

MALLARD EXPLORATION

WELD COUNTY

SEC 31-T8N-R59W

MOTTLED SOUTH 6-16HN

OWB

Plan: PROPOSAL 1

Standard Planning Report

17 December, 2022



Project: WELD COUNTY
Site: SEC 31-T8N-R59W
Well: MOTTLED SOUTH 6-16HN
Wellbore: OWB
Design: PROPOSAL 1

PROJECT DETAILS: WELD COUNTY
Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: Colorado Northern Zone
System Datum: Mean Sea Level



Azimuths to True North
Magnetic North: 7.31°
Magnetic Field
Strength: 51978.9nT
Dip Angle: 66.86°
Date: 12/17/2022
Model: IGRF2020

WELL DETAILS: MOTTLED SOUTH 6-16HN

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	1469593.61	3409556.79	40.613080°N	104.024769°W	

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	
3	1634.04	30.68	101.70	1561.78	-81.29	392.68	2.00	101.70	268.10	
4	6648.89	30.68	101.70	5874.65	-600.01	2898.41	0.00	0.00	1978.87	
5	7497.40	90.00	181.57	6325.00	-1177.63	3145.75	10.00	81.26	2602.42	LP-MOTTLED SOUTH 6-16HN
6	11523.87	90.00	181.57	6325.00	-5202.60	3035.75	0.00	0.00	6023.52	PBHL-MOTTLED SOUTH 6-16HN

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
190.00	190.01	Laramie Shale Base
575.00	577.20	Laramie Fox Hills Base
880.00	889.97	Pierre Shale Base
1580.00	1655.23	Upper Pierre Shale Base
3271.00	3621.46	Richard Sandstone
3383.00	3751.69	Parkman Sandstone
3716.00	4138.89	Parkman Sandstone Base
6053.00	6864.98	Sharon Springs
6094.00	6919.55	Niobrara Top
6218.00	7113.43	Niobrara B2 Chalk Top
6291.00	7283.75	Niobrara C Chalk Target Reservoir Top
6304.00	7329.86	Niobrara C Chalk Target Top
6325.00	7497.40	Niobrara C Chalk Target Landing Point

