



Company/Rig: Noble Energy/ CoreTech
WELL/API#: 70 Ranch USX BB 09-05/05-123-28083
DECLINATION: 8.24 Degrees
TD AS DRILLED: 6936 Feet
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.41608, Longitude: -104.44901
Grid North = True North -0.68 degs (NAD 27)
Grid Convergence Applied = -0.68 degs



DEPTH REFERENCE : RKB=GL/ ELEVATION= 4748 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 7/21/2015 / 09:12

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: Sean Bratt

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	0.252	295.118	100.000	0.093	-0.199	0.093	0.220	295.118	0.252
200.000	0.582	248.312	199.997	-0.001	-0.870	-0.001	0.870	269.923	0.449
300.000	0.615	262.224	299.992	-0.262	-1.874	-0.262	1.892	262.055	0.148
400.000	0.502	289.254	399.987	-0.190	-2.819	-0.190	2.825	266.149	0.283
500.000	0.349	81.279	499.986	0.001	-2.931	0.001	2.931	270.015	0.826
600.000	0.614	87.358	599.982	0.072	-2.095	0.072	2.096	271.959	0.269
700.000	0.537	89.998	699.977	0.096	-1.091	0.096	1.095	275.047	0.081
800.000	0.699	48.157	799.972	0.504	-0.168	0.504	0.531	341.584	0.467
900.000	0.501	51.107	899.966	1.185	0.627	1.185	1.341	27.893	0.201
1000.000	0.439	62.423	999.963	1.637	1.307	1.637	2.095	38.609	0.111
1100.000	0.488	89.829	1099.960	1.816	2.073	1.816	2.756	48.782	0.225
1200.000	0.420	80.607	1199.957	1.877	2.861	1.877	3.421	56.729	0.099
1300.000	0.331	53.091	1299.955	2.110	3.454	2.110	4.047	58.571	0.198
1400.000	0.328	45.552	1399.953	2.485	3.889	2.485	4.615	57.428	0.043
1500.000	0.154	346.217	1499.952	2.815	4.062	2.815	4.942	55.273	0.282
1600.000	0.171	278.927	1599.952	2.969	3.882	2.969	4.887	52.598	0.180
1700.000	0.348	260.286	1699.951	2.940	3.436	2.940	4.522	49.443	0.194
1800.000	0.556	198.445	1799.948	2.429	2.983	2.429	3.847	50.847	0.497

