MALLARD EXPLORATION

WELD COUNTY, COLORADO (NAD 83)
NE SW SEC. 26 T7N R63W 6th P.M.
BROWN SOUTH 26-28-8HC

ORIGINAL WELLBORE

18 April, 2018

Plan: PROPOSAL #2

MALLARD EXPLORATION

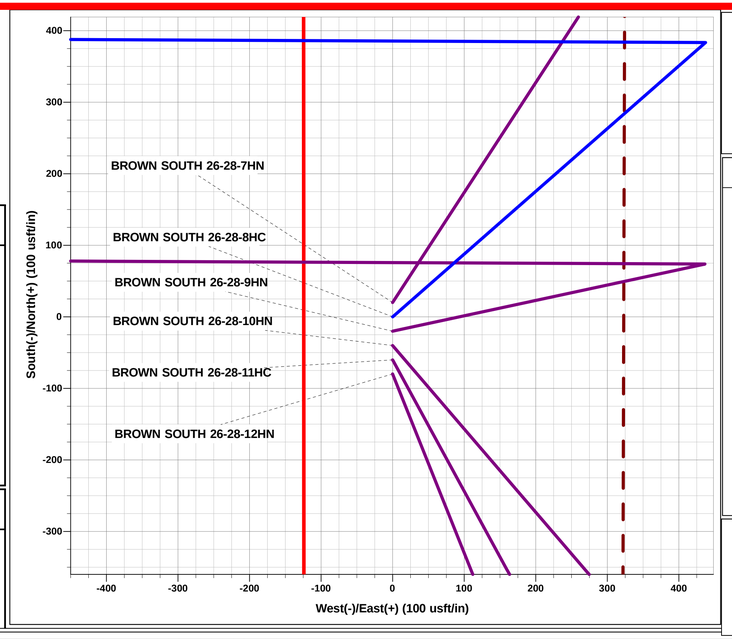
Project: WELD COUNTY, COLORADO (NAD 83)
Site: NE SW SEC. 26 T7N R63W 6th P.M.
Well: BROWN SOUTH 26-28-8HC
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #2

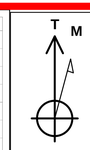
ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	VSect	Dep	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	SHL: 1633ft FSL & 2319ft FWL of Sec 26
200.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2°/100ft BUR)
795.62	800.00	12.00	48.75	41.27	47.07	-45.57	62.60	EOB TO 12° INC
2943.02	2995.37	12.00	48.75	342.22	390.25	-377.86	519.05	END OF TANGENT
3538.64	3595.37	0.00	0.00	383.49	437.32	-423.43	581.65	EOD TO VERTICAL
6274.04	6330.77	0.00	0.00	383.49	437.32	-423.43	581.65	KOP (10°/100ft DGLG)
6847.00	7230.77	90.00	270.27	386.19	-135.63	149.25	1154.61	HZ LP: 2020ft FSL & 2183ft FWL of Sec 26
6847.00	19597.17	90.00	270.27	444.01	-12501.90	12509.78	13521.01	BHL: 2020ft FSL & 460ft FWL of Sec 28

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP - BROWN SOUTH 26-28-8HC (P2)	6274.04	383.49	437.32	40.542859	-104.403022
HZ LP - BROWN SOUTH 26-28-8HC (P2)	6847.00	386.19	-135.63	40.542866	-104.405083
BHL - BROWN SOUTH 26-28-8HC (P2)	6847.00	444.01	-12501.90	40.543016	-104.449577





Azimuths to True North
Magnetic North: 7.94°

Magnetic Field
Strength: 52410.6snT
Dip Angle: 67.00°
Date: 10/04/2018
Model: IGRF2015

FORMATION TOP DETAILS

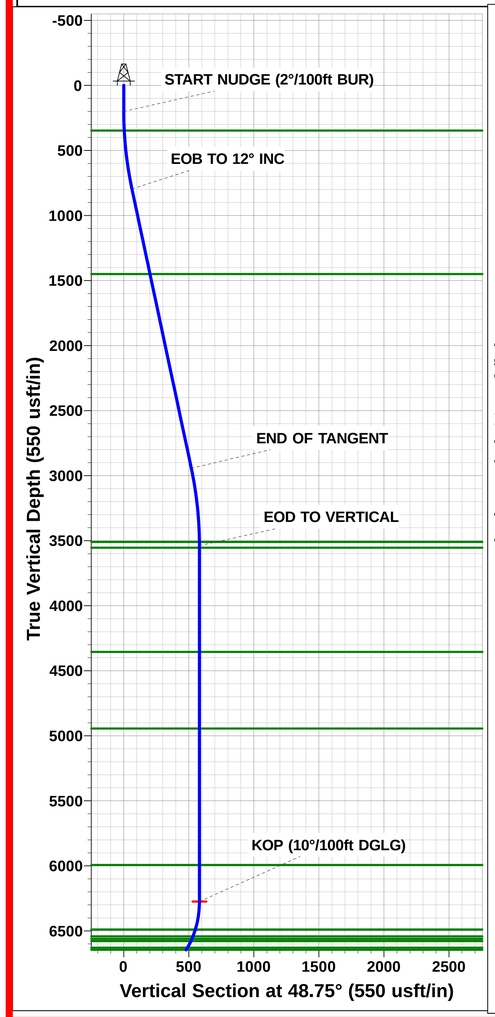
TVDPath	MDPath	Formation
347.00	347.06	Fox Hills Base
1450.00	1469.00	Pierre Shale Top
3510.00	3566.73	Richard Sandstone
3554.00	3610.73	Parkman Sandstone
4355.00	4411.73	Sussex Sandstone
4944.00	5000.73	Shannon Sandstone
5993.00	6049.73	TeePee Buttes
6489.00	6551.12	Sharon Springs
6542.00	6609.60	Niobrara Top
6561.00	6631.32	Niobrara A Chalk
6578.00	6651.17	Niobrara A Chalk Base
6629.00	6713.58	Niobrara B1 Chalk Top
6645.00	6734.26	Niobrara B1 Chalk Base
6672.00	6770.70	Niobrara B2 Chalk Top
6703.00	6815.53	Niobrara B2 Chalk Base
6727.00	6853.15	Niobrara C Chalk Top
6763.00	6916.60	Niobrara C Chalk Base
6800.00	6997.08	Niobrara D Chalk Top
6823.00	7064.35	Ft. Hays
6847.00	7230.77	Codell (Target)

