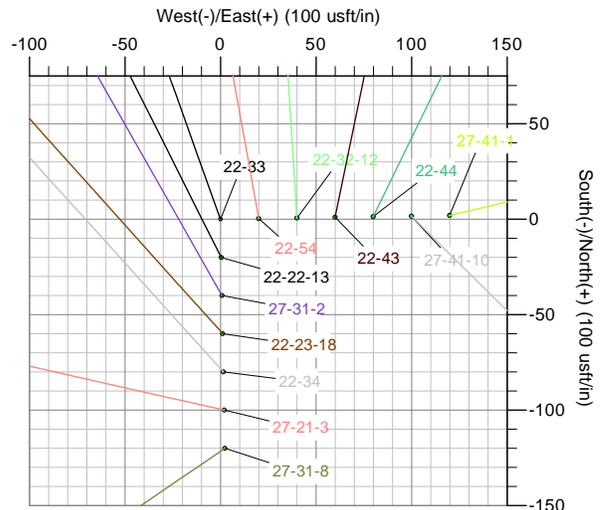
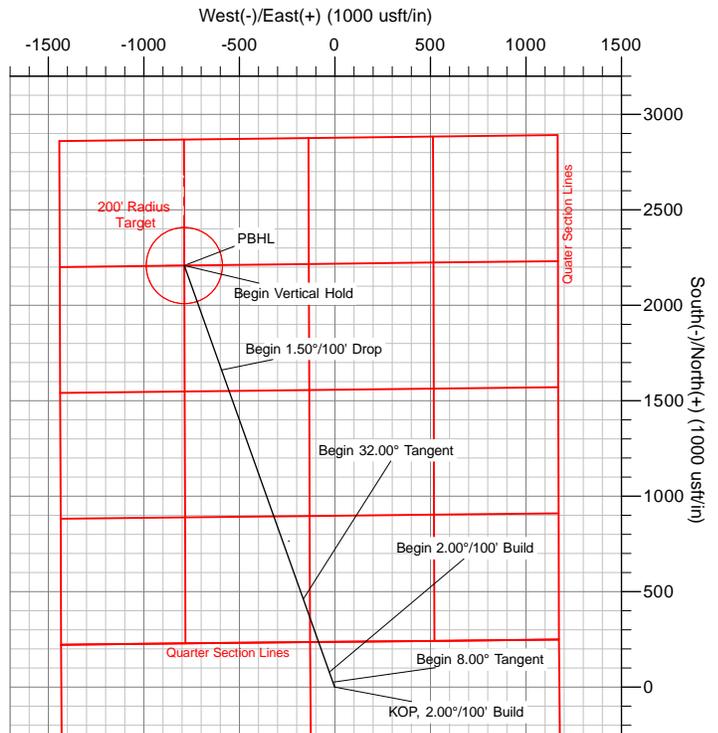
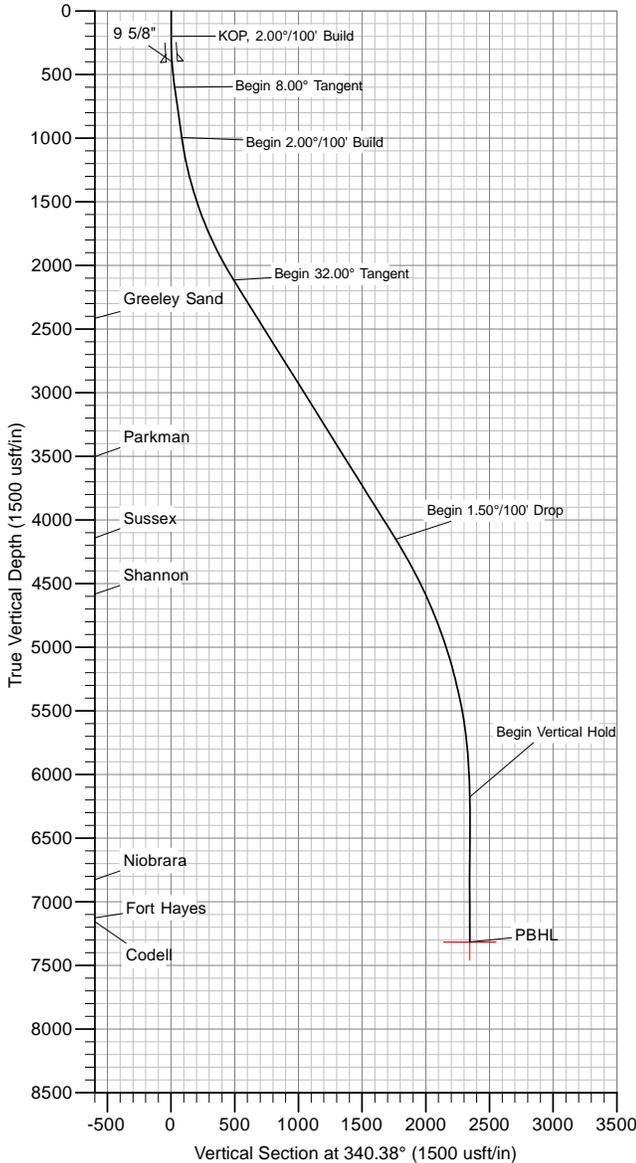


ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Departure	Annotation
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	KOP, 2.00°/100' Build
600.00	8.00	340.38	598.70	26.26	-9.36	27.88	27.88	Begin 8.00° Tangent
1000.00	8.00	340.38	994.81	78.70	-28.06	83.55	83.55	Begin 2.00°/100' Build
2200.05	32.00	340.38	2114.26	462.50	-164.88	491.01	491.01	Begin 32.00° Tangent
4602.70	32.00	340.38	4151.80	1661.81	-592.44	1764.26	1764.26	Begin 1.50°/100' Drop
6736.11	0.00	0.00	6176.00	2208.56	-787.35	2344.71	2344.71	Begin Vertical Hold
7876.11	0.00	0.00	7316.00	2208.56	-787.35	2344.71	2344.71	PBHL





Azimuths to Grid North
 True North: -0.40°
 Magnetic North: 8.45°

Magnetic Field
 Strength: 53109.8snT
 Dip Angle: 67.0°
 Date: 12/16/2011
 Model: WMM_2010

Created By: Marcus Mitcham
 Date: 12:44, December 22 2011
 Plan: Design #1

US State Plane 1983
 Colorado Northern Zone

The customer should only rely on this document after independently verifying all paths, targets, coordinates, lease and hard lines represented. Any decisions made or wells drilled utilizing this or any other information supplied by MS Energy are at the sole risk and responsibility of the customer. MS Energy is not responsible for the accuracy of this schematic or the information contained herein.

Great Western

Weld County, Colorado (NAD 83)

Diamond Valley

22-33

Wellbore #1

Plan: Design #1

Standard Planning Report

22 December, 2011

Database:	Local DB	Local Co-ordinate Reference:	Well 22-33
Company:	Great Western	TVD Reference:	WELL @ 4781.00usft (Cade 22)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4781.00usft (Cade 22)
Site:	Diamond Valley	North Reference:	Grid
Well:	22-33	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #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		

Well	22-33					
Well Position	+N/-S	1,412,687.01 usft	Northing:	1,412,687.01 usft	Latitude:	40° 27' 52.355 N
	+E/-W	3,174,013.26 usft	Easting:	3,174,013.26 usft	Longitude:	104° 52' 28.558 W
Position Uncertainty		0.00 usft	Wellhead Elevation:		Ground Level:	4,767.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	WMM_2010	12/16/2011	8.86	67.07	53,110

Design	Design #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	340.38

Plan Sections										
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	
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	
600.00	8.00	340.38	598.70	26.26	-9.36	2.00	2.00	0.00	340.38	PBHL v1 - Diamond 2
1,000.00	8.00	340.38	994.81	78.70	-28.06	0.00	0.00	0.00	0.00	
2,200.05	32.00	340.38	2,114.26	462.50	-164.88	2.00	2.00	0.00	0.00	
4,602.70	32.00	340.38	4,151.80	1,661.81	-592.44	0.00	0.00	0.00	0.00	
6,736.11	0.00	0.00	6,176.00	2,208.56	-787.35	1.50	-1.50	0.00	180.00	
7,876.11	0.00	0.00	7,316.00	2,208.56	-787.35	0.00	0.00	0.00	0.00	PBHL v1 - Diamond 2

