CENTERS FOR DISEASE CONTROL AND PREVENTION

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

ADVISORY BOARD ON RADIATION AND WORKER HEALTH

SUBCOMMITTEE FOR PROCEDURES REVIEW MEETING

FRIDAY, NOVEMBER 8, 2024

The meeting convened at 11:00 EST

via teleconference,

Josie Beach, Chair, presiding.

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Members Present:

Beach, Josie, Chair

Valerio, Loretta

Ziemer, Paul, Member

Registered and/or Public Comment Participants:

Roberts, Rashaun, DFO

Adams, Nancy, NIOSH

Anderson, Henry, ABRWH Chair

Barton, Bob, SC&A

Behling, Kathy, SC&A

Brackett, Elizabeth

Buchanan, Ron, SC&A

Cook, Madeline

Gogliotti, Rose, SC&A

Griffiths, Richard, SC&A

Holzberger, Malia, HHS

Lobaugh, Megan, NIOSH

Mangel, Amy, SC&A

Marion-Moss, Lori, NIOSH

Ostrow, Steve, SC&A

Rutherford, LaVon, NIOSH

Sharfi, Mutty

Smith, Matthew

Taulbee, Tim, NIOSH

Registered and/or Public Comment Participants continued:

DeGarmo, Denise

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PROCEEDINGS

(11:00 a.m. EST)

WELCOME AND ROLL CALL

DR. ROBERTS: So, I do have 11:00 a.m. Eastern, so I'd like to wish everyone a good morning. Welcome to the Advisory Board on Radiation and Worker Health. This is a meeting of the Subcommittee on Procedures Review. I'm Rashaun Roberts, and I'm the designated federal official for this Board. There is an agenda for today. It's on the NIOSH website for this program under scheduled meetings for November 2024.

Since the subcommittee will be discussing a number of different documents, some of which might involve specific sites, we do need to go ahead and address conflict of interest during the roll call. If a conflict does happen to come up during the course of the meeting, subcommittee members and others do need to recuse themselves from the discussion where that conflict of interest may apply. So, as we move through the roll call, subcommittee members and others, please state whether you have a conflict of interest -- or state your conflict.

So, let's start with the subcommittee chair, Josie Beach.

CHAIR BEACH: I'm here, and I'm conflicted at Hanford. Good morning.

DR. ROBERTS: Good morning. Valerio?

MEMBER VALERIO: Can you hear me?

DR. ROBERTS: Okay. Oh, yes. Hi. Hello, Loretta.

MEMBER VALERIO: Can you hear me? Hi. All right. I'm here.

Conflicted all sites in New Mexico.

DR. ROBERTS: Okay. And Ziemer.

MEMBER ZIEMER: Good morning. I'm here. I'm conflicted at Oak Ridge X-10.

DR. ROBERTS: Okay. All right. Let's move to NIOSH, DCAS, and ORAU.

MS. MARION-MOSS: This is Lori Marion-Moss.

MR. RUTHERFORD: LaVon Rutherford. Oh, go ahead, Lori.

MS. MARION-MOSS: This is Lori Marion-Moss, and I'm conflicted at Mound.

MR. RUTHERFORD: We all take turns here. This is LaVon Rutherford, and I'm conflicted at Fernald.

DR. TAULBEE: This is Tim Taulbee, and I'm conflicted at Mound.

DR. ULSH: Brant Ulsh, conflicted at Fernald and Argonne.

DR. ROBERTS: Okay. Anyone else for NIOSH, DCAS, ORAU? Okay. Moving -- hi. I can hear someone speaking. If you would, please put your phone on mute. Okay. Let's -- if there's no one else for DCAS/ORAU, let's move on to SC&A.

MR. BARTON: Bob Barton, SC&A, no conflict.

MS. BEHLING: Kathy Behling, SC&A, no conflicts.

DR. BUCHANAN: Ron Buchanan, SC&A, conflicted at Los Alamos.

MS. GOGLIOTTI: Rose Gogliotti, SC&A, no conflicts.

MR. GRIFFITHS: Richard Griffiths, SC&A, no conflicts.

DR. ROBERTS: Okay. Anyone else for SC&A? Let's move on to HHS and contractors.

MS. HOLZBERGER: Malia Holzberger, HHS/OGC, no conflict.

DR. ROBERTS: Okay. Any -- anyone else for HHS and contractors or any of the departments, DOL, DOE, other departments? Okay. Hearing none, let's ask if there are members of the public who would like to register their attendance.

DR. DEGARMO: This is Dr. Denise DeGarmo, authorized petitioner representative, Pinellas Plant. Thank you, and good morning.

DR. ROBERTS: Thank you, and welcome.

Okay. So, I do need to go over a couple of additional items before I give the floor to Josie Beach, who chairs this subcommittee. In order to keep everything running smoothly and so that everyone speaking can be clearly understood, everyone please make sure your phone is muted, unless you're speaking, of course. If you don't have a mute button, press star six to mute. If you need to take yourself off mute, press star six again.

And because we can't see each other for this meeting, please identify yourself by name before questions and comments. The agenda and the presentations and background materials that are relevant to today's meeting can be found -- okay. I can hear that someone's off mute. If you could, just please check your phone. So, the materials that are relevant to today's meeting can be found on the NIOSH/DCAS website. The materials were sent to Board Members and to staff prior to the meeting.

So with that, I will go ahead and turn it over to you, Josie.

CHAIR BEACH: Great. Thank you. Good to hear everybody. Loretta, I'm glad you're able to join us today.

MEMBER VALERIO: So, real quick, Josie and Rashaun, I am having to

call in on my cell phone. So, when I look -- you know, when I'm on the NIOSH website and I have to bounce back to mute my phone, I lose the website, so I have to log back in. So, just to let you know, I'll be on as long as I possibly can, but this storm has really thrown us for a loop.

CHAIR BEACH: Okay. Yeah, if you -- and I know if we lose you, we just -- we won't be able to communicate until you log back on. So, thanks for giving us the head up -- heads up. And I understand Paul's going to leave the call for a bit this morning also. Is that correct, Paul?

MEMBER ZIEMER: Yes, I have an -- and I talked -- actually talked last night to Rashaun about this. I have an urgent issue that has arisen that I have to take care of this morning, and I have a specific time slot where I have to do this. It's basically 11:30 to 12:30 Eastern time. So, I will -- I will leave for probably about an hour it will take me to handle this situation. t in the meantime, just to let you know, and I have read all of the documents and also I have made notes on them. So, I -- if -- if there's anything that -- (audio distortion) specific vote needed, and you may -- you want to hold it until I get back, that would be fine, because I -- I -- I'm certainly aware of at least SC&A's discussions on this. And, you know, I'll leave it up to you, Josie, but I'll try to get back as quickly as I can, maybe before 12:30. But, you know, it's going to take about an hour, I think.

CHAIR BEACH: Okay. No, that's perfect, Paul. And I only bring it up again because if Loretta goes off, then we'll have to break until you come back. So, we'll --

MEMBER ZIEMER: Okay.

CHAIR BEACH: -- so it --

MEMBER ZIEMER: -- we'll do our best.

CHAIR BEACH: And we will --

MEMBER ZIEMER: We're kind of limping along, I think.

CHAIR BEACH: Okay. And I think --

MEMBER ZIEMER: Thank you.

CHAIR BEACH: -- we will vote if there's any votes until you get back, and then we'll (audio distortion).

MEMBER ZIEMER: Well, I know in the first slide we're just going to hear, I think, from -- I guess we're going to hear from NIOSH on their responses, and then I know that there's a number of these that just have observations and not findings, but --

CHAIR BEACH: Actually, --

MEMBER ZIEMER: -- we'll take it as you go.

CHAIR BEACH: Yeah, actually, I'm going to jump out of that order. I was just going to explain that --

MEMBER ZIEMER: Oh, I see. Okay.

CHAIR BEACH: -- I'd like to go over --

MEMBER ZIEMER: Gotcha.

CHAIR BEACH: -- some house (audio distortion) and not leave them until the end, as we normally do. We tend to get very rushed.

MEMBER ZIEMER: Gotcha.

DR. ROBERTS: Sorry, Josie. Josie, there's a lot of background noise. I'm wondering, you know, if -- if people are on mute.

CHAIR BEACH: Yeah. I hear it also.

DR. ROBERTS: Paul, is that background noise from -- from your

phone, or?

MEMBER ZIEMER: No, I --

MS. BURGOS: I was trying to reach --

MEMBER ZIEMER: -- I was -- I was on mute.

DR. ROBERTS: Okay.

MS. BURGOS: This is Zaida. I'm going to call the bridge line to see if they can see what's going on.

DR. ROBERTS: Okay. It seems like it went away, but --

MS. BURGOS: (Indiscernible) --

DR. ROBERTS: -- thank you.

CHAIR BEACH: Yeah, it sounds like it went away. Nope, there it is. Okay. Hopefully, it's not my phone. I'm in a quiet office.

PREPARATION FOR DECEMBER 2024 FULL ABRWH MEETING: REVIEW OF TECHNICAL GUIDANCE DOCUMENTS READY FOR FULL BOARD APPROVAL

CHAIR BEACH: I did want to take care of some housekeeping items, so the first thing I'm going to ask Kathy to do is go over tasking for our December meeting, if -- if that's okay. I think Kathy's ready to discuss that.

MS. BEHLING: Yes, I am. Can you hear me?

CHAIR BEACH: Yes.

MS. BEHLING: Okay, great. I had mentioned during our last teleconference that perhaps I would have maybe eight documents that have already been approved by the subcommittee ready for December Board meeting. But since then, Josie and I have talked, and I reduced that to six

because of -- because of the number of findings in the documents that I am going to propose that we -- we talk about in December.

So, I'll go through that list, and I'll just see if everybody agrees with it. But the first one is the OCAS-PER-9, which is the target organ for lymphoma. I've also included OTIB-57, which is the Y-12 criticality accident.

I included PROC-90. What -- if we're going to include that, is it has to be in the CATI report, but that goes in combination with PROC-92, which is closed out. It's -- it's -- PROC-90 had a (audio distortion) 29 findings and PROC-92, I think, had (audio distortion) out there.

Also included is PER-62, which is OTIB-52, which is the construction trade worker OTIB. And then lastly, PER-17, which is the INEL internal -- internal rec -- records. And so, those are the six that I'm proposing for the December meeting. I have to start really looking at these because it's a short period of time between this meeting and the December, so I just wondered if everyone is in agreement with me selecting those -- those (audio distortion) documents.

CHAIR BEACH: Thank you, Kathy. Any questions or comments from the subcommittee members on those?

MEMBER VALERIO: (Indiscernible), Josie.

CHAIR BEACH: Okay, thanks. And, Kathy, it sounds like those will fit in the time slot, the 90 minutes that we requested, correct?

MS. BEHLING: It will. It will. I --

MEMBER ZIEMER: Kathy? This -- this is Paul. Can you also just send us a list of those or email a list of those out to us?

MS. BEHLING: I will do that. In fact, I can forward to you the draft

presentation that I put together if you'd like. It's about --

MEMBER ZIEMER: Yeah.

MS. BEHLING: It's about 70-some slides. So, I will do that after this meeting.

CHAIR BEACH: Okay. Thanks, Kathy. Do we need to officially vote on that, Rashaun, or can we go ahead and task? Are you on mute?

DR. TAULBEE: This is Tim. I've been --

DR. ROBERTS: I'm -- I'm sorry.

CHAIR BEACH: Sorry, we had two people talking. Rashaun?

DR. ROBERTS: Okay. Can you hear me?

CHAIR BEACH: Yes, now we can.

DR. ROBERTS: Was some -- was someone about to ask a question?

CHAIR BEACH: I think that might have been Paul, correct?

DR. TAULBEE: No, this --

MEMBER ZIEMER: (Indiscernible) --

DR. TAULBEE: -- is Tim. I was just going to ask a question.

MEMBER ZIEMER: Oh, yeah. I think it was somebody else.

CHAIR BEACH: Okay. So, Tim, was that you?

DR. TAULBEE: Yes, this is Tim Taulbee. I'm just asking for clarification because I was just counting the number of documents here. Are you -- Kathy, are you going to be covering both PROC-92 and PROC-90?

MS. BEHLING: Yes.

DR. TAULBEE: Did I hear that correctly? Okay.

MS. BEHLING: Yes.

DR. TAULBEE: That's all. Thank you.

MS. BEHLING: I -- I'm sorry, Tim. Yeah. I decided to put those two together because in PROC-90, they actually transferred some of those findings over to 92. So, logically, it felt right that we needed to talk about those together.

DR. TAULBEE: Okay. (Indiscernible) --

MEMBER ZIEMER: Okay. Can I ask a question? Sorry. Yeah, this is Paul. I do have one other question. Kathy, you mentioned the Y-12 accident. What -- what document is that in?

MS. BEHLING: That's OTIB-57.

MEMBER ZIEMER: Okay. And we -- we haven't looked at that, have we?

MS. BEHLING: Yes. (Indiscernible) --

CHAIR BEACH: Yeah, these are all closed out.

MS. BEHLING: (Indiscernible) --

CHAIR BEACH: These are all closed out.

MS. BEHLING: -- Paul. (Indiscernible) --

MEMBER ZIEMER: I don't recall.

CHAIR BEACH: We looked at that in 2006.

MEMBER ZIEMER: Oh, boy, that's --

CHAIR BEACH: Or was it --

MEMBER ZIEMER: That's a long time ago. The reason I asked that question was it -- this is very tricky, but I'm -- you know, I'm conflicted for X-10 at Oak Ridge. The thing is that at the time of the Y-12 accident, some of the X-10 people had been assigned there prior to the accident and were working there. In fact, I was one of those, and I was at Y-12 at the time of

the accident.

And I'm -- I don't know if my X-10 exclusion would -- will cover that, if I have to recuse on any involvement with that document. I don't recall if that was addressed years ago or not. Well, it's something we can't solve here at the moment. I just wanted to mention that. I think I have to recuse from any action on that document, I think.

CHAIR BEACH: Well, the action's already have been done.

MEMBER ZIEMER: So, we --

CHAIR BEACH: Yeah, --

MEMBER ZIEMER: So, we don't have to do anything. We just have to present it, right?

CHAIR BEACH: Present it, and then the Board has to either accept or ask questions and not close it. But, yeah, it's pretty much --

MEMBER ZIEMER: Right.

CHAIR BEACH: -- what we've been doing.

MEMBER ZIEMER: Yeah. Okay. Thank you.

CHAIR BEACH: Okay. Thank you. Okay. Good to know. Thanks, Paul.

Can we go ahead and task that, Rashaun, at this time?

DR. ROBERTS: Yes.

CHAIR BEACH: Okay. So, that is so passed. Does anybody need me to read the list again, or are we okay?

MEMBER ZIEMER: Okay. And you're going to send it out (audio distortion) first?

CHAIR BEACH: Yes. (Indiscernible), yep.

MEMBER ZIEMER: Okay.

CHAIR BEACH: Okay. That's great. And then the second one is updating the BRS. Kathy just had some questions for the subcommittee. There's some stuff that has come up that -- with her and Lori. I think Lori might have the floor on this one if we could discuss that briefly.

MS. BEHLING: If you'd like, I can start. You know, I've been maintaining this temporary BRS, you know, until all data is -- gets transferred. And as I mentioned, this is a two-step process. NIOSH has to enter the documents into the BRS, and then I can go in and add the findings and update them (audio distortion).

Lori has -- has been able to enter almost all of the documents that we have been tracking at this point in time. And I started to enter the resolution information, and I stopped this because of the following concerns: We have (audio distortion) data right now that (audio distortion). And Lori and I have talked about -- we've been talking about this for quite some time, adding some features to the BRS. We -- currently we only have -- we can only list it as a finding. Okay. We have one option, finding. We cannot list an observation.

And the other thing I requested is I want to be able to add a comment, because we do have documents and (audio distortion) we have to put in some statement (audio distortion) this document, and we have no findings. And we're not able to do that right now, because I have to enter that data as a finding to state this is a finding with no findings. And so, when I generate the report that you see in (audio distortion) of (audio distortion), the table that I generate is identifying findings that truly are not findings.

It's not an accurate assessment. So, both Lori and I agree, we've talked about this, and I know there's other priorities, but we're hoping to add a field so that when we have an observation, we could -- a lot of our findings or observations are -- are something that we identify now, we could enter that as an observation.

So, I'm questioning, do we wait? Lori has, I think, talked to IT, and I will turn the floor over to her momentarily, and it sounds like it's something that they may be able to accommodate. How long will that take?

The other thing that Lori and I talked about is perhaps, I think, is that I can enter these observations in some manner that IT, after this observation option is available, they can go in and identify the observation and automatically put them where they belong. So, that's my thinking. And I just wanted to get some feedback on how to proceed with this. But I'm going to turn it over to Lori.

CHAIR BEACH: Thanks, Kathy.

DR. ROBERTS: Actually, I'm sorry to interrupt, Lori. Apparently, Kathy, there's a difficulty with the court reporter hearing you. I don't know if you can adjust your volume, but I wanted to flag that now.

Sorry, Lori.

MS. MARION-MOSS: Good morning, everyone. This is Marion Moss. What -- what we're looking into right now for the BRS -- first and foremost, I would like to mention that I'm really pleased that we have access to that application back again. But I met with our IT team a week or so ago, and they are currently looking into adding some of the features into the BRS as Kathy has requested.

And just to remind some of -- of the Board Members, this request goes back quite some time. And so, with the availability of our application in a different environment than what -- than where it was before, we are looking into -- looking at the coding, and they are actually planning to incorporate the request of adding a feature into the BRS that distinguishes findings from observations. And they're also going to be looking at how to populate that data after the feature is added.

In terms of a time line, we don't have one as of yet. Like I said, we just met a week ago. And as soon as I know more, which should be within the next two weeks, then I can update Kathy and Josie if you like. That's all I have on that matter today.

CHAIR BEACH: Thanks so much, Lori. This is Josie again. One question I have is sometimes when we find -- we find we have some discussions, we'll change an item from a finding to an observation, and that would be something we'd want to be able to change as well. Is that included in what you guys have discussed with IT?

MS. MARION-MOSS: That will be included, yes. Yes.

CHAIR BEACH: That will be, okay. Okay. Thank you so much, both of you guys. I know this has been a long time coming, and a lot of work behind the scenes that we're not -- we don't know that it's happening, Lori, so thank you for that.

Subcommittee members, what -- what's your thought? Kathy, I don't know if you gave us an actual recommendation on what you think as far as should we wait or should we go ahead. My worry, and I'll just state it up front, is if we go ahead and put everything in, and then it sounded like we

were going to rely on the IT to make the changes for the findings to observations, is that correct, or would you go back in and make those changes?

MS. BEHLING: Yeah, this is Kathy again. Can you hear me better now, court reporter? If you're hearing me (audio distortion).

DR. ROBERTS: If the court reporter confirm that they can hear better, that would be great.

THE COURT REPORTER: Yes, ma'am. Thank you very much.

MS. BEHLING: Okay. And I apologize for that.

What I -- what I would recommend is let's wait to hear from Lori in two weeks to see if we are going to be able to make this transition from findings to observations as an automatic thing. If that's the case and IT can tell me how I go about putting the data in so that they can recognize that this is an observation and do an automatic change, that, I think, is the most prudent thing to do. It just seems like we have a window of opportunity here to enter the data correctly.

And when I go -- I spend a lot of time in the BRS, and I spend a lot of time on reading transcripts, and there's a whole lot of things I would like to update and correct and make more clear in that BRS. And so, I think that I would just recommend -- or I would suggest that we wait to hear from Lori as to what the IT people say, and then perhaps take up the decision.

CHAIR BEACH: Yeah, I -- I agree with that. Paul and Loretta, what do you think? Same?

MEMBER ZIEMER: Well, I -- I'm -- this is Paul. I'm fine with that. I think we're very reliant upon the IT people and Kathy and -- and Lori to -- to

handle this. I think -- I think we know what we -- what we need, and they seem to be doing a good job of getting it in place, so I'm good with it.

CHAIR BEACH: Okay, thanks, Paul.

And then, Kathy, you had modifying SC&A's PER protocol. You wanted to bring us up to date on that?

MS. BEHLING: Yes. And before we leave this subject, can I just ask Lori one additional question?

Lori, you --

CHAIR BEACH: Sure.

MS. BEHLING: -- mentioned that -- that IT is going to add the observation. Can -- are they also going to be able to give us comments? Can we have a drop-down box, that will give those findings, observations, and comments so we can eliminate this finding of no finding?

MS. MARION-MOSS: This is Lori. Kathy, I failed to mention that they are looking into your list of requests, and that includes the comments. So, everything that you and I discussed, they're looking at everything. Okay?

MS. BEHLING: Okay. Thank you.

MS. MARION-MOSS: Thanks so much.

MS. BEHLING: Okay. All right, Josie, if you want me to quickly go over -- what is -- what has happened here is as a result of our contract rebid, Bob Barton and I had some discussions regarding our PER protocol. And I know that Josie, and previously Wanda, had questioned we have in our report and in our protocol that there are five subtasks. Just the simple things. And subtask five just states that we will prepare a written report of our subtask four, which is our case review.

In reality, our current subtask four really covers subtask five in practice. So, we're just proposing that we remove subtask five, and we merge it into subtask four with some appropriate language. And this would just require that we modify our protocol, which will be real -- very simple, and our template for doing the PER written report. I just needed to get the subcommittee's approval before we go ahead and make that change.

