



Company: Anadarko Petroleum
 Well: HSR-Brandel 5-14
 API #: 05-123-16169
 Rig Name: Production / Warrior
 State/County: Colorado/Weld
 Latitude: 40.226, Longitude: -104.751
 Directions are relative to True North
 VS-Azi: 0.000 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : RKB= Ground Level

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: hagro_7300-de_01.ut

Minimum Curvature Method

Report Date/Time: 2/27/2014 / 16:13

Vaughn Energy Services
 Henderson, Colorado
 303-853-4976
 Brian Brewbaker

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	0.107	302.340	100.000	0.050	-0.079	0.050	0.093	302.340	0.107
200.000	0.059	95.310	200.000	0.095	-0.106	0.095	0.142	311.844	0.161
300.000	0.247	81.187	299.999	0.123	0.158	0.123	0.200	52.158	0.190
400.000	0.193	82.466	399.999	0.178	0.538	0.178	0.567	71.699	0.053
500.000	0.201	86.498	499.998	0.211	0.881	0.211	0.906	76.538	0.016
600.000	0.225	129.566	599.998	0.096	1.208	0.096	1.212	85.440	0.158
700.000	0.262	135.665	699.997	-0.193	1.520	-0.193	1.532	97.231	0.045
800.000	0.215	154.783	799.996	-0.526	1.759	-0.526	1.836	106.647	0.092
900.000	0.085	143.959	899.995	-0.755	1.883	-0.755	2.029	111.860	0.132
1000.000	0.091	263.495	999.995	-0.824	1.847	-0.824	2.023	114.042	0.152
1100.000	0.199	316.694	1099.995	-0.707	1.650	-0.707	1.795	113.197	0.162
1200.000	0.373	315.246	1199.994	-0.350	1.302	-0.350	1.348	105.038	0.174
1300.000	0.489	315.324	1299.991	0.185	0.772	0.185	0.794	76.528	0.116
1400.000	0.552	331.808	1399.987	0.913	0.245	0.913	0.945	15.006	0.162
1500.000	0.534	341.556	1499.982	1.779	-0.130	1.779	1.784	355.816	0.094
1600.000	0.597	346.305	1599.978	2.728	-0.401	2.728	2.757	351.637	0.079
1700.000	0.670	359.848	1699.971	3.819	-0.526	3.819	3.855	352.158	0.166
1800.000	0.716	17.264	1799.964	5.001	-0.342	5.001	5.013	356.088	0.215
1900.000	0.696	7.976	1899.957	6.200	-0.072	6.200	6.200	359.332	0.116
2000.000	0.682	5.446	1999.949	7.393	0.068	7.393	7.394	0.531	0.033
2100.000	0.833	5.615	2099.941	8.709	0.196	8.709	8.712	1.290	0.151
2200.000	0.927	359.023	2199.929	10.242	0.253	10.242	10.245	1.418	0.137
2300.000	1.103	358.016	2299.913	12.012	0.206	12.012	12.014	0.984	0.177
2400.000	1.088	7.841	2399.895	13.914	0.303	13.914	13.918	1.246	0.188
2500.000	1.004	3.054	2499.878	15.730	0.479	15.730	15.737	1.743	0.121
2600.000	0.807	354.442	2599.866	17.307	0.457	17.307	17.313	1.513	0.239
2700.000	0.547	344.859	2699.859	18.469	0.264	18.469	18.471	0.820	0.283
2800.000	0.528	9.570	2799.855	19.384	0.216	19.384	19.385	0.639	0.231
2900.000	0.549	1.288	2899.850	20.317	0.303	20.317	20.319	0.856	0.080
3000.000	0.665	341.829	2999.845	21.348	0.133	21.348	21.348	0.357	0.235
3100.000	0.639	2.230	3099.838	22.456	-0.026	22.456	22.456	359.933	0.232
3200.000	0.833	10.001	3199.830	23.729	0.122	23.729	23.729	0.294	0.218
3300.000	0.536	9.159	3299.823	24.907	0.322	24.907	24.909	0.742	0.297
3400.000	0.696	22.700	3399.817	25.929	0.631	25.929	25.937	1.395	0.215

