



Company: Noble Energy

Rig: Production/Core-Tech

API # 05-123-32953

Date: 6/19/2014

Surveyor: Nick Kula

VS: 0.000

Lat : 40.130

Long: -104.578

Well: Starke Y20-3

Location: Weld County, CO

North Reference: GRID

Convergence: GRID North is 0.600 Degrees East

Declination: 8.34

Depth Reference: RKB = Ground Level

Elevation: 4904'

Total Depth as Drilled: 7768'

Lat & Long obtained by handheld GPS at wellhead

MS 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	0.755	120.109	-0.331	0.570	99.997	0.755	-0.331	0.659	120.109
200.000	1.210	118.461	-1.165	2.069	199.982	0.455	-1.165	2.374	119.376
300.000	1.584	132.370	-2.599	4.018	299.953	0.502	-2.599	4.786	122.897
400.000	1.561	144.601	-4.641	5.828	399.915	0.336	-4.641	7.451	128.530
500.000	1.311	144.531	-6.683	7.281	499.884	0.250	-6.683	9.883	132.547
600.000	0.990	144.278	-8.316	8.450	599.863	0.321	-8.316	11.856	134.544
700.000	0.581	192.801	-9.512	8.842	699.855	0.746	-9.512	12.987	137.092
800.000	0.527	231.037	-10.296	8.372	799.850	0.367	-10.296	13.270	140.886
900.000	0.674	247.325	-10.812	7.471	899.845	0.224	-10.812	13.142	145.357
1000.000	0.603	239.885	-11.303	6.473	999.839	0.109	-11.303	13.025	150.202
1100.000	0.601	244.393	-11.794	5.545	1099.833	0.047	-11.794	13.032	154.821
1200.000	0.562	227.473	-12.353	4.710	1199.828	0.175	-12.353	13.220	159.129
1300.000	0.618	230.687	-13.026	3.931	1299.823	0.065	-13.026	13.606	163.207
1400.000	0.364	257.053	-13.439	3.204	1399.819	0.333	-13.439	13.815	166.589
1500.000	0.301	226.838	-13.690	2.703	1499.818	0.184	-13.690	13.954	168.831
1600.000	0.316	221.134	-14.077	2.330	1599.816	0.034	-14.077	14.268	170.602
1700.000	0.379	228.865	-14.502	1.899	1699.814	0.079	-14.502	14.626	172.539
1800.000	0.335	229.148	-14.911	1.429	1799.812	0.045	-14.911	14.979	174.525
1900.000	0.317	239.112	-15.244	0.971	1899.811	0.059	-15.244	15.275	176.357
2000.000	0.295	308.131	-15.227	0.530	1999.810	0.347	-15.227	15.236	178.005
2100.000	0.215	319.508	-14.926	0.206	2099.809	0.094	-14.926	14.927	179.209
2200.000	0.047	12.600	-14.743	0.093	2199.808	0.190	-14.743	14.743	179.637
2300.000	0.158	347.961	-14.568	0.074	2299.808	0.117	-14.568	14.568	179.711
2400.000	0.417	349.357	-14.076	-0.022	2399.807	0.259	-14.076	14.076	180.091
2500.000	0.717	13.720	-13.110	0.059	2499.802	0.378	-13.110	13.110	179.744
2600.000	1.612	17.263	-11.160	0.624	2599.780	0.897	-11.160	11.177	176.798
2700.000	1.798	12.566	-8.285	1.383	2699.736	0.233	-8.285	8.400	170.523
2800.000	1.847	11.459	-5.174	2.045	2799.685	0.060	-5.174	5.564	158.440
2900.000	1.830	16.695	-2.066	2.823	2899.634	0.169	-2.066	3.498	126.192
3000.000	1.933	10.652	1.121	3.594	2999.580	0.224	1.121	3.765	72.673
3100.000	1.764	12.727	4.280	4.245	3099.528	0.182	4.280	6.028	44.760
3200.000	1.611	22.775	7.078	5.128	3199.485	0.332	7.078	8.741	35.922
3300.000	1.552	21.168	9.637	6.161	3299.447	0.075	9.637	11.438	32.592
3400.000	1.079	39.102	11.630	7.244	3399.421	0.621	11.630	13.702	31.917
3500.000	1.300	39.900	13.231	8.565	3499.399	0.222	13.231	15.761	32.917

