



Initial Response to NIOSH Response Paper for ORAUT-RPRT-0092, Savannah River Site, 1991–2007

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SRS status: SEC-00103 review

- ◆ **July 12, 2021:** Board recommendation of SEC class for subcontractors, 1972–1990 (Oct. 12, 2021: *Federal Register* designation date).
- ◆ **April 22, 2022:** SC&A issued “Focused Review of ORAUT-RPRT-0092, Revision 00, and Remaining Petition SEC-00103 Evaluation Report Period: 1991–2007.”
- ◆ **Nov. 22, 2022** (SC&A receipt: **Jan. 5, 2023**): NIOSH issued response to SC&A’s focused review.

Designated SEC, 1972–1990

- ◆ ABRWH recommendation letter, July 12, 2021:
 - “All construction trade employees of Department of Energy subcontractors [excluding employees of the following prime contractors who worked at the Savannah River Site in Aiken, South Carolina, during the specified time periods: E. I. du Pont de Nemours and Company, October 1, 1972, through March 31, 1989; and Westinghouse Savannah River Company [WSRC], April 1, 1989 through December 31, 1990], who worked at the Savannah River Site from October 1, 1972 through December 31, 1990, for a number of work days aggregating at least 250 work days, occurring either solely under this employment or in combination with work days within the parameters established for one or more other classes of employees included in the Special Exposure Cohort.”

ABRWH SEC basis (1972–1990)

- ◆ ABRWH recommendation letter, July 12, 2021:
 - “Subcontractor construction trades workers [CTWs] conducted a broad range of work activities They may have worked in high-contamination and high-airborne radioactivity areas and may have been utilized for short-term high-exposure work tasks.”
 - “Subcontractor [CTWs] may have been ‘transient’ and not have worked for long periods at SRS and also may have been intermittently tasked with nonroutine radiological jobs under work permits, and thus were not likely enrolled in the routine (including termination) bioassay monitoring program.”

ABRWH SEC finding (1972–1990)

- ◆ ABRWH recommendation letter, July 12, 2021:
 - “The Board finds there to be **insufficient information, including a lack of job-specific radio-bioassay monitoring data for subcontractor construction trades workers, and assurance of workplace monitoring and source term data**, to enable NIOSH to estimate with sufficient accuracy all potential internal doses from radionuclides associated with fuel handling, reactor operations, fuel reprocessing, and/or research activities, to which the proposed class may have been exposed during the time period in question.”
(emphasis added)

When did information become “sufficient” to enable DR with sufficient accuracy?

- ◆ Remaining SEC period for subcontractor CTWs: 1991–2007
- ◆ In its 2022 focused review, SC&A examined the following information for sufficiency based on prior SEC designation:
 - WSRC Radiological Work Permit (RWP) and job-specific bioassay policies, procedures, and practices, and their implementation (trending numbers, percentages)
 - Assurance of workplace monitoring (data completeness: degree to which job-specific bioassays submitted)
 - Representativeness of scope and “matching” of radionuclides in RPRT-0092 sampling

Conclusion 1: Sampling premise is not sufficiently grounded in historical SRS practices

SC&A 2022 review

- ◆ Measured against the review criteria used by SC&A's review of RPRT-0092, the sampling premise is not sufficiently grounded in actual WSRC policies, procedures, and practices within the time period 1991–1998.

NIOSH 2022 response

- ◆ Transition between SRS operating contractors led to increasing RWP job-specific bioassays, due to reliance on procedures vs. RWP forms. Use of RWP forms with bioassay checklists lagged behind procedure-based bioassay collections in early 1990s; no evidence of RWP or bioassay inadequacy.
- ◆ Absence of bioassay requirements on RWPs “**irrelevant.**” (*emphasis added*)

Conclusion 1: SC&A 2023 initial response

- ◆ RWPs not implemented by WSRC procedure until late 1992.
- ◆ “Demonstrable implementation” of RWP/job-specific bioassay requirements not apparent in workplace until 1994–1995.
- ◆ RWP requirements for bioassay only evaluative marker for job-specific bioassay performance, in face of SRS history of nonconformance with its own RWP and job-specific bioassay procedures.

Conclusion 2: Results for direct and effective monitoring may be overstated

SC&A 2022 review

- ◆ NIOSH did not address all the radionuclides listed in the RWPs when determining data completeness for job-specific bioassay monitoring.
- ◆ Therefore, the percentage of matching results for direct and effective monitoring appear to be overstated in the RPRT-0092 summary in section 6.3.

NIOSH 2022 response

- ◆ NIOSH agrees that they did not address all radionuclides but has updated those tallies in this response.
- ◆ NIOSH contends that their conclusion has not changed: A co-exposure model can still be constructed.

Conclusion 2: SC&A 2023 initial response

- ◆ NIOSH's 2022 response provides a summary analysis of their updated tallies and weighted point estimates (table 5).
- ◆ The values in table 5 are very similar to SC&A's values in tables 3 and 4 of SC&A's 2022 review.

Conclusion 3: Generalized matching is not sufficient

SC&A 2022 review

- ◆ SC&A found during the 1991–1998 period that plutonium coworker matches were nearly 96% on the same RWPs, but inclusion of additional criteria (e.g., the same date, time, and craft) decreases this percentage significantly (down to 45%).

