



Company: Noble Energy

Rig: Production / CoreTech

API # 05-123-12553

Date: 11/19/2013

Surveyor: CJ Hines

VS: 0.000

Lat : 40.28886

Long: -104.747

Well: Chris Lorenz "A" #1

Location: Weld County, Colorado

North Reference: GRID

Convergence: Grid north is 0.49 East of True North

Declination: 8.51

Depth Reference: Ground Level

Elevation: 4734

Total Depth as Drilled: 7860

Lat & Long obtained by handheld GPS at wellhead

MS Gyro Survey Calculations

Depth	Inc	AzG	N/-S	E/-W	TVD	DL	VS	CD	Cbrg
100.000	0.185	263.283	-0.019	-0.160	100.000	0.185	-0.019	0.161	263.283
200.000	0.115	335.518	0.054	-0.362	200.000	0.185	0.054	0.366	278.452
300.000	0.238	227.084	0.004	-0.556	299.999	0.296	0.004	0.556	270.377
400.000	0.205	347.672	0.037	-0.746	399.999	0.385	0.037	0.747	272.823
500.000	0.602	289.783	0.389	-1.279	499.996	0.523	0.389	1.336	286.934
600.000	0.480	273.383	0.592	-2.191	599.992	0.196	0.592	2.270	285.115
700.000	0.588	288.760	0.781	-3.095	699.988	0.178	0.781	3.192	284.171
800.000	0.754	304.540	1.319	-4.122	799.981	0.247	1.319	4.328	287.747
900.000	0.583	284.399	1.819	-5.157	899.974	0.288	1.819	5.468	289.426
1000.000	0.073	290.359	1.968	-5.710	999.972	0.510	1.968	6.040	289.013
1100.000	0.646	303.783	2.303	-6.238	1099.970	0.574	2.303	6.650	290.263
1200.000	0.264	301.960	2.738	-6.902	1199.967	0.382	2.738	7.425	291.640
1300.000	0.693	288.018	3.047	-7.672	1299.963	0.441	3.047	8.255	291.661
1400.000	0.722	289.581	3.445	-8.841	1399.955	0.035	3.445	9.488	291.291
1500.000	0.660	267.559	3.632	-10.010	1499.948	0.271	3.632	10.649	289.942
1600.000	0.568	271.599	3.621	-11.082	1599.942	0.102	3.621	11.658	288.096
1700.000	0.773	284.114	3.799	-12.232	1699.936	0.251	3.799	12.808	287.256
1800.000	0.666	270.208	3.966	-13.467	1799.928	0.204	3.966	14.039	286.410
1900.000	0.888	278.492	4.083	-14.815	1899.918	0.249	4.083	15.367	285.407
2000.000	0.702	273.125	4.231	-16.193	1999.909	0.201	4.231	16.737	284.642
2100.000	0.577	262.707	4.200	-17.304	2099.903	0.170	4.200	17.806	283.643
2200.000	0.679	220.236	3.684	-18.186	2199.897	0.465	3.684	18.555	281.451
2300.000	0.581	185.707	2.727	-18.619	2299.891	0.386	2.727	18.818	278.331
2400.000	0.615	192.995	1.699	-18.790	2399.886	0.083	1.699	18.867	275.166
2500.000	0.554	185.761	0.695	-18.960	2499.881	0.096	0.695	18.972	272.098
2600.000	0.976	214.761	-0.486	-19.494	2599.872	0.560	-0.486	19.500	268.571
2700.000	0.531	229.282	-1.488	-20.331	2699.863	0.481	-1.488	20.385	265.814
2800.000	0.641	218.943	-2.225	-21.033	2799.858	0.152	-2.225	21.150	263.962
2900.000	0.689	231.915	-3.030	-21.857	2899.851	0.158	-3.030	22.066	262.107
3000.000	1.145	227.447	-4.076	-23.066	2999.838	0.461	-4.076	23.423	259.978
3100.000	0.977	238.121	-5.202	-24.525	3099.821	0.259	-5.202	25.071	258.025
3200.000	1.504	260.475	-5.869	-26.543	3199.798	0.706	-5.869	27.184	257.532
3300.000	1.478	247.702	-6.576	-29.031	3299.764	0.333	-6.576	29.766	257.238
3400.000	1.060	262.200	-7.190	-31.140	3399.740	0.524	-7.190	31.959	256.998
3500.000	0.179	327.689	-7.184	-32.140	3499.734	0.999	-7.184	32.933	257.400
3600.000	0.153	337.374	-6.929	-32.274	3599.733	0.038	-6.929	33.010	257.884

