



MALLARD EXPLORATION

WELD COUNTY, COLORADO (NAD 83)

NE NW SEC. 29 T8N R60W 6th P.M.

SHOVELER FED 29-30-1HN

ORIGINAL WELLBORE

08 October, 2019

Plan: PROPOSAL #1





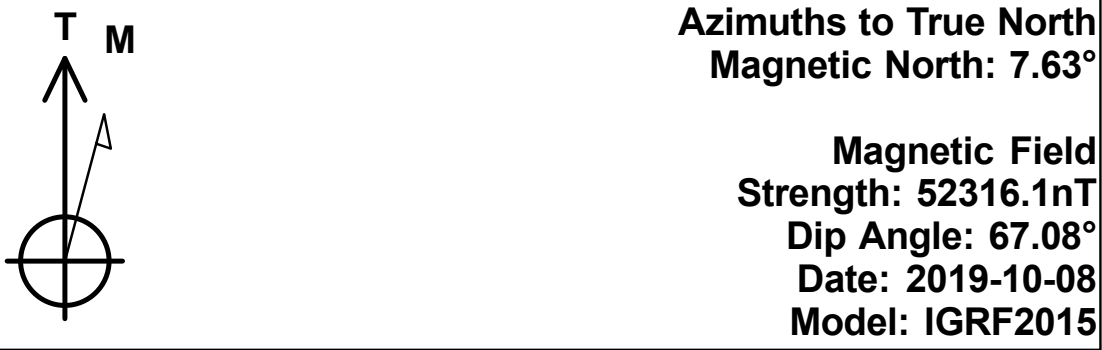
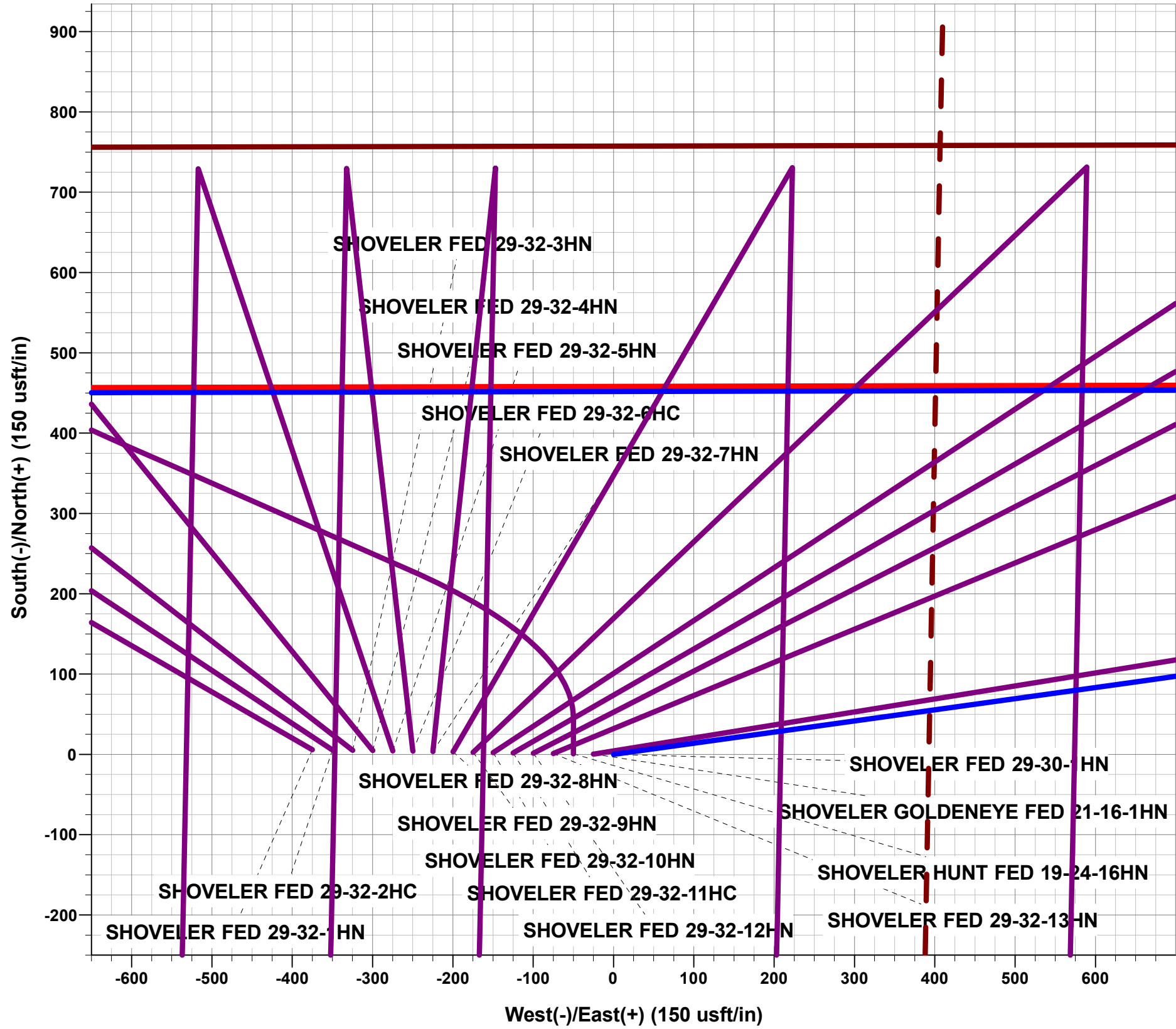
Project: WELD COUNTY, COLORADO (NAD 83)
Site: NE NW SEC. 29 T8N R60W 6th P.M.
Well: SHOVELER FED 29-30-1HN
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #1

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSect	Dep	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	SHL: 757ft FNL & 2247ft FWL of Sec 29
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	START NUDGE (3.5°/100ft BUR)
1130.73	36.08	82.09	1063.96	43.17	310.93	-307.76	313.91	EOB TO 36.08° INC
5737.17	36.08	82.09	4787.08	416.25	2997.66	-2967.12	3026.42	END OF TANGENT
6767.90	0.00	0.00	5751.04	459.42	3308.59	-3274.88	3340.33	EOD TO VERTICAL
6867.90	0.00	0.00	5851.04	459.42	3308.59	-3274.88	3340.33	KOP (10°/100ft BUR)
7767.91	90.00	269.87	6424.00	458.12	2735.63	-2703.04	3913.30	LP: 305ft FNL & 300ft FEL of Sec 29
17713.00	90.00	269.87	6424.00	435.34	-7209.44	7222.57	13858.39	BHL: 305ft FNL & 300ft FWL of Sec 30

