

MALLARD EXPLORATION

WELD COUNTY

SEC 31-T8N-R59W

MOTTLED SOUTH 6-1HN

OWB

Plan: PROPOSAL 1

Standard Planning Report

17 December, 2022



Project: WELD COUNTY
Site: SEC 31-T8N-R59W
Well: MOTTLED SOUTH 6-1HN
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 6-1HN

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	1469590.81	3409256.95	40.613086°N	104.025849°W	

FORMATION TOP DETAILS

TVDP	MD	Formation
190.00	190.00	Laramie Shale Base
575.00	575.11	Laramie Fox Hills Base
880.00	882.27	Pierre Shale Base
1580.00	1592.62	Upper Pierre Shale Base
3270.00	3307.60	Richard Sandstone
3382.00	3421.26	Parkman Sandstone
3715.00	3759.18	Parkman Sandstone Base
6052.00	6144.62	Sharon Springs
6093.00	6194.45	Niobrara Top
6217.00	6373.03	Niobrara B2 Chalk Top
6290.00	6531.21	Niobrara C Chalk Target Reservoir Top
6303.00	6574.16	Niobrara C Chalk Target Top
6324.00	6730.42	Niobrara C Chalk Target Landing Point

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	400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	
3	889.59	9.79	229.75	887.21	-26.97	-31.85	2.00	229.75	31.67	
4	5894.88	9.79	229.75	5819.59	-577.00	-681.53	0.00	0.00	677.57	
5	6730.42	90.00	181.06	6324.00	-1145.03	-757.42	10.00	-49.11	1250.45	LP-MOTTLED SOUTH 6-1HN
6	10779.38	90.00	181.06	6324.00	-5193.30	-832.25	0.00	0.00	5259.56	PBHL-MOTTLED SOUTH 6-1HN

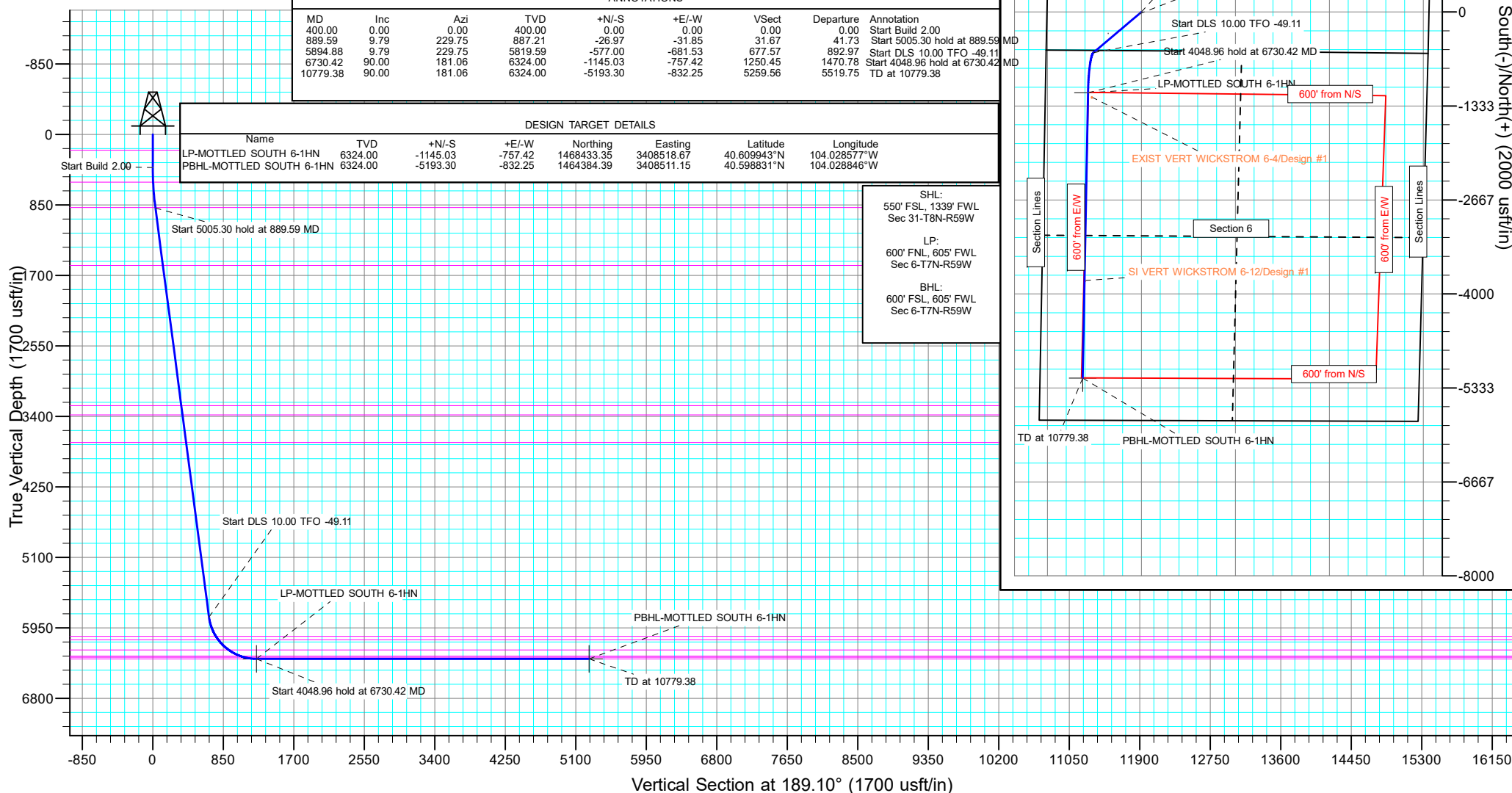
ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSec	Departure	Annotation
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	Start Build 2.00
889.59	9.79	229.75	887.21	-26.97	-31.85	31.67	41.73	Start 5005.30 hold at 889.59 MD
5894.88	9.79	229.75	5819.59	-577.00	-681.53	677.57	892.97	Start DLS 10.00 TFO -49.11
6730.42	90.00	181.06	6324.00	-1145.03	-757.42	1250.45	1470.78	Start 4048.96 hold at 6730.42 MD
10779.38	90.00	181.06	6324.00	-5193.30	-832.25	5259.56	5519.75	TD at 10779.38

