

MALLARD EXPLORATION

WELD COUNTY, COLORADO (NAD 83)

NE SW SEC. 31 T9N R59W 6th P.M.

SHULL FED 31-32-10HN

ORIGINAL WELLBORE

21 December, 2017

Plan: PROPOSAL #1





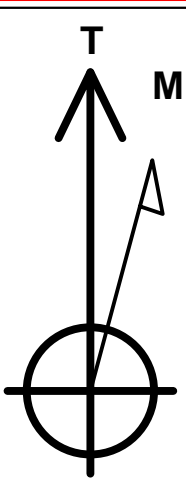
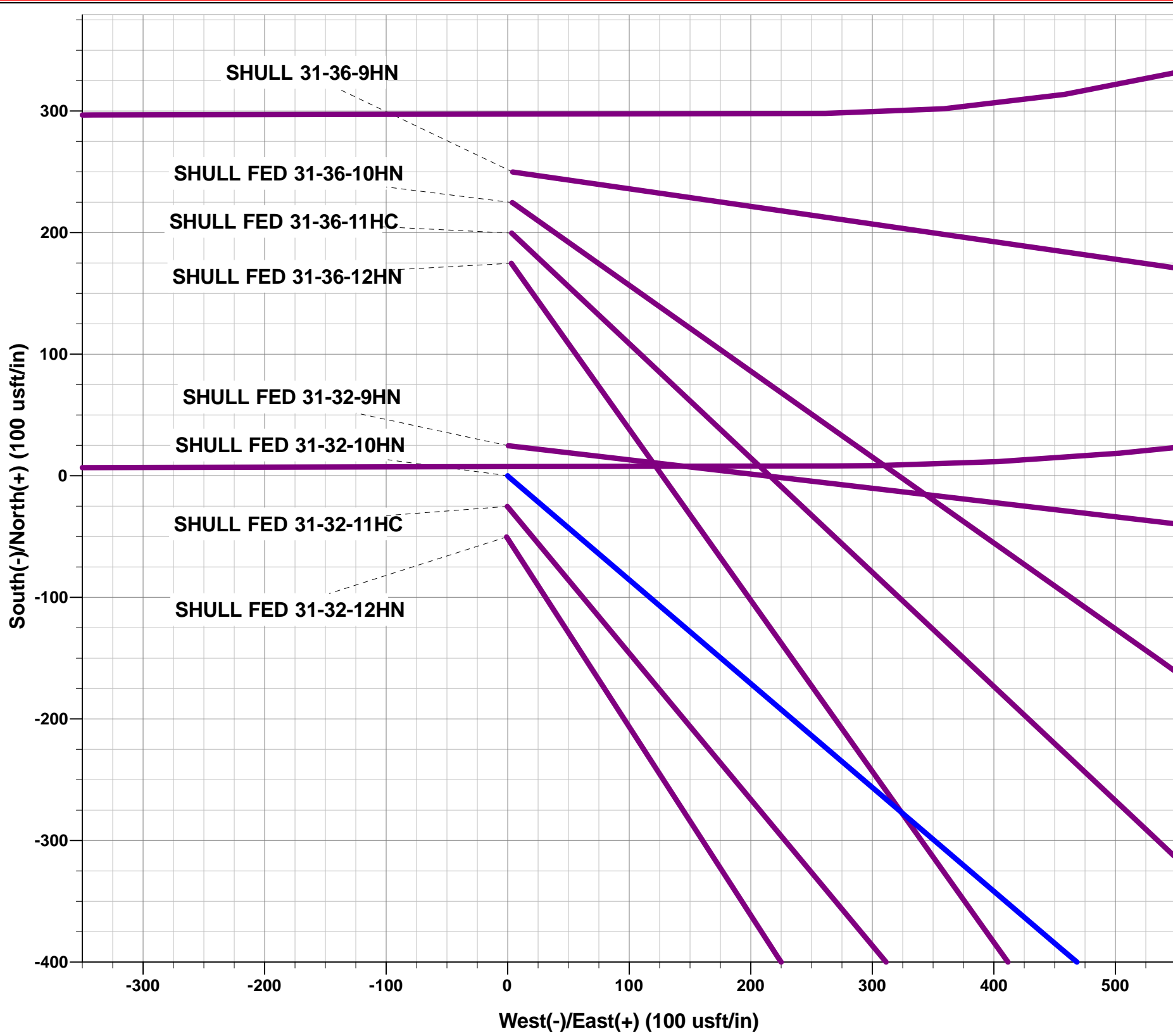
Project: WELD COUNTY, COLORADO (NAD 83)
Site: NE SW SEC. 31 T9N R59W 6th P.M.
Well: SHULL FED 31-32-10HN
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #1

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	VSec	Dep	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	SHL: 1753ft FSL & 1778ft FWL of Sec 31
500.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2°/100ft BUR)
1199.39	1206.53	14.13	130.50	-56.30	65.91	70.18	86.68	EOB TO 14.13° INC
4723.65	4840.76	14.13	130.50	-632.51	740.57	788.45	973.92	END OF TANGENT
5423.04	5547.29	0.00	0.00	-688.81	806.48	858.62	1060.60	EOD TO VERTICAL
5523.04	5647.29	0.00	0.00	-688.81	806.48	858.62	1060.60	KOP (10°/100ft BUR)
6096.00	6547.28	90.00	89.79	-686.71	1379.43	1429.60	1633.55	HZ LP: 1085ft FSL & 2140ft FEL of Sec 32
6096.00	13475.24	90.00	89.80	-661.67	8307.34	8333.65	8561.51	BHL: 1085ft FSL & 460ft FEL of Sec 32

