



**Company:** Noble Energy

**Rig:** Production / CoreTech

**API #** 05-123-33694

**Date:** 11/7/2013

**Surveyor:** Norman Cowan

**VS:** 0.000

**Lat :** 40.222

**Long:** -104.591

**Well:** Horton D 18-20D

**Location:** Weld County, Colorado

**North Reference:** GRID

**Convergence:** Grid north is 0.59 Deg East of True

**Declination:** 8.43 Degrees

**Depth Reference:** Ground Level

**Elevation:** 4775 Feet

**Total Depth as Drilled:** 8058 Feet

**Lat & Long obtained by handheld GPS at wellhead**

**MS Gyro Survey Calculations**

Depth	Inc	AzG	N/-S	E/-W	TVD	DL	VS	CD	Cbrg
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
100.000	0.428	19.338	0.352	0.124	99.999	0.428	0.352	0.373	19.338
200.000	0.318	122.509	0.555	0.481	199.998	0.588	0.555	0.735	40.899
300.000	0.323	109.638	0.312	0.980	299.996	0.072	0.312	1.028	72.356
400.000	0.357	146.755	-0.044	1.416	399.995	0.219	-0.044	1.417	91.760
500.000	0.344	171.862	-0.602	1.629	499.993	0.153	-0.602	1.737	110.269
600.000	0.468	248.914	-1.046	1.291	599.991	0.515	-1.046	1.661	129.035
700.000	0.391	286.464	-1.097	0.582	699.988	0.286	-1.097	1.242	152.035
800.000	0.468	286.575	-0.884	-0.136	799.985	0.078	-0.884	0.894	188.757
900.000	0.481	288.413	-0.635	-0.926	899.982	0.020	-0.635	1.122	235.561
1000.000	0.990	300.583	-0.063	-2.067	999.974	0.530	-0.063	2.068	268.263
1100.000	2.708	289.892	1.181	-5.032	1099.918	1.745	1.181	5.169	283.204
1200.000	4.323	291.510	3.367	-10.760	1199.726	1.617	3.367	11.275	287.373
1300.000	5.748	289.645	6.432	-18.983	1299.338	1.435	6.432	20.044	288.718
1400.000	7.019	291.607	10.366	-29.381	1398.716	1.289	10.366	31.155	289.433
1500.000	8.686	291.860	15.427	-42.070	1497.775	1.668	15.427	44.809	290.138
1600.000	10.171	290.589	21.344	-57.344	1596.421	1.499	21.344	61.187	290.416
1700.000	11.515	290.837	27.999	-74.938	1694.634	1.345	27.999	79.998	290.487
1800.000	13.925	290.505	35.766	-95.540	1792.173	2.410	35.766	102.015	290.524
1900.000	15.044	292.715	44.992	-118.782	1888.993	1.248	44.992	127.017	290.746
2000.000	16.481	292.321	55.392	-143.876	1985.231	1.441	55.392	154.171	291.056
2100.000	17.626	292.310	66.527	-171.006	2080.832	1.145	66.527	183.491	291.258
2200.000	19.301	291.365	78.296	-200.406	2175.682	1.701	78.296	215.157	291.340
2300.000	20.272	291.852	90.765	-231.877	2269.777	0.986	90.765	249.008	291.377
2400.000	21.746	293.025	104.459	-265.007	2363.127	1.532	104.459	284.851	291.513
2500.000	23.302	294.494	119.907	-300.057	2455.496	1.655	119.907	323.128	291.782
2600.000	25.933	294.745	137.263	-337.921	2546.399	2.633	137.263	364.735	292.107
2700.000	28.610	294.609	156.389	-379.555	2635.275	2.677	156.389	410.511	292.393
2800.000	28.404	293.856	175.979	-423.075	2723.152	0.414	175.979	458.215	292.585
2900.000	30.535	293.107	195.570	-468.197	2810.209	2.162	195.570	507.401	292.671
3000.000	30.434	293.194	215.515	-514.842	2896.386	0.110	215.515	558.130	292.714
3100.000	29.158	291.843	234.554	-560.736	2983.165	1.442	234.554	607.817	292.699
3200.000	29.550	290.533	252.267	-606.441	3070.327	0.752	252.267	656.818	292.586
3300.000	27.480	292.290	269.670	-650.887	3158.193	2.233	269.670	704.539	292.505
3400.000	25.634	291.028	286.184	-692.429	3247.639	1.930	286.184	749.239	292.456
3500.000	25.664	290.790	301.632	-732.865	3337.785	0.107	301.632	792.511	292.371

