

U.S. Department of Health and Human Services
Centers for Disease Control
National Institute for Occupational Safety and
Health
Advisory Board on Radiation and Worker Health
Metals and Controls Corporation Work Group
Monday, April 13, 2020

The Work Group convened telephonically at 11:00
a.m. Eastern Time, Josie Beach, Chair, presiding.

Present:

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

Also Present:

Ted Katz, Designated Federal Official
Nancy Adams, NIOSH Contractor
Bob Barton, SC&A
Zaida Burgos, NIOSH
Mike Elliott
Rose Gogliotti, SC&A
Tom Labone, ORAU Team
John Mauro, SC&A
Pat McCloskey, ORAU Team
Jenny Naylor, HHS
Lavon Rutherford, DCAS
Muttu Sharfi, ORAU Team
Tim Taulbee, DCAS

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Proceedings

(11:00 a.m.)

Welcome and Roll Call/Introductions

Mr. Katz: This is the Advisory Board on Radiation and Worker Health.

It is the Metals and Controls Work Group, and welcome everybody. There are just some preliminaries.

The presentation that John Mauro will be giving is posted on the NIOSH website, but let me note that the basics of that presentation is not posted there, and that's my fault.

I sent it to the petitioner assistant who should have sent it out to the petitioners, but I didn't send it to the person who posts it in time, so it's not posted yet, but it will get posted and will be there for future reference, anyway, that paper, and it was distributed to the staff and Work Group Members, and so on.

So, let me say that.

Okay, let me get through roll call to start with, and let me mention since we're dealing with a site, we have conflict of interest to deal with, too.

That won't apply to the Members because the Members by definition aren't conflicted on this site, or they wouldn't be on the Work Group.

But let me run through and make sure we have all our Members here, starting with the Chair, Josie Beach.

(Roll call.)

Mr. Katz: Okay, and Mike, and let me just check with you up front here.

You commented at the last meeting. Do you have

additional comments for this meeting?

Mr. Elliott: I'd like to reserve the right to at least make a comment.

It'll be brief, whatever it is, and I do have a hard stop at 1:30. I have a conference call for work today.

Mr. Katz: Yeah. My guess is we'll be done by then, Mike.

And absolutely you have the right to comment. I guess but you don't have prepared comments. Is that what you're saying?

Mr. Elliott: Correct, I have no prepared comments at this time.

Mr. Katz: Okay. Thanks, Mike. And you did get the materials from Josh. Is that correct?

Mr. Elliott: Yes I did, thank you.

Mr. Katz: Okay, thanks.

(Roll call continued.)

Mr. Katz: And while we're waiting, let me just note, you know, the general plan today, and then let me just let Josie make whatever remarks she wants to make to kick this off, since it's her meeting.

But at our last meeting, we had quite a bit of discussion that was fairly fresh to the Board Members. So, we wanted some time for them to digest that.

Let me note that at the time, we were going to have a Board meeting in April. Of course, that has been now postponed, and we are expecting a Board meeting in August, the end of August.

So that is in the planning now. That presumes, of course, that the COVID situation will have relaxed enough that we can have a face-to-face Board

meeting at the end of August.

So, we are starting to make plans for scheduling that meeting, and there'll be more about that at the June Board teleconference. So, hang on to your hats on that.

But the same plan for this Work Group I think would apply to August, which would be that this Work Group will present on this petition at the August Board meeting, where the Board does not act in August, but to consider, and if this Work Group wants to leave some issues for Board input before it finalizes its recommendations on certain findings, that's fine.

And if this Work Group wants to resolve the findings of this Work Group, that's also fine. It's up to the Work Group and how things go today.

Let me just also note I hear some sort of chatter breaking in at times, at least on my phone, so everybody but the person speaking should stay on mute to help everyone's audio, and if you don't have a mute button, press *6 to mute your phone, and then you press *6 again to come off of mute.

Okay, so, Dave Kotelchuck, are you with us now?

(No response.)

Mr. Katz: Okay, well, Josie, it's quarter past 11:00 at this point, so I'll suggest, you know, if you have preliminary comments you want to make, that you would go ahead. And we really should get going because it's really -- I don't know what the issue is with Dave, but --

Chair Beach: I understand. Yeah, no, I hate to not have him on the phone. I really don't have any long-winded --

Member Kotelchuck: Hello?

(Simultaneous speaking.)

Member Kotelchuck: Hey, I'm on, folks.

Chair Beach: Oh, good.

Member Kotelchuck: Oh, I'm so sorry to hold you all up. I don't know what the problem is.

Mr. Katz: Okay, but glad to have you, Dave.

Chair Beach: Yeah, you're on now, so that's --

Member Kotelchuck: I am so glad to be here.

Review of the Issues Resolution Roadmap/Work Group Resolutions/Additional Tasks

Chair Beach: Excellent. I'm glad everybody's on. I don't have any long-winded comments to make. I do appreciate the document, the road map that was put together by Rose and John Mauro. I think that helps put everything into a nice packet.

So, John, I'm assuming you're going to start the presentation. Is that correct?

Dr. Mauro: Yes, I'll be starting using the slides, but I'm hoping that Rose and Pat McCloskey -- hi, Pat -- would help out.

Pat, Rose, and I, in a strange sort of way because we spent so much time with the petitioners, are very close to this issue, and I'm sure Mike Elliott remembers us from our meeting, oh, a while back.

Chair Beach: Before you start though, I guess I've got a question for the Work Group.

Do we want John to go through the entire presentation, or do we want to take these one issue at a time?

What's your thoughts on that?

Member Kotelchuck: You know, I was wondering about that myself. I have serious concerns about the very first slide that he has, and I believe it might interrupt things.

So, I would be open to having John go through all of his slides without our comment, and then come back to them one by one.

Chair Beach: Okay.

Member Kotelchuck: And then, how would that be?

Chair Beach: Yeah, I think that would be fine. Loretta and Henry, what do you think?

Member Valerio: I agree with Dave.

Chair Beach: Okay.

Mr. Katz: But let's not --

(Simultaneous speaking.)

Member Anderson: Let's not doddle on going through the whole thing.

Report: Issues Resolution Roadmap for Metals and Controls Corp., March 12, 2020

Dr. Mauro: Okay, I guess if you folks are ready, I'm ready. I understand I will go through the slide presentation.

Just to let everybody know that the slide presentation, in essence, is a summary of the road map that's dated March 12. I'm hoping you folks had a chance to look at it. If not, that's okay.

And if you did look at the road map, you'll probably see that on page 8 of the road map, there's a list of all of the issues.

Now, the reason we put the road map together for M&C was that since the beginning of our work, which I guess goes back to the original SEC PER that was issued by NIOSH on April 23, 2018.

So it was, you know, about only a two year period, but there's an awful lot that took place over that two year period by way of White Papers, Work Group meetings, interviews.

During the course of all of those exchanges of White Papers and discussions, a lot of findings, observations, issues, concerns were embedded, and they unfolded over time as with the interaction with the petitioners, with Mike.

If you go to the work site information sheet on NIOSH's website, you'll see there's, you know, a large list of publications, documents, and papers, et cetera.

But none of them really have, I guess, completely articulated an issue crisply. None of them say, after the discussions -- where there was a lot of discussions of the issues -- were they opened or closed, or in progress, or in abeyance? Something that we often do and put into the BRS.

So, given that we were in that state, we really were in a state where we haven't really explicitly decided, okay, what issues we can close, and which ones really need to be open.

And this goes for both SEC type issues, and what we call, you know, a Site Profile-type issues. Sometimes it's difficult to distinguish between the two.

So, Ted asked if SC&A would prepare a road map, and I don't know whether or not you folks have access to the road map or not. It is on open NIOSH website.

But it's a complex document, and it has as an attachment where we collected -- well, a series of attachments -- all of the issues as best SC&A could identify, describe, and then give a recommendation, whether we believe, in light of what transpired, we believe whether the issue we -- this is SC&A speaking now -- are closed or remain in progress.

Now, given the complexity of the road map, which itself would be difficult to go through right now, you know, we went ahead and put together a slide presentation, which is a boiled down version of the

road map.

So what I plan to do is go through my slide presentation, and then after we do that, the degree to which you would like to then move over to the road map, especially as appendices, where each and every one of the perhaps 25 or so issues, findings, comments that are listed on page 8 of the road map, we could actually go through a process of, you know, discussing whether they should be closed or not.

Okay, with that introduction, let's start with my slide presentation.

And I'd like to thank Rose. It's a very pretty slide presentation. Rose put it together for me, and Rose was very instrumental in everything we did here, so we worked as a team. And of course, all the work by Pat.

We tried to capture and reflect everything so to tell the story, and that there would be concurrence, that the way in which we represent the information is clear and unambiguous, and does capture the story, and NIOSH hopefully sees it the same way.

But we'll see as we proceed.

Let me begin. Just as a refresher, it's important to set the stage. NIOSH put out a SEC PER in April 23, 2018.

And it was what I call a conventional SEC Petition Evaluation Report before a site, where we're concerned with the residual period.

As you probably remember, M&C was granted an SEC for the AWE period, which went from the early '50s to, I believe, the end of 1967.

And the main reason for granting the SEC was issues related to reconstructing doses from thorium.

Then, of course, the second SEC petition came across the process dealing with the residual period,

which goes from the beginning of January 1968 to about 1996, which is a residual period.

Now, it's important to understand the distinction of what took place during the operations and then the residual period, and that goes for the heart of the matter.

M&C was basically a facility that machined, handled, and fabricated fuel for the weapons complex, and it included relatively large amounts of uranium and relatively small amounts of thorium.

So, during that time period that ended at the end of 1967.

Now, what's important here is that beginning in 1968, and the associated SEC Petition Evaluation Report, NIOSH used the classic approach of what I call the OTIB-70 approach, where you have lots of information on contamination on surfaces of, you know, gross alpha, on surfaces throughout the -- well, two of the more important buildings, Building 10 and Building 4.

And using that data gives a conventional approach to deriving the doses to workers who might be walking around and working on that residual radioactivity, where they get external exposure, and also internal exposure from resuspension and inadvertent ingestion.

And that was the essence of the original SEC Petition Evaluation Report. SC&A reviewed it. We had a couple of comments on that.

So that goes to the start of this thing, where NIOSH basically took some high-end surface contamination levels and used the resuspension factor of ten to the minus 6.

Our only comment on that was, well, you know, for this type of exposure path where people are walking around a building, working, this is during the residual period, we thought that the more

appropriate approach would be to use the average activity because people are walking around, not the high-end activity, which would imply people are always sort of at the high-end location.

But we suggested that NIOSH go with a higher resuspension factor of ten to the minus 5, and they concurred that yes, that would be a more appropriate approach, and the outcome of that is a small increase in the doses.

So that was sort of the very first issue that we engaged in, and I believe that there is agreement between SC&A and NIOSH on that very first step in the process. But something very important happened after the issuance, beside that review work that SC&A did.

Right after the SEC Petition Evaluation Report was issued, the petitioners pointed out that we missed the boat. And you may recall that they pointed out that there was an awful lot of activity that took place during the residual period, where workers were involved in what we refer to as maintenance and refurbishing activities, where they were doing work in the above-ground and below-ground environment in Building 10, which is by far the most important building.

And in the above-ground and below-ground environment outdoors where there is residual radioactivity -- but the dilemma was that while they were doing this in the 1970s and 1980s, they were not aware that there was residual radioactivity.

It wasn't until the 1980s and 1990s that it became apparent that there was residual radioactivity.

So you can see where workers involved in these kinds of activities may have come into contact with contaminated material and experienced exposures, and there was no monitoring, there was no air sampling data, there was no soil sampling data, sludge sampling data, there was no bioassay programs.

They were basically working from 1968 to well into the 1980s or 1990s under the impression that the site was clean from the perspective of radioactive material.

And it's because of that that the petitioners said listen, you folks missed all this in your SEC Petition Evaluation Report. You need to address it.

And everyone agreed. You probably have heard this before, but it's important to me to give -- what I call set the table before I get into the slides.

And this really goes to my very first slide, which is called goals of the road map. A lot of information was gathered after we learned that we missed the boat. We spent a lot of time talking to the petitioners, gathering information to understand these exposure scenarios.

And it's important to think about them as there was a large team of workers at M&C that were involved in these repurposing and maintenance activities, where they crack into the flooring of Building 10 periodically to do repair work on drainage lines, for example.

They would snake drainage lines, they would excavate dirt so that they could install new, large equipment for the work that was being done, non-AWE work, what I would call commercial work or other work that was not related to AWEs. And all this is going on, and these folks are handling this material. This is an example of one of these scenarios.

So, the point that was made by the petitioners is that it was essential for NIOSH to look into these exposure pathways and quantify them, and it was their position that you really can't quantify these because we have no data.

And so the question then came to NIOSH, and then eventually to SC&A, well, is there any way that these doses can be reconstructed?

This may have been the only time we did something to this extent. We sat down for four days with the petitioners and the workers in October of 2018 -- this was shortly after the SEC PER was issued -- to say, jeez, we've got to find out more about this.

And what we had to do was carefully listen to the workers. And we spoke with 12 workers, each worker for about two hours each, taking lots of notes. And all those notes now I believe have been put on the open web.

But what we had to do is listen and try to construct scenarios, worker scenarios. What did they actually do, and where would be the exposures that might occur?

So, almost think of it like this. Beside the fact that, you know, they are 2,000 hours per year or more, there were certain time periods that different workers performed different maintenance and repurposing activities where for some relatively short period of time, they would experience unique exposures associated with particular activities, above-ground and below-ground, indoors and outdoors, that would have delivered exposures that were unique to M&C.

