



Company: Noble Energy  
Well: Wells Ranch USX AA 15-17  
API: 05-123-25046  
Rig Name: Production/ Lightning Wireline  
State/County: Colorado/Weld  
Latitude: 40.491, Longitude: -104.417  
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\_run01-01\_ed.ut

Minimum Curvature Method

Report Date/Time: 8/7/2012 / 17:39

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	0.682	141.629	99.998	-0.467	0.370	-0.467	0.595	141.629	0.682
200.000	0.440	146.956	199.993	-1.256	0.949	-1.256	1.574	142.927	0.247
300.000	0.233	122.013	299.991	-1.685	1.330	-1.685	2.147	141.714	0.249
400.000	0.677	118.852	399.988	-2.078	2.019	-2.078	2.897	135.814	0.445
500.000	0.269	293.463	499.986	-2.269	2.321	-2.269	3.246	134.352	0.945
600.000	0.566	340.983	599.983	-1.708	1.944	-1.708	2.588	131.303	0.433
700.000	1.294	20.282	699.970	-0.182	2.175	-0.182	2.182	94.780	0.928
800.000	1.564	30.143	799.939	2.058	3.252	2.058	3.848	57.672	0.364
900.000	1.633	39.217	899.901	4.342	4.838	4.342	6.501	48.091	0.262
1000.000	1.533	38.532	999.862	6.493	6.573	6.493	9.239	45.349	0.102
1100.000	1.555	37.951	1099.826	8.610	8.241	8.610	11.918	43.745	0.027
1200.000	1.802	31.950	1199.783	11.014	9.907	11.014	14.814	41.972	0.302
1300.000	1.531	20.397	1299.741	13.600	11.205	13.600	17.621	39.485	0.430
1400.000	1.422	41.316	1399.709	15.784	12.489	15.784	20.127	38.354	0.546
1500.000	1.362	31.440	1499.679	17.729	13.929	17.729	22.546	38.154	0.247
1600.000	1.270	28.113	1599.653	19.720	15.070	19.720	24.819	37.387	0.119
1700.000	1.183	49.896	1699.630	21.362	16.382	21.362	26.920	37.483	0.471
1800.000	1.110	83.173	1799.611	22.142	18.133	22.142	28.620	39.316	0.660
1900.000	1.135	43.285	1899.594	22.978	19.774	22.978	30.316	40.714	0.766
2000.000	1.188	22.497	1999.574	24.657	20.850	24.657	32.291	40.218	0.422
2100.000	1.043	42.229	2099.555	26.289	21.859	26.289	34.190	39.743	0.408
2200.000	1.176	39.977	2199.536	27.750	23.130	27.750	36.126	39.812	0.140
2300.000	0.971	53.765	2299.519	29.037	24.473	29.037	37.975	40.125	0.329
2400.000	1.393	27.059	2399.498	30.621	25.709	30.621	39.982	40.017	0.684
2500.000	1.185	25.377	2499.473	32.638	26.706	32.638	42.172	39.291	0.211
2600.000	1.237	31.849	2599.450	34.490	27.719	34.490	44.248	38.788	0.146
2700.000	0.911	24.548	2699.433	36.130	28.618	36.130	46.091	38.383	0.353
2800.000	1.251	33.747	2799.415	37.760	29.555	37.760	47.951	38.050	0.380
2900.000	1.068	6.698	2899.395	39.594	30.270	39.594	49.839	37.399	0.571
3000.000	0.982	0.828	2999.379	41.377	30.391	41.377	51.339	36.297	0.136
3100.000	0.943	355.058	3099.365	43.054	30.333	43.054	52.666	35.166	0.105
3200.000	0.843	3.496	3199.353	44.607	30.307	44.607	53.928	34.193	0.165
3300.000	0.828	5.366	3299.342	46.060	30.419	46.060	55.198	33.442	0.031
3400.000	0.724	356.174	3399.333	47.410	30.444	47.410	56.343	32.707	0.161

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	0.803	331.450	3499.325	48.655	30.067	48.655	57.196	31.715	0.336
3600.000	0.470	357.983	3599.318	49.681	29.718	49.681	57.891	30.887	0.436
3700.000	0.686	326.945	3699.313	50.593	29.377	50.593	58.504	30.142	0.373
3800.000	0.446	17.135	3799.309	51.467	29.165	51.467	59.157	29.539	0.527
3900.000	0.943	6.127	3899.301	52.658	29.368	52.658	60.294	29.149	0.512
4000.000	0.766	29.584	3999.291	54.058	29.786	54.058	61.721	28.854	0.388
4100.000	0.908	25.424	4099.280	55.355	30.456	55.355	63.180	28.819	0.155
4200.000	0.913	24.782	4199.267	56.794	31.130	56.794	64.766	28.728	0.011
4300.000	1.161	36.942	4299.251	58.327	32.073	58.327	66.564	28.805	0.330
4400.000	1.035	25.731	4399.233	59.950	33.074	59.950	68.468	28.885	0.248
4500.000	1.441	47.670	4499.210	61.610	34.395	61.610	70.561	29.173	0.617
4600.000	1.714	61.669	4599.172	63.167	36.641	63.167	73.025	30.117	0.470
4700.000	1.961	70.359	4699.121	64.452	39.569	64.452	75.629	31.547	0.372
4800.000	2.061	79.907	4799.059	65.342	42.952	65.342	78.195	33.318	0.349
4900.000	2.386	89.656	4898.984	65.670	46.804	65.670	80.642	35.478	0.497
5000.000	2.024	93.942	4998.910	65.561	50.647	65.561	82.846	37.687	0.398
5100.000	2.190	96.435	5098.843	65.226	54.308	65.226	84.875	39.781	0.190
5200.000	2.217	93.389	5198.769	64.897	58.137	64.897	87.130	41.855	0.120
5300.000	2.072	110.352	5298.700	64.154	61.763	64.154	89.053	43.912	0.649
5400.000	2.123	108.443	5398.633	62.939	65.215	62.939	90.633	46.018	0.087
5500.000	1.732	104.383	5498.576	61.978	68.437	61.978	92.330	47.835	0.414
5600.000	2.018	119.580	5598.523	60.733	71.432	60.733	93.760	49.628	0.571
5700.000	1.945	122.416	5698.463	58.955	74.395	58.955	94.922	51.605	0.123
5800.000	1.578	132.679	5798.416	57.112	76.840	57.112	95.740	53.378	0.482
5900.000	1.365	139.886	5898.383	55.268	78.619	55.268	96.101	54.894	0.282
6000.000	1.149	129.864	5998.359	53.714	80.156	53.714	96.489	56.173	0.307
6100.000	1.076	161.396	6098.341	52.181	81.226	52.181	96.543	57.282	0.609
6200.000	0.702	184.735	6198.329	50.681	81.475	50.681	95.951	58.116	0.513
6300.000	1.052	216.994	6298.318	49.338	80.872	49.338	94.734	58.614	0.592
6400.000	0.870	222.192	6398.304	48.042	79.810	48.042	93.154	58.954	0.201
6500.000	0.769	237.808	6498.294	47.122	78.732	47.122	91.757	59.099	0.244
6600.000	1.227	228.143	6598.278	46.050	77.367	46.050	90.034	59.238	0.487
6700.000	0.614	224.585	6698.265	44.954	76.193	44.954	88.466	59.459	0.616
6750.000	0.766	215.270	6748.261	44.490	75.812	44.490	87.902	59.593	0.376
HORIZONTAL DISPLACEMENT IS 87.902 FEET AT 59.593 DEGREES									