



SC&A Summary Position on Dose Reconstruction Feasibility for Subcontractor Construction Trade Workers at SRS

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Job-specific vs. routine bioassays

- ◆ “The purpose of the job-specific bioassay sampling program is to collect bioassay samples from workers whose **routine bioassay program does not include some or all of the radionuclides present at the work site and who are not on a routine program**” (Kornacki et al., 1998, PDF p. 15; emphasis added).
- ◆ “it is very important to realize that being on a routine sampling program does not automatically cover the bioassay sampling requirement specified on the RWP. . . . **routine sampling programs may not be appropriate for work involving non-routine mixes or concentrations of radioactive material**” (WSRC, 1997, PDF p. 9; emphasis added).
- ◆ “certain facilities such as the Savannah River Technology Center (SRTC) and the solid waste disposal facilities handle a wide array of radioactive materials, some of which may not be encountered in the typical radiological work environment by workers in those areas” (WSRC, 1998, p. 2).

Key question

- ◆ Deficiencies in permit-driven, job-specific bioassay program identified in the late 1990s
- ◆ Only 21% compliance with job-specific bioassay requirements (1997)
- ◆ Transient short-term subcontractors are the most likely (but not sole group) affected by the job-specific bioassay program
- ◆ Former worker interviews indicate that some subcontractors were brought in to do the work with higher exposure potential (NIOSH, 2017)
- ◆ **Key Question: Did deficiencies exist in the completeness of the job-specific bioassay program during prior years that would preclude formulation of a representative co-exposure model?**

Overview of NIOSH work products not yet discussed by work groups

- ◆ ORAUT-RPRT-0094, rev. 00, “Bioassay for Subcontractor Construction Trade Workers at the Savannah River Site from 1972 to 1997,” contains a compilation of claimant internal monitoring data for subcontractors (NIOSH, 2019a; “RPRT-0094”)
- ◆ Analysis of plutonium logbook data for subcontractors (NIOSH, 2020a)
- ◆ Stratification analyses of claimant tritium bioassay for subcontractors and prime contractors (NIOSH, 2021a, 2021b)

ORAUT-RPRT-0094 overview

- ◆ Provides estimates of the numbers and fractions of subcontractor construction trade workers (subCTWs) who were monitored by SRS for external and internal exposure during 1972 through 1997
 - Established from the number of claims in the NOCTS database in which one or more position description met the definition of a subCTW
 - Used claimants who had records of external monitoring, whole-body counts, and urine bioassay results within a given year

SC&A tasked to review RPRT-0094

- ◆ Savannah River Site work group tasked SC&A on October 21, 2020, to review RPRT-0094 to determine if the report:
 - Supports a co-exposure model for SRS subcontractors, consistent with the guidelines in DCAS-IG-006 (e.g., completeness and representativeness)
 - Substantiates the actual representativeness of the claimant data sample collected as compared to that of the overall site worker population

Summary of SC&A's review approach for RPRT-0094

- ◆ **Primary question:** *Does the analysis in RPRT-0094 obviate the original concerns with potential deficiencies in the permit-driven, job-specific bioassay program?*
- ◆ SC&A presented the analysis in “Summary of Key Issues Concerning Internal Monitoring Completeness and Representativeness for SRS Subcontractor Construction Trade Workers” (SC&A, 2021).

SC&A's primary concerns regarding RPRT-0094

- ◆ While RPRT-0094 covers a considerable amount of data for the timeframe and facilities in question, it suffers from three basic issues:
 1. It homogenizes all forms of SRS internal monitoring data into a single metric for application, which precludes a definitive treatment of data completeness for specific radionuclide source terms (findings 1–6).
 2. It does not substantiate the actual representativeness of the claimant data sample collected as compared to that of the overall site worker population.
 3. It does not address the completeness and representation of permit-driven, job-specific monitoring.

