

Company: Anadarko Petroleum
 Well: HSR-Bella 13-8A
 API: 05-123-20142
 Rig Name: Production/ Canary
 State/County: Colorado/Weld
 Latitude: 40.234, Longitude: -104.808
 Directions are relative to 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-de_01_mrg.ut

Minimum Curvature Method

Report Date/Time: 8/5/2013 / 15:22

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	0.389	213.658	99.999	-0.282	-0.188	-0.282	0.339	213.658	0.389
200.000	0.202	154.325	199.998	-0.724	-0.300	-0.724	0.784	202.494	0.335
300.000	0.120	179.626	299.998	-0.987	-0.223	-0.987	1.012	192.708	0.107
400.000	0.118	189.264	399.997	-1.194	-0.239	-1.194	1.217	191.303	0.020
500.000	0.093	175.959	499.997	-1.377	-0.249	-1.377	1.399	190.269	0.035
600.000	0.164	231.810	599.997	-1.546	-0.356	-1.546	1.587	192.967	0.136
700.000	0.338	264.735	699.996	-1.662	-0.762	-1.662	1.828	204.639	0.219
800.000	0.291	231.425	799.995	-1.848	-1.255	-1.848	2.233	214.183	0.186
900.000	0.365	241.651	899.993	-2.157	-1.734	-2.157	2.767	218.786	0.093
1000.000	0.599	247.615	999.989	-2.507	-2.496	-2.507	3.538	224.878	0.239
1100.000	0.701	274.816	1099.983	-2.655	-3.589	-2.655	4.464	233.512	0.321
1200.000	0.489	272.332	1199.978	-2.586	-4.625	-2.586	5.299	240.789	0.214
1300.000	0.639	270.006	1299.973	-2.568	-5.608	-2.568	6.169	245.394	0.152
1400.000	0.649	293.593	1399.967	-2.342	-6.685	-2.342	7.083	250.695	0.263
1500.000	0.638	273.501	1499.961	-2.081	-7.760	-2.081	8.034	254.989	0.225
1600.000	0.689	277.145	1599.954	-1.972	-8.913	-1.972	9.128	257.523	0.066
1700.000	0.701	269.436	1699.947	-1.903	-10.121	-1.903	10.298	259.349	0.094
1800.000	0.639	271.103	1799.940	-1.899	-11.290	-1.899	11.449	260.454	0.065
1900.000	0.686	221.033	1899.934	-2.340	-12.241	-2.340	12.462	259.179	0.562
2000.000	0.909	207.229	1999.924	-3.497	-12.997	-3.497	13.459	254.941	0.292
2100.000	1.203	200.619	2099.907	-5.184	-13.729	-5.184	14.676	249.313	0.318
2200.000	1.142	193.030	2199.886	-7.138	-14.324	-7.138	16.004	243.511	0.167
2300.000	0.790	197.407	2299.872	-8.767	-14.755	-8.767	17.163	239.282	0.360
2400.000	0.395	225.023	2399.866	-9.669	-15.205	-9.669	18.018	237.548	0.477
2500.000	0.509	286.444	2499.864	-9.786	-15.875	-9.786	18.649	238.347	0.472
2600.000	0.687	303.800	2599.858	-9.327	-16.799	-9.327	19.215	240.960	0.252
2700.000	0.801	289.432	2699.850	-8.761	-17.956	-8.761	19.979	243.991	0.218
2800.000	1.028	288.542	2799.837	-8.244	-19.465	-8.244	21.139	247.047	0.227
2900.000	1.108	264.896	2899.820	-8.044	-21.278	-8.044	22.748	249.291	0.445
3000.000	1.256	296.139	2999.800	-7.648	-23.226	-7.648	24.452	251.775	0.652
3100.000	1.309	294.570	3099.775	-6.690	-25.248	-6.690	26.120	255.160	0.063
3200.000	1.250	287.138	3199.750	-5.893	-27.329	-5.893	27.957	257.831	0.176
3300.000	0.949	275.449	3299.732	-5.493	-29.196	-5.493	29.708	259.344	0.374
3400.000	0.982	264.468	3399.718	-5.497	-30.873	-5.497	31.359	259.904	0.188
3500.000	0.984	261.923	3499.703	-5.701	-32.576	-5.701	33.071	260.074	0.044

