



Company: Noble Energy
 Well: Wells Ranch 24-15
 API: 05-123-23142
 Rig Name: Production/Lightning Wireline
 State/County: Colorado/ Weld
 Latitude: 40.482, Longitude: -104.426
 GRID North is 0.690 Degrees East of True North
 VS-Azi: 0.000 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : RKB = Ground Level

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01_ed.ut

Minimum Curvature Method

Report Date/Time: 12/3/2012 / 11:30

Vaughn Energy Services
 Henderson, Colorado
 866-835-8333
 Jason Kinchelov

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	****
100.000	0.502	313.151	99.999	0.299	-0.319	0.299	0.438	313.151	0.502
200.000	0.318	308.468	199.996	0.771	-0.856	0.771	1.152	312.024	0.186
300.000	0.315	307.371	299.995	1.111	-1.292	1.111	1.704	310.694	0.007
400.000	0.399	337.654	399.993	1.601	-1.644	1.601	2.294	314.243	0.203
500.000	0.478	332.377	499.990	2.293	-1.970	2.293	3.023	319.337	0.089
600.000	0.394	345.234	599.987	2.995	-2.251	2.995	3.747	323.077	0.129
700.000	0.317	335.834	699.985	3.580	-2.452	3.580	4.339	325.598	0.096
800.000	0.346	341.444	799.983	4.119	-2.661	4.119	4.904	327.136	0.043
900.000	0.345	346.299	899.981	4.698	-2.829	4.698	5.484	328.948	0.029
1000.000	0.551	342.231	999.978	5.449	-3.047	5.449	6.243	330.788	0.208
1100.000	0.430	354.001	1099.975	6.280	-3.233	6.280	7.063	332.761	0.157
1200.000	0.476	343.728	1199.972	7.051	-3.388	7.051	7.823	334.335	0.093
1300.000	0.691	4.879	1299.966	8.051	-3.453	8.051	8.760	336.784	0.301
1400.000	0.981	350.577	1399.956	9.497	-3.542	9.497	10.136	339.546	0.355
1500.000	1.006	9.797	1499.941	11.207	-3.533	11.207	11.751	342.503	0.333
1600.000	1.116	351.674	1599.924	13.036	-3.524	13.036	13.504	344.871	0.351
1700.000	1.101	348.613	1699.905	14.941	-3.855	14.941	15.431	345.532	0.061
1800.000	1.193	355.393	1799.885	16.921	-4.129	16.921	17.418	346.288	0.164
1900.000	1.071	16.308	1899.866	18.856	-3.950	18.856	19.266	348.170	0.428
2000.000	1.068	19.064	1999.849	20.634	-3.383	20.634	20.910	350.690	0.052
2100.000	1.214	355.786	2099.830	22.571	-3.156	22.571	22.791	352.040	0.482
2200.000	1.665	1.934	2199.798	25.080	-3.185	25.080	25.281	352.762	0.476
2300.000	1.913	0.232	2299.749	28.201	-3.129	28.201	28.374	353.668	0.254
2400.000	2.003	356.857	2399.691	31.615	-3.218	31.615	31.779	354.187	0.146
2500.000	2.281	1.389	2499.621	35.350	-3.266	35.350	35.500	354.721	0.325
2600.000	2.475	352.857	2599.535	39.481	-3.486	39.481	39.635	354.954	0.403
2700.000	2.669	352.620	2699.434	43.932	-4.054	43.932	44.119	354.728	0.194
2800.000	2.903	354.921	2799.316	48.763	-4.577	48.763	48.978	354.638	0.260
2900.000	3.266	356.156	2899.171	54.128	-4.992	54.128	54.358	354.731	0.369
3000.000	3.446	351.087	2999.000	59.940	-5.649	59.940	60.205	354.616	0.347
3100.000	3.641	352.989	3098.808	66.061	-6.502	66.061	66.380	354.379	0.227
3200.000	3.618	356.861	3198.608	72.363	-7.062	72.363	72.707	354.426	0.246
3300.000	3.132	353.539	3298.434	78.228	-7.542	78.228	78.590	354.493	0.524
3400.000	2.402	343.728	3398.318	82.954	-8.437	82.954	83.381	354.193	0.867