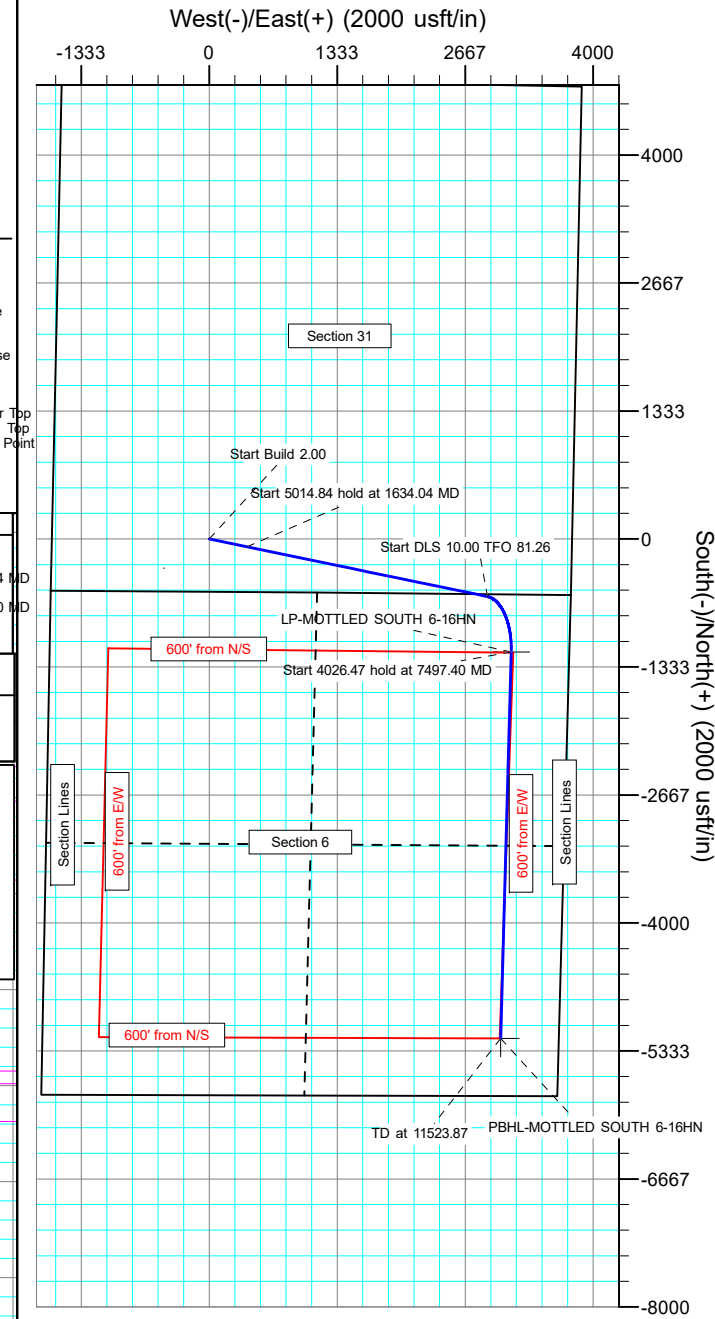
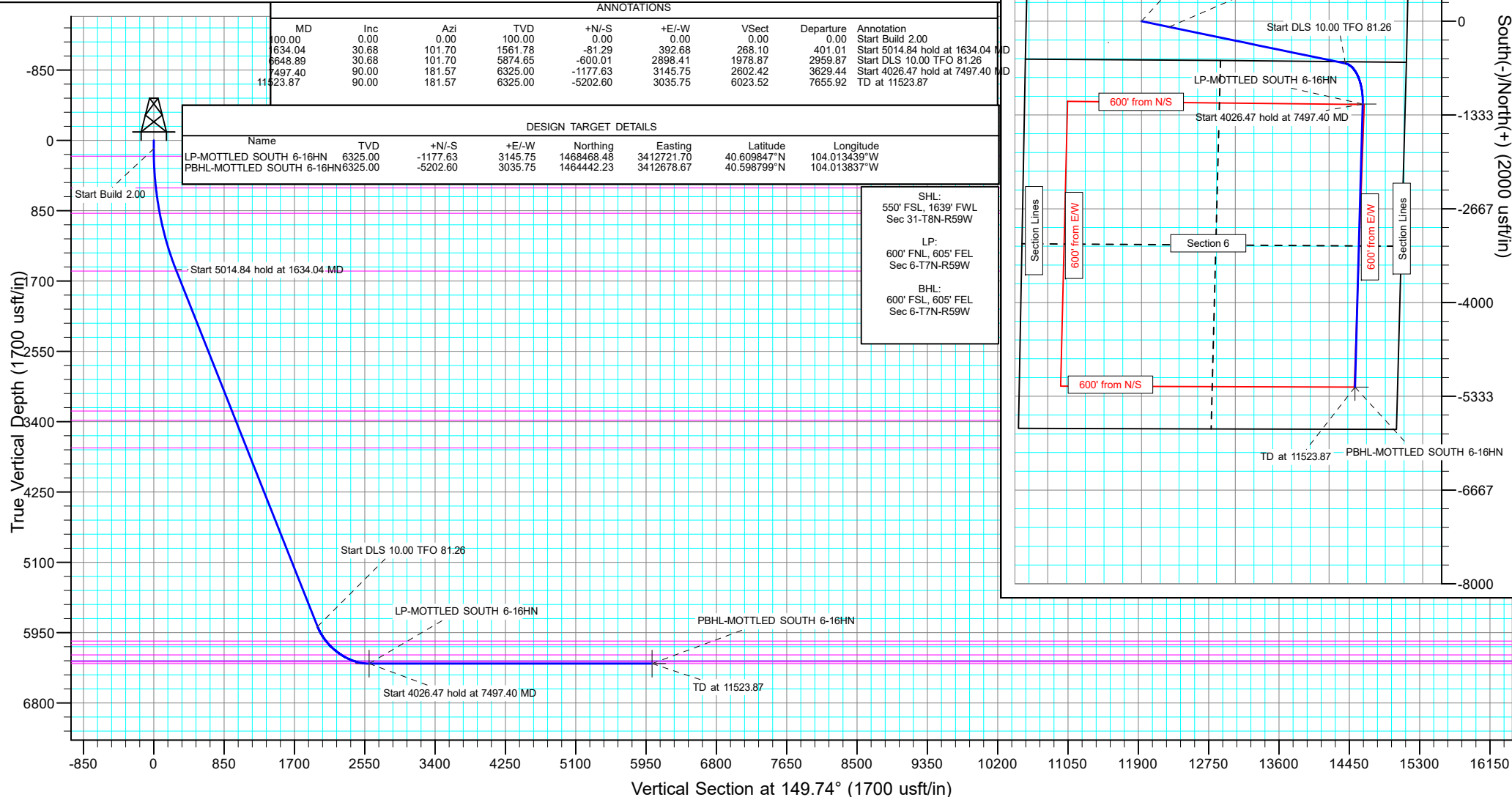
ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSec	Departure	Annotation
0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	Start Build 2.00
1634.04	30.68	101.70	1561.78	-81.29	392.68	268.10	401.01	Start 5014.84 hold at 1634.04 MD
6648.89	30.68	101.70	5874.65	-600.01	2898.41	1978.87	2959.87	Start DLS 10.00 TFO 81.26
7497.40	90.00	181.57	6325.00	-1177.63	3145.75	2602.42	3629.44	Start 4026.47 hold at 7497.40 MD
11523.87	90.00	181.57	6325.00	-5202.60	3035.75	6023.52	7655.92	TD at 11523.87

