

# **MALLARD EXPLORATION**

**WELD COUNTY, COLORADO (NAD 83)**

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

**ANDERSON FED 6-5-4HN**

**ORIGINAL WELLBORE**

**25 July, 2019**

**Plan: PROPOSAL #3**





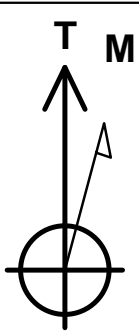
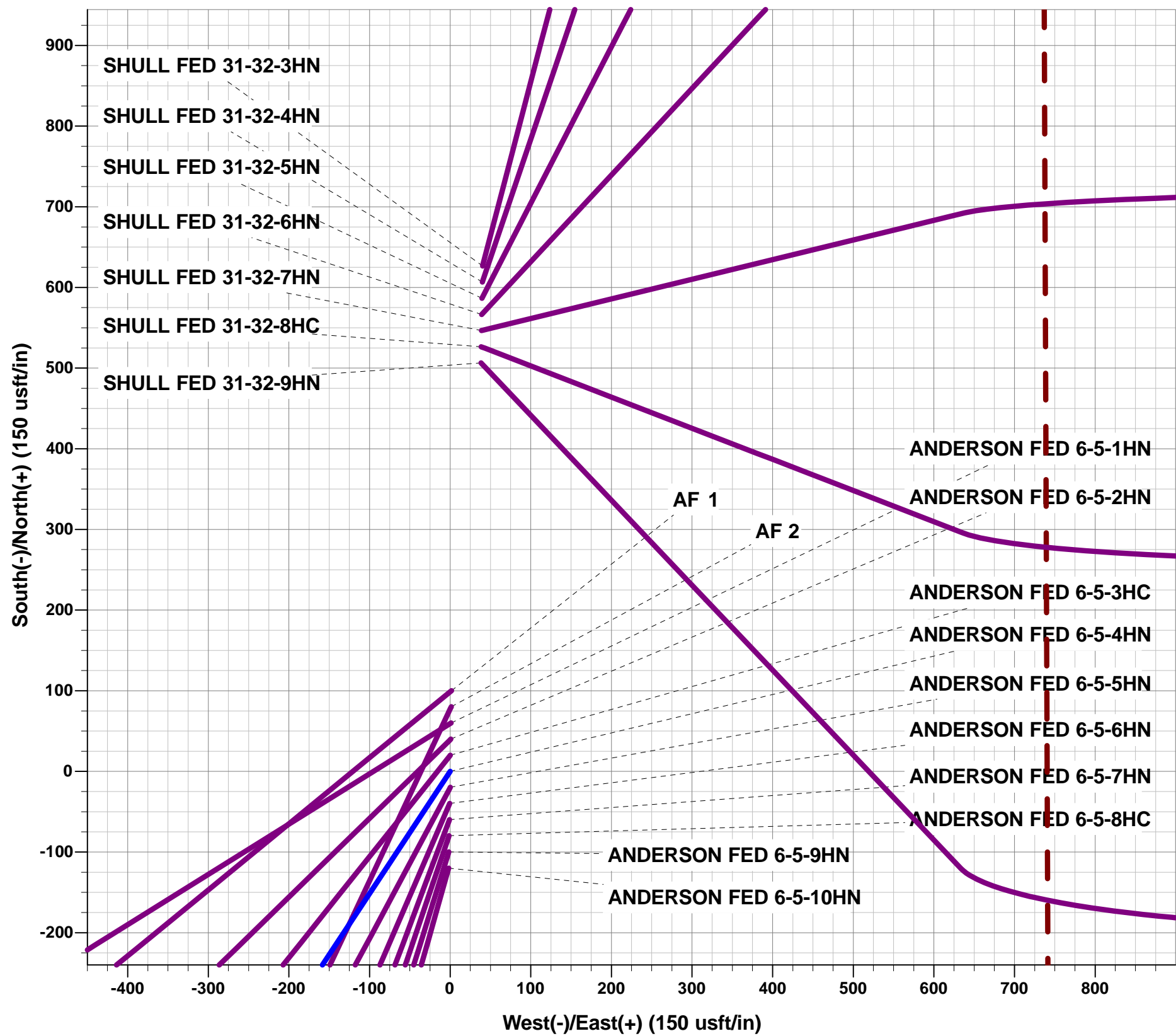
Project: WELD COUNTY, COLORADO (NAD 83)  
Site: SE SW SEC. 31 T9N R59W 6th P.M.  
Well: ANDERSON FED 6-5-4HN  
Wellbore: ORIGINAL WELLBORE  
Design: PROPOSAL #3

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: 642ft FSL & 1911ft FWL of Sec 31
700.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (3°/100ft BUR)
1680.23	1729.35	30.88	213.43	-225.95	-149.15	-84.36	270.74	EOB TO 30.88° INC
5390.47	6052.42	30.88	213.43	-2077.71	-1371.48	-775.72	2489.55	KOP (10°/100ft DGLG)
6048.00	7116.60	90.00	90.01	-2406.07	-821.97	-159.12	3242.10	LP *NEW*: 1780ft FNL & 600ft FWL of Sec 6
6048.00	16758.51	90.00	90.01	-2408.45	8819.94	9142.86	12884.01	BHL: 1780ft FNL & 300ft FEL of Sec 5

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
LP *NEW* - ANDERSON FED 6-5-4HN (P3)	6048.00	-2406.07	-821.97	40.694417	-104.026389
BHL - ANDERSON FED 6-5-4HN (P3)	6048.00	-2408.45	8819.94	40.694406	-103.991619



