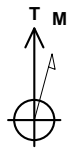


# GADECO, LLC

Project: Weld County, CO (NAD 83)  
Site: Tigertail Federal  
Well: 2-3  
Wellbore: OH  
Design: Plan #2a



Azimuths to True North  
Magnetic North: 8.42°

Magnetic Field  
Strength: 52738.2snT  
Dip Angle: 67.17°  
Date: 8/20/2015  
Model: BGGM2015

PROJECT DETAILS: Weld County, CO (NAD 83)

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

## DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
SHL(TTF 23-H)	0.00	0.00	0.00	1463089.36	3273859.72	40° 36' 1.432 N	104° 30' 49.545 W
PBHL(TTF 23-H)	6795.00	2656.67	28.17	1465746.18	3273858.34	40° 36' 27.684 N	104° 30' 49.180 W

## SECTION DETAILS

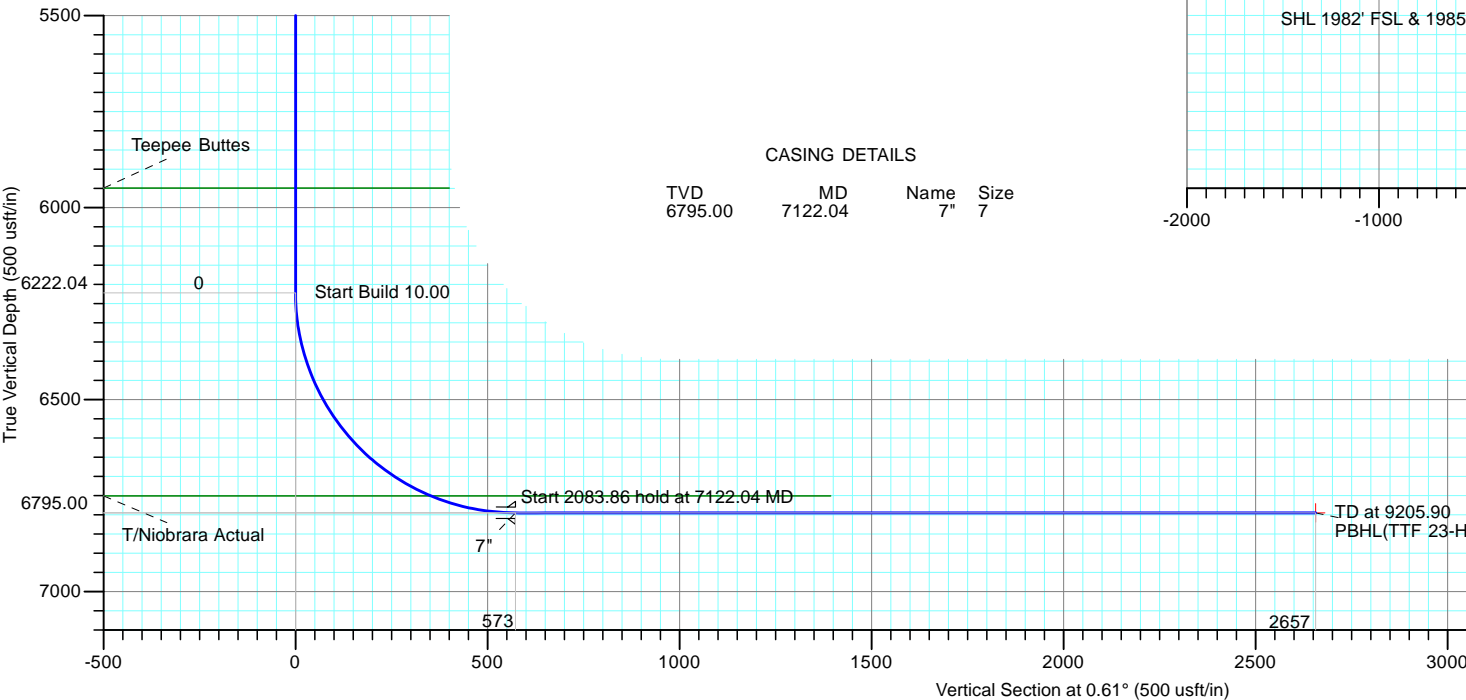
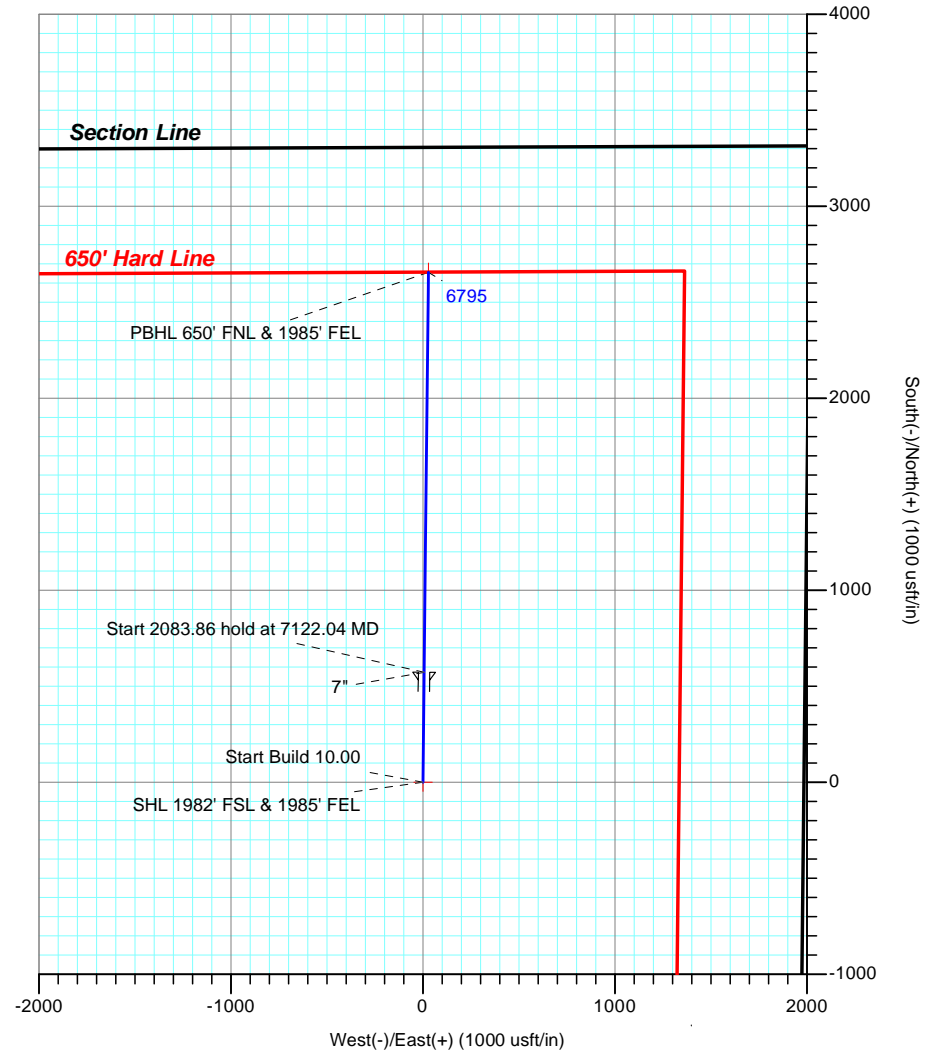
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	6222.04	0.00	0.00	6222.04	0.00	0.00	0.00	0.00	0.00	
3	7122.04	90.00	0.61	6795.00	572.93	6.07	10.00	0.61	572.96	
4	9205.90	90.00	0.61	6795.00	2656.67	28.17	0.00	0.00	2656.82	PBHL(TTF 23-H)

## CASING DETAILS

TVD	MD	Name	Size
6795.00	7122.04	7"	7

## FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2938.00	2938.00	Pierre
3681.00	3681.00	Parkman
4501.00	4501.00	Sussex
5131.00	5131.00	Shannon
5949.00	5949.00	Teepee Buttes
6751.00	6896.04	T/Niobrara Actual



