Centers for Disease Control
National Institute for Occupational Safety and Health
Advisory Board on Radiation and Worker Health
Metals & Controls Corporation Work Group
Thursday, January 9, 2020

The Work Group convened telephonically at 10:30 a.m. Eastern Time, Josie Beach, Chair, presiding.

Present:

Josie Beach, Chair
Henry Anderson, Member*
David Kotelchuck, Member*
Loretta R. Valerio, Member*

Also Present:

Ted Katz, Designated Federal Official
Nancy Adams, Niosh Contractor*
Bob Anigstein, SC&A*
Bob Barton, SC&A
Nancy Chalmers, DCAS
Christine Corwin, DCAS
Michael Elliott
Rose Gogliotti, SC&A
William "Rusty" Lorenzen
John Mauro, SC&A
Pat Mccloskey, ORAU Team
Jenny Naylor, HHS
Lavon Rutherford, DCAS
Mutty Sharfi, ORAU Team
Tim Taulbee, DCAS

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Proceedings

(10:34 a.m.)

Welcome/Roll Call

Mr. Katz: I'll start with just saying welcome to everybody. This is the Advisory Board on Radiation and Worker Health. It's the Metals and Controls Work Group.

And it's the first time in quite a while that the Work Group has been together, but there has been a lot of work done on behalf of the Work Group by the two staffs, both dealing with the thorium, welding, et cetera, business, and with petitioner concerns that were submitted to the Board, which they've both responded to, so you get more of that.

And let me just note, too, the background documents for this meeting are posted on the NIOSH website, there's scheduled meetings, today's date. So you can go there and see those background documents.

Now, there are presentations that are completely derivative of the background documents, for the most part I think. Those have not been clear

ed to be posted. They will get posted. So I'm sorry that they're not posted in advance of the meeting, but that's just the problem with getting things cleared in time particularly with the holiday coming just before this, and we have to go through all of those machinations.

So they will get posted. But, again, they are derivative, and so it's the best we can do. But, of course, everything, you know, will be said, so you'll hear what's being discussed as well as you have the background documents.

On -- oh, going on from there, let me just remind

everyone as I go through roll call, since we're speaking about a specific site, please speak to conflict of interest. You don't need to do this with the Board Members because, by definition, they don't have conflicts with the site or they wouldn't be on the Work Group.

So, and then for roll call for the Board, Josie Beach is the Chair. She is here. And we have as Members already on the phone Dr. Henry Anderson, and we have Dr. David Kotelchuck, and we should have Loretta Valerio shortly.

(Roll call.)

Mr. Katz: Okay. Then just last note, for those of you not familiar, please mute your phones. There will be opportunity for the petitioner to comment later on the agenda, as you'll see, and the agenda is posted on the website with those background documents.

But there's a proceedings -- and same for the staff, I can hear a lot of background breathing, for example. Please, all of you, mute your phones. The only person that should not be muted is whoever is speaking at the given -- at a given time. And if you don't have a mute button, press *6. That will mute your phones. And then press *6 again to come off of mute.

And, please, no one put this on hold at any point but hang up and dial back in if you need to leave for a piece, because putting it on hold will cause a disturbance for everyone else, the background music or whatever comes with your hold -- the hold function on your phone.

So, and then with that, let me just go first to Josie -- or let me check on -- if we have Loretta first, Valerio.

Member Valerio: Ted, I'm here. I had problems with the password. It wouldn't take for some reason, but I'm here.

Mr. Katz: Okay. Great. Glad you're here.

Okay. So we have our full roster of Work Group Members, and let me go to Josie first, and then I think we have staff ready to present these various background documents that are new to the Work Group.

Go ahead. Josie?

Chair Beach: Yeah. Good morning, everyone. I was just going to check who is going to be presenting. I don't see anything up yet, at least on my laptop. Does anybody have a presentation up yet?

Ms. Corwin: This is Christine. I don't see anything in Skype that allows me to put my presentation up.

Chair Beach: I think you have to take control to be the presenter. Isn't that correct, Ted?

Mr. Katz: Right.

Dr. Taulbee: Chris, I'm not seeing you in the list of participants here. I'm seeing everybody else. Did you come in through the CDC cardholders' part on the link?

Ms. Corwin: Maybe I did not. I didn't -- maybe --

Dr. Taulbee: Okay. Well, if you come in through there --

Ms. Corwin: Let me go get help real quick. Okay. Just a second.

Mr. Katz: It's okay. It's pretty quick.

Chair Beach: Ted, I know on the agenda -- I'll just go through this really briefly.

Mr. Katz: Yes.

Chair Beach: The petitioners do have a document they want to present, so it was down here as an

option, optional to the petitioner. And I think -- Mike, you're on the phone, did -- you sent your written statement in; is that correct?

Mr. Elliott: I have not sent in my written statement yet. I was going to do that after the meeting, Josie.

Chair Beach: Okay. Great. That's fine. I just wanted to let it be known that you were going to present. I think he's got about a 15-minute presentation.

Mr. Katz: That's fine. We don't -- we don't have a back end on this meeting, so that's fine.

Chair Beach: Yeah. That was my next

Mr. Katz: Fifteen minutes, whatever.

Someone else is trying to speak.

Mr. Elliott: Mr. Katz? I'm sorry. Mr. Katz, may I just mention one thing? So --

Mr. Katz: Yeah, of course.

Mr. Elliott: We do not have access to any Skype or slide presentation. We only have audio access.

Mr. Katz: That's correct. That's correct. So, Mike, you can't have access because the Skype is intended to be able to show stuff that's Privacy Act protected, and so on.

Mr. Elliott: Got it. Okay.

Mr. Katz: That's why. That's why. And as I said in my -- maybe you didn't hear it -- my initial remarks, you know, we try to get presentations cleared in advance of the meeting, but there's a lot of things to get done. And with the holidays and all, we couldn't get them cleared in time. So they're not posted, but they will be posted just as soon as possible, so you'll be able to review them after the meeting.

And I apologize for that. It's just -- there's nothing

that can be done when they're not cleared in time.

Mr. Elliott: Understood. Thank you very much.

Chair Beach: Christina is in the lobby as a guest. I don't know, Ted --

Mr. Katz: Yeah. I'll go and admit her. She shouldn't be as a guest, but I'll --

Chair Beach: Yeah. Oh, I know, but I just saw her there.

Mr. Katz: I don't know what's going on there, because she -- she got a direct invite. I didn't -- but anyway, I've admitted her on --

Member Kotelchuck: Hello, Ted?

Mr. Katz: Yes, Dave.

Member Kotelchuck: For the fellow who just spoke, but they can go onto the DCAS website and see all of the papers, not the --

Mr. Katz: Yeah. Well, I know, and I addressed that.

Member Kotelchuck: -- papers and follow it on --

Mr. Katz: Right. I just --

Member Kotelchuck: -- the PowerPoint.

Mr. Katz: What I said earlier was that the presentations are all derivative of the papers.

Member Kotelchuck: Exactly.

Mr. Katz: So there's not any original material in the presentations. But just the same, you know, we prefer that the presentations be available to everyone.

Someone else is trying to speak to me in the middle of this. Is there someone else that needed to say something? Okay. No.

So we're still waiting I think for Christine to get on, but --

Ms. Corwin: I need someone to -- someone to make me a presenter. For some reason, it's not -- it's just keeping me as a guest and it's asking

Mr. Katz: Why don't I suggest this? Why don't I suggest this? Why doesn't someone else -- I'm admitting someone again. But why don't -- why doesn't someone else just do the -- work the slides for you?

Chair Beach: Otherwise, I think she'd have to go all the way out, Christine, and come back in as a main -- wouldn't she?

Mr. Katz: Yeah. I don't know why I'm admitting her through the lobby, because she shouldn't be --

Chair Beach: No.

Mr. Katz: -- ending up in the lobby in the first place. I don't know what's going on.

But, anyway, so someone else from DCAS perhaps can do her slides for her.

Dr. Taulbee: Chris, if you can send me your slides, I'll go ahead and try and do that from my workstation here.

Ms. Corwin: Okay. I'll send them to you right now.

Chair Beach: So while that's happening, so, Christine, you're going to present. Are you presenting the thorium and welding and --

Mr. Katz: Yeah.

Chair Beach: Let's see, and then is SC&A going to go ahead and present the petitioner's concerns paper, or are you doing that also? I know you made the slide.

Mr. Katz: So, yeah, this is Ted. So, anyway, she does have a presentation for that. And as far as I know, Bob doesn't. So --

Chair Beach: I knew the section was out there, and I didn't -- I didn't know --

Mr. Katz: Yeah. I think -- I think the format is that Christine will present, and then Bob and John Mauro will have a chance to respond. And then the Work Group will have their interrogatives with them, and then we move to the next presentation. Does that make sense? I think that will work.

Chair Beach: Okay.

Mr. Katz: Yeah. And I just wanted to say, while we're waiting still for this, Mike Elliott, if you would -- it could be after the meeting is fine, but if you would go ahead and send your remarks to me, or if you have the DCAS email address and send it to them, they'll forward it to me. Either way that would be good, because I'll make sure that your remarks are distributed to the Board Members and also that I can share that with the people that do the transcripts of the meeting, so that they can make sure the transcript is accurate. I know you may not say exactly what you write, but it should help some.

Mr. Elliott: Yes, yes. I will definitely do that. And, in fact, the reason why I held off until after the meeting is because I figured I -- you know, it's very possible that I will do some, you know --

Mr. Katz: Of course.

Mr. Elliott: -- changes, you know, in the course of speaking. So --

Mr. Katz: Of course. Of course.

Mr. Elliott: -- we'll send them out. I also plan to attach a document that I had intended to include with the original SEC petition, and I was going to send that

by -- as an email attachment. Is that okay? I was going to send that to --

Mr. Katz: That's perfect.

Mr. Elliott: Yeah. All right. I have --

Mr. Katz: And don't send it to Josie, though, because I couldn't distribute everything to all of the Board Members, whereas you're just sending it to one Board Member, which is really not the most functional way to go about this.

Mr. Elliott: When I submit things officially, I typically send them to Josh -- I'm blanking on his last name.

Mr. Katz: That works, too. Josh Kinman. That works, too.

Mr. Elliott: Yeah, yeah. Yeah.

Mr. Katz: Yeah. That works, too. And he can -- he can just include in your note, please to forward it to me, and then I'll make sure that the Board Members get everything.

Mr. Elliott: Got it. Okay.

Mr. Katz: And same with the staff for the Board, the contractor SC&A. So that's very helpful. Thank you, Mike.

Mr. Elliott: All right.

Mr. Katz: Okay. How are we doing?

Chair Beach: Still blank.

Ms. Corwin: I've sent the -- I've sent the presentation to --

Dr. Taulbee: Almost there.

Ms. Corwin: Yeah.

Mr. Katz: Okay. Okay. Thanks, Tim. No, I know, I

know. I'm sorry. It's all right. It's all right. This is another hiccup. There we go.

Ms. Corwin: I'm just not sure what happened.

Mr. Katz: It's all right. It's all right. Let's see, take over as presenter. Actually, somebody can now do -- yeah. And, actually, it has that function. And I don't know if everybody sees that, but there's a button at the top, take over as presenter. I don't know if --

Chair Beach: Yeah. I bet Christina can do that.

Mr. Katz: If she has that button at the top, unless she is being discriminated against here.

Chair Beach: I don't -- I don't see --

Dr. Taulbee: Anytime you are ready, Chris.

Ms. Corwin: Okay.

Dr. Taulbee: Just tell me when to turn the slide.

Thorium and Welding

Ms. Corwin: It just popped -- it just popped up.

Okay. I'll begin then with, obviously, the first slide.

So good morning. My name is Christine Corwin. I am a health physicist with NIOSH, and I'm presenting information about the Metals and Controls Thorium and Welding Exposure Model for SEC-00236.

I would like to begin with some background information on why and how the Thorium and Welding Exposure Model was developed.

On to Slide 2. NIOSH presented the Evaluation Report for SEC-00236 for the Metals and Controls Corporation to the Advisory Board on August 24, 2017.

Go on to -- oh, wait a minute. No, this is the wrong -- Tim, that's the wrong presentation.

Dr. Taulbee: Sorry. Wrong presentation?

Ms. Corwin: Update. Yeah. The very first one that came across the email.

Dr. Taulbee: Oh, okay. I apologize. Sorry.

Ms. Corwin: Right.

Dr. Taulbee: The White Paper one. Sorry.

Ms. Corwin: Yeah. That's all right. Well, you shouldn't have to do this at all. I apologize.

Dr. Taulbee: It's all right. That one, let's try again here. Okay.

Ms. Corwin: There we go.

Dr. Taulbee: There we go.

Ms. Corwin: Okay. So NIOSH presented the Evaluation Report for SEC-00236 for the Metals and Controls Corporation to the Advisory Board on August 24, 2017. At the conclusion of that presentation, a petitioner raised a concern about the adequacy of the Evaluation Report in addressing maintenance-type work.

The petitioner stated that he took great care to define the Class of Work Group under evaluation of the petition as precisely and as narrowly as possible to coincide with workers for whom there was a high degree of confidence that they received elevated exposures to residual radioactive contamination.

In response to this concern, on September 5, 2017, NIOSH initiated strategies to continue research and further develop the SEC. These strategies included plans to review monitoring records in the Site Research Database and plans to search for former M&C workers so that NIOSH could conduct interviews with them.

Next slide.

From October 24, 2017, through October 26, 2017, NIOSH, ORAU, and SC&A personnel interviewed 12 former M&C workers and individuals knowledgeable about maintenance work. Interviewers asked questions regarding the frequency and duration of work, including HVAC, utility and drain line maintenance, and equipment installations.

In addition to the interviews, other actions were occurring. On November 8, 2017, the Working Group, SC&A, NIOSH, and ORAU held a teleconference to discuss technical issues associated with developing exposure models for maintenance work.

On February 6, 2018, NIOSH obtained additional monitoring data regarding remediation work performed by Creative Pollution Solutions, or CPS, in 1992 and 1994.

On February 13, 2018, NIOSH received SC&A's review of the M&C SEC Petition Evaluation Report.

On April 23, 2018, NIOSH issued the Metals and Controls Corporation's subsurface exposure model White Paper. And on May 3, 2018, SC&A presented their findings and observations associated with the SEC Evaluation Report.

The petitioner also made a statement and provided a letter with their concerns. After the meeting, an issues matrix was created.

On August 22, 2018, the Working Group presented their findings and observations on the SEC-00236 Evaluation Report during a full Advisory Board meeting, and NIOSH provided an update on the progress of the SEC work. The petitioners also made a statement and provided a letter with their concerns.

On November 20, 2018, during a Working Group meeting, NIOSH presented the Metals and Controls Corporation maintenance exposure model White Paper that included HVAC maintenance and Building 10 overhead exposure models. And SC&A presented

their observations associated with the Metals and Controls subsurface exposure model, and the Metals and Controls maintenance exposure model White Papers.

On December 13, 2018, during a full Advisory Board meeting, the Working Group presented an update, and the petitioners also made a statement and provided a letter with their concerns.

On April 8, 2019, NIOSH issued the Metals and Controls Corporation Thorium and Welding Exposure Model White Paper and made it available to SC&A and the Working Group.

And, finally, on July 26, 2019, SC&A issued an eight-page memo that was a review of NIOSH's Metals and Controls Corporation Thorium and Welding Exposure Model.

The Metals and Controls Corporation Thorium and Welding Exposure Model White Paper addressed two concerns that were raised by the petitioner which were exposures to thorium that occurred while working inside Building 10, and exposures that occurred during welding activities.

The Metals and Controls Corporation Thorium and Welding Exposure Model White Paper addressed these two concerns by providing a method for bounding thorium exposures while working inside Building 10 and providing an exposure model for exposures that occur during welding activities.

Next slide.

Dr. Taulbee: Is this the correct slide, or did I skip one?

Ms. Corwin: Let me see. No, you're one behind.

Dr. Taulbee: How about now?

Ms. Corwin: No. Go to slide 9. Yes, that's it. Okay.

Petitioner expressed a concern that the grab samples that were collected in the drainage system pipe and surrounding soils were only analyzed for uranium. And that since we know some thorium work occurred, we have no way of knowing how much thorium was present in the residual radioactivity and to which the maintenance workers were exposed.

Next slide.

During AWE operations, thorium-bearing component fabrication occurred, which included reactor fuel, metallic alloys, and metallic foils. The only definitive information regarding the amount of thorium at M&C is from a 1962 nuclear safety analysis that listed the total quantity of thorium as 244 kilograms.

The uranium to thorium-232 ratio in the 1962 inventory data was dominated by uranium. There was approximately 32 times as much uranium as there was thorium-232, and the activity ratio was even more dominated by uranium, where there was 188 times more uranium when assuming natural uranium and thorium-232.

Next slide.

As M&C cleaned the areas used for AWE operations prior to 1968, they buried waste and materials in the area between Buildings 11 and 12. M&C personnel made the NRC aware of this burial area in 1982 as part of their D&D effort.

The NRC performed a verification sampling of the burial area in 1984, and notified M&C personnel of the presence of contamination above release limits, including the presence of thorium. The M&C contractor, CPS, performed additional sampling of the burial area in 1992 and corroborated the presence of thorium in their report to M&C.

So this brings us to the new NIOSH method for bounding thorium exposures. Although M&C only analyzed Building 10 subsurface samples for uranium

in 1995, NIOSH can bound thorium exposures during maintenance work by assuming that the subsurface sediments contained equivalent amounts of natural uranium and thorium-232.

Using the previously determined 90 percentile measured uranium activity in the sediment -- what's documented in the Metals and Controls Corporation maintenance exposure model White Paper -- NIOSH determined that the sediment NIOSH determined the sediment to be about one percent by weight of natural uranium.

Next slide.

So if we assume that the subsurface was contaminated with equal amounts of thorium and uranium, the one percent available sludge and a subsequent dust loading created from maintenance work would have resulted in a thorium air concentration of 2.2 micrograms per meter cubed.

Using the thorium-232-specific activity of 0.11 microcuries per gram, the air concentration would have been 2.42 times 10 to the negative 13 microcuries per millimeter during one month of subsurface maintenance each year.

So to provide some perspective, this concentration would amount to an inhalation --

Chair Beach: Christine, can I stop you for a sec?

Ted, could you ask someone to --

Mr. Katz: Yeah. I mean, they can hear you, but -- yeah, someone is coughing, and whoever is coughing is not on mute. So if you could just please put your phone on mute. And if you don't have a mute button, press *6. That would help everyone else. Thanks.

Go ahead again, Christine.

Ms. Corwin: Okay. So to provide some perspective on

all those numbers, this concentration would amount to an inhalation committed effective dose of 10.42 millirem a year. And then if we add ingestion into the estimate, then the dose becomes 14.78 millirem per year.

So, to summarize, NIOSH believes they can use the calculated error concentration to bound internal thorium exposures that occurred while performing subsurface maintenance within Building 10. NIOSH will continue to estimate worker doses using the most claimant-favorable isotope of thorium or uranium.

For the burial area and Building 10 outside perimeter, NIOSH can use isotopic thorium-232 results to model air concentrations breathed by maintenance workers as previously described in the Metals and Controls Corporation maintenance exposure model White Paper.

Now we're on to the second issue that was raised by the petitioner and was that of welding of structural framework that was sometimes necessary for roof penetration work that occurred.

Next slide?

During the residual period, while performing maintenance work in the Building 10 overhead area, maintenance -- M&C workers were potentially exposure to contamination remaining from AWE operations. This work included installing pipe racks, welding supports to the trusses to fortify the roof, and cutting and drilling up through the roof to make penetrations for running services to rooftop equipment, such as air conditioning systems, recirculating water, chilled water supply and returns, and steam and condensate returns, as well as installing equipment on the roof.

A June 1981 NRC inspection report stated that Texas Instruments used a cutting and welding permit program. The permit system used a card on which

the necessary precautions required to be taken were listed.

In 1964, a Metals and Controls safety manual specified welding and flame-cutting precautions for fire safety, including pre-work cleaning of combustible debris, removal of deposits inside of ductwork, use of curtains and shields to protect personnel from glare and sparks, and the use of permit-required areas for sewers, fits, drains, ventilators, and ducts. The manual also stated that barricades were required for overhead work.