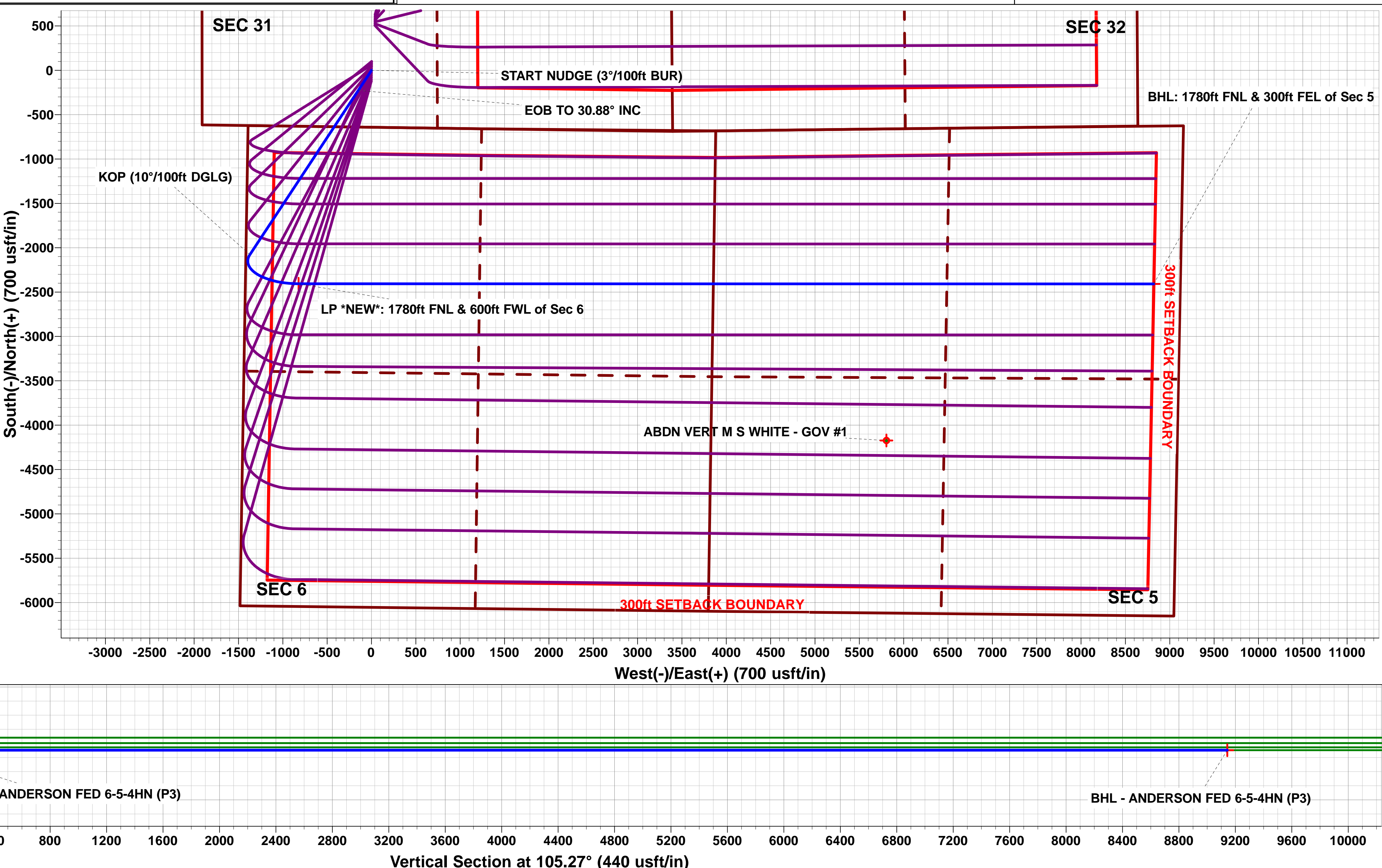
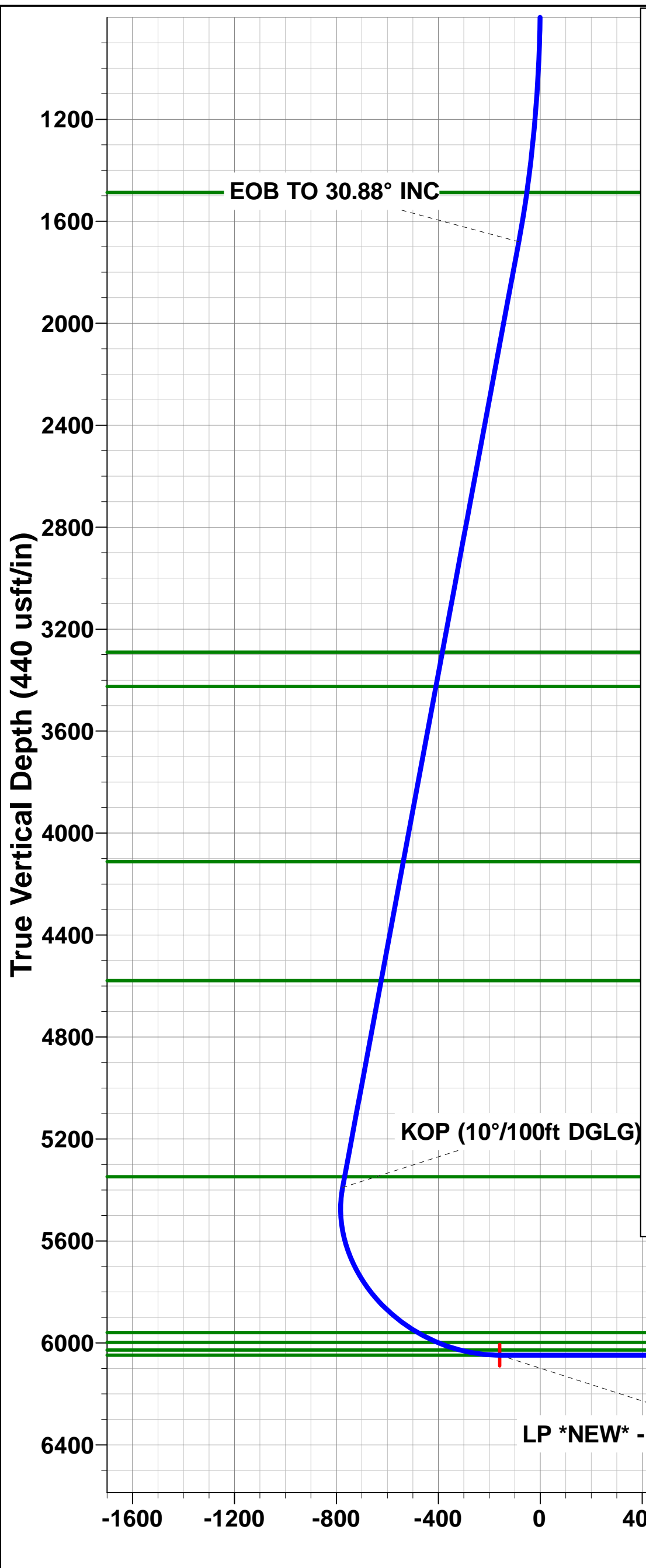
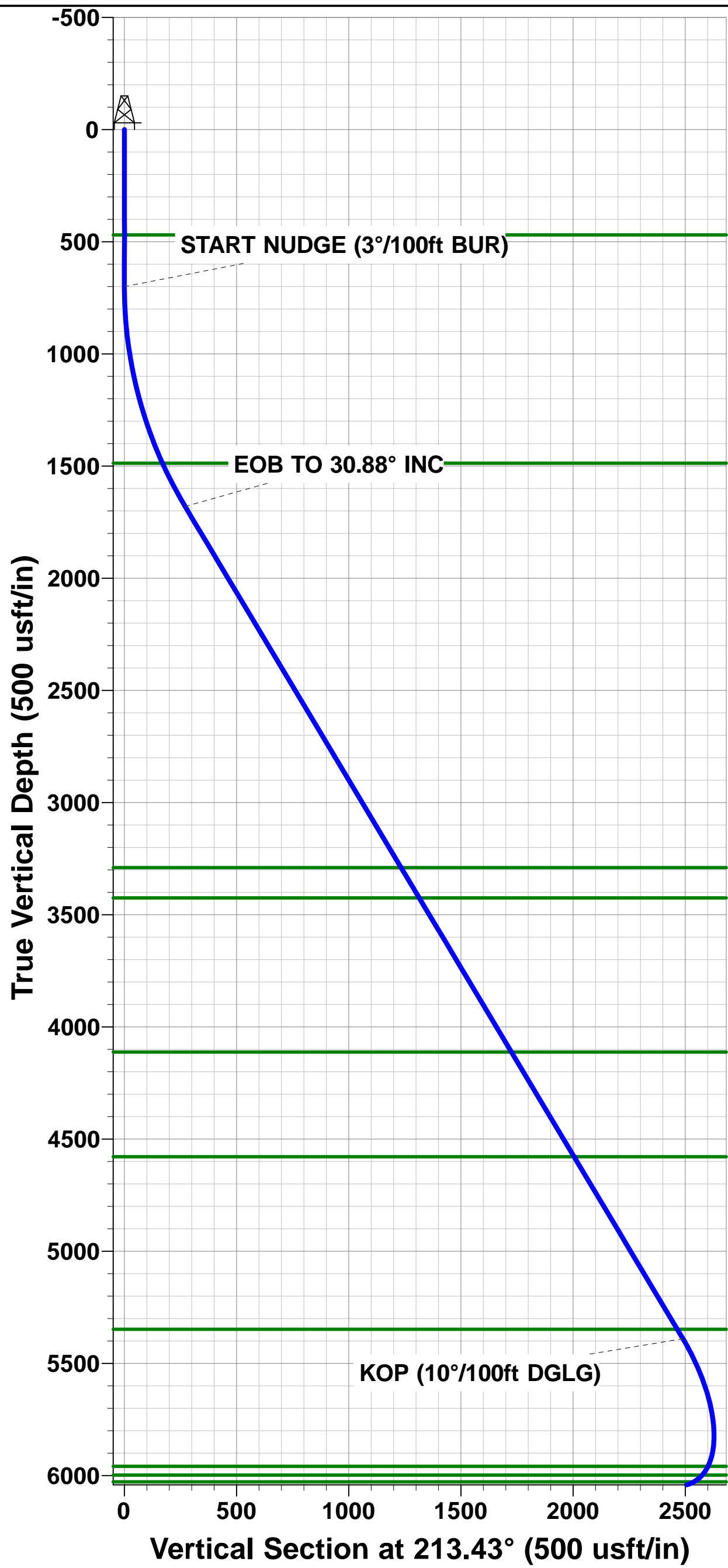
Azimuths to True North  
Magnetic North: 7.61°  
Magnetic Field  
Strength: 52382.5snT  
Dip Angle: 67.15°  
Date: 22/07/2019  
Model: IGRF2015