NIOSH 2022 response

- ◆ While not documented in RPRT-0092, the criteria used for a coworker match was a subCTW on the same RWP, same date, and same time. Additionally, a laborer could not be used as a coworker for another craft.
- ◆ In summary, coworkers used for effective monitoring matching need only have the same or higher exposure potential than the unmonitored worker. SC&A's criteria of same RWP, same date, same time, and same craft are far too restrictive and do not need to be considered when creating a co-exposure model.

Conclusion 3: SC&A 2023 response

- ◆ SC&A's 2019 review of RPRT-0092 found instances of the same date and/or same time criteria not met.
- ◆ NIOSH quality assurance review may have corrected that condition.
- ◆ To use a coworker's data from another craft for effective monitoring matching would require that it be apparent that the coworker's craft had the potential to have the same or higher exposure potential than the unmonitored worker.

Conclusion 4: RWP-specified, job-specific bioassay data are incomplete

SC&A 2022 review

- ◆ RWP-required, job-specific bioassay data should be assumed to be substantially incomplete for purposes of demonstrating monitoring data completeness and representativeness for use in a co-exposure model until the end of 1996.
- ◆ A 100% resampling of all workers on job-specific bioassays was performed for 1997; enhanced accountability and tracking of job-specific bioassays were implemented in 1998.

NIOSH 2022 response

- ◆ NIOSH disagrees that SRS self-assessments in response to regulatory issues in 1998 indicate monitoring data incompleteness from a statistical standpoint or that finding bioassay program inadequacy is relevant to constructing a bounding co-exposure model.
- ◆ If the Track database samples prescribed by the site internal dosimetrist when a suspected intake occurred are part of NIOSH's co-exposure database, this is evidence that a bounding co-exposure model could be constructed, despite the SC&A conclusion that "RWP-specified, job-specific bioassay data are incomplete."

Conclusion 4: SC&A 2023 response

- ◆ If it can be demonstrated that bioassay data from “the most highly-exposed workers” are fully captured in the Track database, beginning sometime in 1991, that would be useful.
- ◆ However, “special” bioassays are typically for cause, to follow up suspected intakes via field indicators, and would not be necessarily representative for missed intakes.
- ◆ Also, WSRC 1999 self-assessment found deficiencies in how personnel were identified for special bioassays (SRDB 167677, p. 22).
- ◆ The only firm verification of job-specific bioassay completeness was performed in 1997 (79% incomplete).
- ◆ For 1991–1996, SC&A applies available fractional markers to gauge RWP and job-specific bioassay implementation and sees this as the best measure of program implementation.

Conclusion 5: Feasibility of co-exposure model needs balance

SC&A 2022 review

- ◆ Feasibility of co-exposure model needs to balance RWP implementation with completeness of coworker data.

NIOSH 2022 response

- ◆ Accepts SC&A's position that if SC&A conclusions 1–4 are addressed, then SC&A “would consider NIOSH’s conclusion valid . . . to support development of a co-exposure model.”

Conclusion 5: SC&A 2023 response

- ◆ Conclusion 5 also included the following:
 - “A conclusion about the feasibility of a co-exposure model for workers lacking bioassay results for nonroutine work may be reached by balancing the programmatic limitations of the RWPs and job-specific bioassays with the availability of suitable coworker bioassay data (as given in RPRT-0092).”
- ◆ SC&A believes a co-exposure model for subcontractor CTWs cannot be shown to be feasible **unless** and **until** data completeness and representativeness are demonstrated by both RWP-related bioassay performance and SRS procedural implementation.
- ◆ The lack of **both** figured in the designated SEC for 1972–1990.

Possible SEC cutoff dates for sufficiency of job-specific bioassay data and program assurance

- ◆ **1991:** NIOSH finds field procedures changed to require notifications for suspected intakes; “Track” system cited by LaBone
 - RWP-specified bioassay = 0%, direct monitoring (DM) = 91%, effective monitoring (EM) = 96%
- ◆ **1992:** RWPs required by WSRC procedure, includes job-specific bioassays
- ◆ **1994:** SC&A finds listing of required bioassays on RWPs exceeds 60%; required listing of target radionuclides
 - RWP = 63%, DM = 73%, EM = 90%
- ◆ **1996:** Last year for which job-specific bioassays not verified as complete by WSRC (responding to 1997 self-assessment)
 - RWP = 85%, DM = 75%, EM = 83%
- ◆ While the trend lines for DM and EM metrics are uneven, the upward trend for inclusion of bioassay requirements in RWPs is apparent and steady

SC&A review continues

- ◆ SC&A seeks further corroboration of LaBone interview statements (NIOSH 2022, p. 15) about 5Q1.1-506 interpretation, “special” monitoring programs, and Track database, to verify inclusion of “most-highly exposed workers” in bioassay dataset “at some point in 1991.”
- ◆ Based on SEC designation for prior years (1972–1990), SC&A’s position remains that acceptable co-exposure models for subcontractor CTWs can be developed for post-1990 when both:
 1. RWP-required, job-specific bioassay data are shown to be sufficiently complete and representative for subcontractor CTWs.
 2. Evidence of program adequacy is available to show WSRC assured required bioassays were performed and submitted.
- ◆ SC&A conclusion 5 acknowledges that an SEC cutoff date for “sufficiency of information” to support co-exposure model development needs to balance the two above considerations upon which the existing SEC designation is based for 1972–1990.