Interviews of M&C maintenance personnel indicated that welding is the -- welding in the dusty overhead area of Building 10 was only one of our many duties, but also included subsurface and HVAC work, and occupied approximately four hours per month or 48 hours per year.

NIOSH previously characterized the overhead work environment in Building 10 using the total surface activity and assumed 10 percent of that activity was removable and available to generate airborne activity.

NIOSH will continue to assign doses using this method for other work in the overhead area. However, for welding, NIOSH will assume 100 percent of the activity is resuspended.

NIOSH previously modeled exposures for the entire overhead area uniformly, using the 95th percentile contamination level and a one times 10 to the negative fourth resuspension factor. We are aware that good work practices require clean bare metal prior to welding, which can include wire brushing and grinding as described in worker interviews.

NIOSH believes this weld preparation work to be the portion of the welding task capable of generating the highest airborne concentration. In addition, NUREG-1400, Section 1.2.3, indicates that a dispersability

factor of 10 should be used when modeling intakes that involve grinding operations.

Therefore, NIOSH will increase the resuspension factor and apply a value of one times 10 to the negative third to the 95th percentile contamination level. These factors result in a calculated air concentration of 4.05 times 10 to the negative 12th microcuries per millimeter -- sorry, milliliter.

This air concentration would be assumed to be inhaled for the 48 hours of welding that occurred per year for M&C personnel that performed welding in the Building 10 overhead area, and will be added in addition to other assigned exposures.

To provide some perspective, again, this equates to a committed effective dose of 16.75 millirem per year. Adding in dose from ingestion gives us an estimated dose of 16.77 millirem per year.

So, to summarize the White Paper in this presentation, NIOSH bounding method for internal exposures from welding, NIOSH will assume 100 percent of the total surface activity is removable and available for resuspension. NIOSH will increase the resuspension factor and apply a value of one times 10 to the negative third to the 95th percentile contamination level.

So this air concentration will be assumed to be inhaled for the 48 hours of welding that occurred per year for M&C personnel that performed welding in the Building 10 overhead area, and will be assigned in addition to the other assigned exposures.

And that's the end of my presentation. The references are attached.

Chair Beach: Thanks, Christina. Does anybody have any questions, Work Group Members, clarifications that are needed?

Member Valerio: I don't have any, Josie. This is

Loretta.

Chair Beach: Okay. Dave, any for you?

Member Kotelchuck: Yeah, I do. On slide 18, on the many duties that they were -- we were estimated that there were -- welding was four hours per month. When I would see this paper, which gave the sources, on page 6 of the White Paper, the number four hours per month, 48 per year, were given in R-OP 2017-B. I believe that is the interview of one person. Is that not correct, that that number, four hours, comes from -- there were 12 interviews, but they were lettered A, B through whatever, through --

Chair Beach: F, G, yeah.

Member Kotelchuck: Yeah. So 2017-B, the four hours per month, would appear there to come from one individual among the 12. Is that correct?

And maybe somebody who is -- yourself, Ms. Corwin, or the -- or the other people who contributed to the White Paper. That's, to me, a question, whether that's information from one person or whether -- which is what I believe it is. But I would like to confirm that.

Mr. McCloskey: This is Pat McCloskey. I can answer that one for you.

Member Kotelchuck: Good.

Mr. McCloskey: So those 12 people, we looked at all of those interviews and looked for folks that had experience with welding, who listed it in their interviews. And we reached out to I'm going to say two or three of those folks and only got a response from one. But we felt like he was in a position where he was pretty knowledgeable as a maintenance supervisor. I can't remember the exact name of the person right now, but --

Member Kotelchuck: No. And, actually, we can't

discuss it on --

Mr. McCloskey: Oh, okay. Yeah.

Member Kotelchuck: -- in a public meeting anyway.

Mr. McCloskey: Appreciate that. Thanks for keeping me straight there.

Member Kotelchuck: Right.

Mr. McCloskey: Yeah. We felt like he was qualified to give a value and we went with that one person.

Member Kotelchuck: Right. And that was a 2017 interview about the work that had been done through -- from '68 through -- that's thin, frankly. However, it is what it is. It's one person -- I'm trying to remember back -- you know, making their best estimate. It's -- but the four hours is a very important number in terms of getting the extent of exposure.

It would be nice and would have been nicer if one could have had several folks or questions -- but, okay, that's my question. You answered it. Thank you.

Chair Beach: Well, and on that same line, that same worker -- Pat, I'm going to ask you, since you answered Dave. Was he -- did he actually do work as well, or was he just a supervisor? Because when you read his statement, it sounds like he was actually doing the work.

Mr. McCloskey: I believe, you know, most of the folks there at M&C worked their way up. The supervisors were taken from men that worked in the field for a while, and he started out as a worker and I believe at the end he was a supervisor who oversaw a lot of work. So --

Member Kotelchuck: Right. That was -- that was due of many of the people, many of the 12. I was looking over my notes about their interviews. But those were

people who had field experience, and I guess that is an issue.

It seems to me that that one should -- put it this way. I did not look up the interview of 2017-B in the last couple of days. These are notes that I took originally when I was reading it, but it is important to check that it was a field person, a person with field experience, no matter how they moved up the ladder.

If it was -- that's a single person, but at least a good -- an experienced single person. Still, that's thin.

Dr. Mauro: Dr. Kotelchuck, this is John Mauro. There is a point to this. I'd like to add another dimension that might be helpful.

Member Kotelchuck: Sure.

Dr. Mauro: One of the philosophies that we all adopted is that when we do these dose scenarios, we assume it's always the same person. So it's sort of like if you're going to reconstruct a person's dose, we know that different people worked at different times on these projects.

So it wasn't always the same person that did any particular job. In order to bound the exposure, we used what I would consider to be a truly bounding assumption that one person whether he was working in a subsurface environment, or he was working in the rafters, or he was replacing filters, and all of these various scenarios, we assumed it was always the same person. You know, whether it was once every quarter or once every year, or whatever the periodicity, or once a month, we always assumed that it was the same person, and his dose is -- and the reality is that wasn't the case.

We know from the interviews of all the workers that different people were drawn upon from the maintenance and repurposing activities. So that's an added conservatism built into this, which we should

keep in mind as we work our way through all of these different scenarios.

Member Kotelchuck: Please do clarify for me, though, I didn't quite -- if the person has a work record, and what -- is it correct to say that anybody, where there was welding, are you -- are you assigning four hours to every single one of the maintenance persons conservatively?

Or only for four -- four hours only for those with whom their -- whatever work records there are, like worked with welding? That is not clear. Who was actually assigned the welding -- these welding hours?

Chair Beach: Can I ask another question that's pertinent to Dave's before you answer Dave? This is Josie. Was the building, the rafters, the roof, that was open to all areas of Building 10 except for the one area I think in Area 7; is that correct?

Ms. Corwin: Correct.

Chair Beach: Okay. Because -- so if somebody was up there grinding, dusting, brushing, then that respirable air would cover I mean, it would go everywhere in the building when they used air to brush off that. So I wanted to make that point, that it was -- and find out, because the guy said it made a heck of a mess. And so go ahead, John. I just wanted to know that. That was throughout the entire building. It wasn't just in one space.

Dr. Mauro: I'll take a shot, and certainly Pat, Ed, or -- revise any -- my perception of the scenario.

When we did the doses. When the doses are done, you're saying -- you know, you have the activity on the surface that's being worked on, brushed, and, yes, you have an open area where that brushing of course is going to disperse the surface activity. And the closer you are to the -- where the brushing is going on, the higher the concentration is.

So it's the guy that's actually doing the brushing that's going to get the resuspension factor of 10 to the minus 3. And in my experience, 10 to the minus 3 is about as high as it can go. I think I saw one paper where someone had 10 to the minus 2.

So to answer your question, yes, of course, any dust that has been resuspended during the brushing and cleansing operation prior to the welding will be dispersed. But the people that are greater distances from -- where the activity is taking place, they're going to experience dust loadings that are orders of magnitude lower, because -- you know, because they're further away.

So this resuspension factor really is for the guy that is actually doing it, and I would say that in any given welding operation that took place it's likely that there was a crew of people. And it wasn't always the same person.

Now, the number of people in that crew who were qualified as welders to do that work, I don't have the answer to that. But I do know from speaking that there were groups of people that were assigned to what I would refer to as maintenance and repurposing activities. And there were a number of them, and they all circulated, if so qualified.

And I would -- to help, as best I can, likely there was a limited number of qualified welders. There may have been only one. I mean, I'll be the first to say it's possible that they only had one qualified welder, and he was the one who always did the work.

So, but -- and that was the assumption that was used, that whenever any of that work was done, and they got a snootful for that time period, whether it's four hours or some other number of hours, it was for that one. We gave it to that person. So you really can't, in my mind, place -- I mean, that's really a higher end, possibly plausible, but certainly a high end way of approaching the problem.

I hope that helps.

Member Kotelchuck: It does. So that says to me that the four hours -- let me get back to my question. So the four hours were given to those people -- would be given to those people in maintenance who were -- had qualifications as a welder or had something with regard to the welding responsibilities in their work record.

Mr. Katz: Well, let's -- this is Ted. Dave, before we -- let's get that from the DCAS folks, as to whether that's the case or whether all maintenance workers --

Member Kotelchuck: Yeah.

Mr. Katz: We don't know, so let's hear from DCAS about that.

Member Kotelchuck: Okay.

Ms. Corwin: That would -- it would apply to personnel that were involved in the welding and in support of the welding, you know, whoever the group was that performed the necessary tasks associated with the welding.

Member Kotelchuck: That's a little bit -- that's concerning to me.

Mr. Rutherford: This is LaVon Rutherford. Chris and Jack, correct me if I'm wrong, I don't believe we have the information to know exactly who was involved in the welding. So it would include all maintenance personnel; am I correct?

Mr. McCloskey: This is Pat. So what happened at Metals and Controls -- and we heard this a lot doing the interviews -- is you couldn't say, "Hey, I'm an electrician, I don't do plumbing." You couldn't do that.

Ideally, we -- you know, we've already said here in

Chris' slide that they had an established program where they roped off the area and kept people back, and there were permits required.

And we're thinking that records would show someone was a welder, but I think we would allow -- what we would commonly do is if someone doing an interview said that they did some welding, we certainly would have -- would recognize that and give them --

Ms. Corwin: Correct. We don't -- we don't have to have like proof of -- in their employment records. Typically, we get the information from CATIs.

Mr. Katz: Chris, this is Ted. I'm sorry, but you have also survivors. In this case, you don't necessarily have CATI information on what they did, in which case, what do you do? That's why I'm -- I'm thinking like LaVon is. In a case where you have a CATI, you don't know -- you knew -- you may not even know they were actually a maintenance worker.

And I think the only way -- thing you can do is assume they might have been a maintenance worker and assume they might have done welding as a maintenance worker, right? I mean, it's -- I'm not sure what you're doing, but --

Member Kotelchuck: Right. Which is to say, one -- and that was the concern, is that simply being assigned to everybody, or are there ways of finding out who were welders? And I admit, in the -- in the interviews, there were very clear statements about, you know, when the -- if the plumber, if the -- if the plumbers are busy and the electricians are not, the electricians become plumbers. That's what one of the interviewees said.

And that sounded -- and that seems to be confirmed by other things that people rotated. So I don't know -- I just want to know, the four hours it sounds like should be assigned to everybody.

Dr. Mauro: Dr. Kotelchuck, I would agree with you. I

would agree with you. I'll tell you -- I'll tell you why. Remember, the process was, let's say, a two-step process. There was prep work where you scrubbed and cleaned, because you don't just weld. You scrub and clean.

Member Kotelchuck: Sure.

Dr. Mauro: And that could be by any maintenance worker. He's given instructions, "I want you to scrub and clean, so that the bare metal is there." So the welder then could come, the qualified welder, could come in and do his job.

So, in my -- and, you know, I'm just winging this a bit because I didn't write any of this, and any of the work I wrote, we didn't get down to this granularity, which is good, not getting down to a level of granularity we haven't done before.

It seems to me reasonable that, since we don't know -- since there is this pool of workers, I would say that that particular exposure, the scrubbing and brushing, and the 10 to the minus 3, and all of that, I would give that to everybody. That would -- that could possibly have been involved in repurposing the maintenance for a number of reasons.

We don't know who did the work -- welding -- but that's almost not that relevant. What is really relevant is who may have been a support person out to the welder who did the prep work.

So I think a reasonable strategy, which I personally believe could be a Site Profile-type issue, is do we assume only a limited number of people, or do we assume anyone from the pool could possibly have done that work? I think it should be given to everybody.

Member Kotelchuck: Yeah. It sounds to -- the argument, I think, sounds that it probably should be given to everybody. I still have, myself, the concern that -- this is one person who said it. We're assigning

it to everybody. But at least it -- let's take that one person's information and say, "Look, it's good information. There's reason to believe it's good information." It's one person, but those four hours should be given to everybody, or will have to be given to everybody.

Dr. Anigstein: This is Bob Anigstein. Even though we shouldn't be dictating NIOSH's procedures, which hasn't been written yet, but based on other sites that I've been involved with -- for instance, General Steel Industries, called GSI, in Illinois -- they would take -- the agreement was find the highest doses that anyone could plausibly get. In those cases, there was exposure to industrial radiography that was using radium sources.

And unless someone can be proven not to have worked in the plant, it was automatically giving the highest doses to the plant workers. So it was a negative thing. You were guilty until proven innocent.

Member Kotelchuck: Yeah. And this is claimant-favorable, of course.

Dr. Anigstein: Very claimant-favorable. And this eliminates the need to identify this particular worker's job, because maybe he had more than one job and the petitioner was a deceased worker and maybe his survivors aren't very clear what work he did. So this seems to be a common NIOSH practice. And NIOSH can correct me if --

(Simultaneous speaking.)

Member Kotelchuck: Yeah. Makes sense. This is a complicated case because this was a maintenance crew and people did many different kinds of jobs. And we're going to have to characterize each one of them. But we're doing welding, and my question is answered. My questions are answered.

Chair Beach: This is Josie. I have another follow-on question. I think, Pat, you spoke, you said that the

procedure -- and I don't know what page it is on your slides, Christina -- but you said the procedure that you found in the mid-'60s said that they would rope off the area, put up screens, that type of thing.

Did you hear that from any interviews that you conducted, Pat, that agreed with that statement, that they actually followed that procedure that you found?

Mr. McCloskey: Josie, hi. Top of my head, I'm trying to remember in the interviews if they said -- I mean, as the site matured, their controls got better. I remember that. But I don't remember hearing anything specific about welding and barricades that I can remember.

Chair Beach: In the controls. Yeah. I mean, it's easy to cite what you find in procedures, but most of us that work in those areas know that they're not always followed. So, that's why I just thought it -- because I was looking for that specifically from the workers' interviews and didn't see it. So.

Mr. McCloskey: They had a pretty good program late, and I don't -- I can't see raining sparks down on people below you, even without rules, but, you know --

(Simultaneous speaking.)

Chair Beach: Yeah, you know, I wasn't concerned about the welding so much as the cleaning and grinding, because the one worker that you guys did cite talked about what a mess -- a heck of a mess, and he used the compressed air tank to blow it all off. And so, anyway, that's fine. I was just curious about that, if you knew.

Mr. Rutherford: Josie, this is LaVon. I wanted to point out that, Dave, if we do go with applying this to everyone, that issue won't matter.

Chair Beach: Correct.

Member Kotelchuck: Yes, that's right.

Chair Beach: If we do. Henry, do you have any questions or comments?

Member Anderson: No. I was just -- you have already covered it. I think it needs to be added in to everybody. I don't think there is enough information in most of the records to try to segregate the group into those who did this kind of work and those who didn't.

So, it certainly is an activity that would go on, and I think breaking it out into -- it was a welding job that needed to be done, but the prep work really could be done by anybody who is available. And I think that is really where the major exposures would occur with that individual. The question is: how broad is that exposure from that cleaning activity down below them?

Chair Beach: Well, and one of the other --

(Simultaneous speaking.)

Member Anderson: The descriptions are it could be pretty messy, and especially using a grinder, it goes all over.

Chair Beach: Yeah. The other part of this -- and I'll let it out -- that I know the roof surveys were based on historical histories. They used to exhaust the uranium processing through the roof penetrations. And so if somebody was getting into not just welding on the surface, but if you were actually having to put pipes in through the roof, there's source material that you could come in contact with that we haven't even really touched on in this comment. So.

Dr. Mauro: This is John Mauro again. I'm sorry to interrupt, but there's another perspective here that I think is important to keep in mind. The reality is, let's say there is a pool of people that we draw upon that might have been up close and personal doing the

actual prep work and getting this relatively elevated exposure. And we're going, therefore, everyone gets that dose.

But think about this for a minute. We're assuming it's always -- it's everyone, and it's always the same person. Stay with me a minute. It's as if the same person is always the one who's doing the prep work and getting the high exposure year after year, and we're going to give that to everybody.

Now, we know now -- you know, think about it. So, therefore, that covers every scenario that you might conceive of. That is, yes, there are going to be people that are farther away, right, when this work is going on, and may be exposed to some of the stuff that falls out, or whatever.

But, no, we're going to give everybody as if every single person did that job every single time. Did you follow that?

Member Anderson: Yeah.

Dr. Mauro: Which is extremely conservative, because we know that -- so that almost, like, puts to bed all of these other secondary issues. Well, what about a little further away? No, we're going to give this to everybody as if he was the person that did it every single time. Got it?

Member Anderson: Right.

Dr. Mauro: I really believe you can't do much more than that.

Member Anderson: Right.

Chair Beach: If we can agree that the dose that is being given is a correct dose for --

Dr. Mauro: Absolutely. And I'm sorry to interrupt, but keep in mind, what we're saying, the 90th percentile, the measured level on the surface of the metal, 10 to

the minus-three resuspension factor, so -- yes.

Dr. Anigstein: Excuse me for interrupting, John, but we have some comments about the doses, so maybe we should wait until the next --

Dr. Mauro: Oh, okay. So there may be some other things to discuss about whether --

Dr. Anigstein: Yeah, I mean, there's agreement that everyone should get -- that there's four hours a month of exposure to the welding prep, and that should be given to everyone. But what the actual exposure is is another matter, which is the subject of an SC&A report.

Dr. Mauro: A refinement on what a better number might be. I agree, but, you see, right now I am trying to--

Dr. Anigstein: You're jumping a little ahead.

Dr. Mauro: Yeah. Well, no, no, I think I'm trying to set a perspective that assumptions were made that really pushed it to its limit.

Now, whether you have a better resuspension factor, whether your upper 90th percentile activity on the surface that's going to be, you know, prepped, and some discussion is needed on that, that's fine, you know, and we certainly could get there.

But I think the bigger issue is really, you know, how do you cut out this problem? And that's why I bring this up. I think it puts to bed a number of questions regarding, well, what about people that may be further away? Well, that question goes away if you're giving the high-end dose to everybody as if he was the only one that ever did it.

Mr. Katz: I think that's understood, John. I think that's a nice clarification.

Dr. Mauro: Yeah. Okay. Thank you.

Mr. Katz: Yeah.

Member Anderson: This is Andy again. I mean, taking that further, rather than each individual who is working might have up to four hours a month, it really comes down to, well, how many potential people are there? And then, if you said it's the same person, it could become a full-time job. So then you assign, instead of four hours a month, the whole work month.

Dr. Mauro: I agree. I think that -- yep.

(Simultaneous speaking.)

Member Anderson: If there's only five potential people that would be eligible to do that, then it would be 20 hours a month. So I think that really goes way beyond.

Mr. Katz: I don't understand that, Andy. I don't understand what you're trying to say there.

Member Anderson: What I'm trying to say is, John was saying that, if it was the same person all the time, as I read this, it's an individual maintenance worker they said averaged about, you know, four hours a month, but it isn't the same person four hours a month. It's all of the workers four hours a month. And if now you say, "Well, it was the same worker," then that one worker would be taking all of the hours from other individuals.

