



Anadarko Petroleum Corporation

Riverbend

Riverbend 14 Pad

Riverbend 14-12 (111406) - Slot 14-12

14-12

Survey: 14-12

Survey Report - Geographic

07 December, 2011

Survey Report - Geographic

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Riverbend 14-12 (111406) - Slot 14-12
Project:	Riverbend	TVD Reference:	KB @ 4968.00ft (Original Well Elev)
Site:	Riverbend 14 Pad	MD Reference:	KB @ 4968.00ft (Original Well Elev)
Well:	Riverbend 14-12 (111406)	North Reference:	True
Wellbore:	14-12	Survey Calculation Method:	Minimum Curvature
Design:	14-12	Database:	EDM5000

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

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

Well	Riverbend 14-12 (111406) - Slot 14-12					
Well Position	+N/-S	0.00 ft	Northing:	14,547,208.00 usft	Latitude:	40.056126°N
	+E/-W	0.00 ft	Easting:	1,683,122.58 usft	Longitude:	104.847382°W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	4,953.00 ft

Wellbore	14-12				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2012/02/22	8.79	66.73	52,868

Design	14-12				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	48.60	

Survey Program	Date	2011/12/06			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
46.60	8,517.00	14-12 (14-12)	MWD	MWD - Standard	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
0.00	0.00	0.00	0.00	0.00	0.00	14,547,208.00	1,683,122.58	40.056126°N	104.847382°W	
4.04	0.03	31.37	4.04	0.00	0.00	14,547,208.00	1,683,122.58	40.056126°N	104.847382°W	
Chikuma Harry S #2 (VE) at 1400										
4.41	0.03	31.37	4.41	0.00	0.00	14,547,208.00	1,683,122.58	40.056126°N	104.847382°W	
Chikuma Harry S #2 (VE) at TD										
41.19	0.27	31.37	41.19	0.08	0.05	14,547,208.09	1,683,122.63	40.056127°N	104.847382°W	
Mathisen Unit #2 (VE)										
46.60	0.31	31.37	46.60	0.11	0.07	14,547,208.11	1,683,122.64	40.056127°N	104.847382°W	
77.20	0.09	70.96	77.20	0.19	0.13	14,547,208.19	1,683,122.71	40.056127°N	104.847381°W	
108.10	0.31	78.39	108.10	0.21	0.24	14,547,208.21	1,683,122.82	40.056127°N	104.847381°W	
139.00	0.31	88.36	139.00	0.23	0.40	14,547,208.23	1,683,122.98	40.056127°N	104.847380°W	
200.30	0.40	143.56	200.30	0.06	0.69	14,547,208.06	1,683,123.27	40.056127°N	104.847379°W	

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Site:	Riverbend 14 Pad	MD Reference:	KB @ 4968.00ft (Original Well Elev)
Well:	Riverbend 14-12 (111406)	North Reference:	True
Wellbore:	14-12	Survey Calculation Method:	Minimum Curvature
Design:	14-12	Database:	EDM5000

