



# Review of NIOSH Response to SC&A Draft Review of NIOSH's Evaluation Report for Petition SEC-00219, Idaho National Laboratory: Burial Ground, 1952–1970

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To the INL/ANL-W Work Group

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# Background

- ◆ NIOSH evaluation report (ER) deems dose reconstruction for INL's Burial Ground (BG) feasible for 1952–1970, based on availability of “procedural information” and “data on-hand,” from which it finds it has “adequate monitoring data” to estimate dose with sufficient accuracy.
- ◆ NIOSH's conclusion supported by what it considers stringent contamination controls, defense-in-depth radiological controls, and available internal dose data.
- ◆ SC&A's 2017 review found that BG was considered “low priority” by INL management; lacked adequate contamination control; dealt with mixed fission products (MFPs) and transuranics of uncertain source term; lacked adequate alpha monitoring capability; and, overall, lacked adequate bioassay and occupational air sampling.

# SC&A response and presentation format

- ◆ SC&A's summary of NIOSH's (January 2020) response to SC&A 2017 findings ("positions")
- ◆ SC&A's (May 2020) review of NIOSH response

# NIOSH Response, SC&A 2020 Review

Slide 5: Position 1(a) – Contamination control program

Slide 6: Position 1(b) – Radioactive waste source terms

Slide 7: Position 1(c) – Special bioassay program implementation

Slides 8–14: Position 2 – Dose reconstruction approach with actinides in mixed waste

Slide 15: Position 3 – Radiological monitoring program: Rigor and defense in depth

# Position 1 (a) – Contamination control program

- ◆ **NIOSH:** Disputes SC&A's findings of "low priority" being afforded BG and that "strict" contamination control program is questionable. Cites "relatively mature HP program" at site and a "defense-in-depth" approach to radiological controls.
- ◆ **SC&A:** AEC found that site contractor was treating BG as low priority. While INL procedures existed, their actual application to the BG and the adequacy of implemented contamination controls and monitoring are questionable, given AEC and contractor reviews and former worker accounts.

# Position 1 (b) – Radioactive waste source terms

- ◆ **NIOSH:** Acknowledges that “exact isotopic mix” and activity content were unknown for many shipments, but between radiation surveys performed and use of dosimetrically “limiting” radionuclides, radiological monitoring was adequate. With exception of Rocky Flats Plant (RFP) waste, MFPs were considered controlling.
- ◆ **SC&A:** Accepts NIOSH’s position regarding MFPs being controlling for onsite waste but finds the source term for offsite waste (e.g., RFP) more uncertain. Bioassay monitoring data lacking for actinides involved, making dose estimation more challenging.

# Position 1 (c) – Special bioassay program implementation

- ◆ **NIOSH:** Notes that procedural requirements at CFA (and therefore BG) would have led to requests for special whole body counts, if requested by HP. However, unable to “find evidence of a worker in 1952–1970 being placed on special bioassay as a result of a specific contamination event at the Burial Ground.”
- ◆ **SC&A:** Agrees no evidence of special bioassays implemented at BG. NIOSH’s comment that this was due to special bioassays not being necessary because of lack of contamination is not supported by documentation reporting site contamination and statements by former workers.

# Position 2 – Dose reconstruction approach with actinides in mixed waste

- ◆ **NIOSH:** Dose contributions from MFPs estimated using “applicable coworker models” and ORAUT-OTIB-0054, with bounding dose for actinide internal dose to be based on bioassay data from 18 workers doing exhumation work in the 1970s.
- ◆ **SC&A:**
  - **MFPs:** Agrees MFPs are dominant source term for onsite waste but disagrees that BG workers were necessarily “exposed to similar levels of MFPs as other unmonitored INL workers.”
  - **Actinides:** SC&A questions use of TRU monitoring data from late-1970s exhumation program to represent like exposures from 1952–1970; PPE, surveillance, and HP practices different.



# SC&A Review of Proposed NIOSH Bounding Approach for BG Actinides

Slide 10: Overview of 18 monitored workers used in NIOSH bounding approach

Slide 11: Photograph of Early Waste Retrieval operations inside the operating area containment

Slide 12: Photograph of Initial Drum Retrieval operation

Slide 13: Summary of NIOSH and SC&A positions on bounding approach

Slide 14: Questions regarding intake modeling assumptions

# Overview of 18 monitored workers used in NIOSH bounding approach

Table 1. Overview of 18 monitored workers proposed for use in transuranic dose reconstruction during the 1954–1970 time period

Job title	Initial Drum Recovery	Early Waste Retrieval	General operations	Total
Health Physics	1	2	1	4
Equipment Operator	4	3	3	10
Laborer	0	0	1	1
Supervisor	1	1	1	3
Total	6	6	6	18

# Photograph of Early Waste Retrieval operations inside the operating area containment



# Photograph of Initial Drum Retrieval operation



# Summary of NIOSH and SC&A positions on bounding approach

- ◆ “For actinide dose reconstruction, NIOSH proposes to use the bioassay data from the 18 workers that participated in the exhumation work in the late-1970s to provide a bounding estimate for internal actinide doses to identified Burial Ground workers during the burial period (1952–1970). **This would be considered bounding because the burial activities had a much lower potential for contamination and therefore a lower potential for internal exposure than the unearthing activities that took place.**” [Emphasis added.] (NIOSH, 2020, p. 62)
- ◆ SC&A agrees that the potential for contamination was likely to be higher during unearthing activities; however, it is not as clear that exposure potential was necessarily higher.

# Questions regarding intake modeling assumptions

- ◆ Single chronic intake period.
- ◆ Start date assumed to be January 1, 1971; however, IDR and EWR operations did not start until 1974 and 1976, respectively.
- ◆ End date assumed to be December 31, 1980; however, the latest bioassay results were taken in May 1978 and the highest observed result was taken in August 1977.
- ◆ Longer assumed chronic intake period results in a lower calculated intake rate.
- ◆ Intent is to model the intake potential during exhumation activities. A more appropriate start date would be the beginning of these activities, and the appropriate end date would be the date of the bioassay samples utilized.



# Position 3 – Radiological monitoring program: Rigor and defense in depth

- ◆ **NIOSH:** Disputes SC&A's questioning of "rigor and effectiveness of radiological monitoring program at the Burial Ground" and cites programs (e.g., safe work permits) in place and INL management directives.
- ◆ **SC&A:** While examples of HP monitoring and surveillance exist, contradictory documentation and accounts from AEC, INL contractors, and former workers undercut conclusion that the BG had exemplary contamination control and "defense in depth" radiological control programs.

# Conclusions:

## Burial Ground, 1951–1970

- ◆ No evidence of internal dose assessment program, or routine and special bioassay data, for the Burial Ground
- ◆ Low-level contamination prevalent at BG, with potential for uncontrolled worker exposure during unloading and burial operations
- ◆ AEC audit found BG operation was not considered a “priority” by its operating contractor
- ◆ An operational conflict of interest was found to exist, with HP organization having assumed line management responsibilities for waste management operations
- ◆ SC&A disagrees with NIOSH premise behind coworker model use, i.e., that BG operations were operated with similar rad control programs as rest of INL and there were no uncontrolled source terms
- ◆ Proposed internal dose bounding approach to actinides raises questions about representativeness, given use of late-1970s internal monitoring data for 1952–1970 BG exposures





# Synopsis

SC&A views the Burial Ground as having a contamination program commensurate with a radioactive waste landfill of its era—the 1950s and 1960s—when less management priority was assigned to such operations, and sporadic low-level contamination from unloading and dumping drums and containers was a common part of work and did not warrant a special response from the radiological control program.



# Questions?