

## **Overview of**

### ***VALIDATION OF THORIUM ANNUAL DOSE CONVERSION FACTORS (ORAUT-OTIB-0028, Rev. 01)***

Workers have the potential to receive radiation doses from exposure to various sources at many Department of Energy and Atomic Weapons Employer facilities. Dose reconstructors are required by the governing regulations to use the best available science, including guidance provided by the International Commission on Radiological Protection (ICRP). A computer code (i.e., computer program) called IMBA (Integrated Modules for Bioassay Analysis) is used to facilitate the calculation of internal doses using the methods and assumptions recommended by the ICRP. The exposure to specific organs is determined using IMBA and the associated assumptions provided in the computer code. This Technical Information Bulletin (TIB), *Validation of Thorium Annual Dose Conversion Factors* (ORAUT-OTIB-0028), provides documentation to show that IMBA meets the recommendations of the ICRP with respect to certain assumed values, called dose conversion factors, for radioactive thorium isotopes.

### **SUMMARY OF FINDINGS RESULTING FROM THE TECHNICAL REVIEW**

The technical contractor for the Advisory Board on Radiation and Worker Health (the Board) reviewed the TIB and produced the four findings summarized below:

*Finding #1:* The TIB refers to a number of files that were not provided to the technical contractor and which are required in order to independently verify the dose conversion factors.

*Finding #2:* Guidance is required when there is a long-term, or chronic, intake of a certain form of thorium.

*Finding #3:* Guidance is required when there is an acute, or sudden, intake of a certain form of thorium.

*Finding #4:* Guidance is required about what procedure should be followed when there is an intake of thorium particles with a diameter different from that which is assumed in the TIB.

### **RESOLUTION OF FINDINGS**

In response to the findings identified above, the National Institute for Occupational Safety and Health (NIOSH) did the following:

- (1) *Finding #1*: NIOSH provided the subject files to the technical contractor, which then independently verified the dose conversion factors.
- (2) *Findings #2 and #3*: The technical contractor determined that Rev. 2 of the procedure resolved the findings.
- (3) *Finding #4*: NIOSH responded by stating that it is not aware of a different process for selecting the particle diameter ever having been applied. The technical contractor accepted this response.

All issues were resolved to the satisfaction of the Board.

Note that since the issuance of Rev. 1, NIOSH decided that this Technical Information Bulletin should not only treat thorium radioactive isotopes, but also other radioactive isotopes. NIOSH subsequently rewrote the Bulletin as Rev. 02 and renamed it *Validation of DCAL Annual Dose Coefficients*. DCAL is the acronym given a specialized computer code for determining a range of specific dose coefficients to be used in reconstruction programs.