

MALLARD EXPLORATION

WELD COUNTY

SEC 6-T7N-R60W

SHELDUCK 6-5-4HN

OWB

Plan: PROPOSAL 1

Standard Planning Report

28 May, 2022



Project: WELD COUNTY
Site: SEC 6-T7N-R60W
Well: SHELDUCK 6-5-4HN
Wellbore: OWB
Design: PROPOSAL 1



Azimuths to True North
Magnetic North: 7.44°
Magnetic Field
Strength: 52019.7nT
Dip Angle: 66.86°
Date: 5/28/2022
Model: IGRF2020

WELL DETAILS: SHELDUCK 6-5-4HN

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	1464570.77	3376812.83	40.600730°N	104.142971°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	400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	
3	1328.14	18.56	329.01	1311.99	127.77	-76.74	2.00	329.01	-54.40	
4	6062.97	18.56	329.01	5800.48	1419.91	-852.85	0.00	0.00	-604.57	
5	7057.02	90.00	89.89	6441.00	1605.55	-287.94	10.00	119.55	-16.63	SHELDUCK 6-5-4HN-LP
6	16962.82	90.00	89.89	6441.00	1623.82	9617.84	0.00	0.00	9753.96	SHELDUCK 6-5-4HN-PBHL

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
1328.14	18.56	329.01	1311.99	127.77	-76.74	-54.40	149.04	Start 4734.82 hold at 1328.14 MD
6062.97	18.56	329.01	5800.48	1419.91	-852.85	-604.57	1656.35	Start DLS 10.00 TFO 119.55
7057.02	90.00	89.89	6441.00	1605.55	-287.94	-16.63	2305.89	Start 9905.80 hold at 7057.02 MD
16962.82	90.00	89.89	6441.00	1623.82	9617.84	9753.96	12211.69	TD at 16962.82

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
SHELDUCK 6-5-4HN-LP - plan hits target center	6441.00	1605.55	-287.94	1466171.73	3376500.35	40.605137°N	104.144008°W	Point
SHELDUCK 6-5-4HN-PBHL - plan hits target center	6441.00	1623.82	9617.84	1466341.58	3386404.70	40.605182°N	104.108333°W	Point

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
226.00	226.00	Laramie Base
681.00	681.45	Laramie Fox Hills Base
926.00	929.00	Pierre Shale Base
1751.00	1791.25	Upper Pierre Shale Base*
3460.00	3594.04	Richard Sandstone
3561.00	3700.58	Parkman Sandstone
3941.00	4101.43	Parkman Sandstone Base
6282.00	6610.34	Sharon Springs
6319.00	6668.16	Niobrara Top
6422.00	6906.05	Niobrara B2 Chalk Reservoir Top
6434.00	6965.55	Niobrara B2 Chalk Target Top
6441.00	7057.02	Niobrara B2 Chalk Target Center Line (LP)

