

Great Western

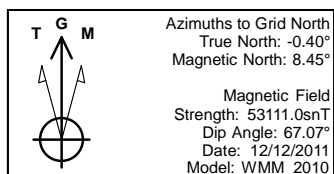
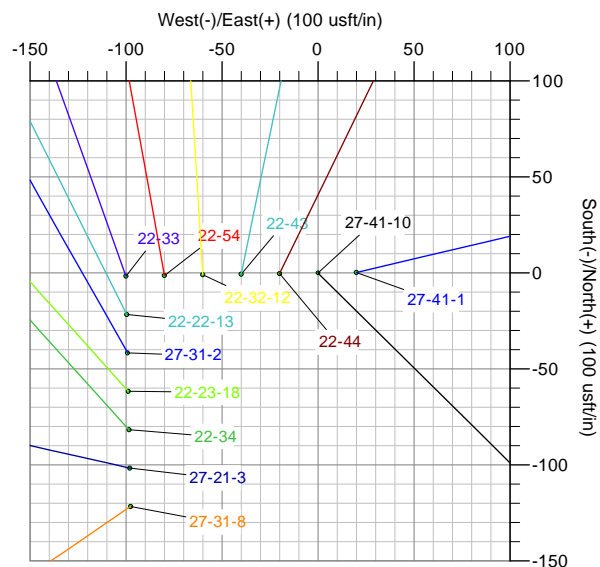
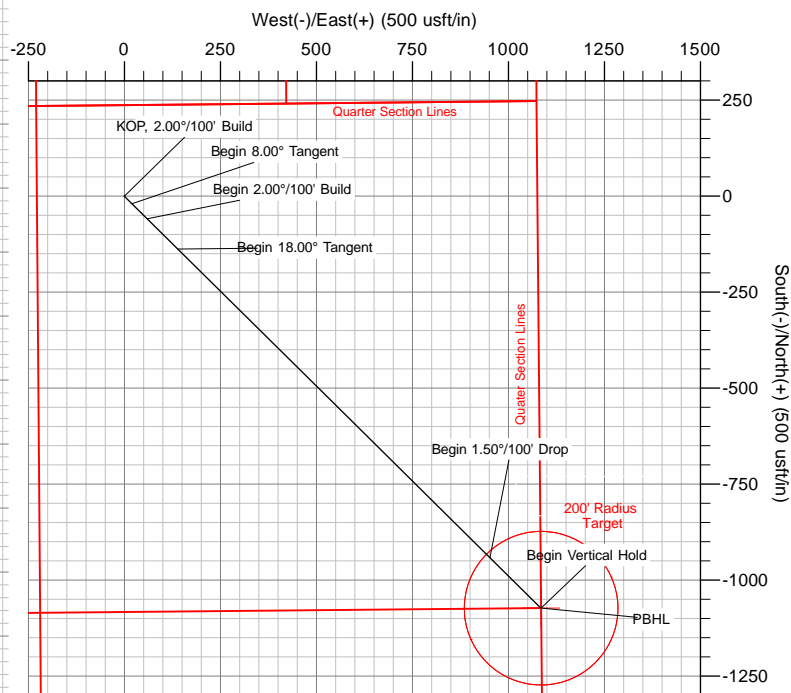
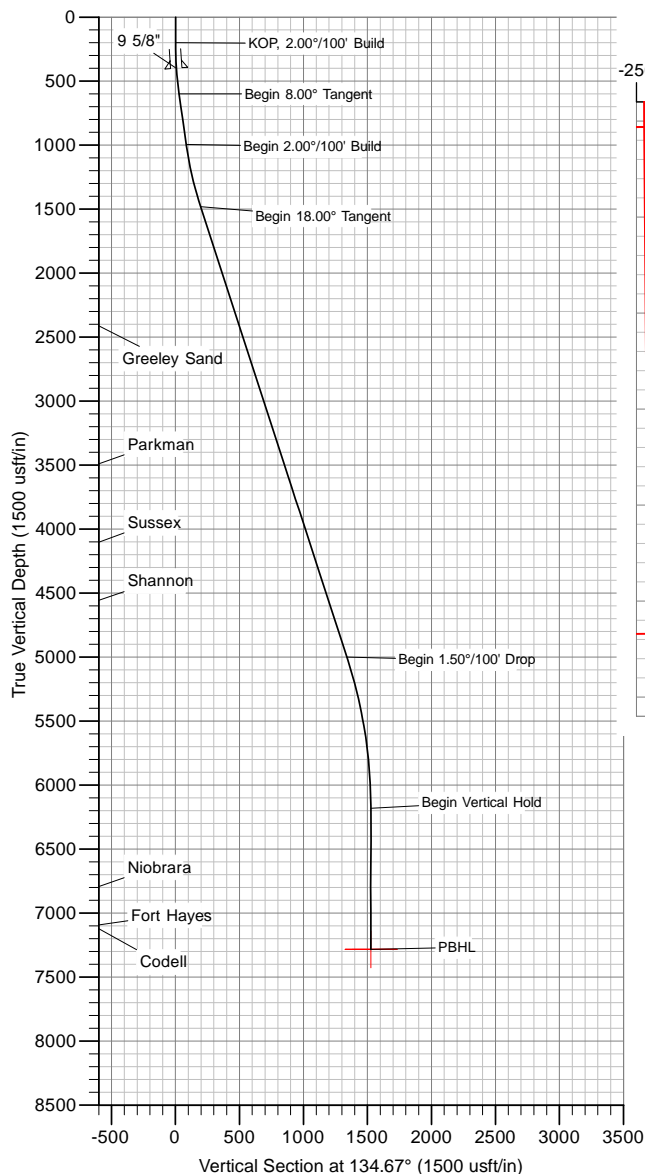
Company: Great Western
 Site: Great Western
 Well: 27-41-10
 Project: Weld County, Colorado (NAD 83)
 Rig Name: Cade 22



