

MALLARD EXPLORATION

WELD COUNTY, COLORADO (NAD 83)

SE SW SEC. 31 T9N R59W 6th P.M.

SHULL FED 31-32-6HN

ORIGINAL WELLBORE

23 July, 2019

Plan: PROPOSAL #2





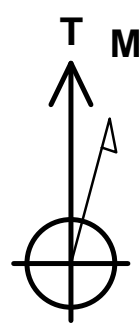
Project: WELD COUNTY, COLORADO (NAD 83)
Site: SE SW SEC. 31 T9N R59W 6th P.M.
Well: SHULL FED 31-32-6HN
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #2

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: 1209ft FSL & 1951ft FWL of Sec 31
1370.00	1370.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2°/100ft BUR)
1965.49	1969.86	12.00	42.96	45.79	42.64	46.59	62.57	EOB TO 12° INC
5740.31	5828.98	12.00	42.96	632.86	589.31	643.87	864.75	KOP (10°/100ft DGLG)
6226.00	6647.23	90.00	89.80	710.12	1156.18	1215.39	1442.38	LP: 1935ft FSL & 2182ft FEL of Sec 31
6226.00	13619.59	90.00	89.80	734.39	8128.50	8161.61	8414.74	BHL: 1935ft FSL & 460ft FEL of Sec 32

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
LP - SHULL FED 31-32-6HN (P2)	6226.00	710.12	1156.19	40.704525	-104.019114
BHL - SHULL FED 31-32-6HN (P2)	6226.00	734.39	8128.50	40.704588	-103.993967



