



Company: Noble Energy
Lease / Well: Ehrlich State / 36-1
API#: 05-123-11510
Rig Name: Production / Lightning Wireline
State / County: Colorado / Weld County
Latitude: 40.358, Longitude: -104.615
GRID North is 0.570 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: inrun_ed.ut

Minimum Curvature Method

Report Date/Time: 9/1/2011 / 14:01

Vaughn Energy Services
Henderson, CO
303-853-4976
Robert Davis

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	0.352	56.281	99.999	0.171	0.256	0.171	0.308	56.281	0.352
200.000	0.305	358.654	199.998	0.608	0.505	0.608	0.790	39.737	0.320
300.000	0.254	353.500	299.997	1.095	0.474	1.095	1.193	23.408	0.057
400.000	0.221	260.563	399.996	1.284	0.258	1.284	1.309	11.377	0.346
500.000	0.429	221.599	499.995	0.972	-0.181	0.972	0.988	349.448	0.293
600.000	0.630	199.555	599.990	0.174	-0.614	0.174	0.638	285.801	0.282
700.000	0.616	184.377	699.985	-0.880	-0.839	-0.880	1.216	223.622	0.165
800.000	0.456	224.162	799.981	-1.701	-1.157	-1.701	2.057	214.215	0.394
900.000	0.641	199.235	899.976	-2.515	-1.618	-2.515	2.991	212.761	0.298
1000.000	0.460	175.077	999.972	-3.443	-1.768	-3.443	3.871	207.182	0.291
1100.000	0.402	238.086	1099.969	-4.029	-2.032	-4.029	4.512	206.763	0.453
1200.000	0.407	269.576	1199.967	-4.217	-2.685	-4.217	5.000	212.487	0.220
1300.000	0.248	182.428	1299.966	-4.436	-3.050	-4.436	5.383	214.510	0.466
1400.000	0.317	257.068	1399.965	-4.714	-3.329	-4.714	5.771	215.226	0.347
1500.000	0.779	205.412	1499.960	-5.390	-3.890	-5.390	6.647	215.818	0.633
1600.000	0.684	198.487	1599.952	-6.570	-4.371	-6.570	7.891	213.634	0.129
1700.000	0.886	251.523	1699.944	-7.381	-5.293	-7.381	9.083	215.646	0.724
1800.000	0.681	206.662	1799.935	-8.158	-6.293	-8.158	10.303	217.650	0.627
1900.000	0.725	264.186	1899.929	-8.753	-7.190	-8.753	11.327	219.401	0.678
2000.000	0.466	230.171	1999.924	-9.078	-8.132	-9.078	12.187	221.856	0.428
2100.000	0.596	237.825	2099.920	-9.615	-8.885	-9.615	13.092	222.740	0.148
2200.000	1.212	276.350	2199.907	-9.775	-10.377	-9.775	14.256	226.710	0.833
2300.000	0.748	259.096	2299.893	-9.782	-12.070	-9.782	15.536	230.977	0.545
2400.000	0.875	258.637	2399.883	-10.056	-13.459	-10.056	16.801	233.236	0.126
2500.000	1.468	278.016	2499.862	-10.028	-15.476	-10.028	18.441	237.059	0.705
2600.000	1.115	287.127	2599.836	-9.562	-17.675	-9.562	20.096	241.585	0.407
2700.000	1.128	281.952	2699.817	-9.072	-19.567	-9.072	21.568	245.126	0.102
2800.000	1.272	288.828	2799.795	-8.510	-21.581	-8.510	23.198	248.479	0.204
2900.000	1.598	293.767	2899.764	-7.590	-23.908	-7.590	25.084	252.388	0.349
3000.000	1.305	277.383	2999.732	-6.881	-26.314	-6.881	27.199	255.345	0.505
3100.000	0.927	284.725	3099.713	-6.529	-28.226	-6.529	28.971	256.976	0.403
3200.000	0.386	263.402	3199.706	-6.362	-29.343	-6.362	30.025	257.767	0.585
3300.000	0.588	30.778	3299.704	-5.960	-29.415	-5.960	30.013	258.545	0.877
3400.000	0.761	49.358	3399.697	-5.087	-28.649	-5.087	29.097	259.931	0.277

