SEC 236: Metals and Controls Corp.

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Advisory Board on Radiation and Worker Health Meeting

April 17, 2024

Overview (1/2)

- The big picture
  - NIOSH Evaluation Report findings
  - Timeline
- Specific Issues
  - Intrusive activities – no monitoring
  - Data applicability
  - Source term

Overview (2/2)

- Specific Issues
  - Confined spaces
  - Contaminated equipment
  - Coagulants
  - Pipe contamination
  - Extreme conservatism
- Conclusions

The Big Picture

NIOSH Evaluation Report Findings

- Petitioned class evaluated: "**All atomic weapons employees who worked** as facilities construction & maintenance workers including lubricators-oilers, industrial pipefitters, engineering technicians (mechanical, electrical, structural), maintenance supervisors, electricians, plumbers, millwrights, carpenters, instrumentation technicians, chemical handlers, waste treatment operators, and all production workers including machine operators-helpers, and repair & maintenance (commonly called R&M) workers, who worked in buildings 4, 5, 10 interior areas, and buildings 5, 10, 11, 12, 17 exterior areas **at Metals and Controls Corp. in Attleboro, MA, during the period from 1/1/68 through 3/21/97**"
- ***"NIOSH has determined that there is sufficient information to estimate with sufficient accuracy both internal and external radiation doses for members of the evaluated class."*** (NIOSH ER presentation, 8/2017)

Timeline (1/3)

- Metals & Controls operations
  - AWE 1952-1967, currently designated as a SEC
  - HFIR (1965-81), Navy fuels, commercial work – not covered
  - Residual contamination period from 1/1/68 – 03/21/97

- SEC 236
  - Petition qualified on 11/14/2016
  - Evaluation Report issued on 04/05/2017
  - 11 worker interviews conducted in 10/2017 by NIOSH/ORAUT and SC&A

Timeline (2/3) - Consensus Achieved!...

Issues Resolution Roadmap for Metals and Controls Corporation SEC Petition-00236

SC&A, Inc.

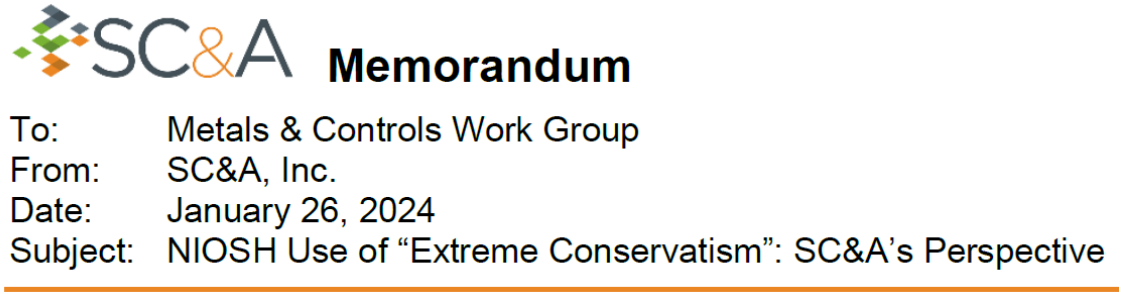
March 12, 2020

"SC&A argues that these data can, in fact, be used to assign plausible upper bound doses to M&C workers during the residual period, including the early years of the residual period."

"Note that although there are differences in many of the assumptions used by NIOSH and SC&A for reconstructing the subsurface doses to M&C workers in Building 10, we believe that both sets of assumptions are scientifically sound and claimant favorable, and SC&A is prepared to accept NIOSH's assumptions."

Timeline (3/3) - Consensus Abandoned

- The M&C Workgroup did not concur and requested further SC&A review.
- Today, “SC&A concludes that plausible circumstances exist for radiation exposures different from and potentially in excess of those addressed by NIOSH’s Inside Subsurface bounding model values for M&C maintenance workers for the entirety of the residual period prior to 1995, with insufficient information to estimate those maximum dose contributions.” (SC&A 1/26/2024)


SC&A Memorandum

To: Metals & Controls Work Group
From: SC&A, Inc.
Date: January 26, 2024
Subject: NIOSH Use of “Extreme Conservatism”: SC&A’s Perspective

Specific Issues

Addressing the Specific Issues (1/2)

Issues identified by M&C WG Chair Beach on 12/7/23, slide 19

Summary concerns for inside subsurface bounding model

- Intrusive work activities by maintenance workers at M&C during the residual period led to potential exposures for which there are no available monitoring data.
- NIOSH applies 1995 D&D survey data as basis for an upper bound for residual period exposure. For radiological data from one time period to be considered informative about exposures during another time period, there should be sufficient similarity of conditions and processes between the two periods.
- Although NIOSH has proposed a claimant-favorable “inside subsurface” bounding concentration (6,887 pCi/g), there remains uncertainty about source terms and exposure pathways during the residual period, 1968-1997.