PROJECT DETAILS: WELD COUNTY

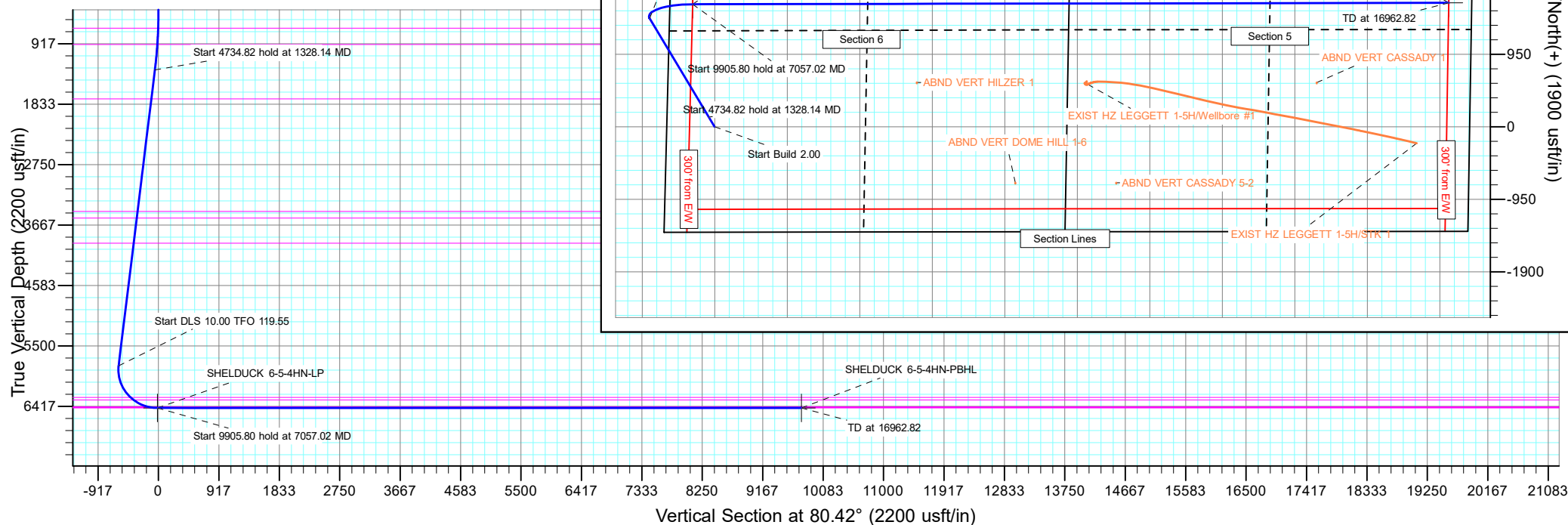
Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: Colorado Northern Zone

System Datum: Mean Sea Level

SHL:
1382' FSL, 629' FWL
Sec 6-T7N-R60W

LP:
2300' FNL, 300' FWL
Sec 6-T7N-R60W

BHL:
2300' FNL, 300' FEL
Sec 5-T7N-R60W



Planning Report

Database:	EDM 5000.16 Single User Db	Local Co-ordinate Reference:	Well SHELDUCK 6-5-4HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 27' @ 4981.00usft
Project:	WELD COUNTY	MD Reference:	KB 27' @ 4981.00usft
Site:	SEC 6-T7N-R60W	North Reference:	True
Well:	SHELDUCK 6-5-4HN	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 6-T7N-R60W				
Site Position:		Northing:	1,463,178.22	usft	Latitude:	40.596935°N
From:	Lat/Long	Easting:	3,376,169.80	usft	Longitude:	104.145363°W
Position Uncertainty:		0.00	usft	Slot Radius:	13.200	in

Well		SHELDUCK 6-5-4HN				
Well Position	+N/-S	0.00 usft	Northing:	1,464,570.78 usft	Latitude:	40.600730°N
	+E/-W	0.00 usft	Easting:	3,376,812.82 usft	Longitude:	104.142971°W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	4,954.00 usft
Grid Convergence:		0.88 °				

Wellbore	OWB				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2020	5/28/2022	7.44	66.86	52,019.74753319

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	80.42	

Plan Survey Tool Program	Date	5/28/2022			
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.00	16,962.82 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	
1,328.14	18.56	329.01	1,311.99	127.77	-76.74	2.00	2.00	0.00	329.01	
6,062.97	18.56	329.01	5,800.48	1,419.91	-852.85	0.00	0.00	0.00	0.00	
7,057.02	90.00	89.89	6,441.00	1,605.55	-287.94	10.00	7.19	12.16	119.55	SHELDUCK 6-5-4HN
16,962.82	90.00	89.89	6,441.00	1,623.82	9,617.84	0.00	0.00	0.00	0.00	SHELDUCK 6-5-4HN

