



Company/ Rig: Noble Energy/ CoreTech
Well/API#: Winter 9-19/05-123-21866
Declination: 8.26 Degrees
TD as Drilled: 7147 Feet
County/State: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.46917, Longitude: -104.58627
Grid North = True North -0.59 degs (NAD 27)
Grid Correction Applied = -0.59 degs



Depth Reference : RKB= GL/ Elevation= 4712 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 2/5/2016 / 08:36

LAT & LONG OBTAINED BY GPS AT WELLHEAD

NORTH REFERENCE: GRID

CORPUS CHRISTI, TX

800-606-4976

SURVEYOR: SEAN BRATT / WINTER 9-19

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	0.299	73.780	100.000	0.073	0.251	0.073	0.261	73.780	0.299
200.000	0.153	59.647	199.999	0.213	0.616	0.213	0.652	70.916	0.155
300.000	0.319	327.767	299.998	0.516	0.583	0.516	0.778	48.465	0.358
400.000	0.192	325.629	399.997	0.890	0.340	0.890	0.952	20.904	0.128
500.000	0.137	355.758	499.997	1.147	0.237	1.147	1.171	11.655	0.100
600.000	0.503	186.192	599.996	0.830	0.180	0.830	0.849	12.262	0.638
700.000	0.734	187.981	699.990	-0.240	0.044	-0.240	0.244	169.598	0.232
800.000	1.129	203.854	799.977	-1.776	-0.443	-1.776	1.830	194.015	0.469
900.000	1.237	189.485	899.955	-3.741	-1.020	-3.741	3.878	195.244	0.314
1000.000	1.328	189.482	999.930	-5.948	-1.388	-5.948	6.108	193.137	0.091
1100.000	1.519	198.474	1099.900	-8.349	-1.999	-8.349	8.585	193.467	0.294
1200.000	1.617	189.836	1199.862	-10.996	-2.660	-10.996	11.314	193.600	0.256
1300.000	1.664	191.544	1299.821	-13.809	-3.192	-13.809	14.173	193.015	0.067
1400.000	1.489	181.541	1399.784	-16.530	-3.517	-16.530	16.900	192.013	0.325
1500.000	1.519	200.537	1499.750	-19.070	-4.017	-19.070	19.489	191.896	0.497
1600.000	1.357	198.412	1599.718	-21.434	-4.856	-21.434	21.977	192.765	0.170
1700.000	1.163	192.718	1699.694	-23.547	-5.453	-23.547	24.170	193.039	0.231
1800.000	1.112	197.637	1799.674	-25.461	-5.971	-25.461	26.152	193.197	0.110