And all of this is discussed, and we discussed all this before, and all these White Papers, you know, are on the web.

And but they're all presented in a way that's contained in so many different documents, and the road map attempts to collect all this and organize it so that we can get our arms around it, and then eventually go through each issue, and the Work Group can make a decision regarding whether the issue has effectively been resolved, or whether or not it's closed, or whether it remains open.

I will begin this by saying that in SC&A's opinion -- and this is almost like the end of the story, but it's nice to know where we're going to head -- SC&A believes that all SEC issues have been resolved, a

subject that will be probably the most important discussion we will have.

But I do believe that there are not too many left, but there are a number of issues that I would refer to as Site Profile issues that still require resolution.

Okay, with that, more or less an extended introduction to set the table, let's go on to the next slide, the one called exposure scenarios. Remember, we invented these. What I mean by that is between Pat McCloskey, and NIOSH, and their contractors, and SC&A, we said okay, we listened to the workers, and they had opportunities to comment on many meetings, and we effectively identified a number of exposure scenarios that were very unique to the workers involved in maintenance and repurposing.

And the first and most important one, which we're going to start with, is the exposures associated with work in Building 10.

Building 10 was the most important building with respect to the handling of the AWE activities that took place prior to 1968, and it's the building that had the potential for the greatest amount of residual radioactivity that was left over once the residual period began.

Okay? And out of that, what we call the Building 10 exposures, we grouped them into four different categories of activities that the workers were involved in. What we call subsurface work, including the snaking of pipes and the replacement of pipes in the subsurface environment. HVAC maintenance, where workers had to go and clean out and service the HVAC system, which includes removal of filters. There was also a lot of maintenance work on the roofing, and a lot of that work involved a unique pathway, welding.

So for Building 10, we invented or categorized with the help, of course, of the petitioners, to understand and create these four major categories of exposure

pathways.

And the other group we are calling non-Building 10 exposure. This really refers to work that was done outdoors.

So that's our second group, where people were doing things outdoors.

And finally, we are going to talk a little bit about what I call overarching issues, and they'll become apparent what they are, and they're issues related to external exposures, issues related to substitute data.

And to me in my mind, that is the single most important overarching SEC issue that I know Josie and the Work Group are going to want to hear more about because within that issue, therein lies the potential for an SEC.

And finally, we have thorium. As you probably are aware and remember, we had lots of gross alpha data, we had lots of uranium data, but we did have a limited amount of thorium data, which meant that it's going to be a little more difficult to reconstruct doses to workers -- internal doses from an inhalation of thorium because there was a limitation on that data.

So, the series of slides you're about to go through go through each of these major headings and their subcategories.

So I'm going to go to the next slide, okay, which is titled Building 10 subsurface and pipes.

Okay, we talked about this before, but it all boils down to the issue -- what was done is, we have lots of data characterizing the uranium concentrations in the subsurface environment in Building 10, and I won't go into the numbers.

There are a large amount of material that was collected in the 1990s just prior to the beginning of

the license termination, the FUSRAP characterization, and then close out period.

So, that data, which was extensive, was collected in the 1990s, and it characterized the nature of the radioactive contamination in the subsurface environment.

And as sort of like a preliminary to point out that the big issue -- and we'll talk about this much more -- is, you know, can you use that data as a substitute for the concentrations of radionuclides that were collected in the 1990s and apply it to activities that took place in the 1970s and '80s?

We're going to get to that, and I know we're going to want to talk a lot about that, but let's try to put to bed right now some of the things that I think are a little easier.

Let's just operate for a moment on the assumption that we like the 1990 data and that we can theoretically use it, and that's what SC&A did, and that's what NIOSH did.

And this slide represents a summary of SC&A's investigations into trying to reconstruct the internal exposures and the external exposures from workers involved in Building 10 subsurface activities and snaking the pipes, where they likely inadvertently came into contact or close proximity to contaminated sludge and soil in the subsurface environment, and did not know it, okay? And during the course of those activities, they removed a lot of solid material during these activities.

Now, both SC&A and NIOSH independently derived doses using standard techniques, techniques that we've been using forever, for doing dose calculations.

Once you have an idea of what the concentration level is of a radionuclide in the soil of the subsurface environment, or any material, in terms of picocuries per gram, you are in a position using very

conventional methods to reconstruct inhalation exposures, and inadvertent ingestion exposures, and external exposures.

And we both did that, and it turns out what we have is a comparison of the key assumptions and approach that SC&A used on the major parameters in going through these calculations, and those that were used by NIOSH. Okay?

Of course the most important metric is the concentration of, in this case, uranium, that was in the subsurface environment, especially in the pipes because we found that it's the pipelines that represented the places where the highest concentrations were found.

And the reason that happened is that during AWE operations, there were drainage pipes and conduits that carried water, wastewater, that ran through these pipes and got clogged with soot, sediment, and in fact, in one particular instance, a small piece of the uranium rod.

And so, when you look at all of the data that's been collected in the 1990s, and to a limited extent in the 1980s, you have lots of information on the concentration of uranium.

In some cases, it's total uranium, in some cases, it's individual isotopes, uranium and thorium.

But we did our work and we said that, well, what we think is a good idea is using the data that's collected inside the pipelines in a subsurface environment.

To look at that data, and we said well, there's a distribution of concentrations, but we think that the high-end values are the values that should be used. So we found that high-end value, we call it the 95th percentile, was 5,878 picocuries per gram.

NIOSH did the same thing we did, except when they looked at the data, they came up with 6,887 picocuries per gram.

Quite frankly, two different groups of people looking at a large data set. This is agreement, as far as I'm concerned. To say one is right and one is wrong would be inappropriate. They're both scientifically sound and claimant-favorable.

If you agree that you could use data collected in the 1990s to characterize the radionuclide composition what was in the pipelines in the 1970s and 1980s.

Again, this is the big issue.

Now, we'll get into this in a little bit more detail, but we found that though the pipes were snaked, and likely a considerable amount of radioactivity might have been removed inadvertently by the M&C workers performing subsurface activities, that we also found that there were a number of pipelines which were clearly never snaked and never cleaned up, never removed.

In fact, this is where we found this small piece of fuel.

Now, the fuel is pure uranium, but we also found right there in the vicinity of the same network of pipelines, elevated levels of sludge that were as high as ten percent of pure uranium.

In other cases, one percent, and in most cases, well below that.

So clearly, there were pipelines that were never snaked, and that contained the highest levels of uranium that conceivably could have been present because it included an actual piece of uranium.

And so, I'm giving you a little hint right now of one of the reasons we believe that though a considerable amount of material, including radioactive material, may have been removed during these 1970s and 1980s repurposing activities, with regard to the pipelines, there was clearly evidence that some of those pipes were not cleaned, snaked, and those pipes, as it turns out,

contained, in absolute terms, the highest concentrations of residual radioactivity that could have been present in those pipelines.

So this is one of the reasons that we believe that the data that we have from the 1990s probably apply to these earlier years because it's clear that those specific pipelines where the -- there were places on the entire site that had the highest levels, levels that could not be any higher because it included pure uranium.

So in any event, I'm sort of giving you a hint of one of the big SEC issues and where we're headed, and why we think we have a tractable problem.

And then there are other parameters involved in this calculation.

You picture the person who's down in the hole, and he's digging and he's cutting pipe or he's snaking pipe, and there's airborne radioactivity being kicked up as a result of these activities.

Well, SC&A researched the literature and it turns out the EPA recommends that for remediation activities, a good default value for the dust loading is 200 micrograms per cubic meter.

So, you know, once you feel that you got a pretty good handle on the picocuries per gram of contamination, then you say, well, what might be up in the air?

We're saying, well, we think a pretty good number is 200 micrograms per cubic meter.

Now NIOSH, they came up with a different number. They came up with 220 micrograms per cubic meter, which is different than ours, and they came up with it in an entirely different way. They used some data from a remediation at the Mound Site.

Now, we felt that, eh, you know, if that was the only number we had, we'd have a problem with that. And

you know, the degree to which what they did, and what was present at the Mound Site facility, does that apply to subsurface work at the M&C facility?

But coincidentally, it turns out that the numbers are very close.

And in fact, when you look at our sources of data, the 220 is within the domain ranges of values that are certainly plausible for airborne activity during remediation activities of this site.

So again, my position is, and SC&A's position is, that there's no difference between these numbers. They both are reasonably scientifically valid concentrations of what might be airborne by the way of dust for these types of activities.

So although there's a difference, we consider the difference to be not substantive.

Next item, breathing rate.

Now, one of the things we did, which we never did before at another site, is we didn't use the classic 1.2 cubic meter per hour number for breathing rate for these workers.

And this was something that Rose suggested that we do because she felt that, you know, you visualize a guy working in a hole with a shovel, digging and working, he's really working, and he's breathing heavily.

And it was SC&A's position that, you know, we're going to give them the next higher breathing rate and go to the 2.5.

So we ended up using a higher breathing rate.

Now, something interesting transpired. One of the things we originally did, both SC&A and NIOSH, we assumed that the people that were doing this work, when they did it, during the course of a year, that over the course of a year, totality of one month per year was spent in a hole.

Now, this would be not a one-time event that took place over one month.

It may have been many different separate activities where a person would go into the subsurface environment and do some work, and maybe that would happen several times per year.

And as best we could tell from our conversations with the petitioners in our October 28 interviews, we, SC&A picked a totality of one effective month per year was spent by workers in the hole.

And which meant, perhaps, you know, any individual operation would be some fraction of that.

But then we extended that to two months per year because there was some good feedback from the petitioners that they felt that one month per year was not conservative enough, so we've changed it to two months per year.

So now we're asking ourselves, okay, so perhaps these workers spent more time -- each time they did the work, they spent more time in the hole than we thought.

And it's really impossible for a person to be -- no, I wouldn't say impossible -- it's highly unlikely that a person would be working so hard for so many consecutive hours, and for all those consecutive hours, have a breathing rate of 2.5 cubic meters per hour.

So right now, given this change, you know, we're thinking that, you know, it's hard to say, but the 1.2 number that NIOSH used is probably not a bad number.

Our number may be a little exaggerated, you know, an overestimate of the breathing rate, especially when we thought to extend the duration a person may be in the hole.

Now, let me say a couple more things which goes to

the SEC issue. Think about this. We know that we got the upper 95th percentile concentration.

I'm spending a lot of time on this one because this is where all the action is. Everything I'll say after here is by far less limiting than this exposure scenario.

So it's important that we look closely at this, and you'll see we'll move much more quickly as we move through the next slides, so please bear with me.

You know, think of it like this.

We believe we found a set of data representing contamination in pipes that were not cleaned out, that were not removed, and represent the distribution of concentrations that are at the upper end, and are likely to represent the upper end that was present at the site during the entire AWE period, even though there were other pipes that may have been snaked where the radioactivity was removed.

But this is clearly a set of pipes that were not snaked, and they do represent an upper end.

So that goes toward the SEC issue. But now let's see, there's another aspect.

But we said, but you know, even then, we would not want to take the average of the activities that were in these pipelines that apparently were not snaked.

Just to give the benefit of the doubt, what we'll do is we'll go with the upper 95th percentile concentration that was observed in the sludge in these particular pipelines.

And we're going to take it a step further. We're going to assume that that upper 95th percentile concentration was not only present in the pipelines, it was also present in the dirt in the vicinity of the pipelines.

In effect, all of the dirt in the subsurface environment where M&C workers may have encountered is at the upper 95th percentile. Something that we've considered to be incredibly claimant-favorable, so that all that there is is at the upper 95th percentile.

So this all goes towards the SEC now -- issue. We did one more thing, and so did NIOSH, and not only did we assume that all the dirt was at the 95th percentile, we assumed that the same person is doing this work month after month, year after year, the same person, and calculated that annual dose.

We know from talking to the workers that different people went in the hole to do these kinds of things, but we assume they're the same person.

And now, this is a subtlety, this is something we've done before. When you don't know who that person is, or what different people did, you make the assumption that everyone gets that dose.

So think of it like this. Our recommendation or our approach to the problem was to say, this particular dose under these assumptions is going to be applied to every single worker that are covered by this petition, namely that they were exposed to the upper 95th percentile all the time, whenever they were in the hole, and every single worker gets that dose.

This is a way for us to feel confident that we are placing an upper bound, a plausible -- perhaps not even a little bit, more than plausible.

You know, it's an extremely high-end scenario for deriving inhalation doses to workers involved in subsurface activity.

Well, we're going to give this to everybody because we don't know who did and who did not perform subsurface work, so this exposure, this internal exposure is going to be applied to all workers.

And by the way, you're going to find out that even under those circumstances, which are quite extreme, the doses are relatively low, and we have the actual numbers, of course.

So I spent a lot of time on this slide because it goes to the heart of all the issues that are concerned to the Work Group.

I'm going to move on now.

By the way, we recommend notwithstanding the SEC discussion that we'll probably have later, we believe that if you accept that this is a reasonable way to come at the problem, and that the parameters that we both used -- though in some cases there are differences, we don't consider those differences of any great substance, and we're perfectly supportive of using NIOSH's assumptions or SC&A's assumptions.

We think they're both reasonable, scientifically sound ways of reconstructing the doses to these workers. So, in a way I'm saying that, rather than quibble over some of these small differences, I think we should close the issue because we don't think that there are any issues except for the SEC issue that I mentioned.

But once you accept that premise that we can use that data, we believe this issue could be closed regarding subsurface exposures, internal exposures in Building 10.

