

Well Name: **HCW 24-13**

Surface Location: HCW 24-13 Pad Sec.26-T6N-R67W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4757.0

+N/-S +E/-W
0.0 0.0

Northing
1414337.44

Easting
3181758.63

Latitude
40.468920

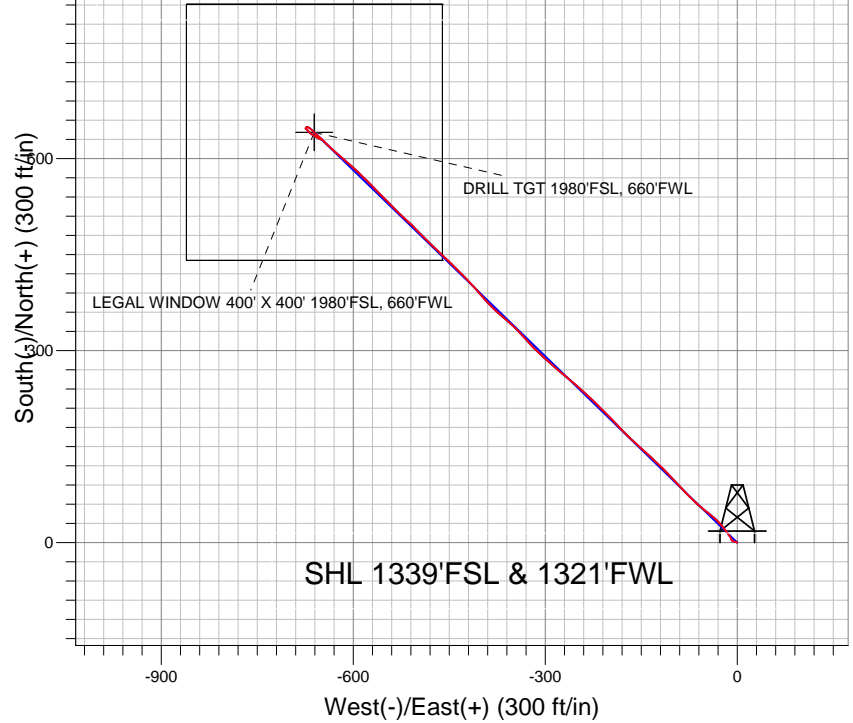
Longitude
-104.846720

Slot

Original Well Elev WELL @ 4770.0ft (Original Well Elev)

