

# Great Western

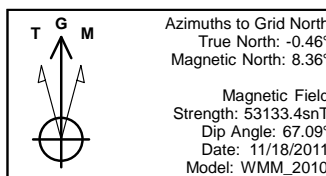
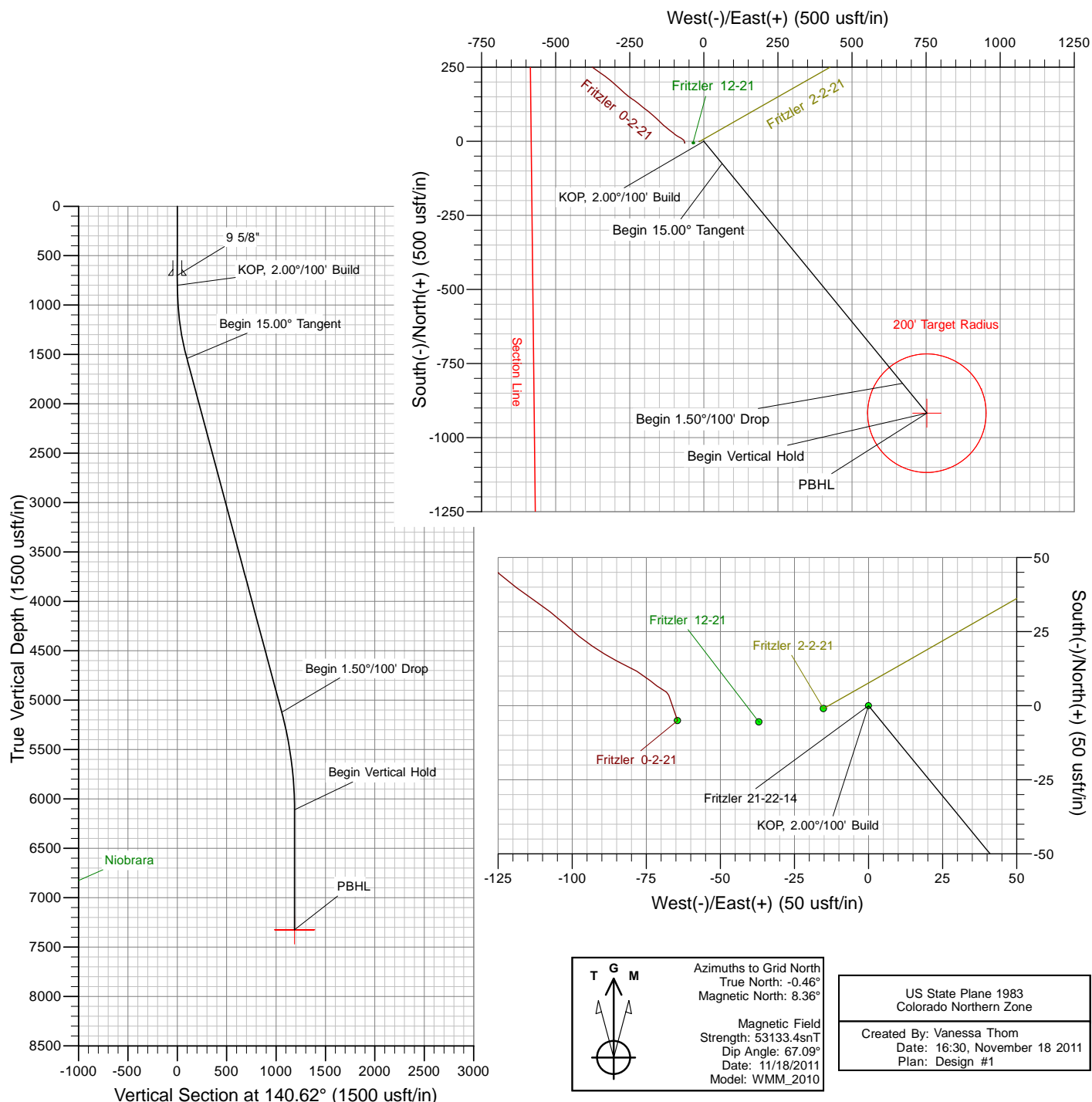
Company: Great Western  
 Site: Fritzler  
 Well: 21-22-14  
 Project: Weld County, Colorado (NAD 83)  
 Rig Name: Cade 22



