

# **MALLARD EXPLORATION**

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

**NE NW SEC. 13 T8N R61W 6th P.M.**

**RUDDY 13-3HN**

**ORIGINAL WELLBORE**

**30 March, 2018**

**Plan: PROPOSAL #2**



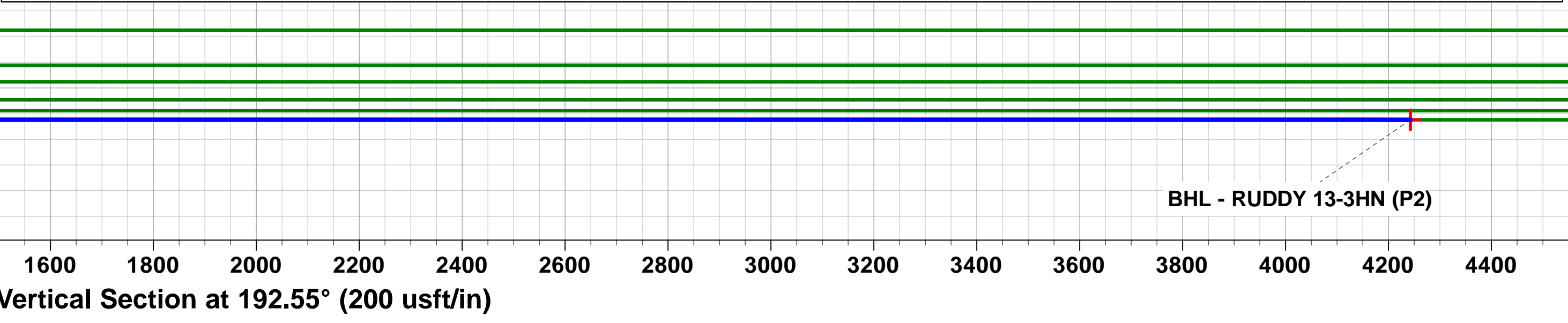
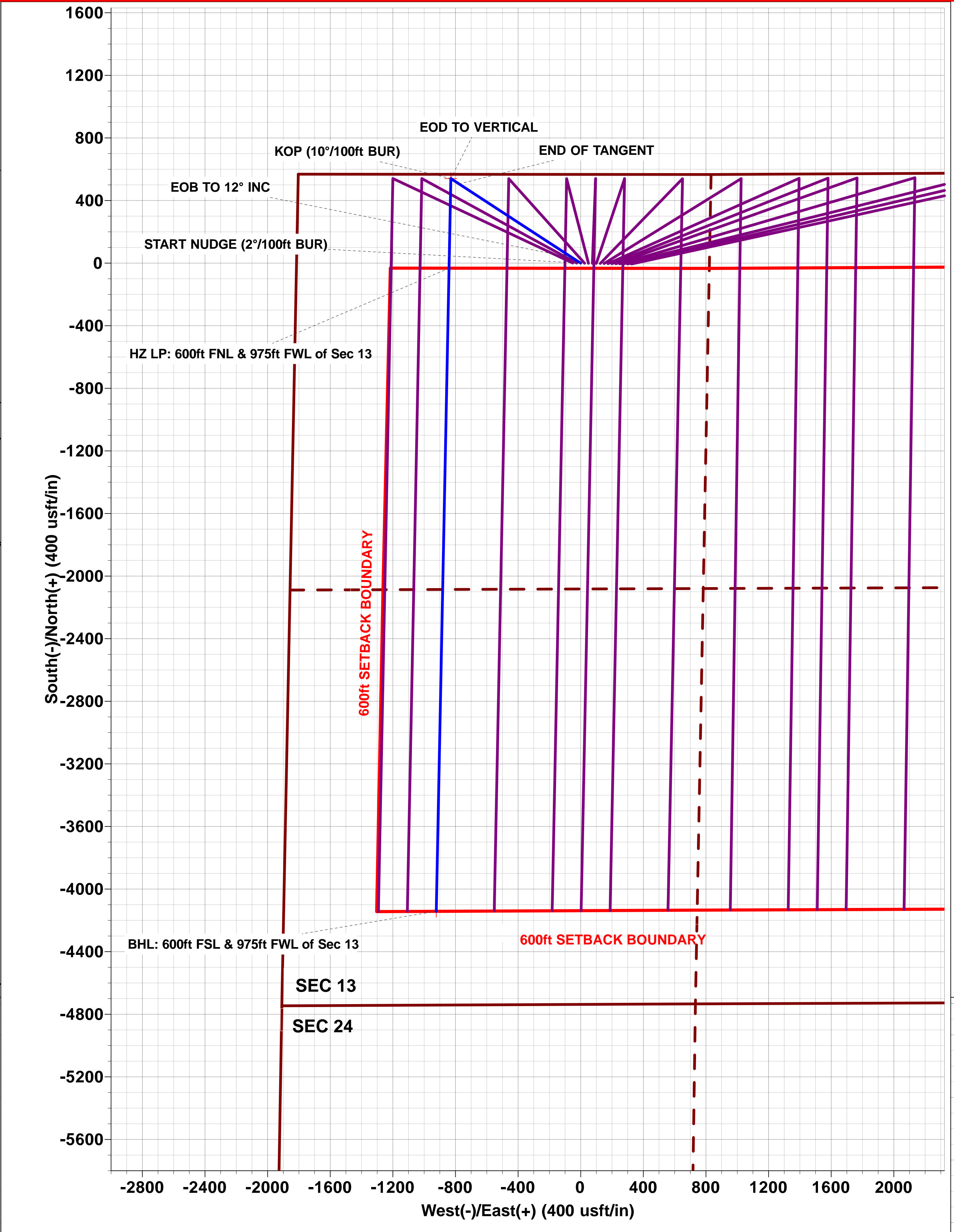
