Colorado Department of Public Health and Environment

LABORATORY & RADIATION SERVICES DIVISION

Radiometric Measurement Report

THIS REPORT IS AN ORIGINAL DOCUMENT ONLY IF IT IS SIGNED OR INITIALED IN BLUE INK

Report of Whole Body (*in vivo*) Gamma Spectrometry Measurements

Name:

File number 5045

Referred by: U.S. Geological Survey
Department of the Interior
P.O. Box 25046
Denver, Colorado 80225

ATTN:

Date of measurement: 13-Nov-97

Data collection HPGe 125% Rel. Ef Range 50 - 2500 keV
Data analysis (primary) Peak search
Data analysis (secondary) Visual inspection

Nuclide	Assay	Units	NBS Handbook #69 Maximum Permissible Body Burden/Organ
Natural potassium	130.0 +/- 13.0	grams	---
Natural potassium	1.30 +/- 0.13	gm/kg body weight	---
Chromium-51	< 6.3	nanocuries	800000 Total body
Manganese-54	< 0.6	nanocuries	20000 Liver
Cobalt-58	< 0.6	nanocuries	30000 Total body
Iron-59	< 1.1	nanocuries	20000 Total body
Cobalt-60	< 0.5	nanocuries	10000 Total body
Zirco-/Niobium-95	< 0.7	nanocuries	20000 Total body
Ruthenium-106	< 5.7	nanocuries	3000 Kidney
Iodine-131	< 0.7	nanocuries	700 Thyroid
Cesium-134	< 0.8	nanocuries	20000 Total body
Cesium-137	< 0.7	nanocuries	30000 Total body
Radium-226	< 18.6	nanocuries	100 Bone
Uranium-Natural	< 19.0	nanocuries	500 Total body
	< 0.0		

COMMENTS: None

Date of next scheduled measurement: Not scheduled by RCF

Notes: 1. Analytical results reported in the format "<x" indicate that none of the radionuclide was found. The reported result shows the lower limit of detection (LLD) at the 95% statistical confidence level. Positive measuremements in the format "x ± y" are also at the 95% confidence level.

2. The Maximum Permissible Body Burden is the quantity of a radionuclide that would yield an absorbed dose equivalent of 5 rem if that quantity is maintained continuously for one year.

Reviewed by: Tony Harrison
L. Tony Harrison MSPH

Date: 6-May-98

This is an example of a Full Body Radiation Count performed at the CDPHE State Lab.

All the "less thans" mean that we didn't see any of those isotopes, but the potassium result indicates that the person was reasonably well nourished at the time. Potassium is a vital nutrient, in the sense that we die if it gets too low (or too high) and it's also naturally radioactive. The body regulates potassium so well that to a certain degree, it is used as a QC point, meaning that the results in g/kg body weight are very similar for all healthy people, although there are significant differences between men and women.

The other isotopes on the list have to do with the workplace and expected exposures. In the case of USGS workers, they were known to be working with activated samples from the reactor, so most of the things on the list are fission and activation products. A different type of workplace or exposure event would have a different list. We could never be sure exactly what was in the specific samples, so part of the process is to look for unknown/unidentified peaks in the spectrum, and identify them. Fortunately, it is very rare to find any.