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	North	East	Lat	Long
LP-MOTTLED SOUTH 6-16HN	6325.00	-1177.63	3145.75	1468468.48	3412721.70	40.609847°N	104.013439°W
PBHL-MOTTLED SOUTH 6-16HN	6325.00	-5202.60	3035.75	1464442.23	3412678.67	40.598799°N	104.013837°W

SHL:
550' FSL, 1639' FWL
Sec 31-T8N-R59W
LP:
600' FNL, 605' FEL
Sec 6-T7N-R59W
BHL:
600' FSL, 605' FEL
Sec 6-T7N-R59W



Planning Report

Database:	EDM 5000.16 Single User Db	Local Co-ordinate Reference:	Well MOTTLED SOUTH 6-16HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 17' @ 4986.00usft
Project:	WELD COUNTY	MD Reference:	KB 17' @ 4986.00usft
Site:	SEC 31-T8N-R59W	North Reference:	True
Well:	MOTTLED SOUTH 6-16HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	OWB		
Design:	PROPOSAL 1		

Project	WELD COUNTY		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site		SEC 31-T8N-R59W			
Site Position:		Northing:	1,469,027.10 usft	Latitude:	40.611600°N
From:	Lat/Long	Easting:	3,407,915.13 usft	Longitude:	104.030715°W
Position Uncertainty:	0.00 usft	Slot Radius:	13.200 in		

Well		MOTTLED SOUTH 6-16HN				
Well Position	+N/-S	0.00 usft	Northing:	1,469,593.61 usft	Latitude:	40.613080°N
	+E/-W	0.00 usft	Easting:	3,409,556.79 usft	Longitude:	104.024769°W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	4,969.00 usft
Grid Convergence:		0.95 °				

Wellbore	OWB				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	12/17/2022	7.31	66.86	51,978.92048157

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 (°)	
	0.00	0.00	0.00	149.74	

Plan Survey Tool Program	Date	12/17/2022			
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.00	11,523.87 PROPOSAL 1 (OWB)	MWD		
			OWSG MWD - Standard		

