



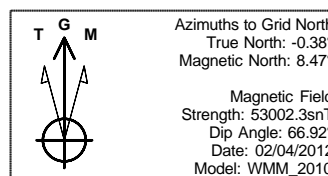
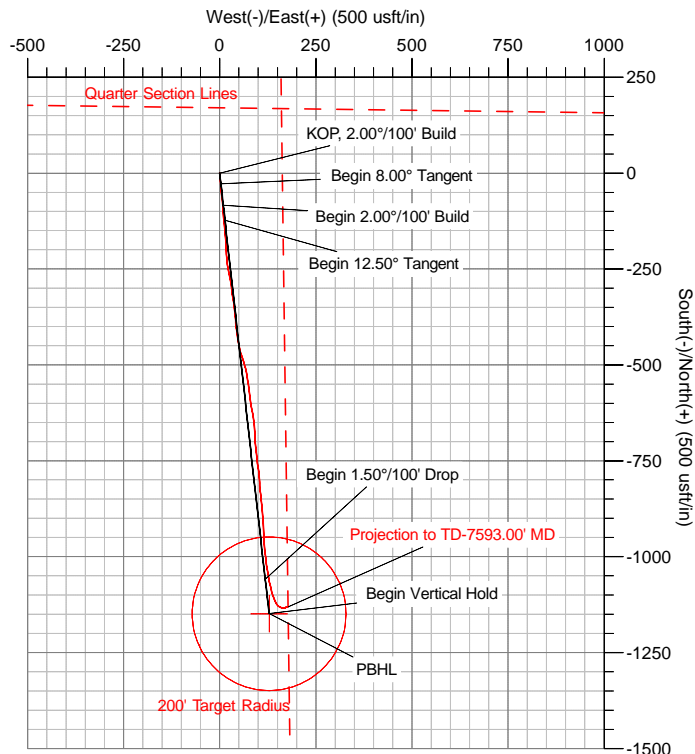
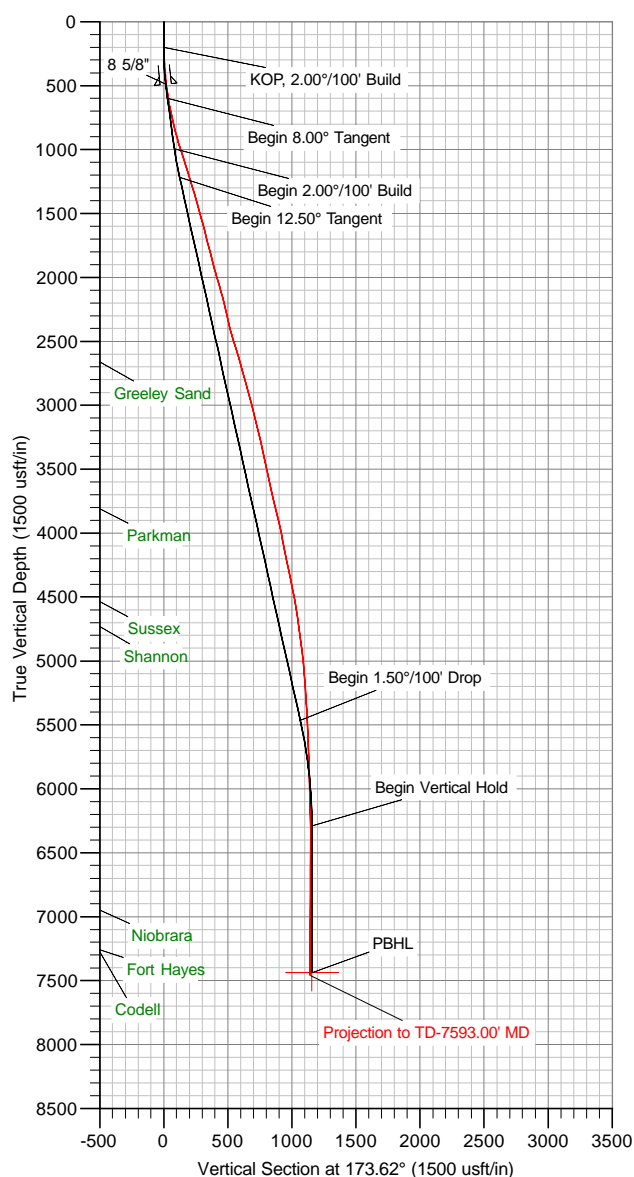
Company: Great Western  
 Site: Binder  
 Well: 4-6-20  
 Project: Weld County, Colorado (NAD 83)  
 Rig Name: Cade 22



