

# **MALLARD EXPLORATION**

**WELD COUNTY**

**SEC 31-T8N-R59W**

**MOTTLED SOUTH 6-4HN**

**OWB**

**Plan: PROPOSAL 1**

## **Standard Planning Report**

**17 December, 2022**



Project: WELD COUNTY  
Site: SEC 31-T8N-R59W  
Well: MOTTLED SOUTH 6-4HN  
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: 51978.8nT  
Dip Angle: 66.86°  
Date: 12/17/2022  
Model: IGRF2020

WELL DETAILS: MOTTLED SOUTH 6-4HN

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	1469591.08	3409316.93	40.613084°N	104.025633°W	

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	
3	935.39	6.71	186.07	934.62	-19.50	-2.07	2.00	186.07	19.55	
4	5762.55	6.71	186.07	5728.74	-580.17	-61.72	0.00	0.00	581.74	
5	6595.73	90.00	181.06	6235.00	-1149.05	-77.46	10.00	-5.04	1150.82	LP-MOTTLED SOUTH 6-4HN
6	10641.78	90.00	181.06	6235.00	-5194.40	-152.45	0.00	0.00	5196.64	PBHL-MOTTLED SOUTH 6-4HN

FORMATION TOP DETAILS

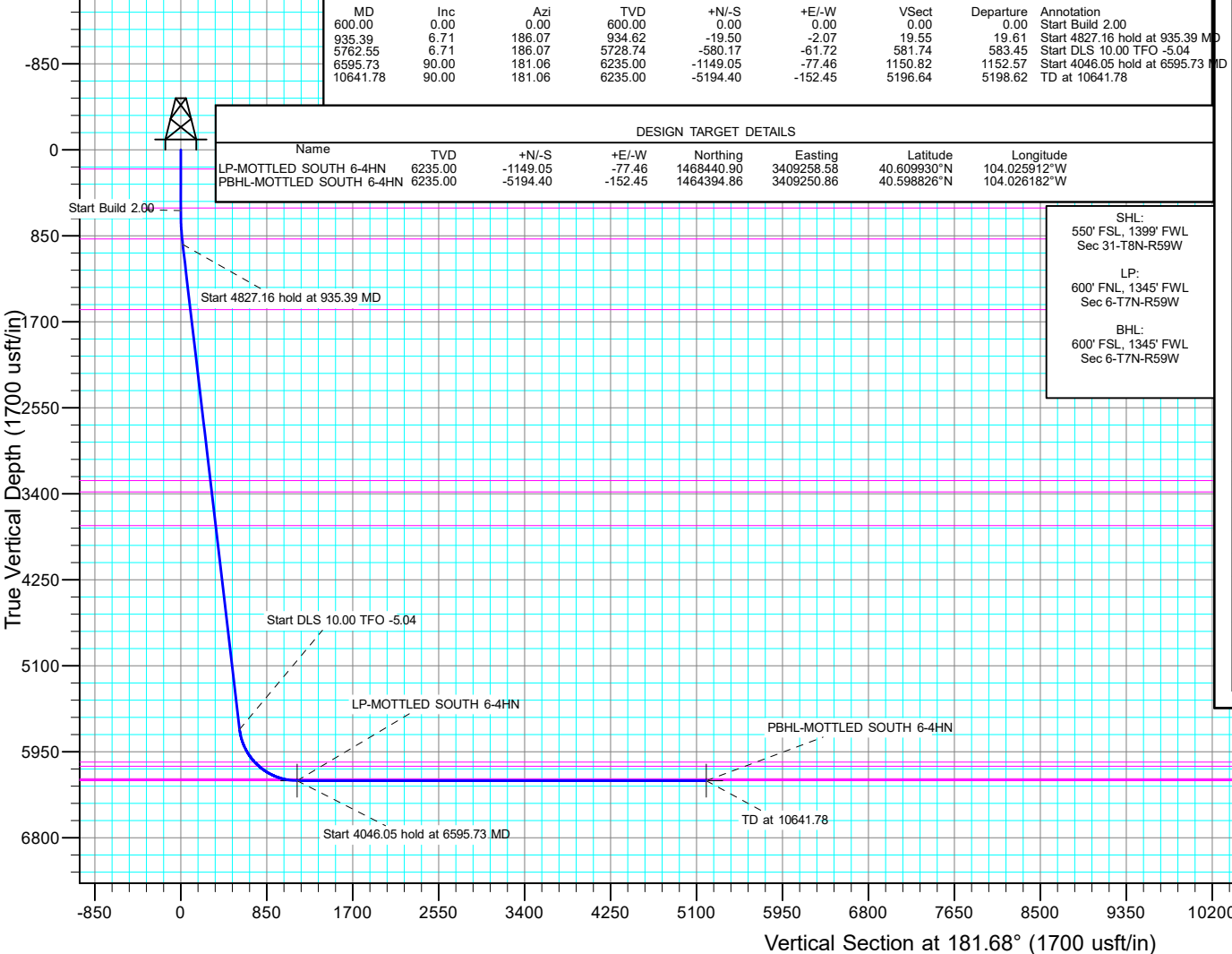
TVDPath	MDPath	Formation
190.00	190.00	Laramie Shale Base
575.00	575.00	Laramie Fox Hills Base
880.00	880.45	Pierre Shale Base
1580.00	1585.21	Upper Pierre Shale Base
3270.00	3286.86	Richard Sandstone
3382.00	3399.63	Parkman Sandstone
3715.00	3734.93	Parkman Sandstone Base
6052.00	6124.62	Sharon Springs
6093.00	6183.50	Niobrara Top
6217.00	6451.72	Niobrara B Chalk Target Top
6227.00	6499.86	Niobrara B Chalk Target Top
6235.00	6595.73	Niobrara B Chalk Target Landing Point

