

MALLARD EXPLORATION

WELD COUNTY, COLORADO (NAD 83)

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

ANDERSON FED 6-5-3HC

ORIGINAL WELLBORE

25 July, 2019

Plan: PROPOSAL #3





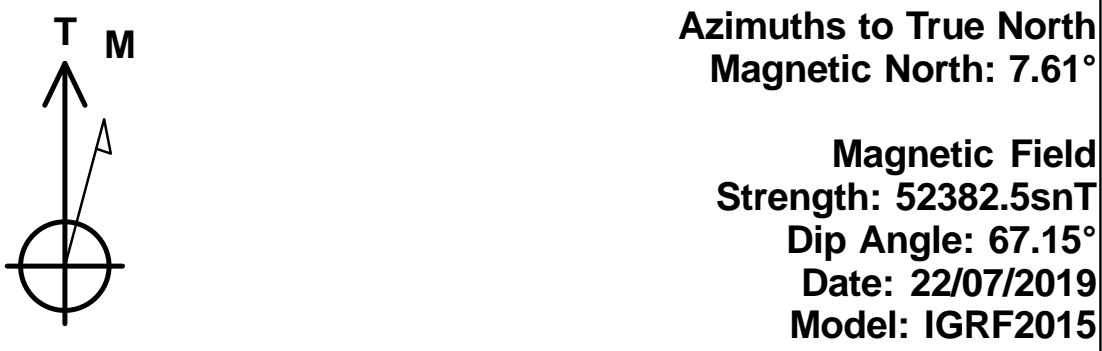
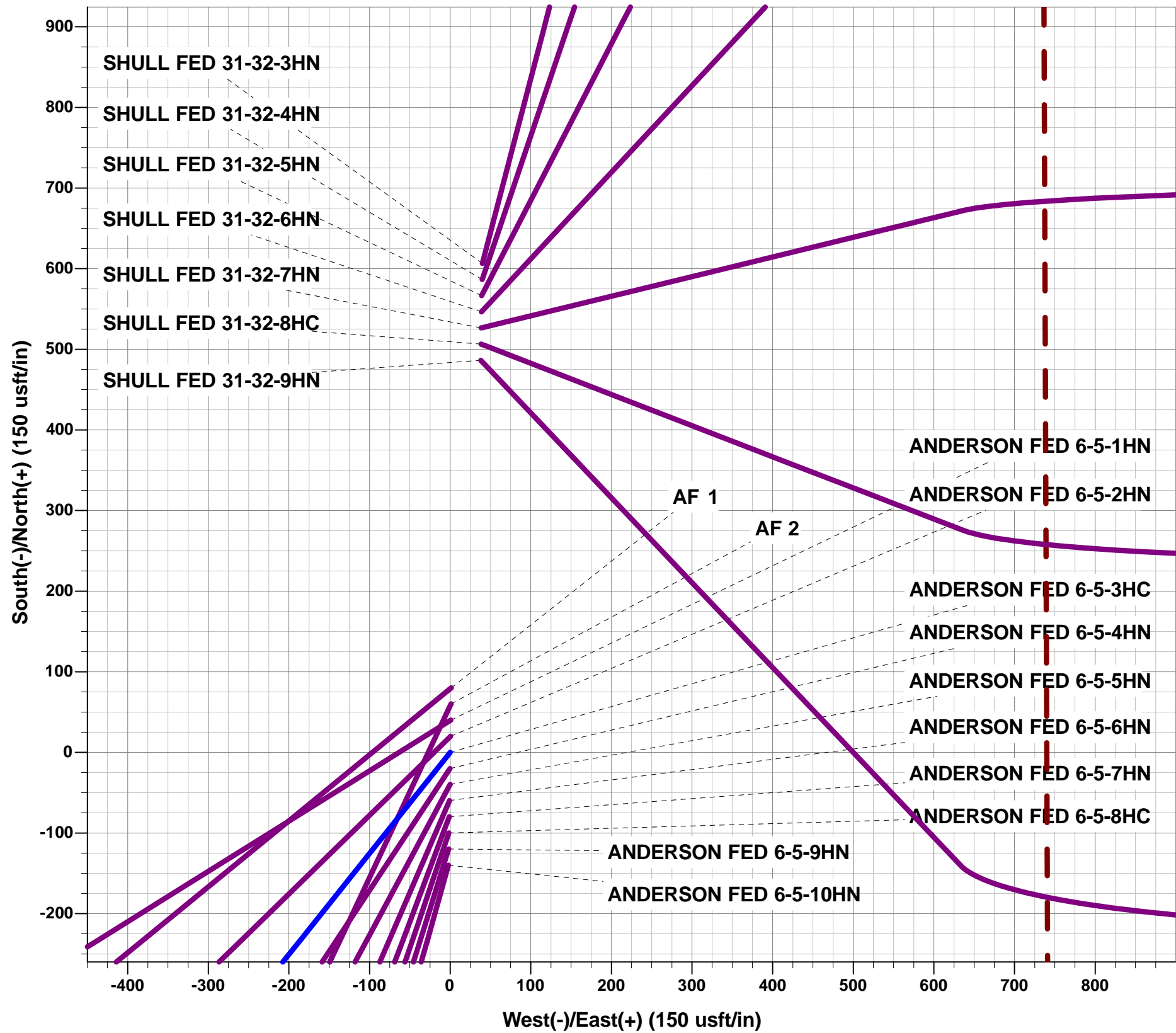
Project: WELD COUNTY, COLORADO (NAD 83)
Site: SE SW SEC. 31 T9N R59W 6th P.M.
Well: ANDERSON FED 6-5-3HC
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #3

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: 662ft FSL & 1911ft FWL of Sec 31
800.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (3°/100ft BUR)
1649.19	1680.00	26.40	218.58	-155.70	-124.21	-87.16	199.18	EOB TO 26.4° INC
5657.80	6155.34	26.40	218.58	-1711.24	-1365.18	-957.91	2189.08	KOP (10°/100ft DGLG)
6340.00	7216.27	90.00	90.01	-1976.16	-814.74	-362.86	2899.42	LP *NEW*: 1330ft FNL & 600ft FWL of Sec 6
6340.00	16859.39	90.00	90.01	-1978.54	8828.37	9047.36	12542.54	BHL: 1330ft FNL & 300ft FEL of Sec 5