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP - SHOVELER FED 29-30-1HN	5851.04	459.42	3308.59	40.639696	-104.105360
LP - SHOVELER FED 29-30-1HN	6424.00	458.12	2735.63	40.639693	-104.107425
BHL - SHOVELER FED 29-30-1HN	6424.00	435.34	-7209.44	40.639628	-104.143259

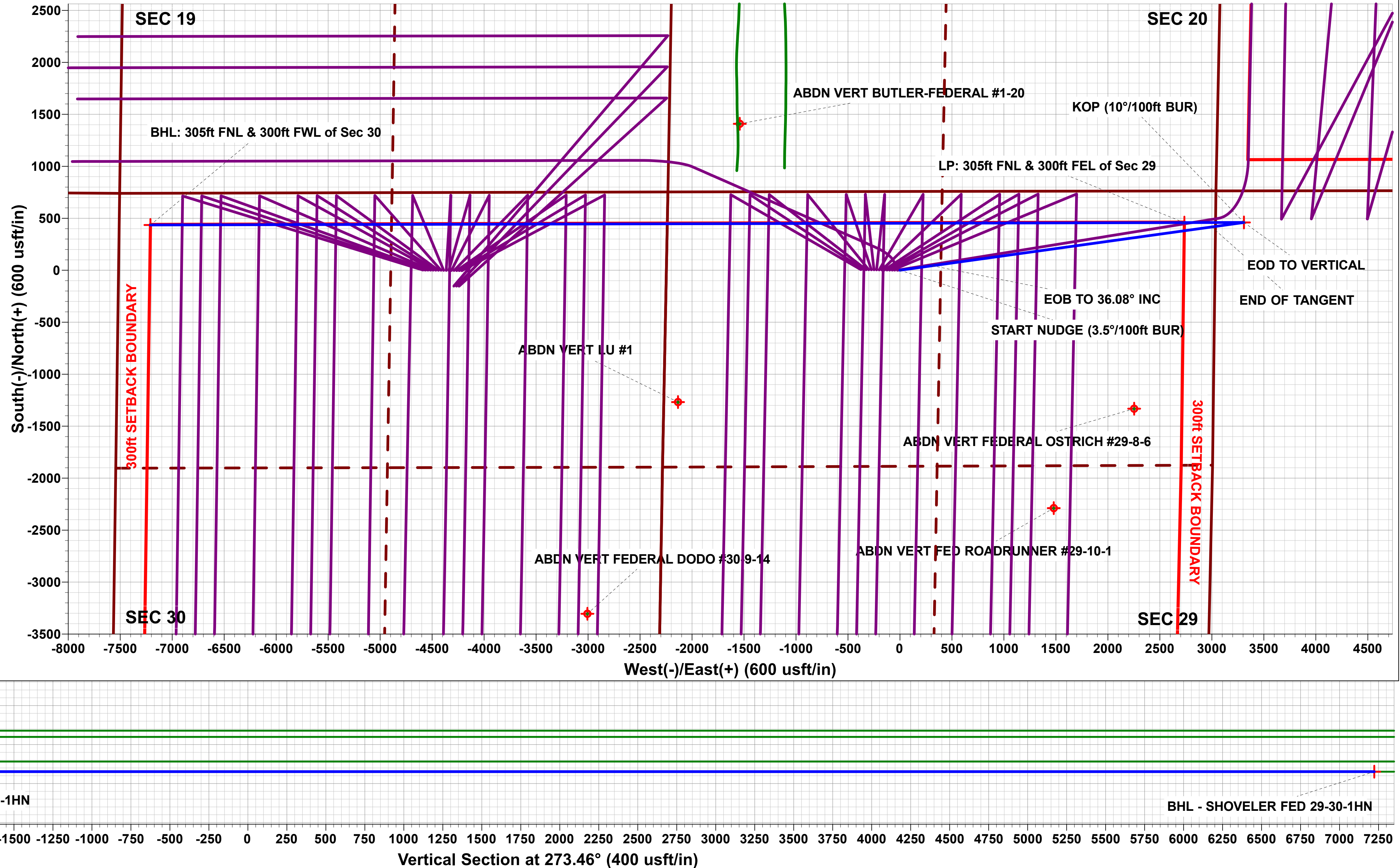
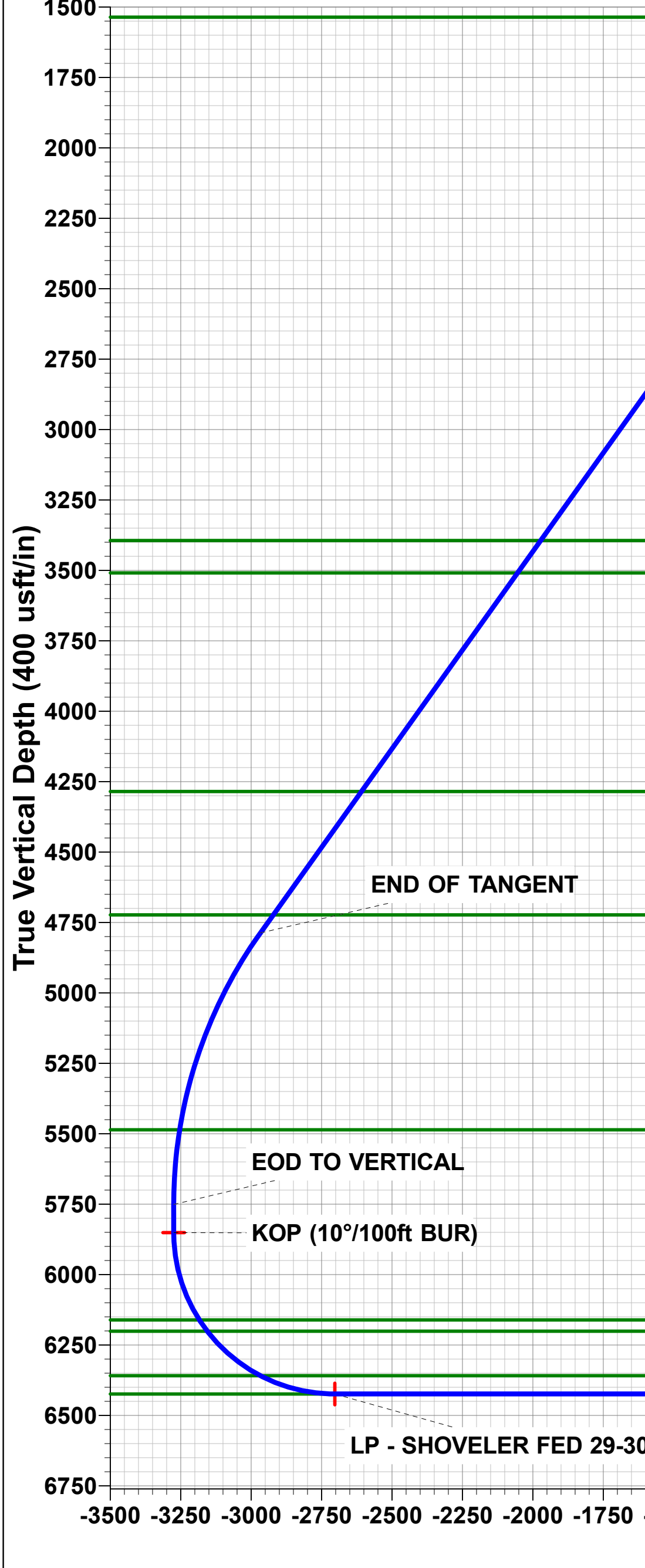
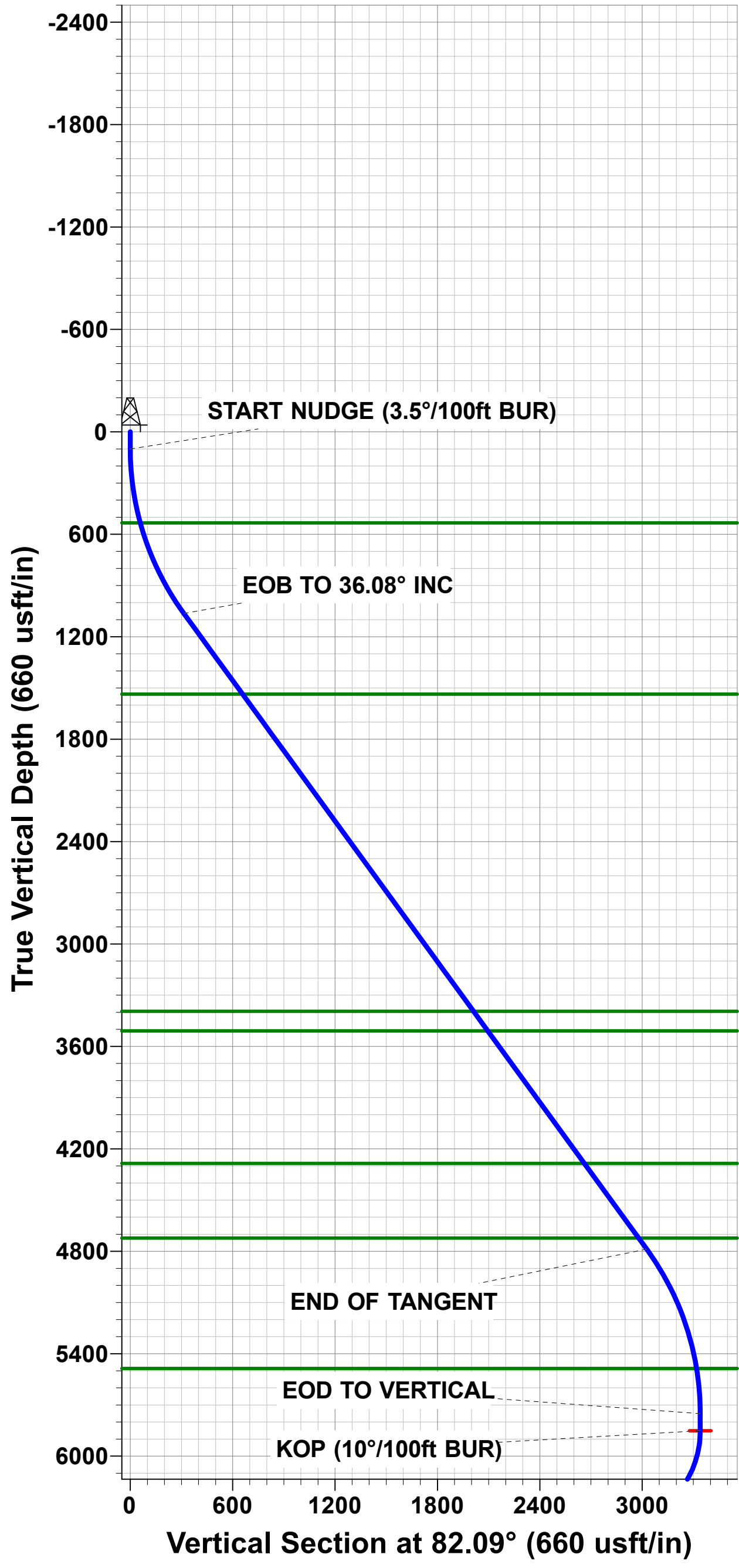


