



Review of NIOSH White Paper:  
“Assessment of Certain Special  
Exposure Cohort-Related Issues  
for the Hanford Site”  
Work Group Update

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To the Advisory Board on Radiation and  
Worker Health, Hanford Work Group

Teleconference Meeting

August 13, 2020



# Background

- ◆ Original SEC petition SEC-00057 qualified for Jan. 1, 1942–Dec. 31, 1990; series of classes added, final ones in response to 83.14 petition for all Hanford workers, July 1, 1972–Dec. 31, 1983 (SEC-00201), and another for named prime contractors for Jan. 1, 1984–Dec. 31, 1990 (SEC-00226)
- ◆ Remaining group to be evaluated are employees of prime operating contractors excluded in SEC-00226, for 1984–1990
- ◆ White paper issued Jan. 7, 2020; provides status of NIOSH assessment for SEC-00226 of dose assessment feasibility for remaining SEC-related issues
- ◆ Work group met on April 14, 2020; SC&A presented its review, number of SEC issues closed
- ◆ SC&A provided response to remaining open SEC issues on June 24, 2020

# Hanford white paper: Conclusions

**OVERALL:** NIOSH has found “nothing contrary to the determination made in SEC-00201 ER that dose reconstruction was feasible from 1984 onward for employees of the prime contractor organizations, as defined in the SEC-00226 class definition.”

- ◆ **Radionuclides of concern (ROC):** No evidence of large-scale use of ROCs or any cases of “potential chronic source of intake.”
- ◆ **Lack of monitoring data for non-chronic sources:** Does not equate to dose reconstruction infeasibility. Conversely, existence of nuclide-specific data indicates that a radiological incident occurred. Minor incidents were not significant internal dose contributors.
- ◆ **Programmatic incident reporting:** “Appropriate bioassay methods were available for all ROCs and were used when needed.”
- ◆ **Workplace monitoring:** “Backstopped” by routine bioassay program.

# SC&A's Hanford evaluation focus (1984–1990)

Review for resolution of remaining Board Review System issues:

- ◆ **Key ROC:** Source term/potential exposure
  - Th-232 (issue 3)
  - HEU (issue 4)
  - U-233 (issue 7)
  - Np-237 (issue 9)
  
- ◆ **Programmatic issues:** Exposure sources/adequacy of monitoring
  - Special tritium compounds (issue 10): Any operational sources?
  - Skin contamination at N Reactor (issue 20): Adequate monitoring and records?
  - Minor radiological incidents (issue 22): Sufficient followup and bioassays?
  - Building 324 leaks (issue 27): Adequacy and completeness of internal monitoring data?

# Review of data adequacy and completeness

- ◆ Review of Hanford internal dosimetry program practices, 1983–1990
- ◆ Review of REX internal monitoring database for prime contractors



# Preliminary SC&A Status

Issue 3

Issue 4

Issue 7

Issue 9

Issue 10

Issue 20

Issue 22

Issue 27

# Thorium-232 (issue 3)

- ◆ **Issue:** Potential thorium exposures during remediation, use of thorium in fuel fabrication in 300 Area, and possible use of thorium in other Hanford areas.
- ◆ **SC&A:** Agrees no evidence of process use and operations involving Th-232 in 1984–1990, and no incidents involving intakes
  - **Basis:** Review of SRDB documentation (including interviews), review of Nuclear Materials Management and Safeguards System (NMMSS) database, review of incident reports, review of internal dose database
- ◆ **Work Group:** Closed issue at April WG meeting.

# Highly enriched uranium (issue 4)

- ◆ **Issue:** HEU sources with associated potential worker exposures.
- ◆ **SC&A:** Questions whether NIOSH has sufficiently confirmed lack of operations involving HEU in 308 Building given that it is “unknown how frequently [such] operations involving enriched uranium took place.” However, SC&A agrees that routine bioassays would have presumably detected U-235 intakes.
  - **Basis:** Review of SRDB documentation, review of NMMSS database, review of incident reports, review of internal dose database
- ◆ **Work Group:** Closed issue at April WG meeting.

