



Company: Noble Energy
Rig: Production / V.E.S.

API # 05-123-16908

Date: 4/25/2014

Surveyor: Norman Cowan

VS: 0.000

Lat : 40.382

Long: -104.528

Well: Emancipator 22-09

Location: Weld County, Colorado

North Reference: GRID

Convergence: Grid north is 0.63 Deg East of Tru

Declination: 8.35 Degrees

Depth Reference: Ground Level

Elevation: 4563 Feet

Total Depth as Drilled: 6919 Feet

Lat & Long obtained by handheld GPS at wellhead

Drillog 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
100.000	0.578	154.322	-0.454	0.218	99.998	0.578	-0.454	0.504	154.322
200.000	0.665	168.594	-1.478	0.552	199.992	0.177	-1.478	1.578	159.528
300.000	0.137	49.976	-1.970	0.758	299.990	0.741	-1.970	2.111	158.954
400.000	0.239	26.604	-1.707	0.943	399.990	0.126	-1.707	1.950	151.076
500.000	0.390	25.920	-1.214	1.185	499.988	0.151	-1.214	1.697	135.678
600.000	0.587	29.647	-0.462	1.588	599.985	0.199	-0.462	1.654	106.228
700.000	0.723	24.489	0.558	2.103	699.978	0.148	0.558	2.176	75.147
800.000	0.754	342.320	1.759	2.165	799.970	0.532	1.759	2.789	50.907
900.000	0.273	50.788	2.536	2.150	899.967	0.701	2.536	3.325	40.285
1000.000	0.728	14.373	3.302	2.492	999.963	0.533	3.302	4.137	37.043
1100.000	0.390	34.478	4.198	2.843	1099.958	0.385	4.198	5.070	34.105
1200.000	0.639	17.795	5.010	3.206	1199.954	0.288	5.010	5.948	32.617
1300.000	0.633	18.843	6.063	3.555	1299.948	0.013	6.063	7.029	30.383
1400.000	0.292	3.705	6.840	3.750	1399.945	0.359	6.840	7.800	28.731
1500.000	0.503	342.611	7.513	3.635	1499.942	0.253	7.513	8.346	25.818
1600.000	0.219	311.402	8.059	3.360	1599.940	0.335	8.059	8.731	22.635
1700.000	0.322	324.021	8.413	3.052	1699.939	0.119	8.413	8.949	19.937
1800.000	0.646	315.421	9.042	2.491	1799.935	0.331	9.042	9.379	15.400
1900.000	0.675	325.582	9.930	1.762	1899.929	0.121	9.930	10.085	10.062
2000.000	0.233	289.028	10.482	1.237	1999.925	0.507	10.482	10.555	6.729
2100.000	0.517	275.714	10.593	0.595	2099.923	0.295	10.593	10.610	3.215
2200.000	0.037	250.910	10.628	0.115	2199.922	0.484	10.628	10.628	0.622
2300.000	0.808	273.413	10.659	-0.619	2299.918	0.774	10.659	10.677	356.678
2400.000	0.865	267.969	10.674	-2.077	2399.908	0.098	10.674	10.874	348.991
2500.000	0.699	226.184	10.225	-3.271	2499.899	0.579	10.225	10.736	342.260
2600.000	1.258	232.284	9.131	-4.580	2599.884	0.568	9.131	10.215	333.363
2700.000	0.997	266.290	8.403	-6.317	2699.866	0.705	8.403	10.513	323.069
2800.000	1.108	212.525	7.532	-7.705	2799.851	0.957	7.532	10.775	314.351
2900.000	1.354	220.470	5.818	-8.991	2899.828	0.299	5.818	10.709	302.907
3000.000	1.090	237.372	4.406	-10.559	2999.806	0.444	4.406	11.442	292.651
3100.000	1.219	218.724	3.064	-12.026	3099.786	0.395	3.064	12.410	284.292
3200.000	1.239	241.557	1.718	-13.642	3199.763	0.487	1.718	13.750	277.179
3300.000	1.580	214.687	0.069	-15.378	3299.734	0.734	0.069	15.378	270.258
3400.000	2.305	231.144	-2.326	-17.729	3399.676	0.907	-2.326	17.881	262.526
3500.000	2.696	212.045	-5.581	-20.542	3499.583	0.914	-5.581	21.287	254.801

3600.000	2.665	229.785	-9.075	-23.565	3599.475	0.827	-9.075	25.252	248.938
3700.000	2.849	224.931	-12.335	-27.095	3699.360	0.297	-12.335	29.771	245.523
3800.000	2.568	228.911	-15.566	-30.538	3799.248	0.338	-15.566	34.277	242.991
3900.000	2.417	218.760	-18.682	-33.546	3899.154	0.466	-18.682	38.398	240.886
4000.000	1.829	237.834	-21.176	-36.217	3999.086	0.911	-21.176	41.954	239.685
4100.000	1.867	232.634	-23.014	-38.862	4099.034	0.172	-23.014	45.166	239.366
4200.000	0.993	251.074	-24.283	-40.976	4199.002	0.977	-24.283	47.631	239.348
4300.000	1.319	261.619	-24.732	-42.935	4298.982	0.388	-24.732	49.549	240.056
4400.000	1.196	305.016	-24.301	-44.929	4398.960	0.937	-24.301	51.079	241.592
4500.000	1.279	334.036	-22.699	-46.272	4498.938	0.625	-22.699	51.540	243.870
4600.000	1.454	322.400	-20.690	-47.535	4598.909	0.328	-20.690	51.843	246.478
4700.000	0.944	348.150	-18.879	-48.478	4698.888	0.730	-18.879	52.025	248.723
4800.000	1.104	303.814	-17.537	-49.448	4798.873	0.787	-17.537	52.465	250.473
4900.000	0.849	316.957	-16.459	-50.754	4898.859	0.338	-16.459	53.356	252.033
5000.000	0.247	325.401	-15.740	-51.382	4998.854	0.606	-15.740	53.739	252.969
5100.000	1.117	347.795	-14.610	-51.711	5098.846	0.893	-14.610	53.735	254.224
5200.000	0.557	301.627	-13.402	-52.331	5198.836	0.834	-13.402	54.020	255.635
5300.000	0.352	307.338	-12.961	-52.989	5298.833	0.210	-12.961	54.551	256.256
5400.000	0.402	267.229	-12.791	-53.584	5398.831	0.263	-12.791	55.090	256.574
5500.000	0.405	232.429	-13.024	-54.215	5498.828	0.241	-13.024	55.757	256.492
5600.000	0.350	271.734	-13.230	-54.800	5598.826	0.259	-13.230	56.374	256.428
5700.000	0.459	243.711	-13.398	-55.465	5698.824	0.223	-13.398	57.060	256.420
5800.000	0.184	258.758	-13.607	-55.982	5798.822	0.286	-13.607	57.612	256.339
5900.000	0.352	262.360	-13.679	-56.444	5898.821	0.168	-13.679	58.078	256.377
6000.000	0.182	266.388	-13.730	-56.906	5998.820	0.171	-13.730	58.539	256.436
6100.000	0.445	247.922	-13.886	-57.424	6098.818	0.279	-13.886	59.079	256.406
6200.000	0.377	250.075	-14.144	-58.094	6198.816	0.069	-14.144	59.791	256.317
6300.000	0.399	266.612	-14.277	-58.751	6298.814	0.114	-14.277	60.461	256.342
6350.000	0.621	219.457	-14.496	-59.097	6348.812	0.911	-14.496	60.849	256.218

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