



Review of ORAUT-OTIB-0011, Revision 00

Kathleen Behling, SC&A, Inc.

Advisory Board on Radiation and Worker Health,
Subcommittee for Procedure Reviews (SPR)

October 28, 2026



ORAUT-OTIB-0011 (“OTIB-0011”)

- ◆ Title: “Technical Information Bulletin: Tritium Calculated and Missed Dose Estimates,” revision 00, issued June 29, 2004
- ◆ Outlines the methodology for estimating tritium doses from urine data for missed and calculated doses
- ◆ SC&A reviewed OTIB-0011 as part of the second set of procedure reviews:
 - Revision 0 issued June 2006
 - Revision 1 issued [August 2007](#)
- ◆ SC&A’s review identified two findings

OTIB-0011 overview

- ◆ Supports entry of organ doses into the Interactive RadioEpidemiological Program (IREP) via an Excel workbook, “Tritium Doses from Urine Data Workbook.xls”
- ◆ Based on International Commission on Radiological Protection (ICRP) models for assessing effective dose from tritiated water intake

OTIB-0011 dose calculation method

- ◆ Applies three calculation types based on measurement frequency and minimum detectable activity (MDA) values:
 - Type 1: Frequent measurements, trapezoid rule
 - Type 2: Large time gaps (greater than 40 days), exponential decay model
 - Type 3: Last measurement, exponential decay to infinity
- ◆ Adjusts calculations when measurements are below (missed) or above (calculated) MDA
- ◆ Incorporates exponential functions to model tritium clearance, with adjustments for measurements below MDA



SC&A's OTIB-0011 finding 1

OTIB-0011 remains incomplete until the workbook is reviewed. Only at that point does the user learn that an assumed tritium level can be entered for periods when no urine samples were collected, allowing this value to be included in the calculation.

SPR discussions of finding 1

8/29/2007 SPR meeting:

- ◆ The National Institute for Occupational Safety and Health (NIOSH) questioned this finding because the last section of OTIB-0011, “Time Periods with No Monitoring,” discusses times without bioassay data.
- ◆ Discussions determined that the workbooks constitute part of the procedure.
- ◆ SC&A was tasked to review the wording in the OTIB-0011 section about time periods with no monitoring.

10/2/2007 Board Review System entry:

- ◆ “Not explicitly addressed at October 2, 2007, meeting, but given the discussion held at a previous meeting, it is recommended that this issue be closed.”



SC&A's OTIB-0011 finding 2

OTIB-0011 assumes that tritiated water is instantaneously absorbed and distributed throughout body water. Our review of relevant literature indicates that absorption and distribution of tritium requires about 2 hours.

SPR discussions of finding 2

8/29/2007 SPR meeting:

- ◆ NIOSH and Oak Ridge Associated Universities are aware of the delay in mixing. The assumption of instantaneous mixing comes from the ICRP model, which is what is applied. It is not going to have an impact on the dose calculation.

10/2/2007 Board Review System entry:

- ◆ “Not discussed at the meeting, but SC&A agrees with this response.”
- ◆ “Not closed during the meeting, but given NIOSH’s response, it is recommended that this issue be closed.”



Questions?