



Company/Rig: Noble Energy/ CoreTech
WELL/API#: Loloff B 35-21/05-123-24446
DECLINATION: 8.18 Degrees
TD AS DRILLED: 6895 Feet
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.35645, Longitude: -104.51700
Grid North = True North -0.64 degs (NAD 27)
Grid Convergence Applied = -0.64 degs



DEPTH REFERENCE : RKB=GL/ ELEVATION= 4620 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut
Minimum Curvature Method
Report Date/Time: 7/1/2016 / 12:40

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD
NORTH REFERENCE: GRID
HENDERSON, COLORADO
303-853-4976
Surveyor: Sean Bratt / Loloff B 35-21

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	0.892	278.656	99.996	0.117	-0.769	0.117	0.778	278.656	0.892
200.000	0.533	281.828	199.988	0.330	-1.994	0.330	2.021	279.386	0.361
300.000	0.348	251.328	299.985	0.328	-2.737	0.328	2.757	276.824	0.292
400.000	0.609	271.887	399.982	0.248	-3.556	0.248	3.565	273.984	0.308
500.000	0.835	280.600	499.974	0.399	-4.804	0.399	4.820	274.751	0.251
600.000	0.636	270.224	599.965	0.535	-6.075	0.535	6.099	275.037	0.239
700.000	0.884	280.042	699.957	0.672	-7.390	0.672	7.420	275.197	0.279
800.000	0.750	268.615	799.947	0.791	-8.803	0.791	8.838	275.134	0.210
900.000	0.950	277.243	899.936	0.880	-10.279	0.880	10.317	274.891	0.237
1000.000	0.758	283.031	999.924	1.133	-11.746	1.133	11.801	275.511	0.210
1100.000	0.867	262.321	1099.915	1.181	-13.140	1.181	13.193	275.137	0.311
1200.000	0.795	264.135	1199.904	1.009	-14.580	1.009	14.615	273.961	0.076
1300.000	0.401	277.387	1299.898	0.984	-15.618	0.984	15.649	273.604	0.415
1400.000	0.330	287.783	1399.896	1.117	-16.240	1.117	16.278	273.933	0.097
1500.000	0.412	237.320	1499.895	1.010	-16.816	1.010	16.847	273.438	0.325
1600.000	0.432	238.930	1599.892	0.622	-17.442	0.622	17.453	272.041	0.024
1700.000	0.799	227.052	1699.886	-0.048	-18.275	-0.048	18.275	269.849	0.386
1800.000	1.223	241.487	1799.870	-1.033	-19.723	-1.033	19.750	267.003	0.491

