U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL
SAFETY AND HEALTH

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ADVISORY BOARD ON RADIATION AND
WORKER HEALTH

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SUBCOMMITTEE ON PROCEDURES REVIEW

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WEDNESDAY
FEBRUARY 18, 2015

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The Subcommittee convened via teleconference at 11:00 a.m., Eastern Standard Time, Wanda I. Munn, Chair, presiding.

PRESENT:

WANDA I. MUNN, Chair
JOSIE BEACH, Member
PAUL L. ZIEMER, Member

ALSO PRESENT:

TED KATZ, Designated Federal Official
NANCY ADAMS, NIOSH Contractor
HANS BEHLING, SC&A
KATHY BEHLING, SC&A
RON BUCHANAN, SC&A
BOB BURNS, ORAU Team
ROSE GOGLIOTTI, SC&A
STU HINNEFELD, DCAS
JENNY LIN, HHS
LORI MARION-MOSS, DCAS
STEPHEN MARSCHKE, SC&A
JOHN MAURO, SC&A
JIM NETON, DCAS
STEVE OSTROW, SC&A
MUTTY SHARFI, ORAU Team
SCOTT SIEBERT, ORAU Team
MATTHEW SMITH, ORAU Team
JOHN STIVER, SC&A
ELYSE THOMAS, ORAU Team

T-A-B-L-E O-F C-O-N-T-E-N-T-S

P-R-O-C-E-E-D-I-N-G-S

(11:00 a.m.)

MR. KATZ: Let's get started with roll call. So let me start with a few things, as much material as can be posted had been posted for this meeting.

For people who are listening in and want to see the documents that we're talking about, so you'll find them on the NIOSH website under the Board Section, Scheduled Meeting, with today's date and you can go on there and click on a file and follow along.

There's a Subcommittee meeting with respect to conflict of interest. We don't have any agenda items that are apparently related to any conflicts we have with Board Members.

Josie and Wanda are conflicted, of course, for Hanford matters, but I don't think we have any Hanford matters on our plate, and Paul has conflicts for X-10 and LANL after 2000, and I don't think any of those are on our plate either today, so we should be clear there.

Let us do, so you don't have to speak

to conflict as we do roll call, but let's get started. We already, I don't need to do roll call for the Board Members because they are, the three are already there, Wanda, the Chair, and Paul and Josie.

Do we have any other Board Members that are on the line? Okay, I didn't expect so.

(Roll call)

CHAIR MUNN: Good morning, everybody. Thanks for your efforts this morning. We have a significant amount of material to go through today and I trust that we're all ready for that.

The first thing we have on our agenda item is to review the BRS status. I think Lori has indicated to all of us that all of the responses that NIOSH had to post are up and I think you have indication of what those are.

We've had a comment from Steve about the difficulty in trying to get some of the attachments filed in and that is under advisement and I would not expect any resolution to that as of yet. If there is, Lori or Steve, correct me.

Otherwise, anyone who has any question

or any issue with respect of where we are with the BRS please let me know.

So I believe we have -- I'm taking that silence to mean that we are all happy with where the system is with a minor difficulty that we've already established of impacting what we're trying to do and that that's under control and going to be taken care of.

Unless we have any other concerns with respect to the BRS we're going to go right on through to the White Paper regarding Overarching Issue 9.

Jim, are you going to speak to that? Who?

DR. NETON: Yes, Wanda, I'm going to try to summarize what we've done here.

CHAIR MUNN: Good, thank you.

DR. NETON: Okay, everybody hear me okay? Is my volume alright on the phone?

CHAIR MUNN: Sounds great here.

DR. MAURO: Sounds good.

DR. NETON: Good. So this an issue that SC&A commented, it's been out there for quite

some time and it's related to skin contamination, a skin contamination review they did a while back.

And eventually we agreed on all the issues except for one and that is NIOSH's position that we believe that uranium was not difficult to remove from the skin and clothing by washing.

It was a direct experience of at least one NIOSH staff member who worked at a uranium facility that this was indeed the case. SC&A didn't necessarily disagree with us but they thought it would be prudent if we went and provided some additional documentation of this experience.

So there's a White Paper out there, I don't know is it being shown on the BRS? Yes, it is, okay. So we went out and reviewed the literature to the extent we could to see if there's any qualitative and/or quantitative information regarding this.

And, actually, to my surprise it wasn't abundant. Oftentimes it almost seemed like it was taken for granted that this was the case.

There is all kinds of evidence of people, you know, recommending to take showers when

they're contaminated and that sort of thing, but very little in the way of at least a quantitative evaluation.

We did manage to find a couple articles though. Back in the late 1950s there was one article published in the American Industrial Hygiene Association Journal by Blackwell in '59 where they were actually reviewing methods of surface contamination control at a uranium rolling operation.

I don't believe this was a massive industrial operation like you might have had at Bethlehem Steel, but, nonetheless, it was a full rolling operation with salt baths and all that sort of equipment.

And a part of the procedure actually talked about personnel contamination and there was a quotation in there that I included in the response paper about personnel when they left the immediate area they were surveyed and if they were contaminated a washroom was provided for those who may have received contamination of the skin and a washing with soap and detergent usually removed any

contamination, so that's the first thing we found in the literature.

A second article appeared in the, most people know the existence of HASL-58, it's a very nice continuum of proceedings put on by HASL in 1958 about uranium contamination control measures.

And one of those papers talked about a case study at the Hanford site where there was a worker who had visible amounts of UO3 powder around his nose, mouth, and chin.

A portable survey meter found that to be around 10,000 dpm per seven square inches and the report stated that a shower removed the detectable surface contamination. So at least there's those two late 1950s articles.

And this is, by the way, for intact skin. There is no, neither of these involve any sort of, you know, breakage of the skin where, you know, we would agree that there might be some issues there.

And then there was a quantitative evaluation done by Friedman in '58, and this is also, I forget exactly where this was published,

it might have been the AIHA Journal as well. I'll go back and look here. Friedman?

Yes, it was the American Industrial Hygiene Association Journal as well, where he looked at the, actually labeled soil with lanthanum-140 and applied it to the skin of the forearms of I think about 40 workers, well 45 volunteers, and actually looked at the cumulative removal efficiency of various washing techniques.

In other words he did one washing, two washing, three washing, and I included an adaptation table of that article that was actually reported in a SENES DTRA report that demonstrated that the soil, the radiolabeled soil was taken off very quantitatively with the first washing to the extent that just soap and water, scrub and flush removed 95.8 percent, on average I think that is, of the 45, the forearms of the 45 people that were in the study.

We would certainly agree that this is not exactly analogous to uranium contamination. But I think I made this point earlier, the uranium, at least to our experience does behave more like

a dirt/soil contamination to some extent because it's a very low specific activity material, radioactive material and we calculate that something like 5,000 dpm on a small surface area of skin would be around three milligrams of contamination and, indeed, you saw the, when I talked about the Hanford case study, a 10,000 dpm measured on the chin and around the mouth of the person was considered to be visible contamination, that would have been somewhere in the vicinity of six milligrams.

And, finally, a note is that we looked at the personal decontamination guidance in the DOE manual Good Practices that is out there, and it recommends gently scrubbing the skin with soap and water to remove surface contamination.

There are other methods mentioned but only after the initial attempt which a general washing has proven to be ineffective. And, you know, as we mentioned at the beginning of this discussion it is NIOSH's experience that general washing is usually most often effective to remove contamination and abrasive decontamination

methods are not typically required at least in our experience.

So, in conclusion, there's a couple qualitative studies out there that talk about removal with soap and water and at least one quantitative study using soil on the forearms that demonstrates radioactive soil can be removed fairly effectively.

And, finally, the DOE Good Practices manual that I just talked about recommends washing with soap and water as their initial attempt. And that's it.

CHAIR MUNN: Thank you, Jim. SC&A, do you find this White Paper to be adequate for the concerns that you had expressed? We have discussed this several times and in our conversations this was, I think, just a wrap up on Jim's part.

We had asked NIOSH to give us a piece of paper that had the words on it and he's done so. Can we now move on from this concern? Does it meet your requirements? It's --

(Simultaneous speaking)

DR. MAURO: With the silence I was going to jump in, this is John Mauro.

CHAIR MUNN: Oh, okay.

DR. MAURO: I know that Hans and I were, I guess we were the ones that were primarily concerned and all I can say is that what was just explained to me was a very nice job and I think you did the best with what was out there and, you know, I'm satisfied.

I don't know if, Hans, you feel the same way?

CHAIR MUNN: Hans?

DR. H. BEHLING: Yes, with regard to skin contamination I think the evidence is there to suggest that a simple washing is probably adequate.

But I think, if I recall, we did have a second issue that involved the clothing contamination and the potential contribution to skin dose from persistent clothing contamination.

And I think we talked about in days past, the time era, people may have worn their clothing a little longer than they do today and

often times work clothing was perhaps washed once a week at most maybe and that clothing contamination could contribute significant skin exposure, but I'm not sure if that was resolved independently of this White Paper.

DR. NETON: This is Jim. We did have that discussion and my recollection was that we pointed to the fact that we do have a method for addressing clothing contamination that's in the Bethlehem Steel Site Profile and that we are going to consider using that type of approach at facilities where this would be the case.

I think we used clothing contamination that was actually measured prior to laundering, I think it was at the Mallinckrodt facility. I haven't looked at that in a while, but that was, we acknowledged that that still could be an issue. We are going to address that in that way.

CHAIR MUNN: Yes, I had thought we had laid that to rest. Although, if it's still outstanding I suppose we need to get some words injected into the BRS to identify that.

DR. NETON: I thought it might be

there, but maybe I'm mistaken.

MR. MARSCHKE: This is Steve Marschke. I remember that we did talk about that. I am looking for it here in the BRS to see if there's anything on it and I can't see anything.

I'll have to go back and look at the minutes of meetings and the transcript there and see whether or not we talked about this and what we actually said about clothing contamination.

DR. H. BEHLING: Thank you, yes.

DR. NETON: Yes, I guess I'd like to at least get some agreement on this washing issue, though. It sounds like we do agree that that one is okay.

CHAIR MUNN: I think I heard those words, so with respect to the concern on skin I think we need to indicate that that concern has been met, that SC&A agrees that the concern has been adequately met and we can close that portion of it.

DR. NETON: I do agree as well that we don't to lose that other issue though and I'd have to go back and review the transcripts if it's not in the BRS somewhere as to what we said on that,

but I distinctly remember talking about the approach that's used in the Bethlehem Steel Site Profile.

MR. MARSCHKE: The only thing I can see, Jim, is in the same concern, Concern 1 here is that when John Mauro, the entry for John Mauro on January 7, 2014, we are talking about skin and clothing, and so I would go back and start looking, and there is a -- but that's --

CHAIR MUNN: There's a memo attached.

MR. MARSCHKE: Memo attached, but that's our memo so that wouldn't resolve the issue.

CHAIR MUNN: No.

MR. MARSCHKE: But there might have been a Procedures meeting sometime around that time period when the clothing was discussed and --

DR. NETON: You know, and, Steve, I think I remember, that issue may be resolved in that memo now that I'm thinking about it.

MR. MARSCHKE: Oh, you think so? Well let's open it up and take a look.

DR. NETON: Yes, take a look because I, you know, I hate to, you know, delay things, but

I --

CHAIR MUNN: No, it's not a delay actually. This is a --

DR. NETON: I think there was some mention of it made in there.

CHAIR MUNN: Yes, keep going down.

MR. MARSCHKE: I'm going to look for clothing.

DR. NETON: Yes, just do a search for clothing.

MEMBER BEACH: Well the title certainly suggests clothing is in this memo.

DR. NETON: Yes. I think somewhere in there -- Is it the one where it basically said that we resolved most of the issues?

All right, here it is. "During this discussion NIOSH pointed out that NIOSH accounted for skin and clothing, such as contaminated clothing, according to the methods used to reconstruct doses at Bethlehem Steel."

CHAIR MUNN: Yes.

DR. NETON: "Based on this discussion it appears NIOSH is prepared to take this exposure

scenario into consideration on a case-by-case basis."

I'm not sure what that means. This is talking specifically about clothing not washing.

CHAIR MUNN: Looks like we may have to go back to the July 2014 transcript.

(Simultaneous speaking)

DR. NETON: I think this does cover both. It talks about --

(Off the record comments)

MR. MARSCHKE: "We recommend this issue be held in abeyance."

(Off the record comments)

DR. NETON: Okay, all right. Yes, I kind of consider that a separate issue than the washing issue.

CHAIR MUNN: Yes, it seems to be, and I think, I do think that we resolved the clothing in our discussions.

MR. MARSCHKE: I think it's right there in that first paragraph. Wanda, it says basically, "We now understand that this is in fact the approach that NIOSH plans to use, including

doses beneath clothing."

"Given this understanding our concerns with respect to this matter is resolved."

CHAIR MUNN: Yes.

MR. MARSCHKE: So that's, I think they're talking, and in here they talk about how they're going to use IREP to skin --

CHAIR MUNN: To identify skin dose, yes, underneath clothing. Yes, and we know that it, from previous discussions we know that clothing is taken into consideration in that process.

I would interpret that sentence to mean that the clothing issue has been resolved. Do you, Hans?

DR. H. BEHLING: Yes, Wanda.

CHAIR MUNN: Okay, good.

DR. H. BEHLING: Sorry.

CHAIR MUNN: So with that it appears to me that we can now close the issue with respect to skin dose as it applies here. Let's --

DR. MAURO: Before we move on, this is John. Jim, those references you cited sound like really good references to have access to. Are they

on the archives so that in the future we could all take advantage of it?

DR. NETON: You know, John, they are not, but I could easily, I'll make sure that they get put there. I think there's a section on the Site Research Database that allows for generic items to appear.

DR. MAURO: That would be great, thanks a lot.

DR. NETON: Yes, I'll take and -- I didn't get, you know, I didn't have time to put those out there, but I'll make sure they get there.

They're actually fairly readily retrievable if you have a library that's got the AIHA stuff going way back. We happen to have one in NIOSH, it's kind of nice.

CHAIR MUNN: Okay. I think we can close this specific concern, Concern 1, and let's move on then to OTIB-54.

We have quite a number of documents and issues to address here, first one being Items 1 through 4. I believe Steve Ostrow is going to present those.

DR. NETON: Wanda, this is Jim.

CHAIR MUNN: Yes?

DR. NETON: Before we get started could we confirm that Bob Burns is on the telephone? I expected him, he didn't chime in when we initially signed in.

MR. BURNS: Yes, I'm here.

CHAIR MUNN: Oh, good.

DR. NETON: Okay, great. Thanks. Okay.

CHAIR MUNN: Terrific. Yes, good paper, Bob. All right, Steve Ostrow?

DR. OSTROW: Good morning, this is Steve. We had several findings on OTIB-54 and we've been resolving them every time we have a meeting.

Findings 1 through 4 all deal with reactor modeling, how ORAU did it and used ORIGEN to model reactors, how they selected the reactors, how they reduced the number of isotopes they were considering, and so forth and so on.

ORAU responded with the RPRT-67, which addresses these four findings that we have, 1

through 4. We took a look at the ORAU report and SC&A issued its own report on February 6th, which everyone should have, where we took a look at the these four findings.

I just wanted to say a little bit of a compliment here. ORAU did a bang up job on this report, on their report, very comprehensive, very interesting, very good, especially to nuclear engineering people.

CHAIR MUNN: Yes, indeed.

DR. OSTROW: Yes. I enjoyed it. So anyway the, so to summarize what our findings were of the review, originally Findings 1 through 4 were all listed as "in progress," they're waiting to look at the, and the action on ORAU's part was to issue this report, which they did.

So as a result of our review we recommend that three of the findings be closed and one of the findings remain in progress and I'll go through them one at a time.

Steve Marschke, did you put in the BRS the four recommendations that we had on this?

MR. MARSCHKE: Yes, I did, but I can't

get to the, I'm trying to change the one from the last, the overarching one there and I'm trying to close that and it's --

DR. OSTROW: So I suggest we just hang on for just a minute until Steve gets there, it'll make things easier.

CHAIR MUNN: That's reasonable. Let's do it while it's hot.

DR. OSTROW: Well until he gets there I can read what our Finding Number 1 was, which is a short one. "SC&A is not able to evaluate the appropriateness of the input parameters used for the ORIGEN-2 run," didn't say not specified or references cited in the OTIB, so that was our finding.

And as soon as Steve gets to it you can see our conclusion. Okay, there we go. It's like in the middle of the screen right now, and, okay, I'll read in case everybody is not on the video conference, okay.

"After review of the data sources and input parameters presented in the ORAU reactor modeling report as well as an examination of

literature, SC&A is satisfied that the report adequately specifies and references the pertinent input parameters and assumptions associated with the ORIGEN-2 runs and finds them appropriate." SC&A therefore recommends that this finding be closed.

So we went a little bit further than just looking at the ORAU report. We looked at the actual source literature itself for the different, for ORIGEN and the different reactor types and satisfied ourselves that not only did ORAU address our concern, but they also did it correctly.

Their inputs were from the right sources and everything, so we recommend that this finding be closed.

CHAIR MUNN: Steve Marschke, can you please do that for us, indicate that SC&A and NIOSH agrees with NIOSH's approach and the Subcommittee as of this date closes this item.

MR. MARSCHKE: Will do.

CHAIR MUNN: Thank you.

MR. KATZ: This is Ted. I don't know if any others hear it, but there's some background

noise coming through from someone's phone.

CHAIR MUNN: Yes, someone has traffic going by. Very good.

DR. OSTROW: Okay, Steve, when you're --

CHAIR MUNN: Without any comment let's move on to Finding 2.

DR. OSTROW: Okay. I'll read the finding, it's also short. "The OTIB does not provide sufficient information to allow evaluation of its downselect from the initial seven to the final four representative reactors chosen."

What this means is that ORAU started out with a list of several reactors, ran ORIGEN and reduced the number of reactors considered to just four, the Advanced Test Reactor, Fast Flux Test Facility, the N Reactor, and a TRIGA reactor with stainless steel cladding.

And we had, I mean we didn't have any technical reasons to doubt what NIOSH did, what ORAU did, but as you can see in our finding what they put in their report is almost identical to what was originally in the OTIB, so they didn't really

answer the question.

What we would really have liked to have seen was some data from tables or whatever comparing the results from the seven different reactors and showing that the four representative ones that they selected actually encompasses the, I guess the parameter space of the original seven reactors, that these really are representative.

We needed some more explanation of this and as I said since the ORAU report just says the same thing as the OTIB did, that we don't think it was adequately addressed and we recommend then that this stay, you know, as an open item in progress.

CHAIR MUNN: NIOSH, any comments?

MR. BURNS: This is Bob. Looking at SC&A's report, as I understood it, the suggestion was to add some tables to your RPRT-67 or elsewhere that would further allow them to make those evaluations?

DR. OSTROW: Yes. Yes, that's basically it because I mean you say that the four reactors you selected are representative, but you don't say, and you said in your report the factors

that you considered, but you don't show us any data so we could actually judge for ourselves that these are representative.

MR. BURNS: Okay. I mean that data certainly exists. It would be a bit voluminous, but it could certainly be added if that's what NIOSH asks us to do.

DR. OSTROW: Okay. I mean don't totally bomb us with data, but, you know, some, you know, important tables, whatever, not, you know, hundreds of pages of data.

I assume you have all the data because you made all the runs.

MR. BURNS: Right.

MEMBER ZIEMER: This is Ziemer. Can I just comment that, would it be possible if you were just to have two or three summary tables that illustrate the parameters that were used to show that it's equivalent?

MR. BURNS: The answer is yes, again, if that's what we're asked to do by NIOSH.

DR. OSTROW: That would be fine because we don't really want to wade through huge amounts

of data. Paul's suggestion is very good, it can all be, you know, summarized in a couple of tables.

CHAIR MUNN: Yes, and SC&A is it your request that this be added to RPRT-67 or is that it simply be provided to us here?

DR. OSTROW: We don't care, whichever is more convenient. If it's something short maybe just, you know, a technical memo.

CHAIR MUNN: It would be more expedient to do it as a White Paper or technical memo here.

DR. OSTROW: In short, yes.

CHAIR MUNN: Yes, if that's okay. Bob, is --

MR. KATZ: Oh, I think we need to hear from NIOSH if that's okay for ORAU to provide that.

CHAIR MUNN: Yes.

MR. HINNEFELD: This is Stu. I think a way to proceed here is for us to get with ORAU and decide a good way to provide the information that will allow this, the logic of the selection to be more obvious, and then we'll inform the Subcommittee and SC&A when a product's available and where it can be viewed.

CHAIR MUNN: Good. That's very helpful. Thank you, Stu. We'll take that under consideration and make a note that Finding 2 will be addressed by NIOSH next time.

DR. OSTROW: Okay. So if you want to we can move on to Finding 3. Finding 3, I'm not going to read the whole finding because it's a little bit long, but it deals with the information about the ORIGEN-S run, before we were talking ORIGEN-2, now we're talking about ORIGEN-S and we wanted NIOSH to provide an explanation of the ORIGEN-S runs that they did so we could see if it was appropriate.

And Steve is getting the finding here. Okay. And we think that what NIOSH provided is adequate, that we believe that the reactor modeling report contains sufficient information on the parameters selected for the ORIGEN-S run for each of the representative reactors to inform an assessment if the values chosen are appropriate.

