

MALLARD EXPLORATION

WELD COUNTY, COLORADO (NAD 83)

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

ANDERSON FED 6-5-6HN

ORIGINAL WELLBORE

25 July, 2019

Plan: PROPOSAL #3





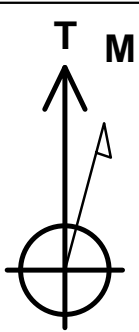
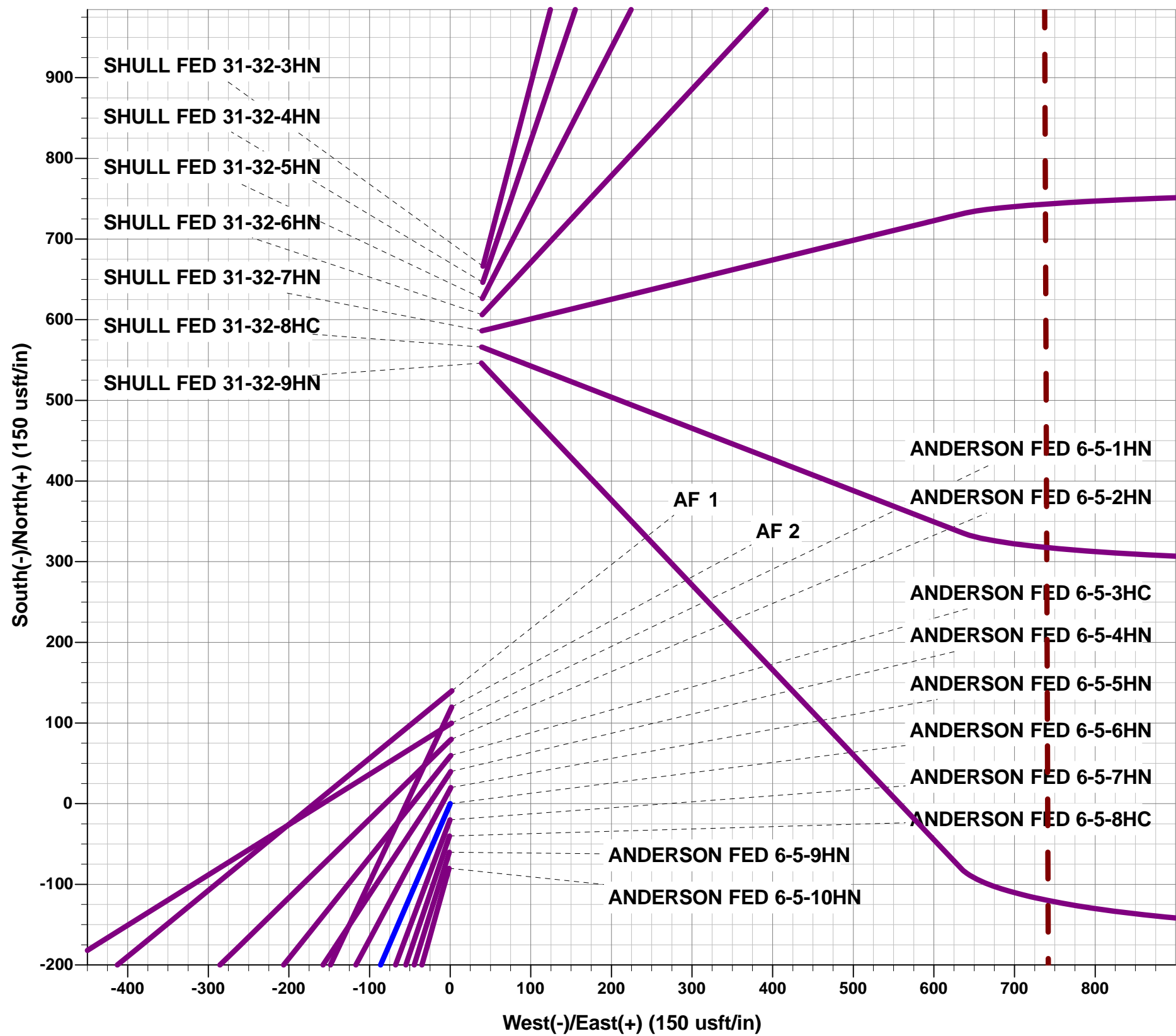
Project: WELD COUNTY, COLORADO (NAD 83)
Site: SE SW SEC. 31 T9N R59W 6th P.M.
Well: ANDERSON FED 6-5-6HN
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #3

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: 602ft FSL & 1910ft FWL of Sec 31
500.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (3°/100ft BUR)
1677.81	1769.19	38.08	203.34	-373.17	-161.01	-1.30	406.42	EOB TO 38.08° INC
5654.05	6820.32	38.08	203.34	-3233.36	-1395.03	-11.28	3521.46	KOP (10°/100ft DGLG)
6229.00	7858.06	90.00	90.63	-3654.93	-843.13	661.93	4329.69	LP *NEW*: 2350ft FSL & 600ft FWL of Sec 6
6229.00	17495.03	90.00	90.63	-3760.49	8793.26	9563.61	13966.65	BHL: 2350ft FSL & 300ft FEL of Sec 5

