

MALLARD EXPLORATION

WELD COUNTY, COLORADO (NAD 83)

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

ANDERSON FED 6-5-2HN

ORIGINAL WELLBORE

25 July, 2019

Plan: PROPOSAL #3





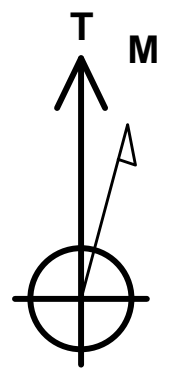
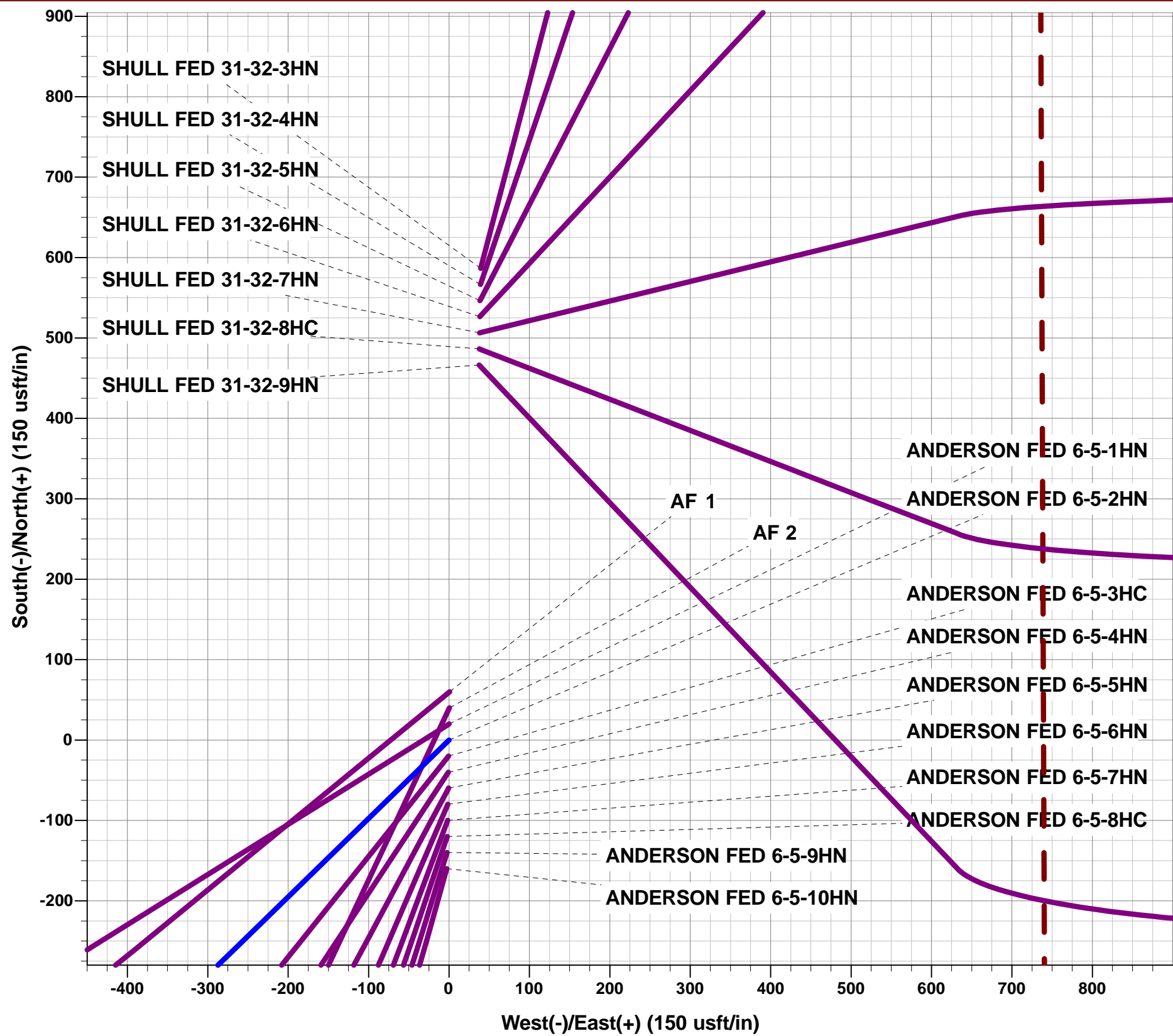
Project: WELD COUNTY, COLORADO (NAD 83)
Site: SE SW SEC. 31 T9N R59W 6th P.M.
Well: ANDERSON FED 6-5-2HN
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #3

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: 682ft FSL & 1912ft FWL of Sec 31
900.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (3°/100ft BUR)
1691.24	1715.83	24.47	225.72	-119.82	-122.86	-100.33	171.61	EOB TO 24.47° INC
5472.05	5869.91	24.47	225.72	-1321.45	-1354.93	-1106.49	1892.63	KOP (10°/100ft BUR)
6180.00	6942.41	90.00	90.01	-1546.61	-807.79	-528.69	2581.40	LP *NEW*: 880ft FNL & 600ft FWL of Sec 6
6180.00	16587.01	90.00	90.01	-1548.63	8836.81	8971.48	12226.00	BHL: 880ft FNL & 300ft FEL of Sec 5

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
LP *NEW*- ANDERSON FED 6-5-2HN (P3)	6180.00	-1546.61	-807.79	40.696886	-104.026335
BHL - ANDERSON FED 6-5-2HN (P3)	6180.00	-1548.63	8836.81	40.696876	-103.991554