CHAIR BEACH: Yeah, I'm in agreement with that, Kathy. I know we talked about it quite some time ago, so yes. I'm a yes on that.

And Paul, do we still have you for another minute here?

And Loretta, are you still with us?

MEMBER ZIEMER: Yeah, I'm still here. I'm good with it, yeah.

CHAIR BEACH: Okay. Thanks.

MEMBER ZIEMER: And I'm bailing out here shortly.

CHAIR BEACH: Okay. We'll see you back in an hour.

MEMBER ZIEMER: Yeah.

CHAIR BEACH: Just interrupt --

MEMBER ZIEMER: Thank you.

CHAIR BEACH: -- and let us know you're back.

MEMBER ZIEMER: I will.

CHAIR BEACH: Okay, thanks, Paul.

DR. ROBERTS: And Josie, can -- Loretta, can we get verbal confirmation from you that you're still on the call?

MEMBER VALERIO: Can you hear me now?

DR. ROBERTS: Yes. Okay. Great.

MEMBER VALERIO: I'm a yes on that, too.

DR. ROBERTS: Okay.

CHAIR BEACH: Okay. The fourth item was tasking of unreviewed documents. Should we wait until Paul comes back later or go ahead and go forward with that?

DR. ROBERTS: Josie?

CHAIR BEACH: Yeah.

DR. ROBERTS: You might want to -- you might want to wait on that.

CHAIR BEACH: Yeah, that's kind of what I was thinking, too. Okay.

CARRY-OVER ITEMS FROM JANUARY 2024 SPR MEETING

CHAIR BEACH: So, let's move on to the agenda and the carry-over items starting with the first item, DCAS PER-40. And --

MR. RUTHERFORD: All right. Just -- and you want me to take it, Josie? This is LaVon Rutherford.

CHAIR BEACH: Yeah, LaVon, I know Kathy was -- has a presentation, but if you want to go ahead and go first. That -- that's fine.

MR. RUTHERFORD: Okay. I -- Kathy's got a presentation? Because she actually presented on this back in --

CHAIR BEACH: Yeah.

MR. RUTHERFORD: -- November of 2023, and then she did have some follow-up. I know we had a new SC&A document on PER-40 in September on the claims review, but I -- I don't know if --

CHAIR BEACH: (Indiscernible) --

MR. RUTHERFORD: -- it's her -- go ahead.

CHAIR BEACH: Yeah, oh, sorry, LaVon, for interrupting. I thought she

might just, like, give us a brief update, but -- but I'm fine. I mean, I've read it. I'm sure Loretta has also.

MS. BEHLING: And if I can interrupt just a second, this is Kathy, again. Yeah, that presentation got put into this meeting, and as LaVon mentioned, I presented that back in November of 2023, so it really did not belong here. It was just there were so many documents that we were changing dates on, so that inadvertently got added. But I have no presentation. However, Ron Buchanan and I did look at NIOSH's response, and we do have some -- some comments after LaVon's.

DCAS-PER-068 "Electro Metallurgical Co."

MS. BEHLING: Yeah. And can you see --

DR. OSTROW: Yeah, this is Steve.

MS. BEHLING: Sorry.

DR. OSTROW: This is Steve. Good morning, everyone. Next slide, please.

MS. BEHLING: Okay. Are you seeing my screen?

DR. OSTROW: Got it. Yes, we see it.

MS. BEHLING: Okay.

DR. OSTROW: All right. Thanks. So, the purpose, why are we looking at DCAS-PER-00068? So, let's go next. TBD rev. 1 came out in September -- in September 2015, replacing rev. 0 2009. And also, in April 2016, NIOSH issued the PER, P-E-R, and we were -- I think it was passed June of 2023, to review the PER. In January of this year, we issued our report reviewing it.

Next slide, please.

A little background. Okay. A little background. Electro Met, as Paul -- this was sort of put at the front end of the weapons complex. It's a unique -- it was a unique carbide, a manufacturing plant in Niagara Falls, and their purpose was to take uranium tetrachloride, which is green coal -- coal, and turn it into uranium metal. There were a few plants that did this stuff. Electro Met did it from 1943 to 1953.

Subsequently, it was decontaminated and released. The -- at a time that had estimated 50 to 70 workers, actually, at the plant. The weapons portion of -- of Electro Met occupied a single-purpose built 50-by-290-foot single-story building, which they called the "Area Plant." And the site itself was much larger because they had a lot of other things they were doing other than working with uranium.

They -- they received the uranium tetrachloride from Union Carbide Linde plant in Tonawanda, New York. And when they processed it, they sent the finished product, metal, and residues to several other nuclear weapons program sites.

Next slide, please. Next slide. Kathy, if you're running this, you can go to the next slide.

MS. BEHLING: Yeah, I'm sorry. I had myself on mute. I am -- I did something wrong here, and now I have to --

DR. OSTROW: Oh, okay.

MS. BEHLING: -- try to figure it out. How do I --

DR. OSTROW: No problem.

MS. BEHLING: -- get back here? There we go. Sorry.

DR. OSTROW: Yeah, --

MS. GOGLIOTTI: Kathy, use the arrow keys.

DR. OSTROW: Okay. So, the --

MS. BEHLING: Yeah, I tried that. It wasn't working.

DR. OSTROW: All right. Anyway, so what did they actually do at Electro Met? Just a little bit of the background. So, they converted UF_4 coal or the green -- green coal, to uranium metal. They mixed the UF_4 -- UF_4 with magnesium, put the mixture into a metal "bomb," they're called. This is a bomb with a furnace, which started a vigorous exothermic reduction reaction. So, when finished, the bomb was opened, the uranium metal separated from the magnesium chloride slag and was removed.

Uranium was then cast into ingots, and later in the process, the ingots were recast into billets that were shipped to a site for further processing. So, they also -- it's mentioned that the uranium scraps from other facilities were taken in by Electro Met to remelt them into ingots. So, ingot metal processing, basically.

Next slide, please.

This slide is a good one. It shows the different -- the history of operations. There's three operation periods and three standby periods, starting in August 1942. As I mentioned before, everything was over by August of 1953. The plant was designed to have a capacity of about 50 tons of uranium metal per month, but they never actually got up that high. The highest they ever got was 44 tons. So, this shows the different periods.

They -- they were also doing the plant itself, not the -- the uranium part, but the rest of the site was doing other nonradioactive stuff along with

this. I just noted there's a footnote at the bottom here, that we'll talk about more later, that they, in the process of doing stuff, there was SEC-136 that was done a few years ago. We'll discuss that later.

And they found that dose reconstruction was not feasible from the beginning of plant operation until the end of 1947, which means first operation period, the first standby period, and the beginning of the second operation period are already covered by this.

Next slide, please.

All right. Where did the radiation come from? Well, this case, unlike some of our other sites, this one is sort of simple (audio distortion). They're just dealing with uranium. So, it's uranium and the uranium progeny that was the decay chain. And just as an example, they were taking in the U-238, and it has a huge half-life, 4.3 billion years, and there's 13 different radionuclides decay chain, and half-life ranging very short to very long and ending in stable Lead-208. So, this decay chain of uranium produced a radioactive sort of product, and it produced alpha, beta, and gamma radiations.

The -- NIOSH has indicated -- we checked as far as we could. There's no documentation that there were any other sources of radiation at the plant other than uranium and its progeny.

Next slide, please.

So, I'll talk briefly about the SEC-136. It's sort of a crucial document. NIOSH issued the petition evaluation report for all workers in any area of the Electro Met in 2009. Following -- there's a whole series of SC&A reviews and work discussions, etc. And NIOSH revised the SEC to its current version,

rev. 1 of 2012, for the current SEC, changed the SEC period of life, and changed the determination of feasibility for internal dose reconstruction to not feasible. It was -- the first SEC that had feasible, and the dose reconstruction then is feasible after 12/31/47. There was a reason for that, that we can discuss in a little bit.

Next slide, please.

All right. So, the -- so, the final class that the SEC DR came up with was that not feasible estimated internal exposure from August 13, '42, that's when the plant started, through December 31, '47. The internal monitoring data, work area, radiological monitoring data, and source term data are not sufficient to provide an accurate estimate of the bounding dose during this early period. And as I mentioned before, the SEC period encompasses the entire first operation period, the entire first standby period, and part of the second operation period.

Next, please. Next slide, please.

Okay. So, briefly about internal and external radiation monitoring. The -- after the SEC period, the AEC New York's Operations Health -- Health and Safety Laboratory, "HASL," conducted two large air sampling campaigns in November 1948 and 1949. The 1948 air sampling came out higher than the 1949 one, and rev. 1 of TBD chose to use the higher 1948 sampling data, and the 1948 sampling, this was during the summer, August, they had the doors totally open and the windows were open, because, you know, it was hot there (audio distortion), and the ventilation system was also upgraded by then.

So, the -- they chose to use the 1948 data, and the other thing they

chose to do with rev. 1 TBD that they -- their -- they had air sampling data by job type, a bunch of different job titles. And the highest by far was the green salt room operator, that was the actual title -- did that. And did -- we'll see in a minute, that person's air sampling data was much higher concentrations than the (audio distortion). I just noticed there was also substantial floor contamination during the operational period, and less (audio distortion) during the standby period, there's still contamination of the floor. I figured this would help.

Next slide, please.

This was the external monitoring. The -- the beta and gamma from decayed uranium isotopes and their progeny, alpha wasn't considered. Too short of a range for (audio distortion) health. External exposures differed significantly for different job titles. The external dosimetry includes during the second operational period, and NIOSH collected data of 58 employees, represents 21 job types, from June '48 to September '49.

And (audio distortion) interesting, Table 5 for the TBD, shows all the external dosimetry data for the 21 job titles. And I just want to mention, I mentioned before, the green salt room operator, he was exposed to 577 times the -- the --

(Whereupon, sirens sound.)

DR. OSTROW: -- (audio distortion) level of (audio distortion) integration to (audio distortion) meter, and the green salt room operator was exposed to 577 times that. So, rev. 1 of the TBD provided the highest green salt room operator for everybody. I think part of the reason why they weren't overly sure who was in which place when people moved around

(audio distortion) the highest exposure.

All right. So, let's go to the next page. Next slide, please.

All right. Now, subtask one of this review changes necessitate -- necessitating the PER. And I have on the following slide the information. But the -- the basic reason was, they changed from TBD rev. 1 -- 00 to TBD rev. 1 with different data, different methods, so NIOSH decided to issue a PER. So, we reviewed every -- all the documents. We (audio distortion) incorporated into rev. 1, and we agree with NIOSH that the impact on worker doses support the need for PER. So, that's the determination.

The next slide, please.

The next two slides are busy, and I'm not going to read them. (Indiscernible) the actual chronology of what happened with Electro Met. People who have been here for a while, you might remember that 2006, we had a document called TBD-6001 revision -- rev. F0, and this is general guidance for all uranium processing facilities. Because even if (audio distortion), they weren't broken out separately.

2007 is TBD-6001 has various entities, including the entity, which is Electro Met (audio distortion) Electro Met. In 2009, I mentioned that was the first revision of the evaluation report, when NIOSH concluded that dose reconstruction was feasible. We reviewed it, work group discussed it, and in the second column, 2011, the Electro Met TBD was broken out as a standalone document. Nothing has changed from what it was (audio distortion).

We did a review of the rev. 1 of the SEC. It came up (audio distortion). The -- going on -- can you go to the next page please?

Okay. Okay. Work group meeting, etc., back and forth. In 2012, NIOSH issued rev. 1 of the SEC evaluation report, which I discussed in the beginning, and determined that it can't reconstruct internal dose (audio distortion).

2012, that's the second column now, SEC (sic) issued an addendum (audio distortion) 2011, in response to rev. 1 of (audio distortion). This was called a partial review. This was a (audio distortion), and we had the -- updated the issue matrix (audio distortion). And, going down to the end there, 2015, SEC rev. 1, which was (audio distortion) and which incorporated (audio distortion) standard (audio distortion) and the (audio distortion). And finally, NIOSH issued the (audio distortion).

Next slide, please.

All right. This is subtask two of the PER, and, here, we have some caveats and cautions to be noted. That SC&A has not formally reviewed rev. 0, or rev. 1 of the SEC, but we tangentially reviewed them during the ER evaluation. So, we have to look at the TBD, so we didn't formally review them. What the -- we performed, with this PER review, a limited review of the two revisions to see how the changes from rev. 0 of the TBD changed to the rev. 1, and how that might affect dose reconstruction.

And the last bullet, the records at issue, (audio distortion) states a substantial update of the documents re-analysis of the external and internal dosimetry data constitutes a total rewrite of the document. (Indiscernible) read it carefully, too (audio distortion). NIOSH was very justified in issuing the PER.

The next one.

Just some more caveats. We are putting things in perspective. And, as I mentioned, on 2012, the (audio distortion) previous report (audio distortion). We had updated (audio distortion) and SC&A's comments. And looking carefully at subsequent work groups where this was discussed, although, the findings were -- most of them were discussed, there was no systematic review or disposition of the findings. So, that means the work group -- SC&A, NIOSH, and the work group members, discussed this, but, there was never any disposition of any of the findings. So, everything was still left up in the air.

And as I mentioned, again, we haven't been tasked with reviewing rev. 1 of the TBD to see if it resolves the findings made on rev. 0. But it's still a hanging issue.

The next slide, please.

And I'm not going to go through the changes from rev. 0 to rev. 1 because that would be very expansive. This is a few highlights. This is -- as I mentioned, rev. 1, added a lot of material based on the granted, SEC-136 incorporating many more monitoring (audio distortion) and updating the standard methods guidance (audio distortion). For example, rev. 1 of the TBD made several very claimant favorable assumptions determining the (audio distortion), therefore, resulting inhalation, ingestion doses (audio distortion) adopted the 1948 (audio distortion) chose the air concentration data for (audio distortion).

As far as external dose, that -- this was a general change in methodology. The increased external photon dose rates were normal. So, that was a big change.

Next slide, please.

Okay. And the PER states that the changes in rev. 1, of the TBD resulted in an increased external dose estimates for all claims completed using an earlier version, and because of this, it was not necessary for the PER to itemize any other increases in dose or further break down the time period to affect the general increase in doses. So, in light of the statement, SC&A examined NIOSH's approach to assigning external doses, and we found that the revised external dose section contained much more information and guidance. It expanded, to give you an idea, from one page to about 13 pages in length, much, much more detailed now.

Okay. We can go to the next slide, please.

And this is from the selection of how the external dosimetry changed. The -- I'm not going to read all the different items here, but all of the assumptions that are made are quite claim -- claimant favorable and intend to increase the dose than what was originally calculated in rev. 0.

Change to the next, please.

This is a -- this comparison from TBD rev. 0, Table 3 to TBD rev. 1, Table 7, we made up this little table here. And it shows the -- the shaded sections are rev. 0, and the unshaded are rev. 1. And it shows -- just for example, for -- rev. 0 has the photon dose for the operators a little under 4,000 millirem per year and supervisors 1,000 and others 256. Rev. 1 just rates everyone as uniformly to 4,403 millirem per year. And part of the reason that was done was, I think I mentioned earlier, there was some issue about -- there was still some issues about who was doing what and where and when. There was changes to job assignments, people tended to go -- to

be in different areas, so it was decided that you couldn't break it down -- the doses to the -- any further, so just everybody was assumed to have the higher dose.

And the standby period, still in column one, of photons, before it was 256 millirem per year dose, and it was raised to 1 -- 1.4 rem per year during the standby period. And part of that is, I think, from contamination on the floors and other places.

Next slide please.

This one's a little bit interesting. Okay. Subtask three, the PER selection criteria. (Indiscernible) easy. The number of previously completed dose reconstructions were small, so NIOSH didn't do any sampling. They just went ahead and examined all the claims with a probability of causation less than 50 percent, which amounted to 63 cases they looked at. They looked at every single one. NIOSH -- so, deleted from consideration 25 of those cases that qualified for -- for inclusion within the -- within the SEC, so, they were eliminated immediately.

Then reading -- this is from the PER. After performing new dose reconstructions of the remaining 39 cases, NIOSH found that 19 of those POCs less than 45 percent, and 20 had POCs greater than 52 percent. We found the selection process valid, had no findings. But this is -- what I wrote in the last bullet is not exactly correct either.

Just -- just before the meeting began this morning, I took a look at the slides again, and then I realized that the arithmetic doesn't add up exactly. If you started with 63 cases and you eliminated 25 of them because of the SEC, you should only have 38 cases, not 39 cases left. So, the arithmetic is

off by -- somewhere by one -- one case unless I told you this something, but it's pretty clear in the -- in the PER.

So, either the 60 -- either it's not 63 cases, or they didn't deliver -- delete 25, or they just did an arithmetic error. It doesn't change any of the conclusions, but I asked NIOSH -- they probably can't think off their head right now, but somehow their -- the PER is off by one case. The arithmetic doesn't quite work. And although I looked at this many times, you know, I didn't even notice it until right before the -- today's meeting.

Okay. So, the last -- one more slide, please.

This is our recommendation that we recommend that the Board select two cases for production workers covering the operational period with POCs still less than 45 percent after NIOSH reworked them. So, that's our recommendation for the audit.

And, the other recommendation, which is a little bit outside of this, that it would be a nice idea to actually formally review TBD rev. -- rev. 1. As I mentioned, we just did a -- a limited review to this PER review.

Okay. So, that's it. Next slide, questions.

CHAIR BEACH: Thank you, Steve. This is Josie.

DR. OSTROW: You're welcome.

CHAIR BEACH: Oh, my phone's gonna die, let me switch it real quick.

DR. OSTROW: Okay.

CHAIR BEACH: Okay. I'm back. Do I have you there?

DR. OSTROW: Yeah, I'm here. We hear you.

DR. ROBERTS: Okay. Sorry. Sorry, Josie. I've just been notified that the court reporter is having some difficulties hearing Steve.

DR. OSTROW: Oh.

CHAIR BEACH: Oh, goodness. Did -- yeah, that was a long --

DR. OSTROW: Yeah. I have my phone on speaker phone while I was looking at the slides, so that -- maybe I was turning my head away.

CHAIR BEACH: Okay. So, I guess we all need to be aware that we are being recorded, so we have to be careful how we're speaking and make sure we're speaking into our devices.

A couple of things come to mind on this. We're not gonna close it out because -- we'll wait for Paul's questions, but my question is you talked about a total rewrite, going back to slide 14 and then SC&A has not reviewed rev. 1, and then we've -- the recommendation is to select two cases. Do you think we need to formally review rev. 1 before we select the four cases -- or the two cases? And that's a question to Steve and Kathy. And then the total rewrite, that would be to NIOSH, when we're expecting that.

DR. OSTROW: Well, they did it already. Rev. 1 is a total rewrite of rev. 0, but SC&A was never actually tasked to either review rev. 0 or rev. 1 of the TBD. We just --

CHAIR BEACH: Oh, okay. So, I --

DR. OSTROW: -- reviewed it tangentially. (Indiscernible) --

CHAIR BEACH: Okay. So, it's already --

DR. OSTROW: -- tangentially.

CHAIR BEACH: Okay. Thank you --

MS. BEHLING: Yeah, and I --

CHAIR BEACH: -- for clarifying that for me.

MS. BEHLING: Okay. And I'm sorry Josie, if I can, interject here also. Typically, when we get a PER, under subtask two, we -- if we have not reviewed the technical basis document or whatever is associated with that PER, we do that under subtask two. In this particular case, because we felt that might be a little too much to include into this PER, we decided to recommend that we have that as a separate tasking, because it was a complete rewrite. And we just thought that it may not be appropriate to include all of that under the subtask two. But that's typically what we do. This is sort of an exception in this particular case. So, I -- I do agree that we probably would need to have tasking on this. And I don't think there is a separate Electro Met work group.

DR. OSTROW: No, I don't think so.

MS. BEHLING: No. And I don't think --

CHAIR BEACH: No.

MS. BEHLING: -- that tasking belongs here. And the other thing I will say with regard to subtask four, that the case reviews are associated with this PER, if we review rev. 1 and we have findings and changes are made, there will be a rev. 2 issued, and there will be a new PER, so I don't think there's any problem in also tasking the subtask four just so that we can close out this PER-68. Does that make sense?

CHAIR BEACH: Yes. It makes perfect sense. Okay. And that -- we'll add that to your list of -- when we get to the tasking later, the DCAS PER-068 rev. 1 and the -- the -- we can go ahead and do the subtask two -- four tasking, I believe, now. Is that correct, Rashaun? That's a formality generally.

DR. ROBERTS: Yes.

CHAIR BEACH: Okay. And Loretta, any comments, questions on the presentation? While we're waiting -- waiting for Loretta --

MEMBER VALERIO: Can you hear me? Sorry --

CHAIR BEACH: Go ahead.

MEMBER VALERIO: -- about that.

CHAIR BEACH: Nope, go ahead.

MEMBER VALERIO: Josie, can you hear me?

CHAIR BEACH: Yes.

MEMBER VALERIO: So, I have a couple of questions, and because we didn't have power, for almost 24 hours, I couldn't go back and, you know, do some reading, but -- and I don't have my notes with me, because I'm not at home, but I do have a question. Maybe they can refresh my memory. During the standby period, was the site fully staffed? That's one question. And the other question is, if operations ceased in June of 1953, and what I read was it was subsequently decontaminated and released, why was there still a standby period after June of '53, and when did the residual period begin?

