

MALLARD EXPLORATION

WELD COUNTY, COLORADO (NAD 83)

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

PT-5HN

ORIGINAL WELLBORE

04 December, 2018

Plan: PROPOSAL #1





Project: WELD COUNTY, COLORADO (NAD 83)
Site: SW SW SEC. 35 T9N R60W 6th P.M.
Well: PT-5HN
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: 739ft FSL & 1198ft FWL of Sec 35		
300.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2°/100ft BUR)		
1535.49	1577.40	25.55	101.00	-53.47	274.95	107.91	280.11	EOB TO 25.55° INC		
1555.00	1599.03	25.55	101.00	-55.25	284.11	111.50	289.43	SURFACE CASING		
5784.39	6286.76	25.55	101.00	-441.16	2268.60	890.31	2311.09	KOP (10°/100ft DGLG)		
6264.25	7144.16	90.00	181.09	-1016.71	2483.67	1497.44	2961.04	HZ LP: 300ft FNL & 2085ft FEL of Sec 2		
6264.25	17242.99	90.00	181.09	-11113.73	2292.17	11347.65	13059.88	BHL: 300ft FSL & 2085ft FEL of Sec 11		

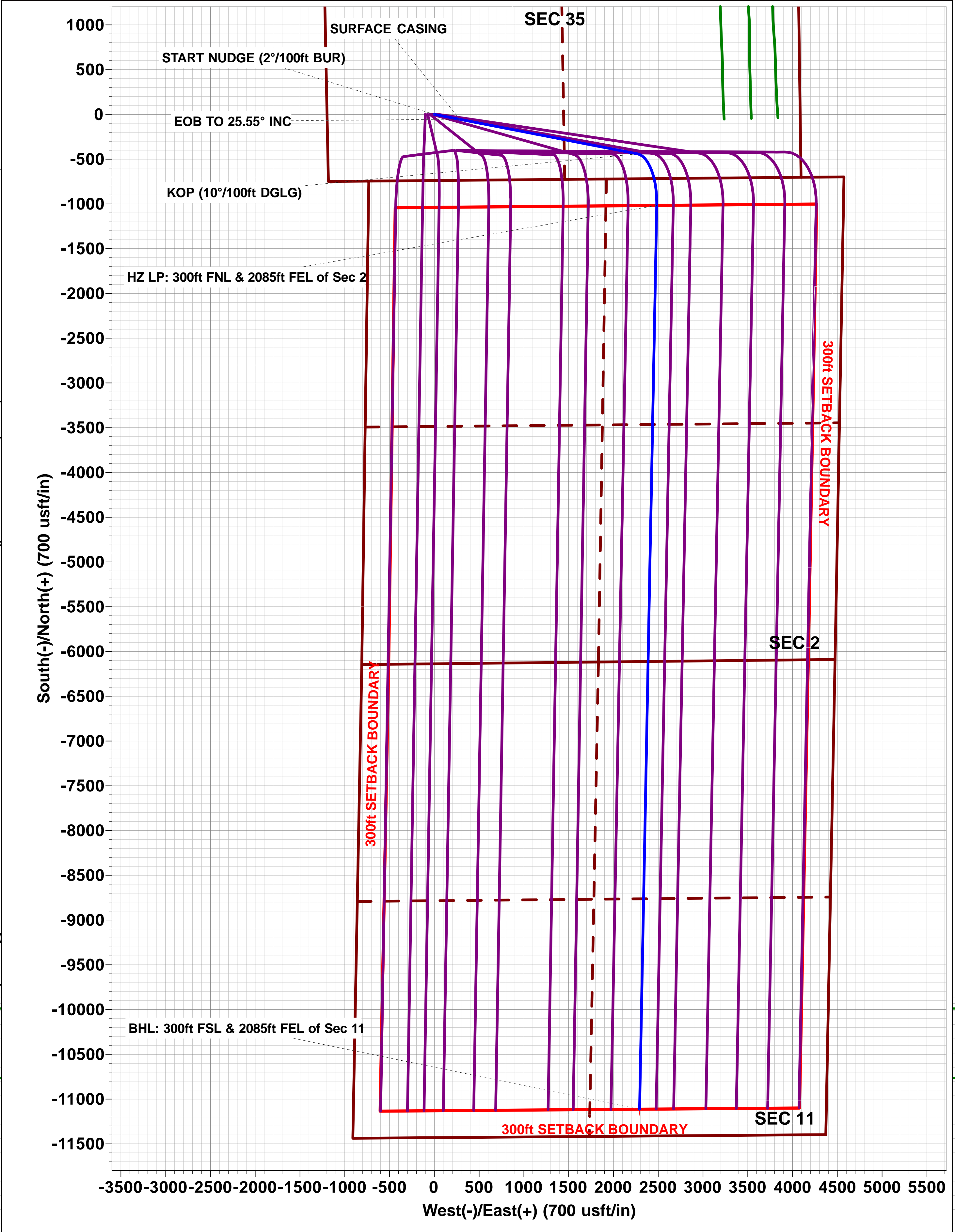
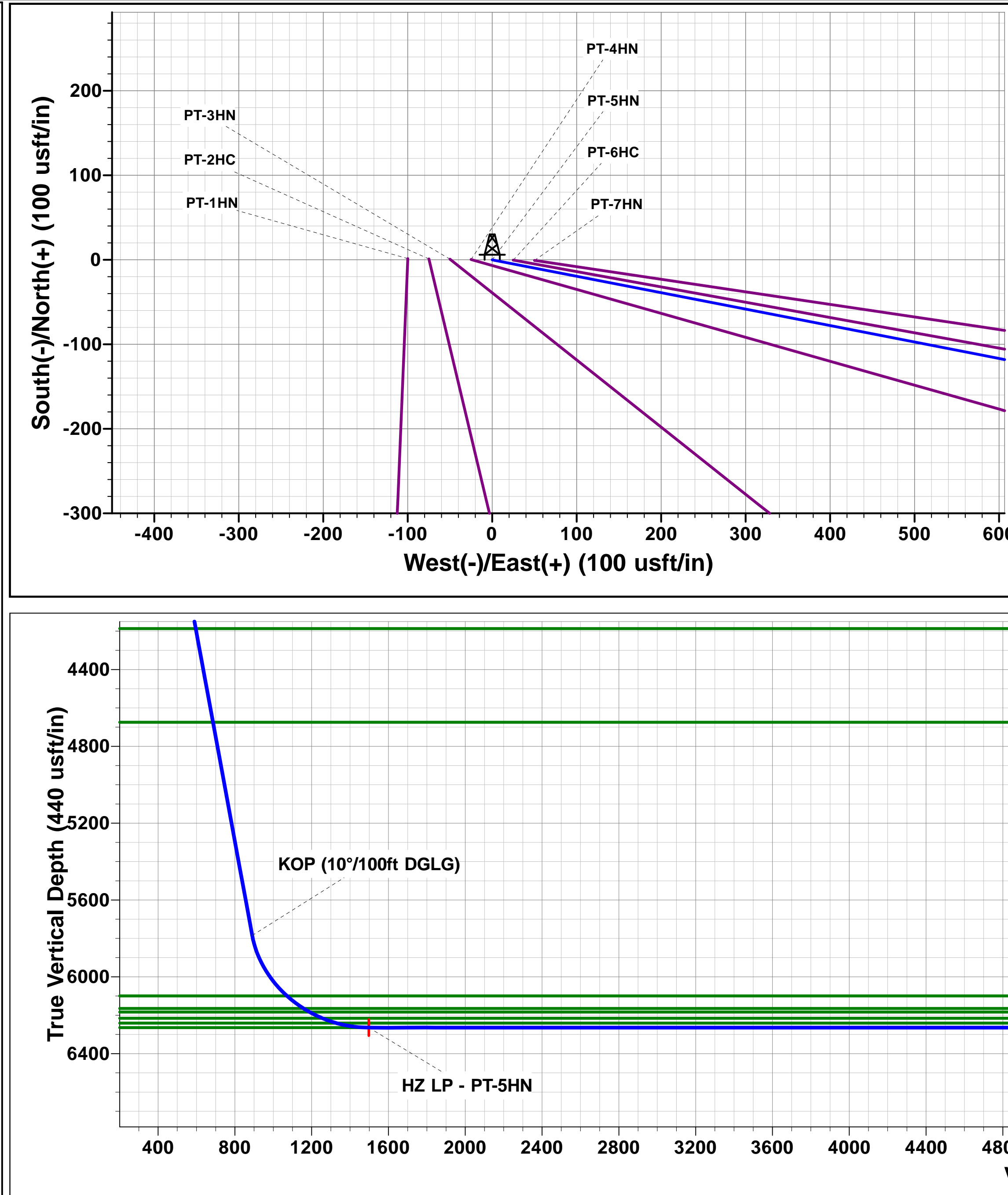
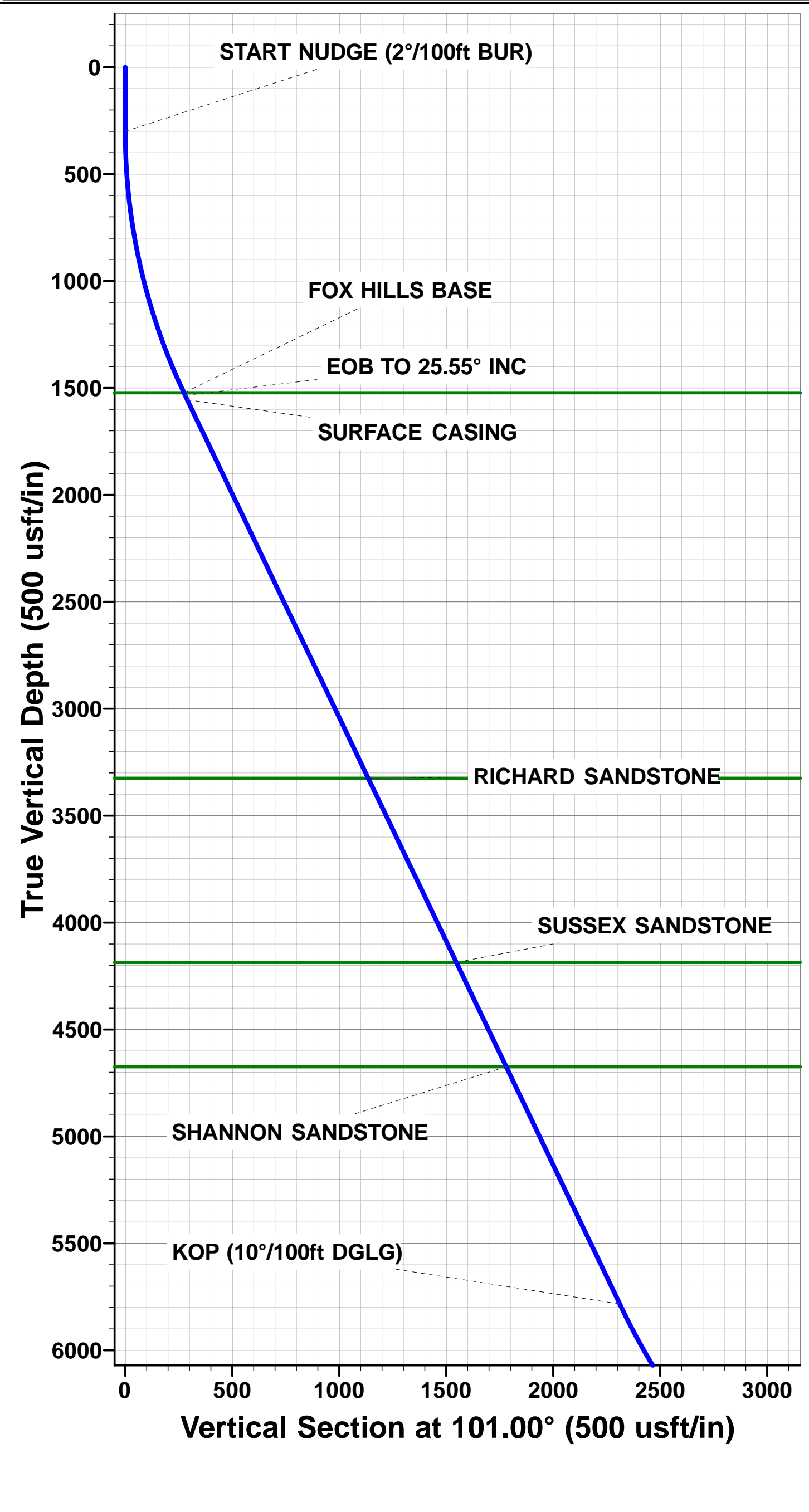
PROPOSED LOCAL COORDINATES:

SHL: 739ft FSL & 1198ft FWL Sec 35

HZ LP: 300ft FNL & 2085ft FEL Sec 2

BHL: 300ft FSL & 2085ft FEL of Sec 11

WELLBORE TARGET DETAILS (LAT/LONG)					
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
HZ LP - PT-5HN	6264.25	-1016.71	2483.67	40.698338	-104.055104
BHL - PT-5HN	6264.25	-11113.73	2292.17	40.670624	-104.055798



Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well PT-5HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4938.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4938.00usft (Original Well Elev)
Site:	SW SW SEC. 35 T9N R60W 6th P.M.	North Reference:	True
Well:	PT-5HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

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:	1,501,488.30 usft
From:	Lat/Long	Easting:	3,398,030.17 usft
Position Uncertainty:	0.00 usft	Slot Radius:	1.10000ft
		Latitude:	40.701133
		Longitude:	-104.064421
		Grid Convergence:	0.93 °

Well	PT-5HN		
Well Position	+N/-S	-1.47 usft	Northing:
	+E/-W	99.82 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	40.701129
		Longitude:	-104.064061
		Ground Level:	4,922.00 usft

Wellbore	ORIGINAL WELLBORE				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	04/12/2018	7.70	67.16	52,450

Design	PROPOSAL #1			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	6,264.25	0.00	0.00	168.35

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
0.00	0.00	0.00	0.00	-4,938.00	0.00	0.00	0.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	-4,638.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,577.40	25.55	101.00	1,535.49	-3,402.51	-53.47	274.95	2.00	2.00	0.00	101.00	
6,286.76	25.55	101.00	5,784.39	846.39	-441.16	2,268.60	0.00	0.00	0.00	0.00	
7,144.16	90.00	181.09	6,264.25	1,326.25	-1,016.71	2,483.67	10.00	7.52	9.34	81.04	HZ LP - PT-5HN
17,242.99	90.00	181.09	6,264.25	1,326.25	-11,113.73	2,292.17	0.00	0.00	0.00	0.00	BHL - PT-5HN