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
LP *NEW* - ANDERSON FED 6-5-3HC (P3)	6340.00	-1976.16	-814.74	40.695652	-104.026362
BHL - ANDERSON FED 6-5-3HC (P3)	6340.00	-1978.54	8828.37	40.695641	-103.991587

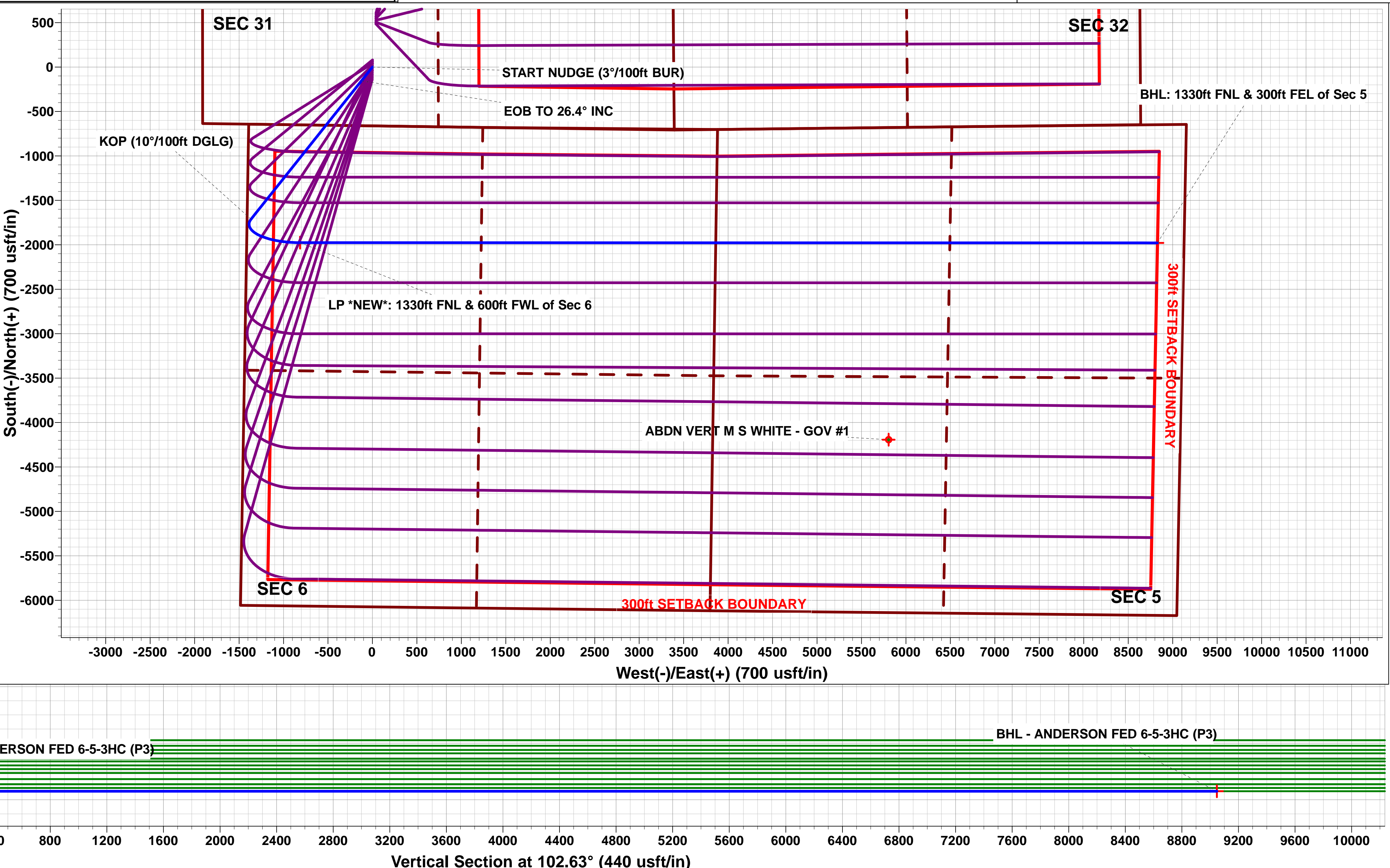
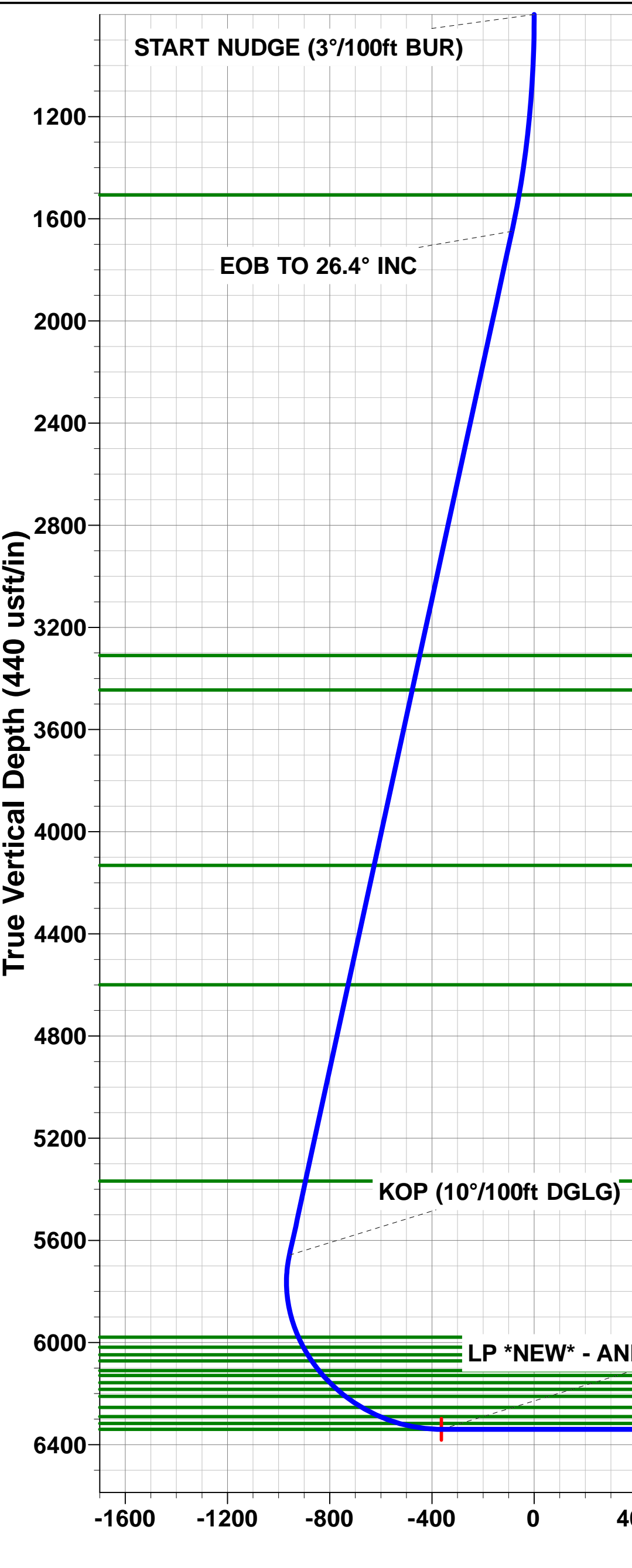
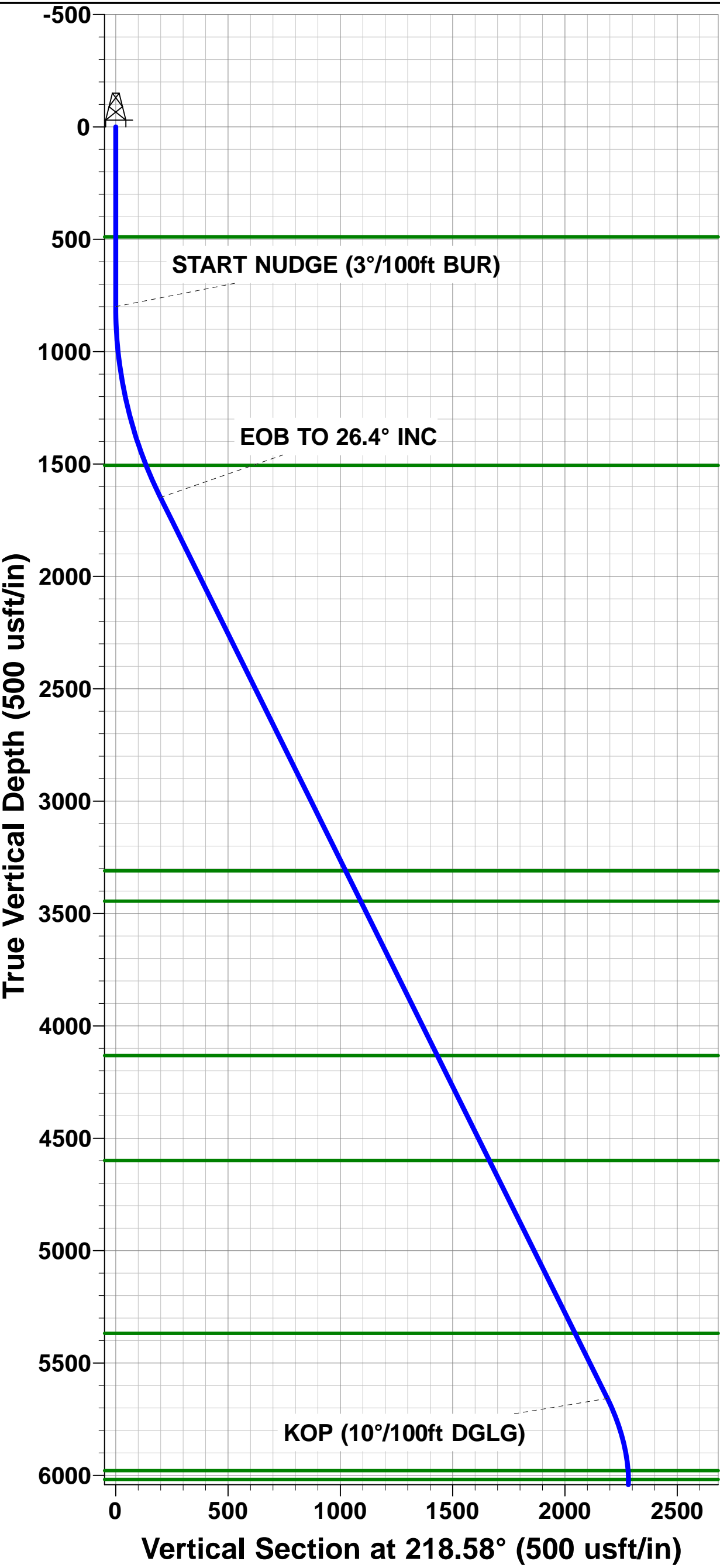