Comparison of SC&A's evaluation to homogenized evaluation in RPRT-0094

Radionuclide category	SC&A percentage range of internally monitored subCTWs during DuPont era* (1972–1990)	SC&A percentage range of internally monitored subCTWs during WSRC era** (1991–1997)	SC&A percentage range of internally monitored subCTWs for all years evaluated*** (1972–1997)
Plutonium	3–34%	47–73%	3–73%
Fission products	2–84%	73–94%	2–94%
Uranium	2–84%	71–94%	2–94%
Neptunium	0–84%	60–90%	0–90%
Americium	0–10%	4–17%	0–17%

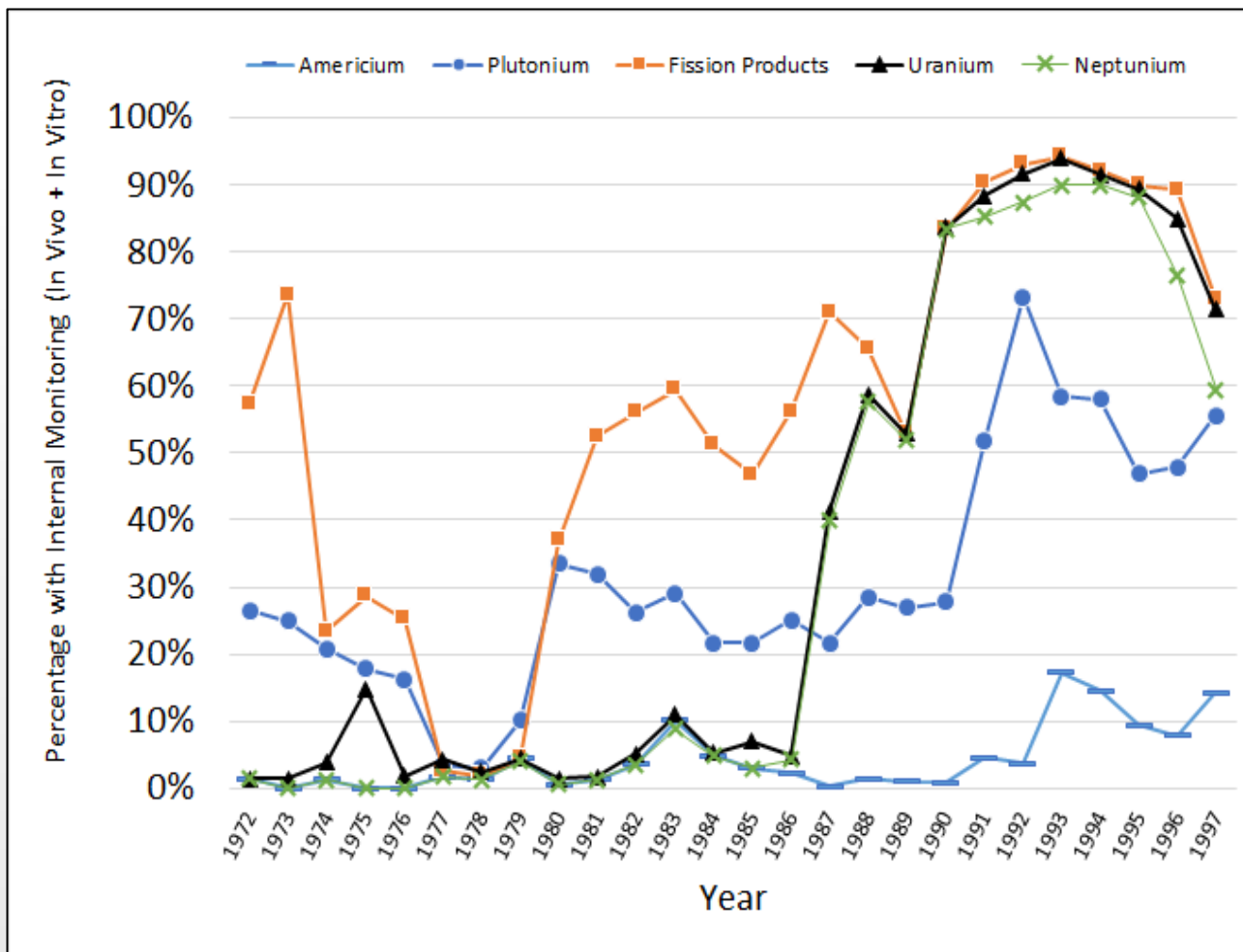
* Can be compared to the RPRT-0094 range of all non-tritium monitoring, 5–87%.

