

MALLARD EXPLORATION

WELD COUNTY

SEC 31-T8N-R59W

MOTTLED SOUTH 6-7HN

OWB

Plan: PROPOSAL 1

Standard Planning Report

17 December, 2022



Project: WELD COUNTY
Site: SEC 31-T8N-R59W
Well: MOTTLED SOUTH 6-7HN
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 6-7HN

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	1469591.71	3409376.89	40.613083°N	104.025417°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	500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	
3	949.75	8.99	136.33	947.90	-25.48	24.33	2.00	136.33	27.81	
4	5880.29	8.99	136.33	5817.81	-583.05	556.66	0.00	0.00	636.30	
5	6716.52	90.00	181.06	6324.00	-1153.41	602.50	10.00	45.09	1208.37	LP-MOTTLED SOUTH 6-7HN
6	10760.03	90.00	181.06	6324.00	-5196.22	527.62	0.00	0.00	5222.94	PBHL-MOTTLED SOUTH 6-7HN

FORMATION TOP DETAILS

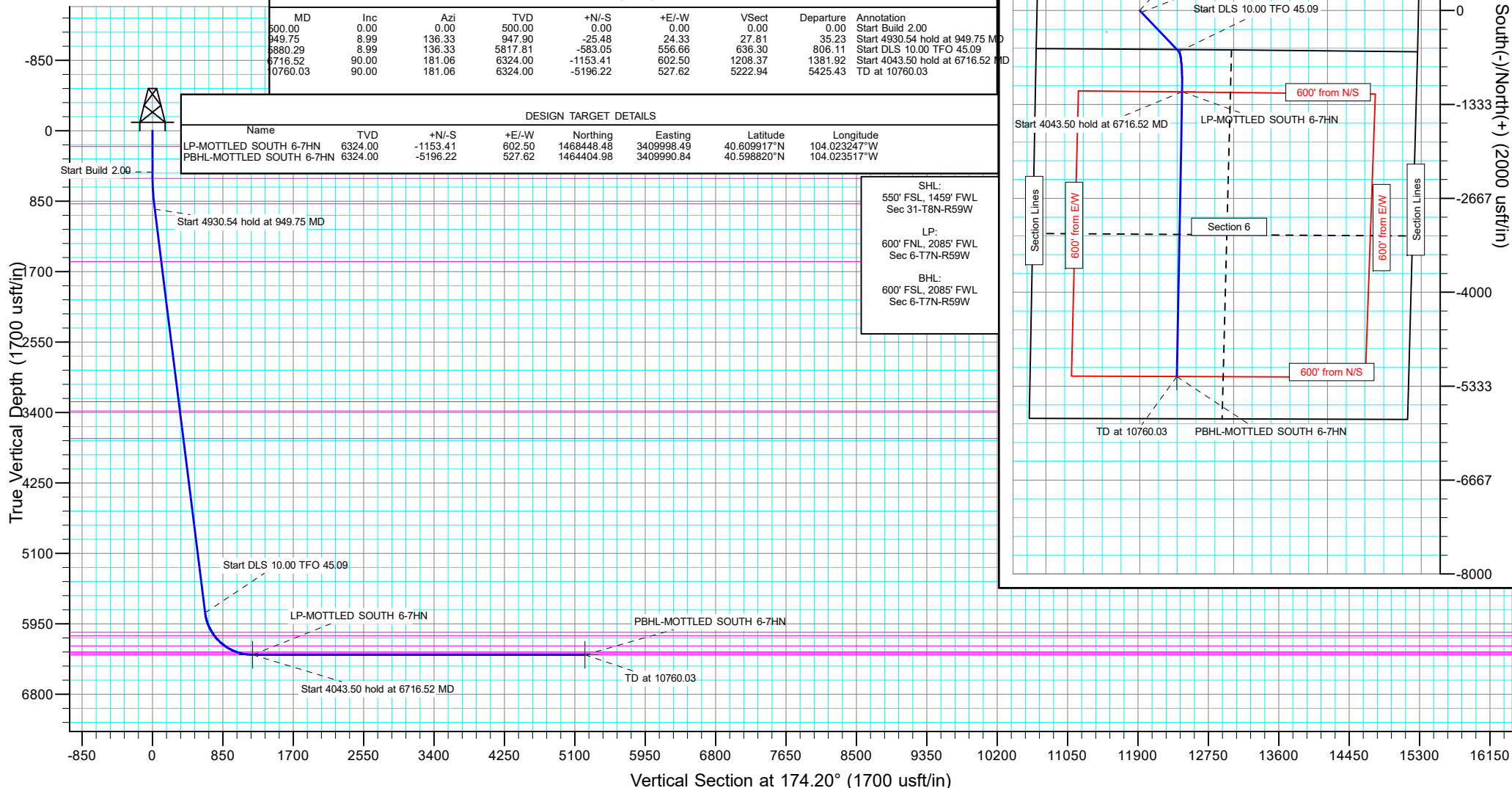
TVDPPath	MDPath	Formation
190.00	190.00	Laramie Shale Base
575.00	575.01	Laramie Fox Hills Base
880.00	881.12	Pierre Shale Base
1580.00	1589.72	Upper Pierre Shale Base
3270.00	3300.76	Richard Sandstone
3382.00	3414.15	Parkman Sandstone
3715.00	3751.30	Parkman Sandstone Base
6052.00	6131.41	Sharon Springs
6093.00	6181.17	Niobrara Top
6217.00	6359.53	Niobrara B2 Chalk Top
6290.00	6517.53	Niobrara C Chalk Target Reservoir Top
6303.00	6560.43	Niobrara C Chalk Target Top
6324.00	6716.52	Niobrara C Chalk Target Landing Point