Addressing the Specific Issues (2/2)

Issues identified by M&C WG Chair Beach on 12/7/23, slide 19

Summary concerns for inside subsurface bounding model

- There is insufficient information available to account for the exposure contribution of confined spaces, pipe scale releases, and released coagulants in a workplace not controlled as a radiation environment, unlike that of the later D&D era at M&C from which NIOSH draws its data.

- The application of “extreme conservatism” is formulating the proposed upper bound concentration to account for “intrusive activities, high exposure conditions, uncertain facility activities, or unknown contamination sources” may not be a plausible approach to compensate for inadequate or insufficient information.

Intrusive Activities – No Monitoring

- *"Intrusive work activities by maintenance workers at M&C during the residual period led to potential exposures for which there are no available monitoring data."*
- All available evidence supports the conclusion that potential exposures were so low that monitoring was not required and would not be required even today.
- "In many circumstances, **access to personal dosimetry data and area monitoring data is not necessary to estimate the maximum radiation doses that could have been incurred by any member of the class**, although radiation doses can be estimated more precisely with such data." [42 CFR 83.13(c)(1)(iv)]

Data Applicability (1/2)

- *"NIOSH applies **1995 D&D** survey data as basis for an upper bound for residual period exposure. **For radiological data from one time period to be considered informative about exposures during another time period**, there should be sufficient similarity of conditions and processes between the two periods."*
- Not accurate. NIOSH drew its data from the 1995 Weston **pre-D&D** survey, the explicit purpose of which was, "The drainage system investigation was performed … **prior to the Full-Scale Interiors Remediation Project**. An aggressive investigation schedule was implemented … **to assess the potential for inadvertent exposures to non-radiological workers performing routine drainage system maintenance**…" (SRDB 165965, pdf pg. 7/31)

Data Applicability (2/2) – Following Precedent

Site	Available Data	Intrusive work
Chapman Valve (1949-1993)	Contamination and soil data from end of residual period (1992)	Grinding, chipping, lathing, etc.
Linde residual period (1970-2006)	Contamination data from 2001	Subsurface utility tunnel maintenance
M&C (1968-1995)	Contamination and soil data from end of residual period (1995)	Drain line snaking, occasional cutting and removal

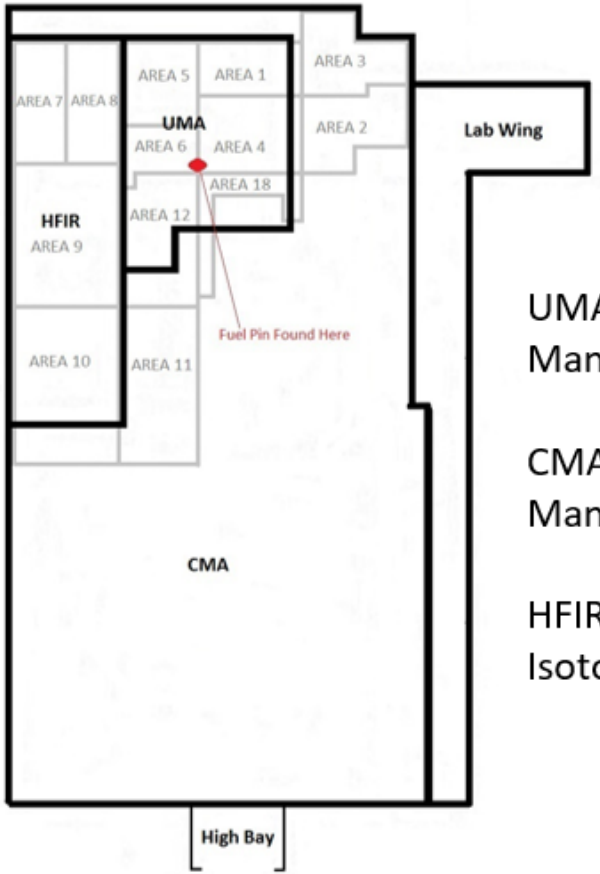
Source Term (1/3)

- *"Although NIOSH has proposed a claimant-favorable "inside subsurface" bounding concentration (6,887pCi/g), there remains uncertainty about source terms and exposure pathways during the residual period, 1968–1997."*

