

Company: Anadarko Petroleum Corp.
 Well/API: Freund #L7-4/05-123-15280
 Tool Type: North Seeking MiNS Gyro
 Rig Name: Production / VESSI
 County/State: Weld/Colorado
 VS-Azi: 0.000 Degrees
 Latitude: 40.24400, Longitude: -104.82700
 No Grid Convergence Applied
 All Azimuths referenced to True North



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : RKB = GL Elevation = 4789 Feet

DRILLOG GYRO SURVEY CALCULATIONS

Filename: pre-de_01.ut
 Minimum Curvature Method
 Report Date/Time: 5/18/2015 / 10:13
 Lat/Long Obtained By Handheld GPS At Wellhead
 Handheld GPS Reference: NAD83/Device Error: +/- 9 Feet
 VES Survey International - Henderson, CO
 Kevin McDowell
 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	0.390	325.603	99.999	0.281	-0.192	0.281	0.340	325.603	0.390
200.000	0.226	320.048	199.998	0.712	-0.511	0.712	0.876	324.356	0.166
300.000	0.206	332.732	299.997	1.023	-0.720	1.023	1.251	324.876	0.052
400.000	0.356	303.908	399.996	1.356	-1.060	1.356	1.721	321.989	0.202
500.000	0.493	254.106	499.993	1.412	-1.731	1.412	2.234	309.190	0.378
600.000	0.461	345.421	599.991	1.683	-2.246	1.683	2.806	306.841	0.682
700.000	0.372	279.828	699.989	2.127	-2.667	2.127	3.412	308.573	0.457
800.000	0.660	323.511	799.985	2.646	-3.330	2.646	4.253	308.470	0.468
900.000	0.590	335.625	899.979	3.578	-3.885	3.578	5.282	312.644	0.150
1000.000	0.557	318.005	999.974	4.408	-4.423	4.408	6.245	314.905	0.179
1100.000	0.413	292.035	1099.971	4.905	-5.083	4.905	7.063	313.980	0.259
1200.000	0.477	302.903	1199.968	5.266	-5.766	5.266	7.809	312.404	0.105
1300.000	0.683	313.843	1299.963	5.905	-6.546	5.905	8.816	312.055	0.234
1400.000	0.645	311.375	1399.956	6.690	-7.398	6.690	9.974	312.124	0.048
1500.000	0.364	326.134	1499.952	7.325	-7.997	7.325	10.845	312.491	0.307
1600.000	0.288	306.044	1599.950	7.736	-8.377	7.736	11.403	312.725	0.136
1700.000	0.166	300.968	1699.950	7.959	-8.704	7.959	11.794	312.440	0.123
1800.000	0.538	214.216	1799.948	7.645	-9.092	7.645	11.879	310.061	0.554
1900.000	0.619	230.470	1899.943	6.914	-9.772	6.914	11.971	305.278	0.182
2000.000	0.380	222.961	1999.939	6.327	-10.415	6.327	12.186	301.277	0.247
2100.000	0.539	188.308	2099.936	5.619	-10.709	5.619	12.094	297.685	0.313
2200.000	0.281	215.562	2199.933	4.955	-10.920	4.955	11.991	294.405	0.316
2300.000	0.216	149.074	2299.933	4.593	-10.966	4.593	11.889	292.728	0.278
2400.000	0.162	209.456	2399.932	4.308	-10.938	4.308	11.756	291.499	0.196
2500.000	0.379	294.612	2499.931	4.323	-11.309	4.323	12.107	290.921	0.400
2600.000	0.429	258.508	2599.929	4.386	-11.977	4.386	12.755	290.115	0.255
2700.000	0.371	251.768	2699.927	4.211	-12.651	4.211	13.333	288.409	0.075
2800.000	0.218	316.249	2799.925	4.247	-13.090	4.247	13.761	287.976	0.340
2900.000	0.510	233.978	2899.924	4.123	-13.581	4.123	14.193	286.887	0.527
3000.000	0.529	236.633	2999.920	3.607	-14.326	3.607	14.774	284.133	0.031
3100.000	0.711	258.588	3099.914	3.231	-15.320	3.231	15.657	281.908	0.296
3200.000	0.700	230.894	3199.907	2.723	-16.401	2.723	16.626	279.426	0.338
3300.000	0.581	223.643	3299.900	1.971	-17.225	1.971	17.337	276.527	0.143
3400.000	0.979	249.674	3399.891	1.307	-18.376	1.307	18.423	274.068	0.523