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	0.605	24.888	3499.811	26.968	1.088	26.968	26.990	2.310	0.095
3600.000	0.448	117.845	3599.808	27.264	1.656	27.264	27.315	3.475	0.771
3700.000	1.182	165.500	3699.798	26.083	2.260	26.083	26.181	4.951	0.941
3800.000	2.046	178.511	3799.757	23.300	2.564	23.300	23.441	6.281	0.933
3900.000	2.157	176.730	3899.690	19.637	2.718	19.637	19.824	7.881	0.129
4000.000	2.295	177.989	3999.615	15.757	2.896	15.757	16.021	10.413	0.146
4100.000	2.498	184.589	4099.527	11.583	2.792	11.583	11.915	13.550	0.342
4200.000	2.579	172.619	4199.430	7.180	2.906	7.180	7.746	22.037	0.535
4300.000	2.330	173.946	4299.338	2.928	3.410	2.928	4.494	49.349	0.255
4400.000	2.369	181.817	4399.254	-1.159	3.558	-1.159	3.742	108.042	0.325
4500.000	1.985	175.580	4499.182	-4.951	3.626	-4.951	6.137	143.780	0.451
4600.000	1.803	181.639	4599.128	-8.251	3.715	-8.251	9.048	155.761	0.270
4700.000	1.569	196.568	4699.085	-11.135	3.280	-11.135	11.608	163.589	0.496
4800.000	1.609	196.349	4799.046	-13.794	2.494	-13.794	14.018	169.751	0.041
4900.000	1.535	222.804	4899.010	-16.124	1.189	-16.124	16.168	175.782	0.723
5000.000	1.512	243.311	4998.975	-17.699	-0.899	-17.699	17.721	182.908	0.543
5100.000	1.678	246.256	5098.937	-18.880	-3.417	-18.880	19.187	190.259	0.185
5200.000	1.535	245.818	5198.897	-20.018	-5.979	-20.018	20.892	196.629	0.143
5300.000	1.112	253.387	5298.870	-20.844	-8.130	-20.844	22.374	201.309	0.456
5400.000	0.983	281.641	5398.854	-20.949	-9.901	-20.949	23.171	205.296	0.527
5500.000	0.590	342.659	5498.846	-20.284	-10.894	-20.284	23.025	208.240	0.867
5600.000	0.313	351.991	5598.843	-19.522	-11.086	-19.522	22.450	209.592	0.286
5700.000	0.914	36.497	5698.837	-18.610	-10.650	-18.610	21.441	209.781	0.725
5800.000	1.617	70.364	5798.814	-17.494	-8.846	-17.494	19.603	206.824	0.998
5900.000	2.690	90.261	5898.743	-17.030	-5.170	-17.030	17.798	196.886	1.292
6000.000	4.099	106.724	5998.567	-18.070	0.600	-18.070	18.080	178.098	1.699
6100.000	4.063	106.815	6098.314	-20.123	7.414	-20.123	21.446	159.774	0.036
6200.000	2.322	104.279	6198.155	-21.648	12.769	-21.648	25.133	149.465	1.746
6300.000	1.219	68.593	6298.108	-21.759	15.724	-21.759	26.846	144.147	1.510
6400.000	0.775	39.807	6398.093	-20.851	17.147	-20.851	26.996	140.567	0.656
6500.000	0.788	84.878	6498.085	-20.270	18.265	-20.270	27.285	137.978	0.599
6600.000	0.142	60.920	6598.081	-20.148	19.058	-20.148	27.734	136.592	0.660
6700.000	0.341	60.800	6698.080	-19.943	19.426	-19.943	27.841	135.752	0.198
6800.000	0.515	346.637	6798.078	-19.361	19.582	-19.361	27.537	134.675	0.534
6900.000	0.333	70.037	6898.076	-18.824	19.751	-18.824	27.284	133.624	0.580
7000.000	0.212	121.106	6998.075	-18.820	20.182	-18.820	27.596	133.000	0.259
7100.000	0.469	52.041	7098.073	-18.664	20.663	-18.664	27.845	132.091	0.440
7200.000	0.394	48.465	7198.070	-18.185	21.243	-18.185	27.963	130.566	0.080
7300.000	0.573	33.313	7298.067	-17.539	21.775	-17.539	27.960	128.851	0.219
HORIZONTAL DISPLACEMENT IS 27.960 FEET AT 128.851 DEGREES									