

# **MALLARD EXPLORATION**

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

**SW SE SEC. 9 T8N R60W 6th P.M.**

**DUCLAIR 16-9HN**

**ORIGINAL WELLBORE**

**18 June, 2018**

**Plan: PROPOSAL #1**



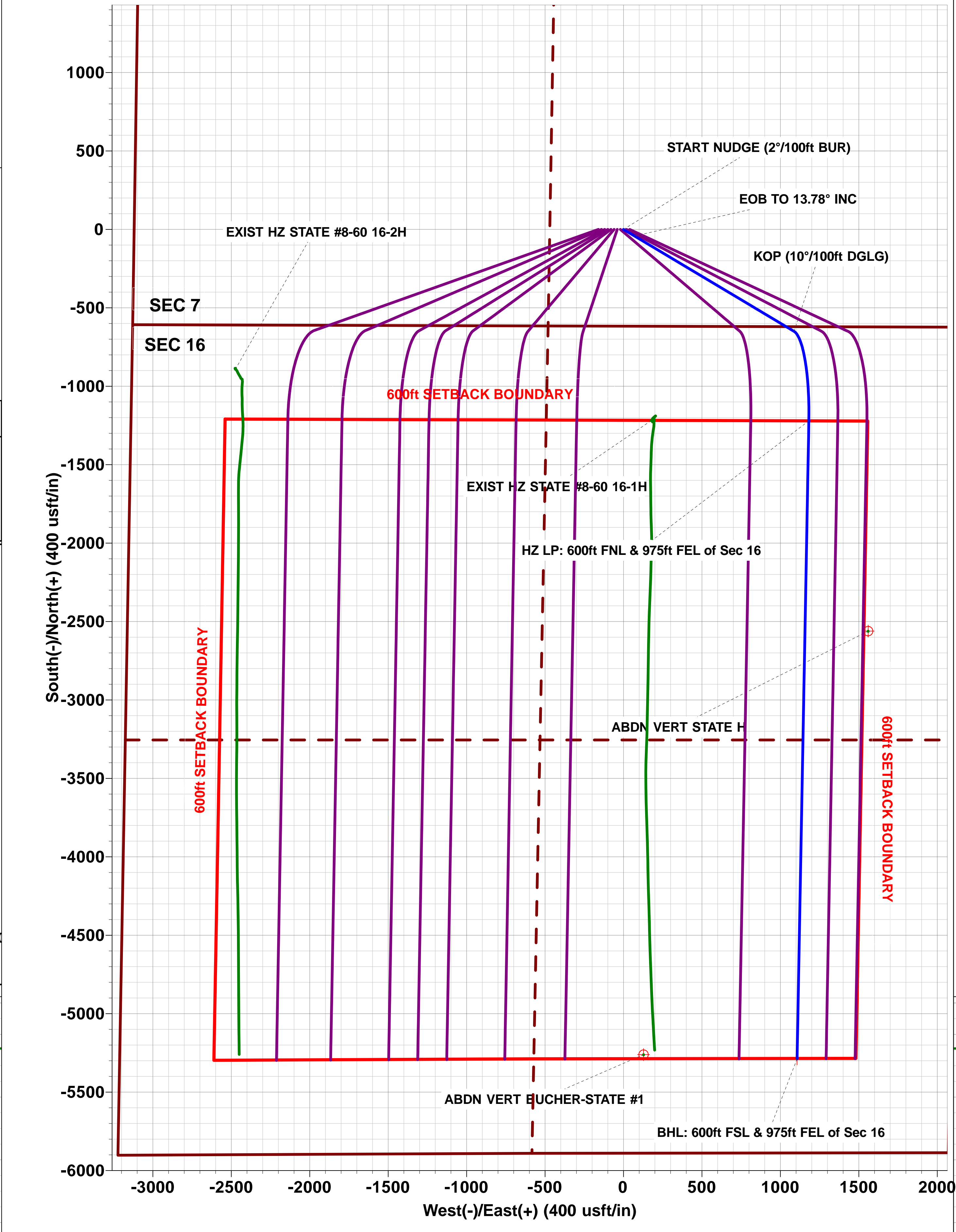
