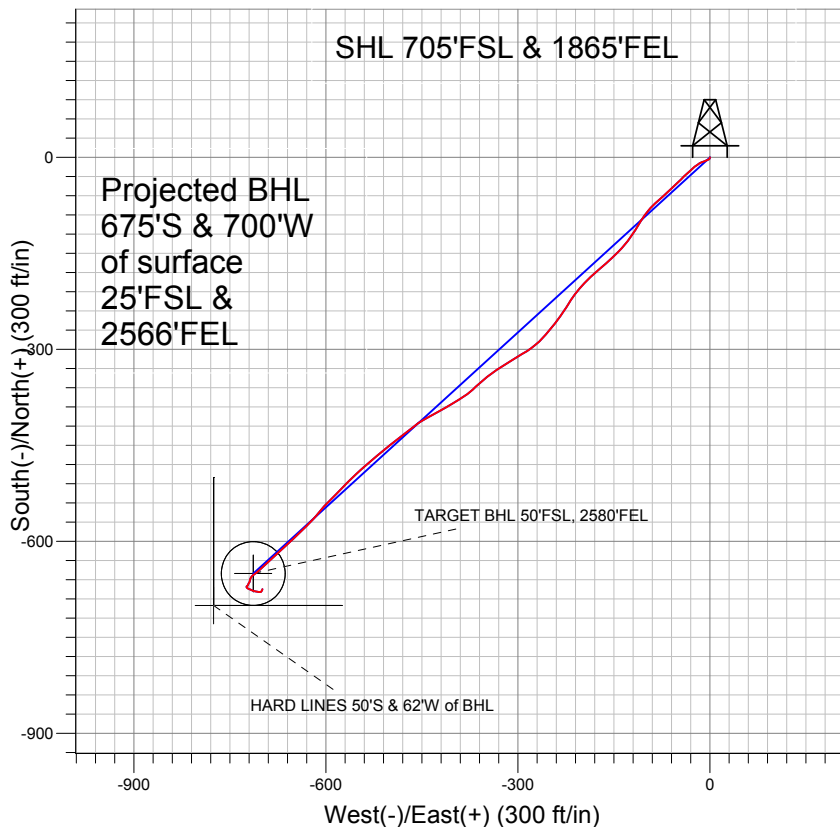


## Anadarko, Weld County CO



### LEGEND

- ✚ Cottonwood 36-33, Wellbore #1, Plan #1 (11-04-10) V0
- ✚ Wellbore #1
- Survey #1

## Final Survey Plot

Projected Final Survey -  
8270'MD & 8155'TVD @ 972' VS  
0.9 deg Inc 16.0 deg AZ

Project: SEC.33-T2N-R66W  
Site: Cottonwood 15-33 Pad Sec.33-T2N-R66W  
Well: Cottonwood 36-33  
Plan: Wellbore #1



## **Directional**

### **Anadarko, Weld County CO**

**SEC.33-T2N-R66W**

**Cottonwood 15-33 Pad Sec.33-T2N-R66W**

**Cottonwood 36-33**

**Wellbore #1**

**Survey: Survey #1**

### **Standard Survey Report**

**01 December, 2010**

<b>Company:</b>	Anadarko, Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Cottonwood 36-33
<b>Project:</b>	SEC.33-T2N-R66W	<b>TVD Reference:</b>	WELL @ 4997.0ft (Original Well Elev)
<b>Site:</b>	Cottonwood 15-33 Pad Sec.33-T2N-R66W	<b>MD Reference:</b>	WELL @ 4997.0ft (Original Well Elev)
<b>Well:</b>	Cottonwood 36-33	<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.33-T2N-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>	Cottonwood 15-33 Pad Sec.33-T2N-R66W		
<b>Site Position:</b>		<b>Northing:</b>	1,276,226.88 ft
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,201,622.77 ft
<b>Position Uncertainty:</b>	0.0 ft	<b>Slot Radius:</b>	"
		<b>Latitude:</b>	40° 5' 21.786 N
		<b>Longitude:</b>	104° 46' 45.700 W
		<b>Grid Convergence:</b>	0.47 °

