



Company: Noble Energy
 Well: Wells Ranch 44-15
 API: 05-123-23138
 Rig Name: Production/Lightning Wireline
 State/County: Colorado/ Weld
 Latitude: 40.482, Longitude: -104.417
 GRID North is 0.700 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 / 13:38

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

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	0.244	18.445	100.000	0.202	0.067	0.202	0.213	18.445	0.244
200.000	0.245	1.658	199.999	0.618	0.141	0.618	0.634	12.854	0.071
300.000	0.204	46.629	299.998	0.954	0.277	0.954	0.993	16.180	0.176
400.000	0.211	34.000	399.997	1.229	0.509	1.229	1.330	22.511	0.046
500.000	0.258	9.944	499.997	1.604	0.651	1.604	1.731	22.102	0.108
600.000	0.302	18.322	599.995	2.076	0.773	2.076	2.215	20.424	0.060
700.000	0.417	355.075	699.994	2.689	0.825	2.689	2.812	17.052	0.183
800.000	0.173	354.166	799.992	3.202	0.778	3.202	3.295	13.661	0.244
900.000	0.133	324.700	899.992	3.447	0.696	3.447	3.516	11.411	0.087
1000.000	0.188	318.043	999.991	3.663	0.519	3.663	3.700	8.063	0.058
1100.000	0.215	327.899	1099.991	3.944	0.309	3.944	3.957	4.486	0.044
1200.000	0.327	347.168	1199.990	4.382	0.146	4.382	4.385	1.910	0.143
1300.000	0.425	347.398	1299.987	5.023	0.002	5.023	5.023	0.020	0.098
1400.000	0.372	342.054	1399.985	5.694	-0.179	5.694	5.697	358.196	0.065
1500.000	0.388	339.784	1499.983	6.320	-0.396	6.320	6.333	356.413	0.022
1600.000	0.244	15.912	1599.981	6.843	-0.455	6.843	6.858	356.198	0.239
1700.000	0.244	15.111	1699.980	7.253	-0.341	7.253	7.261	357.311	0.003
1800.000	0.761	316.165	1799.977	7.938	-0.745	7.938	7.973	354.637	0.669
1900.000	0.639	284.847	1899.970	8.560	-1.744	8.560	8.736	348.483	0.396
2000.000	0.865	281.370	1999.961	8.852	-3.024	8.852	9.354	341.141	0.231
2100.000	1.206	244.494	2099.946	8.548	-4.714	8.548	9.761	331.126	0.730
2200.000	1.191	234.483	2199.924	7.491	-6.509	7.491	9.924	319.014	0.210
2300.000	1.198	224.796	2299.902	6.145	-8.091	6.145	10.160	307.216	0.202
2400.000	1.421	223.571	2399.876	4.505	-9.683	4.505	10.680	294.948	0.225
2500.000	1.221	217.017	2499.849	2.755	-11.179	2.755	11.514	283.846	0.251
2600.000	1.212	207.227	2599.827	0.964	-12.304	0.964	12.342	274.482	0.208
2700.000	1.034	205.164	2699.808	-0.793	-13.172	-0.793	13.196	266.556	0.182
2800.000	0.930	212.972	2799.793	-2.290	-13.997	-2.290	14.183	260.708	0.170
2900.000	0.791	215.730	2899.782	-3.531	-14.842	-3.531	15.256	256.618	0.145
3000.000	0.611	212.886	2999.774	-4.539	-15.534	-4.539	16.184	253.712	0.183
3100.000	0.358	222.936	3099.771	-5.216	-16.037	-5.216	16.864	251.983	0.266
3200.000	0.448	198.351	3199.768	-5.816	-16.373	-5.816	17.375	250.445	0.193
3300.000	0.510	199.415	3299.765	-6.607	-16.644	-6.607	17.908	248.350	0.063
3400.000	1.446	180.415	3399.749	-8.289	-16.801	-8.289	18.735	243.742	0.978

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	2.031	177.971	3499.703	-11.321	-16.748	-11.321	20.215	235.942	0.589
3600.000	2.179	179.985	3599.635	-14.993	-16.684	-14.993	22.432	228.056	0.166
3700.000	2.276	178.661	3699.560	-18.880	-16.638	-18.880	25.165	221.387	0.110
3800.000	2.392	178.379	3799.477	-22.952	-16.532	-22.952	28.286	215.764	0.117
3900.000	2.411	177.424	3899.389	-27.140	-16.379	-27.140	31.700	211.110	0.044
4000.000	2.455	178.349	3999.299	-31.383	-16.222	-31.383	35.328	207.335	0.059
4100.000	2.155	168.400	4099.218	-35.366	-15.783	-35.366	38.727	204.050	0.499
4200.000	2.233	145.409	4199.147	-38.811	-14.299	-38.811	41.361	200.225	0.877
4300.000	2.482	130.510	4299.063	-41.821	-11.547	-41.821	43.385	195.435	0.659
4400.000	2.316	128.382	4398.975	-44.481	-8.317	-44.481	45.252	190.591	0.188
4500.000	2.236	124.093	4498.896	-46.829	-5.118	-46.829	47.108	186.237	0.188
4600.000	2.156	109.873	4598.824	-48.562	-1.734	-48.562	48.593	182.045	0.549
4700.000	2.146	111.214	4698.753	-49.879	1.781	-49.879	49.910	177.955	0.051
4800.000	1.755	131.380	4798.696	-51.568	4.675	-51.568	51.780	174.820	0.784
4900.000	1.757	135.991	4898.649	-53.683	6.889	-53.683	54.123	172.688	0.141
5000.000	1.832	138.505	4998.600	-55.983	9.013	-55.983	56.704	170.854	0.109
5100.000	1.854	137.083	5098.549	-58.366	11.174	-58.366	59.426	169.162	0.051
5200.000	1.588	117.971	5198.504	-60.200	13.499	-60.200	61.695	167.361	0.629
5300.000	1.490	103.151	5298.469	-61.146	15.989	-61.146	63.202	165.346	0.409
5400.000	1.507	105.029	5398.434	-61.783	18.525	-61.783	64.500	163.309	0.052
5500.000	1.849	112.515	5498.391	-62.742	21.286	-62.742	66.254	161.260	0.405
5600.000	1.809	98.273	5598.341	-63.586	24.338	-63.586	68.085	159.055	0.455
5700.000	1.234	89.428	5698.306	-63.803	26.977	-63.803	69.272	157.080	0.620
5800.000	1.315	90.153	5798.281	-63.795	29.201	-63.795	70.161	155.405	0.083
5900.000	1.313	73.300	5898.255	-63.469	31.447	-63.469	70.832	153.643	0.385
6000.000	1.109	63.638	5998.233	-62.710	33.411	-62.710	71.055	151.952	0.289
6100.000	1.227	63.855	6098.212	-61.809	35.239	-61.809	71.148	150.311	0.118
6200.000	1.579	63.417	6198.182	-60.720	37.433	-60.720	71.331	148.347	0.353
6300.000	1.666	56.409	6298.142	-59.299	39.876	-59.299	71.460	146.081	0.216
6400.000	2.003	57.713	6398.090	-57.562	42.564	-57.562	71.589	143.519	0.340
6500.000	2.073	62.535	6498.027	-55.794	45.646	-55.794	72.087	140.713	0.185
6600.000	0.567	53.085	6597.998	-54.663	47.647	-54.663	72.514	138.923	1.517
6700.000	0.366	19.088	6697.995	-54.064	48.147	-54.064	72.395	138.313	0.334
HORIZONTAL DISPLACEMENT IS 72.395 FEET AT 138.313 DEGREES									