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
LP *NEW* - ANDERSON FED 6-5-6HN (P3)	6229.00	-3654.93	-843.13	40.690880	-104.026467
BHL - ANDERSON FED 6-5-6HN (P3)	6229.00	-3760.49	8793.26	40.690586	-103.991719



Azimuths to True North
Magnetic North: 7.61°
Magnetic Field
Strength: 52382.4snT
Dip Angle: 67.15°
Date: 22/07/2019
Model: IGRF2015

FORMATION TOP DETAILS

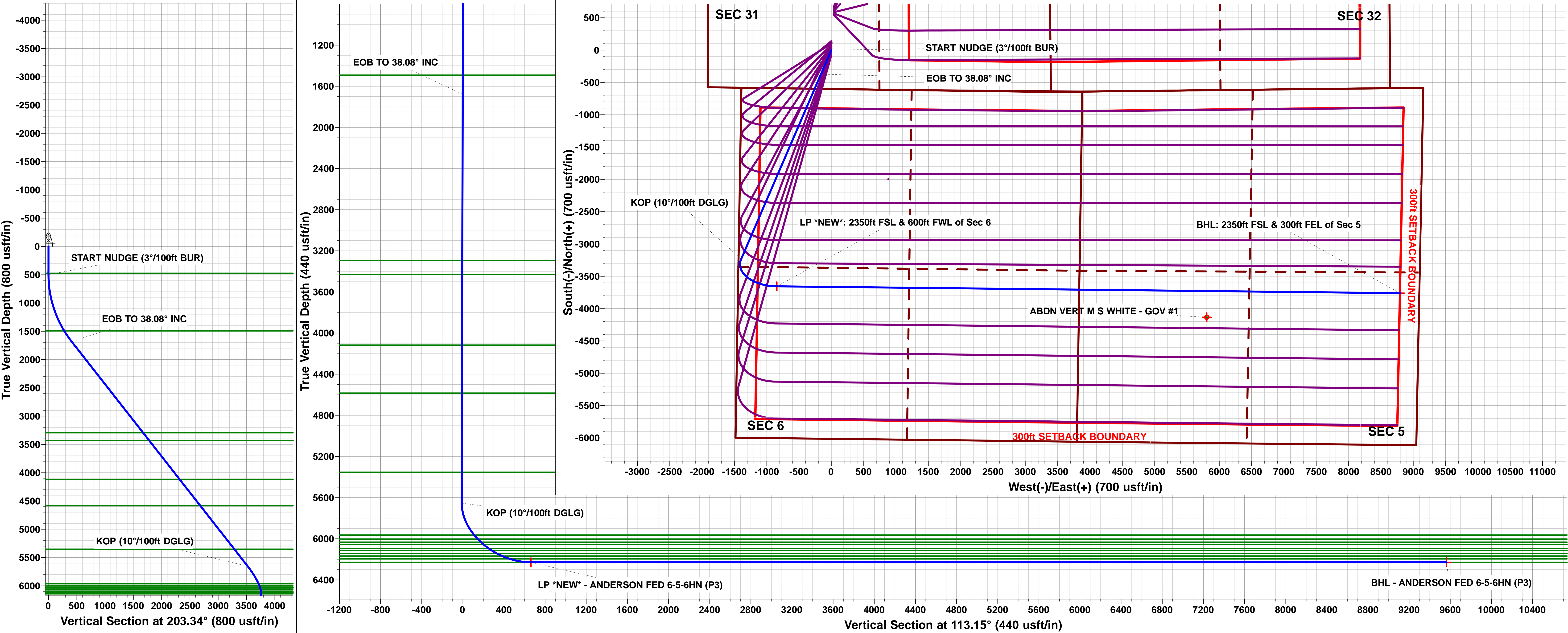
TVDPath	MDPath	Formation
475.00	475.00	Fox Hills Base
1492.00	1543.09	Pierre Shale Top
3295.00	3823.55	Richard Sandstone
3430.00	3995.04	Parkman Sandstone
4117.00	4867.76	Sussex Sandstone
4584.00	5461.00	Shannon Sandstone
5353.00	6437.89	TeePee Buttes
5964.00	7212.32	Sharon Springs
6003.00	7266.92	Niobrara Top
6033.00	7311.11	Niobrara A Chalk
6057.00	7348.28	Niobrara A Chalk Base
6095.00	7411.59	Niobrara B1 Chalk Top
6114.00	7446.01	Niobrara B1 Chalk Base
6142.00	7501.62	Niobrara B2 Chalk Top
6168.00	7561.07	Niobrara B2 Chalk Base
6196.00	7640.76	Niobrara C Chalk Target Top
6229.00	7858.06	Niobrara C Chalk Target Center

PROPOSED LOCAL COORDINATES:

SHL: 602ft FSL & 1910ft FWL of Sec 31

HZ LP *NEW*: 2350ft FSL & 600ft FWL of Sec 6

BHL: 2350ft FSL & 300ft FEL of Sec 5



Planning Report



Database:	Database 1	Local Co-ordinate Reference:	Well ANDERSON FED 6-5-6HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4903.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4903.00usft
Site:	SE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	ANDERSON FED 6-5-6HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3		

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	ANDERSON FED 6-5-6HN		
Well Position	+N-S	78.32 usft	Northing:
	+E-W	155.28 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	40.700912
		Longitude:	-104.023427
		Ground Level:	4,878.00 usft

