Savannah River Site
SEC Petition Evaluation Report Review
Status Report

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Advisory Board on Radiation and Worker Health
Augusta, Georgia
April 29, 2014
Remaining Key Work Group Issues

Ongoing Review (post-September 1972):
- Neptunium-237
- Thorium
- Overall CTW to NCW internal dose comparison
- Subcontractor database validation

Other Open Issues, including:
- Recycled uranium
- Coworker model to be reviewed:
  - Trivalent actinides, Am, Cm, Cf
  - Fission and activation products
  - Co-60
- Tritium/tritides
- Exotic radionuclides
- Internal dose due to incidents
SC&A Review Activities

• Onsite Data Captures and Interviews:
  – June 2013: Interview of crafts and construction workers
  – August 2013: Joint NIOSH/SC&A data capture and interviews
  – November 2013: Joint NIOSH/SC&A data capture and interviews

• Ongoing SRS Document Reviews

• Work Group/NIOSH/SC&A Technical Calls

• Work Group Calls/Meetings:
  – February 5 and February 26, 2014 (neptunium and thorium)
  – September 26, 2013, and April 7, 2014 [OPOS (One person-One sample)]
Neptunium – Issue Status

• NIOSH Developed Coworker Model for Np-237 (ORAU-RPRT-0056, 2012)
  – Proposes to use data for all workers based on conclusion that dose distributions of CTW and NCW workers were the same
  – Proposes dose estimation methods for Np-237

• SC&A Provided Comments in July 2013 Review to which NIOSH Responded in January 2014:
  – Findings 1–8 question CTW/NCW comparison and express concerns over OPOS
    • Issues included whether both groups were monitored in same manner (or needed to be), statistical validity, minimum sampling size, and sample dominance
  – Findings 9–19 address specific methods for Np-237 dose estimation
    • Issues included use of chest vs. whole body geometry, whether 86.5 keV photons suitable for estimating Np-237, how whole body counts and urinalysis results actually compare, assumptions made about intake dates, and rationale for sharp discontinuities in observed in-vivo based intake rates for Np-237
Neptunium – Work Group Actions

Work Group Meeting Call (February 26, 2014):

• Findings 1–8 of SC&A report address aspects devolving to comparability of CW:NCW — deferred to SEC Work Group for OPOS discussion

• Findings 9–19 address various concerns over current Np-237 dose estimation approach based on available bioassay data – NIOSH agreed to conduct additional comparative analysis of bioassay data and review new Np/Pu concentration ratio data for possible application
Thorium – Issue Status

• NIOSH Issued Addendum #3 to ER Addressing Thorium (post-1972); Presented at the December 2012 Advisory Board Meeting, Knoxville
  – Addendum #3 concludes dose reconstruction feasible for thorium, 1972–2007, because of very low inventory, minimal use, process knowledge, radiological controls, and availability of alternate bioassay data (Am, Cm, Cf)

• SC&A Provided Comments in September 2013 Review to which NIOSH Responded in January 2014:
  – Concerns over adequacy and completeness of NIOSH’s source term description (time and place); while NIOSH expanded Table 5-1, SC&A has issues with basis for table and its implementation
  – Questions regarding monitoring configuration at tank farms to support bounding model for thoron exposure
  – Concerns over wide variability observed in individual urine sample counts for thorium
  – Other issues were deferred to SEC Work Group (OPOS-related), required provision of additional information, or were closed (e.g., chelation-related data not to be used)
Thorium – Work Group Actions

Work Group Meeting Call (February 26, 2014):

• SC&A to prepare analysis of expanded Table 5-1 of OTIB-0081 used to identify SRS workers potentially exposed to thorium
• NIOSH to provide report of DAC-based approach to bound thorium doses after January 1, 1990
• NIOSH to obtain additional air sampling measurements for SRS tank farm to develop facility-specific bounding dose for thoron
• NIOSH to investigate derivation of coworker intakes for thorium given observed wide variability of counts for same urinalysis sample
• Issues related to CTW:NCW comparisons deferred to OPOS discussion
Overall CTW to NCW Internal Dose Comparison – SEC Work Group Deliberations

- ORAUT-RPRT-0053 (2012) introduced one person-one sample (OPOS) methodology as alternative to existing pooled-data approach for coworker models. Addresses problems of “data dominance” and correlation.

- General approach has specific application to SRS (e.g., Np and Th), but does not ameliorate concern over differences in CTW:NCW monitoring.

- SC&A provided initial response to RPRT-0053, and more detailed response in September 2013 and Work Group presentation in April 2014:
  - SC&A concludes that use of OPOS on fixed-period basis is not scientifically justified based on review of data dominance and correlation at SRS and Fernald, and statistical validity.
  - Should only be used where clear evidence of data dominance is present due to spike in samples from incident(s).

- NIOSH response (January 2014) and Work Group presentation (April 2014) dispute SC&A findings; will issue written response on presented SC&A issues.
Subcontractor Database Validation

**Issue:**
Subcontractor dose records maintained in “company” hardcopy files prior to being migrated to electronic databases being used for dose reconstruction.

**Questions:**
- How complete were company files for various subcontractor tiers (i.e., company names, personnel identifiers)?
- Was all relevant information migrated to SRS electronic databases?

**Work Group Action:**
- Explore options to address these questions
- As a first step, NIOSH is reviewing NOCTS for claimants who were subcontractors and comparing with SRS electronic records