Azimuths to True North
Magnetic North: 7.61°

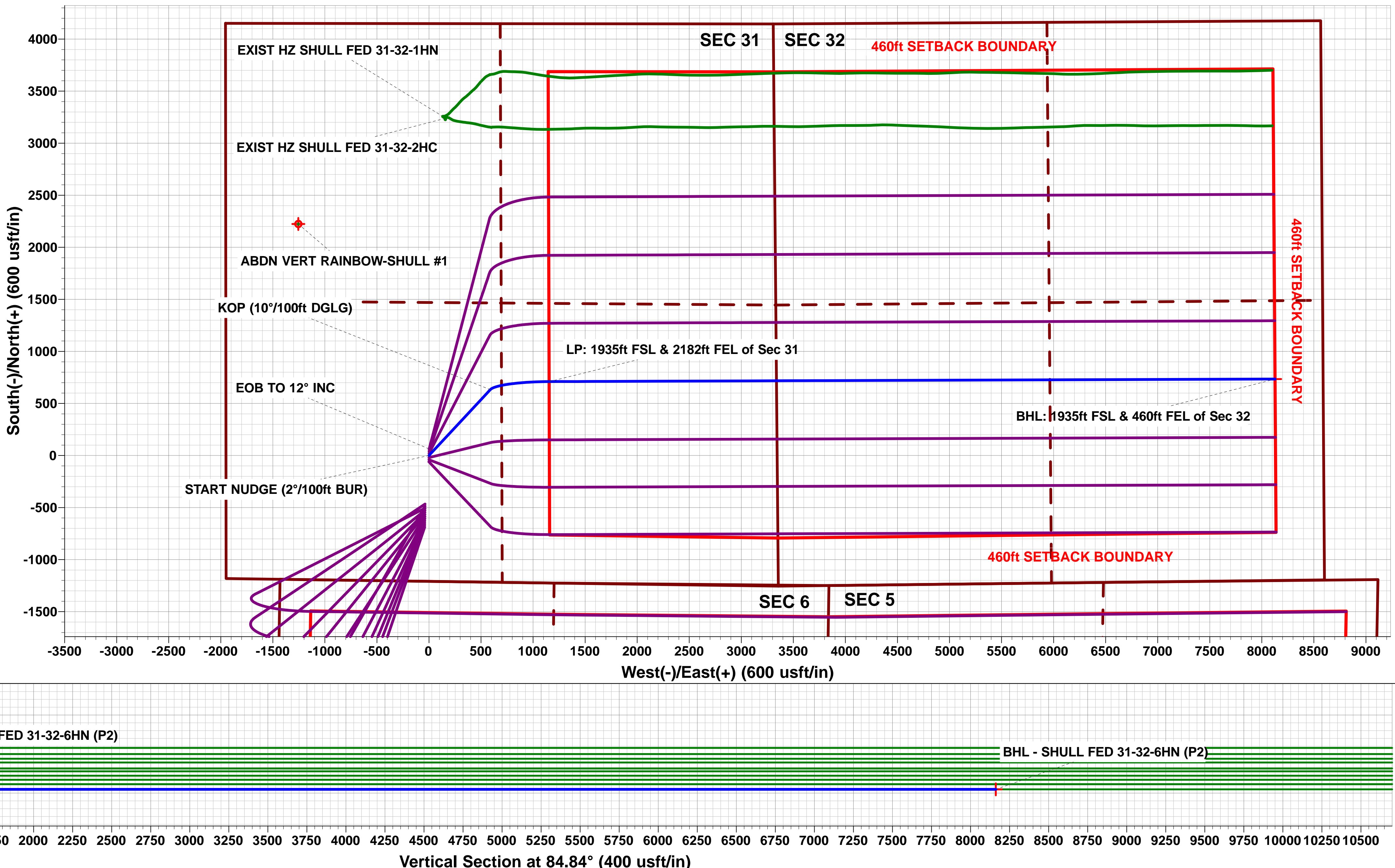
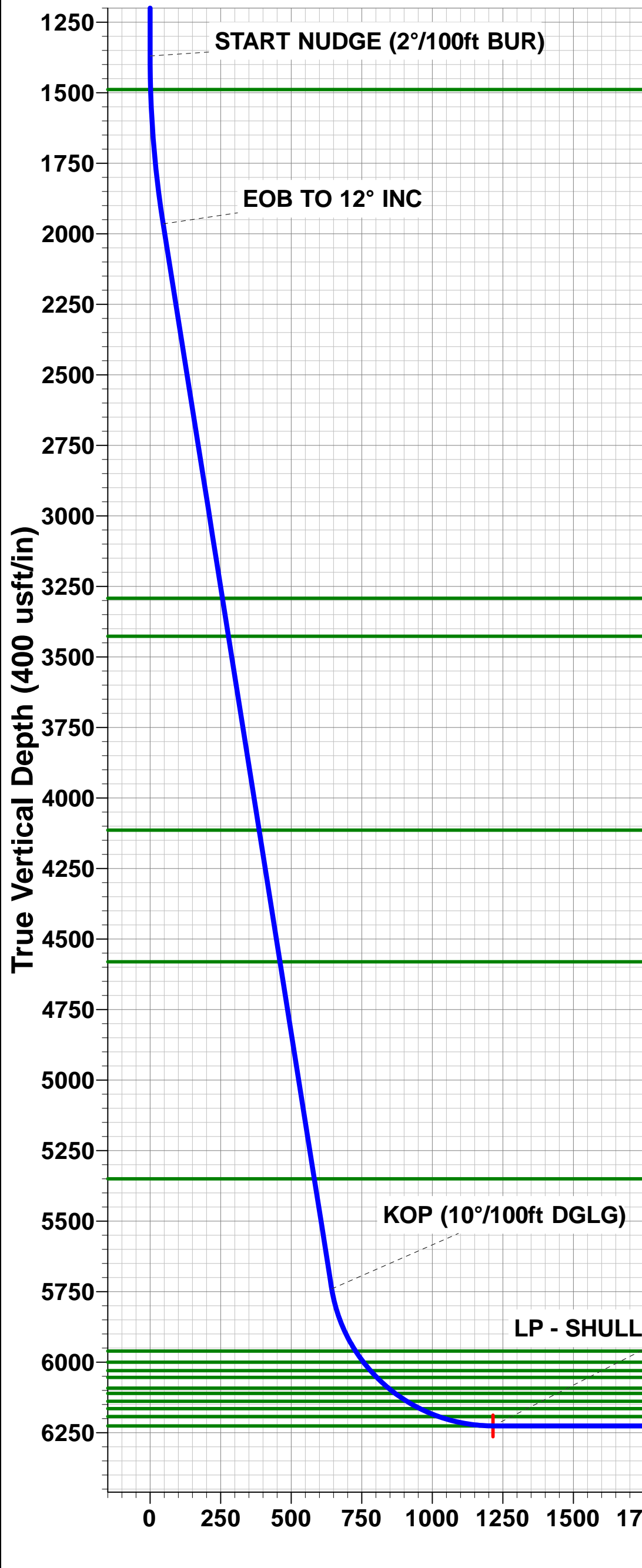
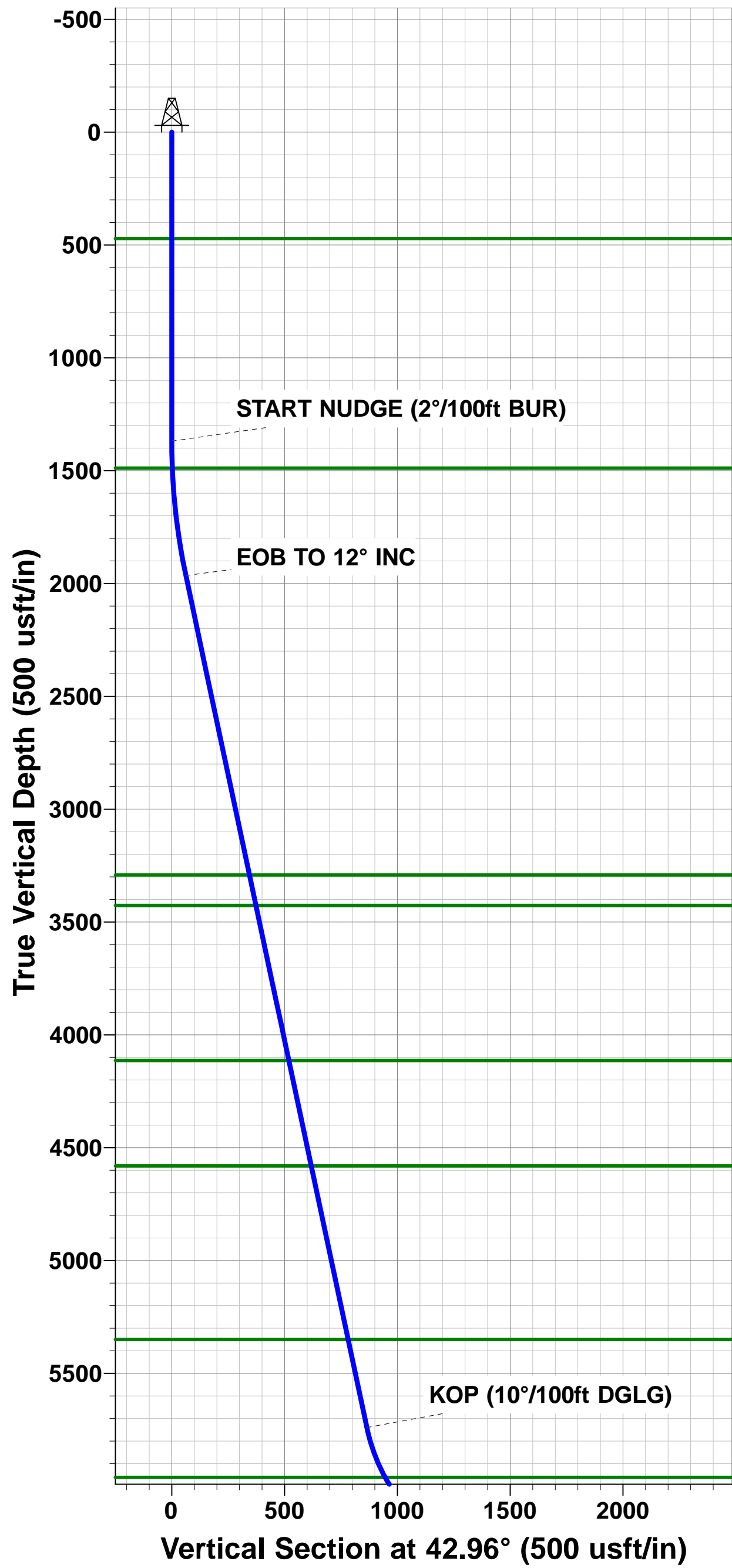