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	0.588	359.491	3499.691	-4.141	-28.149	-4.141	28.452	261.631	0.590
3600.000	0.693	27.141	3599.685	-3.090	-27.878	-3.090	28.049	263.675	0.323
3700.000	0.198	70.157	3699.682	-2.493	-27.439	-2.493	27.552	264.809	0.565
3800.000	0.596	56.756	3799.679	-2.149	-26.841	-2.149	26.927	265.423	0.406
3900.000	0.371	103.250	3899.676	-1.938	-26.091	-1.938	26.163	265.753	0.434
4000.000	0.462	161.197	3999.674	-2.393	-25.646	-2.393	25.758	264.668	0.411
4100.000	0.240	18.371	4099.673	-2.577	-25.450	-2.577	25.580	264.219	0.669
4200.000	0.447	117.751	4199.672	-2.559	-25.039	-2.559	25.170	264.164	0.540
4300.000	0.440	120.240	4299.669	-2.934	-24.363	-2.934	24.539	263.132	0.020
4400.000	0.377	70.633	4399.667	-3.019	-23.720	-3.019	23.911	262.747	0.348
4500.000	0.420	141.657	4499.665	-3.197	-23.182	-3.197	23.401	262.148	0.464
4600.000	0.291	60.606	4599.663	-3.359	-22.733	-3.359	22.980	261.594	0.472
4700.000	0.217	93.273	4699.662	-3.245	-22.323	-3.245	22.558	261.728	0.160
4800.000	0.044	120.728	4799.662	-3.276	-22.101	-3.276	22.343	261.569	0.179
4900.000	0.595	154.695	4899.660	-3.765	-21.846	-3.765	22.168	260.222	0.559
5000.000	0.255	197.763	4999.657	-4.447	-21.692	-4.447	22.143	258.415	0.444
5100.000	0.491	260.980	5099.656	-4.726	-22.183	-4.726	22.681	257.973	0.440
5200.000	0.038	339.145	5199.654	-4.763	-22.618	-4.763	23.114	258.109	0.485
5300.000	0.125	220.165	5299.654	-4.815	-22.700	-4.815	23.205	258.023	0.147
5400.000	0.091	214.658	5399.654	-4.964	-22.816	-4.964	23.350	257.725	0.036
5500.000	0.439	229.968	5499.653	-5.276	-23.154	-5.276	23.748	257.164	0.352
5600.000	0.636	246.558	5599.648	-5.743	-23.957	-5.743	24.636	256.519	0.249
5700.000	0.378	23.854	5699.647	-5.662	-24.333	-5.662	24.983	256.900	0.949
5800.000	0.211	143.438	5799.646	-5.509	-24.090	-5.509	24.712	257.120	0.516
5900.000	0.679	323.345	5899.644	-5.181	-24.334	-5.181	24.880	257.981	0.890
6000.000	0.466	334.238	5999.639	-4.339	-24.865	-4.339	25.241	260.101	0.239
6100.000	0.405	354.158	6099.636	-3.621	-25.078	-3.621	25.338	261.783	0.162
6200.000	0.595	15.623	6199.632	-2.769	-24.974	-2.769	25.127	263.672	0.263
6300.000	0.861	320.968	6299.625	-1.686	-25.307	-1.686	25.363	266.189	0.709
6400.000	0.877	349.110	6399.614	-0.351	-25.925	-0.351	25.927	269.225	0.423
6500.000	0.628	339.285	6499.606	0.913	-26.263	0.913	26.279	271.992	0.279
6600.000	1.079	317.881	6599.594	2.124	-27.089	2.124	27.172	274.484	0.544
6700.000	0.551	333.921	6699.584	3.255	-27.931	3.255	28.120	276.646	0.570
6800.000	0.623	322.675	6799.579	4.119	-28.472	4.119	28.769	278.232	0.135
6900.000	0.731	310.882	6899.572	4.969	-29.284	4.969	29.703	279.630	0.176

<div> HORIZONTAL DISPLACEMENT IS 29.703 FEET AT 279.630 DEGREES </div>
