



Company: Noble Energy
Well: Bashor State AA 16-14
API #: 05-123-26115
Rig Name: Production/Lightning
State/County: Colorado/Weld
Latitude: 40.481, Longitude: -104.444
GRID North is 0.680 Degrees East of True North
VS-Azi: 0.000 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : Ground Level

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run02-01_ed.ut

Minimum Curvature Method

Report Date/Time: 10/19/2012 / 18:33

Vaughn Energy Services

Henderson, Colorado

866-835-8333

Randy Holcomb

RKB=Ground Level

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	0.464	325.441	99.999	0.334	-0.230	0.334	0.405	325.441	0.464
200.000	0.235	155.467	199.998	0.481	-0.375	0.481	0.609	322.079	0.697
300.000	0.099	53.196	299.998	0.346	-0.220	0.346	0.410	327.550	0.274
400.000	0.613	274.276	399.996	0.438	-0.684	0.438	0.812	302.626	0.690
500.000	0.216	270.635	499.993	0.480	-1.405	0.480	1.485	288.844	0.397
600.000	0.459	259.002	599.991	0.405	-1.987	0.405	2.028	281.531	0.251
700.000	0.933	296.828	699.984	0.696	-3.106	0.696	3.183	282.636	0.636
800.000	0.606	271.028	799.975	1.073	-4.361	1.073	4.491	283.826	0.469
900.000	1.013	294.570	899.965	1.450	-5.693	1.450	5.875	284.291	0.518
1000.000	0.629	274.594	999.955	1.862	-7.045	1.862	7.287	284.805	0.473
1100.000	1.165	289.947	1099.943	2.253	-8.548	2.253	8.840	284.764	0.582
1200.000	1.025	271.831	1199.925	2.628	-10.397	2.628	10.724	284.185	0.371
1300.000	0.805	285.950	1299.912	2.850	-11.967	2.850	12.301	283.395	0.313
1400.000	0.960	285.190	1399.900	3.262	-13.451	3.262	13.841	283.633	0.155
1500.000	0.795	293.744	1499.888	3.761	-14.894	3.761	15.362	284.172	0.210
1600.000	0.660	285.845	1599.880	4.198	-16.083	4.198	16.622	284.627	0.168
1700.000	0.731	303.704	1699.873	4.709	-17.168	4.709	17.802	285.338	0.227
1800.000	0.744	311.759	1799.865	5.495	-18.182	5.495	18.994	286.815	0.104
1900.000	1.141	298.071	1899.851	6.396	-19.545	6.396	20.565	288.119	0.454
2000.000	1.371	299.746	1999.827	7.458	-21.462	7.458	22.721	289.161	0.233
2100.000	1.656	313.954	2099.793	9.054	-23.541	9.054	25.222	291.037	0.469
2200.000	2.219	316.582	2199.735	11.463	-25.912	11.463	28.334	293.864	0.570
2300.000	2.176	318.432	2299.661	14.290	-28.502	14.290	31.884	296.627	0.083
2400.000	2.691	334.939	2399.572	17.836	-30.756	17.836	35.554	300.111	0.865
2500.000	2.834	339.189	2499.456	22.274	-32.629	22.274	39.507	304.320	0.250
2600.000	2.835	339.857	2599.334	26.907	-34.359	26.907	43.641	308.065	0.033
2700.000	2.293	339.722	2699.233	31.105	-35.904	31.105	47.504	310.904	0.541
2800.000	2.174	342.742	2799.157	34.793	-37.160	34.793	50.906	313.116	0.168
2900.000	2.042	349.927	2899.090	38.359	-38.034	38.359	54.019	315.244	0.295
3000.000	1.390	337.105	2999.045	41.231	-38.818	41.231	56.629	316.727	0.753
3100.000	1.593	337.218	3099.011	43.630	-39.828	43.630	59.075	317.608	0.203
3200.000	0.846	344.759	3198.987	45.624	-40.561	45.624	61.047	318.362	0.763
3300.000	0.755	358.366	3298.978	46.995	-40.773	46.995	62.217	319.055	0.210
3400.000	0.706	13.332	3398.970	48.254	-40.650	48.254	63.094	319.888	0.197

