MALLARD EXPLORATION

WELD COUNTY, COLORADO (NAD 83)
NE NE SEC. 30 T8N R60W 6th P.M.
GADWALL FED 30-31-13HN

ORIGINAL WELLBORE

31 August, 2017

Plan: PROPOSAL #1

MALLARD EXPLORATION

Project: WELD COUNTY, COLORADO (NAD 83)
Site: NE NE SEC. 30 T8N R60W 6th P.M.
Well: GADWALL FED 30-31-13HN
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #1

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	VSect	Dep	Annotation
0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	SHL: 751ft FNL & 2042ft FEL of Sec 30
400.0	400.0	0.00	0.00	0.0	0.0	0.0	0.0	START NUDGE (2°/100ft BUR)
1009.5	1014.2	12.28	44.32	46.9	45.8	-44.3	65.6	EOB TO 12.28° INC
5062.5	5162.1	12.28	44.32	678.3	662.5	-640.5	948.1	END OF TANGENT
5672.0	5776.4	0.00	0.00	725.2	708.3	-684.8	1013.7	EOD TO VERTICAL
5772.0	5876.4	0.00	0.00	725.2	708.3	-684.8	1013.7	KOP (10°/100ft BUR)
6345.0	6776.4	90.00	180.84	152.3	699.9	-113.3	1586.7	HZ LP: 600ft FNL & 1345ft FEL of Sec 30
6345.0	16153.1	90.00	181.46	-9222.5	512.2	9236.7	10963.4	BHL: 600ft FSL & 1345ft FEL of Sec 31

PROPOSED LOCAL COORDINATES:

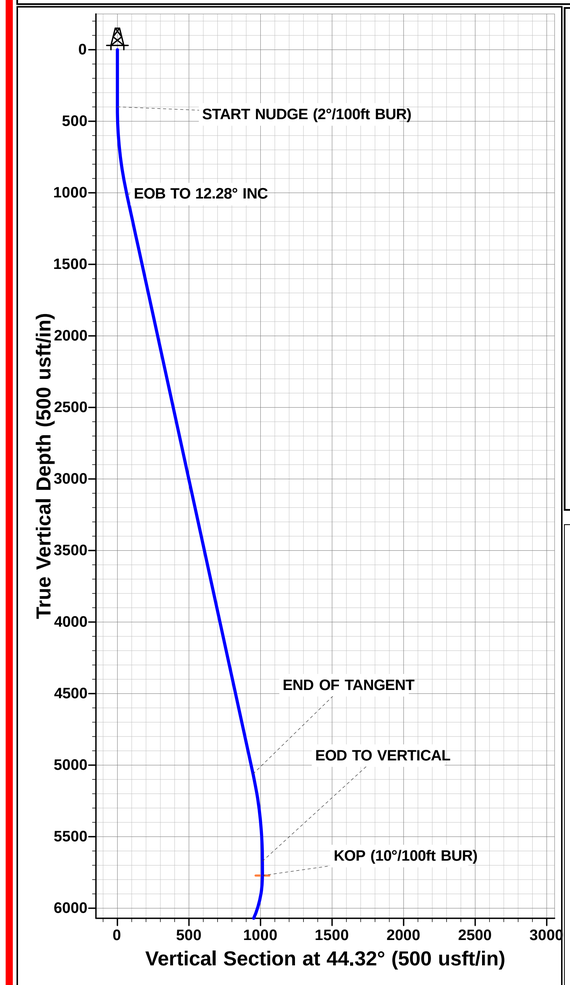
SHL: 751ft FNL & 2042ft FEL of Sec 30

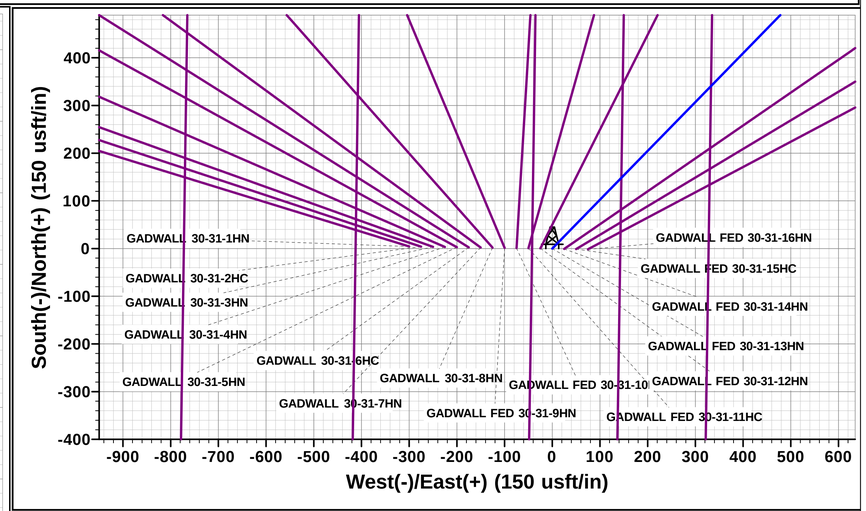
HZ LP: 600ft FNL & 1345ft FEL of Sec 30

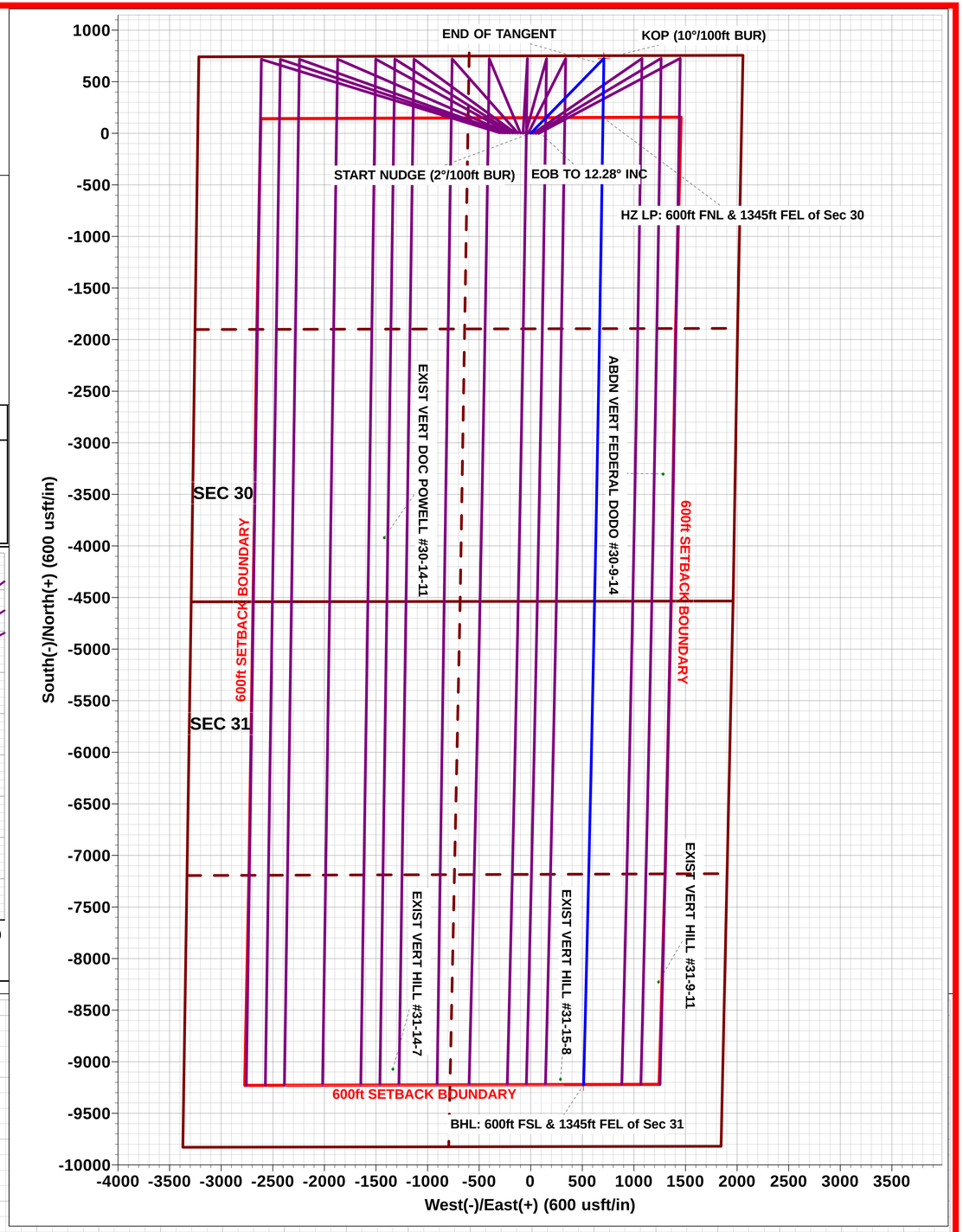
BHL: 600ft FSL & 1345ft FEL of Sec 31

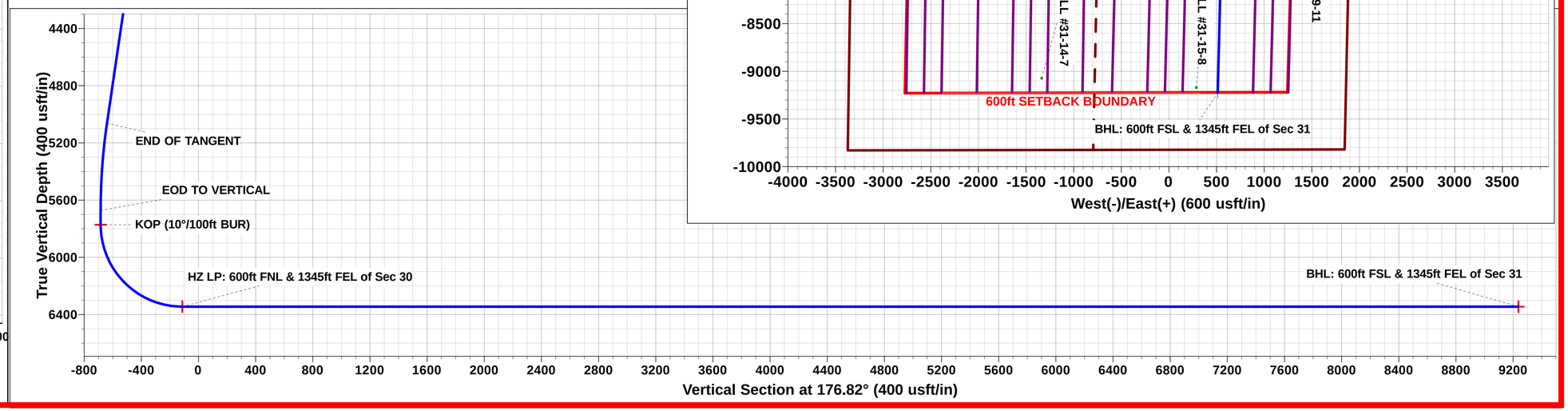
WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP: GADWALL FED 30-31-13HN	5772.0	725.2	708.3	40.640418	-104.130183
HZ LP: GADWALL FED 30-31-13HN	6345.0	152.3	699.9	40.638846	-104.130213
BHL: GADWALL FED 30-31-13HN	6345.0	-9222.5	512.2	40.613114	-104.130890









Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well GADWALL FED 30-31-13HN
Company:	MALLARD EXPLORATION	**TVD Reference:**	KB-EST @ 4963.0usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	**MD Reference:**	KB-EST @ 4963.0usft (Original Well Elev)
Site:	NE NE SEC. 30 T8N R60W 6th P.M.	**North Reference:**	True
Well:	GADWALL FED 30-31-13HN	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

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 NE SEC. 30 T8N R60W 6th P.M.				
Site Position:		**Northing:**	1,478,346.58 usft	**Latitude:**	40.638440
From:	Lat/Long	**Easting:**	3,379,143.09 usft	**Longitude:**	-104.133816
Position Uncertainty:	0.0 usft	**Slot Radius:**	1.10000 ft	**Grid Convergence:**	0.88 °

Well	GADWALL FED 30-31-13HN				
Well Position	**+N/-S**	-4.4 usft	**Northing:**	1,478,346.83 usft	**Latitude:** 40.638428
	+E/-W	300.0 usft	**Easting:**	3,379,443.13 usft	**Longitude:** -104.132735
Position Uncertainty		0.0 usft	**Wellhead Elevation:**	usft	**Ground Level:** 4,947.0 usft

Wellbore	ORIGINAL WELLBORE				
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2015	30/08/2017	7.87	67.14	52,556

Design	PROPOSAL #1			
Audit Notes:				
Version:	**Phase:**	PROTOTYPE	**Tie On Depth:**	0.0

Vertical Section:	**Depth From (TVD) (usft)**	**+N/-S (usft)**	**+E/-W (usft)**	**Direction (°)**
	0.0	0.0	0.0	176.82

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
0.0	0.00	0.00	0.0	-4,963.0	0.0	0.0	0.00	0.00	0.00	0.00	
400.0	0.00	0.00	400.0	-4,563.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,014.2	12.28	44.32	1,009.5	-3,953.5	46.9	45.8	2.00	2.00	0.00	44.32	
5,162.1	12.28	44.32	5,062.5	99.5	678.3	662.5	0.00	0.00	0.00	0.00	
5,776.4	0.00	0.00	5,672.0	709.0	725.2	708.3	2.00	-2.00	0.00	180.00	
5,876.4	0.00	0.00	5,772.0	809.0	725.2	708.3	0.00	0.00	0.00	0.00	KOP: GADWALL FED
6,776.4	90.00	180.84	6,345.0	1,382.0	152.3	699.9	10.00	10.00	-19.91	180.84	HZ LP: GADWALL FE
16,153.1	90.00	181.46	6,345.0	1,382.0	-9,222.5	512.2	0.01	0.00	0.01	89.16	BHL: GADWALL FED

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well GADWALL FED 30-31-13HN
Company:	MALLARD EXPLORATION	**TVD Reference:**	KB-EST @ 4963.0usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	**MD Reference:**	KB-EST @ 4963.0usft (Original Well Elev)
Site:	NE NE SEC. 30 T8N R60W 6th P.M.	**North Reference:**	True
Well:	GADWALL FED 30-31-13HN	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