ANNOTATIONS

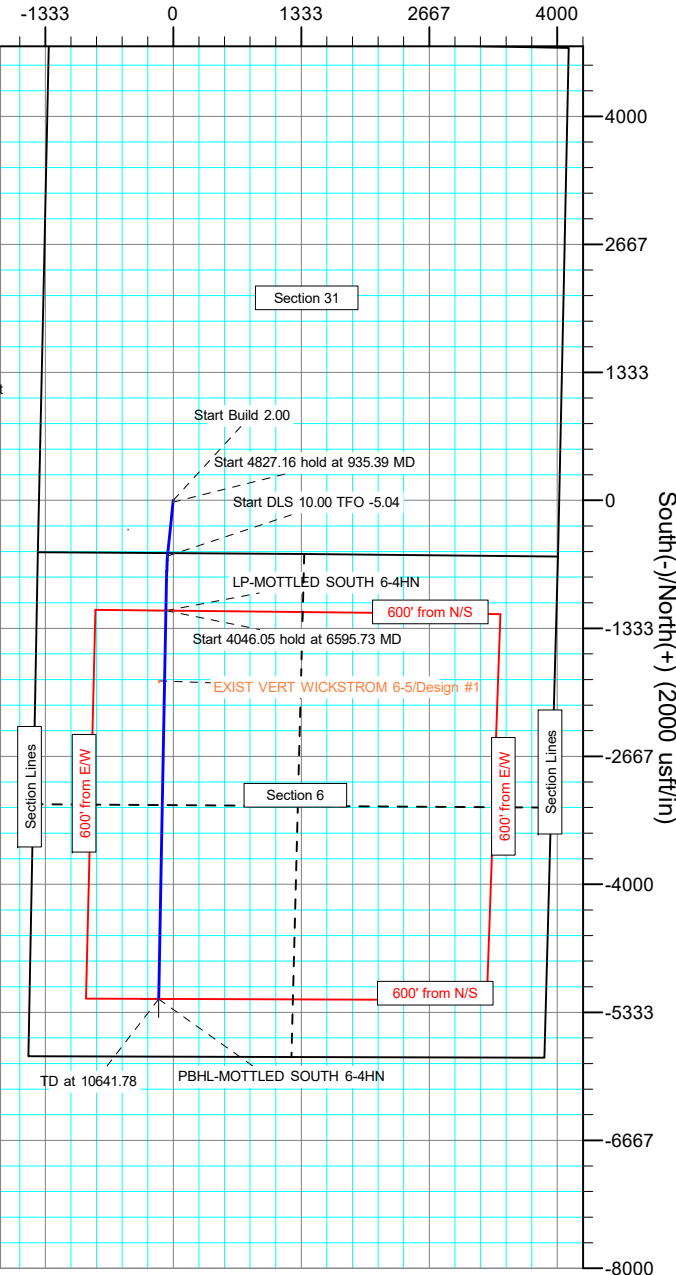
MD	Inc	Azi	TVD	+N/-S	+E/-W	VSect	Departure	Annotation
600.00	0.00	0.00	600.00	0.00	0.00	0.00	19.61	Start Build 2.00
935.39	6.71	186.07	934.62	-19.50	-2.07	19.55	583.45	Start 4827.16 hold at 935.39 MD
5762.55	6.71	186.07	5728.74	-580.17	-61.72	581.74	5196.62	Start DLS 10.00 TFO -5.04
6595.73	90.00	181.06	6235.00	-1149.05	-77.46	1150.82	1152.57	Start 4046.05 hold at 6595.73 MD
10641.78	90.00	181.06	6235.00	-5194.40	-152.45	5196.64	5198.62	TD at 10641.78