** Can be compared to the RPRT-0094 range of all non-tritium monitoring, 76–96%.

*** Can be compared to the RPRT-0094 range of all non-tritium monitoring, 5–96%.

Source: Table extracted from SC&A (2021), table 4.

Summary of SC&A's evaluation of claimant internal monitoring data



Source: SC&A (2021), as figure 8.

SC&A's summary conclusion on applicability of RPRT-0094

SC&A does not find that the analysis of claimant subcontractor data in RPRT-0094 adequately addresses the original concerns of permit-driven, job-specific bioassay monitoring. It is SC&A's position that the original concerns related to the job-specific bioassay program can only be adequately addressed through a direct connection between Radiological Work Permit (RWP) monitoring requirements and available internal monitoring for those workers (as analyzed in ORAUT-RPRT-0092).

SC&A evaluation of plutonium logbook data

- ◆ NIOSH cites plutonium logbook bioassay data to illustrate that subCTWs were adequately monitored in areas outside 773-A between 1972 and 1990.
- ◆ SC&A's review of logbook data confirmed the vast majority of samples were routine ones, with no distinction being made for permit-indicated or job-specific bioassays.
- ◆ SC&A finds it is not relevant to cite the preponderance of routine plutonium bioassay samples as a basis for concluding that subCTWs, including those on job plans, were sufficiently monitored in areas outside of 773-A.

Preliminary comments on tritium bootstrapping analysis

- ◆ Tritium was specifically omitted from the ORAUT-RPRT-0092 analysis as not relevant due to low dose potential and general restriction to reactor areas.
- ◆ The bootstrapping analysis establishes whether stratification may be necessary (NIOSH, 2021a, 2021b).
- ◆ The bootstrapping analysis does not address the completeness and representativeness of subcontractors working under the permit-driven, job-specific monitoring program in any subsequent co-exposure models.
- ◆ Prior to stratification, completeness and representativeness should be established.

SC&A's overall conclusions on new material

- ◆ SC&A concludes that RPRT-0094 (NIOSH, 2019a) does not meet the intent of DCAS-IG-006 (NIOSH, 2020b) requiring data completeness to be determined from sufficient measurements established from monitored workers with comparable activities and relationships to the radiation environment.
- ◆ SC&A does not believe the analysis of plutonium logbook data in NIOSH (2021a) (primarily routine monitoring) adequately addresses the issue of the completeness of the permit-driven, job-specific monitoring program nor the representativeness of available data in the formulation of a co-exposure model.
- ◆ In SC&A's opinion, the bootstrap analysis of tritium data does not establish that subcontractors on permit-driven, job-specific bioassay are appropriately represented in co-exposure models.

SC&A's overall conclusions on job-specific bioassay

- ◆ SC&A believes the only adequate analysis to establish completeness and representativeness of workers on permit-driven, job-specific bioassay was attempted in ORAUT-RPRT-0092 (NIOSH, 2019b).
- ◆ RPRT-0092 is the only analysis that allows for the direct and unambiguous connection between RWP monitoring requirements and subsequent internal monitoring.
- ◆ SC&A's review of RPRT-0092 concluded:
 - without the validation of subcontractor data completeness that the RPRT-0092 evaluation was to provide, there has been no substantiation that there are sufficient job-specific bioassay measurements available to ensure that the coworker data in OTIB-0081 are either bounding or representative of the exposure potential of subcontractors performing permit-driven work across the SRS site. [SC&A, 2019, p. 65]

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