

# **MALLARD EXPLORATION**

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

**NE NW SEC. 4 T7N R60W 6th P.M.**

**WIGEON FED 33-28-15HC**

**ORIGINAL WELLBORE**

**18 September, 2017**

**Plan: PROPOSAL #2**



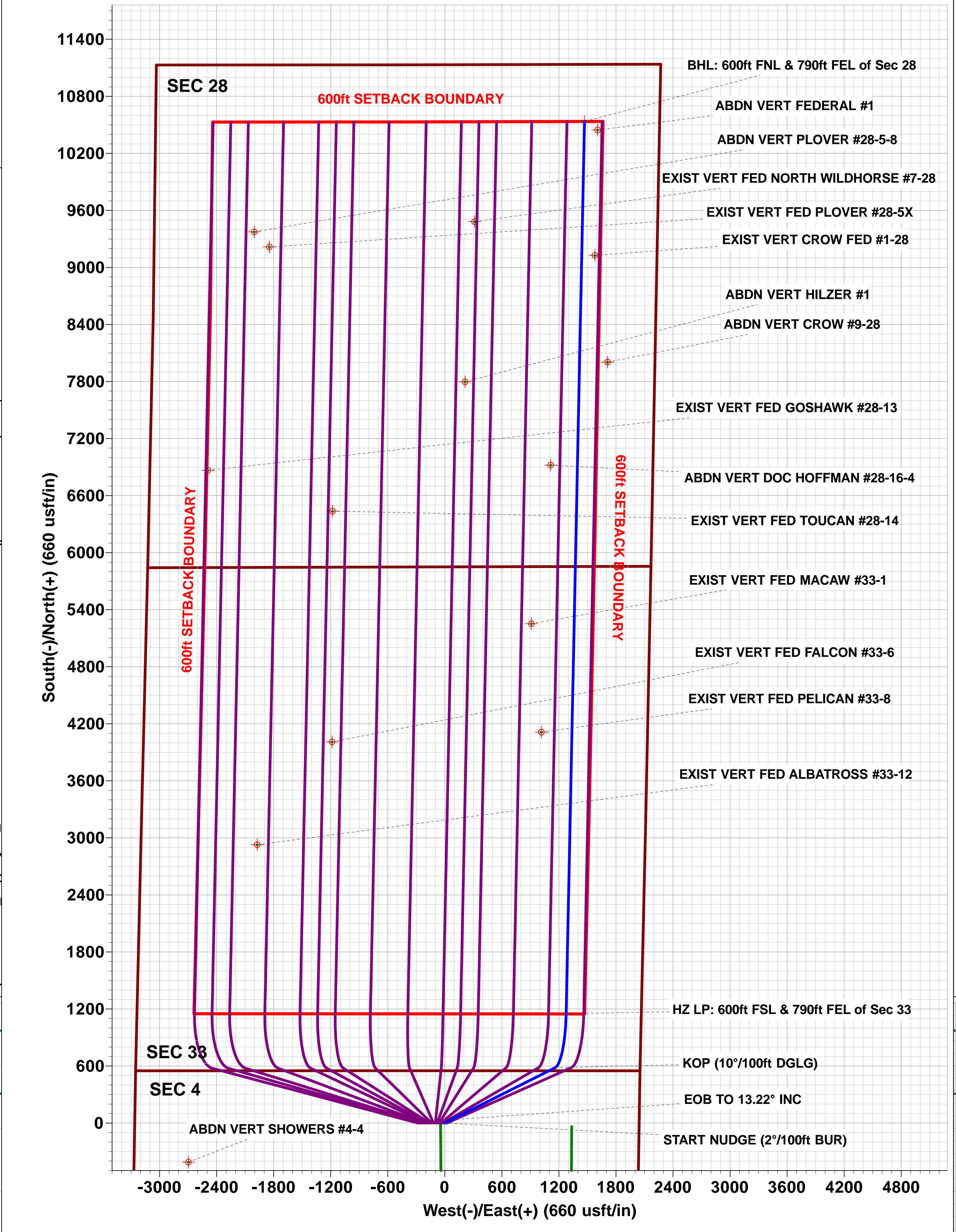