Database:	Local DB	Local Co-ordinate Reference:	Well 22-33
Company:	Great Western	TVD Reference:	WELL @ 4781.00usft (Cade 22)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4781.00usft (Cade 22)
Site:	Diamond Valley	North Reference:	Grid
Well:	22-33	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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	0.00
100.00	0.00	0.00	100.00	0.00	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	0.00
KOP, 2.00°/100' Build										
300.00	2.00	340.38	299.98	1.64	-0.59	1.75	2.00	2.00	2.00	0.00
400.00	4.00	340.38	399.84	6.57	-2.34	6.98	2.00	2.00	2.00	0.00
9 5/8"										
500.00	6.00	340.38	499.45	14.78	-5.27	15.69	2.00	2.00	2.00	0.00
600.00	8.00	340.38	598.70	26.26	-9.36	27.88	2.00	2.00	2.00	0.00
Begin 8.00° Tangent										
700.00	8.00	340.38	697.73	39.37	-14.04	41.80	0.00	0.00	0.00	0.00
800.00	8.00	340.38	796.76	52.48	-18.71	55.71	0.00	0.00	0.00	0.00
900.00	8.00	340.38	895.78	65.59	-23.38	69.63	0.00	0.00	0.00	0.00
1,000.00	8.00	340.38	994.81	78.70	-28.06	83.55	0.00	0.00	0.00	0.00
Begin 2.00°/100' Build										
1,100.00	10.00	340.38	1,093.57	93.43	-33.31	99.19	2.00	2.00	2.00	0.00
1,200.00	12.00	340.38	1,191.73	111.40	-39.72	118.27	2.00	2.00	2.00	0.00
1,300.00	14.00	340.38	1,289.16	132.59	-47.27	140.77	2.00	2.00	2.00	0.00
1,400.00	16.00	340.38	1,385.75	156.97	-55.96	166.65	2.00	2.00	2.00	0.00
1,500.00	18.00	340.38	1,481.38	184.51	-65.78	195.88	2.00	2.00	2.00	0.00
1,600.00	20.00	340.38	1,575.92	215.17	-76.71	228.44	2.00	2.00	2.00	0.00
1,700.00	22.00	340.38	1,669.28	248.93	-88.74	264.27	2.00	2.00	2.00	0.00
1,800.00	24.00	340.38	1,761.32	285.73	-101.86	303.34	2.00	2.00	2.00	0.00
1,900.00	26.00	340.38	1,851.95	325.54	-116.05	345.60	2.00	2.00	2.00	0.00
2,000.00	28.00	340.38	1,941.04	368.30	-131.30	391.00	2.00	2.00	2.00	0.00
2,100.00	30.00	340.38	2,028.50	413.96	-147.58	439.48	2.00	2.00	2.00	0.00
2,200.05	32.00	340.38	2,114.26	462.50	-164.88	491.01	2.00	2.00	2.00	0.00
Begin 32.00° Tangent										
2,300.00	32.00	340.38	2,199.02	512.39	-182.67	543.97	0.00	0.00	0.00	0.00
2,400.00	32.00	340.38	2,283.82	562.30	-200.46	596.97	0.00	0.00	0.00	0.00
2,500.00	32.00	340.38	2,368.63	612.22	-218.26	649.96	0.00	0.00	0.00	0.00
2,555.86	32.00	340.38	2,416.00	640.10	-228.20	679.56	0.00	0.00	0.00	0.00
Greeley Sand										
2,600.00	32.00	340.38	2,453.43	662.14	-236.05	702.95	0.00	0.00	0.00	0.00
2,700.00	32.00	340.38	2,538.23	712.05	-253.85	755.95	0.00	0.00	0.00	0.00
2,800.00	32.00	340.38	2,623.04	761.97	-271.64	808.94	0.00	0.00	0.00	0.00
2,900.00	32.00	340.38	2,707.84	811.88	-289.44	861.93	0.00	0.00	0.00	0.00
3,000.00	32.00	340.38	2,792.64	861.80	-307.23	914.93	0.00	0.00	0.00	0.00
3,100.00	32.00	340.38	2,877.45	911.72	-325.03	967.92	0.00	0.00	0.00	0.00
3,200.00	32.00	340.38	2,962.25	961.63	-342.82	1,020.91	0.00	0.00	0.00	0.00
3,300.00	32.00	340.38	3,047.06	1,011.55	-360.62	1,073.91	0.00	0.00	0.00	0.00
3,400.00	32.00	340.38	3,131.86	1,061.47	-378.41	1,126.90	0.00	0.00	0.00	0.00
3,500.00	32.00	340.38	3,216.66	1,111.38	-396.21	1,179.90	0.00	0.00	0.00	0.00
3,600.00	32.00	340.38	3,301.47	1,161.30	-414.00	1,232.89	0.00	0.00	0.00	0.00
3,700.00	32.00	340.38	3,386.27	1,211.22	-431.80	1,285.88	0.00	0.00	0.00	0.00
3,800.00	32.00	340.38	3,471.08	1,261.13	-449.59	1,338.88	0.00	0.00	0.00	0.00
3,835.29	32.00	340.38	3,501.00	1,278.75	-455.87	1,357.58	0.00	0.00	0.00	0.00
Parkman										
3,900.00	32.00	340.38	3,555.88	1,311.05	-467.39	1,391.87	0.00	0.00	0.00	0.00
4,000.00	32.00	340.38	3,640.68	1,360.96	-485.18	1,444.86	0.00	0.00	0.00	0.00
4,100.00	32.00	340.38	3,725.49	1,410.88	-502.98	1,497.86	0.00	0.00	0.00	0.00
4,200.00	32.00	340.38	3,810.29	1,460.80	-520.77	1,550.85	0.00	0.00	0.00	0.00
4,300.00	32.00	340.38	3,895.09	1,510.71	-538.57	1,603.84	0.00	0.00	0.00	0.00

