



Company: Noble Energy
Well: Moser X 3-27
API: 05-123-29665
Rig Name: Production/VES
State/County: Colorado/Weld
Latitude: 40.175, Longitude: -104.645
GRID North is 0.550 Degrees East of True North
VS-Azi: 0.000 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : RKB=Ground Level

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: hgyro_run01_ed.ut
Minimum Curvature Method
Report Date/Time: 2/18/2013 / 11:01

Vaughn Energy Services
Henderson, CO
303-853-4976
Levi Sheldon

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	0.574	210.591	99.998	-0.431	-0.255	-0.431	0.501	210.591	0.574
200.000	0.453	215.327	199.994	-1.184	-0.738	-1.184	1.395	211.931	0.128
300.000	0.305	243.520	299.992	-1.625	-1.205	-1.625	2.023	216.551	0.234
400.000	0.346	281.281	399.991	-1.685	-1.740	-1.685	2.422	225.912	0.214
500.000	0.477	316.001	499.988	-1.327	-2.324	-1.327	2.676	240.282	0.275
600.000	0.419	342.486	599.985	-0.679	-2.723	-0.679	2.807	255.993	0.213
700.000	0.375	56.546	699.983	-0.151	-2.560	-0.151	2.565	266.632	0.479
800.000	0.465	92.312	799.981	0.013	-1.882	0.013	1.882	270.402	0.272
900.000	0.642	90.031	899.976	-0.003	-0.915	-0.003	0.916	269.782	0.178
1000.000	0.602	92.196	999.970	-0.024	0.170	-0.024	0.172	98.012	0.046
1100.000	0.848	93.471	1099.962	-0.089	1.434	-0.089	1.436	93.547	0.246
1200.000	0.908	90.239	1199.950	-0.137	2.964	-0.137	2.968	92.645	0.078
1300.000	0.967	95.030	1299.937	-0.214	4.597	-0.214	4.602	92.669	0.098
1400.000	0.828	102.587	1399.925	-0.446	6.143	-0.446	6.159	94.150	0.183
1500.000	0.756	111.703	1499.915	-0.847	7.461	-0.847	7.509	96.478	0.145
1600.000	0.705	119.147	1599.907	-1.391	8.611	-1.391	8.722	99.174	0.108
1700.000	0.565	133.114	1699.901	-2.027	9.508	-2.027	9.721	102.034	0.208
1800.000	0.363	110.396	1799.898	-2.474	10.164	-2.474	10.461	103.680	0.269
1900.000	0.326	120.962	1899.896	-2.731	10.705	-2.731	11.048	104.311	0.073
2000.000	0.115	131.114	1999.895	-2.943	11.025	-2.943	11.411	104.948	0.214
2100.000	0.188	350.049	2099.895	-2.848	11.073	-2.848	11.433	104.424	0.287
2200.000	0.425	333.206	2199.894	-2.355	10.877	-2.355	11.129	102.217	0.251
2300.000	1.037	355.774	2299.885	-1.121	10.643	-1.121	10.702	96.013	0.665
2400.000	1.173	356.120	2399.867	0.803	10.507	0.803	10.538	85.630	0.136
2500.000	1.082	352.919	2499.847	2.761	10.321	2.761	10.684	75.023	0.111
2600.000	0.245	302.066	2599.840	3.811	10.024	3.811	10.724	69.181	0.946
2700.000	0.351	214.535	2699.839	3.673	9.669	3.673	10.343	69.200	0.419
2800.000	0.386	198.949	2799.837	3.102	9.386	3.102	9.885	71.710	0.106
2900.000	0.303	261.166	2899.836	2.743	9.015	2.743	9.423	73.075	0.363
3000.000	0.456	281.551	2999.833	2.782	8.364	2.782	8.815	71.600	0.202
3100.000	0.406	280.287	3099.831	2.925	7.626	2.925	8.168	69.013	0.051
3200.000	0.858	262.891	3199.824	2.896	6.534	2.896	7.147	66.096	0.486
3300.000	1.096	266.648	3299.810	2.747	4.836	2.747	5.562	60.398	0.246
3400.000	1.540	286.209	3399.784	3.066	2.591	3.066	4.014	40.195	0.626

