

Well Name: **Riverbend 22-18**

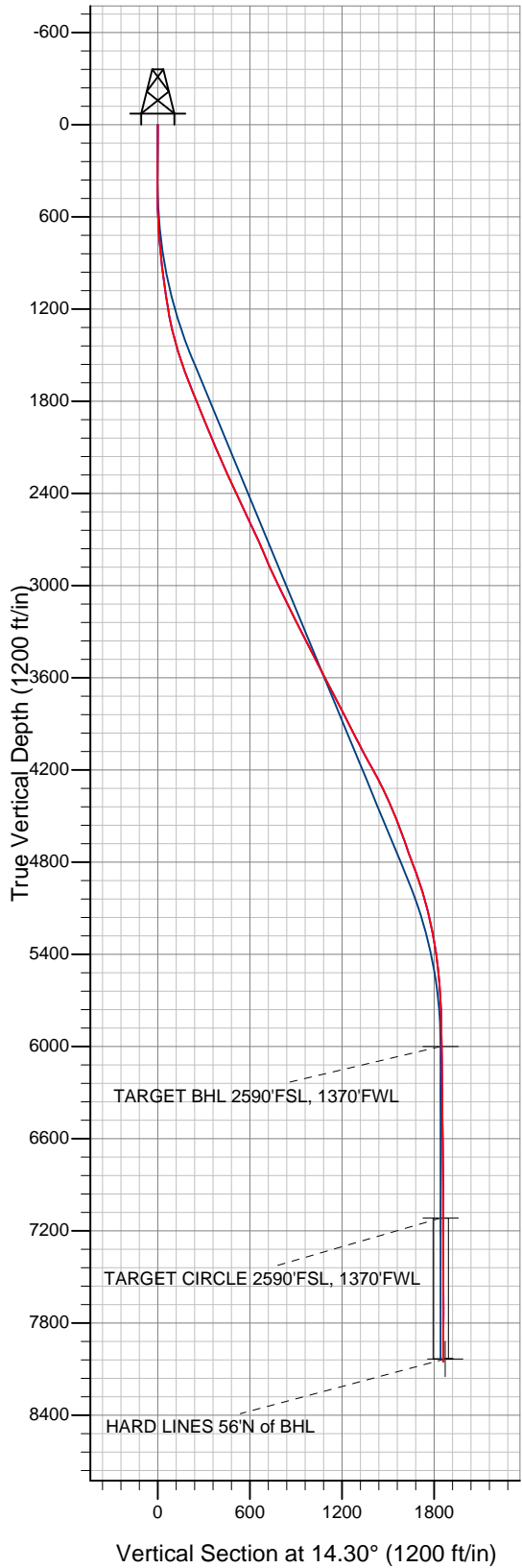
Surface Location: Riverbend 13-18 Pad Sec.18-T1N-R66W  
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4919.0

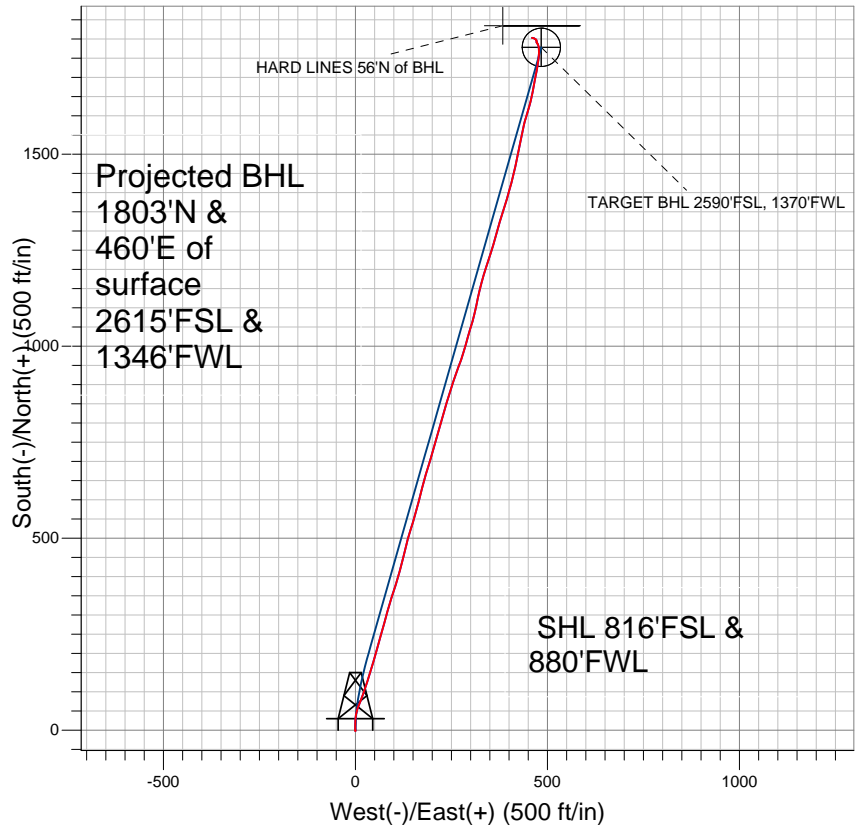
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1260351.10	3188540.12	40° 2' 45.913 N	104° 49' 35.580 W

