



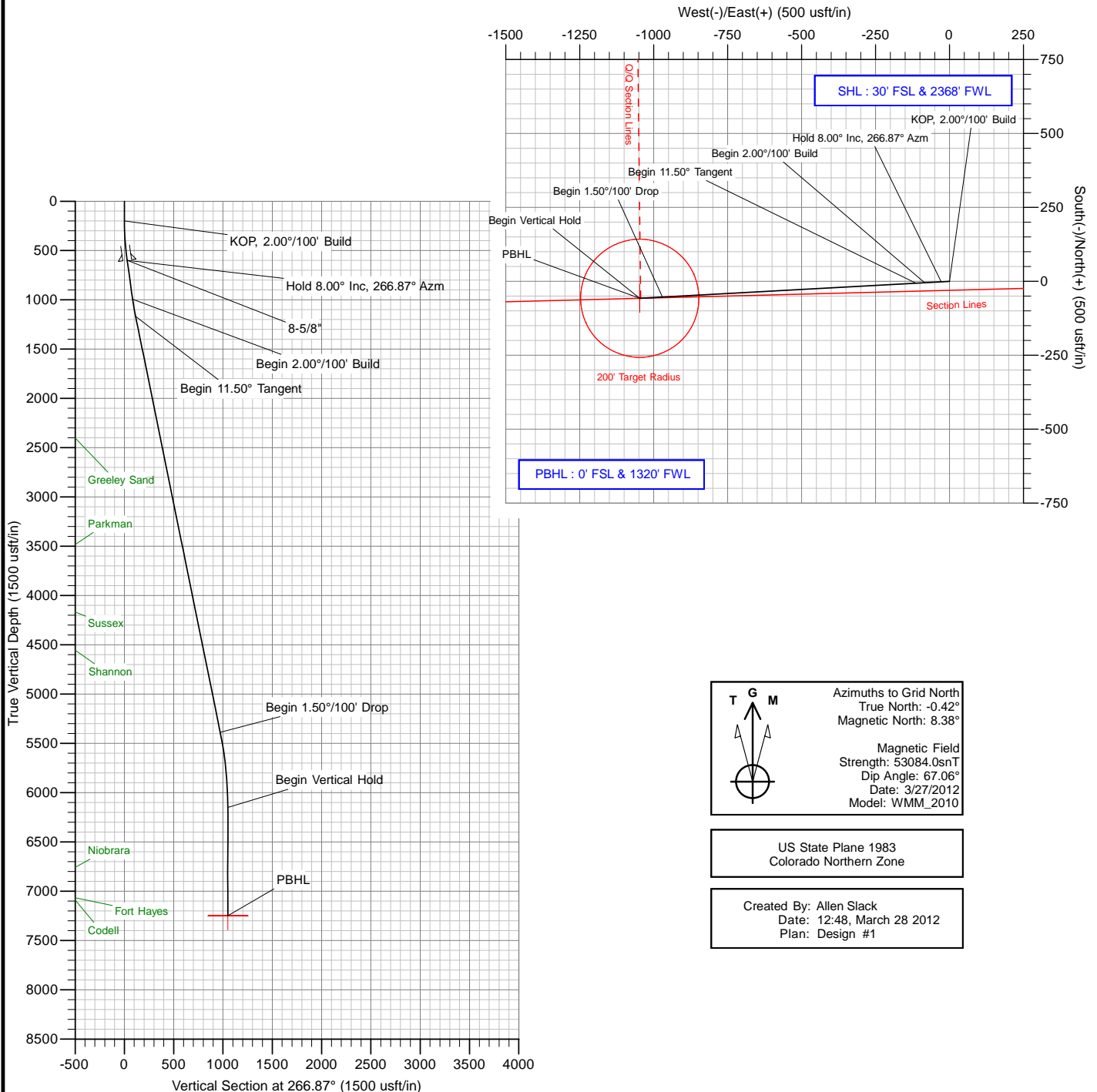
Company: Great Western  
Site: HCW FD  
Well: 24-35D  
Project: Weld County, Colorado (NAD 83)  
Rig Name: Cade 22