Great Western

Projected BHL 630'N & 650'W of
surface 1969'FSL & 671'FWL

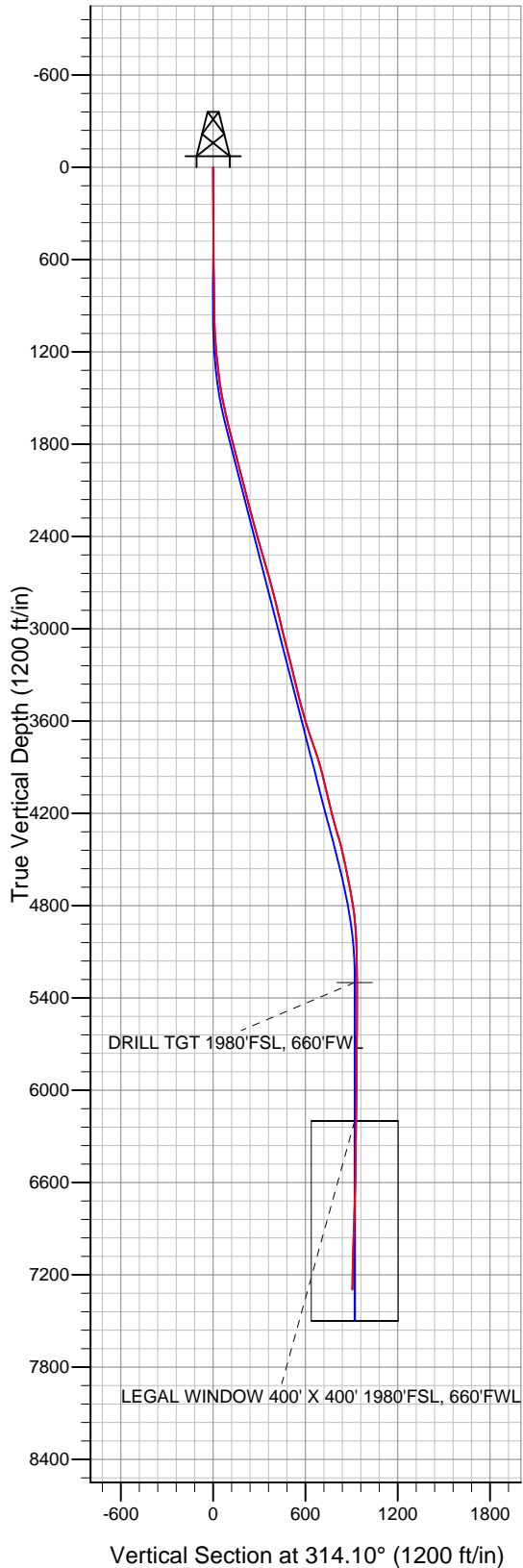


LEGEND

- ◆ HCW 24-13, Wellbore #1, Plan #2 (12-16-10) V0
- Wellbore #1
- Survey #1

Final Survey Plot

Projected Final Survey -
7410'MD & 7296'TVD @ 905' VS
1.2 deg Inc 106.0 deg AZ



Project: SEC.26-T6N-R67W
Site: HCW 24-13 Pad Sec.26-T6N-R67W
Well: HCW 24-13
Plan: Wellbore #1



Directional

Great Western

SEC.26-T6N-R67W

HCW 24-13 Pad Sec.26-T6N-R67W

HCW 24-13

Wellbore #1

Survey: Survey #1

Standard Survey Report

10 January, 2011

Company:	Great Western	Local Co-ordinate Reference:	Well HCW 24-13
Project:	SEC.26-T6N-R67W	TVD Reference:	WELL @ 4770.0ft (Original Well Elev)
Site:	HCW 24-13 Pad Sec.26-T6N-R67W	MD Reference:	WELL @ 4770.0ft (Original Well Elev)
Well:	HCW 24-13	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	SEC.26-T6N-R67W, Weld County, Colorado		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site		HCW 24-13 Pad Sec.26-T6N-R67W			
Site Position:		Northing:		1,414,337.45ft	
From:	Lat/Long	Easting:		Longitude:	
		3,181,758.63ft		-104.846720	
Position Uncertainty:		Slot Radius:		Grid Convergence:	
0.0 ft		"		0.42 °	

Well	HCW 24-13					
Well Position	+N/-S	0.0 ft	Northing:	1,414,337.44 ft	Latitude:	40.468920
	+E/-W	0.0 ft	Easting:	3,181,758.63 ft	Longitude:	-104.846720
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,757.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	12/16/2010	8.94	67.12	53,233

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.0	0.0	0.0	314.10	

Survey Program		Date	1/10/2011		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
636.0	7,410.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard	

Survey	Wellbore Data									
	Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
Survey	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
	636.0	0.70	291.20	636.0	1.4	-3.6	3.6	0.11	0.11	0.00
	732.0	0.90	283.60	732.0	1.8	-4.9	4.8	0.24	0.21	-7.92
	825.0	0.70	275.90	825.0	2.0	-6.2	5.8	0.24	-0.22	-8.28
	919.0	0.80	274.70	919.0	2.1	-7.4	6.8	0.11	0.11	-1.28
	1,012.0	1.80	337.60	1,011.9	3.5	-8.6	8.6	1.72	1.08	67.63
	1,106.0	3.70	334.00	1,105.8	7.6	-10.5	12.9	2.03	2.02	-3.83
	1,200.0	5.60	321.20	1,199.5	13.9	-14.7	20.3	2.29	2.02	-13.62
	1,294.0	6.30	324.60	1,293.0	21.7	-20.6	29.9	0.83	0.74	3.62
	1,387.0	8.00	316.90	1,385.3	30.6	-27.9	41.4	2.09	1.83	-8.28
	1,481.0	10.30	310.00	1,478.1	40.8	-38.9	56.3	2.71	2.45	-7.34
	1,575.0	12.20	307.80	1,570.3	52.3	-53.1	74.5	2.07	2.02	-2.34
	1,668.0	13.20	313.20	1,661.0	65.6	-68.6	94.9	1.67	1.08	5.81