ANNOTATIONS

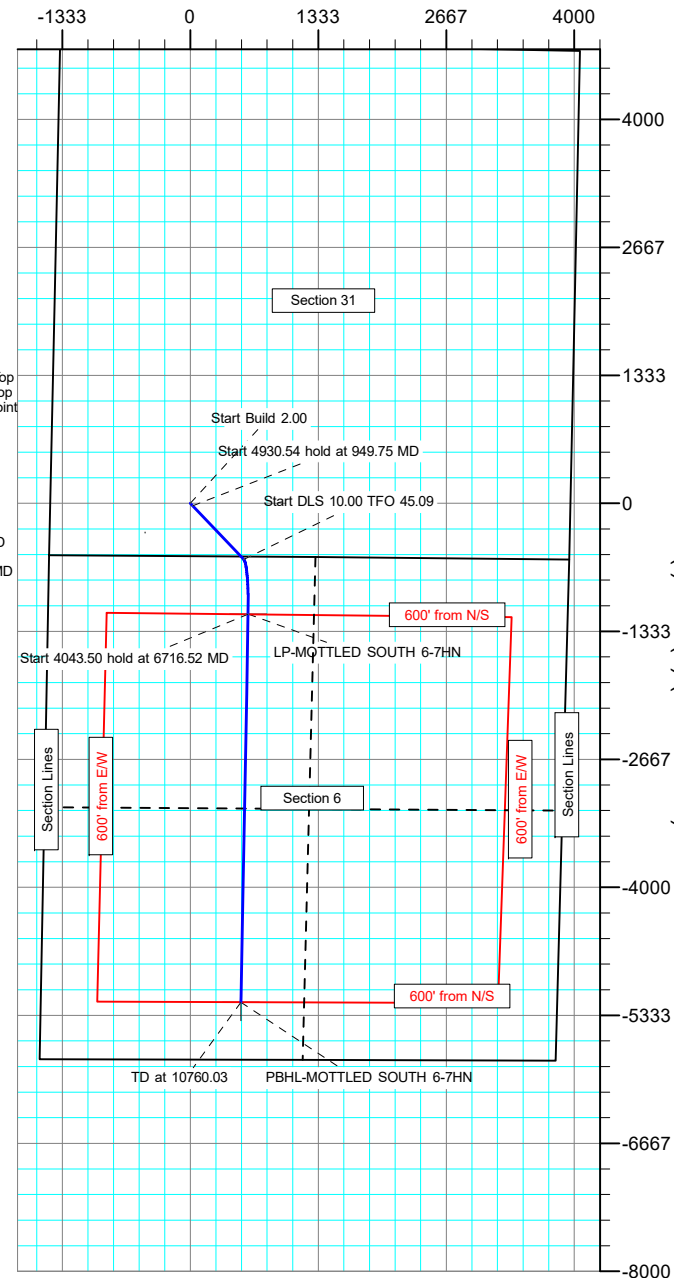
MD	Inc	Azi	TVD	+N/-S	+E/-W	VSec	Departure	Annotation
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	Start Build 2.00
949.75	8.99	136.33	947.90	-25.48	24.33	27.81	35.23	Start 4930.54 hold at 949.75 MD
5880.29	8.99	136.33	5817.81	-583.05	556.66	636.30	806.11	Start DLS 10.00 TFO 45.09
6716.52	90.00	181.06	6324.00	-1153.41	602.50	1208.37	1381.92	Start 4043.50 hold at 6716.52 MD
10760.03	90.00	181.06	6324.00	-5196.22	527.62	5222.94	5425.43	TD at 10760.03

