



Company: Noble Energy  
Well: Wells Ranch USX AA 15-19  
API: 05-123-25047  
Rig Name: Production/Lightning Wireline  
State/County: Colorado/Weld  
Latitude: 40.490, Longitude: -104.427  
GRID North is 0.690 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: 7/27/2012 / 10:41

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	0.191	215.394	100.000	-0.136	-0.096	-0.136	0.167	215.394	0.191
200.000	0.382	200.542	199.999	-0.584	-0.310	-0.584	0.661	207.963	0.204
300.000	0.208	176.723	299.997	-1.077	-0.417	-1.077	1.155	201.145	0.210
400.000	0.202	190.386	399.997	-1.432	-0.438	-1.432	1.497	197.012	0.049
500.000	0.194	245.730	499.996	-1.675	-0.624	-1.675	1.787	200.439	0.184
600.000	0.528	5.205	599.995	-1.286	-0.737	-1.286	1.482	209.815	0.646
700.000	0.486	345.571	699.991	-0.416	-0.800	-0.416	0.902	242.518	0.178
800.000	0.581	355.668	799.987	0.499	-0.944	0.499	1.068	297.866	0.133
900.000	0.410	348.504	899.983	1.355	-1.054	1.355	1.717	322.133	0.181
1000.000	0.434	346.613	999.980	2.075	-1.213	2.075	2.403	329.686	0.027
1100.000	0.665	10.025	1099.976	3.014	-1.200	3.014	3.244	338.300	0.318
1200.000	0.610	31.784	1199.969	4.038	-0.818	4.038	4.120	348.544	0.247
1300.000	0.639	31.671	1299.964	4.965	-0.245	4.965	4.971	357.170	0.029
1400.000	0.501	349.056	1399.959	5.869	-0.036	5.869	5.869	359.650	0.434
1500.000	0.465	352.706	1499.955	6.701	-0.170	6.701	6.703	358.543	0.048
1600.000	0.461	344.655	1599.952	7.492	-0.328	7.492	7.499	357.490	0.065
1700.000	0.295	358.643	1699.950	8.138	-0.441	8.138	8.150	356.898	0.189
1800.000	0.438	74.417	1799.948	8.498	-0.079	8.498	8.498	359.469	0.464
1900.000	0.209	154.732	1899.947	8.436	0.368	8.436	8.444	2.495	0.453
2000.000	0.401	247.906	1999.946	8.139	0.122	8.139	8.140	0.856	0.462
2100.000	0.299	118.524	2099.945	7.883	0.027	7.883	7.883	0.197	0.634
2200.000	0.562	192.024	2199.943	7.278	0.154	7.278	7.280	1.215	0.557
2300.000	0.455	192.537	2299.939	6.411	-0.034	6.411	6.411	359.695	0.107
2400.000	0.685	188.511	2399.934	5.431	-0.209	5.431	5.435	357.797	0.233
2500.000	0.775	200.946	2499.926	4.208	-0.539	4.208	4.242	352.698	0.182
2600.000	0.747	210.520	2599.917	3.014	-1.112	3.014	3.213	339.748	0.130
2700.000	0.533	215.566	2699.911	2.074	-1.714	2.074	2.691	320.428	0.221
2800.000	0.445	215.973	2799.907	1.381	-2.213	1.381	2.609	301.967	0.088
2900.000	0.426	260.253	2899.905	1.004	-2.808	1.004	2.982	289.670	0.329
3000.000	0.258	243.698	2999.903	0.841	-3.377	0.841	3.480	283.983	0.193
3100.000	0.538	248.061	3099.900	0.565	-4.014	0.565	4.054	278.019	0.281
3200.000	0.198	107.855	3199.899	0.337	-4.285	0.337	4.298	274.500	0.701
3300.000	0.523	227.616	3299.898	-0.024	-4.458	-0.024	4.458	269.697	0.645
3400.000	0.446	257.534	3399.894	-0.416	-5.176	-0.416	5.193	265.410	0.261

