

MALLARD EXPLORATION

WELD COUNTY, COLORADO (NAD 83)

SW SW SEC. 35 T9N R60W 6TH P.M.

PINTAIL 2-9HN

ORIGINAL WELLBORE

12 October, 2017

Plan: PROPOSAL #2



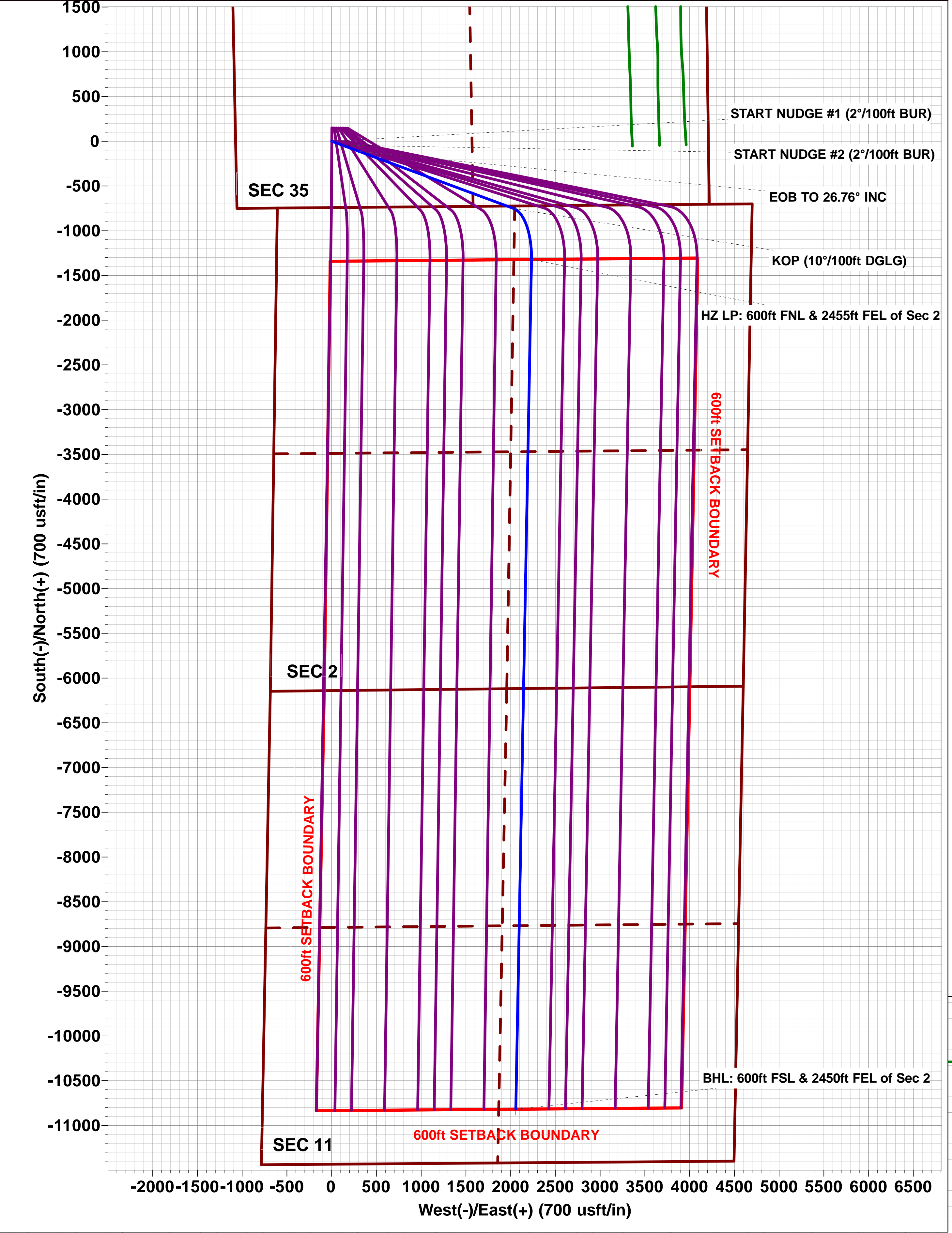
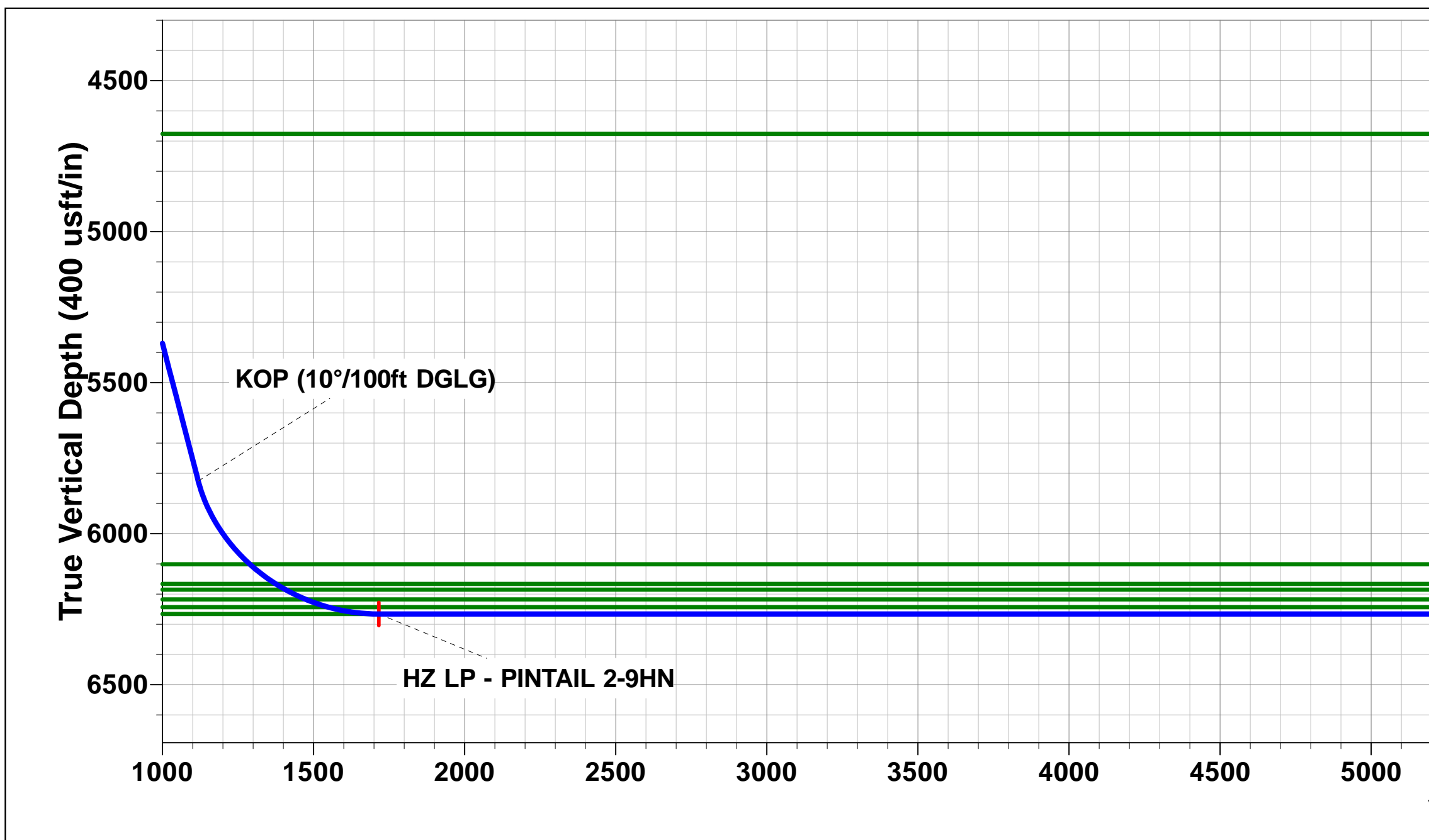
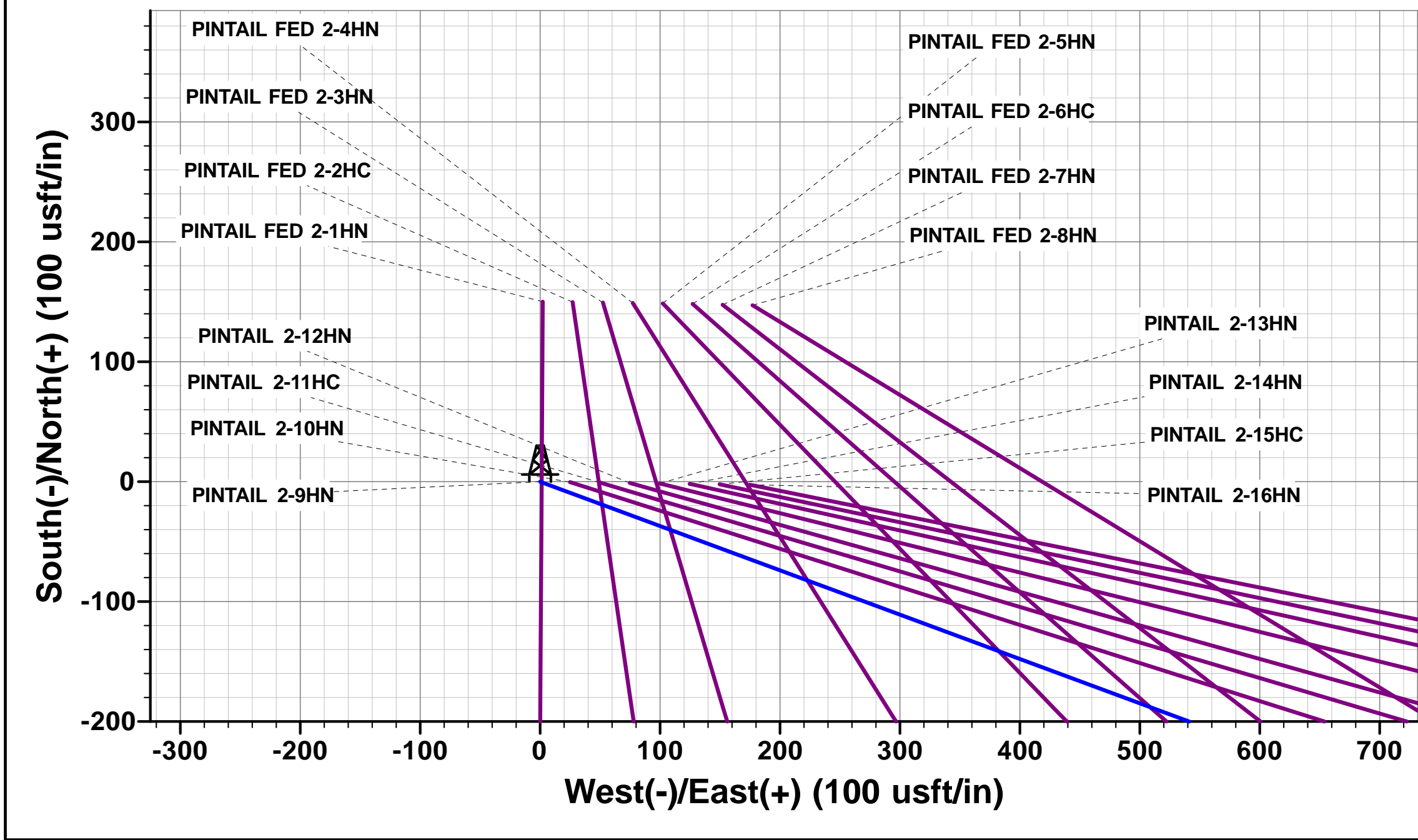
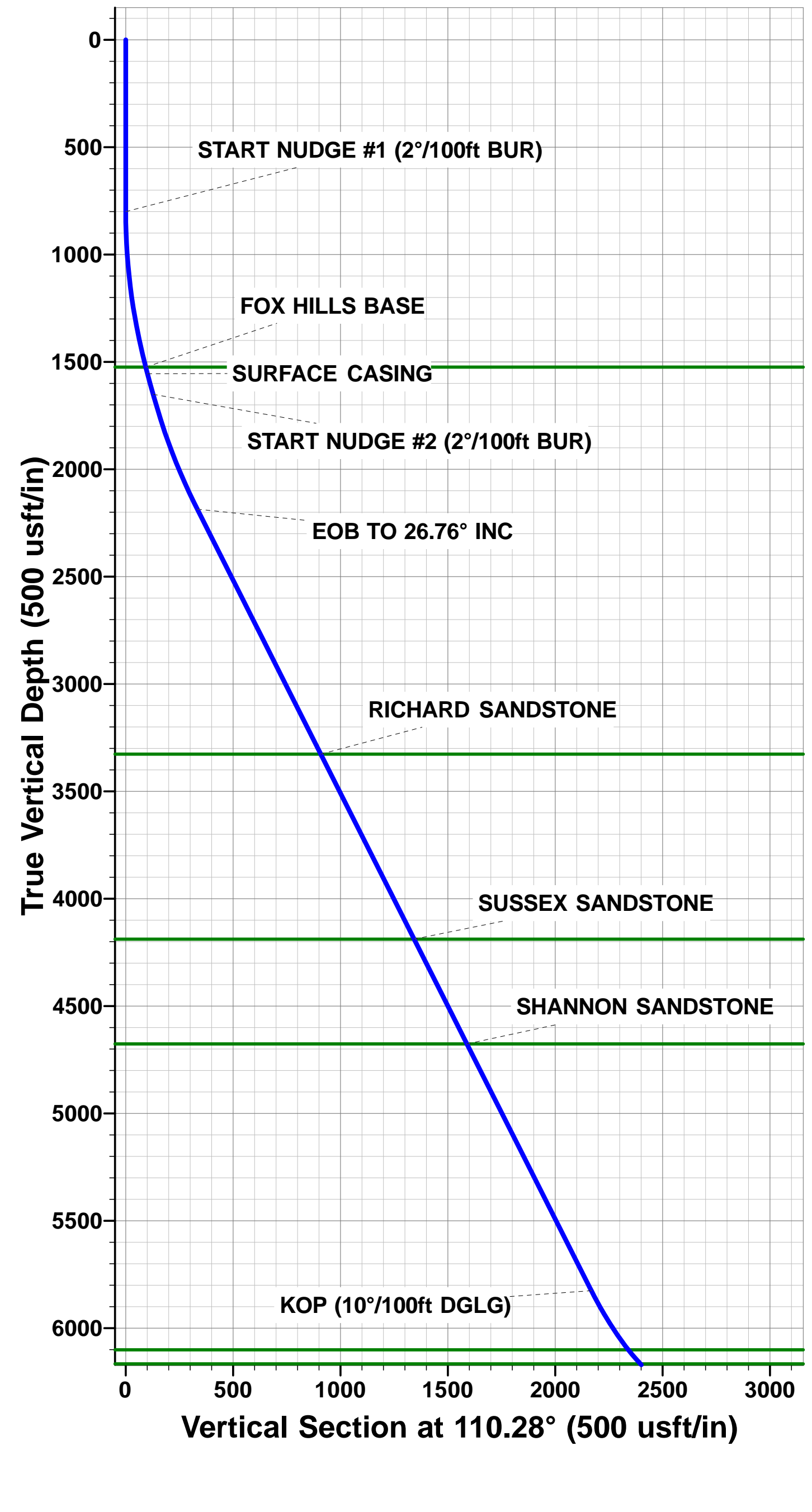


