



Company: Noble Energy

Well: Duke J 4-25

API: 05-123-27326

Rig Name: Production/Lightning

Location: Weld County, Colorado

Latitude: 40.426, Longitude: -104.793

GRID North is 0.460 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-de\_01.ut

Minimum Curvature Method

Report Date/Time: 9/4/2012 / 14:01

Vaughn Energy Services

Henderson, CO.

Justin Williams

303-853-4976

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	0.943	275.307	99.995	0.076	-0.820	0.076	0.823	275.307	0.943
200.000	0.522	222.688	199.988	-0.182	-1.948	-0.182	1.957	264.651	0.751
300.000	0.560	223.382	299.984	-0.872	-2.593	-0.872	2.735	251.404	0.039
400.000	0.937	275.840	399.976	-1.144	-3.741	-1.144	3.912	252.995	0.743
500.000	0.438	236.688	499.969	-1.271	-4.874	-1.271	5.037	255.384	0.658
600.000	0.755	267.460	599.964	-1.510	-5.852	-1.510	6.044	255.529	0.440
700.000	1.012	138.584	699.958	-2.202	-5.926	-2.202	6.322	249.620	1.598
800.000	1.279	137.068	799.938	-3.681	-4.582	-3.681	5.878	231.228	0.269
900.000	0.816	154.517	899.921	-5.141	-3.516	-5.141	6.228	214.369	0.557
1000.000	1.033	146.850	999.908	-6.539	-2.716	-6.539	7.081	202.558	0.250
1100.000	1.139	118.162	1099.891	-7.763	-1.347	-7.763	7.879	189.842	0.548
1200.000	0.883	148.444	1199.876	-8.889	-0.067	-8.889	8.889	180.432	0.583
1300.000	0.769	158.296	1299.865	-10.169	0.584	-10.169	10.186	176.710	0.182
1400.000	0.926	126.533	1399.855	-11.274	1.482	-11.274	11.371	172.510	0.488
1500.000	2.442	112.488	1499.809	-12.570	4.100	-12.570	13.222	161.934	1.559
1600.000	3.405	118.958	1599.678	-14.823	8.667	-14.823	17.171	149.684	1.017
1700.000	5.001	118.733	1699.406	-18.357	15.089	-18.357	23.762	140.580	1.596
1800.000	6.443	119.370	1798.905	-23.204	23.801	-23.204	33.240	134.273	1.443
1900.000	6.915	116.296	1898.227	-28.622	34.087	-28.622	44.510	130.020	0.592
2000.000	7.066	111.975	1997.484	-33.591	45.188	-33.591	56.305	126.626	0.547
2100.000	8.402	111.449	2096.572	-38.564	57.692	-38.564	69.395	123.761	1.338
2200.000	10.580	111.861	2195.197	-44.655	73.015	-44.655	85.587	121.449	2.179
2300.000	11.225	107.171	2293.394	-50.947	90.835	-50.947	104.147	119.287	1.096
2400.000	12.776	103.378	2391.207	-56.379	110.893	-56.379	124.402	116.949	1.739
2500.000	14.447	103.345	2488.395	-61.817	133.789	-61.817	147.380	114.799	1.671
2600.000	16.637	95.603	2584.743	-66.095	160.178	-66.095	173.279	112.423	3.012
2700.000	18.594	95.807	2680.049	-69.106	190.289	-69.106	202.449	109.959	1.958
2800.000	18.760	99.852	2774.787	-73.470	221.994	-73.470	233.836	108.312	1.306
2900.000	19.073	101.167	2869.387	-79.386	253.867	-79.386	265.990	107.365	0.529
3000.000	20.145	101.032	2963.586	-85.845	286.799	-85.845	299.371	106.664	1.073
3100.000	19.323	100.051	3057.712	-92.028	319.992	-92.028	332.963	106.045	0.887
3200.000	19.037	101.847	3152.162	-98.264	352.244	-98.264	365.694	105.587	0.655
3300.000	19.894	102.786	3246.446	-105.377	384.798	-105.377	398.966	105.315	0.912
3400.000	20.094	101.634	3340.419	-112.607	418.215	-112.607	433.110	105.070	0.442

