SNC-STR-90-9

BIRKBECK COLLEGE
University of London

Department of Physics
Tel. 01-631 6310
Direct line: 01-631 .....

Malet Street
London, WC1E 7HX

J. BARTON Jan 9/91

Natural Radioactive Contamination in Various Materials

These results were obtained using the Holborn multiple gamma ray detector*. The six crystal system is now under improved computer control but is still using some very poor scintillators and inadequate passive shielding. The following points also need to be appreciated:

1. Most of the samples were measured for two days.

2. The errors quoted are the statistical ones. There are many sources of systematic error which have not yet been studied properly. They could be at least as large as the statistical ones but the general trend of the results should be reliable.

3. The Uranium values are deduced on the assumption that the whole Uranium series is in equilibrium; if this is not true then the total amount of Uranium would be larger as the measurement is of gamma rays in a Radium decay product. Estimates of high energy gamma rate effects using these results will be reliable but not those for alpha particle and low energy gamma ray rates.

4. No attempt has yet been made to search for non-naturally occurring isotopes.

5. All results in mass parts per million.

6. Approximate conversion factors are:

Potassium	1 ppm	=	300 γ's (3000 β's) kg^{-1} d^{-1}
Uranium	1 ppm	=	1.0 x 10^6 chains kg^{-1} d^{-1}
Thorium	1 ppm	=	0.4 x 10^6 chains kg^{-1} d^{-1}

* "Methods of Low-level Counting and Spectrometry", pp 3-13, International Atomic Energy Agency, Vienna, 1981.

Table 3: Fractional Contribution to Background

		20cm S.C.	25cm S.C.
S.S	waist	93.42%	94.2%
	floor	.78%	.69%
	walls	5.8%	5.1%
Norite	waist	78.7%	75.2%
	floor	2.2%	2.6%
	walls	19.1%	22.3%
Norite	waist	87.9%	
no S.C.	floor	1.05%	
	walls	11.0%	