Discussion of Metals and Controls Remaining Issues

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Overview (1 of 2)

- Introduction
- Specific Issues
  - Green lube (coagulant)
  - Interior pipe contamination
  - Confined spaces
  - Dust loading

Overview (2 of 2)

- Specific Issues (continued)
  - Intrusive activity
  - Data applicability
  - Extreme conservatism
  - Conservatism of 95th percentile soil contamination value
- Conclusions

Introduction

Introduction – Developments Since Last WG Meeting (1 of 2)

- Josie Beach presented, "*Update: M&C Work Group Review of SEC-Related Issues*" at the ABRWH Meeting on 2023-08-16.
- NIOSH issued their latest response, "*NIOSH Response to "SC&A Review [April 2023] of NIOSH Response [January 2023] to SC&A's Supplemental Review of M&C Work Group Issues [August 2022]*" on 2023-08-22.
- SC&A issued their latest response, "*SC&A Review of Overall NIOSH Response to SC&A's Supplemental Review of M&C Work Group Issues as of November 2023, Revision 0 PC-1*" on 2023-11-22.

Introduction – What Has Changed? (2 of 2)

- Much of this presentation will look familiar, because not much has changed since our last presentation on 2023-07-13:
  - No new evidence on green lube;
  - No new evidence on interior pipe contamination;
  - No new evidence on confined spaces;
  - No new evidence on intrusive activity;
  - No new evidence on data applicability;
  - No new evidence on extreme conservatism;
  - No new evidence on 95^{th} percentile soil contamination – conservative.

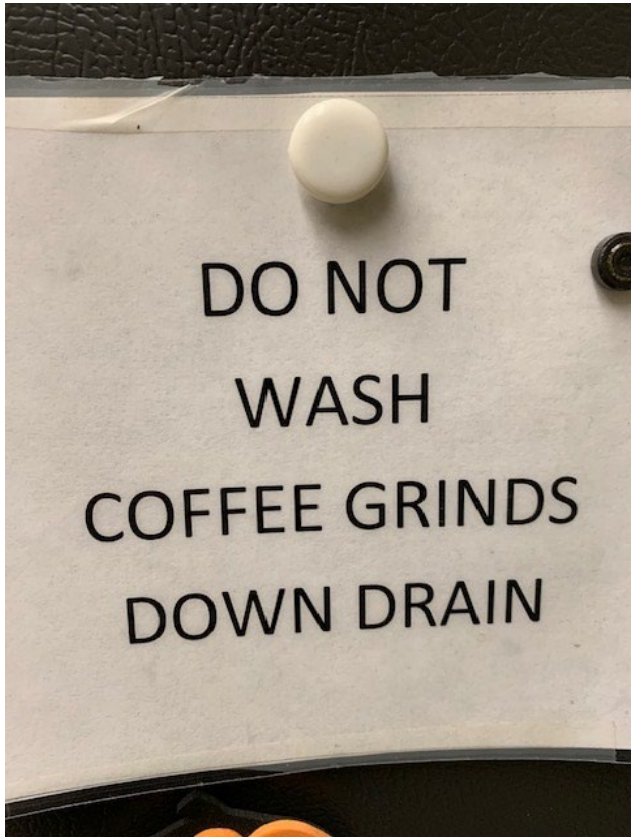
Specific Issues

Green Lube (1 of 4)

- SC&A has conflated the “green lube” (term used by interviewee) with “coagulant” (term used by both NIOSH and SC&A) with chemicals used in water treatment.
- This is a residual period. Uranium/Thorium (U/Th) is in soil and adhered to pipes - not waterborne, not subject to coagulation.
- No evidence has been presented that green lube is corrosive or abrasive enough to displace U/Th from pipe scale/residue.
  - Undesirable qualities in a lubricant.

Green Lube (2 of 4)

- Many materials can clog a drain line (e.g. bacon grease, coffee grounds, vegetable oil, toilet paper, etc.)
- Just because a material can clog a drain, that doesn't make it functionally similar to coagulants used in water treatment, and no evidence supporting such a similarity has been produced.



Green Lube (3 of 4)

- Even if green lube displaced U/Th (for which no evidence has been produced), it would be into the larger wet mass of lube, lowering the concentration, not concentrating it (a fraction of U/Th displaced from pipes divided by large mass of green lube). No evidence of concentration has been presented.
- Even if U/Th became entrained in green lube (for which no evidence has been produced), it would have been non-respirable, lowering the exposure potential.

Green Lube (4 of 4)

- The references SC&A cited regarding the use of coagulants in water treatment covered:
  - Removal of pharmaceuticals from wastewater;
  - Use of aluminum or iron salts – not lubricants;
  - Use of plant-based coagulants.
- While specific plant-based coagulants exist, none of the cited references demonstrate that commonly used lubricants generally, let alone green lube specifically, are functionally similar to water treatment coagulants.

