



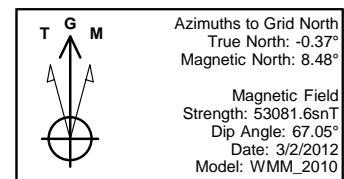
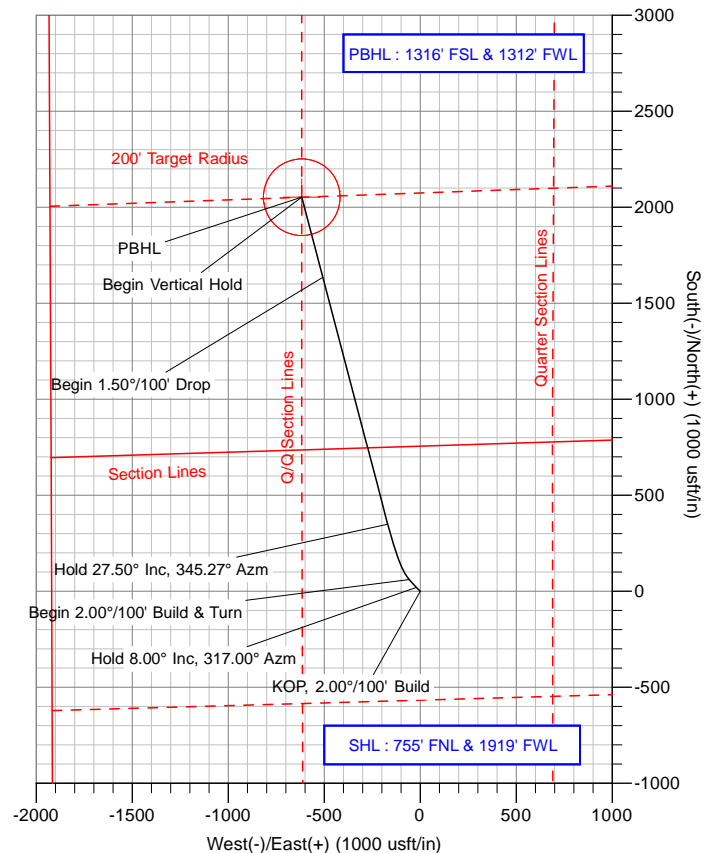
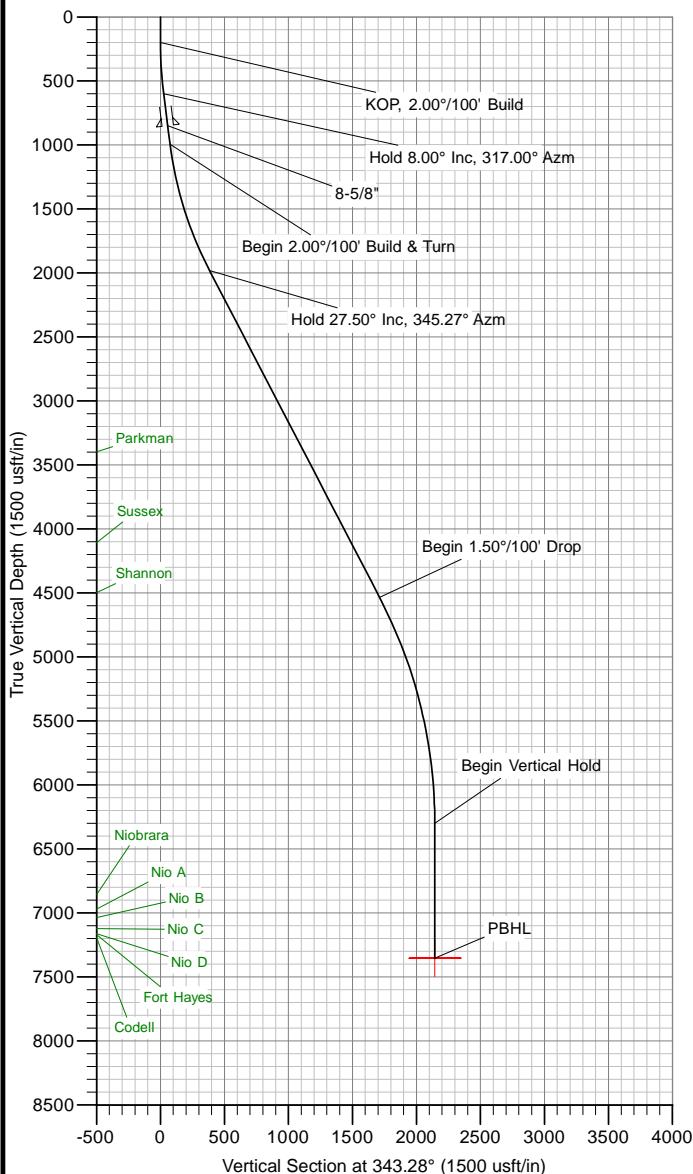
Company: Great Western  
Site: H-Y  
Well: 20-53  
Project: Weld County, Colorado (NAD 83)  
Rig Name: Cade 22



