original Well Elev)
Site:	NW SW SEC. 32 T9N R60W 6th P.M.	North Reference:	True
Well:	CB4	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

Formations						
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,565.64	1,550.00	Pierre Shale Top				
3,494.80	3,437.00	Richard Sandstone				
3,607.26	3,547.00	Parkman Sandstone				
4,309.61	4,234.00	Sussex Sandstone				
4,813.62	4,727.00	Shannon Sandstone				
5,639.92	5,549.00	TeePee Buttes				
6,316.36	6,185.00	Sharon Springs				
6,369.75	6,222.00	Niobrara Top				
6,417.61	6,252.00	Niobrara A Chalk				
6,463.98	6,278.00	Niobrara A Chalk Base				
6,550.81	6,318.00	Niobrara B1 Chalk Top				
6,592.63	6,333.00	Niobrara B1 Chalk Base				
6,781.97	6,364.00	Niobrara B2 Chalk Top (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: 2491ft FSL & 631ft FWL of Sec 32
450.00	450.00	0.00	0.00	START NUDGE (2°/100ft BUR)
1,050.00	1,045.62	-9.81	-61.83	EOB TO 12° INC
4,810.25	4,723.70	-132.32	-833.97	END OF TANGENT
5,410.25	5,319.33	-142.13	-895.80	EOD TO VERTICAL
5,881.96	5,791.04	-142.13	-895.80	KOP (10°/100ft BUR)
6,781.97	6,364.00	-128.23	-323.01	HZ LP: 2366ft FSL & 301ft FWL of Sec 32
11,482.33	6,364.00	-14.18	4,375.97	BHL: 2432ft FSL & 300ft FEL of Sec 32