



# **Anadarko Petroleum Corporation**

**Riverbend**

**Riverbend 14 Pad**

**Riverbend 35-12 (111408) - Slot 35-12**

**35-12**

**Survey: 35-12**

## **Survey Report - Geographic**

**16 December, 2011**

# Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Riverbend 35-12 (111408) - Slot 35-12
<b>Project:</b>	Riverbend	<b>TVD Reference:</b>	KB @ 4968.00ft (Original Well Elev)
<b>Site:</b>	Riverbend 14 Pad	<b>MD Reference:</b>	KB @ 4968.00ft (Original Well Elev)
<b>Well:</b>	Riverbend 35-12 (111408)	<b>North Reference:</b>	True
<b>Wellbore:</b>	35-12	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	35-12	<b>Database:</b>	EDM5000

<b>Project</b>	Riverbend		
<b>Map System:</b>	Universal Transverse Mercator	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD83 Colorado - HARN		
<b>Map Zone:</b>	Zone 13N (108 W to 102 W)		

<b>Site</b>	Riverbend 14 Pad		
<b>Site Position:</b>		<b>Northing:</b>	14,547,138.00 usft
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,683,122.87 usft
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	13.20 in
		<b>Latitude:</b>	40.055934°N
		<b>Longitude:</b>	104.847381°W
		<b>Grid Convergence:</b>	0.10 °

<b>Well</b>	Riverbend 35-12 (111408) - Slot 35-12		
<b>Well Position</b>	<b>+N/-S</b>	0.00 ft	<b>Northing:</b>
	<b>+E/-W</b>	0.00 ft	<b>Easting:</b>
<b>Position Uncertainty</b>	0.00 ft	<b>Wellhead Elevation:</b>	ft
		<b>Latitude:</b>	40.056071°N
		<b>Longitude:</b>	104.847382°W
		<b>Ground Level:</b>	4,953.00 ft

<b>Wellbore</b>	35-12		
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination</b>
			(°)
	IGRF2010	02/22/12	8.79
			Dip Angle
			(°)
			66.73
			Field Strength
			(nT)
			52,868

<b>Design</b>	35-12		
<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)</b>	<b>+N/-S</b>	<b>+E/-W</b>
	(ft)	(ft)	(ft)
	0.00	0.00	0.00
			Direction
			(°)
			49.01

<b>Survey Program</b>	<b>Date</b>	12/15/11		
<b>From</b>	<b>To</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
(ft)	(ft)			
83.00	8,265.00	35-12 (35-12)	MWD	MWD - Standard

<b>Survey</b>									
<b>Measured</b>	<b>Inclination</b>	<b>Azimuth</b>	<b>Vertical</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Map</b>	<b>Map</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Depth</b>	(°)	(°)	<b>Depth</b>	(ft)	(ft)	<b>Northing</b>	<b>Easting</b>		
(ft)			(ft)			(usft)	(usft)		
0.00	0.00	0.00	0.00	0.00	0.00	14,547,188.00	1,683,122.66	40.056071°N	104.847382°W
4.02	0.03	107.10	4.02	0.00	0.00	14,547,188.00	1,683,122.66	40.056071°N	104.847382°W
<b>Chikuma Harry S #2 (VE) at 1400</b>									
4.39	0.03	107.10	4.39	0.00	0.00	14,547,188.00	1,683,122.66	40.056071°N	104.847382°W
<b>Chikuma Harry S #2 (VE) at TD</b>									
83.00	0.62	107.10	83.00	-0.13	0.43	14,547,187.87	1,683,123.09	40.056071°N	104.847380°W
176.00	0.62	111.09	175.99	-0.46	1.38	14,547,187.54	1,683,124.04	40.056070°N	104.847377°W
237.00	1.19	94.48	236.99	-0.63	2.32	14,547,187.38	1,683,124.98	40.056070°N	104.847373°W
300.00	2.20	77.70	299.96	-0.42	4.15	14,547,187.59	1,683,126.82	40.056070°N	104.847367°W
392.00	4.31	50.89	391.81	2.13	8.56	14,547,190.15	1,683,131.22	40.056077°N	104.847351°W
484.00	6.28	52.69	483.41	7.37	15.25	14,547,195.39	1,683,137.90	40.056092°N	104.847327°W
575.00	7.69	61.30	573.74	13.31	24.55	14,547,201.35	1,683,147.19	40.056108°N	104.847294°W

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<b>Company:</b>	Anadarko Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Riverbend 35-12 (111408) - Slot 35-12
<b>Project:</b>	Riverbend	<b>TVD Reference:</b>	KB @ 4968.00ft (Original Well Elev)
<b>Site:</b>	Riverbend 14 Pad	<b>MD Reference:</b>	KB @ 4968.00ft (Original Well Elev)
<b>Well:</b>	Riverbend 35-12 (111408)	<b>North Reference:</b>	True
<b>Wellbore:</b>	35-12	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	35-12	<b>Database:</b>	EDM5000

