



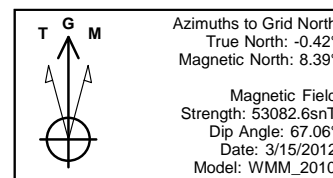
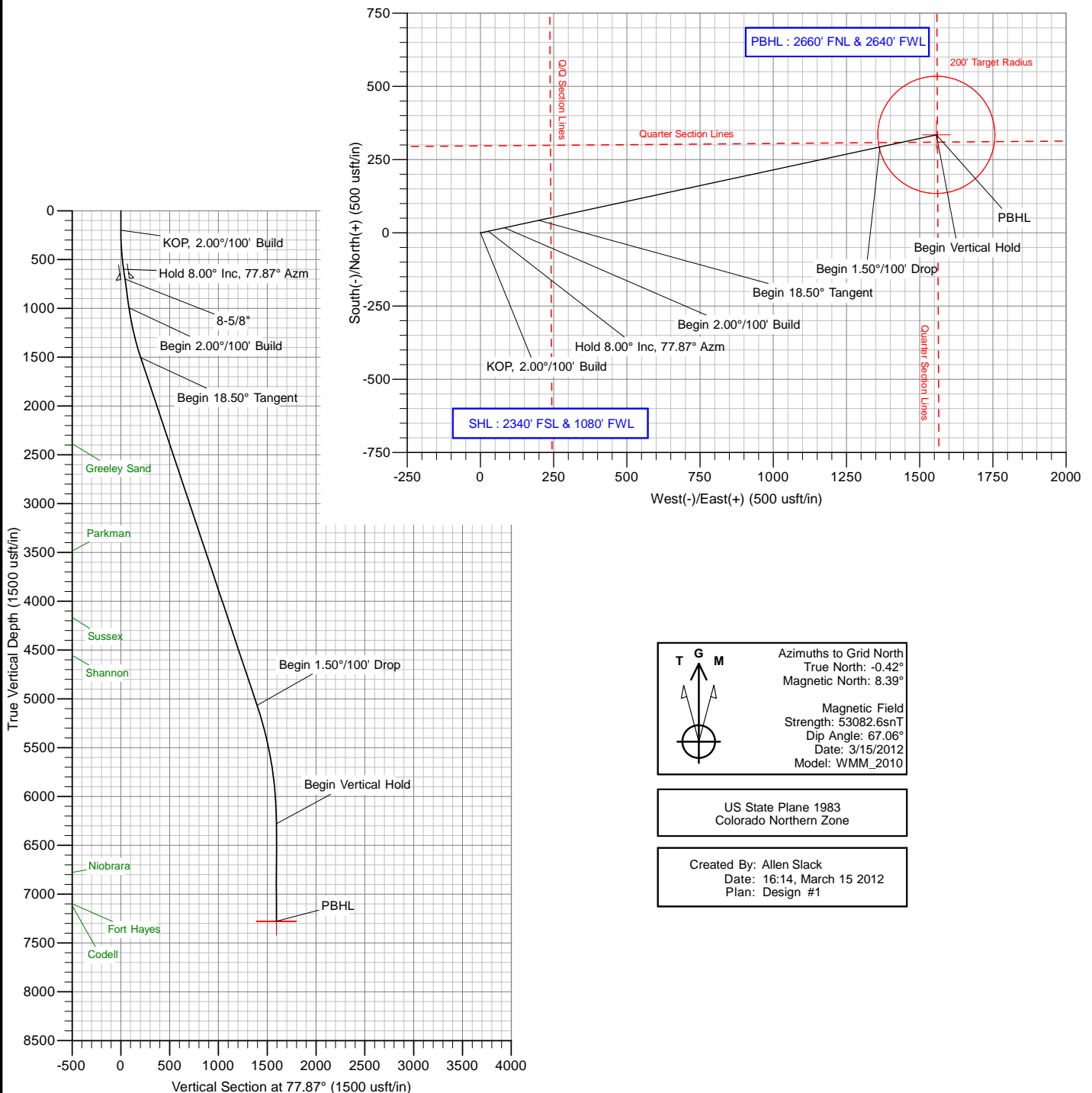
Company: Great Western  
Site: Great Western  
Well: 25-22-13  
Project: Weld County, Colorado (NAD 83)  
Rig Name: Cade 22