Wellbore	ORIGINAL WELLBORE				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	22/07/2019	7.61	67.15	52,382

Design	PROPOSAL #3			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)
	0.00	0.00	0.00	113.15

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	-4,903.00	0.00	0.00	0.00	0.00	0.00	0.00	
500.00	0.00	0.00	500.00	-4,403.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,769.19	38.08	203.34	1,677.81	-3,225.19	-373.17	-161.00	3.00	3.00	0.00	203.34	
6,820.32	38.08	203.34	5,654.05	751.05	-3,233.36	-1,395.03	0.00	0.00	0.00	0.00	
7,858.06	90.00	90.63	6,229.00	1,326.00	-3,654.93	-843.13	10.00	5.00	-10.86	-108.23	LP *NEW* - ANDEF
17,495.03	90.00	90.63	6,229.00	1,326.00	-3,760.49	8,793.26	0.00	0.00	0.00	0.00	BHL - ANDERSON

Planning Report



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Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4903.00usft
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Site:	SE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	ANDERSON FED 6-5-6HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3		

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: 602ft FSL & 1910ft FWL of Sec 31										
0.00	0.00	0.00	0.00	4,903.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	4,803.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	4,703.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	4,603.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	4,503.00	0.00	0.00	0.00	0.00	0.00	0.00
Fox Hills Base										
475.00	0.00	0.00	475.00	4,428.00	0.00	0.00	0.00	0.00	0.00	0.00
START NUDGE (3°/100ft BUR)										
500.00	0.00	0.00	500.00	4,403.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	3.00	203.34	599.95	4,303.05	-2.40	-1.04	-0.01	3.00	3.00	0.00
700.00	6.00	203.34	699.63	4,203.37	-9.61	-4.14	-0.03	3.00	3.00	0.00
800.00	9.00	203.34	798.77	4,104.23	-21.59	-9.31	-0.08	3.00	3.00	0.00
900.00	12.00	203.34	897.08	4,005.92	-38.32	-16.53	-0.13	3.00	3.00	0.00
1,000.00	15.00	203.34	994.31	3,908.69	-59.75	-25.78	-0.21	3.00	3.00	0.00
1,100.00	18.00	203.34	1,090.18	3,812.82	-85.83	-37.03	-0.30	3.00	3.00	0.00
1,200.00	21.00	203.34	1,184.43	3,718.57	-116.47	-50.25	-0.41	3.00	3.00	0.00
1,300.00	24.00	203.34	1,276.81	3,626.19	-151.61	-65.41	-0.53	3.00	3.00	0.00
1,400.00	27.00	203.34	1,367.06	3,535.94	-191.13	-82.46	-0.67	3.00	3.00	0.00
1,500.00	30.00	203.34	1,454.93	3,448.07	-234.94	-101.36	-0.82	3.00	3.00	0.00
Pierre Shale Top										
1,543.09	31.29	203.34	1,492.00	3,411.00	-255.11	-110.06	-0.89	3.00	3.00	0.00
1,600.00	33.00	203.34	1,540.18	3,362.82	-282.91	-122.06	-0.99	3.00	3.00	0.00
1,700.00	36.00	203.34	1,622.59	3,280.41	-334.91	-144.50	-1.17	3.00	3.00	0.00
EOB TO 38.08° INC										
1,769.19	38.08	203.34	1,677.81	3,225.19	-373.17	-161.01	-1.30	3.00	3.00	0.00
1,800.00	38.08	203.34	1,702.07	3,200.93	-390.62	-168.53	-1.36	0.00	0.00	0.00
1,900.00	38.08	203.34	1,780.79	3,122.21	-447.24	-192.96	-1.56	0.00	0.00	0.00
2,000.00	38.08	203.34	1,859.51	3,043.49	-503.87	-217.39	-1.76	0.00	0.00	0.00
2,100.00	38.08	203.34	1,938.23	2,964.77	-560.49	-241.82	-1.95	0.00	0.00	0.00
2,200.00	38.08	203.34	2,016.95	2,886.05	-617.12	-266.25	-2.15	0.00	0.00	0.00
2,300.00	38.08	203.34	2,095.67	2,807.33	-673.74	-290.69	-2.35	0.00	0.00	0.00
2,400.00	38.08	203.34	2,174.39	2,728.61	-730.37	-315.12	-2.55	0.00	0.00	0.00
2,500.00	38.08	203.34	2,253.11	2,649.89	-786.99	-339.55	-2.74	0.00	0.00	0.00
2,600.00	38.08	203.34	2,331.83	2,571.17	-843.62	-363.98	-2.94	0.00	0.00	0.00
2,700.00	38.08	203.34	2,410.55	2,492.45	-900.24	-388.41	-3.14	0.00	0.00	0.00
2,800.00	38.08	203.34	2,489.27	2,413.73	-956.87	-412.84	-3.34	0.00	0.00	0.00
2,900.00	38.08	203.34	2,567.98	2,335.02	-1,013.49	-437.27	-3.53	0.00	0.00	0.00
3,000.00	38.08	203.34	2,646.70	2,256.30	-1,070.11	-461.70	-3.73	0.00	0.00	0.00
3,100.00	38.08	203.34	2,725.42	2,177.58	-1,126.74	-486.13	-3.93	0.00	0.00	0.00
3,200.00	38.08	203.34	2,804.14	2,098.86	-1,183.36	-510.56	-4.13	0.00	0.00	0.00
3,300.00	38.08	203.34	2,882.86	2,020.14	-1,239.99	-534.99	-4.32	0.00	0.00	0.00
3,400.00	38.08	203.34	2,961.58	1,941.42	-1,296.61	-559.42	-4.52	0.00	0.00	0.00
3,500.00	38.08	203.34	3,040.30	1,862.70	-1,353.24	-583.85	-4.72	0.00	0.00	0.00
3,600.00	38.08	203.34	3,119.02	1,783.98	-1,409.86	-608.28	-4.92	0.00	0.00	0.00
3,700.00	38.08	203.34	3,197.74	1,705.26	-1,466.49	-632.71	-5.11	0.00	0.00	0.00
3,800.00	38.08	203.34	3,276.46	1,626.54	-1,523.11	-657.14	-5.31	0.00	0.00	0.00
Richard Sandstone										
3,823.55	38.08	203.34	3,295.00	1,608.00	-1,536.45	-662.90	-5.36	0.00	0.00	0.00
3,900.00	38.08	203.34	3,355.18	1,547.82	-1,579.74	-681.57	-5.51	0.00	0.00	0.00
Parkman Sandstone										
3,995.04	38.08	203.34	3,430.00	1,473.00	-1,633.55	-704.79	-5.70	0.00	0.00	0.00
4,000.00	38.08	203.34	3,433.90	1,469.10	-1,636.36	-706.01	-5.71	0.00	0.00	0.00