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
LP-MOTTLED SOUTH 6-4HN	6235.00	-1149.05	-77.46	1468440.90	3409258.58	40.609930°N	104.025912°W
PBHL-MOTTLED SOUTH 6-4HN	6235.00	-5194.40	-152.45	1464394.86	3409250.86	40.598826°N	104.026182°W



West(-)/East(+) (2000 usft/in)



## Planning Report

<b>Database:</b>	EDM 5000.16 Single User Db	<b>Local Co-ordinate Reference:</b>	Well MOTTLED SOUTH 6-4HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB 17' @ 4985.00usft
<b>Project:</b>	WELD COUNTY	<b>MD Reference:</b>	KB 17' @ 4985.00usft
<b>Site:</b>	SEC 31-T8N-R59W	<b>North Reference:</b>	True
<b>Well:</b>	MOTTLED SOUTH 6-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	PROPOSAL 1		

<b>Project</b>	WELD COUNTY		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	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 6-4HN				
Well Position	+N/-S	0.00 usft	Northing:	1,469,591.08 usft	Latitude:	40.613084°N
	+E/-W	0.00 usft	Easting:	3,409,316.92 usft	Longitude:	104.025633°W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	4,968.00 usft
Grid Convergence:		0.95 °				

<b>Wellbore</b>	OWB				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2020	12/17/2022	7.31	66.86	51,978.84596548

<b>Design</b>	PROPOSAL 1				
<b>Audit Notes:</b>					
<b>Version:</b>		<b>Phase:</b>	PROTOTYPE	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	181.68	

<b>Plan Survey Tool Program</b>	<b>Date</b>	12/17/2022			
<b>Depth From (usft)</b>	<b>Depth To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>	
1	0.00	10,641.78 PROPOSAL 1 (OWB)	MWD		
			OWSG MWD - Standard		

<b>Plan Sections</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>	<b>TFO (°)</b>	<b>Target</b>
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	
935.39	6.71	186.07	934.62	-19.50	-2.07	2.00	2.00	0.00	186.07	
5,762.55	6.71	186.07	5,728.74	-580.17	-61.72	0.00	0.00	0.00	0.00	
6,595.73	90.00	181.06	6,235.00	-1,149.05	-77.46	10.00	10.00	-0.60	-5.04	LP-MOTTLED SOUTI
10,641.78	90.00	181.06	6,235.00	-5,194.40	-152.45	0.00	0.00	0.00	0.00	PBHL-MOTTLED SOI