Let me move on so we can get through this. I spent a lot of time, but let me move on a little more quickly.

The other scenario that we --

Member Kotelchuck: Please. Please do.

Dr. Mauro: Yeah. I want to make sure everybody understands because this is the heart of the matter. This is where the issue --

Member Kotelchuck: You're making the detailed argumentation that if we want to discuss this, we're going to have to go over again.

I was hoping -- respectfully, I was hoping this would be a briefer presentation and then we go over each one in great detail with lots of discussion by yourself, and everybody from NIOSH, and all the people from the Working Group.

Dr. Mauro: I understand, Dr. Kotelchuck. I will move quickly.

Member Kotelchuck: So, with that, I respectfully -- please.

Dr. Mauro: I will do that right now.

The second scenario is the HVAC scenario. This is where workers are involved in maintenance activities.

I won't explain how we did our doses, but the bottom line is both SC&A and NIOSH agree on the approach in the exposures basically on workers that work with the -- replace filters, and the filters could be contaminated with elevated levels of dust.

And when they pull out those -- when they did that work, they could have experienced relatively high concentrations of uranium on dust, inhaled that, and experienced exposures.

We considered the assumptions that we used quite conservative and -- which we can get into detail later, if you want to, but we're coming up with dose rates on the order of 1.77 millirem per hour, which is an effective dose, not an organ dose, and which we consider to be very small.

And the real question is, do you agree with the strategy for how this was done? We can talk about that in great detail later. So, I'm moving quickly.

Let me go with the next slide. Building 10 roof and overhead. There was maintenance work that took

place on the -- in the roofing environment.

And we have data, which basically is swipe data and survey data, for gross alpha activity whereby we -- a lot of data whereby we can characterize the upper 95th percentile contamination levels.

And using an appropriately conservative resuspension factor, in this case 10 to the minus 4 per meter -- as you know, typically we would use either 10 to the minus 6 or 10 to the minus 5, but we kicked it up a notch here given the nature of the kind of work in terms of maintenance work that took place.

And we think that although there are small differences in the activity, the gross alpha activity, as you can see, we consider both sets of numbers, since they were derived independently, really close and we have no dispute with NIOSH regarding it, and we think this issue could be closed.

Let me move on. Welding. This was an issue raised a little bit more recently by the petitioners, and NIOSH had prepared a report regarding how they would reconstruct doses to welders. SC&A is currently reviewing that work and a report will be coming out shortly.

We apologize that we weren't -- do not have this work ready now, but [identifying information redacted].

External exposures outdoors. Okay. There were workers outside. We have lots of data characterizing contamination in surface soil from cores taken at many locations. Lots of data -- we'll get into the details -- characterizing the radioactivity.

Which means that once you know -- have a sense that you trust the characterization of the outdoor contamination in the soil where workers may have been involved and working outdoors, you can reconstruct the doses.

We used the average -- SC&A used the average activity of the data for the official soil to derive the external exposures from people working outdoors -- and we assumed they were out there for 2,000 hours per year -- and we came up with low doses.

A recurring theme for every one of these scenarios is, notwithstanding the quite conservative assumptions used, we're still getting doses that are extremely low and we would recommend closing this issue.

Next one. Below ground. We know that workers were also involved in subsurface work outdoors.

We modeled it using -- taking the core data, now, where we get information vertically on how the activity referred with depth and location outdoors, we took the upper 95th percentile value and derived a dose for people working 200 hours per year outdoors. We get 2 millirem per year. So, we're getting extremely low external doses.

Okay. Now, I'll keep going. In addition, as you can imagine, we could do internal doses, and we did, the same way.

We're going to talk a little bit about an overarching issue for external exposures and we'll do that a little later. We're going to go quickly.

Finally, SC&A looked at another -- we created another scenario which we call the water treatment scenario.

We really haven't talked much about it, but it was discussed during the meetings and we found that the -- that this is probably another way where water was collected, the solids were separated, compacted, and disposed of or shipped offsite for further treatment. We modeled it that way.

We found the doses to be extremely small and negligible and we said that's that. Really, the end of the story here. There is really no issue here.

But we did look at that because it was pointed out as a possible -- as one of the things people did during the residual period.

External exposure issues. This is an overarching issue that -- where NIOSH said that, well, let's use the last few months -- and they can probably explain it better than I can -- of the film badge data that was collected at the end of the AWE period as being a good representative of what the exposures might have been to the workers during the residual period.

Their argument is that, well, those workers likely were involved in subsurface activities, maintenance activities and also -- and, of course, also uranium-handling activities because at the end of 1967 there was still some uranium onsite.

SC&A's position was, well, we'd rather not use that approach because it may be an overestimate of the doses.

If there was actually uranium being handled at that time, we would be the first to agree that such an approach would be bounding.

But we felt that it was incumbent on us to try, at least, to actually reconstruct the external exposures from those scenarios that we just described using the data in the same way, and we did.

And when you compare the results, it turns out that NIOSH's approach results in doses that are somewhat higher -- not much higher -- than our doses, and we are perfectly comfortable with accepting NIOSH's doses as a good way to place a plausible upper bound on external exposures that any of the workers might have experienced.

And that's substantiated by the fact that we actually modeled each of these different pathways and we came out with doses that were somewhat lower both -- external, both beta and gamma. Now, we really are not that concerned.

Conceptually, I was always a little troubled by the idea that you would use data -- film badge data that was collected during the AWE period.

But NIOSH focused in on it and they made this clear, as work progressed, that they really worked on the end -- the data represented the end of the AWE period where there's reason to believe that it reflects refurbishing and maintenance activities, but also exposures to the fuel itself.

And in that regard, it gives you a somewhat higher dose than the one -- the doses we got, but -- so, we feel that there is -- this is an issue that can be closed. We're perfectly fine with accepting NIOSH's values as being bounding.

Alright. Now, we're getting to the most important issue which we call substitute data. In effect, I've already addressed this issue.

The limiting pathway, by far, is Building 10. And you heard my extended discussion of why we believe we could use that data to reconstruct those doses, and we're going to give those doses to everybody.

So, in effect, we think that accounts for the concerns about whether you can use 1990 data to apply to 1970 and 1980.

There are two other reasons, that I didn't discuss previously, that there's further evidence that that's probably a reasonable thing to do because it turns out when the NRC came in in the 1980s and did their measurements of some selected sources of contamination, they found that the results of their measurements were comparable to the results of the measurements made by M&C at the end of 1967 when they terminated activities and they had a bunch of data characterizing the environment of the site, of Building 10.

And that the numbers for the places where they did take measurements, they were comparable.

This sort of argues that really things that didn't change that much between the end of AWE operations and when the measurements were made in the 1980s.

A similar thing happened in the 1990s where a comparison was made between the 1980 data and the 1990 data, which was the data collected by contractors in support of the characterization and cleanup of the site.

So, adding all these things together, these three items, we feel that there is a level of information that says, yes, we can use the 1990 data as a substitute for exposures in the 1970s and '80s. And that goes to the heart of the SEC issues that we're dealing with here.

Thorium exposures is another overarching issue. NIOSH has prepared its report on the subject.

SC&A was hoping to have its results ready on this issue. Work is being performed by Bob Anigstein and, unfortunately -- well, I spoke to him, as I said.

He will have the report ready in time, I guess, for the plans that you're making for the next meetings so that we could get into not only thorium, but also the other work, the welding work.

That concludes my slide presentation. I hope you found it sufficient as to lay the groundwork for us to go into the individual issues.

Chair Beach: Yeah, John, that was sufficient. Thank you very much. Very well-done.

Dave, I know you have some questions. Do you want to start us off here?

Member Kotelchuck: Okay. I have questions about Slide No. 3, the subsurface -- Building 10 subsurface and pipes.

Dr. Mauro: Sure.

Member Kotelchuck: Can you hear me okay?

Dr. Mauro: Yes, I can.

Member Kotelchuck: And I spent a lot of time going through this because as I reviewed the NIOSH document for October 24th, 2018, which I will refer to because I went through it, and the issue was looking at the Mound Plant canal cleanup and using it as an upper bound on -- for the plant for the indoor work.

Now, I raised the outdoor/indoor question at the -- at our last meeting and I'm basically continuing -- I've continued to pursue that.

And I -- on page -- now, folks don't necessarily have it in front of them, but on page 9 of that report, that NIOSH report, they said there could be -- one is -- Mound is outdoors and the subsurface work in Building 10 is indoors -- there could be differences that make the Mound excavation activities more likely to generate airborne dust than the inside subsurface work at M&C; however, the Mound data provides implausible upper bound for the M&C dust loading. And that really bothered me.

It's an area of industrial hygiene -- and I've been involved in that specific area. I was at CIH for a couple of decades until I retired.

And what I -- generally when we're talking about a source, a source that's indoors tends to have a higher level of exposure than an -- for particulates than an outdoor source, because the outdoor source, it's no longer -- there's no longer any bounding. There is the atmosphere that dilutes depending on weather, depending on wind and turbulence.

And you can't -- if you're going to do a dust loading on the outside -- on outdoors, then you've got to -- you've got to consider the weather conditions.

And, therefore, to say -- so, by my measure of

thinking if we talk about dust loading outdoors, it should be less than what went on indoors in any of the buildings.

And that -- one of us is wrong or I -- and I would like to -- would like -- well, put it this way: That is my concern.

And I would like to have a discussion of why it is more likely to generate the dust loading than indoors, and that to me is important.

I can then go over, and I would be very glad to, some of the other issues that were raised that give credibility to the Mound.

So, basically I don't -- my feeling is that the Mound data is not appropriate to use for the dust loading.

And all -- if you look at Slide 3, the dust loading -- the contamination levels are fine at -- but you're using the dust loading -- you're using the Mound data for both SC&A and NIOSH dust loading.

Well, I don't see how you can use it. So, can somebody explain to me why they believe that it might -- that this is an upper bound?

Mr. Rutherford: I'll jump in just for a second.

Member Kotelchuck: Good. Please.

Mr. Rutherford: I will say that SC&A's 200 micrograms per cubic meter is not the same as the Mound data. They took theirs from a different source.

The 220 micrograms per cubic meter, I think Pat can get into the details why that was chosen, but I think a couple of things that Dr. Mauro -- that John mentioned earlier play a factor here.

If you take -- look into the fact that -- in fact, if you read his roadmap report, it talks about the high water table around --

(Simultaneous speaking)

Member Kotelchuck: Yes.

Mr. Rutherford: So, excavation that took place during that, there's a high likelihood that the material was wet. There's a high likelihood that when they removed the pipes, there was water in the pipes.

And so, I believe, in that situation, you have a lower chance of the dust loading inside the underground surfaces, but I'll let Pat add additional details on why the 220 micrograms was chosen.

Mr. McCloskey: Yeah. Sure.

In that same document you were just reading there, Dr. Kotelchuck, on page 9 --

Member Kotelchuck: Yes.

Mr. McCloskey: -- go up to the beginning of that section. And this is where we go through the IG4's authority to use --

Member Kotelchuck: Right.

Mr. McCloskey: -- to qualify surrogate data.

Member Kotelchuck: Yes.

Mr. McCloskey: But in the Facilities and Process Similarity section starting halfway through there, we say, excavation activities at Mound involved using a backhoe to remove soils. Using water as a dust suppressant was sporadic and not consistently applied. In addition, wind breaks, tents or ventilation were not used.

And then the next paragraph we say, both outside and inside subsurface work at M&C occurred from '68 to '96 as with Mound's excavation activities.

Now, here is where we felt the need to talk about one being -- the indoor work being different than

the outdoor work: Outside subsurface work involved using a backhoe to remove soils. Inside subsurface work at M&C involved shoveling and snaking soils and drain residues.

Member Kotelchuck: Right.

Mr. McCloskey: So, we highlight the heavy equipment that was used outside and its ability to generate more dust, right?

Member Kotelchuck: Right.

Mr. McCloskey: And so, we felt like in the next -- and everything else was pretty much the same, if you continue out that paragraph.

And so in the next paragraph right after that, we say: Outdoor subsurface work, as you read, is substantially similar. There could be differences that make the Mound excavation activities more likely to generate airborne dust than inside subsurface work. And it is solely based on that heavy equipment use there.

Member Kotelchuck: Right, but --

Mr. McCloskey: And there's other things we do in this paper to also do a sanity check of our data, right?

Member Kotelchuck: That's correct. Right.

Mr. McCloskey: We looked at the internal monitoring and the urinalysis that was done when actually they used heavy equipment inside or -- and we compared that to the --

Member Kotelchuck: But let me --

Mr. McCloskey: Go ahead.

Member Kotelchuck: But looking at each of those, and I have gone over them, first, wasn't the burial area basically outdoor work?

(Simultaneous speaking.)

Member Kotelchuck: Yes, that's correct. But what I'm concerned about is that -- given my concerns, I said you're using the Mound data, which is outside, you're comparing the urinalysis that you did there with the outside work in the burial area and, guess what, outside and outside agree. And that is good and that says that the Mound data is good.

And, by the way, it was a very fine study -- I mean, it was a very fine, detailed study outdoors.

So, you're comparing outdoors and outdoors and, guess what, that's good. So, it's sanity in the outdoors, but I'm worried about the indoor exposure.

Now, you've told me, and you're saying, that the indoor exposure may be bound because of the water table and the dampness there.

And that may be true, but you're applying the outdoor work to the indoor, and that outdoor work wouldn't characterize what the indoor was.