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
LP-MOTTLED SOUTH 6-1HN	6324.00	-1145.03	-757.42	1468433.35	3408518.67	40.609943°N	104.028577°W
PBHL-MOTTLED SOUTH 6-1HN	6324.00	-5193.30	-832.25	1464384.39	3408511.15	40.598831°N	104.028846°W

SHL:
550' FSL, 1339' FWL
Sec 31-T8N-R59W
LP:
600' FNL, 605' FWL
Sec 6-T7N-R59W
BHL:
600' FSL, 605' FWL
Sec 6-T7N-R59W



Planning Report

Database:	EDM 5000.16 Single User Db	Local Co-ordinate Reference:	Well MOTTLED SOUTH 6-1HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 17' @ 4985.00usft
Project:	WELD COUNTY	MD Reference:	KB 17' @ 4985.00usft
Site:	SEC 31-T8N-R59W	North Reference:	True
Well:	MOTTLED SOUTH 6-1HN	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 6-1HN					
Well Position	+N/-S	0.00 usft	Northing:	1,469,590.81 usft	Latitude:	40.613086°N
	+E/-W	0.00 usft	Easting:	3,409,256.95 usft	Longitude:	104.025849°W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	4,968.00 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	51,978.82585278

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	189.10	

Plan Survey Tool Program	Date	12/17/2022			
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.00	10,779.38 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	
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00	
889.59	9.79	229.75	887.21	-26.97	-31.85	2.00	2.00	0.00	229.75	
5,894.88	9.79	229.75	5,819.59	-577.00	-681.53	0.00	0.00	0.00	0.00	
6,730.42	90.00	181.06	6,324.00	-1,145.03	-757.42	10.00	9.60	-5.83	-49.11	LP-MOTTLED SOUTI
10,779.38	90.00	181.06	6,324.00	-5,193.30	-832.25	0.00	0.00	0.00	0.00	PBHL-MOTTLED SOI