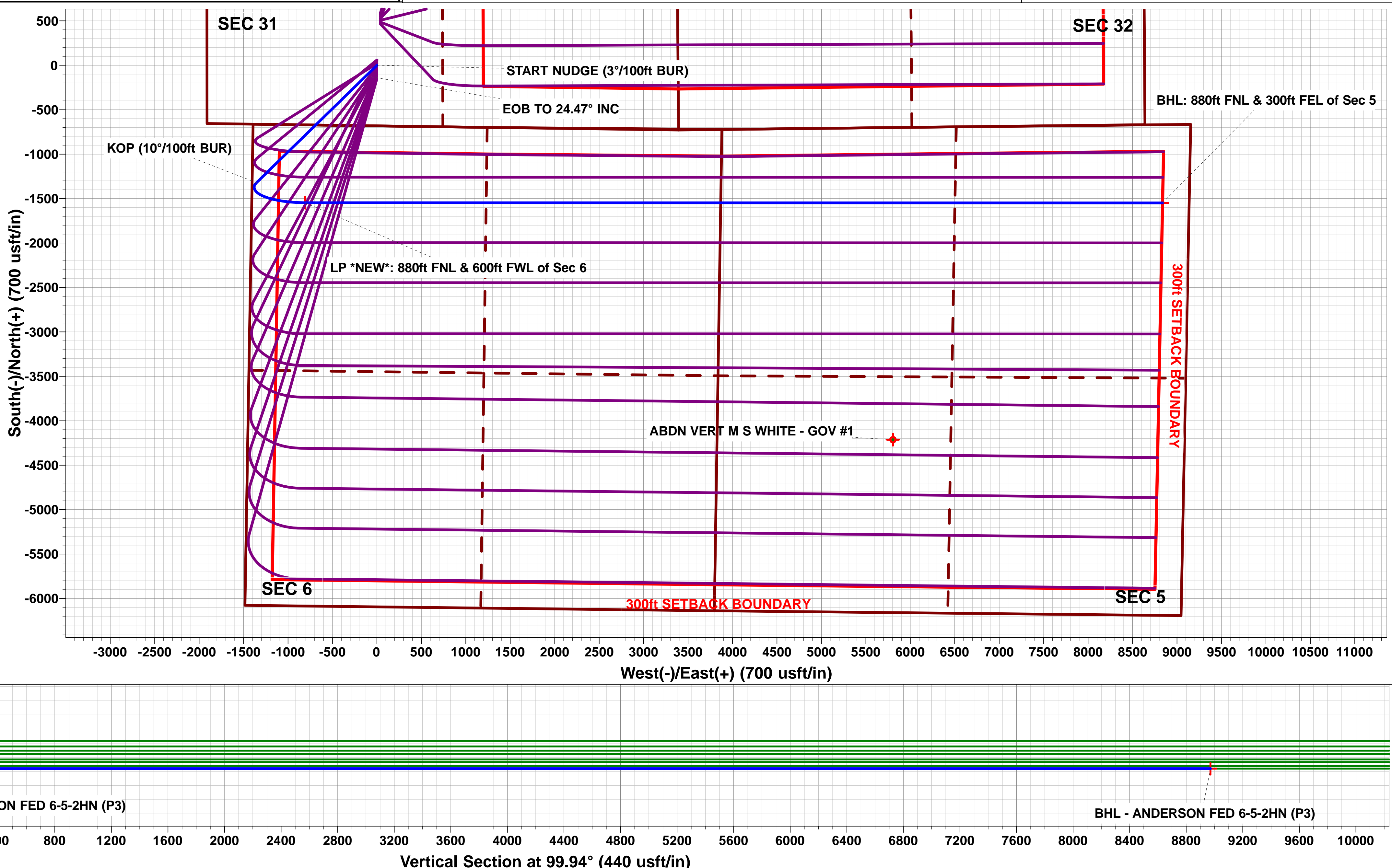
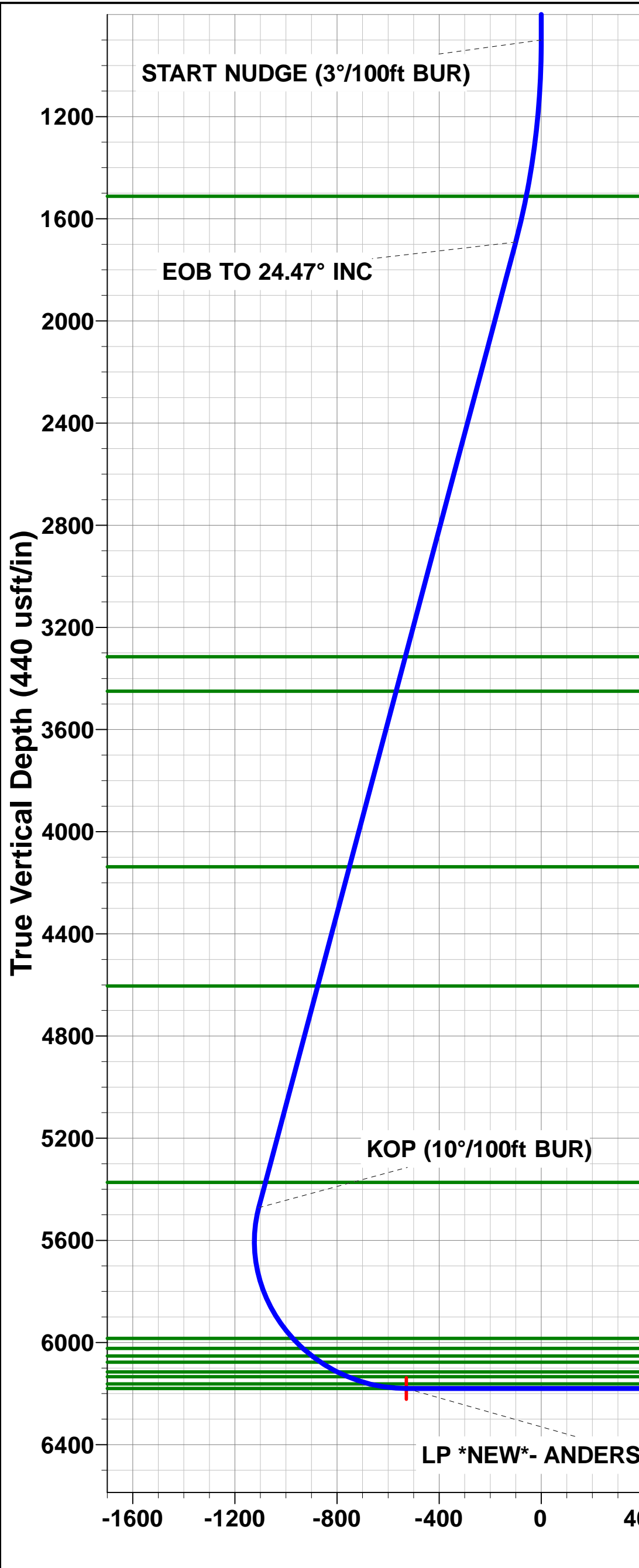
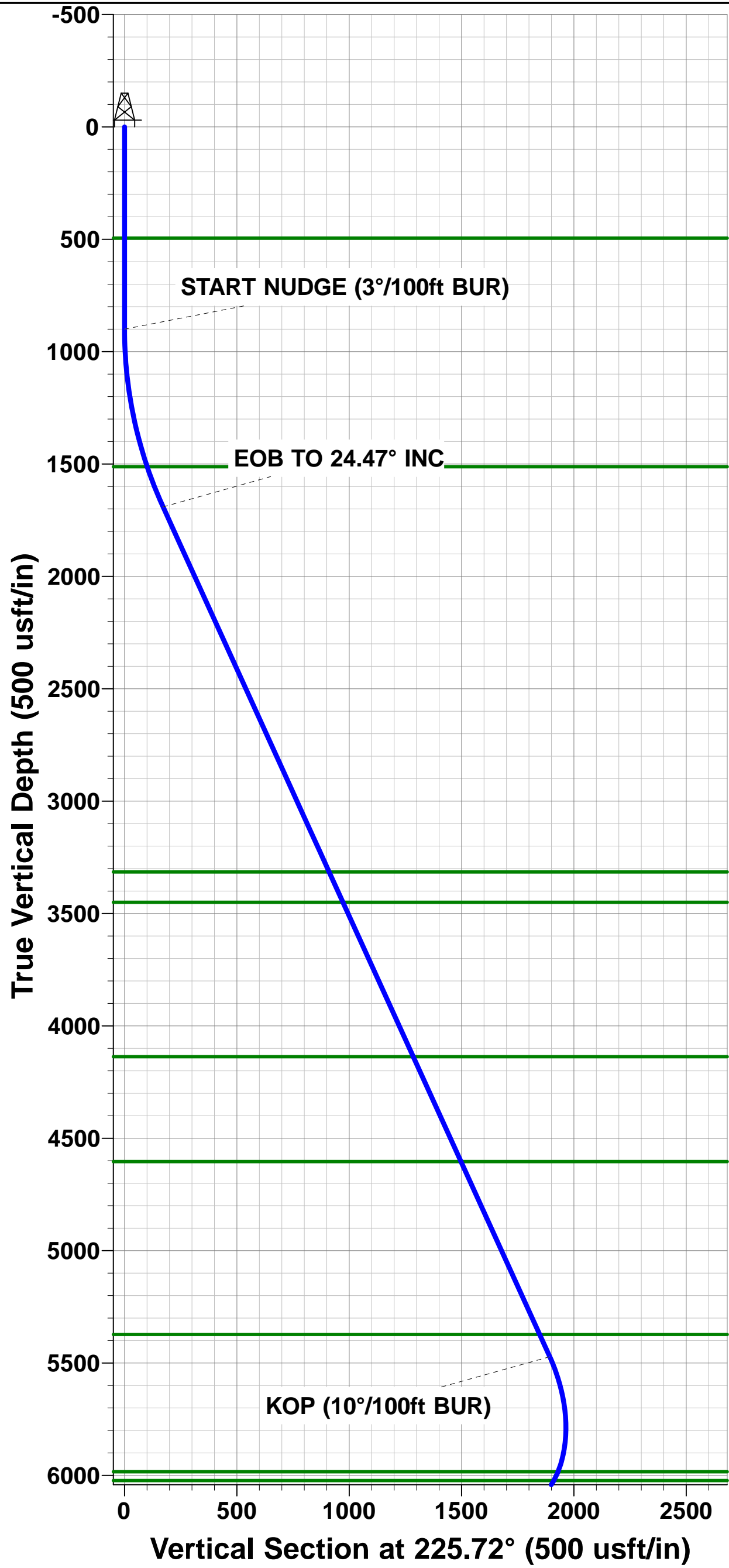
Azimuths to True North
Magnetic North: 7.61°
Magnetic Field
Strength: 52382.5snT
Dip Angle: 67.15°
Date: 22/07/2019
Model: IGRF2015

