



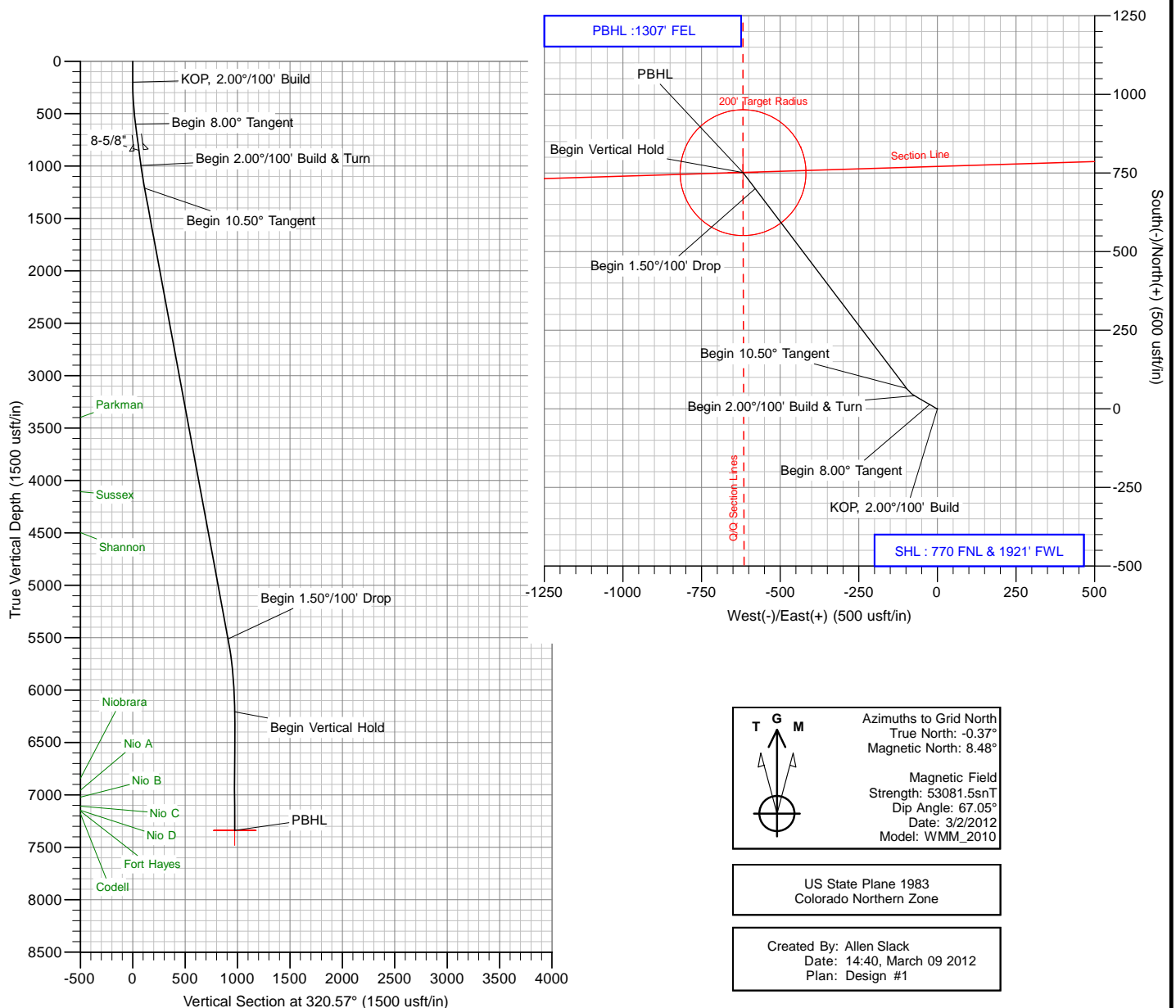
Company: Great Western  
Site: H-Y  
Well: 29-21-4  
Project: Weld County, Colorado (NAD 83)  
Rig Name: Cade 22