FORMATION TOP DETAILS

TVDPath	MDPath	Formation
490.00	490.00	Fox Hills Base
1507.00	1524.23	Pierre Shale Top
3310.00	3534.18	Richard Sandstone
3445.00	3684.90	Parkman Sandstone
4132.00	4451.89	Sussex Sandstone
4599.00	4973.26	Shannon Sandstone
5368.00	5831.80	TeePee Buttes
5979.00	6505.41	Sharon Springs
6018.00	6550.28	Niobrara Top
6048.00	6585.84	Niobrara A Chalk
6072.00	6615.12	Niobrara A Chalk Base
6110.00	6663.36	Niobrara B1 Chalk Top
6129.00	6688.54	Niobrara B1 Chalk Base
6157.00	6727.28	Niobrara B2 Chalk Top
6183.00	6765.43	Niobrara B2 Chalk Base
6211.00	6809.58	Niobrara C Chalk Top
6254.00	6886.61	Niobrara C Chalk Base
6290.00	6966.39	Niobrara D Chalk Top
6317.00	7047.52	Ft. Hays
6340.00	7216.27	Codell (Target)

PROPOSED LOCAL COORDINATES:

SHL: 662ft FSL & 1911ft FWL of Sec 31
HZ LP *new*: 1330ft FNL & 600ft FWL of Sec 6
BHL: 1330ft FNL & 300ft FEL of Sec 5