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP: SHULL FED 31-32-10HN	5523.04	-688.81	806.48	40.702184	-104.020999
HZ LP: SHULL FED 31-32-10HN	6096.00	-686.71	1379.43	40.702190	-104.018933
BHL: SHULL FED 31-32-10HN	6096.00	-661.67	8307.34	40.702255	-103.993947



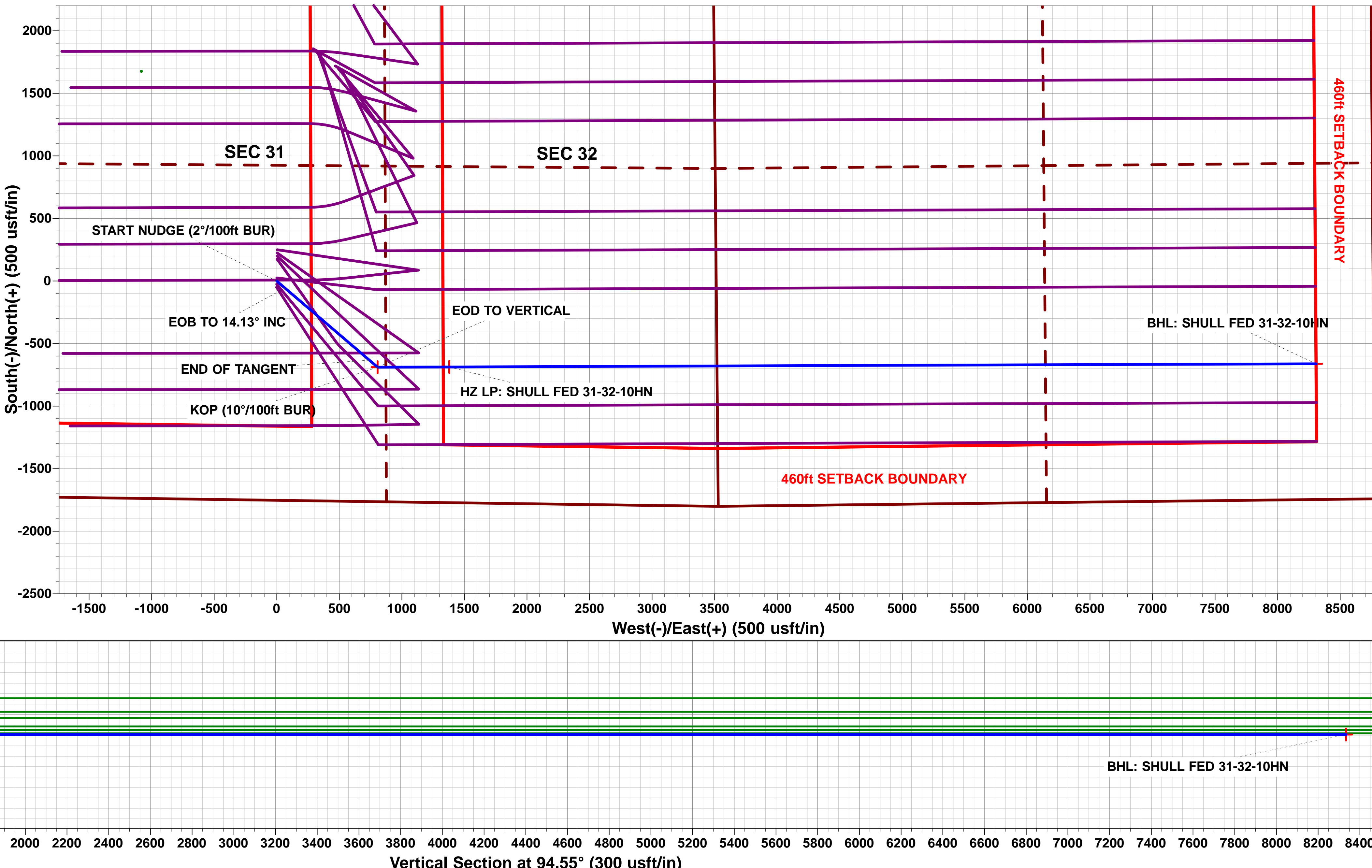
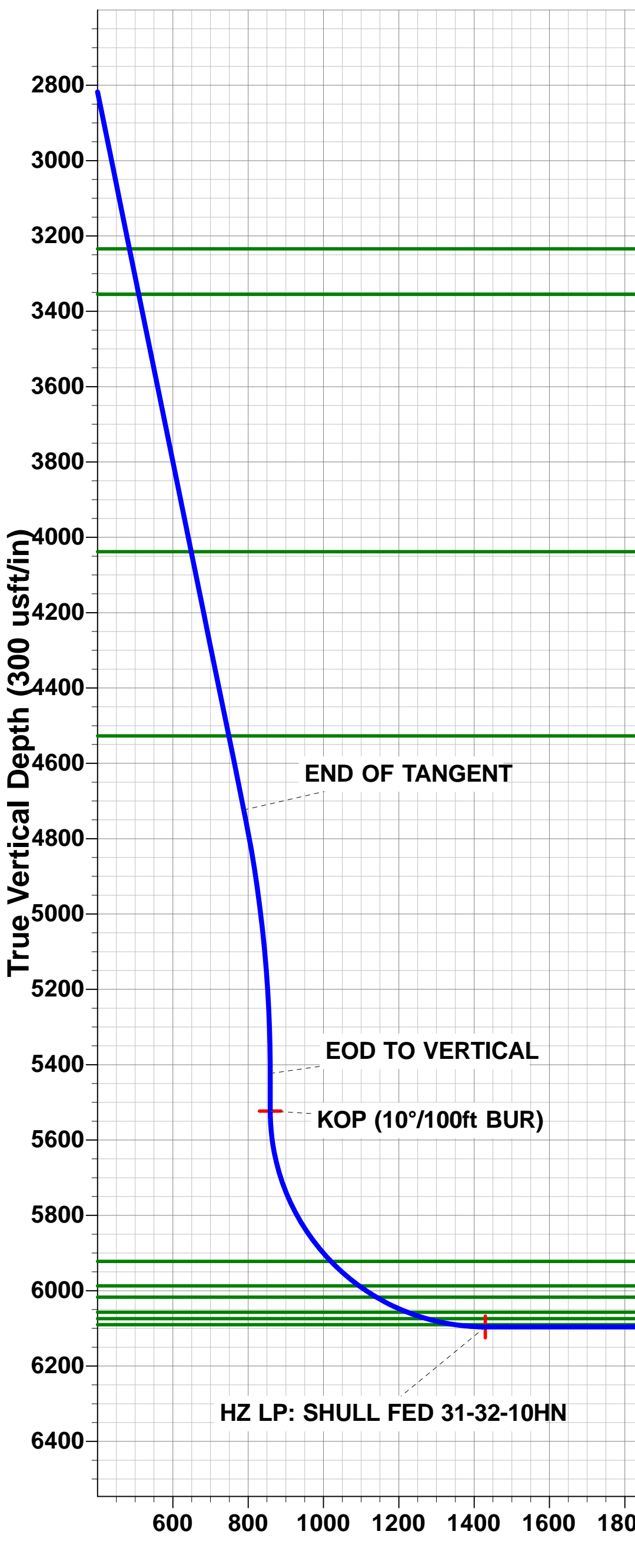
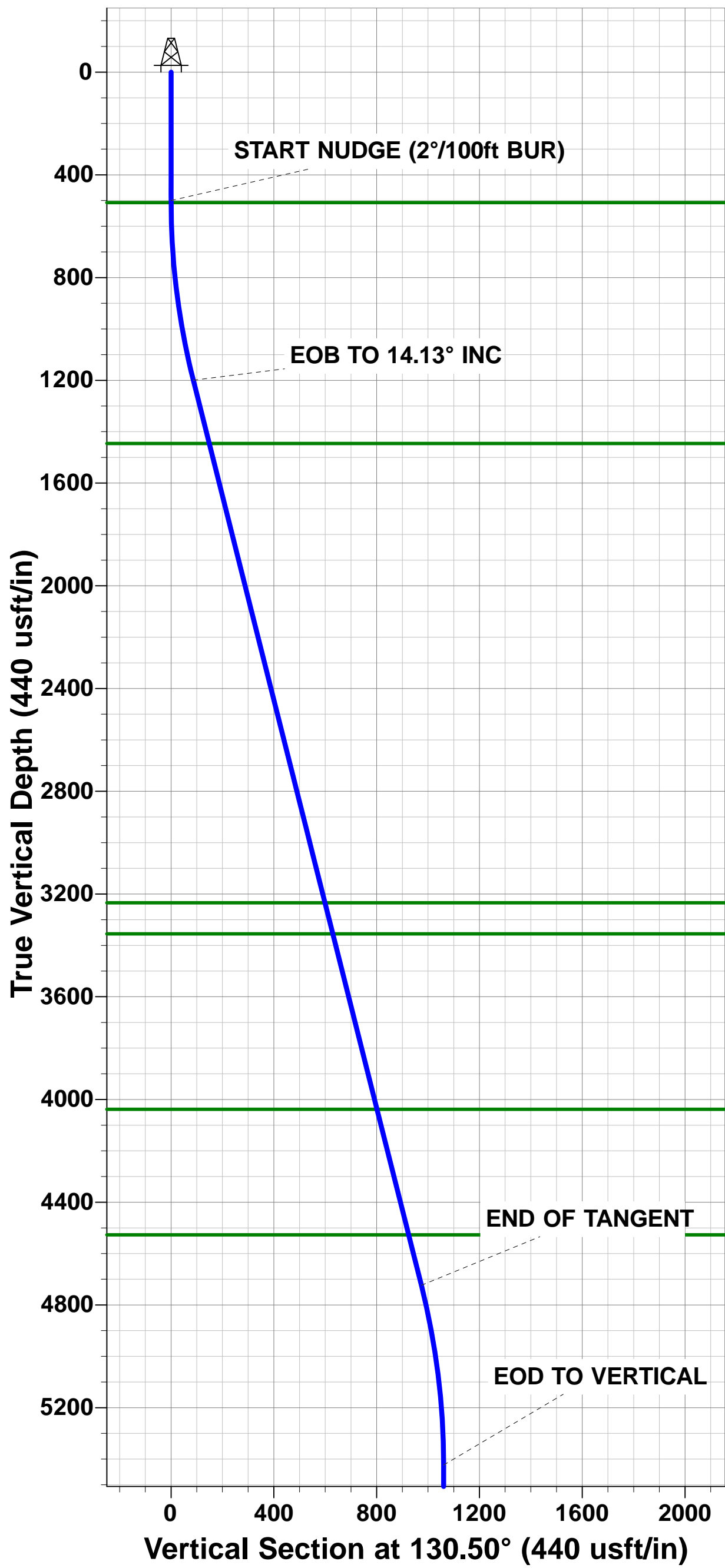
Azimuths to True North
Magnetic North: 7.78°
Magnetic Field
Strength: 52566.3snT
Dip Angle: 67.20°
Date: 19/12/2017
Model: IGRF2015