Planning Report



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Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4938.00usft (Original Well Elev)
Site:	SW SW SEC. 35 T9N R60W 6th P.M.	North Reference:	True
Well:	PT-5HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	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)
SHL: 739ft FSL & 1198ft FWL of Sec 35										
0.00	0.00	0.00	0.00	4,938.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	4,838.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	4,738.00	0.00	0.00	0.00	0.00	0.00	0.00
START NUDGE (2°/100ft BUR)										
300.00	0.00	0.00	300.00	4,638.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	2.00	101.00	399.98	4,538.02	-0.33	1.71	0.67	2.00	2.00	0.00
500.00	4.00	101.00	499.84	4,438.16	-1.33	6.85	2.69	2.00	2.00	0.00
600.00	6.00	101.00	599.45	4,338.55	-3.00	15.41	6.05	2.00	2.00	0.00
700.00	8.00	101.00	698.70	4,239.30	-5.32	27.37	10.74	2.00	2.00	0.00
800.00	10.00	101.00	797.47	4,140.53	-8.31	42.72	16.77	2.00	2.00	0.00
900.00	12.00	101.00	895.62	4,042.38	-11.95	61.45	24.12	2.00	2.00	0.00
1,000.00	14.00	101.00	993.06	3,944.94	-16.24	83.53	32.78	2.00	2.00	0.00
1,100.00	16.00	101.00	1,089.64	3,848.36	-21.18	108.94	42.75	2.00	2.00	0.00
1,200.00	18.00	101.00	1,185.27	3,752.73	-26.76	137.63	54.01	2.00	2.00	0.00
1,300.00	20.00	101.00	1,279.82	3,658.18	-32.98	169.59	66.56	2.00	2.00	0.00
1,400.00	22.00	101.00	1,373.17	3,564.83	-39.82	204.77	80.36	2.00	2.00	0.00
1,500.00	24.00	101.00	1,465.21	3,472.79	-47.28	243.12	95.41	2.00	2.00	0.00
FOX HILLS BASE										
1,563.30	25.27	101.00	1,522.75	3,415.25	-52.31	269.02	105.58	2.00	2.00	0.00
EOB TO 25.55° INC										
1,577.40	25.55	101.00	1,535.49	3,402.51	-53.47	274.95	107.91	2.00	2.00	0.00
SURFACE CASING										
1,599.03	25.55	101.00	1,555.00	3,383.00	-55.25	284.11	111.50	0.00	0.00	0.00
1,600.00	25.55	101.00	1,555.88	3,382.12	-55.33	284.52	111.66	0.00	0.00	0.00
1,700.00	25.55	101.00	1,646.10	3,291.90	-63.56	326.86	128.27	0.00	0.00	0.00
1,800.00	25.55	101.00	1,736.32	3,201.68	-71.79	369.19	144.89	0.00	0.00	0.00
1,900.00	25.55	101.00	1,826.55	3,111.45	-80.03	411.52	161.50	0.00	0.00	0.00
2,000.00	25.55	101.00	1,916.77	3,021.23	-88.26	453.86	178.12	0.00	0.00	0.00
2,100.00	25.55	101.00	2,006.99	2,931.01	-96.49	496.19	194.73	0.00	0.00	0.00
2,200.00	25.55	101.00	2,097.21	2,840.79	-104.72	538.53	211.34	0.00	0.00	0.00
2,300.00	25.55	101.00	2,187.44	2,750.56	-112.95	580.86	227.96	0.00	0.00	0.00
2,400.00	25.55	101.00	2,277.66	2,660.34	-121.19	623.19	244.57	0.00	0.00	0.00
2,500.00	25.55	101.00	2,367.88	2,570.12	-129.42	665.53	261.18	0.00	0.00	0.00
2,600.00	25.55	101.00	2,458.10	2,479.90	-137.65	707.86	277.80	0.00	0.00	0.00
2,700.00	25.55	101.00	2,548.33	2,389.67	-145.88	750.19	294.41	0.00	0.00	0.00
2,800.00	25.55	101.00	2,638.55	2,299.45	-154.12	792.53	311.03	0.00	0.00	0.00
2,900.00	25.55	101.00	2,728.77	2,209.23	-162.35	834.86	327.64	0.00	0.00	0.00
3,000.00	25.55	101.00	2,818.99	2,119.01	-170.58	877.19	344.25	0.00	0.00	0.00
3,100.00	25.55	101.00	2,909.22	2,028.78	-178.81	919.53	360.87	0.00	0.00	0.00
3,200.00	25.55	101.00	2,999.44	1,938.56	-187.05	961.86	377.48	0.00	0.00	0.00
3,300.00	25.55	101.00	3,089.66	1,848.34	-195.28	1,004.19	394.10	0.00	0.00	0.00
3,400.00	25.55	101.00	3,179.88	1,758.12	-203.51	1,046.53	410.71	0.00	0.00	0.00
3,500.00	25.55	101.00	3,270.11	1,667.89	-211.74	1,088.86	427.32	0.00	0.00	0.00
RICHARD SANDSTONE										
3,561.12	25.55	101.00	3,325.25	1,612.75	-216.77	1,114.74	437.48	0.00	0.00	0.00
3,600.00	25.55	101.00	3,360.33	1,577.67	-219.97	1,131.20	443.94	0.00	0.00	0.00
3,700.00	25.55	101.00	3,450.55	1,487.45	-228.21	1,173.53	460.55	0.00	0.00	0.00
3,800.00	25.55	101.00	3,540.77	1,397.23	-236.44	1,215.86	477.16	0.00	0.00	0.00
3,900.00	25.55	101.00	3,631.00	1,307.00	-244.67	1,258.20	493.78	0.00	0.00	0.00
4,000.00	25.55	101.00	3,721.22	1,216.78	-252.90	1,300.53	510.39	0.00	0.00	0.00
4,100.00	25.55	101.00	3,811.44	1,126.56	-261.14	1,342.86	527.01	0.00	0.00	0.00
4,200.00	25.55	101.00	3,901.66	1,036.34	-269.37	1,385.20	543.62	0.00	0.00	0.00

