



Company: Noble Energy
Rig: Production/ VES
API # 05-123-27306
Date: 11/7/2013
Surveyor: Sean Bratt
VS: 0.000
Lat : 40.257930
Long: -104.551030

Well: Karch D04-17
Location: Weld County, Colorado
North Reference: GRID
Convergence: Grid north is 0.61 Degr
Declination: 8.44 Degrees
Depth Reference: Ground Level
Elevation: 4707 Feet
Total Depth as Drilled: 7071 Feet

Lat & Long obtained by handheld GPS at wellhead
HA Gyro Survey Calculations

Depth	Inc	AzG	N/-S	E/-W	TVD	DL	VS	CD
0.000	0.000	0.000	0.000	0.000	0.000	****	0.000	0.000
100.000	0.206	118.661	-0.086	0.158	100.000	0.206	-0.086	0.180
200.000	0.436	80.873	-0.112	0.691	199.998	0.301	-0.112	0.700
300.000	0.391	75.409	0.034	1.396	299.996	0.060	0.034	1.396
400.000	0.344	19.450	0.403	1.826	399.994	0.347	0.403	1.870
500.000	0.203	274.717	0.700	1.749	499.993	0.441	0.700	1.884
600.000	0.231	38.738	0.872	1.700	599.993	0.383	0.872	1.910
700.000	0.485	308.337	1.292	1.494	699.991	0.539	1.292	1.975
800.000	0.297	45.384	1.737	1.346	799.990	0.599	1.737	2.198
900.000	0.260	266.324	1.905	1.304	899.989	0.522	1.905	2.309
1000.000	0.346	30.495	2.151	1.231	999.989	0.537	2.151	2.478
1100.000	0.376	10.411	2.733	1.444	1099.987	0.129	2.733	3.091
1200.000	0.286	340.395	3.290	1.419	1199.985	0.192	3.290	3.583
1300.000	0.436	348.697	3.898	1.261	1299.983	0.159	3.898	4.097
1400.000	0.409	336.974	4.600	1.047	1399.980	0.090	4.600	4.717
1500.000	0.476	352.268	5.340	0.852	1499.977	0.135	5.340	5.407
1600.000	0.757	351.344	6.405	0.696	1599.972	0.281	6.405	6.442
1700.000	0.606	341.987	7.561	0.433	1699.964	0.187	7.561	7.573
1800.000	0.438	328.619	8.390	0.071	1799.960	0.207	8.390	8.390
1900.000	0.470	5.102	9.125	-0.092	1899.957	0.286	9.125	9.125
2000.000	0.162	149.528	9.412	0.016	1999.956	0.609	9.412	9.412
2100.000	0.148	270.439	9.291	-0.042	2099.956	0.270	9.291	9.291
2200.000	0.686	211.695	8.783	-0.486	2199.953	0.622	8.783	8.797
2300.000	0.857	214.778	7.660	-1.226	2299.944	0.176	7.660	7.758
2400.000	0.200	299.041	7.130	-1.805	2399.940	0.860	7.130	7.355
2500.000	0.657	307.947	7.568	-2.410	2499.937	0.461	7.568	7.942
2600.000	1.021	308.639	8.477	-3.559	2599.926	0.364	8.477	9.194
2700.000	0.536	325.251	9.418	-4.521	2699.917	0.530	9.418	10.447
2800.000	1.107	315.181	10.488	-5.469	2799.906	0.587	10.488	11.828
2900.000	1.042	297.471	11.593	-6.957	2899.889	0.337	11.593	13.520
3000.000	0.999	286.170	12.255	-8.602	2999.873	0.206	12.255	14.973
3100.000	0.787	247.989	12.241	-10.076	3099.862	0.618	12.241	15.854
3200.000	0.705	202.184	11.414	-10.945	3199.854	0.585	11.414	15.813
3300.000	0.851	152.875	10.183	-10.839	3299.846	0.662	10.183	14.872
3400.000	1.078	172.818	8.589	-10.382	3399.832	0.402	8.589	13.475
3500.000	2.009	169.586	5.932	-9.948	3499.795	0.935	5.932	11.582