LEAM DRILLING SYSTEMS LLC  
2010 East Davis, Conroe, Texas 77301  
Phone: 936/756-7577, Fax: 936/756-7595

Plan: Plan #2a (2-3/OH)  
Tigertail Federal  
Created By: David Vogler  
Date: 9:02, August 22 2015  
Approved: \_\_\_\_\_ Date: \_\_\_\_\_

# LEAM Drilling Systems LLC

## Planning Report

<b>Database:</b>	EDM 5000.1 Multi_User Db	<b>Local Co-ordinate Reference:</b>	Well 2-3
<b>Company:</b>	GADECO, LLC	<b>TVD Reference:</b>	GE 4887' + 15' @ 4902.00usft (Planning)
<b>Project:</b>	Weld County, CO (NAD 83)	<b>MD Reference:</b>	GE 4887' + 15' @ 4902.00usft (Planning)
<b>Site:</b>	Tigertail Federal	<b>North Reference:</b>	True
<b>Well:</b>	2-3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #2a		

<b>Project</b>	Weld County, CO (NAD 83)		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		

Site		Tigertail Federal			
Site Position:		Northing:	1,463,089.36 usft	Latitude:	40° 36' 1.432 N
From:	Map	Easting:	3,273,859.72 usft	Longitude:	104° 30' 49.545 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.64 °

Well	2-3					
Well Position	+N/-S	0.00 usft	Northing:	1,463,089.36 usft	Latitude:	40° 36' 1.432 N
	+E/-W	0.00 usft	Easting:	3,273,859.72 usft	Longitude:	104° 30' 49.545 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	4,887.00 usft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	BGGM2015	8/20/2015	8.42	67.17	52,738

<b>Design</b>	Plan #2a			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.00	0.00	0.00	0.61

<b>Plan Sections</b>										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (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	0.00	0.00	0.00	0.00	0.00	0.00	
6,222.04	0.00	0.00	6,222.04	0.00	0.00	0.00	0.00	0.00	0.00	
7,122.04	90.00	0.61	6,795.00	572.93	6.07	10.00	10.00	0.00	0.61	
9,205.90	90.00	0.61	6,795.00	2,656.67	28.17	0.00	0.00	0.00	0.00	PBHL(TTF 23-H)

# LEAM Drilling Systems LLC

## Planning Report

<b>Database:</b>	EDM 5000.1 Multi_User Db	<b>Local Co-ordinate Reference:</b>	Well 2-3
<b>Company:</b>	GADECO, LLC	<b>TVD Reference:</b>	GE 4887' + 15' @ 4902.00usft (Planning)
<b>Project:</b>	Weld County, CO (NAD 83)	<b>MD Reference:</b>	GE 4887' + 15' @ 4902.00usft (Planning)
<b>Site:</b>	Tigertail Federal	<b>North Reference:</b>	True
<b>Well:</b>	2-3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #2a		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>SHL(TTF 23-H)</b>									
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	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
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,938.00	0.00	0.00	2,938.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Pierre</b>									
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00
3,681.00	0.00	0.00	3,681.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Parkman</b>									
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	0.00	0.00
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00
4,500.00	0.00	0.00	4,500.00	0.00	0.00	0.00	0.00	0.00	0.00
4,501.00	0.00	0.00	4,501.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Sussex</b>									
4,600.00	0.00	0.00	4,600.00	0.00	0.00	0.00	0.00	0.00	0.00