Planning Report



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Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4938.00usft (Original Well Elev)
Site:	SW SW SEC. 35 T9N R60W 6th P.M.	North Reference:	True
Well:	PT-5HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	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)
4,300.00	25.55	101.00	3,991.89	946.11	-277.60	1,427.53	560.23	0.00	0.00	0.00
4,400.00	25.55	101.00	4,082.11	855.89	-285.83	1,469.86	576.85	0.00	0.00	0.00
4,500.00	25.55	101.00	4,172.33	765.67	-294.07	1,512.20	593.46	0.00	0.00	0.00
SUSSEX SANDSTONE										
4,515.98	25.55	101.00	4,186.75	751.25	-295.38	1,518.96	596.12	0.00	0.00	0.00
4,600.00	25.55	101.00	4,262.55	675.45	-302.30	1,554.53	610.07	0.00	0.00	0.00
4,700.00	25.55	101.00	4,352.78	585.22	-310.53	1,596.87	626.69	0.00	0.00	0.00
4,800.00	25.55	101.00	4,443.00	495.00	-318.76	1,639.20	643.30	0.00	0.00	0.00
4,900.00	25.55	101.00	4,533.22	404.78	-326.99	1,681.53	659.92	0.00	0.00	0.00
5,000.00	25.55	101.00	4,623.44	314.56	-335.23	1,723.87	676.53	0.00	0.00	0.00
SHANNON SANDSTONE										
5,056.87	25.55	101.00	4,674.75	263.25	-339.91	1,747.94	685.98	0.00	0.00	0.00
5,100.00	25.55	101.00	4,713.67	224.33	-343.46	1,766.20	693.14	0.00	0.00	0.00
5,200.00	25.55	101.00	4,803.89	134.11	-351.69	1,808.53	709.76	0.00	0.00	0.00
5,300.00	25.55	101.00	4,894.11	43.89	-359.92	1,850.87	726.37	0.00	0.00	0.00
5,400.00	25.55	101.00	4,984.33	-46.33	-368.16	1,893.20	742.98	0.00	0.00	0.00
5,500.00	25.55	101.00	5,074.56	-136.56	-376.39	1,935.53	759.60	0.00	0.00	0.00
5,600.00	25.55	101.00	5,164.78	-226.78	-384.62	1,977.87	776.21	0.00	0.00	0.00
5,700.00	25.55	101.00	5,255.00	-317.00	-392.85	2,020.20	792.83	0.00	0.00	0.00
5,800.00	25.55	101.00	5,345.22	-407.22	-401.08	2,062.54	809.44	0.00	0.00	0.00
5,900.00	25.55	101.00	5,435.45	-497.45	-409.32	2,104.87	826.05	0.00	0.00	0.00
6,000.00	25.55	101.00	5,525.67	-587.67	-417.55	2,147.20	842.67	0.00	0.00	0.00
6,100.00	25.55	101.00	5,615.89	-677.89	-425.78	2,189.54	859.28	0.00	0.00	0.00
6,200.00	25.55	101.00	5,706.11	-768.11	-434.01	2,231.87	875.89	0.00	0.00	0.00
KOP (10°/100ft DGLG)										
6,286.76	25.55	101.00	5,784.39	-846.39	-441.16	2,268.60	890.31	0.00	0.00	0.00
6,300.00	25.79	104.01	5,796.32	-858.32	-442.40	2,274.19	892.66	10.00	1.79	22.72
6,400.00	29.37	124.30	5,885.14	-947.14	-461.53	2,315.66	919.77	10.00	3.59	20.29
6,500.00	35.31	139.43	5,969.73	-1,031.73	-497.40	2,354.82	962.81	10.00	5.94	15.13
6,600.00	42.63	150.32	6,047.52	-1,109.52	-548.90	2,390.47	1,020.45	10.00	7.32	10.89
SHARON SPRINGS										
6,673.92	48.55	156.52	6,099.25	-1,161.25	-596.12	2,413.94	1,071.43	10.00	8.02	8.39
6,700.00	50.71	158.43	6,116.14	-1,178.14	-614.47	2,421.55	1,090.95	10.00	8.29	7.34
NIOBRARA A CHALK										
6,783.22	57.79	163.83	6,164.75	-1,226.75	-678.35	2,443.23	1,157.89	10.00	8.51	6.49
6,800.00	59.25	164.82	6,173.51	-1,235.51	-692.13	2,447.09	1,172.16	10.00	8.66	5.86
NIOBRARA A CHALK BASE										
6,819.53	60.95	165.92	6,183.25	-1,245.25	-708.51	2,451.37	1,189.07	10.00	8.71	5.67
NIOBRARA B1 CHALK TOP										
6,894.33	67.54	169.86	6,215.75	-1,277.75	-774.34	2,465.43	1,256.38	10.00	8.81	5.26
6,900.00	68.04	170.14	6,217.89	-1,279.89	-779.51	2,466.34	1,261.63	10.00	8.88	4.97
NIOBRARA B1 CHALK BASE										
6,972.84	74.54	173.61	6,241.25	-1,303.25	-847.76	2,476.04	1,330.44	10.00	8.93	4.76
7,000.00	76.98	174.84	6,247.93	-1,309.93	-873.95	2,478.69	1,356.62	10.00	8.98	4.54
7,100.00	86.01	179.20	6,262.71	-1,324.71	-972.59	2,483.78	1,454.26	10.00	9.02	4.36
HZ LP: 300ft FNL & 2085ft FEL of Sec 2 - NIOBRARA B2 CHALK TOP										
7,144.16	90.00	181.09	6,264.25	-1,326.25	-1,016.71	2,483.67	1,497.44	10.00	9.05	4.27
7,200.00	90.00	181.09	6,264.25	-1,326.25	-1,072.55	2,482.61	1,551.91	0.00	0.00	0.00
7,300.00	90.00	181.09	6,264.25	-1,326.25	-1,172.53	2,480.71	1,649.45	0.00	0.00	0.00
7,400.00	90.00	181.09	6,264.25	-1,326.25	-1,272.51	2,478.82	1,746.99	0.00	0.00	0.00
7,500.00	90.00	181.09	6,264.25	-1,326.25	-1,372.49	2,476.92	1,844.53	0.00	0.00	0.00
7,600.00	90.00	181.09	6,264.25	-1,326.25	-1,472.47	2,475.03	1,942.07	0.00	0.00	0.00
7,700.00	90.00	181.09	6,264.25	-1,326.25	-1,572.46	2,473.13	2,039.60	0.00	0.00	0.00