Company:	Great Western	Local Co-ordinate Reference:	Well HCW 24-13
Project:	SEC.26-T6N-R67W	TVD Reference:	WELL @ 4770.0ft (Original Well Elev)
Site:	HCW 24-13 Pad Sec.26-T6N-R67W	MD Reference:	WELL @ 4770.0ft (Original Well Elev)
Well:	HCW 24-13	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
1,762.0	14.60	318.40	1,752.2	81.8	-84.3	117.5	1.99	1.49	5.53	
1,856.0	14.60	316.00	1,843.2	99.1	-100.4	141.1	0.64	0.00	-2.55	
1,950.0	15.20	314.50	1,934.1	116.3	-117.4	165.3	0.76	0.64	-1.60	
2,046.0	14.20	313.30	2,026.9	133.2	-135.0	189.6	1.09	-1.04	-1.25	
2,139.0	14.00	311.70	2,117.1	148.5	-151.7	212.3	0.47	-0.22	-1.72	
2,232.0	14.20	313.40	2,207.3	163.8	-168.4	234.9	0.49	0.22	1.83	
2,326.0	15.30	317.20	2,298.2	180.9	-185.2	258.8	1.56	1.17	4.04	
2,419.0	15.70	316.10	2,387.8	198.9	-202.2	283.7	0.53	0.43	-1.18	
2,513.0	16.50	313.00	2,478.1	217.2	-220.8	309.7	1.25	0.85	-3.30	
2,607.0	16.60	313.00	2,568.2	235.5	-240.4	336.5	0.11	0.11	0.00	
2,700.0	14.50	310.00	2,657.8	252.0	-259.1	361.4	2.42	-2.26	-3.23	
2,794.0	14.30	309.60	2,748.9	267.0	-277.0	384.7	0.24	-0.21	-0.43	
2,888.0	15.30	312.10	2,839.8	282.7	-295.2	408.7	1.26	1.06	2.66	
2,981.0	12.80	313.60	2,930.0	298.0	-311.7	431.2	2.72	-2.69	1.61	
3,075.0	13.50	317.90	3,021.5	313.3	-326.6	452.6	1.28	0.74	4.57	
3,169.0	14.20	316.50	3,112.8	329.8	-341.9	475.1	0.83	0.74	-1.49	
3,262.0	14.50	311.30	3,202.9	345.8	-358.5	498.1	1.42	0.32	-5.59	
3,356.0	13.60	311.60	3,294.1	360.9	-375.6	520.9	0.96	-0.96	0.32	
3,447.0	13.50	317.30	3,382.5	375.8	-390.8	542.2	1.47	-0.11	6.26	
3,541.0	14.20	319.50	3,473.8	392.6	-405.8	564.6	0.93	0.74	2.34	
3,634.0	16.60	316.00	3,563.5	410.9	-422.4	589.3	2.77	2.58	-3.76	
3,728.0	17.80	314.40	3,653.3	430.6	-442.0	617.1	1.37	1.28	-1.70	
3,822.0	18.70	313.60	3,742.5	451.0	-463.2	646.5	0.99	0.96	-0.85	
3,916.0	18.40	314.30	3,831.6	471.8	-484.7	676.4	0.40	-0.32	0.74	
4,010.0	14.80	316.40	3,921.7	490.8	-503.6	703.2	3.88	-3.83	2.23	
4,103.0	13.10	310.50	4,012.0	506.3	-519.8	725.6	2.38	-1.83	-6.34	
4,197.0	13.90	317.10	4,103.4	521.5	-535.6	747.5	1.85	0.85	7.02	
4,290.0	13.80	314.20	4,193.7	537.4	-551.1	769.8	0.75	-0.11	-3.12	
4,384.0	16.80	315.80	4,284.3	555.0	-568.7	794.6	3.22	3.19	1.70	
4,478.0	15.60	314.40	4,374.6	573.5	-587.2	820.8	1.34	-1.28	-1.49	
4,572.0	12.60	310.90	4,465.8	589.1	-603.9	843.7	3.32	-3.19	-3.72	
4,665.0	11.60	311.50	4,556.7	601.9	-618.6	863.1	1.08	-1.08	0.65	
4,759.0	11.30	311.40	4,648.8	614.3	-632.6	881.8	0.32	-0.32	-0.11	
4,853.0	10.10	314.70	4,741.2	626.2	-645.4	899.2	1.43	-1.28	3.51	
4,946.0	7.70	310.80	4,833.1	636.0	-655.9	913.6	2.66	-2.58	-4.19	
5,040.0	4.80	317.30	4,926.5	643.0	-663.3	923.8	3.17	-3.09	6.91	
5,133.0	3.20	306.20	5,019.3	647.4	-668.1	930.3	1.90	-1.72	-11.94	
5,227.0	1.40	274.40	5,113.2	649.0	-671.3	933.8	2.28	-1.91	-33.83	
5,321.0	0.80	261.50	5,207.2	649.0	-673.1	935.0	0.69	-0.64	-13.72	
5,413.7	0.50	216.18	5,299.9	648.6	-674.0	935.4	0.62	-0.32	-48.87	
DRILL TGT 1980'FSL, 660'FWL										
5,414.0	0.50	216.00	5,300.2	648.6	-674.0	935.4	0.62	-0.07	-70.28	
5,508.0	0.60	184.50	5,394.2	647.8	-674.3	935.0	0.33	0.11	-33.51	
5,601.0	0.40	192.60	5,487.2	647.0	-674.4	934.5	0.23	-0.22	8.71	
5,695.0	0.10	279.30	5,581.2	646.7	-674.5	934.4	0.43	-0.32	92.23	
5,789.0	0.40	65.80	5,675.2	646.8	-674.3	934.4	0.52	0.32	155.85	
5,882.0	0.40	120.80	5,768.2	646.8	-673.7	933.9	0.40	0.00	59.14	
5,976.0	0.50	143.30	5,862.2	646.3	-673.2	933.2	0.21	0.11	23.94	
6,070.0	0.60	142.80	5,956.1	645.6	-672.7	932.3	0.11	0.11	-0.53	
6,163.0	0.60	146.90	6,049.1	644.8	-672.1	931.4	0.05	0.00	4.41	
6,257.0	0.70	139.90	6,143.1	643.9	-671.5	930.3	0.14	0.11	-7.45	
6,314.0	0.70	137.90	6,200.1	643.4	-671.0	929.6	0.04	0.00	-3.51	
LEGAL WINDOW 400' X 400' 1980'FSL, 660'FWL										
6,351.0	0.70	136.60	6,237.1	643.1	-670.7	929.2	0.04	0.00	-3.51	

