



Company/Rig: Noble Energy Inc/Production
WELL/API#: Antholz PC AB 06-16/05-123-32110
DECLINATION: 8.27 Degrees
TD AS DRILLED: 7440'
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.59651, Longitude: -104.58531
Grid North = True North -0.59 degs (NAD 27)
Grid Correction Applied = -0.59 degs



DEPTH REFERENCE : RKB=GL/Elevation=4992'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 2/15/2016 / 12:15

Lat/Long Obtained By Handheld GPS at Wellhead

North Reference: Grid

Denver, Colorado

303-853-4976

Surveyor: Jason Kinchelow / Antholz PC AB 06-16

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	0.268	303.352	100.000	0.129	-0.195	0.129	0.234	303.352	0.268
200.000	0.066	54.338	199.999	0.291	-0.344	0.291	0.450	310.243	0.298
300.000	0.047	289.754	299.999	0.339	-0.336	0.339	0.477	315.261	0.101
400.000	0.093	282.489	399.999	0.370	-0.453	0.370	0.585	309.218	0.046
500.000	0.262	331.924	499.999	0.590	-0.640	0.590	0.870	312.636	0.214
600.000	0.196	297.082	599.998	0.869	-0.900	0.869	1.252	313.996	0.151
700.000	0.505	282.208	699.996	1.040	-1.483	1.040	1.812	305.048	0.319
800.000	0.766	238.221	799.990	0.782	-2.482	0.782	2.602	287.484	0.534
900.000	1.167	235.404	899.976	-0.148	-3.888	-0.148	3.891	267.815	0.404
1000.000	1.378	255.381	999.952	-1.030	-5.890	-1.030	5.979	260.080	0.488
1100.000	1.134	244.379	1099.928	-1.761	-7.946	-1.761	8.138	257.501	0.342
1200.000	1.109	240.087	1199.909	-2.672	-9.677	-2.672	10.039	254.564	0.088
1300.000	1.499	250.205	1299.883	-3.597	-11.746	-3.597	12.285	252.972	0.452
1400.000	1.415	235.127	1399.851	-4.746	-13.990	-4.746	14.773	251.260	0.391
1500.000	1.164	231.841	1499.825	-6.080	-15.802	-6.080	16.931	248.955	0.261
1600.000	0.858	225.123	1599.810	-7.236	-17.131	-7.236	18.597	247.101	0.328
1700.000	1.292	239.773	1699.792	-8.332	-18.636	-8.332	20.414	245.910	0.510
1800.000	1.181	246.603	1799.769	-9.309	-20.556	-9.309	22.565	245.636	0.184