FORMATION TOP DETAILS

TVDPath	MDPath	Formation
533.00	538.21	Fox Hills Base
1536.00	1714.76	Pierre Shale Top
3394.00	4013.58	Richard Sandstone
3509.00	4155.86	Parkman Sandstone
4285.00	5115.97	Sussex Sandstone
4723.00	5657.89	Shannon Sandstone
5486.00	6501.69	TeePee Buttes
6161.00	7195.40	Sharon Springs
6201.00	7244.37	Niobrara Top
6359.00	7492.33	Niobrara B2 Chalk Top
6424.00	7767.91	Niobrara C Chalk Target Top

PROPOSED LOCAL COORDINATES:

SHL: 757ft FNL & 2247ft FWL of Sec 29
HZ LP: 305ft FNL & 300ft FEL of Sec 29
BHL: 305ft FNL & 300ft FWL of Sec 30



Planning Report

Database:	Database 1	Local Co-ordinate Reference:	Well SHOVELER FED 29-30-1HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4972.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4972.00usft
Site:	NE NW SEC. 29 T8N R60W 6th P.M.	North Reference:	True
Well:	SHOVELER FED 29-30-1HN	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	NE NW SEC. 29 T8N R60W 6th P.M.		
Site Position:		Northing:	1,478,416.23 usft
From:	Lat/Long	Easting:	3,383,356.26 usft
Position Uncertainty:	0.00 usft	Slot Radius:	1.10 ft
		Latitude:	40.638452
		Longitude:	-104.118633
		Grid Convergence:	0.89 °

Well	SHOVELER FED 29-30-1HN					
Well Position	+N/-S	-5.83 usft	Northing:	1,478,416.24 usfl	Latitude:	40.638436
	+E/-W	374.95 usft	Easting:	3,383,731.25 usfl	Longitude:	-104.117282
Position Uncertainty		0.00 usft	Wellhead Elevation:	usfl	Ground Level:	4,947.00 usft

Wellbore	ORIGINAL WELLBORE				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	2019-10-08	7.63	67.08	52,316.14202549

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 (°)
	6,424.00	0.00	0.00	273.46

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	-4,972.00	0.00	0.00	0.00	0.00	0.00	0.00	
100.00	0.00	0.00	100.00	-4,872.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,130.73	36.08	82.09	1,063.96	-3,908.04	43.17	310.93	3.50	3.50	0.00	82.09	
5,737.17	36.08	82.09	4,787.08	-184.92	416.25	2,997.66	0.00	0.00	0.00	0.00	
6,767.90	0.00	0.00	5,751.04	779.04	459.42	3,308.59	3.50	-3.50	0.00	180.00	
6,867.90	0.00	0.00	5,851.04	879.04	459.42	3,308.59	0.00	0.00	0.00	0.00	KOP - SHOVELER
7,767.91	90.00	269.87	6,424.00	1,452.00	458.12	2,735.63	10.00	10.00	-10.01	269.87	LP - SHOVELER FI
17,713.00	90.00	269.87	6,424.00	1,452.00	435.34	-7,209.44	0.00	0.00	0.00	0.00	BHL - SHOVELER

Planning Report

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Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4972.00usft
Site:	NE NW SEC. 29 T8N R60W 6th P.M.	North Reference:	True
Well:	SHOVELER FED 29-30-1HN	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: 757ft FNL & 2247ft FWL of Sec 29										
0.00	0.00	0.00	0.00	4,972.00	0.00	0.00	0.00	0.00	0.00	0.00
START NUDGE (3.5°/100ft BUR)										
100.00	0.00	0.00	100.00	4,872.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	3.50	82.09	199.94	4,772.06	0.42	3.02	-2.99	3.50	3.50	0.00
300.00	7.00	82.09	299.50	4,672.50	1.68	12.09	-11.96	3.50	3.50	0.00
400.00	10.50	82.09	398.32	4,573.68	3.77	27.15	-26.87	3.50	3.50	0.00
500.00	14.00	82.09	496.03	4,475.97	6.69	48.16	-47.67	3.50	3.50	0.00
Fox Hills Base										