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
LP-MOTTLED SOUTH 6-7HN	6324.00	-1153.41	602.50	1468448.48	3409998.49	40.609917°N	104.023247°W
PBHL-MOTTLED SOUTH 6-7HN	6324.00	-5196.22	527.62	1464404.98	3409990.84	40.598820°N	104.023517°W



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



Planning Report

Database:	EDM 5000.16 Single User Db	Local Co-ordinate Reference:	Well MOTTLED SOUTH 6-7HN
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 6-7HN	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 6-7HN					
Well Position	+N/-S	0.00 usft	Northing:	1,469,591.71 usft	Latitude:	40.613083°N
	+E/-W	0.00 usft	Easting:	3,409,376.89 usft	Longitude:	104.025417°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	51,978.86659554

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	174.20	

Plan Survey Tool Program	Date	12/17/2022			
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.00	10,760.03 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	
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	
949.75	8.99	136.33	947.90	-25.48	24.33	2.00	2.00	0.00	136.33	
5,880.29	8.99	136.33	5,817.81	-583.05	556.66	0.00	0.00	0.00	0.00	
6,716.52	90.00	181.06	6,324.00	-1,153.41	602.50	10.00	9.69	5.35	45.09	LP-MOTTLED SOUTI
10,760.03	90.00	181.06	6,324.00	-5,196.22	527.62	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 6-7HN	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									
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
575.01	1.50	136.33	575.00	-0.71	0.68	0.78	2.00	2.00	0.00
Laramie Fox Hills Base									
600.00	2.00	136.33	599.98	-1.26	1.21	1.38	2.00	2.00	0.00
700.00	4.00	136.33	699.84	-5.05	4.82	5.51	2.00	2.00	0.00
800.00	6.00	136.33	799.45	-11.35	10.84	12.39	2.00	2.00	0.00
881.12	7.62	136.33	880.00	-18.31	17.48	19.98	2.00	2.00	0.00
Pierre Shale Base									
900.00	8.00	136.33	898.70	-20.17	19.25	22.01	2.00	2.00	0.00
949.75	8.99	136.33	947.90	-25.48	24.33	27.81	2.00	2.00	0.00
Start 4930.54 hold at 949.75 MD									
1,000.00	8.99	136.33	997.54	-31.16	29.75	34.01	0.00	0.00	0.00
1,100.00	8.99	136.33	1,096.31	-42.47	40.55	46.35	0.00	0.00	0.00
1,200.00	8.99	136.33	1,195.08	-53.78	51.35	58.69	0.00	0.00	0.00
1,300.00	8.99	136.33	1,293.85	-65.09	62.14	71.04	0.00	0.00	0.00
1,400.00	8.99	136.33	1,392.62	-76.40	72.94	83.38	0.00	0.00	0.00
1,500.00	8.99	136.33	1,491.39	-87.71	83.74	95.72	0.00	0.00	0.00
1,589.72	8.99	136.33	1,580.00	-97.85	93.42	106.79	0.00	0.00	0.00
Upper Pierre Shale Base									
1,600.00	8.99	136.33	1,590.16	-99.02	94.53	108.06	0.00	0.00	0.00
1,700.00	8.99	136.33	1,688.93	-110.32	105.33	120.40	0.00	0.00	0.00
1,800.00	8.99	136.33	1,787.70	-121.63	116.13	132.74	0.00	0.00	0.00
1,900.00	8.99	136.33	1,886.47	-132.94	126.92	145.08	0.00	0.00	0.00
2,000.00	8.99	136.33	1,985.24	-144.25	137.72	157.42	0.00	0.00	0.00
2,100.00	8.99	136.33	2,084.01	-155.56	148.52	169.77	0.00	0.00	0.00
2,200.00	8.99	136.33	2,182.78	-166.87	159.31	182.11	0.00	0.00	0.00
2,300.00	8.99	136.33	2,281.55	-178.18	170.11	194.45	0.00	0.00	0.00
2,400.00	8.99	136.33	2,380.32	-189.48	180.91	206.79	0.00	0.00	0.00
2,500.00	8.99	136.33	2,479.09	-200.79	191.70	219.13	0.00	0.00	0.00
2,600.00	8.99	136.33	2,577.86	-212.10	202.50	231.47	0.00	0.00	0.00
2,700.00	8.99	136.33	2,676.63	-223.41	213.29	243.81	0.00	0.00	0.00
2,800.00	8.99	136.33	2,775.40	-234.72	224.09	256.15	0.00	0.00	0.00
2,900.00	8.99	136.33	2,874.17	-246.03	234.89	268.50	0.00	0.00	0.00
3,000.00	8.99	136.33	2,972.94	-257.33	245.68	280.84	0.00	0.00	0.00
3,100.00	8.99	136.33	3,071.71	-268.64	256.48	293.18	0.00	0.00	0.00
3,200.00	8.99	136.33	3,170.48	-279.95	267.28	305.52	0.00	0.00	0.00
3,300.00	8.99	136.33	3,269.25	-291.26	278.07	317.86	0.00	0.00	0.00
3,300.76	8.99	136.33	3,270.00	-291.35	278.16	317.95	0.00	0.00	0.00
Richard Sandstone									
3,400.00	8.99	136.33	3,368.02	-302.57	288.87	330.20	0.00	0.00	0.00
3,414.15	8.99	136.33	3,382.00	-304.17	290.40	331.95	0.00	0.00	0.00
Parkman Sandstone									
3,500.00	8.99	136.33	3,466.79	-313.88	299.67	342.54	0.00	0.00	0.00
3,600.00	8.99	136.33	3,565.56	-325.19	310.46	354.88	0.00	0.00	0.00
3,700.00	8.99	136.33	3,664.33	-336.49	321.26	367.23	0.00	0.00	0.00
3,751.30	8.99	136.33	3,715.00	-342.29	326.80	373.56	0.00	0.00	0.00
Parkman Sandstone Base									
3,800.00	8.99	136.33	3,763.10	-347.80	332.06	379.57	0.00	0.00	0.00
3,900.00	8.99	136.33	3,861.87	-359.11	342.85	391.91	0.00	0.00	0.00