<b>Well</b>	Cottonwood 36-33		
<b>Well Position</b>	<b>+N/-S</b>	0.0 ft	<b>Northing:</b>
	<b>+E/-W</b>	0.0 ft	<b>Easting:</b>
<b>Position Uncertainty</b>	0.0 ft	<b>Wellhead Elevation:</b>	ft
		<b>Latitude:</b>	40° 5' 21.469 N
		<b>Longitude:</b>	104° 46' 45.700 W
		<b>Ground Level:</b>	4,982.0 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	11/4/2010	8.93	66.82	53,029

<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	226.03	

<b>Survey Program</b>	<b>Date</b>	12/1/2010			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
176.0	8,270.0	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	
176.0	0.30	199.80	176.0	-0.4	-0.2	0.4	0.17	0.17	0.00	
268.0	0.30	201.80	268.0	-0.9	-0.3	0.8	0.01	0.00	2.17	
421.0	0.40	197.10	421.0	-1.8	-0.6	1.7	0.07	0.07	-3.07	
574.0	0.60	229.70	574.0	-2.8	-1.4	2.9	0.22	0.13	21.31	
760.0	1.50	247.50	760.0	-4.4	-4.4	6.2	0.51	0.48	9.57	
958.0	2.20	251.50	957.9	-6.6	-10.4	12.0	0.36	0.35	2.02	
1,024.0	2.20	247.40	1,023.8	-7.4	-12.8	14.4	0.24	0.00	-6.21	
1,119.0	2.90	238.80	1,118.7	-9.4	-16.5	18.4	0.84	0.74	-9.05	
1,214.0	4.00	233.40	1,213.5	-12.6	-21.2	24.0	1.21	1.16	-5.68	
1,309.0	5.10	228.60	1,308.2	-17.4	-27.0	31.5	1.22	1.16	-5.05	
1,404.0	6.10	227.60	1,402.8	-23.6	-33.9	40.8	1.06	1.05	-1.05	
1,499.0	8.00	226.60	1,497.1	-31.5	-42.5	52.5	2.00	2.00	-1.05	

