



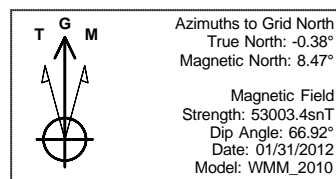
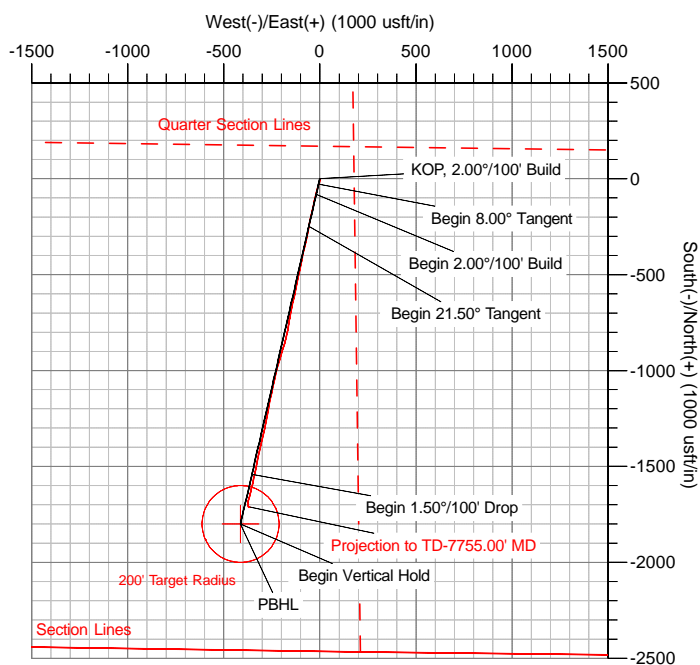
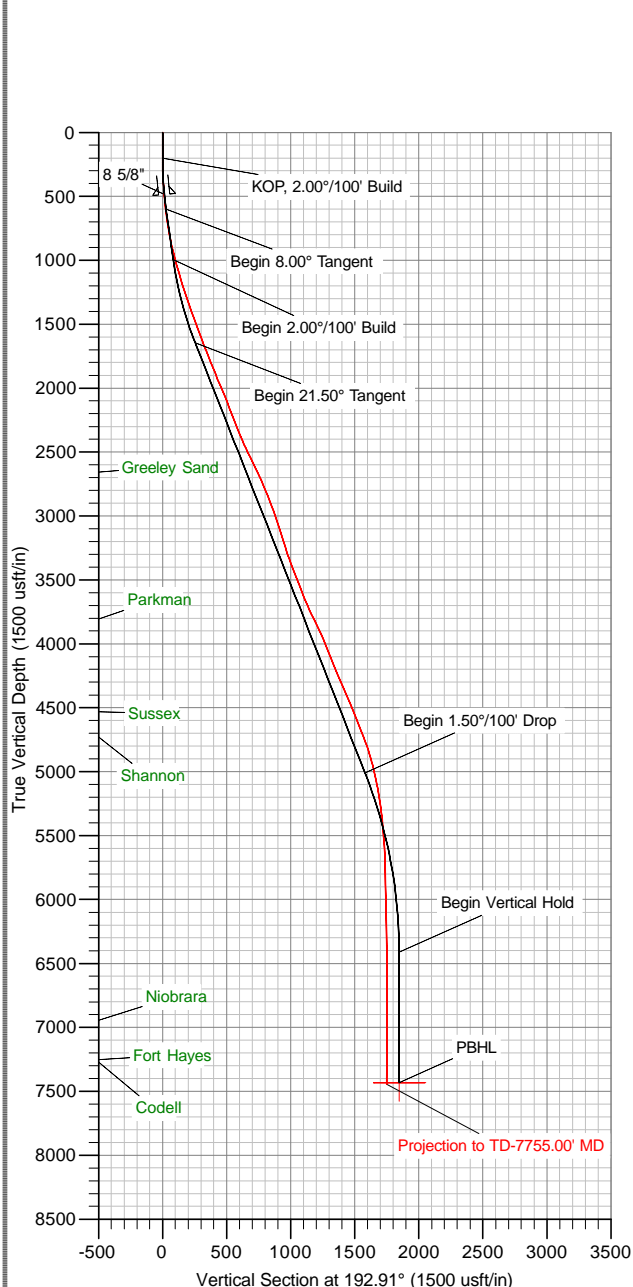
Company: Great Western
Site: Binder
Well: 24-20
Project: Weld County, Colorado (NAD 83)
Rig Name: Cade 22