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: 751ft FNL & 2042ft FEL of Sec 30										
0.0	***0.00***	***0.00***	***0.0***	***4,963.00***	***0.0***	***0.0***	***0.0***	***0.00***	***0.00***	***0.00***
100.0	0.00	0.00	100.0	4,863.00	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	4,763.00	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	4,663.00	0.0	0.0	0.0	0.00	0.00	0.00
START NUDGE (2°/100ft BUR)										
400.0	***0.00***	***0.00***	***400.0***	***4,563.00***	***0.0***	***0.0***	***0.0***	***0.00***	***0.00***	***0.00***
500.0	2.00	44.32	500.0	4,463.02	1.2	1.2	-1.2	2.00	2.00	0.00
600.0	4.00	44.32	599.8	4,363.16	5.0	4.9	-4.7	2.00	2.00	0.00
700.0	6.00	44.32	699.5	4,263.55	11.2	11.0	-10.6	2.00	2.00	0.00
800.0	8.00	44.32	798.7	4,164.30	19.9	19.5	-18.8	2.00	2.00	0.00
900.0	10.00	44.32	897.5	4,065.53	31.1	30.4	-29.4	2.00	2.00	0.00
1,000.0	12.00	44.32	995.6	3,967.38	44.8	43.7	-42.3	2.00	2.00	0.00
EOB TO 12.28° INC										
1,014.2	***12.28***	***44.32***	***1,009.5***	***3,953.48***	***46.9***	***45.8***	***-44.3***	***2.00***	***2.00***	***0.00***
1,100.0	12.28	44.32	1,093.3	3,869.66	60.0	58.6	-56.6	0.00	0.00	0.00
1,200.0	12.28	44.32	1,191.1	3,771.95	75.2	73.4	-71.0	0.00	0.00	0.00
1,300.0	12.28	44.32	1,288.8	3,674.24	90.4	88.3	-85.4	0.00	0.00	0.00
1,400.0	12.28	44.32	1,386.5	3,576.53	105.6	103.2	-99.8	0.00	0.00	0.00
1,500.0	12.28	44.32	1,484.2	3,478.82	120.9	118.0	-114.1	0.00	0.00	0.00
FOX HILLS BASE										
1,558.1	***12.28***	***44.32***	***1,541.0***	***3,422.00***	***129.7***	***126.7***	***-122.5***	***0.00***	***0.00***	***0.00***
1,600.0	12.28	44.32	1,581.9	3,381.11	136.1	132.9	-128.5	0.00	0.00	0.00
1,700.0	12.28	44.32	1,679.6	3,283.40	151.3	147.8	-142.9	0.00	0.00	0.00
1,800.0	12.28	44.32	1,777.3	3,185.69	166.5	162.6	-157.3	0.00	0.00	0.00
1,900.0	12.28	44.32	1,875.0	3,087.98	181.7	177.5	-171.6	0.00	0.00	0.00
2,000.0	12.28	44.32	1,972.7	2,990.27	197.0	192.4	-186.0	0.00	0.00	0.00
2,100.0	12.28	44.32	2,070.4	2,892.56	212.2	207.2	-200.4	0.00	0.00	0.00
2,200.0	12.28	44.32	2,168.2	2,794.84	227.4	222.1	-214.7	0.00	0.00	0.00
2,300.0	12.28	44.32	2,265.9	2,697.13	242.6	237.0	-229.1	0.00	0.00	0.00
2,400.0	12.28	44.32	2,363.6	2,599.42	257.9	251.8	-243.5	0.00	0.00	0.00
2,500.0	12.28	44.32	2,461.3	2,501.71	273.1	266.7	-257.9	0.00	0.00	0.00
2,600.0	12.28	44.32	2,559.0	2,404.00	288.3	281.6	-272.2	0.00	0.00	0.00
2,700.0	12.28	44.32	2,656.7	2,306.29	303.5	296.4	-286.6	0.00	0.00	0.00
2,800.0	12.28	44.32	2,754.4	2,208.58	318.7	311.3	-301.0	0.00	0.00	0.00
2,900.0	12.28	44.32	2,852.1	2,110.87	334.0	326.2	-315.4	0.00	0.00	0.00
3,000.0	12.28	44.32	2,949.8	2,013.16	349.2	341.0	-329.7	0.00	0.00	0.00
3,100.0	12.28	44.32	3,047.5	1,915.45	364.4	355.9	-344.1	0.00	0.00	0.00
3,200.0	12.28	44.32	3,145.3	1,817.74	379.6	370.8	-358.5	0.00	0.00	0.00
3,300.0	12.28	44.32	3,243.0	1,720.03	394.8	385.6	-372.8	0.00	0.00	0.00
3,400.0	12.28	44.32	3,340.7	1,622.32	410.1	400.5	-387.2	0.00	0.00	0.00
RICHARD SNADSTONE										
3,455.6	***12.28***	***44.32***	***3,395.0***	***1,568.00***	***418.5***	***408.8***	***-395.2***	***0.00***	***0.00***	***0.00***
3,500.0	12.28	44.32	3,438.4	1,524.61	425.3	415.4	-401.6	0.00	0.00	0.00
PARKMAN SANDSTONE										
3,572.3	***12.28***	***44.32***	***3,509.0***	***1,454.00***	***436.3***	***426.1***	***-412.0***	***0.00***	***0.00***	***0.00***
3,600.0	12.28	44.32	3,536.1	1,426.90	440.5	430.2	-416.0	0.00	0.00	0.00
3,700.0	12.28	44.32	3,633.8	1,329.19	455.7	445.1	-430.3	0.00	0.00	0.00
3,800.0	12.28	44.32	3,731.5	1,231.48	470.9	460.0	-444.7	0.00	0.00	0.00
3,900.0	12.28	44.32	3,829.2	1,133.77	486.2	474.8	-459.1	0.00	0.00	0.00
4,000.0	12.28	44.32	3,926.9	1,036.06	501.4	489.7	-473.5	0.00	0.00	0.00
4,100.0	12.28	44.32	4,024.7	938.35	516.6	504.6	-487.8	0.00	0.00	0.00
4,200.0	12.28	44.32	4,122.4	840.64	531.8	519.4	-502.2	0.00	0.00	0.00

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Site:	NE NE SEC. 30 T8N R60W 6th P.M.	**North Reference:**	True
Well:	GADWALL FED 30-31-13HN	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

