



RADIOACTIVITY TESTS

Qualitative Analysis Summary

Based on gamma analysis of the Orykta[®] sample, there is only naturally occurring radioactivity in the samples. The isotopes detected are either from the decay of natural uranium or potassium found in many soils.

One kilogram of the Orykta[®] sample was put into a 1-liter marinelli beaker, sealed and counted for 24-hours on a 20% High Purity Germanium (HPGe) detector. Following the sample count, a 24-hour background count was taken.

As stated above, only naturally occurring radioisotopes were detected. A second series of . 24-hour counts (sample and background) was performed for confirmation. The isotopes detected include Thallium-210, Lead-214, Bismuth-214, Radium-226, Thorium- 234, Protactinium-234m and Potassium-40.

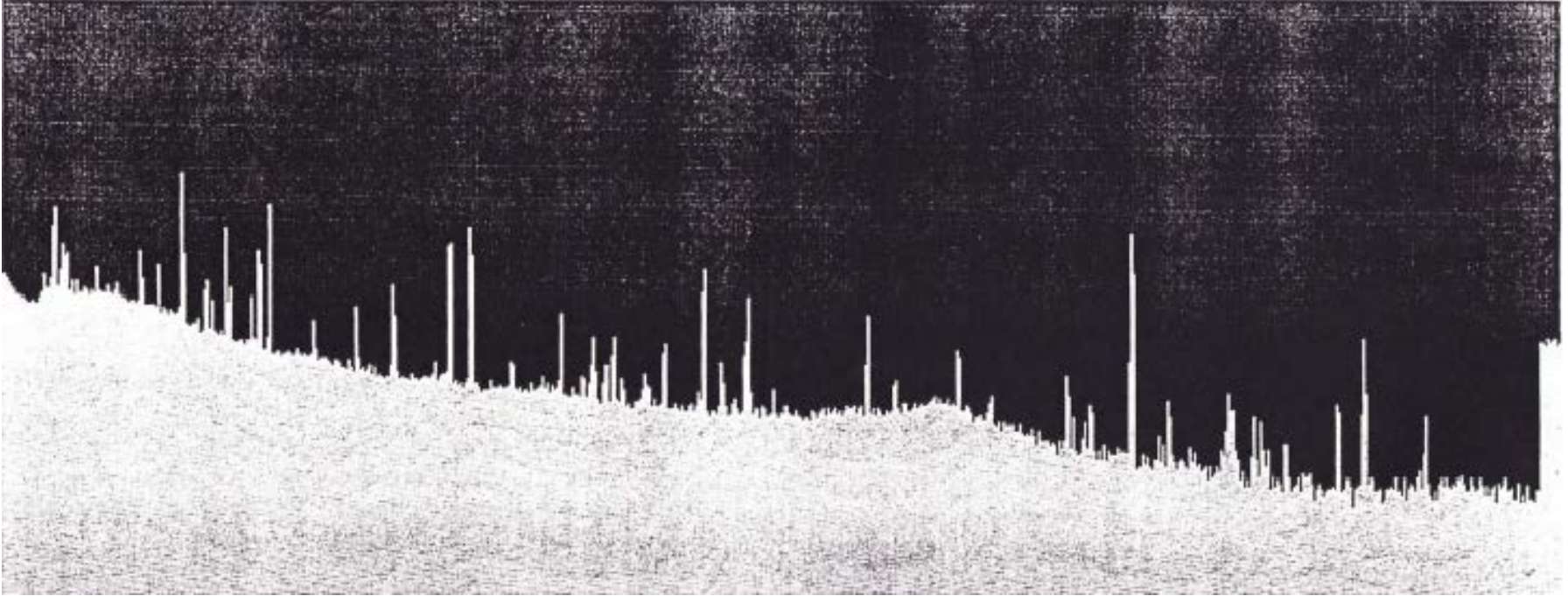
UNIVERSITY
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RADIATION SCIENCE
AND ENGINEERING
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PENNSYLVANIA
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RADIOACTIVITY
TESTS

Orykta[®] Sample



*1 kilogram of sample in a sealed 1 liter marinelli beaker
Counted for 24 hours on Gamma System 5*

Quantitative Analysis Summary

After being sealed for least 30 days to allow for equilibrium, the Orykta® sample was counted three times for 24 hours each time. A 24-hour background count was also performed. Naturally occurring Thorium-232 and Uranium-238 were analyzed using their respective daughter gamma emission lines. The Thorium concentration was determined using Actinium-228, Lead-212, Bismuth-212 and Thallium-208. The Uranium concentration was determined using Lead-214, Bismuth-214 and Protactinium-234m gamma emissions. It should be noted that the Protactinium-234m is a better indication of the actual Uranium content than either Lead-214 or Bismuth-214.

Uranium Concentration		
Nuclide	Concentration (ppm)	
Pb – 214	.0037	
Bi – 214	.0033	
Pa234m	.006	Average U ppm: 0.0046
Thorium Concentration		
Ac-228	.0111	
Pb – 212	.0147	
Bi – 214	.0081	
Pa234m	.0105	Average Th ppm: 0.0111