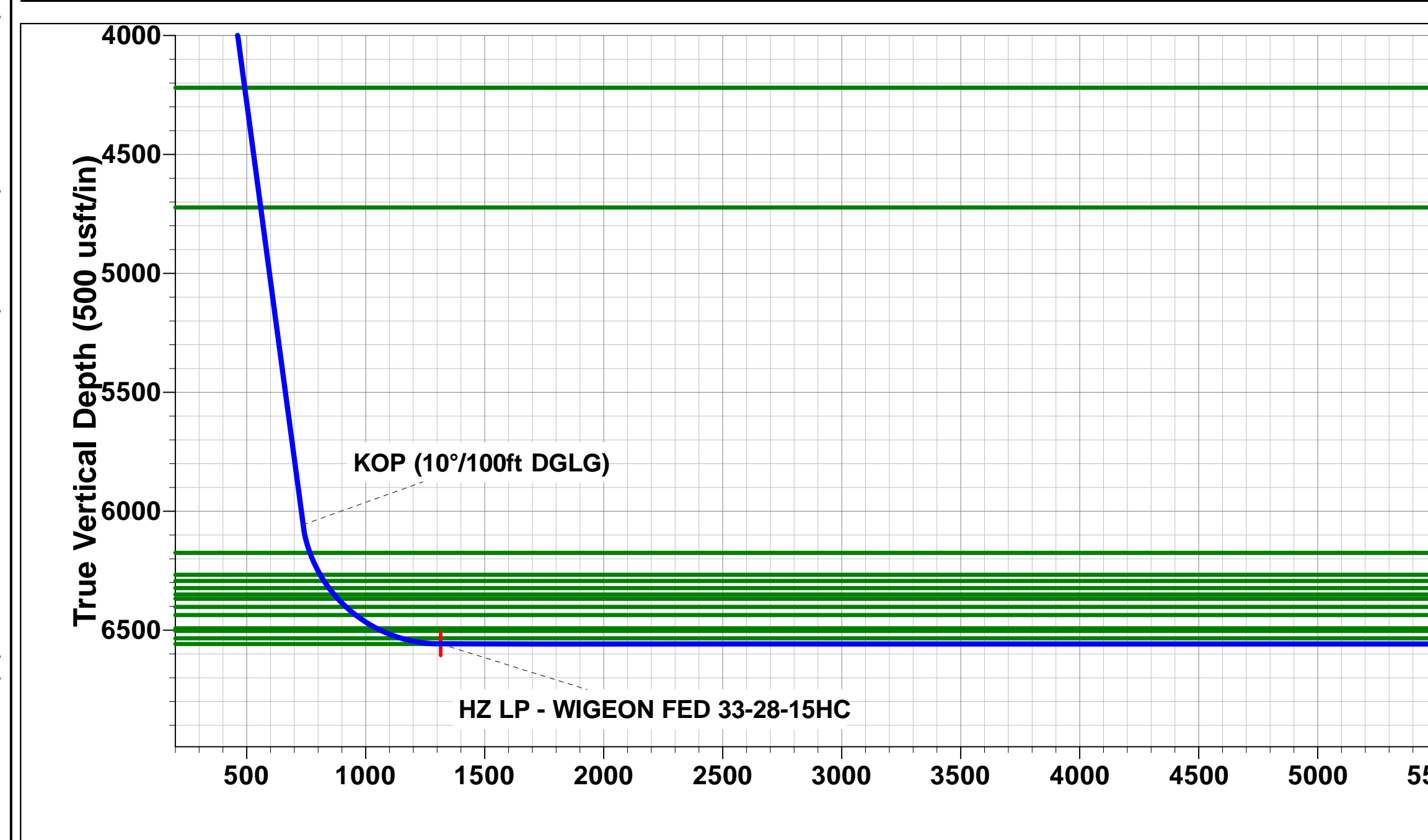
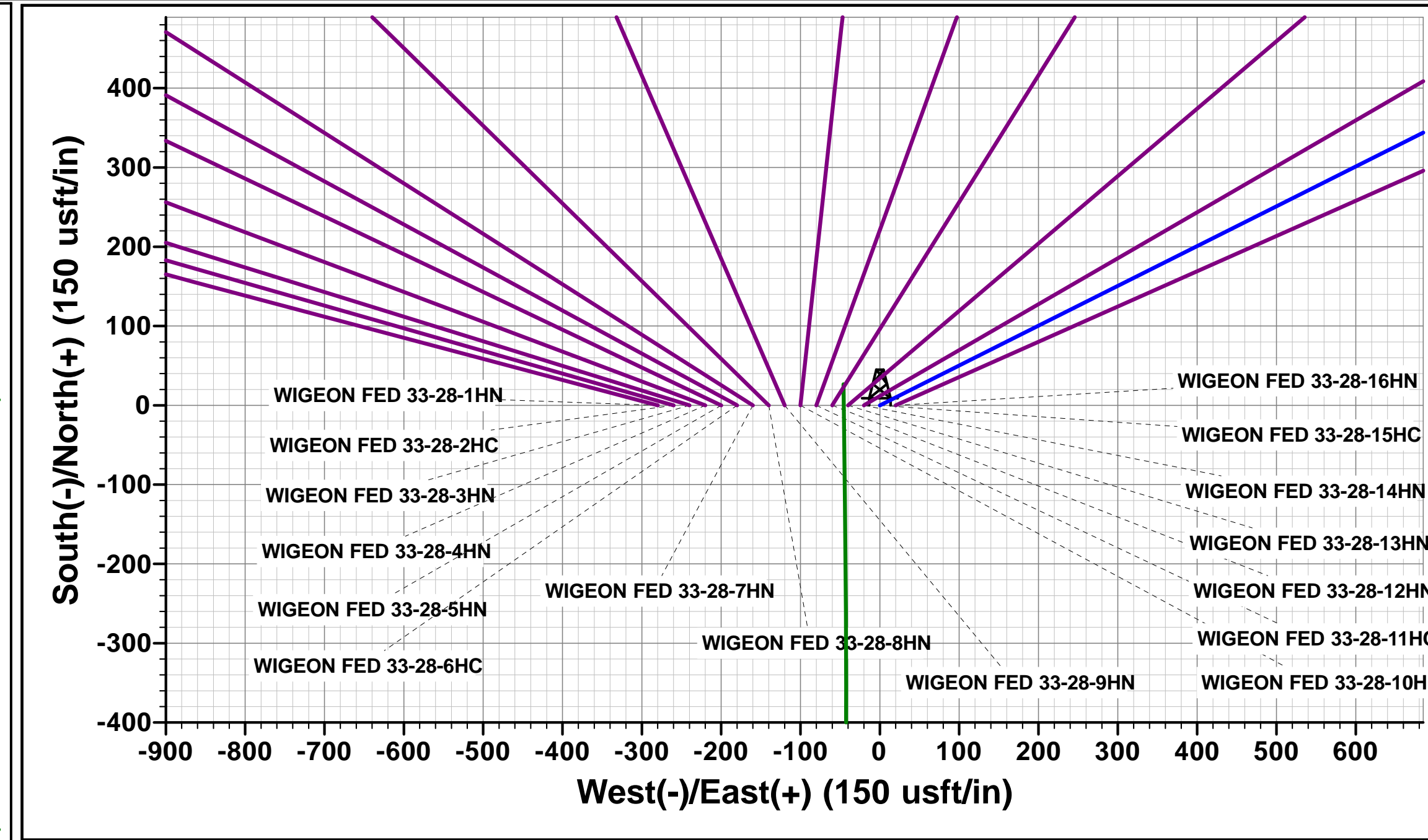
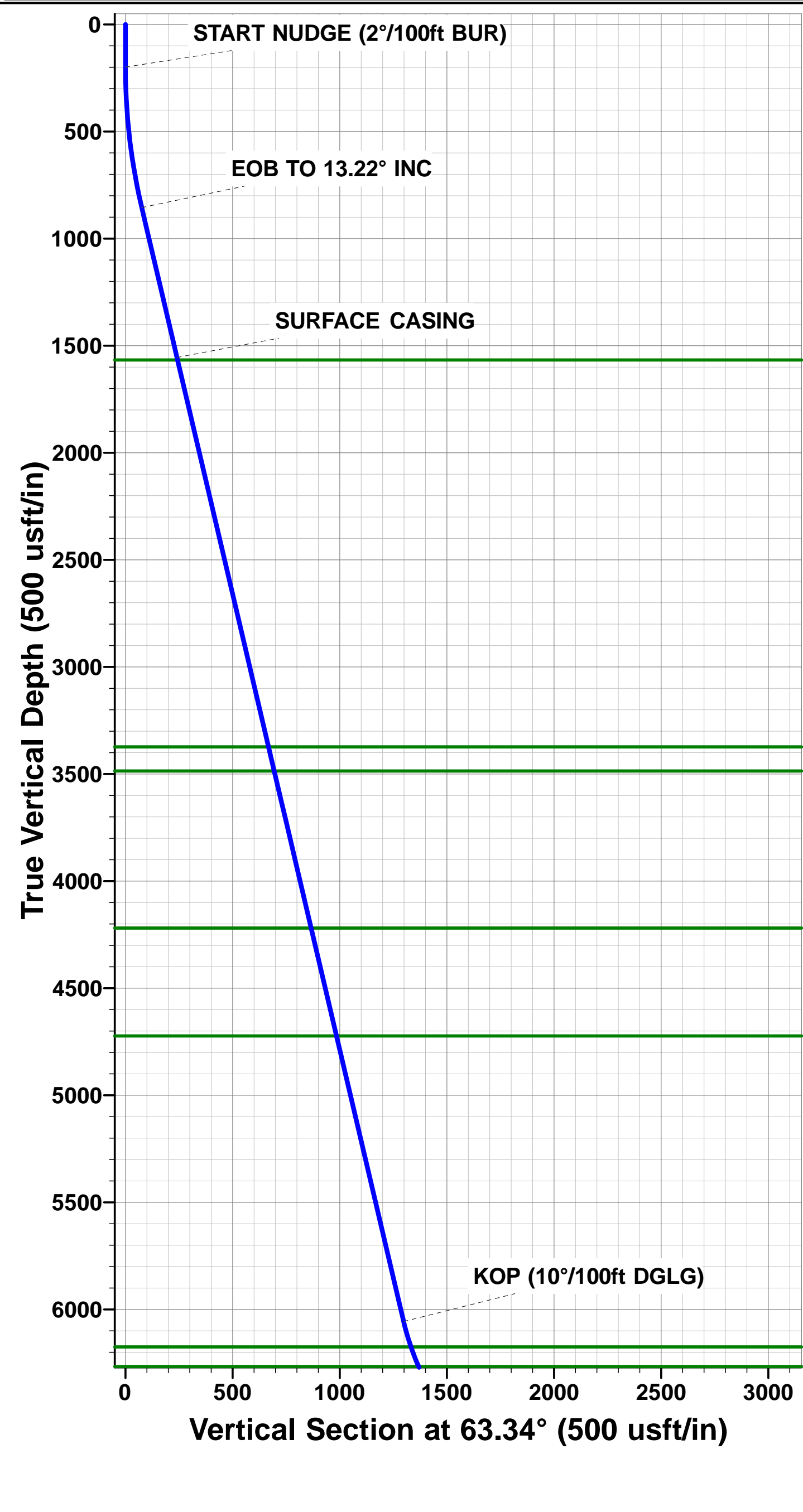