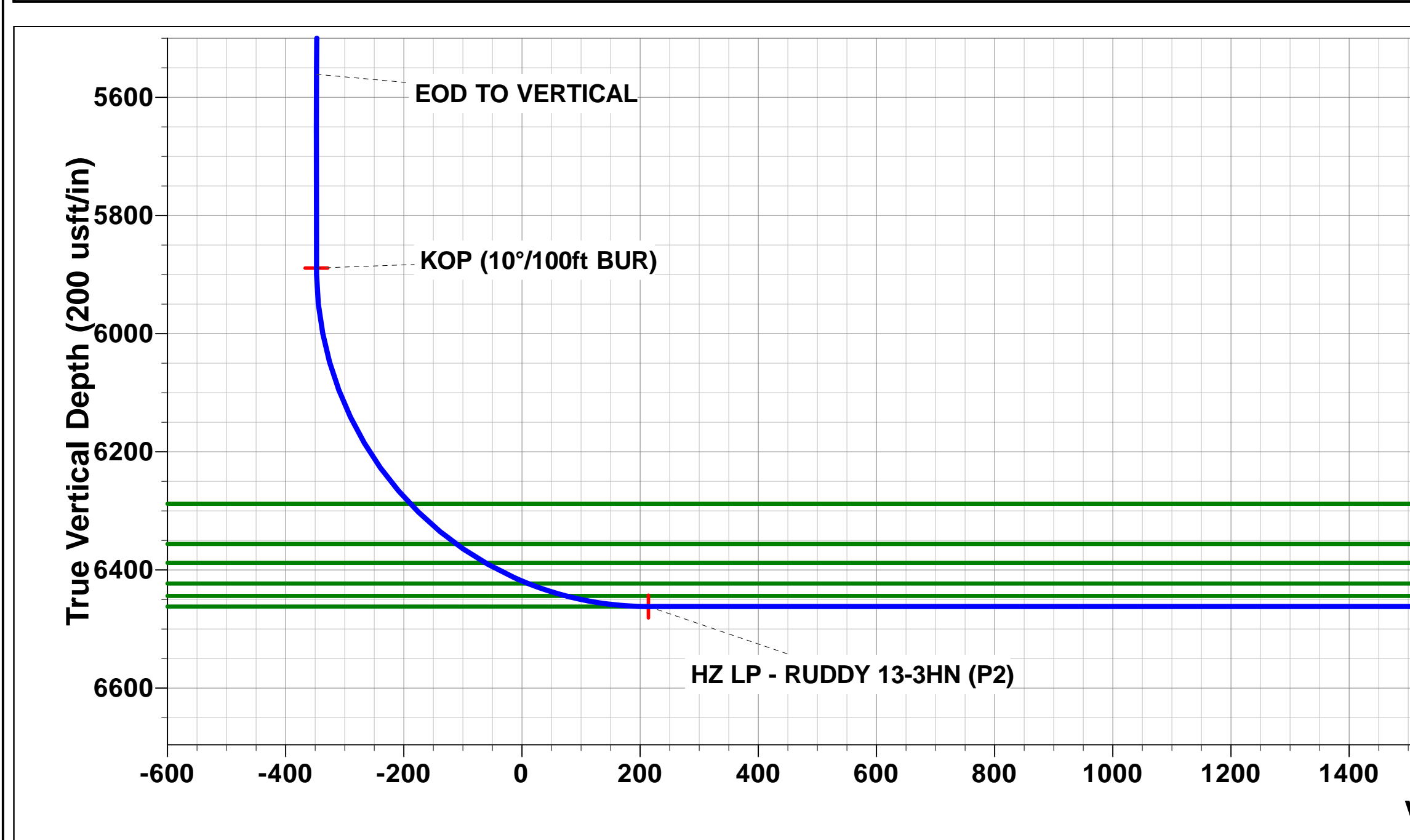
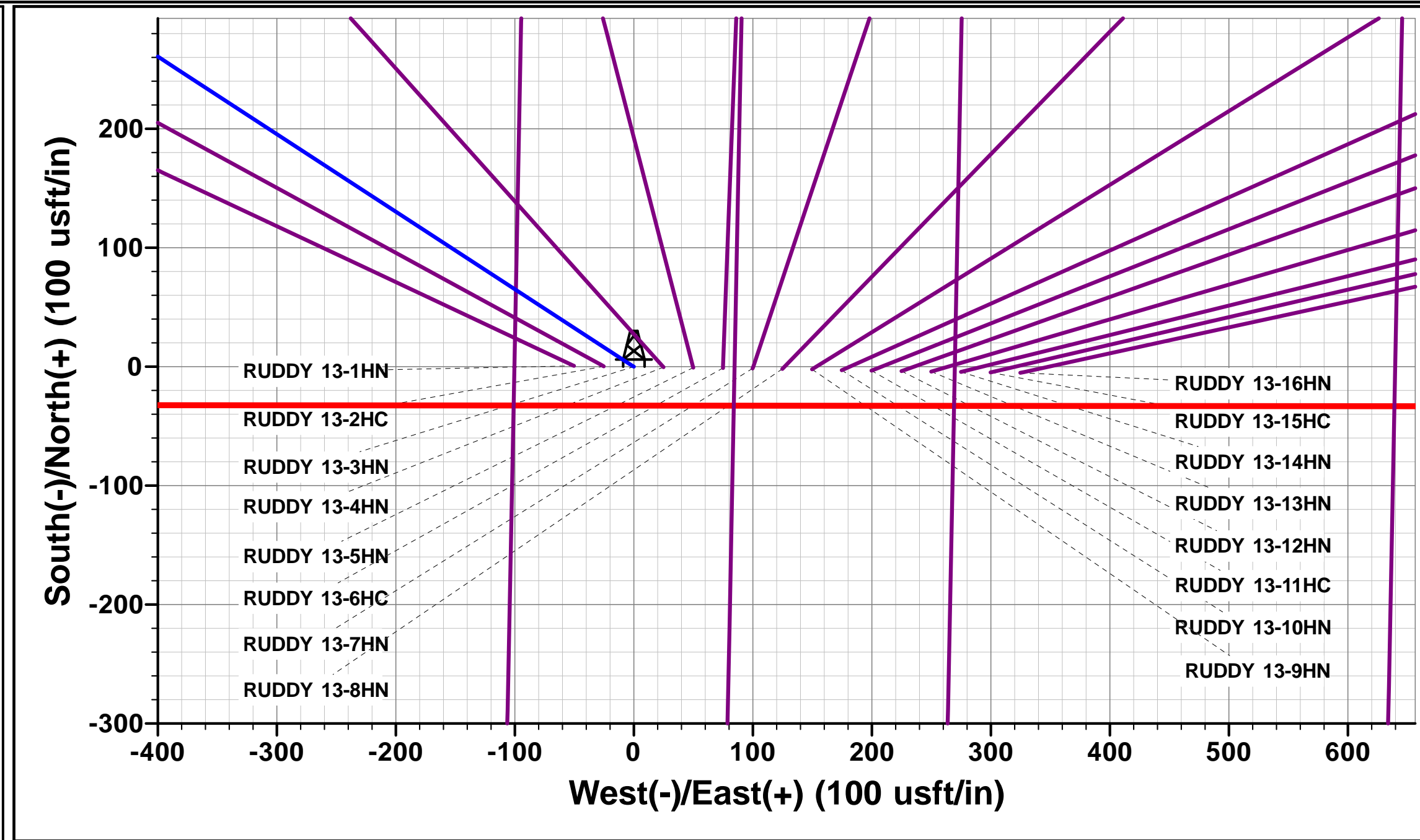
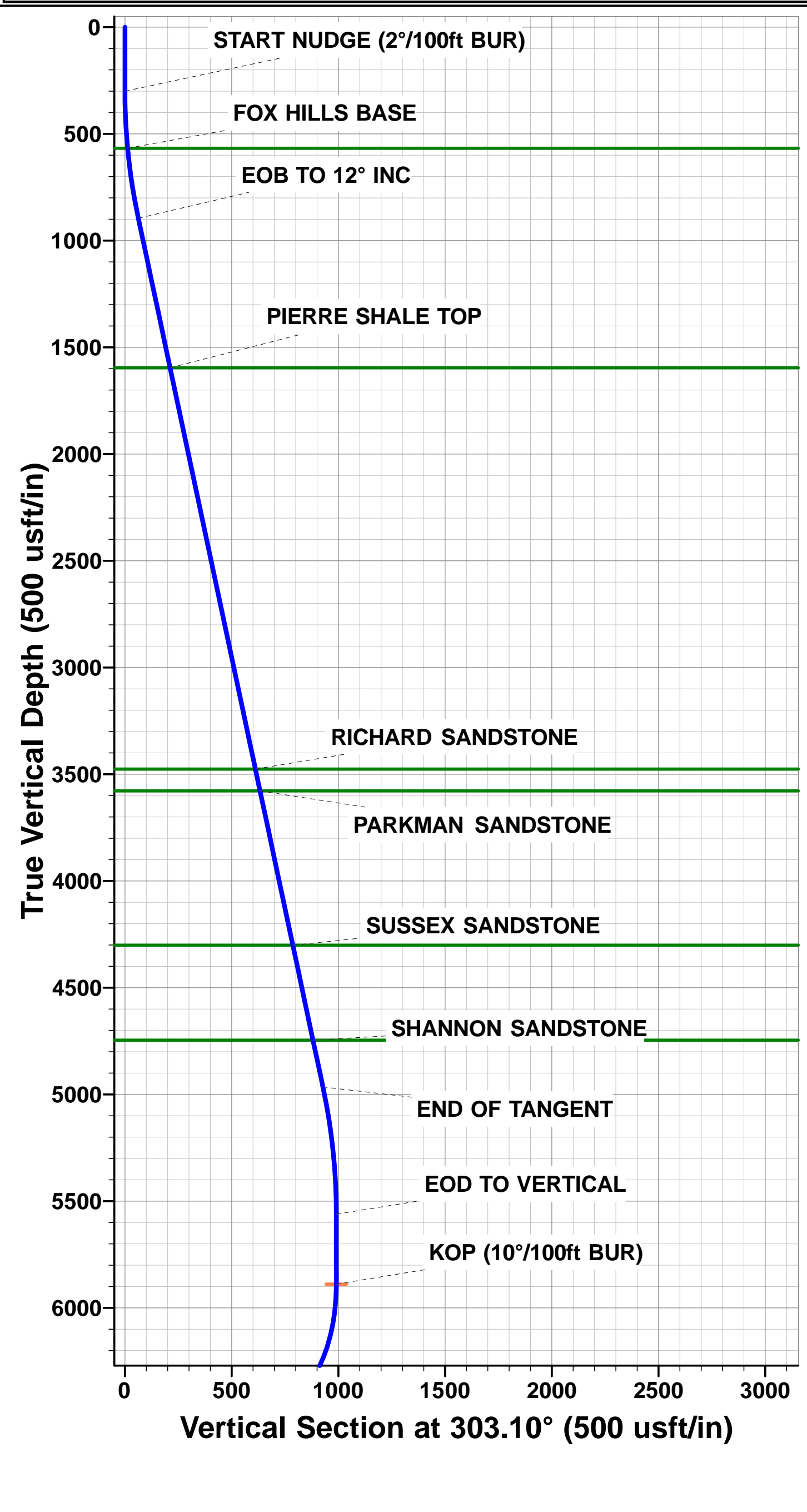