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	300.00	598.70	13.94	-24.14	26.10	27.88	Begin 8.00° Tangent
1000.00	8.00	300.00	994.81	41.77	-72.36	78.22	83.55	Begin 2.00°/100' Build & Turn
1219.58	10.50	322.83	1211.59	65.37	-97.69	112.53	118.48	Begin 10.50° Tangent
5592.27	10.50	322.83	5511.09	700.18	-579.00	908.56	915.13	Begin 1.50°/100' Drop
6292.08	0.00	0.00	6207.00	751.12	-617.63	972.44	979.06	Begin Vertical Hold
7424.08	0.00	0.00	7339.00	751.12	-617.63	972.44	979.06	PBHL



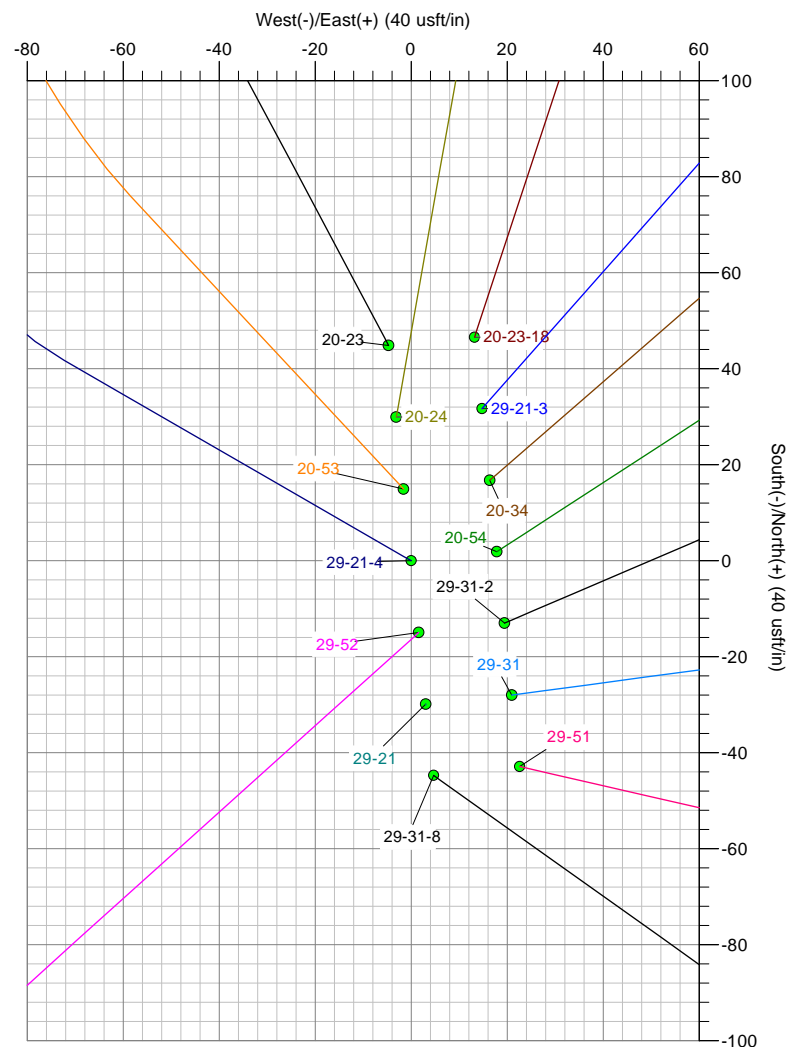
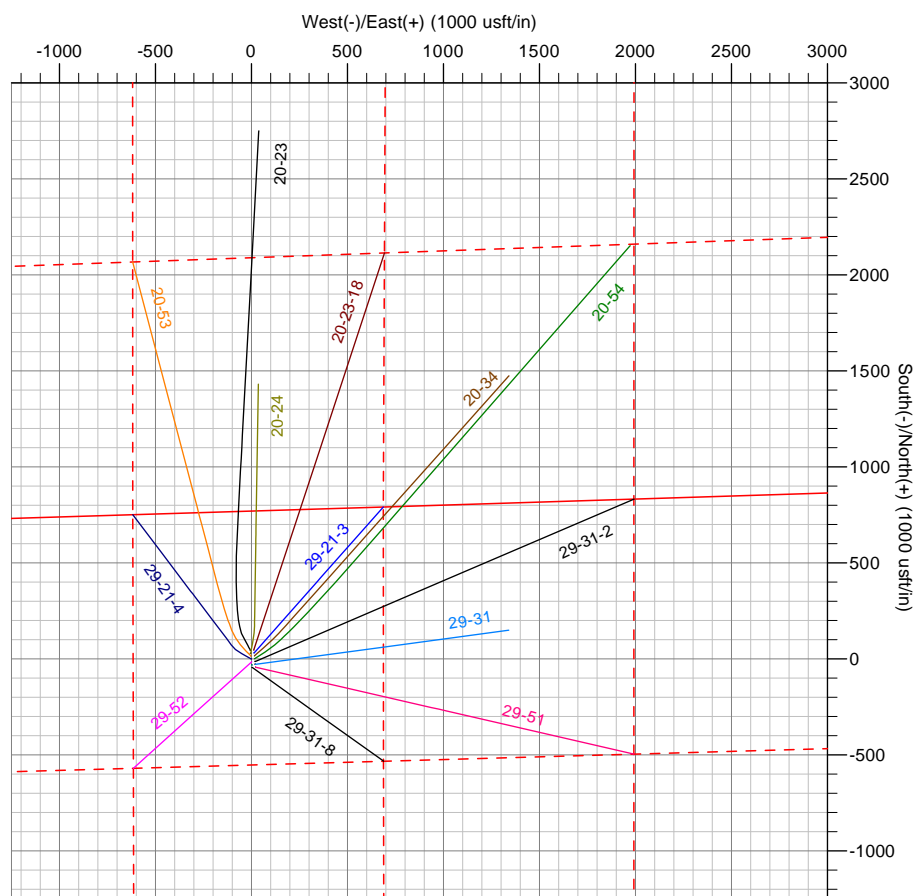
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Site: H-Y  
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# **Great Western**