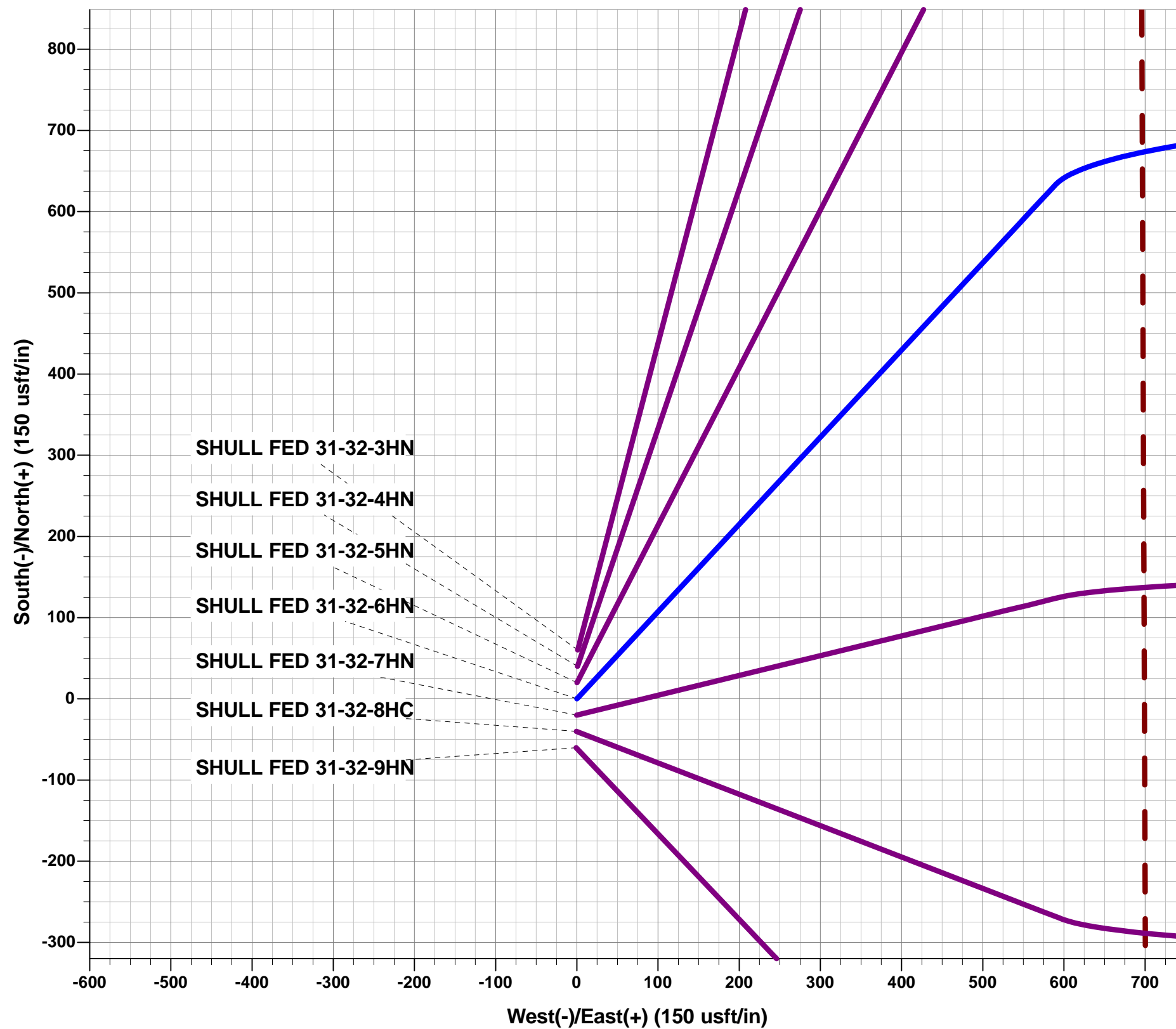
Magnetic Field
Strength: 52383.3snT
Dip Angle: 67.15°
Date: 22/07/2019
Model: IGRF2015