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
495.00	495.00	Fox Hills Base
1512.00	1522.99	Pierre Shale Top
3315.00	3499.90	Richard Sandstone
3450.00	3648.23	Parkman Sandstone
4137.00	4403.05	Sussex Sandstone
4604.00	4916.16	Shannon Sandstone
5373.00	5761.08	TeePee Buttes
5984.00	6441.11	Sharon Springs
6023.00	6496.77	Niobrara Top
6053.00	6543.63	Niobrara A Chalk
6077.00	6584.70	Niobrara A Chalk Base
6115.00	6659.99	Niobrara B1 Chalk Top
6134.00	6705.54	Niobrara B1 Chalk Base
6162.00	6794.88	Niobrara B2 Chalk Target Top
6180.00	6942.4	Niobrara B2 Chalk Target Center

PROPOSED LOCAL COORDINATES:

SHL: 682ft FSL & 1912ft FWL of Sec 31
HZ LP *new*: 880ft FNL & 600ft FWL of Sec 6
BHL: 880ft FNL & 300ft FEL of Sec 5



Planning Report



Database:	Database 1	Local Co-ordinate Reference:	Well ANDERSON FED 6-5-2HN
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 6-5-2HN	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 6-5-2HN		
Well Position	+N-S	158.11 usft	Northing:
	+E-W	156.66 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	40.701131
		Longitude:	-104.023422
		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	52,383

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 (°)
	6,180.00	0.00	0.00	99.94

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	
900.00	0.00	0.00	900.00	-4,003.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,715.83	24.47	225.72	1,691.25	-3,211.75	-119.82	-122.86	3.00	3.00	0.00	225.72	
5,869.91	24.47	225.72	5,472.05	569.05	-1,321.45	-1,354.93	0.00	0.00	0.00	0.00	
6,942.41	90.00	90.01	6,180.00	1,277.00	-1,546.61	-807.79	10.00	6.11	-12.65	-133.01	LP *NEW*- ANDER
16,587.01	90.00	90.01	6,180.00	1,277.00	-1,548.63	8,836.81	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 6-5-2HN	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: 682ft FSL & 1912ft 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										
495.00	0.00	0.00	495.00	4,408.00	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
800.00	0.00	0.00	800.00	4,103.00	0.00	0.00	0.00	0.00	0.00	0.00
START NUDGE (3°/100ft BUR)										
900.00	0.00	0.00	900.00	4,003.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	3.00	225.72	999.95	3,903.05	-1.83	-1.87	-1.53	3.00	3.00	0.00
1,100.00	6.00	225.72	1,099.63	3,803.37	-7.30	-7.49	-6.12	3.00	3.00	0.00
1,200.00	9.00	225.72	1,198.77	3,704.23	-16.42	-16.83	-13.75	3.00	3.00	0.00
1,300.00	12.00	225.72	1,297.08	3,605.92	-29.14	-29.88	-24.40	3.00	3.00	0.00
1,400.00	15.00	225.72	1,394.31	3,508.69	-45.44	-46.59	-38.05	3.00	3.00	0.00
1,500.00	18.00	225.72	1,490.18	3,412.82	-65.26	-66.92	-54.65	3.00	3.00	0.00
Pierre Shale Top										
1,522.99	18.69	225.72	1,512.00	3,391.00	-70.32	-72.10	-58.88	3.00	3.00	0.00
1,600.00	21.00	225.72	1,584.43	3,318.57	-88.57	-90.81	-74.16	3.00	3.00	0.00
1,700.00	24.00	225.72	1,676.81	3,226.19	-115.28	-118.21	-96.53	3.00	3.00	0.00
EOB TO 24.47° INC										
1,715.83	24.47	225.72	1,691.24	3,211.76	-119.82	-122.86	-100.33	3.00	3.00	0.00
1,800.00	24.47	225.72	1,767.85	3,135.15	-144.17	-147.82	-120.72	0.00	0.00	0.00
1,900.00	24.47	225.72	1,858.87	3,044.13	-173.10	-177.48	-144.94	0.00	0.00	0.00
2,000.00	24.47	225.72	1,949.88	2,953.12	-202.02	-207.14	-169.16	0.00	0.00	0.00
2,100.00	24.47	225.72	2,040.89	2,862.11	-230.95	-236.80	-193.38	0.00	0.00	0.00
2,200.00	24.47	225.72	2,131.91	2,771.09	-259.87	-266.46	-217.60	0.00	0.00	0.00
2,300.00	24.47	225.72	2,222.92	2,680.08	-288.80	-296.12	-241.82	0.00	0.00	0.00
2,400.00	24.47	225.72	2,313.94	2,589.06	-317.73	-325.78	-266.04	0.00	0.00	0.00
2,500.00	24.47	225.72	2,404.95	2,498.05	-346.65	-355.44	-290.26	0.00	0.00	0.00
2,600.00	24.47	225.72	2,495.96	2,407.04	-375.58	-385.10	-314.49	0.00	0.00	0.00
2,700.00	24.47	225.72	2,586.98	2,316.02	-404.51	-414.76	-338.71	0.00	0.00	0.00
2,800.00	24.47	225.72	2,677.99	2,225.01	-433.43	-444.42	-362.93	0.00	0.00	0.00
2,900.00	24.47	225.72	2,769.01	2,133.99	-462.36	-474.08	-387.15	0.00	0.00	0.00
3,000.00	24.47	225.72	2,860.02	2,042.98	-491.29	-503.73	-411.37	0.00	0.00	0.00
3,100.00	24.47	225.72	2,951.04	1,951.96	-520.21	-533.39	-435.59	0.00	0.00	0.00
3,200.00	24.47	225.72	3,042.05	1,860.95	-549.14	-563.05	-459.81	0.00	0.00	0.00
3,300.00	24.47	225.72	3,133.06	1,769.94	-578.06	-592.71	-484.03	0.00	0.00	0.00
3,400.00	24.47	225.72	3,224.08	1,678.92	-606.99	-622.37	-508.25	0.00	0.00	0.00
Richard Sandstone										
3,499.90	24.47	225.72	3,315.00	1,588.00	-635.89	-652.00	-532.45	0.00	0.00	0.00
3,500.00	24.47	225.72	3,315.09	1,587.91	-635.92	-652.03	-532.47	0.00	0.00	0.00
3,600.00	24.47	225.72	3,406.11	1,496.89	-664.84	-681.69	-556.69	0.00	0.00	0.00
Parkman Sandstone										
3,648.23	24.47	225.72	3,450.00	1,453.00	-678.79	-695.99	-568.38	0.00	0.00	0.00
3,700.00	24.47	225.72	3,497.12	1,405.88	-693.77	-711.35	-580.92	0.00	0.00	0.00
3,800.00	24.47	225.72	3,588.14	1,314.86	-722.70	-741.01	-605.14	0.00	0.00	0.00
3,900.00	24.47	225.72	3,679.15	1,223.85	-751.62	-770.67	-629.36	0.00	0.00	0.00
4,000.00	24.47	225.72	3,770.16	1,132.84	-780.55	-800.33	-653.58	0.00	0.00	0.00

