

COMPANY/RIG: Noble Energy/Production/CoreTech

WELL: Lamp H 25-31

DECLINATION: 8.33

TD AS DRILLED: 7290

COUNTY/STATE: Weld/Colorado

Latitude: 40.200, Longitude: -104.622

GRID North is 0.570 Degrees East of True North

VS-Azi: 0.000 Degrees



DEPTH REFERENCE : RKB = GL Elevation = 4855

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 10/22/2014 / 16:05

LAT & LONG OBTAINED BY HANDHELD GPS AT WELLHEAD

NORTH REFERENCE: GRID

HENDERSON, COLORADO

303-853-4976

Surveyor: JUSTIN WILLIAMS

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	0.118	332.779	100.000	0.092	-0.047	0.092	0.103	332.779	0.118
200.000	0.283	279.410	199.999	0.223	-0.338	0.223	0.405	303.504	0.232
300.000	0.304	301.254	299.998	0.402	-0.808	0.402	0.902	296.429	0.113
400.000	0.287	320.718	399.997	0.733	-1.193	0.733	1.400	301.562	0.101
500.000	0.733	347.164	499.993	1.550	-1.494	1.550	2.153	316.062	0.493
600.000	1.231	7.501	599.978	3.239	-1.496	3.239	3.568	335.214	0.601
700.000	1.254	34.873	699.955	5.202	-0.730	5.202	5.253	352.016	0.588
800.000	1.502	44.298	799.926	7.038	0.811	7.038	7.084	6.577	0.335
900.000	1.212	35.139	899.898	8.840	2.335	8.840	9.144	14.796	0.361
1000.000	1.154	35.850	999.877	10.521	3.533	10.521	11.098	18.563	0.060
1100.000	0.999	36.027	1099.859	12.042	4.636	12.042	12.903	21.054	0.155
1200.000	0.874	44.877	1199.846	13.287	5.686	13.287	14.453	23.168	0.191
1300.000	0.863	8.194	1299.835	14.573	6.332	14.573	15.889	23.484	0.547
1400.000	0.415	12.927	1399.829	15.672	6.520	15.672	16.974	22.589	0.451
1500.000	0.848	5.659	1499.823	16.761	6.674	16.761	18.041	21.712	0.440
1600.000	0.808	346.120	1599.812	18.182	6.578	18.182	19.336	19.889	0.284
1700.000	0.815	332.452	1699.802	19.497	6.080	19.497	20.423	17.319	0.193
1800.000	0.940	316.278	1799.791	20.721	5.184	20.721	21.359	14.047	0.276
1900.000	1.166	319.294	1899.774	22.084	3.954	22.084	22.435	10.150	0.232