# LEAM Drilling Systems LLC

## Planning Report

<b>Database:</b>	EDM 5000.1 Multi_User Db	<b>Local Co-ordinate Reference:</b>	Well 2-3
<b>Company:</b>	GADECO, LLC	<b>TVD Reference:</b>	GE 4887' + 15' @ 4902.00usft (Planning)
<b>Project:</b>	Weld County, CO (NAD 83)	<b>MD Reference:</b>	GE 4887' + 15' @ 4902.00usft (Planning)
<b>Site:</b>	Tigertail Federal	<b>North Reference:</b>	True
<b>Well:</b>	2-3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #2a		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,700.00	0.00	0.00	4,700.00	0.00	0.00	0.00	0.00	0.00	0.00
4,800.00	0.00	0.00	4,800.00	0.00	0.00	0.00	0.00	0.00	0.00
4,900.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	0.00	0.00
5,000.00	0.00	0.00	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00
5,100.00	0.00	0.00	5,100.00	0.00	0.00	0.00	0.00	0.00	0.00
5,131.00	0.00	0.00	5,131.00	0.00	0.00	0.00	0.00	0.00	0.00
Shannon									
5,200.00	0.00	0.00	5,200.00	0.00	0.00	0.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,300.00	0.00	0.00	0.00	0.00	0.00	0.00
5,400.00	0.00	0.00	5,400.00	0.00	0.00	0.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,500.00	0.00	0.00	0.00	0.00	0.00	0.00
5,600.00	0.00	0.00	5,600.00	0.00	0.00	0.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,700.00	0.00	0.00	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,800.00	0.00	0.00	0.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,900.00	0.00	0.00	0.00	0.00	0.00	0.00
5,949.00	0.00	0.00	5,949.00	0.00	0.00	0.00	0.00	0.00	0.00
Teepee Buttes									
6,000.00	0.00	0.00	6,000.00	0.00	0.00	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	6,100.00	0.00	0.00	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,200.00	0.00	0.00	0.00	0.00	0.00	0.00
6,222.04	0.00	0.00	6,222.04	0.00	0.00	0.00	0.00	0.00	0.00
6,250.00	2.80	0.61	6,249.99	0.68	0.01	0.68	10.00	10.00	0.00
6,300.00	7.80	0.61	6,299.76	5.30	0.06	5.30	10.00	10.00	0.00
6,350.00	12.80	0.61	6,348.94	14.23	0.15	14.23	10.00	10.00	0.00
6,400.00	17.80	0.61	6,397.15	27.41	0.29	27.41	10.00	10.00	0.00
6,450.00	22.80	0.61	6,444.03	44.75	0.47	44.75	10.00	10.00	0.00
6,500.00	27.80	0.61	6,489.22	66.11	0.70	66.11	10.00	10.00	0.00
6,550.00	32.80	0.61	6,532.38	91.32	0.97	91.33	10.00	10.00	0.00
6,600.00	37.80	0.61	6,573.18	120.20	1.27	120.21	10.00	10.00	0.00
6,650.00	42.80	0.61	6,611.30	152.52	1.62	152.53	10.00	10.00	0.00
6,700.00	47.80	0.61	6,646.46	188.05	1.99	188.06	10.00	10.00	0.00
6,750.00	52.80	0.61	6,678.39	226.50	2.40	226.51	10.00	10.00	0.00
6,800.00	57.80	0.61	6,706.85	267.59	2.84	267.61	10.00	10.00	0.00
6,850.00	62.80	0.61	6,731.62	311.00	3.30	311.02	10.00	10.00	0.00
6,896.04	67.40	0.61	6,751.00	352.75	3.74	352.77	10.00	10.00	0.00
T/Niobrara Actual									
6,900.00	67.80	0.61	6,752.51	356.41	3.78	356.43	10.00	10.00	0.00
6,950.00	72.80	0.61	6,769.36	403.47	4.28	403.49	10.00	10.00	0.00
7,000.00	77.80	0.61	6,782.05	451.81	4.79	451.84	10.00	10.00	0.00
7,050.00	82.80	0.61	6,790.48	501.08	5.31	501.11	10.00	10.00	0.00
7,100.00	87.80	0.61	6,794.58	550.89	5.84	550.92	10.00	10.00	0.00
7,122.04	90.00	0.61	6,795.00	572.92	6.07	572.96	10.00	10.00	0.00
7"									
7,200.00	90.00	0.61	6,795.00	650.88	6.90	650.92	0.00	0.00	0.00
7,300.00	90.00	0.61	6,795.00	750.87	7.96	750.92	0.00	0.00	0.00
7,400.00	90.00	0.61	6,795.00	850.87	9.02	850.92	0.00	0.00	0.00
7,500.00	90.00	0.61	6,795.00	950.86	10.08	950.92	0.00	0.00	0.00
7,600.00	90.00	0.61	6,795.00	1,050.86	11.14	1,050.92	0.00	0.00	0.00
7,700.00	90.00	0.61	6,795.00	1,150.85	12.20	1,150.92	0.00	0.00	0.00
7,800.00	90.00	0.61	6,795.00	1,250.85	13.26	1,250.92	0.00	0.00	0.00
7,900.00	90.00	0.61	6,795.00	1,350.84	14.32	1,350.92	0.00	0.00	0.00
8,000.00	90.00	0.61	6,795.00	1,450.83	15.38	1,450.92	0.00	0.00	0.00
8,100.00	90.00	0.61	6,795.00	1,550.83	16.44	1,550.92	0.00	0.00	0.00