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Company:	MALLARD EXPLORATION	TVD Reference:	KB 27' @ 4981.00usft
Project:	WELD COUNTY	MD Reference:	KB 27' @ 4981.00usft
Site:	SEC 6-T7N-R60W	North Reference:	True
Well:	SHELDUCK 6-5-4HN	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
226.00	0.00	0.00	226.00	0.00	0.00	0.00	0.00	0.00	0.00
Laramie 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	329.01	499.98	1.50	-0.90	-0.64	2.00	2.00	0.00
600.00	4.00	329.01	599.84	5.98	-3.59	-2.55	2.00	2.00	0.00
681.45	5.63	329.01	681.00	11.84	-7.11	-5.04	2.00	2.00	0.00
Laramie Fox Hills Base									
700.00	6.00	329.01	699.45	13.45	-8.08	-5.73	2.00	2.00	0.00
800.00	8.00	329.01	798.70	23.90	-14.36	-10.18	2.00	2.00	0.00
900.00	10.00	329.01	897.47	37.31	-22.41	-15.89	2.00	2.00	0.00
929.00	10.58	329.01	926.00	41.75	-25.08	-17.78	2.00	2.00	0.00
Pierre Shale Base									
1,000.00	12.00	329.01	995.62	53.67	-32.23	-22.85	2.00	2.00	0.00
1,100.00	14.00	329.01	1,093.06	72.95	-43.82	-31.06	2.00	2.00	0.00
1,200.00	16.00	329.01	1,189.64	95.14	-57.14	-40.51	2.00	2.00	0.00
1,300.00	18.00	329.01	1,285.27	120.20	-72.20	-51.18	2.00	2.00	0.00
1,328.14	18.56	329.01	1,311.99	127.77	-76.74	-54.40	2.00	2.00	0.00
Start 4734.82 hold at 1328.14 MD									
1,400.00	18.56	329.01	1,380.11	147.38	-88.52	-62.75	0.00	0.00	0.00
1,500.00	18.56	329.01	1,474.91	174.67	-104.91	-74.37	0.00	0.00	0.00
1,600.00	18.56	329.01	1,569.70	201.96	-121.30	-85.99	0.00	0.00	0.00
1,700.00	18.56	329.01	1,664.50	229.25	-137.69	-97.61	0.00	0.00	0.00
1,791.25	18.56	329.01	1,751.00	254.15	-152.65	-108.21	0.00	0.00	0.00
Upper Pierre Shale Base*									
1,800.00	18.56	329.01	1,759.30	256.54	-154.09	-109.23	0.00	0.00	0.00
1,900.00	18.56	329.01	1,854.10	283.83	-170.48	-120.85	0.00	0.00	0.00
2,000.00	18.56	329.01	1,948.89	311.12	-186.87	-132.47	0.00	0.00	0.00
2,100.00	18.56	329.01	2,043.69	338.41	-203.26	-144.09	0.00	0.00	0.00
2,200.00	18.56	329.01	2,138.49	365.70	-219.65	-155.71	0.00	0.00	0.00
2,300.00	18.56	329.01	2,233.29	392.99	-236.04	-167.33	0.00	0.00	0.00
2,400.00	18.56	329.01	2,328.08	420.28	-252.44	-178.95	0.00	0.00	0.00
2,500.00	18.56	329.01	2,422.88	447.57	-268.83	-190.57	0.00	0.00	0.00
2,600.00	18.56	329.01	2,517.68	474.86	-285.22	-202.19	0.00	0.00	0.00
2,700.00	18.56	329.01	2,612.48	502.15	-301.61	-213.80	0.00	0.00	0.00
2,800.00	18.56	329.01	2,707.27	529.44	-318.00	-225.42	0.00	0.00	0.00
2,900.00	18.56	329.01	2,802.07	556.73	-334.39	-237.04	0.00	0.00	0.00
3,000.00	18.56	329.01	2,896.87	584.02	-350.79	-248.66	0.00	0.00	0.00
3,100.00	18.56	329.01	2,991.67	611.31	-367.18	-260.28	0.00	0.00	0.00
3,200.00	18.56	329.01	3,086.46	638.60	-383.57	-271.90	0.00	0.00	0.00
3,300.00	18.56	329.01	3,181.26	665.89	-399.96	-283.52	0.00	0.00	0.00
3,400.00	18.56	329.01	3,276.06	693.18	-416.35	-295.14	0.00	0.00	0.00
3,500.00	18.56	329.01	3,370.86	720.47	-432.74	-306.76	0.00	0.00	0.00
3,594.04	18.56	329.01	3,460.00	746.13	-448.16	-317.69	0.00	0.00	0.00
Richard Sandstone									
3,600.00	18.56	329.01	3,465.65	747.76	-449.13	-318.38	0.00	0.00	0.00
3,700.00	18.56	329.01	3,560.45	775.05	-465.53	-330.00	0.00	0.00	0.00
3,700.58	18.56	329.01	3,561.00	775.21	-465.62	-330.07	0.00	0.00	0.00
Parkman Sandstone									
3,800.00	18.56	329.01	3,655.25	802.34	-481.92	-341.62	0.00	0.00	0.00
3,900.00	18.56	329.01	3,750.05	829.63	-498.31	-353.24	0.00	0.00	0.00
4,000.00	18.56	329.01	3,844.84	856.92	-514.70	-364.86	0.00	0.00	0.00

