



Company: Noble Energy  
Well: Wells Ranch AA 24-3X  
API: 05-123-32830  
Rig Name: Production/Lightning Wireline  
State/County: Colorado/ Weld  
Latitude: 40.478, Longitude: -104.388  
GRID North is 0.720 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: 2/25/2012 / 17:13

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	0.344	329.756	99.999	0.260	-0.151	0.260	0.301	329.756	0.344
200.000	0.255	271.578	199.998	0.526	-0.525	0.526	0.743	315.018	0.302
300.000	0.448	27.249	299.997	0.879	-0.568	0.879	1.047	327.119	0.604
400.000	0.419	41.919	399.994	1.499	-0.145	1.499	1.506	354.465	0.114
500.000	0.583	32.622	499.990	2.200	0.373	2.200	2.231	9.632	0.183
600.000	0.310	32.389	599.987	2.857	0.792	2.857	2.964	15.505	0.274
700.000	0.595	45.408	699.984	3.449	1.307	3.449	3.688	20.751	0.301
800.000	0.758	43.636	799.977	4.292	2.133	4.292	4.792	26.422	0.164
900.000	0.830	27.667	899.968	5.412	2.925	5.412	6.152	28.391	0.232
1000.000	0.827	19.595	999.957	6.734	3.504	6.734	7.591	27.489	0.117
1100.000	0.591	358.058	1099.950	7.929	3.728	7.929	8.762	25.183	0.352
1200.000	0.766	27.365	1199.943	9.038	4.018	9.038	9.891	23.969	0.383
1300.000	0.705	29.107	1299.935	10.169	4.625	10.169	11.172	24.454	0.066
1400.000	0.744	34.356	1399.927	11.242	5.290	11.242	12.425	25.199	0.077
1500.000	0.744	16.190	1499.918	12.402	5.837	12.402	13.707	25.206	0.235
1600.000	0.654	348.880	1599.911	13.586	5.909	13.586	14.815	23.504	0.342
1700.000	0.391	19.645	1699.907	14.467	5.913	14.467	15.629	22.231	0.375
1800.000	0.603	56.871	1799.904	15.077	6.469	15.077	16.406	23.223	0.376
1900.000	0.741	66.232	1899.897	15.625	7.501	15.625	17.332	25.645	0.175
2000.000	0.739	77.057	1999.888	16.030	8.722	16.030	18.249	28.550	0.140
2100.000	1.010	102.427	2099.877	15.985	10.211	15.985	18.968	32.570	0.466
2200.000	0.972	74.918	2199.863	16.016	11.891	16.016	19.948	36.590	0.473
2300.000	1.164	76.677	2299.845	16.471	13.698	16.471	21.423	39.749	0.195
2400.000	0.627	121.445	2399.834	16.420	15.154	16.420	22.344	42.703	0.844
2500.000	0.691	118.614	2499.827	15.846	16.150	15.846	22.625	45.545	0.072
2600.000	0.489	110.087	2599.822	15.410	17.080	15.410	23.005	47.943	0.220
2700.000	0.780	132.624	2699.816	14.802	17.982	14.802	23.291	50.540	0.378
2800.000	0.744	148.391	2799.807	13.789	18.823	13.789	23.333	53.776	0.212
2900.000	0.546	190.334	2899.801	12.767	19.078	12.767	22.956	56.210	0.497
3000.000	0.615	160.222	2999.796	11.793	19.174	11.793	22.510	58.407	0.309
3100.000	0.561	179.814	3099.791	10.798	19.357	10.798	22.165	60.845	0.207
3200.000	0.264	138.624	3199.788	10.136	19.511	10.136	21.987	62.548	0.402
3300.000	0.234	181.482	3299.788	9.760	19.658	9.760	21.947	63.597	0.184
3400.000	1.077	184.960	3399.780	8.620	19.572	8.620	21.386	66.230	0.844

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	0.846	178.549	3499.766	6.946	19.509	6.946	20.709	70.403	0.255
3600.000	1.137	182.531	3599.751	5.217	19.484	5.217	20.170	75.011	0.300
3700.000	1.178	174.398	3699.731	3.202	19.540	3.202	19.801	80.694	0.169
3800.000	1.683	155.337	3799.700	0.844	20.253	0.844	20.271	87.613	0.687
3900.000	1.932	150.642	3899.650	-1.959	21.692	-1.959	21.781	95.160	0.289
4000.000	1.777	148.209	3999.598	-4.746	23.336	-4.746	23.813	101.496	0.173
4100.000	1.563	121.402	4099.557	-6.775	25.317	-6.775	26.208	104.981	0.802
4200.000	2.076	97.693	4199.507	-7.728	28.276	-7.728	29.313	105.285	0.900
4300.000	2.425	98.202	4299.430	-8.272	32.165	-8.272	33.212	104.423	0.350
4400.000	2.074	115.777	4399.354	-9.361	35.888	-9.361	37.089	104.619	0.770
4500.000	1.821	120.932	4499.296	-10.964	38.881	-10.964	40.397	105.748	0.307
4600.000	1.434	111.416	4599.256	-12.238	41.408	-12.238	43.179	106.465	0.471
4700.000	1.279	121.535	4699.228	-13.279	43.525	-13.279	45.505	106.966	0.285
4800.000	1.569	83.810	4799.199	-13.715	45.837	-13.715	47.845	106.658	0.961
4900.000	2.073	76.266	4899.148	-13.138	48.955	-13.138	50.687	105.022	0.557
5000.000	2.363	100.870	4999.076	-13.097	52.737	-13.097	54.339	103.947	0.986
5100.000	2.402	109.233	5098.989	-14.176	56.739	-14.176	58.484	104.028	0.350
5200.000	2.012	121.731	5198.916	-15.789	60.211	-15.789	62.247	104.694	0.618
5300.000	1.912	128.643	5298.857	-17.754	63.006	-17.754	65.460	105.737	0.257
5400.000	1.700	131.918	5398.807	-19.787	65.413	-19.787	68.341	106.830	0.235
5500.000	1.454	133.432	5498.769	-21.650	67.439	-21.650	70.829	107.799	0.250
5600.000	1.152	151.834	5598.744	-23.409	68.834	-23.409	72.706	108.782	0.512
5700.000	1.195	154.058	5698.723	-25.233	69.765	-25.233	74.188	109.884	0.063
5800.000	0.739	174.176	5798.709	-26.813	70.287	-26.813	75.228	110.881	0.562
5900.000	0.776	134.292	5898.701	-27.927	70.837	-27.927	76.143	111.517	0.518
6000.000	0.785	175.006	5998.692	-29.082	71.381	-29.082	77.078	112.167	0.543
6100.000	0.630	165.581	6098.685	-30.296	71.577	-30.296	77.725	112.941	0.193
6200.000	0.181	280.867	6198.683	-30.798	71.559	-30.798	77.905	113.286	0.726
6300.000	0.548	226.474	6298.681	-31.098	71.056	-31.098	77.563	113.637	0.467
6400.000	0.485	189.035	6398.677	-31.845	70.643	-31.845	77.489	114.266	0.337
6500.000	0.602	176.320	6498.672	-32.788	70.610	-32.788	77.851	114.908	0.167
6600.000	0.585	168.525	6598.667	-33.812	70.745	-33.812	78.410	115.545	0.082
6700.000	0.682	156.101	6698.661	-34.856	71.088	-34.856	79.173	116.120	0.168
HORIZONTAL DISPLACEMENT IS 79.173 FEET AT 116.120 DEGREES									