Project: WELD COUNTY, COLORADO (NAD 83)  
Site: NE NW SEC. 13 T8N R61W 6th P.M.  
Well: RUDDY 13-3HN  
Wellbore: ORIGINAL WELLBORE  
Design: PROPOSAL #2

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: 567ft FNL & 1815ft FWL of Sec 13		
300.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2°/100ft BUR)		
895.62	900.00	12.00	303.10	34.19	-52.44	-21.98	62.60	EOB TO 12° INC		
4965.38	5060.68	12.00	303.10	506.62	-777.10	-325.64	927.66	END OF TANGENT		
5561.01	5660.68	0.00	0.00	540.81	-829.54	-347.61	990.26	EOD TO VERTICAL		
5889.04	5988.71	0.00	0.00	540.81	-829.54	-347.61	990.26	KOP (10°/100ft BUR)		
6462.00	6888.72	90.00	181.13	-32.04	-840.84	214.00	1563.22	HZ LP: 600ft FNL & 975ft FWL of Sec 13		
6462.00	10998.77	90.00	181.13	-4141.29	-922.00	4242.68	5673.27	BHL: 600ft FSL & 975ft FWL of Sec 13		

PROPOSED LOCAL COORDINATES:  
SHL: 567ft FNL & 1815ft FWL Sec 13  
HZ LP: 600ft FNL & 975ft FWL Sec 13  
BHL: 600ft FSL & 975ft FWL of Sec 13

WELLBORE TARGET DETAILS (LAT/LONG)					
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP - RUDDY 13-3HN (P2)	5889.04	540.81	-829.54	40.669337	-104.159209
HZ LP - RUDDY 13-3HN (P2)	6462.00	-32.04	-840.84	40.667765	-104.159250
BHL - RUDDY 13-3HN (P2)	6462.00	-4141.29	-922.00	40.656486	-104.159542



# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well RUDDY 13-3HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4987.00usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4987.00usft (Original Well Elev)
<b>Site:</b>	NE NW SEC. 13 T8N R61W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	RUDDY 13-3HN	<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. 13 T8N R61W 6th P.M.		
<b>Site Position:</b>		<b>Northing:</b>	1,488,966.08 usft
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,372,713.69 usft
<b>Position Uncertainty:</b>	0.00 usft	<b>Slot Radius:</b>	1.10000 ft
		<b>Latitude:</b>	40.667855
		<b>Longitude:</b>	-104.156400
		<b>Grid Convergence:</b>	0.87 °

<b>Well</b>	RUDDY 13-3HN		
<b>Well Position</b>	<b>+N-S</b>	-0.74 usft	<b>Northing:</b>
	<b>+E-W</b>	50.21 usft	<b>Easting:</b>
<b>Position Uncertainty</b>	0.00 usft	<b>Wellhead Elevation:</b>	usft
		<b>Latitude:</b>	40.667853
		<b>Longitude:</b>	-104.156219
		<b>Ground Level:</b>	4,967.00 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	27/03/2018	7.82	67.14	52,503

<b>Design</b>	PROPOSAL #2			
<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>
	6,462.00	0.00	0.00	192.55

<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	-4,987.00	0.00	0.00	0.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	-4,687.00	0.00	0.00	0.00	0.00	0.00	0.00	
900.00	12.00	303.10	895.62	-4,091.38	34.19	-52.44	2.00	2.00	0.00	303.10	
5,060.68	12.00	303.10	4,965.38	-21.62	506.62	-777.10	0.00	0.00	0.00	0.00	
5,660.68	0.00	0.00	5,561.00	574.00	540.81	-829.54	2.00	-2.00	0.00	180.00	
5,988.71	0.00	0.00	5,889.04	902.04	540.81	-829.54	0.00	0.00	0.00	0.00	KOP - RUDDY 13-3
6,888.72	90.00	181.13	6,462.00	1,475.00	-32.04	-840.84	10.00	10.00	-19.87	181.13	HZ LP - RUDDY 13
10,998.77	90.00	181.13	6,462.00	1,475.00	-4,141.29	-922.00	0.00	0.00	0.00	90.38	BHL - RUDDY 13-3

# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well RUDDY 13-3HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4987.00usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4987.00usft (Original Well Elev)
<b>Site:</b>	NE NW SEC. 13 T8N R61W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	RUDDY 13-3HN	<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: 567ft FNL &amp; 1815ft FWL of Sec 13</b>										
0.00	0.00	0.00	0.00	4,987.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	4,887.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	4,787.00	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	4,687.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	2.00	303.10	399.98	4,587.02	0.95	-1.46	-0.61	2.00	2.00	0.00
500.00	4.00	303.10	499.84	4,487.16	3.81	-5.85	-2.45	2.00	2.00	0.00
<b>FOX HILLS BASE</b>										
568.39	5.37	303.10	568.00	4,419.00	6.86	-10.52	-4.41	2.00	2.00	0.00
600.00	6.00	303.10	599.45	4,387.55	8.57	-13.15	-5.51	2.00	2.00	0.00
700.00	8.00	303.10	698.70	4,288.30	15.23	-23.36	-9.79	2.00	2.00	0.00
800.00	10.00	303.10	797.47	4,189.53	23.77	-36.46	-15.28	2.00	2.00	0.00
<b>EOB TO 12° INC</b>										
900.00	12.00	303.10	895.62	4,091.38	34.19	-52.44	-21.98	2.00	2.00	0.00
1,000.00	12.00	303.10	993.44	3,993.56	45.54	-69.86	-29.27	0.00	0.00	0.00
1,100.00	12.00	303.10	1,091.25	3,895.75	56.90	-87.28	-36.57	0.00	0.00	0.00
1,200.00	12.00	303.10	1,189.07	3,797.93	68.25	-104.69	-43.87	0.00	0.00	0.00
1,300.00	12.00	303.10	1,286.88	3,700.12	79.61	-122.11	-51.17	0.00	0.00	0.00
1,400.00	12.00	303.10	1,384.70	3,602.30	90.96	-139.53	-58.47	0.00	0.00	0.00
1,500.00	12.00	303.10	1,482.51	3,504.49	102.32	-156.94	-65.77	0.00	0.00	0.00
1,600.00	12.00	303.10	1,580.33	3,406.67	113.67	-174.36	-73.06	0.00	0.00	0.00
<b>PIERRE SHALE TOP</b>										
1,616.02	12.00	303.10	1,596.00	3,391.00	115.49	-177.15	-74.23	0.00	0.00	0.00
1,700.00	12.00	303.10	1,678.14	3,308.86	125.03	-191.78	-80.36	0.00	0.00	0.00
1,800.00	12.00	303.10	1,775.96	3,211.04	136.38	-209.19	-87.66	0.00	0.00	0.00
1,900.00	12.00	303.10	1,873.77	3,113.23	147.74	-226.61	-94.96	0.00	0.00	0.00
2,000.00	12.00	303.10	1,971.59	3,015.41	159.09	-244.03	-102.26	0.00	0.00	0.00
2,100.00	12.00	303.10	2,069.40	2,917.60	170.45	-261.44	-109.56	0.00	0.00	0.00
2,200.00	12.00	303.10	2,167.22	2,819.78	181.80	-278.86	-116.85	0.00	0.00	0.00
2,300.00	12.00	303.10	2,265.03	2,721.97	193.15	-296.28	-124.15	0.00	0.00	0.00
2,400.00	12.00	303.10	2,362.84	2,624.16	204.51	-313.69	-131.45	0.00	0.00	0.00
2,500.00	12.00	303.10	2,460.66	2,526.34	215.86	-331.11	-138.75	0.00	0.00	0.00
2,600.00	12.00	303.10	2,558.47	2,428.53	227.22	-348.53	-146.05	0.00	0.00	0.00
2,700.00	12.00	303.10	2,656.29	2,330.71	238.57	-365.94	-153.35	0.00	0.00	0.00
2,800.00	12.00	303.10	2,754.10	2,232.90	249.93	-383.36	-160.64	0.00	0.00	0.00
2,900.00	12.00	303.10	2,851.92	2,135.08	261.28	-400.78	-167.94	0.00	0.00	0.00
3,000.00	12.00	303.10	2,949.73	2,037.27	272.64	-418.19	-175.24	0.00	0.00	0.00
3,100.00	12.00	303.10	3,047.55	1,939.45	283.99	-435.61	-182.54	0.00	0.00	0.00
3,200.00	12.00	303.10	3,145.36	1,841.64	295.35	-453.03	-189.84	0.00	0.00	0.00
3,300.00	12.00	303.10	3,243.18	1,743.82	306.70	-470.44	-197.14	0.00	0.00	0.00
3,400.00	12.00	303.10	3,340.99	1,646.01	318.06	-487.86	-204.43	0.00	0.00	0.00
3,500.00	12.00	303.10	3,438.81	1,548.19	329.41	-505.28	-211.73	0.00	0.00	0.00
<b>RICHARD SANDSTONE</b>										
3,538.02	12.00	303.10	3,476.00	1,511.00	333.73	-511.90	-214.51	0.00	0.00	0.00
3,600.00	12.00	303.10	3,536.62	1,450.38	340.77	-522.69	-219.03	0.00	0.00	0.00
<b>PARKMAN SANDSTONE</b>										
3,642.30	12.00	303.10	3,578.00	1,409.00	345.57	-530.06	-222.12	0.00	0.00	0.00
3,700.00	12.00	303.10	3,634.44	1,352.56	352.12	-540.11	-226.33	0.00	0.00	0.00
3,800.00	12.00	303.10	3,732.25	1,254.75	363.47	-557.53	-233.63	0.00	0.00	0.00
3,900.00	12.00	303.10	3,830.07	1,156.93	374.83	-574.95	-240.93	0.00	0.00	0.00
4,000.00	12.00	303.10	3,927.88	1,059.12	386.18	-592.36	-248.23	0.00	0.00	0.00
4,100.00	12.00	303.10	4,025.70	961.30	397.54	-609.78	-255.52	0.00	0.00	0.00

# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well RUDDY 13-3HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4987.00usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4987.00usft (Original Well Elev)
<b>Site:</b>	NE NW SEC. 13 T8N R61W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	RUDDY 13-3HN	<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)
4,200.00	12.00	303.10	4,123.51	863.49	408.89	-627.20	-262.82	0.00	0.00	0.00
4,300.00	12.00	303.10	4,221.32	765.68	420.25	-644.61	-270.12	0.00	0.00	0.00
<b>SUSSEX SANDSTONE</b>										
<b>4,381.46</b>	<b>12.00</b>	<b>303.10</b>	<b>4,301.00</b>	<b>686.00</b>	<b>429.50</b>	<b>-658.80</b>	<b>-276.07</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
4,400.00	12.00	303.10	4,319.14	667.86	431.60	-662.03	-277.42	0.00	0.00	0.00
4,500.00	12.00	303.10	4,416.95	570.05	442.96	-679.45	-284.72	0.00	0.00	0.00
4,600.00	12.00	303.10	4,514.77	472.23	454.31	-696.86	-292.02	0.00	0.00	0.00
4,700.00	12.00	303.10	4,612.58	374.42	465.67	-714.28	-299.31	0.00	0.00	0.00
4,800.00	12.00	303.10	4,710.40	276.60	477.02	-731.70	-306.61	0.00	0.00	0.00
<b>SHANNON SANDSTONE</b>										
<b>4,836.40</b>	<b>12.00</b>	<b>303.10</b>	<b>4,746.00</b>	<b>241.00</b>	<b>481.15</b>	<b>-738.04</b>	<b>-309.27</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
4,900.00	12.00	303.10	4,808.21	178.79	488.38	-749.11	-313.91	0.00	0.00	0.00
5,000.00	12.00	303.10	4,906.03	80.97	499.73	-766.53	-321.21	0.00	0.00	0.00
<b>END OF TANGENT</b>										
<b>5,060.68</b>	<b>12.00</b>	<b>303.10</b>	<b>4,965.38</b>	<b>21.62</b>	<b>506.62</b>	<b>-777.10</b>	<b>-325.64</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
5,100.00	11.21	303.10	5,003.90	-16.90	510.94	-783.73	-328.41	2.00	-2.00	0.00
5,200.00	9.21	303.10	5,102.31	-115.31	520.62	-798.58	-334.64	2.00	-2.00	0.00
5,300.00	7.21	303.10	5,201.28	-214.28	528.43	-810.55	-339.65	2.00	-2.00	0.00
5,400.00	5.21	303.10	5,300.69	-313.69	534.34	-819.61	-343.45	2.00	-2.00	0.00
5,500.00	3.21	303.10	5,400.41	-413.41	538.35	-825.77	-346.03	2.00	-2.00	0.00
5,600.00	1.21	303.10	5,500.33	-513.33	540.46	-829.00	-347.39	2.00	-2.00	0.00
<b>EOD TO VERTICAL</b>										
<b>5,660.68</b>	<b>0.00</b>	<b>0.00</b>	<b>5,561.01</b>	<b>-574.01</b>	<b>540.81</b>	<b>-829.54</b>	<b>-347.61</b>	<b>2.00</b>	<b>-2.00</b>	<b>0.00</b>
5,700.00	0.00	0.00	5,600.33	-613.33	540.81	-829.54	-347.61	0.00	0.00	0.00
5,800.00	0.00	0.00	5,700.33	-713.33	540.81	-829.54	-347.61	0.00	0.00	0.00
5,900.00	0.00	0.00	5,800.33	-813.33	540.81	-829.54	-347.61	0.00	0.00	0.00
<b>KOP (10°/100ft BUR)</b>										
<b>5,988.71</b>	<b>0.00</b>	<b>0.00</b>	<b>5,889.04</b>	<b>-902.04</b>	<b>540.81</b>	<b>-829.54</b>	<b>-347.61</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
6,000.00	1.13	181.13	5,900.32	-913.32	540.70	-829.54	-347.50	10.00	10.00	0.00
6,100.00	11.13	181.13	5,999.63	-1,012.63	530.04	-829.75	-337.05	10.00	10.00	0.00
6,200.00	21.13	181.13	6,095.57	-1,108.57	502.30	-830.30	-309.86	10.00	10.00	0.00
6,300.00	31.13	181.13	6,185.24	-1,198.24	458.33	-831.17	-266.75	10.00	10.00	0.00
6,400.00	41.13	181.13	6,265.90	-1,278.90	399.45	-832.33	-209.03	10.00	10.00	0.00
<b>SHARON SPRINGS</b>										
<b>6,430.04</b>	<b>44.13</b>	<b>181.13</b>	<b>6,288.00</b>	<b>-1,301.00</b>	<b>379.12</b>	<b>-832.73</b>	<b>-189.09</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
6,500.00	51.13	181.13	6,335.12	-1,348.12	327.47	-833.75	-138.46	10.00	10.00	0.00
<b>NIOBRARA A CHALK</b>										
<b>6,534.59</b>	<b>54.59</b>	<b>181.13</b>	<b>6,356.00</b>	<b>-1,369.00</b>	<b>299.91</b>	<b>-834.29</b>	<b>-111.44</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
<b>NIOBRARA A CHALK BASE</b>										
<b>6,594.29</b>	<b>60.56</b>	<b>181.13</b>	<b>6,388.00</b>	<b>-1,401.00</b>	<b>249.55</b>	<b>-835.29</b>	<b>-62.06</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
6,600.00	61.13	181.13	6,390.78	-1,403.78	244.56	-835.39	-57.17	10.00	10.00	0.00
<b>NIOBRARA B1 CHALK TOP</b>										
<b>6,676.10</b>	<b>68.74</b>	<b>181.13</b>	<b>6,423.00</b>	<b>-1,436.00</b>	<b>175.69</b>	<b>-836.75</b>	<b>10.34</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
6,700.00	71.13	181.13	6,431.20	-1,444.20	153.25	-837.19	32.35	10.00	10.00	0.00
<b>NIOBRARA B1 CHALK BASE</b>										
<b>6,744.72</b>	<b>75.60</b>	<b>181.13</b>	<b>6,444.00</b>	<b>-1,457.00</b>	<b>110.42</b>	<b>-838.03</b>	<b>74.34</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
6,800.00	81.13	181.13	6,455.15	-1,468.15	56.31	-839.10	127.39	10.00	10.00	0.00
<b>HZ LP: 600ft FNL &amp; 975ft FWL of Sec 13 - NIOBRARA B2 CHALK TOP (TARGET)</b>										
<b>6,888.72</b>	<b>90.00</b>	<b>181.13</b>	<b>6,462.00</b>	<b>-1,475.00</b>	<b>-32.04</b>	<b>-840.84</b>	<b>214.00</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
6,900.00	90.00	181.13	6,462.00	-1,475.00	-43.32	-841.07	225.06	0.00	0.00	0.00
7,000.00	90.00	181.13	6,462.00	-1,475.00	-143.30	-843.04	323.08	0.00	0.00	0.00
7,100.00	90.00	181.13	6,462.00	-1,475.00	-243.28	-845.01	421.10	0.00	0.00	0.00
7,200.00	90.00	181.13	6,462.00	-1,475.00	-343.26	-846.99	519.12	0.00	0.00	0.00



# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well RUDDY 13-3HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4987.00usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4987.00usft (Original Well Elev)
<b>Site:</b>	NE NW SEC. 13 T8N R61W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	RUDDY 13-3HN	<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)
7,300.00	90.00	181.13	6,462.00	-1,475.00	-443.24	-848.96	617.14	0.00	0.00	0.00
7,400.00	90.00	181.13	6,462.00	-1,475.00	-543.22	-850.93	715.16	0.00	0.00	0.00
7,500.00	90.00	181.13	6,462.00	-1,475.00	-643.20	-852.91	813.18	0.00	0.00	0.00
7,600.00	90.00	181.13	6,462.00	-1,475.00	-743.18	-854.88	911.20	0.00	0.00	0.00
7,700.00	90.00	181.13	6,462.00	-1,475.00	-843.16	-856.85	1,009.22	0.00	0.00	0.00
7,800.00	90.00	181.13	6,462.00	-1,475.00	-943.14	-858.83	1,107.24	0.00	0.00	0.00
7,900.00	90.00	181.13	6,462.00	-1,475.00	-1,043.12	-860.80	1,205.26	0.00	0.00	0.00
8,000.00	90.00	181.13	6,462.00	-1,475.00	-1,143.10	-862.78	1,303.28	0.00	0.00	0.00
8,100.00	90.00	181.13	6,462.00	-1,475.00	-1,243.08	-864.75	1,401.30	0.00	0.00	0.00
8,200.00	90.00	181.13	6,462.00	-1,475.00	-1,343.07	-866.72	1,499.32	0.00	0.00	0.00
8,300.00	90.00	181.13	6,462.00	-1,475.00	-1,443.05	-868.70	1,597.34	0.00	0.00	0.00
8,400.00	90.00	181.13	6,462.00	-1,475.00	-1,543.03	-870.67	1,695.36	0.00	0.00	0.00
8,500.00	90.00	181.13	6,462.00	-1,475.00	-1,643.01	-872.65	1,793.38	0.00	0.00	0.00
8,600.00	90.00	181.13	6,462.00	-1,475.00	-1,742.99	-874.62	1,891.40	0.00	0.00	0.00
8,700.00	90.00	181.13	6,462.00	-1,475.00	-1,842.97	-876.59	1,989.42	0.00	0.00	0.00
8,800.00	90.00	181.13	6,462.00	-1,475.00	-1,942.95	-878.57	2,087.44	0.00	0.00	0.00
8,900.00	90.00	181.13	6,462.00	-1,475.00	-2,042.93	-880.54	2,185.46	0.00	0.00	0.00
9,000.00	90.00	181.13	6,462.00	-1,475.00	-2,142.91	-882.52	2,283.48	0.00	0.00	0.00
9,100.00	90.00	181.13	6,462.00	-1,475.00	-2,242.89	-884.49	2,381.50	0.00	0.00	0.00
9,200.00	90.00	181.13	6,462.00	-1,475.00	-2,342.87	-886.47	2,479.52	0.00	0.00	0.00
9,300.00	90.00	181.13	6,462.00	-1,475.00	-2,442.85	-888.44	2,577.54	0.00	0.00	0.00
9,400.00	90.00	181.13	6,462.00	-1,475.00	-2,542.83	-890.42	2,675.56	0.00	0.00	0.00
9,500.00	90.00	181.13	6,462.00	-1,475.00	-2,642.81	-892.39	2,773.58	0.00	0.00	0.00
9,600.00	90.00	181.13	6,462.00	-1,475.00	-2,742.79	-894.37	2,871.60	0.00	0.00	0.00
9,700.00	90.00	181.13	6,462.00	-1,475.00	-2,842.77	-896.34	2,969.62	0.00	0.00	0.00
9,800.00	90.00	181.13	6,462.00	-1,475.00	-2,942.75	-898.32	3,067.64	0.00	0.00	0.00