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
508.00	508.00	FOX HILLS BASE
1446.00	1460.84	PIERRE SHALE TOP
3234.00	3304.62	RICHARD SNADSTONE
3355.00	3429.40	PARKMAN SANDSTONE
4038.00	4133.71	SUSSEX SANDSTONE
4527.00	4637.97	SHANNON SANDSTONE
5922.00	6088.61	SHARON SPRINGS
5987.00	6188.01	NIOBRARA A CHALK
6017.00	6242.84	NIOBRARA A CHALK BASE
6057.00	6334.67	NIOBRARA B1 CHALK TOP
6074.00	6388.00	NIOBRARA B1 CHALK BASE
6090.00	6464.30	NIOBRARA B2 CHALK TOP

PROPOSED LOCAL COORDINATES:

SHL: 1753ft FSL & 1778ft FWL of Sec 31
HZ LP: 1085ft FSL & 2140ft FEL of Sec 32
BHL: 1085ft FSL & 460ft FEL of Sec 32



Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well SHULL FED 31-32-10HN
Company:	MALLARD EXPLORATION	TVD Reference:	WELL @ 4900.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	WELL @ 4900.00usft (Original Well Elev)
Site:	NE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	SHULL FED 31-32-10HN	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	NE SW SEC. 31 T9N R59W 6th P.M.		
Site Position:		Northing:	1,502,994.38 usft
From:	Lat/Long	Easting:	3,409,243.99 usft
Position Uncertainty:	0.00 usft	Slot Radius:	1.10000 ft
		Latitude:	40.704761
		Longitude:	-104.023893
		Grid Convergence:	0.95 °

Well	SHULL FED 31-32-10HN		
Well Position	+N/-S	-249.94 usft	Northing:
	+E/-W	-4.16 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	40.704075
		Longitude:	-104.023908
		Ground Level:	4,880.00 usft

Wellbore	ORIGINAL WELLBORE				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	19/12/2017	7.78	67.20	52,566

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 (°)
	0.00	0.00	0.00	94.55

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	-4,900.00	0.00	0.00	0.00	0.00	0.00	0.00	
500.00	0.00	0.00	500.00	-4,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,206.53	14.13	130.50	1,199.39	-3,700.61	-56.30	65.91	2.00	2.00	0.00	130.50	
4,840.76	14.13	130.50	4,723.65	-176.35	-632.51	740.57	0.00	0.00	0.00	0.00	
5,547.29	0.00	0.00	5,423.04	523.04	-688.81	806.48	2.00	-2.00	0.00	180.00	
5,647.29	0.00	0.00	5,523.04	623.04	-688.81	806.48	0.00	0.00	0.00	0.00	KOP: SHULL FED 31-
6,547.28	90.00	89.79	6,096.00	1,196.00	-686.71	1,379.43	10.00	10.00	9.98	89.79	HZ LP: SHULL FED 3
13,475.24	90.00	89.80	6,096.00	1,196.00	-661.67	8,307.34	0.00	0.00	0.00	74.57	BHL: SHULL FED 31-