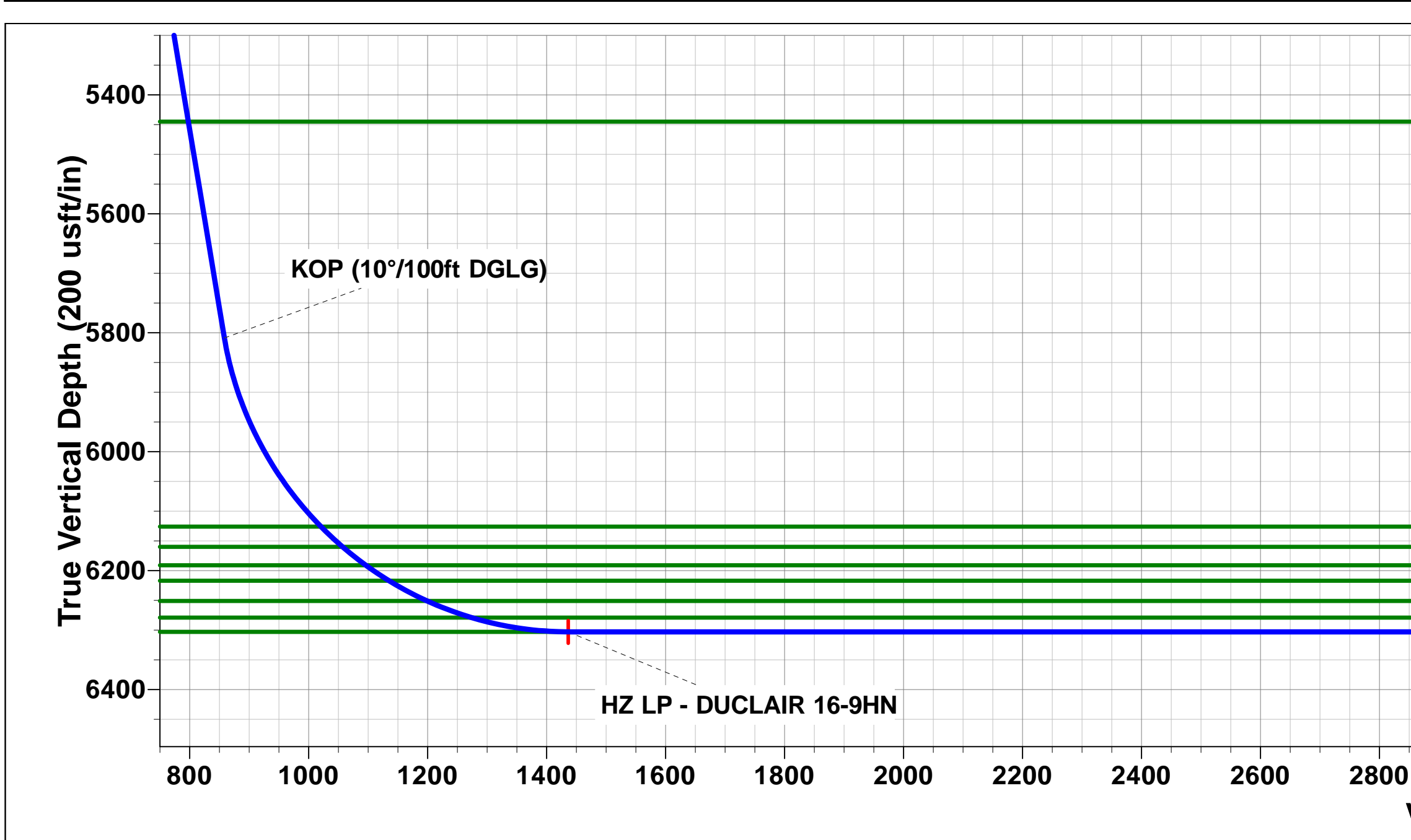
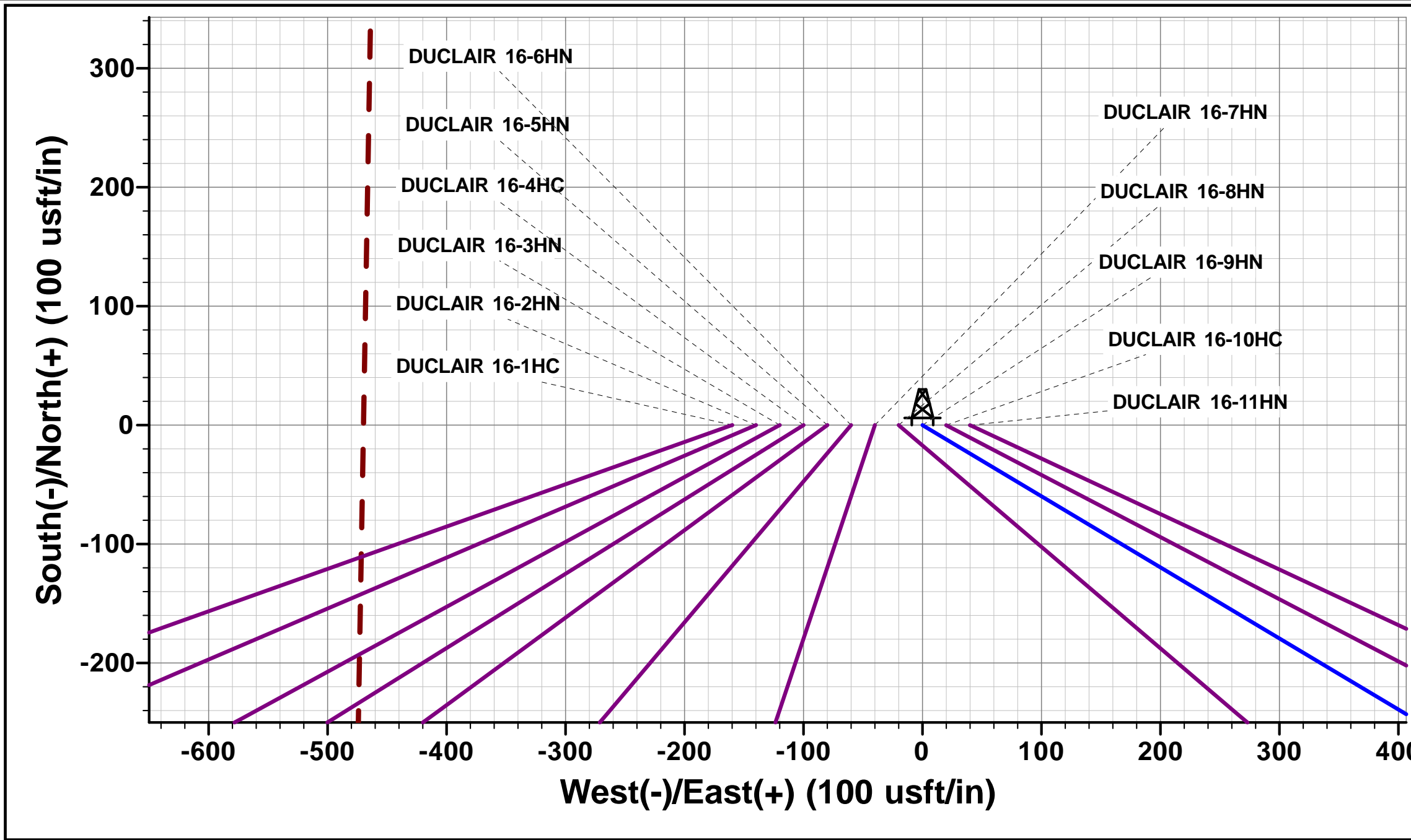
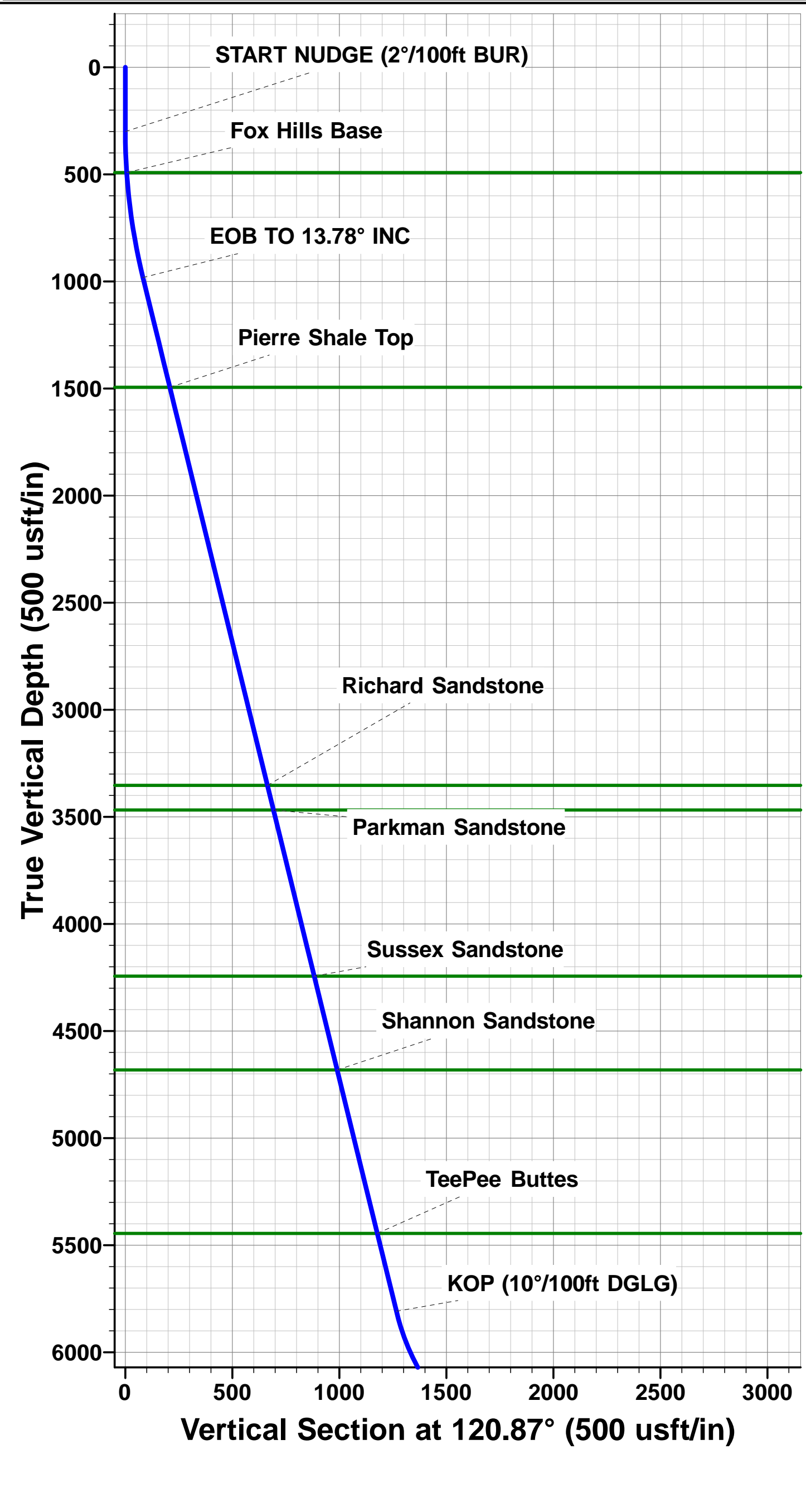