Mr. Katz: No, no. The practical -- no, the practical way this works is just every worker who comes in with a claim who was in the place, if this goes through this way and NIOSH adopts this, every worker who's under that roof basically would get four hours of this dose. So it's not additive, you don't end up having, you know, 40 hours or more. You get four hours, each worker who claims.

Member Anderson: No, I understand that. But I thought John was saying it could be the same person

did it all. There's only one person doing --

(Simultaneous speaking.)

Member Anderson: Then it depends how many jobs were there, and then that is a one -- you're not saying every month only one person did four hours.

Mr. Rutherford: Actually, let me add a little clarification, help you out here. This is LaVon again. There was, on average, four hours of welding work total in the overhead.

Member Anderson: That's good. That helps. That's really what I was getting at.

Mr. Rutherford: All right. Thank you.

Member Anderson: So, it's not 16 hours. It would be divided amongst four people, that's --

Mr. Katz: No.

Chair Beach: Okay. And so this is Josie. That is if we decide that this is a Site Profile issue and not an SEC issue. Then those numbers and that time is negotiable and something to be worked out at the time we're discussing that as a Site Profile, correct?

Member Anderson: Yes.

Mr. Katz: Well, I mean, yeah, it doesn't matter what label you put on it. I mean, you have to --

Chair Beach: Right. Okay. Any other discussion on the internal welding?

Member Valerio: So, Josie, this is Loretta. I have a question.

Chair Beach: Okay. Go ahead.

Member Valerio: Just to clarify, this four-hour exposure limit will be applied to support -- meaning laborers, custodians, anyone who may have been in

the building -- will receive this four-hour dose, is that correct?

Mr. Katz: That's what you're hearing from the Work Group as a recommendation, in effect.

Member Valerio: That's the recommendation. So, to expand on my question, are we -- and it really doesn't matter, I guess -- is this just welding that was done up in the rafters? Or was it welding that was done down, you know, on the ground level during this timeframe as well? Because I believe that there was, when they were cutting into the drains and into the pipes. So, basically, going back to the original question, this four hours would apply to anyone whose work record places them in this building, correct?

Mr. Katz: Correct.

Member Valerio: Okay.

Mr. Katz: Again, this is the discussion that's going on in the Work Group. And NIOSH hasn't put out a method yet or adopted this, but they've discussed it amicably. So that's where we are right now.

Dr. Mauro: I think there is one last question that needs to be asked. This four hour number, is that four hours a year that that kind of work was being done year after year? Or is that four hours total for the entire residual period?

Mr. McCloskey: This is, on average, four hours per month, or 48 hours per year.

Dr. Mauro: Right. So we're getting -- so everyone -- now, just to make sure, because I didn't want to mislead anyone as we were talking through. So, we have -- every individual that theoretically could have been involved in the prep work is going to be given the totality of that exposure, not just one time, not just a one-time exposure, but --

Dr. Anigstein: That's the practice run. That's the practice. P putting perhaps a different slant on this, it's not as if you have -- I'm just making up a number -- 300 workers, and there just isn't enough welding work for everybody to be doing that. I'm just posing it as a strawman. That's not the relevant question.

The relevant question is, since we don't know for certainty who did the work and who didn't, you just assume that every claimant, until proven otherwise --

Dr. Mauro: Yes. Gets it all.

Dr. Anigstein: -- did that four hours, every month, for every month that he worked at M&C.

Dr. Mauro: Good. That's what I just wanted to confirm, nail that down, because, you know, and it turns out that it's -- I didn't remember the number of -- the four hours and how often that was.

Dr. Anigstein: Once a month.

Dr. Mauro: Once a month.

Dr. Anigstein: Four hours a month, every month.

Dr. Mauro: And that's year after year.

Dr. Anigstein: Right.

Dr. Mauro: And it's always the same guy. And that's everybody.

Dr. Anigstein: Well, it's not that it's always --

Dr. Mauro: I know it's not.

Dr. Anigstein: to put it slightly different, or to make it more plausible, it's not always the same guy. But until -- we don't know who the guy is --

Dr. Mauro: We assume.

Dr. Anigstein: -- you assume -- every claim is

considered individually, and for each claim you assume that he did that work until proven otherwise.

Dr. Mauro: Beautiful. Thank you.

Mr. Katz: Please. We're retreading now, so I think we should move on.

Member Kotelchuck: Right. Before we -- I had one last comment about that slide. I'm having trouble with my computer. Everything is going off on both of my computers, my CDC and home. But I had a note for myself, and I would like to ask questions about slide 17, in reference to the 1964 safety and health manual. It is clear that the manual, I mean, had information that welding had to be approved, there was a sign card from someone in the plant that they were obeying those rules. But I am concerned that the 1964 safety and health manual, when you did the 12 interviews, a number of people, including people with environmental responsibilities, said they hadn't heard about the manual.

And so, I mean, to my mind, there is question in the record about whether people actually paid attention to that and did what they said they did. A sign card is certainly evidence that somebody knew somebody signed off on it. On the other hand, did people really follow those rules? I just feel like that 1964 manual, to my mind, reference to it, to my mind, was -- I don't know how seriously to take it. And yet it was part of what was assumed to be the case in trying to develop the exposure scenario.

Now, I don't have 17 up, but you folks have it. I'll get back on. Is there any comment about how -- or, from Ms. Corwin -- about how much was the safety and health manual -- or, how was the safety and health manual used in determining the exposure in the welding, excuse me, and the thorium?

Ms. Corwin: We didn't necessarily use it to drive any of the exposure scenario necessarily. It was more of

an instructive thing, to show that they did have a program, and we can only assume that the program became more mature and not less mature as time went on.

And that they didn't -- so if they had a program, then we can assume that some type of safety measures were in place. We don't take credit for any of those in our exposure scenario.

Member Kotelchuck: Alright. Okay. And I will say it is dubious to me that the 1964 manual was put out during the operational period. The reports about what happened at the end of the operational period, which is I believe '67, '68, after that there was no health and safety office for radiation. There was no health and safety program for radiation.

I don't at all trust, from evidence on the record, that things got -- not only didn't things get better, I think the whole radiation program disappeared from what it appears and -- which is concerning, so I don't --

Ms. Corwin: But we don't assume that the safety program and the welding program disappeared, because, you know, safety was still present at the --

Member Kotelchuck: You know, you're right about that. You are right about that. And that's an absolutely proper response. If we're talking about welding, then we're talking about the safety program, and generally people had very good experience with the safety program, and that was true of many of the witnesses.

They didn't have a radiation component, but we're not talking about -- we're talking about the welding.

Mr. Katz: Yeah. I think a key piece here is that they didn't rely on any assumptions based on those programs anyway.

Member Kotelchuck: Okay. Fine. All right. Thank you.

Ms. Corwin: Also, I just wanted to let everyone know that my phone keeps disconnecting. So if you don't hear me, it's because I'm trying to dial back in.

Member Kotelchuck: Okay. I'm going to --

Dr. Taulbee: I've had the same thing. Apparently, our building went down, and all the phones reset in the middle of this.

Member Kotelchuck: Ah, okay.

Member Anderson: Happy New Year.

(Laughter.)

Mr. Katz: Yeah. Nothing but technical difficulties all around.

Member Kotelchuck: Okay. All right. Mine seems to be coming back.

Mr. Katz: So we've had a round of questions. We didn't really have an opportunity yet for SC&A -- I mean, SC&A has piped up, of course, but they haven't had a chance to respond yet to NIOSH's presentation. Is there more at this point than makes sense for SC&A to response, or where are we?

Dr. Mauro: This is John. I have a suggestion. I think we have explored what I would consider to be the overarching SEC-type problems. Can you get your arms wrapped around the problem? You know, do we have the wherewithal to do that?

Then I think it is time. Now, let's get down to, all right, do we agree on resuspension factors, contamination levels, things like that. What parameters are you going to use?

So, in my mind, what we did is a very we've accomplished something very important here. We've explored thoroughly, conceptually, whether you can wrap your arms around this problem and whether or not it represents an SEC issue or not, which of course

is a judgment that the Board makes.

But I think we've explored the issues that are pertinent to an SEC very thoroughly just now.

Mr. Katz: So if you're going to bore down into the actual dosimetric values issues, is there -- Christine, is there a portion of your presentation that gets to that first, before SC&A addresses whatever their concerns might be with your approach?

Ms. Corwin: You know, I have a presentation on just the status of the concerns raised by SC&A in their review of our paper that I can go through. It depends on what you and SC&A would like. If you would like me to go through that?

Mr. Katz: Well, if that served that up -- if that served the issues up well, and if that's fine with Josie, it seems like that's the next step.

Ms. Corwin: It summarizes --

Dr. Anigstein: Well, I mean, we did --

Ms. Corwin: -- the findings and the three observations.

Dr. Anigstein: We did --

Mr. Katz: Bob, go ahead. What are you trying to say?

Dr. Anigstein: Yeah. Well, you know, we did a response to the discussion that Christine -- is that -- did I get it right? -- just presented. So I don't have a screen presentation, but I can go through briefly our observations and conclusions about the NIOSH approach to thorium and to welding.

Mr. Katz: But, Bob, do you need Christine to do her presentation first? Is that sort of --

Dr. Anigstein: Well, I think her presentation -- I assume that that is based on the November 27th paper. Is that correct?

Ms. Corwin: That's correct.

Dr. Anigstein: Right. So I think it would make -- I think it would be more logical if I presented the SC&A position first, and I could -- if that's -- it might be efficient if that's -- you know, if that is acceptable to everyone else, I could -- instead of going back and forth --

Mr. Katz: I would just -- yeah. So I would just say whatever makes it -- because we want this discussion to be clear as possible to the Board Members and to the petitioner and his company. I don't mean company. I meant the person attending with him.

So whatever makes that discussion as clear and full as possible is I think the way to go. It's for you two to judge, Christine and Bob, I think.

Ms. Corwin: I'm fine with that.

Dr. Anigstein: Okay. So we have concerns -- the memo that was transmitted on July 26, 2019, was a response to the NIOSH White Paper of April 8, 2019. And I preface this by saying this is what -- the concern that we came up with was we're not disputing the SEC issues.

We are simply disputing the details, and perhaps this should have been reserved for the TBD stage, because these are really TBD issues that I'm raising. But having said that, I'd just like to briefly go through them because otherwise they will be swept under the rug.

And we have some concerns that maybe the NIOSH approach is not the most effective way of solving that issue. The concern I have -- one sec. The first concern we have is about how much thorium there is onsite.

Now, NIOSH did, actually, an analysis in the paper. We sent that. In their paper, they did -- they did an analysis of soil samples that were taken. There was

a study conducted by ORAU, not to be confused with the ORAU Team on the present contract, and in 1984 they were contracted by NRC, I believe, and they did samplings of both surface soils and boreholes throughout the site.

And the first part, even though Christine didn't mention that, NIOSH had analyzed the -- there were 751, if my memory serves me correctly, individual samples, and they gave concentrations and picocuries per gram of uranium-235, uranium-238, thorium-232, and I believe also radium, which is not at issue here.

And NIOSH went and did a pairwise comparison in every one of these samples of the ratio between total uranium, which was incidentally a little difficult to get because that 234 was not -- which would have been present was not analyzed, and a total uranium and a total thorium, or the thorium-232 rather, which is essentially all of natural thorium.

And then they came up with a ratio of -- activity ratio of 9.88 to 1 uranium to thorium. But then it was a little confusing -- and I must have jumped to the wrong conclusion I see now in retrospect, that they utilized that data. They did that analysis but did not utilize the data.

I, nevertheless, examined it thinking that it was of value, since they had done quite a bit of work on that. And I reviewed that entire report. The author was Sowell, S-O-W-E-L-L. He's the chief author of the NRC study that was done in 1984, published in 1985.

And I found that our individual data sets, or about half a dozen tables, for different areas of the site -- and in all but two of them, the vast majority of the samples, if you scan, just eyeballing through the data and looking at the thorium-232 concentrations, and comparing them to about five locations offsite in the vicinity -- so they would have the same -- presume to have the same natural background but not have

been subject to contamination from the M&C operational period.

And we found that the vast majority of the cases -- not -- you know, and this is a sample of the data sets -- well within natural background.

If you look at the five cases, five samples, and you say, okay, this is the mean thorium concentration, this is the standard deviation, and it's a little far-fetched. It's a little weak to use five samples to get a distribution, it was the best we had. And you look at the data sets and you say, "Yeah. Okay. Here is one that's high level, to the high level."

Well, within log-normal distribution, you would expect to have a few at the upper end. And by doing the statistics, one out of 100, one out of 200, yeah, you would expect that. But these were all within normal background, except for two smaller sets.

And we identified one subset that using the NIOSH methodology, even though it's not the methodology that was ultimately used by NIOSH, but we used the NIOSH methodology of comparing, pairwise comparison, side by side, and doing a ratio and doing a geometric mean.

And we found there was one set that had, I believe, 88 samples, which had definitely elevated readings of thorium. So there was some thorium contamination in that one area with the burial ground, I believe, around Building 12.

And so we utilized that. And the reason we're somewhat uncomfortable, dubious, about the NIOSH assumption is there was -- not to be quibbling, but the data that was cited about the total thorium harm was not a safety study. It was actually a concern about liability. They were -- M&C was concerned, gee, we have this valuable material onsite, and it belongs to -- we're the custodians of it, but it belongs to the NRC. And what happens if something goes

wrong? Is the company going to be liable for the cost for any losses of this? And should we take out an insurance policy?

And so they did an inventory, and there was really very little explanation of what went into that inventory. That table was just like two sheets, two pages within a large PDF file. And the inventory listed different enrichments of uranium all the way from 93 -- at the high end of 93 percent down to a low end of 1.8 percent in normal uranium. And then it had one column of numbers simply called Commission. Presumably, that means the Atomic Energy Commission, the predecessor to the NRC at the time.

And then it has another column, License. And in some cases, the Commission amounts exceed the License amount. Other cases, the License amount exceeds the Commission amount. There is no explanation.

So the total, if you add up the total, you end up seeing that there was a total of 244 kilograms of thorium and 700-and -- I'll just round it off -- a little less than 8,000 kilograms of uranium, if you add both the Commission and License amounts.

So there is no question there was more uranium at that particular time, January 1, 1962, which was six years before the end of the operational period, that there was more uranium onsite than thorium. And this is logical because the description of the operations basically were a fabrication of uranium fuel elements.

However, we see really no firm justification for the assumption. Well, let's just assume that there was one kilogram of thorium for every kilogram of uranium onsite. Is it likely to have been worse? Well, we don't know for the particular operation. But is that a number that is derived on the basis of data? SC&A has a problem with that.

We don't have a problem -- we believe that the

thorium can be bounded. We believe thorium exposures are tractable. But we just weren't quite sure we were in agreement with the -- that the methodology that was proposed would necessarily meet the qualifications of sufficient accuracy.

So, consequently, we looked at the thorium to uranium levels. In that one data set it was Table 6A of the Sowell report, the 1985 Sowell report. Calling it Sowell -- should maybe call it the ORAU report.

And we found that you could derive a ratio, you could -- because there was U-238, U-235, and thorium listed. And so we followed -- I know there is more than one, and Christine might get to that, more than one way of treating the statistics.

But I thought the simple -- I thought to treat the statistics consistent with the way that NIOSH had treated the statistics, even though they ended up not utilizing that in the final analysis, but they did sample by sample and a pairwise comparison between thorium and uranium.

So we came up with a different, somewhat higher value, for the thorium concentration. And I will skip ahead, if that's okay, and answer. That would then -- I also have to cite some recent history of the project, and that is we got word -- somehow there was a -- that NIOSH had prepared a response to the SC&A response, SC&A memo that I'm just talking about.

However, that was not -- we would not know that was released, because in previous experience we noted that the NIOSH Team or the ORAU Team, working under contract of NIOSH, will prepare a report, and then understandably it would undergo review then by the senior NIOSH technical staff. So there was typically a several-week lapse.

We're going by other sites now -- Carborundum most recent that I worked with -- where there would be a

lapse of time from the date on the cover date of the report and the date where it was actually made available to us.

So the fact that it was a November date, I said, "Well, we'll be getting this soon. We'll seeing it eventually." And then we never received, unlike we usually get an email with an advance copy of it, but we never received that report.

And the first I heard of it, or that I know -- was when Ted Katz issued the agenda on Monday, and it listed -- Monday afternoon I got the agenda, which listed the papers to be discussed. And lo and behold, there was this November 27th NIOSH critique of the SC&A review of the thorium and welding exposure model.

And so by the time -- it was 3:00 on Monday by the time I was able to obtain that. And I have to add, I was looking for that report, and I looked on the DCAS website, because usually, if you look at the meeting announcement, after the meeting announcement, the papers for discussion will be listed.

So I looked several times. It wasn't there, and I assumed they haven't come out yet.

So we got it at 3:00 Monday afternoon. So we did not have time to review it, and particularly the text itself was fairly straightforward, but there was attached to it another report by -- authored by Tom LaBone of ORAU -- of the ORAU Team, which involved a very detailed statistical analysis. And during this two days available, we were simply not able to recruit a statistician.

The statistician -- we had a long-time senior statistician who worked for SC&A for at least 25 years, Dr. Chmelynski, who had just retired, and we could not recruit a statistician to examine this and examine the data until we agree with it. So I read -- I read the text, but I can't really answer the statistics.

All I can say is they -- it was critical of the statistical

methods that I utilized, and my -- my statistical method was based on -- there was something called -- perhaps I'm going too far afield. I'll try to keep this brief. Something called regression order statistics, which we have utilized. We have utilized those most recently with the Carborundum site.

But since NIOSH had not utilized that for their soil samples, I simply followed the example of the NIOSH analysis of the complete data set in the -- I call it the Sowell report.

So I just want to say that that was the justification for doing it that way. There were critical -- and I admitted in my report that the statistics were shaky. There was a weak -- we did two things. We were criticized for two things.

One of them was some turned out to be a substantial fraction of the U-235 data, was listed in the Sowell report as less than, meaning they were less than the lowest detectable level, the LDL, and what is traditional -- we certainly used it for bioassay samples, if it's not detectable, you can't say it's zero, but it could be anywhere between zero and the detectable level.

So as a statistically valid approximation -- let's just say it's one-half the detectable level, because on average that's what it will be. If you have a bunch of samples like that, there will be a distribution, but their average would be one-half the detectable level.

And detectable level for these samples was not a single level always. It was depending on the counting statistics, so there was -- it was for each individual sample. They'd say, "This is how long we counted, and this is what it would have taken to be -- to detect, and we didn't detect to that level."

So, and using that statistic, we got a result that typically, when you want to do a correlation, you typically want at least 95 percent certainty, in other

words, there is not more than a five percent chance that this is due to randomness, that it really is a real correlation.

Well, in this case, the chance of being random was 12 percent. There is a technique for evaluating it, which I did not present, but there's actually calculators that you can download from academic websites. And this was confirmed by my colleague, Dr. Chmelynski, last summer.

So it's a weak correlation, in most scientific work -- you couldn't publish a scientific paper in a scientific journal, giving those results with -- but I thought it was better than just an assumption of one-to-one.

As it turned out, the doses that calculated through this method were somewhat higher than the doses calculated by NIOSH using their one-gram-per-one-gram method. And, again, this is probably premature, this is really a Site Profile issue. It probably should not have been -- maybe, in retrospect, was too strong a statement.

And particularly on examining the data, which I managed to do in the past few days, there are other approaches which might have resulted in lower doses. So, in the end, we're not in serious disagreement with the thorium doses that NIOSH had calculated, because ours are somewhat higher, but they're still small doses. It's still in the millirem per year range.

So the doses for thorium -- and we believe that the thorium issue is tractable, it just might be better from an administrative -- from an acceptability standpoint, if there could be some firmer evidence based on actual measurements to make it a little firmer.

But the number is not that far, we're not in serious dispute with the number because at this time, we're concerned with SEC issues, and there is no question that thorium can be, at some plausible, claimant-

favorable assumption, conclusions could be reached regarding how to assign thorium exposures so that does not become -- we do not believe that that is an intractable issue.

Then, going on to welding, the major problem with welding is -- our take on the welding is here you have a worker -- we just discussed how many workers -- but here you have a worker vigorously brushing, using a wire brush, using a grinder, using either a grinding wheel or a motorized wire brush.