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
1900.000	1.185	235.730	1899.747	-10.301	-22.357	-10.301	24.615	245.262	0.224
2000.000	0.623	254.411	1999.735	-11.029	-23.735	-11.029	26.172	245.077	0.628
2100.000	0.752	237.028	2099.728	-11.532	-24.808	-11.532	27.358	245.069	0.244
2200.000	0.694	257.262	2199.720	-12.023	-25.950	-12.023	28.599	245.141	0.260
2300.000	0.808	260.284	2299.711	-12.275	-27.235	-12.275	29.873	245.738	0.120
2400.000	0.859	234.513	2399.701	-12.829	-28.540	-12.829	31.291	245.795	0.375
2500.000	1.184	230.887	2499.685	-13.916	-29.952	-13.916	33.027	245.080	0.331
2600.000	1.354	240.939	2599.661	-15.142	-31.787	-15.142	35.209	244.528	0.280
2700.000	1.497	212.427	2699.631	-16.819	-33.521	-16.819	37.504	243.355	0.716
2800.000	1.427	211.660	2799.598	-18.981	-34.875	-18.981	39.706	241.442	0.073
2900.000	1.483	233.851	2899.567	-20.805	-36.573	-20.805	42.076	240.367	0.563
3000.000	1.233	268.022	2999.540	-21.605	-38.693	-21.605	44.316	240.822	0.833
3100.000	1.158	230.787	3099.520	-22.281	-40.551	-22.281	46.269	241.213	0.766
3200.000	1.166	231.868	3199.499	-23.548	-42.134	-23.548	48.268	240.800	0.024
3300.000	0.787	238.051	3299.485	-24.540	-43.517	-24.540	49.959	240.581	0.393
3400.000	0.837	230.035	3399.475	-25.372	-44.660	-25.372	51.364	240.398	0.124
3500.000	0.670	226.714	3499.466	-26.242	-45.645	-26.242	52.651	240.104	0.172
3600.000	0.782	184.703	3599.459	-27.323	-46.127	-27.323	53.612	239.360	0.531
3700.000	0.713	165.371	3699.450	-28.605	-46.026	-28.605	54.191	238.139	0.260
3800.000	1.038	118.830	3799.440	-29.644	-45.075	-29.644	53.949	236.669	0.753
3900.000	1.353	103.528	3899.418	-30.356	-43.134	-30.356	52.746	234.864	0.446
4000.000	1.345	144.084	3999.393	-31.583	-41.298	-31.583	51.991	232.593	0.935
4100.000	1.283	150.406	4099.366	-33.507	-40.057	-33.507	52.223	230.088	0.157
4200.000	1.626	163.246	4199.334	-35.839	-39.095	-35.839	53.036	227.488	0.470
4300.000	1.615	155.330	4299.294	-38.477	-38.098	-38.477	54.148	224.716	0.224
4400.000	1.644	167.917	4399.254	-41.161	-37.210	-41.161	55.487	222.114	0.358
4500.000	1.594	148.801	4499.215	-43.753	-36.189	-43.753	56.780	219.595	0.540
4600.000	1.454	173.551	4599.181	-46.204	-35.326	-46.204	58.161	217.400	0.667
4700.000	1.210	161.774	4699.154	-48.467	-34.853	-48.467	59.698	215.720	0.366
4800.000	1.151	165.308	4799.133	-50.442	-34.268	-50.442	60.981	214.191	0.093
4900.000	1.370	166.913	4899.108	-52.578	-33.743	-52.578	62.474	212.691	0.222
5000.000	1.633	186.734	4999.075	-55.158	-33.639	-55.158	64.607	211.377	0.578
5100.000	1.775	183.165	5099.030	-58.120	-33.892	-58.120	67.280	210.248	0.177
5200.000	1.776	186.937	5198.982	-61.204	-34.164	-61.204	70.094	209.170	0.117
5300.000	1.881	164.328	5298.933	-64.323	-33.908	-64.323	72.713	207.796	0.724
5400.000	0.906	168.689	5398.902	-66.679	-33.310	-66.679	74.536	206.545	0.980
5500.000	1.055	142.120	5498.888	-68.181	-32.589	-68.181	75.569	205.547	0.474
5600.000	0.509	104.157	5598.879	-69.016	-31.593	-69.016	75.904	204.596	0.725
5700.000	0.767	108.232	5698.872	-69.334	-30.526	-69.334	75.757	203.763	0.261
5800.000	1.257	61.041	5798.858	-69.013	-28.931	-69.013	74.832	202.744	0.926

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
5900.000	1.290	29.585	5898.835	-67.503	-27.416	-67.503	72.858	202.104	0.691
6000.000	1.111	50.664	5998.813	-65.909	-26.110	-65.909	70.893	201.611	0.473
6100.000	1.420	22.309	6098.790	-64.149	-24.890	-64.149	68.808	201.207	0.688
6200.000	1.654	8.023	6198.754	-61.574	-24.218	-61.574	66.166	201.471	0.447
6300.000	1.604	5.592	6298.714	-58.753	-23.881	-58.753	63.420	202.120	0.085
6400.000	1.607	1.274	6398.674	-55.958	-23.713	-55.958	60.775	202.966	0.121
6500.000	1.341	349.830	6498.641	-53.404	-23.889	-53.404	58.504	204.100	0.396
6600.000	0.821	18.306	6598.624	-51.572	-23.870	-51.572	56.829	204.837	0.733
6700.000	0.620	343.799	6698.616	-50.373	-23.796	-50.373	55.711	205.286	0.468
6750.000	0.611	313.934	6748.614	-49.928	-24.064	-49.928	55.424	205.733	0.635