Project: WELD COUNTY, COLORADO (NAD 83)  
Site: NE NW SEC. 4 T7N R60W 6th P.M.  
Well: WIGEON FED 33-28-15HC  
Wellbore: ORIGINAL WELLBORE  
Design: PROPOSAL #2

ANNOTATIONS									
TVD	MD	Inc	Azi	+N/-S	+E/-W	VSect	Dep	Annotation	
0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	SHL: 550ft FNL & 2044ft FEL of Sec 4	
200.0	200.0	0.00	0.00	0.0	0.0	0.0	0.0	START NUDGE (2°/100ft BUR)	
855.3	861.2	13.22	63.34	34.1	67.9	43.1	76.0	EOB TO 13.22° INC	
1555.0	1579.9	13.22	63.34	107.8	214.8	136.5	240.4	SURFACE CASING	
6057.0	6204.5	13.22	63.34	582.4	1160.3	737.1	1298.2	KOP (10°/100ft DGLG)	
6558.0	7043.2	90.00	1.18	1149.9	1276.0	1315.1	1888.1	HZ LP: 600ft FSL & 790ft FEL of Sec 33	
6558.0	16431.3	90.00	1.18	10536.0	1469.0	10637.9	11276.2	BHL: 600ft FNL & 790ft FEL of Sec 28	

PROPOSED LOCAL COORDINATES:  
  
SHL: 550ft FNL & 2044ft FEL Sec 4  
  
HZ LP: 600ft FSL & 790ft FEL Sec 33  
  
BHL: 600ft FNL & 790ft FEL of Sec 28

WELLBORE TARGET DETAILS (LAT/LONG)					
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
HZ LP - WIGEON FED 33-28-15HC	6558.0	1149.9	1276.0	40.613140	-104.090804
BHL - WIGEON FED 33-28-15HC	6558.0	10536.0	1469.0	40.638903	-104.090107



# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well WIGEON FED 33-28-15HC
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4973.0usft
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4973.0usft
<b>Site:</b>	NE NW SEC. 4 T7N R60W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	WIGEON FED 33-28-15HC	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	PROPOSAL #2		

<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>	NE NW SEC. 4 T7N R60W 6th P.M.		
<b>Site Position:</b>		<b>Northing:</b>	1,467,825.37 usft
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,388,564.57 usft
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	1.10000ft
		<b>Latitude:</b>	40.609161
		<b>Longitude:</b>	-104.100471
		<b>Grid Convergence:</b>	0.90 °

<b>Well</b>	WIGEON FED 33-28-15HC		
<b>Well Position</b>	<b>+N/-S</b>	299.9 usft	<b>Northing:</b> 1,468,147.42 usfi
	<b>+E/-W</b>	1,408.0 usft	<b>Easting:</b> 3,389,967.61 usfi
<b>Position Uncertainty</b>	0.0 usft	<b>Wellhead Elevation:</b>	usfi
		<b>Latitude:</b>	40.609984
		<b>Longitude:</b>	-104.095400
		<b>Ground Level:</b>	4,957.0 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	31/08/2017	7.84	67.12	52,545

<b>Design</b>	PROPOSAL #2				
<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>	
	29.0	0.0	0.0	7.94	