3600.000	26.175	292.901	317.902	-773.428	3427.727	1.055	317.902	836.214	292.344
3700.000	25.724	292.251	334.702	-813.832	3517.645	0.534	334.702	879.970	292.356
3800.000	25.627	292.954	351.354	-853.831	3607.772	0.320	351.354	923.297	292.367
3900.000	26.671	293.449	368.719	-894.336	3697.536	1.067	368.719	967.363	292.406
4000.000	28.028	294.129	387.256	-936.370	3786.355	1.392	387.256	1013.290	292.469
4100.000	27.834	294.142	406.409	-979.116	3874.707	0.194	406.409	1060.112	292.542
4200.000	26.581	293.227	424.782	-1020.980	3963.641	1.321	424.782	1105.822	292.590
4300.000	24.596	291.420	441.207	-1060.920	4053.830	2.132	441.207	1149.005	292.581
4400.000	26.253	291.728	456.996	-1100.840	4144.142	1.662	456.996	1191.930	292.545
4500.000	26.391	294.344	474.345	-1141.640	4233.777	1.168	474.345	1236.259	292.563
4600.000	26.992	295.670	493.337	-1182.340	4323.121	0.847	493.337	1281.135	292.649
4700.000	27.558	295.198	513.016	-1223.720	4412.003	0.606	513.016	1326.908	292.745
4800.000	27.905	293.112	532.050	-1266.180	4500.518	1.031	532.050	1373.421	292.792
4900.000	26.122	294.213	550.266	-1307.780	4589.605	1.852	550.266	1418.833	292.820
5000.000	23.485	293.170	567.138	-1346.180	4680.373	2.673	567.138	1460.774	292.845
5100.000	22.291	293.228	582.458	-1381.930	4772.498	1.194	582.458	1499.665	292.855
5200.000	20.423	291.926	596.454	-1415.550	4865.627	1.927	596.454	1536.079	292.849
5300.000	20.676	291.432	609.420	-1448.170	4959.264	0.307	609.420	1571.173	292.822
5400.000	21.710	290.610	622.382	-1481.910	5052.500	1.076	622.382	1607.305	292.782
5500.000	19.750	290.263	634.745	-1515.080	5146.021	1.964	634.745	1642.670	292.731
5600.000	18.015	290.326	645.968	-1545.430	5240.636	1.735	645.968	1675.003	292.684
5700.000	15.114	290.917	655.996	-1572.120	5336.476	2.906	655.996	1703.490	292.649
5800.000	12.623	290.264	664.436	-1594.550	5433.553	2.496	664.436	1727.442	292.621
5900.000	11.203	290.905	671.687	-1613.870	5531.397	1.426	671.687	1748.071	292.597
6000.000	10.356	294.471	678.876	-1631.130	5629.633	1.078	678.876	1766.764	292.597
6100.000	10.231	295.750	686.458	-1647.310	5728.024	0.260	686.458	1784.615	292.622
6200.000	9.673	292.412	693.519	-1663.070	5826.519	0.802	693.519	1801.884	292.637
6300.000	9.007	291.704	699.617	-1678.110	5925.193	0.676	699.617	1818.111	292.632
6400.000	7.637	295.336	705.355	-1691.390	6024.139	1.466	705.355	1832.576	292.637
6500.000	5.573	295.731	710.308	-1701.770	6123.469	2.065	710.308	1844.064	292.655
6600.000	3.671	297.581	713.898	-1708.990	6223.140	1.908	713.898	1852.103	292.672
6700.000	1.694	319.268	716.501	-1712.790	6323.027	2.188	716.501	1856.616	292.701
6800.000	1.425	278.746	717.811	-1714.980	6422.993	1.109	717.811	1859.145	292.712
6900.000	1.587	251.171	717.553	-1717.520	6522.960	0.735	717.553	1861.388	292.674
7000.000	1.592	239.167	716.394	-1720.030	6622.922	0.332	716.394	1863.253	292.612
7100.000	1.895	234.799	714.729	-1722.570	6722.875	0.331	714.729	1864.963	292.535
7200.000	1.575	239.977	713.088	-1725.110	6822.829	0.356	713.088	1866.683	292.458
7300.000	2.274	247.025	711.626	-1728.130	6922.773	0.737	711.626	1868.914	292.381
7400.000	2.409	248.426	710.078	-1731.910	7022.689	0.146	710.078	1871.823	292.293
7500.000	2.125	253.815	708.789	-1735.650	7122.611	0.355	708.789	1874.792	292.214
7600.000	1.990	265.062	708.122	-1739.160	7222.547	0.425	708.122	1877.791	292.154
7700.000	1.565	268.870	707.946	-1742.250	7322.498	0.441	707.946	1880.592	292.114
7800.000	1.245	262.648	707.780	-1744.690	7422.468	0.354	707.780	1882.793	292.081