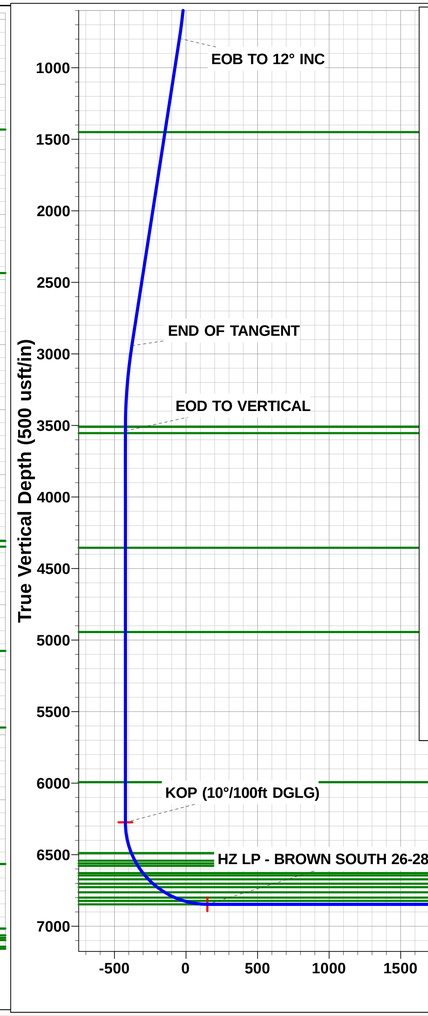
PROPOSED LOCAL COORDINATES:

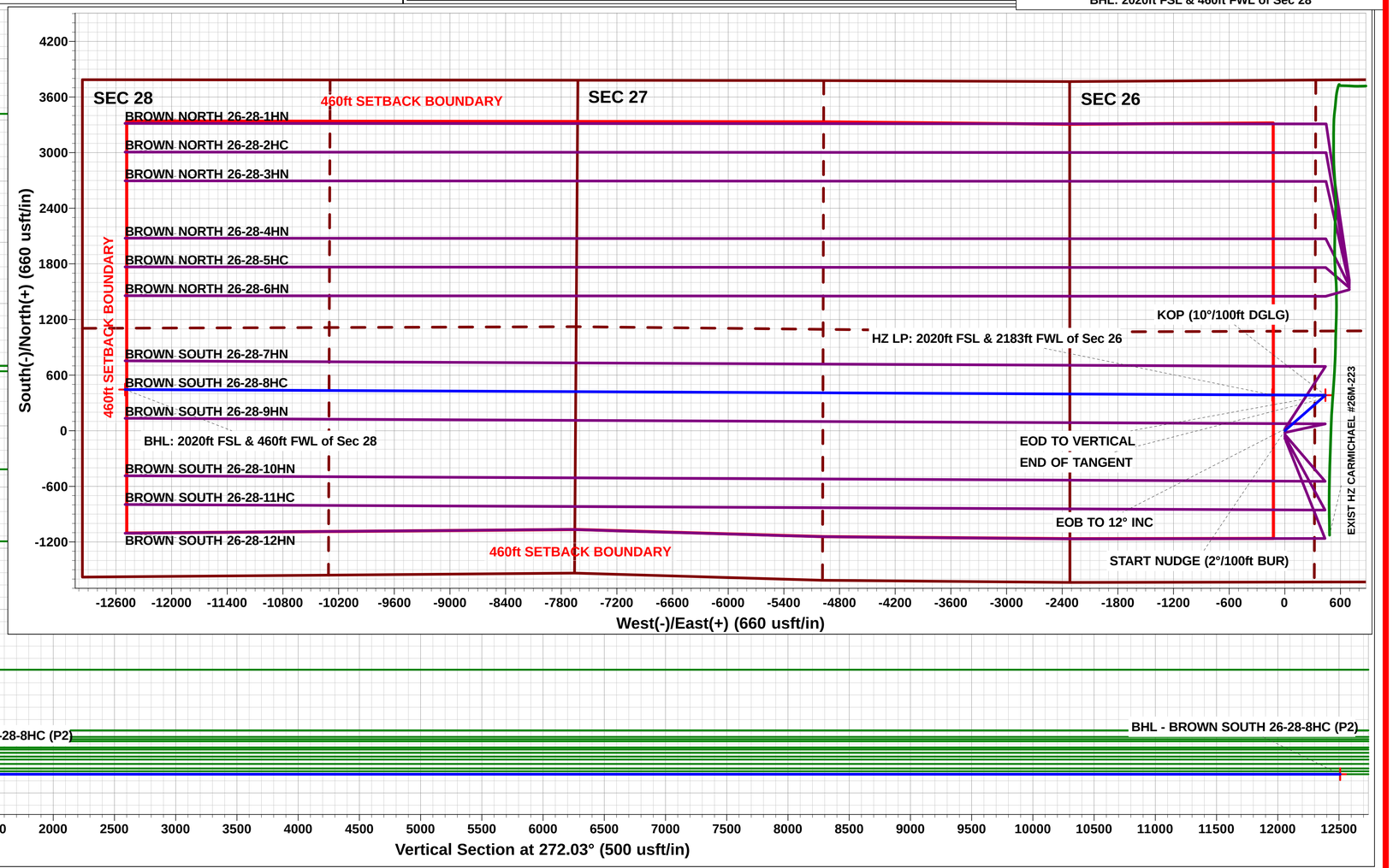
SHL: 1633ft FSL & 2319ft FWL of Sec 26

HZ LP: 2020ft FSL & 2183ft FWL of Sec 26

BHL: 2020ft FSL & 460ft FWL of Sec 28







Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well BROWN SOUTH 26-28-8HC
Company:	MALLARD EXPLORATION	**TVD Reference:**	KB-EST @ 4767.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	**MD Reference:**	KB-EST @ 4767.00usft
Site:	NE SW SEC. 26 T7N R63W 6th P.M.	**North Reference:**	True
Well:	BROWN SOUTH 26-28-8HC	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #2		

Project WELD COUNTY, COLORADO (NAD 83)

Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site NE SW SEC. 26 T7N R63W 6th P.M.