Planning Report



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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 6-5-2HN	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	24.47	225.72	3,861.18	1,041.82	-809.48	-829.99	-677.80	0.00	0.00	0.00
4,200.00	24.47	225.72	3,952.19	950.81	-838.40	-859.65	-702.02	0.00	0.00	0.00
4,300.00	24.47	225.72	4,043.21	859.79	-867.33	-889.31	-726.24	0.00	0.00	0.00
4,400.00	24.47	225.72	4,134.22	768.78	-896.25	-918.96	-750.46	0.00	0.00	0.00
Sussex Sandstone										
4,403.05	24.47	225.72	4,137.00	766.00	-897.14	-919.87	-751.20	0.00	0.00	0.00
4,500.00	24.47	225.72	4,225.24	677.76	-925.18	-948.62	-774.68	0.00	0.00	0.00
4,600.00	24.47	225.72	4,316.25	586.75	-954.11	-978.28	-798.90	0.00	0.00	0.00
4,700.00	24.47	225.72	4,407.26	495.74	-983.03	-1,007.94	-823.12	0.00	0.00	0.00
4,800.00	24.47	225.72	4,498.28	404.72	-1,011.96	-1,037.60	-847.35	0.00	0.00	0.00
4,900.00	24.47	225.72	4,589.29	313.71	-1,040.89	-1,067.26	-871.57	0.00	0.00	0.00
Shannon Sandstone										
4,916.16	24.47	225.72	4,604.00	299.00	-1,045.56	-1,072.05	-875.48	0.00	0.00	0.00
5,000.00	24.47	225.72	4,680.31	222.69	-1,069.81	-1,096.92	-895.79	0.00	0.00	0.00
5,100.00	24.47	225.72	4,771.32	131.68	-1,098.74	-1,126.58	-920.01	0.00	0.00	0.00
5,200.00	24.47	225.72	4,862.34	40.66	-1,127.66	-1,156.24	-944.23	0.00	0.00	0.00
5,300.00	24.47	225.72	4,953.35	-50.35	-1,156.59	-1,185.90	-968.45	0.00	0.00	0.00
5,400.00	24.47	225.72	5,044.36	-141.36	-1,185.52	-1,215.56	-992.67	0.00	0.00	0.00
5,500.00	24.47	225.72	5,135.38	-232.38	-1,214.44	-1,245.22	-1,016.89	0.00	0.00	0.00
5,600.00	24.47	225.72	5,226.39	-323.39	-1,243.37	-1,274.88	-1,041.11	0.00	0.00	0.00
5,700.00	24.47	225.72	5,317.41	-414.41	-1,272.30	-1,304.54	-1,065.33	0.00	0.00	0.00
TeePee Buttes										
5,761.08	24.47	225.72	5,373.00	-470.00	-1,289.97	-1,322.65	-1,080.13	0.00	0.00	0.00
5,800.00	24.47	225.72	5,408.42	-505.42	-1,301.22	-1,334.20	-1,089.56	0.00	0.00	0.00
KOP (10°/100ft BUR)										
5,869.91	24.47	225.72	5,472.05	-569.05	-1,321.45	-1,354.93	-1,106.49	0.00	0.00	0.00
5,900.00	22.52	219.97	5,499.65	-596.65	-1,330.22	-1,363.10	-1,113.02	10.00	-6.48	-19.11
6,000.00	18.12	193.77	5,593.59	-690.59	-1,360.08	-1,379.14	-1,123.67	10.00	-4.40	-26.20
6,100.00	18.52	161.60	5,688.76	-785.76	-1,390.33	-1,377.82	-1,117.15	10.00	0.40	-32.17
6,200.00	23.48	137.04	5,782.27	-879.27	-1,420.06	-1,359.18	-1,093.66	10.00	4.96	-24.56
6,300.00	30.87	122.13	5,871.27	-968.27	-1,448.36	-1,323.79	-1,053.91	10.00	7.39	-14.91
6,400.00	39.34	112.83	5,953.06	-1,050.06	-1,474.37	-1,272.72	-999.11	10.00	8.47	-9.31
Sharon Springs										
6,441.11	42.99	109.95	5,984.00	-1,081.00	-1,484.21	-1,247.52	-972.60	10.00	8.88	-7.00
Niobrara Top										
6,496.77	48.03	106.63	6,023.00	-1,120.00	-1,496.62	-1,209.82	-933.32	10.00	9.05	-5.97
6,500.00	48.33	106.45	6,025.15	-1,122.15	-1,497.30	-1,207.52	-930.93	10.00	9.14	-5.46
Niobrara A Chalk										
6,543.63	52.34	104.22	6,053.00	-1,150.00	-1,506.16	-1,175.14	-897.51	10.00	9.19	-5.12
Niobrara A Chalk Base										
6,584.70	56.15	102.32	6,077.00	-1,174.00	-1,513.80	-1,142.70	-864.24	10.00	9.28	-4.61
6,600.00	57.57	101.66	6,085.36	-1,182.36	-1,516.46	-1,130.17	-851.44	10.00	9.32	-4.32
Niobrara B1 Chalk Top										
6,659.99	63.20	99.25	6,115.00	-1,212.00	-1,525.89	-1,078.90	-799.32	10.00	9.37	-4.02
6,700.00	66.97	97.78	6,131.86	-1,228.86	-1,531.26	-1,043.03	-763.05	10.00	9.43	-3.69
Niobrara B1 Chalk Base										
6,705.54	67.49	97.58	6,134.00	-1,231.00	-1,531.94	-1,037.96	-757.95	10.00	9.44	-3.56
Niobrara B2 Chalk Target Top										
6,794.88	75.96	94.57	6,162.00	-1,259.00	-1,540.86	-953.69	-673.40	10.00	9.48	-3.37
6,800.00	76.44	94.41	6,163.22	-1,260.22	-1,541.25	-948.73	-668.45	10.00	9.50	-3.21
6,900.00	85.96	91.30	6,178.51	-1,275.51	-1,546.13	-850.16	-570.51	10.00	9.52	-3.11
LP *NEW*: 880ft FNL & 600ft FWL of Sec 6 - Niobrara B2 Chalk Target Center										