And if I may just jump to the very next page, when you were doing that third comparison -- we'll come back to the other one -- you had -- on page 11, you're looking at the maximum bad case, if you will, inside in the Building 10 subsurface and you're using data -- good data from 1995, right -- or 1994-'95 -- '95.

With the '95 data with measurements -- good quality measurements for those workers that were working in that excavation, the inside value for the uranium was 1.5 times 10^{-12} microcuries per milliliter. And the outside was a factor of 50 below it, 2.5 10^{-14} .

So, it is exactly with good data for a limited number of people, not necessarily the workers in the plant, but the people who were contracted and doing this work, the outside uranium, you know, concentration

was much, much less than the inside.

And that's the concern that I have that you're using the outside loading data from Mound to extend to inside whereas, in fact, that is a very low value compared to the value that people have inside.

And there's one measurement right there that contradicts what you were saying that the inside -- or the outside measurement might be larger than the inside.

So, that's -- let's just say that's concerning, you know.

Mr. Rutherford: Can we ask SC&A how they came up with their 200 number?

Member Kotelchuck: Sure.

Dr. Mauro: Yeah, no, we just reviewed the literature on remediation for assumptions for modeling that EPA has put out.

And they have a range of values of what the dust loading should be assumed when reconstructing doses for remediation workers. And they recommend 200 micrograms per cubic meter.

So, we accepted that and that together with the other assumptions -- now, theoretically we could have went with a higher number, but then we would have been using multiple high values.

See, sometimes I hesitate on every parameter in a calculation to always use the high value because then we get off on the tail that's so extreme and is not plausible.

For example, we use very high-end values for the concentrations. We use a very high-level value for the breathing rate. We theoretically could have gone with a higher value for the dust loading.

Even though the recommended dust loading is 200, we could have said, well, we theoretically have gone

with higher values for dust loadings that are in the literature, but then we would have actually three parameters. All of which would be what you would call high, upper-end values which were a multiplicative -- puts you in a place where you're at an extreme.

The probability of that being the case becomes extremely small sort of compounding conservativisms. So, we went with the 200, which is the recommended value.

Member Kotelchuck: Well --

Dr. Mauro: But I understand your concern and --

Member Kotelchuck: -- are you telling me that you are not using the Mound data to- go from your --

Dr. Mauro: No, we did not.

Member Kotelchuck: -- 95th percentile down to that dust loading?

Dr. Mauro: No, we did not use any Mound data. We simply went into the literature that EPA puts out regarding modeling doses associated with remediation work.

And their recommended value --

Member Kotelchuck: So, if we drop the Mound study entirely and said, look, it's fine, it's a very good study of the outdoor exposure, but that's -- we're dealing with the subsurface.

If we threw it away, you're telling me we'd get the same results, but we were not using it numerically.

Dr. Mauro: Yes. Correct. We are not using it. We are using our own independent -- and, coincidentally, they come in pretty close to each other.

And, yes, if we -- you know, if you go with the 200 -
- we're going with 200 as opposed to 220 micrograms per cubic meter based on a completely

independent dataset compiled by the EPA for remediation work, which is sort of generic.

And we could have gone with a higher value and the range of values that are reported in the literature, but we felt that the combination of multiple parameters at the upper end value would put you in a place that is implausible.

So, yeah, we did not even look at the Mound data. What we did is say, well, we -- in fact, we actually came up with our number before NIOSH did its work.

They decided to go with the Mound as a surrogate number and it just turned out to be very close to the value we used, which is completely independent.

Member Anderson: It's the EPA Exposure Factors Handbook?

Dr. Mauro: Yes. It was either -- you know, it was either that -- you know, I have to say it was either that or the data summarized in NUREG/CR-5512, which is the NRC's guidelines.

You know, I use both of those. I use the Exposure Factors Handbook and I use what's called NUREG/CR-5512, which talks about, you know, decommissioning exposures.

Member Anderson: Okay.

Dr. Mauro: And I'd have to go back and -- I could collect all that data and put it all together.

In fact, I think I've done that, you know, in other occasions and that's where we come out at.

Member Kotelchuck: Okay. I'd like to see that data because we -- okay. So, I understood.

So, the NIOSH -- right. The NIOSH used that data, which I think is flawed or inappropriate to be using for the subsurface.

And I -- what you have argued is that the exposure indoors was even lower than it would ordinarily have been because of the water table.

But that doesn't tell me that using the outdoors data, which is too low, is going to give you a result.

What you're saying is the result is even lower on the indoor -- so, it's lower on the indoor. So, using the outdoor data, which is too low, is better than -- is better than what you might have measured had you measured in there.

And I just feel that's -- it's a circular argument.

Dr. Mauro: Well, I'll look --

Member Kotelchuck: I mean, the fact that SC&A used a different set of parameters there, I'll be very glad to take a look at that.

I want to take a look at it, in fact, because it --

Ms. Gogliotti: Dave, I can send you that reference that we used.

Member Kotelchuck: Okay. I'd appreciate it. I'd appreciate it.

Right now, I'm in -- this has been a little bit difficult. I have been off of my Smart Card and off of the CDC. I have no access to it. I expired -- my Smart Card expired on February 6th.

By the time we could get things together to have it reproduced -- I have a new Smart Card sitting in Atlanta and there's no way to get it.

I'm not flying to Atlanta, nor should I, and they can't mail it.

Mr. Katz: Dave, Rose can send you -- I can send you a personal email of what Rose has referenced.

Member Kotelchuck: Yes. Fine.

Ms. Gogliotti: Yeah. These are publicly available --

Member Kotelchuck: And I'd appreciate that.

Ms. Gogliotti: -- documents.

Member Kotelchuck: And I -- absolutely. I realize that.

Mr. Katz: Thanks, Rose.

Member Kotelchuck: Thank you.

Chair Beach: Okay. And so, back on that note, the EPA documents, where was that gathered?

Dr. Mauro: Well, I have to go do some homework. I hear the question. What we can do, I guess, Step 1 is, Rose, if you can provide that document.

In addition, I have a compendium of information on indoor dust loadings. In fact, I'm doing all that work --

Member Kotelchuck: Great.

Dr. Mauro: -- I'm doing a lot of work for CDC at this time on another program related to the national -- never mind. I'm not going to get into that.

But I -- yes, I understand your concern and we will provide you with information so you can see that the 200 micrograms per cubic meter we used is, in fact, something that you considered to be reasonable based on the datasets --

Member Kotelchuck: Right.

Dr. Mauro: -- that are the basis for it. I think that's certainly a reasonable question and we'll get that to you.

Member Kotelchuck: Okay. Very good.

Dr. Mauro: Yeah. Yeah. Be glad to do that.

Member Kotelchuck: I appreciate that.

Dr. Taulbee: Dr. Kotelchuck, this is Tim Taulbee.

Member Kotelchuck: Uh-huh.

Dr. Taulbee: I have one additional comment for you to consider in this when you're comparing the indoors and outdoors comparison.

In general, I would agree with what you're saying when you consider the disproportionate factors of being indoors and outdoors for an equal volume of soil being moved.

But in this particular case for the Mound data in particular, large volumes of soil were being moved and the high-volume air sampler was positioned to try and capture the bulk of that -- of the dust cloud as the dirt was being dumped into the dump trucks and running there along the side of the road.

So, for equal volumes of dirt being moved, I would agree with you 100 percent that indoor could be higher, but we do have to consider the water table that Pat was mentioning there earlier as a factor.

But also, please consider the volume of soil that would be moved via an excavator versus somebody with a shovel trying to dig out to clear out a pipe or to get to the pipe.

Member Kotelchuck: Okay.

Chair Beach: Well, and don't forget they used backhoes, they used other mechanical digging devices inside that facility to excavate those pipes at times.

Member Kotelchuck: Yeah.

Dr. Mauro: Oh, yeah. I can help a little bit on that. This is John.

There really was a two-step process. They would bring in contractors to crack the concrete floor in Building 10.

Member Kotelchuck: Uh-huh.

Dr. Mauro: And then there was a certain amount of backhoe-type work with heavy equipment to -- because they actually went down sometimes eight feet to find the conduits that they wanted to service or to excavate the dirt away so they could build new foundations for the new equipment that was being repurposed.

And then the M&C workers, those are contractors that came in to do the big work, the heavy removal work. This is a big area --

Member Kotelchuck: Uh-huh.

Dr. Mauro: -- a big indoor area. And then the contractors, they would go in the hole with the shovel and go up close and personal to the dirt and then perhaps cut segments of pipe.

So, it's almost like fine work, you know, fine work where you're not using big equipment.

Now, you're down to a shovel and cutters that would remove pipeline and replace a segment of pipe.

So, it was -- it's really those people, the latter, that are the ones that we're concerned with because those were the M&C people that were doing the fine work in the --

Member Kotelchuck: Yes.

Dr. Mauro: -- subsurface environment. And it's the dust loading that they experienced, and the external exposures that they experienced, that is really at play.

And the reasonable question that you raise is, is it reasonable to assume that those people doing that kind of fine work -- I call it "fine work" because they're down to the shovel level --

Member Kotelchuck: Okay.

Dr. Mauro: -- using the 200 micrograms per cubic

meter, is that a reasonable assumption coupled with that they're assuming that the activity as being resuspended is always the upper 95th percentile level no matter -- you know, once they're in that hole.

Member Kotelchuck: Uh-huh.

Dr. Mauro: But I think it's a good idea -- let's get the data on indoor dust loadings in your hands --

Member Kotelchuck: Okay.

Dr. Mauro: -- so you could determine that.

Member Kotelchuck: Good. Good. Good. Alright. I very much appreciate it.

Chair Beach: I still -- this is Josie. I still do not agree with using the data from the '80s and '90s, particularly the '90s.

The work that they were doing was to characterize in order to dig up and remove contamination, not to assess dose to workers. So, I'm not in agreement there.

Henry or Loretta, any questions on the first issue?

Member Anderson: I don't have any. I think it's been covered.

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

Chair Beach: Okay. So, SC&A's recommendation is to close.

Is anybody ready to entertain that? I'm assuming, Dave, you might not be --

Member Kotelchuck: I'm not.

Chair Beach: You're looking for some more --

Member Kotelchuck: I'm not -- yeah, I want more and I'll look at that information. We have a meeting later this year and, you know, I'll have a chance to

have looked at it and assess and reassess.

Member Anderson: Just so we have a way forward here, I think you can get those documents pretty quickly.

Member Kotelchuck: Yeah.

Chair Beach: Okay. So, Issue 1 is going to remain open, correct?

Member Kotelchuck: Yeah.

Chair Beach: Is there any other documents anybody needs to look at or -- I'm at a bit of a disadvantage. I'm going to be using the roadmap. I lost my computer.

My computer keeps heating up and shutting down. So, there's -- I think I need a new one. But with everything closed down, they can't get a new one to me.

So, let's move on to the next --

Mr. Katz: Before we move on -- this is Ted.

Chair Beach: Okay.

Mr. Katz: So, given that Issue 1 is as big an issue as it is and it's remaining in progress and you may want an opportunity again before the August Board meeting to address it, and you still have Bob Anigstein's report on thorium even though that -- they're recommending that the Site Profile -- the Work Group has the chance to tackle that matter, whether you get to it today.

So, I'm just going to suggest -- well, you probably will want to schedule another Work Group meeting at some point for sort of late July or early August time frame --

Chair Beach: Correct.

Mr. Katz: -- to be able to read this, at least, and

that gives plenty of time. It doesn't have to be quite that long if Bob Anigstein gets up on his feet sooner and so on, but that would be -- you have as much as that time to come back together again before the August Board meeting.

I just wanted to mention that now so that --

Chair Beach: Yeah. I don't think -- I'd rather go sooner than later.

Mr. Katz: Yeah. Sure. It's better to do it while things are fresh. Sure.

Chair Beach: Yeah.

Member Anderson: Especially on Issue 1 here, Dave, if after you've looked at the documents, you're comfortable, then I think that's about all we have to do on this issue.

Now, the second one, we don't have the draft report yet. So --

Mr. Katz: Right. Let's see what we're left with once we get to the end of all this.

Member Anderson: Yeah.

Chair Beach: Okay. And, Andy, sorry if I'm -- what's the second one you said? We don't have the draft report.

That's the thorium, correct?

Member Anderson: Yeah.

Chair Beach: Okay. Gotcha.

Dr. Mauro: And it includes welding also. Welding and thorium.

Chair Beach: Right. Okay.

So, then the second finding -- I don't have my slides. So, someone is going to have to help me out here. I apologize. My laptop's gone.

Dr. Mauro: This is John. Yeah, the -- if you don't have your slides in front of you, we're looking at a slide that deals with HVAC maintenance.

This is the one where workers go in and replace filters periodically and do maintenance work inside HVAC ductwork and, therefore, have the potential to -- again, this is a scenario we built from our discussions.

I think we believe that there were people that did this kind of work and they theoretically could have been exposed to quite high dust levels that are associated when you're pulling filters and maintaining an HVAC system.

And so there's a slide here that describes what we did and the assumptions we made. And we actually -- SC&A did the work, and then NIOSH reviewed it and they accepted our results.

And the end result is we show a listing here of the main parameters and what the dose rate is per hour while people were doing that kind of activity.

Member Anderson: Is that Slide 11?

Dr. Mauro: Does it have a number on it?

Member Kotelchuck: Slide 5.

Dr. Mauro: Slide 5. Slide 5.

Chair Beach: Alright.

Okay. Any comments on the dust loading?

(Pause.)

Chair Beach: The HVAC systems?

(Pause.)