Planning Report

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Company:	MALLARD EXPLORATION	TVD Reference:	KB 27' @ 4981.00usft
Project:	WELD COUNTY	MD Reference:	KB 27' @ 4981.00usft
Site:	SEC 6-T7N-R60W	North Reference:	True
Well:	SHELDUCK 6-5-4HN	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)
4,100.00	18.56	329.01	3,939.64	884.21	-531.09	-376.48	0.00	0.00	0.00
4,101.43	18.56	329.01	3,941.00	884.60	-531.33	-376.65	0.00	0.00	0.00
Parkman Sandstone Base									
4,200.00	18.56	329.01	4,034.44	911.50	-547.48	-388.10	0.00	0.00	0.00
4,300.00	18.56	329.01	4,129.24	938.79	-563.88	-399.72	0.00	0.00	0.00
4,400.00	18.56	329.01	4,224.03	966.08	-580.27	-411.34	0.00	0.00	0.00
4,500.00	18.56	329.01	4,318.83	993.37	-596.66	-422.96	0.00	0.00	0.00
4,600.00	18.56	329.01	4,413.63	1,020.66	-613.05	-434.58	0.00	0.00	0.00
4,700.00	18.56	329.01	4,508.43	1,047.95	-629.44	-446.20	0.00	0.00	0.00
4,800.00	18.56	329.01	4,603.22	1,075.24	-645.83	-457.82	0.00	0.00	0.00
4,900.00	18.56	329.01	4,698.02	1,102.53	-662.23	-469.44	0.00	0.00	0.00
5,000.00	18.56	329.01	4,792.82	1,129.82	-678.62	-481.06	0.00	0.00	0.00
5,100.00	18.56	329.01	4,887.62	1,157.11	-695.01	-492.68	0.00	0.00	0.00
5,200.00	18.56	329.01	4,982.41	1,184.40	-711.40	-504.30	0.00	0.00	0.00
5,300.00	18.56	329.01	5,077.21	1,211.69	-727.79	-515.92	0.00	0.00	0.00
5,400.00	18.56	329.01	5,172.01	1,238.98	-744.18	-527.54	0.00	0.00	0.00
5,500.00	18.56	329.01	5,266.81	1,266.27	-760.58	-539.15	0.00	0.00	0.00
5,600.00	18.56	329.01	5,361.60	1,293.57	-776.97	-550.77	0.00	0.00	0.00
5,700.00	18.56	329.01	5,456.40	1,320.86	-793.36	-562.39	0.00	0.00	0.00
5,800.00	18.56	329.01	5,551.20	1,348.15	-809.75	-574.01	0.00	0.00	0.00
5,900.00	18.56	329.01	5,646.00	1,375.44	-826.14	-585.63	0.00	0.00	0.00
6,000.00	18.56	329.01	5,740.79	1,402.73	-842.53	-597.25	0.00	0.00	0.00
6,062.97	18.56	329.01	5,800.48	1,419.91	-852.85	-604.57	0.00	0.00	0.00
Start DLS 10.00 TFO 119.55									
6,100.00	17.03	340.07	5,835.75	1,430.07	-857.74	-607.70	10.00	-4.13	29.86
6,200.00	16.63	15.08	5,931.71	1,457.72	-859.01	-604.35	10.00	-0.41	35.01
6,300.00	21.39	42.52	6,026.42	1,485.04	-842.93	-583.94	10.00	4.76	27.44
6,400.00	28.86	58.37	6,116.99	1,511.21	-809.97	-547.08	10.00	7.47	15.85
6,500.00	37.46	67.80	6,200.69	1,535.42	-761.14	-494.91	10.00	8.59	9.43
6,600.00	46.55	74.05	6,274.95	1,556.94	-697.93	-428.99	10.00	9.09	6.25
6,610.34	47.51	74.59	6,282.00	1,558.98	-690.64	-421.47	10.00	9.26	5.17
Sharon Springs									
6,668.16	52.90	77.30	6,319.00	1,569.72	-647.56	-377.20	10.00	9.33	4.70
Niobrara Top									
6,700.00	55.89	78.64	6,337.53	1,575.11	-622.24	-351.34	10.00	9.40	4.19
6,800.00	65.37	82.30	6,386.53	1,589.39	-536.39	-264.31	10.00	9.48	3.66
6,900.00	74.93	85.44	6,420.46	1,599.34	-442.99	-170.55	10.00	9.56	3.14
6,906.05	75.51	85.62	6,422.00	1,599.80	-437.15	-164.72	10.00	9.58	2.96
Niobrara B2 Chalk Reservoir Top									
6,965.55	81.21	87.34	6,434.00	1,603.36	-379.01	-106.80	10.00	9.59	2.89
Niobrara B2 Chalk Target Top									
7,000.00	84.52	88.31	6,438.28	1,604.66	-344.86	-72.91	10.00	9.60	2.81
7,057.02	90.00	89.89	6,441.00	1,605.55	-287.94	-16.63	10.00	9.61	2.78
Start 9905.80 hold at 7057.02 MD - Niobrara B2 Chalk Target Center Line (LP)									
7,100.00	90.00	89.89	6,441.00	1,605.63	-244.96	25.76	0.00	0.00	0.00
7,200.00	90.00	89.89	6,441.00	1,605.81	-144.96	124.40	0.00	0.00	0.00
7,300.00	90.00	89.89	6,441.00	1,606.00	-44.96	223.03	0.00	0.00	0.00
7,400.00	90.00	89.89	6,441.00	1,606.18	55.04	321.67	0.00	0.00	0.00
7,500.00	90.00	89.89	6,441.00	1,606.36	155.04	420.30	0.00	0.00	0.00
7,600.00	90.00	89.89	6,441.00	1,606.55	255.04	518.94	0.00	0.00	0.00
7,700.00	90.00	89.89	6,441.00	1,606.73	355.04	617.57	0.00	0.00	0.00
7,800.00	90.00	89.89	6,441.00	1,606.92	455.04	716.21	0.00	0.00	0.00
7,900.00	90.00	89.89	6,441.00	1,607.10	555.04	814.84	0.00	0.00	0.00