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	1.820	301.044	3499.741	4.260	-0.060	4.260	4.261	359.196	0.515
3600.000	1.826	301.965	3599.690	5.923	-2.772	5.923	6.539	334.920	0.030
3700.000	1.862	306.109	3699.639	7.724	-5.436	7.724	9.445	324.861	0.138
3800.000	1.977	305.165	3799.582	9.674	-8.159	9.674	12.655	319.858	0.119
3900.000	2.162	301.344	3899.517	11.649	-11.179	11.649	16.145	316.178	0.231
4000.000	2.060	288.360	3999.450	13.196	-14.497	13.196	19.604	312.311	0.488
4100.000	1.773	272.964	4099.395	13.843	-17.748	13.843	22.508	307.953	0.587
4200.000	1.160	254.687	4199.362	13.655	-20.269	13.655	24.439	303.968	0.764
4300.000	0.950	273.944	4299.345	13.445	-22.072	13.445	25.845	301.347	0.409
4400.000	0.908	299.535	4399.332	13.892	-23.588	13.892	27.375	300.496	0.413
4500.000	0.934	299.789	4499.320	14.688	-24.985	14.688	28.982	300.450	0.027
4600.000	1.206	291.810	4599.302	15.484	-26.669	15.484	30.838	300.139	0.309
4700.000	1.602	280.449	4699.272	16.128	-29.020	16.128	33.201	299.063	0.482
4800.000	1.460	271.679	4799.236	16.419	-31.668	16.419	35.672	297.405	0.273
4900.000	1.056	243.341	4899.213	16.043	-33.765	16.043	37.383	295.414	0.730
5000.000	0.818	217.807	4999.200	15.065	-35.026	15.065	38.129	293.274	0.474
5100.000	0.529	193.550	5099.193	14.052	-35.572	14.052	38.247	291.556	0.400
5200.000	0.564	201.691	5199.189	13.145	-35.862	13.145	38.196	290.131	0.085
5300.000	0.348	234.821	5299.186	12.513	-36.292	12.513	38.389	289.023	0.333
5400.000	0.295	252.945	5399.184	12.263	-36.786	12.263	38.776	288.436	0.114
5500.000	0.433	206.446	5499.182	11.849	-37.200	11.849	39.042	287.668	0.314
5600.000	0.649	187.267	5599.178	10.949	-37.440	10.949	39.008	286.302	0.279
5700.000	1.387	194.687	5699.161	9.217	-37.819	9.217	38.926	283.697	0.748
5800.000	0.880	179.595	5799.142	7.278	-38.120	7.278	38.809	280.809	0.584
5900.000	0.831	175.904	5899.131	5.787	-38.063	5.787	38.500	278.645	0.074
6000.000	0.990	185.122	5999.118	4.204	-38.088	4.204	38.319	276.298	0.216
6100.000	1.169	191.148	6099.100	2.343	-38.363	2.343	38.434	273.495	0.212
6200.000	1.622	186.253	6199.070	-0.065	-38.714	-0.065	38.714	269.904	0.468
6300.000	1.817	193.478	6299.025	-3.014	-39.238	-3.014	39.353	265.608	0.291
6400.000	2.044	193.594	6398.969	-6.289	-40.026	-6.289	40.517	261.071	0.227
6500.000	2.322	206.849	6498.897	-9.829	-41.360	-9.829	42.512	256.632	0.574
6600.000	2.930	215.254	6598.791	-13.723	-43.750	-13.723	45.852	252.585	0.718
6700.000	3.843	220.720	6698.616	-18.350	-47.411	-18.350	50.838	248.842	0.967
6800.000	4.403	217.267	6798.357	-23.945	-51.922	-23.945	57.177	245.242	0.613
6900.000	4.548	220.714	6898.052	-30.005	-56.833	-30.005	64.267	242.168	0.305
7000.000	4.537	217.646	6997.738	-36.142	-61.835	-36.142	71.623	239.694	0.243
7100.000	4.782	210.995	7097.408	-42.847	-66.397	-42.847	79.022	237.165	0.593
7200.000	4.707	208.567	7197.066	-50.024	-70.506	-50.024	86.449	234.644	0.214
7300.000	3.757	210.664	7296.792	-56.446	-74.139	-56.446	93.181	232.716	0.963
7400.000	2.018	229.138	7396.663	-60.416	-77.141	-60.416	97.984	231.932	1.951
7500.000	0.898	242.637	7496.630	-61.928	-79.169	-61.928	100.513	231.966	1.163
7600.000	0.677	241.418	7596.620	-62.571	-80.384	-62.571	101.866	232.103	0.222
7620.000	0.700	240.911	7616.619	-62.687	-80.594	-62.687	102.103	232.124	0.120
HORIZONTAL DISPLACEMENT IS 102.103 FEET AT 232.124 DEGREES									