Date	Available Data
1967	7765 contamination results
11/1982	97 floor, 10 wall and ceiling, fixed and removable contamination
02/1983	938 fixed and 81 removable contamination surveys
09/1995	Contamination data for 41 targeted locations

Source Term (2/3)

- Building 10 – most contaminated onsite
- UMA – most contaminated area of Building 10
- Priority 1 drain lines – most contaminated
- Soils around drain lines - highest exposure potential
- Hot spots identified during 100% walkover survey
  - Not random – biased high
- 95th percentile of this filtered and biased high subset



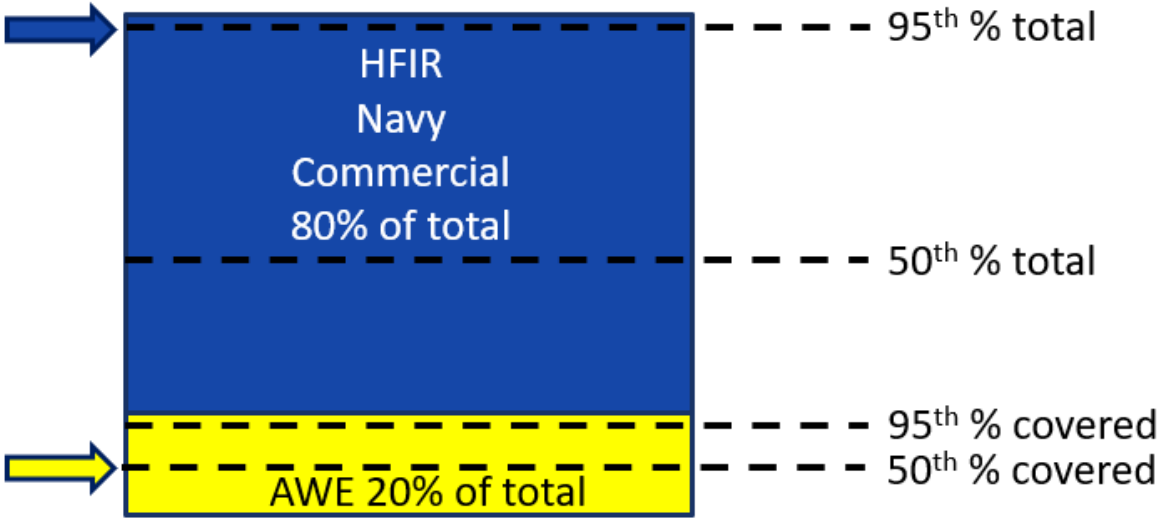
UMA=Unclad Fuel Manufacturing Area;

CMA=Clad Fuel Manufacturing Area

HFIR=High Flux Isotope Reactor

Source Term (3/3)

"NIOSH has not provided evidence that similar or higher levels may not have existed elsewhere in drainage system" (Beach, 12/7/23, slide 13)



Bounding estimate is 95th percentile of **total** (covered + noncovered) soil concentration,

- Associated with the most contaminated drain lines,
- In the most contaminated area,
- Of the most contaminated building onsite.

“Insufficient Information”

- *“There is insufficient information available to account for the exposure contribution of **confined spaces**, **pipe scale** releases, and released **coagulants** in a **workplace not controlled as a radiation environment**, unlike that of **the later D&D era at M&C from which NIOSH draws its data**.”*
- Once again, NIOSH drew its data from the end of the residual period, NOT the D&D era. This is not surrogate data.
  - The explicit purpose of the 1995 Weston **pre-D&D** survey was, “… to assess the potential for inadvertent exposures to **non-radiological workers performing routine drainage system maintenance**…” (SRDB 165965, pdf pg. 7/31)

“Insufficient Information” – Nonrad Work Environment

- *“There is insufficient information available to account for the exposure … in a workplace not controlled as a radiation environment…”*
- Radiation doses were so low that they did not require monitoring, even by today’s standards.
  - “Direct gamma measurements did not exceed 10 microR [0.0001 rem] hour” (NRC 1983, SRDB 24651 pdf pg. 11/169). This is 5 times lower than that which would require monitoring.
- **NIOSH’s source term model assumes no workplace controls (e.g. access controls, monitoring, training, etc.).**

“Insufficient Information” - Confined Spaces

- *“There is insufficient information available to account for the exposure contribution of confined spaces…”*
- Shallow, open trenches are not confined spaces. Work with Priority 1 drain lines ***did not*** involve confined spaces (2-3 ft below grade).
- SC&A’s confined spaces concern was associated with use of Mound surrogate dust loading data to the inside subsurface scenario. We are no longer proposing to use that – we agree with SC&A 2020 recommendation to use dust loading value of 200 ug/m^3 from NUREG-CR/5512.
- So why is this issue still being presented as part of a SEC basis?