Planning Report



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Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4903.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4903.00usft
Site:	SE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	ANDERSON FED 6-5-6HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3		

Planned Survey										
MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,100.00	38.08	203.34	3,512.62	1,390.38	-1,692.99	-730.44	-5.90	0.00	0.00	0.00
4,200.00	38.08	203.34	3,591.34	1,311.66	-1,749.61	-754.87	-6.10	0.00	0.00	0.00
4,300.00	38.08	203.34	3,670.06	1,232.94	-1,806.24	-779.30	-6.30	0.00	0.00	0.00
4,400.00	38.08	203.34	3,748.78	1,154.22	-1,862.86	-803.73	-6.50	0.00	0.00	0.00
4,500.00	38.08	203.34	3,827.50	1,075.50	-1,919.48	-828.16	-6.69	0.00	0.00	0.00
4,600.00	38.08	203.34	3,906.22	996.78	-1,976.11	-852.59	-6.89	0.00	0.00	0.00
4,700.00	38.08	203.34	3,984.94	918.06	-2,032.73	-877.02	-7.09	0.00	0.00	0.00
4,800.00	38.08	203.34	4,063.66	839.34	-2,089.36	-901.45	-7.29	0.00	0.00	0.00
Sussex Sandstone										
4,867.76	38.08	203.34	4,117.00	786.00	-2,127.73	-918.00	-7.42	0.00	0.00	0.00
4,900.00	38.08	203.34	4,142.38	760.62	-2,145.98	-925.88	-7.48	0.00	0.00	0.00
5,000.00	38.08	203.34	4,221.10	681.90	-2,202.61	-950.31	-7.68	0.00	0.00	0.00
5,100.00	38.08	203.34	4,299.82	603.18	-2,259.23	-974.74	-7.88	0.00	0.00	0.00
5,200.00	38.08	203.34	4,378.54	524.46	-2,315.86	-999.17	-8.08	0.00	0.00	0.00
5,300.00	38.08	203.34	4,457.26	445.74	-2,372.48	-1,023.60	-8.27	0.00	0.00	0.00
5,400.00	38.08	203.34	4,535.98	367.02	-2,429.11	-1,048.03	-8.47	0.00	0.00	0.00
Shannon Sandstone										
5,461.00	38.08	203.34	4,584.00	319.00	-2,463.65	-1,062.94	-8.59	0.00	0.00	0.00
5,500.00	38.08	203.34	4,614.70	288.30	-2,485.73	-1,072.46	-8.67	0.00	0.00	0.00
5,600.00	38.08	203.34	4,693.42	209.58	-2,542.36	-1,096.90	-8.87	0.00	0.00	0.00
5,700.00	38.08	203.34	4,772.14	130.86	-2,598.98	-1,121.33	-9.06	0.00	0.00	0.00
5,800.00	38.08	203.34	4,850.86	52.14	-2,655.60	-1,145.76	-9.26	0.00	0.00	0.00
5,900.00	38.08	203.34	4,929.58	-26.58	-2,712.23	-1,170.19	-9.46	0.00	0.00	0.00
6,000.00	38.08	203.34	5,008.30	-105.30	-2,768.85	-1,194.62	-9.66	0.00	0.00	0.00
6,100.00	38.08	203.34	5,087.02	-184.02	-2,825.48	-1,219.05	-9.85	0.00	0.00	0.00
6,200.00	38.08	203.34	5,165.74	-262.74	-2,882.10	-1,243.48	-10.05	0.00	0.00	0.00
6,300.00	38.08	203.34	5,244.46	-341.46	-2,938.73	-1,267.91	-10.25	0.00	0.00	0.00
6,400.00	38.08	203.34	5,323.18	-420.18	-2,995.35	-1,292.34	-10.45	0.00	0.00	0.00
TeePee Buttes										
6,437.89	38.08	203.34	5,353.00	-450.00	-3,016.81	-1,301.60	-10.52	0.00	0.00	0.00
6,500.00	38.08	203.34	5,401.89	-498.89	-3,051.98	-1,316.77	-10.64	0.00	0.00	0.00
6,600.00	38.08	203.34	5,480.61	-577.61	-3,108.60	-1,341.20	-10.84	0.00	0.00	0.00
6,700.00	38.08	203.34	5,559.33	-656.33	-3,165.23	-1,365.63	-11.04	0.00	0.00	0.00
6,800.00	38.08	203.34	5,638.05	-735.05	-3,221.85	-1,390.06	-11.24	0.00	0.00	0.00
KOP (10°/100ft DGLG)										
6,820.32	38.08	203.34	5,654.05	-751.05	-3,233.36	-1,395.03	-11.28	0.00	0.00	0.00
6,900.00	36.26	190.48	5,717.64	-814.64	-3,279.16	-1,409.07	-6.17	10.00	-2.28	-16.14
7,000.00	36.07	173.49	5,798.58	-895.58	-3,337.63	-1,411.11	14.94	10.00	-0.19	-16.98
7,100.00	38.21	157.27	5,878.49	-975.49	-3,395.55	-1,395.79	51.80	10.00	2.14	-16.22
7,200.00	42.33	143.14	5,954.93	-1,051.93	-3,451.16	-1,363.56	103.30	10.00	4.12	-14.13
Sharon Springs										
7,212.32	42.95	141.56	5,964.00	-1,061.00	-3,457.76	-1,358.46	110.58	10.00	5.02	-12.77
Niobrara Top										
7,266.92	45.93	135.03	6,003.00	-1,100.00	-3,486.23	-1,333.02	145.17	10.00	5.46	-11.97
7,300.00	47.90	131.39	6,025.60	-1,122.60	-3,502.76	-1,315.41	167.86	10.00	5.97	-10.99
Niobrara A Chalk										
7,311.11	48.59	130.22	6,033.00	-1,130.00	-3,508.17	-1,309.13	175.76	10.00	6.19	-10.53
Niobrara A Chalk Base										
7,348.28	50.97	126.49	6,057.00	-1,154.00	-3,525.76	-1,286.88	203.14	10.00	6.41	-10.05
7,400.00	54.47	121.69	6,088.33	-1,185.33	-3,548.78	-1,252.79	243.53	10.00	6.76	-9.26
Niobrara B1 Chalk Top										
7,411.59	55.28	120.68	6,095.00	-1,192.00	-3,553.69	-1,244.69	252.91	10.00	6.98	-8.76
Niobrara B1 Chalk Base										