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	0.764	169.333	1899.942	1.314	2.953	1.314	3.232	66.016	0.388
2000.000	0.926	153.163	1999.931	-0.062	3.441	-0.062	3.442	91.035	0.287
2100.000	1.204	130.603	2099.914	-1.467	4.604	-1.467	4.832	107.674	0.498
2200.000	1.359	133.458	2199.889	-2.966	6.262	-2.966	6.929	115.345	0.167
2300.000	1.889	133.930	2299.849	-4.925	8.310	-4.925	9.660	120.655	0.531
2400.000	1.983	141.659	2399.792	-7.426	10.570	-7.426	12.918	125.088	0.277
2500.000	1.847	128.068	2499.736	-9.776	12.912	-9.776	16.195	127.130	0.473
2600.000	1.455	126.937	2599.695	-11.532	15.195	-11.532	19.076	127.197	0.394
2700.000	1.549	143.703	2699.661	-13.385	17.010	-13.385	21.644	128.198	0.448
2800.000	1.578	127.277	2799.624	-15.308	18.905	-15.308	24.326	128.997	0.447
2900.000	1.393	142.506	2899.591	-17.106	20.741	-17.106	26.885	129.514	0.434
3000.000	1.606	136.513	2999.557	-19.087	22.445	-19.087	29.464	130.378	0.264
3100.000	1.979	137.657	3099.507	-21.380	24.572	-21.380	32.571	131.026	0.375
3200.000	1.475	142.953	3199.462	-23.683	26.511	-23.683	35.549	131.776	0.528
3300.000	0.831	140.507	3299.441	-25.270	27.747	-25.270	37.530	132.325	0.646
3400.000	0.562	154.577	3399.434	-26.273	28.419	-26.273	38.703	132.753	0.316
3500.000	0.402	156.116	3499.430	-27.037	28.772	-27.037	39.481	133.220	0.161
3600.000	0.561	109.525	3599.427	-27.521	29.375	-27.521	40.253	133.134	0.408
3700.000	0.559	93.648	3699.422	-27.716	30.324	-27.716	41.081	132.427	0.155
3800.000	0.314	153.252	3799.420	-27.991	30.934	-27.991	41.718	132.141	0.483
3900.000	0.412	175.250	3899.418	-28.594	31.087	-28.594	42.238	132.608	0.169
4000.000	0.671	195.730	3999.413	-29.516	30.958	-29.516	42.774	133.634	0.320
4100.000	0.898	229.332	4099.404	-30.590	30.205	-30.590	42.990	135.363	0.503
4200.000	1.454	257.483	4199.384	-31.376	28.373	-31.376	42.302	137.877	0.786
4300.000	1.791	249.264	4299.343	-32.204	25.673	-32.204	41.185	141.438	0.409
4400.000	1.822	229.464	4399.295	-33.790	23.003	-33.790	40.877	145.754	0.622
4500.000	1.607	233.447	4499.250	-35.658	20.669	-35.658	41.216	149.902	0.246
4600.000	1.900	224.296	4599.203	-37.680	18.385	-37.680	41.926	153.990	0.405
4700.000	2.023	227.195	4699.145	-40.066	15.933	-40.066	43.117	158.314	0.158
4800.000	2.154	212.212	4799.079	-42.855	13.636	-42.855	44.972	162.350	0.560
4900.000	2.160	220.138	4899.008	-45.886	11.419	-45.886	47.285	166.025	0.298
5000.000	2.034	209.137	4998.942	-48.877	9.340	-48.877	49.761	169.181	0.421
5100.000	1.663	202.185	5098.890	-51.770	7.928	-51.770	52.373	171.293	0.433
5200.000	1.635	201.512	5198.848	-54.440	6.857	-54.440	54.871	172.821	0.034
5300.000	1.498	178.182	5298.812	-57.074	6.376	-57.074	57.429	173.626	0.647
5400.000	1.482	172.583	5398.778	-59.663	6.584	-59.663	60.025	173.702	0.146
5500.000	1.004	169.507	5498.754	-61.807	6.911	-61.807	62.192	173.620	0.482
5600.000	0.635	186.727	5598.744	-63.219	7.006	-63.219	63.606	173.677	0.440
5700.000	0.552	201.349	5698.739	-64.217	6.765	-64.217	64.573	173.986	0.172
5800.000	0.741	232.369	5798.733	-65.061	6.078	-65.061	65.344	174.663	0.391

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	0.974	232.129	5898.721	-65.978	4.895	-65.978	66.159	175.757	0.232
6000.000	1.153	239.068	5998.704	-67.017	3.360	-67.017	67.101	177.129	0.221
6100.000	1.363	236.269	6098.680	-68.194	1.508	-68.194	68.211	178.733	0.218
6200.000	1.533	243.386	6198.648	-69.454	-0.676	-69.454	69.457	180.558	0.247
6300.000	1.660	246.847	6298.609	-70.622	-3.203	-70.622	70.695	182.597	0.160
6400.000	2.239	250.486	6398.551	-71.844	-6.376	-71.844	72.126	185.071	0.592
6500.000	1.807	160.435	6498.509	-73.982	-7.689	-73.982	74.381	185.933	2.878
6600.000	2.355	108.786	6598.451	-76.130	-5.215	-76.130	76.308	183.919	1.879
6700.000	2.907	80.065	6698.349	-76.354	-0.772	-76.354	76.358	180.580	1.410