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Company:	MALLARD EXPLORATION	TVD Reference:	KB 17' @ 4985.00usft
Project:	WELD COUNTY	MD Reference:	KB 17' @ 4985.00usft
Site:	SEC 31-T8N-R59W	North Reference:	True
Well:	MOTTLED SOUTH 6-1HN	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
190.00	0.00	0.00	190.00	0.00	0.00	0.00	0.00	0.00	0.00
Laramie Shale Base									
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
500.00	2.00	229.75	499.98	-1.13	-1.33	1.32	2.00	2.00	0.00
575.11	3.50	229.75	575.00	-3.46	-4.08	4.06	2.00	2.00	0.00
Laramie Fox Hills Base									
600.00	4.00	229.75	599.84	-4.51	-5.33	5.30	2.00	2.00	0.00
700.00	6.00	229.75	699.45	-10.14	-11.98	11.91	2.00	2.00	0.00
800.00	8.00	229.75	798.70	-18.01	-21.28	21.15	2.00	2.00	0.00
882.27	9.65	229.75	880.00	-26.17	-30.91	30.73	2.00	2.00	0.00
Pierre Shale Base									
889.59	9.79	229.75	887.21	-26.97	-31.85	31.67	2.00	2.00	0.00
Start 5005.30 hold at 889.59 MD									
900.00	9.79	229.75	897.47	-28.11	-33.20	33.01	0.00	0.00	0.00
1,000.00	9.79	229.75	996.01	-39.10	-46.18	45.91	0.00	0.00	0.00
1,100.00	9.79	229.75	1,094.56	-50.09	-59.16	58.82	0.00	0.00	0.00
1,200.00	9.79	229.75	1,193.10	-61.08	-72.14	71.72	0.00	0.00	0.00
1,300.00	9.79	229.75	1,291.64	-72.07	-85.12	84.63	0.00	0.00	0.00
1,400.00	9.79	229.75	1,390.18	-83.06	-98.10	97.53	0.00	0.00	0.00
1,500.00	9.79	229.75	1,488.73	-94.04	-111.08	110.44	0.00	0.00	0.00
1,592.62	9.79	229.75	1,580.00	-104.22	-123.10	122.39	0.00	0.00	0.00
Upper Pierre Shale Base									
1,600.00	9.79	229.75	1,587.27	-105.03	-124.06	123.34	0.00	0.00	0.00
1,700.00	9.79	229.75	1,685.81	-116.02	-137.04	136.25	0.00	0.00	0.00
1,800.00	9.79	229.75	1,784.36	-127.01	-150.02	149.15	0.00	0.00	0.00
1,900.00	9.79	229.75	1,882.90	-138.00	-163.00	162.05	0.00	0.00	0.00
2,000.00	9.79	229.75	1,981.44	-148.99	-175.98	174.96	0.00	0.00	0.00
2,100.00	9.79	229.75	2,079.99	-159.98	-188.96	187.86	0.00	0.00	0.00
2,200.00	9.79	229.75	2,178.53	-170.97	-201.94	200.77	0.00	0.00	0.00
2,300.00	9.79	229.75	2,277.07	-181.96	-214.92	213.67	0.00	0.00	0.00
2,400.00	9.79	229.75	2,375.62	-192.95	-227.90	226.58	0.00	0.00	0.00
2,500.00	9.79	229.75	2,474.16	-203.93	-240.88	239.48	0.00	0.00	0.00
2,600.00	9.79	229.75	2,572.70	-214.92	-253.86	252.38	0.00	0.00	0.00
2,700.00	9.79	229.75	2,671.25	-225.91	-266.84	265.29	0.00	0.00	0.00
2,800.00	9.79	229.75	2,769.79	-236.90	-279.82	278.19	0.00	0.00	0.00
2,900.00	9.79	229.75	2,868.33	-247.89	-292.80	291.10	0.00	0.00	0.00
3,000.00	9.79	229.75	2,966.88	-258.88	-305.78	304.00	0.00	0.00	0.00
3,100.00	9.79	229.75	3,065.42	-269.87	-318.76	316.91	0.00	0.00	0.00
3,200.00	9.79	229.75	3,163.96	-280.86	-331.74	329.81	0.00	0.00	0.00
3,300.00	9.79	229.75	3,262.51	-291.85	-344.72	342.72	0.00	0.00	0.00
3,307.60	9.79	229.75	3,270.00	-292.68	-345.70	343.70	0.00	0.00	0.00
Richard Sandstone									
3,400.00	9.79	229.75	3,361.05	-302.83	-357.70	355.62	0.00	0.00	0.00
3,421.26	9.79	229.75	3,382.00	-305.17	-360.46	358.36	0.00	0.00	0.00
Parkman Sandstone									
3,500.00	9.79	229.75	3,459.59	-313.82	-370.68	368.52	0.00	0.00	0.00
3,600.00	9.79	229.75	3,558.14	-324.81	-383.66	381.43	0.00	0.00	0.00
3,700.00	9.79	229.75	3,656.68	-335.80	-396.64	394.33	0.00	0.00	0.00
3,759.18	9.79	229.75	3,715.00	-342.31	-404.32	401.97	0.00	0.00	0.00
Parkman Sandstone Base									
3,800.00	9.79	229.75	3,755.22	-346.79	-409.61	407.24	0.00	0.00	0.00

