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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URANIUM REFINING ATOMIC WEAPONS EMPLOYERS
WORK GROUP

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TUESDAY
JULY 19, 2016

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The Work Group convened in the Montreal Room of the Cincinnati Airport Marriott, 2395 Progress Drive, Hebron, Kentucky, at 9:00 a.m., Henry Anderson, Chairman, presiding.

PRESENT:

HENRY ANDERSON, Chairman
R. WILLIAM FIELD, Member
DAVID KOTELCHUCK, Member

ALSO PRESENT:

TED KATZ, Designated Federal Official
DAVE ALLEN, DCAS*
BOB BARTON, SC&A*
HANS BEHLING, SC&A*
RON BUCHANAN, SC&A*
ROSE GOGLIOTTI, SC&A*
LARA HUGHES, DCAS
JOYCE LIPSZTEIN, SC&A*
JOHN MAURO, SC&A*
JIM NETON, NIOSH
STEVE OSTROW, SC&A*
MATTHEW SMITH, ORAU*
JOHN STIVER, SC&A
DENNIS STRENGE, ORAU*
WILLIAM THURBER, SC&A
JOE ZLOTNICKI, SC&A*

*Participating via telephone

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(8:57 a.m.)

Welcome and Roll Call

MR. KATZ: So, we can get started. We are a couple of minutes early but we have got a roll call to do and so on.

(Roll call.)

MR. KATZ: Okay, so let me just then note we have a lot of people on the line. Please mute your phones except when you are addressing the group. That will just help out with the audio.

MEMBER KOTELCHUCK: Ted, I'm having a little trouble getting in on Live Meeting. Now, I would like to get on if I can. The Live Meeting has come up but I haven't -- I put in the password and I don't seem to be getting the code and the password but I don't seem to be getting it coming up.

MR. KATZ: So, you shouldn't even have to put in a password, per se. You should just be clicking on a link. Is that what you are doing?

MEMBER KOTELCHUCK: I am clicking on a link, yes.

MR. KATZ: And you're saying the link is not bringing you in? Sometimes you have to repeat the link, clicking on the link more than once before it will actually bring it up.

MEMBER KOTELCHUCK: Okay.

MR. STIVER: Yeah, sometimes that link will put you into the wrong bin. I found that if you copy it and paste it in your browser, it will take you right to the meeting.

MEMBER KOTELCHUCK: Okay. Meanwhile, I can certainly go onto the different files that you sent the other day.

MR. KATZ: Okay, because I am not sure how many, if any, presentations there will be on Live Meeting anyway, Dave.

MEMBER KOTELCHUCK: Right. Okay, good. Well, fine. Then, let's go ahead.

MR. KATZ: Okay, very good. So, then, again, mute your phones, please, folks, except when you are addressing the group. *6 to mute, *6 to

come off of the mute.

And Andy, it is your meeting.

SEC-00217 Westinghouse Electric Corp. (New Jersey) Petition covering the period 1960 to 2011

CHAIRMAN ANDERSON: Okay. Well, welcome, everybody. And we've been through roll call, so the first business is to deal with the Westinghouse Electric SEC petition, which was covering the period 1960 to 2011 in Bloomfield, New Jersey.

There's a couple of findings and observations that remain from our earlier discussion. I don't know, it's probably worthwhile if someone can go through, just briefly, the petition and the overall issues and what the recommendation was.

DR. NETON: Well, the petition was SEC Number 217, which is Westinghouse Bloomfield. And we had actually proposed that Classes be added at the Board meeting. I forget when that was. The report was submitted April 14, 2015. So there's a couple of periods that were added, very brief

periods: February 1958 through May 31st, 1958, and June 1st, 1959 through June 30th, 1959. So those two AWE covered periods were recommended to be added, and they have been added.

But that created a couple residual contamination periods. And so the Advisory Board asked SC&A to review our approaches that were used for the residual contamination periods. And that is what we are basically going to discuss today.

And I think probably SC&A could do a better job summarizing their findings.

MR. STIVER: Yes, and Bill Thurber of SC&A was the author and the guiding force behind that review. So, Bill, if you'd like to go ahead.

CHAIRMAN ANDERSON: Go ahead.

MR. THURBER: We had two observations and two findings. And the observations are, obviously, not terribly significant but, it's just a matter of consistency and good practice.

One of the observations dealt with the fact that the ingestion exposures should be adjusted for the varying lengths of the workday

over the residual periods. And based on the assumptions that had been used in TBD-6000, for example. And so depending on what time, what point in time the residual exposure occurred, you should use eight hours or eight and a half -- or, I'm sorry, 8.8 or 9.6 hours.

The second observation was that, at the time, NIOSH provided not only comments but they also provided a model spreadsheet and there was a little discrepancy between the deposition time that was used in the model spreadsheet and the deposition time that was used in their review.

So those were the two observations. There were also two findings.

DR. NETON: Maybe I can just address those.

MR. THURBER: Sure.

DR. NETON: We totally agree with the observations and we are going to modify the approach as appropriate.

MR. THURBER: Perfect. With regard to the findings, again, we had two findings. One was

that the procedure used to calculate the air concentrations during the first residual period, and actually all residual periods, wasn't consistent with the guidance provided in OTIB-0070.

And the second finding was that the way that the ingestion doses were treated was not consistent with the concept that has been evolved over several meetings regarding hand-to-mouth transfer and the fact that using TIB-009 was not appropriate for the residual period. And I think that has generally been established on a number of recent cases, that NIOSH has stated that they agree that that is not the appropriate approach for the ingestion.

So, those were the two findings that we had.

DR. NETON: Okay. Yeah, we definitely agree that using the TIB-009 in the residual contamination period is not appropriate, although it is a little confusing, because in here we actually had an air concentration value. But it

really doesn't matter because the TIB-009 assumes you have an active generator of airborne. And so you would grossly underestimate the ingestion, based on using a resuspended air concentration. So, we agree with that.

We will modify this, although we're still somewhat thinking about this fairly extensive discussion in SC&A's review of what's appropriate to use, and we are still not -- we're still debating internally whether or not, if we use the so-called U approach, the NUREG approach, that you assume a 1.1 times 10 to the minus 4 square meters per hour ingestion -- that's right out of the NUREG -- whether that contaminated that coffee cup source term that's used during the covered period, where you have an active generator which really needs to be added back in there.

When you have an active generator, the coffee cup source term is about ten percent, which is half of the ingestion and then half of it is from the contaminated surface.

When you get into the resuspension

route, that becomes a much, much less important source term. In fact, I think it's less than ten percent, if you calculate it out.

So, we're still debating on how we're going to do that. In principle, though, we totally agree with SC&A's comments. And I think we are going to have to put together a little more formal response to how we're going to deal with that issue, whether it's 1.1 times 10 to the minus 4 independently or whether we add back in this contaminated coffee cup, because they were derived from somewhat different principles and I think we're kind of mixing modalities a little bit.

CHAIRMAN ANDERSON: So, is what you are saying is that OTIB-0070 is what is going to -- I mean, that's broadly used --

DR. NETON: It's broadly used.

CHAIRMAN ANDERSON: As opposed to -- I want to close out this specific site.

DR. NETON: Yes, this specific site --

CHAIRMAN ANDERSON: So, I think we are good on the site, on the broader OTIB.

DR. NETON: Exactly. There's a broader recommendations in there, in their finding, that suggested that TIB-009 and -0070, either/or, may need to be readjusted, because TIB-0070 says use TIB-009.

CHAIRMAN ANDERSON: Yeah.

DR. NETON: And that can be used. It's an interpretation issue. TIB-009, it's okay, if you take the last air concentration value that was measured at the end of operations and use that to calculate ingestion at the start of the residual, it's okay to use TIB-009. We've done that before.

But if you immediately go to the resuspension mode, it's not appropriate to use TIB-009. We agree with that.

We're going to have to flesh that out but we agree with SC&A's finding and whether we use -- well, they recommend an approach that's based on TBD-6000, which we agree with, which is you drop down air concentration based on TBD-6000 and that will generate a source term on the ground. And whether it's 85 dpm or 69 dpm per cubic meter air.

MR. THURBER: The issue that we had was -- I mean, the number is small, however you look at it. No question. The issue that we had was we were uncomfortable with back-extrapolating, because that was not the way the guidance was written. The approach that NIOSH took, the difference was in the noise, but we felt that if you go to a lot of trouble to develop the guidances, you ought to try and use them going forward in your extrapolations.

And the question then is, if you're going forward, what are the assumptions you make and the guidance says, well, use TBD-6000. And you go to TBD-6000 and you can come up with some options. But we felt that that's the approach that should be taken, rather than developing something new.

DR. NETON: We agree. And I think what I'd like to suggest is that these may be held in abeyance as Site Profile issues, not SEC issues. Because we're not 100 percent ready here to agree on these sort of the nuances of the coffee cup

ingestion versus -- that's a little bit more broad-based. But if we just hold this in abeyance as a Site Profile issue, I think that's fine with us.

CHAIRMAN ANDERSON: Okay.

DR. NETON: We agree in principle.

MR. THURBER: I certainly have no problem with that. They're not SEC issues.

CHAIRMAN ANDERSON: And Ted, would that then stay with us, our Committee, or would it be --

MR. KATZ: It would stay with you just to see that it gets closed out at whatever point you sort it out.

CHAIRMAN ANDERSON: Okay.

DR. MAURO: This is John. Just a quick question. Again, it's procedural.

We're, in effect, in the world of the ingestion pathway, I believe in OTIB-009. And I know that we've agreed that during the residual period the hand-to-mouth approach is the appropriate way to go, but I don't recall if there

has ever been a procedure, a revision to a procedure that was sort of formalized, that says, okay, when you are in this situation, you do this. It has really been resolved on a case-by-case basis, or am I incorrect about that?

DR. NETON: No, that's correct, John.

DR. MAURO: Okay.

DR. NETON: That's why I am suggesting -- this is more of an -- I don't want call it overarching because that has kind of special meaning, but it is a more general issue than just this specific site. It's certainly not an SEC issue, but we do need -- we agree that we need to address it. And that's why I'd like to keep it open until we can put out some more formal response, a more formal approach. And whether that's modifying the procedure, and how we modify that procedure, I think that's what we are still discussing.

I did put out a White Paper during one of our discussions on the ingestion approach, the surface area approach, but that was just a White

Paper, not a procedure.

I think if we hold this open, all of this will sort of come out eventually when we modify the procedure appropriately.

CHAIRMAN ANDERSON: So, do you have a timeframe for that? I mean, you know, what's your plan?

DR. NETON: This should be very straightforward. I don't see this is going to require a lot of research. I would say, you know, months, a couple of months, maybe.

MR. KATZ: Okay, so it's going to be in progress is really what it is, but it's in progress as a Site Profile issue.

DR. NETON: Yes, I would say in progress is probably better.

(Simultaneous speaking.)

MR. KATZ: Changed from an SEC issue. Okay.

CHAIRMAN ANDERSON: And the two observations we've resolved. So, those are closed. We closed those two observations.

They're pretty straightforward.

MR. KATZ: You have the other finding. Right? There are two findings.

DR. NETON: Well, they're both related to the same thing.

MR. KATZ: Okay, so both of them.

CHAIRMAN ANDERSON: Yeah.

DR. NETON: Well, the first finding had to do with the backward extrapolation.

MR. KATZ: Okay, right.

CHAIRMAN ANDERSON: Which the 85 was more claimant-favorable.

DR. NETON: Essentially, SC&A suggested that the backward extrapolation was not recommended by the procedure and it's not necessarily claimant-favorable using the --

(Simultaneous speaking.)

DR. NETON: So, it kind of validated that it was claimant-favorable to large extent.

MR. THURBER: In that particular case. Because, obviously, as we've discussed before, if the decay rate is rapid and you are doing a forward

extrapolation, the dose is going to be much less because it drops off so quickly. When you're doing backward extrapolation, you could come up with a different -- in this particular case, it didn't make any difference.

DR. NETON: But I agree and we will address both of these in the revision. I mean, maybe there's some clarificational language in that table that is used in --

MR. KATZ: And we should check in, Andy, with Bill and Dave. Are you clear and okay with all of this?

MEMBER FIELD: Yeah, I think it's moving in the right direction. The review, I thought, spelled out what was of concern pretty well.

MEMBER KOTELCHUCK: And I am fine with them.

MR. KATZ: Okay, very good.

DR. NETON: So, that could be the maybe closed out at the Board meeting?

MR. KATZ: So we should hear, just,

again, let's check again and see. Do we have the petitioner for Westinghouse on the line?

(No audible response.)

MR. KATZ: Okay, not. So, otherwise, we would want to hear what they had to say.

Right, so this is on the agenda for the August Board meeting. So, do you need some help with someone making some slides for you?

CHAIRMAN ANDERSON: Yeah. I mean, do we just want to take these two?

MR. KATZ: Well, the only findings that were outstanding.

CHAIRMAN ANDERSON: Yeah.

MR. KATZ: So, you could maybe have a slide or two just reminding people about this SEC and how it was dispositioned already.

CHAIRMAN ANDERSON: Yeah, let's do that.

MR. KATZ: And then take on these findings and how they are basically transferred to being Site Profile issues.

DR. NETON: And that will close the

issue.

MR. KATZ: And that will enable them to close out that SEC petition. And John, would you be willing to have someone take care of those slides?

MR. STIVER: Sure.

MR. KATZ: So, it sounds like it is four or five slides, a pretty short presentation.

CHAIRMAN ANDERSON: Yeah.

MR. KATZ: It's whatever it takes.

CHAIRMAN ANDERSON: Okay. So with that, we will now move on to another one that's been languishing for a while, United Nuclear.

DR. NETON: Who wants to take the lead on taking that one on? Hans?

MR. STIVER: Hans, are you on right now?

MR. KATZ: Maybe on mute.

MR. STIVER: He's probably on mute.

MR. KATZ: Hans Behling, are you on the line, perhaps on mute? I mean, he was on.

MR. STIVER: Yeah, he was. He was on

the roll call.

MR. KATZ: He joined us at the beginning.

MR. STIVER: He might have got cut off.

MR. KATZ: John, or somebody, can you maybe call Hans on another line or something, or email him just to see if he has lost his connection? John Mauro?

DR. MAURO: Oh, I can do that, sure.

MR. KATZ: You or whoever might have Hans' phone number.

DR. MAURO: I'll try to reach him right now while we are continuing.

MR. KATZ: Thank you.

(Pause.)

DR. MAURO: You may want to -- I now that United Nuclear is in pretty good shape, if I recall. I remember reading the report on that.

MR. KATZ: Right.

CHAIRMAN ANDERSON: Once we got it straight, we were in good shape.

DR. MAURO: While I'm trying to track

him down, I do have a suggestion, but certainly -- Hooker and W.R. Grace, the last two on our list, are also fairly simple and straightforward. And the one that is going to give us a little bit of work to do is going to be NUMEC, which happens to be mine. And all I could offer up is, while I'm trying to run down Hans to call out United Nuclear, I could see us picking up Hooker, because I think Bill, again, is on the line, and Bill is in a position to talk about Hooker while I'm trying to get a hold of Hans.

MR. KATZ: Okay. Bill is in the room.

DR. NETON: Well, I need to get Dave Allen on the line, though, at this point.

MR. KATZ: Dave, have you joined us yet?

MR. ALLEN: This is Dave Allen, I'm on.

MR. KATZ: Okay, great.

DR. NETON: And Doug Thurber is here.

MR. KATZ: So, we can shift and go ahead and take on Hooker while we are waiting for Hans.

CHAIRMAN ANDERSON: Two big documents.

DR. BEHLING: Hello.

MR. KATZ: Oh, there's Hans. Is that Hans?

DR. BEHLING: Yes, for some reason I was having problems with my phone. Just as I was about to come on it disconnected me for unknown reasons. I assume was being asked to discuss the second issue here of United Nuclear Corporation.

MR. KATZ: Exactly.

DR. BEHLING: Are we prepared to allow me to start?

MR. KATZ: Yes, please do, Hans.

DR. BEHLING: Okay, I'm very sorry, first of all --

MR. KATZ: No problem. No problem. It was just a minute pause.

Validity of the Coworker Model for United Nuclear Corporation

DR. BEHLING: Okay. Anyway, this is a quick overview. My discussion today is a June 2016 memo that was issued by SC&A. And this most recent memo is linked to several documents that go back

all the way to 2009 and relate to the United Nuclear Corporation TBD, where, back in 2009, SC&A identified several findings, one of which was the issue of a coworker model for uranium inhalation. And that was identified as finding number 4.

And for the sake of clarity in discussing SC&A's most current memo, I feel it's prudent to briefly summarize some of the relevant issues that previously had been sent to the Work Group in the past but I think warrant a brief review just in order for everyone to get back onboard as to what the issues were.

In SC&A's original UNC, United Nuclear Corporation, Site Profile finding number 4 raised questions that involve the assignment of uranium inhalation quantities to unmonitored workers that were originally defined in Table D.1 in the Battelle-TBD-6001, Appendix D. And that particular document was subsequently reformatted in Tables 1 and 2 of DCAS-TKBS-0008 that was issued on March 21st, 2011.

So, if you want to go back to the data,

those are the two documents, and the most recent one involving the data subject to questions was in the 2011 DCAS document.

For the unmonitored workers, these Tables 1 and 2, daily inhalation of uranium values on behalf of unmonitored workers were presented for classifications that were defined for solubility type S and M; two, job categories that included three different categories: operations people, supervisors, and others; and lastly, for two specific time periods that were segregated by June of 1963. In other words, two time periods: prior to June 1963 and post-June 1963.

An important aspect, again, that I want to mention that will be brought up in a few minutes is that the recommended inhalation daily dose values represented the geometric means of the distribution, as well as the geometric standard deviation. And as part of SC&A's evaluation of these data, and this goes back to 2009, SC&A identified available urinalysis data for two workers, which is part of our normal approach to

our review, and that is actually trying to assess some of the actual data that are available and see if, in fact, the coworker model is at least consistent with the assessment involving a subsample of people that we were looking for.

MR. KATZ: Can I just halt you a second, Hans? There's a lot of clicking on the phone and it sounds like some sort of interference problem. I guess we could just start by everyone but Hans muting your phone and see if that takes that away. I don't know whether it is Hans' phone or someone else's.

DR. BEHLING: I don't know. As I said, I had some trouble when I first started.

MR. KATZ: That took care of it. That took care of it, thanks.

DR. BEHLING: Okay. Anyway, as I had mentioned, as part of our review of the TBD, we normally select a subset of data that would allow us to evaluate the coworker model. And in this case, I will say up-front, because it's important when we discuss it subsequently, that my selection

of the two workers that I was looking to assess in context with the coworker model and inhalation quantities that were being recommended involved two workers. And as I said, there were three categories that were assessed for potential assignment of inhalation quantities. And at the top of the list were operators, subsequently also supervisors, and then all others, in descending order.

And when I looked at the data that were available for assessment, I chose two operators. And also I looked at the data that were available among operators and chose two that were probably very high on the list. It wasn't a random sample. I screened the data for people who had urinalysis data. The data that were available were urinalysis data that were expressed in dpm alpha activity per liter of urine.

