



Company: Noble Energy
Well: Sarchet X 20-8
API: 05-123-25400
Rig Name: Production/Lightning Wireline
State/County: Colorado/Weld
Latitude: 40.126, Longitude: -104.680
GRID North is 0.530 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_ed.ut

Minimum Curvature Method

Report Date/Time: 11/21/2012 / 11:47

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	0.261	128.456	100.000	-0.142	0.178	-0.142	0.228	128.456	0.261
200.000	0.330	100.712	199.998	-0.337	0.639	-0.337	0.723	117.766	0.157
300.000	0.388	60.455	299.997	-0.223	1.217	-0.223	1.237	100.405	0.253
400.000	0.324	355.188	399.995	0.225	1.487	0.225	1.504	81.396	0.387
500.000	0.334	6.437	499.993	0.796	1.496	0.796	1.695	61.972	0.065
600.000	0.354	14.155	599.992	1.385	1.604	1.385	2.120	49.186	0.050
700.000	0.363	359.596	699.990	2.001	1.677	2.001	2.611	39.972	0.091
800.000	0.390	20.300	799.988	2.637	1.793	2.637	3.189	34.220	0.138
900.000	0.391	15.137	899.985	3.285	2.000	3.285	3.846	31.338	0.035
1000.000	0.543	58.617	999.982	3.861	2.494	3.861	4.596	32.860	0.374
1100.000	0.570	61.909	1099.977	4.342	3.337	4.342	5.476	37.546	0.042
1200.000	0.346	63.357	1199.974	4.712	4.046	4.712	6.211	40.655	0.224
1300.000	0.605	64.773	1299.971	5.072	4.794	5.072	6.979	43.386	0.259
1400.000	0.332	68.190	1399.967	5.405	5.541	5.405	7.741	45.712	0.274
1500.000	0.748	74.416	1499.963	5.688	6.439	5.688	8.591	48.542	0.419
1600.000	0.827	74.144	1599.953	6.060	7.761	6.060	9.847	52.015	0.079
1700.000	0.899	84.361	1699.942	6.335	9.236	6.335	11.200	55.556	0.170
1800.000	1.142	81.406	1799.926	6.561	11.003	6.561	12.811	59.194	0.248
1900.000	1.156	84.183	1899.906	6.812	12.992	6.812	14.670	62.332	0.057
2000.000	0.903	65.780	1999.890	7.237	14.714	7.237	16.398	63.810	0.414
2100.000	0.868	54.709	2099.878	7.998	16.051	7.998	17.933	63.513	0.174
2200.000	0.719	22.093	2199.869	9.017	16.905	9.017	19.159	61.925	0.468
2300.000	1.022	6.259	2299.857	10.485	17.238	10.485	20.177	58.690	0.384
2400.000	1.304	359.172	2399.837	12.509	17.319	12.509	21.364	54.160	0.317
2500.000	1.726	352.748	2499.802	15.141	17.112	15.141	22.849	48.497	0.454
2600.000	1.887	344.383	2599.752	18.221	16.479	18.221	24.568	42.126	0.309
2700.000	2.114	336.033	2699.691	21.493	15.286	21.493	26.375	35.421	0.369
2800.000	2.397	332.815	2799.614	25.039	13.581	25.039	28.485	28.476	0.310
2900.000	2.558	332.474	2899.520	28.878	11.595	28.878	31.119	21.876	0.161
3000.000	2.697	328.399	2999.415	32.860	9.331	32.860	34.159	15.852	0.233
3100.000	2.880	323.763	3099.297	36.890	6.613	36.890	37.478	10.164	0.290
3200.000	2.791	320.169	3199.174	40.785	3.569	40.785	40.941	5.002	0.199
3300.000	2.356	318.336	3299.073	44.190	0.644	44.190	44.195	0.835	0.442
3400.000	1.444	316.316	3399.017	46.637	-1.593	46.637	46.664	358.044	0.914

