



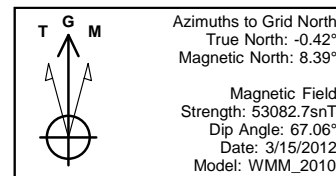
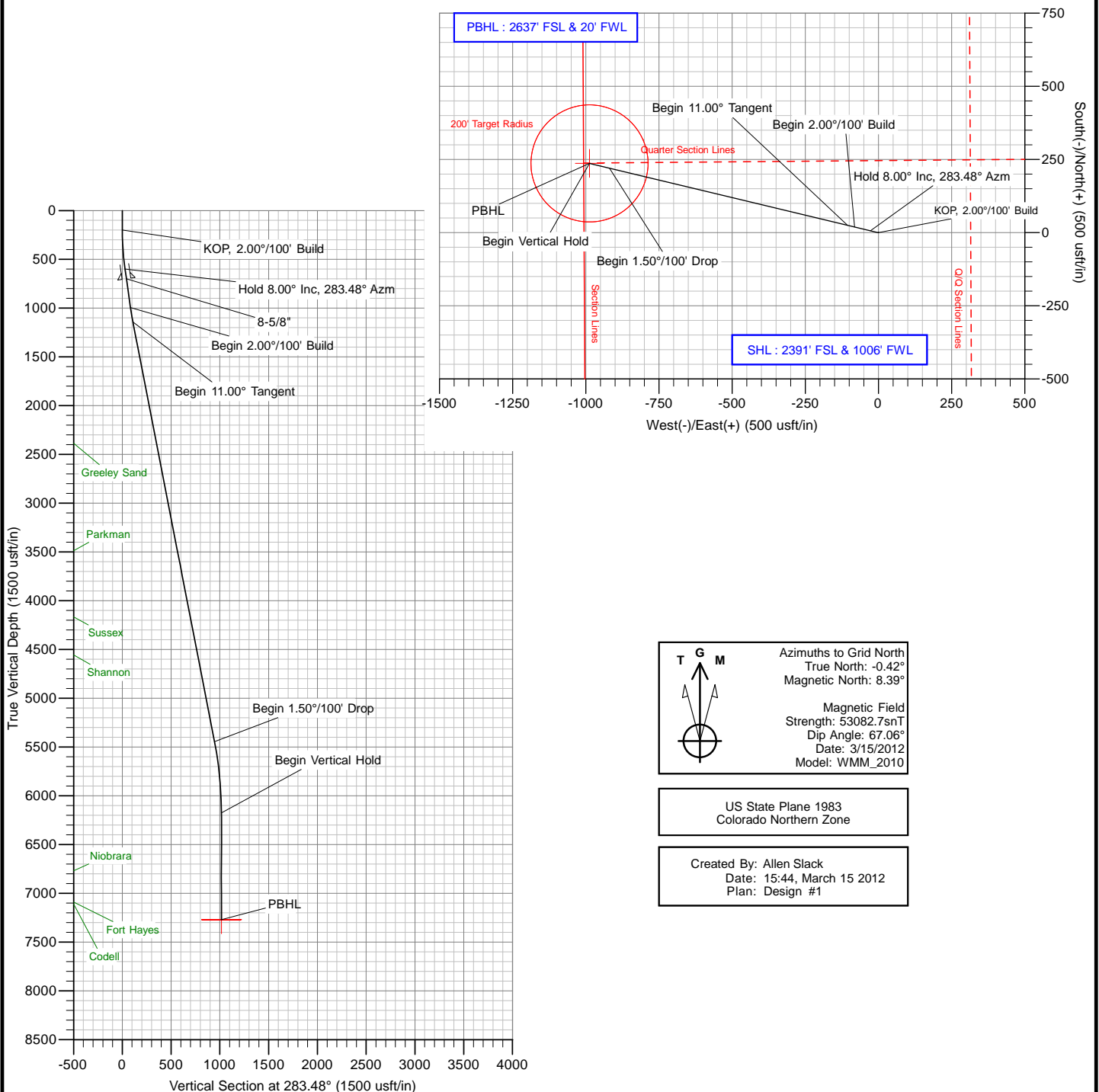
Company: Great Western
Site: Great Western
Well: 25-12-15
Project: Weld County, Colorado (NAD 83)
Rig Name: Cade 22