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	266.87	598.70	-1.52	-27.84	27.88	27.88	Hold 8.00° Inc, 266.87° Azm
1000.00	8.00	266.87	994.81	-4.56	-83.42	83.55	83.55	Begin 2.00°/100' Build
1174.92	11.50	266.87	1167.17	-6.18	-113.00	113.16	113.16	Begin 11.50° Tangent
5481.76	11.50	266.87	5387.58	-53.06	-970.24	971.69	971.69	Begin 1.50°/100' Drop
6248.32	0.00	0.00	6149.00	-57.24	-1046.78	1048.35	1048.35	Begin Vertical Hold
7348.32	0.00	0.00	7249.00	-57.24	-1046.78	1048.35	1048.35	PBHL



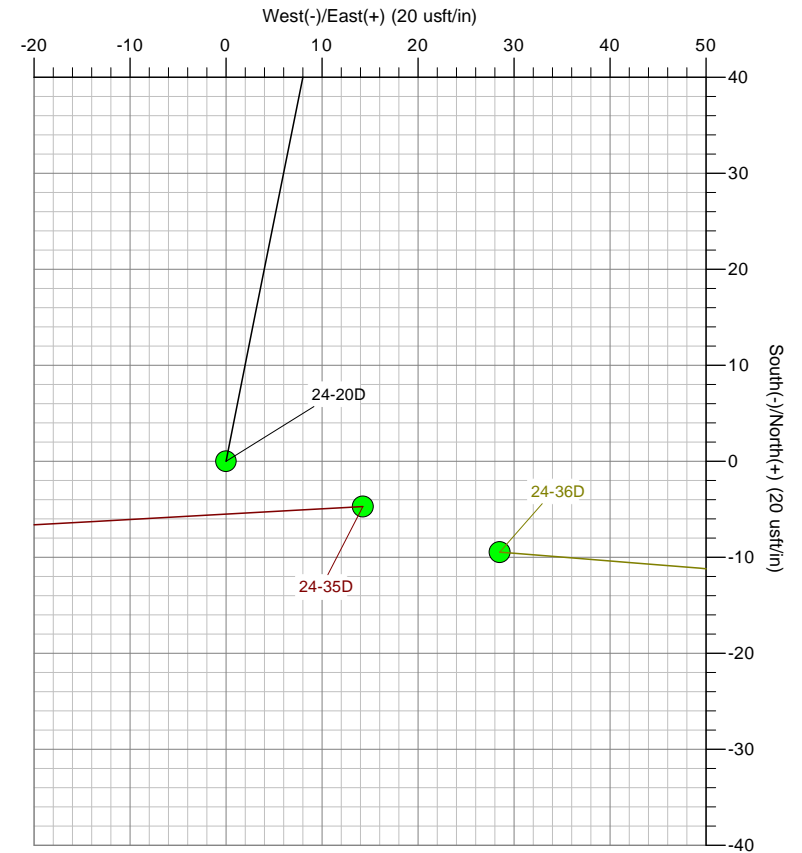
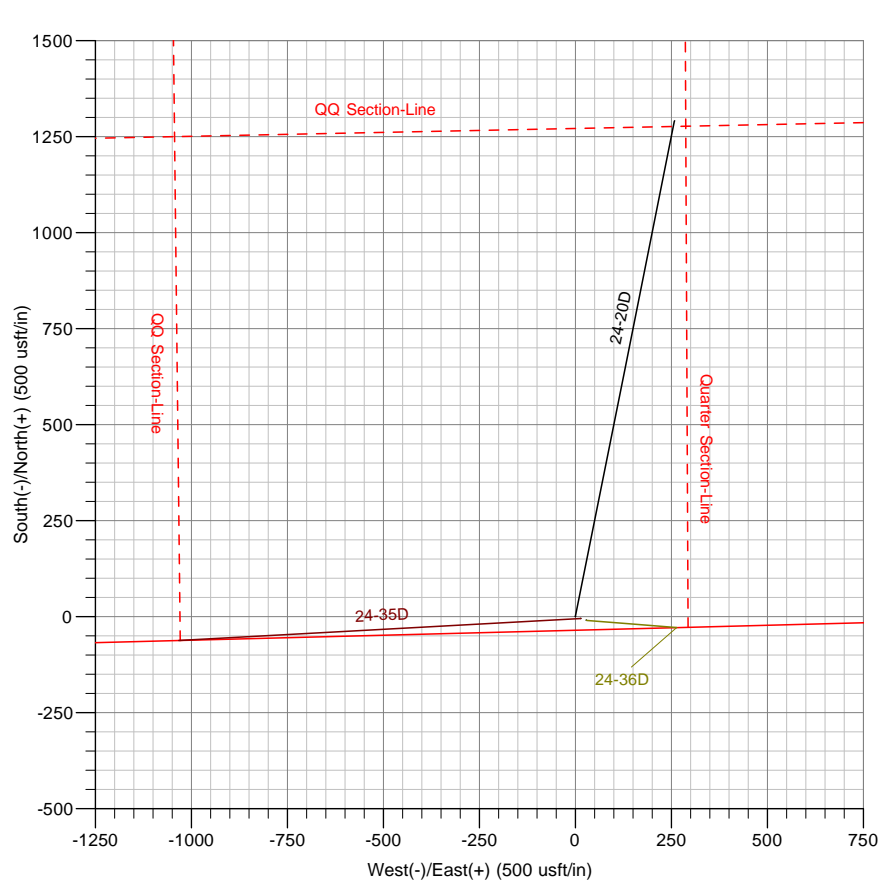
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Company: Great Western  
Site: HCW FD  
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# **Great Western**

