



Company/Rig: Noble Energy/ CoreTech
 WELL/API#: Stinar C 14-28D/05-123-32786
 DECLINATION: 8.13 Degrees
 TD AS DRILLED: 7022 Feet
 COUNTY/STATE: Weld/Colorado
 VS-Azi: 0.000 Degrees
 Latitude: 40.31828, Longitude: -104.51545
 Grid North = True North -0.64 degs (NAD 27)
 Grid Correction Applied = -0.64 degs



DEPTH REFERENCE : RKB=GL/ ELEVATION= 4638 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut
 Minimum Curvature Method
 Report Date/Time: 11/22/2016 / 11:46

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID
 HENDERSON, COLORADO
 303-853-4976

Surveyor: Sean Bratt / Stinar C 14-28D

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	0.240	283.957	100.000	0.051	-0.203	0.051	0.209	283.957	0.240
200.000	0.284	221.685	199.999	-0.084	-0.571	-0.084	0.578	261.623	0.274
300.000	0.828	226.182	299.994	-0.770	-1.258	-0.770	1.474	238.536	0.545
400.000	0.882	221.866	399.983	-1.843	-2.293	-1.843	2.942	231.204	0.084
500.000	0.748	213.200	499.973	-2.963	-3.164	-2.963	4.334	226.882	0.182
600.000	0.726	225.324	599.964	-3.954	-3.972	-3.954	5.604	225.127	0.157
700.000	0.706	234.102	699.957	-4.761	-4.921	-4.761	6.847	225.950	0.111
800.000	1.689	289.562	799.936	-4.629	-6.810	-4.629	8.234	235.796	1.414
900.000	4.760	297.734	899.766	-2.204	-11.873	-2.204	12.075	259.485	3.097
1000.000	6.611	303.258	999.271	2.885	-20.359	2.885	20.563	278.064	1.928
1100.000	9.003	310.021	1098.339	11.075	-31.167	11.075	33.076	289.562	2.558
1200.000	14.027	319.262	1196.303	25.299	-45.078	25.299	51.692	299.302	5.336
1300.000	14.016	319.243	1293.323	43.654	-60.892	43.654	74.924	305.637	0.011
1400.000	14.048	319.054	1390.339	61.994	-76.752	61.994	98.662	308.929	0.055
1500.000	14.029	319.358	1487.353	80.358	-92.600	80.358	122.606	310.952	0.076
1600.000	14.270	320.966	1584.319	99.129	-108.256	99.129	146.785	312.480	0.461