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	77.87	598.70	5.86	27.26	27.88	27.88	Hold 8.00° Inc, 77.87° Azm
1000.00	8.00	77.87	994.81	17.56	81.68	83.55	83.55	Begin 2.00°/100' Build
1525.12	18.50	77.87	1505.23	42.81	199.20	203.75	203.75	Begin 18.50° Tangent
5279.80	18.50	77.87	5065.84	293.18	1364.12	1395.27	1395.27	Begin 1.50°/100' Drop
6513.29	0.00	0.00	6278.00	334.67	1557.15	1592.71	1592.71	Begin Vertical Hold
7513.29	0.00	0.00	7278.00	334.67	1557.15	1592.71	1592.71	PBHL



US State Plane 1983  
Colorado Northern Zone

Created By: Allen Slack  
Date: 16:14, March 15 2012  
Plan: Design #1

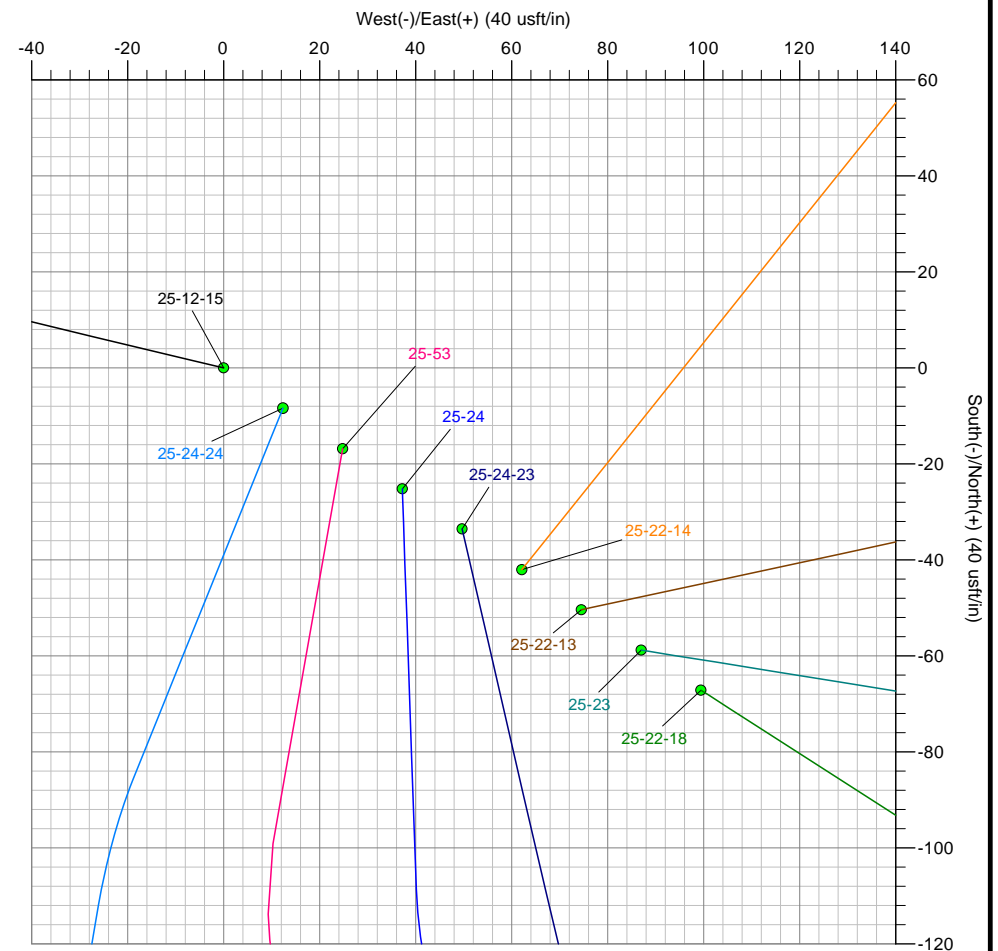
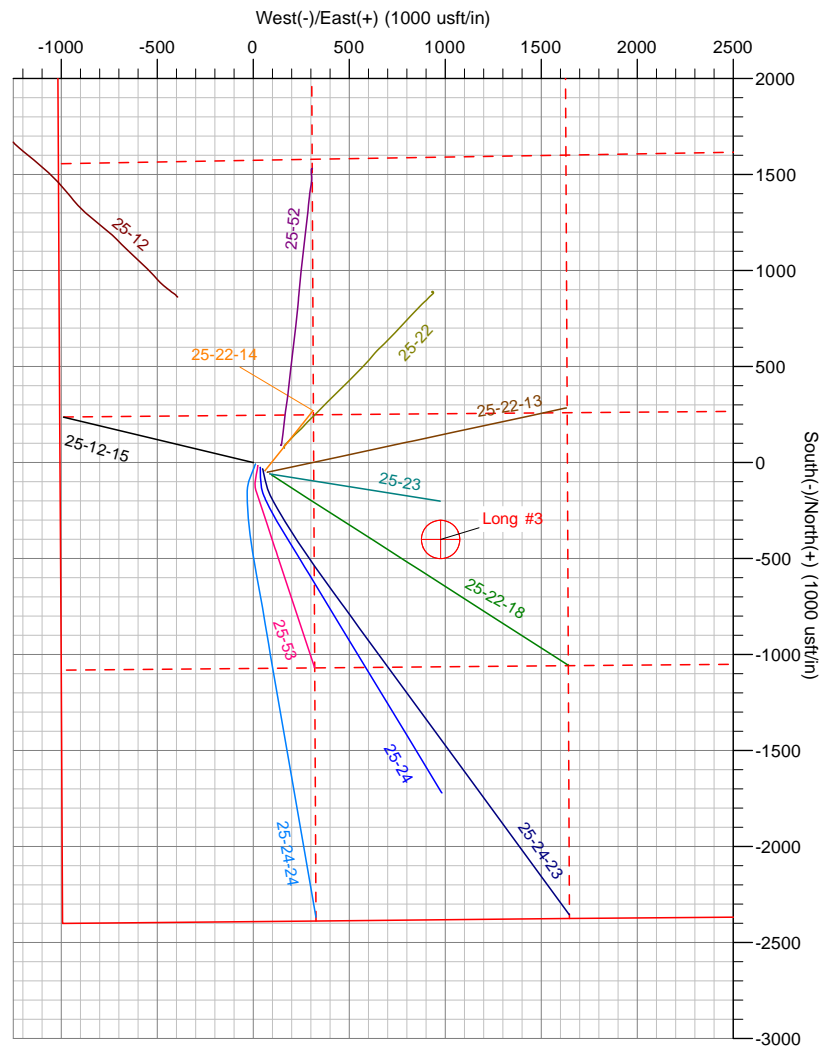
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Company: Great Western  
Site: Great Western  
Project: Weld County, Colorado (NAD 83)  
Rig Name: Cade 22