Planning Report



Database:	Database 1	Local Co-ordinate Reference:	Well ANDERSON FED 6-5-6HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4903.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4903.00usft
Site:	SE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	ANDERSON FED 6-5-6HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3		

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)
7,446.01	57.73	117.78	6,114.00	-1,211.00	-3,567.69	-1,219.63	281.45	10.00	7.12	-8.43
7,500.00	61.69	113.53	6,141.23	-1,238.23	-3,587.84	-1,177.62	328.00	10.00	7.34	-7.86
Niobrara B2 Chalk Top										
7,501.62	61.82	113.41	6,142.00	-1,239.00	-3,588.40	-1,176.31	329.43	10.00	7.47	-7.55
Niobrara B2 Chalk Base										
7,561.07	66.32	109.10	6,168.00	-1,265.00	-3,607.74	-1,126.50	382.84	10.00	7.58	-7.25
7,600.00	69.34	106.44	6,182.69	-1,279.69	-3,618.73	-1,092.17	418.72	10.00	7.74	-6.83
Niobrara C Chalk Target Top										
7,640.76	72.54	103.77	6,196.00	-1,293.00	-3,628.76	-1,054.98	456.85	10.00	7.85	-6.56
7,700.00	77.25	100.04	6,211.44	-1,308.44	-3,640.53	-999.04	512.92	10.00	7.95	-6.29
7,800.00	85.30	94.04	6,226.62	-1,323.62	-3,652.57	-901.07	607.73	10.00	8.05	-6.01
LP *NEW*: 2350ft FSL & 600ft FWL of Sec 6 - Niobrara C Chalk Target Center										
7,858.06	90.00	90.63	6,229.00	-1,326.00	-3,654.93	-843.13	661.93	10.00	8.10	-5.87
7,900.00	90.00	90.63	6,229.00	-1,326.00	-3,655.39	-801.19	700.67	0.00	0.00	0.00
8,000.00	90.00	90.63	6,229.00	-1,326.00	-3,656.48	-701.20	793.04	0.00	0.00	0.00
8,100.00	90.00	90.63	6,229.00	-1,326.00	-3,657.58	-601.20	885.41	0.00	0.00	0.00
8,200.00	90.00	90.63	6,229.00	-1,326.00	-3,658.68	-501.21	977.78	0.00	0.00	0.00
8,300.00	90.00	90.63	6,229.00	-1,326.00	-3,659.77	-401.21	1,070.15	0.00	0.00	0.00
8,400.00	90.00	90.63	6,229.00	-1,326.00	-3,660.87	-301.22	1,162.52	0.00	0.00	0.00
8,500.00	90.00	90.63	6,229.00	-1,326.00	-3,661.96	-201.23	1,254.89	0.00	0.00	0.00
8,600.00	90.00	90.63	6,229.00	-1,326.00	-3,663.06	-101.23	1,347.26	0.00	0.00	0.00
8,700.00	90.00	90.63	6,229.00	-1,326.00	-3,664.15	-1.24	1,439.63	0.00	0.00	0.00
8,800.00	90.00	90.63	6,229.00	-1,326.00	-3,665.25	98.76	1,532.00	0.00	0.00	0.00
8,900.00	90.00	90.63	6,229.00	-1,326.00	-3,666.34	198.75	1,624.37	0.00	0.00	0.00
9,000.00	90.00	90.63	6,229.00	-1,326.00	-3,667.44	298.74	1,716.74	0.00	0.00	0.00
9,100.00	90.00	90.63	6,229.00	-1,326.00	-3,668.53	398.74	1,809.11	0.00	0.00	0.00
9,200.00	90.00	90.63	6,229.00	-1,326.00	-3,669.63	498.73	1,901.48	0.00	0.00	0.00
9,300.00	90.00	90.63	6,229.00	-1,326.00	-3,670.72	598.73	1,993.85	0.00	0.00	0.00
9,400.00	90.00	90.63	6,229.00	-1,326.00	-3,671.82	698.72	2,086.22	0.00	0.00	0.00
9,500.00	90.00	90.63	6,229.00	-1,326.00	-3,672.91	798.71	2,178.60	0.00	0.00	0.00
9,600.00	90.00	90.63	6,229.00	-1,326.00	-3,674.01	898.71	2,270.97	0.00	0.00	0.00
9,700.00	90.00	90.63	6,229.00	-1,326.00	-3,675.11	998.70	2,363.34	0.00	0.00	0.00
9,800.00	90.00	90.63	6,229.00	-1,326.00	-3,676.20	1,098.70	2,455.71	0.00	0.00	0.00
9,900.00	90.00	90.63	6,229.00	-1,326.00	-3,677.30	1,198.69	2,548.08	0.00	0.00	0.00
10,000.00	90.00	90.63	6,229.00	-1,326.00	-3,678.39	1,298.68	2,640.45	0.00	0.00	0.00
10,100.00	90.00	90.63	6,229.00	-1,326.00	-3,679.49	1,398.68	2,732.82	0.00	0.00	0.00
10,200.00	90.00	90.63	6,229.00	-1,326.00	-3,680.58	1,498.67	2,825.19	0.00	0.00	0.00
10,300.00	90.00	90.63	6,229.00	-1,326.00	-3,681.68	1,598.67	2,917.56	0.00	0.00	0.00
10,400.00	90.00	90.63	6,229.00	-1,326.00	-3,682.77	1,698.66	3,009.93	0.00	0.00	0.00
10,500.00	90.00	90.63	6,229.00	-1,326.00	-3,683.87	1,798.65	3,102.30	0.00	0.00	0.00
10,600.00	90.00	90.63	6,229.00	-1,326.00	-3,684.96	1,898.65	3,194.67	0.00	0.00	0.00
10,700.00	90.00	90.63	6,229.00	-1,326.00	-3,686.06	1,998.64	3,287.04	0.00	0.00	0.00
10,800.00	90.00	90.63	6,229.00	-1,326.00	-3,687.15	2,098.64	3,379.41	0.00	0.00	0.00
10,900.00	90.00	90.63	6,229.00	-1,326.00	-3,688.25	2,198.63	3,471.78	0.00	0.00	0.00
11,000.00	90.00	90.63	6,229.00	-1,326.00	-3,689.34	2,298.62	3,564.15	0.00	0.00	0.00
11,100.00	90.00	90.63	6,229.00	-1,326.00	-3,690.44	2,398.62	3,656.52	0.00	0.00	0.00
11,200.00	90.00	90.63	6,229.00	-1,326.00	-3,691.53	2,498.61	3,748.89	0.00	0.00	0.00
11,300.00	90.00	90.63	6,229.00	-1,326.00	-3,692.63	2,598.61	3,841.26	0.00	0.00	0.00
11,400.00	90.00	90.63	6,229.00	-1,326.00	-3,693.73	2,698.60	3,933.63	0.00	0.00	0.00
11,500.00	90.00	90.63	6,229.00	-1,326.00	-3,694.82	2,798.59	4,026.00	0.00	0.00	0.00
11,600.00	90.00	90.63	6,229.00	-1,326.00	-3,695.92	2,898.59	4,118.37	0.00	0.00	0.00
11,700.00	90.00	90.63	6,229.00	-1,326.00	-3,697.01	2,998.58	4,210.74	0.00	0.00	0.00
11,800.00	90.00	90.63	6,229.00	-1,326.00	-3,698.11	3,098.58	4,303.11	0.00	0.00	0.00

Planning Report



Database:	Database 1	Local Co-ordinate Reference:	Well ANDERSON FED 6-5-6HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4903.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4903.00usft
Site:	SE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	ANDERSON FED 6-5-6HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3		