Site Position:		**Northing:**	1,442,123.32 usft	**Latitude:**	40.541865
From:	Lat/Long	**Easting:**	3,304,493.27 usft	**Longitude:**	-104.404387
Position Uncertainty:	0.00 usft	**Slot Radius:**	1.10000 ft	**Grid Convergence:**	0.71 °

Well BROWN SOUTH 26-28-8HC

Well Position	**+N/-S**	-21.50 usft	**Northing:**	1,442,101.10 usft	**Latitude:**	40.541806
	+E/-W	-57.81 usft	**Easting:**	3,304,435.73 usft	**Longitude:**	-104.404595
Position Uncertainty		0.00 usft	**Wellhead Elevation:**	usft	**Ground Level:**	4,747.00 usft

Wellbore ORIGINAL WELLBORE

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	10/04/2018	7.94	67.00	52,411

Design PROPOSAL #2

Audit Notes:

Version:		**Phase:**	PROTOTYPE	**Tie On Depth:**	0.00

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	6,847.00	0.00	0.00	272.03

Plan Sections

MD (usft)	Inc (°)	Azi (°)	Vertical Depth	SS (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft	Build Rate (°/100usft	Turn Rate (°/100usft	TFO (°)	Target
0.00	0.00	0.00	0.00	-4,767.00	0.00	0.00	0.00	0.00	0.00	0.00	
200.00	0.00	0.00	200.00	-4,567.00	0.00	0.00	0.00	0.00	0.00	0.00	
800.00	12.00	48.75	795.62	-3,971.38	41.27	47.07	2.00	2.00	0.00	48.75	
2,995.37	12.00	48.75	2,943.01	-1,823.99	342.22	390.25	0.00	0.00	0.00	0.00	
3,595.37	0.00	0.00	3,538.64	-1,228.36	383.49	437.32	2.00	-2.00	0.00	180.00	
6,330.77	0.00	0.00	6,274.04	1,507.04	383.49	437.32	0.00	0.00	0.00	0.00	KOP - BROWN SO
7,230.77	90.00	270.27	6,847.00	2,080.00	386.19	-135.63	10.00	10.00	-9.97	270.27	HZ LP - BROWN S
19,597.17	90.00	270.27	6,847.00	2,080.00	444.01	-12,501.90	0.00	0.00	0.00	-81.39	BHL - BROWN SOU

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well BROWN SOUTH 26-28-8HC
Company:	MALLARD EXPLORATION	**TVD Reference:**	KB-EST @ 4767.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	**MD Reference:**	KB-EST @ 4767.00usft
Site:	NE SW SEC. 26 T7N R63W 6th P.M.	**North Reference:**	True
Well:	BROWN SOUTH 26-28-8HC	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #2		

Planned Survey

MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
SHL: 1633ft FSL & 2319ft FWL of Sec 26										
0.00	***0.00***	***0.00***	***0.00***	***4,767.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***
100.00	0.00	0.00	100.00	4,667.00	0.00	0.00	0.00	0.00	0.00	0.00
START NUDGE (2°/100ft BUR)										
200.00	***0.00***	***0.00***	***200.00***	***4,567.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***
300.00	2.00	48.75	299.98	4,467.02	1.15	1.31	-1.27	2.00	2.00	0.00
Fox Hills Base										
347.06	***2.94***	***48.75***	***347.00***	***4,420.00***	***2.49***	***2.84***	***-2.75***	***2.00***	***2.00***	***0.00***
400.00	4.00	48.75	399.84	4,367.16	4.60	5.25	-5.08	2.00	2.00	0.00
500.00	6.00	48.75	499.45	4,267.55	10.35	11.80	-11.42	2.00	2.00	0.00
600.00	8.00	48.75	598.70	4,168.30	18.38	20.96	-20.30	2.00	2.00	0.00
700.00	10.00	48.75	697.47	4,069.53	28.70	32.72	-31.68	2.00	2.00	0.00
EOB TO 12° INC										
800.00	***12.00***	***48.75***	***795.62***	***3,971.38***	***41.27***	***47.07***	***-45.57***	***2.00***	***2.00***	***0.00***
900.00	12.00	48.75	893.44	3,873.56	54.98	62.70	-60.71	0.00	0.00	0.00
1,000.00	12.00	48.75	991.25	3,775.75	68.69	78.33	-75.85	0.00	0.00	0.00