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
470.00	470.00	Fox Hills Base
1487.00	1511.17	Pierre Shale Top
3290.00	3605.01	Richard Sandstone
3425.00	3762.31	Parkman Sandstone
4112.00	4562.78	Sussex Sandstone
4579.00	5106.92	Shannon Sandstone
5348.00	6002.94	TeePee Buttes
5959.00	6773.90	Sharon Springs
5998.00	6861.44	Niobrara Top
6028.00	6956.03	Niobrara A Chalk Target Top
6048.00	7116.60	Niobrara A Chalk Target Center

PROPOSED LOCAL COORDINATES:

SHL: 642ft FSL & 1911ft FWL of Sec 31  
HZ LP \*NEW\*: 1780ft FNL & 600ft FWL of Sec 6  
BHL: 1780ft FNL & 300ft FEL of Sec 5



# Planning Report



<b>Database:</b>	Database 1	<b>Local Co-ordinate Reference:</b>	Well ANDERSON FED 6-5-4HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB 25' @ 4903.00usft
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB 25' @ 4903.00usft
<b>Site:</b>	SE SW SEC. 31 T9N R59W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	ANDERSON FED 6-5-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	PROPOSAL #3		

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

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

<b>Well</b>	ANDERSON FED 6-5-4HN		
<b>Well Position</b>	<b>+N-S</b>	118.03 usft	<b>Northing:</b>
	<b>+E-W</b>	155.83 usft	<b>Easting:</b>
<b>Position Uncertainty</b>	0.00 usft	<b>Wellhead Elevation:</b>	usft
		<b>Latitude:</b>	40.701021
		<b>Longitude:</b>	-104.023425
		<b>Ground Level:</b>	4,878.00 usft