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Well:	SHULL FED 31-32-10HN	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: 1753ft FSL & 1778ft FWL of Sec 31										
0.00	0.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	4,800.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	4,700.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	4,600.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	4,500.00	0.00	0.00	0.00	0.00	0.00	0.00
START NUDGE (2°/100ft BUR)										
500.00	0.00	0.00	500.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00
FOX HILLS BASE										
508.00	0.16	130.50	508.00	4,392.00	-0.01	0.01	0.01	2.00	2.00	0.00
600.00	2.00	130.50	599.98	4,300.02	-1.13	1.33	1.41	2.00	2.00	0.00
700.00	4.00	130.50	699.84	4,200.16	-4.53	5.31	5.65	2.00	2.00	0.00
800.00	6.00	130.50	799.45	4,100.55	-10.19	11.93	12.70	2.00	2.00	0.00
900.00	8.00	130.50	898.70	4,001.30	-18.11	21.20	22.57	2.00	2.00	0.00
1,000.00	10.00	130.50	997.47	3,902.53	-28.27	33.09	35.23	2.00	2.00	0.00
1,100.00	12.00	130.50	1,095.62	3,804.38	-40.66	47.60	50.68	2.00	2.00	0.00
1,200.00	14.00	130.50	1,193.06	3,706.94	-55.27	64.71	68.89	2.00	2.00	0.00
EOB TO 14.13° INC										
1,206.53	14.13	130.50	1,199.39	3,700.61	-56.30	65.91	70.18	2.00	2.00	0.00
1,300.00	14.13	130.50	1,290.03	3,609.97	-71.12	83.27	88.65	0.00	0.00	0.00
1,400.00	14.13	130.50	1,387.01	3,512.99	-86.97	101.83	108.41	0.00	0.00	0.00
PIERRE SHALE TOP										
1,460.84	14.13	130.50	1,446.00	3,454.00	-96.62	113.12	120.44	0.00	0.00	0.00
1,500.00	14.13	130.50	1,483.98	3,416.02	-102.83	120.39	128.18	0.00	0.00	0.00
1,600.00	14.13	130.50	1,580.95	3,319.05	-118.68	138.96	147.94	0.00	0.00	0.00
1,700.00	14.13	130.50	1,677.93	3,222.07	-134.54	157.52	167.71	0.00	0.00	0.00
1,800.00	14.13	130.50	1,774.90	3,125.10	-150.39	176.08	187.47	0.00	0.00	0.00
1,900.00	14.13	130.50	1,871.88	3,028.12	-166.25	194.65	207.23	0.00	0.00	0.00
2,000.00	14.13	130.50	1,968.85	2,931.15	-182.10	213.21	227.00	0.00	0.00	0.00
2,100.00	14.13	130.50	2,065.82	2,834.18	-197.96	231.78	246.76	0.00	0.00	0.00
2,200.00	14.13	130.50	2,162.80	2,737.20	-213.81	250.34	266.53	0.00	0.00	0.00
2,300.00	14.13	130.50	2,259.77	2,640.23	-229.67	268.90	286.29	0.00	0.00	0.00
2,400.00	14.13	130.50	2,356.75	2,543.25	-245.52	287.47	306.05	0.00	0.00	0.00
2,500.00	14.13	130.50	2,453.72	2,446.28	-261.38	306.03	325.82	0.00	0.00	0.00
2,600.00	14.13	130.50	2,550.70	2,349.30	-277.24	324.60	345.58	0.00	0.00	0.00
2,700.00	14.13	130.50	2,647.67	2,252.33	-293.09	343.16	365.35	0.00	0.00	0.00
2,800.00	14.13	130.50	2,744.64	2,155.36	-308.95	361.72	385.11	0.00	0.00	0.00
2,900.00	14.13	130.50	2,841.62	2,058.38	-324.80	380.29	404.87	0.00	0.00	0.00
3,000.00	14.13	130.50	2,938.59	1,961.41	-340.66	398.85	424.64	0.00	0.00	0.00
3,100.00	14.13	130.50	3,035.57	1,864.43	-356.51	417.41	444.40	0.00	0.00	0.00
3,200.00	14.13	130.50	3,132.54	1,767.46	-372.37	435.98	464.17	0.00	0.00	0.00
3,300.00	14.13	130.50	3,229.52	1,670.48	-388.22	454.54	483.93	0.00	0.00	0.00
RICHARD SNADSTONE										
3,304.62	14.13	130.50	3,234.00	1,666.00	-388.96	455.40	484.85	0.00	0.00	0.00
3,400.00	14.13	130.50	3,326.49	1,573.51	-404.08	473.11	503.70	0.00	0.00	0.00
PARKMAN SANDSTONE										
3,429.40	14.13	130.50	3,355.00	1,545.00	-408.74	478.56	509.51	0.00	0.00	0.00
3,500.00	14.13	130.50	3,423.46	1,476.54	-419.93	491.67	523.46	0.00	0.00	0.00
3,600.00	14.13	130.50	3,520.44	1,379.56	-435.79	510.23	543.22	0.00	0.00	0.00
3,700.00	14.13	130.50	3,617.41	1,282.59	-451.64	528.80	562.99	0.00	0.00	0.00
3,800.00	14.13	130.50	3,714.39	1,185.61	-467.50	547.36	582.75	0.00	0.00	0.00
3,900.00	14.13	130.50	3,811.36	1,088.64	-483.35	565.93	602.52	0.00	0.00	0.00
4,000.00	14.13	130.50	3,908.33	991.67	-499.21	584.49	622.28	0.00	0.00	0.00