Those were the original data that I had to look at, and I selected two operator workers and they were designated not by name but by code. The first operator was identified as AAA, Operator AAA,

and Operator BBB. So AAA and BBB were the two people that I looked at.

And what I then did, by means of the IMBA Expert computer code, I converted the actual data on behalf of these people and converted the urine data into what would be considered a daily inhalation value. And these were cited in the SC&A review of the TBD under section 34. And we defined values, as a result of that actual empirical data, that were considerably higher than the proposed recommended values that were being cited in the TBD for a coworker model.

And we presented this to the Work Group on several occasions. I think the most recent one was I think back in May of 2011, according to my records. And as a result of the discussions that took place with the Work Group, I think it was recommended that NIOSH actually take a look at the actual data that we presented and assess the data in terms of the validity, et cetera, et cetera, and also determine if, in fact, the data involving those two individuals were in fact incorporated

into the coworker model, meaning that the actual high values that were cited as part of the records for these individuals were part of the actual coworker model that was used to derive the geometric mean that were then identified for people who were not monitored and to be assigned.

And as a result of that request, the NIOSH has issued a White Paper. And I'm going to ask John Stiver if he can bring that up on the computer for people to see it. And this is the White Paper entitled "White Paper Addressing Issues on the Coworker Model for United Nuclear Corporation" and was issued in February 2014. And the author of that was Dr. Lara Hughes.

I don't know if Lara is available today to comment or not. I will discuss the paper or I can share that discussion with Lara, if she chooses to do so. Is Lara on the phone?

MR. KATZ: She's in the room, yes.

DR. HUGHES: I'm here, yeah.

DR. BEHLING: Oh, Lara, I don't know if you would prefer you discussing that paper.

Because the actual memo that I made reference to, and cited in the actual agenda for today, it's really in response to that particular White Paper that you wrote, Lara. And if you want to discuss it, I will be happy to turn it over to you, since you are the author. Or I can discuss it, whichever you want.

DR. HUGHES: I'll be happy to discuss it, although I do not have that White Paper in question in front of me. I'm not sure --

MR. STIVER: I can pull it up, Lara. Just a second.

DR. HUGHES: I have a memo, the review of the IMBA analysis that I prepared in July 2012, and that was specifically related to the IMBA runs of the two high exposed workers, AAA and BBB. And I think the crux was that we found essentially our values, when we used the bioassay of these workers and ran them through the model IMBA and calculated the daily intake rates, that the values were fairly similar.

For one of the periods, there was a

discrepancy of about -- there was a factor of ten difference but that turned out to be a transcription error.

DR. BEHLING: Yeah, in fact, I have it on my computer now if the people here in the room, as well as on the phone, have access to that. The issue that I was hoping for you to discuss, or I will discuss it, are the results that you identified in Table 1 of your White Paper. And I see it on my computer right now. So I assume that other people in the room, as well as on the phone, have access to that.

DR. HUGHES: Okay.

MR. STIVER: I pulled it up on Live Meeting. So, that Table 1 is available to anybody who has Live Meeting.

DR. HUGHES: Is it the predicted chronic intakes of uranium?

MR. STIVER: This is your February 2014 paper.

DR. HUGHES: I don't have it. I don't think I have --

MR. STIVER: Do you have Live Meeting?

DR. HUGHES: No, I don't. I'm not connected.

DR. BEHLING: Well, in that case, Lara, if you don't mind, I will just briefly discuss the issues there.

DR. HUGHES: Okay.

DR. BEHLING: And I will focus principally on Table 1 because that's really the crux of the findings that you identified in your White Paper, and really is also the essential issue that we responded to in our recent memo that will be the last thing we will discuss here, briefly.

But one of the things -- and I won't go through the actual citation of all the issues that were raised -- but in your White Paper you also acknowledged the fact that in a Work Group meeting on September 7, 2012, NIOSH agreed during the discussion to change the guidance on the Site Profile, to use the 95th percentile value of the coworker model for doses during the gap period between '61 and '62.

That was cited in your report, but it was previously also acknowledged during the Working Group meeting so that the concession that was made in light of the issues that we raised in our review of the TBD, we went from the geometric mean of the values that you had derived earlier in the TBD to a 95th percentile value.

Then you also identified the two workers in question that I already mentioned, Worker AAA and BBB, and we had, in behalf of those individuals, 68 and 71 urine bioassay data points, respectively, that we were able to work with.

And what you did was actually duplicate what we had done previously in our initial review. And I think if we can go to Table 1 that is at the bottom of the page, John, you will see the outcome.

And I just want to briefly mention what you are looking at here. This portion of the table, the table actually continues on the next page but we won't -- John, go back to the original -- but this portion of the table is the pre-June 1963 data, which is really critical because this

is where we had some very, very high exposure data or urine data for these two particular operators, AAA and BBB.

And what you see here in this table on the farthest side is the first row is NIOSH analysis of using the actual urine data as SC&A did, and then converting that to daily intakes. And so what you see here in Table 1 is that for Type S, the daily intake would have corresponded to 437,900 dpm per day for Operator A, based on the actual data that were available that we used and NIOSH used.

And below that, you see SC&A analysis that has a value of 42,670, and you realize that's a factor of ten. And we will come to that in a few minutes because that was actually a transcription error that we actually introduced in converting the value. We actually had a value that was, in essence, virtually identical, when, in fact, we looked back at the data, and I think NIOSH verified this, when we supported you with our own IMBA runs and you concluded the very same thing that we also concluded, that this represents a transcription

error. Because we had actually determined that the inhalation intake rates would have been 426,670 and we dropped the number six there and reduced it by a factor of ten.

So, anyway, using the actual urine data that were available for Operator AAA, NIOSH had derived 437,900 dpm per day as an intake. And if I can correct for the transcriptional error, for SC&A, ours would have been 426,000, which is essentially very consistent with that number.

The Site Profile in the original tables would have recommended a geometric value of 12,590. And that, obviously, is a very, very much lower value than 437.

On the other hand, when the decision was made to actually adopt the 95th percentile value, that value would have been raised from 12,590 to 89,277. And when you compared the actual empirical-derived value of 437,900 to the 95th percentile value, you realize that the ratio is still 4.9, which means we're actually -- the 95th percentile value that would be assigned is a factor

of nearly five-fold lower.

And the same thing applies to the Type M next to it where you see, in this case, that transcription error that we have been guilty of introducing in Type S was not translated or not transferred to Type M. We see that the NIOSH value of 13,803 is essentially identical to the SC&A of 13,490.

And again, what you see here is the original geometric mean value of 872, and, of course, the revised recommendation to use the 95th percentile value of 6,183. And again, that is 2.2-fold lower than the actual value that would have been derived had you used the actual empirical for the urine for Operator AAA.

And the same thing applies to Operator BBB. You can just look at this. I won't go through the numbers. And again, for Type S, SC&A in fact, if you had introduced a transcriptional error for the Type S, again we were off by a factor of ten. But when we corrected it, our numbers are pretty consistent with the numbers of 187,800,

because when we reran our own value, and I think NIOSH verified this when they looked at our data, our number would have been 208,880 dpm.

So, again, we were pretty consistent when we corrected for that transcriptional error but we also realized that we were still somewhat low, even at the 95th percentile value, which at 89,277 is 2.1-fold lower than the empirically derived value that both NIOSH and SC&A derived that would have been almost 200,000 dpm per day.

Anyway, when we also raised the issue of -- we can go to the post-June 1963, and there you see values, again, that are in exactly reverse. Again, in this case, when NIOSH analyzed the data, in this case, the empirical data was adjusted for Operator AAA, a value of 6,445 dpm per day, when in fact the Site Profile geometric mean value would have been, essentially, the appropriate value.

And as a result of the selection of the 95th percentile value, we would assign for this individual 46,681, meaning we are probably, by assigning the 95th percentile value for an operator

as a coworker default value, we would be a factor of about eight higher than actually the empirical data would suggest.

So, post-June 1963, the coworker model would actually over-predict the inhalation quantities that would have been derived by the empirical method as NIOSH and SC&A identified. And the same thing applies to the Operator B, which is on the right-hand side, where, again, we are about a factor of approximately seven too high, as you see by the ratio value of 0.15.

So, again, there's a summary for the pre-June 1963 data. We would probably still underestimate the inhalation based on the empirical data for these two guys if we were to use the urine data. And for the post-, we would overestimate the actual inhalation dose by using the 95th percentile.

So, that's basically our review. And then there were secondary issues that I think Lara had identified. And that is, we had raised questions about whether or not the data that we had

used in behalf of these two individuals were, in fact, incorporated into the actual matrix of information that was used to derive the geometric mean and the 95th percentile. And that's in the last table. So, John, if you can just quickly go down the screen here.

Okay. Here you see a table, and those identify on the far left side the ten bioassay results from the data set that was used. And you will see on the second and third column of that table data that are in bold and data that are not. And the bold data involves those things that were not included. And so you see that some of the data that involved these two workers were, in fact, included in the coworker model and others are not.

And I think Lara explains why that could happen. I think several of the numbers, or the actual empirical data that were defined in behalf of these two workers, were considered outliers because they didn't make sense. They were very high and when you looked at the pre- and the post-date urinalysis data for those particular

issues, it seemed improbable that you could have such a high number. And they were considered, basically, an artifact or a contamination event.

And there were other issues that were identified as perhaps not necessarily being linked to an outlier, but, for reasons that were difficult to assess at that time, we don't know why some of the numbers were not necessarily included. But nevertheless, when they were included, the numbers really didn't change significantly in terms of the coworker model.

And so when we reviewed the White Paper that Lara had authored, and that brings us to the current memo that is really the subject of discussion for this, but, in essence, requires very little. So, John, if you could bring up the most recent memo that we submitted.

And much of this memo really reiterates what I've already talked about. It just summarizes the very fact that we started out with our original finding number 4. We submitted the data for review and discussion to the Work Group.

It identifies the fact that there were recommendations made for NIOSH to assess SC&A's number. And of course, we acknowledge in our document that we had made a transcriptional error in behalf of Type S for Coworker AAA and BBB that were corrected.

And in essence, we also concur with Lara's assessment of the issue that perhaps the 95th percentile value, in spite of the fact that it might not necessarily embrace the actual higher numbers that we would have derived, are probably appropriate for a coworker model, for a number of reasons.

One is that these two coworkers were exceptionally high-end workers. And as I have mentioned at the very beginning of my discussion, I had selected them for a reason. I wanted to see if, in fact, these data would correspond to a bounding value that were identified in the coworker model under the GM. And, of course, it didn't. It was way, way off.

But as a result of the acceptance of the

95th percentile value, as opposed to the geometric mean, we're probably coming within a factor of five for AAA coworker and a factor of two for the BBB worker.

And given the fact that the 95th percentile far also exceeds the expected intake for those two individuals post-June 1963, and given all the dose issues that Lara identified as perhaps outlier values that were inappropriate for use in assessing them, we, I guess, as a bottom line, we concur with Lara's assessment. And I think we can potentially accept the resolution of the 95th percentile value as a coworker model that can be used for an unmonitored worker, with the full understanding that, in the case of Coworker AAA and BBB, you would really, in essence, possibly still default to the actual empirical model as opposed to using a coworker model.

And for people who may not be monitored, they are likely not to be the high-end people, such as the operators, for whom that data are available, we feel that the coworker model, as is currently

being proposed, using the 95th percentile value is probably an appropriate approach. And we recommend that resolve this issue by accepting that recommendation.

DR. NETON: NIOSH has nothing to add.

MR. KATZ: So you concur?

DR. NETON: We concur.

CHAIRMAN ANDERSON: Yeah, a long discussion. So we have resolved the issue.

DR. NETON: We concur with SC&A's recommendation to close the issue.

DR. MAURO: This is John Mauro. Just in listening to -- trying to sort of step back and get the big picture, when we have a circumstance where a coworker model has been developed with the data that is available, and you're doing a dose reconstruction using the coworker model -- this probably is self-evident, but when you do have real data for real people, the way Hans just described, assuming that data were good and is rock-solid stuff that you can hang your hat on, you wouldn't use the coworker model. You would use the actual

data on the real people. Is that correct?

MR. KATZ: Correct.

DR. MAURO: And in this case you didn't use the real data for the real people because you didn't trust it.

DR. BEHLING: Well, actually, John, I think the way the TBD was rewritten in 2011, it does state that when real data are available, that they will have priority in use. This is, in essence, a coworker model that is earmarked for unmonitored workers. And any time you have real data, obviously, they should take precedent over a coworker model. And I think that's stated in the TBD.

DR. MAURO: Yeah. And that's the way I understood it also. But I do hear also, though, that for these particular workers, at least for that first time period, you didn't really trust the data. So, therefore, you didn't go with the data and you went with the 95th percentile, because there was something about the data for those two workers that didn't make sense.

DR. NETON: No, John.

DR. HUGHES: No, that's not correct.

DR. MAURO: Okay, then if you could help me out a little bit.

DR. HUGHES: Well, for one thing, I don't think that these individuals are claimants, per se. So, I don't know if a dose reconstruction has been done. I would have to read up.

In this case, if the dose reconstruction were to be done for these claimants, we would use the bioassay data. Now, there is always the issue, with the involvement with the coworker model, some values were omitted because these individuals had additional data that was found in the back of the document.

And I don't know the details because it's been a few years since I have looked at this. There were some spikes in there that were not explained by the data that were collected over subsequent days. These were individuals that received a good amount of intake and they have had a number of subsequent positive bioassay data.

So, there were some spikes that were not explained by the follow-up data. So, those I think were omitted, because in the report there were indications that they suspected the samples were contaminated. And I think that's a valid process.

DR. MAURO: Well, and you know, I bring this up only because it's one of judgment. And as we know, when we go through these kinds of processes it is appropriate for the dose reconstructor and the folks doing the work to use their judgment. And what I am hearing here is, if these were claimants and you were confronted with having to do a dose reconstruction for these claimants, you would have looked at the data the way you just described and you would have documented that. In this case, I'm still thinking out loud for myself, that, listen, yeah, we really have an option here. We can go with the real data that are much higher, eight times higher, four times higher, but we don't believe it.

And I think it's important that when that happens, when a certain degree of discretion

is used to bypass the coworker model, then it's essential that the rationale for that -- and I thought that was the case here, that there was a rationale why you didn't go that route, but what you are saying is you were really never confronted with that circumstance because these workers that Hans used in his test were not claimants.

DR. BEHLING: No, they're not, John. They were strictly identified in one of the documents that were cited for the information that would involve the development of the core group, where they had tables and tables of information involving urinalysis data that they have of different people, including operators. And when I screened those data sheets, I identified Coworker AAA and BBB because I realized, looking at the actual numbers that involve dpm per liter of urine that they were being assessed for, these turned out to be very high values.

And I chose that for a simple reason. I wanted to see if, in fact, the coworker model would be a bounding value. And it turned out not

to be the case. As I said, in the case of the data that were used that both NIOSH and SC&A ended up with for the AAA coworker, we ended up with a value over 400,000 dpm per day, which is obviously many, many times the geometric mean of the recommended value that was identified in the Site Profile. We talked about the difference between 437,900 dpm per day versus the GM value of 12,590. We are talking about 30-some-odd-fold difference.

But then when the concession was made to use the 95th percentile value, the 12,590 value translated for the Operator A to 89,277. And that still, however, was a factor of nearly 5, 4.9-fold lower than the empirical value derived from actual urine data.

But then again, Lara has explained that some of the values that were available -- and I didn't question, I didn't assess in terms of the validity, but apparently NIOSH did, and identified a couple high values that seemed inappropriate because of adjacent values before and after that would not allow that number to exist. And the

interpretation of that artifact was that it might be a contamination issue.

And without having gone through a lot of assessments, I will concur because I did look at the numbers that were being questioned, and I looked at the adjacent timeframes for other urinalysis, and that does suggest the likelihood is that they might have been a false high number.

DR. MAURO: No, I got it. I just wanted to --

CHAIRMAN ANDERSON: So, we have resolved the issue, I think.

MEMBER FIELD: This is Bill. I have a question. For the false positives, the ones that were deemed contaminated, the adjacent values, they were for the same person, right?

DR. HUGHES: That's correct.

CHAIRMAN ANDERSON: Yes.

MEMBER FIELD: Okay, I just wanted to clarify that.

DR. BEHLING: Yeah, if you look at the actual original data that I used -- and I think in

my review of the TBD, I actually have given an exhibit that identified Coworker A and Coworker B -- or Operator; I'm not saying Coworker -- Operator A and B, they actually have a subset of their actual exposures in the original review.

So you can look at those and I think you can identify the adjacent values as appropriately assessed in behalf of each of those two workers and for that particular high value, and come to the conclusion that it doesn't look like it might be -- it could very well be an artifact.

MEMBER FIELD: Right, thanks.

DR. BEHLING: Anyway, I guess to sum things up, from my review of Lara's White Paper and reassessment of the data, at this point, I would certainly propose the recommendation to the Working Group to perhaps close this issue out and accept the coworker model as it's currently being proposed. For unmonitored worker, of course.

CHAIRMAN ANDERSON: That seems reasonable. I think we got it. I mean, been a long time in the works here, but I think we finally

figured out what the differences were between the two and now it's reconciled. And I would certainly agree that we ought to close this out, that the coworker model and the 95th percentile process seems to work.

MEMBER KOTELCHUCK: Right. And Dave, I agree. It was a very nice presentation and very clarifying.

MR. KATZ: So, for this one, Andy and group, I think we also need a presentation, because we have a session so you can close out the Site Profile review.

The only issue with this -- and again, I think, whoever prepares it for SC&A, just a little bit of backtracking so that people have context before you get to what you've closed out would be helpful for Andy.

But this is a little bit uncertain as to whether this will actually make it on the agenda, because it depends on what happens with a couple other SECs which would have priority for being addressed during the meeting.

So if we could have that presentation prepared in case. And there's at least a 50-50 shot that it will be used. But if not, it will be used in the next Board meeting or teleconference.

CHAIRMAN ANDERSON: It would be nice to have it ready to go so we don't have to go back through this.

MR. KATZ: Absolutely. Absolutely, so that'll be a way to seal the information, at least, right, while it's fresh.

CHAIRMAN ANDERSON: Yeah.

MR. KATZ: Thank you.

CHAIRMAN ANDERSON: Okay, any other comments by anyone? Thank you both.

MR. KATZ: Yeah, thank you. On to Hooker.

CHAIRMAN ANDERSON: Okay.

MR. KATZ: Is everyone okay? Does anyone need a break before we go on to Hooker?

MR. STIVER: I'd like to take a slight break.

MR. KATZ: Okay, so let's take a

five-minute break and then we will move on to Hooker.

(Whereupon, the above-entitled matter went off the record at 9:58 a.m. and resumed at 10:05 a.m.)

MR. KATZ: Alright. Okay, we're all back in the room, and we thought just we were going to take it out of order for a different reason before we got Hans back. So we thought we would discuss Hooker first since it's a shorter slog than NUMEC. And we have Dave on the phone and that will free Dave to go off and go to work.