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	134.67	598.70	-19.60	19.83	27.88	27.88	Begin 8.00° Tangent
1000.00	8.00	134.67	994.81	-58.74	59.42	83.55	83.55	Begin 2.00°/100' Build
1499.93	18.00	134.67	1481.31	-137.70	139.29	195.86	195.86	Begin 18.00° Tangent
5200.44	18.00	134.67	5000.73	-941.58	952.44	1339.30	1339.30	Begin 1.50°/100' Drop
6400.35	0.00	0.00	6181.00	-1073.00	1085.37	1526.22	1526.22	Begin Vertical Hold
7502.35	0.00	0.00	7283.00	-1073.00	1085.37	1526.22	1526.22	PBHL



Created By: Marcus Mitcham
 Date: 13:24, 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.
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Great Western

Weld County, Colorado (NAD 83)

Great Western

27-41-10

Wellbore #1

Plan: Design #1

Standard Planning Report

22 December, 2011

Database:	Local DB	Local Co-ordinate Reference:	Well 27-41-10
Company:	Great Western	TVD Reference:	WELL @ 4781.00usft (Cade 22)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4781.00usft (Cade 22)
Site:	Great Western	North Reference:	Grid
Well:	27-41-10	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	27-41-10			
Well Position	+N/-S	1,412,688.67 usft	Northing:	1,412,688.67 usft
	+E/-W	3,174,113.22 usft	Easting:	3,174,113.22 usft
Position Uncertainty		0.00 usft	Wellhead Elevation:	Latitude: 40° 27' 52.364 N
				Longitude: 104° 52' 27.265 W
				Ground Level: 4,767.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	WMM_2010	12/12/2011	8.86	67.07	53,111

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	134.67

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	134.67	598.70	-19.60	19.83	2.00	2.00	0.00	134.67	PBHL - Great Western
1,000.00	8.00	134.67	994.81	-58.74	59.42	0.00	0.00	0.00	0.00	
1,499.93	18.00	134.67	1,481.31	-137.70	139.29	2.00	2.00	0.00	0.00	
5,200.44	18.00	134.67	5,000.73	-941.58	952.44	0.00	0.00	0.00	0.00	
6,400.35	0.00	0.00	6,181.00	-1,073.00	1,085.37	1.50	-1.50	0.00	180.00	
7,502.35	0.00	0.00	7,283.00	-1,073.00	1,085.37	0.00	0.00	0.00	0.00	PBHL - Great Western