Project: WELD COUNTY, COLORADO (NAD 83)  
Site: SW SE SEC. 9 T8N R60W 6th P.M.  
Well: DUCLAIR 16-9HN  
Wellbore: ORIGINAL WELLBORE  
Design: PROPOSAL #1

ANNOTATIONS										
TVD	MD	Inc	Azi	+N/-S	+E/-W	VSect	Dep	Annotation		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	SHL: 617ft FSL & 2180ft FEL of Sec 9		
300.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2°/100ft BUR)		
982.39	989.01	13.78	120.87	-42.30	70.78	55.90	82.46	EOB TO 13.78° INC		
5808.95	5958.62	13.78	120.87	-649.61	1086.88	858.45	1266.21	KOP (10°/100ft DGLG)		
6303.00	6790.61	90.00	181.06	-1220.38	1181.51	1436.50	1855.32	HZ LP: 600ft FNL & 975ft FEL of Sec 16		
6303.00	10858.66	90.00	181.06	-5287.73	1106.51	5402.27	5923.37	BHL: 600ft FSL & 975ft FEL of Sec 16		

PROPOSED LOCAL COORDINATES:  
  
SHL: 617ft FSL & 2180ft FEL Sec 9  
HZ LP: 600ft FNL & 975ft FEL Sec 16  
BHL: 600ft FSL & 975ft FEL of Sec 16

WELLBORE TARGET DETAILS (LAT/LONG)					
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
HZ LP - DUCLAIR 16-9HN	6303.00	-1220.38	1181.51	40.667904	-104.090044
BHL - DUCLAIR 16-9HN	6303.00	-5287.73	1106.51	40.656740	-104.090315



# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well DUCLAIR 16-9HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4932.00usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4932.00usft (Original Well Elev)
<b>Site:</b>	SW SE SEC. 9 T8N R60W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	DUCLAIR 16-9HN	<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

Site	SW SE SEC. 9 T8N R60W 6th P.M.				
Site Position:		Northing:	1,490,468.76 usft	Latitude:	40.671254
From:	Lat/Long	Easting:	3,389,758.56 usft	Longitude:	-104.094879
Position Uncertainty:	0.00 usft	Slot Radius:	1.10000 ft	Grid Convergence:	0.91 °

Well	DUCLAIR 16-9HN					
Well Position	+N-S	-0.10 usft	Northing:	1,490,471.20 usfi	Latitude:	40.671254
	+E-W	159.78 usft	Easting:	3,389,918.32 usfi	Longitude:	-104.094303
Position Uncertainty		0.00 usft	Wellhead Elevation:	usfi	Ground Level:	4,912.00 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	18/06/2018	7.76	67.15	52,485

<b>Design</b>	PROPOSAL #1			
<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>
	6,303.00	0.00	0.00	168.18

<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	-4,932.00	0.00	0.00	0.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	-4,632.00	0.00	0.00	0.00	0.00	0.00	0.00	
989.01	13.78	120.87	982.39	-3,949.61	-42.30	70.78	2.00	2.00	0.00	120.87	
5,958.62	13.78	120.87	5,808.95	876.95	-649.61	1,086.88	0.00	0.00	0.00	0.00	
6,790.61	90.00	181.06	6,303.00	1,371.00	-1,220.38	1,181.51	10.00	9.16	7.23	60.91	HZ LP - DUCLAIR
10,858.66	90.00	181.06	6,303.00	1,371.00	-5,287.73	1,106.51	0.00	0.00	0.00	0.00	BHL - DUCLAIR 16

