

MALLARD EXPLORATION

WELD COUNTY, COLORADO (NAD 83)

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

PINTAIL FED 2-11-5HN

ORIGINAL WELLBORE

04 December, 2018

Plan: PROPOSAL #4





Project: WELD COUNTY, COLORADO (NAD 83)
Site: SE SW SEC. 35 T9N R60W 6TH P.M.
Well: PINTAIL FED 2-11-5HN
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #4

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: 333ft FSL & 1477ft FWL of Sec 35		
500.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2"/100ft BUR)		
1467.65	1487.06	19.74	91.33	-3.92	168.32	30.04	168.37	EOB TO 19.74° INC		
1555.00	1579.87	19.74	91.33	-4.65	199.66	35.63	199.72	SURFACE CASING		
5722.75	6007.86	19.74	91.33	-39.48	1694.91	302.44	1695.37	KOP (10"/100ft DGLG)		
6261.25	6907.03	90.00	181.09	-616.01	1877.24	900.30	2334.85	HZ LP: 300ft FNL & 2405ft FEL of Sec 2		
6261.25	17005.14	90.00	181.09	-10712.29	1685.49	10844.08	12432.96	BHL: 300ft FSL & 2405ft FEL of Sec 11		

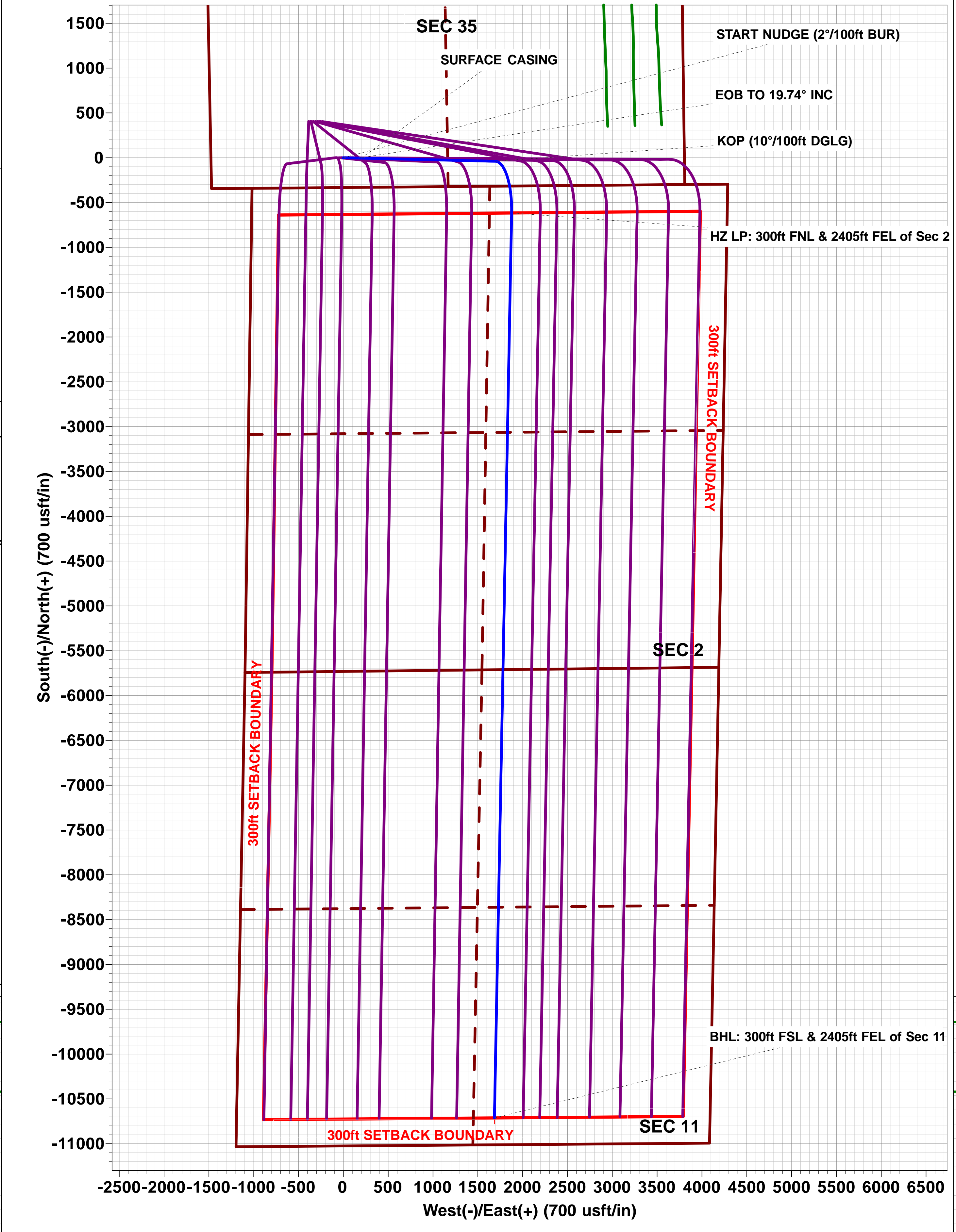
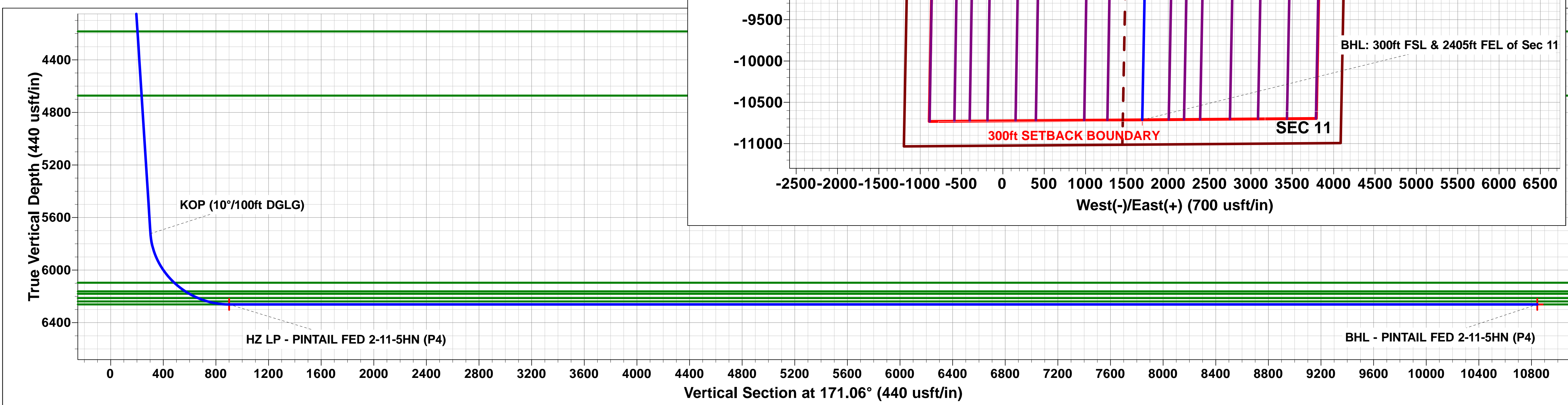
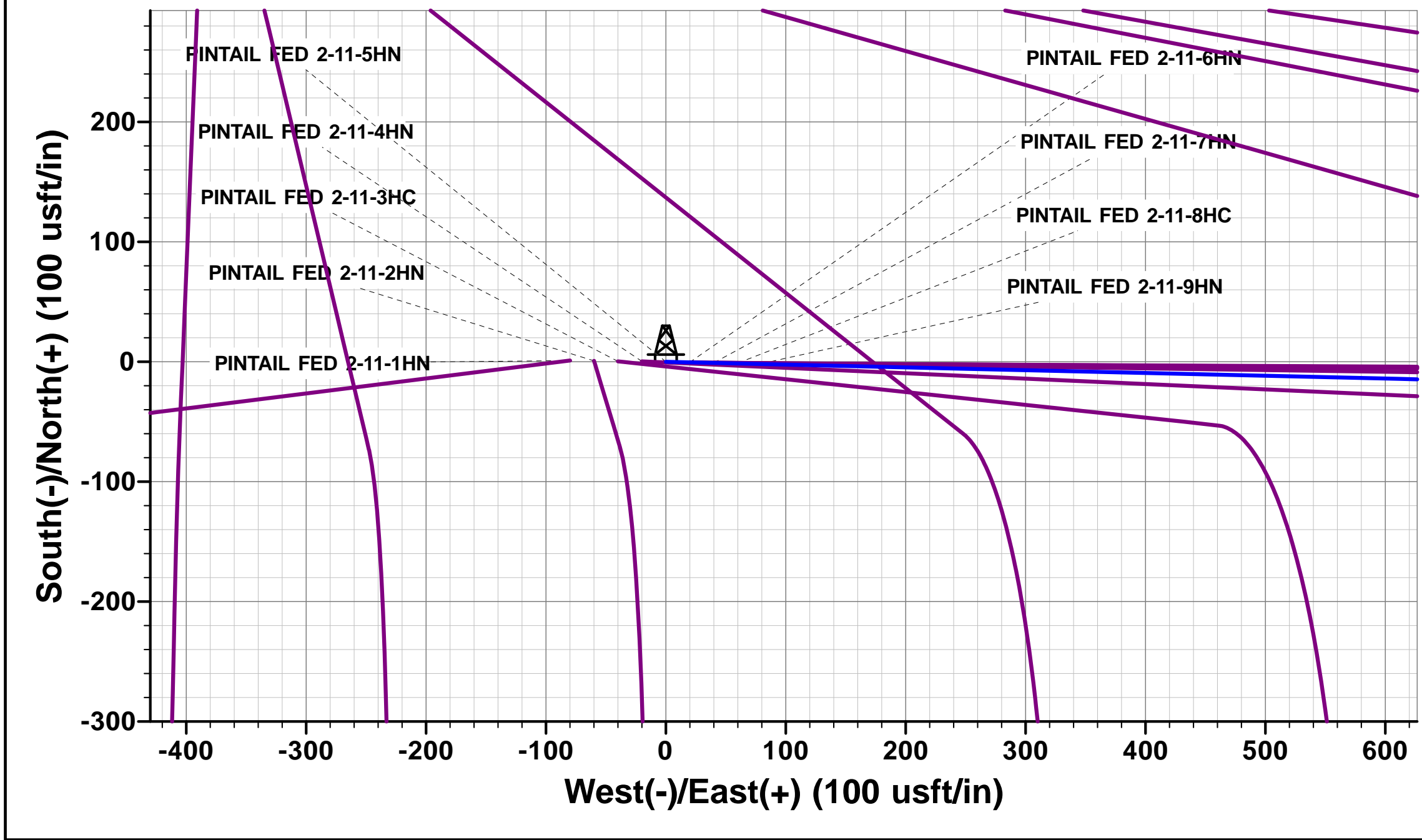
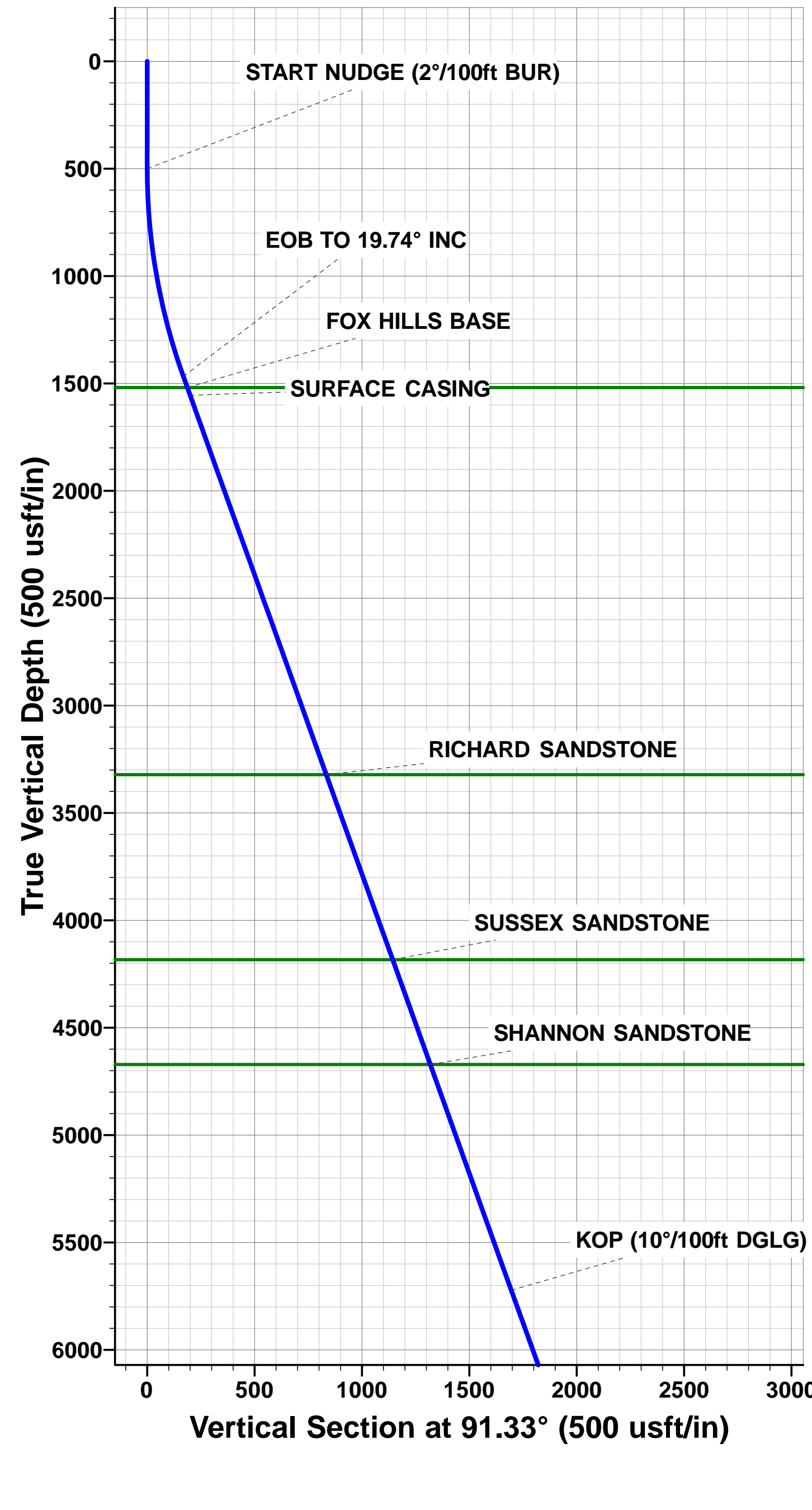
PROPOSED LOCAL COORDINATES:

SHL: 333ft FSL & 1477ft FWL Sec 35

HZ LP: 300ft FNL & 2405ft FEL Sec 2

BHL: 300ft FSL & 2405ft FEL of Sec 11

WELLBORE TARGET DETAILS (LAT/LONG)					
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
HZ LP - PINTAIL FED 2-11-5HN (P4)	6261.25	-616.00	1877.24	40.698330	-104.056258
BHL - PINTAIL FED 2-11-5HN (P4)	6261.25	-10712.29	1685.49	40.670618	-104.056952



Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well PINTAIL FED 2-11-5HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4935.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4935.00usft
Site:	SE SW SEC. 35 T9N R60W 6TH P.M.	North Reference:	True
Well:	PINTAIL FED 2-11-5HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #4		

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	SE SW SEC. 35 T9N R60W 6TH P.M.		
Site Position:		Northing:	1,501,638.38 usft
From:	Lat/Long	Easting:	3,398,005.01 usft
Position Uncertainty:	0.00 usft	Slot Radius:	1.10000ft
		Latitude:	40.701546
		Longitude:	-104.064503
		Grid Convergence:	0.93 °

Well	PINTAIL FED 2-11-5HN		
Well Position	+N-S	-555.61 usft	Northing:
	+E-W	408.99 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	40.700021
		Longitude:	-104.063028
		Ground Level:	4,919.00 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 #4			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)
	6,261.25	0.00	0.00	171.06

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	-4,935.00	0.00	0.00	0.00	0.00	0.00	0.00	
500.00	0.00	0.00	500.00	-4,435.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,487.06	19.74	91.33	1,467.65	-3,467.35	-3.92	168.32	2.00	2.00	0.00	91.33	
6,007.86	19.74	91.33	5,722.75	787.75	-39.48	1,694.91	0.00	0.00	0.00	0.00	
6,907.03	90.00	181.09	6,261.25	1,326.25	-616.00	1,877.24	10.00	7.81	9.98	89.77	HZ LP - PINTAIL FI
17,005.14	90.00	181.09	6,261.25	1,326.25	-10,712.25	1,685.49	0.00	0.00	0.00	0.00	BHL - PINTAIL FEC

