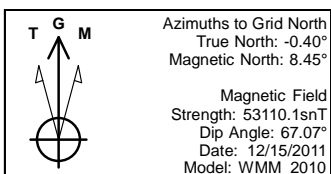
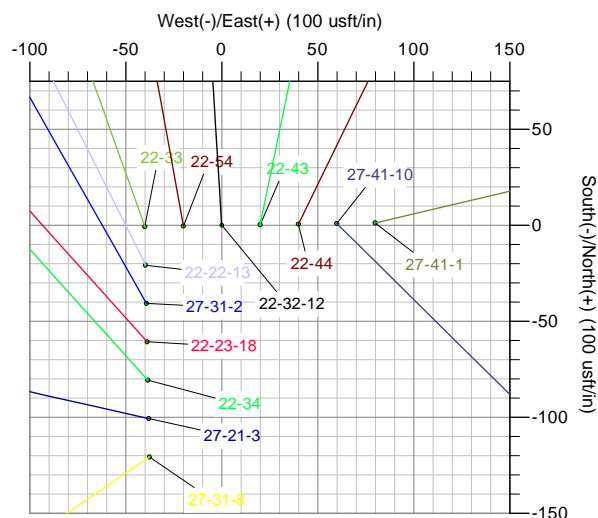
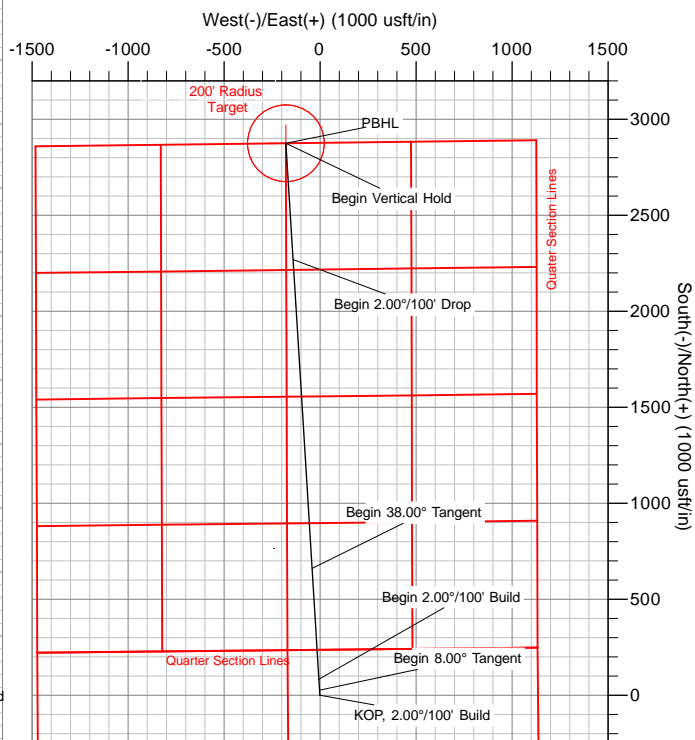
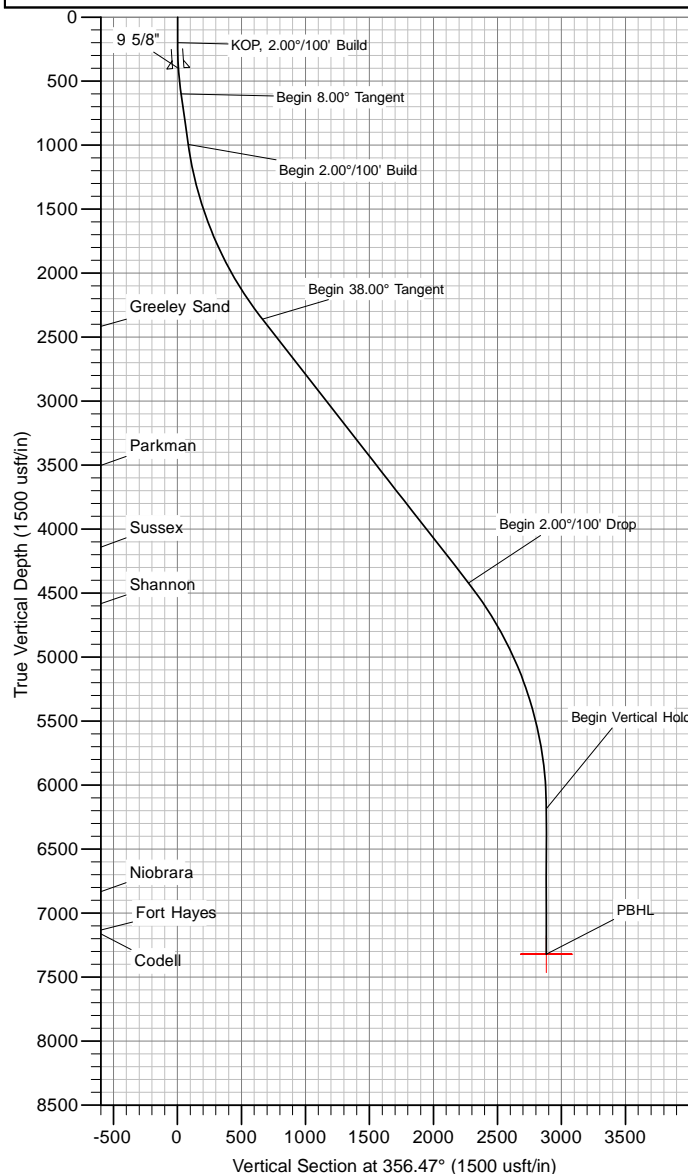