On these types, there's a tremendous amount of dust that will be generated, albeit for a short period of time. And looking at the various resuspension factors in OTIB-70, summarized in OTIB-70 then I went back to the source documents and they were correctly cited, you can get measured resuspension factors as high as four times ten to the minus two. And that was not done by mechanical, you know, power-driven tools. That was done by simply two workers vigorously sweeping the floor.

So if brooms can raise that kind of dust, a grinder could easily, in our mind, do the same. So our objection is, well, in round numbers, it should be ten to the minus two instead of ten to the minus three, just for that brief operation, just for those four hours per month that the worker would have done. We think it should be higher.

And that's the only objection we have to the welding scenario. Had a question about which worker it was. I could not find it, but that was clarified in the response paper, NIOSH's response paper identifying the page of the interview notes.

So, again, we have no objection to the general philosophy of the NIOSH report. The answer in NIOSH's response paper was, well, the ten to the minus three was an average. Well, we're not talking about an average 20 -- you know, for the whole work day. We're just talking about that dose one hour per

week, that it should be higher.

And, again, the doses are still modest, and it does not make it -- and it's certainly not an SEC issue.

So that's the end of the SC&A work on the welding and thorium model.

Dr. Mauro: This is John Mauro, just real quick. I understand that the main issue we're talking about now is the resuspension factor.

But when it gets to the thorium and uranium on the metal that was going to be welded, Bob gave the overarching story on, you know, and mainly it's useful when we're going to get to the discussion of the activity that in the subsurface environment. We'll get there later, I guess in part two.

But when it comes to the welding operation -- and I have a question -- some assumption was made regarding the upper 95th percentile contamination level that was on the surface of the metal that was going to be prepped for welding.

Dr. Anigstein: We don't -- we're not questioning that.

Dr. Mauro: No, no, no. I just want to know for my own benefit. What assumptions were made regarding the amount of uranium and thorium? In other words, did you assume -- I believe they took swipe samples or handheld survey measurements. I need a little help here.

And, if so, did you assume that it was all the worst case. That is, well, depending on the cancer, we assumed it was all -- all the activity that was resuspended was thorium, or all the activity that was resuspended was --

Dr. Anigstein: The procedure that was recommended and was accepted by NIOSH --

Dr. Mauro: Yes.

Dr. Anigstein: -- and their response to my response was, whichever gives you the highest PoC.

Dr. Mauro: Okay. So that's important because if the one-to-one issue that you just brought up is really applicable to the subsurface. It's really not applicable to this issue that we're talking about now, which is the welding work.

Dr. Anigstein: We are assuming that all of the -- assuming that wherever there is uranium there would also be thorium, and we just -- and the only dispute is about what is the exact ratio?

Dr. Mauro: No. But I'm talking about the -- I hope everybody is following.

Dr. Anigstein: Even for the welding model --

Dr. Mauro: Oh, okay. I misunderstood.

Dr. Anigstein: -- we're assuming that it's either -- since the swipe samples were based on gross alpha, the gross alpha can be either thorium or uranium, or both, or a mixture of both. And then we'll assume that whichever is the most claimant favorable, that was the --

Dr. Mauro: So the one-to-one --

Dr. Anigstein: -- NIOSH response.

Dr. Mauro: The one-to-one thing wasn't used. What was used is, as is --

Dr. Anigstein: That's right. That is correct.

Dr. Mauro: Okay. I just wanted to --

Dr. Anigstein: That is correct.

Dr. Mauro: Yeah. I jump in on that only because I -- the method that was used for the welding was very conventional. Let's use the worst -- here is a gross alpha. We don't know. It could -- we know it's

probably some kind of mixture of uranium and thorium, probably mostly uranium, but you know what we're going to do? We're going to assume the worst. That is

Dr. Anigstein: That was the -- my response to the first NIOSH paper was the recommendation that they assume thorium or uranium, which is the worst, and the NIOSH response agreed with that.

Dr. Mauro: And that's the only reason I brought it up, because I wanted to make sure everybody understood that we're on the same page when it comes to that part of the analysis, and that is with regard to the contamination that was on the welding activity. It seemed that -- you know, because that's what we were talking about, right?

And then when we went onto the Site Profile issues, you know, I wanted to make sure everybody understood that what you were describing really didn't apply to the welding question. You know, you were describing -- and not so much the resuspension. We agree we still have an issue here on resuspension. But I wanted to make sure we put to bed the Site Profile issue, if there was any, regarding the activity approach.

Dr. Anigstein: There is no disagreement there.

Dr. Mauro: Right, right. Good. And that needed to be said. Okay? And that's the only reason I jumped in.

Chair Beach: Okay. Thank you. Is there any Work Group Member questions for SC&A at this time?

Member Anderson: No, not from me.

Member Kotelchuck: I don't have any questions.

Member Valerio: Not from me, Josie.

Chair Beach: Okay. I think we can move on with Christina's next presentation.

Mr. Katz: Whoa, one second. Josie, I just want to ask everyone, we've been on for about an hour and 45 minutes. Does anyone need a comfort break? Or to go grab a lunch or what have you? I just want to check. I'm fine personally, but --

Chair Beach: I'm fine, but would be willing to take a break if anybody needs one.

Mr. Katz: Speak up if someone needs a break.

Member Kotelchuck: Yeah, wouldn't mind.

Mr. Katz: Okay. How much time do you need? So 15 minutes? 10 minutes?

Member Kotelchuck: Yeah, that would be fine.

Mr. Katz: What do you need?

Member Kotelchuck: Fifteen minutes would be fine.

Mr. Katz: Okay. So let's go on a 15 minute break. That would put us back on the line at 12:30.

(Whereupon, the above-entitled matter went off the record at 12:15 p.m. and resumed at 12:35 p.m.)

Chair Beach: Okay. We are back online, and, Christine, you can go ahead and start.

Ms. Corwin: Okay. Good afternoon. This is Christine Corwin again, health physicist with NIOSH. And in this presentation I'll be giving an update on the Metals and Controls thorium and welding exposure model that kind of describes what the issues outstanding are.

Slide 2. Tim is still having to do this for me, so I apologize.

It's a summary of current NIOSH responses to SC&A's review of the NIOSH Metals and Controls Corporation Thorium and Welding Exposure Model White Paper.

So to summarize the issues, after SC&A's review, there are two findings presented by SC&A. They are both in progress, as we have discussed, and they are both TBD issues that can be worked out as part of that process. There are three observations.

Go ahead.

Mr. Katz: Well, hello, everybody. I'm not sure what I'm missing here, but I'm just rejoining. This is Ted.

So, anyway, sorry about that. I needed that sideline chat. But let me just make sure I have all four Board Members on. So Josie is back, I'm sure, but do I have Andy and Loretta and Dave?

Member Kotelchuck: Dave is here.

Member Anderson: Yeah, I'm here.

Member Valerio: This is Loretta. I'm here.

Mr. Katz: Okay. Good. And, presumably, then everyone else is on the line, and so we can get started again.

I don't know. Chris, did you already start or --

Chair Beach: Ted, this is Josie. That was my fault. I jumped the gun and told her to start, so I apologize for that.

Mr. Katz: Okay. Well, you don't need to retread. Just go on. But let me just remind everyone else to please mute your phones, so we don't have issues. Thanks. And *6 if you don't have a mute button. Thanks.

Ms. Corwin: Okay. So we're on the third slide.

As I said, there are two findings that SC&A found -- presented, and there are TBD issues that we feel resolution can come to in that manner for the -- during the TBD discussion.

There are three observations that have been

resolved. That is the summary.

So moving on to the next slide.

So Finding 1, which is for the thorium and internal exposure model. And we have kind of hashed this over already, but SC&A asserts, in Finding 1, that NIOSH underestimated the thorium-232 concentration in the sediments and residues in the pipes under Building 10, leading to an underestimate of thorium-232 intakes by workers performing subsurface activities.

So there are kind of two issues associated with this finding. The first issue is the uranium-to-thorium ratio that we have already discussed. SC&A concluded that all of the thorium-232 data in Sowell -- the report we have been talking about we are referring to -- with the possible exception of the two samples listed in Table 11, are consistent with naturally occurring thorium-232 in soils in the area and cannot be used to estimate the intakes of thorium-232 originating from AWE activities.

The only data that include a substantial number of samples with the thorium-232 level significantly elevated above background are those presented in Sowell in Tables 5A and 5B. So that is what SC&A is -- that was their conclusion.

So as part of our response, NIOSH response is that the ratio provided was intended to be supplemental information to support the conservativism of the model where NIOSH assumes subsurface sediments contained equivalent mass concentrations of natural uranium and thorium-232, though we assume that there is equal masses.

A second issue associated with this finding is that the new NIOSH bounding method to estimate thorium intakes, SC&A found that it was not valid to assume that the specific activity of the uranium contamination in the pipe sediments was that of

natural uranium.

Uranium isotopic ratios in the pipes indicated that most of the pipe sediments were contaminated with uranium of varying enrichments. NIOSH responded by stating that NIOSH determined the total uranium values and could have calculated an effective specific activity for these samples. But, however, an adjustment, though, would have resulted in a higher specific activity or a higher enrichment for uranium, would be less favorable to the claimant. And this is because an increase in uranium enrichment means, for a given uranium activity, a corresponding smaller uranium mass is present.

And since NIOSH assumes the mass of thorium and uranium in the subsurface are equivalent or equal, any assumption that an increase -- any assumptions that increase the uranium activity will result in a reduction of the assumed equivalent mass of thorium.

Therefore, NIOSH believes that the assumption of natural uranium is the most claimant favorable in bounding enrichment.

Slide 6.

So SC&A provided an alternate method to estimate intakes of thorium, which we just discussed also. SC&A used a paired sample method to determine the uranium-to-thorium ratio, which resulted in a slightly higher dose than the NIOSH model.

NIOSH believes that SC&A's calculation of the paired sample method appears to be inconsistent with standard practice. In addition, NIOSH did a statistical analysis of SC&A's method and determined that based on the correlation coefficients between U-235 and thorium-232, there is no statistical relationship that can be drawn between the two data sets.

Therefore, NIOSH believes that equal mass is the most claimant favorable and defensive approach.

Also, SC&A recommended using OCAS-TIB-009 to determine the daily ingestion rates, which, as I stated, these are all TBD issues.

NIOSH believes that the use of NUREG/CR-5512 to determine ingestion intakes when exposures are characterized by mass-based samples is more appropriate than using OCAS-OTIB-9.

OCAS-TIB-9 is based on the concept that ingestion is proportional to contamination, and contamination is proportional to airborne. But this issue was addressed in a review by the Procedures Subcommittee, and the discussion of this issue is documented in the Board Review System, the BRS, under overarching issue number 2.

So, as I stated, that can be considered a TBD issue as well.

Okay. So moving on to the next slide, we'll move on to Finding 2, as documented in SC&A's review of the White Paper.

SC&A asserts that NIOSH understated the resuspension factor related to welding activities. We, as well, just discussed this issue. SC&A believes that the highly disruptive or dispersive nature of the activities accompanying welding, such as grinding and wire brushing, should be modeled using the highest reported resuspension factor in an indoor environment.

The decision to use a resuspension factor of one times ten to the negative second as opposed to one times ten to the negative third is considered a TBD issue. However, the ones times ten to the negative second resuspension value referenced by SC&A and the reference from OTIB-70 is listed in Table 11 of the reference. And it is also footnoted that the values are not used due to unrepresentative conditions.

Therefore, NIOSH believes that the assumption of a resuspension factor of ones times ten to the negative

third is representative and bounding of the work activities and conditions at M&C. That's a reference to the table where they did the sweeping that was talked about.

Okay. Next slide.

Now we are going to move on to the three observations documented in SC&A's review of the thorium and welding exposure model White Paper.

The first observation states that the uranium inventory cited by NIOSH is inconsistent with that in the source document. NIOSH acknowledges that this was a data entry error, which will be corrected in the TBD. The inventory is not used in the proposed dose methodology. We are in agreement on that.

SC&A's second observation states that NIOSH should clarify the source of the four hour per month time estimate for welding activities. This, again, is talking about the source for the four month per hour, not the actual four hour issue.

NIOSH acknowledges that an incorrect reference was used, and the correct reference was subsequently provided, and the reference will be corrected in the Evaluation Report.

Okay. So on to observation 3, which is the last observation made by SC&A, and that was in estimating doses from the welding scenario. That NIOSH should assign doses using the most claimant-favorable isotopes known to have been used at M&C, and we have also discussed this, and NIOSH agrees with this observation and intends to apply it to the exposure model.

NIOSH will ensure that the revised Evaluation Report's exposure model reflects this observation.

So, in summary, to summarize our path forward, resolutions, which we are kind of all agreeing are TBD issues for Findings 1 and 2, that is where we need to

find some resolution.

Finding 1 concerns the underestimating of intakes by workers performing subsurface activities, which includes the uranium-to-thorium ratio issue, and the new NIOSH bounding method to estimate intakes and the SC&A alternative method.

Finding 2 concerns the resuspension factor used for activities accompanying welding, which is a TBD issue also.

Next slide?

All SC&A observations are agreed to by NIOSH and will be corrected in either the TBD or the revised ER.

That's the end of my presentation.

Chair Beach: Thanks, Christina. That was a good summary.

Any questions, Work Group Members? Dave?

Member Kotelchuck: Going back to slide 9, the NIOSH -- since we discussed the issue, the source of the four hour per month time estimate, it said an incorrect reference was used. Did we not discuss that earlier and noted that the data came from one person? Wasn't that -- do I have some -- am I misinterpreting that? A correct reference was subsequently provided, and I don't know where that is.

Ms. Corwin: The issue is that there is just an incorrect source in the paper itself. It was referenced incorrectly.

Member Kotelchuck: That is the reference to the 2017-B? That's the one -- is that the reference that was the reference --

Ms. Corwin: Correct.

Member Kotelchuck: -- to the four hours?

Ms. Corwin: Correct.

Member Kotelchuck: And what was the correct reference? Because I did go back to the original White Paper.

Dr. Taulbee: Pat, can you clarify here, please?

Ms. Corwin: Clarify that, sorry.

Mr. McCloskey: Sure, yeah, if you look in our, sure, if you look in our November 27 paper on page six of eight, in the body of the text we say it's SC&A 2019 PDF page seven. And I'll go back to the reference section and tell you the SRDB number. So it should be, let's see.

Ms. Corwin: The 174357 is it?

Mr. McCloskey: Here it is, okay, documented communication with redacted person. SRDB ref ID 169916 is where you should go to get the statement from the person.

Member Kotelchuck: That's E. I think that would have been --

Mr. McCloskey: Yeah, but you can't just go read his original interview. There was a follow-up communication with this supervisor. And when you open up this new SRDB reference ID, what you're going to find is an email communication with the gentleman, and so.

Member Kotelchuck: I see, a follow-up. Okay, I did not, okay. So there was a follow-up, and I'll check that out.

Mr. McCloskey: Yeah.

Member Kotelchuck: Okay, I'll look it up. Thank you.

Mr. McCloskey: Sure.

Chair Beach: Okay, any other questions regarding

this slide presentation? It's basically a summary. We've talked about some of these items. Anything else just specific to this?

Dr. Mauro: Josie, this is John Mauro. My question goes to those are all Site Profile issues. But you know, one of the greatest concerns that were raised by the Petitioners and have been responded to by both NIOSH and SC&A has to do with reconstructing the doses to workers in a subsurface environment, and whether the characterization of that subsurface environment radionuclide concentrations in the pipelines and in the soil can be used.

Because most of that data was collected from measurements made in the 1980s and 90s. And we're using those concentrations as surrogates, for want of a better term, for the exposures that the workers might have experienced during the residual period in the 1970s and early 80s. Now, were you planning on talking about that separately?

Dr. Anigstein: John, excuse me, this is Bob.

Dr. Mauro: Sure.

Dr. Anigstein: This is the next, this'll be talked about under the petitioner concerns, the next agenda item.

Dr. Mauro: My apologies, I jumped the gun as usual. I'm sorry, I'll just back off and let you guys continue.

Chair Beach: Let's get to the next activity. I do have an action item. I know SC&A, and this can come later, hasn't responded to the last, the November paper. So I put that down as an action for SC&A. Is that correct?

Mr. Katz: That would be one, yeah. That should be one, yeah.

Chair Beach: Okay, are we ready to move onto Petitioner's concern's, if there's no other Work Group Member questions or discussion?

Mr. Katz: Let me just add something now to that action item. So Bob, if you can, and I think you probably can given the nature of it, Bob and Bob which ever, if you need statistical help, you may not even need it, given the nature of the discussions you already had.

But if you can get this done in a timely fashion, considering that we have, we might have another Work Group meeting and we have an April Board meeting, that would be great. The April Board meeting is April 21-22.

So if you can do that within that timeframe that, well in advance of that April 21-22, that would be great for this tasking and whatever other taskings might come out of this Work Group meeting. Thanks.

Petitioner's Concerns

Chair Beach: Okay, then I think we're ready to hear the Petitioner's concerns that you have put together. Christina?

Ms. Corwin: And Tim, if you could get the third presentation I sent to you.

Dr. Taulbee: Yeah, give me just a second please.

Ms. Corwin: Sure.

Dr. Taulbee: Okay, can everybody see it now? Okay, go ahead --

Ms. Corwin: I cannot yet --

Dr. Taulbee: Chris -- yeah, oh.

Ms. Corwin: Just one second.

Dr. Taulbee: Is it up?

Chair Beach: I see it.

Dr. Taulbee: Okay.

Ms. Corwin: Yeah, I got it, okay. I seem to be running a little slower on my computer for some reason.

Okay, so I'm presenting some information about the Metals and Controls Thorium and Welding -- oh, no, it's not Thorium and Welding, we're on to -- sorry, I picked up the wrong paper.

Mr. Katz: Petitioner's concerns.

Ms. Corwin: Yeah, Petitioner concerns, I picked up the, my wrong paper. Okay, so this is a presentation to summarize the Petitioner's concerns that were submitted after meetings that were held and presentations that were given. Okay. Sorry about that.

Okay, so for some background, the NIOSH presented the Evaluation Report for SEC-236, Metals and Controls, to the Advisory Board on August 24, 2017. A petitioner raised a concern about the adequacy of the Evaluation Report in addressing maintenance-type work.

In response to this concern, on September 5, 2017, NIOSH initiated strategies to continue the Metals and Controls research and to further develop the Evaluation Report.

To develop the Evaluation Report and initiate new strategies, a couple of things were done. We reviewed monitoring records in the Site Research Database, as well as conduct interviews with M&C workers. From October 24, 2017 through October 26, 2017, NIOSH, Oak Ridge, Associated Universities, ORAU, and SC&A personnel interviewed 12 former M&C workers and individuals knowledgeable about maintenance work.

Interviewers asked questions regarding the frequency and duration of work, including heating ventilation and air conditioning, utility and drain line maintenance, and new equipment installation.

On December 13, 2018 during a full Advisory Board meeting, the M&C Working Group presented an update. The Petitioners also made a statement of their concerns.

Petitioner concern number one. The concerns are summarized and not word for word, just so everyone knows. NIOSH has failed to satisfy fundamental regulatory requirements for estimating maximum radiation doses and identifying radionuclides in maximum quantities, such as, the things that the Petitioner feels that were, we were failing at were source term characterization that is incomplete; incomplete knowledge of the nature, frequency, and duration of jobs performed; and intimate contact with the source term.

And a complete absence of any measurements or monitoring of the workers who are covered by this petition, and there is no comparable population with measurements or monitoring data that can be relied on as a surrogate for the claims in question.

For the next slide, the regulations cited by the Petitioner are contained in 42 CFR 83, Section 83.13, Subpart C, and state that radiation doses are considered to be estimated with sufficient accuracy if NIOSH has access to sufficient information to estimate the maximum radiation dose that could have been incurred in plausible circumstances by any member of the Class.

NIOSH believes that there is adequate information in the residual contamination period at M&C to meet that requirement. To bound doses to the majority of M&C workers, those that perform production and support tasks, NIOSH used pre-D&D contamination survey data from the end of the AWE operational period in 1967 in conjunction with the data from closer to the end of the residual period in 1982. Next slide.