Planning Report



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Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4935.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4935.00usft
Site:	SE SW SEC. 35 T9N R60W 6TH P.M.	North Reference:	True
Well:	PINTAIL FED 2-11-5HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #4		

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: 333ft FSL & 1477ft FWL of Sec 35										
0.00	0.00	0.00	0.00	4,935.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	4,835.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	4,735.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	4,635.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	4,535.00	0.00	0.00	0.00	0.00	0.00	0.00
START NUDGE (2°/100ft BUR)										
500.00	0.00	0.00	500.00	4,435.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	2.00	91.33	599.98	4,335.02	-0.04	1.74	0.31	2.00	2.00	0.00
700.00	4.00	91.33	699.84	4,235.16	-0.16	6.98	1.24	2.00	2.00	0.00
800.00	6.00	91.33	799.45	4,135.55	-0.37	15.69	2.80	2.00	2.00	0.00
900.00	8.00	91.33	898.70	4,036.30	-0.65	27.87	4.97	2.00	2.00	0.00
1,000.00	10.00	91.33	997.47	3,937.53	-1.01	43.51	7.76	2.00	2.00	0.00
1,100.00	12.00	91.33	1,095.62	3,839.38	-1.46	62.59	11.17	2.00	2.00	0.00
1,200.00	14.00	91.33	1,193.06	3,741.94	-1.98	85.07	15.18	2.00	2.00	0.00
1,300.00	16.00	91.33	1,289.64	3,645.36	-2.58	110.95	19.80	2.00	2.00	0.00
1,400.00	18.00	91.33	1,385.27	3,549.73	-3.27	140.17	25.01	2.00	2.00	0.00
EOB TO 19.74° INC										
1,487.06	19.74	91.33	1,467.65	3,467.35	-3.92	168.32	30.04	2.00	2.00	0.00
1,500.00	19.74	91.33	1,479.83	3,455.17	-4.02	172.69	30.82	0.00	0.00	0.00
FOX HILLS BASE										
1,542.42	19.74	91.33	1,519.75	3,415.25	-4.36	187.02	33.37	0.00	0.00	0.00
SURFACE CASING										
1,579.87	19.74	91.33	1,555.00	3,380.00	-4.65	199.66	35.63	0.00	0.00	0.00
1,600.00	19.74	91.33	1,573.95	3,361.05	-4.81	206.46	36.84	0.00	0.00	0.00
1,700.00	19.74	91.33	1,668.07	3,266.93	-5.60	240.23	42.87	0.00	0.00	0.00
1,800.00	19.74	91.33	1,762.19	3,172.81	-6.38	274.00	48.89	0.00	0.00	0.00
1,900.00	19.74	91.33	1,856.32	3,078.68	-7.17	307.77	54.92	0.00	0.00	0.00
2,000.00	19.74	91.33	1,950.44	2,984.56	-7.96	341.53	60.94	0.00	0.00	0.00
2,100.00	19.74	91.33	2,044.56	2,890.44	-8.74	375.30	66.97	0.00	0.00	0.00
2,200.00	19.74	91.33	2,138.69	2,796.31	-9.53	409.07	72.99	0.00	0.00	0.00
2,300.00	19.74	91.33	2,232.81	2,702.19	-10.32	442.84	79.02	0.00	0.00	0.00
2,400.00	19.74	91.33	2,326.93	2,608.07	-11.10	476.61	85.05	0.00	0.00	0.00
2,500.00	19.74	91.33	2,421.05	2,513.95	-11.89	510.37	91.07	0.00	0.00	0.00
2,600.00	19.74	91.33	2,515.18	2,419.82	-12.67	544.14	97.10	0.00	0.00	0.00
2,700.00	19.74	91.33	2,609.30	2,325.70	-13.46	577.91	103.12	0.00	0.00	0.00
2,800.00	19.74	91.33	2,703.42	2,231.58	-14.25	611.68	109.15	0.00	0.00	0.00
2,900.00	19.74	91.33	2,797.54	2,137.46	-15.03	645.45	115.17	0.00	0.00	0.00
3,000.00	19.74	91.33	2,891.67	2,043.33	-15.82	679.21	121.20	0.00	0.00	0.00
3,100.00	19.74	91.33	2,985.79	1,949.21	-16.61	712.98	127.22	0.00	0.00	0.00
3,200.00	19.74	91.33	3,079.91	1,855.09	-17.39	746.75	133.25	0.00	0.00	0.00
3,300.00	19.74	91.33	3,174.04	1,760.96	-18.18	780.52	139.28	0.00	0.00	0.00
3,400.00	19.74	91.33	3,268.16	1,666.84	-18.97	814.29	145.30	0.00	0.00	0.00
RICHARD SANDSTONE										
3,457.47	19.74	91.33	3,322.25	1,612.75	-19.42	833.69	148.76	0.00	0.00	0.00
3,500.00	19.74	91.33	3,362.28	1,572.72	-19.75	848.05	151.33	0.00	0.00	0.00
3,600.00	19.74	91.33	3,456.40	1,478.60	-20.54	881.82	157.35	0.00	0.00	0.00
3,700.00	19.74	91.33	3,550.53	1,384.47	-21.33	915.59	163.38	0.00	0.00	0.00
3,800.00	19.74	91.33	3,644.65	1,290.35	-22.11	949.36	169.40	0.00	0.00	0.00
3,900.00	19.74	91.33	3,738.77	1,196.23	-22.90	983.13	175.43	0.00	0.00	0.00
4,000.00	19.74	91.33	3,832.90	1,102.10	-23.69	1,016.89	181.45	0.00	0.00	0.00
4,100.00	19.74	91.33	3,927.02	1,007.98	-24.47	1,050.66	187.48	0.00	0.00	0.00
4,200.00	19.74	91.33	4,021.14	913.86	-25.26	1,084.43	193.51	0.00	0.00	0.00