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	173.62	598.70	-27.71	3.10	27.88	27.88	Begin 8.00° Tangent
1000.00	8.00	173.62	994.81	-83.03	9.29	83.55	83.55	Begin 2.00°/100' Build
1224.99	12.50	173.62	1216.15	-122.81	13.74	123.57	123.57	Begin 12.50° Tangent
5575.23	12.50	173.62	5463.27	-1058.52	118.44	1065.13	1065.13	Begin 1.50°/100' Drop
6408.55	0.00	0.00	6290.00	-1148.50	128.51	1155.67	1155.67	Begin Vertical Hold
7555.55	0.00	0.00	7437.00	-1148.50	128.51	1155.67	1155.67	PBHL



US State Plane 1983  
 Colorado Northern Zone

Created By: Megan Pope  
 Date: 11:50, February 10 2012  
 Plan: Design #3

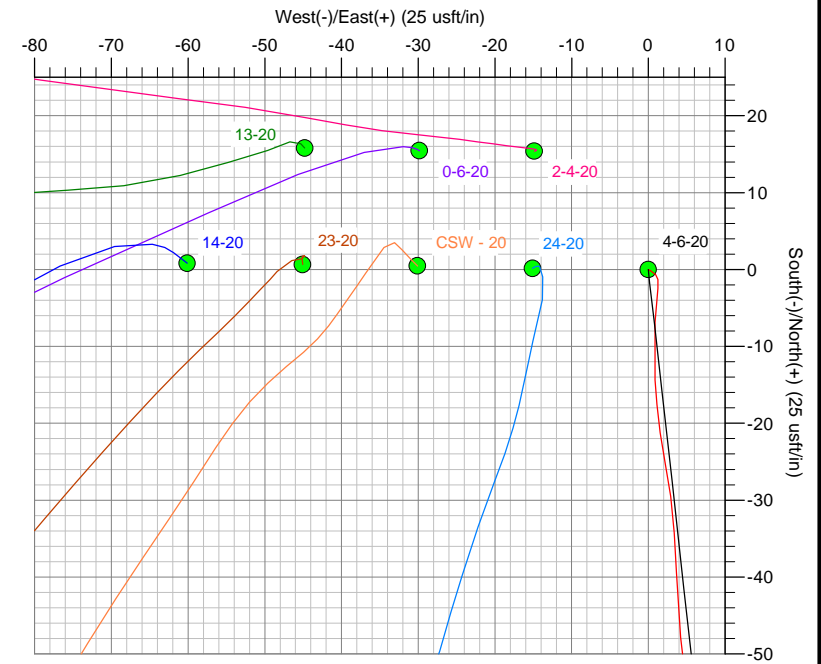
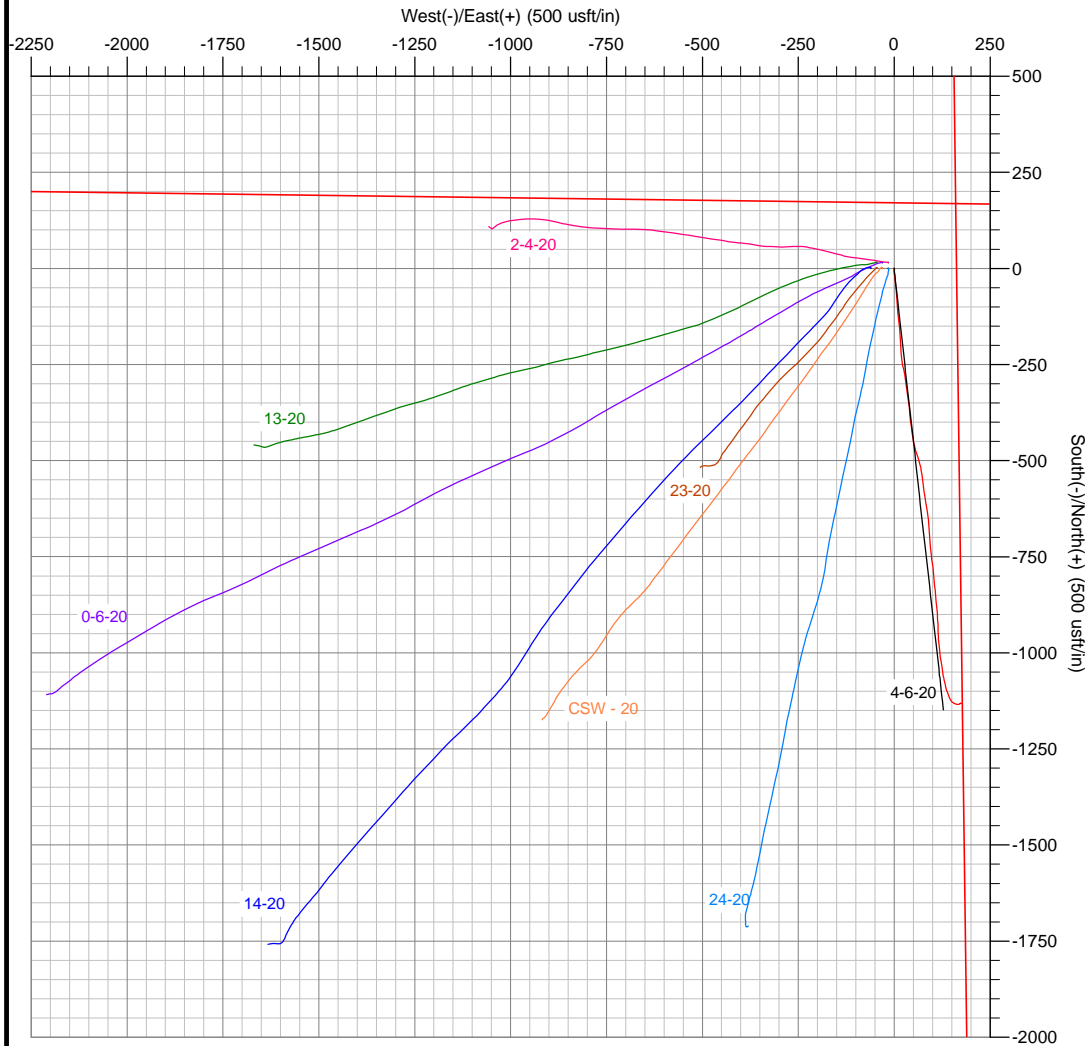
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# Great Western