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	0.935	201.090	1899.658	-27.147	-6.558	-27.147	27.928	193.581	0.187
2000.000	0.289	190.404	1999.652	-28.156	-6.897	-28.156	28.989	193.764	0.653
2100.000	0.369	97.854	2099.651	-28.448	-6.624	-28.448	29.209	193.107	0.479
2200.000	0.579	88.859	2199.648	-28.482	-5.799	-28.482	29.067	191.508	0.222
2300.000	0.547	82.608	2299.643	-28.411	-4.820	-28.411	28.817	189.628	0.069
2400.000	0.922	76.221	2399.634	-28.158	-3.565	-28.158	28.383	187.215	0.383
2500.000	0.767	77.710	2499.624	-27.824	-2.129	-27.824	27.905	184.376	0.156
2600.000	0.849	80.333	2599.614	-27.557	-0.744	-27.557	27.567	181.547	0.090
2700.000	1.070	72.154	2699.600	-27.146	0.875	-27.146	27.160	178.154	0.259
2800.000	0.948	70.507	2799.584	-26.584	2.543	-26.584	26.705	174.536	0.125
2900.000	0.816	100.017	2899.573	-26.432	4.024	-26.432	26.736	171.345	0.467
3000.000	0.670	115.749	2999.564	-26.810	5.252	-26.810	27.319	168.917	0.249
3100.000	0.557	93.745	3099.559	-27.096	6.263	-27.096	27.810	166.984	0.259
3200.000	0.584	129.465	3199.554	-27.452	7.142	-27.452	28.365	165.417	0.351
3300.000	0.590	123.345	3299.549	-28.059	7.966	-28.059	29.168	164.150	0.063
3400.000	0.540	83.959	3399.544	-28.293	8.865	-28.293	29.649	162.602	0.384
3500.000	0.874	40.854	3499.537	-27.666	9.833	-27.666	29.361	160.434	0.606
3600.000	1.179	31.738	3599.521	-26.214	10.873	-26.214	28.380	157.472	0.344
3700.000	1.146	54.487	3699.501	-24.758	12.228	-24.758	27.613	153.715	0.460
3800.000	0.995	32.963	3799.484	-23.449	13.515	-23.449	27.065	150.042	0.427
3900.000	1.015	25.036	3899.469	-21.918	14.362	-21.918	26.204	146.764	0.140
4000.000	1.212	14.236	3999.450	-20.091	14.997	-20.091	25.071	143.260	0.287
4100.000	1.016	26.557	4099.431	-18.272	15.654	-18.272	24.061	139.414	0.308
4200.000	1.278	11.240	4199.411	-16.385	16.267	-16.385	23.089	135.207	0.401
4300.000	1.485	5.667	4299.382	-14.003	16.613	-14.003	21.727	130.127	0.246
4400.000	1.813	12.376	4399.341	-11.169	17.080	-11.169	20.407	123.181	0.380
4500.000	2.013	13.519	4499.285	-7.916	17.829	-7.916	19.507	113.940	0.204
4600.000	2.405	14.824	4599.210	-4.179	18.777	-4.179	19.236	102.549	0.395
4700.000	2.715	17.652	4699.110	0.106	20.032	0.106	20.032	89.696	0.335
4800.000	3.184	30.929	4798.979	4.745	22.177	4.745	22.679	77.922	0.825
4900.000	3.462	38.170	4898.811	9.501	25.471	9.501	27.185	69.543	0.503
5000.000	3.346	41.979	4998.635	14.044	29.288	14.044	32.482	64.381	0.254
5100.000	2.416	47.755	5098.508	17.631	32.801	17.631	37.239	61.741	0.973
5200.000	1.529	60.295	5198.448	19.709	35.520	19.709	40.621	60.975	0.982
5300.000	0.619	63.801	5298.429	20.608	37.163	20.608	42.494	60.990	0.912
5400.000	0.032	225.135	5398.427	20.827	37.627	20.827	43.007	61.035	0.649
5500.000	0.473	284.134	5498.426	20.908	37.207	20.908	42.679	60.667	0.457
5600.000	0.346	304.200	5598.424	21.178	36.558	21.178	42.249	59.916	0.190
5700.000	0.657	285.505	5698.420	21.501	35.756	21.501	41.723	58.981	0.347
5800.000	0.629	285.705	5798.413	21.803	34.676	21.803	40.960	57.840	0.027

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	0.727	337.587	5898.407	22.537	33.905	22.537	40.712	56.387	0.600
6000.000	0.897	294.090	5998.398	23.443	32.949	23.443	40.438	54.568	0.622
6100.000	0.946	311.619	6098.385	24.311	31.618	24.311	39.883	52.443	0.285
6200.000	0.918	332.432	6198.372	25.569	30.630	25.569	39.899	50.145	0.338
6300.000	0.680	322.607	6298.363	26.751	29.898	26.751	40.119	48.180	0.273
6400.000	1.118	339.164	6398.350	28.134	29.191	28.134	40.542	46.056	0.504
6500.000	0.921	338.868	6498.334	29.796	28.554	29.796	41.269	43.781	0.197
6600.000	0.879	349.053	6598.322	31.299	28.119	31.299	42.075	41.936	0.165
6700.000	1.242	347.725	6698.305	33.111	27.743	33.111	43.197	39.959	0.364
6800.000	1.902	6.981	6798.267	35.817	27.714	35.817	45.287	37.732	0.837
6900.000	2.790	2.633	6898.183	39.895	28.027	39.895	48.756	35.089	0.905