1,100.00	12.00	48.75	1,089.07	3,677.93	82.40	93.97	-90.98	0.00	0.00	0.00
1,200.00	12.00	48.75	1,186.88	3,580.12	96.11	109.60	-106.12	0.00	0.00	0.00
1,300.00	12.00	48.75	1,284.70	3,482.30	109.81	125.23	-121.25	0.00	0.00	0.00
1,400.00	12.00	48.75	1,382.51	3,384.49	123.52	140.86	-136.39	0.00	0.00	0.00
Pierre Shale Top										
1,469.00	***12.00***	***48.75***	***1,450.00***	***3,317.00***	***132.98***	***151.65***	***-146.83***	***0.00***	***0.00***	***0.00***
1,500.00	12.00	48.75	1,480.33	3,286.67	137.23	156.49	-151.52	0.00	0.00	0.00
1,600.00	12.00	48.75	1,578.14	3,188.86	150.94	172.13	-166.66	0.00	0.00	0.00
1,700.00	12.00	48.75	1,675.96	3,091.04	164.65	187.76	-181.80	0.00	0.00	0.00
1,800.00	12.00	48.75	1,773.77	2,993.23	178.35	203.39	-196.93	0.00	0.00	0.00
1,900.00	12.00	48.75	1,871.59	2,895.41	192.06	219.02	-212.07	0.00	0.00	0.00
2,000.00	12.00	48.75	1,969.40	2,797.60	205.77	234.65	-227.20	0.00	0.00	0.00
2,100.00	12.00	48.75	2,067.22	2,699.78	219.48	250.29	-242.34	0.00	0.00	0.00
2,200.00	12.00	48.75	2,165.03	2,601.97	233.19	265.92	-257.47	0.00	0.00	0.00
2,300.00	12.00	48.75	2,262.84	2,504.16	246.89	281.55	-272.61	0.00	0.00	0.00
2,400.00	12.00	48.75	2,360.66	2,406.34	260.60	297.18	-287.75	0.00	0.00	0.00
2,500.00	12.00	48.75	2,458.47	2,308.53	274.31	312.82	-302.88	0.00	0.00	0.00
2,600.00	12.00	48.75	2,556.29	2,210.71	288.02	328.45	-318.02	0.00	0.00	0.00
2,700.00	12.00	48.75	2,654.10	2,112.90	301.73	344.08	-333.15	0.00	0.00	0.00
2,800.00	12.00	48.75	2,751.92	2,015.08	315.43	359.71	-348.29	0.00	0.00	0.00
2,900.00	12.00	48.75	2,849.73	1,917.27	329.14	375.34	-363.43	0.00	0.00	0.00
END OF TANGENT										
2,995.37	***12.00***	***48.75***	***2,943.02***	***1,823.98***	***342.22***	***390.25***	***-377.86***	***0.00***	***0.00***	***0.00***
3,000.00	11.91	48.75	2,947.55	1,819.45	342.85	390.97	-378.56	2.00	-2.00	0.00
3,100.00	9.91	48.75	3,045.74	1,721.26	355.32	405.20	-392.33	2.00	-2.00	0.00
3,200.00	7.91	48.75	3,144.53	1,622.47	365.53	416.84	-403.60	2.00	-2.00	0.00
3,300.00	5.91	48.75	3,243.80	1,523.20	373.46	425.88	-412.36	2.00	-2.00	0.00
3,400.00	3.91	48.75	3,343.42	1,423.58	379.10	432.31	-418.59	2.00	-2.00	0.00
3,500.00	1.91	48.75	3,443.29	1,323.71	382.44	436.13	-422.28	2.00	-2.00	0.00
Richard Sandstone										
3,566.73	***0.57***	***48.75***	***3,510.00***	***1,257.00***	***383.40***	***437.21***	***-423.33***	***2.00***	***-2.00***	***0.00***
EOD TO VERTICAL										
3,595.37	***0.00***	***0.00***	***3,538.64***	***1,228.36***	***383.49***	***437.32***	***-423.43***	***2.00***	***-2.00***	***0.00***
3,600.00	0.00	0.00	3,543.27	1,223.73	383.49	437.32	-423.43	0.00	0.00	0.00
Parkman Sandstone										
3,610.73	***0.00***	***0.00***	***3,554.00***	***1,213.00***	***383.49***	***437.32***	***-423.43***	***0.00***	***0.00***	***0.00***
3,700.00	0.00	0.00	3,643.27	1,123.73	383.49	437.32	-423.43	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well BROWN SOUTH 26-28-8HC
Company:	MALLARD EXPLORATION	**TVD Reference:**	KB-EST @ 4767.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	**MD Reference:**	KB-EST @ 4767.00usft
Site:	NE SW SEC. 26 T7N R63W 6th P.M.	**North Reference:**	True
Well:	BROWN SOUTH 26-28-8HC	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #2		