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
472.00	472.00	Fox Hills Base
1489.00	1489.03	Pierre Shale Top
3292.00	3326.00	Richard Sandstone
3427.00	3464.01	Parkman Sandstone
4114.00	4166.35	Sussex Sandstone
4581.00	4643.78	Shannon Sandstone
5350.00	5429.95	TeePee Buttes
5961.00	6068.62	Sharon Springs
6000.00	6116.54	Niobrara Top
6030.00	6155.54	Niobrara A Chalk
6054.00	6188.48	Niobrara A Chalk Base
6092.00	6244.82	Niobrara B1 Chalk Top
6111.00	6275.57	Niobrara B1 Chalk Base
6139.00	6325.39	Niobrara B2 Chalk Top
6165.00	6378.82	Niobrara B2 Chalk Base
6193.00	6450.65	Niobrara C Chalk Target Top
6226.00	6647.23	Niobrara C Chalk Target Center

PROPOSED LOCAL COORDINATES:

SHL: 1209ft FSL & 1951ft FWL of Sec 31
HZ LP: 1935ft FSL & 2185ft FEL of Sec 31
BHL: 1935ft FSL & 460ft FEL of Sec 32



Planning Report



Database:	Database 1	Local Co-ordinate Reference:	Well SHULL FED 31-32-6HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4902.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4902.00usft
Site:	SE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	SHULL FED 31-32-6HN	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	SE SW SEC. 31 T9N R59W 6th P.M.		
Site Position:		Northing:	1,501,513.53 usft
From:	Lat/Long	Easting:	3,409,242.57 usft
Position Uncertainty:	0.00 usft	Slot Radius:	1.10 ft
		Latitude:	40.700697
		Longitude:	-104.023987
		Grid Convergence:	0.95 °

Well	SHULL FED 31-32-6HN		
Well Position	+N-S	684.57 usft	Northing:
	+E-W	194.92 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	40.702576
		Longitude:	-104.023284
		Ground Level:	4,877.00 usft

Wellbore	ORIGINAL WELLBORE				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	22/07/2019	7.61	67.15	52,383

Design	PROPOSAL #2			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)
	5.00	0.00	0.00	84.84

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	-4,902.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,370.00	0.00	0.00	1,370.00	-3,532.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,969.86	12.00	42.96	1,965.49	-2,936.51	45.79	42.64	2.00	2.00	0.00	42.96	
5,828.98	12.00	42.96	5,740.31	838.31	632.85	589.31	0.00	0.00	0.00	0.00	
6,647.23	90.00	89.80	6,226.00	1,324.00	710.12	1,156.19	10.00	9.53	5.72	47.47	LP - SHULL FED 3'
13,619.59	90.00	89.80	6,226.00	1,324.00	734.38	8,128.50	0.00	0.00	0.00	0.00	BHL - SHULL FED