Planning Report

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Company:	MALLARD EXPLORATION	TVD Reference:	KB 27' @ 4981.00usft
Project:	WELD COUNTY	MD Reference:	KB 27' @ 4981.00usft
Site:	SEC 6-T7N-R60W	North Reference:	True
Well:	SHELDUCK 6-5-4HN	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)
8,000.00	90.00	89.89	6,441.00	1,607.29	655.04	913.48	0.00	0.00	0.00
8,100.00	90.00	89.89	6,441.00	1,607.47	755.04	1,012.11	0.00	0.00	0.00
8,200.00	90.00	89.89	6,441.00	1,607.66	855.04	1,110.75	0.00	0.00	0.00
8,300.00	90.00	89.89	6,441.00	1,607.84	955.04	1,209.38	0.00	0.00	0.00
8,400.00	90.00	89.89	6,441.00	1,608.02	1,055.04	1,308.02	0.00	0.00	0.00
8,500.00	90.00	89.89	6,441.00	1,608.21	1,155.04	1,406.65	0.00	0.00	0.00
8,600.00	90.00	89.89	6,441.00	1,608.39	1,255.04	1,505.29	0.00	0.00	0.00
8,700.00	90.00	89.89	6,441.00	1,608.58	1,355.04	1,603.92	0.00	0.00	0.00
8,800.00	90.00	89.89	6,441.00	1,608.76	1,455.04	1,702.56	0.00	0.00	0.00
8,900.00	90.00	89.89	6,441.00	1,608.95	1,555.04	1,801.19	0.00	0.00	0.00
9,000.00	90.00	89.89	6,441.00	1,609.13	1,655.04	1,899.83	0.00	0.00	0.00
9,100.00	90.00	89.89	6,441.00	1,609.32	1,755.04	1,998.46	0.00	0.00	0.00
9,200.00	90.00	89.89	6,441.00	1,609.50	1,855.04	2,097.10	0.00	0.00	0.00
9,300.00	90.00	89.89	6,441.00	1,609.68	1,955.04	2,195.73	0.00	0.00	0.00
9,400.00	90.00	89.89	6,441.00	1,609.87	2,055.04	2,294.37	0.00	0.00	0.00
9,500.00	90.00	89.89	6,441.00	1,610.05	2,155.04	2,393.00	0.00	0.00	0.00
9,600.00	90.00	89.89	6,441.00	1,610.24	2,255.04	2,491.64	0.00	0.00	0.00
9,700.00	90.00	89.89	6,441.00	1,610.42	2,355.04	2,590.27	0.00	0.00	0.00
9,800.00	90.00	89.89	6,441.00	1,610.61	2,455.04	2,688.91	0.00	0.00	0.00
9,900.00	90.00	89.89	6,441.00	1,610.79	2,555.04	2,787.54	0.00	0.00	0.00
10,000.00	90.00	89.89	6,441.00	1,610.98	2,655.04	2,886.18	0.00	0.00	0.00
10,100.00	90.00	89.89	6,441.00	1,611.16	2,755.04	2,984.81	0.00	0.00	0.00
10,200.00	90.00	89.89	6,441.00	1,611.34	2,855.04	3,083.45	0.00	0.00	0.00
10,300.00	90.00	89.89	6,441.00	1,611.53	2,955.04	3,182.08	0.00	0.00	0.00
10,400.00	90.00	89.89	6,441.00	1,611.71	3,055.04	3,280.72	0.00	0.00	0.00