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	VSect	Departure	Annotation
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	KOP, 2.00°/100' Build
1549.76	15.00	140.62	1541.23	-75.41	61.89	97.55	97.55	Begin 15.00° Tangent
5256.44	15.00	140.62	5121.69	-816.76	670.32	1056.62	1056.62	Begin 1.50°/100' Drop
6256.13	0.00	0.00	6110.00	-917.31	752.84	1186.69	1186.69	Begin Vertical Hold
7471.13	0.00	0.00	7325.00	-917.31	752.84	1186.69	1186.69	PBHL



US State Plane 1983  
 Colorado Northern Zone

Created By: Vanessa Thom  
 Date: 16:30, November 18 2011  
 Plan: Design #1

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# **Great Western**

**Weld County, Colorado (NAD 83)**

**Fritzler**

**21-22-14**

**Wellbore #1**

**Plan: Design #1**

## **Standard Planning Report**

**18 November, 2011**

<b>Database:</b>	Southern Region	<b>Local Co-ordinate Reference:</b>	Well 21-22-14
<b>Company:</b>	Great Western	<b>TVD Reference:</b>	WELL @ 4760.00usft (Cade 22)
<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>MD Reference:</b>	WELL @ 4760.00usft (Cade 22)
<b>Site:</b>	Fritzler	<b>North Reference:</b>	Grid
<b>Well:</b>	21-22-14	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

<b>Project</b>	Weld County, Colorado (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		

<b>Well</b>	21-22-14			
<b>Well Position</b>	<b>+N/-S</b>	1,417,130.78 usft	<b>Northing:</b>	1,417,130.78 usft
	<b>+E/-W</b>	3,197,424.71 usft	<b>Easting:</b>	3,197,424.71 usft
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>	
			<b>Latitude:</b>	40° 28' 34.5248 N
			<b>Longitude:</b>	104° 47' 25.205 W
			<b>Ground Level:</b>	4,746.00 usft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	WMM_2010	11/18/2011	8.82	67.09	53,133

<b>Design</b>	Design #1			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PROTOTYPE	<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	140.62

<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	
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,549.76	15.00	140.62	1,541.23	-75.41	61.89	2.00	2.00	0.00	140.62	
5,256.44	15.00	140.62	5,121.69	-816.76	670.32	0.00	0.00	0.00	0.00	
6,256.13	0.00	0.00	6,110.00	-917.31	752.84	1.50	-1.50	0.00	180.00	
7,471.13	0.00	0.00	7,325.00	-917.31	752.84	0.00	0.00	0.00	0.00	PBHL v1 - Fritzler 2