SC&A therefore recommends that this finding be closed. And as on the first finding we went beyond just looking at the ORAU report, we went

back to the original source documents about the different types of reactors and we looked also at the, you know, the manuals for ORIGEN-S, which is part of a larger scale system that Oak Ridge maintains for reactor analysis.

So we recommend that this finding be closed, we're satisfied.

CHAIR MUNN: Any comment from Board Members or others?

MEMBER ZIEMER: Yes, I agree it should be closed.

CHAIR MUNN: Josie?

MEMBER BEACH: Yes, I'm in agreement with that also.

CHAIR MUNN: Very good. Steve, will you please make note on Finding 3 that the Subcommittee agrees this finding is now closed.

Thank you, Steve. Now let's move on to Finding 4. Steve Ostrow?

DR. OSTROW: Okay. Finding 4 deals specifically with the TRIGA reactor and we had also some questions about which TRIGA reactor was chosen in the aluminum or stainless steel cladding one and

we had some question about what fuel enrichment was chosen and a few other things.

The ORAU reactor modeling report provides all the information that we needed. It contains the information on TRIGA reactor cases that were lacking in the OTIB and it's consistent with literature.

We looked at the literature also on that, so we recommend that this finding be closed.

CHAIR MUNN: Any comment from anyone with respect to that recommendation? Agreed, Paul?

MEMBER ZIEMER: Yes, I agree with that.

CHAIR MUNN: Agreed, Josie?

MEMBER BEACH: Yes.

CHAIR MUNN: Steve will you please make the appropriate statement on the findings and close Finding 4? Thank you Steve Ostrow. Any other comments with respect to that portion of OTIB-54?

All right, thank you folks. That finding is now closed. That brings us to Finding 5, the White Paper, that Bob Burns provided for us. Bob?

MR. BURNS: This is Bob. No, I did not provide that White Paper.

CHAIR MUNN: Oh, you didn't.

MEMBER BEACH: Are you talking about the December 19th one?

CHAIR MUNN: I must be looking at the wrong thing then. All right, then who's going to do Finding 5 at NIOSH?

DR. NETON: This is Jim, I'm a little confused. Is this the White Paper that dealt with the usage of the different release fractions in the emergency --

CHAIR MUNN: I thought it was release fractions.

(Simultaneous speaking)

DR. NETON: Yes, Bob, you did write that White Paper.

MR. BURNS: Oh, okay. I didn't provide it and I wasn't prepared to discuss this.

DR. NETON: Well your name is on it.

(Simultaneous speaking)

MR. BURNS: Oh, understood. I --

CHAIR MUNN: Okay. Then --

MR. BURNS: I'm at a bit of loss here.

CHAIR MUNN: Well let's read the finding.

DR. MAURO: Can I help out? This is John Mauro. I read through the paper. It was clear that an enormous amount of work went into it and I understood it and in effect and in brief I'm hoping that maybe we can go through this now and at least give you our perspective on it and how you want to deal with that.

You could decide, but in reviewing it it's clear that the issue had to deal with the -- you will visualize workers handling a spent fuel and you wanted to estimate what might become airborne and become an inhalation concern.

And when you do that you have to assign that all of the, you know, the long list, the radionuclides to the fuel, and you have to determine the release fraction, what fraction of the activities in which of these isotopes become airborne.

And some of the radionuclides are a lot more volatile, like the iodines are probably the

most volatile, cesium and ruthenium are a less volatile, and then just about everything else, argon, the lower volatility, and those release fractions will establish the mix.

If you recall everything is based on the mix, so you have an airborne mix now and the question that we raised is that a set of release fractions were selected in OTIB-54 to come up with that, that mix for release fractions, and they used a fairly simple approach.

I think they just had two categories. The iodines, which had a release fraction of something like 0.5, correct me if I'm wrong, I'm just doing this from memory now.

And everything else was given I believe it was 0.01, and that would be the high end of the, in fact that would be appropriate for semi-volatiles like cesium and ruthenium, but they used that for everything.

And the question I raise is since this is a relative number in the mix is it possible that by assigning everything else a 0.01 is that in fact claimant-favorable because in theory an

alternative approach would've been to assign everything else, except for the cesium or ruthenium, something lower like 0.001?

In fact that's referred to as the DOE mix in the literature, but NIOSH elected to go with what they call the alternative mix, and the question was since everything is relative, you know, on its face value you would say well, we gave everything 0.01 which is more conservative, but the reality is since everything is, in terms of relative to each other, it's not apparent that in fact that's a claimant-favorable assumption. So that was the issue.

What NIOSH and ORAU did was do an immense amount of work in terms of well, let's see what happens if we were to use what we would call the DOE mix for a whole, I believe it was said of 100 cases, and what would happen if we use the alternative mix, the alternative mix being the mix that OTIB-54 elected to use.

And they present an incredible series of tables, someone did an awful lot of work, to show the outcome in terms of under what circumstances

is the DOE mix more claimant- favorable and under what circumstances the alternative mix, the one in OTIB-54, are more claimant-favorable, and the outcome was that it depends.

MR. BURNS: Right. That's exactly what I was going to say, the answer depends.

DR. MAURO: It depends. Now the only -- now of course we did not check any numbers. All we did was look at the presentation and I have to say, you know, we take those results on face value.

My only question is that there really is nothing in the report shows what you plan to do. What I mean by that is when you're dealing with a case and we know that depending on which release fractions you use could affect the outcome.

Is it your plan to continue to use the alternative mix, and that becomes your standard mix, or is it now your plan to use both and see which one is limiting?

Because the report itself is silent on that and we're wondering, you know, what your strategy is going to be.

MR. BURNS: Okay. And I can't speak to

that. I mean the purpose of that report was to provide that information to NIOSH and I guess by extension back to the Board and then just put it out there for discussion of, in response to your question, what are we going to do next, do we stick with the status quo or make some adjustment?

I don't think it was our intention to pick one or the other, rather just to present the information.

DR. MAURO: Yes. I could help out a little bit. In discussing it amongst ourselves we recognized that the DOE mix release fractions really were intended for use for accident conditions.

MR. BURNS: Right.

DR. MAURO: And if a case could be made that under non-accident conditions your alternative approach would be more appropriate, but I don't think it's self-evident that that's the case. In other words, I mean --

DR. NETON: John? Dr. Mauro?

DR. MAURO: Yes?

DR. NETON: I thought that when that

case was made in the paper, and it was our intent to stick with our mix versus, you know, for exactly that reason that, you know, for the situations that we're modeling here the alternative mix, as you're calling it, is more realistic.

DR. MAURO: Okay. I have to say that in thinking back to the Paper when I read it last week I didn't recall seeing that statement made, that conclusion.

I know you mentioned that the DOE mix was intended to use for accidents and I understood that.

DR. NETON: Right.

DR. MAURO: But it wasn't apparent that you decided to stay with the alternative mix as being the approach and now the only concern I have is, now this is just what I would call a self-evident, you know, whether you're under accident conditions or not clearly there are substantial differences in the volatility of iodine versus ruthenium and cesium versus just about everything else whether you're under accident conditions or not.

So I guess I would say that I understand that the DOE mix was for accidents but it's not apparent to me why it would not also apply to when you're just handling the material.

DR. H. BEHLING: This is Hans Behling. Can I just give a quick update as to which the differences -- under what conditions would these radionuclides be released and exposed to individuals, are we talking about spent fuel in a hot cell?

DR. MAURO: It is -- the whole OTIB -- Well I'll tell you my perspective. The OTIB is intended to be used to reconstruct doses to workers who are exposed, who are associated with basically reactors and spent fuel and it covers a broad range of circumstances where people might be exposed to airborne fission products that are associated with spent fuel and the only information you have for that worker is a gross beta gamma analysis of urine.

So I guess to answer your question is the OTIB, in my understanding, has broad applications. There could be many circumstances under which it could be used, everything ranging

from a person working at a reactor to perhaps a person working in a glove box with fuel.

That's my understanding and so it's within that context that I raise the question regarding the release fractions.

DR. H. BEHLING: Well wouldn't the issue here really be one, when you talk about an accident you're talking about an operating power plant or a reactor that has a fresh inventory of most of the short-lived radioiodines that wouldn't exist in spent fuel.

MR. BURNS: All right. Well there's guidance in the OTIB for --

DR. MAURO: Age.

MR. BURNS: -- age and also for whether or not iodine should or should not be included in a particular case.

DR. MAURO: Yes. Yes, so we don't have an issue with that. You do address that issue. It's more along, it's just looking for a rationale that fundamentally there are these differences in the volatility, potential volatility for these I would say three classes of radionuclides.

We'll say the volatiles being the iodines and, of course, the mix that's in the fuel itself takes into consideration, you know, what type of fuel you're working with, what age, or burn up, I mean all of that's all built into the first half of our conversation. We're really now where we talked about the fuel itself.

Now on the back end we'll say okay, somehow a person is going to be exposed to airborne, or radioactivity associated, somehow related to what's in that fuel, and the release fraction, of course, has an effect as you clearly pointed out and I don't remember the conditions under which the DOE mix as opposed to the alternative mix are limiting, and there were some big differences.

(Simultaneous speaking)

MR. BURNS: Well really it depends on what you're gamma counting or beta counting because the choice of the release fraction has such a big effect, order of magnitude effect on the cesium-strontium ratio for uranium fuel.

DR. MAURO: Yes.

DR. H. BEHLING: But isn't one of the

major factors that would differ from an accident scenario of DOE model the barriers we're talking about?

When you have a reactor that is operational and then you have an accident you have moveable barriers that may not exist, including, obviously, the water, the reactor vessel, the various filtration system that would remove some of the stuff before it would in essence expose individuals in an operating reactor that has undergone a transient or an accident.

These barriers wouldn't exist so it would clearly change the release fractions, the absence of water, many of these materials are soluble in water, obviously there are barriers involving the reactor vessel, the containment vessel where people general speaking are not there during a reactor operation.

All those things will impact what the release fractions are that people are exposed to.

MR. BURNS: Right. Yes, I don't think the DOE standard necessarily covered or was limited to reactor accidents. As I recall it's the

DOE-1027 standard that we utilized and that pertains to, I don't have it in front of me, but I think it pertains to Category II nuclear facilities, so not necessarily reactors.

Regardless, I don't think it takes credit for water and filters and such.

CHAIR MUNN: Does that help, Hans?

DR. H. BEHLING: Yes. You know, I'm used to dealing with these reactor issues coming from the nuclear power area and our concern was always what are the release fractions in the conditions such as the Three Mile Island accident, and they're quite different from what I believe you may be looking at here in this White Paper.

MR. BURNS: Yes, I think that's accurate. As I'm sure you know there's a whole series of NUREG reports that address release fractions for reactor accidents that don't necessarily look the same as the DOE-1027 standard.

But our rationale for setting the semi-volatile and particulate release fractions the same was basically we wanted to account for accumulation of routine contamination in the

workplace and I just didn't want a situation where there was an order of magnitude difference between the cesium and strontium on the source terms, because that's just not indicative of what you see in irradiated fuel.

DR. H. BEHLING: Yes, I agree with what you just said.

CHAIR MUNN: So you're okay with what we have here, Hans?

DR. H. BEHLING: Yes, I am.

DR. MAURO: Yes, Hans raised a broader question. Mine was really a narrow one namely just on when you do, and it sounds like after you've performed your analysis, which you couldn't have done more, you have shown that it depends which one is limiting and I guess when I read it I don't recall that you did come to a conclusion, but if you have that is to stay with the alternative release fractions.

You know, I guess it's not apparent to me, you know, why that in fact will be always claimant-favorable or appropriately -- well it's reasonably claimant-favorable for most

circumstances that you may want to account for. I mean that's where it left me.

I only bring this up because I read it and these were my impressions and I thought I'd just pass them on to see if perhaps we could even close this based on the discussions we're having right now.

CHAIR MUNN: That was going to be my suggestion.

DR. MAURO: But I have to say I haven't yet heard a good rationale for why staying with the alternative, you know, is in fact the appropriate approach, you know.

Not that there has to be great insight into it except a very simple assumption that yes there really are at least three different categories of volatility as opposed to just two, and notwithstanding whether you're talking the normal handling of this material or accidents.

And so it's not apparent to me that, that resorting just to the alternative approach, the OTIB-54 approach, is in fact the appropriate way to go.

CHAIR MUNN: NIOSH, any thoughts?

DR. NETON: Yes. I think this is a case where we're probably never going to be 100 percent certain that it's always going to be bounding but at some point you have to make a decision.

I have to take a look into running this both ways and it just --

DR. MAURO: It's too big, yeah.

Now, I have to say, I understand the dilemma and I understand that there are times when reasonable compromise has to be done just for the sake of expediency and not to find yourself in a situation where it's just impossible to run all these alternative cases.

And a little bit more of why -- and in fact, in looking over your tables, I think that maybe the answer does lie somewhere embedded in those series of tables from the 100 cases that were reviewed. And I didn't spend a lot of time sort of dissecting it, but I think embedded in those tables might be a rationale why the weight of evidence is such that staying with the alternative

approach is appropriate.

But I didn't go that far and maybe, you know, just looking at those, because I think you did all the homework and now it's just a matter of sort of teasing out the data to say to yourself, well, listen, we really can't, from a practical perspective, you know, run these variety of cases, it would be just overwhelming.

And if it could be shown that the current release fractions seem to be reasonable, applicable, across the board in its current form, I don't know, that would be helpful.

MR. MARSCHKE: John, this is Steve Marschke. Can I make a suggestion?

DR. MAURO: Sure.

MR. MARSCHKE: We know Jim Neton, or Jim has pointed out what he plans to do with it, and basically he planned on using what he had been using. And I guess, based upon that knowledge, I mean, can SC&A go back and look at those tables and see whether or not those tables support, you know, the continued use of the current approach, I guess it is?

DR. MAURO: I'm almost embarrassed to say this, but I was overwhelmed by the amount of analysis that was done there. The sophistication of the analysis --

CHAIR MUNN: That was pretty spectacular.

DR. MAURO: It was truly spectacular. And I almost feel inadequate to be the one to go in there and try to do that. I think the people who authored that, who have great insight obviously into this analysis and the different 100 cases they looked at, and I guess, you know, it would be, I would think, a lot easier for them to sort of sniff it out.

I know that I have to say I don't feel as if I have the qualifications to make those judgments.

DR. NETON: John, this is Jim. I tend to agree with you. I think that maybe we didn't quite go far enough here and it really is -- the tables, the document does show that it depends, and I think more than usual, it seems like it's in our favor.

DR. MAURO: I agree with that. That what it -- it sort of read that way to me, too, but I was afraid to say it.

DR. NETON: I think it may end up becoming sort of a small weight-of-the-evidence type argument, as you suggested, where we talk about the more reasonableness of the source term release fractions that we've used and go through the examples.

And I would agree, the paper itself doesn't come to a point of conclusion, at least, you know, a summary that says here's what we're doing and why. So I think maybe we'll take it upon ourselves and go back and maybe fine-tune that argument a little bit.

CHAIR MUNN: If it's possible to provide a couple of paragraphs summarizing the rationale, it would probably be --

DR. NETON: Wanda, that sounds -- we'll take a shot at it.

CHAIR MUNN: Okay.

MEMBER ZIEMER: Well, let me make an additional comment, Wanda, if I may. This is

Ziemer again. It seems to me that you could always find a case where this wouldn't be bounding, but in the predominance of cases you're going to be fine.

I think that's what's going to be -- and in fact you said something to that effect, someone, I think, I was trying to locate it here, but I didn't find it. But there may be some case where this wasn't bounding, but it would be a rare case, the way you've approached this, I would think.

CHAIR MUNN: Thank you, Paul. I will carry Finding 5 with a notation that we expect a summary of the rationale to be forthcoming from NIOSH and we'll have that on our agenda next time.

Any other comment with respect to this White Paper and our discussion? I guess not. Thank you, Bob, for an illuminating document. We'll move on to OTIB-82.

DR. OSTROW: Excuse me, Wanda, it's Steve Ostrow.

CHAIR MUNN: Yes, Steve?

DR. OSTROW: Before we get off of OTIB-54, I see yesterday NIOSH posted on the BRS

something about Finding Number 9 that we had, which is in abeyance. This is the one that has to do with the actual tool that NIOSH/ORAU uses to implement the OTIB-54 procedure.

CHAIR MUNN: Yeah, the workbook.

DR. OSTROW: Yeah, the workbook. And we had comments in the past that their workbook didn't match the version of the OTIB, or there was a mismatch. From what I read in the posting yesterday, it says, "a new tool, Version 1.5.10, has been published."

We've been checking their workbooks in the past. Ron Buchanan has been doing that for us. We recommend that the Procedures Group, you know, direct SC&A to go take a look at the new version of the workbook and see if it matches the OTIB.

MR. SIEBERT: This is Scott Siebert. Steve, I'm glad you mentioned that because I was just about to jump in and point out the exact same thing before we moved on.

Yes, this new tool now implements the air monitor and workplace monitoring portion of the OTIB that previously had not been in the tool

because we just did not have call for it.

DR. OSTROW: Right.

MR. SIEBERT: Right. And now what you'll be able to do is you'll use this to validate the Example 3 numbers that do have that workplace monitoring information in it.

So, yeah, it's ready for you to do so, if the Subcommittee asks you to do.

DR. OSTROW: Okay, thanks, Scott.

CHAIR MUNN: Seems to be a rational follow-up, from my perspective. Paul?

MEMBER ZIEMER: Right. I think we just note that this says that the new tool has been published so it makes sense to have them take a look at that.

CHAIR MUNN: Josie?

MEMBER BEACH: Yeah, I agree with that also.

CHAIR MUNN: Yeah. Thank you, Scott. Yeah, this Subcommittee requests SC&A, directs them, to take a look at that workbook and see that those tools meet the concerns that they expressed in Finding 9.

DR. OSTROW: Okay, thank you, Wanda.

CHAIR MUNN: You bet. Thank you. Any other comments about OTIB-54? And thank you both for pointing that out.

If not, we'll move on to OTIB-82 review. SC&A?

DR. H. BEHLING: Okay, that's mine. This is Hans Behling. OTIB-82 is the guidance document for the dose reconstruction method for chronic lymphocytic leukemia. And that document was issued on December 20th, 2012. And just a quick overview as to what this really entails.

Regarding chronic lymphocytic leukemia, it's important to understand that it's the most frequent form of leukemia in the Western countries, and accounts for, approximately, based on recent NCI data, about 30 percent of all leukemias are CLL leukemias. And for the most current year that I've looked at, 2014, the American Cancer Society estimates about almost 16,000 new cases of CLL among the 52,380 cases of all leukemias.

As a result, NIOSH has estimated that,

on the basis of the current claims that we have been receiving -- and where CLL has been diagnosed that were part of the claim filed, but in the past were rejected because of the fact that CLL was previously not considered radiogenic cancer -- we do expect to get 363 CLL cases that will now be available for a dose reconstruction.

The Department of Health and Human Services, back in March of 2011, made the decision to consider the CLL cancer as a radiogenic cancer. And the final rule came out in 2012 that now regards CLL as a potentially radiation-induced cancer.

So, having said all of that, it was obviously the intent of NIOSH to provide a model which would allow us to assess what are the radiation doses associated with CLL.

And as just an overview statement, it is probably one of the most complex dose reconstructions among all the cancers that we have had to deal with in the past.

In response to this issue for devising a model, the people at SENES were asked to construct this model. And their model was defined in a

report entitled, "Review, Synthesis, and Application of Information on the Human Lymphocytic System to Radiation Dosimetry for Chronic Lymphocytic Leukemia." And that particular 64-page document was issued back in March 2012.

And it is on that basis of that technical document that SENES wrote that NIOSH developed ORAUT-OTIB-82, which is defined in terms of dose reconstruction model for CLL dose reconstruction. And, as I've said, this was issued in December of 2012.

Just as an overview, when SC&A reviews an OTIB document such as this, we usually have a protocol that we had established back in 2009. And in that protocol for our review of OTIBs, we have a total of seven defined objectives that I won't go through, but each of these objectives looks at the various components of our review system.

However, for reviewing ORAUT-OTIB-82, we were not asked to do a standard review or audit process, and this was due to the fact that it was considered that this particular CLL model, the technical basis for this model as was developed by

SENES, had been adequately peer reviewed and therefore the core of this model was something that we did not address in our review.

In essence, then, we were asked to really review the application of OTIB-82 and the methodology used to reconstruct doses based on this very complex CLL model.

Just as an overview -- I assume everyone has read both the OTIB-82 as far as the SENES report. And if you have, it's clear that this is a very, very complex model to work with. And the fact that the precursor cell, as we know it in terms of our current status of knowledge regarding CLL, it's likely to be a B lymphocyte -- the "B" stands for bone marrow-derived lymphocyte.

And these cells, once they leave the bone marrow, become very extensively disseminated in various tissues of the body, not the least of which is the lymphatic system which represents well over several hundreds of lymph nodes in the body. But in addition to that, there is numerous other tissues where these precursor cells to chronic lymphocytic leukemia are resident.

And so these locations, not only are they very diffuse and throughout the body, but they tend to change with time and over a period of life span and under conditions of health, so it's quite a difficult model to assess.

What I was hoping to do, with regard to just quickly brief the people for looking at this issue here, Steve, if you can go to Page 10 of my report, you will see Exhibit 1. And here you have basically the crux of this whole dose reconstruction model.

Obviously, we need to assess exposure doses from principally three sources, that is occupation; medical exposures, such as from X-rays, and that is in column number two, and there you see all of the different tissues that have to be looked at for the reconstruction dose, and many of these tissues will obviously be affected by how close are they to the primary field of an X-ray, et cetera, and so forth.