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
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	317.00	598.70	20.39	-19.01	25.00	27.88	Hold 8.00° Inc, 317.00° Azm
1000.00	8.00	317.00	994.81	61.10	-56.98	74.91	83.55	Begin 2.00°/100' Build & Turn
2038.63	27.50	345.27	1980.54	349.01	-168.47	382.71	398.64	Hold 27.50° Inc, 345.27° Azm
4918.89	27.50	345.27	4535.43	1635.11	-506.63	1711.74	1728.46	Begin 1.50°/100' Drop
6752.02	0.00	0.00	6299.00	2052.42	-616.36	2142.97	2159.95	Begin Vertical Hold
7807.02	0.00	0.00	7354.00	2052.42	-616.36	2142.97	2159.95	PBHL



US State Plane 1983  
Colorado Northern Zone

Created By: Allen Slack  
Date: 14:35, March 08 2012  
Plan: Design #1

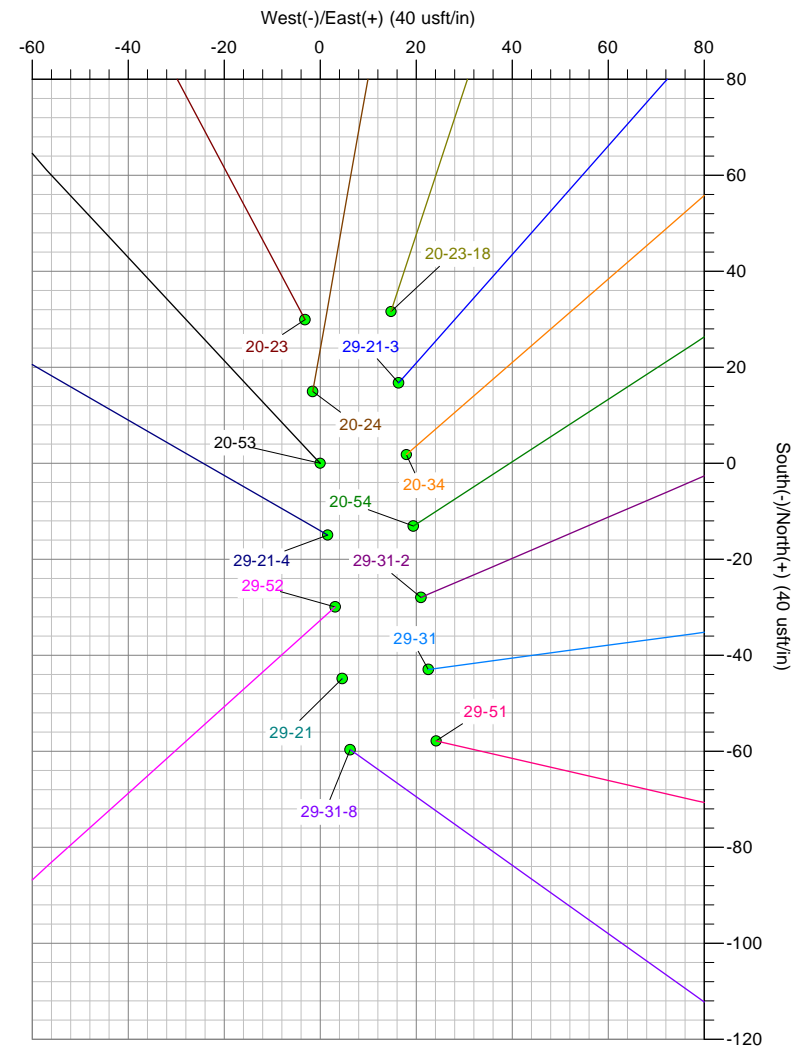
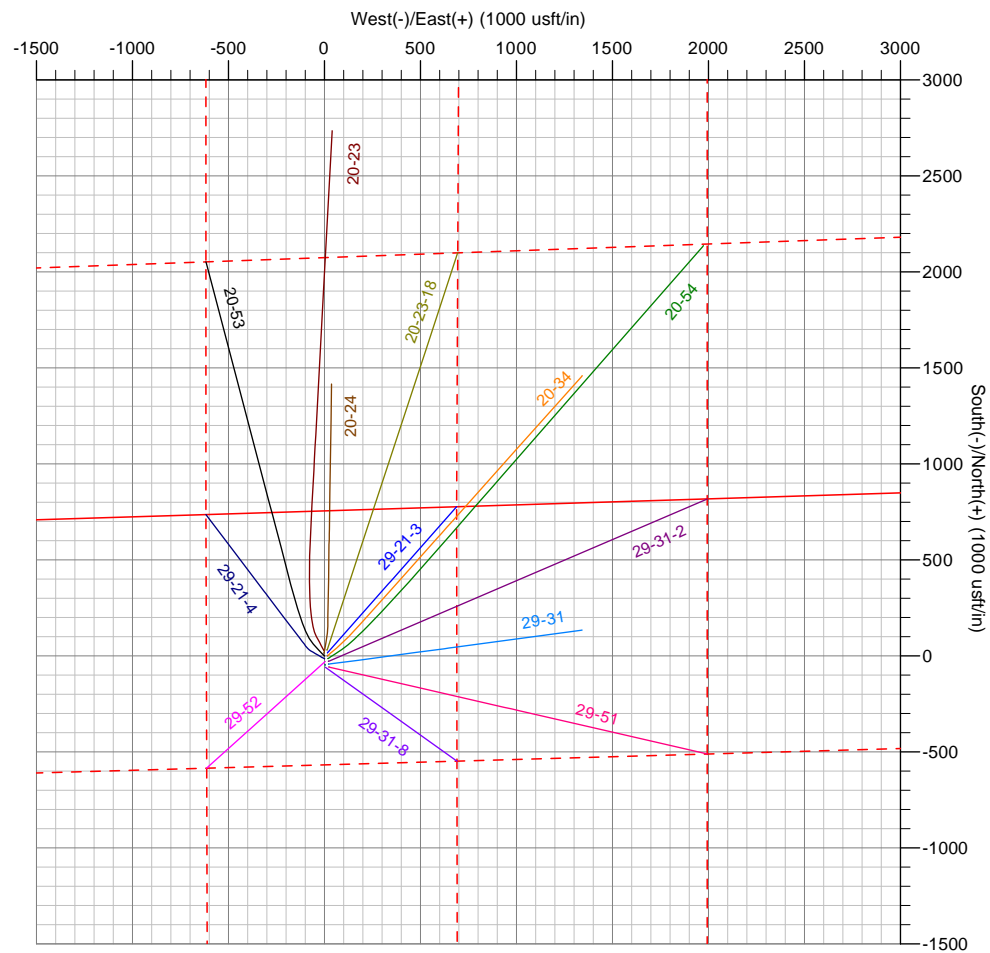
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# **Great Western**