Planning Report

Database:	EDM 5000.16 Single User Db	Local Co-ordinate Reference:	Well MOTTLED SOUTH 6-1HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 17' @ 4985.00usft
Project:	WELD COUNTY	MD Reference:	KB 17' @ 4985.00usft
Site:	SEC 31-T8N-R59W	North Reference:	True
Well:	MOTTLED SOUTH 6-1HN	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)
3,900.00	9.79	229.75	3,853.77	-357.78	-422.59	420.14	0.00	0.00	0.00
4,000.00	9.79	229.75	3,952.31	-368.77	-435.57	433.05	0.00	0.00	0.00
4,100.00	9.79	229.75	4,050.85	-379.76	-448.55	445.95	0.00	0.00	0.00
4,200.00	9.79	229.75	4,149.40	-390.75	-461.53	458.85	0.00	0.00	0.00
4,300.00	9.79	229.75	4,247.94	-401.74	-474.51	471.76	0.00	0.00	0.00
4,400.00	9.79	229.75	4,346.48	-412.72	-487.49	484.66	0.00	0.00	0.00
4,500.00	9.79	229.75	4,445.03	-423.71	-500.47	497.57	0.00	0.00	0.00
4,600.00	9.79	229.75	4,543.57	-434.70	-513.45	510.47	0.00	0.00	0.00
4,700.00	9.79	229.75	4,642.11	-445.69	-526.43	523.38	0.00	0.00	0.00
4,800.00	9.79	229.75	4,740.65	-456.68	-539.41	536.28	0.00	0.00	0.00
4,900.00	9.79	229.75	4,839.20	-467.67	-552.39	549.19	0.00	0.00	0.00
5,000.00	9.79	229.75	4,937.74	-478.66	-565.37	562.09	0.00	0.00	0.00
5,100.00	9.79	229.75	5,036.28	-489.65	-578.35	574.99	0.00	0.00	0.00
5,200.00	9.79	229.75	5,134.83	-500.64	-591.33	587.90	0.00	0.00	0.00
5,300.00	9.79	229.75	5,233.37	-511.63	-604.31	600.80	0.00	0.00	0.00
5,400.00	9.79	229.75	5,331.91	-522.61	-617.29	613.71	0.00	0.00	0.00
5,500.00	9.79	229.75	5,430.46	-533.60	-630.27	626.61	0.00	0.00	0.00
5,600.00	9.79	229.75	5,529.00	-544.59	-643.25	639.52	0.00	0.00	0.00
5,700.00	9.79	229.75	5,627.54	-555.58	-656.23	652.42	0.00	0.00	0.00
5,800.00	9.79	229.75	5,726.09	-566.57	-669.21	665.33	0.00	0.00	0.00
5,894.88	9.79	229.75	5,819.59	-577.00	-681.53	677.57	0.00	0.00	0.00
Start DLS 10.00 TFO -49.11									
5,900.00	10.13	227.55	5,824.63	-577.58	-682.19	678.25	10.00	6.69	-42.97
6,000.00	18.45	203.92	5,921.52	-598.04	-695.13	700.50	10.00	8.32	-23.63
6,100.00	27.88	195.24	6,013.38	-635.16	-707.73	739.14	10.00	9.42	-8.68
6,144.62	32.19	192.94	6,052.00	-656.81	-713.13	761.38	10.00	9.66	-5.16
Sharon Springs									
6,194.45	37.04	190.95	6,093.00	-684.50	-718.96	789.65	10.00	9.74	-4.00
Niobrara Top									
6,200.00	37.59	190.75	6,097.42	-687.81	-719.59	793.01	10.00	9.77	-3.50
6,300.00	47.40	187.90	6,171.07	-754.40	-730.38	860.46	10.00	9.82	-2.85
6,373.03	54.60	186.34	6,217.00	-810.68	-737.37	917.14	10.00	9.86	-2.14
Niobrara B2 Chalk Top									
6,400.00	57.27	185.84	6,232.10	-832.89	-739.74	939.45	10.00	9.88	-1.87
6,500.00	67.16	184.19	6,278.67	-920.91	-747.40	1,027.58	10.00	9.89	-1.65
6,531.21	70.25	183.73	6,290.00	-949.92	-749.41	1,056.53	10.00	9.90	-1.48
Niobrara C Chalk Target Reservoir Top									
6,574.16	74.51	183.12	6,303.00	-990.77	-751.85	1,097.26	10.00	9.91	-1.42
Niobrara C Chalk Target Top									
6,600.00	77.07	182.76	6,309.34	-1,015.79	-753.13	1,122.16	10.00	9.91	-1.37
6,700.00	86.98	181.45	6,323.20	-1,114.63	-756.76	1,220.33	10.00	9.92	-1.31
6,730.42	90.00	181.06	6,324.00	-1,145.03	-757.42	1,250.45	10.00	9.92	-1.29
Start 4048.96 hold at 6730.42 MD - Niobrara C Chalk Target Landing Point									
6,800.00	90.00	181.06	6,324.00	-1,214.59	-758.71	1,319.35	0.00	0.00	0.00
6,900.00	90.00	181.06	6,324.00	-1,314.58	-760.56	1,418.36	0.00	0.00	0.00
7,000.00	90.00	181.06	6,324.00	-1,414.56	-762.41	1,517.38	0.00	0.00	0.00
7,100.00	90.00	181.06	6,324.00	-1,514.54	-764.25	1,616.39	0.00	0.00	0.00
7,200.00	90.00	181.06	6,324.00	-1,614.52	-766.10	1,715.41	0.00	0.00	0.00
7,300.00	90.00	181.06	6,324.00	-1,714.51	-767.95	1,814.42	0.00	0.00	0.00
7,400.00	90.00	181.06	6,324.00	-1,814.49	-769.80	1,913.44	0.00	0.00	0.00
7,500.00	90.00	181.06	6,324.00	-1,914.47	-771.64	2,012.46	0.00	0.00	0.00
7,600.00	90.00	181.06	6,324.00	-2,014.46	-773.49	2,111.47	0.00	0.00	0.00
7,700.00	90.00	181.06	6,324.00	-2,114.44	-775.34	2,210.49	0.00	0.00	0.00

