



CATHEDRAL

Job Number: 115488
 Company: Anadarko
 Lease/Well: Markham 35-8
 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\115488.SVY
 Date/Time: 04-Nov-11 / 11:52
 Curve Name: Markham 35-8

Cathedral Energy

WINSERVE SURVEY CALCULATIONS
Minimum Curvature Method
Vertical Section Plane 150.71
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	.30	76.30	152.00	.09	.39	.11	.40	76.30	.20
245.00	1.00	139.50	244.99	-.47	1.15	.97	1.24	112.02	.97
338.00	3.00	148.20	337.93	-3.15	2.96	4.20	4.32	136.79	2.17
416.00	4.40	148.30	415.77	-7.43	5.61	9.22	9.31	142.96	1.79
505.00	3.40	164.60	504.56	-12.88	8.10	15.20	15.22	147.83	1.67
593.00	6.00	159.10	592.26	-19.69	10.44	22.28	22.29	152.08	3.00
679.00	8.20	153.70	677.60	-29.39	14.76	32.86	32.89	153.34	2.67
787.00	11.90	147.60	783.92	-45.71	24.14	51.67	51.69	152.16	3.56
848.00	12.40	145.70	843.56	-56.43	31.20	64.48	64.48	151.06	1.05
936.00	13.80	143.60	929.27	-72.68	42.75	84.31	84.32	149.53	1.68
1026.00	14.90	147.40	1016.46	-91.07	55.36	106.51	106.57	148.71	1.61
1116.00	14.40	146.70	1103.53	-110.17	67.74	129.22	129.33	148.41	.59
1202.00	16.00	148.90	1186.52	-129.26	79.73	151.74	151.87	148.33	1.98
1290.00	15.60	148.30	1271.20	-149.71	92.21	175.68	175.83	148.37	.49
1380.00	15.60	147.50	1357.88	-170.21	105.07	199.86	200.03	148.31	.24
1467.00	15.20	147.50	1441.76	-189.70	117.49	222.92	223.13	148.23	.46
1557.00	15.20	147.50	1528.61	-209.60	130.17	246.48	246.73	148.16	.00
1646.00	15.20	152.30	1614.50	-229.77	141.86	269.80	270.03	148.31	1.41
1735.00	15.20	151.40	1700.39	-250.34	152.87	293.13	293.33	148.59	.27
1825.00	14.30	153.60	1787.42	-270.66	163.46	316.03	316.19	148.87	1.18
1912.00	13.40	153.10	1871.89	-289.27	172.80	336.83	336.96	149.15	1.04
2002.00	13.80	152.10	1959.37	-308.06	182.54	357.98	358.08	149.35	.52
2092.00	14.60	149.60	2046.62	-327.33	193.30	380.05	380.15	149.44	1.12
2181.00	12.90	149.60	2133.06	-345.58	204.01	401.20	401.30	149.45	1.91