Database:	Local DB	Local Co-ordinate Reference:	Well 27-41-10
Company:	Great Western	TVD Reference:	WELL @ 4781.00usft (Cade 22)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4781.00usft (Cade 22)
Site:	Great Western	North Reference:	Grid
Well:	27-41-10	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
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
KOP, 2.00°/100' Build									
300.00	2.00	134.67	299.98	-1.23	1.24	1.75	2.00	2.00	0.00
400.00	4.00	134.67	399.84	-4.91	4.96	6.98	2.00	2.00	0.00
9 5/8"									
500.00	6.00	134.67	499.45	-11.03	11.16	15.69	2.00	2.00	0.00
600.00	8.00	134.67	598.70	-19.60	19.83	27.88	2.00	2.00	0.00
Begin 8.00° Tangent									
700.00	8.00	134.67	697.73	-29.39	29.72	41.80	0.00	0.00	0.00
800.00	8.00	134.67	796.76	-39.17	39.62	55.71	0.00	0.00	0.00
900.00	8.00	134.67	895.78	-48.95	49.52	69.63	0.00	0.00	0.00
1,000.00	8.00	134.67	994.81	-58.74	59.42	83.55	0.00	0.00	0.00
Begin 2.00°/100' Build									
1,100.00	10.00	134.67	1,093.57	-69.74	70.54	99.19	2.00	2.00	0.00
1,200.00	12.00	134.67	1,191.73	-83.15	84.11	118.27	2.00	2.00	0.00
1,300.00	14.00	134.67	1,289.16	-98.96	100.11	140.77	2.00	2.00	0.00
1,400.00	16.00	134.67	1,385.75	-117.16	118.51	166.65	2.00	2.00	0.00
1,499.93	18.00	134.67	1,481.31	-137.70	139.29	195.86	2.00	2.00	0.00
Begin 18.00° Tangent									
1,600.00	18.00	134.67	1,576.48	-159.44	161.28	226.78	0.00	0.00	0.00
1,700.00	18.00	134.67	1,671.59	-181.16	183.25	257.68	0.00	0.00	0.00
1,800.00	18.00	134.67	1,766.69	-202.88	205.22	288.58	0.00	0.00	0.00
1,900.00	18.00	134.67	1,861.80	-224.61	227.20	319.48	0.00	0.00	0.00
2,000.00	18.00	134.67	1,956.91	-246.33	249.17	350.38	0.00	0.00	0.00
2,100.00	18.00	134.67	2,052.01	-268.05	271.15	381.28	0.00	0.00	0.00
2,200.00	18.00	134.67	2,147.12	-289.78	293.12	412.18	0.00	0.00	0.00
2,300.00	18.00	134.67	2,242.23	-311.50	315.09	443.08	0.00	0.00	0.00
2,400.00	18.00	134.67	2,337.33	-333.23	337.07	473.98	0.00	0.00	0.00
2,479.56	18.00	134.67	2,413.00	-350.51	354.55	498.56	0.00	0.00	0.00
Greeley Sand									
2,500.00	18.00	134.67	2,432.44	-354.95	359.04	504.88	0.00	0.00	0.00
2,600.00	18.00	134.67	2,527.55	-376.67	381.02	535.78	0.00	0.00	0.00
2,700.00	18.00	134.67	2,622.65	-398.40	402.99	566.68	0.00	0.00	0.00
2,800.00	18.00	134.67	2,717.76	-420.12	424.96	597.57	0.00	0.00	0.00
2,900.00	18.00	134.67	2,812.87	-441.84	446.94	628.47	0.00	0.00	0.00
3,000.00	18.00	134.67	2,907.97	-463.57	468.91	659.37	0.00	0.00	0.00
3,100.00	18.00	134.67	3,003.08	-485.29	490.89	690.27	0.00	0.00	0.00
3,200.00	18.00	134.67	3,098.18	-507.01	512.86	721.17	0.00	0.00	0.00
3,300.00	18.00	134.67	3,193.29	-528.74	534.83	752.07	0.00	0.00	0.00
3,400.00	18.00	134.67	3,288.40	-550.46	556.81	782.97	0.00	0.00	0.00
3,500.00	18.00	134.67	3,383.50	-572.19	578.78	813.87	0.00	0.00	0.00
3,600.00	18.00	134.67	3,478.61	-593.91	600.76	844.77	0.00	0.00	0.00
3,610.93	18.00	134.67	3,489.00	-596.28	603.16	848.15	0.00	0.00	0.00
Parkman									
3,700.00	18.00	134.67	3,573.72	-615.63	622.73	875.67	0.00	0.00	0.00
3,800.00	18.00	134.67	3,668.82	-637.36	644.71	906.57	0.00	0.00	0.00
3,900.00	18.00	134.67	3,763.93	-659.08	666.68	937.47	0.00	0.00	0.00
4,000.00	18.00	134.67	3,859.04	-680.80	688.65	968.37	0.00	0.00	0.00
4,100.00	18.00	134.67	3,954.14	-702.53	710.63	999.27	0.00	0.00	0.00
4,200.00	18.00	134.67	4,049.25	-724.25	732.60	1,030.17	0.00	0.00	0.00
4,254.41	18.00	134.67	4,101.00	-736.07	744.56	1,046.98	0.00	0.00	0.00