Chair Beach: Part of my issue with it is I'm not in agreement with the time frame; however, I know that's a Site Profile issue. I do not agree with that part of it.

I also -- see, we haven't really addressed the explosions or the fires that took place in Building 10.

That would have added to a lot of that dust loading. So, I have some issues with your numbers.

Dr. Mauro: Yeah. Let me -- I understand what you're saying. Just let me give you a perspective.

When we derived the dust loading, we used the swipe sampling data that was collected at the end of the AWE operation period. This was on surfaces, okay.

And we know that we have numbers to try to see what the airborne dust loading might be from resuspension, and that is the dust loading that would make its way into an HVAC system and onto filters.

Now, we also know that during the residual period, periodically the filters replaced and there was maintenance work.

Now, the question that you're raising is certainly a legitimate one. And that is, well, that only accounts for the residual radioactivity that was on the surfaces at the end of the AWE period. And we're assuming it's at that level all the time during the residual period. And we gave you the resuspension factor and derived what might be inside on the filters.

Now, you're raising the question, well, there could have been fires, okay. Good concern and we thought about that. During the residual period, we know, in fact, there were some incidents.

Now, the question becomes, now, what that does -- this is an interesting way to think about it. What that does is the fires create a lot more dust, okay, which dilutes down the uranium that might be on the filters, okay.

So, it's almost as if the more dust loading milligrams you put on the filters, the lower the specific activity.

So, in a funny way, you know, the fires may have -- and associated, let's say, incremental dust loading that would occur and then they would, of course, pull the filters, what that would do is that would create a circumstance where the specific activity in picocuries per gram of soot or dust on the filters would go down.

And, thereby --- stay with me -- thereby, when you assume -- now, I have picocuries per gram of dust on the filters and in the ductwork.

The lower the milligrams are, you know, inside, the more you reduce the specific activity in picocuries per gram. So, it's a funny thing.

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

Dr. Mauro: Yeah.

Chair Beach: Hey, Ted, would you send me those slides to my home computer? Then I can at least get on this computer.

Mr. Katz: Yeah. Of course I will.

Chair Beach: Thank you.

Ms. Gogliotti: They posted on the website also.

Chair Beach: Yeah. I just thought it would be quicker for me to access them. Thanks.

Mr. Katz: Yeah, I'll do that.

Chair Beach: Alright. Go ahead, John.

Dr. Mauro: Well, I -- in a way, one of the things that troubled me is the strategy that we used is say, okay, we know what might be airborne in -- by using a resuspension factor, take what's on the surface, apply a resuspension factor and you get an

airborne concentration of uranium in, let's say, picocuries per cubic meter. And that, of course -- now, you've got picocuries per cubic meter.

Then you also say, well, we have a dust loading and now I'm assuming the dust loading in the room, I believe, was 200 or 100. I think that the average dust loading in the room was -- I should have the value written down here, but in the room now, okay.

So, if you know the dust loading in the room, in the air, not in the ductwork yet, and then you know what the picocuries per cubic meter is, you know what the milligrams or micrograms per cubic meter is, what you now assume is that that -- you know the specific activity, picocuries per gram of dust or soot, and that's what we're assuming is the specific activity that's on the filters.

Now, the guy with the filters, the guy goes inside and pulls the filters, generates an enormous amount of dust. We assume the highest dust loading that one considers to be breathable for any period of time, and there's literature on that, is 100 milligrams -- okay, not 200 micrograms, but 100 milligrams per cubic meter. And that's what he's exposed to for some period of time. I don't have the number of hours per year, but -- and so what happens is -- now, this is interesting.

When I use whatever value, the 200 micrograms per cubic meter, to get the specific activity, the lower the dust loading in terms of airborne concentration normally present in the room, the higher the specific activity.

So, theoretically, one could argue if I was -- I have the hat on of the petitioners. I would say, well, John, you know, if you used a much lower chronic airborne dust loading than 200 or 100 micrograms per cubic meter -- for example, in your room right now I could tell you it's probably about 2 micrograms per cubic meter.

What would happen then is a specific activity would go up proportionately, the number of picocuries per gram on the dust would go up, and that would make it much worse when the guy changes the filter.

So, in a funny sort of way, the concern you have regarding fires would actually dilute down specific activity.

So, you know, we had to find a balance of where we think things are reasonable and plausible, but still an upper bound.

And so, I think the fire issue, in a way, argues that the exposures from handling the filters would go down the way in which we did the analysis.

I don't know if you fully followed that, but you could see it's almost like not intuitive when you think of it the way we did it.

Did you folks follow that? I don't know if everybody understood that.

Mr. Katz: Yeah.

Dr. Mauro: You had to get the specific activity on the dust and picocuries per gram in the dust, and that's how -- and we had to come up with a way to do that.

Because once you agree that, yep, we know what the specific activities are to dust, now that dust now is sitting on a filter or sitting in a ductwork.

And if you accept that specific activity and then you say, but the people handling that, that dust comes off, it becomes airborne, and it becomes at a level in terms of milligrams per cubic meter that's at the highest level that you could have in people, without respiratory protection, that people could work with for any period of time because the air is very basically unbreathable. We used that work and there's literature on that.

So, that places an upper bound on the level of dust

-- radioactivity that a maintenance worker might be inhaling. That's what we believe.

And I believe NIOSH looked at that work and they feel that that was a reasonable approach to take. It's a bit of a brainteaser.

Member Valerio: John, this is Loretta.

Chair Beach: Yes. Go ahead, Loretta.

Member Valerio: Can you hear me okay?

Chair Beach: Yes.

Member Valerio: John, can you explain to me, on average, how often these HVAC filters were changed out?

Dr. Mauro: Yeah. Well, we spoke to -- that was an important question.

When we spoke to the workers, what we did was -- they explained that well. I think the standard protocol was four times a year. And, Mike, if you're on the line, you may be able to help me.

When we had our discussions, however you said in practice, they really weren't that attentive to the change-outs and that very often it might have been only once per year.

And now, the duration -- of course, that would be the frequency that this is done. It's an important question.

So, what is the frequency that they change out the filters and maintain the HVAC system?

And, in addition, each time they do that, how many hours do they spend doing that and is it always the same person?

I mean, these are the questions that -- you know, all of that is laid out. We assumed it's always the same person that is doing the change-out and that's

the exposure he's experienced.

No, I didn't write down here the number of hours each one of these were. For some reason, the number "4 hours per change-out" was what we -- every time they did the filter change-out is what we used, but I'd have to go back and check my words and where it's written out.

Chair Beach: John, there was like 1300 different filters. Some of them were large enough for men to enter into and clean.

Dr. Mauro: Yeah. Yeah.

Chair Beach: There was also some fan work associated with those. It wasn't just filter change-out --

Dr. Mauro: Yeah.

Chair Beach: -- when you're talking HVA systems. There was cleaning of the fan motors and then --

Dr. Mauro: Yeah.

Chair Beach: -- whatever maintenance needs to be done there, too.

Dr. Mauro: Yeah. What you're doing is raising a reasonable question, and I'll say that, regarding how many hours per year might a person be involved in this kind of activity where he was exposed to 100 milligrams per cubic meter of that dust.

Now, I -- certainly I cannot speak to -- I have to go back and look at what we used. But if someone feels that -- because remember, we are just doing the best we can to characterize the activities that took place based on our interviews.

If we have feedback that says there's a different number of hours per year or hours per, let's say, an event, you know, and the number -- what I call "event," when a person was involved in some type

of HVAC maintenance -- I'd be the first to say, we need to fix that.

But I think that the picocuries per milligram number, that is what is the concentration of the uranium on the dust, and the assumption that it's -- whenever you're involved in these activities, that you're at 100 milligrams per cubic meter, I think that that's a reasonable approach.

I would be the first to agree that if there's better information on the duration, number of hours per year -- but keep in mind that whatever those hours per year are that we are assuming to get this dose, we can certainly adjust that if there's reason to believe that it's too low.

But, remember, we're assuming it's always the same person year after year that's doing that and event after event.

Chair Beach: Uh-huh.

Dr. Mauro: Now, that might be the case. There may be one guy that he -- that did that work or a team that always did that kind of work.

And certainly Mike can speak to that and -- but that's what we assumed that it was always the same persons -- person or persons that did that work year after year each time it was done.

But if you feel that the number of hours per year that this kind of activity took place was too low -- and we'd be glad to provide you -- I don't have it in front of me.

I don't know, Rose, if you have your hands on that number or not, but if you feel that a higher number -- we would say we're looking to you workers. Let us know what you believe to be a reasonable exposure duration.

But remember, we're assuming the same person or persons are always doing it, you know. So, that's an

important consideration when making that judgment. I hope that helps.

Member Kotelchuck: Well, it is, but I'm still -- I'm still not so clear on the fire document, but I would like to look at it.

And I'm actually glad we have another meeting so that this discussion, by your focusing with the slides, actually is very helpful to bring together the issues from the many different reports -- many different reports, but I'd still like to look a little bit more at the fire issue.

Chair Beach: Dave.

Member Kotelchuck: Yeah.

Chair Beach: Dave, I don't think the fire issue came up in any of the reports. It's in the interview notes.

Several of the interviewees mentioned fires.

Member Kotelchuck: They certainly did. Right. Right.

Chair Beach: Okay.

Member Kotelchuck: But it suggests -- I think John is -- I thought that you were -- that that was taken -- if you will, thought about and taken into account.

Dr. Mauro: I did. As I indicated -- I know I should have written it up that way, but I did and I said, gee, if anything, the fires are going to dilute down -
-

Member Kotelchuck: Uh-huh.

Dr. Mauro: -- and you're going to get lower picocuries per milligram because the idea being -- now, I'm ready to listen to -- is it possible that during the fires, the actual dust that was generated had a higher specific activity? I would argue intuitively no.

Member Kotelchuck: Uh-huh.

Dr. Mauro: If anything, you generate a lot more dust and -- which is going to dilute down.

Member Kotelchuck: Right. Right. And not radioactive, yeah.

Dr. Mauro: You got it. You got it.

Member Kotelchuck: Yeah.

Chair Beach: And I believe there was an explosion at one point, too. And that goes not just for the HVAC, but for the facility and the dust loading.

So, I think the missing link here is individual work that was done for 30-plus years -- or 29-plus years.

Alright. So, any other comments or questions? We're kind of taking these piece by piece.

So, the HVAC maintenance, is anybody in the Work Group ready to close that as has been recommended?

Member Kotelchuck: Not really.

Chair Beach: No?

Member Kotelchuck: I'm just one person. I don't feel confident, but there is -- there are, frankly, such overarching issues here about --

Chair Beach: Yes.

Member Kotelchuck: -- reading all of the interviews that -- those are very much, you know, what work was done, how could we characterize individual -- when was the data collected.

Those are not addressed here and I understand those are not -- that's not what this -- these discuss other issues and very important ones. Anyway, I don't feel ready to --

Dr. Mauro: Dr. Kotelchuck.

Member Kotelchuck: Yes.

Dr. Mauro: I'm sorry to interrupt, but I sort of understand your concern. I think that one of the issues, and I'd really be interested in hearing this, is the duration.

In other words, we made some assumptions regarding the duration of exposures as best we could judge.

Member Kotelchuck: Yes.

Dr. Mauro: I think we should hear more from the petitioners, you know, because really the petitioners are really part of this operation here.

Member Kotelchuck: Yes.

Dr. Mauro: We're trying to use their information correctly. And if we underestimated that duration of handling HVAC activities as too low, well, it's very important that we hear more about that.

Chair Beach: John?

Dr. Mauro: Yeah.

Chair Beach: Let me interrupt just for a second because I think that gets into the Site Profile realm, if I'm not mistaken.

And while I do want to hear from the petitioners, we're still wrestling with the SEC issue and I don't think we've even come close to deciding, as a Work Group, where we are with that.

So, am I incorrect here?

Dr. Mauro: No, I think you're correct.

Member Kotelchuck: Right. Yes.

Chair Beach: And I think we can get to the duration

--

Dr. Mauro: Do the other issues first.

Chair Beach: Yeah. I think we can get to the duration question, and a very important question, a little bit later if you don't mind holding off on that.

Member Kotelchuck: Josie, we need to go through those interviews because the other -- I mean, the explosion is one thing, but the fires, what was the extent of those fires? Did they lead to --

Chair Beach: Well, those interviews, in my opinion, I know SC&A and NIOSH have used parts and pieces of them, but there's a lot of information in those interviews that go -- take us back to Issue 1 that we've already discussed.

Dr. Mauro: Josie, let me help out a little bit. I'm trying to, you know, look at this as if I'm looking at it from the outside and I was criticizing my own work, and I can do that.

The question is we -- I invented a strategy, a specific activity approach which was never done before where I tried to come up with what might be a concentration on the dust that's on the filters and in the ductwork and in the fans and everywhere, and I used an approach that I sort of developed.

I'd very much like to hear feedback from the Board on whether that strategy, that fundamental approach to coming at a problem like this -- because I think it's important.

If this turns out to be something that the Board and NIOSH feels is reasonable for coming at a problem like this, I think it will add some value to the program because it could have applicability -- we find ourselves confronted with this problem on this project, but I could see it having applicability broadly.

Mainly the fundamental approach that I used, you know -- anyway, that could theoretically be an SEC issue that is do you think that that's a scientifically reasonable way to come at a problem like this.

So, I would say, you know, yeah. And now the more I think about it, the more I think it is an SEC issue.

I originally -- see, I believe that this is a good way to come at the problem, but I'd be very receptive to any thoughts others had on whether that strategy works or not. So, I mean, I'm trying to be helpful.