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)
4,300.0	12.28	44.32	4,220.1	742.93	547.0	534.3	-516.6	0.00	0.00	0.00
SUSSEX SANDSTONE										
4,336.8	***12.28***	***44.32***	***4,256.0***	***707.00***	***552.6***	***539.8***	***-521.9***	***0.00***	***0.00***	***0.00***
4,400.0	12.28	44.32	4,317.8	645.22	562.3	549.2	-530.9	0.00	0.00	0.00
4,500.0	12.28	44.32	4,415.5	547.51	577.5	564.0	-545.3	0.00	0.00	0.00
4,600.0	12.28	44.32	4,513.2	449.80	592.7	578.9	-559.7	0.00	0.00	0.00
4,700.0	12.28	44.32	4,610.9	352.08	607.9	593.8	-574.1	0.00	0.00	0.00
4,800.0	12.28	44.32	4,708.6	254.37	623.2	608.6	-588.4	0.00	0.00	0.00
SHANNON SANDSTONE										
4,804.5	***12.28***	***44.32***	***4,713.0***	***250.00***	***623.8***	***609.3***	***-589.1***	***0.00***	***0.00***	***0.00***
4,900.0	12.28	44.32	4,806.3	156.66	638.4	623.5	-602.8	0.00	0.00	0.00
5,000.0	12.28	44.32	4,904.0	58.95	653.6	638.4	-617.2	0.00	0.00	0.00
5,100.0	12.28	44.32	5,001.8	-38.76	668.8	653.2	-631.6	0.00	0.00	0.00
END OF TANGENT										
5,162.1	***12.28***	***44.32***	***5,062.5***	***-99.48***	***678.3***	***662.5***	***-640.5***	***0.00***	***0.00***	***0.00***
5,200.0	11.53	44.32	5,099.5	-136.52	683.9	667.9	-645.8	2.00	-2.00	0.00
5,300.0	9.53	44.32	5,197.8	-234.83	696.9	680.7	-658.1	2.00	-2.00	0.00
5,400.0	7.53	44.32	5,296.7	-333.72	707.5	691.1	-668.1	2.00	-2.00	0.00
5,500.0	5.53	44.32	5,396.1	-433.07	715.7	699.0	-675.8	2.00	-2.00	0.00
5,600.0	3.53	44.32	5,495.8	-532.75	721.3	704.5	-681.1	2.00	-2.00	0.00
5,700.0	1.53	44.32	5,595.6	-632.65	724.5	707.6	-684.1	2.00	-2.00	0.00
EOD TO VERTICAL										
5,776.4	***0.00***	***0.00***	***5,672.0***	***-709.00***	***725.2***	***708.3***	***-684.8***	***2.00***	***-2.00***	***0.00***
5,800.0	0.00	0.00	5,695.6	-732.64	725.2	708.3	-684.8	0.00	0.00	0.00
KOP (10°/100ft BUR)										
5,876.4	***0.00***	***0.00***	***5,772.0***	***-809.00***	***725.2***	***708.3***	***-684.8***	***0.00***	***0.00***	***0.00***
5,900.0	2.36	180.84	5,795.6	-832.63	724.7	708.3	-684.3	10.00	10.00	0.00
6,000.0	12.36	180.84	5,894.7	-931.68	711.9	708.1	-671.5	10.00	10.00	0.00
6,100.0	22.36	180.84	5,990.0	-1,027.00	682.1	707.7	-641.8	10.00	10.00	0.00
6,200.0	32.36	180.84	6,078.7	-1,115.70	636.2	707.0	-596.0	10.00	10.00	0.00
6,300.0	42.36	180.84	6,158.1	-1,195.09	575.6	706.1	-535.6	10.00	10.00	0.00
SHARON SPRINGS										
6,315.0	***43.86***	***180.84***	***6,169.0***	***-1,206.00***	***565.4***	***706.0***	***-525.4***	***10.00***	***10.00***	***0.00***
6,400.0	52.36	180.84	6,225.7	-1,262.74	502.2	705.0	-462.3	10.00	10.00	0.00
NIOBRARA A CHALK										
6,432.8	***55.64***	***180.84***	***6,245.0***	***-1,282.00***	***475.6***	***704.7***	***-435.8***	***10.00***	***10.00***	***0.00***
NIOBRARA A CHALK BASE										
6,486.1	***60.97***	***180.84***	***6,273.0***	***-1,310.00***	***430.3***	***704.0***	***-390.6***	***10.00***	***10.00***	***0.00***
6,500.0	62.36	180.84	6,279.6	-1,316.61	418.1	703.8	-378.4	10.00	10.00	0.00
NIOBRARA B1 CHALK TOP										
6,566.6	***69.02***	***180.84***	***6,307.0***	***-1,344.00***	***357.4***	***702.9***	***-317.9***	***10.00***	***10.00***	***0.00***
6,600.0	72.36	180.84	6,318.1	-1,355.05	325.9	702.5	-286.4	10.00	10.00	0.00
NIOBRARA B1 CHALK BASE										
6,617.1	***74.07***	***180.84***	***6,323.0***	***-1,360.00***	***309.5***	***702.2***	***-270.1***	***10.00***	***10.00***	***0.00***
6,700.0	82.36	180.84	6,339.9	-1,376.91	228.5	701.1	-189.2	10.00	10.00	0.00
HZ LP: 600ft FNL & 1345ft FEL of Sec 30 - NIOBRARA B2 CHALK TOP										
6,776.4	***90.00***	***180.84***	***6,345.0***	***-1,382.00***	***152.3***	***699.9***	***-113.3***	***10.00***	***10.00***	***0.00***
6,800.0	90.00	180.84	6,345.0	-1,382.00	128.7	699.6	-89.7	0.01	0.00	0.01
6,900.0	90.00	180.84	6,345.0	-1,382.01	28.7	698.1	10.1	0.01	0.00	0.01
7,000.0	90.00	180.85	6,345.0	-1,382.02	-71.3	696.7	109.8	0.01	0.00	0.01
7,100.0	90.00	180.86	6,345.0	-1,382.02	-171.3	695.2	209.6	0.01	0.00	0.01
7,200.0	90.00	180.86	6,345.0	-1,382.03	-271.3	693.7	309.3	0.01	0.00	0.01
7,300.0	90.00	180.87	6,345.0	-1,382.04	-371.3	692.1	409.1	0.01	0.00	0.01

