



Company: Noble Energy
Well: Dechant X 19-5
API: 05-123-25385
Rig Name: Production/Lightning Wireline
State/County: Colorado/ Weld
Latitude: 40.126, Longitude: -104.714
GRID North is 0.510 Degrees East of True North
VS-Azi: 0.000 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : RKB= Ground Level

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: ha gyro-de_01.ut
Minimum Curvature Method
Report Date/Time: 2/5/2013 / 13:14

Vaughn Energy Services
Henderson, Colorado
303-853-4976
Jason Kinchelow

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	0.678	139.189	99.998	-0.448	0.387	-0.448	0.592	139.189	0.678
200.000	0.333	135.841	199.994	-1.104	0.976	-1.104	1.474	138.530	0.347
300.000	0.225	68.313	299.993	-1.240	1.360	-1.240	1.841	132.352	0.322
400.000	0.175	132.231	399.992	-1.270	1.656	-1.270	2.087	127.497	0.216
500.000	0.210	144.778	499.992	-1.523	1.875	-1.523	2.415	129.087	0.054
600.000	0.143	347.150	599.991	-1.550	1.952	-1.550	2.493	128.451	0.347
700.000	0.204	1.981	699.991	-1.250	1.931	-1.250	2.300	122.931	0.075
800.000	0.690	356.993	799.988	-0.472	1.905	-0.472	1.963	103.903	0.487
900.000	0.851	5.773	899.979	0.869	1.948	0.869	2.133	65.971	0.200
1000.000	0.661	4.979	999.970	2.182	2.073	2.182	3.010	43.535	0.191
1100.000	0.522	2.355	1099.964	3.211	2.142	3.211	3.860	33.705	0.142
1200.000	0.476	352.061	1199.961	4.077	2.103	4.077	4.588	27.286	0.100
1300.000	0.574	344.745	1299.957	4.972	1.914	4.972	5.328	21.054	0.119
1400.000	0.546	348.834	1399.952	5.923	1.690	5.923	6.159	15.923	0.049
1500.000	0.497	326.894	1499.948	6.755	1.360	6.755	6.890	11.387	0.204
1600.000	0.674	313.450	1599.942	7.522	0.697	7.522	7.555	5.291	0.222
1700.000	0.799	310.864	1699.934	8.383	-0.257	8.383	8.387	358.241	0.130
1800.000	0.693	317.153	1799.926	9.283	-1.196	9.283	9.360	352.656	0.134
1900.000	0.585	320.757	1899.919	10.122	-1.931	10.122	10.304	349.201	0.116
2000.000	0.465	313.365	1999.915	10.795	-2.548	10.795	11.092	346.718	0.137
2100.000	0.480	327.236	2099.912	11.426	-3.070	11.426	11.832	344.960	0.115
2200.000	1.358	326.739	2199.898	12.769	-3.947	12.769	13.365	342.825	0.878
2300.000	2.196	272.453	2299.855	13.842	-6.511	13.842	15.297	334.810	1.784
2400.000	0.710	182.744	2399.828	13.305	-8.455	13.305	15.764	327.567	2.304
2500.000	0.931	198.541	2499.818	11.916	-8.743	11.916	14.779	323.733	0.314
2600.000	1.014	188.723	2599.804	10.271	-9.135	10.271	13.746	318.350	0.186
2700.000	1.498	155.267	2699.781	8.209	-8.722	8.209	11.978	313.264	0.859
2800.000	1.557	169.332	2799.746	5.686	-7.924	5.686	9.753	305.665	0.379
2900.000	2.111	165.498	2899.694	2.568	-7.211	2.568	7.655	289.603	0.567
3000.000	2.336	174.709	2999.619	-1.244	-6.562	-1.244	6.679	259.263	0.422
3100.000	2.215	171.226	3099.540	-5.183	-6.079	-5.183	7.989	229.547	0.184
3200.000	1.551	186.976	3199.486	-8.437	-5.949	-8.437	10.323	215.187	0.836
3300.000	0.902	157.586	3299.464	-10.508	-5.813	-10.508	12.009	208.952	0.884
3400.000	0.222	213.266	3399.459	-11.397	-5.619	-11.397	12.707	206.246	0.798

