



Company/Rig: Noble Energy Inc/Production
 WELL/API#: Agricultural Products Fed 32-08F/05-123-15578
 DECLINATION: 8.35 Degrees
 TD AS DRILLED: 7400'
 COUNTY/STATE: Weld/Colorado
 VS-Azi: 0.000 Degrees
 Latitude: 40.26941, Longitude: -104.79438
 Grid North = True North -0.46 degs (NAD 27)
 Grid Correction Applied = -0.46 degs



DEPTH REFERENCE : RKB=GL/Elevation=4761'

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 2/15/2016 / 11:59

Lat/Long Obtained By Handheld GPS at Wellhead

North Reference: Grid

Denver, Colorado

303-853-4976

Surveyor: Jason Kinchelov / Agricultural Products Federal 32-08 F

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	0.170	17.636	100.000	0.141	0.045	0.141	0.148	17.636	0.170
200.000	0.127	221.302	200.000	0.200	0.017	0.200	0.200	4.829	0.290
300.000	0.059	30.634	300.000	0.161	-0.030	0.161	0.164	349.524	0.185
400.000	0.055	94.893	400.000	0.201	0.045	0.201	0.206	12.478	0.061
500.000	0.135	216.525	500.000	0.102	0.022	0.102	0.105	12.226	0.171
600.000	0.147	203.598	599.999	-0.110	-0.099	-0.110	0.148	222.112	0.034
700.000	0.185	306.373	699.999	-0.131	-0.281	-0.131	0.310	244.938	0.260
800.000	0.341	292.188	799.998	0.077	-0.686	0.077	0.691	276.389	0.167
900.000	0.295	309.959	899.996	0.355	-1.159	0.355	1.212	287.014	0.108
1000.000	0.445	273.858	999.994	0.546	-1.744	0.546	1.828	287.396	0.270
1100.000	0.336	285.395	1099.992	0.650	-2.414	0.650	2.500	285.078	0.134
1200.000	0.535	290.693	1199.989	0.893	-3.134	0.893	3.258	285.911	0.204
1300.000	0.485	311.537	1299.985	1.339	-3.887	1.339	4.111	289.004	0.191
1400.000	0.592	302.254	1399.981	1.895	-4.640	1.895	5.012	292.211	0.138
1500.000	0.544	320.587	1499.976	2.537	-5.379	2.537	5.947	295.255	0.187
1600.000	0.730	314.145	1599.970	3.348	-6.138	3.348	6.991	298.613	0.199
1700.000	0.694	313.811	1699.962	4.211	-7.032	4.211	8.196	300.916	0.036
1800.000	0.802	307.186	1799.954	5.053	-8.027	5.053	9.485	302.194	0.138
1900.000	0.649	308.495	1899.946	5.829	-9.028	5.829	10.746	302.851	0.154

