



Company: Anadarko Petroleum Corp.
 Well/API: HSR-Spaur 2-7/05-123-19313
 Tool Type: North Seeking Rate Gyro
 Rig Name: Production/ Summit
 County/State: Weld/Colorado
 VS-Azi: 0.000 Degrees
 Latitude: 40.33235, Longitude: -104.92966
 All Azimuths referenced to True North
 No Grid Convergence Applied



Depth Reference : RKB= GL Elevation= 4858 Feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01-de_01.ut

Minimum Curvature Method

Report Date/Time: 10/17/2016 / 13:18

Lat/Long Obtained by Handheld GPS at Wellhead

Handheld GPS Reference: NAD83/ Device Error: +/- 9 Feet

VES Survey International- Henderson Co

Surveyor: Sean Bratt / HSR-Spaur 2-7

303-853-4976

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	0.303	204.710	100.000	-0.240	-0.110	-0.240	0.264	204.710	0.303
200.000	0.308	236.703	199.998	-0.627	-0.446	-0.627	0.770	215.388	0.168
300.000	0.344	240.951	299.997	-0.921	-0.933	-0.921	1.311	225.380	0.043
400.000	0.276	270.939	399.995	-1.063	-1.437	-1.063	1.788	233.513	0.174
500.000	0.294	223.929	499.994	-1.244	-1.856	-1.244	2.235	236.179	0.228
600.000	0.352	255.661	599.993	-1.504	-2.332	-1.504	2.775	237.172	0.185
700.000	0.276	245.055	699.991	-1.682	-2.848	-1.682	3.308	239.434	0.095
800.000	0.566	229.057	799.988	-2.108	-3.440	-2.108	4.034	238.506	0.310
900.000	0.433	218.975	899.984	-2.725	-4.051	-2.725	4.882	236.072	0.159
1000.000	0.520	201.542	999.981	-3.441	-4.455	-3.441	5.629	232.320	0.168
1100.000	0.633	225.957	1099.976	-4.247	-5.019	-4.247	6.575	229.760	0.268
1200.000	0.744	209.271	1199.969	-5.198	-5.733	-5.198	7.739	227.806	0.228
1300.000	0.628	225.542	1299.962	-6.148	-6.442	-6.148	8.905	226.338	0.226
1400.000	0.598	202.166	1399.956	-7.015	-7.030	-7.015	9.931	225.060	0.250
1500.000	0.666	258.322	1499.951	-7.616	-7.796	-7.616	10.899	225.669	0.598
1600.000	0.577	284.329	1599.945	-7.609	-8.854	-7.609	11.674	229.322	0.293
1700.000	0.950	270.987	1699.936	-7.470	-10.170	-7.470	12.619	233.702	0.410
1800.000	0.957	274.718	1799.923	-7.387	-11.832	-7.387	13.949	238.020	0.062