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)
11,900.00	90.00	90.63	6,229.00	-1,326.00	-3,699.20	3,198.57	4,395.48	0.00	0.00	0.00
12,000.00	90.00	90.63	6,229.00	-1,326.00	-3,700.30	3,298.56	4,487.85	0.00	0.00	0.00
12,100.00	90.00	90.63	6,229.00	-1,326.00	-3,701.39	3,398.56	4,580.22	0.00	0.00	0.00
12,200.00	90.00	90.63	6,229.00	-1,326.00	-3,702.49	3,498.55	4,672.59	0.00	0.00	0.00
12,300.00	90.00	90.63	6,229.00	-1,326.00	-3,703.58	3,598.55	4,764.96	0.00	0.00	0.00
12,400.00	90.00	90.63	6,229.00	-1,326.00	-3,704.68	3,698.54	4,857.33	0.00	0.00	0.00
12,500.00	90.00	90.63	6,229.00	-1,326.00	-3,705.77	3,798.53	4,949.70	0.00	0.00	0.00
12,600.00	90.00	90.63	6,229.00	-1,326.00	-3,706.87	3,898.53	5,042.07	0.00	0.00	0.00
12,700.00	90.00	90.63	6,229.00	-1,326.00	-3,707.96	3,998.52	5,134.44	0.00	0.00	0.00
12,800.00	90.00	90.63	6,229.00	-1,326.00	-3,709.06	4,098.52	5,226.81	0.00	0.00	0.00
12,900.00	90.00	90.63	6,229.00	-1,326.00	-3,710.16	4,198.51	5,319.18	0.00	0.00	0.00
13,000.00	90.00	90.63	6,229.00	-1,326.00	-3,711.25	4,298.50	5,411.55	0.00	0.00	0.00
13,100.00	90.00	90.63	6,229.00	-1,326.00	-3,712.35	4,398.50	5,503.92	0.00	0.00	0.00
13,200.00	90.00	90.63	6,229.00	-1,326.00	-3,713.44	4,498.49	5,596.29	0.00	0.00	0.00
13,300.00	90.00	90.63	6,229.00	-1,326.00	-3,714.54	4,598.49	5,688.66	0.00	0.00	0.00
13,400.00	90.00	90.63	6,229.00	-1,326.00	-3,715.63	4,698.48	5,781.03	0.00	0.00	0.00
13,500.00	90.00	90.63	6,229.00	-1,326.00	-3,716.73	4,798.47	5,873.40	0.00	0.00	0.00
13,600.00	90.00	90.63	6,229.00	-1,326.00	-3,717.82	4,898.47	5,965.77	0.00	0.00	0.00
13,700.00	90.00	90.63	6,229.00	-1,326.00	-3,718.92	4,998.46	6,058.14	0.00	0.00	0.00
13,800.00	90.00	90.63	6,229.00	-1,326.00	-3,720.01	5,098.46	6,150.51	0.00	0.00	0.00
13,900.00	90.00	90.63	6,229.00	-1,326.00	-3,721.11	5,198.45	6,242.88	0.00	0.00	0.00
14,000.00	90.00	90.63	6,229.00	-1,326.00	-3,722.20	5,298.44	6,335.25	0.00	0.00	0.00
14,100.00	90.00	90.63	6,229.00	-1,326.00	-3,723.30	5,398.44	6,427.62	0.00	0.00	0.00
14,200.00	90.00	90.63	6,229.00	-1,326.00	-3,724.39	5,498.43	6,519.99	0.00	0.00	0.00
14,300.00	90.00	90.63	6,229.00	-1,326.00	-3,725.49	5,598.43	6,612.36	0.00	0.00	0.00
14,400.00	90.00	90.63	6,229.00	-1,326.00	-3,726.59	5,698.42	6,704.73	0.00	0.00	0.00
14,500.00	90.00	90.63	6,229.00	-1,326.00	-3,727.68	5,798.41	6,797.10	0.00	0.00	0.00