Planning Report



Database:	Database 1	Local Co-ordinate Reference:	Well ANDERSON FED 6-5-2HN
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 6-5-2HN	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)
6,942.41	90.00	90.01	6,180.00	-1,277.00	-1,546.61	-807.79	-528.69	10.00	9.53	-3.03
7,000.00	90.00	90.01	6,180.00	-1,277.00	-1,546.62	-750.20	-471.96	0.00	0.00	0.00
7,100.00	90.00	90.01	6,180.00	-1,277.00	-1,546.64	-650.20	-373.46	0.00	0.00	0.00
7,200.00	90.00	90.01	6,180.00	-1,277.00	-1,546.66	-550.20	-274.96	0.00	0.00	0.00
7,300.00	90.00	90.01	6,180.00	-1,277.00	-1,546.68	-450.20	-176.46	0.00	0.00	0.00
7,400.00	90.00	90.01	6,180.00	-1,277.00	-1,546.71	-350.20	-77.95	0.00	0.00	0.00
7,500.00	90.00	90.01	6,180.00	-1,277.00	-1,546.73	-250.20	20.55	0.00	0.00	0.00
7,600.00	90.00	90.01	6,180.00	-1,277.00	-1,546.75	-150.20	119.05	0.00	0.00	0.00
7,700.00	90.00	90.01	6,180.00	-1,277.00	-1,546.77	-50.20	217.55	0.00	0.00	0.00
7,800.00	90.00	90.01	6,180.00	-1,277.00	-1,546.79	49.80	316.06	0.00	0.00	0.00
7,900.00	90.00	90.01	6,180.00	-1,277.00	-1,546.81	149.80	414.56	0.00	0.00	0.00
8,000.00	90.00	90.01	6,180.00	-1,277.00	-1,546.83	249.80	513.06	0.00	0.00	0.00
8,100.00	90.00	90.01	6,180.00	-1,277.00	-1,546.85	349.80	611.56	0.00	0.00	0.00
8,200.00	90.00	90.01	6,180.00	-1,277.00	-1,546.87	449.80	710.07	0.00	0.00	0.00
8,300.00	90.00	90.01	6,180.00	-1,277.00	-1,546.89	549.80	808.57	0.00	0.00	0.00
8,400.00	90.00	90.01	6,180.00	-1,277.00	-1,546.91	649.80	907.07	0.00	0.00	0.00
8,500.00	90.00	90.01	6,180.00	-1,277.00	-1,546.94	749.80	1,005.57	0.00	0.00	0.00
8,600.00	90.00	90.01	6,180.00	-1,277.00	-1,546.96	849.80	1,104.08	0.00	0.00	0.00
8,700.00	90.00	90.01	6,180.00	-1,277.00	-1,546.98	949.80	1,202.58	0.00	0.00	0.00
8,800.00	90.00	90.01	6,180.00	-1,277.00	-1,547.00	1,049.80	1,301.08	0.00	0.00	0.00
8,900.00	90.00	90.01	6,180.00	-1,277.00	-1,547.02	1,149.80	1,399.58	0.00	0.00	0.00
9,000.00	90.00	90.01	6,180.00	-1,277.00	-1,547.04	1,249.80	1,498.09	0.00	0.00	0.00
9,100.00	90.00	90.01	6,180.00	-1,277.00	-1,547.06	1,349.80	1,596.59	0.00	0.00	0.00
9,200.00	90.00	90.01	6,180.00	-1,277.00	-1,547.08	1,449.80	1,695.09	0.00	0.00	0.00
9,300.00	90.00	90.01	6,180.00	-1,277.00	-1,547.10	1,549.80	1,793.59	0.00	0.00	0.00
9,400.00	90.00	90.01	6,180.00	-1,277.00	-1,547.12	1,649.80	1,892.10	0.00	0.00	0.00
9,500.00	90.00	90.01	6,180.00	-1,277.00	-1,547.14	1,749.80	1,990.60	0.00	0.00	0.00
9,600.00	90.00	90.01	6,180.00	-1,277.00	-1,547.17	1,849.80	2,089.10	0.00	0.00	0.00
9,700.00	90.00	90.01	6,180.00	-1,277.00	-1,547.19	1,949.80	2,187.60	0.00	0.00	0.00
9,800.00	90.00	90.01	6,180.00	-1,277.00	-1,547.21	2,049.80	2,286.11	0.00	0.00	0.00
9,900.00	90.00	90.01	6,180.00	-1,277.00	-1,547.23	2,149.80	2,384.61	0.00	0.00	0.00
10,000.00	90.00	90.01	6,180.00	-1,277.00	-1,547.25	2,249.80	2,483.11	0.00	0.00	0.00
10,100.00	90.00	90.01	6,180.00	-1,277.00	-1,547.27	2,349.80	2,581.61	0.00	0.00	0.00
10,200.00	90.00	90.01	6,180.00	-1,277.00	-1,547.29	2,449.80	2,680.12	0.00	0.00	0.00
10,300.00	90.00	90.01	6,180.00	-1,277.00	-1,547.31	2,549.80	2,778.62	0.00	0.00	0.00
10,400.00	90.00	90.01	6,180.00	-1,277.00	-1,547.33	2,649.80	2,877.12	0.00	0.00	0.00
10,500.00	90.00	90.01	6,180.00	-1,277.00	-1,547.35	2,749.80	2,975.62	0.00	0.00	0.00
10,600.00	90.00	90.01	6,180.00	-1,277.00	-1,547.37	2,849.80	3,074.13	0.00	0.00	0.00
10,700.00	90.00	90.01	6,180.00	-1,277.00	-1,547.40	2,949.80	3,172.63	0.00	0.00	0.00
10,800.00	90.00	90.01	6,180.00	-1,277.00	-1,547.42	3,049.80	3,271.13	0.00	0.00	0.00
10,900.00	90.00	90.01	6,180.00	-1,277.00	-1,547.44	3,149.80	3,369.63	0.00	0.00	0.00
11,000.00	90.00	90.01	6,180.00	-1,277.00	-1,547.46	3,249.80	3,468.14	0.00	0.00	0.00
11,100.00	90.00	90.01	6,180.00	-1,277.00	-1,547.48	3,349.80	3,566.64	0.00	0.00	0.00
11,200.00	90.00	90.01	6,180.00	-1,277.00	-1,547.50	3,449.80	3,665.14	0.00	0.00	0.00
11,300.00	90.00	90.01	6,180.00	-1,277.00	-1,547.52	3,549.80	3,763.64	0.00	0.00	0.00
11,400.00	90.00	90.01	6,180.00	-1,277.00	-1,547.54	3,649.80	3,862.15	0.00	0.00	0.00
11,500.00	90.00	90.01	6,180.00	-1,277.00	-1,547.56	3,749.80	3,960.65	0.00	0.00	0.00
11,600.00	90.00	90.01	6,180.00	-1,277.00	-1,547.58	3,849.80	4,059.15	0.00	0.00	0.00
11,700.00	90.00	90.01	6,180.00	-1,277.00	-1,547.60	3,949.80	4,157.65	0.00	0.00	0.00
11,800.00	90.00	90.01	6,180.00	-1,277.00	-1,547.62	4,049.80	4,256.16	0.00	0.00	0.00
11,900.00	90.00	90.01	6,180.00	-1,277.00	-1,547.65	4,149.80	4,354.66	0.00	0.00	0.00
12,000.00	90.00	90.01	6,180.00	-1,277.00	-1,547.67	4,249.80	4,453.16	0.00	0.00	0.00
12,100.00	90.00	90.01	6,180.00	-1,277.00	-1,547.69	4,349.80	4,551.66	0.00	0.00	0.00
12,200.00	90.00	90.01	6,180.00	-1,277.00	-1,547.71	4,449.80	4,650.17	0.00	0.00	0.00