Planning Report



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Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4938.00usft (Original Well Elev)
Site:	SW SW SEC. 35 T9N R60W 6th P.M.	North Reference:	True
Well:	PT-5HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	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)
7,800.00	90.00	181.09	6,264.25	-1,326.25	-1,672.44	2,471.23	2,137.14	0.00	0.00	0.00
7,900.00	90.00	181.09	6,264.25	-1,326.25	-1,772.42	2,469.34	2,234.68	0.00	0.00	0.00
8,000.00	90.00	181.09	6,264.25	-1,326.25	-1,872.40	2,467.44	2,332.22	0.00	0.00	0.00
8,100.00	90.00	181.09	6,264.25	-1,326.25	-1,972.38	2,465.54	2,429.76	0.00	0.00	0.00
8,200.00	90.00	181.09	6,264.25	-1,326.25	-2,072.37	2,463.65	2,527.29	0.00	0.00	0.00
8,300.00	90.00	181.09	6,264.25	-1,326.25	-2,172.35	2,461.75	2,624.83	0.00	0.00	0.00
8,400.00	90.00	181.09	6,264.25	-1,326.25	-2,272.33	2,459.86	2,722.37	0.00	0.00	0.00
8,500.00	90.00	181.09	6,264.25	-1,326.25	-2,372.31	2,457.96	2,819.91	0.00	0.00	0.00
8,600.00	90.00	181.09	6,264.25	-1,326.25	-2,472.29	2,456.06	2,917.45	0.00	0.00	0.00
8,700.00	90.00	181.09	6,264.25	-1,326.25	-2,572.28	2,454.17	3,014.98	0.00	0.00	0.00
8,800.00	90.00	181.09	6,264.25	-1,326.25	-2,672.26	2,452.27	3,112.52	0.00	0.00	0.00
8,900.00	90.00	181.09	6,264.25	-1,326.25	-2,772.24	2,450.37	3,210.06	0.00	0.00	0.00
9,000.00	90.00	181.09	6,264.25	-1,326.25	-2,872.22	2,448.48	3,307.60	0.00	0.00	0.00
9,100.00	90.00	181.09	6,264.25	-1,326.25	-2,972.20	2,446.58	3,405.14	0.00	0.00	0.00
9,200.00	90.00	181.09	6,264.25	-1,326.25	-3,072.19	2,444.69	3,502.67	0.00	0.00	0.00
9,300.00	90.00	181.09	6,264.25	-1,326.25	-3,172.17	2,442.79	3,600.21	0.00	0.00	0.00
9,400.00	90.00	181.09	6,264.25	-1,326.25	-3,272.15	2,440.89	3,697.75	0.00	0.00	0.00
9,500.00	90.00	181.09	6,264.25	-1,326.25	-3,372.13	2,439.00	3,795.29	0.00	0.00	0.00
9,600.00	90.00	181.09	6,264.25	-1,326.25	-3,472.11	2,437.10	3,892.83	0.00	0.00	0.00
9,700.00	90.00	181.09	6,264.25	-1,326.25	-3,572.10	2,435.20	3,990.36	0.00	0.00	0.00
9,800.00	90.00	181.09	6,264.25	-1,326.25	-3,672.08	2,433.31	4,087.90	0.00	0.00	0.00
9,900.00	90.00	181.09	6,264.25	-1,326.25	-3,772.06	2,431.41	4,185.44	0.00	0.00	0.00
10,000.00	90.00	181.09	6,264.25	-1,326.25	-3,872.04	2,429.52	4,282.98	0.00	0.00	0.00
10,100.00	90.00	181.09	6,264.25	-1,326.25	-3,972.02	2,427.62	4,380.52	0.00	0.00	0.00
10,200.00	90.00	181.09	6,264.25	-1,326.25	-4,072.01	2,425.72	4,478.05	0.00	0.00	0.00
10,300.00	90.00	181.09	6,264.25	-1,326.25	-4,171.99	2,423.83	4,575.59	0.00	0.00	0.00
10,400.00	90.00	181.09	6,264.25	-1,326.25	-4,271.97	2,421.93	4,673.13	0.00	0.00	0.00
10,500.00	90.00	181.09	6,264.25	-1,326.25	-4,371.95	2,420.03	4,770.67	0.00	0.00	0.00
10,600.00	90.00	181.09	6,264.25	-1,326.25	-4,471.93	2,418.14	4,868.21	0.00	0.00	0.00
10,700.00	90.00	181.09	6,264.25	-1,326.25	-4,571.92	2,416.24	4,965.74	0.00	0.00	0.00
10,800.00	90.00	181.09	6,264.25	-1,326.25	-4,671.90	2,414.35	5,063.28	0.00	0.00	0.00
10,900.00	90.00	181.09	6,264.25	-1,326.25	-4,771.88	2,412.45	5,160.82	0.00	0.00	0.00
11,000.00	90.00	181.09	6,264.25	-1,326.25	-4,871.86	2,410.55	5,258.36	0.00	0.00	0.00
11,100.00	90.00	181.09	6,264.25	-1,326.25	-4,971.84	2,408.66	5,355.90	0.00	0.00	0.00
11,200.00	90.00	181.09	6,264.25	-1,326.25	-5,071.83	2,406.76	5,453.43	0.00	0.00	0.00
11,300.00	90.00	181.09	6,264.25	-1,326.25	-5,171.81	2,404.87	5,550.97	0.00	0.00	0.00
11,400.00	90.00	181.09	6,264.25	-1,326.25	-5,271.79	2,402.97	5,648.51	0.00	0.00	0.00
11,500.00	90.00	181.09	6,264.25	-1,326.25	-5,371.77	2,401.07	5,746.05	0.00	0.00	0.00
11,600.00	90.00	181.09	6,264.25	-1,326.25	-5,471.76	2,399.18	5,843.59	0.00	0.00	0.00
11,700.00	90.00	181.09	6,264.25	-1,326.25	-5,571.74	2,397.28	5,941.12	0.00	0.00	0.00
11,800.00	90.00	181.09	6,264.25	-1,326.25	-5,671.72	2,395.38	6,038.66	0.00	0.00	0.00
11,900.00	90.00	181.09	6,264.25	-1,326.25	-5,771.70	2,393.49	6,136.20	0.00	0.00	0.00
12,000.00	90.00	181.09	6,264.25	-1,326.25	-5,871.68	2,391.59	6,233.74	0.00	0.00	0.00
12,100.00	90.00	181.09	6,264.25	-1,326.25	-5,971.67	2,389.70	6,331.28	0.00	0.00	0.00
12,200.00	90.00	181.09	6,264.25	-1,326.25	-6,071.65	2,387.80	6,428.81	0.00	0.00	0.00
12,300.00	90.00	181.09	6,264.25	-1,326.25	-6,171.63	2,385.90	6,526.35	0.00	0.00	0.00
12,400.00	90.00	181.09	6,264.25	-1,326.25	-6,271.61	2,384.01	6,623.89	0.00	0.00	0.00
12,500.00	90.00	181.09	6,264.25	-1,326.25	-6,371.59	2,382.11	6,721.43	0.00	0.00	0.00
12,600.00	90.00	181.09	6,264.25	-1,326.25	-6,471.58	2,380.21	6,818.97	0.00	0.00	0.00
12,700.00	90.00	181.09	6,264.25	-1,326.25	-6,571.56	2,378.32	6,916.50	0.00	0.00	0.00
12,800.00	90.00	181.09	6,264.25	-1,326.25	-6,671.54	2,376.42	7,014.04	0.00	0.00	0.00