Planning: 936.442.2510 Fax: 936.442.2515
Operations: 936.442.2500 Fax: 936.442.2599

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	V/Sect	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	192.91	598.70	-27.18	-6.23	27.88	27.88	Begin 8.00° Tangent
1000.00	8.00	192.91	994.81	-81.44	-18.66	83.55	83.55	Begin 2.00°/100' Build
1675.20	21.50	192.91	1646.24	-248.63	-56.98	255.08	255.08	Begin 21.50° Tangent
5290.43	21.50	192.91	5009.82	-1540.37	-353.02	1580.30	1580.30	Begin 1.50°/100' Drop
6724.03	0.00	0.00	6410.00	-1799.53	-412.41	1846.18	1846.18	Begin Vertical Hold
7747.03	0.00	0.00	7433.00	-1799.53	-412.41	1846.18	1846.18	PBHL



US State Plane 1983
Colorado Northern Zone

Created By: Megan Pope
Date: 10:50, February 06 2012
Plan: Design #2

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)

Binder

24-20

Wellbore #1

Survey: MS MWD

Standard Survey Report

06 February, 2012

Company:	Great Western	Local Co-ordinate Reference:	Well 24-20
Project:	Weld County, Colorado (NAD 83)	TVD Reference:	WELL @ 4916.00usft (Cade 22)
Site:	Binder	MD Reference:	WELL @ 4916.00usft (Cade 22)
Well:	24-20	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	Southern Region

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	24-20				
Well Position	+N/-S	0.00 usft	Northing:	1,351,977.64 usft	Latitude: 40° 17' 53.1631 N
	+E/-W	0.00 usft	Easting:	3,163,195.47 usft	Longitude: 104° 54' 53.700 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level: 4,902.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	WMM_2010	01/31/12	8.85	66.92	53,003

Design	Surveys				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00		192.91

Survey Program	Date	02/06/12			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
84.00	7,755.00	MS MWD (Wellbore #1)	MWD	MWD - Standard	

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	
84.00	0.70	59.50	84.00	0.26	0.44	-0.35	0.83	0.83	0.00	
174.00	0.40	177.80	174.00	0.23	0.93	-0.43	1.06	-0.33	131.44	
264.00	1.40	159.30	263.98	-1.12	1.33	0.79	1.14	1.11	-20.56	
355.00	2.50	193.20	354.93	-4.09	1.27	3.70	1.70	1.21	37.25	
446.00	4.50	192.60	445.76	-9.51	0.04	9.26	2.20	2.20	-0.66	
475.00	5.10	191.00	474.66	-11.88	-0.46	11.68	2.12	2.07	-5.52	
541.00	5.50	193.30	540.37	-17.84	-1.75	17.78	0.69	0.61	3.48	
632.00	7.60	201.20	630.78	-27.69	-4.93	28.10	2.51	2.31	8.68	
724.00	8.70	197.50	721.85	-40.00	-9.22	41.05	1.32	1.20	-4.02	
818.00	10.90	194.90	814.47	-55.37	-13.64	57.02	2.39	2.34	-2.77	
913.00	13.10	192.80	907.39	-74.56	-18.34	76.77	2.36	2.32	-2.21	
1,007.00	14.70	193.60	998.63	-96.54	-23.50	99.35	1.71	1.70	0.85	
1,101.00	16.50	194.10	1,089.17	-121.08	-29.56	124.62	1.92	1.91	0.53	
1,196.00	17.60	191.20	1,179.99	-148.25	-35.63	152.47	1.46	1.16	-3.05	