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	0.229	236.192	3499.458	-11.670	-5.891	-11.670	13.072	206.787	0.090
3600.000	0.395	344.895	3599.457	-11.448	-6.147	-11.448	12.994	208.235	0.517
3700.000	0.728	315.668	3699.452	-10.660	-6.681	-10.660	12.581	212.077	0.429
3800.000	0.662	349.254	3799.445	-9.639	-7.233	-9.639	12.051	216.884	0.406
3900.000	0.929	29.875	3899.436	-8.369	-6.937	-8.369	10.870	219.654	0.606
4000.000	1.113	15.279	3999.421	-6.729	-6.277	-6.729	9.203	223.009	0.317
4100.000	1.172	45.959	4099.402	-5.081	-5.286	-5.081	7.332	226.131	0.607
4200.000	0.963	32.586	4199.384	-3.663	-4.099	-3.663	5.497	228.214	0.324
4300.000	0.735	55.742	4299.374	-2.594	-3.116	-2.594	4.055	230.225	0.407
4400.000	0.111	3.231	4399.371	-2.136	-2.581	-2.136	3.350	230.383	0.673
4500.000	0.330	314.124	4499.370	-1.839	-2.782	-1.839	3.335	236.531	0.270
4600.000	0.451	298.420	4599.368	-1.452	-3.334	-1.452	3.637	246.474	0.160
4700.000	0.612	331.338	4699.363	-0.796	-3.936	-0.796	4.016	258.565	0.338
4800.000	0.802	331.195	4799.356	0.285	-4.529	0.285	4.538	273.604	0.190
4900.000	1.115	298.745	4899.342	1.366	-5.719	1.366	5.880	283.435	0.614
5000.000	2.005	281.381	4999.305	2.179	-8.287	2.179	8.569	284.733	0.998
5100.000	2.098	280.195	5099.241	2.848	-11.803	2.848	12.142	283.567	0.102
5200.000	2.178	280.713	5199.171	3.525	-15.471	3.525	15.868	282.837	0.083
5300.000	1.901	255.974	5299.110	3.477	-18.948	3.477	19.264	280.397	0.915
5400.000	1.749	286.232	5399.061	3.501	-22.023	3.501	22.300	279.033	0.964
5500.000	1.361	270.930	5499.025	3.947	-24.676	3.947	24.990	279.088	0.566
5600.000	1.198	275.370	5599.000	4.064	-26.904	4.064	27.209	278.590	0.190
5700.000	1.060	262.955	5698.980	4.049	-28.863	4.049	29.146	277.985	0.280
5800.000	1.144	286.344	5798.962	4.216	-30.740	4.216	31.027	277.810	0.454
5900.000	1.249	274.963	5898.941	4.591	-32.783	4.591	33.103	277.973	0.259
6000.000	1.347	281.553	5998.915	4.921	-35.021	4.921	35.365	277.999	0.178
6100.000	2.076	299.238	6098.870	6.041	-37.753	6.041	38.233	279.092	0.892
6200.000	1.844	305.941	6198.812	7.871	-40.636	7.871	41.392	280.962	0.326
6300.000	1.161	325.722	6298.778	9.652	-42.510	9.652	43.592	282.793	0.848
6400.000	0.865	358.543	6398.763	11.244	-43.100	11.244	44.542	284.622	0.639
6500.000	0.833	341.785	6498.752	12.690	-43.346	12.690	45.165	286.318	0.250
6600.000	0.739	346.672	6598.742	14.008	-43.722	14.008	45.911	287.765	0.115
6700.000	0.927	355.023	6698.732	15.441	-43.941	15.441	46.575	289.362	0.223
6800.000	0.698	1.012	6798.722	16.856	-44.000	16.856	47.119	290.961	0.244
6900.000	0.734	358.623	6898.714	18.105	-44.005	18.105	47.584	292.364	0.047
7000.000	0.615	33.395	6998.707	19.194	-43.725	19.194	47.752	293.700	0.419
7100.000	0.884	109.575	7098.701	19.383	-42.702	19.383	46.896	294.414	0.949
7200.000	3.024	158.104	7198.641	16.677	-40.991	16.677	44.254	292.138	2.527
7300.000	1.594	193.372	7298.562	12.876	-40.329	12.876	42.335	287.706	1.953
7400.000	1.201	306.846	7398.546	12.151	-41.490	12.151	43.233	286.323	2.347
7500.000	1.705	318.057	7498.514	13.886	-43.323	13.886	45.494	287.772	0.576
7600.000	2.390	323.573	7598.449	16.670	-45.556	16.670	48.510	290.099	0.712
7700.000	2.711	315.409	7698.350	20.033	-48.455	20.033	52.432	292.462	0.484
7800.000	3.534	320.569	7798.201	24.097	-52.073	24.097	57.378	294.833	0.868

<div> HORIZONTAL DISPLACEMENT IS 57.378 FEET AT 294.833 DEGREES </div>