Planning Report



Database:	Database 1	Local Co-ordinate Reference:	Well ANDERSON FED 6-5-2HN
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 6-5-2HN	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)
12,300.00	90.00	90.01	6,180.00	-1,277.00	-1,547.73	4,549.80	4,748.67	0.00	0.00	0.00
12,400.00	90.00	90.01	6,180.00	-1,277.00	-1,547.75	4,649.80	4,847.17	0.00	0.00	0.00
12,500.00	90.00	90.01	6,180.00	-1,277.00	-1,547.77	4,749.80	4,945.67	0.00	0.00	0.00
12,600.00	90.00	90.01	6,180.00	-1,277.00	-1,547.79	4,849.80	5,044.18	0.00	0.00	0.00
12,700.00	90.00	90.01	6,180.00	-1,277.00	-1,547.81	4,949.80	5,142.68	0.00	0.00	0.00
12,800.00	90.00	90.01	6,180.00	-1,277.00	-1,547.83	5,049.80	5,241.18	0.00	0.00	0.00
12,900.00	90.00	90.01	6,180.00	-1,277.00	-1,547.85	5,149.80	5,339.68	0.00	0.00	0.00
13,000.00	90.00	90.01	6,180.00	-1,277.00	-1,547.88	5,249.80	5,438.19	0.00	0.00	0.00
13,100.00	90.00	90.01	6,180.00	-1,277.00	-1,547.90	5,349.80	5,536.69	0.00	0.00	0.00
13,200.00	90.00	90.01	6,180.00	-1,277.00	-1,547.92	5,449.80	5,635.19	0.00	0.00	0.00
13,300.00	90.00	90.01	6,180.00	-1,277.00	-1,547.94	5,549.80	5,733.69	0.00	0.00	0.00
13,400.00	90.00	90.01	6,180.00	-1,277.00	-1,547.96	5,649.80	5,832.20	0.00	0.00	0.00
13,500.00	90.00	90.01	6,180.00	-1,277.00	-1,547.98	5,749.80	5,930.70	0.00	0.00	0.00
13,600.00	90.00	90.01	6,180.00	-1,277.00	-1,548.00	5,849.80	6,029.20	0.00	0.00	0.00
13,700.00	90.00	90.01	6,180.00	-1,277.00	-1,548.02	5,949.80	6,127.70	0.00	0.00	0.00
13,800.00	90.00	90.01	6,180.00	-1,277.00	-1,548.04	6,049.80	6,226.21	0.00	0.00	0.00
13,900.00	90.00	90.01	6,180.00	-1,277.00	-1,548.06	6,149.80	6,324.71	0.00	0.00	0.00
14,000.00	90.00	90.01	6,180.00	-1,277.00	-1,548.08	6,249.80	6,423.21	0.00	0.00	0.00
14,100.00	90.00	90.01	6,180.00	-1,277.00	-1,548.11	6,349.80	6,521.71	0.00	0.00	0.00
14,200.00	90.00	90.01	6,180.00	-1,277.00	-1,548.13	6,449.80	6,620.22	0.00	0.00	0.00
14,300.00	90.00	90.01	6,180.00	-1,277.00	-1,548.15	6,549.80	6,718.72	0.00	0.00	0.00
14,400.00	90.00	90.01	6,180.00	-1,277.00	-1,548.17	6,649.80	6,817.22	0.00	0.00	0.00
14,500.00	90.00	90.01	6,180.00	-1,277.00	-1,548.19	6,749.80	6,915.72	0.00	0.00	0.00
14,600.00	90.00	90.01	6,180.00	-1,277.00	-1,548.21	6,849.80	7,014.23	0.00	0.00	0.00
14,700.00	90.00	90.01	6,180.00	-1,277.00	-1,548.23	6,949.80	7,112.73	0.00	0.00	0.00
14,800.00	90.00	90.01	6,180.00	-1,277.00	-1,548.25	7,049.80	7,211.23	0.00	0.00	0.00
14,900.00	90.00	90.01	6,180.00	-1,277.00	-1,548.27	7,149.80	7,309.73	0.00	0.00	0.00
15,000.00	90.00	90.01	6,180.00	-1,277.00	-1,548.29	7,249.80	7,408.24	0.00	0.00	0.00
15,100.00	90.00	90.01	6,180.00	-1,277.00	-1,548.31	7,349.80	7,506.74	0.00	0.00	0.00