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
666.00	9.49	69.17	663.71	18.90	36.90	14,547,206.96	1,683,159.53	40.056123°N	104.847250°W
756.00	10.42	68.91	752.36	24.47	51.43	14,547,212.56	1,683,174.05	40.056139°N	104.847198°W
848.00	10.90	69.08	842.77	30.57	67.32	14,547,218.68	1,683,189.93	40.056155°N	104.847141°W
940.00	10.81	69.48	933.12	36.70	83.52	14,547,224.84	1,683,206.12	40.056172°N	104.847083°W
953.00	10.81	69.48	945.89	37.55	85.80	14,547,225.70	1,683,208.40	40.056175°N	104.847075°W
998.00	10.81	69.48	990.10	40.51	93.71	14,547,228.67	1,683,216.30	40.056183°N	104.847047°W
1,007.00	11.12	67.37	998.93	41.14	95.30	14,547,229.30	1,683,217.89	40.056184°N	104.847041°W
1,097.00	10.11	63.68	1,087.39	47.98	110.39	14,547,236.17	1,683,232.97	40.056203°N	104.846987°W
1,187.00	12.48	57.57	1,175.64	56.70	125.68	14,547,244.92	1,683,248.25	40.056227°N	104.846933°W
1,274.00	14.11	54.49	1,260.31	67.90	142.25	14,547,256.15	1,683,264.80	40.056258°N	104.846873°W
1,364.00	15.51	48.30	1,347.32	82.28	160.17	14,547,270.56	1,683,282.69	40.056297°N	104.846809°W
1,454.00	15.51	47.20	1,434.05	98.46	177.98	14,547,286.77	1,683,300.48	40.056342°N	104.846746°W
1,542.00	15.82	45.48	1,518.78	114.87	195.17	14,547,303.20	1,683,317.63	40.056387°N	104.846684°W
1,629.00	16.08	44.21	1,602.43	131.82	212.02	14,547,320.18	1,683,334.46	40.056433°N	104.846624°W
1,717.00	15.12	47.99	1,687.19	148.23	229.05	14,547,336.63	1,683,351.46	40.056478°N	104.846563°W
1,805.00	14.72	45.98	1,772.22	163.68	245.62	14,547,352.11	1,683,368.00	40.056521°N	104.846504°W
1,895.00	14.50	43.68	1,859.31	179.78	261.62	14,547,368.23	1,683,383.98	40.056565°N	104.846447°W
1,985.00	13.58	41.79	1,946.62	195.81	276.44	14,547,384.28	1,683,398.77	40.056609°N	104.846394°W
2,074.00	13.40	45.57	2,033.17	210.82	290.77	14,547,399.32	1,683,413.07	40.056650°N	104.846343°W
2,163.00	12.92	49.31	2,119.83	224.52	305.68	14,547,413.05	1,683,427.96	40.056688°N	104.846289°W
2,253.00	11.82	47.90	2,207.74	237.26	320.15	14,547,425.81	1,683,442.41	40.056723°N	104.846238°W
2,342.00	10.81	45.57	2,295.01	249.22	332.87	14,547,437.79	1,683,455.11	40.056756°N	104.846192°W
2,432.00	11.69	46.01	2,383.28	261.46	345.46	14,547,450.05	1,683,467.68	40.056789°N	104.846147°W
2,521.00	12.00	51.77	2,470.39	273.45	359.22	14,547,462.06	1,683,481.41	40.056822°N	104.846098°W
2,610.00	13.32	54.41	2,557.23	285.14	374.82	14,547,473.78	1,683,497.00	40.056854°N	104.846042°W
2,700.00	11.91	50.89	2,645.05	297.03	390.46	14,547,485.70	1,683,512.61	40.056887°N	104.845986°W
2,790.00	13.10	53.17	2,732.92	309.00	405.83	14,547,497.70	1,683,527.96	40.056920°N	104.845931°W