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

**H-Y**

**29-21-4**

**Wellbore #1**

**Plan: Design #1**

## **Standard Planning Report**

**09 March, 2012**

<b>Database:</b>	Southern Region	<b>Local Co-ordinate Reference:</b>	Well 29-21-4
<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>	29-21-4	<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>	29-21-4			
<b>Well Position</b>	<b>+N/-S</b>	1,412,044.32 usft	<b>Northing:</b>	1,412,044.32 usft
	<b>+E/-W</b>	3,161,507.72 usft	<b>Easting:</b>	3,161,507.72 usft
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>	<b>Latitude:</b> 40° 27' 46.8441 N
				<b>Longitude:</b> 104° 55' 10.408 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	320.57

<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	300.00	598.70	13.94	-24.14	2.00	2.00	0.00	300.00	
1,000.00	8.00	300.00	994.81	41.77	-72.36	0.00	0.00	0.00	0.00	
1,219.58	10.50	322.83	1,211.59	65.37	-97.69	2.00	1.14	10.40	67.39	
5,592.27	10.50	322.83	5,511.09	700.18	-579.00	0.00	0.00	0.00	0.00	
6,292.08	0.00	0.01	6,207.00	751.12	-617.63	1.50	-1.50	0.00	180.00	
7,424.08	0.00	0.01	7,339.00	751.12	-617.63	0.00	0.00	0.00	0.00	0.00 PBHL v1 - H-Y 29-21-

