



Company: Anadarko Petroleum  
 Well: HSR- Hearst 10-36  
 API: 05-123-15260  
 Rig Name: Production/ Warrior  
 State/County: Colorado/Weld  
 Latitude: 40.267, Longitude: -104.722  
 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: h gyro-de\_01.ut  
 Minimum Curvature Method  
 Report Date/Time: 1/23/2014 / 14:26

VAUGHN ENERGY SERVICES  
 HENDERSON, COLORADO  
 303-853-4976  
 SEAN BRATT

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	0.490	10.698	99.999	0.420	0.079	0.420	0.428	10.698	0.490
200.000	0.535	10.835	199.995	1.298	0.246	1.298	1.322	10.746	0.045
300.000	0.278	353.644	299.992	1.998	0.307	1.998	2.021	8.746	0.282
400.000	0.173	329.454	399.991	2.368	0.204	2.368	2.377	4.920	0.139
500.000	0.343	327.216	499.990	2.750	-0.035	2.750	2.750	359.274	0.170
600.000	0.173	341.746	599.989	3.145	-0.244	3.145	3.154	355.559	0.180
700.000	0.256	337.471	699.989	3.495	-0.377	3.495	3.516	353.838	0.084
800.000	0.255	313.046	799.988	3.853	-0.625	3.853	3.904	350.781	0.108
900.000	0.221	331.653	899.987	4.175	-0.880	4.175	4.267	348.104	0.084
1000.000	0.222	318.280	999.986	4.489	-1.100	4.489	4.622	346.234	0.052
1100.000	0.285	301.345	1099.985	4.763	-1.441	4.763	4.976	343.170	0.097
1200.000	0.250	305.598	1199.984	5.019	-1.830	5.019	5.342	339.965	0.040
1300.000	0.301	309.230	1299.983	5.312	-2.211	5.312	5.754	337.401	0.054
1400.000	0.244	316.761	1399.982	5.634	-2.561	5.634	6.188	335.557	0.067
1500.000	0.343	325.183	1499.980	6.035	-2.878	6.035	6.686	334.506	0.107
1600.000	0.583	310.505	1599.977	6.611	-3.435	6.611	7.450	332.541	0.266
1700.000	0.688	318.569	1699.971	7.392	-4.220	7.392	8.511	330.279	0.138
1800.000	0.737	315.489	1799.963	8.300	-5.068	8.300	9.725	328.594	0.062
1900.000	0.846	316.535	1899.954	9.294	-6.026	9.294	11.077	327.042	0.110
2000.000	1.032	339.365	1999.941	10.673	-6.851	10.673	12.682	327.302	0.414
2100.000	1.177	344.841	2099.922	12.506	-7.437	12.506	14.550	329.262	0.179
2200.000	1.160	348.849	2199.901	14.491	-7.901	14.491	16.505	331.398	0.083
2300.000	1.265	347.720	2299.879	16.562	-8.332	16.562	18.540	333.295	0.107
2400.000	1.654	347.186	2399.846	19.048	-8.886	19.048	21.019	334.989	0.389
2500.000	1.246	337.444	2499.814	21.459	-9.624	21.459	23.518	335.846	0.475
2600.000	0.822	318.397	2599.798	23.000	-10.517	23.000	25.290	335.427	0.541
2700.000	0.834	323.186	2699.787	24.118	-11.429	24.118	26.689	334.645	0.070
2800.000	0.727	326.084	2799.778	25.227	-12.219	25.227	28.030	334.157	0.114
2900.000	0.654	327.069	2899.771	26.233	-12.883	26.233	29.225	333.844	0.074
3000.000	0.504	349.494	2999.766	27.144	-13.274	27.144	30.216	333.941	0.269
3100.000	0.392	343.612	3099.763	27.905	-13.450	27.905	30.977	334.266	0.121
3200.000	0.254	3.985	3199.761	28.454	-13.531	28.454	31.508	334.567	0.177
3300.000	0.136	220.475	3299.761	28.585	-13.593	28.585	31.653	334.568	0.373
3400.000	0.568	229.546	3399.759	28.173	-14.048	28.173	31.481	333.498	0.435
3500.000	0.988	257.571	3499.750	27.666	-15.267	27.666	31.599	331.108	0.555