And so you can go down the list here and see all of the tissues that have to be looked at with regard to reconstructing, even with the simple

annual PA X-ray. Generally speaking, one would assume that the dose contribution from occupational medical exposures is relatively minimal. The most important one is the second one; that is internal dose organ. And, again, here you have a total of 28 different tissues that have to be looked at with regard to assessing a dose to each and every one of them.

And one of the things that we will probably not point out today, but when we actually go through some of the audits of CLL cancers that we've been asked to do under the 21st set that we are in the process of completing, we will talk about how significant the contribution of internal doses, based on this table here that we're looking at. And it's not an equal distribution by any means, and it's the most important one.

Among the most important issues here that we talk at some later point in time is the contribution of internal exposures involved in alpha-emitting radionuclides that have very, very low solubility that are deposited in the lung and then removed from the lung by various means,

phagocytic cells that contribute mostly to dose exposures to lymph nodes, regional lymph nodes.

And so one of the hallmarks for this dose reconstruction, when you look at the distribution of doses for all these tissues, is that it is going to vary significantly, specifically for the internal exposure.

For X-ray doses and external dose from other sources, the distribution of radiation dose to the different organs that harbor the lymphocyte will be more or less constant. The only differences being based on the tissue depths and the attenuation that the doses will vary among the various organs, as you see in the third part there, there's external dose.

So one of the things we won't talk about today are the differences in terms of the importance with their contributions for the three sets.

Again, so let me go now to the next area where we are at least going to discuss the methodology that NIOSH developed in assessing the various exposures from internal, occupational

medical, and external.

If you go to Page 11, Steve, you will see an overview of what we had to do in terms of complying with the request to assess OTIB-82. As I had mentioned, the complexity of deriving weighted organ tissues was developed in the CLL Simulator Tool that NIOSH specifically developed in response to this particular SENES-derived CLL model.

And in the second paragraph, you can just read along with me, "The complexity of the Simulator Tool which allows the Integrated Modules for Bioassay Analysis, and the Chronic Annual Dose, that is the CAD Workbook files, to be imported for calculating internal dose to all CLL organs simultaneously."

What this really does, in essence, it doesn't force the dose reconstructor to do 28 different tissues independently. And so a workbook has been developed that does this whole process automatically without the need for this excessive work effort that would normally have to be done by the dose reconstructor.

The other tools that were modified on behalf of the CLL tool were issues such as, or documents such as OTIB-18, the Internal Dose Overestimates for Facilities with Air Sampling Programs; ORAUT-OTIB-54, the Fission and Activation product Assignment for Internal Dose-Related Gross Beta and Gross Gamma Analysis. Thirdly, ORAUT-OTIB-49. And, again, I'll just quickly go over the OTIB-11.

In the process of reviewing this, SC&A was provided some training in running the CLL Simulator Tool. And in response to that training, we generated both IMBA and CAD files for all the CLL claim-imported files in the CLL Simulator Tool and evaluated the internal doses generated by the tool.

We were able to do all those things, and, as you see at the bottom, SC&A's evaluation of internal dose tools and technical guidance, we found no findings, but identified one minor observation. And that observation is at the bottom of the page there and it's just strictly an issue here.

The OTIB-82 states that although the CLL tool for CLL internal dose is mentioned, details of its use are not included here. These are addressed in a tool user's guide. When we tried to find that tool user's guide we were not able to, and we still assume that up to this point in time it does not exist. And I think what we were told, in direct dialogue with NIOSH, it is really in essence not a user's guide but a training program that has been established for all dose reconstructors who are being asked to do dose reconstruction. So that's the only criticism we have, this one observation.

In review of the external dose -- that's on the next page, Steve, on Page 12 -- we once again looked at what had been done to expedite this whole process. And one of the issues that you have to do in assessing external exposure is to develop a blended DCF.

In other words, this blended DCF is really a combination of all the different organs that will be affected from external exposures. And they have to be, obviously, weighted by virtue

of the number of B lymphocytes that are expected to be there as a fraction of the total.

And in the process, as you see in that first equation, we developed a CLL DCF that's a blended value. And not to go into it in detail, but that was expressly detailed in the DCAS-RPT-004 document. And just for the convenience of the reader, we have those numbers in Table 1, which is on Page 13.

And as you can see, this is a very complex table. It identifies the DCFs for a host of different photon energies, as you see up top here: 20 keV, greater than 30 keV, less than 30 keV, and so forth and so forth.

You have different exposure geometries, such as AP. As you go down on this, you have ISO, you have glove box configurations, and you also have, on the next page, on Page 14, the dose conversion factors for neutrons, standard neutrons, glove box neutrons, and electrons.

And, again, I won't go through details. We looked at all of those things and came to the conclusion that we agreed with everything that was

done, including the various types of distributions, the physical distributions, that are defined in each of those, whether it's Weibull 3 or log-normal 2, or normal distribution.

So, again, when we reviewed all these documents, we had no findings that we could point to. And that takes us to the third area, and that is the medical X-ray dose to compartments comprised in CLL models.

And, again, not to elaborate too much, but we realized again here, when you have a given X-ray, whether it's a conventional chest X-ray or otherwise, the exposures to these different organs were varied based on body locations and how close they are to the actual primary field for that X-ray.

And those numbers and exposures for those organs were calculated in a document that was defined in ORAUT-RPRT-64, and we looked at those again and we have no findings with regard to the CLL risk model that defines doses for occupational medical X-ray.

So there is no need to elaborate since there are really no findings other than the single

observation. SC&A's assessment of ORAUT-OTIB-82 was limited based on a limited scope because of the fact that we were asked not to look at the actual technical background information document that defines the model itself as produced by SENES.

And we are going to be talking more about this CLL model, to some extent, within the scope of the audit of dose reconstruction program when we actually present the four CLL cases that to-date we have looked at in behalf of the 21st set of audits, dose reconstruction audits. And we will have a few comments at that time, hopefully, that we can at least make oblique reference to some of the issues that we were not able to discuss here.

CHAIR MUNN: Thank you, Hans, for your, as usual, detailed and thorough report. Much appreciated.

DR. H. BEHLING: Thank you.

CHAIR MUNN: Comments? Hearing no comments, and there being no findings --

MEMBER ZIEMER: Wanda, just a question on that user's guide. Maybe NIOSH can comment, is there a plan to actually have such a thing, or is

it already taken care of in the existing methodology?

MR. HINNEFELD: I think we may need to defer to ORAU on that and their view of the utility of procuring a user's guide or where we stand, you know, compared to where we stand today.

MR. SIEBERT: This is Scott. Basically, and I'm glad that SC&A pointed that out, because I did not recall that being in OTIB-82 when we wrote that portion, because we were writing the OTIB at the same time we were developing the tool.

And they are correct, at this moment there is not a user's guide. However, we've done training with all of the dose reconstructors as in how to apply and use that tool. So I'd have to go do some more discussion, but I'm not aware of the plan to create an additional guidance document for that at this time.

MEMBER ZIEMER: So it would be appropriate just to modify the wording so that it's not misleading. In other words, you are training the folks on how to do it but they don't have a specific user guide.

MR. SIEBERT: Correct, at this point. Now, if NIOSH decides to tell us to do it one way or the other that's what we want to do, but that's where we are right now.

CHAIR MUNN: It seems to me that we need to carry this just one more time to give NIOSH and ORAU an opportunity to discuss which is going to happen, whether the document is going to just be changed to remove that reference, or assure us that there is not a real need for the guide. Any other considerations?

MR. KATZ: This is Ted. Just clarity from the Subcommittee. I mean, so, SC&A has recommended no findings for these matters. So the Subcommittee just needs to speak to that, whether those are closed or not.

CHAIR MUNN: Correct. They are indeed, they should be closed on the BRS.

MR. KATZ: Okay.

MR. MARSCHKE: So, right now, the BRS -- this is Steve Marschke. I'm sorry, Wanda. Sorry to interrupt.

CHAIR MUNN: Mm-hmm.

MR. MARSCHKE: Right now the BRS doesn't have any entries for the approval for OTIB-82. We could add a finding of no findings if we want to have this minor observation just kind of taken care of on the sideline, or we can add the minor observation as a finding.

MR. KATZ: So, Steve, I mean, we do, and we've done it elsewhere, we do have a finding of no finding. I mean, that is a finding.

CHAIR MUNN: Correct.

MR. MARSCHKE: Yeah, I know --

MR. KATZ: Ironic as that sounds, but --

MR. MARSCHKE: We can add that as a finding of no finding, if that's what the Subcommittee directs me to.

CHAIR MUNN: That's appropriate and that would be my direction. Paul, Josie, any negative reaction to that?

MEMBER BEACH: None here, Wanda.

MEMBER ZIEMER: Yeah, that's fine with me. I don't know if the Subcommittee actually has to do any follow-up on it, unless you just want to

be sure that there's some proper wording there.

CHAIR MUNN: It seems appropriate for us to assure that the minor concern that exists was put to bed one way or another. So I would prefer to carry it just to make sure that it has been looked at and we --

MEMBER ZIEMER: Based on how NIOSH and ORAU want to handle it, right?

CHAIR MUNN: Yeah, right, exactly. Just a question of what we're going to do and having a notation in our record that that's what's going to happen. We'll carry that very small item for our next time and we'll do a finding of no findings.

And we will, while Steve's doing that, we will move on to PER-42. We have --

MR. KATZ: I'm sorry, Wanda, to interrupt again, but just so that the record's right for Steve. So there are really three potential findings and they are all findings of no findings, not just one.

MR. MARSCHKE: So you want me to enter three findings of no findings?

MR. KATZ: For the X-rays, internal,

and external, right, those are the three areas that Hans covered where there were potential findings.

MR. HINNEFELD: Ted, this is Stu, just because he broke the report into three areas and discussed each area separately, I mean, and there are no findings in the entire report, I don't see any particular reason to list those three areas.

You know, typically when there's a review with no findings, the BRS carries a single entry, a single no findings entry, regardless of how many sections of the report there were.

DR. H. BEHLING: Yeah, I agree with you. In fact, in my observation, I said a way to correct it is simply delete that statement from the OTIB. It's a simple fix, as far as I'm concerned.

CHAIR MUNN: Right.

DR. H. BEHLING: The dose reconstructors are getting training and that is in lieu of this particular CLL tool user guide. So they've gotten their training, and as far as I'm concerned, the only thing that needs to be done is delete it from the text itself, that statement.

CHAIR MUNN: Okay. Do we have

agreement from NIOSH that that will occur? I was postponing that decision for them.

MR. HINNEFELD: I would suspect that would be our response, yeah. It just occurs to me that if SC&A is going to be reviewing the CLL dose reconstructions, does it fall upon us then to provide the training to them, the SC&A person that are going to review those DRs, so they will understand the use of the tool?

CHAIR MUNN: Right. So my only question here, Stu, is are we deciding now that the wording will be changed in the OTIB?

MR. HINNEFELD: Yes, sure, I'll decide that now.

CHAIR MUNN: Okay, very good.

MR. HINNEFELD: Yeah, let's have ORAU remove that phrase or that sentence from the OTIB.

CHAIR MUNN: Very good. Then what we are going to say here is that we have a finding of no findings and that the one concern with regard to wording will be changed to remove the reference to a guide.

MR. HINNEFELD: Okay.

MS. K. BEHLING: Excuse me, this is Kathy Behling. In reviewing some of the CLL cases that we've had so far, we've also taken notice that there is a guide that has been put into at least some of, at least I think most of these CLL claims that we've looked at. I think Liz Brackett has put together some guidance or instructions that we have been seeing in the claim files, so I think you can feel comfortable in taking that wording out of the OTIB.

CHAIR MUNN: Good.

DR. H. BEHLING: And I do want to say something in anticipation of future reviews of our CLL dose reconstructions. There was a document that Liz Brackett put out, which is a very, very informative one, and also gives me reasons to question whether or not there should be additional ones.

I think the CLL dose reconstruction process is a very, very tedious, very complex, and a very time-consuming dose reconstruction protocol. And I think it lends itself very, very well to certain changes that could potentially give

a heads up and says if you have certain things that you are looking at on behalf of a claimant, you can almost exclude the chance of doing anything other than a very, very abbreviated dose reconstruction, because you know up-front there is not a chance that this person will ever receive a PoC that approaches 50 percent.

And I say that perhaps prematurely here, but in having reviewed this, we do know, and I alluded to this briefly, first of all, CLL as a cancer has been historically regarded as a non-radiogenic cancer, meaning that many of the epidemiologic studies that have been done to-date, including the prominent ones, such as the A-Bomb survivor studies where the principle exposure was external and reached doses that were approximately, you know, lethal doses, or approaching lethal doses, and still there was little evidence that CLL was a potential radiogenic cancer.

And that's understandable when you realize that perhaps the major contributor is really from internal exposures, and not only from

internal exposures but internal exposures involving an alpha-emitting radionuclide that is very, very insoluble.

And in our dose reconstruction audits, we will actually demonstrate what are the critical tissues that will give rise to a sufficiently high dose that will then promote a PoC value that approaches 50 percent. And there's plenty of opportunity to do both a minimal or a maximized. Minimized meaning the focus is strictly on the internal exposures if the exposure involves exposure to uranium, thorium, or plutonium as an insoluble alpha-emitting radionuclides.

And so there's plenty of options, I think, to develop a very, very quick and dirty method by which these CLL cases can be screened without going through a lot of work.

What Liz Brackett did and showed, and I often questioned, because the wording was there to do, whether it's plutonium, uranium, either as M or S or Super S for plutonium, when you know very well it's going to be Super S if it's plutonium, that'll give you the highest CLL dose.

There's no sense doing S or M because you know up-front it's not going to give you the higher value. So those are the kind of things that I think can be done to expedite the dose reconstruction of CLL cases, both minimized and maximized potentials.

CHAIR MUNN: Thank you, Hans. Okay. Steve, are we okay? I was looking away from the screen and I didn't see what you wrote.

MR. MARSCHKE: I just -- well, we're okay now. I just screwed it up a little bit.

CHAIR MUNN: Okay.

MR. MARSCHKE: But it's in there and it's closed, and you can see what the thing is and it's closed.

CHAIR MUNN: Very good, all right. Thank you very much.

We'll move on to PER-42, Finding 1, record closure. NIOSH, who's going to --

DR. NETON: Excuse me, I was on mute. This is Jim. I think I'll handle this one since I wrote the response.

CHAIR MUNN: All right.

DR. NETON: If you recall -- could you scroll up a little bit, Steve, so we can see a little more of the response?

MR. MARSCHKE: Which, what is --

DR. NETON: I actually --

MR. MARSCHKE: Okay, yeah.

CHAIR MUNN: To PER-42, Finding 1.

DR. NETON: There should be a response in there somewhere.

MR. MARSCHKE: There is.

DR. NETON: Yeah, there it is. This came about at the last Subcommittee meeting when SC&A questioned the logic behind not, essentially, reconstructing doses for non-presumptive cancers, particularly in the residual contamination period, what appear to be the residual contamination period at Linde.

There was an operational period, then the residual contamination period extended, but part of that residual contamination period was added to the SEC, not because it was in a residual period but because there was additional work going on during that time period that kicked up a lot of

dust, so to speak, and limited our ability to do -- prohibited our ability to do dose reconstructions in that time period. And SC&A's finding was that, well, you got a residual model and it spanned that area so the exposure is at least X, some small fraction of that.

And I think we discussed it and we all agreed that that wouldn't be appropriate and NIOSH was tasked with just essentially writing up what we discussed. And that's what is represented here.

I don't know if I have to read the whole thing, but it talks about exactly that, that this was an infeasibility during the sort of beginning of the residual contamination period, it was added, and in accordance with the SEC regulation, NIOSH cannot -- we determined that we can't estimate the maximum radiation dose for every type of cancer with radiation doses are reconstructed. It could've been incurred in plausible circumstances by any member of class. This has been interpreted, looking at the regulation and the guideline, that that also means that you can't reconstruct any

doses for the non-presumptive cancer. Essentially that's what this says here.

Almost every, now, designation though that's added says we will, however, use any internal monitoring data that may become available to reconstruct doses for the people who aren't eligible for the SEC.

That is, you know, if there were bioassay data that was valid, or external monitoring data, we would certainly use that to reconstruct that dose. But any of the models, coworker models or otherwise, could be used to reconstruct doses in that period for the nuclide, for the reason the Class was added.

I kind of bungled that a little bit but I think you can get the idea of what I'm trying to say.

CHAIR MUNN: Yeah, thank you, Jim. That's only been posted for a little while, I think. Has SC&A had an opportunity to take a look at that and do we find that sufficient?

DR. H. BEHLING: Well, again, I was the author of that finding, and I understand why

there's a technical issue in excluding that time period that's covered by the SEC.

On the other hand, there is, I guess, that secondary problem where your 1954 data point is transported beyond the SEC period and used as a starting point from 1970. And that kind of just sort of prompted me to raise that question.

The fact that a 1954 data point simply jumped ahead by a total of 16 years and then this was used as a starting point for assessing the potential exposure post-1970. That kind of gave me reasons to question that whole process.

DR. NETON: Right. We talked about that at the last Subcommittee meeting. You can't say that it’s at least X, some small fraction of the dose, because doses can't be reconstructed with sufficient accuracy during that time period.

I mean, it's a logical conclusion of the way the Act and the regulations are written.

DR. H. BEHLING: I would've, Jim, said, okay, we'll do it that way, but then at least apply the 0.067 depletion rate as defined in OTIB-70, and then start out in 1970 with that much reduced. I

realize it's claimant-favorable and we always tend to say, well, it doesn't make sense, but if it's claimant-favorable, accept it.

DR. NETON: Well, we talked about this, Hans. I mean, you could also say, even during an SEC period where it doesn't bracket a residual period, the dose is at least equal to some general area air sample background.

I mean, that's not the way it’s done, you can't make up a small dose and say it's at least that, because, you know, it ends up begging to question, well, could it be a little higher than that, or X plus some percentage?

So we can't put a plausible upper bound on the person's dose in this period, period, is what is said. I mean, we talked about, I thought we agreed that, you know, in principle at the last meeting, and this is my attempt at a summary of what we discussed.

DR. H. BEHLING: No, I agree. If you have to comply with certain rules and regulations that say you can't use this because it was an SEC period, even though it might have been something

used under different circumstances, then we'll have to simply go with that.

DR. NETON: Yeah.

CHAIR MUNN: So do we find this acceptable?

DR. H. BEHLING: Yes.

CHAIR MUNN: All right. Then, Steve, would you please make the entry that the explanation has been accepted and this item is now closed.

MEMBER ZIEMER: And could I make one minor editorial change?

CHAIR MUNN: Yes.

MEMBER ZIEMER: Yeah, in the seventh line, the word "it" suddenly has a capital I on it and it should be lowercase. "After review of available information, it could not be demonstrated."

CHAIR MUNN: Okay.

MEMBER ZIEMER: At least Jim's, the document that NIOSH distributed. And I'm looking to see if that showed up in the entry on the BRS System. I think it did.

DR. NETON: I can make -- am I on mute?

CHAIR MUNN: No.

(Simultaneous speaking.)

DR. NETON: That's a simple change.

MEMBER ZIEMER: But I agree with the closure. I just wanted to make that minor edit.

MR. MARSCHKE: I can't get to that. I'll have to get back to that, that's a separate edit. I'll have to go back to that.

CHAIR MUNN: Yeah, we'll --

(Simultaneous speaking.)

MR. KATZ: Wanda, can I recommend that maybe we take a comfort break at least?

CHAIR MUNN: Oh, all right. We are very close to breaking for lunch, but, yeah, we can take five minutes while Steve --

MR. KATZ: Well, if it's five minutes and then you're going to break for lunch that's fine. I just know we've been going for a while.

CHAIR MUNN: Yeah, we have been going for a while, and we're almost to where we need to be for lunch, I think.

MR. KATZ: Okay. No, we don't have to

break and then re-meet in five minutes just to break again.

CHAIR MUNN: There are times when it's necessary, but we'll wait for just a moment, if we can.

MR. KATZ: All right.

CHAIR MUNN: As soon as we finish up with PER-42. And I think the other two findings may go well. We'll see. Okay, great. Very good. Thank you, Steve.

Now if we can take a look at the NIOSH response to see if we can take care of that clerical nit. Do we have an "it" that is capitalized and shouldn't be?

MR. MARSCHKE: I think it's in the line "it could not be demonstrated?"

MEMBER ZIEMER: That's correct. It's in the middle of the sentence.

MR. MARSCHKE: Yes, that's fine.

CHAIR MUNN: No, it's fine. It's lowercase here.

MEMBER ZIEMER: It's good now.

CHAIR MUNN: So we're good. Yeah,

thank you. We'll move on to Finding 2. SC&A?

DR. H. BEHLING: Again, that's mine, and I thought that was resolved because --

DR. NETON: Yeah, this is Jim. Let me explain a little bit here. We agreed with that finding, and it was really just a typographical -- it's a cut and paste error when we revised the Site Profile to talk about, I think it was the occupancy factor or something like that.

DR. H. BEHLING: Yeah.

DR. NETON: And we actually did indeed make that fix, but in going through the internal review process we do with every revision to a Site Profile, a slight administrative glitch occurred and somebody made some comments, so we have to go back and fix some administrative detail in the Site Profile.