Original Well Elev WELL @ 4934.0ft (Original Well Elev)

Slot



**Anadarko, Weld County CO**



**LEGEND**

- ✕ Riverbend 22-18, Wellbore #1, Plan #1 (10-12-10) V0
- Wellbore #1
- Survey #1

**Final Survey Plot**

Projected Final Survey -  
8425'MD & 8052'TVD @ 1860' VS  
0.7 deg Inc 282.1 deg AZ

Project: SEC.18-T1N-R66W  
Site: Riverbend 13-18 Pad Sec.18-T1N-R66W  
Well: Riverbend 22-18  
Plan: Wellbore #1



## Directional

# Anadarko, Weld County CO

SEC.18-T1N-R66W

Riverbend 13-18 Pad Sec.18-T1N-R66W

Riverbend 22-18

Wellbore #1

Survey: Survey #1

## Standard Survey Report

15 November, 2010



<b>Company:</b>	Anadarko, Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Riverbend 22-18
<b>Project:</b>	SEC.18-T1N-R66W	<b>TVD Reference:</b>	WELL @ 4934.0ft (Original Well Elev)
<b>Site:</b>	Riverbend 13-18 Pad Sec.18-T1N-R66W	<b>MD Reference:</b>	WELL @ 4934.0ft (Original Well Elev)
<b>Well:</b>	Riverbend 22-18	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	Landmark

<b>Project</b>	SEC.18-T1N-R66W, Weld County, Colorado		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		Using Well Reference Point
<b>Map Zone:</b>	Colorado Northern Zone		Using geodetic scale factor

<b>Site</b>	Riverbend 13-18 Pad Sec.18-T1N-R66W				
<b>Site Position:</b>		<b>Northing:</b>	1,260,291.37 ft	<b>Latitude:</b>	40° 2' 45.323 N
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,188,540.86 ft	<b>Longitude:</b>	104° 49' 35.576 W
<b>Position Uncertainty:</b>	0.0 ft	<b>Slot Radius:</b>	"	<b>Grid Convergence:</b>	0.44 °

<b>Well</b>	Riverbend 22-18					
<b>Well Position</b>	<b>+N/-S</b>	0.0 ft	<b>Northing:</b>	1,260,351.10 ft	<b>Latitude:</b>	40° 2' 45.913 N
	<b>+E/-W</b>	0.0 ft	<b>Easting:</b>	3,188,540.12 ft	<b>Longitude:</b>	104° 49' 35.580 W
<b>Position Uncertainty</b>		0.0 ft	<b>Wellhead Elevation:</b>	ft	<b>Ground Level:</b>	4,919.0 ft

<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>
	IGRF2010	10/12/2010	8.96	66.78	53,008

<b>Design</b>	Wellbore #1				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	14.30	

<b>Survey Program</b>	<b>Date</b>	11/15/2010			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
175.0	8,425.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard	