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
3600.000	1.640	261.237	3599.723	27.262	-17.524	27.262	32.408	327.267	0.657
3700.000	2.293	274.494	3699.664	27.201	-20.933	27.201	34.323	322.419	0.791
3800.000	2.468	276.237	3799.578	27.591	-25.068	27.591	37.278	317.743	0.190
3900.000	2.629	277.421	3899.479	28.122	-29.483	28.122	40.744	313.646	0.170
4000.000	2.659	276.412	3999.372	28.677	-34.063	28.677	44.527	310.093	0.055
4100.000	2.439	279.369	4099.273	29.282	-38.468	29.282	48.345	307.279	0.256
4200.000	2.509	269.245	4199.180	29.600	-42.757	29.600	52.003	304.694	0.442
4300.000	2.503	267.035	4299.085	29.458	-47.126	29.458	55.576	302.009	0.097
4400.000	2.462	269.110	4398.991	29.312	-51.454	29.312	59.218	299.669	0.099
4500.000	2.488	263.262	4498.898	29.024	-55.758	29.024	62.860	297.499	0.254
4600.000	2.308	265.357	4598.810	28.606	-59.920	28.606	66.398	295.520	0.200
4700.000	2.125	266.152	4698.735	28.319	-63.777	28.319	69.781	293.943	0.185
4800.000	2.116	279.742	4798.668	28.507	-67.446	28.507	73.223	292.912	0.502
4900.000	2.421	273.735	4898.589	28.957	-71.373	28.957	77.023	292.083	0.386
5000.000	2.401	274.128	4998.501	29.245	-75.570	29.245	81.031	291.156	0.026
5100.000	2.313	279.847	5098.416	29.741	-79.647	29.741	85.018	290.476	0.251
5200.000	2.135	275.768	5198.341	30.273	-83.488	30.273	88.807	289.931	0.238
5300.000	1.388	284.806	5298.293	30.770	-86.512	30.770	91.821	289.579	0.795
5400.000	1.572	280.211	5398.260	31.322	-89.032	31.322	94.381	289.382	0.219
5500.000	1.629	276.514	5498.221	31.727	-91.794	31.727	97.123	289.067	0.118
5600.000	1.333	276.785	5598.187	32.025	-94.362	32.025	99.649	288.747	0.296
5700.000	1.391	280.231	5698.159	32.378	-96.712	32.378	101.988	288.510	0.100
5800.000	1.328	293.832	5798.131	33.062	-98.967	33.062	104.343	288.473	0.328
5900.000	1.285	295.064	5898.105	34.006	-101.043	34.006	106.612	288.601	0.051
6000.000	1.156	301.475	5998.083	35.008	-102.919	35.008	108.710	288.786	0.188
6100.000	0.768	299.607	6098.068	35.866	-104.363	35.866	110.353	288.966	0.389
6200.000	0.641	295.450	6198.061	36.437	-105.451	36.437	111.569	289.062	0.136
6300.000	0.608	292.856	6298.055	36.884	-106.445	36.884	112.654	289.112	0.044
6400.000	0.402	265.195	6398.051	37.061	-107.283	37.061	113.504	289.057	0.313
6500.000	0.168	204.957	6498.050	36.898	-107.694	36.898	113.840	288.913	0.350
6600.000	0.036	111.244	6598.050	36.754	-107.726	36.754	113.824	288.839	0.174
6700.000	0.076	25.996	6698.050	36.802	-107.668	36.802	113.784	288.871	0.081
6800.000	0.063	66.786	6798.050	36.883	-107.588	36.883	113.735	288.923	0.050
6900.000	0.329	53.199	6898.049	37.077	-107.308	37.077	113.533	289.061	0.268
7000.000	0.286	31.067	6998.047	37.462	-106.949	37.462	113.321	289.304	0.125
7100.000	0.430	124.024	7098.046	37.466	-106.509	37.466	112.907	289.380	0.529
7200.000	0.341	107.874	7198.044	37.165	-105.915	37.165	112.246	289.336	0.140
HORIZONTAL DISPLACEMENT IS 112.246 FEET AT 289.336 DEGREES									