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Well:	SHULL FED 31-32-10HN	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)
4,100.00	14.13	130.50	4,005.31	894.69	-515.06	603.05	642.04	0.00	0.00	0.00
SUSSEX SANDSTONE										
4,133.71	14.13	130.50	4,038.00	862.00	-520.41	609.31	648.71	0.00	0.00	0.00
4,200.00	14.13	130.50	4,102.28	797.72	-530.92	621.62	661.81	0.00	0.00	0.00
4,300.00	14.13	130.50	4,199.26	700.74	-546.77	640.18	681.57	0.00	0.00	0.00
4,400.00	14.13	130.50	4,296.23	603.77	-562.63	658.74	701.34	0.00	0.00	0.00
4,500.00	14.13	130.50	4,393.21	506.79	-578.49	677.31	721.10	0.00	0.00	0.00
4,600.00	14.13	130.50	4,490.18	409.82	-594.34	695.87	740.86	0.00	0.00	0.00
SHANNON SANDSTONE										
4,637.97	14.13	130.50	4,527.00	373.00	-600.36	702.92	748.37	0.00	0.00	0.00
4,700.00	14.13	130.50	4,587.15	312.85	-610.20	714.44	760.63	0.00	0.00	0.00
4,800.00	14.13	130.50	4,684.13	215.87	-626.05	733.00	780.39	0.00	0.00	0.00
END OF TANGENT										
4,840.76	14.13	130.50	4,723.65	176.35	-632.51	740.57	788.45	0.00	0.00	0.00
4,900.00	12.95	130.50	4,781.25	118.75	-641.52	751.11	799.67	2.00	-2.00	0.00
5,000.00	10.95	130.50	4,879.08	20.92	-654.96	766.85	816.43	2.00	-2.00	0.00
5,100.00	8.95	130.50	4,977.57	-77.57	-666.18	779.98	830.41	2.00	-2.00	0.00
5,200.00	6.95	130.50	5,076.60	-176.60	-675.16	790.49	841.60	2.00	-2.00	0.00
5,300.00	4.95	130.50	5,176.06	-276.06	-681.88	798.37	849.99	2.00	-2.00	0.00
5,400.00	2.95	130.50	5,275.82	-375.82	-686.35	803.60	855.56	2.00	-2.00	0.00
5,500.00	0.95	130.50	5,375.76	-475.76	-688.56	806.18	858.31	2.00	-2.00	0.00
EOD TO VERTICAL										
5,547.29	0.00	0.00	5,423.04	-523.04	-688.81	806.48	858.62	2.00	-2.00	0.00
5,600.00	0.00	0.00	5,475.75	-575.75	-688.81	806.48	858.62	0.00	0.00	0.00
KOP (10°/100ft BUR)										
5,647.29	0.00	0.00	5,523.04	-623.04	-688.81	806.48	858.62	0.00	0.00	0.00
5,700.00	5.27	89.79	5,575.68	-675.68	-688.80	808.90	861.04	10.00	10.00	0.00
5,800.00	15.27	89.79	5,673.95	-773.95	-688.74	826.71	878.79	10.00	10.00	0.00
5,900.00	25.27	89.79	5,767.64	-867.64	-688.61	861.31	913.27	10.00	10.00	0.00
6,000.00	35.27	89.79	5,853.89	-953.89	-688.42	911.66	963.44	10.00	10.00	0.00
SHARON SPRINGS										
6,088.61	44.13	89.79	5,922.00	-1,022.00	-688.22	968.20	1,019.79	10.00	10.00	0.00
6,100.00	45.27	89.79	5,930.10	-1,030.10	-688.19	976.22	1,027.78	10.00	10.00	0.00
NIOBRARA A CHALK										
6,188.01	54.07	89.79	5,987.00	-1,087.00	-687.94	1,043.25	1,094.57	10.00	10.00	0.00
6,200.00	55.27	89.79	5,993.93	-1,093.93	-687.91	1,053.03	1,104.32	10.00	10.00	0.00
NIOBRARA A CHALK BASE										
6,242.84	59.56	89.79	6,017.00	-1,117.00	-687.78	1,089.12	1,140.29	10.00	10.00	0.00
6,300.00	65.27	89.79	6,043.46	-1,143.46	-687.59	1,139.75	1,190.75	10.00	10.00	0.00
NIOBRARA B1 CHALK TOP										
6,334.67	68.74	89.79	6,057.00	-1,157.00	-687.47	1,171.66	1,222.55	10.00	10.00	0.00
NIOBRARA B1 CHALK BASE										
6,388.00	74.07	89.79	6,074.00	-1,174.00	-687.29	1,222.19	1,272.90	10.00	10.00	0.00
6,400.00	75.27	89.79	6,077.17	-1,177.17	-687.25	1,233.76	1,284.44	10.00	10.00	0.00
NIOBRARA B2 CHALK TOP										
6,464.30	81.70	89.79	6,090.00	-1,190.00	-687.02	1,296.74	1,347.19	10.00	10.00	0.00
6,500.00	85.27	89.79	6,094.05	-1,194.05	-686.89	1,332.20	1,382.53	10.00	10.00	0.00
HZ LP: 1085ft FSL & 2140ft FEL of Sec 32										
6,547.28	90.00	89.79	6,096.00	-1,196.00	-686.71	1,379.43	1,429.60	10.00	10.00	0.00
6,600.00	90.00	89.79	6,096.00	-1,196.00	-686.52	1,432.15	1,482.13	0.00	0.00	0.00
6,700.00	90.00	89.79	6,096.00	-1,196.00	-686.15	1,532.15	1,581.79	0.00	0.00	0.00
6,800.00	90.00	89.79	6,096.00	-1,196.00	-685.79	1,632.15	1,681.44	0.00	0.00	0.00

