



Company/Rig: Noble Energy/ CoreTech
WELL/API#: Wells Ranch 31-33/05-123-23487
DECLINATION: 8.18 Degrees
TD AS DRILLED: 6999 Feet
COUNTY/STATE: Weld/Colorado
VS-Azi: 0.000 Degrees
Latitude: 40.44791, Longitude: -104.44035
Grid Convergence Applied = -0.68 degs (NAD 27)
Grid North = True North -0.68 degs



DEPTH REFERENCE : RKB=GL/ ELEVATION= 4779 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 5/12/2015 / 10:01

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	0.932	5.226	99.996	0.810	0.074	0.810	0.813	5.226	0.932
200.000	1.237	357.012	199.978	2.698	0.092	2.698	2.699	1.949	0.342
300.000	1.178	348.898	299.955	4.785	-0.162	4.785	4.788	358.056	0.181
400.000	0.689	339.691	399.942	6.358	-0.569	6.358	6.383	354.884	0.510
500.000	0.714	326.570	499.935	7.442	-1.121	7.442	7.526	351.432	0.162
600.000	0.928	350.181	599.924	8.760	-1.603	8.760	8.905	349.633	0.396
700.000	0.881	333.138	699.912	10.243	-2.088	10.243	10.454	348.478	0.272
800.000	0.851	345.435	799.901	11.648	-2.622	11.648	11.939	347.313	0.188
900.000	0.872	16.822	899.890	13.095	-2.589	13.095	13.348	348.817	0.466
1000.000	0.927	3.107	999.878	14.631	-2.325	14.631	14.815	350.972	0.222
1100.000	0.804	8.990	1099.866	16.132	-2.171	16.132	16.278	352.335	0.151
1200.000	0.653	12.443	1199.858	17.382	-1.939	17.382	17.490	353.636	0.157
1300.000	0.531	11.955	1299.853	18.392	-1.720	18.392	18.473	354.658	0.122
1400.000	0.287	351.965	1399.850	19.094	-1.659	19.094	19.166	355.035	0.279
1500.000	0.391	356.582	1499.849	19.683	-1.714	19.683	19.757	355.023	0.107
1600.000	0.275	20.794	1599.847	20.248	-1.649	20.248	20.315	355.343	0.180
1700.000	0.280	5.887	1699.846	20.716	-1.539	20.716	20.773	355.752	0.072
1800.000	0.414	8.017	1799.844	21.317	-1.463	21.317	21.367	356.073	0.134

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	0.634	14.635	1899.840	22.209	-1.273	22.209	22.246	356.719	0.228
2000.000	0.619	13.729	1999.834	23.270	-1.005	23.270	23.291	357.526	0.018
2100.000	0.750	59.072	2099.827	24.131	-0.316	24.131	24.133	359.251	0.541
2200.000	1.511	59.259	2199.807	25.141	1.379	25.141	25.179	3.139	0.761
2300.000	1.483	69.657	2299.773	26.265	3.726	26.265	26.528	8.074	0.273
2400.000	1.079	56.124	2399.748	27.240	5.722	27.240	27.835	11.862	0.502
2500.000	1.142	52.031	2499.729	28.378	7.289	28.378	29.299	14.405	0.101
2600.000	0.957	19.016	2599.713	29.780	8.346	29.780	30.928	15.656	0.622
2700.000	1.138	31.196	2699.697	31.419	9.133	31.419	32.720	16.208	0.286
2800.000	0.657	18.022	2799.684	32.814	9.824	32.814	34.253	16.667	0.520
2900.000	1.181	339.535	2899.672	34.324	9.641	34.324	35.652	15.690	0.782
3000.000	1.186	356.292	2999.651	36.322	9.214	36.322	37.473	14.235	0.345
3100.000	1.247	41.102	3099.631	38.175	9.862	38.175	39.428	14.485	0.929
3200.000	2.024	63.834	3199.590	39.773	12.162	39.773	41.591	17.003	0.998
3300.000	2.917	67.502	3299.496	41.525	16.097	41.525	44.536	21.189	0.906
3400.000	3.206	79.051	3399.354	43.030	21.193	43.030	47.966	26.221	0.680
3500.000	3.041	89.614	3499.207	43.579	26.591	43.579	51.051	31.391	0.598
3600.000	3.007	83.374	3599.068	43.899	31.849	43.899	54.236	35.961	0.331
3700.000	3.329	76.748	3698.915	44.868	37.281	44.868	58.335	39.723	0.487
3800.000	3.303	74.123	3798.748	46.321	42.878	46.321	63.120	42.789	0.154
3900.000	3.130	74.548	3898.590	47.837	48.280	47.837	67.966	45.264	0.175
4000.000	2.676	68.329	3998.462	49.426	53.081	49.426	72.529	47.042	0.551
4100.000	2.616	66.343	4098.355	51.204	57.341	51.204	76.876	48.236	0.110
4200.000	2.294	70.103	4198.263	52.801	61.313	52.801	80.915	49.266	0.360
4300.000	1.901	69.507	4298.196	54.063	64.748	54.063	84.351	50.139	0.393
4400.000	1.767	46.189	4398.146	55.711	67.414	55.711	87.455	50.430	0.753
4500.000	1.642	64.519	4498.103	57.394	69.820	57.394	90.382	50.579	0.557
4600.000	1.334	66.262	4598.069	58.479	72.179	58.479	92.896	50.986	0.311
4700.000	1.278	47.473	4698.043	59.702	74.066	59.702	95.132	51.129	0.430
4800.000	0.672	39.960	4798.029	60.905	75.265	60.905	96.820	51.020	0.617
4900.000	0.780	29.896	4898.021	61.945	75.981	61.945	98.032	50.811	0.167
5000.000	0.661	45.632	4998.013	62.938	76.732	62.938	99.242	50.640	0.230
5100.000	0.445	357.790	5098.009	63.729	77.129	63.729	100.051	50.434	0.490
5200.000	0.841	334.140	5198.002	64.778	76.794	64.778	100.466	49.852	0.469
5300.000	0.969	325.625	5297.990	66.136	75.996	66.136	100.744	48.968	0.185
5400.000	1.706	322.814	5397.962	68.020	74.619	68.020	100.969	47.649	0.739
5500.000	1.666	316.143	5497.919	70.254	72.712	70.254	101.107	45.985	0.200
5600.000	1.815	308.982	5597.873	72.299	70.474	72.299	100.964	44.267	0.264
5700.000	1.930	301.485	5697.819	74.175	67.806	74.175	100.497	42.432	0.270
5800.000	1.963	296.852	5797.762	75.828	64.842	75.828	99.772	40.534	0.161

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	2.103	294.846	5897.699	77.373	61.649	77.373	98.930	38.547	0.157
6000.000	2.205	289.510	5997.628	78.786	58.171	78.786	97.934	36.440	0.225
6100.000	2.629	288.506	6097.539	80.157	54.183	80.157	96.751	34.057	0.426
6200.000	2.733	283.023	6197.430	81.422	49.684	81.422	95.384	31.392	0.277
6300.000	2.654	286.115	6297.319	82.602	45.138	82.602	94.130	28.654	0.166
6400.000	2.717	275.184	6397.210	83.458	40.554	83.458	92.790	25.916	0.515
6500.000	3.102	273.712	6497.081	83.848	35.494	83.848	91.051	22.944	0.392