10,500.00	90.00	89.89	6,441.00	1,611.90	3,155.04	3,379.35	0.00	0.00	0.00
10,600.00	90.00	89.89	6,441.00	1,612.08	3,255.04	3,477.99	0.00	0.00	0.00
10,700.00	90.00	89.89	6,441.00	1,612.27	3,355.04	3,576.62	0.00	0.00	0.00
10,800.00	90.00	89.89	6,441.00	1,612.45	3,455.04	3,675.26	0.00	0.00	0.00
10,900.00	90.00	89.89	6,441.00	1,612.64	3,555.04	3,773.89	0.00	0.00	0.00
11,000.00	90.00	89.89	6,441.00	1,612.82	3,655.04	3,872.53	0.00	0.00	0.00
11,100.00	90.00	89.89	6,441.00	1,613.00	3,755.04	3,971.16	0.00	0.00	0.00
11,200.00	90.00	89.89	6,441.00	1,613.19	3,855.04	4,069.80	0.00	0.00	0.00
11,300.00	90.00	89.89	6,441.00	1,613.37	3,955.04	4,168.43	0.00	0.00	0.00
11,400.00	90.00	89.89	6,441.00	1,613.56	4,055.04	4,267.07	0.00	0.00	0.00
11,500.00	90.00	89.89	6,441.00	1,613.74	4,155.04	4,365.70	0.00	0.00	0.00
11,600.00	90.00	89.89	6,441.00	1,613.93	4,255.04	4,464.34	0.00	0.00	0.00
11,700.00	90.00	89.89	6,441.00	1,614.11	4,355.03	4,562.98	0.00	0.00	0.00
11,800.00	90.00	89.89	6,441.00	1,614.30	4,455.03	4,661.61	0.00	0.00	0.00
11,900.00	90.00	89.89	6,441.00	1,614.48	4,555.03	4,760.25	0.00	0.00	0.00
12,000.00	90.00	89.89	6,441.00	1,614.66	4,655.03	4,858.88	0.00	0.00	0.00
12,100.00	90.00	89.89	6,441.00	1,614.85	4,755.03	4,957.52	0.00	0.00	0.00
12,200.00	90.00	89.89	6,441.00	1,615.03	4,855.03	5,056.15	0.00	0.00	0.00
12,300.00	90.00	89.89	6,441.00	1,615.22	4,955.03	5,154.79	0.00	0.00	0.00
12,400.00	90.00	89.89	6,441.00	1,615.40	5,055.03	5,253.42	0.00	0.00	0.00
12,500.00	90.00	89.89	6,441.00	1,615.59	5,155.03	5,352.06	0.00	0.00	0.00
12,600.00	90.00	89.89	6,441.00	1,615.77	5,255.03	5,450.69	0.00	0.00	0.00
12,700.00	90.00	89.89	6,441.00	1,615.96	5,355.03	5,549.33	0.00	0.00	0.00
12,800.00	90.00	89.89	6,441.00	1,616.14	5,455.03	5,647.96	0.00	0.00	0.00
12,900.00	90.00	89.89	6,441.00	1,616.32	5,555.03	5,746.60	0.00	0.00	0.00
13,000.00	90.00	89.89	6,441.00	1,616.51	5,655.03	5,845.23	0.00	0.00	0.00
13,100.00	90.00	89.89	6,441.00	1,616.69	5,755.03	5,943.87	0.00	0.00	0.00
13,200.00	90.00	89.89	6,441.00	1,616.88	5,855.03	6,042.50	0.00	0.00	0.00
13,300.00	90.00	89.89	6,441.00	1,617.06	5,955.03	6,141.14	0.00	0.00	0.00