Company:	Great Western	Local Co-ordinate Reference:	Well 24-20
Project:	Weld County, Colorado (NAD 83)	TVD Reference:	WELL @ 4916.00usft (Cade 22)
Site:	Binder	MD Reference:	WELL @ 4916.00usft (Cade 22)
Well:	24-20	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	Southern Region

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)	
1,291.00	18.80	194.30	1,270.24	-177.18	-42.21	182.13	1.62	1.26	3.26	
1,384.00	18.70	191.10	1,358.31	-206.33	-48.78	212.01	1.11	-0.11	-3.44	
1,478.00	20.30	190.40	1,446.91	-237.15	-54.62	243.36	1.72	1.70	-0.74	
1,573.00	20.00	190.20	1,536.10	-269.35	-60.47	276.06	0.32	-0.32	-0.21	
1,667.00	20.20	191.70	1,624.37	-301.07	-66.61	308.34	0.59	0.21	1.60	
1,761.00	21.60	193.40	1,712.19	-333.79	-73.91	341.87	1.62	1.49	1.81	
1,855.00	22.20	193.80	1,799.40	-367.87	-82.16	376.92	0.66	0.64	0.43	
1,949.00	21.80	190.40	1,886.56	-402.28	-89.55	412.12	1.42	-0.43	-3.62	
2,043.00	23.30	191.40	1,973.37	-437.68	-96.37	448.14	1.65	1.60	1.06	
2,138.00	22.40	192.30	2,060.92	-473.78	-103.94	485.03	1.02	-0.95	0.95	
2,232.00	21.00	191.60	2,148.25	-507.78	-111.14	519.78	1.51	-1.49	-0.74	
2,327.00	21.30	193.00	2,236.85	-541.27	-118.45	554.05	0.62	0.32	1.47	
2,422.00	21.40	191.10	2,325.34	-575.09	-125.67	588.63	0.74	0.11	-2.00	
2,516.00	22.90	191.90	2,412.40	-609.81	-132.74	624.06	1.63	1.60	0.85	
2,611.00	25.40	192.90	2,499.08	-647.77	-141.10	662.92	2.67	2.63	1.05	
2,707.00	27.20	191.20	2,585.14	-689.36	-149.96	705.44	2.03	1.88	-1.77	
2,799.00	25.80	189.80	2,667.47	-729.72	-157.45	746.45	1.67	-1.52	-1.52	
2,891.00	22.50	187.50	2,751.41	-766.91	-163.16	783.98	3.73	-3.59	-2.50	
2,986.00	21.50	192.00	2,839.49	-801.97	-169.15	819.49	2.06	-1.05	4.74	
3,080.00	20.80	193.90	2,927.16	-835.02	-176.74	853.40	1.04	-0.74	2.02	
3,175.00	18.50	196.70	3,016.63	-865.83	-185.13	885.31	2.62	-2.42	2.95	
3,270.00	17.90	198.20	3,106.87	-894.14	-194.02	914.88	0.80	-0.63	1.58	
3,363.00	17.10	196.10	3,195.57	-920.85	-202.28	942.77	1.10	-0.86	-2.26	
3,458.00	18.20	198.80	3,286.10	-948.32	-210.93	971.47	1.44	1.16	2.84	
3,553.00	21.10	194.00	3,375.56	-978.96	-219.85	1,003.33	3.49	3.05	-5.05	
3,648.00	21.40	193.40	3,464.10	-1,012.41	-228.00	1,037.76	0.39	0.32	-0.63	
3,743.00	21.00	192.30	3,552.67	-1,045.90	-235.65	1,072.11	0.59	-0.42	-1.16	
3,837.00	21.50	192.70	3,640.28	-1,079.17	-243.02	1,106.18	0.55	0.53	0.43	
3,932.00	24.60	191.50	3,727.69	-1,115.53	-250.79	1,143.37	3.30	3.26	-1.26	
4,026.00	26.40	192.60	3,812.53	-1,155.10	-259.25	1,183.83	1.98	1.91	1.17	
4,121.00	25.20	189.60	3,898.06	-1,195.66	-267.23	1,225.14	1.87	-1.26	-3.16	
4,214.00	22.20	190.90	3,983.21	-1,232.44	-273.86	1,262.48	3.27	-3.23	1.40	
4,308.00	21.20	190.90	4,070.54	-1,266.57	-280.43	1,297.21	1.06	-1.06	0.00	
4,402.00	22.90	192.90	4,157.67	-1,301.09	-287.73	1,332.49	1.98	1.81	2.13	
4,494.00	22.90	192.50	4,242.42	-1,336.02	-295.60	1,368.29	0.17	0.00	-0.43	
4,589.00	23.40	191.80	4,329.77	-1,372.53	-303.46	1,405.63	0.60	0.53	-0.74	
4,684.00	23.40	192.60	4,416.95	-1,409.40	-311.43	1,443.36	0.33	0.00	0.84	
4,778.00	21.50	192.80	4,503.83	-1,444.42	-319.32	1,479.25	2.02	-2.02	0.21	
4,873.00	22.30	191.10	4,591.97	-1,479.08	-326.65	1,514.68	1.07	0.84	-1.79	
4,968.00	21.50	191.30	4,680.11	-1,513.84	-333.53	1,550.09	0.85	-0.84	0.21	
5,062.00	20.10	191.10	4,767.99	-1,546.59	-340.01	1,583.46	1.49	-1.49	-0.21	
5,154.00	17.20	193.10	4,855.15	-1,575.35	-346.14	1,612.87	3.23	-3.15	2.17	
5,250.00	13.50	192.90	4,947.71	-1,600.11	-351.86	1,638.28	3.85	-3.85	-0.21	
5,343.00	12.90	195.60	5,038.25	-1,620.69	-357.08	1,659.50	0.92	-0.65	2.90	

