



Company: Noble Energy
Rig: Production / VES
API # 05-123-15097

Date: 9/9/2013
Surveyor: CJ Hines

VS: 0.000
Lat : 40.402
Long: -104.548

Well: Patriot B16-08
Location: Weld County, Colorado
North Reference: GRID
Convergence: GRID North is 0.62 Degrees East
Declination: 8.44

Depth Reference: Ground Level
Elevation: 4589'

Total Depth as Drilled: 6747'

Lat & Long obtained by handheld GPS at wellhead

HA 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	0.353	83.986	0.032	0.306	99.999	0.353	0.032	0.308	83.986
200.000	0.555	117.547	-0.160	1.042	199.996	0.326	-0.160	1.054	98.701
300.000	0.438	100.344	-0.452	1.848	299.993	0.189	-0.452	1.902	103.752
400.000	0.403	165.302	-0.861	2.313	399.990	0.452	-0.861	2.468	110.423
500.000	0.324	173.999	-1.483	2.431	499.988	0.096	-1.483	2.848	121.381
600.000	0.432	167.344	-2.132	2.544	599.986	0.116	-2.132	3.319	129.976
700.000	0.575	171.152	-2.996	2.703	699.982	0.147	-2.996	4.035	137.940
800.000	0.640	172.249	-4.046	2.856	799.977	0.067	-4.046	4.952	144.780
900.000	0.615	178.758	-5.136	2.943	899.971	0.076	-5.136	5.919	150.185
1000.000	0.549	172.920	-6.148	3.014	999.966	0.088	-6.148	6.847	153.885
1100.000	0.792	179.624	-7.315	3.077	1099.959	0.255	-7.315	7.936	157.183
1200.000	0.644	182.340	-8.567	3.059	1199.951	0.152	-8.567	9.097	160.352
1300.000	0.720	175.587	-9.756	3.084	1299.944	0.111	-9.756	10.232	162.456
1400.000	0.871	175.255	-11.141	3.196	1399.934	0.151	-11.141	11.590	163.995
1500.000	0.603	178.544	-12.424	3.272	1499.926	0.272	-12.424	12.848	165.246
1600.000	0.579	159.605	-13.423	3.461	1599.920	0.196	-13.423	13.862	165.541
1700.000	0.674	173.572	-14.481	3.703	1699.915	0.179	-14.481	14.947	165.656
1800.000	0.117	156.781	-15.158	3.809	1799.912	0.563	-15.158	15.630	165.895
1900.000	0.074	132.624	-15.296	3.897	1899.912	0.058	-15.296	15.784	165.708
2000.000	0.220	123.219	-15.445	4.105	1999.911	0.147	-15.445	15.981	165.116
2100.000	0.356	110.017	-15.656	4.557	2099.910	0.150	-15.656	16.306	163.772
2200.000	0.233	118.276	-15.859	5.028	2199.909	0.129	-15.859	16.637	162.409
2300.000	0.238	115.421	-16.044	5.394	2299.908	0.012	-16.044	16.927	161.416
2400.000	0.205	116.976	-16.214	5.741	2399.907	0.033	-16.214	17.201	160.501
2500.000	0.270	112.757	-16.387	6.118	2499.906	0.067	-16.387	17.492	159.527
2600.000	0.241	97.386	-16.505	6.544	2599.905	0.074	-16.505	17.755	158.374
2700.000	0.158	47.955	-16.439	6.855	2699.905	0.183	-16.439	17.811	157.365
2800.000	0.127	92.770	-16.352	7.068	2799.904	0.113	-16.352	17.814	156.625
2900.000	0.053	323.742	-16.320	7.151	2899.904	0.165	-16.320	17.818	156.339
3000.000	0.054	333.859	-16.241	7.103	2999.904	0.009	-16.241	17.726	156.378
3100.000	0.206	341.627	-16.028	7.025	3099.904	0.153	-16.028	17.500	156.331
3200.000	0.236	324.689	-15.690	6.850	3199.903	0.071	-15.690	17.120	156.415
3300.000	0.181	300.912	-15.441	6.596	3299.903	0.101	-15.441	16.790	156.870
3400.000	0.601	284.231	-15.231	5.952	3399.900	0.431	-15.231	16.352	158.655
3500.000	0.269	279.602	-15.063	5.213	3499.897	0.334	-15.063	15.939	160.911