2,880.00	12.61	51.50	2,820.66	321.23	421.68	14,547,509.96	1,683,543.79	40.056954°N	104.845875°W
2,969.00	13.49	50.27	2,907.36	333.92	437.27	14,547,522.67	1,683,559.36	40.056988°N	104.845819°W
3,057.00	15.12	50.41	2,992.63	347.79	454.01	14,547,536.57	1,683,576.08	40.057026°N	104.845759°W
3,147.00	13.71	49.40	3,079.79	362.21	471.15	14,547,551.02	1,683,593.19	40.057066°N	104.845698°W
3,236.00	14.50	49.09	3,166.11	376.37	487.58	14,547,565.21	1,683,609.60	40.057105°N	104.845639°W
3,326.00	13.10	47.51	3,253.51	390.64	503.62	14,547,579.51	1,683,625.61	40.057144°N	104.845582°W
3,415.00	13.40	46.50	3,340.14	404.55	518.54	14,547,593.44	1,683,640.51	40.057182°N	104.845529°W
3,503.00	14.59	50.41	3,425.53	418.64	534.48	14,547,607.55	1,683,656.42	40.057221°N	104.845472°W
3,592.00	12.70	50.27	3,512.01	432.04	550.64	14,547,620.98	1,683,672.56	40.057258°N	104.845414°W
3,680.00	13.10	52.08	3,597.79	444.35	565.95	14,547,633.32	1,683,687.85	40.057292°N	104.845359°W
3,767.00	13.89	53.39	3,682.39	456.63	582.11	14,547,645.63	1,683,703.99	40.057325°N	104.845301°W
3,856.00	14.19	52.38	3,768.73	469.66	599.32	14,547,658.69	1,683,721.18	40.057361°N	104.845240°W
3,944.00	12.48	52.91	3,854.36	481.98	615.45	14,547,671.04	1,683,737.29	40.057395°N	104.845182°W
4,034.00	13.80	45.48	3,942.00	495.38	630.86	14,547,684.46	1,683,752.68	40.057432°N	104.845127°W
4,123.00	12.39	43.68	4,028.69	509.72	645.03	14,547,698.83	1,683,766.81	40.057471°N	104.845077°W
4,212.00	13.36	45.00	4,115.45	523.90	658.89	14,547,713.03	1,683,780.66	40.057510°N	104.845027°W
4,302.00	14.99	42.67	4,202.71	539.81	674.13	14,547,728.97	1,683,795.87	40.057554°N	104.844973°W
4,390.00	14.19	40.78	4,287.87	556.35	688.89	14,547,745.53	1,683,810.60	40.057599°N	104.844920°W
4,480.00	13.40	49.88	4,375.28	571.42	704.08	14,547,760.63	1,683,825.76	40.057641°N	104.844866°W
4,571.00	11.69	50.19	4,464.11	584.12	719.22	14,547,773.35	1,683,840.88	40.057675°N	104.844811°W
4,659.00	11.60	51.77	4,550.30	595.31	733.02	14,547,784.56	1,683,854.66	40.057706°N	104.844762°W
4,749.00	13.32	45.40	4,638.18	608.19	747.51	14,547,797.47	1,683,869.13	40.057742°N	104.844710°W
4,839.00	14.99	44.69	4,725.44	623.74	763.08	14,547,813.05	1,683,884.67	40.057784°N	104.844655°W
4,930.00	14.90	43.68	4,813.36	640.57	779.44	14,547,829.90	1,683,901.00	40.057830°N	104.844596°W
5,019.00	13.80	43.20	4,899.59	656.58	794.61	14,547,845.94	1,683,916.14	40.057874°N	104.844542°W
5,107.00	11.60	43.29	4,985.43	670.67	807.86	14,547,860.06	1,683,929.37	40.057913°N	104.844495°W
5,197.00	11.91	43.59	5,073.54	683.99	820.47	14,547,873.39	1,683,941.96	40.057950°N	104.844450°W
5,287.00	11.82	53.57	5,161.63	696.19	834.29	14,547,885.62	1,683,955.76	40.057983°N	104.844400°W