DR. OSTROW: Oh, okay. So, they kept the last standby period because the Atomic Energy Commission wasn't sure if they were going to decommission the plant or not. They were thinking then well, do we still need to -- to have this plant operating, so they put it in standby while they made the decision. So, it was standby for a while, then they decided that they were going to decommission it. They weren't going to use it anymore for uranium work.

CHAIR BEACH: We still have you, Loretta? Okay. Any follow-up questions?

MEMBER VALERIO: Just whether or not the site was fully staffed during the standby periods.

DR. OSTROW: I believe it was because they were doing a lot of other stuff at the -- at the site that wasn't radioactive involved, and they kept things running. You know, they were doing other stuff. I think on that chart that shows the different periods, they were producing -- doing something with zirconium metal at one point in the area plant, even though they weren't doing uranium then, they were doing, you know, zirconium. So, they were doing other stuff other than uranium. I think even during the standby period, they were operating and doing things which might not have been radioactive.

So, as far as I can recall, I think they were fully staffed all the time. And it varied, I mean they changed the number of people they had, but there was still a good number of people during the standby period.

MEMBER VALERIO: Okay. And were there any radiological surveys during the standby period?

DR. OSTROW: That is a good question. I -- you know, I don't recall. I would have to go back to the literature to find out. Does NIOSH know offhand if they did any of that?

DR. TAULBEE: I'm sorry, could you repeat the question, please?

MEMBER VALERIO: Were there any radiological surveys conducted during the standby periods?

DR. TAULBEE: Off the top of my head, I don't recall that there were,

but I would have to go through and look at that documentation. The first standby period, I don't -- in fact, I'm quite confident there was no radiological surveys during that, because that's part of the SEC and that was part of the issue of us designating that SEC. But the second standby period, I'm -- I'm not sure of. We can get back to you on that if -- if desired.

CHAIR BEACH: So, Tim, --

MEMBER VALERIO: (Indiscernible) I was just --

CHAIR BEACH: Oh, sorry, Loretta, go ahead.

MEMBER VALERIO: No, I was just saying that I was just curious whether, you know -- because of the residual contamination, I was just wondering if there was any surveys during the standby period. That was my question.

CHAIR BEACH: Okay. And I just wanted to get the dates. This is Josie again. The first standby period and the operating period was August 13, 1942, to December 31, 1947, correct?

DR. OSTROW: For the -- yeah, for the SEC, yeah.

CHAIR BEACH: Okay. And then the second period, what were those dates, again?

DR. OSTROW: The first operations period was August 13, 1942, to August 31, 1946. First standby was September 1, '46, to September 30, '47. And the second operations period began October 1, 1947, and went through September 30, 1949.

CHAIR BEACH: Okay. I was --

DR. OSTROW: That's on -- that's on slide five.

CHAIR BEACH: Right. Okay.

DR. OSTROW: Yeah, it's on the screen now. You see it?

CHAIR BEACH: Yeah, I was trying to find that again. My question, which is close to what Loretta was asking, was on slide nine. There was substantial floor contamination during the operational period, but less during the standby period. That was on --

DR. OSTROW: Yeah. That --

CHAIR BEACH: -- slide nine.

DR. OSTROW: Yeah, that -- that would imply that someone actually took a measurement during the standby period, but I don't have that in front of me to check it. But this -- this was from our report and -- in our slide, so it must have been based on something. So, it sounds like there was some surveys during the standby period.

CHAIR BEACH: Yeah, and I'm -- I guess I was wondering about a cleanup period, if there was any cleanup done. It wasn't really mentioned.

DR. OSTROW: No, we didn't go into the -- the D&D part after they stopped operations completely.

CHAIR BEACH: Yeah. Okay. Anything else, Loretta?

MEMBER VALERIO: No, not right now.

CHAIR BEACH: Okay. I would suggest that we hold this for more discussion when Paul gets back. I know he had a list of questions on different procedures, so. And he's expected back in about 10-15 minutes or so.

So, we have -- we have selected -- or we have tasked to review two cases, and I think we should -- we can go ahead and move on unless there's anything else. All right.

Good reporting, Steve. A lot of information there.

DR. OSTROW: Probably too --

CHAIR BEACH: Thank you.

DR. OSTROW: Probably too much information. I tend to stuff my slides with information.

CHAIR BEACH: Well, it's kind of handy to have some information. All right. It looks like Amy is up next.

NIOSH'S Program Evaluation Report DCAS-PER-070

"Nuclear Metals, Inc."

MS. MANGEL: Hi, can everyone hear me?

CHAIR BEACH: Yes, --

MS. BEHLING: (Indiscernible) --

CHAIR BEACH: I can.

MS. BEHLING: Can I just confirm that you're seeing my slides?

CHAIR BEACH: Yes, we're seeing your -- I'm seeing your slides.

MS. BEHLING: Okay, thank you. I'm sorry to interrupt.

CHAIR BEACH: No, no worries.

MS. MANGEL: Okay. This is Amy Mangel with SC&A. I'll be reporting our review of PER-70 for Nuclear Metals, Inc. The purpose was to address the impact of issuing the TBD for NMI on previously completed cases. Before the TBD was issued, dose reconstructions were conducted using site research that was summarized in a SEC evaluation report.

Background to the site: Beginning in 1958, activities included producing depleted uranium products, supplying uranium billets to Savannah

River reactors, manufacturing metal powders, handling thorium and thorium oxide. Two classes of workers were added to the SEC from October 29, 1958, through the end of '79, and the second class from the beginning of 1980 through the end of 1990, and it was determined because internal dose for thorium and enriched uranium couldn't be estimated with sufficient accuracy.

The covered period began in October 29th of 1958, through December 30, 1990, and the residual period begins January 1, 1991, through March 1, 2011.

So, task one, the changes necessitated in PER, the dose reconstructions had previously been conducted using site research in a SEC ER, and the TBD was issued in April of 2015. We had not previously reviewed this TBD, so therefore as part of our subtask two review of PER-70, we also reviewed the TBD for its overall (indiscernible).

For the internal dose estimate, internal dosimetry is believed to exist for most workers at NMI. There's uranium urinalyses with an assumed minimal -- minimum detectable activity of 0.005 milligrams per liter. The TBD says to use a specific activity of 683 picocuries per milligram for natural uranium. And for workers that don't have internal dosimetry records, the TBD says to use OTIB-84, which is the NMI coworker internal dosimetry guidance document.

We agree that internal dosimetry records should be used for dose reconstructions, if it's available, and if it's not available, to use OTIB-84. Just a note, OTIB-84 has not yet been reviewed by SC&A, and we didn't review that document as part of this PER review. And we also note that the

co-exposure model in OTIB-84 has been updated to meet the newer guidance from IG-006.

Observation one: Clarification needed on the type of uranium assumed for exposures for monitored and unmonitored workers. So, in the TBD, it suggests using a specific activity for natural uranium of 683 picocuries per milligram. In OTIB-84, it used a uranium-specific activity of 360 picocuries per milligram, which is consistent with depleted uranium. So, we were just kind of wondering and looking for clarification on the reasoning behind the different assumptions between monitored workers being exposed to natural uranium and unmonitored workers exposed to depleted uranium.

And note the specific activities of natural uranium and depleted uranium that were used in the TBD and in OTIB-84 differ from the values that are used in Table 31 of -- 3.1 of TBD-6000.

Observation two: Additional information needed regarding other bioassay measurements NMI workers received during operations. The SEC evaluation report addendum states that the first in vivo bioassay for NMI was conducted in 1981. They acquired a whole-body counter for uranium lung counting and performed over 800 lung counts from '82 through 1990. And the TBD didn't discuss any lung counting or information about how those measurements could be used in dose reconstruction, and we believe that the TBD could benefit from a discussion about these other possible bioassay techniques.

For external dose, a majority of the NMI workers have had external dosimetry. Table 1 of the TBD describes the different dosimeter types, the sensitivity of the dosimeters, the manufacturer, the exchange frequency.

For a worker who might not have external dosimetry records, an over or underestimating approach could be used, or a co-exposure model could be developed.

And we agree that the records should be used when available and when unavailable, using over or underestimating assumptions is appropriate. And it should be noted that an external co-exposure model has not yet been developed for NMI workers.

Observation three --

MEMBER ZIEMER: This is Ziemer. I'm back aboard. I just wanted to let you know.

CHAIR BEACH: Okay. Thank you, Jim -- Paul.

MS. MANGEL: Observation three: Missing guidance on the energy ranges for assigned doses. The TBD doesn't provide guidance about this, and we assume 30 to 250 keV photons are appropriate, but believe that this information should be in the TBD -- should be included in the TBD.

Observation four: We were unable to verify the minimum detectable sensitivities that are listed in Table 1 of the TBD. We reviewed several different SRB -- SRDB documents, and we weren't able to verify all of the values that are listed in that table. In our report, it goes into more detail about which documents we reviewed, but we weren't able to verify every value listed in that table.

For observation five, additional clarification is needed regarding shallow and deep dose for post-1983 dosimetry records. So, in 2019, SC&A reviewed a dose reconstruction for a former NMI employee, and in that review, we noted that starting in 1983, the reported shallow dose included

deep dose in the record, and NIOSH indicated that we were correct and that they would provide additional instructions to the HPs doing the dose reconstructions for NMI. The TBD was written before the dose reconstruction was reviewed, but we're just reiterating this concern just to make sure that the issue isn't lost.

MEMBER VALERIO: Amy?

MS. MANGEL: Observation -- yes?

MEMBER VALERIO: This is Loretta. I'm sorry. I just wanted to make sure that -- since Paul just stepped back on that he knew that we were reviewing PER-70.

MS. MANGEL: Yes, thank you. Good point. Yes, this is PER-70 for Nuclear Metals, Inc.

For observation six, discussion is needed on the presence of industrial radiography at the site and potential doses to workers. We found on page 46 of SRDB document 25090, it described two industrial X-ray machines that were kept at the site, and they were used for X-ray of metal specimens and parts. And we believe that the TBD would benefit from including some sort of discussion about the potential dose to workers from industrial radiography at the site.

For neutrons, SEC 195 evaluation report stated that neutron monitoring wasn't performed at the site, but the potential for neutron exposure existed. The evaluation report also states that OTIB-24 should be used to assign unmonitored neutron dose. However, the TBD doesn't discuss potential external neutron dose. This issue has been discussed by the Board for other sites, and the potential dose is small and further

consideration of neutron dose may not be needed. However, we believe that it should be at least addressed in the TBD to some degree.

For the residual period, internal dose from uranium, NIOSH used the -- used a maximum uranium intake rate of 574 picocuries per day that comes from OTIB-84 and the guidance from TBD-6000 to calculate the surface contamination level of 169,700 picocuries per liter squared. Using the resuspension factor of 1E to negative 5, they calculated a uranium inhalation intake rate of 11.2 picocuries per day, and no uranium ingestion was calculated since the values from OTIB-84 were based on urinalysis results. And these intake rates were -- each year these intake rates decreased due to source-term depletion for the guidance from OTIB-70.

For residual period internal dose from thorium, there were no thorium bioassay or contamination measurements. Site's -- the site's thorium contamination guideline of 5000 dpm per 100 square centimeters total alpha was used. It was divided by three to account for the three alpha decays in the thorium decay chain.

Similar to uranium, NIOSH calculated a resuspended thorium concentration and then an inhalation intake rate of 11 dpm per day. Thorium ingestion was calculated using the surface contamination value, which came to 100.5 dpm per day. And these intake rates would be applied for each of the five radionuclides in the thorium decay chain, and these intake rates would also decrease each year due to source-term depletion for OTIB-70.

We were able to match the calculated intakes for uranium inhalation, thorium inhalation, and thorium ingestion. And we also confirmed the

values in TBD Table 3, which are the different intake rates as they decreased each year due to the source-term depletion.

Observation seven: Discussion needed on the potential for overtime at the site. The calculations for the residual period internal and external dose are based on 2,000 hours per year. If workers routinely work overtime, it might be appropriate to adjust that assumption. And during worker outreach activities in 2012, it was repeatedly mentioned that there was an overtime policy. So, it might -- this is something that might need to be considered.

For the residual period external dose from uranium, the previously -- the previous surface contamination level based on intake, they used the uranium dose conversion factors from TBD-6000, and assuming 2,000 hours per year, came up with 0.3 millirem per year from photons and 28.8 millirem per year beta. For thorium, the surface contamination limit of 5,000 dpms per 100 square centimeters, using dose conversion factors from EPA Federal Guidance Report No. 12 and assuming 2,000 hours per year, came to 1.9 millirem per year from photons and 9.6 millirem per year beta.

We were able to match the calculated uranium external dose rate. We confirmed that the dose conversion factors came from Table 3.10 of TBD-6000. We were also able to match NIOSH's calculated thorium external dose rate and confirmed that the contaminated ground surface dose conversion factors from Federal Guidance Report No. 12 were used.

For occupational medical dose, there's no site-specific guidance for NMI. It's recommended to use OTIB-6 and assume pre-employment, annual, and termination examinations, and we agree with this -- with the

guidance of using OTIB-6 and the assumed frequency.

For subtask three, the PER selection criteria, first, it considered all completed claims with employment at NMI with a POC less than 50 percent, and this was 21 claims. Three of those already used the TBD, so they were removed from further evaluation, and this left 18 claims. And these 18 claims were re-evaluated using the TBD. Sixteen of them had a POC below 45 percent, and two had a POC between 45 percent and 50 percent. So, for those two claims, IREP was run 30 times at 10,000 iterations, and the POC was still below 50 percent for both of those claims. We agree with their selection criteria and that they were broad enough to capture all the potentially affected claims.

The PER was conducted in a timely manner. The TBD was issued in April 2015, and the PER was issued in April 2016.

Subtask four: We recommend that the Board select one of the cases evaluated by NIOSH that had a POC between 45 percent and 50 percent provided that case contains the exposure pathway discussed in the PER. And that's it. Any questions?

CHAIR BEACH: Thanks, Amy. Good reporting. I had a question on slide 14 about the documents. You weren't able to verify some of the things in Table 1. Can you give us a little more of a -- of how -- how many documents you were lacking to verify that table?

MS. MANGEL: Let me look in our review. I don't recall offhand. Okay. So, in -- in the review that we submitted, I had a table that covers the different time periods that were covered by the SRDB documents that I reviewed, and the -- the reported minimum in the SRDB document -- I -- I

think I was able to verify most, but not all. I'm sorry, I can't -- I don't remember the specifics off the top of my head right now, but it wasn't -- it wasn't that I couldn't find everything; it was just that I couldn't find some things, and it -- it's more clear in the report. I just -- I can't --

CHAIR BEACH: Yeah.

MS. MANGEL: -- remember off the top of my head.

CHAIR BEACH: Okay. No problem. I can go back to the report also and look. I was just curious if it was a substantial...

And then, Paul, any questions for 70 or Loretta?

MEMBER VALERIO: This is Loretta. I don't have any.

CHAIR BEACH: Okay. Thanks, Loretta.

Dr. Ziemer, are you there? Do you have any questions? I wonder if we lost him, or you're on mute, Paul, maybe? No, I'm not hearing from Paul, and I was gonna --

MEMBER ZIEMER: Okay. Can you hear me now?

CHAIR BEACH: Yes, yes.

MEMBER ZIEMER: Can you hear me now? Okay.

CHAIR BEACH: Yes.

MEMBER ZIEMER: Sorry. I was on mute. I am on the road right now, so I -- there may be some road noise here. But I have no questions on this one.

CHAIR BEACH: On 70. Okay. So, we were asked to select one case for review in subtask four. Are we in agreement with that, and we can go ahead and task that?

MEMBER VALERIO: This is Loretta, yes.

CHAIR BEACH: Okay. And, Paul, are you in agreement with that? I know you're on the road.

So, Rashaun, I think we should go ahead and -- I was going to wait a bit to take our break, but let's go ahead and take a 30-minute break and then -- and go forward --

MEMBER ZIEMER: I'm in agreement on that. Can you hear me now?

CHAIR BEACH: Yeah, why --

MEMBER ZIEMER: Can you hear me now?

CHAIR BEACH: Yes.

MEMBER ZIEMER: Yeah, I -- I'm in agreement with that, yeah.

CHAIR BEACH: Okay. We were going to circle back around to PER-40 and 68 for questions before we officially close those out, but I'm suggesting that we go ahead and take a 30-minute break and then get back started in a 30-minute time period. It's --

Rashaun, are you okay with that?

DR. ROBERTS: Sure, if that's okay with the rest of the group.

CHAIR BEACH: Sure. It gives Paul a chance to get home to his notes, and then we can just move forward.

DR. ROBERTS: Yeah.

CHAIR BEACH: Okay.

DR. ROBERTS: I agree. So, we will come back together at about 1:15 Eastern?

CHAIR BEACH: Yes.

DR. ROBERTS: Okay.

DR. ROBERTS: Sure. Okay. I will post.

CHAIR BEACH: Okay. Great. Thank you, everyone.

(Whereupon, a break was taken from 12:46 p.m. EST until 1:16 p.m. EST.)

DR. ROBERTS: I will start with roll call in just a moment. Okay. Well, hopefully everyone's back on. I have 1:15 Eastern, so I will start with a roll call to make sure that the subcommittee members are on the line, starting with Beach.

CHAIR BEACH: I'm here.

DR. ROBERTS: Great. Valerio?

MEMBER VALERIO: I'm here.

DR. ROBERTS: Okay. And Ziemer?

MEMBER ZIEMER: Yes, I'm here and back in my home office. Thank you.

DR. ROBERTS: Great. Thank you.

Okay. Over to you, Josie.

CHAIR BEACH: Thank you.

Paul, I want to apologize. I probably should have gave you a little extra time. I didn't know how far from the house you were. So, it's --

MEMBER ZIEMER: No, that -- that -- thank you. Thank you. That was plenty of time, so I'm -- I'm good.

CHAIR BEACH: Okay. Perfect. Okay. So, just to recap, we have completed DCAS-PER-70. We have tasked one case for review. And then circling back to PE -- DCAS-PER-40, Mallinckrodt, did you have some questions?

And so you know, we did select four cases, or we tasked four cases for

review. Oh, no, no, no. I take that back. I'm sorry. So, the report on the four tasks that we selected was out September 26, 2024, so that will be added to our discussions for the next meeting. So, those four have been tasked and completed. Did you have any other questions on the presentation or anything to do with PER-40? I guess we didn't have a presentation, just a response from NIOSH --

MEMBER ZIEMER: So -- so, I'm -- yeah. I was going to ask, there was just a response from NIOSH? Was that all we needed?

CHAIR BEACH: It was a response from NIOSH and agreement on both observations from SC&A with a minor point on the first observation for a change to the TBD. I didn't write it down, so just to --

MEMBER ZIEMER: Well, I think --

CHAIR BEACH: -- to follow up --

MEMBER ZIEMER: -- the first one was just incorrect units, so that was very minor, right?

CHAIR BEACH: Yes, correct.

MEMBER ZIEMER: And --

CHAIR BEACH: So, there was -- yeah.

MEMBER ZIEMER: And the other had to do with the period -- periods of assigning the -- the -- the -- the beta exposures, I believe, and that's --

CHAIR BEACH: Yes.

MEMBER ZIEMER: Were we okay on that?

CHAIR BEACH: Yes, yes. SC&A agreed with both of those --

MEMBER ZIEMER: Yeah, okay.

CHAIR BEACH: -- observations. Yeah.

MEMBER ZIEMER: Okay. Yeah, I'm good on that one. And then on 068, there really weren't any findings. I...

CHAIR BEACH: No, there weren't any findings, but there were some questions asked, Loretta mainly, and just a couple follow-ups. There was also -- we have -- SC&A has reviewed PER-068, rev. 0, and we're going to add rev. 1 for a tasking question for when we get into tasking later. We also selected two cases for review, and those were tasked.

MEMBER ZIEMER: And those follow the recommended -- recommendations of SC&A, right?

CHAIR BEACH: Correct.

MEMBER ZIEMER: Yeah, I'm good then.

CHAIR BEACH: Okay. You didn't have any follow-up questions in your notes? That's why we --

MEMBER ZIEMER: No, no, I'm just --

CHAIR BEACH: Okay.

MEMBER ZIEMER: I'm good on that one. Uh-huh.

CHAIR BEACH: Okay. So, on --

DR. TAULBEE: Josie, this is Tim.

MEMBER ZIEMER: And then on --

CHAIR BEACH: Hey, Tim.

MEMBER ZIEMER: -- on 70, which we were just finishing up, what -- what about responses to -- how are you handling the observations? Does SC&A -- does NIOSH need to respond to any of those, or...?

CHAIR BEACH: Yes. And I think Tim was probably --

DR. TAULBEE: Yeah.

CHAIR BEACH: -- just now going to bring that up, so.

MEMBER ZIEMER: Okay. Thank you.

DR. TAULBEE: Yes, that -- that's correct. We will develop responses for the seven observations on PER-70. But I wanted to circle back to PER-68 real quick. During the break, I did look through the -- the TBD rather quickly, and there are some surveys at the end during one of the standby periods. And one of them is the dismantlement of Electro Met and decontamination survey in August of 1953. So, there is some survey information in that time period in that -- during those standby and shutdown type of time periods.