12,900.00	90.00	181.09	6,264.25	-1,326.25	-6,771.52	2,374.53	7,111.58	0.00	0.00	0.00
13,000.00	90.00	181.09	6,264.25	-1,326.25	-6,871.50	2,372.63	7,209.12	0.00	0.00	0.00
13,100.00	90.00	181.09	6,264.25	-1,326.25	-6,971.49	2,370.73	7,306.66	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well PT-5HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4938.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4938.00usft (Original Well Elev)
Site:	SW SW SEC. 35 T9N R60W 6th P.M.	North Reference:	True
Well:	PT-5HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	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)
13,200.00	90.00	181.09	6,264.25	-1,326.25	-7,071.47	2,368.84	7,404.19	0.00	0.00	0.00
13,300.00	90.00	181.09	6,264.25	-1,326.25	-7,171.45	2,366.94	7,501.73	0.00	0.00	0.00
13,400.00	90.00	181.09	6,264.25	-1,326.25	-7,271.43	2,365.04	7,599.27	0.00	0.00	0.00
13,500.00	90.00	181.09	6,264.25	-1,326.25	-7,371.41	2,363.15	7,696.81	0.00	0.00	0.00
13,600.00	90.00	181.09	6,264.25	-1,326.25	-7,471.40	2,361.25	7,794.35	0.00	0.00	0.00
13,700.00	90.00	181.09	6,264.25	-1,326.25	-7,571.38	2,359.36	7,891.88	0.00	0.00	0.00
13,800.00	90.00	181.09	6,264.25	-1,326.25	-7,671.36	2,357.46	7,989.42	0.00	0.00	0.00
13,900.00	90.00	181.09	6,264.25	-1,326.25	-7,771.34	2,355.56	8,086.96	0.00	0.00	0.00
14,000.00	90.00	181.09	6,264.25	-1,326.25	-7,871.32	2,353.67	8,184.50	0.00	0.00	0.00
14,100.00	90.00	181.09	6,264.25	-1,326.25	-7,971.31	2,351.77	8,282.04	0.00	0.00	0.00
14,200.00	90.00	181.09	6,264.25	-1,326.25	-8,071.29	2,349.87	8,379.57	0.00	0.00	0.00
14,300.00	90.00	181.09	6,264.25	-1,326.25	-8,171.27	2,347.98	8,477.11	0.00	0.00	0.00
14,400.00	90.00	181.09	6,264.25	-1,326.25	-8,271.25	2,346.08	8,574.65	0.00	0.00	0.00
14,500.00	90.00	181.09	6,264.25	-1,326.25	-8,371.23	2,344.19	8,672.19	0.00	0.00	0.00
14,600.00	90.00	181.09	6,264.25	-1,326.25	-8,471.22	2,342.29	8,769.73	0.00	0.00	0.00
14,700.00	90.00	181.09	6,264.25	-1,326.25	-8,571.20	2,340.39	8,867.26	0.00	0.00	0.00
14,800.00	90.00	181.09	6,264.25	-1,326.25	-8,671.18	2,338.50	8,964.80	0.00	0.00	0.00
14,900.00	90.00	181.09	6,264.25	-1,326.25	-8,771.16	2,336.60	9,062.34	0.00	0.00	0.00
15,000.00	90.00	181.09	6,264.25	-1,326.25	-8,871.14	2,334.70	9,159.88	0.00	0.00	0.00
15,100.00	90.00	181.09	6,264.25	-1,326.25	-8,971.13	2,332.81	9,257.42	0.00	0.00	0.00
15,200.00	90.00	181.09	6,264.25	-1,326.25	-9,071.11	2,330.91	9,354.95	0.00	0.00	0.00
15,300.00	90.00	181.09	6,264.25	-1,326.25	-9,171.09	2,329.02	9,452.49	0.00	0.00	0.00
15,400.00	90.00	181.09	6,264.25	-1,326.25	-9,271.07	2,327.12	9,550.03	0.00	0.00	0.00
15,500.00	90.00	181.09	6,264.25	-1,326.25	-9,371.05	2,325.22	9,647.57	0.00	0.00	0.00
15,600.00	90.00	181.09	6,264.25	-1,326.25	-9,471.04	2,323.33	9,745.11	0.00	0.00	0.00
15,700.00	90.00	181.09	6,264.25	-1,326.25	-9,571.02	2,321.43	9,842.64	0.00	0.00	0.00
15,800.00	90.00	181.09	6,264.25	-1,326.25	-9,671.00	2,319.53	9,940.18	0.00	0.00	0.00
15,900.00	90.00	181.09	6,264.25	-1,326.25	-9,770.98	2,317.64	10,037.72	0.00	0.00	0.00
16,000.00	90.00	181.09	6,264.25	-1,326.25	-9,870.96	2,315.74	10,135.26	0.00	0.00	0.00
16,100.00	90.00	181.09	6,264.25	-1,326.25	-9,970.95	2,313.85	10,232.80	0.00	0.00	0.00
16,200.00	90.00	181.09	6,264.25	-1,326.25	-10,070.93	2,311.95	10,330.33	0.00	0.00	0.00
16,300.00	90.00	181.09	6,264.25	-1,326.25	-10,170.91	2,310.05	10,427.87	0.00	0.00	0.00
16,400.00	90.00	181.09	6,264.25	-1,326.25	-10,270.89	2,308.16	10,525.41	0.00	0.00	0.00
16,500.00	90.00	181.09	6,264.25	-1,326.25	-10,370.87	2,306.26	10,622.95	0.00	0.00	0.00
16,600.00	90.00	181.09	6,264.25	-1,326.25	-10,470.86	2,304.36	10,720.49	0.00	0.00	0.00
16,700.00	90.00	181.09	6,264.25	-1,326.25	-10,570.84	2,302.47	10,818.02	0.00	0.00	0.00
16,800.00	90.00	181.09	6,264.25	-1,326.25	-10,670.82	2,300.57	10,915.56	0.00	0.00	0.00
16,900.00	90.00	181.09	6,264.25	-1,326.25	-10,770.80	2,298.68	11,013.10	0.00	0.00	0.00
17,000.00	90.00	181.09	6,264.25	-1,326.25	-10,870.78	2,296.78	11,110.64	0.00	0.00	0.00
17,100.00	90.00	181.09	6,264.25	-1,326.25	-10,970.77	2,294.88	11,208.18	0.00	0.00	0.00
17,200.00	90.00	181.09	6,264.25	-1,326.25	-11,070.75	2,292.99	11,305.71	0.00	0.00	0.00
BHL: 300ft FSL & 2085ft FEL of Sec 11										
17,242.99	90.00	181.09	6,264.25	-1,326.25	-11,113.73	2,292.17	11,347.65	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well PT-5HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4938.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4938.00usft (Original Well Elev)
Site:	SW SW SEC. 35 T9N R60W 6th P.M.	North Reference:	True
Well:	PT-5HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