538.21	15.34	82.09	533.00	4,439.00	8.02	57.75	-57.16	3.50	3.50	0.00
600.00	17.50	82.09	592.26	4,379.74	10.42	75.05	-74.28	3.50	3.50	0.00
700.00	21.00	82.09	686.66	4,285.34	14.95	107.70	-106.60	3.50	3.50	0.00
800.00	24.50	82.09	778.86	4,193.14	20.27	145.99	-144.51	3.50	3.50	0.00
900.00	28.00	82.09	868.54	4,103.46	26.35	189.80	-187.86	3.50	3.50	0.00
1,000.00	31.50	82.09	955.34	4,016.66	33.18	238.94	-236.50	3.50	3.50	0.00
1,100.00	35.00	82.09	1,038.96	3,933.04	40.72	293.24	-290.25	3.50	3.50	0.00
EOB TO 36.08° INC										
1,130.73	36.08	82.09	1,063.96	3,908.04	43.17	310.93	-307.76	3.50	3.50	0.00
1,200.00	36.08	82.09	1,119.95	3,852.05	48.78	351.33	-347.75	0.00	0.00	0.00
1,300.00	36.08	82.09	1,200.77	3,771.23	56.88	409.66	-405.48	0.00	0.00	0.00
1,400.00	36.08	82.09	1,281.60	3,690.40	64.98	467.98	-463.22	0.00	0.00	0.00
1,500.00	36.08	82.09	1,362.42	3,609.58	73.08	526.31	-520.95	0.00	0.00	0.00
1,600.00	36.08	82.09	1,443.25	3,528.75	81.18	584.63	-578.68	0.00	0.00	0.00
1,700.00	36.08	82.09	1,524.07	3,447.93	89.28	642.96	-636.41	0.00	0.00	0.00
Pierre Shale Top										
1,714.76	36.08	82.09	1,536.00	3,436.00	90.47	651.57	-644.93	0.00	0.00	0.00
1,800.00	36.08	82.09	1,604.89	3,367.11	97.38	701.29	-694.14	0.00	0.00	0.00
1,900.00	36.08	82.09	1,685.72	3,286.28	105.48	759.61	-751.87	0.00	0.00	0.00
2,000.00	36.08	82.09	1,766.54	3,205.46	113.58	817.94	-809.60	0.00	0.00	0.00
2,100.00	36.08	82.09	1,847.37	3,124.63	121.67	876.26	-867.33	0.00	0.00	0.00
2,200.00	36.08	82.09	1,928.19	3,043.81	129.77	934.59	-925.07	0.00	0.00	0.00
2,300.00	36.08	82.09	2,009.02	2,962.98	137.87	992.91	-982.80	0.00	0.00	0.00
2,400.00	36.08	82.09	2,089.84	2,882.16	145.97	1,051.24	-1,040.53	0.00	0.00	0.00
2,500.00	36.08	82.09	2,170.66	2,801.34	154.07	1,109.56	-1,098.26	0.00	0.00	0.00
2,600.00	36.08	82.09	2,251.49	2,720.51	162.17	1,167.89	-1,155.99	0.00	0.00	0.00
2,700.00	36.08	82.09	2,332.31	2,639.69	170.27	1,226.22	-1,213.72	0.00	0.00	0.00
2,800.00	36.08	82.09	2,413.14	2,558.86	178.37	1,284.54	-1,271.45	0.00	0.00	0.00
2,900.00	36.08	82.09	2,493.96	2,478.04	186.47	1,342.87	-1,329.19	0.00	0.00	0.00
3,000.00	36.08	82.09	2,574.78	2,397.22	194.56	1,401.19	-1,386.92	0.00	0.00	0.00
3,100.00	36.08	82.09	2,655.61	2,316.39	202.66	1,459.52	-1,444.65	0.00	0.00	0.00
3,200.00	36.08	82.09	2,736.43	2,235.57	210.76	1,517.84	-1,502.38	0.00	0.00	0.00
3,300.00	36.08	82.09	2,817.26	2,154.74	218.86	1,576.17	-1,560.11	0.00	0.00	0.00
3,400.00	36.08	82.09	2,898.08	2,073.92	226.96	1,634.49	-1,617.84	0.00	0.00	0.00
3,500.00	36.08	82.09	2,978.90	1,993.10	235.06	1,692.82	-1,675.57	0.00	0.00	0.00
3,600.00	36.08	82.09	3,059.73	1,912.27	243.16	1,751.14	-1,733.30	0.00	0.00	0.00
3,700.00	36.08	82.09	3,140.55	1,831.45	251.26	1,809.47	-1,791.04	0.00	0.00	0.00
3,800.00	36.08	82.09	3,221.38	1,750.62	259.36	1,867.80	-1,848.77	0.00	0.00	0.00
3,900.00	36.08	82.09	3,302.20	1,669.80	267.45	1,926.12	-1,906.50	0.00	0.00	0.00
4,000.00	36.08	82.09	3,383.03	1,588.97	275.55	1,984.45	-1,964.23	0.00	0.00	0.00
Richard Sandstone										
4,013.58	36.08	82.09	3,394.00	1,578.00	276.65	1,992.37	-1,972.07	0.00	0.00	0.00
4,100.00	36.08	82.09	3,463.85	1,508.15	283.65	2,042.77	-2,021.96	0.00	0.00	0.00
Parkman Sandstone										