Project: WELD COUNTY, COLORADO (NAD 83)
Site: SW SW SEC. 35 T9N R60W 6TH P.M.
Well: PINTAIL 2-9HN
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #2

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: 742ft FSL & 1073ft FWL of Sec 35		
800.0	800.0	0.00	0.00	0.0	0.0	0.0	0.0	START NUDGE #1 (2°/100ft BUR)		
1555.0	1564.0	15.28	110.28	-35.1	95.0	52.2	101.3	SURFACE CASING		
1651.5	1664.0	15.28	110.28	-44.2	119.7	65.8	127.6	START NUDGE #2 (2°/100ft BUR)		
2186.3	2237.9	26.76	110.28	-115.5	312.5	171.8	333.1	EOB TO 26.76° INC		
5825.6	6313.7	26.76	110.28	-751.6	2033.7	1118.5	2168.2	KOP (10°/100ft DGLG)		
6266.2	7128.5	90.00	181.06	-1322.0	2233.0	1716.1	2800.4	HZ LP: 600ft FNL & 2455ft FEL of Sec 2		
6266.2	16626.3	90.00	181.06	-10818.3	2058.0	11012.3	12298.2	BHL: 600ft FSL & 2450ft FEL of Sec 2		

PROPOSED LOCAL COORDINATES:
SHL: 742ft FSL & 1073ft FWL Sec 35
HZ LP: 600ft FNL & 2455ft FEL Sec 2
BHL: 600ft FSL & 2450ft FEL of Sec 11

WELLBORE TARGET DETAILS (LAT/LONG)					
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
HZ LP - PINTAIL 2-9HN	6266.2	-1322.0	2233.0	40.697505	-104.056458
BHL - PINTAIL 2-9HN (P2)	6266.2	-10818.3	2058.0	40.671440	-104.057092



Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well PINTAIL 2-9HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4940.0usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4940.0usft (Original Well Elev)
Site:	SW SW SEC. 35 T9N R60W 6TH P.M.	North Reference:	True
Well:	PINTAIL 2-9HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #2		

