



CATHEDRAL

Job Number: 115501
 Company: Anadarko
 Lease/Well: Markham 13-8
 Location: Sec8-T2N-R65W
 Rig Name: Xtreme 14
 RKB: 4950
 G.L. or M.S.L.: 4950

State/Country: Colorado USA
 Declination: 8.76
 Grid: True North
 File name: C:\WINSERVE\115501.SVY
 Date/Time: 08-Nov-11 / 07:36
 Curve Name: Markham 13-8

Cathedral Energy

WINSERVE SURVEY CALCULATIONS
Minimum Curvature Method
Vertical Section Plane 195.12
Vertical Section Referenced to Wellhead
Rectangular Coordinates Referenced to Wellhead

<i>Measured Depth FT</i>	<i>Incl Angle Deg</i>	<i>Drift Direction Deg</i>	<i>True Vertical Depth</i>	<i>N-S FT</i>	<i>E-W FT</i>	<i>Vertical Section FT</i>	<i>C L O S U R E Distance FT</i>	<i>Direction Deg</i>	<i>Dogleg Severity Deg/100</i>
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
152.00	1.10	127.60	151.99	-.89	1.16	.56	1.46	127.60	.72
245.00	1.30	149.90	244.97	-2.35	2.39	1.64	3.35	134.46	.54
338.00	2.20	175.10	337.93	-5.04	3.07	4.06	5.90	148.62	1.25
416.00	3.40	192.80	415.83	-8.79	2.69	7.78	9.19	162.98	1.88
503.00	4.60	204.80	502.62	-14.47	.65	13.80	14.48	177.41	1.67
593.00	7.10	205.50	592.15	-22.77	-3.25	22.83	23.00	188.14	2.78
682.00	8.80	203.80	680.29	-33.96	-8.37	34.97	34.98	193.85	1.93
785.00	10.70	201.20	781.80	-50.09	-15.01	52.27	52.29	196.68	1.89
891.00	10.90	200.50	885.92	-68.65	-22.08	72.03	72.11	197.83	.23
981.00	12.20	199.60	974.09	-85.58	-28.25	89.98	90.12	198.27	1.46
1070.00	11.80	199.50	1061.15	-103.01	-34.44	108.43	108.62	198.49	.45
1158.00	13.30	195.50	1147.05	-121.25	-40.15	127.53	127.73	198.32	1.97
1246.00	13.00	194.60	1232.74	-140.58	-45.35	147.55	147.72	197.88	.41
1335.00	12.70	194.80	1319.51	-159.73	-50.37	167.34	167.48	197.50	.34
1423.00	12.60	193.90	1405.37	-178.40	-55.15	186.61	186.73	197.18	.25
1513.00	12.70	192.80	1493.19	-197.58	-59.70	206.31	206.40	196.81	.29
1602.00	12.50	192.00	1580.05	-216.54	-63.87	225.70	225.76	196.43	.30
1690.00	12.70	188.80	1665.93	-235.41	-67.33	244.82	244.85	195.96	.83
1780.00	11.60	191.40	1753.91	-254.06	-70.63	263.69	263.69	195.54	1.36
1866.00	10.90	189.70	1838.26	-270.55	-73.71	280.41	280.41	195.24	.90
1956.00	9.80	188.20	1926.79	-286.52	-76.23	296.49	296.49	194.90	1.26
2045.00	11.00	189.90	2014.33	-302.38	-78.77	312.46	312.47	194.60	1.39
2135.00	11.00	197.00	2102.68	-319.05	-82.76	329.59	329.61	194.54	1.50
2223.00	11.60	198.20	2188.97	-335.49	-87.98	346.82	346.83	194.69	.73