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

**HCW FD**

**24-35D**

**Wellbore #1**

**Plan: Design #1**

## **Standard Planning Report**

**28 March, 2012**

<b>Database:</b>	Southern Region	<b>Local Co-ordinate Reference:</b>	Well 24-35D
<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>	HCW FD	<b>North Reference:</b>	Grid
<b>Well:</b>	24-35D	<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>	24-35D			
<b>Well Position</b>	<b>+N/-S</b>	1,413,051.99 usft	<b>Northing:</b>	1,413,051.99 usft
	<b>+E/-W</b>	3,182,831.10 usft	<b>Easting:</b>	3,182,831.10 usft
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>	
			<b>Latitude:</b>	40° 27' 55.3312 N
			<b>Longitude:</b>	104° 50' 34.439 W
			<b>Ground Level:</b>	4,744.00 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	3/27/2012	8.80	67.06	53,084

<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	266.87

<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	266.87	598.70	-1.52	-27.84	2.00	2.00	0.00	266.87	PBHL v1 - HCW FC
1,000.00	8.00	266.87	994.81	-4.56	-83.42	0.00	0.00	0.00	0.00	
1,174.92	11.50	266.87	1,167.17	-6.18	-113.00	2.00	2.00	0.00	0.00	
5,481.76	11.50	266.87	5,387.58	-53.06	-970.24	0.00	0.00	0.00	0.00	
6,248.32	0.00	0.00	6,149.00	-57.24	-1,046.78	1.50	-1.50	0.00	180.00	
7,348.32	0.00	0.00	7,249.00	-57.24	-1,046.78	0.00	0.00	0.00	0.00	PBHL v1 - HCW FC