# Planning Report

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<b>Project:</b>	WELD COUNTY	<b>MD Reference:</b>	KB 17' @ 4985.00usft
<b>Site:</b>	SEC 31-T8N-R59W	<b>North Reference:</b>	True
<b>Well:</b>	MOTTLED SOUTH 6-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	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	
190.00	0.00	0.00	190.00	0.00	0.00	0.00	0.00	0.00	0.00	
Laramie Shale Base										
575.00	0.00	0.00	575.00	0.00	0.00	0.00	0.00	0.00	0.00	
Laramie Fox Hills Base										
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	
Start Build 2.00										
700.00	2.00	186.07	699.98	-1.74	-0.18	1.74	2.00	2.00	0.00	
800.00	4.00	186.07	799.84	-6.94	-0.74	6.96	2.00	2.00	0.00	
880.45	5.61	186.07	880.00	-13.64	-1.45	13.68	2.00	2.00	0.00	
Pierre Shale Base										
900.00	6.00	186.07	899.45	-15.61	-1.66	15.65	2.00	2.00	0.00	
935.39	6.71	186.07	934.62	-19.50	-2.07	19.55	2.00	2.00	0.00	
Start 4827.16 hold at 935.39 MD										
1,000.00	6.71	186.07	998.79	-27.00	-2.87	27.08	0.00	0.00	0.00	
1,100.00	6.71	186.07	1,098.11	-38.62	-4.11	38.72	0.00	0.00	0.00	
1,200.00	6.71	186.07	1,197.42	-50.23	-5.34	50.37	0.00	0.00	0.00	
1,300.00	6.71	186.07	1,296.74	-61.85	-6.58	62.02	0.00	0.00	0.00	
1,400.00	6.71	186.07	1,396.05	-73.46	-7.81	73.66	0.00	0.00	0.00	
1,500.00	6.71	186.07	1,495.37	-85.08	-9.05	85.31	0.00	0.00	0.00	
1,585.21	6.71	186.07	1,580.00	-94.98	-10.10	95.23	0.00	0.00	0.00	
Upper Pierre Shale Base										
1,600.00	6.71	186.07	1,594.69	-96.69	-10.29	96.95	0.00	0.00	0.00	
1,700.00	6.71	186.07	1,694.00	-108.31	-11.52	108.60	0.00	0.00	0.00	
1,800.00	6.71	186.07	1,793.32	-119.92	-12.76	120.25	0.00	0.00	0.00	
1,900.00	6.71	186.07	1,892.63	-131.54	-13.99	131.89	0.00	0.00	0.00	
2,000.00	6.71	186.07	1,991.95	-143.15	-15.23	143.54	0.00	0.00	0.00	
2,100.00	6.71	186.07	2,091.26	-154.77	-16.46	155.19	0.00	0.00	0.00	
2,200.00	6.71	186.07	2,190.58	-166.38	-17.70	166.83	0.00	0.00	0.00	
2,300.00	6.71	186.07	2,289.89	-178.00	-18.94	178.48	0.00	0.00	0.00	
2,400.00	6.71	186.07	2,389.21	-189.61	-20.17	190.12	0.00	0.00	0.00	
2,500.00	6.71	186.07	2,488.52	-201.23	-21.41	201.77	0.00	0.00	0.00	
2,600.00	6.71	186.07	2,587.84	-212.84	-22.64	213.42	0.00	0.00	0.00	
2,700.00	6.71	186.07	2,687.16	-224.46	-23.88	225.06	0.00	0.00	0.00	
2,800.00	6.71	186.07	2,786.47	-236.07	-25.11	236.71	0.00	0.00	0.00	
2,900.00	6.71	186.07	2,885.79	-247.69	-26.35	248.36	0.00	0.00	0.00	
3,000.00	6.71	186.07	2,985.10	-259.30	-27.58	260.00	0.00	0.00	0.00	
3,100.00	6.71	186.07	3,084.42	-270.92	-28.82	271.65	0.00	0.00	0.00	
3,200.00	6.71	186.07	3,183.73	-282.53	-30.06	283.29	0.00	0.00	0.00	
3,286.86	6.71	186.07	3,270.00	-292.62	-31.13	293.41	0.00	0.00	0.00	
Richard Sandstone										
3,300.00	6.71	186.07	3,283.05	-294.15	-31.29	294.94	0.00	0.00	0.00	
3,399.63	6.71	186.07	3,382.00	-305.72	-32.52	306.54	0.00	0.00	0.00	
Parkman Sandstone										
3,400.00	6.71	186.07	3,382.36	-305.76	-32.53	306.59	0.00	0.00	0.00	
3,500.00	6.71	186.07	3,481.68	-317.38	-33.76	318.23	0.00	0.00	0.00	
3,600.00	6.71	186.07	3,580.99	-328.99	-35.00	329.88	0.00	0.00	0.00	
3,700.00	6.71	186.07	3,680.31	-340.61	-36.23	341.53	0.00	0.00	0.00	
3,734.93	6.71	186.07	3,715.00	-344.67	-36.66	345.59	0.00	0.00	0.00	
Parkman Sandstone Base										
3,800.00	6.71	186.07	3,779.63	-352.22	-37.47	353.17	0.00	0.00	0.00	
3,900.00	6.71	186.07	3,878.94	-363.84	-38.70	364.82	0.00	0.00	0.00	
4,000.00	6.71	186.07	3,978.26	-375.45	-39.94	376.46	0.00	0.00	0.00	