Planning Report

Database:	EDM 5000.16 Single User Db	Local Co-ordinate Reference:	Well SHELDUCK 6-5-4HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 27' @ 4981.00usft
Project:	WELD COUNTY	MD Reference:	KB 27' @ 4981.00usft
Site:	SEC 6-T7N-R60W	North Reference:	True
Well:	SHELDUCK 6-5-4HN	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)	
13,400.00	90.00	89.89	6,441.00	1,617.25	6,055.03	6,239.77	0.00	0.00	0.00	
13,500.00	90.00	89.89	6,441.00	1,617.43	6,155.03	6,338.41	0.00	0.00	0.00	
13,600.00	90.00	89.89	6,441.00	1,617.62	6,255.03	6,437.04	0.00	0.00	0.00	
13,700.00	90.00	89.89	6,441.00	1,617.80	6,355.03	6,535.68	0.00	0.00	0.00	
13,800.00	90.00	89.89	6,441.00	1,617.98	6,455.03	6,634.31	0.00	0.00	0.00	
13,900.00	90.00	89.89	6,441.00	1,618.17	6,555.03	6,732.95	0.00	0.00	0.00	
14,000.00	90.00	89.89	6,441.00	1,618.35	6,655.03	6,831.58	0.00	0.00	0.00	
14,100.00	90.00	89.89	6,441.00	1,618.54	6,755.03	6,930.22	0.00	0.00	0.00	
14,200.00	90.00	89.89	6,441.00	1,618.72	6,855.03	7,028.85	0.00	0.00	0.00	
14,300.00	90.00	89.89	6,441.00	1,618.91	6,955.03	7,127.49	0.00	0.00	0.00	
14,400.00	90.00	89.89	6,441.00	1,619.09	7,055.03	7,226.12	0.00	0.00	0.00	
14,500.00	90.00	89.89	6,441.00	1,619.28	7,155.03	7,324.76	0.00	0.00	0.00	
14,600.00	90.00	89.89	6,441.00	1,619.46	7,255.03	7,423.39	0.00	0.00	0.00	
14,700.00	90.00	89.89	6,441.00	1,619.64	7,355.03	7,522.03	0.00	0.00	0.00	
14,800.00	90.00	89.89	6,441.00	1,619.83	7,455.03	7,620.66	0.00	0.00	0.00	
14,900.00	90.00	89.89	6,441.00	1,620.01	7,555.03	7,719.30	0.00	0.00	0.00	
15,000.00	90.00	89.89	6,441.00	1,620.20	7,655.03	7,817.93	0.00	0.00	0.00	
15,100.00	90.00	89.89	6,441.00	1,620.38	7,755.03	7,916.57	0.00	0.00	0.00	
15,200.00	90.00	89.89	6,441.00	1,620.57	7,855.03	8,015.20	0.00	0.00	0.00	
15,300.00	90.00	89.89	6,441.00	1,620.75	7,955.03	8,113.84	0.00	0.00	0.00	
15,400.00	90.00	89.89	6,441.00	1,620.94	8,055.03	8,212.47	0.00	0.00	0.00	
15,500.00	90.00	89.89	6,441.00	1,621.12	8,155.03	8,311.11	0.00	0.00	0.00	
15,600.00	90.00	89.89	6,441.00	1,621.30	8,255.03	8,409.74	0.00	0.00	0.00	
15,700.00	90.00	89.89	6,441.00	1,621.49	8,355.03	8,508.38	0.00	0.00	0.00	
15,800.00	90.00	89.89	6,441.00	1,621.67	8,455.03	8,607.01	0.00	0.00	0.00	
15,900.00	90.00	89.89	6,441.00	1,621.86	8,555.03	8,705.65	0.00	0.00	0.00	
16,000.00	90.00	89.89	6,441.00	1,622.04	8,655.03	8,804.28	0.00	0.00	0.00	
16,100.00	90.00	89.89	6,441.00	1,622.23	8,755.03	8,902.92	0.00	0.00	0.00	
16,200.00	90.00	89.89	6,441.00	1,622.41	8,855.03	9,001.55	0.00	0.00	0.00	
16,300.00	90.00	89.89	6,441.00	1,622.60	8,955.03	9,100.19	0.00	0.00	0.00	
16,400.00	90.00	89.89	6,441.00	1,622.78	9,055.03	9,198.82	0.00	0.00	0.00	
16,500.00	90.00	89.89	6,441.00	1,622.96	9,155.03	9,297.46	0.00	0.00	0.00	
16,600.00	90.00	89.89	6,441.00	1,623.15	9,255.03	9,396.09	0.00	0.00	0.00	
16,700.00	90.00	89.89	6,441.00	1,623.33	9,355.03	9,494.73	0.00	0.00	0.00	
16,800.00	90.00	89.89	6,441.00	1,623.52	9,455.03	9,593.36	0.00	0.00	0.00	
16,900.00	90.00	89.89	6,441.00	1,623.70	9,555.03	9,692.00	0.00	0.00	0.00	
16,962.82	90.00	89.89	6,441.00	1,623.82	9,617.84	9,753.96	0.00	0.00	0.00	
TD at 16962.82										