<b>Database:</b>	Southern Region	<b>Local Co-ordinate Reference:</b>	Well 29-21-4
<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>	29-21-4	<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	300.00	299.98	0.87	-1.51	1.63	2.00	2.00	0.00
400.00	4.00	300.00	399.84	3.49	-6.04	6.53	2.00	2.00	0.00
500.00	6.00	300.00	499.45	7.85	-13.59	14.69	2.00	2.00	0.00
600.00	8.00	300.00	598.70	13.94	-24.14	26.10	2.00	2.00	0.00
<b>Begin 8.00° Tangent</b>									
700.00	8.00	300.00	697.73	20.90	-36.20	39.13	0.00	0.00	0.00
800.00	8.00	300.00	796.76	27.86	-48.25	52.16	0.00	0.00	0.00
853.77	8.00	300.00	850.00	31.60	-54.73	59.17	0.00	0.00	0.00
<b>8-5/8"</b>									
900.00	8.00	300.00	895.78	34.82	-60.30	65.19	0.00	0.00	0.00
1,000.00	8.00	300.00	994.81	41.77	-72.36	78.22	0.00	0.00	0.00
<b>Begin 2.00°/100' Build &amp; Turn</b>									
1,100.00	8.96	311.94	1,093.72	50.46	-84.18	92.44	2.00	0.96	11.94
1,200.00	10.22	321.27	1,192.33	62.59	-95.52	109.01	2.00	1.26	9.34
1,219.58	10.50	322.83	1,211.59	65.37	-97.69	112.53	2.00	1.40	7.95
<b>Begin 10.50° Tangent</b>									
1,300.00	10.50	322.83	1,290.66	77.04	-106.54	127.17	0.00	0.00	0.00
1,400.00	10.50	322.83	1,388.99	91.56	-117.55	145.38	0.00	0.00	0.00
1,500.00	10.50	322.83	1,487.32	106.08	-128.55	163.58	0.00	0.00	0.00
1,600.00	10.50	322.83	1,585.64	120.59	-139.56	181.79	0.00	0.00	0.00
1,700.00	10.50	322.83	1,683.97	135.11	-150.57	199.99	0.00	0.00	0.00
1,800.00	10.50	322.83	1,782.29	149.63	-161.57	218.19	0.00	0.00	0.00
1,900.00	10.50	322.83	1,880.62	164.15	-172.58	236.40	0.00	0.00	0.00
2,000.00	10.50	322.83	1,978.95	178.66	-183.59	254.60	0.00	0.00	0.00
2,100.00	10.50	322.83	2,077.27	193.18	-194.60	272.81	0.00	0.00	0.00
2,200.00	10.50	322.83	2,175.60	207.70	-205.60	291.01	0.00	0.00	0.00
2,300.00	10.50	322.83	2,273.93	222.22	-216.61	309.22	0.00	0.00	0.00
2,400.00	10.50	322.83	2,372.25	236.73	-227.62	327.42	0.00	0.00	0.00
2,500.00	10.50	322.83	2,470.58	251.25	-238.63	345.63	0.00	0.00	0.00
2,600.00	10.50	322.83	2,568.91	265.77	-249.63	363.83	0.00	0.00	0.00
2,700.00	10.50	322.83	2,667.23	280.29	-260.64	382.04	0.00	0.00	0.00
2,800.00	10.50	322.83	2,765.56	294.81	-271.65	400.24	0.00	0.00	0.00
2,900.00	10.50	322.83	2,863.89	309.32	-282.66	418.45	0.00	0.00	0.00
3,000.00	10.50	322.83	2,962.21	323.84	-293.66	436.65	0.00	0.00	0.00
3,100.00	10.50	322.83	3,060.54	338.36	-304.67	454.86	0.00	0.00	0.00
3,200.00	10.50	322.83	3,158.86	352.88	-315.68	473.06	0.00	0.00	0.00
3,300.00	10.50	322.83	3,257.19	367.39	-326.69	491.26	0.00	0.00	0.00
3,400.00	10.50	322.83	3,355.52	381.91	-337.69	509.47	0.00	0.00	0.00
3,442.19	10.50	322.83	3,397.00	388.04	-342.34	517.15	0.00	0.00	0.00
<b>Parkman</b>									
3,500.00	10.50	322.83	3,453.84	396.43	-348.70	527.67	0.00	0.00	0.00
3,600.00	10.50	322.83	3,552.17	410.95	-359.71	545.88	0.00	0.00	0.00
3,700.00	10.50	322.83	3,650.50	425.46	-370.71	564.08	0.00	0.00	0.00
3,800.00	10.50	322.83	3,748.82	439.98	-381.72	582.29	0.00	0.00	0.00
3,900.00	10.50	322.83	3,847.15	454.50	-392.73	600.49	0.00	0.00	0.00
4,000.00	10.50	322.83	3,945.48	469.02	-403.74	618.70	0.00	0.00	0.00
4,100.00	10.50	322.83	4,043.80	483.54	-414.74	636.90	0.00	0.00	0.00
4,164.27	10.50	322.83	4,107.00	492.87	-421.82	648.60	0.00	0.00	0.00
<b>Sussex</b>									