Planning Report



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Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4935.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4935.00usft
Site:	SE SW SEC. 35 T9N R60W 6TH P.M.	North Reference:	True
Well:	PINTAIL FED 2-11-5HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #4		

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	19.74	91.33	4,115.26	819.74	-26.05	1,118.20	199.53	0.00	0.00	0.00
SUSSEX SANDSTONE										
4,372.76	19.74	91.33	4,183.75	751.25	-26.62	1,142.77	203.92	0.00	0.00	0.00
4,400.00	19.74	91.33	4,209.39	725.61	-26.83	1,151.97	205.56	0.00	0.00	0.00
4,500.00	19.74	91.33	4,303.51	631.49	-27.62	1,185.73	211.58	0.00	0.00	0.00
4,600.00	19.74	91.33	4,397.63	537.37	-28.41	1,219.50	217.61	0.00	0.00	0.00
4,700.00	19.74	91.33	4,491.76	443.24	-29.19	1,253.27	223.63	0.00	0.00	0.00
4,800.00	19.74	91.33	4,585.88	349.12	-29.98	1,287.04	229.66	0.00	0.00	0.00
SHANNON SANDSTONE										
4,891.23	19.74	91.33	4,671.75	263.25	-30.70	1,317.85	235.16	0.00	0.00	0.00
4,900.00	19.74	91.33	4,680.00	255.00	-30.77	1,320.81	235.68	0.00	0.00	0.00
5,000.00	19.74	91.33	4,774.12	160.88	-31.55	1,354.57	241.71	0.00	0.00	0.00
5,100.00	19.74	91.33	4,868.25	66.75	-32.34	1,388.34	247.74	0.00	0.00	0.00
5,200.00	19.74	91.33	4,962.37	-27.37	-33.13	1,422.11	253.76	0.00	0.00	0.00
5,300.00	19.74	91.33	5,056.49	-121.49	-33.91	1,455.88	259.79	0.00	0.00	0.00
5,400.00	19.74	91.33	5,150.61	-215.61	-34.70	1,489.65	265.81	0.00	0.00	0.00
5,500.00	19.74	91.33	5,244.74	-309.74	-35.48	1,523.41	271.84	0.00	0.00	0.00
5,600.00	19.74	91.33	5,338.86	-403.86	-36.27	1,557.18	277.86	0.00	0.00	0.00
5,700.00	19.74	91.33	5,432.98	-497.98	-37.06	1,590.95	283.89	0.00	0.00	0.00
5,800.00	19.74	91.33	5,527.11	-592.11	-37.84	1,624.72	289.91	0.00	0.00	0.00
5,900.00	19.74	91.33	5,621.23	-686.23	-38.63	1,658.49	295.94	0.00	0.00	0.00
6,000.00	19.74	91.33	5,715.35	-780.35	-39.42	1,692.25	301.97	0.00	0.00	0.00
KOP (10°/100ft DGLG)										
6,007.86	19.74	91.33	5,722.75	-787.75	-39.48	1,694.91	302.44	0.00	0.00	0.00
6,100.00	21.74	116.95	5,809.09	-874.09	-47.59	1,725.74	315.25	10.00	2.17	27.80
6,200.00	27.33	137.12	5,900.18	-965.18	-72.87	1,757.96	345.23	10.00	5.59	20.17
6,300.00	34.83	150.04	5,985.86	-1,050.86	-114.54	1,787.92	391.05	10.00	7.50	12.92
6,400.00	43.25	158.66	6,063.52	-1,128.52	-171.34	1,814.71	451.32	10.00	8.42	8.62
SHARON SPRINGS										
6,446.53	47.34	161.78	6,096.25	-1,161.25	-202.46	1,825.87	483.79	10.00	8.80	6.70
6,500.00	52.13	164.89	6,130.80	-1,195.80	-241.54	1,837.53	524.21	10.00	8.96	5.81
NIORARA A CHALK										
6,553.39	56.99	167.61	6,161.75	-1,226.75	-283.78	1,847.84	567.54	10.00	9.10	5.10
NIORARA A CHALK BASE										
6,588.93	60.26	169.26	6,180.25	-1,245.25	-313.50	1,853.91	597.84	10.00	9.18	4.64
6,600.00	61.28	169.75	6,185.66	-1,250.66	-323.00	1,855.67	607.50	10.00	9.22	4.44
NIORARA B1 CHALK TOP										
6,662.17	67.04	172.34	6,212.75	-1,277.75	-378.25	1,864.35	663.42	10.00	9.27	4.18
6,700.00	70.56	173.81	6,226.43	-1,291.43	-413.25	1,868.59	698.66	10.00	9.32	3.89
NIORARA B1 CHALK BASE										
6,739.09	74.22	175.27	6,238.25	-1,303.25	-450.33	1,872.13	735.84	10.00	9.35	3.72
6,800.00	79.93	177.44	6,251.87	-1,316.87	-509.55	1,875.90	794.93	10.00	9.38	3.56
6,900.00	89.34	180.85	6,261.21	-1,326.21	-608.98	1,877.36	893.37	10.00	9.41	3.42
HZ LP: 300ft FNL & 2405ft FEL of Sec 2 - NIOBRARA B2 CHALK TOP										
6,907.03	90.00	181.09	6,261.25	-1,326.25	-616.00	1,877.24	900.30	10.00	9.41	3.38
7,000.00	90.00	181.09	6,261.25	-1,326.25	-708.96	1,875.48	991.85	0.00	0.00	0.00
7,100.00	90.00	181.09	6,261.25	-1,326.25	-808.94	1,873.58	1,090.32	0.00	0.00	0.00
7,200.00	90.00	181.09	6,261.25	-1,326.25	-908.92	1,871.68	1,188.79	0.00	0.00	0.00
7,300.00	90.00	181.09	6,261.25	-1,326.25	-1,008.90	1,869.78	1,287.26	0.00	0.00	0.00
7,400.00	90.00	181.09	6,261.25	-1,326.25	-1,108.89	1,867.88	1,385.73	0.00	0.00	0.00
7,500.00	90.00	181.09	6,261.25	-1,326.25	-1,208.87	1,865.98	1,484.21	0.00	0.00	0.00
7,600.00	90.00	181.09	6,261.25	-1,326.25	-1,308.85	1,864.08	1,582.68	0.00	0.00	0.00
7,700.00	90.00	181.09	6,261.25	-1,326.25	-1,408.83	1,862.18	1,681.15	0.00	0.00	0.00