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
262.70	1.10	103.79	262.69	-0.26	1.41	14,547,207.75	1,683,123.99	40.056126°N	104.847377°W
323.60	2.20	86.39	323.57	-0.32	3.14	14,547,207.69	1,683,125.72	40.056125°N	104.847371°W
384.90	2.59	75.58	384.81	0.10	5.66	14,547,208.11	1,683,128.23	40.056127°N	104.847362°W
446.00	3.52	69.47	445.83	1.10	8.75	14,547,209.12	1,683,131.33	40.056129°N	104.847351°W
507.30	4.61	60.59	506.97	2.97	12.66	14,547,210.99	1,683,135.23	40.056134°N	104.847337°W
568.30	6.59	54.88	567.68	6.19	17.66	14,547,214.22	1,683,140.23	40.056143°N	104.847319°W
629.20	8.00	52.70	628.08	10.77	23.89	14,547,218.81	1,683,146.45	40.056156°N	104.847297°W
690.60	9.10	54.97	688.80	16.14	31.26	14,547,224.20	1,683,153.81	40.056171°N	104.847270°W
751.80	9.49	56.07	749.20	21.74	39.41	14,547,229.80	1,683,161.95	40.056186°N	104.847241°W
812.20	10.42	55.27	808.69	27.63	48.03	14,547,235.71	1,683,170.56	40.056202°N	104.847210°W
873.00	10.99	57.69	868.43	33.86	57.45	14,547,241.96	1,683,179.97	40.056219°N	104.847177°W
884.00	10.99	57.69	879.23	34.98	59.22	14,547,243.08	1,683,181.74	40.056222°N	104.847170°W
938.70	11.69	59.80	932.86	40.55	68.42	14,547,248.67	1,683,190.93	40.056238°N	104.847137°W
969.30	11.38	60.68	962.84	43.59	73.73	14,547,251.72	1,683,196.23	40.056246°N	104.847118°W
1,012.90	11.82	62.48	1,005.55	47.76	81.44	14,547,255.90	1,683,203.94	40.056257°N	104.847091°W
1,068.10	12.70	61.69	1,059.49	53.25	91.79	14,547,261.41	1,683,214.28	40.056273°N	104.847054°W
1,103.90	13.89	61.29	1,094.33	57.18	99.03	14,547,265.35	1,683,221.51	40.056283°N	104.847028°W
1,147.40	15.69	63.18	1,136.39	62.34	108.86	14,547,270.53	1,683,231.33	40.056298°N	104.846993°W
1,190.90	17.09	60.46	1,178.12	68.15	119.67	14,547,276.35	1,683,242.13	40.056313°N	104.846954°W
1,235.90	18.11	58.00	1,221.01	75.12	131.35	14,547,283.34	1,683,253.80	40.056333°N	104.846912°W
1,280.90	19.29	56.46	1,263.64	82.93	143.48	14,547,291.18	1,683,265.92	40.056354°N	104.846869°W
1,326.00	20.30	53.78	1,306.07	91.67	156.00	14,547,299.94	1,683,278.42	40.056378°N	104.846824°W
1,369.70	21.01	50.88	1,346.96	101.09	168.20	14,547,309.38	1,683,290.60	40.056404°N	104.846781°W
1,414.60	21.88	49.48	1,388.76	111.60	180.80	14,547,319.92	1,683,303.19	40.056433°N	104.846736°W
1,459.40	22.28	49.79	1,430.27	122.51	193.63	14,547,330.84	1,683,316.00	40.056463°N	104.846690°W
1,502.90	22.28	48.08	1,470.52	133.34	206.06	14,547,341.70	1,683,328.41	40.056493°N	104.846645°W
1,547.90	22.10	46.10	1,512.19	144.91	218.51	14,547,353.29	1,683,340.84	40.056524°N	104.846601°W
1,636.00	23.29	46.01	1,593.47	168.50	242.98	14,547,376.92	1,683,365.27	40.056589°N	104.846514°W
