Responses to SCA-TR-2021-SP001, Revision 0, *Review of 2019–2020 Revisions to Rocky Flats Plant Technical Basis Documents*

Response Paper

National Institute for Occupational Safety and Health
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Mutty M. Sharfi
Oak Ridge Associated Universities Team

Reviewed by LaVon B. Rutherford
Division of Compensation Analysis and Support

ORAUT-TKBS-0011-2, ROCKY FLATS PLANT – SITE DESCRIPTION

Section 3.1.1 – SC&A (2005) Finding 8, Section 5.4.1 – Inadequate Information Regarding Recycled Uranium

> *On the basis of its acknowledgement and treatment in TBD* [technical basis document]*-5, SC&A recommends closure of this issue from a substantive standpoint. However, SC&A also recommends that, for consistency, TBD-2, revision 02, be revised to reflect this understanding* [SC&A 2021, p. 10].

NIOSH Response:

To be more consistent with the text in ORAUT-TKBS-0011-5, *Rocky Flats Plant – Occupational Internal Dose* [Oak Ridge Associated Universities (ORAU) Team (ORAUT) 2020b], edits to ORAUT-TKBS-0011-2, *Rocky Flats Plant – Site Description* [ORAUT 2020a], to point out that recycled uranium could have been at Rocky Flats Plant (RFP) starting in 1952 will be done in future revisions.

ORAUT-TKBS-0011-3, ROCKY FLATS PLANT – OCCUPATIONAL MEDICAL DOSE

Section 4.2 – General Review of ORAUT-TKBS-0011-3, Revision 03

> *SC&A does note that the "Publication Record" on page 2 of revision 03 contains incorrect table references for revision 03 (table 3-7 and table A-2 are no longer used in this version). Also, the reference to table 3-4 in at the end of the second paragraph in section 3.4.2 (p. 10), should be corrected to table 3-3, which has the organ dose estimates* [SC&A 2021, p. 17].

NIOSH Response:

Edits to ORAUT-TKBS-0011-3, *Rocky Flats Plant – Occupational Medical Dose* [ORAUT 2019a], to address these errors will be done in future revisions.

ORAUT-TKBS-0011-5, ROCKY FLATS PLANT – OCCUPATIONAL INTERNAL DOSE

Section 6.2.4 – SC&A (2005) Section 5.2.6.2 – Calibration of Lung Counting to Am-241

> *SC&A did find that table B-11, page 104, lacks units for the MDA* [minimum detectable amount] *values; it appears that it should specify the unit of nanocuries* [SC&A 2021, p. 31].

NIOSH Response:

Edits to ORAUT-TKBS-0011-5 [ORAUT 2020b] to add units for the MDA values will be done in future revisions.

Section 6.3 – TBD Does Not Consider Potential Contribution of Ingestion Pathway

> *TBD-5 should include recommendations for ingestion intakes or direct reference to the appropriate ingestion-intake-related document. Although this issue has been resolved in practice, ingestion intakes should be addressed in TBD-5 with reference to OCAS-TIB-009. Therefore, SC&A recommends that this issue remain open until appropriate revisions are made in TBD-5* [SC&A 2021, p. 33].

NIOSH Response:

TBDs are designed to contain site-specific guidance. The selection of intake pathway (e.g., inhalation vs. ingestion) is a generic issue to all sites and is therefore covered in ORAUT-OTIB-0060, *Internal Dose Reconstruction* [ORAUT 2018]. This is done in order to maintain consistency in dose assessments across all sites. There is no site-specific scenario that is being identified in this finding that would warrant the TBD to provide site-specific guidance. Therefore, no changes to ORAUT-TKBS-0011-5 [ORAUT 2020b] are recommended.

ORAUT-TKBS-0011-6, ROCKY FLATS PLANT – OCCUPATIONAL EXTERNAL DOSE

Section 7.3.4.1 – Default Neutron Energy Distribution

> ***Observation 1: Different neutron dose multiplier factors need clarification.***
>
> *The reason for the change in neutron dose multiplier factors listed in table 6-16 of revision 03 compared to table 6-14 of revision 00 needs clarification* [SC&A 2021, p. 50].

NIOSH Response:

These numbers were updated based on the guidance in ORAUT-OTIB-0055, *Technical Basis for Conversion from NCRP Report 38 Neutron Quality Factors to ICRP Publication 60 Radiation Weighting Factors for Respective IREP Input Neutron Energy Ranges* [ORAUT 2006], which was issued after ORAUT-TKBS-0011-6, *Rocky Flats Plant – Occupational External Dose*, Rev. 0 [ORAUT 2004].

