

Well Name: **Riverbend 12-18**

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  
0.0 0.0

Northing  
1260381.33

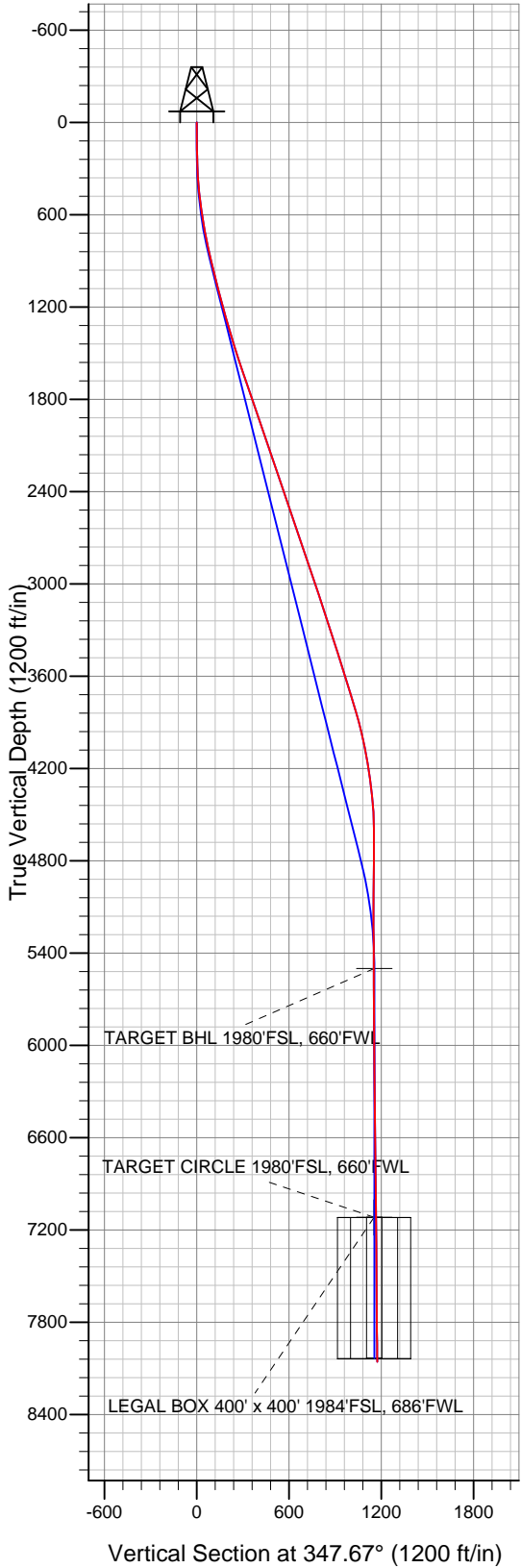
Easting  
3188539.61

Latitude  
40° 2' 46.212 N

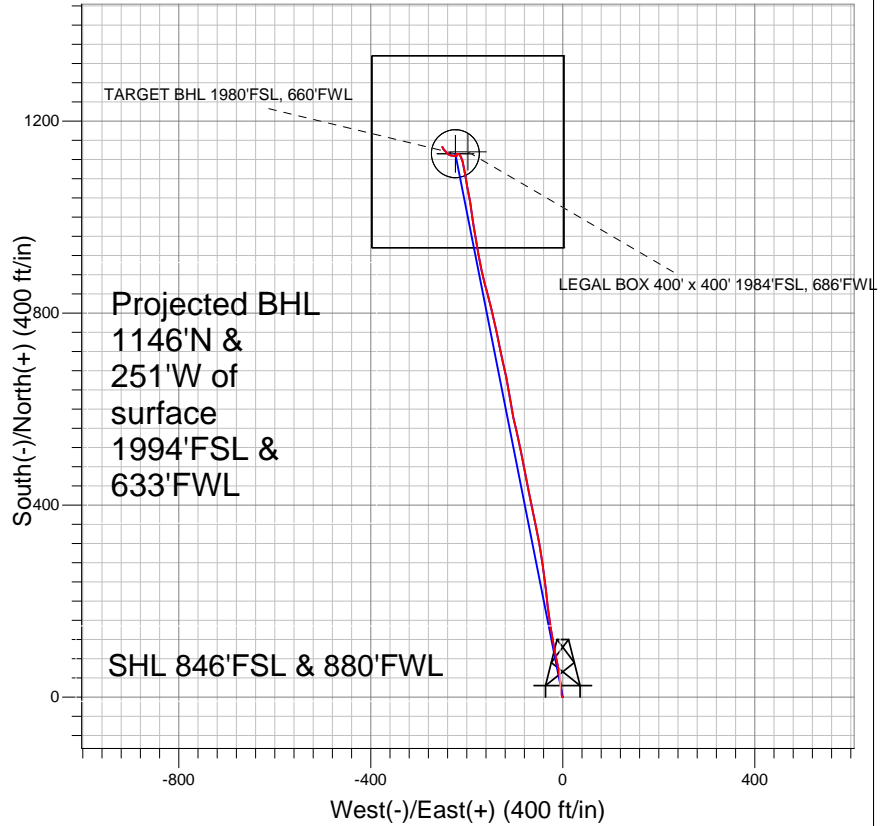
Longitude  
104° 49' 35.584 W

Slot

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



## Anadarko, Weld County CO



### LEGEND

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

## Final Survey Plot

Projected Final Survey -  
8225'MD & 8057'TVD @ 1173' VS  
0.5 deg Inc 341.2 deg AZ

Project: SEC.18-T1N-R66W  
Site: Riverbend 13-18 Pad Sec.18-T1N-R66W  
Well: Riverbend 12-18  
Plan: Wellbore #1



## Directional

# Anadarko, Weld County CO

SEC.18-T1N-R66W

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

Riverbend 12-18

Wellbore #1

Survey: Survey #1

## Standard Survey Report

19 November, 2010



<b>Company:</b>	Anadarko, Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Riverbend 12-18
<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 12-18	<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 12-18					
