Advisory Board on Radiation and Worker Health Savannah River Site (SRS) Work Group

Recommendation for SEC Class Consideration

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Savannah River Site (SRS)

- SRS began operations in 1952; devoted to material production for nuclear weapons program.
- SRS processes included nuclear fuel fabrication, reactor operation, radiochemical processing, uranium recycling, plutonium and tritium production, neutron source production, and waste management.
- Facilities (30+) include: production reactors, F and H processing canyons, Solid Waste Disposal Facility, F/H Area Tank Farms, Pu Form Facility (PUFF) and Pu Experimental Facility (PEF) facilities, Receiving Basin for Offsite Fuel facility, Uranium Target Fabrication Facility, Fuel Fabrication Facility, scrap recovery facility, and 773-A analytic laboratory.
- Key Radionuclides: Pu, Am, U, NP, Th, tritium, fission products
- For RPRT-0092 analysis period (1972-1998), two operating contractors: DuPont (1972-1989) and Westinghouse (1989-1998).

SEC History: SRS

Petition 00103

- Qualified, March 2008
- NIOSH Evaluation Report (Nov 14, 2008): Jan 1, 1950-Dec31, 2007
  - Addendum 1 (May 4, 2010): Jan 1, 1953-Dec 31, 1965
  - Addendum 2 (Aug 9, 2011): Jan 1, 1953-Dec 31, 1972
- Advisory Board on Dec 29, 2011, recommended SEC class for Jan 1, 1953-Sept 30, 1972 for "all employees" at SRS, due to lack of sufficient information necessary "to complete individual dose reconstructions with sufficient accuracy for internal radiological exposures due to thorium in some areas of the facility during the time period in question."
  - **Addendum 3 (Nov 20, 2012): Oct 1, 1972-Dec 31, 2007 – under review by work group, with focus of current review on subcontractors, and job-specific bioassay data completeness and representativeness for 1972-1998**

Subcontractors at SRS

- Supplemented in-house construction trade workers (CTWs); performed same crafts (e.g., electricians, carpenters, laborers, sheet metal workers, welders).
- Relatively few in numbers in 1970s, but grew rapidly from 1980s to early 1990s as SRS mission expanded to include major waste management, environmental upgrades, D&D, and reactor restart operations.
- Usually temporary and intermittent hires, subCTWs, moved throughout SRS facilities, may have been assigned higher exposure radiological jobs (based on interviews with former workers), which were often performed under work permits.

SEC Issue: Subcontractor bioassay data completeness

- In 2014, SC&A reported to ABRWH that SRS subcontractor records had not been verified and validated (V&V) for completeness. NIOSH considered options for substantiating bioassay data completeness, including use of CPWR and NOCTS data.
- In 2017, NIOSH performed subCTW bioassay data completeness review based on Job Plans for bldg. 773-A for 1981-1986 (RPRT-0083); ABRWH tasked SC&A to perform similar site-wide review for 1972-1998.
- SC&A found completeness based on indicators of subCTW job-specific bioassays in range of 66-84%, depending on assumptions made. NIOSH determined higher rates. More notable was contractor self-survey showing **only 21% completeness for job-specific bioassays in 1997**, leading to DOE enforcement action at the time.

Work Group Evaluation

- NIOSH expanded scope of SRS subCTW review with additional permit records from Atlanta Federal Records Center; evaluation issued in June 2019, as RPRT-0092. Concluded that for 1972-1998, “a large percentage of subCTWs were monitored for potential intakes while working under a Job Plan, SWP or RWP.”
- SC&A notes “large percentage” (89%) is over all years, all permits, one radionuclide, but finds conclusion based on faulty premise and assumptions regarding what, when, and how bioassays matched.
- In context of permit-related job-specific bioassays, for at least 1972-1990, SC&A finds:
  - Inability to link job-specific bioassays to permits
  - Uncertain target radionuclides, lack of reliable site-wide facility characterization
  - Only one SRS facility (773-A) surveyed (with none for 1975-1979)
  - Low completeness rates found for Am-241 in 1981-1987 (e.g., 20% actually monitored, 33% total could be considered represented in co-exposure model). RPRT-0092 survey results for Am-241 only for 1973, 1981-1987.

Work Group Discussion:
Meetings of Dec 6, 2019 and Nov 17, 2020

- Did RPRT-0092 accomplish its objective of demonstrating that “monitored [subCTWs] and unmonitored [subCTWs] worked side by side in the same radiological environment at the same time”? Can completeness of job-specific bioassays for subCTWs be demonstrated? *Not for at least 1972-1990*
- Does the limited scope of review for 1972-1990 (just 773-A) impair a site-wide conclusion regarding subCTW job-specific bioassay completeness for those years? *Yes*
- Does limited subCTW bioassay data for Am-241 (only 1973, 1981-1987), with 20% monitored and 33% represented in co-exposure model, satisfy IG-006 criteria? *No*
- Are there alternative methods of demonstrating completeness available? Or applying a co-exposure model for unmonitored subCTWs based on routine, incident, or NOCTS data? *None that satisfy IG-006, co-exposure guidelines concerning representation*

Work Group Conclusion

- For 1972-1990, RPRT-0092 falls short of demonstrating SubCTW job-specific bioassay data completeness due to lack of permit records to support evaluation and inability to relate bioassays to specific permits in DuPont era.
- For 1991-1998, subCTW job-specific bioassay data completeness may be established, but with some qualifications that remain to be addressed regarding effectiveness of RWP bioassay compliance.
- Alternative methods, including relying on routine monitoring and NOCTS data, are not sufficient to establish **completeness** and **representativeness** of subCTW data, as required by IG-006 co-exposure guidelines.

Work Group Recommendation

- That the Advisory Board consider an SEC class for subcontractor employees at SRS for October 1, 1972 to December 31, 1990.
- Basis includes:
  - Unmonitored subCTWs who should have been monitored under work permits and Job Plans for job-specific bioassays, but were not.
  - Potential for elevated exposures over various site locations at intermittent times – subCTWs were often transient, performed high exposure potential jobs under Job Plans and permits, and did not consistently provide termination bioassays.
  - Severely constrained scope of data: only 773-A facility
    - Limited data analysis demonstrates real issues for Am-241 across all years
    - Uncertain completeness for other radionuclides (Pu, FP): subCTW job-specific bioassay evaluation in RPRT-0092 performed only for 773-A, none for 1975-1979