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

**H-Y**

**20-53**

**Wellbore #1**

**Plan: Design #1**

## **Standard Planning Report**

**08 March, 2012**

<b>Database:</b>	Southern Region	<b>Local Co-ordinate Reference:</b>	Well 20-53
<b>Company:</b>	Great Western	<b>TVD Reference:</b>	WELL @ 4797.00usft (Cade 22)
<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>MD Reference:</b>	WELL @ 4797.00usft (Cade 22)
<b>Site:</b>	H-Y	<b>North Reference:</b>	Grid
<b>Well:</b>	20-53	<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>	20-53			
<b>Well Position</b>	<b>+N/-S</b>	1,412,059.26 usft	<b>Northing:</b>	1,412,059.26 usft
	<b>+E/-W</b>	3,161,506.16 usft	<b>Easting:</b>	3,161,506.16 usft
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>	
			<b>Latitude:</b>	40° 27' 46.9918 N
			<b>Longitude:</b>	104° 55' 10.427 W
			<b>Ground Level:</b>	4,783.00 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	3/2/2012	8.85	67.05	53,082

<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	343.28

<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	
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	
600.00	8.00	317.00	598.70	20.39	-19.01	2.00	2.00	0.00	317.00	
1,000.00	8.00	317.00	994.81	61.10	-56.98	0.00	0.00	0.00	0.00	
2,038.63	27.50	345.27	1,980.54	349.01	-168.47	2.00	1.88	2.72	38.06	
4,918.89	27.50	345.27	4,535.43	1,635.11	-506.63	0.00	0.00	0.00	0.00	
6,752.02	0.00	0.00	6,299.00	2,052.42	-616.36	1.50	-1.50	0.00	180.00	
7,807.02	0.00	0.00	7,354.00	2,052.42	-616.36	0.00	0.00	0.00	0.00	PBHL v1 - H-Y 20-5