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

<b>Design</b>	PROPOSAL #3			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PROTOTYPE	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N-S (usft)</b>	<b>+E-W (usft)</b>	<b>Direction (°)</b>
	6,048.00	0.00	0.00	105.27

<b>Plan Sections</b>											
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	
700.00	0.00	0.00	700.00	-4,203.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,729.35	30.88	213.43	1,680.23	-3,222.77	-225.95	-149.15	3.00	3.00	0.00	213.43	
6,052.42	30.88	213.43	5,390.47	487.47	-2,077.71	-1,371.48	0.00	0.00	0.00	0.00	
7,116.60	90.00	90.01	6,048.00	1,145.00	-2,406.07	-821.97	10.00	5.56	-11.60	-119.52	LP *NEW* - ANDEF
16,758.51	90.00	90.01	6,048.00	1,145.00	-2,408.45	8,819.94	0.00	0.00	0.00	0.00	BHL - ANDERSON

# Planning Report



<b>Database:</b>	Database 1	<b>Local Co-ordinate Reference:</b>	Well ANDERSON FED 6-5-4HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB 25' @ 4903.00usft
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB 25' @ 4903.00usft
<b>Site:</b>	SE SW SEC. 31 T9N R59W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	ANDERSON FED 6-5-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	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)
<b>SHL: 642ft FSL &amp; 1911ft FWL of Sec 31</b>										
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
<b>Fox Hills Base</b>										
470.00	0.00	0.00	470.00	4,433.00	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
<b>START NUDGE (3°/100ft BUR)</b>										
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	3.00	213.43	799.95	4,103.05	-2.18	-1.44	-0.82	3.00	3.00	0.00
900.00	6.00	213.43	899.63	4,003.37	-8.73	-5.76	-3.26	3.00	3.00	0.00
1,000.00	9.00	213.43	998.77	3,904.23	-19.62	-12.95	-7.33	3.00	3.00	0.00
1,100.00	12.00	213.43	1,097.08	3,805.92	-34.83	-22.99	-13.00	3.00	3.00	0.00
1,200.00	15.00	213.43	1,194.31	3,708.69	-54.31	-35.85	-20.28	3.00	3.00	0.00
1,300.00	18.00	213.43	1,290.18	3,612.82	-78.01	-51.50	-29.13	3.00	3.00	0.00
1,400.00	21.00	213.43	1,384.43	3,518.57	-105.87	-69.88	-39.53	3.00	3.00	0.00
1,500.00	24.00	213.43	1,476.81	3,426.19	-137.80	-90.96	-51.45	3.00	3.00	0.00
<b>Pierre Shale Top</b>										
1,511.17	24.34	213.43	1,487.00	3,416.00	-141.62	-93.48	-52.87	3.00	3.00	0.00
1,600.00	27.00	213.43	1,567.06	3,335.94	-173.73	-114.68	-64.86	3.00	3.00	0.00
1,700.00	30.00	213.43	1,654.93	3,248.07	-213.54	-140.96	-79.73	3.00	3.00	0.00
<b>EOB TO 30.88° INC</b>										
1,729.35	30.88	213.43	1,680.23	3,222.77	-225.95	-149.15	-84.36	3.00	3.00	0.00
1,800.00	30.88	213.43	1,740.87	3,162.13	-256.22	-169.13	-95.66	0.00	0.00	0.00
1,900.00	30.88	213.43	1,826.69	3,076.31	-299.05	-197.40	-111.65	0.00	0.00	0.00
2,000.00	30.88	213.43	1,912.52	2,990.48	-341.89	-225.68	-127.64	0.00	0.00	0.00
2,100.00	30.88	213.43	1,998.34	2,904.66	-384.72	-253.95	-143.64	0.00	0.00	0.00
2,200.00	30.88	213.43	2,084.16	2,818.84	-427.55	-282.23	-159.63	0.00	0.00	0.00
2,300.00	30.88	213.43	2,169.99	2,733.01	-470.39	-310.50	-175.62	0.00	0.00	0.00
2,400.00	30.88	213.43	2,255.81	2,647.19	-513.22	-338.78	-191.61	0.00	0.00	0.00
2,500.00	30.88	213.43	2,341.64	2,561.36	-556.06	-367.05	-207.61	0.00	0.00	0.00
2,600.00	30.88	213.43	2,427.46	2,475.54	-598.89	-395.32	-223.60	0.00	0.00	0.00
2,700.00	30.88	213.43	2,513.28	2,389.72	-641.73	-423.60	-239.59	0.00	0.00	0.00
2,800.00	30.88	213.43	2,599.11	2,303.89	-684.56	-451.87	-255.58	0.00	0.00	0.00
2,900.00	30.88	213.43	2,684.93	2,218.07	-727.39	-480.15	-271.58	0.00	0.00	0.00
3,000.00	30.88	213.43	2,770.76	2,132.24	-770.23	-508.42	-287.57	0.00	0.00	0.00
3,100.00	30.88	213.43	2,856.58	2,046.42	-813.06	-536.70	-303.56	0.00	0.00	0.00
3,200.00	30.88	213.43	2,942.41	1,960.59	-855.90	-564.97	-319.55	0.00	0.00	0.00
3,300.00	30.88	213.43	3,028.23	1,874.77	-898.73	-593.25	-335.55	0.00	0.00	0.00
3,400.00	30.88	213.43	3,114.05	1,788.95	-941.57	-621.52	-351.54	0.00	0.00	0.00
3,500.00	30.88	213.43	3,199.88	1,703.12	-984.40	-649.80	-367.53	0.00	0.00	0.00
3,600.00	30.88	213.43	3,285.70	1,617.30	-1,027.23	-678.07	-383.52	0.00	0.00	0.00
<b>Richard Sandstone</b>										
3,605.01	30.88	213.43	3,290.00	1,613.00	-1,029.38	-679.49	-384.32	0.00	0.00	0.00
3,700.00	30.88	213.43	3,371.53	1,531.47	-1,070.07	-706.35	-399.52	0.00	0.00	0.00
<b>Parkman Sandstone</b>										
3,762.31	30.88	213.43	3,425.00	1,478.00	-1,096.76	-723.96	-409.48	0.00	0.00	0.00
3,800.00	30.88	213.43	3,457.35	1,445.65	-1,112.90	-734.62	-415.51	0.00	0.00	0.00
3,900.00	30.88	213.43	3,543.17	1,359.83	-1,155.74	-762.89	-431.50	0.00	0.00	0.00
4,000.00	30.88	213.43	3,629.00	1,274.00	-1,198.57	-791.17	-447.49	0.00	0.00	0.00