## ANNOTATIONS

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	356.47	598.70	27.83	-1.72	27.88	27.88	Begin 8.00° Tangent
1000.00	8.00	356.47	994.81	83.39	-5.14	83.55	83.55	Begin 2.00°/100' Build
2500.24	38.00	356.47	2360.04	661.87	-40.82	663.12	663.12	Begin 38.00° Tangent
5115.90	38.00	356.47	4421.07	2269.35	-139.95	2273.66	2273.66	Begin 2.00°/100' Drop
7016.14	0.00	0.00	6185.00	2875.65	-177.34	2881.11	2881.11	Begin Vertical Hold
8152.14	0.00	0.00	7321.00	2875.65	-177.34	2881.11	2881.11	PBHL



Created By: Marcus Mitcham  
 Date: 12:40, December 22 2011  
 Plan: Design #1

US State Plane 1983  
 Colorado Northern Zone

# **Great Western**

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

**Diamond Valley**

**22-32-12**

**Wellbore #1**

**Plan: Design #1**

## **Standard Planning Report**

**22 December, 2011**

<b>Database:</b>	Local DB	<b>Local Co-ordinate Reference:</b>	Well 22-32-12
<b>Company:</b>	Great Western	<b>TVD Reference:</b>	WELL @ 4781.00usft (Cade 22)
<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>MD Reference:</b>	WELL @ 4781.00usft (Cade 22)
<b>Site:</b>	Diamond Valley	<b>North Reference:</b>	Grid
<b>Well:</b>	22-32-12	<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>	22-32-12			
<b>Well Position</b>	<b>+N/-S</b>	1,412,687.69 usft	<b>Northing:</b>	1,412,687.69 usft
	<b>+E/-W</b>	3,174,053.27 usft	<b>Easting:</b>	3,174,053.27 usft
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>	<b>Latitude:</b> 40° 27' 52.359 N
				<b>Longitude:</b> 104° 52' 28.040 W
				<b>Ground Level:</b> 4,767.00 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	12/15/2011	8.86	67.07	53,110

<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	356.47

<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	356.47	598.70	27.83	-1.72	2.00	2.00	0.00	356.47	PBHL v1 Diamond - 2
1,000.00	8.00	356.47	994.81	83.39	-5.14	0.00	0.00	0.00	0.00	
2,500.24	38.00	356.47	2,360.04	661.87	-40.82	2.00	2.00	0.00	0.00	
5,115.90	38.00	356.47	4,421.07	2,269.35	-139.95	0.00	0.00	0.00	0.00	
7,016.14	0.00	0.00	6,185.00	2,875.65	-177.34	2.00	-2.00	0.00	180.00	
8,152.14	0.00	0.00	7,321.00	2,875.65	-177.34	0.00	0.00	0.00	0.00	PBHL v1 Diamond - 2