But I don't think there's a whole lot within that -- within those time periods, but it's there in the TBD. So, I just wanted to circle back to Loretta's question about that, whether there was any surveys. And I was able to locate at least one.

CHAIR BEACH: Okay. Loretta, any follow-up comments or questions?

MEMBER VALERIO: No. No, I was just making a note. Thank you for that, though.

CHAIR BEACH: Okay. Thank you. Yes.

Okay. So, Rashaun, I think we need to vote to close out PER-40. Well, nope, I take that back. We're not going to close that out until we finish up with the review of subtask four, which will be added to our next meeting. 68 and 70, I guess we -- we are not going to close out any of those, so.

DR. TAULBEE: This is Tim. Can I recommend you close out PER-68? I mean, the review of rev. 1 can be a separate task.

CHAIR BEACH: No, no, no, I -- I understand that. But we don't usually close them out until we go through the select or the cases for and review, so we just tasked those two. Isn't that correct, how we --

DR. TAULBEE: Oh, I'm sorry.

CHAIR BEACH: -- generally do that?

DR. TAULBEE: Okay. I'm sorry.

CHAIR BEACH: Yeah.

DR. TAULBEE: I thought we had already reviewed 68. Never mind. I apologize.

CHAIR BEACH: Okay. No worries. Yeah, yeah. Okay.

I was going to get ahead of myself and try and close them out also. So, once we do the two cases for 68, we'll close out rev. 0, and then we'll move forward with rev. 1, if we so desire to task that.

Okay. Anything else, Kathy, that I may have missed on those first three?

MS. BEHLING: No, not that I can think of.

CHAIR BEACH: Okay. So, we can --

MS. BEHLING: I do have one --

CHAIR BEACH: -- go ahead and tee up DCAS-PER-072, and I believe Amy is again on for that discussion. Seymour Specialty Wiring Company. Okay.

Review of NIOSH's Program Evaluation Report DCAS-PER-72, "Seymour Specialty Wiring Company"

MS. MANGEL: Kathy, are you going to present the slides?

MS. BEHLING: Can you see my screen?

CHAIR BEACH: No.

MS. MANGEL: No, not right now.

MS. BEHLING: Okay. Hold on. Okay?

MS. MANGEL: There we go.

MS. BEHLING: How about now?

MS. MANGEL: Thank you.

MS. BEHLING: Yes.

CHAIR BEACH: Yes, thank you.

MS. MANGEL: Okay. So, this is Amy Mangel again with SC&A. I'll be presenting our review of PER-72 for Seymour Specialty Wiring Company. The purpose of the PER was to address the impact on previously completed cases due to the issuing of rev. 1 of Appendix CD of TBD-6000, which is the TBD for Seymour Specialty Wiring Company.

Some background: It starts with Bridgeport Brass Company performed re-electrical work in two different locations. There was the Adrian plant in Michigan and Havens Laboratory in Bridgeport, Connecticut. In May of 1962, the relocation of Havens Laboratory was approved to move to Seymour, Connecticut, and this was Seymour Specialty Wiring Company. And then in 1964, all Bridgeport Brass work was consolidated and moved to Ohio as Reactive Metals, Inc., extrusion plant. Work at Seymour included extrusion, machining, and metallurgical laboratory analysis of uranium products.

The covered period goes from May 15, 1962, to October 21, 1964, with a residual period from October 22, 1964, through 1993. Subtask one:

Rev. 1 of Appendix CD included changes based on revisions to TBD-6000. These changes included changes to the prescriptive dose estimate, which used additional bioassay data for the occupational internal dose and the use of external dose dosimetry data from Havens Lab for the occupational external dose, and there were changes to the residual period dose estimates.

Our review of PER-72 included an evaluation of Appendix CD, rev. 1, for its guidance on dose reconstruction because we had not previously reviewed Appendix CD. Just to note, we have reviewed PER-61 for Bridgeport Brass Company back in 2017 and that included a TBD review. And just mentioning that resolution of issues from that review could potentially impact dose estimates for Seymour since they're related, and some of the dose estimates for Seymour rely on dose estimates from Bridgeport Brass.

For occupational external dose, NIOSH didn't find any dosimetry data for the Seymour site. Since the operations at Havens Lab were moved to Seymour, NIOSH used the 95th percentile of external dose estimates from Havens Lab, and this amounted to 1.225 rem per year gamma and 2.932 rem per year beta, and we agree with NIOSH's reasoning for using the 95th percentile external dose from Havens Lab for Seymour employees.

Observation one: Missing guidance on the energy ranges for assigned doses. The appendix doesn't provide this information. We assume photons would be assigned as 30 to 250 keV, and we would recommend this document include this information.

For observation two: Discussion needed on the presence of industrial

radiography at the site and potential dose to workers. Based on references made in the Bridgeport Brass TBD, the extrusion plant TBD, and the Seymour 1963 monthly progress report in SRDB document 26768 indicate that industrial radiography was used at the site. Use of radiography at the Havens Lab was discussed in a September 2017 subcommittee for Dose Reconstruction -- Dose Reconstruction Reviews meeting, and we believe that the appendix would benefit from a discussion of a potential dose from this to -- to the workers.

For the residual period, external beta/gamma dose, the maximum contact beta/gamma measurement from a long, thin crack on the concrete floor from a 1977 survey, which was confirmed in a later survey in 1980 that was used, and NIOSH assumed a line source and calculated one meter corrected dose rates of 0.0175 and 0.011 millirad per hour. Contact beta/gamma measurements from 1964 surveys were more extensive, and NIOSH assumed a circular source. They used the average measurement from each of the 1964 surveys and the average area of the rooms that were surveyed to calculate one-meter corrected dose rates, and these came to be .0174 and .0214 millirad per hour.

So, with all of these estimated dose rates from these surveys, NIOSH used the highest of the four calculated dose rates and then rounded up to 0.022 millirad per hour. From the 1980 surveys, there was a maximum 1-meter gamma-only dose rate of 0.010 -- 0.10 -- 0.010 -- oh, my gosh -- mrad per hour. The 1-meter beta dose rate assumed -- was assumed to be 0.012 mR per hour, and based on 2,000 hours per year, this came to 20 mR per year gamma and 24 mR per year beta.

We were able to match NIOSH's calculations for the dose rates from the 1977 and 1980 surveys, and we could closely match the dose rates from the 1964 surveys. There was also data from a 1992 survey that we believe should also be considered, and we'll talk about this more in a different observation.

For observation three, the method used to calculate the residual period external dose may not be bounding. It wasn't clear when -- when NIOSH used the measurements from the 1977 and the 1980 surveys, they used maximum measurements, but when using the data from the 1964 surveys, it -- they used average measurements, like the average dose rate and the average room size. In rev. 1 of the appendix, it says that the 0.022 millirad per hour estimate is bounding, but this value was calculated using averages. So, we -- we believe it might be more claimant-favorable to use maximum measurements from the 1964 surveys. And also, if there is a potential for overtime at the site, that should also be considered.

For occupational medical dose, there's no site-specific guidance for the site, and the TBD says to use OTIB-6 to assign occupational medical dose, and we agree with using OTIB-6 since there is no site-specific information.

For internal dose, there were uranium urinalysis samples collected 14 times from 25 employees. NIOSH calculated intakes for 21 of the employees for types M and S uranium. Data from four of the employees was excluded. These employees either had no or only one positive urinalysis result. One high measurement was excluded, and NIOSH calculated the geometric mean and geometric standard deviation of the intakes for each solubility type.

We reviewed the urinalysis results in SRDB documents 9885 and 9895. We agree with NIOSH's determination to exclude the four employees with one or no positive results, and we also agree with NIOSH's determination to exclude the erroneously high results. Subsequent bioassay of that individual did not confirm that high intake. And if I recall correctly, in the files themselves, there were no notes about that value, so we agree that it was probably an error. We were able to verify most of the urinalysis data in Appendix CD Table 1 and refer to finding one.

So, finding one: Urinalysis results duplicated in analyses of occupational internal dose. So, there's a table in the TBD of the -- of the data that were used. And we were unable to locate a record in SRDB documents from February 11, 1964. There is a record from January 10, 1964, that has a date sent of February 11, 1964, and in this table in the appendix, the data listed for these two dates is exactly the same for the same employees except for one entry. So, we believe it might be possible that the data from January 10th were included twice. So, if -- if this is the case, the calculated intakes might need revision. If this is actually a record, if we could just know -- you know, point us to where in the documentation this is. And our -- our feeling that this might be duplicated is furthered by the fact that in rev. 0 of the appendix, it says that there were 13 sets of urine -- urine samples, whereas in rev. 1, it says 14. So, we just wanted some clarification about this.

For observation four, discussion is needed on the potential presence of recycled uranium and internal dose estimates from contaminants. In the Bridgeport Brass TBD, it states that recycled uranium might have been

processed at Haven's Lab after 1952. So, therefore, since the operation is moved to Seymour, it's reasonable to assume that recycled uranium could be handled at Seymour as well. TBD-6000 states that in the absence of definitive information about the origin of the uranium, to assume that it contains contaminants from recycled uranium. And we believe the appendix should discuss this possibility and include dose estimates if necessary.

For observation five, discussion needed on the presence of thorium on site. In SRDB document 9895, there were two liquid waste samples alluding to thorium being at the site. One was labeled thorium coolant from Do-All, and another was labeled thorium chips and coolant from Do-All. In SRDB document 26494, which is the telegram from 1963, it -- it has -- it alludes to confirming dimensions for the extrusion of a thorium rod. So, we believe that the appendix would benefit from a discussion of thorium at the site and its impact on dose reconstruction.

For the residual period, internal dose due to inhalation, NIOSH used the maximum removable contamination level of 112 dpm from -- from a survey after operations left the Seymour site. The highest value of four surveys from 1964 through 1980 assumed 2,000 hours per year and a resuspension factor of 1E to negative 5, which came to an inhalation rate of .736 dpm per day. For ingestion, this 112 dpm per 100 square centimeters was used. It also assumed 2,000 hours per year and an ingestion factor of 1.1E to negative 4 meters squared per hour and came to 6.75 dpm per gallon per day.

We reviewed a 1965 follow-up survey and confirmed that the 112 value was the highest removable contamination measurement from the

surveys between 1964 and 1980. We were able to match NIOSH's calculated inhalation and ingestion rates. We also reviewed a 1993 survey report of the site, SRDB document 10847. This contains a 1992 FUSRAP survey of the site. And this survey wasn't discussed in rev. 1 of Appendix CD and had some results that are higher than 112 dpm per 100 square centimeters, which leads us to observation six.

This survey and its results weren't discussed in revision 1 of the appendix. As we mentioned, some of the survey results included measurements higher than the maximum removable contamination value reported in rev. 1 of the appendix, and it wasn't really clear why the survey wasn't discussed in rev. 1, and we believe that NIOSH should take this survey into consideration for these calculations.

For the PER selection criteria, all previously completed claims with verified employment at the site and a POC of less than 50 percent led to eight claims. Two of these claims already used revision 1 of Appendix CD, so they were removed from further evaluation. One claim had employment at a different site, and when that claim was evaluated under a different PER, changes to Appendix CD were included in that re-evaluation, which left five claims.

So, these five claims were re-evaluated using rev. 1 of Appendix CD, and all claims had a POC below 45 percent. We agree with the selection criteria and believe that all affected claims were captured. The PER was conducted in a timely manner. Rev. 1 of the appendix was in April 2015, and the PER was issued in July 2016.

For subtask four, we recommend that the Board select one of the five

patients -- one of the five cases evaluated by NIOSH, ideally a case with employment in the operational period and residual period, if possible.

Any questions?

CHAIR BEACH: Thanks, Amy. Another good report.

And when we're -- when we are assigning or tasking these, I'm assuming that NIOSH will follow your recommendation on -- on the cases, and if they have questions, I know Lori will reach out to you or SC&A. Questions, Paul or Loretta?

MEMBER ZIEMER: Yes, this is Paul. I have a couple of questions. Amy, if we could look -- take a look at slide 12, and -- and this -- my question is going to deal with this and some others as well. I just want to make sure that the use -- the terminology used here of using the word dose rate and expressing it in milliradians per hour is Seymour's terminology and not SC&A's, because mR per hour is not a dose rate; it's an exposure rate. But I just wanted to make sure, if that's what Seymour was using, then it's fine to express it that way. I just wanted to make sure that SC&A wasn't doing it that way, per se. Do you understand what I'm asking? It's a --

MS. MANGEL: Yes, --

MEMBER ZIEMER: -- little confusing.

MS. MANGEL: -- I understand. (Indiscernible) --

MEMBER ZIEMER: Yeah. If you're quoting --

MS. MANGEL: It -- it's not --

MEMBER ZIEMER: So, that's not --

MS. MANGEL: It was probably just an error --

MEMBER ZIEMER: If that's how SC --

MS. MANGEL: -- (indiscernible).

MEMBER ZIEMER: Yeah, if Seymour was expressing it that way, then that's what you do, yeah. And is that what you're saying, they did?

MS. MANGEL: I don't remember offhand if it was exactly like that in the record. I -- I can look. I just don't remember right now.

MEMBER ZIEMER: Well, yeah, I -- I'm just -- again, I say this is picky, but if -- if this is just how SC&A is summarizing it in their own words, then you don't want to be using dose rate or mR per hour, --

MS. MANGEL: I agree.

MEMBER ZIEMER: -- but if that's how -- but if that's how the original record expressed it, then you have to follow that. So, that's it. Okay.

Okay. My second question had to do with the finding, which looks -- it's really, like, one column in the record was expressed twice, perhaps, but it looks an awful lot like an observation. I just wondered what -- I -- I don't know how others feel, but it looks more like a -- a -- a glitch on recording something by NIOSH.

MS. MANGEL: Well, I -- I think our feeling is if -- if the record was included twice by accident, then -- then the calculations would need to be updated and a different -- a different number would result from that.

MEMBER ZIEMER: Yeah, yeah. Understood. I -- I was just kind of raising -- it looks a lot like observations do in many cases, but I -- I take your point. Okay.

I think that's all I have at the moment.

CHAIR BEACH: Okay. Thanks, Paul.

Loretta, anything on this?

MEMBER VALERIO: No, I don't have anything.

CHAIR BEACH: Okay. And SC&A or Kathy, Bob, any extra discussion on Paul's question on the findings versus (indiscernible) observation? I'm sure you guys hashed this out before the report went out; is that correct?

MS. BEHLING: We did. This is Kathy. Yeah, we -- we were under the impression that this -- that this particular record was entered twice. That's the conclusion that we drew, so we classified it as a finding of that (audio drop).

THE COURT REPORTER: Ms. Behling, could you speak into your microphone?

MS. BEHLING: Yes, is that better?

THE COURT REPORTER: Yes. Thank you.

MS. BEHLING: Okay.

CHAIR BEACH: Okay.

MS. BEHLING: So, that was the reason, but we could discuss this, and I felt that (audio drop).

CHAIR BEACH: Okay. Thank you, and I apologize to NIOSH. I haven't really been circling back to you on questions for any of these. It's been a little chaotic this morning, so I apologize for that.

Thank you to the court reporter for letting us know immediately when you're having trouble hearing. I think that's helpful.

Tim, your team, any -- any comments on this to Seymour?

DR. TAULBEE: No. We -- we will be, you know, developing responses like we typically do after this initial presentation. That -- that's kind of where we're at.

CHAIR BEACH: Okay. And I guess we all kind of assume that. So, if there's questions -- please, if I go over you, please stop me and ask.

And so, in this case, we were asked to -- or select one case for review. Paul, Loretta, are you in agreement with that asking?

MEMBER ZIEMER: This is Paul. I'm in agreement with that.

CHAIR BEACH: Okay, thank you.

MEMBER VALERIO: This is Loretta. I'm --

MEMBER ZIEMER: Yeah, and I --

MEMBER VALERIO: -- in agreement.

MEMBER ZIEMER: Yeah.

CHAIR BEACH: Did you have --

MEMBER VALERIO: Sorry, Paul.

CHAIR BEACH: -- something else, Paul?

MEMBER ZIEMER: I was just going to add on my previous point about the findings. Either way, NIOSH is going to correct it, so I'm okay with it.

I just was -- I just was initially a little surprised that it was a finding because it looks an awful lot like some things that are observations. But either way, it will be taken care of, so I'm good.

CHAIR BEACH: Okay. Great.

MR. BARTON: This is Bob Barton. If I could just add -- add on to that. I -- I understand the question. And I think that the findings (audio break) observations, and estimations have sort of evolved as this program has evolved. And really, you know, I don't think we have a strong feeling necessarily either way. I mean, obviously, a finding is something that we feel might be an (audio distortion). And this case seems like it's very

significant, somewhat of a minor one. But as you just stated, Dr. Ziemer, as long as it's being tracked and followed up on, I -- we don't have a strong feeling either way.

I know in different venues, for example, the DR Subcommittee, we eventually report to the secretary how -- how many findings and, well, presumably just the findings. (Audio distortion), so I understand the sentiment there about correctly classifying this. But, again, I think as long as the issue is being tracked, as you stated, Dr. Ziemer, I don't -- I don't think SC&A -- necessarily the way. I don't know if NIOSH really has a strong opinion on it. But as long as they're following up on it and it's tracked and discussed going forward, I think that's the important point, as -- as you just pointed out.

CHAIR BEACH: Okay. That sounds good with nothing else to discuss unless somebody has something more. Thanks, Bob.

Review of ORAUT-RPRT-0060, Revision 00, "Neutron Dose from Highly Enriched Uranium"

CHAIR BEACH: We will move on to -- with Ron reporting on ORAUT-0060, neutron dose from highly enriched uranium.

DR. BUCHANAN: Yeah. Can you hear me okay?

CHAIR BEACH: Yes.

DR. BUCHANAN: Okay. This is Ron Buchanan with SC&A, as she says.

And today I'll be presenting our review of Report 60 from neutron dose from highly enriched uranium.

Next slide.

Now, Report 60 was issued by NIOSH in March of 2019, and it provides neutron to photon ratios for assigning neutron doses of highly enriched uranium compounds during periods when certain sites didn't have neutron dose data, or it wasn't reliable or not available or not reported. Now, the four major sites that it involved here is gaseous diffusion plants and one uranium metal processing facility, and that's, of course, K-25, Portsmouth, Paducah, and Y-12.

Now, this presentation involves quite a few facets of things because we have four sites. We have two sets of data at most of the sites. We have two different methods of analyzing the data, mathematical average and a quantile regression analysis method. And then on top of that, Report 60 was issued before a white paper was issued in May, but SC&A was tasked with reviewing the white paper from -- the May issue before it was tasked to review Report 60, the earlier report. And so, I'll try to keep it all straight here and not confuse you too much or get it all tangled up. So, we'll progress from here.

So, the source of that, like I say, there was two sources at most of the facilities, and that was when they measured around storage vaults and areas, work areas, surveys. And then we have the second major category is personnel, no photon and neutron dosimetry results from which we can determine neutron photon ratio. Now, not all data was available at both sites, and not a lot of data was available at some sites. So, I'll go briefly through this.

Paducah had neutron and dose area measurements, but no personnel dosimetry measurements to be used. Portsmouth had neutron and photon

around storage areas. However, it had a good amount of personnel dosimetry. And just mathematically averaging, the N:P ratio came out to 0.39 from 3,727 neutron to photon pairs. And these were actually badges worn by the workers and had neutron to photon recording, and so you could determine the N:P ratio. Same way with K-25, had survey instrument. However, the personnel data. I did a mathematical average neutron to photon ratio of 0.42 from 375 pair.

Now, the Y-12 had some area surveys, and this came out to a N:P ratio of 0.4, and had limited personnel data. And the personnel data was limited so they didn't do an average N:P ratio, but they did use a second method, 89 N:P pair was used in the quantile regression analysis, QRA, for Y-12.

Now, summary of the data, we see that in the report, that the Table 5-2 of Report 60 summarizes the average N:P ratio for K-25 and Portsmouth, and the N:P quantile regression analysis at K-25, Portsmouth, and Y-12. So, again, we're talking about two methods in different sites.

For dose reconstruction purposes, now NIOSH said we should use the QRA because it gives a more accurate N:P ratio, and the NIOSH recommends the neutron dose reconstruction methods, which are summarized in Attachment A, Report 60. A pretty concise and useful attachment, two pages, for the dose reconstruction.

Now, we get into now the issuance of two papers, the Report 60, like I say, is issued in March of 2019, and then later on, the white paper neutron dose assignment for K-25 and Portsmouth gaseous diffusion plants in May of 2019, a few months later. Now, they contain essentially the same

information. We evaluate both of them. Report 60, the earlier report, contains a section two, which has some background information, which we evaluated it and will report on.

Okay. So, we'll look at our findings and issues and stuff in the white paper first, because that's what we was tasked with first, and it all applies to Report 60. In September of 2019, we issued a review of NIOSH's May 2019 white paper. We had no findings and three observations. In February of 2020, NIOSH responded to our three observations, and then in July of 2020, we issued a review of their -- their response. And then in January of '21, NIOSH issued a response in the form of a memorandum to the Gaseous Diffusion Work Group concerning our four observations.