1,725.90	23.69	45.57	1,675.92	193.49	268.67	14,547,401.95	1,683,390.92	40.056658°N	104.846422°W
1,814.40	24.30	43.77	1,756.77	219.08	293.96	14,547,427.59	1,683,416.16	40.056728°N	104.846331°W
1,904.50	24.61	43.68	1,838.79	246.04	319.74	14,547,454.59	1,683,441.90	40.056802°N	104.846239°W
1,992.00	23.91	44.08	1,918.56	271.95	344.66	14,547,480.55	1,683,466.77	40.056873°N	104.846150°W
2,082.30	22.28	45.00	2,001.62	297.21	369.50	14,547,505.84	1,683,491.57	40.056942°N	104.846061°W
2,172.00	20.92	47.37	2,085.02	320.08	393.31	14,547,528.75	1,683,515.33	40.057005°N	104.845976°W
2,261.60	20.08	49.79	2,168.95	340.84	416.82	14,547,549.56	1,683,538.82	40.057062°N	104.845892°W
2,349.80	19.29	49.79	2,251.99	360.02	439.51	14,547,568.78	1,683,561.47	40.057115°N	104.845811°W
2,439.20	19.20	50.98	2,336.40	378.81	462.21	14,547,587.60	1,683,584.14	40.057167°N	104.845730°W
2,527.90	19.29	48.87	2,420.14	397.63	484.58	14,547,606.46	1,683,606.47	40.057218°N	104.845650°W
2,616.60	19.91	46.19	2,503.70	417.72	506.51	14,547,626.59	1,683,628.37	40.057273°N	104.845572°W
2,705.00	20.21	47.20	2,586.74	438.52	528.58	14,547,647.42	1,683,650.40	40.057331°N	104.845493°W
2,794.40	19.60	46.41	2,670.80	459.35	550.77	14,547,668.29	1,683,672.56	40.057388°N	104.845414°W
2,883.30	19.91	50.19	2,754.47	479.32	573.20	14,547,688.30	1,683,694.95	40.057443°N	104.845333°W
2,972.80	20.21	49.40	2,838.54	499.14	596.64	14,547,708.16	1,683,718.36	40.057497°N	104.845250°W
3,062.80	20.70	47.20	2,922.87	520.07	620.12	14,547,729.13	1,683,741.80	40.057554°N	104.845166°W
3,150.20	21.88	44.21	3,004.30	542.24	642.81	14,547,751.34	1,683,764.46	40.057615°N	104.845085°W
3,240.20	23.38	44.61	3,087.37	566.97	667.04	14,547,776.11	1,683,788.65	40.057683°N	104.844998°W
3,330.40	22.90	44.47	3,170.31	592.23	691.91	14,547,801.42	1,683,813.47	40.057753°N	104.844909°W
3,417.50	23.20	49.18	3,250.47	615.54	716.76	14,547,824.77	1,683,838.28	40.057817°N	104.844820°W
3,507.60	23.60	42.80	3,333.17	640.38	742.45	14,547,849.65	1,683,863.93	40.057885°N	104.844729°W
3,597.10	23.60	49.18	3,415.20	665.24	768.19	14,547,874.56	1,683,889.62	40.057953°N	104.844637°W
3,687.20	22.19	42.50	3,498.21	689.58	793.34	14,547,898.94	1,683,914.73	40.058020°N	104.844547°W
3,777.30	21.80	42.19	3,581.75	714.52	816.07	14,547,923.92	1,683,937.42	40.058088°N	104.844465°W
3,866.80	22.72	41.79	3,664.58	739.72	838.75	14,547,949.16	1,683,960.05	40.058158°N	104.844384°W
3,956.60	23.60	43.59	3,747.15	765.67	862.70	14,547,975.15	1,683,983.96	40.058229°N	104.844299°W
4,046.60	22.28	46.41	3,830.03	790.49	887.48	14,548,000.01	1,684,008.70	40.058297°N	104.844210°W