# Planning Report



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<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4932.00usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4932.00usft (Original Well Elev)
<b>Site:</b>	SW SE SEC. 9 T8N R60W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	DUCLAIR 16-9HN	<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: 617ft FSL &amp; 2180ft FEL of Sec 9</b>										
0.00	0.00	0.00	0.00	4,932.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	4,832.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	4,732.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>START NUDGE (2°/100ft BUR)</b>										
300.00	0.00	0.00	300.00	4,632.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	2.00	120.87	399.98	4,532.02	-0.90	1.50	1.18	2.00	2.00	0.00
<b>Fox Hills Base</b>										
492.14	3.84	120.87	492.00	4,440.00	-3.30	5.53	4.37	2.00	2.00	0.00
500.00	4.00	120.87	499.84	4,432.16	-3.58	5.99	4.73	2.00	2.00	0.00
600.00	6.00	120.87	599.45	4,332.55	-8.05	13.47	10.64	2.00	2.00	0.00
700.00	8.00	120.87	698.70	4,233.30	-14.30	23.93	18.90	2.00	2.00	0.00
800.00	10.00	120.87	797.47	4,134.53	-22.33	37.36	29.51	2.00	2.00	0.00
900.00	12.00	120.87	895.62	4,036.38	-32.12	53.74	42.44	2.00	2.00	0.00
<b>EOB TO 13.78° INC</b>										
989.01	13.78	120.87	982.39	3,949.61	-42.30	70.78	55.90	2.00	2.00	0.00
1,000.00	13.78	120.87	993.06	3,938.94	-43.65	73.03	57.68	0.00	0.00	0.00
1,100.00	13.78	120.87	1,090.18	3,841.82	-55.87	93.47	73.83	0.00	0.00	0.00
1,200.00	13.78	120.87	1,187.30	3,744.70	-68.09	113.92	89.98	0.00	0.00	0.00
1,300.00	13.78	120.87	1,284.43	3,647.57	-80.31	134.37	106.13	0.00	0.00	0.00
1,400.00	13.78	120.87	1,381.55	3,550.45	-92.53	154.81	122.28	0.00	0.00	0.00
1,500.00	13.78	120.87	1,478.67	3,453.33	-104.75	175.26	138.42	0.00	0.00	0.00
<b>Pierre Shale Top</b>										
1,516.82	13.78	120.87	1,495.00	3,437.00	-106.80	178.70	141.14	0.00	0.00	0.00
1,600.00	13.78	120.87	1,575.79	3,356.21	-116.97	195.70	154.57	0.00	0.00	0.00
1,700.00	13.78	120.87	1,672.91	3,259.09	-129.19	216.15	170.72	0.00	0.00	0.00
1,800.00	13.78	120.87	1,770.03	3,161.97	-141.41	236.60	186.87	0.00	0.00	0.00
1,900.00	13.78	120.87	1,867.16	3,064.84	-153.63	257.04	203.02	0.00	0.00	0.00
2,000.00	13.78	120.87	1,964.28	2,967.72	-165.85	277.49	219.17	0.00	0.00	0.00
2,100.00	13.78	120.87	2,061.40	2,870.60	-178.07	297.94	235.32	0.00	0.00	0.00
2,200.00	13.78	120.87	2,158.52	2,773.48	-190.29	318.38	251.47	0.00	0.00	0.00
2,300.00	13.78	120.87	2,255.64	2,676.36	-202.51	338.83	267.62	0.00	0.00	0.00
2,400.00	13.78	120.87	2,352.76	2,579.24	-214.73	359.27	283.77	0.00	0.00	0.00
2,500.00	13.78	120.87	2,449.88	2,482.12	-226.95	379.72	299.92	0.00	0.00	0.00
2,600.00	13.78	120.87	2,547.01	2,384.99	-239.17	400.17	316.07	0.00	0.00	0.00
2,700.00	13.78	120.87	2,644.13	2,287.87	-251.39	420.61	332.21	0.00	0.00	0.00
2,800.00	13.78	120.87	2,741.25	2,190.75	-263.61	441.06	348.36	0.00	0.00	0.00
2,900.00	13.78	120.87	2,838.37	2,093.63	-275.83	461.51	364.51	0.00	0.00	0.00
3,000.00	13.78	120.87	2,935.49	1,996.51	-288.05	481.95	380.66	0.00	0.00	0.00
3,100.00	13.78	120.87	3,032.61	1,899.39	-300.27	502.40	396.81	0.00	0.00	0.00
3,200.00	13.78	120.87	3,129.74	1,802.26	-312.49	522.84	412.96	0.00	0.00	0.00
3,300.00	13.78	120.87	3,226.86	1,705.14	-324.71	543.29	429.11	0.00	0.00	0.00
3,400.00	13.78	120.87	3,323.98	1,608.02	-336.94	563.74	445.26	0.00	0.00	0.00
<b>Richard Sandstone</b>										
3,429.88	13.78	120.87	3,353.00	1,579.00	-340.59	569.85	450.08	0.00	0.00	0.00
3,500.00	13.78	120.87	3,421.10	1,510.90	-349.16	584.18	461.41	0.00	0.00	0.00
<b>Parkman Sandstone</b>										
3,548.29	13.78	120.87	3,468.00	1,464.00	-355.06	594.06	469.21	0.00	0.00	0.00
3,600.00	13.78	120.87	3,518.22	1,413.78	-361.38	604.63	477.56	0.00	0.00	0.00
3,700.00	13.78	120.87	3,615.34	1,316.66	-373.60	625.07	493.71	0.00	0.00	0.00
3,800.00	13.78	120.87	3,712.47	1,219.53	-385.82	645.52	509.85	0.00	0.00	0.00
3,900.00	13.78	120.87	3,809.59	1,122.41	-398.04	665.97	526.00	0.00	0.00	0.00
4,000.00	13.78	120.87	3,906.71	1,025.29	-410.26	686.41	542.15	0.00	0.00	0.00