So, we'll go into a little bit of the observations here. Apparent inconsistency in use of the limit -- lower limits of detected, the LOD. In 2020, NIOSH responded that the text from the white paper would be revised with correct verbiage when it's added to the site profile TBD. And to make it clear, I think this was mainly concerned with less than or greater or equal to the LOD, the way it was written was confusing or not clear. And we concur with their plans to correct that terminology, and we will review that when the TBD is available.

Observation two, the use of the Portsmouth data values near zero.

NIOSH responded that the uncensored neutron and photon dose data was available Portsmouth, so it was modeled as is. And at the time, we had not evaluated that method. Since then, it has been evaluated, and SC&A concurs that NIOSH's model is mathematically accurate and is okay to use in the absence of other information once we've passed it by our statistician,

and we consider this observation resolved and recommend closure.

Now, the observation three, which gives you the standard N:P ratio versus the quantile regression and Monte Carlo approach, as I stated previously, NIOSH found that the QRA is the preferable method for assigning neutron dose based on photon measurements. And SC&A at that time questioned that, and we put that under review. And as kind of an overarching issue, the QRA method, and since that was in Report 87, kind of a separate issue. And so, later on today, Richard -- well, Griffins will give us a report on that, and at that time, I believe that we've agreed with it, but I'll wait for him to give his presentation.

Now, observation four was the use of the neutron plus photon for calculating neutron dose. I think this was a mathematical error. We found out that they had used in Table 6 of the white paper, N over N plus P, which -- instead of the N over P, which would create a lower-than-normal value for the neutron to photon ratio for the portion of the data. And now, if the QRA method is used, it -- it -- this incorrect value wouldn't have any impact on dose reconstruction, but it should be corrected or -- or explained why NIOSH believes that is the correct value.

The status of this observation four is that NIOSH concurs with SC&A, and corrections will be made in the revised edition. And that they state again they're going to use the QRA method, and SC&A will review that for the correct N:P ratios when that revised TBD should be available for Portsmouth and K-25.

And so, SC&A issued its review of Report 60 in January of this year. We found that Report 60, like I said, contains essentially the same

information as the white paper, so the observations from the white paper I just discussed apply to Report 60. And in addition, as I mentioned earlier, Report 60 contains radiological properties of uranium material in section 2.0, not included in the white paper. So, to verify these values, SC&A reviewed section 2 of Report 60 for its accuracy and validation of the data and the references used, and we identified one finding and two observations concerning Tables 2.1 and 2.2 of Report 60.

Table 2.1, the first one lists the composition of various uranium materials and three very highly enriched uranium materials. And we see that we verified from the reference NAS, 2005 the percent of weight of Uranium-234, 235, and 238. However, in that reference, we could not see where it listed 233 and 236, and those values were listed in Table 2-1 and didn't have any other references apparently referring to those. So, we verified the rest of the data in Table 2-1 and found them correct except as outlined in finding 1.

We found incorrect values in Table 2-1 for recycled natural uranium, low-enriched uranium, and depleted uranium, and I won't go over all these. It's a mass fraction, actually. It seems to be off from that -- from the Y-12 TBD Table 5-7, which was used as a reference here. But NIOSH can look this over and compare it with their resource. And so, the incorrect values -- the implication of this is that the percent weights from Table 2-1, if you use it, from a domino effect, you use it in Table 2-2, then the values will be incorrect in some of the entries in Table 2-2. So, we used the mass fraction from the Y-12 TBD Table 5-7 to derive yield values and compare them to the values in Table 2-2 of Report 60.

Now, so we'll move on to Table 2-2 of Report 60. It lists the neutron yields of various uranium isotopes as a function of the material they're contained in, and it lists the spontaneous fissions and the alpha yields and such in different materials for different uranium and uranium compounds. And we verified that the data for uranium in the first six rows of Table 2-2 are correct using the reference DOE 2009. We evaluated the remaining data in Table 2-2 and found them correct except for new observation five and six as follows:

Okay. When the clarification for NU, LEU, and HEU fission neutron yields data in Table 2-2 in this observation, we found that the rows 7, 8, and 9 were correct except for the spontaneous fission yield column 2. And it doesn't match that list in the document NAS 2005. Now, we went back to source material and calculated their own fission -- fission yield, and we get values very similar to what they did. So, I think there's a mismatch there in the table and the source.

Okay. And then a minor note is the information in Table 2-2 footnote b and c, we found that -- that it should refer back on itself. Table 2-2 is a pretty lengthy table built on itself and rather than referring back to 2-1 for those particular references.

So, a summary of the new finding one and observation five and six is that this is from section 2, which is new compared to the white paper which we previously evaluated. We found that there are concerns with the background information not present in the other white paper and the findings -- and the two observations would not affect the neutron dose assignment recommended in Attachment A. But they should be corrected or

clarified why NIOSH thinks the values are correct if I'm miscalculating something.

So, our review of Report 60, which we was tasked with, reviewed it, and found it contained the same information essentially as the white paper. And so, that that observation is applied to it. We reviewed the additional section 2, not in the white paper, and had one additional finding and two observations. In total, that makes one finding, six observations for the neutron dose measurement.

So, the status of the findings are listed here. And we find that finding one is a new one for NIOSH's consideration. Observation one, we'll review when the TBD is available. Observation two, we recommend closure. Observation three is the URA over -- overarching issue. And so, we'll have a presentation later on that and assume we can close that if, you know, the statistician feels that that is correct to use. And observation four, we'll use -- we'll review the TBD when that becomes available. And observation five is a new one for NIOSH to consider, as well as observation six.

So in conclusion, we reviewed both papers and one finding, six observations, and these would not impact the recommended method in Attachment A of Report 60. It should be addressed or corrected.

Okay. Open to questions.

CHAIR BEACH: Thank you, Ron. Appreciate your reporting.

Paul Loretta, any questions?

MEMBER ZIEMER: I have no questions. That's a very helpful report, Ron. Thank you.

MEMBER VALERIO: This is Loretta. I have no question -- no

questions.

CHAIR BEACH: Okay. I had a couple on slide 9. We need to just consider closing observation two with recommendation from SC&A. Do both -- do you, Paul and Loretta agree with that closing?

MEMBER ZIEMER: Yes, correct. I agree with that one.

CHAIR BEACH: Okay. Loretta, do you --

MEMBER VALERIO: Yes, I --

CHAIR BEACH: -- agree with that one?

MEMBER VALERIO: Yes.

CHAIR BEACH: Okay. And then moving down to slide 10, my question is, should this observation three, and then I believe it would be the same for four, be moved to Report 0087, or should it stay here where -- where it's at now?

MEMBER ZIEMER: I thought -- this is Paul. I thought that Ron said that it was already moved to the overarching, that it would be reported on later today. Was that -- did I understand that correctly?

DR. BUCHANAN: That's correct.

CHAIR BEACH: Okay. So, I missed that part of it. So, those will be addressed later today. Okay. And then one other question. I think this is going to be for NIOSH on slide 21. So, there was findings from May 2019, correct? Or not findings, observations? Is there --

DR. TAULBEE: Yes.

CHAIR BEACH: -- any progress been made on it? Has there been any progress made on that, Tim? I'm assuming you would have reported that out, but 2019 to now, can you just give us an update on that?

DR. TAULBEE: Sure. If you go to, actually, the next slide, I believe slide 22. Is that correct? Yes, there we go. I'm sorry. When you go through a lot of these observations and even the findings here, these aren't really used in our -- for the dose reconstruction. This is kind of a holdover of a previous method that was replaced in 2019 that kind of initiated this review by SC&A to look at this particular version. And, yes, we've got some mistakes here in the tables, and we will make those corrections and thank SC&A for pointing them out for us. It's not a -- it's not a big deal, but we will certainly do so.

With the -- so, what's really happened here is that the white paper has been kind of melded here into our Report 60, into this new methodology where we're using quantile regression. And so, we wanted to blend it with some of our past method of the ratios to try and, you know, I guess, in a sense, where you'd have a feel for what the -- kind of the new method was. And this is where Report 87 comes into play. We are reviewing our quantile regression method.

So, what we're planning to do here, to make it long story short -- sorry, Josie, I'm rambling -- is that we're going to revise Report 60 and incorporate these observations and, of course, the findings,

a correction to a table because those calculations aren't used. I mean, we're using the dosimetry and the survey data for the dose estimation method. And we'll be making that a little clearer in Report 60 when we do that.

So, we plan to issue a new Report 60 that will incorporate all of this together. But there is, I believe, a couple of observations in Report 87, or

maybe just one, that kind of ties into this. So, we might end up changing some of how we do the quantile regression based upon that. We're still discussing it.

CHAIR BEACH: Okay.

DR. TAULBEE: I hope that answers your question.

CHAIR BEACH: Oh, it does totally. I just really wanted it on the record where we were at with it, so it was less confusing. And the new report, any time line on that?

DR. TAULBEE: No. I really can't give you a time line on that. I'm sorry. There are certain aspects to it that require further discussion. So, sorry.

CHAIR BEACH: Oh, no problem. You know me, I have to ask.

DR. TAULBEE: Understood.

CHAIR BEACH: Okay. And thank you for that, though. And I think, Ron, we can call this done, and we can note, Kathy, that we did close -- I can't remember, a -- finding two, I believe it was, on nine.

DR. BUCHANAN: Observation two.

MEMBER ZIEMER: I believe --

CHAIR BEACH: Observation, not finding --

MEMBER ZIEMER: -- it was observation.

CHAIR BEACH: Observation --

MEMBER ZIEMER: Yeah, observation two.

CHAIR BEACH: I misspoke. Observation. So, yeah, okay, we can note that that closed. And we can move on to the DR template review, and Kathy is going to lead that discussion. Okay, thank you.

DR Template Reviews - Assessment of NIOSH Approach and Findings Versus Observations

MS. BEHLING: Can you see my screen?

CHAIR BEACH: Yes.

MS. BEHLING: And can you hear me?

CHAIR BEACH: Yes, and I'm assuming the court reporter will let you know if she loses you.

MS. BEHLING: Okay. Please do. I'm going to try to speak up.

Okay, today we are going to talk once a -- once again about DR template review. And to give you a little background as to why we're talking about this again, SC&A started reviewing two documents by NIOSH -- NIOSH under this umbrella of the DR templates, namely the DR methodology document and the DR template in February of 2023. And we reviewed two sites using the protocols that we had established (audio drop) Amchitka Island site and the Albuquerque Operations Office. Before we had really established this formal protocol, we did also look at the Peek Street facility. So, we presented those reviews at the March 14, 2024, subcommittee meeting.

And as a result of those discussions, SC&A has since held a team meeting to -- to assess NIOSH's dose reconstruction template approach and to process how SC&A plans to identify observations and findings that was requested of us.

So, you've seen this slide before. And this is the slide that shows our review process. And it, as with other document reviews, we plan on

reviewing the completeness of data sources and consistency between the documents and data sources, technical accuracy of the guidelines and scientific data -- data. We will also -- we had also planned on -- we prepared the dose reconstruction methodology document using the DR template for the consistency. And finally, we decided that we will be reviewing five cases to ensure that dose reconstruction was done according to the methodology. And we are going to attempt to track professional judgments and share that data with the Dose Reconstruction Methodology Review Work Group.

So, it was premature for me to put this paper statement into this slide. I, actually, had thought I got this clearance prior to this previous subcommittee meeting that was postponed. But yesterday when I was going through and preparing for the presentation, I contacted NIOSH and asked if I could send out the template and the DR methodology document for it, just to show you an example of that. And NIOSH prefers that these documents remain (audio drop). However, you can access -- access them (audio break) and they're under the Procedures Subcommittee, and there's a folder under there for the DR template. So, something that you may have been looking at to get an understanding of what type of documents we're looking at here.

So, but for -- for that particular slide, I just may mention that the DR methodology document is a two-page -- just two-page document, and the template is actually a 22-page. And it's a DR report that has color coding, so it helps the dose reconstructor in completing the dose reconstruction.

So, NIOSH has presented to the subcommittee their philosophy on

performing dose reconstruction using this DR template methodology. And based on that present -- presentation, SC&A concluded that NIOSH considers the approved dose reconstruction report to be the final document. The DR template is considered as the most up-to-date guidance, and the DR methodology document is used to supplement that template.

NIOSH has also stated that these DR templates are not technical basis documents, and they will likely not fit the needs for all potential claims at a specific site. And the use of the template will typically require professional judgment that should be justified to document the dose reconstruction report.

So, during our internal meeting, SC&A did have some concerns with this approach. Now, obviously, we all agree that each dose reconstruction deserves to be treated equally. But considering that we find some -- that assuming the DR report represents the final approved document, it does not provide either NIOSH or anyone auditing this approach the means of assessing (audio drop) from our perspective. So, we're suggesting that perhaps NIOSH could identify one, sort of, official declared document, a DR instruction document, that maintains its use for these small sites. That's not a TBD, but something smaller and equivalent to a TBD.

And we also understand that this case-specific methodology may be needed for these single claims at these small sites. But our concern is, when a second claim at that same site is done, we should be able to mirror the methods of the first claim to ensure, again, consistency. And I'm -- I -- I don't have -- I'm sure NIOSH does not have the time when they're reviewing the claims to go back to all previously adjudicated claims of the same site to

try to ensure (audio drop). I don't -- I doubt that that's happening.

So, moving on to -- we were also asked to, maybe, better define our approach to identifying finding -- identifying some findings versus observations. And we plan to do the same process as we currently use in (audio break) other NIOSH documents. When we review DR claims under the Subcommittee on Dose Reconstruction Reviews and this subcommittee, findings are generally identified when the dose reconstructor did not follow the appropriate technical guidance or the doses were calculated incorrectly.

In general, observations -- we include observations when -- if SC&A is attempting to calculate the same dose, and we're not in a reasonable range, we would classify that as an observation. If there is any inconsistencies between the DR report statements and the actual data that was derived, we will flag that. And if clarity is needed to understand NIOSH's assumptions or methodology, we would make that an observation.

When we're reviewing technical guidance documents under the -- this subcommittee, again, findings are identified when SC&A does not agree with NIOSH's methodology or assumption. And observations can include inconsistencies in technical guidance documents, recommend -- yeah, recommendations for improvements or clarity in the technical guidance documents, and incorrect references and that type of thing. (Audio drop.)

So, in order for SC&A to perform our audit in a manner that is consistent with other reviews, we feel we need some official guidance documents. If it is determined that that should be the DR template, we would submit that document for technical accuracy, and we would identify findings and observations consistent with the way we review other technical

guidance documents. In addition, if the DR template is considered the official guidance document, the discrepancies between the template and the (indiscernible) or the guidance document, we will generally consider those as observations unless we determine that this could lead to an error in the dose reconstruction, that we have...

For cases -- for case reviews, findings, and observations, we will be consistent with our DR reviews performed under the other subcommittee that goes through the dose reconstruction (audio drop). But for that to happen, we feel that we have some -- some guidance documents to point to. So, I guess the bottom line here is that we're just struggling with how we audit the dose reconstruction that's not based on some methodology guidance document, and how do we attempt to ensure that there's some level of consistency.

I personally, actually, think that NIOSH made an attempt in their template, in the color-coded template, to address variations in claims, and they -- they developed these templates so that they were trying to ensure there was some consistency. The only other comment I will make is that if it's ultimately determined that the approved dose reconstruction report is the final official document, I believe that the only method of audit -- auditing that is to review all cases associated with the site so that we can determine if there's some level of consistency.

So, there you have it. Any questions?

CHAIR BEACH: This is Josie. Thanks, Kathy, for breaking that out and making it a little clearer to us for what you're up against. My thought was going to be exactly what you just said. We might need to maybe not all

cases but a good number of cases, which I believe we discussed at an earlier meeting for Amchitka and Albuquerque, and we asked for more cases for both of those sites for this very reason. I kind of feel like -- this is just my opinion -- we need to not go to all cases but go a good number selected and then go from there to see how those -- so, depending on the sites, of course. If there's a site that only has five, then review all five. But if -- some of the sites that have more cases, they're turning them into TBDs, as we've discussed before.

So, if there's 20 -- I mean, what's the limit here? I guess, I'm going to ask the subcommittee on what your thoughts are. And then the -- back to Lori on getting the cases out to SC&A, has that been accomplished for Amchitka and Albuquerque? And how many are we -- are each of those going to be for those two sites? I don't remember the number we determined.

MS. BEHLING: This is Kathy. We had asked for ten cases from Amchitka and five from Albuquerque. And the other thing that I would comment on, the reason we increased the number of cases was going back to this professional judgment issue and us working with the -- the work group on looking at the professional judgment concerns there. And we thought this would be a good avenue since we were just starting. So, that's why we asked for more cases.

CHAIR BEACH: Okay.

MS. BEHLING: (Indiscernible) as well.

CHAIR BEACH: And have those cases been given to you yet?

MS. BEHLING: No, not --

MS. MARION-MOSS: This is Lori. I'm still working on getting those cases. I do recall a comment made regarding cases that was presented for Peek Street where the claims did not have estimates to all exposure pathways. So, I'm working through, especially the Amchitka claims, to find claims where there's estimates on all the exposure pathways. So, I'm still working on that.

CHAIR BEACH: Okay. So, how's the time line, because it's been several months? And not to put you on the spot, Lori, I know you're -- you're moving to a different job and probably trying to learn that job. Is somebody going to be filling your role in this, or?

MS. MARION-MOSS: I'm assuming so. Yes, Josie, someone will replace me. We're still working through that at this time. So, and we're doing some transitioning as we speak. So, once that's finalized, Kathy will know, and you will know.

But the time line for these claims, I would say at least next month, I should have all of them. I have some. I wanted to present it to the -- to Kathy together instead of piecemealing them. So, give -- give us to next month, and she should have all those claims.

CHAIR BEACH: Okay. Lori, thank you. And I do appreciate you getting them all together at one time. I think that is helpful.

Subcommittee, what are your thoughts on some of these concerns Kathy raised?

MEMBER ZIEMER: Well, this is Paul. A couple comments here. First of all, I think it's difficult for the subcommittee to evaluate the best way to do this. I -- I would say in most cases, unless it's a very small number, we

should not be looking at 100 percent of something that -- we should do a decent sampling if that's what we want to do.

But I would like to learn, and maybe the best one to help us learn this are the people who handle this. The NIOSH folks are handling and they're working with the template. They must also be looking at the -- some level of consistency on how they're used.

And I sort of have two questions. One is, what is NIOSH -- what are you doing to look at that issue of consistency on the template, number one? Number two, if you were the one from the outside trying to evaluate their use, what do you see in terms of the strengths and weaknesses of what SC&A is proposing here for -- for adjudicating this or -- or for evaluating this?

DR. TAULBEE: Okay. This is Tim. Let me address the first one with -- about consistency. And this is where -- this is actually why the templates were kind of born and brought together, so that we could be more consistent across individual dose reconstruction.

Kathy, if you could, go back up to slide five for just a second. I mean, you absolutely described our hierarchy of documents there. The DR report is the final document, okay. We use the templates to try and get to consistency between DRs, but not necessarily. There's some cases where, you know, if we're doing a large overestimate, it might deviate from that template, and we just, you know -- we're putting a lot of dose on the -- you know, in the dose reconstruction report that really isn't necessary, but it's clearly an overestimate. And so, you know, we generally would be following those templates, but there are deviations from that standpoint.

So, could you go to the next slide, please? So, that's how we're addressing this. The one thing that I really want to kind of emphasize -- reemphasize from the presentation I gave back in September a year ago is, again, that DR report is the final document. These templates and the DR methodology are not TBDs. They are not, you know, kind of official documents. It seems to me you're wanting us to say, well, these templates are similar to TBDs, go ahead and, you know, review them. And that's not the case. And I do not recommend that whatsoever.

I do agree with -- with what Josie was mentioning there a minute ago of reviewing the claims, and we've talked about that before, because the claims are the final answer. And so, if you want to look for consistency, are we applying this combination of templates, DR methodology, and individual dose reconstruction, you've got to look at the claims. And the claims are where your answer is.

The only way I see to do this is to look at claims from that standpoint and -- and review them from the professional judgment standpoint and what we use, you know, within that -- within that dose reconstruction. So, that's my recommendation to you there, Paul. You know, the third bullet here on Kathy's slide is us needing to identify one official DR guidance document, I would love to be able to do that, but it's just not practical, especially on any type of timely manner from that standpoint. You know, we don't have TBDs on -- on these small sites, because it takes a lot of resources to do just that.

When we get to where we have more and more of these cases, then we are turning them into TBDs. And we've got four of them on the books right now that we're working on, and we're just trying to get them out there.

And then once we get those four done, we're going down. And our goal is to have all of these over 100 or more claims that they will have an individual TBD. But when there's just seven claims or five claims, I don't see us having a TBD for many, many years just due to resources. They're not unlimited over here in NIOSH.

And so, this is our process, and this is how we're doing it. We'll continue to use the templates from that standpoint but looking at the individual claim. And if it fits in the template, then we'll use the template.

If it doesn't fit, then it's a handcrafted, completely unique DR, dose reconstruction. But that dose reconstruction report is the final document. Did that help, Paul?

CHAIR BEACH: Yeah. I --

MEMBER ZIEMER: Yeah, it -- it -- I'm sorry. It sounds like, in a sense, you're suggesting that reviewing template use per se is not the issue then, but only including it as we review the cases. I'm trying to assess whether -- what we're talking about, template -- use of template consistency or -- I'm looking at SC&A's terms here.