DR. NETON: I think Bill can start.

SC&A Review of DCAS-TKBS-0009, Revision 2 for Hooker Electrochemical Company

MR. THURBER: Sure, Hooker. We prepared a review back in 2013 of Revision 1 to the Hooker TBD. And you'll recall that what happened at Hooker was they received so-called C-2 slag from Electro Metallurgical Company, which was down the road in Niagara Falls. And from another AEC project, they had some extra hydrochloric acid.

And so the objective was to treat this C-2 slag, which was a product of the bomb reduction process to produce uranium metal from uranium fluoride and magnesium, to take that slag from the bombs and to treat with hydrochloric acid and to upgrade the slag to increase its uranium content.

So that was what happened, and this went on from, whenever, July 1944 through January 1946.

So NIOSH prepared a Revision 1 of the Technical Basis Document. And we reviewed it in 2013. And at that time, we developed six findings. And subsequently, NIOSH updated the TBD to Revision 2. And Ted Katz asked us in April of this year if we would review Revision 2 of the TBD to see whether the six findings that we had originally made in our review of Revision 1 of the TBD had been resolved.

And so let me go through those six findings quickly and tell you where we think things stand.

And one thing I would add is that when we did our review of Revision 1 of the TBD we came across some new data which had not been considered

before which we felt had a fairly significant impact on the amount of exposure that the workers might have received, both in terms of the uranium content in the materials and the time that the processing took place, so that there were a couple of factors which would have affected the worker exposure that had not been considered when NIOSH did their original review.

So, anyways, our first finding was that we felt that NIOSH needed to review the assumptions regarding the composition of the slag and the concentration of the concentrate that was produced by acid leaching of the slag. And indeed, in Revision 2 to the TBD, NIOSH did take into account the fact that the slag concentration had been understated. And so they revised the slag concentration from something like less than one percent to 2.65 percent uranium.

And based on our review, we felt that this was an appropriate adjustment based on the additional data that had been uncovered, and we were satisfied that this finding has been properly

addressed in Revision 2 of NIOSH's TBD.

The second finding had to do with the fact that we felt that the slag leaching process was understated -- I'm sorry, that the throughput through the system was understated by about a factor of five. It was originally assumed by NIOSH that ten tons a month of the slag would be processed, and we felt that that was -- based on this new information, we felt that that was a significant understatement by about a factor of five.

And in response to this finding, NIOSH looked at three production scenarios. And they felt that rather than ten tons per month, that a throughput of 89 tons per month better fit the new data. And again, we think that that is an appropriate adjustment and we are satisfied that that finding has been properly addressed by NIOSH.

The third finding, we felt that the internal exposure was understated because the exposure time was not properly addressed and that the amount of uranium in the concentrate was not

properly addressed. So, in their Revision 2, NIOSH upgraded the concentrate concentration significantly, and they decided that the slag handling time should be increased to 25 percent of the workday rather than five percent, which was originally assumed. And again, we felt that these findings were consistent with the new data that had been examined.

So, the first three findings, again, we felt were properly addressed by NIOSH.

The fourth finding, we felt that the ingestion intake needed to be calculated in a manner that was consistent with the inhalation intake. And the issue was that actually the ingestion had actually not been included. And so we pointed that out and we think that's still an open issue, that NIOSH needs to address the ingestion. So, that is unresolved, from our perspective, at the time of review.

DR. NETON: We agree with that. We need to formally include that.

MR. THURBER: The fifth finding had to

do with -- it's a little be trivial, perhaps -- actually, maybe not. And that deals with the fact that the units of measure in some of the tables were confusingly stated. The text would refer to doses when the data was actually presented as exposures, or vice versa. For example, there would be a table that would be labeled "dose rates" but the information would be exposure rates, in terms of mR per hour. And we think that some cleanup is required there to be sure that the units are expressed consistently with the text and vice versa.

DR. NETON: Yeah, this is Jim. I think Dave Allen may have some comment on that. I'm not sure. Dave, are you there?

MR. ALLEN: Yeah, I'm here. I was just thinking we let Bill go through all the findings and then I could give our response, or however the group wants to do that.

DR. NETON: Either way. Well, we're through four. We are on five right now. Maybe five and six, I think, are somewhat related.

MR. THURBER: Five and six are definitely related.

DR. NETON: Maybe Bill could go through six and then we could comment on five and six as a group.

MR. THURBER: Finding 6, again, referring to one of the tables in the NIOSH Revision 2 of the TBD, it talked about the units of measure for the photon dose conversion factors. And again, this was a question of whether these are exposure rates or dose rates.

Well, that's sufficient. So, you know, as Jim said, five and six are kind of related. We think there is some cleanup required in the text and tables to clarify whether these are dose rates or exposure rates. And that summarizes it.

DR. NETON: Dave, do any of you want to chime in on that at all?

MEMBER KOTELCHUCK: Excuse me, Ted, before Dave -- this is Dave Kotelchuck. I have been on the line the whole time. My mute was on, it turns out. So, just for the record.

MR. KATZ: Oh, okay. I didn't know we were missing you even.

MEMBER KOTELCHUCK: Oh, okay, wonderful. I thought you said something about Dave can go do something.

MR. KATZ: Oh no, that was a different Dave. That was Dave Allen.

(Laughter.)

MEMBER KOTELCHUCK: Alright, very good.

MR. KATZ: Sorry about that.

MEMBER KOTELCHUCK: Thank you. The other Dave, you should begin now. Sorry.

MR. ALLEN: Okay, this is Dave Allen. As Bill said, on findings 1, 2, and 3, I think SC&A is recommending closing. And just to point out, those three were changed as a result of the definitive information that Bill Thurber found. We actually looked at this issue in the previous review and SC&A agreed with our interpretation on the sparse information that we had, but when they found the definitive information, that kind of

contradicted some of the data that we did have and ended up changing the scenarios quite a bit. It definitely made it more robust. There's a whole math balance in the TBD now that clarifies everything exactly what happened, pretty much.

As far as finding 4, primarily that was the ingestion intake. And Bill notes that that should have been added and he is absolutely right. That was purely an oversight. I can tell you, as far as any dose reconstructions we've done by Revision 2, we have added in an ingestion intake, but it's not in the TBD and that needs to be added.

Then we get to finding number 5 -- actually, it's several different things. As Bill said, there were several cleanup things. There were some mixed units, et cetera. And we agree with, I want to say, everything he said. Yeah, it was mostly just some mixture of units that was incorrect. And we agree we need to clean those up at the same time we add the ingestion in there.

DR. NETON: I think I would also say, though, even though the units may have been

mislabeled, the dose reconstructions have been done correctly. Because there is a difference between if you use roentgen versus --

MR. THURBER: Right, particularly when you are looking at organ doses it's very important to make a distinction.

DR. NETON: I'm sorry, Dave. Go ahead.

MR. ALLEN: No, that's a good point. The units make a difference in some cases. In some cases, it doesn't, honestly. Whether you call it exposure or call it dose, on the other hand, nobody honestly pays very much attention to that. They pay attention to what the unit is.

And that's what I wanted to point out with finding 6. We actually calculated the photon dose in mR per hour, or mR per day -- I can't remember what the time unit was in the table. And no such thing exists for beta, so we calculated that in millirem.

And technically, ICRP type is distinguished by calling one exposure and one dose,

but they also call a lot of other things "dose." They have HP(10),H*(10), air kerma, all kinds of things they call dose and they don't do a very good job of distinguishing them with a word.

The purpose of that was there were two lines in the table. One was in mR, one was in millirem. We decided to just say dose, instead of trying to confuse things by distinguishing dose from exposure. We put the units right next to the number to make sure there was no confusion.

That one just seems to me like the technically correct way of doing it is just going to confuse matters even more and it has never confused anybody yet. That one I would like to leave alone. The other stuff from finding 5, I would clean up.

And I am not married to that. I can clean it up. I just think it is a little more confusing if I do, as far as finding 6 goes.

And I think that was it. That's my responses to it.

CHAIRMAN ANDERSON: Okay, other

comments people have? So, when will the pen to paper --

DR. NETON: When will the TBD be revised?

CHAIRMAN ANDERSON: Yeah, I think we've got it all resolved but I suppose it's in abeyance until we actually have a firm document in hand, I guess.

MR. KATZ: Right. Right, none of these are really in progress. They're really all in abeyance since we have agreement about all the details.

CHAIRMAN ANDERSON: Yeah, all the issues were resolved, it's a time --

DR. NETON: None of these should take a lot of time. It's just a matter of getting the schedule. I don't know, Dave, do you have an idea? I mean, there's a lot of competing priorities these days. That's the only thing.

CHAIRMAN ANDERSON: Well, and you're continuing to process them, and you know it, so --

DR. NETON: And again, right now, it's

not affecting the dose reconstructions. They are being done correctly. It's just a matter of documenting it properly.

Dave, do you have any feel for a timeframe on this?

MR. ALLEN: Well, like you say, it's just a matter of priorities. I think I can push to try to get a draft out in a month, and then our review cycle often takes like a couple months because it's not going to be high on any of the review people's priorities either. But it might be three months or so at the earliest before we get this revised.

CHAIRMAN ANDERSON: Okay.

MR. KATZ: Okay, so -- oh, go ahead Bill.

MR. THURBER: I would just make one more comment. I don't mean to be didactic about this. But to me, dose and exposure are two different things. And Dave's comment, well, they're frequently intermixed, I have no argument with that, but it doesn't seem to me that that's

a good argument for proliferating confusion -- what's confusion in my mind.

DR. NETON: I hear you. Dave and I will talk about this. We'll make it right.

MR. KATZ: So, this is another one where we could have then a close-out of the Site Profile review. Again, whether we have time to actually address it at the upcoming Board meeting is questionable right now.

CHAIRMAN ANDERSON: Yeah.

MR. KATZ: But you could probably close it out pretty quickly with a presentation on this.

MEMBER KOTELCHUCK: Dave, question. So, where does this reside during this period, over the next three months, or at the end of the three months? With the Board or with the Working Group?

MR. KATZ: No, it's not with the Board anymore, or really with the Working Group. It's in abeyance, so everything is agreed upon and NIOSH will put out, eventually, a revised TBD. And that will, whenever the Work Group is meeting on something else more substantive, they can then take

a nod that that was all put to bed.

MEMBER KOTELCHUCK: Okay, thank you.

CHAIRMAN ANDERSON: Is the TBD not posted?

MR. KATZ: These are available. Yes, I mean, they're posted on --

CHAIRMAN ANDERSON: Because what I'm wondering is if one at the top of that could just put a statement saying "see" -- I don't know if any public would look at it.

MR. KATZ: They wouldn't, in general.

CHAIRMAN ANDERSON: I don't think so.

DR. NETON: The TBD is on our website.

MR. KATZ: I'm saying these details, the public is not going to really be cognizant of this detail and that it's being addressed, these findings from SC&A.

CHAIRMAN ANDERSON: Yeah, okay.

MR. KATZ: You mean putting a notice out saying we've resolved all these issues?

CHAIRMAN ANDERSON: Just a line at the top of it, so when you went to it, it would say "see

the minutes of this" or something or other.

MR. KATZ: We've never done that. I don't know.

DR. NETON: It's not been our practice. Usually, the people that follow individual Site Profiles kind of follow the meetings themselves.

CHAIRMAN ANDERSON: Okay, then we don't need -- because it doesn't seem to me -- I think we've got enough other things going on. I wouldn't want you to spend a lot of time rewriting this thing, as long as people wouldn't be looking for it.

MR. KATZ: Well, it has to get rewritten because that's a matter of course.

DR. NETON: Yes, it will be revised. It's not affecting any dose reconstructions. So, I don't even suspect the PER is involved here.

CHAIRMAN ANDERSON: Okay.

DR. NETON: Because like I say, the ingestion has been done. It has just not been specifically described in the Site Profile. And the table with the units, that's a matter of, like

I said, being correct in the terminology.

CHAIRMAN ANDERSON: Yeah.

MR. KATZ: So, anyway, since this is fresh, if we could just get another Site Profile review presentation to close it out. Whether we use it at this next Board meeting or not is questionable, but it's good to have.

DR. NETON: It might be good for the call after, you know, in-between.

MR. KATZ: Right, this is another one that we could do at the teleconference.

(Simultaneous speaking.)

MR. THURBER: If you are going to task SC&A to do this, I would hope that you and Dave could have sorted out your position on 6 before we have to do a whole rewrite.

DR. NETON: Sure, we will do that.

MR. KATZ: Yeah, check in with them as you prepare everything about that last part of it, that one bullet or whatever it ends up being.

CHAIRMAN ANDERSON: How late are we planning to go on the second day?

MR. KATZ: We finish at 1:00, and that's pretty much set in stone because it's noticed.

CHAIRMAN ANDERSON: Okay.

MR. KATZ: So, that's the problem. We don't really have room to expand.

CHAIRMAN ANDERSON: Well, yeah, I thought it was a short day.

MR. KATZ: Yeah, so that's the catch.

CHAIRMAN ANDERSON: I'm trying to work my travel so that I can get home.

MR. KATZ: Right, 1:00 p.m. I believe we'll run until 1:00 p.m., though, unless some other things fall off the shelf. Right now, we're, in a sense, overbooked.

CHAIRMAN ANDERSON: Okay, that's Hooker. Any other comments, Members on the phone?

MEMBER KOTELCHUCK: I'm fine with what we have.

CHAIRMAN ANDERSON: Okay.

MEMBER FIELD: I think everything sounds good.

CHAIRMAN ANDERSON: Okay. So, let's go back to the NUMEC White Paper. Is that okay?

DR. MAURO: This is John. I'd be glad to go ahead with NUMEC, but I think W.R. Grace may be able to be taken care of pretty quickly also, if Ron agrees. So that we could leave the home stretch for NUMEC, which may take a little bit more time than the others.

DR. NETON: Okay, I would need to give Tom Tomes a quick phone call to get him involved, but I'm okay with that.

CHAIRMAN ANDERSON: Okay, that's fine with me, too. Sure.

MR. KATZ: Is he waiting for you to call him?

DR. NETON: He's waiting for me to call him.

DR. POSTON: Ted?

MR. KATZ: Yes?

DR. POSTON: John Poston, I'm here.

MR. KATZ: Well, hi, John. This is -- okay, you're welcome. This is not your Work Group.

DR. POSTON: I thought it was today.

MR. KATZ: You're welcome to hang in here if you want to listen, but this isn't one of your Work Groups. John, I think you are with us for Idaho -- for the INL Work Group, which is August 2.

DR. POSTON: Oh.

CHAIRMAN ANDERSON: Everybody gets noticed for all of them and it's hard to remember which is yours.

MR. KATZ: Yeah, status notices.

(Simultaneous speaking.)

DR. POSTON: Well, I wasted a lot of time last night reading all this stuff. I found it interesting.

MR. KATZ: You will be well-prepared for the Board session.

DR. POSTON: Alright, bye.

MR. KATZ: Bye-bye, John.

DR. NETON: I got a hold of Tom Tomes. He is calling in.

(Pause.)

DR. NETON: Okay, Tom, are you on yet? He should be dialing in now.

MR. KATZ: Tom, have you joined us yet? Not yet.

DR. BUCHANAN: I could go ahead and give a recap for this, if you'd like.

CHAIRMAN ANDERSON: Yeah. Should we start that?

MR. KATZ: Tom will be familiar enough, right? He doesn't need to catch all the recap.

DR. NETON: Yeah. I just -- does it beep when they dial in?

MR. KATZ: No, you don't hear it if you are already on. No, you don't.

DR. NETON: Well, yeah, go ahead.

MR. KATZ: Go ahead, Ron, that's fine. Why don't you start your recap?

W.R. Grace and Company in Erwin, Tennessee Update on Findings

DR. BUCHANAN: Okay, this is Ron Buchanan with SC&A. And W.R. Grace is a uranium, and some plutonium, processing plant in Tennessee

that did work for both AEC and commercial outfits. Complicates the issue somewhat.

It is now called NFS, Nuclear Fuel Services, and they are presently operating. They are downblending enriched uranium.

And so we did the Site Profile review in 2012, I think, three or four years ago, and we came up with seven findings. And finding 6 has been closed previously. It was on X-ray. That was closed, so that leaves the other findings.

We had findings 1, 2, 3, 4, 5 and 7. Now, the current status of those was that NIOSH was going to go back to NFS and request some additional information. This is mainly about when plutonium was and wasn't used at the facility for weapons purposes. And so they had requested additional information from NFS, and was waiting to receiving that to look at some more details on when the plutonium intake should be assigned and also any neutron dose associated with that.

Now, we did have finding 5, which was somewhat of a different issue, which I'll address

now. Finding 5 was SC&A brought up the fact that there was no information presented in the TBD concerning dosimetry calibration knowledge. And W.R. Grace outsourced their dosimetry to Nuclear Chicago in early years, in the '50s, and then they switched to Landauer in around 1961.

And so we wanted to see if there was any additional information on dosimetry calibration at that time, since there had been none presented.

And we discussed this during our August 25th Work Group meeting in 2015 last year. And what the Work Group wanted us to look and see if we could find any more information on that. NIOSH was going to look at some cases to see if the doses increased or decreased when they switched the dosimeter vendors in '61 and then re-reviewed that data. And SC&A was to contact NFS and Landauer to see about calibration.

And so that's essentially finding 5. I'll present the results of that now, and then I'll let NIOSH address the rest of the findings, since that was their action item when we had the last Work

Group meeting in August of 2015.

Dosimetry calibration, we did contact NFS and Landauer to see if we could find some information on that. We could not find sensitive information. Landauer does state, they did state when I contacted them, that they did not report the different energy ranges. They did report non-penetrating if the surface dose was greater than five times the deep dose, which would indicate plutonium exposure. And that was the main information.

We looked over some of their sheets and did not find where they reported different energy range or non-penetrating versus penetrating for normal exposures. So, that does substantiate that.

NIOSH did provide us four claimants which worked continuously and was matched continuously between '58 and '63 or '65, somewhere in that area. And we looked at their yearly doses and did not find a large change in those periods. The first part was Nuclear Chicago. The latter

part was Landauer.

So, at this point, we do not find indication that there is further information available to substantiate any differences in calibration for external dosimetry. And so we recommend, at this point, that that issue be closed.

CHAIRMAN ANDERSON: Any comments, questions by people?

MEMBER KOTELCHUCK: Looking at the four cases, it certainly doesn't look like there is any change.

CHAIRMAN ANDERSON: No.

MEMBER KOTELCHUCK: I didn't sit and plot it but things look fairly consistent.

DR. NETON: Maybe Tom Tomes is on the phone by now.

MR. KATZ: Tom, are you on yet?

DR. NETON: Are you on mute, maybe?

MR. TOMES: Yes, I'm on the phone.

MR. KATZ: Yes, he is on.

DR. NETON: Did you have a chance to

hear any of what was just talked about?

MR. TOMES: I came in with the talk on the finding 5.

DR. NETON: Okay.

MR. TOMES: And I concur with everything that was said and the work that I did on it for the four cases. And like I said, there was no indication that there was any substantial difference in the results.