Planning Report

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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 6-7HN	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)
4,000.00	8.99	136.33	3,960.64	-370.42	353.65	404.25	0.00	0.00	0.00
4,100.00	8.99	136.33	4,059.41	-381.73	364.45	416.59	0.00	0.00	0.00
4,200.00	8.99	136.33	4,158.18	-393.04	375.24	428.93	0.00	0.00	0.00
4,300.00	8.99	136.33	4,256.95	-404.34	386.04	441.27	0.00	0.00	0.00
4,400.00	8.99	136.33	4,355.72	-415.65	396.84	453.61	0.00	0.00	0.00
4,500.00	8.99	136.33	4,454.49	-426.96	407.63	465.96	0.00	0.00	0.00
4,600.00	8.99	136.33	4,553.26	-438.27	418.43	478.30	0.00	0.00	0.00
4,700.00	8.99	136.33	4,652.03	-449.58	429.22	490.64	0.00	0.00	0.00
4,800.00	8.99	136.33	4,750.80	-460.89	440.02	502.98	0.00	0.00	0.00
4,900.00	8.99	136.33	4,849.58	-472.20	450.82	515.32	0.00	0.00	0.00
5,000.00	8.99	136.33	4,948.35	-483.50	461.61	527.66	0.00	0.00	0.00
5,100.00	8.99	136.33	5,047.12	-494.81	472.41	540.00	0.00	0.00	0.00
5,200.00	8.99	136.33	5,145.89	-506.12	483.21	552.34	0.00	0.00	0.00
5,300.00	8.99	136.33	5,244.66	-517.43	494.00	564.69	0.00	0.00	0.00
5,400.00	8.99	136.33	5,343.43	-528.74	504.80	577.03	0.00	0.00	0.00
5,500.00	8.99	136.33	5,442.20	-540.05	515.60	589.37	0.00	0.00	0.00
5,600.00	8.99	136.33	5,540.97	-551.35	526.39	601.71	0.00	0.00	0.00
5,700.00	8.99	136.33	5,639.74	-562.66	537.19	614.05	0.00	0.00	0.00
5,800.00	8.99	136.33	5,738.51	-573.97	547.99	626.39	0.00	0.00	0.00
5,880.29	8.99	136.33	5,817.81	-583.05	556.66	636.30	0.00	0.00	0.00
Start DLS 10.00 TFO 45.09									
5,900.00	10.48	144.02	5,837.24	-585.62	558.77	639.07	10.00	7.53	39.05
6,000.00	19.38	162.60	5,933.81	-608.87	569.10	663.24	10.00	8.90	18.58
6,100.00	28.99	169.46	6,024.95	-648.63	578.52	703.75	10.00	9.61	6.86
6,131.41	32.06	170.81	6,052.00	-664.35	581.25	719.67	10.00	9.76	4.30
Sharon Springs									
6,181.18	36.94	172.54	6,093.00	-692.23	585.30	747.82	10.00	9.81	3.47
Niobrara Top									
6,200.00	38.79	173.09	6,107.86	-703.69	586.74	759.37	10.00	9.84	2.94
6,300.00	48.66	175.44	6,180.04	-772.39	593.51	828.39	10.00	9.87	2.34
6,359.53	54.55	176.51	6,217.00	-818.91	596.77	875.01	10.00	9.90	1.81
Niobrara B2 Chalk Top									
6,400.00	58.56	177.16	6,239.30	-852.62	598.63	908.73	10.00	9.91	1.59
6,500.00	68.49	178.54	6,283.82	-941.96	601.94	997.95	10.00	9.92	1.39
6,517.53	70.23	178.77	6,290.00	-958.36	602.32	1,014.30	10.00	9.93	1.26
Niobrara C Chalk Target Reservoir Top									
6,560.43	74.49	179.29	6,303.00	-999.23	603.01	1,055.03	10.00	9.93	1.22
Niobrara C Chalk Target Top									
6,600.00	78.42	179.75	6,312.26	-1,037.68	603.33	1,093.32	10.00	9.93	1.17
6,700.00	88.36	180.88	6,323.76	-1,136.89	602.78	1,191.97	10.00	9.94	1.13
6,716.52	90.00	181.06	6,324.00	-1,153.41	602.50	1,208.37	10.00	9.94	1.11
Start 4043.50 hold at 6716.52 MD - Niobrara C Chalk Target Landing Point									
6,800.00	90.00	181.06	6,324.00	-1,236.87	600.95	1,291.25	0.00	0.00	0.00
6,900.00	90.00	181.06	6,324.00	-1,336.86	599.10	1,390.54	0.00	0.00	0.00