Planning Report

Database:	Database 1	Local Co-ordinate Reference:	Well SHOVELER FED 29-30-1HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4972.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4972.00usft
Site:	NE NW SEC. 29 T8N R60W 6th P.M.	North Reference:	True
Well:	SHOVELER FED 29-30-1HN	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)
4,155.86	36.08	82.09	3,509.00	1,463.00	288.18	2,075.35	-2,054.21	0.00	0.00	0.00
4,200.00	36.08	82.09	3,544.67	1,427.33	291.75	2,101.10	-2,079.69	0.00	0.00	0.00
4,300.00	36.08	82.09	3,625.50	1,346.50	299.85	2,159.42	-2,137.42	0.00	0.00	0.00
4,400.00	36.08	82.09	3,706.32	1,265.68	307.95	2,217.75	-2,195.16	0.00	0.00	0.00
4,500.00	36.08	82.09	3,787.15	1,184.85	316.05	2,276.07	-2,252.89	0.00	0.00	0.00
4,600.00	36.08	82.09	3,867.97	1,104.03	324.15	2,334.40	-2,310.62	0.00	0.00	0.00
4,700.00	36.08	82.09	3,948.79	1,023.21	332.25	2,392.73	-2,368.35	0.00	0.00	0.00
4,800.00	36.08	82.09	4,029.62	942.38	340.34	2,451.05	-2,426.08	0.00	0.00	0.00
4,900.00	36.08	82.09	4,110.44	861.56	348.44	2,509.38	-2,483.81	0.00	0.00	0.00
5,000.00	36.08	82.09	4,191.27	780.73	356.54	2,567.70	-2,541.54	0.00	0.00	0.00
5,100.00	36.08	82.09	4,272.09	699.91	364.64	2,626.03	-2,599.27	0.00	0.00	0.00
Sussex Sandstone										
5,115.97	36.08	82.09	4,285.00	687.00	365.94	2,635.34	-2,608.50	0.00	0.00	0.00
5,200.00	36.08	82.09	4,352.92	619.08	372.74	2,684.35	-2,657.01	0.00	0.00	0.00
5,300.00	36.08	82.09	4,433.74	538.26	380.84	2,742.68	-2,714.74	0.00	0.00	0.00
5,400.00	36.08	82.09	4,514.56	457.44	388.94	2,801.00	-2,772.47	0.00	0.00	0.00
5,500.00	36.08	82.09	4,595.39	376.61	397.04	2,859.33	-2,830.20	0.00	0.00	0.00
5,600.00	36.08	82.09	4,676.21	295.79	405.14	2,917.66	-2,887.93	0.00	0.00	0.00
Shannon Sandstone										
5,657.89	36.08	82.09	4,723.00	249.00	409.82	2,951.42	-2,921.35	0.00	0.00	0.00
5,700.00	36.08	82.09	4,757.04	214.96	413.24	2,975.98	-2,945.66	0.00	0.00	0.00
END OF TANGENT										
5,737.17	36.08	82.09	4,787.08	184.92	416.25	2,997.66	-2,967.12	0.00	0.00	0.00
5,800.00	33.88	82.09	4,838.56	133.44	421.20	3,033.33	-3,002.43	3.50	-3.50	0.00
5,900.00	30.38	82.09	4,923.23	48.77	428.51	3,086.00	-3,054.56	3.50	-3.50	0.00
6,000.00	26.88	82.09	5,010.99	-38.99	435.10	3,133.44	-3,101.52	3.50	-3.50	0.00
6,100.00	23.38	82.09	5,101.52	-129.52	440.94	3,175.50	-3,143.15	3.50	-3.50	0.00
6,200.00	19.88	82.09	5,194.46	-222.46	446.01	3,212.00	-3,179.27	3.50	-3.50	0.00
6,300.00	16.38	82.09	5,289.49	-317.49	450.29	3,242.81	-3,209.77	3.50	-3.50	0.00
6,400.00	12.88	82.09	5,386.23	-414.23	453.76	3,267.81	-3,234.52	3.50	-3.50	0.00
6,500.00	9.38	82.09	5,484.34	-512.34	456.41	3,286.93	-3,253.44	3.50	-3.50	0.00
TeePee Buttes										
6,501.69	9.32	82.09	5,486.00	-514.00	456.45	3,287.20	-3,253.71	3.50	-3.50	0.00
6,600.00	5.88	82.09	5,583.44	-611.44	458.24	3,300.07	-3,266.45	3.50	-3.50	0.00
6,700.00	2.38	82.09	5,683.16	-711.16	459.23	3,307.20	-3,273.50	3.50	-3.50	0.00
EOD TO VERTICAL										
6,767.90	0.00	0.00	5,751.04	-779.04	459.42	3,308.59	-3,274.88	3.50	-3.50	0.00
6,800.00	0.00	0.00	5,783.14	-811.14	459.42	3,308.59	-3,274.88	0.00	0.00	0.00
KOP (10°/100ft BUR)										
6,867.90	0.00	0.00	5,851.04	-879.04	459.42	3,308.59	-3,274.88	0.00	0.00	0.00
6,900.00	3.21	269.87	5,883.12	-911.12	459.42	3,307.69	-3,273.99	10.00	10.00	0.00
7,000.00	13.21	269.87	5,981.97	-1,009.97	459.39	3,293.43	-3,259.75	10.00	10.00	0.00
7,100.00	23.21	269.87	6,076.85	-1,104.85	459.31	3,262.22	-3,228.60	10.00	10.00	0.00
Sharon Springs										
7,195.40	32.75	269.87	6,161.00	-1,189.00	459.21	3,217.51	-3,183.98	10.00	10.00	0.00
7,200.00	33.21	269.87	6,164.86	-1,192.86	459.21	3,215.01	-3,181.48	10.00	10.00	0.00
Niobrara Top										
7,244.37	37.65	269.87	6,201.00	-1,229.00	459.15	3,189.29	-3,155.82	10.00	10.00	0.00
7,300.00	43.21	269.87	6,243.33	-1,271.33	459.07	3,153.23	-3,119.83	10.00	10.00	0.00
7,400.00	53.21	269.87	6,309.89	-1,337.89	458.90	3,078.77	-3,045.51	10.00	10.00	0.00
Niobrara B2 Chalk Top										
7,492.33	62.44	269.87	6,359.00	-1,387.00	458.72	3,000.70	-2,967.59	10.00	10.00	0.00
7,500.00	63.21	269.87	6,362.50	-1,390.50	458.71	2,993.88	-2,960.79	10.00	10.00	0.00