Planned Survey

MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
3,800.00	0.00	0.00	3,743.27	1,023.73	383.49	437.32	-423.43	0.00	0.00	0.00
3,900.00	0.00	0.00	3,843.27	923.73	383.49	437.32	-423.43	0.00	0.00	0.00
4,000.00	0.00	0.00	3,943.27	823.73	383.49	437.32	-423.43	0.00	0.00	0.00
4,100.00	0.00	0.00	4,043.27	723.73	383.49	437.32	-423.43	0.00	0.00	0.00
4,200.00	0.00	0.00	4,143.27	623.73	383.49	437.32	-423.43	0.00	0.00	0.00
4,300.00	0.00	0.00	4,243.27	523.73	383.49	437.32	-423.43	0.00	0.00	0.00
4,400.00	0.00	0.00	4,343.27	423.73	383.49	437.32	-423.43	0.00	0.00	0.00
Sussex Sandstone										
4,411.73	***0.00***	***0.00***	***4,355.00***	***412.00***	***383.49***	***437.32***	***-423.43***	***0.00***	***0.00***	***0.00***
4,500.00	0.00	0.00	4,443.27	323.73	383.49	437.32	-423.43	0.00	0.00	0.00
4,600.00	0.00	0.00	4,543.27	223.73	383.49	437.32	-423.43	0.00	0.00	0.00
4,700.00	0.00	0.00	4,643.27	123.73	383.49	437.32	-423.43	0.00	0.00	0.00
4,800.00	0.00	0.00	4,743.27	23.73	383.49	437.32	-423.43	0.00	0.00	0.00
4,900.00	0.00	0.00	4,843.27	-76.27	383.49	437.32	-423.43	0.00	0.00	0.00
5,000.00	0.00	0.00	4,943.27	-176.27	383.49	437.32	-423.43	0.00	0.00	0.00
Shannon Sandstone										
5,000.73	***0.00***	***0.00***	***4,944.00***	***-177.00***	***383.49***	***437.32***	***-423.43***	***0.00***	***0.00***	***0.00***
5,100.00	0.00	0.00	5,043.27	-276.27	383.49	437.32	-423.43	0.00	0.00	0.00
5,200.00	0.00	0.00	5,143.27	-376.27	383.49	437.32	-423.43	0.00	0.00	0.00
5,300.00	0.00	0.00	5,243.27	-476.27	383.49	437.32	-423.43	0.00	0.00	0.00
5,400.00	0.00	0.00	5,343.27	-576.27	383.49	437.32	-423.43	0.00	0.00	0.00
5,500.00	0.00	0.00	5,443.27	-676.27	383.49	437.32	-423.43	0.00	0.00	0.00
5,600.00	0.00	0.00	5,543.27	-776.27	383.49	437.32	-423.43	0.00	0.00	0.00
5,700.00	0.00	0.00	5,643.27	-876.27	383.49	437.32	-423.43	0.00	0.00	0.00
5,800.00	0.00	0.00	5,743.27	-976.27	383.49	437.32	-423.43	0.00	0.00	0.00
5,900.00	0.00	0.00	5,843.27	-1,076.27	383.49	437.32	-423.43	0.00	0.00	0.00
6,000.00	0.00	0.00	5,943.27	-1,176.27	383.49	437.32	-423.43	0.00	0.00	0.00
TeePee Buttes										
6,049.73	***0.00***	***0.00***	***5,993.00***	***-1,226.00***	***383.49***	***437.32***	***-423.43***	***0.00***	***0.00***	***0.00***
6,100.00	0.00	0.00	6,043.27	-1,276.27	383.49	437.32	-423.43	0.00	0.00	0.00
6,200.00	0.00	0.00	6,143.27	-1,376.27	383.49	437.32	-423.43	0.00	0.00	0.00
6,300.00	0.00	0.00	6,243.27	-1,476.27	383.49	437.32	-423.43	0.00	0.00	0.00
KOP (10°/100ft DGLG)										
6,330.77	***0.00***	***0.00***	***6,274.04***	***-1,507.04***	***383.49***	***437.32***	***-423.43***	***0.00***	***0.00***	***0.00***
6,400.00	6.92	270.27	6,343.10	-1,576.10	383.51	433.14	-419.26	10.00	10.00	0.00
6,500.00	16.92	270.27	6,440.82	-1,673.82	383.61	412.51	-398.63	10.00	10.00	0.00
Sharon Springs										
6,551.12	***22.04***	***270.27***	***6,489.00***	***-1,722.00***	***383.69***	***395.47***	***-381.60***	***10.00***	***10.00***	***0.00***
6,600.00	26.92	270.27	6,533.47	-1,766.47	383.78	375.22	-361.36	10.00	10.00	0.00
Niobrara Top										
6,609.60	***27.88***	***270.27***	***6,542.00***	***-1,775.00***	***383.80***	***370.80***	***-356.94***	***10.00***	***10.00***	***0.00***
Niobrara A Chalk										
6,631.32	***30.06***	***270.27***	***6,561.00***	***-1,794.00***	***383.85***	***360.28***	***-346.43***	***10.00***	***10.00***	***0.00***
Niobrara A Chalk Base										
6,651.17	***32.04***	***270.27***	***6,578.00***	***-1,811.00***	***383.90***	***350.05***	***-336.20***	***10.00***	***10.00***	***0.00***
6,700.00	36.92	270.27	6,618.24	-1,851.24	384.03	322.41	-308.58	10.00	10.00	0.00
Niobrara B1 Chalk Top										
6,713.58	***38.28***	***270.27***	***6,629.00***	***-1,862.00***	***384.07***	***314.12***	***-300.29***	***10.00***	***10.00***	***0.00***
Niobrara B1 Chalk Base										
6,734.26	***40.35***	***270.27***	***6,645.00***	***-1,878.00***	***384.13***	***301.02***	***-287.20***	***10.00***	***10.00***	***0.00***
Niobrara B2 Chalk Top										
6,770.70	***43.99***	***270.27***	***6,672.00***	***-1,905.00***	***384.25***	***276.56***	***-262.75***	***10.00***	***10.00***	***0.00***

