ORAU Team **NIOSH Dose Reconstruction Project** Technical Information Bulletin – Assignment of Environmental Internal Doses for Employees Not Exposed to Airborne Radionuclides in the Workplace	Document Number: ORAUT-OTIB-0014 Effective Date: 06/22/2004 Revision No.: 00 Controlled Copy No.:_____ Page 1 of 7
Subject Expert: Pamela Olsen Document Owner Approval: Signature on File Date: 06/12/2004 Edward F. Maher, Task 5 Manager Concurrence: Signature on File Date: 06/22/2004 Richard E. Toohey, Project Director Approval: Signature on File Date: 06/22/2004 James W. Neton, OCAS Health Science Administrator	Supersedes: None

RECORD OF ISSUE/REVISIONS

ISSUE AUTHORIZATION DATE	EFFECTIVE DATE	REV. NO.	DESCRIPTION
Draft	06/09/2004	00-A	New technical information bulletin for the assignment of environmental internal doses for employees not exposed to airborne radionuclides in the workplace. Initiated by Pamela Olsen.
Draft	06/11/2004	00-B	Incorporates NIOSH review comments. Initiated by Pamela Olsen.
06/22/2004	06/22/2004	00	First approved issue. Initiated by Pamela Olsen.

1.0 PURPOSE

The purpose of this Technical Information Bulletin (TIB) is to provide guidance to dose reconstructors on (1) when they can assign environmental internal doses rather than potential workplace exposures to workers, and (2) the methodology for assigning such doses.

2.0 BACKGROUND

According to 42 CFR 82 and the *Internal Dose Reconstruction Implementation Guideline* (NIOSH 2002), internal radiation doses must be evaluated if there was any potential for internal radiation exposure. However, internal radiation doses to some employees were limited to doses from inhalation of airborne radionuclides in the ambient environment resulting from site operations or contamination, as opposed to localized airborne radionuclides from uncontained radioactive materials in the workplace. This TIB describes (1) the considerations dose reconstructors can use in identifying such employees, and (2) the methods dose reconstructors can use in assigning such doses to individuals.

3.0 IDENTIFYING EMPLOYEES FOR WHOM ENVIRONMENTAL INTERNAL DOSES ARE APPROPRIATE

The following considerations are important when evaluating the appropriateness of assigning environmental internal doses as opposed to internal doses from actual or potential workplace exposures:

- Job Description. This information is available from various sources including U.S. Department of Labor (DOL) records (including information provided by the claimant when completing the claim application), U.S. Department of Energy (DOE) records, and the claimant interview. Dose reconstructors should use the collective set of information regarding the employee's job when evaluating the appropriateness of assigning environmental internal doses.

  Attachment A includes a list of common job categories, divided into three categories according to the potential for internal radiation exposures from workplace sources. Employees with job descriptions that are consistent with Category 1 generally had little potential for exposure, although there will be exceptions on individual cases. Category 2 includes job categories that often had potential for exposure depending on specific job responsibilities and work locations (see below). Category 3 includes job categories that typically had potential for exposure, which would suggest that dose reconstructors should not assign environmental doses for these categories in lieu of dose from workplace sources unless they can determine definitively that the individual did not work with or near unconfined radioactive materials.

- Work Location. The location to be considered includes both the site and the specific work location(s) on the site. At some sites, there was little potential for workplace internal exposures at most areas; at other sites, there was such potential at only a few locations. Technical Basis Documents (TBDs) for a site, specifically Parts 2, 4 and 5 of the Site Profile, contain information on the potential for workplace internal exposures on specific sites and areas. In some cases, the TBDs might definitively identify work locations (in combination with job descriptions and timeframes, see below) for which there was no potential for internal exposures associated with workplace sources and for which it is appropriate to assign environmental internal doses.

- Timeframe. In general, measures to contain radioactive material improved over time throughout the DOE Complex. On the other hand, contamination levels might have increased in certain facilities, systems, and components over time, increasing the likelihood of exposure. By the mid-1980s, DOE policy mandated the implementation of physical controls, such as containments, and administrative controls, such as requiring monitoring if contamination reached certain levels, to ensure internal radiation exposures were not occurring to the extent practicable.

- Presence or Absence of Internal Monitoring Data. Although monitoring practices varied from site to site and over time, sites were generally more likely to monitor personnel with a potential for workplace internal exposures than those with no potential. Monitoring an employee for internal exposure, especially routinely or frequently, is often an indicator of potential internal radiation exposure. In some cases, however, employees received internal monitoring for reasons other than identification of internal exposures (e.g., a termination whole-body count performed primarily for recordkeeping or legal purposes). Part 5 of the Site Profiles identifies such situations. The presence of positive internal monitoring data is often a clear indicator of workplace exposures because detection capabilities were generally not sufficient to detect environmental or onsite ambient levels of airborne radioactive materials. (Note: There are notable exceptions, such as the detection of global cesium fallout in whole-body counts).

- Coworker Information. If available, dose reconstructors can use coworker internal monitoring data or other information to help verify the potential for workplace internal exposures. Such data and information might come from completed dose reconstructions, compilations of DOE data, interview information, or contact with coworkers who are not Energy Employee Occupational Illness Compensation Program Act (EEOICPA) claimants. Overall, the robustness of this information will improve over time with the collection and evaluation of information.