# Survey Report - Geographic

<b>Company:</b>	Anadarko Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Riverbend 35-12 (111408) - Slot 35-12
<b>Project:</b>	Riverbend	<b>TVD Reference:</b>	KB @ 4968.00ft (Original Well Elev)
<b>Site:</b>	Riverbend 14 Pad	<b>MD Reference:</b>	KB @ 4968.00ft (Original Well Elev)
<b>Well:</b>	Riverbend 35-12 (111408)	<b>North Reference:</b>	True
<b>Wellbore:</b>	35-12	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	35-12	<b>Database:</b>	EDM5000

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,376.00	14.28	51.37	5,248.32	708.46	850.20	14,547,897.91	1,683,971.65	40.058017°N	104.844343°W
5,463.00	14.02	41.97	5,332.69	722.99	865.63	14,547,912.47	1,683,987.05	40.058057°N	104.844288°W
5,550.00	12.22	41.31	5,417.42	737.74	878.76	14,547,927.25	1,684,000.15	40.058097°N	104.844241°W
5,640.00	11.12	44.87	5,505.56	751.05	891.17	14,547,940.58	1,684,012.54	40.058134°N	104.844197°W
5,730.00	11.60	50.27	5,593.80	762.99	904.25	14,547,952.53	1,684,025.60	40.058167°N	104.844150°W
5,820.00	11.82	55.99	5,681.93	773.93	918.85	14,547,963.50	1,684,040.19	40.058197°N	104.844098°W
5,909.00	12.00	57.17	5,769.01	784.04	934.18	14,547,973.64	1,684,055.50	40.058224°N	104.844043°W
5,997.00	11.21	57.79	5,855.21	793.56	949.11	14,547,983.18	1,684,070.41	40.058251°N	104.843990°W
6,086.00	11.12	48.38	5,942.53	803.87	962.84	14,547,993.52	1,684,084.13	40.058279°N	104.843941°W
6,175.00	8.70	50.98	6,030.20	813.81	974.49	14,548,003.48	1,684,095.76	40.058306°N	104.843899°W
6,264.00	7.38	51.59	6,118.32	821.60	984.20	14,548,011.29	1,684,105.45	40.058328°N	104.843864°W
6,351.00	7.69	51.11	6,204.57	828.73	993.11	14,548,018.43	1,684,114.35	40.058347°N	104.843833°W
6,442.00	6.11	50.98	6,294.91	835.60	1,001.61	14,548,025.31	1,684,122.84	40.058366°N	104.843802°W
6,531.00	5.49	48.78	6,383.45	841.39	1,008.49	14,548,031.11	1,684,129.71	40.058382°N	104.843778°W
6,621.00	4.61	49.71	6,473.10	846.56	1,014.49	14,548,036.30	1,684,135.70	40.058396°N	104.843756°W
6,710.00	4.00	47.11	6,561.85	850.99	1,019.49	14,548,040.73	1,684,140.69	40.058408°N	104.843738°W
6,800.00	2.99	64.60	6,651.69	854.13	1,023.91	14,548,043.88	1,684,145.11	40.058417°N	104.843722°W
6,808.34	2.81	65.36	6,660.01	854.31	1,024.30	14,548,044.06	1,684,145.49	40.058417°N	104.843721°W
<b>35-12 Legal Window</b>									
6,808.55	2.81	65.38	6,660.23	854.31	1,024.31	14,548,044.07	1,684,145.50	40.058417°N	104.843721°W
<b>35-12 BH</b>									
6,888.00	1.19	83.80	6,739.63	855.21	1,026.90	14,548,044.97	1,684,148.09	40.058420°N	104.843712°W
6,978.00	0.88	224.69	6,829.62	854.82	1,027.34	14,548,044.58	1,684,148.53	40.058419°N	104.843710°W
7,066.00	2.02	239.90	6,917.59	853.57	1,025.52	14,548,043.32	1,684,146.72	40.058415°N	104.843717°W
7,156.00	1.89	233.17	7,007.54	851.88	1,022.96	14,548,041.63	1,684,144.16	40.058411°N	104.843726°W
7,245.00	1.80	229.57	7,096.49	850.09	1,020.72	14,548,039.84	1,684,141.93	40.058406°N	104.843734°W
7,335.00	1.41	222.67	7,186.46	848.36	1,018.90	14,548,038.11	1,684,140.10	40.058401°N	104.843740°W
7,424.00	1.19	203.07	7,275.43	846.71	1,017.79	14,548,036.45	1,684,139.00	40.058397°N	104.843744°W
7,514.00	0.79	190.81	7,365.42	845.24	1,017.31	14,548,034.98	1,684,138.52	40.058393°N	104.843746°W
7,604.00	0.79	173.50	7,455.41	844.01	1,017.26	14,548,033.75	1,684,138.48	40.058389°N	104.843746°W
7,692.00	0.48	170.60	7,543.41	843.05	1,017.39	14,548,032.79	1,684,138.61	40.058386°N	104.843746°W
7,781.00	0.48	208.17	7,632.40	842.35	1,017.28	14,548,032.09	1,684,138.49	40.058385°N	104.843746°W
7,871.00	0.48	135.57	7,722.40	841.75	1,017.36	14,548,031.49	1,684,138.58	40.058383°N	104.843746°W
7,961.00	0.31	142.60	7,812.40	841.29	1,017.77	14,548,031.03	1,684,138.99	40.058382°N	104.843744°W
8,051.00	0.04	45.40	7,902.40	841.11	1,017.94	14,548,030.86	1,684,139.16	40.058381°N	104.843744°W
8,141.00	0.09	166.77	7,992.40	841.07	1,017.98	14,548,030.81	1,684,139.20	40.058381°N	104.843744°W
8,220.00	0.09	100.90	8,071.40	841.00	1,018.06	14,548,030.74	1,684,139.28	40.058381°N	104.843743°W
8,265.00	0.09	100.90	8,116.40	840.98	1,018.13	14,548,030.73	1,684,139.35	40.058381°N	104.843743°W
<b>Proj to TD at 8265 MD/8116 TVD</b>									

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
8,265.00	8,116.40	840.98	1,018.13	Proj to TD at 8265 MD/8116 TVD

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