9,900.00	90.00	181.13	6,462.00	-1,475.00	-3,042.73	-900.29	3,165.66	0.00	0.00	0.00
10,000.00	90.00	181.13	6,462.00	-1,475.00	-3,142.71	-902.27	3,263.68	0.00	0.00	0.00
10,100.00	90.00	181.13	6,462.00	-1,475.00	-3,242.69	-904.24	3,361.71	0.00	0.00	0.00
10,200.00	90.00	181.13	6,462.00	-1,475.00	-3,342.68	-906.22	3,459.73	0.00	0.00	0.00
10,300.00	90.00	181.13	6,462.00	-1,475.00	-3,442.66	-908.20	3,557.75	0.00	0.00	0.00
10,400.00	90.00	181.13	6,462.00	-1,475.00	-3,542.64	-910.17	3,655.77	0.00	0.00	0.00
10,500.00	90.00	181.13	6,462.00	-1,475.00	-3,642.62	-912.15	3,753.79	0.00	0.00	0.00
10,600.00	90.00	181.13	6,462.00	-1,475.00	-3,742.60	-914.12	3,851.81	0.00	0.00	0.00
10,700.00	90.00	181.13	6,462.00	-1,475.00	-3,842.58	-916.10	3,949.83	0.00	0.00	0.00
10,800.00	90.00	181.13	6,462.00	-1,475.00	-3,942.56	-918.08	4,047.85	0.00	0.00	0.00
10,900.00	90.00	181.13	6,462.00	-1,475.00	-4,042.54	-920.05	4,145.87	0.00	0.00	0.00
<b>BHL: 600ft FSL &amp; 975ft FWL of Sec 13</b>										
<b>10,998.77</b>	<b>90.00</b>	<b>181.13</b>	<b>6,462.00</b>	<b>-1,475.00</b>	<b>-4,141.29</b>	<b>-922.00</b>	<b>4,242.68</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 RUDDY 13-3HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB-EST @ 4987.00usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	KB-EST @ 4987.00usft (Original Well Elev)
<b>Site:</b>	NE NW SEC. 13 T8N R61W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	RUDDY 13-3HN	<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 (°)
568.39	568.00	FOX HILLS BASE			
1,616.02	1,596.00	PIERRE SHALE TOP			
3,538.02	3,476.00	RICHARD SANDSTONE			
3,642.30	3,578.00	PARKMAN SANDSTONE			
4,381.46	4,301.00	SUSSEX SANDSTONE			
4,836.40	4,746.00	SHANNON SANDSTONE			
6,430.04	6,288.00	SHARON SPRINGS			
6,534.59	6,356.00	NIOBRARA A CHALK			
6,594.29	6,388.00	NIOBRARA A CHALK BASE			
6,676.10	6,423.00	NIOBRARA B1 CHALK TOP			
6,744.72	6,444.00	NIOBRARA B1 CHALK BASE			
6,888.72	6,462.00	NIOBRARA B2 CHALK TOP (TARG			

Plan Annotations				
MD (usft)	TVD (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
0.00	0.00	0.00	0.00	SHL: 567ft FNL & 1815ft FWL of Sec 13
300.00	300.00	0.00	0.00	START NUDGE (2°/100ft BUR)
900.00	895.62	34.19	-52.44	EOB TO 12° INC
5,060.68	4,965.38	506.62	-777.10	END OF TANGENT
5,660.68	5,561.01	540.81	-829.54	EOD TO VERTICAL
5,988.71	5,889.04	540.81	-829.54	KOP (10°/100ft BUR)
6,888.72	6,462.00	-32.04	-840.84	HZ LP: 600ft FNL & 975ft FWL of Sec 13
10,998.77	6,462.00	-4,141.29	-922.00	BHL: 600ft FSL & 975ft FWL of Sec 13