Planning Report



Database:	Database 1	Local Co-ordinate Reference:	Well ANDERSON FED 6-5-3HC
Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4903.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4903.00usft
Site:	SE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	ANDERSON FED 6-5-3HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3		

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	SE SW SEC. 31 T9N R59W 6th P.M.		
Site Position:		Northing:	1,501,513.53 usft
From:	Lat/Long	Easting:	3,409,242.57 usft
Position Uncertainty:	0.00 usft	Slot Radius:	1.10 ft
		Latitude:	40.700697
		Longitude:	-104.023987
		Grid Convergence:	0.95 °

Well	ANDERSON FED 6-5-3HC		
Well Position	+N-S	138.07 usft	Northing:
	+E-W	156.11 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	40.701076
		Longitude:	-104.023424
		Ground Level:	4,878.00 usft

Wellbore	ORIGINAL WELLBORE				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	22/07/2019	7.61	67.15	52,382

Design	PROPOSAL #3			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)
	6,340.00	0.00	0.00	102.63

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	-4,903.00	0.00	0.00	0.00	0.00	0.00	0.00	
800.00	0.00	0.00	800.00	-4,103.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,680.00	26.40	218.58	1,649.20	-3,253.80	-155.70	-124.21	3.00	3.00	0.00	218.58	
6,155.34	26.40	218.58	5,657.80	754.80	-1,711.24	-1,365.18	0.00	0.00	0.00	0.00	
7,216.27	90.00	90.01	6,340.00	1,437.00	-1,976.16	-814.74	10.00	5.99	-12.12	-125.53	LP *NEW* - ANDEF
16,859.39	90.00	90.01	6,340.00	1,437.00	-1,978.54	8,828.37	0.00	0.00	0.00	0.00	BHL - ANDERSON

Planning Report



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Site:	SE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	ANDERSON FED 6-5-3HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3		

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: 662ft FSL & 1911ft FWL of Sec 31										
0.00	0.00	0.00	0.00	4,903.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	4,803.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	4,703.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	4,603.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	4,503.00	0.00	0.00	0.00	0.00	0.00	0.00
Fox Hills Base										
490.00	0.00	0.00	490.00	4,413.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	4,403.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	4,303.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	4,203.00	0.00	0.00	0.00	0.00	0.00	0.00
START NUDGE (3°/100ft BUR)										
800.00	0.00	0.00	800.00	4,103.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	3.00	218.58	899.95	4,003.05	-2.05	-1.63	-1.15	3.00	3.00	0.00
1,000.00	6.00	218.58	999.63	3,903.37	-8.18	-6.52	-4.58	3.00	3.00	0.00
1,100.00	9.00	218.58	1,098.77	3,804.23	-18.38	-14.66	-10.29	3.00	3.00	0.00
1,200.00	12.00	218.58	1,197.08	3,705.92	-32.63	-26.03	-18.26	3.00	3.00	0.00
1,300.00	15.00	218.58	1,294.31	3,608.69	-50.87	-40.58	-28.48	3.00	3.00	0.00
1,400.00	18.00	218.58	1,390.18	3,512.82	-73.07	-58.29	-40.90	3.00	3.00	0.00
1,500.00	21.00	218.58	1,484.43	3,418.57	-99.16	-79.11	-55.51	3.00	3.00	0.00
Pierre Shale Top										
1,524.23	21.73	218.58	1,507.00	3,396.00	-106.06	-84.61	-59.37	3.00	3.00	0.00
1,600.00	24.00	218.58	1,576.81	3,326.19	-129.07	-102.97	-72.25	3.00	3.00	0.00
EOB TO 26.4° INC										
1,680.00	26.40	218.58	1,649.19	3,253.81	-155.70	-124.21	-87.16	3.00	3.00	0.00
1,700.00	26.40	218.58	1,667.10	3,235.90	-162.65	-129.76	-91.05	0.00	0.00	0.00
1,800.00	26.40	218.58	1,756.68	3,146.32	-197.41	-157.49	-110.50	0.00	0.00	0.00
1,900.00	26.40	218.58	1,846.25	3,056.75	-232.17	-185.22	-129.96	0.00	0.00	0.00
2,000.00	26.40	218.58	1,935.82	2,967.18	-266.93	-212.95	-149.42	0.00	0.00	0.00
2,100.00	26.40	218.58	2,025.39	2,877.61	-301.68	-240.67	-168.87	0.00	0.00	0.00
2,200.00	26.40	218.58	2,114.96	2,788.04	-336.44	-268.40	-188.33	0.00	0.00	0.00
2,300.00	26.40	218.58	2,204.53	2,698.47	-371.20	-296.13	-207.79	0.00	0.00	0.00
2,400.00	26.40	218.58	2,294.10	2,608.90	-405.96	-323.86	-227.24	0.00	0.00	0.00
2,500.00	26.40	218.58	2,383.67	2,519.33	-440.72	-351.59	-246.70	0.00	0.00	0.00
2,600.00	26.40	218.58	2,473.24	2,429.76	-475.47	-379.32	-266.16	0.00	0.00	0.00
2,700.00	26.40	218.58	2,562.82	2,340.18	-510.23	-407.05	-285.61	0.00	0.00	0.00
2,800.00	26.40	218.58	2,652.39	2,250.61	-544.99	-434.78	-305.07	0.00	0.00	0.00
2,900.00	26.40	218.58	2,741.96	2,161.04	-579.75	-462.51	-324.53	0.00	0.00	0.00
3,000.00	26.40	218.58	2,831.53	2,071.47	-614.51	-490.24	-343.98	0.00	0.00	0.00
3,100.00	26.40	218.58	2,921.10	1,981.90	-649.26	-517.96	-363.44	0.00	0.00	0.00
3,200.00	26.40	218.58	3,010.67	1,892.33	-684.02	-545.69	-382.90	0.00	0.00	0.00
3,300.00	26.40	218.58	3,100.24	1,802.76	-718.78	-573.42	-402.35	0.00	0.00	0.00
3,400.00	26.40	218.58	3,189.81	1,713.19	-753.54	-601.15	-421.81	0.00	0.00	0.00
3,500.00	26.40	218.58	3,279.38	1,623.62	-788.30	-628.88	-441.27	0.00	0.00	0.00
Richard Sandstone										
3,534.18	26.40	218.58	3,310.00	1,593.00	-800.18	-638.36	-447.92	0.00	0.00	0.00
3,600.00	26.40	218.58	3,368.96	1,534.04	-823.06	-656.61	-460.72	0.00	0.00	0.00
Parkman Sandstone										
3,684.90	26.40	218.58	3,445.00	1,458.00	-852.56	-680.15	-477.24	0.00	0.00	0.00
3,700.00	26.40	218.58	3,458.53	1,444.47	-857.81	-684.34	-480.18	0.00	0.00	0.00
3,800.00	26.40	218.58	3,548.10	1,354.90	-892.57	-712.07	-499.64	0.00	0.00	0.00
3,900.00	26.40	218.58	3,637.67	1,265.33	-927.33	-739.80	-519.09	0.00	0.00	0.00
4,000.00	26.40	218.58	3,727.24	1,175.76	-962.09	-767.53	-538.55	0.00	0.00	0.00