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	0.523	250.805	3499.891	-0.650	-5.987	-0.650	6.022	263.808	0.095
3600.000	0.691	220.555	3599.885	-1.258	-6.810	-1.258	6.925	259.537	0.356
3700.000	0.551	150.590	3699.881	-2.134	-6.966	-2.134	7.285	252.965	0.721
3800.000	0.931	145.321	3799.872	-3.221	-6.267	-3.221	7.047	242.799	0.386
3900.000	1.111	145.473	3899.856	-4.688	-5.255	-4.688	7.042	228.266	0.180
4000.000	0.992	159.698	3999.839	-6.299	-4.406	-6.299	7.687	214.970	0.286
4100.000	1.073	158.277	4099.823	-7.981	-3.758	-7.981	8.822	205.217	0.085
4200.000	1.217	168.382	4199.803	-9.891	-3.198	-9.891	10.396	197.916	0.247
4300.000	1.405	179.393	4299.777	-12.158	-2.971	-12.158	12.516	193.732	0.314
4400.000	1.617	187.690	4399.743	-14.782	-3.147	-14.782	15.113	192.017	0.304
4500.000	1.525	199.685	4499.705	-17.434	-3.784	-17.434	17.839	192.246	0.341
4600.000	1.887	198.853	4599.661	-20.245	-4.764	-20.245	20.798	193.243	0.362
4700.000	1.765	191.914	4699.610	-23.310	-5.614	-23.310	23.976	193.542	0.252
4800.000	2.242	197.406	4799.549	-26.683	-6.517	-26.683	27.467	193.725	0.513
4900.000	2.404	196.227	4899.467	-30.562	-7.688	-30.562	31.514	194.120	0.169
5000.000	2.483	196.710	4999.376	-34.651	-8.897	-34.651	35.775	194.400	0.082
5100.000	2.398	199.246	5099.285	-38.701	-10.210	-38.701	40.025	194.778	0.137
5200.000	1.901	203.970	5199.214	-42.192	-11.573	-42.192	43.751	195.339	0.527
5300.000	1.866	197.924	5299.160	-45.258	-12.748	-45.258	47.019	195.732	0.202
5400.000	1.867	196.163	5399.107	-48.372	-13.703	-48.372	50.275	195.817	0.057
5500.000	1.632	197.618	5499.061	-51.294	-14.588	-51.294	53.328	195.875	0.239
5600.000	1.401	196.933	5599.025	-53.820	-15.375	-53.820	55.973	195.943	0.232
5700.000	1.554	215.566	5698.993	-56.093	-16.520	-56.093	58.475	196.410	0.502
5800.000	1.201	200.628	5798.964	-58.177	-17.677	-58.177	60.803	196.902	0.501
5900.000	1.141	209.475	5898.943	-60.025	-18.537	-60.025	62.822	197.162	0.190
6000.000	1.018	197.462	5998.926	-61.739	-19.293	-61.739	64.683	197.354	0.257
6100.000	1.112	195.070	6098.908	-63.523	-19.812	-63.523	66.541	197.322	0.104
6200.000	1.152	202.131	6198.889	-65.392	-20.443	-65.392	68.513	197.361	0.145
6300.000	1.296	205.239	6298.866	-67.347	-21.304	-67.347	70.636	197.554	0.158
6400.000	1.535	208.183	6398.835	-69.551	-22.419	-69.551	73.075	197.867	0.250
6500.000	1.801	191.668	6498.794	-72.271	-23.370	-72.271	75.955	197.920	0.547
6600.000	1.932	208.065	6598.741	-75.298	-24.481	-75.298	79.177	198.011	0.548
6700.000	1.697	210.528	6698.691	-78.061	-26.027	-78.061	82.286	198.439	0.248
6740.000	1.942	203.522	6738.671	-79.193	-26.598	-79.193	83.540	198.565	0.826
HORIZONTAL DISPLACEMENT IS 83.540 FEET AT 198.565 DEGREES									