# Planning Report

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<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB 17' @ 4985.00usft
<b>Project:</b>	WELD COUNTY	<b>MD Reference:</b>	KB 17' @ 4985.00usft
<b>Site:</b>	SEC 31-T8N-R59W	<b>North Reference:</b>	True
<b>Well:</b>	MOTTLED SOUTH 6-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	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)
4,100.00	6.71	186.07	4,077.57	-387.07	-41.18	388.11	0.00	0.00	0.00
4,200.00	6.71	186.07	4,176.89	-398.68	-42.41	399.76	0.00	0.00	0.00
4,300.00	6.71	186.07	4,276.20	-410.30	-43.65	411.40	0.00	0.00	0.00
4,400.00	6.71	186.07	4,375.52	-421.91	-44.88	423.05	0.00	0.00	0.00
4,500.00	6.71	186.07	4,474.83	-433.53	-46.12	434.70	0.00	0.00	0.00
4,600.00	6.71	186.07	4,574.15	-445.14	-47.35	446.34	0.00	0.00	0.00
4,700.00	6.71	186.07	4,673.47	-456.76	-48.59	457.99	0.00	0.00	0.00
4,800.00	6.71	186.07	4,772.78	-468.37	-49.82	469.63	0.00	0.00	0.00
4,900.00	6.71	186.07	4,872.10	-479.99	-51.06	481.28	0.00	0.00	0.00
5,000.00	6.71	186.07	4,971.41	-491.60	-52.30	492.93	0.00	0.00	0.00
5,100.00	6.71	186.07	5,070.73	-503.22	-53.53	504.57	0.00	0.00	0.00
5,200.00	6.71	186.07	5,170.04	-514.83	-54.77	516.22	0.00	0.00	0.00
5,300.00	6.71	186.07	5,269.36	-526.45	-56.00	527.87	0.00	0.00	0.00
5,400.00	6.71	186.07	5,368.67	-538.06	-57.24	539.51	0.00	0.00	0.00
5,500.00	6.71	186.07	5,467.99	-549.68	-58.47	551.16	0.00	0.00	0.00
5,600.00	6.71	186.07	5,567.30	-561.29	-59.71	562.80	0.00	0.00	0.00
5,700.00	6.71	186.07	5,666.62	-572.91	-60.94	574.45	0.00	0.00	0.00
5,762.55	6.71	186.07	5,728.74	-580.17	-61.72	581.74	0.00	0.00	0.00
Start DLS 10.00 TFO -5.04									
5,800.00	10.44	184.26	5,765.77	-585.74	-62.20	587.31	10.00	9.98	-4.85
5,900.00	20.44	182.64	5,862.04	-612.28	-63.68	613.89	10.00	9.99	-1.61
6,000.00	30.43	182.06	5,952.23	-655.14	-65.40	656.78	10.00	10.00	-0.58
6,100.00	40.43	181.75	6,033.61	-713.01	-67.31	714.68	10.00	10.00	-0.31
6,124.62	42.89	181.70	6,052.00	-729.37	-67.80	731.04	10.00	10.00	-0.23