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Company:	Great Western	TVD Reference:	WELL @ 4781.00usft (Cade 22)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4781.00usft (Cade 22)
Site:	Great Western	North Reference:	Grid
Well:	27-41-10	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)
Sussex									
4,300.00	18.00	134.67	4,144.35	-745.97	754.58	1,061.07	0.00	0.00	0.00
4,400.00	18.00	134.67	4,239.46	-767.70	776.55	1,091.97	0.00	0.00	0.00
4,500.00	18.00	134.67	4,334.57	-789.42	798.52	1,122.87	0.00	0.00	0.00
4,600.00	18.00	134.67	4,429.67	-811.15	820.50	1,153.77	0.00	0.00	0.00
4,700.00	18.00	134.67	4,524.78	-832.87	842.47	1,184.66	0.00	0.00	0.00
4,732.83	18.00	134.67	4,556.00	-840.00	849.69	1,194.81	0.00	0.00	0.00
Shannon									
4,800.00	18.00	134.67	4,619.89	-854.59	864.45	1,215.56	0.00	0.00	0.00
4,900.00	18.00	134.67	4,714.99	-876.32	886.42	1,246.46	0.00	0.00	0.00
5,000.00	18.00	134.67	4,810.10	-898.04	908.39	1,277.36	0.00	0.00	0.00
5,100.00	18.00	134.67	4,905.21	-919.76	930.37	1,308.26	0.00	0.00	0.00
5,200.44	18.00	134.67	5,000.73	-941.58	952.44	1,339.30	0.00	0.00	0.00
Begin 1.50°/100' Drop									
5,300.00	16.51	134.67	5,095.81	-962.34	973.44	1,368.82	1.50	-1.50	0.00
5,400.00	15.01	134.67	5,192.05	-981.43	992.75	1,395.98	1.50	-1.50	0.00
5,500.00	13.51	134.67	5,288.97	-998.74	1,010.26	1,420.60	1.50	-1.50	0.00
5,600.00	12.01	134.67	5,386.50	-1,014.26	1,025.96	1,442.68	1.50	-1.50	0.00
5,700.00	10.51	134.67	5,484.57	-1,027.98	1,039.84	1,462.19	1.50	-1.50	0.00
5,800.00	9.01	134.67	5,583.12	-1,039.90	1,051.89	1,479.14	1.50	-1.50	0.00
5,900.00	7.51	134.67	5,682.08	-1,049.99	1,062.10	1,493.50	1.50	-1.50	0.00
6,000.00	6.01	134.67	5,781.39	-1,058.26	1,070.46	1,505.26	1.50	-1.50	0.00
6,100.00	4.51	134.67	5,880.96	-1,064.70	1,076.98	1,514.42	1.50	-1.50	0.00
6,200.00	3.01	134.67	5,980.74	-1,069.30	1,081.63	1,520.97	1.50	-1.50	0.00
6,300.00	1.51	134.67	6,080.66	-1,072.07	1,084.43	1,524.90	1.50	-1.50	0.00
6,400.35	0.00	0.00	6,181.00	-1,073.00	1,085.37	1,526.22	1.50	-1.50	0.00
Begin Vertical Hold									
6,500.00	0.00	0.00	6,280.65	-1,073.00	1,085.37	1,526.22	0.00	0.00	0.00
6,600.00	0.00	0.00	6,380.65	-1,073.00	1,085.37	1,526.22	0.00	0.00	0.00
6,700.00	0.00	0.00	6,480.65	-1,073.00	1,085.37	1,526.22	0.00	0.00	0.00
6,800.00	0.00	0.00	6,580.65	-1,073.00	1,085.37	1,526.22	0.00	0.00	0.00
6,900.00	0.00	0.00	6,680.65	-1,073.00	1,085.37	1,526.22	0.00	0.00	0.00
7,000.00	0.00	0.00	6,780.65	-1,073.00	1,085.37	1,526.22	0.00	0.00	0.00
7,012.35	0.00	0.00	6,793.00	-1,073.00	1,085.37	1,526.22	0.00	0.00	0.00
Niobrara									
7,100.00	0.00	0.00	6,880.65	-1,073.00	1,085.37	1,526.22	0.00	0.00	0.00
7,200.00	0.00	0.00	6,980.65	-1,073.00	1,085.37	1,526.22	0.00	0.00	0.00
7,300.00	0.00	0.00	7,080.65	-1,073.00	1,085.37	1,526.22	0.00	0.00	0.00
7,312.35	0.00	0.00	7,093.00	-1,073.00	1,085.37	1,526.22	0.00	0.00	0.00
Fort Hayes									
7,342.35	0.00	0.00	7,123.00	-1,073.00	1,085.37	1,526.22	0.00	0.00	0.00
Codell									
7,400.00	0.00	0.00	7,180.65	-1,073.00	1,085.37	1,526.22	0.00	0.00	0.00
7,502.35	0.00	0.00	7,283.00	-1,073.00	1,085.37	1,526.22	0.00	0.00	0.00
PBHL									