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
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Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
6,445.0	0.70	138.70	6,331.1	642.2	-669.9	928.0	0.03	0.00	2.23	
6,538.0	0.70	138.00	6,424.1	641.4	-669.2	926.9	0.01	0.00	-0.75	
6,632.0	0.70	135.90	6,518.1	640.5	-668.4	925.7	0.03	0.00	-2.23	
6,726.0	1.00	127.60	6,612.1	639.6	-667.3	924.4	0.34	0.32	-8.83	
6,819.0	1.80	122.30	6,705.1	638.3	-665.5	922.1	0.87	0.86	-5.70	
6,913.0	2.40	120.20	6,799.0	636.6	-662.5	918.8	0.64	0.64	-2.23	
7,007.0	2.20	125.00	6,892.9	634.5	-659.3	915.1	0.30	-0.21	5.11	
7,100.0	1.80	122.10	6,985.9	632.7	-656.6	911.9	0.44	-0.43	-3.12	
7,194.0	1.40	115.30	7,079.8	631.5	-654.4	909.3	0.47	-0.43	-7.23	
7,288.0	1.30	114.90	7,173.8	630.5	-652.3	907.3	0.11	-0.11	-0.43	
7,365.0	1.20	106.00	7,250.8	629.9	-650.8	905.7	0.28	-0.13	-11.56	
7,410.0	1.20	106.00	7,295.8	629.7	-649.9	904.9	0.00	0.00	0.00	

Checked By: _____ Approved By: _____ Date: _____