

Great Western

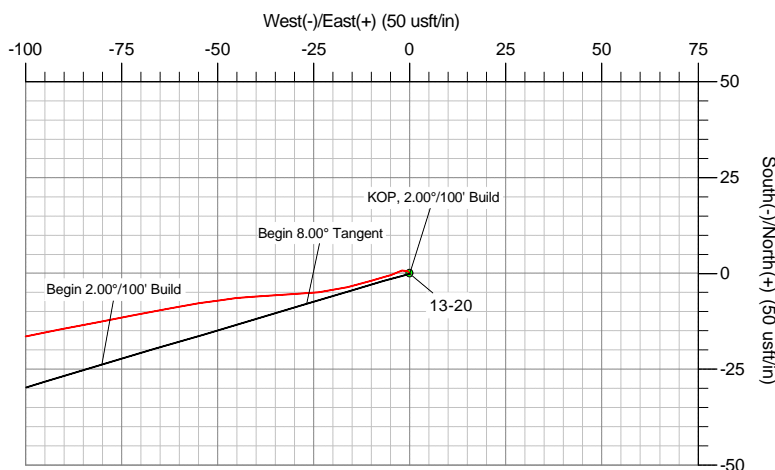
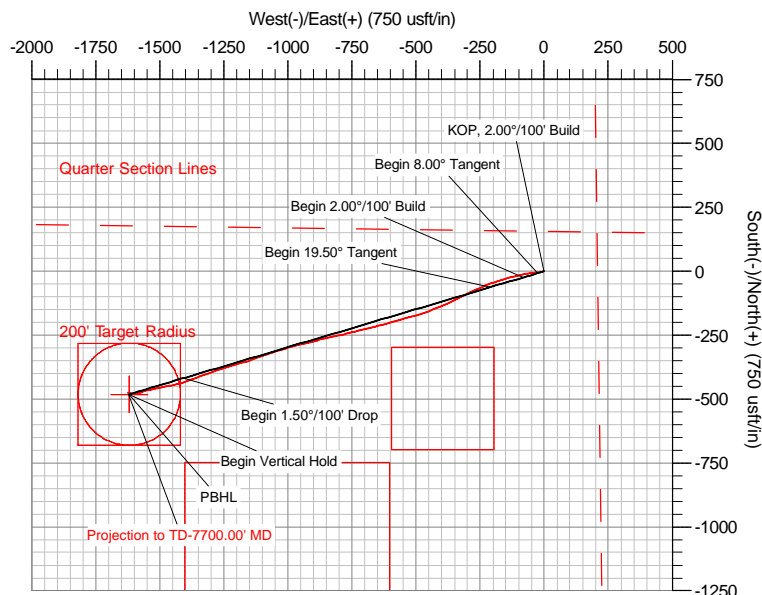
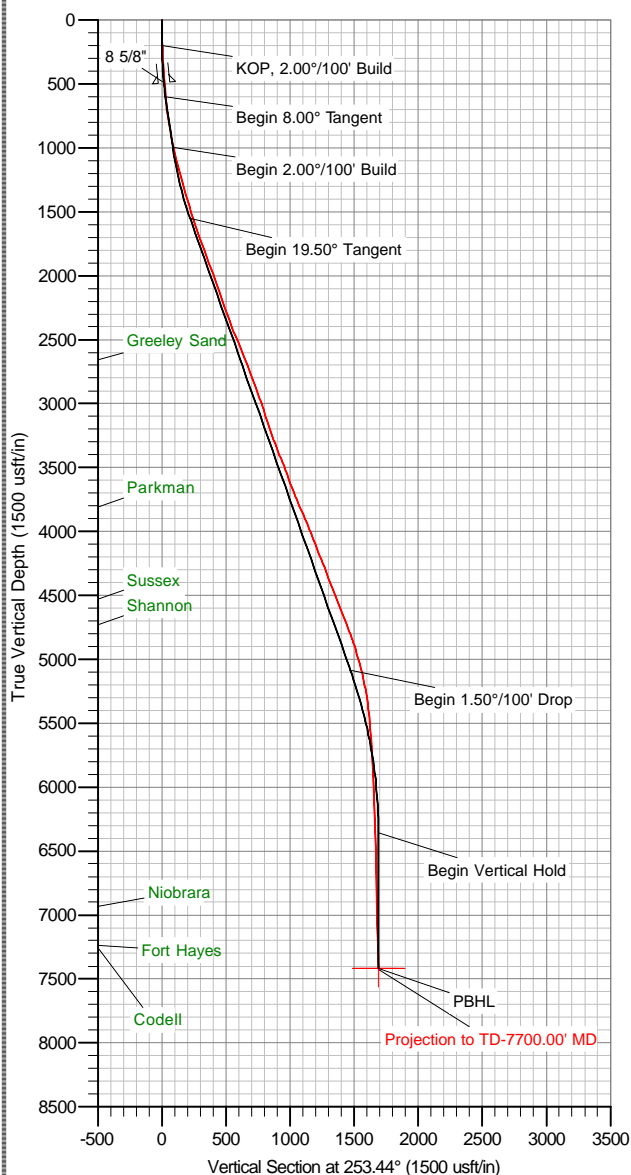
Company: Great Western
 Site: Binder
 Well: 13-20
 Project: Weld County, Colorado (NAD 83)
 Rig Name: Cade 22