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,634.04	30.68	101.70	1,561.78	-81.29	392.68	2.00	2.00	0.00	101.70	
6,648.89	30.68	101.70	5,874.65	-600.01	2,898.41	0.00	0.00	0.00	0.00	
7,497.40	90.00	181.57	6,325.00	-1,177.63	3,145.75	10.00	6.99	9.41	81.26	LP-MOTTLED SOUTI
11,523.87	90.00	181.57	6,325.00	-5,202.60	3,035.75	0.00	0.00	0.00	0.00	PBHL-MOTTLED SOI

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Company:	MALLARD EXPLORATION	TVD Reference:	KB 17' @ 4986.00usft
Project:	WELD COUNTY	MD Reference:	KB 17' @ 4986.00usft
Site:	SEC 31-T8N-R59W	North Reference:	True
Well:	MOTTLED SOUTH 6-16HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	OWB		
Design:	PROPOSAL 1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
190.01	1.80	101.70	190.00	-0.29	1.38	0.95	2.00	2.00	0.00
Laramie Shale Base									
200.00	2.00	101.70	199.98	-0.35	1.71	1.17	2.00	2.00	0.00
300.00	4.00	101.70	299.84	-1.41	6.83	4.67	2.00	2.00	0.00
400.00	6.00	101.70	399.45	-3.18	15.37	10.49	2.00	2.00	0.00
500.00	8.00	101.70	498.70	-5.65	27.30	18.64	2.00	2.00	0.00
577.20	9.54	101.70	575.00	-8.04	38.83	26.51	2.00	2.00	0.00
Laramie Fox Hills Base									
600.00	10.00	101.70	597.47	-8.82	42.62	29.10	2.00	2.00	0.00
700.00	12.00	101.70	695.62	-12.69	61.30	41.85	2.00	2.00	0.00
800.00	14.00	101.70	793.06	-17.25	83.33	56.89	2.00	2.00	0.00
889.97	15.80	101.70	880.00	-21.94	105.98	72.36	2.00	2.00	0.00
Pierre Shale Base									
900.00	16.00	101.70	889.64	-22.50	108.67	74.20	2.00	2.00	0.00
1,000.00	18.00	101.70	985.27	-28.42	137.30	93.74	2.00	2.00	0.00
1,100.00	20.00	101.70	1,079.82	-35.02	169.18	115.51	2.00	2.00	0.00
1,200.00	22.00	101.70	1,173.17	-42.29	204.27	139.47	2.00	2.00	0.00
1,300.00	24.00	101.70	1,265.21	-50.21	242.53	165.59	2.00	2.00	0.00
1,400.00	26.00	101.70	1,355.84	-58.77	283.91	193.84	2.00	2.00	0.00
1,500.00	28.00	101.70	1,444.94	-67.98	328.37	224.19	2.00	2.00	0.00
1,600.00	30.00	101.70	1,532.39	-77.80	375.84	256.60	2.00	2.00	0.00
1,634.04	30.68	101.70	1,561.78	-81.29	392.68	268.10	2.00	2.00	0.00
Start 5014.84 hold at 1634.04 MD									
1,655.23	30.68	101.70	1,580.00	-83.48	403.27	275.33	0.00	0.00	0.00
Upper Pierre Shale Base									
1,700.00	30.68	101.70	1,618.50	-88.11	425.64	290.60	0.00	0.00	0.00
1,800.00	30.68	101.70	1,704.50	-98.46	475.60	324.71	0.00	0.00	0.00
1,900.00	30.68	101.70	1,790.50	-108.80	525.57	358.83	0.00	0.00	0.00
2,000.00	30.68	101.70	1,876.51	-119.14	575.54	392.94	0.00	0.00	0.00
2,100.00	30.68	101.70	1,962.51	-129.49	625.50	427.06	0.00	0.00	0.00
2,200.00	30.68	101.70	2,048.51	-139.83	675.47	461.17	0.00	0.00	0.00
2,300.00	30.68	101.70	2,134.51	-150.17	725.43	495.28	0.00	0.00	0.00
2,400.00	30.68	101.70	2,220.51	-160.52	775.40	529.40	0.00	0.00	0.00
2,500.00	30.68	101.70	2,306.52	-170.86	825.37	563.51	0.00	0.00	0.00
2,600.00	30.68	101.70	2,392.52	-181.20	875.33	597.63	0.00	0.00	0.00
2,700.00	30.68	101.70	2,478.52	-191.55	925.30	631.74	0.00	0.00	0.00
2,800.00	30.68	101.70	2,564.52	-201.89	975.27	665.85	0.00	0.00	0.00
2,900.00	30.68	101.70	2,650.53	-212.24	1,025.23	699.97	0.00	0.00	0.00
3,000.00	30.68	101.70	2,736.53	-222.58	1,075.20	734.08	0.00	0.00	0.00
3,100.00	30.68	101.70	2,822.53	-232.92	1,125.16	768.20	0.00	0.00	0.00
3,200.00	30.68	101.70	2,908.53	-243.27	1,175.13	802.31	0.00	0.00	0.00
3,300.00	30.68	101.70	2,994.53	-253.61	1,225.10	836.43	0.00	0.00	0.00
3,400.00	30.68	101.70	3,080.54	-263.95	1,275.06	870.54	0.00	0.00	0.00
3,500.00	30.68	101.70	3,166.54	-274.30	1,325.03	904.65	0.00	0.00	0.00
3,600.00	30.68	101.70	3,252.54	-284.64	1,375.00	938.77	0.00	0.00	0.00
3,621.46	30.68	101.70	3,271.00	-286.86	1,385.72	946.09	0.00	0.00	0.00
Richard Sandstone									
3,700.00	30.68	101.70	3,338.54	-294.99	1,424.96	972.88	0.00	0.00	0.00
3,751.69	30.68	101.70	3,383.00	-300.33	1,450.79	990.52	0.00	0.00	0.00
Parkman Sandstone									

