



Company: Noble Energy
Rig: Production / Lightning
API # 05-123-14445
Date: 10/31/2013
Surveyor: Justin Williams
VS: 0.000
Lat : 40.333
Long: -104.791
Well: Keith 1
Location: Weld County Colorado
North Reference: GRID
Convergence: GRID North is 0.46 Degrees East of True North
Declination: 8.47 Degrees
Depth Reference: RKB = Ground Level
Elevation: 4689 Feet
Total Depth as Drilled: 7368 Feet

Lat & Long obtained by handheld GPS at wellhead

MS Gyro Survey Calculations

Depth	Inc	AzG	N/-S	E/-W	TVD	DL	VS	CD	Cbgr
0.000	0.000	0.000	0.000	0.000	0.000	****	0.000	0.000	0.000
100.000	0.072	130.341	-0.041	0.048	100.000	0.072	-0.041	0.063	130.341
200.000	0.176	161.716	-0.227	0.144	200.000	0.120	-0.227	0.268	147.628
300.000	0.204	311.443	-0.254	0.058	300.000	0.366	-0.254	0.261	167.071
400.000	0.387	238.466	-0.313	-0.363	399.998	0.381	-0.313	0.479	229.186
500.000	0.383	218.465	-0.751	-0.858	499.996	0.134	-0.751	1.141	228.794
600.000	0.246	294.891	-0.923	-1.261	599.995	0.404	-0.923	1.563	233.805
700.000	0.539	251.418	-0.982	-1.902	699.993	0.398	-0.982	2.140	242.683
800.000	0.519	206.608	-1.537	-2.550	799.989	0.404	-1.537	2.978	238.918
900.000	0.435	246.582	-2.094	-3.102	899.986	0.336	-2.094	3.742	235.983
1000.000	0.653	238.119	-2.545	-3.934	999.981	0.231	-2.545	4.686	237.097
1100.000	0.469	244.281	-3.024	-4.786	1099.976	0.193	-3.024	5.661	237.718
1200.000	0.604	205.762	-3.676	-5.384	1199.972	0.376	-3.676	6.519	235.677
1300.000	0.523	225.822	-4.468	-5.940	1299.968	0.212	-4.468	7.433	233.049
1400.000	0.617	207.408	-5.264	-6.515	1399.963	0.205	-5.264	8.376	231.062
1500.000	0.525	211.233	-6.134	-7.000	1499.958	0.100	-6.134	9.307	228.775
1600.000	0.640	241.360	-6.793	-7.728	1599.953	0.322	-6.793	10.289	228.683
1700.000	0.851	277.787	-6.960	-8.954	1699.945	0.508	-6.960	11.341	232.141
1800.000	0.978	270.002	-6.859	-10.543	1799.932	0.177	-6.859	12.578	236.953
1900.000	0.907	287.051	-6.627	-12.154	1899.919	0.288	-6.627	13.843	241.398
2000.000	0.580	278.527	-6.320	-13.411	1999.910	0.345	-6.320	14.825	244.767
2100.000	0.415	255.490	-6.336	-14.262	2099.906	0.256	-6.336	15.606	246.047
2200.000	0.218	274.714	-6.411	-14.802	2199.905	0.221	-6.411	16.131	246.582
2300.000	0.400	260.533	-6.453	-15.337	2299.903	0.196	-6.453	16.639	247.182
2400.000	0.320	297.634	-6.381	-15.929	2399.902	0.242	-6.381	17.159	248.170
2500.000	0.132	214.104	-6.346	-16.241	2499.901	0.332	-6.346	17.437	248.656
2600.000	0.248	321.309	-6.273	-16.441	2599.901	0.314	-6.273	17.597	249.116
2700.000	0.406	257.380	-6.181	-16.922	2699.899	0.371	-6.181	18.016	249.934
2800.000	0.582	211.501	-6.691	-17.533	2799.896	0.418	-6.691	18.767	249.111
2900.000	0.687	255.334	-7.276	-18.378	2899.890	0.484	-7.276	19.766	248.402
3000.000	0.761	269.913	-7.429	-19.623	2999.882	0.198	-7.429	20.982	249.264
3100.000	0.903	295.507	-7.090	-20.998	3099.872	0.394	-7.090	22.163	251.342
3200.000	0.885	277.461	-6.651	-22.475	3199.860	0.281	-6.651	23.439	253.516
3300.000	0.898	280.360	-6.409	-24.012	3299.848	0.047	-6.409	24.853	255.055
3400.000	1.037	286.228	-6.016	-25.651	3399.834	0.171	-6.016	26.347	256.802
3500.000	0.978	283.093	-5.569	-27.352	3499.818	0.080	-5.569	27.913	258.491
3600.000	0.951	275.192	-5.301	-29.010	3599.804	0.136	-5.301	29.490	259.645
3700.000	0.955	288.014	-4.968	-30.629	3699.790	0.213	-4.968	31.029	260.787
3800.000	0.784	268.804	-4.725	-32.105	3799.779	0.336	-4.725	32.451	261.629
3900.000	0.771	270.812	-4.729	-33.462	3899.770	0.030	-4.729	33.794	261.955
4000.000	0.844	279.119	-4.603	-34.861	3999.760	0.138	-4.603	35.164	262.478
4100.000	0.883	286.282	-4.270	-36.328	4099.749	0.115	-4.270	36.578	263.296
4200.000	1.074	286.668	-3.785	-37.966	4199.734	0.191	-3.785	38.154	264.306
4300.000	0.929	298.565	-3.129	-39.576	4299.719	0.253	-3.129	39.699	265.480
4400.000	0.989	285.038	-2.517	-41.122	4399.705	0.234	-2.517	41.199	266.497