<b>Company:</b>	Anadarko, Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Cottonwood 36-33
<b>Project:</b>	SEC.33-T2N-R66W	<b>TVD Reference:</b>	WELL @ 4997.0ft (Original Well Elev)
<b>Site:</b>	Cottonwood 15-33 Pad Sec.33-T2N-R66W	<b>MD Reference:</b>	WELL @ 4997.0ft (Original Well Elev)
<b>Well:</b>	Cottonwood 36-33	<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)
1,595.0	10.10	225.40	1,591.9	-42.0	-53.3	67.5	2.20	2.19	-1.25
1,690.0	11.70	227.20	1,685.1	-54.4	-66.3	85.5	1.72	1.68	1.89
1,785.0	13.00	229.10	1,777.9	-68.0	-81.5	105.8	1.43	1.37	2.00
1,880.0	12.40	220.00	1,870.6	-82.8	-96.1	126.6	2.20	-0.63	-9.58
1,975.0	13.30	212.70	1,963.3	-99.8	-108.6	147.4	1.95	0.95	-7.68
2,073.0	14.10	211.20	2,058.5	-119.5	-120.8	169.9	0.89	0.82	-1.53
2,168.0	15.00	222.50	2,150.4	-138.4	-135.1	193.4	3.13	0.95	11.89
2,263.0	15.90	225.70	2,242.0	-156.6	-152.8	218.7	1.30	0.95	3.37
2,358.0	17.20	230.10	2,333.1	-174.7	-172.8	245.7	1.90	1.37	4.63
2,453.0	15.60	224.80	2,424.2	-192.8	-192.6	272.5	2.30	-1.68	-5.58
2,549.0	16.60	217.60	2,516.4	-212.8	-210.1	298.9	2.32	1.04	-7.50
2,644.0	15.80	210.70	2,607.7	-234.7	-225.0	324.8	2.19	-0.84	-7.26
2,739.0	15.50	218.40	2,699.2	-255.7	-239.5	349.9	2.21	-0.32	8.11
2,834.0	15.60	220.00	2,790.7	-275.5	-255.6	375.2	0.46	0.11	1.68
2,929.0	14.80	230.10	2,882.4	-293.0	-273.1	400.0	2.91	-0.84	10.63
3,025.0	15.70	240.40	2,975.0	-307.3	-293.8	424.8	2.97	0.94	10.73
3,120.0	15.40	236.90	3,066.5	-320.6	-315.5	449.7	1.04	-0.32	-3.68
3,215.0	15.10	236.30	3,158.2	-334.3	-336.4	474.2	0.36	-0.32	-0.63
3,310.0	14.00	228.60	3,250.2	-348.8	-355.3	497.9	2.34	-1.16	-8.11
3,405.0	11.40	227.00	3,342.8	-362.8	-370.8	518.7	2.76	-2.74	-1.68
3,500.0	11.80	238.30	3,435.9	-374.3	-385.9	537.6	2.42	0.42	11.89
3,595.0	13.20	237.80	3,528.6	-385.2	-403.4	557.7	1.48	1.47	-0.53
3,691.0	14.40	241.60	3,621.9	-396.7	-423.2	580.0	1.57	1.25	3.96
3,786.0	13.50	241.70	3,714.1	-407.6	-443.3	602.0	0.95	-0.95	0.11
3,881.0	14.60	231.20	3,806.2	-420.3	-462.4	624.6	2.92	1.16	-11.05
3,976.0	14.60	232.70	3,898.2	-435.1	-481.3	648.4	0.40	0.00	1.58
4,071.0	15.30	231.50	3,990.0	-450.2	-500.6	672.8	0.81	0.74	-1.26
4,166.0	15.90	229.90	4,081.5	-466.3	-520.4	698.3	0.78	0.63	-1.68
4,262.0	15.10	228.80	4,174.0	-483.1	-539.8	723.9	0.89	-0.83	-1.15
4,357.0	17.20	226.40	4,265.2	-500.9	-559.3	750.3	2.32	2.21	-2.53
4,452.0	15.20	223.00	4,356.4	-519.7	-578.0	776.8	2.33	-2.11	-3.58
4,547.0	14.50	225.90	4,448.3	-537.1	-595.0	801.1	1.07	-0.74	3.05
4,642.0	13.90	218.50	4,540.4	-554.3	-610.7	824.3	2.01	-0.63	-7.79
4,737.0	12.60	225.80	4,632.9	-570.4	-625.2	846.0	2.23	-1.37	7.68
4,833.0	13.50	224.50	4,726.4	-585.7	-640.6	867.7	0.99	0.94	-1.35
4,927.0	11.90	227.30	4,818.1	-600.1	-655.4	888.3	1.82	-1.70	2.98
5,022.0	10.30	228.40	4,911.3	-612.4	-668.9	906.6	1.70	-1.68	1.16
5,117.0	7.70	227.70	5,005.1	-622.3	-680.0	921.5	2.74	-2.74	-0.74
5,212.0	6.40	226.70	5,099.4	-630.3	-688.5	933.1	1.37	-1.37	-1.05
5,308.0	4.80	222.70	5,194.9	-636.9	-695.2	942.5	1.71	-1.67	-4.17
5,403.0	4.00	231.90	5,289.7	-641.8	-700.5	949.7	1.12	-0.84	9.68
5,498.0	3.40	227.20	5,384.5	-645.8	-705.1	955.9	0.71	-0.63	-4.95
5,593.0	2.50	233.00	5,479.3	-649.0	-708.9	960.7	1.00	-0.95	6.11
5,688.0	1.70	228.10	5,574.3	-651.1	-711.6	964.2	0.86	-0.84	-5.16
5,783.0	1.30	238.80	5,669.2	-652.6	-713.5	966.7	0.51	-0.42	11.26
5,813.7	1.17	237.51	5,700.0	-653.0	-714.1	967.3	0.43	-0.42	-4.21
<b>TARGET BHL 50°FSL, 2580°FEL</b>									
5,878.0	0.90	233.60	5,764.2	-653.6	-715.1	968.4	0.43	-0.42	-6.08
5,974.0	0.60	220.70	5,860.2	-654.5	-716.0	969.7	0.36	-0.31	-13.44
6,069.0	0.50	211.40	5,955.2	-655.2	-716.5	970.6	0.14	-0.11	-9.79
6,164.0	0.50	218.00	6,050.2	-655.9	-717.0	971.4	0.06	0.00	6.95
6,259.0	0.60	206.80	6,145.2	-656.7	-717.5	972.3	0.15	0.11	-11.79
6,354.0	1.10	208.40	6,240.2	-657.9	-718.1	973.6	0.53	0.53	1.68
6,449.0	0.90	183.70	6,335.2	-659.5	-718.6	975.0	0.50	-0.21	-26.00