<b>Database:</b>	Southern Region	<b>Local Co-ordinate Reference:</b>	Well 20-53
<b>Company:</b>	Great Western	<b>TVD Reference:</b>	WELL @ 4797.00usft (Cade 22)
<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>MD Reference:</b>	WELL @ 4797.00usft (Cade 22)
<b>Site:</b>	H-Y	<b>North Reference:</b>	Grid
<b>Well:</b>	20-53	<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	317.00	299.98	1.28	-1.19	1.56	2.00	2.00	0.00
400.00	4.00	317.00	399.84	5.10	-4.76	6.26	2.00	2.00	0.00
500.00	6.00	317.00	499.45	11.48	-10.70	14.07	2.00	2.00	0.00
600.00	8.00	317.00	598.70	20.39	-19.01	25.00	2.00	2.00	0.00
<b>Hold 8.00° Inc, 317.00° Azm</b>									
700.00	8.00	317.00	697.73	30.57	-28.51	37.48	0.00	0.00	0.00
800.00	8.00	317.00	796.76	40.75	-38.00	49.95	0.00	0.00	0.00
853.77	8.00	317.00	850.00	46.22	-43.10	56.66	0.00	0.00	0.00
<b>8-5/8"</b>									
900.00	8.00	317.00	895.78	50.93	-47.49	62.43	0.00	0.00	0.00
1,000.00	8.00	317.00	994.81	61.10	-56.98	74.91	0.00	0.00	0.00
<b>Begin 2.00°/100' Build &amp; Turn</b>									
1,100.00	9.65	324.37	1,093.62	73.01	-66.61	89.08	2.00	1.65	7.37
1,200.00	11.42	329.55	1,191.94	88.36	-76.51	106.63	2.00	1.76	5.18
1,300.00	13.25	333.33	1,289.63	107.13	-86.67	127.53	2.00	1.83	3.79
1,400.00	15.12	336.21	1,386.58	129.31	-97.08	151.76	2.00	1.87	2.87
1,500.00	17.02	338.45	1,482.66	154.86	-107.72	179.29	2.00	1.90	2.25
1,600.00	18.94	340.26	1,577.78	183.75	-118.57	210.09	2.00	1.92	1.81
1,700.00	20.88	341.74	1,671.79	215.95	-129.64	244.11	2.00	1.94	1.48
1,800.00	22.82	342.98	1,764.61	251.42	-140.90	281.32	2.00	1.95	1.24
1,900.00	24.78	344.04	1,856.10	290.12	-152.34	321.67	2.00	1.95	1.06
2,000.00	26.74	344.95	1,946.16	331.99	-163.94	365.12	2.00	1.96	0.91
2,038.63	27.50	345.27	1,980.54	349.01	-168.47	382.71	2.00	1.96	0.83
<b>Hold 27.50° Inc, 345.27° Azm</b>									
2,100.00	27.50	345.27	2,034.98	376.41	-175.67	411.03	0.00	0.00	0.00
2,200.00	27.50	345.27	2,123.68	421.07	-187.41	457.18	0.00	0.00	0.00
2,300.00	27.50	345.27	2,212.39	465.72	-199.15	503.32	0.00	0.00	0.00
2,400.00	27.50	345.27	2,301.09	510.37	-210.90	549.46	0.00	0.00	0.00
2,500.00	27.50	345.27	2,389.79	555.02	-222.64	595.60	0.00	0.00	0.00
2,600.00	27.50	345.27	2,478.50	599.68	-234.38	641.75	0.00	0.00	0.00
2,700.00	27.50	345.27	2,567.20	644.33	-246.12	687.89	0.00	0.00	0.00
2,800.00	27.50	345.27	2,655.90	688.98	-257.86	734.03	0.00	0.00	0.00
2,900.00	27.50	345.27	2,744.61	733.63	-269.60	780.17	0.00	0.00	0.00
3,000.00	27.50	345.27	2,833.31	778.28	-281.34	826.32	0.00	0.00	0.00
3,100.00	27.50	345.27	2,922.01	822.94	-293.08	872.46	0.00	0.00	0.00
3,200.00	27.50	345.27	3,010.72	867.59	-304.82	918.60	0.00	0.00	0.00
3,300.00	27.50	345.27	3,099.42	912.24	-316.56	964.74	0.00	0.00	0.00
3,400.00	27.50	345.27	3,188.12	956.89	-328.30	1,010.89	0.00	0.00	0.00
3,500.00	27.50	345.27	3,276.83	1,001.55	-340.04	1,057.03	0.00	0.00	0.00
3,600.00	27.50	345.27	3,365.53	1,046.20	-351.79	1,103.17	0.00	0.00	0.00
3,635.48	27.50	345.27	3,397.00	1,062.04	-355.95	1,119.54	0.00	0.00	0.00
<b>Parkman</b>									
3,700.00	27.50	345.27	3,454.24	1,090.85	-363.53	1,149.31	0.00	0.00	0.00
3,800.00	27.50	345.27	3,542.94	1,135.50	-375.27	1,195.46	0.00	0.00	0.00
3,900.00	27.50	345.27	3,631.64	1,180.16	-387.01	1,241.60	0.00	0.00	0.00
4,000.00	27.50	345.27	3,720.35	1,224.81	-398.75	1,287.74	0.00	0.00	0.00
4,100.00	27.50	345.27	3,809.05	1,269.46	-410.49	1,333.88	0.00	0.00	0.00
4,200.00	27.50	345.27	3,897.75	1,314.11	-422.23	1,380.03	0.00	0.00	0.00
4,300.00	27.50	345.27	3,986.46	1,358.77	-433.97	1,426.17	0.00	0.00	0.00