CHAIR BEACH: I think if you go back to that slide, Paul.

MEMBER ZIEMER: I'm looking for slide three, maybe, which would help me here.

CHAIR BEACH: Because --

MEMBER ZIEMER: Compare the DR methodology to the DR template for consistency. I'm -- I'm trying to get a --

CHAIR BEACH: So, what I think --

MEMBER ZIEMER: -- better feel for what it is we would actually be

doing when we said we're doing a review of template.

CHAIR BEACH: So, Paul, as Kathy pointed out, the template is usually a two-page document, --

MEMBER ZIEMER: Yeah.

CHAIR BEACH: -- correct me if I'm wrong, and then --

MEMBER ZIEMER: Yeah.

CHAIR BEACH: -- the methodology is -- like, in the case she described, it was 22 pages. So, --

MEMBER ZIEMER: Well, when you --

CHAIR BEACH: -- (indiscernible) --

MEMBER ZIEMER: -- (indiscernible). I think it's reverse of that; is it not?

MS. BEHLING: It is; it is. This is Kathy. I'm sorry.

CHAIR BEACH: Oh, thank you.

MEMBER ZIEMER: The template was pretty long, as I recall.

MS. BEHLING: Correct.

MEMBER ZIEMER: I haven't seen it myself, so I don't know exactly.

MS. BEHLING: This is Kathy. That's correct.

MEMBER ZIEMER: The template is long.

CHAIR BEACH: Oh, so it's the methodology that's a shorter one. Okay. I just had that mixed up. So, --

MS. BEHLING: -- Kathy, based on what --

DR. TAULBEE: And this is Tim.

CHAIR BEACH: Go ahead.

DR. TAULBEE: This is Tim. If I can give you a little bit of an

explanation. The template will have a whole section kind of prewritten how -- about a particular exposure. But if you're looking at a particular dose reconstruction and you recognize that that person never worked in that area or didn't have anything to do with that part, then you delete that whole section out of the template for the dose reconstruction. So, that's -- that's what I'm trying to get at, why dose reconstruction is kind of the final answer here, and that's part of why these templates are very large, because there's a lot of language in there that may or may not appear in the final DR.

MS. BEHLING: Correct.

CHAIR BEACH: Okay.

MS. BEHLING: And what we have -- and this is Kathy again. And what we have done on the two sites that we've looked at, and I don't think NIOSH had any difficulty with this, but we compared that methodology document to (audio distortion) to the template just to be sure there was no discrepancy between the two. I guess the concern was let's not make all of those findings. NIOSH, I think, would appreciate knowing maybe there's differences between those two.

The other thing that comes to mind, and forgive me for -- for saying this, we looked at a lot of dose reconstruction over the years, and -- and especially the fact that there is a template for these small sites. I -- and I know that NIOSH says, yes, we are going to document and justify anything that we do outside of what that template -- template specifies. I don't always see that. Sometimes -- most of the time I will say, there's –- I -- I -- yes, it's there, but if we're to depend on the dose reconstructor, some just do not explain themselves and others do.

And I think for this particular set of dose reconstruction, I think it's very critical because of all the professional judgment decisions that have to go into this that these -- these dose reconstructions are very clearly justified as to why they did what they did when they deviate from that template. I'm just going to reemphasize that.

And I do, as my last statement was, that -- and like you said, maybe we don't look at all of the cases, but we have to look at a representative number of cases to ensure it's -- just this is so different. Every other -- every other thing we audit, you audit it against something. And now we don't seem to have that. And so, I realize there are a lot of OTIBs and things like that out there that could be used when there's variations in cases, and that's fine. And I know that one template isn't going to cover every -- every variation that could exist in a certain case. But so, I do think it's very important for us to look at the cases in the dose reconstruction report is the final document.

DR. ULSH: Josie, this is Brant. Can I stick my nose in here?

CHAIR BEACH: Sure, Brant.

DR. ULSH: Well, Kathy, I -- I certainly understand your point of view because I've been in your role. I've been an auditor at a site, and I do exactly what you said. You want to have a guidance document that you can bounce things against and note deviations from it. And that's the whole difficulty here is that we don't have that kind of a guidance document for these sites. If we did, it would be a TBD. So, the question -- I mean, the question becomes then if you look -- review a dose reconstruction and it is different from the template, does that mean it's wrong?

And what Tim, I think, is trying to say is that it doesn't mean that it's wrong. So, how do you interpret that? I think it's a reasonable approach to look -- you know, to compare different dose reconstructions, and I think it would be entirely reasonable for you to note this one is different from that one; why is that? And you should be able to find that in the dose reconstruction itself. But if not, it would be appropriate for an observation when you ask us to explain it, and we should be able to explain it. That's a reasonable criterion.

But noting that it's different from the template, I don't think, tells you what you want from an auditor's standpoint, that a mistake has been made or -- or something like that. I hope that's helpful. That was my intent.

MS. BEHLING: Yes. Yes. I agree. I agree with everything you said, yes. And, again, we're back to the review has to be on a substantial number of cases so that we can compare, and that will also help us with this profession -- tracking professional judgment. And I think -- am I --

CHAIR BEACH: Okay.

MS. BEHLING: The other thing I would ask Tim is, I don't think if we do a comparison between the DR methodology document and the DR template, just for consistency, I think that would be something he would appreciate, correct? Not that -- not that it has -- you know, it's just something I think that should be brought to your attention as an observation.

DR. TAULBEE: As an observation, yes. I mean, I don't have a -- I don't have a problem with that. I think you're going to see a lot of that, and the reason that I say that is as we've updated other TBDs, what has

happened is many of the DR methodologies were written in one time period, and then -- take Hanford, for example, it was written for Hanford revision 1, and then Hanford TBD was revised too, the DR methodology might not have been, but the DR template probably was. And -- or the DR template might not have been updated, nor the methodology, but the dose reconstruction itself is using the proper table from the Hanford document and is guided in that way.

So, that's the type of thing you're probably going to see, because each time the TBD changes, we don't go through and just look at the DR methodologies or the DR templates. As we are doing the case, we might then update the template, but the one that you have might be the older template, if that's --

MS. BEHLING: Right.

DR. TAULBEE: -- making sense to you. So, as observations, sure, you know, point them out from that standpoint, but I don't really consider those findings, because that's not -- it's not in our method of how we go about with these cases. It's the final DR. Now, if the final DR is citing an old -- an incorrect TBD or an incorrect table, yeah, now that's -- that's something we need to look at. But that should be cited within the dose reconstruction itself.

MS. BEHLING: Okay. I -- I agree.

MR. BARTON: Tim, this is Bob Barton. I mean, you just cited an example of Hanford, which is a TBD. So, what's -- like, (audio distortion) -- that don't have TBD? Effectively, your methodology is de facto TBD. And then that goes to the template that goes to the constructor user. And we're

simply asking the question, can we assure some consistency between those two documents? And I agree with you that there are going to be cases that are going to be out of -- outside the boundaries of those two documents. So, those two should be consistent. I understand there's reasons why they might not be at any point in time.

But I also think that stating that, well, we need to start with the individual dose reconstruction and work backwards, I mean, that's not a great use of resources either. I mean, we only audit like 1 percent of dose reconstructions. So, how would we even get it (audio distortion) methodology --

THE COURT REPORTER: Mr. Barton, you cut out.

MR. BARTON: I'm sorry. When did I cut out? Can you hear me?

THE COURT REPORTER: Yes.

DR. TAULBEE: We can hear you, Bob, but you're moving in and out. I was following your conversation, but apparently the court reporter couldn't.

MR. BARTON: Okay. I guess my point was that, you know, what's been suggested is that the dose reconstruction is really the final document, and I agree with that, especially from an individual claimant standpoint. From an actual evaluation standpoint as to whether there's a consistent, transparent process, we really can't start an individual dose reconstruction and move backwards. So, we're simply asking the question that with these sites that don't have technical basis documents, because they're small, and which is completely understandable, everybody understands that -- but basically your DR methodology becomes your TBD for that small site. And, you know, if we're seeing inconsistencies between that de facto TBD and

then the -- the -- basically, what you use as a template for your dose reconstruction report aren't matching up and there's no explanation, then I think that's a real clarity issue that -- that -- I think that's what we're trying to get at here.

DR. TAULBEE: I understand what you're saying, Bob, but what I'm trying to relay is that these methodologies and templates are not TBDs that have been reviewed and approved in a formal sense, okay? This was -- what has been reviewed in a formal sense are the individual DRs. Okay. That is why those are the final ones. That is our final approved document that goes out. I recognize that you'd like it to be easier, and you're questioning how can we ensure consistency, and my answer is looking at the DRs for the consistency across the site, across the individual -- from these individual claims. That's where you're going to find the answer to the question that you're asking.

Looking at or just trying to review the DR templates and the DR methodology isn't going to get you there. That's -- that's my answer. Back to you.

MS. BEHLING: This is Kathy, again, if I could ask a question. One of the things that crossed my mind with regard to consistency, (audio drop) to have certain dose reconstructors work specifically on a certain site so that they're more familiar with that particular site, with these templates, and that type of thing. Do you think that would be -- help with (audio drop)?

DR. TAULBEE: That is my understanding, but I'll let Lori or Bomber answer that better.

MR. RUTHERFORD: Okay. I'll jump in.

MS. MARION-MOSS: This is Lori.

MR. RUTHERFORD: Yes, that's my understanding as well.

MS. MARION-MOSS: Same here.

MR. RUTHERFORD: Go ahead, Lori.

MS. MARION-MOSS: This is Lori.

MS. BEHLING: Yeah, that makes sense, and that's the most efficient approach, and that would help with any inconsistency concerns that we have. But, again, as you said, and I agree, to look at (audio drop) and to look at, like -- like Bob said, not just 1 percent, you need to look at a substantial number of cases. And what -- as -- also, as Tim mentioned, one of the things that I was going to recommend as our next DR template site is (audio drop). Now, there's 85 cases there. At least that's based on some old numbers, because I guess don't have access to a lot of information right now. But we get down to sites that are very small, that have 16 cases, five cases. So, it's not unreasonable for us to do, I think, to -- you know, some of these sites (audio distortion), and we cover a good portion of the cases that are out there.

CHAIR BEACH: So, this is Josie. So, right now we have three templates that we have reviewed. And the 10 cases for Amchitka and five for Albuquerque, what's the percentage of those? I -- I couldn't find my -- my form that has the number of cases. What percent -- does anybody know how many offhand are at Amchitka and Albuquerque and then Peek Street also?

MS. BEHLING: This is Kathy. I am looking at presentations that Tim made, you know, back in 2022. Amchitka is listed as 177 claims. Now,

likely these will be higher because this is back some time. Albuquerque is 119 claims. And now, Peek Street -- Peek Street is 30 claims. But we're not moving on with Peek Street, just because there were findings and observations that I believe NIOSH wants to address before we do that.

CHAIR BEACH: Okay. So, moving forward, how many cases would be recommended for Amchitka and Albuquerque? You said 10 and five. Is that still adequate? I'm saying no. So, since Lori is still working on putting -- pulling these together, I expect her to jump in also. Do we want to find more cases?

MS. BEHLING: This is Kathy. I don't know if the subcommittee wants to establish some percentage in the case of Amchitka. That would be a lot of cases, but it's 177 claims that I (audio drop).

CHAIR BEACH: And also, we heard from --

DR. TAULBEE: This is Tim --

CHAIR BEACH: -- that over 100 was gonna get a TBD. But I don't think these two are on that list yet. Are they, Tim?

DR. TAULBEE: That's correct. They're not on the list yet. The top four is what we're currently working on. Let me suggest that you stick with the 10 and five or maybe 10 and 10, some low number until you review them, and you -- you get your method down or how you're going to do this better. And then -- I mean, you can come up with a percentage now, and I don't know what you're going to use, maybe 5 percent, 10 percent, I don't know, 50 percent, whatever you want. But I would recommend keeping your number low right now to figure out how you want to do this. And keep in mind that us pulling the cases or identifying them is not trivial right now

with our IT system. So, --

CHAIR BEACH: Yeah, I understand that.

DR. TAULBEE: -- you want to go find a whole bunch of them that meet certain criteria, it's not trivial. It's difficult.

CHAIR BEACH: Gotcha.

MEMBER ZIEMER: Yeah, this is Paul. And I might add that right now we're plucking around at arbitrary numbers that don't have themselves a basis in -- in the logic of it. But let me ask this question: Tim, you or Bomber suggested that we're using some of the same dose reconstructors at certain sites. For example, would it make sense to look at -- let's say you've got 10 cases you want to look at, would it make sense to look at who the dose reconstructors were and see how they intercompare on the use of the template?

DR. TAULBEE: You could --

CHAIR BEACH: Yeah.

DR. TAULBEE: -- certainly do that. I think --

MEMBER ZIEMER: It's -- it's sort of the question of what -- what is it we're looking for, consistency from one dose construct -- reconstructor to another, or simply looking at the inherent contents of the templates in terms of how -- we -- we do want consistency.

CHAIR BEACH: I think, correct me if I'm wrong, Kathy, we're looking for consistency in that final document, the DR guidance document, at the -- which is what they're considering the final document, so that it's consistent for each individual at the site, correct?

MS. BEHLING: Right, that final dose reconstruction report, yes. That's

what they're using as their final report, or as -- as their primary document.

CHAIR BEACH: So, I'm going to suggest what Tim recommended, is we stick with the 10 cases and the five, since Lori's close to getting those to you next month, and then there's nothing saying we can't determine if we've reviewed those that we need more cases because we're not satisfied or it's not as consistent as we would like.

So, SC&A, do you agree with that approach?

MS. BEHLING: This is Kathy. I agree with that.

CHAIR BEACH: Okay. And then come up with a number if we do decide to assign General Electric, how many cases would you like for that between now and when we do our tasking before the end of the meeting, so -- unless you want to still have that task on our list. Okay.

For -- and for the good of the rest of the agenda, any more on this before we move on? Okay. Hearing none, I would say we're going to stick with 10 cases, five cases for Amchitka, Albuquerque, and then we have four sites to go over and then tasking. I know the meeting's done at 4:30, so we want to be done by 4:00 in order to get that -- last bit, tasking and scheduling the next meeting. So, is that enough time, Rashaun, a half hour?

DR. ROBERTS: Yes, I think so.

CHAIR BEACH: Okay. So, we'll have to keep that in mind, and we're going to start. I believe Ron has --

UNKNOWN SPEAKER: It's -- we'll --

CHAIR BEACH: Who's trying to speak?

MS. BEHLING: I wasn't trying to speak, Josie, but this is Kathy. In -- for the sake of time here, I am just wondering, would you -- do you think it

would be prudent to have Richard discuss Report 87 next, since it -- he's been discussing that in -- along with his Report 60, and we were talking about maybe trans -- some of those observations would be transferred to Report 87? Perhaps it's -- it would be nice --

CHAIR BEACH: Yeah.

MS. BEHLING: -- to have that discussion in today.

CHAIR BEACH: Okay. I agree with that, because I don't know that we're going to get all -- all four of these. So, yes, I think that's a good conclusion. And I apologize in advance to anybody who is going to be waiting again until the next meeting. So, yeah, I think that's a good suggestion.

Everybody agree? Paul? Loretta?

MEMBER ZIEMER: Yeah, that's fine. That makes sense to me.

CHAIR BEACH: Okay.

MEMBER VALERIO: I agree with that.

CHAIR BEACH: All right, thanks. Then let's go ahead and pull that up.

MS. BEHLING: And, Richard, are you still with us?

MR. GRIFFITHS: Yep, I'm here.

CHAIR BEACH: All right. Thank you.

NEWLY-ISSUED SC&A REVIEWS

Review of ORAUT-RPRT-0087 on Application of Regression in External Dose Reconstruction

MR. GRIFFITHS: No problem. Just give me a second to set up what I

was going to talk about here. Okay. All right. Thank you.

Yeah, good afternoon, everybody. This is Richard Griffiths from SC&A, and I am going to give an overview of SC&A's review of Report 087, which was application of regression in external dose reconstruction.

And, Kathy, you can go to the next slide. Thank you.

Yeah, this is going to reference back to, I guess, what Ron Buchanan touched on a little earlier about the overarching issue of quantile regression. So, what I'm going to do here is talk about prime -- I'm going to talk about two reports, kind of like Ron did too, right? I'm going to talk about Report 087, which introduced the use of quantile regression, essentially as -- in the form of a reference document. And the idea is for -- for using quantile regression to estimate or impute unknown doses of one type of radiation from known doses of another type. In Report 087, the example you used is imputing or estimating beta doses or unknown beta doses from known gamma doses for the same -- the same worker, okay.

In addition to talking about Report 087, I'm also going to touch on the white paper that Ron talked about, okay. So, NIOSH 2019, because it was in 2019 -- NIOSH 2019 that we -- we saw the first application of quantile regression, and presumably that came from what had, you know, transpired with Report 087 being a reference document for -- for quantile regression, or "QR," as I'm going to refer to it in this presentation.

Hopefully, my comments here on NIOSH 2019 are really just sort of in a contextual sense, and the idea being here that we looked at NIOSH 2019 in the sense that, you know, what is -- what did Report 087 tell the authors of NIOSH 2019? What kind of information did they pull from Report 0087,

and how did they use that information, and did that tell us anything about, you know, how Report 0087 should have been set up, okay? So in a sense, we looked at NIOSH 2019 in a contextual sense.

All right. So, let's see. So, on this slide, so as I said, Report 0087 introduced the use of QR for imputing unknown doses from known doses. The basic idea was -- here it was suggested that quantile regression was a better method than the traditional regression on order statistics method, all right? And then the NIOSH white paper from 2019, which Ron talked about a little bit, employed quantile regression to predict neutron doses from known photon doses or to, you know, essentially improve upon the 0.2 N:P ratio that had been used up to that point. So, yeah, so, from that NIOSH -- from that review, QR was identified as an overarching issue, and that -- that's what this presentation is going to focus on, our -- our review of that.

All right. Next slide.

All right. So, I'm going to start off with a summary here, and I think this has actually been talked about a little bit here already during this meeting, but in general we concur that the quantile regression method can be helpful. It's a very useful method. Personally, I have used quantile regression, and I think it's very useful for some of the reasons that 0087 reports.

I mean, it adds flexibility to analyses, and in particular, one of the things that's nice about it is it's what we call distribution agnostic, okay? So, we don't really have to know what the distribution of the data is beforehand, or it doesn't have to follow a standard form in order for us to use quantile regression. That can be powerful. But it is just one tool.

There are -- there are a number of regression methods that can be used for the imputation for the estimation procedures that are talked about in 0087, one of them being regression in order statistics, which was used traditionally apparently. Another method is also talked about in 0087 is ordinary least squares or what I would think about as the traditional textbook type of regression, linear regression, okay? And so, we think that while QR is a good tool and it is a very helpful tool, there are other methods at times for some situations that might be better. We're gonna -- I'm going to talk about that a little bit too.

But so, sort of a few main bullet points from our presentation that I'll talk about here is, ultimately, we feel like Report 0087 -- while QR method I think is a good method and is a very useful tool and should -- should be there to use, we think that you should also consider that there are data sets for which other techniques will be superior. Report 0087 as a reference document should, we feel, help the analyst determine which method is best in which situation. And it probably should provide more guidance about evaluating the chosen method once it's implemented. And we think it should also give some guidance about other factors that might affect the choice of method. And finally on this slide, it should consider how to quantify the precision of the imputations or the estimates that come out of the model. And I'm going to talk about these in a little bit more detail as we go through here.

So next slide.

All right. On the next two slides, I know quantile regression sounds like a very riveting topic to everybody here. I mean, certainly to me this is

really interesting, but I understand it's not quite so interesting or, I guess, known to everybody. All right. So, I wanted to sort of demystify what we're talking about here with quantile regression a little bit before I get into where we're going. Because this, I think, points out some of the things that I'm going to talk about and make observations on later on.

All right. From my perspective, as a statistician, when I think about quantile regression, okay, very nice name, right? It sounds -- it sounds like a very complex method. But in a lot of ways, it's very similar to what you think of as a traditional linear regression. And as I said, what I'm thinking about here as a traditional linear regression is an ordinary least squares regression, which is also talked about in Report 0087. And so, both methods are essentially used to estimate likelihood.

And I'm going to use the example from 0087 here. Likelihood of different values of a beta dose from a given gamma dose, okay? If you want a picture in your head, I mean, you can picture an X-Y axis with a scatterplot of a bunch of observations, each observation being a beta dose and a gamma dose, and you fit a line, a straight line, to those that, you know, sort of fit through this cloud of points, all right? And in both cases, that's exactly what a linear regression and a quantile regression are. But they tell you different things about the data, all right?

The traditional linear regression is typically used to fit what would be called, you know, an expected value line or a mean line. And what that means is that if you go to that line and you locate the gamma value or the value on the X-axis that leads up to that line, then that line gives you the mean estimated dose for a beta distribution, okay? So, on average,

basically what it's saying is for a given gamma dose of X, this line tells you what the beta dose would be, all right?

For the quantile regression, same -- same setup. You've got that line, okay? But the interpretation for -- at least for one type of quantile regression line, the one that sort of relates to a mean would be it's not a mean that you're getting at that line. You're getting a median, okay? And so, what the quantile regression does is it gives you a percentile, and you can fit a number of different regression lines with a quantile regression. You could fit a median line, which is a 50th percentile. You could fit a 5th percentile line, a 95th percentile line, okay?