So we can't issue it at this time. The fix has been made. I probably could've cut and pasted the fix but I figured it would be better to wait until we just re-issue it completely. And the things that we're addressing had nothing to do with the technical content necessarily, it's more

administrative detail.

MR. MARSCHKE: The finding is currently in abeyance, so I guess, you know, we kind of agreed with -- that, to me, indicates that we agree with what Jim is saying.

CHAIR MUNN: Yeah, it sounds as though --

DR. NETON: Yeah, I was just getting ready -- I was going to say, I could've provided you a copy of it this meeting, because we did fix it, but like I say, the final version hasn't been signed off yet.

So I'll have to wait until the next Subcommittee to do that.

CHAIR MUNN: Okay. Okay, that's fine. We'll just take that off of our follow list. We have taken care of what we can take care of and we'll go on to Subtask 4. Is Ron going to do this?

DR. BUCHANAN: Yes.

CHAIR MUNN: Oh, good. Okay.

DR. BUCHANAN: Yes, this is Ron Buchanan with SC&A. Subtask 4 for OTIB-42 consisted of reviewing two cases.

Now, just a little background, PER-42 was issued for Linde and it required that all the cases be reworked that were less than 50 percent and had non-SEC-covered cancer. And this was 71 cases.

And so this consisted of complete dose reconstructions for all these cases, and so we selected two cases to determine if the rework was done properly. And so that's what we'll briefly discuss today.

And so Case Number 1 on Page 4 of our report was an inspector that worked there at the plant, had prostate cancer, worked in, you know, '52 through '84. And there is no DR.

It was in '05 and so it needed reworked and so they did a rework in August of 2012. And we then looked at the dose assignments, like we do on a regular audit of a DR report, and we found that -- I'll just briefly go through what they did -- they assigned the plant dose.

There's two doses assigned here, a plant dose, and then if you were a utility worker you also got some tunnels that ran under the plant.

So, utility workers, you more than likely would have spent some time in there so they assign a dose for that.

So we have the plant dose, there was no monitoring, so this was an assigned dose from Table 424, Page 65 of the TBD-25. There's two periods, '52 to '53 and '54 to '84, as Hans had referred to earlier. And we see that they assign the dose correctly from the tables on Page 65 and Page 70 for the latter period, and we had no findings there. This was for the plant area.

And then for the tunnel area they assigned the tunnel ambient external dose, and this was from Table 613 on Page 76, for the two time periods, and we see that they assigned dose correctly and that we had no findings.

The neutron and medical dose were no findings on that. And then we had internal dose. This was taken from Table 68 of Page 73. And take the projected intakes, put that in the Chronic Annual Dose Workbook, the CADW, determine the correct dose, and we had no findings in that area.

So, in a review of this first case, they

had a total of 7.898 rem assigned, PoC of 25.35 percent, and we had no findings. And we were able to duplicate the dose in the PoC and agreed with that.

Case Number 2 of our report is on Page 11, and we see that this was a similar worker, a similar time period. This was a maintenance person, pipefitter foreman, had skin cancer, and his first DR was in 2006 and it was reworked in August of 2012 using the new TBD.

And, again, we went through and evaluated the two periods for the plant exposure using the Tables 424 and Section 6.2. And we agree except for one finding, and it appears doing the calculations that we arrived at 4.434 rem compared to NIOSH's assigned 3.955 rem.

And we find that it appears that NIOSH used, for the skin, they used a dose conversion factor for ambient for skin, and we find that although the TBD says for the tunnel you use ambient dose conversion factor, for the plant it doesn't say that.

So for the plant it should've been the

normal one, according to OTIB-17, Page 6, instead of the 0.677 for ambient dose conversion factor from the IG-001.

And so this would create a slight decrease in dose as NIOSH assigned it compared to the way we calculated it. Now, we did check back to the previous case I just described, in Case A, and they did use the correct dose conversion factor there, 1.244 for the prostate. And so that did not appear in the previous dose reconstruction.

So we agree with this except for that dose conversion factor used for the plant exposure, and it would not significantly impact total dose for the upcoming PoC in this case. But it was what appeared to be an error.

Now, since it was skin, we assigned electron dose using the recommended in Table 424, Page 65 of the TBD, for the two periods. And the penetrating dose also. And we agree with those doses assigned.

Also, the tunnel dose, that was assigned correctly using the values of 613, and so we had no issues in that. We had no issues with

the neutron or the medical dose.

And so we registered the internal dose and we see that they correctly used the projected intakes, and we put those in the CADW, and the dose is correctly assigned for internal intake.

So, in summary, for the Case B, we arrived at a slightly higher dose, 23.839 rem, as compared to 23.360 rem. We got a PoC of 11.56 percent; they derived a PoC of 10.73 percent because of the slightly dose on this dose conversion factor for plant exposure.

And so we agree except for the dose conversion factor for the plant external exposure. And so, in summary, for these two cases, we agreed that they were assigned except for that one exception and the outcome would not be impacted in this case.

So that's where we are at on those two case audits.

CHAIR MUNN: Fine. Any comments? I propose that we close this item with the comment that the reviewer noted an incorrect dose conversion factor used which did not affect the

outcome. And other than that, there is a finding of no findings. Does anyone have a problem with that?

MEMBER ZIEMER: That's fine with me.

MEMBER BEACH: That works for me also, Wanda.

CHAIR MUNN: All right, fine. Steve, can you do that, indicate --

MR. MARSCHKE: Yeah, I think so.

CHAIR MUNN: Okay. And as Steve is starting to do that, he and I will stay on the line here for a little bit and make sure that that that finding of no findings essentially gets listed, and we will mark this item, Subtask 4, as closed. And I believe that cleans us up with respect to PER-42. We'll take another look at the BRS just to make sure.

It's time for us to break for lunch. Let's take an hour. Be back here at five minutes to the hour. And, well, I'll see you, then unless anyone has some concerns one way or another. If not, I'll see you in an hour.

MR. KATZ: Thanks, Wanda, and

everyone.

MEMBER ZIEMER: Okay.

(Whereupon, the above-entitled matter went off the record at 12:54 p.m. and resumed at 2:00 p.m.)

MR. KATZ: This is the Subcommittee on Procedures Review. And we can get started again.

CHAIR MUNN: And we'll start with our first item being PER-31, report review that's a carryover from previous agendas. NIOSH?

MR. HINNEFELD: Yeah, this is Stu. I think we're going to need to continue to carry that. We are in the process, we in ORAU are in the process of trying to get information from Y-12 that may provide a way to interpret that thorium to thorium in vivo data, which is kind of the primary --

CHAIR MUNN: All right.

MR. HINNEFELD: So we're just going to have to carry it forward again. We're not ready to -- we don't have anything ready yet.

CHAIR MUNN: Then we need to go on to PER-45, responses from NIOSH for eight findings that were listed recently, I believe.

MR. HINNEFELD: Jim, did we enter those in BRS this week or --

DR. NETON: They should be in there, Stu. Is Mutty Sharfi on the line?

MR. SHARFI: I am.

DR. NETON: Yeah, we reviewed them and discussed them. But I think Mutty's going to carry the water on the responses here, with input from me as necessary.

MEMBER ZIEMER: Is this Aliquippa Forge?

DR. NETON: Yeah, correct. Do we just want to go through these one by one, then?

CHAIR MUNN: Let's start with Number 1, yeah, failure to account for remedial activities in deriving estimate of residual exposure.

DR. NETON: This was a finding that basically stated that we used an inappropriate date going back in time. We started, I forget the year.

MR. SHARFI: '92.

DR. NETON: '92. And there had been remedial activities that took place prior to that. So, Mutty, could you maybe just fill folks in on

what our thinking is on that?

MR. SHARFI: Sure. This is where we, like I said, we took a 1992 survey and we back-extrapolated using a source term depletion correction factor back all the way to the start of the residual period.

In '88 there was kind of an interim remediation action that they did where they did some minor cleanup. So the comment was that there could be an underestimate since we're using post-remediation surveys and that, I guess, the external exposure rate could have been higher if the remediation actions wouldn't have occurred in '92.

Basically, I did find a 1978 pre-remediation survey for when FUSRAP did their survey for the remediation activities. And when you did a back-projection of what we proposed, or we have in the TBD, versus the surveys that were actually done in '78, we're still bounding of those surveys.

So, our argument is that the back-extrapolation still doesn't result in an

underestimate of the external dose based on the '78 surveys.

CHAIR MUNN: These are fairly recent postings. Has SC&A had an opportunity to look at them? Is there any comment? Do we need to give you time?

DR. H. BEHLING: Well, this is Hans. I have not really looked at it. I'm not sure when the responses were posted. But, in preparation for this meeting, I was kind of busy in the last couple of days here, among other things. So I haven't really taken a look.

But if I recall, that 1988 partial remediation effort may not have involved decontamination of surfaces but the removal of contaminated objects from one of the buildings, 30, I believe. And so it may not come into play depending on what NIOSH did in terms of assessing it in 1977 under FUSRAP.

Whether or not that calculation takes into consideration the removal of source terms that would have resulted in external radiation exposure, that had very little to do with surface

decontamination.

And that's as much as I -- as I said, I have not reviewed NIOSH's responses, but I'm just talking off the top of my head. So I can't really respond in a definitive way.

But if I recall, much of the remediation in 1988 was actually the removal of source terms, objects, rather than cleaning up the walls, the floors or other material that remained.

CHAIR MUNN: Okay.

DR. NETON: Yeah. I think that supports our case, then. I think maybe, Hans, you have to take a look at it. And Mutty wrote in here that the '78 survey, I think, had all values less than the detection limits of the portable survey instruments.

And if you take the value that we used from 1992 and back-extrapolate, it overarches the -- you know, it provides, even if you assume that it went over the detection limit, it provides doses higher than what they measured in 1978. So we believe it’s a fairly good bounding number.

But take a look at it. There's a White

Paper that was provided, I think, on this to SC&A at the same time it was posted on the BRS. I think that was around February -- it was posted on the BRS on February 10th, I think.

MEMBER BEACH: I think that paper was January 23rd, wasn't it, Jim?

DR. NETON: That was the date on the paper. But I don't think it was distributed until --

MEMBER BEACH: It wasn't posted, oh, okay.

DR. NETON: -- sometime later. But, yeah, that's the date on the paper.

MEMBER ZIEMER: Yes. I got my copy on the 10th. I mean, it was emailed on the 10th, even though it was probably under internal review before that. So we didn't see it until the 10th.

DR. NETON: There's no difference between the paper and what's in the BRS. I cut and pasted the responses, so they're identical.

MEMBER ZIEMER: Right.

CHAIR MUNN: All right. We'll carry that for response from SC&A next time.

DR. H. BEHLING: Wanda, let me just say this. I'm not going to state that Jim is incorrect, except that when we have what we look at as our only source of information, it would appear that if you do have some remediation effort, and it's not quantifiable to the point where you can say this reduced anything by a certain amount, other than the fact that a remediation effort took place, first principles would suggest that that obviously reduced something that affects dose.

And on that basis, my finding was based on strictly the fact that you had a 1992 attempt to extrapolate backward in time that ignores a partial remediation effort in 1988, which you can reasonably assume would affect the dose strength. And that's really the sole basis on which that finding rests.

DR. NETON: Yeah. Take a look on it, Hans, and see. Like I said, we believe that it provides an overarching bounding approach based on the 1978 FUSRAP survey data. They actually use more sensitive survey meters. I think they used pressurized ion chambers in '92 and were reporting

something like 0.015 mR, 15 micro-R per hour, which includes a natural background component of probably around ten in that part of the country.

So, yeah, take a look at it we'll talk more about it maybe in the next --

DR. H. BEHLING: Yeah. And as I said, I'm willing to accept that. But I just want to make sure Ted and other people, the Board, understands why I made it a finding. If it turns out that the calculation dose in 1992 extrapolated backward is still a bounding value, the only thing I'm asking you to do is to understand why I made it a finding.

DR. NETON: Oh, I completely understand why you made it a finding. We're just trying to respond to it.

CHAIR MUNN: Okay. That's fine. I will expect a response from SC&A to this NIOSH response to the finding next time.

And we'll go to Finding 2.

DR. NETON: Okay, I think Finding 2 is very similar to Finding 1, and the backwards extrapolation issue is brought into play again.

MR. SHARFI: This one's a little

opposite. This one brings up the point that the main source of external dose during the residual period would have been associated really with more of a fixed contamination, and that realistically you should have had a constant external dose over time. And therefore the back extrapolation, and that's overestimating external dose.

And so, you know, numerically there's not a lot of -- there's limited data in the sense of locking in that. All the exposures associated with fixed contamination. You know, we still believe that the more bounding and claimant-favorable approach is going ahead and back-extrapolating the source term depletion on the external as well as the internal. Having external consistent with the internal is a more claimant-favorable approach and more bounding.

DR. NETON: Anyway, it does rely on a buy-in of the back extrapolation from 1992. So I think they are somewhat linked. So, SC&A can take a look at that and we'll discuss it further probably in the next go-around.

DR. H. BEHLING: If I recall now,

again, when I look at contamination, traditionally speaking, especially as a function of time, what you see is depletion that most quickly involve, or most readily involve the removable. Because any kind of physical activity, resuspension, evacuation by air flow out of the building, that's what's going to remove more quickly than fixed contamination, which, in some instances, is very stubborn. And the absence of scattering really won't remove anything. And yet it is the principle cause of external radiation, whatever is fixed.

In general terms, it's usually the limiting factor for cleanup activity, the fixed contamination, especially if you deal with concrete flooring or any other porous substances or surfaces that may be holding onto that contamination. And it's not readily removable.

DR. NETON: Yeah, we agree, Hans. But I think Mutty was saying our starting point, if we include some sort of removable contamination, will provide a higher initial starting point for the exposure during the residual period and ramp down what we used at the end, which was more than likely

a fixed contamination point.

The only other alternative would be to reduce the starting point to relate to the fixed contamination at the beginning, but we didn't do that.

DR. H. BEHLING: Okay. But as I said, what we're dealing here with is starting in the back end of this whole procedure, mainly in 1992, and seeing what is still removable and working backwards, when, in fact, you know, that is a limiting issue here, that there may not be much left to remove in 1992. And working backwards would potentially not be claimant-favorable.

DR. NETON: Well, no. But the airborne contamination -- we'll talk about this later -- started with the air sampling data at the end of operations before any -- well, before any real cleanup was made. There were some efforts to clean up things grossly, but there was more than likely still removable contamination. We'll get into that as we get into these findings. That's all.

At any rate, I still think this is

hinging upon SC&A's acceptance of the backwards approach from Finding 1. So we probably can't decide anything here until Finding 1 is resolved.

CHAIR MUNN: So the two of them are too closely linked --

DR. NETON: Well, that’s the starting point, right?

DR. H. BEHLING: You know, now that I think about it, I hadn't really looked at that particular document for quite some time. But I thought that, really, the number one problem in that whole document was the failure to acknowledge an air concentration that was somewhere -- God, I don't remember the exact numbers.

But what happened to that initial air concentration that started at the beginning of the residual period was totally ignored and then was converted into, if I recall, an airborne activity that was settled for a whole year, and then we would have a resuspension.

We used, obviously, the standard deposition velocity and then the resuspension of E minus 6. And we calculated an airborne

concentration that was 42 times lower than the actual empirical air concentration that was measured. That was really the central problem that I had with that whole document.

DR. NETON: Yeah, we actually agree with you on that finding.

DR. H. BEHLING: Yeah. And that, I think, changes the whole document. Because if we start with a different value, I think that almost -- that's probably -- that's 90 percent of the problems I saw.

DR. NETON: Yeah. What happened was we misinterpreted this -- there was an eight dpm air sample that was taken at the end of operations. And you had to read it closely, but it almost implied that it was an operational sample, meaning there was other activities going on to generate airborne. In fact, there weren't.

So that eight dpm air sample in fact should have been used as a starting point for the air concentration during the residual period. And we're going to do that. So we 100 percent agree with you on that finding. It was just a misread

of the air data itself.

DR. H. BEHLING: Yeah. You know, they're also linked together in this whole package. And I think if we correct that particular aspect, then I think most of the issues go away almost.

DR. NETON: Okay. Well, that's good. We agree with that. There was also a calculational error made that you identified.

DR. H. BEHLING: Yeah. But I think that is the number one error. If we eliminate that, I think we can probably clear the slate pretty much for the others.

DR. NETON: Okay. So maybe we won't go through the other ones. You take a look at it and see what you think of the other ones in light of us changing that. I think it was 0.2 dpm that we calculated.

And, really, in light of what that sample was, it made no sense to do what we did. Like I say, we misinterpreted what that air sample was. It went from 0.2 to 8 as a starting point for the residual contamination period. And that's written up in one of our responses.

CHAIR MUNN: So, for our purposes here on the Board, I think I'm hearing that NIOSH has an action with respect to the originating documents. And we're going to hold for it. NIOSH has an action now? Do you want me to --

DR. NETON: No. I think SC&A's --

(Simultaneous speaking)

CHAIR MUNN: SC&A's going to do something.

DR. NETON: Yeah, they're going review our comment, our responses to their findings.

CHAIR MUNN: Right. And then next time we're going to hear from them as to what actions they -- both NIOSH and SC&A have agreed on the basic issue. And SC&A is going to review the responses here and suggest how to incorporate that issue. Is that correct?

DR. H. BEHLING: Yes.

DR. NETON: I think so. We've agreed -- our response is we agreed, I think, with two out of the eight findings or whatever they mainly were. The rest of them may -- well, SC&A needs to look at the rest of them in light of our agreement with

those two findings.

CHAIR MUNN: Okay.

DR. H. BEHLING: And they're somewhat interrelated. All the findings are interrelated. They deal with the elimination of the 1988 remediation which, if what I gather from Jim's comments, may not have had an impact.

And several of those findings relate to that particular issue. But the most important issue was the acceptance of an air sample that was 42 times higher than the calculated air sample as a starting point.

And I think NIOSH just told me that, by and large, they agree that this was an error on their part. And if that's corrected, probably just about everything else falls by the wayside.

CHAIR MUNN: Yes. I think I have that. But what I don't have is, the next action is whose?

DR. H. BEHLING: Well, I will review their responses. And then I think we can, I don't know, formally or in the presence of the Subcommittee, discuss our feelings, how to resolve it best. But I think we are close to coming to an

understanding in terms of how to make the necessary corrections.

CHAIR MUNN: Okay. That's what I wanted to hear. Next time, I expect a review from SC&A of these NIOSH responses and a suggestion for resolution. Okay?

DR. H. BEHLING: Yes.

CHAIR MUNN: Very good. Then is this applicable to all eight of the findings for PER-45? My screen has gone blank and so I'm not looking at the BRS. I'll get back to it.

So is this applicable to all of the others there? It looks, just ruffling through these, it looks as though they all, in some way, relate to that, to the post-dating issue.

DR. NETON: Well, yeah. Well, we responded to all eight findings. And SC&A needs to provide their opinion on the adequacy of our response.

CHAIR MUNN: Right. That's what we'll expect next time. Thank you. Unless there is other comments to be made with respect to PER-45, we'll go on to PER-43 and the four case reviews that

Hans has done, I believe.

DR. H. BEHLING: Yes, that's mine, too. For those who are not necessarily familiar with, again, DCAS-PER-0043 was obviously the result of changes to OTIB-5 which changed internal and external target organs.

And part of our review under Subtask 4 was to review four cases. And NIOSH identified the list of claims that were subject to this change under PER-43. And, Steve, if you can identify Page 8 on my report.

MR. MARSCHKE: I've got to find it.

DR. H. BEHLING: Anyway, we had asked for four particular cases. And Exhibit 1 that I included in my write-up identifies all of the claims to-date that had been impacted by PER-43. And we chose four of them.

And I can identify which ones they are, although it's really not that important. But let me just state, for the sake -- and I will ask the Chair or the other Members for permission to do the following. There were four cases, two of which had no finding. And I'm not sure if it's worth our time

to go through those or just strictly focus on the two claims that did have findings.

Is there any problem with me skipping over the two claims that I reviewed for which there were no findings?

CHAIR MUNN: That's certainly fine with me. I see no point in spending time with material that has been reviewed and approved. I'd like to hear from the other Board Members in that regard.

MEMBER ZIEMER: Well, that's fine with me as well. We have the report. So we have that information. We don't need to rehash it, I don't think.

CHAIR MUNN: Right.

DR. H. BEHLING: Okay.

CHAIR MUNN: Josie?

MEMBER BEACH: No, I agree with that also. I agree.

CHAIR MUNN: Very good. Then we can focus on these two that have findings on them.

DR. H. BEHLING: Okay. The first case, and I guess I would ask Steve to go to Page

9 of the report. Okay. And you were identifying a number of things that I want to point out.

The first case is an energy employee who worked at the Paducah Gaseous Diffusion Plant. And this individual was diagnosed with [identifying information redacted] carcinoma, which is sometimes referred to as [identifying information redacted] cancer, of the [identifying information redacted], in 2010. And that has an ICD-9 code of [identifying information redacted].

And that initial dose reconstruction was conducted on March 22nd, 2011. No, that was the time of the second cancer. But, anyway, the first cancer of the [identifying information redacted], the [identifying information redacted] carcinoma of the [identifying information redacted], you will see as the current DR in the PER dose in Table 2-1. And you realize that, after the initial assessment of the total dose to that cancer, 4.951 rem was reduced to 1.801 rem.

Then, as a result of the second cancer, as I said, the second cancer was identified as [identifying information redacted] carcinoma, or

metastatic to the [identifying information redacted]. And that has an ICD-9 code of [identifying information redacted].