<b>Database:</b>	Local DB	<b>Local Co-ordinate Reference:</b>	Well 22-32-12
<b>Company:</b>	Great Western	<b>TVD Reference:</b>	WELL @ 4781.00usft (Cade 22)
<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>MD Reference:</b>	WELL @ 4781.00usft (Cade 22)
<b>Site:</b>	Diamond Valley	<b>North Reference:</b>	Grid
<b>Well:</b>	22-32-12	<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	356.47	299.98	1.74	-0.11	1.75	2.00	2.00	0.00
400.00	4.00	356.47	399.84	6.97	-0.43	6.98	2.00	2.00	0.00
<b>9 5/8"</b>									
500.00	6.00	356.47	499.45	15.66	-0.97	15.69	2.00	2.00	0.00
600.00	8.00	356.47	598.70	27.83	-1.72	27.88	2.00	2.00	0.00
<b>Begin 8.00° Tangent</b>									
700.00	8.00	356.47	697.73	41.72	-2.57	41.80	0.00	0.00	0.00
800.00	8.00	356.47	796.76	55.61	-3.43	55.71	0.00	0.00	0.00
900.00	8.00	356.47	895.78	69.50	-4.29	69.63	0.00	0.00	0.00
1,000.00	8.00	356.47	994.81	83.39	-5.14	83.55	0.00	0.00	0.00
<b>Begin 2.00°/100' Build</b>									
1,100.00	10.00	356.47	1,093.57	99.00	-6.11	99.19	2.00	2.00	0.00
1,200.00	12.00	356.47	1,191.73	118.05	-7.28	118.27	2.00	2.00	0.00
1,300.00	14.00	356.47	1,289.16	140.50	-8.66	140.77	2.00	2.00	0.00
1,400.00	16.00	356.47	1,385.75	166.33	-10.26	166.65	2.00	2.00	0.00
1,500.00	18.00	356.47	1,481.38	195.51	-12.06	195.88	2.00	2.00	0.00
1,600.00	20.00	356.47	1,575.92	228.00	-14.06	228.44	2.00	2.00	0.00
1,700.00	22.00	356.47	1,669.28	263.77	-16.27	264.27	2.00	2.00	0.00
1,800.00	24.00	356.47	1,761.32	302.77	-18.67	303.34	2.00	2.00	0.00
1,900.00	26.00	356.47	1,851.95	344.95	-21.27	345.60	2.00	2.00	0.00
2,000.00	28.00	356.47	1,941.04	390.26	-24.07	391.00	2.00	2.00	0.00
2,100.00	30.00	356.47	2,028.50	438.64	-27.05	439.48	2.00	2.00	0.00
2,200.00	32.00	356.47	2,114.21	490.05	-30.22	490.98	2.00	2.00	0.00
2,300.00	34.00	356.47	2,198.08	544.41	-33.57	545.44	2.00	2.00	0.00
2,400.00	36.00	356.47	2,279.99	601.65	-37.10	602.80	2.00	2.00	0.00
2,500.24	38.00	356.47	2,360.04	661.87	-40.82	663.12	2.00	2.00	0.00
<b>Begin 38.00° Tangent</b>									
2,571.26	38.00	356.47	2,416.00	705.51	-43.51	706.85	0.00	0.00	0.00
<b>Greeley Sand</b>									
2,600.00	38.00	356.47	2,438.64	723.17	-44.60	724.55	0.00	0.00	0.00
2,700.00	38.00	356.47	2,517.44	784.63	-48.39	786.12	0.00	0.00	0.00
2,800.00	38.00	356.47	2,596.23	846.08	-52.18	847.69	0.00	0.00	0.00
2,900.00	38.00	356.47	2,675.03	907.54	-55.97	909.27	0.00	0.00	0.00
3,000.00	38.00	356.47	2,753.83	969.00	-59.76	970.84	0.00	0.00	0.00
3,100.00	38.00	356.47	2,832.62	1,030.45	-63.55	1,032.41	0.00	0.00	0.00
3,200.00	38.00	356.47	2,911.42	1,091.91	-67.34	1,093.98	0.00	0.00	0.00
3,300.00	38.00	356.47	2,990.21	1,153.37	-71.13	1,155.56	0.00	0.00	0.00
3,400.00	38.00	356.47	3,069.01	1,214.82	-74.92	1,217.13	0.00	0.00	0.00
3,500.00	38.00	356.47	3,147.81	1,276.28	-78.71	1,278.70	0.00	0.00	0.00
3,600.00	38.00	356.47	3,226.60	1,337.73	-82.50	1,340.28	0.00	0.00	0.00
3,700.00	38.00	356.47	3,305.40	1,399.19	-86.29	1,401.85	0.00	0.00	0.00
3,800.00	38.00	356.47	3,384.19	1,460.65	-90.08	1,463.42	0.00	0.00	0.00
3,900.00	38.00	356.47	3,462.99	1,522.10	-93.87	1,524.99	0.00	0.00	0.00
3,948.24	38.00	356.47	3,501.00	1,551.75	-95.70	1,554.70	0.00	0.00	0.00
<b>Parkman</b>									
4,000.00	38.00	356.47	3,541.78	1,583.56	-97.66	1,586.57	0.00	0.00	0.00
4,100.00	38.00	356.47	3,620.58	1,645.01	-101.45	1,648.14	0.00	0.00	0.00
4,200.00	38.00	356.47	3,699.38	1,706.47	-105.24	1,709.71	0.00	0.00	0.00
4,300.00	38.00	356.47	3,778.17	1,767.93	-109.03	1,771.29	0.00	0.00	0.00