Formations					
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,563.30	1,522.75	FOX HILLS BASE			
3,561.12	3,325.25	RICHARD SANDSTONE			
4,515.98	4,186.75	SUSSEX SANDSTONE			
5,056.87	4,674.75	SHANNON SANDSTONE			
6,673.92	6,099.25	SHARON SPRINGS			
6,783.22	6,164.75	NIOBRARA A CHALK			
6,819.53	6,183.25	NIOBRARA A CHALK BASE			
6,894.33	6,215.75	NIOBRARA B1 CHALK TOP			
6,972.84	6,241.25	NIOBRARA B1 CHALK BASE			
7,144.16	6,264.25	NIOBRARA B2 CHALK TOP			

Plan Annotations				
MD (usft)	TVD (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
0.00	0.00	0.00	0.00	SHL: 739ft FSL & 1198ft FWL of Sec 35
300.00	300.00	0.00	0.00	START NUDGE (2°/100ft BUR)
1,577.40	1,535.49	-53.47	274.95	EOB TO 25.55° INC
1,599.03	1,555.00	-55.25	284.11	SURFACE CASING
6,286.76	5,784.39	-441.16	2,268.60	KOP (10°/100ft DGLG)
7,144.16	6,264.25	-1,016.71	2,483.67	HZ LP: 300ft FNL & 2085ft FEL of Sec 2
17,242.99	6,264.25	-11,113.73	2,292.17	BHL: 300ft FSL & 2085ft FEL of Sec 11