Planning: 936.442.2510 Fax: 936.442.2515  
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# **Great Western**

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

**Great Western**

**25-22-13**

**Wellbore #1**

**Plan: Design #1**

## **Standard Planning Report**

**15 March, 2012**



# MS Energy Services Planning Report



<b>Database:</b>	Southern Region	<b>Local Co-ordinate Reference:</b>	Well 25-22-13
<b>Company:</b>	Great Western	<b>TVD Reference:</b>	WELL @ 4765.00usft (Cade 22)
<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>MD Reference:</b>	WELL @ 4765.00usft (Cade 22)
<b>Site:</b>	Great Western	<b>North Reference:</b>	Grid
<b>Well:</b>	25-22-13	<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>	25-22-13			
<b>Well Position</b>	<b>+N/-S</b>	1,410,034.59 usft	<b>Northing:</b>	1,410,034.59 usft
	<b>+E/-W</b>	3,181,561.53 usft	<b>Easting:</b>	3,181,561.53 usft
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>	
			<b>Latitude:</b>	40° 27' 25.6070 N
			<b>Longitude:</b>	104° 50' 51.152 W
			<b>Ground Level:</b>	4,751.00 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	3/15/2012	8.81	67.06	53,083

<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	77.87

<b>Plan Sections</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	<b>TFO (°)</b>	<b>Target</b>
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	77.87	598.70	5.86	27.26	2.00	2.00	0.00	77.87	PBHL v1 - Great W
1,000.00	8.00	77.87	994.81	17.56	81.68	0.00	0.00	0.00	0.00	
1,525.12	18.50	77.87	1,505.23	42.81	199.20	2.00	2.00	0.00	0.00	
5,279.80	18.50	77.87	5,065.84	293.18	1,364.12	0.00	0.00	0.00	0.00	
6,513.29	0.00	0.00	6,278.00	334.67	1,557.15	1.50	-1.50	0.00	180.00	
7,513.29	0.00	0.00	7,278.00	334.67	1,557.15	0.00	0.00	0.00	0.00	PBHL v1 - Great W

<b>Database:</b>	Southern Region	<b>Local Co-ordinate Reference:</b>	Well 25-22-13
<b>Company:</b>	Great Western	<b>TVD Reference:</b>	WELL @ 4765.00usft (Cade 22)
<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>MD Reference:</b>	WELL @ 4765.00usft (Cade 22)
<b>Site:</b>	Great Western	<b>North Reference:</b>	Grid
<b>Well:</b>	25-22-13	<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
<b>KOP, 2.00°/100' Build</b>									
300.00	2.00	77.87	299.98	0.37	1.71	1.75	2.00	2.00	0.00
400.00	4.00	77.87	399.84	1.47	6.82	6.98	2.00	2.00	0.00
500.00	6.00	77.87	499.45	3.30	15.34	15.69	2.00	2.00	0.00
600.00	8.00	77.87	598.70	5.86	27.26	27.88	2.00	2.00	0.00
<b>Hold 8.00° Inc, 77.87° Azm</b>									
700.00	8.00	77.87	697.73	8.78	40.86	41.80	0.00	0.00	0.00
702.29	8.00	77.87	700.00	8.85	41.18	42.12	0.00	0.00	0.00