Planning Report

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Company:	MALLARD EXPLORATION	TVD Reference:	KB 17' @ 4986.00usft
Project:	WELD COUNTY	MD Reference:	KB 17' @ 4986.00usft
Site:	SEC 31-T8N-R59W	North Reference:	True
Well:	MOTTLED SOUTH 6-16HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	OWB		
Design:	PROPOSAL 1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
3,800.00	30.68	101.70	3,424.54	-305.33	1,474.93	1,007.00	0.00	0.00	0.00
3,900.00	30.68	101.70	3,510.55	-315.67	1,524.90	1,041.11	0.00	0.00	0.00
4,000.00	30.68	101.70	3,596.55	-326.02	1,574.86	1,075.22	0.00	0.00	0.00
4,100.00	30.68	101.70	3,682.55	-336.36	1,624.83	1,109.34	0.00	0.00	0.00
4,138.89	30.68	101.70	3,716.00	-340.38	1,644.26	1,122.61	0.00	0.00	0.00
Parkman Sandstone Base									
4,200.00	30.68	101.70	3,768.55	-346.70	1,674.79	1,143.45	0.00	0.00	0.00
4,300.00	30.68	101.70	3,854.56	-357.05	1,724.76	1,177.57	0.00	0.00	0.00
4,400.00	30.68	101.70	3,940.56	-367.39	1,774.73	1,211.68	0.00	0.00	0.00
4,500.00	30.68	101.70	4,026.56	-377.73	1,824.69	1,245.79	0.00	0.00	0.00
4,600.00	30.68	101.70	4,112.56	-388.08	1,874.66	1,279.91	0.00	0.00	0.00
4,700.00	30.68	101.70	4,198.56	-398.42	1,924.63	1,314.02	0.00	0.00	0.00
4,800.00	30.68	101.70	4,284.57	-408.77	1,974.59	1,348.14	0.00	0.00	0.00
4,900.00	30.68	101.70	4,370.57	-419.11	2,024.56	1,382.25	0.00	0.00	0.00
5,000.00	30.68	101.70	4,456.57	-429.45	2,074.52	1,416.36	0.00	0.00	0.00
5,100.00	30.68	101.70	4,542.57	-439.80	2,124.49	1,450.48	0.00	0.00	0.00
5,200.00	30.68	101.70	4,628.58	-450.14	2,174.46	1,484.59	0.00	0.00	0.00
5,300.00	30.68	101.70	4,714.58	-460.48	2,224.42	1,518.71	0.00	0.00	0.00
5,400.00	30.68	101.70	4,800.58	-470.83	2,274.39	1,552.82	0.00	0.00	0.00
5,500.00	30.68	101.70	4,886.58	-481.17	2,324.36	1,586.94	0.00	0.00	0.00
5,600.00	30.68	101.70	4,972.58	-491.51	2,374.32	1,621.05	0.00	0.00	0.00
5,700.00	30.68	101.70	5,058.59	-501.86	2,424.29	1,655.16	0.00	0.00	0.00
5,800.00	30.68	101.70	5,144.59	-512.20	2,474.26	1,689.28	0.00	0.00	0.00
5,900.00	30.68	101.70	5,230.59	-522.55	2,524.22	1,723.39	0.00	0.00	0.00
6,000.00	30.68	101.70	5,316.59	-532.89	2,574.19	1,757.51	0.00	0.00	0.00
6,100.00	30.68	101.70	5,402.60	-543.23	2,624.15	1,791.62	0.00	0.00	0.00
6,200.00	30.68	101.70	5,488.60	-553.58	2,674.12	1,825.73	0.00	0.00	0.00
6,300.00	30.68	101.70	5,574.60	-563.92	2,724.09	1,859.85	0.00	0.00	0.00
6,400.00	30.68	101.70	5,660.60	-574.26	2,774.05	1,893.96	0.00	0.00	0.00
6,500.00	30.68	101.70	5,746.60	-584.61	2,824.02	1,928.08	0.00	0.00	0.00
6,600.00	30.68	101.70	5,832.61	-594.95	2,873.99	1,962.19	0.00	0.00	0.00
6,648.89	30.68	101.70	5,874.65	-600.01	2,898.41	1,978.87	0.00	0.00	0.00
Start DLS 10.00 TFO 81.26									
6,700.00	31.82	111.31	5,918.37	-607.55	2,923.75	1,998.15	10.00	2.23	18.81
6,800.00	35.90	127.77	6,001.57	-635.16	2,971.61	2,046.12	10.00	4.08	16.46
6,864.98	39.55	136.56	6,053.00	-661.88	3,000.93	2,083.97	10.00	5.63	13.53
Sharon Springs									
6,900.00	41.77	140.72	6,079.57	-679.01	3,015.98	2,106.35	10.00	6.32	11.89
6,919.55	43.07	142.89	6,094.00	-689.37	3,024.13	2,119.41	10.00	6.64	11.09
Niobrara Top									
7,000.00	48.78	150.79	6,149.99	-737.76	3,055.52	2,177.03	10.00	7.10	9.82
7,100.00	56.49	158.82	6,210.69	-809.65	3,089.02	2,256.00	10.00	7.71	8.03
7,113.43	57.57	159.78	6,218.00	-820.19	3,093.01	2,267.11	10.00	7.99	7.17
Niobrara B2 Chalk Top									
7,200.00	64.64	165.49	6,259.84	-892.47	3,115.47	2,340.87	10.00	8.17	6.60
7,283.75	71.66	170.40	6,291.00	-968.43	3,131.61	2,414.60	10.00	8.39	5.87
Niobrara C Chalk Target Reservoir Top									
7,300.00	73.04	171.31	6,295.93	-983.72	3,134.07	2,429.05	10.00	8.48	5.55
7,329.86	75.59	172.93	6,304.00	-1,012.20	3,138.01	2,455.63	10.00	8.52	5.44
Niobrara C Chalk Target Top									
7,400.00	81.60	176.62	6,317.87	-1,080.62	3,144.24	2,517.87	10.00	8.57	5.25
7,497.40	90.00	181.57	6,325.00	-1,177.63	3,145.75	2,602.42	10.00	8.62	5.08
Start 4026.47 hold at 7497.40 MD - Niobrara C Chalk Target Landing Point									