Planning Report



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Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4935.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4935.00usft
Site:	SE SW SEC. 35 T9N R60W 6TH P.M.	North Reference:	True
Well:	PINTAIL FED 2-11-5HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #4		

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	6,261.25	-1,326.25	-1,508.81	1,860.28	1,779.62	0.00	0.00	0.00
7,900.00	90.00	181.09	6,261.25	-1,326.25	-1,608.80	1,858.39	1,878.09	0.00	0.00	0.00
8,000.00	90.00	181.09	6,261.25	-1,326.25	-1,708.78	1,856.49	1,976.57	0.00	0.00	0.00
8,100.00	90.00	181.09	6,261.25	-1,326.25	-1,808.76	1,854.59	2,075.04	0.00	0.00	0.00
8,200.00	90.00	181.09	6,261.25	-1,326.25	-1,908.74	1,852.69	2,173.51	0.00	0.00	0.00
8,300.00	90.00	181.09	6,261.25	-1,326.25	-2,008.72	1,850.79	2,271.98	0.00	0.00	0.00
8,400.00	90.00	181.09	6,261.25	-1,326.25	-2,108.71	1,848.89	2,370.45	0.00	0.00	0.00
8,500.00	90.00	181.09	6,261.25	-1,326.25	-2,208.69	1,846.99	2,468.92	0.00	0.00	0.00
8,600.00	90.00	181.09	6,261.25	-1,326.25	-2,308.67	1,845.09	2,567.40	0.00	0.00	0.00
8,700.00	90.00	181.09	6,261.25	-1,326.25	-2,408.65	1,843.20	2,665.87	0.00	0.00	0.00
8,800.00	90.00	181.09	6,261.25	-1,326.25	-2,508.63	1,841.30	2,764.34	0.00	0.00	0.00
8,900.00	90.00	181.09	6,261.25	-1,326.25	-2,608.62	1,839.40	2,862.81	0.00	0.00	0.00
9,000.00	90.00	181.09	6,261.25	-1,326.25	-2,708.60	1,837.50	2,961.28	0.00	0.00	0.00
9,100.00	90.00	181.09	6,261.25	-1,326.25	-2,808.58	1,835.60	3,059.75	0.00	0.00	0.00
9,200.00	90.00	181.09	6,261.25	-1,326.25	-2,908.56	1,833.70	3,158.23	0.00	0.00	0.00
9,300.00	90.00	181.09	6,261.25	-1,326.25	-3,008.54	1,831.80	3,256.70	0.00	0.00	0.00
9,400.00	90.00	181.09	6,261.25	-1,326.25	-3,108.53	1,829.90	3,355.17	0.00	0.00	0.00
9,500.00	90.00	181.09	6,261.25	-1,326.25	-3,208.51	1,828.00	3,453.64	0.00	0.00	0.00
9,600.00	90.00	181.09	6,261.25	-1,326.25	-3,308.49	1,826.11	3,552.11	0.00	0.00	0.00
9,700.00	90.00	181.09	6,261.25	-1,326.25	-3,408.47	1,824.21	3,650.59	0.00	0.00	0.00
9,800.00	90.00	181.09	6,261.25	-1,326.25	-3,508.45	1,822.31	3,749.06	0.00	0.00	0.00
9,900.00	90.00	181.09	6,261.25	-1,326.25	-3,608.44	1,820.41	3,847.53	0.00	0.00	0.00
10,000.00	90.00	181.09	6,261.25	-1,326.25	-3,708.42	1,818.51	3,946.00	0.00	0.00	0.00
10,100.00	90.00	181.09	6,261.25	-1,326.25	-3,808.40	1,816.61	4,044.47	0.00	0.00	0.00
10,200.00	90.00	181.09	6,261.25	-1,326.25	-3,908.38	1,814.71	4,142.94	0.00	0.00	0.00
10,300.00	90.00	181.09	6,261.25	-1,326.25	-4,008.36	1,812.81	4,241.42	0.00	0.00	0.00
10,400.00	90.00	181.09	6,261.25	-1,326.25	-4,108.35	1,810.92	4,339.89	0.00	0.00	0.00
10,500.00	90.00	181.09	6,261.25	-1,326.25	-4,208.33	1,809.02	4,438.36	0.00	0.00	0.00
10,600.00	90.00	181.09	6,261.25	-1,326.25	-4,308.31	1,807.12	4,536.83	0.00	0.00	0.00
10,700.00	90.00	181.09	6,261.25	-1,326.25	-4,408.29	1,805.22	4,635.30	0.00	0.00	0.00
10,800.00	90.00	181.09	6,261.25	-1,326.25	-4,508.27	1,803.32	4,733.77	0.00	0.00	0.00
10,900.00	90.00	181.09	6,261.25	-1,326.25	-4,608.26	1,801.42	4,832.25	0.00	0.00	0.00
11,000.00	90.00	181.09	6,261.25	-1,326.25	-4,708.24	1,799.52	4,930.72	0.00	0.00	0.00
11,100.00	90.00	181.09	6,261.25	-1,326.25	-4,808.22	1,797.62	5,029.19	0.00	0.00	0.00
11,200.00	90.00	181.09	6,261.25	-1,326.25	-4,908.20	1,795.72	5,127.66	0.00	0.00	0.00
11,300.00	90.00	181.09	6,261.25	-1,326.25	-5,008.18	1,793.83	5,226.13	0.00	0.00	0.00
11,400.00	90.00	181.09	6,261.25	-1,326.25	-5,108.17	1,791.93	5,324.60	0.00	0.00	0.00
11,500.00	90.00	181.09	6,261.25	-1,326.25	-5,208.15	1,790.03	5,423.08	0.00	0.00	0.00
11,600.00	90.00	181.09	6,261.25	-1,326.25	-5,308.13	1,788.13	5,521.55	0.00	0.00	0.00
11,700.00	90.00	181.09	6,261.25	-1,326.25	-5,408.11	1,786.23	5,620.02	0.00	0.00	0.00
11,800.00	90.00	181.09	6,261.25	-1,326.25	-5,508.09	1,784.33	5,718.49	0.00	0.00	0.00
11,900.00	90.00	181.09	6,261.25	-1,326.25	-5,608.08	1,782.43	5,816.96	0.00	0.00	0.00
12,000.00	90.00	181.09	6,261.25	-1,326.25	-5,708.06	1,780.53	5,915.44	0.00	0.00	0.00
12,100.00	90.00	181.09	6,261.25	-1,326.25	-5,808.04	1,778.63	6,013.91	0.00	0.00	0.00
12,200.00	90.00	181.09	6,261.25	-1,326.25	-5,908.02	1,776.74	6,112.38	0.00	0.00	0.00
12,300.00	90.00	181.09	6,261.25	-1,326.25	-6,008.00	1,774.84	6,210.85	0.00	0.00	0.00
12,400.00	90.00	181.09	6,261.25	-1,326.25	-6,107.99	1,772.94	6,309.32	0.00	0.00	0.00
12,500.00	90.00	181.09	6,261.25	-1,326.25	-6,207.97	1,771.04	6,407.79	0.00	0.00	0.00
12,600.00	90.00	181.09	6,261.25	-1,326.25	-6,307.95	1,769.14	6,506.27	0.00	0.00	0.00
12,700.00	90.00	181.09	6,261.25	-1,326.25	-6,407.93	1,767.24	6,604.74	0.00	0.00	0.00
12,800.00	90.00	181.09	6,261.25	-1,326.25	-6,507.91	1,765.34	6,703.21	0.00	0.00	0.00
12,900.00	90.00	181.09	6,261.25	-1,326.25	-6,607.90	1,763.44	6,801.68	0.00	0.00	0.00
13,000.00	90.00	181.09	6,261.25	-1,326.25	-6,707.88	1,761.55	6,900.15	0.00	0.00	0.00
13,100.00	90.00	181.09	6,261.25	-1,326.25	-6,807.86	1,759.65	6,998.62	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well PINTAIL FED 2-11-5HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4935.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4935.00usft
Site:	SE SW SEC. 35 T9N R60W 6TH P.M.	North Reference:	True
Well:	PINTAIL FED 2-11-5HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #4		