<b>8-5/8"</b>									
800.00	8.00	77.87	796.76	11.71	54.47	55.71	0.00	0.00	0.00
900.00	8.00	77.87	895.78	14.63	68.08	69.63	0.00	0.00	0.00
1,000.00	8.00	77.87	994.81	17.56	81.68	83.55	0.00	0.00	0.00
<b>Begin 2.00°/100' Build</b>									
1,100.00	10.00	77.87	1,093.57	20.84	96.98	99.19	2.00	2.00	0.00
1,200.00	12.00	77.87	1,191.73	24.85	115.63	118.27	2.00	2.00	0.00
1,300.00	14.00	77.87	1,289.16	29.58	137.62	140.77	2.00	2.00	0.00
1,400.00	16.00	77.87	1,385.75	35.02	162.93	166.65	2.00	2.00	0.00
1,500.00	18.00	77.87	1,481.38	41.16	191.51	195.88	2.00	2.00	0.00
1,525.12	18.50	77.87	1,505.23	42.81	199.20	203.75	2.00	2.00	0.00
<b>Begin 18.50° Tangent</b>									
1,600.00	18.50	77.87	1,576.24	47.81	222.43	227.51	0.00	0.00	0.00
1,700.00	18.50	77.87	1,671.07	54.47	253.46	259.25	0.00	0.00	0.00
1,800.00	18.50	77.87	1,765.90	61.14	284.48	290.98	0.00	0.00	0.00
1,900.00	18.50	77.87	1,860.73	67.81	315.51	322.71	0.00	0.00	0.00
2,000.00	18.50	77.87	1,955.57	74.48	346.54	354.45	0.00	0.00	0.00
2,100.00	18.50	77.87	2,050.40	81.15	377.56	386.18	0.00	0.00	0.00
2,200.00	18.50	77.87	2,145.23	87.82	408.59	417.92	0.00	0.00	0.00
2,300.00	18.50	77.87	2,240.06	94.48	439.61	449.65	0.00	0.00	0.00
2,400.00	18.50	77.87	2,334.89	101.15	470.64	481.39	0.00	0.00	0.00
2,452.84	18.50	77.87	2,385.00	104.68	487.03	498.15	0.00	0.00	0.00
<b>Greeley Sand</b>									
2,500.00	18.50	77.87	2,429.72	107.82	501.66	513.12	0.00	0.00	0.00
2,600.00	18.50	77.87	2,524.55	114.49	532.69	544.85	0.00	0.00	0.00
2,700.00	18.50	77.87	2,619.38	121.16	563.72	576.59	0.00	0.00	0.00
2,800.00	18.50	77.87	2,714.21	127.83	594.74	608.32	0.00	0.00	0.00
2,900.00	18.50	77.87	2,809.05	134.49	625.77	640.06	0.00	0.00	0.00
3,000.00	18.50	77.87	2,903.88	141.16	656.79	671.79	0.00	0.00	0.00
3,100.00	18.50	77.87	2,998.71	147.83	687.82	703.53	0.00	0.00	0.00
3,200.00	18.50	77.87	3,093.54	154.50	718.85	735.26	0.00	0.00	0.00
3,300.00	18.50	77.87	3,188.37	161.17	749.87	766.99	0.00	0.00	0.00
3,400.00	18.50	77.87	3,283.20	167.83	780.90	798.73	0.00	0.00	0.00
3,500.00	18.50	77.87	3,378.03	174.50	811.92	830.46	0.00	0.00	0.00
3,600.00	18.50	77.87	3,472.86	181.17	842.95	862.20	0.00	0.00	0.00
3,612.80	18.50	77.87	3,485.00	182.02	846.92	866.26	0.00	0.00	0.00
<b>Parkman</b>									
3,700.00	18.50	77.87	3,567.69	187.84	873.97	893.93	0.00	0.00	0.00
3,800.00	18.50	77.87	3,662.53	194.51	905.00	925.67	0.00	0.00	0.00
3,900.00	18.50	77.87	3,757.36	201.18	936.03	957.40	0.00	0.00	0.00
4,000.00	18.50	77.87	3,852.19	207.84	967.05	989.14	0.00	0.00	0.00
4,100.00	18.50	77.87	3,947.02	214.51	998.08	1,020.87	0.00	0.00	0.00