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Design:	Surveys	Database:	Southern Region

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)	
5,437.00	10.60	193.80	5,130.27	-1,639.20	-361.96	1,678.63	2.48	-2.45	-1.91	
5,533.00	8.50	194.60	5,224.94	-1,654.64	-365.86	1,694.55	2.19	-2.19	0.83	
5,722.00	5.50	194.00	5,412.51	-1,676.95	-371.57	1,717.57	1.59	-1.59	-0.32	
5,814.00	4.40	183.30	5,504.16	-1,684.75	-372.84	1,725.46	1.56	-1.20	-11.63	
5,907.00	3.30	172.60	5,596.95	-1,690.97	-372.70	1,731.49	1.41	-1.18	-11.51	
6,002.00	2.10	171.70	5,691.85	-1,695.40	-372.10	1,735.68	1.26	-1.26	-0.95	
6,191.00	1.20	185.20	5,880.77	-1,700.80	-371.78	1,740.87	0.52	-0.48	7.14	
6,380.00	1.00	190.40	6,069.73	-1,704.39	-372.25	1,744.48	0.12	-0.11	2.75	
6,664.00	1.20	163.00	6,353.68	-1,709.67	-371.83	1,749.53	0.20	0.07	-9.65	
6,949.00	0.10	79.20	6,638.66	-1,712.48	-370.71	1,752.02	0.42	-0.39	-29.40	
7,230.00	0.20	108.80	6,919.66	-1,712.59	-370.01	1,751.97	0.04	0.04	10.53	
7,515.00	0.70	84.40	7,204.65	-1,712.58	-367.81	1,751.47	0.18	0.18	-8.56	
7,705.00	0.80	45.30	7,394.64	-1,711.54	-365.71	1,749.98	0.27	0.05	-20.58	
7,755.00	0.80	45.30	7,444.63	-1,711.04	-365.21	1,749.39	0.00	0.00	0.00	
Projection to TD-7755.00' MD										

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
7,755.00	7,444.63	-1,711.04	-365.21	Projection to TD-7755.00' MD	