Overview of

***BAYESIAN METHODS FOR ESTIMATION OF UNMONITORED Y-12 EXTERNAL
PENETRATING DOSES WITH A TIME-DEPENDENT LOGNORMAL MODEL***
(ORAUT-OTIB-0015, Rev. 0)

Workers at many Department of Energy and Atomic Weapons Employer facilities have the
potential to receive an external radiation dose due to exposure to radioactive material. The
Technical Information Bulletin (TIB), *Bayesian Methods for Estimation of Unmonitored Y-12
External Penetrating Doses With a Time-dependent Lognormal Model* (ORAUT-OTIB-0015),
provides guidance on the use of a method, based on the mathematical technique of Bayesian
analysis, for assigning doses at the Y-12 Site to personnel who have limited or no monitoring
data. This assignment of dose is based on data appropriately taken from records of other workers
with similar work history on the same site.

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: Certain variables are not defined.

Finding #2: The method to determine potential radiation dose uses a factor called Limit of
Detection (LOD) related to the sensitivity of radiation monitoring. The Limit of Detection
assumed by this procedure is too low and therefore not claimant favorable.

Finding #3: The TIB makes use of 40 calendar quarters of coworker exposure data for 1956–
1965, but another technical document indicates that only the data from 37 quarters are reliable.

Finding #4: The procedure does not contain any prescriptive information. Additionally, it
contains a level of detail related to the theory underlying the methodology that is far more than
reasonable, needed, or desired for dose reconstruction.

RESOLUTION OF FINDINGS

The National Institute for Occupational Safety and Health (NIOSH) decided to no longer use
Bayesian methods for dose reconstructions and cancelled the TIB. Therefore, all findings with
respect to this OTIB are no longer relevant.