<b>Well Position</b>	<b>+N-S</b>	0.0 ft	<b>Northing:</b>	1,260,381.33 ft	<b>Latitude:</b>	40° 2' 46.212 N
	<b>+E-W</b>	0.0 ft	<b>Easting:</b>	3,188,539.61 ft	<b>Longitude:</b>	104° 49' 35.584 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	347.67	

<b>Survey Program</b>	<b>Date</b>	11/19/2010			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
175.0	8,225.0	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	0.80	304.30	175.0	0.7	-1.0	0.9	0.46	0.46	0.00	
268.0	1.80	340.10	268.0	2.4	-2.0	2.8	1.34	1.08	38.49	
362.0	4.00	357.30	361.8	7.1	-2.7	7.5	2.49	2.34	18.30	
453.0	5.80	355.10	452.5	14.8	-3.2	15.2	1.99	1.98	-2.42	
543.0	7.70	353.80	541.9	25.4	-4.3	25.7	2.12	2.11	-1.44	
632.0	9.20	353.70	629.9	38.4	-5.7	38.7	1.69	1.69	-0.11	
719.0	10.60	349.80	715.6	53.2	-7.9	53.6	1.78	1.61	-4.48	
810.0	12.30	347.80	804.8	70.9	-11.4	71.7	1.92	1.87	-2.20	
885.0	13.40	349.10	877.9	87.2	-14.7	88.4	1.52	1.47	1.73	
944.0	13.40	348.70	935.3	100.6	-17.4	102.0	0.16	0.00	-0.68	
1,034.0	13.90	350.60	1,022.8	121.5	-21.2	123.2	0.75	0.56	2.11	
1,121.0	14.90	351.30	1,107.0	142.9	-24.6	144.8	1.17	1.15	0.80	