7,000.00	90.00	181.06	6,324.00	-1,436.84	597.25	1,489.82	0.00	0.00	0.00
7,100.00	90.00	181.06	6,324.00	-1,536.82	595.39	1,589.11	0.00	0.00	0.00
7,200.00	90.00	181.06	6,324.00	-1,636.80	593.54	1,688.39	0.00	0.00	0.00
7,300.00	90.00	181.06	6,324.00	-1,736.79	591.69	1,787.67	0.00	0.00	0.00
7,400.00	90.00	181.06	6,324.00	-1,836.77	589.84	1,886.96	0.00	0.00	0.00
7,500.00	90.00	181.06	6,324.00	-1,936.75	587.99	1,986.24	0.00	0.00	0.00
7,600.00	90.00	181.06	6,324.00	-2,036.74	586.14	2,085.53	0.00	0.00	0.00
7,700.00	90.00	181.06	6,324.00	-2,136.72	584.28	2,184.81	0.00	0.00	0.00
7,800.00	90.00	181.06	6,324.00	-2,236.70	582.43	2,284.10	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
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Well:	MOTTLED SOUTH 6-7HN	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)	
7,900.00	90.00	181.06	6,324.00	-2,336.68	580.58	2,383.38	0.00	0.00	0.00	
8,000.00	90.00	181.06	6,324.00	-2,436.67	578.73	2,482.67	0.00	0.00	0.00	
8,100.00	90.00	181.06	6,324.00	-2,536.65	576.88	2,581.95	0.00	0.00	0.00	
8,200.00	90.00	181.06	6,324.00	-2,636.63	575.02	2,681.23	0.00	0.00	0.00	
8,300.00	90.00	181.06	6,324.00	-2,736.62	573.17	2,780.52	0.00	0.00	0.00	
8,400.00	90.00	181.06	6,324.00	-2,836.60	571.32	2,879.80	0.00	0.00	0.00	
8,500.00	90.00	181.06	6,324.00	-2,936.58	569.47	2,979.09	0.00	0.00	0.00	
8,600.00	90.00	181.06	6,324.00	-3,036.56	567.62	3,078.37	0.00	0.00	0.00	
8,700.00	90.00	181.06	6,324.00	-3,136.55	565.77	3,177.66	0.00	0.00	0.00	
8,800.00	90.00	181.06	6,324.00	-3,236.53	563.91	3,276.94	0.00	0.00	0.00	
8,900.00	90.00	181.06	6,324.00	-3,336.51	562.06	3,376.22	0.00	0.00	0.00	
9,000.00	90.00	181.06	6,324.00	-3,436.50	560.21	3,475.51	0.00	0.00	0.00	
9,100.00	90.00	181.06	6,324.00	-3,536.48	558.36	3,574.79	0.00	0.00	0.00	
9,200.00	90.00	181.06	6,324.00	-3,636.46	556.51	3,674.08	0.00	0.00	0.00	
9,300.00	90.00	181.06	6,324.00	-3,736.44	554.65	3,773.36	0.00	0.00	0.00	
9,400.00	90.00	181.06	6,324.00	-3,836.43	552.80	3,872.65	0.00	0.00	0.00	
9,500.00	90.00	181.06	6,324.00	-3,936.41	550.95	3,971.93	0.00	0.00	0.00	
9,600.00	90.00	181.06	6,324.00	-4,036.39	549.10	4,071.21	0.00	0.00	0.00	
9,700.00	90.00	181.06	6,324.00	-4,136.38	547.25	4,170.50	0.00	0.00	0.00	
9,800.00	90.00	181.06	6,324.00	-4,236.36	545.40	4,269.78	0.00	0.00	0.00	
9,900.00	90.00	181.06	6,324.00	-4,336.34	543.54	4,369.07	0.00	0.00	0.00	
10,000.00	90.00	181.06	6,324.00	-4,436.32	541.69	4,468.35	0.00	0.00	0.00	
10,100.00	90.00	181.06	6,324.00	-4,536.31	539.84	4,567.64	0.00	0.00	0.00	
10,200.00	90.00	181.06	6,324.00	-4,636.29	537.99	4,666.92	0.00	0.00	0.00	
10,300.00	90.00	181.06	6,324.00	-4,736.27	536.14	4,766.20	0.00	0.00	0.00	
10,400.00	90.00	181.06	6,324.00	-4,836.26	534.28	4,865.49	0.00	0.00	0.00	
10,500.00	90.00	181.06	6,324.00	-4,936.24	532.43	4,964.77	0.00	0.00	0.00	
10,600.00	90.00	181.06	6,324.00	-5,036.22	530.58	5,064.06	0.00	0.00	0.00	
10,700.00	90.00	181.06	6,324.00	-5,136.20	528.73	5,163.34	0.00	0.00	0.00	
10,760.03	90.00	181.06	6,324.00	-5,196.22	527.62	5,222.94	0.00	0.00	0.00	
TD at 10760.03										