Company: Great Western  
Site: Binder  
Project: Weld County, Colorado (NAD 83)  
Rig Name: Cade 22



Planning: 936.442.2510 Fax: 936.442.2515  
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# **Great Western**

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

**Binder**

**4-6-20**

**Wellbore #1**

**Survey: MS MWD**

## **Standard Survey Report**

**10 February, 2012**

<b>Company:</b>	Great Western	<b>Local Co-ordinate Reference:</b>	Well 4-6-20
<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>TVD Reference:</b>	WELL @ 4916.00usft (Cade 22)
<b>Site:</b>	Binder	<b>MD Reference:</b>	WELL @ 4916.00usft (Cade 22)
<b>Well:</b>	4-6-20	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys	<b>Database:</b>	Southern Region

<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		

Well	4-6-20					
Well Position	+N/-S	0.00 usft	Northing:	1,351,977.46 usft	Latitude:	40° 17' 53.1604 N
	+E/-W	0.00 usft	Easting:	3,163,210.56 usft	Longitude:	104° 54' 53.506 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	4,902.00 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	02/04/12	8.84	66.92	53,002

<b>Design</b>	Surveys				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<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	173.62	

<b>Survey Program</b>	<b>Date</b>	02/10/12			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
85.00	7,593.00	MS MWD (Wellbore #1)	MWD	MWD - Standard	