Now, that, as a result of the changes that were introduced in OTIB-5, was also subject to a revision. So this dose reconstruction was subject to a couple of revisions. First, there was the additional, the second cancer, and then a revision as a result of changes to the OTIB-5. And in Table 1 you will see those changes.

In the second cancer, metastatic cancer to the [identifying information redacted], the change from PER-43 resulted in a dose that changed from 3.379 rem to 19.917 rem. That was a significant change.

And as a result of that change, the PoC went from 8.18 to 35.23 percent. And when I looked at that, and the first thing that struck me was very odd, is the fact that this cancer was identified as a metastatic cancer to the [identifying information redacted] and that it had a different ICD-9 code from the primary cancer.

And so the question that came to mind

is, how was it that this cancer was even treated as a primary cancer where dose reconstruction was conducted and a revised PoC?

And if you go to the next page, Page 10, you will see on the top of the page -- let me see, okay, right there on top -- my feeling was, right away, that this second cancer should have never been assigned an ICD-9 code [identifying information redacted].

And as I explain below, where I quote the fact that a metastatic cancer is, by and large, the same as a primary cancer by definition. And for that, you have to understand the following.

When you have a primary cancer, and, let's say, it's a tissue that involves the lung, if that cell in the lung undergoes a transformation, becomes a cancer, at a certain time during the clonal expansion of that primary cancer, depending on how aggressive the cancer might be, a cell or two breaks loose, hitches a ride in the lymphatic cell in the bloodstream and sets up a secondary or metastatic cancer somewhere else. It is still a primary cancer that was identified at

the point where the cancer was formed, namely in the lung.

So, in essence, what this particular case involved was a cancer that was identified as a metastatic cancer but should have never been changed to a [identifying information redacted] ICD-9 code, by definition.

And when I went back into the records to see how did this happen, you will see the following. At some point -- and this is, now, if you scroll up a bit, Steve? No, I'm still on Page 10.

MR. MARSCHKE: Want to go to 11?

DR. H. BEHLING: Go back to Page 10. I traced the timeline, where I started out by saying, in order to assess the circumstance on which this error occurred, SC&A reviewed records for these in order to construct the following timeline.

And under Number 1, sometime prior to April 4th, 2011, the particular case had been returned to DOL due to an additional cancer with ICD-9 code [identifying information redacted], which requires a medical review.

On April 4th, 2011, an email was submitted by DOL that acknowledged the need for a medical review regarding the EE's additional cancer. Distribution included Dr. Ronald E. Goans, who is obviously the medical expert who voiced his opinion.

And on April 6th, 2011, Dr. Goans forwarded his medical review. And this is included in Exhibit 3 that follows in a couple of pages thereafter. And I'll point to that later on.

But he states, and I've quoted from his document, "In my professional opinion, the [identifying information redacted] tumor metastatic to the [identifying information redacted] is a secondary metastatic tumor undifferentiated from the primary [identifying information redacted] tumor of the [identifying information redacted]."

And he says, "I think the ICD-9 code of the primary appears to be correct, and I have not tried to change the ICD-9 code for the metastatic." The meaning of which, he wanted to say it should have been the same as the primary cancer, which obviously

had an ICD-9 code of [identifying information redacted].

On April 7th, 2011, a note to review was released. And that is in Exhibit 4, which we'll come to in a second here, which, by and large, says that the internal organ applied to the [identifying information redacted] cancer was the same as they applied to the [identifying information redacted] cancer.

And in spite of this medical view, and in spite of that notification, that ICD-9 code of [identifying information redacted] remained. And so my first finding is that this ICD-9 code [identifying information redacted] change should have never been.

As by definition, when you have a metastatic cancer, it's the same tissue as the primary cancer. And there's no need to do a dose reconstruction on the cancer because, before that cancer was relocated to a secondary site, it received its transformation and dose as part of the primary cancer.

And the same thing, basically, Finding

1 and 2 are linked to each other. There's no need -- first, Finding 1 says we failed to not keep the same ICD-9 code for the metastatic [identifying information redacted] cancers as with the primary cancer. And, second, there was no need under those conditions, because it was even labeled as a metastatic cancer. There was no need to do a dose reconstruction.

And when you go now to Page 12, I included a definition from the National Cancer Institute. And you can just read the comments that pretty much define my concern here.

In the middle of the page -- scroll up just a bit here, and I've already mentioned this -- the metastatic cancer has the same name and the same type of cancer cells as the original or primary cancer. For example, breast cancer that spreads to the lung and forms a metastatic tumor is a metastatic breast cancer, not lung cancer.

And so this may be an issue that needs to be told to all of the dose reconstructors so that when you have a metastatic cancer based on a medical review, there's really no need to do a dose

reconstruction. And there's no need to change the ICD-9 code. Because a cancer that comes from one source to another is still the primary cancer, regardless of where it relocates.

And the next page, on Page 13, is Exhibit 3. This is the original memo from Dr. Ronald Goans that talks about the thing that I just quoted. And Exhibit 4 is strictly the note to reviewer that apparently was not acknowledged by NIOSH.

So are there any questions with regard to the first case?

MR. HINNEFELD: This is Stu. I don't really have any questions, but I think we'll need to spend some time. I don't know if we've really pulled these up and really analyzed these and are prepared. Jim, we haven't entered responses on these, have we?

DR. NETON: Well, Stu, I think the situation here is that metastatic [identifying information redacted] cancer is covered under this program. I've been looking online and I can't find a list of covered cancers. I mean, under the SEC -- when they added cancers, oh, wait a minute.

Metastatic [identifying information redacted] cancer is an SEC cancer.

MR. KATZ: That's correct. It is an SEC cancer.

(Simultaneous speaking.)

DR. NETON: But I'm not sure that was relevant to --

MR. KATZ: No, it's not. I don't think it is.

CHAIR MUNN: No, this is not [identifying information redacted].

DR. NETON: It's not [identifying information redacted] cancer, but it was a -- trying to think. Yeah, I'd have to look at it. Stu's right. I need to look at it.

But it just crossed my mind, there are some quirks in this program, especially in the SEC, that metastatic [identifying information redacted] cancer and another one -- I think it might be kidney -- is covered, because they didn't specify, you know, they doctored the RECA list, which was primary cancers, then they added a couple more cancers, one of which was [identifying information redacted].

And they said [identifying information redacted] cancer, not specifying whether it was primary or metastatic.

MR. SIEBERT: Jim, this is Scott Siebert. I can tell you, this claim actually was accepted under the SEC a couple weeks later, because of the metastatic [identifying information redacted] cancer.

DR. NETON: Okay.

MR. KATZ: But that shouldn't have a bearing on Hans' question, right?

MR. HINNEFELD: No, I don't that affects Hans' question. I think that we need to chase it down a little bit. And I'm not really prepared to speak a lot about this case.

But, you know, the determination of the primary cancers on a claim is DOL's responsibility. And if DOL said there were two primary cancers, theoretically what would happen, if we got a medical review from our consultant that said, hey, I think one of these is secondary and there's only one primary, we would have provided that information to Labor to see if they wanted to change the cancer

diagnoses for the claim.

But cancer diagnoses for the claim always come from Labor. And if they told us that there were two primaries, even when we pointed out to them that, hey, are you sure, then we would do a dose reconstruction for two primaries.

But we just need to look at -- I'm not familiar with the facts of the case. We just need to look at the history of the case. And I apologize for not being ready today. But we're not ready today to go into that.

CHAIR MUNN: All right. So we need to have Finding 1 and Finding 2 reviewed by NIOSH for next time.

DR. H. BEHLING: This is Hans. I'm just going to ask just a question that may or may not be essential to the issue here. But whenever you have a metastatic cancer, regardless of what DOL does with it, whether it includes it in the SEC, there should be no need to ever do a separate dose reconstruction for that secondary cancer, metastatic cancer.

Because, by definition, it was a cancer

while it was still part of a primary lesion. It only somehow or other detached itself from the primary lesion and then relocated, in this case, to the [identifying information redacted].

But the dose that was responsible for that transition of a normal cell to a cancer cell occurred at the primary lesion. So there's no need to do a second dose reconstruction.

MR. KATZ: Hans, I think that's understood. I think what Stu was saying was that if DOL says treat it as a primary cancer, they dictate that determination. And we could obviously give them information back, but at the end of the day, they decide what's to be treated as a primary cancer.

DR. H. BEHLING: Are we through with that discussion?

CHAIR MUNN: I believe we are. I believe we are. Yeah, as far as the Subcommittee is concerned, NIOSH needs to review both Findings 1 and 2 and review the case to establish what actually needs to go forward. And we'll hear from them next time. So we can go on with the other two,

three cases.

DR. H. BEHLING: No, there's only one more.

CHAIR MUNN: Oh, just one more case.

(Simultaneous speaking.)

DR. H. BEHLING: But we have two cases that have no finding. So I'm on Page 17. And this involves Case Number 3. And this particular case involves an EE who worked at the Feed Materials Production Center. And he was identified or diagnosed with [identifying information redacted] that had an ICD-9 code [identifying information redacted] in 1999.

Well, that particular ICD-9 code was affected by changes in OTIB-5. And it was subjected to review. Now, one of the things that I looked at very carefully was that, in the second paragraph, I have, NIOSH completed DR for this case in 2006. It was based on the assumption that the external dose to the [identifying information redacted] was best determined by using the dose calculated for the [identifying information redacted]. And the internal dose to the

[identifying information redacted] was best determined by using dose calculated by the [identifying information redacted], as specified under OTIB-5.

With the revision of that particular OTIB-5, there were changes to Code [identifying information redacted] in which the external organ was changed from the [identifying information redacted]. And the internal organ was changed from the [identifying information redacted], along with the following [identifying information redacted].

And this is the key here, the [identifying information redacted], which I quote below here. [Identifying information redacted].

So, in this case, I believe a medical review should have been conducted. And let me see here, what needs to be told here. I think that explanation will become obvious when I point to Exhibit 6, which identifies that the internal organ was a result of the [identifying information redacted] as the internal organ of interest instead of the [identifying information redacted].

There was a change in -- obviously based

on the [identifying information redacted], and for that, I think, it's best to simply go to Page 19 where I talk about what should have been done in response to [identifying information redacted].

When you have no definitive understanding of where that cancer took place, the American Cancer Society tells you that there are three potential options. [Identifying information redacted].

And if I could ask -- well, I will look at Exhibit B on Page 20, and that continues to 21. But I would like to turn to Exhibit 7 on Page 22 where you will see where the [identifying information redacted] locations are.

Okay. Here you have, on the far right-hand side, [identifying information redacted].

Finding Number 3, by and large, then says, "In the absence of a medical review that would specify the [identifying information redacted], NIOSH's selection of the [identifying information redacted] as appropriate internal organ is inappropriate and would obviate the need for Case

Number 3 to be reevaluated."

And I believe that we need to have a medical review, because it will determine which of the [identifying information redacted] locations would have been selected had a medical review been done.

CHAIR MUNN: Any comment or question?

MR. HINNEFELD: This is Stu. I think, just like the previous finding, we'll need to go see, you know, if we can come up with a response or a reaction to the finding.

DR. H. BEHLING: At least as far as I can see, I usually try to look to see if there was a medical review done. In this case, I could not find any evidence of a medical review.

And so I can easily understand how the [identifying information redacted] may have been ignored that says, [identifying information redacted]. And that would change, obviously, the approach to doing a dose reconstruction for that cancer.

MR. HINNEFELD: Right. We'll have to go back and see what happened there --

MR. SIEBERT: Stu, this is Scott. One thing I can say on this, that this could have fallen under the fact of you can do an overestimate and if it's -- because we used the [identifying information redacted] the first time we did it.

And if we assessed it using the [identifying information redacted] knowing that was going to be more claimant-favorable, and it still was less than 50 percent, there would be no reason to slow down the process and get a medical review. Because either way that we assessed it, it was going to be less than 50 percent.

I mean, I can't tell you specifically that's what happened in this case, but that logically makes sense to me while doing PERs.

CHAIR MUNN: Yeah. It sounds as though it's a high possibility.

MR. HINNEFELD: I thought of that. I thought that, Scott. And I think that we need to go back and come up with a reasoned response. And, I mean, there should be wording to that effect, I would think.

CHAIR MUNN: Yeah. We'll carry

Finding 3 as a review due from NIOSH. And do we have anything more with PER-43?

DR. H. BEHLING: Before we go on, can I ask a question here? Would the dose reconstructor have stated that he did both in order to determine which is the more limiting or which gives you the higher dose and therefore higher PoC? I would have known that he tried both. I mean, I didn't see that in the dose reconstruction.

MR. SIEBERT: Well, I can tell you, if we did it with the [identifying information redacted] the first time, and the [identifying information redacted] is the only other option, if they did it with the [identifying information redacted] and it's a larger PoC, then obviously we're doing it both ways.

Because nothing else changed. The only change to this case was the organ of interest. So they didn't necessarily have to say they looked at it both ways, in my mind. Because if it was done with one in the original, and it was done under the PER with one that was larger, either one gave you a PoC that was less than 50 percent.

So it probably could have been more clearly stated if that was the case. However, I can see the thought process involved.

CHAIR MUNN: Yeah. We all will see what the upshot is after you've taken a look at it specifically for next time. Thank you, Scott.

DR. NETON: This is Jim. I just have a little comment to add on that first case that Hans discussed.

CHAIR MUNN: Mm-hmm.

DR. NETON: I'll just kind of add quickly, and we're not going to answer completely now, but it does appear, it says -- I looked at the NIOSH report summary document, the most recent one, and Labor reported that, I'm quoting, "An additional metastatic cancer has been reported. This new cancer will be accepted as the SEC specified cancer."

So that non-metastatic cancer was the one that got the person into the SEC. And then it says, "Please continue with dose reconstruction for possible non-SEC cancer medical benefits in regards to the other two primary cancers."

So, we'll explain it, but it looks to me like the metastatic cancer got him into the SEC. And for non-SEC cancers, if you want to get medical benefits for those, Labor asks us to reconstruct those doses to see if the PoC goes over 50 percent in toto. So, you know, I think there's a rationale behind that one.

CHAIR MUNN: Yeah, for the Gaseous Diffusion Plant case, right?

DR. NETON: Well, no. For any SEC site. But anyway --

CHAIR MUNN: Well, yeah. But specifically for Findings 1 and 2, yeah.

DR. H. BEHLING: But, okay, in this case he was covered under the SEC but --

DR. NETON: The primary cancer, the cancer that got him into the SEC, had to be considered along with the other non-SEC cancers to see if he qualified for medical benefits for those non-SEC cancers.

DR. H. BEHLING: Based on what I saw, obviously the medical reviewer heeded to the need to revise the ICD-9 codes from [identifying

information redacted] to [identifying information redacted]. And that wasn't obviously done.

And I guess the second issue is would there even be a need to do a dose reconstruction for a metastatic cancer that is identical to the primary cancer?

DR. NETON: Well, we'll have to research that a little further. But I can kind of see the logic behind what happened here.

DR. H. BEHLING: Well, I can see the issue that he might have been compensated under this special situation. But the fact is, when you have a metastatic cancer, the dose of the metastatic cancer is the same as the primary cancer, no matter what the issues are. There's no need to revise the dose reconstruction.

CHAIR MUNN: All right. We'll look forward to some additional thoughts on that after the review has taken place. And thank you, Hans. Anything else so say about PER-43 until we move on?

(No response.)

CHAIR MUNN: We'll look at that next time. And now we'll go to PER-18 review.

MS. K. BEHLING: Okay. This is Kathy Behling. And PER-18 was the LANL site. And under Subtask 4, I had presented our findings, I think, last time. And we had looked at three cases. And there were, I think I had four or so -- no, five findings that we entered into the BRS. And NIOSH has responded to those findings. So I can quickly go through them, if you'd like.

The first one was PER-18 in Finding 06. Because there were five findings from the review of the PER-18. And on this finding, I was questioning -- I saw in the records there was a neutron dose of 80 millirem that didn't appear to have been accounted for in the dose reconstruction.

And based on Scott Siebert's review, he said that that was correct. And they did go in and add that dose to the official file now. So, based on that response, I assume that we can close this finding.

CHAIR MUNN: That's good. Can you make that notation, Steve?

MR. MARSCHKE: Yes.

CHAIR MUNN: How does that catch us up

with PER-18? Do we have anything outstanding? What's outstanding? We're done with that one.

MS. K. BEHLING: Okay. Yeah, there are a few other findings here. But I think that we can resolve all of these. But I'll just give you a brief explanation. Do you want me to wait?

CHAIR MUNN: Yeah, let's wait. And let's see if we can close Finding 6 in real-time here.

(Pause.)

MR. KATZ: While we're doing this, can I ask either Kathy or NIOSH, does this PER relate to the period post-2000 for LANL or does it -- I don't know.

MS. K. BEHLING: I'm not sure.

MR. KATZ: Maybe, NIOSH, can you answer that question? Or is it more generic than that?

MR. SIEBERT: Give me a minute. I'm doing a little bit of digging. But I don't think it's post-2000. But let me check.

MR. KATZ: Okay, thank you, Scott.

(Pause.)

MR. MARSCHKE: Okay.

CHAIR MUNN: Okay, thank you.

MS. K. BEHLING: And would you like me to go on, or do you want to wait for Scott?

MR. KATZ: Oh, no. You can go ahead.

CHAIR MUNN: I think you can go on. PER-18, we're on Finding 7.

MS. K. BEHLING: Yes. I'm going to address, if I can, Finding 7 and Finding 8 together, because they're very similar.

In Finding 7, this had to do with, when I went through the records, I did not see where, for film badge records, that an uncertainty was applied as recommended in the Technical Basis Document. That's Finding 7.

In Finding 8, there's also supposed to be a Model 7776 dosimeter uncertainty factor for neutrons that I didn't think was applied.

And here, I believe, Scott also responded to this. And he indicated that NIOSH does not agree with this and that if you go into the various tools that are in this file, that you will see where these uncertainties are applied.

And he points specifically to a

simulation setup tab in the Voss MC simulation tools and told me where to look for this uncertainty factor, and also points out some information from the LANL calculation error workbook, and how they coordinate and how these uncertainty factors get applied.

And I did go into those workbooks. I do now see where these uncertainty factors are. And I agree that they were applied appropriately. So I do agree with Scott's comments and his response to both Findings 7 and 8.

But if I can just take a minute, Wanda, just so that I can elaborate on this finding a little bit.

CHAIR MUNN: Yeah, please do, Kathy.

MS. K. BEHLING: Okay. You know, obviously, you know, as we can see just based on the response, the dose reconstruction process is very complex. And it continues to evolve.

And typically, in the old days, we used to be able to go into just an external calculation workbook, which is complex in itself. There's usually at least thirteen or more tabs that have

lots of information and calculations. If we would go into a scoreboard tab and marry that sometimes with a Monte Carlo tab, we can pretty much determine how NIOSH is calculating their doses.

I will say, and I know this is not new to NIOSH or to ORAU, but we're seeing now additional workbooks, such as these error calculation workbooks, these Voss simulation tools. It used to be they would run the Monte Carlo risk analysis using Crystal Ball. Now they use Voss.

The first time, as we were talking earlier today with the CLL cases, the first time we saw a Weibull dose distribution was in reviewing a case. We didn't know when that was being used, why it was used.

And so all I'm trying to suggest here is that, from a reviewer's point of view, and it just seems that it would make for a more efficient process if sometimes SC&A was made aware of these changes, perhaps, and kept sort of in the loop.

Now, in one particular case, you know, once we're aware of a new tool, we generally train ourselves. Now, I know we talked earlier about the

CLL simulator. The only reason we ended up requesting training on that particular tool was because there was no workbook. I mean, there was no guidance document.

And so I guess, from my perspective, it just seems that if we could be made aware of the new tools as they come out, if there's some training that we could get, or if even there's -- and Scott does allude to some instructional, these Voss simulator instructions, which I'm not even quite sure where that document exists.

But it would certainly make, you know, the process more efficient. And I think it would help to eliminate findings like this. And so we're sensitive to that today.

MR. KATZ: I think that's a great suggestion, Kathy. And I wondered if, Stu, you don't need to answer now, but if Stu and Scott, if you could just figure out whether there's a way to bring them in. Because there must be sort of a notification that goes out internally when you guys have new tools and new methods. And maybe if SC&A can be brought into the loop there, that would be

helpful.

MR. SIEBERT: Well, this is Scott. One thing I'll point out that's difficult is the fact that they're looking backwards in time. These tools -- and we'll actually deal with this in one of the later findings on this one right here -- the tools that we refer to that are so complex, with the different ones we have to deal with, we no longer use those. We simplified them by putting them all into a single tool.

So, even if we had given you an update on when the tool had changed, that would have been back in, I guess, 2010, and you're reviewing it now --

MS. K. BEHLING: Correct.

MR. SIEBERT: -- which the newer tool actually is there. And this old tool is out of date for what we do these days. I'm not sure how helpful that would be. But I guess you know what I'm trying to say.

MS. K. BEHLING: Yeah. I guess what we're trying to avoid is, like I said, even with the Weibull distribution, the first time we saw it in

a dose reconstruction report we felt like we had to make it a finding, because we just didn't know where it had come from.

And if we were perhaps kept abreast of some of these changes, or these additions of new workbooks and new methodologies, like I said, the Voss versus the Monte Carlo and that type of thing, we would at least be aware of some of these things. And we could avoid, like I said, some of these findings. And if we need training, we would ask for it. If we can train ourselves, we try to do that. Just a thought.

