

Company: Anadarko Petroleum Corp.
 Well/API: FT. Lupton Highlands #32-9/05-123-23820
 Tool Type: North Seeking Rate Gyro
 Rig Name: Production/ V.E.S.
 County/State: Weld County / Colorado
 Latitude: 40.068, Longitude: -104.780
 Directions are relative to True North
 VS-Azi: 0.000 Degrees



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : RKB = GL Elevation = 5024 ft

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: ftluptonhighlands#32-9-de_01.ut

Minimum Curvature Method

Report Date/Time: 11/20/2014 / 02:23

Lat/Long Obtained By Handheld GPS At Wellhead
 Handheld GPS Reference: NAD83/Device Error: ±9 Feet
 VES Survey International - Henderson CO
 Jay Hinman
 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	0.585	85.150	99.998	0.043	0.509	0.043	0.511	85.150	0.585
200.000	0.387	88.367	199.995	0.096	1.356	0.096	1.359	85.949	0.200
300.000	0.672	63.701	299.990	0.365	2.218	0.365	2.248	80.650	0.358
400.000	0.360	88.256	399.986	0.634	3.058	0.634	3.123	78.278	0.375
500.000	0.972	84.480	499.979	0.726	4.216	0.726	4.278	80.234	0.613
600.000	0.601	75.476	599.970	0.939	5.568	0.939	5.646	80.429	0.389
700.000	0.671	98.737	699.964	0.981	6.654	0.981	6.726	81.611	0.265
800.000	0.904	81.297	799.954	1.012	8.013	1.012	8.077	82.804	0.332
900.000	0.621	61.366	899.945	1.391	9.268	1.391	9.372	81.466	0.384
1000.000	0.586	58.826	999.940	1.915	10.182	1.915	10.360	79.347	0.044
1100.000	0.641	67.307	1099.934	2.396	11.135	2.396	11.390	77.858	0.106
1200.000	0.220	43.733	1199.931	2.750	11.784	2.750	12.100	76.864	0.448
1300.000	0.590	73.122	1299.929	3.038	12.409	3.038	12.775	76.244	0.413
1400.000	0.338	132.642	1399.926	2.987	13.119	2.987	13.454	77.173	0.510
1500.000	0.157	133.699	1499.925	2.692	13.435	2.692	13.702	78.668	0.182
1600.000	0.551	155.277	1599.923	2.161	13.735	2.161	13.904	81.060	0.410
1700.000	0.334	205.186	1699.920	1.460	13.813	1.460	13.889	83.966	0.422
1800.000	0.198	223.937	1799.919	1.072	13.568	1.072	13.611	85.483	0.159
1900.000	0.430	256.488	1899.917	0.859	13.083	0.859	13.111	86.242	0.284
2000.000	0.411	252.643	1999.915	0.665	12.376	0.665	12.393	86.926	0.034
2100.000	0.827	253.599	2099.909	0.354	11.340	0.354	11.346	88.214	0.416
2200.000	0.989	276.115	2199.896	0.242	9.790	0.242	9.793	88.586	0.388
2300.000	0.590	293.376	2299.887	0.538	8.460	0.538	8.477	86.363	0.460
2400.000	0.598	294.566	2399.881	0.959	7.513	0.959	7.574	82.726	0.015
2500.000	0.475	310.611	2499.877	1.446	6.724	1.446	6.877	77.866	0.193
2600.000	0.936	337.695	2599.869	2.471	6.099	2.471	6.581	67.944	0.557
2700.000	1.870	333.759	2699.838	4.691	5.068	4.691	6.905	47.211	0.938
2800.000	2.160	343.948	2799.777	7.965	3.825	7.965	8.836	25.651	0.460
2900.000	2.813	331.719	2899.683	11.937	2.141	11.937	12.128	10.170	0.838
3000.000	2.933	330.862	2999.557	16.333	-0.267	16.333	16.335	359.063	0.127
3100.000	3.314	325.652	3099.408	20.954	-3.144	20.954	21.188	351.468	0.474
3200.000	3.325	323.808	3199.241	25.680	-6.487	25.680	26.487	345.824	0.107
3300.000	3.188	317.656	3299.080	30.076	-10.072	30.076	31.718	341.485	0.375