<b>Survey</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
175.0	0.60	172.10	175.0	-0.9	0.1	-0.8	0.34	0.34	0.00	
268.0	0.70	200.30	268.0	-1.9	0.0	-1.9	0.36	0.11	30.32	
362.0	0.20	236.20	362.0	-2.6	-0.3	-2.6	0.59	-0.53	38.19	
453.0	0.70	333.70	453.0	-2.1	-0.7	-2.3	0.83	0.55	107.14	
543.0	1.50	2.50	543.0	-0.5	-0.9	-0.7	1.05	0.89	32.00	
632.0	2.80	2.20	631.9	2.9	-0.8	2.6	1.46	1.46	-0.34	
719.0	4.50	359.30	718.7	8.4	-0.7	8.0	1.96	1.95	-3.33	
810.0	6.30	1.00	809.3	17.0	-0.7	16.3	1.99	1.98	1.87	
896.0	6.80	2.50	894.8	26.8	-0.4	25.8	0.61	0.58	1.74	
1,034.0	7.00	12.90	1,031.8	43.1	1.8	42.2	0.92	0.14	7.54	
1,121.0	8.10	17.50	1,118.0	54.1	4.9	53.7	1.44	1.26	5.29	
1,212.0	10.00	22.10	1,207.9	67.6	9.8	67.9	2.23	2.09	5.05	