MS Energy Services
 www.msenergyservices.com

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	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	253.44	598.70	-7.94	-26.72	27.88	27.88	Begin 8.00° Tangent
1000.00	8.00	253.44	994.81	-23.81	-80.08	83.55	83.55	Begin 2.00°/100' Build
1574.98	19.50	253.44	1552.38	-62.69	-210.86	219.98	219.98	Begin 19.50° Tangent
5320.40	19.50	253.44	5082.97	-418.97	-1409.25	1470.21	1470.21	Begin 1.50°/100' Drop
6620.38	0.00	0.00	6358.00	-481.40	-1619.25	1689.30	1689.30	Begin Vertical Hold
7680.38	0.00	0.00	7418.00	-481.40	-1619.25	1689.30	1689.30	PBHL



Azimuths to Grid North
 True North: -0.38°
 Magnetic North: 8.48°

Magnetic Field
 Strength: 53011.3snT
 Dip Angle: 66.92°
 Date: 01/04/2012
 Model: WMM_2010

US State Plane 1983
 Colorado Northern Zone

Created By: Megan Pope
 Date: 10:17, January 09 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

13-20

Wellbore #1

Survey: MS MWD

Standard Survey Report

09 January, 2012

Company:	Great Western	Local Co-ordinate Reference:	Well 13-20
Project:	Weld County, Colorado (NAD 83)	TVD Reference:	Well @ 4916.00usft (Cade 22)
Site:	Binder	MD Reference:	Well @ 4916.00usft (Cade 22)
Well:	13-20	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	13-20					
Well Position	+N/-S	0.00 usft	Northing:	1,351,993.27 usft	Latitude:	40° 17' 53.3195 N
	+E/-W	0.00 usft	Easting:	3,163,165.76 usft	Longitude:	104° 54' 54.083 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	01/04/12	8.86	66.92	53,011

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		253.44

Survey Program	Date	01/08/12			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
81.00	7,700.00	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	
81.00	1.10	319.60	81.00	0.59	-0.50	0.31	1.36	1.36	0.00	
171.00	1.20	244.30	170.98	0.84	-1.91	1.59	1.56	0.11	-83.67	
261.00	2.80	250.40	260.92	-0.30	-4.83	4.72	1.79	1.78	6.78	
352.00	3.90	254.70	351.77	-1.87	-9.91	10.03	1.24	1.21	4.73	
442.00	4.40	255.60	441.53	-3.53	-16.21	16.54	0.56	0.56	1.00	
538.00	4.60	263.40	537.24	-4.89	-23.60	24.01	0.67	0.21	8.13	
630.00	4.50	267.10	628.95	-5.50	-30.87	31.16	0.34	-0.11	4.02	
723.00	7.70	266.20	721.41	-6.10	-40.73	40.78	3.44	3.44	-0.97	
816.00	9.90	260.90	813.31	-7.77	-54.84	54.79	2.52	2.37	-5.70	
911.00	11.20	258.40	906.70	-10.92	-71.95	72.07	1.45	1.37	-2.63	
1,005.00	12.50	259.70	998.70	-14.58	-90.90	91.28	1.41	1.38	1.38	
1,098.00	14.20	256.80	1,089.18	-18.98	-111.91	112.68	1.96	1.83	-3.12	
1,193.00	15.10	253.90	1,181.09	-25.07	-135.14	136.68	1.22	0.95	-3.05	
1,288.00	15.50	253.40	1,272.73	-32.13	-159.20	161.75	0.44	0.42	-0.53	