MR. HINNEFELD: This is Stu. We'll work with ORAU and see what we can do about notifications. But like Scott said, you know, the chances are, you know, if we notify about any new tools, it'll be some time before SC&A would see that tool and complete a review. But we'll see what we can do.

MS. K. BEHLING: Yeah. But, like I said, even if it's going to be a few years down that we might encounter that in a dose reconstruction, if we're at least aware of it and it doesn't surprise

us when we see certain things.

So I'm not, you know, trying to justify my finding here and why I was wrong. But, you know, things are very, very complex and, you know, especially with these best estimates.

So I guess in resolving, or in reviewing the response for 18-07 and 18-08, Findings 7 and 8, I do agree, now that I'm aware of where to look for these uncertainty factors, I was able to track them down. I was able to see that they were applied correctly.

And so, again, I'll have to concede these two findings. And I think we can close them. Do you agree, Wanda?

CHAIR MUNN: I certainly do. If there are any comments from other Board Members?

MEMBER ZIEMER: I agree on these as well.

MEMBER BEACH: I do too, Wanda. This is Josie.

CHAIR MUNN: That's fine. Steve, will you please make the proper notation for both Findings 7 and 8 on PER-18?

MR. MARSCHKE: Will do.

CHAIR MUNN: Thank you. I think Steve has almost a template that can go right in there right now. And, Kathy?

MS. K. BEHLING: Would you like me to continue?

CHAIR MUNN: Please continue.

MS. K. BEHLING: Okay. Finding 9, in this finding I was questioning why the dose reconstructor used a median value rather than a 95th percentile value for the neutron-to-photon ratio. I felt that that was an underestimation when you actually looked at his records. It would have -- his measured doses would have given him a higher dose than the 95th percentile dose.

And in the response, I think, Scott, you know, you can jump in if I'm not saying this correctly, but I think NIOSH's response is fairly lengthy. And they do agree that, based on the records for the years 1951 and 1953, it was best to use either the 95th percentile value or actually the measured dose.

And they have gone in, from what I

understand, and made changes to the dose reconstruction guidelines and also, I believe, they made changes to the workbook. Yes. And again. Scott, correct me if I'm wrong, but they went in and they --

(Telephonic interference.)

CHAIR MUNN: Kathy, you're fading out badly. You're breaking up on my phone. I don't know whether it's just my phone.

MR. KATZ: It's not just you. It's everyone. It's all very garbled.

CHAIR MUNN: Oh, okay. You're breaking up badly, Kathy.

(Telephonic interference.)

MR. KATZ: Yeah, Kathy. I think there's something wrong with your line. I mean, I could make out what you were saying, but it's very difficult.

MS. K. BEHLING: Okay. Let me grab another phone. I'll put you mute for just one second.

MR. KATZ: Yes.

DR. H. BEHLING: Kathy, try the other

phone next to you.

MR. KATZ: Yes, Hans is very clear.

DR. H. BEHLING: Yeah. She sat at a different location to keep us separate from fighting.

(Laughter.)

CHAIR MUNN: Yeah, that's probably why.

DR. H. BEHLING: No, she has another phone.

MS. K. BEHLING: Okay. Is that better?

MR. KATZ: That's perfect.

CHAIR MUNN: Much, much better.

MS. K. BEHLING: Okay, I'm sorry. Okay, let me repeat myself, then. Did you want me to go through this Finding 9 again?

CHAIR MUNN: Not all the way. Just back up a couple of sentences.

MS. K. BEHLING: Okay. What I was saying is that NIOSH did agree with the finding. It appears that they are making changes. They made a change to this dose reconstruction report.

And they're also making changes to guidance and to the workbook associated with, I

guess, LANL. Or is it all the workbooks, Scott? I think you were telling --

MR. SIEBERT: It's LANL, because it's this specific issue with the neutrons at LANL.

MS. K. BEHLING: Okay. So, based on their response and everything that they have done, like I said, they did agree with the finding. And they have made the appropriate changes.

CHAIR MUNN: The changes have been made? Or are they going to be made?

MS. K. BEHLING: Scott?

MR. SIEBERT: We have put the new information into the DR guidance document. And we have already updated the tool. So we have taken care of it already.

CHAIR MUNN: All right. So that leads me to believe that we can close this item. Is that correct?

MS. K. BEHLING: Yes.

CHAIR MUNN: Very good. Paul?

MR. KATZ: Wanda, why don't you have Paul, unless I get clarification from Scott, why don't we just have Paul recused from this?

CHAIR MUNN: Okay.

MEMBER ZIEMER: Works for me on this one.

MR. KATZ: That's why, we don't know.

MEMBER ZIEMER: Yeah, okay.

CHAIR MUNN: Josie?

MEMBER BEACH: Yes, I agree with that also, closing.

CHAIR MUNN: If you would make the appropriate notation, Steve. All right. That's very good.

MS. K. BEHLING: And would you like me to go on, Wanda?

CHAIR MUNN: Please do.

MS. K. BEHLING: Okay. And this is the last finding. It's Finding 10. And in this case, I could not manually calculate the neutron dose and get close to matching the NIOSH numbers. My numbers came in lower than the numbers that were actually generated for the dose reconstruction.

And I believe that Lori responded to this finding. And she indicated that there was an error that, I guess, the neutron error calculation

was transcribed incorrectly into the simulation setup tab in the Voss simulation tool.

And apparently that -- and there's a very long explanation here -- but that is the reason their doses were excessively high and I couldn't match their numbers.

And they said that this potential situation has been resolved through the updated workbook, which contains all the necessary error calculations.

So, it sounds to me that, again, they've made their changes, and they agreed with the finding. And so, again, I would suggest that we could close this, unless Lori would like to add anything to her response.

CHAIR MUNN: Lori?

MS. MARION-MOSS: This is Lori. Actually, I uploaded that to Scott.

CHAIR MUNN: Scott?

MR. SIEBERT: This is Scott. Yeah, that is the case. It was a case of the dose reconstructor just making the error when they transferred some numbers over and putting the wrong

ones in, which wildly overestimated the neutron dose.

And, yeah, we've entirely rolled that into a single tool where it's carried through without the dose reconstructor having to recreate those numbers between multiple tools. And that will avoid that same issue.

MS. K. BEHLING: Okay, very good.

CHAIR MUNN: Excellent.

MS. K. BEHLING: Again, I would suggest that we could close that.

CHAIR MUNN: That sounds wonderful to me. That's a salubrious outcome. Anyone with further comments regarding Finding 10 of PER-18?

(No audible response)

CHAIR MUNN: If not, then we can close that item, Steve. And thank you very much, all concerned. It's nice to be able to take PER-18 off of our list.

Now, we'll go on to PER-11, Findings 3 and 5, NIOSH.

MR. HINNEFELD: This is Stu. I'll start out with a little something here. As I

understand things, PER-11 and PER-14 are sort of intertwined here, because PER-14, as I understand it, is a construction trade workers PER.

And PER-11 is a K-25 TBD and TIB revisions to PER. And the findings, I believe both Findings 3 and 5 related to, were we correctly choosing to apply the construction trade worker adjustment to certain cases in that PER-11.

And it has to do with a specific word search for job type I think was used in PER-14 in construction trade worker ones, in fact, that same approach wasn't necessarily used in 11. Now, does that kind of summarize the situation, where we're at on these?

MS. GOGLIOTTI: Yes.

MR. HINNEFELD: Okay. And as I recall, at the last meeting we kind of agreed that, gee, we probably want to make, we want to make sure we're making a comprehensive application, you know, in every case we should.

And now I'm kind of getting a little foggy on where the discussion went. It may have to do with in what order these PERs were worked. For

instance, if we did PER-11 first, it's a lower number. That doesn't necessarily mean it was done first.

And we missed some construction workers there. Some of them we reworked were not -- we didn't apply the construction trade worker adjustment when perhaps we should have.

But then later on, we did PER-14, where we looked for all construction workers. And we did the comprehensive search for construction workers, you know, the word search. Logic dictates that we would have found those K-25 cases from PER-11 that we didn't treat as construction trade workers when we did PER-11.

MS. GOGLIOTTI: I believe PER-14 --

MR. HINNEFELD: Was there anybody else?

MS. GOGLIOTTI: -- actually was done first.

MR. HINNEFELD: Fourteen was done first?

MS. GOGLIOTTI: I believe so.

MR. HINNEFELD: Okay. Well, that's certainly could happen. Okay. Well, I think we

kind of agreed that we should make sure we make, we don't want to miss anybody in PER-11.

But I don't know that we've proceeded any farther than that agreement yet. Jim or Lori, have you got other stuff to add here, or am I losing track of the thread here?

MS. MARION-MOSS: This is Lori. I believe that the issue here, and correct me if I'm wrong, Rose, but the issue here is that SC&A wants or would prefer that we include the list of titles in PER-11, similar to what we've done in PER-14. Am I correct?

MS. GOGLIOTTI: That's part of the issue. Well, previously we determined that OTIB-52 was being incorrectly interpreted to exclude construction trade workers that worked for the prime contractor. So those were being excluded already, incorrectly. So that's one aspect of the problem.

And the second is, because construction trade worker means different things to different people, we're concerned that different dose reconstructors would do the same case differently.

MS. MARION-MOSS: But you go on to discussing your responses. And I can't remember which one, but you specifically say that we need to establish criteria for what a construction trade worker is.

MS. GOGLIOTTI: Yes. That would resolve a large portion of the problem.

MS. MARION-MOSS: And what we are assessing is that that is what we did in Revision 2 of OTIB-52. We've established what that criteria was.

And I used your example that you used in the case that you referenced in your response. And if you take a look at that particular case, which is the K-25 case, yes, we deemed this individual, or this EE, as a non-CTW. But if you look at -- and the reason we did so was because of the criteria that was in OTIB-52.

If you go back and look at our revision, this particular individual, regardless of what his title may have been, would have been assessed against the new criteria, the clarification that was made. And this individual would have been

assessed to determine whether or not he would have been a CTW. And he would have been.

So basically, what I'm saying is that I believe we have addressed the criteria that you specified we needed to do in OTIB-52.

MR. HINNEFELD: And that, Lori, you're saying in the most recent revision of OTIB-52, and the PER-14 was in a previous one. But do we have a PER underway or that we have completed that was based on the qualifying language that we added to the construction trade worker TIB, OTIB-52?

MS. MARION-MOSS: No. That PER is being developed.

MR. HINNEFELD: Okay. So what we're saying then is that that PER where we address where, you know, since we clarified OTIB-52 to make it clearer that employees of the prime should also be construction trade workers if they had the right trade, we made that adjustment to OTIB-52.

We are getting prepared to do a PER based on that adjustment. And that PER, were it not to do, should rectify any situation like they observed in PER-11, or for that matter any other site where

we may have, you know, not applied construction trade worker adjustments to people who said they were employees at the plant. So that's essentially where we at on this, right?

MS. MARION-MOSS: Right.

MS. GOGLIOTTI: So the plan is, if I'm understanding this correctly, that a new PER will be issued to address the revision of OTIB-52 and that will encompass --

MS. MARION-MOSS: Correct.

MS. GOGLIOTTI: -- all these cases that were missed by PER-11 and PER-15 as a result of misinterpretation of 52?

MS. MARION-MOSS: Correct.

MR. HINNEFELD: Yeah.

MS. MARION-MOSS: PER-14.

MS. GOGLIOTTI: So would it be reasonable to move these into abeyance until that PER is issued?

DR. NETON: Well, I don't know if it makes any difference. This is Jim. But PER-11 was done before PER-14.

MS. GOGLIOTTI: It was.

DR. NETON: PER-11 was done on 9/26/2007 or issued. And PER-14 was 11/28/2007. I don't know if that makes any difference.

MR. HINNEFELD: Yeah. But nonetheless, the ultimate fix is the upcoming PER from the clarification of OTIB-52.

DR. NETON: Well, I agree.

MR. HINNEFELD: Yeah. I think, you know, abeyance could be a status or, I don't know, you know. In progress could still be the status, and it wouldn't be closed until, somehow we'd want to link them to the new PER, to that upcoming PER which I don't think is numbered yet.

MR. MARSCHKE: Do we want to, this is Steve, do we want add a comment to this basically discussion under PER-11, what is it, 11-3 or whatever it is?

CHAIR MUNN: Yeah, Findings 3 and 5.

MR. MARSCHKE: Finding 3, basically saying to summarize this discussion saying that, you know, NIOSH is in the process of issuing a PER for revision, or OTIB-52, Revision 2, which will basically envelope all these --

CHAIR MUNN: Yeah, will resolve this finding.

MR. MARSCHKE: Will resolve this finding.

CHAIR MUNN: That will make it simple enough.

MR. KATZ: Right. And I think it is abeyance then, because there's agreement there was an issue. And that will be resolving it. And there's agreement on basically how to resolve it. And we just need to see it.

MR. MARSCHKE: Okay. Then we'll do a change as opposed to the --

CHAIR MUNN: That statement is appropriate and abeyance should be, which will resolve this issue.

Okay, let's go back up to the very first line. And let's eliminate the words has explained that they are. Just take out that phrase and just say is. And the process of the PER associated with OTIB-52, Revision 2. That's fine for me. Anyone have any problem with that?

MEMBER ZIEMER: That looks good.

CHAIR MUNN: Very good. Let's move on.

MR. MARSCHKE: Want to do the same for the other one?

CHAIR MUNN: Finding 5. It appears to me that a similar statement needs to be made and in abeyance. Is that the feeling of the others on the Board? Paul?

MEMBER ZIEMER: Yes.

CHAIR MUNN: And Josie?

MEMBER BEACH: Yes. Same here.

CHAIR MUNN: Steve, if you will just repeat that comment under Finding 5?

MR. MARSCHKE: Will do.

CHAIR MUNN: We'll move on to PER-14. We'll take a look to see what the -- and NIOSH, I believe I interpreted what you said to encompass this PER as well. Is that correct?

MR. MARSCHKE: We're on 14 now?

CHAIR MUNN: Yeah, on PER-14. Stu, Jim, it's my understanding.

MR. HINNEFELD: Well, yeah. I didn't think there was a, I don't know if there was a particular finding on 14 that we were addressing,

but it would be, I mean, that would actually give a comparison, the workers' comparison that was used in PER-14 that was not used in PER-11. So is there an active finding that's relevant to the discussion we just had on 14?

MR. MARSCHKE: The BRS shows all the findings on 14 closed.

MR. HINNEFELD: Yeah. So I didn't think there were any, I didn't think there was anything open on 14, to be honest.

CHAIR MUNN: All right. Then we can just take that off our list entirely.

MS. GOGLIOTTI: I believe that that was on the list initially because NIOSH was going to compare the claims from PER-11 and see what job titles in PER-11 came up versus what was used in PER-14.

MR. HINNEFELD: For me it was, it's there for sort of comparison purposes for the PER-11 findings. Because there wasn't anything really to discuss on 14.

CHAIR MUNN: Right. All right. Then we'll remove that from our agenda. And we will go

on to PER-52. SC&A?

DR. H. BEHLING: That's me again. But, Wanda, can I just take one second to go back to the previous case number where we had a [identifying information redacted] cancer?

And I'm still confused. Because I don't want to make this mistake again where, I guess, NIOSH responded that the dose reconstructor may have then reviewed the internal dose, based on the decision to either assign it to [identifying information redacted] or [identifying information redacted] and use the [identifying information redacted] because it's higher.

And I always realize that I'm going to be questioned in terms of my failure to understand that. And I'm going back to the [identifying information redacted] which really states that, for those cancers that are described as [identifying information redacted], select the [identifying information redacted] as the internal organ.

But in the case where [identifying information redacted], a medical review should be conducted to determine the appropriate internal

organ of interest, appropriate organ of interest.

That does not mean select the higher one. There are certain instances, I understand, when you, for instance, determine whether or not the action for Type M or S is potentially an option you should consider, you select the higher one. But that is the decision of the dose reconstructor.

In this case, the way I interpret [identifying information redacted], it says that, and I quote again, [identifying information redacted], not the higher one, which would be optional for the dose reconstructor.

The way I interpret that [identifying information redacted] to say is, you will rely on a medical review to determine which is the appropriate, not necessarily the higher one.

And I just want to make that issue, because I always feel that we're going to get, perhaps, held accountable for introducing a finding that should not be a finding. And the way I see this, I will stand by my position that this is a finding until a medical review was conducted that says one way or the other.

MR. HINNEFELD: Okay. So then what you're saying is that the footnote does not provide the leeway for an --

DR. H. BEHLING: Dose reconstructor.

MR. HINNEFELD: -- expedient, you know, expedient approach.

DR. H. BEHLING: Yes.

MR. HINNEFELD: For instance, if you do the highest approach, and it's not going to be compensable or above 45 percent, then that typically is, you know, something that we've done for expedience.

But this [identifying information redacted] doesn't allow that flexibility. So an option would be to revise that [identifying information redacted] to allow for the flexibility of using the higher outcome as an expedient measure.

DR. H. BEHLING: That would be my recommendation. And I think that would solve the issue. Had that been reconstructed or considered, that would not be my finding.

MR. HINNEFELD: Right.

MR. SIEBERT: This is Scott. Once

again, I can understand how that could solve the problem. However, we don't necessarily have in every procedure to state that you can use efficiency methods if they're deemed appropriate.

In this case, you know, the medical review is going to select either [identifying information redacted]. And I agree, if you follow the letter of the procedure, and it says that we need to do that in a best estimate case, I would agree wholeheartedly that medical review would need to be done.

However, if you have two options and both of them are non-compensable, efficiency methods have been used in the past and continue to be used. So I understand where you're coming from. But I'm just pointing out that we don't necessarily proceduralize all efficiency methods.

DR. H. BEHLING: To me, I always feel that guidance should be as definitive as possible so that the option for deciding one way or the other should not be that of a dose reconstructor, at least in certain cases where you realize it could make the difference between compensation and not

compensation unless you segregate that case.

But in this case, that [identifying information redacted] should say use either one depending on which one's higher provided he's not compensable.

MR. SIEBERT: Well, that's my point. That, in our normal practice of efficiency methods, if one was compensable and the other one was not, the dose reconstructor would get the medical review. Because in a --

(Simultaneous speaking)

MR. SIEBERT: -- you can't --

MR. HINNEFELD: I'd like to intervene here. If I could intervene, Ted, you and I know why discussion's going on. And perhaps we can sort out a way outside the meeting --

MR. KATZ: This is actually, I mean, I don't want to get into it here, but this is actually a non-issue. So there's no reason to persist here.

MR. HINNEFELD: Yeah, that's what I'm thinking. We can sort out a way that this is scored appropriately for --

MR. KATZ: And this thing would be

scored appropriately. This is just, like I said, a non-issue.

MR. HINNEFELD: Yeah. That's what I'm saying.

CHAIR MUNN: So how are we --

MR. KATZ: So, Wanda, you can just proceed from here. We really don't need to persist on this discussion at all.

CHAIR MUNN: Okay.

DR. H. BEHLING: Okay. I will take PER-52. This is the review of the Westinghouse template. And that came about as a result of additional air sample data.

In the original template for the Westinghouse facility, there were only 3,093 air samples available to determine what potential intakes might have been on the part of workers and both from inhalation and ingestion.

And then subsequently, a substantial number of air samples were discovered that raised the total to 12,694 air samples. And in the process of analyzing that data, it became very clear that the potential inhalation and ingestion doses would

go up, hence the issue of DCAS PER-52 that would then assess the potential impact on those cases that had been previously completed under the old template.

And I'll make it quick here, if Steve could go to Page 10 of that report. Okay. These three tables, 2A, 2B and 2C, are the things that give me a little bit of a problem here.

These three sets of intakes were defined for three groups of workers. The one up top, 2A, intakes for unmonitored operators and general laborers. And the key here that I want to point out is unmonitored operators. Those are the highest, those are the 95th percentile values of the more than 12,000 air samples that were taken. And you have both intakes: inhalation and ingestion.

The second one is unmonitored supervisors. And again, the word unmonitored sticks out here. And the third is for unmonitored all other workers.

And we see that they are obviously the unmonitored supervisors are 50 percent of the operators and the other workers are ten percent of the unmonitored supervisors.

And the thing that I had some concerns were the issues that are described on the next page as to how they might apply, on Page 11.

You have, and I'll read for you at the top of the page, during operational periods '71, '72, partially monitored workers, those who have bioassays for uranium and plutonium, should be assigned unmonitored exposures at the 95th percentile.

Now, here's the question. When I see the word unmonitored, does that mean completely unmonitored, partially unmonitored? And what does that really mean?

And I wasn't really sure whether we're talking about a categorization of people who follow in one of three classifications as operators and laborers, supervisors and all others. Or are those divisions subject to a secondary assessment based on whether or not they are potential bioassay data.

And my question is what happens if you have an operator who you know is defined as an operator or a laborer but, for some reason or another, he was never monitored?

What do you do? Do you assign him the 95th percentile value as it occurs in Table 2A? Or is he automatically, by virtue of not having any bioassay data, he is defaulted to Table 2B which is for unmonitored supervisors?

And so you have this conflict. Do you have an operator without bioassay who then gets the mean value? Or do you assess him with Table 2A?

And the second question is for the value of the supervisors, I'm not sure whether the 50 percent value is a median value or is this just an arbitrary decision to say it's 50 percent of the operator value.