# Planning Report



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<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB 25' @ 4903.00usft
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB 25' @ 4903.00usft
<b>Site:</b>	SE SW SEC. 31 T9N R59W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	ANDERSON FED 6-5-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	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	30.88	213.43	3,714.82	1,188.18	-1,241.41	-819.44	-463.49	0.00	0.00	0.00
4,200.00	30.88	213.43	3,800.65	1,102.35	-1,284.24	-847.72	-479.48	0.00	0.00	0.00
4,300.00	30.88	213.43	3,886.47	1,016.53	-1,327.07	-875.99	-495.47	0.00	0.00	0.00
4,400.00	30.88	213.43	3,972.29	930.71	-1,369.91	-904.27	-511.46	0.00	0.00	0.00
4,500.00	30.88	213.43	4,058.12	844.88	-1,412.74	-932.54	-527.46	0.00	0.00	0.00
<b>Sussex Sandstone</b>										
<b>4,562.78</b>	<b>30.88</b>	<b>213.43</b>	<b>4,112.00</b>	<b>791.00</b>	<b>-1,439.63</b>	<b>-950.29</b>	<b>-537.50</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
4,600.00	30.88	213.43	4,143.94	759.06	-1,455.58	-960.82	-543.45	0.00	0.00	0.00
4,700.00	30.88	213.43	4,229.77	673.23	-1,498.41	-989.09	-559.44	0.00	0.00	0.00
4,800.00	30.88	213.43	4,315.59	587.41	-1,541.25	-1,017.37	-575.43	0.00	0.00	0.00
4,900.00	30.88	213.43	4,401.41	501.59	-1,584.08	-1,045.64	-591.43	0.00	0.00	0.00
5,000.00	30.88	213.43	4,487.24	415.76	-1,626.91	-1,073.92	-607.42	0.00	0.00	0.00
5,100.00	30.88	213.43	4,573.06	329.94	-1,669.75	-1,102.19	-623.41	0.00	0.00	0.00
<b>Shannon Sandstone</b>										
<b>5,106.92</b>	<b>30.88</b>	<b>213.43</b>	<b>4,579.00</b>	<b>324.00</b>	<b>-1,672.71</b>	<b>-1,104.15</b>	<b>-624.52</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
5,200.00	30.88	213.43	4,658.89	244.11	-1,712.58	-1,130.47	-639.40	0.00	0.00	0.00
5,300.00	30.88	213.43	4,744.71	158.29	-1,755.42	-1,158.74	-655.39	0.00	0.00	0.00
5,400.00	30.88	213.43	4,830.53	72.47	-1,798.25	-1,187.01	-671.39	0.00	0.00	0.00
5,500.00	30.88	213.43	4,916.36	-13.36	-1,841.09	-1,215.29	-687.38	0.00	0.00	0.00
5,600.00	30.88	213.43	5,002.18	-99.18	-1,883.92	-1,243.56	-703.37	0.00	0.00	0.00
5,700.00	30.88	213.43	5,088.01	-185.01	-1,926.75	-1,271.84	-719.36	0.00	0.00	0.00
5,800.00	30.88	213.43	5,173.83	-270.83	-1,969.59	-1,300.11	-735.36	0.00	0.00	0.00
5,900.00	30.88	213.43	5,259.65	-356.65	-2,012.42	-1,328.39	-751.35	0.00	0.00	0.00
6,000.00	30.88	213.43	5,345.48	-442.48	-2,055.26	-1,356.66	-767.34	0.00	0.00	0.00
<b>TeePee Buttes</b>										
<b>6,002.94</b>	<b>30.88</b>	<b>213.43</b>	<b>5,348.00</b>	<b>-445.00</b>	<b>-2,056.52</b>	<b>-1,357.49</b>	<b>-767.81</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>KOP (10°/100ft DGLG)</b>										
<b>6,052.42</b>	<b>30.88</b>	<b>213.43</b>	<b>5,390.47</b>	<b>-487.47</b>	<b>-2,077.71</b>	<b>-1,371.48</b>	<b>-775.72</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
6,100.00	28.81	204.81	5,431.76	-528.76	-2,098.32	-1,383.03	-781.43	10.00	-4.36	-18.11
6,200.00	26.58	183.73	5,520.51	-617.51	-2,142.62	-1,394.62	-780.95	10.00	-2.23	-21.09
6,300.00	27.72	161.84	5,609.72	-706.72	-2,187.15	-1,388.81	-763.61	10.00	1.14	-21.88
6,400.00	31.87	143.43	5,696.67	-793.67	-2,230.56	-1,365.78	-729.96	10.00	4.15	-18.41
6,500.00	38.05	129.64	5,778.71	-875.71	-2,271.52	-1,326.22	-681.01	10.00	6.18	-13.79
6,600.00	45.43	119.47	5,853.36	-950.36	-2,308.80	-1,271.34	-618.25	10.00	7.38	-10.17
6,700.00	53.51	111.69	5,918.35	-1,015.35	-2,341.26	-1,202.81	-543.58	10.00	8.08	-7.78
<b>Sharon Springs</b>										
<b>6,773.90</b>	<b>59.75</b>	<b>106.94</b>	<b>5,959.00</b>	<b>-1,056.00</b>	<b>-2,361.56</b>	<b>-1,144.59</b>	<b>-482.07</b>	<b>10.00</b>	<b>8.44</b>	<b>-6.42</b>
6,800.00	61.99	105.41	5,971.71	-1,068.71	-2,367.91	-1,122.69	-459.28	10.00	8.59	-5.86
<b>Niobrara Top</b>										
<b>6,861.44</b>	<b>67.33</b>	<b>102.05</b>	<b>5,998.00</b>	<b>-1,095.00</b>	<b>-2,381.05</b>	<b>-1,068.77</b>	<b>-403.80</b>	<b>10.00</b>	<b>8.69</b>	<b>-5.47</b>
6,900.00	70.72	100.07	6,011.80	-1,108.80	-2,387.95	-1,033.44	-367.90	10.00	8.78	-5.13
<b>Niobrara A Chalk Target Top</b>										
<b>6,956.03</b>	<b>75.67</b>	<b>97.34</b>	<b>6,028.00</b>	<b>-1,125.00</b>	<b>-2,396.05</b>	<b>-980.45</b>	<b>-314.64</b>	<b>10.00</b>	<b>8.84</b>	<b>-4.88</b>
7,000.00	79.58	95.28	6,037.42	-1,134.42	-2,400.76	-937.77	-272.23	10.00	8.89	-4.68
7,100.00	88.51	90.76	6,047.78	-1,144.78	-2,405.96	-838.57	-175.16	10.00	8.93	-4.52
<b>LP *NEW*: 1780ft FNL &amp; 600ft FWL of Sec 6 - Niobrara A Chalk Target Center</b>										
<b>7,116.60</b>	<b>90.00</b>	<b>90.01</b>	<b>6,048.00</b>	<b>-1,145.00</b>	<b>-2,406.07</b>	<b>-821.97</b>	<b>-159.12</b>	<b>10.00</b>	<b>8.95</b>	<b>-4.47</b>
7,200.00	90.00	90.01	6,048.00	-1,145.00	-2,406.09	-738.57	-78.66	0.00	0.00	0.00
7,300.00	90.00	90.01	6,048.00	-1,145.00	-2,406.12	-638.57	17.81	0.00	0.00	0.00
7,400.00	90.00	90.01	6,048.00	-1,145.00	-2,406.14	-538.57	114.29	0.00	0.00	0.00
7,500.00	90.00	90.01	6,048.00	-1,145.00	-2,406.16	-438.57	210.76	0.00	0.00	0.00
7,600.00	90.00	90.01	6,048.00	-1,145.00	-2,406.19	-338.57	307.24	0.00	0.00	0.00
7,700.00	90.00	90.01	6,048.00	-1,145.00	-2,406.21	-238.57	403.71	0.00	0.00	0.00