# Planning Report



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<b>Site:</b>	SW SE SEC. 9 T8N R60W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	DUCLAIR 16-9HN	<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)
4,100.00	13.78	120.87	4,003.83	928.17	-422.48	706.86	558.30	0.00	0.00	0.00
4,200.00	13.78	120.87	4,100.95	831.05	-434.70	727.31	574.45	0.00	0.00	0.00
4,300.00	13.78	120.87	4,198.07	733.93	-446.92	747.75	590.60	0.00	0.00	0.00
<b>Sussex Sandstone</b>										
<b>4,347.29</b>	<b>13.78</b>	<b>120.87</b>	<b>4,244.00</b>	<b>688.00</b>	<b>-452.70</b>	<b>757.42</b>	<b>598.24</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
4,400.00	13.78	120.87	4,295.20	636.80	-459.14	768.20	606.75	0.00	0.00	0.00
4,500.00	13.78	120.87	4,392.32	539.68	-471.36	788.64	622.90	0.00	0.00	0.00
4,600.00	13.78	120.87	4,489.44	442.56	-483.58	809.09	639.05	0.00	0.00	0.00
4,700.00	13.78	120.87	4,586.56	345.44	-495.80	829.54	655.20	0.00	0.00	0.00
<b>Shannon Sandstone</b>										
<b>4,798.27</b>	<b>13.78</b>	<b>120.87</b>	<b>4,682.00</b>	<b>250.00</b>	<b>-507.81</b>	<b>849.63</b>	<b>671.07</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
4,800.00	13.78	120.87	4,683.68	248.32	-508.02	849.98	671.35	0.00	0.00	0.00
4,900.00	13.78	120.87	4,780.80	151.20	-520.24	870.43	687.50	0.00	0.00	0.00
5,000.00	13.78	120.87	4,877.93	54.07	-532.46	890.88	703.64	0.00	0.00	0.00
5,100.00	13.78	120.87	4,975.05	-43.05	-544.68	911.32	719.79	0.00	0.00	0.00
5,200.00	13.78	120.87	5,072.17	-140.17	-556.90	931.77	735.94	0.00	0.00	0.00
5,300.00	13.78	120.87	5,169.29	-237.29	-569.12	952.21	752.09	0.00	0.00	0.00
5,400.00	13.78	120.87	5,266.41	-334.41	-581.34	972.66	768.24	0.00	0.00	0.00
5,500.00	13.78	120.87	5,363.53	-431.53	-593.56	993.11	784.39	0.00	0.00	0.00
<b>TeePee Buttes</b>										
<b>5,583.88</b>	<b>13.78</b>	<b>120.87</b>	<b>5,445.00</b>	<b>-513.00</b>	<b>-603.81</b>	<b>1,010.26</b>	<b>797.94</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
5,600.00	13.78	120.87	5,460.66	-528.66	-605.78	1,013.55	800.54	0.00	0.00	0.00
5,700.00	13.78	120.87	5,557.78	-625.78	-618.00	1,034.00	816.69	0.00	0.00	0.00
5,800.00	13.78	120.87	5,654.90	-722.90	-630.22	1,054.45	832.84	0.00	0.00	0.00
5,900.00	13.78	120.87	5,752.02	-820.02	-642.44	1,074.89	848.99	0.00	0.00	0.00
<b>KOP (10°/100ft DGLG)</b>										
<b>5,958.62</b>	<b>13.78</b>	<b>120.87</b>	<b>5,808.95</b>	<b>-876.95</b>	<b>-649.61</b>	<b>1,086.88</b>	<b>858.45</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