Because in previous, or the old templates, there was a geometric mean as well as a 95th percentile. But I suspect that the Table 2B is not a median value or a geometric mean value. Is that correct?

CHAIR MUNN: Can someone --

DR. H. BEHLING: Could someone answer that?

CHAIR MUNN: -- answer the question?

(Simultaneous speaking)

MS. MARION-MOSS: Mutty, would you have an answer?

DR. H. BEHLING: Can I interrupt? Because on Page 11, the second one, for completely unmonitored workers, unmonitored exposure should be based on the geometric mean intake. So I take it, it is a geometric mean intake. But it doesn't appear to be that. It's a 50 percent value.

MR. SHARFI: This is for which?

CHAIR MUNN: It's a review of PER-52.

MR. SHARFI: I would have to pull Westinghouse. Let me look it up a little bit and see if I can get back with you.

CHAIR MUNN: Okay.

DR. H. BEHLING: I mean, when you look at, for instance, the old templates, and you look at the value of the geometric mean which, during the operational period this, in fact, Steve, go to Page 9, please.

If you look at Table 1, if you scroll up a bit, you can see, look at the geometric mean for 1971 through '73. And we have a geometric mean of 9.122.

And you also have a GSD which is also missing in that, if it turns out to be a geometric mean. And then you look at the 95th percentile which is approximately more than fourfold higher, not 50 percent, which gives me reasons to question what is Table 2B.

It doesn't appear to be a geometric mean value as referred to, I guess, indirectly on Page 11 where it says for completely unmonitored workers, unmonitored exposure should be based on the geometric mean intake and assigned either da, da, da, da, da.

You don't have that value, according to my assessment of what these numbers represent, nor do you have their geometric standard deviation which is usually incorporated when a geometric mean is used as an intake for a lower-exposed worker. So I guess I'm having problems with those three tables.

MR. SHARFI: Okay. Can you move back up to the first table? I don't have the document in front of me, so I was trying to pull the numbers 9.2, 9.1.

DR. H. BEHLING: Yeah, the first one is

9.122. And then it has the geometric standard deviation of 4.638. And then the 95th percentile is approximately fourfold higher, slightly more than fourfold higher than the geometric mean.

But that was the old template. I'm just using that as a reference for assessing the merit of the data that are presented in Table 2A, 2B, 2C, which are in the revised templates.

MR. SHARFI: I will bet you, without going into raw data, that the 95th percentile is not the calculated 95th percentile, but the actual, based off the data which is probably what you're seeing is, as you get to the higher levels of it, you're going to get tailoff.

And so the theoretical 95th, which would be about 115 if you calculate it based off the GSD versus the measured 95th percentile, the actual data set, that is probably the actual 95th percentile. The data set was used for that 95th percentile.

DR. H. BEHLING: So is Table 2B a geometric mean?

MR. SIEBERT: Can I interrupt? This is

Scott. We haven't, as far as I know, we have not created formal responses to this. So I'm not sure if we should really just be winging it. And I think we should probably develop formal responses for these, get them into the application and then move forward at that point.

DR. H. BEHLING: Okay.

MR. SIEBERT: I mean, Stu, feel free to tell me I'm wrong and move on and continue what we're doing. But that just seems wiser to me.

MR. HINNEFELD: Well, I think you're right, Scott. I think if we haven't entered responses, then we should take the opportunity to put some reviewed responses together and get into the BRS.

DR. H. BEHLING: Yes. As I said, it confused me to a large degree. Because in the event, as I've just mentioned earlier, if you did have someone who, on the basis of records, was clearly identified as a Westinghouse worker who was an operator or a laborer but who had no bioassay data, which category of data, Table 2A or 2B, would apply? And according to --

MR. SHARFI: Well, they're the operator then. They would go to 2A.

DR. H. BEHLING: Well, but because, on Page 11, it says for completely unmonitored workers. It doesn't say laborer or operators or supervisors. Unmonitored exposure should be based on a geometric mean intake. And this is what really confuses me. Which table do you apply when you have a certain condition where you don't have any bioassay data but the guy is clearly identified as an operator or laborer?

MR. SHARFI: Well, then they go to the operator table. I mean, that's what those unmonitored intakes are for, is for unmonitored laborers and operators.

DR. H. BEHLING: Well, but read the third paragraph on that Page 11. It says for completely unmonitored workers, exposure should be based on the geometric mean intake rate. So as far as I'm concerned, that option is yours, as a dose reconstructor, to decide whether you go to Table 2A or 2B?

CHAIR MUNN: So do we have a finding

that would encompass that question?

DR. H. BEHLING: Yeah. I include that finding on Page 11, at the very bottom of Page 11.

CHAIR MUNN: Very good. Then we will anticipate that NIOSH will take the finding into consideration and provide us with some response.

DR. H. BEHLING: It may just be, Wanda, in the form of some clarification, how to use those three tables: 2A, 2B, 2C.

CHAIR MUNN: Right.

MR. SHARFI: Okay.

CHAIR MUNN: Very good, Finding 1 will be due for a response.

DR. H. BEHLING: Yeah, the Finding Number 2, just a brief thing. I think we may have even discussed this earlier. But, Steve, if you can go to Page 12, again, we have the issue of a 12 percent 10-year-old fuel-grade plutonium ratios.

And you realize that, obviously, all of the air sampling that was done with Westinghouse was gross alpha counts, which means that you have the option of defining whether it's for plutonium, thorium or uranium as the option allows you to.

But if it turns out to be ten-year-old fuel-grade plutonium, then the mixture has to be defined in terms of plutonium-238 alpha, 239-alpha and americium-241 alpha. Because the three of them combined obviously make a total two unity. And so you have to break down the fraction of each of those alpha contributors to the air sampling data that was collected.

On the other hand, plutonium-241 is not an alpha emitter. And it needs to be looked at, obviously, because it will contribute to the dose, but it is not an alpha emitter.

And so I just think that that should be at least identified. Eliminate the word plutonium-241 alpha and then put a footnote. It must be incorporated into the dose assessment. I think we've discussed that finding before somewhere else, if I recall.

CHAIR MUNN: Possibly. But we will continue to carry it as a NIOSH response due.

DR. H. BEHLING: Okay. That's pretty much it for PER-52.

CHAIR MUNN: Alright. Any comments or

questions? What I have now is that we have two outstanding findings. And NIOSH will review the review and respond to the two findings. Any other action, any other concern?

(No audible response)

CHAIR MUNN: If not, let's go on to PER-9, case audits.

MR. MARSCHKE: Wait a minute. This is Steve. I'm looking at the BRS.

CHAIR MUNN: Yes.

MR. MARSCHKE: Kathy, did you enter the second finding? I mean, I see the first finding that Hans was discussing on the partially monitored and completely unmonitored question. And then we get into Sub-task 4 findings. And I don't see the plutonium-241 question in here.

CHAIR MUNN: Yeah. It looks like we need an addition of plutonium --

MS. K. BEHLING: You're right, Steve. And I apologize. I've been having some problems entering some of this data into the BRS. And I have a lot of findings to enter, and I must have gotten confused here. But I can make a correction to that

--

MR. MARSCHKE: Okay.

MS. K. BEHLING: -- offline, if you prefer.

CHAIR MUNN: That's good. That's all we need is just to add that second finding in, Kathy.

MS. K. BEHLING: I will do that.

CHAIR MUNN: And that will be good.

(Telephonic interference)

MS. K. BEHLING: So I will make those changes.

CHAIR MUNN: That's true. Okay. That's good. Thank you much, appreciate that. And thank you, Steve. Now, NIOSH, PER-9, case audits.

MS. MARION-MOSS: Before we move on, Wanda, Steve, can I ask you a question about that, the BRS?

MR. MARSCHKE: Sure.

MS. MARION-MOSS: So wouldn't that be the finding? The only thing she would need to remove is the wording Sub-task 4?

CHAIR MUNN: No. We haven't gotten

into Sub-task 4 yet. Well, hmm.

MS. MARION-MOSS: The finding is there, isn't it?

MR. MARSCHKE: As you read it, that is the Number 2 finding.

CHAIR MUNN: That's the Number 2?

MS. MARION-MOSS: That's the Number 2 finding. She just added Sub-task 4. And it's --

MR. MARSCHKE: Oh, okay.

MS. MARION-MOSS: -- in there. So that's all you would need to correct, Kathy.

CHAIR MUNN: Right.

MS. K. BEHLING: Okay. Yes, you're correct. I see it now. I wasn't visualizing all of the finding wording. So, yeah. I just inadvertently put in Sub-task 4.

MR. MARSCHKE: Okay. That sounds good. Can we do that? Maybe we can edit that.

CHAIR MUNN: If we can edit it, just take it out now, that would be helpful. Super, done. That's great.

MR. MARSCHKE: Okay.

CHAIR MUNN: Alright, very good.

Thank you.

MR. MARSCHKE: Thank you, Lori.

MS. MARION-MOSS: Yes.

CHAIR MUNN: Now, the third time, hopefully is the charm. PER-9, case audits.

MR. HINNEFELD: Lori, remind me. Who's speaking about this one?

MS. MARION-MOSS: I believe we only have one open finding which is Finding Number 6.

MR. SMITH: Sure. This is Matt Smith with the ORAU team. And on this issue, I think it's come up in the past as well, maybe during the TBD review.

On this particular one, the concern was that the older tool was not performing in the same manner with respect to applying correction factors and uncertainty as the current tool.

And as you can see from the response here, basically, we took a look at it. Excuse me. And the older tool was performing correctly in that it was not applying any kind of energy correction factor or a factor of 1.3 to account for dosimeter errors.

When it comes to missed dose, we have an LOD value that typically encompasses whatever the response factors would be for the variety of energies that that dosimeter has to deal with.

And in addition, when it comes to uncertainty, we take the tack of always applying it as a log-normal distribution with that familiar GS, you know, 1.52.

So bottom line is the factors that would go against this measured dose don't go against the missed dose. This particular claim was missed dose only. So those factors would not be expected to be in there.

So the bottom line is we took a look at the current tool, the 1.5 version, took a look at the older tool, and found it was performing in the same manner. So we didn't find an error in the workbook process here.

MS. K. BEHLING: And this is Kathy. I did look briefly at this response earlier today or yesterday. And I do agree with everything that Matt is saying.

And you're correct, we had questioned

whether this missed dose should also have a correction factor applied. And we have concluded that that's not the case. I guess I just have to remind myself that these were all truly missed doses. But with that being said, he is correct. And I think that we can accept this response.

CHAIR MUNN: Thank you, Kathy. Any comment otherwise?

MEMBER ZIEMER: Sounds like we can close that.

CHAIR MUNN: It sounds as though we can. Josie?

MEMBER BEACH: Yes, I agree with that also.

CHAIR MUNN: Steve, would you please make the appropriate notation that SC&A agrees with the NIOSH response? And the Subcommittee has closed this finding. That will take us to PER-47. We have -- Hans, is that you again?

DR. H. BEHLING: Yes, unfortunately it is. And I'm going to frustrate everybody in trying to go through this one.

One of the things I want to point out is

that normally, whenever I identify an issue, I usually have the data right there in the body of the text. But in this case, I've had to introduce all of the exhibits, and there's plenty of them, at the tail end in various attachments because of the large number of pages that they represent.

So, Steve Marschke, please be kind to me. Don't get upset when I say turn to page such-and-such. Because we're going to be doing this in order to understand the issues that represent the four findings.

MR. MARSCHKE: Okay. Give me a chance to get to the document, to find it. The first --

DR. H. BEHLING: Yeah. And, Steve, I will identify each of the exhibits by page number so that you will have a better grasp in turning to the page that identifies each of the findings that I need to reference.

MR. MARSCHKE: Doesn't seem to be here.

MS. K. BEHLING: Excuse me, Steve. This is actually listed under the meeting minutes or the agenda for today's meeting. It was one of the documents, I believe, that should be --

CHAIR MUNN: I believe we all have it. We should have it.

MEMBER ZIEMER: It isn't the newest version, is it, Matt?

DR. H. BEHLING: Yes.

CHAIR MUNN: Yeah. All you have to do is give us the page number, and we can go there.

DR. H. BEHLING: Okay. Are we still waiting for Steve, or should I go ahead?

CHAIR MUNN: No, no. You can go ahead.

DR. H. BEHLING: Okay. Just as a quickie, the Grand Junction had a template earlier that was based on a limited amount of data. And it was during a NIOSH evaluation of the Grand Junction SEC petition that they discovered a substantial body of new data and available new data that allowed certain changes to be made in a revised template.

Among the changes were external dosimeter data for the years between 1982 and 1999 containing 15,000 records which contained data involving gamma and beta exposures and a limited number of neutron exposures. There were also data available for moderate neutron exposures which

we'll also discuss as one of the complexities.

And lastly, there was not actually, not lastly, second to lastly, surrogate exposure data for assigning annual gamma and beta doses to unmonitored workers were derived. And lastly, there was air sampling data that included radon measurements that we will also discuss.

Before we talk about any findings, if I can ask you to turn to Page 9, I did make one particular observation. And that is this is generic, this is not unique here.

But whenever we have a template that is made in lieu of a Technical Basis Document for that particular site, we usually have to go out and identify a claim that is affected by that template and then extract the template from a claim.

And I think there's just an issue here that perhaps we can simplify this and not have to rely on taking a claim that has the template as part of its document that explains what was done in behalf of that particular claim using the template as a reference document, because the claim does contain Privacy Act issues. And it would be very

useful if these templates were available on the Web that did not have any affiliation with a particular dose reconstruction, if that's possible.

I'm just throwing this out. This is not the first time I've sort of thought about making that an observation. And if that can be done, it would be perhaps useful for SC&A to have that template in the absence of any particular claim associated with that template.

Are there any comments on that issue about making a template available that is not attached to a claim? Stu?

MR. HINNEFELD: I understand the point. And we'll have to see what the impact, what we can do.

DR. H. BEHLING: Okay. Let me try to get as quickly through this in order to expedite things. One of the things I did do again here, because of the need to reference the revised template, is Attachment A where I used excerpts from the revised template that are part of my discussion and part of the findings.

So on Page 24, you will see Attachment

A, and you will see various pages that are extracted from the template that we will be talking about. Among them is Table 1, which is defined on Page 25 as well as 26.

And those are the unmonitored gamma doses that can be assigned to either operator, laborer, supervisor or administrative personnel. You see that on Page 25 and 26.

On Page 27, you have Table 2 which are neutron doses that were established. And those are neutron doses that are specifically aimed at assignments for geologists and all other people.

And then on Table 3, which is on Page 30 of Attachment A, you have relative activity and total activity fractions or entailments. And that will come up as one of the findings, and also the Table 4, which is on Page 32, which is inhalation, ingestion rate intakes for the various four categories of workers which will also come into play when I talk about one of the findings.

So that's Attachment A. After that, you have Attachments B and C. And I will call out the page number as we get to them.

When SC&A looked at Table 1 of Attachment A, which I just mentioned were on Page 25 and 26, the unmonitored gamma doses that are defined in Table 1 of the revised template, I had a problem in trying to identify how these numbers came to be.

And one of the obligations we have under the contract in reviewing these things is to first duplicate those numbers and then say I know how NIOSH came to that number and then, secondly, determine whether or not we agree with that methodology.

And I realize that I wasn't able to do that because of the fact that the attempt to duplicate that number was very difficult for me with the available information that we had available.

And one of the pieces of information was a document that I can identify here as Exhibit B1 on Page 35. And that particular document, if you go to Page 35, as Exhibit B1, identifies various numbers.

And just for the sake of focusing on a specific number as, whenever we do an attempt to

reproduce the numbers, we always look at one particular date that can be randomly chosen or whatever.

In this case, I chose 1985. And if you look at, on Page 35, under the year 1985, you see photon exposures that represent 118 people, individuals who were at the Grand Junction facility. And you see, obviously, other data including the average dose to those people, the maximum dose.

In this case, it had one individual who was, for that year, identified with an exposure of 8500 millirem. And then you have also the geometric mean, the standard geometric standard deviation and the 95th percentile value.

The 95th percentile value here is 132.18 millirems. However, important to understand is that it does not include any missed doses, as we're talking a few minutes ago, missed dose that could be added to that based on the information and guidance provided.

These people were monitored on a quarterly basis. And the assumption was that

whatever dose they received in one year was received in a single monitoring period, meaning that the other three monitoring periods are subject to missed dose.

In the case of 1985, the LOD value for people who were monitored would have been 20 millirems. So half of that times three is 30, as the footnote suggests. So that in truth, according to Exhibit B1, the dose for the 95th percentile value would have been 132.18 plus 30 or 163 millirem.

When you compare that to Table 1 in Attachment A, which I'll go back to now, making sure, okay, Page 25. And you realize that the dose for the -- where am I, 1985, okay -- for 1985 which is actually on Page 26, it's a continuation of Table 1, you see for, in 1985 the operator/laborer dose is, in fact, defined by 0.90 rem or 90 millirem which represents really 60 millirem of actual dose plus 30 of missed dose which is considerably less than the 162 millirem that I would have identified based on Exhibit 1.

And when I first had Exhibit 1

available, I wasn't even sure where that came from. And I called NIOSH to get additional information on this.

And I have to backtrack a little bit. This particular review is a Revision 1 review. And all of the Committee may have received the original draft Rev 0.

And I had identified that as a conditional finding, because I didn't really have a way of verifying how that number came to be, except that Exhibit B1 was, in fact, something that I knew had to have been something that NIOSH produced, except I couldn't place it.

Only afterwards did I come to the realization that that particular Exhibit 1 actually came from the SEC Petition Evaluation Report. So it was actually something that now has a genesis or a pedigree in terms of the NIOSH record.

So anyway, so that in essence became an issue. And as a result of the conditional response or finding that I listed in the original draft report, we were asked to confer with NIOSH to understand how it was that they came to the value

that they had listed in Table 1 of Attachment A which says 90 millirem is the 95th percentile that includes the 30 millirem of missed dose for people who were monitored a total of four times a year.

As a result, we asked NIOSH where did these numbers come from. And they in turn told us to go to a spreadsheet. And in that spreadsheet, they provided us with all the data for all the years.

And in turn, that spreadsheet became, obviously, Exhibit 2. Exhibit 2, B2, is on Page 36. And Exhibit 2 truly identifies all of the recorded values that represent B1. On Exhibit 2, on Page 36 and continues on Page 37, and 38 and 39, it identifies, if you look at the far left hand side, it identifies the 118 personnel who were monitored in 1985.

It gives you all of the doses. And I will also tell you up front, the doses that are measured here are not real doses. They are doses that were defined in the DOE reports as the highest category. We talk about that a little bit later.

But right now, except for the fact that the data in Exhibit B2 on Page 36, 37, 38 and 39

represented data that I had initially identified as Exhibit B1, and all of a sudden realized where those came from, and they represent 118 people who were monitored.

And when you look at, on Page 39, the geometric dose, the average dose and the 95th percentile value, they match exactly what I had expected to see based on the original Exhibit B1.

Now, they represent 118 people who had a positive dose assigned to them in 1985. And, as I said, this is the discrepancy that I was not able to identify early on.

So, let me see where are we here in terms of Finding Number 1. Finding Number 1 on Page 12, no, Page 13 of the document, it said these data that I extracted up front from the SEC petition for the Grand Junction people, and it is contained in the SEC Evaluation Report, do not match the revised template data of Table 1 defined in Attachment 1A.

So we have 162 for that year in 1985, 162 millirem versus the 90 millirem that are listed in the revised template in Table 1. So that is Finding Number 1.

And on Page 13, my Finding Number 1 states as follows. Dose estimates defined in Table 1 of the revised Grand Junction template are not only inconsistent with data cited in Petition Evaluation Report for SEC 00175, but are inappropriately derived.

And the reason I say inappropriately derived is that, when I looked at the actual means by which dose numbers were derived, you have to go to Exhibit 3, B3, which starts on Page 40.

Now, Exhibit B3 is the same data as you saw in Exhibit B. But instead of 118 people, it has 528 individuals who were monitored.

Now, if you turn the Page from 40 to Page 43, you will see a yellow line that separates the people who were monitored in 1985 between those who had positive measurements that stopped at the point of 118 and then continue on with all people who never had a single positive measurement in 1985.

And all of their exposures, if you look down the total column on the far right hand side, they are 40, 40, 40 millirem down the line between 119 and 528.

And what it means is that NIOSH, in order to derive the 95th percentile value for operators and laborers, they used the entire complement of 528 individuals of which 410 people had no exposure at all, meaning that it's hard for me to assess why you would assume that the majority of people, 410 out of 520 people in that pool of monitored workers, were people with no single measurable exposures throughout that year.

And I also feel that, in fact, that in the SEC Evaluation Report, NIOSH had, I found five doses that were consistent with the higher value of 162 for 1985 was unmeasured.

So Finding Number 1 is, by and large, my assessment of the way in which NIOSH reconstructed which I was able to duplicate, but I disagree with. I can figure out how they arrived with Table 1 in Attachment A and where the 1985 data for the most exposed individuals, the 95th percentile says he was exposed to 90 millirem.

But it is obviously a value that I consider is not appropriate when you realize that that includes 410 people out of 528 people who had

no exposures or no measurable exposures and was strictly based on 40 millirem of missed dose. So that's my first finding.

MEMBER ZIEMER: A quick question, Hans. Could you clarify, the ones that show 50, and there was a large number of them that show 50, is that minimal dose?

DR. H. BEHLING: No. In fact, I'm going to ask you to turn to, and I will go to, let's see here, 61 and 62, Page 61 and 62. This is how they measured.