Section 7.3.4.2 – Tables 6-18 and 6-19 of Revision 03

> ***Observation 2: LOD* [limit of detection] *values for 1962 and 1963 need clarification.***
>
> *The reason for recommending 226 mrem instead of the calculated value of 369 mrem in tables 6-18 and 6-19 needs clarification* [SC&A 2021, p. 50].

NIOSH Response:

The value of 369 mrem provided by SC&A in their finding cannot be reproduced. For 1962 and 1963, the LOD equation is $LOD = Blank + 1.65 \times \text{sqrt}(Blank)$. The value of *Blank* is calculated by the equation $Blank = 100 \times (16/10)$, which results in 160 mrem. Therefore, the LOD value should be $160 + 1.65 \times \text{sqrt}(160)$ or 181 mrem. Edits to ORAUT-TKBS-0011-6 [ORAUT 2019b] to correct the LOD value for 1962 and 1963 in Table 6-18 will be done in future revisions.

Section 7.3.4.3 – LOD Values for 2004 and 2005

> ***Observation 3: References for LOD values for 2004 and 2005 are needed.***
>
> *References for recommending photon, neutron, and beta LOD values for 2004 and 2005 are needed* [SC&A 2021, p. 51].

NIOSH Response:

Edits to ORAUT-TKBS-0011-6 [ORAUT 2019b] to provide references for the LOD values for 2004 and 2005 will be done in future revisions.

Section 7.3.5 – Missing or Incorrect Information

> *SC&A found that the following references were used in the text but were not listed in the reference section on pages 64–69:*
>
> - *Page 10: Sebelius (2013)*
> - *Page 11: NIOSH (2013)*
> - *Page 94: NIOSH (2006)*
>
> *SC&A found that the caption for table C-8 given in the list of tables at the bottom of page 93 should use the phrase "uranium workers" not "plutonium workers," per the actual caption for table C-8 on page 108* [SC&A 2021, p. 51].

NIOSH Response:

Edits to ORAUT-TKBS-0011-6 [ORAUT 2019b] to correct the references and fix the caption for Table C-8 will be done in future revisions.

References

NIOSH [2004]. Estimation of ingestion intakes. Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. OCAS-TIB-009 Rev. 0, April 13. [SRDB Ref ID: 22397]

ORAUT [2004]. Rocky Flats Plant – occupational external dose. Oak Ridge, TN: Oak Ridge Associated Universities Team. ORAUT-TKBS-0011-6 Rev. 00, January 20. [SRDB Ref ID: 20175]

ORAUT [2006]. Technical basis for conversion from NCRP Report 38 neutron quality factors to ICRP Publication 60 radiation weighting factors for respective IREP input neutron energy ranges. Oak Ridge, TN: Oak Ridge Associated Universities Team. ORAUT-OTIB-0055 Rev. 00, June 5. [SRDB Ref ID: 29980]

ORAUT [2018]. Internal dose reconstruction. Oak Ridge, TN: Oak Ridge Associated Universities Team. ORAUT-OTIB-0060 Rev. 02, April 20. [SRDB Ref ID: 171554]

ORAUT [2019a]. Rocky Flats Plant – occupational medical dose. Oak Ridge, TN: Oak Ridge Associated Universities Team. ORAUT-TKBS-0011-3 Rev. 03, August 19. [SRDB Ref ID: 177867]

ORAUT [2019b]. Rocky Flats Plant – occupational external dose. Oak Ridge, TN: Oak Ridge Associated Universities Team. ORAUT-TKBS-0011-6 Rev. 03, January 14. [SRDB Ref ID: 175317]

ORAUT [2020a]. Rocky Flats Plant – site description. Oak Ridge, TN: Oak Ridge Associated Universities Team. ORAUT-TKBS-0011-2 Rev. 02, August 20. [SRDB Ref ID: 180380]

ORAUT [2020b]. Rocky Flats Plant – occupational internal dose. Oak Ridge, TN: Oak Ridge Associated Universities Team. ORAUT-TKBS-0011-5 Rev. 04, September 1. [SRDB Ref ID: 178626]

SC&A [2021]. Review of 2019–2020 revisions to Rocky Flats Plant technical basis documents. Vienna, VA: SC&A Inc. SCA-TR-2021-SP001 Rev. 0, December 3. [SRDB Ref ID: 193211]