Planning Report

Database:	Database 1	Local Co-ordinate Reference:	Well SHOVELER FED 29-30-1HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4972.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4972.00usft
Site:	NE NW SEC. 29 T8N R60W 6th P.M.	North Reference:	True
Well:	SHOVELER FED 29-30-1HN	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)
7,600.00	73.21	269.87	6,399.57	-1,427.57	458.49	2,901.14	-2,868.23	10.00	10.00	0.00
7,700.00	83.21	269.87	6,419.98	-1,447.98	458.27	2,803.37	-2,770.65	10.00	10.00	0.00
LP: 305ft FNL & 300ft FEL of Sec 29 - Niobrara C Chalk Target Top										
7,767.91	90.00	269.87	6,424.00	-1,452.00	458.12	2,735.63	-2,703.04	10.00	10.00	0.00
7,800.00	90.00	269.87	6,424.00	-1,452.00	458.05	2,703.53	-2,671.01	0.00	0.00	0.00
7,900.00	90.00	269.87	6,424.00	-1,452.00	457.82	2,603.53	-2,571.20	0.00	0.00	0.00
8,000.00	90.00	269.87	6,424.00	-1,452.00	457.59	2,503.53	-2,471.40	0.00	0.00	0.00
8,100.00	90.00	269.87	6,424.00	-1,452.00	457.36	2,403.53	-2,371.60	0.00	0.00	0.00
8,200.00	90.00	269.87	6,424.00	-1,452.00	457.14	2,303.53	-2,271.79	0.00	0.00	0.00
8,300.00	90.00	269.87	6,423.99	-1,451.99	456.91	2,203.53	-2,171.99	0.00	0.00	0.00
8,400.00	90.00	269.87	6,423.99	-1,451.99	456.68	2,103.54	-2,072.18	0.00	0.00	0.00
8,500.00	90.00	269.87	6,423.99	-1,451.99	456.46	2,003.54	-1,972.38	0.00	0.00	0.00
8,600.00	90.00	269.87	6,423.99	-1,451.99	456.23	1,903.54	-1,872.58	0.00	0.00	0.00
8,700.00	90.00	269.87	6,423.99	-1,451.99	456.00	1,803.54	-1,772.77	0.00	0.00	0.00
8,800.00	90.00	269.87	6,423.99	-1,451.99	455.77	1,703.54	-1,672.97	0.00	0.00	0.00
8,900.00	90.00	269.87	6,423.99	-1,451.99	455.55	1,603.54	-1,573.16	0.00	0.00	0.00
9,000.00	90.00	269.87	6,423.99	-1,451.99	455.32	1,503.54	-1,473.36	0.00	0.00	0.00
9,100.00	90.00	269.87	6,423.99	-1,451.99	455.09	1,403.54	-1,373.55	0.00	0.00	0.00
9,200.00	90.00	269.87	6,423.99	-1,451.99	454.87	1,303.54	-1,273.75	0.00	0.00	0.00
9,300.00	90.00	269.87	6,423.98	-1,451.98	454.64	1,203.54	-1,173.95	0.00	0.00	0.00
9,400.00	90.00	269.87	6,423.98	-1,451.98	454.41	1,103.54	-1,074.14	0.00	0.00	0.00
9,500.00	90.00	269.87	6,423.98	-1,451.98	454.18	1,003.54	-974.34	0.00	0.00	0.00
9,600.00	90.00	269.87	6,423.98	-1,451.98	453.96	903.54	-874.53	0.00	0.00	0.00
9,700.00	90.00	269.87	6,423.98	-1,451.98	453.73	803.54	-774.73	0.00	0.00	0.00
9,800.00	90.00	269.87	6,423.98	-1,451.98	453.50	703.54	-674.92	0.00	0.00	0.00
9,900.00	90.00	269.87	6,423.98	-1,451.98	453.28	603.54	-575.12	0.00	0.00	0.00
10,000.00	90.00	269.87	6,423.98	-1,451.98	453.05	503.54	-475.32	0.00	0.00	0.00
10,100.00	90.00	269.87	6,423.98	-1,451.98	452.82	403.54	-375.51	0.00	0.00	0.00
10,200.00	90.00	269.87	6,423.97	-1,451.97	452.59	303.54	-275.71	0.00	0.00	0.00
10,300.00	90.00	269.87	6,423.97	-1,451.97	452.37	203.54	-175.90	0.00	0.00	0.00
10,400.00	90.00	269.87	6,423.97	-1,451.97	452.14	103.54	-76.10	0.00	0.00	0.00
10,500.00	90.00	269.87	6,423.97	-1,451.97	451.91	3.54	23.71	0.00	0.00	0.00
10,600.00	90.00	269.87	6,423.97	-1,451.97	451.69	-96.46	123.51	0.00	0.00	0.00
10,700.00	90.00	269.87	6,423.97	-1,451.97	451.46	-196.46	223.31	0.00	0.00	0.00
10,800.00	90.00	269.87	6,423.97	-1,451.97	451.23	-296.46	323.12	0.00	0.00	0.00
10,900.00	90.00	269.87	6,423.97	-1,451.97	451.00	-396.46	422.92	0.00	0.00	0.00
11,000.00	90.00	269.87	6,423.97	-1,451.97	450.78	-496.46	522.73	0.00	0.00	0.00
11,100.00	90.00	269.87	6,423.97	-1,451.97	450.55	-596.46	622.53	0.00	0.00	0.00
11,200.00	90.00	269.87	6,423.96	-1,451.96	450.32	-696.46	722.33	0.00	0.00	0.00
11,300.00	90.00	269.87	6,423.96	-1,451.96	450.10	-796.46	822.14	0.00	0.00	0.00
11,400.00	90.00	269.87	6,423.96	-1,451.96	449.87	-896.46	921.94	0.00	0.00	0.00
11,500.00	90.00	269.87	6,423.96	-1,451.96	449.64	-996.46	1,021.75	0.00	0.00	0.00
11,600.00	90.00	269.87	6,423.96	-1,451.96	449.41	-1,096.46	1,121.55	0.00	0.00	0.00
11,700.00	90.00	269.87	6,423.96	-1,451.96	449.19	-1,196.46	1,221.36	0.00	0.00	0.00
11,800.00	90.00	269.87	6,423.96	-1,451.96	448.96	-1,296.46	1,321.16	0.00	0.00	0.00
11,900.00	90.00	269.87	6,423.96	-1,451.96	448.73	-1,396.46	1,420.96	0.00	0.00	0.00
12,000.00	90.00	269.87	6,423.96	-1,451.96	448.51	-1,496.46	1,520.77	0.00	0.00	0.00
12,100.00	90.00	269.87	6,423.95	-1,451.95	448.28	-1,596.46	1,620.57	0.00	0.00	0.00
12,200.00	90.00	269.87	6,423.95	-1,451.95	448.05	-1,696.46	1,720.38	0.00	0.00	0.00
12,300.00	90.00	269.87	6,423.95	-1,451.95	447.82	-1,796.45	1,820.18	0.00	0.00	0.00
12,400.00	90.00	269.87	6,423.95	-1,451.95	447.60	-1,896.45	1,919.99	0.00	0.00	0.00
12,500.00	90.00	269.87	6,423.95	-1,451.95	447.37	-1,996.45	2,019.79	0.00	0.00	0.00
12,600.00	90.00	269.87	6,423.95	-1,451.95	447.14	-2,096.45	2,119.59	0.00	0.00	0.00
12,700.00	90.00	269.87	6,423.95	-1,451.95	446.92	-2,196.45	2,219.40	0.00	0.00	0.00

