



Job Number: RL09016
 Company: Anadarko Petroleum
 Lease/Well: Frank 35-31
 Location: Johnstown County
 Rig Name: Patterson #184
 RKB: ☐
 G.L. or M.S.L.: ☐

State/Country: Colorado
 Declination: ☐
 Grid: ☐
 File name: C:\WINSERVE\RL09016.SVY
 Date/Time: 24-Jan-09 / 06:46
 Curve Name: Working curve

Strata Directional

WINSERVE SURVEY CALCULATIONS
 Minimum Curvature Method
 Vertical Section Plane 234.19
 Vertical Section Referenced to Wellhead
 Rectangular Coordinates Referenced to Wellhead

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE Distance FT	Direction Deg	Dogleg Severity Deg/100
773.00	.00	.00	773.00	.00	.00	.00	.00	.00	.00
903.00	1.00	258.90	902.99	-.22	-1.11	1.03	1.13	258.90	.77
1030.00	1.50	246.70	1029.96	-1.09	-3.73	3.66	3.88	253.71	.44
1157.00	3.00	243.20	1156.86	-3.25	-8.22	8.57	8.84	248.46	1.19
1283.00	3.90	246.50	1282.63	-6.44	-15.09	16.01	16.41	246.89	.73
1474.00	3.60	249.20	1473.22	-11.16	-26.66	28.15	28.90	247.28	.18
1601.00	3.10	246.10	1600.01	-13.97	-33.52	35.36	36.32	247.38	.42
1727.00	3.20	249.20	1725.82	-16.60	-39.93	42.09	43.24	247.43	.16
1823.00	3.50	252.70	1821.65	-18.42	-45.23	47.46	48.83	247.84	.38
1918.00	3.50	252.40	1916.47	-20.16	-50.76	52.96	54.62	248.34	.02
1981.00	3.90	250.70	1979.34	-21.45	-54.62	56.84	58.68	248.56	.66
2045.00	4.40	247.30	2043.17	-23.11	-58.93	61.32	63.31	248.58	.87
2108.00	4.80	249.30	2105.97	-24.98	-63.63	66.22	68.36	248.57	.68
2171.00	5.20	250.10	2168.73	-26.88	-68.78	71.51	73.85	248.65	.64
2234.00	7.00	245.50	2231.37	-29.45	-74.96	78.02	80.53	248.55	2.96
2298.00	8.70	243.20	2294.77	-33.25	-82.83	86.62	89.25	248.13	2.70
2361.00	10.40	244.40	2356.90	-37.85	-92.21	96.93	99.68	247.68	2.72
2425.00	11.20	233.30	2419.77	-44.06	-102.40	108.83	111.48	246.72	3.48
2487.00	13.90	230.00	2480.28	-52.45	-112.94	122.28	124.52	245.09	4.50
2551.00	16.00	230.20	2542.11	-63.04	-125.61	138.75	140.54	243.35	3.28
2614.00	15.90	229.70	2602.69	-74.18	-138.86	156.01	157.43	241.89	.27
2678.00	14.90	229.50	2664.39	-85.19	-151.80	172.95	174.07	240.70	1.56
2741.00	14.60	228.00	2725.31	-95.77	-163.86	188.92	189.79	239.70	.77
2804.00	13.80	227.00	2786.39	-106.20	-175.26	204.27	204.92	238.78	1.33