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Project:	Riverbend	TVD Reference:	KB @ 4968.00ft (Original Well Elev)
Site:	Riverbend 14 Pad	MD Reference:	KB @ 4968.00ft (Original Well Elev)
Well:	Riverbend 14-12 (111406)	North Reference:	True
Wellbore:	14-12	Survey Calculation Method:	Minimum Curvature
Design:	14-12	Database:	EDM5000

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,136.90	22.10	47.77	3,913.64	813.71	912.45	14,548,023.27	1,684,033.64	40.058361°N	104.844121°W
4,225.40	23.51	50.80	3,995.23	836.05	938.46	14,548,045.66	1,684,059.61	40.058422°N	104.844028°W
4,315.30	24.61	52.30	4,077.31	858.84	967.17	14,548,068.49	1,684,088.27	40.058485°N	104.843925°W
4,403.70	23.99	50.58	4,157.88	881.50	995.62	14,548,091.21	1,684,116.68	40.058547°N	104.843824°W
4,494.40	23.91	48.08	4,240.78	905.49	1,023.54	14,548,115.24	1,684,144.56	40.058613°N	104.843724°W
4,584.50	23.69	48.78	4,323.21	929.62	1,050.74	14,548,139.42	1,684,171.72	40.058679°N	104.843627°W
4,674.50	23.69	48.47	4,405.63	953.52	1,077.87	14,548,163.37	1,684,198.82	40.058745°N	104.843530°W
4,762.80	23.29	47.68	4,486.61	977.03	1,104.06	14,548,186.92	1,684,224.96	40.058809°N	104.843436°W
4,851.60	23.82	50.41	4,568.02	1,000.28	1,130.86	14,548,210.22	1,684,251.72	40.058873°N	104.843340°W
4,940.10	22.81	54.41	4,649.29	1,021.66	1,158.59	14,548,231.64	1,684,279.41	40.058932°N	104.843241°W
5,028.50	23.69	53.09	4,730.51	1,042.29	1,186.72	14,548,252.33	1,684,307.51	40.058989°N	104.843141°W
5,118.10	24.61	49.57	4,812.28	1,065.21	1,215.32	14,548,275.29	1,684,336.07	40.059051°N	104.843039°W
5,207.90	23.51	48.38	4,894.27	1,089.23	1,242.94	14,548,299.36	1,684,363.65	40.059117°N	104.842940°W
5,298.20	23.29	48.69	4,977.15	1,112.98	1,269.81	14,548,323.15	1,684,390.48	40.059183°N	104.842844°W
5,385.50	22.50	46.58	5,057.57	1,135.85	1,294.91	14,548,346.07	1,684,415.54	40.059245°N	104.842754°W
5,474.10	21.60	49.70	5,139.69	1,158.05	1,319.66	14,548,368.31	1,684,440.25	40.059306°N	104.842666°W
5,564.20	22.10	50.67	5,223.32	1,179.52	1,345.42	14,548,389.82	1,684,465.97	40.059365°N	104.842574°W
5,652.40	22.10	50.58	5,305.04	1,200.57	1,371.07	14,548,410.92	1,684,491.59	40.059423°N	104.842482°W
5,742.00	21.62	51.37	5,388.20	1,221.58	1,396.99	14,548,431.97	1,684,517.47	40.059481°N	104.842389°W
5,828.70	21.80	50.80	5,468.75	1,241.73	1,421.94	14,548,452.16	1,684,542.39	40.059536°N	104.842300°W
5,919.30	18.90	50.98	5,553.68	1,261.60	1,446.38	14,548,472.08	1,684,566.79	40.059591°N	104.842213°W
6,007.60	17.89	43.68	5,637.48	1,280.42	1,466.86	14,548,490.93	1,684,587.24	40.059642°N	104.842140°W
6,094.70	17.80	47.37	5,720.39	1,299.11	1,485.90	14,548,509.65	1,684,606.25	40.059694°N	104.842071°W
6,182.00	15.69	48.87	5,803.99	1,315.91	1,504.61	14,548,526.49	1,684,624.93	40.059740°N	104.842005°W
6,273.80	17.71	49.57	5,891.91	1,333.13	1,524.59	14,548,543.74	1,684,644.88	40.059787°N	104.841933°W
6,362.00	15.82	51.20	5,976.36	1,349.37	1,544.17	14,548,560.01	1,684,664.43	40.059832°N	104.841863°W
6,450.80	14.02	47.29	6,062.16	1,364.25	1,561.51	14,548,574.92	1,684,681.75	40.059873°N	104.841801°W
6,540.40	14.19	45.31	6,149.06	1,379.34	1,577.29	14,548,590.04	1,684,697.50	40.059914°N	104.841745°W