To bound doses to maintenance workers, NIOSH

used data that was taken before D&D to characterize the subsurface environments and from the roof and overhead areas.

Using our knowledge of the source term of radioactivity that was present in the work activities involved with the source term and the use of surrogate dust-loading data qualified in accordance with OCAS-IG-004, NIOSH believes it has estimated the maximum radiation dose that could have been incurred under plausible circumstances.

In addition, maximizing conditions, such as the use of the 95th percentile in most claimant-favorable solubility types, are applied.

During the period of residual contamination, it was known that NIOSH would typically have access to sparse workplace monitoring data and often no worker monitoring data. NIOSH developed standard approaches that are described in ORAU-OTIB-70, which is the dose reconstruction during residual radioactivity period at Atomic Weapons Employer facilities.

This document, which was specifically written to deal with the reconstruction of doses during periods where monitoring data are sparse or non-existent, incorporates methods that were developed in two other NIOSH documents, which were OCAS-TIB-9, the estimation of ingestion intakes, and Battelle TBD-6000, the Site Profiles for atomic weapons employers that worked with uranium metals.

In the absence of little or no monitoring data, these documents rely on surrogate data and models to estimate internal and external exposure. Through its contractor, the Board has reviewed each of these documents for scientific validity.

Although a number of issues and findings were raised during the review process, the Board's Subcommittee on Procedures Review and the Battelle TBD-6000

Working Groups reviewed each finding. All findings and issues raised during the review process of the documents were resolved and the documents were revised accordingly.

The second concern brought forth by the Petitioner in his letter concerns incomplete source term characterization. The Petitioner noted that the 1996 drain characterization survey in the interiors of Building 10 and Building 4 only analyzed the sediment and soil samples for isotopic uranium. Therefore, we can never know for sure what the thorium concentrations might have been.

The Petitioner's concern about the lack of thorium analysis of sediment and soil samples is addressed in the Metals and Controls Corporation Thorium and Welding Exposure Model White Paper, which we just discussed. NIOSH can use the calculated air concentration to bound internal thorium exposures that occurred while performing subsurface maintenance within Building 10.

NIOSH will continue to estimate worker doses using the most claimant-favorable isotope of thorium or uranium.

For the burial area in Building 10 outside the perimeter, NIOSH can use isotopic thorium-232 results to model air concentrations breathed by maintenance workers, as previously described in the Metals and Controls Corporation Maintenance Exposure Model White Paper.

In the third concern brought forth by the Petitioner, it was stated that by the time the drain survey was conducted in 1995, there had been close to 30 years of disturbances of the drain lines during the residual period. They were snaked numerous times and some of the most plugged sections had been removed entirely.

Therefore, there is no guarantee that the levels we

documented in the drain survey represent the maximum levels ever present into which the M&C maintenance workers would have been exposed.

NIOSH has addressed the Petitioner's concern regarding the effect of 30 years of disturbance and removal on the representativeness of sediment analysis in the Metals and Controls Maintenance Exposure Model White Paper. In that paper, NIOSH stated that the drainage system under Building 10 required frequent maintenance during the residual period, including the years prior to the characterization.

Since this maintenance would have potentially removed sediments with the highest uranium concentration and made the geometric mean of the survey data under-conservative, NIOSH calculated the 95th percentile concentration and will use it to bound exposures.

The fourth concern documented by the Petitioner states that the gross alpha screening analysis methodology that we used for the 1994/1995 comprehensive characterization surveys for the majority of subsurface soils, other than the drain survey area, was biased low at concentrations above the 30 picocuries per gram standard, or cleanup standard.

The subsurface exposure model developed by NIOSH used data from outside areas, including the area surrounding Building 10, the former burial area, the metals recovery area, the Building 11 stockade area, the Building 11 rail spur, railroad spur area, and the Building 12 west and south lawn areas.

These areas were characterized with 2,391 soil samples collected prior to remediation of each area from 1985 to 1995. The data was presented in four site documents containing survey data, group sampling methodology, and sample screening methodology. NIOSH reviewed the screening

methodology M&C developed to ascertain whether any bias was inherent in their analytical process.

The M&C gross alpha screening method was developed during the pilot study excavation of the former burial area where M&C split samples. And they analyzed half of the samples with their field method, and they sent the other half to Lockheed Analytical Lab for independent verification.

M&C determined that their screening method results correlated very well with the isotopic uranium analysis performed by Lockheed Analytical Lab. NIOSH has not identified a bias that would affect the conservativeness of our exposure model.

For the fifth concern brought forth by the Petitioner, the Petitioner cited remarks made by the Chair of the M&C Work Group at the 126th meeting of the Advisory Board on December 13, 2018 referring to contaminated soil and other debris removed by rail cars during the 1992-1996 decommissioning activities from a site that had ostensibly been released for unrestricted use.

The Petitioner stated that this residual contamination exposed M&C maintenance workers to unknown and unknowable levels of exposure. The rail cars of contaminated material generated after the U.S. Nuclear Regulatory Commission initially released Building 10 are related to the changing release criteria and the subsequent use of more comprehensive investigative methods.

The additional contamination identified using updated methods, including sections of the concrete floor and subsurface material, was previously inaccessible, and as such did not present a significant exposure hazard to M&C maintenance workers.

It is important to note that although M&C, using updated techniques, was able to find contamination throughout the site after the NRC initially released

Building 10, NIOSH incorporated these additional contamination data into its exposure models.

Petitioner concern number six states that concerning the incomplete knowledge of the nature, frequency, and duration of jobs performed, the degree of confidence that the NIOSH and SC&A technical experts placed in the one-month duration for all intrusive activities, both subsurface and in overhead areas, seems overly confident.

Initially, NIOSH allowed one month of additional exposure for subsurface work. However, NIOSH has evaluated additional exposure scenarios for maintenance workers, such as roof work, overhead area work, HVAC maintenance and welding, and now provides for two months per year of these enhanced exposures.

And additionally, additional exposure is also provided for welding activities.

It's also important to understand that for these exposure models, NIOSH assumes that the same person does all of the work associated with the highest concentrations of airborne contaminants. Furthermore, according to interviews, NIOSH understands that workers visited buildings throughout the site. Some spent time in the High Flux Isotope Reactor area, which is not a covered area. Slide.

Interviewers also indicated that workers were promoted or changed job titles during the evaluated period, which also affected their exposure potential. But regardless, we assume that the same person does all the work associated with the highest concentrations of airborne contaminants.

I'm on slide 23. Yes, for Petitioner concern seven, the Petitioner asserts that there is a complete absence of any measurements or monitoring of the workers who are the subject of the petition. NIOSH has relied on

measurement and monitoring data for several surrogate populations that are not comparable to the typical M&C maintenance worker in the Class covered by the petition.

The surrogate classes proposed by NIOSH do not adequately characterize the maximum radiation dose to any member of the Class covered by the petition.

NIOSH analyzed M&C maintenance work, including use of personal protection equipment, PPE, and safety and health protocols. And we modeled associated exposures using plausible circumstances and without taking credit for any PPE or exposure-limiting procedures.

NIOSH created additional exposure models, such as the subsurface exposure model, to address worker contact with sediments and to allow for longer exposure occupancy durations. NIOSH used maximum assumptions, such as resuspension factors, to address work scenarios that involved work with accumulated dust, such as in the overhead area and during welding activities.

NIOSH recognizes that there is some uncertainty when trying to bound doses to a Class of workers that perform multiple and diverse tasks during an extended period. For this reason, NIOSH applied the use of the 95th percentile radioactivity levels in its model to accommodate any uncertainty associated with the work process assumptions.

As stated previously, NIOSH assumes the same person does all of the work associated with the highest concentration of airborne contaminants, which provides additional conservatism to the exposure models.

The Petitioner's eighth concern asserted that NIOSH has failed to take a broader and more accurate view of the typical M&C maintenance worker. The measurement and monitoring data from the 1960s,

80s, and the 1990s for radiation workers and D&D workers, on which NIOSH has relied for their dose reconstruction modeling, are not suitable to estimate the bounding dose for the Class of M&C maintenance workers.

NIOSH presented the SEC-00236 Evaluation Report to the Advisory Board on October 24, 2017. The Petitioner subsequently raised a concern about the adequacy of the Evaluation Report in addressing maintenance work. In response to this concern, NIOSH obtained additional information and developed models in subsequent White Papers that bound doses to workers that performed more invasive tasks, as identified by the Petitioner.

The method for the reconstruction of doses during periods of residual contamination have been established, documented, and accepted for use at numerous AWE sites with operations similar to those at M&C.

For maintenance activities that were unique at M&C, NIOSH used monitoring data from measurements obtained before D&D, along with maximizing assumptions, to create bounding exposure models.

For Petitioner concern nine, the Petitioner conveyed concerns from an M&C health physicist that NIOSH was using measurements and monitoring data collected for D&D workers during the 1990s decommissioning project as a surrogate for the types of exposures received by M&C maintenance workers during the residual period for estimating a bounding dose.

According to the Petitioner, the M&C health physicist also claimed that Members of the Advisory Board stated that it is virtually impossible to identify every conceivable exposure scenario that the M&C maintenance workers were exposed to.

NIOSH used, NIOSH only used the D&D exposure

data for its comparative value and not for dose reconstruction modeling. NIOSH used monitoring data from measurements obtained before D&D, along with maximizing assumptions to accommodate any extreme conditions encountered by M&C maintenance personnel to create bounding exposure models.

NIOSH researched M&C maintenance work and interviewed workers to model exposures associated with their worst-case tasks. Whenever new exposure scenarios were identified, NIOSH evaluated them and created the additional exposure models as necessary. NIOSH will continue to exercise due diligence in our research to further understand M&C maintenance work and ensure that all significant exposure scenarios are addressed.

And that is the end of my presentation.

Chair Beach: Thanks, Christine. I have a question on slide, I think it's around 10, the surrogate data being used. That was, that one and 8, can you just give a little bit more background data of the surrogate data?

Ms. Corwin: Pat, if you could jump in here.

Mr. McCloskey: Sure, Chris. I'm just waiting to see which slide we're on here for which surrogate do you want me to see. Which slide did you want, Josie, slide 8 or slide 10?

Chair Beach: I think it was slide 10. When I wrote it down, we had already moved past it, so. There's two places that surrogate data is mentioned, concern number one and concern seven. So.

Mr. McCloskey: Okay, let me go back to concern number one.

Dr. Anigstein: Excuse me, slide 9 mentions surrogate data.

Mr. McCloskey: Thank you. There you go.

Chair Beach: Specifically I think OTIB-70.

(Simultaneous speaking.)

Chair Beach: Go ahead, sorry.

Mr. McCloskey: So this is a more general statement that talks about, that's beginning here is provided by Dr. Neton in the paper initially. But in the beginning of this EEOICPA program, we recognized that we wouldn't always have data for a lot of these sites where we were trying to bound doses.

And we knew that we would create procedures such as, that are referenced here that could be used in cases where we have little or no data. And we have ways of qualifying surrogate data to make sure it's applicable.

Chair Beach: Well, I know NIOSH has criteria for surrogate data, and so does the Board. Did anybody go through and make sure that we hit all the points on the surrogate data? I guess that's an SC&A question, using the Board's data criteria?

Dr. Mauro: This is John, I'll take a shot at that. The way in which this unfolded in terms of the surrogate data idea, keep in the mind the surrogate data philosophy always referred to a different facility where you have similar operations and activities and similar time periods, and whether or not the data and information that's from the other facility applies to the facility of concern.

So that, I have to say, now I'm doing the best of my recollection being involved with meetings and all this work, is that we didn't actually go there.

What we went to is say listen, we have data, we have lots of data, and the data primarily exist toward the end of the AWE operations, and then lots of data starts to come in in '82, '85, and in the nineties, '92 and later. All of which was related to trying to characterize whether or not the site was, still had

some residual activity that needed to be cleaned up.

So we didn't, we looked at it from the point of view, and I'm hoping this helps, the point of view can we use that data, which is quite abundant, as a way to say well, what might have been the exposures that were experienced by M&C maintenance and repurposing people who worked in the 70s and early 80s.

So we got this window of time, so we didn't ask the question the way you just posed it, as surrogate data, although it's reasonable term to use. We really asked the question is we have this, we have all this data, but it starts in the 80s. And we know that in the 70s and early 80s that lots of things were going on in the subsurface environment, both indoors and outdoors.

And, but we don't -- and at the time that was done, the workers had, in my understanding, no idea or appreciation that wow, there was some radioactivity there. And they were just going about doing what we would call their non-AWE or commercial activities, which involved lots of subsurface work, and it's all characterized and discussed.

So what we really did, and I hope this answers, is we simply asked ourselves is there a way in which we could use the available data, which is quite comprehensive, but about a decade or more later than when this activity took place, and say okay, things really didn't change that much from going from 1970s into the 1980s that we can't use or can we use, or can we use, or --

(Buzzing sound.)

Dr. Mauro: Well, got that buzz again. I guess everybody else has it?

Mr. Katz: Yeah, I think everybody else has it.

Dr. Mauro: Should we hang up and call back?

Mr. Katz: Well, it's one person's line, I don't know who, it just went away.

Dr. Mauro: I've still got it. I'm going to hang up and call back.

Mr. Katz: Do you still have it right now?

Dr. Mauro: Okay, it just cleared up, okay. So I would pose the question along the lines not so much as a classic surrogate data which has those five criteria, and simply say that what we spent a lot of time thinking about, both NIOSH and SC&A, is the degree to which the data that we do have for the site, for the same locations, the subsurface environment indoors and outdoors and the above-surface environment indoors, where we have all this data and we have it for starting in the 80s, can we use that to reconstruct doses to workers that were involved in various maintenance repurposing in the 70s. That's probably the simplest way to go.

And so to answer your question, I think effectively we did, we could refer to that question as a surrogate data question, but because it just says reasonable and are there any impediments to preventing us from doing that.

Is it, in other words, is it possible that the activity that we characterized, that was characterized by the various contractors and the NRC in the 80s, mid-80s and 90s for the site, and for the very locations we're interested in, can that somehow be used to reconstruct doses to M&C maintenance people during the 70s? That's probably like the simplest way to think about it, and I hope that answers your question.

Chair Beach: Well, we didn't use criteria that was established for the Board, so you have answered that.

The other point on that surrogate data is one of the documents stated that the interior of Building 10 was washed prior to doing surveys in the '81/'82

timeframe, and so I guess that's where my concern lies as how representative some of those samples we're using for surrogate data.

Dr. Mauro: Yeah, I mean ---

(Simultaneous speaking.)

Chair Beach: Yeah, I'm going to open it up for, and then I'll ask my other questions. Go ahead, Dave.

Member Kotelchuck: John, how confident -- what you're saying is can we use the data, and I'm asking you how confident are you that that can pin down reasonably or maximize the exposure for each of the individuals, the dozens of individuals who are part of maintenance, who are part of the petition, the group that's being petitioned?

I mean, you're, it's not just can I do something, it is how confident are you that you really got it pinned down.

If we approve it, if we get rid of the, if we do not approve the SEC, then we're going to do each person individually. And you're telling me that you're confident that you kind of can pin this, can pin these exposures down per person.

Dr. Mauro: Yeah, the answer to your question is I am confident that we could place a plausible upper bound, in fact a quite high upper bound, on both the external and internal exposure that every worker that worked at the facility in repurposing and maintenance in the time period of interest because of the data we have and the strategy that was adopted to deal with that and other information.

So, and I'm in a position where I could -- well, it's already been written off, more information. The answer is I am confident, but that doesn't mean that you will agree.

Member Kotelchuck: Well, no, in fact I'm honestly, I

am not confident. And particularly look at the some of the maximizing procedures or the maximizing assumptions, and we will talk about them. And I will, I have a question later, though, on another slide that exactly addresses that issue for the subsurface workers.

But I mean, it's, the maximizing assumptions are absolutely critical to setting up the maximum exposure for each individual. And I don't feel confident that they're based on the sound of science, despite the fact that a lot of hard work has been put into it, and I hate to be not, I hate to be skeptical, but I am.

Anyway --

Dr. Taulbee: Dr. Kotelchuck, if I could come in here. This is Tim Taulbee. One thing I would like to point out is that some of the data that is being used here in the 1980s and 1990s, this is during the residual period. So from a surrogate data standpoint, this really isn't surrogate data. This is during that particular residual time period as different activities were taking place.

The actual surrogate data is where we're using things like a resuspension factor. And so it's kind of Type 2,or believe that's the correct term, secondary type of data. But the raw, fundamental data that we're using is from this facility during this time period. And yes, it's sparse. Not for individuals, no. But from the contamination survey, contamination and airborne data, that is, so.

Member Kotelchuck: That's true, there's a window, as John said. The window being from '68 through middle 80s.

Chair Beach: Eighty-seven.

Member Kotelchuck: It's a long time, right, quarter of a century.

Chair Beach: And Tim, can I ask, you did say airborne in your comment. And what airborne samples are you referring to?

Dr. Taulbee: I may have misspoke there, I'm not sure that there is any airborne. Surface contamination, sorry. Go ahead, Pat.

Mr. McCloskey: Yeah, when you first pulled up slide 1 and talked about the Petitioner's concern for surrogate data, that was a more general explanation I gave at the beginning of our paper.

But the only time we've ever used anything akin to surrogate data for this entire Metals and Controls SEC was sort of like Tim was mentioning a minute ago, the dust-loading factor that we applied to the actual survey data from Metals and Controls.

The surrogate data was taken from the Mound facility, where we were struggling to come up with how much airborne would be created or dust would happen from an excavation that it would have occurred in the basement of Building 10. And so, and we did go through the process, if you look in our maintenance worker exposure model, we went through the process of qualifying that data with our IG-004.

And then I believe SC&A went through a process of looking at that, and with a separate method. I don't know that they used the Board's criteria, but Dr. Mauro came up with a very similar dust-loading value, a separate method, so. That's the only time I did any kind of certain --

Mr. Katz: Just to clarify, Pat, when you said IG-004, I think that is, those are the guidelines for surrogate data, right?

Mr. McCloskey: That's our methodology.

Mr. Katz: Right, right, right. Well, they're very similar, the Board's and NIOSH ones, they're very

similar.

Chair Beach: So you're using Mound data outside, outside data for inside work.

Mr. Katz: For the dust-loading.

Chair Beach: For the dust load, yeah, I got that.

Member Kotelchuck: For the dust-loading, right. But does that make sense?

Mr. McCloskey: And we used that outside, that was an outside excavation at Mound but there is some subsurface work that occurs outside of Metals and Controls that we were trying to bound. So yeah, we did use it for inside subsurface work and outside subsurface work.

Member Kotelchuck: Yeah, but it's the inside that's the problem in most, much of the work that we're dealing with is inside. And to me, comparing dust-loading outside and inside are really -- and yet you set the outside as the maximizing exposure for everybody, both the other outside workers, which at that --

Mr. Katz: Dave, I think you have it in reverse. So you're using the more conservative. He's using, I think, the inside dust-loading for inside and outside.

Member Kotelchuck: No, the Mound is outside.

Mr. McCloskey: That was taken just downwind from where the digging was occurring. So it would be more in the plume.

Member Kotelchuck: Yeah, so it's outside completely, and the other one is outside and inside, and much of the exposure of workers that we're dealing with are inside at M&C.

And I did, that was one of the maximize -- I was going to raise it later, but it's one of the maximizing assumptions that I think I don't feel is a proper one.

And if you'd let me be blunt, it's not proper. We should have outside people compared to outside. It's basic IH, it's basic health and safety in terms of dust-loading.

Dr. Mauro: SC&A was in a similar situation, but we didn't use the Mound data, we went into the EPA literature for the mediation. And we came up with a number to 200 micrograms per cubic meter as being the measured recommended value for reconstructing doses from inhalation during the mediation cleanup activities. Yeah, so we felt that was a good number.

Member Kotelchuck: Okay, let me go look at that. But the one that was in the original White Paper I did feel that when I came to realize that by comparing outside and inside and using the outside for maximization, that I, in terms of the dust that we -- I felt it was inappropriate.