3600.000	1.425	46.247	14.960	10.190	3599.371	0.196	14.960	18.101	34.261
3700.000	1.455	58.042	16.492	12.166	3699.339	0.297	16.492	20.494	36.415
3800.000	1.609	68.869	17.670	14.553	3799.304	0.327	17.670	22.892	39.473
3900.000	2.228	67.883	18.909	17.663	3899.247	0.620	18.909	25.875	43.050
4000.000	2.226	70.993	20.273	21.301	3999.172	0.121	20.273	29.406	46.416
4100.000	2.480	63.240	21.880	25.068	4099.088	0.406	21.880	33.274	48.886
4200.000	2.428	67.436	23.667	28.956	4198.996	0.187	23.667	37.397	50.740
4300.000	2.585	80.578	24.849	33.137	4298.901	0.594	24.849	41.419	53.135
4400.000	2.645	75.179	25.808	37.592	4398.797	0.253	25.808	45.598	55.529
4500.000	3.034	86.128	26.577	42.463	4498.675	0.666	26.577	50.094	57.958
4600.000	3.214	79.343	27.274	47.858	4598.527	0.411	27.274	55.084	60.321
4700.000	3.370	82.271	28.188	53.526	4698.362	0.229	28.188	60.494	62.228
4800.000	3.381	84.791	28.851	59.375	4798.188	0.149	28.851	66.013	64.085
4900.000	3.058	87.175	29.250	64.975	4898.030	0.350	29.250	71.256	65.764
5000.000	3.160	95.518	29.116	70.382	4997.884	0.463	29.116	76.167	67.526
5100.000	2.750	95.388	28.626	75.514	5097.751	0.409	28.626	80.758	69.239
5200.000	2.452	95.048	28.213	80.034	5197.647	0.299	28.213	84.861	70.582
5300.000	2.076	101.066	27.677	83.942	5297.569	0.444	27.677	88.387	71.752
5400.000	2.199	99.594	27.009	87.611	5397.500	0.135	27.009	91.680	72.866
5500.000	2.054	91.838	26.632	91.294	5497.431	0.322	26.632	95.099	73.737
5600.000	1.712	84.830	26.709	94.573	5597.377	0.412	26.709	98.272	74.229
5700.000	1.782	86.610	26.936	97.613	5697.331	0.088	26.936	101.261	74.574
5800.000	1.423	75.616	27.336	100.368	5797.291	0.471	27.336	104.024	74.765
5900.000	1.225	75.819	27.906	102.607	5897.265	0.199	27.906	106.334	74.785
6000.000	0.685	67.118	28.400	104.194	5997.251	0.557	28.400	107.995	74.753
6100.000	0.792	56.828	29.011	105.322	6097.242	0.170	29.011	109.245	74.600
6200.000	0.722	68.687	29.618	106.488	6197.234	0.171	29.618	110.530	74.457
6300.000	0.528	61.753	30.065	107.481	6297.228	0.208	30.065	111.607	74.372
6400.000	0.307	50.180	30.455	108.093	6397.225	0.235	30.455	112.302	74.265
6500.000	0.370	41.041	30.870	108.511	6497.223	0.083	30.870	112.817	74.119
6600.000	0.287	315.825	31.294	108.549	6597.222	0.449	31.294	112.969	73.918
6700.000	0.444	314.840	31.747	108.099	6697.220	0.157	31.747	112.665	73.634
6800.000	0.552	315.387	32.363	107.486	6797.216	0.109	32.363	112.253	73.244
6900.000	0.633	331.976	33.193	106.888	6897.211	0.189	33.193	111.924	72.748
7000.000	0.355	337.787	33.967	106.512	6997.207	0.282	33.967	111.797	72.312
7100.000	0.169	289.117	34.302	106.256	7097.206	0.274	34.302	111.655	72.108
7200.000	0.299	33.101	34.569	106.259	7197.206	0.377	34.569	111.740	71.979
7300.000	0.334	258.822	34.731	106.115	7297.205	0.583	34.731	111.654	71.877
7400.000	0.493	197.428	34.264	105.700	7397.203	0.444	34.264	111.115	72.039
7450.000	0.421	228.465	33.937	105.498	7447.201	0.508	33.937	110.822	72.168

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