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
2000.000	1.466	317.493	1999.747	23.799	2.426	23.799	23.922	5.820	0.304
2100.000	1.384	305.433	2099.717	25.442	0.578	25.442	25.448	1.301	0.310
2200.000	0.995	285.352	2199.695	26.372	-1.244	26.372	26.401	357.300	0.564
2300.000	1.212	295.510	2299.677	27.057	-3.035	27.057	27.227	353.600	0.291
2400.000	0.693	296.241	2399.663	27.780	-4.532	27.780	28.147	350.734	0.518
2500.000	0.788	267.775	2499.655	28.021	-5.762	28.021	28.607	348.380	0.376
2600.000	0.952	219.469	2599.644	27.353	-6.977	27.353	28.229	345.690	0.727
2700.000	1.483	193.159	2699.622	25.451	-7.800	25.451	26.620	342.962	0.758
2800.000	1.297	197.140	2799.593	23.109	-8.428	23.109	24.598	339.963	0.209
2900.000	1.048	206.229	2899.572	21.207	-9.166	21.207	23.103	336.626	0.310
3000.000	1.042	207.080	2999.555	19.578	-9.984	19.578	21.976	332.980	0.017
3100.000	0.966	203.522	3099.540	17.995	-10.734	17.995	20.954	329.184	0.098
3200.000	0.601	196.590	3199.530	16.720	-11.220	16.720	20.136	326.136	0.377
3300.000	0.919	200.349	3299.521	15.466	-11.648	15.466	19.362	323.015	0.322
3400.000	1.012	173.068	3399.508	13.838	-11.821	13.838	18.200	319.497	0.464
3500.000	0.662	160.571	3499.497	12.417	-11.522	12.417	16.939	317.142	0.392
3600.000	1.507	145.381	3599.478	10.790	-10.583	10.790	15.114	315.557	0.885
3700.000	1.798	123.061	3699.438	8.852	-8.521	8.852	12.287	316.093	0.700
3800.000	1.554	132.104	3799.395	7.088	-6.201	7.088	9.417	318.820	0.359
3900.000	1.895	122.610	3899.350	5.288	-3.802	5.288	6.512	324.284	0.444
4000.000	1.508	126.916	3999.306	3.606	-1.357	3.606	3.853	339.381	0.408
4100.000	1.532	143.911	4099.271	1.736	0.482	1.736	1.801	15.532	0.450
4200.000	1.569	157.572	4199.235	-0.610	1.792	-0.610	1.893	108.801	0.371
4300.000	1.886	164.787	4299.189	-3.463	2.746	-3.463	4.420	141.588	0.384
4400.000	1.936	152.400	4399.134	-6.548	3.961	-6.548	7.653	148.833	0.415
4500.000	1.511	146.503	4499.089	-9.145	5.471	-9.145	10.657	149.110	0.460
4600.000	1.283	144.917	4599.059	-11.161	6.842	-11.161	13.091	148.489	0.231
4700.000	1.282	142.375	4699.034	-12.963	8.169	-12.963	15.322	147.782	0.057
4800.000	1.340	136.585	4799.008	-14.698	9.655	-14.698	17.585	146.699	0.145
4900.000	1.136	129.254	4898.984	-16.174	11.226	-16.174	19.689	145.237	0.258
5000.000	1.028	118.088	4998.967	-17.224	12.785	-17.224	21.451	143.414	0.236
5100.000	1.145	115.928	5098.949	-18.083	14.475	-18.083	23.163	141.324	0.124
5200.000	0.705	93.583	5198.936	-18.559	15.988	-18.559	24.496	139.256	0.561
5300.000	0.836	50.866	5298.927	-18.137	17.168	-18.137	24.973	136.573	0.574
5400.000	1.205	60.678	5398.911	-17.162	18.650	-17.162	25.345	132.620	0.407
5500.000	1.228	64.603	5498.889	-16.187	20.535	-16.187	26.148	128.248	0.086
5600.000	1.375	70.617	5598.863	-15.329	22.634	-15.329	27.337	124.108	0.201
5700.000	1.188	87.493	5698.838	-14.886	24.802	-14.886	28.926	120.972	0.419
5800.000	1.251	91.548	5798.816	-14.870	26.929	-14.870	30.761	118.908	0.107
5900.000	1.233	79.418	5898.792	-14.702	29.077	-14.702	32.583	116.822	0.263

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
6000.000	1.242	95.704	5998.769	-14.612	31.214	-14.612	34.465	115.085	0.351
6100.000	1.435	93.923	6098.742	-14.805	33.542	-14.805	36.664	113.817	0.197
6200.000	1.616	92.913	6198.707	-14.963	36.199	-14.963	39.169	112.458	0.183
6300.000	2.336	97.904	6298.647	-15.315	39.625	-15.315	42.482	111.131	0.740
6400.000	1.912	76.623	6398.579	-15.209	43.268	-15.209	45.863	109.367	0.888
6500.000	0.615	55.929	6498.553	-14.522	45.335	-14.522	47.604	107.762	1.355
6600.000	0.509	316.308	6598.550	-13.901	45.473	-13.901	47.550	106.998	0.861
6700.000	1.240	281.697	6698.538	-13.360	44.106	-13.360	46.085	106.852	0.871
6800.000	1.282	275.355	6798.514	-13.036	41.932	-13.036	43.912	107.270	0.146
6900.000	1.673	253.564	6898.482	-13.345	39.418	-13.345	41.616	108.703	0.678
7000.000	1.256	254.137	6998.449	-14.057	36.964	-14.057	39.547	110.821	0.418