Sharon Springs									
6,183.50	48.78	181.58	6,093.00	-771.56	-69.01	773.26	10.00	10.00	-0.20
Niobrara Top									
6,200.00	50.43	181.55	6,103.70	-784.13	-69.35	785.82	10.00	10.00	-0.18
6,300.00	60.43	181.40	6,160.37	-866.34	-71.46	868.06	10.00	10.00	-0.15
6,400.00	70.43	181.27	6,201.90	-957.14	-73.57	958.89	10.00	10.00	-0.12
6,451.72	75.60	181.21	6,217.00	-1,006.58	-74.64	1,008.34	10.00	10.00	-0.11
Niobrara B Chalk Target Reservoir Top									
6,499.87	80.41	181.16	6,227.00	-1,053.65	-75.61	1,055.41	10.00	10.00	-0.11
Niobrara B Chalk Target Top									
6,500.00	80.43	181.16	6,227.02	-1,053.78	-75.62	1,055.55	10.00	10.00	-0.11
6,595.73	90.00	181.06	6,235.00	-1,149.05	-77.46	1,150.82	10.00	10.00	-0.10
Start 4046.05 hold at 6595.73 MD - Niobrara B Chalk Target Landing Point									
6,600.00	90.00	181.06	6,235.00	-1,153.32	-77.54	1,155.10	0.00	0.00	0.00
6,700.00	90.00	181.06	6,235.00	-1,253.30	-79.40	1,255.09	0.00	0.00	0.00
6,800.00	90.00	181.06	6,235.00	-1,353.28	-81.25	1,355.09	0.00	0.00	0.00
6,900.00	90.00	181.06	6,235.00	-1,453.27	-83.10	1,455.08	0.00	0.00	0.00
7,000.00	90.00	181.06	6,235.00	-1,553.25	-84.96	1,555.07	0.00	0.00	0.00
7,100.00	90.00	181.06	6,235.00	-1,653.23	-86.81	1,655.07	0.00	0.00	0.00
7,200.00	90.00	181.06	6,235.00	-1,753.22	-88.66	1,755.06	0.00	0.00	0.00
7,300.00	90.00	181.06	6,235.00	-1,853.20	-90.52	1,855.06	0.00	0.00	0.00
7,400.00	90.00	181.06	6,235.00	-1,953.18	-92.37	1,955.05	0.00	0.00	0.00
7,500.00	90.00	181.06	6,235.00	-2,053.16	-94.22	2,055.05	0.00	0.00	0.00
7,600.00	90.00	181.06	6,235.00	-2,153.15	-96.08	2,155.04	0.00	0.00	0.00
7,700.00	90.00	181.06	6,235.00	-2,253.13	-97.93	2,255.03	0.00	0.00	0.00
7,800.00	90.00	181.06	6,235.00	-2,353.11	-99.78	2,355.03	0.00	0.00	0.00
7,900.00	90.00	181.06	6,235.00	-2,453.10	-101.64	2,455.02	0.00	0.00	0.00
8,000.00	90.00	181.06	6,235.00	-2,553.08	-103.49	2,555.02	0.00	0.00	0.00
8,100.00	90.00	181.06	6,235.00	-2,653.06	-105.34	2,655.01	0.00	0.00	0.00