15,200.00	90.00	90.01	6,180.00	-1,277.00	-1,548.34	7,449.80	7,605.24	0.00	0.00	0.00
15,300.00	90.00	90.01	6,180.00	-1,277.00	-1,548.36	7,549.80	7,703.75	0.00	0.00	0.00
15,400.00	90.00	90.01	6,180.00	-1,277.00	-1,548.38	7,649.80	7,802.25	0.00	0.00	0.00
15,500.00	90.00	90.01	6,180.00	-1,277.00	-1,548.40	7,749.80	7,900.75	0.00	0.00	0.00
15,600.00	90.00	90.01	6,180.00	-1,277.00	-1,548.42	7,849.80	7,999.25	0.00	0.00	0.00
15,700.00	90.00	90.01	6,180.00	-1,277.00	-1,548.44	7,949.80	8,097.76	0.00	0.00	0.00
15,800.00	90.00	90.01	6,180.00	-1,277.00	-1,548.46	8,049.80	8,196.26	0.00	0.00	0.00
15,900.00	90.00	90.01	6,180.00	-1,277.00	-1,548.48	8,149.80	8,294.76	0.00	0.00	0.00
16,000.00	90.00	90.01	6,180.00	-1,277.00	-1,548.50	8,249.80	8,393.26	0.00	0.00	0.00
16,100.00	90.00	90.01	6,180.00	-1,277.00	-1,548.52	8,349.80	8,491.77	0.00	0.00	0.00
16,200.00	90.00	90.01	6,180.00	-1,277.00	-1,548.54	8,449.80	8,590.27	0.00	0.00	0.00
16,300.00	90.00	90.01	6,180.00	-1,277.00	-1,548.57	8,549.80	8,688.77	0.00	0.00	0.00
16,400.00	90.00	90.01	6,180.00	-1,277.00	-1,548.59	8,649.80	8,787.27	0.00	0.00	0.00
16,500.00	90.00	90.01	6,180.00	-1,277.00	-1,548.61	8,749.80	8,885.78	0.00	0.00	0.00
BHL: 880ft FNL & 300ft FEL of Sec 5										
16,587.01	90.00	90.01	6,180.00	-1,277.00	-1,548.63	8,836.81	8,971.48	0.00	0.00	0.00

Planning Report



Database:	Database 1	Local Co-ordinate Reference:	Well ANDERSON FED 6-5-2HN
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 6-5-2HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3		

Formations						
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
495.00	495.00	Fox Hills Base				
1,522.99	1,512.00	Pierre Shale Top				
3,499.90	3,315.00	Richard Sandstone				
3,648.23	3,450.00	Parkman Sandstone				
4,403.05	4,137.00	Sussex Sandstone				
4,916.16	4,604.00	Shannon Sandstone				
5,761.08	5,373.00	TeePee Buttes				
6,441.11	5,984.00	Sharon Springs				
6,496.77	6,023.00	Niobrara Top				
6,543.63	6,053.00	Niobrara A Chalk				
6,584.70	6,077.00	Niobrara A Chalk Base				
6,659.99	6,115.00	Niobrara B1 Chalk Top				
6,705.54	6,134.00	Niobrara B1 Chalk Base				
6,794.88	6,162.00	Niobrara B2 Chalk Target Top				
6,942.41	6,180.00	Niobrara B2 Chalk Target Center				

Plan Annotations					
MD (usft)	TVD (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
0.00	0.00	0.00	0.00	SHL: 682ft FSL & 1912ft FWL of Sec 31	
900.00	900.00	0.00	0.00	START NUDGE (3°/100ft BUR)	
1,715.83	1,691.24	-119.82	-122.86	EOB TO 24.47° INC	
5,869.91	5,472.05	-1,321.45	-1,354.93	KOP (10°/100ft BUR)	
6,942.41	6,180.00	-1,546.61	-807.79	LP *NEW*: 880ft FNL & 600ft FWL of Sec 6	
16,587.01	6,180.00	-1,548.63	8,836.81	BHL: 880ft FNL & 300ft FEL of Sec 5	