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	283.48	598.70	6.50	-27.11	27.88	27.88	Hold 8.00° Inc, 283.48° Azm
1000.00	8.00	283.48	994.81	19.47	-81.25	83.55	83.55	Begin 2.00°/100' Build
1150.23	11.00	283.48	1142.97	25.25	-105.36	108.35	108.35	Begin 11.00° Tangent
5532.71	11.00	283.48	5444.86	220.22	-918.90	944.92	944.92	Begin 1.50°/100' Drop
6266.36	0.00	0.00	6174.00	236.59	-987.20	1015.16	1015.16	Begin Vertical Hold
7361.36	0.00	0.00	7269.00	236.59	-987.20	1015.16	1015.16	PBHL



US State Plane 1983
Colorado Northern Zone

Created By: Allen Slack
Date: 15:44, March 15 2012
Plan: Design #1

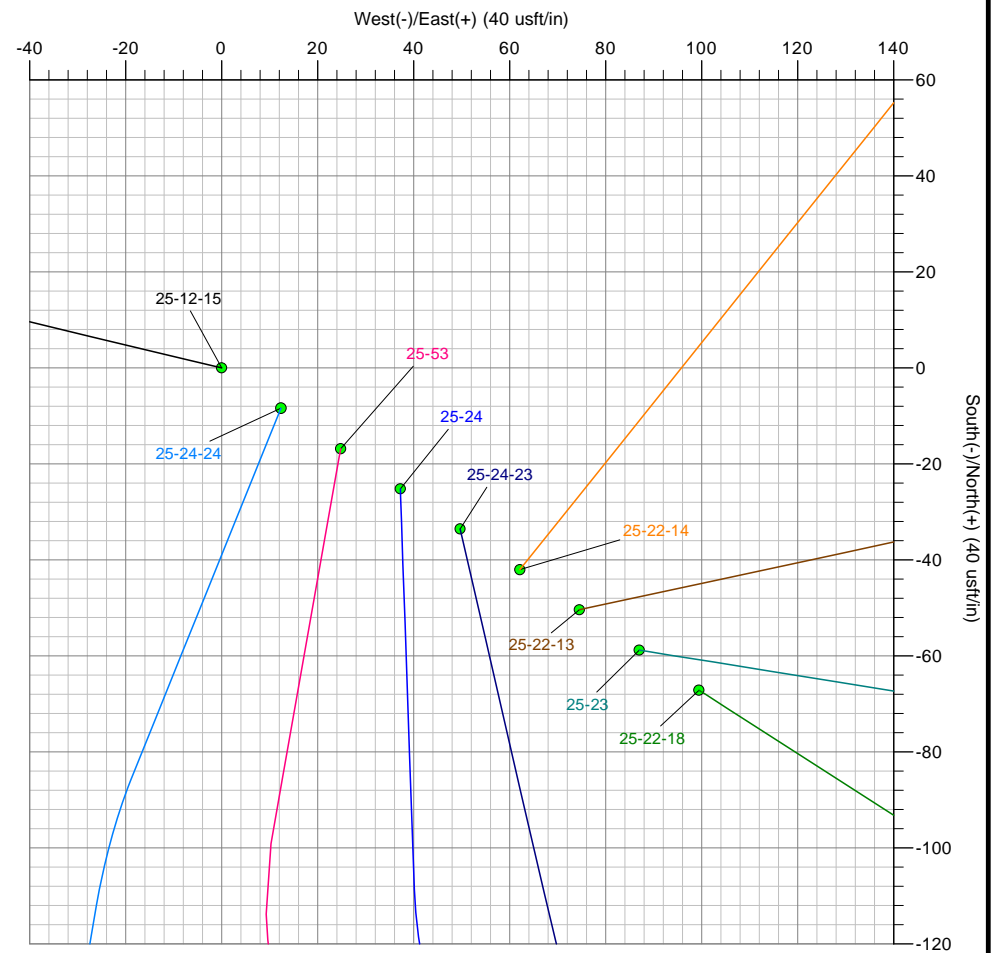
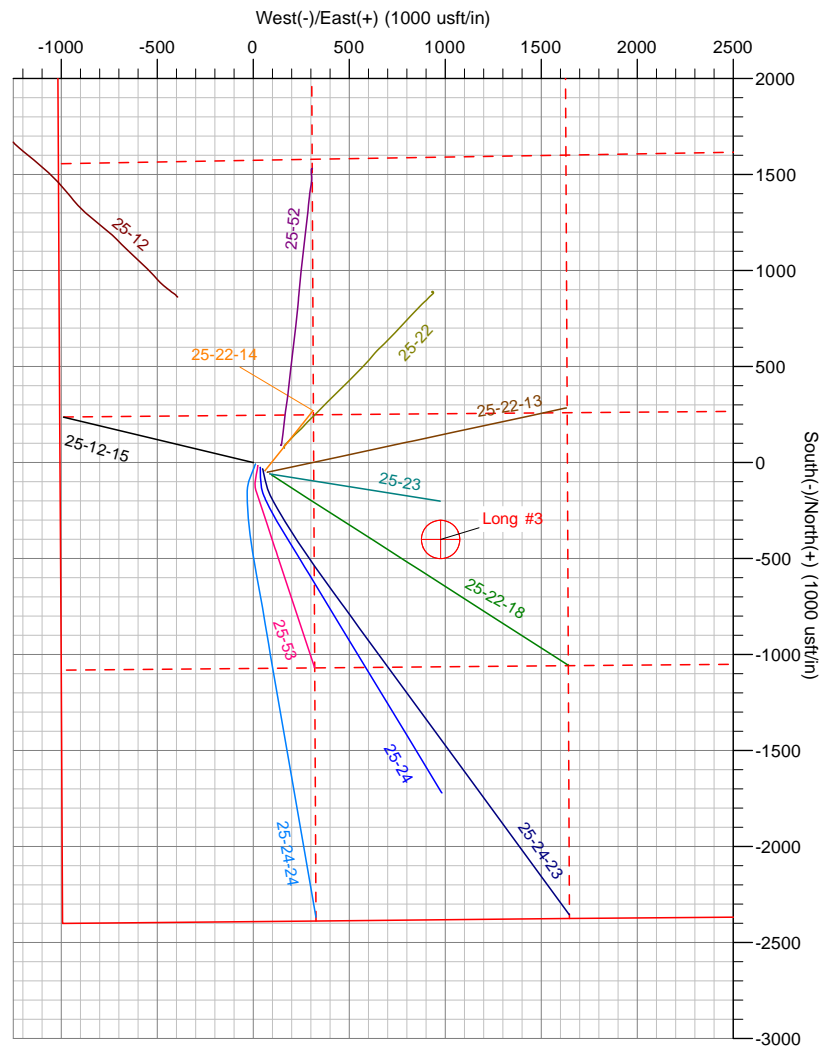
The customer should only rely on this document after independently verifying all paths, targets, coordinates, lease and hard lines represented. Any decisions made or wells drilled utilizing this or any other information supplied by MS Energy are at the sole risk and responsibility of the customer. MS Energy is not responsible for the accuracy of this schematic or the information contained herein.