Planning Report



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Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	WELL @ 4900.00usft (Original Well Elev)
Site:	NE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	SHULL FED 31-32-10HN	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)
6,900.00	90.00	89.79	6,096.00	-1,196.00	-685.42	1,732.14	1,781.10	0.00	0.00	0.00
7,000.00	90.00	89.79	6,096.01	-1,196.01	-685.06	1,832.14	1,880.75	0.00	0.00	0.00
7,100.00	90.00	89.79	6,096.01	-1,196.01	-684.69	1,932.14	1,980.41	0.00	0.00	0.00
7,200.00	90.00	89.79	6,096.01	-1,196.01	-684.33	2,032.14	2,080.06	0.00	0.00	0.00
7,300.00	90.00	89.79	6,096.01	-1,196.01	-683.96	2,132.14	2,179.72	0.00	0.00	0.00
7,400.00	90.00	89.79	6,096.01	-1,196.01	-683.60	2,232.14	2,279.37	0.00	0.00	0.00
7,500.00	90.00	89.79	6,096.01	-1,196.01	-683.23	2,332.14	2,379.02	0.00	0.00	0.00
7,600.00	90.00	89.79	6,096.01	-1,196.01	-682.87	2,432.14	2,478.68	0.00	0.00	0.00
7,700.00	90.00	89.79	6,096.01	-1,196.01	-682.50	2,532.14	2,578.33	0.00	0.00	0.00
7,800.00	90.00	89.79	6,096.01	-1,196.01	-682.14	2,632.14	2,677.99	0.00	0.00	0.00
7,900.00	90.00	89.79	6,096.01	-1,196.01	-681.77	2,732.14	2,777.64	0.00	0.00	0.00
8,000.00	90.00	89.79	6,096.01	-1,196.01	-681.41	2,832.14	2,877.30	0.00	0.00	0.00
8,100.00	90.00	89.79	6,096.02	-1,196.02	-681.04	2,932.14	2,976.95	0.00	0.00	0.00
8,200.00	90.00	89.79	6,096.02	-1,196.02	-680.68	3,032.14	3,076.61	0.00	0.00	0.00
8,300.00	90.00	89.79	6,096.02	-1,196.02	-680.32	3,132.14	3,176.26	0.00	0.00	0.00
8,400.00	90.00	89.79	6,096.02	-1,196.02	-679.95	3,232.13	3,275.92	0.00	0.00	0.00
8,500.00	90.00	89.79	6,096.02	-1,196.02	-679.59	3,332.13	3,375.57	0.00	0.00	0.00
8,600.00	90.00	89.79	6,096.02	-1,196.02	-679.23	3,432.13	3,475.23	0.00	0.00	0.00
8,700.00	90.00	89.79	6,096.02	-1,196.02	-678.86	3,532.13	3,574.88	0.00	0.00	0.00
8,800.00	90.00	89.79	6,096.02	-1,196.02	-678.50	3,632.13	3,674.54	0.00	0.00	0.00
8,900.00	90.00	89.79	6,096.02	-1,196.02	-678.14	3,732.13	3,774.19	0.00	0.00	0.00
9,000.00	90.00	89.79	6,096.02	-1,196.02	-677.77	3,832.13	3,873.85	0.00	0.00	0.00
9,100.00	90.00	89.79	6,096.02	-1,196.02	-677.41	3,932.13	3,973.50	0.00	0.00	0.00
9,200.00	90.00	89.79	6,096.02	-1,196.02	-677.05	4,032.13	4,073.16	0.00	0.00	0.00
9,300.00	90.00	89.79	6,096.02	-1,196.02	-676.68	4,132.13	4,172.81	0.00	0.00	0.00
9,400.00	90.00	89.79	6,096.02	-1,196.02	-676.32	4,232.13	4,272.47	0.00	0.00	0.00
9,500.00	90.00	89.79	6,096.02	-1,196.02	-675.96	4,332.13	4,372.12	0.00	0.00	0.00
9,600.00	90.00	89.79	6,096.02	-1,196.02	-675.60	4,432.13	4,471.78	0.00	0.00	0.00
9,700.00	90.00	89.79	6,096.02	-1,196.02	-675.24	4,532.13	4,571.43	0.00	0.00	0.00
9,800.00	90.00	89.79	6,096.02	-1,196.02	-674.87	4,632.13	4,671.09	0.00	0.00	0.00
9,900.00	90.00	89.79	6,096.02	-1,196.02	-674.51	4,732.12	4,770.74	0.00	0.00	0.00
10,000.00	90.00	89.79	6,096.02	-1,196.02	-674.15	4,832.12	4,870.39	0.00	0.00	0.00
10,100.00	90.00	89.79	6,096.02	-1,196.02	-673.79	4,932.12	4,970.05	0.00	0.00	0.00
10,200.00	90.00	89.79	6,096.02	-1,196.02	-673.43	5,032.12	5,069.70	0.00	0.00	0.00
10,300.00	90.00	89.79	6,096.02	-1,196.02	-673.07	5,132.12	5,169.36	0.00	0.00	0.00
10,400.00	90.00	89.79	6,096.02	-1,196.02	-672.71	5,232.12	5,269.01	0.00	0.00	0.00
10,500.00	90.00	89.79	6,096.02	-1,196.02	-672.34	5,332.12	5,368.67	0.00	0.00	0.00
10,600.00	90.00	89.79	6,096.02	-1,196.02	-671.98	5,432.12	5,468.32	0.00	0.00	0.00
10,700.00	90.00	89.79	6,096.02	-1,196.02	-671.62	5,532.12	5,567.98	0.00	0.00	0.00
10,800.00	90.00	89.79	6,096.02	-1,196.02	-671.26	5,632.12	5,667.63	0.00	0.00	0.00
10,900.00	90.00	89.79	6,096.02	-1,196.02	-670.90	5,732.12	5,767.29	0.00	0.00	0.00
11,000.00	90.00	89.79	6,096.02	-1,196.02	-670.54	5,832.12	5,866.94	0.00	0.00	0.00
11,100.00	90.00	89.79	6,096.02	-1,196.02	-670.18	5,932.12	5,966.60	0.00	0.00	0.00
11,200.00	90.00	89.79	6,096.02	-1,196.02	-669.82	6,032.12	6,066.26	0.00	0.00	0.00
11,300.00	90.00	89.79	6,096.02	-1,196.02	-669.46	6,132.12	6,165.91	0.00	0.00	0.00
11,400.00	90.00	89.79	6,096.02	-1,196.02	-669.10	6,232.11	6,265.57	0.00	0.00	0.00
11,500.00	90.00	89.79	6,096.02	-1,196.02	-668.74	6,332.11	6,365.22	0.00	0.00	0.00
11,600.00	90.00	89.79	6,096.02	-1,196.02	-668.38	6,432.11	6,464.88	0.00	0.00	0.00
11,700.00	90.00	89.79	6,096.02	-1,196.02	-668.02	6,532.11	6,564.53	0.00	0.00	0.00
11,800.00	90.00	89.79	6,096.02	-1,196.02	-667.66	6,632.11	6,664.19	0.00	0.00	0.00
11,900.00	90.00	89.79	6,096.02	-1,196.02	-667.31	6,732.11	6,763.84	0.00	0.00	0.00
12,000.00	90.00	89.79	6,096.01	-1,196.01	-666.95	6,832.11	6,863.50	0.00	0.00	0.00
12,100.00	90.00	89.79	6,096.01	-1,196.01	-666.59	6,932.11	6,963.15	0.00	0.00	0.00
12,200.00	90.00	89.79	6,096.01	-1,196.01	-666.23	7,032.11	7,062.81	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well SHULL FED 31-32-10HN
Company:	MALLARD EXPLORATION	TVD Reference:	WELL @ 4900.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	WELL @ 4900.00usft (Original Well Elev)
Site:	NE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	SHULL FED 31-32-10HN	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)
12,300.00	90.00	89.79	6,096.01	-1,196.01	-665.87	7,132.11	7,162.46	0.00	0.00	0.00
12,400.00	90.00	89.79	6,096.01	-1,196.01	-665.51	7,232.11	7,262.12	0.00	0.00	0.00
12,500.00	90.00	89.79	6,096.01	-1,196.01	-665.15	7,332.11	7,361.77	0.00	0.00	0.00
12,600.00	90.00	89.79	6,096.01	-1,196.01	-664.80	7,432.11	7,461.43	0.00	0.00	0.00
12,700.00	90.00	89.79	6,096.01	-1,196.01	-664.44	7,532.11	7,561.08	0.00	0.00	0.00
12,800.00	90.00	89.79	6,096.01	-1,196.01	-664.08	7,632.11	7,660.74	0.00	0.00	0.00
12,900.00	90.00	89.80	6,096.01	-1,196.01	-663.72	7,732.11	7,760.39	0.00	0.00	0.00
13,000.00	90.00	89.80	6,096.01	-1,196.01	-663.36	7,832.10	7,860.05	0.00	0.00	0.00
13,100.00	90.00	89.80	6,096.00	-1,196.00	-663.01	7,932.10	7,959.70	0.00	0.00	0.00
13,200.00	90.00	89.80	6,096.00	-1,196.00	-662.65	8,032.10	8,059.36	0.00	0.00	0.00
13,300.00	90.00	89.80	6,096.00	-1,196.00	-662.29	8,132.10	8,159.01	0.00	0.00	0.00
13,400.00	90.00	89.80	6,096.00	-1,196.00	-661.93	8,232.10	8,258.67	0.00	0.00	0.00
BHL: 1085ft FSL & 460ft FEL of Sec 32										
13,475.24	90.00	89.80	6,096.00	-1,196.00	-661.67	8,307.34	8,333.65	0.00	0.00	0.00