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

Site	SW SW SEC. 35 T9N R60W 6TH P.M.				
Site Position:		Northing:	1,501,638.38 usft	Latitude:	40.701546
From:	Lat/Long	Easting:	3,398,005.01 usft	Longitude:	-104.064503
Position Uncertainty:	0.0 usft	Slot Radius:	1.10000ft	Grid Convergence:	0.93 °

Well	PINTAIL 2-9HN					
Well Position	+N-S	-150.1 usft	Northing:	1,501,488.25 usfi	Latitude:	40.701134
	+E-W	-2.2 usft	Easting:	3,398,005.22 usfi	Longitude:	-104.064511
Position Uncertainty		0.0 usft	Wellhead Elevation:	usfi	Ground Level:	4,924.0 usft

Wellbore	ORIGINAL WELLBORE				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	26/08/2017	7.83	67.20	52,597

Design	PROPOSAL #2			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)
	6,266.2	0.0	0.0	169.23

Plan Sections											
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	-4,940.0	0.0	0.0	0.00	0.00	0.00	0.00	
800.0	0.00	0.00	800.0	-4,140.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,564.0	15.28	110.28	1,555.0	-3,385.0	-35.1	95.0	2.00	2.00	0.00	110.28	
1,664.0	15.28	110.28	1,651.5	-3,288.5	-44.2	119.7	0.00	0.00	0.00	0.00	
2,237.9	26.76	110.28	2,186.3	-2,753.7	-115.5	312.5	2.00	2.00	0.00	0.01	
6,313.7	26.76	110.28	5,825.6	885.6	-751.6	2,033.7	0.00	0.00	0.00	0.00	
7,128.5	90.00	181.06	6,266.2	1,326.2	-1,322.0	2,233.0	10.00	7.76	8.69	72.70	HZ LP - PINTAIL 2-
16,626.3	90.00	181.06	6,266.2	1,326.2	-10,818.3	2,058.0	0.00	0.00	0.00	0.00	BHL - PINTAIL 2-9H

Planning Report



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Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4940.0usft (Original Well Elev)
Site:	SW SW SEC. 35 T9N R60W 6TH P.M.	North Reference:	True
Well:	PINTAIL 2-9HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	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)
SHL: 742ft FSL & 1073ft FWL of Sec 35										
0.0	0.00	0.00	0.0	4,940.00	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	4,840.00	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	4,740.00	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	4,640.00	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	4,540.00	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	4,440.00	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	4,340.00	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	4,240.00	0.0	0.0	0.0	0.00	0.00	0.00
START NUDGE #1 (2°/100ft BUR)										
800.0	0.00	0.00	800.0	4,140.00	0.0	0.0	0.0	0.00	0.00	0.00
900.0	2.00	110.28	900.0	4,040.02	-0.6	1.6	0.9	2.00	2.00	0.00
1,000.0	4.00	110.28	999.8	3,940.16	-2.4	6.5	3.6	2.00	2.00	0.00
1,100.0	6.00	110.28	1,099.5	3,840.55	-5.4	14.7	8.1	2.00	2.00	0.00
1,200.0	8.00	110.28	1,198.7	3,741.30	-9.7	26.2	14.4	2.00	2.00	0.00
1,300.0	10.00	110.28	1,297.5	3,642.53	-15.1	40.8	22.4	2.00	2.00	0.00
1,400.0	12.00	110.28	1,395.6	3,544.38	-21.7	58.7	32.3	2.00	2.00	0.00
1,500.0	14.00	110.28	1,493.1	3,446.94	-29.5	79.8	43.9	2.00	2.00	0.00
FOX HILLS BASE										
1,532.7	14.65	110.28	1,524.7	3,415.25	-32.3	87.4	48.1	2.00	2.00	0.00
SURFACE CASING										
1,564.0	15.28	110.28	1,555.0	3,385.00	-35.1	95.0	52.2	2.00	2.00	0.00
1,600.0	15.28	110.28	1,589.7	3,350.30	-38.4	103.9	57.1	0.00	0.00	0.00
START NUDGE #2 (2°/100ft BUR)										
1,664.0	15.28	110.28	1,651.5	3,288.54	-44.2	119.7	65.8	0.00	0.00	0.00
1,700.0	16.00	110.28	1,686.1	3,253.89	-47.6	128.8	70.8	2.00	2.00	0.00
1,800.0	18.00	110.28	1,781.7	3,158.27	-57.7	156.2	85.9	2.00	2.00	0.00
1,900.0	20.00	110.28	1,876.3	3,063.72	-69.0	186.8	102.7	2.00	2.00	0.00
2,000.0	22.00	110.28	1,969.6	2,970.37	-81.4	220.4	121.2	2.00	2.00	0.00
2,100.0	24.00	110.28	2,061.7	2,878.32	-95.0	257.0	141.3	2.00	2.00	0.00
2,200.0	26.00	110.28	2,152.3	2,787.69	-109.6	296.7	163.1	2.00	2.00	0.00
EOB TO 26.76° INC										
2,237.9	26.76	110.28	2,186.3	2,753.73	-115.5	312.5	171.8	2.00	2.00	0.00
2,300.0	26.76	110.28	2,241.7	2,698.29	-125.2	338.7	186.3	0.00	0.00	0.00
2,400.0	26.76	110.28	2,331.0	2,609.00	-140.8	380.9	209.5	0.00	0.00	0.00
2,500.0	26.76	110.28	2,420.3	2,519.71	-156.4	423.2	232.7	0.00	0.00	0.00
2,600.0	26.76	110.28	2,509.6	2,430.42	-172.0	465.4	255.9	0.00	0.00	0.00
2,700.0	26.76	110.28	2,598.9	2,341.13	-187.6	507.6	279.2	0.00	0.00	0.00
2,800.0	26.76	110.28	2,688.2	2,251.83	-203.2	549.9	302.4	0.00	0.00	0.00
2,900.0	26.76	110.28	2,777.5	2,162.54	-218.8	592.1	325.6	0.00	0.00	0.00
3,000.0	26.76	110.28	2,866.7	2,073.25	-234.4	634.3	348.8	0.00	0.00	0.00
3,100.0	26.76	110.28	2,956.0	1,983.96	-250.0	676.5	372.1	0.00	0.00	0.00
3,200.0	26.76	110.28	3,045.3	1,894.67	-265.6	718.8	395.3	0.00	0.00	0.00
3,300.0	26.76	110.28	3,134.6	1,805.38	-281.3	761.0	418.5	0.00	0.00	0.00
3,400.0	26.76	110.28	3,223.9	1,716.09	-296.9	803.2	441.7	0.00	0.00	0.00
3,500.0	26.76	110.28	3,313.2	1,626.79	-312.5	845.5	465.0	0.00	0.00	0.00
RICHARD SANDSTONE										
3,515.7	26.76	110.28	3,327.2	1,612.75	-314.9	852.1	468.6	0.00	0.00	0.00
3,600.0	26.76	110.28	3,402.5	1,537.50	-328.1	887.7	488.2	0.00	0.00	0.00
3,700.0	26.76	110.28	3,491.8	1,448.21	-343.7	929.9	511.4	0.00	0.00	0.00
3,800.0	26.76	110.28	3,581.1	1,358.92	-359.3	972.2	534.6	0.00	0.00	0.00
3,900.0	26.76	110.28	3,670.4	1,269.63	-374.9	1,014.4	557.9	0.00	0.00	0.00
4,000.0	26.76	110.28	3,759.7	1,180.34	-390.5	1,056.6	581.1	0.00	0.00	0.00