And that's -- that's actually one of the differences with the quantile regression, okay? You can essentially fit a number of different lines to give you a whole distribution of, you know, beta doses from gamma doses, whereas the ordinary least squares regression isn't typically used that way. It's not used to sort of give you, like, you know, the percentile distribution.

However, it can be used to do that, okay? But it's under some restrictive assumptions that you would -- that would be able to use a linear regression line for that.

And essentially one of the -- one of the assumptions would have those lines, the distribution, the percentiles from a traditional linear regression would all be just a specific distance away from each other. In other words, they'd all be parallel lines, and so they would have the same flow. Whereas with the quantile regression, it's a little more flexible. It allows for lines that aren't necessarily parallel to each other. So, for something like where you have, say, gamma doses that tended to, you know -- I'm sorry, beta doses

that tended to spread out more when the gamma doses are larger, the quantile regression could sort of adjust for that and, you know, say that the percent -- the relationships are different at a different level for the different gammas, okay?

But that actually -- but this points out one thing that I'll -- that I'll come to later on is it comes at a bit of a cost to do that because you have to estimate more parameters or more lines. You have to estimate both a Y-intercept and a slope for the quantile regression for each percentile, whereas with the linear regression, you don't have so many parameters because they have the same slope.

Okay, go to the next slide. Thank you.

All right. So, a couple technical things here. I won't get into this too much, okay? But the previous slide is kind of like, you know, these -- QR and OLS are similar. Here's something that's different is in the way they fit the calculations that are actually done. The authors of Report 0087 know this, and I don't expect everybody on this call to understand this, so I'm just going to kind of go past this. But the way the lines are fit in -- in the calculations, what we're dealing with is differences between observations and the line itself. We square those differences and we're minimizing those squared differences, whereas in the QR method, you minimize absolute values or functions of absolute values. Kind of a technical minor difference, but it does have important effects on -- on the calculations.

And so, the complexity of the software calculations are different between the traditional linear regression method and the quantile regression. You know, modern software, you know, you don't -- you don't

see those differences, but oftentimes you need a little more complex software to get the calculations correct. So, it's not something that can actually be done in just -- you know, Excel, I know, has a package for it, but R and SAS, which are dedicated statistical packages, tend to offer a fuller suite of, you know, calculations for -- for quantile regression.

All right. And the other thing that's important is that the interpretation of the results is a little different. And the reason this is important is because when somebody does a quantile regression analysis versus a linear regression analysis, they, I think, need to be a little more well-informed about the methods they're using so that they understand some of the results that come out of it. And I think -- I think that has an effect when you're thinking about, you know, what you're recommending as a method to use for a particular analysis.

Okay. Go on to the next slide. Thank you, Kathy.

All right. So, basically into the observations here that we had from Report 0087. One of the -- one of the questions, you know, that naturally comes up is when you're looking at a quantile regression, you've got a data set, is quantile regression the best method for dose reconstruction? Okay. Because we know in the past we've used, you know, the ROS method and it's worked, right? We get results for it. And so, if we have a data set, and I said before that there are other methods you can use, it doesn't have to be regression orders, it doesn't have to be quantile regression, it doesn't even have to be ordinary linear regression, linear models. There are other methods. All right.

So, how do you determine that? How do you know which methods are

best? And what a statistician would do is they would do some essentially exploratory data analysis up front. They'd look at the data, they'd do some kind of analysis up front, you know, how's the data distributed, what does it look like in a graph, and that would suggest a model, okay, of some form.

In the same sense, once you've decided on a model and you fit the model to the data, how do you evaluate the data? How do you evaluate the model? How well does it fit to data? Does it look like it's telling us what's really there, and is it something that we want to use inferences from downstream for -- for later analysis? Okay.

So, Report 087 does consider both types of analysis, which is important as a reference guide. You know, you want somebody to be able to go to the guide, go to the reference, and say how do I choose a model, and how do I evaluate the model? How do I know it's the best model? Okay. But we feel like it could be a little more in-depth.

So, observation one, our observation one is that Report 0087 would benefit from expanded guidance on how to use preliminary statistical analyses to determine which methods are best. I will talk about the post-analysis stuff to you in a couple slides.

We'll go to the next slide.

And this slide is just kind of being a little more specific about what those preliminary analyses might be. One way to think about it is that the quantile regression method is what I would call distribution agnostic. Okay.

It doesn't -- it doesn't require the -- some of its -- the assumptions of the traditional method. So in particular, your data points, you know, we talk about doses having, say, a log-normal distribution or a normal distribution

under transformation. The QR method doesn't require that. It doesn't -- it doesn't -- the data doesn't have to be normal, log-normal, or anything to still work.

All right. But the question is what if the data distribution can be established? Okay. So, if the data is normal or log-normal, and, again, this is something you'd want to determine up front in an analysis, you know, maybe the traditional linear model is the most appropriate model. If it has a different form, what statisticians would call an exponential family, come from the exponential family of distributions, maybe there's something like a generalized linear model that might be the best method. And we'll talk a little bit about -- later on about why, even though the QR method might work in these cases, why, in fact, these types of models might be better models for that.

At any rate, in Report 0087, they give a Q-Q plot for the data set that they work with. And so, they do draw some conclusions from that, in particular that the data is not normal, okay, which would suggest that the ROS method is not going to work. And so in that case, you know, if they couldn't establish any other kind of data, the QR method probably is -- is a valid -- is a valid method, but it's probably among the best methods you're going to get to use because of the fact that it doesn't need that assumption. Okay. And so, exploratory data analyses like the Q-Q plot and other formal statistical tests could help determine what the appropriate method would be.

And this leads us to observation two about Report 0087. We say that it would benefit from more extensive discussion of these types of pre-analysis methods. You know, Q-Q plots, histograms, box plots, which are all

graphical methods, and they're also statistical testing methods to help determine what that underlying distribution is. I kind of feel like as a reference document, it should point these things out. It should -- it should refer the analyst or somebody who's going to use these methods to these -- you know, these types of preliminary analysis that could be used to establish which method is going to be the best method.

Okay. And I am going to talk about why we want to do that, right, later on. It's not just saying that, okay, the QR method is a method that can be used. There are reasons why in these downstream analyses why we'd want to establish this up front.

Okay. You can go to the next one, Kathy.

All right. So, this takes me back to the evaluation. Okay. So, you know, assuming once you've got a model, you've fit the model, how do you determine that it looks right, that it's doing a good job? And Report 0087 does compare the fit of the QR model to the ROS model for the data that they -- that they -- that they had in the report. I mean, again, this is -- this is an important step to determine which method is best. I'm going to point out, though, that there are other evaluation methods beyond just the goodness-of-fit comparisons that are there in the report, things like cross-validation and formal statistical testing.

And so, -- so, we feel like, you know, Report 087 does give some guidance on what happens after you fit the data and how to establish that one model is better than the other or even how to establish that the model you fit is actually a good model, which is important, again, for understanding not only the -- not only about, you know, how you're going to use the model

or the inferences from that model, the estimation and imputation on the model, but what it means downstream from the model. Okay.

So here again, we feel like Report 0087, again, because it's a reference document, it's trying to guide people, analysts, in the use of the QR method or other methods. We think it would benefit from expanded coverage of post-analysis and evaluation. So, observation three is that methods of comparison discussed in 0087 should be expanded and formalized methods such as cross-validation and statistical testing of predictive results are warranted to help the analysts determine the appropriateness of their chosen regression method.

All right. We can go to the next one.

All right. So, taking a break from those analyses. One of the things -- we go back to, we talked about the QR method, estimating percentiles with separate lines, and the fact that because of that, it requires estimation of more parameters than you'd have in a traditional regression, okay. So, in terms of a -- you know, a linear regression, you'd have -- you'd have your parameters, and if you were actually constructing -- you know, trying to estimate the distribution, an entire distribution, say, at, you know, quintiles every fifth percentile, you'd have probably almost twice as many parameters to estimate with a QR method as with a linear model. Okay. And it -- you know, it's different for different methods, but comparing those two, you know, it comes at a cost using QR.

And so, the thing is, and this is why I talked about the pre-analysis being important, so if the data for distribution can be established, if you know it's a normal or a log normal, something traditional that can be

modeled with something other than a QR model, QR does lose an important benefit, okay? It loses the benefit of being distribution agnostic, okay? So, since you know the distribution, you really need a method that's distribution agnostic, okay? It does give you flexibility, admittedly, in terms of doing the percentiles, but if you feel the assumption is -- is a good assumption, maybe another model is -- is better, okay?

And so, what might happen if you put a QR model is your -- your -- your parameter estimates, your inferences from the QR model might be less precise than from a better model, another model that -- that works well with the assumptions, and that -- that can have downstream effects, okay? And in particular -- and I'll talk about one of these later on too. In particular, if the sample size are small for QR, the -- it can give you some results that aren't -- you know, that don't look right, okay?

And so, it's really -- it's important to assess, you know, the precision, I think, of the estimate and your parameters coming out of it, and the sample size consideration is one of those reasons for that. And so, observation four is the QR method may be less appropriate than other regression methods when the sample size is relatively small and/or the underlying distribution is known normal, log normal, or something that's traditional.

Okay. We'll go on to the next slide.

All right. So, those were the main thoughts directly on Report 0087. On this slide, observation five in the report gives sort of a catch-all of a few other more editorial comments, and I'm just going to kind of go through these before I start talking a little bit about what we think, you know, in -- in the context of NIOSH 2019, how would the advice for quantile regression

from 0087 work?

All right. So, observation five is SC&I -- SC&A provides the following editorial comments for completeness of review and consideration when Report 0087 is revised, and just six observations there. And you can read more about these in the report, so I'm not going to really explain these too much. But in section 7.1, which was an example of a bad fit, I feel like specifying a model with a bad fit and comparing it to a QR model doesn't mean the QR model is the best model, right? And it's just, you know, we don't want it to be misconstrued. Clearly, the authors know that.

But we think that maybe it's better to compare the fit of the QR model to that of the ROS model, which technically it was in -- in -- in brief, and to maybe the OLS model too, because it wasn't really a comparison of QR to OLS in -- in 007 (sic).

Second -- second thing here is the precision of the imputation should be quantified. I'm going to come back to this one later on. Equation 6-1, and I'm not going to put that up on the slide here, but if you go back and look at this, and I think the authors will understand this, is it needs another subscript to make clear that each of the quantiles has a separate intercept and slope.

Four is that, and this is kind of amusing, but I'm going to point this out anyway, but beta refers to both a type of dose, right, a beta dose, and a regression parameter in the equation. That could be -- that could be confusing to some people.

Section 2.0 is -- okay. So, section -- so, I mentioned that 0087 uses a data set, uses an example data set, and the data set does a lot of censoring.

We're familiar with that because a lot of observations are -- a lot of measurements are lower than detection. So, you have to do something with those. And 0087 sort of classifies those into four different categories.

And what I'm saying here is that I don't think it's really clear why you're using only types 1 and 3 data in the -- in the modeling. So, I think that needs to be clarified. There is an explanation there. I think maybe it's more about why 2 and 4 weren't used.

And then also in section 3.0, a similar topic, it seems like we need a little more clarity on how the -- the gamma doses or how the censored gamma doses were actually treated. Again, there's more -- more in the actual -- I think more in the review in the document itself.

All right. Let's go on to the next slide.

All right. So, this -- this next -- I think, next three observations come from our reading of NIOSH 2019, so in conjunction with 0087. So, as I said, I believe what -- what -- how this works, and I think Ron has the same impression too, is that NIOSH 2019 used Report 0087, the reference documents for the QR method. The QR method was introduced in the 2018 report. And so, then they used that as a method to predict N:P ratios or estimate N:P ratios as an improvement over the standard, you know, that 0.2 ratio that had been used. And they give some evidence for why that is and talk about that a little bit and talk about how the models work in 2019.

But one of the things I find interesting in this, especially since 0087 is the reference document, is that the QR model in both of these reports had the same form. It's a very simple, straightforward form. I'm not saying it's not a good form, because it is. But -- but the question is, is that the proper

form? So, is the model the best one to use?

And one of the things statisticians would think about in terms of setting up a model like that is, are there other features that could improve the model? So, when I say improve the model, I'm talking about things like making the actual inferences, the actual estimates from the model more precise. All right. And -- and if you look at 2019, they -- you know, there's a whole bunch of different sites they have, the -- you know, the neutron and photon doses from. There's a really nice listing of that. It talks about how they differ by different factors.

So, if you -- you know, and I think these factors I listed here, the type of uranium, the facility, location, etc., those all come directly from 2019. And so, the statistician's thinking about that and thinking about the relationship that I'm trying to model between the beta and gamma doses.

Is that relationship changing by these different factors? And if it is changing by those factors, which 2019 would lead me to believe it is, don't we want to use that in the model, right? Isn't that useful information for actually predicting beta doses? And -- and -- and if it is, then it should be included in the model. It -- it -- you know, it doesn't have to have the simple form that 0087 showed. And if it is going to be a more precise model with those other factors included, then that's probably the one that should be used.

So, observation six is the usefulness of covariate information should be considered when determining the form of the QR model most appropriate for a given analysis. And, again, that's something I think that can be pointed out in Report 0087 itself.

Go on to the next one.

All right. So, observation seven, and up front on this one, I'm going to apologize because I -- the way I said NIOSH 2019, we looked at it contextually. We looked at it for what it's telling us about 0087. And, yet this just -- sorry. This -- this observation actually is directly -- it states it's about NIOSH 2019, and it really -- it needs to be rewritten.

But, at any rate, what this one is about is the accuracy of the QR method. Okay. Measuring the precision of the QR model helps the analyst determine if QR is appropriate for a given dataset. So, again, going back to sort of a post-analysis evaluation of a model, it's important to know when you come out of the model how precise your model parameter estimates are, how precise your estimates or imputations are, and how well the model fits the data. Okay. And -- and this is -- it's not just important for the model itself. Okay.

But if this is -- you know, estimations or predictions, imputations from this model get passed downstream to, you know, like fitting a distribution or -- or a co-exclusion model or into probability of causation calculation, if you fit a model that has imprecise estimates, imprecise parameters, okay, it has -- it propagates downstream. And so, it's important to know. It's important to understand the precision of a model parameter estimate. It's important to understand the precision of the estimate.

So, observation seven here is that provide readers with -- to provide readers with quantified evidence of QR being an accurate method of analysis. NIOSH 2019 should measure the precision of the N:P ratio estimates and provide results of statistical testing of the QR fit for the N:P

ratio estimates. And so, again, I think this probably should be reworded to not say NIOSH 2019 but say essentially that Report 0087 should provide guidance on quantifying, you know, the model -- you know, the precision of the model.

All right. So, let's go on to the next one. Thank you. Okay. I think this is my last observation on Report 0087.

But I'll start this slide off with a quote. So, this is from Report 087 from section 1: This report is intended as reference by statisticians who use the methods described in this report. So, again, you know, Report 087 is positioned as sort of a reference document as guidance for users. And so, as such, we feel like it should help the user, as I've been saying, right, help -- help the analyst determine which method is most appropriate. And one way to do that would be to provide some guidelines, I think.

So, list situations that QR might be best for and those for which other methods might be better for. And so, in -- in the actual report that we constructed our commentary, we start on a list. And certainly it's not all-inclusive. But sort of give an example of what we're thinking about in terms of practical guidelines.

And so, observation six is that NIOSH should consider constructing clear and practical guidelines for the intended analyst that outline situations when QR is and is not appropriate.

Okay. So, on the next slide, I believe what I'm doing is some pros and cons. So, this actually could be something that could be an -- or something that would help form a sort of practical guideline for which situations QR is good for, which it is not, which could be used in Report 0087. So, here are

some pros of the QR method is you don't need to know the distribution. We've talked about that. Flexibility in modeling percentiles.

No adjustment needed for heteroscedasticity. Okay. So, that's a statistician word, right? But that just means that one of the assumptions of a -- of a traditional linear model would be that, you know, the beta doses don't spread out more for larger gamma doses than they do for smaller gamma doses. And that's really what heteroscedasticity is, the fact that, yeah, sort of the fanning out of beta doses for the gamma doses. So, QR doesn't -- doesn't require that, whereas, you know, traditional linear models need -- need the variability to be the same. All right. And then the last pro here that's listed for QR is that it uses relevant information to understand relationships between dose types.

All right. Some of the cons. As I stated before, it's more complex than other methods. Okay. Not so much an issue in terms of computing, I don't think, but in terms of interpreting and understanding what's coming out of the model, I think it's important that, you know, that's acknowledged that QR is more complex and that it -- it requires sort of a different level of understanding the -- the implications and the -- the inferences that are going to come out of the model.

It requires relatively large sample sizes. So, again, thinking about guidelines, if you've got a data set with a small sample size, QR may not be your best -- best method. You -- you know, if you -- you can establish a -- a -- a distribution for it or you can assume something, you might be better off with a different method.

It -- it -- and that's actually, I think this next one is actually directly

from Report 0087. It's extra work to deal with censored observations. Can produce nonsensical results. I alluded to this a little bit earlier, okay, but what I'm talking about here, and this is particularly true in small data sets, okay. You could fit a QR model to it, and because, you know, the fact that we allow for the QR method is more flexible, it allows for different slope and different intercepts for each percentile, you could get a case where those lines actually cross each other.

And I've seen cases like this, and probably they were for small sample sizes. But you can get a case where you estimate a beta dose at the 90th percentile, and that beta dose is actually larger than the estimate at the 95th percentile. Statisticians understand why that happens, but that's not really -- it's not really great for analysts who are trying to use the data, right? So, you know, we've got to be careful in cases like that with the QR method. So, there definitely are cases in which the QR method, you probably don't want to use it, and that would be one of them, all right.

And often the distribution is known. I mean, we talk a lot about -- talk a lot about log normal -- we talk a lot about log-normal distributions. And so, if the log-normal distribution is appropriate, I mean, QR loses the primary advantage. So, something to think about when you're -- when you're trying to fit a QR model.

All right. Let's go on to the next one. All right.

Conclusion. Definitely, like I said up front, I believe QR can be a useful tool. It's certainly a good statistical method, and it's certainly a method that should be in your -- in your toolbox when you're trying to analyze these data sets. And honestly, in Report 087 and the comparison

that they did to the regression and order statistics model, QR is definitely the better model for that data set than ROS was there. But it's not always going to be true, right? And so, which regression method you want to use, it needs to be determined on a case-by-case basis.

And -- and we think that should be reflected in the -- in the reference document, Report 0087. And there are, of course, other methods besides QR, OLS, and ROS that are available. So, sort of in a nutshell, what we're suggesting is that Report 0087 would benefit from expanded coverage of how to determine which method is best in which situation, how to evaluate the chosen method once it's implemented, how sample size impacts the choice of method that should be discussed, we think, in 0087, and how to quantify the decision of the imputation.

All right. And I think the next slide is just the references. Is that right? You can go to the next one, Kathy. Okay. Just the references. Okay. So, end the document, that's the end. Thanks for -- thanks for listening in.

CHAIR BEACH: All right, Richard. Thank you for a complex subject, and you handled it well.

Subcommittee, questions? And then we'll move on to NIOSH if they have anything to add. So, Paul, Loretta, anything? Any comments, questions for Richard?

MEMBER ZIEMER: Well, this is Paul. You know, as a non-statistician, it -- it -- for me as a non-statistician, all I can say is it seems to make sense that I would want to hear from the NIOSH statisticians, too, in terms of their responses to this.

CHAIR BEACH: Yep, I agree with you there. Loretta, anything?

MEMBER VALERIO: Oh, I agree with that completely. It was a very interesting and detailed report. So, yeah, let's hear from NIOSH.

CHAIR BEACH: Okay. Perfect.

MEMBER ZIEMER: I do have one question, though. As a practical matter, -- this is Paul again. As a practical matter, and I don't know necessarily if this question goes to Rich or to NIOSH, but -- as a practical matter, to what extent is the individual dose reconstructor making an evaluation of the proper -- the proper one of these models to use?

DR. TAULBEE: This is Tim. I can answer that. They're --

MEMBER ZIEMER: Yeah.

DR. TAULBEE: -- not. (Indiscernible) --

MEMBER ZIEMER: Yeah, that's what I thought. So, this -- this is for the -- this is your folks, right?

DR. TAULBEE: Right. This is for the statisticians.

MEMBER ZIEMER: Yeah, I got you.

DR. TAULBEE: The people who are using --

MEMBER ZIEMER: -- that's what I thought.

DR. TAULBEE: -- this are the statisticians, so. We are --

MEMBER ZIEMER: Right, right.

DR. TAULBEE: -- developing some responses to this, and, you know, we will -- we will be putting that out. But there is, I believe, one of them that it does kind of impact a little bit of Report 60, so that's what we're currently evaluating right now along those lines. But our statisticians are the ones who use this document. So, all the evaluations that Richard was

just going through are done by our statisticians. We need to get all the things that they consider. But we will be documenting that and putting it out as a response.

CHAIR BEACH: Okay. Thanks for --

MR. BARTON: Yeah, this is --

CHAIR BEACH: -- the discussion.