<b>Survey</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>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
85.00	0.40	113.50	85.00	-0.12	0.27	0.15	0.47	0.47	0.00	
175.00	0.70	134.00	175.00	-0.63	0.96	0.73	0.39	0.33	22.78	
266.00	1.80	183.30	265.97	-2.44	1.27	2.56	1.59	1.21	54.18	
357.00	3.80	186.40	356.86	-6.86	0.85	6.91	2.20	2.20	3.41	
447.00	5.80	175.80	446.54	-14.36	0.86	14.37	2.42	2.22	-11.78	
477.00	6.40	175.30	476.37	-17.54	1.10	17.55	2.01	2.00	-1.67	
540.00	7.80	168.90	538.89	-25.24	2.21	25.33	2.55	2.22	-10.16	
631.00	10.30	178.00	628.75	-39.43	3.69	39.59	3.16	2.75	10.00	
722.00	11.90	172.40	718.05	-56.86	5.21	57.09	2.12	1.76	-6.15	
816.00	13.40	175.70	809.77	-77.33	7.31	77.66	1.77	1.60	3.51	
910.00	16.10	176.20	900.66	-101.20	8.99	101.57	2.88	2.87	0.53	
1,003.00	17.80	174.20	989.62	-128.21	11.28	128.67	1.93	1.83	-2.15	
1,098.00	17.70	175.00	1,080.10	-157.05	14.01	157.63	0.28	-0.11	0.84	
1,192.00	16.60	175.70	1,169.92	-184.67	16.26	185.33	1.19	-1.17	0.74	

<b>Company:</b>	Great Western	<b>Local Co-ordinate Reference:</b>	Well 4-6-20
<b>Project:</b>	Weld County, Colorado (NAD 83)	<b>TVD Reference:</b>	WELL @ 4916.00usft (Cade 22)
<b>Site:</b>	Binder	<b>MD Reference:</b>	WELL @ 4916.00usft (Cade 22)
<b>Well:</b>	4-6-20	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys	<b>Database:</b>	Southern Region