3600.000	0.979	272.806	-14.982	4.128	3599.891	0.713	-14.982	15.540	164.594
3700.000	0.600	268.298	-14.956	2.752	3699.881	0.384	-14.956	15.207	169.574
3800.000	1.275	248.735	-15.374	1.192	3799.867	0.737	-15.374	15.421	175.567
3900.000	0.426	213.563	-16.088	-0.050	3899.856	0.958	-16.088	16.088	180.179
4000.000	0.858	219.931	-16.972	-0.737	3999.849	0.437	-16.972	16.988	182.485
4100.000	0.698	223.773	-17.986	-1.638	4099.840	0.169	-17.986	18.060	185.205
4200.000	0.720	223.513	-18.881	-2.492	4199.832	0.023	-18.881	19.045	187.520
4300.000	0.698	195.055	-19.925	-3.083	4299.825	0.349	-19.925	20.162	188.796
4400.000	0.534	182.934	-20.979	-3.265	4399.819	0.208	-20.979	21.231	188.847
4500.000	0.702	169.540	-22.046	-3.178	4499.813	0.220	-22.046	22.274	188.203
4600.000	1.052	151.118	-23.452	-2.624	4599.802	0.445	-23.452	23.598	186.383
4700.000	0.315	154.153	-24.503	-2.061	4699.794	0.737	-24.503	24.589	184.807
4800.000	0.985	141.516	-25.423	-1.406	4799.787	0.681	-25.423	25.462	183.165
4900.000	0.542	120.109	-26.333	-0.462	4899.778	0.519	-26.333	26.337	181.005
5000.000	0.350	182.205	-26.876	-0.065	4999.775	0.489	-26.876	26.876	180.138
5100.000	0.207	233.618	-27.288	-0.222	5099.774	0.274	-27.288	27.289	180.466
5200.000	0.548	267.596	-27.416	-0.845	5199.772	0.393	-27.416	27.429	181.766
5300.000	0.926	296.137	-27.080	-2.048	5299.764	0.516	-27.080	27.157	184.325
5400.000	0.362	322.673	-26.473	-2.965	5399.757	0.623	-26.473	26.638	186.391
5500.000	0.450	356.697	-25.829	-3.179	5499.755	0.252	-25.829	26.024	187.018
5600.000	0.860	37.565	-24.842	-2.745	5599.749	0.597	-24.842	24.994	186.305
5700.000	0.753	95.281	-24.308	-1.633	5699.740	0.784	-24.308	24.363	183.843
5800.000	1.234	138.583	-25.177	-0.266	5799.726	0.859	-25.177	25.178	180.605
5900.000	0.946	143.999	-26.652	0.932	5899.708	0.306	-26.652	26.668	177.998
6000.000	0.628	136.051	-27.714	1.797	5999.699	0.336	-27.714	27.772	176.290
6100.000	0.773	136.896	-28.600	2.638	6099.691	0.145	-28.600	28.722	174.731
6200.000	0.655	144.099	-29.556	3.433	6199.683	0.148	-29.556	29.754	173.374
6300.000	0.526	108.846	-30.167	4.203	6299.678	0.378	-30.167	30.458	172.068
6400.000	0.480	130.370	-30.587	4.957	6399.675	0.193	-30.587	30.986	170.795
6500.000	0.594	130.751	-31.197	5.669	6499.670	0.114	-31.197	31.708	169.700
6600.000	0.525	133.286	-31.849	6.396	6599.665	0.073	-31.849	32.485	168.646
6700.000	0.501	122.448	-32.398	7.098	6699.661	0.100	-32.398	33.167	167.642
6735.000	0.578	115.698	-32.557	7.387	6734.660	0.285	-32.557	33.384	167.217

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