Planning Report



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Well:	PINTAIL 2-9HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	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	26.76	110.28	3,849.0	1,091.05	-406.1	1,098.9	604.3	0.00	0.00	0.00
4,200.0	26.76	110.28	3,938.2	1,001.76	-421.7	1,141.1	627.5	0.00	0.00	0.00
4,300.0	26.76	110.28	4,027.5	912.46	-437.3	1,183.3	650.8	0.00	0.00	0.00
4,400.0	26.76	110.28	4,116.8	823.17	-452.9	1,225.5	674.0	0.00	0.00	0.00
SUSSEX SANDSTONE										
4,480.5	26.76	110.28	4,188.7	751.25	-465.5	1,259.6	692.7	0.00	0.00	0.00
4,500.0	26.76	110.28	4,206.1	733.88	-468.6	1,267.8	697.2	0.00	0.00	0.00
4,600.0	26.76	110.28	4,295.4	644.59	-484.2	1,310.0	720.4	0.00	0.00	0.00
4,700.0	26.76	110.28	4,384.7	555.30	-499.8	1,352.2	743.7	0.00	0.00	0.00
4,800.0	26.76	110.28	4,474.0	466.01	-515.4	1,394.5	766.9	0.00	0.00	0.00
4,900.0	26.76	110.28	4,563.3	376.72	-531.0	1,436.7	790.1	0.00	0.00	0.00
5,000.0	26.76	110.28	4,652.6	287.42	-546.6	1,478.9	813.4	0.00	0.00	0.00
SHANNON SANDSTONE										
5,027.1	26.76	110.28	4,676.7	263.25	-550.8	1,490.4	819.6	0.00	0.00	0.00
5,100.0	26.76	110.28	4,741.9	198.13	-562.2	1,521.2	836.6	0.00	0.00	0.00
5,200.0	26.76	110.28	4,831.2	108.84	-577.8	1,563.4	859.8	0.00	0.00	0.00
5,300.0	26.76	110.28	4,920.4	19.55	-593.4	1,605.6	883.0	0.00	0.00	0.00
5,400.0	26.76	110.28	5,009.7	-69.74	-609.0	1,647.8	906.3	0.00	0.00	0.00
5,500.0	26.76	110.28	5,099.0	-159.03	-624.6	1,690.1	929.5	0.00	0.00	0.00
5,600.0	26.76	110.28	5,188.3	-248.32	-640.2	1,732.3	952.7	0.00	0.00	0.00
5,700.0	26.76	110.28	5,277.6	-337.62	-655.9	1,774.5	975.9	0.00	0.00	0.00
5,800.0	26.76	110.28	5,366.9	-426.91	-671.5	1,816.8	999.2	0.00	0.00	0.00
5,900.0	26.76	110.28	5,456.2	-516.20	-687.1	1,859.0	1,022.4	0.00	0.00	0.00
6,000.0	26.76	110.28	5,545.5	-605.49	-702.7	1,901.2	1,045.6	0.00	0.00	0.00
6,100.0	26.76	110.28	5,634.8	-694.78	-718.3	1,943.5	1,068.8	0.00	0.00	0.00
6,200.0	26.76	110.28	5,724.1	-784.07	-733.9	1,985.7	1,092.1	0.00	0.00	0.00
6,300.0	26.76	110.28	5,813.4	-873.36	-749.5	2,027.9	1,115.3	0.00	0.00	0.00
KOP (10°/100ft DGLG)										
6,313.7	26.76	110.28	5,825.6	-885.64	-751.6	2,033.7	1,118.5	0.00	0.00	0.00
6,400.0	30.37	126.73	5,901.5	-961.50	-771.5	2,069.5	1,144.6	10.00	4.19	19.07
6,500.0	36.54	141.09	5,985.0	-1,045.02	-809.8	2,108.5	1,189.6	10.00	6.17	14.35
6,600.0	43.98	151.49	6,061.4	-1,121.36	-863.7	2,143.9	1,249.1	10.00	7.43	10.40
SHARON SPRINGS										
6,657.7	48.61	156.25	6,101.2	-1,161.25	-901.1	2,162.2	1,289.3	10.00	8.03	8.25
6,700.0	52.12	159.32	6,128.2	-1,188.21	-931.3	2,174.5	1,321.2	10.00	8.29	7.26
NIOBRARA A CHALK										
6,767.2	57.83	163.63	6,166.7	-1,226.75	-983.4	2,191.9	1,375.7	10.00	8.51	6.43
6,800.0	60.68	165.54	6,183.5	-1,243.54	-1,010.6	2,199.4	1,403.8	10.00	8.66	5.82
NIOBRARA A CHALK BASE										
6,803.5	60.98	165.74	6,185.2	-1,245.25	-1,013.6	2,200.1	1,406.9	10.00	8.70	5.64
NIOBRARA B1 CHALK TOP										
6,878.4	67.56	169.72	6,217.7	-1,277.75	-1,079.4	2,214.4	1,474.3	10.00	8.79	5.31
6,900.0	69.48	170.79	6,225.7	-1,285.66	-1,099.3	2,217.8	1,494.4	10.00	8.87	4.97
NIOBRARA B1 CHALK BASE										
6,957.0	74.56	173.50	6,243.2	-1,303.25	-1,152.9	2,225.2	1,548.5	10.00	8.92	4.76
7,000.0	78.42	175.46	6,253.3	-1,313.30	-1,194.5	2,229.2	1,590.1	10.00	8.97	4.55
7,100.0	87.43	179.83	6,265.6	-1,325.61	-1,293.6	2,233.2	1,688.1	10.00	9.01	4.37
HZ LP: 600ft FNL & 2455ft FEL of Sec 2 - NIOBRARA B2 CHALK TOP										
7,128.5	90.00	181.06	6,266.2	-1,326.25	-1,322.0	2,233.0	1,716.1	10.00	9.03	4.30
7,200.0	90.00	181.06	6,266.2	-1,326.25	-1,393.6	2,231.7	1,786.1	0.00	0.00	0.00
7,300.0	90.00	181.06	6,266.2	-1,326.25	-1,493.5	2,229.9	1,884.0	0.00	0.00	0.00
7,400.0	90.00	181.06	6,266.2	-1,326.25	-1,593.5	2,228.0	1,981.8	0.00	0.00	0.00
7,500.0	90.00	181.06	6,266.2	-1,326.25	-1,693.5	2,226.2	2,079.7	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well PINTAIL 2-9HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4940.0usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4940.0usft (Original Well Elev)
Site:	SW SW SEC. 35 T9N R60W 6TH P.M.	North Reference:	True