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
LP-MOTTLED SOUTH 6-7HN - hit/miss target - Shape - Point	0.00	0.00	6,324.00	-1,153.41	602.50	1,468,448.48	3,409,998.48	40.609917°N	104.023247°W
PBHL-MOTTLED SOUTH 6-7HN - plan hits target center - Point	0.00	0.00	6,324.00	-5,196.22	527.62	1,464,404.98	3,409,990.84	40.598820°N	104.023517°W

Planning Report

Database:	EDM 5000.16 Single User Db	Local Co-ordinate Reference:	Well MOTTLED SOUTH 6-7HN
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 6-7HN	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				
575.01	575.00	Laramie Fox Hills Base				
881.12	880.00	Pierre Shale Base				
1,589.72	1,580.00	Upper Pierre Shale Base				
3,300.76	3,270.00	Richard Sandstone				
3,414.15	3,382.00	Parkman Sandstone				
3,751.30	3,715.00	Parkman Sandstone Base				
6,131.41	6,052.00	Sharon Springs				
6,181.18	6,093.00	Niobrara Top				
6,359.53	6,217.00	Niobrara B2 Chalk Top				
6,517.53	6,290.00	Niobrara C Chalk Target Reservoir Top				
6,560.43	6,303.00	Niobrara C Chalk Target Top				
6,716.52	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	
500.00	500.00	0.00	0.00	Start Build 2.00	
949.75	947.90	-25.48	24.33	Start 4930.54 hold at 949.75 MD	
5,880.29	5,817.81	-583.05	556.66	Start DLS 10.00 TFO 45.09	
6,716.52	6,324.00	-1,153.41	602.50	Start 4043.50 hold at 6716.52 MD	
10,760.03	6,324.00	-5,196.22	527.62	TD at 10760.03	