<b>Company:</b>	Anadarko, Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Riverbend 22-18
<b>Project:</b>	SEC.18-T1N-R66W	<b>TVD Reference:</b>	WELL @ 4934.0ft (Original Well Elev)
<b>Site:</b>	Riverbend 13-18 Pad Sec.18-T1N-R66W	<b>MD Reference:</b>	WELL @ 4934.0ft (Original Well Elev)
<b>Well:</b>	Riverbend 22-18	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	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)	
1,302.0	12.70	20.80	1,296.1	84.1	16.2	85.5	3.01	3.00	-1.44	
1,392.0	14.20	19.50	1,383.6	103.7	23.4	106.3	1.70	1.67	-1.44	
1,481.0	16.80	17.30	1,469.4	126.3	30.9	130.0	2.99	2.92	-2.47	
1,570.0	19.00	16.60	1,554.1	152.5	38.9	157.3	2.48	2.47	-0.79	
1,661.0	21.60	17.00	1,639.4	182.7	48.0	188.9	2.86	2.86	0.44	
1,749.0	21.90	14.40	1,721.2	214.1	56.8	221.5	1.15	0.34	-2.95	
1,839.0	21.50	16.40	1,804.8	246.1	65.6	254.7	0.93	-0.44	2.22	
1,928.0	22.50	15.90	1,887.3	278.2	74.9	288.1	1.14	1.12	-0.56	
2,018.0	21.90	14.90	1,970.6	311.0	83.9	322.1	0.79	-0.67	-1.11	
2,109.0	23.10	17.80	2,054.7	344.4	93.8	356.8	1.80	1.32	3.19	
2,199.0	24.20	17.30	2,137.1	378.8	104.6	392.9	1.24	1.22	-0.56	
2,290.0	23.60	15.60	2,220.3	414.1	115.1	429.7	1.00	-0.66	-1.87	
2,381.0	24.10	13.80	2,303.6	449.7	124.4	466.5	0.97	0.55	-1.98	
2,470.0	24.40	13.80	2,384.7	485.2	133.1	503.1	0.34	0.34	0.00	
2,560.0	26.10	17.80	2,466.1	522.1	143.6	541.4	2.68	1.89	4.44	
2,649.0	26.10	15.40	2,546.0	559.6	154.8	580.5	1.19	0.00	-2.70	
2,737.0	24.80	14.70	2,625.5	596.2	164.6	618.4	1.52	-1.48	-0.80	
2,826.0	23.60	15.10	2,706.7	631.4	174.0	654.8	1.36	-1.35	0.45	
2,916.0	23.40	15.50	2,789.2	666.0	183.5	690.7	0.28	-0.22	0.44	
3,007.0	23.00	16.70	2,872.9	700.5	193.4	726.5	0.68	-0.44	1.32	
3,096.0	25.80	16.10	2,953.9	735.7	203.8	763.3	3.16	3.15	-0.67	
3,186.0	26.50	17.30	3,034.7	773.7	215.2	802.9	0.97	0.78	1.33	
3,275.0	26.30	14.40	3,114.4	811.8	226.0	842.5	1.47	-0.22	-3.26	
3,364.0	25.90	16.70	3,194.3	849.5	236.5	881.6	1.22	-0.45	2.58	
3,453.0	26.70	17.20	3,274.1	887.2	248.0	921.0	0.93	0.90	0.56	
3,542.0	26.80	20.20	3,353.6	925.2	260.8	960.9	1.52	0.11	3.37	
3,632.0	27.40	19.20	3,433.7	963.8	274.7	1,001.7	0.84	0.67	-1.11	
3,723.0	28.10	15.50	3,514.3	1,004.2	287.3	1,044.0	2.04	0.77	-4.07	
3,813.0	27.30	17.00	3,593.9	1,044.3	299.0	1,085.8	1.18	-0.89	1.67	
3,903.0	27.10	13.20	3,674.0	1,084.0	309.7	1,126.9	1.94	-0.22	-4.22	
3,994.0	28.00	12.00	3,754.7	1,125.1	318.9	1,169.0	1.16	0.99	-1.32	
4,082.0	27.00	15.10	3,832.7	1,164.6	328.4	1,209.6	1.98	-1.14	3.52	
4,173.0	26.80	17.50	3,913.9	1,204.1	339.9	1,250.8	1.21	-0.22	2.64	
4,263.0	27.10	18.00	3,994.1	1,243.0	352.3	1,291.5	0.42	0.33	0.56	
4,354.0	28.50	15.20	4,074.6	1,283.6	364.4	1,333.9	2.10	1.54	-3.08	
4,442.0	28.30	17.00	4,152.0	1,323.8	376.0	1,375.7	1.00	-0.23	2.05	
4,531.0	28.00	16.80	4,230.5	1,364.0	388.2	1,417.7	0.35	-0.34	-0.22	
4,620.0	27.10	15.60	4,309.4	1,403.5	399.7	1,458.8	1.19	-1.01	-1.35	
4,709.0	25.30	14.60	4,389.3	1,441.5	410.0	1,498.1	2.08	-2.02	-1.12	
4,796.0	22.20	11.80	4,468.9	1,475.6	418.0	1,533.1	3.79	-3.56	-3.22	
4,886.0	20.30	11.90	4,552.8	1,507.5	424.7	1,565.7	2.11	-2.11	0.11	
4,974.0	20.30	10.50	4,635.3	1,537.4	430.7	1,596.2	0.55	0.00	-1.59	
5,062.0	19.20	12.30	4,718.1	1,566.6	436.5	1,625.9	1.43	-1.25	2.05	
5,153.0	20.80	17.00	4,803.6	1,596.7	444.4	1,657.0	2.49	1.76	5.16	
5,239.0	19.90	15.00	4,884.3	1,625.4	452.7	1,686.9	1.32	-1.05	-2.33	
5,330.0	18.20	13.20	4,970.3	1,654.2	459.9	1,716.6	1.98	-1.87	-1.98	
5,421.0	15.10	7.90	5,057.5	1,679.8	464.8	1,742.5	3.79	-3.41	-5.82	
5,507.0	13.00	12.10	5,140.9	1,700.3	468.4	1,763.3	2.71	-2.44	4.88	
5,598.0	11.90	10.10	5,229.7	1,719.6	472.2	1,782.9	1.30	-1.21	-2.20	
5,687.0	10.20	8.50	5,317.1	1,736.4	475.0	1,799.9	1.94	-1.91	-1.80	
5,778.0	8.10	6.60	5,406.9	1,750.8	476.9	1,814.3	2.33	-2.31	-2.09	
5,866.0	6.00	2.20	5,494.3	1,761.5	477.8	1,824.9	2.46	-2.39	-5.00	
5,955.0	5.10	356.70	5,582.8	1,770.1	477.7	1,833.3	1.17	-1.01	-6.18	
6,046.0	3.90	352.40	5,673.6	1,777.2	477.1	1,840.0	1.37	-1.32	-4.73	