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well GADWALL FED 30-31-13HN
Company:	MALLARD EXPLORATION	**TVD Reference:**	KB-EST @ 4963.0usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	**MD Reference:**	KB-EST @ 4963.0usft (Original Well Elev)
Site:	NE NE SEC. 30 T8N R60W 6th P.M.	**North Reference:**	True
Well:	GADWALL FED 30-31-13HN	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

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)
7,400.0	90.00	180.88	6,345.0	-1,382.05	-471.2	690.6	508.8	0.01	0.00	0.01
7,500.0	90.00	180.88	6,345.1	-1,382.05	-571.2	689.1	608.6	0.01	0.00	0.01
7,600.0	90.00	180.89	6,345.1	-1,382.06	-671.2	687.5	708.3	0.01	0.00	0.01
7,700.0	90.00	180.90	6,345.1	-1,382.07	-771.2	686.0	808.1	0.01	0.00	0.01
7,800.0	90.00	180.90	6,345.1	-1,382.07	-871.2	684.4	907.8	0.01	0.00	0.01
7,900.0	90.00	180.91	6,345.1	-1,382.08	-971.2	682.8	1,007.6	0.01	0.00	0.01
8,000.0	90.00	180.92	6,345.1	-1,382.08	-1,071.2	681.2	1,107.3	0.01	0.00	0.01
8,100.0	90.00	180.92	6,345.1	-1,382.09	-1,171.2	679.6	1,207.0	0.01	0.00	0.01
8,200.0	90.00	180.93	6,345.1	-1,382.10	-1,271.1	678.0	1,306.8	0.01	0.00	0.01
8,300.0	90.00	180.94	6,345.1	-1,382.10	-1,371.1	676.4	1,406.5	0.01	0.00	0.01
8,400.0	90.00	180.94	6,345.1	-1,382.11	-1,471.1	674.7	1,506.3	0.01	0.00	0.01
8,500.0	90.00	180.95	6,345.1	-1,382.11	-1,571.1	673.1	1,606.0	0.01	0.00	0.01
8,600.0	90.00	180.96	6,345.1	-1,382.12	-1,671.1	671.4	1,705.8	0.01	0.00	0.01
8,700.0	90.00	180.96	6,345.1	-1,382.12	-1,771.1	669.7	1,805.5	0.01	0.00	0.01
8,800.0	90.00	180.97	6,345.1	-1,382.13	-1,871.1	668.1	1,905.2	0.01	0.00	0.01
8,900.0	90.00	180.98	6,345.1	-1,382.13	-1,971.0	666.4	2,005.0	0.01	0.00	0.01
9,000.0	90.00	180.98	6,345.1	-1,382.13	-2,071.0	664.6	2,104.7	0.01	0.00	0.01
9,100.0	90.00	180.99	6,345.1	-1,382.14	-2,171.0	662.9	2,204.4	0.01	0.00	0.01
9,200.0	90.00	181.00	6,345.1	-1,382.14	-2,271.0	661.2	2,304.2	0.01	0.00	0.01
9,300.0	90.00	181.00	6,345.1	-1,382.15	-2,371.0	659.4	2,403.9	0.01	0.00	0.01
9,400.0	90.00	181.01	6,345.1	-1,382.15	-2,471.0	657.7	2,503.6	0.01	0.00	0.01
9,500.0	90.00	181.02	6,345.2	-1,382.15	-2,571.0	655.9	2,603.4	0.01	0.00	0.01
9,600.0	90.00	181.02	6,345.2	-1,382.16	-2,670.9	654.1	2,703.1	0.01	0.00	0.01
9,700.0	90.00	181.03	6,345.2	-1,382.16	-2,770.9	652.3	2,802.8	0.01	0.00	0.01
9,800.0	90.00	181.04	6,345.2	-1,382.16	-2,870.9	650.5	2,902.6	0.01	0.00	0.01
9,900.0	90.00	181.04	6,345.2	-1,382.17	-2,970.9	648.7	3,002.3	0.01	0.00	0.01
10,000.0	90.00	181.05	6,345.2	-1,382.17	-3,070.9	646.9	3,102.0	0.01	0.00	0.01
10,100.0	90.00	181.06	6,345.2	-1,382.17	-3,170.9	645.1	3,201.8	0.01	0.00	0.01
10,200.0	90.00	181.06	6,345.2	-1,382.17	-3,270.8	643.2	3,301.5	0.01	0.00	0.01
10,300.0	90.00	181.07	6,345.2	-1,382.17	-3,370.8	641.4	3,401.2	0.01	0.00	0.01
10,400.0	90.00	181.08	6,345.2	-1,382.18	-3,470.8	639.5	3,500.9	0.01	0.00	0.01
10,500.0	90.00	181.08	6,345.2	-1,382.18	-3,570.8	637.6	3,600.7	0.01	0.00	0.01
10,600.0	90.00	181.09	6,345.2	-1,382.18	-3,670.8	635.7	3,700.4	0.01	0.00	0.01
10,700.0	90.00	181.10	6,345.2	-1,382.18	-3,770.8	633.8	3,800.1	0.01	0.00	0.01
10,800.0	90.00	181.10	6,345.2	-1,382.18	-3,870.7	631.9	3,899.8	0.01	0.00	0.01
10,900.0	90.00	181.11	6,345.2	-1,382.18	-3,970.7	629.9	3,999.5	0.01	0.00	0.01
11,000.0	90.00	181.12	6,345.2	-1,382.18	-4,070.7	628.0	4,099.3	0.01	0.00	0.01
11,100.0	90.00	181.12	6,345.2	-1,382.18	-4,170.7	626.0	4,199.0	0.01	0.00	0.01
11,200.0	90.00	181.13	6,345.2	-1,382.19	-4,270.7	624.1	4,298.7	0.01	0.00	0.01
11,300.0	90.00	181.14	6,345.2	-1,382.19	-4,370.6	622.1	4,398.4	0.01	0.00	0.01
11,400.0	90.00	181.14	6,345.2	-1,382.19	-4,470.6	620.1	4,498.1	0.01	0.00	0.01
11,500.0	90.00	181.15	6,345.2	-1,382.19	-4,570.6	618.1	4,597.8	0.01	0.00	0.01
11,600.0	90.00	181.16	6,345.2	-1,382.19	-4,670.6	616.1	4,697.6	0.01	0.00	0.01
11,700.0	90.00	181.16	6,345.2	-1,382.19	-4,770.6	614.1	4,797.3	0.01	0.00	0.01
11,800.0	90.00	181.17	6,345.2	-1,382.19	-4,870.5	612.0	4,897.0	0.01	0.00	0.01
11,900.0	90.00	181.18	6,345.2	-1,382.18	-4,970.5	610.0	4,996.7	0.01	0.00	0.01
12,000.0	90.00	181.18	6,345.2	-1,382.18	-5,070.5	607.9	5,096.4	0.01	0.00	0.01
12,100.0	90.00	181.19	6,345.2	-1,382.18	-5,170.5	605.9	5,196.1	0.01	0.00	0.01
12,200.0	90.00	181.20	6,345.2	-1,382.18	-5,270.5	603.8	5,295.8	0.01	0.00	0.01
12,300.0	90.00	181.20	6,345.2	-1,382.18	-5,370.4	601.7	5,395.5	0.01	0.00	0.01
12,400.0	90.00	181.21	6,345.2	-1,382.18	-5,470.4	599.6	5,495.2	0.01	0.00	0.01
12,500.0	90.00	181.22	6,345.2	-1,382.18	-5,570.4	597.5	5,594.9	0.01	0.00	0.01
12,600.0	90.00	181.22	6,345.2	-1,382.18	-5,670.4	595.4	5,694.7	0.01	0.00	0.01
12,700.0	90.00	181.23	6,345.2	-1,382.17	-5,770.3	593.2	5,794.4	0.01	0.00	0.01