Well:	PINTAIL 2-9HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	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)
7,600.0	90.00	181.06	6,266.2	-1,326.25	-1,793.5	2,224.3	2,177.6	0.00	0.00	0.00
7,700.0	90.00	181.06	6,266.2	-1,326.25	-1,893.5	2,222.5	2,275.5	0.00	0.00	0.00
7,800.0	90.00	181.06	6,266.2	-1,326.25	-1,993.5	2,220.7	2,373.3	0.00	0.00	0.00
7,900.0	90.00	181.06	6,266.2	-1,326.25	-2,093.4	2,218.8	2,471.2	0.00	0.00	0.00
8,000.0	90.00	181.06	6,266.2	-1,326.25	-2,193.4	2,217.0	2,569.1	0.00	0.00	0.00
8,100.0	90.00	181.06	6,266.2	-1,326.24	-2,293.4	2,215.1	2,667.0	0.00	0.00	0.00
8,200.0	90.00	181.06	6,266.2	-1,326.24	-2,393.4	2,213.3	2,764.8	0.00	0.00	0.00
8,300.0	90.00	181.06	6,266.2	-1,326.24	-2,493.4	2,211.4	2,862.7	0.00	0.00	0.00
8,400.0	90.00	181.06	6,266.2	-1,326.24	-2,593.4	2,209.6	2,960.6	0.00	0.00	0.00
8,500.0	90.00	181.06	6,266.2	-1,326.24	-2,693.3	2,207.8	3,058.5	0.00	0.00	0.00
8,600.0	90.00	181.06	6,266.2	-1,326.24	-2,793.3	2,205.9	3,156.4	0.00	0.00	0.00
8,700.0	90.00	181.06	6,266.2	-1,326.24	-2,893.3	2,204.1	3,254.2	0.00	0.00	0.00
8,800.0	90.00	181.06	6,266.2	-1,326.24	-2,993.3	2,202.2	3,352.1	0.00	0.00	0.00
8,900.0	90.00	181.06	6,266.2	-1,326.24	-3,093.3	2,200.4	3,450.0	0.00	0.00	0.00
9,000.0	90.00	181.06	6,266.2	-1,326.24	-3,193.3	2,198.5	3,547.9	0.00	0.00	0.00
9,100.0	90.00	181.06	6,266.2	-1,326.24	-3,293.2	2,196.7	3,645.7	0.00	0.00	0.00
9,200.0	90.00	181.06	6,266.2	-1,326.24	-3,393.2	2,194.9	3,743.6	0.00	0.00	0.00
9,300.0	90.00	181.06	6,266.2	-1,326.24	-3,493.2	2,193.0	3,841.5	0.00	0.00	0.00
9,400.0	90.00	181.06	6,266.2	-1,326.24	-3,593.2	2,191.2	3,939.4	0.00	0.00	0.00
9,500.0	90.00	181.06	6,266.2	-1,326.24	-3,693.2	2,189.3	4,037.2	0.00	0.00	0.00
9,600.0	90.00	181.06	6,266.2	-1,326.24	-3,793.1	2,187.5	4,135.1	0.00	0.00	0.00
9,700.0	90.00	181.06	6,266.2	-1,326.24	-3,893.1	2,185.6	4,233.0	0.00	0.00	0.00
9,800.0	90.00	181.06	6,266.2	-1,326.24	-3,993.1	2,183.8	4,330.9	0.00	0.00	0.00
9,900.0	90.00	181.06	6,266.2	-1,326.24	-4,093.1	2,182.0	4,428.8	0.00	0.00	0.00
10,000.0	90.00	181.06	6,266.2	-1,326.23	-4,193.1	2,180.1	4,526.6	0.00	0.00	0.00
10,100.0	90.00	181.06	6,266.2	-1,326.23	-4,293.1	2,178.3	4,624.5	0.00	0.00	0.00
10,200.0	90.00	181.06	6,266.2	-1,326.23	-4,393.0	2,176.4	4,722.4	0.00	0.00	0.00
10,300.0	90.00	181.06	6,266.2	-1,326.23	-4,493.0	2,174.6	4,820.3	0.00	0.00	0.00
10,400.0	90.00	181.06	6,266.2	-1,326.23	-4,593.0	2,172.7	4,918.1	0.00	0.00	0.00
10,500.0	90.00	181.06	6,266.2	-1,326.23	-4,693.0	2,170.9	5,016.0	0.00	0.00	0.00
10,600.0	90.00	181.06	6,266.2	-1,326.23	-4,793.0	2,169.1	5,113.9	0.00	0.00	0.00
10,700.0	90.00	181.06	6,266.2	-1,326.23	-4,893.0	2,167.2	5,211.8	0.00	0.00	0.00
10,800.0	90.00	181.06	6,266.2	-1,326.23	-4,992.9	2,165.4	5,309.7	0.00	0.00	0.00
10,900.0	90.00	181.06	6,266.2	-1,326.23	-5,092.9	2,163.5	5,407.5	0.00	0.00	0.00
11,000.0	90.00	181.06	6,266.2	-1,326.23	-5,192.9	2,161.7	5,505.4	0.00	0.00	0.00
11,100.0	90.00	181.06	6,266.2	-1,326.23	-5,292.9	2,159.8	5,603.3	0.00	0.00	0.00
11,200.0	90.00	181.06	6,266.2	-1,326.23	-5,392.9	2,158.0	5,701.2	0.00	0.00	0.00
11,300.0	90.00	181.06	6,266.2	-1,326.23	-5,492.9	2,156.2	5,799.0	0.00	0.00	0.00
11,400.0	90.00	181.06	6,266.2	-1,326.23	-5,592.8	2,154.3	5,896.9	0.00	0.00	0.00
11,500.0	90.00	181.06	6,266.2	-1,326.23	-5,692.8	2,152.5	5,994.8	0.00	0.00	0.00
11,600.0	90.00	181.06	6,266.2	-1,326.23	-5,792.8	2,150.6	6,092.7	0.00	0.00	0.00
11,700.0	90.00	181.06	6,266.2	-1,326.23	-5,892.8	2,148.8	6,190.5	0.00	0.00	0.00
11,800.0	90.00	181.06	6,266.2	-1,326.23	-5,992.8	2,147.0	6,288.4	0.00	0.00	0.00
11,900.0	90.00	181.06	6,266.2	-1,326.22	-6,092.8	2,145.1	6,386.3	0.00	0.00	0.00
12,000.0	90.00	181.06	6,266.2	-1,326.22	-6,192.7	2,143.3	6,484.2	0.00	0.00	0.00
12,100.0	90.00	181.06	6,266.2	-1,326.22	-6,292.7	2,141.4	6,582.1	0.00	0.00	0.00
12,200.0	90.00	181.06	6,266.2	-1,326.22	-6,392.7	2,139.6	6,679.9	0.00	0.00	0.00
12,300.0	90.00	181.06	6,266.2	-1,326.22	-6,492.7	2,137.7	6,777.8	0.00	0.00	0.00
12,400.0	90.00	181.06	6,266.2	-1,326.22	-6,592.7	2,135.9	6,875.7	0.00	0.00	0.00
12,500.0	90.00	181.06	6,266.2	-1,326.22	-6,692.7	2,134.1	6,973.6	0.00	0.00	0.00
12,600.0	90.00	181.06	6,266.2	-1,326.22	-6,792.6	2,132.2	7,071.4	0.00	0.00	0.00