Chair Beach: Well, I'm just realizing --

Member Kotelchuck: But maybe your model, maybe the SC&A model works better.

Chair Beach: Well, is NIOSH adopting SC&A's model, do we know that at this time?

Member Kotelchuck: I don't know.

Dr. Mauro: Well, your numbers are 220 micrograms per cubic meter, ours are 200. So coincidentally, they're awful close. And we use the EPA recommended values, while your numbers from the Mound plant was, I believe, 220.

So it was quite startling that, completely independent, came to the same place for the purpose of estimating dust-loadings for people involved in remediation activities.

Member Kotelchuck: Yeah, okay, I mean, I will certainly look at that. I was really going off of the White Paper. We had a lot of papers over these many

months, and so I used the basic White Paper, from NIOSH, of course. Okay, good.

Chair Beach: All right, any other comments on Petitioner's concerns, and not just related to Petitioner concern number one, all of them? I know I have a comment on Petitioner concern five. Anyone else?

Member Kotelchuck: I have one on six. But why don't you go ahead, I've talked a lot already.

Chair Beach: Okay, can you move to, yeah, there you go, thanks. Not that I don't have concerns on the other ones, but just a quick note on the Petitioner concern number five talked about residual contamination was, I believe it said that you, was not accessible, was that correct on this one?

Ms. Corwin: Correct. And there's a couple different things. First of all, as surveys were being performed over the years, there were different release criteria that were in place. And then the second thing is that D&D and other things were happening, inaccessible areas were being made accessible. So was that –

Chair Beach: oh, sorry, Christine.

Ms. Corwin: That's all right.

Chair Beach: Go ahead, I thought you were done. Okay.

Based upon the 1995 survey, the characterization of (telephonic interference) five and ten, I think that was a Weston report. It talked about floor space. We find that surface contamination on concrete floors and utility trenches, rims exceeding the unrestricted release criteria.

So it basically said that there was contamination. It was above the release criteria, and I took that to mean it was in accessible areas. So that was just one of my comments on Petitioner's concern number five.

Ms. Corwin: Well, some of it may be have been in accessible areas, but it was under a different release criteria, the release criteria for that time, instead of what the previous criteria was.

Chair Beach: Okay, and then just note that maintenance workers were all over those facilities during that earlier time period, and they were in all kinds of places we would have thought was inaccessible. So anyway, I just wasn't sure if that was answered completely.

Ms. Corwin: Well, we had the subsurface work exposure that we provide two months per year of that additional exposure.

Chair Beach: Yeah, yeah, I understand.

Ms. Corwin: For the subsurface areas.

Chair Beach: Correct.

Member Kotelchuck: Well, could I -- couldn't help, that was my question on slide 21. NIOSH allowed a month for additional exposure for subsurface, and then extended it to two months. What was, why was it, why two? Why not four or five? What was the basis for making the choice from one to two months, and not to --

Ms. Corwin: Well, I can, I wasn't here at the time. Pat, you might be able to jump in. But we felt that one month was probably sufficient based on interviews and what we know of the work. But we, to be overly conservative, went with two months. But Pat, you can jump in.

Mr. McCloskey: Sure. Initially, we did the interviews after the initial Evaluation Report was presented to the Board. And we did those interviews, and we went off and modeled a subsurface exposure model, we made a subsurface exposure model. And that work alone we felt was sufficient for one-month occupancy.

And then we presented it to the Work Group and we heard some additional concerns regarding HVAC maintenance, we heard concerns about work in the overhead. And we went off and added to our subsurface model a maintenance model, which added those additional scenarios.

And with that, we were asked to look at the occupancy rate initially, and we decided that another month of maintenance work was prudent there to be added with those additional exposure scenarios added to the maintenance workers.

Member Kotelchuck: Yeah, but prudence is not a sound basis, in my mind. I mean, there's, we're trying to decide on compensation for people who had cancer.

Mr. McCloskey: It's probably a bad word.

Member Kotelchuck: And I mean, I just feel like it sounds, if I didn't use the word prudence, I would say it sounds like, well, people said it was worse. Okay, let's make it two. Let's, why not make it three. Put it this way, it is, it's spiritually a good thing that one looks at the, one makes the calculation and then people say, well, there are other problems you didn't address, and you try to address them.

And by the way, there has been a lot of addressing of many of the issues that were raised. But there's got to be a basis for it that is more than -- I mean, for example, when we went from 10 to the minus four to 10 to minus three, there's a basis in lots of other situations that the use of 10 to the minus three is appropriate.

And then the discussion came, well, what about 10 to the minus two. No, that's, John said, you know, I've never seen that number, maybe I've only seen it once or twice. That's a scientific argument.

The providing of an extra month, it's not just that I don't know why it's two and not any other number.

But it undermines my confidence that we really know what these, we're trying to get the maximum exposure for every individual.

It's, I'm uncomfortable with the choice of two, although it's a good idea that people are trying to think about what are some of the issues raised and trying to respond to those issues. But I don't feel comfortable with the choice two --

Dr. Mauro: Yeah, this is John. I, let me step back a bit and let -- because I think that we're getting down a little too close, and I want to step back for a second.

Member Kotelchuck: Okay.

Dr. Mauro: One of the things that happened during our interviews is we were basically probing all of the different kinds of things that took place by the repurposing and maintenance activities. And we came up with a list that said all of it, look what was going on. There were the subsurface activities going on inside Building 10, where people were underground, all right.

Oh, wait a minute, there was also people doing maintenance, and that was -- and by the way, during that time we asked them, you know, well, you know, how often did this happen. And of course there was some uncertainty, but the number that emerged from that discussion, from talking to these folks, was maybe about a month every year.

And but, you know, of course there's uncertainty there. And so we had that. And then we said but there were other things that were going on, right. People were, maintenance workers were also involved in this welding operation and other activities up in the rafters.

And then, okay, that's another scenario that the same crew, maintenance crew, then we said, hold the presses. They had to clean out and replace filters inside the HVAC system, which were very dusty

operations.

And we said, well, you know, how often did you do that, and we got some information on that. And then we, you know, so we kept on going. Then we went outdoors, where people were involved in activities. Even there were some water treatment facilities.

So we in effect tried to extrapolate all of the different types of activities that maintenance and repurposing people might have been doing in the 1970s -- I'm going to call it the 19070s because that's really the window when all this is going on and no one had any idea that what they were doing, there was radioactivity in the soil, in the pipes, in the rafters, on the filters, and so forth and so on.

So we said okay, we are going to model every one of these pathways as best we can and place a plausible upper bound. So each one are separate calculations showing that what we believe to be the upper bound, and we give our rationale.

And then superimposed on that -- now of course, that comes to, you know, and we're saying now, are we going to assume the same person is doing all of these things, and, or are we going to say well, no, there's some people who dealt with the subsurface people, and we'll give them that one month a year. Now that's been upped to two months per year, which I think accommodates the sensibility that there was uncertainty in that one month per year statement.

So I wouldn't call it arbitrary, I would say that it was almost a way to say listen, we're not, you know, though they said one month a year, we have to acknowledge that it could have been longer and it was stretched out to two.

Now, the folks on the phone that are, the ones who did this work and they're listening in right now, you know, Mr. Elliott, you know, and I'm sure he has something to say whether the subsurface work that

was involved, and there were really two kinds of things that were going on. I'm sorry to go on but we have to sometimes --

Member Kotelchuck: I appreciate that.

Dr. Mauro: Yeah, all right, so what we end up saying is well, listen, we got ourselves, let's just talk about for a minute that scenario. We had about six that we looked at, but let us go look at them and see if we could model each one. And we originally used one hour. And now, you know, I think it moved to two, and I can understand the rationale for that.

And I certainly would be interested in knowing from Mr. Elliott whether or not he felt that, yeah, two probably, having the same person, stay with me now, that this work was being done over some number of times per year, or I think it was the number of hours per year, and that it was done, you know, cumulatively. And it was over the course of a year, effectively 200 hours or about one month's worth of activity, of this kind of activity took place.

But that could be individual periods, well, we did it this week, or you know, skipped some time and did it a few days. So but what we said is okay, we're going to go with, you know, two hours of exposure, I believe -- I'm sorry. The number of hours was effectively one month per year, then moved up to two months per year.

And we're going to -- but also know at the same time that for that particular scenario, and that went on year after year. So we're saying in effect that the same person is always the one who's doing that work every time it's being done.

And every time it's being done, you know, it, we're going with this two months per year for ten years, twelve years, whatever the number of years are that the guy happened to be a worker.

So worker number one, okay, when was he there,

from here to here. And he was a member of the maintenance crew, yeah. Well, we're going to give him two, you know, two months per year every year that he worked at the facility. So now, I think it's fair to think of it from that perspective.

Now, you raised a point, well, is three hours per year better? But, and certainly I'd be the first to say if Mr. Elliott and the folks on the phone feel that the original one was maybe a little weak, and now we're going with two. Is two still weak? Keeping in mind it's always the same person. And we all know that that's not true, that different people -- I remember there was some laughter about this during the meeting.

You know, one of the jobs with the -- these are pretty dirty jobs. And you know, once you reach a certain level of seniority, you know, you don't, that guy don't go in the hole. Going in the hole with the new guys that were, you know, properly trained of course and everything. But you know, this was not a job that, you know, a guy would always do.

And please correct me, I know Mr. Elliott and the folks there, they're there, and I don't want to misrepresent it, but you, we were there together, all of us, and we really worked hard together to try to understand what's going on. And this is the outcome.

The outcome now is that we're going to go, we are recommending well, when that maintenance work in the subsurface environment was being done, we're assuming that it was done the equivalent of two months' worth of work every year.

And now, but more importantly, it's always the same person. And see that person, every single person is going to get that dose, every single person for every year that he worked there. Now, if you feel that that underestimates the duration of exposure, well, we're here to listen. But it seems to me that that captures it.

Mr. Katz: Thanks, John. John, this is Ted. I just want to add something else for Dave's and the Board Members' benefit really, and this is just from a policy perspective this issue, because Dave was talking about how scientifically based it is adding an hour, doubling the time, whatever.

But you know, the statute asked for reasonable estimates of dose; it doesn't ask that every element of this be shored up by sort of scientifically accurate or precise estimates. It asks for reasonable estimates and understanding that a lot of this requires overestimates and assumptions and so on.

And in addressing specifically, when we regulate, when we produced the rules for this, talking about reasonable estimates, we talked about that there needs to be a factual basis, you know, by which we derive estimates. But that doesn't mean you can't build on those reasonable estimates conservatism and so on. So I just wanted to say that.

Member Kotelchuck: I, yeah, okay, and I agree, and I understand. But it has to add up to our having confidence that they're reasonable, or I believe that the max -- since we don't have much data, that the maximum, the maximum estimates are very important and a reasonable maximum.

Mr. Katz: Right, it has to be, you have to be reasonably confident that they are capturing, capping the doses, right.

Member Kotelchuck: Right.

Mr. Katz: Thanks.

Member Kotelchuck: Okay, thanks.

Chair Beach: Okay, any other questions from Board Members?

Member Valerio: This is Loretta, I have a question.

Chair Beach: Okay, go ahead, Loretta.

Member Valerio: So on slide 18 where the Petitioner's concern on the contaminated soil and other debris moved by the rail cars, so going back to the response to concern number four, where they stated that the areas were characterized with 23, almost 2400 soil samples, does that include soil samples from the contaminated soil that was removed by the rail cars?

Ms. Corwin: Can you repeat that again? I'm not sure I understood that.

Member Valerio: So on the response of Petitioner for concern number four, it talks about almost 2400 soil samples that were collected prior to remediation, okay. Then the concern number five had to do with the contaminated soil and other debris that was removed by rail cars during the 1992 through 1996 decommissioning activity.

So my question is there's contaminated soil and the debris that was removed by rail car between 1992 and 1996, was that part of the samples that were taken during, prior to the remediation area or the remediation from 1985-1995?

Dr. Anigstein: This is Bob Anigstein, I'd like to volunteer an answer to that. The 19 -- what I call the Sowell report, based on the 1984 survey that was performed by ORAU on the contract with NRC did look at the burial ground and did sample extensively, 750 samples.

And that did include, to my understanding, some of the waste, because that was -- first they thought that remediation was adequate and the NRC, based on new measurements and new regulations, no, the site cannot be released because it's so contaminated.

And the most contaminated soil was loaded into the rail cars. So that soil had -- so this was done in '92. The soil certainly had been present in 1984, when the initial surveys were done. So the answer, the short

answer to your questions is yes.

Member Valerio: Okay. All right, thank you.

Chair Beach: One of my questions was based on that also. I don't know if it's a question or a statement mostly. I think there was 350 rail cars, and it was determined that each of the rail cars couldn't exceed a certain amount of grams.

And so there was quite a bit of mixing highly contaminated with not-so-contaminated to make sure that each of the cars met the criteria. So there's a lot more to that waste going out.

And correct me if I'm not wrong, but they sent out burial waste in '92, and then again '95, '96, correct? From different sites? Because there was quite a bit of work done in '92, and then again later on in '95/'96 time period.

Ms. Corwin: Correct.

Dr. Mauro: This is John. Again, I'm sorry to interrupt, but there's a perspective question here again. What we're talking about is at that time, which was the FUSRAP remediation issues resolution to close out survey type measurements and then activity. Now, I want to make sure I understand what we're discussing.

There were M&C workers on site in the vicinity of where those shipments were being made by contractors who came in specially to get rid of the bulk.

Where, our interest, the scenario that we're talking about, on just clarification is, the people that might have been nearby, you know, where that, that the contractor activity was going on, they may have experienced some exposure to, let's say airborne loadings that may have come off the trucks, and ultimately I guess the rails car.

So the questions that are, the issue that we're discussing, that scenario, M&C workers that were in the vicinity of where these contractors were doing their work, contractors who of course we all know were under a very thorough health and safety program, CTS and I guess Roy F. Weston was involved. I don't know about the people who did the shipping. But that was all under regulatory control by, either the state agencies or the Nuclear Regulatory Commission.

So the questions that we're talking about now are our ability to reconstruct the, let's say the combination of inhalation and external exposure that M&C folks who might be nearby during that time period could have experienced.

And if that is in fact what we're talking about, what I will say is that the big driver, the thing that we have been sort of dancing around for a while, no, that's not where the action is, that's not where the exposures were of great substance.

Where the exposures were of limiting concern, and they still turned out not to be that large, are the guys who were working in the subsurface environment in Building 10 to, as part of the repurposing activities underground, who were up close and personal to the pipes and the contaminated soil.

So in a way I have to say I'm a little frustrated, because that's where the action is. That's where the highest doses occur, inhalation and external. There are all these other scenarios that we've been talking about, welding. The one we just talked about, which I believe we were talking about, workers that might have been nearby when the trucks were going by to get rid of the stuff in the 1990s.

There's these ventilation -- these are all different scenarios. And the one by far that drives this thing is, you know, you can look at every one of them, these are sort of like episodic things that are taking

place by people, sometimes the same people, sometimes different people.

And superimposed on all this throughout the entire time period was there was residual radioactivity in Building 10 on the floor, which goes back to the original, original evaluations done by NIOSH, where they went with the classic OTIB-70 approach, where there's residual activity that we know from swipe samples collected in the late 60s, lots and lots of data, and that this activity's on the surface and the workers in the, once we got into the residual period were exposed to the resuspension and the external radiation associated with that.

So in the grand scheme of what we're trying to get our arms around here is that the starting point is in the space where you have everybody that works in Building 10 is being exposed to this surface residual contamination, which was very well characterized at the end of the AWE period.

All right, now what the issue is, is we that neglected to, and this is when we've learned a lot, when we had our meetings with the folks that are on the phone right now and other, there were a total of 12 people, we found out is, holy mackerel, there was this radioactivity that was in all these different places, okay, which we've been talking about: the subsurface, the pipes, the rafters, the HVAC system, outdoor low-level waste disposal.

All of that was out there, and the original SEC Evaluation Report didn't characterize this. This was a major limitation of the original report.

Everything we're talking about now is we're going one by one through each of these scenarios of unusual activities that took place in the 1970s and 80s. And we have to be able to say with confidence that every one of those scenarios, we can place a plausible upper bound on those scenarios.

And we talked a lot about welding just now, and now we're about to talk about the subsurface activity. And now we left that, for some reason, and we moved outdoors to this other one.

In my opinion, and seeing this from what I would say the upper level, I'd like to get down into the weeds and say, and go to where I believe is the big ticket SEC issue. I'm sorry to do this but I have to say that, because I'm very close to this. And I feel as if it's, I have this picture, it's almost like a portfolio in front of me, of everything that went on.

I read -- by the way, between, once I knew we were going to have this meeting, I read everything, and it all came back to me. And where we really should be, I'm sorry to do this and you can shut me off anytime you want, but I feel as if the big ticket item is the point that Josie and I discussed.

And that is, look, during the 70s, they were doing their refurbishing activities, which involved going in, they're digging down into the ground, removing dirt, and installing new foundations for new equipment.

They were repairing pipelines, they were coring pipelines. And radioactivity was being removed, right. I mean, they didn't know they were removing radioactivity. They were removing dirt, junk, and equipment and doing whatever they had to do to repurpose and maintain the facility to do its new commercial work that began in '69.

But at no time did they know that they were dealing with radioactivity, so they had no provisions for monitoring it, for seeing where it was or what was going on.

And inadvertently we could all agree, and this became the big-ticket item and I think it is to this moment, the big-ticket item is that these people were in the hole, okay, I call them in the hole doing, work up close and personal to these pipes, some of which

were leaking, which resulted in contamination, contaminated soil.

There was also contamination of the subsoil, subsurface soil, inside Building 10, because the water seeped in and leaked out. So you have pipelines that leaked, you have pipelines that were plugged, you have dirt that was contaminated because the pipeline leaked, you had dirt that was contaminated because there was a high water table that was going up and down and water would seep in.

So, and these people were down there in that hole, and we, and that was the big, you know, when all is said and done, that's where the action is. And we have to be able to say, place a plausible upper bound on every single worker that might have been exposed in that scenario, which we were assuming to be every single worker.

And then we said, okay, well, how do you bound that? Can you bound that? And then the, and an issue that I have to say I was the one that, I hate to steal anybody's thunder, but I said wait a minute, hold the presses. You know, there was this coring activity and refurbishing which was removing dirt. And we don't know how much of the radioactivity was removed.

We know that some may have been removed, maybe very little, or maybe a substantial amount; we don't know. So therefore, therefore all of this terrific characterization work that took place in Building 10 in the subsurface environment, which is where I believe is all the action is, you know, we have a problem.

The measurements that were made in the 1980s and 90s of the activity everywhere, including the subsurface activity in Building 10, can be, has its limitations. The limitations being maybe the measurements that were made in the 90s in the subsurface environment in Building 10 doesn't accurately represent what was present in the

subsurface environment in the 1970s. Because some of it might have been inadvertently, not on purpose, removed.

So it might have -- so what we're using as our starting point for what we believe to be the concentration of the radioactivity in the subsurface environment might in fact be an underestimate, because some of it might have been there in the 70s but was removed inadvertently while they were doing their repurposing activities.

And I think this is where, this is what we should be talking about, because that's the big SEC issue. And the solution to that that we came up with, and that -- yes, I'm going on because I feel as if we've been talking around the big issue, and I wanted to get here.

Chair Beach: And I appreciate that. I just don't want you to solve it right here at this moment.

Dr. Mauro: Okay.

Chair Beach: Because I think you made a good point and I really appreciate that. I think we're going around because we've had two meetings, but we've never actually gotten into the nuts and bolts of questions the Work Group Members actually have. And so, I think that's why. So, if I can hold you right there, unless somebody --

Dr. Mauro: Okay. Again, I apologize because I do get emotionally engaged when I'm involved in these calls. So, I'm sorry for jumping in that way.

Chair Beach: I am appreciative of everything you said, and thank you. That was excellent summarization.

On the petitioners' concerns, any other questions or comments?

(No response.)

Chair Beach: Hearing none, I just have one small comment that I want to make on petitioner concern number eight. And, John, it goes back to what we're talking about. The concern was answered by NIOSH that this is an AWE site and it's we're using different established procedures to get at the dose.