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	1.168	270.741	3599.685	-5.808	-34.446	-5.808	34.932	260.429	0.247
3700.000	1.487	282.524	3699.659	-5.514	-36.731	-5.514	37.142	261.463	0.418
3800.000	1.918	288.391	3799.614	-4.704	-39.585	-4.704	39.864	263.223	0.465
3900.000	2.030	292.169	3899.555	-3.508	-42.813	-3.508	42.956	265.315	0.172
4000.000	2.082	291.877	3999.491	-2.163	-46.139	-2.163	46.189	267.316	0.053
4100.000	2.187	290.273	4099.421	-0.825	-49.615	-0.825	49.621	269.047	0.121
4200.000	1.485	308.146	4199.370	0.637	-52.424	0.637	52.428	270.696	0.898
4300.000	0.642	327.485	4299.352	1.910	-53.744	1.910	53.778	272.035	0.905
4400.000	0.618	340.746	4399.346	2.891	-54.223	2.891	54.300	273.052	0.147
4500.000	0.515	58.826	4499.343	3.632	-54.016	3.632	54.138	273.847	0.718
4600.000	0.506	11.619	4599.339	4.298	-53.543	4.298	53.715	274.589	0.409
4700.000	0.734	116.693	4699.336	4.443	-52.881	4.443	53.068	274.802	0.994
4800.000	1.348	156.983	4799.320	3.072	-51.849	3.072	51.940	273.391	0.920
4900.000	2.286	167.898	4899.269	0.040	-50.971	0.040	50.971	270.045	0.996
5000.000	2.664	177.087	4999.176	-4.231	-50.435	-4.231	50.612	265.204	0.547
5100.000	2.543	174.156	5099.072	-8.759	-50.091	-8.759	50.851	260.081	0.180
5200.000	1.963	174.056	5198.995	-12.669	-49.688	-12.669	51.277	255.696	0.580
5300.000	1.561	176.620	5298.947	-15.732	-49.430	-15.732	51.873	252.345	0.409
5400.000	1.341	174.578	5398.915	-18.257	-49.239	-18.257	52.515	249.656	0.226
5500.000	0.959	191.303	5498.895	-20.243	-49.292	-20.243	53.287	247.674	0.505
5600.000	0.701	214.550	5598.885	-21.567	-49.803	-21.567	54.273	246.586	0.419
5700.000	0.665	269.090	5698.879	-22.080	-50.730	-22.080	55.327	246.479	0.627
5800.000	0.996	253.705	5798.868	-22.333	-52.145	-22.333	56.726	246.815	0.397
5900.000	1.124	226.434	5898.852	-23.253	-53.690	-23.253	58.509	246.583	0.515
6000.000	1.352	249.071	5998.829	-24.350	-55.502	-24.350	60.609	246.312	0.535
6100.000	1.401	234.379	6098.800	-25.484	-57.598	-25.484	62.984	246.133	0.355
6200.000	1.497	239.421	6198.768	-26.860	-59.716	-26.860	65.479	245.782	0.160
6300.000	1.276	233.767	6298.739	-28.183	-61.739	-28.183	67.868	245.464	0.260
6400.000	0.826	257.881	6398.722	-28.992	-63.342	-28.992	69.662	245.406	0.621
6500.000	0.631	274.864	6498.714	-29.097	-64.596	-29.097	70.846	245.751	0.289
6600.000	0.639	256.083	6598.708	-29.185	-65.686	-29.185	71.877	246.044	0.207
6700.000	0.345	295.567	6698.705	-29.189	-66.499	-29.189	72.623	246.302	0.432
6800.000	0.526	29.599	6798.703	-28.660	-66.544	-28.660	72.453	246.699	0.649
6900.000	1.245	25.856	6898.690	-27.283	-65.844	-27.283	71.272	247.493	0.721
7000.000	2.070	44.739	6998.648	-25.023	-64.098	-25.023	68.810	248.675	0.979
7100.000	2.223	34.627	7098.578	-22.144	-61.725	-22.144	65.577	250.264	0.408
7200.000	2.686	17.954	7198.488	-18.319	-59.901	-18.319	62.640	252.995	0.846
7300.000	2.345	5.218	7298.392	-14.053	-58.993	-14.053	60.643	256.601	0.653
7400.000	2.068	346.505	7398.319	-10.260	-59.228	-10.260	60.110	260.172	0.768
7500.000	1.206	4.359	7498.278	-7.456	-59.569	-7.456	60.033	262.866	0.991
7600.000	0.388	41.075	7598.268	-6.151	-59.266	-6.151	59.585	264.075	0.925
7700.000	0.456	81.198	7698.265	-5.835	-58.651	-5.835	58.940	264.318	0.297

HORIZONTAL DISPLACEMENT IS
58.940 FEET AT 264.318 DEGREES