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
2000.000	0.615	313.341	1999.939	6.551	-9.862	6.551	11.839	303.594	0.063
2100.000	0.322	322.942	2099.936	7.143	-10.422	7.143	12.635	304.428	0.303
2200.000	0.103	230.411	2199.935	7.310	-10.660	7.310	12.926	304.438	0.342
2300.000	0.344	203.965	2299.935	6.978	-10.852	6.978	12.902	302.743	0.255
2400.000	0.293	246.380	2399.933	6.602	-11.207	6.602	13.007	300.501	0.235
2500.000	0.187	217.614	2499.932	6.371	-11.541	6.371	13.182	298.899	0.157
2600.000	0.270	235.165	2599.932	6.107	-11.834	6.107	13.317	297.297	0.108
2700.000	0.452	218.534	2699.930	5.663	-12.273	5.663	13.517	294.771	0.208
2800.000	0.543	234.654	2799.926	5.081	-12.906	5.081	13.870	291.488	0.166
2900.000	0.626	232.847	2899.921	4.476	-13.727	4.476	14.439	288.061	0.085
3000.000	0.530	237.385	2999.916	3.897	-14.552	3.897	15.065	284.993	0.107
3100.000	0.543	255.568	3099.911	3.530	-15.400	3.530	15.800	282.911	0.170
3200.000	0.620	262.372	3199.906	3.340	-16.395	3.340	16.732	281.516	0.103
3300.000	0.914	270.754	3299.897	3.279	-17.729	3.279	18.030	280.479	0.314
3400.000	1.073	272.598	3399.882	3.332	-19.462	3.332	19.745	279.715	0.162
3500.000	1.214	266.105	3499.862	3.302	-21.454	3.302	21.707	278.751	0.191
3600.000	1.430	273.393	3599.835	3.304	-23.756	3.304	23.985	277.919	0.274
3700.000	1.678	289.027	3699.799	3.856	-26.386	3.856	26.666	278.314	0.489
3800.000	1.870	289.531	3799.751	4.878	-29.308	4.878	29.711	279.451	0.192
3900.000	1.780	295.557	3899.700	6.094	-32.246	6.094	32.817	280.701	0.212
4000.000	2.025	284.891	3999.646	7.218	-35.355	7.218	36.084	281.539	0.430
4100.000	1.959	291.536	4099.585	8.299	-38.653	8.299	39.534	282.118	0.240
4200.000	1.675	294.907	4199.535	9.542	-41.568	9.542	42.649	282.929	0.303
4300.000	1.679	304.015	4299.492	10.977	-44.108	10.977	45.453	283.975	0.266
4400.000	1.625	300.526	4399.451	12.517	-46.543	12.517	48.197	285.052	0.114
4500.000	1.601	298.753	4499.411	13.909	-48.990	13.909	50.926	285.850	0.055
4600.000	1.666	302.719	4599.370	15.367	-51.438	15.367	53.684	286.634	0.130
4700.000	1.607	316.512	4699.330	17.171	-53.626	17.171	56.308	287.755	0.397
4800.000	1.634	309.324	4799.290	19.092	-55.694	19.092	58.876	288.921	0.205
4900.000	1.116	319.773	4899.261	20.739	-57.426	20.739	61.056	289.857	0.574
5000.000	1.241	322.374	4999.240	22.340	-58.716	22.340	62.823	290.830	0.136
5100.000	0.719	315.228	5099.225	23.643	-59.819	23.643	64.322	291.566	0.536
5200.000	0.602	308.563	5199.218	24.416	-60.672	24.416	65.400	291.921	0.139
5300.000	0.513	330.891	5299.214	25.134	-61.301	25.134	66.253	292.295	0.233
5400.000	0.272	321.795	5399.211	25.712	-61.665	25.712	66.811	292.634	0.248
5500.000	0.172	52.956	5499.211	25.989	-61.692	25.989	66.943	292.844	0.325
5600.000	0.279	26.150	5599.210	26.298	-61.465	26.298	66.855	293.164	0.147
5700.000	0.383	68.239	5699.209	26.641	-61.047	26.641	66.607	293.576	0.257
5800.000	0.687	70.173	5799.204	26.968	-60.173	26.968	65.940	294.141	0.305
5900.000	0.614	103.267	5899.198	27.049	-59.087	27.049	64.984	294.597	0.377

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
6000.000	0.811	149.700	5999.191	26.315	-58.209	26.315	63.881	294.326	0.590
6100.000	1.211	146.512	6099.175	24.822	-57.269	24.822	62.417	293.434	0.405
6200.000	1.096	166.585	6199.155	23.011	-56.464	23.011	60.973	292.172	0.418
6300.000	1.204	156.298	6299.135	21.119	-55.820	21.119	59.681	290.723	0.232
6400.000	1.142	164.661	6399.114	19.196	-55.134	19.196	58.380	289.196	0.182
6500.000	0.649	179.328	6499.102	17.668	-54.864	17.668	57.638	287.850	0.539
6600.000	0.400	171.932	6599.098	16.756	-54.808	16.756	57.312	286.999	0.258
6700.000	0.541	190.678	6699.094	15.946	-54.847	15.946	57.118	286.211	0.207
6800.000	0.923	182.722	6799.086	14.677	-54.972	14.677	56.898	284.949	0.394
6900.000	1.331	159.923	6899.067	12.782	-54.612	12.782	56.088	283.173	0.599
7000.000	1.205	175.721	6999.043	10.643	-54.135	10.643	55.171	281.122	0.370
7100.000	0.658	154.328	7099.029	9.077	-53.807	9.077	54.568	279.575	0.639
7150.000	0.728	151.238	7149.026	8.539	-53.530	8.539	54.207	279.064	0.159