<b>Company:</b>	Anadarko, Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Riverbend 12-18
<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 12-18	<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)	
1,212.0	15.60	351.00	1,194.8	166.5	-28.3	168.7	0.77	0.77	-0.33	
1,302.0	15.80	353.30	1,281.5	190.7	-31.6	193.0	0.73	0.22	2.56	
1,392.0	16.20	353.60	1,368.0	215.3	-34.4	217.7	0.45	0.44	0.33	
1,481.0	17.50	353.90	1,453.2	241.0	-37.2	243.3	1.46	1.46	0.34	
1,570.0	18.10	352.30	1,537.9	268.0	-40.5	270.4	0.87	0.67	-1.80	
1,661.0	19.10	350.40	1,624.2	296.6	-44.9	299.4	1.28	1.10	-2.09	
1,749.0	19.20	349.40	1,707.3	325.1	-49.9	328.2	0.39	0.11	-1.14	
1,839.0	19.20	348.80	1,792.3	354.1	-55.5	357.8	0.22	0.00	-0.67	
1,928.0	19.40	348.50	1,876.3	383.0	-61.3	387.2	0.25	0.22	-0.34	
2,018.0	18.50	348.70	1,961.4	411.6	-67.1	416.5	1.00	-1.00	0.22	
2,109.0	18.90	348.10	2,047.6	440.2	-73.0	445.6	0.49	0.44	-0.66	
2,199.0	18.80	349.60	2,132.8	468.7	-78.6	474.7	0.55	-0.11	1.67	
2,290.0	18.80	348.40	2,218.9	497.5	-84.2	504.0	0.42	0.00	-1.32	
2,381.0	18.90	348.00	2,305.0	526.3	-90.2	533.4	0.18	0.11	-0.44	
2,470.0	18.40	346.90	2,389.4	554.1	-96.4	561.9	0.69	-0.56	-1.24	
2,560.0	19.00	348.30	2,474.6	582.3	-102.6	590.7	0.83	0.67	1.56	
2,649.0	19.30	350.60	2,558.7	611.0	-107.9	619.9	0.91	0.34	2.58	
2,737.0	19.00	350.50	2,641.8	639.4	-112.7	648.7	0.34	-0.34	-0.11	
2,826.0	18.70	347.90	2,726.0	667.7	-118.0	677.5	1.00	-0.34	-2.92	
2,916.0	18.20	347.20	2,811.4	695.5	-124.2	706.0	0.61	-0.56	-0.78	
3,007.0	18.40	347.60	2,897.8	723.4	-130.4	734.5	0.26	0.22	0.44	
3,096.0	18.50	349.00	2,982.2	750.9	-136.1	762.7	0.51	0.11	1.57	
3,186.0	18.40	348.90	3,067.6	778.9	-141.6	791.2	0.12	-0.11	-0.11	
3,275.0	18.20	345.10	3,152.1	806.1	-147.9	819.1	1.36	-0.22	-4.27	
3,364.0	18.40	344.50	3,236.6	833.1	-155.2	847.0	0.31	0.22	-0.67	
3,453.0	18.40	345.90	3,321.1	860.2	-162.4	875.1	0.50	0.00	1.57	
3,542.0	18.80	348.80	3,405.4	887.9	-168.6	903.4	1.13	0.45	3.26	
3,632.0	17.30	349.10	3,491.0	915.3	-173.9	931.3	1.67	-1.67	0.33	
3,723.0	17.30	349.00	3,577.9	941.9	-179.1	958.4	0.03	0.00	-0.11	
3,813.0	17.00	352.40	3,663.9	968.0	-183.4	984.9	1.16	-0.33	3.78	
3,903.0	16.80	351.30	3,750.0	993.9	-187.1	1,011.0	0.42	-0.22	-1.22	
3,994.0	16.10	351.30	3,837.3	1,019.4	-191.0	1,036.7	0.77	-0.77	0.00	
4,082.0	14.00	349.60	3,922.2	1,042.0	-194.7	1,059.5	2.44	-2.39	-1.93	
4,173.0	12.60	349.50	4,010.8	1,062.5	-198.5	1,080.4	1.54	-1.54	-0.11	
4,263.0	10.80	350.10	4,098.9	1,080.5	-201.8	1,098.7	2.00	-2.00	0.67	
4,354.0	8.90	348.30	4,188.6	1,095.8	-204.7	1,114.2	2.11	-2.09	-1.98	
4,442.0	7.80	349.40	4,275.6	1,108.3	-207.1	1,127.0	1.26	-1.25	1.25	
4,531.0	6.40	344.30	4,364.0	1,119.0	-209.6	1,138.0	1.72	-1.57	-5.73	
4,620.0	4.20	330.20	4,452.6	1,126.6	-212.5	1,146.0	2.85	-2.47	-15.84	
4,709.0	2.30	309.40	4,541.4	1,130.6	-215.5	1,150.6	2.48	-2.13	-23.37	
4,796.0	1.50	274.40	4,628.4	1,131.8	-218.0	1,152.3	1.58	-0.92	-40.23	
4,886.0	1.60	268.40	4,718.4	1,131.9	-220.5	1,152.8	0.21	0.11	-6.67	
4,974.0	1.50	155.50	4,806.3	1,130.8	-221.2	1,151.9	2.94	-0.11	-128.30	
5,062.0	1.30	170.90	4,894.3	1,128.7	-220.6	1,149.8	0.48	-0.23	17.50	
5,153.0	0.50	213.30	4,985.3	1,127.4	-220.6	1,148.5	1.09	-0.88	46.59	
5,239.0	1.00	277.70	5,071.3	1,127.2	-221.6	1,148.5	1.05	0.58	74.88	
5,330.0	1.10	282.20	5,162.3	1,127.5	-223.2	1,149.1	0.14	0.11	4.95	
5,421.0	1.10	273.70	5,253.3	1,127.7	-224.9	1,149.7	0.18	0.00	-9.34	
5,507.0	1.00	272.50	5,339.2	1,127.8	-226.5	1,150.2	0.12	-0.12	-1.40	
5,598.0	0.90	264.10	5,430.2	1,127.8	-228.0	1,150.4	0.19	-0.11	-9.23	
5,667.7	0.82	270.81	5,499.9	1,127.7	-229.1	1,150.6	0.18	-0.11	9.63	
<b>TARGET BHL 1980'FSL, 660'FWL</b>										
5,687.0	0.80	272.90	5,519.2	1,127.7	-229.3	1,150.7	0.18	-0.10	10.81	
5,778.0	0.80	277.50	5,610.2	1,127.8	-230.6	1,151.1	0.07	0.00	5.05	