Company: Great Western
Site: Great Western
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



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Great Western

Weld County, Colorado (NAD 83)

Great Western

25-12-15

Wellbore #1

Plan: Design #1

Standard Planning Report

15 March, 2012

Database:	Southern Region	Local Co-ordinate Reference:	Well 25-12-15
Company:	Great Western	TVD Reference:	WELL @ 4766.00usft (Cade 22)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4766.00usft (Cade 22)
Site:	Great Western	North Reference:	Grid
Well:	25-12-15	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Project	Weld County, Colorado (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Well	25-12-15			
Well Position	+N-S	1,410,084.96 usft	Northing:	1,410,084.96 usft
	+E-W	3,181,486.99 usft	Easting:	3,181,486.99 usft
Position Uncertainty		0.00 usft	Wellhead Elevation:	
			Latitude:	40° 27' 26.1101 N
			Longitude:	104° 50' 52.111 W
			Ground Level:	4,752.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	WMM_2010	3/15/2012	8.81	67.06	53,083

Design	Design #1			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)
	0.00	0.00	0.00	283.48

Plan Sections										
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	283.48	598.70	6.50	-27.11	2.00	2.00	0.00	283.48	PBHL v1 - Great W
1,000.00	8.00	283.48	994.81	19.47	-81.25	0.00	0.00	0.00	0.00	
1,150.23	11.00	283.48	1,142.97	25.25	-105.36	2.00	2.00	0.00	0.00	
5,532.71	11.00	283.48	5,444.86	220.22	-918.90	0.00	0.00	0.00	0.00	
6,266.36	0.00	0.00	6,174.00	236.59	-987.20	1.50	-1.50	0.00	180.00	
7,361.36	0.00	0.00	7,269.00	236.59	-987.20	0.00	0.00	0.00	0.00	PBHL v1 - Great W



Database:	Southern Region	Local Co-ordinate Reference:	Well 25-12-15
Company:	Great Western	TVD Reference:	WELL @ 4766.00usft (Cade 22)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4766.00usft (Cade 22)
Site:	Great Western	North Reference:	Grid
Well:	25-12-15	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	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
KOP, 2.00°/100' Build									
300.00	2.00	283.48	299.98	0.41	-1.70	1.75	2.00	2.00	0.00
400.00	4.00	283.48	399.84	1.63	-6.79	6.98	2.00	2.00	0.00
500.00	6.00	283.48	499.45	3.66	-15.26	15.69	2.00	2.00	0.00
600.00	8.00	283.48	598.70	6.50	-27.11	27.88	2.00	2.00	0.00
Hold 8.00° Inc, 283.48° Azm									
700.00	8.00	283.48	697.73	9.74	-40.65	41.80	0.00	0.00	0.00
702.29	8.00	283.48	700.00	9.82	-40.96	42.12	0.00	0.00	0.00
8-5/8"									
800.00	8.00	283.48	796.76	12.98	-54.18	55.71	0.00	0.00	0.00
900.00	8.00	283.48	895.78	16.23	-67.71	69.63	0.00	0.00	0.00
1,000.00	8.00	283.48	994.81	19.47	-81.25	83.55	0.00	0.00	0.00
Begin 2.00°/100' Build									
1,100.00	10.00	283.48	1,093.57	23.12	-96.46	99.19	2.00	2.00	0.00
1,150.23	11.00	283.48	1,142.97	25.25	-105.36	108.35	2.00	2.00	0.00
Begin 11.00° Tangent									
1,200.00	11.00	283.48	1,191.82	27.46	-114.60	117.85	0.00	0.00	0.00
1,300.00	11.00	283.48	1,289.98	31.91	-133.17	136.94	0.00	0.00	0.00
1,400.00	11.00	283.48	1,388.14	36.36	-151.73	156.03	0.00	0.00	0.00
1,500.00	11.00	283.48	1,486.30	40.81	-170.29	175.11	0.00	0.00	0.00
1,600.00	11.00	283.48	1,584.46	45.26	-188.86	194.20	0.00	0.00	0.00
1,700.00	11.00	283.48	1,682.62	49.71	-207.42	213.29	0.00	0.00	0.00
1,800.00	11.00	283.48	1,780.78	54.16	-225.98	232.38	0.00	0.00	0.00
1,900.00	11.00	283.48	1,878.94	58.61	-244.55	251.47	0.00	0.00	0.00
2,000.00	11.00	283.48	1,977.10	63.05	-263.11	270.56	0.00	0.00	0.00
2,100.00	11.00	283.48	2,075.27	67.50	-281.67	289.65	0.00	0.00	0.00
2,200.00	11.00	283.48	2,173.43	71.95	-300.24	308.74	0.00	0.00	0.00
2,300.00	11.00	283.48	2,271.59	76.40	-318.80	327.83	0.00	0.00	0.00
2,400.00	11.00	283.48	2,369.75	80.85	-337.36	346.92	0.00	0.00	0.00
2,416.56	11.00	283.48	2,386.00	81.59	-340.44	350.08	0.00	0.00	0.00
Greeley Sand									
2,500.00	11.00	283.48	2,467.91	85.30	-355.93	366.00	0.00	0.00	0.00
2,600.00	11.00	283.48	2,566.07	89.75	-374.49	385.09	0.00	0.00	0.00
2,700.00	11.00	283.48	2,664.23	94.20	-393.05	404.18	0.00	0.00	0.00
2,800.00	11.00	283.48	2,762.39	98.64	-411.62	423.27	0.00	0.00	0.00
2,900.00	11.00	283.48	2,860.56	103.09	-430.18	442.36	0.00	0.00	0.00
3,000.00	11.00	283.48	2,958.72	107.54	-448.74	461.45	0.00	0.00	0.00
3,100.00	11.00	283.48	3,056.88	111.99	-467.31	480.54	0.00	0.00	0.00
3,200.00	11.00	283.48	3,155.04	116.44	-485.87	499.63	0.00	0.00	0.00
3,300.00	11.00	283.48	3,253.20	120.89	-504.43	518.72	0.00	0.00	0.00
3,400.00	11.00	283.48	3,351.36	125.34	-523.00	537.80	0.00	0.00	0.00
3,500.00	11.00	283.48	3,449.52	129.79	-541.56	556.89	0.00	0.00	0.00
3,537.16	11.00	283.48	3,486.00	131.44	-548.46	563.99	0.00	0.00	0.00
Parkman									
3,600.00	11.00	283.48	3,547.68	134.23	-560.12	575.98	0.00	0.00	0.00
3,700.00	11.00	283.48	3,645.84	138.68	-578.69	595.07	0.00	0.00	0.00
3,800.00	11.00	283.48	3,744.01	143.13	-597.25	614.16	0.00	0.00	0.00
3,900.00	11.00	283.48	3,842.17	147.58	-615.81	633.25	0.00	0.00	0.00
4,000.00	11.00	283.48	3,940.33	152.03	-634.38	652.34	0.00	0.00	0.00
4,100.00	11.00	283.48	4,038.49	156.48	-652.94	671.43	0.00	0.00	0.00