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	6,261.25	-1,326.25	-6,907.84	1,757.75	7,097.10	0.00	0.00	0.00
13,300.00	90.00	181.09	6,261.25	-1,326.25	-7,007.82	1,755.85	7,195.57	0.00	0.00	0.00
13,400.00	90.00	181.09	6,261.25	-1,326.25	-7,107.81	1,753.95	7,294.04	0.00	0.00	0.00
13,500.00	90.00	181.09	6,261.25	-1,326.25	-7,207.79	1,752.05	7,392.51	0.00	0.00	0.00
13,600.00	90.00	181.09	6,261.25	-1,326.25	-7,307.77	1,750.15	7,490.98	0.00	0.00	0.00
13,700.00	90.00	181.09	6,261.25	-1,326.25	-7,407.75	1,748.25	7,589.45	0.00	0.00	0.00
13,800.00	90.00	181.09	6,261.25	-1,326.25	-7,507.73	1,746.35	7,687.93	0.00	0.00	0.00
13,900.00	90.00	181.09	6,261.25	-1,326.25	-7,607.71	1,744.46	7,786.40	0.00	0.00	0.00
14,000.00	90.00	181.09	6,261.25	-1,326.25	-7,707.70	1,742.56	7,884.87	0.00	0.00	0.00
14,100.00	90.00	181.09	6,261.25	-1,326.25	-7,807.68	1,740.66	7,983.34	0.00	0.00	0.00
14,200.00	90.00	181.09	6,261.25	-1,326.25	-7,907.66	1,738.76	8,081.81	0.00	0.00	0.00
14,300.00	90.00	181.09	6,261.25	-1,326.25	-8,007.64	1,736.86	8,180.29	0.00	0.00	0.00
14,400.00	90.00	181.09	6,261.25	-1,326.25	-8,107.62	1,734.96	8,278.76	0.00	0.00	0.00
14,500.00	90.00	181.09	6,261.25	-1,326.25	-8,207.61	1,733.06	8,377.23	0.00	0.00	0.00
14,600.00	90.00	181.09	6,261.25	-1,326.25	-8,307.59	1,731.16	8,475.70	0.00	0.00	0.00
14,700.00	90.00	181.09	6,261.25	-1,326.25	-8,407.57	1,729.27	8,574.17	0.00	0.00	0.00
14,800.00	90.00	181.09	6,261.25	-1,326.25	-8,507.55	1,727.37	8,672.64	0.00	0.00	0.00
14,900.00	90.00	181.09	6,261.25	-1,326.25	-8,607.53	1,725.47	8,771.12	0.00	0.00	0.00
15,000.00	90.00	181.09	6,261.25	-1,326.25	-8,707.52	1,723.57	8,869.59	0.00	0.00	0.00
15,100.00	90.00	181.09	6,261.25	-1,326.25	-8,807.50	1,721.67	8,968.06	0.00	0.00	0.00
15,200.00	90.00	181.09	6,261.25	-1,326.25	-8,907.48	1,719.77	9,066.53	0.00	0.00	0.00
15,300.00	90.00	181.09	6,261.25	-1,326.25	-9,007.46	1,717.87	9,165.00	0.00	0.00	0.00
15,400.00	90.00	181.09	6,261.25	-1,326.25	-9,107.44	1,715.97	9,263.47	0.00	0.00	0.00
15,500.00	90.00	181.09	6,261.25	-1,326.25	-9,207.43	1,714.07	9,361.95	0.00	0.00	0.00
15,600.00	90.00	181.09	6,261.25	-1,326.25	-9,307.41	1,712.18	9,460.42	0.00	0.00	0.00
15,700.00	90.00	181.09	6,261.25	-1,326.25	-9,407.39	1,710.28	9,558.89	0.00	0.00	0.00
15,800.00	90.00	181.09	6,261.25	-1,326.25	-9,507.37	1,708.38	9,657.36	0.00	0.00	0.00
15,900.00	90.00	181.09	6,261.25	-1,326.25	-9,607.35	1,706.48	9,755.83	0.00	0.00	0.00
16,000.00	90.00	181.09	6,261.25	-1,326.25	-9,707.34	1,704.58	9,854.31	0.00	0.00	0.00
16,100.00	90.00	181.09	6,261.25	-1,326.25	-9,807.32	1,702.68	9,952.78	0.00	0.00	0.00
16,200.00	90.00	181.09	6,261.25	-1,326.25	-9,907.30	1,700.78	10,051.25	0.00	0.00	0.00
16,300.00	90.00	181.09	6,261.25	-1,326.25	-10,007.28	1,698.88	10,149.72	0.00	0.00	0.00
16,400.00	90.00	181.09	6,261.25	-1,326.25	-10,107.26	1,696.99	10,248.19	0.00	0.00	0.00
16,500.00	90.00	181.09	6,261.25	-1,326.25	-10,207.25	1,695.09	10,346.66	0.00	0.00	0.00
16,600.00	90.00	181.09	6,261.25	-1,326.25	-10,307.23	1,693.19	10,445.14	0.00	0.00	0.00
16,700.00	90.00	181.09	6,261.25	-1,326.25	-10,407.21	1,691.29	10,543.61	0.00	0.00	0.00
16,800.00	90.00	181.09	6,261.25	-1,326.25	-10,507.19	1,689.39	10,642.08	0.00	0.00	0.00
16,900.00	90.00	181.09	6,261.25	-1,326.25	-10,607.17	1,687.49	10,740.55	0.00	0.00	0.00
17,000.00	90.00	181.09	6,261.25	-1,326.25	-10,707.16	1,685.59	10,839.02	0.00	0.00	0.00
BHL: 300ft FSL & 2405ft FEL of Sec 11										
17,005.14	90.00	181.09	6,261.25	-1,326.25	-10,712.29	1,685.49	10,844.08	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well PINTAIL FED 2-11-5HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4935.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4935.00usft
Site:	SE SW SEC. 35 T9N R60W 6TH P.M.	North Reference:	True
Well:	PINTAIL FED 2-11-5HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #4		