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
3500.000	1.127	248.028	3499.874	0.642	-20.090	0.642	20.100	271.831	0.151
3600.000	1.194	270.759	3599.854	0.288	-22.043	0.288	22.045	270.749	0.462
3700.000	1.226	301.546	3699.833	0.861	-23.996	0.861	24.012	272.056	0.643
3800.000	1.347	292.771	3799.808	1.876	-25.991	1.876	26.059	274.128	0.231
3900.000	1.270	306.606	3899.782	2.991	-27.964	2.991	28.124	276.106	0.324
4000.000	1.301	286.367	3999.758	3.972	-29.943	3.972	30.205	277.556	0.453
4100.000	1.262	301.332	4099.733	4.864	-31.972	4.864	32.340	278.651	0.336
4200.000	0.702	258.778	4199.719	5.317	-33.514	5.317	33.933	279.016	0.883
4300.000	0.625	250.351	4299.712	5.015	-34.629	5.015	34.990	278.240	0.124
4400.000	0.789	251.883	4399.705	4.617	-35.797	4.617	36.094	277.349	0.165
4500.000	0.928	249.384	4499.693	4.118	-37.209	4.118	37.437	276.315	0.143
4600.000	0.513	249.165	4599.685	3.673	-38.386	3.673	38.561	275.466	0.415
4700.000	0.748	203.498	4699.680	2.915	-39.065	2.915	39.174	274.268	0.535
4800.000	0.930	211.353	4799.669	1.623	-39.748	1.623	39.781	272.339	0.215
4900.000	0.737	213.701	4899.658	0.395	-40.527	0.395	40.529	270.559	0.196
5000.000	0.529	249.921	4999.653	-0.298	-41.317	-0.298	41.318	269.586	0.440
5100.000	0.624	222.392	5099.648	-0.859	-42.119	-0.859	42.127	268.831	0.290
5200.000	0.648	225.472	5199.641	-1.659	-42.889	-1.659	42.921	267.785	0.042
5300.000	0.380	241.554	5299.637	-2.213	-43.584	-2.213	43.641	267.093	0.302
5400.000	0.609	202.513	5399.634	-2.863	-44.080	-2.863	44.173	266.284	0.395
5500.000	0.697	200.274	5499.627	-3.925	-44.494	-3.925	44.667	264.959	0.091
5600.000	0.702	210.985	5599.620	-5.020	-45.020	-5.020	45.299	263.637	0.131
5700.000	0.593	217.311	5699.614	-5.957	-45.650	-5.957	46.037	262.565	0.130
5800.000	0.474	229.170	5799.609	-6.639	-46.276	-6.639	46.750	261.835	0.162
5900.000	0.516	275.762	5899.606	-6.865	-47.037	-6.865	47.535	261.697	0.393
6000.000	0.330	328.740	5999.603	-6.573	-47.634	-6.573	48.086	262.143	0.412
6100.000	0.669	27.269	6099.600	-5.809	-47.516	-5.809	47.870	263.030	0.571
6200.000	0.668	350.356	6199.594	-4.715	-47.347	-4.715	47.581	264.313	0.423
6300.000	1.452	334.403	6299.576	-2.998	-47.992	-2.998	48.085	266.425	0.830
6400.000	1.670	327.592	6399.539	-0.625	-49.320	-0.625	49.324	269.274	0.286
6500.000	1.847	357.228	6499.494	2.214	-50.179	2.214	50.227	272.527	0.915
6600.000	1.638	23.714	6599.449	5.133	-49.682	5.133	49.946	275.898	0.824
6700.000	0.999	56.900	6699.424	6.917	-48.377	6.917	48.869	278.137	0.971
6800.000	0.879	120.698	6799.413	7.001	-46.987	7.001	47.506	278.475	0.997
6900.000	0.494	139.609	6899.405	6.281	-46.048	6.281	46.474	277.767	0.442
7000.000	1.121	186.502	6999.396	4.981	-45.879	4.981	46.148	276.196	0.862
7100.000	0.957	225.184	7099.381	3.421	-46.582	3.421	46.707	274.200	0.705
HORIZONTAL DISPLACEMENT IS 46.707 FEET AT 274.200 DEGREES									