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	20.066	101.015	3434.341	-119.348	451.879	-119.348	467.374	104.795	0.214
3600.000	20.623	100.829	3528.103	-125.935	486.015	-125.935	502.066	104.527	0.561
3700.000	20.798	101.434	3621.641	-132.763	520.714	-132.763	537.372	104.304	0.276
3800.000	21.088	100.005	3715.035	-139.408	555.832	-139.408	573.047	104.080	0.588
3900.000	21.296	99.871	3808.273	-145.647	591.439	-145.647	609.108	103.834	0.214
4000.000	21.156	99.128	3901.488	-151.622	627.147	-151.622	645.215	103.591	0.303
4100.000	20.616	101.898	3994.919	-158.115	662.192	-158.115	680.808	103.429	1.126
4200.000	20.533	101.559	4088.541	-165.258	696.600	-165.258	715.935	103.346	0.145
4300.000	20.957	103.321	4182.059	-172.893	731.185	-172.893	751.347	103.304	0.755
4400.000	21.608	101.699	4275.239	-180.747	766.617	-180.747	787.637	103.266	0.877
4500.000	21.267	100.878	4368.321	-187.903	802.457	-187.903	824.163	103.179	0.454
4600.000	21.483	100.684	4461.443	-194.720	838.261	-194.720	860.580	103.077	0.227
4700.000	19.588	100.617	4555.084	-201.204	872.734	-201.204	895.627	102.982	1.895
4800.000	18.370	101.372	4649.646	-207.400	904.659	-207.400	928.128	102.912	1.242
4900.000	16.004	102.634	4745.174	-213.523	933.562	-213.523	957.669	102.883	2.396
5000.000	14.032	104.124	4841.754	-219.497	958.772	-219.497	983.577	102.895	2.009
5100.000	12.029	104.509	4939.175	-225.066	980.619	-225.066	1006.115	102.926	2.004
5200.000	9.833	102.743	5037.355	-229.561	999.037	-229.561	1025.073	102.941	2.221
5300.000	7.559	100.841	5136.199	-232.682	1013.827	-232.682	1040.186	102.926	2.292
5400.000	5.475	102.718	5235.547	-234.969	1024.942	-234.969	1051.531	102.912	2.094
5500.000	3.431	108.686	5335.241	-236.978	1032.432	-236.978	1059.280	102.927	2.094
5600.000	1.123	97.471	5435.155	-238.065	1036.238	-238.065	1063.233	102.939	2.340
5700.000	0.454	154.270	5535.146	-238.549	1037.382	-238.549	1064.456	102.950	0.953
5800.000	0.630	184.931	5635.142	-239.453	1037.506	-239.453	1064.780	102.996	0.333
5900.000	0.307	245.588	5735.139	-240.111	1037.215	-240.111	1064.645	103.034	0.549
6000.000	0.367	312.729	5835.138	-240.005	1036.736	-240.005	1064.154	103.034	0.376
6100.000	0.427	297.532	5935.135	-239.616	1036.171	-239.616	1063.516	103.021	0.120
6200.000	0.511	354.777	6035.133	-238.999	1035.800	-238.999	1063.016	102.993	0.455
6300.000	0.606	16.704	6135.128	-238.049	1035.912	-238.049	1062.911	102.942	0.232
6400.000	0.697	53.495	6235.122	-237.181	1036.552	-237.181	1063.342	102.888	0.420
6500.000	0.744	52.239	6335.114	-236.421	1037.555	-236.421	1064.150	102.836	0.050
6600.000	0.896	63.850	6435.104	-235.679	1038.770	-235.679	1065.170	102.783	0.224
6700.000	0.570	59.651	6535.095	-235.083	1039.901	-235.083	1066.142	102.738	0.330
6800.000	0.390	356.878	6635.092	-234.491	1040.312	-234.491	1066.412	102.702	0.523
6900.000	0.357	38.187	6735.091	-233.907	1040.486	-233.907	1066.453	102.670	0.265
7000.000	0.250	69.290	6835.089	-233.585	1040.882	-233.585	1066.770	102.648	0.192
7100.000	0.060	29.775	6935.089	-233.463	1041.112	-233.463	1066.967	102.639	0.207
7200.000	0.100	346.510	7035.089	-233.332	1041.117	-233.332	1066.944	102.632	0.070
7300.000	0.226	106.789	7135.088	-233.304	1041.286	-233.304	1067.102	102.629	0.290
7400.000	0.340	107.338	7235.087	-233.449	1041.758	-233.449	1067.595	102.631	0.114
HORIZONTAL DISPLACEMENT IS 1067.595 FEET AT 102.631 DEGREES									