DR. NETON: Okay, so maybe you want to talk about the coworker approach, the coworker work that we are involved with now with the plutonium/uranium?

MR. TOMES: I missed what was expressed earlier but if you want, I can comment.

CHAIRMAN ANDERSON: So, we are left with one through four. Six is closed and seven is still open.

MR. KATZ: So, the Work Group is closing five. Right?

CHAIRMAN ANDERSON: Yes.

MR. TOMES: Well, I can go down where

we stand on these other findings.

DR. NETON: Yes, I think that would be good.

MR. TOMES: Finding 1 was concerning the accuracy and completeness of bioassay records that had not been assessed previously. NIOSH agreed that we should review the accuracy of plutonium bioassay and the uranium bioassay starting in 1991. Incidentally, that approach and we recently -- June, late June, recently completed that review of all the records. We have gone through all the claimant records. And then the results are still in review but our preliminary indication is that the uranium bioassay is sufficient from 1991 to present, which is what we were reviewing. The results of the plutonium are still in review. We have really no conclusion on that at this point.

But the plutonium was a little bit more complicated because point of assessment for bioassay went back into the mid- to late '60s. So, that is still in progress.

Finding 2 was that the insufficient uranium intake data for this TBD for the 1958 to 1970 era, which is the SEC period. NIOSH previously explained that POD intakes are bounding intakes for workers who do not have bioassay data, and it was based on a somewhat limited data and so we have provided the POD favorable intake.

The comment was that that single intake would not be appropriate for all personnel, not sufficiently accurate, necessarily. However, we presented our argument for why we consider that to be a bounding intake and we suggested that we will provide a graded approach for intakes for workers who were not exposed to as high levels. And that would be providing a TBD revision and I believe SC&A concurred that was a valid approach to take. And that was planned to be presented in a TBD revision. So, that is -- we have no updates on that at this point.

Finding 3 said that NIOSH set the plutonium dose for both the operational period and procedural period. This finding concerned

whether or not the plutonium was a covered activity. And we previously evaluated that and after quite a bit of work, we determined that we should cover those exposures. And that is under review. That is part -- that was rolled into the bioassay portion that was rolled into what we are assessing for finding 1, which is still under review for plutonium. And the methods are being developed and we have no conclusion for that yet.

Finding 4 is the lack of neutron dose examined. And our response to that previously was that we would evaluate neutron dose in association with plutonium activities, which is being considered for finding 3.

Finding 5, we just discussed that. Finding 6 was already closed.

Finding 7 was the lack of environmental intake. And our response to that was we were obtaining additional data from NFS to see if we need to address that issue and that data is under review. We are still determining whether the data we received from NFS earlier this year is sufficient

or whether we need to do another request to NFS. I have no conclusion on that finding at this point.

CHAIRMAN ANDERSON: Okay. So, did you get some information from them?

MR. TOMES: Yes, we got quite a bit of information, not much of it useful. Most of that information is information but not necessarily useful.

CHAIRMAN ANDERSON: Yes. Yes, so they were responsive but not necessarily helpful.

MR. TOMES: Right. But it always comes up when you review these that we should go back and ask for more data. So, that is always one of the questions we consider. And that is where we are at right now is whether we have the method we could use with the available data.

CHAIRMAN ANDERSON: Okay.

MR. TOMES: We haven't really even talked to Jim about that because it is still in the early stage of being discussed.

CHAIRMAN ANDERSON: What was the coworker model issue?

DR. NETON: I thought there was a plutonium -- that was the plutonium issue, whether we could do coworker model. Wasn't that the issue?

MR. TOMES: Yes, that was -- I didn't specifically address the coworker model but that was part of the finding 3 and finding 1 assessment bioassay data. We don't have that model.

CHAIRMAN ANDERSON: You don't know yet. Okay.

DR. BUCHANAN: This is Ron again. I would like to also add that there were secondary findings, A, B, C, and D, which are going to be addressed with changes in the TBD when it was revised.

MR. TOMES: I did not go through those and specifically make notes. I can --

DR. BUCHANAN: Yes, that's okay. I just wanted to advise the Work Group of that.

MR. TOMES: I think a couple of those are just clarifications in the TBD.

DR. BUCHANAN: Right.

CHAIRMAN ANDERSON: Okay. So,

basically --

MEMBER KOTELCHUCK: Ron, Dave. This is the first time I have seen secondary findings and I don't know what that category is, if you will. Could you explain it?

DR. BUCHANAN: Generally, we don't do it too much anymore. When we first were doing these, we would do primary findings which would perhaps impact the actual dose assigned. Secondary findings was like maybe incorrect reference to a table or incorrect reference to a reference, or something that would be -- maybe that needed change to clarify an item for a dose reconstructor.

MEMBER KOTELCHUCK: Well, would it be now handled mostly by calling it an observation?

MR. KATZ: Yes.

DR. BUCHANAN: Yes, we kind of have it as an observation now. We were using secondary findings previously.

MEMBER KOTELCHUCK: Good. Okay, thanks.

CHAIRMAN ANDERSON: Okay, I don't --

MR. KATZ: So, all work in progress.

CHAIRMAN ANDERSON: Yes, I don't think we have anything for the Board meeting.

MR. KATZ: No. No.

CHAIRMAN ANDERSON: But it is good that we have closed out two now.

MR. KATZ: Yes, and it is good to be reminded as to where we are with this.

CHAIRMAN ANDERSON: And it is good if you are looking at a coworker model that would be important to see, once you evaluate the data; do we have data to do that? If not, close it out a lot quicker.

Okay, with that, let's move on to the NUMEC White Paper.

NUMEC White Paper Discussion

DR. MAURO: This is John Mauro. I would be glad to start. Or certainly, if NIOSH would prefer.

It is interesting and complex

arrangement. A great deal of work has been done and I also believe a great deal has been accomplished and a lot of things can be closed. But I think it is a bit of an unraveling process, given the nature of the history of the program.

And I look to you folks on how would you like to start?

DR. HUGHES: If you would like to go to the issues, through the issues, John, and then we respond.

DR. MAURO: Okay.

CHAIRMAN ANDERSON: Let's just go front to back, yes.

DR. MAURO: Yes, I could start. And because of the nature of the work, I think it would be good for us to, Lara and Jim, and Dr. Strenge is also on line, all of whom contributed and there is a lot of interaction here. And I can't say that I have everything unraveled and clear as a bell in mind but I have a lot. I spent some time on it.

Let me set the table a little bit. When dealing with NUMEC, which is two sites, one is Parks

Township and one is the Apollo Site, both in Pennsylvania, near Apollo, Pennsylvania and they both did things that were quite a bit different. Apollo had a very, very broad range of activities involving uranium and many radionuclides, external/internal. Very complex. And while Parks Township was more oriented toward plutonium.

Both of them have SECs, which are quite extensive going from the Apollo from 1957 to 1983 for initial operations period. And the Parks Township go from 1960 through around 1980, I believe. So, we have got SECs, very large SECs.

And so and we have an interesting set of circumstances regarding the operations period for both these sites and their SECs. The things that make things interesting here is that in listing the things that can't be reconstructed and can be reconstructed becomes our first layer of ambiguity in my mind, to a certain degree.

Clearly internal is a concern. External appears to be a concern but here is where I am a little unclear and we will get to that. So,

you can see why things start to get layered.

But let's start with -- oh, and another dimension, and maybe we can clean up real fast is besides operation periods for these two different facilities and their SECs and all the technical issues that are embedded in it, we also have a residual period that applies to both locations. And there were a number of issues that we discussed over the history of the program. And I would like to offer up right now to just quickly say that the residual issues that we had of concern were, simply put, dealing with what type of airborne activity would you use during the end of operations as your starting point for doing the residual activity as it goes away in time and what type of resuspension factor would you use to reconstruct those exposures.

And we had some discussion about the optimal approach and all of those discussions, of course, also took place at a time when we were talking about OTIB-70 and how to deal with residual period. In my opinion, from reading the entire

record as best I could over the past week or so, I believe that all issues related to the residual period of both sites have been resolved. And I can say and certainly please, anyone else on the line, given the complexity of the site, who have also been looking at this matter, but in my reading of the situation is that all of those issues have been resolved. So, that is off the table. And the only thing we really have to talk about are the complexities associated with the operations period for both Parks and Apollo.

Is there anyone on the line that feels, from looking at the record, that maybe I am oversimplifying? But that is my takeaway.

DR. LIPSZTEIN: I just want to comment John that the changes that were agreed upon, they are supposed to be included in the draft TBD Revision 3B that we didn't see.

DR. MAURO: Yes.

DR. LIPSZTEIN: So, we're agreed upon but we didn't see the change on the TBD itself.

DR. MAURO: Very good point. What I

just said goes for the record but we haven't actually seen them in the new TBD that I believe is planned for publication this August. And that has been very clear in an excellent overview of this very complex story, that Lara Hughes prepared in her report dated June 23, 2016, which is a great place to start.

But that point is made, and yes, there is still material that needs to be -- all of these things that we are going to be talking about, a lot of that is going to be -- has been agreed upon, not all of it, and will be in this new TBD that will come out. But I believe you will see as we move through this, we can say that there is an awful lot that is in abeyance. And one of the areas, as Joyce brought forward, has to do with the residual period.

So, we can say that we have agreed in principle and it is just a matter of awaiting formalization on that in the new TBD that is going to be issued according to the schedule, looks like an August date. I don't know is that August date

still a good date?

DR. NETON: As far as I know, yes.

CHAIRMAN ANDERSON: It's coming up pretty quick.

DR. MAURO: Okay. It is pretty quick.

CHAIRMAN ANDERSON: I hate to say it but the summer is rapidly --

DR. HUGHES: No, it's in the final review stages.

CHAIRMAN ANDERSON: Okay, good.

DR. MAURO: Now, let me just move the next layer, which is good, a big chunk that we just clear out. Now, we are going to talk a little bit about the definition of the SEC. And I am going to give you my brief take on some problems. They are not technical problems. They are clarity in terms of what is the definition of the Class, and what does it all mean?

Let me just start with let's say Parks Township. Okay? And the physician there is from 1960 to 1980, a Class has been granted, an SEC has been granted and it is mainly because of the

inability to perform internal doses, reconstruct internal doses. But there are other issues related to what is called the CDP data, the Helgeson data and falsification that I think is in play here. And there is also a statement that indicates that you really -- you can't do neutron doses. This is my reading, now, please correct me if I am not getting this right.

And you really can't build any type of coworker model for polonium and iridium. But one of the things that sort of left me a little bit disoriented with regard to -- now we are talking Parks, is that it appears that -- and you notice that I haven't actually gotten into the 21 issues that Lara summarized. I'm starting off more up in the stratosphere.

There seems to be a little bit of uncertainty on my part of the ability to do external dose, whether or not -- and maybe here's a place where we may have some disagreement. Namely -- and by the way, a lot of this is already, unfortunately it is a deja vu all over again, I realize this. We

talked a lot about this back a year about it at one of the Work Group meetings where what we have is an SEC is being granted, primarily because of internal but there seems to be some question regarding external.

Stay with me for a minute on this now. Envision, we have got workers during the time period were covered by the SEC. They granted their compensation under the SEC but then of course, you have a large number of workers who are not covered because of the types of cancers, including ET1, ET2, prostate, skin, and perhaps others and they are denied.

And here is where things get interesting. We are talking right now Parks but a lot of what I am saying also has certain applicability to Apollo. But now along comes a bunch of workers who are not going to be compensated because of the type of cancer they have. And one of the things that we were very complimentary about in the Site Profile is we said listen, we are going to do the best we can to reconstruct, do partial

dose reconstructions for those workers who are not compensated because of the type of cancer.

And one of the things that is different here, and this was mentioned in our review, and we know that is -- we are starting -- you do the best you can when you have data for that person. And you try to do the best you can to reconstruct the dose to the organ of interest. But in this report, you actually take it a step further and you start to describe in some considerable detail how you are going to do that. And that is, in my opinion, something new because think of it like this: in the past the position of NIOSH was is listen, we are always going to use data for that worker if we can, and do the best we can to assign some dose to the extent that we could. And so it stops at that. But in this case, you want the next degree, which is a good thing, saying this is how we are going to do it. And in fact a lot of how you are going to do it, it is made reference to in Lara's report on June 23rd, but there is a lot of detail regarding how are you going to do it in the report by Dennis

Strenge and Jim dated May 14, 2015.

So, what we have here is a circumstance that says we are going to -- we have procedures, we have approaches, assumptions, methods we are going to use to reconstruct the doses, partial dose reconstructions and this is how we are going to do it.

And therein is the start of where some of the issues lie and they fall into two different categories, when you say yes, we are going to do the best we can. One category is okay, here we have a worker and we are going to -- we have some data and for him or her, we are going to do this, this, and this to reconstruct that dose.

And so we have some questions regarding that and we have folks on the line, including Joe Zlotnicki and Joyce who can speak to those particular matters, the approach that is planned; in one case external and the other case, internal.

And then we have another category that has to deal with coworker models. Now we all know that coworker models are never used to reconstruct

doses for these people. In other words, that is the reason there is an SEC -- you can't build a coworker model. But you are going to see as we move through this process that there are words and discussions and material, including in Lara's write-up, that leave you with the impression that maybe a coworker model will be built and used.

And the place where that happens and it has to do with what I call finding 14, dealing with neutron-to-photon ratios. And there is some discussion on what those ratios would be and they reference to, in Lara's June 23, 2016 report, and there is considerable detail on that matter in the report by Dennis Strenge and Jim Neton dealing with these matters. And there are issues of that nature that leave you with this, and this is very interesting.

We are going to build a coworker -- we are going to use neutron-to-photon ratios to reconstruct external doses to neutrons. And there is ambiguity of whether or not that, in some of the words, whether or not you are claiming you can or

you cannot reconstruct external doses. I get the sense that the answer is no, you can't, but you are going to do the best you can. And then you run into the circumstance where when you -- and that is okay.

Certainly if you have some external data, let's say photon data, and yes, we are going to do the best we can to assign some photon dose to these uncovered SEC people. But then I see some words that say not only that, we are going to do the best we can to give them some neutron dose based on neutron-to-photon ratios.

And, in my opinion, unless anyone disagrees, by definition, that is a coworker model. And all of a sudden, we have got this unusual circumstance where a coworker model is going to be used to reconstruct a neutron dose for a worker and, in my mind, by definition, there has to be a coworker model.

So, what I just laid out now, what I would call a macro level, the big picture of what we are trying to unravel. And with that, and I just communicated to you my understanding of the

material that I have read without actually going into finding 1, finding 2, finding 3. I think we need to do that and close them out or find out where they come to bear. But you can see by the story I just told why I felt that this was a very layered, complex, almost like a Rubik's Cube that we are trying to unravel a little bit.

And now everyone on the phone who has been close to this, did I accurately represent the nuances and dimensions, the various facets that we have to come to grips with on this particular site?

MR. BARTON: John, this is Bob. Yes, I think that is a pretty good 10,000-foot view, so to speak. I think a lot of what you talked about, it is a complex site with several issues, originally 21. I think a lot is going to come out as we sort of work our way through that anyway. So, it was a good setup.

DR. MAURO: Thank you. I don't know if NIOSH, do you think I did a disservice here or is that a fairly good representation of the knots we are going to try to unravel?

DR. NETON: This is Jim. I don't -- I'm not sure where you are going with this. I'm looking at the paper that Lara put out and I thought it was pretty clear that we decided that we are not going to have a coworker model for external.

CHAIRMAN ANDERSON: Right.

DR. NETON: Whether we have a neutron/photon ratio that applies to monitored workers that have badge results, that is a different issue.

DR. MAURO: Okay, that is important because I didn't -- that is why I raised the question. See, I hear in neutron/photon, I say okay, you have got some photon data, now I want to assign neutron data. You don't have neutron data for this guy and that means you have no other choice but to go find some neutron data ratios, which is, by definition in my mind, a coworker model.

Now, that is my definition. I may be wrong. So, and then all of a sudden, you introduce a coworker model into the SEC world, which is, in my mind, a no-no.

DR. NETON: I guess maybe Lara can remember more of what we described on the neutron/photon ratios.

DR. HUGHES: The neutron/photon ratio here, it is a model. It is not -- we would not consider it typically a coworker model. It is based on -- and I think Dennis might be able to elaborate more but it is based on measurements that were taken, like paired measurements.

And in this case, it is fairly rudimentary. Typically, we would like it to be more robust, as you commented in your issues yourself. But it is all we can do. It is all we have and we use it for the fewer -- there is relatively few externally monitored workers but in the case where we have data for these workers, we will apply the data during dose reconstruction.

It doesn't mean we can do a coworker model. Also it doesn't mean we can assign this model to an unmonitored person. It is basically the best we can do with the data that we have, that we have gotten from the site. There is various

issues, mostly are internal, there are some external that we feel that we cannot do a coworker model. And we certainly have numerous reasons why the site has become an SEC.

But again, for the people that were unmonitored that do not fall under the SEC, we try to assign the doses as best as we can with what we have and that is what we are looking at here, basically.

DR. MAURO: And you know what? I agree completely. And I think that I bring this neutron/photon ratio up specifically because it struck me that that has to be, by definition, a coworker model.

Think about it. You may not agree with that but in my mind, there is no escaping it that is you are somehow using an understanding of the relationship between photon and neutron exposures that you have data for, for the site in general and the operations that took place. Or you actually have a record of some exposures for other workers where you can say it looks like we have got this

type of neutron/photon relationship.

And in my mind, that is a coworker model which puts NIOSH in an interesting situation. It means that hold the presses, Jack; maybe we can reconstruct neutron doses. And all of a sudden, it is not one of the reasons why the SEC is being granted.

So, I find that as being -- puts me in a place that I'm off balance. I said well, if you could build a coworker model, well, then that is no longer an SEC issue.

DR. NETON: Maybe we could hear a little more about them because I have forgotten the exact nature of how neutron/photon ratio was being developed.

DR. MAURO: Yes, well, I bring that up because --

DR. NETON: I'm not sure I share your confusion, John. I mean I would like to hear more.

DR. MAURO: Yes, well, we will get there. I wanted to give this introduction because it has -- you know and operate at a higher level

before we get down to deal with the specifics. And certainly we are now at a point where we could deal with the specifics, given this what I consider overview of my take on --

DR. NETON: I mean I don't understand why you confuse it. If we say that we could reconstruct neutron exposures for workers who were monitored for photons, that that implies that we could do coworker models for unmonitored workers. I don't understand what that is a confusing issue.

CHAIRMAN ANDERSON: I thought was all we -- and I think that if we have data, you can expand that data for that person.

MR. STIVER: Well, I think the kind of nuance here is that you have monitored workers with a monitored for photons only.

CHAIRMAN ANDERSON: Yes.

MR. STIVER: And here you have this other type of exposure which kind of becomes like a coworker model in that you don't have monitoring data for neutrons for these particular people but we have got this other set over here that we can

use to develop --

DR. NETON: Who were monitored, though.

MR. STIVER: Who were monitored but they weren't monitored for neutrons. So, it is kind of inconsistent.

(Simultaneous speaking.)