Database:	Local DB	Local Co-ordinate Reference:	Well 22-33
Company:	Great Western	TVD Reference:	WELL @ 4781.00usft (Cade 22)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4781.00usft (Cade 22)
Site:	Diamond Valley	North Reference:	Grid
Well:	22-33	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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)	
4,400.00	32.00	340.38	3,979.90	1,560.63	-556.36	1,656.84	0.00	0.00	0.00	
4,500.00	32.00	340.38	4,064.70	1,610.55	-574.16	1,709.83	0.00	0.00	0.00	
4,589.97	32.00	340.38	4,141.00	1,655.46	-590.17	1,757.51	0.00	0.00	0.00	
Sussex										
4,602.70	32.00	340.38	4,151.80	1,661.81	-592.44	1,764.26	0.00	0.00	0.00	
Begin 1.50°/100' Drop										
4,700.00	30.54	340.38	4,234.96	1,709.38	-609.39	1,814.76	1.50	-1.50	0.00	
4,800.00	29.04	340.38	4,321.74	1,756.18	-626.08	1,864.44	1.50	-1.50	0.00	
4,900.00	27.54	340.38	4,409.79	1,800.83	-641.99	1,911.84	1.50	-1.50	0.00	
5,000.00	26.04	340.38	4,499.05	1,843.28	-657.13	1,956.91	1.50	-1.50	0.00	
5,090.69	24.68	340.38	4,581.00	1,879.87	-670.17	1,995.76	1.50	-1.50	0.00	
Shannon										
5,100.00	24.54	340.38	4,589.47	1,883.52	-671.47	1,999.63	1.50	-1.50	0.00	
5,200.00	23.04	340.38	4,680.96	1,921.52	-685.02	2,039.97	1.50	-1.50	0.00	
5,300.00	21.54	340.38	4,773.49	1,957.25	-697.76	2,077.90	1.50	-1.50	0.00	
5,400.00	20.04	340.38	4,866.97	1,990.68	-709.68	2,113.40	1.50	-1.50	0.00	
5,500.00	18.54	340.38	4,961.36	2,021.80	-720.77	2,146.44	1.50	-1.50	0.00	
5,600.00	17.04	340.38	5,056.57	2,050.58	-731.03	2,176.99	1.50	-1.50	0.00	
5,700.00	15.54	340.38	5,152.55	2,077.00	-740.45	2,205.04	1.50	-1.50	0.00	
5,800.00	14.04	340.38	5,249.24	2,101.05	-749.02	2,230.57	1.50	-1.50	0.00	
5,900.00	12.54	340.38	5,346.55	2,122.71	-756.74	2,253.56	1.50	-1.50	0.00	
6,000.00	11.04	340.38	5,444.44	2,141.95	-763.61	2,274.00	1.50	-1.50	0.00	
6,100.00	9.54	340.38	5,542.83	2,158.78	-769.61	2,291.86	1.50	-1.50	0.00	
6,200.00	8.04	340.38	5,641.65	2,173.18	-774.74	2,307.15	1.50	-1.50	0.00	
6,300.00	6.54	340.38	5,740.84	2,185.13	-779.00	2,319.84	1.50	-1.50	0.00	
6,400.00	5.04	340.38	5,840.33	2,194.64	-782.39	2,329.93	1.50	-1.50	0.00	
6,500.00	3.54	340.38	5,940.04	2,201.69	-784.90	2,337.41	1.50	-1.50	0.00	
6,600.00	2.04	340.38	6,039.92	2,206.27	-786.54	2,342.28	1.50	-1.50	0.00	
6,700.00	0.54	340.38	6,139.89	2,208.40	-787.29	2,344.54	1.50	-1.50	0.00	
6,736.11	0.00	0.00	6,176.00	2,208.56	-787.35	2,344.71	1.50	-1.50	0.00	
Begin Vertical Hold										
6,800.00	0.00	0.00	6,239.89	2,208.56	-787.35	2,344.71	0.00	0.00	0.00	
6,900.00	0.00	0.00	6,339.89	2,208.56	-787.35	2,344.71	0.00	0.00	0.00	
7,000.00	0.00	0.00	6,439.89	2,208.56	-787.35	2,344.71	0.00	0.00	0.00	
7,100.00	0.00	0.00	6,539.89	2,208.56	-787.35	2,344.71	0.00	0.00	0.00	
7,200.00	0.00	0.00	6,639.89	2,208.56	-787.35	2,344.71	0.00	0.00	0.00	
7,300.00	0.00	0.00	6,739.89	2,208.56	-787.35	2,344.71	0.00	0.00	0.00	
7,386.11	0.00	0.00	6,826.00	2,208.56	-787.35	2,344.71	0.00	0.00	0.00	
Niobrara										
7,400.00	0.00	0.00	6,839.89	2,208.56	-787.35	2,344.71	0.00	0.00	0.00	
7,500.00	0.00	0.00	6,939.89	2,208.56	-787.35	2,344.71	0.00	0.00	0.00	
7,600.00	0.00	0.00	7,039.89	2,208.56	-787.35	2,344.71	0.00	0.00	0.00	
7,686.11	0.00	0.00	7,126.00	2,208.56	-787.35	2,344.71	0.00	0.00	0.00	
Fort Hayes										
7,700.00	0.00	0.00	7,139.89	2,208.56	-787.35	2,344.71	0.00	0.00	0.00	
7,716.11	0.00	0.00	7,156.00	2,208.56	-787.35	2,344.71	0.00	0.00	0.00	
Codell										
7,800.00	0.00	0.00	7,239.89	2,208.56	-787.35	2,344.71	0.00	0.00	0.00	
7,876.11	0.00	0.00	7,316.00	2,208.56	-787.35	2,344.71	0.00	0.00	0.00	
PBHL										

