

Company: Noble Energy

Lease/Well: SH Farms C / 17-3

API: 05-123-23007

Rig Name: Production / Lightning Wireline

State/County: Colorado / Weld

Latitude: 40.315, Longitude: -104.579

GRID North is 0.600 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: 12/5/2011 / 18:51

Vaughn Energy Services

Henderson Colorado

866-835-8333

Norman Cowan

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	0.776	279.242	99.997	0.109	-0.669	0.109	0.678	279.242	0.776
200.000	0.568	271.832	199.990	0.233	-1.833	0.233	1.848	277.258	0.225
300.000	0.573	270.022	299.985	0.250	-2.829	0.250	2.840	275.040	0.019
400.000	0.692	211.817	399.980	-0.264	-3.648	-0.264	3.657	265.864	0.624
500.000	0.984	193.721	499.969	-1.611	-4.170	-1.611	4.471	248.872	0.390
600.000	1.205	226.757	599.952	-3.166	-5.140	-3.166	6.037	238.368	0.657
700.000	1.369	228.489	699.927	-4.678	-6.800	-4.678	8.254	235.474	0.169
800.000	0.398	154.834	799.916	-5.785	-7.547	-5.785	9.509	232.530	1.314
900.000	1.172	46.809	899.908	-5.400	-6.654	-5.400	8.569	230.940	1.350
1000.000	1.275	43.271	999.886	-3.889	-5.145	-3.889	6.450	232.914	0.128
1100.000	1.472	51.186	1099.857	-2.274	-3.381	-2.274	4.075	236.080	0.273
1200.000	1.309	51.922	1199.828	-0.764	-1.481	-0.764	1.667	242.711	0.164
1300.000	1.532	45.688	1299.797	0.874	0.374	0.874	0.951	23.178	0.271
1400.000	2.903	30.124	1399.720	3.998	2.602	3.998	4.770	33.052	1.486
1500.000	4.666	18.234	1499.500	10.053	5.146	10.053	11.293	27.107	1.921
1600.000	6.120	28.574	1599.057	18.598	8.968	18.598	20.647	25.744	1.743
1700.000	8.037	33.908	1698.291	29.082	15.418	29.082	32.916	27.931	2.025
1800.000	9.940	35.027	1797.059	41.952	24.273	41.952	48.468	30.053	1.910
1900.000	11.008	37.172	1895.391	56.627	34.995	56.627	66.568	31.715	1.137
2000.000	12.489	36.786	1993.294	72.895	47.239	72.895	86.863	32.945	1.483
2100.000	13.810	35.618	2090.670	91.258	60.665	91.258	109.582	33.615	1.348
2200.000	13.960	35.857	2187.748	110.736	74.681	110.736	133.566	33.996	0.160
2300.000	15.452	30.502	2284.474	131.992	88.510	131.992	158.921	33.844	2.017
2400.000	16.237	39.158	2380.687	154.314	104.102	154.314	186.145	34.004	2.488
2500.000	17.302	33.769	2476.439	177.519	121.197	177.519	214.946	34.323	1.883
2600.000	20.965	32.270	2570.899	205.016	139.021	205.016	247.706	34.141	3.696
2700.000	22.261	30.459	2663.867	236.473	158.175	236.473	284.497	33.778	1.457
2800.000	21.711	31.652	2756.595	268.545	177.483	268.545	321.896	33.461	0.709
2900.000	20.534	32.633	2849.875	299.061	196.648	299.061	357.922	33.327	1.229
3000.000	19.812	34.195	2943.740	327.849	215.630	327.849	392.404	33.333	0.901
3100.000	20.215	36.695	3037.703	355.720	235.479	355.720	426.600	33.504	0.945
3200.000	18.941	42.194	3131.928	381.601	256.706	381.601	459.910	33.929	2.239
3300.000	17.944	44.472	3226.792	404.619	278.400	404.619	491.144	34.530	1.230
3400.000	17.174	44.578	3322.132	426.128	299.555	426.128	520.882	35.106	0.771