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	0.682	32.650	3498.962	49.355	-40.187	49.355	63.646	320.846	0.234
3600.000	0.451	42.083	3598.958	50.148	-39.602	50.148	63.899	321.702	0.249
3700.000	0.453	351.574	3698.955	50.831	-39.396	50.831	64.311	322.223	0.386
3800.000	0.631	13.209	3798.950	51.758	-39.328	51.758	65.005	322.771	0.268
3900.000	0.417	20.275	3898.946	52.636	-39.076	52.636	65.555	323.410	0.223
4000.000	0.654	29.363	3998.942	53.475	-38.670	53.475	65.992	324.128	0.251
4100.000	0.596	45.988	4098.936	54.334	-38.016	54.334	66.313	325.020	0.190
4200.000	0.813	78.682	4198.929	54.835	-36.946	54.835	66.120	326.029	0.448
4300.000	1.092	106.109	4298.915	54.709	-35.334	54.709	65.128	327.143	0.527
4400.000	1.083	102.151	4398.897	54.246	-33.495	54.246	63.754	328.306	0.076
4500.000	0.579	61.585	4498.887	54.288	-32.127	54.288	63.081	329.383	0.745
4600.000	0.360	302.598	4598.885	54.697	-31.947	54.697	63.344	329.712	0.817
4700.000	0.739	242.258	4698.881	54.566	-32.783	54.566	63.657	329.003	0.642
4800.000	0.629	219.205	4798.874	53.841	-33.701	53.841	63.518	327.956	0.294
4900.000	0.713	260.556	4898.868	53.313	-34.661	53.313	63.590	326.970	0.480
5000.000	0.589	264.641	4998.861	53.163	-35.787	53.163	64.086	326.054	0.132
5100.000	0.258	285.514	5098.859	53.176	-36.515	53.176	64.506	325.523	0.360
5200.000	0.287	272.670	5198.858	53.247	-36.983	53.247	64.831	325.218	0.068
5300.000	0.737	252.208	5298.853	53.063	-37.846	53.063	65.176	324.502	0.478
5400.000	0.656	259.046	5398.846	52.757	-39.020	52.757	65.619	323.513	0.116
5500.000	0.249	330.092	5498.843	52.837	-39.690	52.837	66.083	323.087	0.621
5600.000	0.536	333.939	5598.841	53.445	-40.004	53.445	66.759	323.185	0.289
5700.000	0.817	328.981	5698.834	54.477	-40.577	54.477	67.928	323.319	0.286
5800.000	0.740	332.951	5798.824	55.662	-41.237	55.662	69.273	323.467	0.094
5900.000	0.954	333.248	5898.813	56.980	-41.906	56.980	70.730	323.668	0.214
6000.000	0.965	342.888	5998.800	58.527	-42.528	58.527	72.347	323.997	0.162
6100.000	1.279	321.182	6098.781	60.201	-43.475	60.201	74.258	324.165	0.523
6200.000	1.629	315.795	6198.748	62.089	-45.165	62.089	76.778	323.967	0.375
6300.000	2.285	329.731	6298.690	64.829	-47.161	64.829	80.168	323.966	0.806
6400.000	2.771	346.233	6398.594	68.899	-48.741	68.899	84.396	324.724	0.870
6500.000	1.775	348.206	6498.514	72.762	-49.632	72.762	88.078	325.701	0.999
6600.000	1.868	8.236	6598.464	75.891	-49.715	75.891	90.725	326.772	0.640
6700.000	1.830	13.014	6698.412	79.060	-49.122	79.060	93.078	328.146	0.159
HORIZONTAL DISPLACEMENT IS 93.078 FEET AT 328.146 DEGREES									