# LEAM Drilling Systems LLC

## Planning Report

<b>Database:</b>	EDM 5000.1 Multi_User Db	<b>Local Co-ordinate Reference:</b>	Well 2-3
<b>Company:</b>	GADECO, LLC	<b>TVD Reference:</b>	GE 4887' + 15' @ 4902.00usft (Planning)
<b>Project:</b>	Weld County, CO (NAD 83)	<b>MD Reference:</b>	GE 4887' + 15' @ 4902.00usft (Planning)
<b>Site:</b>	Tigertail Federal	<b>North Reference:</b>	True
<b>Well:</b>	2-3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	Plan #2a		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
8,200.00	90.00	0.61	6,795.00	1,650.82	17.50	1,650.92	0.00	0.00	0.00	
8,300.00	90.00	0.61	6,795.00	1,750.82	18.56	1,750.92	0.00	0.00	0.00	
8,400.00	90.00	0.61	6,795.00	1,850.81	19.62	1,850.92	0.00	0.00	0.00	
8,500.00	90.00	0.61	6,795.00	1,950.81	20.68	1,950.92	0.00	0.00	0.00	
8,600.00	90.00	0.61	6,795.00	2,050.80	21.74	2,050.92	0.00	0.00	0.00	
8,700.00	90.00	0.61	6,795.00	2,150.79	22.80	2,150.92	0.00	0.00	0.00	
8,800.00	90.00	0.61	6,795.00	2,250.79	23.86	2,250.92	0.00	0.00	0.00	
8,900.00	90.00	0.61	6,795.00	2,350.78	24.93	2,350.92	0.00	0.00	0.00	
9,000.00	90.00	0.61	6,795.00	2,450.78	25.99	2,450.92	0.00	0.00	0.00	
9,100.00	90.00	0.61	6,795.00	2,550.77	27.05	2,550.92	0.00	0.00	0.00	
9,205.90	90.00	0.61	6,795.00	2,656.67	28.17	2,656.82	0.00	0.00	0.00	
PBHL(TTF 23-H)										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
- hit/miss target										
- Shape										
SHL(TTF 23-H)	0.00	0.00	0.00	0.00	0.00	1,463,089.36	3,273,859.72	40° 36' 1.432 N	104° 30' 49.545 W	
- plan hits target center										
- Point										
PBHL(TTF 23-H)	0.00	0.00	6,795.00	2,656.67	28.17	1,465,746.18	3,273,858.34	40° 36' 27.684 N	104° 30' 49.180 W	
- plan hits target center										
- Point										

Casing Points										
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")						
7,122.04	6,795.00	7"	7	7-1/2						

Formations										
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)					
2,938.00	2,938.00	Pierre		0.00	0.61					
3,681.00	3,681.00	Parkman		0.00	0.61					
4,501.00	4,501.00	Sussex		0.00	0.61					
5,131.00	5,131.00	Shannon		0.00	0.61					
5,949.00	5,949.00	Teepee Buttes		0.00	0.61					
6,896.04	6,751.00	T/Niobrara Actual		0.00	0.61					