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
3400.000	2.765	324.427	3398.945	34.093	-13.348	34.093	36.613	338.618	0.549
3500.000	3.056	311.198	3498.817	37.811	-16.758	37.811	41.358	336.097	0.730
3600.000	2.681	317.083	3598.691	41.280	-20.356	41.280	46.026	333.751	0.477
3700.000	2.634	314.853	3698.584	44.613	-23.578	44.613	50.460	332.144	0.113
3800.000	2.377	311.818	3798.488	47.617	-26.753	47.617	54.618	330.672	0.289
3900.000	2.228	314.031	3898.408	50.351	-29.696	50.351	58.456	329.469	0.173
4000.000	2.156	311.577	3998.334	52.950	-32.500	52.950	62.129	328.459	0.119
4100.000	1.873	296.141	4098.273	54.918	-35.374	54.918	65.325	327.213	0.609
4200.000	1.815	282.534	4198.222	55.982	-38.387	55.982	67.879	325.561	0.440
4300.000	1.953	287.887	4298.168	56.849	-41.555	56.849	70.417	323.834	0.223
4400.000	2.051	284.749	4398.107	57.828	-44.907	57.828	73.217	322.168	0.147
4500.000	1.778	310.278	4498.053	59.287	-47.821	59.287	76.169	321.110	0.887
4600.000	2.096	330.922	4597.997	61.888	-49.893	61.888	79.495	321.124	0.761
4700.000	2.460	323.936	4697.918	65.220	-52.045	65.220	83.441	321.410	0.457
4800.000	2.553	336.473	4797.823	68.997	-54.197	68.997	87.738	321.850	0.555
4900.000	2.609	334.717	4897.721	73.097	-56.059	73.097	92.118	322.515	0.097
5000.000	3.044	328.101	4997.600	77.409	-58.434	77.409	96.988	322.952	0.543
5100.000	3.058	332.690	5097.458	82.033	-61.061	82.033	102.264	323.338	0.245
5200.000	3.716	329.261	5197.283	87.189	-63.941	87.189	108.122	323.745	0.688
5300.000	4.642	327.708	5297.016	93.395	-67.759	93.395	115.386	324.039	0.933
5400.000	3.909	326.189	5396.737	99.648	-71.818	99.648	122.832	324.219	0.741
5500.000	2.937	325.085	5496.558	104.581	-75.181	104.581	128.800	324.288	0.975
5600.000	1.981	322.650	5596.464	108.056	-77.696	108.056	133.089	324.283	0.961
5700.000	1.416	311.358	5696.420	110.246	-79.672	110.246	136.021	324.145	0.654
5800.000	1.046	314.377	5796.397	111.701	-81.252	111.701	138.127	323.968	0.375
5900.000	0.958	298.623	5896.382	112.740	-82.639	112.740	139.784	323.759	0.288
6000.000	1.158	268.072	5996.366	113.107	-84.382	113.107	141.115	323.276	0.590
6100.000	0.766	229.913	6096.352	112.642	-85.903	112.642	141.660	322.670	0.730
6200.000	0.902	248.173	6196.342	111.919	-87.145	111.919	141.846	322.094	0.297
6300.000	1.510	270.481	6296.320	111.638	-89.193	111.638	142.893	321.377	0.757
6400.000	1.304	279.076	6396.290	111.828	-91.634	111.828	144.577	320.668	0.294
6500.000	1.843	277.938	6496.252	112.230	-94.350	112.230	146.620	319.947	0.539
6600.000	1.664	281.563	6596.205	112.743	-97.365	112.743	148.966	319.186	0.210
6700.000	1.660	271.147	6696.163	113.063	-100.235	113.063	151.097	318.441	0.302
6800.000	1.948	244.649	6796.115	112.364	-103.220	112.364	152.578	317.429	0.873
6900.000	1.366	231.193	6896.073	110.889	-105.685	110.889	153.186	316.376	0.697
7000.000	1.048	211.688	6996.051	109.364	-107.094	109.364	153.068	315.601	0.515
7100.000	0.822	224.558	7096.038	108.074	-108.078	108.074	152.843	314.999	0.307
7200.000	0.435	199.141	7196.032	107.205	-108.706	107.205	152.676	314.601	0.468
7300.000	0.305	43.339	7296.031	107.040	-108.648	107.040	152.519	314.573	0.724
7400.000	0.845	10.977	7396.026	107.957	-108.325	107.957	152.935	314.903	0.610

<div> HORIZONTAL DISPLACEMENT IS 152.935 FEET AT 314.903 DEGREES </div>
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