Planning Report



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Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4903.00usft
Site:	SE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	ANDERSON FED 6-5-3HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3		

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	26.40	218.58	3,816.81	1,086.19	-996.85	-795.25	-558.01	0.00	0.00	0.00
4,200.00	26.40	218.58	3,906.38	996.62	-1,031.60	-822.98	-577.46	0.00	0.00	0.00
4,300.00	26.40	218.58	3,995.95	907.05	-1,066.36	-850.71	-596.92	0.00	0.00	0.00
4,400.00	26.40	218.58	4,085.52	817.48	-1,101.12	-878.44	-616.38	0.00	0.00	0.00
Sussex Sandstone										
4,451.89	26.40	218.58	4,132.00	771.00	-1,119.16	-892.83	-626.47	0.00	0.00	0.00
4,500.00	26.40	218.58	4,175.09	727.91	-1,135.88	-906.17	-635.83	0.00	0.00	0.00
4,600.00	26.40	218.58	4,264.67	638.33	-1,170.64	-933.90	-655.29	0.00	0.00	0.00
4,700.00	26.40	218.58	4,354.24	548.76	-1,205.39	-961.63	-674.75	0.00	0.00	0.00
4,800.00	26.40	218.58	4,443.81	459.19	-1,240.15	-989.36	-694.21	0.00	0.00	0.00
4,900.00	26.40	218.58	4,533.38	369.62	-1,274.91	-1,017.09	-713.66	0.00	0.00	0.00
Shannon Sandstone										
4,973.26	26.40	218.58	4,599.00	304.00	-1,300.38	-1,037.40	-727.92	0.00	0.00	0.00
5,000.00	26.40	218.58	4,622.95	280.05	-1,309.67	-1,044.82	-733.12	0.00	0.00	0.00
5,100.00	26.40	218.58	4,712.52	190.48	-1,344.43	-1,072.54	-752.58	0.00	0.00	0.00
5,200.00	26.40	218.58	4,802.09	100.91	-1,379.19	-1,100.27	-772.03	0.00	0.00	0.00
5,300.00	26.40	218.58	4,891.66	11.34	-1,413.94	-1,128.00	-791.49	0.00	0.00	0.00
5,400.00	26.40	218.58	4,981.23	-78.23	-1,448.70	-1,155.73	-810.95	0.00	0.00	0.00
5,500.00	26.40	218.58	5,070.81	-167.81	-1,483.46	-1,183.46	-830.40	0.00	0.00	0.00
5,600.00	26.40	218.58	5,160.38	-257.38	-1,518.22	-1,211.19	-849.86	0.00	0.00	0.00
5,700.00	26.40	218.58	5,249.95	-346.95	-1,552.98	-1,238.92	-869.32	0.00	0.00	0.00
5,800.00	26.40	218.58	5,339.52	-436.52	-1,587.73	-1,266.65	-888.77	0.00	0.00	0.00
TeePee Buttes										
5,831.80	26.40	218.58	5,368.00	-465.00	-1,598.79	-1,275.46	-894.96	0.00	0.00	0.00
5,900.00	26.40	218.58	5,429.09	-526.09	-1,622.49	-1,294.38	-908.23	0.00	0.00	0.00
6,000.00	26.40	218.58	5,518.66	-615.66	-1,657.25	-1,322.11	-927.69	0.00	0.00	0.00
6,100.00	26.40	218.58	5,608.23	-705.23	-1,692.01	-1,349.83	-947.14	0.00	0.00	0.00
KOP (10°/100ft DGLG)										
6,155.34	26.40	218.58	5,657.80	-754.80	-1,711.24	-1,365.18	-957.91	0.00	0.00	0.00
6,200.00	24.06	209.64	5,698.21	-795.21	-1,726.93	-1,375.88	-964.92	10.00	-5.24	-20.02
6,300.00	21.27	184.50	5,790.70	-887.70	-1,762.82	-1,387.41	-968.33	10.00	-2.79	-25.14
6,400.00	22.73	157.88	5,883.64	-980.64	-1,798.89	-1,381.55	-954.71	10.00	1.46	-26.62
6,500.00	27.78	137.46	5,974.22	-1,071.22	-1,834.06	-1,358.46	-924.49	10.00	5.05	-20.41
Sharon Springs										
6,505.41	28.13	136.57	5,979.00	-1,076.00	-1,835.91	-1,356.73	-922.40	10.00	6.36	-16.47
Niobrara Top										
6,550.28	31.18	129.91	6,018.00	-1,115.00	-1,851.05	-1,340.54	-903.29	10.00	6.80	-14.84
Niobrara A Chalk										
6,585.84	33.80	125.44	6,048.00	-1,145.00	-1,862.70	-1,325.42	-885.99	10.00	7.38	-12.57
6,600.00	34.89	123.83	6,059.69	-1,156.69	-1,867.24	-1,318.84	-878.58	10.00	7.67	-11.37
Niobrara A Chalk Base										
6,615.12	36.07	122.21	6,072.00	-1,169.00	-1,872.02	-1,311.49	-870.36	10.00	7.82	-10.74
Niobrara B1 Chalk Top										
6,663.36	39.97	117.60	6,110.00	-1,207.00	-1,886.77	-1,285.72	-841.99	10.00	8.09	-9.57
Niobrara B1 Chalk Base										
6,688.54	42.07	115.48	6,129.00	-1,226.00	-1,894.15	-1,270.94	-825.95	10.00	8.34	-8.40
6,700.00	43.04	114.57	6,137.44	-1,234.44	-1,897.43	-1,263.91	-818.38	10.00	8.45	-7.91
Niobrara B2 Chalk Top										
6,727.28	45.37	112.54	6,157.00	-1,254.00	-1,905.03	-1,246.47	-799.70	10.00	8.55	-7.45
Niobrara B2 Chalk Base										
6,765.43	48.69	109.96	6,183.00	-1,280.00	-1,915.12	-1,220.46	-772.11	10.00	8.69	-6.77
6,800.00	51.74	107.84	6,205.12	-1,302.12	-1,923.72	-1,195.33	-745.71	10.00	8.82	-6.13

