

# **MALLARD EXPLORATION**

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

**SW SW SEC. 31 T8N R59W 6th P.M.**

**MOTTLED 31-4HN**

**ORIGINAL WELLBORE**

**26 September, 2017**

**Plan: PROPOSAL #1**





Project: WELD COUNTY, COLORADO (NAD 83)  
Site: SW SW SEC. 31 T8N R59W 6th P.M.  
Well: MOTTLED 31-4HN  
Wellbore: ORIGINAL WELLBORE  
Design: PROPOSAL #1

ANNOTATIONS									
TVD	MD	Inc	Azi	+N/-S	+E/-W	VSection	Dep	Annotation	
0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	SHL: 550ft FSL & 1259ft FWL of Sec 31	
400.0	400.0	0.00	0.00	0.0	0.0	0.0	0.0	START NUDGE (2°/100ft BUR)	
995.6	1000.0	12.00	171.76	-62.0	9.0	-61.7	62.6	EOB TO 12° INC	
2894.2	2941.0	12.00	171.76	-461.3	66.8	-459.3	466.2	END OF TANGENT	
3489.8	3541.0	0.00	0.00	-523.3	75.8	-520.9	528.8	EOD TO VERTICAL	
5638.0	5689.2	0.00	0.00	-523.3	75.8	-520.9	528.8	KOP (10°/100ft BUR)	
6211.0	6589.2	90.00	1.11	49.6	86.9	52.0	1101.7	HZ LP: 600ft FSL & 1345ft FWL of Sec 31	
6211.0	16004.8	90.00	1.12	9463.4	270.0	9467.2	10517.3	BHL: 600ft FNL & 1345ft FWL of Sec 30	