DR. NETON: So that is why you can reconstruct external photon doses for people who weren't monitored. I don't know how that logically follows. That is what you are implying.

MR. STIVER: You are trying to -- you are reconstructing the neutron doses for those who weren't monitored for neutrons.

MR. SMITH: This is Matt Smith with ORAU Team. I know we can get into it deeper, as we go on but just real quick. You know from the report in 2015 that Dennis put together, you know when you take a look at the 0.34 ratio that is cited, that is based on data, a study in fact that was performed in 1975, once TLDs came into use.

So, it is not the kind of data that you

would use in a coworker study by any means. It is, again, a limited study but it what we had to work with, what we weren't able to get by doing more requests from the site for data. And it was that study that led to the development of that particular ratio.

In addition in that study, there were some six dosimetry plates around the facility. So, we have got neutron and photon data from six TLD positions.

You know nowhere are we going towards a coworker model where we have tried to ascertain neutron dose from some large set of data of Energy Employee workers.

MR. STIVER: Okay, that makes more sense.

MR. SMITH: What we are trying to do here, as has been stated repeatedly already, is we are doing the best approach we can with data that exists in the post-NTA era.

DR. MAURO: I think this is important because I don't think we have seen this -- I haven't

seen this before. That is, when I hear that we are going to do the best we can to assign doses for an uncovered worker for an SEC, what always means is yup, we happen to have some numbers for him and it is unique to that person and we are going to do the best we can. Great. And not only that, you actually describe in some detail how you are going to do that, which is even better.

But then when I saw the neutron/photon, it says wait a minute, that is not measurements for this guy. This is some other information you have and you are saying that there are certain other types of information like these measures you have just mentioned, which you can use for that guy. And that doesn't mean you are building a coworker model. That means you are just taking advantage of information you happen to have at the site that will allow you, at least in the case of that one person, to be able to reconstruct his doses. And it doesn't mean that any worker that you have external doses -- by the way, am I correct that it is your position that the SEC has been granted, in

part, because you cannot reconstruct external doses in the case of both Apollo and NUMEC?

DR. NETON: They are two separate issues, John. I think Parks was added as an 83.14, which means that we stopped evaluating the infeasibility as soon as one was identified. Which I think in the case of Parks was thorium, I don't remember but it was an internal issue.

And I think if you look at Section 6.2 of that Evaluation Report, it said because we identified infeasibility, we didn't evaluate external completely at the time. That is very standard language for an 83.14. And then when we back and evaluated it further, the decision was made that external was also infeasible.

DR. MAURO: Okay and I read that.

DR. NETON: Now, I think the other one, I think we did say an external was infeasible at Apollo.

DR. MAURO: Yes, that's correct.

DR. NETON: And if you think about, these are sister facilities that shared common

dosimetry programs. That is another nuance here that we need to think about is it was one health physics that covered both facilities.

DR. MAURO: Right. And you know what? I would like to go into it a little bit more before we go vertical. Let's talk about the idea of a person that is not covered because of the nature of his cancer. He works at NUMEC. And you are going to do the best you can to reconstruct his internal doses -- his doses. And what I just heard, because it is an 83.14, this is where I think I need some help, because it is an 83.14, you agree well, we really can't reconstruct this guy's doses because of a thorium. I think thorium was one of the big kickers here. We can't do his internal. But then I say to myself, okay. So, as a result, an SEC is granted based on 83.14 because you can't reconstruct internal doses to thorium.

And then you have got all these other people out there who are not going to be compensated because they are not covered. But all of a sudden you tell me but hold it. Maybe we can reconstruct

his external doses and maybe we can even build a coworker model for all of the other workers that are not going to be compensated but we can assign doses to them. Not only can we assign doses to them because we have some data for those people but it is possible, if you look at the data, and here is where we are going to have -- this is one of the places where we are going to have a difference of opinion that needs to be aired out. If you could build a coworker model, in other words, I can't see just walking away and say well, that is the end of the story. Now, hold it. You have got some solid data out there on external dosimetry, let's say it is for Parks and if you look at the data, you say you know we could actually build a coworker model.

MR. KATZ: John, I mean I think you misheard something. Because after -- they didn't base 83.14 on external. That's true. You got that part right. But afterwards, they concluded it's true they cannot do external even for that site.

DR. NETON: It's pretty clear in the

write-up that Lara put together on page 16, 17, 18, there is a fairly good discussion about why we feel external coworker models aren't feasible.

MR. KATZ: Are not feasible.

DR. NETON: And maybe that should be the basis of discussion here, not that -- the path to go in that, which is we didn't chime in on external during an 83.14 but we have decided now that we can. That was the instructions we got from the last Working Group meeting.

DR. MAURO: I think that may be the technical point, one of the -- we are going to have two types of technical issues that we are going to deal with. We have a number of comments made by Joe Zlotnicki and Joyce on those methods regarding external/internal, where you have data for people and how are you going to do their reconstruction. And then we have this other issue that we just talked about, whereby I think we have a bit of a disagreement on whether you can build a coworker model or not for external exposure. So, it becomes very clean. I'm not saying who is right and wrong

here. I'm just saying but these are the things that I think are important to talk about on this subject and these are, I also believe, to be somewhat precedent setting and that we really have never gone down this road.

In a funny sort of way, it is happening because you guys went the extra yard and tried to do a very good job on NUMEC by getting into in considerable detail how are you going to do the doses for the people who are not covered by the SEC, something that you don't often see.

So, it is interesting that the very thing that was well-intended actually is causing areas where we are going to have to discuss and resolve matters.

MR. STIVER: John? This is Stiver. Let me just cut in for a second.

If you look in Lara's report, page 15, the last seven lines kind of lays out a summary of why they are not able to do external coworker models. They said the main reason for --

I could just read it into the record.

The main reasons for the infeasibility conclusion are the available gaps and the inability to separate out the data by site and the work area job title. In some cases, the external dosimetry reports for the contractors, such as Landauer, list the facility but that is not always the case. It seems that this practice was taken up sometime in the 1970s but then stopped again.

It is, therefore, not possible to separate out the data by site. There is also the factor that many of the workers who may have been routinely in radiation areas were not monitored by external dosimetry. Therefore, the available data may not be representative of the exposure scenarios.

So, in my mind, that kind of lays out in general terms the reason for the infeasibility.

DR. NETON: That's good. That is our position. And maybe we should be speaking from that point. If you disagree with that, I would be interested to hear why you feel that those are not valid reasons.

DR. MAURO: I'm going to put Bob Barton on the spot. Bob, when you and I spoke about this and you had a chance to look at that very issue, we were talking a bit about well, is that true. In other words, are they in a position where they really can't do it? And the sense was that well wait a minute, I'm not ready to give up on that yet.

However, and we have all been looking at this issue now for getting ready for this meeting and I know we have had these kinds of conversations internally.

I don't know. Bob Barton, where are you right now on that? Do you agree with that statement we just heard or do you want to talk a little bit more about that?

MR. BARTON: Sure, John. And what was alluded to, a lot of those points that John Stiver just read into the record that are in Lara's report were things that were discussed in general terms at the last meeting. And as Jim Neton said, they were given the task to go ahead and say alright, we have to look at these areas of, I guess, pathways

to cull them, which pretty much will go to the external dose and possibly uranium and say, do we have the data? Do we have the ability to construct a coworker model within the sufficient accuracy guidelines and the implementation guide that has been developed?

And I guess where it is a bit strange for me, I guess we are expecting more of a sort of quantitative assessment. I mean these are all very generally good terms but how many dosimeters do we actually have? How many workers do we have monitored? In other words the mention that sometimes Landauer would report the actual site the person was at. How many of those do we have by year so that we can say definitively? Because I mean we don't really have anything to go on because we have not dove into the records.

So, I guess it would be helpful, at least from my perspective to maybe hear a bit more detail, if it exists, or some sort of quantitative indicator that says yes, we all agree that given the guidelines for how you construct coworker

models at this stage of the program, that it is in fact impossible. And so while you are not going to revise the SEC, it is important to know that for an unmonitored worker, we just don't have any avenues to say, for instance, assign a coworker external dose.

DR. NETON: I'm not sure how you become -- if you don't have quantitative information to build a coworker model, I don't know how you would be quantitative about describing how you can't do it. I'm missing something here, Bob.

MR. BARTON: I mean in the Parks SEC report, it says that external data exists from what was it 1961 until whenever. So, there is some data. We don't know how much.

So, I guess what we were hoping for was, the number of say badges you have by year.

DR. NETON: Well, that wouldn't help anything if you don't know the data completely. See, we don't know what the ultimate data set is. Right? I mean it is a data completeness problem. You have a lot of -- you have badges, sure. But

do you have them all?

MR. BARTON: We always have that problem, though, don't we?

DR. NETON: Well, we go through this in painstaking detail, coworker models. We try to say okay -- we are doing this at Savannah River right now. What percentage of the data do we have? Do we look at monthly reports and say okay, they monitor 100 people every month and do we have 100 badges every month? All the kind of happiness that we do with all these things. We have none of that here. So, I'm not sure what you are asking for.

I mean if you can't do it, you can't do it.

MR. STIVER: This last sentence here that you have people going into radiation areas that were monitored. It could have been high exposure areas. You must have some, like a claimant review that would lead you to expected --

DR. NETON: There is indications here when we talk about people that have internal monitoring results but no external data. I mean

so there is indications of I'll call it chinks in the armor, if you will, or inconsistencies that are there. I don't know. I'm not sure how quantitative you can get if you don't have a quantitative way to evaluate it.

MR. BARTON: Well, I guess my only point was that on our side of the fence, we really have no idea to what extent what data you actually have so we are kind of going blind in here.

You know, like I said, it might be helpful just to see how many people were monitored but you might have the completeness issue.

DR. HUGHES: Well, we have Table 1 in the White Paper that has kind of a rough outline on the number of external dosimetry results per year. That kind of gives you an indication how many data points we have. It also shows you that for some years we have none, such as 19 -- hold on. There are some years where we have very few data points. That was one of the issues, that externally we are looking at these gaps that we haven't been able to resolve.

We also, when we look at individual dose reports from the site for claimants, there is often you see that were not monitored externally, even they were monitored internally. And from the internal data, you get a pretty clear picture that they did work in a radiation area. There is indications, and I think it is listed in the TBD, that the site also relied on area monitoring to control their radiation fields, which is not a good -- it would not show up in their records. Let's say it like that.

So, there is definitely issues that we feel like the data is not complete. We do not believe that everybody who needed to be monitored was monitored, that the data set that we have does not include like highly exposed workers.

DR. MAURO: I think you just hit the single most important point. There is always this completeness issue but when you feel that you do have a set of data that is the high end exposures, whereby you could say well, we are not missing any of the -- the data we do have is capturing the high

end folks and from there, launches into a coworker model.

Now, you just made reference to a table that is in your Site Profile?

DR. HUGHES: No, it is in the White Paper.

DR. MAURO: I have a couple of White Papers. I have yours, Lara on June 23rd.

MR. STIVER: It is Table 1 on page --

CHAIRMAN ANDERSON: It is in June 23rd's.

DR. MAURO: Yes, I have got that in my hand.

MR. STIVER: It begins on page 15.

CHAIRMAN ANDERSON: Fifteen and sixteen.

DR. MAURO: Okay, good. Thank you. Let me go look at that. Okay, where we go. Good.

MR. BARTON: Yes, I think what we really just wanted and, Lara you just gave some excellent points there, is to bring closure to this I think from the last meeting was, and you agreed,

that we really do need to close this out; go look at it and provide our rationale for why we believe that unmonitored doses just simply can't be assigned for this site because of A, B, and C. And I think that is really what we wanted to do is kind of get to those points that Lara just pointed out and have the Work Group understand exactly why a coworker model can't be built. And I think that is really all we were looking for.

DR. MAURO: Okay, this is good. This is good. And I did see this table and I am very appreciative that you have pointed this out.

So, what we have here is a nice summary by year for the data and what you are telling me is you don't know if this data goes toward NUMEC or Parks. But and it gives you -- these are the numbers of measurements that were made.

For example, I am looking at 1965. You have got the total number of individuals that were measured were 131. And I believe those -- which I presume for each one of those individuals, whatever those measurements are, they could be

quarterly, they could be a single one-year measurement, they could be monthly. Am I understanding this correctly?

DR. HUGHES: Yes, it is the total.

DR. MAURO: Yes, and so would you -- what you are basically saying is for the year 1965, the data that you do have for beta, gamma, deep -- you don't have neutrons. We have got data for 131 individuals that look at these metrics. And your position is from that, and this is good, in your judgment you really can't build a coworker model for external exposure for 1965. That amount of data is insufficient and there has got to be a reason why your takeaway is there is a reason why that is insufficient. And it has to go back to Jim's write-up on what you really need for a good coworker model.

And right now I guess I would say I'm not quite sure where it fails Jim's criteria.

DR. HUGHES: Well, for one, this is comingled data. So, it is like this is Parks and Apollo together. We determined that we cannot

tell who was Parks and who is Apollo from this data, from these 131 individuals. It might be both, in many cases, because workers transitioned back and forth.

DR. MAURO: Well, does that matter?

DR. HUGHES: Yes.

DR. NETON: Well, you have got two separate facilities, two separate covered facilities with comingled data. So, how are you going to say that this bounds this guy who worked at Parks versus this guy who worked at Apollo?

MR. STIVER: John, you have separate exposure scenarios for the two different sites, too.

DR. NETON: I mean forget stratification data base on job category. You can't even stratify based on facility.

MR. STIVER: And you know in my mind, the real kicker here is that you may not have a representative data set. You might be missing on the high end. That is really --

CHAIRMAN ANDERSON: It could be one of

the facilities or the other.

DR. NETON: That is the other issue. It is not necessarily the number of samples you have but that you have a complete set of the samples.

MEMBER KOTELCHUCK: John, this is Dave. John Mauro, you essentially are saying and we are all discussing why we can't have a coworker model and this doesn't fit for a coworker model. That's fine.

But the problem that we have from the point of view of the persons who are asking for compensation is that they have a non-designated cancer. And you are saying well, if they use the data that exists, you are effectively having a coworker model. I would turn it around and say you have this person. Because they have a non-designated cancer, they will not be compensated unless there is some data that gives some information that will allow you to make a partial dose reconstruction.

What is the problem with that? I mean otherwise, we are essentially saying if you feel

like it is inconsistent and implicitly, you don't want to use the data that is there, then you are just saying you are denying.

DR. MAURO: Right on target. But you brought it to the point -- there is one more step.

MEMBER KOTELCHUCK: Okay.

DR. MAURO: Everything you said is right on target. The next step is but if there is enough data out there -- you have a worker, you don't have any external dose for him, he is not covered and, therefore, he gets nothing. He gets no dose assigned. So, he's denied.

And all I am saying is well, hold the presses. We know the main reason why the SEC has granted his internal and why these people area all being compensated but for this guy and these other people who have cancers that are not covered. And NIOSH is doing the right thing. Well, if we have some external data for this guy, we are going to give it to him.

But I am kicking it one more step up because I think this is an important philosophical

-- not philosophical -- practical matter, really.

I'm just looking at 1965. And I'm saying alright, we have data. We have 131 individuals who have data. Stay with me now.

MEMBER KOTELCHUCK: Right.

DR. MAURO: And now this guy, he is not one of those 131 individuals but you do have 131 individuals with data. And I say well, you know, you could take that 131 data points for that year and plot it. Okay, let's say we are talking about gamma, most of which is what we really care about anyway, most of the time. And there is 118 measurements.

I take my 118 measurements for that year. Now don't forget, we are not talking about all the years now. We are just talking about one year. So, we are really getting pretty good. And we plot it and I come up with a 95th percentile value for that guy -- for that data set. And I say to myself, here is my 95th percentile value. Why can't I use that, assign that to this guy who has

no external data?

Now, here is the last step in the argument. Jim just argued that wait a minute, you can't do that. You know why? Because we don't know if that 118 gamma data represents the limiting group. Is it possible we are missing the important exposures?

MEMBER KOTELCHUCK: Yes, it is possible.

DR. MAURO: And that is the question that is not apparent to me. In other words, I know that an argument is being made well, that 118 could really be a mixture of some people from Parks and some people from Apollo. And one could argue that well, that is a problem.

MEMBER KOTELCHUCK: That is a problem. Then, it is not very good. And then if you don't use it, then the man is denied or the person is denied.

DR. MAURO: Okay.

MEMBER KOTELCHUCK: So you would rather -- I mean it may not be correct but it is

the best we have and if the best we have isn't good enough, denied.

DR. MAURO: Okay. And the only point I want to leave on the table because I don't entirely agree with that -- it doesn't make me right.

MEMBER KOTELCHUCK: Okay.

DR. MAURO: That is why we are having this meeting.

MEMBER KOTELCHUCK: Right.

DR. MAURO: If I were doing it, and I would say listen, I am going to do the best I can, it is sort of like one of these cases where you are doing it blind. I was confronted with this. You said you know what I am going to do with this guy? I am going to pluck off the upper 95th percentile to 1965 of that 118 numbers. And you are right. I don't know if this is Parks or not. So, I would say so what. I am going to pick the upper 95th percentile, which is certainly going to be a plausible upper bound value that I could assign to this guy and I could feel pretty confident that I

am doing the right thing by this guy because I am trying to do the best I can to give him a plausible upper end external dose, even though he has no record and this way, we at least give him something, as opposed to nothing. And I would argue that that would be the right philosophy and policy to take.

And if that fact is incorrect, and if NIOSH has the judgement and the Board's judgement that no, John, you don't do that, I'm fine with that. But I felt compelled to say if I were doing it, that is what I would do.

MEMBER KOTELCHUCK: I would agree with you.

DR. MAURO: Okay. So, there it was --

MR. STIVER: The other aspect, though, John, is that you are saying that 95th percentile, based on the available data, might be plausible but you reason to believe that that is really not the upper end of the distribution.

DR. NETON: You see, John, what happens in the case of the 95th percentile compensates that one fellow you are talking about. And then someone

else comes along and says well, that is not accurate. I had a higher exposure than that and he is not getting compensated because -- I don't know.

MEMBER KOTELCHUCK: Because why?

DR. NETON: Because you don't really know what the upper 95th percentile is in this case. And so it sort of ends up being an arbitrary assignment based on the data that you have and you don't know is of sufficient quality to set that 95th percentile.

MEMBER KOTELCHUCK: So, I would rather deny you. And I think we have to -- our assignment under this law is to be, if you will, worker friendly, or give the benefit of the doubt to the worker.

And to not use the data is to deny all the workers.

MR. KATZ: But Dave, I mean this is worked out very early in the program. You can't do minimum dose reconstructions. It is not defensible legally for the reason that Jim

explained. Because it may benefit one worker but another worker, just as he says, can contend that they have higher doses and there is no way to sort it out.

I mean that is just a settled matter in terms of we don't do that. We don't do minimum estimates. We can't defend those legally in court.

MEMBER KOTELCHUCK: But then -- well, I accept that that is the case and that was determined well before I was around. But does that mean that we can never compensate partial dose reconstruction?

