



Company: NOBLE ENERGY
 Well: BROWN USX AA 3-15
 API: 05-123-26046
 Rig Name: PRODUCTION/LIGHTNING
 State/County: COLORADO/WELD
 Latitude: 40.510, Longitude: -104.420
 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_run01-02-de_01.ut

Minimum Curvature Method

Report Date/Time: 11/17/2012 / 13:01

VAUGHN ENERGY SERVICES

HENDERSON, COLORADO

866-835-8333

NICK KULA

DEPTH REFERENCE=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	0.173	270.176	100.000	0.000	-0.151	0.000	0.151	270.176	0.173
200.000	0.376	337.431	199.999	0.304	-0.427	0.304	0.524	305.453	0.348
300.000	0.317	319.147	299.997	0.817	-0.734	0.817	1.098	318.045	0.125
400.000	0.454	347.407	399.995	1.412	-1.001	1.412	1.731	324.664	0.230
500.000	0.521	304.779	499.992	2.058	-1.461	2.058	2.524	324.630	0.360
600.000	0.536	334.136	599.987	2.738	-2.038	2.738	3.413	323.336	0.268
700.000	0.171	252.947	699.986	3.115	-2.385	3.115	3.923	322.564	0.537
800.000	0.255	255.642	799.985	3.016	-2.743	3.016	4.077	317.716	0.085
900.000	0.295	226.943	899.984	2.785	-3.147	2.785	4.202	311.515	0.142
1000.000	0.260	210.478	999.983	2.414	-3.450	2.414	4.211	304.981	0.087
1100.000	0.296	36.100	1099.982	2.427	-3.413	2.427	4.188	305.420	0.556
1200.000	0.041	124.307	1199.982	2.616	-3.231	2.616	4.157	308.996	0.298
1300.000	0.014	0.451	1299.982	2.608	-3.201	2.608	4.129	309.166	0.050
1400.000	0.016	338.982	1399.982	2.632	-3.206	2.632	4.148	309.388	0.006
1500.000	0.064	145.871	1499.982	2.599	-3.180	2.599	4.107	309.261	0.079
1600.000	0.041	221.784	1599.982	2.526	-3.172	2.526	4.055	308.529	0.067
1700.000	0.048	66.525	1699.982	2.516	-3.158	2.516	4.038	308.544	0.087
1800.000	0.066	76.859	1799.982	2.546	-3.064	2.546	3.983	309.721	0.020
1900.000	0.040	313.090	1899.982	2.583	-3.034	2.583	3.984	310.408	0.094
2000.000	0.082	267.109	1999.982	2.603	-3.131	2.603	4.072	309.740	0.061
2100.000	0.107	312.808	2099.982	2.663	-3.271	2.663	4.218	309.149	0.077
2200.000	0.324	227.496	2199.981	2.535	-3.548	2.535	4.361	305.545	0.333
2300.000	0.348	231.429	2299.979	2.155	-3.994	2.155	4.538	298.346	0.033
2400.000	0.298	285.967	2399.978	2.037	-4.481	2.037	4.922	294.447	0.299
2500.000	0.326	358.160	2499.977	2.393	-4.740	2.393	5.310	296.787	0.368
2600.000	0.274	33.179	2599.976	2.878	-4.618	2.878	5.441	301.928	0.187
2700.000	0.327	46.510	2699.974	3.274	-4.281	3.274	5.389	307.412	0.087
2800.000	0.332	304.879	2799.973	3.636	-4.311	3.636	5.640	310.142	0.510
2900.000	0.310	310.318	2899.972	3.977	-4.756	3.977	6.199	309.904	0.037
3000.000	0.430	294.653	2999.970	4.309	-5.303	4.309	6.833	309.093	0.156
3100.000	0.377	221.716	3099.968	4.219	-5.863	4.219	7.224	305.740	0.482
3200.000	0.128	352.545	3199.967	4.084	-6.097	4.084	7.339	303.817	0.471