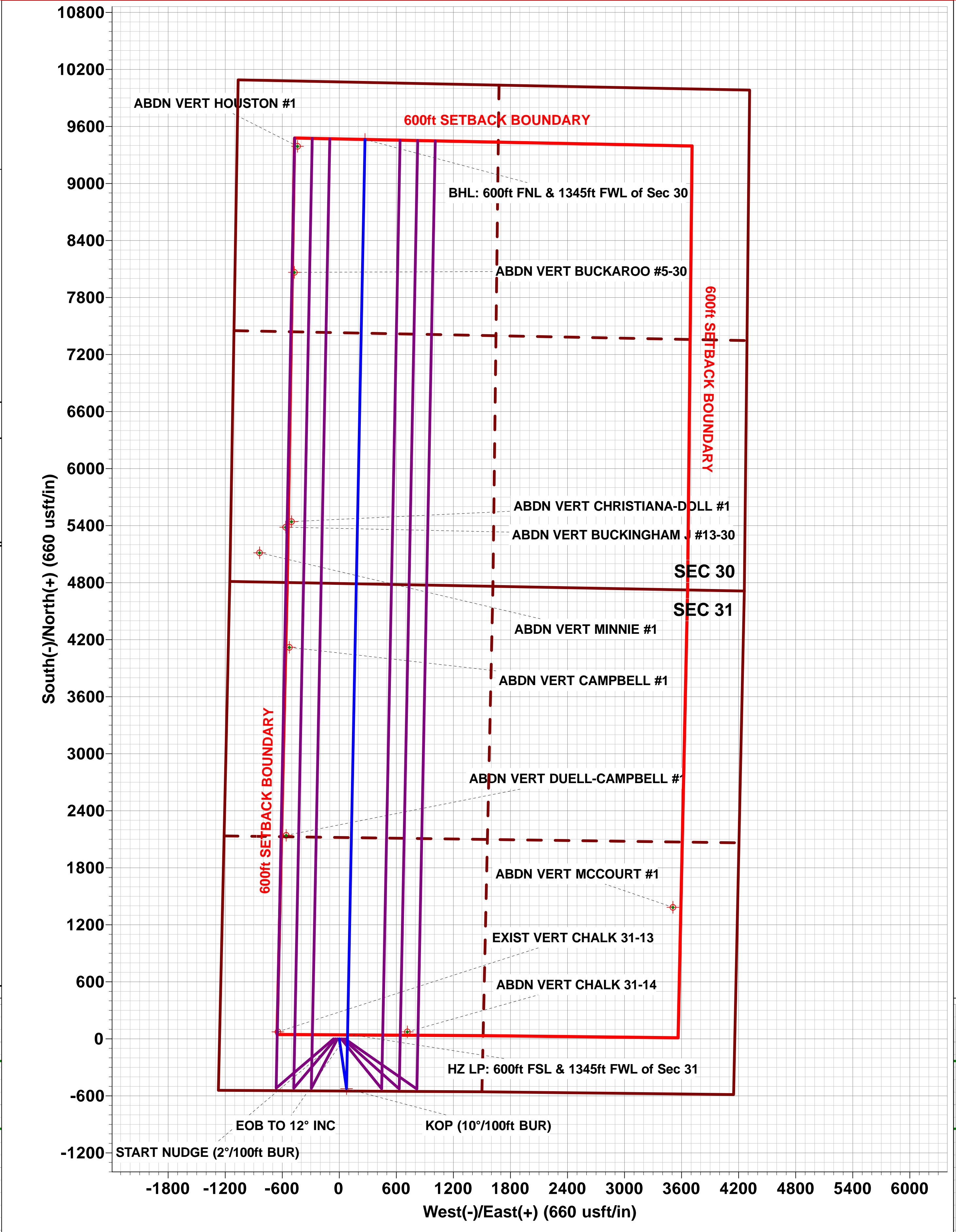
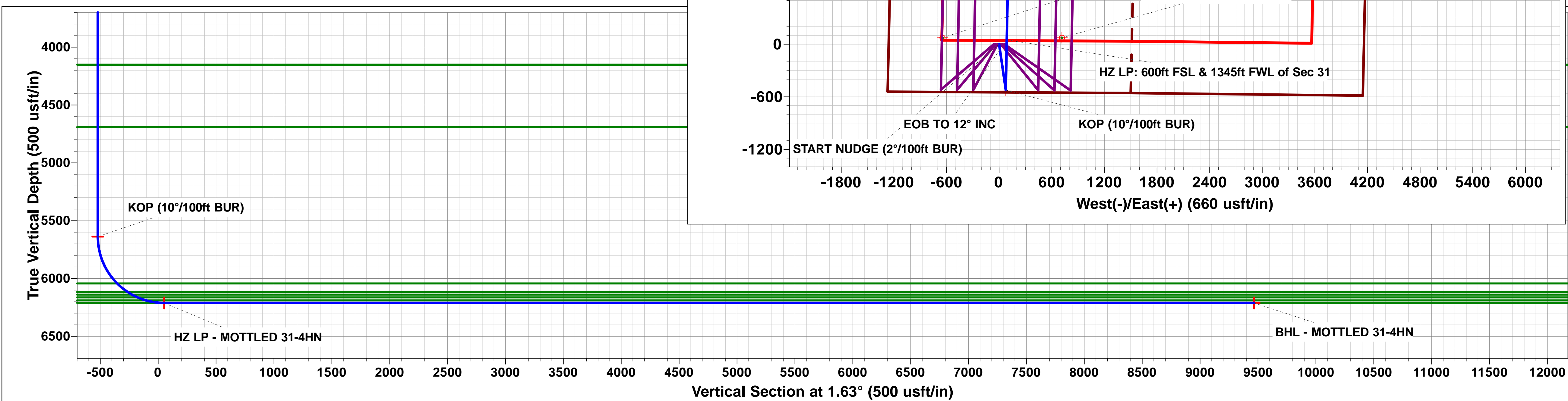
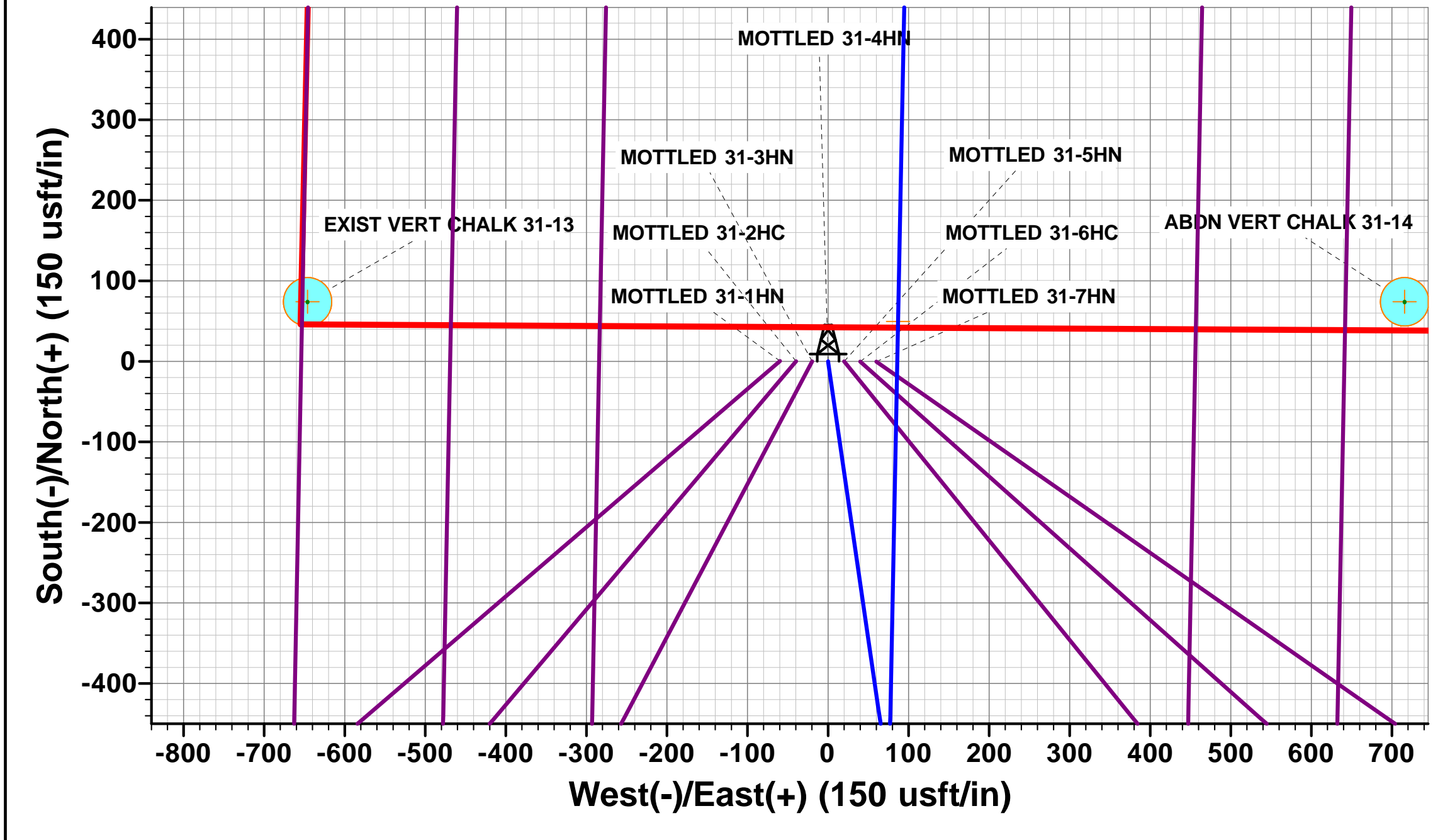
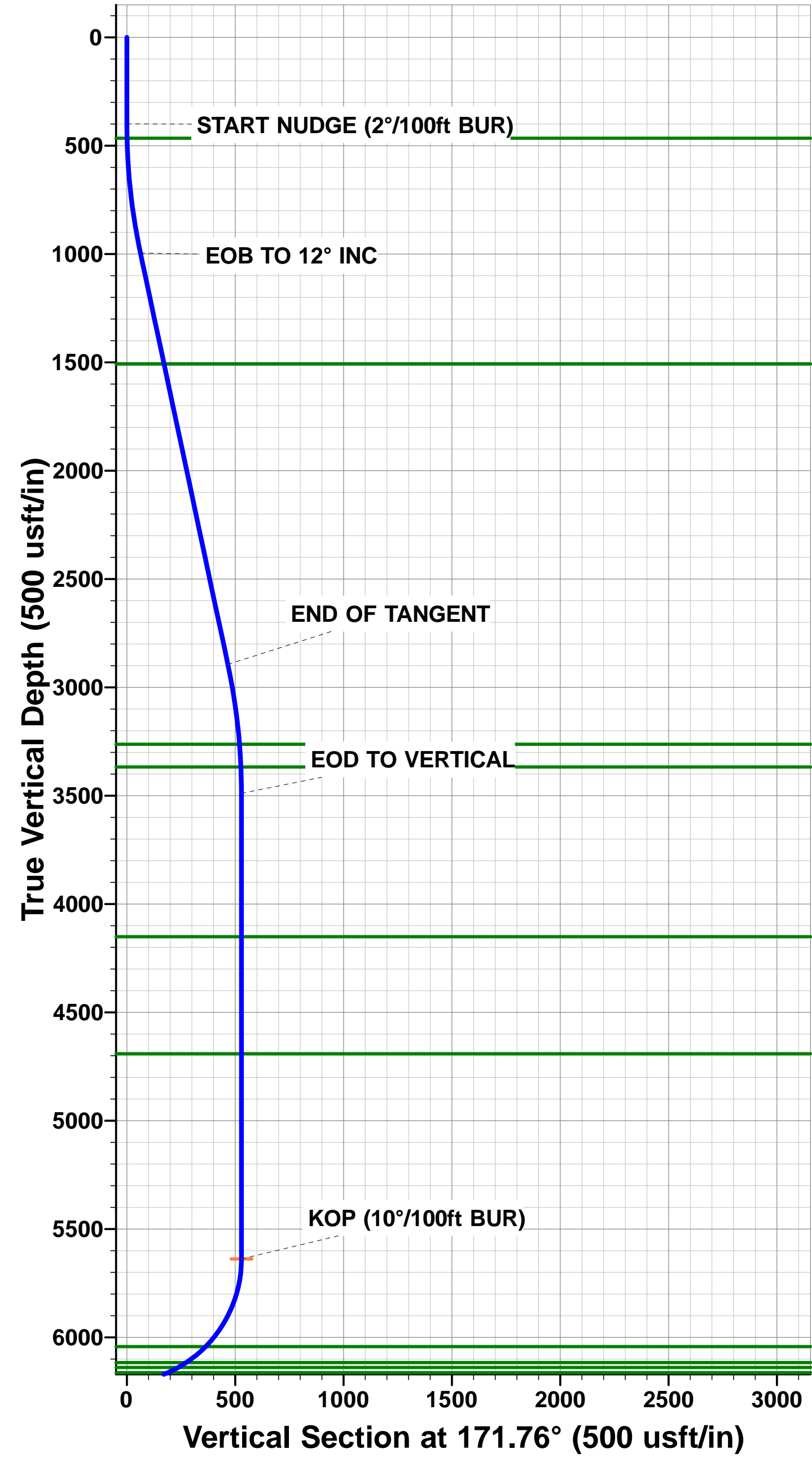
PROPOSED LOCAL COORDINATES:

SHL: 550ft FSL & 1259ft FWL Sec 31

HZ LP: 600ft FSL & 1345ft FWL Sec 31

BHL: 600ft FNL & 1345ft FWL of Sec 30

WELLBORE TARGET DETAILS (LAT/LONG)					
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP - MOTTLED 31-4HN	5638.0	-523.3	75.8	40.611651	-104.025865
HZ LP - MOTTLED 31-4HN	6211.0	49.6	86.9	40.613223	-104.025825
BHL - MOTTLED 31-4HN	6211.0	9463.4	270.0	40.639062	-104.025165



# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well MOTTLED 31-4HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4982.0usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4982.0usft (Original Well Elev)
<b>Site:</b>	SW SW SEC. 31 T8N R59W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	MOTTLED 31-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	PROPOSAL #1		

<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>	SW SW SEC. 31 T8N R59W 6th P.M.		
<b>Site Position:</b>		<b>Northing:</b>	1,469,589.22 usft
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,409,117.03 usft
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	1.10000ft
		<b>Latitude:</b>	40.613088
		<b>Longitude:</b>	-104.026353
		<b>Grid Convergence:</b>	0.95 °

<b>Well</b>	MOTTLED 31-4HN		
<b>Well Position</b>	<b>+N-S</b>	-0.4 usft	<b>Northing:</b>
	<b>+E-W</b>	59.7 usft	<b>Easting:</b>
<b>Position Uncertainty</b>		0.0 usft	<b>Wellhead Elevation:</b>
			<b>Latitude:</b>
			<b>Longitude:</b>
			<b>Ground Level:</b>

<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	26/09/2017	7.80	67.13	52,545

<b>Design</b>	PROPOSAL #1			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PROTOTYPE	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N-S (usft)</b>	<b>+E-W (usft)</b>	<b>Direction (°)</b>
	6,211.0	0.0	0.0	1.63