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<b>Site:</b>	Riverbend 13-18 Pad Sec.18-T1N-R66W	<b>MD Reference:</b>	WELL @ 4934.0ft (Original Well Elev)
<b>Well:</b>	Riverbend 22-18	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	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)
6,135.0	2.50	345.40	5,762.4	1,782.1	476.2	1,844.5	1.63	-1.57	-7.87
6,224.0	2.30	339.50	5,851.3	1,785.6	475.1	1,847.7	0.36	-0.22	-6.63
6,313.0	0.60	307.90	5,940.3	1,787.6	474.1	1,849.3	2.04	-1.91	-35.51
6,372.5	0.67	312.53	5,999.8	1,788.0	473.6	1,849.6	0.14	0.11	7.79
<b>TARGET BHL 2590'FSL, 1370'FWL</b>									
6,402.0	0.70	314.50	6,029.3	1,788.3	473.3	1,849.8	0.14	0.12	6.67
6,490.0	0.90	312.00	6,117.3	1,789.1	472.4	1,850.4	0.23	0.23	-2.84
6,580.0	0.50	344.40	6,207.3	1,790.0	471.8	1,851.0	0.61	-0.44	36.00
6,669.0	0.60	345.90	6,296.3	1,790.8	471.6	1,851.8	0.11	0.11	1.69
6,758.0	0.70	2.50	6,385.3	1,791.8	471.5	1,852.7	0.24	0.11	18.65
6,849.0	0.70	8.70	6,476.3	1,792.9	471.6	1,853.8	0.08	0.00	6.81
6,937.0	0.80	352.70	6,564.3	1,794.0	471.6	1,854.9	0.26	0.11	-18.18
7,028.0	0.80	348.00	6,655.3	1,795.3	471.4	1,856.1	0.07	0.00	-5.16
7,118.0	0.50	329.20	6,745.3	1,796.2	471.1	1,856.9	0.40	-0.33	-20.89
7,208.0	0.40	331.20	6,835.3	1,796.8	470.7	1,857.4	0.11	-0.11	2.22
7,299.0	0.40	323.60	6,926.2	1,797.4	470.4	1,857.9	0.06	0.00	-8.35
7,389.0	0.30	13.50	7,016.2	1,797.9	470.2	1,858.3	0.34	-0.11	55.44
7,480.0	0.40	94.90	7,107.2	1,798.1	470.6	1,858.6	0.51	0.11	89.45
7,489.7	0.31	90.85	7,117.0	1,798.1	470.7	1,858.6	0.99	-0.96	-41.67
<b>TARGET CIRCLE 2590'FSL, 1370'FWL</b>									
7,569.0	0.50	298.30	7,196.2	1,798.2	470.6	1,858.7	0.99	0.24	-192.41
7,657.0	0.90	297.60	7,284.2	1,798.7	469.6	1,859.0	0.45	0.45	-0.80
7,747.0	0.90	299.50	7,374.2	1,799.4	468.4	1,859.3	0.03	0.00	2.11
7,837.0	0.90	296.70	7,464.2	1,800.1	467.1	1,859.7	0.05	0.00	-3.11
7,927.0	0.90	302.10	7,554.2	1,800.8	465.9	1,860.0	0.09	0.00	6.00
8,018.0	0.90	307.40	7,645.2	1,801.6	464.7	1,860.5	0.09	0.00	5.82
8,108.0	0.90	285.00	7,735.2	1,802.2	463.5	1,860.8	0.39	0.00	-24.89
8,198.0	0.70	264.50	7,825.2	1,802.3	462.3	1,860.6	0.38	-0.22	-22.78
8,289.0	0.70	280.40	7,916.2	1,802.4	461.2	1,860.4	0.21	0.00	17.47
8,379.0	0.70	282.10	8,006.2	1,802.6	460.1	1,860.4	0.02	0.00	1.89
8,407.8	0.70	282.10	8,035.0	1,802.6	459.7	1,860.3	0.00	0.00	0.00
<b>HARD LINES 56'N of BHL</b>									
8,425.0	0.70	282.10	8,052.2	1,802.7	459.5	1,860.3	0.00	0.00	0.00

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_