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
3500.000	2.070	337.772	3498.241	86.637	-9.708	86.637	87.179	353.607	0.405
3600.000	2.085	340.214	3598.176	90.021	-11.007	90.021	90.692	353.029	0.090
3700.000	2.100	337.899	3698.109	93.431	-12.312	93.431	94.239	352.493	0.086
3800.000	2.173	337.211	3798.040	96.876	-13.736	96.876	97.845	351.930	0.077
3900.000	1.949	350.081	3897.975	100.299	-14.763	100.299	101.380	351.627	0.512
4000.000	1.982	341.291	3997.917	103.613	-15.611	103.613	104.782	351.432	0.303
4100.000	1.265	353.752	4097.876	106.348	-16.285	106.348	107.588	351.294	0.795
4200.000	0.854	28.654	4197.860	108.099	-16.048	108.099	109.284	351.556	0.747
4300.000	1.031	47.025	4297.847	109.366	-15.033	109.366	110.394	352.173	0.348
4400.000	1.227	60.322	4397.827	110.510	-13.444	110.510	111.324	353.064	0.326
4500.000	1.351	75.114	4497.802	111.343	-11.375	111.343	111.922	354.167	0.354
4600.000	1.467	104.061	4597.773	111.334	-8.995	111.334	111.697	355.381	0.713
4700.000	1.744	122.275	4697.735	110.211	-6.466	110.211	110.400	356.642	0.577
4800.000	2.113	135.859	4797.678	108.075	-3.896	108.075	108.146	357.935	0.585
4900.000	2.519	139.154	4897.596	105.090	-1.175	105.090	105.097	359.359	0.427
5000.000	2.830	148.554	4997.488	101.322	1.550	101.322	101.334	0.876	0.537
5100.000	2.535	143.661	5097.378	97.434	4.149	97.434	97.522	2.438	0.373
5200.000	2.246	140.021	5197.291	94.151	6.718	94.151	94.390	4.081	0.327
5300.000	1.978	138.537	5297.223	91.356	9.120	91.356	91.810	5.701	0.273
5400.000	1.838	130.289	5397.168	89.026	11.486	89.026	89.764	7.352	0.308
5500.000	1.869	128.245	5497.116	86.979	13.990	86.979	88.097	9.137	0.073
5600.000	1.871	129.585	5597.062	84.929	16.529	84.929	86.523	11.013	0.044
5700.000	1.864	126.995	5697.009	82.910	19.086	82.910	85.079	12.964	0.085
5800.000	1.775	126.814	5796.959	81.004	21.625	81.004	83.840	14.947	0.090
5900.000	1.828	117.582	5896.910	79.337	24.279	79.337	82.969	17.015	0.295
6000.000	1.689	107.968	5996.863	78.144	27.094	78.144	82.708	19.122	0.326
6100.000	2.046	102.245	6096.809	77.311	30.240	77.311	83.015	21.363	0.403
6200.000	1.464	90.581	6196.762	76.919	33.263	76.919	83.803	23.386	0.680
6300.000	1.296	67.353	6296.734	77.342	35.584	77.342	85.135	24.707	0.580
6400.000	1.082	93.123	6396.713	77.726	37.571	77.726	86.330	25.798	0.570
6500.000	1.135	104.117	6496.695	77.433	39.475	77.433	86.914	27.012	0.219
6600.000	1.102	122.871	6596.676	76.669	41.243	76.669	87.058	28.277	0.366
6700.000	1.287	133.079	6696.654	75.380	42.871	75.380	86.719	29.628	0.282
HORIZONTAL DISPLACEMENT IS 86.719 FEET AT 29.628 DEGREES									