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
SHELDUCK 6-5-4HN-LF - hit/miss target - Shape - plan hits target center - Point	0.00	0.00	6,441.00	1,605.55	-287.94	1,466,171.73	3,376,500.35	40.605137°N	104.144008°W
SHELDUCK 6-5-4HN-PF - plan hits target center - Point	0.00	0.00	6,441.00	1,623.82	9,617.84	1,466,341.59	3,386,404.69	40.605182°N	104.108333°W

Planning Report

Database:	EDM 5000.16 Single User Db	Local Co-ordinate Reference:	Well SHELDUCK 6-5-4HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB 27' @ 4981.00usft
Project:	WELD COUNTY	MD Reference:	KB 27' @ 4981.00usft
Site:	SEC 6-T7N-R60W	North Reference:	True
Well:	SHELDUCK 6-5-4HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	OWB		
Design:	PROPOSAL 1		

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
226.00	226.00	Laramie Base				
681.45	681.00	Laramie Fox Hills Base				
929.00	926.00	Pierre Shale Base				
1,791.25	1,751.00	Upper Pierre Shale Base*				
3,594.04	3,460.00	Richard Sandstone				
3,700.58	3,561.00	Parkman Sandstone				
4,101.43	3,941.00	Parkman Sandstone Base				
6,610.34	6,282.00	Sharon Springs				
6,668.16	6,319.00	Niobrara Top				
6,906.05	6,422.00	Niobrara B2 Chalk Reservoir Top				
6,965.55	6,434.00	Niobrara B2 Chalk Target Top				
7,057.02	6,441.00	Niobrara B2 Chalk Target Center Line (L				

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
400.00	400.00	0.00	0.00	Start Build 2.00
1,328.14	1,311.99	127.77	-76.74	Start 4734.82 hold at 1328.14 MD
6,062.97	5,800.48	1,419.91	-852.85	Start DLS 10.00 TFO 119.55
7,057.02	6,441.00	1,605.55	-287.94	Start 9905.80 hold at 7057.02 MD
16,962.82	6,441.00	1,623.82	9,617.84	TD at 16962.82