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)	
1,287.00	17.20	177.40	1,260.81	-212.23	17.92	212.91	0.82	0.63	1.79	
1,380.00	16.30	172.10	1,349.87	-238.90	20.33	239.68	1.91	-0.97	-5.70	
1,475.00	15.40	167.00	1,441.26	-264.40	25.00	265.54	1.74	-0.95	-5.37	
1,569.00	16.30	172.50	1,531.69	-289.64	29.53	291.13	1.86	0.96	5.85	
1,662.00	14.90	171.90	1,621.27	-314.42	32.92	316.13	1.52	-1.51	-0.65	
1,757.00	14.20	171.10	1,713.22	-338.02	36.45	339.98	0.77	-0.74	-0.84	
1,852.00	13.90	174.10	1,805.38	-360.88	39.42	363.03	0.83	-0.32	3.16	
1,945.00	14.40	176.60	1,895.56	-383.54	41.26	385.75	0.85	0.54	2.69	
2,041.00	16.10	171.10	1,988.18	-408.61	44.02	410.97	2.32	1.77	-5.73	
2,135.00	16.40	171.70	2,078.42	-434.62	47.96	437.26	0.37	0.32	0.64	
2,231.00	14.40	167.30	2,170.97	-459.68	52.54	462.67	2.41	-2.08	-4.58	
2,326.00	12.70	159.90	2,263.33	-481.01	58.72	484.56	2.55	-1.79	-7.79	
2,420.00	13.90	164.20	2,354.81	-501.58	65.35	505.73	1.65	1.28	4.57	
2,515.00	15.80	169.50	2,446.64	-525.28	70.81	529.89	2.46	2.00	5.58	
2,610.00	17.40	173.60	2,537.68	-552.11	74.75	557.00	2.09	1.68	4.32	
2,705.00	16.90	172.30	2,628.46	-579.91	78.19	585.01	0.66	-0.53	-1.37	
2,800.00	15.20	171.00	2,719.75	-605.90	81.99	611.26	1.83	-1.79	-1.37	
2,893.00	15.50	170.20	2,809.43	-630.19	86.01	635.84	0.39	0.32	-0.86	
2,988.00	15.10	172.80	2,901.07	-654.97	89.72	660.89	0.84	-0.42	2.74	
3,082.00	14.50	179.00	2,991.95	-678.89	91.46	684.85	1.80	-0.64	6.60	
3,176.00	13.90	174.70	3,083.08	-701.90	92.71	707.85	1.29	-0.64	-4.57	
3,272.00	13.50	174.10	3,176.35	-724.53	94.93	730.59	0.44	-0.42	-0.63	
3,365.00	13.30	173.90	3,266.82	-745.96	97.18	752.14	0.22	-0.22	-0.22	
3,460.00	12.30	171.20	3,359.46	-766.83	99.89	773.18	1.23	-1.05	-2.84	
3,555.00	11.40	174.90	3,452.44	-786.18	102.27	792.67	1.24	-0.95	3.89	
3,650.00	12.40	177.30	3,545.39	-805.72	103.59	812.24	1.17	1.05	2.53	
3,744.00	12.60	172.40	3,637.17	-825.96	105.42	832.56	1.15	0.21	-5.21	
3,838.00	13.50	176.00	3,728.74	-847.07	107.54	853.78	1.29	0.96	3.83	
3,931.00	13.50	173.60	3,819.17	-868.69	109.51	875.48	0.60	0.00	-2.58	
4,024.00	13.10	174.70	3,909.68	-889.97	111.69	896.87	0.51	-0.43	1.18	
4,118.00	11.40	176.90	4,001.53	-909.86	113.18	916.80	1.88	-1.81	2.34	
4,213.00	10.00	177.80	4,094.88	-927.47	114.00	934.40	1.48	-1.47	0.95	
4,307.00	12.30	178.10	4,187.10	-945.64	114.65	952.52	2.45	2.45	0.32	
4,400.00	11.70	174.20	4,278.07	-964.92	115.93	971.83	1.08	-0.65	-4.19	
4,495.00	12.20	174.80	4,371.01	-984.50	117.81	991.49	0.54	0.53	0.63	
4,589.00	10.90	174.10	4,463.10	-1,003.23	119.62	1,010.31	1.39	-1.38	-0.74	
4,684.00	9.70	171.00	4,556.57	-1,020.07	121.80	1,027.29	1.39	-1.26	-3.26	
4,778.00	8.20	171.20	4,649.42	-1,034.52	124.06	1,041.90	1.60	-1.60	0.21	
4,873.00	8.00	170.20	4,743.48	-1,047.73	126.23	1,055.27	0.26	-0.21	-1.05	
4,967.00	7.50	170.10	4,836.62	-1,060.22	128.39	1,067.92	0.53	-0.53	-0.11	
5,060.00	6.50	167.60	4,928.92	-1,071.34	130.57	1,079.21	1.12	-1.08	-2.69	
5,153.00	5.50	166.90	5,021.41	-1,080.82	132.71	1,088.87	1.08	-1.08	-0.75	
5,344.00	4.00	163.60	5,211.75	-1,096.13	136.66	1,104.53	0.80	-0.79	-1.73	
5,532.00	3.00	157.10	5,399.40	-1,106.95	140.43	1,115.70	0.57	-0.53	-3.46	

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<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Surveys	<b>Database:</b>	Southern Region

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)	
5,720.00	2.50	158.00	5,587.18	-1,115.28	143.88	1,124.36	0.27	-0.27	0.48	
5,910.00	2.30	152.00	5,777.02	-1,122.49	147.22	1,131.90	0.17	-0.11	-3.16	
6,098.00	2.20	128.40	5,964.88	-1,128.06	151.82	1,137.95	0.49	-0.05	-12.55	
6,287.00	3.10	113.40	6,153.67	-1,132.35	159.35	1,143.04	0.60	0.48	-7.94	
6,476.00	1.60	88.00	6,342.51	-1,134.29	166.68	1,145.78	0.95	-0.79	-13.44	
6,759.00	0.40	29.10	6,625.47	-1,133.28	171.11	1,145.28	0.51	-0.42	-20.81	
6,942.00	0.50	33.00	6,808.46	-1,132.06	171.86	1,144.14	0.06	0.05	2.13	
7,322.00	0.20	110.50	7,188.46	-1,130.90	173.38	1,143.16	0.13	-0.08	20.39	
7,542.00	1.10	95.30	7,408.44	-1,131.23	175.84	1,143.76	0.41	0.41	-6.91	
7,593.00	1.10	95.30	7,459.43	-1,131.32	176.82	1,143.96	0.00	0.00	0.00	
Projection to TD-7593.00' MD										

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
7,593.00	7,459.43	-1,131.32	176.82	Projection to TD-7593.00' MD	