Database:	Southern Region	Local Co-ordinate Reference:	Well 25-12-15
Company:	Great Western	TVD Reference:	WELL @ 4766.00usft (Cade 22)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4766.00usft (Cade 22)
Site:	Great Western	North Reference:	Grid
Well:	25-12-15	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	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	11.00	283.48	4,136.65	160.93	-671.50	690.52	0.00	0.00	0.00
4,229.90	11.00	283.48	4,166.00	162.26	-677.05	696.22	0.00	0.00	0.00
Sussex									
4,300.00	11.00	283.48	4,234.81	165.38	-690.07	709.61	0.00	0.00	0.00
4,400.00	11.00	283.48	4,332.97	169.83	-708.63	728.69	0.00	0.00	0.00
4,500.00	11.00	283.48	4,431.13	174.27	-727.19	747.78	0.00	0.00	0.00
4,600.00	11.00	283.48	4,529.29	178.72	-745.76	766.87	0.00	0.00	0.00
4,627.21	11.00	283.48	4,556.00	179.93	-750.81	772.07	0.00	0.00	0.00
Shannon									
4,700.00	11.00	283.48	4,627.46	183.17	-764.32	785.96	0.00	0.00	0.00
4,800.00	11.00	283.48	4,725.62	187.62	-782.88	805.05	0.00	0.00	0.00
4,900.00	11.00	283.48	4,823.78	192.07	-801.45	824.14	0.00	0.00	0.00
5,000.00	11.00	283.48	4,921.94	196.52	-820.01	843.23	0.00	0.00	0.00
5,100.00	11.00	283.48	5,020.10	200.97	-838.57	862.32	0.00	0.00	0.00
5,200.00	11.00	283.48	5,118.26	205.42	-857.13	881.41	0.00	0.00	0.00
5,300.00	11.00	283.48	5,216.42	209.86	-875.70	900.49	0.00	0.00	0.00
5,400.00	11.00	283.48	5,314.58	214.31	-894.26	919.58	0.00	0.00	0.00
5,500.00	11.00	283.48	5,412.75	218.76	-912.82	938.67	0.00	0.00	0.00
5,532.71	11.00	283.48	5,444.86	220.22	-918.90	944.92	0.00	0.00	0.00
Begin 1.50°/100' Drop									
5,600.00	10.00	283.48	5,511.02	223.07	-930.82	957.18	1.50	-1.50	0.00
5,700.00	8.50	283.48	5,609.71	226.82	-946.45	973.24	1.50	-1.50	0.00
5,800.00	7.00	283.48	5,708.80	229.96	-959.55	986.72	1.50	-1.50	0.00
5,900.00	5.50	283.48	5,808.20	232.49	-970.13	997.60	1.50	-1.50	0.00
6,000.00	4.00	283.48	5,907.86	234.42	-978.17	1,005.87	1.50	-1.50	0.00
6,100.00	2.50	283.48	6,007.69	235.74	-983.68	1,011.53	1.50	-1.50	0.00
6,200.00	1.00	283.48	6,107.64	236.45	-986.64	1,014.58	1.50	-1.50	0.00
6,266.36	0.00	0.00	6,174.00	236.59	-987.20	1,015.16	1.50	-1.50	0.00
Begin Vertical Hold									
6,300.00	0.00	0.00	6,207.64	236.59	-987.20	1,015.16	0.00	0.00	0.00
6,400.00	0.00	0.00	6,307.64	236.59	-987.20	1,015.16	0.00	0.00	0.00
6,500.00	0.00	0.00	6,407.64	236.59	-987.20	1,015.16	0.00	0.00	0.00
6,600.00	0.00	0.00	6,507.64	236.59	-987.20	1,015.16	0.00	0.00	0.00
6,700.00	0.00	0.00	6,607.64	236.59	-987.20	1,015.16	0.00	0.00	0.00
6,800.00	0.00	0.00	6,707.64	236.59	-987.20	1,015.16	0.00	0.00	0.00
6,861.36	0.00	0.00	6,769.00	236.59	-987.20	1,015.16	0.00	0.00	0.00
Niobrara									
6,900.00	0.00	0.00	6,807.64	236.59	-987.20	1,015.16	0.00	0.00	0.00
7,000.00	0.00	0.00	6,907.64	236.59	-987.20	1,015.16	0.00	0.00	0.00
7,100.00	0.00	0.00	7,007.64	236.59	-987.20	1,015.16	0.00	0.00	0.00
7,181.36	0.00	0.00	7,089.00	236.59	-987.20	1,015.16	0.00	0.00	0.00
Fort Hayes									
7,200.00	0.00	0.00	7,107.64	236.59	-987.20	1,015.16	0.00	0.00	0.00
7,201.36	0.00	0.00	7,109.00	236.59	-987.20	1,015.16	0.00	0.00	0.00
Codell									
7,300.00	0.00	0.00	7,207.64	236.59	-987.20	1,015.16	0.00	0.00	0.00
7,361.36	0.00	0.00	7,269.00	236.59	-987.20	1,015.16	0.00	0.00	0.00
PBHL									