The one thing that I said at the beginning, and I'm saying now, is this is not a typical AWE site. Between '92 and '96, there was 583,000 tons of waste, contaminated waste, removed from this site. This is highly unusual. And so, I think a lot of the questions I personally have are because there's a lot to this site that we haven't gone over and talked about.

And so, with that, I'm going to just move on. If nobody has any more questions on petitioners' concerns or questions for NIOSH, SC&A, I think it's time to hear from the petitioner, unless, Ted, you have anything else that we're missing.

Mr. Katz: But before we get to petitioners, if there's more substance that John didn't get to related to -- unless he's rehashing stuff that we've already addressed, don't you want John to finish?

Chair Beach: Yes, I was just afraid we were going to get into the Site Profile fixes that we haven't agreed. It's not an SEC. So, I guess --

Mr. Katz: No, but he's saying that this is the more substantive issue, if there is an SEC issue to address.

Chair Beach: Right.

Mr. Katz: I think we probably should hear that out.

Chair Beach: Okay. Because I know we've never really gone through what John's topic was. So, you are absolutely correct. Our first couple of meetings we had White Papers that were addressed and concerns came out of it, but we never actually put the subsurface modeling to bed, so to speak.

Mr. Katz: Yes.

Chair Beach: So, I'm, if everybody's --

Mr. Katz: If you're okay --

Chair Beach: Yes.

Mr. Katz: Yes, if you're okay, let's hear John out, and then, maybe if we need, we get a response from NIOSH to where John's going, if that's needed. And then, absolutely, we go to the petitioner, and then, we'd talk about where we go from here after we know what petitioner has to add to all of this.

Chair Beach: Okay. That sounds fair enough. Thanks.

Mr. Katz: So, John, back on your horse.

Dr. Mauro: Thank you. I appreciate it because I feel as if we need to hit that because that's important.

Now, just to let everyone know, by the way, Josie, one of the scenarios that you were just talking about there was shipping these enormous volumes of material. We did look at that. We said, listen, there were people outside and they were nearby, and they could have been exposed to dust associated with this vast bulk of volume that was being moved. And there's dust that could be coming off and people could be breathing that.

Now we looked at that. We modeled that. It's in one of our reports. And we found that not to be that important. We said that, nope, nope, and we looked at all these others and we said, where's the big one? Well, the big one is the subsurface guy. He's in a hole and he's down there with the bad stuff.

And so now, I'm going to pick up from there. So, let's go to the scenario that I believe to be the one that's limiting where people could have experienced the highest exposures and where there's the most uncertainty. Can we really reconstruct those doses

and place a plausible upper bound?

And the thing that makes that an important issue -- and, Josie, you and I actually ran into each other at the airport and we talked about this a little bit. I said, you know, this is where we have to engage the problem. When the refurbishment and maintenance activities took place, we have to come to grips with the reality that, inadvertently, some of that material was probably removed; some of the radioactivity was probably removed.

So, therefore, the characterization of the subsurface and the pipeline and the other conduits, the characterization that took place in the eighties and nineties may underestimate what was actually there in the seventies. Okay? And therefore, because of them might have been removed -- we don't know how much. It may have been very little or it could have been substantial. So, we have to deal with that.

And the way in which we dealt with that -- and this is where I believe the Board has to make one of these judgments -- the way we dealt with that is to say, listen, we have great amount of data on the uranium concentration that was inside these pipelines, okay, lots of data. And we accumulated all that data and put it all together.

And one could argue that, well, if it wasn't for the coring activity, and so forth, I would use the median, the distribution, the full distribution of the uranium as being this is the concentration of the uranium in the soil. And, of course, we've got the thorium issue. You go with the one-to-one, or whatever ratio you want to use. You come up with a picocurie per gram distribution of uranium in the sludge and other coring material that was inside the pipe and inside the dirt that was in the vicinity of the pipe, where the workers are probably working.

And when they're down there in that hole, okay, down there in a hole, they're being externally

exposed. And this would be this, was it one month or was it two months a year? What we said is now we're up to two months. And I'd love to hear whether or not -- well, I think that's probably pretty good. And we're assuming it's always the same person, remember. So, every year, I mean for the entire two months every year, which was like just in a two-month segment, and the same guy goes in and does all the work.

No, we know that it was different people that went in over that two-month period and year after year. We're saying, no, it's the same guy all the time every two months for ten years, or whatever, how long he worked there. We're going to give him this dose and say, okay, now how do we know that's an upper bound, when we all agree that, you know, some of that radioactivity might have been removed? The radioactivity that we characterized in the eighties and nineties may be a little bit of an underestimate, because some of that activity might have been removed inadvertently when the refurbishment activities were taking place in the seventies. Okay?

So, what did we do? And both NIOSH and SC&A looked at this problem and did it on their own independently. And I said, you know what? And this was me. I said, you know what we do? We've got a problem. What do we do that we feel, as health physicists, is claimant favorable and plausible and bounding?

I said, let's assume that the activity to which these workers, this worker -- because, remember, we're going to give this to every worker. That two months every year, two months out of every year, there's a worker who's being exposed to the upper 95th percentile concentration of uranium and thorium that's in the dirt in the subsurface environment.

Why the 95th percentile? Because we're saying, well, listen, some of the activity could have been removed inadvertently during the refurbishment. And the data

we're using is the 1980-1990 data and, therefore, it might be an underestimate.

So now, this is a judgment call. I'll be the first to say, listen, you pick a number. So, I went ahead and said, listen, I can't even imagine this, but maybe is it possible that so much was inadvertently removed that what was left was all at the 95th percentile level? That's what we're basically doing. We're saying, what was left inadvertently -- you know, the stuff that was inadvertently removed, but, then, this stuff that's left in the pipelines and in the dirt, on the ground, we're going to say that it's all, 100 percent of it is at the 95th percentile concentration.

And we're going to assume, now we know it's moist because there is good data that says this is sort of like the subsurface kind of moist, but we're going to assume that that guy is there for two months every year, year after year after year, up close and personal to the upper 95th percentile concentration of uranium and thorium in that dirt, and the dust loading that he's breathing is 200 micrograms per cubic meter, a number which is a number that's recommended by the EPA for this kind of thing.

And I'm saying to myself, John, do you feel comfortable that that puts an upper bound? And I say there's several reasons why I think that's true. And remember, you asked me the question, David, I believe, "Do you feel confident?" And the answer is, yes, I do feel very confident.

The idea that, inadvertently, most -- what we're really saying is most of the radioactivity was inadvertently removed. And for that to happen, for that to happen, what I just described, for that to happen, most of the radioactivity would have to have been inadvertently removed. They didn't search for it and pull it out, no. It just happened to be removed.

So, to assume that it's all at the upper 95th percentile, in my mind, you know, is way up there,

to the point where -- I hate to even say this -- it may not even be plausible. But, you know, maybe.

So, here we are, we're in this area where here's where judgment comes and you say to yourself --

Mr. Katz: Okay. John? John? Sorry.

Dr. Mauro: I'm trying my best.

Mr. Katz: No, it's just that Josie has got to be somewhere at a certain time. So, you've got a couple more minutes, and then, we've got to move on.

Dr. Mauro: I'm done.

Mr. Katz: Okay.

Dr. Mauro: So, as far as I'm concerned -- as far as I'm concerned -- that is your limiting pathway and we use an approach, 95th percentile concentration everywhere in the subsurface environment. And the same guy, two months out of every year, year after year, is up close and personal working with that stuff and breathing it in with the dust loading of 200 microcuries per cubic meter.

In my mind, we are way up there and I feel confident. If I was a betting man, and God comes down and gives me the right answer, I think I win that bet -- all right? -- that no one got a dose higher than that. All right?

Mr. Katz: Thank you, John.

Dr. Mauro: And that's the end of my story.

Mr. Katz: Thanks, John.

If anyone has any quick questions for John on this point? Otherwise, we will need to give the petitioner an opportunity to speak, because we also need to talk about what's next. And we need to be able to get Josie off because she's got to be somewhere else. So, if you have any questions for John?

And John, that's very helpful. So, thank you for that bit.

Board Members?

Dr. Mauro: You're more than welcome. I've been waiting for a long time to tell that story.

(Laughter.)

Mr. Katz: Okay. You're one of the greats in terms of storytelling. That's for sure.

(Laughter.)

Mr. Katz: Okay. I'm not hearing any questions from the Board Members.

I think you were very clear and it's a pretty simple thing you are trying to convey.

Okay. So, Josie, back to you, or to turn it over to -- Michael Elliott, I think it's time for you now.

Petitioner's Comments

Mr. Elliott: Yes.

Mr. Katz: So, why don't you take it away?

Mr. Elliott: Okay. Well, good morning or good afternoon, depending on what time zone you're in.

I want to certainly thank Josie Beach; the other distinguished Advisory Board Members who serve on the M&C Work Group; the technical experts at NIOSH and SC&A who are assisting the Board in evaluating the petition, and any members of the public who may be on this call.

Thank you for this opportunity to speak on behalf of my fellow petitioners with regard to SEC Petition 00236.

This petition, as you know, pertains to a Class of workers at M&C during the residual period comprised

of facility construction and maintenance service workers; production equipment R&M workers, and production machine operators/helpers who worked in certain affected areas of the facility. For simplicity, I will follow the same convention that we have in the past and refer to the entire Class of workers covered in this petition simply as "M&C maintenance workers".

In the two months recent White Papers that NIOSH has published during 2019, the thorium and welding exposure model from April 8th, 2019 and the Petitioner Concerns Response Paper from June 18th, 2019, NIOSH concludes both White Papers with the following statement, and, you know, we pretty much heard this again today: "NIOSH believes that all the exposure models developed to date adequately bound maintenance exposures experienced by M&C workers during the residual radiation period."

I disagree and I contend that NIOSH has failed to satisfy the regulatory requirements codified in 42 CFR 83.13 for evaluating a petition for designating a Class of employees as members of the Special Exposure Cohort, or SEC.

In that section of the regulation, paragraph (c)(1)(i) states, "Radiation doses can be estimated with sufficient accuracy if NIOSH has established that it has access to sufficient information to estimate the maximum radiation dose for every type of cancer for which radiation doses are reconstructed that could have been incurred in plausible circumstances by any member of the Class."

And further down in paragraph (c)(1)(ii) it states that, "To establish a positive finding under the previous paragraphs of this section would require, at a minimum, that NIOSH have access to reliable information on the identity or set of possible identities and maximum quantity of each radionuclide to which members of the Class were potentially exposed without adequate protection."

As I previously articulated at the last December 13th, 2018 Board meeting, Advisory Board meeting, I contend that NIOSH has failed to satisfy these fundamental regulatory requirements. NIOSH has failed to demonstrate that it has access to sufficient information to estimate the maximum dose that could have been incurred in plausible circumstances by any member of the Class because it has failed to satisfy the minimum requirement of having access to reliable information on the identity or set of possible identities and maximum quantities of each radionuclide to which members of the Class were potentially exposed without adequate protection.

Among the types of information that are lacking, they can be divided into four broad categories that I previously articulated back in December: incomplete source term characterization; incomplete knowledge of the nature, frequency, and duration of exposure; a complete absence of any measurements or monitoring of the workers who are covered by this petition, and no comparable population with measurements and monitoring data that can be relied on as a surrogate for the Class in question. And I will highlight just a few examples in each category in my remarks today.

So, for the first type of information that is lacking, the incomplete source term characterization: notwithstanding NIOSH's use of the 95th percentile concentration to bound exposures, due to gaps in the site characterization data, which we just discussed, we cannot be certain that the 95th percentile concentration represents the maximum concentration to which members of the Class were exposed without adequate protection.

Such data gaps are particularly concerning in the 1995 drain survey. And I've got to interject here that the 1995 drain survey was the first time we characterized the drains. So, from '67 to '95, all kinds of activity took place in those subsurface drains in Building 10. Contrary to what Dr. Mauro just said,

they were never characterized in the eighties. The subsurface drains inside Building 10 were not characterized until 1995. Let me be absolutely clear on that point.

By the time the drain survey was conducted in 1995, there had been close to 30 years of disturbances of the drain lines through the residual period. The drains were snaked numerous times and some of the most plugged sections had been removed entirely. So, there is no guarantee that the levels we documented in the drain survey represent the maximum levels ever present and to which M&C maintenance workers would have been exposed without adequate protection.

It is also well-known that the 1995 drain survey was limited to isotopic analysis for uranium. For reasons previously reported, isotopic analysis for thorium was not performed. So, we have no direct measurements of thorium concentrations that may have been present in the drains and surrounding soils.

NIOSH has suggested a workaround in their modeling by assuming equal amounts of uranium and thorium in the drains. However, this does not overcome the limitations of the 95th percentile concentration data, as articulated above, for uranium. We simply cannot say with any certainty that the 95th percentile concentration of uranium or, by extension, an equivalent amount of thorium is representative of the maximum concentrations that were ever present.

The source term estimates for the exterior affected areas relied in large part on the gross alpha screening method analytical data that was collected during 1994 to 1995, comprehensive site characterization surveys, as part of our decommissioning project.

As I have said before, my recollection is that the gross alpha screening method was biased low at concentrations above 30 picocuries per gram. I say this for a couple of reasons, not least of which is that

I recall the principal health physicist and founder of CPS Environmental, Mark Griffon, who pioneered the relatively novel application of gross alpha screening method for surveying in the field, conveyed that information to me at the time.

Mark, as you probably are aware, later served on the Advisory Board for Radiation and Worker Health. His tenure lasted from 2002 to 2015. So, you probably have his contact information, if you want to confirm what I am saying.

I would also refer you to Exhibit 5 of the original August 26th, 2016 SEC Petition Request, which is entitled, "Remediation of the Former Radioactive Waste Burial Site". That was put together by CPS in September 1993. Appendix C of that report is entitled, "Radiological Field Screening Through Uranium in Soil". And among other information, it contains correlation curves comparing the gross alpha screening analytical results to split samples sent out to commercial laboratories for gamma spectroscopy and alpha spectroscopy analysis.

Note, I hope I included that appendix in the exhibits that I submitted with the original SEC Petition Request, but in the event that I inadvertently left it out, I am attaching that section of the report to the email that will follow this testimony, in which I convey this oral testimony for the record.

Figure C-4 in that report, which summarizes the comparison of the gross alpha screening results to gamma spectroscopy and alpha spectroscopy analytical results at LAL Labs for five samples ranging from activity concentrations of less than 10 picocuries per gram to somewhere around 150 to 200 picocuries per gram, demonstrates the relationship that I have described; namely, the gross alpha screening method is biased low compared to both alpha and gamma spectroscopy at concentrations above 30 picocuries per gram.

Figure C-5, which summarizes the comparison of the gross alpha screening results to only gamma spectroscopy results run at four outside commercial laboratories for 10 samples over a narrower range of activity concentrations, somewhat lower, does not exhibit the same relationship. It appears to show no clear bias above 30 picocuries per gram.

But the fact remains that the question about bias is not without cause for concern. In the words of my colleague, William Lorenzen, who's in the room with me today -- he's an operational health physicist who worked with us on the decommissioning project and one of the authors of Appendix C that I just referred to -- he describes the techniques and scientific justification for the use of gross alpha screening was only to determine levels of uranium that would require remediation. In other words, those around the 30-picocurie-per-gram level. The technique has no validity at greater levels of contamination or in mixed isotopic samples. So, while the gross alpha screening technique may be perfectly suitable for making field decisions and establishing excavation boundaries for remediation, it is scientifically unsound for estimating dose to workers.

The second type of information that is lacking is the incomplete knowledge of the nature, frequency, and duration of exposure. NIOSH has largely based its estimates of the nature, frequency, and duration of exposure on worker interviews that were conducted in October 2017. I would argue that relying on such information raises some serious questions.

Statistically speaking, this is a very small sample population. NIOSH interviewed only 12 workers, not all of whom were representative of the Class of workers covered under this petition; me, for example. So, that means we might be relying on approximately ten or so workers to define the nature, frequency, and duration of exposures to what could have been at least dozens of workers who worked in this capacity during the residual period and,

unwittingly, came in direct contact with the AWE program source materials over the course of carrying out their job duties.

At the time of the work interviews, the start and finish of the residual period was already 20 to 40 years in the past. And let me reiterate that the residual period began in 1968, January 1st, 1968, and extended through March 31st, 1997. So, basically, a quarter of a century that I believe Mr. Kotelchuck referred to.

And so, it was not just the 1970s, as Dr. Mauro has said time and again on the call this morning. It was really the seventies, eighties, and early nineties that our maintenance workers were being exposed without adequate protection.

It seems somewhat unrealistic to believe that workers' memories -- you know, when we did these interviews in 2017, now 20 to 40 years hence -- would be able to recall specific details with a high degree of accuracy about the nature of the multitude of tasks that they might have performed in their job duties and how long they were performing each one of those tasks. In fact, I have no recollection. I have pretty close contact with at least two of the people who were interviewed, and they really have no sense of exactly how much time was spent doing these activities. So, I do not agree with Dr. Mauro that one month is sufficient or even two months. All I can say is that we don't know.

As one of the Board Members remarked back on December 13th at the December 13th Board meeting, the work performed by the Class of workers covered under this petition most closely resembles that of emergency response personnel who on any given day could be asked to do any of a number of tasks of an unanticipated and unpredictable nature.

Given that reality, it is nearly impossible to account for the nature, frequency, and duration of the myriad

of tasks that they might have performed. And by logical extension -- sorry, Dr. Mauro -- it is equally challenging to estimate the maximum radiation dose for every type of cancer for which radiation doses are reconstructed that could have occurred in plausible circumstances by any member of the Class.

As another example of how the NIOSH maintenance exposure model is likely inadequate and incomplete, we know that the NIOSH maintenance worker exposure model attempted to address Building 10's HVAC system maintenance and resulting in an estimated duration of one hour per year, which seems completely unrealistically low in its own right.

But putting that criticism aside for the moment, the nature of the filter change-out model that NIOSH assumed does not take into account filter disposal. Besides changing the filters, the maintenance workers also would have had to have disposed of the filters. In many cases, this may well have included the use of compactors to crush the filters; thus, creating another opportunity for unmeasured exposure to source term.

Furthermore, I would argue that the duration of the work task on the job is not representative of the total duration of exposure these workers experienced. As I have previously testified, these workers had no awareness or training of the radiological hazards to which they were exposed. They would have gone about their maintenance tasks without any thought of taking special precautions to limit exposure.

After completing dirty, dusty work tasks, we've heard from one petitioner that they would often blow off any gross contamination with a compressed air gun back in the maintenance shop, creating clouds of respirable dust, I might add. And there is no guarantee they would necessarily wash their hands before eating, drinking, or smoking. And to make matters worse, they would wear their contaminated work clothes home, launder them at home, shower

at home; thus, extending the duration of exposures well beyond their work tasks on the job, and even more alarming, potentially exposing family members at home as well.

For all the reasons above, I have no confidence in NIOSH's ability to account for the nature, frequency, and duration of the multitude of work tasks that M&C maintenance workers performed. In its maintenance worker exposure model and its thorium and welding exposure model, NIOSH has estimated two months per year for subsurface and overhead intrusive activities and 48 hours per year for welding activities.

But I reject that any numerical estimate is valid. In my opinion, the only honest statement one can make is that we cannot accurately estimate the nature, frequency, or duration of exposures that would account for the maximum radiation dose that could have been incurred in plausible circumstances by any member of the Class.

When I hear today Dr. Mauro and his colleagues at SC&A say so confidently that we've addressed the SEC issue, we've explored it thoroughly, and we can get our arms around the problem -- in other words, they are confident in a bounding dose, that a bounding dose can be estimated for plausible circumstances in a clean and favorable manner -- all I can say is that I am amazed and incredulous at such confidence in light of such tenuous data, assumptions, and uncertainties.

The third type of information that's lacking, a complete --

Mr. Katz: Michael? Michael, just one second. I just want to let you know, because we're running up against -- so, I think if you have a couple more minutes, and then, we've got to do some planning before Josie goes, since she's Chair. So, if you can wrap up what you have to say --

Mr. Elliott: You know what? Sorry, Mr. Katz, but you know what? I have a three o'clock meeting today, which is in 20 minutes, that I am missing. Okay? This is being done on my -- I have to take vacation to be on this call. Alright?

