
Bob Barton, SC&A, Inc.

To the Advisory Board on Radiation and Worker Health, Y-12 Work Group

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Background

- Presented to the Advisory Board on August 21, 2019
  - NIOSH evaluated class: January 1977–December 1994
  - Recommended (and accepted) class: January 1977–July 1979
  - Class not recommended: August 1979–December 1986
  - Reserved period: January 1987–December 1994

- Basis for recommended class: Infeasible to reconstruct thorium exposure
SC&A review approach

- Is dose reconstruction to unmonitored workers feasible?
- Evaluate available thorium data and information against established co-exposure criteria:
  - Completeness
  - Adequacy
  - Representativeness
- Additional concern regarding uranium exposures to machinists
- What about other sources?
Thorium processing documentation

- Affirms that large-scale thorium work ended in the 1970s (before evaluated period)
- Captured documents lack information about later smaller scale projects (Observation 1)
  - Worker names
  - Thorium processing locations
  - Duration of activities
Thorium monitoring data completeness

- Compare quarterly health physics reports that tabulate the number of in vivo counts performed
- Only available up to September 1981, when reporting practices changed (Finding 1)
- Limited evaluation showed 95% of the reported data are available for co-exposure analysis
- Additional in vivo data may be available that were not considered due to monitoring “type” designation (Observation 4)
Comparison to thorium processing

- How much thorium was in process compared to the amount of monitoring data we have in hand?
- Information on the annual throughput is currently unavailable
- Evidence suggests that information is available but likely redacted (Finding 2)
Thorium data adequacy

- Is the analytical method effective?
- In vivo methods to monitor for thorium are identical to other EEOICPA sites previously evaluated
- Mobile In Vivo Radiation Monitoring Laboratory (MIVRML)
  - developed at Y-12
  - used at the Fernald site and elsewhere (Observation 2)
- Potential for bias in the measured data as found during the Fernald SEC-00046 (Observation 3)
Thorium data representativeness

- Who was monitored?
  - Review job title information for monitored claimants
  - Analyze department codes for monitored workers

- No specific trends were observed

- SC&A concludes the monitoring program reflects “routine, representative” sampling rather than “targeted” as defined in the co-exposure guidelines (Observations 5 and 6)
Uranium data summary

◆ How complete is the uranium data overall?
◆ SC&A comparison of health physics reports and available co-exposure urinalysis data:
  – Range by year was 75%–121%
  – 98.4% completeness overall (Observation 7)
◆ No data to evaluate representativeness (Finding 3)
◆ In vivo monitoring for uranium is not addressed (Observation 8)
Uranium data for machinists

- Is the uranium monitoring program adequate for machinists?

- Review of claimant population:
  - 236 claims designated as “machinist”
  - 47% were monitored internally for uranium (while also wearing a dosimeter)

- What about dose reconstruction (Observation 10)?
  - 51% would not require co-exposure assignment
  - 24% would require partial co-exposure assignment
  - 25% would require co-exposure assignment for entire employment
Exposure potential for machinists

- Compare airborne contamination data for uranium operations
  - Metal fabrication: machining operations
  - Metal preparation type a: chemical processes, casting operations, rolling and forming
  - Metal preparation type b: chemical recovery processes

- Metal preparation categories were consistently bounding of fabrication activities

- SC&A conclusion: Metal preparation workers likely bound metal fabrication done by machinists (Observation 9)
Other sources of exposure

- Discussed in SC&A review of ORAUT-RPRT-0090, “Monitoring Feasibility Evaluation for Exotic Radionuclides Produced by the Oak Ridge National Laboratory Isotopes Division” (Observation 11)
- Specific to Y-12: Pu-241 exposures not addressed (Finding 4)
- Post-production activities after 1983 (D&D) not addressed (Observation 12)
Questions?