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Company:	MALLARD EXPLORATION	TVD Reference:	KB 17' @ 4985.00usft
Project:	WELD COUNTY	MD Reference:	KB 17' @ 4985.00usft
Site:	SEC 31-T8N-R59W	North Reference:	True
Well:	MOTTLED SOUTH 6-1HN	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)	
7,800.00	90.00	181.06	6,324.00	-2,214.42	-777.19	2,309.50	0.00	0.00	0.00	
7,900.00	90.00	181.06	6,324.00	-2,314.41	-779.04	2,408.52	0.00	0.00	0.00	
8,000.00	90.00	181.06	6,324.00	-2,414.39	-780.88	2,507.53	0.00	0.00	0.00	
8,100.00	90.00	181.06	6,324.00	-2,514.37	-782.73	2,606.55	0.00	0.00	0.00	
8,200.00	90.00	181.06	6,324.00	-2,614.35	-784.58	2,705.57	0.00	0.00	0.00	
8,300.00	90.00	181.06	6,324.00	-2,714.34	-786.43	2,804.58	0.00	0.00	0.00	
8,400.00	90.00	181.06	6,324.00	-2,814.32	-788.28	2,903.60	0.00	0.00	0.00	
8,500.00	90.00	181.06	6,324.00	-2,914.30	-790.12	3,002.61	0.00	0.00	0.00	
8,600.00	90.00	181.06	6,324.00	-3,014.29	-791.97	3,101.63	0.00	0.00	0.00	
8,700.00	90.00	181.06	6,324.00	-3,114.27	-793.82	3,200.64	0.00	0.00	0.00	
8,800.00	90.00	181.06	6,324.00	-3,214.25	-795.67	3,299.66	0.00	0.00	0.00	
8,900.00	90.00	181.06	6,324.00	-3,314.23	-797.52	3,398.68	0.00	0.00	0.00	
9,000.00	90.00	181.06	6,324.00	-3,414.22	-799.36	3,497.69	0.00	0.00	0.00	
9,100.00	90.00	181.06	6,324.00	-3,514.20	-801.21	3,596.71	0.00	0.00	0.00	
9,200.00	90.00	181.06	6,324.00	-3,614.18	-803.06	3,695.72	0.00	0.00	0.00	
9,300.00	90.00	181.06	6,324.00	-3,714.17	-804.91	3,794.74	0.00	0.00	0.00	
9,400.00	90.00	181.06	6,324.00	-3,814.15	-806.76	3,893.75	0.00	0.00	0.00	
9,500.00	90.00	181.06	6,324.00	-3,914.13	-808.60	3,992.77	0.00	0.00	0.00	
9,600.00	90.00	181.06	6,324.00	-4,014.11	-810.45	4,091.78	0.00	0.00	0.00	
9,700.00	90.00	181.06	6,324.00	-4,114.10	-812.30	4,190.80	0.00	0.00	0.00	
9,800.00	90.00	181.06	6,324.00	-4,214.08	-814.15	4,289.82	0.00	0.00	0.00	
9,900.00	90.00	181.06	6,324.00	-4,314.06	-816.00	4,388.83	0.00	0.00	0.00	
10,000.00	90.00	181.06	6,324.00	-4,414.05	-817.84	4,487.85	0.00	0.00	0.00	
10,100.00	90.00	181.06	6,324.00	-4,514.03	-819.69	4,586.86	0.00	0.00	0.00	
10,200.00	90.00	181.06	6,324.00	-4,614.01	-821.54	4,685.88	0.00	0.00	0.00	
10,300.00	90.00	181.06	6,324.00	-4,714.00	-823.39	4,784.89	0.00	0.00	0.00	
10,400.00	90.00	181.06	6,324.00	-4,813.98	-825.24	4,883.91	0.00	0.00	0.00	
10,500.00	90.00	181.06	6,324.00	-4,913.96	-827.08	4,982.93	0.00	0.00	0.00	
10,600.00	90.00	181.06	6,324.00	-5,013.94	-828.93	5,081.94	0.00	0.00	0.00	
10,700.00	90.00	181.06	6,324.00	-5,113.93	-830.78	5,180.96	0.00	0.00	0.00	
10,779.38	90.00	181.06	6,324.00	-5,193.30	-832.25	5,259.56	0.00	0.00	0.00	
TD at 10779.38										