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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>	29-21-4	<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	10.50	322.83	4,142.13	498.05	-425.75	655.11	0.00	0.00	0.00
4,300.00	10.50	322.83	4,240.45	512.57	-436.76	673.31	0.00	0.00	0.00
4,400.00	10.50	322.83	4,338.78	527.09	-447.77	691.52	0.00	0.00	0.00
4,500.00	10.50	322.83	4,437.11	541.61	-458.77	709.72	0.00	0.00	0.00
4,560.91	10.50	322.83	4,497.00	550.45	-465.48	720.81	0.00	0.00	0.00
<b>Shannon</b>									
4,600.00	10.50	322.83	4,535.43	556.12	-469.78	727.92	0.00	0.00	0.00
4,700.00	10.50	322.83	4,633.76	570.64	-480.79	746.13	0.00	0.00	0.00
4,800.00	10.50	322.83	4,732.09	585.16	-491.80	764.33	0.00	0.00	0.00
4,900.00	10.50	322.83	4,830.41	599.68	-502.80	782.54	0.00	0.00	0.00
5,000.00	10.50	322.83	4,928.74	614.19	-513.81	800.74	0.00	0.00	0.00
5,100.00	10.50	322.83	5,027.07	628.71	-524.82	818.95	0.00	0.00	0.00
5,200.00	10.50	322.83	5,125.39	643.23	-535.83	837.15	0.00	0.00	0.00
5,300.00	10.50	322.83	5,223.72	657.75	-546.83	855.36	0.00	0.00	0.00
5,400.00	10.50	322.83	5,322.04	672.27	-557.84	873.56	0.00	0.00	0.00
5,500.00	10.50	322.83	5,420.37	686.78	-568.85	891.77	0.00	0.00	0.00
5,592.27	10.50	322.83	5,511.09	700.18	-579.00	908.56	0.00	0.00	0.00
<b>Begin 1.50°/100' Drop</b>									
5,600.00	10.38	322.83	5,518.70	701.29	-579.85	909.96	1.50	-1.50	0.00
5,700.00	8.88	322.83	5,617.29	714.63	-589.96	926.68	1.50	-1.50	0.00
5,800.00	7.38	322.83	5,716.28	725.90	-598.50	940.81	1.50	-1.50	0.00
5,900.00	5.88	322.83	5,815.61	735.10	-605.48	952.35	1.50	-1.50	0.00
6,000.00	4.38	322.83	5,915.20	742.22	-610.88	961.29	1.50	-1.50	0.00
6,100.00	2.88	322.83	6,015.00	747.27	-614.71	967.62	1.50	-1.50	0.00
6,200.00	1.38	322.83	6,114.93	750.23	-616.96	971.33	1.50	-1.50	0.00
6,292.08	0.00	0.01	6,207.00	751.12	-617.63	972.44	1.50	-1.50	0.00
<b>Begin Vertical Hold</b>									
6,300.00	0.00	0.01	6,214.92	751.12	-617.63	972.44	0.00	0.00	0.00
6,400.00	0.00	0.01	6,314.92	751.12	-617.63	972.44	0.00	0.00	0.00
6,500.00	0.00	0.01	6,414.92	751.12	-617.63	972.44	0.00	0.00	0.00
6,600.00	0.00	0.01	6,514.92	751.12	-617.63	972.44	0.00	0.00	0.00
6,700.00	0.00	0.01	6,614.92	751.12	-617.63	972.44	0.00	0.00	0.00
6,800.00	0.00	0.01	6,714.92	751.12	-617.63	972.44	0.00	0.00	0.00
6,900.00	0.00	0.01	6,814.92	751.12	-617.63	972.44	0.00	0.00	0.00
6,925.08	0.00	0.01	6,840.00	751.12	-617.63	972.44	0.00	0.00	0.00
<b>Niobrara</b>									
7,000.00	0.00	0.01	6,914.92	751.12	-617.63	972.44	0.00	0.00	0.00
7,039.08	0.00	0.01	6,954.00	751.12	-617.63	972.44	0.00	0.00	0.00
<b>Nio A</b>									
7,100.00	0.00	0.01	7,014.92	751.12	-617.63	972.44	0.00	0.00	0.00
7,105.08	0.00	0.01	7,020.00	751.12	-617.63	972.44	0.00	0.00	0.00
<b>Nio B</b>									
7,192.08	0.00	0.01	7,107.00	751.12	-617.63	972.44	0.00	0.00	0.00
<b>Nio C</b>									
7,200.00	0.00	0.01	7,114.92	751.12	-617.63	972.44	0.00	0.00	0.00
7,232.08	0.00	0.01	7,147.00	751.12	-617.63	972.44	0.00	0.00	0.00
<b>Nio D</b>									
7,239.08	0.00	0.01	7,154.00	751.12	-617.63	972.44	0.00	0.00	0.00
<b>Fort Hayes</b>									
7,264.08	0.00	0.01	7,179.00	751.12	-617.63	972.44	0.00	0.00	0.00
<b>Codell</b>									
7,300.00	0.00	0.01	7,214.92	751.12	-617.63	972.44	0.00	0.00	0.00
7,400.00	0.00	0.01	7,314.92	751.12	-617.63	972.44	0.00	0.00	0.00

