



MEMORANDUM

TO: Savannah River Site Work Group
FROM: SC&A, Inc.
DATE: January 31, 2018
SUBJECT: SC&A's ORAUT-OTIB-0075 Findings of 2010 and 2017

Introduction and Background

The documents relevant to this discussion are:

- ORAUT-OTIB-0075, Revision 00, *Use of Claimant Datasets for Coworker Modeling*, May 25, 2009 (NIOSH 2009; hereafter "OTIB-0075, Revision 00")
- ORAUT-OTIB-0075, Revision 01, *Use of Claimant Datasets for Coworker Modeling*, June 17, 2016 (NIOSH 2016a; hereafter "OTIB-0075, Revision 01")
- ORAUT-OTIB-0081, Revision 03, *Internal Coworker Dosimetry Data for the Savannah River Site*, November 22, 2016 (NIOSH 2016b; hereafter "OTIB-0081")
- SC&A 2010 report, SC&A-200-2009-28555, Revision 0, *Review of ORAUT-OTIB-0075: Use of Claimant Datasets for Coworker Modeling for Construction Workers at Savannah River Site*, January 13, 2010 (SC&A 2010)
- SC&A 2017 report, SCA-TR-2017-PR011, Revision 0, *SC&A's Evaluation of ORAUT-OTIB-0075, Revision 01, "Use of Claimant Datasets for Coworker Modeling,"* October 9, 2017 (SC&A 2017)

SC&A reviewed OTIB-0075, Revision 00 (NIOSH 2009), in 2010 (SC&A 2010). SC&A's report provided an overall review of OTIB-0075, Revision 00, and further expanded on Section 7.0 of OTIB-0075 concerning the Savannah River Site (SRS) data. In that expanded analysis, SC&A pointed out the need to look at possible stratification of coworker intake data according to radionuclide, work area, and craft for construction trade workers (CTWs) and non-CTWs.

After the National Institute for Occupational Safety and Health (NIOSH) issued OTIB-0075, Revision 01 (NIOSH 2016a), SC&A provided a report (SC&A 2017) that evaluated the revised OTIB-0075 to determine if the original findings identified in SC&A's 2010 report were resolved.

The following is a summary of the current status of SC&A's review of OTIB-0075, Revisions 00 and 01, and the related findings.

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Status of Evaluation of ORAUT-OTIB-0075

Evaluation of ORAUT-OTIB-0075, Revision 00

In OTIB-0075, Revision 00 (NIOSH 2009), NIOSH compared the intake values in the site's complete dataset to the intake values in the NIOSH OCAS Claimant Tracking System (NOCTS) to illustrate that the NOCTS dataset represents a sample of the complete dataset for use in a coworker intake model. The datasets for the following sites were analyzed:

- Y-12: Uranium urine bioassays, 1950–1988
- Mound Laboratory: Plutonium urine bioassay, 1960–1990
- SRS: Tritium dose, 1991–2000

In its 2010 analysis of OTIB-0075, Revision 00, SC&A:

- Agreed with the results for Y-12 uranium data results.
- Disagreed with the plutonium data results.
- Agreed with the SRS tritium data results, with the caution that the results only apply to tritium for that period and could not be extrapolated to other radionuclides and time periods without supporting evidence.

Evaluation of ORAUT-OTIB-0075, Revision 01

NIOSH added more entries into the datasets in OTIB-0075, Revision 01 (NIOSH 2016a). SC&A analyzed the new data and issued a report in 2017 (SC&A 2017), which can be summarized as follows (the finding numbers are the same in both the 2010 and the 2017 SC&A reviews):

- **Finding 1:** *At the Y-12 Plant, the complete (all-worker) and claimant datasets for uranium in urine from 1950 to 1988 show no significant difference at the annual level of aggregation. This finding confirms the conclusions reached in OTIB-0075 for uranium at the Y-12 Plant.*

This was a statement that SC&A concurs with NIOSH's results. Therefore, this presently would be considered an observation instead of a finding. SC&A recommends that this item be closed.

- **Finding 2:** *At the Mound Laboratory, the complete (all-worker) and claimant datasets for plutonium in urine from 1960 to 1990 show significant differences at the annual level of aggregation. This finding raises questions concerning the conclusions reached in OTIB-0075 for plutonium at the Mound Laboratory.*

SC&A found that the new NOCTS dataset for plutonium intakes at Mound Laboratory statistically represented the intakes in the complete dataset. This resolved Finding 2 of SC&A (2010). SC&A recommends closure of Finding 2.

- **Finding 3:** *At SRS, the complete (all-worker) and claimant datasets for annual tritium doses from 1991 to 2001 show no significant difference at the annual level of aggregation, but the sample size is very small and the regression results were dominated by a single year with high exposure, 1991. If this year is omitted, the complete and claimant datasets for annual tritium doses period from 1992 through 2001 again show no significant difference at the annual level of aggregation.*

This was a statement that SC&A concurred with NIOSH's results but cautioned that they cannot be extrapolated to other radionuclides and time periods. Therefore, this presently would be considered an observation instead of a finding. SC&A recommends that this item be closed.