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well BROWN SOUTH 26-28-8HC
Company:	MALLARD EXPLORATION	**TVD Reference:**	KB-EST @ 4767.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	**MD Reference:**	KB-EST @ 4767.00usft
Site:	NE SW SEC. 26 T7N R63W 6th P.M.	**North Reference:**	True
Well:	BROWN SOUTH 26-28-8HC	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #2		

Planned Survey

MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,800.00	46.92	270.27	6,692.55	-1,925.55	384.35	255.68	-241.88	10.00	10.00	0.00
Niobrara B2 Chalk Base										
6,815.53	***48.48***	***270.27***	***6,703.00***	***-1,936.00***	***384.40***	***244.20***	***-230.40***	***10.00***	***10.00***	***0.00***
Niobrara C Chalk Top										
6,853.15	***52.24***	***270.27***	***6,727.00***	***-1,960.00***	***384.54***	***215.23***	***-201.45***	***10.00***	***10.00***	***0.00***
6,900.00	56.92	270.27	6,754.14	-1,987.14	384.72	177.06	-163.30	10.00	10.00	0.00
Niobrara C Chalk Base										
6,916.60	***58.58***	***270.27***	***6,763.00***	***-1,996.00***	***384.78***	***163.03***	***-149.27***	***10.00***	***10.00***	***0.00***
Niobrara D Chalk Top										
6,997.08	***66.63***	***270.27***	***6,800.00***	***-2,033.00***	***385.12***	***91.63***	***-77.90***	***10.00***	***10.00***	***0.00***
7,000.00	66.92	270.27	6,801.15	-2,034.15	385.13	88.95	-75.22	10.00	10.00	0.00
Ft. Hays										
7,064.35	***73.36***	***270.27***	***6,823.00***	***-2,056.00***	***385.42***	***28.46***	***-14.76***	***10.00***	***10.00***	***0.00***
7,100.00	76.92	270.27	6,832.14	-2,065.14	385.58	-6.00	19.68	10.00	10.00	0.00
7,200.00	86.92	270.27	6,846.17	-2,079.17	386.04	-104.88	118.51	10.00	10.00	0.00
HZ LP: 2020ft FSL & 2183ft FWL of Sec 26 - Codell (Target)										
7,230.77	***90.00***	***270.27***	***6,847.00***	***-2,080.00***	***386.19***	***-135.63***	***149.25***	***10.00***	***10.00***	***0.00***
7,300.00	90.00	270.27	6,847.00	-2,080.00	386.51	-204.86	218.45	0.00	0.00	0.00
7,400.00	90.00	270.27	6,847.00	-2,080.00	386.98	-304.86	318.40	0.00	0.00	0.00
7,500.00	90.00	270.27	6,847.00	-2,080.00	387.46	-404.86	418.36	0.00	0.00	0.00
7,600.00	90.00	270.27	6,847.00	-2,080.00	387.93	-504.86	518.31	0.00	0.00	0.00
7,700.00	90.00	270.27	6,847.00	-2,080.00	388.40	-604.86	618.26	0.00	0.00	0.00
7,800.00	90.00	270.27	6,847.00	-2,080.00	388.87	-704.86	718.21	0.00	0.00	0.00
7,900.00	90.00	270.27	6,847.00	-2,080.00	389.34	-804.86	818.17	0.00	0.00	0.00
8,000.00	90.00	270.27	6,847.00	-2,080.00	389.81	-904.85	918.12	0.00	0.00	0.00
8,100.00	90.00	270.27	6,847.00	-2,080.00	390.28	-1,004.85	1,018.07	0.00	0.00	0.00
8,200.00	90.00	270.27	6,847.00	-2,080.00	390.75	-1,104.85	1,118.02	0.00	0.00	0.00
8,300.00	90.00	270.27	6,847.00	-2,080.00	391.22	-1,204.85	1,217.98	0.00	0.00	0.00
8,400.00	90.00	270.27	6,847.01	-2,080.01	391.69	-1,304.85	1,317.93	0.00	0.00	0.00
8,500.00	90.00	270.27	6,847.01	-2,080.01	392.16	-1,404.85	1,417.88	0.00	0.00	0.00
8,600.00	90.00	270.27	6,847.01	-2,080.01	392.63	-1,504.85	1,517.83	0.00	0.00	0.00
8,700.00	90.00	270.27	6,847.01	-2,080.01	393.10	-1,604.85	1,617.79	0.00	0.00	0.00
8,800.00	90.00	270.27	6,847.01	-2,080.01	393.57	-1,704.85	1,717.74	0.00	0.00	0.00
8,900.00	90.00	270.27	6,847.01	-2,080.01	394.04	-1,804.84	1,817.69	0.00	0.00	0.00
9,000.00	90.00	270.27	6,847.01	-2,080.01	394.51	-1,904.84	1,917.64	0.00	0.00	0.00
9,100.00	90.00	270.27	6,847.01	-2,080.01	394.98	-2,004.84	2,017.60	0.00	0.00	0.00
9,200.00	90.00	270.27	6,847.01	-2,080.01	395.45	-2,104.84	2,117.55	0.00	0.00	0.00
9,300.00	90.00	270.27	6,847.01	-2,080.01	395.92	-2,204.84	2,217.50	0.00	0.00	0.00
9,400.00	90.00	270.27	6,847.01	-2,080.01	396.39	-2,304.84	2,317.46	0.00	0.00	0.00
9,500.00	90.00	270.27	6,847.01	-2,080.01	396.86	-2,404.84	2,417.41	0.00	0.00	0.00
9,600.00	90.00	270.27	6,847.01	-2,080.01	397.33	-2,504.84	2,517.36	0.00	0.00	0.00
9,700.00	90.00	270.27	6,847.01	-2,080.01	397.80	-2,604.84	2,617.31	0.00	0.00	0.00
9,800.00	90.00	270.27	6,847.01	-2,080.01	398.27	-2,704.83	2,717.27	0.00	0.00	0.00
9,900.00	90.00	270.27	6,847.01	-2,080.01	398.74	-2,804.83	2,817.22	0.00	0.00	0.00
10,000.00	90.00	270.27	6,847.01	-2,080.01	399.21	-2,904.83	2,917.17	0.00	0.00	0.00
10,100.00	90.00	270.27	6,847.01	-2,080.01	399.68	-3,004.83	3,017.12	0.00	0.00	0.00
10,200.00	90.00	270.27	6,847.01	-2,080.01	400.15	-3,104.83	3,117.08	0.00	0.00	0.00
10,300.00	90.00	270.27	6,847.01	-2,080.01	400.62	-3,204.83	3,217.03	0.00	0.00	0.00
10,400.00	90.00	270.27	6,847.01	-2,080.01	401.08	-3,304.83	3,316.98	0.00	0.00	0.00
10,500.00	90.00	270.27	6,847.01	-2,080.01	401.55	-3,404.83	3,416.93	0.00	0.00	0.00
10,600.00	90.00	270.27	6,847.01	-2,080.01	402.02	-3,504.83	3,516.89	0.00	0.00	0.00
10,700.00	90.00	270.27	6,847.01	-2,080.01	402.49	-3,604.82	3,616.84	0.00	0.00	0.00
10,800.00	90.00	270.27	6,847.01	-2,080.01	402.96	-3,704.82	3,716.79	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well BROWN SOUTH 26-28-8HC
Company:	MALLARD EXPLORATION	**TVD Reference:**	KB-EST @ 4767.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	**MD Reference:**	KB-EST @ 4767.00usft
Site:	NE SW SEC. 26 T7N R63W 6th P.M.	**North Reference:**	True
Well:	BROWN SOUTH 26-28-8HC	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #2		