MR. KATZ: No, no because partial dose reconstructions are based on actual data in hand on a person. So, generally speaking, the partial dose reconstructions, you can't do a coworker model, so you can't compensate the people that weren't monitored.

MEMBER KOTELCHUCK: Okay.

MR. KATZ: But there is no deficiency for those who were monitored. So, you can deal

with their cases. And that, generally, is what a partial dose reconstruction is.

DR. NETON: That is not to say we could never have coworker models for some sites.

MR. KATZ: Right.

MR. STIVER: It would give the SEC based on the inability to do thorium internal but you might have a perfectly good external dose.

DR. NETON: And we have examples of that.

MR. KATZ: Right and it is still a partial.

DR. MAURO: In my mind, we are almost there. So, you are saying to me that you believe that 118 measurements for 1965, since you cannot say with a high degree of confidence that that captures the upper end distribution of the exposures, that it may very well be some data you happen to have and the selection of those 118 people were not done because they were the people they were worried about, they just happen to be people that were badged. And if that is the case, I would agree

with you. I would say listen, we got 118 numbers and we don't even know what they mean.

But if it turns out that the records show the known data policy, we are badging these -- these people we decided to badge, we badged because we had good reason to badge them and we do believe they were problematic. What do you do in that circumstance?

MR. STIVER: The should build a coworker model.

DR. NETON: Then we would build a coworker model. But again, the statements that John Stiver read that were part of our discussion, discussed why we don't believe those numbers are useful to us.

DR. MAURO: What I heard John read is you really didn't know which site to put them at.

MR. KATZ: No, there is two things, John. John, there is two things.

DR. MAURO: Okay.

MR. KATZ: I could just clearly state two things. One, you have people monitored for

internal that definitely have no external dose. So, you know people were exposed and not monitored. So, you already know that is an incomplete external set.

DR. MAURO: Okay.

MR. KATZ: Okay, that is firm. It is not conjecture. It is actually a firm fact that you don't have an incomplete set.

DR. MAURO: Okay.

MR. KATZ: And the second thing is if you have two different sites, data from two different sites comingled and you can't separate the two, think about it this way. They might as well be at Rocky Flats and Savannah River. You are not going to apply Rocky Flats data to the Savannah River workers. You can't do that if you had mingled data. You wouldn't be able to apply it and make a coworker model based on both Rocky Flats and Savannah for only Savannah River workers.

It is the same thing here. I mean they are all under the same company but they are two separate facilities, completely separate

facilities. They are treated separately as far as this compensation program is concerned.

DR. MAURO: Okay, let me just take you a little bit on that. We have an operation called NUMEC. It happens to have two physically different locations and they happen to manage their external dosimetry program under a single umbrella and they didn't go through the trouble as they perhaps might have by saying who got his dose where, when.

So, we have a pool of workers who you both agreed could very well have gone between the two sites. Sometimes they work there; sometimes they work there.

So, what we have is a pool of workers that could be in different locations but if there is some evidence, and here is where -- I'm ready to go with you guys on this but doesn't mean you have captured the high end. That is what I am stuck on. If I felt as if that notwithstanding the fact that we don't really -- he may have been here; he may have been there but we do know one thing for

sure. Whenever we decided to badge someone, wherever you happen to go, we picked him because he was a high-end guy because of the nature of the job. I would argue that that makes for a coworker model.

MR. KATZ: No, John, it doesn't matter. If you can't say which site the data come from, you can't apply it to a person from another site. You can't.

DR. NETON: How would you know the high end of Parks was not higher than the high end at Apollo? And so now you have got stratified data you can't segregate. So, I am going to assign the guy the mixture, even though I worked at Apollo that may have had a much higher 95th percentile than the Parks data. We don't know. I mean I'm not saying that is true but you just can't tell.

DR. MAURO: I hear what you are saying. And listen, I'm not digging my heels in because I want to. It has got to make sense to me.

I have got an RSO that is running the health physics program that covers both sites.

And I am making the decision of who I am going to badge and who I am not going to badge on a day to day or week to week basis. And I know sometimes I'm sending a guy off to Apollo and sometimes I am sending him off to NUMEC. But I am going to make a decision on that day or that week or that month when the guy is going to be there who I am going to give that TLD to or who I am not going to give it to. And in my mind, that is a single program. I don't care that they are physically in two different locations. I'm managing a pool of workers in a way that I feel confident that I am managing the people who are getting the high end doses and they need to be managed. So, I don't accept that.

MR. KATZ: Well, you don't accept it but it is just the way it is. Because again, they didn't have the exact same exposures in those two facilities. They are not identical. So, you don't. You have data for two different facilities that have been mingled. You don't know which goes with which and you can't apply data from one

facility to people at another facility, unless you go through that whole surrogate thing that doesn't apply.

DR. MAURO: I don't agree with that.

MR. STIVER: John, there is one other aspect that Lara brought up earlier was that oftentimes they use area monitoring to determine who was going to get badged. So, it is not like you have got an RSO who is basing his assignments of dosimeters on exposure potential. We have got a situation where there may be high exposure potential with no external dosimetry.

MR. THURBER: But isn't it also true that if you want to try and compensate as many people as make some sense to do, you take whatever data you have got, whether it is representative of the high end or not and say we are going to apply this data to all these people. They are better off than -- your alternative is to deny them all. Do I understand it correctly?

DR. NETON: Well, you can't assign an arbitrary number and start making compensation

decisions. If I pick an arbitrary value and say that is certainly higher than X, just as Ted just explained --

MR. THURBER: No, I'm not saying arbitrary. You take the data you have and I'm going to use it.

DR. NETON: But it is arbitrary because there is no basis for it, other than the fact that it is the data that I have that I can't determine whether it is a bounding value, a representative value of exposures.

MR. KATZ: And that is the part, Bill, I was saying that has been settled.

MR. THURBER: Okay.

MR. KATZ: That is really a settled matter. There is no really point in debating it again because it is so already completely settled and the lawyers put their foot down on that matter.

MR. THURBER: Okay, fine. That clarifies that, but one other point, and I am a dispassionate observer on this particular site.

The conversation started out regarding

the neutron/proton ratio and the fact that if we have proton data that we can use a factor to also calculate the neutron exposure. Now, does that constitute a coworker model? Not in my mind.

DR. NETON: That's used to augment a person who was monitored for photons. I have a badge and I have a photon exposure. And you know that there is a certain ratio associated with the photons and neutrons, you can augment their measured exposure, not some made up value.

MR. THURBER: No, no, I understand that and I don't think that is a coworker model.

DR. MAURO: No. No, not if you don't know where the guy worked. Now you are telling me I have got a photon dose for a guy who may be at Apollo versus Parks and we know that Parks was a plutonium-oriented facility but I'm going to go ahead and use this neutron/photon business when you don't know where he was. And clearly, there has got to be a big difference in the neutron/photon relationship between Parks and Apollo.

So, there is a lot of things here that

are churning up stuff that we really haven't churned up before. And I find myself in a position where I feel as if we are not doing everything we can to assign what I would consider to be a plausible bounding dose to this guy who is not covered by the SEC and it certainly looks to me that you know, I think I can find a way to assign a plausibly bounding dose for this guy. And based on the data that I have --

DR. NETON: You know, John, you have got to be consistent. You look at the implementation guide --

CHAIRMAN ANDERSON: It doesn't have to be fair.

DR. NETON: -- we are going through a lot of hoops to demonstrate that these data are plausible -- not plausible -- representative. And you just can't sort of ignore that now and say well, I want to be a good guy and generous and start making up numbers just because you feel they should get more exposure. I mean it just doesn't work that way.

DR. MAURO: Well, I don't think -- well, I don't think you are making up numbers here. I think we are looking at some really nice numbers. I see 118 measurements just in 1965 alone and I know I can do a lot with that.

DR. NETON: Well, I agree John but --

DR. MAURO: I have to say, listen, first of all, I want to apologize to everyone because sometimes I get stuck on things that when they don't make sense to me, I just don't let go. And right now I am in a place where I am uncomfortable with the way in which this is -- I respect the decision.

DR. NETON: I would like you to start thinking about some of the other sites where we have developed coworker models and all the hoops we jumped through to demonstrate that they were representative.

I think about places like Savannah River, Idaho, Rocky Flats, to some extent, when we went and developed some of those models. We went to great lengths to look at data completeness,

representativeness.

DR. MAURO: Yes, but Jim, that was the purpose to decide whether we are going to make this an SEC or not.

DR. NETON: Right, based on --

DR. MAURO: We are not talking about that here. We are saying we have already granted the SEC. And all we are trying to do is do the best we can to give this guy some dose that we think is fair --

DR. NETON: But you have a double standard.

MR. STIVER: So, the implication there is that we have a lower standard for commercial dose reconstruction than any other kind. So, we can't have that sort of patchwork.

DR. NETON: You can't have a double standard here.

DR. MAURO: We have two different frames of reference. In the Rocky Flats situation, it was well, listen, can we build a coworker model and if we can't, we have got to grant

the SEC. And that is the one frame of reference which is extremely important. It has been resolved and it is clean.

Now, we have a different set of circumstances where we have an SEC. We have got a bunch of people that we would like to assign some doses to and what you are saying is we are not going to assign those doses.

MR. KATZ: That context has nothing to do with it. It should not be a factor because it is, is the science good enough or is it not is the question and you can't have two standards. It won't hold up legally, either. I mean that would just be so easy to contest.

DR. MAURO: Okay. Well --

MR. BARTON: John, hold on for a second. This is Bob. I think I can kind of sum this up pretty well. I mean at the last meeting, there was a lot of discussion on this.

If Parks had been an 83.13 instead of an 83.14, then I would assume that in that SEC Evaluation Report, it would also say that external

dose isn't feasible for reasons A, B, and C. The fact that it was an 83.14 is very -- the efficiency of getting that SEC in place as soon as possible, the external wasn't evaluated and that is what we brought up last year and which NIOSH agreed to go back and look at. And they came to the conclusion that what we have is neither sufficiently accurate or necessarily bounding.

So, like I said, I think it was -- and Jim you can correct me -- if this had been an 83.13, then the ER Report would have probably said we can't reconstruct external doses either.

DR. NETON: That's correct.

MR. BARTON: So, this was a step that we asked for because it just seemed like a loose end was out there. So, the low dose was never evaluated for coworker feasibility. And it sounds like NIOSH is finding, though, that it is, in fact, infeasible, based on the stringent guidelines that have been set up for SEC Issues Work Group and are in the implementation guide.

So, I mean we asked them to look into

it and they looked into it and concluded it is not possible. And now it is sort of, I mean, it is kind of -- and that is the discussion I wanted to hear in a Work Group setting that the Work Group knows why it isn't feasible. And then they can either agree or send us all back to the drawing board or what have you. But I thought that discussion was warranted and I think we got it.

DR. MAURO: And I have got to thank everyone for allowing me to say my piece. Thank you.

MEMBER FIELD: This is Bill. I don't want to prolong the conversation but John, do you believe, I mean this is the way I am hearing it, that you can do a bounding dose based on those 118 measurements. Is that what you are saying?

DR. MAURO: Yes, I'm going to argue that someone decided in 1965 to monitor 118 people for external dose and I'm going to say -- and I will maybe do a little bit more homework and say well, let me see if I can figure out the reason why this guy decided to assign his film badge or a TLD to

118 people.

And I am going to walk away from that saying you know he probably did that based on some judgment on who he thinks he should assign it to. And usually, usually those judgments are we are sending this guy to a place where we probably should monitor him because he is probably going to get more than ten percent of the allowable exposure limit. And I think that was the correct area. So, we are going to monitor it.

So, as far as I am concerned, that is why he was picked, why these 118 were picked because these are the ones that had the greatest potential for external exposure.

So, now you have put me in the place where I need to be. That is, yes, we are looking at these subpopulation of workers that somebody made an informed judgment need to be monitored. Bingo.

Now, I have got myself a data set that represents a distribution of workers that probably were more likely than not the higher end potential

for exposure. I grab those numbers and make a distribution and I pick off the 95th percentile and I assign that dose to this guy who is not covered by the SEC but I give him that external dose so we get something to the organ of concern. That is what I would have done.

DR. NETON: Okay but John, you have got to look at the other side of the picture. Apollo Site was an 83.13 and we did evaluate external and we determined we couldn't do external doses at Apollo, primarily because they had these radium-beryllium and polonium-beryllium sources. There was no indication of monitoring. We have no indication of source-term. So, we have no idea what kind of exposures may have occurred there. And now you have a commingled data set that includes both Apollo and Parks in the same monitoring program. So, I don't know how you can argue that you have got a bounding dose, based on those 118 people.

DR. MAURO: Alright, I have to admit that argument you just made is very strong. You

are saying you can show that there are job categories where there could have been quite external exposures that were not under the 83.13, that were not monitored and that is why you granted the SEC and this group of 118 may very well have included some of those, which you are making a case that means that that 118 does not necessarily represent the bounding case.

DR. NETON: Right.

DR. MAURO: Alright, you win. Thank you, but this was good.

CHAIRMAN ANDERSON: Okay, any other? So, going back upstream on this, there are still a number of open issues here that are progressing.

DR. MAURO: Yes, I think we did the thing that I really wanted to do.

CHAIRMAN ANDERSON: We have got to -- up to number --

DR. NETON: That was a key issue, though.

CHAIRMAN ANDERSON: Oh, yes, I agree.

MR. STIVER: Yes, it really is kind of

the thread that runs through there.

CHAIRMAN ANDERSON: Yes, I mean it underscores a lot of detail.

DR. MAURO: Where we are now is there are questions that SC&A raised regarding now where you do have data and whether or not the data that you do have and how you are using that information to assign this dose to this person and these are the questions that were raised by Joe Zlotnicki -- and thank you so much for staying. I'm hoping Joe is still there and Joyce -- where we have some concerns on how they were planning to use that data to reconstruct not only internal but also external. And those are the only issues in my mind that are left.

And if we can close those out, whereby the questions we have regarding those, we are done, in my opinion. So, I think that is where we need to be now, unless someone thinks there are other things that we should do first.

MEMBER KOTELCHUCK: Hi, Dave. You referred to settled decision before. I didn't

know and have not looked at the materials regarding that decision and I would like to think more about the issue that John just agreed to.

So, I am, if you will, abstaining until I get more information and learn a little bit more. I see the arguments and I am perfectly happy to go ahead with those other findings. But if it is implied that I agree, I don't agree but I don't necessarily disagree. I feel like I need a little more information and thinking a little bit more about this issue. It was certainly the first time I have come across it.

DR. MAURO: Dr. Kotelchuck, I would be more than -- see, Jim just convinced me and, as you know, it took a lot of work but he made a case that brought him across the end zone. And anytime you would like -- Jim, certainly you could explain it better than I can -- but what did it for me to turn the corner is conceptually very simple and I would be more than happy to explain the reason why I am comfortable now. And if you would like to talk about it, I would be glad to help.

MEMBER KOTELCHUCK: Right. Right, well, I think I may wish to. And also I want to find out a little bit more from Ted about when the decision was made earlier by lawyers about what would hold up legally and what would not. And I may well be convinced on it.

But I would like a little more information and I just want to put it on the table that I don't feel fully informed to make a decision implicitly to deny compensation to the persons in this situation.

MR. KATZ: Yes, Dave, that's fine. I am happy to talk to you about the legal parts of it.

MEMBER KOTELCHUCK: Sure and maybe I will speak to both. First, I would like to speak with you, Ted, further, outside of this meeting.

MR. KATZ: Okay.

MEMBER KOTELCHUCK: We have got a lot of things to do. I don't want to hold it up.

But I don't want to imply that we are all agreed and let's go ahead. I'm not agreed but

I'm not disagreed either. Okay. So, let's go on. I mean I have said my piece.

DR. MAURO: If you like -- again, I apologize if I keep inserting myself here -- I went very carefully through the work done by Lara and Dennis Strenge and identified the findings that I believe are still at a place where a little discussion is needed. I have a little table in front of me that I use to -- and the vast majority of them, I have checked off and said okay, I think the answer has been provided and it is satisfactory. But of course, I am not the final arbiter on these matters.

MEMBER KOTELCHUCK: Right.

DR. MAURO: But some of them have been closed out already. In other words, if you go back to the transcript for the August last year, they have been closed out and that is a done deal. So, the ones that I have noted here are the ones that were not, in fact, closed out, still requires a little discussion. And if it helps, I would be glad to point out which ones those are. Or Lara,

you did all the work and I'm doing all the talking.

MEMBER KOTELCHUCK: I would like to first speak to Ted and then understand the decisions that were made previously and then maybe get back in touch with you, John. I appreciate your offer but I think we need to go ahead with talking about the findings that we have now on the table.

MR. KATZ: Alright, that is what John is trying to do. He's trying to get into the details.

MEMBER KOTELCHUCK: Okay, I appreciate that and I will be in touch with you.

DR. MAURO: And Lara, you did so much work here -- and Dennis -- to address the items that are before us now, that now that we have got this other stuff out of the way. Perhaps you folks would like to go ahead and take the lead on that.

DR. HUGHES: I certainly can. Do you want me to walk through each finding? I mean, if you want to just --

CHAIRMAN ANDERSON: Let's just go one

at a time and close down the ones we can safely --

DR. HUGHES: Yes, well the closed ones, they were closed under the condition that the change is included in the TBD revision. I have gone through the TBD revision draft and ensured that they included in one way or another now. It hasn't been issued. I realize that. But we'll just leave it at that, I guess.

DR. NETON: I guess they think it'll be in abeyance until the --

CHAIRMAN ANDERSON: Yes.

DR. HUGHES: Yes, so the first one was the open one that shows up on my list is finding number 4D, uranium inhalation recommendations.

Now, when this was initially discussed at the Work Group meeting last year, it kind of went from this issue towards this coworker model discussion that we, I think, just addressed to a certain extent. So, our response was really to this issue was that we would go and look at the feasibility of the coworker model and we have done that and we have discussed that. So, let's just

move on, if that is okay.

CHAIRMAN ANDERSON: So, four was closed --

DR. HUGHES: Yes.

CHAIRMAN ANDERSON: -- with the exception of the coworker. And we discussed that. So, four is basically done.

DR. HUGHES: Yes, the same as with number five that had something to do with the --

MR. BARTON: Lara?

DR. HUGHES: Yes?

MR. BARTON: If I might, because the finding 4 was about uranium. We are kind of just talking about external dosimetry. It -- was the same feasibility generally found and could you talk a little bit about what you guys found when you evaluated uranium specifically? Because we are talking about unmonitored workers again in coworker models.

In the external dosimetry context, could you talk a little bit about the work that was done to determine the feasibility or

infeasibility, as it seems, for uranium intakes?

MR. STIVER: This is regarding a DWE data, wasn't it?

DR. NETON: Well, they are two separate issues, really. The DWE data --

MR. STIVER: That is a part that was essentially closed out, based on the --

DR. NETON: Yes, the DWE that you have -- that infeasibility actually comes in more in finding -- is that 14 or 18? It is one of the later findings.

See I think this thing got -- these two things sort of got conflated. There was a DWE issue where we said we are not using DWE, we used GA air samples and we put a GSD of 5 on it and I think that is close.