Interior Drain Pipe Contamination (1 of 5)

- SC&A continues to assert, “a wide array of intrusive activities, many involving power tools, were used to cut, clean out, and repair these pipes, including saws, drills, grinders, powered snakes, **and cutting torches**. The specific tools employed would have depended upon the type of pipe (e.g., cast iron versus clay), the size and nature of the clog, and the size and condition of the pipe." (emphasis added)

Interior Drain Pipe Contamination (2 of 5)

- SC&A continues to assert, “While the Bridgeport Brass AWE hazard assessment focuses on the cutting of steel pipes, torch cutting was among several means by which cast iron (CI) pipes and vitreous clay (VC) pipes were cut at M&C by maintenance workers.”

Interior Drain Pipe Contamination (3 of 5)

- As we previously stated, cutting torches (capable of generating fumes due to high temperatures) would not have been used on the clay or cast iron drain pipes. Torches are used on carbon steel pipes. No evidence was provided to support the routine use of torches on CI and VC pipes at M&C.
- Snap cutters, power snakes and saws would have been used, and the latter could generate respirable particulates.

Interior Drain Pipe Contamination (4 of 5)

- There are 6 scale samples from inside pipes.
- There 12 direct beta scintillator readings of scale from inside pipes.
- There are additional interior pipe surface contamination samples.
- There are 20 sediment/soil samples (surrounding pipes).
- This set of data was NOT meant to be representative. It was meant to be **biased high** by focusing on the areas of highest contamination potential identified during the Pilot investigation. Intended to identify max, not range.

Interior Drain Pipe Contamination (5 of 5)

- “The scope of the cited sampling of scale is very limited **for purposes of characterizing the range of activity levels within M&C drain pipes** and what may represent the upper bound of that activity” (SC&A 2023, p. 19). (emphasis added)
- All sampling at every site is "limited;" M&C's sampling is more comprehensive than what was previously accepted by the Board for other sites.

Confined Spaces

- *“*SC&A clearly acknowledges that this issue, by past practice and experience, is a TBD issue for which there are obviously means and information by which a more accurate dust loading factor can be derived." (SC&A 2023, p. 30)
- NIOSH agrees with the general need to review **OTIB-70 and TBD-6000** on the issue of confined spaces.
- NIOSH agrees that further discussion – if necessary – should be in the context of a TBD issue.

Dust Loading (1 of 3)

- "SC&A stands by its original finding 2 (SC&A, 2022) that NIOSH's proposed application of Mound project data for deriving the M&C dust loading factor does not satisfy the Board's surrogate data policy for site and process similarity given disparities between the sites for confined space conditions" (SC&A 2023, p. 30).
- SC&A originally concurred with NIOSH.

Dust Loading (2 of 3)

- “The renovation indoor dust loading of 10^{-4} g/m^3 (100 µg/m^3) might include excavation and would seem to independently support NIOSH’s use of 212 µg/m^3 as a reasonable estimate when applied to the M&C subsurface indoor excavation scenario." (SC&A 2021, p. 18)
- “This range provides a prudently conservative estimate of actual radioactive dust-loadings in the workplace or household, and serves as an adequate basis for the first-level generic screening analysis." (SC&A 2021, p. 18–19)

Dust Loading (3 of 3)

- “…SC&A suggests that NIOSH also refer to NUREG/CR-5512 (in addition to the Mound outdoor data) as a basis for the selected dust loading for both M&C and for use in OTIB-0070." (SC&A 2021, p. 19)
- NIOSH concurred in our 8/23 response paper. We stand by our concurrence.

Intrusive Activity

- We propose to use survey data from 1996 throughout the residual period (1968-1997). Similar to:
  - Chapman Valve (soil data from 1987, and 1992 applied back to 1949)
    - Diverse, intrusive work, similar to the situation at M&C
  - Linde (data from 2001 applied to 1970-2006)
    - Subsurface maintenance utility work, confined spaces
  - Vitro (air data from 1977 applied to 1965 – 1985)

Data Applicability (1 of 2)

- SC&A asserted, “A judgment on the question of whether there **is sufficient similarity of conditions and processes between the D&D era, during which the 1995 characterization sampling was conducted, and the preceding M&C residual period maintenance activities** resides with the Board, as it did for Linde Ceramics on a similar question between Linde’s D&D and renovation periods." (emphasis added)

Data Applicability (2 of 2)

- The 1995 survey was **not** part of the D&D era. It was part of the maintenance period, prior to D&D.
- Weston stated that the purpose of the survey was, “The drainage system investigation was performed…in support of Nuclear Regulatory Commission (NRC) license termination and **to assess the potential for inadvertent exposures to non-radiological workers performing routine drainage system maintenance**…." (Weston, 1996, p. 2)(emphasis added)

Extreme Conservatism (1 of 8)

- NIOSH has specified what it meant by extreme conservatism – “conservative assumptions appropriate for a bounding scenario."
- SC&A’s inaccurate representation of NIOSH’s use of this phrase are based on its unsubstantiated assertions regarding confined spaces, green lube, and the applicability of sampling data from late in the maintenance period to the preceding years – a practice consistent with 20 years of program precedent.

