
Draft

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National Institute for Occupational Safety and Health

A Review of ORAUT-TKBS-0016-4 for Mound Plant – Occupational Environmental Dose

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SC&A, Inc. technical support for the Advisory Board on Radiation and Worker Health’s review of NIOSH dose reconstruction program

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Abbreviations and Acronyms

ABRWH	Advisory Board on Radiation and Worker Health
Bq	becquerel
CDC	Centers for Disease Control and Prevention
DR	dose reconstruction
MP	Mound Plant
NIOSH	National Institute for Occupational Safety and Health
ORAUT	Oak Ridge Associated Universities Team
TBD	technical basis document

1 Statement of Purpose

To support dose reconstruction (DR), the National Institute for Occupational Safety and Health (NIOSH) and the Oak Ridge Associated Universities Team (ORAUT) assembled a large body of guidance documents, workbooks, computer codes, and tools. One of those documents is ORAUT-TKBS-0016-4, revision 02, “Mound Plant – Occupational Environmental Dose” (ORAUT, 2019; “TBD-4”), which provides information to allow ORAUT dose reconstructors to assign occupational environmental dose to Mound Plant (MP) workers.

On July 28, 2025, SC&A was tasked by the Subcommittee for Procedures Review to review the most recently revised MP technical basis documents (TBDs). TBD-4 is part of those revised TBDs.

2 SC&A’s Review of ORAUT-TKBS-0016-4

SC&A found that the MP occupational environmental TBD has been issued as follows.

- October 6, 2004: revision 00 (ORAUT, 2004)
- March 13, 2009: revision 00 PC-1 (ORAUT, 2009)
- February 7, 2013: revision 01 (ORAUT, 2013)
- July 2, 2019: revision 02 (ORAUT, 2019)

TBD-4, revision 00 (ORAUT, 2004), was reviewed by SC&A in 2006 (SC&A, 2006). TBD-4, revision 01 (ORAUT, 2013), was reviewed by SC&A in 2016 (SC&A, 2016). SC&A identified no primary or secondary issues in either of their reviews. Therefore, in this present review, SC&A focused on identifying changes made to the contents, tables, and DR recommendations in TBD-4, revision 02, compared to those in revision 00 since revision 00 was the original issuance of TBD-4 and SC&A has no issues concerning TBD-4, revision 01 (SC&A, 2016).

2.1 SC&A’s review of NIOSH’s changes in content of TBD-4

SC&A reviewed the contents of TBD-4, revision 02, and found that several sections had been added:

- Section 4.1: Introduction
- Section 4.1.1: Purpose
- Section 4.1.2: Scope
- Section 4.1.3: Special Exposure Cohort (for MP workers, along with effective dates)
- Section 4.2.7: Assignment of Ambient External Dose (also discusses use of values in table 4-20)

One section in TBD-4, revision 00 (previous section 4.1), which discussed the Dayton Facilities, was not included in revision 02.

SC&A compared paragraph by paragraph revision 02 of TBD-4 to revision 00. SC&A found only minor editorial changes and no changes in content that would impact DR for MP. Some of the wording in section 4.3 concerning uncertainties is slightly different in revision 02 compared to revision 00, but the results and summary table (4-21 in revision 02 and 4-30 in revision 00) provides the same numerical values. Additionally, the first three paragraphs of section 4.3 in revision 00, concerning the Dayton facility, are not contained in revision 02 of TBD-4.

SC&A found that, as stated in the Publication Records on page 3 of TBD-4, revision 02, recommendations from ORAUT-PROC-0060, revision 01 (ORAUT, 2006, pp. 14, 18, and 24), concerning ambient external dose assignments were incorporated in TBD-4, revision 02.

SC&A also found that all changes identified in the Publication Records on page 3 of TBD-4, revision 02, were included in the revision to the document.

SC&A identified no findings or observations concerning the contents of revision 02 of TBD-4.