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<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>MD Reference:</b>	WELL @ 4765.00usft (Cade 22)
<b>Site:</b>	Great Western	<b>North Reference:</b>	Grid
<b>Well:</b>	25-22-13	<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)
4,200.00	18.50	77.87	4,041.85	221.18	1,029.10	1,052.60	0.00	0.00	0.00
4,300.00	18.50	77.87	4,136.68	227.85	1,060.13	1,084.34	0.00	0.00	0.00
4,329.86	18.50	77.87	4,165.00	229.84	1,069.39	1,093.81	0.00	0.00	0.00
<b>Sussex</b>									
4,400.00	18.50	77.87	4,231.51	234.52	1,091.15	1,116.07	0.00	0.00	0.00
4,500.00	18.50	77.87	4,326.34	241.19	1,122.18	1,147.81	0.00	0.00	0.00
4,600.00	18.50	77.87	4,421.17	247.85	1,153.21	1,179.54	0.00	0.00	0.00
4,700.00	18.50	77.87	4,516.01	254.52	1,184.23	1,211.28	0.00	0.00	0.00
4,741.12	18.50	77.87	4,555.00	257.26	1,196.99	1,224.32	0.00	0.00	0.00
<b>Shannon</b>									
4,800.00	18.50	77.87	4,610.84	261.19	1,215.26	1,243.01	0.00	0.00	0.00
4,900.00	18.50	77.87	4,705.67	267.86	1,246.28	1,274.74	0.00	0.00	0.00
5,000.00	18.50	77.87	4,800.50	274.53	1,277.31	1,306.48	0.00	0.00	0.00
5,100.00	18.50	77.87	4,895.33	281.20	1,308.34	1,338.21	0.00	0.00	0.00
5,200.00	18.50	77.87	4,990.16	287.86	1,339.36	1,369.95	0.00	0.00	0.00
5,279.80	18.50	77.87	5,065.84	293.18	1,364.12	1,395.27	0.00	0.00	0.00
<b>Begin 1.50°/100' Drop</b>									
5,300.00	18.20	77.87	5,085.01	294.52	1,370.34	1,401.63	1.50	-1.50	0.00
5,400.00	16.70	77.87	5,180.40	300.82	1,399.65	1,431.62	1.50	-1.50	0.00
5,500.00	15.20	77.87	5,276.55	306.60	1,426.52	1,459.09	1.50	-1.50	0.00
5,600.00	13.70	77.87	5,373.39	311.84	1,450.91	1,484.05	1.50	-1.50	0.00
5,700.00	12.20	77.87	5,470.84	316.55	1,472.82	1,506.45	1.50	-1.50	0.00
5,800.00	10.70	77.87	5,568.85	320.72	1,492.23	1,526.30	1.50	-1.50	0.00
5,900.00	9.20	77.87	5,667.34	324.35	1,509.12	1,543.58	1.50	-1.50	0.00
6,000.00	7.70	77.87	5,766.25	327.44	1,523.48	1,558.27	1.50	-1.50	0.00
6,100.00	6.20	77.87	5,865.51	329.98	1,535.31	1,570.37	1.50	-1.50	0.00
6,200.00	4.70	77.87	5,965.06	331.97	1,544.60	1,579.87	1.50	-1.50	0.00
6,300.00	3.20	77.87	6,064.82	333.42	1,551.33	1,586.76	1.50	-1.50	0.00
6,400.00	1.70	77.87	6,164.73	334.32	1,555.51	1,591.03	1.50	-1.50	0.00
6,500.00	0.20	77.87	6,264.71	334.67	1,557.13	1,592.69	1.50	-1.50	0.00
6,513.29	0.00	0.00	6,278.00	334.67	1,557.15	1,592.71	1.50	-1.50	0.00
<b>Begin Vertical Hold</b>									
6,600.00	0.00	0.00	6,364.71	334.67	1,557.15	1,592.71	0.00	0.00	0.00
6,700.00	0.00	0.00	6,464.71	334.67	1,557.15	1,592.71	0.00	0.00	0.00
6,800.00	0.00	0.00	6,564.71	334.67	1,557.15	1,592.71	0.00	0.00	0.00
6,900.00	0.00	0.00	6,664.71	334.67	1,557.15	1,592.71	0.00	0.00	0.00
7,000.00	0.00	0.00	6,764.71	334.67	1,557.15	1,592.71	0.00	0.00	0.00
7,013.29	0.00	0.00	6,778.00	334.67	1,557.15	1,592.71	0.00	0.00	0.00
<b>Niobrara</b>									
7,100.00	0.00	0.00	6,864.71	334.67	1,557.15	1,592.71	0.00	0.00	0.00
7,200.00	0.00	0.00	6,964.71	334.67	1,557.15	1,592.71	0.00	0.00	0.00
7,300.00	0.00	0.00	7,064.71	334.67	1,557.15	1,592.71	0.00	0.00	0.00
7,333.29	0.00	0.00	7,098.00	334.67	1,557.15	1,592.71	0.00	0.00	0.00
<b>Fort Hayes</b>									
7,353.29	0.00	0.00	7,118.00	334.67	1,557.15	1,592.71	0.00	0.00	0.00
<b>Codell</b>									
7,400.00	0.00	0.00	7,164.71	334.67	1,557.15	1,592.71	0.00	0.00	0.00
7,500.00	0.00	0.00	7,264.71	334.67	1,557.15	1,592.71	0.00	0.00	0.00
7,513.29	0.00	0.00	7,278.00	334.67	1,557.15	1,592.71	0.00	0.00	0.00
<b>PBHL</b>									