Planning Report



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Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4902.00usft
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Site:	SE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	SHULL FED 31-32-6HN	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: 1209ft FSL & 1951ft FWL of Sec 31										
0.00	0.00	0.00	0.00	4,902.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	4,802.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	4,702.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	4,602.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	4,502.00	0.00	0.00	0.00	0.00	0.00	0.00
Fox Hills Base										
472.00	0.00	0.00	472.00	4,430.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	4,402.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	4,302.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	4,202.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	4,102.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	4,002.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	3,902.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	3,802.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	3,702.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	3,602.00	0.00	0.00	0.00	0.00	0.00	0.00
START NUDGE (2°/100ft BUR)										
1,370.00	0.00	0.00	1,370.00	3,532.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.60	42.96	1,400.00	3,502.00	0.11	0.11	0.12	2.00	2.00	0.00
Pierre Shale Top										
1,489.03	2.38	42.96	1,489.00	3,413.00	1.81	1.69	1.84	2.00	2.00	0.00
1,500.00	2.60	42.96	1,499.96	3,402.04	2.16	2.01	2.20	2.00	2.00	0.00
1,600.00	4.60	42.96	1,599.75	3,302.25	6.75	6.29	6.87	2.00	2.00	0.00
1,700.00	6.60	42.96	1,699.27	3,202.73	13.89	12.94	14.14	2.00	2.00	0.00
1,800.00	8.60	42.96	1,798.39	3,103.61	23.57	21.95	23.98	2.00	2.00	0.00
1,900.00	10.60	42.96	1,896.98	3,005.02	35.78	33.32	36.40	2.00	2.00	0.00
EOB TO 12° INC										
1,969.86	12.00	42.96	1,965.49	2,936.51	45.79	42.64	46.59	2.00	2.00	0.00
2,000.00	12.00	42.96	1,994.97	2,907.03	50.38	46.91	51.26	0.00	0.00	0.00
2,100.00	12.00	42.96	2,092.78	2,809.22	65.59	61.08	66.73	0.00	0.00	0.00
2,200.00	12.00	42.96	2,190.60	2,711.40	80.80	75.24	82.21	0.00	0.00	0.00
2,300.00	12.00	42.96	2,288.42	2,613.58	96.02	89.41	97.69	0.00	0.00	0.00
2,400.00	12.00	42.96	2,386.23	2,515.77	111.23	103.58	113.16	0.00	0.00	0.00
2,500.00	12.00	42.96	2,484.05	2,417.95	126.44	117.74	128.64	0.00	0.00	0.00
2,600.00	12.00	42.96	2,581.86	2,320.14	141.65	131.91	144.12	0.00	0.00	0.00
2,700.00	12.00	42.96	2,679.68	2,222.32	156.86	146.07	159.59	0.00	0.00	0.00
2,800.00	12.00	42.96	2,777.49	2,124.51	172.08	160.24	175.07	0.00	0.00	0.00
2,900.00	12.00	42.96	2,875.31	2,026.69	187.29	174.40	190.55	0.00	0.00	0.00
3,000.00	12.00	42.96	2,973.13	1,928.87	202.50	188.57	206.03	0.00	0.00	0.00
3,100.00	12.00	42.96	3,070.94	1,831.06	217.71	202.74	221.50	0.00	0.00	0.00
3,200.00	12.00	42.96	3,168.76	1,733.24	232.93	216.90	236.98	0.00	0.00	0.00
3,300.00	12.00	42.96	3,266.57	1,635.43	248.14	231.07	252.46	0.00	0.00	0.00
Richard Sandstone										
3,326.00	12.00	42.96	3,292.00	1,610.00	252.09	234.75	256.48	0.00	0.00	0.00
3,400.00	12.00	42.96	3,364.39	1,537.61	263.35	245.23	267.93	0.00	0.00	0.00
Parkman Sandstone										
3,464.01	12.00	42.96	3,427.00	1,475.00	273.09	254.30	277.84	0.00	0.00	0.00
3,500.00	12.00	42.96	3,462.20	1,439.80	278.56	259.40	283.41	0.00	0.00	0.00
3,600.00	12.00	42.96	3,560.02	1,341.98	293.77	273.56	298.89	0.00	0.00	0.00
3,700.00	12.00	42.96	3,657.84	1,244.16	308.99	287.73	314.37	0.00	0.00	0.00
3,800.00	12.00	42.96	3,755.65	1,146.35	324.20	301.90	329.84	0.00	0.00	0.00
3,900.00	12.00	42.96	3,853.47	1,048.53	339.41	316.06	345.32	0.00	0.00	0.00