<b>Database:</b>	Local DB	<b>Local Co-ordinate Reference:</b>	Well 22-32-12
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<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>MD Reference:</b>	WELL @ 4781.00usft (Cade 22)
<b>Site:</b>	Diamond Valley	<b>North Reference:</b>	Grid
<b>Well:</b>	22-32-12	<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	38.00	356.47	3,856.97	1,829.38	-112.82	1,832.86	0.00	0.00	0.00	
4,500.00	38.00	356.47	3,935.76	1,890.84	-116.61	1,894.43	0.00	0.00	0.00	
4,600.00	38.00	356.47	4,014.56	1,952.30	-120.40	1,956.00	0.00	0.00	0.00	
4,700.00	38.00	356.47	4,093.36	2,013.75	-124.19	2,017.58	0.00	0.00	0.00	
4,760.47	38.00	356.47	4,141.00	2,050.91	-126.48	2,054.81	0.00	0.00	0.00	
Sussex										
4,800.00	38.00	356.47	4,172.15	2,075.21	-127.98	2,079.15	0.00	0.00	0.00	
4,900.00	38.00	356.47	4,250.95	2,136.66	-131.77	2,140.72	0.00	0.00	0.00	
5,000.00	38.00	356.47	4,329.74	2,198.12	-135.56	2,202.30	0.00	0.00	0.00	
5,100.00	38.00	356.47	4,408.54	2,259.58	-139.35	2,263.87	0.00	0.00	0.00	
5,115.90	38.00	356.47	4,421.07	2,269.35	-139.95	2,273.66	0.00	0.00	0.00	
Begin 2.00°/100' Drop										
5,200.00	36.32	356.47	4,488.09	2,320.05	-143.08	2,324.46	2.00	-2.00	0.00	
5,300.00	34.32	356.47	4,569.67	2,377.76	-146.64	2,382.28	2.00	-2.00	0.00	
5,313.69	34.05	356.47	4,581.00	2,385.44	-147.11	2,389.97	2.00	-2.00	0.00	
Shannon										
5,400.00	32.32	356.47	4,653.23	2,432.59	-150.02	2,437.21	2.00	-2.00	0.00	
5,500.00	30.32	356.47	4,738.65	2,484.47	-153.22	2,489.19	2.00	-2.00	0.00	
5,600.00	28.32	356.47	4,825.83	2,533.35	-156.23	2,538.16	2.00	-2.00	0.00	
5,700.00	26.32	356.47	4,914.67	2,579.16	-159.06	2,584.06	2.00	-2.00	0.00	
5,800.00	24.32	356.47	5,005.06	2,621.85	-161.69	2,626.83	2.00	-2.00	0.00	
5,900.00	22.32	356.47	5,096.88	2,661.36	-164.13	2,666.42	2.00	-2.00	0.00	
6,000.00	20.32	356.47	5,190.03	2,697.66	-166.36	2,702.78	2.00	-2.00	0.00	
6,100.00	18.32	356.47	5,284.39	2,730.68	-168.40	2,735.87	2.00	-2.00	0.00	
6,200.00	16.32	356.47	5,379.85	2,760.40	-170.23	2,765.64	2.00	-2.00	0.00	
6,300.00	14.32	356.47	5,476.29	2,786.77	-171.86	2,792.07	2.00	-2.00	0.00	
6,400.00	12.32	356.47	5,573.60	2,809.77	-173.28	2,815.11	2.00	-2.00	0.00	
6,500.00	10.32	356.47	5,671.64	2,829.37	-174.49	2,834.74	2.00	-2.00	0.00	
6,600.00	8.32	356.47	5,770.32	2,845.54	-175.48	2,850.94	2.00	-2.00	0.00	
6,700.00	6.32	356.47	5,869.50	2,858.26	-176.27	2,863.69	2.00	-2.00	0.00	
6,800.00	4.32	356.47	5,969.06	2,867.52	-176.84	2,872.96	2.00	-2.00	0.00	
6,900.00	2.32	356.47	6,068.89	2,873.30	-177.20	2,878.76	2.00	-2.00	0.00	
7,000.00	0.32	356.47	6,168.86	2,875.60	-177.34	2,881.07	2.00	-2.00	0.00	
7,016.14	0.00	0.00	6,185.00	2,875.65	-177.34	2,881.11	2.00	-2.00	21.86	
Begin Vertical Hold										
7,100.00	0.00	0.00	6,268.86	2,875.65	-177.34	2,881.11	0.00	0.00	0.00	
7,200.00	0.00	0.00	6,368.86	2,875.65	-177.34	2,881.11	0.00	0.00	0.00	
7,300.00	0.00	0.00	6,468.86	2,875.65	-177.34	2,881.11	0.00	0.00	0.00	
7,400.00	0.00	0.00	6,568.86	2,875.65	-177.34	2,881.11	0.00	0.00	0.00	
7,500.00	0.00	0.00	6,668.86	2,875.65	-177.34	2,881.11	0.00	0.00	0.00	
7,600.00	0.00	0.00	6,768.86	2,875.65	-177.34	2,881.11	0.00	0.00	0.00	
7,662.14	0.00	0.00	6,831.00	2,875.65	-177.34	2,881.11	0.00	0.00	0.00	
Niobrara										
7,700.00	0.00	0.00	6,868.86	2,875.65	-177.34	2,881.11	0.00	0.00	0.00	
7,800.00	0.00	0.00	6,968.86	2,875.65	-177.34	2,881.11	0.00	0.00	0.00	
7,900.00	0.00	0.00	7,068.86	2,875.65	-177.34	2,881.11	0.00	0.00	0.00	
7,962.14	0.00	0.00	7,131.00	2,875.65	-177.34	2,881.11	0.00	0.00	0.00	
Fort Hayes										
7,992.14	0.00	0.00	7,161.00	2,875.65	-177.34	2,881.11	0.00	0.00	0.00	
Codell										
8,000.00	0.00	0.00	7,168.86	2,875.65	-177.34	2,881.11	0.00	0.00	0.00	
8,100.00	0.00	0.00	7,268.86	2,875.65	-177.34	2,881.11	0.00	0.00	0.00	
8,152.14	0.00	0.00	7,321.00	2,875.65	-177.34	2,881.11	0.00	0.00	0.00	