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
1900.000	1.056	257.507	1899.907	-7.518	-13.564	-7.518	15.508	241.002	0.317
2000.000	0.939	273.361	1999.892	-7.669	-15.282	-7.669	17.099	243.350	0.298
2100.000	1.022	255.189	2099.878	-7.849	-16.963	-7.849	18.691	245.168	0.320
2200.000	0.932	253.039	2199.863	-8.315	-18.603	-8.315	20.376	245.918	0.097
2300.000	0.976	252.779	2299.850	-8.804	-20.195	-8.804	22.030	246.445	0.045
2400.000	0.863	266.987	2399.837	-9.096	-21.761	-9.096	23.585	247.315	0.254
2500.000	0.746	290.312	2499.827	-8.910	-23.123	-8.910	24.780	248.928	0.345
2600.000	0.849	330.434	2599.818	-8.039	-24.099	-8.039	25.405	251.551	0.555
2700.000	0.901	331.704	2699.807	-6.702	-24.837	-6.702	25.726	254.898	0.056
2800.000	0.923	331.502	2799.794	-5.302	-25.594	-5.302	26.138	258.296	0.021
2900.000	0.881	355.400	2899.782	-3.829	-26.040	-3.829	26.320	261.636	0.376
3000.000	0.982	37.502	2999.770	-2.383	-25.580	-2.383	25.691	264.678	0.676
3100.000	1.755	46.491	3099.741	-0.649	-23.948	-0.649	23.957	268.448	0.800
3200.000	1.536	24.194	3199.700	1.628	-22.288	1.628	22.348	274.177	0.672
3300.000	1.307	352.111	3299.671	3.980	-21.896	3.980	22.254	280.301	0.816
3400.000	1.304	334.602	3399.646	6.137	-22.540	6.137	23.361	285.231	0.397
3500.000	1.384	318.309	3499.618	8.067	-23.832	8.067	25.160	288.701	0.389
3600.000	1.323	310.500	3599.591	9.719	-25.513	9.719	27.302	290.854	0.194
3700.000	1.435	308.828	3699.562	11.255	-27.367	11.255	29.591	292.355	0.119
3800.000	1.472	305.490	3799.529	12.786	-29.389	12.786	32.049	293.511	0.092
3900.000	1.295	316.296	3899.500	14.348	-31.215	14.348	34.355	294.686	0.315
4000.000	1.581	312.113	3999.469	16.090	-33.019	16.090	36.731	295.979	0.305
4100.000	1.382	306.008	4099.435	17.724	-35.018	17.724	39.248	296.846	0.254
4200.000	1.230	305.775	4199.409	19.060	-36.864	19.060	41.500	297.341	0.152
4300.000	0.983	310.344	4299.391	20.243	-38.389	20.243	43.399	297.804	0.261
4400.000	0.929	319.100	4399.377	21.412	-39.574	21.412	44.995	298.416	0.156
4500.000	0.978	311.680	4499.363	22.592	-40.742	22.592	46.587	299.009	0.133
4600.000	1.001	314.693	4599.348	23.774	-42.001	23.774	48.262	299.511	0.057
4700.000	0.886	306.545	4699.335	24.849	-43.243	24.849	49.874	299.883	0.176
4800.000	0.948	323.143	4799.322	25.971	-44.360	25.971	51.404	300.347	0.272
4900.000	1.102	309.402	4899.306	27.244	-45.600	27.244	53.118	300.856	0.289
5000.000	1.197	311.979	4999.286	28.553	-47.120	28.553	55.096	301.215	0.108
5100.000	1.296	309.762	5099.262	29.975	-48.765	29.975	57.241	301.578	0.110
5200.000	1.635	316.581	5199.229	31.734	-50.615	31.734	59.741	302.087	0.381
5300.000	2.279	307.777	5299.171	33.989	-53.168	33.989	63.103	302.590	0.709
5400.000	2.340	309.036	5399.090	36.493	-56.325	36.493	67.114	302.939	0.079
5500.000	1.479	312.536	5499.033	38.651	-58.862	38.651	70.417	303.290	0.869
5600.000	0.934	343.356	5599.012	40.304	-60.046	40.304	72.318	303.870	0.829
5700.000	2.119	356.480	5698.975	42.930	-60.393	42.930	74.096	305.407	1.228
5800.000	1.757	351.578	5798.917	46.293	-60.731	46.293	76.363	307.317	0.398

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
5900.000	1.798	349.106	5898.869	49.350	-61.252	49.350	78.659	308.858	0.087
6000.000	1.396	353.018	5998.830	52.099	-61.696	52.099	80.751	310.179	0.416
6100.000	1.255	346.507	6098.803	54.372	-62.100	54.372	82.539	311.204	0.206
6200.000	1.450	348.420	6198.775	56.677	-62.609	56.677	84.452	312.153	0.201
6300.000	1.659	357.125	6298.739	59.363	-62.936	59.363	86.515	313.326	0.315
6400.000	1.198	333.882	6398.708	61.747	-63.469	61.747	88.549	314.212	0.732
6500.000	0.690	287.014	6498.696	62.862	-64.505	62.862	90.070	314.261	0.884
6600.000	0.924	265.676	6598.686	62.978	-65.886	62.978	91.143	313.707	0.377
6700.000	0.569	239.237	6698.677	62.663	-67.117	62.663	91.822	313.035	0.486
6800.000	0.686	250.794	6798.672	62.212	-68.109	62.212	92.245	312.409	0.172
6900.000	0.564	345.506	6898.668	62.491	-68.797	62.491	92.942	312.250	0.923
7000.000	0.740	32.628	6998.662	63.511	-68.572	63.511	93.466	312.806	0.545
7100.000	0.685	16.038	7098.654	64.630	-68.059	64.630	93.856	313.520	0.212
7200.000	0.355	45.861	7198.650	65.421	-67.671	65.421	94.124	314.031	0.417
7300.000	0.142	295.258	7298.649	65.689	-67.561	65.689	94.232	314.195	0.426
7350.000	0.288	190.265	7348.649	65.592	-67.640	65.592	94.220	314.120	0.705