The issue about dealing with can we do a coworker model for uranium comes down later in the findings, I think. Which one was that?

DR. HUGHES: I think it is 18.

DR. NETON: 18.

DR. HUGHES: That was the -- to come up

with a starting point for the residual period. I think that is where the air data was used.

DR. NETON: Oh, 18 was for the breathing zone air samples.

DR. HUGHES: Yes, there was an earlier where we used -- in some cases, where a worker had breathing zone data, that was used for internal and that was kind of a leftover from pre-SEC methodology in very specific cases.

And Dennis can correct me if I am wrong here because I don't actually do the dose reconstructions. There are some cases where they used a worker's individual breathing zone data to assess their internal doses.

MR. STRENGE: Yes, that is correct.

DR. MAURO: There is one more dimension to finding 4. There was a little bit of confusion related to when you talk about GA versus BZ air sampling and when you use it for operations and when you use it for residual. And I believe that this has all been resolved.

DR. NETON: Right.

DR. MAURO: I think there is agreement that the right way to go is for the residual period you have a general air data and that is the right data to use when you are going to move into the residual period.

DR. NETON: Right, that was finding 18.

DR. MAURO: I think it was a little, in my opinion, compounding of the two issues. One, a breathing zone during operation which, as you just explained is not at play for operations. But the general air aspect of this really went toward reconstruction doses during residual period. And the way in which I read the response is yes, that is the plan. The plan is to use the classic GA data that is available during operation as your starting point for the residual period. So, I think finding 4 is fine.

DR. NETON: Okay but it does -- if we did sort of devolve into this discussion on internal coworker models as part of that discussion and Lara has covered that in her paper, starting on page 13? Yes. So, I think Bob was asking about

what our opinion is on coworker for uranium.

DR. HUGHES: Okay, sorry.

DR. NETON: And maybe Lara can explain. If you want to cover that now, that is fine or we can --

DR. HUGHES: Yes, we did a similar evaluation for the internal the uranium and we are running into the same issues that we discussed for the external that we are looking at commingled data, the inability to stratify by site and also the inability to stratify by job title because we don't have -- the records we have do not include job titles. So, that is the two main drivers here. It would lead to an inability to do a coworker model for uranium. That is really it.

MR. BARTON: Okay, this is Bob. So, the state of the records were essentially the same and the same deficiencies were found for the uranium records and the external.

DR. HUGHES: That is correct.

MR. BARTON: Okay, thank you.

DR. HUGHES: Okay, shall we move on?

CHAIRMAN ANDERSON: Yes.

DR. HUGHES: Okay, number five. Okay, so finding 6, there was a discussion about the plutonium fuel grade mix that was addressed in the TBD that was used for the partial dose reconstructions. And there was a request that this was not sufficiently detailed. This was discussed in last year's Work Group meeting and SC&A has raised the issue that there might have been other possible plutonium mixes at the site that should be investigated.

We have looked into it to the extent that we have records and the update really is that we cannot -- that we do not know how to pursue this issue any further. We do not have any more data. So, what we currently have can be used to make a reasonably claimant-favorable assumption for partial dose reconstructions and anything else would be more or less speculation. Any reported plutonium bioassay can be used that is in people's records, and there really is no other information that we have. We do not expect that

any additional data capture is possible at this site. The site has been somewhat hard to work with, to put it mildly. So, we feel like we have gotten everything that we can.

CHAIRMAN ANDERSON: There is no indication of other fuels that you know of?

DR. HUGHES: There is some indications that they had various amounts or various types of fuels. We just don't quite know. And we can do a claimant-favorable assumption. I think it is stated in the TBD.

DR. OSTROW: Lara, this is Steve Ostrow. This is finding 6 that we are talking about?

DR. HUGHES: Right.

DR. OSTROW: I saw that in the past that you said that you were going to put certain things in the new Revision 3 of TBD. I just want to confirm one of the comments was that -- then you said you would do this -- provide some guidance in the TBD how the dose reconstructor is supposed to select which of these four different isotopic mixes

that you are going to be giving. So, is that correct that you are going to give some guidance in the next TBD issue of how to use this table?

DR. HUGHES: I do believe that is correct. Typically, those reconstructors are trained on use of the documents. And even if it may not be spelled out in the TBD, they usually have tools in place to use what is available, the data consistently in a claimant-favorable manner, at least --

DR. OSTROW: Well, how are we supposed to know whether the instructions that you give the dose reconstructors, the guidance, is valid if we don't see it, if it is not written in the TBD? That is one issue.

DR. HUGHES: We certainly tried to address it in the TBD. Now -- this is a little bit more of an overarching issue, but there are -- sometimes there will be details that are not in the TBD that are done. Now, that is often maybe not evident when the TBD is prepared. I don't know. I don't want to --

DR. MAURO: This is John. I might be able to help out a little bit here. In looking over Dennis and Jim's report dated May 14, 2015, on finding 6 there is a great deal of information describing just what was brought up now by Steve.

It is one of those documents that I came across as I was reviewing it. Am I correct that the guidance or the information that is contained here in great detail is the kind of information that you plan to insert into the next revision? In effect, that is sort of a preview.

DR. NETON: Yes, I think so. That was our original response, was we were going to update the table with the recently captured information.

DR. MAURO: Right. So, it is here, in theory of this is what we are going to see in the updated TBD.

MR. STIVER: And it is Table 5.3 or 5-3 of the May 2014 report. It says right there guidance will be added regarding selection of the appropriate inventory component for evaluation of internal doses based on available information,

which is what Steve was getting at.

DR. OSTROW: Yes, okay. That's what I understand. I also have a little further question.

I guess there are two cases that are considered. One is where you actually know where the worker was working and what fuels he was exposed to, so you can pick one of the four isotopic compositions that are given at Table 5-3.

The other case is where you didn't actually know where the worker was working. And in that case, I assume that the guidance is going to say okay, pick the most claimant-favorable of the mixes that you have. How is the dose reconstructor going to do that? Is he going to run different combinations of grade and agent to see which is the limiting dose for that worker where you don't have that much information? Is there going to be a worksheet that is going to go with it?

DR. HUGHES: Yes, I'm not sure there is a worksheet but that is typically how it is done,

that they would run different scenarios and pick the one that is more claimant-favorable. Although, I mean -- if Dennis will correct me. I don't usually do these. I only review them occasionally.

MR. STRENGE: Yes, that is correct. It is up to the dose reconstructor to be sure he has got the claimant-favorable for non-compensable claim.

DR. OSTROW: So, how would he do that? Would he actually run the different cases and pick the one that is the most claimant-favorable?

MR. STRENGE: Yes, he could pick a few, not a whole lot. And pretty quick, he will get an idea of what is giving you the higher dose.

DR. OSTROW: Okay and this sort of guidance will be in the new TBD?

MR. STRENGE: Yes, I believe so. It has been a while since I looked at it.

DR. OSTROW: Okay, that is basically it, then. I think this particular finding, we don't have any issues with what NIOSH is doing or

saying but we sort of have to see for ourselves when the new TBD revision comes out.

MR. KATZ: So, is this one we are saying to put in abeyance?

DR. OSTROW: I guess it is abeyance until we see the new TBD text.

MR. KATZ: Yes, thanks, Steve.

MR. STIVER: So I have a procedural question for you.

MR. KATZ: Yes.

MR. STIVER: I am assuming that when the TBD comes out, we're -- it is fair game for us to go back and --

MR. KATZ: Go look and -- yes, because before we have the whatever, the next Work Group meeting, the same with the other Site Profile review we're talking about where we have stuff in abeyance to check and see that it is in order.

DR. HUGHES: Okay, I am going to move on to finding 7. Finding 7 was regarding the MDAs for the lung counts for americium-241. The issue was that the counting method should be further

explored in order to give them credibility. NIOSH has agreed to add some additional guidance to the draft TBD and has reviewed the additional data to come up with more reasonable values. But SC&A reiterated their concerns.

During the previous discussion, Dr. Neton agreed that the MDA numbers for plutonium looked low and we agreed to further look into the issue. SC&A issued another iteration of their assessment that the MDA values for in vivo monitoring for americium-241 and plutonium-239 are not reliable, that very limited data is available, and that the low reported values for MDAs for americium-241 in vivo lung monitoring need to be further developed.

The values for plutonium-239 are not considered credible due to the fact that the 17 keV X-rays are being measured directly. We have looked somewhat more into the issue, evaluated the chest count data that was done by NUMEC. We found that many of the reported results have the MDA value reported on the result with a bioassay result.

Or if it is not detectable, it will state that it is below the MDA and it will list the MDA. The MDAs appear to be somewhat lower than what might be reported today but it would be difficult to come up with an alternate value. We just don't have any information.

Most of the measurements for NUMEC were done at the University of Pittsburgh facility, where the NUMEC in vivo program was done. It was overseen by a person who is highly regarded in the field. Can you give the name or --

DR. NETON: I would rather not give you the name.

DR. HUGHES: Alright, that's fine. So, the lower MDAs could be a result of calibration tandems used at the time.

DR. NETON: This is Jim. I kind of was involved more in this one and I basically -- I don't know how we would go back and reconstruct what the real MDAs were for that counting system at that time, rather than what we've just proposed to use the face values that were reported. I don't know

how you would go and make up a detection limit for the counting system at the University of Pittsburgh at that time.

DR. LIPSZTEIN: Jim?

DR. NETON: Yes.

DR. LIPSZTEIN: I don't know if it is worthwhile this discussion for numbers of the cancers, discussion on plutonium and americium. But if you are overestimating the counting deficiency, this is not claimant-favorable. Right?

DR. NETON: I agree with that but I don't know how we would come up with any other way to change it. I know what -- we know what the detection limits are for various systems but it depends, of course, as you know, on the background of the counter, how long the counting time was, type of detector, the geometry that was used to do the lung measurement. You know, I don't think we can just pick a number and say okay, the detection limit is 100 nanocuries or something like that for plutonium.

So, I think as a partial dose reconstruction goes, it is claimant-favorable -- not favorable but it's a partial dose reconstruction to use the data as it was reported. And again, I don't know that it is going to make any big difference in compensation but we really can't -- that is really not a valid reason not to do something.

DR. LIPSZTEIN: Yes.

DR. NETON: So, our position is that we are going to use the values. Because again, I looked at the setup and I don't know how we come up with some other number. If it says it was a positive 15 nanocuries, that is what we will use.

DR. LIPSZTEIN: Yes. That is if you use the ---

(Simultaneous speaking.)

DR. NETON: That was the other point I was going to make is I'm not sure how often the lung counting would be used versus the urine data. And maybe in this case, it may be appropriate just to say we wouldn't use the counter data.

Again, I think if the counter showed a positive value -- I don't know. I would have to go look at the monitoring records for plutonium. Although, we are not doing internal dosimetry. We don't have a coworker model. So, it is a difficult situation. I'm not sure how to get out of it. That is how we ended up where we were. We just would use the values, even acknowledging that detection limits would be reported somewhat differently today. But there is no way to -- I don't know of any way to figure that out.

The other alternative is to just not to use them at all, to say that they are not sufficiently accurate. But since we have a reported value --- yeah.

DR. HUGHES: Anybody else? Anything to add? Okay, shall we move on --

CHAIRMAN ANDERSON: Yes.

DR. HUGHES: -- to the next finding?

CHAIRMAN ANDERSON: Yes. Let's move on.

DR. HUGHES: The next finding was this

finding 11, which is also related to the in vivo counts. That is the one that the next finding that is listed as open on my list.

MR. KATZ: Can I just get clarification, though? So, finding 7, what are we doing? Is that closed at this point?

DR. NETON: Well, I don't know. I mean --

MR. KATZ: What does the Work Group want to do with that situation?

CHAIRMAN ANDERSON: Are we going to come to any close agreement on it? Probably not.

Guys on the phone, you have thoughts?

DR. LIPSZTEIN: You are talking about 11?

MR. KATZ: Seven. Back to seven, Joyce.

DR. LIPSZTEIN: Oh, go back to seven?

MR. KATZ: So the just question -- so I just asked the Work Group, given the discussion what do they want to do with that finding. I mean you have three choices. You can leave it in

progress. You can close it. But if you leave it in progress, then you need a path forward to be able to close it.

CHAIRMAN ANDERSON: Now, I don't know if we have a path forward. I mean I don't feel that strongly about it. I mean I think we have had a good discussion about it. So, I am prepared to --

MR. KATZ: To close it?

CHAIRMAN ANDERSON: -- close it. Yes.

MR. KATZ: So, in effect, you are saying you basically agree with NIOSH's approach that they will handle it.

MEMBER KOTELCHUCK: This is Dave. I also agree with the NIOSH approach and I am willing to close it.

MR. KATZ: And Bill?

DR. LIPSZTEIN: The only thing we have to note is that it is not claimant-favorable. The other option is to use only urine and feces bioassays. But I agree with Jim that for a number of these cancers, I don't know how important this discussion is on the dose detection.

If there is some positive data, then -- but if it is -- I don't know. It is non-claimant-favorable but, at the same time, I don't think it makes any difference.

MEMBER KOTELCHUCK: Well, I don't --

DR. LIPSZTEIN: For the -- you know for numbers on the cancers.

MEMBER KOTELCHUCK: I don't see that it is not claimant-favorable. It may not be. I will put it this way. It looks to me as if you don't have an alternative -- there's no real alternative. And I don't think what you are saying is --

CHAIRMAN ANDERSON: It is as good as it is going to be. And NIOSH is aware of the issue, so somebody looking at an individual case --

DR. LIPSZTEIN: You can either use urine or feces bioassay. And NIOSH came to the conclusion that was the problem was with the -- it overestimates the deficiency. When you overestimate the deficiency, you get a lower detection limit and then you are really having a number that doesn't really mean anything. And it

is not claimant-favorable because if you had a higher MDA, then you had a higher dose.

MEMBER KOTELCHUCK: And you can determine that. I mean you can look at the urine bioassay.

DR. LIPSZTEIN: I don't know what, for each individual case --

DR. NETON: I think, Joyce, if we had your urine bioassay, in this case I would agree with you that we should use that over the in vivo count. But if all we have is an in vivo count, then I think we would have to use it. There is no other way to do that. Right?

DR. LIPSZTEIN: It is a knowing that it is not claimant-favorable.

DR. NETON: What else would you do, though?

MR. KATZ: It is claimant-favorable because there is a lack of an alternative. So, it is the most claimant-favorable thing you can do.

DR. NETON: The alternative is not to use it and say we can't use it because it is not

claimant-favorable.

DR. LIPSZTEIN: And also if you are using variations for plutonium, you have to know the age and flow rate.

DR. NETON: Exactly.

DR. LIPSZTEIN: Which is something that you also don't know exactly from the discussion on finding 6.

DR. NETON: Right. Yes, it is a tough issue. We are dealing with non-presumptive cancers and, again, partial dose reconstructions.

DR. LIPSZTEIN: Yes.

MEMBER KOTELCHUCK: Well, I'm comfortable with closing.

DR. LIPSZTEIN: Okay.

CHAIRMAN ANDERSON: Okay, so be it. It is closed. We can always come back and discuss it because we are not going to close the whole thing out. Okay, 11.

DR. HUGHES: Okay, this is also related to the in vivo counts. This is regarding the Helgeson Company-provided chest count data. And

there was an issue that when Helgeson did counts at other sites, it was determined that there was -- the counts for uranium were biased high and represented false positives. This affected the data at the Pantex Plant.

We found Helgeson did a few instances where they provided in vivo counts for NUMEC. So, we looked into it a little more. NUMEC used the Helgeson mobile whole body counter for plutonium and americium counts mostly. In the few instances where they did the pre-enriched uranium or for uranium-235, the MDA reported for uranium-235 in 1968 is 18 micrograms. But NUMEC did merge with the whole body counts at the low-level radiation monitoring facility at the University of Pittsburgh, which there is many more counts.

So, we have these two -- but we have two sets of data for in vivo. We have some that were done by Helgeson, some that were done by University of Pittsburgh and they typically have different MDA values reported. So, that is the reason why we see these different values. The reported value at the

University of Pittsburgh was 63 milligrams for uranium-235. So, we could certainly clarify that in the TBD. I don't think it is spelled out in that much detail.

The issue with Pantex was that the counts for uranium were biased high and represented false positives. It has been done at the -- the Pantex TBD has eliminated all references to Helgeson in vivo counts because it was determined that they are not reliable and can't be used.

In this case for NUMEC, if they were used, it would not be to the detriment of the claimant, since it would produce a positive bias. And there is really -- again, we are at the point where we can either use this data or we cannot use it, if it is available for a claimant.

And that is pretty much where we are at. There is not really a correction factor or anything we can develop for this, that I am aware of, aside from determining that we shouldn't be using it for an unpresumptive claim. This is where we are.

CHAIRMAN ANDERSON: So, yes.

MR. STIVER: Joyce, would you like to weigh in on that?

DR. LIPSZTEIN: Yes, I am here. I think this is exactly the opposite of seven. I think the counting is not reliable but, in this case, it is claimant-favorable and it is non-presumptive cancers also. For me, it is good. So, it is okay. This is better than seven.

CHAIRMAN ANDERSON: Okay. So, we can close it out?

DR. LIPSZTEIN: Yes, because it is claimant-favorable, even if it is a false positive.

CHAIRMAN ANDERSON: Yes. Okay?

MEMBER KOTELCHUCK: Okay.

CHAIRMAN ANDERSON: Closed, it is. Not happily, but closed. The best we could do, again. Okay, next.

DR. HUGHES: Okay, finding 12. This is regarding Table 6-2 in the TBD. Is that right?

There was an issue regarding the table and the associated text in Table 6.3.2 of the Site Profile because there was some oversights and

inconsistencies or errors.

This was discussed last year and we provided a response and a little bit more detail, as we were reading and there were still some inconsistencies and they elaborated that more information, essentially, was needed how data from the neutron detection devices will be used to reconstruct neutron doses. There is an issue regarding the different descriptions of the dosimeters in the TBD.

We believe the guidance during the TBD revision process and when discussing with ORAU, the consensus was the available guidance is suitable for assigning neutron doses for partial dose reconstructions. And if SC&A has any more questions regarding the details, we have to -- the dose reconstructors on the phone. So, we can certainly clarify that. But at this point in the TBD we can't really find anything that is an error.

Now, there is different dosimeters listed for different time periods and this is the detail that is in some of those tables has been

extracted from various documents. It doesn't necessarily show up in a worker's file. So, if you see a neutron reading, you don't necessarily know. You would kind of have to make assumptions.

So, I'm not really sure how the neutron dose is assigned in cases. Now we also have the neutron/photon ratio that can be used. I think this is regarding TBDs -- TLDs. I'm sorry. This was effectively their period. So, I mean if you have any outstanding questions, we can discuss them now.

MR. STIVER: Yes, Joe, are you still on the line?

MR. ZLOTNICKI: Yes, I am. This is Joe Zlotnicki, SC&A.

Yes, I think one of the issues was just that there was an inconsistency between the table and the TBD and the text. And in one place, it indicated that something did not have -- for a particular time period, that a dosimeter did not have a neutron capability, whereas, the table indicated that it did.