<b>Database:</b>	Southern Region	<b>Local Co-ordinate Reference:</b>	Well 20-53
<b>Company:</b>	Great Western	<b>TVD Reference:</b>	WELL @ 4797.00usft (Cade 22)
<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>MD Reference:</b>	WELL @ 4797.00usft (Cade 22)
<b>Site:</b>	H-Y	<b>North Reference:</b>	Grid
<b>Well:</b>	20-53	<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)
4,400.00	27.50	345.27	4,075.16	1,403.42	-445.71	1,472.31	0.00	0.00	0.00
4,435.90	27.50	345.27	4,107.00	1,419.45	-449.93	1,488.87	0.00	0.00	0.00
<b>Sussex</b>									
4,500.00	27.50	345.27	4,163.86	1,448.07	-457.45	1,518.45	0.00	0.00	0.00
4,600.00	27.50	345.27	4,252.57	1,492.72	-469.19	1,564.60	0.00	0.00	0.00
4,700.00	27.50	345.27	4,341.27	1,537.38	-480.93	1,610.74	0.00	0.00	0.00
4,800.00	27.50	345.27	4,429.97	1,582.03	-492.68	1,656.88	0.00	0.00	0.00
4,875.56	27.50	345.27	4,497.00	1,615.77	-501.55	1,691.75	0.00	0.00	0.00
<b>Shannon</b>									
4,900.00	27.50	345.27	4,518.68	1,626.68	-504.42	1,703.02	0.00	0.00	0.00
4,918.89	27.50	345.27	4,535.43	1,635.11	-506.63	1,711.74	0.00	0.00	0.00
<b>Begin 1.50°/100' Drop</b>									
5,000.00	26.28	345.27	4,607.77	1,670.59	-515.96	1,748.40	1.50	-1.50	0.00
5,100.00	24.78	345.27	4,698.01	1,712.27	-526.92	1,791.47	1.50	-1.50	0.00
5,200.00	23.28	345.27	4,789.34	1,751.65	-537.28	1,832.17	1.50	-1.50	0.00
5,300.00	21.78	345.27	4,881.70	1,788.71	-547.02	1,870.46	1.50	-1.50	0.00
5,400.00	20.28	345.27	4,975.04	1,823.42	-556.15	1,906.33	1.50	-1.50	0.00
5,500.00	18.78	345.27	5,069.28	1,855.75	-564.65	1,939.73	1.50	-1.50	0.00
5,600.00	17.28	345.27	5,164.37	1,885.68	-572.52	1,970.67	1.50	-1.50	0.00
5,700.00	15.78	345.27	5,260.23	1,913.20	-579.75	1,999.10	1.50	-1.50	0.00
5,800.00	14.28	345.27	5,356.81	1,938.28	-586.35	2,025.02	1.50	-1.50	0.00
5,900.00	12.78	345.27	5,454.03	1,960.90	-592.30	2,048.40	1.50	-1.50	0.00
6,000.00	11.28	345.27	5,551.83	1,981.06	-597.60	2,069.23	1.50	-1.50	0.00
6,100.00	9.78	345.27	5,650.15	1,998.73	-602.24	2,087.49	1.50	-1.50	0.00
6,200.00	8.28	345.27	5,748.90	2,013.91	-606.23	2,103.18	1.50	-1.50	0.00
6,300.00	6.78	345.27	5,848.04	2,026.59	-609.57	2,116.28	1.50	-1.50	0.00
6,400.00	5.28	345.27	5,947.48	2,036.75	-612.24	2,126.77	1.50	-1.50	0.00
6,500.00	3.78	345.27	6,047.17	2,044.38	-614.25	2,134.67	1.50	-1.50	0.00
6,600.00	2.28	345.27	6,147.02	2,049.50	-615.59	2,139.95	1.50	-1.50	0.00
6,700.00	0.78	345.27	6,246.99	2,052.08	-616.27	2,142.62	1.50	-1.50	0.00
6,752.02	0.00	0.00	6,299.00	2,052.42	-616.36	2,142.97	1.50	-1.50	0.00
<b>Begin Vertical Hold</b>									
6,800.00	0.00	0.00	6,346.98	2,052.42	-616.36	2,142.97	0.00	0.00	0.00
6,900.00	0.00	0.00	6,446.98	2,052.42	-616.36	2,142.97	0.00	0.00	0.00
7,000.00	0.00	0.00	6,546.98	2,052.42	-616.36	2,142.97	0.00	0.00	0.00
7,100.00	0.00	0.00	6,646.98	2,052.42	-616.36	2,142.97	0.00	0.00	0.00
7,200.00	0.00	0.00	6,746.98	2,052.42	-616.36	2,142.97	0.00	0.00	0.00
7,300.00	0.00	0.00	6,846.98	2,052.42	-616.36	2,142.97	0.00	0.00	0.00
7,308.02	0.00	0.00	6,855.00	2,052.42	-616.36	2,142.97	0.00	0.00	0.00
<b>Niobrara</b>									
7,400.00	0.00	0.00	6,946.98	2,052.42	-616.36	2,142.97	0.00	0.00	0.00
7,422.02	0.00	0.00	6,969.00	2,052.42	-616.36	2,142.97	0.00	0.00	0.00
<b>Nio A</b>									
7,488.02	0.00	0.00	7,035.00	2,052.42	-616.36	2,142.97	0.00	0.00	0.00
<b>Nio B</b>									
7,500.00	0.00	0.00	7,046.98	2,052.42	-616.36	2,142.97	0.00	0.00	0.00
7,575.02	0.00	0.00	7,122.00	2,052.42	-616.36	2,142.97	0.00	0.00	0.00
<b>Nio C</b>									
7,600.00	0.00	0.00	7,146.98	2,052.42	-616.36	2,142.97	0.00	0.00	0.00
7,615.02	0.00	0.00	7,162.00	2,052.42	-616.36	2,142.97	0.00	0.00	0.00
<b>Nio D</b>									
7,622.02	0.00	0.00	7,169.00	2,052.42	-616.36	2,142.97	0.00	0.00	0.00
<b>Fort Hayes</b>									