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Project:	WELD COUNTY	MD Reference:	KB 17' @ 4986.00usft
Site:	SEC 31-T8N-R59W	North Reference:	True
Well:	MOTTLED SOUTH 6-16HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	OWB		
Design:	PROPOSAL 1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
7,500.00	90.00	181.57	6,325.00	-1,180.23	3,145.68	2,604.64	0.00	0.00	0.00	
7,600.00	90.00	181.57	6,325.00	-1,280.19	3,142.95	2,689.60	0.00	0.00	0.00	
7,700.00	90.00	181.57	6,325.00	-1,380.15	3,140.22	2,774.57	0.00	0.00	0.00	
7,800.00	90.00	181.57	6,325.00	-1,480.12	3,137.49	2,859.53	0.00	0.00	0.00	
7,900.00	90.00	181.57	6,325.00	-1,580.08	3,134.75	2,944.50	0.00	0.00	0.00	
8,000.00	90.00	181.57	6,325.00	-1,680.04	3,132.02	3,029.46	0.00	0.00	0.00	
8,100.00	90.00	181.57	6,325.00	-1,780.00	3,129.29	3,114.43	0.00	0.00	0.00	
8,200.00	90.00	181.57	6,325.00	-1,879.97	3,126.56	3,199.39	0.00	0.00	0.00	
8,300.00	90.00	181.57	6,325.00	-1,979.93	3,123.83	3,284.36	0.00	0.00	0.00	
8,400.00	90.00	181.57	6,325.00	-2,079.89	3,121.09	3,369.32	0.00	0.00	0.00	
8,500.00	90.00	181.57	6,325.00	-2,179.86	3,118.36	3,454.29	0.00	0.00	0.00	
8,600.00	90.00	181.57	6,325.00	-2,279.82	3,115.63	3,539.25	0.00	0.00	0.00	
8,700.00	90.00	181.57	6,325.00	-2,379.78	3,112.90	3,624.22	0.00	0.00	0.00	
8,800.00	90.00	181.57	6,325.00	-2,479.74	3,110.17	3,709.18	0.00	0.00	0.00	
8,900.00	90.00	181.57	6,325.00	-2,579.71	3,107.43	3,794.15	0.00	0.00	0.00	
9,000.00	90.00	181.57	6,325.00	-2,679.67	3,104.70	3,879.11	0.00	0.00	0.00	
9,100.00	90.00	181.57	6,325.00	-2,779.63	3,101.97	3,964.08	0.00	0.00	0.00	
9,200.00	90.00	181.57	6,325.00	-2,879.59	3,099.24	4,049.04	0.00	0.00	0.00	
9,300.00	90.00	181.57	6,325.00	-2,979.56	3,096.51	4,134.01	0.00	0.00	0.00	
9,400.00	90.00	181.57	6,325.00	-3,079.52	3,093.77	4,218.97	0.00	0.00	0.00	
9,500.00	90.00	181.57	6,325.00	-3,179.48	3,091.04	4,303.94	0.00	0.00	0.00	
9,600.00	90.00	181.57	6,325.00	-3,279.45	3,088.31	4,388.90	0.00	0.00	0.00	
9,700.00	90.00	181.57	6,325.00	-3,379.41	3,085.58	4,473.87	0.00	0.00	0.00	
9,800.00	90.00	181.57	6,325.00	-3,479.37	3,082.84	4,558.83	0.00	0.00	0.00	
9,900.00	90.00	181.57	6,325.00	-3,579.33	3,080.11	4,643.80	0.00	0.00	0.00	
10,000.00	90.00	181.57	6,325.00	-3,679.30	3,077.38	4,728.76	0.00	0.00	0.00	
10,100.00	90.00	181.57	6,325.00	-3,779.26	3,074.65	4,813.73	0.00	0.00	0.00	
10,200.00	90.00	181.57	6,325.00	-3,879.22	3,071.92	4,898.69	0.00	0.00	0.00	
10,300.00	90.00	181.57	6,325.00	-3,979.18	3,069.18	4,983.66	0.00	0.00	0.00	
10,400.00	90.00	181.57	6,325.00	-4,079.15	3,066.45	5,068.62	0.00	0.00	0.00	
10,500.00	90.00	181.57	6,325.00	-4,179.11	3,063.72	5,153.59	0.00	0.00	0.00	
10,600.00	90.00	181.57	6,325.00	-4,279.07	3,060.99	5,238.55	0.00	0.00	0.00	
10,700.00	90.00	181.57	6,325.00	-4,379.03	3,058.26	5,323.52	0.00	0.00	0.00	
10,800.00	90.00	181.57	6,325.00	-4,479.00	3,055.52	5,408.48	0.00	0.00	0.00	
10,900.00	90.00	181.57	6,325.00	-4,578.96	3,052.79	5,493.45	0.00	0.00	0.00	
11,000.00	90.00	181.57	6,325.00	-4,678.92	3,050.06	5,578.41	0.00	0.00	0.00	
11,100.00	90.00	181.57	6,325.00	-4,778.89	3,047.33	5,663.38	0.00	0.00	0.00	
11,200.00	90.00	181.57	6,325.00	-4,878.85	3,044.60	5,748.34	0.00	0.00	0.00	
11,300.00	90.00	181.57	6,325.00	-4,978.81	3,041.86	5,833.31	0.00	0.00	0.00	
11,400.00	90.00	181.57	6,325.00	-5,078.77	3,039.13	5,918.27	0.00	0.00	0.00	
11,500.00	90.00	181.57	6,325.00	-5,178.74	3,036.40	6,003.24	0.00	0.00	0.00	
11,523.87	90.00	181.57	6,325.00	-5,202.60	3,035.75	6,023.52	0.00	0.00	0.00	
TD at 11523.87										