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
2868.00	13.50	229.00	2848.58	-116.31	-186.48	219.28	219.78	238.05	.87
2931.00	13.30	229.40	2909.86	-125.85	-197.53	233.82	234.21	237.50	.35
2995.00	13.30	229.80	2972.15	-135.39	-208.74	248.50	248.81	237.03	.14
3058.00	13.50	230.90	3033.43	-144.71	-219.98	263.07	263.31	236.66	.51
3122.00	14.10	231.20	3095.59	-154.30	-231.86	278.31	278.51	236.36	.94
3185.00	14.70	234.90	3156.61	-163.71	-244.38	293.97	294.14	236.18	1.74
3248.00	14.90	234.20	3217.52	-173.04	-257.49	310.06	310.23	236.10	.43
3312.00	14.10	234.10	3279.48	-182.43	-270.47	326.08	326.25	236.00	1.25
3375.00	13.90	235.30	3340.61	-191.24	-282.91	341.32	341.48	235.94	.56
3438.00	13.50	232.80	3401.81	-199.99	-294.99	356.24	356.39	235.86	1.13
3502.00	13.70	232.40	3464.02	-209.13	-306.95	371.28	371.42	235.73	.35
3565.00	13.60	232.90	3525.24	-218.15	-318.76	386.14	386.26	235.61	.25
3629.00	14.20	230.60	3587.37	-227.67	-330.83	401.50	401.60	235.47	1.27
3692.00	14.00	230.80	3648.47	-237.39	-342.71	416.82	416.90	235.29	.33
3756.00	13.70	225.30	3710.61	-247.62	-354.09	432.04	432.08	235.04	2.11
3819.00	13.60	221.90	3771.83	-258.38	-364.34	446.65	446.66	234.66	1.28
3882.00	14.20	221.30	3832.99	-269.70	-374.39	461.42	461.42	234.23	.98
3946.00	13.90	223.90	3895.07	-281.13	-384.90	476.63	476.64	233.86	1.09
4009.00	13.60	225.20	3956.27	-291.80	-395.41	491.39	491.42	233.57	.68
4073.00	13.30	230.10	4018.51	-301.83	-406.39	506.17	506.22	233.40	1.84
4136.00	13.80	231.30	4079.76	-311.18	-417.82	520.90	520.96	233.32	.91
4199.00	14.20	239.30	4140.90	-319.82	-430.33	536.10	536.16	233.38	3.13
4263.00	13.80	243.30	4203.00	-327.26	-443.89	551.46	551.49	233.60	1.64
4325.00	12.80	240.70	4263.33	-333.94	-456.49	565.58	565.60	233.81	1.88
4389.00	12.90	239.30	4325.73	-341.06	-468.82	579.74	579.75	233.96	.51
4452.00	12.40	241.30	4387.20	-347.90	-480.80	593.46	593.46	234.11	1.05
4516.00	14.20	238.50	4449.48	-355.30	-493.52	608.11	608.11	234.25	2.99
4579.00	15.90	233.40	4510.32	-364.48	-507.04	624.44	624.45	234.29	3.42
4642.00	15.10	233.90	4571.03	-374.46	-520.59	641.28	641.28	234.27	1.29
4706.00	14.30	234.00	4632.93	-384.02	-533.72	657.52	657.52	234.26	1.25
4769.00	14.20	234.60	4694.00	-393.07	-546.32	673.03	673.03	234.27	.28
4833.00	15.50	235.20	4755.86	-402.50	-559.74	689.43	689.43	234.28	2.05
4896.00	15.60	234.20	4816.55	-412.26	-573.52	706.32	706.32	234.29	.45
4960.00	14.90	233.80	4878.30	-422.15	-587.14	723.15	723.15	234.28	1.11
5023.00	13.70	233.80	4939.34	-431.34	-599.70	738.71	738.71	234.27	1.90
5087.00	13.50	234.10	5001.55	-440.20	-611.87	753.76	753.76	234.27	.33
5150.00	13.10	234.00	5062.86	-448.71	-623.60	768.25	768.25	234.26	.64
5214.00	13.20	234.50	5125.18	-457.21	-635.41	782.81	782.81	234.26	.24
5277.00	12.30	234.20	5186.63	-465.31	-646.71	796.72	796.72	234.26	1.43
5340.00	11.70	234.40	5248.25	-472.96	-657.35	809.81	809.81	234.27	.95
5404.00	10.90	233.90	5311.01	-480.30	-667.52	822.35	822.35	234.26	1.26
5467.00	10.20	232.80	5372.94	-487.18	-676.77	833.89	833.89	234.25	1.16
5531.00	9.10	232.60	5436.04	-493.68	-685.31	844.61	844.61	234.23	1.72

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
5594.00	8.70	233.10	5498.28	-499.57	-693.07	854.36	854.36	234.22	.65
5658.00	7.50	234.40	5561.64	-504.91	-700.34	863.37	863.37	234.21	1.90
5721.00	7.00	234.00	5624.14	-509.56	-706.79	871.32	871.32	234.21	.80
5784.00	6.50	233.70	5686.70	-513.93	-712.77	878.73	878.73	234.21	.80
5848.00	5.90	236.40	5750.32	-517.89	-718.43	885.64	885.64	234.21	1.04
5911.00	5.50	235.50	5813.01	-521.39	-723.62	891.89	891.89	234.23	.65
5975.00	4.00	235.50	5876.79	-524.39	-727.98	897.19	897.19	234.23	2.34
6038.00	2.90	233.90	5939.68	-526.58	-731.08	900.98	900.98	234.24	1.75
6101.00	2.50	233.80	6002.61	-528.33	-733.48	903.95	903.95	234.23	.63
6197.00	1.40	212.00	6098.55	-530.56	-735.79	907.13	907.13	234.21	1.36
6292.00	1.10	208.30	6193.53	-532.35	-736.84	909.02	909.02	234.15	.33
6387.00	1.00	217.40	6288.51	-533.81	-737.77	910.64	910.64	234.11	.20
6482.00	1.00	213.00	6383.50	-535.16	-738.73	912.20	912.20	234.08	.08
6577.00	.80	216.20	6478.48	-536.39	-739.57	913.61	913.61	234.05	.22
6672.00	1.10	203.30	6573.47	-537.77	-740.32	915.02	915.02	234.01	.39
6925.00	1.00	253.30	6826.43	-540.63	-743.40	919.19	919.20	233.97	.35
7179.00	1.00	104.10	7080.42	-541.81	-743.37	919.86	919.87	233.91	.76
7337.00	1.40	107.10	7238.38	-542.71	-740.19	917.80	917.83	233.75	.26
7468.00	1.40	98.70	7369.35	-543.42	-737.08	915.70	915.75	233.60	.16
Projection to Bit									
7510.00	1.40	98.70	7411.33	-543.58	-736.06	914.97	915.02	233.55	.00