<b>Database:</b>	Southern Region	<b>Local Co-ordinate Reference:</b>	Well 24-35D
<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>	HCW FD	<b>North Reference:</b>	Grid
<b>Well:</b>	24-35D	<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	266.87	299.98	-0.10	-1.74	1.75	2.00	2.00	0.00
400.00	4.00	266.87	399.84	-0.38	-6.97	6.98	2.00	2.00	0.00
500.00	6.00	266.87	499.45	-0.86	-15.67	15.69	2.00	2.00	0.00
600.00	8.00	266.87	598.70	-1.52	-27.84	27.88	2.00	2.00	0.00
<b>Hold 8.00° Inc, 266.87° Azm</b>									
601.31	8.00	266.87	600.00	-1.53	-28.02	28.06	0.00	0.00	0.00
<b>8-5/8"</b>									
700.00	8.00	266.87	697.73	-2.28	-41.73	41.80	0.00	0.00	0.00
800.00	8.00	266.87	796.76	-3.04	-55.63	55.71	0.00	0.00	0.00
900.00	8.00	266.87	895.78	-3.80	-69.53	69.63	0.00	0.00	0.00
1,000.00	8.00	266.87	994.81	-4.56	-83.42	83.55	0.00	0.00	0.00
<b>Begin 2.00°/100' Build</b>									
1,100.00	10.00	266.87	1,093.57	-5.42	-99.04	99.19	2.00	2.00	0.00
1,174.92	11.50	266.87	1,167.17	-6.18	-113.00	113.16	2.00	2.00	0.00
<b>Begin 11.50° Tangent</b>									
1,200.00	11.50	266.87	1,191.75	-6.45	-117.99	118.16	0.00	0.00	0.00
1,300.00	11.50	266.87	1,289.75	-7.54	-137.89	138.10	0.00	0.00	0.00
1,400.00	11.50	266.87	1,387.74	-8.63	-157.80	158.03	0.00	0.00	0.00
1,500.00	11.50	266.87	1,485.73	-9.72	-177.70	177.97	0.00	0.00	0.00
1,600.00	11.50	266.87	1,583.72	-10.81	-197.60	197.90	0.00	0.00	0.00
1,700.00	11.50	266.87	1,681.72	-11.89	-217.51	217.83	0.00	0.00	0.00
1,800.00	11.50	266.87	1,779.71	-12.98	-237.41	237.77	0.00	0.00	0.00
1,900.00	11.50	266.87	1,877.70	-14.07	-257.32	257.70	0.00	0.00	0.00
2,000.00	11.50	266.87	1,975.70	-15.16	-277.22	277.64	0.00	0.00	0.00
2,100.00	11.50	266.87	2,073.69	-16.25	-297.13	297.57	0.00	0.00	0.00
2,200.00	11.50	266.87	2,171.68	-17.34	-317.03	317.50	0.00	0.00	0.00
2,300.00	11.50	266.87	2,269.68	-18.43	-336.93	337.44	0.00	0.00	0.00
2,400.00	11.50	266.87	2,367.67	-19.51	-356.84	357.37	0.00	0.00	0.00
2,435.03	11.50	266.87	2,402.00	-19.90	-363.81	364.36	0.00	0.00	0.00
<b>Greeley Sand</b>									
2,500.00	11.50	266.87	2,465.66	-20.60	-376.74	377.31	0.00	0.00	0.00
2,600.00	11.50	266.87	2,563.66	-21.69	-396.65	397.24	0.00	0.00	0.00
2,700.00	11.50	266.87	2,661.65	-22.78	-416.55	417.17	0.00	0.00	0.00
2,800.00	11.50	266.87	2,759.64	-23.87	-436.46	437.11	0.00	0.00	0.00
2,900.00	11.50	266.87	2,857.63	-24.96	-456.36	457.04	0.00	0.00	0.00
3,000.00	11.50	266.87	2,955.63	-26.04	-476.26	476.98	0.00	0.00	0.00
3,100.00	11.50	266.87	3,053.62	-27.13	-496.17	496.91	0.00	0.00	0.00
3,200.00	11.50	266.87	3,151.61	-28.22	-516.07	516.84	0.00	0.00	0.00
3,300.00	11.50	266.87	3,249.61	-29.31	-535.98	536.78	0.00	0.00	0.00
3,400.00	11.50	266.87	3,347.60	-30.40	-555.88	556.71	0.00	0.00	0.00
3,500.00	11.50	266.87	3,445.59	-31.49	-575.79	576.65	0.00	0.00	0.00
3,537.15	11.50	266.87	3,482.00	-31.89	-583.18	584.05	0.00	0.00	0.00
<b>Parkman</b>									
3,600.00	11.50	266.87	3,543.59	-32.58	-595.69	596.58	0.00	0.00	0.00
3,700.00	11.50	266.87	3,641.58	-33.66	-615.59	616.51	0.00	0.00	0.00
3,800.00	11.50	266.87	3,739.57	-34.75	-635.50	636.45	0.00	0.00	0.00
3,900.00	11.50	266.87	3,837.56	-35.84	-655.40	656.38	0.00	0.00	0.00
4,000.00	11.50	266.87	3,935.56	-36.93	-675.31	676.32	0.00	0.00	0.00
4,100.00	11.50	266.87	4,033.55	-38.02	-695.21	696.25	0.00	0.00	0.00