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well GADWALL FED 30-31-13HN
Company:	MALLARD EXPLORATION	**TVD Reference:**	KB-EST @ 4963.0usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	**MD Reference:**	KB-EST @ 4963.0usft (Original Well Elev)
Site:	NE NE SEC. 30 T8N R60W 6th P.M.	**North Reference:**	True
Well:	GADWALL FED 30-31-13HN	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

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)
12,800.0	90.00	181.24	6,345.2	-1,382.17	-5,870.3	591.1	5,894.1	0.01	0.00	0.01
12,900.0	90.00	181.24	6,345.2	-1,382.17	-5,970.3	588.9	5,993.8	0.01	0.00	0.01
13,000.0	90.00	181.25	6,345.2	-1,382.17	-6,070.3	586.7	6,093.5	0.01	0.00	0.01
13,100.0	90.00	181.26	6,345.2	-1,382.16	-6,170.2	584.5	6,193.2	0.01	0.00	0.01
13,200.0	90.00	181.26	6,345.2	-1,382.16	-6,270.2	582.3	6,292.9	0.01	0.00	0.01
13,300.0	90.00	181.27	6,345.2	-1,382.16	-6,370.2	580.1	6,392.6	0.01	0.00	0.01
13,400.0	90.00	181.28	6,345.2	-1,382.15	-6,470.2	577.9	6,492.3	0.01	0.00	0.01
13,500.0	90.00	181.28	6,345.2	-1,382.15	-6,570.1	575.7	6,592.0	0.01	0.00	0.01
13,600.0	90.00	181.29	6,345.1	-1,382.15	-6,670.1	573.4	6,691.7	0.01	0.00	0.01
13,700.0	90.00	181.30	6,345.1	-1,382.14	-6,770.1	571.2	6,791.4	0.01	0.00	0.01
13,800.0	90.00	181.30	6,345.1	-1,382.14	-6,870.1	568.9	6,891.0	0.01	0.00	0.01
13,900.0	90.00	181.31	6,345.1	-1,382.14	-6,970.0	566.6	6,990.7	0.01	0.00	0.01
14,000.0	90.00	181.32	6,345.1	-1,382.13	-7,070.0	564.4	7,090.4	0.01	0.00	0.01
14,100.0	90.00	181.32	6,345.1	-1,382.13	-7,170.0	562.1	7,190.1	0.01	0.00	0.01
14,200.0	90.00	181.33	6,345.1	-1,382.12	-7,270.0	559.7	7,289.8	0.01	0.00	0.01
14,300.0	90.00	181.34	6,345.1	-1,382.12	-7,369.9	557.4	7,389.5	0.01	0.00	0.01
14,400.0	90.00	181.34	6,345.1	-1,382.11	-7,469.9	555.1	7,489.2	0.01	0.00	0.01
14,500.0	90.00	181.35	6,345.1	-1,382.11	-7,569.9	552.7	7,588.9	0.01	0.00	0.01
14,600.0	90.00	181.36	6,345.1	-1,382.10	-7,669.9	550.4	7,688.6	0.01	0.00	0.01
14,700.0	90.00	181.36	6,345.1	-1,382.10	-7,769.8	548.0	7,788.3	0.01	0.00	0.01
14,800.0	90.00	181.37	6,345.1	-1,382.09	-7,869.8	545.6	7,887.9	0.01	0.00	0.01
14,900.0	90.00	181.38	6,345.1	-1,382.09	-7,969.8	543.2	7,987.6	0.01	0.00	0.01
15,000.0	90.00	181.38	6,345.1	-1,382.08	-8,069.7	540.8	8,087.3	0.01	0.00	0.01
15,100.0	90.00	181.39	6,345.1	-1,382.07	-8,169.7	538.4	8,187.0	0.01	0.00	0.01
15,200.0	90.00	181.39	6,345.1	-1,382.07	-8,269.7	536.0	8,286.7	0.01	0.00	0.01
15,300.0	90.00	181.40	6,345.1	-1,382.06	-8,369.7	533.5	8,386.4	0.01	0.00	0.01
15,400.0	90.00	181.41	6,345.1	-1,382.05	-8,469.6	531.1	8,486.0	0.01	0.00	0.01
15,500.0	90.00	181.41	6,345.0	-1,382.05	-8,569.6	528.6	8,585.7	0.01	0.00	0.01
15,600.0	90.00	181.42	6,345.0	-1,382.04	-8,669.6	526.1	8,685.4	0.01	0.00	0.01
15,700.0	90.00	181.43	6,345.0	-1,382.03	-8,769.5	523.7	8,785.1	0.01	0.00	0.01
15,800.0	90.00	181.43	6,345.0	-1,382.03	-8,869.5	521.2	8,884.8	0.01	0.00	0.01
15,900.0	90.00	181.44	6,345.0	-1,382.02	-8,969.5	518.7	8,984.4	0.01	0.00	0.01
16,000.0	90.00	181.45	6,345.0	-1,382.01	-9,069.4	516.1	9,084.1	0.01	0.00	0.01
16,100.0	90.00	181.45	6,345.0	-1,382.00	-9,169.4	513.6	9,183.8	0.01	0.00	0.01
BHL: 600ft FSL & 1345ft FEL of Sec 31										
16,153.1	***90.00***	***181.46***	***6,345.0***	***-1,382.00***	***-9,222.5***	***512.2***	***9,236.7***	***0.01***	***0.00***	***0.01***

Database:	EDM 5000.1 Single User Db	**Local Co-ordinate Reference:**	Well GADWALL FED 30-31-13HN
Company:	MALLARD EXPLORATION	**TVD Reference:**	KB-EST @ 4963.0usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	**MD Reference:**	KB-EST @ 4963.0usft (Original Well Elev)
Site:	NE NE SEC. 30 T8N R60W 6th P.M.	**North Reference:**	True
Well:	GADWALL FED 30-31-13HN	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

Formations

MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,558.1	1,541.0	FOX HILLS BASE			
3,455.6	3,395.0	RICHARD SNADSTONE			
3,572.3	3,509.0	PARKMAN SANDSTONE			
4,336.8	4,256.0	SUSSEX SANDSTONE			
4,804.5	4,713.0	SHANNON SANDSTONE			
6,315.0	6,169.0	SHARON SPRINGS			
6,432.8	6,245.0	NIOBRARA A CHALK			
6,486.1	6,273.0	NIOBRARA A CHALK BASE			
6,566.6	6,307.0	NIOBRARA B1 CHALK TOP			
6,617.1	6,323.0	NIOBRARA B1 CHALK BASE			
6,776.4	6,345.0	NIOBRARA B2 CHALK TOP			

Plan Annotations

MD (usft)	TVD (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
0.0	0.0	0.0	0.0	SHL: 751ft FNL & 2042ft FEL of Sec 30
400.0	400.0	0.0	0.0	START NUDGE (2°/100ft BUR)
1,014.2	1,009.5	46.9	45.8	EOB TO 12.28° INC
5,162.1	5,062.5	678.3	662.5	END OF TANGENT
5,776.4	5,672.0	725.2	708.3	EOD TO VERTICAL
5,876.4	5,772.0	725.2	708.3	KOP (10°/100ft BUR)
6,776.4	6,345.0	152.3	699.9	HZ LP: 600ft FNL & 1345ft FEL of Sec 30
16,153.1	6,345.0	-9,222.5	512.2	BHL: 600ft FSL & 1345ft FEL of Sec 31