<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
0.0	0.00	0.00	0.0	-4,982.0	0.0	0.0	0.00	0.00	0.00	0.00	
400.0	0.00	0.00	400.0	-4,582.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,000.0	12.00	171.76	995.6	-3,986.4	-62.0	9.0	2.00	2.00	0.00	171.76	
2,941.0	12.00	171.76	2,894.2	-2,087.8	-461.3	66.8	0.00	0.00	0.00	0.00	
3,541.0	0.00	0.00	3,489.8	-1,492.2	-523.3	75.8	2.00	-2.00	0.00	180.00	
5,689.2	0.00	0.00	5,638.0	656.0	-523.3	75.8	0.00	0.00	0.00	0.00	KOP - MOTTLED 3
6,589.2	90.00	1.11	6,211.0	1,229.0	49.6	86.9	10.00	10.00	0.12	1.11	HZ LP - MOTTLED
16,004.8	90.00	1.12	6,211.0	1,229.0	9,463.4	270.0	0.00	0.00	0.00	49.97	BHL - MOTTLED 3

# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well MOTTLED 31-4HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4982.0usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4982.0usft (Original Well Elev)
<b>Site:</b>	SW SW SEC. 31 T8N R59W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	MOTTLED 31-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	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)
<b>SHL: 550ft FSL &amp; 1259ft FWL of Sec 31</b>										
0.0	0.00	0.00	0.0	4,982.00	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	4,882.00	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	4,782.00	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	4,682.00	0.0	0.0	0.0	0.00	0.00	0.00
<b>START NUDGE (2°/100ft BUR)</b>										
400.0	0.00	0.00	400.0	4,582.00	0.0	0.0	0.0	0.00	0.00	0.00
<b>Fox Hills Base</b>										
466.0	1.32	171.76	466.0	4,516.00	-0.8	0.1	-0.7	2.00	2.00	0.00
500.0	2.00	171.76	500.0	4,482.02	-1.7	0.3	-1.7	2.00	2.00	0.00
600.0	4.00	171.76	599.8	4,382.16	-6.9	1.0	-6.9	2.00	2.00	0.00
700.0	6.00	171.76	699.5	4,282.55	-15.5	2.2	-15.5	2.00	2.00	0.00
800.0	8.00	171.76	798.7	4,183.30	-27.6	4.0	-27.5	2.00	2.00	0.00
900.0	10.00	171.76	897.5	4,084.53	-43.1	6.2	-42.9	2.00	2.00	0.00
<b>EOB TO 12° INC</b>										
1,000.0	12.00	171.76	995.6	3,986.38	-62.0	9.0	-61.7	2.00	2.00	0.00
1,100.0	12.00	171.76	1,093.4	3,888.56	-82.5	12.0	-82.2	0.00	0.00	0.00
1,200.0	12.00	171.76	1,191.3	3,790.75	-103.1	14.9	-102.6	0.00	0.00	0.00
1,300.0	12.00	171.76	1,289.1	3,692.93	-123.7	17.9	-123.1	0.00	0.00	0.00
1,400.0	12.00	171.76	1,386.9	3,595.12	-144.3	20.9	-143.6	0.00	0.00	0.00
1,500.0	12.00	171.76	1,484.7	3,497.30	-164.8	23.9	-164.1	0.00	0.00	0.00
<b>Pierre Shale Top</b>										
1,523.8	12.00	171.76	1,508.0	3,474.00	-169.7	24.6	-169.0	0.00	0.00	0.00
1,600.0	12.00	171.76	1,582.5	3,399.49	-185.4	26.9	-184.6	0.00	0.00	0.00
1,700.0	12.00	171.76	1,680.3	3,301.67	-206.0	29.8	-205.1	0.00	0.00	0.00
1,800.0	12.00	171.76	1,778.1	3,203.86	-226.6	32.8	-225.5	0.00	0.00	0.00
1,900.0	12.00	171.76	1,876.0	3,106.04	-247.1	35.8	-246.0	0.00	0.00	0.00
2,000.0	12.00	171.76	1,973.8	3,008.23	-267.7	38.8	-266.5	0.00	0.00	0.00
2,100.0	12.00	171.76	2,071.6	2,910.41	-288.3	41.8	-287.0	0.00	0.00	0.00
2,200.0	12.00	171.76	2,169.4	2,812.60	-308.9	44.7	-307.5	0.00	0.00	0.00
2,300.0	12.00	171.76	2,267.2	2,714.78	-329.4	47.7	-328.0	0.00	0.00	0.00
2,400.0	12.00	171.76	2,365.0	2,616.97	-350.0	50.7	-348.4	0.00	0.00	0.00
2,500.0	12.00	171.76	2,462.8	2,519.16	-370.6	53.7	-368.9	0.00	0.00	0.00
2,600.0	12.00	171.76	2,560.7	2,421.34	-391.2	56.7	-389.4	0.00	0.00	0.00
2,700.0	12.00	171.76	2,658.5	2,323.53	-411.8	59.6	-409.9	0.00	0.00	0.00
2,800.0	12.00	171.76	2,756.3	2,225.71	-432.3	62.6	-430.4	0.00	0.00	0.00
2,900.0	12.00	171.76	2,854.1	2,127.90	-452.9	65.6	-450.9	0.00	0.00	0.00
<b>END OF TANGENT</b>										
2,941.0	12.00	171.76	2,894.2	2,087.79	-461.3	66.8	-459.3	0.00	0.00	0.00
3,000.0	10.82	171.76	2,952.0	2,029.96	-472.9	68.5	-470.7	2.00	-2.00	0.00
3,100.0	8.82	171.76	3,050.6	1,931.43	-489.8	70.9	-487.6	2.00	-2.00	0.00
3,200.0	6.82	171.76	3,149.6	1,832.36	-503.2	72.9	-501.0	2.00	-2.00	0.00
3,300.0	4.82	171.76	3,249.1	1,732.89	-513.3	74.3	-510.9	2.00	-2.00	0.00
<b>Richard Sandstone</b>										
3,313.9	4.54	171.76	3,263.0	1,719.00	-514.4	74.5	-512.1	2.00	-2.00	0.00
3,400.0	2.82	171.76	3,348.9	1,633.11	-519.9	75.3	-517.5	2.00	-2.00	0.00
<b>Parkman Sandstone</b>										
3,419.1	2.44	171.76	3,368.0	1,614.00	-520.7	75.4	-518.4	2.00	-2.00	0.00
3,500.0	0.82	171.76	3,448.8	1,533.17	-523.0	75.8	-520.6	2.00	-2.00	0.00
<b>EOD TO VERTICAL</b>										
3,541.0	0.00	0.00	3,489.8	1,492.17	-523.3	75.8	-520.9	2.00	-2.00	0.00
3,600.0	0.00	0.00	3,548.8	1,433.17	-523.3	75.8	-520.9	0.00	0.00	0.00
3,700.0	0.00	0.00	3,648.8	1,333.17	-523.3	75.8	-520.9	0.00	0.00	0.00

# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well MOTTLED 31-4HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4982.0usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4982.0usft (Original Well Elev)
<b>Site:</b>	SW SW SEC. 31 T8N R59W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	MOTTLED 31-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	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)
3,800.0	0.00	0.00	3,748.8	1,233.17	-523.3	75.8	-520.9	0.00	0.00	0.00
3,900.0	0.00	0.00	3,848.8	1,133.17	-523.3	75.8	-520.9	0.00	0.00	0.00
4,000.0	0.00	0.00	3,948.8	1,033.17	-523.3	75.8	-520.9	0.00	0.00	0.00
4,100.0	0.00	0.00	4,048.8	933.17	-523.3	75.8	-520.9	0.00	0.00	0.00
4,200.0	0.00	0.00	4,148.8	833.17	-523.3	75.8	-520.9	0.00	0.00	0.00
<b>Sussex Sandstone</b>										
<b>4,202.2</b>	<b>0.00</b>	<b>0.00</b>	<b>4,151.0</b>	<b>831.00</b>	<b>-523.3</b>	<b>75.8</b>	<b>-520.9</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
4,300.0	0.00	0.00	4,248.8	733.17	-523.3	75.8	-520.9	0.00	0.00	0.00
4,400.0	0.00	0.00	4,348.8	633.17	-523.3	75.8	-520.9	0.00	0.00	0.00
4,500.0	0.00	0.00	4,448.8	533.17	-523.3	75.8	-520.9	0.00	0.00	0.00
4,600.0	0.00	0.00	4,548.8	433.17	-523.3	75.8	-520.9	0.00	0.00	0.00
4,700.0	0.00	0.00	4,648.8	333.17	-523.3	75.8	-520.9	0.00	0.00	0.00
<b>Shannon Sandstone</b>										
<b>4,742.2</b>	<b>0.00</b>	<b>0.00</b>	<b>4,691.0</b>	<b>291.00</b>	<b>-523.3</b>	<b>75.8</b>	<b>-520.9</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
4,800.0	0.00	0.00	4,748.8	233.17	-523.3	75.8	-520.9	0.00	0.00	0.00
4,900.0	0.00	0.00	4,848.8	133.17	-523.3	75.8	-520.9	0.00	0.00	0.00
5,000.0	0.00	0.00	4,948.8	33.17	-523.3	75.8	-520.9	0.00	0.00	0.00
5,100.0	0.00	0.00	5,048.8	-66.83	-523.3	75.8	-520.9	0.00	0.00	0.00
5,200.0	0.00	0.00	5,148.8	-166.83	-523.3	75.8	-520.9	0.00	0.00	0.00
5,300.0	0.00	0.00	5,248.8	-266.83	-523.3	75.8	-520.9	0.00	0.00	0.00
5,400.0	0.00	0.00	5,348.8	-366.83	-523.3	75.8	-520.9	0.00	0.00	0.00
5,500.0	0.00	0.00	5,448.8	-466.83	-523.3	75.8	-520.9	0.00	0.00	0.00
5,600.0	0.00	0.00	5,548.8	-566.83	-523.3	75.8	-520.9	0.00	0.00	0.00
<b>KOP (10°/100ft BUR)</b>										
<b>5,689.2</b>	<b>0.00</b>	<b>0.00</b>	<b>5,638.0</b>	<b>-656.00</b>	<b>-523.3</b>	<b>75.8</b>	<b>-520.9</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
5,700.0	1.08	1.11	5,648.8	-666.83	-523.2	75.8	-520.8	10.00	10.00	0.00
5,800.0	11.08	1.11	5,748.1	-766.14	-512.6	76.0	-510.2	10.00	10.00	0.00
5,900.0	21.08	1.11	5,844.1	-862.11	-485.0	76.5	-482.6	10.00	10.00	0.00
6,000.0	31.08	1.11	5,933.8	-951.81	-441.1	77.4	-438.7	10.00	10.00	0.00
6,100.0	41.08	1.11	6,014.5	-1,032.53	-382.2	78.5	-379.9	10.00	10.00	0.00
<b>Sharon Springs</b>										
<b>6,139.0</b>	<b>44.98</b>	<b>1.11</b>	<b>6,043.0</b>	<b>-1,061.00</b>	<b>-355.7</b>	<b>79.0</b>	<b>-353.3</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
6,200.0	51.08	1.11	6,083.8	-1,101.80	-310.3	79.9	-307.9	10.00	10.00	0.00
<b>Niobrara A Chalk</b>										
<b>6,256.4</b>	<b>56.72</b>	<b>1.11</b>	<b>6,117.0</b>	<b>-1,135.00</b>	<b>-264.8</b>	<b>80.8</b>	<b>-262.4</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
<b>Niobrara A Chalk Base</b>										
<b>6,298.9</b>	<b>60.97</b>	<b>1.11</b>	<b>6,139.0</b>	<b>-1,157.00</b>	<b>-228.4</b>	<b>81.5</b>	<b>-226.0</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
6,300.0	61.08	1.11	6,139.5	-1,157.54	-227.5	81.5	-225.0	10.00	10.00	0.00
<b>Niobrara B1 Chalk Top</b>										
<b>6,353.0</b>	<b>66.38</b>	<b>1.11</b>	<b>6,163.0</b>	<b>-1,181.00</b>	<b>-179.9</b>	<b>82.5</b>	<b>-177.5</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
6,400.0	71.08	1.11	6,180.0	-1,198.04	-136.2	83.3	-133.8	10.00	10.00	0.00
<b>Niobrara B1 Chalk Base</b>										
<b>6,429.9</b>	<b>74.07</b>	<b>1.11</b>	<b>6,189.0</b>	<b>-1,207.00</b>	<b>-107.6</b>	<b>83.9</b>	<b>-105.2</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
6,500.0	81.08	1.11	6,204.1	-1,222.07	-39.3	85.2	-36.8	10.00	10.00	0.00
<b>HZ LP: 600ft FSL &amp; 1345ft FWL of Sec 31 - Niobrara B2 Chalk Top (Target)</b>										
<b>6,589.2</b>	<b>90.00</b>	<b>1.11</b>	<b>6,211.0</b>	<b>-1,229.00</b>	<b>49.6</b>	<b>86.9</b>	<b>52.0</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
6,600.0	90.00	1.11	6,211.0	-1,229.00	60.4	87.1	62.8	0.00	0.00	0.00
6,700.0	90.00	1.11	6,211.0	-1,229.01	160.3	89.0	162.8	0.00	0.00	0.00
6,800.0	90.00	1.11	6,211.0	-1,229.01	260.3	91.0	262.8	0.00	0.00	0.00
6,900.0	90.00	1.11	6,211.0	-1,229.02	360.3	92.9	362.8	0.00	0.00	0.00
7,000.0	90.00	1.11	6,211.0	-1,229.02	460.3	94.9	462.8	0.00	0.00	0.00
7,100.0	90.00	1.11	6,211.0	-1,229.03	560.3	96.8	562.8	0.00	0.00	0.00
7,200.0	90.00	1.11	6,211.0	-1,229.04	660.2	98.7	662.8	0.00	0.00	0.00



# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well MOTTLED 31-4HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4982.0usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4982.0usft (Original Well Elev)
<b>Site:</b>	SW SW SEC. 31 T8N R59W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	MOTTLED 31-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	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)
7,300.0	90.00	1.11	6,211.0	-1,229.04	760.2	100.7	762.8	0.00	0.00	0.00
7,400.0	90.00	1.11	6,211.0	-1,229.05	860.2	102.6	862.8	0.00	0.00	0.00
7,500.0	90.00	1.11	6,211.1	-1,229.05	960.2	104.6	962.8	0.00	0.00	0.00
7,600.0	90.00	1.11	6,211.1	-1,229.06	1,060.2	106.5	1,062.8	0.00	0.00	0.00
7,700.0	90.00	1.11	6,211.1	-1,229.06	1,160.1	108.4	1,162.8	0.00	0.00	0.00
7,800.0	90.00	1.11	6,211.1	-1,229.07	1,260.1	110.4	1,262.8	0.00	0.00	0.00
7,900.0	90.00	1.11	6,211.1	-1,229.07	1,360.1	112.3	1,362.8	0.00	0.00	0.00
8,000.0	90.00	1.11	6,211.1	-1,229.08	1,460.1	114.3	1,462.8	0.00	0.00	0.00
8,100.0	90.00	1.11	6,211.1	-1,229.08	1,560.1	116.2	1,562.8	0.00	0.00	0.00
8,200.0	90.00	1.11	6,211.1	-1,229.08	1,660.1	118.1	1,662.7	0.00	0.00	0.00
8,300.0	90.00	1.11	6,211.1	-1,229.09	1,760.0	120.1	1,762.7	0.00	0.00	0.00
8,400.0	90.00	1.11	6,211.1	-1,229.09	1,860.0	122.0	1,862.7	0.00	0.00	0.00
8,500.0	90.00	1.11	6,211.1	-1,229.10	1,960.0	124.0	1,962.7	0.00	0.00	0.00
8,600.0	90.00	1.11	6,211.1	-1,229.10	2,060.0	125.9	2,062.7	0.00	0.00	0.00
8,700.0	90.00	1.11	6,211.1	-1,229.10	2,160.0	127.8	2,162.7	0.00	0.00	0.00
8,800.0	90.00	1.11	6,211.1	-1,229.11	2,259.9	129.8	2,262.7	0.00	0.00	0.00
8,900.0	90.00	1.11	6,211.1	-1,229.11	2,359.9	131.7	2,362.7	0.00	0.00	0.00
9,000.0	90.00	1.11	6,211.1	-1,229.11	2,459.9	133.7	2,462.7	0.00	0.00	0.00
9,100.0	90.00	1.11	6,211.1	-1,229.12	2,559.9	135.6	2,562.7	0.00	0.00	0.00
9,200.0	90.00	1.11	6,211.1	-1,229.12	2,659.9	137.5	2,662.7	0.00	0.00	0.00
9,300.0	90.00	1.11	6,211.1	-1,229.12	2,759.8	139.5	2,762.7	0.00	0.00	0.00
9,400.0	90.00	1.11	6,211.1	-1,229.12	2,859.8	141.4	2,862.7	0.00	0.00	0.00
9,500.0	90.00	1.11	6,211.1	-1,229.13	2,959.8	143.4	2,962.7	0.00	0.00	0.00
9,600.0	90.00	1.11	6,211.1	-1,229.13	3,059.8	145.3	3,062.7	0.00	0.00	0.00
9,700.0	90.00	1.11	6,211.1	-1,229.13	3,159.8	147.3	3,162.7	0.00	0.00	0.00
9,800.0	90.00	1.11	6,211.1	-1,229.13	3,259.8	149.2	3,262.7	0.00	0.00	0.00
9,900.0	90.00	1.11	6,211.1	-1,229.14	3,359.7	151.1	3,362.7	0.00	0.00	0.00
10,000.0	90.00	1.11	6,211.1	-1,229.14	3,459.7	153.1	3,462.7	0.00	0.00	0.00
10,100.0	90.00	1.11	6,211.1	-1,229.14	3,559.7	155.0	3,562.7	0.00	0.00	0.00
10,200.0	90.00	1.11	6,211.1	-1,229.14	3,659.7	157.0	3,662.7	0.00	0.00	0.00
10,300.0	90.00	1.11	6,211.1	-1,229.14	3,759.7	158.9	3,762.7	0.00	0.00	0.00
10,400.0	90.00	1.11	6,211.1	-1,229.14	3,859.6	160.9	3,862.7	0.00	0.00	0.00
10,500.0	90.00	1.11	6,211.1	-1,229.14	3,959.6	162.8	3,962.7	0.00	0.00	0.00
10,600.0	90.00	1.11	6,211.1	-1,229.14	4,059.6	164.7	4,062.6	0.00	0.00	0.00
10,700.0	90.00	1.11	6,211.1	-1,229.15	4,159.6	166.7	4,162.6	0.00	0.00	0.00
10,800.0	90.00	1.11	6,211.1	-1,229.15	4,259.6	168.6	4,262.6	0.00	0.00	0.00
10,900.0	90.00	1.11	6,211.1	-1,229.15	4,359.5	170.6	4,362.6	0.00	0.00	0.00
11,000.0	90.00	1.11	6,211.1	-1,229.15	4,459.5	172.5	4,462.6	0.00	0.00	0.00
11,100.0	90.00	1.11	6,211.1	-1,229.15	4,559.5	174.5	4,562.6	0.00	0.00	0.00
11,200.0	90.00	1.11	6,211.1	-1,229.15	4,659.5	176.4	4,662.6	0.00	0.00	0.00
11,300.0	90.00	1.11	6,211.1	-1,229.15	4,759.5	178.4	4,762.6	0.00	0.00	0.00
11,400.0	90.00	1.11	6,211.1	-1,229.15	4,859.5	180.3	4,862.6	0.00	0.00	0.00
11,500.0	90.00	1.11	6,211.1	-1,229.15	4,959.4	182.2	4,962.6	0.00	0.00	0.00
11,600.0	90.00	1.11	6,211.1	-1,229.15	5,059.4	184.2	5,062.6	0.00	0.00	0.00
11,700.0	90.00	1.11	6,211.1	-1,229.15	5,159.4	186.1	5,162.6	0.00	0.00	0.00
11,800.0	90.00	1.11	6,211.1	-1,229.15	5,259.4	188.1	5,262.6	0.00	0.00	0.00
11,900.0	90.00	1.12	6,211.1	-1,229.15	5,359.4	190.0	5,362.6	0.00	0.00	0.00
12,000.0	90.00	1.12	6,211.1	-1,229.14	5,459.3	192.0	5,462.6	0.00	0.00	0.00
12,100.0	90.00	1.12	6,211.1	-1,229.14	5,559.3	193.9	5,562.6	0.00	0.00	0.00
12,200.0	90.00	1.12	6,211.1	-1,229.14	5,659.3	195.9	5,662.6	0.00	0.00	0.00
12,300.0	90.00	1.12	6,211.1	-1,229.14	5,759.3	197.8	5,762.6	0.00	0.00	0.00
12,400.0	90.00	1.12	6,211.1	-1,229.14	5,859.3	199.8	5,862.6	0.00	0.00	0.00
12,500.0	90.00	1.12	6,211.1	-1,229.14	5,959.2	201.7	5,962.6	0.00	0.00	0.00
12,600.0	90.00	1.12	6,211.1	-1,229.14	6,059.2	203.7	6,062.6	0.00	0.00	0.00

# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well MOTTLED 31-4HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4982.0usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4982.0usft (Original Well Elev)
<b>Site:</b>	SW SW SEC. 31 T8N R59W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	MOTTLED 31-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	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)
12,700.0	90.00	1.12	6,211.1	-1,229.14	6,159.2	205.6	6,162.6	0.00	0.00	0.00
12,800.0	90.00	1.12	6,211.1	-1,229.13	6,259.2	207.5	6,262.6	0.00	0.00	0.00
12,900.0	90.00	1.12	6,211.1	-1,229.13	6,359.2	209.5	6,362.6	0.00	0.00	0.00
13,000.0	90.00	1.12	6,211.1	-1,229.13	6,459.1	211.4	6,462.6	0.00	0.00	0.00
13,100.0	90.00	1.12	6,211.1	-1,229.13	6,559.1	213.4	6,562.5	0.00	0.00	0.00
13,200.0	90.00	1.12	6,211.1	-1,229.12	6,659.1	215.3	6,662.5	0.00	0.00	0.00
13,300.0	90.00	1.12	6,211.1	-1,229.12	6,759.1	217.3	6,762.5	0.00	0.00	0.00
13,400.0	90.00	1.12	6,211.1	-1,229.12	6,859.1	219.2	6,862.5	0.00	0.00	0.00
13,500.0	90.00	1.12	6,211.1	-1,229.12	6,959.1	221.2	6,962.5	0.00	0.00	0.00
13,600.0	90.00	1.12	6,211.1	-1,229.11	7,059.0	223.1	7,062.5	0.00	0.00	0.00
13,700.0	90.00	1.12	6,211.1	-1,229.11	7,159.0	225.1	7,162.5	0.00	0.00	0.00
13,800.0	90.00	1.12	6,211.1	-1,229.11	7,259.0	227.0	7,262.5	0.00	0.00	0.00
13,900.0	90.00	1.12	6,211.1	-1,229.10	7,359.0	229.0	7,362.5	0.00	0.00	0.00
14,000.0	90.00	1.12	6,211.1	-1,229.10	7,459.0	230.9	7,462.5	0.00	0.00	0.00
14,100.0	90.00	1.12	6,211.1	-1,229.10	7,558.9	232.9	7,562.5	0.00	0.00	0.00
14,200.0	90.00	1.12	6,211.1	-1,229.09	7,658.9	234.8	7,662.5	0.00	0.00	0.00
14,300.0	90.00	1.12	6,211.1	-1,229.09	7,758.9	236.8	7,762.5	0.00	0.00	0.00
14,400.0	90.00	1.12	6,211.1	-1,229.08	7,858.9	238.7	7,862.5	0.00	0.00	0.00
14,500.0	90.00	1.12	6,211.1	-1,229.08	7,958.9	240.7	7,962.5	0.00	0.00	0.00
14,600.0	90.00	1.12	6,211.1	-1,229.08	8,058.8	242.6	8,062.5	0.00	0.00	0.00
14,700.0	90.00	1.12	6,211.1	-1,229.07	8,158.8	244.6	8,162.5	0.00	0.00	0.00
14,800.0	90.00	1.12	6,211.1	-1,229.07	8,258.8	246.5	8,262.5	0.00	0.00	0.00
14,900.0	90.00	1.12	6,211.1	-1,229.06	8,358.8	248.5	8,362.5	0.00	0.00	0.00
15,000.0	90.00	1.12	6,211.1	-1,229.06	8,458.8	250.4	8,462.5	0.00	0.00	0.00
15,100.0	90.00	1.12	6,211.1	-1,229.05	8,558.7	252.4	8,562.5	0.00	0.00	0.00
15,200.0	90.00	1.12	6,211.0	-1,229.05	8,658.7	254.3	8,662.5	0.00	0.00	0.00
15,300.0	90.00	1.12	6,211.0	-1,229.04	8,758.7	256.3	8,762.5	0.00	0.00	0.00
15,400.0	90.00	1.12	6,211.0	-1,229.04	8,858.7	258.2	8,862.5	0.00	0.00	0.00
15,500.0	90.00	1.12	6,211.0	-1,229.03	8,958.7	260.2	8,962.4	0.00	0.00	0.00
15,600.0	90.00	1.12	6,211.0	-1,229.02	9,058.7	262.1	9,062.4	0.00	0.00	0.00
15,700.0	90.00	1.12	6,211.0	-1,229.02	9,158.6	264.1	9,162.4	0.00	0.00	0.00
15,800.0	90.00	1.12	6,211.0	-1,229.01	9,258.6	266.0	9,262.4	0.00	0.00	0.00
15,900.0	90.00	1.12	6,211.0	-1,229.01	9,358.6	268.0	9,362.4	0.00	0.00	0.00
16,000.0	90.00	1.12	6,211.0	-1,229.00	9,458.6	269.9	9,462.4	0.00	0.00	0.00
<b>BHL: 600ft FNL &amp; 1345ft FWL of Sec 30</b>										
<b>16,004.8</b>	<b>90.00</b>	<b>1.12</b>	<b>6,211.0</b>	<b>-1,229.00</b>	<b>9,463.4</b>	<b>270.0</b>	<b>9,467.2</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well MOTTLED 31-4HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4982.0usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4982.0usft (Original Well Elev)
<b>Site:</b>	SW SW SEC. 31 T8N R59W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	MOTTLED 31-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	PROPOSAL #1		