6,630.80	11.51	45.00	6,237.19	1,393.51	1,591.55	14,548,604.23	1,684,711.74	40.059953°N	104.841694°W
6,719.00	10.59	47.20	6,323.75	1,405.24	1,603.72	14,548,615.98	1,684,723.89	40.059985°N	104.841650°W
6,807.60	7.78	48.30	6,411.21	1,414.76	1,614.17	14,548,625.52	1,684,734.32	40.060011°N	104.841613°W
6,896.20	6.42	48.78	6,499.13	1,422.01	1,622.38	14,548,632.79	1,684,742.51	40.060031°N	104.841584°W
6,985.00	4.70	54.49	6,587.51	1,427.40	1,629.07	14,548,638.19	1,684,749.20	40.060046°N	104.841560°W
7,065.83	3.52	60.83	6,668.13	1,430.53	1,633.94	14,548,641.33	1,684,754.06	40.060055°N	104.841542°W
14-12 BH - 14-12 Legal Window									
7,075.50	3.38	61.88	6,677.78	1,430.81	1,634.45	14,548,641.61	1,684,754.57	40.060055°N	104.841541°W
7,164.30	2.29	85.08	6,766.47	1,432.20	1,638.52	14,548,643.00	1,684,758.64	40.060059°N	104.841526°W
7,253.00	1.89	91.98	6,855.11	1,432.30	1,641.75	14,548,643.11	1,684,761.87	40.060059°N	104.841514°W
7,341.00	1.41	77.70	6,943.08	1,432.48	1,644.26	14,548,643.29	1,684,764.38	40.060060°N	104.841505°W
7,432.10	1.19	56.38	7,034.16	1,433.24	1,646.14	14,548,644.06	1,684,766.26	40.060062°N	104.841499°W
7,522.30	1.10	38.23	7,124.34	1,434.44	1,647.46	14,548,645.26	1,684,767.57	40.060065°N	104.841494°W
7,610.80	1.10	42.67	7,212.82	1,435.73	1,648.56	14,548,646.55	1,684,768.67	40.060069°N	104.841490°W
7,699.10	1.01	46.19	7,301.11	1,436.89	1,649.69	14,548,647.72	1,684,769.80	40.060072°N	104.841486°W
7,787.10	1.32	55.37	7,389.09	1,438.01	1,651.09	14,548,648.83	1,684,771.20	40.060075°N	104.841481°W
7,873.70	1.10	60.78	7,475.67	1,438.98	1,652.63	14,548,649.81	1,684,772.74	40.060078°N	104.841476°W
7,964.10	0.62	59.28	7,566.06	1,439.65	1,653.81	14,548,650.48	1,684,773.92	40.060080°N	104.841471°W
8,052.50	0.40	56.69	7,654.45	1,440.07	1,654.48	14,548,650.90	1,684,774.59	40.060081°N	104.841469°W
8,142.80	0.22	33.09	7,744.75	1,440.39	1,654.84	14,548,651.22	1,684,774.94	40.060082°N	104.841468°W
8,229.90	0.31	283.27	7,831.85	1,440.58	1,654.70	14,548,651.41	1,684,774.80	40.060082°N	104.841468°W
8,318.90	0.09	67.90	7,920.85	1,440.66	1,654.53	14,548,651.49	1,684,774.64	40.060082°N	104.841469°W
8,409.30	0.40	97.47	8,011.25	1,440.65	1,654.91	14,548,651.48	1,684,775.01	40.060082°N	104.841467°W
8,472.00	0.62	101.47	8,073.95	1,440.55	1,655.46	14,548,651.38	1,684,775.56	40.060082°N	104.841465°W
8,517.00	0.62	101.47	8,118.95	1,440.45	1,655.94	14,548,651.29	1,684,776.04	40.060082°N	104.841464°W
Proj to TD at 8517 MD/8119 TVD									

Survey Report - Geographic

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Riverbend 14-12 (111406) - Slot 14-12
Project:	Riverbend	TVD Reference:	KB @ 4968.00ft (Original Well Elev)
Site:	Riverbend 14 Pad	MD Reference:	KB @ 4968.00ft (Original Well Elev)
Well:	Riverbend 14-12 (111406)	North Reference:	True
Wellbore:	14-12	Survey Calculation Method:	Minimum Curvature
Design:	14-12	Database:	EDM5000

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
8,517.00	8,118.95	1,440.45	1,655.94	Proj to TD at 8517 MD/8119 TVD

Checked By: _____	Approved By: _____	Date: _____
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