



Company: Noble Energy  
Lease/Well: Trebor B 12/#17  
API: 05-123-22159  
Rig Name: Production/Lightning  
State/County: Colorado/Weld  
Latitude: 40.418, Longitude: -104.494  
GRID North is 0.650 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\_run01-01\_ed.ut

Minimum Curvature Method

Report Date/Time: 2/19/2013 / 18:06

Vaughn Energy Services

Fort Worth, Texas

817-741-3610

Robert Hooper

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	0.243	225.167	100.000	-0.149	-0.150	-0.149	0.212	225.167	0.243
200.000	0.365	264.185	199.998	-0.331	-0.617	-0.331	0.700	241.816	0.234
300.000	0.112	307.352	299.997	-0.304	-1.012	-0.304	1.056	253.281	0.294
400.000	0.389	303.192	399.996	-0.059	-1.373	-0.059	1.374	267.546	0.278
500.000	0.372	298.160	499.994	0.280	-1.944	0.280	1.964	278.209	0.037
600.000	0.526	323.694	599.991	0.804	-2.502	0.804	2.628	287.810	0.249
700.000	0.536	330.533	699.987	1.581	-3.005	1.581	3.395	297.759	0.064
800.000	0.577	302.712	799.982	2.261	-3.658	2.261	4.300	301.715	0.270
900.000	0.327	290.818	899.979	2.634	-4.348	2.634	5.084	301.206	0.266
1000.000	0.357	294.873	999.977	2.867	-4.898	2.867	5.675	300.339	0.039
1100.000	0.386	305.719	1099.975	3.194	-5.454	3.194	6.321	300.356	0.076
1200.000	0.580	305.081	1199.972	3.682	-6.142	3.682	7.161	300.942	0.194
1300.000	0.596	312.536	1299.967	4.324	-6.939	4.324	8.176	301.930	0.078
1400.000	0.548	305.362	1399.962	4.952	-7.712	4.952	9.165	302.707	0.086
1500.000	0.431	303.687	1499.958	5.438	-8.416	5.438	10.020	302.870	0.118
1600.000	0.103	263.729	1599.957	5.637	-8.819	5.637	10.466	302.588	0.358
1700.000	0.346	199.966	1699.956	5.343	-9.011	5.343	10.476	300.667	0.314
1800.000	0.603	163.704	1799.953	4.554	-8.967	4.554	10.057	296.927	0.383
1900.000	0.957	140.700	1899.943	3.403	-8.290	3.403	8.961	292.319	0.466
2000.000	1.315	131.133	1999.924	2.002	-6.897	2.002	7.182	286.188	0.404
2100.000	1.620	136.076	2099.891	0.229	-5.052	0.229	5.058	272.600	0.330
2200.000	1.974	139.401	2199.842	-2.096	-2.951	-2.096	3.620	234.613	0.369
2300.000	2.032	144.272	2299.781	-4.843	-0.795	-4.843	4.908	189.327	0.180
2400.000	1.669	144.558	2399.728	-7.468	1.084	-7.468	7.547	171.739	0.362
2500.000	1.599	150.567	2499.688	-9.871	2.615	-9.871	10.211	165.163	0.185
2600.000	1.609	160.394	2599.649	-12.408	3.772	-12.408	12.969	163.093	0.275
2700.000	1.393	159.615	2699.614	-14.871	4.666	-14.871	15.585	162.579	0.217
2800.000	1.610	159.683	2799.580	-17.328	5.577	-17.328	18.203	162.158	0.217
2900.000	1.466	170.178	2899.544	-19.906	6.284	-19.906	20.874	162.481	0.316
3000.000	1.206	181.298	2999.517	-22.219	6.478	-22.219	23.144	163.746	0.366
3100.000	0.853	223.789	3099.502	-23.809	5.939	-23.809	24.538	165.994	0.816
3200.000	0.254	257.821	3199.497	-24.393	5.207	-24.393	24.943	167.951	0.658
3300.000	0.755	323.530	3299.493	-23.910	4.598	-23.910	24.348	169.114	0.691
3400.000	0.924	330.803	3399.483	-22.676	3.813	-22.676	22.995	170.455	0.199