# Uranium-233 (issue 7)

- ◆ **Issue:** Possible sources of Np-237 intakes at Hanford.
- ◆ **SC&A:** Questions whether NIOSH investigated scrap solutions of U-233 in Plutonium Finishing Plant and possible applications in experimental work in 300 Area (identified previously by SC&A).
  - NIOSH responses on this issue have been general, not specific to these SC&A lines of inquiry.
  - SC&A does not dispute that NIOSH's review was broad, including interviews, area-specific records, and material control and accountability records.
- ◆ **NIOSH:** Memorandum of May 21, 2020, provides WG-requested corroboratory information about potential U-233 exposure sources.
- ◆ **SC&A:** Recommends issue closure by Work Group.

# Neptunium-237 (issue 9)

- ◆ **Issue:** Possible sources of Np-237 intakes at Hanford for 1984–1990.
- ◆ **SC&A:** Agrees no evidence of potential chronic intakes of purified Np-237 in Hanford operations, with incidents limited to one in 1989 involving chemical separations work for neptunium dosimeters from the MIP test (with adequate bioassay followup).
  - **Basis:** Review of SRDB documentation, review of NMMSS database, review of incident reports, review of internal dose database
- ◆ **Work Group:** Closed issue at April WG meeting.

# Special tritium compounds (issue 10)

- ◆ **Issue:** Site profile citation that metal tritides (“Special Tritium Compounds”) potentially present as part of Tritium Target Program beginning in 1988.
- ◆ **SC&A:** Agrees that no evidence of post-irradiation examinations of irradiated tritium target rods took place at Hanford in 1984–1990. Any other potential exposures to STCs can be addressed by NIOSH if an exposure source identified.
  - **Basis:** Review of SRDB documentation
- ◆ **Work Group:** Closed issue at April WG meeting.

# Skin contamination at N Reactor (issue 20)

- ◆ **Issue:** Whether skin contaminations at N Reactor were adequately monitored and recorded in 1984–1990.
- ◆ **SC&A:** Agrees that formal documentation of skin contamination cases at N Reactor was in place prior to 1984 and was followed until N Reactor ceased operation in 1987. Information from skin contamination forms can be used, as necessary, to estimate a skin dose.
  - **Basis:** SRDB documentation
- ◆ **Work Group:** Closed issue at April WG meeting.

# Internal monitoring associated with minor radiological incidents (issue 22)

- ◆ **Issue:** Whether sufficient bioassays were taken to account for potential worker exposures from minor radiological incidents during 1984–1990.
- ◆ **SC&A:** Agrees that by the 1980s, contractor radiological incident reporting appears to be comprehensive and effectively implemented, beyond just the more serious events.
  - **Basis:** SRDB incident reports and interviews
- ◆ **Work Group:** Closed issue at April WG meeting.

# Building 324 leaks (issue 27)

- ◆ **Issue:** Adequacy and completeness of internal monitoring data for workers who may have been affected by radiochemical-cell leakage incidents that occurred in 324 Building.
- ◆ **SC&A:** SC&A investigated this issue further and agrees that the three incidents cited by NIOSH corroborate NIOSH's conclusion of no "personnel monitoring deficiencies or indications of unmonitored internal dose." Recommends closure of issue by WG.

# Data adequacy and completeness

- ◆ NIOSH used various in vitro and in vivo bioassay data when addressing the remaining Hanford issues in their Jan. 7, 2020, white paper.
- ◆ SC&A evaluated adequacy and completeness of these bioassay data using the REX, SRDB, and NOCTS databases.
- ◆ SC&A found no discrepancies between NIOSH data and REX in vivo database and verified infrequency of bioassays for ROCs, which were event-driven.

# Overall Conclusions

SC&A concurs with NIOSH's overall conclusion that nothing has been found "contrary to the determination made in the SEC-00201 [evaluation report] that dose reconstruction was feasible from 1984 onward for employees of the prime contractor organizations, as defined in the SEC-00226 class definition."