

Overview of

USE OF ICRP 66 TO CALCULATE RESPIRATORY TRACT DOSES (OCAS-TIB-008)

Workers may have the potential to receive a radiation dose to the respiratory tract due to the nature of work at many Department of Energy (DOE) facilities. At these facilities, tiny radioactive particles can become airborne and travel through the air very much like dust particles. Due to the small size of these particles, workers may breathe them in unknowingly. Once inhaled, some particles may be deposited inside the respiratory tract (e.g., lungs); others are exhaled. While in the body, the radionuclides (i.e., radioactive elements) attached to these particles decay and the energy given off contributes to the dose received by the tissue.

This procedure provides supplemental guidance to the National Institute for Occupational Safety and Health (NIOSH) Division of Compensation Analysis and Support (DCAS)* staff on how to calculate the doses to the lungs and other organs in the respiratory tract due to the inhalation of airborne particles containing radionuclides. The people who do the dose reconstruction are required by regulations that govern their work to use the best available science to perform dose reconstructions. This includes guidance provided by the **International Commission on Radiological Protection (ICRP)**.

Under the Energy Employee Occupational Illness Compensation Program Act of 2000 (EEOICPA), the dose to the particular tissue that developed cancer must be estimated. *ICRP Publication 66: Human Respiratory Tract Model for Radiological Protection (ICRP 66)* is a document developed by the ICRP that provides guidance on how to calculate dose to the respiratory tract after breathing in airborne radionuclides.

Following ICRP 66, NIOSH uses a computer program to facilitate the calculation of the internal doses to a particular organ. The specific organs of concern and the assumptions used to calculate the doses to them are shown in a table in the procedure. However, not all organs are included in the ICRP guidance. In order to deal with this limitation, other representative organs or tissues are used to calculate the doses. The procedure under review provides guidance on which tissues and organs included in ICRP 66 can be used as substitutes for those organs not specifically covered..

SUMMARY OF FINDINGS RESULTING FROM THE TECHNICAL REVIEW

The technical contractor's review of this procedure produced three findings:

Findings #1 and #2: Guidance on the selection of substitutes is not always clear.

* Formerly known as the NIOSH Office of Compensation Analysis and Support (OCAS).

Finding #3: The method described to assign the highest dose to the mouth, nose, and throat does not follow ICRP 66 recommendations.

RESOLUTION OF FINDINGS

In response to the findings identified above, NIOSH issued Revision 1 of this procedure, which addressed all of the concerns satisfactorily.

All findings in the procedure *Use of ICRP 66 To Calculate Respiratory Tract Doses* (OCAS-TIB-0008) are closed.