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	0.831	338.382	3499.471	-21.298	3.153	-21.298	21.530	171.580	0.148
3600.000	1.004	333.295	3599.458	-19.842	2.492	-19.842	19.998	172.842	0.191
3700.000	0.799	334.122	3699.446	-18.432	1.794	-18.432	18.519	174.441	0.205
3800.000	0.685	344.753	3799.437	-17.227	1.332	-17.227	17.278	175.578	0.178
3900.000	0.717	330.778	3899.430	-16.104	0.869	-16.104	16.128	176.910	0.173
4000.000	0.511	328.445	3999.424	-15.179	0.331	-15.179	15.182	178.751	0.207
4100.000	0.663	328.148	4099.419	-14.307	-0.208	-14.307	14.309	180.832	0.153
4200.000	0.454	332.951	4199.414	-13.463	-0.693	-13.463	13.481	182.948	0.214
4300.000	0.678	346.050	4299.409	-12.536	-1.016	-12.536	12.577	184.634	0.258
4400.000	0.433	354.077	4399.404	-11.585	-1.198	-11.585	11.647	185.903	0.256
4500.000	0.700	346.369	4499.399	-10.615	-1.381	-10.615	10.705	187.411	0.277
4600.000	0.836	6.385	4599.391	-9.297	-1.444	-9.297	9.408	188.826	0.299
4700.000	1.277	25.543	4699.374	-7.567	-0.882	-7.567	7.618	186.649	0.559
4800.000	1.239	24.055	4799.349	-5.575	0.039	-5.575	5.575	179.600	0.050
4900.000	1.283	33.966	4899.325	-3.659	1.105	-3.659	3.823	163.200	0.222
5000.000	1.102	36.450	4999.304	-1.957	2.302	-1.957	3.021	130.381	0.188
5100.000	1.089	55.277	5099.286	-0.642	3.654	-0.642	3.710	99.970	0.359
5200.000	0.898	59.181	5199.271	0.301	5.109	0.301	5.117	86.633	0.203
5300.000	0.980	51.713	5299.257	1.232	6.453	1.232	6.569	79.191	0.147
5400.000	0.659	85.415	5399.247	1.808	7.698	1.808	7.907	76.782	0.566
5500.000	0.707	103.775	5499.240	1.707	8.870	1.707	9.033	79.107	0.223
5600.000	0.708	92.222	5599.233	1.536	10.087	1.536	10.203	81.340	0.142
5700.000	0.567	118.862	5699.227	1.274	11.137	1.274	11.210	83.477	0.324
5800.000	0.319	135.037	5799.224	0.838	11.767	0.838	11.797	85.928	0.275
5900.000	0.553	149.352	5899.221	0.226	12.210	0.226	12.212	88.942	0.256
6000.000	1.327	183.085	5999.207	-1.346	12.393	-1.346	12.466	96.198	0.920
6100.000	0.905	148.629	6099.189	-3.176	12.742	-3.176	13.132	103.998	0.774
6200.000	1.729	123.589	6199.163	-4.685	14.410	-4.685	15.152	108.011	0.986
6300.000	2.305	116.267	6299.100	-6.410	17.470	-6.410	18.608	110.148	0.630
6400.000	2.587	113.154	6399.009	-8.187	21.348	-8.187	22.864	110.982	0.312
6500.000	2.723	109.836	6498.902	-9.881	25.658	-9.881	27.495	111.061	0.205
6600.000	2.706	108.969	6598.790	-11.454	30.125	-11.454	32.229	110.818	0.045
6700.000	2.293	112.213	6698.694	-12.978	34.209	-12.978	36.588	110.775	0.436
HORIZONTAL DISPLACEMENT IS 36.588 FEET AT 110.775 DEGREES									