Chair Beach: Thank you. I don't know if anybody is ready to -- or looked back far enough at how you came to these numbers, John.

I think you used a model that was a preexisting model, correct, and then it brought it into this scenario? Is that --

Dr. Mauro: Yeah. I basically took a basic, fundamental model that was accepted under OTIB-70.

And then I expanded it by marrying it to the dust loading and the OTIB-70 model -- it's something we have never done before -- to get the specific activity.

We've never done that where we get the specific activity of the dust and then use that as the basis for an inhalation dose calculation.

That approach, over the years I've been on the program, I don't think we ever used and I'd like to hear some feedback.

And I think it's important that there's a degree of comfort that, yeah, that approach can be used and works here or there are flaws in it.

Mr. Katz: Well, John, this is all going to end up in front of the whole Board in August.

Dr. Mauro: Yeah.

Mr. Katz: So, you're welcome -- and I'm sure you'll be helping Josie with the presentation to the whole Board.

So, you can really make a point of that issue as a crosscutting issue not just for the SEC, but for the program, in general, as a method, but you can do that then.

Dr. Mauro: Sure. Okay.

Mr. Katz: I mean, you have just three Board -- four Board Members here.

Dr. Mauro: Right.

Chair Beach: Thank you.

We have a unique issue here, I feel, with M&C because we have a NIOSH method and an SC&A method in several instances.

And so, that confuses and makes the issue even harder to think out in -- I know in my mind. I don't know about the other Board Members here.

Member Kotelchuck: Well, Josie, I'm going to --

Mr. Katz: Dave, before you jump in, I was just going to say, Josie, I mean, this is another reason why I think, again, in August, you know, it would be to your advantage to get -- that you get feedback from the rest of the Board on that.

Chair Beach: Yes. I agree.

Member Kotelchuck: Yeah. I mean, this whole -- there's a broader perspective that I bring to this that hangs over all of this detailed discussion and a situation that seems to be unique.

I mean, I try to go over -- we have a situation in which we have no data on the workers or the petitioners.

We have -- on the petitioners themselves, we have no work plan. We don't have good records about what the people did.

Now, I have in the past on the Board, I have

approved determining that we can make -- we can reasonably assess exposure to people for whom we had essentially no data, no personal data, but those were cases where people were working on a -- more or less a manufacturing situation in which a person did repetitive work in some case.

Here is a case where I feel the people are coming in and doing all sorts of work. And I was particularly struck by the person who said, you know, if you're an electrician and you don't have a lot of work and the plumbers are busy, you become a plumber.

Mr. Katz: Right.

Member Kotelchuck: People are doing troubleshooting of all kinds. And troubleshooters, of course, you know, they could go home and -- according to this, they could go home at night and not know what they were going to work on in the morning.

So, it's not a -- it's not like one job that they do repetitively again and again. They're troubleshooters. So, to me it's an unusual situation.

We don't -- I don't recall ever having taken in maintenance workers as a special group, but it does appear to me that that may be the case here.

And I -- so, this discussion doesn't allow me to -- or put it this way: Our group has to decide whether the lack of information that we have about individual cases and, you know, what I hear from the -- trying to make an assessment is, well, everybody does all the same. We'll put in -- we'll put in everybody does work on the roof, everybody welds, everybody -- and that's most clearly not the case, but we don't know what the case is.

We don't know what the work is that individuals do and yet we're saying, oh, we can make individual assessments.

And so, I am just troubled and I'm looking at this as

a distinctive case. I don't know about unique. I haven't been on the Board forever, but it's such a distinctive case and I don't feel that I can reasonably say worker -- maintenance worker X did this. We don't know.

Chair Beach: I just -- go ahead.

Mr. Katz: I was just going to say, Dave, just one thing, one element in what you're saying that I do want to speak to because it is something that's very common in this program, is applying a worst-case scenario to a broad group of people not knowing who it actually applies to.

Member Kotelchuck: Uh-huh.

Mr. Katz: And that gets done all the time. So, in effect, I mean, what this is doing is very similar to what's done all over this program, which is you take sort of the worst scenario, you don't know who it applies to within a very large group, so you give it to everybody.

And this has been done umpteen times in this program. It's just that there are multiple scenarios that are being applied here, but they're all being applied on that same principle.

Member Kotelchuck: Well, I agree with you on that that we -- that we have done that. But the places where we have done it in AWE facilities particularly, I've always had the feeling that people do a particular job. There is a particular groundedness to where people are.

The folks we're dealing with here do everything and we can't pick out what's -- who's working on the subsurface and who's -- so, it does seem, to me, different because these are troubleshooting people doing everything rather than the usual AWE where people are working, more or less, in a constant exposure situation.

And we do our best and we do assign -- we do

assign, you know, everybody --

Mr. Katz: Dave, I would just say in many of the AWEs there are many different jobs and yet we're applying the single exposures across the Board.

At many of the AWEs, that's actually a very similar case.

Member Kotelchuck: Yeah.

Mr. Katz: I don't want to prolong that, but certainly --

Member Kotelchuck: Uh-huh.

Mr. Katz: -- the staff could give you umpteen examples of this whether it's many different roles under the roof, but similar --

Member Kotelchuck: Yes.

Mr. Katz: -- exposures could apply to everybody. It happened at ESI. It happened at many places.

Member Kotelchuck: Yeah.

Mr. Katz: So, that element of this is not that unusual.

Member Kotelchuck: I agree. Okay.

Mr. Katz: Okay.

Member Kotelchuck: Yeah.

Mr. Katz: Go ahead. I really -- I'm just trying to --

Member Kotelchuck: No. No. We're trying to establish the upper bound and then that is applied to everyone.

Dr. Mauro: This is John. I might be able to help out a little bit here.

Think about all the workers working, let's say, 2,000 hours per year. And we say, okay, well, we know

that there were some workers that spent two months per year in the hole under Building 10 and they're going to get a dose for that 2-month period, right?

Member Kotelchuck: Uh-huh.

Dr. Mauro: Good. So, if that's all they did, that is, those workers were the guys that were in the hole, they would get their two months' worth of exposure and then we'd add on what I call the baseline exposure, which is the conventional OTIB-70 resuspension from surfaces approach --

Member Kotelchuck: Right.

Dr. Mauro: -- and you add the two together.

But then you say, well, wait a minute. Wait a minute. There might -- the same guys going underground in Building 10, they may have also been the crew that went underground, let's say, for one month a year -- and I don't have the numbers in front of me, but it might have been -- so now we've got three months.

So, you know what we're going to do? We're going to give them the two months for Building 10, we're going to give them one month in the subsurface environment outdoors.

So, now we got -- we've covered them for three months. The same people. And this is everybody. Now, when I say "the same people," now this means everybody.

Then we say, wait a minute. Wait a minute. We also know that maybe a certain number of hours per year they were doing HVAC maintenance. I'll make a number up. One. One month.

So, now we got two months on subsurface Building 10. We got two months, one month, whatever, subsurface outdoors. We got one month working in the HVAC.

So, now, all of a sudden we got two, three, four, five months -- five months people are getting these different doses, okay.

And then we add in -- that means we've got -- the rest of the year they're exposed to the baseline, which is always there, and you add them all up.

And that would be the maximum dose that you could assign to anybody and we're going to give that to everybody.

I mean, that's -- see, I thought a lot about this. I say, how do you deal with this? So, you're filling up the year with months.

And so, what you do is, let's pile on all the months from all the scenarios so that we maximize it as if every single worker did all that until you fill up your 2,000 hours per year. And then you give that dose, and you give that dose to everybody.

You see how I'm thinking about this, how you combine all this?

Member Kotelchuck: Yes.

Dr. Mauro: Yes.

Chair Beach: John, you mentioned a baseline dose. What are you meaning there?

Dr. Mauro: Oh, the original analysis that was in the first SEC Evaluation Report simply said that, well, we have this surface contamination all over the building in Building 10 everywhere, you know, becquerels per square meter on the floor.

And we know what that is because of the extensive swipes and surveys performed at the end of the AWE period.

So, at the beginning of the residual period, our starting point is we've got all this contamination, could be gross alpha -- let's say it's gross alpha for a minute, okay? We have the numbers. You're

saying, well, that's always there.

So, people who are working in Building 10 are always going to be exposed to that, okay, which is resuspension factor and inhalation.

Now, to go to the thorium/uranium issue, the plan would be, well, we could assume that they're only measuring gross alpha, but you could assume that it's all thorium, you could assume that it's all uranium, whatever gives you the worst dose.

But the point being you've got a baseline that even if people were not doing any maintenance work of any kind, they didn't do that, that would be the dose they get from the direct exposure, resuspension and inhalation from surface contamination. And so, that's what I mean by a baseline.

But then you say, well, wait a minute. There were incremental time periods where these very same people may have been involved in specialized, relatively short-term incremental repurposing and maintenance activities.

And now, you'll take a two-month period and say, well, for two months the person is in the subsurface environment where he's getting much higher exposures than the baseline, okay.

So, we're going to say, okay, well, for that person we would not give him 12 months' worth of baseline exposure. We'll give him 10 months of baseline exposure and 2 months of subsurface work in Building 10.

So, you're always -- what you're doing is you're taking out -- you're relocating the guy, okay.

He's not just walking around anymore. Now, he's in the hole for two months. So, that means ten months he's walking around.

But then you could keep going with that and say,

but wait a minute. In addition to that two months, he may also spend another two months outside under -- in a hole and he gets that dose.

So, what you do is you're chipping away at the baseline and adding in for those time periods, the time periods he's involved in these other activities where he gets unique, specialized exposures which are clearly higher than the exposures you get from the baseline on a per-hour basis. You see it?

Mr. Katz: Yes.

Dr. Mauro: Conceptually, that's how we're looking at it.

Chair Beach: Okay. So, we have some other slides to go through, other issues.

Anything else on the HVAC?

Roof and overhead, I know we're waiting on the welding/thorium issue. Any other comments on the -- I know these are all separated out, but they're all in one building. So, they're all intermixed, of course.

Roof and overhead, Andy, Loretta, Dave, anything?

Mr. Elliott: Excuse me, Josie. I apologize for interrupting. This is Mike Elliott, petitioner.

Chair Beach: Go ahead.

Mr. Elliott: Mr. Katz, I apologize for interrupting, but I do have to run and start -- I'm actually leading my conference call at 1:30. So, I have to get that fired up on GoToWebinar. So, I'm going to have to leave the call.

May I make just a few very brief remarks?

Mr. Katz: Of course. Of course.

Chair Beach: Yes. Go ahead.

Mr. Elliott: Thank you.

Mr. Katz: Sure.

Mr. Elliott: Yeah. So, I would like to just, you know, throw my 100 percent support behind the questions that the Board Members are asking. I think they're all very legitimate questions.

You know, particularly I think when Josie talks about applying data from the '90s that was intended to help us discern the limits of excavation for a remediation project and then trying to apply that to dose reconstruction, I think that's questionable.

I think Dr. Kotelchuck has also done a great job on numerous occasions, you know, describing these workers more like emergency response workers or troubleshooters that were not encountering any kind of, you know, scenarios that were -- could be described as routine or, you know, every scenario was different.

So, notwithstanding the -- you know, the tremendous efforts that SC&A and NIOSH have gone through to try to come up with all these different exposure scenarios and models, I still contend, as I stated, you know, on January 9th in my oral testimony, that any numerical estimate -- I reject any numerical estimate as valid.

In my opinion, the only honest statement we 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 implausible circumstances by any member of the Class.

So, you know, I'm just going to plead and beseech the Board Members to continue down that line of questioning.

And I'll just mention that there is apparently at least one other colleague who's listening in on the call. He's been texting me the whole time.

He's concerned that -- this is a gentleman by the

name of Darrell Hanlon. He's concerned that, you know, some of the issues he raised in his oral testimony of June 2018 have never been addressed.

And he was promised, at that time, that somebody would get back to him and, you know, further explore the exposures that he feels he was exposed to that he feels are not being addressed by any of our models. So, I'll just put that out there.

Chair Beach: Will you repeat his name?

Mr. Elliott: Yeah. It's Darrell Hanlon. If you like, I can send to Ted Katz and to [identifying information redacted] his contact information. And I'm happy to send it to you as well.

Chair Beach: Thank you.

Mr. Katz: That would be great. That would be great. And I suspect actually that SC&A may have it if they've interviewed him, but go ahead and send it and I'll --

Mr. Elliott: Okay. Alright. Well, thank you very much for your time.

Chair Beach: Yeah. Thanks for hanging in there with Mr. Elliott: Sure.

Mr. Katz: Thank you.

Mr. Elliott: Bye-bye.

Mr. Katz: Bye.

Chair Beach: Okay. So, we are back looking at the slides. Slide 6, the roof and overhead. Comments from the Work Group Members?

(Pause.)

Chair Beach: Nothing new to ask or add. And then the welding work?

(Pause.)

Chair Beach: How about the outdoor and above ground external exposures?

(Pause.)

Chair Beach: I feel like going back to the interview notes again. Workers were in these areas, the above ground -- or I guess I should say the underground is what I was going to comment on, but we're not to that yet.

Anything on the above ground?

(Pause.)

Chair Beach: I feel like the workers dug through these underground burial grounds putting in buildings.

There's many testimonies -- and I know we only have 12 interviews, so -- and there's a lot of material in those 12 that states they went in, they dug up lines.

If they needed to dig up a line, it didn't matter where it was. They went through burial grounds or around them.

So, I guess I don't -- I take issue with some of this, these numbers in the models in those cases.