So, again, it may be that the individual bios for the workers have all this clarified but in the TBD, I have to go on that. The Z badge from Landauer does contain a CR-39 neutron detector. And it was just a case of clarifying whether the table or the text were correct for the period of interest.

So, as far as I know, that is still an open issue. It may just be more of a typo and clarification that they just need to agree with each other. Was it a Z badge? If so, there was neutron for that period.

And then there was a second area which related to the mention of thermal neutron dosimetry but no indication as to how that was done. One would assume that it was a cadmium filter in a film badge but it didn't mention it. So, those were the two sort of specific sort of basic facts about the neutron dosimetry for a couple of time windows.

DR. HUGHES: Right. Dennis, do you have anything to add regarding to that? Because I have not seen any resolution.

MR. STRENGE: No. Basically, when we do dose reconstruction, we see what doses are given and apply the correction factors, ICRP-60 certain factors and do the calculations. The calculations are pretty straightforward.

MR. ZLOTNICKI: You see from my point of view, I am only seeing the TBD. So, I can't judge whether or not you can reconstruct doses, given what is being described if I can't be assured that what is said there is accurate.

But maybe in this case, you actually have more information than was claimed in the TBD for a period of time for neutron. But as you said, in the actual file for the worker, you have got what you have got. But I don't see the individual files so it is hard for me to know, especially in this case on the thermal what is going on.

MR. STRENGE: Right, we very seldom see an entry for thermal dose. In fact, for NUMEC, I don't remember seeing anything for thermal.

MR. ZLOTNICKI: Me either. That is unusual.

MR. STRENGE: We picked them out of the neutrons and applied the energy spectrums according to one of the other tables in the TBD.

DR. NETON: Well, I guess what we need to clarify is Table 6-2 says they used Z badges and it says that they were used for beta-gamma. Do we have neutron doses for the CR-39 component for the Z badges, I mean in that era?

MR. ZLOTNICKI: Exactly, that is the question.

DR. NETON: It seems like we need to answer the question. I don't think we have done that here. Maybe we misunderstood the question. I haven't reviewed this real thoroughly in a while.

MR. STRENGE: Well, we seldom know what type of badge was used from the records. They just say neutron dose and here it is. And very seldom do we know what dosimetry was used. Once in a while they will say TLD.

MR. ZLOTNICKI: Are you suggesting you don't have the raw -- in this case this is a Landauer dosimeter. Are you saying you don't have the

Landauer dosimetry report for that period in general?

MR. STRENGE: Well, quite often we have Landauer reports and they have one line -- if the worker had beta-gamma, we will have a line of dose values for that. If they were also assigned a neutron dosimeter, there will be a second line with a neutron results.

MR. ZLOTNICKI: Yes, but does it tell them on the report that indicates the type of badge that was assigned to the individual for every reporting period?

MR. STRENGE: I believe it is like one or two or three and that is just saying beta-gamma, I think, versus neutron. I would have to look at the -- I have got --

(Simultaneous speaking.)

MR. ZLOTNICKI: It is also important if you have the original reports, it is there. Obviously, if someone has translated that into a database for the facility, then obviously, I have no idea what they do there.

MR. STRENGE: Okay. Anyway --

DR. NETON: I think, Joe, we need to go back and take a look at this a little closer and clarify what was used when and for what purpose.

MR. ZLOTNICKI: Right. And by the way, getting back to the earlier -- I don't want to resurface the earlier discussion with John that went on at the beginning of this section but, clearly, in looking at the intent of the RSO and so on, if some people were given badges with neutron dosimeters in them and some were not, that gives some indication of at least what was in the mind of the RSO at the time that occurred, rather than everyone getting the same type of dosimeter.

DR. NETON: Right.

MR. STRENGE: Yes, the Landauer reports seem to imply that there was actually two dosimeters, physically separate but I am not positive on that.

MR. ZLOTNICKI: The Z dosimeter, there is a TLD component to it and a CR-39 component but they are both held in the same holder.

MR. STRENGE: Okay.

MR. SMITH: This is Matt Smith with ORAU Team. The other thing that is in the mix is the TBD revision itself. What has just been discussed with the differences between table and text I believe was part of our internal comments on squaring things up. Regarding the Z-1 dosimeter, again, my thought is that we are going towards an N/P ratio on that front but we can leave that to the next issue.

MR. ZLOTNICKI: Yes. So, my suggestion is that obviously I haven't seen the new revision and you may have cleaned it up in terms of the ticking of time between the tables and the text. To me, that just has to be in abeyance.

CHAIRMAN ANDERSON: Okay.

MR. SMITH: I'll take notes on this again and we will revisit it.

CHAIRMAN ANDERSON: Okay. Okay, moving along.

DR. HUGHES: Okay. This is finding 13.

CHAIRMAN ANDERSON: Yes.

DR. HUGHES: This was --

CHAIRMAN ANDERSON: So this is part of the coworker model.

DR. HUGHES: Yes, this is part of the coworker discussion.

DR. NETON: I agree we have had that discussion.

CHAIRMAN ANDERSON: We don't need to rehash that.

DR. MAURO: Oh, you don't want to talk about that again?

CHAIRMAN ANDERSON: No.

MR. STIVER: Are you ready for round two, John?

CHAIRMAN ANDERSON: Okay, 14.

DR. HUGHES: Fourteen is the discussion of the adjustment factors for NTA film. We decided we could come up with a somewhat rudimentary neutron/photon approach that can be used. It has already been reviewed by SC&A and has found that it is not comprehensive or robust and

that we should come up with a more bounding approach.

We have reviewed it and due to the limited data, we really have not developed anything else for now just because we don't have any more data. That is all we have really.

MR. ZLOTNICKI: Yes, this is Joe Zlotnicki here. Leaving the coworker SEC thing aside for a minute and just looking at even a given individual, I think it is very, very difficult to have an N/P ratio for some areas of the facilities, such as someone who works with polonium-beryllium or radium-beryllium sources in shielded or unshielded condition.

The enormous variation in the ratio of the gamma to neutron that you would see in that situation with some of them being much more energetic gamma emitters, that is a very complicated thing because your ratios are going to be vastly different. And unless you have some indication of what the person was working with.

So, in other words, it may be that in

certain areas that they are just in general plant areas and there is a normal background from uranium and neutron, it may be plausible, particularly anyone working with shielded and unshielded, especially gamma shielded and unshielded neutron sources, you can have vast spectral differences or ratio differences between the two.

DR. NETON: This is Jim. If someone could refresh my memory. Is it a strict constant ratio that we applied or is it a distribution with a central tendency and uncertainty associated with it?

MR. SMITH: This is Matt Smith with ORAU Team. There is kind of a general factor which has a geometric mean and GSD; another factor that is aimed at glove box workers, again, with a GM and GSD; and then a single factor that is aimed at folks that did work with the neutron sources. And you know it is based on a combination of photon measurement and neutron calculation.

DR. NETON: Right.

MR. SMITH: And that one is at 2.3.

DR. NETON: Okay, what are the GSDs on these values?

MR. SMITH: It's 0.3 for in a general area, a factor of one for the glove box workers.

DR. NETON: But I mean the GSD on them is?

MR. SMITH: Oh, I'm sorry. The GSD in both cases is 1.5 to 2.0.

DR. NETON: Okay.

DR. MAURO: This is John. Is the write-up of finding 14 in Dennis' work is basically that answer? In other words, does that material, in effect, answer the question? Is that what it is there for?

DR. NETON: I don't know. I was trying to get at the idea that we don't normally assign a constant value as an N/P ratio.

DR. MAURO: And there isn't.

DR. NETON: And we have a distribution value. So, I understand Joe's concern but I think we have tried to address that by incorporating uncertainty in there, in the use of those values.

DR. MAURO: Well, I only reason I pointed this out is that it appears that considerable work went into Dennis' work on finding 14. It lays out what the neutron/photon ratios are for different circumstances. And there is a statement that said this approach will be included in the Site Profile. So, I am assuming that that write-up is, in fact, the write-up we will probably see in the next Site Profile.

DR. HUGHES: Yes.

DR. NETON: I would suspect so, yes.

MR. STRENGE: Yes, what Matt just outlined is in the revised TBD.

DR. NETON: Okay.

CHAIRMAN ANDERSON: So, do we put this one in abeyance until it is final or is it closed?

MR. KATZ: Sounds like you want to look at that one.

CHAIRMAN ANDERSON: Yes, I think so. Sixteen is coworker model. Seventeen was previously closed.

MEMBER FIELD: Fifteen, I think is --

CHAIRMAN ANDERSON: Oh, 15, yes.

DR. HUGHES: I wasn't going to interrupt you.

CHAIRMAN ANDERSON: No, I'm sorry, 15. I was on the wrong page for abeyance here. Okay, 15.

DR. HUGHES: This is regarding different photon energies regarding operations at NUMEC would indicate the need for possible adjustment factors for film badge dosimeter readings.

This was discussed last year and then it did remain open and stated that it needs to be revised for potential over- and under-responses. There was some guidance that we initially provided that was added to the TBD. That is really all we did. The guidance, except, we assigned doses a certain way, so less than 30 keV photons. And that is really it. So, any additional questions, we can answer.

CHAIRMAN ANDERSON: So, is there additional review going on?

DR. HUGHES: No, we reviewed what we have and then we cannot do any additional data capture. We haven't found any information. There was an attempt to come up with some adjustment factors by the NUMEC HP at the time. I think it was from 1965 thereabouts. But other than that, we really haven't found any other information.

MR. ZLOTNICKI: This is Joe again. I think that this is talking about we don't know the format of the dosimeter, how thick the coating or covering layers were on the dosimeter.

In some places -- in some industrial settings, it was quite common to bag the dosimeter, even in some undetermined thickness of plastic to protect it from just the dirty industrial environment. That means we don't really know how much of the very low-energy photon or beta was being absorbed.

My suggestion would be if you don't know, you could bound that by looking at all the sites of the worst case and just say assume it was that if you don't know and then apply the

appropriate adjustment factor for that thickness of whatever type of plastic would likely -- probably vinyl in those days -- would have been used to coat the badge.

MR. SMITH: This is Matt Smith with ORAU Team. To address this, what we suggested and what is in the revised TBD, again for a further look down the road, is going with an approach that we used with Savannah River, which is to go ahead and use the open window value to determine the less than 30 keV photons.

I can't speak right now today to whether or not bagging was done at this facility. I am certainly not aware of that process being done. Certainly in the film era, we see or know that we have got a certain amount of over-response going on in that, oh, I will say 70 to 100 keV range. I realize we have got some low-energy X-rays and a 60 keV for americium. But there is also over-response going on that is working, in a sense, in the favor of what we are trying to do.

We felt this was a pretty favorable

approach to take to account for any low-energy photon dose that wasn't being captured by what we usually would call the deep dose component.

MR. ZLOTNICKI: That's what is written up in the revised TBD, right?

MR. SMITH: Yes, that is the approach. It is discussed in the paper put together by Dennis from 2015. That is the one that is dated May 14, 2015. Now, that is another change bound for the revised TBD.

MR. ZLOTNICKI: This is Joe again. I think that, again, we should probably just look at what is actually stated. It sounds reasonable for photon. I don't remember off the top of my head if there was any beta issue or not at this site.

MR. SMITH: You know in this site, I believe we are looking at protactinium electrons. So, we are talking about pretty high-energy electrons, source-term as well. I believe using that open window would give me a pretty good read on what is there.

MR. ZLOTNICKI: If it wasn't covered

up. One of the questions was what adjustment factor should be used compared with the calibration of the device. And obviously, we don't know and, depending on which era we are talking about, we don't know what the open window covering was and whether or not there should be a correction with protactinium. It depends on whether they calibrated with the depleted uranium or whatever.

So, certainly, if it was pouched, there would need to be a correction factor, which, by the sound of it, we don't have good records as to what would have been done.

So, again, the only thing one can do is assume there was a pouch, assume it wasn't corrected for and just apply whatever that correction factor would be for the beta of interest.

CHAIRMAN ANDERSON: Other comments?

MEMBER KOTELCHUCK: No.

MR. KATZ: Well, does NIOSH agree with that approach?

CHAIRMAN ANDERSON: Could you just

summarize it again, quick?

MR. SMITH: From ORAU's side?

CHAIRMAN ANDERSON: Yes.

MR. SMITH: From ORAU's side, again, we are taking an approach and I'm sorry I was trying to get it pulled up but it is online in one of the Savannah River Technical Information Bulletins. It is either number six or number seven, I believe. And I will try to grab that, while we have discussions on other issues.

But the approach that we are recommending here is similar or the same as what we did with Savannah River during the film era, which is to go ahead and use the open window value determination of low-energy photons and electrons. In other words, all non-penetrating radiation.

We believe it is likely favorable on the low-energy photon front because we know there is some film over-response in the 100 keV range. And we also feel it is likely accurate for the electron source term because we are dealing with relatively high energy electron sources. I think we are in

the 2 MeV range.

Do we have data on what the thicknesses are for the open window and/or was there bagging? I don't have any knowledge on bagging and Dennis you can weigh in if you have seen anything mentioned in the material you have read through.

MR. STRENGE: No, I haven't.

MR. SMITH: Same material. Okay. And on the dosimeter design, I have not seen a schematic on these. So, I'm not really in a good position to weigh in right now on what the covered thicknesses were. Certainly, I wouldn't think they would be any more different than what we were seeing with Savannah River. And that is all I have got.

DR. NETON: I mean that sounds reasonable to me. I don't know if SC&A agrees with that approach or not.

MR. STIVER: What do you think, Joe?

MR. ZLOTNICKI: Unfortunately, I haven't looked at that Savannah River document or if I have, it was five years ago or something. So,

I would need to look at that. I mean it sounds reasonable but I haven't looked at the approach so I can't give a definitive answer.

DR. NETON: I think we need to hold that one in progress.

CHAIRMAN ANDERSON: Yes, let's keep that in progress, abeyance.

DR. NETON: And maybe Matt can identify the section of the Savannah River document that we could look at.

CHAIRMAN ANDERSON: Yes, it seems probably the best we could do but let's -- let's just confirm that before we close it out.

MR. SMITH: Yes, I will get you the TIB number here shortly.

CHAIRMAN ANDERSON: Okay.

DR. NETON: Okay, great.

CHAIRMAN ANDERSON: So, sixteen.

DR. HUGHES: Again, that is the coworker model.

CHAIRMAN ANDERSON: That is the coworker.

DR. HUGHES: Everything else is residual period.

CHAIRMAN ANDERSON: Yes.

DR. NETON: Eighteen -- seventeen is closed.

MR. KATZ: Seventeen was the same, coworker?

DR. NETON: No, no, 17 was --

CHAIRMAN ANDERSON: No, 17 was closed.

DR. NETON: And 18 is that GA/BZ thing which was already discussed.

DR. HUGHES: That has been revised.

CHAIRMAN ANDERSON: Yes, 19 is closed, 20 is closed, 21 is closed. And then there is all of these dose reconstruction, which we have discussed coworker models.

MR. STIVER: Maybe summarize what is on the agenda for going forward, then?

CHAIRMAN ANDERSON: Yes. Go ahead, summarize it.

MR. KATZ: What's on the agenda for what?

MR. STIVER: Going forward -- path forward. Kind of summarize it, since you have got it all.

CHAIRMAN ANDERSON: We have 12 we put in abeyance. We have here 14 and --

MR. KATZ: But 12 is really in progress, I think. We said in abeyance but it is really in progress.

CHAIRMAN ANDERSON: Okay, that's fine.

MR. KATZ: Fourteen was in abeyance.

CHAIRMAN ANDERSON: Fifteen we had in progress. And I think everything else is closed.

MR. STIVER: Six was in abeyance, too.

CHAIRMAN ANDERSON: Was it?

MR. KATZ: Finding 6 is in abeyance, yes.

CHAIRMAN ANDERSON: Yes.

MR. KATZ: And I don't think anything sits with SC&A.

CHAIRMAN ANDERSON: No.

MR. KATZ: If it is in abeyance, it all sits with NIOSH. And then in progress is with

NIOSH, too.

DR. NETON: Well, I think the last one we just talked about, the photon open window issue, SC&A may want to look at that, too.

MR. KATZ: Right.

CHAIRMAN ANDERSON: Yes, look at Savannah River.

DR. NETON: Look at Savannah River, too, and talk about the open window approach.

(Simultaneous speaking.)

MR. KATZ: Right, Matt was going to send the reference.

MR. SMITH: This is Matt again with ORAU Team. It is OCAS-TIB number 6. This is from 2007. I will put a caveat on it. As everyone knows, Savannah River was one of the first sites out of the gate and a lot of things changed, as we rolled along. You will see the general method is described just previously in section 3 of that TIB.

But just be aware that there are some Savannah River-specific correction factors there that are mentioned that would not necessarily apply

to NUMEC. Really, it is a correction factor relating to the HP(10) quantity. And Joe, he will know what is going on there.

But there will likely be more questions but the general method is given there in Section 3.

CHAIRMAN ANDERSON: Okay, very good. Okay and then we have the coworker I think we've --

MR. KATZ: Killed that.

CHAIRMAN ANDERSON: -- discussed and --

MR. KATZ: Beat it to death.

CHAIRMAN ANDERSON: -- hopefully, we are resolved enough on it.

DR. NETON: I think Dr. Kotelchuck is still wanted to --

MEMBER KOTELCHUCK: Yes, I will check it out. I will check it out further and try to understand a little bit more.

CHAIRMAN ANDERSON: Yes, the historic perspective on it.

MR. KATZ: So, do you want to leave all those in progress then, or you -- as a Work Group, or are they closed?

CHAIRMAN ANDERSON: My sense would be to be closed. I mean I am getting up to speed for Dave on what is in the past and the issue of what do you do with individuals who do not -- who would be an SEC, other than --

MR. STIVER: Well, that is more of a generalized --

CHAIRMAN ANDERSON: That is a generalized discussion.

MEMBER KOTELCHUCK: You know there is no reason -- we don't have to be unanimous. If the other folks want to close it and I will just abstain, that's fine, for the moment.

That is okay and I will learn more and if it ever comes back before the Board or before this committee, I will be better prepared to move ahead.

MR. KATZ: Okay.

CHAIRMAN ANDERSON: That's fine. We

just want to be sure you could get the information.

MEMBER KOTELCHUCK: You are not doing it over my objection. Put it that way.

CHAIRMAN ANDERSON: Yes, good. Thank you.

MR. KATZ: Okay, so anyway, we have a few items from NUMEC that will be on the agenda next time we meet, next time the Work Group meets, but you guys took care of a lot of work today.

DR. NETON: Yes, it was a very good discussion.

MR. STIVER: We made a lot of progress today.

CHAIRMAN ANDERSON: Any other issues, people have --

MEMBER KOTELCHUCK: No.

CHAIRMAN ANDERSON: -- before we break for lunch at least?

Adjourn

MR. KATZ: Yes, we are adjourning.

CHAIRMAN ANDERSON: We are adjourning.

MR. KATZ: Thank you, everybody.

(Whereupon, the above-entitled matter went off the record at 1:02 p.m.)