

Company: ANADARKO PETROLEUM

Well: BUTCH 3-19

API: 05-123-22141

Rig Name: PRODUCTION/ WARRIOR

State/County: COLORADO / WELD

Latitude: 40.218, Longitude: -104.936

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: run1-de\_01.ut

Minimum Curvature Method

Report Date/Time: 12/17/2013 / 12:20

VAUGHN ENERGY SERVICES

HENDERSON, COLORADO

303-853-4976

NICK KULA

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	0.195	30.542	100.000	0.146	0.086	0.146	0.170	30.542	0.195
200.000	0.047	86.957	200.000	0.295	0.214	0.295	0.364	35.904	0.173
300.000	0.118	218.976	300.000	0.217	0.190	0.217	0.288	41.132	0.154
400.000	0.057	138.406	399.999	0.100	0.157	0.100	0.187	57.609	0.122
500.000	0.386	21.296	499.999	0.377	0.313	0.377	0.489	39.693	0.415
600.000	0.548	154.640	599.997	0.258	0.640	0.258	0.690	68.031	0.860
700.000	1.395	161.868	699.982	-1.331	1.223	-1.331	1.808	137.419	0.855
800.000	1.575	173.712	799.948	-3.854	1.753	-3.854	4.234	155.546	0.355
900.000	1.726	173.972	899.907	-6.718	2.061	-6.718	7.027	162.941	0.151
1000.000	1.603	179.906	999.865	-9.614	2.222	-9.614	9.867	166.987	0.211
1100.000	1.572	177.927	1099.826	-12.383	2.274	-12.383	12.590	169.596	0.063
1200.000	1.597	182.945	1199.788	-15.145	2.252	-15.145	15.312	171.544	0.141
1300.000	1.473	183.935	1299.752	-17.819	2.092	-17.819	17.941	173.304	0.127
1400.000	1.295	179.997	1399.723	-20.231	2.004	-20.231	20.330	174.344	0.202
1500.000	1.151	203.662	1499.701	-22.281	1.601	-22.281	22.339	175.891	0.521
1600.000	0.777	217.787	1599.687	-23.737	0.782	-23.737	23.750	178.114	0.440
1700.000	0.665	240.556	1699.679	-24.559	-0.139	-24.559	24.559	180.324	0.305
1800.000	1.012	277.395	1799.669	-24.730	-1.520	-24.730	24.777	183.518	0.624
1900.000	1.289	285.240	1899.649	-24.321	-3.481	-24.321	24.569	188.146	0.318
2000.000	1.367	291.731	1999.622	-23.584	-5.675	-23.584	24.257	193.529	0.170
2100.000	1.401	292.109	2099.593	-22.682	-7.915	-22.682	24.023	199.238	0.035
2200.000	1.150	303.981	2199.568	-21.661	-9.880	-21.661	23.808	204.520	0.363
2300.000	1.358	328.701	2299.545	-20.087	-11.328	-20.087	23.061	209.421	0.574
2400.000	1.651	339.815	2399.510	-17.723	-12.441	-17.723	21.653	215.068	0.413
2500.000	1.665	342.191	2499.469	-14.987	-13.382	-14.987	20.092	221.764	0.070
2600.000	1.675	340.786	2599.426	-12.223	-14.308	-12.223	18.818	229.494	0.042
2700.000	1.660	341.844	2699.384	-9.466	-15.240	-9.466	17.941	238.154	0.034
2800.000	1.233	335.336	2799.352	-7.112	-16.141	-7.112	17.638	246.219	0.457
2900.000	0.806	327.934	2899.336	-5.539	-16.963	-5.539	17.844	251.916	0.446