Note: The dose reconstructor should evaluate all of the above information collectively to determine if the assignment of environmental internal doses is appropriate for a particular employee and document the evaluation in the dose reconstruction report.

4.0 ASSIGNING ENVIRONMENTAL INTERNAL DOSES

If dose reconstructors determine (based on the considerations described above) that it is appropriate to assign environmental internal doses, they shall base the assignment of such doses on the information in Part 4 of the respective Site Profile (together with information in Part 5, as needed). This typically involves the assignment of specified intakes for the relevant years and work locations and running the Integrated Modules for Bioassay Analysis (IMBA) computer program to determine doses. These program runs can occur in advance on a generic or nominal basis to identify maximizing scenarios and doses and to permit scaling calculations based on assumed intakes.

In some cases, it might be appropriate to assign environmental internal doses for some radionuclides but not for others. For example, for a worker with potential exposure to plutonium in the workplace for whom an analysis of bioassay data is necessary to assign plutonium doses, it might be appropriate to assign environmental tritium doses if the worker was exposed to ambient tritium from stack releases at other locations on the site.

If calculated environmental internal doses are small (e.g., a few millirem per year) for a particular site and set of circumstances (e.g., employment location and timeframe) for clearly noncompensable cases, maximizing calculations in advance of the dose reconstructions could permit the assignment of

a reasonable maximum nominal value (e.g., 10 mrem/year) for cases that meet these criteria. This permits the processing of cases without a detailed assessment of specific intakes if the maximizing assumptions result in small doses that will not affect compensability.

If specific work locations on the site are unknown, dose reconstructors should always apply maximizing assumptions unless there is clear evidence (e.g., through the job description) that the maximum does not apply. As described in the previous section, however, an uncertain work location lessens the credibility of assigning environmental doses versus workplace internal doses. If work locations varied routinely (e.g., mail carrier, security guard), it might be appropriate to apply a site-wide average, if available, or use a weighted average based on percentage of time in various locations.

Calculated annual environmental internal doses that total less than 1 mrem for a specific radiation type and energy interval (for photons and electrons), are not required to be included in the Interactive RadioEpidemiological Program (IREP) input sheet. For such cases, the dose reconstruction report should include appropriate discussions..

5.0 APPLICATIONS AND LIMITATIONS

Because this TIB provides guidance on the considerations for assigning environmental internal doses, there are no inherent limitations on its use. The guidance contained herein is appropriate for all cases that require a decision on whether it might be appropriate to assign environmental internal doses.

REFERENCES

42 CFR 82, Methods for Radiation Dose Reconstruction Under the Energy Employees Occupational Illness Compensation Program Act of 2000; Final Rule, *Federal Register*/Vol.67, No. 85/Thursday, May 2, 2002, p 22314.

NIOSH (National Institute for Occupational Safety and Health), 2002, *Internal Dose Reconstruction Implementation Guideline*, Rev. 0, OCAS-IG-002, Office of Compensation Analysis and Support, Cincinnati, Ohio.

ATTACHMENT A
JOB CATEGORIES AND GENERAL INDICATION OF POTENTIAL FOR APPLICATION OF ENVIRONMENTAL INTERNAL EXPOSURES

The purpose of the following examples is to give the dose reconstructor a general idea of the types of job categories for which it is more likely that justification exists for assigning environmental internal doses because of the absence of a likelihood of exposure to airborne radionuclides from sources in the workplace. This list is not all-inclusive, but includes many of the categories most frequently provided in DOL records. As discussed in this document, job category (and associated responsibilities) is one factor among several that dose reconstructors must evaluate before they can determine whether to assign environmental internal doses.

Examples of Job Categories that Might Have Little or No Potential for Workplace Internal Exposures

Administrator
Assistant
Business Systems Specialist
Cafeteria Worker
Checker
Clerk
Computer Specialist
Dispatcher
Draftsman
Groundskeeper
Instructor
Manager
Medical Technician
Office Supervisor
Planner
QA Specialist
Program Analyst
Programmer
Radio Operator
Recruiter
Scheduler
Secretary
Telephone Operator

Examples of Job Categories that Generally Have Some Potential for Workplace Internal Exposures Depending on Job Specifics

Biologist
Boilermaker
Bricklayer
Carpenter
Construction Worker
Driver
Electrician
Electronics Technician
Engineer
Equipment Operator
Firefighter
Foreman
Foundry Worker
Heavy Equipment Operator
HP Analyst
Instrument Mechanic
Insulator
Ironworker
Janitor
Laborer
Mechanic
Painter
Patrolman
Photographer
Scientist
Security Guard
Specialist
Storekeeper
Supervisor
Surveyor
Technician

Examples of Job Categories that Probably Have Some Potential for Workplace Internal Exposures

Analytical Chemist
Assembly Worker
Chemical Operator
Fabricator
Glovebox Worker
HP Technician
Machinist
Material Handler
Metallurgist
Millwright
Pipefitter
Plumber
Processor
Production Worker
Radiation Monitor
Radiochemist
Reactor Operator
Steamfitter
Waste Handler
Welder