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	
2312.00	12.20	196.00	2276.06	-353.03	-93.37	365.16	365.16	194.81	.85
2401.00	10.20	193.90	2363.36	-369.72	-97.85	382.44	382.45	194.82	2.29
2489.00	11.60	194.70	2449.77	-385.84	-101.97	399.08	399.09	194.80	1.60
2578.00	9.80	194.10	2537.22	-401.84	-106.09	415.60	415.61	194.79	2.03
2668.00	10.90	193.80	2625.75	-417.53	-109.98	431.77	431.78	194.76	1.22
2756.00	9.90	195.00	2712.31	-432.92	-113.92	447.65	447.66	194.74	1.16
2844.00	11.30	194.50	2798.80	-448.58	-118.04	463.84	463.85	194.74	1.59
2932.00	12.30	193.60	2884.94	-466.03	-122.40	481.83	481.84	194.72	1.16
3022.00	11.90	190.90	2972.94	-484.46	-126.41	500.67	500.69	194.62	.77
3111.00	12.30	196.40	3059.97	-502.57	-130.82	519.30	519.32	194.59	1.37
3201.00	12.00	196.80	3147.95	-520.72	-136.24	538.23	538.25	194.66	.35
3290.00	10.20	196.50	3235.29	-537.14	-141.15	555.36	555.37	194.72	2.02
3378.00	8.30	197.50	3322.14	-550.67	-145.27	569.50	569.51	194.78	2.17
3468.00	7.30	197.40	3411.30	-562.32	-148.93	581.70	581.71	194.83	1.11
3555.00	6.00	195.20	3497.72	-571.98	-151.78	591.77	591.78	194.86	1.52
3644.00	4.60	196.30	3586.33	-579.90	-154.00	599.99	600.00	194.87	1.58
3734.00	3.60	194.20	3676.10	-586.10	-155.71	606.42	606.43	194.88	1.12
3823.00	2.70	200.70	3764.97	-590.77	-157.13	611.30	611.31	194.89	1.09
3913.00	1.80	207.50	3854.90	-594.01	-158.54	614.80	614.80	194.94	1.04
4001.00	1.50	207.70	3942.86	-596.25	-159.71	617.27	617.27	194.99	.34
4087.00	1.50	229.60	4028.83	-597.98	-161.09	619.30	619.30	195.08	.66
4177.00	1.80	254.10	4118.80	-599.13	-163.35	621.00	621.00	195.25	.84
4264.00	1.90	254.60	4205.75	-599.89	-166.05	622.43	622.44	195.47	.12
4353.00	1.00	284.50	4294.72	-600.08	-168.23	623.19	623.22	195.66	1.29
4440.00	1.30	298.10	4381.70	-599.43	-169.83	622.98	623.02	195.82	.46
4529.00	1.10	292.00	4470.68	-598.63	-171.51	622.65	622.72	195.99	.27
4618.00	1.20	270.80	4559.67	-598.30	-173.24	622.78	622.88	196.15	.49
4705.00	1.20	258.60	4646.65	-598.47	-175.04	623.41	623.54	196.30	.29
4794.00	1.50	240.20	4735.62	-599.23	-176.97	624.65	624.82	196.45	.59
4880.00	1.40	247.50	4821.60	-600.19	-178.91	626.08	626.29	196.60	.24
4970.00	.90	243.10	4911.58	-600.93	-180.56	627.23	627.47	196.72	.56
5059.00	1.10	281.20	5000.57	-601.08	-182.02	627.75	628.04	196.85	.76
5148.00	1.20	319.40	5089.55	-600.21	-183.46	627.29	627.62	197.00	.85
5237.00	1.30	317.60	5178.53	-598.76	-184.75	626.22	626.61	197.15	.12
5324.00	.90	309.90	5265.51	-597.59	-185.94	625.40	625.85	197.28	.49
5413.00	1.10	303.00	5354.50	-596.68	-187.19	624.85	625.35	197.42	.26
5502.00	.30	271.50	5443.49	-596.20	-188.14	624.64	625.19	197.51	.96
5591.00	.40	254.90	5532.49	-596.28	-188.68	624.85	625.42	197.56	.16
5680.00	.50	243.70	5621.49	-596.53	-189.32	625.26	625.85	197.61	.15
5770.00	.60	165.50	5711.48	-597.16	-189.56	625.93	626.53	197.61	.78
5859.00	.60	147.90	5800.48	-598.01	-189.19	626.66	627.22	197.56	.21
5947.00	.30	151.80	5888.48	-598.60	-188.84	627.14	627.68	197.51	.34
6033.00	.50	140.50	5974.47	-599.09	-188.50	627.52	628.04	197.47	.25
6121.00	.50	189.90	6062.47	-599.76	-188.32	628.12	628.63	197.43	.47
6209.00	.70	195.90	6150.47	-600.66	-188.53	629.04	629.55	197.43	.24

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	
6299.00	.90	185.10	6240.46	-601.89	-188.74	630.29	630.79	197.41	.28
6387.00	1.00	195.40	6328.44	-603.32	-189.01	631.74	632.23	197.39	.22
6475.00	1.10	193.80	6416.43	-604.88	-189.42	633.35	633.84	197.39	.12
6565.00	1.50	192.90	6506.41	-606.87	-189.88	635.39	635.88	197.37	.45
6651.00	1.40	209.60	6592.38	-608.88	-190.65	637.53	638.03	197.39	.50
6740.00	1.40	225.70	6681.35	-610.58	-191.97	639.52	640.05	197.45	.44
6829.00	1.50	226.80	6770.32	-612.14	-193.60	641.45	642.02	197.55	.12
6919.00	1.50	235.20	6860.29	-613.62	-195.42	643.35	643.99	197.67	.24
7008.00	1.50	232.00	6949.26	-615.00	-197.30	645.17	645.87	197.79	.09
7096.00	.40	197.80	7037.25	-616.00	-198.30	646.40	647.13	197.84	1.35
7184.00	.40	202.50	7125.25	-616.58	-198.51	647.01	647.75	197.85	.04
7272.00	.60	211.60	7213.24	-617.26	-198.87	647.76	648.50	197.86	.24
7360.00	.90	218.40	7301.24	-618.19	-199.54	648.84	649.60	197.89	.36
7449.00	.90	207.70	7390.23	-619.36	-200.30	650.16	650.94	197.92	.19
7505.00	.80	210.00	7446.22	-620.08	-200.70	650.97	651.75	197.93	.19
Projection to Bit									
7560.00	.80	210.00	7501.21	-620.75	-201.08	651.71	652.51	197.95	.00