2.2 SC&A's review of tables in TBD-4

SC&A compared the contents of the tables in revision 02 of TBD-4 to the contents of the tables in revision 00 and spot checked some of the numerical values of the many entries and was able to match NIOSH's values. SC&A found only minor editorial changes and no changes in content that would impact DR for MP.

In TBD-4, revision 00, table 4-29, "Mean and maximum environmental external radiation levels at Mound by year," the unit of sievert was used. However, in the equivalent table in revision 02 (table 4-20), dose values were changed to the unit of rem for consistency with DR reporting. SC&A found that the recommended dose equivalent values in sieverts from table 4-29 in revision 00 were correctly converted to units of rems for table 4-20 in revision 02. SC&A did note that some of the tables in revision 02 still use the unit of sievert.

In addition, the tables in revision 02 of TBD-4 list years in chronological order from earliest to most recent, which is more logical than the reverse order of some tables in revision 00.

SC&A identified no findings or observations concerning the tables in revision 02 of TBD-4.

2.3 SC&A's review of dose reconstruction recommendations in TBD-4

SC&A evaluated the DR recommendations in revision 02 of TBD-4 and compared them to those in revision 00. The key DR recommendations in revision 02 are contained in:

- Table 4-9: Sitewide annual median effluent inhalation intakes [in becquerel] (Bq)
- Table 4-11: Sitewide maximum annual intakes (Bq)
- Table 4-20: Mean and maximum environmental external radiation levels (rem) by year

DR recommendations in TBD-4, revision 02, have not changed compared to those in revision 00.

SC&A identified no findings or observations concerning DR recommendations in revision 02 of TBD-4.

3 Evaluation of Commitments to Modify the TBD

No previous issues were identified concerning TBD-4, revisions 00 or 01; therefore, NIOSH made no commitments to modify TBD-4 because of 2006 SC&A's review (SC&A, 2006).

4 Conclusions

SC&A reviewed the contents, tables, and DR recommendations in MP TBD-4, revision 02, and did not identify any findings or observations.

5 References

Oak Ridge Associated Universities Team. (2004). *Technical basis document for the Mound Site – Occupational environmental dose* (ORAUT-TKBS-0016-4, rev. 00).

<https://www.cdc.gov/niosh/ocas/pdfs/arch/mound4-r0.pdf>

Oak Ridge Associated Universities Team. (2006). *Occupational onsite ambient dose reconstruction for DOE sites* (ORAUT-PROC-0060, rev. 01).

<https://www.cdc.gov/niosh/ocas/pdfs/orau/orauproc/or-proc-60-r1.pdf>

Oak Ridge Associated Universities Team. (2009). *Mound Site – Occupational environmental dose* (ORAUT-TKBS-0016-4, rev. 00 PC-1).

<https://www.cdc.gov/niosh/ocas/pdfs/arch/mound4-r0-pc1.pdf>

Oak Ridge Associated Universities Team. (2013). *Mound Site – Occupational environmental dose* (ORAUT-TKBS-0016-4, rev. 01).

<https://www.cdc.gov/niosh/ocas/pdfs/arch/mound4-r1.pdf>

Oak Ridge Associated Universities Team. (2019). *Mound Plant – Occupational environmental dose* (ORAUT-TKBS-0016-4, rev. 02).

<https://www.cdc.gov/niosh/ocas/pdfs/tbd/mound4-r2-508.pdf>

SC&A, Inc. (2006). *Review of the NIOSH site profile for the Mound Laboratory Site* (SCA-TR-TASK1-0012). <https://www.cdc.gov/niosh/ocas/pdfs/abrwh/scarpts/sca-moundsp-r0.pdf>

SC&A, Inc. (2016). *SC&A's review of remaining site profile issues for Mound Laboratory related to current technical basis documents* (SCA-TR-2016-SP002, rev. 0).

<https://www.cdc.gov/niosh/ocas/pdfs/abrwh/scarpts/sca-moundsptbds-r0.pdf>