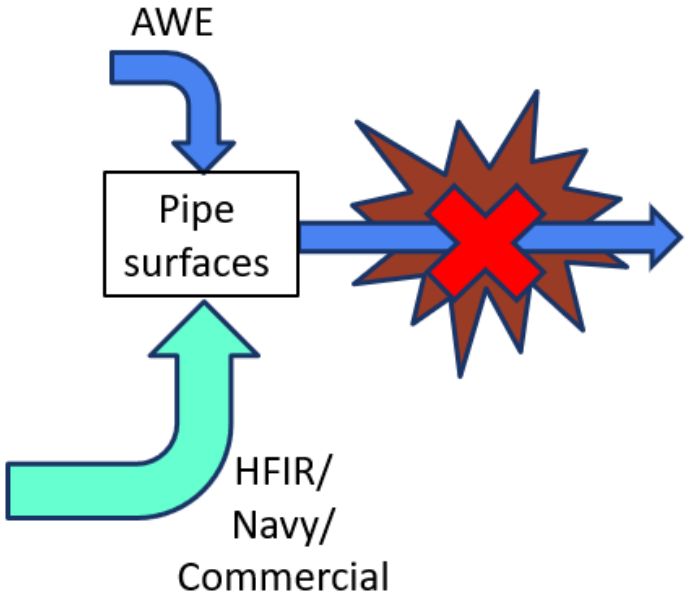
Photo credit: Photo by ©Marccophoto/Getty Images

“Insufficient Information” – Contaminated Equipment

- “*Maintenance, movement, and replacement of repurposed AWE equipment*” listed as “*…typical intrusive activities and exposure pathways during M&C residual period*” (Beach, 12/7/24, slide 10).
- Not accurate
  - Contaminated machinery cleaned, surveyed/disposed of at the end of AWE operations, confirmed by 7,765 contamination survey results, including equipment
  - Any remaining equipment used only for HFIR – not covered
  - Texas Instruments resurveyed in 1982, confirmed by NRC inspection
  - No evidence of covered exposure to contaminated equipment during the residual period has been provided.

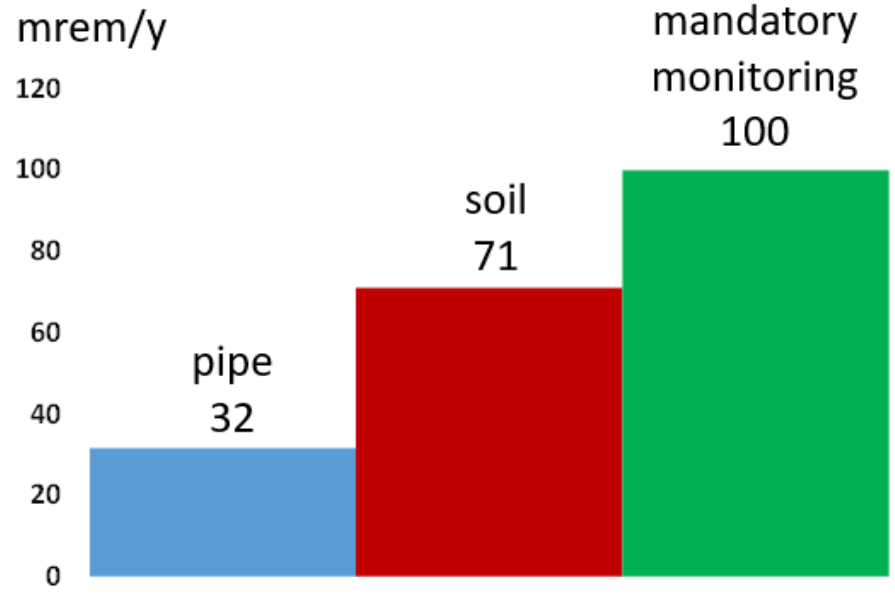
“Insufficient Information” - Coagulants

- *“There is insufficient information available to account for the exposure contribution of …released coagulants…”*
- *“I understand NIOSH's reticence on this, because **it's not evidence based beyond the fact that it was released and it caused clogs**. …it's pretty clear that sediments were consolidated and **possibly concentrated. But can I prove that; no.** There's just no information. This is an uncertainty that - that **we're raising as a question.**”* (J. Fitzgerald, M&C WG transcript, 12/6/23, p. 93-94)



“Insufficient Information” - Pipe Contamination

- *“There is insufficient information available to account for the exposure contribution of …pipe scale releases…”*
- The 100% preliminary walkover survey identified 13 hot spots. Samples were collected at all of them.
- Pipe cut scenario is not bounding.