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	0.559	306.750	3499.001	47.840	-2.854	47.840	47.925	356.585	0.898
3600.000	0.239	275.381	3598.999	48.152	-3.453	48.152	48.276	355.898	0.377
3700.000	0.206	279.444	3698.998	48.201	-3.838	48.201	48.354	355.447	0.036
3800.000	0.387	285.061	3798.997	48.318	-4.342	48.318	48.513	354.865	0.183
3900.000	0.593	296.714	3898.993	48.639	-5.131	48.639	48.909	353.978	0.228
4000.000	0.957	316.783	3998.984	49.480	-6.165	49.480	49.863	352.898	0.449
4100.000	1.061	316.153	4098.968	50.756	-7.378	50.756	51.290	351.729	0.105
4200.000	0.977	328.899	4198.952	52.154	-8.460	52.154	52.836	350.786	0.241
4300.000	1.335	346.447	4298.932	54.017	-9.173	54.017	54.790	350.362	0.500
4400.000	1.543	342.976	4398.901	56.437	-9.841	56.437	57.288	350.109	0.225
4500.000	1.625	340.440	4498.862	59.060	-10.709	59.060	60.023	349.722	0.108
4600.000	1.717	334.832	4598.820	61.752	-11.821	61.752	62.874	349.163	0.187
4700.000	1.892	337.505	4698.770	64.634	-13.090	64.634	65.946	348.551	0.194
4800.000	2.489	348.114	4798.697	68.284	-14.169	68.284	69.739	348.277	0.719
4900.000	2.898	3.052	4898.588	72.933	-14.482	72.933	74.357	348.769	0.809
5000.000	2.680	16.158	4998.470	77.703	-13.697	77.703	78.901	350.003	0.672
5100.000	2.448	12.934	5098.370	82.030	-12.568	82.030	82.988	351.289	0.273
5200.000	2.291	9.866	5198.285	86.081	-11.748	86.081	86.879	352.229	0.201
5300.000	1.738	356.365	5298.223	89.565	-11.501	89.565	90.300	352.683	0.725
5400.000	1.351	337.348	5398.187	92.166	-12.051	92.166	92.951	352.551	0.638
5500.000	1.559	320.052	5498.155	94.296	-13.378	94.296	95.241	351.925	0.483
5600.000	1.280	314.088	5598.125	96.116	-15.054	96.116	97.288	351.099	0.315
5700.000	1.539	319.347	5698.094	97.912	-16.731	97.912	99.331	350.303	0.289
5800.000	1.431	308.653	5798.061	99.710	-18.581	99.710	101.427	349.444	0.297
5900.000	1.210	323.674	5898.035	101.341	-20.181	101.341	103.330	348.737	0.409
6000.000	0.998	318.129	5998.016	102.839	-21.387	102.839	105.040	348.252	0.237
6100.000	0.965	308.980	6098.001	104.017	-22.623	104.017	106.449	347.730	0.160
6200.000	0.762	318.655	6197.990	105.046	-23.717	105.046	107.690	347.277	0.249
6300.000	0.661	315.181	6297.982	105.955	-24.563	105.955	108.764	346.948	0.110
6400.000	0.482	311.650	6397.977	106.643	-25.283	106.643	109.599	346.662	0.182
6500.000	0.352	287.795	6497.975	107.016	-25.890	107.016	110.104	346.400	0.214
6600.000	0.290	294.094	6597.973	107.214	-26.414	107.214	110.419	346.160	0.071
6700.000	0.258	306.814	6697.972	107.452	-26.825	107.452	110.750	345.983	0.068
6800.000	0.306	325.632	6797.971	107.808	-27.156	107.808	111.175	345.862	0.103
6900.000	0.195	263.447	6897.970	108.008	-27.476	108.008	111.448	345.727	0.275
7000.000	0.091	253.345	6997.970	107.966	-27.721	107.966	111.468	345.600	0.107
7100.000	0.216	230.367	7097.969	107.823	-27.942	107.823	111.385	345.472	0.138
7200.000	0.198	269.105	7197.969	107.700	-28.260	107.700	111.346	345.297	0.139
7227.000	0.378	252.189	7224.968	107.672	-28.392	107.672	111.352	345.228	0.731
HORIZONTAL DISPLACEMENT IS 111.352 FEET AT 345.228 DEGREES									