# Planning Report



<b>Database:</b>	Database 1	<b>Local Co-ordinate Reference:</b>	Well ANDERSON FED 6-5-4HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB 25' @ 4903.00usft
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB 25' @ 4903.00usft
<b>Site:</b>	SE SW SEC. 31 T9N R59W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	ANDERSON FED 6-5-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	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)
7,800.00	90.00	90.01	6,048.00	-1,145.00	-2,406.24	-138.57	500.18	0.00	0.00	0.00
7,900.00	90.00	90.01	6,048.00	-1,145.00	-2,406.26	-38.57	596.66	0.00	0.00	0.00
8,000.00	90.00	90.01	6,048.00	-1,145.00	-2,406.29	61.43	693.13	0.00	0.00	0.00
8,100.00	90.00	90.01	6,048.00	-1,145.00	-2,406.31	161.43	789.61	0.00	0.00	0.00
8,200.00	90.00	90.01	6,048.00	-1,145.00	-2,406.34	261.43	886.08	0.00	0.00	0.00
8,300.00	90.00	90.01	6,048.00	-1,145.00	-2,406.36	361.43	982.56	0.00	0.00	0.00
8,400.00	90.00	90.01	6,048.00	-1,145.00	-2,406.39	461.43	1,079.03	0.00	0.00	0.00
8,500.00	90.00	90.01	6,048.00	-1,145.00	-2,406.41	561.43	1,175.51	0.00	0.00	0.00
8,600.00	90.00	90.01	6,048.00	-1,145.00	-2,406.44	661.43	1,271.98	0.00	0.00	0.00
8,700.00	90.00	90.01	6,048.00	-1,145.00	-2,406.46	761.43	1,368.45	0.00	0.00	0.00
8,800.00	90.00	90.01	6,048.00	-1,145.00	-2,406.49	861.43	1,464.93	0.00	0.00	0.00
8,900.00	90.00	90.01	6,048.00	-1,145.00	-2,406.51	961.43	1,561.40	0.00	0.00	0.00
9,000.00	90.00	90.01	6,048.00	-1,145.00	-2,406.53	1,061.43	1,657.88	0.00	0.00	0.00
9,100.00	90.00	90.01	6,048.00	-1,145.00	-2,406.56	1,161.43	1,754.35	0.00	0.00	0.00
9,200.00	90.00	90.01	6,048.00	-1,145.00	-2,406.58	1,261.43	1,850.83	0.00	0.00	0.00
9,300.00	90.00	90.01	6,048.00	-1,145.00	-2,406.61	1,361.43	1,947.30	0.00	0.00	0.00
9,400.00	90.00	90.01	6,048.00	-1,145.00	-2,406.63	1,461.43	2,043.78	0.00	0.00	0.00
9,500.00	90.00	90.01	6,048.00	-1,145.00	-2,406.66	1,561.43	2,140.25	0.00	0.00	0.00
9,600.00	90.00	90.01	6,048.00	-1,145.00	-2,406.68	1,661.43	2,236.73	0.00	0.00	0.00
9,700.00	90.00	90.01	6,048.00	-1,145.00	-2,406.71	1,761.43	2,333.20	0.00	0.00	0.00
9,800.00	90.00	90.01	6,048.00	-1,145.00	-2,406.73	1,861.43	2,429.67	0.00	0.00	0.00
9,900.00	90.00	90.01	6,048.00	-1,145.00	-2,406.76	1,961.43	2,526.15	0.00	0.00	0.00
10,000.00	90.00	90.01	6,048.00	-1,145.00	-2,406.78	2,061.43	2,622.62	0.00	0.00	0.00
10,100.00	90.00	90.01	6,048.00	-1,145.00	-2,406.81	2,161.43	2,719.10	0.00	0.00	0.00
10,200.00	90.00	90.01	6,048.00	-1,145.00	-2,406.83	2,261.43	2,815.57	0.00	0.00	0.00
10,300.00	90.00	90.01	6,048.00	-1,145.00	-2,406.86	2,361.43	2,912.05	0.00	0.00	0.00
10,400.00	90.00	90.01	6,048.00	-1,145.00	-2,406.88	2,461.43	3,008.52	0.00	0.00	0.00
10,500.00	90.00	90.01	6,048.00	-1,145.00	-2,406.90	2,561.43	3,105.00	0.00	0.00	0.00
10,600.00	90.00	90.01	6,048.00	-1,145.00	-2,406.93	2,661.43	3,201.47	0.00	0.00	0.00
10,700.00	90.00	90.01	6,048.00	-1,145.00	-2,406.95	2,761.43	3,297.95	0.00	0.00	0.00
10,800.00	90.00	90.01	6,048.00	-1,145.00	-2,406.98	2,861.43	3,394.42	0.00	0.00	0.00
10,900.00	90.00	90.01	6,048.00	-1,145.00	-2,407.00	2,961.43	3,490.89	0.00	0.00	0.00
11,000.00	90.00	90.01	6,048.00	-1,145.00	-2,407.03	3,061.43	3,587.37	0.00	0.00	0.00
11,100.00	90.00	90.01	6,048.00	-1,145.00	-2,407.05	3,161.43	3,683.84	0.00	0.00	0.00
11,200.00	90.00	90.01	6,048.00	-1,145.00	-2,407.08	3,261.43	3,780.32	0.00	0.00	0.00
11,300.00	90.00	90.01	6,048.00	-1,145.00	-2,407.10	3,361.43	3,876.79	0.00	0.00	0.00
11,400.00	90.00	90.01	6,048.00	-1,145.00	-2,407.13	3,461.43	3,973.27	0.00	0.00	0.00
11,500.00	90.00	90.01	6,048.00	-1,145.00	-2,407.15	3,561.43	4,069.74	0.00	0.00	0.00
11,600.00	90.00	90.01	6,048.00	-1,145.00	-2,407.18	3,661.43	4,166.22	0.00	0.00	0.00
11,700.00	90.00	90.01	6,048.00	-1,145.00	-2,407.20	3,761.43	4,262.69	0.00	0.00	0.00
11,800.00	90.00	90.01	6,048.00	-1,145.00	-2,407.23	3,861.43	4,359.16	0.00	0.00	0.00
11,900.00	90.00	90.01	6,048.00	-1,145.00	-2,407.25	3,961.43	4,455.64	0.00	0.00	0.00
12,000.00	90.00	90.01	6,048.00	-1,145.00	-2,407.28	4,061.43	4,552.11	0.00	0.00	0.00
12,100.00	90.00	90.01	6,048.00	-1,145.00	-2,407.30	4,161.43	4,648.59	0.00	0.00	0.00
12,200.00	90.00	90.01	6,048.00	-1,145.00	-2,407.32	4,261.43	4,745.06	0.00	0.00	0.00
12,300.00	90.00	90.01	6,048.00	-1,145.00	-2,407.35	4,361.43	4,841.54	0.00	0.00	0.00
12,400.00	90.00	90.01	6,048.00	-1,145.00	-2,407.37	4,461.43	4,938.01	0.00	0.00	0.00
12,500.00	90.00	90.01	6,048.00	-1,145.00	-2,407.40	4,561.43	5,034.49	0.00	0.00	0.00
12,600.00	90.00	90.01	6,048.00	-1,145.00	-2,407.42	4,661.43	5,130.96	0.00	0.00	0.00
12,700.00	90.00	90.01	6,048.00	-1,145.00	-2,407.45	4,761.43	5,227.44	0.00	0.00	0.00
12,800.00	90.00	90.01	6,048.00	-1,145.00	-2,407.47	4,861.43	5,323.91	0.00	0.00	0.00
12,900.00	90.00	90.01	6,048.00	-1,145.00	-2,407.50	4,961.43	5,420.38	0.00	0.00	0.00
13,000.00	90.00	90.01	6,048.00	-1,145.00	-2,407.52	5,061.43	5,516.86	0.00	0.00	0.00
13,100.00	90.00	90.01	6,048.00	-1,145.00	-2,407.55	5,161.43	5,613.33	0.00	0.00	0.00