<b>Company:</b>	Anadarko, Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Cottonwood 36-33
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<b>Site:</b>	Cottonwood 15-33 Pad Sec.33-T2N-R66W	<b>MD Reference:</b>	WELL @ 4997.0ft (Original Well Elev)
<b>Well:</b>	Cottonwood 36-33	<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)
6,545.0	0.80	194.20	6,431.2	-660.9	-718.8	976.2	0.19	-0.10	10.94
6,640.0	0.70	198.00	6,526.1	-662.0	-719.2	977.2	0.12	-0.11	4.00
6,735.0	0.60	199.70	6,621.1	-663.1	-719.5	978.2	0.11	-0.11	1.79
6,830.0	0.70	208.60	6,716.1	-664.0	-720.0	979.2	0.15	0.11	9.37
6,925.0	0.80	213.70	6,811.1	-665.1	-720.6	980.4	0.13	0.11	5.37
7,021.0	0.80	201.80	6,907.1	-666.3	-721.2	981.7	0.17	0.00	-12.40
7,116.0	0.70	205.90	7,002.1	-667.4	-721.7	982.8	0.12	-0.11	4.32
7,211.0	0.70	213.10	7,097.1	-668.4	-722.3	983.9	0.09	0.00	7.58
7,297.7	0.70	220.31	7,183.7	-669.3	-722.9	985.0	0.10	0.00	8.32
<b>TARGET CIRCLE 50°FSL &amp; 2580°FEL</b>									
7,306.0	0.70	221.00	7,192.1	-669.4	-723.0	985.1	0.10	0.01	8.30
7,401.0	0.90	231.70	7,287.1	-670.3	-724.0	986.4	0.26	0.21	11.26
7,496.0	0.90	162.20	7,382.1	-671.4	-724.3	987.5	1.08	0.00	-73.16
7,592.0	1.90	126.30	7,478.0	-673.1	-722.8	987.5	1.34	1.04	-37.40
7,687.0	3.00	114.40	7,573.0	-675.1	-719.3	986.3	1.27	1.16	-12.53
7,782.0	4.90	107.70	7,667.7	-677.3	-713.1	983.5	2.05	2.00	-7.05
7,877.0	4.00	98.40	7,762.4	-679.0	-706.0	979.5	1.21	-0.95	-9.79
7,973.0	1.20	57.70	7,858.3	-679.0	-701.8	976.5	3.32	-2.92	-42.40
8,067.0	0.90	29.50	7,952.3	-677.8	-700.6	974.8	0.63	-0.32	-30.00
8,163.0	0.90	16.40	8,048.3	-676.4	-700.1	973.5	0.21	0.00	-13.65
8,217.0	0.90	16.02	8,102.3	-675.6	-699.8	972.7	0.01	0.00	-0.70
<b>HARD LINES 50'S &amp; 62'W of BHL</b>									
8,220.0	0.90	16.00	8,105.3	-675.6	-699.8	972.7	0.01	0.00	-0.70
8,270.0	0.90	16.00	8,155.3	-674.8	-699.6	972.0	0.00	0.00	0.00

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