<b>Database:</b>	Southern Region	<b>Local Co-ordinate Reference:</b>	Well 20-53
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<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>MD Reference:</b>	WELL @ 4797.00usft (Cade 22)
<b>Site:</b>	H-Y	<b>North Reference:</b>	Grid
<b>Well:</b>	20-53	<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)
7,647.02	0.00	0.00	7,194.00	2,052.42	-616.36	2,142.97	0.00	0.00	0.00
<b>Codell</b>									
7,700.00	0.00	0.00	7,246.98	2,052.42	-616.36	2,142.97	0.00	0.00	0.00
7,800.00	0.00	0.00	7,346.98	2,052.42	-616.36	2,142.97	0.00	0.00	0.00
7,807.02	0.00	0.00	7,354.00	2,052.42	-616.36	2,142.97	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 - H-Y 20-53	0.00	0.01	7,354.00	2,052.42	-616.36	1,414,111.68	3,160,889.80	40° 28' 7.3130 N	104° 55' 18.229 W
- plan hits target center									
- Circle (radius 200.00)									

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
853.77	850.00	8-5/8"	8-5/8	12-1/4

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
3,635.48	3,397.00	Parkman		0.00		
4,435.90	4,107.00	Sussex		0.00		
4,875.56	4,497.00	Shannon		0.00		
7,308.02	6,855.00	Niobrara		0.00		
7,422.02	6,969.00	Nio A		0.00		
7,488.02	7,035.00	Nio B		0.00		
7,575.02	7,122.00	Nio C		0.00		
7,615.02	7,162.00	Nio D		0.00		
7,622.02	7,169.00	Fort Hayes		0.00		
7,647.02	7,194.00	Codell		0.00		



<b>Database:</b>	Southern Region	<b>Local Co-ordinate Reference:</b>	Well 20-53
<b>Company:</b>	Great Western	<b>TVD Reference:</b>	WELL @ 4797.00usft (Cade 22)
<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>MD Reference:</b>	WELL @ 4797.00usft (Cade 22)
<b>Site:</b>	H-Y	<b>North Reference:</b>	Grid
<b>Well:</b>	20-53	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

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	20.39	-19.01	Hold 8.00° Inc, 317.00° Azm
1,000.00	994.81	61.10	-56.98	Begin 2.00°/100' Build & Turn
2,038.63	1,980.54	349.01	-168.47	Hold 27.50° Inc, 345.27° Azm
4,918.89	4,535.43	1,635.11	-506.63	Begin 1.50°/100' Drop
6,752.02	6,299.00	2,052.42	-616.36	Begin Vertical Hold
7,807.02	7,354.00	2,052.42	-616.36	PBHL