Planned Survey

MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,900.00	90.00	270.27	6,847.01	-2,080.01	403.43	-3,804.82	3,816.74	0.00	0.00	0.00
11,000.00	90.00	270.27	6,847.01	-2,080.01	403.90	-3,904.82	3,916.70	0.00	0.00	0.00
11,100.00	90.00	270.27	6,847.01	-2,080.01	404.37	-4,004.82	4,016.65	0.00	0.00	0.00
11,200.00	90.00	270.27	6,847.01	-2,080.01	404.84	-4,104.82	4,116.60	0.00	0.00	0.00
11,300.00	90.00	270.27	6,847.01	-2,080.01	405.31	-4,204.82	4,216.55	0.00	0.00	0.00
11,400.00	90.00	270.27	6,847.01	-2,080.01	405.77	-4,304.82	4,316.51	0.00	0.00	0.00
11,500.00	90.00	270.27	6,847.01	-2,080.01	406.24	-4,404.82	4,416.46	0.00	0.00	0.00
11,600.00	90.00	270.27	6,847.01	-2,080.01	406.71	-4,504.81	4,516.41	0.00	0.00	0.00
11,700.00	90.00	270.27	6,847.01	-2,080.01	407.18	-4,604.81	4,616.36	0.00	0.00	0.00
11,800.00	90.00	270.27	6,847.01	-2,080.01	407.65	-4,704.81	4,716.32	0.00	0.00	0.00
11,900.00	90.00	270.27	6,847.01	-2,080.01	408.12	-4,804.81	4,816.27	0.00	0.00	0.00
12,000.00	90.00	270.27	6,847.01	-2,080.01	408.58	-4,904.81	4,916.22	0.00	0.00	0.00
12,100.00	90.00	270.27	6,847.02	-2,080.02	409.05	-5,004.81	5,016.17	0.00	0.00	0.00
12,200.00	90.00	270.27	6,847.02	-2,080.02	409.52	-5,104.81	5,116.13	0.00	0.00	0.00
12,300.00	90.00	270.27	6,847.02	-2,080.02	409.99	-5,204.81	5,216.08	0.00	0.00	0.00
12,400.00	90.00	270.27	6,847.02	-2,080.02	410.46	-5,304.81	5,316.03	0.00	0.00	0.00
12,500.00	90.00	270.27	6,847.02	-2,080.02	410.93	-5,404.80	5,415.98	0.00	0.00	0.00
12,600.00	90.00	270.27	6,847.02	-2,080.02	411.39	-5,504.80	5,515.94	0.00	0.00	0.00
12,700.00	90.00	270.27	6,847.02	-2,080.02	411.86	-5,604.80	5,615.89	0.00	0.00	0.00
12,800.00	90.00	270.27	6,847.02	-2,080.02	412.33	-5,704.80	5,715.84	0.00	0.00	0.00
12,900.00	90.00	270.27	6,847.02	-2,080.02	412.80	-5,804.80	5,815.79	0.00	0.00	0.00
13,000.00	90.00	270.27	6,847.02	-2,080.02	413.27	-5,904.80	5,915.75	0.00	0.00	0.00
13,100.00	90.00	270.27	6,847.02	-2,080.02	413.73	-6,004.80	6,015.70	0.00	0.00	0.00
13,200.00	90.00	270.27	6,847.02	-2,080.02	414.20	-6,104.80	6,115.65	0.00	0.00	0.00
13,300.00	90.00	270.27	6,847.02	-2,080.02	414.67	-6,204.80	6,215.60	0.00	0.00	0.00
13,400.00	90.00	270.27	6,847.02	-2,080.02	415.14	-6,304.79	6,315.56	0.00	0.00	0.00
13,500.00	90.00	270.27	6,847.02	-2,080.02	415.60	-6,404.79	6,415.51	0.00	0.00	0.00
13,600.00	90.00	270.27	6,847.02	-2,080.02	416.07	-6,504.79	6,515.46	0.00	0.00	0.00
13,700.00	90.00	270.27	6,847.02	-2,080.02	416.54	-6,604.79	6,615.41	0.00	0.00	0.00
13,800.00	90.00	270.27	6,847.02	-2,080.02	417.01	-6,704.79	6,715.37	0.00	0.00	0.00
13,900.00	90.00	270.27	6,847.02	-2,080.02	417.47	-6,804.79	6,815.32	0.00	0.00	0.00
14,000.00	90.00	270.27	6,847.02	-2,080.02	417.94	-6,904.79	6,915.27	0.00	0.00	0.00
14,100.00	90.00	270.27	6,847.02	-2,080.02	418.41	-7,004.79	7,015.22	0.00	0.00	0.00
14,200.00	90.00	270.27	6,847.02	-2,080.02	418.87	-7,104.79	7,115.18	0.00	0.00	0.00
14,300.00	90.00	270.27	6,847.02	-2,080.02	419.34	-7,204.78	7,215.13	0.00	0.00	0.00
14,400.00	90.00	270.27	6,847.02	-2,080.02	419.81	-7,304.78	7,315.08	0.00	0.00	0.00
14,500.00	90.00	270.27	6,847.02	-2,080.02	420.28	-7,404.78	7,415.03	0.00	0.00	0.00
14,600.00	90.00	270.27	6,847.02	-2,080.02	420.74	-7,504.78	7,514.99	0.00	0.00	0.00
14,700.00	90.00	270.27	6,847.02	-2,080.02	421.21	-7,604.78	7,614.94	0.00	0.00	0.00
14,800.00	90.00	270.27	6,847.01	-2,080.01	421.68	-7,704.78	7,714.89	0.00	0.00	0.00
14,900.00	90.00	270.27	6,847.01	-2,080.01	422.14	-7,804.78	7,814.84	0.00	0.00	0.00
15,000.00	90.00	270.27	6,847.01	-2,080.01	422.61	-7,904.78	7,914.80	0.00	0.00	0.00
15,100.00	90.00	270.27	6,847.01	-2,080.01	423.08	-8,004.78	8,014.75	0.00	0.00	0.00
15,200.00	90.00	270.27	6,847.01	-2,080.01	423.54	-8,104.77	8,114.70	0.00	0.00	0.00
15,300.00	90.00	270.27	6,847.01	-2,080.01	424.01	-8,204.77	8,214.65	0.00	0.00	0.00
15,400.00	90.00	270.27	6,847.01	-2,080.01	424.48	-8,304.77	8,314.61	0.00	0.00	0.00
15,500.00	90.00	270.27	6,847.01	-2,080.01	424.94	-8,404.77	8,414.56	0.00	0.00	0.00
15,600.00	90.00	270.27	6,847.01	-2,080.01	425.41	-8,504.77	8,514.51	0.00	0.00	0.00
15,700.00	90.00	270.27	6,847.01	-2,080.01	425.88	-8,604.77	8,614.46	0.00	0.00	0.00
15,800.00	90.00	270.27	6,847.01	-2,080.01	426.34	-8,704.77	8,714.42	0.00	0.00	0.00
15,900.00	90.00	270.27	6,847.01	-2,080.01	426.81	-8,804.77	8,814.37	0.00	0.00	0.00
16,000.00	90.00	270.27	6,847.01	-2,080.01	427.27	-8,904.77	8,914.32	0.00	0.00	0.00
16,100.00	90.00	270.27	6,847.01	-2,080.01	427.74	-9,004.77	9,014.27	0.00	0.00	0.00
16,200.00	90.00	270.27	6,847.01	-2,080.01	428.21	-9,104.76	9,114.23	0.00	0.00	0.00

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well BROWN SOUTH 26-28-8HC
Company:	MALLARD EXPLORATION	**TVD Reference:**	KB-EST @ 4767.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	**MD Reference:**	KB-EST @ 4767.00usft
Site:	NE SW SEC. 26 T7N R63W 6th P.M.	**North Reference:**	True
Well:	BROWN SOUTH 26-28-8HC	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #2		

