

Company: Anadarko Petroleum Corp.

Well: Randi 9-16A

API: 05-123-20941

Rig Name: Production/Pheonix

State/County: Colorado/Weld

Latitude: 40.137, Longitude: -104.888

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.ut

Minimum Curvature Method

Report Date/Time: 11/22/2013 / 13:49

Vaughn Energy Services

Henderson, CO

303-853-4976

Levi Sheldon

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	0.514	6.204	99.999	0.446	0.048	0.446	0.448	6.204	0.514
200.000	0.307	346.857	199.996	1.152	0.036	1.152	1.153	1.787	0.246
300.000	0.216	66.707	299.995	1.488	0.148	1.488	1.495	5.682	0.343
400.000	0.489	102.745	399.993	1.468	0.738	1.468	1.643	26.679	0.340
500.000	0.461	104.879	499.990	1.271	1.543	1.271	1.999	50.540	0.033
600.000	0.257	134.462	599.988	1.010	2.093	1.010	2.324	64.243	0.269
700.000	0.213	218.164	699.987	0.706	2.138	0.706	2.252	71.720	0.315
800.000	0.539	257.606	799.985	0.459	1.564	0.459	1.630	73.632	0.398
900.000	0.626	264.721	899.980	0.308	0.561	0.308	0.640	61.204	0.113
1000.000	0.693	262.557	999.973	0.180	-0.583	0.180	0.610	287.110	0.071
1100.000	0.677	262.486	1099.966	0.024	-1.769	0.024	1.769	270.775	0.016
1200.000	0.805	268.617	1199.958	-0.070	-3.057	-0.070	3.058	268.682	0.150
1300.000	0.976	264.770	1299.946	-0.165	-4.607	-0.165	4.610	267.950	0.182
1400.000	1.115	263.061	1399.929	-0.360	-6.422	-0.360	6.432	266.790	0.143
1500.000	1.018	265.697	1499.912	-0.544	-8.273	-0.544	8.291	266.235	0.109
1600.000	1.314	269.136	1599.891	-0.628	-10.305	-0.628	10.324	266.511	0.305
1700.000	1.401	272.563	1699.863	-0.591	-12.673	-0.591	12.687	267.330	0.119
1800.000	1.447	275.184	1799.832	-0.422	-15.152	-0.422	15.158	268.404	0.080
1900.000	1.390	267.088	1899.802	-0.370	-17.621	-0.370	17.625	268.798	0.208
2000.000	1.394	274.458	1999.772	-0.337	-20.046	-0.337	20.049	269.038	0.179
2100.000	1.117	258.120	2099.748	-0.443	-22.212	-0.443	22.217	268.858	0.450
2200.000	0.988	257.931	2199.731	-0.824	-24.009	-0.824	24.024	268.035	0.128
2300.000	1.016	259.747	2299.716	-1.162	-25.726	-1.162	25.752	267.414	0.042
2400.000	1.009	261.458	2399.701	-1.450	-27.469	-1.450	27.507	266.977	0.031
2500.000	0.336	319.855	2499.694	-1.357	-28.528	-1.357	28.560	267.277	0.880
2600.000	0.392	25.140	2599.692	-0.823	-28.572	-0.823	28.584	268.350	0.396
2700.000	0.375	32.119	2699.690	-0.236	-28.253	-0.236	28.254	269.521	0.050
2800.000	0.379	23.176	2799.688	0.345	-27.949	0.345	27.951	270.706	0.059
2900.000	0.211	251.832	2899.687	0.591	-27.994	0.591	28.000	271.209	0.542
3000.000	0.603	250.974	2999.684	0.362	-28.667	0.362	28.669	270.723	0.392
3100.000	0.912	242.431	3099.676	-0.178	-29.871	-0.178	29.871	269.658	0.328
3200.000	1.277	249.561	3199.657	-0.936	-31.620	-0.936	31.634	268.305	0.389
3300.000	1.717	251.526	3299.623	-1.800	-34.086	-1.800	34.133	266.977	0.443
3400.000	2.527	257.868	3399.554	-2.738	-37.662	-2.738	37.761	265.842	0.841