Planning Report



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Well:	SHULL FED 31-32-6HN	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)
4,000.00	12.00	42.96	3,951.28	950.72	354.62	330.23	360.80	0.00	0.00	0.00
4,100.00	12.00	42.96	4,049.10	852.90	369.84	344.39	376.27	0.00	0.00	0.00
Sussex Sandstone										
4,166.35	12.00	42.96	4,114.00	788.00	379.93	353.79	386.54	0.00	0.00	0.00
4,200.00	12.00	42.96	4,146.91	755.09	385.05	358.56	391.75	0.00	0.00	0.00
4,300.00	12.00	42.96	4,244.73	657.27	400.26	372.72	407.23	0.00	0.00	0.00
4,400.00	12.00	42.96	4,342.55	559.45	415.47	386.89	422.70	0.00	0.00	0.00
4,500.00	12.00	42.96	4,440.36	461.64	430.69	401.06	438.18	0.00	0.00	0.00
4,600.00	12.00	42.96	4,538.18	363.82	445.90	415.22	453.66	0.00	0.00	0.00
Shannon Sandstone										
4,643.78	12.00	42.96	4,581.00	321.00	452.56	421.42	460.43	0.00	0.00	0.00
4,700.00	12.00	42.96	4,635.99	266.01	461.11	429.39	469.14	0.00	0.00	0.00
4,800.00	12.00	42.96	4,733.81	168.19	476.32	443.55	484.61	0.00	0.00	0.00
4,900.00	12.00	42.96	4,831.62	70.38	491.53	457.72	500.09	0.00	0.00	0.00
5,000.00	12.00	42.96	4,929.44	-27.44	506.75	471.88	515.57	0.00	0.00	0.00
5,100.00	12.00	42.96	5,027.26	-125.26	521.96	486.05	531.04	0.00	0.00	0.00
5,200.00	12.00	42.96	5,125.07	-223.07	537.17	500.22	546.52	0.00	0.00	0.00
5,300.00	12.00	42.96	5,222.89	-320.89	552.38	514.38	562.00	0.00	0.00	0.00
5,400.00	12.00	42.96	5,320.70	-418.70	567.60	528.55	577.47	0.00	0.00	0.00
TeePee Buttes										
5,429.95	12.00	42.96	5,350.00	-448.00	572.15	532.79	582.11	0.00	0.00	0.00
5,500.00	12.00	42.96	5,418.52	-516.52	582.81	542.71	592.95	0.00	0.00	0.00
5,600.00	12.00	42.96	5,516.33	-614.33	598.02	556.88	608.43	0.00	0.00	0.00
5,700.00	12.00	42.96	5,614.15	-712.15	613.23	571.04	623.91	0.00	0.00	0.00
5,800.00	12.00	42.96	5,711.97	-809.97	628.44	585.21	639.38	0.00	0.00	0.00
KOP (10°/100ft DGLG)										
5,828.98	12.00	42.96	5,740.31	-838.31	632.85	589.31	643.87	0.00	0.00	0.00
5,900.00	17.58	60.51	5,808.99	-906.99	643.55	603.70	659.16	10.00	7.87	24.72
6,000.00	26.67	71.83	5,901.56	-999.56	658.02	638.26	694.88	10.00	9.09	11.31
Sharon Springs										
6,068.62	33.20	76.10	5,961.00	-1,059.00	667.35	671.17	728.49	10.00	9.51	6.22
6,100.00	36.22	77.58	5,986.80	-1,084.80	671.41	688.57	746.19	10.00	9.63	4.73
Niobrara Top										
6,116.54	37.82	78.28	6,000.00	-1,098.00	673.49	698.31	756.07	10.00	9.67	4.23
Niobrara A Chalk										
6,155.54	41.61	79.75	6,030.00	-1,128.00	678.22	722.77	780.86	10.00	9.71	3.76
Niobrara A Chalk Base										
6,188.48	44.82	80.83	6,054.00	-1,152.00	682.02	744.99	803.34	10.00	9.75	3.27
6,200.00	45.94	81.17	6,062.09	-1,160.09	683.30	753.09	811.52	10.00	9.77	3.02
Niobrara B1 Chalk Top										
6,244.82	50.33	82.41	6,092.00	-1,190.00	688.06	786.13	844.85	10.00	9.79	2.77
Niobrara B1 Chalk Base										
6,275.57	53.35	83.18	6,111.00	-1,209.00	691.08	810.11	869.01	10.00	9.81	2.48
6,300.00	55.74	83.74	6,125.17	-1,223.17	693.35	829.88	888.90	10.00	9.82	2.31
Niobrara B2 Chalk Top										
6,325.39	58.24	84.29	6,139.00	-1,237.00	695.57	851.05	910.19	10.00	9.83	2.18
Niobrara B2 Chalk Base										
6,378.82	63.50	85.37	6,165.00	-1,263.00	699.76	897.52	956.84	10.00	9.84	2.01
6,400.00	65.59	85.77	6,174.10	-1,272.10	701.24	916.58	975.96	10.00	9.86	1.88
Niobrara C Chalk Target Top										
6,450.65	70.58	86.67	6,193.00	-1,291.00	704.33	963.46	1,022.92	10.00	9.86	1.78
6,500.00	75.45	87.50	6,207.41	-1,305.41	706.73	1,010.58	1,070.07	10.00	9.87	1.68