MR. BARTON: -- Bob Barton. Just to add on to that. I agree completely. I mean, this is really one of the (audio distortion) exposure models --

CHAIR BEACH: Bob?

MR. BARTON: -- you know, science --

CHAIR BEACH: Bob?

MR. BARTON: program-wise --

CHAIR BEACH: You're cutting out --

MR. BARTON: (Indiscernible) --

CHAIR BEACH: -- again, Bob. Sorry. Yeah.

MR. BARTON: Okay. I tend to walk around when I'm speaking, so that's probably the problem. Can you hear me okay right now?

CHAIR BEACH: Yeah.

MR. BARTON: Okay. I was just going to add on to what Tim said. Yeah, this -- this -- this document is really program-wide and would be used, for example, in developing a -- co-exposure models or any other type of data analysis that would be site-wide or even complex-wide. So, to answer your question, Dr. Ziemer, I agree with Tim. This is more of a macro issue for the program, not an individual dose reconstruction. That's all.

CHAIR BEACH: Thanks, Bob. Okay. Anything else for the good of this discussion?

So, we have three documents left to review. We have about 30 minutes or so. Kathy, any -- any one of those you think would be best to move to next? We're going --

MS. BEHLING: Well, yeah. This is --

CHAIR BEACH: -- to hold it.

MS. BEHLING: Sorry.

CHAIR BEACH: No, go ahead.

MS. BEHLING: This is Kathy. I was going to suggest that perhaps we want to keep 36 and 40 together because they're both co-exposure models --

CHAIR BEACH: Yeah.

MS. BEHLING: -- for Portsmouth. So, if Rose is -- is prepared and she can (audio drop) about half an hour, I would suggest (audio screen) my screen. Is that okay, Rose?

MS. GOGLIOTTI: Sure. That's fine with me. It will not take me a half hour. Mine is very quick. Let me pull that up for you.

MS. BEHLING: Okay. I'll stop sharing.

MS. GOGLIOTTI: Okay. That should be up on the screen for you.

CHAIR BEACH: Thanks, everybody, for your flexibility on this. Appreciate it. Go ahead, Rose.

Review of ORAUT-OTIB-0093

MS. GOGLIOTTI: No, no problem. Okay. So, this is OTIB-93, and

OTIB-93 is titled "Conversion of Committed Effective Dose to Annual Organ Dose." And this was initially issued by NIOSH in October of 2023, and the following month we were tasked to review that document. And we issued our review in May of 2024.

Overall, it's a very short document. It's only two pages of content, and it's very straightforward. But I do think it's important to have a little background before we talk about what the actual document is doing.

So, I know everyone is familiar with 10 CFR Part 835 to some extent, but 10 CFR is NRC, and Part 835 is, of course, occupational radiation protection. And these are the rules that establish the radiation protection standards, limits, and program requirements for protecting individuals from ionizing radiation resulting from the conduct of DOE activities.

And beginning in January of 1996, DOE facilities were required to have internal dose evaluation programs for their radiological workers who, under typical conditions, would receive a dose of .1 rem or more committed effective dose equivalent in a single year. And that gets abbreviated CEDE, so that's the terminology I'll use here. And CEDE is the risk-weighted sum of the committed dose equivalent to tissue over 50 years after an intake.

Subsequent to that, 10 CFR Part 85 -- 835 was changed, and it was revised to change the dosimetric terms in the regulation to reflect the terminology in ICRP. And full compliance with that was required by July of 2010. And one of the dosimetric terms that was changed and impacts us here is CEDE was changed to committed effective dose, or CED. And that is the sum of the committed equivalent doses to various tissues or organs in the body. And it's important to note that while these were the deadlines for

compliance, many facilities were in compliance well ahead of these requirements. Okay.

So, that takes us to the purpose of the document. So, as we know, the DOE monitoring requirements were based on a 50-year dose to whole body. And we also know that Energy Employees Occupational Compensation Program Act requires annual organ doses. So, those are the doses that we're putting directly in the IREP. And, unfortunately, there's not a direct way to convert from CED to annual organ dose.

However, there is a way to convert CED to an annual intake, and that could be used to calculate organ doses. And now it's indicated that that is what they wanted to take advantage of with this document. So, specifically, what they want to do is to assign a dose of 0.1 rem, so 100 millirems CED, in each year of a potential exposure. And they want to use that as a bounding estimate of internal doses for workers that were unmonitored. So, if they have no monitoring records, this is a way to calculate a bounding dose of what they could have received without being monitored.

And it's a fairly simple equation to do this calculation, probably one of the simplest ones we see in the program. So here, intake is equal to 0.001 sieverts, divided by your dose conversion factor. And those are the units of sieverts per becquerel, and they come from ICRP 119. So, very simple. It's simply moving the decimal place over. And with that, all possible material types need to be considered. And then once you have an intake, you can easily calculate and model your annual organ doses. That's what we do with the program every day.

Okay. So, I do want to point out that this is not a carte blanche

review that says that this is something you can use at every site without any discussion. That's not what this review is saying. We're just review -- reviewing the method, but it needs to be evaluated by the Board on a site-by-site basis to make sure that it's appropriate to use in every specific instance. And that's totally outside of the scope of my review, but I did want to point that out.

Additionally, it can't be used for special metal tritides. And that is because ICRP does not have -- oops, sorry -- guidance specifically for them, as well as insoluble Pu-238 and Super S plutonium. There's already guidance documents available to use for that. Specifically, it's OTIB-66, Report 5, and OTIB-49.

So, that's basically the review. We did review this approach. We found the methodology to be reasonable and consistent with current ICRP guidance, and we had no findings or observations.

CHAIR BEACH: Thanks, Rose.

MS. GOGLIOTTI: Told you I could be fast.

CHAIR BEACH: Yes. And after I looked at it, I thought, yep, that one'll be -- that'll be simple.

I have a question for NIOSH. Can you give us an idea based on Rose's conclusions on slide 6, where -- where is this being used?

DR. TAULBEE: This is Tim. As I recall, and -- and please, others chime in if I've got this wrong -- I believe that Sandia is the first slated that we are going to be using this.

MR. RUTHERFORD: That's correct.

CHAIR BEACH: Okay.

MS. GOGLIOTTI: So, you can clarify that it's not currently being used?

DR. TAULBEE: I don't believe so. Bomber or Lori, do you know?

MR. RUTHERFORD: No. I don't recall it being used anywhere.

MS. MARION-MOSS: This is Lori. That's correct. It's not currently being used.

MS. GOGLIOTTI: Thank you.

MR. BARTON: This is Bob Barton. I mean, the subject itself is the center of a lot of SEC-related discussions at the moment about when you can use the 100-millirem value that Rose is talking about. So, I think -- again, I'm not sure it's being used. It doesn't sound like it is, but it is a very significant topic when it comes to SEC discussions, particularly after about 1995. So, that's really where it weighs in at this point in the program.

CHAIR BEACH: So, -- so, this is Josie again. Based on that, what we just heard, and the fact that it may be being used in the future at Sandia, does SC&A feel like they would want to look at that after it's been used, or are we good with just closing this out?

MS. GOGLIOTTI: Personally, I think this is --

MR. BARTON: I think this is --

MS. GOGLIOTTI: -- (indiscernible) out.

MR. BARTON: -- actually a lot simpler than that. I think this is really just a simple unit conversion calculation to be used, and it's being documented here in this report. The discussion about whether 100-milligram is appropriate at these various sites is ongoing. But at Sandia, --

CHAIR BEACH: Yeah.

MR. BARTON: -- we did settle with an analyst and said that, yes, we

believe that given the state of the records there and the exposure potential that 100-millirem could be used. But, again, this is really just a very simple equation that -- that Rose showed.

CHAIR BEACH: Okay.

MR. BARTON: I don't think it goes to policy for any specific (indiscernible).

CHAIR BEACH: Yeah, right. And I --

UNIDENTIFIED SPEAKER: (Indiscernible) Rose?

CHAIR BEACH: You agree that you were going to say the exact same thing. Okay. That's (indiscernible) --

MS. GOGLIOTTI: Yes, exactly the same thing as it's more about just when it's being applied, and that's a discussion for a different context.

CHAIR BEACH: Okay. And that's --

MEMBER ZIEMER: Yeah. And this is -- this is Paul. This -- this really has nothing to do with the use of the 0.1 rem value. It has to do with how you make the conversion from the old method to -- it's a -- it's the calculational part that's important on this one right now.

MS. GOGLIOTTI: Correct.

CHAIR BEACH: Okay. Great.

CHAIR BEACH: Wanted to make sure I understood that. And, Loretta, anything there?

MEMBER VALERIO: Nothing.

CHAIR BEACH: Okay. Thank you. And based on SC&A's recommendation, no findings, no observations, I believe we can consider this closed.

MEMBER ZIEMER: I agree.

CHAIR BEACH: Okay.

MEMBER ZIEMER: That's Paul.

CHAIR BEACH: Great. Thank you. Yeah.

MEMBER VALERIO: Now, Josie, question for you. Because they are looking at using this at Sandia, can I agree to close it, or should I just not participate at all on this one?

CHAIR BEACH: Oh, that's a good point. Well, no, they haven't used it there, so you're fine.

MEMBER VALERIO: Okay.

CHAIR BEACH: This is -- you're perfectly within your rights to talk about this. Yeah.

MEMBER ZIEMER: This is Paul again.

MEMBER VALERIO: Okay.

MEMBER ZIEMER: This -- this particular document doesn't have anything to do with a particular site. It has to do with a calculation method.

CHAIR BEACH: Yep. Today it does not. That's correct.

MEMBER ZIEMER: No, no.

MEMBER VALERIO: Okay.

MEMBER ZIEMER: -- can be applied, but right now it's just how you make that conversion, as I understand it.

MS. GOGLIOTTI: Yeah.

MEMBER VALERIO: That's the way I understood it, but I wanted to double-check. So, I'm good with closing it.

CHAIR BEACH: Okay. So, we can mark that as closed.

Anything else we need to go back to? Any -- we're going to move forward with tasking and the next meeting, unless there's something else somebody wants to go back to that we need to finish up on. Okay. Rashaun, you okay with doing tasking first and then go on to the next meeting?

DR. ROBERTS: Yes, that sounds fine to me.

CHAIR BEACH: Okay. Thank you.

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CHAIR BEACH: And Kathy, have you put something else up?

MS. BEHLING: I did. Are you seeing my screen?

CHAIR BEACH: Yes.

MS. BEHLING: Okay. Okay. Do you want me to go through this, Josie?

CHAIR BEACH: Yes, please, if you don't mind.

MS. BEHLING: Okay. Initially, I had listed that perhaps we want to do the General Electric Vallecitos template. However, based on our discussions here and the fact that we're likely going to get 10 (audio drop) cases for the other sites, I'm not sure if we want to continue to have that on the list.

CHAIR BEACH: Yeah. Before we move on, let's discuss that. I think we should hold off on any more templates until we get the next set of cases and then maybe see where we are. How do -- how do you feel, Paul and Loretta?

MEMBER ZIEMER: Josie, this is Paul. I agree with that completely. I

think we should stick with those -- that first group -- first two groups.

CHAIR BEACH: Okay. Yep. And Loretta, are you okay with that as well?

MEMBER VALERIO: Yeah, I agree completely.

CHAIR BEACH: Okay. So, yep, let's just -- let's put that on the back burner, Kathy, and move on to other tasking.

MS. BEHLING: Yeah. I agree based on our discussions earlier.

CHAIR BEACH: Yeah.

MS. BEHLING: Here in Table 2, I have a list of three PERs and potentially four OTIBs, but PER-88, that's the Pacific Proving Ground, and that PER was issued because of a revision to -- to the TBD. PER-89, this is Bliss and Laughlin Steel and, again, that was a revision to a TBD-6000. Then we have PER-90. I know we've done a lot of the PERs. I think this is the only one we haven't done for Grand Junction Operations Office.

Then moving on to OTIBS, OTIB-67 (sic), this is deciding reconstruction of intakes of thorium resulting from nuclear weapons

program. OTIB-80, this is the internal dosimetry co-exposure model for Sandia -- yeah, Sandia, the Santa -- the Santa Susana Field Laboratory and the -- pardon me -- and the De Soto Avenue facility. Also, --

THE COURT REPORTER: Ms. Behling, could you speak up, please?

MS. BEHLING: -- about. Okay. And we talked earlier today about OTIB-84, and this was discussed during, I guess, (indiscernible) session of the Nuclear Metals, Incorporated, and this is the internal co-exposure dosimetry data. I put this on the list, but I did -- did make a note that this OTIB does not meet the DCAS-IG-006 guidelines. And so, we were

questioning if NIOSH is planning or in the works of revising this. And if so, then it's not a good campaign right now.

DR. TAULBEE: This is Tim. So, with the new guidance, we do eventually plan on updating all of our co-exposure models. But I can tell you this one is far down on the list right now. We've got some co-exposure models, such as Hanford, that have SEC implications that we're trying to work through now. So, that's where the resources are all focused right now. So, it's going to take quite a while. But then again, if you review this, I can tell you that probably any findings or observations you may have, our response will end up being we will revise it when -- you know, following DCAS -- or IG-006 when we get to it. So, it's your choice.

MS. BEHLING: Okay. And then, Josie, the last one on my list is OTIB-92 and this is correction factors for neutron dose measures with nuclear track emulsion with type-A film, so.

CHAIR BEACH: Can we go back to the start of your OTIB list? I wrote down 0076. Was it 76 or 67?

MS. BEHLING: Seven --

CHAIR BEACH: -- That was --

MS. BEHLING: -- six.

CHAIR BEACH: -- thorium. Pardon me?

MS. BEHLING: Yeah.

CHAIR BEACH: 76? Okay.

MS. BEHLING: Correct.

CHAIR BEACH: Okay. So, I got -- and then the one you just asked him about, that was for 84, right? Correct?

MS. BEHLING: Correct. Yes.

CHAIR BEACH: Okay. Which is the one we've discussed today. Subcommittee, thoughts on this tasking and 84 in -- specifically, if we should move forward on that or not.

MEMBER ZIEMER: Let's see. What is the title on 84 again?

CHAIR BEACH: That's the internal co-exposure of model --

MEMBER ZIEMER: Oh. Oh, yeah.

CHAIR BEACH: -- four, NMI. Nuclear Metals, yeah. The one we discussed today.

MEMBER ZIEMER: Oh, yeah.

CHAIR BEACH: Ron -- yeah. Ron talked about 84 not being reviewed.

What's -- what's your thought, SC&A, on reviewing that or waiting?

MR. BARTON: Well, this is Bob. I think Tim has a point that anything we come up with (audio drop), you know, we --

CHAIR BEACH: Bob, you're --

MR. BARTON: -- model --

CHAIR BEACH: Yeah, you cut out --

MR. BARTON: -- (indiscernible) --

CHAIR BEACH: -- halfway through.

MR. BARTON: I have --

CHAIR BEACH: We're gonna have to strap --

MR. BARTON: (Indiscernible.)

CHAIR BEACH: Yep.

MR. BARTON: You know, I -- I think there might be some benefit in looking at it through the lens of the fact that NIOSH will be intending to

revise the co-exposure model at the same time as we look at what's there already. It might better inform NIOSH's creation of that co-exposure model. So, I think there might be some benefit there without really diving in too deep.

CHAIR BEACH: Okay. Yeah, I agree with that also. That makes --

MS. BEHLING: I agree with that.

CHAIR BEACH: -- a good point.

MR. BARTON: Yeah.

CHAIR BEACH: Okay.

MS. BEHLING: Yeah.

MEMBER ZIEMER: Well, Bob -- this is Paul again. Bob, what -- what do you mean by "not diving in too deep"? Are you going to review it or what do you -- what do you mean by that?

MR. BARTON: Well, we would be able to look at the dataset underlying it. I'm not familiar with the specifics of that co-exposure model. And basically, what I'm saying is we wouldn't just be hammering down the same old findings and observations that would be solved by the IG-6 process anyway. But it might help to take a look at the data and see if there's anything that might even preclude formulation of a co-exposure model.

MEMBER ZIEMER: Okay. Thanks.

CHAIR BEACH: Okay. Thank you. Okay. So, we're looking at tasking PER-088, 89, 090, OTIB-0076, 0080, 0084, and 0092. Are we okay with those?

MEMBER VALERIO: Josie, this is Loretta. Would you repeat those?

CHAIR BEACH: Yeah. It's PER-088, which is Pacific Proving Ground;

PER-089, which is Bliss and Laughlin; PER-090, which is GJOO; and then OTIB-0076, thorium from Nuclear Weapons; OTIB-0080, internal co-exposure at Santa Susana; OTIB-0084, internal co-exposure at MNI, Nuclear Metals, Incorp. -- and Company; and then OTIB-0092, neutrons BF4 type of -- of film.

MEMBER VALERIO: Okay.

CHAIR BEACH: Okay. Are we okay with tasking all those?

MEMBER ZIEMER: What kind of timetable are we talking for on these? This is a pretty good workload.

CHAIR BEACH: Yeah. I -- I'm under the assumption Kathy wouldn't recommend any tasking unless SC&A could handle the tasking. But I don't think we're going to set a timetable on it. We have -- we probably, for the agenda, we'll probably have a fairly good agenda already outlined for our next meeting.

MEMBER ZIEMER: Right.

CHAIR BEACH: But I can let Kathy answer that.

MS. BEHLING: That's true. This is Kathy, and that's true. And when you task, we have six months. I -- right now, the dose -- Dose Reconstruction Subcommittee is not doing a lot. We're -- don't have a chairperson. And so, I don't know that -- Rose can correct me here if I'm wrong -- but I don't think we're even setting up the one-on-one meetings there and haven't received a new set of dosage reconstructions. So, it seems to me that we can handle this tasking, unless I'm (audio drop), Rose.

MS. GOGLIOTTI: Yeah, you're -- you're correct, Kathy. We don't have anything on the dosage reconstructions front so far. That might change.

Andy has been talking about it, but I have nothing.

MS. BEHLING: So, I think we're -- I think we can handle this tasking. We get six months from the date of tasking.

MEMBER ZIEMER: Okay. It sounds like they can handle it, so I'm okay with it. This is Paul.

CHAIR BEACH: Okay. Thanks, Paul. Good question.

Loretta, are you okay with this?

MEMBER VALERIO: Yes.

CHAIR BEACH: Okay. And Rashaun, back to you. Same question, are you okay with this tasking?

DR. ROBERTS: Yes. I think it's been discussed.

CHAIR BEACH: Okay. So, then I guess we'll ask you to look forward for our next subcommittee meeting date. And I would look in February or March. What do others think?

MEMBER VALERIO: This is Loretta. February or March work for me.

CHAIR BEACH: Thank you.

MEMBER ZIEMER: Well, of course, it's going to depend on the date, of course, but generally, I'm fairly clear.

CHAIR BEACH: Okay.

DR. ROBERTS: All right. Then let's look at March for this. You know, are there particular weeks, Josie, that -- that work better for you there?

CHAIR BEACH: Well, and I'm going to ask if we could do this on a Friday, if that's not too difficult for others. It works much better for me right now, but it's not all me, so. The 7th, the 14th --

MEMBER VALERIO: Sorry, Josie, this is Loretta. I was going to say

Fridays work better for me as well.

CHAIR BEACH: Okay. Great. Any complications with that from others?

MEMBER ZIEMER: Did you say March?

DR. ROBERTS: Yeah.

CHAIR BEACH: Yeah. So, March 14th --

MEMBER ZIEMER: Right now my Fridays are clear.

CHAIR BEACH: Okay.

MEMBER ZIEMER: Right now my Fridays are clear. You never know when an emergency is going to arise, but.

CHAIR BEACH: Yeah, yeah, yeah. We can accommodate, hopefully. So, Rashaun, --

DR. ROBERTS: Okay. So, --

CHAIR BEACH: Go ahead.

DR. ROBERTS: Well, I was actually, looking at my schedule, it's probably going to be better to do something a little bit later if we're -- if we're doing a Friday.

CHAIR BEACH: Okay.

DR. ROBERTS: How would the 21st work?

CHAIR BEACH: Clear for me. That would be great.

DR. ROBERTS: March 21st, and Loretta and Paul?

MEMBER ZIEMER: Yes, I'm good.

MEMBER VALERIO: I'm good.

DR. ROBERTS: Okay.

CHAIR BEACH: Great. Thank you. I appreciate everybody

accommodating Fridays.

Anything else? A very productive meeting. If anybody has any desire to get in and look at those templates we were discussing earlier, I think we could reach out to get some training on how to get to them. I was able to get to them and read them yesterday. So, Paul or Loretta, when you have access back on your computer, maybe if you need some help with that, someone could step in and help.

MS. GOGLIOTTI: Yeah. Feel free to reach out to me. They're on the portal. But I do know that other people still need to be trained on using the CyberArk, so I'm happy to do that training as well.

CHAIR BEACH: Okay. Great. Yeah. Thank you. I just thought (audio distortion) to know that those -- that's available. And I didn't want to name you out, but I knew you were probably the one.

MS. GOGLIOTTI: Okay. It's always me.

CHAIR BEACH: Thanks, everybody. Productive meeting. Appreciate everybody's attention and work. And I would say we're clear to adjourn, Rashaun.

DR. ROBERTS: Great. Yeah. Thanks, everybody.

(Whereupon, the meeting was adjourned at 4:10 p.m. EST.)