As I had started out to say, none of these doses are real doses. They are, in fact, people who were classified -- and I will go back to, actually it's Page 62. Because that's the appropriate value. Or you can go to either one.

But you can see up until, in Exhibit C-2, the classification by DOE was based on no measurable doses which, if you had anything less than -- let's see, the categorization of people who were monitored, either in the earliest days between '65 and '73, were between zero and one rem. There was no subdivision.

That didn't come until 1974 when there was segregation between less measurable and measurable meaning somewhere above zero. And so this is how these doses were calculated.

If you go back to the Exhibits B2 and B3, you will see that they all have the same number. And it's strictly based on the fact that they happen to fall within the category of exposure which, in the early days, was based in increments of one rem.

If you go to Exhibit C2, no C1, on Page 61, you will see that the subsequent timeframe that starts in 1986, you will see people who were monitored were categorized by less than measurable, measurable defined by less than ten, ten to 25, no, 100 to 250 millirem and so on.

So these numbers that you see in those tables are, in essence, just categories in which a person fell which really brings you to a serious problem. Had 1985 been incorporated to an earlier timeframe, the actual default value would have been that one guy that I pointed out who in 1985 had 8500 millirem assumption and that would have been really an outlier to speak of.

So anyway, Finding Number 1 is really a question of, what do you use in terms of the DOE data. Do you use all personnel who were essentially monitored?

In the case of 1986, we had 528 people monitored. But of these 528 people, 410 had no exposure, and only 118 had measurable exposure. And those were probably, obviously, not necessarily real numbers either. But they fell into categories that are classified in B1 and B2.

Anyway, when I think of a 95th percentile value of maximally exposed, I think it would be wrong to weight them down with people who are the majority of monitored people with no exposure at all in 1985.

And this is my feeling, that I agree with what was done in the SEC Petition Evaluation Report that says you should stick with only those people when you're talking about assessing the 95th percentile people with measured dose.

Can I ask people to comment on this or, Stu or Jim?

MR. HINNEFELD: Well, I think that

there's a lot to digest here. And I think we'd be better suited to take the findings and work up some sort of review or response of them --

(Telephonic interference)

MR. SHARFI: Stu or Jim, I would add that there's currently ER data that's coming out for the post-'75 period that will, the new ER will cover all this stuff. Probably I can answer some of this stuff, if you want me to. This is Mutty Sharfi, sorry.

DR. NETON: I think we just got this a few days ago, not too long ago. I think I agree with Stu, we might want to, you know, go back and think about it a little bit and field a more formal exercise.

CHAIR MUNN: That seems appropriate. There's a lot of information and a lot of data. Yeah, I think we'll record Finding 1 as awaiting NIOSH response. And we'll go on.

MR. KATZ: Wanda, I'm just wondering if NIOSH hasn't really had time to digest this, whether it makes sense to really have Hans labor through the explanations and then they'll be two months stale

when Stu's folks are ready to actually respond.

DR. H. BEHLING: Do you see any point? I have similar issues with neutron doses. NIOSH, as I mentioned earlier, has identified additional neutron data. And in the case of the neutron data, they established a 95th percentile value on neutron doses that the vast majority of them were below LOD values.

MR. KATZ: I understand. I'm just raising the question without getting into more findings about whether it makes sense to really be reviewing these, have Hans reviewing these before NIOSH is ready to engage and respond to them.

CHAIR MUNN: Well, I think, speaking personally for myself, as a member of the Board, I would prefer to see us delineate the findings. And we haven't --

MR. KATZ: Okay, that's fine. I was only raising it just speaking as, and we'll have to reiterate it all the next time we meet. But that's fine.

CHAIR MUNN: Well, no. I don't think we would. Because the findings then are stated and

the response from NIOSH will be, they'll have adequate time to look at them and formulate responses to them.

MR. KATZ: Okay.

CHAIR MUNN: Perhaps I'm missing the point? But I --

MR. KATZ: But, anyway, it doesn't matter. My point was just that Hans makes a very thorough and clear explanation. And then you wait two months, and everybody's forgotten about Hans' clear explanation at the point that NIOSH responds. So that's my point. But that's fine, if you want to hear it and have him go through these, that's fine. It's your prerogative.

CHAIR MUNN: Well, I'd like to get the findings on the Board. And I'd like to have us hear what Hans has to say for those specific findings, for this one. So if you'll continue, Hans?

DR. H. BEHLING: Yeah. Again, I'd mention I'll try to cut it briefly here and not belabor too much. But in the case of the neutron doses, the SEC Evaluation Report also has data that I looked at. And that's defined in Exhibit B5 on

Page 56, if you would turn to that value. That's in that paper, and I'll explain the values I identified there.

CHAIR MUNN: Okay, very good. We've got it.

DR. H. BEHLING: Okay. On that page, if you look at the year 1986 which I selected as a reference value for it, then identifying the individual numbers here, you will find that there were a total of six individuals monitored, that the average neutron dose was 94.97, the maximum 85. Geometric mean value there is 79, and so forth and so forth. And the 95th percentile value was --

(Telephonic interference)

Now, when we talked to NIOSH and asked how did these numbers come to be as they appear here in the SEC Evaluation Report, they also gave us a spreadsheet. And they identified the values that are showing on Page 57, the next page.

And when you look at the data there, on that Exhibit B6, you will see on the top of this, you will see 1986. And those are the six dosimeter readings that you see in the previous Exhibit B5.

And when you look at those particular values that are defined in Exhibit B5, you will be able to match, based on those dosimeter readings, the high, the low. You will see 94.17, oh, that's not the one, because that's the average, but the highest dose. If you go back to --

MS. GOGLIOTTI: Hans? You're a little difficult to hear. Can you speak louder please?

DR. H. BEHLING: Can everybody hear me?

CHAIR MUNN: That's better.

DR. H. BEHLING: Okay. If you go back to Exhibit B5, I just wanted to show that there is a relationship between Exhibit B5 and B6. If you go to B5 and you look at 1986, you will see that the maximum individual neutron exposure was 181.

Now, if you turn the page and go to Exhibit B6, you will see that the 181 is the second entry in 1986. And when you assess these particular six values, you will end up, again, with the average, and the 95th percentile, the geometric mean and so forth. They are all identified in B5.

So I know where these numbers came from. But now, when I look at Exhibit B6 on Page 57, and

you realize -- and it continues on to 58 -- you realize that these numbers contain a substantial number of values that are below LOD.

In other words, if you look at the values there, halfway down the page on Page 57, you will see doses of 6836 millirems. And so they're well below the 40 millirems that are considered LOD.

And I, again, question would you want to necessarily incorporate dose values that then will establish the values that we saw in the attachment, Table 2, Attachment A.

MR. KATZ: I think your phone is suffering from what Kathy's phone was suffering from earlier, I think. It's getting worse and worse to listen to.

CHAIR MUNN: Yeah. So the bottom line here, I think, is, if I'm hearing you correctly, Hans, the bottom line is essentially the same type of concern that you had with the previous data. And so Finding 2 would therefore -- what page is Finding 2 on?

(No audible response)

CHAIR MUNN: Have we lost you, Hans?

DR. H. BEHLING: I'm switching phones, because the reason I'm getting, I'm on a cordless phone, and my batteries are dying out.

MR. KATZ: That's much better, Hans. Thanks.

CHAIR MUNN: Yes.

DR. H. BEHLING: Number 2 is on Page 15.

CHAIR MUNN: Okay.

DR. H. BEHLING: And I will read it, switching here, SC&A recommends the exclusion of neutron dosimeter values below LOD value of 40 millirems for devising a geometric mean and a 95th percentile neutron dose for unmonitored workers.

And as I said, when you look at the values there, Exhibit B6 shows that a total of 40 dosimeters registered doses below 40 millirem and 15 of those doses registered doses below LOD over two.

And so I came to the conclusion that maybe these values should not be used and excluded. Because one of the things that I did was to calculate what the new doses would be if we would exclude anything below LOD.

And that is in Exhibit, let's see, where are these here? That's in Exhibit B7 on Page 9. This is where I recalculated neutron doses excluding all values that are below LOD.

And when we do that, you end up with a geometric mean of 67.8 millirems and a 95th percentile of 168 millirems, which are considerably higher than the values that were derived using the entire set of dosimeters that include the many dosimeter readings that were below LOD.

CHAIR MUNN: Okay, good. And then my memory was you had one more finding, correct?

DR. H. BEHLING: No, there is a couple more. On Page 15, there was just an observation that I introduced that was initially a finding that we were asked not to consider a finding, because it requires nothing more than a change in wording.

So on Page 15 of the report, I have Observation 2, current guidance for the assignment of medical X-rays is ambiguous and requires clarification. Because the way it's stated in the middle of the page that it goes as follows. A pre-employment annual and post-employment

anterior-posterior chest and AP pelvis X-ray should be assumed for each year. Of course, that can't be true. And, of course, it's obviously an issue that just needs to be reworded properly.

You don't have a pre-employment and terminal employment for each year that you might have been there. So obviously, it's just a question of rewording that.

CHAIR MUNN: Yeah, okay. And then Finding 3 then.

DR. H. BEHLING: Finding 3 --

CHAIR MUNN: That's on Page 17, I think.

DR. H. BEHLING: That's based on a reference to, there were three pieces of information that could have been used for air monitoring data. One, Page 16 on the bottom, you will see there was a 0.046 milligram per cubic meter of uranium is one of the means by which you can establish a dose.

And another one was maximally to be used on medical worker exposures, maximum of exposures, and they were, I find in 69 air sample measurements that were apparently uncovered as part of the SEC

evaluation.

And there's no reference to those. And the statement that says you may use these two to reconstruct doses, except that there's no way I can actually look at these data and see what they reference and what they ultimately entail.

So my Finding Number 3 is NIOSH provides neither the raw data nor a document, of course, for the 516 air sample measurements associated with the DNC work for the years '89 through 2006. And again, if they can identify a document where I could look at those, then that would be helpful.

CHAIR MUNN: All right. Maybe we can find that next time. And then Finding 4, the activity fractions on Page 18, I guess.

DR. H. BEHLING: That's relatively easy. Again, in the process of --

(Telephonic interference)

MR. KATZ: Sorry, could you repeat. There was some paper shuffling. And we couldn't hear you, or I couldn't at least.

DR. H. BEHLING: Are we on Finding 4?

CHAIR MUNN: Yes, we are.

DR. H. BEHLING: Okay. This is the decontamination decommissioning. And there's a table, Table 4, in Attachment A that identifies what those numbers should be.

And again, Table 4 is on Page 32 of the report that has these values. And in trying to match dose, I was able to match dose. And I was able to match the total uranium inhaled. And you see that on Page 18.

I looked at the approach that was taken. And I was able to match the 7.54 E minus 3 microcuries per year. So that was okay.

But then when I looked at the total thorium-230 and radium-226 inhaled, I end up with a value of 3.74 E minus three microcuries per year which is approximately less or about half of the value that is cited in Table 4 of Attachment A.

And when I looked closer, I realized that the difference between my calculation and their calculation is that NIOSH failed to employ the activity fractions that are identified in Table 3, Attachment A, which would have reduced the 7.54 E minus three to 3.74 E minus three.

So that's just an error that I believe can be corrected with just a simple acceptance of the activity fractions that are provided in Table 3 which were not included in that calculation.

CHAIR MUNN: Okay, that's good. I'll ask NIOSH to take a look at that and have some responses for us next time. And does anyone have anything additional before we move on?

DR. H. BEHLING: Well, this is pretty much it. So these are the four findings that I identified with regard to the revised template.

CHAIR MUNN: Good. Thank you, Hans. Much appreciated. We were scheduled for a break. But we have very little left on our plate. Shall we take a five minute break or can we plow on?

MEMBER ZIEMER: Well, I'd like to go on.

CHAIR MUNN: All right.

MEMBER BEACH: I'm ready to go on.

CHAIR MUNN: Okay, let's move on, then. Let's go on to take a look at a PER status. The Board Members should have a copy of the status report that Kathy sent us earlier. And she'll be able to tell us, get some feeling of where we are,

what we've done, what we haven't done. I believe, SC&A, you want to tell us, Kathy? You want to --

MS. K. BEHLING: Yes.

CHAIR MUNN: -- give us it quickly.

MS. K. BEHLING: Okay, yes, I will. I just had provided a memo back in December. And what I had promised to do during the last meeting was to go into the BRS system and look at the PERs and see if we had already completed either a PER review or a PER Sub-task 4, the case reviews.

And they had not been recorded in the BRS system as a finding of no findings. And I did that. And that's what this table that Steve is showing represents.

I found that we had, I think, there was actually only five cases where I actually introduced a finding of no finding. And so, hopefully, that's all updated in the PER or in the BRS.

The only other thing that I expanded just a little bit, because I wanted to just give you a full understanding of everything that was in the BRS, and when I did that, I did identify that there

were a few cases where we either were not assigned a PER, and perhaps there was a good reason for that, or we were not assigned the Sub-task 4 version of that PER.

And so the first Sub-task 4 review that we haven't been assigned yet is PER-8, and that was our review of the IREP lung cancer model. And I know that during that review we had some findings that were, I guess, going to be discussed by some scientific committee or whatever.

And we realized that it was going to be probably beyond the scope of what we were doing here. And so perhaps that's why we didn't do the Sub-task 4. But that still remains open. And these are just things you may want to consider for next time around. But that's number one.

We never did a PER review of the Rocky Flats plant dose reconstruction mods which was PER-21. And again, maybe Ron Buchanan can help me here, if he's still on the phone, as to why might not have done that. I don't know if we're waiting on something on not. Ron, are you on the phone?

DR. BUCHANAN: Yes, I'm on. No, I

don't know why we had not done that. I don't know of the reason. There might be one, but I'm not aware of anything that's going on that postponed that.

MS. K. BEHLING: Okay. And again, I'm not expecting the Subcommittee to make any decisions today but just to point these out. And I guess I did skip one here.

PER-11, for some reason in my mind I thought we had done a Sub-task 4 review on this. It's the K-25 TBD and OTIB revisions. But based on my review, it doesn't look like we did any case reviews on the K-25 TBD. And that's it for that particular memo.

MR. KATZ: So, Kathy?

MS. K. BEHLING: Yes.

MR. KATZ: Could I ask you, this is Ted, can I ask you to, before the next meeting, you, Ron, whoever, for these particular PERs, can you look at whether you have already recommendations for a number of cases and nature of cases?

MS. K. BEHLING: Yes, certainly.

MR. KATZ: And send that up. Actually,

I mean you can do that much before the next meeting. And then when you look through the records, if it looks like these are just ones where we dropped it and we should have assigned cases, then we can go ahead and, you know, identify those cases, make those case assignments even without waiting for the next meeting.

MS. K. BEHLING: Okay, yes, of course.

MR. KATZ: Okay with Wanda and the Subcommittee, then that would be efficient, I think.

CHAIR MUNN: I think that's appropriate, yeah. Paul, Josie, does that meet your requirements to pursue this?

MEMBER BEACH: Yes, absolutely.

MEMBER ZIEMER: Of course.

CHAIR MUNN: All right. Thank you, yeah.

MS. K. BEHLING: And, Wanda, I don't know if you want me to go on. I'll, again, be brief. The other thing, the other memo that I did submit shortly after our previous meeting was on December 10th. And what that was was a list of the new PERs

that have been issued. And there have been three.

I briefly discussed them during the last meeting, but it was recommended that we put together a little bit more formal information on that which I did in that memo.

And the first one was PER-55 which is the TBD-6000 revision. And I know we've looked at this a lot. But I think there is enough information here that I do think that we may want to look at this particular PER.

And so I did, excuse me just one second, I cannot believe this. My phone is -- I have my other phone. I'm going to pick up another phone. Just one second, I'm sorry. Okay. Can you hear me?

MR. KATZ: Yeah, you're clear.

MS. K. BEHLING: Okay, I'm sorry. So what I am recommending here for this PER-55 which is, you know, there have been so many changes to TBD-6000, and there are really quite a few cases that are impacted by this, potentially, initially 108. And I think there 30 cases that were actually reevaluated.

But this is one that, because of the various changes, that we may want to look at and that you may want to task us to look at.

Now, the other two, and I was sort of laughing to myself, but we used PER-56 which is the BWXT Virginia and the PER-58 which is Dow Chemical. Dow Chemical, the 58, is actually impacted by changes to OTIB-70 and to this particular TBD-6000.

And so provided you decide to task us with reviewing TBD-6000, then I would not recommend us reviewing PER-58 because, as long as we, since we've already looked at OTIB-70 extensively and we have looked at TBD-6000, and both this Virginia and this Dow Chemical, it's very clear as to what cases they needed to select. I mean, so there is not a whole lot of reason I don't see in necessarily reviewing those two PERs.

But I did recommend reviewing PER-55. So I don't know if you're in a position at this point to task us with any of those or not or make a decision.

CHAIR MUNN: I think we probably can take a look at those at the same time that we look

at the others and try to do all of our PER decisions in one lump.

MS. K. BEHLING: Very good.

CHAIR MUNN: Probably the wisest thing to do.

MS. K. BEHLING: Okay.

CHAIR MUNN: And we'll have an opportunity to look at it offline. Thank you, Kathy.

MS. K. BEHLING: Thank you.

CHAIR MUNN: Very helpful. The next item that we have on our administrative detail was abeyance items that were ready for closing. We were going to go through that. But I don't know how extensive those are.

If there's any real meat there, Lori, we will have considerably more time, I think, on our agenda next time than we have this one. But you might let us know what the status is.

MS. MARION-MOSS: Well, actually here, Wanda, Procedures 90 and 92 which I provided the Committee --

CHAIR MUNN: Uh-huh.

MS. MARION-MOSS: -- are the documents that NIOSH is submitting to the Committee in hopes of resolving the outstanding findings that are currently in the BRS.

So I've provided the revisions to both of those documents for SC&A and the committee to look at. And we could possibly carry it over for next meeting, but it would give Members an opportunity to review those, and look at the findings and address them next time.

CHAIR MUNN: I suspect that's wise. Both of these procedures are administrative PROCs and not technical in nature. I think it would be wise for us to carry those next time unless there's some pressing need for us to address them today.

Does anyone have any strong feelings with respect to taking a look at PROCs 90 and 92 today, or can we postpone those until next time?

MEMBER BEACH: To be honest, Wanda, this is Josie, I had put those aside, because they weren't on the agenda --

CHAIR MUNN: Yeah.

MEMBER BEACH: -- with everything we

had to review for this meeting.

CHAIR MUNN: This is true. Well, I've taken a look at --

MEMBER BEACH: My vote is for them to carry over.

CHAIR MUNN: As I said, they're administrative and not technical at all. So we can, I think, postpone those until next time. Does anyone have any other concerns with respect to the abeyance items that we are hoping to look at more frequently now?

(No audible response)

CHAIR MUNN: If not, then let's take a look at when we can do our next meeting and see what times are logical for all involved. We'll be here in Richland next month for our Board meeting.

Josie and I are looking forward to having you folks. April, do we need 60 days out? Is that appropriate? Or do we need 90 days?

MS. MARION-MOSS: I think that's up to NIOSH. They have most of the action items --

CHAIR MUNN: Yeah, I think so.

MS. MARION-MOSS: -- at this point.

MR. KATZ: Well, let's also ask SC&A though what they foresee delivering in the interim. Because that would also govern this. But, yeah, 60 seems like a minimum. But SC&A, do you, is there a lot of payload coming?

MS. K. BEHLING: This is Kathy Behling. I think, I don't see a whole lot of additional document reviews coming to the Subcommittee now.

MR. KATZ: Okay. Thanks.

MR. MARSCHKE: Yeah. This is Steve. I don't see any procedures. I don't know that there's any actual procedures in the pipeline at this point. John Stiver, are you around, are you still on?

MS. K. BEHLING: I don't believe, this is Kathy, I don't believe that John is still with us.

MR. MARSCHKE: Oh, okay.

MS. K. BEHLING: But between you and I, Steve, I think we know what PERs or what additional procedures there are, you know, on the back burner. And I don't think there's any PERs either, just what I had introduced today.

MR. MARSCHKE: Okay.

CHAIR MUNN: All right. So is it reasonable for us to be looking at something just past tax time, like perhaps Tuesday, April 21st?

MR. KATZ: The 21st and the 22nd are out. In fact, that week is real, well, 21st, 22nd, 20th are all out.

CHAIR MUNN: Okay.

MR. KATZ: Unavailable. But, yeah.

CHAIR MUNN: The following week or the preceding week?

MR. KATZ: Wide open.

MEMBER BEACH: How about the 28th?

CHAIR MUNN: Fine with me. Does anyone have objection to Tuesday --

MR. KATZ: The 28th.

CHAIR MUNN: -- April 28th?

(No audible response)

CHAIR MUNN: If not, then we'll establish that as the date for our meeting. And we will initiate an agenda for it when we are a little further along. Is there anything else for the good of the order?

MR. KATZ: Just thank you, everybody, for all this good work.

CHAIR MUNN: I appreciate all the hard work that went into this, a lot of heavy documentation and a lot of heavy-duty thinking. So thank you very much, all concerned.

Have a wonderful rest of the day and a beautiful weekend, regardless of whether you're covered with snow or not. And we'll speak with you very shortly. We'll have an agenda in your hands at least three weeks in advance of our next meeting. Thank you all.

(Whereupon, the above-entitled matter went off the record at 4:45 p.m.)