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	0.920	259.043	1899.853	-1.695	-21.449	-1.695	21.516	265.483	0.443
2000.000	1.086	253.668	1999.838	-2.114	-23.147	-2.114	23.243	264.783	0.191
2100.000	0.976	264.525	2099.821	-2.461	-24.904	-2.461	25.026	264.356	0.224
2200.000	1.181	250.202	2199.804	-2.892	-26.722	-2.892	26.878	263.824	0.337
2300.000	1.089	245.383	2299.784	-3.637	-28.555	-3.637	28.786	262.742	0.132
2400.000	1.049	247.008	2399.767	-4.390	-30.262	-4.390	30.578	261.746	0.051
2500.000	0.804	247.457	2499.754	-5.016	-31.752	-5.016	32.146	261.022	0.245
2600.000	0.907	251.464	2599.743	-5.537	-33.151	-5.537	33.610	260.518	0.119
2700.000	0.890	277.912	2699.731	-5.682	-34.670	-5.682	35.132	260.693	0.411
2800.000	0.921	282.971	2799.718	-5.395	-36.222	-5.395	36.622	261.529	0.086
2900.000	0.834	274.463	2899.707	-5.157	-37.731	-5.157	38.082	262.217	0.156
3000.000	0.570	273.850	2999.699	-5.067	-38.953	-5.067	39.281	262.588	0.265
3100.000	0.348	222.193	3099.696	-5.259	-39.653	-5.259	40.000	262.445	0.447
3200.000	0.377	221.161	3199.694	-5.732	-40.074	-5.732	40.481	261.860	0.030
3300.000	0.771	180.788	3299.689	-6.652	-40.299	-6.652	40.845	260.627	0.542
3400.000	1.103	163.752	3399.676	-8.248	-40.039	-8.248	40.880	258.359	0.430
3500.000	1.049	170.891	3499.658	-10.077	-39.625	-10.077	40.886	255.732	0.144
3600.000	1.351	157.929	3599.636	-12.073	-39.037	-12.073	40.861	252.814	0.404
3700.000	1.159	171.099	3699.613	-14.165	-38.437	-14.165	40.965	249.770	0.345
3800.000	0.978	151.774	3799.595	-15.916	-37.877	-15.916	41.086	247.207	0.401
3900.000	0.790	120.853	3899.584	-17.022	-36.882	-17.022	40.621	245.226	0.505
4000.000	0.809	118.638	3999.574	-17.713	-35.671	-17.713	39.827	243.593	0.036
4100.000	1.666	101.718	4099.550	-18.347	-33.629	-18.347	38.308	241.385	0.923
4200.000	1.745	101.700	4199.506	-18.951	-30.714	-18.951	36.090	238.326	0.079
4300.000	2.019	112.486	4299.452	-19.933	-27.596	-19.933	34.042	234.159	0.446
4400.000	1.854	87.537	4399.397	-20.537	-24.352	-20.537	31.856	229.858	0.852
4500.000	2.285	65.730	4499.333	-19.648	-20.918	-19.648	28.699	226.793	0.890
4600.000	2.453	42.975	4599.250	-17.263	-17.642	-17.263	24.683	225.622	0.949
4700.000	3.114	32.104	4699.132	-13.396	-14.739	-13.396	19.917	227.733	0.844
4800.000	2.877	26.742	4798.995	-8.854	-12.166	-8.854	15.047	233.956	0.367
4900.000	2.138	34.840	4898.899	-5.082	-9.972	-5.082	11.192	242.995	0.818
5000.000	1.251	44.467	4998.855	-2.772	-8.141	-2.772	8.600	251.198	0.928
5100.000	0.739	51.946	5098.839	-1.595	-6.869	-1.595	7.051	256.926	0.528
5200.000	0.595	24.380	5198.833	-0.725	-6.147	-0.725	6.189	263.277	0.347
5300.000	0.582	19.086	5298.828	0.229	-5.766	0.229	5.771	272.270	0.056
5400.000	0.737	24.458	5398.821	1.294	-5.334	1.294	5.488	283.635	0.167
5500.000	0.644	11.602	5498.814	2.430	-4.954	2.430	5.518	296.122	0.180
5600.000	0.855	5.331	5598.805	3.722	-4.772	3.722	6.052	307.954	0.226
5700.000	1.011	359.116	5698.792	5.347	-4.717	5.347	7.130	318.582	0.186
5800.000	1.181	359.960	5798.774	7.259	-4.731	7.259	8.665	326.908	0.172

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	1.020	9.879	5898.755	9.168	-4.579	9.168	10.247	333.460	0.249
6000.000	1.577	358.373	5998.729	11.420	-4.465	11.420	12.262	338.645	0.612
6100.000	1.466	356.589	6098.694	14.072	-4.580	14.072	14.799	341.971	0.121
6200.000	1.869	5.658	6198.652	16.972	-4.496	16.972	17.557	345.164	0.481
6300.000	1.957	352.221	6298.596	20.286	-4.566	20.286	20.793	347.315	0.456
6400.000	2.204	6.004	6398.531	23.890	-4.596	23.890	24.328	349.110	0.556
6500.000	2.473	5.012	6498.448	27.951	-4.206	27.951	28.266	351.442	0.273
6600.000	2.837	1.969	6598.340	32.574	-3.933	32.574	32.810	353.116	0.390