4500.000	0.867	269.420	-2.301	-42.712	4499.692	0.280	-2.301	42.774	266.917
4600.000	0.774	254.139	-2.493	-44.118	4599.682	0.237	-2.493	44.189	266.766
4700.000	0.636	230.838	-3.028	-45.198	4699.674	0.315	-3.028	45.299	266.167
4800.000	0.525	226.560	-3.693	-45.961	4799.669	0.119	-3.693	46.109	265.406
4900.000	0.666	244.567	-4.257	-46.818	4899.664	0.233	-4.257	47.011	264.804
5000.000	0.577	224.902	-4.864	-47.698	4999.658	0.230	-4.864	47.945	264.178
5100.000	0.577	266.648	-5.250	-48.556	5099.654	0.411	-5.250	48.839	263.829
5200.000	0.458	244.946	-5.448	-49.421	5199.650	0.227	-5.448	49.720	263.709
5300.000	0.610	251.089	-5.790	-50.286	5299.645	0.163	-5.790	50.619	263.432
5400.000	0.792	239.969	-6.308	-51.388	5399.638	0.226	-6.308	51.774	263.001
5500.000	1.174	230.216	-7.309	-52.773	5499.623	0.416	-7.309	53.277	262.114
5600.000	1.710	219.806	-9.111	-54.516	5599.591	0.595	-9.111	55.272	260.512
5700.000	1.488	222.156	-11.220	-56.343	5699.552	0.231	-11.220	57.449	258.737
5800.000	1.478	217.748	-13.203	-58.004	5799.519	0.115	-13.203	59.487	257.177
5900.000	1.346	235.876	-14.881	-59.765	5899.489	0.464	-14.881	61.590	256.018
6000.000	0.957	254.370	-15.765	-61.541	5999.469	0.533	-15.765	63.529	255.632
6100.000	0.747	275.388	-15.929	-62.995	6099.458	0.373	-15.929	64.977	255.810
6200.000	1.184	266.419	-15.932	-64.675	6199.443	0.461	-15.932	66.609	256.162
6300.000	0.760	231.375	-16.410	-66.225	6299.430	0.711	-16.410	68.228	256.083
6400.000	0.396	250.883	-16.938	-67.069	6399.424	0.409	-16.938	69.175	255.827
6500.000	0.675	241.727	-17.330	-67.915	6499.420	0.291	-17.330	70.091	255.685
6600.000	0.630	245.072	-17.840	-68.932	6599.413	0.059	-17.840	71.203	255.489
6700.000	1.008	244.269	-18.454	-70.223	6699.403	0.379	-18.454	72.607	255.276
6800.000	0.911	248.327	-19.130	-71.755	6799.389	0.118	-19.130	74.261	255.072
6900.000	1.027	255.204	-19.652	-73.360	6899.375	0.163	-19.652	75.947	255.003
7000.000	0.696	249.504	-20.094	-74.795	6999.363	0.341	-20.094	77.447	254.962
7100.000	0.878	231.357	-20.785	-75.962	7099.354	0.307	-20.785	78.755	254.697