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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 12-18	<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)	
5,866.0	0.90	288.20	5,698.2	1,128.1	-231.9	1,151.6	0.21	0.11	12.16	
5,955.0	1.00	294.10	5,787.2	1,128.7	-233.2	1,152.4	0.16	0.11	6.63	
6,046.0	0.60	266.70	5,878.2	1,129.0	-234.4	1,153.0	0.60	-0.44	-30.11	
6,135.0	0.60	296.50	5,967.2	1,129.1	-235.3	1,153.3	0.35	0.00	33.48	
6,224.0	0.60	291.40	6,056.2	1,129.5	-236.2	1,153.9	0.06	0.00	-5.73	
6,313.0	0.60	304.10	6,145.2	1,130.0	-237.0	1,154.5	0.15	0.00	14.27	
6,402.0	0.80	315.30	6,234.2	1,130.7	-237.8	1,155.4	0.27	0.22	12.58	
6,490.0	0.90	305.10	6,322.2	1,131.5	-238.8	1,156.4	0.21	0.11	-11.59	
6,580.0	1.00	300.70	6,412.1	1,132.3	-240.1	1,157.4	0.14	0.11	-4.89	
6,669.0	0.70	305.20	6,501.1	1,133.0	-241.2	1,158.4	0.35	-0.34	5.06	
6,758.0	0.80	320.90	6,590.1	1,133.8	-242.0	1,159.3	0.26	0.11	17.64	
6,849.0	0.80	330.20	6,681.1	1,134.8	-242.7	1,160.5	0.14	0.00	10.22	
6,937.0	0.70	329.60	6,769.1	1,135.8	-243.3	1,161.6	0.11	-0.11	-0.68	
7,028.0	0.70	316.00	6,860.1	1,136.7	-244.0	1,162.6	0.18	0.00	-14.95	
7,118.0	0.70	315.00	6,950.1	1,137.5	-244.8	1,163.5	0.01	0.00	-1.11	
7,208.0	0.70	306.70	7,040.1	1,138.2	-245.6	1,164.4	0.11	0.00	-9.22	
7,284.7	0.70	315.21	7,116.7	1,138.8	-246.3	1,165.2	0.14	0.00	11.11	
<b>TARGET CIRCLE 1980'FSL, 660'FWL</b>										
7,286.5	0.70	315.42	7,118.6	1,138.8	-246.3	1,165.2	0.14	0.01	11.08	
<b>LEGAL BOX 400' x 400' 1984'FSL, 686'FWL</b>										
7,299.0	0.70	316.80	7,131.1	1,139.0	-246.4	1,165.3	0.14	0.01	11.06	
7,389.0	0.70	328.60	7,221.1	1,139.8	-247.1	1,166.3	0.16	0.00	13.11	
7,480.0	0.60	321.30	7,312.1	1,140.7	-247.7	1,167.3	0.14	-0.11	-8.02	
7,569.0	0.50	324.20	7,401.1	1,141.4	-248.2	1,168.0	0.12	-0.11	3.26	
7,657.0	0.60	340.60	7,489.1	1,142.1	-248.6	1,168.8	0.21	0.11	18.64	
7,747.0	0.40	324.80	7,579.1	1,142.8	-248.9	1,169.6	0.27	-0.22	-17.56	
7,837.0	0.30	325.30	7,669.1	1,143.3	-249.2	1,170.1	0.11	-0.11	0.56	
7,927.0	0.40	336.10	7,759.1	1,143.7	-249.5	1,170.6	0.13	0.11	12.00	
8,018.0	0.50	327.70	7,850.0	1,144.4	-249.8	1,171.3	0.13	0.11	-9.23	
8,108.0	0.50	337.10	7,940.0	1,145.1	-250.2	1,172.1	0.09	0.00	10.44	
8,179.0	0.50	341.20	8,011.0	1,145.6	-250.4	1,172.7	0.05	0.00	5.77	
8,225.0	0.50	341.20	8,057.0	1,146.0	-250.5	1,173.1	0.00	0.00	0.00	

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