<b>Database:</b>	Southern Region	<b>Local Co-ordinate Reference:</b>	Well 29-21-4
<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>	29-21-4	<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)
7,424.08	0.00	0.01	7,339.00	751.12	-617.63	972.44	0.00	0.00	0.00
PBHL									

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 29-21-4	0.00	0.01	7,339.00	751.12	-617.63	1,412,795.44	3,160,890.10	40° 27' 54.3063 N	104° 55' 18.336 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 (°)	
3,442.19	3,397.00	Parkman		0.00		
4,164.27	4,107.00	Sussex		0.00		
4,560.91	4,497.00	Shannon		0.00		
6,925.08	6,840.00	Niobrara		0.00		
7,039.08	6,954.00	Nio A		0.00		
7,105.08	7,020.00	Nio B		0.00		
7,192.08	7,107.00	Nio C		0.00		
7,232.08	7,147.00	Nio D		0.00		
7,239.08	7,154.00	Fort Hayes		0.00		
7,264.08	7,179.00	Codell		0.00		

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment	
200.00	200.00	0.00	0.00	KOP, 2.00°/100' Build	
600.00	598.70	13.94	-24.14	Begin 8.00° Tangent	
1,000.00	994.81	41.77	-72.36	Begin 2.00°/100' Build & Turn	
1,219.58	1,211.59	65.37	-97.69	Begin 10.50° Tangent	
5,592.27	5,511.09	700.18	-579.00	Begin 1.50°/100' Drop	
6,292.08	6,207.00	751.12	-617.63	Begin Vertical Hold	
7,424.08	7,339.00	751.12	-617.63	PBHL	