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Site:	Great Western	North Reference:	Grid
Well:	27-41-10	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
PBHL - Great Western - - plan hits target center - Circle (radius 200.00)	0.00	0.00	7,283.00	-1,073.00	1,085.37	1,411,615.68	3,175,198.59	40° 27' 41.685 N	104° 52' 13.321 W

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

Formations						
Measured Depth	Vertical Depth	Name		Lithology	Dip	Dip Direction
(usft)	(usft)				(°)	(°)
2,479.56	2,413.00	Greeley Sand			0.00	
3,610.93	3,489.00	Parkman			0.00	
4,254.41	4,101.00	Sussex			0.00	
4,732.83	4,556.00	Shannon			0.00	
7,012.35	6,793.00	Niobrara			0.00	
7,312.35	7,093.00	Fort Hayes			0.00	
7,342.35	7,123.00	Codell			0.00	

Plan Annotations					
Measured Depth	Vertical Depth	Local Coordinates		Comment	
(usft)	(usft)	+N/-S (usft)	+E/-W (usft)		
200.00	200.00	0.00	0.00	KOP, 2.00°/100' Build	
600.00	598.70	-19.60	19.83	Begin 8.00° Tangent	
1,000.00	994.81	-58.74	59.42	Begin 2.00°/100' Build	
1,499.93	1,481.31	-137.70	139.29	Begin 18.00° Tangent	
5,200.44	5,000.73	-941.58	952.44	Begin 1.50°/100' Drop	
6,400.35	6,181.00	-1,073.00	1,085.37	Begin Vertical Hold	
7,502.35	7,283.00	-1,073.00	1,085.37	PBHL	