Company:	Great Western	Local Co-ordinate Reference:	Well 13-20
Project:	Weld County, Colorado (NAD 83)	TVD Reference:	Well @ 4916.00usft (Cade 22)
Site:	Binder	MD Reference:	Well @ 4916.00usft (Cade 22)
Well:	13-20	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)	
1,383.00	15.20	252.00	1,364.34	-39.61	-183.20	186.89	0.50	-0.32	-1.47	
1,478.00	16.30	250.10	1,455.77	-47.99	-207.59	212.65	1.28	1.16	-2.00	
1,572.00	17.80	247.60	1,545.64	-57.96	-233.27	240.12	1.78	1.60	-2.66	
1,665.00	18.80	246.10	1,633.93	-69.45	-260.12	269.12	1.19	1.08	-1.61	
1,760.00	20.60	245.70	1,723.37	-82.53	-289.35	300.87	1.90	1.89	-0.42	
1,855.00	21.00	243.90	1,812.18	-96.89	-319.87	334.22	0.79	0.42	-1.89	
1,948.00	20.60	242.70	1,899.12	-111.73	-349.37	366.72	0.63	-0.43	-1.29	
2,043.00	19.80	246.10	1,988.28	-125.91	-378.93	399.10	1.50	-0.84	3.58	
2,135.00	20.00	246.10	2,074.78	-138.60	-407.56	430.16	0.22	0.22	0.00	
2,229.00	18.90	247.60	2,163.42	-150.91	-436.34	461.25	1.29	-1.17	1.60	
2,324.00	19.50	251.50	2,253.14	-161.81	-465.60	492.41	1.49	0.63	4.11	
2,419.00	19.60	254.00	2,342.66	-171.23	-495.95	524.19	0.89	0.11	2.63	
2,513.00	21.20	253.90	2,430.76	-180.29	-527.44	556.95	1.70	1.70	-0.11	
2,608.00	23.00	254.90	2,518.78	-189.89	-561.87	592.68	1.94	1.89	1.05	
2,701.00	22.80	254.60	2,604.45	-199.41	-596.78	628.86	0.25	-0.22	-0.32	
2,793.00	21.00	253.50	2,689.81	-208.83	-629.77	663.17	2.01	-1.96	-1.20	
2,888.00	20.10	256.40	2,778.76	-217.50	-661.96	696.50	1.43	-0.95	3.05	
2,982.00	19.90	256.30	2,867.09	-225.09	-693.20	728.61	0.22	-0.21	-0.11	
3,077.00	20.20	257.40	2,956.34	-232.49	-724.92	761.12	0.51	0.32	1.16	
3,172.00	17.20	254.80	3,046.31	-239.76	-754.49	791.53	3.28	-3.16	-2.74	
3,265.00	18.20	257.20	3,134.91	-246.58	-781.92	819.77	1.33	1.08	2.58	
3,359.00	19.10	259.10	3,223.98	-252.74	-811.34	849.72	1.16	0.96	2.02	
3,453.00	21.70	255.80	3,312.08	-259.91	-843.29	882.40	3.02	2.77	-3.51	
3,548.00	21.00	254.10	3,400.56	-268.88	-876.69	916.97	0.98	-0.74	-1.79	
3,643.00	22.50	258.00	3,488.79	-277.33	-910.85	952.11	2.19	1.58	4.11	
3,738.00	19.00	257.10	3,577.62	-284.56	-943.71	985.67	3.70	-3.68	-0.95	
3,832.00	20.50	255.00	3,666.09	-292.24	-974.53	1,017.40	1.77	1.60	-2.23	
3,927.00	23.10	253.40	3,754.29	-301.87	-1,008.46	1,052.67	2.81	2.74	-1.68	
4,022.00	24.60	253.00	3,841.17	-312.98	-1,045.23	1,091.08	1.59	1.58	-0.42	
4,114.00	22.50	251.20	3,925.51	-324.25	-1,080.21	1,127.83	2.41	-2.28	-1.96	
4,209.00	20.50	249.90	4,013.89	-335.82	-1,113.05	1,162.60	2.16	-2.11	-1.37	
4,304.00	21.50	249.70	4,102.58	-347.58	-1,145.00	1,196.57	1.06	1.05	-0.21	
4,399.00	22.90	254.10	4,190.54	-358.69	-1,179.11	1,232.43	2.29	1.47	4.63	
4,494.00	20.70	254.70	4,278.74	-368.18	-1,213.08	1,267.70	2.33	-2.32	0.63	
4,589.00	20.80	252.20	4,367.58	-377.77	-1,245.34	1,301.35	0.94	0.11	-2.63	
4,683.00	21.10	250.80	4,455.37	-388.44	-1,277.21	1,334.94	0.62	0.32	-1.49	
4,778.00	20.80	251.40	4,544.09	-399.44	-1,309.34	1,368.88	0.39	-0.32	0.63	
4,873.00	21.40	249.40	4,632.72	-410.92	-1,341.55	1,403.03	0.99	0.63	-2.11	
4,968.00	22.30	250.80	4,720.90	-422.94	-1,374.80	1,438.32	1.09	0.95	1.47	
5,063.00	20.20	250.30	4,809.43	-434.40	-1,407.27	1,472.71	2.22	-2.21	-0.53	
5,156.00	17.70	256.40	4,897.39	-443.14	-1,436.13	1,502.87	3.43	-2.69	6.56	
5,251.00	15.80	259.20	4,988.36	-448.96	-1,462.87	1,530.16	2.17	-2.00	2.95	
5,345.00	14.00	260.10	5,079.20	-453.31	-1,486.65	1,554.19	1.93	-1.91	0.96	
5,437.00	12.00	258.40	5,168.83	-457.15	-1,506.98	1,574.77	2.21	-2.17	-1.85	