3600.000	2.946	172.483	1.660	-9.295	3599.700	0.945	1.660	9.442
3700.000	3.075	181.585	-3.569	-9.033	3699.563	0.495	-3.569	9.713
3800.000	2.371	188.441	-8.297	-9.411	3799.449	0.775	-8.297	12.546
3900.000	1.393	189.478	-11.542	-9.915	3899.394	0.978	-11.542	15.215
4000.000	0.624	213.495	-13.195	-10.415	3999.378	0.861	-13.195	16.810
4100.000	0.290	293.336	-13.549	-10.948	4099.376	0.640	-13.549	17.419
4200.000	0.770	355.223	-12.779	-11.236	4199.372	0.683	-12.779	17.017
4300.000	0.941	324.336	-11.443	-11.771	4299.361	0.484	-11.443	16.416
4400.000	0.852	311.221	-10.286	-12.809	4399.349	0.223	-10.286	16.428
4500.000	1.002	339.383	-8.978	-13.676	4499.337	0.474	-8.978	16.360
4600.000	1.402	19.685	-7.007	-13.572	4599.316	0.909	-7.007	15.274
4700.000	2.241	27.171	-4.116	-12.267	4699.265	0.870	-4.116	12.939
4800.000	2.861	35.424	-0.343	-9.928	4799.165	0.719	-0.343	9.934
4900.000	3.227	37.436	3.925	-6.771	4899.024	0.381	3.925	7.826
5000.000	2.590	30.591	8.105	-3.910	4998.895	0.724	8.105	8.999
5100.000	1.747	22.544	11.458	-2.176	5098.823	0.894	11.458	11.662
5200.000	1.299	7.576	13.989	-1.442	5198.788	0.595	13.989	14.064
5300.000	0.985	6.434	15.968	-1.196	5298.768	0.315	15.968	16.012
5400.000	0.503	47.318	17.120	-0.777	5398.760	0.689	17.120	17.138
5500.000	0.658	72.680	17.589	0.094	5498.755	0.296	17.589	17.589
5600.000	0.699	41.627	18.215	1.046	5598.748	0.365	18.215	18.245
5700.000	0.934	42.698	19.269	2.004	5698.738	0.236	19.269	19.373
5800.000	1.089	36.901	20.628	3.127	5798.722	0.186	20.628	20.864
5900.000	1.347	38.606	22.306	4.431	5898.700	0.261	22.306	22.742
6000.000	1.721	45.292	24.281	6.231	5998.664	0.414	24.281	25.068
6100.000	1.682	34.587	26.546	8.132	6098.620	0.320	26.546	27.764
6200.000	1.685	24.856	29.089	9.584	6198.577	0.286	29.089	30.627
6300.000	1.118	5.422	31.395	10.294	6298.547	0.732	31.395	33.040
6400.000	0.399	30.509	32.667	10.563	6398.538	0.776	32.667	34.332
6500.000	0.676	348.938	33.546	10.626	6498.534	0.461	33.546	35.189
6600.000	0.878	340.961	34.850	10.263	6598.524	0.229	34.850	36.329
6700.000	0.787	330.759	36.173	9.678	6698.514	0.174	36.173	37.445
6800.000	0.575	324.224	37.179	9.049	6798.507	0.225	37.179	38.265

0

rees East of True North

Cbrg

0.000

118.661

99.220

88.603

77.558

68.183

62.830

49.130

37.767

34.399

29.791

27.843

23.333

17.928

12.824

9.060

6.203

3.279

0.483

359.425

0.099

359.742

356.835

350.904

345.792

342.335

337.228

334.355

332.459

329.030

324.935

320.540

316.201

313.215

309.601

300.807

280.124
248.439
228.600
220.664
218.286
218.940
221.323
225.809
231.234
236.718
242.693
251.452
268.019
300.100
334.244
349.247
354.115
355.716
357.402
0.306
3.288
5.937
8.619
11.234
14.393
17.032
18.235
18.154
17.919
17.577
16.410
14.978
13.680