Formations					
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,542.42	1,519.75	FOX HILLS BASE			
3,457.47	3,322.25	RICHARD SANDSTONE			
4,372.76	4,183.75	SUSSEX SANDSTONE			
4,891.23	4,671.75	SHANNON SANDSTONE			
6,446.53	6,096.25	SHARON SPRINGS			
6,553.39	6,161.75	NIOBRARA A CHALK			
6,588.93	6,180.25	NIOBRARA A CHALK BASE			
6,662.17	6,212.75	NIOBRARA B1 CHALK TOP			
6,739.09	6,238.25	NIOBRARA B1 CHALK BASE			
6,907.03	6,261.25	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: 333ft FSL & 1477ft FWL of Sec 35
500.00	500.00	0.00	0.00	START NUDGE (2°/100ft BUR)
1,487.06	1,467.65	-3.92	168.32	EOB TO 19.74° INC
1,579.87	1,555.00	-4.65	199.66	SURFACE CASING
6,007.86	5,722.75	-39.48	1,694.91	KOP (10°/100ft DGLG)
6,907.03	6,261.25	-616.01	1,877.24	HZ LP: 300ft FNL & 2405ft FEL of Sec 2
17,005.14	6,261.25	-10,712.29	1,685.49	BHL: 300ft FSL & 2405ft FEL of Sec 11