



Company/Rig: Noble Energy Inc/Production
WELL/API#: WPF III A18-3/05-123-13196
DECLINATION: 8.19 Degrees
TD AS DRILLED: 7115 Feet
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.49138, Longitude: -104.59545
Grid North = True North -0.58 degs (NAD 27)
Grid Correction Applied = -0.58 degs



DEPTH REFERENCE : RKB=GL/Elevation= 4693'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 11/28/2016 / 13:26

Lat/Long Obtained By Handheld GPS at Wellhead

North Reference: Grid

Denver, Colorado

303-853-4976

Surveyor: Jason Kinchelow / WPF III A18-3

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	****
100.000	0.536	97.214	99.999	-0.059	0.464	-0.059	0.468	97.214	0.536
200.000	0.352	78.444	199.996	-0.056	1.229	-0.056	1.230	92.612	0.233
300.000	0.542	74.679	299.992	0.130	1.986	0.130	1.990	86.245	0.192
400.000	0.208	50.421	399.990	0.371	2.581	0.371	2.608	81.826	0.362
500.000	0.260	97.195	499.989	0.458	2.947	0.458	2.982	81.167	0.192
600.000	0.190	37.863	599.989	0.560	3.274	0.560	3.321	80.290	0.231
700.000	0.281	37.696	699.988	0.885	3.525	0.885	3.635	75.908	0.091
800.000	0.224	324.381	799.987	1.238	3.561	1.238	3.770	70.827	0.305
900.000	0.199	307.131	899.987	1.502	3.309	1.502	3.634	65.581	0.068
1000.000	0.308	348.189	999.986	1.870	3.116	1.870	3.634	59.030	0.205
1100.000	0.181	312.437	1099.985	2.239	2.944	2.239	3.699	52.745	0.192
1200.000	0.327	305.826	1199.984	2.513	2.596	2.513	3.613	45.941	0.149
1300.000	0.388	351.277	1299.982	3.014	2.314	3.014	3.800	37.511	0.282
1400.000	0.348	332.267	1399.980	3.618	2.121	3.618	4.194	30.384	0.128
1500.000	0.592	343.560	1499.977	4.382	1.834	4.382	4.750	22.709	0.260
1600.000	0.591	350.908	1599.971	5.387	1.606	5.387	5.621	16.602	0.076

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1700.000	1.023	353.722	1699.961	6.784	1.427	6.784	6.932	11.878	0.433
1800.000	0.891	355.492	1799.947	8.446	1.268	8.446	8.541	8.539	0.136
1900.000	0.854	8.116	1899.936	9.958	1.312	9.958	10.044	7.507	0.195
2000.000	1.015	16.953	1999.922	11.543	1.676	11.543	11.664	8.260	0.216
2100.000	0.687	37.546	2099.911	12.867	2.300	12.867	13.071	10.134	0.444
2200.000	0.293	80.418	2199.908	13.385	2.918	13.385	13.699	12.297	0.513
2300.000	0.367	139.687	2299.906	13.183	3.377	13.183	13.609	14.368	0.333
2400.000	0.548	166.148	2399.903	12.475	3.699	12.475	13.012	16.515	0.273
2500.000	0.533	161.848	2499.899	11.569	3.958	11.569	12.227	18.887	0.043
2600.000	0.678	161.344	2599.893	10.566	4.292	10.566	11.405	22.108	0.145
2700.000	0.666	160.552	2699.886	9.458	4.675	9.458	10.550	26.302	0.016
2800.000	0.559	172.097	2799.881	8.427	4.935	8.427	9.766	30.355	0.163
2900.000	0.764	143.205	2899.874	7.410	5.402	7.410	9.170	36.089	0.385
3000.000	0.745	148.153	2999.866	6.325	6.144	6.325	8.817	44.169	0.068
3100.000	0.908	136.315	3099.855	5.200	7.034	5.200	8.747	53.526	0.235
3200.000	1.228	151.513	3199.838	3.685	8.092	3.685	8.892	65.517	0.425
3300.000	1.144	148.797	3299.816	1.889	9.120	1.889	9.314	78.297	0.101
3400.000	1.219	152.891	3399.795	0.089	10.122	0.089	10.122	89.497	0.113
3500.000	1.114	174.627	3499.775	-1.826	10.698	-1.826	10.852	99.686	0.452
3600.000	0.937	171.420	3599.759	-3.602	10.911	-3.602	11.490	108.270	0.186
3700.000	0.854	174.671	3699.747	-5.153	11.102	-5.153	12.239	114.898	0.097
3800.000	0.962	166.109	3799.734	-6.711	11.373	-6.711	13.205	120.543	0.173
3900.000	0.781	164.803	3899.723	-8.183	11.753	-8.183	14.321	124.848	0.183
4000.000	0.584	165.984	3999.715	-9.336	12.055	-9.336	15.247	127.754	0.197
4100.000	0.577	153.400	4099.710	-10.281	12.404	-10.281	16.111	129.652	0.127
4200.000	0.261	216.254	4199.708	-10.915	12.495	-10.915	16.591	131.138	0.514
4300.000	0.833	311.937	4299.704	-10.612	11.819	-10.612	15.885	131.920	0.898
4400.000	0.909	337.314	4399.693	-9.395	10.973	-9.395	14.445	130.570	0.390
4500.000	1.118	339.216	4499.677	-7.751	10.320	-7.751	12.907	126.907	0.212
4600.000	1.252	336.888	4599.656	-5.834	9.546	-5.834	11.187	121.432	0.142
4700.000	1.239	349.138	4699.632	-3.768	8.913	-3.768	9.677	112.914	0.266
4800.000	1.267	355.991	4799.609	-1.603	8.632	-1.603	8.780	100.519	0.152
4900.000	1.162	3.220	4899.586	0.513	8.612	0.513	8.627	86.593	0.186
5000.000	1.133	347.772	4999.566	2.491	8.459	2.491	8.818	73.589	0.310
5100.000	1.123	347.970	5099.547	4.417	8.045	4.417	9.178	61.234	0.011
5200.000	0.660	329.379	5199.535	5.871	7.547	5.871	9.562	52.119	0.540
5300.000	0.651	333.000	5299.528	6.873	6.996	6.873	9.808	45.507	0.043
5400.000	0.530	338.559	5399.523	7.810	6.569	7.810	10.205	40.068	0.133
5500.000	0.845	329.846	5499.516	8.879	6.030	8.879	10.732	34.181	0.331

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
5600.000	0.500	351.883	5599.509	9.948	5.598	9.948	11.415	29.365	0.425
5700.000	0.786	344.712	5699.502	11.042	5.355	11.042	12.272	25.873	0.297