<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	-4,973.0	0.0	0.0	0.00	0.00	0.00	0.00	
200.0	0.00	0.00	200.0	-4,773.0	0.0	0.0	0.00	0.00	0.00	0.00	
861.2	13.22	63.34	855.3	-4,117.7	34.1	67.9	2.00	2.00	0.00	63.34	
6,204.5	13.22	63.34	6,056.9	1,083.9	582.4	1,160.3	0.00	0.00	0.00	0.00	
7,043.2	90.00	1.18	6,558.0	1,585.0	1,149.9	1,276.0	10.00	9.15	-7.41	-62.80	HZ LP - WIGEON F
16,431.3	90.00	1.18	6,558.0	1,585.0	10,536.0	1,469.0	0.00	0.00	0.00	90.00	BHL - WIGEON FE

# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well WIGEON FED 33-28-15HC
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4973.0usft
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4973.0usft
<b>Site:</b>	NE NW SEC. 4 T7N R60W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	WIGEON FED 33-28-15HC	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	PROPOSAL #2		

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 FNL &amp; 2044ft FEL of Sec 4</b>										
0.0	0.00	0.00	0.0	4,973.00	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	4,873.00	0.0	0.0	0.0	0.00	0.00	0.00
<b>START NUDGE (2°/100ft BUR)</b>										
200.0	0.00	0.00	200.0	4,773.00	0.0	0.0	0.0	0.00	0.00	0.00
300.0	2.00	63.34	300.0	4,673.02	0.8	1.6	1.0	2.00	2.00	0.00
400.0	4.00	63.34	399.8	4,573.16	3.1	6.2	4.0	2.00	2.00	0.00
500.0	6.00	63.34	499.5	4,473.55	7.0	14.0	8.9	2.00	2.00	0.00
600.0	8.00	63.34	598.7	4,374.30	12.5	24.9	15.8	2.00	2.00	0.00
700.0	10.00	63.34	697.5	4,275.53	19.5	38.9	24.7	2.00	2.00	0.00
800.0	12.00	63.34	795.6	4,177.38	28.1	55.9	35.5	2.00	2.00	0.00
<b>EOB TO 13.22° INC</b>										
861.2	13.22	63.34	855.3	4,117.65	34.1	67.9	43.1	2.00	2.00	0.00
900.0	13.22	63.34	893.1	4,079.88	38.1	75.8	48.2	0.00	0.00	0.00
1,000.0	13.22	63.34	990.5	3,982.53	48.3	96.3	61.2	0.00	0.00	0.00
1,100.0	13.22	63.34	1,087.8	3,885.19	58.6	116.7	74.1	0.00	0.00	0.00
1,200.0	13.22	63.34	1,185.2	3,787.84	68.8	137.2	87.1	0.00	0.00	0.00
1,300.0	13.22	63.34	1,282.5	3,690.49	79.1	157.6	100.1	0.00	0.00	0.00
1,400.0	13.22	63.34	1,379.9	3,593.14	89.4	178.0	113.1	0.00	0.00	0.00
1,500.0	13.22	63.34	1,477.2	3,495.79	99.6	198.5	126.1	0.00	0.00	0.00
<b>SURFACE CASING</b>										
1,579.9	13.22	63.34	1,555.0	3,418.00	107.8	214.8	136.5	0.00	0.00	0.00
<b>Fox Hills Base</b>										
1,592.2	13.22	63.34	1,567.0	3,406.00	109.1	217.3	138.1	0.00	0.00	0.00
1,600.0	13.22	63.34	1,574.6	3,398.44	109.9	218.9	139.1	0.00	0.00	0.00
1,700.0	13.22	63.34	1,671.9	3,301.10	120.2	239.4	152.1	0.00	0.00	0.00
1,800.0	13.22	63.34	1,769.3	3,203.75	130.4	259.8	165.1	0.00	0.00	0.00
1,900.0	13.22	63.34	1,866.6	3,106.40	140.7	280.3	178.0	0.00	0.00	0.00
2,000.0	13.22	63.34	1,964.0	3,009.05	150.9	300.7	191.0	0.00	0.00	0.00
2,100.0	13.22	63.34	2,061.3	2,911.70	161.2	321.1	204.0	0.00	0.00	0.00
2,200.0	13.22	63.34	2,158.6	2,814.35	171.5	341.6	217.0	0.00	0.00	0.00
2,300.0	13.22	63.34	2,256.0	2,717.00	181.7	362.0	230.0	0.00	0.00	0.00
2,400.0	13.22	63.34	2,353.3	2,619.66	192.0	382.5	243.0	0.00	0.00	0.00
2,500.0	13.22	63.34	2,450.7	2,522.31	202.3	402.9	256.0	0.00	0.00	0.00
2,600.0	13.22	63.34	2,548.0	2,424.96	212.5	423.4	268.9	0.00	0.00	0.00
2,700.0	13.22	63.34	2,645.4	2,327.61	222.8	443.8	281.9	0.00	0.00	0.00
2,800.0	13.22	63.34	2,742.7	2,230.26	233.0	464.3	294.9	0.00	0.00	0.00
2,900.0	13.22	63.34	2,840.1	2,132.91	243.3	484.7	307.9	0.00	0.00	0.00
3,000.0	13.22	63.34	2,937.4	2,035.56	253.6	505.1	320.9	0.00	0.00	0.00
3,100.0	13.22	63.34	3,034.8	1,938.22	263.8	525.6	333.9	0.00	0.00	0.00
3,200.0	13.22	63.34	3,132.1	1,840.87	274.1	546.0	346.9	0.00	0.00	0.00
3,300.0	13.22	63.34	3,229.5	1,743.52	284.4	566.5	359.9	0.00	0.00	0.00
3,400.0	13.22	63.34	3,326.8	1,646.17	294.6	586.9	372.8	0.00	0.00	0.00
<b>Richard Sandstone</b>										
3,448.5	13.22	63.34	3,374.0	1,599.00	299.6	596.8	379.1	0.00	0.00	0.00
3,500.0	13.22	63.34	3,424.2	1,548.82	304.9	607.4	385.8	0.00	0.00	0.00
<b>Parkman Sandstone</b>										
3,563.5	13.22	63.34	3,486.0	1,487.00	311.4	620.3	394.1	0.00	0.00	0.00
3,600.0	13.22	63.34	3,521.5	1,451.47	315.1	627.8	398.8	0.00	0.00	0.00
3,700.0	13.22	63.34	3,618.9	1,354.12	325.4	648.2	411.8	0.00	0.00	0.00
3,800.0	13.22	63.34	3,716.2	1,256.78	335.7	668.7	424.8	0.00	0.00	0.00
3,900.0	13.22	63.34	3,813.6	1,159.43	345.9	689.1	437.8	0.00	0.00	0.00
4,000.0	13.22	63.34	3,910.9	1,062.08	356.2	709.6	450.8	0.00	0.00	0.00