Mr. Katz: Well, that's great. That's great, Michael. I can't help that. I can't help that.

Mr. Elliott: No, no, you're going to hear me out. You're going to listen to me.

Mr. Katz: No, Michael, actually, if I have to close the meeting, I'm closing the meeting. I can't do it without my Chair. So, if you don't mind --

Chair Beach: And I still have an hour. I still have an hour, Ted.

Mr. Katz: Okay. I thought you said you had to go at 25 --

Chair Beach: It was my time, 12:45.

Mr. Katz: Okay, and I thought you were two hours different from me. Okay.

Chair Beach: No, I'm three. I'm sorry.

Mr. Katz: Okay. Okay, great.

So, Michael, carry on. Carry on. That's my mistake.

Chair Beach: Sorry. Sorry about that.

Mr. Katz: All right. Go ahead, Michael.

Mr. Elliott: Okay. Thank you.

The third type of information that was lacking is a complete absence of any measurements and monitoring of the workers who are covered by this petition. This is the one fact in which there is no dispute. Notwithstanding all their exposure modeling and use of surrogate data, NIOSH has never stated

anything to contradict the fact that there is no measurement or monitoring data of the workers who are covered under this petition.

At the May 3rd, 2018, M&C Work Group meeting, Dr. Mauro of SC&A, the independent consultant retained by the Advisory Board to provide technical review of NIOSH's work, even testified that -- and I quote -- "It's a stretch to be able to reconstruct dose to M&C maintenance workers."

One of the reasons that Dr. Mauro cited as the basis of this uncertainty was that there are no personnel or area measurements of radiological exposures to M&C workers. Since this fact is not in dispute, I will not belabor the point.

The fourth type of information that's lacking is no comparable population with measurements or monitoring data that can be relied on as a surrogate for the Class in question. In the Petitioner Concerns Response Paper, NIOSH, June 18th, 2019, I can only assume that NIOSH refers to OTIB-0070 and two other NIOSH documents as precedent to justify the type of modeling they have applied to the M&C worker exposure models.

NIOSH contends that, quote, "In the absence of little or no monitoring data, these documents rely on surrogate data and models to estimate internal and external exposure." End quote. NIOSH goes on to state that the Advisory Board, through its consultant, has reviewed these documents for scientific validity and, with some minor technical clarifications, all issues have been resolved.

The implication seems to be that NIOSH now believes that, given the precedent of these documents, it has permission to rely on surrogate data and models to estimate bounding dose to workers at any residual period AWE facility, including in this case for the M&C maintenance workers. If that is what NIOSH intended, then I strongly disagree.

First of all, while NIOSH states that all technical clarifications were resolved, it does not go so far as to state that the Board has endorsed the approaches for estimating exposure to workers articulated in OTIB-70 and the other cited documents for application at all AWE facilities with residual period SEC petitions.

Secondly, I would argue that every AWE facility with residual period SEC petition needs to be evaluated on the merits of its particular circumstances. As an example of the need for site-specific evaluation of the facts, I would refer to the attachment to the Petitioner Concerns Response Paper prepared by Dr. James Neton.

In the background section, Dr. Neton summarizes the underlying assumptions of how residual contamination has come to be located in an AWE facility during the residual period, and I quote: "A number of AWE facilities that have produced and/or processed materials for the AEC became contaminated from the generation and settling of airborne radioactive particulate on plant equipment and surfaces. If this material was not cleaned up during or after the AEC contract period, any remaining contamination could serve as a source of internal and external radiation exposure to workers."

And then they go on to explain how those exposures are calculated using various methods, standard methods, that are contained in the OTIB-70 document and in OCAS-TIB-009 and Battelle-TBD-600.

"The documents referenced above include methods to calculate the levels of surface contamination during residual contamination periods using measured surrogate levels of air concentration, estimate of the amount of ingestion, and determine the depletion of surface contamination over time." And I'll stop quoting Dr. Neton at this point.

As has been well established in the case for the M&C maintenance workers covered under this petition, the settlement of airborne particulate matter on plant equipment and surfaces is just one of several exposure pathways to which the covered workers were subjected, and it is not the most significant. At least we agree with that, with Dr. Mauro on that point.

As I have stated on numerous occasions in the past, the M&C maintenance workers were exposed to AWE program period source materials that were released in an uncontrolled manner into subsurface drains, subsurface soils, utility trenches, and overhead areas, where they routinely worked without any awareness, training, or control to limit exposure to the radiological hazards present, either during their intrusive maintenance activities or disposal practices.

There is absolutely no comparison to the conceptual site model that forms the basis of OTIB-70. The exposures experienced by M&C maintenance workers were far worse than anything envisioned by OTIB-70. It must be acknowledged that the standard approaches for estimating worker exposures in OTIB-70 are completely inadequate for the M&C maintenance workers.

As the M&C Work Group considers its next steps and its recommendation to the full Advisory Board, I would ask you to reflect on some of the founding principles established in the enabling statute and the subsequent Executive Order to the affected agencies charged with carrying out the compensation program in October and December of the year 2000, respectively.

Under the EEOICPA Act of 2000, I'd like to highlight just a couple of citations. Section 7384(a), Findings, says, in paragraph 6, "Studies indicate that 98 percent of radiation-induced cancers within the nuclear weapons complex have occurred at dose levels below existing maximum safe thresholds."

And paragraph eight says, "To ensure fairness and equity, the civilian men and women who over the past 50 years have performed duties uniquely related to the nuclear weapons production and testing programs of the DOE and its predecessor agencies should have efficient, uniform, and adequate compensation for radiation-related health conditions."

Section 7384(d) is the establishment of the Energy Employees Occupational Illness Compensation Program. Paragraph (b) lists the purpose of the program. "The purpose of the compensation program is to provide for timely, uniform, and adequate compensation for covered employees."

And Section 7384(q) specifically covers designation of additional members of Special Exposure Cohorts. Paragraph (a), "Advice on Additional Members," Part 1 says, "The Advisory Board on Radiation and Worker Health, under Section 7384(o) of this title, shall advise the President whether there is a Class of employees at any DOE facility who likely were exposed to radiation at the facility, but for whom it is not feasible to estimate with sufficient accuracy the radiation dose they received."

Then under Executive Order 13179, dated December 7th, 2000, I call your attention to the following citation in Section 1, "Policy," the third paragraph: "It has been the policy of this Administration to support fair and timely compensation for the workers and their survivors. The federal government should ensure that this program minimizes the administrative burden on workers and their survivors and respects their dignity and privacy. This Order sets out agency responsibilities to accomplish these goals, building on the Administration's articulated principles and the framework set forth in the EEOICPA of 2000. The Departments of Labor, Health and Human Services, and Energy shall be responsible for developing and implementing actions under the Act to compensate these workers and their families

in a manner that is compassionate, fair, and timely." Emphasis added on those last three. This I believe is the test of the Advisory Board: to act in a manner that is compassionate, fair, and timely.

More recently, in a letter to Ms. Josie Beach, dated November 20th, 2018, Congressman Joseph Kennedy, who represents the 4th Congressional District in Massachusetts, which includes the city of Attleboro, acknowledged the uncertainty among Members of the Work Group as to how to evaluate the extent of the radiation these workers were exposed to in order to ascertain their eligibility for compensation. But Congressman Kennedy goes further by stating, quote, "It is my hope that the Work Group will take a broader view and consider the cases of these workers in their final determination."

When the Congressman challenges us to take a broader view, I think he is asking us to be true to the original founding principles of the compensation program. I fear that NIOSH, in its attempt to standardize the approaches to develop worker exposure models, especially as it pertains to the residual period exposure models, has lost sight of the founding principles of the compensation program.

Just because NIOSH believes it can develop a worker exposure model on some very tenuous and unverifiable assumptions doesn't mean they have satisfied the requirements of the regulation or the enabling statute.

Referring back to the regulatory requirement of how NIOSH is to evaluate a petition for adding a Class of employees to be recognized under the SEC, paragraph 83.13(C)(3) states, "If it is not feasible to estimate with sufficient accuracy radiation doses for members of the Class, as provided under paragraph (C)(1) of this section, then NIOSH must determine, as required by statute, that there is a reasonable likelihood that such radiation dose may have endangered the health of the members of the Class."

When I read this regulatory citation, and I reflect on all the uncertainties and gaps in the information used to estimate the bounding dose for the M&C maintenance workers covered under this petition, it seems clear to me that this is a scenario in which NIOSH must determine, as required by statute, that this Class of employees should be added as members of a Special Exposure Cohort. If NIOSH is unwilling to concede that it is not feasible to estimate with sufficient accuracy radiation doses for members of the Class covered under this petition, then I believe the Advisory Board needs to exercise its statutory authority to so, per 42 USC Section 7384(q), and recommend addition of this Class of workers as members of the Special Exposure Cohort.

In the spirit of the enabling statute and the subsequent Executive Order at the time that the EEOICPA was established in the year 2000, I sincerely hope that the M&C Work Group will pass along a recommendation to the full Advisory Board to act favorably on SEC Petition 00236.

Thank you for your careful consideration of my testimony. And with that, I conclude my remarks today.

Chair Beach: Thanks, Michael, and I apologize for the confusion on my schedule. When you're working from East Coast to Pacific, it does get confusing.

Any questions for the petitioners?

(No response.)

Chair Beach: Michael, was anybody else going to have comments?

Mr. Elliott: No. No, we're all done.

Path Forward/April Board Meeting

Chair Beach: Okay. Thank you.

No questions. So, you're going to go ahead and submit that.

And, Ted, I guess we need to talk about path forward, the April Board meeting process.

Mr. Katz: Right. Right. So, I think we need to get the petitioners' commentary in writing, and we'll also need to get the transcript, although it sounds like he abided by his written comments pretty closely for the most part. So, we should get that sooner than we'll get the transcript.

First of all, we need for the staff to look at those comments and address items that haven't already previously been addressed that need to be addressed. And some of that policy and regulatory commentary doesn't really need to be addressed, but the technical matters do for sure.

Then whatever follow-up items we have we should touch on with respect to the discussions today. Josie, do you have notes on that?

Chair Beach: I just have the action item for NIOSH to -- or excuse me -- SC&A to look at NIOSH's thorium and welding paperwork.

Mr. Katz: Right.

Chair Beach: Yes, going back to some of John's comments, we do have some White Papers that we discussed in our previous meeting. The Work Group has never actually closed out on any of these topics.

Mr. Katz: Right.

Chair Beach: So, I'm not quite sure how to proceed.

Mr. Katz: Right. Well, I'm going to get to that next.

Chair Beach: Okay, okay. That was the only action item I had. Did anybody else jot anything down? SC&A or NIOSH?

Member Kotelchuck: No. If I may say -- this is Dave; can you hear me?

Mr. Katz: Yes. Yes, we hear you good.

Member Kotelchuck: Yes, okay, fine. It's not that I don't have questions about the presentation by the petitioners, but there's plenty to think about and discuss, and I'm looking forward to doing that.

Mr. Katz: Right.

Member Kotelchuck: And it's a little hard to ask questions without spending more time thinking about it, anyhow.

Mr. Katz: Yes, yes.

Member Kotelchuck: So, I don't want the absence of questions to suggest that, oh, well, done.

Mr. Katz: No. Of course. Of course.

Member Kotelchuck: Not at all.

Mr. Katz: So, here is what I was going to suggest, which relates to what you just said, Dave, and everybody also. Because we had all these presentations and discussions by staff especially and questions from Board Members, but we didn't act on anything in terms of closing any findings or making decisions as to whether things are SEC or Site Profile. And I would note, also, that the major Site Profile matters, some of those still need to be sort of resolved in principle for the Board to be willing to sign off on them with an SEC, because that has been the more common tradition of late. The Board would want to see in principle at least how that's resolved.

So, one approach here going forward would be to, once we have the petitioners' comments -- and he has an attachment, too, and I'm not sure how that relates but we will see when we get it -- and the staff has had time to address that material, to have

another Work Group meeting where we would do this: we would both address those additional materials, but also go to, now that you've had the discussion, and then, you will have had time to think about the discussions that we had today, and we will have the transcript by then, too, from today. Since it will be closer to the April Board meeting, you could have a Work Group meeting where you could go through and see if there are items that you are ready to close or shift to TBD, or decide that you're not ready to shift them to TBD, of the SEC issues. You could go through that process, say, late March.

And then, at the April Board meeting, what we could do is have this as an update to the Board. Because, as I've said on the side to Josie earlier, the Board is not going to want to digest all this new material and actions in the same go anyway. So, we could have, at the April meeting, we could update the Board in a very full way about all of this. And, of course, the petitioner would have, again, an opportunity to comment, and based on where we are at that point, the petitioner can be updated there.

So, you could update the Board, wherever this all stands, whether you've closed some SEC issues from the Board's standpoint or not, whether you have a recommendation or not. It wouldn't be an action item for that Board meeting, but, then, it would be an opportunity to get the perspectives of the rest of the Board for you to, then, finish the work of the Work Group after the April Board meeting. And then, that would mean August would be the action item. It would be an action item for August.

I guess that's my, from what's happened today, that's sort of my preferred approach, but I can give you other approaches, if you have concerns or other thoughts about this.

So, let me just hear what you think about this as a template.

Dr. Taulbee: This is Tim. I actually have a question.

Chair Beach: Oh, go ahead.

Dr. Taulbee: Josie and Ted, I have a question here. If I'm understanding this right, because this I was not aware of, there are still open issues with regards to previous White Papers, and so forth, associated with this site? Is that correct?

Chair Beach: Tim, I don't think -- open issues, yes, because the Work Group addressed the initial papers, the Metals and Controls Maintenance Workers Exposure Model, the subsurface, but the Work Group never actually weighed-in on whether they agreed with any of those approaches or not. And if somebody knows or understands that better than I do -- that's my take on it.

Dr. Taulbee: Josie, that's what Ted is talking about, then, with regards to TBD versus SEC issues, is going through all of the previous White Papers and sorting all of that out of where we're at?

Chair Beach: Yes.

Dr. Taulbee: Is that correct?

Chair Beach: Yes.

Mr. Katz: So, Tim, just to be sure --

Dr. Taulbee: Thank you.

Mr. Katz: -- there are two things here. And I think you may be concerned about one or the other.

One is the Work Group settling out on whether they think something is not an SEC issue or is, to the extent that they're ready to do that. And they may not on some items, and that's fine, but setting that up to the extent they can for what they report to the Board.

But the other part of it is some of these items we

discussed in principle how it might be addressed as a TBD issue, but, really, there isn't NIOSH agreement yet that this is, in fact, how we are going to handle, how you propose handling it. So, we would need that, too. I mean not for this April meeting, but the Board is not going to sign off on resolving an SEC one way or the other without actually knowing those, in principle, how are those TBD issues going to be settled out. That's what I was saying.

Dr. Taulbee: Okay. Right. I understand.

Mr. Katz: Yes.

Dr. Taulbee: Okay. Thank you.

Mr. McCloskey: Rose Gogliotti has got a good start for us in the BRS right now.

Mr. Katz: Yes.

Mr. McCloskey: And so, a lot of this is described there. We could go update that with where we think we are now and disposition this a little more efficiently.

Mr. Katz: Yes, but, I mean, that's just recordkeeping. What we're talking about here, Pat, is, first of all, the Work Group taking a stand, which it hasn't done. And secondly, NIOSH taking a stand on what it will propose to do, which hasn't been done; it's just been discussed.

Mr. McCloskey: Okay.

Mr. Katz: That's what I'm saying. So, the BRS is just a recordkeeping system.

Chair Beach: Yes, and we do have an issues matrix that does spell out which ones are SEC issues. I guess they're all listed as SEC issues. So, it would probably be good to update that as well with where we're at with each item.

Mr. Katz: Yes. Yes, but, I mean, again, they're all SEC

issues until the Work Group says they're not.

Chair Beach: Yes. It would be a template for the Work Group Members to have it.

Mr. Katz: Yes, oh, yes. No, that would be very handy, to set that up. And again, it could be recommended -- clearly, SC&A and NIOSH have recommended things be shifted from an SEC issue, and that could be reflected in the matrix. And that would be really helpful, yes, I agree totally. And maybe that's what Pat is talking about.

Anyway, let me hear from the rest of the Work Group Members. Does this path forward sound like the right one or do you have concerns? Because there are other approaches to this.

Member Kotelchuck: Dave. I'm comfortable with going ahead and trying to get the meeting in March. That sounds good to me. And I agree with you that, if there's real contention, the Board is not going to want to be briefed on an issue and, then, decide right on the spot, and I think there may be. So, I'm open to that possibility.

Mr. Katz: Yes. I mean, there's no question the Board really doesn't like to act in one go.

Member Kotelchuck: Yes, right.

Mr. Katz: Anything that has a lot of options to it.

Member Kotelchuck: Yes. Yes, I've seen that, and that has happened in many other of the cases, where we will brief the Board about what the issues are from the Work Group and, then, get together at a later time. Have them digest it, as we've tried --

Mr. Katz: Yes.

Member Kotelchuck: -- to digest the earlier reports to the Working Group.

Mr. Katz: Right.

Member Kotelchuck: So, I'm comfortable with that. I think that's a good way forward.

Mr. Katz: Okay. Okay.

Member Anderson: Yes, and I'm comfortable with it. I just think we do need to kind of get a stepwise way forward, or we keep going over and over various issues. And so, I mean, a key is the determination is it SEC, which is really the more pressing, I think, decision to make versus the TBD.

Mr. Katz: Right.

Member Anderson: And if we could put some of those across that, I think for the SEC it's can you do the dose reconstruction or not. And if the method that's being proposed by NIOSH would do that, but we're just unhappy or uncomfortable with some of the decisions in that process, in that methodology, but it could be corrected, then I think putting it as a TBD area is probably a good thing, if we can make that decision.

Mr. Katz: Right. Right.

Member Anderson: It's just fine. I think we can do it. But I do want it to keep moving because we have so many other things. Then, with your circumstances and a new person coming in, we lose some of the historic memory. I know each of us on the Committee kind of do our best to keep notes and lists going, but you're kind of the real repository.

Mr. Katz: Yes. Well, the Board is definitely going to rely on all of you as well as John and everybody at SC&A and Tim and everybody, because you guys all have memories, too. And frankly, it's kind of ironic for anyone to rely on my memory because I'm famously not an elephant.

Member Anderson: Well, you have a lot of the documents that are in-hand, I think.

Mr. Katz: Yes. Yes, I know. I know.

Anyway, that sounds good. And I think, no matter what, whether you can only put some of the SEC issues into TBD-land, if you want to call it that, and some of them you're just not ready to do yet, I think what will be more important is that all your uncertainties and concerns get laid out in that presentation to the Board, so that those other Board Members really can weigh in on the issues that feel like you need the most input on. That's going to be most important at that April Board meeting, as well as what the petitioner brings to the April Board meeting.

Okay. So, I think we have a path forward. I will be, then, sending out a scheduling notice. So, keep an eye out for it.

And I'll try to put it far enough into March, so that we have time both to digest what the petitioner has -- I mean, he has given us a great heads-up because he's gone through it orally, but to digest what the petitioner sends in, but also to think about what we've discussed and talked about here today.

And again, I'll get the transcripts to you just as soon as we can those transcripts to you, so you can go over what was discussed today before they're even cleared, and so on.

Yes, and then, we'll move forward likewise. And when I do the agenda for the Board meeting, I'll have this on there with plenty of time to interact with the rest of the Board Members.

So, I want to thank everyone.

Mike, I want to apologize for the little sort of difficulty we just had. I didn't mean it to come out so difficult, but I thought I was losing Josie and I have certain limits to what I can do. So, I'm sorry about that little tiff.

Mr. Elliott: Sure, I understand. Apology taken and I don't take it personally.

Adjourn

Mr. Katz: Okay, good. Thank you. Thank you. I really didn't mean to be sounding harsh at all.

Okay. So, then, everybody, thank you so much for all the hard work that's gone into today.

(Whereupon, the above-entitled matter went off the record at 3:05 p.m.)