Extreme Conservatism (2 of 8)

- SC&A selectively quoted former Board Member Melius, “carried to an extreme, we could take any site . . . and we could come up with what we think is the highest possible exposure at that site that would occur, and that would be bounding, and apply that to everybody that ever worked at the site” (ABRWH, 2011, p. 129). However, the essential questions, as the former Board Chair put it, are “is that a plausible bound? And then, who are we trying to characterize?” (ABRWH, 2011, p. 129).

Extreme Conservatism (3 of 8)

- SC&A did not quote Board Member Lockey, “It would be very difficult to say that for a guard, for instance, we are being **unreasonable in setting a high exposure level** for that guard because we don't have exposure records, but we do have for electricians or for a concrete worker." (ABRWH, 2011, p. 131). (emphasis added)

Extreme Conservatism (4 of 8)

- SC&A did not quote Board Member Munn, “We do not have a situation where there is a long, unexplained period of potential **extremely high exposure.** We have a relatively short period of activity that takes place after decontamination, where the probability of extremely high doses is extremely low. The bounding dose that has been established is not likely to have been exceeded if it were at all, certainly not for any period of time." (ABRWH, 2011, p. 133). (emphasis added)

Extreme Conservatism (5 of 8)

- Board Member Munn continued, “**If we are going to take a position that it is impossible for us to make bounding calculations as a reasonable argument, then we ought to be very straightforward about that and say we are not going to allow that, even though it has been specifically prescribed, as I understand it, by the legislation, that that is okay**." (ABRWH, 2011, p. 133). (emphasis added)

Extreme Conservatism (6 of 8)

- SC&A did not quote Board Member Melius just one page later, “So, we have a lot of uncertainty, and the uncertainty leads to **a bounding level that is quite high** in order to be bounding, to try to take into account what is happening at the site." (ABRWH, 2011, p. 130). (emphasis added)

Extreme Conservatism (7 of 8)

- More Melius: “…during a residual period there may be different activities, but it is unlikely to lead to as high exposures or **unusually high exposures**. **And so, the OTIB-70 approach is probably something that is appropriate and something I am personally comfortable with in these situations**." (ABRWH, 2011, p. 146). (emphasis added)

Extreme Conservatism (8 of 8)

- Clearly, the Board questioned whether **high** bounding doses were sufficiently accurate.
- 71 mrem is very low and comparable to natural background. Sufficient accuracy is not an issue at this low dose.
- Board previously accepted 100 mrem bounding dose at Sandia.
- In fact, doses <100 mrem are below NRC and DOE's threshold for required monitoring! How can this be high enough to present sufficient accuracy concerns?

Conservatism of 95th Percentile Soil Contamination Value

- Based on worker interviews and discussions with SC&A and the Work Group, NIOSH determined that exposure to contaminated soil near the Priority 1 drain pipes represented a bounding scenario.
- The highest soil concentration was found near a U fuel pin in a drain pipe. It is both bounding and plausible, as it is based on an observed condition.

Soil Scenario is Bounding

- Other scenarios were developed in response to SC&A and WG concerns to show that they could be bounded to satisfy SC&A and WG concerns.
  - NIOSH maintains that the soil scenario is bounding.

Conclusion

Conclusion (1 of 3)

- Green lube (coagulant) – no evidence of concentration mechanism, and implausible.
- Interior pipe contamination/scale – data requested by SC&A and WG, and NIOSH provided it. Soil scenario is bounding.
- Confined spaces – not an issue at M&C for work with contaminated soils. TBD - not SEC- issue.
- Dust loading – agrees with (SC&A 2021) and NUREG/CR-5512. TBD - not SEC - issue.
- Intrusive activity – consistent with Chapman Valve, Vitro, and Linde, all accepted by the Board.

Conclusion (2 of 3)

- Data applicability – 1995 survey is from the end of the maintenance period and was intended to assess **maintenance, non-radiological** worker doses. Directly relevant.
- Extreme conservatism – consistent with 20 years of program precedent. Low bounding dose (below required monitoring threshold), so not a sufficient accuracy issue.
- Conservatism of 95th percentile soil contamination value – data includes hot spots, biased high. Also includes contributions from noncovered contaminants.

Conclusion (3 of 3)

- What is the concern?
  - Bounding dose is too high to be sufficiently accurate?
  - OR is it not high enough to be bounding?
- We have addressed every issue raised by SC&A and the WG.
- Our positions today are the same as they were in 7/23, and even earlier. We can bound the dose with sufficient accuracy.
- No new evidence has been presented to change our conclusions, only unsupported speculation.

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.