## Planning Report

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<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB 17' @ 4985.00usft
<b>Project:</b>	WELD COUNTY	<b>MD Reference:</b>	KB 17' @ 4985.00usft
<b>Site:</b>	SEC 31-T8N-R59W	<b>North Reference:</b>	True
<b>Well:</b>	MOTTLED SOUTH 6-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	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)	
8,200.00	90.00	181.06	6,235.00	-2,753.04	-107.20	2,755.00	0.00	0.00	0.00	
8,300.00	90.00	181.06	6,235.00	-2,853.03	-109.05	2,855.00	0.00	0.00	0.00	
8,400.00	90.00	181.06	6,235.00	-2,953.01	-110.90	2,954.99	0.00	0.00	0.00	
8,500.00	90.00	181.06	6,235.00	-3,052.99	-112.76	3,054.99	0.00	0.00	0.00	
8,600.00	90.00	181.06	6,235.00	-3,152.98	-114.61	3,154.98	0.00	0.00	0.00	
8,700.00	90.00	181.06	6,235.00	-3,252.96	-116.46	3,254.98	0.00	0.00	0.00	
8,800.00	90.00	181.06	6,235.00	-3,352.94	-118.32	3,354.97	0.00	0.00	0.00	
8,900.00	90.00	181.06	6,235.00	-3,452.92	-120.17	3,454.96	0.00	0.00	0.00	
9,000.00	90.00	181.06	6,235.00	-3,552.91	-122.02	3,554.96	0.00	0.00	0.00	
9,100.00	90.00	181.06	6,235.00	-3,652.89	-123.88	3,654.95	0.00	0.00	0.00	
9,200.00	90.00	181.06	6,235.00	-3,752.87	-125.73	3,754.95	0.00	0.00	0.00	
9,300.00	90.00	181.06	6,235.00	-3,852.86	-127.59	3,854.94	0.00	0.00	0.00	
9,400.00	90.00	181.06	6,235.00	-3,952.84	-129.44	3,954.93	0.00	0.00	0.00	
9,500.00	90.00	181.06	6,235.00	-4,052.82	-131.29	4,054.93	0.00	0.00	0.00	
9,600.00	90.00	181.06	6,235.00	-4,152.80	-133.15	4,154.92	0.00	0.00	0.00	
9,700.00	90.00	181.06	6,235.00	-4,252.79	-135.00	4,254.92	0.00	0.00	0.00	
9,800.00	90.00	181.06	6,235.00	-4,352.77	-136.85	4,354.91	0.00	0.00	0.00	
9,900.00	90.00	181.06	6,235.00	-4,452.75	-138.71	4,454.91	0.00	0.00	0.00	
10,000.00	90.00	181.06	6,235.00	-4,552.74	-140.56	4,554.90	0.00	0.00	0.00	
10,100.00	90.00	181.06	6,235.00	-4,652.72	-142.41	4,654.89	0.00	0.00	0.00	
10,200.00	90.00	181.06	6,235.00	-4,752.70	-144.27	4,754.89	0.00	0.00	0.00	
10,300.00	90.00	181.06	6,235.00	-4,852.68	-146.12	4,854.88	0.00	0.00	0.00	
10,400.00	90.00	181.06	6,235.00	-4,952.67	-147.97	4,954.88	0.00	0.00	0.00	
10,500.00	90.00	181.06	6,235.00	-5,052.65	-149.83	5,054.87	0.00	0.00	0.00	
10,600.00	90.00	181.06	6,235.00	-5,152.63	-151.68	5,154.86	0.00	0.00	0.00	
10,641.78	90.00	181.06	6,235.00	-5,194.40	-152.45	5,196.64	0.00	0.00	0.00	
TD at 10641.78										

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL-MOTTLED SOUT	0.00	0.00	6,235.00	-5,194.40	-152.45	1,464,394.86	3,409,250.85	40.598826°N	104.026182°W
- plan hits target center									
- Point									
LP-MOTTLED SOUTH €	0.00	0.00	6,235.00	-1,149.05	-77.46	1,468,440.91	3,409,258.57	40.609930°N	104.025912°W
- plan hits target center									
- Point									

## Planning Report

<b>Database:</b>	EDM 5000.16 Single User Db	<b>Local Co-ordinate Reference:</b>	Well MOTTLED SOUTH 6-4HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB 17' @ 4985.00usft
<b>Project:</b>	WELD COUNTY	<b>MD Reference:</b>	KB 17' @ 4985.00usft
<b>Site:</b>	SEC 31-T8N-R59W	<b>North Reference:</b>	True
<b>Well:</b>	MOTTLED SOUTH 6-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	PROPOSAL 1		

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
190.00	190.00	Laramie Shale Base				
575.00	575.00	Laramie Fox Hills Base				
880.45	880.00	Pierre Shale Base				
1,585.21	1,580.00	Upper Pierre Shale Base				
3,286.86	3,270.00	Richard Sandstone				
3,399.63	3,382.00	Parkman Sandstone				
3,734.93	3,715.00	Parkman Sandstone Base				
6,124.62	6,052.00	Sharon Springs				
6,183.50	6,093.00	Niobrara Top				
6,451.72	6,217.00	Niobrara B Chalk Target Reservoir Top				
6,499.87	6,227.00	Niobrara B Chalk Target Top				
6,595.73	6,235.00	Niobrara B Chalk Target Landing Point				

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
600.00	600.00	0.00	0.00	Start Build 2.00
935.39	934.62	-19.50	-2.07	Start 4827.16 hold at 935.39 MD
5,762.55	5,728.74	-580.17	-61.72	Start DLS 10.00 TFO -5.04
6,595.73	6,235.00	-1,149.05	-77.46	Start 4046.05 hold at 6595.73 MD
10,641.78	6,235.00	-5,194.40	-152.45	TD at 10641.78