# Planning Report



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<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4973.0usft
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4973.0usft
<b>Site:</b>	NE NW SEC. 4 T7N R60W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	WIGEON FED 33-28-15HC	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	PROPOSAL #2		

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)
4,100.0	13.22	63.34	4,008.3	964.73	366.5	730.0	463.8	0.00	0.00	0.00
4,200.0	13.22	63.34	4,105.6	867.38	376.7	750.5	476.7	0.00	0.00	0.00
4,300.0	13.22	63.34	4,203.0	770.03	387.0	770.9	489.7	0.00	0.00	0.00
<b>Sussex Sandstone</b>										
<b>4,317.5</b>	<b>13.22</b>	<b>63.34</b>	<b>4,220.0</b>	<b>753.00</b>	<b>388.8</b>	<b>774.5</b>	<b>492.0</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
4,400.0	13.22	63.34	4,300.3	672.68	397.2	791.4	502.7	0.00	0.00	0.00
4,500.0	13.22	63.34	4,397.7	575.34	407.5	811.8	515.7	0.00	0.00	0.00
4,600.0	13.22	63.34	4,495.0	477.99	417.8	832.2	528.7	0.00	0.00	0.00
4,700.0	13.22	63.34	4,592.4	380.64	428.0	852.7	541.7	0.00	0.00	0.00
4,800.0	13.22	63.34	4,689.7	283.29	438.3	873.1	554.7	0.00	0.00	0.00
<b>Shannon Sandstone</b>										
<b>4,834.2</b>	<b>13.22</b>	<b>63.34</b>	<b>4,723.0</b>	<b>250.00</b>	<b>441.8</b>	<b>880.1</b>	<b>559.1</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
4,900.0	13.22	63.34	4,787.1	185.94	448.6	893.6	567.7	0.00	0.00	0.00
5,000.0	13.22	63.34	4,884.4	88.59	458.8	914.0	580.6	0.00	0.00	0.00
5,100.0	13.22	63.34	4,981.8	-8.75	469.1	934.5	593.6	0.00	0.00	0.00
5,200.0	13.22	63.34	5,079.1	-106.10	479.3	954.9	606.6	0.00	0.00	0.00
5,300.0	13.22	63.34	5,176.5	-203.45	489.6	975.3	619.6	0.00	0.00	0.00
5,400.0	13.22	63.34	5,273.8	-300.80	499.9	995.8	632.6	0.00	0.00	0.00
5,500.0	13.22	63.34	5,371.1	-398.15	510.1	1,016.2	645.6	0.00	0.00	0.00
5,600.0	13.22	63.34	5,468.5	-495.50	520.4	1,036.7	658.6	0.00	0.00	0.00
5,700.0	13.22	63.34	5,565.8	-592.85	530.7	1,057.1	671.5	0.00	0.00	0.00
5,800.0	13.22	63.34	5,663.2	-690.19	540.9	1,077.6	684.5	0.00	0.00	0.00
5,900.0	13.22	63.34	5,760.5	-787.54	551.2	1,098.0	697.5	0.00	0.00	0.00
6,000.0	13.22	63.34	5,857.9	-884.89	561.4	1,118.5	710.5	0.00	0.00	0.00
6,100.0	13.22	63.34	5,955.2	-982.24	571.7	1,138.9	723.5	0.00	0.00	0.00
6,200.0	13.22	63.34	6,052.6	-1,079.59	582.0	1,159.3	736.5	0.00	0.00	0.00
<b>KOP (10°/100ft DGLG)</b>										
<b>6,204.5</b>	<b>13.22</b>	<b>63.34</b>	<b>6,057.0</b>	<b>-1,083.97</b>	<b>582.4</b>	<b>1,160.3</b>	<b>737.1</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
6,300.0	19.50	37.10	6,148.7	-1,175.68	600.1	1,179.7	757.2	10.00	6.57	-27.48
<b>Sharon Springs</b>										
<b>6,328.1</b>	<b>21.80</b>	<b>32.48</b>	<b>6,175.0</b>	<b>-1,202.00</b>	<b>608.2</b>	<b>1,185.3</b>	<b>766.1</b>	<b>10.00</b>	<b>8.16</b>	<b>-16.42</b>
6,400.0	28.07	24.11	6,240.2	-1,267.16	635.0	1,199.4	794.5	10.00	8.73	-11.65
<b>Niobrara A Chalk</b>										
<b>6,430.8</b>	<b>30.88</b>	<b>21.51</b>	<b>6,267.0</b>	<b>-1,294.00</b>	<b>649.0</b>	<b>1,205.3</b>	<b>809.2</b>	<b>10.00</b>	<b>9.10</b>	<b>-8.42</b>
<b>Niobrara A Chalk Base</b>										
<b>6,461.6</b>	<b>33.72</b>	<b>19.31</b>	<b>6,293.0</b>	<b>-1,320.00</b>	<b>664.4</b>	<b>1,211.0</b>	<b>825.2</b>	<b>10.00</b>	<b>9.25</b>	<b>-7.14</b>
<b>Niobrara B1 Chalk Top</b>										
<b>6,498.4</b>	<b>37.17</b>	<b>17.08</b>	<b>6,323.0</b>	<b>-1,350.00</b>	<b>684.7</b>	<b>1,217.7</b>	<b>846.2</b>	<b>10.00</b>	<b>9.36</b>	<b>-6.06</b>
6,500.0	37.32	16.99	6,324.3	-1,351.25	685.6	1,217.9	847.2	10.00	9.42	-5.55
<b>Niobrara B1 Chalk Base</b>										
<b>6,533.1</b>	<b>40.45</b>	<b>15.28</b>	<b>6,350.0</b>	<b>-1,377.00</b>	<b>705.5</b>	<b>1,223.7</b>	<b>867.7</b>	<b>10.00</b>	<b>9.46</b>	<b>-5.17</b>
<b>Niobrara B2 Chalk Top (Target)</b>										
<b>6,557.2</b>	<b>42.74</b>	<b>14.17</b>	<b>6,368.0</b>	<b>-1,395.00</b>	<b>721.0</b>	<b>1,227.8</b>	<b>883.6</b>	<b>10.00</b>	<b>9.52</b>	<b>-4.62</b>
6,600.0	46.84	12.41	6,398.4	-1,425.40	750.3	1,234.7	913.6	10.00	9.57	-4.11
<b>Niobrara B2 Chalk Base</b>										
<b>6,605.3</b>	<b>47.35</b>	<b>12.21</b>	<b>6,402.0</b>	<b>-1,429.00</b>	<b>754.1</b>	<b>1,235.5</b>	<b>917.5</b>	<b>10.00</b>	<b>9.61</b>	<b>-3.79</b>
<b>Niobrara C Chalk Top</b>										
<b>6,658.1</b>	<b>52.44</b>	<b>10.37</b>	<b>6,436.0</b>	<b>-1,463.00</b>	<b>793.7</b>	<b>1,243.4</b>	<b>957.8</b>	<b>10.00</b>	<b>9.64</b>	<b>-3.49</b>
6,700.0	56.50	9.08	6,460.4	-1,487.36	827.3	1,249.1	991.9	10.00	9.68	-3.08
<b>Niobrara C Chalk Base</b>										
<b>6,762.4</b>	<b>62.56</b>	<b>7.37</b>	<b>6,492.0</b>	<b>-1,519.00</b>	<b>880.6</b>	<b>1,256.8</b>	<b>1,045.7</b>	<b>10.00</b>	<b>9.72</b>	<b>-2.74</b>
<b>Niobrara D Chalk Top</b>										

# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well WIGEON FED 33-28-15HC
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4973.0usft
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4973.0usft
<b>Site:</b>	NE NW SEC. 4 T7N R60W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	WIGEON FED 33-28-15HC	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	PROPOSAL #2		

## 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>6,787.3</b>	<b>64.99</b>	<b>6.74</b>	<b>6,503.0</b>	<b>-1,530.00</b>	<b>902.7</b>	<b>1,259.5</b>	<b>1,068.0</b>	<b>10.00</b>	<b>9.74</b>	<b>-2.53</b>
6,800.0	66.22	6.43	6,508.2	-1,535.24	914.2	1,260.9	1,079.5	10.00	9.75	-2.45
<b>Ft. Hays</b>										
<b>6,875.0</b>	<b>73.54</b>	<b>4.69</b>	<b>6,534.0</b>	<b>-1,561.00</b>	<b>984.2</b>	<b>1,267.7</b>	<b>1,149.8</b>	<b>10.00</b>	<b>9.76</b>	<b>-2.31</b>
6,900.0	75.99	4.15	6,540.6	-1,567.58	1,008.3	1,269.5	1,173.9	10.00	9.78	-2.19
7,000.0	85.77	2.05	6,556.4	-1,583.41	1,106.7	1,274.8	1,272.2	10.00	9.78	-2.09
<b>HZ LP: 600ft FSL &amp; 790ft FEL of Sec 33 - Codell (Target)</b>										
<b>7,043.2</b>	<b>90.00</b>	<b>1.18</b>	<b>6,558.0</b>	<b>-1,585.00</b>	<b>1,149.9</b>	<b>1,276.0</b>	<b>1,315.0</b>	<b>10.00</b>	<b>9.79</b>	<b>-2.04</b>
7,100.0	90.00	1.18	6,558.0	-1,585.00	1,206.7	1,277.2	1,371.5	0.00	0.00	0.00
7,200.0	90.00	1.18	6,558.0	-1,585.00	1,306.7	1,279.3	1,470.8	0.00	0.00	0.00
7,300.0	90.00	1.18	6,558.0	-1,585.00	1,406.6	1,281.3	1,570.1	0.00	0.00	0.00
7,400.0	90.00	1.18	6,558.0	-1,585.00	1,506.6	1,283.4	1,669.4	0.00	0.00	0.00
7,500.0	90.00	1.18	6,558.0	-1,585.00	1,606.6	1,285.4	1,768.7	0.00	0.00	0.00
7,600.0	90.00	1.18	6,558.0	-1,585.00	1,706.6	1,287.5	1,868.0	0.00	0.00	0.00
7,700.0	90.00	1.18	6,558.0	-1,585.00	1,806.6	1,289.5	1,967.3	0.00	0.00	0.00
7,800.0	90.00	1.18	6,558.0	-1,585.00	1,906.5	1,291.6	2,066.6	0.00	0.00	0.00
7,900.0	90.00	1.18	6,558.0	-1,585.00	2,006.5	1,293.6	2,165.9	0.00	0.00	0.00
8,000.0	90.00	1.18	6,558.0	-1,585.00	2,106.5	1,295.7	2,265.2	0.00	0.00	0.00
8,100.0	90.00	1.18	6,558.0	-1,585.00	2,206.5	1,297.7	2,364.5	0.00	0.00	0.00
8,200.0	90.00	1.18	6,558.0	-1,585.00	2,306.4	1,299.8	2,463.8	0.00	0.00	0.00
8,300.0	90.00	1.18	6,558.0	-1,585.00	2,406.4	1,301.8	2,563.1	0.00	0.00	0.00
8,400.0	90.00	1.18	6,558.0	-1,585.00	2,506.4	1,303.9	2,662.4	0.00	0.00	0.00
8,500.0	90.00	1.18	6,558.0	-1,585.00	2,606.4	1,305.9	2,761.8	0.00	0.00	0.00
8,600.0	90.00	1.18	6,558.0	-1,585.00	2,706.4	1,308.0	2,861.1	0.00	0.00	0.00
8,700.0	90.00	1.18	6,558.0	-1,585.00	2,806.3	1,310.0	2,960.4	0.00	0.00	0.00
8,800.0	90.00	1.18	6,558.0	-1,585.00	2,906.3	1,312.1	3,059.7	0.00	0.00	0.00
8,900.0	90.00	1.18	6,558.0	-1,585.00	3,006.3	1,314.1	3,159.0	0.00	0.00	0.00
9,000.0	90.00	1.18	6,558.0	-1,585.00	3,106.3	1,316.2	3,258.3	0.00	0.00	0.00
9,100.0	90.00	1.18	6,558.0	-1,585.00	3,206.3	1,318.2	3,357.6	0.00	0.00	0.00
9,200.0	90.00	1.18	6,558.0	-1,585.00	3,306.2	1,320.3	3,456.9	0.00	0.00	0.00
9,300.0	90.00	1.18	6,558.0	-1,585.00	3,406.2	1,322.4	3,556.2	0.00	0.00	0.00
9,400.0	90.00	1.18	6,558.0	-1,585.00	3,506.2	1,324.4	3,655.5	0.00	0.00	0.00
9,500.0	90.00	1.18	6,558.0	-1,585.00	3,606.2	1,326.5	3,754.8	0.00	0.00	0.00
9,600.0	90.00	1.18	6,558.0	-1,585.00	3,706.2	1,328.5	3,854.1	0.00	0.00	0.00
9,700.0	90.00	1.18	6,558.0	-1,585.00	3,806.1	1,330.6	3,953.4	0.00	0.00	0.00
9,800.0	90.00	1.18	6,558.0	-1,585.00	3,906.1	1,332.6	4,052.7	0.00	0.00	0.00
9,900.0	90.00	1.18	6,558.0	-1,585.00	4,006.1	1,334.7	4,152.0	0.00	0.00	0.00
10,000.0	90.00	1.18	6,558.0	-1,585.00	4,106.1	1,336.7	4,251.3	0.00	0.00	0.00
10,100.0	90.00	1.18	6,558.0	-1,585.00	4,206.0	1,338.8	4,350.6	0.00	0.00	0.00
10,200.0	90.00	1.18	6,558.0	-1,585.00	4,306.0	1,340.8	4,449.9	0.00	0.00	0.00
10,300.0	90.00	1.18	6,558.0	-1,585.00	4,406.0	1,342.9	4,549.2	0.00	0.00	0.00
10,400.0	90.00	1.18	6,558.0	-1,585.00	4,506.0	1,344.9	4,648.5	0.00	0.00	0.00
10,500.0	90.00	1.18	6,558.0	-1,585.00	4,606.0	1,347.0	4,747.8	0.00	0.00	0.00
10,600.0	90.00	1.18	6,558.0	-1,585.00	4,705.9	1,349.0	4,847.1	0.00	0.00	0.00
10,700.0	90.00	1.18	6,558.0	-1,585.00	4,805.9	1,351.1	4,946.5	0.00	0.00	0.00
10,800.0	90.00	1.18	6,558.0	-1,585.00	4,905.9	1,353.2	5,045.8	0.00	0.00	0.00
10,900.0	90.00	1.18	6,558.0	-1,585.00	5,005.9	1,355.2	5,145.1	0.00	0.00	0.00
11,000.0	90.00	1.18	6,558.0	-1,585.00	5,105.9	1,357.3	5,244.4	0.00	0.00	0.00
11,100.0	90.00	1.18	6,558.0	-1,585.00	5,205.8	1,359.3	5,343.7	0.00	0.00	0.00
11,200.0	90.00	1.18	6,558.0	-1,585.00	5,305.8	1,361.4	5,443.0	0.00	0.00	0.00
11,300.0	90.00	1.18	6,558.0	-1,585.00	5,405.8	1,363.4	5,542.3	0.00	0.00	0.00
11,400.0	90.00	1.18	6,558.0	-1,585.00	5,505.8	1,365.5	5,641.6	0.00	0.00	0.00
11,500.0	90.00	1.18	6,558.0	-1,585.00	5,605.8	1,367.5	5,740.9	0.00	0.00	0.00
11,600.0	90.00	1.18	6,558.0	-1,585.00	5,705.7	1,369.6	5,840.2	0.00	0.00	0.00

# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well WIGEON FED 33-28-15HC
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4973.0usft
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4973.0usft
<b>Site:</b>	NE NW SEC. 4 T7N R60W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	WIGEON FED 33-28-15HC	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	PROPOSAL #2		

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)
11,700.0	90.00	1.18	6,558.0	-1,585.00	5,805.7	1,371.7	5,939.5	0.00	0.00	0.00
11,800.0	90.00	1.18	6,558.0	-1,585.00	5,905.7	1,373.7	6,038.8	0.00	0.00	0.00
11,900.0	90.00	1.18	6,558.0	-1,585.00	6,005.7	1,375.8	6,138.1	0.00	0.00	0.00
12,000.0	90.00	1.18	6,558.0	-1,585.00	6,105.6	1,377.8	6,237.4	0.00	0.00	0.00
12,100.0	90.00	1.18	6,558.0	-1,585.00	6,205.6	1,379.9	6,336.7	0.00	0.00	0.00
12,200.0	90.00	1.18	6,558.0	-1,585.00	6,305.6	1,381.9	6,436.0	0.00	0.00	0.00
12,300.0	90.00	1.18	6,558.0	-1,585.00	6,405.6	1,384.0	6,535.3	0.00	0.00	0.00
12,400.0	90.00	1.18	6,558.0	-1,585.00	6,505.6	1,386.0	6,634.6	0.00	0.00	0.00
12,500.0	90.00	1.18	6,558.0	-1,585.00	6,605.5	1,388.1	6,733.9	0.00	0.00	0.00
12,600.0	90.00	1.18	6,558.0	-1,585.00	6,705.5	1,390.2	6,833.2	0.00	0.00	0.00
12,700.0	90.00	1.18	6,558.0	-1,585.00	6,805.5	1,392.2	6,932.6	0.00	0.00	0.00
12,800.0	90.00	1.18	6,558.0	-1,585.00	6,905.5	1,394.3	7,031.9	0.00	0.00	0.00
12,900.0	90.00	1.18	6,558.0	-1,585.00	7,005.5	1,396.3	7,131.2	0.00	0.00	0.00
13,000.0	90.00	1.18	6,558.0	-1,585.00	7,105.4	1,398.4	7,230.5	0.00	0.00	0.00
13,100.0	90.00	1.18	6,558.0	-1,585.00	7,205.4	1,400.4	7,329.8	0.00	0.00	0.00
13,200.0	90.00	1.18	6,558.0	-1,585.00	7,305.4	1,402.5	7,429.1	0.00	0.00	0.00
13,300.0	90.00	1.18	6,558.0	-1,585.00	7,405.4	1,404.5	7,528.4	0.00	0.00	0.00
13,400.0	90.00	1.18	6,558.0	-1,585.00	7,505.4	1,406.6	7,627.7	0.00	0.00	0.00
13,500.0	90.00	1.18	6,558.0	-1,585.00	7,605.3	1,408.7	7,727.0	0.00	0.00	0.00
13,600.0	90.00	1.18	6,558.0	-1,585.00	7,705.3	1,410.7	7,826.3	0.00	0.00	0.00
13,700.0	90.00	1.18	6,558.0	-1,585.00	7,805.3	1,412.8	7,925.6	0.00	0.00	0.00
13,800.0	90.00	1.18	6,558.0	-1,585.00	7,905.3	1,414.8	8,024.9	0.00	0.00	0.00
13,900.0	90.00	1.18	6,558.0	-1,585.00	8,005.2	1,416.9	8,124.2	0.00	0.00	0.00
14,000.0	90.00	1.18	6,558.0	-1,585.00	8,105.2	1,418.9	8,223.5	0.00	0.00	0.00
14,100.0	90.00	1.18	6,558.0	-1,585.00	8,205.2	1,421.0	8,322.8	0.00	0.00	0.00
14,200.0	90.00	1.18	6,558.0	-1,585.00	8,305.2	1,423.1	8,422.1	0.00	0.00	0.00
14,300.0	90.00	1.18	6,558.0	-1,585.00	8,405.2	1,425.1	8,521.4	0.00	0.00	0.00
14,400.0	90.00	1.18	6,558.0	-1,585.00	8,505.1	1,427.2	8,620.7	0.00	0.00	0.00
14,500.0	90.00	1.18	6,558.0	-1,585.00	8,605.1	1,429.2	8,720.0	0.00	0.00	0.00
14,600.0	90.00	1.18	6,558.0	-1,585.00	8,705.1	1,431.3	8,819.3	0.00	0.00	0.00
14,700.0	90.00	1.18	6,558.0	-1,585.00	8,805.1	1,433.4	8,918.7	0.00	0.00	0.00
14,800.0	90.00	1.18	6,558.0	-1,585.00	8,905.1	1,435.4	9,018.0	0.00	0.00	0.00
14,900.0	90.00	1.18	6,558.0	-1,585.00	9,005.0	1,437.5	9,117.3	0.00	0.00	0.00
15,000.0	90.00	1.18	6,558.0	-1,585.00	9,105.0	1,439.5	9,216.6	0.00	0.00	0.00
15,100.0	90.00	1.18	6,558.0	-1,585.00	9,205.0	1,441.6	9,315.9	0.00	0.00	0.00
15,200.0	90.00	1.18	6,558.0	-1,585.00	9,305.0	1,443.6	9,415.2	0.00	0.00	0.00
15,300.0	90.00	1.18	6,558.0	-1,585.00	9,404.9	1,445.7	9,514.5	0.00	0.00	0.00
15,400.0	90.00	1.18	6,558.0	-1,585.00	9,504.9	1,447.8	9,613.8	0.00	0.00	0.00
15,500.0	90.00	1.18	6,558.0	-1,585.00	9,604.9	1,449.8	9,713.1	0.00	0.00	0.00
15,600.0	90.00	1.18	6,558.0	-1,585.00	9,704.9	1,451.9	9,812.4	0.00	0.00	0.00
15,700.0	90.00	1.18	6,558.0	-1,585.00	9,804.9	1,453.9	9,911.7	0.00	0.00	0.00
15,800.0	90.00	1.18	6,558.0	-1,585.00	9,904.8	1,456.0	10,011.0	0.00	0.00	0.00
15,900.0	90.00	1.18	6,558.0	-1,585.00	10,004.8	1,458.1	10,110.3	0.00	0.00	0.00
16,000.0	90.00	1.18	6,558.0	-1,585.00	10,104.8	1,460.1	10,209.6	0.00	0.00	0.00
16,100.0	90.00	1.18	6,558.0	-1,585.00	10,204.8	1,462.2	10,308.9	0.00	0.00	0.00
16,200.0	90.00	1.18	6,558.0	-1,585.00	10,304.8	1,464.2	10,408.2	0.00	0.00	0.00
16,300.0	90.00	1.18	6,558.0	-1,585.00	10,404.7	1,466.3	10,507.5	0.00	0.00	0.00
16,400.0	90.00	1.18	6,558.0	-1,585.00	10,504.7	1,468.4	10,606.8	0.00	0.00	0.00
<b>BHL: 600ft FNL &amp; 790ft FEL of Sec 28</b>										
<b>16,431.3</b>	<b>90.00</b>	<b>1.18</b>	<b>6,558.0</b>	<b>-1,585.00</b>	<b>10,536.0</b>	<b>1,469.0</b>	<b>10,637.9</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well WIGEON FED 33-28-15HC
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4973.0usft
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4973.0usft
<b>Site:</b>	NE NW SEC. 4 T7N R60W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	WIGEON FED 33-28-15HC	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	PROPOSAL #2		

Formations						
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,592.2	1,567.0	Fox Hills Base				
3,448.5	3,374.0	Richard Sandstone				
3,563.5	3,486.0	Parkman Sandstone				
4,317.5	4,220.0	Sussex Sandstone				
4,834.2	4,723.0	Shannon Sandstone				
6,328.1	6,175.0	Sharon Springs				
6,430.8	6,267.0	Niobrara A Chalk				
6,461.6	6,293.0	Niobrara A Chalk Base				
6,498.4	6,323.0	Niobrara B1 Chalk Top				
6,533.1	6,350.0	Niobrara B1 Chalk Base				
6,557.2	6,368.0	Niobrara B2 Chalk Top (Target)				
6,605.3	6,402.0	Niobrara B2 Chalk Base				
6,658.1	6,436.0	Niobrara C Chalk Top				
6,762.4	6,492.0	Niobrara C Chalk Base				
6,787.3	6,503.0	Niobrara D Chalk Top				
6,875.0	6,534.0	Ft. Hays				
7,043.2	6,558.0	Codell (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 FNL & 2044ft FEL of Sec 4
200.0	200.0	0.0	0.0	START NUDGE (2°/100ft BUR)
861.2	855.3	34.1	67.9	EOB TO 13.22° INC
1,579.9	1,555.0	107.8	214.8	SURFACE CASING
6,204.5	6,057.0	582.4	1,160.3	KOP (10°/100ft DGLG)
7,043.2	6,558.0	1,149.9	1,276.0	HZ LP: 600ft FSL & 790ft FEL of Sec 33
16,431.3	6,558.0	10,536.0	1,469.0	BHL: 600ft FNL & 790ft FEL of Sec 28