<b>Database:</b>	Southern Region	<b>Local Co-ordinate Reference:</b>	Well 21-22-14
<b>Company:</b>	Great Western	<b>TVD Reference:</b>	WELL @ 4760.00usft (Cade 22)
<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>MD Reference:</b>	WELL @ 4760.00usft (Cade 22)
<b>Site:</b>	Fritzler	<b>North Reference:</b>	Grid
<b>Well:</b>	21-22-14	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	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
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
<b>9 5/8"</b>									
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>KOP, 2.00°/100' Build</b>									
900.00	2.00	140.62	899.98	-1.35	1.11	1.75	2.00	2.00	0.00
1,000.00	4.00	140.62	999.84	-5.39	4.43	6.98	2.00	2.00	0.00
1,100.00	6.00	140.62	1,099.45	-12.13	9.96	15.69	2.00	2.00	0.00
1,200.00	8.00	140.62	1,198.70	-21.55	17.69	27.88	2.00	2.00	0.00
1,300.00	10.00	140.62	1,297.47	-33.64	27.61	43.52	2.00	2.00	0.00
1,400.00	12.00	140.62	1,395.62	-48.39	39.72	62.60	2.00	2.00	0.00
1,500.00	14.00	140.62	1,493.06	-65.78	53.99	85.10	2.00	2.00	0.00
1,549.76	15.00	140.62	1,541.23	-75.41	61.89	97.55	2.00	2.00	0.00
<b>Begin 15.00° Tangent</b>									
1,600.00	15.00	140.62	1,589.76	-85.46	70.13	110.55	0.00	0.00	0.00
1,700.00	15.00	140.62	1,686.35	-105.46	86.55	136.43	0.00	0.00	0.00
1,800.00	15.00	140.62	1,782.95	-125.46	102.96	162.30	0.00	0.00	0.00
1,900.00	15.00	140.62	1,879.54	-145.46	119.38	188.17	0.00	0.00	0.00
2,000.00	15.00	140.62	1,976.14	-165.46	135.79	214.05	0.00	0.00	0.00
2,100.00	15.00	140.62	2,072.73	-185.46	152.21	239.92	0.00	0.00	0.00
2,200.00	15.00	140.62	2,169.33	-205.46	168.62	265.80	0.00	0.00	0.00
2,300.00	15.00	140.62	2,265.92	-225.46	185.04	291.67	0.00	0.00	0.00
2,400.00	15.00	140.62	2,362.52	-245.46	201.45	317.54	0.00	0.00	0.00
2,500.00	15.00	140.62	2,459.11	-265.46	217.87	343.42	0.00	0.00	0.00
2,600.00	15.00	140.62	2,555.71	-285.46	234.28	369.29	0.00	0.00	0.00
2,700.00	15.00	140.62	2,652.30	-305.46	250.69	395.16	0.00	0.00	0.00
2,800.00	15.00	140.62	2,748.90	-325.46	267.11	421.04	0.00	0.00	0.00
2,900.00	15.00	140.62	2,845.49	-345.46	283.52	446.91	0.00	0.00	0.00
3,000.00	15.00	140.62	2,942.09	-365.46	299.94	472.79	0.00	0.00	0.00
3,100.00	15.00	140.62	3,038.68	-385.46	316.35	498.66	0.00	0.00	0.00
3,200.00	15.00	140.62	3,135.28	-405.47	332.77	524.53	0.00	0.00	0.00
3,300.00	15.00	140.62	3,231.87	-425.47	349.18	550.41	0.00	0.00	0.00
3,400.00	15.00	140.62	3,328.46	-445.47	365.60	576.28	0.00	0.00	0.00
3,500.00	15.00	140.62	3,425.06	-465.47	382.01	602.16	0.00	0.00	0.00
3,600.00	15.00	140.62	3,521.65	-485.47	398.43	628.03	0.00	0.00	0.00
3,700.00	15.00	140.62	3,618.25	-505.47	414.84	653.90	0.00	0.00	0.00
3,800.00	15.00	140.62	3,714.84	-525.47	431.25	679.78	0.00	0.00	0.00
3,900.00	15.00	140.62	3,811.44	-545.47	447.67	705.65	0.00	0.00	0.00
4,000.00	15.00	140.62	3,908.03	-565.47	464.08	731.52	0.00	0.00	0.00
4,100.00	15.00	140.62	4,004.63	-585.47	480.50	757.40	0.00	0.00	0.00
4,200.00	15.00	140.62	4,101.22	-605.47	496.91	783.27	0.00	0.00	0.00
4,300.00	15.00	140.62	4,197.82	-625.47	513.33	809.15	0.00	0.00	0.00
4,400.00	15.00	140.62	4,294.41	-645.47	529.74	835.02	0.00	0.00	0.00
4,500.00	15.00	140.62	4,391.01	-665.47	546.16	860.89	0.00	0.00	0.00
4,600.00	15.00	140.62	4,487.60	-685.47	562.57	886.77	0.00	0.00	0.00
4,700.00	15.00	140.62	4,584.20	-705.47	578.98	912.64	0.00	0.00	0.00
4,800.00	15.00	140.62	4,680.79	-725.47	595.40	938.52	0.00	0.00	0.00