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
3300.000	0.068	157.504	3299.967	4.140	-6.089	4.140	7.363	304.211	0.194
3400.000	0.127	300.150	3399.967	4.140	-6.162	4.140	7.424	303.898	0.186
3500.000	0.036	301.878	3499.967	4.213	-6.285	4.213	7.566	303.835	0.092
3600.000	0.046	290.878	3599.967	4.244	-6.349	4.244	7.636	303.760	0.013
3700.000	0.126	98.867	3699.967	4.241	-6.277	4.241	7.576	304.042	0.171
3800.000	0.155	77.930	3799.966	4.252	-6.037	4.252	7.384	305.158	0.058
3900.000	0.155	353.693	3899.966	4.415	-5.920	4.415	7.385	306.712	0.207
4000.000	0.181	291.815	3999.966	4.608	-6.081	4.608	7.630	307.150	0.174
4100.000	0.308	69.241	4099.965	4.761	-5.976	4.761	7.641	308.546	0.458
4200.000	0.335	70.947	4199.964	4.952	-5.448	4.952	7.362	312.270	0.028
4300.000	0.398	145.920	4299.962	4.760	-4.977	4.760	6.887	313.722	0.449
4400.000	0.614	194.249	4399.959	3.954	-4.915	3.954	6.308	308.813	0.459
4500.000	0.750	234.478	4499.952	3.054	-5.580	3.054	6.361	298.692	0.486
4600.000	0.437	228.223	4599.947	2.419	-6.397	2.419	6.839	290.714	0.319
4700.000	0.558	261.852	4699.943	2.096	-7.164	2.096	7.465	286.306	0.311
4800.000	0.185	80.786	4799.942	2.053	-7.487	2.053	7.763	285.331	0.744
4900.000	0.227	333.126	4899.941	2.255	-7.417	2.255	7.752	286.912	0.334
5000.000	0.337	96.559	4999.941	2.398	-7.215	2.398	7.603	288.388	0.499
5100.000	0.476	116.658	5099.938	2.178	-6.551	2.178	6.904	288.392	0.197
5200.000	0.601	114.830	5199.934	1.772	-5.704	1.772	5.973	287.254	0.127
5300.000	0.528	56.165	5299.930	1.808	-4.845	1.808	5.171	290.461	0.557
5400.000	0.747	81.058	5399.924	2.165	-3.818	2.165	4.390	299.557	0.348
5500.000	0.697	112.732	5499.916	2.032	-2.614	2.032	3.310	307.859	0.397
5600.000	0.577	157.275	5599.911	1.332	-1.858	1.332	2.286	305.638	0.495
5700.000	0.723	115.737	5699.905	0.594	-1.095	0.594	1.246	298.457	0.481
5800.000	0.303	102.233	5799.900	0.264	-0.269	0.264	0.377	314.429	0.434
5900.000	0.194	234.464	5899.900	0.109	-0.149	0.109	0.185	306.332	0.456
6000.000	0.211	75.226	5999.900	0.058	-0.108	0.058	0.123	298.228	0.399
6100.000	0.605	72.363	6099.897	0.265	0.573	0.265	0.632	65.183	0.394
6200.000	0.493	48.230	6199.893	0.711	1.397	0.711	1.568	63.015	0.254
6300.000	0.135	70.153	6299.891	1.038	1.828	1.038	2.102	60.422	0.371
6400.000	0.333	14.859	6399.890	1.358	2.013	1.358	2.429	55.991	0.279
6500.000	1.057	77.991	6499.883	1.831	2.990	1.831	3.506	58.512	0.954
6600.000	0.971	69.564	6599.867	2.319	4.686	2.319	5.228	63.669	0.172
6700.000	0.911	49.858	6699.854	3.128	6.088	3.128	6.844	62.808	0.327
HORIZONTAL DISPLACEMENT IS 6.844 FEET AT 62.808 DEGREES									