Database:	Southern Region	Local Co-ordinate Reference:	Well 25-12-15
Company:	Great Western	TVD Reference:	WELL @ 4766.00usft (Cade 22)
Project:	Weld County, Colorado (NAD 83)	MD Reference:	WELL @ 4766.00usft (Cade 22)
Site:	Great Western	North Reference:	Grid
Well:	25-12-15	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	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	7,269.00	236.59	-987.20	1,410,321.54	3,180,499.79	40° 27' 28.5195 N	104° 51' 4.860 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 (°)	
2,416.56	2,386.00	Greeley Sand		0.00		
3,537.16	3,486.00	Parkman		0.00		
4,229.90	4,166.00	Sussex		0.00		
4,627.21	4,556.00	Shannon		0.00		
6,861.36	6,769.00	Niobrara		0.00		
7,181.36	7,089.00	Fort Hayes		0.00		
7,201.36	7,109.00	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	6.50	-27.11	Hold 8.00° Inc, 283.48° Azm
1,000.00	994.81	19.47	-81.25	Begin 2.00°/100' Build
1,150.23	1,142.97	25.25	-105.36	Begin 11.00° Tangent
5,532.71	5,444.86	220.22	-918.90	Begin 1.50°/100' Drop
6,266.36	6,174.00	236.59	-987.20	Begin Vertical Hold
7,361.36	7,269.00	236.59	-987.20	PBHL