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	6,324.00	-5,193.30	-832.25	1,464,384.40	3,408,511.15	40.598831°N	104.028846°W
LP-MOTTLED SOUTH € - plan hits target center - Point	0.00	0.00	6,324.00	-1,145.03	-757.42	1,468,433.35	3,408,518.67	40.609943°N	104.028577°W

Planning Report

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

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
190.00	190.00	Laramie Shale Base				
575.11	575.00	Laramie Fox Hills Base				
882.27	880.00	Pierre Shale Base				
1,592.62	1,580.00	Upper Pierre Shale Base				
3,307.60	3,270.00	Richard Sandstone				
3,421.26	3,382.00	Parkman Sandstone				
3,759.18	3,715.00	Parkman Sandstone Base				
6,144.62	6,052.00	Sharon Springs				
6,194.45	6,093.00	Niobrara Top				
6,373.03	6,217.00	Niobrara B2 Chalk Top				
6,531.21	6,290.00	Niobrara C Chalk Target Reservoir Top				
6,574.16	6,303.00	Niobrara C Chalk Target Top				
6,730.42	6,324.00	Niobrara C Chalk Target Landing Point				

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
400.00	400.00	0.00	0.00	Start Build 2.00	
889.59	887.21	-26.97	-31.85	Start 5005.30 hold at 889.59 MD	
5,894.88	5,819.59	-577.00	-681.53	Start DLS 10.00 TFO -49.11	
6,730.42	6,324.00	-1,145.03	-757.42	Start 4048.96 hold at 6730.42 MD	
10,779.38	6,324.00	-5,193.30	-832.25	TD at 10779.38	