Recent SC&A & NIOSH Positions on ORAUT-RPRT-0091 re: Savannah River Site Americium-241 Source Terms (1971–1999)

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To the Advisory Board on Radiation and Worker Health, SRS and SEC Issues Work Groups

Teleconference Meeting

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Background – Americium-241 concern

- **Nov. 2017 WG meeting:** SC&A observed that some workers may have been enrolled in incorrect routine bioassay programs prior to 1999.
  - Specific example: Am-241 sources apparently excluded in Radiological Work Permit (RWP) preparation at two SRS facilities.
  - Am-241 findings included in 1998 WSRC self-assessment. Sitewide formal (systematic) radiological characterization process at SRS not established by WSRC until March 1999.
- SC&A's references requested by NIOSH. WG tasked SC&A to detail its concerns.
- **January 2018 SC&A memo:** SC&A noted its concerns without further investigation.

Background – ORAUT-RPRT-0091

- **June 2019 NIOSH response:** ORAUT-RPRT-0091, "Evaluation of Savannah River Site Americium-241 Source Terms Between 1971 and 1999 Using Bioassay Frequency Tables."
- **January 2020 SC&A memo report:** SC&A reviewed RPRT-0091.
- **October 2020 NIOSH response:** Provided expanded information in response to SC&A question 3 (worker enrollments) and question 4 (facility source term characterization).

Origin of issue

- Before March 1999, site bioassay control procedures included table of locations and job functions with recommended routine bioassay sampling types and frequencies.
- 1998 WSRC audit found some individuals responsible for RWP bioassay requirements were relying on these tables rather than establishing actual radioisotopes present in operations.
- Beginning March 1999, bioassay frequency tables dropped from WSRC procedures. All radionuclides potentially contributing 10 percent or more of inhaled dose were to be monitored.

RPRT-0091, Section 3: Description of SRS internal dosimetry program

- **NIOSH:** Describes SRS in vivo and in vitro bioassay monitoring programs.
- **SC&A:** Does not dispute this description but notes that RPRT-0091 does not clearly distinguish between monitoring policies and procedures of WSRC era (after 1989) and earlier DuPont era.
  - Some requirements cited, e.g., 100 mrem/year threshold for bioassay monitoring, were not prescribed as requirements until 1988, under DOE Order 5480.11, and not promulgated as regulations until 1995, under 10 CFR Part 835.
  - This program difference is detailed in SC&A's response to RPRT-0092.

RPRT-0091, Section 4: Americium, curium, and californium

- **NIOSH:**
  - Provides historic operational review of SRS locations identified for Am/Cm/Cf routine monitoring.
  - Identifies 10 new locations, in addition to 773-A, identified by Farrell and Findlay (1999).
- **SC&A**: Agrees with NIOSH's review of SRS facility locations for routine Am/Cm/Cf monitoring.

RPRT-0091, Section 5: Dose reconstruction for Am-241 at two SRS facilities

- **NIOSH:**
  - **Building 221-F:** While urinalysis for Am/Cm/Cf discontinued in 1989, chest counting continued into the 1990s
    - Any positive results for Pu would have distinguished and quantified any americum-241 present
    - Routine urinalyses for Am-241 required for job-specific RWPs at the time (WSRC era)
  - **Multi-Purpose Processing Facility (MPPF):** Inactive for much of 1990s, with first project involving Am/Cm solution not until 2004–2005
    - Reflected in RWPs in 1996, 1998
- **SC&A:**
  - Agrees that the two SRS facilities for which Am-241 as a source term was not identified in procedures for bioassay monitoring do not pose a dose reconstruction concern.

RPRT-0091, Section 6: Responses to SC&A questions

- **NIOSH June 2019 response to SC&A January 2018 memo:** Responded to SC&A questions about SRS programs and procedures to characterize facility radiological source terms, identify appropriate bioassays, properly enroll workers in bioassay programs, and ascertain the ramifications to dose reconstruction of identified gaps.
- **SC&A January 2020 report:** Provided specific responses to NIOSH's responses, but SC&A believes these programmatic issues are subsumed by the ongoing evaluation of ORAUT-RPRT-0092.
- **NIOSH October 2, 2020, response:** For these specific questions, emphasizes additional programmatic considerations. SC&A believes these considerations are encompassed by its updated response to ORAUT-RPRT-0092.

Conclusion

- NIOSH's explanation for the two SRS facilities (221-F & MPPF), for which unrecognized Am-241 sources were not included in RWP preparation, mitigates SC&A's original (Nov. 2017) concern.
  - Note: While these circumstances provide a pathway for adequate dose reconstruction of potential Am-241 internal doses for workers in these specific facilities, they do not resolve the larger question of whether source-term characterization at SRS in earlier years (particularly the DuPont era, 1972–1989 for SEC purposes) were sufficiently accurate and complete to support job planning and later, RWP, preparation. That concern is addressed in SC&A's review of ORAUT-RPRT-0092.

Questions?