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<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>MD Reference:</b>	WELL @ 4760.00usft (Cade 22)
<b>Site:</b>	Fritzler	<b>North Reference:</b>	Grid
<b>Well:</b>	21-22-14	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	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)
4,900.00	15.00	140.62	4,777.39	-745.47	611.81	964.39	0.00	0.00	0.00
5,000.00	15.00	140.62	4,873.98	-765.47	628.23	990.26	0.00	0.00	0.00
5,100.00	15.00	140.62	4,970.58	-785.48	644.64	1,016.14	0.00	0.00	0.00
5,200.00	15.00	140.62	5,067.17	-805.48	661.06	1,042.01	0.00	0.00	0.00
5,256.44	15.00	140.62	5,121.69	-816.76	670.32	1,056.62	0.00	0.00	0.00
<b>Begin 1.50°/100' Drop</b>									
5,300.00	14.34	140.62	5,163.83	-825.29	677.32	1,067.65	1.50	-1.50	0.00
5,400.00	12.84	140.62	5,261.02	-843.46	692.23	1,091.14	1.50	-1.50	0.00
5,500.00	11.34	140.62	5,358.80	-859.65	705.52	1,112.09	1.50	-1.50	0.00
5,600.00	9.84	140.62	5,457.10	-873.86	717.18	1,130.47	1.50	-1.50	0.00
5,700.00	8.34	140.62	5,555.84	-886.07	727.20	1,146.27	1.50	-1.50	0.00
5,800.00	6.84	140.62	5,654.96	-896.28	735.58	1,159.49	1.50	-1.50	0.00
5,900.00	5.34	140.62	5,754.39	-904.49	742.32	1,170.10	1.50	-1.50	0.00
6,000.00	3.84	140.62	5,854.07	-910.67	747.39	1,178.10	1.50	-1.50	0.00
6,100.00	2.34	140.62	5,953.92	-914.84	750.82	1,183.50	1.50	-1.50	0.00
6,200.00	0.84	140.62	6,053.88	-916.99	752.58	1,186.27	1.50	-1.50	0.00
6,256.13	0.00	0.00	6,110.00	-917.31	752.84	1,186.69	1.50	-1.50	0.00
<b>Begin Vertical Hold</b>									
6,300.00	0.00	0.00	6,153.87	-917.31	752.84	1,186.69	0.00	0.00	0.00
6,400.00	0.00	0.00	6,253.87	-917.31	752.84	1,186.69	0.00	0.00	0.00
6,500.00	0.00	0.00	6,353.87	-917.31	752.84	1,186.69	0.00	0.00	0.00
6,600.00	0.00	0.00	6,453.87	-917.31	752.84	1,186.69	0.00	0.00	0.00
6,700.00	0.00	0.00	6,553.87	-917.31	752.84	1,186.69	0.00	0.00	0.00
6,800.00	0.00	0.00	6,653.87	-917.31	752.84	1,186.69	0.00	0.00	0.00
6,900.00	0.00	0.00	6,753.87	-917.31	752.84	1,186.69	0.00	0.00	0.00
6,971.13	0.00	0.00	6,825.00	-917.31	752.84	1,186.69	0.00	0.00	0.00
<b>Niobrara</b>									
7,000.00	0.00	0.00	6,853.87	-917.31	752.84	1,186.69	0.00	0.00	0.00
7,100.00	0.00	0.00	6,953.87	-917.31	752.84	1,186.69	0.00	0.00	0.00
7,200.00	0.00	0.00	7,053.87	-917.31	752.84	1,186.69	0.00	0.00	0.00
7,300.00	0.00	0.00	7,153.87	-917.31	752.84	1,186.69	0.00	0.00	0.00
7,400.00	0.00	0.00	7,253.87	-917.31	752.84	1,186.69	0.00	0.00	0.00
7,471.13	0.00	0.00	7,325.00	-917.31	752.84	1,186.69	0.00	0.00	0.00
<b>PBHL</b>									

## 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									
PBHL v1 - Fritzler 21-	0.00	0.00	7,325.00	-917.31	752.84	1,416,213.47	3,198,177.55	40° 28' 25.4007 N	104° 47' 15.558 W
- plan hits target center									
- Circle (radius 200.00)									

## Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
700.00	700.00	9 5/8"	9-5/8	12-1/4

<b>Database:</b>	Southern Region	<b>Local Co-ordinate Reference:</b>	Well 21-22-14
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<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>MD Reference:</b>	WELL @ 4760.00usft (Cade 22)
<b>Site:</b>	Fritzler	<b>North Reference:</b>	Grid
<b>Well:</b>	21-22-14	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
6,971.13	6,825.00	Niobrara		0.00	

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
800.00	800.00	0.00	0.00	KOP, 2.00°/100' Build
1,549.76	1,541.23	-75.41	61.89	Begin 15.00° Tangent
5,256.44	5,121.69	-816.76	670.32	Begin 1.50°/100' Drop
6,256.13	6,110.00	-917.31	752.84	Begin Vertical Hold
7,471.13	7,325.00	-917.31	752.84	PBHL