Planning Report

Database:	EDM 5000.16 Single User Db	Local Co-ordinate Reference:	Well MOTTLED SOUTH 6-16HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 17' @ 4986.00usft
Project:	WELD COUNTY	MD Reference:	KB 17' @ 4986.00usft
Site:	SEC 31-T8N-R59W	North Reference:	True
Well:	MOTTLED SOUTH 6-16HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	OWB		
Design:	PROPOSAL 1		

Design Targets									
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL-MOTTLED SOUT - plan hits target center - Point	0.00	0.00	6,325.00	-5,202.60	3,035.75	1,464,442.24	3,412,678.67	40.598799°N	104.013837°W
LP-MOTTLED SOUTH 6 - plan hits target center - Point	0.00	0.00	6,325.00	-1,177.63	3,145.75	1,468,468.48	3,412,721.70	40.609847°N	104.013439°W

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
190.01	190.00	Laramie Shale Base			
577.20	575.00	Laramie Fox Hills Base			
889.97	880.00	Pierre Shale Base			
1,655.23	1,580.00	Upper Pierre Shale Base			
3,621.46	3,271.00	Richard Sandstone			
3,751.69	3,383.00	Parkman Sandstone			
4,138.89	3,716.00	Parkman Sandstone Base			
6,864.98	6,053.00	Sharon Springs			
6,919.55	6,094.00	Niobrara Top			
7,113.43	6,218.00	Niobrara B2 Chalk Top			
7,283.75	6,291.00	Niobrara C Chalk Target Reservoir Top			
7,329.86	6,304.00	Niobrara C Chalk Target Top			
7,497.40	6,325.00	Niobrara C Chalk Target Landing Point			

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
100.00	100.00	0.00	0.00	Start Build 2.00
1,634.04	1,561.78	-81.29	392.68	Start 5014.84 hold at 1634.04 MD
6,648.89	5,874.65	-600.01	2,898.41	Start DLS 10.00 TFO 81.26
7,497.40	6,325.00	-1,177.63	3,145.75	Start 4026.47 hold at 7497.40 MD
11,523.87	6,325.00	-5,202.60	3,035.75	TD at 11523.87