14,600.00	90.00	90.63	6,229.00	-1,326.00	-3,728.78	5,898.41	6,889.47	0.00	0.00	0.00
14,700.00	90.00	90.63	6,229.00	-1,326.00	-3,729.87	5,998.40	6,981.84	0.00	0.00	0.00
14,800.00	90.00	90.63	6,229.00	-1,326.00	-3,730.97	6,098.40	7,074.21	0.00	0.00	0.00
14,900.00	90.00	90.63	6,229.00	-1,326.00	-3,732.06	6,198.39	7,166.58	0.00	0.00	0.00
15,000.00	90.00	90.63	6,229.00	-1,326.00	-3,733.16	6,298.38	7,258.95	0.00	0.00	0.00
15,100.00	90.00	90.63	6,229.00	-1,326.00	-3,734.25	6,398.38	7,351.32	0.00	0.00	0.00
15,200.00	90.00	90.63	6,229.00	-1,326.00	-3,735.35	6,498.37	7,443.69	0.00	0.00	0.00
15,300.00	90.00	90.63	6,229.00	-1,326.00	-3,736.44	6,598.37	7,536.06	0.00	0.00	0.00
15,400.00	90.00	90.63	6,229.00	-1,326.00	-3,737.54	6,698.36	7,628.43	0.00	0.00	0.00
15,500.00	90.00	90.63	6,229.00	-1,326.00	-3,738.63	6,798.35	7,720.80	0.00	0.00	0.00
15,600.00	90.00	90.63	6,229.00	-1,326.00	-3,739.73	6,898.35	7,813.17	0.00	0.00	0.00
15,700.00	90.00	90.63	6,229.00	-1,326.00	-3,740.82	6,998.34	7,905.54	0.00	0.00	0.00
15,800.00	90.00	90.63	6,229.00	-1,326.00	-3,741.92	7,098.34	7,997.91	0.00	0.00	0.00
15,900.00	90.00	90.63	6,229.00	-1,326.00	-3,743.02	7,198.33	8,090.28	0.00	0.00	0.00
16,000.00	90.00	90.63	6,229.00	-1,326.00	-3,744.11	7,298.32	8,182.65	0.00	0.00	0.00
16,100.00	90.00	90.63	6,229.00	-1,326.00	-3,745.21	7,398.32	8,275.02	0.00	0.00	0.00
16,200.00	90.00	90.63	6,229.00	-1,326.00	-3,746.30	7,498.31	8,367.39	0.00	0.00	0.00
16,300.00	90.00	90.63	6,229.00	-1,326.00	-3,747.40	7,598.31	8,459.76	0.00	0.00	0.00
16,400.00	90.00	90.63	6,229.00	-1,326.00	-3,748.49	7,698.30	8,552.13	0.00	0.00	0.00
16,500.00	90.00	90.63	6,229.00	-1,326.00	-3,749.59	7,798.29	8,644.51	0.00	0.00	0.00
16,600.00	90.00	90.63	6,229.00	-1,326.00	-3,750.68	7,898.29	8,736.88	0.00	0.00	0.00
16,700.00	90.00	90.63	6,229.00	-1,326.00	-3,751.78	7,998.28	8,829.25	0.00	0.00	0.00
16,800.00	90.00	90.63	6,229.00	-1,326.00	-3,752.87	8,098.28	8,921.62	0.00	0.00	0.00
16,900.00	90.00	90.63	6,229.00	-1,326.00	-3,753.97	8,198.27	9,013.99	0.00	0.00	0.00
17,000.00	90.00	90.63	6,229.00	-1,326.00	-3,755.06	8,298.26	9,106.36	0.00	0.00	0.00
17,100.00	90.00	90.63	6,229.00	-1,326.00	-3,756.16	8,398.26	9,198.73	0.00	0.00	0.00
17,200.00	90.00	90.63	6,229.00	-1,326.00	-3,757.25	8,498.25	9,291.10	0.00	0.00	0.00