12,700.0	90.00	181.06	6,266.2	-1,326.22	-6,892.6	2,130.4	7,169.3	0.00	0.00	0.00
12,800.0	90.00	181.06	6,266.2	-1,326.22	-6,992.6	2,128.5	7,267.2	0.00	0.00	0.00
12,900.0	90.00	181.06	6,266.2	-1,326.22	-7,092.6	2,126.7	7,365.1	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well PINTAIL 2-9HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4940.0usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4940.0usft (Original Well Elev)
Site:	SW SW SEC. 35 T9N R60W 6TH P.M.	North Reference:	True
Well:	PINTAIL 2-9HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	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)
13,000.0	90.00	181.06	6,266.2	-1,326.22	-7,192.6	2,124.8	7,463.0	0.00	0.00	0.00
13,100.0	90.00	181.06	6,266.2	-1,326.22	-7,292.6	2,123.0	7,560.8	0.00	0.00	0.00
13,200.0	90.00	181.06	6,266.2	-1,326.22	-7,392.5	2,121.2	7,658.7	0.00	0.00	0.00
13,300.0	90.00	181.06	6,266.2	-1,326.22	-7,492.5	2,119.3	7,756.6	0.00	0.00	0.00
13,400.0	90.00	181.06	6,266.2	-1,326.22	-7,592.5	2,117.5	7,854.5	0.00	0.00	0.00
13,500.0	90.00	181.06	6,266.2	-1,326.22	-7,692.5	2,115.6	7,952.3	0.00	0.00	0.00
13,600.0	90.00	181.06	6,266.2	-1,326.22	-7,792.5	2,113.8	8,050.2	0.00	0.00	0.00
13,700.0	90.00	181.06	6,266.2	-1,326.22	-7,892.5	2,111.9	8,148.1	0.00	0.00	0.00
13,800.0	90.00	181.06	6,266.2	-1,326.21	-7,992.4	2,110.1	8,246.0	0.00	0.00	0.00
13,900.0	90.00	181.06	6,266.2	-1,326.21	-8,092.4	2,108.3	8,343.8	0.00	0.00	0.00
14,000.0	90.00	181.06	6,266.2	-1,326.21	-8,192.4	2,106.4	8,441.7	0.00	0.00	0.00
14,100.0	90.00	181.06	6,266.2	-1,326.21	-8,292.4	2,104.6	8,539.6	0.00	0.00	0.00
14,200.0	90.00	181.06	6,266.2	-1,326.21	-8,392.4	2,102.7	8,637.5	0.00	0.00	0.00
14,300.0	90.00	181.06	6,266.2	-1,326.21	-8,492.4	2,100.9	8,735.4	0.00	0.00	0.00
14,400.0	90.00	181.06	6,266.2	-1,326.21	-8,592.3	2,099.0	8,833.2	0.00	0.00	0.00
14,500.0	90.00	181.06	6,266.2	-1,326.21	-8,692.3	2,097.2	8,931.1	0.00	0.00	0.00
14,600.0	90.00	181.06	6,266.2	-1,326.21	-8,792.3	2,095.4	9,029.0	0.00	0.00	0.00
14,700.0	90.00	181.06	6,266.2	-1,326.21	-8,892.3	2,093.5	9,126.9	0.00	0.00	0.00
14,800.0	90.00	181.06	6,266.2	-1,326.21	-8,992.3	2,091.7	9,224.7	0.00	0.00	0.00
14,900.0	90.00	181.06	6,266.2	-1,326.21	-9,092.2	2,089.8	9,322.6	0.00	0.00	0.00
15,000.0	90.00	181.06	6,266.2	-1,326.21	-9,192.2	2,088.0	9,420.5	0.00	0.00	0.00
15,100.0	90.00	181.06	6,266.2	-1,326.21	-9,292.2	2,086.1	9,518.4	0.00	0.00	0.00
15,200.0	90.00	181.06	6,266.2	-1,326.21	-9,392.2	2,084.3	9,616.2	0.00	0.00	0.00
15,300.0	90.00	181.06	6,266.2	-1,326.21	-9,492.2	2,082.5	9,714.1	0.00	0.00	0.00
15,400.0	90.00	181.06	6,266.2	-1,326.21	-9,592.2	2,080.6	9,812.0	0.00	0.00	0.00
15,500.0	90.00	181.06	6,266.2	-1,326.21	-9,692.1	2,078.8	9,909.9	0.00	0.00	0.00
15,600.0	90.00	181.06	6,266.2	-1,326.21	-9,792.1	2,076.9	10,007.8	0.00	0.00	0.00
15,700.0	90.00	181.06	6,266.2	-1,326.20	-9,892.1	2,075.1	10,105.6	0.00	0.00	0.00
15,800.0	90.00	181.06	6,266.2	-1,326.20	-9,992.1	2,073.2	10,203.5	0.00	0.00	0.00
15,900.0	90.00	181.06	6,266.2	-1,326.20	-10,092.1	2,071.4	10,301.4	0.00	0.00	0.00
16,000.0	90.00	181.06	6,266.2	-1,326.20	-10,192.1	2,069.6	10,399.3	0.00	0.00	0.00
16,100.0	90.00	181.06	6,266.2	-1,326.20	-10,292.0	2,067.7	10,497.1	0.00	0.00	0.00
16,200.0	90.00	181.06	6,266.2	-1,326.20	-10,392.0	2,065.9	10,595.0	0.00	0.00	0.00
16,300.0	90.00	181.06	6,266.2	-1,326.20	-10,492.0	2,064.0	10,692.9	0.00	0.00	0.00
16,400.0	90.00	181.06	6,266.2	-1,326.20	-10,592.0	2,062.2	10,790.8	0.00	0.00	0.00
16,500.0	90.00	181.06	6,266.2	-1,326.20	-10,692.0	2,060.3	10,888.7	0.00	0.00	0.00
16,600.0	90.00	181.06	6,266.2	-1,326.20	-10,792.0	2,058.5	10,986.5	0.00	0.00	0.00
BHL: 600ft FSL & 2450ft FEL of Sec 2										
16,626.3	90.00	181.06	6,266.2	-1,326.20	-10,818.3	2,058.0	11,012.3	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well PINTAIL 2-9HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4940.0usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4940.0usft (Original Well Elev)
Site:	SW SW SEC. 35 T9N R60W 6TH P.M.	North Reference:	True
Well:	PINTAIL 2-9HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #2		