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<b>Site:</b>	HCW FD	<b>North Reference:</b>	Grid
<b>Well:</b>	24-35D	<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	11.50	266.87	4,131.54	-39.11	-715.11	716.18	0.00	0.00	0.00
4,237.20	11.50	266.87	4,168.00	-39.51	-722.52	723.60	0.00	0.00	0.00
<b>Sussex</b>									
4,300.00	11.50	266.87	4,229.54	-40.19	-735.02	736.12	0.00	0.00	0.00
4,400.00	11.50	266.87	4,327.53	-41.28	-754.92	756.05	0.00	0.00	0.00
4,500.00	11.50	266.87	4,425.52	-42.37	-774.83	775.98	0.00	0.00	0.00
4,600.00	11.50	266.87	4,523.52	-43.46	-794.73	795.92	0.00	0.00	0.00
4,631.11	11.50	266.87	4,554.00	-43.80	-800.92	802.12	0.00	0.00	0.00
<b>Shannon</b>									
4,700.00	11.50	266.87	4,621.51	-44.55	-814.64	815.85	0.00	0.00	0.00
4,800.00	11.50	266.87	4,719.50	-45.64	-834.54	835.79	0.00	0.00	0.00
4,900.00	11.50	266.87	4,817.50	-46.73	-854.44	855.72	0.00	0.00	0.00
5,000.00	11.50	266.87	4,915.49	-47.81	-874.35	875.65	0.00	0.00	0.00
5,100.00	11.50	266.87	5,013.48	-48.90	-894.25	895.59	0.00	0.00	0.00
5,200.00	11.50	266.87	5,111.47	-49.99	-914.16	915.52	0.00	0.00	0.00
5,300.00	11.50	266.87	5,209.47	-51.08	-934.06	935.46	0.00	0.00	0.00
5,400.00	11.50	266.87	5,307.46	-52.17	-953.97	955.39	0.00	0.00	0.00
5,481.76	11.50	266.87	5,387.58	-53.06	-970.24	971.69	0.00	0.00	0.00
<b>Begin 1.50°/100' Drop</b>									
5,500.00	11.22	266.87	5,405.46	-53.25	-973.83	975.28	1.50	-1.50	0.00
5,600.00	9.72	266.87	5,503.79	-54.25	-991.98	993.46	1.50	-1.50	0.00
5,700.00	8.22	266.87	5,602.57	-55.10	-1,007.56	1,009.06	1.50	-1.50	0.00
5,800.00	6.72	266.87	5,701.71	-55.81	-1,020.54	1,022.07	1.50	-1.50	0.00
5,900.00	5.22	266.87	5,801.17	-56.38	-1,030.94	1,032.48	1.50	-1.50	0.00
6,000.00	3.72	266.87	5,900.86	-56.80	-1,038.73	1,040.28	1.50	-1.50	0.00
6,100.00	2.22	266.87	6,000.72	-57.09	-1,043.91	1,045.47	1.50	-1.50	0.00
6,200.00	0.72	266.87	6,100.69	-57.23	-1,046.48	1,048.04	1.50	-1.50	0.00
6,248.32	0.00	0.00	6,149.00	-57.24	-1,046.78	1,048.35	1.50	-1.50	0.00
<b>Begin Vertical Hold</b>									
6,300.00	0.00	0.00	6,200.68	-57.24	-1,046.78	1,048.35	0.00	0.00	0.00
6,400.00	0.00	0.00	6,300.68	-57.24	-1,046.78	1,048.35	0.00	0.00	0.00
6,500.00	0.00	0.00	6,400.68	-57.24	-1,046.78	1,048.35	0.00	0.00	0.00
6,600.00	0.00	0.00	6,500.68	-57.24	-1,046.78	1,048.35	0.00	0.00	0.00
6,700.00	0.00	0.00	6,600.68	-57.24	-1,046.78	1,048.35	0.00	0.00	0.00
6,800.00	0.00	0.00	6,700.68	-57.24	-1,046.78	1,048.35	0.00	0.00	0.00
6,856.32	0.00	0.00	6,757.00	-57.24	-1,046.78	1,048.35	0.00	0.00	0.00
<b>Niobrara</b>									
6,900.00	0.00	0.00	6,800.68	-57.24	-1,046.78	1,048.35	0.00	0.00	0.00
7,000.00	0.00	0.00	6,900.68	-57.24	-1,046.78	1,048.35	0.00	0.00	0.00
7,100.00	0.00	0.00	7,000.68	-57.24	-1,046.78	1,048.35	0.00	0.00	0.00
7,165.32	0.00	0.00	7,066.00	-57.24	-1,046.78	1,048.35	0.00	0.00	0.00
<b>Fort Hayes</b>									
7,188.32	0.00	0.00	7,089.00	-57.24	-1,046.78	1,048.35	0.00	0.00	0.00
<b>Codell</b>									
7,200.00	0.00	0.00	7,100.68	-57.24	-1,046.78	1,048.35	0.00	0.00	0.00
7,300.00	0.00	0.00	7,200.68	-57.24	-1,046.78	1,048.35	0.00	0.00	0.00
7,348.32	0.00	0.00	7,249.00	-57.24	-1,046.78	1,048.35	0.00	0.00	0.00
<b>PBHL</b>									