Dr. Mauro: Could I -- I'm sorry to interrupt you, Josie, but I want to help out sharpening the question.

Really -- and this is what we do. We have data showing coring from outdoor data, let's say, a subsurface, right?

Chair Beach: Coring in individual locations?

Dr. Mauro: Right. In other words, people go in individual -- there's coring data and we --

Chair Beach: Right.

Dr. Mauro: -- look at as much of the data and we

have it all laid out, how much we have, where it was taken.

And what we said is, hm, a person doing subsurface work -- it's sort of like what we did in indoors and said a person doing subsurface work would go out there for some time period at some frequency for some number of hours and where are we going to say he is?

We said, well, we probably want to take the average. That is, he could have been gone many times in -- and he didn't always go into the location where the highest bore hole or coring information is, but we're going to assume that.

That is, every time the guy went down into the hole, he always went down -- the same guy always went down into the hole that was at the upper 95th percentile of all the boring data.

Now, I say to myself, well, you know, you really can't do worse than that except if you don't accept the boring data as being representative of what the conditions were during the residual period because, remember, the boring data was collected much later.

This all goes back to that assumption, but I think the given -- if you were to accept that, you could use that substantive data.

The approach we use would say, listen, yeah, the guy's going in the hole outdoors now. And he's always going in -- the same guy is always going in the same hole and it's the 95th percentile highest hole of all the data that we have regarding holes.

Now, a reasonable question is, do you have enough data taken in enough different locations where you've captured the upper end? That's a reasonable question to ask.

I'm trying to really sharpen the issue.

Chair Beach: Uh-huh.

Dr. Mauro: And then, you know, did you assume when he went in the hole -- okay, let's say you accept that. Yep, that seems to be reasonable.

Then you say, well, listen, we're assuming he did that these many times per year. And each time he did it, he had this dust loading, you know, and he had this breathing rank. See, this is all that goes into this.

Now, to me, the -- if I was sitting in your shoes, I would say, listen, I want to really be sure that we got this right.

Did the SC&A and NIOSH, did they find the -- or are they using an assumed worst-case bore hole that -- you know, and the question is, well, maybe not because of course we didn't sample -- no one sampled the whole place, but we have a lot of samples, cores, and we use the upper 95th percentile.

Is it possible that we might have missed another one that might have been higher? Sure.

But is it possible that if we did find that -- and what we did do is assume that that high-end number is always the same person going into that hole all the time whenever he goes into a hole.

That sort of makes you more comfortable that, yeah, probably that's your -- you really can't get much worse than that, you know, that he's always going in that hole and it's always the same person.

The reality is he's always going into a different hole and it's usually -- not usually, it may often be another person. I'm talking year after year after year over a 20-year period.

Member Kotelchuck: Uh-huh.

Dr. Mauro: So, you got to put all this combination of assumptions together and you go after every single

one of them, if you want, and that would be reasonable.

But you think about the combination of assumptions and now it becomes a judgment call, and that's -- to me, if I was on the Board, that's a judgement I'd be -- I hate to do that, but I feel as if I've been around so long and I understand this problem.

And, believe me, when I look at these things and I think about what we're doing, I think about it as if I was on the Board and I have to convince myself that what I'm doing is the right way to do this and it's fair to the workers.

And I think that when you take -- as you have to take all those assumptions together, the real big one is always at the 95th percentile, and the same worker all the time is doing that work at the 95th percentile location and, boy, that gives me comfort.

If I was a worker, I would say to myself, yeah, I think I'm being treated fairly. Believe me, I actually think that way.

If I was the -- when I say, geez, I think you guys gave us the high-end doses -- and we always go back to Josie's concern and the petitioner's concern. Can you use the 1990 data as a substitute for the 1970s and '80s?

And we -- and that's where I think everything comes down to and, you know, we give you our reasons why we think that it's a bounding approach because of the strategy used.

But therein lies the heart of the issues here, you know, whether it's talking about Building 10 where the -- oh, by the way, another thing that I would think about and I would ask the actual -- the petitioners, did we miss the boat? We're right back to the core.

When we listen to them, what we came away with is that subsurface work in Building 10, that's it.

That's where the -- I mean, that's where if you're going to say where were the highest doses, it's that, you know.

I'd be the first to admit there may be -- and so, we looked at all these other things and we found that to be way above the worst job you could have to get the highest dose and of course we're giving that to everybody.

Now, I'd be the first to say there may be other jobs that we missed, when we talked to those 12 workers, that may have been worse than that.

It's possible, but, you know -- and that would be a real good question to ask, you know, this interaction with the -- we've never had such incredible interaction with the claimants to understand the problem.

And we did everything we can to try to understand it and then model it, but there may -- now, if there's information out there that says there may have been some other jobs where they might have been exposed for more prolonged period of times up close and personal than the Building 10 subsurface, we want to know about that.

Anyway, I wanted to have that on the record.

Member Kotelchuck: Okay. Yeah.

Chair Beach: Okay. So, where are we?

Any other Work Group discussions on any topics? Outdoor?

Mr. Katz: Well, let me just ask you, Josie, while you're on the outdoor issues, I mean, what more do you want?

Do you either need more work on it or someone needs to think about some issues related to it or do you want to resolve it if there is no more to do and you guys feel like you've had time to think about it?

Chair Beach: I think that you all need to go over to the substitute data issue because I think John is correct.

I think that is the key to all -- Building 10, 4, 5, all the different -- and I know Building 10 is the biggest, but the burial grounds had a significant amount of exposure possibility. So, I think you really need to go to substitute data.

Mr. Katz: Uh-huh.

Chair Beach: You know, I hate to push. Are people ready to say, yeah, we think we have an SEC here, or, no, we need more?

I hate to just go to another meeting without hearing from at least the four of us where we're at.

I mean, we've had many, many meetings and it's -- I'm not clear.

Mr. Katz: Right. And so, if you remain sort of uncomfortable sort of putting the stake in the ground about this with the outdoor issue, again, you can also hear from the rest of the Board on this matter. So, that's the other way to get at it without having to resolve it by the Work Group.

And if you feel like it's part and parcel and you really can't distinguish this from Building 10 in terms of your uncertainty about this going back retrospectively, then, you know, you can just sort of tie this with the Building 10 matter and wait to hear from the other Board Members or whatever, or wait until the next Work Group meeting if that's going to help you.

Chair Beach: Well, you know, Ted -- and I know that what you're saying this is all tied together.

So, it's -- we either accept -- I mean, everything we're doing here is modeled. And we can say a month, in two months those are Site Profile issues, but we have to determine if we're going to accept

the models and accept that there is an SEC or there's not an SEC.

And I guess that's where I'm at is we -- and we are closer to it. We can take all of this to the Board, but we're closer to it.

And if we aren't willing or can't make a decision based on what we know now after all these meetings and all the materials, whether we think they're an SEC issue or not, I guess that's kind of where I'm at.

Mr. Katz: Right. Well, the Board, just to be clear, in August when you bring this to the Board again, it's not an action item to the Board at that point.

So, I mean, the opportunity from the Board is just to hear if they have other issues to think about before you actually make a decision because certainly the Work Group should be ultimately making recommendations to the Board before the Board acts on it.

Chair Beach: Exactly.

Mr. Katz: So, you could have another Work Group meeting after August to settle your matter if you don't settle it before, yeah.

Member Kotelchuck: You know, Josie, I feel like from the beginning going all the way back to Pete Darnell, who was working on this earlier and taking the lead for NIOSH, it's obvious, I mean, that it makes sense always NIOSH has to try to think about how best it can estimate exposures. And so, they always come up, and rightfully so, with their best estimates.

We have always, in our meetings, we've been basically led by the technical discussion of the -- how the calculations are done and whether they're adequate, but I feel like we've never, as a Working Group, talked together about our broader concerns about data, about the, really, it seems to me, very

large uncertainties that this petition presents to us.

And there's a way in which I wish we could talk as a group about the overarching concerns that really make us ambivalent about whether these calculations amount to some reasonable assessment of the individual exposures.

I don't know how to do that, but I also -- I would say I don't feel that leading off with a technical discussion deals with issues that we were concerned with when it was brought up at the Board meeting a couple of years ago.

I don't know how other Working Group folks feel.

Chair Beach: I hear you and I think that's why I'm pushing this a little bit.

Member Kotelchuck: Yeah.

Chair Beach: For me, I feel like there's a lack of good source data. There's a complete lack of any monitoring data coupled with -- all the assumptions, all the uncertainties and the unusual circumstances, Metals and Controls for 29 years.

We can model it, but models are only as good as the source. And I think the missing piece here is the work that was actually done.

We can throw a month, a two-month Site Profile stuff, but I think you're right, Dave. I think we haven't had that discussion.

And this is the opportunity to do that. We're all on the phone.

Member Kotelchuck: Yeah.

Member Anderson: And this residual period is unusual compared to the other residual periods we've covered at other sites.

Chair Beach: I agree.

Member Kotelchuck: Oh, absolutely.

Member Anderson: It's really a surrogate exposure issue, kind of, and you can always come up with a high value, but is it realistic?

Chair Beach: Well, and I keep hearing small doses, small doses. And, to me, that --

(Telephonic interference.)

Chair Beach: That was after the rest of the lack of data and then I think Dave, you talked after I did.

Member Kotelchuck: And was that when I raised the issue that we have been led by the technical discussions --

Chair Beach: Yes --

Member Kotelchuck: -- of NIOSH trying to make the best estimate it could of the exposure, but that there were really -- and that led the discussion. But the larger concerns that many of us had, the over-arching concerns about the distinction, if not uniqueness, at least the distinction of this particular workforce where they were doing troubleshooting jobs and measurements were made of different -- very few over a period of 30 years, that we needed to discuss our over-arching concerns and that is not the technical discussion.

The technical discussion, well, the technical work has to be done. We can never consider an SEC without NIOSH and SC&A trying to determine as best it can what the exposures were. That's an obligation that the Board and the program has. And they're trying to do it and we've been listening to that, that there are a bunch of concerns that the Working Group folks have and that -- I wish we could talk as, and I said, I wish we could talk as a Working Group about those larger concerns.

And I believe, Josie, you said yes, well, we are here now. Maybe we can discuss it. And that's the point

at which I think the court reporter broke in.

Is that a reasonable summary?

Mr. Katz: Well, that gets us most of the way there and then John and Rose just clarified the issue about -- go ahead, John and Rose. Talk about how these -- there are four other cases.

Member Kotelchuck: Three.

Mr. Katz: Three other cases for the residual period with unusual --

(Simultaneous speaking.)

Mr. Katz: Right. Let them recount that.

Chair Beach: And before they do that, I think Andy is the one that actually brought up the unusualness of the AWE sites. Is that correct, Andy?

Member Anderson: Yes, that's right. Yes, I just said that the real issue here is this is an unusual site and therefore, the appropriateness of kind of surrogate or alternative data is really, is this the appropriate data that can be used because there isn't really a comparable site to use. And then we went on from there.

So I would certainly underscore that if the decision is doses can be reconstructed using these methods, I think that the technical way it's been gone about is probably acceptable, but the issue is before you go to do those calculations, is it really appropriately comparison.

Mr. Katz: Okay, John and Rose --

Member Kotelchuck: I would be very interested in seeing how the other sites that were approved, I think that's really the case that needs to be made, is this similar to those, and therefore our reluctance to kind of go outside the box on this is appropriate.

Dr. Mauro: This is John. I think there's something

we did not do. NIOSH did not do and we did not do and it just dawned on me, based on this conversation.

Ms. Gogliotti: John, just for the court reporter though, SC&A and the other thing that we discussed was that SC&A has reviewed approximately fifty --

(Simultaneous speaking.)

Dr. Mauro: Yes. Yes.

Ms. Gogliotti: Of those, only three extended coverage into the sites' residual periods and those three were Ames Laboratory, Norton Company, and Vitro Manufacturing.

Chair Beach: And those are of the AWE sites, correct?

Ms. Gogliotti: Correct.

Dr. Mauro: And I think picking up from there, because that's where we left off, was the thing we didn't do is okay, so clearly, there were three sites where things were so unusual during the residual period that we felt -- the Board felt it appropriate to grant the SEC. And the other 47, apparently, there was sufficient information to deny the SEC.

Now, what would be of value for something that NIOSH probably may want to do or certainly SC&A could do is okay, good. Let's see how those decisions were made, what were the circumstances under which they were either granted or denied, and where does this site, M&C, fit into that array of decisions? Are we leaning more toward a type of circumstance that is closer to when it was granted or are we leaning more toward a type of circumstance where it was denied?

We do not have that information and it would be useful because it is important to be consistent in how we went about our decision-making. And that may be of value.

Member Kotelchuck: That may well be. That may well be.

Mr. Rutherford: This is LaVon Rutherford. I don't mind doing that considering I was the lead on two of those three. I know what the reasons were on those, but we can put something together and provide that to the Board.

Chair Beach: Okay.

Member Anderson: Good to have that to start.

Member Kotelchuck: That would be very helpful. I would find that -- I would appreciate that very much.

Chair Beach: Okay, any other discussion? So Loretta, any comments?

Member Valerio: Well, I appreciate that LaVon is offering -- it was LaVon, correct, that was offering to send the information on those other AWE sites?

(Simultaneous speaking.)

Chair Beach: -- send the information but put it together. Yes.

Member Valerio: Right. Yes, I remember some of Ames, but the other two I don't recall at all. So I think that information would be beneficial for all of us as far as the Work Group moving forward on whether we need to close some of these or you know, keep them in progress a little bit longer.