Planned Survey

MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
16,300.00	90.00	270.27	6,847.01	-2,080.01	428.67	-9,204.76	9,214.18	0.00	0.00	0.00
16,400.00	90.00	270.27	6,847.01	-2,080.01	429.14	-9,304.76	9,314.13	0.00	0.00	0.00
16,500.00	90.00	270.27	6,847.01	-2,080.01	429.60	-9,404.76	9,414.08	0.00	0.00	0.00
16,600.00	90.00	270.27	6,847.01	-2,080.01	430.07	-9,504.76	9,514.04	0.00	0.00	0.00
16,700.00	90.00	270.27	6,847.01	-2,080.01	430.54	-9,604.76	9,613.99	0.00	0.00	0.00
16,800.00	90.00	270.27	6,847.01	-2,080.01	431.00	-9,704.76	9,713.94	0.00	0.00	0.00
16,900.00	90.00	270.27	6,847.01	-2,080.01	431.47	-9,804.76	9,813.89	0.00	0.00	0.00
17,000.00	90.00	270.27	6,847.01	-2,080.01	431.93	-9,904.76	9,913.85	0.00	0.00	0.00
17,100.00	90.00	270.27	6,847.01	-2,080.01	432.40	-10,004.75	10,013.80	0.00	0.00	0.00
17,200.00	90.00	270.27	6,847.01	-2,080.01	432.86	-10,104.75	10,113.75	0.00	0.00	0.00
17,300.00	90.00	270.27	6,847.01	-2,080.01	433.33	-10,204.75	10,213.70	0.00	0.00	0.00
17,400.00	90.00	270.27	6,847.01	-2,080.01	433.79	-10,304.75	10,313.65	0.00	0.00	0.00
17,500.00	90.00	270.27	6,847.01	-2,080.01	434.26	-10,404.75	10,413.61	0.00	0.00	0.00
17,600.00	90.00	270.27	6,847.01	-2,080.01	434.73	-10,504.75	10,513.56	0.00	0.00	0.00
17,700.00	90.00	270.27	6,847.01	-2,080.01	435.19	-10,604.75	10,613.51	0.00	0.00	0.00
17,800.00	90.00	270.27	6,847.01	-2,080.01	435.66	-10,704.75	10,713.46	0.00	0.00	0.00
17,900.00	90.00	270.27	6,847.01	-2,080.01	436.12	-10,804.75	10,813.42	0.00	0.00	0.00
18,000.00	90.00	270.27	6,847.01	-2,080.01	436.59	-10,904.74	10,913.37	0.00	0.00	0.00
18,100.00	90.00	270.27	6,847.01	-2,080.01	437.05	-11,004.74	11,013.32	0.00	0.00	0.00
18,200.00	90.00	270.27	6,847.01	-2,080.01	437.52	-11,104.74	11,113.27	0.00	0.00	0.00
18,300.00	90.00	270.27	6,847.01	-2,080.01	437.98	-11,204.74	11,213.23	0.00	0.00	0.00
18,400.00	90.00	270.27	6,847.01	-2,080.01	438.45	-11,304.74	11,313.18	0.00	0.00	0.00
18,500.00	90.00	270.27	6,847.01	-2,080.01	438.91	-11,404.74	11,413.13	0.00	0.00	0.00
18,600.00	90.00	270.27	6,847.00	-2,080.00	439.38	-11,504.74	11,513.08	0.00	0.00	0.00
18,700.00	90.00	270.27	6,847.00	-2,080.00	439.84	-11,604.74	11,613.04	0.00	0.00	0.00
18,800.00	90.00	270.27	6,847.00	-2,080.00	440.30	-11,704.74	11,712.99	0.00	0.00	0.00
18,900.00	90.00	270.27	6,847.00	-2,080.00	440.77	-11,804.73	11,812.94	0.00	0.00	0.00
19,000.00	90.00	270.27	6,847.00	-2,080.00	441.23	-11,904.73	11,912.89	0.00	0.00	0.00
19,100.00	90.00	270.27	6,847.00	-2,080.00	441.70	-12,004.73	12,012.85	0.00	0.00	0.00
19,200.00	90.00	270.27	6,847.00	-2,080.00	442.16	-12,104.73	12,112.80	0.00	0.00	0.00
19,300.00	90.00	270.27	6,847.00	-2,080.00	442.63	-12,204.73	12,212.75	0.00	0.00	0.00
19,400.00	90.00	270.27	6,847.00	-2,080.00	443.09	-12,304.73	12,312.70	0.00	0.00	0.00
19,500.00	90.00	270.27	6,847.00	-2,080.00	443.56	-12,404.73	12,412.66	0.00	0.00	0.00
BHL: 2020ft FSL & 460ft FWL of Sec 28										
19,597.17	***90.00***	***270.27***	***6,847.00***	***-2,080.00***	***444.01***	***-12,501.90***	***12,509.78***	***0.00***	***0.00***	***0.00***

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well BROWN SOUTH 26-28-8HC
Company:	MALLARD EXPLORATION	**TVD Reference:**	KB-EST @ 4767.00usft
Project:	WELD COUNTY, COLORADO (NAD 83)	**MD Reference:**	KB-EST @ 4767.00usft
Site:	NE SW SEC. 26 T7N R63W 6th P.M.	**North Reference:**	True
Well:	BROWN SOUTH 26-28-8HC	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #2		

Formations

MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
347.06	347.00	Fox Hills Base			
1,469.00	1,450.00	Pierre Shale Top			
3,566.73	3,510.00	Richard Sandstone			
3,610.73	3,554.00	Parkman Sandstone			
4,411.73	4,355.00	Sussex Sandstone			
5,000.73	4,944.00	Shannon Sandstone			
6,049.73	5,993.00	TeePee Buttes			
6,551.12	6,489.00	Sharon Springs			
6,609.60	6,542.00	Niobrara Top			
6,631.32	6,561.00	Niobrara A Chalk			
6,651.17	6,578.00	Niobrara A Chalk Base			
6,713.58	6,629.00	Niobrara B1 Chalk Top			
6,734.26	6,645.00	Niobrara B1 Chalk Base			
6,770.70	6,672.00	Niobrara B2 Chalk Top			
6,815.53	6,703.00	Niobrara B2 Chalk Base			
6,853.15	6,727.00	Niobrara C Chalk Top			
6,916.60	6,763.00	Niobrara C Chalk Base			
6,997.08	6,800.00	Niobrara D Chalk Top			
7,064.35	6,823.00	Ft. Hays			
7,230.77	6,847.00	Codell (Target)			

Plan Annotations

MD (usft)	TVD (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
0.00	0.00	0.00	0.00	SHL: 1633ft FSL & 2319ft FWL of Sec 26
200.00	200.00	0.00	0.00	START NUDGE (2°/100ft BUR)
800.00	795.62	41.27	47.07	EOB TO 12° INC
2,995.37	2,943.02	342.22	390.25	END OF TANGENT
3,595.37	3,538.64	383.49	437.32	EOD TO VERTICAL
6,330.77	6,274.04	383.49	437.32	KOP (10°/100ft DGLG)
7,230.77	6,847.00	386.19	-135.63	HZ LP: 2020ft FSL & 2183ft FWL of Sec 26
19,597.17	6,847.00	444.01	-12,501.90	BHL: 2020ft FSL & 460ft FWL of Sec 28