Planning Report



Database:	Database 1	Local Co-ordinate Reference:	Well SHULL FED 31-32-6HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4902.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4902.00usft
Site:	SE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	SHULL FED 31-32-6HN	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)
6,600.00	85.33	89.08	6,224.08	-1,322.08	709.65	1,109.01	1,168.36	10.00	9.88	1.58
LP: 1935ft FSL & 2182ft FEL of Sec 31 - Niobrara C Chalk Target Center										
6,647.23	90.00	89.80	6,226.00	-1,324.00	710.12	1,156.19	1,215.39	10.00	9.88	1.54
6,700.00	90.00	89.80	6,226.00	-1,324.00	710.30	1,208.95	1,267.96	0.00	0.00	0.00
6,800.00	90.00	89.80	6,226.00	-1,324.00	710.65	1,308.95	1,367.59	0.00	0.00	0.00
6,900.00	90.00	89.80	6,226.00	-1,324.00	711.00	1,408.95	1,467.21	0.00	0.00	0.00
7,000.00	90.00	89.80	6,226.00	-1,324.00	711.34	1,508.95	1,566.84	0.00	0.00	0.00
7,100.00	90.00	89.80	6,226.00	-1,324.00	711.69	1,608.95	1,666.46	0.00	0.00	0.00
7,200.00	90.00	89.80	6,226.00	-1,324.00	712.04	1,708.95	1,766.09	0.00	0.00	0.00
7,300.00	90.00	89.80	6,226.00	-1,324.00	712.39	1,808.95	1,865.71	0.00	0.00	0.00
7,400.00	90.00	89.80	6,226.00	-1,324.00	712.74	1,908.95	1,965.34	0.00	0.00	0.00
7,500.00	90.00	89.80	6,226.00	-1,324.00	713.08	2,008.95	2,064.96	0.00	0.00	0.00
7,600.00	90.00	89.80	6,226.00	-1,324.00	713.43	2,108.95	2,164.59	0.00	0.00	0.00
7,700.00	90.00	89.80	6,226.00	-1,324.00	713.78	2,208.95	2,264.21	0.00	0.00	0.00
7,800.00	90.00	89.80	6,226.00	-1,324.00	714.13	2,308.95	2,363.84	0.00	0.00	0.00
7,900.00	90.00	89.80	6,226.00	-1,324.00	714.48	2,408.94	2,463.46	0.00	0.00	0.00
8,000.00	90.00	89.80	6,226.00	-1,324.00	714.82	2,508.94	2,563.09	0.00	0.00	0.00
8,100.00	90.00	89.80	6,226.00	-1,324.00	715.17	2,608.94	2,662.71	0.00	0.00	0.00
8,200.00	90.00	89.80	6,226.00	-1,324.00	715.52	2,708.94	2,762.34	0.00	0.00	0.00
8,300.00	90.00	89.80	6,226.00	-1,324.00	715.87	2,808.94	2,861.96	0.00	0.00	0.00
8,400.00	90.00	89.80	6,226.00	-1,324.00	716.22	2,908.94	2,961.59	0.00	0.00	0.00
8,500.00	90.00	89.80	6,226.00	-1,324.00	716.56	3,008.94	3,061.21	0.00	0.00	0.00
8,600.00	90.00	89.80	6,226.00	-1,324.00	716.91	3,108.94	3,160.84	0.00	0.00	0.00
8,700.00	90.00	89.80	6,226.00	-1,324.00	717.26	3,208.94	3,260.46	0.00	0.00	0.00
8,800.00	90.00	89.80	6,226.00	-1,324.00	717.61	3,308.94	3,360.09	0.00	0.00	0.00
8,900.00	90.00	89.80	6,226.00	-1,324.00	717.96	3,408.94	3,459.71	0.00	0.00	0.00
9,000.00	90.00	89.80	6,226.00	-1,324.00	718.31	3,508.94	3,559.34	0.00	0.00	0.00
9,100.00	90.00	89.80	6,226.00	-1,324.00	718.65	3,608.94	3,658.96	0.00	0.00	0.00
9,200.00	90.00	89.80	6,226.00	-1,324.00	719.00	3,708.94	3,758.59	0.00	0.00	0.00
9,300.00	90.00	89.80	6,226.00	-1,324.00	719.35	3,808.94	3,858.21	0.00	0.00	0.00
9,400.00	90.00	89.80	6,226.00	-1,324.00	719.70	3,908.94	3,957.84	0.00	0.00	0.00
9,500.00	90.00	89.80	6,226.00	-1,324.00	720.05	4,008.93	4,057.46	0.00	0.00	0.00
9,600.00	90.00	89.80	6,226.00	-1,324.00	720.39	4,108.93	4,157.09	0.00	0.00	0.00
9,700.00	90.00	89.80	6,226.00	-1,324.00	720.74	4,208.93	4,256.71	0.00	0.00	0.00
9,800.00	90.00	89.80	6,226.00	-1,324.00	721.09	4,308.93	4,356.34	0.00	0.00	0.00
9,900.00	90.00	89.80	6,226.00	-1,324.00	721.44	4,408.93	4,455.96	0.00	0.00	0.00
10,000.00	90.00	89.80	6,226.00	-1,324.00	721.79	4,508.93	4,555.59	0.00	0.00	0.00
10,100.00	90.00	89.80	6,226.00	-1,324.00	722.13	4,608.93	4,655.21	0.00	0.00	0.00
10,200.00	90.00	89.80	6,226.00	-1,324.00	722.48	4,708.93	4,754.84	0.00	0.00	0.00
10,300.00	90.00	89.80	6,226.00	-1,324.00	722.83	4,808.93	4,854.46	0.00	0.00	0.00
10,400.00	90.00	89.80	6,226.00	-1,324.00	723.18	4,908.93	4,954.09	0.00	0.00	0.00
10,500.00	90.00	89.80	6,226.00	-1,324.00	723.53	5,008.93	5,053.71	0.00	0.00	0.00
10,600.00	90.00	89.80	6,226.00	-1,324.00	723.87	5,108.93	5,153.34	0.00	0.00	0.00
10,700.00	90.00	89.80	6,226.00	-1,324.00	724.22	5,208.93	5,252.96	0.00	0.00	0.00
10,800.00	90.00	89.80	6,226.00	-1,324.00	724.57	5,308.93	5,352.59	0.00	0.00	0.00
10,900.00	90.00	89.80	6,226.00	-1,324.00	724.92	5,408.93	5,452.21	0.00	0.00	0.00
11,000.00	90.00	89.80	6,226.00	-1,324.00	725.27	5,508.93	5,551.84	0.00	0.00	0.00
11,100.00	90.00	89.80	6,226.00	-1,324.00	725.61	5,608.93	5,651.46	0.00	0.00	0.00
11,200.00	90.00	89.80	6,226.00	-1,324.00	725.96	5,708.92	5,751.09	0.00	0.00	0.00
11,300.00	90.00	89.80	6,226.00	-1,324.00	726.31	5,808.92	5,850.71	0.00	0.00	0.00
11,400.00	90.00	89.80	6,226.00	-1,324.00	726.66	5,908.92	5,950.34	0.00	0.00	0.00
11,500.00	90.00	89.80	6,226.00	-1,324.00	727.01	6,008.92	6,049.96	0.00	0.00	0.00
11,600.00	90.00	89.80	6,226.00	-1,324.00	727.36	6,108.92	6,149.59	0.00	0.00	0.00
11,700.00	90.00	89.80	6,226.00	-1,324.00	727.70	6,208.92	6,249.21	0.00	0.00	0.00