<b>Database:</b>	Local DB	<b>Local Co-ordinate Reference:</b>	Well 22-32-12
<b>Company:</b>	Great Western	<b>TVD Reference:</b>	WELL @ 4781.00usft (Cade 22)
<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>MD Reference:</b>	WELL @ 4781.00usft (Cade 22)
<b>Site:</b>	Diamond Valley	<b>North Reference:</b>	Grid
<b>Well:</b>	22-32-12	<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)
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 Diamond - 22-32-12	0.00	0.00	7,321.00	2,875.65	-177.34	1,415,563.34	3,173,875.93	40° 28' 20.787 N	104° 52' 30.073 W
- plan hits target center									
- Circle (radius 200.00)									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
400.00	399.84	9 5/8"	9-5/8	12-1/4	

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
2,571.26	2,416.00	Greeley Sand		0.00		
3,948.24	3,501.00	Parkman		0.00		
4,760.47	4,141.00	Sussex		0.00		
5,313.69	4,581.00	Shannon		0.00		
7,662.14	6,831.00	Niobrara		0.00		
7,962.14	7,131.00	Fort Hayes		0.00		
7,992.14	7,161.00	Codell		0.00		

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
200.00	200.00	0.00	0.00	KOP, 2.00°/100' Build	
600.00	598.70	27.83	-1.72	Begin 8.00° Tangent	
1,000.00	994.81	83.39	-5.14	Begin 2.00°/100' Build	
2,500.24	2,360.04	661.87	-40.82	Begin 38.00° Tangent	
5,115.90	4,421.07	2,269.35	-139.95	Begin 2.00°/100' Drop	
7,016.14	6,185.00	2,875.65	-177.34	Begin Vertical Hold	
8,152.14	7,321.00	2,875.65	-177.34	PBHL	