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	13.652	321.221	1681.365	117.902	-123.408	117.902	170.677	313.693	0.621
1800.000	13.865	323.100	1778.496	136.683	-137.994	136.683	194.228	314.727	0.495
1900.000	14.210	321.694	1875.510	155.896	-152.796	155.896	218.289	315.575	0.485
2000.000	14.288	320.316	1972.434	175.024	-168.283	175.024	242.802	316.125	0.348
2100.000	13.090	321.996	2069.592	193.444	-183.136	193.444	266.382	316.568	1.262
2200.000	11.976	323.808	2167.208	210.741	-196.235	210.741	287.958	317.041	1.181
2300.000	12.178	322.984	2264.995	227.536	-208.712	227.536	308.761	317.471	0.266
2400.000	13.166	322.099	2362.558	244.945	-222.058	244.945	330.617	317.806	1.007
2500.000	13.952	327.270	2459.773	264.074	-235.573	264.074	353.878	318.265	1.444
2600.000	15.201	325.764	2556.553	285.054	-249.468	285.054	378.801	318.809	1.305
2700.000	15.834	326.176	2652.908	307.227	-264.438	307.227	405.359	319.281	0.643
2800.000	15.165	327.429	2749.271	329.583	-279.074	329.583	431.865	319.744	0.748
2900.000	14.548	328.053	2845.927	351.264	-292.761	351.264	457.269	320.190	0.637
3000.000	14.182	326.305	2942.801	372.113	-306.203	372.113	481.901	320.550	0.568
3100.000	12.199	323.711	3040.159	390.824	-319.254	390.824	504.645	320.755	2.069
3200.000	11.702	322.791	3137.991	407.417	-331.640	407.417	525.332	320.854	0.533
3300.000	12.718	321.467	3235.728	424.105	-344.631	424.105	546.475	320.902	1.054
3400.000	14.193	321.962	3332.980	442.373	-359.043	442.373	569.742	320.936	1.479
3500.000	14.813	322.058	3429.793	462.110	-374.458	462.110	594.781	320.981	0.620
3600.000	15.847	323.307	3526.234	483.140	-390.476	483.140	621.205	321.055	1.085
3700.000	15.956	324.361	3622.408	505.258	-406.643	505.258	648.571	321.172	0.309
3800.000	16.421	323.517	3718.442	527.794	-423.056	527.794	676.419	321.286	0.521
3900.000	15.610	322.178	3814.561	549.787	-439.711	549.787	703.997	321.348	0.891
4000.000	14.197	320.477	3911.195	569.875	-455.767	569.875	729.713	321.348	1.479
4100.000	13.718	320.326	4008.242	588.461	-471.140	588.461	753.830	321.318	0.481
4200.000	11.345	322.367	4105.853	605.379	-484.718	605.379	775.522	321.316	2.413
4300.000	9.669	321.532	4204.173	619.745	-495.949	619.745	793.756	321.332	1.683
4400.000	8.607	321.457	4302.902	632.173	-505.836	632.173	809.637	321.335	1.062
4500.000	6.630	322.799	4402.015	642.625	-513.989	642.625	822.892	321.346	1.985
4600.000	5.238	324.534	4501.477	650.941	-520.128	650.941	833.221	321.374	1.403
4700.000	4.113	337.957	4601.145	657.983	-524.123	657.983	841.217	321.461	1.563
4800.000	1.729	4.167	4701.012	662.812	-525.359	662.812	845.767	321.599	2.672
4900.000	0.495	15.133	4800.991	664.734	-525.137	664.734	847.136	321.691	1.246
5000.000	0.678	13.798	4900.986	665.726	-524.883	665.726	847.758	321.746	0.183
5100.000	1.029	9.811	5000.975	667.185	-524.589	667.185	848.722	321.823	0.355
5200.000	0.863	7.771	5100.961	668.816	-524.334	668.816	849.847	321.904	0.169
5300.000	1.075	355.327	5200.947	670.496	-524.309	670.496	851.155	321.976	0.298
5400.000	0.699	317.578	5300.935	671.881	-524.797	671.881	852.547	322.007	0.675
5500.000	0.738	319.157	5400.927	672.819	-525.629	672.819	853.798	322.002	0.043

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	0.971	330.170	5500.916	674.040	-526.472	674.040	855.279	322.008	0.284
5700.000	1.095	317.555	5600.900	675.480	-527.538	675.480	857.070	322.011	0.258
5800.000	1.409	322.577	5700.876	677.162	-528.930	677.162	859.253	322.007	0.332
5900.000	1.188	315.302	5800.851	678.876	-530.406	678.876	861.512	321.999	0.275
6000.000	1.313	317.747	5900.827	680.461	-531.906	680.461	863.685	321.986	0.136
6100.000	1.302	317.600	6000.801	682.148	-533.443	682.148	865.961	321.974	0.011
6200.000	1.284	317.567	6100.775	683.814	-534.965	683.814	868.211	321.963	0.018
6300.000	1.180	322.256	6200.752	685.455	-536.351	685.455	870.357	321.958	0.145
6400.000	0.960	332.306	6300.735	687.011	-537.371	687.011	872.210	321.968	0.288
6500.000	1.225	350.755	6400.717	688.808	-537.932	688.808	873.972	322.012	0.437
6600.000	1.452	357.991	6500.689	691.129	-538.148	691.129	875.935	322.094	0.282
6700.000	0.987	356.728	6600.667	693.254	-538.241	693.254	877.670	322.174	0.465