Planning Report



Database:	Database 1	Local Co-ordinate Reference:	Well ANDERSON FED 6-5-6HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 25' @ 4903.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB 25' @ 4903.00usft
Site:	SE SW SEC. 31 T9N R59W 6th P.M.	North Reference:	True
Well:	ANDERSON FED 6-5-6HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3		

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)
17,300.00	90.00	90.63	6,229.00	-1,326.00	-3,758.35	8,598.25	9,383.47	0.00	0.00	0.00
17,400.00	90.00	90.63	6,229.00	-1,326.00	-3,759.44	8,698.24	9,475.84	0.00	0.00	0.00
BHL: 2350ft FSL & 300ft FEL of Sec 5										
17,495.03	90.00	90.63	6,229.00	-1,326.00	-3,760.49	8,793.26	9,563.61	0.00	0.00	0.00

Formations						
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
475.00	475.00	Fox Hills Base				
1,543.09	1,492.00	Pierre Shale Top				
3,823.55	3,295.00	Richard Sandstone				
3,995.04	3,430.00	Parkman Sandstone				
4,867.76	4,117.00	Sussex Sandstone				
5,461.00	4,584.00	Shannon Sandstone				
6,437.89	5,353.00	TeePee Buttes				
7,212.32	5,964.00	Sharon Springs				
7,266.92	6,003.00	Niobrara Top				
7,311.11	6,033.00	Niobrara A Chalk				
7,348.28	6,057.00	Niobrara A Chalk Base				
7,411.59	6,095.00	Niobrara B1 Chalk Top				
7,446.01	6,114.00	Niobrara B1 Chalk Base				
7,501.62	6,142.00	Niobrara B2 Chalk Top				
7,561.07	6,168.00	Niobrara B2 Chalk Base				
7,640.76	6,196.00	Niobrara C Chalk Target Top				
7,858.06	6,229.00	Niobrara C Chalk Target Center				

Plan Annotations					
MD (usft)	TVD (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
0.00	0.00	0.00	0.00	SHL: 602ft FSL & 1910ft FWL of Sec 31	
500.00	500.00	0.00	0.00	START NUDGE (3°/100ft BUR)	
1,769.19	1,677.81	-373.17	-161.01	EOB TO 38.08° INC	
6,820.32	5,654.05	-3,233.36	-1,395.03	KOP (10°/100ft DGLG)	
7,858.06	6,229.00	-3,654.93	-843.13	LP *NEW*: 2350ft FSL & 600ft FWL of Sec 6	
17,495.03	6,229.00	-3,760.49	8,793.26	BHL: 2350ft FSL & 300ft FEL of Sec 5	