6,000.00	16.19	133.93	5,848.93	-916.93	-656.14	1,095.27	866.57	10.00	5.83	31.58
6,100.00	24.01	152.51	5,942.86	-1,010.86	-683.93	1,114.75	897.76	10.00	7.81	18.58
6,200.00	32.97	161.91	6,030.71	-1,098.71	-727.96	1,132.63	944.51	10.00	8.97	9.40
6,300.00	42.37	167.56	6,109.80	-1,177.80	-786.87	1,148.38	1,005.41	10.00	9.39	5.66
<b>Sharon Springs</b>										
<b>6,322.31</b>	<b>44.49</b>	<b>168.55</b>	<b>6,126.00</b>	<b>-1,194.00</b>	<b>-801.88</b>	<b>1,151.55</b>	<b>1,020.74</b>	<b>10.00</b>	<b>9.53</b>	<b>4.41</b>
<b>Niobrara Top</b>										
<b>6,372.06</b>	<b>49.26</b>	<b>170.49</b>	<b>6,160.00</b>	<b>-1,228.00</b>	<b>-837.57</b>	<b>1,158.13</b>	<b>1,057.03</b>	<b>10.00</b>	<b>9.58</b>	<b>3.92</b>
6,400.00	51.95	171.47	6,177.73	-1,245.73	-858.90	1,161.51	1,078.59	10.00	9.63	3.49
<b>Niobrara A Chalk</b>										
<b>6,422.05</b>	<b>54.08</b>	<b>172.19</b>	<b>6,191.00</b>	<b>-1,259.00</b>	<b>-876.33</b>	<b>1,164.01</b>	<b>1,096.17</b>	<b>10.00</b>	<b>9.65</b>	<b>3.26</b>
<b>Niobrara A Chalk Base</b>										
<b>6,468.99</b>	<b>58.62</b>	<b>173.60</b>	<b>6,217.00</b>	<b>-1,285.00</b>	<b>-915.09</b>	<b>1,168.83</b>	<b>1,135.09</b>	<b>10.00</b>	<b>9.68</b>	<b>3.01</b>
6,500.00	61.63	174.46	6,232.45	-1,300.45	-941.84	1,171.63	1,161.84	10.00	9.71	2.77
<b>Niobrara B1 Chalk Top</b>										
<b>6,541.84</b>	<b>65.70</b>	<b>175.54</b>	<b>6,251.00</b>	<b>-1,319.00</b>	<b>-979.18</b>	<b>1,174.89</b>	<b>1,199.07</b>	<b>10.00</b>	<b>9.73</b>	<b>2.59</b>
6,600.00	71.37	176.94	6,272.27	-1,340.27	-1,033.17	1,178.42	1,252.64	10.00	9.75	2.41
<b>Niobrara B1 Chalk Base</b>										
<b>6,622.32</b>	<b>73.55</b>	<b>177.45</b>	<b>6,279.00</b>	<b>-1,347.00</b>	<b>-1,054.43</b>	<b>1,179.46</b>	<b>1,273.66</b>	<b>10.00</b>	<b>9.76</b>	<b>2.29</b>
6,700.00	81.14	179.16	6,296.01	-1,364.01	-1,130.13	1,181.68	1,348.21	10.00	9.77	2.19
<b>HZ LP: 600ft FNL &amp; 975ft FEL of Sec 16 - Niobrara B2 Chalk Top (Target)</b>										
<b>6,790.61</b>	<b>90.00</b>	<b>181.06</b>	<b>6,303.00</b>	<b>-1,371.00</b>	<b>-1,220.38</b>	<b>1,181.51</b>	<b>1,436.50</b>	<b>10.00</b>	<b>9.78</b>	<b>2.10</b>
6,800.00	90.00	181.06	6,303.00	-1,371.00	-1,229.76	1,181.33	1,445.65	0.00	0.00	0.00
6,900.00	90.00	181.06	6,303.00	-1,371.00	-1,329.75	1,179.49	1,543.14	0.00	0.00	0.00
7,000.00	90.00	181.06	6,303.00	-1,371.00	-1,429.73	1,177.65	1,640.63	0.00	0.00	0.00
7,100.00	90.00	181.06	6,303.00	-1,371.00	-1,529.71	1,175.80	1,738.11	0.00	0.00	0.00



# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well DUCLAIR 16-9HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4932.00usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4932.00usft (Original Well Elev)
<b>Site:</b>	SW SE SEC. 9 T8N R60W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	DUCLAIR 16-9HN	<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)
7,200.00	90.00	181.06	6,303.00	-1,371.00	-1,629.69	1,173.96	1,835.60	0.00	0.00	0.00
7,300.00	90.00	181.06	6,303.00	-1,371.00	-1,729.68	1,172.12	1,933.08	0.00	0.00	0.00
7,400.00	90.00	181.06	6,303.00	-1,371.00	-1,829.66	1,170.27	2,030.57	0.00	0.00	0.00
7,500.00	90.00	181.06	6,303.00	-1,371.00	-1,929.64	1,168.43	2,128.05	0.00	0.00	0.00
7,600.00	90.00	181.06	6,303.00	-1,371.00	-2,029.63	1,166.59	2,225.54	0.00	0.00	0.00
7,700.00	90.00	181.06	6,303.00	-1,371.00	-2,129.61	1,164.74	2,323.03	0.00	0.00	0.00
7,800.00	90.00	181.06	6,303.00	-1,371.00	-2,229.59	1,162.90	2,420.51	0.00	0.00	0.00
7,900.00	90.00	181.06	6,303.00	-1,371.00	-2,329.58	1,161.06	2,518.00	0.00	0.00	0.00
8,000.00	90.00	181.06	6,303.00	-1,371.00	-2,429.56	1,159.21	2,615.48	0.00	0.00	0.00
8,100.00	90.00	181.06	6,303.00	-1,371.00	-2,529.54	1,157.37	2,712.97	0.00	0.00	0.00
8,200.00	90.00	181.06	6,303.00	-1,371.00	-2,629.52	1,155.52	2,810.45	0.00	0.00	0.00
8,300.00	90.00	181.06	6,303.00	-1,371.00	-2,729.51	1,153.68	2,907.94	0.00	0.00	0.00
8,400.00	90.00	181.06	6,303.00	-1,371.00	-2,829.49	1,151.84	3,005.43	0.00	0.00	0.00
8,500.00	90.00	181.06	6,303.00	-1,371.00	-2,929.47	1,149.99	3,102.91	0.00	0.00	0.00
8,600.00	90.00	181.06	6,303.00	-1,371.00	-3,029.46	1,148.15	3,200.40	0.00	0.00	0.00
8,700.00	90.00	181.06	6,303.00	-1,371.00	-3,129.44	1,146.31	3,297.88	0.00	0.00	0.00
8,800.00	90.00	181.06	6,303.00	-1,371.00	-3,229.42	1,144.46	3,395.37	0.00	0.00	0.00
8,900.00	90.00	181.06	6,303.00	-1,371.00	-3,329.41	1,142.62	3,492.85	0.00	0.00	0.00
9,000.00	90.00	181.06	6,303.00	-1,371.00	-3,429.39	1,140.78	3,590.34	0.00	0.00	0.00
9,100.00	90.00	181.06	6,303.00	-1,371.00	-3,529.37	1,138.93	3,687.83	0.00	0.00	0.00
9,200.00	90.00	181.06	6,303.00	-1,371.00	-3,629.35	1,137.09	3,785.31	0.00	0.00	0.00
9,300.00	90.00	181.06	6,303.00	-1,371.00	-3,729.34	1,135.25	3,882.80	0.00	0.00	0.00
9,400.00	90.00	181.06	6,303.00	-1,371.00	-3,829.32	1,133.40	3,980.28	0.00	0.00	0.00
9,500.00	90.00	181.06	6,303.00	-1,371.00	-3,929.30	1,131.56	4,077.77	0.00	0.00	0.00
9,600.00	90.00	181.06	6,303.00	-1,371.00	-4,029.29	1,129.71	4,175.25	0.00	0.00	0.00
9,700.00	90.00	181.06	6,303.00	-1,371.00	-4,129.27	1,127.87	4,272.74	0.00	0.00	0.00
9,800.00	90.00	181.06	6,303.00	-1,371.00	-4,229.25	1,126.03	4,370.22	0.00	0.00	0.00
9,900.00	90.00	181.06	6,303.00	-1,371.00	-4,329.24	1,124.18	4,467.71	0.00	0.00	0.00
10,000.00	90.00	181.06	6,303.00	-1,371.00	-4,429.22	1,122.34	4,565.20	0.00	0.00	0.00
10,100.00	90.00	181.06	6,303.00	-1,371.00	-4,529.20	1,120.50	4,662.68	0.00	0.00	0.00
10,200.00	90.00	181.06	6,303.00	-1,371.00	-4,629.18	1,118.65	4,760.17	0.00	0.00	0.00
10,300.00	90.00	181.06	6,303.00	-1,371.00	-4,729.17	1,116.81	4,857.65	0.00	0.00	0.00
10,400.00	90.00	181.06	6,303.00	-1,371.00	-4,829.15	1,114.97	4,955.14	0.00	0.00	0.00
10,500.00	90.00	181.06	6,303.00	-1,371.00	-4,929.13	1,113.12	5,052.62	0.00	0.00	0.00
10,600.00	90.00	181.06	6,303.00	-1,371.00	-5,029.12	1,111.28	5,150.11	0.00	0.00	0.00
10,700.00	90.00	181.06	6,303.00	-1,371.00	-5,129.10	1,109.44	5,247.60	0.00	0.00	0.00
10,800.00	90.00	181.06	6,303.00	-1,371.00	-5,229.08	1,107.59	5,345.08	0.00	0.00	0.00
<b>BHL: 600ft FSL &amp; 975ft FEL of Sec 16</b>										
<b>10,858.66</b>	<b>90.00</b>	<b>181.06</b>	<b>6,303.00</b>	<b>-1,371.00</b>	<b>-5,287.73</b>	<b>1,106.51</b>	<b>5,402.27</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 DUCLAIR 16-9HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4932.00usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4932.00usft (Original Well Elev)
<b>Site:</b>	SW SE SEC. 9 T8N R60W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	DUCLAIR 16-9HN	<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 (°)	
492.14	492.00	Fox Hills Base				
1,516.82	1,495.00	Pierre Shale Top				
3,429.88	3,353.00	Richard Sandstone				
3,548.29	3,468.00	Parkman Sandstone				
4,347.29	4,244.00	Sussex Sandstone				
4,798.27	4,682.00	Shannon Sandstone				
5,583.88	5,445.00	TeePee Buttes				
6,322.31	6,126.00	Sharon Springs				
6,372.06	6,160.00	Niobrara Top				
6,422.05	6,191.00	Niobrara A Chalk				
6,468.99	6,217.00	Niobrara A Chalk Base				
6,541.84	6,251.00	Niobrara B1 Chalk Top				
6,622.32	6,279.00	Niobrara B1 Chalk Base				
6,790.61	6,303.00	Niobrara B2 Chalk Top (Target)				

Plan Annotations				
MD (usft)	TVD (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
0.00	0.00	0.00	0.00	SHL: 617ft FSL & 2180ft FEL of Sec 9
300.00	300.00	0.00	0.00	START NUDGE (2°/100ft BUR)
989.01	982.39	-42.30	70.78	EOB TO 13.78° INC
5,958.62	5,808.95	-649.61	1,086.88	KOP (10°/100ft DGLG)
6,790.61	6,303.00	-1,220.38	1,181.51	HZ LP: 600ft FNL & 975ft FEL of Sec 16
10,858.66	6,303.00	-5,287.73	1,106.51	BHL: 600ft FSL & 975ft FEL of Sec 16