- **Finding 6:** *At Y-12, only 37% of all claimants (3 out of 8) have data in the "complete" Y-12 uranium urine bioassay coworker database for 1950 to 1988. This subset of 731 claimants with uranium bioassay data had a total of approximately 70,000 bioassays.*

OTIB-0075, Revision 00, page 10, footnote 7, states that out of 1971 claimants, 731 claimants had bioassay records in the complete dataset, which is 37%.

OTIB-0075, Revision 01, page 8, states that a total of 1,585 claimants submitted 119,044 uranium urine samples. However, there was no indication in the text or footnotes of how many total claimants there were. Therefore, with the present information, SC&A could not determine the fraction of the number of claimants who were monitored (i.e., had bioassay records in the complete dataset) compared to the total number of claimants in the dataset to determine if Finding 6 has been resolved by the new data. At this point, the item could be considered an observation instead of a finding because it requests clarification or additional information. Therefore, this item remains open.

- **Findings 4, 5, 7, 8, 9, 10, 11, 12, and 13:** In 2010, SC&A performed example analyses of NOCTS data that led to these findings (SC&A 2010), which indicate that there could be stratification of coworker data by radionuclide, work area, or job type within the CTW and non-CTW groups, and between the two groups. Finding 7 was related to the Y-12 dataset, and Finding 8 was related to the Mound Laboratory dataset; the remaining Findings 4, 5, 9, 10, 11, 12, and 13 were all related to the SRS dataset. In OTIB-0075, Revision 01, NIOSH (2016a) illustrated that NOCTS datasets statistically represent complete datasets for certain radionuclides, for some sites, during specific time periods, but did not address possible radionuclide, work area, or job type stratification in the coworker data.

Suggested Path Forward

SC&A suggests the following course of action:

- Findings 1 and 3 can be closed because they only stated that SC&A concurred with the results, which would be considered observations by today's criteria.

- Finding 2 can be closed because it has been resolved by the addition data for Mound Laboratory.
- Finding 6 is a request for additional information concerning the total number of claimants in the dataset. SC&A will review this information when it becomes available, and if there is not a finding, this item could become a resolved observation.
- Findings 7 and 8 (for Y-12 and Mound Laboratory, respectively) can be closed because they are not applicable to OTIB-0075, Revisions 00 and 01. The original purpose of OTIB-0075 did not include addressing stratification or site-specific issues. In SC&A's original 2010 report, SC&A was using these as illustrative examples.
- Findings 4, 5, 9, 10, 11, 12, and 13 concerning SRS dataset stratification can be considered, as needed and if applicable, in the resolution of SRS dose reconstruction issues. These finding would be removed from consideration concerning OTIB-0075, Revisions 00 and 01, because the findings are more applicable to current SRS issues than to OTIB-0075.

Clarification Concerning ORAUT-OTIB-0081, *Internal Coworker Dosimetry Data for the Savannah River Site*

One of the current issues for dose reconstruction at SRS is the question of subcontractor CTW intakes versus prime contractor CTW intakes. This issue was not addressed in OTIB-0081, Revision 03 (NIOSH 2016b), which was mentioned in the SRS Work Group meeting of November 14, 2017. In OTIB-0081, NIOSH addressed the stratification of SRS intakes between CTWs and non-CTWs for:

- Americium-241 intake, solubility Type M, for the period 1964–1989
- Tritium dose for the period 1954–1990
- Thorium-232 intake, solubility Types M and S, for the period 1972–1989

OTIB-0081, Revision 03, pages 34 and 35, provides summary tables of the recommended intakes, or doses, for unmonitored workers.

As can be seen from the list above, OTIB-0081 does not address work areas or job types, nor does it address all the major potential SRS radionuclides or time periods needed for dose reconstruction.

Summary

SC&A recommends that (1) Findings 1, 2, 3, 7, and 8 be closed, (2) Finding 6 be resolved with clarification or additional data, and (3) the data generated by SC&A in deriving Findings 4, 5, 9, 10, 11, 12, and 13 be used as needed, and appropriate, to address intake issues at SRS.

References

NIOSH 2009. *Use of Claimant Datasets for Coworker Modeling*, ORAUT-OTIB-0075, Revision 00, National Institute for Occupational Safety and Health, Cincinnati, Ohio. May 25, 2009.

NIOSH 2016a. *Use of Claimant Datasets for Coworker Modeling*, ORAUT-OTIB-0075, Revision 01, National Institute for Occupational Safety and Health, Cincinnati, Ohio. June 17, 2016.

NIOSH 2016b. *Internal Coworker Dosimetry Data for the Savannah River Site*, ORAUT-OTIB-0081, Revision 03, National Institute for Occupational Safety and Health, Cincinnati, Ohio. November 22, 2016.

SC&A 2010. *Review of ORAUT-OTIB-0075: Use of Claimant Datasets for Coworker Modeling for Construction Workers at Savannah River Site*, SC&A-200-2009-28555, Revision 0, SC&A, Inc., Vienna, Virginia, and Saliant, Inc., Jefferson, Maryland. January 13, 2010.

SC&A 2017. *SC&A's Evaluation of ORAUT-OTIB-0075, Revision 01, "Use of Claimant Datasets for Coworker Modeling,"* SCA-TR-2017-PR011, Revision 0, SC&A, Inc., Vienna, Virginia, and Saliant, Inc., Jefferson, Maryland. October 9, 2017.