Planning Report



Database:	Database 1	Local Co-ordinate Reference:	Well ANDERSON FED 6-5-3HC
Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4903.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4903.00usft
Site:	SE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	ANDERSON FED 6-5-3HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3		

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 C Chalk Top										
6,809.58	52.59	107.28	6,211.00	-1,308.00	-1,926.00	-1,188.12	-738.17	10.00	8.89	-5.80
Niobrara C Chalk Base										
6,886.61	59.52	103.22	6,254.00	-1,351.00	-1,942.70	-1,126.50	-674.39	10.00	9.00	-5.27
6,900.00	60.73	102.58	6,260.67	-1,357.67	-1,945.30	-1,115.19	-662.78	10.00	9.09	-4.81
Niobrara D Chalk Top										
6,966.39	66.81	99.59	6,290.00	-1,387.00	-1,956.69	-1,056.78	-603.29	10.00	9.15	-4.50
7,000.00	69.90	98.18	6,302.40	-1,399.40	-1,961.51	-1,025.91	-572.12	10.00	9.21	-4.19
Ft. Hays										
7,047.52	74.30	96.28	6,317.00	-1,414.00	-1,967.19	-981.06	-527.11	10.00	9.25	-4.00
7,100.00	79.17	94.27	6,329.04	-1,426.04	-1,971.88	-930.21	-476.48	10.00	9.28	-3.82
7,200.00	88.48	90.60	6,339.78	-1,436.78	-1,976.07	-831.01	-378.75	10.00	9.31	-3.67
LP *NEW*: 1330ft FNL & 600ft FWL of Sec 6 - Codell (Target)										
7,216.27	90.00	90.01	6,340.00	-1,437.00	-1,976.16	-814.74	-362.86	10.00	9.32	-3.62
7,300.00	90.00	90.01	6,340.00	-1,437.00	-1,976.18	-731.01	-281.15	0.00	0.00	0.00
7,400.00	90.00	90.01	6,340.00	-1,437.00	-1,976.21	-631.01	-183.57	0.00	0.00	0.00
7,500.00	90.00	90.01	6,340.00	-1,437.00	-1,976.23	-531.01	-85.98	0.00	0.00	0.00
7,600.00	90.00	90.01	6,340.00	-1,437.00	-1,976.25	-431.01	11.60	0.00	0.00	0.00
7,700.00	90.00	90.01	6,340.00	-1,437.00	-1,976.28	-331.01	109.19	0.00	0.00	0.00
7,800.00	90.00	90.01	6,340.00	-1,437.00	-1,976.30	-231.01	206.77	0.00	0.00	0.00
7,900.00	90.00	90.01	6,340.00	-1,437.00	-1,976.33	-131.01	304.36	0.00	0.00	0.00
8,000.00	90.00	90.01	6,340.00	-1,437.00	-1,976.35	-31.01	401.94	0.00	0.00	0.00
8,100.00	90.00	90.01	6,340.00	-1,437.00	-1,976.38	68.99	499.53	0.00	0.00	0.00
8,200.00	90.00	90.01	6,340.00	-1,437.00	-1,976.40	168.99	597.11	0.00	0.00	0.00
8,300.00	90.00	90.01	6,340.00	-1,437.00	-1,976.43	268.99	694.70	0.00	0.00	0.00
8,400.00	90.00	90.01	6,340.00	-1,437.00	-1,976.45	368.99	792.28	0.00	0.00	0.00
8,500.00	90.00	90.01	6,340.00	-1,437.00	-1,976.48	468.99	889.86	0.00	0.00	0.00
8,600.00	90.00	90.01	6,340.00	-1,437.00	-1,976.50	568.99	987.45	0.00	0.00	0.00
8,700.00	90.00	90.01	6,340.00	-1,437.00	-1,976.53	668.99	1,085.03	0.00	0.00	0.00
8,800.00	90.00	90.01	6,340.00	-1,437.00	-1,976.55	768.99	1,182.62	0.00	0.00	0.00
8,900.00	90.00	90.01	6,340.00	-1,437.00	-1,976.58	868.99	1,280.20	0.00	0.00	0.00
9,000.00	90.00	90.01	6,340.00	-1,437.00	-1,976.60	968.99	1,377.79	0.00	0.00	0.00
9,100.00	90.00	90.01	6,340.00	-1,437.00	-1,976.62	1,068.99	1,475.37	0.00	0.00	0.00
9,200.00	90.00	90.01	6,340.00	-1,437.00	-1,976.65	1,168.99	1,572.96	0.00	0.00	0.00
9,300.00	90.00	90.01	6,340.00	-1,437.00	-1,976.67	1,268.99	1,670.54	0.00	0.00	0.00
9,400.00	90.00	90.01	6,340.00	-1,437.00	-1,976.70	1,368.99	1,768.13	0.00	0.00	0.00
9,500.00	90.00	90.01	6,340.00	-1,437.00	-1,976.72	1,468.99	1,865.71	0.00	0.00	0.00
9,600.00	90.00	90.01	6,340.00	-1,437.00	-1,976.75	1,568.99	1,963.30	0.00	0.00	0.00
9,700.00	90.00	90.01	6,340.00	-1,437.00	-1,976.77	1,668.99	2,060.88	0.00	0.00	0.00
9,800.00	90.00	90.01	6,340.00	-1,437.00	-1,976.80	1,768.99	2,158.47	0.00	0.00	0.00
9,900.00	90.00	90.01	6,340.00	-1,437.00	-1,976.82	1,868.99	2,256.05	0.00	0.00	0.00
10,000.00	90.00	90.01	6,340.00	-1,437.00	-1,976.85	1,968.99	2,353.64	0.00	0.00	0.00
10,100.00	90.00	90.01	6,340.00	-1,437.00	-1,976.87	2,068.99	2,451.22	0.00	0.00	0.00
10,200.00	90.00	90.01	6,340.00	-1,437.00	-1,976.90	2,168.99	2,548.81	0.00	0.00	0.00
10,300.00	90.00	90.01	6,340.00	-1,437.00	-1,976.92	2,268.99	2,646.39	0.00	0.00	0.00
10,400.00	90.00	90.01	6,340.00	-1,437.00	-1,976.94	2,368.99	2,743.98	0.00	0.00	0.00
10,500.00	90.00	90.01	6,340.00	-1,437.00	-1,976.97	2,468.99	2,841.56	0.00	0.00	0.00
10,600.00	90.00	90.01	6,340.00	-1,437.00	-1,976.99	2,568.99	2,939.15	0.00	0.00	0.00
10,700.00	90.00	90.01	6,340.00	-1,437.00	-1,977.02	2,668.99	3,036.73	0.00	0.00	0.00
10,800.00	90.00	90.01	6,340.00	-1,437.00	-1,977.04	2,768.99	3,134.32	0.00	0.00	0.00
10,900.00	90.00	90.01	6,340.00	-1,437.00	-1,977.07	2,868.99	3,231.90	0.00	0.00	0.00
11,000.00	90.00	90.01	6,340.00	-1,437.00	-1,977.09	2,968.99	3,329.49	0.00	0.00	0.00
11,100.00	90.00	90.01	6,340.00	-1,437.00	-1,977.12	3,068.99	3,427.07	0.00	0.00	0.00
11,200.00	90.00	90.01	6,340.00	-1,437.00	-1,977.14	3,168.99	3,524.66	0.00	0.00	0.00