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	15.872	38.924	3418.006	447.285	318.511	447.285	549.102	35.455	2.068
3600.000	15.344	38.688	3514.319	468.251	335.373	468.251	575.964	35.611	0.532
3700.000	16.919	47.598	3610.393	488.395	354.392	488.395	603.426	35.966	2.930
3800.000	19.248	46.657	3705.447	509.523	377.127	509.523	633.908	36.507	2.347
3900.000	19.188	46.033	3799.875	532.245	400.943	532.245	666.363	36.991	0.214
4000.000	17.829	46.064	3894.700	554.278	423.796	554.278	697.729	37.401	1.359
4100.000	15.182	40.336	3990.577	574.886	443.300	574.886	725.954	37.636	3.104
4200.000	14.776	41.969	4087.179	594.349	460.304	594.349	751.751	37.757	0.585
4300.000	16.599	39.893	4183.451	614.791	477.994	614.791	778.747	37.865	1.907
4400.000	16.594	37.508	4279.286	637.078	495.849	637.078	807.301	37.894	0.681
4500.000	17.327	37.479	4374.936	660.223	513.605	660.223	836.471	37.880	0.734
4600.000	17.923	38.959	4470.242	684.006	532.341	684.006	866.747	37.893	0.746
4700.000	17.955	41.318	4565.381	707.548	552.193	707.548	897.519	37.970	0.727
4800.000	17.004	43.904	4660.764	729.660	572.511	729.660	927.455	38.119	1.228
4900.000	16.999	45.212	4756.394	750.494	593.025	750.494	956.514	38.315	0.383
5000.000	17.416	40.450	4851.923	772.181	613.110	772.181	985.986	38.449	1.469
5100.000	18.627	36.905	4947.018	796.342	632.411	796.342	1016.909	38.455	1.634
5200.000	19.192	34.637	5041.622	822.637	651.343	822.637	1049.276	38.371	0.927
5300.000	16.050	34.985	5136.918	847.493	668.616	847.493	1079.487	38.271	3.144
5400.000	12.166	32.771	5233.883	867.687	682.251	867.687	1103.788	38.178	3.920
5500.000	9.497	41.344	5332.099	882.745	693.408	882.745	1122.521	38.150	3.111
5600.000	6.672	40.237	5431.095	893.375	702.611	893.375	1136.566	38.184	2.830
5700.000	6.664	42.686	5530.419	902.075	710.298	902.075	1148.156	38.217	0.284
5800.000	6.597	39.530	5629.751	910.771	717.888	910.771	1159.684	38.246	0.371
5900.000	6.269	63.597	5729.139	917.631	726.436	917.631	1170.366	38.367	2.696
6000.000	6.028	66.186	5828.564	922.179	736.130	922.179	1179.958	38.599	0.368
6100.000	5.130	51.038	5928.095	927.110	744.411	927.110	1188.983	38.762	1.717
6200.000	3.143	14.576	6027.845	932.577	748.578	932.577	1195.855	38.754	3.202
6300.000	2.634	10.267	6127.718	937.491	749.678	937.491	1200.377	38.648	0.554
6400.000	2.352	5.341	6227.623	941.794	750.278	941.794	1204.115	38.543	0.354
6500.000	2.120	8.298	6327.547	945.667	750.736	945.667	1207.432	38.445	0.259
6600.000	1.817	7.346	6427.488	949.069	751.206	949.069	1210.390	38.362	0.305
6700.000	2.044	2.455	6527.431	952.423	751.485	952.423	1213.194	38.274	0.280
6800.000	1.576	358.632	6627.381	955.579	751.528	955.579	1215.700	38.184	0.483
6900.000	1.884	359.666	6727.335	958.598	751.486	958.598	1218.048	38.094	0.310
7000.000	1.849	354.354	6827.282	961.848	751.318	961.848	1220.504	37.994	0.176
HORIZONTAL DISPLACEMENT IS 1220.504 FEET AT 37.994 DEGREES									