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
3000.000	0.482	321.410	2999.329	-4.614	-17.599	-4.614	18.193	255.309	0.331
3100.000	0.379	308.535	3099.326	-4.079	-18.120	-4.079	18.574	257.315	0.141
3200.000	0.295	303.703	3199.325	-3.730	-18.593	-3.730	18.964	258.658	0.089
3300.000	0.422	253.083	3299.323	-3.694	-19.160	-3.694	19.513	259.088	0.327
3400.000	0.859	250.104	3399.316	-4.056	-20.217	-4.056	20.620	258.656	0.438
3500.000	0.754	275.129	3499.307	-4.252	-21.577	-4.252	21.992	258.851	0.364
3600.000	0.561	238.135	3599.301	-4.452	-22.648	-4.452	23.081	258.879	0.455
3700.000	0.769	227.179	3699.294	-5.166	-23.556	-5.166	24.115	257.629	0.243
3800.000	0.745	234.544	3799.285	-6.000	-24.577	-6.000	25.299	256.282	0.100
3900.000	0.740	227.125	3899.277	-6.816	-25.580	-6.816	26.473	255.079	0.096
4000.000	0.075	306.559	3999.274	-7.217	-26.106	-7.217	27.085	254.547	0.730
4100.000	0.161	262.906	4099.274	-7.195	-26.298	-7.195	27.265	254.698	0.119
4200.000	0.914	265.912	4199.269	-7.270	-27.234	-7.270	28.187	255.054	0.753
4300.000	1.043	266.677	4299.254	-7.379	-28.938	-7.379	29.864	255.695	0.129
4400.000	1.154	258.879	4399.236	-7.626	-30.835	-7.626	31.764	256.108	0.186
4500.000	1.213	247.464	4499.214	-8.226	-32.801	-8.226	33.816	255.921	0.242
4600.000	1.042	233.516	4599.195	-9.172	-34.509	-9.172	35.707	255.115	0.322
4700.000	1.110	240.771	4699.178	-10.186	-36.085	-10.186	37.495	254.237	0.152
4800.000	0.952	224.905	4799.162	-11.247	-37.517	-11.247	39.166	253.312	0.325
4900.000	0.900	237.801	4899.149	-12.254	-38.768	-12.254	40.658	252.459	0.214
5000.000	0.702	235.396	4999.139	-13.020	-39.936	-13.020	42.005	251.943	0.201
5100.000	0.701	232.836	5099.131	-13.737	-40.928	-13.737	43.172	251.446	0.031
5200.000	0.512	215.695	5199.126	-14.470	-41.676	-14.470	44.117	250.853	0.260
5300.000	0.588	232.516	5299.121	-15.145	-42.344	-15.145	44.971	250.319	0.177
5400.000	0.671	238.820	5399.115	-15.760	-43.252	-15.760	46.034	249.979	0.108
5500.000	0.762	213.664	5499.108	-16.617	-44.121	-16.617	47.146	249.363	0.325
5600.000	0.902	207.722	5599.097	-17.867	-44.856	-17.867	48.283	248.282	0.164
5700.000	0.884	225.051	5699.085	-19.109	-45.768	-19.109	49.597	247.339	0.270
5800.000	0.709	229.002	5799.075	-20.059	-46.781	-20.059	50.900	246.790	0.184
5900.000	0.549	245.664	5899.070	-20.663	-47.684	-20.663	51.968	246.572	0.241
6000.000	0.551	235.505	5999.065	-21.132	-48.516	-21.132	52.919	246.464	0.097
6100.000	0.523	244.067	6099.061	-21.604	-49.323	-21.604	53.846	246.346	0.085
6200.000	0.556	253.506	6199.056	-21.941	-50.198	-21.941	54.784	246.391	0.095
6300.000	0.697	262.783	6299.050	-22.155	-51.267	-22.155	55.850	246.628	0.173
6400.000	1.097	273.389	6399.038	-22.175	-52.826	-22.175	57.292	247.229	0.432
6500.000	1.426	277.112	6499.013	-21.964	-55.017	-21.964	59.239	248.237	0.339
6600.000	0.720	240.087	6598.996	-22.124	-56.796	-22.124	60.953	248.718	0.955
6700.000	1.388	103.449	6698.988	-22.719	-56.163	-22.719	60.584	247.976	1.974
6800.000	1.974	84.999	6798.945	-22.850	-53.269	-22.850	57.963	246.782	0.791
6900.000	2.850	76.488	6898.856	-22.119	-49.135	-22.119	53.884	245.764	0.944
7000.000	3.643	74.635	6998.694	-20.697	-43.654	-20.697	48.312	244.634	0.799
7100.000	4.191	69.134	7098.461	-18.553	-37.177	-18.553	41.549	243.478	0.664

HORIZONTAL DISPLACEMENT IS  
41.549 FEET AT 243.478 DEGREES