Planning Report



Database:	Database 1	Local Co-ordinate Reference:	Well ANDERSON FED 6-5-3HC
Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4903.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4903.00usft
Site:	SE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	ANDERSON FED 6-5-3HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3		

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)
11,300.00	90.00	90.01	6,340.00	-1,437.00	-1,977.17	3,268.99	3,622.24	0.00	0.00	0.00
11,400.00	90.00	90.01	6,340.00	-1,437.00	-1,977.19	3,368.99	3,719.83	0.00	0.00	0.00
11,500.00	90.00	90.01	6,340.00	-1,437.00	-1,977.22	3,468.99	3,817.41	0.00	0.00	0.00
11,600.00	90.00	90.01	6,340.00	-1,437.00	-1,977.24	3,568.99	3,915.00	0.00	0.00	0.00
11,700.00	90.00	90.01	6,340.00	-1,437.00	-1,977.27	3,668.99	4,012.58	0.00	0.00	0.00
11,800.00	90.00	90.01	6,340.00	-1,437.00	-1,977.29	3,768.99	4,110.17	0.00	0.00	0.00
11,900.00	90.00	90.01	6,340.00	-1,437.00	-1,977.31	3,868.99	4,207.75	0.00	0.00	0.00
12,000.00	90.00	90.01	6,340.00	-1,437.00	-1,977.34	3,968.99	4,305.34	0.00	0.00	0.00
12,100.00	90.00	90.01	6,340.00	-1,437.00	-1,977.36	4,068.99	4,402.92	0.00	0.00	0.00
12,200.00	90.00	90.01	6,340.00	-1,437.00	-1,977.39	4,168.99	4,500.51	0.00	0.00	0.00
12,300.00	90.00	90.01	6,340.00	-1,437.00	-1,977.41	4,268.99	4,598.09	0.00	0.00	0.00
12,400.00	90.00	90.01	6,340.00	-1,437.00	-1,977.44	4,368.99	4,695.68	0.00	0.00	0.00
12,500.00	90.00	90.01	6,340.00	-1,437.00	-1,977.46	4,468.99	4,793.26	0.00	0.00	0.00
12,600.00	90.00	90.01	6,340.00	-1,437.00	-1,977.49	4,568.99	4,890.85	0.00	0.00	0.00
12,700.00	90.00	90.01	6,340.00	-1,437.00	-1,977.51	4,668.99	4,988.43	0.00	0.00	0.00
12,800.00	90.00	90.01	6,340.00	-1,437.00	-1,977.54	4,768.99	5,086.02	0.00	0.00	0.00
12,900.00	90.00	90.01	6,340.00	-1,437.00	-1,977.56	4,868.99	5,183.60	0.00	0.00	0.00
13,000.00	90.00	90.01	6,340.00	-1,437.00	-1,977.59	4,968.99	5,281.19	0.00	0.00	0.00
13,100.00	90.00	90.01	6,340.00	-1,437.00	-1,977.61	5,068.99	5,378.77	0.00	0.00	0.00
13,200.00	90.00	90.01	6,340.00	-1,437.00	-1,977.64	5,168.99	5,476.36	0.00	0.00	0.00
13,300.00	90.00	90.01	6,340.00	-1,437.00	-1,977.66	5,268.99	5,573.94	0.00	0.00	0.00
13,400.00	90.00	90.01	6,340.00	-1,437.00	-1,977.68	5,368.99	5,671.53	0.00	0.00	0.00
13,500.00	90.00	90.01	6,340.00	-1,437.00	-1,977.71	5,468.99	5,769.11	0.00	0.00	0.00
13,600.00	90.00	90.01	6,340.00	-1,437.00	-1,977.73	5,568.99	5,866.69	0.00	0.00	0.00
13,700.00	90.00	90.01	6,340.00	-1,437.00	-1,977.76	5,668.99	5,964.28	0.00	0.00	0.00
13,800.00	90.00	90.01	6,340.00	-1,437.00	-1,977.78	5,768.99	6,061.86	0.00	0.00	0.00
13,900.00	90.00	90.01	6,340.00	-1,437.00	-1,977.81	5,868.99	6,159.45	0.00	0.00	0.00
14,000.00	90.00	90.01	6,340.00	-1,437.00	-1,977.83	5,968.99	6,257.03	0.00	0.00	0.00
14,100.00	90.00	90.01	6,340.00	-1,437.00	-1,977.86	6,068.99	6,354.62	0.00	0.00	0.00
14,200.00	90.00	90.01	6,340.00	-1,437.00	-1,977.88	6,168.99	6,452.20	0.00	0.00	0.00
14,300.00	90.00	90.01	6,340.00	-1,437.00	-1,977.91	6,268.99	6,549.79	0.00	0.00	0.00
14,400.00	90.00	90.01	6,340.00	-1,437.00	-1,977.93	6,368.99	6,647.37	0.00	0.00	0.00
14,500.00	90.00	90.01	6,340.00	-1,437.00	-1,977.96	6,468.99	6,744.96	0.00	0.00	0.00
14,600.00	90.00	90.01	6,340.00	-1,437.00	-1,977.98	6,568.99	6,842.54	0.00	0.00	0.00
14,700.00	90.00	90.01	6,340.00	-1,437.00	-1,978.01	6,668.99	6,940.13	0.00	0.00	0.00
14,800.00	90.00	90.01	6,340.00	-1,437.00	-1,978.03	6,768.99	7,037.71	0.00	0.00	0.00
14,900.00	90.00	90.01	6,340.00	-1,437.00	-1,978.05	6,868.99	7,135.30	0.00	0.00	0.00
15,000.00	90.00	90.01	6,340.00	-1,437.00	-1,978.08	6,968.99	7,232.88	0.00	0.00	0.00
15,100.00	90.00	90.01	6,340.00	-1,437.00	-1,978.10	7,068.99	7,330.47	0.00	0.00	0.00
15,200.00	90.00	90.01	6,340.00	-1,437.00	-1,978.13	7,168.99	7,428.05	0.00	0.00	0.00
15,300.00	90.00	90.01	6,340.00	-1,437.00	-1,978.15	7,268.99	7,525.64	0.00	0.00	0.00
15,400.00	90.00	90.01	6,340.00	-1,437.00	-1,978.18	7,368.99	7,623.22	0.00	0.00	0.00
15,500.00	90.00	90.01	6,340.00	-1,437.00	-1,978.20	7,468.99	7,720.81	0.00	0.00	0.00
15,600.00	90.00	90.01	6,340.00	-1,437.00	-1,978.23	7,568.99	7,818.39	0.00	0.00	0.00
15,700.00	90.00	90.01	6,340.00	-1,437.00	-1,978.25	7,668.99	7,915.98	0.00	0.00	0.00
15,800.00	90.00	90.01	6,340.00	-1,437.00	-1,978.28	7,768.99	8,013.56	0.00	0.00	0.00
15,900.00	90.00	90.01	6,340.00	-1,437.00	-1,978.30	7,868.99	8,111.15	0.00	0.00	0.00
16,000.00	90.00	90.01	6,340.00	-1,437.00	-1,978.33	7,968.99	8,208.73	0.00	0.00	0.00
16,100.00	90.00	90.01	6,340.00	-1,437.00	-1,978.35	8,068.99	8,306.32	0.00	0.00	0.00
16,200.00	90.00	90.01	6,340.00	-1,437.00	-1,978.37	8,168.99	8,403.90	0.00	0.00	0.00
16,300.00	90.00	90.01	6,340.00	-1,437.00	-1,978.40	8,268.99	8,501.49	0.00	0.00	0.00
16,400.00	90.00	90.01	6,340.00	-1,437.00	-1,978.42	8,368.99	8,599.07	0.00	0.00	0.00
16,500.00	90.00	90.01	6,340.00	-1,437.00	-1,978.45	8,468.99	8,696.66	0.00	0.00	0.00
16,600.00	90.00	90.01	6,340.00	-1,437.00	-1,978.47	8,568.99	8,794.24	0.00	0.00	0.00