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<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>MD Reference:</b>	WELL @ 4765.00usft (Cade 22)
<b>Site:</b>	Great Western	<b>North Reference:</b>	Grid
<b>Well:</b>	25-22-13	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	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 - Great Wes - hit/miss target - Shape - plan hits target center - Circle (radius 200.00)	0.00	0.00	7,278.00	334.67	1,557.15	1,410,369.26	3,183,118.68	40° 27' 28.8004 N	104° 50' 30.976 W

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
702.29	700.00	8-5/8"	8-5/8	12-1/4	

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
2,452.84	-2,380.00	Greeley Sand		0.00		
3,612.80	-1,280.00	Parkman		0.00		
4,329.86	-600.00	Sussex		0.00		
4,741.12	-210.00	Shannon		0.00		
7,013.29	2,013.00	Niobrara		0.00		
7,333.29	2,333.00	Fort Hayes		0.00		
7,353.29	2,353.00	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	5.86	27.26	Hold 8.00° Inc, 77.87° Azm
1,000.00	994.81	17.56	81.68	Begin 2.00°/100' Build
1,525.12	1,505.23	42.81	199.20	Begin 18.50° Tangent
5,279.80	5,065.84	293.18	1,364.12	Begin 1.50°/100' Drop
6,513.29	6,278.00	334.67	1,557.15	Begin Vertical Hold
7,513.29	7,278.00	334.67	1,557.15	PBHL