

Statement by David Kotelchuck, Work Group Member

Meeting of the Advisory Board on Radiation and Worker
Health, Metals & Controls Work Group

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The goal

A plausible, scientifically sound, bounding model for the exposures of 400+ maintenance personnel claimants during the residual period at the Metals and Controls (M&C) facility (1968–1997)

Two basic background facts

1. No individual exposure measurements were made during the residual period (1968–1997) for any of the claimants.
2. Records of the individual work activities of the claimants during the residual period were not found.

These facts basically force a one-size-fits-all exposure model

- That is, any bounding model developed must assign the identical exposure to each and every one of the 400+ claimants, except for their differing durations of employment.
- (It should be noted that even if several claimants have identical durations of employment and thus identical exposures, their doses and probabilities of causation may differ depending on their differing types of cancers.)

The available exposure data during the residual period

1. Measured radiation exposures of personnel from the end of the operational period can be extrapolated into the residual period.
2. In 1995, two years from the end of the residual period, Weston workers conducted radiation measurements preliminary to the beginning of its D&D operations in 1998.

The quality limitations of these two data sources

1. The initial 1968 exposure data are extrapolated from the 1967 operational period as the geometrical mean (GM) of exposures of all operational period maintenance workers. The bounding model then applies this GM annually to all maintenance worker claimants. But two-thirds of the claimants (70.1%) began their employment during the residual period (NIOSH SEC ER, 2017), so these initial data poorly characterize the exposures of most of these Special Exposure Cohort (SEC) claimants.
2. The exposures experienced by M&C maintenance workers in the subsurface environment are not adequately characterized in the NIOSH bounding model; thus, nor are the doses derived from them.

Attention to subsurface exposures in Bldg. 10

NOTE: The Work Group (WG) and staff generally agreed that the greatest exposures to the M&C maintenance workers came from the subsurface work in Building 10. Since the NIOSH bounding model is applied to all claimants, *further discussion during this presentation focuses solely on such subsurface work and whether or not it is bounded.*

M&C workers had greater exposures than expected (due to different job tasks than Weston employees)

- Weston, during its 10-day work period in 1995, was assigned to enter into and assess the higher radiation levels of fluids and sludge within subsurface pipes of Bldg. 10, meanwhile removing any physical obstructions, such as the fuel rod discovered within one of the pipes.
- In contrast, M&C maintenance workers doing subsurface work routinely over the years had to snake out and repair (cut, saw, grind, weld) underground pipes, as well as remove observed obstructions.
- **The Result:** M&C workers were exposed to additional radioactive sources of exposure than considered in the NIOSH model.

Individual Weston worker exposure measurements NOT used in the NIOSH bounding model

Individual exposure measurements made on the Weston workers were available but not used in the NIOSH bounding model, in recognition of the differences in job tasks of the M&C and Weston workers.

M&C workers experienced greater doses than expected (due to lack of H&S info, training, & PPE)

- M&C maintenance workers were given no radiological health and safety (H&S) information or training during the residual period, and only occasionally received personal protective equipment (PPE). Also, after 1983, following the NRC's removal of radiation work restrictions for Building 10, they believed they were not working under hazardous radiological conditions.
- Thus, certainly after 1983, M&C maintenance workers could not be expected to have followed the ordinary, common-sense precautions that any intelligent person would follow when working on and near the piping in a potentially hazardous radiation environment.
- **The Result:** The M&C maintenance workers would be expected to experience greater doses of radiation than assessed in the NIOSH bounding model.

How does the NIOSH bounding model seek to compensate?

The current NIOSH bounding model for subsurface work in Bldg. 10 posits the basic equivalence of subsurface work activities among the Weston and M&C maintenance workers. It then seeks to compensate for differences in exposures and in doses by choosing the 95th percentile of measured Weston radioactivity for the bounding model, rather than the 50th as would ordinarily be done.

Bounding based on professional judgement

The determination of bounding typically rests on professional judgement. NIOSH notes that of 60 previous residual-period SEC proposals, 57 were rejected and three were approved by the Board. This suggests a priori that a new residual period SEC proposal is unlikely to be approved, but it is the Board's responsibility to look at each proposal individually and seek out its particular, and perhaps unique, features.

Does the NIOSH M&C model bound?

- In terms of the **varied exposures from the job tasks** of the M&C maintenance workers, does the difference between the 50th and 95th percentiles bound them?
- This WG member does not know if they do and does not see how this could be determined within our limited data and information base.
- In terms of the **differences in the H&S programs**, their impact on doses appears inestimable to this WG member, so going from 50th to 95th percentiles may or may not bound these.
- I do not know, and do not believe we can determine this.

The NIOSH model does not appear to bound

Thus, in my professional judgement, I do not have confidence that using the 95th percentile of pipe radioactivity measured by Weston rather than the 50th bounds the M&C maintenance workers' exposures.

Importance of the Mound surrogate data model

With the limitations in quality of the two M&C data sources (Slide 6), developing a surrogate data model is of great importance. NIOSH has proposed that a trenching project at the Mound facility could serve as an acceptable surrogate model for outdoor and indoor subsurface exposures to maintenance workers at M&C. Again, we will consider here only its application to indoor subsurface work.

The Mound database: Collected under different conditions than the M&C subsurface trenching

- The Mound project trenching data were collected outdoors on a country lane, whereas the M&C maintenance subsurface exposures, of course, took place indoors in Building 10.
- As such, using the Mound data as surrogates for M&C violates one of the Criteria for the Use of Surrogate Data, adopted by the Board in 2014.
- At the last WG meeting (5/12/23), SC&A staff appealed to professional judgement that the use of Mound data for surrogacy was acceptable.

The Mound database seems a poor fit for M&C

Because of the major differences in work environments between Mound and M&C – an outdoor, relatively placid country lane vs. an indoor, dirty, often muddy industrial worksite, respectively – this WG member believes the Mound database is a poor fit for M&C surrogacy.

Even if accepted, Mound data *alone* are inadequate

- Even if the Mound database is accepted by the WG for surrogacy, based on its professional judgement, the Mound data alone are inadequate to fully characterize M&C maintenance workers' radiological exposures.
- The Mound data seek to account for the radioactive dust-loading of the soil, which, when stirred up, results in worker exposure to dusts and particulates.

Additional sources of M&C exposures

- As noted in Slide 8, M&C maintenance workers doing subsurface work routinely had to snake out and repair (cut, saw, grind, weld) underground pipes.
- These routine components of M&C operations also created additional sources of radioactive dusts and particulates, beyond those from the (Mound-based) dust-loading.
- The current NIOSH bounding model does not appear to account for these and should.

Conclusion

Based on insufficient data to assess doses over a lengthy residual period, and despite serious efforts by NIOSH to develop a scientifically sound bounding model, I do not believe that the model developed for these M&C residual-period claimants is a plausible one.