The other comment I had was when you said, you know, these exposure scenarios were small, potential small dose, and in my mind, yes, they may have been small, but they were also chronic if it was the same person conducting the work over and over and over again.

Dr. Mauro: By the way, the small dose is that. In other words, when we assume the same person over and over and over again, that's the annual

dose we're giving, that is we say this many millirem per year for the subsurface environment Building 10 which is by far the biggest one. That would be the annual dose for that same person being exposed over and over.

The same thing goes for the others. In some places we expressed it in terms of millirem per hour. Of course, you could then -- and then we said we could convert that to what it would be per year, but based on the assumption of the number of hours per year. But you know, that's something that we did do as best we could to say what would be the total annual dose that a person doing this work would be.

So yes, we did do that. We didn't just say, you know, an individual event. For example, in the case of the subsurface environment, the two months really is two months' worth of the person being in the hole, you know, and that would be his annual dose from working in the subsurface environment, two months, the same person always going in the hole.

And then of course, the question then becomes, all right, if you wanted to reconstruct his dose, what would you do? You would say --

Chair Beach: John --

Dr. Mauro: Yes. I want to make sure that's clear, because that's something that's easy to misunderstand.

Chair Beach: Okay, sorry.

Dr. Mauro: That's all I wanted to say.

Member Kotelchuck: Even this discussion, brief as it is, I think is helpful in that if this group were to recommend to the Board an SEC, I think it would have an obligation to be able to tell the Board why this case is so different from other cases that, that is that we would grant an SEC. In other words, if we choose to go along with the approach that has been

going -- that has been made, and John has addressed SC&A and NIOSH extensively, but if we have, if some of us have concerns that there are -- that there's something distinct, we would have to convince the Board that -- we would have to argue to the Board why this is different than the other cases.

So getting the response -- getting the background for the three cases where we have decided to grant an SEC in special circumstances would be very helpful.

Chair Beach: I agree.

Member Kotelchuck: And in a sense that case has to be made even -- even if we, you know -- well, the case has to be made. And the Working Group has to make that. It has to make the case either if it's for an SEC, why is this distinctive? And if it isn't for an SEC, then why, then we have to affirm that the approach that John has outlined and discussed is adequate.

Chair Beach: Correct.

Mr. Katz: Right, and just to always keep in mind at the end of the day, the Board's basis has to have a science basis.

Member Kotelchuck: Yes.

Mr. Katz: So the comparison I think is important and I think that's great that you're addressing that issue of sort of -- but at the end of the day you also have to put a substantive scientific basis either way for adding or for not adding.

Member Kotelchuck: Right, absolutely, but a scientific judgment can be the data is not accurate enough.

Chair Beach: Or adequate --

Member Kotelchuck: In our judgment.

Mr. Katz: Well that's far too vague, Dave, that's not going to cut it.

Member Kotelchuck: Yes.

Mr. Katz: That the data is not accurate enough, but you understand what the basis has to be.

Member Kotelchuck: Yes. Yes.

Chair Beach: And I do think it's important for the Work Group to come to the Board with a recommendation if at all possible. I don't know any situation where a Work Group has not come to the Board with some kind of a recommendation. I think that's important. I appreciate this discussion.

Member Kotelchuck: Yes. And I also feel an obligation as a Working Group Member, we've been over this now for a few years, right, if we look back at all the documents. And we have got to make a decision. The Board has to move. We have many different plans, many different positions, and we have an obligation as Board Members to decide. And I suppose it could be an unusual situation or could be, in fact, a unique situation where we come to them and say well, this is what we think. We have differences of opinion. Here's one side. Here's the other. You decide. I guess it can be -- because the Board actually decides, we recommend.

Mr. Katz: Right. Well we've done that too, actually, Dave. Maybe not in your history, but we've done that in the past.

Member Kotelchuck: No, it's not in my history, no.

Mr. Katz: Yes, but we have. Work Groups have done exactly what you're saying as well. So it's all possible.

Member Kotelchuck: Okay.

Chair Beach: Okay, so any other comments before I move to see if petitioners have any other -- I know Mike has gone --

Mr. Katz: Mike is gone, so --

Petitioner Comments

Chair Beach: I knew there was another petitioner listening in. I didn't know if he wanted to make comments, so I thought I would at least ask.

Mr. Hanlon: Yes, can you hear me?

Chair Beach: Yes, is this Darrell?

Mr. Hanlon: Yes, it's Darrell.

Chair Beach: Darrell, would you like make comments?

Mr. Hanlon: Only that I was not present during -- I don't know the members who you interviewed, so if it's possible, when you get my contact information from Mike, if you could send me their comments I can contact them myself. I have set up --

Chair Beach: Darrell --

Mr. Hanlon: -- a Facebook page --

Chair Beach: Mike probably has -- I'm sorry to interrupt, Darrell. This is Josie again. I think Mike probably has all of that information. You could get it fairly quickly through him if that's possible.

Mr. Hanlon: Okay.

Chair Beach: I think --

Mr. Katz: Let me jump in here, Darrell, because there are some things that aren't actually okay. You cannot -- you can -- so there are -- there should be on the public site a summary of the comments that have been given from the workers. But you will not be able to get their individual comments because their privacy is being protected, Darrell. So you may be able to get in touch with individual workers and talk to them individually for sure by speaking to Mike. But you won't be able to get from us their

individual comments because we have to protect their privacy. That's just a requirement on us.

Mr. Hanlon: I understand, but the comments are without name, but the comments are still public, yes.

Mr. Katz: Yes, they're only summarized in public and you can get that from our website. And if you have trouble getting it, when you send me my email, I'll forward you a link or what have you to get you to the right place.

Mr. Hanlon: Yes. Obviously, I don't have a lot of time myself. I appreciate all of your efforts. I don't believe your models are correct. If you can review my testimony that I gave you when you were in Providence, Rhode Island, I think it was June of 2018, I gave you some good information to work with. I could probably provide some more if I could at least find some of the workers. I have set up a Facebook page just for the TI maintenance and construction people.

I will say this, one of the reasons why I think your models are wrong is on average, every day was spent on ladders or lifts. And so we're always moving dust. We're always putting hangers up, putting hangers down, dislodging dust constantly. We jackhammer in the floors. We used saws that went in the floors. We dug up with shovels. I used to be the training facilitator for facilities and I left around 2001 from Texas Instruments. But I have a good rapport with most of the guys, I understand, but we never knew it all, period. And I tried to share with them all of OSHA's requirements as part of training, but we never were aware at all at any time that there was nuclear anything anywhere, including down in Building 1. What is that, the thorium down there, 1 and 2, that was encapsulated in the floor?

Ms. Gogliotti: We're not aware of that, if that is true, at least I'm not. I haven't heard of it being in Building 1 and 2.

Mr. Hanlon: Okay, well I might have the wrong -- what's the material they used to paint on watches, watch dials, and stuff?

Ms. Gogliotti: I think that was --

Mr. Hanlon: Which material is that?

Ms. Gogliotti: -- four or five, the radium, wasn't it?

Mr. Hanlon: What was it?

Ms. Gogliotti: Radium?

(Simultaneous speaking.)

Ms. Gogliotti: Oh, okay, it was Building 1.

Mr. Hanlon: But, you know, we would spend at least six to eight hours up in the ceilings, and if somebody was cutting and bending a pipe down or if we're working by ourselves, that's what we do. We're using the ceiling constantly, putting holes, sticking our heads up and wedging them between pipes just to get an eyeball so we could see a little bit.

We're breathing in that dust, we seldom wore a mask up there, so we're always moving in dust. And I did have a catastrophic release of dust. I explained during my testimony back in June of 2018 that I was putting up new lighting, track lighting, and I wasn't aware of the nuclear anything. And I cut down the old fluorescent lighting with bolts, a bolt cutter, and that just had a catastrophic release of all the dust. I mean there must have been in some cases two or three inches of dust on top of a lot of the old fixtures, but it was just released, it went into the building and all over the place.

I don't want to re-testify right now, but those are the comments. I would ask you to -- I know you want to move and close out things, but I don't think you have your modeling right, so I wouldn't recommend, in my opinion, that you close anything out at this point.

Dr. Mauro: This is John. Just to help out a little bit, in the road map report that only came out on March 12th, we do have an Appendix, okay? It's called Appendix B and it says issues raised by petitioners during the May 3, 2018 Work Group meeting. Certainly, if -- that's basically a summary of the issues and discussions pertaining to those issues.

Darrell, the quickest way for you to get into this literature, which is vast, is take a look at Appendix B to see did we get it right in Appendix B and that is available. And of course, you can take it from there because behind Appendix B is reference to a whole bunch of correspondence and transcripts and stuff like that.

Mr. Hanlon: And is the website also on there?

Mr. Katz: Darrell, when you send in your contact information to Mike, I will send you back a link both so you can see just the report that John's talking about, John Mauro is talking about, as well as the interviews that have been done and you can get to all that material that way.

Mr. Hanlon: Okay, and I'm sorry, and your name is?

Mr. Katz: I'm Ted Katz and I'm the Designated Federal Official for the Advisory Board. But Mike is going to send in your contact information. I'll get that.

Mr. Hanlon: Okay, great.

Mr. Katz: I will respond to that with what you need.

Mr. Hanlon: Alright, thank you. I have no need to hold you up any longer. I have to go myself, so I want to thank you all for all the effort you've put in so far.

Mr. Katz: Right, Darrell, we appreciate you attending. Thank you very much.

Path Forward/August Board Meeting
Presentation/Plans

Chair Beach: Thanks, Darrell.

So are we ready for Path Forward? I know we have the EPA study coming out from John, correct?

Dr. Mauro: We're going to forward -- I got action items here. And the only one I wrote down is send the dust loading data, the basis, and the literature that stands behind our 200 micrograms per cubic meter value. And we will do that. That's the only action item I have.

Chair Beach: Okay, and that's going to the whole Work Group and then NIOSH is taking on -- Bomber is going to do the AWE sites, the three that -- the special -- okay, you're going to send out a memo or some type of report on that?

Mr. Rutherford: Yes, what I'll do is I'll take those sites that we've added periods to the SEC that are in the residual period and I'll lay out the reasons for the recommendations to add those classes.

Chair Beach: Okay. And that's something the Work Group Members can do, too. They can go in and look at those now that you know the three named. And it's in SC&A's earliest report, I believe, it highlights that also. So I mean if you want to start doing some research, waiting for LaVon. I mean that's certainly available.

And then, Ted, can we schedule another Work Group meeting from now?

Mr. Katz: So we could, except that the big question mark is we don't know when Bob will be back on his feet. And I think if he ends up back on his feet sooner than later, it may -- I think it would be better to be able to incorporate what he brings to the table, too, and be able to capture that in the next meeting. So you may want to just wait a bit and see how that comes and schedule it sort of in

the June time frame I would think.

Chair Beach: Okay.

Mr. Katz: There's only four of you to schedule together. It shouldn't be that hard to get you together.

Chair Beach: How long do we have you, Ted?

Mr. Katz: You only have me until the very beginning of June.

Chair Beach: Very beginning of June, so our next call -- is your replacement on the line today?

Mr. Katz: Sure, I should have given you -- but no. My replacement, I misled you unintentionally. Your replacement -- well, I've been training her. She's been training and learning about the program and so on, but there was a little snafu because security requirements for this program for my position are a harder nut to crack than they were when I came into it.

And so she's been hung up for a while, but she will be onboard at the end of this month. And so she'll be reaching out to all of you at the end of this month and so you'll get her sooner and then she'll definitely be onboard well before your June meeting teleconference.

Ms. Adams: Ted, this is Nancy. Dr. Howard sent out the announcement just a little bit ago about the selection.

Mr. Katz: Okay, that's great.

Member Kotelchuck: We didn't get it. It came out during this call.

Ms. Adams: Right.

Mr. Katz: It's not official yet, so --

Ms. Adams: The 27th of April.

Mr. Katz: Yes, the 27th of April which I don't believe we're there yet.

Ms. Adams: No.

Mr. Katz: It's April 13th, so --

Chair Beach: I was hoping you'd hang on so you could see us one last time in August.

Member Valerio: Yes, Ted, why don't you postpone your retirement.

Chair Beach: Yes, Ted, at least make one more meeting.

Member Anderson: Even if you're retired, you can come to the meeting.

Mr. Katz: Well, the meeting is probably going to be in Idaho. I do like Idaho.

Member Anderson: Okay, we'll --

Chair Beach: See you in Idaho.

Member Anderson: Get your travel tickets now before you retire.

Mr. Katz: Yes, it's really inexpensive right now.

Chair Beach: Yes. Okay, anyway, enough of badgering poor Ted. Anything else for the -- Ted will send out something for a Work Group call and -- are we okay? Anything else?

Mr. Katz: I think we're good. I think we're good.

Chair Beach: I need to say a special --

Mr. Katz: Josie, we just lost you. Josie? Josie? Hello?

Member Kotelchuck: I'm here.

Mr. Katz: Can you hear Josie or is it just me?

Member Kotelchuck: No, I can't hear Josie.

Member Valerio: I can't hear Josie.

Adjourn

Mr. Katz: Josie, you wanted to say something special for something, but we lost you. I don't think she realizes she's been cut off.

Alright. Well, then I'll adjourn for Josie, without her special remarks. But thank you all and I hope you all stay safe and some of you, I think, will join me or maybe none of you -- actually, none of you are on the Work Group tomorrow. But take care. And, again, you'll get word of my replacement soon. Okay, bye-bye.

(Whereupon, the above-entitled matter went off the record at 2:06 p.m.)