Planning Report



Database:	Database 1	Local Co-ordinate Reference:	Well ANDERSON FED 6-5-3HC
Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4903.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4903.00usft
Site:	SE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	ANDERSON FED 6-5-3HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3		

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)
16,700.00	90.00	90.01	6,340.00	-1,437.00	-1,978.50	8,668.99	8,891.83	0.00	0.00	0.00
16,800.00	90.00	90.01	6,340.00	-1,437.00	-1,978.52	8,768.99	8,989.41	0.00	0.00	0.00
BHL: 1330ft FNL & 300ft FEL of Sec 5										
16,859.39	90.00	90.01	6,340.00	-1,437.00	-1,978.54	8,828.37	9,047.36	0.00	0.00	0.00

Formations						
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
490.00	490.00	Fox Hills Base				
1,524.23	1,507.00	Pierre Shale Top				
3,534.18	3,310.00	Richard Sandstone				
3,684.90	3,445.00	Parkman Sandstone				
4,451.89	4,132.00	Sussex Sandstone				
4,973.26	4,599.00	Shannon Sandstone				
5,831.80	5,368.00	TeePee Buttes				
6,505.41	5,979.00	Sharon Springs				
6,550.28	6,018.00	Niobrara Top				
6,585.84	6,048.00	Niobrara A Chalk				
6,615.12	6,072.00	Niobrara A Chalk Base				
6,663.36	6,110.00	Niobrara B1 Chalk Top				
6,688.54	6,129.00	Niobrara B1 Chalk Base				
6,727.28	6,157.00	Niobrara B2 Chalk Top				
6,765.43	6,183.00	Niobrara B2 Chalk Base				
6,809.58	6,211.00	Niobrara C Chalk Top				
6,886.61	6,254.00	Niobrara C Chalk Base				
6,966.39	6,290.00	Niobrara D Chalk Top				
7,047.52	6,317.00	Ft. Hays				
7,216.27	6,340.00	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: 662ft FSL & 1911ft FWL of Sec 31
800.00	800.00	0.00	0.00	START NUDGE (3°/100ft BUR)
1,680.00	1,649.19	-155.70	-124.21	EOB TO 26.4° INC
6,155.34	5,657.80	-1,711.24	-1,365.18	KOP (10°/100ft DGLG)
7,216.27	6,340.00	-1,976.16	-814.74	LP *NEW*: 1330ft FNL & 600ft FWL of Sec 6
16,859.39	6,340.00	-1,978.54	8,828.37	BHL: 1330ft FNL & 300ft FEL of Sec 5