3700.000	0.193	328.412	-6.662	-32.414	3699.733	0.048	-6.662	33.091	258.385
3800.000	0.300	334.251	-6.283	-32.615	3799.732	0.110	-6.283	33.215	259.095
3900.000	0.317	334.470	-5.798	-32.848	3899.730	0.017	-5.798	33.356	259.989
4000.000	0.636	327.247	-5.083	-33.267	3999.727	0.324	-5.083	33.653	261.314
4100.000	1.462	304.966	-3.885	-34.613	4099.710	0.907	-3.885	34.830	263.596
4200.000	1.913	313.146	-2.012	-36.877	4199.666	0.510	-2.012	36.931	266.877
4300.000	1.677	305.805	-0.015	-39.281	4299.617	0.329	-0.015	39.281	269.979
4400.000	2.084	293.674	1.572	-42.133	4399.563	0.567	1.572	42.162	272.136
4500.000	2.007	289.129	2.875	-45.453	4499.500	0.180	2.875	45.543	273.620
4600.000	1.809	282.820	3.799	-48.646	4599.444	0.288	3.799	48.794	274.466
4700.000	1.692	289.210	4.635	-51.579	4699.398	0.227	4.635	51.787	275.135
4800.000	1.035	258.252	4.937	-53.858	4799.370	0.965	4.937	54.084	275.238
4900.000	0.515	252.749	4.620	-55.171	4899.361	0.525	4.620	55.365	274.787
5000.000	0.515	290.038	4.641	-56.022	4999.357	0.329	4.641	56.214	274.735
5100.000	0.464	261.372	4.734	-56.844	5099.353	0.247	4.734	57.041	274.761
5200.000	0.298	294.136	4.779	-57.481	5199.351	0.267	4.779	57.680	274.753
5300.000	0.142	276.076	4.899	-57.841	5299.350	0.169	4.899	58.048	274.841
5400.000	0.183	267.795	4.906	-58.123	5399.350	0.047	4.906	58.330	274.824
5500.000	0.205	325.836	5.048	-58.383	5499.350	0.189	5.048	58.601	274.941
5600.000	0.223	300.296	5.294	-58.652	5599.349	0.096	5.294	58.891	275.158
5700.000	0.153	270.581	5.394	-58.954	5699.348	0.118	5.394	59.200	275.228
5800.000	0.061	296.587	5.419	-59.135	5799.348	0.102	5.419	59.383	275.236
5900.000	0.245	327.801	5.624	-59.297	5899.348	0.195	5.624	59.563	275.418
6000.000	0.205	357.117	5.983	-59.420	5999.347	0.120	5.983	59.720	275.750
6100.000	0.280	318.816	6.346	-59.590	6099.346	0.174	6.346	59.927	276.079
6200.000	0.307	23.448	6.776	-59.644	6199.345	0.315	6.776	60.028	276.481
6300.000	0.169	19.865	7.160	-59.488	6299.344	0.139	7.160	59.917	276.863
6400.000	0.309	10.186	7.564	-59.390	6399.343	0.145	7.564	59.870	277.258
6500.000	0.269	358.343	8.064	-59.349	6499.342	0.072	8.064	59.894	277.738
6600.000	0.182	251.398	8.248	-59.506	6599.342	0.366	8.248	60.075	277.891
6700.000	0.283	218.703	8.004	-59.811	6699.341	0.163	8.004	60.345	277.622
6800.000	0.727	157.343	7.226	-59.722	6799.337	0.641	7.226	60.157	276.899
6900.000	0.850	143.586	6.044	-59.037	6899.328	0.225	6.044	59.346	275.845
7000.000	1.140	137.505	4.713	-57.925	6999.313	0.308	4.713	58.116	274.652
7100.000	1.257	120.953	3.415	-56.312	7099.291	0.364	3.415	56.415	273.471

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