Planning Report



Database:	Database 1	Local Co-ordinate Reference:	Well SHULL FED 31-32-6HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4902.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4902.00usft
Site:	SE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	SHULL FED 31-32-6HN	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)
11,800.00	90.00	89.80	6,226.00	-1,324.00	728.05	6,308.92	6,348.84	0.00	0.00	0.00
11,900.00	90.00	89.80	6,226.00	-1,324.00	728.40	6,408.92	6,448.46	0.00	0.00	0.00
12,000.00	90.00	89.80	6,226.00	-1,324.00	728.75	6,508.92	6,548.09	0.00	0.00	0.00
12,100.00	90.00	89.80	6,226.00	-1,324.00	729.10	6,608.92	6,647.71	0.00	0.00	0.00
12,200.00	90.00	89.80	6,226.00	-1,324.00	729.44	6,708.92	6,747.34	0.00	0.00	0.00
12,300.00	90.00	89.80	6,226.00	-1,324.00	729.79	6,808.92	6,846.96	0.00	0.00	0.00
12,400.00	90.00	89.80	6,226.00	-1,324.00	730.14	6,908.92	6,946.59	0.00	0.00	0.00
12,500.00	90.00	89.80	6,226.00	-1,324.00	730.49	7,008.92	7,046.21	0.00	0.00	0.00
12,600.00	90.00	89.80	6,226.00	-1,324.00	730.84	7,108.92	7,145.84	0.00	0.00	0.00
12,700.00	90.00	89.80	6,226.00	-1,324.00	731.18	7,208.92	7,245.47	0.00	0.00	0.00
12,800.00	90.00	89.80	6,226.00	-1,324.00	731.53	7,308.91	7,345.09	0.00	0.00	0.00
12,900.00	90.00	89.80	6,226.00	-1,324.00	731.88	7,408.91	7,444.72	0.00	0.00	0.00
13,000.00	90.00	89.80	6,226.00	-1,324.00	732.23	7,508.91	7,544.34	0.00	0.00	0.00
13,100.00	90.00	89.80	6,226.00	-1,324.00	732.58	7,608.91	7,643.97	0.00	0.00	0.00
13,200.00	90.00	89.80	6,226.00	-1,324.00	732.92	7,708.91	7,743.59	0.00	0.00	0.00
13,300.00	90.00	89.80	6,226.00	-1,324.00	733.27	7,808.91	7,843.22	0.00	0.00	0.00
13,400.00	90.00	89.80	6,226.00	-1,324.00	733.62	7,908.91	7,942.84	0.00	0.00	0.00
13,500.00	90.00	89.80	6,226.00	-1,324.00	733.97	8,008.91	8,042.47	0.00	0.00	0.00
13,600.00	90.00	89.80	6,226.00	-1,324.00	734.32	8,108.91	8,142.09	0.00	0.00	0.00
BHL: 1935ft FSL & 460ft FEL of Sec 32										
13,619.59	90.00	89.80	6,226.00	-1,324.00	734.38	8,128.50	8,161.61	0.00	0.00	0.00

Formations						
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
472.00	472.00	Fox Hills Base				
1,489.03	1,489.00	Pierre Shale Top				
3,326.00	3,292.00	Richard Sandstone				
3,464.01	3,427.00	Parkman Sandstone				
4,166.35	4,114.00	Sussex Sandstone				
4,643.78	4,581.00	Shannon Sandstone				
5,429.95	5,350.00	TeePee Buttes				
6,068.62	5,961.00	Sharon Springs				
6,116.54	6,000.00	Niobrara Top				
6,155.54	6,030.00	Niobrara A Chalk				
6,188.48	6,054.00	Niobrara A Chalk Base				
6,244.82	6,092.00	Niobrara B1 Chalk Top				
6,275.57	6,111.00	Niobrara B1 Chalk Base				
6,325.39	6,139.00	Niobrara B2 Chalk Top				
6,378.82	6,165.00	Niobrara B2 Chalk Base				
6,450.65	6,193.00	Niobrara C Chalk Target Top				
6,647.23	6,226.00	Niobrara C Chalk Target Center				

Planning Report



Database:	Database 1	Local Co-ordinate Reference:	Well SHULL FED 31-32-6HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4902.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4902.00usft
Site:	SE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	SHULL FED 31-32-6HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #2		

Plan Annotations				
Local Coordinates				
MD (usft)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Comment
0.00	0.00	0.00	0.00	SHL: 1209ft FSL & 1951ft FWL of Sec 31
1,370.00	1,370.00	0.00	0.00	START NUDGE (2°/100ft BUR)
1,969.86	1,965.49	45.79	42.64	EOB TO 12° INC
5,828.98	5,740.31	632.85	589.31	KOP (10°/100ft DGLG)
6,647.23	6,226.00	710.12	1,156.18	LP: 1935ft FSL & 2182ft FEL of Sec 31
13,619.59	6,226.00	734.38	8,128.50	BHL: 1935ft FSL & 460ft FEL of Sec 32