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	
2269.00	13.40	152.90	2218.76	-363.13	213.62	421.21	421.30	149.53	1.02
2357.00	12.90	151.60	2304.45	-380.85	222.94	441.22	441.30	149.66	.66
2446.00	13.50	152.00	2391.10	-398.76	232.54	461.54	461.61	149.75	.68
2536.00	13.80	150.50	2478.55	-417.37	242.76	482.78	482.84	149.82	.52
2625.00	13.40	150.60	2565.06	-435.60	253.05	503.71	503.77	149.85	.45
2714.00	13.40	148.90	2651.64	-453.41	263.44	524.33	524.39	149.84	.44
2802.00	13.20	149.60	2737.28	-470.81	273.79	544.57	544.63	149.82	.29
2891.00	13.20	151.10	2823.92	-488.47	283.84	564.89	564.95	149.84	.38
2980.00	14.50	151.40	2910.33	-507.15	294.09	586.19	586.25	149.89	1.46
3068.00	13.70	152.50	2995.68	-526.07	304.17	607.62	607.67	149.96	.96
3158.00	14.20	153.10	3083.03	-545.37	314.09	629.30	629.34	150.06	.58
3246.00	12.60	155.10	3168.63	-563.70	323.01	649.66	649.69	150.19	1.89
3333.00	13.20	154.20	3253.43	-581.25	331.33	669.04	669.05	150.32	.73
3423.00	13.40	154.40	3341.02	-599.90	340.31	689.70	689.71	150.43	.23
3512.00	11.60	154.80	3427.91	-617.30	348.58	708.92	708.92	150.55	2.02
3602.00	9.40	153.90	3516.39	-632.09	355.66	725.28	725.28	150.63	2.45
3692.00	9.80	157.00	3605.13	-645.74	361.89	740.24	740.24	150.73	.73
3780.00	12.00	154.20	3691.54	-660.88	368.80	756.81	756.82	150.84	2.57
3868.00	12.90	159.70	3777.48	-678.33	376.19	775.65	775.66	150.99	1.69
3957.00	12.70	158.30	3864.26	-696.73	383.25	795.16	795.19	151.19	.41
4046.00	12.40	156.00	3951.14	-714.55	390.76	814.37	814.42	151.33	.65
4134.00	14.00	153.70	4036.81	-732.73	399.32	834.41	834.47	151.41	1.91
4222.00	14.80	152.00	4122.05	-752.20	409.31	856.28	856.35	151.45	1.03
4312.00	13.40	149.40	4209.33	-771.32	420.02	878.20	878.27	151.43	1.71
4402.00	12.10	147.90	4297.11	-788.29	430.34	898.05	898.10	151.37	1.49
4488.00	11.20	142.80	4381.34	-802.58	440.18	915.32	915.36	151.26	1.59
4576.00	12.00	147.40	4467.55	-817.09	450.27	932.92	932.95	151.14	1.39
4664.00	12.00	146.10	4553.62	-832.39	460.31	951.17	951.19	151.06	.31
4754.00	11.90	147.50	4641.67	-847.99	470.51	969.76	969.77	150.98	.34
4843.00	12.70	147.40	4728.63	-863.97	480.71	988.69	988.70	150.91	.90
4933.00	11.80	149.60	4816.58	-880.24	490.70	1007.77	1007.77	150.86	1.13
5019.00	11.30	155.60	4900.84	-895.50	498.63	1024.96	1024.96	150.89	1.51
5108.00	11.70	153.00	4988.05	-911.48	506.33	1042.66	1042.67	150.95	.74
5198.00	10.70	158.70	5076.34	-927.39	513.51	1060.05	1060.07	151.03	1.66
5287.00	9.70	162.60	5163.94	-942.25	518.75	1075.57	1075.61	151.17	1.36
5375.00	10.00	158.50	5250.64	-956.43	523.77	1090.40	1090.45	151.29	.87
5463.00	8.70	158.50	5337.47	-969.73	529.01	1104.56	1104.64	151.39	1.48
5554.00	9.10	158.40	5427.37	-982.83	534.18	1118.51	1118.61	151.48	.44
5639.00	7.70	159.10	5511.46	-994.40	538.68	1130.81	1130.93	151.55	1.65
5727.00	7.80	149.10	5598.66	-1005.03	543.85	1142.61	1142.74	151.58	1.53
5815.00	7.20	141.00	5685.91	-1014.44	550.39	1154.02	1154.13	151.52	1.38
5905.00	6.90	134.70	5775.23	-1022.62	557.78	1164.77	1164.85	151.39	.92
5994.00	4.70	135.10	5863.77	-1028.97	564.16	1173.42	1173.48	151.27	2.47
6082.00	2.70	133.40	5951.58	-1032.95	568.21	1178.87	1178.92	151.19	2.28
6170.00	1.80	134.30	6039.51	-1035.34	570.70	1182.18	1182.21	151.14	1.02

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	
6257.00	1.70	138.30	6126.47	-1037.25	572.54	1184.75	1184.78	151.10	.18
6346.00	1.40	140.60	6215.44	-1039.08	574.11	1187.11	1187.13	151.08	.34
6434.00	1.30	168.50	6303.41	-1040.89	574.99	1189.12	1189.14	151.08	.75
6522.00	1.20	167.80	6391.39	-1042.77	575.38	1190.95	1190.98	151.11	.11
6612.00	.80	326.30	6481.39	-1043.17	575.23	1191.22	1191.26	151.13	2.18
6701.00	1.10	185.60	6570.38	-1043.50	574.81	1191.31	1191.34	151.15	2.01
6789.00	1.00	191.20	6658.37	-1045.09	574.57	1192.58	1192.63	151.20	.16
6877.00	1.10	196.90	6746.35	-1046.66	574.18	1193.75	1193.80	151.25	.16
6966.00	1.10	209.70	6835.34	-1048.21	573.51	1194.78	1194.85	151.32	.28
7054.00	1.00	210.00	6923.32	-1049.61	572.71	1195.61	1195.69	151.38	.11
7142.00	1.10	195.60	7011.31	-1051.09	572.10	1196.60	1196.70	151.44	.32
7232.00	1.80	203.30	7101.28	-1053.22	571.30	1198.07	1198.19	151.52	.81
7320.00	2.10	204.80	7189.23	-1055.96	570.08	1199.86	1200.01	151.64	.35
7409.00	2.20	210.60	7278.16	-1058.91	568.53	1201.67	1201.88	151.77	.27
7496.00	2.20	212.40	7365.10	-1061.75	566.78	1203.30	1203.56	151.91	.08
7585.00	1.90	217.10	7454.04	-1064.37	564.98	1204.70	1205.03	152.04	.39
7675.00	1.30	215.60	7544.01	-1066.39	563.48	1205.73	1206.11	152.15	.67
7763.00	1.10	228.70	7631.99	-1067.76	562.27	1206.33	1206.76	152.23	.38
7851.00	1.20	234.20	7719.97	-1068.86	560.89	1206.61	1207.08	152.31	.17
7978.00	1.00	238.30	7846.95	-1070.22	558.86	1206.81	1207.35	152.43	.17
Projection To Bit - TD									
8033.00	1.00	238.30	7901.94	-1070.72	558.05	1206.85	1207.42	152.47	.00