Formations					
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
466.0	466.0	Fox Hills Base			
1,523.8	1,508.0	Pierre Shale Top			
3,313.9	3,263.0	Richard Sandstone			
3,419.1	3,368.0	Parkman Sandstone			
4,202.2	4,151.0	Sussex Sandstone			
4,742.2	4,691.0	Shannon Sandstone			
6,139.0	6,043.0	Sharon Springs			
6,256.4	6,117.0	Niobrara A Chalk			
6,298.9	6,139.0	Niobrara A Chalk Base			
6,353.0	6,163.0	Niobrara B1 Chalk Top			
6,429.9	6,189.0	Niobrara B1 Chalk Base			
6,589.2	6,211.0	Niobrara B2 Chalk Top (Target)			

Plan Annotations				
MD (usft)	TVD (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
0.0	0.0	0.0	0.0	SHL: 550ft FSL & 1259ft FWL of Sec 31
400.0	400.0	0.0	0.0	START NUDGE (2°/100ft BUR)
1,000.0	995.6	-62.0	9.0	EOB TO 12° INC
2,941.0	2,894.2	-461.3	66.8	END OF TANGENT
3,541.0	3,489.8	-523.3	75.8	EOD TO VERTICAL
5,689.2	5,638.0	-523.3	75.8	KOP (10°/100ft BUR)
6,589.2	6,211.0	49.6	86.9	HZ LP: 600ft FSL & 1345ft FWL of Sec 31
16,004.8	6,211.0	9,463.4	270.0	BHL: 600ft FNL & 1345ft FWL of Sec 30