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<b>Site:</b>	HCW FD	<b>North Reference:</b>	Grid
<b>Well:</b>	24-35D	<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 - HCW FD 2 - hit/miss target - Shape - plan hits target center - Circle (radius 200.00)	0.00	0.00	7,249.00	-57.24	-1,046.78	1,412,994.75	3,181,784.32	40° 27' 54.8420 N	104° 50' 47.988 W

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
601.31	600.00	8-5/8"	8-5/8	12-1/4	

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
2,435.03	2,402.00	Greeley Sand		0.00		
3,537.15	3,482.00	Parkman		0.00		
4,237.20	4,168.00	Sussex		0.00		
4,631.11	4,554.00	Shannon		0.00		
6,856.32	6,757.00	Niobrara		0.00		
7,165.32	7,066.00	Fort Hayes		0.00		
7,188.32	7,089.00	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	-1.52	-27.84	Hold 8.00° Inc, 266.87° Azm	
1,000.00	994.81	-4.56	-83.42	Begin 2.00°/100' Build	
1,174.92	1,167.17	-6.18	-113.00	Begin 11.50° Tangent	
5,481.76	5,387.58	-53.06	-970.24	Begin 1.50°/100' Drop	
6,248.32	6,149.00	-57.24	-1,046.78	Begin Vertical Hold	
7,348.32	7,249.00	-57.24	-1,046.78	PBHL	