# Planning Report



<b>Database:</b>	Database 1	<b>Local Co-ordinate Reference:</b>	Well ANDERSON FED 6-5-4HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB 25' @ 4903.00usft
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB 25' @ 4903.00usft
<b>Site:</b>	SE SW SEC. 31 T9N R59W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	ANDERSON FED 6-5-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	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)
13,200.00	90.00	90.01	6,048.00	-1,145.00	-2,407.57	5,261.43	5,709.81	0.00	0.00	0.00
13,300.00	90.00	90.01	6,048.00	-1,145.00	-2,407.60	5,361.43	5,806.28	0.00	0.00	0.00
13,400.00	90.00	90.01	6,048.00	-1,145.00	-2,407.62	5,461.43	5,902.76	0.00	0.00	0.00
13,500.00	90.00	90.01	6,048.00	-1,145.00	-2,407.65	5,561.43	5,999.23	0.00	0.00	0.00
13,600.00	90.00	90.01	6,048.00	-1,145.00	-2,407.67	5,661.43	6,095.71	0.00	0.00	0.00
13,700.00	90.00	90.01	6,048.00	-1,145.00	-2,407.69	5,761.43	6,192.18	0.00	0.00	0.00
13,800.00	90.00	90.01	6,048.00	-1,145.00	-2,407.72	5,861.43	6,288.65	0.00	0.00	0.00
13,900.00	90.00	90.01	6,048.00	-1,145.00	-2,407.74	5,961.43	6,385.13	0.00	0.00	0.00
14,000.00	90.00	90.01	6,048.00	-1,145.00	-2,407.77	6,061.43	6,481.60	0.00	0.00	0.00
14,100.00	90.00	90.01	6,048.00	-1,145.00	-2,407.79	6,161.43	6,578.08	0.00	0.00	0.00
14,200.00	90.00	90.01	6,048.00	-1,145.00	-2,407.82	6,261.43	6,674.55	0.00	0.00	0.00
14,300.00	90.00	90.01	6,048.00	-1,145.00	-2,407.84	6,361.43	6,771.03	0.00	0.00	0.00
14,400.00	90.00	90.01	6,048.00	-1,145.00	-2,407.87	6,461.43	6,867.50	0.00	0.00	0.00
14,500.00	90.00	90.01	6,048.00	-1,145.00	-2,407.89	6,561.43	6,963.98	0.00	0.00	0.00
14,600.00	90.00	90.01	6,048.00	-1,145.00	-2,407.92	6,661.43	7,060.45	0.00	0.00	0.00
14,700.00	90.00	90.01	6,048.00	-1,145.00	-2,407.94	6,761.43	7,156.93	0.00	0.00	0.00
14,800.00	90.00	90.01	6,048.00	-1,145.00	-2,407.97	6,861.43	7,253.40	0.00	0.00	0.00
14,900.00	90.00	90.01	6,048.00	-1,145.00	-2,407.99	6,961.43	7,349.87	0.00	0.00	0.00
15,000.00	90.00	90.01	6,048.00	-1,145.00	-2,408.02	7,061.43	7,446.35	0.00	0.00	0.00
15,100.00	90.00	90.01	6,048.00	-1,145.00	-2,408.04	7,161.43	7,542.82	0.00	0.00	0.00
15,200.00	90.00	90.01	6,048.00	-1,145.00	-2,408.06	7,261.43	7,639.30	0.00	0.00	0.00
15,300.00	90.00	90.01	6,048.00	-1,145.00	-2,408.09	7,361.43	7,735.77	0.00	0.00	0.00
15,400.00	90.00	90.01	6,048.00	-1,145.00	-2,408.11	7,461.43	7,832.25	0.00	0.00	0.00
15,500.00	90.00	90.01	6,048.00	-1,145.00	-2,408.14	7,561.43	7,928.72	0.00	0.00	0.00
15,600.00	90.00	90.01	6,048.00	-1,145.00	-2,408.16	7,661.43	8,025.20	0.00	0.00	0.00
15,700.00	90.00	90.01	6,048.00	-1,145.00	-2,408.19	7,761.43	8,121.67	0.00	0.00	0.00
15,800.00	90.00	90.01	6,048.00	-1,145.00	-2,408.21	7,861.43	8,218.15	0.00	0.00	0.00
15,900.00	90.00	90.01	6,048.00	-1,145.00	-2,408.24	7,961.43	8,314.62	0.00	0.00	0.00
16,000.00	90.00	90.01	6,048.00	-1,145.00	-2,408.26	8,061.43	8,411.09	0.00	0.00	0.00
16,100.00	90.00	90.01	6,048.00	-1,145.00	-2,408.29	8,161.43	8,507.57	0.00	0.00	0.00
16,200.00	90.00	90.01	6,048.00	-1,145.00	-2,408.31	8,261.43	8,604.04	0.00	0.00	0.00
16,300.00	90.00	90.01	6,048.00	-1,145.00	-2,408.34	8,361.43	8,700.52	0.00	0.00	0.00
16,400.00	90.00	90.01	6,048.00	-1,145.00	-2,408.36	8,461.43	8,796.99	0.00	0.00	0.00
16,500.00	90.00	90.01	6,048.00	-1,145.00	-2,408.39	8,561.43	8,893.47	0.00	0.00	0.00
16,600.00	90.00	90.01	6,048.00	-1,145.00	-2,408.41	8,661.43	8,989.94	0.00	0.00	0.00
16,700.00	90.00	90.01	6,048.00	-1,145.00	-2,408.44	8,761.43	9,086.42	0.00	0.00	0.00
<b>BHL: 1780ft FNL &amp; 300ft FEL of Sec 5</b>										
<b>16,758.51</b>	<b>90.00</b>	<b>90.01</b>	<b>6,048.00</b>	<b>-1,145.00</b>	<b>-2,408.45</b>	<b>8,819.94</b>	<b>9,142.86</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

# Planning Report



<b>Database:</b>	Database 1	<b>Local Co-ordinate Reference:</b>	Well ANDERSON FED 6-5-4HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB 25' @ 4903.00usft
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB 25' @ 4903.00usft
<b>Site:</b>	SE SW SEC. 31 T9N R59W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	ANDERSON FED 6-5-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	PROPOSAL #3		

Formations					
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
470.00	470.00	Fox Hills Base			
1,511.17	1,487.00	Pierre Shale Top			
3,605.01	3,290.00	Richard Sandstone			
3,762.31	3,425.00	Parkman Sandstone			
4,562.78	4,112.00	Sussex Sandstone			
5,106.92	4,579.00	Shannon Sandstone			
6,002.94	5,348.00	TeePee Buttes			
6,773.90	5,959.00	Sharon Springs			
6,861.44	5,998.00	Niobrara Top			
6,956.03	6,028.00	Niobrara A Chalk Target Top			
7,116.60	6,048.00	Niobrara A 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: 642ft FSL & 1911ft FWL of Sec 31
700.00	700.00	0.00	0.00	START NUDGE (3°/100ft BUR)
1,729.35	1,680.23	-225.95	-149.15	EOB TO 30.88° INC
6,052.42	5,390.47	-2,077.71	-1,371.48	KOP (10°/100ft DGLG)
7,116.60	6,048.00	-2,406.07	-821.97	LP *NEW*: 1780ft FNL & 600ft FWL of Sec 6
16,758.51	6,048.00	-2,408.45	8,819.94	BHL: 1780ft FNL & 300ft FEL of Sec 5