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Survey										
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5,530.00	9.90	256.40	5,260.14	-460.97	-1,524.22	1,592.39	2.29	-2.26	-2.15	
5,625.00	7.70	259.00	5,354.01	-464.11	-1,538.41	1,606.88	2.35	-2.32	2.74	
5,720.00	5.20	258.10	5,448.40	-466.21	-1,548.87	1,617.51	2.63	-2.63	-0.95	
5,814.00	5.10	252.10	5,542.02	-468.37	-1,557.02	1,625.93	0.58	-0.11	-6.38	
5,908.00	4.40	254.00	5,635.70	-470.65	-1,564.46	1,633.71	0.76	-0.74	2.02	
6,192.00	2.30	245.40	5,919.20	-476.03	-1,580.11	1,650.25	0.76	-0.74	-3.03	
6,472.00	1.60	251.20	6,199.04	-479.63	-1,588.92	1,659.72	0.26	-0.25	2.07	
6,756.00	1.50	268.30	6,482.94	-481.01	-1,596.39	1,667.28	0.17	-0.04	6.02	
7,038.00	1.40	301.30	6,764.85	-479.33	-1,603.03	1,673.15	0.29	-0.04	11.70	
7,324.00	2.00	276.20	7,050.73	-476.98	-1,610.97	1,680.10	0.33	0.21	-8.78	
7,607.00	2.10	282.50	7,333.55	-475.32	-1,620.94	1,689.19	0.09	0.04	2.23	
7,639.00	2.00	279.00	7,365.53	-475.11	-1,622.07	1,690.20	0.50	-0.31	-10.94	
7,700.00	2.00	279.00	7,426.49	-474.78	-1,624.17	1,692.12	0.00	0.00	0.00	
Projection to TD-7700.00' MD										

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
7,700.00	7,426.49	-474.78	-1,624.17	Projection to TD-7700.00' MD	