Formations						
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,532.7	1,524.7	FOX HILLS BASE				
3,515.7	3,327.2	RICHARD SANDSTONE				
4,480.5	4,188.7	SUSSEX SANDSTONE				
5,027.1	4,676.7	SHANNON SANDSTONE				
6,657.7	6,101.2	SHARON SPRINGS				
6,767.2	6,166.7	NIOBRARA A CHALK				
6,803.5	6,185.2	NIOBRARA A CHALK BASE				
6,878.4	6,217.7	NIOBRARA B1 CHALK TOP				
6,957.0	6,243.2	NIOBRARA B1 CHALK BASE				
7,128.5	6,266.2	NIOBRARA B2 CHALK TOP				

Plan Annotations				
MD (usft)	TVD (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
0.0	0.0	0.0	0.0	SHL: 742ft FSL & 1073ft FWL of Sec 35
800.0	800.0	0.0	0.0	START NUDGE #1 (2°/100ft BUR)
1,564.0	1,555.0	-35.1	95.0	SURFACE CASING
1,664.0	1,651.5	-44.2	119.7	START NUDGE #2 (2°/100ft BUR)
2,237.9	2,186.3	-115.5	312.5	EOB TO 26.76° INC
6,313.7	5,825.6	-751.6	2,033.7	KOP (10°/100ft DGLG)
7,128.5	6,266.2	-1,322.0	2,233.0	HZ LP: 600ft FNL & 2455ft FEL of Sec 2
16,626.3	6,266.2	-10,818.3	2,058.0	BHL: 600ft FSL & 2450ft FEL of Sec 2