Formations						
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
508.00	508.00	FOX HILLS BASE				
1,460.84	1,446.00	PIERRE SHALE TOP				
3,304.62	3,234.00	RICHARD SNADSTONE				
3,429.40	3,355.00	PARKMAN SANDSTONE				
4,133.71	4,038.00	SUSSEX SANDSTONE				
4,637.97	4,527.00	SHANNON SANDSTONE				
6,088.61	5,922.00	SHARON SPRINGS				
6,188.01	5,987.00	NIOBRARA A CHALK				
6,242.84	6,017.00	NIOBRARA A CHALK BASE				
6,334.67	6,057.00	NIOBRARA B1 CHALK TOP				
6,388.00	6,074.00	NIOBRARA B1 CHALK BASE				
6,464.30	6,090.00	NIOBRARA B2 CHALK TOP				

Plan Annotations				
MD (usft)	TVD (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
0.00	0.00	0.00	0.00	SHL: 1753ft FSL & 1778ft FWL of Sec 31
500.00	500.00	0.00	0.00	START NUDGE (2"/100ft BUR)
1,206.53	1,199.39	-56.30	65.91	EOB TO 14.13° INC
4,840.76	4,723.65	-632.51	740.57	END OF TANGENT
5,547.29	5,423.04	-688.81	806.48	EOD TO VERTICAL
5,647.29	5,523.04	-688.81	806.48	KOP (10"/100ft BUR)
6,547.28	6,096.00	-686.71	1,379.43	HZ LP: 1085ft FSL & 2140ft FEL of Sec 32
13,475.24	6,096.00	-661.67	8,307.34	BHL: 1085ft FSL & 460ft FEL of Sec 32