Planning Report

Database:	Database 1	Local Co-ordinate Reference:	Well SHOVELER FED 29-30-1HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4972.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4972.00usft
Site:	NE NW SEC. 29 T8N R60W 6th P.M.	North Reference:	True
Well:	SHOVELER FED 29-30-1HN	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)
12,800.00	90.00	269.87	6,423.95	-1,451.95	446.69	-2,296.45	2,319.20	0.00	0.00	0.00
12,900.00	90.00	269.87	6,423.95	-1,451.95	446.46	-2,396.45	2,419.01	0.00	0.00	0.00
13,000.00	90.00	269.87	6,423.95	-1,451.95	446.23	-2,496.45	2,518.81	0.00	0.00	0.00
13,100.00	90.00	269.87	6,423.94	-1,451.94	446.01	-2,596.45	2,618.62	0.00	0.00	0.00
13,200.00	90.00	269.87	6,423.94	-1,451.94	445.78	-2,696.45	2,718.42	0.00	0.00	0.00
13,300.00	90.00	269.87	6,423.94	-1,451.94	445.55	-2,796.45	2,818.22	0.00	0.00	0.00
13,400.00	90.00	269.87	6,423.94	-1,451.94	445.33	-2,896.45	2,918.03	0.00	0.00	0.00
13,500.00	90.00	269.87	6,423.94	-1,451.94	445.10	-2,996.45	3,017.83	0.00	0.00	0.00
13,600.00	90.00	269.87	6,423.94	-1,451.94	444.87	-3,096.45	3,117.64	0.00	0.00	0.00
13,700.00	90.00	269.87	6,423.94	-1,451.94	444.64	-3,196.45	3,217.44	0.00	0.00	0.00
13,800.00	90.00	269.87	6,423.94	-1,451.94	444.42	-3,296.45	3,317.24	0.00	0.00	0.00
13,900.00	90.00	269.87	6,423.94	-1,451.94	444.19	-3,396.45	3,417.05	0.00	0.00	0.00
14,000.00	90.00	269.87	6,423.93	-1,451.93	443.96	-3,496.45	3,516.85	0.00	0.00	0.00
14,100.00	90.00	269.87	6,423.93	-1,451.93	443.73	-3,596.45	3,616.66	0.00	0.00	0.00
14,200.00	90.00	269.87	6,423.93	-1,451.93	443.51	-3,696.45	3,716.46	0.00	0.00	0.00
14,300.00	90.00	269.87	6,423.93	-1,451.93	443.28	-3,796.45	3,816.27	0.00	0.00	0.00
14,400.00	90.00	269.87	6,423.93	-1,451.93	443.05	-3,896.45	3,916.07	0.00	0.00	0.00
14,500.00	90.00	269.87	6,423.93	-1,451.93	442.83	-3,996.45	4,015.87	0.00	0.00	0.00
14,600.00	90.00	269.87	6,423.93	-1,451.93	442.60	-4,096.45	4,115.68	0.00	0.00	0.00
14,700.00	90.00	269.87	6,423.93	-1,451.93	442.37	-4,196.45	4,215.48	0.00	0.00	0.00
14,800.00	90.00	269.87	6,423.93	-1,451.93	442.14	-4,296.45	4,315.29	0.00	0.00	0.00
14,900.00	90.00	269.87	6,423.93	-1,451.93	441.92	-4,396.45	4,415.09	0.00	0.00	0.00
15,000.00	90.00	269.87	6,423.92	-1,451.92	441.69	-4,496.45	4,514.90	0.00	0.00	0.00
15,100.00	90.00	269.87	6,423.92	-1,451.92	441.46	-4,596.45	4,614.70	0.00	0.00	0.00
15,200.00	90.00	269.87	6,423.92	-1,451.92	441.24	-4,696.45	4,714.50	0.00	0.00	0.00
15,300.00	90.00	269.87	6,423.92	-1,451.92	441.01	-4,796.45	4,814.31	0.00	0.00	0.00
15,400.00	90.00	269.87	6,423.92	-1,451.92	440.78	-4,896.45	4,914.11	0.00	0.00	0.00
15,500.00	90.00	269.87	6,423.92	-1,451.92	440.55	-4,996.45	5,013.92	0.00	0.00	0.00
15,600.00	90.00	269.87	6,423.92	-1,451.92	440.33	-5,096.45	5,113.72	0.00	0.00	0.00
15,700.00	90.00	269.87	6,423.92	-1,451.92	440.10	-5,196.45	5,213.53	0.00	0.00	0.00
15,800.00	90.00	269.87	6,423.92	-1,451.92	439.87	-5,296.45	5,313.33	0.00	0.00	0.00
15,900.00	90.00	269.87	6,423.92	-1,451.92	439.65	-5,396.45	5,413.13	0.00	0.00	0.00
16,000.00	90.00	269.87	6,423.91	-1,451.91	439.42	-5,496.45	5,512.94	0.00	0.00	0.00
16,100.00	90.00	269.87	6,423.91	-1,451.91	439.19	-5,596.45	5,612.74	0.00	0.00	0.00
16,200.00	90.00	269.87	6,423.91	-1,451.91	438.96	-5,696.44	5,712.55	0.00	0.00	0.00
16,300.00	90.00	269.87	6,423.91	-1,451.91	438.74	-5,796.44	5,812.35	0.00	0.00	0.00
16,400.00	90.00	269.87	6,423.91	-1,451.91	438.51	-5,896.44	5,912.15	0.00	0.00	0.00
16,500.00	90.00	269.87	6,423.91	-1,451.91	438.28	-5,996.44	6,011.96	0.00	0.00	0.00
16,600.00	90.00	269.87	6,423.91	-1,451.91	438.06	-6,096.44	6,111.76	0.00	0.00	0.00
16,700.00	90.00	269.87	6,423.91	-1,451.91	437.83	-6,196.44	6,211.57	0.00	0.00	0.00
16,800.00	90.00	269.87	6,423.91	-1,451.91	437.60	-6,296.44	6,311.37	0.00	0.00	0.00
16,900.00	90.00	269.87	6,423.90	-1,451.90	437.37	-6,396.44	6,411.18	0.00	0.00	0.00
17,000.00	90.00	269.87	6,423.90	-1,451.90	437.15	-6,496.44	6,510.98	0.00	0.00	0.00
17,100.00	90.00	269.87	6,423.90	-1,451.90	436.92	-6,596.44	6,610.78	0.00	0.00	0.00
17,200.00	90.00	269.87	6,423.90	-1,451.90	436.69	-6,696.44	6,710.59	0.00	0.00	0.00
17,300.00	90.00	269.87	6,423.90	-1,451.90	436.47	-6,796.44	6,810.39	0.00	0.00	0.00
17,400.00	90.00	269.87	6,423.90	-1,451.90	436.24	-6,896.44	6,910.20	0.00	0.00	0.00
17,500.00	90.00	269.87	6,423.90	-1,451.90	436.01	-6,996.44	7,010.00	0.00	0.00	0.00
17,600.00	90.00	269.87	6,423.90	-1,451.90	435.78	-7,096.44	7,109.81	0.00	0.00	0.00
17,700.00	90.00	269.87	6,423.90	-1,451.90	435.56	-7,196.44	7,209.61	0.00	0.00	0.00
BHL: 305ft FNL & 300ft FWL of Sec 30										
17,713.00	90.00	269.87	6,424.00	-1,452.00	435.34	-7,209.44	7,222.57	0.00	0.00	0.00

Planning Report

Database:	Database 1	Local Co-ordinate Reference:	Well SHOVELER FED 29-30-1HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4972.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4972.00usft
Site:	NE NW SEC. 29 T8N R60W 6th P.M.	North Reference:	True
Well:	SHOVELER FED 29-30-1HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

Formations						
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
538.21	533.00	Fox Hills Base				
1,714.76	1,536.00	Pierre Shale Top				
4,013.58	3,394.00	Richard Sandstone				
4,155.86	3,509.00	Parkman Sandstone				
5,115.97	4,285.00	Sussex Sandstone				
5,657.89	4,723.00	Shannon Sandstone				
6,501.69	5,486.00	TeePee Buttes				
7,195.40	6,161.00	Sharon Springs				
7,244.37	6,201.00	Niobrara Top				
7,492.33	6,359.00	Niobrara B2 Chalk Top				
7,767.91	6,424.00	Niobrara C Chalk Target 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: 757ft FNL & 2247ft FWL of Sec 29
100.00	100.00	0.00	0.00	START NUDGE (3.5°/100ft BUR)
1,130.73	1,063.96	43.17	310.93	EOB TO 36.08° INC
5,737.17	4,787.08	416.25	2,997.66	END OF TANGENT
6,767.90	5,751.04	459.42	3,308.59	EOD TO VERTICAL
6,867.90	5,851.04	459.42	3,308.59	KOP (10°/100ft BUR)
7,767.91	6,424.00	458.12	2,735.63	LP: 305ft FNL & 300ft FEL of Sec 29
17,713.00	6,424.00	435.34	-7,209.44	BHL: 305ft FNL & 300ft FWL of Sec 30