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	2.623	261.783	3499.453	-3.528	-42.081	-3.528	42.228	265.208	0.200
3600.000	1.657	256.717	3599.382	-4.187	-45.752	-4.187	45.943	264.771	0.983
3700.000	0.851	259.112	3699.357	-4.660	-47.889	-4.660	48.115	264.442	0.807
3800.000	0.310	235.900	3799.352	-4.951	-48.842	-4.951	49.092	264.211	0.580
3900.000	0.302	148.887	3899.351	-5.328	-48.929	-5.328	49.219	263.785	0.421
4000.000	0.309	145.927	3999.349	-5.777	-48.642	-5.777	48.984	263.227	0.017
4100.000	0.447	122.937	4099.347	-6.212	-48.164	-6.212	48.563	262.650	0.203
4200.000	0.363	114.614	4199.345	-6.556	-47.549	-6.556	47.999	262.149	0.103
4300.000	0.549	119.128	4299.342	-6.921	-46.843	-6.921	47.351	261.595	0.189
4400.000	0.674	129.052	4399.336	-7.525	-45.968	-7.525	46.580	260.703	0.164
4500.000	0.625	171.130	4499.330	-8.434	-45.427	-8.434	46.203	259.482	0.468
4600.000	0.530	186.853	4599.325	-9.431	-45.398	-9.431	46.367	258.264	0.184
4700.000	0.522	195.838	4699.321	-10.328	-45.578	-10.328	46.733	257.232	0.083
4800.000	0.755	234.063	4799.315	-11.153	-46.235	-11.153	47.561	256.438	0.472
4900.000	0.909	247.658	4899.304	-11.841	-47.502	-11.841	48.955	256.003	0.249
5000.000	1.592	242.807	4999.280	-12.777	-49.471	-12.777	51.094	255.518	0.691
5100.000	1.912	247.721	5099.233	-14.044	-52.249	-14.044	54.104	254.955	0.353
5200.000	2.222	251.180	5199.168	-15.302	-55.627	-15.302	57.694	254.620	0.334
5300.000	2.748	260.570	5299.074	-16.320	-59.827	-16.320	62.013	254.742	0.664
5400.000	2.950	260.425	5398.950	-17.141	-64.730	-17.141	66.961	255.168	0.202
5500.000	3.184	259.133	5498.807	-18.093	-69.995	-18.093	72.296	255.507	0.244
5600.000	3.259	261.062	5598.649	-19.058	-75.531	-19.058	77.898	255.839	0.132
5700.000	3.209	267.700	5698.490	-19.612	-81.136	-19.612	83.473	256.411	0.378
5800.000	3.290	264.913	5798.329	-19.979	-86.791	-19.979	89.061	257.037	0.178
5900.000	3.089	262.793	5898.174	-20.571	-92.323	-20.571	94.587	257.439	0.233
6000.000	3.097	259.673	5998.029	-21.393	-97.653	-21.393	99.969	257.643	0.168
6100.000	3.143	257.689	6097.881	-22.462	-102.989	-22.462	105.410	257.696	0.117
6200.000	2.801	261.524	6197.746	-23.407	-108.083	-23.407	110.589	257.781	0.395
6300.000	2.506	266.486	6297.639	-23.901	-112.682	-23.901	115.189	258.025	0.373
6400.000	2.291	267.726	6397.551	-24.114	-116.862	-24.114	119.324	258.341	0.221
6500.000	1.949	269.802	6497.483	-24.199	-120.560	-24.199	122.965	258.650	0.350
6600.000	1.846	274.542	6597.428	-24.078	-123.867	-24.078	126.185	259.000	0.188
6700.000	1.712	289.206	6697.380	-23.459	-126.882	-23.459	129.033	259.525	0.473
6800.000	1.864	293.588	6797.332	-22.317	-129.783	-22.317	131.688	260.243	0.205
6900.000	2.113	303.304	6897.272	-20.654	-132.815	-20.654	134.411	261.161	0.418
7000.000	2.530	321.806	6997.191	-17.907	-135.720	-17.907	136.896	262.484	0.852
7100.000	2.977	323.974	7097.075	-14.072	-138.612	-14.072	139.324	264.203	0.459
7200.000	3.091	337.298	7196.936	-9.484	-141.180	-9.484	141.498	266.157	0.713
7300.000	3.787	345.379	7296.756	-3.801	-143.054	-3.801	143.105	268.478	0.846
7400.000	3.106	349.620	7396.575	2.059	-144.376	2.059	144.391	270.817	0.727
7500.000	2.603	347.323	7496.450	6.939	-145.362	6.939	145.528	272.733	0.516
7600.000	2.663	342.792	7596.345	11.374	-146.548	11.374	146.989	274.438	0.217
7700.000	2.310	343.364	7696.250	15.525	-147.813	15.525	148.626	275.996	0.354
7800.000	1.506	338.321	7796.194	18.677	-148.875	18.677	150.042	277.151	0.821
7900.000	1.316	341.596	7896.164	20.988	-149.723	20.988	151.187	277.980	0.206
7950.000	1.281	343.136	7946.151	22.068	-150.066	22.068	151.680	278.366	0.100
HORIZONTAL DISPLACEMENT IS 151.680 FEET AT 278.366 DEGREES									