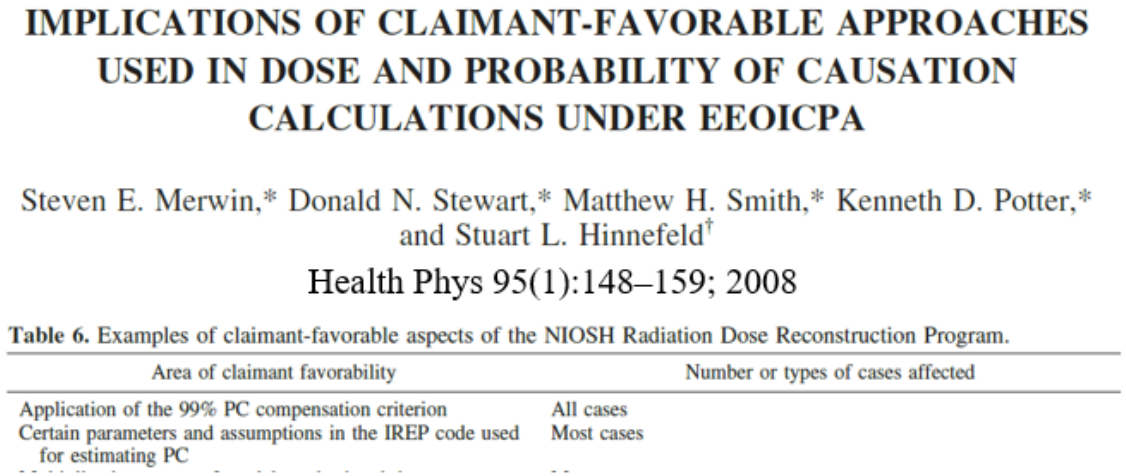


“Extreme Conservatism” (1/3) – Too High and Too Low?

- *“While there are precedents for back-applying conservative D&D measurements for AWE residual periods (e.g., particulates in Linde utility tunnels and intakes at Chapman Valve), that modeling did not assume intrusive activities occurred or that those activities could involve higher exposures due to elevated exposure conditions, uncertain facility activities, or unknown contamination sources.* ***The sediment readings taken in 1995 from a Priority-1 pipe obviously had a high uranium concentration, but is it the bounding case for all inside subsurface activities for the previous 27 years of the residual period?”*** (SC&A 2022, PDF p. 24)
- “***NIOSH's use of the extreme conservatism*** *to account for M&C's intrusive activities, high exposure conditions, and certain facility activities or unknown contamination sources* ***resulted in high bounding values, but we questioned whether it was plausible.***” (12/7/23 transcript p. 81/105)

“Extreme Conservatism” (2/3) – Follows Precedent

- The entire EEOICPA program is extremely conservative
  - Directed by law
  - Detailed in peer-reviewed publication



IMPLICATIONS OF CLAIMANT-FAVORABLE APPROACHES USED IN DOSE AND PROBABILITY OF CAUSATION CALCULATIONS UNDER EEOICPA

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Health Phys 95(1):148–159; 2008

Table 6. Examples of claimant-favorable aspects of the NIOSH Radiation Dose Reconstruction Program.

Area of claimant favorability	Number or types of cases affected
Application of the 99% PC compensation criterion	All cases
Certain parameters and assumptions in the IREP code used for estimating PC	Most cases

Lists 33 extremely conservative aspects of EEOICPA

“Extreme Conservatism” (3/3) – Follows Precedent

- Conservative assumptions include:
  - The same person did all the work in contaminated soils.
  - Sediment is dry and generated dust – it was really wet.
  - The highest air concentration was present during the entire task.
  - All airborne dust is respirable - only a small fraction is really respirable.
  - Uses the most claimant favorable mix of uranium and thorium.
  - Uses the most claimant-favorable solubility type.
  - Uses total source term even though 80% is not covered.
- Same as at other sites – consistent with 20+ years of program precedent.

Conclusion

Our Conclusions

- We **can** plausibly bound the radiation doses received by members of the proposed class with sufficient accuracy.
- SC&A and NIOSH concurred in 2020, but WG and SC&A today disagree.
- There is no evidence – only unsupported speculation - to support infeasibility based on: lack of monitoring, data inapplicability, source term uncertainties, confined spaces, contaminated equipment, coagulants, pipe contamination, or extreme conservatism.
- Our bounding estimate cannot simultaneously be too low to be bounding, and too high to be plausible.
- A SEC designation would contradict established precedent and create disparities with previous SEC evaluations.

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.