Database:	Local DB	Local Co-ordinate Reference:	Well 22-33
Company:	Great Western	TVD Reference:	WELL @ 4781.00usft (Cade 22)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4781.00usft (Cade 22)
Site:	Diamond Valley	North Reference:	Grid
Well:	22-33	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL v1 - Diamond 22- - hit/miss target - Shape	0.00	0.00	7,316.00	2,208.56	-787.35	1,414,895.57	3,173,225.91	40° 28' 14.234 N	104° 52' 38.544 W
- plan hits target center - Circle (radius 200.00)									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
400.00	399.84	9 5/8"	9-5/8	12-1/4	

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
2,555.86	2,416.00	Greeley Sand		0.00		
3,835.29	3,501.00	Parkman		0.00		
4,589.97	4,141.00	Sussex		0.00		
5,090.69	4,581.00	Shannon		0.00		
7,386.11	6,826.00	Niobrara		0.00		
7,686.11	7,126.00	Fort Hayes		0.00		
7,716.11	7,156.00	Codell		0.00		

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
200.00	200.00	0.00	0.00	KOP, 2.00°/100' Build	
600.00	598.70	26.26	-9.36	Begin 8.00° Tangent	
1,000.00	994.81	78.70	-28.06	Begin 2.00°/100' Build	
2,200.05	2,114.26	462.50	-164.88	Begin 32.00° Tangent	
4,602.70	4,151.80	1,661.81	-592.44	Begin 1.50°/100' Drop	
6,736.11	6,176.00	2,208.56	-787.35	Begin Vertical Hold	
7,876.11	7,316.00	2,208.56	-787.35	PBHL	